Marian Meadows
Planned Unit Development and Subdivision

Draft Environmental Impact Statement

FROM THE CASCADES . . . TO THE COLUMBIA
KITTITAS COUNTY

Community Development Services

February 2010

Parametrix

February 16, 2010

Dear Interested Party

The Draft Environmental Impact Statement (DEIS) for the Marian Meadows proposal east of the community of Easton is attached.

This DEIS addresses several alternatives for development of approximately one square mile of land, including the applicant's Planned Unit Development (PUD) proposal for up to 449 units as well as alternatives including a variety of lot sizes and configurations ranging from 147 lots to 449 units.

The alternatives discussed, as well as the Elements of the Environment addressed were determined as a result of a public scoping process from April to October, 2007.

The purpose of public review of the DEIS is to ensure a complete and accurate record of the potential environmental impacts of the proposal as well as the appropriateness of alternatives and mitigating measures.

A separate review process on the proposed PUD will be scheduled before the Kittitas County Hearing Examiner after issuance of the Final EIS.

A Public Hearing will be held to invite verbal comments on adequacy of the DEIS.

March 17, 2010 6:30 PM
Easton Public School Multi-Use Room
893 Railroad Street
Easton, WA 98925

Comments on the DEIS must be received by **5 PM, April 2, 2010** and must be addressed to:

Kittitas County Community Development Services
411 N. Ruby Street, Suite 2
Ellensburg, WA 98962

Comments also may be submitted by email to: MarianDEIS@co.kittitas.wa.us

Questions may be addressed to: Dan Valoff, Planner 509- 962-7506

Marian Meadows

Planned Unit Development and Subdivision

Draft Environmental Impact Statement

Prepared for:
Kittitas County
Community Development Services
411 N. Ruby Street, Suite 2
Ellensburg, WA 98962

Prepared by:
Parametrix Inc.
411 108th Ave NE, Suite 1200
Bellevue, WA 98004

February, 2010

Fact Sheet

TITLE	**Marian Meadows Planned Unit Development and Subdivision** **Draft Environmental Impact Statement**
DESCRIPTION OF PROPOSAL AND ALTERNATIVES	**Alternative 1: The applicant's proposal** on a 520-acre site consists of two elements: • A rezone of the property to the Planned Unit Development (PUD) zoning district as provided by Chapter 17.36 of the Kittitas County zoning code. The PUD provisions allow development at up to three times the underlying zoning density or a total of up to 443 units. • A preliminary plat covering the western one-third of the property (about 120 acres) that is proposed to be divided into 225 lots of approximately 0.5 acre each. **Alternative 2:** This alternative consists of a PUD on the westerly third of the site with 443 units including multi-family units. This alternative generally meets the goals of the applicant. **Other Alternatives** include: **Alternative 3: The No Action Alternative** consists of a subdivision into 3-acre lots in accordance with the R-3 zoning district standards which results in 147 lots. **The Mitigated Alternatives** include specific measures to reduce impacts. **Alternative 4:** This alternative includes development on both the westerly and easterly portions of the site. **Alternative 5:** This alternative includes development only on the westerly portion of the site.
PROPONENT	Easton Ridge Land Company 103 South Second Street PO Box 687 Roslyn, WA 98941 509-649-2211
DATE OF IMPLEMENTATION	Build-out would occur by about 2015.
LEAD AGENCY	Kittitas County Community Development Services 411 N. Ruby Street, Suite 2 Ellensburg, WA 98962
RESPONSIBLE OFFICIAL	Kirk Holmes, Kittitas County Interim Planning Director

FACT SHEET (continued)

CONTACT PERSONS	Dan Valof, Senior Planner 509- 962-7506
LICENSES, PERMITS, AND APPROVALS POTENTIALLY REQUIRED	Kittitas County: Planned Unit Development Rezone Approval Preliminary and Final Plat Approval Master Drainage Plan Approval Environmentally Critical Area Modification Approval Road Improvement Plan Approval Right-of-way Permit for Utility Construction Clearing and Grading Permit(s) Fire Marshal Hydrant Permit Approval Agreement to Locate Utilities (Franchise) Development Agreement (optional) Washington State Department of Ecology: Wastewater Treatment Facility Design Approval Recycled water application permit National Pollutant Discharge Elimination System (NPDES) Permit Washington State Department of Health: Water System Expansion Design Approval Recycled Water Application Permit Washington State Department of Fish and Wildlife: Hydraulic Project Approval Washington State Department of Natural Resources: Forest Practices Permit
AUTHORS AND PRINCIPAL CONTRIBUTORS	Kittitas County Community Development Services 411 N. Ruby Street, Suite 2 Ellensburg, WA 98962 (509) 962-7506 *EIS Review and Approval* Parametrix Inc. 411 108th Avenue NE Suite 1800 Bellevue, WA 98004 (425) 458-6200 *EIS Preparation* Pacific Groundwater Group 1627 Linwood Ave SW Tumwater, WA 98523 Linton Wildrick, LHG *Geology and Groundwater* Earth Systems/Bruce Stoker 19729 207th Ave SE Monroe, WA 98272 *Geologic Hazards*
DATE OF ISSUE OF DRAFT EIS	February 16, 2010
DATE AND LOCATION OF HEARING ON DRAFT EIS	March 17, 2010 6:30PM Easton Public School Multi-Use Room 893 Railroad Street Easton, WA 98925

DATE COMMENTS ARE DUE ON DRAFT EIS	April 2, 2010 Submit to Kittitas County Community Development Services 411 N. Ruby Street, Suite 2 Ellensburg, WA 98962 Or via Email to: MarianDEIS@co.kittitas.wa.us
LOCATION OF BACKGROUND INFORMATION	Kittitas County Community Development Services 411 N. Ruby Street, Suite 2 Ellensburg, WA 98962
AVAILABILITY OF DRAFT EIS TO THE PUBLIC	Kittitas County Community Development Services Easton School Library City of Cle Elum Library

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Acronyms and Abbreviations

ac-ft	acre-feet
ADT	average daily traffic
AKART	all known, available, and reasonable methods of prevention, control, and treatment
ATV	all-terrain vehicle
BNSF	Burlington Northern Santa Fe
BOD	biological oxygen demand
BPA	Bonneville Power Administration
BST	bituminous surface treatment
°C	degrees Celsius
CDP	Census Designated Place
CEA	Connectivity Emphasis Area
CF	Commercial Forest
CFR	Code of Federal Regulations
cfs	cubic feet per second
CPSE	Center for Public Safety Excellence, Inc.
CWPP	Community Wildlife Protection Plan
dB	decibel
dBA	A-weighted decibel
DEIS	Draft Environmental Impact Statement
DNR	Washington State Department of Natural Resources
DOH	Department of Health
DSL	digital subscriber line
Ecology	Washington State Department of Ecology
EDNA	environmental designation for noise abatement
EIS	Environmental Impact Statement
EMF	electromagnetic field
EMS	emergency medical service
EMT	Emergency Medical Technician
EPA	U.S. Environmental Protection Agency
ERU	equivalent residential unit
ESA	Endangered Species Act
°F	degrees Fahrenheit
FAR	Federal Aviation Regulations
FCC	Federal Communications Commission
FERC	Federal Energy Regulatory Commission

ACRONYMS AND ABBREVIATIONS (continued)

FR	Forest and Range
FSRS	Fire Suppression Rating Schedule
FTE	full-time equivalent
GMA	Growth Management Act
gpd	gallons per day
gpm	gallons per minute
GPO	goals, policies, and objectives
HCM	Highway Capacity Manual
HUC	Hydraulic Unit Code
IFC	International Fire Code
ITE	Institute of Transportation Engineers
I-90	Interstate 90
in./yr	inches per year
ISO	Insurance Service Organization
KCC	Kittitas County Code
kV	kilovolt
LOS	level of service
Lt.	Lieutenant
MBR	membrane bioreactors
MOU	Memorandum of Understanding
mph	miles per hour
$MTCO_2E$	metric ton carbon dioxide equivalent
NAAQS	National Ambient Air Quality Standards
NPDES	National Pollutant Discharge Elimination System
NRPA	National Recreation and Park Association
NTSB	National Transportation Safety Board
NTU	nephelometric turbidity unit
NWI	National Wetlands Inventory
OAHP	Office of Archaeological and Historical Preservation
OHWM	ordinary high water mark
OSPI	Office of the Superintendent of Public Instruction
OSS	on-site sewage systems
PM	particulate matter
PPC	Public Protection Classification
PSE	Puget Sound Energy
PUD	planned unit development
R-3	rural 3

ACRONYMS AND ABBREVIATIONS (continued)

RCW	Revised Code of Washington
SBR	sequencing batch reactor
SCF	Straight Creek Fault
SEPA	Washington State Environmental Policy Act
SPCC	Spill Prevention, Control and Countermeasure (Plan)
SPI	State Superintendent of Public Instruction
SWMP	Solid Waste Management Plan
SWR	Solid Waste Regulations
TRB	Transportation Research Board
TSS	total suspended solids
UGA	urban growth area
UGN	urban growth node
USC	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USPS	U.S. Postal Service
UV	ultraviolet
vpd	vehicles per day
WAC	Washington Administrative Code
WAQA	Washington Air Quality Advisory
WASL	Washington Assessment of Student Learning
WDFW	Washington State Department of Fish and Wildlife
WNF	Wenatchee National Forest
WNHP	Washington Natural Heritage Program
WRIA	Water Resource Inventory Area
WSDOT	Washington State Department of Transportation
WSP	Washington State Patrol
WSPRC	Washington State Parks and Recreation Commission
WUI	Wildlife Urban Interface
WUTC	Washington Transportation and Utilities Commission

CHAPTER 1PROJECT SUMMARY

Introduction

This Draft Environmental Impact Statement (DEIS) was prepared to provide information for consideration by Kittitas County in making their decisions regarding permitting of the proposed Marian Meadows development.

This DEIS is intended to be more approachable for the general public. It is written in a question-and-answer format, with explanations of technical terms and various color graphics, tables, and photos to illustrate the text. The format, however, does not reduce the detail of information provided. In some cases, additional technical detail and data are provided in the appendices.

This chapter (Chapter 1) summarizes the proposed project and includes a table comparing the impacts of the alternatives.

Chapter 2 describes the proposal and alternatives.

Chapter 3 describes existing conditions, impacts, and mitigation for each environmental element and alternative.

What is an Environmental Impact Statement ?

The Washington State Environmental Policy Act (SEPA) requires the examination and consideration of potential impacts on environmental resources when considering the approval of a project. An Environmental Impact Statement (EIS) is a document that is required when a proposal is likely to result in significant adverse impacts on the environment.

The purpose of an EIS is to provide information on impacts and mitigating measures. This information is used by a decision maker to decide whether to proceed with a project, or make modifications to reduce specific impacts.

1 Where is the proposed project?

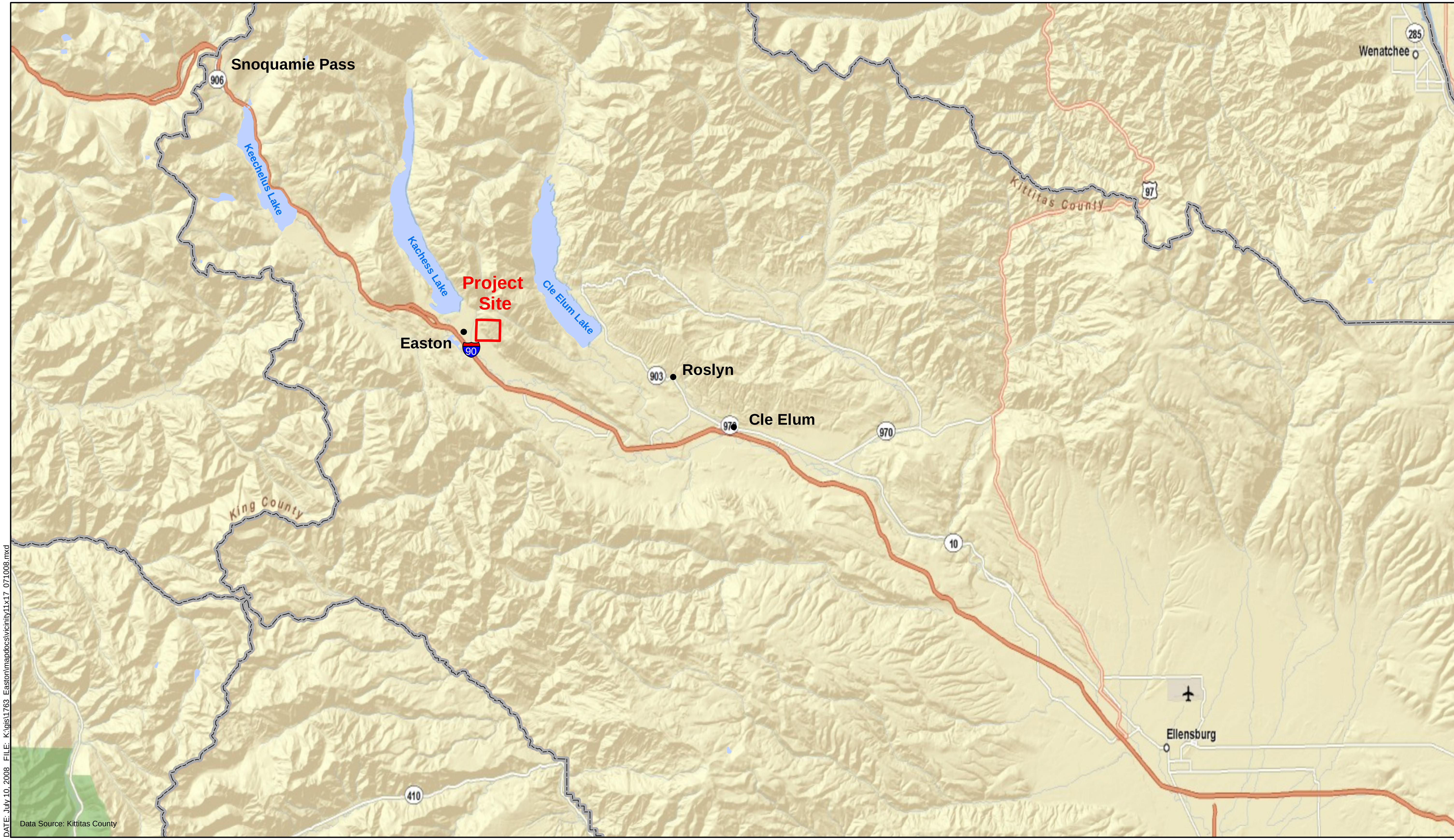
The proposed project is located on the north side of Interstate 90 (I-90), northeast of the unincorporated community of Easton in western Kittitas County, Washington, as indicated in Figure 1-1. The general context of the area is provided in Figure 1-2. The three-dimensional flyover view in Figure 1-3 provides a perspective on the physical features of the setting and the lot layout in Alternative 1.

The project site is approximately 15 miles west of the town of Cle Elum and approximately 15 miles east of the Snoqualmie Pass summit, within the Yakima River Valley, about 2 miles southeast of Kachess Lake. The site is on the lower slopes of Easton Ridge, which divides the Yakima River drainage from Domerie Creek and the Cle Elum River drainage to the east.

Directional References to I-90

Interstate 90 (I-90) traverses Washington State from east to west. Directional references to I-90 in this document respect that general orientation of the roadway and refer to property on either the north or south side of the interstate.

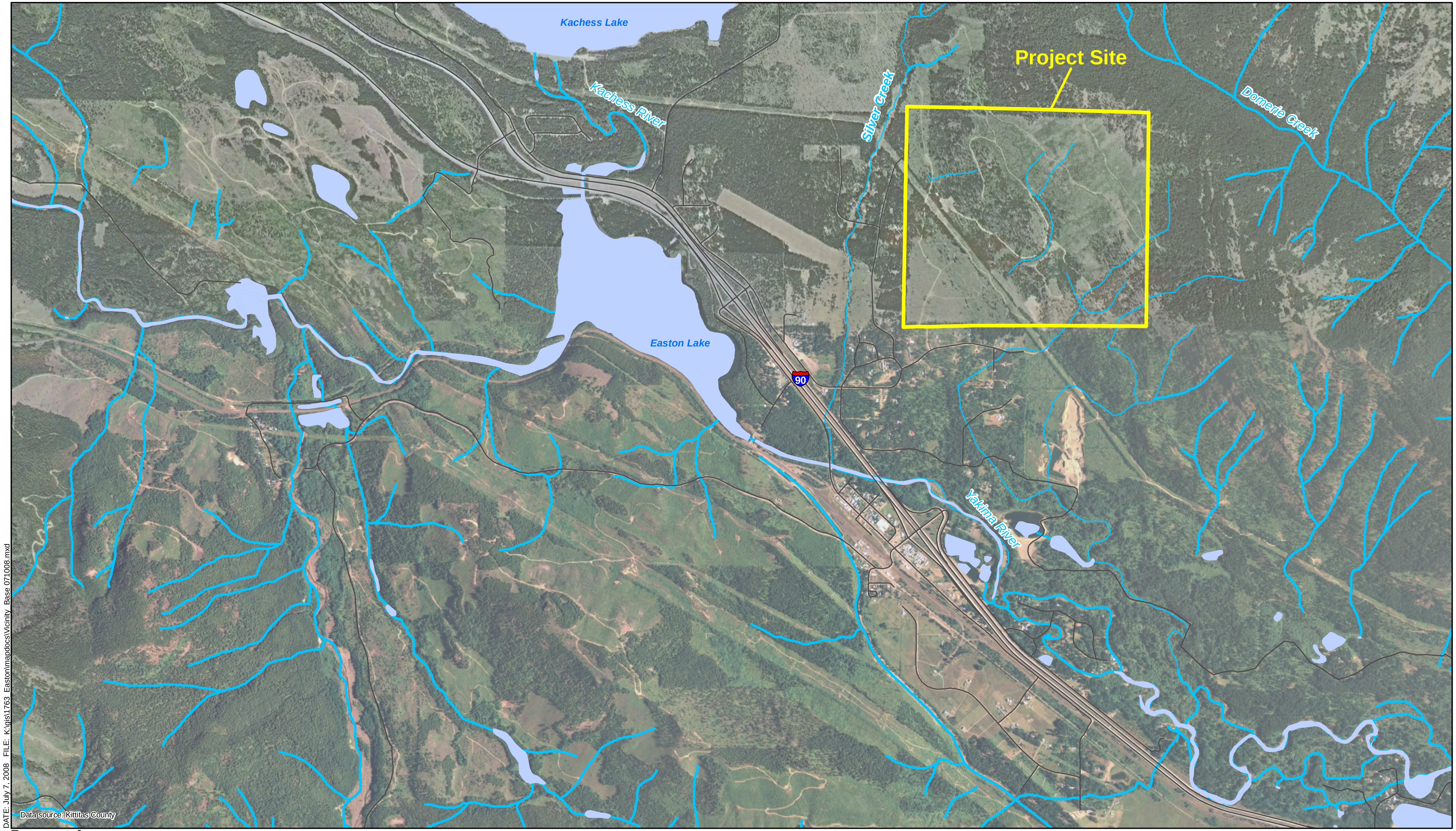
In this area, that reference can be somewhat confusing because I-90 runs in a northwest to southeast orientation. Locations “north” of I-90 in this area are east of the roadway.



Parametrix

N
0 3.5
Scale in Miles

Figure 1-1
Marian Meadows
Location Map



Parametrix

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Scale in Feet

Legend

Project Site
Road
Lake
Stream

Figure 1-2
Marian Meadows
Vicinity Map

DATE: July 11, 2008 FILE:K:\gis\1763_Easton\mapdocs\Vicin_flyover2.mxd

Parametrix

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Project Site

Figure 1-3
Vicinity Map
Flyover view

The site is accessed from the Sparks Road interchange, Exit 70 off of I-90. It is about 1 mile from the interchange to the site via Sparks Road, a county road.

2 What changes to zoning or other requirements are proposed?

The proposal consists of two elements:

- A rezone of the majority of the property (430 acres) to the planned unit development (PUD) zoning district as provided by Chapter 17.36 of the Kittitas County zoning code. The purpose of the PUD zone is to provide for and encourage a harmonious mixture of land uses with greater flexibility in land use controls. About 40 acres are proposed to be excluded from the PUD designation. This area lies at the foot of the steep sloping portion of the site and includes the Bonneville Power Administration (BPA) easement corridor.
- A preliminary plat covering the western one-third of the property (about 120 acres) is proposed to be divided into 225 lots of approximately 0.5 acre each.

3 What are the major design features?

Alternative 1, the applicant's proposal, is for a single-family residential development consisting of:

Alternative 1, the applicant's proposal, is for a single-family residential development consisting of:

- A preliminary plat that would divide the western one-third of the property into 225 lots of approximately 0.5 acre each on a site of about 120 acres.
- Future unspecified single-family development in the eastern portion of the site that would consist of up to 218 additional units on 305 acres. A conceptual layout developed for the DEIS avoids the steepest slopes, wetlands, and streams and results in lot sizes that range from about 0.5 acre to almost 5 acres.

The project includes related infrastructure comprising:

- Approximately 6.4 miles of road.
- Water service by Easton Water District No. 3.
- Sewage disposal through a sewage treatment plant proposed to be built by the applicant and designed such that treated effluent would meet standards for recycled water.

4 What alternatives are considered?

Four alternatives to the applicant's proposal have been developed, with some options related to site conditions and the nearby airport:

- **Alternative 2, Planned Unit Development (PUD),** retains the maximum number of units allowable under a PUD, but locates all 443 units on the western flatter portion of the site and employs a mix of single-family and multi-family units.

- **Alternative 3, No Action Alternative,** illustrates development at the existing zoning, which requires 3-acre minimum lot sizes. The conceptual layout includes a uniform distribution of lots over the proposed development consisting of a total of 147 lots with 143 units provided by the 430 acres zoned Rural (R-3) and 4 units provided by the density allowance in the 90 acres zoned Forest and Range (FR). This option would include water district service but would employ individual on-site sewage disposal rather than a sewage treatment plant.
- **Alternatives 4 and 5 are a Compilation of Mitigation Measures** consisting of development that would either (a) incorporate measures identified in the DEIS analysis that would reduce specific impacts upon the environment, or (b) incorporate changes in the proposal that could be imposed as governmental conditions to control environmental impacts or meet applicable local, state, or federal codes or criteria. Two alternatives were developed after an initial assessment of the existing conditions and impacts of the proposal.
    - **Alternative 4** includes a rezone to PUD but provides a runway clear zone, avoids areas of debris flow hazards, and reduces the number of lots on the steepest slopes on the easterly portion of the site.
    - **Alternative 5** includes the same features as Alternative 4 to avoid impacts, but also avoids all development on the steep slopes located on the easterly portion of the site . It includes slightly smaller lots in some areas than Alternative 4.

These options would include water district service but would employ individual on-site sewage disposal rather than a sewage treatment plant.

- In addition to the site development alternatives, four **tenure scenarios** were developed because the characteristics of the future residents, specifically their ages and whether they live on the site year-round or are part-time recreational residents, will affect many impacts, primarily on public services. Because of uncertainty in predicting the character of future residents, four scenarios have been developed with different mixes of residents:
    - **Tenure Scenario 1:** All full-time residents: 85 percent workforce families and 15 percent retired persons;
    - **Tenure Scenario 2:** 60 percent workforce families, 15 percent retired and 25 percent part-time recreational;
    - **Tenure Scenario 3:** 35 percent workforce families, 30 percent retired, and 35 percent recreational; and
    - **Tenure Scenario 4:** 25 percent workforce families, with 25 percent retired and 50 percent recreational.

5. What Kittitas County decisions are required?

Decisions required by Kittitas County are as follows:

- The Kittitas County Board of Commissioners will consider the PUD rezone as a quasi-judicial decision. The rezone will first be reviewed by the Hearing Examiner who will make a recommendation to the County Commissioners.
- The Kittitas County Board of Commissioners will consider the subdivision as a quasi-judicial decision only if the rezone is approved. The preliminary plat will first be reviewed by the Hearing Examiner who will make a recommendation to the County Commissioners.
- Kittitas County may also issue other ministerial approvals subsequent to rezone and preliminary plat approval for infrastructure review and construction. These include:
    - Road Improvement Plan Approval
    - Clearing and Grading Permit(s)
    - Fire Marshal Hydrant Permit Approval
    - Agreement to Locate Utilities (Franchise)
    - Master Drainage Plan Approval
    - Final Plat Approval.
- For future phases of the project, if the PUD rezone is approved, approvals would include:
    - Preliminary Plat Approval
    - Environmentally Critical Area Modification Approval.

6 What other agencies will review the proposal?

The Easton Water District No. 3 will review and approve construction plans for water system expansion.

The Washington State Department of Ecology will review:

- Wastewater Treatment Facility Design Approval
- Recycled Water Application Permit
- National Pollutant Discharge Elimination System (NPDES) Clearing and Grading Permit.

The Washington State Department of Health will review:

- Water System Expansion Design Approval
- Recycled Water Application Permit.

The Washington Department of Fish and Wildlife will review:

- Hydraulic Project Approval for relocation of a watercourse (if the existing watercourses across the property are determined to be within its jurisdiction).

The Washington State Department of Natural Resources will review:

- Forest Practices Permit for clearing of the site.

7 What other independent projects may occur near the proposal that may affect impacts?

How many lots are in the area now?

At the current time there are about 200 lots in the vicinity. About 40 percent of them are vacant. About a third of them are less than 3 acres in size and are largely included in three existing subdivisions. The majority of the other parcels range from 3 to 5 acres with a few parcels ranging from 20 to 40 acres south of Sparks Road. The state-owned Easton Airport is about 280 acres.

Potential cumulative impacts may occur from land development in the project vicinity in the area north of I-90 served by Sparks Road. Two scenarios would be evaluated:

- Development at existing rural densities at one unit per 3 to 5 acres; and
- Development at the intensity allowed under PUD regulations as proposed for the Marian Meadows site, resulting in about one unit per acre.

Rural Density

Development under existing zoning allowing one lot per 3 acres would allow additional development only for those lots larger than 6 acres. Subdivision of parcels large enough for subdivision (excluding the airport) into 3-acre parcels could create an additional 130 lots. When added to the existing 200 lots (about 80 of which are vacant), there would be a total of about 330 lots in the vicinity outside Marian Meadows.

PUD Density

Development is based on the premise that approval of the Marian Meadows PUD application would set a precedent to allow a similar density up to three times that of the current zoning, or about one unit per acre. If development reflecting this density of development were applied to the area as a whole, many of the existing parcels larger than 2 acres could be subdivided. Subdivision of eligible parcels (excluding the airport) into 3-acre parcels could create about 550 lots in the area, including the existing 200 lots (about 80 of which are vacant).

The cumulative impacts are assessed for elements that would change the impacts as compared to the project alone.

8. What are the potential environmental Impacts of the alternatives?

The following is a summary of potential impacts of the development on environmental elements. More detailed analyses are included in Chapter 3.

Land Use

Land use impacts are related to the number of units and how they are similar to or differ from existing patterns of land use in the vicinity.

Alternative 1, the applicant's proposed PUD with 443 units, would result in a substantial change in density and open space from the majority of the development in the vicinity, particularly the lots directly adjacent to the site, which are generally greater than 3 acres. The majority of the property in the vicinity consists of lots larger than 3 acres.

Most residents in the area would experience the proposal and the alternatives in terms of a change in character as follows:

- Native forest vegetation would no longer predominate on the site. The size of proposed lots and typical associated clearing would result in elements of the built environment such as buildings and ornamental landscaping being the dominant feature.
- The observed visual character of the community would change due largely to the predominance of residences and associated permanent clearing of forest cover.
- Residents of Marian Meadows would be unlikely to derive significant support from traditional rural resource-based economies, and would likely be predominantly commuters to urban areas or recreational users. This may result in fewer social interactions among members of the community.
- There would be an increase in the number of people on local streets, businesses, schools, and other public places.
- The area would likely experience a decline in use by wildlife, especially large mammals such as elk, as discussed in more detail in Section 3.15.

Alternative 2, PUD on the westerly portion of the site only with up to 443 units, would result in the same number of units in a smaller area.

Alternative 2 would have similar impacts as Alternative 1, except that the inclusion of multi-family use would be a greater change from the existing large lot development. The observed visual character of the community would change less for distant views because the steep sloping eastern portion of the site would not be developed and would remain in forested use. This would preserve the forested ridges that contribute to the rural character of the area.

Alternative 3, No Action Alternative with 3-acre lots, would increase the total residential lots in the immediate vicinity from approximately 200 to about 350, a little more than half of the total proposed by Alternatives 1 and 2, but a substantial increase over the existing amount. The character would be similar to the existing large lot development in the vicinity.

Alternative 4, PUD with reduced density on the entire site, would result in an increase in total residential lots in the immediate vicinity from about 200 to about 400, or a little more than half of the total proposed by Alternatives 1 and 2. Alternative 4 would have slightly more lots than the total in Alternatives 3 and 5, but with less visual impact due to fewer lots on the most visible portions of the steep easterly area of the site.

Alternative 5, PUD with all development clustered on the westerly portion of the site, could have up to 147 lots allowed in a PUD by existing zoning without bonus provisions. The development would include a mix of lot sizes with larger lots located immediately adjacent to the site, which would provide consistency with existing adjacent large lots. The majority of residents in the community would experience the change from the existing forest cover; however, a substantial area of native forest vegetation would be preserved in the airport safety zone and hazard avoidance areas, as well as on the easterly portion of the site. The preservation of the steeply sloping easterly portion of the site, which is the most visible, would preserve the forested ridges that contribute to the rural character of the area as seen from a distance.

Cumulative Impacts

Cumulative impacts from development of nearby land at rural densities (existing zoning 3-acre lot sizes) would result, in up to about 770 single-family lots (including the proposed 443 units). The Marian Meadows development would contribute nearly 60 percent of the total lots. The full-time equivalent (FTE) cumulative population would vary between 2,350 and 1,300 residents depending on the proportion of full-time and seasonal residents. For comparative purposes, this would range from 120 percent larger than the 2009 population of Cle Elum (1,870) to about 70 percent of the size of Cle Elum. The rural character of the community would be changed substantially

Alternative 3, the No Action Alternative with 147 lots, would result in a cumulative total of about 470 lots. The majority of development in the area would be in large lots similar to development in the vicinity of the site.

Alternative 4, a PUD with about 195 lots, would result in a cumulative total of about 525 residences in the vicinity, amounting to about 70 percent of the cumulative number of lots with Alternatives 1 and 2. The majority of development in the area would be in large lots; however, lots within the site would be substantially smaller than the existing average in the area.

Under Alternative 5, a PUD on the westerly portion of the site with up to 470 lots would be developed in the vicinity. This would be the same amount of development as in Alternative 3. The majority of development in the area outside of the PUD proposal would be in large lots similar to development in the vicinity of the site. The lot sizes on the developed portion of the site would be substantially smaller than the average in the area.

Under Alternatives 3, 4, and 5, the FTE cumulative population would vary between 1,675 full-time residents and 800 seasonal residents depending on the proportion of full-time and seasonal residents. For comparative purposes, this would range from about 90 percent of the size of Cle Elum to about 40 percent of the size of Cle Elum.

Cumulative impacts with development of nearby land at the same average density as provided in the PUD application would result (in combination with Alternatives 1 and 2 PUDs) in a total of about 990 single-family lots in the area (including the 443 lots included in PUD alternatives). The lots within the Marian Meadows development would be smaller than the average in the area and Alternative 2 would contain the only multi-family development in the area. The FTE population would vary between 2,630 and 1,700 residents. For comparative purposes, this would range from 140 percent larger than the 2009 population of Cle Elum (1,870) to about 90 percent of the size of Cle Elum.

Alternatives 3, 4, and 5 cumulative FTE population would vary between 2,400 full-time residents and 1,200 seasonal residents. For comparative purposes, this would range from about 120 percent larger than the 2009 population of Cle Elum (1,870) to about 64 percent of the size of Cle Elum.

The area as a whole would take on an increasingly suburban character and existing rural characteristics would be reduced. The result would be a setting in which:

- Open space, the natural landscape, and vegetation have a less predominant role as compared to elements of the built environment and ornamental vegetation.
- Forest resource activities would be reduced and nearby residential use would likely interfere to some extent with commercial forestry activities, even with local policies designed to protect resource use.
- There would be little opportunity for small acreage ranches and associated animal keeping.
- Opportunities to see wildlife on a daily basis would be reduced because wildlife habitat would be greatly reduced with smaller lot sizes.
- Governmental services more consistent with urban uses would be required.

Transportation

Traffic intersections in the area are expected to experience relatively small increases in delay in 2020; however, all intersections would continue to operate better than the Kittitas County Level of Service (LOS) C standard.

Increased traffic can be expected to increase; however, existing collision frequency is substantially below a level of concern. As a result, traffic safety is not expected to be a substantial problem in the future with or without the project.

With the substantial increases in traffic volumes, roadways previously shared by motorized and non-motorized travel modes could pose safety concerns.

Road maintenance responsibilities would generally be similar to those being practiced today. However, if substantial increases in traffic occur from the development, resurfacing to fill pot holes and dust suppression treatments along Country Drive and Pit Way could become more frequent and costs could increase slightly.

Within the existing Easton Village subdivision, traffic volumes on Country Road are projected to increase more than four-fold with 10 percent of project trips presumed to take that route. If more project trips chose that route, the increase would be greater. The total number of trips is relatively low, but it may increase enough to change perceptions of safety for children playing in the area. Use of local streets as part of the social interaction pattern within the community, including as a play area for children, may change as the result of perceived increases in traffic.

Cumulative impacts

The cumulative effects of buildout of the proposed PUD, combined with the PUD density in the vicinity, would result in delay increases of up to 144.2 seconds/vehicle. Four intersections would operate worse than the LOS C standard:

- I-90 eastbound ramps/Railroad Street – LOS F
- I-90 westbound ramps/Railroad Street – LOS D
- Sparks Road/Railroad Street – LOS F
- Spark Road/Pit Way – LOS E.

Mitigation of these impacts can be accomplished with relatively minor changes in designation of all-way stop control or minor reconfiguration of intersections to add left turn lanes and similar features.

Transportation - Aviation

Alternative 1 would result in 60 lots located completely or partially in the outer safety zone and 25 lots located completely or partially in the inner turning zone, which would expose those residents to hazards from airport operation.

Alternatives 2, 4, and 5 would result in no lots being located completely or partially in the outer safety zone. Up to 27 lots would be located partially in the inner turning zone; however, building areas would be entirely outside of the airport safety zones. With subdivision restrictions on building within the safety zones, there would be no increase in exposure to hazards from airplane collisions with the ground within the safety zones.

Alternative 3 would result in seven lots being located completely or partially within the outer safety zone and nine lots located completely or partially within the inner turning zone. Of these 15 lots (some lots are in both zones), seven would have building areas outside the safety zones, resulting in a net increase of eight lots with future residents exposed to the higher risk from aviation accidents represented by the safety zones.

Avoidance of building in the airport safety zones incorporated in Alternatives 2, 4, and 5 has the greatest potential for reducing risk to residents of the Marian Meadows development. It also would be practical to allow reduced density development within the zones. If developed at one unit per 3 acres (as provided in Kittitas County Code [KCC] 17.58.050), the impacts would be similar to Alternative 3 and result in seven lots located completely or partially within the outer safety zone and nine lots located completely or partially within the inner turning zone. If developed at one unit per 5 acres (per Washington State Department of Transportation [WSDOT] guidelines), about four to five lots would be located completely or partially within the outer safety zone with four to six lots located completely or partially within the inner turning zone.

Parks and Recreation

Alternatives 1 and 2 recreation demand based on National Recreation and Park Association (NRPA) guidelines would depend on population and would be between 8.5 and 14.3 acres of parkland for the tenure scenario with largely full-time population and between 4.8 and 8.0 acres for the tenur scenario with 50 percent seasonal population. The proposed provision of 1.88 acres of park at three locations would not meet Kittitas County standards or NRPA guidelines.

For all alternatives, the lack of provision for recreation likely would result in either greater use of off-site facilities or a lack of recreational opportunities for residents. The population likely served the least would be the demand for youth sports.

Cumulative impacts

Under existing county LOS standards, it is unlikely that adequate provision for parks and recreational facilities would take place in conjunction with new development. The lack of provision for recreation likely would result in either greater use of off-site facilities, which are either not in existence, or well below the capacity to serve such a population, or would result in a lack of opportunities for recreational activities to serve residents.

Public Services - Schools

Impacts on Instruction

Education financing is established by the state legislature through annual appropriation and includes funding for what the state defines as “basic education.” The local community currently pays about 30 percent of the cost of education not paid by the state.

In the future, if current funding formulas continue, the local community would be expected to provide between 20 and 30 percent of the cost of instruction and transportation.

Impacts on Facilities

The projected student populations are affected substantially by the percent of retired and seasonal residents. The number of students range from about 260 with Alternative 1 with largely full-time residents to about 90 with Alternatives 3 and 5 with the same tenure scenario. This scenario would result in a need to increase the size of facilities by a factor of up to about two and a half for the existing school.

At the lower end of the tenure range with up to 50 percent of residents seasonal, Alternative 1 would add an additional 80 students and Alternatives 3 and 5 would add about 30. This student population likely could be accommodated for the first few years by capacity in existing classrooms. After a period of several years, at least two and possibly three new classrooms would need to be added to the existing school.

Transportation costs are related to facility decisions. For Alternative 1, the student population could vary from about 260 students with all full-time residents to about 80 students with half the units occupied by seasonal recreational residents. The number of school buses required to transport that many students would range from about six to about two.

Cumulative Impacts

If development reflecting PUD density were applied to the area as a whole, additional student enrollment would vary from around 850 at the high end to around 153 at the low end. At the upper end of the range, this would be equivalent to current student enrollment of the Cle Elum School District. With buildout of the project vicinity at rural density with 3-acre lots, the district would have about three-quarters the number of students as the Cle Elum School District.

Public Services - Fire Protection

The Easton Fire District will be substantially affected by additional demands to provide fire protection. The limits of the volunteer district to provide service may result in risks to life and property. All alternatives would require a substantial increase in the need for volunteer fire fighters and equipment.

Alternative 1 increases the total number of residential structures to be protected in the district by about 30 percent. It also provides the greatest potential exposure of fire risk and potential impacts requiring additional volunteer personnel, higher levels of training, and additional equipment. The steep easterly portion of the site provides an area of extreme wildfire hazard because of its location on a slope and the potential for wildfires to move more quickly uphill, heating fuels as it moves uphill, and reinforcing the speed and heat as it moves. The potential for more than 200 units on this portion of the site places a large number of residents at risk. The site is also at risk from wildfires initiated from human sources on the site (as are half of wildfires), including wildfires spreading from forest lands on the north, east, and south sides of the site. The single access provided to the steep easterly portion of the site also limits the ability to escape a fire without interfering with fire response vehicles and equipment trying to move up the same roadway to respond. A fire that started on the flat portion of the site and moved uphill could block or seriously impede escape or access on the road.

Alternative 2 would reduce the risk to persons and property from wildfire substantially by locating all development on the flat westerly portion of the site. The development of approximately 200 multi-family units on the site would substantially increase fire exposure due to the type of units and the lack of separation between units. Fire suppression in multi-family structures would require additional personnel, additional equipment, and additional training for the volunteer fire force.

Alternative 3 would reduce the total exposure to fire risk and resources required of the fire district, compared to Alternative 1, by reducing the number of units and increasing separation between units.

Residences on the steep easterly portion of the site would have similar extreme exposure to risk from wildfires; however, the overall risk exposure would be somewhat less because of fewer lots, as well as larger lots with greater separation between buildings.

Alternative 4 would reduce the total exposure to fire risk and impacts to the fire district, compared to Alternative 1, by reducing the number of units. Residences on the steep easterly portion of the site would have similar extreme exposure to risk from wildfires; however, the overall risk exposure would be somewhat less because of fewer lots and the lack of lots on the higher slopes where escape and access would be most difficult.

Alternative 5 would reduce the total exposure to fire risk and impacts to fire protection resources, compared to Alternative 1, by reducing the number of units and eliminating residents from the extreme exposure to risk on the steep easterly portion of the site.

Cumulative Impacts

Cumulative impacts of the project in the immediate vicinity would result largely from the number of additional residents, lot sizes, type of development, and location.

Alternatives 1 and 2 with 443 units and additional development at rural densities would result in 773 cumulative lots or units in the project vicinity. Alternatives 3 and 5 with 147 units would result in 477 lots, and Alternative 4 with 195 lots would result in 525 lots in the project vicinity. In general, risk and resources needed for fire suppression would be less than the proposed PUD because of the minimum 3-acre lot size and flat terrain, which would tend to reduce the risk of fire spreading and facilitate faster response.

If Alternatives 1 or 2 were approved it may provide the precedent for similar development of other properties in the vicinity at the same overall density. Most of the lots outside Marian Meadows would be on the flat valley floor and at an average of 1 acre each. Distance between structures would be less than with 3-acre lots under existing zoning and would increase the risk of spread of fire for structure fires and wildfires.

Public Services - Police and Public Safety

In general, the additional population in the area will lead to increased demand for police response. That response will demand service from whatever police officers from the sheriff department and other agencies, such as the state patrol, are available. A higher level of response will be reflected in more responses per shift, but may not affect the ability of personnel to respond, unless a number of incidents overlap, or incidents involving a threat to persons require a backup response that would likely involve response from multiple agencies. The likely effect noticed by local residents would be less frequent presence of officers patrolling the area, or longer response time to calls. The likely effect on personnel would be busier shifts and a perception of greater risk to them from multiple calls.

Public Service – Medical Response

The volunteer fire department's ability to respond to cumulative demand is largely dependent on the volunteer pool, which generally is increased by more population, but may be reduced by a greater proportion of residents commuting outside the area or seasonal residents. The long-term impacts on the fire district of fire and emergency medical response may be to encourage a transition to a core paid staff that can respond during working hours when volunteers are less likely to be available.

Hospital District No. 2 is likely to be able to respond to cumulative demand by adding more equipment and personnel because it relies on paid staff, provided that local assessments provide adequate resources, or voters approve additional assessments. Additional development in the area is likely to add enough tax revenue to offset additional costs. In addition, cumulative development in the Easton area is likely to be a relatively smaller component of the hospital district's demand compared to growth in the Cle Elum/Roslyn/Suncadia area.

Public Service - Mail Service

The likely impact of any of the cumulative impact scenarios under any alternative would result in mail demand similar to a small town. Acquisition of a new post office with greatly expanded individual mailboxes, or rural delivery, or both are the likely mitigating measures for increased demand for service.

Utilities - Water

The provision of additional storage east of I-90 would improve water service to that portion of the Easton Water District Service Area.

Alternatives 1 and 2 with 443 units have substantially different water demand with different tenure options. Tenure options 1 and 2 with a higher proportion of full-time residences (workforce and retired) have substantially higher water demand. All the tenure options exceed the current Easton Water District water rights of 137.2 acre-feet (ac-ft) per year with existing use of 71 ac-ft resulting in up to 61 additional ac-ft per year available for new hookups. If the pending water-rights application for an additional 112 ac-ft per year were approved, the resulting rights of 252 ac-ft per year would result in 178 ac-ft available for new hookups. This amount would not be adequate for any options except Tenure Scenario 4 with 50 percent seasonal residents.

A**lternatives 3 and 5** water demands for 147 units are proportionally lower than Alternatives 1 and 2. Tenure options 1 and 2 would exceed the 61 additional ac-ft per year available for new hookups under existing Easton Water District water rights. Tenur options 3 and 4 with seasonal residents totaling 35 percent and 50 percent, respectively, are within the water supply available. If the pending water-rights application for an additional 112 ac-ft per year were approved, all tenure options would be adequately served by the 178 ac-ft available for new hookups.

Alternative 4 water demand for 195 units would exceed the 61 additional ac-ft per year available for new hookups by existing Easton Water District water rights for all tenur scenarios. If the pending water-rights application for an additional 112 ac-ft per year were approved, all tenure options would be adequately served by the 178 ac-ft available for new hookups.

One consequence of the alternatives is the use of much of the existing capacity of the water system. If more water is used by the Marian Meadows development, less is available for other users.

One of the ways in which the water district would be potentially affected is the use of individual wells by future development. One of the disadvantages of individual well water supplies is that water supply and hydrants for fire flow are not provided. In addition, the systems are not monitored for water quality and reliability of service. In this case, an adverse unintended consequence of state water rights, as applied to the Easton Water District, with the demands of the Marian Meadows development may be the development of water supplies for new developments in the area that serves the public less effectively than the expansion of the water district system.

Cumulative Impacts

All cumulative scenarios for either rural development or development equivalent to the proposed PUD are in excess of the water district's existing water rights and additional applications pending. This demand would substantially increase the likelihood of using water sources other than the water district such as individual wells. This scenario would impose difficulties in managing surface and water rights to recognize senior rights and provide in-stream flows. If service is provided by individual wells, fire flow would not be required.

The extent of reduction that can be achieved through water conservation programs varies considerably between communities. Generally, there is a strong correlation between utility provisions of resources, including education and incentives, and the effectiveness of a program (AWE 2009).

Utilities - Sewage Disposal

The applicant's proposed wastewater treatment facilities employing a combination of mechanical and biological processes employ technology that has been successfully used to serve large concentrations of population for many years. In this application, with a relatively small population, there are a number of factors that may lead to adverse impacts, including:

- High cost of implementation. The initial capital cost of a wastewater treatment facility is very high. For a service area of 443 units the cost per unit is several magnitudes larger than on-site disposal. The sequencing batch reactor (SBR) wastewater treatment system proposed, however, is one of the lowest cost alternatives available if such a system is needed or desirable.
- High cost of operation and maintenance. Any sewage treatment facility requires a relatively high level of oversight of operation and maintenance of key facilities. In this case with the potential for

variable populations due to vacation homes, a very high level of oversight may be required during seasonal startups and weekends. This task may involve checking the operation on a regular basis several times a day. It is also critical that personnel be on-call if critical parts of the system are not operating properly. The SBR system proposed needs relatively high levels of oversight and maintenance. For a service area of 443 units, the cost per unit is likely to be many times higher than typical charges for municipal sewage treatment due to economies of scale.

- High cost of replacement. The proposal to use steel tanks in the SBR system reduces initial capital cost, but ensures that major portions of the system will require replacement in 15 to 25 years. This high cost will necessitate rates that build a reserve of funds for replacement that will be half to three-quarters of the cost of the initial system. In addition, key mechanical components such as the influent grinder will require relatively frequent replacement of key components.
- Risk of upset and failure to meet effluent standards as outlined above. There are a number of steps in the treatment process where mechanical failure or the failure to operate the system properly may result in not meeting effluent standards. This occurrence would subject the public using wastewater for reuse to potential risks from coming into contact with effluent that does not meet proposed standards: Moreover, this untreated wastewater could affect the groundwater aquifer used for public water supply. In the worst case, discharge of untreated wastewater would cause the average nitrate concentration in groundwater to increase beyond water quality standards to approximately 15 milligrams of nitrogen per liter (mg-N/L) within a plume that would migrate downgradient from the infiltration pond.

Utilities - Stormwater

Adverse impacts of stormwater conveyance generally will be experienced at downgradient locations. It is possible that during severe storm events in the area, especially rain-on-snow events with frozen ground, the Sparks Road conveyance capacity could be exceeded and surface water would flow generally to the southwest across the gently sloping topography and carve new channels in the path of least resistance.

The worst-case potential impacts would be from debris flow, which have occurred on the site in the past as evidenced by alluvial fans and high capacity channels. Future debris flows and runoff could have catastrophic effects on residents in the development and off site.

The most effective mitigation for alluvial fans is to avoid any human occupancy or improvements on the fan and its downstream conveyance area.

Utilities - Solid Waste

The alternative and potential cumulative development in the area, either at existing rural densities or at the density of the PUD, likely would not affect the capacity of existing solid waste facilities but may require more frequent hauling of solid waste to the ultimate disposal site.

Utilities - Electrical

Substantial upgrades to the electrical substation and distribution system in the area would be required for the proposal and cumulative development. Such system improvements would be borne by general electrical utility rates.

Possible human health effects from exposure to power frequency electric and electromagnetic fields (EMF) are of concern from the overhead power lines that transmit electricity to residences, as well as the BPA 415-kilovolt (kV) line that passes diagonally through the property at the approximate eastern margin of the flat portion of the site. There are, however, no definitive studies that document EMF adverse impacts.

Utilities – Communication and Cable Television

Substantial upgrades to the communication and TV cable system in the area would be required for the proposal and cumulative development. Such system improvements would be borne by general electrical utility rates.

Visual Quality, Light, and Glare

Regardless of the alternative, development in the area would represent a significant change in the visual character of the Easton Range. The current visual continuity provided by somewhat undeveloped forest conditions (mitigated by the presence of clear-cut lines) will be altered in perpetuity by the presence of human development. Specific impacts, however, will vary based on the selected alternative.

Alternative 1, the applicant's PUD proposal with 443 units, would result in substantial change to the visual quality of the area due to the location of residences and infrastructure on the most visible steep-sloping easterly portions of the site seen from I-90 and much of the community. The visual prominence of development of the area will be high, and even more pronounced at night when residence and security lights will be visible at great distances. The development will stretch approximately halfway up the ridge, contrasting with the natural forested surroundings and introduce human elements in contrast to the existing natural scene. The change in visual character of the area will be most pronounced at night when lights in residences, especially outdoor security lights, will be visually prominent on the currently unlighted ridge. The change would contrast sharply with the existing unity of forest cover that characterizes the slopes and ridges framing the valley and would replace the natural landscape of the ridges with a substantial intrusion of human features in the view. The change in the visual character will be generally apparent throughout the community.

Alternatives 2 and 5 with no development on the steep easterly portion of the site would avoid features visible from I-90 and much of the community and retain the forested ridgeline.

Alternative 3 with 3-acre lots on both the easterly and westerly portions of the site would also result in substantial cleared areas for roads and residences, including the residential structures, on the steep easterly portion of the site. The amount of clearing would be less because fewer residences would be developed. That change, however, would contrast sharply with the existing unity of forest cover and would be generally apparent as a contrast to the forested slopes that currently frame the valley.

Development on the lower flat portion of the site would be large lots similar to existing large lots in the area with extensive retention of forest cover. The large lots coupled with preservation of extensive areas of open space for the airport safety zones and debris flow areas would contribute to maintaining the rural character of the area.

Alternative 4, a PUD with reduced density on the entire site, would also result in significant, identifiable impacts to the character of the easterly sloping areas. However, impacts will be less than those associated with Alternative 1 because development would be avoided on the most visible upper portions of the site.

Noise

In general, the long-term noise impacts associated with a given residential development are directly related to the number and tenure of the persons inhabiting a development. Impacts will be the largest where residences are most densely clustered and under the tenure scenarios with the highest population and activity levels.

Air Quality

Regardless of the alternative that is ultimately selected, the existing data for Cle Elum and Ellensburg do not indicate that exceedance of air quality standards is likely, even with a greater population. The upper Yakima River Valley in the vicinity of Easton has virtually constant winds, no inversions, and no topographic or other features that contain air masses.

A restriction on all wood-burning stoves could be imposed on all privately owned units including the single-family residences. This restriction would reduce emissions from the project, but would be likely to be difficult to enforce over the lifetime of the project.

Hazardous Materials

The site has not hosted past industrial or commercial activities that are likely to have resulted in hazardous materials being located on the site. It is possible that unregulated dumping on the site has resulted in deposition of household hazardous waste, but no such evidence has yet been observed in field work or reconnaissance on the site by numerous professionals.

If contaminated soils are encountered during development, the response is likely to be excavation and disposal of contaminated soils at an approved disposal facility. To control accidental discharge of hazardous materials during construction, a Spill Prevention, Control and Countermeasure (SPCC) Plan is likely to reduce potential impacts.

Historic, Cultural, and Archaeological Resources

No cultural resources have been identified on site. It is possible, however, that resources could be uncovered during construction. Mitigation measures available to ensure protection of all significant cultural resources on the site include stopping work, identifying resources, and avoiding or conserving the resources identified.

Geology, Topography, and Soils

The greatest potential for seismic hazards on the site are rockfall, shallow landslides, and debris flow across alluvial fans, as well as water flow downgradient of the fans where water is likely to flow after dropping sediments on the fan.

The most effective means of mitigating potential hazards is avoidance of these areas. Alternatives that avoid the steeper easterly portion of the site avoid much of the hazard area. On the westerly flatter portion of the site, the greatest potential impact is from debris flow and conveyance across the site that can be mitigated by avoiding alluvial fan and conveyance areas.

Surface Water Resources

It is unlikely that water from the site will reach surface water streams except under the most extreme rain-on-snow conditions. All alternatives are likely to handle normal stormwater up to typical 2- and 10-year storms through standard facilities. It is likely that infiltration will be utilized as well as conveyance in roadside ditches. The most significant hazard not addressed in standard engineering design is from isolated events leading to unpredictable volumes of water collecting in narrow canyons leading to catastrophic debris flows. This event has happened periodically on the site as is evidenced by alluvial fans that have formed at the base of several drainages and discontinuous drainage courses across the site. This occurrence can be mitigated by avoiding alluvial fan and conveyance areas.

Groundwater Resources

Water withdrawal for domestic use will reduce groundwater resources in the area. It is likely that the major effect will be the cumulative effect of reduction in overall resources available in the watershed for other beneficial uses, including agriculture, fish habitat, and recreation. The use of sewage treatment faculties that return domestic water to groundwater can reduce the loss of groundwater resources and reduce watershed-wide effects. This is about equally effective whether water returned to groundwater is from a sewage treatment plant or septic tanks. The major potential loss of groundwater to the overall watershed is use for irrigation that results in a substantial loss due to evaporation. This loss is especially significant for groundwater because this resource is protected from evaporation and often is the source of low summer flows in surface waters in the Yakima Valley.

The major risk to groundwater quality and domestic supply is the potential for failure of the sewage treatment facility to meet discharge standards. Discharge of untreated wastewater would cause the average nitrate concentration in groundwater to exceed drinking water standards in downgradient wells.

Vegetation and Wetlands

All alternatives would remove much of the existing forest cover on the flatter easterly portion of the site. Alternatives 1, 3, and 4 would remove varying proportions of the forest cover on the steeper easterly portion of the site.

Alternative 1 would involve residential development in the vicinity of existing wetlands in the bench area of the easterly portion of the site. Direct impacts will depend on the size of buffers included in the proposal. Regardless of the preservation of wetlands or the size of buffers, some change in the hydrologic conditions that support the wetlands can be expected either from diverting water that currently infiltrates into the ground and recharges the wetlands, or through additional discharge of stormwater into watercourses and to the wetland. In either case, the natural hydroperiod of the wetlands would change and have a ripple effect on functions.

Alternatives 2 and 5 would have much less impact on wetlands in the easterly portion of the site because the area would remain undeveloped and subject to disturbance only on the cycle of one a decade or less often for forest management practices. Some disturbance could be expected from recreational activities, but at a much lower intensity than from residential use.

Alternatives 3 and 4 would involve residential development in the vicinity of existing wetlands in the bench area of the easterly portion of the site. Direct impacts would be somewhat less than Alternative 1 because of the lower intensity of use and would also depend on the size of buffers included in the proposal

Fish and Wildlife

Because of the distance to surface water and the soil conditions that promote infiltration, little impact on fish is expected.

Residential development and increased human presence would reduce the amount of suitable habitat for many species, as well as the quality of remaining habitat. Forest and shrub vegetation would be converted to housing, roadways, and lawns or other ornamental plantings with reduced structural diversity. Use of the site would change from the current pattern of occasional daytime recreational use to one in which human activity would become a permanent feature. Under all alternatives, the presence of residences with associated clearing of vegetation and introduction of noise, light, and domestic animals would discourage elk and other sensitive species such as mule deer from using the site. The likely continued use of the site for off-road vehicle use would further curtail habitat use. White-tailed deer, which are less sensitive than mule deer or elk to human disturbance, may become a nuisance due to foraging patterns that include ornamental plantings and vegetable gardens.

Elk likely would continue to use the site as a migration corridor for movement between the summer habitat to the north and winter range along the Yakima and Cle Elum rivers. Elk can tolerate some human disturbance during migration and may tend to move quickly through the Marian Meadows property during periods with low levels of human use, such as at night or in the early morning.

Alternative 1, the applicant's PUD proposal with 443 units, would have the greatest impact on wildlife due to residential development throughout the site. The flat, western portion of the site would be almost entirely divided into relatively small residential lots with little habitat potential. The eastern portion of the site (except for the highest-elevation areas in the northeastern corner) would also be converted to residential use, although with somewhat larger lot sizes. Wetlands and stream corridors on the site would become isolated and fragmented and lose much of their habitat value.

The intensity of residential use would substantially impair migration of large mammals such as elk and mule deer. The remaining corridor on the westerly part of the site, the BPA transmission line easement, is relatively narrow and would be bounded on one side by lots, which would create substantial sources of disturbance from noise, lights, and animals such as dogs and impair wildlife movement.

The potential migration corridor through the upper portion of the site would be impaired to an even greater extent by the subdivision of the less steep sloping lands across which herds would be most likely to travel.

Alternatives 2 and 5 with all development on the western portion of the site would retain the steep, eastern portion of the property in forest use. This area would continue to provide potential wildlife habitat and could serve as a migration corridor. The steep terrain in that part of the site, however, makes it a less productive habitat area and limits its effectiveness as a migration corridor for elk and other large animals. Impacts on the westerly portion of the site would be similar to Alternative 1. Similar restriction of migration across the westerly portion of the site would occur.

Alternative 3, No Action Alternative with up to 147 units of 3-acre lots each, would result in substantially less residential development than Alternative 1 or 2. Habitat value for species sensitive to human disturbance would be reduced compared to current conditions; however, migration across the site would be restricted.

Alternative 4, PUD with reduced density on the entire site with about 195 lots, would result in the development of fewer residential lots than either Alternative 1 or 2. In the long term, however, habitat loss and species displacement would be similar to Alternative 1, although somewhat less on the steep, less productive easterly portion of the site.

Under either of these cumulative impact scenarios, anticipated future development in the vicinity of the Marian Meadows site will contribute to further losses of wildlife habitat, potential degradation of fish habitat, and increased levels of human disturbance. Increased density of residential development in the upper Yakima River Valley floodplain will further constrain the movement of elk and other large mammals through the area, presenting barriers to movement between summer and winter habitat areas.

CHAPTER 2 Description of Alternatives

1 What is proposed by the applicant?

Alternative 1 is the applicant's proposal. As presented in this DEIS, it includes a "pro-forma" subdivision layout in the easterly portion of the site.

Alternative 2 generally meets the goals of the applicant that places all development on the westerly portion of the site and also includes a component of multi-family use.

The Marian Meadows rezone and subdivision is located in unincorporated Kittitas County on a 520-acre site on the west-facing slopes of Easton Ridge (Figures 2-1 and 2-2). The site is divided topographically into an almost level westerly portion (about 120 acres) and a sloping area to the east (about 400 acres). The existing BPA 345-kV transmission line is at the approximate boundary line between the flat and sloped portions of the site.

These alternatives consist of two elements:

Element 1 - Rezone

A rezone of 520 acres of the property to a PUD zoning district is proposed as provided in Chapter 17.36 of the Kittitas County zoning code. An area at the bottom of the steep slope east of the BPA transmission line easement is excluded from the PUD application. The purpose of the PUD zone is to provide for and encourage a harmonious mixture of land uses with greater flexibility in land use controls, as well as to:

- Encourage innovative design;
- Provide for more economical and efficient use of land, streets, and public services;
- Preserve and create usable open space and other amenities;
- Preserve important natural features of the land;
- Encourage development of a variety of housing types and densities;
- Encourage energy conservation, including the use of passive solar energy;
- Encourage infill development of sites with special features;
- Create desirable public and private open space; and
- Vary the type, design, and layout of buildings.

How were the Proposal and Alternatives Developed?

The SEPA guidelines requires agencies to identify, evaluate, and require or implement, where required by the act and these rules, reasonable alternatives that would mitigate adverse effects of proposed actions on the environment according to WAC 197-11-030(2)(a).

As part of the scoping process for the EIS, input from the public and agencies was solicited.

One of the alternatives the public comments consistently requested to be analyzed was development under existing zoning.

Other alternatives have been developed to mitigate specific adverse impacts of the proposal.

Reasonable alternatives are those which an agency with jurisdiction has authority to control impacts either directly or indirectly through requirement of mitigation measures according to WAC 197-11-440(5)(b)(iii).

Limits on the range of alternatives considered for a private party generally do not apply to this proposal because it involves a rezone WAC 197-11-440(5)(d).

The density of a PUD is governed by Kittitas County Comprehensive Plan County-wide Planning Policy D under "Contiguous and Orderly Development, Planned Unit Developments" that states: "Standards shall be developed for residential PUDs outside of urban growth areas (UGAs) and urban growth nodes (UGNs) for a maximum density not to exceed a 3 to 1 ratio of the underlying zone."

The maximum allowed density is derived as follows:

- Rural 3 (R-3) underlying zoning allows one unit per 3 acres, PUD would allow one unit per acre, and 430 acres are zoned R-3; therefore, 430 units are allowed.
- Forest and Range (FR) underlying zoning allows one unit per 20 acres, PUD would allow one unit per 6.66 acres, and 90 acres are zoned FR; therefore, 13.5 units are allowed.

The sum of these results in a total maximum of 443 units.

The criteria for approval of a rezone under Kittitas County Code 17.90.020(7) are:

- The proposed amendment is compatible with the comprehensive plan;
- The proposed amendment bears a substantial relation to the public health, safety or welfare;
- The proposed amendment has merit and value for Kittitas County or a sub-area of the county;
- The proposed amendment is appropriate because of changed circumstances, or a need for additional property in the proposed zone, or the proposed zone is appropriate for reasonable development of the subject property;
- The subject property is suitable for development in general conformance with zoning standards for the proposed zone;
- The proposed amendment will not be materially detrimental to the use of properties in the immediate vicinity of the subject property; and
- The proposed changes in use of the subject property shall not adversely impact irrigation water deliveries to other properties.

Alternative 1 is shown in Figure 2-1 and includes the applicant's proposed plat layout with 226 lots on the westerly portion of the site, together with the "pro-forma" lot layout on the east side. For analysis purposes, this alternative is presumed to have 443 lots. The lot arrangement on the easterly portion of the site is provided for illustrative purposes only and is only one potential arrangement of lots.

The westerly, lower, flatter portion of the property is proposed to be divided into 226 lots on about 120 acres or about 1.8 lots per acre. After removal of area for roads, the lot size would be a little less than 0.5 acre.

The easterly, steeper portion of the property would host the remaining 218 lots on 305 acres. The applicant has not prepared a specific proposal for that portion of the site. Because of the lack of a specific proposal, a "pro-forma" layout of potential building sites and lots on that portion of the site has been developed for the DEIS. The 218 lots on 305 acres is a nominally lower density of 0.72 lots per acre. The steep sloping portions of this site, together with a stream and wetland area, leave only 100 to 150 acres of this portion of the site suitable for building. The layout features lots that vary from about 0.25 acre to about 5 acres.

The site layout and PUD proposal includes the following features:

- Primary access would be provided to Sparks Road, a county-maintained public road to the south.
- Secondary access would be provided to Country Drive near the north boundary of the plat, a privately maintained public road.
- An open space area of about 100 acres is proposed in the northeast corner of the property adjacent to the Wenatchee National Forest.
- Water service would be provided by the Easton Water District No. 3.
- Sewage disposal would be provided through a reclaimed wastewater treatment plant to be built by the applicant, and designed such that treated effluent would meet standards for recycled water.

Alternative 2 is shown in Figure 2-2 and includes clustered development in the lower portion of the site to avoid development in the steep easterly portion of the site and provides:

- Approximately 195 single-family lots ranging from about 5,000 square feet to about 20,000 square feet with slightly larger lots along the margins of the site or adjacent to the BPA transmission line easement, which would provide for a wildlife corridor through the site.
- A multi-family site of about 12.5 acres would accommodate 248 units, or about 20 units per acre if the full PUD density maximum of 443 units is reached.
- Impacts from road and future residential construction on steep sloping hillsides in the easterly portion of the site would be avoided.
- Potential risks of wildfire to persons and property would be reduced by avoiding the area with the highest potential risk and with lower potential for successful evacuation and successful fire suppression.
- Additional public service costs from water service to higher elevations, road maintenance, snow removal, and fire and emergency medical service response would be avoided.
- Larger contiguous areas would be retained for wildlife habitat and wildlife corridors without impacts from nearby residential use.
- About 32 acres in the southwest portion of the site would be undeveloped to accommodate the Easton State Airport safety zone.
- About 6 acres in the southeast portion of the site would be undeveloped to avoid an alluvial fan and debris flow hazard and would accommodate berms and a channel to convey water.
- Fewer deeper lots would be provided within the alluvial fan/debris flow hazard in the northerly portion of the lower site with berms and a channel to convey water away from building areas on the lots.

- Recreation or other use may be accommodated in the airport safety zone and area of geologic hazard.
- The BPA transmission line easement could provide the potential for trail use.
- Additional public service costs from water service to higher elevations, road maintenance, snow removal, and fire and emergency medical service response would be avoided.
- Larger contiguous areas would be retained in the upper portion of the site for wildlife habitat without adverse impacts from nearby residential use.
- Access, water service, and sewage disposal would be the same as in Alternative 1.

Element 2 - Preliminary Plat

The second element of the proposal is a preliminary plat covering the western one-third of the property that would be divided into 225 lots with an average lot size of approximately 0.41 acre, or about 17,500 square feet.

The preliminary plat includes the following features:

- Primary access would be provided to Sparks Road, a county-maintained public road to the south.
- Secondary access would be provided to Country Drive near the north boundary of the plat, a privately maintained public road. As an alternative or supplement, a second access could be provided from Sparks Road at the easterly margin of the flat westerly portion of the site across adjacent property.
- Three roads are stubbed to the east to provide access to the remainder of the site, for which a lot layout has not been developed.

Proposed infrastructure to serve the project includes:

- Approximately 2.6 miles in the current preliminary plat application (and an estimated 3.8 miles in the easterly portion for 6.4 miles of road at full buildout).
- Water service would be provided by the Easton Water District No. 3.
- Sewage disposal is proposed through a wastewater treatment plant to be built by the applicant, and designed such that treated effluent would meet standards for recycled water. The lot size proposed in Alternative 1, however, would allow individual on-site sewage disposal systems under Washington State Board of Health standards. Multi-family development in Alternative 2 likely would not be accommodated by on-site systems.

The Kittitas County Board of Commissioners will consider the subdivision as a quasi-judicial decision only if the rezone is approved. The preliminary plat will first be reviewed by the Planning Commission who will make a recommendation to the County Commissioners. The criteria for approval of a subdivision under Kittitas County Code 16.12.160 and 170 are:

- Whether the proposal includes appropriate provisions for drainage, roads, alleys, and other public ways, water supplies, sanitary wastes, parks, playgrounds, fire protection facilities, school sites and grounds, and other public and private facilities and improvements;
- Whether the proposal conforms to the general purposes of the comprehensive plan; and
- If the public use and interest will apparently be served by the proposal (Ord. 2005-31, 2005).

2 What alternatives have been considered?

Three alternatives to the applicant's proposal have been developed.

Alternative 3: No Action Alternative

This alternative illustrates development at the existing zoning without PUD approval. This option would include water district service but would employ individual on-site sewage disposal rather than a wastewater treatment plant. The proposal includes distribution of lots over the site at the minimum 3-acre lot size allowed by existing zoning. This would allow up to 147 total lots. Figure 2-3 provides a conceptual layout of such a subdivision. The actual layout of roads and lots could vary from this concept and might result in fewer lots. This alternative includes the following features:

- This layout does not provide for avoidance of or larger lots in the airport safety zone.
- This layout does not avoid the area of geological hazards related to the alluvial fan and debris flow hazard. The configuration of lots in this area would expose up to 6 lots to this potential hazard. It is possible that alternative layouts in combination with construction of berms or channels to convey flooding and contain debris could reduce hazard exposure.
- Water service would be provided by the Easton Water District No. 3.
- Sewage disposal would be individual on-site sewage disposal systems on each lot.

The **Compilation of Mitigation Measures Alternatives** consists of Alternatives 4 and 5 that incorporates measures identified in the DEIS analysis that would reduce specific impacts upon the environment., These modifications may be imposed as governmental conditions to control environmental impacts or meet applicable local, state, or federal codes or criteria. Alternatives were developed after evaluating impacts of the proposal.

Two options are presented which would use the PUD process to vary cluster lots.

Alternative 4: Reduced Density PUD on the Lower and Upper Site includes clustered development on both the flatter westerly area and on the steep easterly portion of the site. The conceptual layout in Figure 2-4 includes 195 lots as a possible layout. Other layouts could result in slightly more or fewer lots.

Alternative 5: Reduced Density PUD on the Lower Site provides for development only on the lower westerly portion of the site with a total of up to 147 lots, which is the density allowed by existing zoning but without use of PUD bonus provisions. The conceptual layout in Figure 2-5 includes 124 lots as a possible layout. Other layouts could result in slightly more lots. For the purposes of impact analysis, up to 147 lots are presumed for most elements of the environment.

Both of these options include the following features:

- Lot layout avoids development in the airport safety zone in the southwesterly corner of the site.
- Lot layout avoids the alluvial fan/debris flow hazard in the southeasterly portion of the lower site with berms and a channel to convey water away from structures on the lots.
- Fewer deep lots are provided within the alluvial fan/debris flow hazard in the northerly portion of the lower site with berms and a channel to convey water away from structures on the lots.
- Development in the lower portion of the site provides a variety of lot sizes including larger lot sizes adjacent to existing large lot rural development along the eastern property line.
- An area, which includes acreage east of the BPA transmission line easement, is preserved for a wildlife corridor; larger lots are provided adjacent to this area.
- Additional open space provided in the airport safety zone and area of geologic hazard may be used for recreation or other use.
- The BPA transmission line easement provides the potential for trail use to address recreational needs of future residents.
- Water service would be provided by the Easton Water District No. 3.
- Sewage disposal would be provided by on-site sewage disposal systems. Individual systems for each lot would be feasible for the lower westerly portion of the site. Shared drainfield systems would likely be required for lots in the easterly portion of the site and could be accommodated within the BPA transmission line easement or other open space areas on the lower westerly portion of the site.

Alternative 4 clusters a reduced number of lots in the upper portion of the site to avoid the steep slopes and sensitive natural features, such as wetlands, and provides for more effective forest management and control of wildfire risk. Alternative 5 avoids this area and results in a reduction of the following potential impacts:

- Impacts from road and future residential construction on steep sloping hillsides would be avoided and reduce topographic modification with associated erosion, landslide, and rockfall hazard.
- Potential risks of wildfire to persons and property would be reduced by avoiding the area with the highest potential risk and with lower potential for successful evacuation and fire suppression.
- Additional public service costs from water service to higher elevations, road maintenance, snow removal, and fire and emergency medical service response would be avoided.
- Larger contiguous areas would be retained for wildlife habitat and corridors without impacts from nearby residential use.

Tenure Scenarios

In addition to site development alternatives, four tenure scenarios were developed to reflect a potential range of characteristics of future residents. Because of uncertainty in predicting the character of future residents, these scenarios comprise different mixes of:

- Full-time year-round residents primarily living and working in the area with the age structure and family tenure typical of Kittitas County as a whole;
- Full-time year-round residents who are retired; and
- Part-time seasonal residents primarily using the site for winter sports and summer recreation.

Details of the rationale for the tenure scenarios are found in the discussion of Land Use Impacts, specifically item 8, "Are future residents likely to live on the site year-round? Or will they live on the site seasonally?"

The four tenure scenarios that have been developed include:

Tenure Scenario 1 – All full-time residents

This scenario includes 85 percent workforce families composed of full-time year-round residents with the head of household younger than retirement age and 15 percent retired persons reflecting the current census demographics of Kittitas County.

Tenure Scenario 2 - Primarily workforce families

This scenario includes 60 percent workforce families, with 15 percent retired residents, and 25 percent part-time recreational residents.

Tenure Scenario 3 – Near Balanced

This scenario includes 35 percent workforce families, with 30 percent retired residents, and 35 percent part-time recreational residents.

Tenure Scenario 4 - Primarily Recreational

This scenario includes 25 percent workforce families, with 25 percent retired residents, and 50 percent part-time recreational residents.

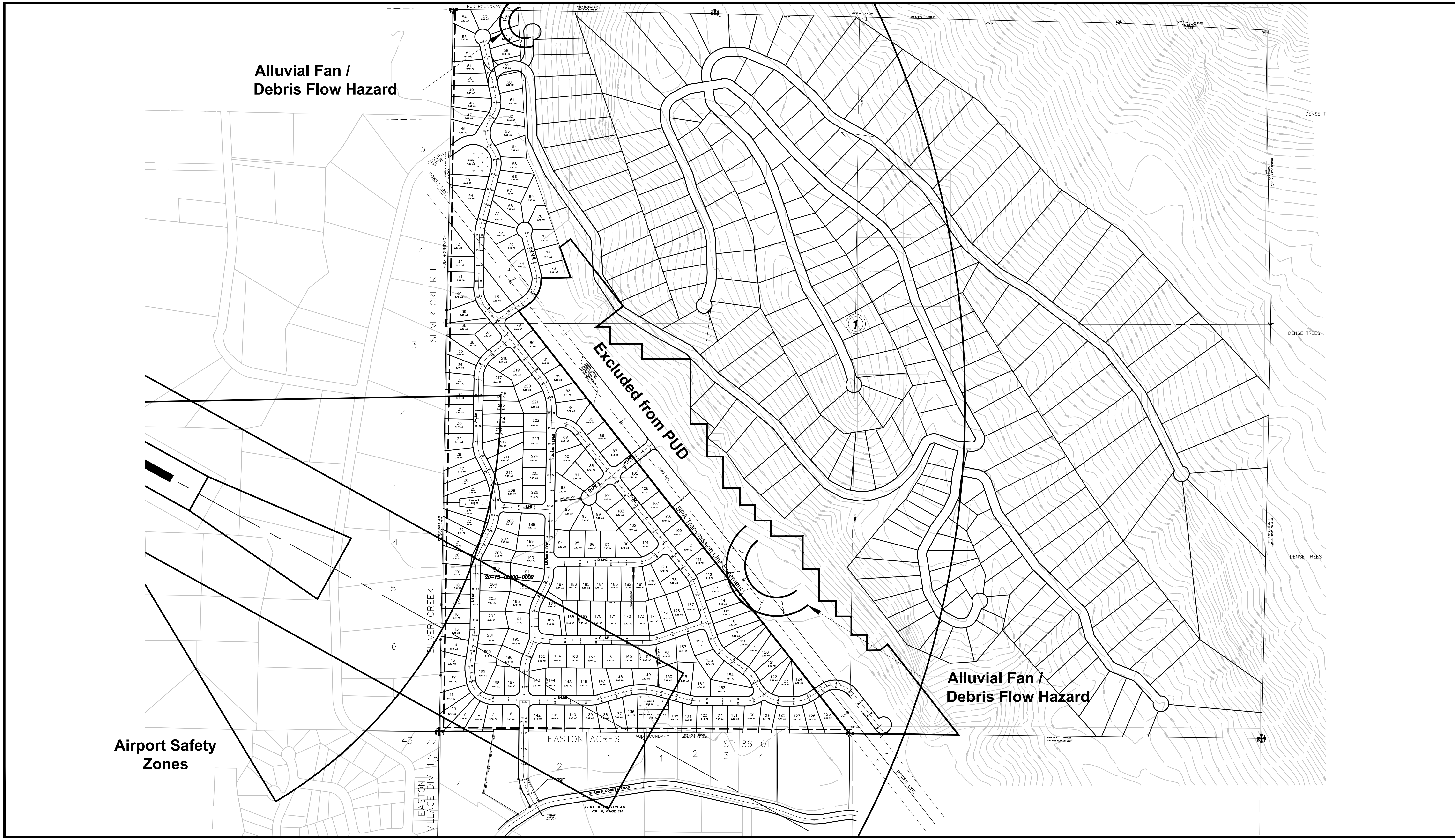
These scenarios do not affect the physical layout of the site, but have different impacts on public services such as schools and utility services.

3 What is the project schedule and phasing?

The project applicant estimates that the 225-unit preliminary plat in the westerly portion of the site would be built by 2014 or within 5 years of approval, weather permitting. This would result in 45 lots placed on the market in each of the 5 years.

Since 2000, an average of 43 new homes have been built each year in the Easton School District, which extends from south of Easton to Snoqualmie Pass.

For the entire 443-unit PUD, buildout of the project has been assumed to take 10 years.



Parametrix DATE: Feb 01, 2010 FILE: BL1763007P03T19-F2-1

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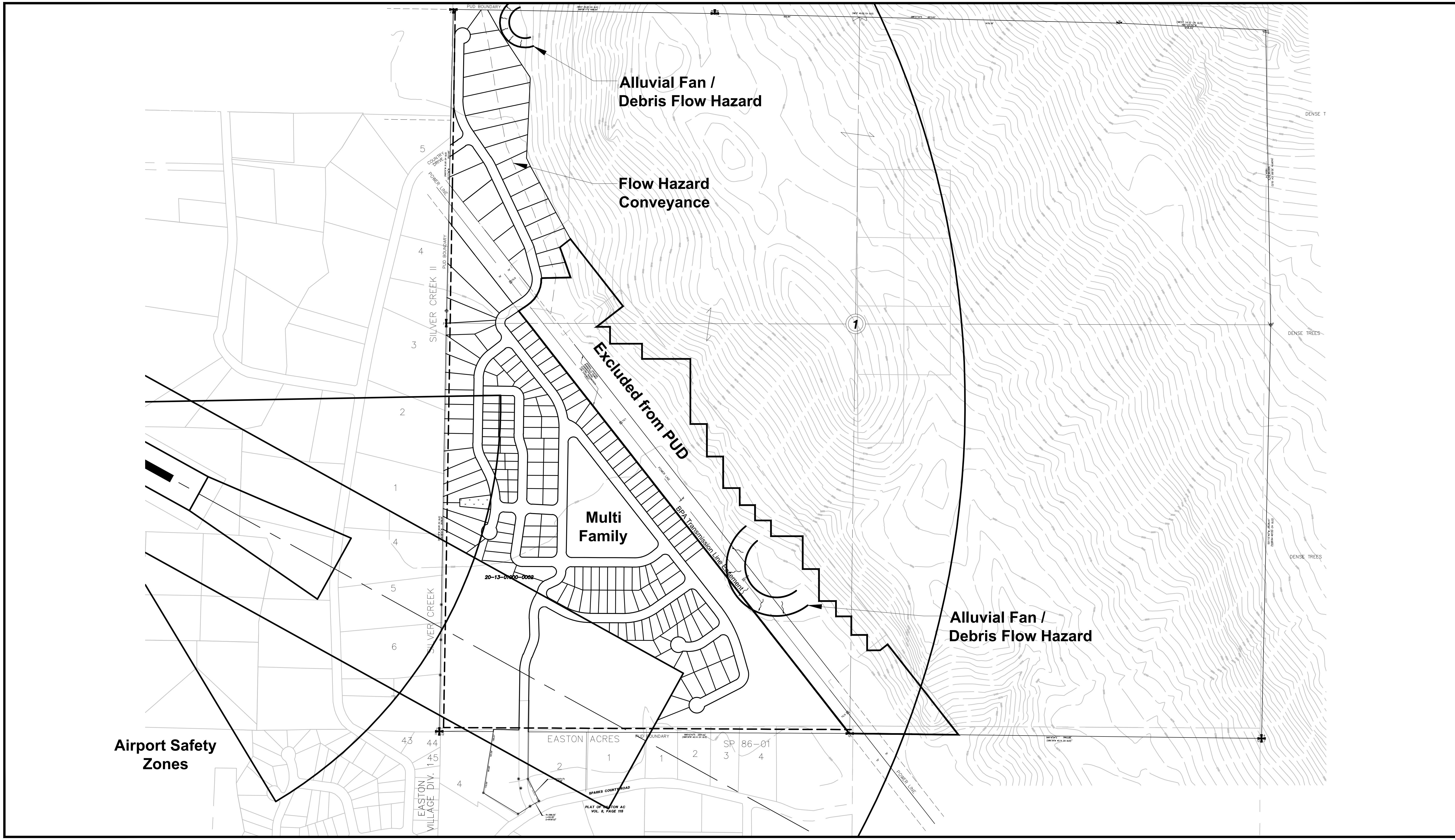
SCALE IN FEET

Kittitas County Marian Medows Estates EIS

Figure 2-1
Alternative 1 - Proposed Development (Pro-Forma Layout on Easterly Portion)



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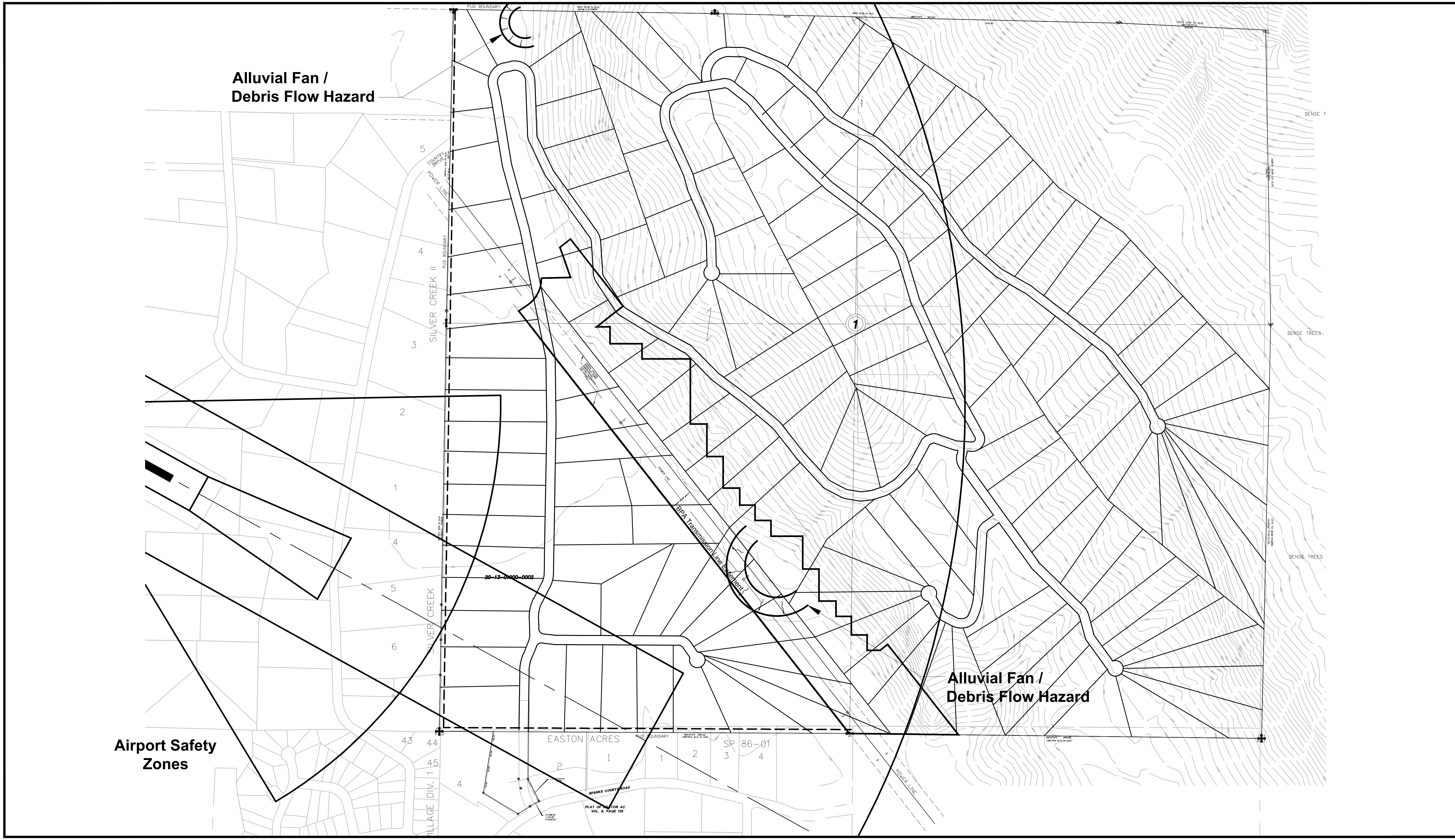
Kittitas County Marian Medows Estates EIS

Figure 2-2
Alternative 2 - Full PUD Density on Westerly Portion of Site



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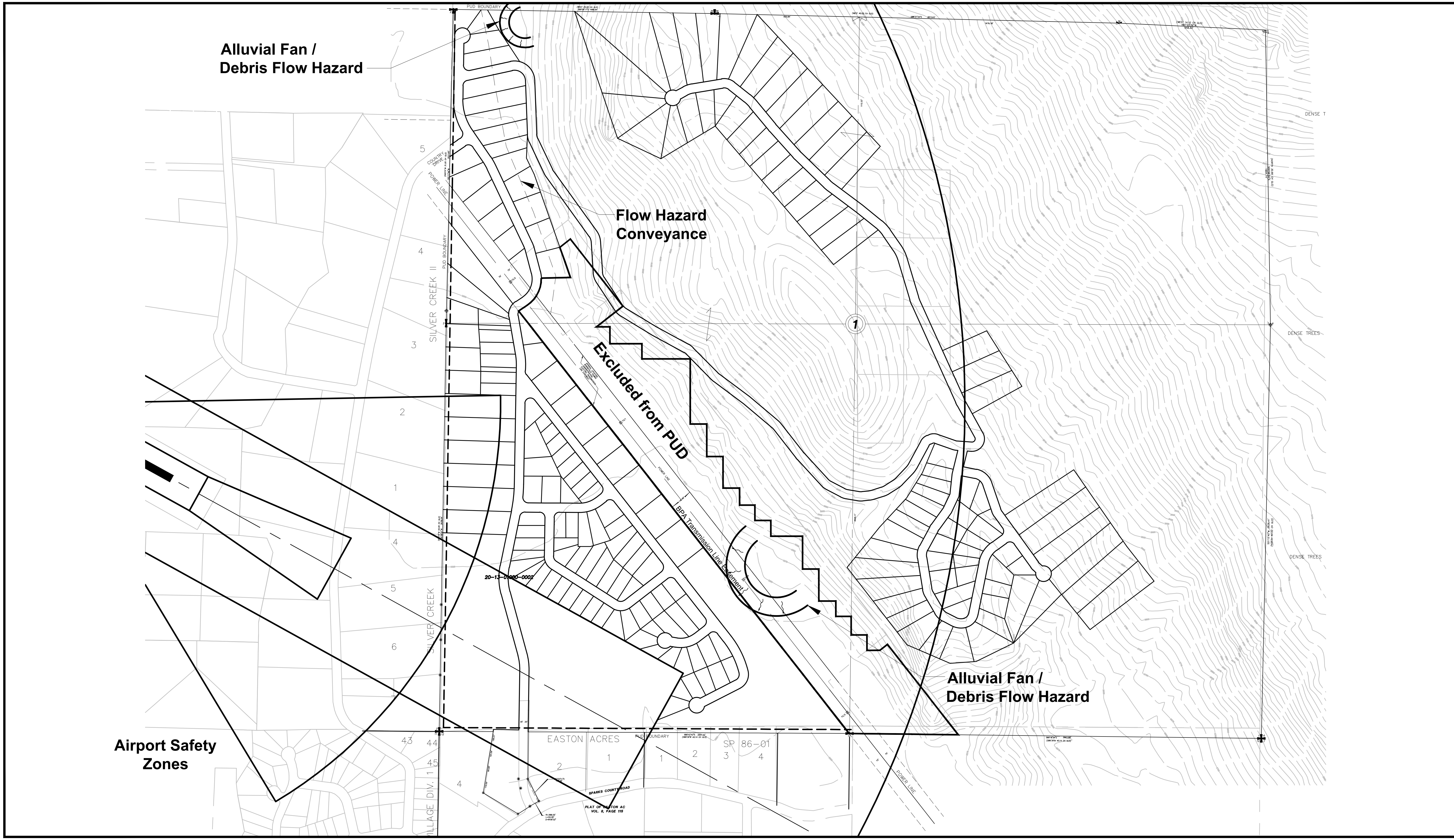
Kittitas County Marian Medows Estates EIS

Figure 2-3
Alternative 3 - No Action, Three Acre Lots



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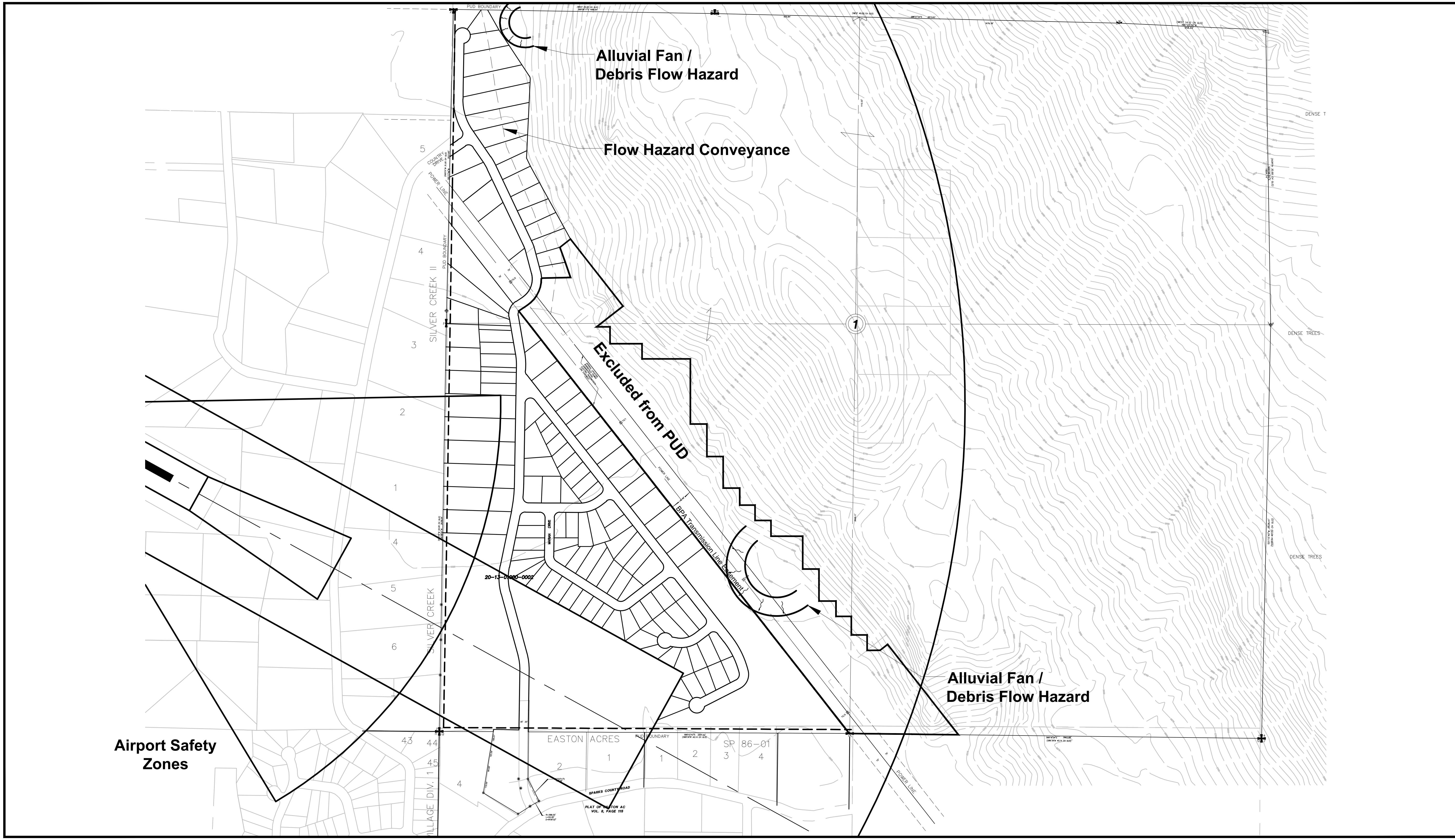
Kittitas County Marian Medows Estates EIS

Figure 2-4
Alternative 4 - Mitigation Alternative: Development on Lower and Upper Portion of Site



Parametrix DATE: Feb 01, 2010 FILE: BL1763007P03T19-F2-5

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Kittitas County Marian Medows Estates EIS

Figure 2-5
Alternative 5 - Mitigation Alternative: Development on Lower Portion of Site Only

Chapter 3 Environmental Consequences

1 What is addressed in this chapter?

This chapter of the DEIS analyzes the environmental consequences of construction and long-term use of the proposed land use action, including buildout of all lots and operation of infrastructure. This chapter also includes an analysis of cumulative impacts of the proposal in conjunction with buildout of surrounding residential land north of I-90 at both the existing zoning and at densities allowed if currently unplatted lands were developed as a PUD.

What is an Environmental Impact?

Impacts are the effects or consequences of actions (WAC 197-11-752).

Significant impacts are those with a reasonable likelihood of more than a moderate adverse impact on environmental quality (WAC 197-11-794[1]).

Significance involves context and intensity and does not lend itself to a formula or quantifiable test. The context may vary with the physical setting. Intensity depends on the magnitude and duration of an impact.

The severity of an impact should be weighed along with the likelihood of its occurrence. An impact may be considered significant even if its chance of occurrence is not great if the resulting environmental impact would be severe if it occurred (WAC 197-11-794[2]).

2 What are the major features of the project location?

The proposed project is within the Yakima River Valley, approximately 2 miles southeast of Kachess Lake. The project area is located on the south-facing slopes of Easton Ridge, which divides the Yakima River drainage from Domerie Creek and the Cle Elum River drainage to the north. At this location, the Yakima River Valley is approximately about 1.50 miles wide and is bounded by Goat Mountain on the south and Easton Ridge on the north.

The proposed site is approximately 15 miles west of the town of Cle Elum and approximately 15 miles east of Snoqualmie Pass summit. It is located on the north side of I-90, and is accessed via the Sparks Road interchange, Exit 70 off of I-90. The proposed site is located approximately 1 road-mile from the interchange.

The following major natural and built features are located in the immediate project vicinity (Figures 3-1 and 3-2):

- The Wenatchee National Forest abuts the proposed site to the east. The U.S. Forest Service is the major landowner of the higher elevation forest land in the proposed site vicinity.
- The Easton State Airport is located approximately 0.25 mile northwest of the proposed site.

- The unincorporated town of Easton, on the south side of I-90, is located approximately 0.75 mile west and approximately 2 road-miles from the proposed site.
- Kachess Lake, part of the U.S. Bureau of Reclamation Yakima River Irrigation Project, is located approximately 1 mile northwest of the proposed site.
- Lake Easton State Park is located approximately 0.50 mile west of the proposed site on the south side of I-90. The park is approximately 1.50 road-miles from the proposed site.

The Upper Kittitas Valley has a total population of approximately 9,300 residents, including the incorporated cities of Cle Elum (population 1,835) and Roslyn (population 1,020), and the unincorporated communities of South Cle Elum (population 580), Ronald (population 326), Easton (population 407), and Snoqualmie Pass (population 441) (OFM 2008).

Directional References to I-90

I-90 traverses Washington State from east to west, ultimately connecting the city of Seattle on the west coast of the continental United States with the city of Boston on the east coast.

Directional references to I-90 in this document respect the general east-west orientation of the roadway and refer to property on either the north or south side of the interstate.

Directional references can be somewhat confusing because I-90 runs in a northwest to southeast orientation in the vicinity of the proposed site. Property "north" of I-90 in this area is also east of the interstate.

3.1 LAND USE

1 What are the geographical areas associated with the project?

In assessing existing land use, and for use in assessing impacts on public services, several different areas have been designated based on the extent to which project impacts would affect local communities close by, or further removed from the project site.

Areas designated for analysis of potential impacts include:

- The immediate **Project Site Vicinity** is described as the area north (or east) of I-90, between Kachess Lake on the north, the floodplain of the Yakima River on the south, the Wenatchee National Forest boundary on the east, and I-90 on the west. This area is served by Sparks Roads. It includes the proposed site, surrounding rural development, and the Easton State Airport.
- The **Easton Vicinity** is the area on both sides of I-90 in the vicinity of the original unincorporated town of Easton and includes those areas accessible from I-90 from Exits 70 and 71. Also included are areas directly accessible to Easton from the local road system, extending west to the boundary between rural and forest zoning, and to the east to the Wenatchee National Forest boundary. The northern boundary is Kachess Lake on the north side of I-90, and the southern boundary is the end of Iron Horse Road on the south side of I-90, which marks the boundary of the road system accessible from Exit 71. Iron Horse Road does not connect to the road system that is accessed by Exit 74.
- The **Area of Influence** is the area in which impacts of the site interact with other features of the natural or human environment to affect overall or cumulative impacts. This area differs according to

the elements addressed. For public services, the Area of Influence includes the service area of the particular service provider. For utilities, it includes the boundaries of a service district or the boundaries of an area served by an identifiable system component. For natural function, the Area of Influence varies by the resource; it is different for geology, surface water, groundwater, wildlife, and other elements. Each subsection below describes the Area of Influence for the resource influence analyzed.

2 What are the existing land uses in the area?

Project Site

The project site land use is currently forest use. The site was previously owned by a timber resources company and has been harvested a number of times since the area was settled in the 1850s. Approximately 130 acres of the westerly flat portion of the site was harvested in the 1980s. Approximately 440 acres of the easterly portion of the site consists of steep slopes and includes areas harvested for timber resources in the 1970s and 1980s. The character of the site and the size of trees and other vegetation reflect the regrowth that has occurred since the last harvest. The largest trees on the site are on steep slopes that were not harvested in the most recent cycles. These trees range from 50 to 70 years of age. The site is crisscrossed with logging roads and a number of landing and staging areas.

Project Site Vicinity

The area to the east of the project site is largely Wenatchee National Forest land managed for multiple purposes including water resources, timber harvest, and recreation.

There are 25 parcels ranging from 2 to 10 acres located south of the project site on Sparks Road and Hawthorn Lane that accommodate full-time and seasonal home sites. To the southeast of this area is an active aggregate mine, the 97-acre Cresto Pit, operated by Ellensburg Cement Products within the Yakima River floodplain.

To the southwest of the project site, the Easton Village plat consists of 72 parcels ranging from one-third to slightly over 1 acre. Immediately west of the project site is the Silver Creek subdivision with 35 parcels averaging approximately 5 acres and ranging from one to seven acres.

The Easton State Airport, owned by WSDOT, is located on a 150-acre site about 0.25 mile west of the project. Northwest of the airport are two residential subdivisions off of Sparks Road with lot sizes between 0.50 acre to 1 acre. These subdivisions are Silver Acre Trails and Easton Estates.

Commercial development on Sparks Road, north of I-90, consists of a convenience store, gas station, restaurant, and recreational vehicle park called Turtle Town.

Easton Vicinity

The unincorporated townsite of Easton was established by the Northern Pacific Railroad on the east side of the Stampede Pass tunnel at the Cascade Mountains divide after the tunnel opened in 1888. Easton was the site of a small depot and roundhouse with additional locomotives to provide extra traction power to move trains over the steeper section of track to the divide as well as providing resting quarters for the railroad crew. Most railroad facilities in Easton were closed in the 1970s (Phillips 2000). The Burlington Northern Santa Fe (BNSF) Railroad mothballed the rail line in 1984 and reopened it to limited traffic in 1996. A portion of the town of Easton is currently occupied by the Easton School District. Main Street and Railroad Avenue contain several businesses. North of the school are 25 houses with an estimated population of 60 residents.

The townsite of Easton should not be confused with the Easton Census Designated Place (CDP), which covers a larger area. The Easton CDP includes all the land between the BNSF Railroad on the south side of I-90 from Lake Easton State Park to Exit 71. It also includes the area north of I-90, which is north of Sparks Road and east of Country Drive. The CDP is smaller than the Easton Vicinity discussed in this document because it excludes land on the south of Sparks Road and east of Country Drive (including the Marian Meadows site). According to the 2000 U.S. Census, the Easton CDP had a population of 338 in 151 households with 228 housing units. The difference between 228 housing units and 151 households indicates that 77 housing units, or approximately one-third of the housing units in the Easton CDP, were either classified as vacant or seasonally occupied at the time of the 2000 census.

On the south side of I-90, most of Lake Easton is surrounded by Lake Easton State Park, except for an 8-acre site containing the Lake Easton Resort and Outdoor Recreation Club. South of the townsite of Easton, there is a development of approximately 40 lots, each 5 to 10 acres, about half of which include homes. West of Easton, development on Cabin Creek Road consists of approximately 30 lots.

According to Kittitas County Assessor's records, approximately half the lots in this area include improvements of sufficient value to indicate that a housing unit has been constructed. Of those with improvements, about half have a taxpayer address outside Kittitas County zip codes, indicating probable seasonal use.

North of I-90 is the Sun Island Park subdivision located just east of Exit 71, which consists of approximately 150 lots, averaging 1.50 acre, between two channels of the Yakima River. Approximately 115 lots are developed and two-thirds are estimated to be occupied seasonally (Anderson 2008).

Area of Influence

For the purposes of this land use analysis, the Area of Influence includes the area addressed in the Upper Kittitas County Vision Plan, prepared in 2005, and extends roughly from Cle Elum to Snoqualmie Pass. The Area of Influence includes the cities of Cle Elum and Roslyn; the unincorporated communities of Ronald, Easton, and Snoqualmie Pass; and the resort community of Suncadia. The 2000 census population of the area was approximately 9,000. Table 3-1 contains more detailed population characteristics.

The communities of Cle Elum, Roslyn, Ronald, and the Suncadia Resort are a distinct community separated from the Easton area by Easton Ridge.

3 How many people live in the project vicinity?

The estimated population of the project vicinity (north of I-90) is based on the number of housing units (about 140 based on the County Assessor's data) and likely 50 percent split between year-round and seasonal residents based on 2000 census data and water consumption data. In addition to housing units, there are 60 to 80 vacant lots in the project vicinity. The estimated year-round residents are between 180 and 200 permanent residents, of which about 20 percent are estimated to be retired. Peak population when most seasonal residents are in the area on holiday weekends is likely to be 450 to 500.

Table 3-1 indicates the population estimates and some characteristics of the population from the 2000 census.

4 What are the plans for future land use in the area?

The Kittitas County Comprehensive Plan designation for the site is Rural, as shown on Figure 3-4.

The Kittitas County Comprehensive Plan designations for the Easton Area are a combination of Rural, Forest, Forest and Range, and Commercial Forest, with a Commercial designation on the north side of I-90 near Exit 70 and in the town of Easton, as shown on Figure 3-4.

5 What is the existing zoning and anticipated land use for the project site and surrounding area?

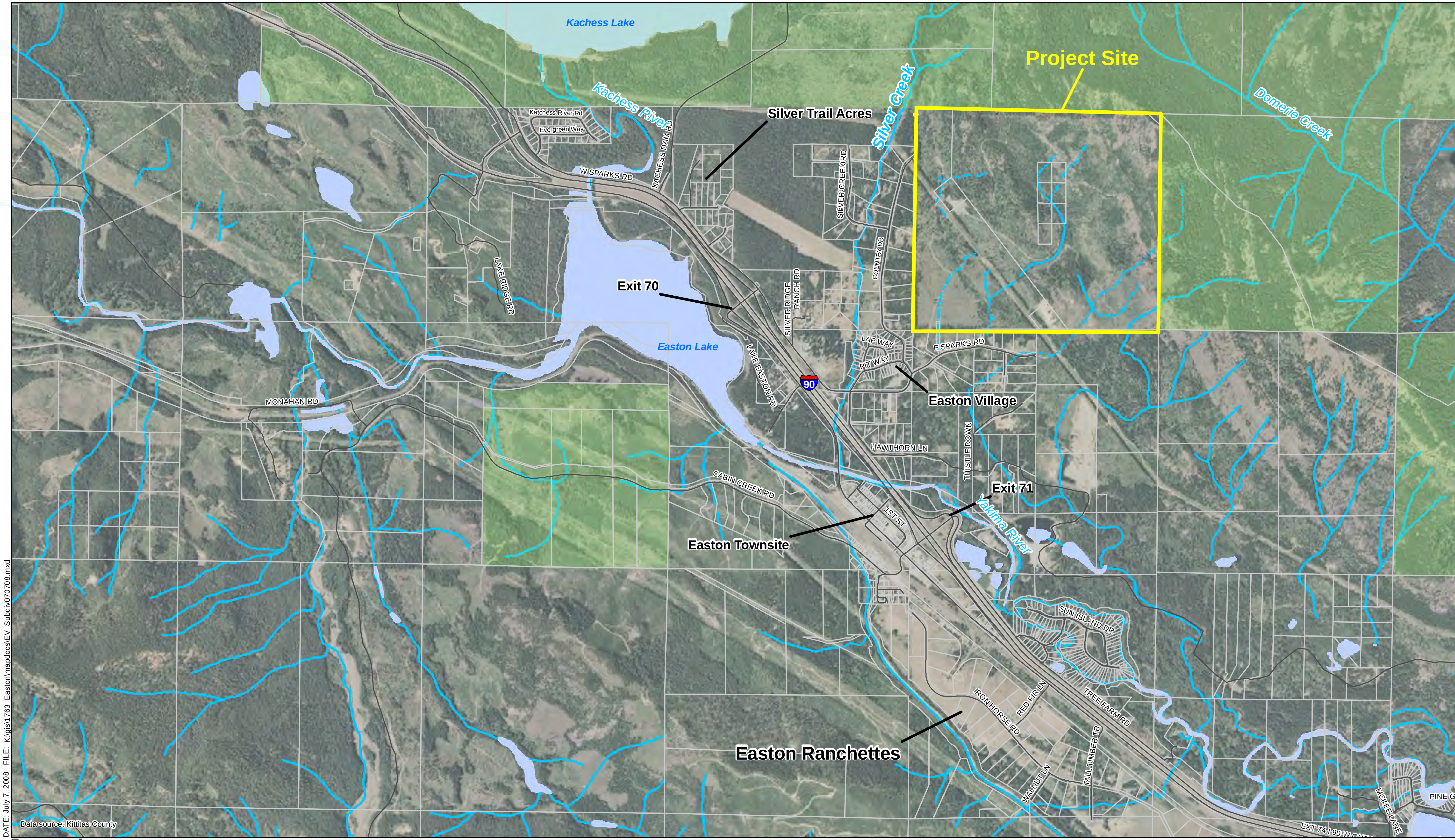
The existing zoning for the project site is Rural 3 (R-3) for 481 acres in the westerly portion of the site. The 88 acres in the northeast corner are zoned Forest and Range (FR) as indicated in Figure 3-5. R-3 zoning was extended in 2002 to over 152 acres in the northern half of the property, which was formerly zoned Commercial Forest (CF).

The purpose of the R-3 zoning designation is to provide areas where residential development may occur on a low density basis. A primary goal in siting R-3 zones is to minimize adverse effects on adjacent natural resource lands (KCC 17.30.10). Accordingly, the minimum lot size is 3 acres (absent PUD zoning), with a front yard setback of 25 feet and other setbacks of 15 feet. A special setback of 200 feet is required from land in the CF zoning district.

What types of land uses are allowed in land zoned R-3?

A variety of land uses are allowed in the R-3 zone, ranging from single-family homes and mobile homes to lodges and community clubhouses. Resource land uses such as agriculture and forestry are also allowed. Mining is allowed in an established mining district, with a new mining use requiring a conditional use permit. A variety of other conditional uses include campgrounds, guest ranches, group homes, retreat centers, golf courses, and gas and oil exploration and production.

The northeast 88 acres of the project site are zoned FR. This area was rezoned from CF in 2002. The purpose of this zone is to provide for areas where natural resource management is the highest priority and where the subdivision and development of lands for uses and activities incompatible with resource management are discouraged. The minimum lot size in the FR zone is 20 acres, with the provision that lots may be 0.50 acre within an approved platted cluster subdivision that is served by public water and sewer. Lot size may also be 6,000 square feet if the lot makes use of existing municipal sewer and water systems.



Parametrix

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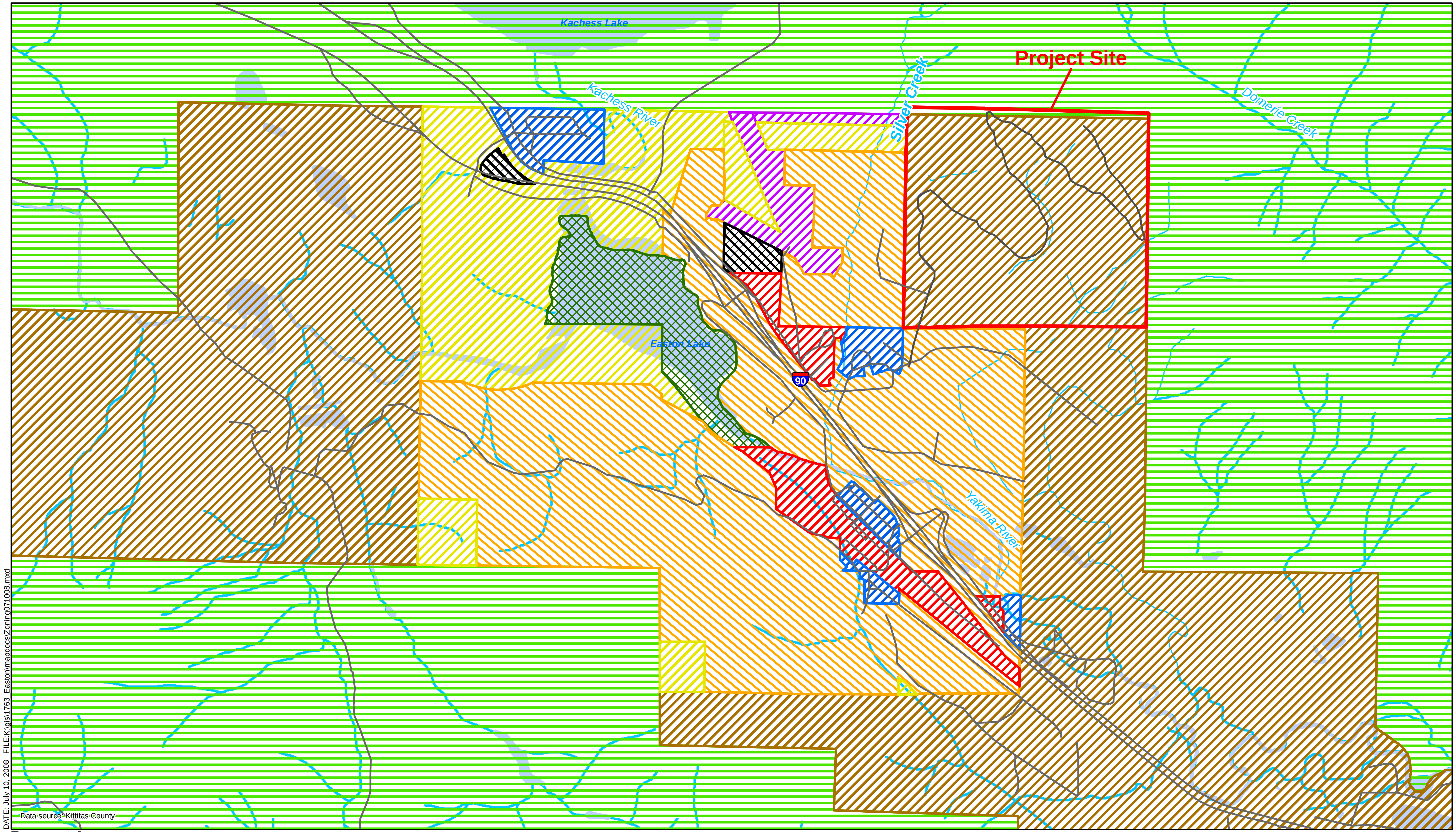
Scale in Feet

Legend

- Road
- Project Site
- Parcel Lines
- USFS Ownership
- Lake
- Intermittent Stream
- Perennial Stream

Figure 3-1
Marian Meadows
Major Features in
the Easton Vicinity



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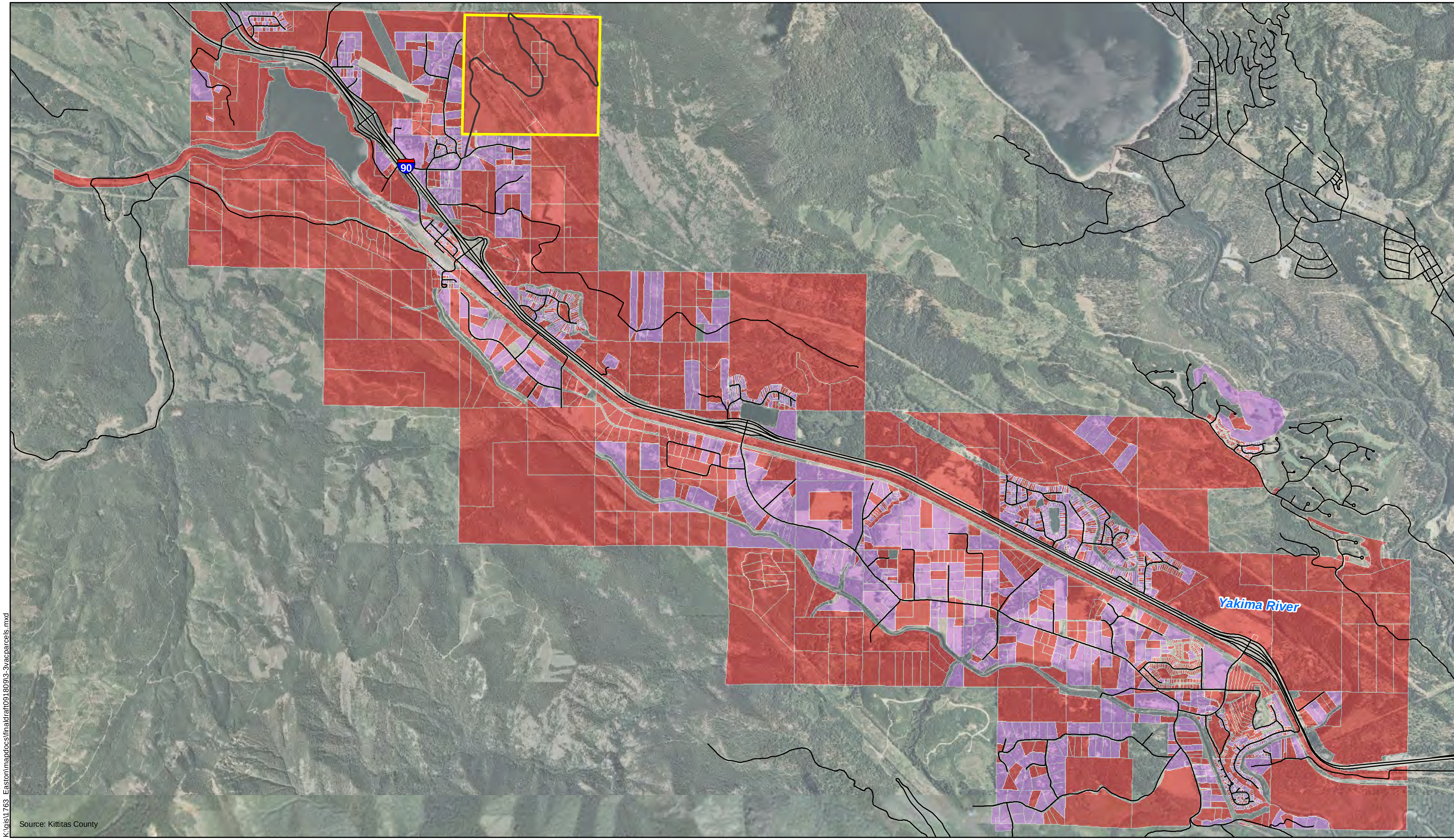
Road
Stream
Lake
Project Site

Land Use

COMMERCIAL
COMMERCIAL FOREST
FOREST MULTIPLE USE
INDUSTRIAL
PUBLIC RECREATION
RURAL
RURAL RESIDENTIAL
UNCLASSIFIED
URBAN RESIDENTIAL

Figure 3-2
Marian Meadows
Existing Land Use
in the Easton Vicinity



Parametrix

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Scale in Feet

Legend

Improvement value <=$10000 (Vacant Parcels)

Improvement value > $10000

Roads

Project Site

Figure 3-3
Marian Meadows
Vacant Parcels

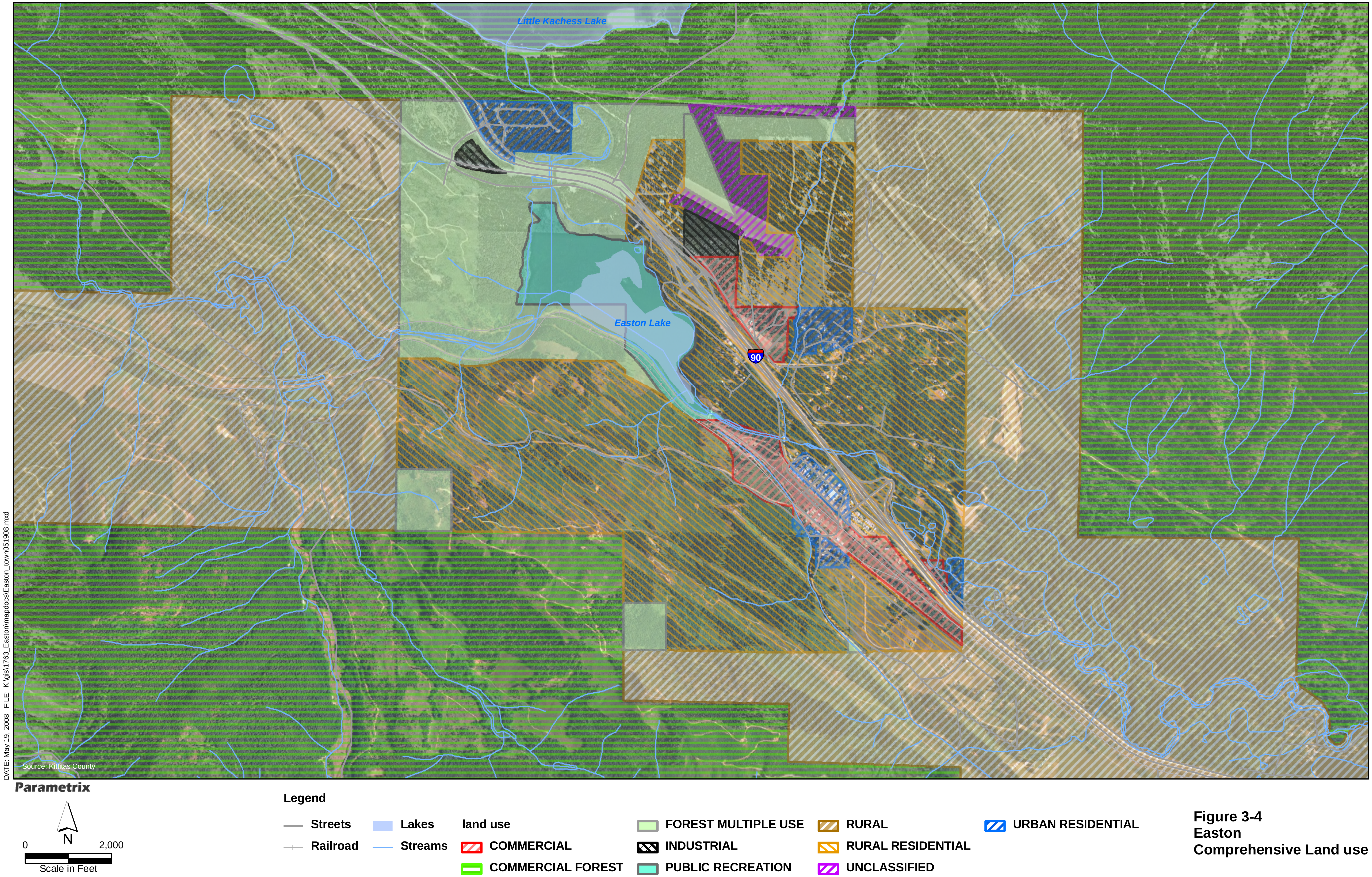


Figure 3-4
Easton
Comprehensive Land use

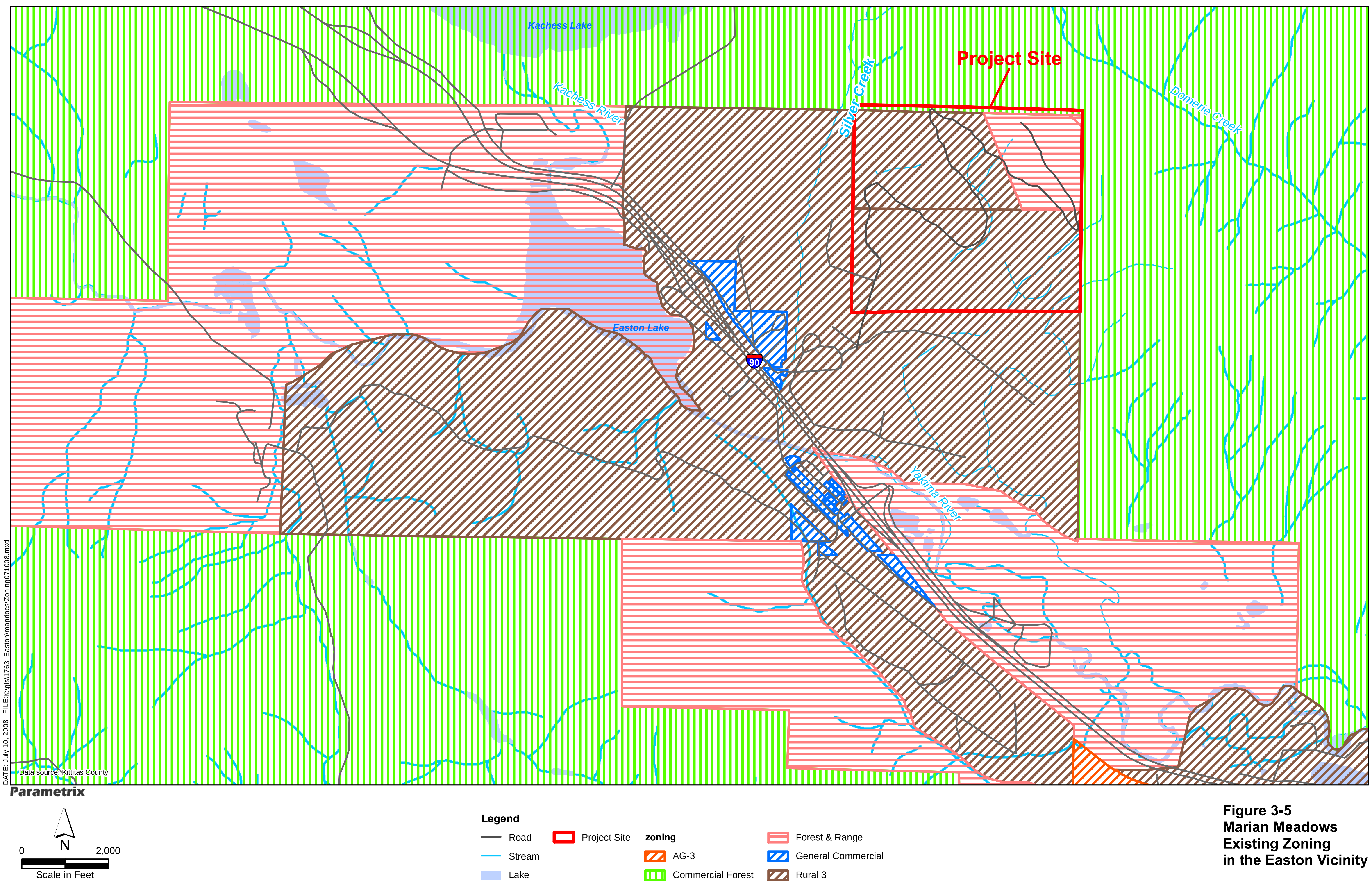


Figure 3-5
Marian Meadows
Existing Zoning
in the Easton Vicinity

Table 3-1. Area Population and Housing Characteristics

	Washington State	Kittitas County	Upper Kittitas County	Easton CDP	Project Vicinity	Easton School District
2000 Census						
Population	5,894,121	33,362	3,336	383	167	837
Age 0-4 (percent)	6.7%	5.1%	4.4%	7.8%	7.8%	
Age 5-18 (percent)	19.0%	15.5%	16.7%	20.9%	14.4%	
Age 18-65 (percent)	63.1%	67.8%	64.0%	59.8%	65.3%	
Age 65 and older (percent)	11.2%	11.6%	14.9%	11.5%	12.5%	
Housing Units	2,451,075	16,475	3,198 units	228	156	
Occupied Housing Units (percent)	92.7% (2,271,398)	81.2% (13,382 units)	44.2% (1,413 units)	66.2% (151 units)	46.8% (73 units)	
Seasonal Housing (percent)	2.5% (60,355 units)	10.87% (1,791 units)	49.9% (1,595 units)	19.7% (45 units)	40.387% (63 units)	
Average Household Size	2.53	2.33	2.35	2.54	1.41	
Households with children (percent)	32.7% (742,481)	26.2% (3,506 total)	24.5% (345 total)	31.4% (169 total)	27.4% (20 total)	
Children per household	0.67 child/house	0.51 child/house	0.5 child/house	0.73 child/house	0.51	
Lived in different county in 1995 (percent)	20.7%	35.1%	36.9%	43.8%	P3	
Median household Income	$45,776	$32,546	$47,367	$37,708	P3	
Workforce (percent)	47.4% (2,793,722)	46.5% (15,509 total)	49.2% (1,641 total)	45.7% (175 total)	P3	
Workplace outside of county	14.9% (414,933)	15.1% (2,301 total)	42.9% (704 total)	52.0% (91 total)	P3	
Work travel time greater than 30 minutes (percent)	33.0% (919,605)	20.7% (3,144 total)	51.5% (833 total)	49.7% (87 total)	P3	
Workforce Resource (percent)	2.5%	5.2%	1.3%	5.0%	P3	
Workforce Manufacturing (percent)	12.5%	5.4%	8.8%	11.0%	P3	
Workforce Construction (percent)	6.9%	7.3%	16.4%	12.1%	P3	
Workforce Trade (percent)	16.2%	16.5%	11.5%	11.5%	P3	
Workforce Services (percent)	61.9%	65.6%	62.0%	60.4%	P3	

CT = Census Tract BG = Block Group

6 What is meant by “rural land use” and how does the proposal relate to rural policies?

Rural land use has a range of generic and legal meanings. The following discussion focuses on the Washington State Growth Management Act (GMA), under RCW Chapter 36.70A, and what “rural” means in that context.

The GMA contains a legislative statement of intent regarding rural lands (RCW 36.70A.011). This statement recognizes the importance of rural lands and rural character to Washington’s economy, its people and environment, while respecting regional differences. In addition, the Washington Legislature addresses business development in rural areas by emphasizing flexibility in retaining and expanding businesses. The Legislature mandates that counties formulate a local vision of “rural character” that will balance a number of goals.

What is the GMA?

The Growth Management Act, known as the GMA (Chapter 36.70A RCW), was adopted by the Legislature in 1990. The GMA was adopted because the Washington State Legislature found that uncoordinated and unplanned growth posed a threat to the environment, sustainable economic development, and the quality of life in Washington. In 1991 the GMA was amended to create the Growth Management Hearings Boards to hear and determine appeals of plans required by local jurisdictions to fulfill the requirements of the GMA.

The definition of “rural character” in RCW 36.70A.030 includes patterns of land use and development:

(a) In which open space, the natural landscape, and vegetation predominate over the built environment;

(b) That foster traditional rural lifestyles, rural-based economies, and opportunities to both live and work in rural areas;

(c) That provide visual landscapes that are traditionally found in rural areas and communities;

(d) That are compatible with the use of the land by wildlife and for fish and wildlife habitat;

(e) That reduce the inappropriate conversion of undeveloped land into sprawling, low-density development;

(f) That generally do not require the extension of urban governmental services; and

(g) That are consistent with the protection of natural surface water flows and groundwater and surface water recharge and discharge areas.

In a public meeting in Easton held in March 2005, 42 persons attended. Their desires were summarized as:

- Preserving clean water supply that meets drinking and fire suppression needs;
- Preserving the community values of open space and treed areas between neighbors through retaining the large-lot residential development pattern;
- Preserving rural character; and
- Protecting wildlife.

The **Growth Management Hearing Boards** have issued a variety of opinions that address rural areas, including lot sizes and allowed uses, consistent with the definition of rural lands. Generally, to be found valid, land uses must meet the following criteria (EWGMB 2008):

- Rural lands do not allow development characteristics of “urban growth,” including lot sizes that result in intensive use of land that is not compatible with a rural character and that require urban levels of service. Rural character has often been related to lot sizes of 5 acres or greater. However, this is not a “bright-line” rule, and flexibility for smaller lot size is allowed.
- Rural areas must encourage the conservation of productive forest lands and agricultural lands, and discourage incompatible uses through lot sizes that allow at least some agriculture or forest use, as well as not introducing land use that will be incompatible with adjacent resource use.
- Rural lands must further open space and recreation goals, conserve fish and wildlife habitat, increase access to natural resource lands and water, and develop parks and recreation facilities that avoid intense urban development and fragmenting of wildlife habitat.
- Rural lands must include densities and allowed uses that protect the environment, particularly water quality, through avoiding a concentration of septic systems and individual wells.

Responses to questionnaires distributed during the creation of the Upper Kittitas County Vision Plan included consistent statements reflecting the features of the area valued by respondents including:

- Wildlife and amenities related to the natural environment;
- Rural atmosphere; and
- Recreation.

An important resource in identifying the values that current residents of the community associate with rural character can be found in the results of public input both at public meetings and from survey results from the Upper Kittitas County Vision Plan, developed by the Kittitas County Conference of Governments in 2004 and 2005.

The features listed as most important in light of future development included:

- Safeguarding wildlife areas and corridors;
- Protecting the area’s “dark skies” from sky glow/light pollution;
- Preserving areas for forest resource activities;
- Preserving important view sheds;
- Preserving areas for agricultural activities, including small acreage lifestyles and animal keeping;
- Preserving and expanding public trail recreation access to areas with significant natural features; and
- Protecting private property rights.

A case study approach that included the small community of Roslyn in western Kittitas County used photo-questionnaires to identify landscape characteristics that residents identified as “rural.” The characteristics of the views most closely associated

What is an Urban Growth Area?

Pursuant to RCW 36.70A.110, “Each county …shall designate an urban growth area or areas within which urban growth shall be encouraged and outside of which growth can occur only if it is not urban in nature. Each city that is located in such a county shall be included within an urban growth area. An urban growth area may include more than a single city. An urban growth area may include territory that is located outside of a city only if such territory already is characterized by urban growth.

with rural character included farmland, open landscapes with few structures, and the presence of features such as livestock. Reasons given for rating these features as “rural” included the agricultural nature of the scenes, the presence of animals, low-density residential character, peace and quiet, a slow pace, and access to nature. Non-visual features associated with rural character include a sense of community, a sense of history, and opportunities for connection to the land, including the opportunity to pasture animals (Tilt 2007).

Rural Residential Policies are most applicable to the proposed project area, and include the following designation criteria:

Criteria 1. Lands outside UGAs and the Rural Transition designation.

Criteria 2. Lands located outside of the Commercial Agriculture or CF land use designations.

Criteria 3. Lands located within a fire district.

Criteria 4. Lands served by established county and/or state road networks that are in existence or can be logically extended as provided in the Kittitas County Transportation Plan.

Criteria 5. Lands at the time of adoption of the ordinance designated or zoned Rural Residential, Agricultural-3 (Ag-3), Agricultural-5 (Ag-5), R-3, or R-5.

Criteria 6. Lands that are otherwise located adjacent to and are logical extensions of this land use designation.

Criteria 7. Lands that do not require extension or provision of public/urban levels of services. Utility services may be provided by PUDs, and public or private utility providers.

Criteria 8. May include lands which have public values that must be protected under state law including but not limited to:

- Shorelines
- Wetlands
- Sensitive fish and wildlife habitats.

Criteria 9. May include lands which have been mapped as floodway, or which have excessively steep slopes, unstable soils, or where other mapped critical area features predominate.

The **Kittitas County Comprehensive Plan** includes the following general **goals, policies, and objectives (GPO)** that apply to rural lands or uses on those lands:

GPO 8.5 Kittitas County recognizes and agrees with the need for continued diversity in densities and uses on rural lands.

GPO 8.6 An expanded public lands element may be added to the Comprehensive Plan before 1999, which contains strategies for county involvement in decisions and action on public lands within the rural lands designated area.

GPO 8.7 Private owners should not be expected to provide public benefits without just compensation. If the citizens desire open space, or habitat, or scenic vistas that would require a sacrifice by the landowner or homeowner, all citizens should be prepared to shoulder their share of the sacrifice.

GPO 8.8 Voluntary, cooperation-seeking, incentive-based strategies will be sought in directing specific uses or prohibitions of uses on rural lands.

GPO 8.9 Projects or developments which result in the significant conservation of rural lands or rural character will be encouraged.

GPO 8.10 Factors within municipalities that encourage movement onto rural lands should be identified and referred to the municipality.

GPO 8.11 Existing and traditional uses should be protected and supported while allowing as much as possible for diversity, progress, experimentation, development and choice in keeping with the retention of rural lands.

GPO 8.13 Methods other than large lot zoning to reduce densities and prevent sprawl should be investigated.

The following policies apply to the portions of the site adjacent to national forest and other resource lands.

GPO 8.15 All conveyance instruments, including plats, short plats as well as other development activities of a residential nature on or within 1,000 feet of land designated as resource lands, shall contain a notice which states: “The subject property is within or adjacent to existing resource areas on which a variety of activities may occur that are not compatible with residential development for certain periods of limited duration. Resource activities performed in accordance with county, state, and federal laws are not subject to legal action as public nuisances. Kittitas County has adopted Right to Farm provisions contained in Section 17.74 of the Kittitas County Code.”

GPO 8.16 Growth in the rural lands should be managed in a manner that minimizes impacts on adjacent natural resource lands.

GPO 8.17 Support for right-to-farm ordinances should be continued and expanded.

GPO 8.19 Clustering of residential development adjacent to commercial forest and agricultural land should be encouraged. The open space in the clustered development may buffer adjacent natural resource land from development.

GPO 8.20 Development standards for access, lot size, and configuration, fire protection, forest protection, water supply and dwelling unit location should be adopted for development within or adjacent to forest lands.

Rural lands of Kittitas County are home sites for thousands of families and provide a unique quality of life for these people. Residents range from resource producers permanently living and working on their own lands to people visiting out-of-state or out-of-area individuals with recreation and vacation homes in the area. Resident people include retired people or young families with members commuting to out-of-area jobs. Residences may be isolated, located in clustered rural neighborhoods, or part of housing developments located on small lots or large land holdings. These residential lots may be located in dense forest or desert sage, along rivers and lakes, or along main thoroughfares to towns and cities. The best description of residential uses on rural lands is diverse and varied.

The following general goals, policies, and objectives from the Kittitas County Comprehensive Plan apply to residential uses on rural lands.

GPO 8.46 Residential development on rural lands must be in areas that can support adequate private water and sewer systems.

GPO 8.47 Insofar as residences are situated where farming, mining, and forestry exits, particular precaution should be taken to minimize the conflict between new residential developments and farm operations. Farming, forestry and mining cannot be expected to curtail normal operation in the interest of residential development.

GPO 8.48 The possibilities and benefits of cluster residential developments located in rural lands should be retained.

GPO 8.49 Lot size should be determined by provision for water and sewer utilities.

GPO 8.50 In the case of planned unit developments (PUDs), only residential PUDs should be permitted outside of UGAs or UGNs.

GPO 8.51 Innovations in housing developments such as, but not limited to cluster developments, PUDs, mobile home courts, and density bonuses should be encouraged whenever possible.

GPO 8.52 Existing lots of record are vested with the right to construct a single-family dwelling, subject to all applicable requirements in effect at the time of building permit application.

GPO 8.53 Where new residential development may be incompatible with resource production activities, any buffering necessary should be carried out by the new development unless an alternative is mutually agreed upon by adjacent landowners.

7 What changes in land use would occur on the site from the proposal and alternatives?

Under the applicant’s proposed PUD and under any of the alternatives, changes in land use from undeveloped/forest land to residential development would occur. The extent to which land cover consisting of forest vegetation would change is a function of the portion of a lot that would be cleared and devoted to buildings and non-forest vegetation such as lawn. Accordingly, those alternatives proposing development throughout the site (Alternatives 1, 3, and 4) would result in more significant changes to land use, while those alternatives limiting development to a portion of the site (Alternatives 2 and 5) would result in less significant changes to land use. The alternatives with smaller lot size would result in more change in land cover than alternatives with larger lot size.

8 Are future residents likely to live on the site year-round? Or will they live on the site seasonally?

In assessing potential impacts of the proposed development, the characteristics of future residents are important to consider. Population characteristics affect the amount of time spent in a residence, and age and family size affect the demand for a variety services, including schools, utilities, and transportation needs.

Generally, there are three market sectors in the housing market in the area which reflect the character of the local economy in western Kittitas County:

- Full-time, year-round residents primarily living and working in the area, with the age structure and family tenure typical of the greater Kittitas County;
- Full-time, year-round residents who are retired; and
- Part-time, seasonal residents primarily using the site for winter sports and summer recreation.

Kittitas County had an economy based on agriculture and timber until the 1970s. Since then it has diversified into a number of areas, most significantly the services, trade, and government sectors. Agriculture in the Kittitas Valley continues to be important; its employment accounted for 6 percent of non-farm employment in 2000 and a similar proportion in 2008. The manufacturing sector is also driven by the local natural resource-based industries. The highest manufacturing employment is found in food processing, followed by lumber and wood products.

Services and trade, combined, accounted for approximately 45 percent of non-agricultural employment in Kittitas County in 2000 and a similar proportion in 2008. Most of these workers were employed in relatively low-paying industries, such as restaurants, food stores, and tourist and recreation-related services.

Kittitas County's strongest employment sector is the government, which provides nearly 40 percent of all non-farm jobs. The major government employers are Central Washington State University in Ellensburg, state government offices, county government offices, and school districts.

Recent growth in employment has been primarily in the services sector. The largest sector is health care, which includes employment in hospitals, the offices of physicians and dentists, and nursing homes, etc. The amusement and recreation services sector is the next largest, with social services third. Average wages in the service sector are relatively low (Mesick 2002).

The choice of housing location depends on a number of factors that are weighed by individuals.

For persons in the workforce, primary considerations include:

- Cost in relation to their income.
- Family space needs, which vary by household size.
- Distance to workplace and cost of commuting (which are affected by a variety of personal choices as well as cost and income).
- Personal or cultural factors such as proximity to family and social groups (ethnic, religious, or other groups one may identify with).
- Factors relating to public services such as the character of local schools and the availability of parks and recreation facilities.
- Amenities one may value that relate to the character of the area, such as the size of lots, open space, vegetation diversity, proximity to recreation facilities, and other factors.

More than half of Easton's workforce worked outside the county. This compares with 17 percent for residents of Cle Elum, 15 miles away. Out-of-county workplaces were likely to be located in King County, because the destination was readily accessible to the area via I-90. Locations could range from Snoqualmie Pass, located 15 miles away, to the greater Seattle urban area, located approximately 60 miles away.

All of these criteria may play a part in the individual choice of location of residence. It is very difficult to predict the factors that may weigh on an individual and even more difficult to predict the factors that will lead to a choice of specific development and residence.

Several characteristics of the Easton workforce from the 2000 census provide some insight on this sector of the community:

- The median family income was 82 percent of the state average, as compared to 71 percent for Kittitas County as a whole.
- The percentage of the workforce in management and professional sectors was less than the state or county average.
- The percentage of the workforce in resource-related jobs was more than twice the county average and over four times the state average, but only approximately 10 percent of the area workforce.
- Commute time was greater than 30 minutes for 55 percent of the workforce and 60 minutes or more for 40 percent of the workforce.

An example of a rural community in which low housing costs have resulted in substantial growth, despite geographic isolation, is the Kendall community in eastern Whatcom County, Washington. This subdivision of several hundred lots was developed in the 1960s as recreational, secondary residences. In the 1980s and 1990s, it grew rapidly with most of the housing stock consisting of low-cost mobile homes. It attracted persons looking for inexpensive housing and notably attracted a high population of immigrants from Russia and Ukraine, which comprise an estimated 30 percent of the community. Seventy-one percent of children enrolled at Kendall Elementary School are now eligible for free or reduced price lunches. In the larger Kendall-North Fork area 24 percent of the population resides in households with incomes below the poverty line (NFCL 2007).

A substantial portion of the existing population is willing to commute long distances to live in the Easton community. This fact indicates that a substantial component of full-time residents may be expected for the proposed development, assuming similar attractions are present.

For persons who are retired, the same factors of cost in relation to income are relevant, although distance to workplace and cost of commuting are not a factor. Public services such as medical services, as well as unpredictable factors such as proximity to friends and relatives, tend to be more important to this demographic group. Amenities may also play a greater role in housing choice for retired persons, because they enjoy greater flexibility in location by not being tied to a specific workplace.

For recreational housing, the factors that affect housing choice relate primarily to amenities. In this case, additional amenities that are likely to be important to the attractiveness of the area include:

- Winter sport facilities such as downhill skiing in the Snoqualmie Pass resort area.
- Summer boating and fishing opportunities at Lake Easton State Park, Kachess Lake, Keechelus Lake, and Cle Elum Lake, as well as the Yakima River.
- Summer hiking and other opportunities in the National Forest in the area.

An important resource in identifying the values that current residents of the community value are public meetings and survey results from the Upper Kittitas County Vision Plan, developed by the Kittitas County Conference of Governments in 2004 and 2005, discussed above. Other important resources are the values identified in a public meeting in Easton held in March 2005. The concerns expressed by residents at that time are also summarized above.

For potential residents in the workforce, an important characteristic of the proposal is housing cost. The cost of purchasing a lot and the cost of placing a residence on the land can be a significant factor that can outweigh factors such as commuting cost.

The cost of lots in the proposed Marian Meadows are not likely to be within the affordability range for persons at the lowest end of the housing market because of the cost of new infrastructure, including roads, water systems, and the proposed wastewater treatment plant. These infrastructure costs, in addition to the premium price placed on new developments, would at least partially offset the relatively low raw land costs associated with the development's isolated location and smaller lot sizes.

Factors related to proximity to place of work also do not favor Easton as a location, because most employment opportunities in Kittitas County are in the Ellensburg area, located approximately 40 miles east of the site. Greater employment opportunities are present in King County to the west with the nearest community in North Bend about 40 miles away and larger centers in Issaquah, Bellevue, Seattle, and Renton 55, 65, and 70 miles distant, respectively.

Major out-of-county employment opportunities are located in King County, which is 40 to 60 miles to the west. The long commute times exhibited by current residents indicate that many working residents are willing to commute long distances.

Personal factors such as characteristics of the community are important for individuals and families that can afford to select from a variety of housing options. These factors are likely to be important for both retired and seasonal residents. The proposal, however, has few amenities identified as important by existing residents, or available in other developments in the area. Specifically:

- The small lot sizes of the applicant's proposal reduces the amenities of large lot sizes, including the ability to keep large animals such as horses, the ability to maintain tree cover on the lot, if desired, and the amenity of privacy and distance between neighbors.
- The site lacks mature native vegetation in most of the lower portion and much of the upper portion. Especially in the lower area, the debris of recent logging may be regarded as a visual drawback.
- The site lacks a number of amenities common to other recreation or resort developments in the area including:
  - Open space areas adjacent to housing with forest cover;
  - Access to open space along rivers and/or lakes;
  - Recreational trails through an interconnected open space system; and
  - Access to active recreation facilities such as golf courses.

The area has ready access to winter sports areas at Snoqualmie Pass, located approximately 20 minutes from the site by car. The area also has ready access to formal winter snowmobile trails several miles from the site. There also are informal trails through the site.

Many of these amenities, however, are available within a few miles of the site. In most cases, access requires driving several miles on the local road system and/or on I-90.

The four tenure scenarios that have been developed include:

- **Tenure Scenario 1 – All full-time residents.** This includes 85 percent workforce families composed of full-time year-round residents with the head of household younger than retirement age and 15 percent retired persons reflecting the current census demographics of Kittitas County.
- **Tenure Scenario 2 - Primarily workforce families:** 60 percent workforce families, with 15 percent retired residents, and 25 percent part-time recreational residents.
- **Tenure Scenario 3 – Near Balanced:** 35 percent workforce families, with 30 percent retired residents, and 35 percent part-time recreational residents.
- **Tenure Scenario 4 - Primarily Recreational:** 25 percent workforce families, with 25 percent retired residents, and 50 percent part-time recreational residents.

The potential population under each tenure scenario for each of the alternatives is indicated in Table 3-2.

9 How would construction of the proposal or alternatives affect nearby land uses?

Construction impacts to nearby land uses would include a temporary increase in vehicles accessing the site to deliver persons, materials, and equipment for construction. This increase could result in localized congestion and occasional disruption of traffic flow at intersections in the immediate project vicinity.

Construction-related impacts are not likely to affect the viability of any existing uses or lead to a change in land use.

Table 3-2. Population of Alternatives with Tenure Scenarios

Units	Tenure of Residents			
	Full-time	Retired	Seasonal/ Recreation	Total
Alternatives 1 and 2: Applicant's Proposals – 443 Units				
Tenure Scenario 1	85 %	15%	0	
Units	377	66	0	443
FTE Population	1,040	140	0	**1,180**
Tenure Scenario 2	60%	15%	25%	
Units	266	66	111	443
FTE Population	864	140	86	**1,089**
Tenure Scenario 3	35%	30%	35%	
Units	155	133	155	443
FTE Population	504	279	120	**903**
Tenure Scenario 4	255	25%	50%	
Units	111	111	222	443
FTE Population	360	233	172	**764**
Alternative 3: Existing Zoning, and Alternative 5: Mitigated with Development on Lower Area – 147 Units				
Tenure Scenario 1	85 %	15%	0	
Units	125	66	0	147
FTE Population	345	46	0	**391**
Tenure Scenario 2	0.6	0.15	0.25	
Units	88	22	37	147
FTE Population	277	46	31	**354**
Tenure Scenario 3	0.35	0.3	0.35	
Units	51	44	51	147
FTE Population	162	93	44	**298**
Tenure Scenario 4	0.25	0.25	0.5	1.000
Units	37	37	74	147
FTE Population	119	77	57	**254**
Alternative 4: Mitigated with Development on Both Upper and Lower Areas – 195 Units				
Tenure Scenario 1	0.85	0.15	0	
Units	166	29	0	195
FTE Population	458	61	0	**519**
Tenure Scenario 2	0.6	0.15	0.25	
Units	117	29	49	195
FTE Population	380	61	28	**470**
Tenure Scenario 3	0.35	0.3	0.35	
Units	68	59	68	195
FTE Population	222	123	53	**398**
Tenure Scenario 4	0.25	0.25	0.5	
Units	49	49	98	195
FTE Population	158	102	76	**336**

10 What are the likely long-term effects on nearby land use associated with the proposal and alternatives?

Alternative 1, the applicant's proposed PUD with 443 units, would result in an increase in total residential lots in the immediate vicinity (the area served by Sparks Road north of I-90 between Kachess Lake to the north, the Yakima River, and the aggregate mine area to the south) from approximately 200 to 643 residential lots.

The proposal would more than triple the current number of existing parcels in the immediate vicinity and more than triple the number of existing residences.

The size and character of the applicant's 443-unit proposal represents a substantial change in density and open space from the majority of the development in the vicinity, particularly the lots directly adjacent to the site, which are generally greater than 3 acres. The majority of the property in the vicinity consists of lots larger than 3 acres. Of the privately owned land in the vicinity (outside Marian Meadows), about 75 percent is in parcels larger than 3 acres. There are several existing subdivisions of smaller lots totaling approximately 80 lots that account for about 25 percent of the land area. If the Easton State Airport is included, almost 90 percent of the area in the project vicinity consists of 3-acre parcels or larger.

It is not anticipated that there would be any direct impacts to existing land uses on existing parcels in the area.

Approximately 18 large lots located immediately adjacent to the property would no longer be bounded by forest land. Instead, each existing lot would be abutted by three to four smaller lots with associated residences. This would result in a change in the character of the area for those adjacent large lots in terms of the amount of vegetation, the proximity of buildings, the frequency that other people are seen, and proximity impacts such as noise and lights. Most existing residences on adjacent lots are generally 100 feet or more from the new lots and in many cases are substantially screened by existing vegetation, which would reduce visual impacts.

Most residents in the area would experience the proposal and the alternatives in terms of a change in character as described below.

- The landscape in the area would no longer be characterized primarily by natural features and open space. Native forest vegetation would no longer predominate on the site. The size of proposed lots and typical associated clearing would result in elements of the built environment such as buildings and ornamental landscaping being the dominant features.
- The observed visual character of the community would change due largely to the predominance of residences and associated permanent clearing of the forest. Clearing and grading for roads and residences on the upper easterly portion of the site would be readily visible to residents in the area. This would substantially change one of the visual

Changes to visual character would be especially pronounced on the upper easterly portion of the site as discussed in the visual quality analysis in Section 3.6.

elements that provides a defining characteristic of the community. This element is the forested ridges that frame the Yakima River Valley and provide natural features as the dominant visual character (see Section 3.6, Visual Quality, Light, and Glare for additional discussion of this impact).

- It is unlikely that forestry use would occur on residential parcels, except cutting of trees for firewood. The uppermost portion of the site could continue to be managed as commercial forest but are likely to provide limited opportunities because of the small area.
- Residents of Marian Meadows would be unlikely to derive significant support from traditional rural resource-based economies, and would likely be predominantly commuters to urban areas or recreational users. This may result in fewer social interactions between members of the community.
- There would be an increase in the number of people on local streets, in local businesses, and in schools and other public places.
- The area would likely experience a decline in use by wildlife, especially large mammals such as elk, as discussed in more detail in Section 3.6.

Alternative 2, PUD on the westerly portion of the site with up to 443 units, would result in the same number of units in a smaller area.

The large lots located immediately adjacent to the site to the north of the runway clear zone would be bounded by the same number of lots as in Alternative 1 and would experience similar impacts. Adjacent lots to the southwest and south would be bounded by open space within the airport safety zone or in areas excluded because of flow hazards. The residents in these lots would experience little or no change from the existing forest cover.

Most residents in the area would experience Alternative 2 similarly to Alternative 1.

- The landscape in the area would no longer be characterized primarily by natural features and open space due to clearing of the lots where elements of the built environment would become the dominant feature. This change would be especially true for the multi-family development.
- The observed visual character of the community would change due largely to the predominance of residences and associated permanent clearing of forest, but it would be apparent largely to persons living close to the site or passing through the site. The visual character of forest cover on the ridge would be preserved.
- It is unlikely that forestry use would occur on residential parcels, except cutting of trees for firewood. The open space areas on the lower portion of the site and the entire upper portion of the site could continue to be managed as commercial forest.

- Residents of the multi-family areas would be less likely to be seasonal (NAR 2008); therefore, a higher proportion of full-time residents commuting to jobs in urban areas or retired residents can be expected. This occurrence may increase the number of people on local streets, in local businesses, schools, and other public places as compared to Alternative 1.
- The lower portion of the site would likely experience a greater decline in use by wildlife, especially large mammals such as elk, but wildlife use on the upper portion of the site would be greater, as compared to Alternative 1.

Alternative 3, No Action Alternative with 3-acre lots, would increase the total residential lots in the immediate vicinity from approximately 200 to about 350, a little more than half of the total proposed by Alternatives 1 and 2, but a substantial increase over the existing amount.

The large lots located immediately adjacent to the site would be bounded by lots similar in size to the existing. Residences would likely be set farther from the boundaries of the plat than Alternatives 1 and 2 resulting in less clearing apparent to the adjacent lots and less impact of noise and lights nearby.

Other residents in the area likely would experience the following:

- The landscape in the area would no longer be characterized primarily by natural features and open space. Native forest vegetation would no longer predominate on the site. The size of lots and typical associated clearing would be typical of existing large lots in the area. Elements of the built environment such as buildings and ornamental landscaping would be more prominent, but more native vegetation would be retained than Alternatives 1 and 2.
- The observed visual character of the community would change due to a larger component of residences and associated permanent clearing of forest cover, but to a less extent than Alternatives 1 and 2. Clearing and grading for roads and residences on the upper easterly portion of the site would be readily visible to residents in the area. Road clearing would be similar, but the number of residents would be less than Alternatives 1 and 2. This development would substantially change one of the visual elements that provides natural forest as the dominant visual character of this portion of the Yakima River Valley (see Section 3.6).
- It is unlikely that forestry use would occur on residential parcels, except cutting of trees for firewood.
- As with other alternatives, residents would likely be predominantly commuters to urban areas or recreational users. The amenities of large lots may attract more persons desiring a community with a rural character. The similarity with the value of existing community members may result in more social interactions among members of the community.

Under Alternative 4, the number of residential lots in the immediate vicinity would almost double but the increase would be about half that of Alternatives 1 and 2.

- The increase in the number of people on local streets, in local businesses, and in schools and other public places would be less than Alternatives 1 and 2.
- The site would likely experience a decline in use by wildlife, especially large mammals such as elk, but use by smaller wildlife species likely would be greater than Alternative 1 because of the potential habitat provided on large lots.

Alternative 4, PUD with reduced density on the entire site, was developed to illustrate elements that would incorporate mitigation measures while retaining development on both the flat westerly portion of the site and the steep easterly portion. (About 195 lots are shown in the conceptual layout in Figure 2-4. Other potential layouts could result in more or fewer lots). This alternative results in an increase in total residential lots in the immediate vicinity from about 200 to about 400 or a little more than half of the total proposed by Alternatives 1 and 2, and slightly more than the total in Alternatives 3 and 5.

Under Alternative 4, the development would include lots that are somewhat smaller than existing large lots in the area, particularly those directly adjacent to the development. The interior lots would be slightly larger than the existing subdivisions in the vicinity with the smallest lots similar to the densest development such as the Easton Village plat to the southwest.

The existing large lots located immediately adjacent to the site would be bounded by smaller lots, except within the airport safety zone where the depth of the lots would be greater and building would be excluded within the westerly portion, resulting in less clearing and less impact of noise and lights nearby.

Adjacent lots to the southwest and south would be bounded by open space in the airport safety zone or in areas excluded because of debris flow hazards.

The majority of residents in the community would experience the alternative in terms of:

- The landscape in the area would no longer be characterized primarily by forest cover. A substantial area of native forest vegetation would be preserved in the airport safety zone, in the hazard avoidance areas, and on upper slopes. The extent to which the build environment predominates would vary by lot size. For persons passing through the area on roads, elements of the built environment such as buildings and ornamental landscaping would be dominant in developed areas, but more native vegetation would be retained in open space areas than Alternatives 1 and 2.
- The observed visual character of the community would change in areas of residential development and associated permanent clearing of the forest cover, but this character would be preserved in open space areas. The visual character for people not living in direct proximity would be primarily affected by clearing and grading for roads and by residences on the westerly portion of the site. On the steep easterly portion of the site, clearing and grading from roads would be less, residences would be lower on the ridge, and therefore less visible to residents in the area. The change to the most visible higher portions of the forested ridges that frame the Yakima River Valley and

contribute to the rural character of the area would be less than Alternatives 1 and 3 but more than Alternative 2 (see Section 3.6).

- It is unlikely that forestry use would occur on residential parcels, except cutting of trees for firewood. The open space areas on the lower portion of the site and portions of the upper portion of the site could continue to be managed as commercial forest.
- The mix of lot sizes may attract all components of potential residents including full-time workforce residents, retired persons, and recreational users. The amenities of large lots or open space may attract more persons desiring a community with a rural character. The similarity with the value of existing community members may result in more social interactions among members of the community.
- The increase in the number of people on local streets, in local businesses, and in schools and other public places would be less than Alternatives 1 and 2 but somewhat greater than Alternative 3.
- The site would likely experience a decline in use by wildlife, especially large mammals such as elk, but wildlife use would likely be greater because of the potential habitat provided in open space areas.

Alternative 5, PUD on the westerly portion of the site, could have up to 147 lots allowed in a PUD by existing zoning without bonus provisions. (About 124 lots are shown in the conceptual layout in Figure 2-5. Alternative layouts could result in more lots if some lots were smaller). This would result in an increase in total residential lots in the immediate vicinity from approximately 200 to between 325 and 350 residential lots, about the same as Alternative 3.

Under Alternative 5, the development would include a mix of lot sizes with all lots smaller than the existing large lots in the area. The interior lots would be only slightly larger than the smallest lots in the area such as in the Easton Village subdivision.

The large lots located immediately adjacent to the site are indicated in the conceptual layout (Figure 2-5) as the same as Alternative 4, but with greater depth within the airport safety zone and exclusion of building in the westerly portion, resulting in less clearing and less impact from nearby noise and lights. Lots to the north would be smaller and be at variance from the character of the adjacent large lots. Adjacent lots to the southwest and south would be bounded by open space in the airport safety zone or in areas excluded because of debris flow hazards.

The majority of residents in the community would experience the alternative in terms of:

- The landscape in the area would no longer be characterized primarily by natural forest cover. A substantial area of native forest vegetation would be preserved in the airport safety zone and hazard avoidance areas and on the easterly portion of the site. In developed areas, the extent to which the build environment predominates would vary by lot size. For persons passing through the area on roads, elements of the built environment such as buildings and ornamental landscaping would be dominant in developed areas, but more native vegetation would be retained in open space areas than other alternatives.

- The observed visual character of the community would change in areas of residential development and associated permanent clearing of the forest cover, but the character would be preserved in open space areas. The visual character for people not living in direct proximity would be preserved by the avoidance of development and associated clearing and grading for roads and residences. The forested ridges that frame the Yakima River Valley and contribute to the rural character of the area would be preserved (see Section 3.6).
- It is unlikely that forestry use would occur on residential parcels, except cutting of trees for firewood. The open space areas on the lower portion of the site and the entire upper portion of the site could continue to be managed as commercial forest.
- The mix of lot sizes may attract all components of potential residents including full-time workforce residents, retired persons, and recreational users. The amenities of large lots or open space may attract more persons desiring a community with a rural character. The similarity with the value of existing community members may result in more social interactions among members of the community.
- The increase in the number of people on local streets, in local businesses, and schools and other public places would be less than Alternatives 1 and 2 but somewhat greater than Alternative 3.
- The lower westerly portion of the site would likely experience a decline in use by wildlife, especially large mammals such as elk, but wildlife use would likely be greater than other alternatives because of the potential habitat provided in open space areas and the preservation of the easterly portion of the site in commercial forest.

11. What are the likely cumulative impacts with development of nearby land at rural densities?

Cumulative impacts of the project in the immediate vicinity (north of I-90 and served by Sparks Road) under the existing 3-acre minimum lot size were analyzed based on the potential increase in development based on lot sizes according to the Kittitas County Assessor's records (Figure 3-6).

Currently, about two-thirds of the lots in the area are larger than 3 acres each. Under the 3-acre minimum lot size, only lots greater than 6 acres in size were considered subdividable. The Easton State Airport was excluded. Division of those lots would result in creation of an additional 130 lots. In addition, there are about 80 existing vacant parcels in the area that could be developed with single-family residences with submittal of building and septic tank applications. There are about 120 existing residences. The total would result in up to 330 lots outside the Marian Meadows development.

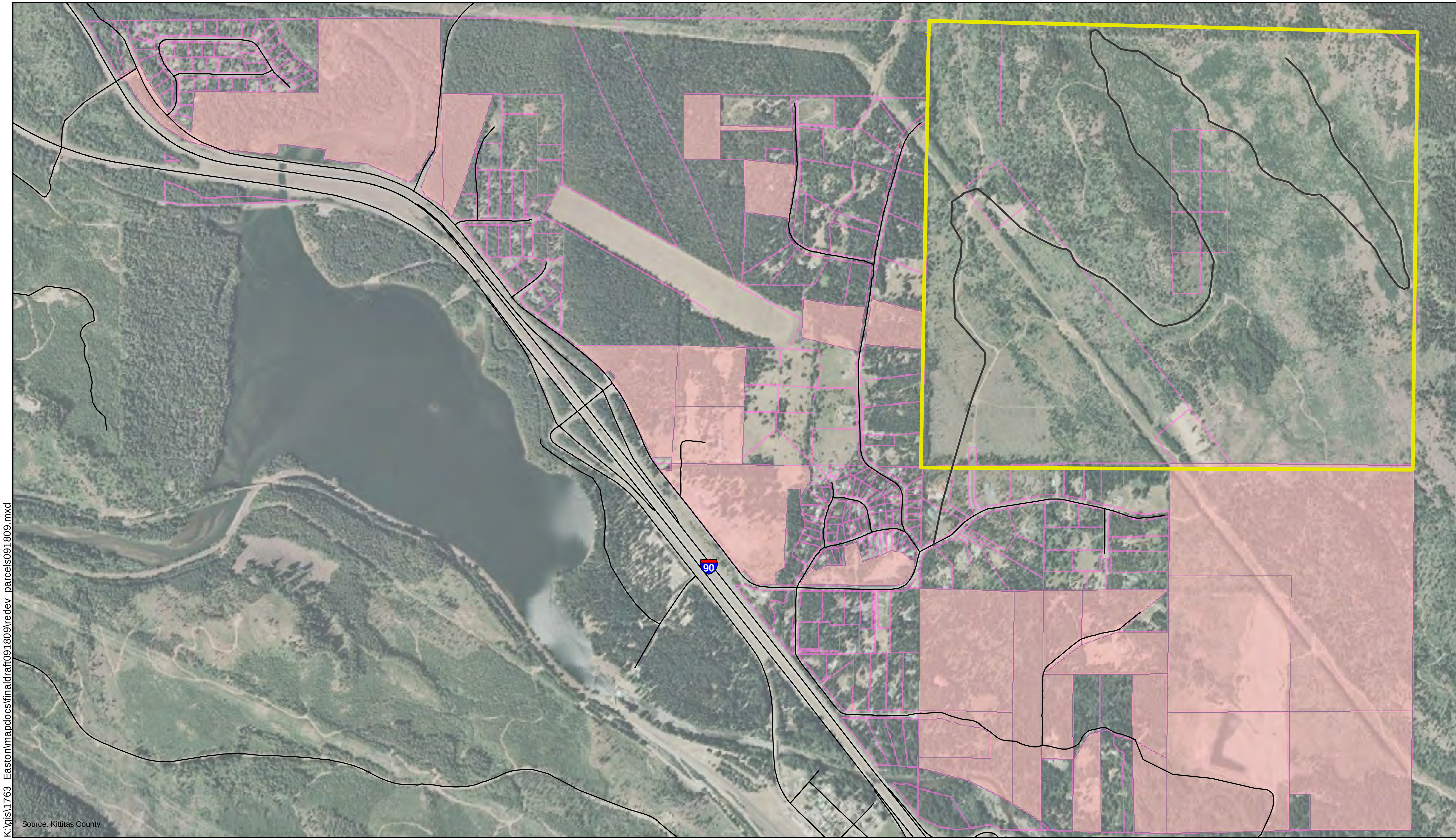
Potential cumulative impacts with the alternatives for the Marian Meadows site are as follows:

- The **Alternative 1 and 2 PUDs** would result in a total of about 770 single-family lots in the area (including the proposed 443 units). The majority of the area would be in large lots greater than 3 acres, but the largest number of lots would be smaller than 1 acre, with the Marian Meadows development contributing nearly 60 percent of the total lots. Alternative 2 would contain the only multi-family development in the area.
- Under **Alternative 3,** the No Action Alternative with 147 lots within the proposal, a total of about 470 lots would be developed. This amounts to about 60 percent of the cumulative number of lots with Alternatives 1 and 2. The majority of development in the area would be in large lots similar to development in the vicinity of the site.
- Under Alternative 4, a PUD with about 195 lots would be developed for a total of about 525 residences in the vicinity, amounting to about 70 percent of the cumulative number of lots with Alternatives 1 and 2. The majority of development in the area would be in large lots; however, lots within the site would be substantially smaller than the average.
- Under **Alternative 5,** a PUD on the westerly portion of the site with up to 147 lots would be developed in the vicinity. This would be the same amount of development as in Alternative 3. The majority of development in the area outside of the PUD proposal would be in large lots similar to development in the vicinity of the site. The lot sizes on the site would be substantially smaller than the average.

Table 3-3 indicates the potential population associated with the cumulative increase in lots for each of the tenure alternatives.

Depending on the proportion of full-time versus part-time residences and the proportion of retirees, a full-time equivalent (FTE) population was calculated with an average household size of 3.25 for full-time seasonal occupancy and a household size of 2.1 for retired. Seasonal FTE population was based on occupancy of units about a quarter of the time. (This would be equivalent to occupancy every weekend, or about 50 percent of weekends and four full weeks per year, or a variety of other combinations.) Under the various tenure scenarios, the area served by Sparks Road could vary in FTE population from 2,300 to about 800. During peak weekend periods the maximum population would be occasionally expected, regardless of the mix of full-time and seasonal occupants.

Alternatives 1 and 2 FTE cumulative population would vary between 2,350 full-time residents and 1,300 seasonal residents. For comparative purposes, this population would range from 120 percent larger than the 2009 population of Cle Elum (1,870) to about 70 percent of the size of Cle Elum. Comparable cities in Washington at the higher end of the range would include Leavenworth in Eastern Washington, or Westport on the Pacific Coast. The smaller end of the range would include Winlock in Lewis County or Sumas near the U.S.-Canadian border in Whatcom County.



Parametrix

N
0 1,000
Scale in Feet

Legend

- Parcel > 6 acres
- Other Parcel
- Project Site
- Roads

Figure 3-6
Marian Meadows
Parcels Subject to Redevelopment Under Existing Zoning

Alternatives 3, 4, and 5 FTE cumulative population would vary between 1,675 full-time residents and 800 seasonal residents. For comparative purposes, this population would range from about 90 percent of the size of Cle Elum to about 40 percent of the size of Cle Elum. Comparable cities in Washington at the higher end of the range would include Napavine (1,690) in Lewis County, or Kettle Falls (1,665) in Spokane County; the smaller end of the range would include Tekoa (830) in Ferry County or Naches (765) in Yakima County.

The area as a whole would take on an increasingly small town or suburban community character and the existing rural characteristics would be reduced. The result would be a setting in which:

- Open space, the natural landscape, and vegetation have a less predominant role as compared to elements of the built environment.
- Forest resource activities would be reduced.
- There would likely be less forest cover and more clearing for small acreage ranches with associated animal keeping.
- Opportunities to see wildlife on a daily basis would be reduced as wildlife habitat would be greatly decreased with smaller lot sizes.
- The extension of governmental services more consistent with urban uses would be required.

It is possible that the increased population under scenarios with larger components of full-time residents may support additional commercial development in the immediate vicinity or in the Easton townsite. The factors leading to additional commercial development are very complex and greatly influenced by existing shopping patterns and opportunities provided in nearby communities. The population needed to support a use such as a large modern grocery store is generally larger than would be present in the area. The existing commercial development in the larger communities of Cle Elum, Roslyn, and the Suncadia Resort currently serve residents of the area and would likely expand before new centers were developed. In addition, a substantial portion of the service needs of the upper Kittitas Valley are currently met by residents making trips to the larger commercial center of Ellensburg approximately 30 miles to the east. In order for a local grocery store to be practical, it would need to serve the larger areas of Snoqualmie Pass to Cle Elum, as well as the smaller towns such as Roslyn and resort developments such as Suncadia. It is unlikely that this location could compete with alternative sites in Cle Elum or Roslyn's Suncadia, given the latter location is near a larger population and resort center.

If commercial development occurred in the immediate vicinity, it is more likely to be oriented to the high volumes of traffic passing by on I-90 or provide the types of items found in a convenience store.

12. What are the likely cumulative impacts with development of nearby land at densities similar to the proposal?

If Alternatives 1 or 2 PUD were approved for this property, it could provide the precedent for similar development of other properties in the vicinity. The potential for subdivision of existing lots based on the average of one unit per acre was analyzed based on existing lot sizes according to Kittitas County Assessor's records as shown in Figure 3-7. If properties in the vicinity were developed at the same intensity as the applicant's PUD proposal, an additional 546 lots could be developed (this includes 80 existing developed and vacant lots). Cumulative development impacts are briefly outlined below.

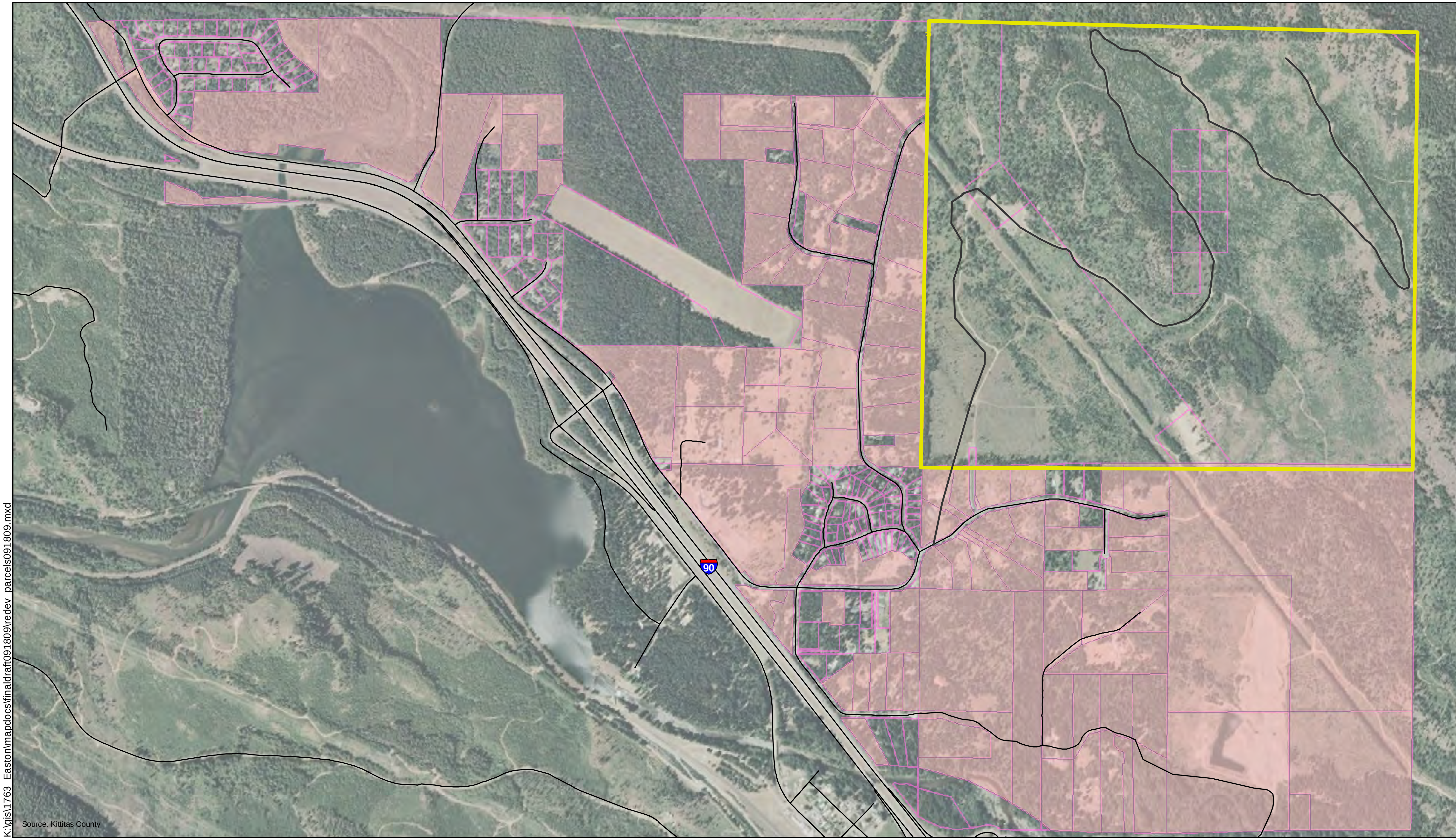
- **Alternatives 1 and 2 PUDs** would result in a total of about 990 single-family lots in the area (including the 443 lots included in PUD alternatives). The majority of the area would be in lot sizes of 1 acre or more, but the largest number of lots would be smaller than 1 acre with the Marian Meadows development contributing about 45 percent of the total lots. The lots within the development would be smaller than the average in the area and Alternative 2 would contain the only multi-family development in the area.
- **Alternative 3,** the No Action Alternative**,** would not be developed under this scenario because it is not a PUD and is designed to be consistent with existing zoning with 3-acre lot sizes rather than the increase allowed under the PUD. For comparative purposes only, the cumulative total of lots in the area with the remainder of the area at PUD densities would result in about 690 lots.
- Under **Alternative 4,** a PUD with about 195 lots on this site would result in a cumulative total of about 741 residences in the vicinity. The majority of the area would be in lot sizes of 1 acre or more, but the largest number of lots would be smaller than 1 acre, with the Marian Meadows development contributing about 25 percent of the total lots. The lots within the development would be smaller than the average in the area.
- Under **Alternative 5**, a PUD on the westerly portion of the site with up to 147 lots would result in a cumulative total of about 693 lots developed in the vicinity. The majority of the area would be in lot sizes of 1 acre or more, but the largest number of lots would be smaller than 1 acre, with the Marian Meadows development contributing about 21 percent of the total lots. The lots within the development would be smaller than the average in the area.

The potential population associated with the cumulative increase in lots is indicated in Table 3-3 for each of the tenure alternatives.

Depending on the proportion of full-time versus part-time residences and the proportion of retirees, a FTE population was calculated with an average household size of 3.25 for full-time seasonal occupancy and a household size of 2.1 for retired residents. Seasonal FTE population was based on occupancy of units about a quarter of the time as outlined above. Under the various tenure scenarios the project vicinity could vary in FTE population from 2,630 to about 1,200. During peak weekend periods, the maximum population could be occasionally expected, regardless of the mix of full-time and seasonal occupants.

Table 3-3. Population of Cumulative Development Scenarios

	Rural Density 330 Units				PUD Density 526 Units			
	Full	**Retired**	**Recreation**	**Total**	**Full**	**Retired**	**Recreation**	**Total**
Alternatives 1 and 2: Applicant's Proposals – 443 Units								
Tenure Scenario 1	**0.85**	**0.15**	**0**		**0.85**	**0.15**	**0**	
Units	657	116	0	**773**	841	148	0	989
FTE Population	1,815	243	0	**2,059**	2,322	312	0	2,634
Tenure Scenario 2	**0.6**	**0.15**	**0.25**		**0.6**	**0.15**	**0.25**	
Units	464	116	193	**773**	593	148	247	989
FTE Population	1,507	243	150	**1,901**	1,929	312	192	2,432
Tenure Scenario 3	**0.35**	**0.3**	**0.35**		**0.35**	**0.3**	**0.35**	
Units	271	232	271	**773**	346	297	346	989
FTE Population	879	487	210	**1,576**	1,125	623	268	2,016
Tenure Scenario 4	**0.25**	**0.25**	**0.5**		**0.25**	**0.25**	**0.5**	
Units	193	193	387	**773**	247	247	495	989
FTE Population	628	406	300	**1,333**	804	519	383	1,706
Alternative 3: Existing Zoning, 3 Acre Lots – 147 Lots **Alternative 5: Mitigated with Development on Lower Area – 147 Units**								
Tenure Scenario 1	**0.85**	**0.15**	**0**		**0.85**	**0.15**	**0**	
Units	405	72	0	477	589	104	0	693
FTE Population	1,120	150	0	1,270	1,627	218	0	1,846
Tenure Scenario 2	**0.6**	**0.15**	**0.25**		**0.6**	**0.15**	**0.25**	
Units	286	72	119	477	416	104	173	693
FTE Population	930	150	92	1,173	1,351	218	134	1,704
Tenure Scenario 3	**0.35**	**0.3**	**0.35**		**0.35**	**0.3**	**0.35**	
Units	167	147	167	477	243	208	243	693
FTE Population	543	301	129	972	788	437	188	1,413
Tenure Scenario 4	**0.25**	**0.25**	**0.5**		**0.25**	**0.25**	**0.5**	
Units	119	119	239	477	173	173	347	693
FTE Population	388	250	185	823	563	364	269	1,195
Alternative 4: Mitigated with Development on Both Upper and Lower Areas – 195 lots								
Tenure Scenario 1	**0.85**	**0.15**	**0**		**0.85**	**0.15**	**0**	
Units	446	79	0	525	630	111	0	741
FTE Population	1,233	165	0	1,398	1,740	233	0	1,973
Tenure Scenario 2	**0.6**	**0.15**	**0.25**		**0.6**	**0.15**	**0.25**	
Units	315	79	131	525	445	111	185	741
FTE Population	1,024	165	92	1,282	1,445	233	134	1,813
Tenure Scenario 3	**0.35**	**0.3**	**0.35**		**0.35**	**0.3**	**0.35**	
Units	184	158	184	525	259	222	259	741
FTE Population	597	331	142	1,070	843	467	201	1,511
Tenure Scenario 4	**0.25**	**0.25**	**0.5**		**0.25**	**0.25**	**0.5**	
Units	131	131	263	525	185	185	371	741
FTE Population	427	276	203	906	602	389	287	1,278



Parametrix

N

0 1,000

Scale in Feet

Legend

Parcel > 2 acres

Other Parcel

Project Site

Roads

Figure 3-7
Marian Meadows
Parcels Subject to Redevelopment
Under PUD Densities

Alternatives 1 and 2 cumulative FTE population would vary between 2,630 full-time residents and 1,700 seasonal residents. For comparative purposes, this would range from 140 percent larger than the 2009 population of Cle Elum (1,870) to about 90 percent of the size of Cle Elum. Comparable cities in Washington at the higher end of the range would include Moxee (2,525) in the Yakima Valley or Warden (2,650) in the Columbia Basin. The smaller end of the range would include Kettle Falls (1,655) in Stevens County or Ritzville (1,740) in Adams County and would be about 160 percent larger than Roslyn (1,015).

Alternatives 3, 4, and 5 cumulative FTE population would vary between 2,400 full-time residents and 1,200 seasonal residents. For comparative purposes, this would range from about 120 percent larger than the 2009 population of Cle Elum (1,870) to about 64 percent of the size of Cle Elum or about 120 percent larger than Roslyn (1,015). Comparable cities in Washington at the higher end of the range would include Okanogan (2,495) in Okanogan County or Chewelah (2,420) in Stevens County. The smaller end of the range would include Tieton (1,195) in the upper Naches Valley in Yakima County or Kittitas (1,150).

Cumulative development impacts on land use at the proposed PUD densities of about one unit per acre would include residential lots at a density similar to the smaller residential sites in the area. Existing larger lots with more extensive forest cover would be divided into a lot size that would result in residences and accessory buildings comprising the primary use, with forest cover an incidental feature.

The area as a whole would take on an increasingly suburban character and existing rural characteristics would be reduced. The result would be a setting in which:

- Open space, the natural landscape, and vegetation have a less predominant role as compared to elements of the built environment and ornamental vegetation.
- Forest resource activities would be reduced and nearby residential use would likely interfere to some extent with commercial forestry activities, even with local policies designed to protect resource use.
- There would be little opportunity for small acreage ranches and associated animal keeping.
- Opportunities to see wildlife on a daily basis would be decreased as wildlife habitat would be greatly reduced with smaller lot sizes.
- The extension of governmental services more consistent with urban uses would be required.

It is possible that the additional population under scenarios with larger components of full-time residents would support additional commercial development in the immediate vicinity or in the Easton townsite. The factors leading to additional commercial development are very complex and greatly influenced by existing shopping patterns and opportunities provided in nearby communities. It is likely that existing commercial development in the larger community of Cle Elum/Roslyn’s Suncadia would expand before new centers were developed. However, the amount of additional population would encourage additional commercial services in the vicinity. A substantial portion of the service needs of the upper Kittitas Valley would likely continue to be met by residents making trips to the larger commercial center of Ellensburg.

13 What measures could reduce the effects of the proposal and alternatives on land use?

The alternatives considered include a range of potential mitigating measures for land use including:

- Development of larger lots consistent with the existing zoning and existing large lot developments that predominates in the area and provides an opportunity for preservation of forest cover as the dominant element of the landscape, as well as the potential for small ranches and associated animal keeping.
- Preservation of open space areas in forest resource use with limited areas of smaller lot-clustered development that provide a mix of residential opportunities while preserving areas of resource uses and wildlife habitat.
- A smaller number of residential units that result in a smaller overall rural population resulting in less need for public services and utilities typical of more urban areas.

3.2 TRANSPORTATION

3.2 1 Transportation – Surface System__

The surface transportation system consists of roadways and pathways that people use to travel on. Users and uses of this transportation system vary, and include work-based trips, non-work-based trips, freight trips, and recreational trips. The surface transportation system includes passenger cars, freight trucks, bicycles, pedestrians, and recreational vehicles, but excludes the air and water modes of travel.

What types of trips use the surface transportation system?

Traffic engineers and planners have categorized several different types of trips to determine which trips are essential and predictable.

Work-based trips refer to the trips to and from work; trips to and from school are also sometimes included in this category.

Non-work-based trips are all of the other trips that are not associated with work, such as going to the grocery store, dry cleaners, restaurants, gas stations, etc.

Freight refers to the movement of commercial goods and excludes the movement of people.

1 What area was studied with respect to transportation?

The area studied to identify the proposal's potential impacts to the surface transportation system generally includes the I-90 Easton interchange and Sparks Road from Railroad Street to Norton Road. Within this study area, seven intersections were studied to evaluate the local transportation system. These intersections represent the key locations where the project's effects would be most noticeable and include:

- I-90 eastbound ramps/Railroad Street;
- I-90 westbound ramps/Railroad Street;
- Sparks Road/Railroad Street;
- Sparks Road/Turtle Town area;
- Sparks Road/Pit Way/Hawthorn Lane;
- Sparks Road/Country Drive; and
- Sparks Road/West Sparks Access.

These intersections are shown on Figure 3-8 and additional detail on the roadways within the study area is provided under Question 2 below.

2 What are the characteristics of the existing transportation system?

The surface transportation system is often characterized by the types of roadways, non-motorized system, transit service and facilities, maintenance, and how well the system functions. Public transit service is not provided in the study area and has therefore not been evaluated. The functions of the system can be further evaluated with several sub-parameters and is detailed under Question 3 below.

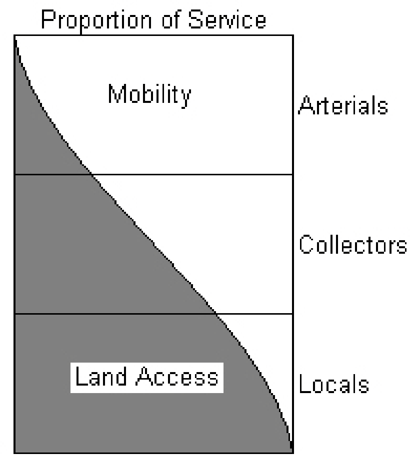
What roadways currently serve the area?

The study area is served by several roadways with different functional classifications and uses. Functional classifications are described differently depending on which public agency owns and maintains the roadway. These roadways are shown in Figure 3-8 and include:

- **I-90** is Washington's primary east-west interstate and is classified by WSDOT as a Rural-Interstate (R5) within the study area. This section of I-90 has two lanes in each direction and the posted speed limit is 70 miles per hour (mph). The average daily traffic (ADT) is approximately 27,000 vehicles per day (vpd) (2006 count).
- **Railroad Street** is classified by Kittitas County as a Rural Local Access (class 9) road and provides access between I-90 from Exit 70, the town of Easton, and the project site (via Sparks Road). This roadway has one lane in each direction and the posted speed limit is 35 mph. South of the I-90 Exit 70 eastbound ramps, the ADT is approximately 550 vpd (2008 count).
- **Sparks Road** is classified by Kittitas County as a Rural Local Access (class 9) road and serves as the primary route to I-90 (via Railroad Street) for traffic on the north side of I-90 with one lane of travel for each direction. The posted speed limit is 35 mph and the ADT is approximately 250 vpd west of Railroad Street and 1,250 vpd east of Railroad Street (2008 count).
- **Pit Way/Hawthorn Lane** is not classified by Kittitas County with respect to functional classification. This two-lane roadway provides residential access and connects to Sparks Road with a posted speed limit of 15 mph. The ADT is roughly 75 vpd (estimated from 2006 and 2008 counts).

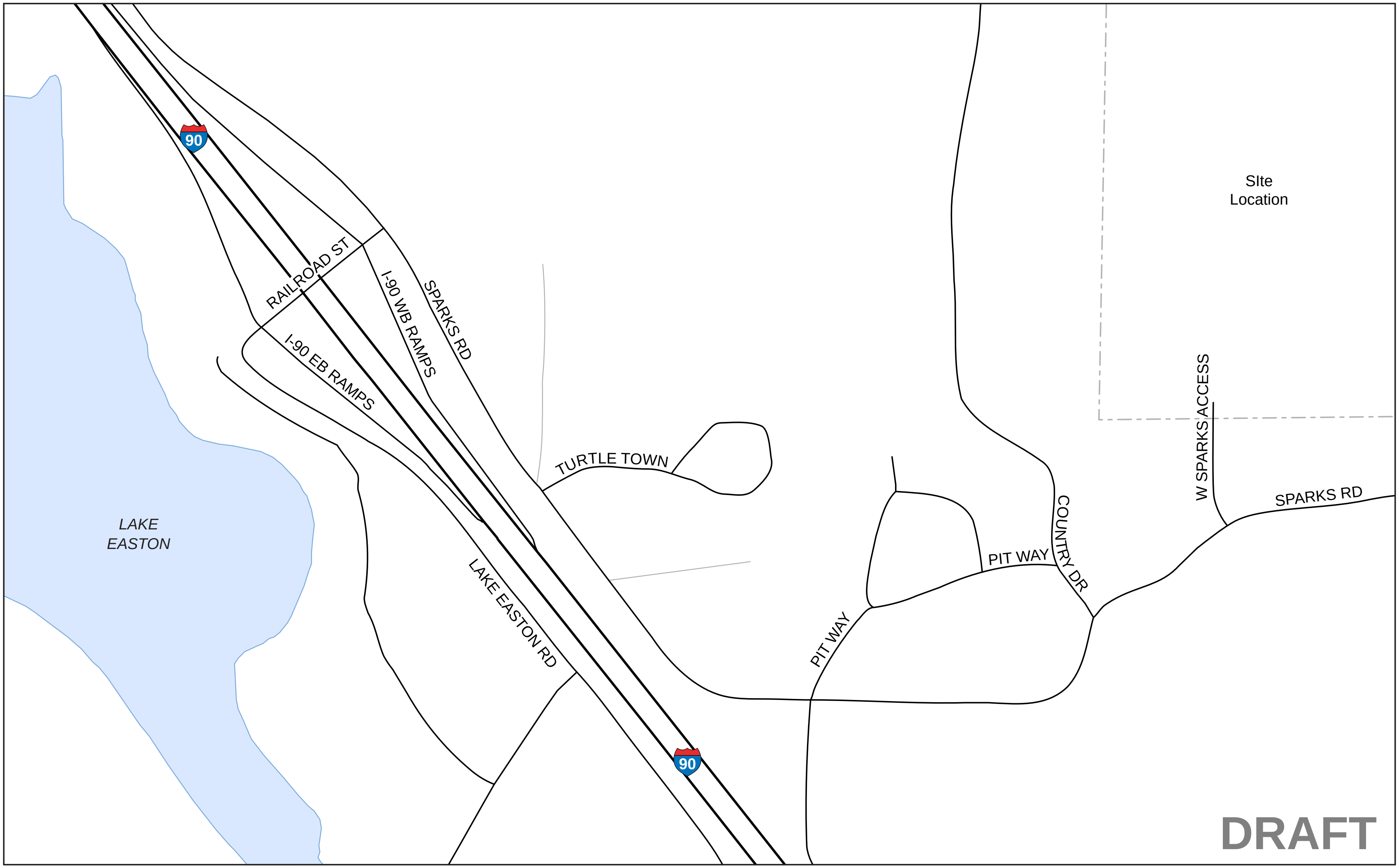
What is functional classification?

Functional classification is the division of roadways into groups having similar characteristics of providing mobility and land access. Public agencies define functional classifications differently, but, in general, arterials provide the most mobility and least direct property access, collectors provide an approximate balance between mobility and direct property access, and local roads emphasize direct property access in lieu of mobility.



Why is roadway surface type important?

The roadway surface type is responsible for many subtle differences that can, especially when considered collectively, result in more important implications. For example, gravel roads typically reduce speed, provide less traction needed for stopping, increase traffic noise and dust, and have higher maintenance costs. Conversely, paved roads require a substantially higher capital investment, take longer to construct, and can temporarily introduce unpleasant odors. Most county roads are paved with a bituminous surface treatment (BST) that consists of a sprayed-on asphalt emulsion covered with a thin layer of coarse gravel.



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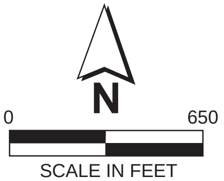

Figure 3-8
Marian Meadows
Transportation Study Area

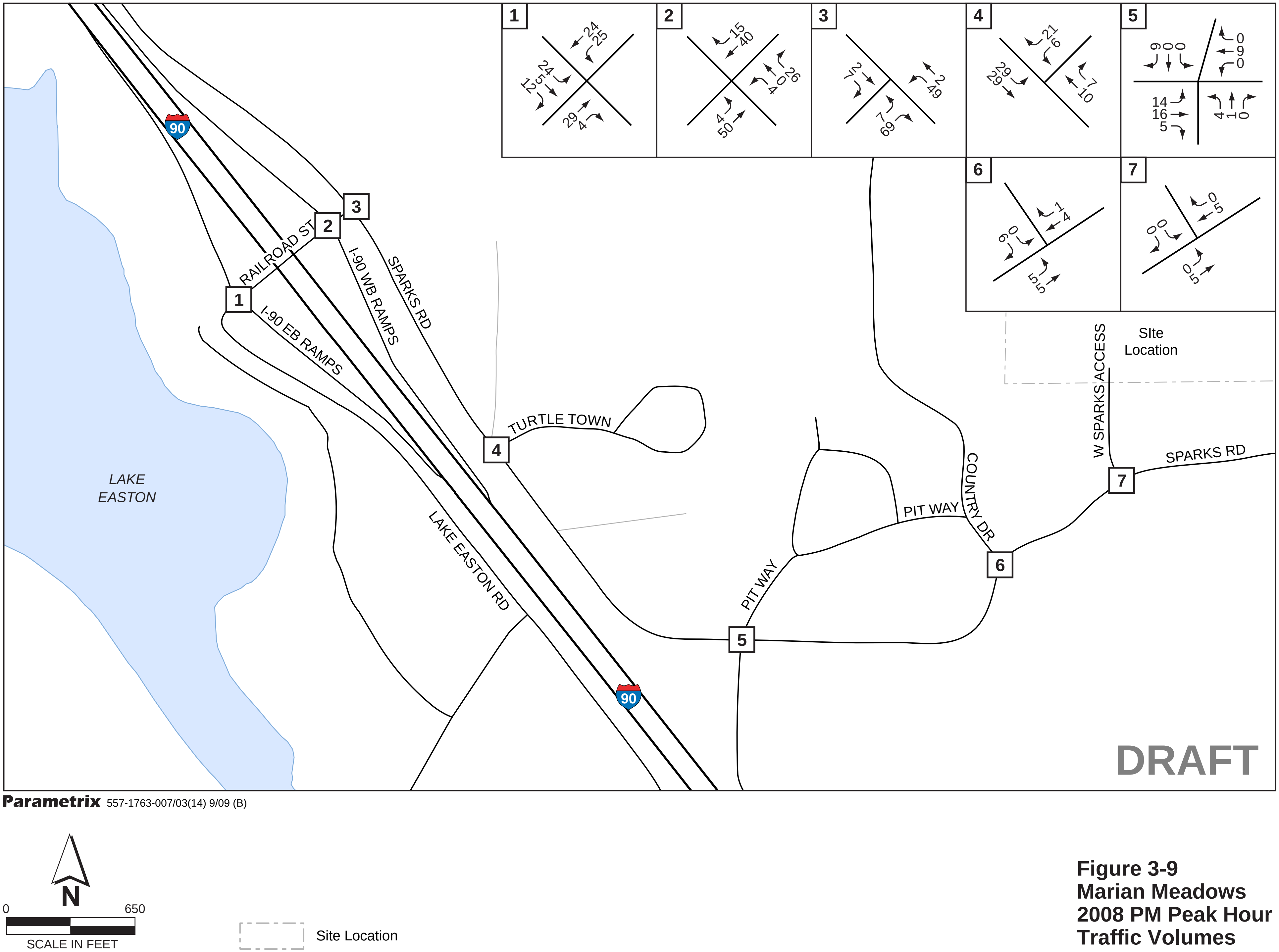

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Figure 3-9
Marian Meadows
2008 PM Peak Hour
Traffic Volumes

- **Country Drive** is a publicly dedicated, privately maintained two-lane road that is not classified by Kittitas County. The posted speed limit is 15 mph and has an ADT of approximately 100 vpd (estimated from 2006 and 2008 counts). Unlike all other roads analyzed, Country Drive is a gravel road to which a bituminous treatment is applied in the summer for dust control.

What is ADT used for?

Transportation planners use existing and projected average daily traffic (ADT) to evaluate the consistency between the roadway's design and use. A roadway with an ADT that is higher than the functional classification standards indicates improvements may be needed.

What pedestrian, bicycle, and other off-road facilities are currently available?

Within the study area and general vicinity there are no separate designated pedestrian, bicycle, and other off-road facilities. Wide lanes and shoulders are present on Railroad Street close to I-90 and some portions of Sparks Road can accommodate non-motorized travel; however, the non-motorized system in general is not delineated. Where shoulders are present they are discontinuous, sloped, and have uneven surfaces that may be difficult for some bicycles, strollers, roller skates, and skateboards.

There are no formal trails on the site or adjacent to the site. Established informal off-road vehicle and snowmobile trails were established along the BPA transmission line easement and on logging roads when the land was owned by Plum Creek Timber Company, which had an "open lands" policy allowing recreation use. Use of those trails continues, although some "no trespassing" signs are located on the property. Off-site trails are discussed in more detail in Section 3.3, Parks and Recreation.

Who maintains existing roadways and other facilities and how much does it cost?

The major roadways within the study area, including Railroad Street and Sparks Road, are maintained by Kittitas County with funding from the County Road fund, which is a property tax assessed on all unincorporated properties.

Country Drive and Pit Way are publicly dedicated, but privately maintained roadways. These roadways have gravel surfaces and require semi-regular spot resurfacing to fill in pot holes, as well as annual grading. They are also treated annually with a dust suppressant and are snow plowed in the winter. The association of local residents hires contractors for maintenance, dust suppression, and snow plowing. The annual cost of dust suppression for the Easton Village subdivision consists of oiling at about $4,000 per application and typically one or two applications are performed per year. The cost of snow plowing averages approximately $5,000 per year; however, in a year with heavy snow, such as the winter of 2007 to 2008, costs can be substantially higher and were about $9,000 for that winter. Based on the length of roads in the subdivision, the average cost per mile is about $10,000 for dust suppression and about $6,200 to $11,000 for snow plowing.

3 How well does the existing surface transportation system function?

The function of a transportation system can be evaluated with respect to several parameters including consistency with the community, level of service (LOS), and safety.

How do local roads currently fit into the character of the local community?

Roadways serve a continuum of functions. Roadways that are primarily oriented towards mobility are designated as arterials and those that emphasize direct property access in lieu of mobility are often designated as local streets. Within rural areas, the low traffic volumes generally do not warrant multiple classifications and most roads serve all functions.

With the exception of I-90, all roadways within the study area are classified as Rural Local Access (class 9) roads or are unclassified and provide direct access to adjacent properties. As a result, these roadways are often used as extensions of front yards where children play.

Numerous studies have emphasized that local roadways are generally used by local residents as an integral part of social interactions within the community. A number of studies have shown that social interactions take place regularly across and within roadways where traffic volumes are low (Appleyard 1963). The use of streets with low traffic volumes for children's play is widespread. Researchers have noted that streets are used for play even if there are alternative recreation facilities in the vicinity because they are immediately available, they are natural meeting places, and they provide a large linear space that is often much larger than is available on residential lots (Whyte 1980). In recognition of this function, many communities have moved toward local street design in residential areas that emphasize the shared use of streets; moreover, streets are designed to be shared by low speed vehicles as well as to accommodate a variety of social functions. Another approach is "traffic calming" that introduces a number of features into street design to slow traffic and render streets safer for local residents (Gilman 2007).

In addition to use by adjacent residents, roads in the area serve a variety of transportation modes. Snowmobiling is a popular winter activity of local residents and others. Rental opportunities for visitors are also provided by local outlets. Snowmobiling is permitted along Sparks Road and Railroad Street with a 25-mph posted speed limit. A number of formal and informal snowmobile trails are used in the vicinity.

All-terrain vehicles (ATVs) are popular during the spring, summer, and fall seasons and often use Sparks Road to access other areas. Similar to snowmobiles, residents and visitors on ATVs are common throughout the study area.

Although not specifically designed for or encouraged, other non-motor vehicle uses of the local roads is generally considered acceptable given the low traffic volumes, weather conditions, and proximity to vacationing areas that promote outdoor activities.

What are the existing standards that define "acceptable" traffic conditions?

Within the study area, the acceptable standards for traffic conditions are defined by the LOS. Kittitas County and WSDOT identify LOS C or better as their standard for acceptable operations in rural areas, such as the study area. LOS is an estimate of the quality of performance of transportation system operations. The most common industry standard for evaluating traffic operations is based on the Transportation Research Board's (TRB) Highway Capacity Manual (HCM), Special Report 209 (TRB 2000). Using this methodology, traffic conditions are assessed with respect to the average intersection delay (in seconds of delay per vehicle) and uses the letter "A" to describe the least amount of congestion and best operations and the letter "F" for the highest amount of congestion and worst operations. The 2000 HCM LOS ratings and criteria for signalized and unsignalized intersections are shown in Table 3-4.

What is level of service (LOS)?

Level of service (LOS) is a means of characterizing the operating conditions and driver comfort at roads and intersections. LOS is reported in terms of grades from A through F, much like a school report card.

LOS A provides the greatest driver comfort. At intersections, there is little delay, generally less than 10 seconds at signalized intersections or stop signs.

LOS B provides a high degree of driver comfort. At intersections, there is little delay, generally between 10 and 20 seconds at signalized intersections and 10 to 15 seconds at stop signs.

LOS C provides a generally acceptable level of comfort for most drivers. At intersections, there is minor delay, generally between 20 and 35 seconds at signalized intersections and 15 to 25 seconds at stop signs. At LOS C, the system moves traffic efficiently, despite less driver comfort.

LOS D provides a decreased comfort level for most drivers. At intersections, there is substantial delay, generally between 35 and 55 seconds at signalized intersections and 25 to 35 seconds at stop signs. At LOS D, the system can move large volumes of traffic, but with lower driver comfort.

LOS E represents unstable flow with substantial restriction and delay. The system is at or near capacity. Driver frustration is high. Delay is between 55 and 80 seconds at signalized intersections and between 30 and 50 seconds at stop signs.

LOS F represents traffic moving under forced flow or breakdown conditions. It creates a very high level of frustration for most drivers. At intersections, there are long delays, generally more than 80 seconds at signalized intersections and more than 50 seconds at stop signs. At LOS F, the system moves very little traffic.

Kittitas County and the Washington State Department of Transportation have adopted a LOS standard of LOS C within the study area.

Table 3-4. Level of Service (LOS) Ratings for Signalized and Unsignalized Intersections

LOS Rating	Average Delay for Signalized Intersections (seconds/vehicle)	Average Delay for Unsignalized Intersections (seconds/vehicle)
A	0 – 10	0 – 10
B	> 10 – 20	> 10 – 15
C	> 20 – 35	> 15 – 25
D	> 35 – 55	> 25 – 35
E	> 55 – 80	> 35 – 50
F	> 80	> 50

Source: HCM (2000)

What are the existing level of service conditions?

Seven intersections were studied to evaluate how well the local transportation system operates. These intersections represent the key locations where the project's effects would be most noticeable.

One of these intersections is at Turtle Town located off Sparks Road that includes a gas station, restaurant, convenience store, and RV park. This area is not accessed by a specific roadway intersection; rather, turns into and out of the area are made along a stretch of undelineated parking areas. For the purposes of this study, all vehicles turning into and out of the Turtle Town area are analyzed as an intersection.

The PM peak hour LOS analysis was conducted for these seven intersections in the study area to determine existing operating conditions. Results are summarized in Table 3-5. Existing 2008 PM peak hour volumes are shown in Figure 3-9.

As shown in Table 3-5 all of the study intersections currently operate acceptably above the LOS C standard.

How much collision data should be studied?

One industry-accepted practice for collision data analysis is to study the last 3 complete and consecutive years. Collision data older than the last 3 years may be associated with out-of-date roadway configurations and/or travel patterns and can make recent trends in the causes of collisions less apparent. Studying less than 3 years of data may not provide an accurate depiction of the collision history.

Table 3-5. Existing 2008 PM Peak Hour LOS Summary

	LOS	Delay (sec/veh)
I-90 Eastbound/Railroad Street	A	9.3
I-90 Westbound/Railroad Street	A	8.8
Sparks Road/Railroad Street	A	9.2
Sparks Road/Turtle Town	A	8.7
Sparks Road/Pit Way	A	9.1
Sparks Road/Country Drive	A	8.4

Are there currently high numbers of collisions or hazardous roadway conditions in the area?

Collisions can occur as a result of a variety of reasons and at any location. By studying the frequency, types, severity, and other characteristics of collisions, trends may appear to help identify ways to reduce the potential for collisions and increase safety.

Collision data were provided by Kittitas County and analyzed for the study area for the last 3 consecutive and complete years of data (2005 to 2007). Between 2005 and 2007, one collision occurred at the Railroad Street/Sparks Road intersection, and two collisions occurred along Sparks Road near the Turtle Town area. The small number of collisions suggests that traffic safety is not a high concern. Given that two of the three collisions occurred in the Turtle Town area, the collision history could suggest that the lack of formal and delineated access could contribute to collisions; however, no conclusions can be clearly drawn because the total number of collisions is low.

An additional source of traffic hazards in the area relates to the nature of the road system in recent plats. These are generally private roads with public rights of use. Because they are not public roads state laws relating to operation of motor vehicles do not apply. As a result, children of varying ages routinely use the roads for recreational vehicle use. These children are of various ages, have varying understanding of traffic safety, and operate within a range of parental oversight. Because of these factors, the potential for conflicts between automobile and recreation vehicle use is increased.

4 What policies and standards govern the transportation system function?

The GMA provides a general framework for transportation planning through two basic requirements:

- A transportation element in the Comprehensive Plan that implements, and is consistent with, the land use element and includes adoption of LOS to serve as a gauge to judge performance of the system; forecasts of traffic, and identification of system needs to meet LOS standards;
- A discussion of how additional funding will be raised, or how land use assumptions will be reassessed to ensure that LOS standards will be met, if probable funding falls short of meeting identified needs.
- A mandate to adopt and enforce ordinances which prohibit development approval if the development causes the level of service to decline below the standards, unless transportation improvements or strategies to accommodate the impacts of development are made concurrent with the development.

The following policies adopted by Kittitas County are relevant to consideration of new development requests:

Multi-Modal Transportation System, Arterial System, and System Maintenance

GPO 4.1 To develop and maintain a safe, efficient and environmentally sound multi-modal transportation system in accordance with local, state, and federal requirements.

GPO 4.3 To create a transportation system that provides reasonable circulation for all users throughout the County.

GPO 4.4 Kittitas County shall provide a transportation system that enhances the safety of the community and which maximizes the use of the existing road system by maintaining a system of arterials, collectors, and local access roads that forms an interconnected network for vehicular circulation.

GPO 4.5 To provide all-weather, all-season use of the arterial system for the movement of goods and services.

GPO 4.9 To identify and encourage preservation of transportation corridors for future rights-of-way by identifying corridors to be preserved as part of the overall transportation plan, by requiring right-of-way dedication or easements as part of development approval, and by acquiring right-of-way for future needs through purchase from willing sellers.

GPO 4.10 Kittitas County will place the appropriate emphasis on maintenance activities in order to preserve the capital investment in the transportation system by dedicating maintenance funding through the annual budgeting process and by developing performance measures to demonstrate the cost savings associated with appropriately scheduled maintenance activities.

GPO 4.11 Encourage and initiate Road Improvement Districts and arterial road building projects with the capital facilities six-year plan to meet concurrency requirements of anticipated growth.

GPO 4.13 Kittitas County shall require new development that reduces County road LOS below the LOS standards to mitigate their impacts.

GPO 4.14A To recognize non-motorized travel as a viable transportation mode by developing a countywide non-motorized system plan and by improving and maintaining existing non-motorized facilities.

GPO 4.14B Encourage new development to provide for safe transportation alternatives.

Land Use, Environment and Economic Development

GPO 4.16 To provide a transportation system that corresponds to and is consistent with patterns of land development in accordance with the adopted land use plans.

GPO 4.16A To adopt plans and regulations in compliance with RCW 36.70.547, or as amended thereafter, to protect airport operations.

GPO 4.18 To ensure the transportation system can support new development and that new development finances all new construction and improvements that might be necessary.

GPO 4.19 Kittitas County shall evaluate the merits of a proposed land use action against the potential impacts on the transportation system by reviewing development proposals for potential impacts to the transportation system and requiring developments to identify and mitigate their transportation impacts through SEPA or other local regulatory actions.

Level of Service (LOS) and Concurrency

GPO 4.25 To implement LOS standards that evaluates the adequacy of transportation facilities, which are measurable, understandable, and appropriate to the services and/or facilities being considered under local conditions.

GPO 4.26 Kittitas County shall utilize the Highway Capacity Manual (HCM) methodology to measure the effectiveness of the arterial system at arterial intersections by evaluating all arterial/arterial intersections (including state highways) to identify existing service levels and by developing a transportation model to evaluate the impacts of future land use alternatives on arterial/arterial intersections. Intersections, which fall below level of service “C” in rural areas and “D” in federal urban areas, shall be considered deficient.

GPO 4.27 To ensure that necessary transportation facilities and services to maintain adopted LOS standards are available when the impacts of development occur.

GPO 4.28 Kittitas County shall develop and implement a concurrency management system, which identifies existing deficiencies, funded improvements, and system capacity balances.

GPO 4.29 To develop a LOS standard that corresponds to land development goals and policies as expressed in the overall Comprehensive Plan for Kittitas County.

GPO 4.30 To encourage land use development patterns and support technology infrastructure, which reduce the demand for increased capacity on roadways.

5 What scenarios were analyzed for the future?

Two future alternatives were analyzed: the No Build Alternative and Alternative 1, Tenure Scenario 1, which has the highest trip generation. Both alternatives were analyzed for the year 2020, which represents the time when the project is expected to be constructed and fully occupied.

- **No Build 2020** – This is a future alternative that does not include any development from the proposed project. A background growth rate of 1.43 percent was used to forecast future year 2020 traffic volumes. This background growth rate was obtained from a traffic impact study prepared previously for the project and agreed on by the County (TENW 2006).

- **Alternative 1, Tenure Scenario 1 2020** – This is a future alternative that includes development of the proposed project with full time residents. This alternative has two options that vary by the amount and location of area developed.
  - ***Current subdivision*** – This option considers impacts of the current subdivision proposal on the westerly portion of the property and would consist of 226 single-family housing units.
  - ***Entire PUD*** – This option would develop both the lower westerly portion and the eastern sloping portion of the project area and would consist of 443 single-family housing units.

Vehicle trips generated by the future 2020 Alternative 1, Tenure Scenario 1 scenarios were based on the trip generation data provided for single-family residences in the Institute of Transportation Engineers (ITE) Trip Generation, 7th Edition. The PM peak hour trips generated are summarized in Tables 3-6 and 3-7.

Table 3-6. Alternative 1 – 226 Lot Subdivision PM Peak Hour Trip Generation

Proposed Land Use	Quantity		ITE Code	Net New Trips		
				Total	In	Out
Project – Single-Family Detached Housing	226	DU	210	223	140	83
Total Development				223	140	**83**

Table 3-7. Alternative 1 – 2 PUD Development of 443 Units PM Peak Hour Trip Generation

Proposed Land Use	Quantity		ITE Code	Net New Trips		
				Total	In	Out
Project – Single-Family Detached Housing	443	DU	210	409	258	151
Total Development				409	258	**151**

The net new trips were distributed to the transportation network based on the surrounding land uses and existing travel patterns. Ten percent of the project trips are expected to use Country Drive to access the development and the other 90 percent are expected to use the proposed access road from the property to Sparks Road. The following trip distribution percentages were obtained from a previously prepared traffic impact study (TENW 2006) and were used to assign the new trips to the study area:

- 35 percent to/from Railroad Street
- 35 percent to/from eastbound I-90
- 30 percent to/from westbound I-90

Based on this trip generation and distribution, traffic volumes would substantially increase in the study area. Under the No Build Alternative (Figure 3-10), the PM peak hour traffic volume along Sparks Road at Railroad Street is expected to be 144 vph in 2020, a negligible increase over existing volumes. For a

226-lot subdivision, this volume is expected to increase to 367 vph as indicated in Figure 3-11, which is about two and a half times greater than the existing volume. With full buildout of the PUD, the PM peak hour volume along Sparks Road would reach 552 vph as shown in Figure 3-12, or about three and a half times greater than the existing volume.

6 How would the proposal and alternatives change how the future transportation system functions?

This section describes how the 226 lot subdivision and 443 lot PUD would affect how well the transportation system functions relative to the No Build Alternative. Other alternatives are not analyzed in detail because the trip generation of Alternative 1 is greater than all other alternatives and therefore provides a "worst case" analysis.

Would the roadways that serve the area change in the future?

No changes are contemplated in the circulation system in the area that uses Sparks Road as the single road providing access to and across I-90. The desirability of additional roadways is discussed in the fire impact analysis in subsection 3.4.2.

All project roadways are required to be designed to County standards. Roadway grades are especially applicable to the project because steep grades can reduce the response times for fire trucks and emergency medical service (EMS) vehicles. Similarly, the County in coordination with the local EMS providers may prohibit certain circulation configurations, such as cul-de-sacs, which can be problematic for oversized EMS vehicles.

What changes to future level of service conditions are expected?

The new trips generated from the project would increase the traffic volumes on the transportation network and would change the LOS conditions. Accounting for the land use development assumptions and traffic volume forecasts described under Question 5 above, the 2020 future year LOS conditions for the No Build and Alternative 1 were analyzed. The results are summarized and compared to the existing conditions in Table 3-8. PM peak hour volumes for the No Build and Alternative 1, Tenure Scenario 1, are shown in Figures 3-10 to 3-12.

As shown in Table 3-8, the study intersections are expected to experience relatively small increases in delay in 2020, even with the worst case Alternative 1, Tenure Scenario 1with buildout of the proposed 443 units with all full-time residents. All of the study intersections would continue to operate better than the LOS C standard. Other alternatives and tenure options would have lower trip generation. Occasional peak traffic with other alternatives involving seasonal recreational use may approximate these levels at peak weekends.

How would collisions and/or hazardous roadway conditions change in the future?

The collision history described under Question 3 above indicated that the frequency of collisions and presence of hazardous roadway conditions are currently not problematic. Although the number of collisions over the last 3 years is low (three collisions from 2005 to 2007), no trends were apparent.

Table 3-8. Existing 2008, No-Build 2020, and Build 2020 LOS Summary

					Build 2020			
	Existing 2008 PM Peak Hour		No-Build 2020 PM Peak Hour		226 Units PM Peak Hour		443 Units PM Peak Hour	
Intersection Name	**LOS**	**Delay (sec/veh)**	**LOS**	**Delay (sec/veh)**	**LOS**	**Delay (sec/veh)**	**LOS**	**Delay (sec/veh)**
I-90 Eastbound/Railroad Street	A	9.3	A	9.5	B	11.5	B	14.4
I-90 Westbound/Railroad Street	A	8.8	A	8.9	A	9.8	B	10.8
Sparks Road/Railroad Street	A	9.2	A	9.3	B	10.7	B	12.4
Sparks Road/Turtle Town	A	8.7	A	8.7	A	9.5	B	10.3
Sparks Road/Pit Way	A	9.1	A	9.2	B	11.0	B	13.1
Sparks Road/Country Drive	A	8.4	A	8.4	A	8.8	A	9.2
Sparks Road/Project Access	NA	NA	NA	NA	A	8.6	A	8.9

sec/veh = seconds per vehicle

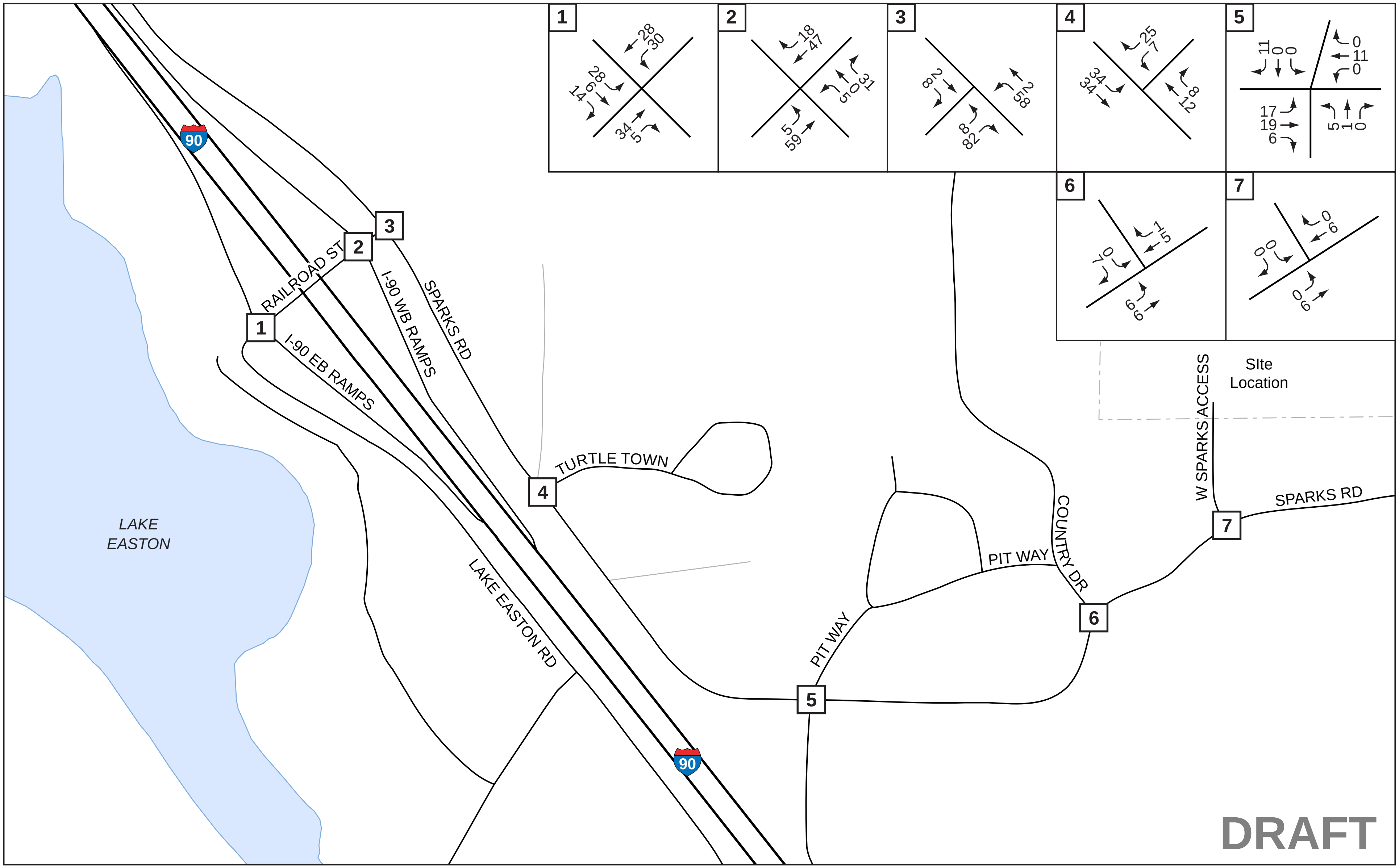
Because collisions result from several environmental and driver factors, there is no collision forecasting methodology that is accepted industry-wide. In general, however, the potential for collisions increases as traffic volumes increase. While the frequency of collisions in the study area can be expected to increase in the future, without the project and more so with the project, quantifying the magnitude of increase is not practical. Nonetheless, based on the total traffic volumes and existing collision frequency (0.66 collisions per year) that is substantially below a level of concern, traffic safety is not expected to be a substantial problem in the future with or without the project.

Would pedestrian, bicycle, and other off-road use and facilities be affected?

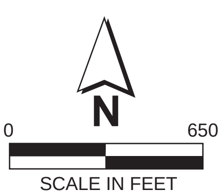
There are no planned non-motorized improvement projects identified within the study area that would be affected by the project alternatives. Therefore, without or with the project, the future non-motorized system within the study area is expected to be similar to the existing conditions.

With the substantial increases in traffic volumes, roadways previously shared by motorized and non-motorized travel modes could pose safety concerns. Although the amount of non-motorized activity in the study area is relatively low, the demand from this development and others may increase non-motorized demand in the future. This may be especially pronounced in Alternative 2 with a multi-family component. To accommodate pedestrians and children on bicycles, sidewalks and signage may become desirable to reduce the potential for vehicle-to-pedestrian collisions. State law (RCW 58.17.110) requires that subdivisions provide safe public walkways for school children from residences to schools or to bus stops.

Traffic hazards are especially a concern for winter snowmobile use when plowed road areas are narrow and both vehicle and snowmobiles may be operating at speeds that do not allow adequate stopping distance or effective avoidance in cases of imminent collision.

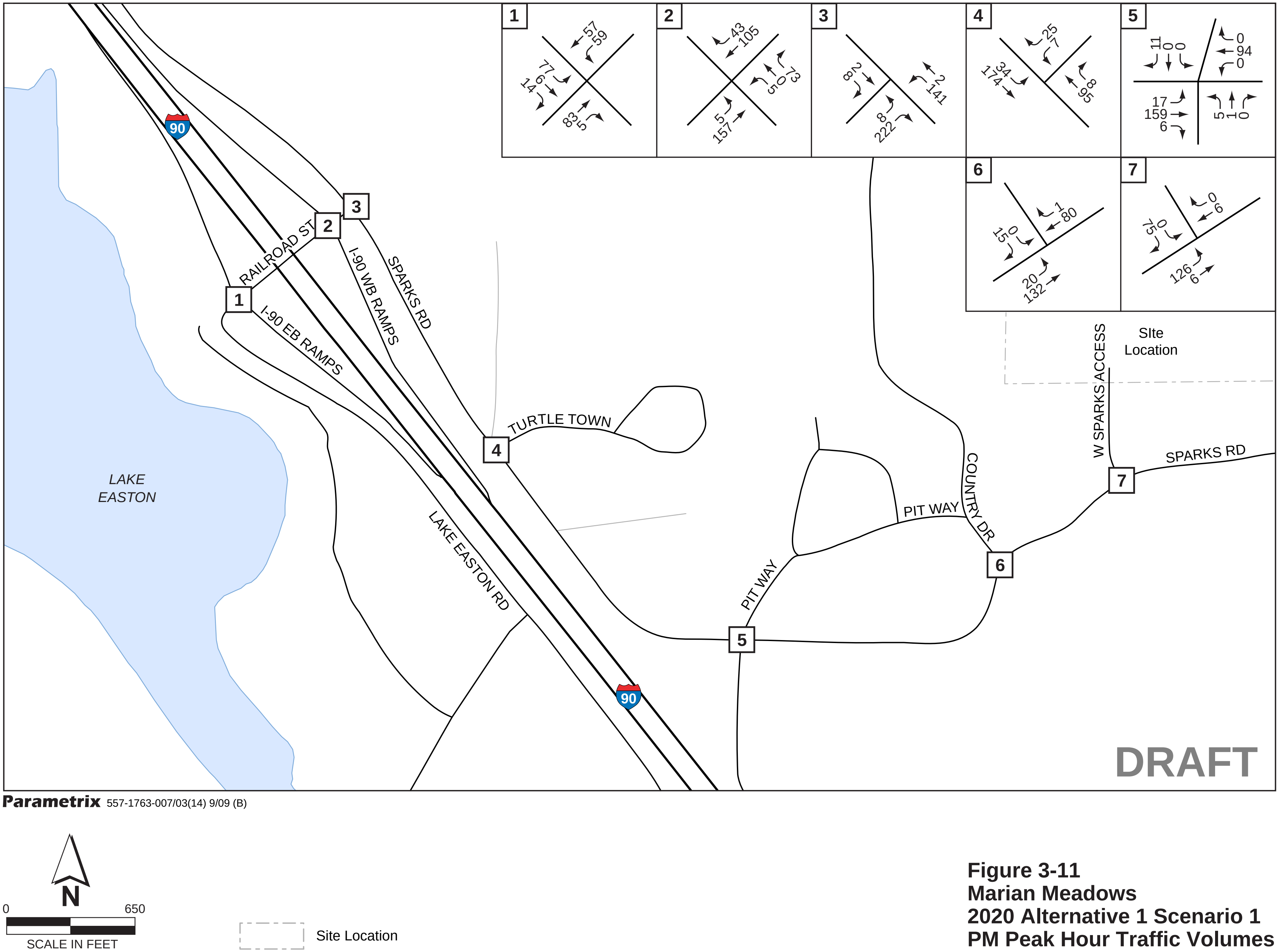


Parametrix 557-1763-007/03(14) 9/09 (B)



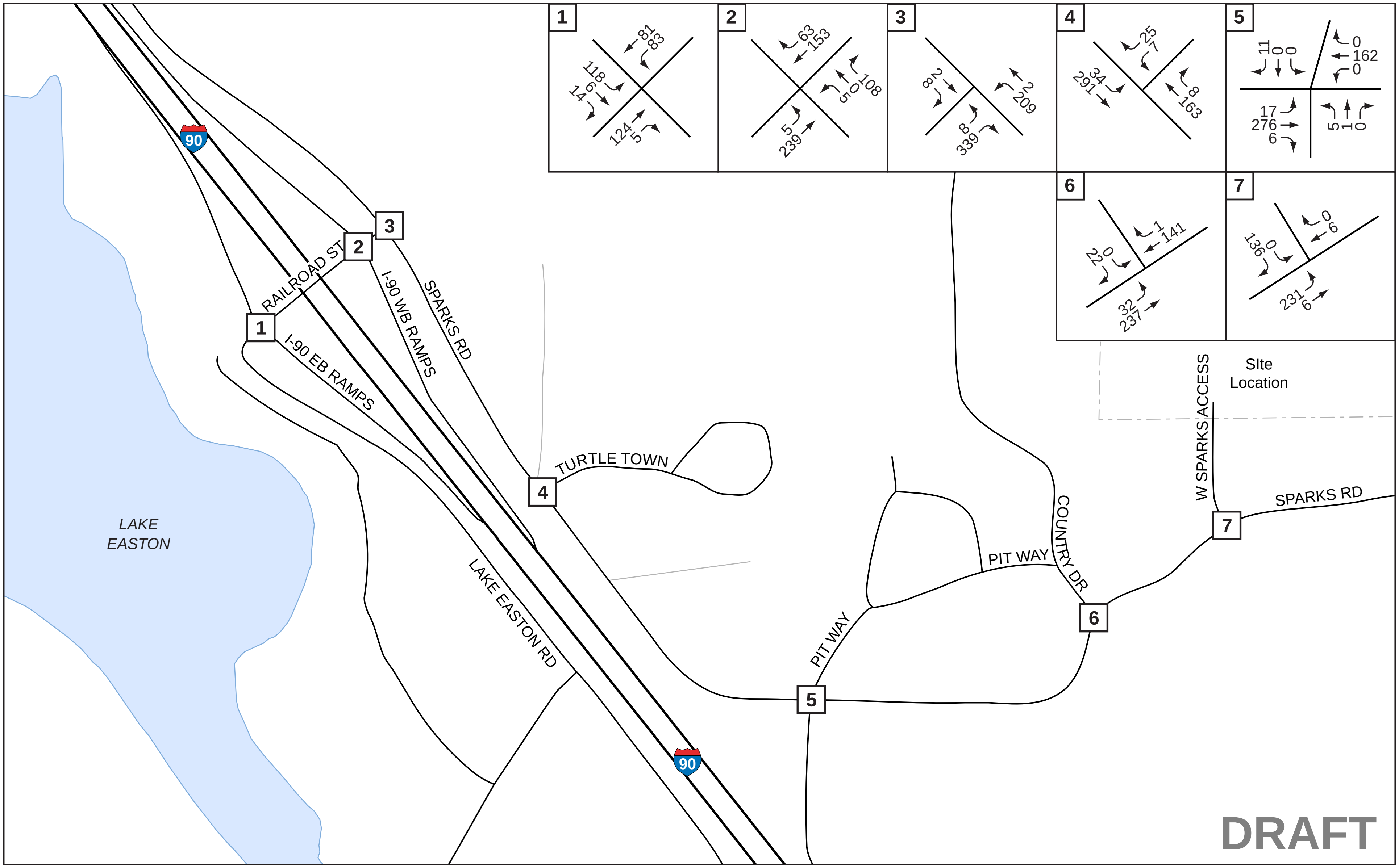
Site Location

Figure 3-10
Marian Meadows
2020 No-Build PM Peak Hour Traffic Volumes

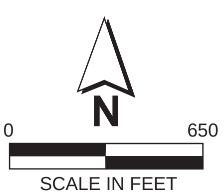


Parametrix 557-1763-007/03(14) 9/09 (B)

Figure 3-11
Marian Meadows
2020 Alternative 1 Scenario 1
PM Peak Hour Traffic Volumes



Parametrix 557-1763-007/03(14) 9/09 (B)



Site Location

Figure 3-12
Marian Meadows
2020 Alternative 1 Scenario 2
PM Peak Hour Traffic Volumes

Development of the project could result in a loss of areas that are informally used by ATVs and snowmobiles such as the BPA transmission line easement. Loss of these informal areas would likely result in more use of formal and designated areas and routes for ATV and snowmobile usage, as well as displacement of informal use to adjacent National Forest and other public lands.

County road standards for rural areas do not require sidewalks; however, sidewalks or trails constructed on the outside banks of the roadside ditch could be developed to enhance pedestrian safety. Alternatively, an off-road system of trails could be developed that may better serve both pedestrians and off-road vehicles by separating them from conflict with vehicular traffic.

How would future maintenance responsibilities and costs change?

Without the project, maintenance responsibilities and costs would generally be similar as they are today. Railroad Street and Sparks Road would continue to be maintained by Kittitas County and costs would be paid by the County road fund. All other roads would be privately maintained. However, if substantial increases in traffic occur from the development, resurfacing to fill pot holes and dust suppression treatments along Country Drive and Pit Way could become more frequent and costs could increase slightly.

Kittitas County maintenance of paved roads such as Railroad Street and Sparks Road are partially related to traffic volumes but also are affected by winter conditions, particularly frost heaving that degrades the road subsurface and surface. Additional traffic volumes would not necessarily result in a proportional increase in maintenance needs but would have some effect.

Maintenance of gravel roads is directly affected by traffic volumes that tend to combine with weather conditions to increase road surface failures resulting in increased pot holes. Additional traffic also increases the dust generated. Both of these factors would degrade the driving experience or adversely affect adjacent residences and increase costs. Gravel roads in the area are maintained by homeowner associations. With the project, traffic volumes on Country Drive and Pit Way would increase and result in an associated maintenance cost increase. Cost impacts depend on the extent to which the project is required to participate in upgrading the roads to avoid impacts or pay a proportional cost of maintenance.

The effects on snow removal needs and costs would be relatively low because snow removal is determined by snowfall. Additional development might decrease the cost per residence if all residences are required to contribute to the cost.

The project’s homeowner association would be responsible for all road maintenance on the site. Roads would be required to be paved initially; therefore, maintenance costs would be relatively low for a period of years until roads began to deteriorate. After that point, bituminous surface treatment would be required every few years to maintain roads in optimum condition. Less frequent maintenance would result in gradual deterioration of roads. In addition, snow removal would be the complete responsibility of the residents and would be paid for by a homeowner association. The cost of snow removal on the upper portion of the site is likely to be much higher than the lower portion. The relative difficulty of snow removal may result in longer road closures in that area due to delays in clearing roads. The difference in the amount and cost of snow removal within the development may be addressed by higher charges for higher elevation areas.

Would there be changes to how local roads fit into the character of the local community?

As described above, roadways in the study area currently provide several functions, including general mobility, freight transportation, direct property access, play areas for children, and recreational facilities (e.g., ATV and snowmobile routes).

The character of shared use roadways would change over time. Without or with the project, roadways would likely be used more by motor vehicles compared to other uses and the build scenarios would further increase motor vehicle usage. Although the proportionate share of motor vehicles using the roadways would increase, the functional classifications and general character of shared use roadways are not expected to change. General mobility, freight transportation, direct property access, and recreational usage would be maintained. Roadways could still serve as extensions of front yard and play areas; however, the increase in traffic volumes may tend to lead to less use. Within the existing Easton Village subdivision, volumes on Country Road are projected to increase more than four-fold with 10 percent of project trips presumed to take that route. If more project trips chose that route, the increase would be greater. The total number of trips is relatively low, but it may be great enough to change perceptions of safety for children playing in the area.

7 What mitigation is needed for the alternatives?

Level of Service Mitigation

From the traffic operations perspective, all of the study intersections under Alternative 1, Tenure Scenario 1with 443 units and full-time residents operate acceptably above the LOS C standard. Therefore, no mitigation is needed with respect to traffic operations.

The potential need for left-turn lanes were examined along Sparks Road at Pit Way, Country Drive, and the project access point (West Sparks Access) where the left turns are highest. WSDOT provides guidance (not standards, regulations, or criteria) on when a left-turn lane should be constructed in the WSDOT Design Manual, Exhibit 1310-12a. In this exhibit, the need for a turn lane is based on the volume of left-turns compared to the total through-movement volume of the roadway and the posted speed limit. Based on that guidance, no left-turn lanes are needed. Turn lanes may also be implemented under special circumstances, such as when visibility is poor; however, in this case the sight distance is adequate.

Mitigation for collisions

Although the potential for collisions would increase due to higher traffic volumes, the existing low collision frequency and relatively low future traffic volumes suggest that the amount of collisions in future would not rise to a level of concern. However, based on the shared-use character of Sparks Road, warning signs may be desirable to reduce the potential for vehicle-to-pedestrian collisions in areas around curves in the roadway, where sight distance is reduced, and/or where pedestrian activity is relatively high.

Mitigation for pedestrian, bicycle, and other off-road use?

With the substantial increases in traffic volumes, roadways previously shared by motorized and non-motorized travel modes could pose safety concerns. Pedestrian and non-motorized transportation modes could be accommodated on sidewalks or a trail system placed behind the standard ditch section on a rural roadway. Such facilities should be designed in consultation with the local school district to ensure they provide safe public walkways for school children from residences to schools or to bus stops in new subdivisions (RCW 58.17.110). Motorized off-road trails are often preferred as a separate trail system because of potential hazards to slow moving and non-motorized vehicles such as bicycles or cross-country skiers. Off-road trails for snowmobiles are often preferred because plowed roads are narrow, collisions are difficult to avoid, and may lead to serious injuries. For winter use, off-road trails are also preferred because clearing for driveways interrupts sidewalks or trails next to the road and makes them unusable. Off-road trails do not require plowing and remain functional throughout the winter. Local communities must decide if trails shared by non-motorized users such as pedestrians, bicycles, and motorized users such as off-road vehicles and snowmobiles are acceptable. In most cases, shared trails must be wider to serve both motorized and non-motorized users.

Maintaining or formalizing existing off-road trails through the site on the BPA transmission line easement would serve the residents of the development as well as other users in the vicinity and avoid displacement of informal use to adjacent National Forest and other public lands.

Mitigation for the character of the local community

Use of local streets as part of the pattern of social interactions within the community, including as a play area for children, may change as the result of perceived increases in traffic. The community most likely to be affected is the Easton Village subdivision of small lots through which Country Road passes. It may be that residents would restrict children’s use of the roads due not only to vehicles but off-road vehicle use. Traffic volumes on Country Road by Marian Meadows residents may be reduced by restricting the access to emergency use only; however, this would affect overall circulation patterns in the area. To reduce impacts of increased traffic volumes, signage could be installed on the roadway advising drivers of “children at play” or speeds could be reduced by “traffic calming” features introduced into the street design.

Mitigation for the maintenance needs and costs

Maintenance needs and costs can be most influenced by the construction standards for new facilities. In general, the higher the standards for subsurface, drainage, and road surface, the more durable they are, and the less they are subject to failure, including reduced life-cycle maintenance costs. Effective maintenance requires preventative measures to avoid failure. This includes controlling the action of water, which can erode ditches, roads, and repairs to the road surface.

Mitigation of road maintenance costs in the development would be most affected by the standards to which the roads are built and the quality of ongoing maintenance. The county controls the implementation of initial standards and the homeowner association will control ongoing maintenance. The extent to which homeowners choose to assess themselves for the cost of preventative maintenance is the largest determinant of future road quality and the lifecycle cost of maintaining road serviceability.

Mitigation of Kittitas County costs of maintaining Sparks Road is largely related to whether an increase in traffic volumes of the magnitude of the project will have an identifiable impact on road surface maintenance needs or costs. In the case of mountain roads, frost heave, and other sources of damage and wear is likely to be as significant as additional traffic. Snow removal by the county is related primarily to the amount of snowfall and is not directly affected by the number of residences served. The cost of maintenance would increase, but may be offset by increased revenues to the County road fund, which is the additional tax base provided by new residences.

Maintenance costs of gravel roads such as Country Road and Pit Lane are more directly affected by traffic volumes that lead to deterioration of the road surface and summer dust. Upgrading the road to a paved surface will increase survivability and reduce dust but may increase maintenance costs in the future due to the need for periodic resurfacing or "chip seals." The additional costs associated with traffic from the proposal could be mitigated by requiring that project residents contribute to maintenance costs.

8 What are the likely cumulative impacts on surface transportation with development of nearby land?

Cumulative impacts account for potential development in nearby areas that are not related to the proposed project. Analysis of the cumulative impacts assumes that the surrounding areas in Easton would be developed under its existing zoning or that approval of the project would provide the precedent for development of other land under PUD density. The following options were analyzed:

- *, 226-Lot Subdivision with Rural Density Development* – This scenario includes development of the lower bench area of the proposed project as a subdivision plus development occurring in the surrounding areas under the existing zoning.
- *, 226-Lot Subdivision with PUD Density Development* – This scenario includes development of the lower bench subdivision plus development occurring in the surrounding areas under PUD density.

- *443-Unit PUD with Rural Density Development* – This scenario includes development of the entire project area plus development occurring in the surrounding areas under the existing rural zoning.
- *443-Unit PUD with PUD Density* Development – This scenario includes development of the entire proposed project area plus development occurring in the surrounding areas under PUD density.

Trips generated by the four cumulative scenarios were estimated and are summarized in Tables 3-9 to 3-12. Traffic volumes would substantially increase in the study area as indicated in Figures 3-13 to 3-16. Under the No Build scenario the 2020 PM peak hour volume along Sparks Road is estimated to be approximately 144 vph. This would increase with the buildout of the area at rural intensities to 552 vph (see Figure 3-14). For the cumulative Scenario 2 with PUD density, which represents the worst-case scenario, the peak hour volume increases to 1,267 vph (see Figure 3-16) almost nine times as much as existing traffic.

Table 3-9. Cumulative 226 Units with Existing Rural Zoning Trip Generation

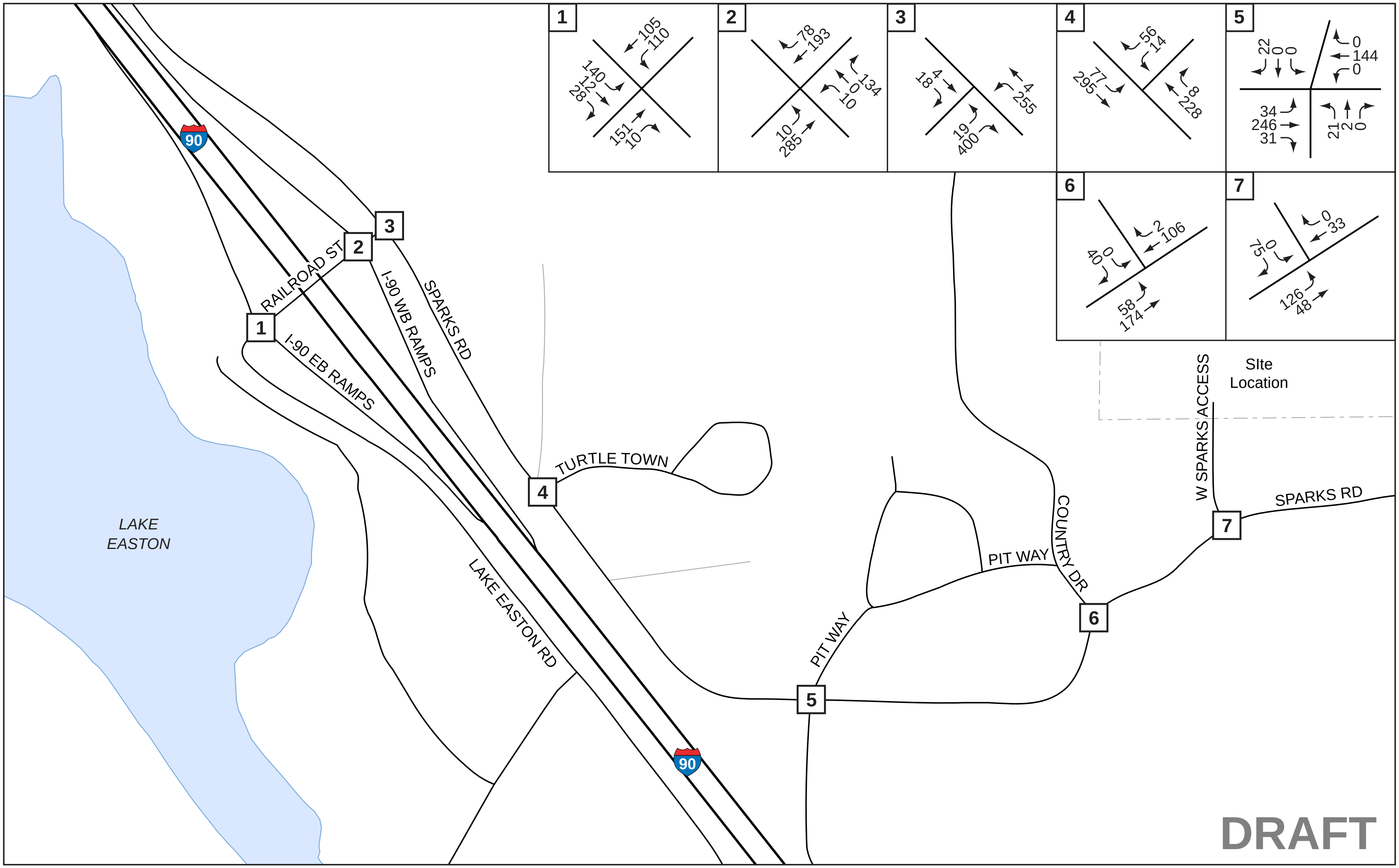
Proposed Land Use	Dwelling Units	ITE Code	Net New Trips Total	In	Out
Project – Single-Family Detached Housing	226	210	223	140	83
Cumulative - with Existing Rural Zoning	131	210	157	99	58
Total Development			**380**	**239**	**141**

Table 3-10. Cumulative 226 Units with PUD Density Trip Generation

Proposed Land Use	Dwelling Units	ITE Code	Net New Trips Total	In	Out
Project - Single-Family Detached Housing	226	210	223	140	83
Cumulative - with PUD Density	567	210	584	368	216
Total Development			**807**	**508**	**299**

Table 3-11. Cumulative 443 Units with Existing Zoning Trip Generation

Proposed Land Use	Dwelling Units	ITE Code	Net New Trips Total	In	Out
Project - Single-Family Detached Housing	443	210	409	258	151
Cumulative - with Existing Rural Zoning	131	210	157	99	58
Total Development			**566**	**357**	**209**



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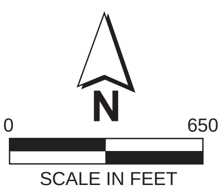
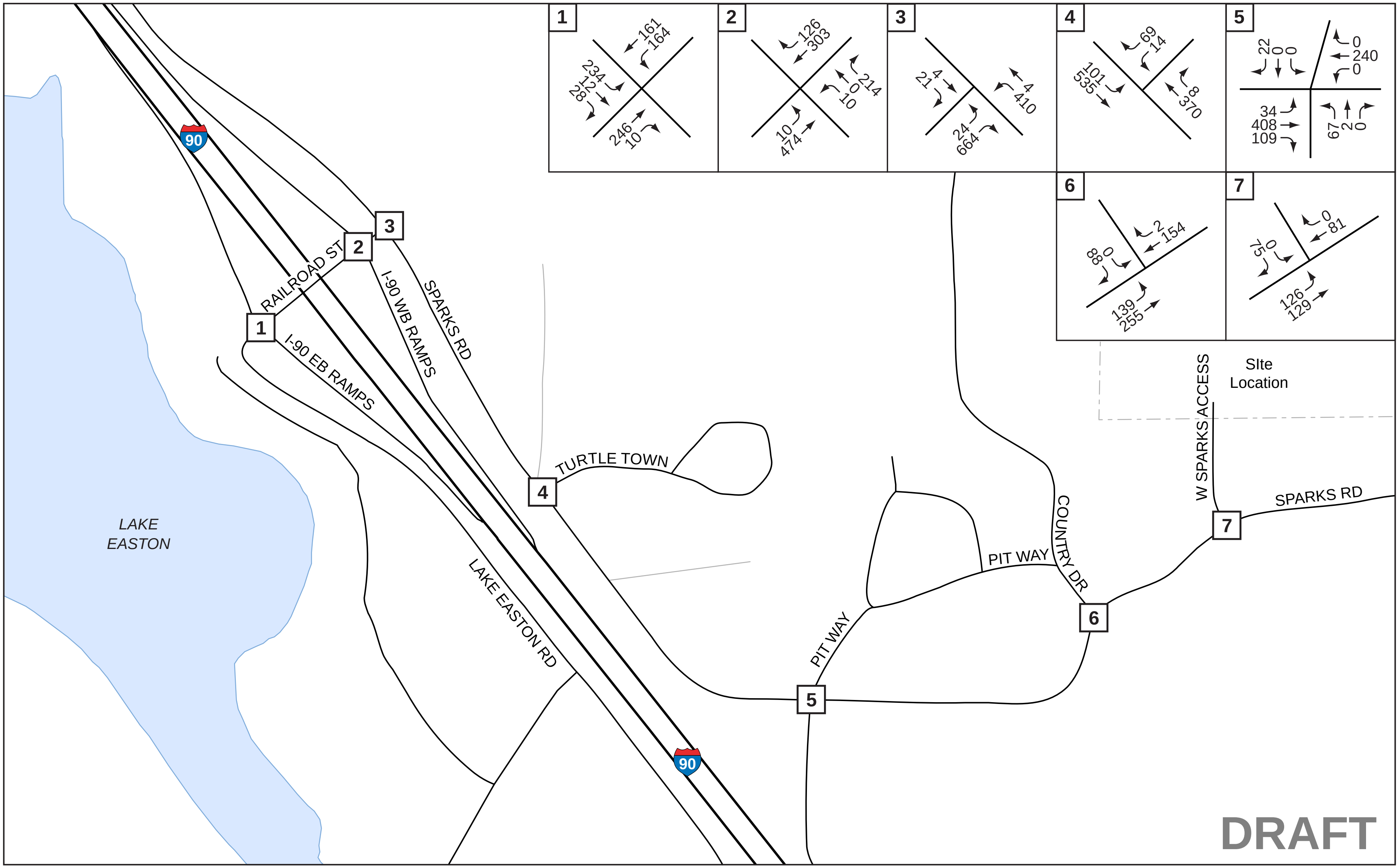


Site Location

Figure 3-13
Marian Meadows
2020 Cumulative with Alternative 1 Scenario 1
and Rural Density PM Peak Hour
Traffic Volumes



Parametrix 557-1763-007/03(14) 9/09 (B)

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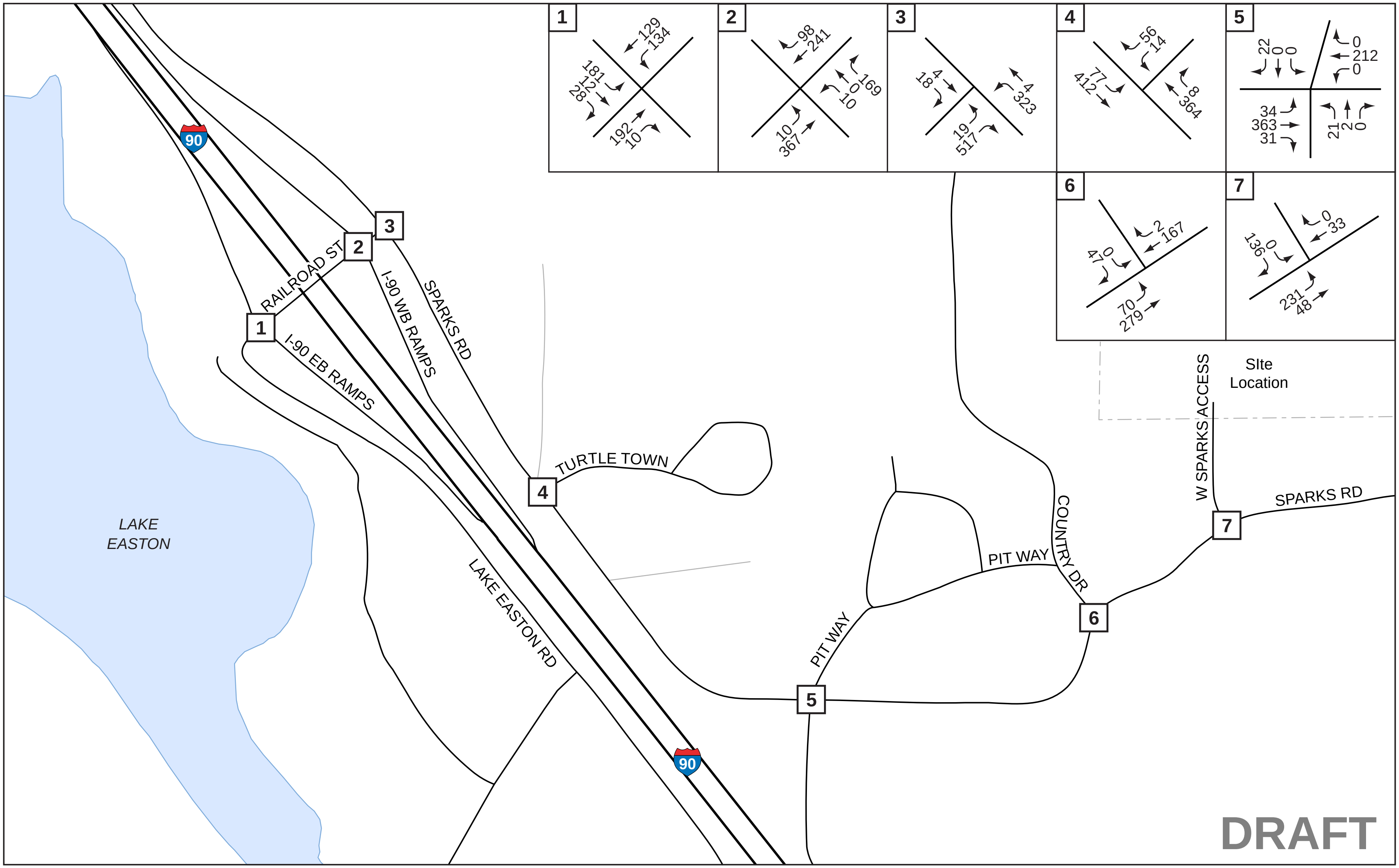
Site Location

Figure 3-14
Marian Meadows
2020 Cumulative with Alternative 1 Scenario 1 and PUD Density PM Peak Hour Traffic Volumes



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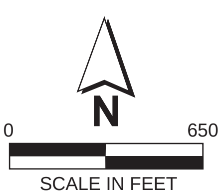
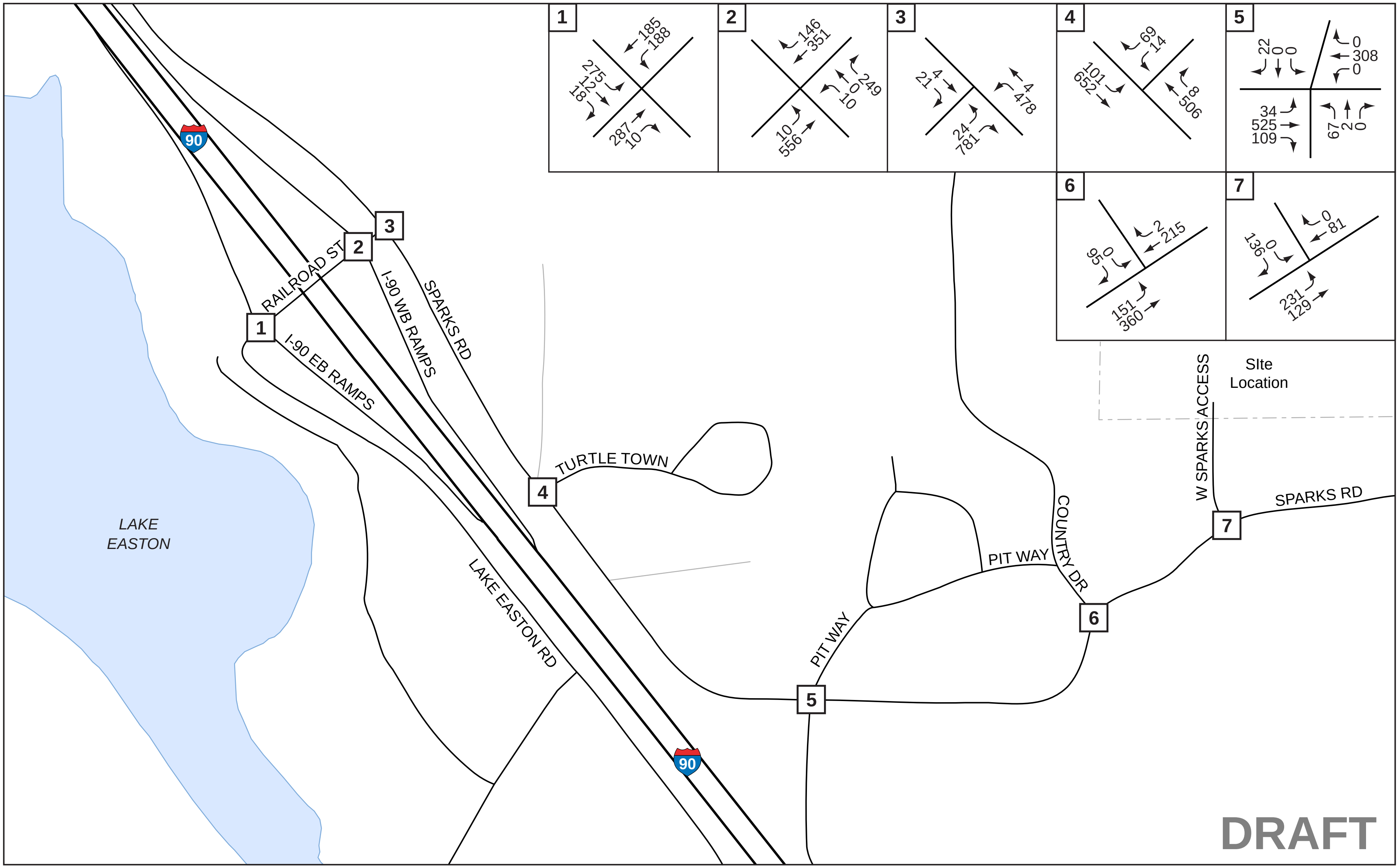
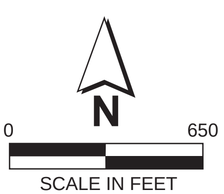


Site Location

Figure 3-15
Marian Meadows
2020 Cumulative with Alternative 1 Scenario 2
and Rural Density PM Peak Hour
Traffic Volumes



Parametrix 557-1763-007/03(14) 9/09 (B)



Site Location

Figure 3-16
Marian Meadows
2020 Cumulative with Alternative 1 Scenario 2 and PUD Density PM Peak Hour Traffic Volumes

Table 3-12. Cumulative 443 Units with PUD Density Trip Generation

Proposed Land Use	Dwelling Units	ITE Code	Net New Trips		
			Total	In	Out
Project - Single-Family Detached Housing	443	210	409	258	151
Cumulative - with PUD Density	567	210	584	368	216
Total Development			**993**	**626**	**367**

Would the cumulative effects change the roadways that serve the area?

As described above, when considering the cumulative effects of the project, traffic volumes in the study area would increase and the magnitude of increase would vary greatly depending on the tenure scenario and whether or not the adjacent areas are assumed to be developed under the existing rural zoning or PUD density.

Depending on the amount of growth and development within the study area, it is possible that some roadways could warrant a change in functional classification to be consistent with traffic volumes that are using the roadways. Substantial increases in traffic volumes could result in minor designations being changed to major classifications. However, because the transportation system would be used in a similar fashion with respect to general mobility, direct property access, roadway network, travel patterns, etc., and the need for improvements would likely be limited to one or two intersections, it is unlikely that the functional classifications would require changes. Therefore, despite substantial traffic volume increases, the functional classifications of the roadways in the study area are expected to remain the same as today.

Would the cumulative effects change the expected level of service?

The new trips generated from the project and development of nearby areas would increase the traffic volumes on the transportation network and would change the LOS conditions. Accounting for the land use development assumptions of the project and the surrounding areas, and traffic volume forecasts described under Question 5, the 2020 future year LOS conditions for cumulative conditions were analyzed. The results are summarized and compared to the No Build 2020 conditions in Table 3-13. PM peak hour volumes for all the cumulative scenarios are shown in Figures 3-13 to 3-16.

Table 3-13. No Build 2020 and Cumulative 2020 LOS Summary

	No Build 2020		Cumulative 2020 with Rural Density			
			226-Lot Subdivision Plus Existing Rural Zoning		443-Unit PUD Plus Existing Rural Zoning	
	LOS	Delay (sec/veh)	LOS	LOS	LOS	Delay (sec/veh)
I-90 Eastbound/Railroad Street	A	9.5	D	D	F	139.2
I-90 Westbound/Railroad Street	A	8.9	B	B	C	18.8
Sparks Road/Railroad Street	A	9.3	C	C	F	60.4
Sparks Road/Turtle Town	A	8.7	B	B	C	15.7
Sparks Road/Pit Way	A	9.2	C	C	C	24.4
Sparks Road/Country Drive	A	8.4	A	A	A	9.7
Sparks Road/W Sparks Access	NA	NA	A	A	A	9.1
Cumulative 2020						
I-90 Eastbound/Railroad Street	A	9.5	F	F	F	139.2
I-90 Westbound/Railroad Street	A	8.9	D	D	C	18.8
Sparks Road/Railroad Street	A	9.3	F	F	F	60.4
Sparks Road/Turtle Town	A	8.7	C	C	C	15.7
Sparks Road/Pit Way	A	9.2	E	E	C	24.4
Sparks Road/Country Drive	A	8.4	B	B	A	9.7
Sparks Road/West Sparks Access	NA	NA	A	A	A	9.1

With buildout of the proposed PUD with cumulative development of surrounding areas at current zoning densities, delays at intersections would generally increase by up to 12.8 seconds/vehicle and continue to operate above LOS C, which is the standard adopted by Kittitas County. The one exception is the I-90 eastbound ramps/Railroad Street intersection, which degrades to LOS D. Although other Alternatives 1 and 2 tenure options may reduce weekday trips due to seasonal residences, this scenario is considered relevant to potential impacts of end-of-weekend trip generation exiting the project vicinity.

The cumulative effects of buildout of the proposed PUD with PUD density development of other land in the vicinity results in delay increases of up to 144.2 seconds/vehicle and four intersections would operate worse than the LOS C standard:

- I-90 eastbound ramps/Railroad Street – LOS F;
- I-90 westbound ramps/Railroad Street – LOS D;
- Sparks Road/Railroad Street – LOS F; and
- Spark Road/Pit Way – LOS E.

The I-90 eastbound ramps/Railroad Street intersection is currently stop-controlled for the eastbound off-ramp only and a high eastbound left-turn volume (275 vph) is the primary contributor to high delays.

Westbound approach vehicles experience increased delays as a result of higher through-movement volumes at the I-90 westbound ramps/Railroad Street intersection.

At the Sparks Road/Railroad Street intersection, both the eastbound and westbound approaches (Sparks Road) are stop-controlled while Railroad Street is a free movement. The high-volume (478 vph) westbound left movement is the primary cause of delays.

At Pit Way, high delays are associated with the northbound left movements (67 vph) that are unable to find adequate gaps in the traffic stream due to relatively high through-movement volumes.

Would the cumulative effects change collision frequencies and/or hazardous roadway conditions?

Increased traffic volumes inherently increase the collision potential and existing hazardous roadway conditions can become exacerbated. Because the recent collision history indicates that traffic safety is not a concern (approximately 0.66 collisions/year compared to a 5.0 collisions/year guiding criterion), it is difficult to conclude if traffic safety is expected to be problematic in the future.

All of the intersections in the study area are one-way/two-way stop-controlled. At these types of unsignalized intersections, the most common collisions occur between vehicles turning into and out of the minor approach with vehicles traveling through the intersection (versus rear-end collisions, sideswipes, or head-on). Conflicts between these vehicles generally arise as the result of aggressive driver behavior due to long minor street delays. Because the LOS of one-way/two-way stop-controlled intersections is defined by the minor street, a loose correlation can be drawn between the amount of minor street delay and collision potential.

Although operating conditions may degrade beyond the LOS standards, five of the study intersections are not expected to experience excessive delays and the increases in traffic volumes associated with the cumulative effects are not expected to increase the collision potential to a level of concern.

At the I-90 eastbound ramps/Railroad Street intersection, the eastbound left-turning movement would experience high delays, with a moderate level of traffic volume (275 vph). This eastbound left movement conflicts with three other movements that have moderate volumes, including the southbound left (188 vph), southbound through (185 vph), and northbound through (287 vph). Based on the high minor street delays and moderate traffic volumes of several conflicting movements, this intersection could experience a collision frequency at a level of concern. Additionally, the type of likely collisions (at-angle) could result in severe injuries.

At the Sparks Road/Railroad Street intersection, which is expected to operate at LOS F, the collision potential would increase; however, approximately 96 percent of the total traffic entering the intersection reflect non-conflicting movements (781 northbound right turns and 478 westbound left turns). Therefore, while the collision potential at the Sparks Road/Railroad Street intersection would increase, it is not likely that the increase would be substantial.

Would the cumulative effects change pedestrian, bicycle, and other off-road use or facilities?

With the substantial increases in traffic volumes from cumulative development, roadways previously shared by motorized and non-motorized travel modes could pose safety concerns. This is especially the case for winter snowmobile use when plowed road areas are narrow and both vehicles and snowmobiles may be operating at speeds that do not allow adequate stopping distance in cases of imminent collision.

The cumulative effects of the project development in combination with the surrounding areas could result in additional loss of areas that are informally used by off-road vehicles and snowmobiles. Loss of these informal areas would likely result in more formal and designated areas and routes for off-road vehicle and snowmobile usage.

The cumulative population of the area could include development of neighborhood schools, which would require safe public walkways for school children from residences to schools or to bus stops in new subdivisions as required by RCW 58.17.110.

Would the cumulative effects change maintenance responsibilities and costs?

The cumulative effects of the project and development of surrounding areas would increase maintenance costs related to traffic volumes and may lead to demand for a higher level of ongoing maintenance.

Kittitas County maintenance of paved roads such as Railroad Street and Sparks Road are partially related to traffic volumes but also are affected by winter conditions, particularly frost heaving that degrades the road subsurface and surface. Additional traffic volumes would not necessarily result in a proportional increase in maintenance needs but would have some effect. The nine-fold increase in traffic volumes may not increase maintenance costs by the same factor but likely would result in the need for more frequent maintenance and also would likely result in more persons requesting higher standards of maintenance. The cost of maintenance would increase, but may be offset by increased revenues to the County Road fund, which is the additional tax base provided by new residences.

Maintenance needs of gravel roads are directly affected by traffic volumes that tend to combine with weather conditions to increase road surface failures resulting in increased pot holes. Additional traffic also increases the dust generated. Both of these factors would degrade the driving experience or adversely affect adjacent residences and increase costs. Gravel roads in the area are maintained by homeowner associations. With cumulative growth, traffic volumes on Country Drive, Pit Way, and Hawthorn Lane would increase, as well as maintenance costs. Cost impacts depend on the extent to which development is required to participate in upgrading the roads to avoid impacts or pay a proportional cost of maintenance. Homeowner associations that maintain many roads in the area have little ability to collect from additional traffic generated off site unless specific agreements are in place to assess other properties that would contribute a fair share of the costs. Providing for such agreements as a condition of approval of new development would provide such a mechanism.

The cumulative effects on snow removal needs and costs are relatively low because snow removal is determined by snowfall. Additional development might decrease the cost per residence if all residences are required to contribute to the cost.

Would the cumulative effects change how roadways fit into the character of the local community?

Development of the project and surrounding areas would increase traffic volumes in the study area substantially. The multiple functions of the local roadway system, including general mobility, freight transportation, direct property access, and recreational usage (i.e., ATVs and snowmobiles) would generally be preserved, but would be heavily dominated by passenger traffic. Use of Sparks Road as play areas would be substantially diminished as a result of the potential for vehicle-to-pedestrian collisions.

Although roadway capacity improvements (i.e., widening) would not be necessary, the substantial increase in traffic volumes may warrant a change in the functional classification from a Rural Local Access (class 9) to a collector. Additionally, some channelization improvements would be needed at four of the study intersections to achieve acceptable operating conditions (see Question 10 below for a discussion of the mitigation). Furthermore, the current perception of Sparks Road being a small community access road would change and could be viewed as a “major” roadway in the study area. The amount of traffic on Sparks Road would be inconsistent compared to the existing small community, but consistent with the level of development in the future.

9 What mitigation is needed for the cumulative impacts?

Level of Service Mitigation

The level of mitigation needed for the cumulative effects depends primarily on the buildout assumption of the surrounding areas. No mitigation is required for cumulative impacts with existing rural zoning. With the PUD density of the surrounding areas, together with PUD development of the proposal at maximum density, several intersections exceed LOS standards. This mitigation may or may not be needed in the future, depending on the scope of future development in the area.

To mitigate the I-90 eastbound ramps/Railroad Street intersection, a simple change from one-way stop-control to an all-way stop-control would improve the LOS from LOS F with > 200 seconds/vehicle of delay to LOS C with 18.4 seconds/vehicle of delay.

At the I-90 westbound ramps/Railroad Street intersection, widening the off-ramp approach to include a left-turn pocket would improve operations from LOS D with 26.8 seconds/vehicle to LOS C with 22.8 seconds/vehicle.

Mitigation at the Sparks Road/Railroad Street intersection would be more complex. At this intersection, approximately 96 percent of the total entering volume is non-conflicting; 781 vph for northbound right from Railroad Street to Sparks Road and 478 vph for westbound left from Sparks Road to Railroad Street.

Widening the northbound approach (Railroad Street) to include a left-turn lane and eliminating the stop signs on the eastbound approach (Sparks Road) and northbound approach to allow through movement from Railroad Way to Sparks Road would improve operations to LOS C and with 15.8 seconds/vehicle of delay. However, this configuration may be confusing to some drivers and the eastbound approach movements would need to yield to multiple other movements and could pose safety concerns. Alternatively, construction of a roundabout would allow the high-volume non-conflicting movements to move freely through the intersections while concurrently accommodating the other low-volume movements. With the roundabout, operations at this intersection would improve from LOS F and 153.5 seconds/vehicle of delay to LOS A with 6.0 seconds/vehicle of delay.

Addition of a median refuge (merging area) for southbound left movements from Pit Way onto Sparks Road would improve this intersection's operations from LOS E to acceptable LOS C with 17.3 seconds/vehicle of delay.

The potential need for left-turn lanes at the on Sparks Road intersection with Pit Way/Hawthorn Lane was examined in detail. The left-turn volume from Sparks Road to Pit Lane is relatively low (because it continues to serve only the existing subdivision) and does not justify a left-turn lane. Under the cumulative growth scenario, the critical movement is the northbound turn movement from Hawthorn Lane into Sparks Road. The potential mitigation would be a median refuge lane on Sparks Road for these left turns. This feature was evaluated with respect to the WSDOT guidance in Exhibit 1310-12a. At Pit Way, the left-turn volume is 34 vph, which represents roughly 4 percent of the through-movement volume and would not justify a refuge lane. (Exhibit 1310-12a guidance is limited to roads with speed limits of 40 mph, which is slightly higher than Sparks Road, but may represent actual operating conditions). The need for construction of a left-turn lane should be monitored based on actual volumes experienced in the future.

At Country Drive, the left-turn volume increases to 151 vph because this roadway serves as a primary access point to the project. With this volume, which represents approximately 26 percent of the through-movement volume, a left-turn lane would be desirable. At the West Sparks Access point, the left turns, 231 vph, constitute the majority of the total entering volume, but the opposing through-movement volume, 81 vph, is very low and therefore a turn lane would not be needed.

Mitigation for collisions

Although traffic volumes are expected to substantially increase, and therefore increase the collision potential, the primary safety concerns are at intersections where delays are excessively high and people drive more aggressively. By mitigating the operational deficiencies at the I-90 eastbound ramps/Railroad Street and Sparks Road/Railroad Street intersections, potential traffic safety concerns would also be mitigated.

Maintenance

Maintenance needs and costs are most influenced by the construction standards for new facilities. In general, the higher the standards for subsurface, drainage, and road surface, the more durable they are, the less they are subject to failure, and the life-cycle maintenance costs are less. Effective maintenance requires preventative measures to avoid failure. This effort includes controlling the action of water, which can erode ditches, roads, and repair work to the road surface.

The cumulative effects of the project and development of the surrounding areas would increase maintenance costs related to traffic volumes and may lead to demand for a higher level of ongoing maintenance responsibilities.

Kittitas County maintenance costs on Railroad Street and Sparks Road could be reduced somewhat by upgrading of those facilities as the result of contributions by new development. This can be done by an impact fee system, which the county does not currently have, or by mitigation required under SEPA authority for larger projects. The latter approach would not address impacts of exempt development, including subdivision into four or fewer lots, which would be likely for development of many lots in the area.

Construction of new roads to higher standards and reconstruction of existing roads to provide bituminous surface treatment would improve serviceability with related increases in maintenance costs. The cost per residence would increase under the cumulative scenario with rural development, but the effect would be less with PUD densities because of the greater number of lots assessed. Upgrading existing roads affected by PUD density development, such as Country Drive and Hawthorn Lane, to include all-weather pavement would reduce the effects of additional traffic on a gravel road including pot holes and dust. However, this upgrade may be difficult to accomplish because multiple parties use the roads and not all are legally obligated to contribute to maintenance or upgrading.

Additional development in the area may lead to a desire by local residents to have Kittitas County assume maintenance because their ability to assess all users their fair share is limited by current maintenance agreements.

A key element in ensuring road maintenance with the existing county policy that requires homeowner associations to maintain many of the roads is to require agreements to participate in maintenance, with clear means of assessing costs and resolving disputes as a condition of approval of new development.

Improvements of the overall road system in the area could be accomplished through a county road improvement district for the acquisition of rights-of-way, improvement of county roads, and improvement of existing private roads that will become county roads as a result of the improvement district process. Such a system of improvements might reduce overall maintenance costs of multiple homeowner associations; however, the long-term costs to the county probably would be increased because of the additional life-cycle costs of maintaining additional road-miles. The state does not allow formation of special districts to pay for road maintenance.

Costs of snow removal are related to snowfall and not to the number of residents. For roads maintained by homeowners, the cost per residence may decrease if more residences are built, provided that all residents served are required to contribute.

Pedestrian, bicycle, and other off-road use

With the substantial increases in traffic volumes from cumulative development, roadways previously shared by motorized and non-motorized travel modes could pose a higher level of safety concerns because of higher vehicular volumes. Pedestrian and non-motorized transportation modes could be accommodated on sidewalks or a trail system placed behind the standard ditch section on a rural roadway. Such facilities should be designed in consultation with the local school district to ensure they provide safe public walkways for school children from residences to schools or to bus stops in new subdivisions (RCW 58.17.110). This is likely to be needed for much of Sparks Road where traffic volumes are highest but also may be warranted for other roads. Motorized off-road trails are often preferred as a separate trail system because of potential hazards to slow moving and non-motorized vehicles such as bicycles or cross-country skiers. Off-road trails for snowmobiles are often preferred because plowed roads are narrow, collisions are difficult to avoid, and may lead to serious injuries. In some communities, shared trails are acceptable to the community if they are wide enough to serve both motorized and non-motorized users. For winter use, off-road trails are preferred because clearing for driveways interrupts sidewalks or trails next to the road and makes them unusable. Off-road trails do not require plowing and remain functional throughout the winter.

Maintaining or formalizing existing off-road trails through the site on the BPA transmission line easement would serve the residents of the development as well as other users in the vicinity and avoid displacement of informal use to adjacent National Forest and other public lands.

Mitigation for the character of the local community

Use of local streets as part of the pattern of social interactions within the community, including the street as a play area for children, may change as the result of perceived increases in traffic. The community most likely to be affected is the Easton Village subdivision of small lots through which Country Road passes. It may be that residents would restrict children’s use of the roads due not only to vehicles but off-road vehicle use. Traffic volumes on Country Road by Marian Meadows residents may be reduced by restricting access to emergency use only; however, this would affect the overall circulation patterns in the area. To reduce impacts of increased traffic volumes, signage could be installed on the roadway advising drivers of children at play or speeds could be reduced by “traffic calming” features introduced into the street design.

3.2.2 Transportation - Aviation

1 What existing airports are in the area?

The Easton State Airport is located about 0.25 mile west of the development site. The airport was constructed in the 1930s by the federal government as an emergency field for aircraft crossing the Cascade Mountains through Snoqualmie Pass. It was acquired by the State of Washington in 1958. The airport runway is composed of 2,640 feet of turf and has medium intensity lighting. Trees surround the airport, and there are trees in both approaches.

The WSDOT Aviation Division estimates that the airport is visited by approximately 30 aircraft per month, including use by recreation groups and for pilot training for mountain flying/soft field practice. Glider and flying clubs are reported to frequently use the field during the summer.

The National Transportation Safety Board (NTSB) has recorded three aircraft accidents related to takeoffs or landings at the Easton State Airport. Two of the accidents took place on the runway itself. The other accident occurred during a July 10, 2007 emergency landing of a two-engine plane about 0.50 mile east of the extended airport centerline and about 0.25 mile south. After impact, the plane erupted into intense flames.

2 What mandates or standards for airports have been established and how are compatible land uses adjacent to airports determined?

The GMA, under RCW 36.70A.510 and RCW 36.70.547, provide that comprehensive plans and development regulations discourage the siting of *incompatible uses* adjacent to general aviation airports. Prior to siting uses near airports, formal consultation is required with the Aviation Division of WSDOT, which also provides technical assistance in developing plans and regulations.

The WSDOT Aviation Land Use Compatibility Program focuses on:

- Hazards to aircraft operation, generally including:
  - Obstructions to the airspace required for flight to, from, and around an airport;
  - Wildlife hazards; and
  - Other forms of interference with safe flight, navigation, or communication.
- Hazards to persons and property from aircraft operations.
- Noise impacts on persons and property from aircraft operations.

The major issues regarding hazards to aircraft relate to obstructions that affect flight, takeoff, and landing.

The WSDOT Aviation Division accepts the height hazards indicated in the Federal Aviation Administration standards under 14 Code of Federal Regulations (CFR) Part 77, Objects Affecting Navigable Airspace. These regulations establish a three-dimensional space in the air above an airport. Any object that penetrates this volume of airspace is considered to be an obstruction and may affect the aeronautical use of the airspace. This three-dimensional space is also known as an “imaginary surface.” The size of these imaginary surfaces is based on the category of each runway according to the current approach, and to any future approach planned for that runway.

For a “visual approach” runway such as the Easton State Airport, the length of the approach surface at the east end of the runway is defined as 5,000 feet with a 20 horizontal to 1 vertical (20:1) slope from the end of the runway. The maximum height allowed at the end of the 5,000-foot radius would be about 250 feet. The allowed height about 1,500 feet from the runway, at the edge of the development site, would be about 75 feet. Native evergreen trees at the edge of the WSDOT airport property, approximately 200 feet from the end of the runway, exceed the height defined by the “imaginary surface” at that point. Outside the 5,000-foot length of the “imaginary surface,” Easton Ridge rises about 2,500 feet at a distance of about 10,000 feet from the runway, an overall slope of about 4:1.

Birds are the most common wildlife hazard near airports. The risk of bird strikes is most serious along the corridors for takeoffs and landings. However, the concern extends to elsewhere in the airport vicinity where a collision may affect aircraft operations. Natural attractions to birds that are not regulated “artificial attractors” include:

- Sanitary landfills.
- Water bodies that may attract birds, including golf course water hazards, drainage detention and retention basins, created wetlands, and waterbodies created as a landslide feature.
- Wildlife refuges that include measures to increase the attraction of birds.
- Agriculture, especially cereal grains.

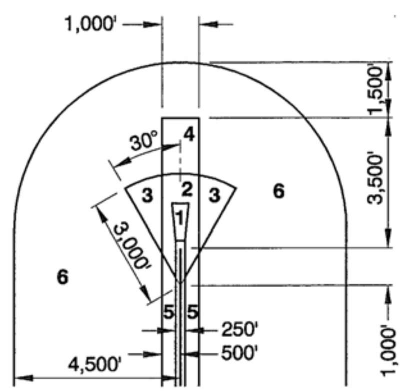


Figure 3-17 Aviation Safety Zones

Wildlife other than birds can also be a concern if they block runways. Deer grazing on grass runways such as Easton’s are a typical concern, as are cattle in an open range area.

Other flight hazards include:

- Visual hazards that obscure the runway or are distractions (particularly lights that can be confused with airfield lights), glare, and smoke.
- Electronic hazards such as devices that interfere with aircraft instruments or radio communication.

The major **hazards to persons and property** are from aircraft accidents.

Based upon historical data from the NTSB, the areas adjacent to airports are more susceptible to aircraft accidents. According to the NTSB, approximately 47 percent of all air carrier and commuter accidents and approximately 64 percent of all general aviation accidents occurred during approach, descent, landing, and takeoff phases at an airport.

In the 1990s, a study sponsored by the California Transportation Institute surveyed 400 general aviation aircraft accidents occurring within 5 miles of an airport. Results, including plotting locations in relation to safety zones, related to clusters of accident sites as they relate to components of flight actions taken in aircraft landing and takeoff.

Table 3-14 and Figure 3-17 illustrate the results of the study.

As can be seen from Table 3-14 indicating the capture rates for different zones, the potential hazard on a per incident basis for Zone 1 and Zone 6 is roughly equal. The potential hazard on a per acre basis is much lower in Zone 1 because Zone 6 is almost 90 times as large as Zone 1. The potential hazard exposure on a per acre basis for Zone 6 is much less than Zone 1, by several orders of magnitude.

The recommendations of the WSDOT Aviation Division for compatible land use as well as the provisions of Kittitas County zoning are indicated in Table 3-15 and generally provide for less density and less exposure of persons to risk as the magnitude of risk decreases.

Aircraft noise is often an issue for residents near airports. A detailed discussion of noise impacts in included in Section 3.7. The state standards for land use near airports emphasize land uses that are less sensitive to noise, such as forestry, agriculture, industrial, or commercial use. Residential uses sensitive to airport noise are recommended to be avoided.

Kittitas County has adopted the following Comprehensive Plan policies relating to airports:

GPO 4.15D To recognize air transport and airports as an important element.

GPO 4.15E Recognize public-use airports as essential public facilities.

GPO 4.15F Protect Kittitas County Airport (Bowers Field), Cle Elum Municipal, DeVere Field and Easton State airports from adjacent incompatible land uses and/or activities that could impact the present or future use of the airports as essential public facilities.

GPO 4.15G A notice to title or disclosure statement should be required for new or substantial redevelopment of lots, buildings, structures, and activities located adjacent to public-use airports. The notice should indicate that the property is located adjacent to the airport and may experience low overhead flights, odor, vibrations, noise and other similar aviation impacts.

GPO 4.14H Protect public-use airports from height hazards by developing a height overlay district that will prohibit buildings or structures from penetrating the Federal Aviation Regulations (FAR) Part 77 “Imaginary Surfaces.”

Kittitas County Zoning restricts uses in the airport safety zones as indicated in Table 3-15.

Table 3-14 Accident Safety Zones and Capture Rates for Aircraft Accidents

Zone	Zone Name	Dimension (Runway less than 4,000 feet)	Zone Size (acres)	Arrivals		Departures		Total	
				Percent of Accidents	Percent per Acre	Percent of Accidents	Percent per Acre	Percent of Accidents	Percent per Acre
1	Runway Protection Zone	S =1,200 feet	8	31	3.88	20	2.46	24	3.01
2	Inner Safety Zone	T = 1,500 feet	16	10	0.63	9	0.61	10	0.62
3	Inner Turning Zone	R = 2,500 feet	113	8	0.07	16	0.14	13	0.11
4	Outer Safety Zone	U = 2,500 feet	26	3	0.13	1	0.04	2	0.07
5	Sideline Safety Zone	E = 500 feet	72	18	0.25	34	0.48	28	0.39
6	Traffic Pattern Zone	F = 4,000 feet	700	8	0.01	13	0.02	11	0.016
			935	**78**		**93**		**88**	

Table 3-15. Aviation Risk Land Use Recommendations

Zone	Zone Name	Dimension (Runway less than 4,000 feet)	Zone Size (acres)	WSDOT Aviation Recommendation[a]	Kittitas County Zoning KCC 17.58.050n[b]
1	Runway Protection Zone	S =1,200 feet	8	Prohibit all residential land uses	1. Land uses, which by their nature will be relatively unoccupied by people should be encouraged (mini-storage, small parking lots, etc.) 2. Schools, play fields, hospitals, nursing homes, and churches are prohibited.
2	Inner Safety Zone	T = 1,500 feet	16	Prohibit all residential land uses	1. Schools, play fields, hospitals, nursing homes, and churches are prohibited. 2. One dwelling unit per 3 acres.
3	Inner Turning Zone	R = 2,500 feet	113	Prohibit all residential land uses	1. Schools, play fields, hospitals, nursing homes, and churches are prohibited. 2. Flammable and combustible liquids and fuel storage per International Fire Code (IFC) standard 3. One dwelling unit per 3 acres.
4	Outer Safety Zone	U = 2,500 feet	26	Less than 4000 feet of runway: Prohibit all residential uses	1. Schools, play fields, hospitals, nursing homes, and churches are prohibited. 2. One dwelling unit per 3 acres.
5	Sideline Safety Zone	E = 500 feet	72	Less than 4000 feet of runway: 1 du/5 acres in rural or urban areas	1. All aviation related uses are permitted. 2. Schools, play fields, hospitals, nursing homes, and churches are prohibited.
6	Traffic Pattern Zone	F = 4,000 feet	700	Prohibit all residential land uses	1. All aviation related uses are permitted within airport property. 2. One dwelling unit per 3 acres.

[a] Airports and Compatible Land Use, Vol. 1, WSDOT, Feb. 1999.

[b] Kittitas County Code;du = dwelling unit

3 How will the proposal and alternatives affect the future use of the airport or result in hazards to aviation?

Neither the applicant's proposed alternative nor any of the other alternatives proposes construction in the runway protection or inner safety zones.

None of the alternatives are likely to create "artificial attractors" that will increase the number of birds in the vicinity that are potential hazards to aircraft.

The alternatives are not likely to increase general populations of wildlife such as deer or elk that might graze on the grass runways at the Easton State Airport. The additional population in the area and the direct connection between the airport site and the National Forest to the north may increase the likelihood that deer and elk would use the airport site as part of their range while avoiding developed areas such as the project site.

The alternatives for development of the site may introduce additional visual hazards, particularly lights and reflected glare, according to the number of units in the alternative and whether development is included in the higher elevation areas in the easterly portion of the site.

4 How will use of the airport result in potential hazards to persons living on the project site?

The extent to which use of the airport will result in potential hazards to persons living in the project site can be roughly approximated by the extent to which an alternative includes residential units located in airport safety zones and are therefore exposed to a higher risk from aviation accidents.

None of the alternatives proposes residential land development in Zone 1 - Runway Protection or Zone 2 - Inner Safety. However, some of the alternatives do propose development in Zone 3 - Inner Turning and Zone 4 - Outer Safety. The number of residences to be developed in either Zone 3 – Inner Turning or Zone 4 – Outer Safety is identified by alternative below.

Alternative 1, the applicant's proposed PUD**,** would result in 60 lots located completely or partially in the outer safety zone and 25 lots located completely or partially in the inner turning zone as indicated in Figure 3-18.

Alternative 2, PUD on the westerly portion of the site, would result in no lots being located completely or partially in the outer safety zone. Up to 27 lots are located partially in the inner turning zone; however, building areas are provided entirely outside of the airport safety zones. With subdivision restrictions on building within the safety zones, there would be no increase in exposure to hazards from airplane collisions with the ground within the safety zones.

Alternative 3, No Action Alternative with up to 147 3-acre lots**,** would result in seven lots being located completely or partially within the outer safety zone and nine lots located completely or partially within the inner turning zone. Of these 15 lots (some lots are in both zones) ,seven would have building areas outside the safety zones, resulting in a net increase of eight lots with future residents exposed to the higher risk from aviation accidents represented by the safety zones.

Alternatives 4 and 5, mitigation alternatives with about 195 and up to 147 lots, respectively, have a building area for all lots entirely outside of the airport safety zones. With subdivision restrictions on building within the safety zones, there would be no increase in exposure to hazards from aviation accidents within the safety zones.

For all the alternatives, there still remains the potential for aviation accidents outside the safety zones.

5 What are the likely cumulative impacts with development of nearby land at existing zoning densities?

A total of 57 existing lots are located within the airport safety zones. Five lots in the Easton Acres neighborhood, six lots in the Silver Creek neighborhood, and nine other lots appear to lie within the Outer Safety Zone. Nine lots in the Silver Creek neighborhood, 13 lots in the Easton Village neighborhood, and 15 other lots are within the inner turning zone.

None of these parcels are large enough to be further subdivided under the 3-acre minimum lot size in existing zoning and therefore hazard exposure is not likely to increase.

6 What are the likely cumulative impacts with development of nearby land at densities similar to the proposal?

There are 16 lots within the airport safety zones that potentially could be subdivided into approximately 40 lots, or 24 additional lots. This would represent an increase in exposure of about 40 percent as compared to the 57 existing lots within the safety zones.

7 What measures could reduce or mitigate impacts of the proposal and alternatives on the airport, or impacts of the airport on the people living on the project site?

Avoidance of building in the airport safety zones incorporated in Alternatives 2, 4, and 5 have the greatest potential for reducing risk to persons living on the site of the Marian Meadows development. It also would be practical to allow reduced density development within the zones. If developed at one unit per 3 acres (as provided in KCC 17.58.050), the impacts would be similar to Alternative 3 and result in seven lots located completely or partially within the outer safety zone and nine lots located completely or partially within the inner turning zone. If developed at one unit per 5 acres (per WSDOT guidelines), about four to five lots would be located completely or partially within the outer safety zone with four to six lots located completely or partially within the inner turning zone.

An additional measure to reduce potential impacts to airport use would be to require that outdoor lights are shielded so that they do not aim above the horizon. This measure, however, would be difficult to enforce in a situation where most outdoor lights are likely to be purchased and installed by landowners who may not be aware of the desirability of shielding. In addition, this may not matter much for the Easton Airport except in evening hours because the airport is not lit and is not currently used at night.

Noise mitigation is addressed in Section 3.7.

Parametrix DATE: Feb 01, 2010 FILE: BL1763007P03T19-F3-18

Kittitas County Marian Medows Estates EIS

Figure 3-18
Aviation Safety Zones, Alternative 1

3.3 PARKS AND RECREATION

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

Recreational use of the site by the public was established when it was owned by Plum Creek Timber Company, which has an “open lands” policy allowing the public to use its lands in Washington and Oregon for passive recreation uses such as hiking and hunting. Recreational trails for snowmobiles and off-road vehicles were established through the site on the BPA transmission line easement and on logging roads. Recreational use of the site has continued despite the sale of the land to the current owner and posting of no trespassing signs at some access points.

The project is located in a predominantly rural area, surrounded by a number of recreational opportunities. Many of the facilities and services offered in the area are unimproved or not solely dedicated as park land. However, there are several opportunities in the immediate vicinity provided by the National Forest Service and Washington State Parks.

Facilities in the immediate vicinity of the site include an informal trail along the BPA easement on the site that that was established under the “open lands” recreation practice of the previous owner, Plum Creek Timber Company. This informal trail is used extensively by off Road Vehicles (ORV) and snowmobiles. The trail extends to the north into current Forest Service land and to the south across former Washington Department of Natural Resources trust land (DNR) which was recently sold to a private party. It extends over both private and Forest Service lands to the south. There also is extensive ORV and snowmobile use of former logging roads on the steeper easterly portion of the site.

There is a system of informal horse trails on private land, on the Easton State Airport site owned by Washington State and on adjacent federal Forest Service lands. The horse trails are used by local residents and by visitors of Silver Creek Ranch, a private facility that provides equestrian oriented camping and recreation (Silver Creek Ranch 2008). DNR land around the Easton Airport allows ORV use on roadways (WAC 332-52-400) and allows snowmobiles use when there is adequate snow cover to prevent resource damage. (WAC 332-52-420).

The project site is bordered to the north and east by the Wenatchee National Forest (WNF) (Figure 3-1).

Hiking Trails: There are numerous hiking trails throughout the Wenatchee National Forest (WNF) . The portions of the WNF near the site include two formal trails that begin near the Silver Creek Dam. The Katchess Ridge Trail (No. 1315 extends to the north. The Easton Ridge Trail extends to the southeast and is tangent to the northwest corner of the site and also intersects informal trails on old logging roads on WNF lands that connect to the site. These trails are closed to motorized use. (WNF 2009a)

Off road vehicle (ORV) use on federal lands is governed by Executive Order 11644 of Feb. 8, 1972 that requires federal agencies to establish policies and regulations to ensure that the use of off-road vehicles on public lands will be controlled and directed so as to protect the resources of those lands, to promote the safety of all users of those lands, and to minimize conflicts among the various uses of those lands. The Forest Service is currently developing a Motorized Travel Management program. After adoption, off-road or off trail use of ORVs or snowmobiles would be prohibited as well as use on restricted trails. The current proposal would provide for ORV use in the vicinity only of Forest Service 4818 along the east side of Lake Kachess (WNF 2009b) which would prohibit use of the existing BPA transmission line informal trails on Forest Service lands.

Local Parks and Recreation Facilities

There are no County-owned parks or County-owned open spaces within the vicinity. However, there are numerous recreational opportunities accessible from the project site or within a short distance. For example, there are numerous designated fishing locations noted by Kittitas County within the area.

Easton School District provides a playground on the south side of I-90, in the Easton townsite, which is available to local residents for recreation when not used by the school. This facility, however, is separated from the site by several miles and I-90.

Kittitas County Park and Recreation District No. 1, also known as the Upper County Park District, was formed in 2005. The district currently includes the area of the Cle Elum-Roslyn School District, except the Teanaway and Swauk areas. It has proposed to expand into the Teanaway, Swauk, and Easton areas, which requires voter approval. The district has adopted a Park and Recreation Comprehensive Plan that was accepted by the state Recreation and Conservation office to qualify for state and federal grant programs. The district has applied for grant funding to continue detailed planning into a second phase that will make more detailed plans for potential trail systems within the district, including the Easton and Teanaway areas. The district has not yet developed facilities (Musso 2008).

Washington State Parks

There are two parks that are owned and maintained by Washington State Parks and Recreation Commission (WSPRC). In addition, WSPRC maintains a system of winter recreation facilities in the project area, including Sno-Park parking areas that provide access to trails for snowmobiling, skiing, snowshoeing, dog sledding, and a variety of winter sports.

Lake Easton State Park is located less than 1 mile southwest of the project site, surrounding Lake Easton, adjacent to the south side of I-90. The park provides year-round activities, ranging from weekly interpretive programs during the summer to cross-country skiing during the winter.

Summer activities include 2 miles of biking trails, 2 miles of hiking trails, an amphitheater, a basketball court, horseshoe pits, boat launches, docks, a playground, horse trails, and picnic sites. The Easton State Park also includes 95 standard campsites, 45 campsites with utilities, four restrooms with four showers, and a dump station. Winter activities include a designated Sno-Park located near the boat launch area, which features 40 parking spaces.

Iron Horse State Park is located along the south side of I-90, less than 1 mile from the project site at its closest. Iron Horse State Park is located on the abandoned Milwaukee Road railroad right-of-way. The park consists of a non-motorized trail connecting Iron Horse State Park to Lake Easton State Park. This trailhead is also accessible from Easton via Railroad Street. For the areas near the project site, the trail is used for hiking, biking, snowshoeing, and dog sledding as well as passive activities such as bird watching and enjoyment of nature. There are a number of additional trails that connect with Iron Horse State Park, including several cross-country skiing trails and routes to fishing locations.

Sno-Park Winter Recreation Sites

The WSPRC program provides cleared parking areas for winter recreationists in proximity to groomed and/or backcountry trails. The state maintains two kinds of Sno-Parks:

Snowmobile Sno-Parks are funded by snowmobile registration fees, a percentage of the state fuel tax, Sno-Park permit revenue, and volunteer hours. The program includes snow removal, trail grooming, sanitation facilities, mapping, trail signs, safety education, and enforcement.

Non-motorized Sports Sno-Parks are funded primarily by Sno-Park permit revenue, state fuel tax, and volunteer hours. Facilities accessed from Sno-Parks include cross-country skiing, dog sledding, snowshoeing, and snow play.

The closest Sno-Park is at Lake Easton State Park, about a mile from the site.

Snowmobiling Routes

A number of snowmobile routes are designated in the area by federal and state agencies as well as local clubs and merchants and include:

- Airport Route;
- Dam Road Route;
- East Kachess Route;
- Easton State Park Route;
- Easton/U-Fish Route;
- Reload Sno-Park Area; and
- Easton/Taneum-Tie Route, BPA transmission line easement corridor.

Cross-County Skiing

There is a cross-country ski trail in Lake Easton State Park accessible from the Sno-Park. In addition, there is a network of trails accessible from the Cabin Creek Sno-Park and the Kachess Lake Sno-Park. The ski trail extends 6.5 miles from the Cabin Creek South Sno-Park and ends at Lake Easton State Park. This ski trail is also known as the Lake Easton State Park Trail.

Dog Sledding

A number of dog sledding trails have been designated by the State Parks Winter Recreation Program and include:

- Kachess Lake to Gold Creek Dog Sledding Route;
- Road #4818 Dog Sledding Route;
- Trail of 1,000 Creeks Dog Sledding Route; and
- Lake Easton and I-90.

Public fishing and limited recreation use is provided at the Washington State Department of Fish and Wildlife (WDFW)-maintained Easton Ponds on a 10-acre site that was a borrow pit for construction materials for I-90. The ponds are stocked with trout for public fishing. In addition, the site has portable toilets, picnic facilities, and a children's play area (BPA 2000). The site is about 3 road-miles from the proposal site.

There are also opportunities for fishing at numerous locations where roads provide access to streams at bridges or where pull-offs have been developed on public lands or timber company lands.

National Forest Service

The project site is bordered to the north and east by the Wenatchee National Forest (WNF) (Figure 3-1). The WNF encompasses over 4 million acres of forest land, spanning from the Pasayten Wilderness along the Canadian border to south of Mount Rainier. The WNF provides several recreational opportunities near the site, including hiking trails, camping, guided snowshoe tours, cross-country skiing, and sno-parks (Figure 3-19).

<u>Hiking Trails:</u> There are numerous hiking trails throughout the WNF. The portions of the WNF near the site include two formal trails that begin near the Silver Creek Dam. Both trails ascend the Easton Ridge and run either north or east. Informal trails on old logging roads connect to the site (WNF 2009a).

<u>Campgrounds:</u> The following campgrounds near the project site are owned and maintained by the National Forest Service:

> East Kachess Group Site – located 5 miles down Forest Route #4818. It includes a sheltered dining area, garbage services, picnic tables, a stove, and vault toilets on site. The maximum capacity allowed on the site is 100 people and 25 cars. This facility is about 7 road-miles from the proposal site.
>
> Kachess Campground – includes one primary boat launch and one unimproved boat launch, flush and vault toilets, piped water, stoves, tables, beach area, a self-guided interpretive trail, 120 camping sites, and 30 picnic sites. This facility is about 8 road miles from the proposal site.

<u>Private Parks:</u> These parks are provided in several subdivisions in the area including two sites totaling about 3 acres within the Sun Island subdivision south of I-90 Exit 71.

Private Forest Lands: The forest lands owned by Plum Creek Timber Company are available to the public on an “open lands” policy that allows public access for recreation and hunting subject to local closures to allow timber harvest, and subject to closure during times of high fire hazard (Plum Creek 2008). Much of the Plum Creek land in the area has been traded to the U.S. Forest Service (including the land immediately north of the site) or sold to other parties (including the development site).

2 What mandates or standards for parks and recreational services have been established?

The Kittitas County Comprehensive Plan Policy GPO 5.12 provides standards for LOS policies. The standards for parks and recreation are:

- Regional Parks – 3.96 acres per 1,000 population
- Trails – 0.44 mile per 1,000 population

The Comprehensive Plan contains the following general policies regarding recreational use:

GPO 8.54 Existing County-owned land should be the preferred location for any new recreation facilities.

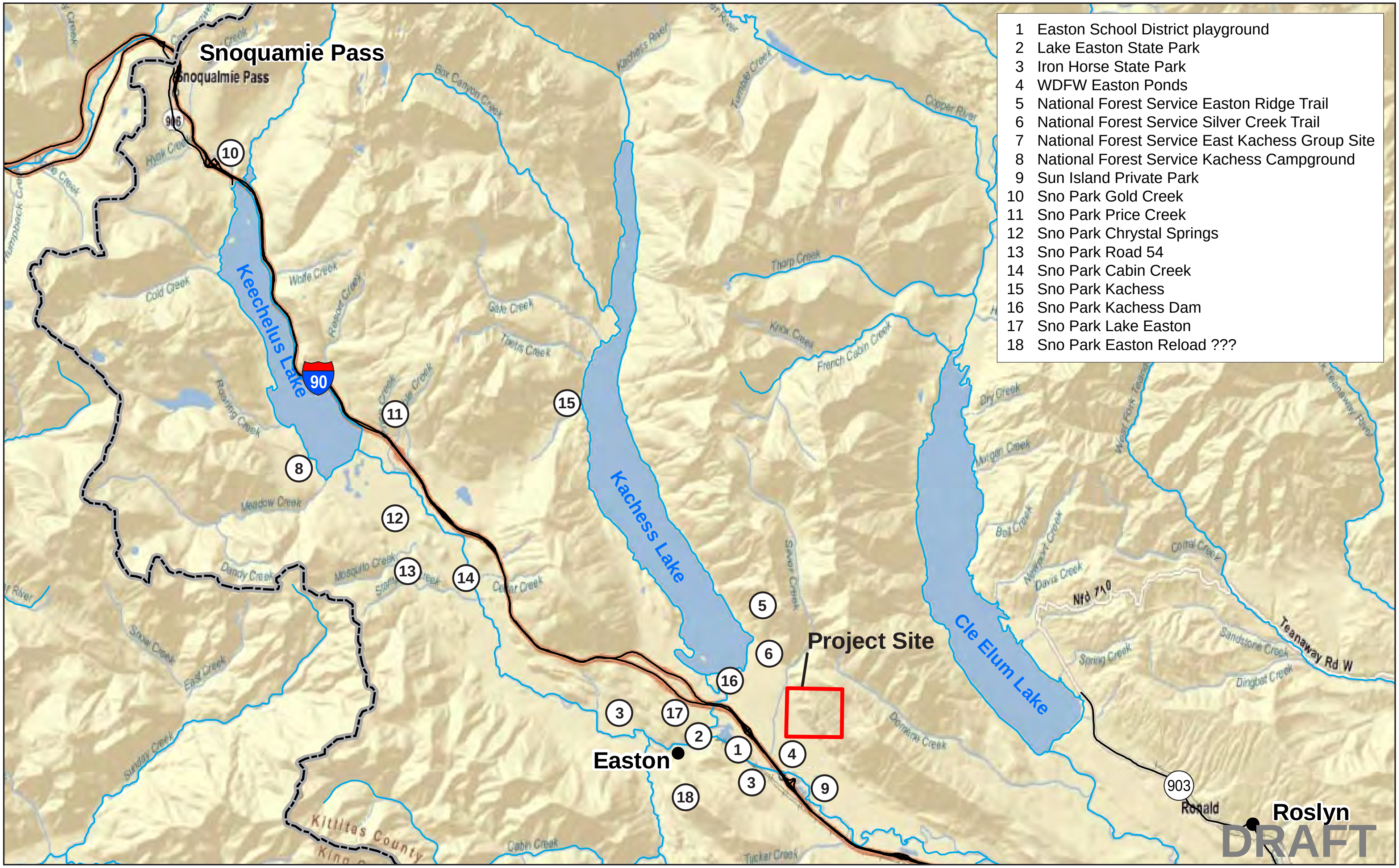
GPO 8.55 Kittitas County should direct the greater part of its recreation budget to maintaining access to exiting areas and continuing to emphasize public safety.

GPO 8.56 Private development of recreational opportunities should be encouraged through a predictable, uncomplicated permit process.

GPO 8.57 Open space is a benefit, which must be provided and financed by the public at large, not at the expense of individual landowners or property taxpayers.

GPO 8.58 Greater identification and education is needed for public recreational lands, particularly in regards to private property, access, parking and community notification.

GPO 8.59 The County should seek financial support from state and federal agencies to assist in providing for recreational area access and safety.



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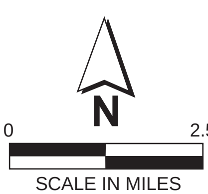


Figure 3-19
Marian Meadows
Existing Park and Recreation Facilities

GPO 8.60 Rural home sites and private lands are not for public use and landowners' privacy and property must be respected.

GPO 8.61 All trespass laws should be strictly enforced.

In addition, the County adopted a Recreation Plan in 2004 that is adopted by reference into the Comprehensive Plan subject to the following limitations:

- The Recreation Plan is adopted as a reference document to be used by Kittitas County as an aid in land use discussions and by members of the public wishing to propose recreation projects, pursue grants for projects, or propose agreements with landholders.
- The Recreation Plan may be used as a reference in the development of potential subdivision or zoning codes amendments related to proposed use of density bonuses or mitigation of identified project impacts.
- The Recreation Plan may be used as a part of the Kittitas County Capital Facilities plan for purposes of utilizing REET proceeds for acquisition or expansion of recreational infrastructure.
- Non-compliance or inconsistency with the Recreation Plan shall not be considered non-compliance or an inconsistency with the Comprehensive Plan or the GMA; nor may any non-compliance or inconsistency with the Recreation Plan be a basis for appeal of any land use decision made by Kittitas County.
- The Recreation Plan shall not be used as evidence of use of property in an action for prescriptive easement or adverse possession.

3 How will the proposal and alternatives affect park and recreation facilities and services?

Using LOS policies established in Kittitas County Comprehensive Plan Policy GPO 5.12, and the range of population projections, the requirements for new parks and recreation facilities can be established as indicated in Table 3-16.

Kittitas County, like many rural counties, does not have park standards for the full range of park types typically found in towns and cities with a substantial population on small lots. The size of the Marian Meadows development is equivalent to the population of a small town, but it depends on the mix of workforce families, retired persons, and seasonal residents, Alternatives 1 and 2 are generally in the population range of Roslyn, Kittitas, or South Cle Elum. As a perspective on the typical park demands of such communities, the park guidelines of the NRPA are also included in Table 3-16 for mini parks, neighborhood parks, and community parks (NRPA 1983). The NRPA guidelines have a low and high range. The standards are included as a "benchmark" against which to measure possible impacts.

The types of park demands are likely to vary with the characteristics of the population.

Families with heads of households actively engaged in the workforce are likely to have children and are likely to meet their recreational demands both on their own property and in public facilities. Informal at-home activities vary with facilities available but typically include activities such as playing in the yard, shooting baskets in the driveway, gardening, and informal neighborhood gatherings. Mini parks are often used by families with younger children for a more varied play experience using more intricate play structures and also providing an opportunity for meeting and socializing with other children. Older children tend to be involved to varying degrees in sports and other activities, creating a demand for sports fields for baseball, softball, soccer, and a variety of other organized, semi-organized, and unorganized sports activities. Sports fields are typically elements of neighborhood and community parks in the NRPA guidelines. Active adults are often involved in a variety of activities including sports, which often include tournament play and more developed facilities with lighting and spectator facilities. Facilities such as golf courses are often private but are public facilities in some communities (Zabriski 2001). A 2002 survey of recent home buyers sponsored by the National Association of Home Builders and the National Association of Realtors identified parks and playgrounds as important to very important with 26 percent and 21 percent of respondents, respectively (NTTP 2002).

Trail facilities for a variety of activities are consistently among the most desired recreational facilities identified by surveys of residents in communities (Flink 2001). A 2002 survey of homebuyers identified trails as the second most important community amenity, second only to highway access and was identified by 36 percent of respondents (44 percent identified highways). Trails provide for a variety of activities including walking, jogging, or biking as well as winter activities such as skiing. Specialized trails provide opportunities for motorized sports including off-road vehicles and snowmobiling. It is likely that the full range of potential residents would use trails, with off-road trails likely to be important to seasonal residents as well as full-time residents.

The proposal includes no formal designation of trails to meet the county standards of between a third and a little more than half a mile of trails. The proposal includes no formal connections to public land in the Easton State Airport or the National Forest to the northeast and north of the site. Informal us of the existing ORV and snowmobile trail along the BPA transmission line easement is likely to continue and will increase substantially from the additional residents of Marion Meadows property. Off-road vehicles and snowmobiles can use roadways, however the use of unlicensed vehicles presents legal issues and presents the potential for conflict with motor vehicles at a substantial risk of life to off-road and snowmobile users.

Impacts on adjacent private land and National Forest Service lands to the north and south depends upon whether provisions are made on-site and also depends on the extent to which provisions are made for ORV and snowmobile use in the Forest Service Motorized Travel Management program. If the BPA transmission line corridor or other facilities in the area were to be designated for ORV use, additional areas for this use would be available to residents of the development. If there are no additional trails designated in the area, it is likely that use would continue anyway. Such uses may be subject to enforcement activities, but such enforcement is likely to be ineffective in controlling the demand for such use, absent adequate designated facilities in the area. The major effect of the project on adjacent public lands owned by the Forest Service and Washington DNR is likely to be continued long-term chronic enforcement problems. Because of the difficulty of enforcing restrictions on highly mobile uses such as ORV and snowmobiles, in the absence of a designated trail system continued use of informal trails would likely result in impacts of erosion and disturbance of wildlife.

Alternatives 1 and 2 recreation impacts would result from a community roughly equivalent to the size of the communities of Kittitas or Roslyn. Table 3-16 indicates the range of potential demand for a variety of types of park that may result from a community of that size. The proposed provision of 1.88 acres of park at three locations would not meet Kittitas County standards and would be much less than NRPA guidelines. Other potential areas for recreation are present on the site, including the BPA transmission line easement, which is currently used by off-road vehicles and snowmobiles. The proposal includes no formal designation of trails to meet the County standards of between a third and a little more than half a mile of trails. The proposal includes no formal connections to allow potential open space use of public land at the Easton State Airport or the National Forest to the northeast and north of the site. Informal access to that public land likely will continue along the BPA transmission line easement, although that easement passes through a private parcel. The current design makes inadequate provision for shared or public recreation facilities and makes no formal provision for informal off-road and snowmobile activities likely to be used by a substantial proportion of residents. Off-road vehicles and snowmobiles can use roadways; however, the use of unlicensed vehicles presents legal issues and the potential for conflict with motor vehicles at a substantial risk of life to off-road and snowmobile users.

Alternative 2 includes a considerable area of open space in debris flow hazard areas that have the potential to provide for informal and formal parks and recreation use, if developed for that purpose. This presumes that the risk to potential users would be acceptable.

For these alternatives, the lack of provision for recreation likely will result in either greater use of off-site facilities or a lack of opportunities for recreational activities to serve residents. The population likely served the least would be the demand for youth sports. Off-site facilities most affected would likely be State of Washington lands that provide a buffer area north of the Easton State Airport and U.S. Forest Service land to the north, as well as playfields at the Easton School.

Alternatives 3, 4, and 5 would result with potential populations between 250 and 635, depending on the tenure scenario. There would be no formal provisions for park and recreation facilities because they are intended to be conceptual to illustrate development options. Alternative 3 with larger lots may be considered to provide more opportunities for private recreation on the lots. All the alternatives with fewer residences would place less demand on off-site facilities.

Table 3-16 Park and Trail Demand per Standards and Guidelines

Alternative and Tenure Scenario	Population	Standards and Guidelines: Kittitas County Regional Trails (miles)	Kittitas County Regional Parks (acres)	National Recreation and Park Association (NRPA) Guidelines: Mini Park Low	Mini Park High	Neighboring Park Low	Neighboring Park High	Community Park Low	Community Park High	NPRA Total Low	NPRA Total High
Standard per 1,000 Population >		**0.44**	**3.6**	**0.25**	**0.5**	**1**	**2**	**5**	**8**	**9.9**	**14.1**
Alt 1 & 2 Applicant's PUDs Tenure Option 1 85% Family 15% Retired	1,363	0.6	4.9	0.3	0.7	1.4	2.7	6.8	10.9	**8.5**	**14.3**
Alt 1 & 2 Applicant's PUDs Tenure Option 2 60% Family 15% Retired 25% Seasonal	1,089	0.5	3.9	0.3	0.5	1.1	2.2	5.4	8.7	**6.8**	**11.4**
Alt 1 & 2 Applicant's PUDs Tenure Option 3 35% Family 30% Retired 35% Seasonal	903	0.4	3.3	0.2	0.5	0.9	1.8	4.5	7.2	**5.6**	**9.5**
Alt 1 & 2 Applicant's PUDs Tenure Option 4 25% Family 25% Retired 50% Seasonal	764	0.3	2.8	0.2	0.4	0.8	1.5	3.8	6.1	**4.8**	**8.0**
Alt 4 Mitigated Tenure Option 1 85% Family 15% Retired	634	0.3	2.3	0.2	0.3	0.6	1.3	3.2	5.1	**4.0**	**6.7**
Alt 4 Mitigated Tenure Option 2 60% Family 15% Retired 25% Seasonal	479	0.2	1.7	0.1	0.2	0.5	1.0	2.4	3.8	**3.0**	**5.0**
Alt 3 – 3-Acre Lots & Alt 5 Tenure Option 1 85% Family 15% Retired	465	0.2	1.7	0.1	0.2	0.5	0.9	2.3	3.7	**2.9**	**4.9**
Alt 4 Mitigated Tenure Option 3 35% Family 30% Retired 35% Seasonal	398	0.2	1.4	0.1	0.2	0.4	0.8	2.0	3.2	**2.5**	**4.2**

Table 3-16 Park and Trail Demand per Standards and Guidelines (continued)

		Standards and Guidelines									
		Kittitas County		National Recreation and Park Association (NRPA) Guidelines						NPRA Total	
		Regional		Mini Park		Neighboring Park		Community Park			
Alternative and Tenure Scenario	Population	Trails (miles)	Parks (acres)	Low	High	Low	High	Low	High	Low	High
Alt 3 - 3 Acre Lots & Alt 5 Tenure Option 2 60% Family 15% Retired 25% Seasonal	352	0.2	1.3	0.1	0.2	0.4	0.7	1.8	2.8	**2.2**	**3.7**
Alt 4 Mitigated Tenure Option 4 25% Family 25% Retired 50% Seasonal	336	0.1	1.2	0.1	0.2	0.3	0.7	1.7	2.7	**2.1**	**3.5**
Alt 3 - 3 Acre Lots & Alt 5 Tenure Option 3 35% Family 30% Retired 35% Seasonal	292	0.1	1.0	0.1	0.1	0.3	0.6	1.5	2.3	**1.8**	**3.1**
Alt 3 - 3 Acre Lots & Alt 5 Tenure Option 4 25% Family 25% Retired 50% Seasonal	247	0.1	0.9	0.1	0.1	0.2	0.5	1.2	2.0	**1.5**	**2.6**

4 What are the likely cumulative impacts on park and recreational facilities with development of nearby land at existing zoning densities?

The cumulative demand for park and recreation facilities based on Kittitas County and NRPA guidelines provide a benchmark against which to measure possible impacts.

Alternatives 1 and 2 FTE cumulative population would vary between 2,060 with all full-time residents and 1,300 with primarily seasonal residents. For comparative purposes, this would range from about 20 percent larger than the 2009 population of Cle Elum to about 70 percent of the size of Cle Elum, or alternatively slightly larger than either Kittitas or Roslyn. At the highest population projections, this would warrant between 13 and 21 acres of parks and between 8 and 14 acres at the lower FTE population.

Under existing County LOS standards, it is unlikely that adequate provision for parks and recreational facilities would take place in conjunction with new development. The lack of provision for recreation likely would result in either greater use of off-site facilities, which are either not in existence or well below the capacity to serve such a population, or would result in a lack of opportunities for recreational activities to serve residents. The population likely served the least would be the demand for youth sports. Off-site facilities most affected would likely be informal use of State of Washington public land and U.S. Forest Service land to the northeast and north, which likely would result in a level of use far beyond that contemplated in forest management plans. Active recreation facilities affected would be existing playfields at the Easton School, which are not adequate to serve the potential demand for youth sports and would likely deteriorate as a result.

Under Alternatives 3, 4, and 5, the FTE cumulative population would vary between 1,400 with all full-time residents and 825 with primarily seasonal residents. For comparative purposes, this would range from about 90 percent of the size of Cle Elum (1,870) to about 40 percent of the size of Cle Elum. At the maximum population scenario between 9 and 15 acres of parks would be warranted. At the lowest end of the FTE population between 5 and 9 acres of parks would be warranted.

As with cumulative impacts of Alternatives 1 and 2, the lack of provision for recreation likely would result in greater use of off-site facilities at a slightly lower level. Such facilities are well below the capacity to serve such a population or would result in a lack of opportunities for recreational activities to serve residents. The population likely served the least would be the demand for youth sports. Off-site facilities most affected would likely be informal use of State of Washington public land and U.S. Forest Service land to the northeast and north, as well as existing playfields at the Easton School.

5 What are the likely cumulative impacts on parks and recreational facilities with development of nearby land at densities similar to the proposal?

The cumulative demand for park and recreation facilities under both Kittitas County and NRPA guidelines are included in Table 3-16. The NRPA guidelines are included as a benchmark against which to measure possible impacts.

Alternatives 1 and 2 cumulative FTE population would vary between about 2,635 with all full-time residents and 1,700 with primarily seasonal residents. For comparative purposes, this would represent a population half as large as the 2009 population of Cle Elum (1,870) to about 90 percent of the size of Cle Elum. At the highest population projections, this would warrant between 16 and 28 acres of parks and between 10 and 18 acres at the lower FTE population.

Under existing County LOS standards, it is unlikely that adequate provision for parks and recreational facilities would take place in conjunction with new development. The lack of provision for recreation likely would result in a lack of opportunities for recreational activities to serve residents because off-site facilities are either not in existence or well below the capacity to serve such a population. The population likely served the least would be the demand for youth sports if a substantial proportion of the population were to be families. Off-site facilities most affected would likely be informal use of State of Washington public land and U.S. Forest Service land to the northeast and north, which likely would result in a level of use far beyond that contemplated in management plans for those facilities. Active recreation facilities affected would be existing playfields at the Easton School, which are not adequate to serve the potential demand for youth sports and would likely deteriorate as a result or require a substantial investment to respond to the public need.

Under Alternatives 3, 4, and 5, the FTE cumulative population would vary between about 1,850 with all full-time residents and 1,200 with primarily seasonal residents. For comparative purposes, this would range from about 90 percent of the size of Cle Elum (1,870) to about 40 percent of the size of Cle Elum, or slightly smaller than Roslyn. At the highest population projections, this would warrant between 12 and 20 acres of parks and between 7.5 and 12.5 acres at the lower FTE population.

As with cumulative impacts of Alternatives 1 and 2, the lack of provision for recreation likely would result in greater use of off-site facilities at a slightly lower level. The population likely served the least would be the demand for youth sports. Off-site facilities most affected would likely be informal use of State of Washington public land and U.S. Forest Service land to the northeast and north, as well as existing playfields at the Easton School.

6 What measures would mitigate effects on park and recreational demand and facilities?

The most straightforward means of mitigating demand for park and recreation facilities is to provide such facilities on the site or provide a proportional contribution to the cost of such facilities.

Provision of park and recreation facilities, including trails, would require not only provision of land but also development of facilities.

Providing facilities for ORV and snowmobile use would differ according to whether Forest Service and DNR plans provided for use of existing informal trails, such as along the BPA transmission line easement. If provisions for this corridor are not provided on Forest Service and other lands, an off-road system could be provided on-site. If such system utilized only the BPA corridor, about a third of a mile of trail would be provided. This could loop within the corridor. An alternative design would provide a loop through the lower portion of the site and could total up to about a mile of trail. In either case, users likely would not limit themselves to this corridor and would likely range widely to both the north and sough along the corridor. This wide ranging use would be especially prevalent for snowmobiles which would not be restricted by fencing or signage when snow is deep.

If provision is made in Forest Service plans for off-site use of the BPA transmission line, the likely use patterns would be similar to use of the existing informal trail, with the potential for more effective containment of impacts on trails and avoidance of some of the adverse impacts of uncontrolled use.

Maintenance of such facilities on the site could be provided by a homeowner association. Maintenance of off-site or regional facilities could be provided by the County or a locally established and funded parks district. Kittitas County Park and Recreation District No. 1, also known as the Upper County Park District, has expanded into the Easton area and could provide such service through voter-approved tax assessments.

3.4 PUBLIC SERVICES

3.4.1 Public Services - Schools

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

The Easton School District boundaries are shown on Figure 3-20 and generally extend from south of Easton to Snoqualmie Pass.

The district provides kindergarten to 12th grade education from a central campus on Railroad Way in Easton. Enrollment has been stable for the past 5 years and has varied from 105 to 120 as indicated in Table 3-17.

Facilities include:

- Four elementary classrooms (Grades K-6);
- Five secondary classrooms (Grades 7-12); and
- Four specialized classrooms (science, art, technology, and special education/remediation).

All classrooms are combined grades with one instructor teaching two groups at different grade levels.

The school has a small playground for elementary students within the main campus between Railroad Way and First Avenue. There is a larger playground between First Avenue and I-90. Because access to this playground requires crossing a public street, it is used by older students or by younger students when escorted across the street.

Table 3-17 Easton School District Enrollment and Staffing

Average FTE Enrollment	Based on Report 1251								
	2008	**2007**	**2006**	**2005**	**2004**	**2003**	**2002**	**2001**	**2000**
Kindergarten	4.13	4.67	3.89	4.94	3.22	4.44	4.33	5.44	5.33
First	10.63	12.11	9.44	7.56	7.33	6.67	11.44	10.00	7.11
Second	13.63	5.56	6.11	9.22	6.78	12.33	8.00	9.22	9.56
Third	8.63	5.44	5.67	7.89	12.00	10.11	9.33	7.44	8.22
Fourth	3.75	6.56	8.11	10.11	10.33	8.44	6.89	8.44	5.11
Fifth	5.00	5.33	12.22	8.44	7.33	5.00	7.00	6.00	9.22
Sixth	8.13	11.22	10.11	7.33	6.56	8.22	9.89	11.56	7.00
Seventh	10.38	8.00	7.58	8.71	9.00	9.22	13.67	7.33	10.33
Eighth	8.00	8.80	8.00	8.67	12.11	13.00	8.67	11.00	9.00
Ninth	8.88	10.99	8.44	13.78	14.78	8.78	10.22	12.11	10.67
Tenth	9.63	6.22	10.33	12.56	10.44	10.00	12.44	10.33	13.89
Eleventh	5.00	8.67	9.44	10.11	10.11	13.56	8.78	12.33	12.56
Twelfth	8.77	8.00	10.44	8.76	12.80	11.44	9.56	8.67	7.56
Grand Total	**104.56**	**101.57**	**109.78**	**118.08**	**122.79**	**121.21**	**120.22**	**119.87**	**115.56**
	Based on Report 1801								
Staff FTE	**2008**	**2007**	**2006**	**2005**	**2004**	**2003**	**2002**	**2001**	**2000**
Classified	7.511	7.751	7.833	7.230	6.321	7.005	8.303	7.209	6.915
Certified	13.000	13.000	14.096	14.096	13.666	14.099	14.001	13.869	13.447

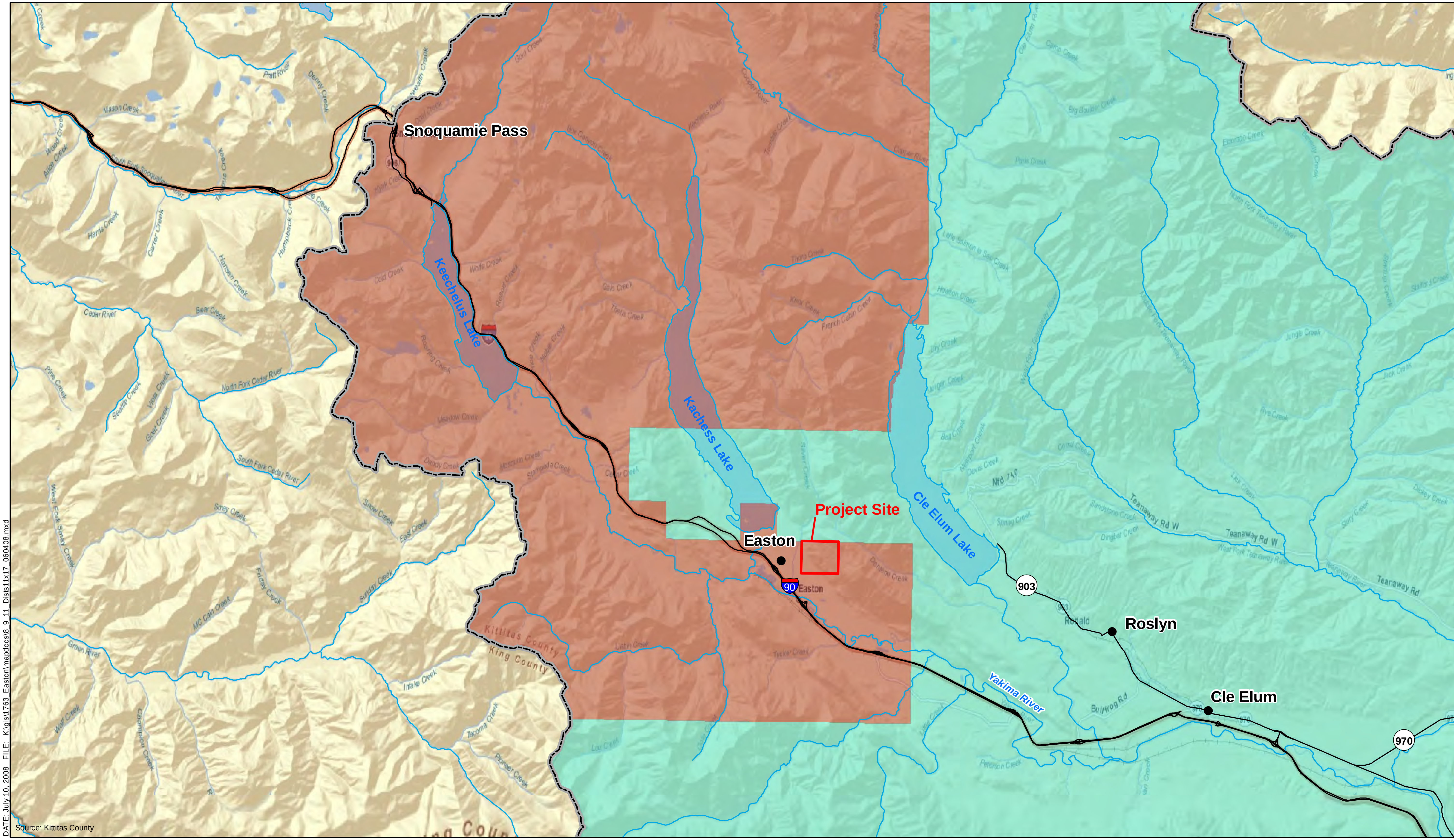
The current facility was constructed in 2004 and financed by a 20 percent state share with 80 percent from a local bond issue.

Most students are transported to school by bus. The district runs two bus routes. A smaller bus serves Snoqualmie Pass and a larger bus serves the southern portion of the district near Easton. This bus serves students on both sides of I-90. A third bus serves as a backup and for special events and travel for sports teams (White 2008).

The number of students in the school has been fairly constant, varying from 102 to 123 between 2000 and 2008 as indicated in Table 3-17. An estimated 15 to 20 students within the district attend the Cle Elum or North Bend school district each year (White 2008). The number of certified staff (teachers) and other staff has also remained fairly constant over that period, ranging from 20 to 22.

Table 3-18 Easton School District Budget

	Year								
Revenue	**2008**	**2007**	**2006**	**2005**	**2004**	**2003**	**2002**	**2001**	**2000**
Local Tax	580,046	600,214	537,264	525,892	515,602	540,985	581,307	437,705	206,432
Local Nontax	95,200	92,759	74,185	228,882	51,986	72,753	61,515	259,524	109,598
State General	1,273,451	1,208,662	1,133,440	1,110,481	1,098,582	1,121,446	1,084,803	1,021,221	972,728
State Special	198,052	206,705	192,654	178,583	144,121	166,897	582,098	147,113	122,480
Federal General	9,500	9,210	10,276	11,168	10,977	11,087	10,834	8,143	7,775
Federal Special	80,823	45,390	92,669	61,900	73,318	74,421	79,077	93,098	108,429
Other	27,500	390	103,780	47,860	61,640	255,986	17,659	0	3,819,712
Total (Sum of Above)	**2,264,572**	**2,163,331**	**2,144,268**	**2,164,765**	**1,956,224**	**2,243,574**	**2,417,293**	**1,966,803**	**5,347,154**
Expenditures	**2008**	**2007**	**2006**	**2005**	**2004**	**2003**	**2002**	**2001**	**2000**
Instruction	1,061,663	953,767	972,686	910,286	903,864	887,297	893,154	846,207	809,043
Instruction Support	138,104	143,561	117,531	106,521	71,670	78,695	98,289	100,094	81,602
Building Administration	123,555	39,689	83,214	99,341	115,259	100,638	32,646	96,137	95,339
Central Administration	198,108	237,062	159,589	180,499	190,355	218,512	193,571	186,017	226,189
Other Support	372,909	337,833	331,057	313,582	316,296	304,033	295,213	208,563	205,405
Buildings	200,126	207,962	207,275	187,097	196,090	166,697	162,616	109,107	103,415
Building Bonds	324,274	323,521	421,289	353,385	372,515	314,527	218,875	209,114	15,506
Pupil Transport	82,045	60,754	49,072	59,858	52,683	71,196	73,558	45,993	44,368
Transport Vehicles	0	0	0	13,723	14,686	52,433	16,107	8,288	23,794
Other	90,738	69,117	74,710	66,628	67,523	66,140	59,040	53,464	57,622
Total (Only Includes Above)	**2,218,613**	**2,035,433**	**2,085,365**	**1,977,337**	**1,984,644**	**1,956,133**	**1,747,855**	**1,654,421**	**1,456,879**



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Parametrix

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Scale in Miles

School Districts

- Cle Elum-Roslyn School District
- Easton School District

Figure 3-20
Marian Meadows
School District Boundaries

The school budget has ranged from $1.9 million to $2.4 million from 2000 to 2008 as indicated in Table 3-18. The state share of the budget has ranged from 59 percent to 65 percent with the local share from a local tax assessment ranging from 29 percent to 35 percent. Federal and other grants generally have provided between 5 percent and 10 percent of the budget.

2 What mandates or standards for school service have been established?

The Washington State Constitution provides for free public education for all students in the state. This constitutional mandate is met through a number of agencies and policies:

- The State Legislature provides:
  - Laws governing schools and school districts; and
  - Budget for "basic instruction" for all public schools in the state.
- The Washington State Board of Education develops policies for state education laws created by the Legislature including:
  - Student learning goals;
  - Student and system accountability; and
  - Basic education assistance.
- The State Superintendent of Public Instruction (SPI) is an elected office responsible for all kindergarten through 12th grade education in the state. The SPI provides:
  - Standards for programs in all public schools;
  - Certification of teachers; and
  - Resources for educational programs.
- Local school boards are established by the state and delegated responsibility for day-to-day operations in accordance with state laws and guidelines. School board members are elected locally. School boards are responsible for:
  - Adopting and administering the local budget.
  - Hiring and overseeing the administrator, and other aspects of operations.
  - Proposing local taxes for operation and capital facilities that are voted on by citizens.
- Citizens:
  - Elect legislators that provide laws and the state school budget.
  - Elect the SPI.
  - Elect local school board members.
  - Vote on local tax levies.

A number of standards adopted by the state affect local school operation:

- Schools must meet common learning standards for grades kindergarten to 10 measured by the Washington Assessment of Student Learning (WASL) (RCW 28A.655).
- The class size goal is 18 students for grades kindergarten to 4 and is to be reduced as feasible for other grades given budget constraints (RCW 28A.505, Initiative 728).
- Transportation must be provided for students living more than 2 miles from schools, or who are separated from the school by unsafe roadways or other barriers, or who have special needs (RCW 28A.160).
- Local jurisdictions are required to provide safe public walkways for school children from residences to schools or to bus stops in new subdivisions (RCW 58.17.110).
- School districts may request the local jurisdiction to adopt school impact fees to pay up to 50 percent of school facility costs due to growth (RCW 82.02.050).
- Local jurisdictions are required to identify lands useful for public purposes, including schools (RCW 36.70A.150), and provide an inventory of facilities, forecast future needs, and provide for a 6-year plan that will finance such facilities (RCW 36.70A.070(3).

Kittitas County has not developed LOS standards for public schools in policy GPO 5.12, which adopts standards for LOS for public facilities.

3 How will the proposal and alternatives affect school facilities and services?

Impacts on schools are related to the number of students, which are determined by the number of units and the family structure of the households occupying the units. The analysis of impacts addresses the three basic parameters of delivery of school service:

- Instruction,
- Facilities, and
- Transportation.

The number of students generated by new dwellings depends primarily on the demographic characteristics of the future residents. Young families typically generate the highest rate or new students. Retirees typically generate the smallest number of students. Existing dwellings generate students over the life-cycle of operation. Typically, a residence occupied by a family composed of younger parents will provide students that start school in kindergarten then move through the 13 grades in the system. If a family stays in a dwelling after children grow beyond school age they do not generate additional students. Most homes are cycled through resale and may again generate students that pass through the school grades.

The Office of the Superintendent of Public Instruction (OSPI) utilizes a method for projecting school enrollment known as the K Linear Cohort Survival method. The cohort survival or progression method starts with current enrollments, by grade, and then advances students one grade for each year of the forecast. If a district expects substantial housing development, and has not recently seen any development, enrollments will be underestimated by the cohort survival methodology (OSPI 2008c).

For districts experiencing substantial growth, student generation rates are derived from census information or generated by surveys. In addition to the children immediately generated when a new home is built, demand is generated for capacity at higher grades as a student moves through the grades. Enrollment from new development typically peaks 5 to 10 years after occupancy (Burk 2008). For this analysis, student generation rates were developed based on census information and surveys of other school districts in Washington State. Because new housing typically attracts younger families with younger children, the student generation rates are higher for elementary than secondary grades. The generation rates used are designed to match the 2000 census information of 0.71 children per household for the Easton area and are 0.35 for elementary (grades kindergarten through 5), 0.18 for middle school (grades 6 through 8), and 0.18 for high school (grades 9 through 12).

Projected student population is provided in Table 3-19 and range from about 260 with Alternative 1 with all full-time residents to about 30 with Alternative 3 and 50 percent seasonal residents.

Impacts on Instruction

State basic education financing of schools is established by the state legislature through annual appropriation and includes funding for what the state defines as “basic education.”

The key to state funding, however, is an apportionment system that is based on a formula for costs that may not actually pay the true cost to the district. In effect, the amount of money allocated by the Legislature is divided up between school districts. They either have to adjust their program to match, or find additional funding.

Items that have been identified as chronic problems in the formula include:

- The formula does not typically fund the entire cost of instruction. On average, the state now provides about 70 to 80 percent of needed funds because of the number of items excluded that are seen as necessary by local communities, including the cost of updating instructional supplies, school books, computer supplies, or power. In Easton, local tax assessments account for about 28 percent of the school budget.
- The full cost of facilities, including utilities (heating fuel, electricity, water) and facility maintenance are not fully funded.
- Transportation costs are generally funded at about 70 percent of cost (although the 2009 Legislature changed the formula, which will increase the state share somewhat).

Easton School currently is eligible for a larger allocation of funding from the state as compared to the standard per student allocation because it is classified as a “small school.”

In the future, if current funding formulas continue, the local community would need to provide between 20 and 30 percent of the cost of instruction and transportation. The actual cost to homeowners on an assessment per $1,000 value of property is affected by the overall value of improvements in the district as compared to the number of students. A large percentage of seasonal residents who do not send children to local schools increase the tax base with the value of their homes without increasing school costs; therefore, they lower the average amount paid in local tax levies for schools.

An important consideration in rapidly developing communities is the willingness of existing residents to pass operating levies (and construction bond levies) to support additional growth. If local citizens are not willing to pass such levies, the quality of school service would decline from the current level to the level that would be supported by state funding alone.

Impacts on Facilities

The projected student population in Table 3-19 range from about 260 with Alternative 1 with all full-time residents to about 90 with Alternative 3 with the same tenure scenario with up to 50 percent seasonal residents. This population would result in a need to increase the size of facilities by a factor of up to two and a half of the existing school.

At the lower end of the tenure range with up to 50 percent of residents seasonal, Alternative 1 would add an additional 80 students and Alternative 3 would add about 30. This student population likely could be accommodated for the first few years by capacity in existing classrooms. After a period of several years, at least two and possibly three new classrooms would need to be added to the existing school for Alternative 1, depending on the grade breakdown of new students. If new students are primarily in elementary grades, as expected, a larger number of classrooms will be needed. Expansion of the existing school will necessitate acquisition of adjacent parcels. For the 30 new students from Alternative 3 under this scenario, at least one new classroom would be needed.

To accommodate additional students under the scenarios with a substantial full-time family population, either a substantial expansion of the existing school would be needed, including acquisition of a substantial amount of land, or one or more new school sites and new school buildings would be required. To serve the projected maximum demand of 260 students, from 8 to 12 new classrooms would be needed, as well as specialty classrooms and support facilities including assembly, gymnasia, and food service. This would be equivalent to doubling the size of the existing school. The local school district has considerable discretion in deciding the size and location of new schools. The site of a new school or expanded school that meets state guidelines would vary according to the grades served and the size of the student population. To serve elementary school students, a site of 5 to 15 acres would be recommended with 10 to 25 acres for a middle school and 20 to 40 acres for a high school. The proposed development alone would not justify a new middle or high school by the student populations it would produce.

Table 3-19. Easton School District Student Population by Alternative and Tenure

Alternative and Tenure Scenario	Units	Annual Student Generation (each year over 10-year buildout) Elem.	Middle	High	Maximum Student Generation Elem.	Middle	High	Total
Alt 1 & 2 Applicant's PUDs Tenure Option 1 85% Family 15% Retired	443	12	6	6	121	61	81	263
Alt 1 & 2 Applicant's PUDs Tenure Option 2 60% Family 15% Retired 25% Seasonal	443	9	4	4	86	43	57	186
Alt 4 Mitigated Tenure Option 1 85% Family 15% Retired	195	5	2	3	53	27	36	116
Alt 1 & 2 Applicant's PUDs Tenure Option 3 35% Family 30% Retired 35% Seasonal	443	5	2	3	52	26	34	112
Alt 3 – 3-Acre Lots & Alt 5 Tenure Option 1 85% Family 15% Retired	147	4	2	2	40	20	27	87
Alt 4 Mitigated Tenure Option 2 60% Family 15% Retired 25% Seasonal	195	4	2	2	38	19	25	82
Alt 1 & 2 Developers PUDs Tenure Option 4 25% Family 25% Retired 50% Seasonal	443	4	2	2	37	19	25	81
Alt 3 – 3-Acre Lots & Alt 5 Tenure Option 2 60% Family 15% Retired 25% Seasonal	147	3	1	1	29	14	19	62
Alt 4 Mitigated Tenure Option 3 35% Family 30% Retired 35% Seasonal	195	2	1	1	23	11	15	49
Alt 4 Mitigated Tenure Option 4 25% Family 25% Retired 50% Seasonal	195	2	1	1	16	8	11	35
Alt 3 – 3-Acre Lots & Alt 5 Tenure Option 3 35% Family 30% Retired 35% Seasonal	147	2	1	1	17	9	11	37
Alt 3 – 3-Acre Lots & Alt 5 Tenure Option 4 25% Family 25% Retired 50% Seasonal	147	1	1	1	12	6	8	27

Elem. = Elementary

Alt = Alternative

The advantages of a single large school to serve the area include having flexibility in filling classrooms as the student population for given grades fluctuates, and benefiting from decreased administrative and operating costs. A single school also is a contributor to community identity. Development of an additional school to serve the demands of this development (as well as cumulative development) would have some advantages in possibly reducing transportation costs. Such a strategy would decrease flexibility somewhat and increase administrative and operating costs. Depending on how students were assigned, it also could contribute to perception of a different community identity for different areas of the district.

State financing of new schools can range from nothing to a maximum of about 70 percent. The existing school in Easton was expanded with no contribution from state funds because it did not meet the state-established need criteria based on the assessed value of the district (White 2008).

State match funds in Washington come from the Common School Construction Fund. Bonds are sold on behalf of the fund then retired from revenues accruing predominantly from the sale of renewable resources from state school trust lands set aside by the Enabling Act of 1889 (primarily timber sales but also other leasing income from farmland or sources as wind and solar energy developed on trust lands). If these sources are insufficient to meet needs, the Legislature can appropriate funds or the State Board of Education can establish a moratorium on certain projects.

School districts may qualify for state match funds for specific capital projects. To qualify, a project must first meet a state-established criteria of need. This is determined by a formula that specifies the amount of square footage the state will help finance to provide permanent structures for the unhoused enrollment projected for the district. If a project qualifies, it can become part of a state prioritization system. This system prioritizes allocation of available funding resources to school districts statewide based on seven prioritization categories. Funds are then disbursed to the districts based on a formula that calculates district-assessed valuation per pupil relative to the whole state-assessed valuation per pupil to establish the percent of the total project cost to be paid by the state. The state contribution can range from nothing to about 70 percent of the project's cost (OSPI 2008b).

In general, in order to qualify for state funding a district must have an existing deficiency. In rapidly growing communities, it generally means that schools must be overcrowded and be using portable classrooms for a substantial number of students before the state will provide funding.

Because availability of state match funds has not kept pace with the rapid enrollment growth occurring in many of Washington's school districts, matching funds from the state may not be received by a school district until after a school has been constructed. In such cases, the district must "front fund" a project. That is, the district must finance the complete project with local funds (the future state's share coming from funds allocated to future district projects). When the state share is finally disbursed (without accounting for escalation), the future district project is partially reimbursed (OSPI 2008b).

School districts can collect two types of local property tax levies for capital facilities:

- Capital Project – These levies must be used for school facilities and other capital purposes. Levies can be for 1 to 6 years.
- Debt Service (also called “bond levies”) – Voter approval of the levy allows a district to issue bonds (borrow money) and collect property taxes to repay principal and interest over the life of the bond (typically 30 years). Levies must be used to purchase land and build or renovate school buildings.

Local funds must be used for the entire cost of the following items because they are not eligible for the state match (OSPI 2008a):

- Acquisition cost of the site.
- Area in excess of the space allocations provided in Washington Administrative Code (WAC) 392-343-035.
- All costs associated with the purchase, installation, or relocation of portable classrooms.
- Alterations, repair, or demolitions (except alterations necessary to connect new construction to an existing building).
- Costs incidental to advertising for bids, site surveys, soil testing for site purchase, or costs other than those connected directly with construction of facilities.
- Bus garages, except interdistrict cooperatives.
- Central administration buildings.
- Stadia/grandstands.

Impacts on Transportation

Transportation costs are also related to facility decisions. Development of a single school campus for the district would require all students from the site to be bused. Development of schools closer to the site might allow some students to walk. For Alternative 1, the student population could vary from about 260 students with all full-time residents to about 80 students with half the units occupied by seasonal recreational residents. The number of school buses required to transport that many students would range from about six to two.

Student transportation is funded jointly by the state and local districts. The current transportation funding system was developed and incorporated in RCW 28A.160.150 through 28A.160.180. The statute defines specific transportation funding eligibility criteria for students, and prescribes a methodology based on the direct radius mile (“crow’s flight”) distance of each student’s assigned bus stop location to their destination school, the number of students transported, minimum load factors, and weighted distance factors. The allocation amount is ultimately based upon a per-student allocation rate, which is adjusted each year by the Legislature.

The school district budgets about $50,000 for transportation of which the state pays about 70 percent. The district's share of the transportation budget funded from the local operations levy is about 30 percent, although the local share also includes transportation for activities for student trips and athletic trips not funded by the state.

School districts can collect local property tax levies for purchase of school buses. Such levies require a 60 percent approval rate.

4 What are the likely cumulative impacts on school facilities and services with development of nearby land at existing zoning or PUD densities?

The potential cumulative impacts of development of nearby land in the vicinity were evaluated for the area north of I-90 served by Sparks Road. The state-owned land surrounding the Easton State Airport was excluded from redevelopment scenarios. The area covered totals about 1.5 square miles (excluding the airport).

Cumulative projections include both development of land at existing rural zoning densities and at densities allowed by PUD approval. The methodology for calculating future cumulative development is discussed in Section 3.1, Land Use. The methodology for school student population is discussed above.

Potential student populations are indicated in Table 3-20. If development reflecting PUD density were applied to the area as a whole, additional student enrollment would vary from around 850 at the high end to around 153 at the low end. At the upper end of the range, this would be equivalent to current student enrollment in the Cle Elum School District. With buildout of the project vicinity at rural density with 3-acre lots, the district would have about three-quarters the number of students as the Cle Elum School District.

In general, the impacts on instruction, facilities, and transportation discussed above for the project would occur at a magnitude three times greater. The same need for local school levies to support instruction, facilities, and transportation would be required but at a greater level.

Table 3-20 Easton School District Cumulative Student Population by Alternative and Tenure

Alternative And Tenure Scenario Rural Units 330, PUD Density Units 546	Cumulative Rural Maximum Student Generation				Cumulative PUD Density Maximum Student Generation			
	Elem.	Middle	High	Total	Elem.	Middle	High	Total
Alt 1 & 2 Applicant's PUDs Tenure Option 1 85% Family 15% Retired	334	167	222	723	393	196	262	850
Alt 1 & 2 Applicant's PUDs Tenure Option 2 60% Family 15% Retired 25% Seasonal	236	118	158	512	278	139	185	603
Alt 4 Mitigated Tenure Option 1 85% Family 15% Retired	198	99	132	428	257	128	171	556
Alt 3 – 3-Acre Lots & Alt 5 Tenure Option 1 85% Family 15% Retired	171	86	114	371	230	115	153	499
Alt 1 & 2 Applicant's PUDs Tenure Option 3 35% Family 30% Retired 35% Seasonal	142	71	95	308	167	84	111	362
Alt 4 Mitigated Tenure Option 2 60% Family 15% Retired 25% Seasonal	140	70	93	303	182	91	121	394
Alt 3 – 3-Acre Lots & Alt 5 Tenure Option 2 60% Family 15% Retired 25% Seasonal	121	61	81	263	163	82	90	353
Alt 1 & 2 Applicant's PUDs Tenure Option 4 25% Family 25% Retired 50% Seasonal	102	51	68	221	120	60	80	260
Alt 4 Mitigated Tenure Option 3 35% Family 30% Retired 35% Seasonal	84	42	56	182	109	55	73	237
Alt 3 – 3-Acre Lots & Alt 5 Tenure Option 3 35% Family 30% Retired 35% Seasonal	73	36	49	158	98	49	65	212
Alt 4 Mitigated Tenure Option 4 25% Family 25% Retired 50% Seasonal	60	30	40	131	79	39	52	170
Alt 3 – 3-Acre Lots & Alt 5 Tenure Option 4 25% Family 25% Retired 50% Seasonal	52	26	35	114	70	35	47	153

Elem. = Elementary

Alt = Alternative

5 What measures could reduce or mitigate impacts of the proposal on school facilities and services?

Instruction

Impacts on instruction resulting from increases in student population involve providing more resources for teachers and materials. Both the state and local component of revenue is largely outside of the control of the county or local jurisdictions. The exception is the ability of local cities and counties to use their taxing and bonding authority to provide funding for specific programs rather than the local levy provisions for school districts. This is advantageous only because counties and cities have more flexible means of bonding than special purpose districts.

No measures have been identified in which the proposal could reduce this impact.

Facilities

Counties have the means to mitigate facilities impacts on public facilities, including schools, through a fee system. Such fees are generally collected at the subdivision or building permit stage. The district would need to develop a capital facility plan establishing school facility needs and cost and the county would need to adopt a fee ordinance. One of the challenges with applying such a system in this case is identifying a means to address an estimated component of recreational residents who would not contribute students to the local school system. The proportion of units used seasonally cannot reliably be predicted in advance and may change as property is sold in the future.

Measures that the proposal could contribute include dedication of sites for schools or provision of funds for site acquisition and building construction.

An additional measure the county could impose would be project phasing coupled with a specific monitoring program for both student generation and provision of facilities by the local school district, including passage of local levies. This would give the county a means to match creation of additional lots to the provision of school facilities. Such a measure would prevent creation of additional lots and additional demand if funding is not obtained from the state or local levies to provide needed facilities.

Transportation

Transportation impacts relate both to facilities and operation. If school buses are considered capital facilities, local jurisdictions have the means to mitigate impacts through a fee system.

The proposal could contribute to transportation facilities by acquiring buses and expanding facilities to store and maintain them.

3.4.2 Public Services - Fire Protection

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

Kittitas Fire District No. 3 serves the proposal area, which is part of a 12-square-mile service area shown on the map in Figure 3-21. It has mutual response agreements with nearby fire districts. The district is entirely manned by volunteers and has a part-time chief. The district has 14 active volunteers at present, four of which live and work near the community. The total fire district budget is $89,500 of which about 37 percent is an assessment to repay bonds for purchase of equipment.

The district has a single fire station west of the BNSF Railroad near I-90, Exit 71. The station was constructed in 1992. Equipment includes a 2004 pumper with a pumping capacity of 3,200 gallons per minute (gpm), a 1994 2,650-gallon pumper with a 750-gpm pump, a 1990 4,000-gallon tender with a 750-gpm pump, and a 1991 one-ton brush truck. The district also has a 2000 aid car used for emergency medical response.

Annual fire responses between 2004 and 2007 ranged between 10 and 29 with property loss between $34,000 and $500,000 (State Fire Marshall 2008).

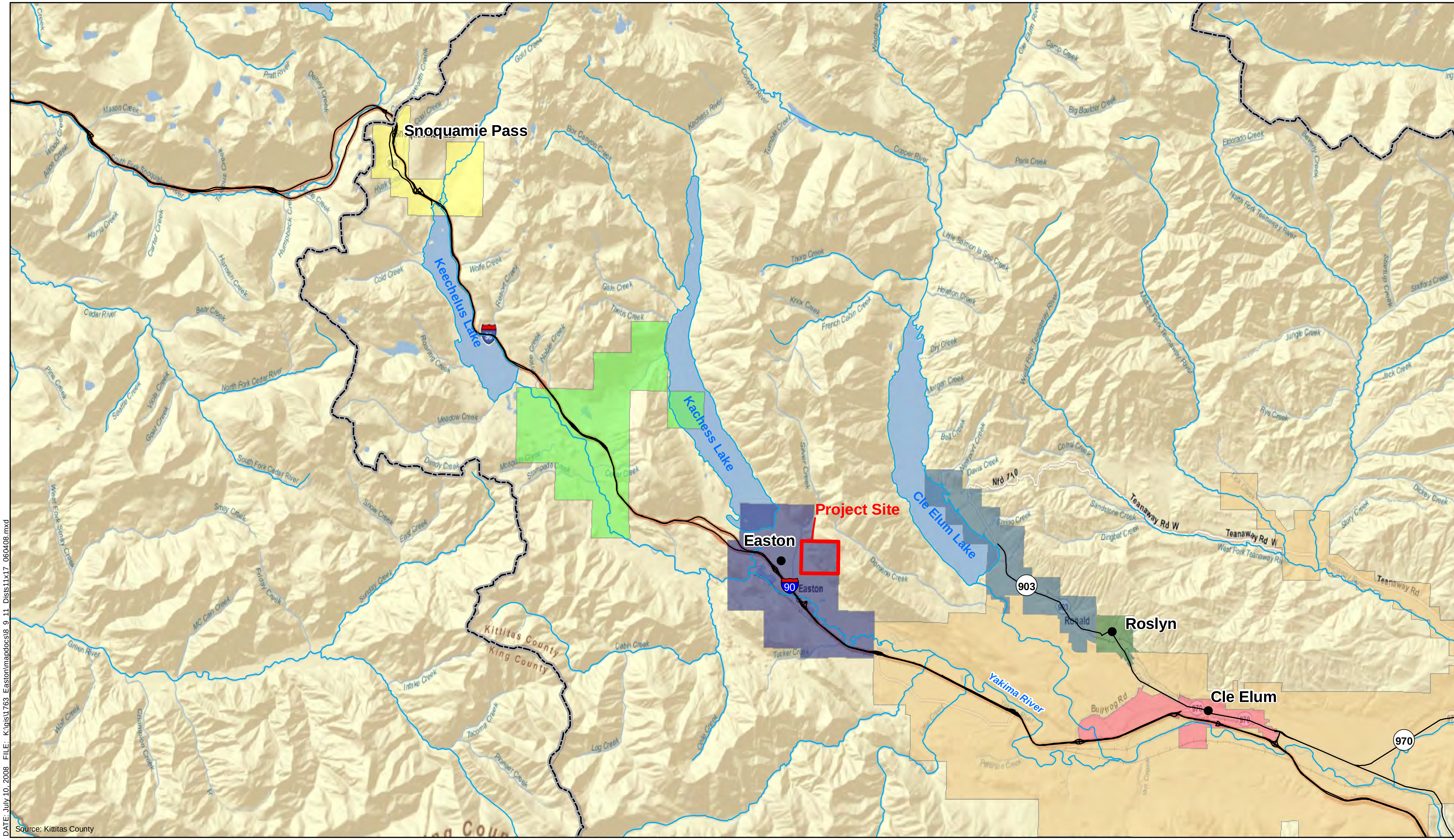
Training and experience of the volunteers varies greatly. Two of the volunteers are certified Emergency Medical Technicians (EMTs).

Wildland fire protection and suppression on all state-owned and private forest and range lands in unincorporated Kittitas County is the responsibility of the Washington State Department of Natural Resources (DNR). These responsibilities include:

- Suppressing wildfires;
- Regulating outdoor burning and industrial operations on forest lands; and
- Providing landowner assistance by inspecting and offering advice on fire-prone rural property.

DNR cooperates with other agencies in mutual aid, prevention, and education. However, county rural fire districts' obligations are limited to protecting improved property and structures, whereas federal agencies' responsibilities are limited to federally managed land under their jurisdiction.

Within Kittitas County, the Okanogan/Wenatchee Ranger District is responsible for fire protection of National Forest lands. Through cooperative agreements with agencies, such as DNR, service districts assist other agencies and jurisdictions with wildland fire protection and suppression. Fire protection assistance to county rural fire protection districts is requested from the U.S. Forest Service through DNR.



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Parametrix

N

0 2.5

Scale in Miles

Fire Districts

- CITY OF CLE ELUM 51-1
- CITY OF ROSLYN 57-1
- Fire District 3 (Easton)
- Fire District 51 (Snoqualmie Pass)
- Fire District 6 (Roslyn)
- Fire District 7 (Cle Elum)
- Fire District 8 (Kachess)
- NA

Figure 3-21
Marian Meadows
Fire District Boundaries

2 What mandates or standards for fire protection service have been established?

Kittitas County has adopted the following polices:

GPO 2.109G Kittitas County will consider creating a wildfire protection policy tied to land use zoning that will protect both the private landowner and public lands from wildfire. When the use of forested lands is changed, the party doing the changing is responsible for providing a fire-resistant buffer around the property.

GPO 2.139 Kittitas County will encourage rural developments in the Wildland Urban Interface (WUI) and the owners of adjacent commercial forest lands to develop Community Wildfire Protection Plans (CWPPs).

The emergency medical response standard adopted in the Kittitas County Emergency Medical Services Standards for Fire District No. 3 is 20 minutes within a 5-mile radius of its station.

The standard for Hospital District No. 2 to respond to the Easton area, which is about 17 miles from its station, is 45 minutes or less (KCEMS 2006). According to the local fire chief, actual response times to the area north of I-90 are in the 8- to 12-minute range (McCaw 2008).

There are a variety of **measures of fire protection effectiveness** in a community. The factors discussed below are based on a model developed by the Center for Public Safety Excellence, Inc. (CPSE 2006) and includes the following:

Fire Risk

The characteristics of an individual community will affect the level of fire risk to protect against. For example, older buildings pose a different set of problems than new buildings built to modern construction codes. Commercial and industrial occupancies pose additional factors to be considered. Construction, occupancy type, water supply, exposure between buildings, modern furniture and furnishings, and the risks which the combination of these factors pose to the occupants constitute the fire risk component.

An additional critical factor in determining the level of fire risk to protect against is the assessment of consequences. Fires result in deaths, personal injuries, and property loss, including damage to the environment. Additional factors, such as the historical value of certain properties and the tax assessment value of property in the community, are also considered. In many cases, the loss of a particular occupancy in a community, such as a major employer or a public facility such as a school, has an adverse impact on the local economy or community values.

Fire Prevention Program Effectiveness

Regulations (codes) and practices pertaining to fire safety focus primarily on fire prevention. Enforcement of these codes is one of the most effective ways of reducing the loss of life and property due to fire. As such, the development, administration, and enforcement of fire prevention measures is an important component of fire protection. Public fire safety education has the potential to substantially reduce the loss of life and property due to fire. Although it is difficult to quantify the results of fire prevention - one cannot count the number of fires that did not occur - effective prevention and public fire safety education are likely to have a direct and substantial impact on reducing the demand on emergency response services.

Detection Capabilities

Fire detection notifies occupants and allows them sufficient time to escape. It may also allow for earlier notification of the fire department. Widespread use of early warning detection systems has the potential to significantly reduce notification time. The Center for Public Safety Excellence, Inc. (CPSE), Standards of Response Coverage, which, when coupled with effective fire department suppression, produces a corresponding reduction of loss of life, injuries, and damage to property from fire. Communities with a large number of seasonally occupied buildings pose an additional challenge for detection.

Built-in Suppression Capabilities

Built-in suppression refers to the fixed fire protection systems in large buildings normally associated with assembly (e.g., theatres); commercial, industrial, and manufacturing complexes; and to a lesser extent residential occupancies. These systems, such as automatic sprinkler protection, play an important role in minimizing the effects of fire by controlling the spread and growth of the fire, thereby enabling the fire department to extinguish the fire more quickly and easily. The extent to which built-in suppression systems are in use, the effectiveness and reliability of these systems, and the age of the buildings in the community will have an impact on the demand for fire fighting services. While built-in suppression systems may decrease the demand placed on fire department suppression services, they may increase the demand placed on in-service fire prevention inspections and associated activities.

Intervention Time

Intervention time, for the purposes of the Comprehensive Model, is defined as the time from ignition until effective fire fighting teams can be directed at the fire. Factors that affect intervention time include, but are not limited to:

- The time required to detect the fire;
- Notification time from the public;
- Notification time to the fire fighters;
- Preparation time for the fire fighters to leave the station;
- The distance between the fire station and the response location;
- The layout of the community;
- Impediments such as weather, construction, traffic jams, and the lack of roads;
- Set-up time; and
- Type and size of the building involved.

Fire department intervention time is crucial in determining the consequences of a fire in terms of deaths, injuries, and loss of property and damage to the environment. Effective fire prevention and public education programs can reduce intervention time. In turn, reducing intervention time can significantly increase fire department effectiveness.

Fire Suppression Ground Effectiveness

A fire department's fire ground effectiveness affects the degree of damage to the environment, property loss, personal injury, and death from fire. Factors that affect a fire department's fire ground effectiveness include:

- Fire ground staffing, the number and assembly of fire fighters at the scene of an emergency, which comprises:
  - The initial fire attack team arriving at the scene and initiating fire ground operations;
  - Additional staff arriving at the scene after the initial fire attack team;
  - The timing and sequencing of arrival of each group of fire fighters; and
  - The relief of fire fighters at prolonged emergencies.
- Fire fighter efficiency is the proficiency in which individuals and teams utilize tools and practices effectively to suppress the fire. Factors that affect efficiency include:
  - Physical capability,
  - Training,
  - Tools/gear used, and
  - Operational guidelines.
- Fire ground command control the ability to communicate information. Direct fire ground command operations are crucial to the successful outcome of a fire ground operation.
- Apparatus and equipment have varying capabilities and must correspond to the demands of the Fire Ground Sub-Model. Innovations in equipment and technology can have an impact on staffing requirements and overall fire department effectiveness.
- Water supply availability including:
  - Amount, duration, and
  - The ease with which the supply can be secured.

This typology is also reflected in the Insurance Service Organization (ISO) Public Protection Classification (PPC) of fire protection in communities, which is based on the ISO's Fire Suppression Rating Schedule (FSRS), which includes the following criteria:

Receiving and handling of fire alarms

- Receipt,
- Operators, and
- Alarm dispatch circuits.

Fire department

- Equipment,
- Distribution of companies within specified response distances,
- Company personnel available for first alarms, and
- Training.

Water supply

- Adequacy of water supply in terms of:
  - Hydrant's size, type, and installation; and
  - Hydrant's inspection and condition.

3 What risks are posed by wildfire in the area and to the proposal and alternatives?

Wildland fires are fires caused by nature or humans that result in the uncontrolled spread of destruction of forests, brush, field crops, grasslands, and real and personal property.

The wildland fire season in Eastern Washington usually begins in late May or early June and typically culminates in late September with a precipitation event; however, wildland fires have occurred in every month of the year. Drought, snow pack, and local weather conditions can expand the length of the fire season. The early and late shoulders of the fire season usually are associated with human-caused fires. Lightning generally is the cause of most fires in July, August, and early September.

People start most wildland fires on state land and private lands in Washington State. Major causes include arson, recreational fires that get out of control, smokers' carelessness, debris burning, fireworks, and children playing with fire. The major cause of fires on federally protected lands is lightning (DNR 2009).

Factors that Influence Wildland Fire

A fire needs three elements in the right combination to start and grow – a heat source, fuel, and oxygen. How a fire behaves primarily depends on the characteristics of available fuel, weather conditions, and terrain.

Fuel:

- Lighter fuels such as grasses, leaves, and needles quickly expel moisture and burn rapidly, while heavier fuels such as tree branches, logs, and trunks take longer to warm and ignite.

- Snags and hazard trees, those that are diseased, dying, or dead, are larger west of the Cascades, but more prolific east of the Cascades. In 2005, about 2.5 million acres of the state's 21 million acres of forest land contained trees killed or defoliated by forest insects and diseases.

Weather:

- East of the Cascades, summer drying typically starts in mid-June and runs through early September, with drought conditions extending this season.
- Passage of a dry, cold front through this region can result in sudden increase in wind speeds and a change in wind direction affecting fire spread.
- Thunderstorm activity, which typically begins in June with wet storms, turns dry with little or no precipitation reaching the ground as the season progresses into July and August. Thunderstorms with dry lightning are more prevalent in Eastern Washington.

Terrain:

- Topography of a region or a local area influences the amount and moisture of fuel.
- Elevation and slope of landforms affect the spread and intensity of fire, which spreads more easily as it moves uphill than downhill and dries and heats fuels in its path, making it easier to ignite and burn. The fire can create its own winds through convection that further intensifies the fire and increase spread.
- Barriers such as highways and lakes can affect the spread of fire depending on their width and location. In an intense fire, wind tends to carry burning debris considerable distance and can jump such fire barriers.

All of the factors for creating extreme hazard conditions are present in the Easton area, especially on the slopes surrounding the valley. Adding to the risk is the near constant wind from the west that quickly dries forests after snowmelt (Nickle 2009).

4 How will the proposal and alternatives affect fire protection facilities and services?

The addition of residences generally adds to the incidence of fire as well as the demands placed on the fire district to control these fires. If all factors were equal, the risk and need for additional fire protection services would be proportional to the increase. This is not the case, however, because the factors affecting risk differ by location and character of development.

In the case of the proposed Marian Meadows development, the addition of 443 residents adds about 30 percent to the number of potential sources of residential fires. The provision of water supply and fire hydrants with adequate fire flow will increase the potential for effective response to fire incidents, depending on the availability of adequate fire flow and the placement of hydrants. Additional water storage is essential for adequate fire flow north of I-90. Addition of adequate fire storage, if included as part of this development, would increase the effectiveness of fire control for all properties north of I-90 served by the Easton Water District's hydrants.

The modern construction codes the new buildings will comply with will result in a slightly lower fire risk than older buildings within the district. The proposed lot size and separation between buildings will add to the risk of fire spreading to adjacent buildings as compared to rural large lot development, but will be about the same or less than existing small lot development in the fire district, such as the Easton Village Subdivision southwest of the site.

The major factor in fire risk to property and persons within the proposed development is the ability of the fire district to respond to fires and suppress them.

The provision for fire detection in the proposal will be largely by residents or neighbors. Tenure options with larger components of seasonal residents may increase detection times depending on proximity of occupied homes as well as whether residents are home full time.

Dispatch by Kittcom, the county-wide 911 system, is comparable to most dispatch services.

The status of the Easton Fire District as an all-volunteer force has the potential to increase deployment of fire fighters to a scene. Such deployment depends on the presence of volunteers in proximity, the time required for them to get a call, time that may be required to safely cease the activities they are engaged in, report to the station, prepare equipment, leave the station and travel to the site. The response time also can be adversely affected by weather, including snow on the ground, impedance from traffic, and possible blockage from accidents on roads or the lack of access over essential facilities such as bridges.

The Marian Meadows site layout is provided with two public roadway accesses, but depends on Sparks Road as its only source of public road access to I-90 and the Easton townsite. If the access along Sparks Road is blocked, there is no access to the site. The most significant potential barrier is the bridge over Silver Creek. If that bridge is blocked, alternative access is available during summer through the Easton State Airport to Silver Creek Road, which has an additional bridge over Silver Creek. Access involving fording Silver Creek may be available in low flow periods by driving north on the Kachess Dam Road and down informal roads on the BPA transmission line easement. These routes would add considerable time and would be impassable over a substantial part of the year when snow would make them impassable. Additional access from Sparks Road farther to the east may be provided over a private parcel; however, this access provides no potential for alternative routes over Silver Creek as does the access from Country Road. On the site, the upper easterly portion of the site could be rendered impassable by snowstorms that could take several days for the roads to be cleared.

Fire response to the steep easterly portion of the site would be slower because of additional distance as well as the steep grade. Access also could be impeded by conflict with residents fleeing from the area. Intense fires could make the single access road unusable due to the proximity of heat and flames.

The distance of the single Easton Fire Station from the site is a potential factor in increasing response time when access is impeded by adverse conditions.

The ability of the volunteer fire fighters to respond in a timely and effective manner depends on the availability and training of personnel. The presence of additional residential units theoretically increases the potential pool of volunteers. Tenure scenarios with larger components of seasonal residents reduce the potential pool of volunteer fire fighters. Full-time residents who commute to work at a distance from the community also reduce the availability of personnel during work hours. Retired residents may be available and willing to participate in the volunteer force, but may have physical and endurance limitations on their effectiveness, depending on age. In addition, the increase in population and number of responses in the community may increase the number of responses to an extent that the existing force experiences burnout, or simple unwillingness to commit the time needed. All these factors make it difficult to predict the availability of an effective force of volunteer fires fighters to respond to the increased exposure of the development. It is a safe assumption, based on the large number of fire departments manned by volunteer fire fighters operating in the state and nationwide, that adequate volunteers will be recruited and maintained to provide some level of response. The probability of effective response is higher in evening hours when more residents are likely to be home.

Limits in the effectiveness of the volunteer fire force to respond will most likely be reflected in the manning levels of the initial and secondary response to incidents. It is likely that minimally manned equipment will be able to respond. If the number of persons responding is limited, the ability to effectively initiate and maintain operations may be limited. If inadequate personnel is available, suppression effectiveness is limited, the risk of fires spreading is increased, and the risk to fire-fighting personnel is increased. If personnel and equipment is limited, response can be requested from other fire forces in the vicinity. That response, however, would take additional time for deployment and travel.

The ability of the Easton Fire District to effectively respond is also currently limited by having only one modern fully equipped fire truck. The second truck, which is 15 years old, can be considered at risk of failure to provide adequate service, if adequate personnel are available to operate it.

Alternatives 1 and 2 provide the greatest potential exposure of fire risk and potential impacts requiring additional volunteer personnel, higher levels of training, and additional equipment. The steep easterly portion of the site provides an area of extreme wildfire hazard due to the location on a slope and the potential for wildfires to move more quickly uphill, heating fuels as it moves uphill and reinforcing the speed and heat as it moves. The potential for more than 200 units on this portion of the site places a large number of residents at risk. The site is at risk from wildfire initiated from human sources on the site (as are half of wildfires) and is also at risk from wildfires spreading from forest lands on the north, east, and south sides of the site. The single access provided to the steep easterly portion of the site also limits the ability to escape a fire without interfering with fire response vehicles and equipment trying to move up the same roadway to respond. A fire that started on the flat portion of the site and moved uphill could block or seriously impede escape or access on the road.

Alternative 2 would reduce the risk to persons and property from wildfire substantially by locating all development on the flat westerly portion of the site. The development of approximately 200 multi-family units on the site would substantially increase fire exposure due to the type of units and the lack of separation between units. Fire suppression in multi-family structures would require additional personnel, additional equipment, and additional training for the volunteer fire force.

Alternative 3 would reduce the total exposure to fire risk and resources required of the fire district, compared to Alternative 1, by reducing the number of units and increasing separation between units. Residences on the steep easterly portion of the site would have similar extreme exposure to risk from wildfire; however, the overall risk exposure would be less because of fewer lots, as well as larger lots with greater separation between buildings.

Alternative 4 would reduce the total exposure to fire risk and impacts to the fire district, compared to Alternative 1, by reducing the number of units. Residences on the steep easterly portion of the site would have similar extreme exposure to risk from wildfire; however, the overall risk exposure would be less because of fewer lots and the lack of lots on the higher slopes where escape and access would be most difficult.

Alternative 5 would reduce the total exposure to fire risk and impacts to fire protection resources, compared to Alternative 1, by reducing the number of units and eliminating residents from the extreme exposure to risk on the steep easterly portion of the site.

5 What are the likely cumulative impacts with development of nearby land at existing zoning densities and PUD densities?

Cumulative impacts of the project in the immediate vicinity (north of I-90 and served by Sparks Road) would result largely from the number of additional residents, lot sizes, type of development, and location.

At the current time about two-thirds of the lot sizes in the area are larger than 3 acres. Under the 3-acre minimum lot size, only lots greater than 6 acres were considered subdividable. This would result in about 320 lots in the area, in addition to the Marian Meadows proposal.

Alternatives 1 and 2, with 443 units with additional development at rural densities, would result in 773 cumulative lots or units in the project vicinity. Alternatives 3 and 5 with 147 units would result in 477 lots, and Alternative 4 with 195 lots would result in 525 lots in the project vicinity. In general, risk and resources needed for fire suppression would be less than the proposed PUD because of the lot size and terrain.

Most of the lots outside Marian Meadows would be on the flat valley floor and on 3-acre lots where separation between structures would be greater and help to reduce the risk and spread of fire. Wildfire hazard on the flat valley floor would be lower due to the absence of terrain features increasing wildfire spread and intensity, as well as easier access for fire suppression.

If the Alternatives 1 or 2 PUD approval were received and provided the precedent for similar development of other properties in the vicinity, subdivision of properties 2 acres or larger could lead to development of up to 546 lots (including 80 existing vacant lots).

Alternatives 1 and 2 with 443 units would result in 990 cumulative lots under PUD density, Alternatives 3 and 5 with 147 units would result in 690 lots, and Alternative 4 with 195 lots would result in 740 lots.

Most of the lots outside Marian Meadows would be on the flat valley floor and at an average of 1 acre would be smaller than the majority of lots in the Marian Meadows PUD alternatives. Distance between structures would be greater and reduce the risk and spread of fire. Wildfire hazard on the flat valley floor would be lower due to the absence of terrain features affecting wildfire spread and intensity, as well as easier access for fire suppression.

6 What measures could reduce or mitigate fire risks to persons and property and the impacts on fire protection facilities and services?

There are several areas in which fire risk and the impacts on fire protection facilities and services can be reduced as described below.

Avoidance of High Risk Areas

Avoidance of the high risk areas including the steep easterly portion of the site would reduce risk of both structural fires and wildfire. If development were avoided in this area, potential wildfires would affect only forest resource lands and not persons and property.

Provision of Access

Provision of more than one access to the westerly portion of the site in the event that Sparks Road was blocked or impeded would greatly increase the reliability of fire response. Two potential access options are available. One would be access from the south from I-90, Exit 71. This would involve a bridge over the Yakima River and connection to Hawthorn Lane, which is not currently maintained by the county. The second would be access from the north across either the public land at the Easton State Airport or the National Forest and connecting to Silver Creek Road which bridges Silver Creek. This access could be initiated at either Silver Ridge Ranch Road or from Kachess Dam Road. To be effective in the winter, snow would have to be cleared from these routes. Because the highest risk of structural fires spreading and the risk of wildfires are greatest in the summer, securing these routes for summer access would be beneficial. Provision of an additional access to the steep easterly portion of the site would substantially decrease the risk of residents being trapped in the area by a fire moving rapidly uphill. There is, however, little potential for access to the north from National Forest land or from the south from even more steeply sloping private land.

Provision of Facilities

In addition to volunteer personnel and training, fire fighting requires equipment and buildings to house that equipment. The addition of up to 443 additional residential units in the district would increase the total residential structures about 30 percent and justify providing a second modern fire apparatus. It may be advantageous to the district also to establish a second station on the north side of I-90. This is a decision that would have to be made by the district board. Advantages of an additional station may include proximity to the population served and may increase the recruitment of local volunteers. Response time from residents to a closer station also may be reduced. On the other hand, a single centrally located station provides the greatest potential for manning apparatus during times when the pool of available personnel is limited. A single station also provides the potential for locating all equipment in a single place and ensures flexibility in choice of appropriate equipment for a given response. A single station also reduces facility maintenance and utility costs. Co-location of equipment also may facilitate maintenance of equipment because all needed tools can be located at one place. If volunteer personnel are scattered or respond at different times, having shared personal equipment on trucks rather than in the station may decrease response time, although individually assigned properly fitted equipment is considered important for safe and effective fire fighting.

The project proponent could contribute to this impact by providing a site for a new building, if desired by the fire district, and contribute a proportional share of the cost of a new truck that would vary by alternative. The advantages of developer contributions over voter-approved levies for equipment is the uncertainty involved in residents passing the levies, as well as a perceived fairness that new development should provide for the costs they impose on the community. On the other hand, additional equipment benefits the entire service area.

Built-in Suppression Capabilities

Built-in suppression through automatic sprinkler systems provides a substantial decrease in risk for structural fires and reduces greatly the risk of fire spread. It is an especially useful strategy in areas served by volunteer fire departments where the response time and number of personnel available may be highly variable. To be effective, fire sprinklers must be appropriately designed, installed, and inspected. Fire sprinklers are a substantial additional cost for single-family homes and require considerably larger water pipelines and meters. In the cold climate that the project residents would experience, sprinklers would be either dry systems, which are much more expensive to install or operate, or buildings with wet systems that must be constantly heated in cold weather, or systems that must be drained and mothballed. Such systems are most effective in reducing risk in the summer months. Mothballing in the winter season would reduce effectiveness in avoiding structural fires but would not substantially increase risk because the hazard from fires spreading in cold wet months is lower. Built-in fire suppression systems are of limited effectiveness in reducing risk from wildfire.

Wildland Fire Defensible Space

A variety of programs have been developed to reduce the risk of wildfire igniting homes. These generally include providing effective access and an area around homes where fuel loads are reduced. This strategy often involves two areas. One is an area close to the home that has a “non-combustible area” of 3 to 10 feet wide around the base of the home with very low potential for ignition from flying embers such as lawn, ground cover, flowers, rock mulches, or hard surfaces. Another is an area of 30 to 50 feet with a small amount of flammable vegetation, including lawn or ornamental plants that are routinely irrigated to reduce ignition temperature. The outer zone generally includes an area where fuel loads are reduced through removal of dead vegetation, thinning of underbrush, and removal of “ladder fuels” by removing low tree branches and removing or pruning the shrubs under the tree. These measures are of variable effectiveness depending on the intensity of the fire. They can be very effective against a slow-moving surface fire. They are of variable effectiveness against a very hot rapidly moving fire in the crowns of trees, although in such cases, crown fires may quickly burn past residences with such measures (FireWise 2009).

Fire Prevention Programs

Public fire safety education has the potential to substantially reduce the loss of life and property due to fire. Although it is difficult to quantify the results of fire prevention because one cannot count the number of fires that did not occur, the fire protection industry believes that effective prevention and public fire safety education are likely to have a direct and substantial impact on reducing the demand on emergency response services.

3.4.3 Public Services - Police and Public Safety

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

The Kittitas County sheriff department provides primary law enforcement services to unincorporated areas of Kittitas County, an area of 2,400 square miles with a population of 16,510 (total county population is 38,300), including the project area. The cities of Cle Elum, Roslyn, Kittitas, and Ellensburg provide their own police service. The Kittitas County sheriff department is headquartered in Ellensburg, and is organized into patrol services, major crimes, civil warrant, special operations, traffic enforcement, U.S. Forest Service patrol, corrections services, narcotics abatement, administration, and records. Services within these divisions include traffic control, drug enforcement, search and rescue, domestic calls, K-9 unit, SWAT team, marine patrol, evacuation, and emergency disaster management. The sheriff department serves as first responder to emergencies and crime throughout the unincorporated county. The department currently employs 24 commissioned officers, 18 reserve officers, 19 corrections officers, and 60 to 100 volunteers for search and rescue operations. The recent voter-passed sales tax increase to support enhanced criminal justice is expected to enable the sheriff department to add five new deputies and one civil deputy (Dana 2008).

The sheriff department currently deploys deputies in two daily shifts in two patrol districts in the eastern and western county. The normal daily deployment is one officer per district on overlapping shifts plus one or more additional deputies on specific assignments or for backup. This deployment is enhanced on Fridays and weekends to cover greater weekend demand from recreational activities that draws seasonal residents and visitors. Reserve officers also enhance deployment levels. The sheriff department has maintained an office at the Easton School in the past. That office has recently been relocated to Bullfrog Road near the Suncadia Resort (Dana 2008).

Response time to calls currently average about 28 minutes. The sheriff's goal is to improve to a 20-minute response time with the addition of personnel. Backup to responses to violent crime in the Easton area is provided by the Washington State Patrol or officers from Cle Elum, as well as other sheriff deputies, depending on availability when a call is received (Dana 2008).

The breakdown in the type of calls for police service in the area is provided in Table 3-21.

Table 3-21. Police Incident Reports, Easton, January 2006 to June 2008

Incident Type	Number	Percent
Burglary	45	33
Theft	35	26
Motor Vehicle (excluding I-90)	25	19
Assault	18	13
Trespass	9	7
Sex Offence	3	2
Total	**135**	**100**

Review of individual reports indicates that most incidents are at residences or businesses. Relatively few are from Lake Easton State Park or campgrounds, indicating that full-time and seasonal residents rather than recreational visitors account for most of the incidents.

The Washington State Patrol (WSP) also serves the area by providing traffic law enforcement, collision investigation, and motorist assistance along the state and interstate highways. In the general vicinity of the project area, these highways include I-90. The WSP detachment office is located in Ellensburg. The District 6 headquarters office is located in Wenatchee, and provides service to a five-county area (referred to as District 6). In addition to highway patrol, the WSP provides drug enforcement, hazardous materials oversight, incident response, truck inspections, and aviation patrol (WSP 2008).

2 What mandates or standards for police service have been established?

The sheriff's office does not have a specific standard for deployment or response time. The sheriff would like to improve the current average response time of 28 minutes to 20 minutes (Dana 2008).

3 What risks are posed by the current level of police service to persons within the area?

Current staffing levels generally provide one sheriff deputy in the western part of the county as a base level with additional staffing on weekends and holidays. Backup to responses to violent crime is provided by the WSP or officers from Cle Elum, which contributes to the average response time to calls. The current average, about 28 minutes, reflects the fact that the deputy covers a large area and may be at some distance from the site of a call.

This level of service is generally not a problem for crimes against property. These crimes are generally discovered by residents after the occurrence. The function of the deputy on-call is to investigate and report. Any follow-up occurs later.

For violent crimes in progress, response time is critical. The dispatch of the closest available police personnel may result in response from a sheriff deputy or state patrol, depending on which is closer, or in some cases initial response may be by officers from Cle Elum. The goal is to improve to a 20-minute response time with the addition of personnel.

4 How will the proposal and alternatives affect police facilities and services?

The potential impacts of the proposal and alternatives must be assessed in relation to the total service area and population served by the Kittitas County sheriff department, particularly service in the eastern part of the county. The addition of up to 1,200 residents with Alterative 1 and all full-time residents would be an increase in populations served by the sheriff of about 8 percent. The proportion would be less with other tenure scenarios. This is also the peak population that could be expected on the site during a peak holiday period when the largest number of seasonal residents would be expected to be present. An increase of 8 percent in population could be presumed to increase demand by the same amount and justify an additional 1.7 commissioned officers. In terms of peak population of western Kittitas County during the peak recreational season, the presence of persons at Lake Easton State Park and at many recreational activities elsewhere in the area would make the increase in service population from the proposal and alternatives a relatively smaller increase.

A second characteristic of the local service area for public safety is the presence of I-90, which brings a large number of automobile and truck trips through the area. Although relatively few persons traveling on this highway stop in the community, this service population demands a substantial police response to accidents and other incidents on the roadway that increases demands on both the sheriff department and the state patrol.

In terms of the deployment of sheriff deputies in two daily shifts in two patrol districts in the eastern and western county, the increase in population and demand would be greater. In tenure scenarios with a large component of seasonal residents, the current practice of enhancing deployment on Fridays and weekends to cover greater weekend demand would respond to this pattern of increased weekend population from recreational activities.

Availability of personnel on a population basis is only one measure of demand for public safety service. The second is the demand for responses. It is probable that property crimes such as burglary and theft have some relationship to the number of housing units and population in the area, although the relationship has not been shown to directly correlate with population and likely reflects other social characteristics of the population. It is also probable that some components of property crimes in the area are from transient perpetrators that find opportunities in the area.

The ability of public safety personnel to respond to a larger population and additional demand depends on the availability of personnel and equipment. Public safety is funded from the county general fund and competes for funding with a variety of other programs. The resources available to the sheriff are a function not only of the tax resources available but also of budget priorities. To a certain extent, the additional tax revenues can be considered to be provided by additional residential development. It is unclear, however, that those resources are adequate to meet the demand for a variety of public services. It is also not predictable how a particular county will allocate those resources in a particular budget cycle.

In general, the additional population in the area will lead to additional demand for police response. That response will demand service from the available police officers from the sheriff department and other agencies such as the state patrol. A higher level of response will be reflected in more responses per shift, but may not affect the ability of the personnel to respond, unless a number of incidents overlap, or incidents involving a threat to persons requires a backup response, which would likely involve response from multiple agencies. The likely effect noticed by local residents would be less frequent presence of officers patrolling the area, or longer response time to calls. The likely effect on personnel would be busier shifts and a perception of greater risk to them from multiple calls.

5 What are the likely cumulative impacts on the level of police service with additional development?

For public safety, the area of potential cumulative impact includes the entire western Kittitas County patrol area. In addition to the potential for 300 to 500 additional residents in the immediate vicinity, the additional housing and recreational development in the area from multiple sources must be considered. Substantial development in the Cle Elum/Roslyn area includes the Suncadia Resort of about 4,000 units and multiple additional developments.

The additional units contributed by the Marian Meadows proposal will contribute to cumulative demands for public safety service and will contribute several percent to the total cumulative demand in the future.

The cumulative additional population in the area will lead to a much greater additional demand for police response. That cumulative demand will require additional personnel and equipment. The fiscal implications will be a budgetary challenge for the county. If provision of personnel to respond does not keep pace with the demand, local residents will notice a less frequent presence of officers patrolling the area, and longer response time to calls. The likely effect on personnel would be busier shifts, a perception of greater risk to them from multiple calls, and possible job-related burnout.

6 What measures could reduce or mitigate impacts of the proposal on police facilities and services and risks to persons and property within the area and the proposal?

There are limited measures that could be implemented by the project to address the project's contribution to cumulative demands on public safety services for personnel and equipment from cumulative growth in western Kittitas County. The response to additional population and demand includes provision of resources for additional personnel as well as related equipment or facilities to accommodate police response. Such equipment or facilities, however, would also serve existing population and other components of cumulative growth; therefore, a fair share contribution from the project would be required. The project's share of the increased demand would be close to 8 percent for the Alternative 1, Tenure 1 Scenario based on the existing population served, and would be less with other alternatives and tenure scenarios, as well as further reduced if cumulative growth were considered.

3.4.4 Public Services – Medical Response

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

Medical response to the area is provided on a two-tier basis. The initial response by EMTs is from the fire district. The second tier of response, if needed, is from Kittitas County Hospital District (Figure 3-22) from a station in Cle Elum. The district operates three ambulances with paramedics that offer advanced life support. Annual medical responses ranged between 81 and 88 from 2003 to 2007 (KITTCOM 2008). In addition to calls from the local community, accidents on I-90 unrelated to the existing population is a substantial portion of the calls for medical service.

The Kittitas Valley Community Hospital in Ellensburg is the area's trauma center. The hospital is equipped to serve up to level four trauma patients. Patients with severe injuries, such as head injuries, advanced burns, and trauma greater than level four are generally transported to the Harborview Medical Center in Seattle.

Fire District 3, the hospital district, and other public safety providers are served by a single county-wide 911 call center that processed approximately 31,000 dispatches in 2007 (KITTCOM 2008). Hospital District No. 2 dispatched assistance about 90 times to the Easton area in 2008 with about 40 of the dispatches related to I-90.

2 What mandates or standards for medical response service have been established?

The emergency medical response standard adopted in the Kittitas County Emergency Medical Services Standards for Fire District No. 3 is 20 minutes within a 5-mile radius of its station.

The standard for Hospital District No. 2 to respond to the Easton area, which is about 17 miles from the station, is 45 minutes or less (KCEMS 2006). According to the local Fire Chief, actual response times to the area north of I-90 are in the 8- to 12-minute range (McCaw 2008).

3 How will the proposal and alternatives affect medical response facilities and services?

All alternatives will create additional demand for emergency medical response based on the increase in population and the extent of special needs populations. The retired component of the population consisting of a larger proportion of persons over 65 are statistically more likely to suffer heart attacks, strokes, and other emergencies. The ability of the local fire district and Hospital District No. 2 to respond depends on resources available. The hospital district has a single response unit, which would require response from other resources such as local fire districts if equipment is utilized. The volunteer fire department is less assured of the ability to add personnel because it relies on volunteers. The challenge of getting enough volunteers would be increased with a greater proportion of residents commuting outside the area or being seasonal residents.

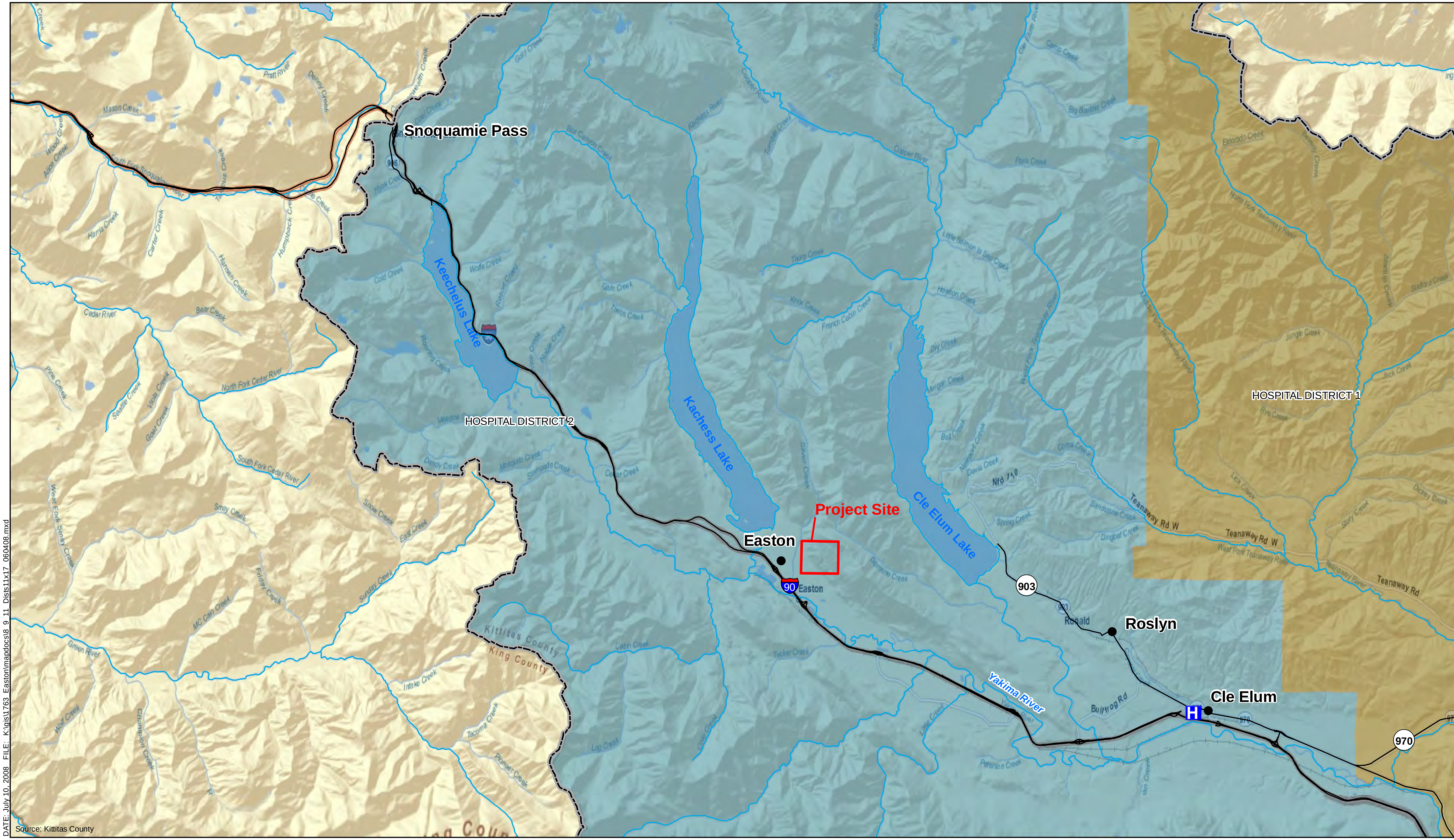
Hospital District No. 2 is likely to be able to respond by adding more equipment and personnel because it relies on paid staff. Additional development in the area is likely to add tax revenue that theoretically can offset additional costs. Hospital district assessments, however, must be established through voter approval (RCW 84.52.069) and assessments adequate to respond to demand are not assured.

4 What are the likely cumulative impacts on medical response facilities and services with development of nearby land at existing zoning densities or at densities similar to the proposal?

The additional development in the area could result in demands equivalent to an additional small town with additional needs for response also based on population characteristics.

The volunteer fire department's ability to respond to cumulative demand is largely dependent on the volunteer pool, which generally is increased by more population but may be reduced by a greater proportion of residents commuting outside the area or being seasonal residents. The long-term impacts on the fire district of fire and emergency medical response may be to encourage a transition to a core paid staff that can respond during working hours when volunteers are less likely to be available.

Hospital District No. 2 is likely to be able to respond to cumulative demand by adding more equipment and personnel because it relies on paid staff, provided that local assessments provide adequate resources, or voters approve additional assessments. Additional development in the area is likely to add enough tax revenue to offset additional costs. In addition, cumulative development in the Easton area is likely to be a relatively smaller component of the hospital district's demand compared to growth in the Cle Elum/Roslyn/Suncadia area.



Parametrix

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0 2.5

Scale in Miles

Hospital District

2

3

H Hospital

Figure 3-22
Marian Meadows
Hospital Districts

5 What measures could reduce or mitigate impacts of the proposal on medical response facilities and services and risks to persons and property within the area and the proposal?

Addition of personnel and equipment is the appropriate mitigation for additional demand for service. For the local fire district, additional equipment likely would require voter-approved levies. For the hospital district, a combination of regular levies and capital facility levies would likely be required to meet long-term demands. Project contribution to a share of equipment costs could be required. The total increase in population within the hospital district, assuming peak summer occupancy of seasonal units, would be about 18 percent of the estimated existing peak population of about 10,000. The percent of future population would be less with the projected population of Suncadia and other development. The relative demand on medical facilities, however, would be greater with tenure scenarios with a larger proportion of persons over 65 who are likely to require a higher proportion of emergency response.

3.4.5 Public Services - Mail Service

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

Mail service is provided to the area by the U.S. Postal Service (USPS) through the Easton Post Office. All residents in the area must pick up their mail at the post office. There is no rural delivery in the area of the project north of I-90. Rural delivery service is currently provided in areas farther south, generally those areas served by Exits 74, 78, Nelson Siding Road, and other roads served from those exits.

2 What mandates or standards for mail service have been established?

The USPS has a mandate from the U.S. Congress to provide mail service throughout the United States.

The character and LOS provided are dictated by standards adopted by the USPS, which generally are based on population density and other characteristics of the community. Four general levels of postal service are provided (USPS 2008):

- Local post office service such as provided in Easton, where residents pick up mail at the post office. The main criterion for such service is a small rural population in which the majority of residents are within reasonable distance of the post office.
- Rural delivery at roadside mailboxes, which is performed by contractors to the USPS. Mail is delivered to mailboxes at the edge of the roadway directly accessible to the vehicle without the operator leaving the vehicle. The criterion for this service is a rural population that is not within reasonable distance to pick up mail at the post office.
- Delivery to mail kiosks. This is the dominant method of mail delivery to new development within the United States and consists of designation of single mail delivery points at the street curb that

serves an area of about a standard residential block. These points are generally designated by the USPS at the time of development approval.

- Door-to-door mail delivery to individual building-mounted mailboxes is generally limited to cities and towns that had such service prior to 1980.

Changed conditions, such as a greater demand for mail service than can be provided by the local post office, can lead to a choice by the post office to expand the post office to provide more facilities for pickup, or provide rural delivery to areas previously not served (USPS 2008).

3 How will the proposal and alternatives affect mail facilities and services?

The existing post office in Easton has no capacity to add additional customer mailboxes. All residents of the new development would be required to receive their mail "general delivery," which means it would be sorted at the post office and handed over the counter to customers when they called for the mail. This likely would require additional manpower at the post office and likely would result in customer dissatisfaction due to waiting times at peak pickup times.

The likely impact of any of the alternatives would either be acquisition of a new post office with greatly expanded individual mailboxes, or rural delivery, or both.

4 What are the likely cumulative impacts on mail service with development of nearby land at existing zoning densities or at densities similar to the proposal?

The likely impact of any of the cumulative impact scenarios under any alternatives that would result in mail demand similar to a small town would either be acquisition of a new post office with greatly expanded individual mailboxes, or rural delivery, or both.

5 What measures could reduce or mitigate impacts of the proposal on mail facilities and services?

Acquisition of a new post office with greatly expanded individual mailboxes, or rural delivery, or both are the likely mitigating measures for increased demand for service.

3.5 UTILITIES

1 What utility services are addressed in this analysis?

This analysis addresses utility services commonly associated with residential use, or specifically proposed as part of the development including water, sewage disposal, stormwater, solid waste, electricity, communications, and cable television.

2 What policies and standards govern utility services?

Utilities are governed by a variety of governmental agencies at the federal, state, and local level as well as by the public and private utility providers.

In general, federal agencies regulate interstate utilities, which include:

- The interstate provision of communication services, which is regulated by the Federal Communications Commission (FCC).
- The interstate provision of electrical service, which is regulated by the Federal Energy Regulatory Commission (FERC).

At the state level, there are both regulations of private utilities and regulations of specific facilities:

- The Washington Transportation and Utilities Commission (WUTC) regulates all public utilities not provided by government bodies, including those that provide water service as well as electrical, telecommunications, and solid waste services.
- The Washington State Department of Health (DOH) regulates water systems through approval of facilities to meet health standards, and also shares regulatory responsibility with Washington State Department of Ecology (Ecology) for certain sewer systems and disposal of effluent.
- Ecology regulates water rights, which affects water utilities, and also regulates sewer system design and disposal of effluent.

Kittitas County has a Comprehensive Plan, in which various goals, policies, and objectives are outlined. It also regulates utilities through granting franchises for operations in specific portions of the county, and for placement of facilities within county rights-of-way.

The county has over 36 goals, policies, and objectives that relate to utilities. Those most relevant to this proposal are outlined below:

GPO 6.1 The County should promote the joint use of transportation rights-of-way and other utility corridors consistent with the underlying private property rights and easement limitations.

GPO 6.6 Expansion and improvement of utility systems should be recognized primarily as the responsibility of the utility providing the corresponding service.

GPO 6.13 The County should coordinate with utility providers.

GPO 6.18 Decisions made regarding utility facilities should be consistent with and complementary to regional demand, resources, and should reinforce an interconnected regional distribution network.

GPO 6.22 Kittitas County reserves the right to review the placement and appropriateness of utilities.

GPO 6.23 Kittitas County reserves the right to review all applications for utilities placed within or through the County for consistency with local policies, laws, custom, and culture.

GPO 6.28 It is the position of Kittitas County that it is inappropriate for utilities to over or under build other utilities. A specific example of such requirements may be found in RCW 35A.14.900 and other state law.

3.5.1 Utilities - Water

1 What water supply facilities and services are currently provided in the area?

All existing residences and businesses in the Easton area obtain domestic water supplies from wells. The predominant water service options available are:

- Public water systems provided by governmental entities. There is one entity in the area, Easton Water District No 3.
- Public water systems provided by private companies or associations. There are several systems in the area, such as the Sun Island water system that serves a subdivision north of I-90 and east of Exit 71.
- Private wells.

The Easton Water District No. 3 was formed in 1967 when local residents formed a special district to purchase the assets of the private company providing service to the area. In 1971, the district purchased the assets of a private company, Easton Silver Springs Inc., including the existing wells, a water withdrawal from Silver Creek, and the distribution system, which has been abandoned. This purchase included the water system and water rights that served Northern Pacific Railroad facilities in Easton.

The Easton Water District No. 3 boundary is shown in Figure 3-23. The system currently serves 188 customers in the original town of Easton and an area on the south side of I-90 extending along Railroad Avenue to the east and Cabin Creek Road to the west. Service on the north side of I-90 includes portions of Hawthorn Lane, Sparks Road north to the commercial area, Silver Springs RV Park and east on Sparks Road, as well as the subdivisions of Easton Village and Silver Creek (Easton 2004; DOH 2008).

The system's water source is three wells, one on the south side of I-90 and two on the north side. The system has a single 100,000-gallon storage tank on the south side of I-90. The system has fire hydrants throughout and delivers 1,000 gpm of fire flow (Easton 2004). The system was completely rebuilt in the 1990s with financing from a Federal Farm Administration loan and grants. The recently instituted rates are based on metered water quantity use (Hill 2008). Withdrawals from the three Easton Water District No. 3 wells are authorized by groundwater rights allowing a total withdrawal of 145 gpm and 137.2 ac-ft per year. These are classified as municipal water rights and were recently evaluated and verified by Ecology's Central Regional Office, in conjunction with a decision by the Kittitas County Water

Conservancy Board (Ecology 2003). The system has an application for additional water rights of 112 ac-ft that has been pending since 1990. The system water use in 2008 was about 71 ac-ft.

According to the District's Small Water System Plan (EWD 2004), which was approved by the DOH in 2005, storage is the principal factor that limits the existing system capacity to 542 connections. The water system currently serves 188 connections. Average residential water usage was 168 gallons per day (gpd) per equivalent residential units (ERUs) (or 0.19 ac-ft per year per ERU), and average non-residential usage was 430 gpd per ERU in 2001. The system plan does not, however, explicitly address the differing water demands for full-time and seasonal residents.

Water meters were recently installed in the system and several years of data are currently available. Use was analyzed by amount used by service and by seasonal patterns. This analysis indicates that:

- The average daily consumption per hookup is 572 gpd. Peak season (summer) average use for all hookups is 941 gpd and low use season (winter) average use is 389 gpd.
- A few large users including the school and commercial uses account for about 57 percent of the annual use. Average daily use by these large users is 4,360 gpd. Peak season (summer) use is 6,871 gpd and low use season (winter) use is 3,131 gpd.
- Median level users are about half of the residential users and account for 36 percent of the water consumption. These are interpreted to be primarily full-time residents. Average daily use for the entire year is 570 gpd. Peak summer use is 960 gpd. Substantially higher summer use indicates that a substantial component of summer water use is for irrigation.
- Low users are about half of the residential users and account for about 7 percent of the annual use. These are interpreted to be primarily part-time seasonalresidents. In deriving average daily use, the users that had only a few readings per year were excluded, which resulted in an average daily use of 135 gpd. Peak season (summer) use for this group is 187 gpd and low use season (winter) use is 106 gpd.This value is consistent with other analysis methodologies used in this study that presume seasonal residences occupancy is equivalent to about a quarter of a full-time household.

Based on the 350-gpd standards provided in the DOH Water System Design Manual (DOH 2001), the capacity would be 355 residential connections. Based on the system current average use of 572 gpd, the capacity of the system would be about 217 hookups. Based on the average seasonal residential use of 135 gpd, if all new users were seasonal, the capacity of the system would be about 632 hookups. This variability highlights the importance of the proportion of full-time and seasonal residential usage as well as commercial uses as a critical factor in determining future system capacity.

There are numerous water systems operated by homeowner associations that serve subdivisions in the area. These range from the Sun Island subdivision (115 connections), six separate water systems serving the Lake Easton Estates subdivision at the far north end of Sparks Road (35 total connections), the Shoop Short Plat water system near the east end of Sparks Road (7 connections), to very small systems such as the McKenna water system serving two lots on Kachess Lake Road. These systems do not provide fire hydrants and fire flow.

Systems serving individual businesses include the Turtle Town RV Park.

Private wells serve a variety of larger lots in the area including the homes in the southerly portion of Hawthorn Lane south of the project site. The Silver Trail Acres subdivision on the north side of I-90 is largely served by private wells as are the Easton small ranches on the south side of I-90.

2 What mandates or standards for water supply service have been established?

The United States Environmental Protection Agency provides standards for drinking water quality that apply to public water systems through the National Drinking Water Regulations, which are administered in Washington State by DOH.

Water systems are primarily regulated by DOH through planning and engineering standards. In general, water systems are required to:

- Provide water that meets health standards;
- Provide water within their identified service area; and
- Meet standards for system capacity and reliability, including facilities as well as operational, technical, managerial, and financial capability.

Regulation of water systems with up to nine connections and some commercial systems are reviewed and approved by the local health department.

Kittitas County Comprehensive Plan policies specific to water systems include:

GPO 5.110 Public facilities outside of urban growth areas or urban growth nodes. New municipal urban public facilities (central sewage collection and treatment, public water systems, urban street infrastructure, and stormwater collection facilities) will not be extended beyond urban growth area and urban growth node boundaries for residential development. Water service, public or private, may be provided beyond urban growth area or urban growth node boundaries. This policy does not apply to stormwater drainage.

Kittitas County has adopted a level of service standard for Water District No. 3 of 320 gallons per capita per day in accordance with GPO 5.12 Standards for Levels of Service.

3 How will the proposal and alternatives affect the provision of water service, including provision to existing users and to potential future development within the water service area?

Alternatives 1 and 2 water demand is indicated under multiple tenure scenarios in Table 3-22. The tenure alternatives with a higher proportion of full-time residences (workforce and retired) have substantially higher water demand. All the tenure options exceed the current Easton Water District water rights of 137.2 ac-ft per year with existing use of 71 ac-ft resulting in up to 61 additional ac-ft per year for new hookups. If the pending water-rights application for an additional 112 ac-ft per year were approved, the resulting rights of 252 ac-ft per year would result in 178 ac-ft available for new hookups. This capacity would not be adequate for any options except Tenure Scenario 4 with 50 percent seasonal residents. Table 3-22 does not make provision for lower water demand that can be expected for multi-family use included in Alternative 2. If multi-family units demand were half that of full-time single-family residences, the resulting demand would be 204 ac-ft per year.

Table 3-22 Projected Water Use, Alternatives 1 and 2 – 443 Units

Use Category	Number of Units	Average Daily Demand per Service (gpd)	Total Annual (acre feet)	Low Season Daily Demand (gpd)	High Season Daily Demand (gpd)
Average Daily Method (includes all users)	**443**	**572**	**283.65**		
Tenure Scenario 1: All Full-Time Residential					
Median use service Workforce 85%; Retired 15%	443	560	**277.97**	157,445	431,955
Tenure Scenario 2: Primarily Workforce					
Median use service	332	560	208.48	118,084	323,966
Workforce 60%; Retired 15%					
Low use service	111	135	16.75	11,764	20,725
Seasonal residential 25%					
TOTAL Scenario 2			**225.23**		
Tenure Scenario 3:					
Near Balanced	288	560	180.68	102,339	280,770
Full time 35%; Retired 30%					
Low use service	155	135	23.46	16,470	29,015
Seasonal residential 35%					
TOTAL Scenario 3			**204.14**		
Tenure Scenario 4:					
Median use service	222	560	138.99	78,722	215,977
Full time 25%; Retired 25%					
Low use service	222	135	33.51	23,528	41,450
Seasonal residential 50%					
TOTAL Scenario 4			**172.50**		

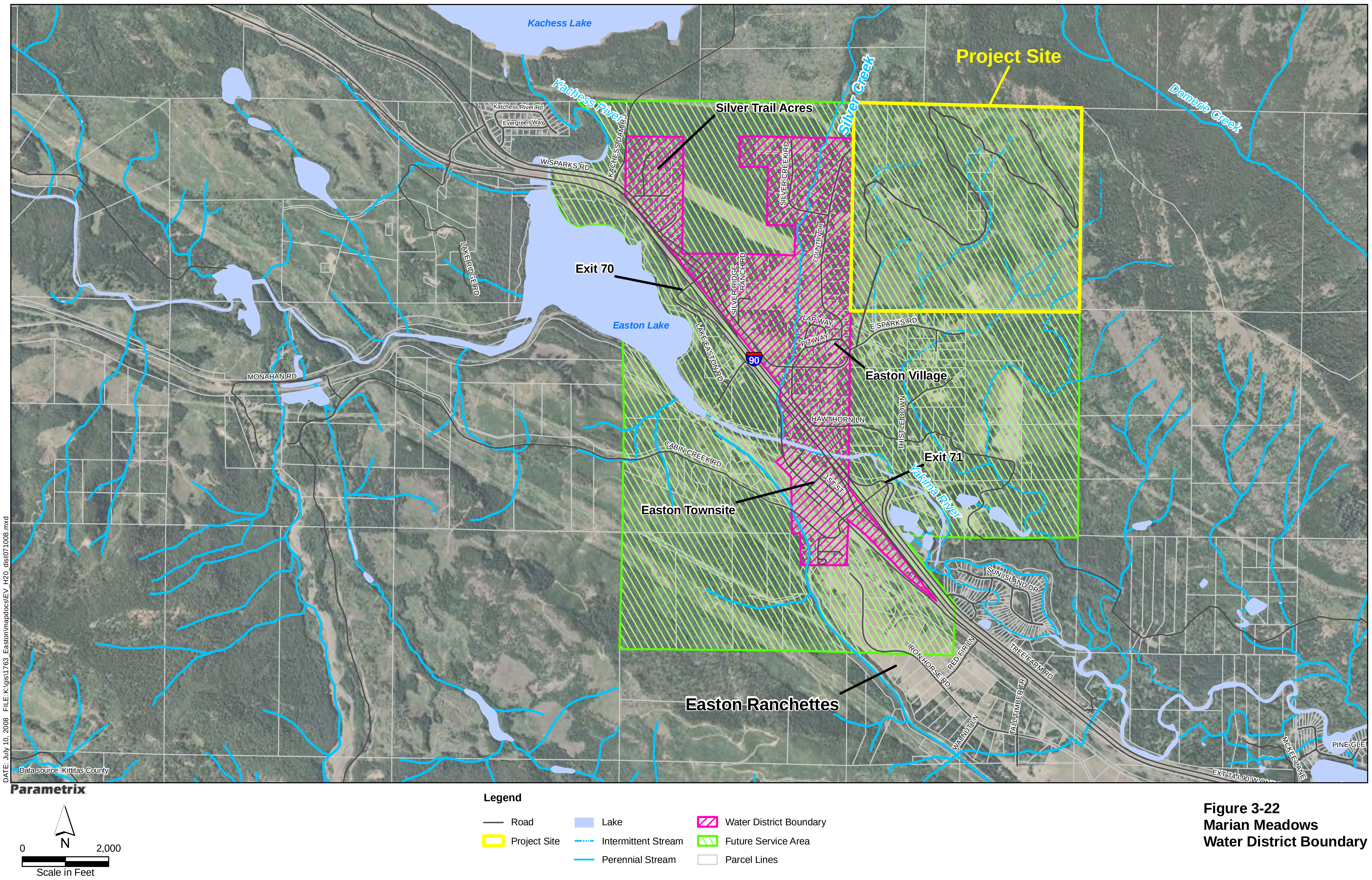


Figure 3-22
Marian Meadows
Water District Boundary

Alternatives 3 and 5 water demand is indicated under multiple tenure scenarios in Table 3-23. The demands are proportionally lower than Alternatives 1 and 2. Tenure Scenarios 3 and 4 with seasonal residents totaling 35 percent and 50 percent, respectively, are within the 61 additional ac-ft per year available for new hookups according to the existing Easton Water District water rights. If the pending water rights application for an additional 112 ac-ft per year were approved, all tenure scenarios would be adequately served by the 178 ac-ft available for new hookups.

Alternative 4 water demand is indicated under multiple tenure scenarios in Table 3-24. None of the tenure scenario demands are within the 61 additional ac-ft per year available for new hookups according to the existing Easton Water District water rights. If the pending water-rights application for an additional 112 ac-ft per year were approved, all tenure options would be adequately served by the 178 ac-ft available for new hookups

Table 3-23. Projected Water Use, Alternatives 3 and 5 – 147 Units

Use Category	Number of Units	Average Daily Demand per Service (gpd)	Total Annual (acre feet)	Low Season Daily Demand (gpd)	High Season Daily Demand (gpd)
Average Daily Method (includes all users)	**147**	**572**	**94.12**		
Tenure Scenario 1: All Full-Time Residential					
Median use service Workforce 85%; Retired 15%	147	560	**93.87**	**51,433**	**141,147**
Tenure Scenario 2: Primarily Workforce					
Median use service	110	560	70.40	38,575	105,860
Workforce 60%; Retired 15%					
Low use service	37	135	5.56	3,904	6,877
Seasonal residential 25%					
TOTAL Scenario 2			**75.96**		
Tenure Scenario 3:					
Near Balanced	96	560	61.02	33,432	91,745
Full time 35%; Retired 30%					
Low use service	57	135	7.78	5,465	9,628
Seasonal residential 35%					
TOTAL Scenario 3			**68.80**		
Tenure Scenario 4:					
Median use service	74	560	46.94	25,717	70,573
Full time 25%; Retired 25%					
Low use service	74	135	11.12	7,807	13,754
Seasonal residential 50 %					
TOTAL Scenario 4			**58.05**		

One consequence of the alternatives is the use of much of the existing capacity of the water system. If more water is used by the Marian Meadows development, less is available for other users.

One of the potential effects of use of the water district capacity is the use of individual wells by future development. Any lot over 1 acre in size with on-site sewage disposal can use an individual well for water supply. A water-rights certificate from Ecology is not required to be obtained prior to drilling a well. These individual wells are theoretically subject to state water-rights laws and theoretically could be required to reduce or cease their use of water if senior water rights were adversely affected.

Table 3-24. Projected Water Use, Alternative 4 – 195 Units

Use Category	Number of Units	Average Daily Demand per Service (gpd)	Total Annual (acre feet)	Low Season Daily Demand (gpd)	High Season Daily Demand (gpd)
Average Daily Method (includes all users)	**195**	**572**	**124.86**		
Tenure Scenario 1: All Full Time Residential					
Median use service Workforce 85 % Retired 15%	195	570	**124.52**	68,228	187,236
Tenure Scenario 2: Primarily Workforce					
Median use service	146	570	93.39	51,171	140,427
Workforce 60 % Retired 15%					
Low use service	49	135	7.38	5,178	9,123
Seasonal residential 25 %					
TOTAL Scenario 2			**100.77**		
Tenure Scenario 3:					
Near Balanced	127	570	80.94	44,348	121,703
Full time 35% Retired 30%					
Low use service	68	135	10.33	7,250	12,772
Seasonal residential 35 %					
TOTAL Scenario 3			**91.26**		
Tenure Scenario 4:					
Median use service	98	570	62.26	34,114	93,618
Full time 25 % Retired 25%					
Low use service	98	135	14.75	10,357	18,246
Seasonal residential 50 %					
TOTAL Scenario 4			**77.01**		

Enforcement of the precedence of senior water-rights against a large number of individual domestic wells is extremely problematic and has not been done to-date in Washington State. One of the disadvantages of individual well water supplies is that water supply for hydrants and fire flow is not provided. In addition, the systems are not monitored for water quality and reliability of service. In this case, an adverse unintended consequence of state water-rights, as applied to the Easton Water District, with the demands of the Marian Meadows development may be the development of water supplies for new development in the area that serves the public less effectively than the expansion of the water district system.

4 What are the likely cumulative impacts on water supply facilities and services with development of nearby land at existing zoning densities?

Cumulative impacts of the project in the immediate vicinity (north of I-90 and served by Sparks Road) under the existing 3-acre minimum lot size were analyzed based on the potential increase in development based on lot sizes according to Kittitas County Assessor's records.

At the current time, about two-thirds of the lots in the area are larger than 3 acres. Under the 3-acre minimum lot size, only lots greater than 6 acres were considered subdividable. The Easton State Airport was excluded. Division of those lots would result in creation of an additional 130 lots. In addition, there are about 80 existing vacant parcels in the area that could be developed with single-family residences with submittal of building and septic tank applications. There are about 120 existing residences. The total would result in up to 330 lots outside the Marian Meadows development.

Alternatives 1 and 2 with 443 units would result in 773 cumulative lots or units in the project vicinity.

Alternatives 3 and 5 with 147 units would result in 477 lots in the project vicinity.

Alternative 4 with 195 lots would result in 525 lots in the project vicinity.

Table 3-25 indicates the average daily demand on an annual basis of these alternatives, based on tenure scenarios.

All cumulative scenarios are in excess of the water district's existing water rights and additional applications pending. This would substantially increase the likelihood of use of water sources other than the water district such as individual wells. This would impose difficulties in managing surface and water rights to recognize senior rights and provide in-stream flows. If service is provided by individual wells, fire flow would not be required.

5 What are the likely cumulative impacts on water supply facilities and services with development of nearby land at densities similar to the proposal?

If the Alternative 1 or 2 PUD approval were received for this property, it could provide the precedent for similar development of other properties in the vicinity. This would allow subdivision of properties 2 acres or larger. If properties not currently subdivided were developed at the same intensity as the proposal, an additional 546 lots could be developed (this includes 80 existing vacant lots).

Alternatives 1 and 2 with 443 units would result in about 990 cumulative lots or units in the project vicinity.

Table 3-25. Cumulative Water Use, Rural Development, in Project Vicinity

Use Category	Average Daily Demand per Service (gpd)	Alternatives 1 and 2 443 units	Alternatives 3 and 5 147 units	Alternative 4 195 units
Number of Units	572	773	477	525
Tenure Scenario 1: All Full-Time Residential				
Median use service Workforce 85%; Retired 15%	560	**493.62**	**304.60**	**335.25**
Tenure Scenario 2: Primarily Workforce				
Median use service Workforce 60%; Retired 15%	560	370.21	228.45	251.44
Low use service Seasonal residential 25%	135	29.24	18.04	19.86
TOTAL Scenario 2		**399.45**	**246.49**	**271.29**
Tenure Scenario 3:				
Near Balanced Full time 35%; Retired 30%	560	320.85	197.99	217.91
Low use service Seasonal residential 35%	135	40.93	25.26	27.80
TOTAL Scenario 3		**361.78**	**223.25**	**245.71**
Tenure Scenario 4:				
Median use service Full time 25%; Retired 25%	560	246.81	152.30	167.63
Low use service Seasonal residential 50%	135	58.47	36.08	39.71
TOTAL Scenario 4		**370.21**	**188.38**	**207.34**

Alternatives 3 and 5 with 147 units would result in about 690 lots in the project vicinity.

Alternative 4 with 195 lots would result in about 740 lots in the project vicinity.

Table 3-26 indicates the cumulative water use for PUD development in the project vicinity based on the tenure scenarios.

All scenarios result in water demand in excess of the water district's existing water rights and additional applications pending. This would substantially increase the likelihood of use of water sources other than the water district such as individual wells. This would impose difficulties in managing surface and water rights to recognize senior rights and provide in-stream flows. If service is provided by individual wells, fire flow would not be required.

Table 3-26. Cumulative Water Use, PUD Density Development in Project Vicinity

Use Category	Average Daily Demand per Service (gpd)	Alternatives 1 & 2 443 units	Alternatives 3 & 5 147 units	Alterative 4 195 units
Number of Units		989	690	740
Tenure Scenario 1: All Full Time Residential				
Median use service Workforce 85 % Retired 15%	560	**632.19**	**441.25**	**472.54**
Tenure Scenario 2: Primarily Workforce				
Median use service Workforce 60 % Retired 15%	560	474.14	330.94	354.41
Low use service Seasonal residential 25 %	135	37.44	26.13	27.99
TOTAL Scenario 2		**511.58**	**357.08**	**382.40**
Tenure Scenario 3:				
Near Balanced Full time 35% Retired 30%	560	410.92	286.82	307.15
Low use service Seasonal residential 35 %	135	52.42	36.59	39.18
TOTAL Scenario 3		**463.34**	**323.40**	**346.34**
Tenure Scenario 4:				
Median use service Full time 25 % Retired 25%	560	316.09 74.88	220.63	236.27
Low use service Seasonal residential 50 %	135		52.27	55.97
TOTAL Scenario 4		**474.14**	**272.90**	**292.25**

6 What measures could reduce or mitigate impacts of the proposal on water supply facilities and services?

The alternatives with fewer units reduce demand on water supply.

A number of programs will tend to reduce water demand:

- The installation of water meters and a rate system based on consumption is the most effective means to reduce water use through greater charges for larger consumption. A system that charges a lower rate for an initial allowance and a higher rate for additional use provides additional incentive to conserve for large water users. The Easton Water District has charged rates based on metered use for a relatively short period. Additional experience of the relationship between use and cost may provide incentive in the future for users to conserve water. Higher charges also would tend to reduce use.

- Education programs in conjunction with metered water use provide customers with tools to reduce water use in conjunction with the incentive provided by rates.
- Metered use and regular monitoring of the system aids in detecting leaks, which aids in water conservation.
- Reduction in summer peak use can be encouraged by plantings of drought-tolerant landscaping, which also can be encouraged by the rate structure.
- Irrigation with non-potable water such as recycled water from a wastewater treatment facility meeting appropriate standards can reduce the use of domestic water for that purpose. Use of greywater from a separated system also is a potential source for subsurface irrigation. Under Washington State DOH standards, greywater may be used for subsurface irrigation of trees, shrubs, flowers, lawns, and other ground covers, but may not be used for watering of food crops, vegetable gardens, or any type of surface or spray irrigation.
- Fixtures that reduce water consumption can be required on new construction and encouraged on existing structures.

The extent of reduction that can be achieved through water conservation programs varies considerably among communities. Generally, there is a strong correlation between utility provisions of resources, including education and incentives, and the effectiveness of a program (AWE 2009).

3.5.2 Utilities - Sewage Disposal

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

The project vicinity is currently served by on-site sewage disposal systems. These are systems that convey, store, treat, or dispose of sewage on the property where it originates or on adjacent or nearby property. The systems typically consist of:

- A septic tank, which receives the sewage and provides separation of settleable and floating solids from the liquid for some biological digestion of organic matter, prior to discharge of the liquid portion into a drainfield.
- A drainfield that is designed so that effluent is absorbed into the surrounding soil where additional treatment is provided through microorganisms in the soil.

How do microorganisms help provide sewage treatment?

Microorganisms are bacteria in the soil that helps treat sewage by "digesting" and breaking down the organic components.

What makes a soil permeable?

The ability for water and air to move through the natural spaces or pores within soil determines if the soil is permeable. If water can flow through the soil quite easily, the soil is highly permeable. Coarse soils typically have large connected pore spaces and high permeability. Fine soils, such as clay, typically have less space within the soil. .

On-site sewage disposal is practical only when:

- There is a satisfactory location for a primary and reserve sewage system on the site at an appropriate slope and with clearance from structures, watercourses, wells, and other restrictions, such as adjoining property.
- There is sufficient undisturbed native soil of suitable texture, structure, permeability, and depth to provide satisfactory treatment and disposal.
- There is adequate separation from the bottom of a drainfield trench to the seasonal high groundwater table to provide sufficient treatment in the soil before the effluent reaches groundwater.

The major limitation for suitability of an on-site system is the character of the soil. Many soils in mountainous areas are not deep enough, are not permeable enough, or are too permeable, or have restrictive layers, or have high groundwater tables. The soils deposited in the flat valley bottom in the Easton area are generally too permeable to permit standard drainfield systems. Most systems in the area use “sand-lined trenches” to provide a layer of soil that provides for adequate retention time for treatment (Gilbert 2008). A sand-lined trench is a combined treatment component and soil dispersal component. Proper function requires that influent to the sand filter be distributed over the media in controlled, uniform doses. In order to achieve accurate dosing, these systems require timed dosing with associated pump systems. The effluent is absorbed into the native soil at the bottom of the sand-lined trenches, which accomplishes dispersal into the subsoil environment and further treatment (DOH 2007).

Soils on sloping hillsides are often too shallow to provide adequate biological treatment, or have restrictive layers that prevent water from moving through them or cause effluent to surface downhill from the system. In these cases, large generators of effluent, such as the Easton School or commercial uses, typically utilize larger on-site systems with large multi-compartment septic tanks and drainfield systems that more evenly distribute effluent to the soils. In some cases, they are required to use more advanced systems such as sand filters.

2 What mandates or standards for sewage disposal service have been established?

The GMA contains several specific mandates for sewage disposal, including the following:

RCW 36.70A.030(16). "Rural governmental services" or "rural services" include those public services and public facilities historically and typically delivered at an intensity usually found in rural areas, and may include domestic water systems, fire and police protection services, transportation and public transit services, and other public utilities associated with rural development and normally not associated with urban areas. Rural services do not include storm or **sanitary sewers**, except as otherwise authorized by RCW 36.70A.030(19) "Urban governmental services" or "urban services" include those public services and public facilities at an intensity historically and typically provided in cities, specifically including storm and **sanitary sewer systems**, domestic water systems, street cleaning services, fire and police protection services, public transit services, and other public utilities associated with urban areas and normally not associated with rural areas.

RCW 36.70A.110(4). In general, cities are the units of local government most appropriate to provide urban governmental services. In general, it is not appropriate that urban governmental services be extended to or expanded in rural areas except in those limited circumstances shown to be necessary to protect basic public health and safety and the environment, and when such services are financially supportable at rural densities and do not permit urban development.

Kittitas County Comprehensive Plan policies specific to sewer systems include:

GPO 5.110 Public facilities outside of urban growth areas or urban growth nodes. New municipal urban public facilities (central sewage collection and treatment, public water systems, urban street infrastructure, and stormwater collection facilities) will not be extended beyond urban growth area and urban growth node boundaries for residential development. Water service, public or private, may be provided beyond urban growth area or urban growth node boundaries. This policy does not apply to stormwater drainage.

Standards for on-site sewage disposal have been developed by the DOH and are contained in WAC 246-272A.

The local health officer has authority and approval over:

(a) Systems with design flows through any common point up to 3,500 gpd.

(b) Any large on-site sewage system for which jurisdiction has been transferred by the department to a local health jurisdiction by contract. Counties with such agreements currently include Clallam, King, Kitsap, Thurston, and San Juan.

DOH (Large On-Site Program per Chapter 246-272B WAC) has authority and approval over:

(a) Sewage systems with design flows through any common point between 3,500 to 14,500 gpd.

(b) Any large on-site sewage system for which jurisdiction has been transferred to the DOH under conditions of memorandum of agreement with Ecology.

Ecology has authority and approval over:

(a) Domestic or industrial wastewater under Chapter 173-240 WAC.

(b) Sewage systems using mechanical treatment, or lagoons, with ultimate design flows above 3,500 gpd.

(c) Sewage systems with subsurface disposal with ultimate design flows above 14,500 gpd.

(d) Any system utilizing subsurface disposal which has received a federal or state construction grant administered by Ecology.

Regardless of what agency reviews and approves sewage disposal systems, regulations provide for:

- Protection of public health from disease that may be contracted in waste products, including protection of water supplies.
- Protection of surface and groundwater to prevent pollution.
- Assurance that the system is adequately designed and installed to function properly.

The major regulations that govern sewage disposal include:

WAC 173-240. Submission of plans and reports for construction of wastewater facilities outlines the requirements for the submittal of planning, design, and construction documents for both domestic and industrial wastewater collection and treatment systems. Prior to the construction or modification of wastewater facilities, an engineering report and plans and specifications for the project must be prepared under the supervision of a professional engineer and approved by Ecology. It also includes requirements for the general sewer plan, construction quality assurance plan, and operation and maintenance manual, as well as for a certified operator and public ownership of the facilities.

WAC 246-272A. On-site sewage disposal regulations are designed to protect the public health by minimizing the potential for public exposure to sewage from on-site sewage systems and by minimizing adverse effects to public health that discharges from on-site sewage systems may have on ground and surface water. The state guidance accomplishes this through regulating the location, design, installation, operation, maintenance, and monitoring of on-site sewage systems to achieve effective long-term sewage treatment and effluent dispersal, including limiting the discharge of contaminants to waters of the state.

WAC 246-272B-00101. Address large on-site sewage systems, provide similar regulations for large systems, and recognize the special design and engineering needs of those systems and the higher level of operation, maintenance, and monitoring required.

WAC 246-272B. Regulations about on-site sewage system additives. This guidance establishes the review, criteria, and decision-making procedures for evaluating on-site sewage disposal system additives to determine whether individual additives have an adverse effect on public health or water quality.

WAC 173-221. Discharge standards and effluent limitations for domestic wastewater facilities establish surface water discharge standards which represent “all known, available, and reasonable methods of prevention, control, and treatment” (AKART) for domestic wastewater treatment facilities, as required by Chapter 90.48 RCW. These are often referred to as technology-based standards. The chapter also provides for alternative discharge standards in some situations where specific criteria have been met.

WAC 173-220 WAC. National Pollutant Discharge Elimination System Permit Program establishes the state permit program for implementation of the NPDES Permit Program created by the federal Clean Water Act. The program requires a discharge permit for any point source discharge of pollutants to surface waters of the state. Permits are issued on a 5-year cycle and address discharge limits, monitoring schedule, and general and special conditions. This chapter also includes the requirements for permit applications and renewal and for public notice.

WAC 173-216 WAC. State Waste Discharge Permit Program establishes the state permit program for the discharge of pollutants to groundwaters of the state and to municipal sewerage systems. The use of reclaimed water is also permitted under the State Waste Discharge Permit Program. The program excludes domestic wastewater discharges from septic tank/drainfield systems with a design capacity not exceeding 14,500 gpd, as well as mechanical treatment and lagoon systems with a design capacity not exceeding 3,500 gpd. DOH regulates these systems under Chapter 248-96 WAC.

3 What sewage disposal facilities are included in the proposal and alternatives and what operational risks do they pose?

Alternative 1, the Applicant's PUD Proposal with up to 443 units is proposed to be served by a tertiary treatment plant designed to produce Class A, reclaimed water.

Impacts related to the proposal include:

- Cost and feasibility of routine operation;
- Cost and feasibility of long-term maintenance and reconstruction and replacement; and
- Reliability and the risk of failure, which relates to the operational issues.

In order to understand potential impacts, it is useful to understand the basic proposed treatment technology. The proposed wastewater treatment facility consists of an SBR "package plant" with additional elements to meet the proposed effluent standard of Class A, reclaimed water. This type of wastewater treatment process involves an equalization/chlorine contact tank and a tertiary filtration system.

What is Aerobic Treatment?

In all aerobic biological wastewater treatment systems, the basic principle is that treatment occurs by growing a culture of bacteria and other microorganisms that utilize BOD and TSS as a food source. Oxygen is required and is provided by mechanical systems using blowers and diffusers. This part of the process, called aeration, also serves to mix the contents of the tank to make sure contaminants in the wastewater come in contact with the biomass. The majority of the food is converted to carbon dioxide and water to produce energy for the microorganisms. The rest of the food is converted to new biomass.

Sequencing Batch Reactor Package Plant

An SBR is a common type of extended aeration biological treatment process that removes organic matter and suspended solids from the wastewater. An SBR performs the major functions of a biological system in a timed sequence using one tank. These major functions are aeration/mixing, clarification/settling, and decanting of clarified effluent. The objective of the biological treatment system is to reduce the biological oxygen demand (BOD) and total suspended solids (TSS) to low levels to protect the oxygen resources of the receiving water.

How the Treatment Plant Functions:

Headworks

The proposed headworks for this project consist of a grinder and a flume for measuring the system flow rate. This system will be located below grade in a vault. This process of in-line grinder is sometimes referred to as a macerator or comminutor that reduces the upfront capital costs.

<u>Risks of Failure:</u>

- Grinders are high-wear items and need frequent inspection and adjustment. They can also be subject to plugging.
- If the grinder is out of service, the plant will be shutdown unless bypass or provisions for storage of wastewater are provided. Bypassing will subject downstream processes to larger solids and risk of failure of downstream processes.
- Increased risk of downstream problems may occur including clogging, equipment wear, and scum formation.
- Ground-up plastics and other debris may adversely affect the quality of biosolids, thereby complicating disposal of these solids.
- Equipment in underground vaults may be less likely to be properly maintained.

The incorporation of a grinder increases the need for regular oversight and maintenance and for having operational staff on-call in case this critical element of the process experiences a breakdown.

<u>Options to Reduce Risk</u>

- Include an influent pump station so the headworks can be above grade to facilitate maintenance.
- Provide two grinder facilities to be operated alternatively to provide greater reliability in case of failure.
- Provide a vortex grit removal system rather than the proposed system of letting grit settle with the biosolids in the SBR.
- Utilize alternative technology consisting of screening and grit removal to continuously remove, wash, and dewater the collected debris. Effective screening also reduces the formation of scum, which greatly reduces the risks of downstream operation problems and increases the life of equipment.

Risks of Failure

- The SBR is a proven technology that with proper design, sizing, and operation should produce a high quality secondary effluent. However, this process relies on solids settleability. Settleability depends on many variables and must be monitored closely. Process upsets resulting in poor settleability will affect the effluent quality.
- Influent variability may affect the ability of the biological processes to function. During off-peak times, or during initial startup, there may not be sufficient loading to maintain the biological system. If a sudden increase occurs in influent load due to an increase in seasonal or weekend occupants, the system may not have sufficient biological activity to effectively process the sewage.

Options to Reduce Risk

- Close operator attention and monitoring may be critical so that adjustments can be made in response to variable conditions to ensure adequate system performance in an application with a high proportion of vacation homes.
- Systems that receive highly variable loads can be fed supplemental food sources (dog food) during low loading periods to maintain biomass in the system. If there are periods of no loads, the system can be shut down and reseeded. This approach would require that the loading pattern be predictable.
- Alternative treatment systems are available that are less susceptible to risk of failure. Membrane bioreactors (MBR) have gained popularity for these types of applications because they are generally considered to be the less susceptible to upsets because the system does not rely on solids settleability.

Chlorination System

Chlorine is used in this phase of treatment to kill disease-causing microorganisms. Chlorine is added to SBR effluent in an effluent equalization tank to provide adequate contact time.

Risks of Failure

- Chlorine demand is significantly higher on unfiltered effluent than filtered effluent. If chlorine demand is underestimated, proper disinfection may not be provided.

What does chlorination do?

Chlorine is a powerful oxidant used to kill disease causing microorganisms that can be present in effluents from wastewater treatment systems. There are several forms of chlorine that can be used. No matter what form chlorine is delivered in, the objective is to provide a sufficient concentration of chlorine after mixing with the final effluent and allow sufficient contact time to allow chlorine to react with and kill microorganisms.

Options to Reduce Risk

- Chlorination after filtration will reduce chlorine demand. In general, disinfection systems are much more effective after filtration when residual solids have been removed.

- If chlorine residual is not required in the reclaimed water system, ultraviolet (UV) disinfection should be considered. This will eliminate safety concerns with chlorine and also eliminate the need to de-chlorinate when discharging to surface waters.

Tertiary Filtration

Tertiary filters remove particles from secondary effluent by physical straining of the filter media and some interactions with the filter media. Coagulation and flocculation are used to aggregate smaller particles into bigger particles and make them easier to remove by filtration. There are a wide variety of filter technologies that are currently on the market.

Risks of Failure

- Plugging or blinding of the filter.
- Use of the filter feed pumps is risky for providing reclaimed water system pressure.

Options to Reduce Risk

- A conservative design with respect to filter influent TSS concentration should be used to ensure that filters can handle SBR effluent TSS variations and reasonable upset conditions.
- Other filter technologies should be evaluated such as continuous backwash filters and disk type filters.
- A separate storage tank and pumps for the reclaimed water system should be employed to decouple filtration from the reclaimed water system and allow more flexibility in system operation.

Overall impacts

Wastewater treatment facilities employing a combination of mechanical and biological processes have been successfully used to serve large concentrations of population for many years. In this application, with a relatively small population, there are a number of factors that may lead to choices other than the SBR system proposed. These include:

- High cost of implementation. The initial capital cost of a wastewater treatment facility is very high. For a service area of 443 units the cost per unit is several magnitudes larger than on-site disposal. The SBR system proposed, however, is one of the lowest cost alternatives available if such a system is needed or desirable.
- High cost of operation and maintenance. Any sewage treatment facility requires a relatively high level of oversight of operation and maintenance of key facilities. In this case, with the potential for variable populations due to vacation homes, a very high level of oversight may be required during seasonal startups and weekends. This may involve checking the operation on a regular basis several times a day. It is also critical that personnel be on-call if critical parts of the system are not operating properly. The SBR system proposed needs relatively high levels of oversight and

maintenance. For a service area of 443 units the cost per unit is likely to be many times higher than typical charges for municipal sewage treatment due to economies of scale.

- High cost of replacement. The proposal to use steel tanks in the SBR system reduces initial capital cost, but ensures that major portions of the system will require replacement in 15 to 25 years. This high cost will necessitate rates that build a reserve of funds for replacement that will be half to three-quarters of the cost of the initial system. In addition, key mechanical components such as the influent grinder will require relatively frequent replacement of key components.
- Risk of upset and failure to meet effluent standards as outlined above. There are a number of steps in the treatment process where mechanical failure or the failure to operate the system properly may result in not meeting effluent standards. This would subject the public to potential risks from coming into contact with effluent that does not meet proposed standards:
    - In a system proposing to use reclaimed water on residential landscaping or other surface application, homeowners could be exposed to effluent that may lead to risk of disease.
    - If effluent were discharged to groundwater, there is a risk of contamination of groundwater and downgradient wells that are providing the water supply. This is discussed in more detail in Section 3.13, Groundwater Resources.

4 What risks may be associated with the proposed and alternative means of sewage disposal?

Proposed Sewage Treatment System

The major risk associated with the proposed sewage treatment facility is potential for failure to meet discharge standards, as discussed above, based on multiple potential contributing causes. This could affect the groundwater aquifer used for public water supply, as discussed in Section 3.13. In the worst case, discharge of untreated wastewater would cause the average nitrate concentration in groundwater to increase to approximately 15 mg-N/L within a plume that would migrate downgradient from the infiltration pond. For full buildout of Marian Meadows, with 443 ERUs, the nitrate concentration would increase to approximately 19 mg-N/L. These values would be far above the current background concentration in the aquifer of 0.22 mg-N/L and would exceed the drinking water standard of 10 mg-N/L. (The concentrations of other dissolved compounds in the untreated wastewater plume might also exceed the drinking water standards.)

Several domestic wells are located along the southern edge of the Marian Meadows property, adjacent to the proposed infiltration pond. The exact direction of the plume migration cannot be predicted with available information but will be generally to the south or southeast. The exact locations of neighboring domestic wells are not known, but they potentially could be affected for a period by the plume.

The somewhat rectangular plume would migrate at a rate of approximately 1 foot per day. Thus, a single well that pumped the average concentration in the plume would experience concentrations that rise to near the maximum concentrations reported above, then decrease to values unaffected by the upset condition, over the course of several months to a year. In all, the plume would persist for many years in the aquifer before reaching the river.

On-site Sewage Systems

On-site sewage systems (OSS) are commonly used to treat and dispose of sanitary waste in lower density developments. Common failures of OSSs in the past have included unpumped and sludge-filled tanks, which result in a clogged adsorption field, and hydraulic overloading caused by increased occupancy and greater water use following installation of new water lines to replace wells and cisterns (EPA 2002). A number of household chemicals have also been found to interfere with the proper operation of the septic system, which allows them to pass through into the aquifer untreated (EPA 2002).

Bacterial and viral pathogen contamination from OSSs can be prevented through proper siting, maintenance, and use. The DOH currently develops and implements standards for the performance, application, design, operation, and maintenance of on-site sewage treatment and disposal systems to prevent bacterial and viral pathogen contamination to groundwater.

Remaining contaminants such as nitrates, chlorides, and any organic solvents placed in the system usually depend on dilution to protect groundwater. The main outstanding issue associated with the design of OSSs is the nitrogen removal capacity. Upon release from the septic tank, most of the nitrogen is in the form of ammonia. This ammonia gets converted by aerobic bacteria in the biomat and upper vadose zone to nitrite and then nitrate, which is a major groundwater pollutant (EPA 2002). Nitrate concentrations can be reduced by dilution or denitrification. Denitrification requires both anaerobic conditions and an available electron donor, like carbon or sulfur. Without this process, the reduction of nitrate concentrations relies entirely on dilution through dispersion or recharge of groundwater supplies by precipitation (EPA 2002).

A high density of septic systems will reduce the ability to dilute the nitrate levels sufficiently. A DOH (2002) technical report suggests it could be necessary to either increase the minimum lot size from 0.5 acre to 1 acre or add additional treatment for nitrogen at high-risk sites within Washington to prevent nitrate contamination to groundwater. All alternatives, except the multi-family component of Alternative 2, have the potential to be adequately served by on-site sewage disposal with lower density options, thereby posing less risk.

5 What are the likely cumulative impacts associated with sewage disposal facilities and services with development of nearby land?

Cumulative impacts of the project in the immediate vicinity (north of I-90 and served by Sparks Road) were analyzed under the existing zoning with a 3-acre minimum lot size, as well as under densities allowed by PUD approval at an overall density of about 1 acre per unit.

Alternatives 1 and 2 with 443 units would result in a cumulative total of about 770 lots or units in the vicinity at existing zoning densities and about 990 cumulative lots or units with PUD densities.

Alternative 4 with 195 lots would result in about 525 lots in the project vicinity under existing zoning and about 740 lots with PUD density.

Alternatives 3 and 5 with 147 units would result in a cumulative total of 477 lots in the project vicinity at existing zoning and about 690 lots with PUD density.

All lots outside the development site could be served by on-site sewage disposal systems at either 3-acre or 1-acre lot sizes.

6 What measures could reduce or mitigate impacts of the proposal on sewage disposal, including risks?

The risks associated with the proposed SBR "package plant" could be addressed with the following strategies:

- Utilization of on-site sewage disposal for alternatives that would allow that option. This strategy would avoid the high cost of implementation, the high operation and maintenance cost, and the high cost of replacement. On-site systems also would avoid the risk of failure due to upset of the system.
- Alternative sewage disposal systems with less risk of upset could be utilized such as MBR, which are generally considered to be the less susceptible to upsets because the system does not rely on solids settleability.
- The proposed SBR "package plant" could be engineered to reduce the likelihood of upset, including more durable materials such as concrete rather than steel, and larger capacity of system components designed to address variation in flows from seasonal residents. This would add substantially to the cost.
- Risk of failure could be addressed by providing greater oversight of operation. This could range from full-time operators on site to a complex monitoring system with remote response from on-call personnel. This would substantially increase operating costs.
- The high cost of replacement could be addressed by providing rates that would fully finance replacement facilities. This method differs from usual public financing, which would be done in the future by new bonds. This action would substantially reduce risks to a public entity that might guarantee the operation of a private facility, but would substantially increase monthly rates to users.

- The risks to potential users of reclaimed water if an upset in operation causes standards to not be met could be addressed by including a full capacity groundwater disposal system. Routing to the reclaimed water system would only occur if on-line testing confirmed that standards were met. This action would add to operating expenses. The option of not using reclaimed water would reduce the risk of exposure and reduce costs, although possibly increasing domestic water demand for summer irrigation.

3.5.3 Utilities - Stormwater

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

The existing roads in the area generally handle runoff through surface ditches. Those ditches provide a means of collecting water as it runs off the impermeable portion of the road surface after which it either percolates into the soil or is carried to streams.

Most existing homes and businesses in the relatively flat areas along the Yakima River rely on infiltration of rainwater or snowmelt beyond ditches or swales to convey water away from structures or driveways. The permeable soils in the area generally absorb most of the water because the amount of impermeable road, driveway, and roof area is relatively small in relation to the area available for water to infiltrate.

In cases where the ground is frozen, runoff may not be able to absorb into the soil and may pond or flow to streams and rivers. In the more steep-sloping mountainous areas, the runoff from snow or rain often moves too quickly to be absorbed, or soil depth is too shallow to absorb all of the runoff.

For particularly intense storm events, or rain-on-snow events, runoff from steep sloping areas can be very large and can lead to catastrophic “flash floods” and debris flows. Such debris flows have occurred on the property in the past as shown by the alluvial fan where the main drainage discharges from the upper portion of the site.

2 What mandates or standards for stormwater management have been established?

Kittitas County has adopted the Ecology Stormwater Manual for Eastern Washington with local regulations as provided in Kittitas County Code 12.70. The manual provides a methodology for calculating runoff depending upon the severity of design storms based on a variety of factors with data derived primarily from past weather reports. The manual also includes a methodology for assessing rain-on-snow events. The manual, however, does not assess the potential for hazards such as debris flows. In addition, various methods for managing stormwater are provided including discharge to surface water or infiltration.

The practice in Kittitas County typically has been to prepare detailed stormwater management plans for subdivisions after preliminary plat approval at the time of the design of roads and other facilities. For this site, at least some reliance on infiltration is likely, given both soil conditions. Stormwater runoff may be accommodated by standard roadside ditches, depending on the results of detailed analysis, or may include a combination of infiltration and overland conveyance through ditches that eventually would discharge to either Silver Creek or the Yakima River.

3 What stormwater facilities are included in the proposal and alternatives?

No specific designs for stormwater facilities are included at the preliminary plat stage. Such detailed designs are generally developed after preliminary approval and are reviewed and approved for compliance with engineering standards and installed prior to final plat approval.

4 What impacts to surface water, flooding, or other resources may be associated with the proposed and alternative means of stormwater management?

All alternatives are likely to handle normal stormwater up to typical 2- and 10-year storms through standard facilities. It is likely that infiltration will be utilized as well as conveyance in roadside ditches. Larger surface flows are likely for rain-on-snow events with frozen ground and will need to be addressed.

The most significant hazard not addressed in standard engineering design is from isolated events leading to unpredictable volumes of water collecting in narrow canyons. This event has happened periodically on the site as is evidenced by alluvial fans that have formed at the base of several drainages.

At these locations during higher flows, large amounts of sediment are transported down the steep channels. When the flood water and sediment hit the lower gradient and unconfined valley bottom, the coarse sediment drops out allowing the upper fan to build. The gravel, sand, and finer sediment are transported farther down the fan. Deposition of this flood sediment often shifts the channel to another portion of the fan endangering any improvements constructed on the fan.

In addition, there is evidence of several channels across the flat portion of the site generally trending from the northeast to the southwest. These channels are 15 to 25 feet wide with a depth between 5 and 10 feet. The size of the channels is indicative of the volumes of water that periodically discharge from the steep upper portion of the site. The channels generally become indistinct near the southern boundary of the site indicating either infiltration of water or human actions that have obliterated the channels.

5 What are the likely cumulative impacts to stormwater facilities and services with development of nearby land at existing zoning densities or at densities similar to the proposal?

Cumulative impacts of stormwater conveyance generally will be experienced at downgradient locations. There are no clear indications of channels from the site leading off the site, although substantial regrading of some existing parcels may have obliterated dry watercourses. The construction of Sparks Road and its ditch conveyance system also has diverted any existing drainage and conveyed it to the west to Silver Creek. It is possible that during severe storm events in the area, especially rain-on-snow events with frozen ground, the Sparks Road conveyance capacity could be exceeded and surface water would flow generally to the southwest across the gently sloping topography and carve new channels in the path of least resistance. This occurrence may affect existing roads, homes, and other improvements in the area.

6 What measures could reduce or mitigate impacts of the proposal on stormwater management facilities and services and risks within the area and the proposal?

The most effective mitigation for alluvial fans is to avoid any human occupancy or improvements on the fan and its likely expansion area. This avoidance is illustrated in Alternatives 2, 4, and 5. In addition, for conveyance of water from peak events discharging across the site, a conveyance system incorporating ditches and possibly berms to protect adjacent development should be constructed.

3.5.4 Utilities - Solid Waste

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

Kittitas County contracts with Waste Management Inc. of Ellensburg to operate the two County transfer stations, one in Ellensburg and one in Cle Elum. The County's contract with Waste Management extends to 2010. County Solid Waste Department employees run the scale houses and collect fees. Waste Management hauls the refuse from the transfer stations to the East Wenatchee Regional Landfill, which is owned by the company. The trip to the landfill is about 75 miles one way from Cle Elum.

The Kittitas County Solid Waste Department manages the Rye Grass construction and demolition debris landfill, which accepts inert materials including asphalt, construction debris, fencing, roofing material, concrete, brick, etc.

The current tipping fee at transfer stations is $75.26 per ton. Of that amount:

$44.07 per ton goes to Waste Management, Inc.;

$28.79 per ton pays for the County Solid Waste Department operations;

$1.55 per ton pays closure costs of the previous landfill; and

$0.85 is a fee to Douglas County for the current landfill.

Recyclable items are accepted at the transfer stations. In addition, a variety of private recycling services accept materials such as appliances. Yard waste also is accepted at transfer stations at a reduced fee if separated from garbage. This material is chipped and offered to the public at no charge.

Household hazardous wastes are accepted at the Moderate Risk Waste Facility in Ellensburg, by appointment.

2 What mandates or standards for solid waste management have been established?

Washington State mandates that each county in the state prepare a Comprehensive Solid Waste Management Plan (SWMP) under RCW 70.95 that establishes the following priorities:

1. Waste reduction (which includes reuse);

2. Recycling, with source separation of recyclable materials preferred;

3. Energy recovery, incineration, or landfill of separated waste; and

4. Energy recovery, incineration, or landfilling of mixed wastes.

Specific standards for plans were adopted by Ecology in WAC 173-350-010. This chapter is adopted under the authority of RCW 70.95, which requires:

(1) Setting minimum functional performance standards for the proper handling and disposal of solid waste originating from residences, commercial, agricultural, and industrial operations, and other sources.

(2) Identifying those functions necessary to assure effective solid waste handling programs at both the state and local level.

(3) Following the priorities for the management of solid waste as set by the legislature in RCW 70.95, Solid Waste Management – Reduction and Recycling.

(4) Describing the responsibility of persons, municipalities, regional agencies, state, and local government related to solid waste.

(5) Requiring use of the best available technology for siting, and all known available and reasonable methods for designing, constructing, operating, and closing solid waste handling facilities.

(6) Promoting regulatory consistency by establishing statewide minimum standards for solid waste handling.

(7) Encouraging the development and operation of waste recycling facilities and activities needed to accomplish the management priority of waste recycling.

Kittitas County adopted its SWMP in 1998 and operates the county solid waste department in accordance with the plan, including the transfer stations and disposal in the landfill in Douglas County.

In addition, the Kittitas County Board of Health has adopted regulations (KCHD 1998) that:

- Prohibit disposal of debris or waste except in designated facilities (KCC 8.20.010).
- Provide for owner responsibilities for collecting and disposing of solid waste (Solid Waste Regulations [SWR] IV.A).
- Provide specific regulations for moderate risk waste, biomedical waste, animal waste, and other elements of the waste stream (SWR IV.B).
- Provide solid waste collection service standards (SWR V).
- Provide standards for handling facilities (SWR VI).
- Provide for enforcement (SWR VII).

3 What solid waste facilities or services are included in the proposal and alternatives?

No particular provisions for solid waste facilities or service are included or required. Residents can haul their garbage to the transfer station or contract with a refuse hauler.

4 How will the proposal and alternatives affect solid waste facilities and services?

The alternative and potential cumulative development in the area either at existing rural densities or at the density of the PUD likely will not affect the capacity of existing solid waste facilities but may require more frequent hauling of solid waste to the ultimate disposal site.

3.5.5 Utilities - Electrical

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

Electrical service in the area is provided by Puget Sound Energy (PSE). The electricity used in the area is largely generated by dams on the Columbia River and distributed to the area by transmission lines. The transmission line that serves the Easton area is located along the Iron Horse Trail because it was originally developed by the railroad and subsequently purchased by PSE.

What is a volt and kilovolt?

Electricity is measured in standardized unit called volts. A kilovolt is one thousand volts and measures electrical potential.

At the Easton substation just west of the BNSF rail line in the town of Easton, the electricity from the transmission line is “stepped down” to the lower voltage of 29 kV used for distribution to users. The Easton substation does not include circuit breakers at the transmission line junction. This means that if there is an interruption in the transmission line at any point between Cle Elum and Snoqualmie Pass, service is interrupted. Manual switches can be used to isolate a downed section of transmission line and allow service from the other direction. This, however, requires that the break in the system is located, which can take hours, or sometimes days in the case of a major regional outage.

Distribution lines carry electricity from the substation to users in the area. The distribution lines serving users on Sparks Road on the north side of I-90 is a radial system, which means a single line carries the power. If there is an interruption anywhere in the line, circuit breakers at the substation interrupt power to the entire line until the break is located and fixed.

The radial transmission system design is subject to outages on a more frequent basis than systems with looped or redundant features. Such redundant systems, however, are more expensive and are generally not justified by the number of services and revenue produced in a rural area. Outages in the Easton area, as reported by PSE, include four momentary substation outages (less than 1 minute) and eight sustained outages. Six of the sustained outages were 30 minutes or less, and two were 10 to 11 hours. The two long outages were due to major windstorms. Winter conditions can extend outages due to heavy snow impeding the accessibility of line crews; however, automatic switching can reduce most outages to under

30 minutes. In the event of a transformer failure, a mobile substation would need to be delivered from the west side over the pass to be installed at Easton. Such a condition may result in outage durations of up to 24 hours.

The distribution system on Sparks Road has experienced two circuit outages (3 hours and 15 hours) due to weather in the past year. The more local overhead and underground distribution in the vicinity of Sparks Road experienced four outages ranging from 1.5 to 5.5 hours due to animals. Country Drive Road experienced four outages ranging from 2 to 15 hours. The 15-hour outage was due to a cable failure (DiRay 2008).

In addition to the electrical systems that serve the users in the area, a number of regional transmission lines pass through the area that carry electricity from the hydropower dams on the Columbia River and other rivers in the eastern part of the state to consumers in urban areas to the west. The BPA Rocky Reach to Maple Valley 345-kV transmission line runs diagonally through the site at approximately the boundary between the flat westerly and steep sloping easterly portions of the site. The transmission line supports are 150 feet high and 1,200 feet apart. The towers were designed to support two circuits of three wires on each side. Only one circuit has been built and consists of three wires, one above the other, on the west side of the towers.

BPA has an easement through the site that allows the agency to maintain a road along the easement. The easement can be fenced as long as gates are provided to allow access to BPA crews (BPA 2008).

2 What mandates or standards for electrical facilities and services have been established?

The WUTC regulates utility service within the state. PSE is a regulated utility and is subject to standards in WAC 480-100 that address a variety of service standards, including the service that must be provided, reliability, responsiveness to service charges, and service outages.

The service to the Easton area generally meets standards for service to rural areas, with specific provisions for upgrading service over time to provide newer technology. Service to rural areas is generally slower to upgrade because the lower number of subscribers does not produce enough income to the company to justify short-term improvements to the technology used.

N minus 1 Criteria

A generally accepted utility industry standard related to reliability is commonly referred to as "N minus 1" (N-1). This means that if the total system of a number of facilities is referred to as "N," the system would still be able to serve all the customers even with the loss of one of those facilities. PSE utilizes the N-l criteria as a guideline for design of its system in most cases. There are portions of the system which do not meet the N-l criteria due to cost. This is primarily the case in rural areas. In addition, PSE does not attempt to meet the N-l criteria in peak demand periods. PSE uses the N-l criteria for operation of the system between 23 and 86 degrees Fahrenheit (°F). This excludes the peak demand periods for electrical heating in the winter and air conditioning in the summer. For example, if a given power line contained five distribution substations and connected to two transmission substations (one at each end), no single break in that line should cause customers served by that line to lose power.

One of the policy questions that decision makers could consider is whether this degree of reliability justifies the economic or environmental costs associated with building systems to meet these standards, or whether putting up with less reliability is a reasonable price to pay for fewer electrical facilities. This would be similar to the decision by PSE not to apply the N-l criteria to peak demand periods but would extend it to potential failures in links of the distribution system.

3 What risks may be associated with existing and planned electrical facilities and services in the area, including risks to future residents of the proposal?

In the United States, scientific and public interest in possible human health effects from exposure to electric and magnetic fields has resulted in a large number of studies addressing EMF. Today, the EMF health effects research is focused on either magnetic fields alone or on both magnetic and electric fields. A large number of epidemiology studies are currently underway both in the United States and in foreign countries, as well as laboratory studies of cells, whole animals, and humans. There also have been studies seeking to assess exposure to EMF in residences and occupational settings.

Electrical distribution facilities in the area consist of the overhead power lines that transmit electrical service to residences. Electrical transmission lines in the area consist of the BPA 415-kV line that passes diagonally through the property at the approximate eastern margin of the flat portion of the site.

Results from studies still leave the role of EMF in the development of leukemia unclear. In general, studies have indicated:

1) There is evidence of a relationship between the configuration of distribution facilities (often referred to as wiring code) and leukemia. Although the potential exists, the correlation is with as yet unidentified “intervening factors.”
2) Little support has been established for a relationship between measured magnetic field exposure and leukemia risk.
3) There is some support for a relationship between children’s use of some electrical appliances and leukemia.

What are Electrio Magnetic Fields?

Electric fields are created by the forces of attraction and repulsion of positive and negative charges. Electric fields occur whenever power lines are energized or whenever the electric cord to an appliance is plugged in. The strength of the electric field depends on the voltage of the object creating it.

Magnetic fields are created by the movement of electric charges. For example, when a current flows through a conductor (such as an appliance cord or power line), a magnetic field is created. Appliances that are plugged in but are not turned on do not produce magnetic fields. As the current flow in a conductor increases, the strength of the magnetic field increases.

Although there are electric and magnetic fields that are caused by natural phenomena, including electric fields by the sun and magnetic fields by the earth’s molten interior, the electric and magnetic fields that are the focus of health effects studies are primarily those that occur when current is flowing through electric power transmission lines, distribution lines, substations, household wiring and electrical equipment, and appliances.

Epidemiologic studies linking EMF and human cancers have prompted researchers to seek out and to specify cell-level changes caused by EMF exposure. Studies have shown that EMF does affect some aspects of these cellular processes to varying degrees; however, the significance of these cell functions and the degree to which they may contribute to health effects are not currently known.

Reports of biological effects of EMF are disturbing to some observers, but it is important to remember that all these effects have not been found in any one animal or cell type, and that effects that occur in one animal or cell type may not occur in other animal or cell types. A conclusion that these biological effects indicate a health effect for one particular species (e.g., human beings) is therefore premature. In addition, the biophysical or biological mechanisms that would explain how EMF interacts with living systems to produce observed effects are still not understood. There is no definitive indication that EMF exposure does or does not cause adverse health effects.

The concept of risk means different things to the expert involved in risk assessment and management and to the public. An appreciation of the differences between the understanding of risk by experts of risk analyses and the public helps to explain why responses to risk vary, and why risk analysts and the public have such trouble reconciling their concepts of risk. Public perception of risk relating to EMF cannot be assumed to mirror that of risk analysts. In contrast to the technical understanding of risk, the public understanding of risk is based on the public's *perception* of risk, and on a determination of the *acceptability of the risk.* Research and experience has shown that public responses to risk are based on how the majority of individuals "feel" about the risks, rather than on some type of individual analytical process. For example, with the "dread effect" such as cancer, an analyst would consider the endpoint of death to be of prime concern. In contrast, the public is more concerned about how the process of death occurs.

For each risk factor, there is a range of acceptance. The *acceptability of risk* is a separate process from the perception or determination of the level of the risk. There are different factors that determine to what extent the public will accept the risk associated with a particular health issue. One of the most important factors of risk acceptance is an informal estimate of the perceived benefits versus costs associated with the issue. However, this factor can be complicated when the benefits of an issue are spread (geographically, for example), but the risks are concentrated.

4 What electrical facilities and services are included in the proposal and alternatives?

The proposal would be provided electrical service by PSE. New service lines would be installed by PSE as either overhead or underground service at PSE's expense, except that for underground service PSE requires the developer to provide trenches and backfill.

5 What impacts to electrical facilities and services may be associated with the proposal and alternatives?

Additional demand for new service in the area will require upgrade of several elements of the existing PSE electrical distribution system. The existing substation in Easton is near capacity and scheduled for replacement of the existing transformer. The new transformer will be needed prior to substantial growth in the area. At that time, additional substation upgrades are likely to be implemented, including a new substation feeder breaker and circuit. All such upgrades can be accommodated within the existing substation.

The local distribution near the proposed project is a one-phase operation. This would be adequate for limited new development, but would require construction of a new three-phase (overhead or underground) distribution system to provide additional capacity.

The addition of additional lines for a looped system rather than a radial system could be implemented to provide additional reliability and meet the N-1 standard of providing service with one element of the distribution system out of service. This may involve an additional crossing of I-90 and additional parallel distribution lines (Lenz 2008).

6 What are the likely cumulative impacts on electrical facilities and services with development of nearby land at existing zoning and PUD densities?

Cumulative impacts of the project in the immediate vicinity (north of I-90 and served by Sparks Road) were analyzed under the existing zoning with a 3-acre minimum lot size as well as under densities allowed by PUD approval at an overall density of about 1 acre per units.

Alternatives 1 and 2 with 443 units would result in a cumulative total of about 770 lots or units in the vicinity at existing zoning densities and about 990 cumulative lots or units with PUD densities.

Alternative 4 with 195 lots would result in about 525 lots in the project vicinity under existing zoning and about 740 lots with PUD density.

Alternatives 3 and 5 with 147 units would result in a cumulative total of 477 lots in the project vicinity at existing zoning and about 690 lots with PUD density.

Additional demand from services would require additional upgrades in the electrical distribution system, including transformer capacity, and may require installation of new distribution circuits from the third Easton substation to the service area (Lentz 2008).

7 What measures could reduce or mitigate impacts of the proposal on electrical facilities and services and risks?

The major potential mitigation for impacts on electrical services is for the utility to plan facility upgrades and implement improvements in conjunction with new development and the growth in demand.

EMF mitigation options are all governed by the laws of physics and these laws are rigid. Mitigation options are therefore generically quite limited. No matter what the source of the magnetic field is, reduction may only occur in the following ways:

- Increase the distance between the field source and the exposed subject, or

- Decrease the propagation of the magnetic field at or near its source.

The alternatives with deeper lots adjacent to the BPA transmission line generally will reduce EMF exposure.

3.5.6 Utilities - Communication

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

The Easton area is provided telephone service from the Qwest system. The local telephone system consists of a standard electrically wired system. In this system, a pair of wires connects the subscriber to the system's central switch office. This is called a subscriber loop. For the Easton area, the central switching system is located in Cle Elum, about 15 miles to the east. The system connecting from Cle Elum to Easton is largely underground. The system in the Easton area is a combination of underground and aboveground circuits.

The standard wired system provides a low bandwidth connection to subscribers with very high reliability. The basic wire communications circuits provide a flexible platform for a variety of services, including digital communications provided by equipment at the switching center. The major limitation to the system is the limited bandwidth provided for modern computer applications.

Qwest currently does not provide digital subscriber line (DSL) service in the Easton area, but is under a compliance order from the WUTC to upgrade its system to provide service by 2010 (Qwest 2007).

Wireless telephone service is available to the Easton area from all major wireless providers because the I-90 corridor as the major east-west highway through the state is provided with "first order" service by all providers in the state. There is a wireless telephone antenna on the south facing slope of the site at about elevation 2,600.

2 What mandates or standards for communication facilities and services have been established?

The WUTC regulates utility service within the state. Qwest is a regulated utility and is subject to standards in WAC 480-120 that address a variety of service standards including the service that must be provided, reliability, responsiveness to service charges, and service outages.

The service to the Easton area generally meets standards for service to rural areas, with specific provisions for upgrading service over time to provide newer technology. Service to rural areas is generally slower to upgrade because the lower number of subscribers does not produce enough income to the company to justify short-term improvements to the technology used.

3 How will the proposal and alternatives affect communication facilities and services?

The site will be provided with telephone service in accordance with WUTC requirements. Provision of new land-line telephone service may depend on projected demand, which also is dependent on the use of cellular telephones. A large component of seasonal residents may reduce the demand for conventional telephone service in preference to cellular service.

Cumulative growth in the area will likely provide a larger market for service and may lead to the provision of a wider range or service, including high capacity internet service.

3.5.7 Utilities - Cable Television

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

Cable television service to the Easton area is provided by Broadstripe (formerly Mellineum). It provides a separate coaxial cable-wired system that was installed in the 1980s and upgraded to include some fiber optic lines in the early 2000s. Broadband internet and telephone service is achieved over the coaxial cable by using cable modems to convert the network.

2 What mandates or standards for cable television facilities and services have been established?

Service areas for cable are established between service providers and local government, in this case Kittitas County.

3 How will the proposal and alternatives affect cable television facilities and services?

The site will be provided with cable service in accordance with requirements of the provided agreement with the county. Provision of service may depend on projected demand, which also is dependent on the projected use of internet service. A large component of seasonal residents may reduce the demand for internet service.

Cumulative growth in the area will likely provide a larger market for service and may lead to the provision of a wider range of service, including high capacity internet service.

3.6 VISUAL QUALITY, LIGHT, AND GLARE

1 How can the aesthetic experience be characterized?

Three critical parameters of the aesthetic experience are evaluated in this analysis:

- Visual Character,
- Visual Quality, and

- Viewer Response.

Visual Character refers to identifiable visual information. The first step in assessing visual impacts is to describe visual attributes and environmental features using objective descriptors. Four key features are used to identify relationships among elements of the visual environment: dominance, scale, diversity, and continuity.

Dominance refers to the position of an individual element, or its extent or contrast among all the other elements of a view.

Scale refers to apparent size relationships between an element and the other components of its surroundings.

Diversity is a function of the number, variety, and intermixing of elements in a view.

Continuity refers to how a given visual element of a scene fits into the visual context of a broader visual environment.

Visual Quality refers to assessing the value of the visual experience to the public. Studies of the American public and across cultures demonstrate strong agreement about preferred qualities of the visual experience (Jacques 1980; Kaplan 1985; Real 2000). This consensus is exhibited in officially designated landscapes generally agreed to have high value such as national parks, scenic rivers, scenic highway viewpoints, and significant natural and human-made features.

One measure of visual quality is the extent to which the view exhibits vividness, intactness, and unity. These characteristics are consistently prominent in landscapes perceived by the public as having high visual quality. This set of measures is similar to other systems that analyze human perceptions based on factors such as legibility—the features which contribute to the recognition of an environment; complexity—the variety or diversity in a scene as it relates to human interest; coherence—the extent to which the scene "hangs together" through repetition of elements which facilitates comprehension; and legibility—the features which contribute to the recognition of an environment (Kaplan 1982).

For this analysis, these three measures are evaluated as described below.

Vividness describes the way landscape components may combine in distinctive and memorable visual patterns. For different landscapes, various elements may contribute to vividness.

Intactness describes the integrity of natural and human-built visual patterns and the extent to which the landscape is free from encroaching elements. Encroaching elements may include a single “eyesore” or may include multiple elements.

Unity measures the visual coherence and compositional harmony of the landscape considered as a whole. It refers to the “fit” between elements of the landscape, but does not connote uniformity in design or character.

Viewer Response is analyzed in terms of viewer exposure and viewer sensitivity.

Viewer Exposure refers to the physical location of viewer groups, the number of people exposed to a view, and the duration of their view. This includes both persons passing through and persons in the surrounding area.

Viewer Sensitivity refers to factors that affect the degree to which a viewer perceives elements of the environment and the extent to which those elements are important to the viewer. Viewer sensitivity is affected by factors such as the activities a viewer is engaged in (which may affect the way in which a scene is perceived), the visual context, and the values.

2 What does the area look like now?

Views in the Easton area are dominated by mountains, trees, and water. The narrow valley was shaped by glaciers and later by deposits from the Yakima River. The major human features are I-90, the BNSF railway, dwellings, and a limited number of commercial buildings. The tree-covered ridges that frame the valley are the dominant visual elements in middle-range views, with distant peaks of the Stevens Range dominating skyline views to the north. These ridges and mountains are the most prominent element of the landscape.

The contrast of the ridges and peaks provides a vivid focus. They are visually integrated by the common elements of tree cover and exposed bedrock. The unity of the landscape is interrupted to some extent by the clear-cut on the site of the proposal, largely because the straight line of the cut follows property lines and cuts diagonally across the upper portion of Easton Ridge without any relationship to the typical natural patterns of vegetation in the landscape.

Views of and from the valley floor are largely obscured by large trees. Natural features such as the Yakima River generally cannot be observed except when one is adjacent to the river, or if one crosses it on a road. Most of I-90 is similarly screened from view, although the background noise from traffic is a constant reminder of the presence of the freeway, except when new snowfall deadens tire noise and limits the volume of vehicular travel. The exception to this is the view of the highway from the frontage roads immediately south of Exit 70.

What is a National Scenic Byway?

A **National Scenic Byway** is a road recognized by the United States Department of Transportation for its archaeological, cultural, historic, natural, recreational, and/or scenic qualities. The program was established by Congress in 1991 to preserve and protect the nation's scenic but often less-traveled roads and promote tourism and economic development. The program is administered by the Federal Highway Administration.

The largest single viewing population in the area is that formed by drivers and passengers on I-90. I-90 carries an average 21,000 vpd containing approximately 40,000 persons. I-90 in this area is a designated National Scenic Byway. In addition, a private non-profit organization, the Mountains to Sound Greenway Trust, supports trail development and scenic enhancement of the route. In conjunction with state and federal agencies, they have been able to plan and implement measures to acquire, protect, and develop lands along the corridor that provide recreational opportunities and protect natural and scenic resources.

Views of the Easton area from I-90 northbound generally are framed by large trees and provide little opportunity to see adjacent lands and features on the valley floor. Exceptions at areas largely cleared are views to the south and east of Easton immediately west of Exit 71, views of the frontage road on the south side immediately east of Exit 70, and views of commercial buildings (Turtle Town) on the north side immediately east of Exit 70. Views westbound down the alignment of I-90 are centered on Ambolis Mountain. Views eastbound are centered on the project site for a distance of approximately 1 mile between mile post 68.7 and 69.7 and as indicated in Figure 3-25. Views not centered on the site generally feature Easton Ridge farther to the south. Drivers and passengers on I-90 are likely to be quite sensitive to views. The activity of driving or riding in a vehicle on an interstate highway provides little opportunity for activities other than enjoying the scenery.

Lake Easton State Park, with 212,000 annual visitors, provides views from the Park primarily to the ridges to the northwest over Lake Easton, although all visitors leaving the Park have a direct view of the proposed site at the Park driveway as shown in Figure 3-25. The view from the Park driveway does include power lines running alongside I-90 in the foreground. Park visitors are likely to be very sensitive to the character of views because the purpose of their visit to the area is to enjoy the setting and recreational amenities.

The John Wayne Trail (Iron Horse State Park) is a state park created on the right-of-way of the former Milwaukee Road Railroad on the east side of I-90. It serves hikers, bikers, and equestrians passing through the area. The Washington State Parks and Recreation Commission estimates that the portion of the trail between North Bend and Thorp has approximately 164,000 annual visitors. Views of the site from the trail are prominent where it passes along the west shore of Lake Easton and also south of Easton, where there is little screening vegetation between the trail and I-90.

Views of the site are available to local residents largely from local streets oriented such that they are centered on the ridgeline portion of the site and from areas east of I-90 where vegetation is sparse enough to allow view corridors toward the ridge. Residents of Easton and the area immediately south generally have views of the ridge within the development from their homes or from routes they regularly travel. These views are not generally interrupted by built structures, utility lines, or associated appurtenances.

Overall, the visual quality of all views of the project site from I-90 and the Easton vicinity are very vivid. This is among the more prominent sections of Easton Ridge. The intactness of the scene is somewhat reduced by the clear cutting to facilitate the harvesting of forest resources on the site; this clear-cut occurred several years prior to this analysis. The contrast of the straight lines of the edge of the clear-cut, however, tend to distinguish the site from the more natural vegetation cover surrounding it and making a more distinct visual pattern that increases its vividness. The unity of the site, with the remainder of the wooded ridge, is somewhat reduced by the clear-cut, but the widespread occurrence of clear-cuts in the area is likely to lead to a perception that such elements are a normal and transitory element of the landscape.

Viewer response is likely to be high for several reasons; there are large numbers of persons exposed to the view, the view is prominent from both I-90 and the local community, and the views available are a valued component of the experience of persons making trips on I-90 and persons living in the area.

The major source of light and glare in the area is street lighting at the I-90 interchange ramps. Street lighting is generally not provided on surface streets in the area. Security lighting varies in businesses and public buildings in the area. Turtle Town, on the north side of I-90, has parking lot lighting adjacent to Sparks Road. The Easton School has a parking lot and building lighting at its perimeter. The fire station in Easton also has parking lot lighting. Some residences have exterior security lighting. The Easton State Airport has runway lighting; however, because of the trees surrounding the airport, runway lights are generally visible only from the air. There currently are no sources of light on the ridges surrounding the community of Easton.

3 What mandates or standards have been established for views and aesthetics?

The Kittitas County Comprehensive Plan recognizes scenic views and view corridors in the following policies:

IV.15 Goal: Identify the "viewshed", that is, scenic areas, which are visible from places of frequent human activity.

IV.16 Goal: Important scenic views and viewlines should be identified, preserved, and where appropriate, enhanced.

4 What will the area look like during construction?

During construction of infrastructure for future residents there will be a disarray of construction equipment, earth movement, and construction materials visible at the project site. Construction activities on the lower part of the site would be visible only from adjacent properties; however, the distance from existing residents and existing tree cover on most adjacent properties will restrict visibility. Construction on portions of the upper easterly portions of the site would be visible from I-90 and the surrounding community. The most visible aspects of construction will be extensive clearing and cut and fill slopes for roadways traversing steep slopes that will contrast in color from the tree cover of the remainder of the site. Construction will require temporary clearing for staging areas; however, if those areas are located away from the perimeter of the site they will not be visible to the surrounding community.

Alternative 1, the applicant’s PUD proposal with 443 units on the entire site, would have the most substantial impacts to visual quality during the construction phase of the project as it includes readily visible road construction on steep cross slopes in the easterly portion of the site. Residential construction will also take place in areas visible from I-90 and much of the surrounding community.

Alternatives 2 and 5 would have much lower visual impacts during construction because there would be no construction on the easterly portion of the site, which is most visible from I-90 and other viewpoints to the south and west.

Alternative 3 with 3-acre lots would have impacts similar to Alternative 1 because the road system on the easterly portion of the site would be similar despite fewer lots.

Alternative 4 with development on both the easterly and westerly portions of the site would have less visible impacts from road construction because the lower part of the main road up steep slopes would be screened from I-90 and other views to the south and west by existing trees. The upper part of the road would be highly visible. The most prominent portion of the roadway system on the uppermost portions of the site would not be subject to road construction and result in less visual impact.

5 What will the area look like after completion of the project?

Regardless of the selected alternative, development in the area will represent a significant change in the visual character of the Easton Range. The current visual continuity provided by somewhat undeveloped forest conditions (mitigated by the presence of clear-cut lines) will be altered in perpetuity by the presence of human development. Specific impacts, however, will vary based on the selected alternative.

Alternative 1, the applicant's PUD proposal with 443 units, will result in substantial change to the visual quality of the area due to the location of residences and infrastructure on the steep-sloping easterly portions of the site that are visible from I-90 and much of the community as indicated in Figures 3-26 and 3-27. These figures indicated building sites that are likely to be visible from the viwpoints discussed above considering topography and likely tree clearing. For a period of several decades while the clearing and cut and fill slopes for roads are revegetated, they will be an obvious contrast in color from the surrounding area and will cut diagonally across several portions of the site, in marked contrast to natural landforms. After revegetation, the line of the roadway is likely to be visible. Clearing of vegetation and construction of residences will contrast against the backdrop forest cover, which will vary somewhat with the amount of clearing and the color and amount of glass used in residences. The visual prominence of development of the area will be high, and even more pronounced at night when residence and security lights will be visible at great distances.

The intactness and unity of the existing forested ridge above the valley will be replaced by a visual scene without the integrating character of continuous forest cover. The development will stretch approximately halfway up the ridge, contrasting with the natural forested surroundings and introduce human elements in contrast to the existing natural scene. The vividness of the ridgeline will decrease somewhat by the visual clutter of roads and residences on the slope.

The change in visual character of the area will be most pronounced at night when lights in residences and especially outdoor security lights will be visually prominent on the currently unlighted ridge.

On the easterly portion of the site, cleared areas for roads and residences, including the built residences, will be visible from the major thoroughfares, especially I-90 (as indicated in Figure 3-26) giving the proposed site high viewer exposure. The I-90 corridor has been designated a National Scenic Byway in this area, indicating that viewers will be highly sensitive to the visual elements of their trip through the corridor. The development on the visible slopes will contribute to change in an important element of the rural environment—the dominance of natural features framing the valley.

The flat westerly portion of the site would not be visible from I-90 and other distant locations. This portion of the site would be viewed only from adjacent properties and roadways. In the future, persons driving through the site, including residents, will note the difference in character from large lot areas by the larger cleared areas and relatively close spacing of residences. The visual character will be similar to higher intensity development in the area such as the Easton Village Subdivision.

Alternatives 2 and 5, with no development on the sloping easterly portion of the site, will avoid features visible from I-90 and much of the community and would retain the forested ridgeline.

Alternative 2 development character on the flat westerly part of the site would contrast substantially from the existing character of the area in terms of amount of clearing, building form, and more extensive parking areas. The addition of multi-family development would represent a change in the visual quality of the vicinity and would contrast with the unity of the existing scene provided by the predominance of native trees and consistency of the single-family residences.

Single-family areas in Alternatives 2 and 5 on the westerly portion of the site would have a character similar to Alternative 1 except for extensive areas of open space for the airport safety zones and debris flow areas, which would contribute to the forest cover characteristic of the rural area.

Alternative 3, with 3-acre lots on both the easterly and westerly portions of the site, would also result in substantial cleared areas for roads and residences, including the built residences, on the easterly portion of the site. This area would be visible from the major thoroughfares, including I-90, giving the proposed site high viewer exposure. The amount of clearing for residences would be less extensive, and the built residences would be fewer, resulting in less extensive change. As compared to Figures 3-27 and 27, the locations where building sites would be visible would be the same, but the number of units visible would decrease3. That change, however, would contrast sharply with the existing unity of forest cover and would contribute to change from the dominance of natural features framing the valley to a substantial intrusion of human features in the view.

Development on the lower flat portion of the site would be large lots similar to existing large lots in the area with extensive retention of forest cover. The large lots, coupled with preservation of extensive areas of open space for the airport safety zones and debris flow areas, would contribute to maintaining the rural character of the area.

Alternative 4, a PUD with reduced density on the entire site, would also result in significant, identifiable impacts to the character of the easterly sloping areas. However, impacts will be less than those associated with Alternative 1 because development would be avoided on the most visible upper portions of the site. Avoidance of the most visible higher areas of the slope would result in less visual contrast with the existing unity of forest cover and would result in less obvious change from the dominance of natural features on the highest portion of the slopes framing the valley. Development on the lower slopes will be similar to Alternatives 2 and 4.

6 What are the likely cumulative impacts on visual quality in the area with development of nearby land at existing zoning or PUD densities?

The potential cumulative impacts of development of nearby land in the vicinity would result in little change in visual quality from I-90 and the area in general because these areas are not visible.

Three-acre development in the area will be generally consistent with existing rural large lot development.

Cumulative development was projected for the area north of I-90 served by Sparks Road under two scenarios:

- Development at existing rural densities at one unit per 3 to 5 acres, and
- Development at the intensity allowed under PUD regulations as proposed for the Marian Meadows site, resulting in about one unit per acre.

Development under existing zoning allowing one lot per 3 acres would allow a total of about 330 lots in the vicinity outside Marian Meadows, including existing development. The majority of these new lots would be located south of Sparks Road, where existing lots are larger. This area includes several parcels 10 acres and larger. Subdivision at the density reflected in the Marian Meadows PUD application would allow a density up to three times that of the current zoning density of one unit per 3 acres, or about one unit per acre. If development reflecting this density of development were applied to the area as a whole, most of the existing parcels larger than 2 acres could be subdivided. This would result in about 780 future dwellings in the vicinity outside of Marian Meadows. These lots would be spread throughout the area because many of the existing 3- to 5-acre lots could be further divided.

Development in these areas would be primarily on the flat valley bottom and would not result in development on the ridges that would be visible from I-90 or the area in general. The cumulative visual impacts would be mainly apparent on roads and in lot size. Under the PUD intensity, houses would be less dispersed and more concentrated on lots. Under rural intensity, houses would be more dispersed and more space would separate them on lots.

7 What measures can reduce the effects of the proposal on the appearance of the area?

Several measures can be taken to reduce visual impacts caused by development of the applicant's proposed PUD and the other alternatives. Unless otherwise noted, it can be assumed that the following measures will be used for the applicant's proposed PUD and the other alternatives.

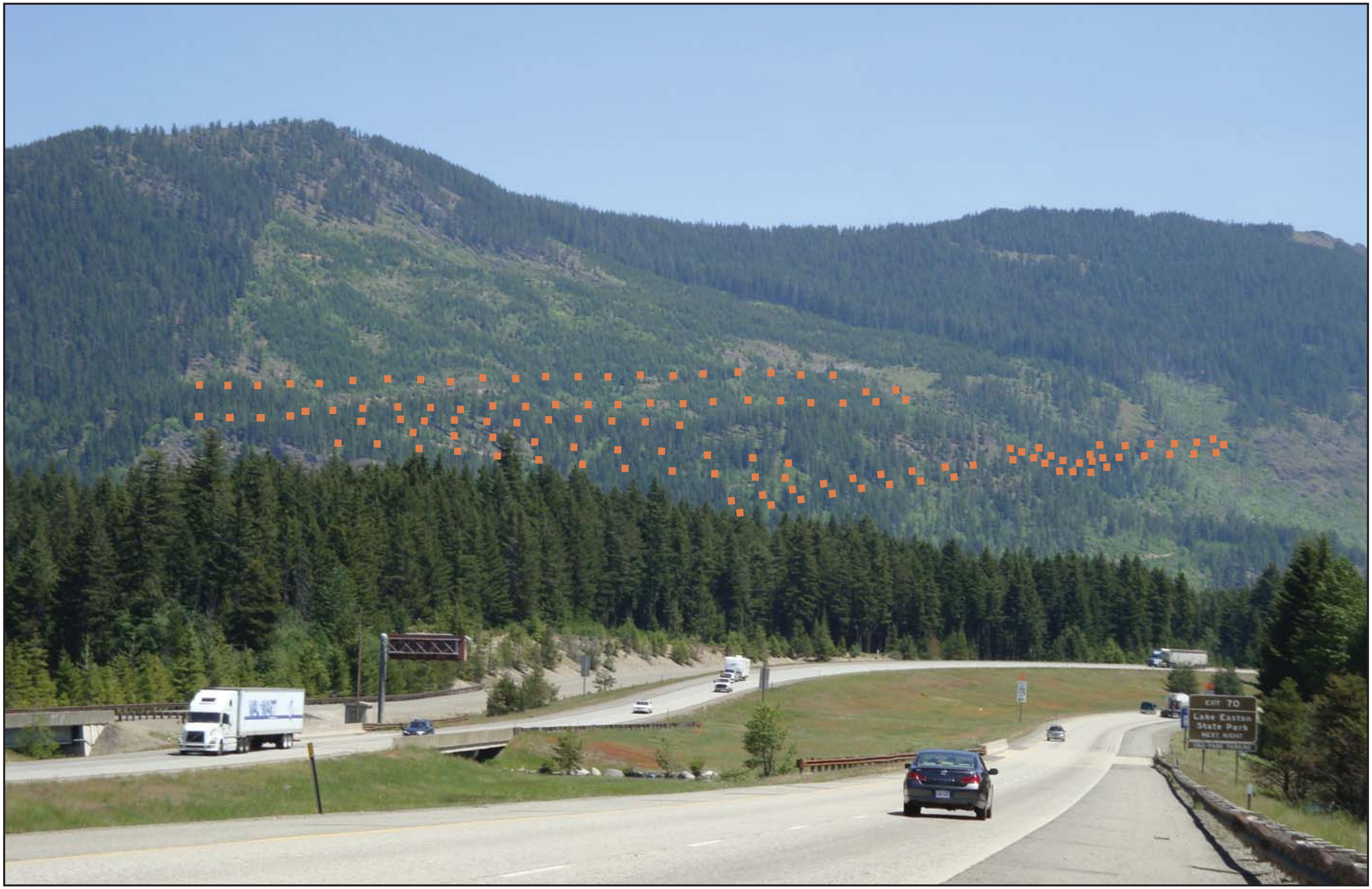
- Revegetation of road cuts by immediately establishing ground cover and planting native coniferous trees would speed the re-establishment of vegetation, which would mask the change in color of exposed soils and bedrock. Areas with extensive bedrock would be screened only when plantings reached adequate height, which could be several decades.
- Proposed building materials and color could be selected to be as visually coherent as possible with landscape features in the vicinity.
- The applicant could prepare a lighting plan for the proposed development to incorporate some or all of the following standards:
  - Use of full-cutoff shielding on outdoor light fixtures.
  - Mounting of light fixture luminaries at a height designed to limit off-site impacts. This may vary depending on screening vegetation between 15 and 30 feet.
  - Establishment of roadway lighting standards based on needed light distribution and the luminance of roadway surfaces.

Parametrix 557-1763-007/03(11) 9/09 (B)

Figure 3-24
Marian Meadows
Existing Views of the Site from I-90

Parametrix 557-1763-007/03(11) 9/09 (B)

Figure 3-25
Marian Meadows
Existing Views of the Site from
Lake Easton State Park



Parametrix 557-1763-007/03(19) 2/10 (B)

Figure 3-26
Marian Meadows
Views of Alternative 1 from I-90

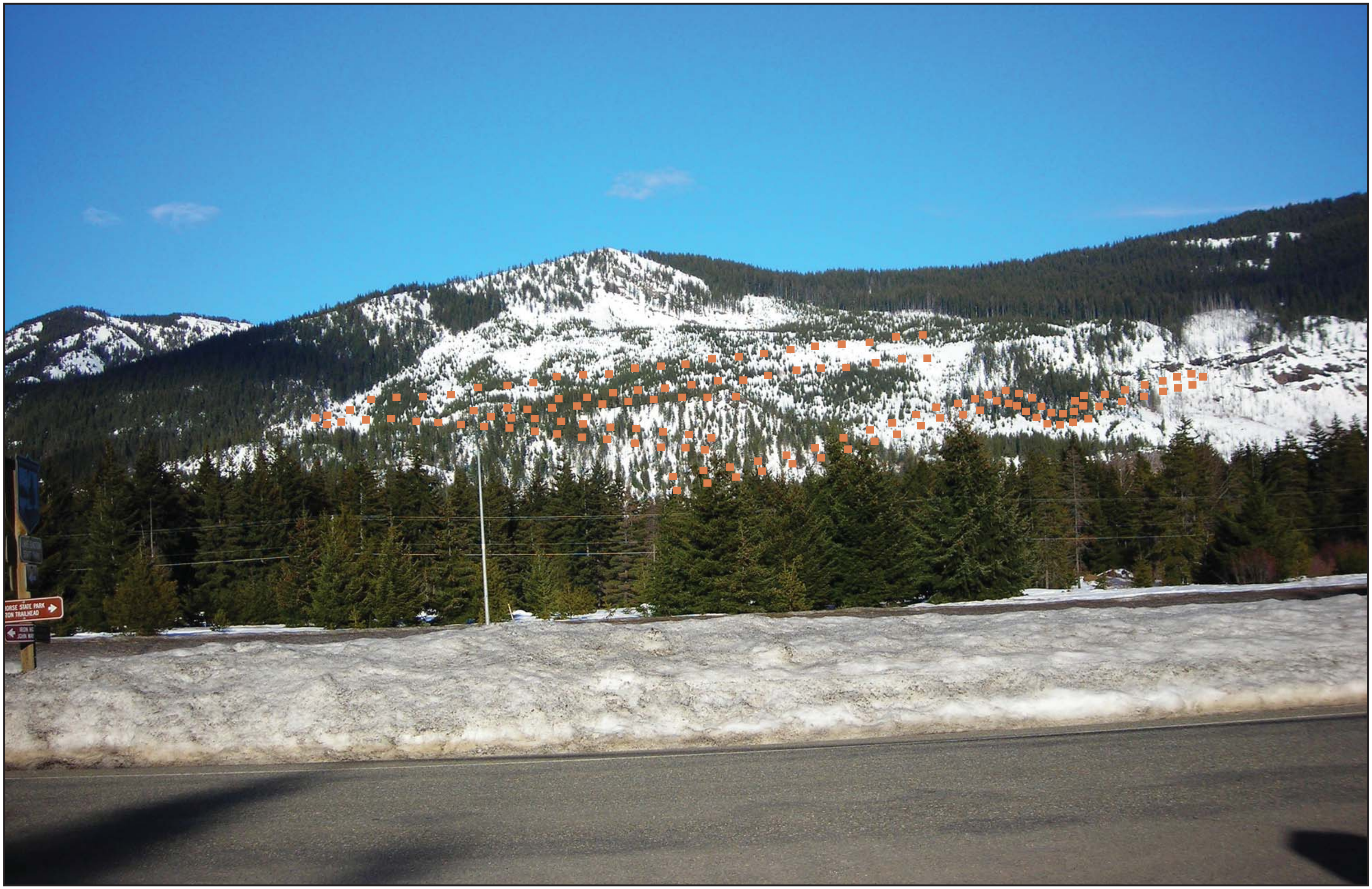


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Figure 3-27
Marian Meadows
Views of Alternative 1 from
Lake Easton State Park

3.7 NOISE

1 What is noise?

Noise is generally defined as unwanted sound (EPA 1971).

The human ear responds to a very wide range of sound intensities. The decibel (dB) scale used to describe sound is a logarithmic rating system, which accounts for the large differences in audible sound intensities. This scale accounts for the human perception of a doubling of loudness as an increase of 10 dB; therefore, a 70-dB sound level will sound about twice as loud as a 60-dB sound level. People generally cannot detect differences of one dB. In ideal laboratory situations, differences of two to three dB can be detected by people, but such a change generally would not be detectable in an average outdoor environment. A three- to five-dB change would probably be perceived under normal listening conditions. Sound levels associated with a range of common noise sources are shown in Table 3-27.

What is a decibel?

Sound levels are expressed on a logarithmic scale in units called decibels (dB). A-weighted decibels (dBA) are the commonly used frequency that measures sound at levels that people can hear.

To the human ear, a one to three dBA change is hard to distinguish, but a five dBA change in noise levels is readily noticeable. A 10 dBA increase would sound like the noise level has been doubled.

Distance from the source, the frequency of the sound, the absorbency of the intervening ground, obstructions, and the duration and pattern of the noise-producing event all affect the transmission and perception of noise. The degree of this effect also depends on who is listening, what activities they are engaged in, and what the is the existing sound level. The variability in the way individuals react to noise makes it impossible to accurately predict how any one individual will respond to a given noise. However, when the community is considered as a whole, trends emerge that relate noise levels to potential effects.

Table 3-27 Sound Levels Produced by Common Noise Sources

Thresholds/ Noise Sources	Sound Level (dBA)	Subjective Evaluations	Possible Effects on Humans [1]
Human threshold of pain Carrier jet takeoff at 50 feet	140	Deafening	Continuous exposure to levels above 70 dBA can cause hearing loss in majority of population
Siren at 100 feet Loud rock band	130		
Jet takeoff at 200 feet Automobile horn at 3 feet	120		
Chain saw Noisy snowmobile Locomotive horn Impact pile driver	110		
Lawn mower at 3 feet Noisy motorcycle at 50 feet	100	Very Loud	
Heavy truck at 50 feet	90		
Pneumatic drill at 50 feet Busy urban street, daytime	80	Loud	
Normal automobile at 50 mph Vacuum cleaner at 3 feet	70		Speech interference
Air conditioning unit at 20 feet Conversation at 3 feet	60	Moderate	
Quiet residential area Light automobile traffic at 100 feet	50		Sleep interference
Library Quiet home	40	Faint	
Soft whisper at 15 feet	30		
Slight rustling of leaves	20	Very Faint	
Broadcasting studio	10		
Threshold of human hearing	0		

Exact threshold boundaries cannot be established because both the subjective evaluations and the physiological responses to sound are continuums. Consequently, overlaps exist among categories of response, depending on the sensitivity of the noise receivers.

[1] Source: EPA (1974).

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

I-90 is the major source of noise in the vicinity of the project site. Other sources of noise include vehicles on local roads, and the occasional sound of trains and whistles on the BNSF railway line about 1.50 miles to the east adjacent to the town of Easton.

Existing noise levels on the site and in the vicinity are indicated in Table 3-28. The locations of the monitoring sites are shown in Figure 3-28.

What is Leq-Equivalent Sound Level?

Leq is the steady A-weighted sound level over any specified period that has the same acoustic energy as the fluctuating noise during that period. It is a measure of cumulative acoustic energy.

Table 3-28 Project Vicinity Noise Measurements

No.	Location	Date/Time	L_{eq} (dBA)	L_{max} (dBA)	L_{min} (dBA)
1	Project site, western flat portion, mid-north	06/12/08 11:00 a.m.	47.2	56.3	44.5
2	Project site, halfway up the road to the eastern portion	06/12/08 11:30 a.m.	49.7	60.0	46.2
3	Sparks Road at Turtle Town, next to I-90	06/12/08 1:00 p.m.	69.3	76.3	61.3
4	Sparks Road near Pit Way	06/12/08 1:30 p.m.	54.7	62.9	49.9

Noise from existing residential use in the area includes noise from roads, people's voices, and residential equipment such as lawn mowers and chain saws. In some cases, noise from recreational vehicles and snowmobiles, in season, may be a major component of noise. The noise level readings on the site of between 47 and 50 dBA are indicative of an area with little human activity and at a distance from traffic on local streets and I-90.

What are auditory and non-auditory impacts?

Auditory impacts are caused by high noise levels that can potentially damage hearing and produce either partial or total deafness. Non-auditory health impacts include sleep and speech disturbance and may also involve human physiological (other than hearing damage) or behavioral effects. Traffic noise is generally not loud enough over a long enough time period to cause hearing impairment and is generally more of a factor of non-auditory health impacts.

The commercial uses at Turtle Town on Sparks Road on the north side of I-90 are dominated by vehicle noise from I-90 at levels close to 70 dBA, as well as local sources of noise from vehicles entering and leaving the site, and incidental noise from refueling and outdoor activities. Noise levels of about 55 dBA farther east on Sparks Road reflect lower noise levels from I-90 due to distance and levels typical of background noise in a residential area.

Noise is a substantial concern for land uses near airports. Typical propeller airplanes generate noise levels between 65 and 95 dBA depending on the activity the airplane is engaged in. The following discussion focuses on single-event noise levels because noise from the Easton State Airport is experienced from single planes landing and taking off. Usually such events are separated by a substantial interval, except when groups have arranged a rendezvous at the airport.

The majority of aircraft noise is produced at takeoff and landing. Figure 3-29 provides a "noise footprint" of typical noise levels produced by general aviation aircraft during landing and takeoff.

The dominant noise from most propeller airplanes is from the propeller itself. Propeller airplane noise varies depending upon the number of engines, the rotational speed of the propellers, the number of blades on each propeller, and the pitch of the blades. To some extent, the type of engine also affects the amount of noise produced.

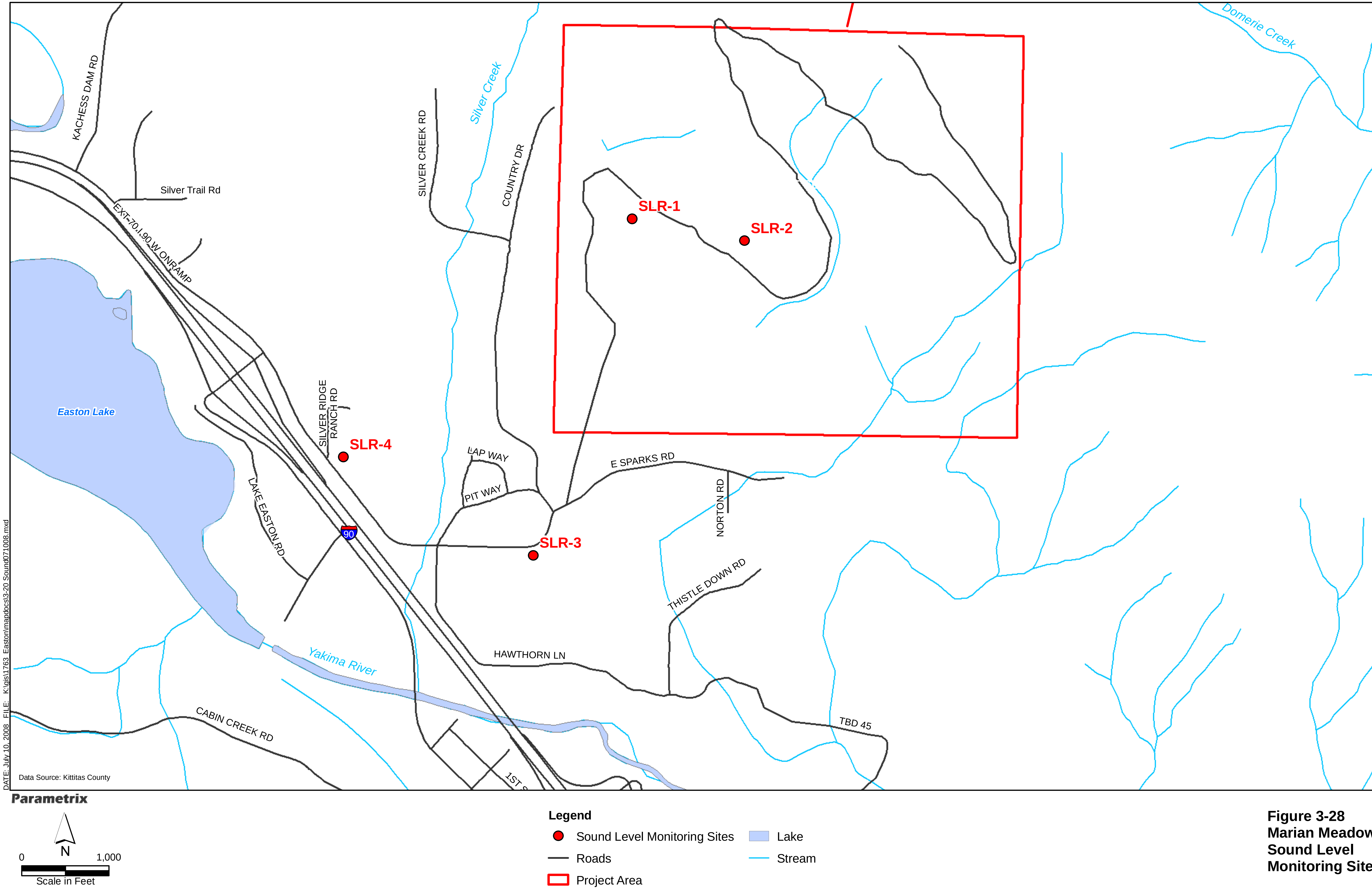
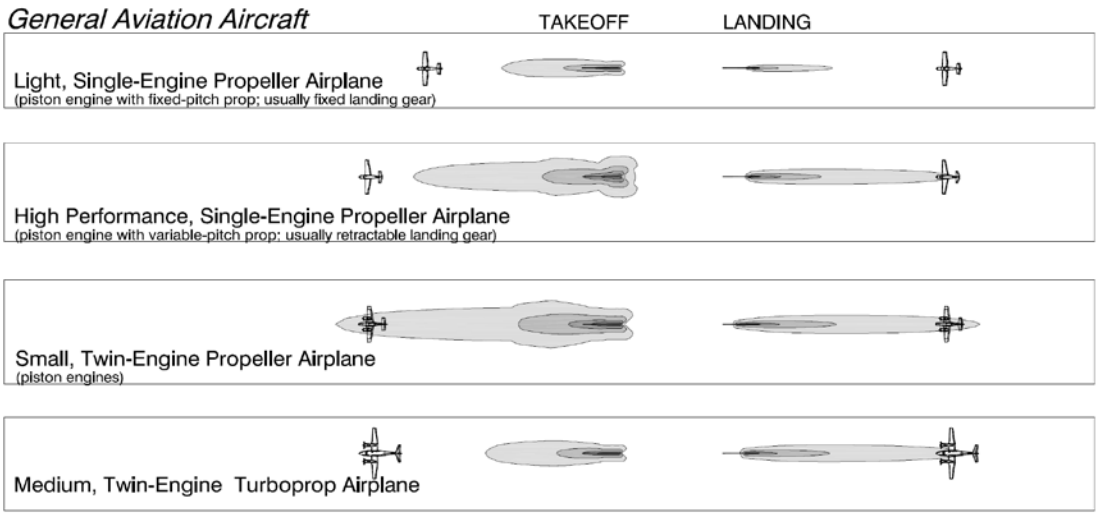


Figure 3-28
Marian Meadows Sound Level Monitoring Sites

Figure 3-29 Aircraft Noise Footprints



Source: California Airport Land Use Planning Handbook (January 2002)

The contours represent the momentary maximum sound level experienced on the ground as the aircraft flies over. The outermost contour for each aircraft indicates a 65-dBA sound level. Additional contours are at 10-dBA increments (75, 85, and, in most cases, 95 dBA).

The noise levels produced by average propeller-driven small airplanes found at general aviation airports have not changed appreciably over the years. The potential for future technological improvements is limited. Moreover, small private airplanes are not replaced with newer models at anywhere near the rate common to commercial airline aircraft. Thus, for many years to come, the noise impacts of typical propeller airplanes are likely to remain similar to the present.

Although airborne aircraft operations are the primary source of aircraft noise in the vicinity of an airport, ground operations can also produce relatively high noise levels. Locations and activities relating to noise levels of ground operation include:

- Taxiing—Aircraft mostly use low power settings when taxiing between parking locations and a runway and produce low noise levels. Exceptions include the added power to begin moving an aircraft when stopped. Also, propeller airplanes need moderately high engine power to start the engine. Noise levels increase correspondingly for these few moments.
- Runway Holding Bays—For land uses near the end of a runway, run-up noise in preparation for takeoffs can be louder and more prolonged than overflight noise.

Pilot technique is also an important variable in aircraft noise. Practices which produce noise variations include:

Angle of climb while on takeoff (also affected by aircraft payload, air temperature, and wind); power adjustments during takeoff; propeller pitch setting on airplanes with variable pitch propellers, especially at high takeoff power settings; and flap settings (especially during landings).

As discussed above, airplane noise in an area such as Easton can be compared to the peak noise experienced from normal activities such as operation of a lawn mower or chain saw. Noise from the Easton State Airport is generally no higher and normally much less frequent than these sources of noise from residential use.

3 What noise standards apply in the area?

The proposal is subject to State of Washington and Kittitas County noise standards and regulations.

State of Washington noise regulations are found in WAC 173-60 (Table 3-29). Traffic traveling on public roadways is exempt from the State of Washington's maximum allowable noise levels. However, noise from individual motor vehicles is regulated by performance standards in state regulations (WAC 173-62). These rules set limits on the noise generated by various classes of motor vehicles.

Table 3-29. State of Washington Maximum Permissible Noise Levels (WAC 173-60-040)

	EDNA of Receiving Property		
EDNA of Noise Source	**Class A**	**Class B**	**Class C**
Class A (Residential, recreational, entertainment, and community services used for habitation)	55 dBA	57 dBA	60 dBA
Class B (Commercial)	57 dBA	60 dBA	65 dBA
Class C (Storage, industrial, agricultural)	60 dBA	65 dBA	70 dBA

EDNA = environmental designation for noise abatement

Construction noise between the hours of 7:00 a.m. and 10:00 p.m. also is exempt from the State of Washington's maximum allowable noise levels.

Noise regulations are addressed in Section 9.45 of the Kittitas County Code as a disturbance. The Code enumerates a list of disturbances, including:

- Operating motors, engines, motorcycles and snowmobiles in a capricious manner, to be plainly audible within any dwelling unit which is not the source or is generated within 200 feet of any dwelling unit.
- Playing amplified or otherwise loud music and voice amplification, either live or recorded.
- Yelling or shouting at a continuous loud level of sound.
- Allowing domestic animals to bark, howl, or otherwise make noise either on private or commercial premises for extended periods of time.
- Using noise-making fireworks except for duly authorized or approved public displays.

4 What are the expected effects of construction noise on nearby uses?

During construction, there would be a temporary increase in sound levels in the immediate vicinity of each of the three proposed actions due to the use of heavy equipment and the hauling of construction materials. The increase in noise levels would depend on the type of equipment being used and the amount of time it is in use. Table 3-30 displays ranges of noise produced by typical construction equipment.

Table 3-30. Typical Construction Equipment Noise

Construction Activity	Estimated L_{eq} at 50 feet (dBA)	Types of Equipment	Range of Noise Levels at 50 feet (dBA)
Clearing	83	Bulldozer	77–96
		Dump Truck	82–94
Grading	75–88	Scraper	80–93
		Bulldozer	77–96
Paving	72–88	Paver	86–88
		Dump Truck	82–94

Source: EPA (1971)

The most sensitive nearby land uses are the single-family residences to the southeast, east, and south of the site. The closest single-family residence to the southeast is about 100 feet from the project boundary.

These construction noise levels are somewhat higher than existing noise experienced by these residences. The character of the construction noise, however, is different from the more continuous noise from roadways. Construction noise varies in intensity and character and tends to be more intrusive for that reason.

Construction would generally be limited to daylight hours and would avoid noise disturbance during the nighttime sleeping hours, when people are most sensitive to disturbance.

What are some practices that can be employed to reduce noise impacts during construction?

Noise-reducing measures could include engine intake silencers and engine closures, muffler sizing, maintenance, and condition; positioning of equipment; shutoff of equipment during idling times, and substitution of hydraulic or electric models for impact tools.

5 How can construction noise be reduced?

The limited duration of construction noise peak levels generally does not require measures to reduce noise during daytime hours. Construction noise is not regulated by State of Washington regulations from 7:00 a.m. to 10:00 p.m. However, construction activities in Kittitas County will generally be limited to daytime hours. From November through February construction activities are typically limited to 8:00 a.m. to 6:00 p.m. and from March through October 7:00 a.m. to 8:00 p.m. During the summer months, these may be amended to reflect those hours prescribed by the Washington State DNR Industrial Fire Precautions regarding starting and completion hours per precaution level. During “Hoot owl” level operations, it is generally permissible to work from 8 p.m. to 1 a.m. to lessen the fire danger. Work occurring outside of daytime hours is generally an option, with each case being looked at and reviewed by Kittitas County Planning Department as an administrative decision.

If necessary, additional practices could be implemented simply and inexpensively to reduce construction noise. Construction contracts will specify that mufflers be in good working order and that engine enclosures be used on equipment when the engine is the dominant source of noise.

Substituting hydraulic or electric models for impact tools such as jack hammers, rock drills, and pavement breakers could also reduce construction and demolition noise. Although back-up alarms installed for safety purposes are exempt from the noise ordinances, noises from such devices are among the most annoying sounds from a construction site. Where feasible, equipment operators could drive forward rather than backward to minimize this noise. Noise from material handling could also be minimized by requiring operators to lift rather than drag materials wherever feasible.

What other measures can be taken to limit noise during construction?

Stationary equipment will generally be placed as far away from sensitive receiving locations as possible whenever construction occurs within 100 feet of a site boundary. Where this is infeasible, portable noise barriers will be placed around the equipment with the opening directed away from any sensitive receiving property.

Notification of residents or other sensitive uses of nighttime work can reduce irritation from nighttime work because people expect it, they are not taken by surprise, and they can often take measures such as shutting windows in advance to reduce noise impacts.

There are also a number of operational measures that can reduce construction noise. Care in operation of equipment, such as preventing tailgate banging on dump trucks after emptying their load, and using bedliners to reduce the noise from placing materials in haul trucks. Back-up alarms are often annoying because they are designed to be attention getting; measures are available to render the noise less intrusive during nighttime work when sleepers are particularly sensitive.

6 What long-term noise disturbance will result from the proposal and alternatives?

New long-term noise impacts will occur as a result from development regardless of the chosen alternative. Noise from typical residential activities varies by season and includes activities such as landscaping, children playing, and operating motor vehicles. Impacts will vary slightly depending on the extent and concentration of residential development.

In general, the long-term noise impacts associated with a given residential development are directly related to the number and tenure of the persons inhabiting a development. Impacts will be the largest where residences are most densely clustered and highly tenured.

Alternative 1, the applicant’s proposed PUD with 443 units on the entire site, would likely result in the second-most significant noise impacts of any of the alternatives because the proposal would allow a high number of residential units across nearly the entire site.

Alternative 2, PUD on the westerly portion of the site with up to 443 units depending on the proportion of multi-family units, would likely result in the most significant noise impacts of any of the alternatives because the proposal would allow the highest number of residential units in the smallest gross area.

Alternative 3, No Action Alternative comprising 3-acre lots with up to 147 lots, would likely result in the most minimal noise impacts of any of the alternatives because development would be less dense throughout the site and noise buffers would be maintained.

Alternative 4, PUD with reduced density on the entire site with about 180 lots, would likely result in medium noise-related impacts throughout the site. Low density development would maintain noise buffers between residences.

Alternative 5 PUD on westerly portion of the site with about 140 lots would likely result in medium noise-related impacts within the westerly portion of the site. Higher-density development would concentrate noise impacts in a smaller gross area.

7 What are the likely cumulative impacts with development of nearby land at rural densities or at densities similar to the proposal?

Cumulative impacts on noise are likely related to both the number of people in the area producing noise and the relative distance between generators and receivers.

The combined development of Alternatives 1 and 2 with other development in the area at the existing zoning density of one unit per 3 acres would result in a community with about the same number of residents as Cle Elum and about 20 percent larger than the 2009 population of Cle Elum if all the units were occupied full-time by families. Subdivision at the density reflected in the Marian Meadows PUD application would allow a density up to about one unit per acre and result in the equivalent of a community with about 1,200 dwellings and a population of about 3,000. This is about 60 percent greater than the estimated 2008 population of Cle Elum of 1,865 (if all the units were occupied full-time by families).

In both cases, the increase in population likely would lead to higher noise levels characterized by residential areas in a small town rather than in a rural area. It is unlikely that such a difference would be measurable, but it may be perceived by residents in terms of the frequency to which they experience noise disturbance

3.8 AIR QUALITY

1 Are there currently air quality problems in the area?

A review of available air quality indicator data from Ecology has determined that there are no known air quality problems in the vicinity of the proposal.

EPA has established National Ambient Air Quality Standards (NAAQS) under the Clean Air Act (40 CFR 6, 51 & 93). The NAAQS specify maximum concentrations for particulate matter (PM_{10} and $PM_{2.5}$), carbon monoxide, ozone, sulfur dioxide, lead, and nitrogen dioxide.

There are three air pollutants of major concern in the Kittitas Valley:

- Particulate matter, which includes both solid matter and liquid droplets suspended in the air. The major sources of particulates in the area are wind-borne dust and wood smoke. Wood smoke may include residential stoves and fireplaces, as well as smoke from burning logging debris and wood from wildfires.
- Carbon monoxide, which is primarily from motor vehicle exhaust.
- Ozone, which is contributed to by motor vehicle exhaust and other sources.

What are particulates?

Particulate matter (PM) is a mixture of particles that can adversely affect human health, damage materials, and form atmospheric haze that degrades visibility.

PM with a diameter of less than or equal to 10 micrometers is referred to as PM_{10}. A PM_{10} particle is roughly 1/8 times the diameter of a human hair. Particles as small as 2.5 micrometers or smaller may be referred to as $PM_{2.5}$.

In general, the smallest particles pose the highest human health risks. PM exposure can affect breathing and aggravate existing respiratory and cardiovascular disease. PM can also alter the body's defense systems against foreign materials and damage lung tissue, contributing to cancer and premature death. Individuals with chronic obstructive pulmonary or cardiovascular disease, asthmatics, the elderly, and children are most sensitive to the effects of PM.

Pursuant to EPA guidelines, Kittitas County is not currently designated as a non-attainment area for any of the pollutants of concern.

Air quality is influenced by natural conditions, such as climate, as well as human activities. The climate characteristics in the Easton area provide almost constant winds that blow from west to east limiting the potential for concentrations of pollutants. Climate in the Kittitas Valley is heavily influenced by the Cascade Mountain Range, which forms a north-south topographic and climatic barrier influencing prevailing wind direction, temperature, and precipitation. As air masses rise over the western slope of the Cascades, cooling and condensation produce heavy precipitation in the mountains. Temperature inversions that trap pollutants occur in the Ellensburg area, where the Kittitas Valley is a bowl enclosed by ridges. In the Easton area, in the upper Kittitas Valley, there are no topographic barriers to the downhill flow of air masses and little evidence of poor dispersion conditions that would lead to exceedance of air quality standards. Information from the National Weather Service station at Stampede Pass and wind records collected for wind generation facilities near Thorpe confirm that low wind conditions are experienced very rarely in the area (WRCC 2008d; EFSC 2008).

Ecology maintains an air quality monitoring station in Ellensburg. That station monitored PM_{10} levels until 2004, when equipment was installed to monitor smaller particulates at the $PM_{2.5}$ level. No exceedances of air quality standards have been observed in Ellensburg for either particulate matter standard (Ecology 2008).

Standards for carbon monoxide were assessed by WSDOT for the I-90 Hyak to Easton Widening project. The assessment determined that carbon monoxide levels are not likely to exceed standards with projected future traffic growth (WSDOT 2002).

An air quality study in Cle Elum in late 2007 and early 2008 indicated patterns of increases of particulates that are consistent with use of wood for heating, with an early morning and late afternoon/early evening increase (Hopkins 2008). These data, however, do not indicate exceedance of standards. Given the lack of exceedance in Ellensburg, which has less favorable winds, the potential for inversions, and a greater population, it appears unlikely that exceedance of air quality standards for particulates would occur in the upper Kittitas Valley in general, and in Easton in particular.

2 What air quality standards apply in the area?

Two agencies have jurisdiction over the ambient air quality in the project area, EPA and Ecology.

As part of the Clean Air Act, EPA established ambient air quality standards for six criteria pollutants. Two classes of ambient air quality standards were established—primary standards to protect the public health, and secondary standards to protect the public welfare and the environment (for example, soils, vegetation, and wildlife).

When measured concentrations of a pollutant exceed the NAAQS, the area is designated as a non-attainment area for that pollutant. Kittitas County has not been designated a non-attainment area for any pollutants. The Seattle/Everett/Tacoma area was designated a carbon monoxide non-attainment area in the 1970s, 80s, and 90s. Programs to improve the emissions of motor vehicles implemented on a nationwide level, in conjunction with regional actions such as inspection of vehicle emissions systems, led to a reduction in pollutants such that the area was redesignated an attainment area for carbon monoxide in 1997. Similarly, the Seattle/Everett/Tacoma area was designated a non-attainment area in the past, but has achieved compliance with the ozone standard in the past 5 years.

An element of the strategy developed by Ecology in ensuring compliance with air quality standards is the regulation of burning related to agriculture or timber harvest, as well as wood stoves and fireplaces used for home heating. Ecology developed the Washington Air Quality Advisory (WAQA), which is a tool for informing people about the health effects of air pollution (Tables 3-31 and 3-32). The Ecology Air Quality Program set a health goal for fine particulate matter ($PM_{2.5}$) of 20 microns per meter (20 $\mu g/m^3$), which is a lower standard than the EPA 24-hour standard of 35 $\mu g/m^3$.

Table 3-31 Washington Air Quality Advisory $PM_{2.5}$ Standards

Category	WAQA Estimated 24-Hour Average µg/m³
Good (0-50)	0 to 13.4
Moderate (51-100)	13.5 to 20.4
Unhealthy for Sensitive Groups (101-150)	20.5 to 35.4
Unhealthy (151-200)	35.5 to 80.4
Very Unhealthy (201-300)	80.5 to 135.4
Hazardous (301-500)	>135.4

In recognition of the effect of wood heating on air quality, Washington State has several laws addressing wood stoves including:

- RCW 70.94.450, which establishes the policy of the state to control, reduce, and prevent air pollution caused by wood stove emissions; encourages Ecology to educate the public about the effects of wood stove emissions and other heating alternatives; and promotes the desirability of achieving better emission performance and heating efficiency from wood stoves.
- RCW 70.94.455, which establishes standards for solid fuel burning devices and provides for the state building code to require an adequate source of heat other than wood stoves in all new and substantially remodeled residential and commercial construction.
- RCW 70.94.470, which establishes standards for smoke opacity to aid in enforcement.
- RCW 70.94.473, which provides that, during an air pollution episode, alternatives to wood burning will be used in buildings with alternative sources of heat, and for those without alternatives, only certified wood stoves can be used.

Table 3-32 Washington Air Quality Advisory Effects by Category

Category	WAQA Health Effects
Good	None
Moderate	Some people with lung and heart disease, stroke, diabetes, or a current respiratory infection may be sensitive to air pollution at this level and should consider limiting outdoor activity.
Unhealthy for Sensitive Groups	People with lung and heart disease, stroke, diabetes, or a current respiratory infection, infants, children, and older adults should limit outdoor activity.
Unhealthy	Everyone should try and limit outdoor activity. If possible, people with lung and heart disease, stroke, or respiratory infections, infants, children, and older adults should stay indoors.
Very Unhealthy	Everyone should try to stay inside. People with lung and heart disease, stroke, diabetes, or a current respiratory infection should limit indoor activity levels. Shut windows and doors if it is not too hot. Set air conditioners on the re-circulate mode if this is available.
Hazardous	Everyone should try to stay indoors. Limit physical activity. Shut windows and doors if it is not too hot. Set air conditioners on the re-circulate mode if this is available. If it is too hot to shut windows and doors, consider leaving the area until air quality improves.

Kittitas County has no specific policies or standards for air quality.

3 During construction, are air quality problems expected?

During construction, dust from excavation and grading would contribute to ambient concentrations of suspended particulate matter. This environmental protection may include application of water or other dust suppressants during dry weather.

The site was recently logged thus limiting the extent of clearing and grubbing necessary to accommodate the proposed site development. However, disposal of existing, non-marketable trees and shrubs may involve slash burning. If this method is employed, the requirements of WAC 222-30-100 will be

How were greenhouse gas emissions calculated for this analysis?

Total lifespan emissions for the applicant's proposed PUD and each of the alternatives were calculated in terms of metric tons of CO_2 equivalent ($MTCO_2E$).

This calculation includes emissions associated with the embodiment of the residential structures and pavement for driveways and roads, the emissions from energy associated with the maintenance and upkeep of these structures, as well as operational use such as heating. Also included are the emissions associated with the transportation needs of inhabitants of the structures over the structures' design lifespan.

complied with for limitations during impaired air quality. Any slash burning would also be conducted pursuant to Kittitas County burning regulations and standards.

Some phases of construction would cause odors detectible to some people away from the project site. This would be particularly true during paving operations with asphalt. Such odors would be short term.

4 What long-term effects on air quality are expected from the proposal and alternatives?

Regardless of the alternative that is ultimately selected, the existing data for Cle Elum and Ellensburg do not indicate exceedance of air quality standards, even with a greater population, less favorable winds, and the potential for inversions. The upper Yakima River Valley in the vicinity of Easton has virtually constant winds, no inversions, and no topographic or other features that contain air masses. Regardless of the alternative, it is very unlikely that the potential population of the site and the area will result in exceedance of air quality standards, even with cumulative growth.

However, measurable long-term air quality impacts will occur under each alternative development scenario. Generally, long-term air quality impacts associated with the proposal and the alternatives can be assumed to be linearly correlated to the amount of residential units developed; the more units developed, the more significant the air quality impacts will be.

Alternative 1, the applicant's PUD proposal with 443 units on the entire site, is not likely to result in exceedance of air quality standards, even if wood heating was used. Some localized concentration of wood smoke may occur, especially in early morning low wind conditions, when fog and wood smoke tend to accumulate in low-lying areas. This may occur in the lower, flat portions of the site, but is unlikely in the steep-sloping easterly portion of the site. Such localized concentrations may be an annoyance for some residents and may adversely affect residents with respiratory conditions, especially on the flatter westerly portion of the site, which will be developed under this scenario.

Regarding contribution of carbon to cumulative impacts of global warming, the total lifespan emissions for Alternative 1 were calculated at an estimated 714,045 metric ton carbon dioxide equivalent ($MTCO_2E$). This is a standard measure of carbon produced in the manufacture of all components of development, including materials and construction of infrastructure and residences as well as life-span operating emissions. This measure is useful primarily in comparing alternatives.

Alternative 2, a PUD on the westerly portion of the site with up to 443 units, depending on the proportion of multi-family units, is not likely to result in exceedance of air quality standards, even if wood heating was used. Some localized concentration of wood smoke may occur, especially in early morning low wind conditions, when fog and wood smoke tend to accumulate in low-lying areas. This may occur in the lower flat portions of the site, such as the westerly portion of the site, where the PUD will be located in Alternative 2. Such localized concentrations may be an annoyance for some residents and may adversely affect residents with respiratory conditions. Because the highest-occupancy proposed

PUD will be located in the westerly portion of the site under Alternative 2, it is anticipated that air quality impacts will be most significant under this scenario.

Total lifespan emissions for Alternative 2 were calculated at an estimated 618,356 $MTCO_2E$, or about 87 percent of Alternative 1.

Alternative 3, No Action Alternative comprising 3-acre lots with up to 147 lots, is not likely to result in exceedance of air quality standards, even if wood heating was used. Some localized concentration of wood smoke may occur, especially in early morning low wind conditions, when fog and wood smoke tend to accumulate in low-lying areas. This may occur in the lower, flat portions of the site, but is unlikely in the sloping easterly portion of the site. Such localized concentrations may be an annoyance for some residents and may adversely affect residents with respiratory conditions, especially on the flatter western portion of the site, which will be developed under this scenario, albeit at a lesser density than other alternatives.

Total lifespan emissions for Alternative 3 were calculated at an estimated 244,290 $MTCO_2E$, or about 35 percent of Alternative 1.

Alternative 4, PUD with reduced density on the entire site with about 180 lots, is not likely to result in exceedance of air quality standards, even if wood heating was used. Some localized concentration of wood smoke may occur, especially in early morning low wind conditions, when fog and wood smoke tend to accumulate in low-lying areas. This may occur in the lower flat portions of the site, but is unlikely in the steep-sloping easterly portion of the site. Such localized concentrations may be an annoyance for some residents and may adversely affect residents with respiratory conditions, especially on the flatter westerly portion of the site, which will be developed under this scenario, albeit at a lesser density than other alternatives.

Total lifespan emissions for Alternative 4 were calculated at an estimated 299,131 $MTCO_2E$, or about 42 percent of Alternative 1.

Alternative 5, a PUD on the westerly portion of the site with about 140 lots, is not likely to result in exceedance of air quality standards, even if wood heating was used. Some localized concentration of wood smoke may occur, especially in early morning low wind conditions, when fog and wood smoke tend to accumulate in low-lying areas. This may occur in the lower flat portions of the site, such as the westerly portion of the site, where the PUD will be located in Alternative 5. Such localized concentrations may be an annoyance for some residents and may adversely affect residents with respiratory conditions. Because the proposed PUD will be located in the westerly portion of the site under Alternative 5, it is anticipated that air quality impacts will be most significant under this scenario. However, it is anticipated that they will be less than those impacts associated with Alternative 2, which is a higher-occupancy alternative development scenario.

Total lifespan emissions for Alternative 5 were calculated at an estimated 225,657 $MTCO_2E$, or about 32 percent of Alternative 1.

5 What are the likely cumulative impacts with development of nearby land at rural densities or at densities similar to the PUD proposal?

Air quality will be primarily affected by the use of wood stoves for heating.

The combined development of Alternatives 1 and 2 with other development in the area at the existing rural zoning density of one unit per 3 acres would result in a community about 20 percent larger than the 2009 population of Cle Elum, if all the units were occupied full-time by families. Cumulative subdivision at the density reflected in the Marian Meadows PUD application would allow a density up to about one unit per acre and result in the equivalent of a community with about 1,200 dwellings and a population of about 3,000. This is about 60 percent greater than the estimated 2008 population of Cle Elum of 1,865 (if all the units were occupied full-time by families).

Given the lack of exceedance of air quality standards in Ellensburg with a much larger population and less favorable dispersion conditions, it is improbable that either scenario would result in exceedance of air quality standards.

6 During construction, what measures can reduce air quality effects of the project?

During construction, several best management practices will be followed to ensure that air quality effects associated with the project are minimized to the extent possible. This will include:

- Well-maintained construction equipment and trucks will be used to reduce emissions; vehicles and equipment will be fitted with emission-controlling components such as air filters and catalytic convertors.
- Prolonged periods of idling vehicles and other engine-powered equipment will be avoided.
- During construction, areas of exposed soils will be regularly sprayed with water or other dust suppressants.
- Cleared area that will be exposed for prolonged periods will be paved, planted with a vegetation ground cover, or covered with gravel.
- Loads in trucks will be covered to ensure that dust and soil does not fly off and pollute the air.
- A program and schedule for road sweeping will be submitted concurrent with submittal of an application for the first phase or subphase of development.

If applicable, burning of land clearing debris will be consistent with the County Solid Waste Plan, Fire Protection regulations, and as conditioned by WAC 173-425-030 or otherwise permitted in accordance with the county-approved Land Stewardship Plan.

7 During operation, what measures can reduce air quality effects of the project?

Additional measures could reduce air quality effects associated with the proposal and the alternatives:

- A restriction on all wood burning stoves could be included to all privately owned units including the single-family residences. This restriction would reduce emissions from the project, but would likely be difficult to enforce over the lifetime of the project.
- Residents can be educated regarding safe operation of devices that can have negative impacts on air quality such as barbecues, chemicals and pesticides, smoking, operation of combustion engines, and fireworks.

3.9 HAZARDOUS MATERIALS

1 Are there likely to be hazardous materials in the project area?

The site has not hosted past industrial or commercial activities that are likely to have resulted in hazardous materials being located on the site. It is possible that unregulated dumping on the site has resulted in deposition of household hazardous waste, but no such evidence has yet been observed in field work or reconnaissance on the site by numerous professionals.

Uses in the vicinity that may generate hazardous waste are limited to automobile service stations and repair with associated fuels, lubricants, chemicals, and former railroad facilities. Operation of the former railroad facilities in Easton may have involved fuels, lubricants, or other hazardous materials, but evaluation of presence of hazardous materials is outside of the scope of this analysis. The closest railroad facilities are located at a significant distance from the proposed site and are unlikely to affect future use.

What is included in the Spill Prevention Control and Countermeasures Plan?
Such a plan normally would include:

1. Designation of responsible contractor personnel for implementation.

2. Prevention and containment provisions including location, design, and construction standards for:

a. Equipment staging and maintenance areas,

b. Fuel staging,

c. Hazardous material staging, and

d. Waste storage areas.

3. Monitoring provisions.

4. Spill notification procedures and designated responders.

5. Designation of response and cleanup protocols.

2 What hazardous materials could be released during construction?

During construction, earth-moving activities could result in uncovering previously unidentified materials that may have been placed on the site without the knowledge of Kittitas County or the landowner; however, this is unlikely.

There is also the slight chance that past unrestricted access to the site may have resulted in dumping of hazardous materials that has resulted in localized contaminated soils.

During construction, fuel or other materials may be accidentally released during construction. Applications of paints, pesticides, chemicals, or discharges of wash water during construction could potentially result in unexpected releases of contaminants to the soil.

3 What measures would address hazardous materials during construction?

The potential for discovery or accidental discharge of hazardous materials during construction will be addressed by an Environmental Management Plan to be implemented by the contractor which would include, but not be limited to, the following elements:

(1) Designation of contractor representatives and procedures to check for the presence of contaminated soil and contaminated groundwater.

(2) Procedures for characterization, management, disposal, and follow-up reporting for contaminated soil, groundwater, and associated materials (such as underground tanks and septic systems).

If contaminated soils are encountered, the response is likely to be excavation and disposal of contaminated soils at an approved disposal facility. If contaminated materials are encountered of a magnitude beyond localized soil contamination, a site investigation may be warranted. If the results of the preliminary site investigation indicate the need for more detailed sampling and analysis, then a detailed site investigation may be performed. The scope of the detailed site investigation would be dependent upon the nature and extent of contamination.

To control accidental discharge of hazardous materials during construction, an SPCC Plan will be created for the project.

It is unlikely that the scope of construction will result in hazardous material spills that will be more than localized and require more than a routine removal and disposal response.

4 What long-term effects could the project and alternatives have on hazardous materials?

The long-term effects of the alternatives discussed in this analysis on hazardous materials are anticipated to be minimal. Residential standards for maintaining and disposing of hazardous materials established in RCW 70.105 will be applicable to all those inhabiting residences at the site.

5 What are the likely cumulative impacts with development of nearby land at rural densities or at densities similar to the PUD proposal?

The potential cumulative impacts of development of nearby land in the vicinity would result in additional residences. This would lead to more potential cases of residents employing hazardous materials but would not increase risk materially.

6 What measures can reduce potential hazardous material risks?

Hazardous material risks during construction generally would be addressed by a control and response plan.

Hazardous material risk of long-term use generally would be addressed by controlling uses using hazardous materials.

Hazardous household materials generally would be addressed through education and providing convenient means of safe disposal.

3.10 HISTORIC, CULTURAL, AND ARCHAEOLOGICAL RESOURCES

1 What historic, cultural, or archaeological resources are likely to be present in the project area?

The potential for cultural resources to be present on the site and in the area relates to the type of human habitation and use that may have occurred.

Prior to European-American contact, the area was occupied by the Kittitas or Upper Yakima Tribe. Ethnographers classify the area as part of a larger retention, the Southern Plateau, which extends from the Okanogan Highlands in the north to the southern edges of the Deschutes and John Day Rivers in the south, and from the crest of the Cascade Mountains in the west to the Bitterroot Mountains in the east.

Period I. 11,500 years ago to 5000/4400 B.C. includes Clovis and post-Clovis cultures that practiced a broad-spectrum hunter-gatherer subsistence strategy. People moved frequently and left no evidence of dwellings or structures. The great majority of artifacts are concentrated in the central and eastern portions of the region along the Columbia and Snake rivers and tributaries. A documented archaeological site in Kittitas County is located at Ryegrass Coulee near Vantage on the Columbia River. No sites have been identified in the upper Kittitas Valley.

Period II. 5000/4400 to 1900 B.C. is characterized by semi-subterranean pit houses along with evidence of increased exploitation of certain nutritious roots and salmon. Less investment is made in the manufacture of stone tools as judged by their decline in quality. The presence of semi-subterranean pit houses likely represents a region-wide shift in settlement patterns to some form of semi-sedentism. However, there are few dated dwellings in the region.

Period III. 1900 B.C. to A.D. 1700 is marked by the widespread reappearance of pit houses, increasing heavy reliance on fishing and storage of salmon, intensive exploitation of camas, and other patterns of use that persisted into the 19th century. These include seasonal (usually winter-early spring) villages in the canyons and exploitation of uplands and mountains from special use camps during the summer and fall. Concentrations of houses in villages appeared by A.D. 500, with longhouses after A.D. 500.

Cultural artifacts in the upper Kittitas Valley are most likely to reflect spring, summer, and fall activities related to gathering and processing of various foods found in the surrounding areas (Hunn 1990). Fisheries utilized by the Kittitas during the summer and early fall were located at the outlets of Lakes Cle Elum, Keechelus, and Kachess (Schuster 1990). In addition, fishing sites are found along the entire length of the Yakima River (DePuydt 1990). The Kittitas maintained particularly strong trade relations with the Snoqualmie, including wintering at their village below Snoqualmie Falls (Prater 1981).

European-American Contact. The horse arrived in the Kittitas Valley around 1740, after being traded by the Shoshone to other Plateau Indians and then to the Kittitas. With the resulting increase in mobility, they could then travel greater distances, often to the Great Plains in pursuit of buffalo or to intertribal trade centers and social gatherings. Plateau people were influenced by the Great Plains culture and adopted many of their practices, such as dress, dancing style, housing style, decorative, beaded horse garments, European trade goods, and changes in inheritance patterns (Meinig 1968; Schuster 1990).

Actual European-American contact began with the Lewis and Clark Expedition in fall 1805, well south of the Easton area. Fur traders soon followed Lewis and Clark. Alexander Ross of the Northwest Company came to the Kittitas Valley in 1814. Some time after 1840, the Kittitas began grazing herds of horses in the valley (Schuster 1990). In May 1841, Lieutenant (Lt.) Charles Wilkes of the United States Exploring Expedition sent Robert Johnson from Puget Sound overland to explore the interior of the Columbia. On his way, Lt. Johnson stopped in the Kittitas Valley to purchase fresh horses. Catholic missions were established in the Yakima River Valley in 1847(Schuster 1982).

European-American Settlement. In the 1850s the Donation Land Act was passed and Indian lands in the Northwest were opened for settlement. Washington Territory was formed in 1853. In June 1855 a treaty was entered into with tribes in Eastern Washington, which created the Consolidated Tribes and Bands of the Yakima Nation and established the Yakima Indian Reservation. Kittitas Indians were eventually relocated to the reservation. In September 1855, as a result of Indian Wars, Colonel George Wright constructed a base camp in the Kittitas Valley. Hostilities continued until September 1858.

By the 1860s, cattle were being driven from the Yakima Valley to the gold mines in Canada. After the Snoqualmie Wagon Road was completed in 1867, ranchers in the Kittitas Valley began to drive cattle to Puget Sound (Prater 1981). Sawmills were established in the Kittitas Valley as early as the 1870s.

The flat westerly portions of the project site and the bench area in the eastern portion was surveyed in 2006 by Reiss-Landreau Research on a grid of 10-meter transects. No cultural resources were found on the site.

In 1887, the Northern Pacific Railroad was completed from the Kittitas Valley through Stampede Pass and onto Tacoma, with railroad support facilities established at Easton. The construction of the railroad stimulated settlement of the Kittitas Valley and other areas of Eastern Washington. The Snoqualmie Wagon Road continued to be used largely for local circulation until the coming of automobiles. The Snoqualmie Wagon Road is now I-90.

Irrigation began as early as 1892. Construction did not begin in the upper valley until the Kittitas Reclamation District was organized in 1911 using water from the reservoirs at Kachess Lake and Keechelus Lake. The Main Canal constructed between 1926 and 1932 utilizes a water intake on the Yakima River just above Easton.

The General Land Office map (c.1898) shows a possible homestead on the project site in Section 1 associated with J.W. Combes as well as an irrigation ditch slightly to the north. Site investigation by archaeologist Chris Landreau led to the conclusion that relative to current section lines, the Combes homestead is farther south in an area where current homes have obliterated any remains. An additional archaeological site consisting of a historic roadway is located about a mile west of the project site.

2 What policies and regulations govern historic cultural or archaeological resources that may be present on the site or in the vicinity?

The provisions of RCW 27.53.060 govern the removal, alteration, or excavation of historic or prehistoric archaeological resources or sites and the removal of archaeological objects from a site. A permit process is designed to ensure that any artifacts on private land are dealt with by a qualified professional. For artifacts on public land, the law provides for preservation or conservation.

> Kittitas County has policies for protection of cultural resources only within the jurisdiction of the Shoreline Management Act and the Snoqualmie Pass Subarea Plan.

RCW 27.44.030 through 27.44.050 declare a public policy to protect Indian burial sites, cairns, glyptic markings, and historic graves located on public and private land to encourage voluntary reporting and respectful handling in cases of accidental disturbance, and to provide for enhanced penalties for deliberate desecration. The law provides for a permit from the director of the Department of Archaeology and Historic Preservation to remove or alter any of the above-listed items, in coordination with the tribes.

RCW 68.60.040 and 68.60.050 protect tombs, plots, monuments, memorials, or markers in a cemetery, as well as other facilities such as fences, and provides penalties for unlawful opening of a grave or removal of personal effects or human remains. This applies to both cemeteries and historic graves.

3 What effects on historic, cultural, or archaeological resources may occur from the proposal and alternatives during construction and use?

The potential for effects on historic and cultural resources is essentially the same for the applicant's proposed PUD or any of the alternatives. If suspected historic, cultural, or archaeological resources are encountered during construction, construction activity will be immediately stopped, the area will be contained, and the Washington Office of Archaeological and Historical Preservation (OAHP) will be notified.

4 What are the likely cumulative impacts with development of nearby land at densities similar to the proposal?

The potential cumulative impacts of development of nearby land in the vicinity was developed for the area north of I-90 served by Sparks Road under two scenarios:

- Development at existing rural densities at one unit per 3 to 5 acres.

- Development at the intensity allowed under PUD regulations as proposed for the Marian Meadows site, resulting in about one unit per acre.

Impacts on archaeological resources are anticipated to be minimal under either development scenario.

5 What measures could reduce effects on historic, cultural, or archaeological resources?

Prior to any disturbance to known significant resource areas, an archaeological permit will be requested from Washington OAHP, state permission granted, and archaeological testing conducted to determine the significance and extent of the cultural resource.

Mitigation measures available to ensure protection of all significant cultural resources on the site include:

(1) Avoidance.

(2) Limited testing to determine the significance and extent of properties deemed potentially significant to the National Register of Historic Places.

(3) Using an approved cultural resources plan, a protective overburden may be placed on top of known significant properties creating an undisturbed barrier between the resource and development activity.

(4) Excavation to recover significant cultural information prior to negatively affecting any properties eligible for placement on the National Register of Historic Places.

Avoidance of impacts to all previously identified significant cultural resources can be obtained by establishing a 150-foot buffer around known resource areas. If it is determined that avoidance of a resource area is not possible, proposed construction or landscape alteration that intrudes into the prescribed buffer area can be conditioned on the applicant conducting archaeological subsurface testing. This testing will be completed prior to any disturbance to adequately document the extent and potential of the cultural resources for nomination to the National Register of Historic Places.

Necessary mitigation measures would be determined after testing in consultation with the Washington OAHP and the Yakama Nation.

3.11 GEOLOGY, TOPOGRAPHY, AND SOILS

1 What are the geologic, topographic, and soil conditions in the area?

The topography and geography of the project site reflect the general characteristics of the area.

The easterly portion of the site on Easton Ridge is on a steep sloping hillside composed largely of bedrock of Teanaway Formation basalt, basaltic tuff, and breccia.

What is a talus slope?

A talus slope, or scree, is mass of rock fragments that have collected at the base of a cliff or steep slope from which they have fallen.

The westerly edge of the steep portions of the site includes talus slopes of rocks formed by rockfall from above. The topography is stepped. A hillside rises from an elevation of about 2,200 feet to an initial ridge about 3,000 feet in elevation. A second slope rises to the crest of Easton Ridge at an elevation of about 4,400 feet. Between the two ridges is a less steep sloping area with a valley containing a stream.

What is an alluvial plain?

An alluvial plain occurs when deposits (usually silt or silty clay) from running water, such as streams, rivers, or floods, form a plain.

The westerly portion of the site consists of a gently sloping alluvial plain at an elevation of about 2,200 feet. There is an electrical transmission line at about the boundary of the alluvial plain and the sloping hillside.

The site topography and geology are typical of the Roslyn Basin of the Upper Yakima River Watershed, which is a classic U-shaped, glacially scoured valley. Figure 3-30 maps the geology in the vicinity. The valley was occupied by a large glacier complex that included coalescent glaciers from the Keechelus Lake, Kachess Lake, and Cle Elum Lake drainages. Deposits of at least three major glacial intervals have been mapped. These are the Lakedale Drift (15,000 years before present), the Thorp Drift (>700,000 years before present), and the Kittitas Drift (120,000 years before present). During Thorp and Kittitas times, the glaciers extended down the valley as far as the Teanaway River. The most recent glacial advance (the Fraser glaciation/Lakedale Drift) extended just east of the Easton area.

The bedrock of Easton Ridge is either Shuksan Greenschist or Silver Creek Pass Member andesite. The major structural feature in the area is the Straight Creek Fault (SCF). The SCF is a major right-lateral strike-slip fault extending north into Canada (Tabor et al. 2000). Portions of the SCF are thought to have been active within the last 10,000 years (Slemmons et al. 1981; Vance and Miller 1983). The southern extent of the SCF is interpreted to loosely follow Kachess Lake, pass through Easton, and curve to the southeast, following the Yakima River Valley, or alternatively through Ambolis Mountain, crossing the Yakima River Valley about 2 miles east of Easton (Tabor et al. 2000; Cheney 1999). The fault is inactive, pre-Tertiary in age (more than 65 million years before present), with right-lateral displacements of between 90 and 180 kilometers (Cheney 1999; Tabor et al. 2000). At the Marian Meadows site, one minor fault mapped by Cheney (1999) as the Tucker Creek Fault extends from Easton Ridge through the western edge of the site and trends from Easton Ridge to the southwest towards Lake Easton.

What is a glacial drift?

Glacial drift is rock material that was transported and deposited by glaciers when they melted.

Deposits on the valley floor are unconsolidated including:

- Glacially deposited glacial gravel and sand outwash.

- Alluvium (water-carried deposits) consisting of moderately sorted cobble gravel along the rivers and poorly sorted gravelly sand on small alluvial fans where streams discharge from the hillsides (Tabor et al. 2000).

The soils on the site and in the vicinity reflect the different environments in which they were formed. Soils are summarized in Table 3-33 and shown on Figure 3-31. The alluvial plain portion of the site corresponds to the Kladnick soil, a well-drained, ashy, sandy loam found on slopes of 0 to 3 percent, with low shrink-swell potential, and no ponding or water saturation within the upper 72 inches. Raedeke Associates, Inc. (2006) described this soil as homogenous 7.5YR 4/3, brown sandy loam to 18 inches, with no redoximorphic features.

The major portion of the steep-sloping southwest face of Easton Ridge at the site corresponds to Roxer soil, a shallow well-drained gravelly, ashy, sandy loam on slopes of 45 to 60 percent, with low shrink-swell potential, and no ponding or water saturation within the upper 72 inches. Raedeke Associates, Inc. (2006) described soils of the Easton Ridge as 7.5YR 4/2 to 4/4, very gravelly sandy loam to 18 inches, with no redoximorphic features.

What is a Fault?

A fault is a crack in the earth surface where the rock on either side of the fault has moved in different directions. When the surfaces slide against each other suddenly, the energy released can create an earthquake.

A small portion of Easton Ridge is classified as Roxer Complex, divided into the Roxer soil composing about 40 percent of the Complex, and Roxer soil with basalt stratum as 55 percent of the Complex. The Roxer soil with basalt stratum is well drained on slopes of 45 to 65 percent, with low shrink-swell potential, no ponding or water saturation within the upper 72 inches, and bedrock at a depth of 40 to 50 inches.

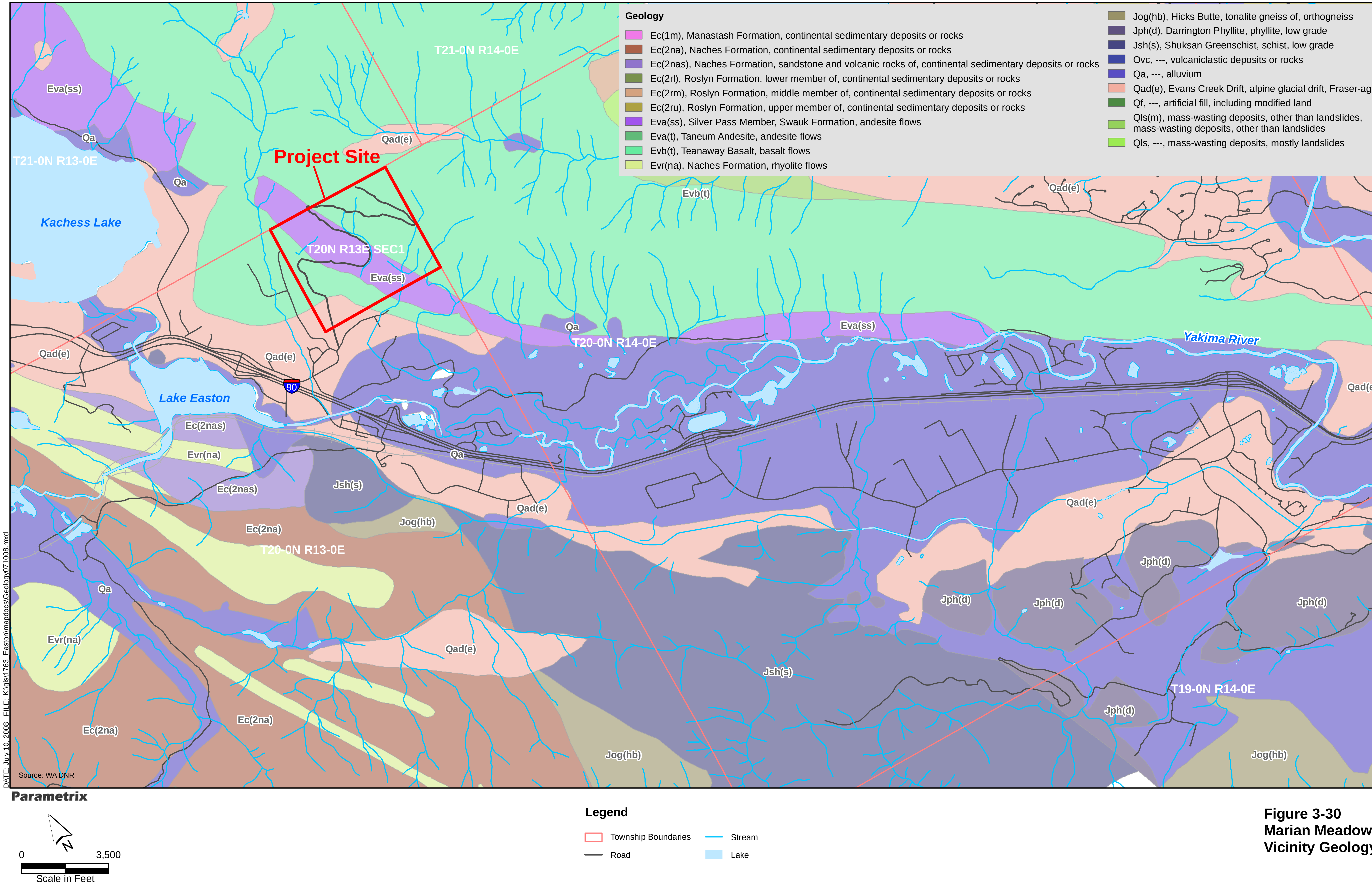


Figure 3-30
Marian Meadows
Vicinity Geology

Table 3-33. Soil Properties at the Marian Meadows Site

Soil name	Approximate perc ent of site	Soil type	Parent material	Infiltration rate	Natural drainage class	Erosion Factor, T	Wind erodability group	Shrink-swell potential	Ponded	Water saturation in upper 72 inches
Kladnick	24	ashy sandy loam	glacial outwash with a mantle of volcanic ash	high	Well-drained	3	2	Low	N	N
Roxer	68	gravelly ashy sandy loam	from basalt and glacial till with a mantle of volcanic ash	moderate	Well-drained	5	3	Low	N	N
Roxer Complex (Roxer 45% & Roxer-basalt substratum 55%)	2	gravelly ashy sandy loam/ basalt substratum	basalt colluvium and glacial till with a mantle of volcanic ash	moderate	Well-drained	3/5	3	Low	N	N
Rock Outcrop/Roxer Complex	4	--/as above	--/as above	very slow/moderate	--/Well-drained	--/3&5	--/3	--/Low	N	N
Rock Outcrop	2	--	--	very slow	--	--	--	--	N	N

Source; USDA (2008)

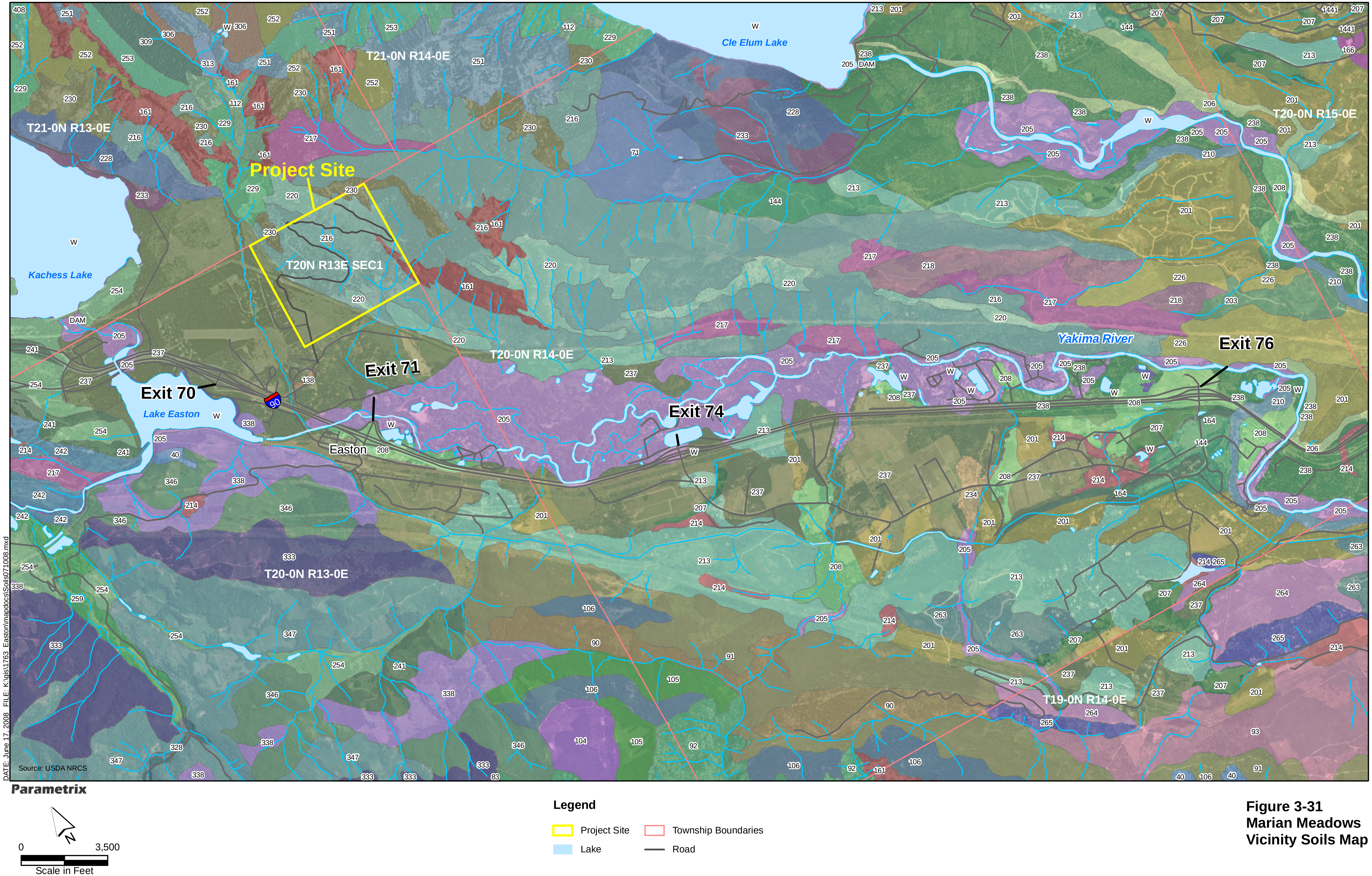


Figure 3-31
Marian Meadows
Vicinity Soils Map

Rock outcrop occurs in a small portion of the Marian Meadows development site as unweathered rock or a mixture of Roxer Complex soils and rock outcrop (NRCS 2008).

2 What risks or hazards are associated with geology, topography, and soils?

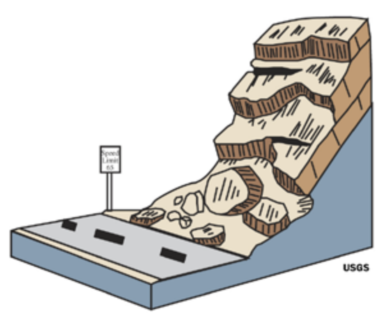
Geologic and natural hazards that could potentially affect the Marian Meadows development site include seismic activity and erosion hazards such as landslides or other types of mass movements.

Landslide Hazards

Landslide hazard areas are those portions of the landscape that have existing landslides or are at risk of future landslides. Mass movement (also called mass wasting) is the more general classification that includes landslides. Mass wasting involves the downward and outward movement of slope-forming materials such as rock, soils, artificial fills, and combinations of these materials (Gray and Sotir 1996). A type of mass wasting is surface erosion, consisting of detachment and transport of individual material particles.

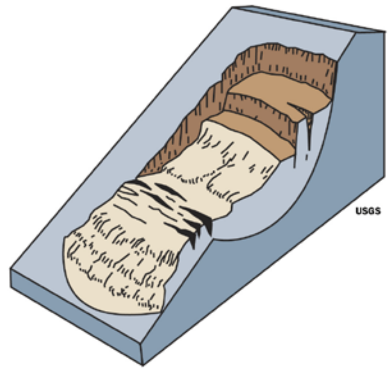
Several mass wasting classification systems are available for detailed studies, but these can be simplified into 1) those that are deeper and typically occur over extended time periods but can occur rapidly during earthquakes, and 2) shallow slides that occur fairly rapidly (Washington Forest Practices Board 1997). The main geological hazards with potential for occurring on the site and in the vicinity are rockfall, translational slides, soil creep, and erosion.

Rockfall includes freefall, tumbling, and rolling of fragments of rock or highly compact soils. Rockfalls typically originate from steep cliffs or features created by human activities such as road cuts. Material strength, surface gradient, joint pattern and spacing, geologic contacts, groundwater, and faulting are some of the primary factors related to rockfall occurrence. Run-out from the source area can extend quite far on steep slopes (Norman et al. 1996; Chatwin et al. 1991). Typically, debris form a wedge or debris fan at the toe of the source area. An example of this feature is the talus slopes on the site. Other rockfall is related to road construction or other human-induced disturbance.



Rockfall

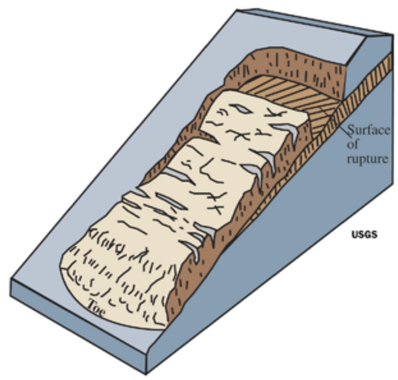
Deep-seated rotational slides are relatively deep movements that often occur slowly over time. These slides typically involve deep deposits and have a bowl-shaped or broad curving failure surface with a steep headwall scarp and additional scarps in the slide mass. Rotational slumps can be small, covering only a few yards (as is common along overly steep road cut and fill slopes), or they can be very large, covering many square miles. Source areas are associated with over-steepened valley walls with thick glacial and weathered bedrock deposits, geologic contacts and faults, and areas with concentrated groundwater conditions.



Rotational landslide

Translational slides occur along relatively shallow, fairly planar failure surfaces. A planar surface is a relatively even sloping surface. Shallow rapid translational slides often occur on shallow deposits over bedrock. Some of the causes of slides include:

- Alteration of the moisture content of the overlying material that forms a lubricated layer between the upper deposits and relatively impermeable deposits below.
- Additional weight on the overlying material that overcomes the friction between the upper and lower surfaces.
- Removal of materials at the toe of a slope that previously held the deposit in place.



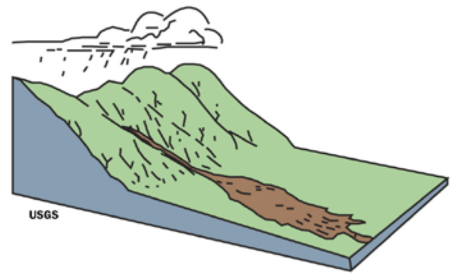
Translational landslide

Human activities that can contribute to translational slides include:

- Alteration of slopes by development or roads that intercept surface and shallow groundwater.
- Removal of vegetation that increases surface runoff and shallow groundwater.
- Diversion and concentration of increased water runoff down steep slopes that reduces stability of the surface soils. (Montgomery et al. 2000; Bunn and Montgomery 2004; Church 2002; Gomi et al. 2002; Dunne and Leopold 1978; and others).

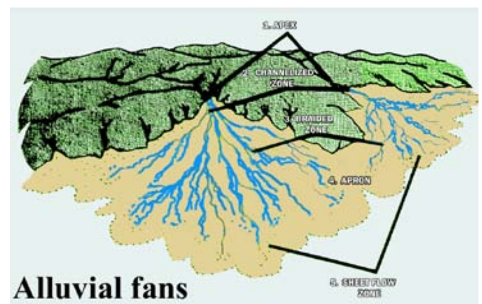
Soil creep and raveling are ongoing gradual movements of slope materials. Over many years, soil creep and raveling result in the accumulation of thicker soils at the lower portions of slopes and concave hollows. Motion is too slow to present a safety hazard but developments that require cutting into steep slopes need to plan for maintenance related to raveling and soil creep.

Debris flows and alluvial fans refer to the mechanism and the typical deposit of these types of geological hazards. They are generally associated with an episode of high water runoff that can be associated with storms, or they may be associated with other landslide types that suddenly release a large amount of mixed earth and water that move rapidly downhill. The characteristic deposit is the alluvial fan that is found at the point where a steep valley reaches a valley bottom and drops its load of heavy materials, spreading out in a fan shape. There is an



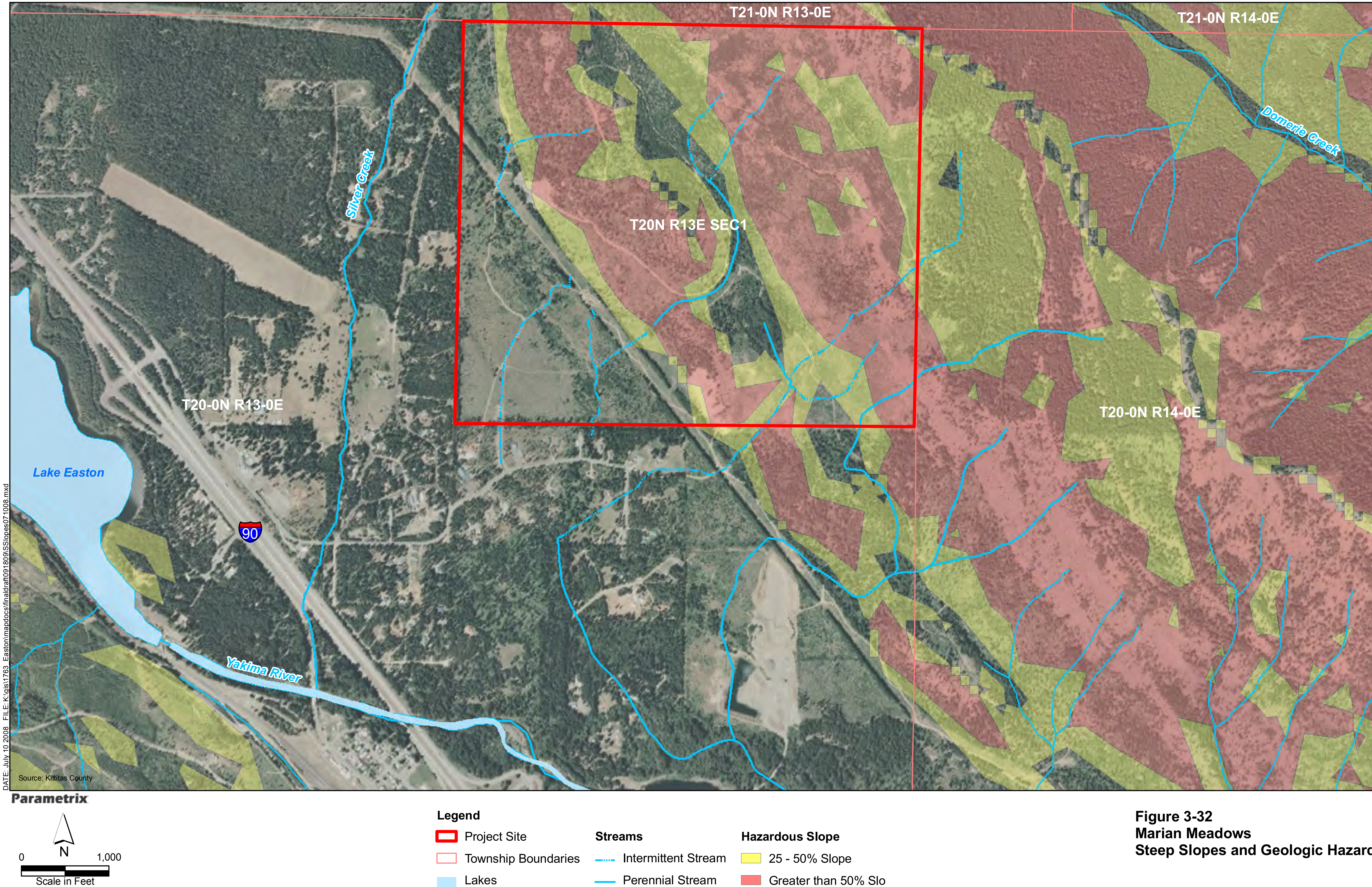
Debris flow

alluvial fan at the foot of the ravine that drains the central portion of the project site as indicated on Figure 3-32, an additional smaller fan near the northerly property line, and an additional off-site fan at the foot of the drainage that traverses the southerly portion of the site.



Erosion is the wearing away of the land surface by running water, wind, processes of mass wasting and corrosion (solution and other chemical processes), as well as waves or moving ice. The term "geologic erosion" refers to natural erosion processes occurring over long (geologic) time spans. "Accelerated erosion" generically refers to erosion that exceeds what is presumed or estimated to be naturally occurring levels, and which is a direct result of human activities.

Undisturbed areas of the Pacific Northwest typically have dense vegetation, decomposed organic material, and loose surface soils. These features reduce surface water runoff and associated erosion and rilling. Water runoff and erosion can occur when vegetation or surface soil layers are removed. If left unchecked, erosion areas can grow into problem areas, delivering significant amounts of sediment to lakes, streams, downslope properties, and wetlands, and possibly leading to landslides. Erosion is also related to channel migration, volcanic activity, lakeshore processes, agriculture, and clearing and grading.



Legend

Project Site

Township Boundaries

Lakes

Streams

Intermittent Stream

Perennial Stream

Hazardous Slope

25 - 50% Slope

Greater than 50% Slo

Figure 3-32
Marian Meadows
Steep Slopes and Geologic Hazards

Vegetation, landform shape, slope gradient, slope length, soil type, rainfall intensity, drainage conditions, and other factors affect erosion rates. Undisturbed areas on the upper eastern slopes of the mountainous areas of the Cascade Mountains typically have dense vegetation, decomposed organic material, and loose surface soils. These features reduce surface water runoff and associated erosion and rilling. Slope gradient, slope length, and the shape of the slope affect the rate of erosion through the extent to which gravity acts on the movement of soil particles, the rate at which water moves across slopes, and the extent to which water flows are concentrated into rills and gullies. Soils that are impermeable or minimally permeable generate surface water runoff with lower intensity rainfalls and begin to erode sooner than very porous soils. Most soil types can erode when disturbed, but not all erosion is transported to adjacent properties or surface waters. Consequently, the proximity to surface waters is a component of the type or level of risk associated with erosion hazard areas.

A landslide hazard study of the Kachess Watershed, by the Washington DNR's Forest Practices Division, identified and mapped landslides and rated the hazard potential (Powell 2005). This assessment estimated that at least 69 percent of the mass-wasting features identified were in clear-cuts less than 5 years old. This correlation between mass wasting and clear-cuts may be due to the difficulty of identifying mass wasting features under forest canopy. The most common landslides were shallow landslide failures in clear-cut areas and on toes of deep-seated landslides located along stream drainages and in inner gorges. Generally, landslides were larger and deeper on the west side of Kachess Lake compared to the east side. Although the slopes are steeper on the east, they are generally more stable, possibly resulting from the dip-slope orientation of the strata.

Seismic hazards are another term for hazards related to earthquakes. Earthquake hazards are related to the presence of faults where sections of the earth surface move in different directions. The largest regional fault zone is the Cascade subduction zone that has the potential to produce earthquakes of a magnitude of 8 about every 500 years. The effect on sites in Eastern Washington may be attenuated somewhat by distance from the expected epicenters off the Washington coast (Frankel 2007). Most earthquakes in the Cascade Mountains have been relatively shallow. Reconstructions of the 1872 North Cascades earthquake, the largest historic earthquake in Washington, suggest an epicenter near Entiat with a magnitude of 6.8 (Bakun et al. 2002). In the Easton area, Modified Mercalli Intensities (an index of property damage on a scale of 1 to 12) are reported as between 6 and 7 (Coombs et al. 1976; WPPSS 1977). A Mercalli scale intensity 7 earthquake results in negligible damage in buildings of good design and construction, slight to moderate in well built ordinary structures, and considerable in poorly built or badly designed structures, with some chimneys broken.

What is the Mercalli Scale?

The modified Mercalli scale is used to describe the intensity of an earthquake on a scale of 1 to 12.

Lower numbers on the intensity scale generally describe how an earthquake is felt by people (1 is not felt by people). The higher numbers on the scale describe observed structural damage (12 is nearly total damage and destruction of structures).

Risks associated with earthquakes include (Noson 1988):

- Structural damage to buildings may result from the forces of the earth movement.
- Landslides and rockfalls may be triggered during earthquakes. Many areas of unconsolidated soils that are normally stable may become unstable during earthquakes. Areas of rock that are stable under normal conditions may fail with ground shaking.
- Liquefaction occurs when sand or silt saturated with water is shaken violently enough to become “quicksand.” The liquefied material may then cause lateral-spread landslides or loss of bearing strength under foundations or roadways, depending on the depth and thickness of the liquefied zone and local topography. The groundwater table is generally low enough in the project area to avoid this occurrence; however, local areas of high groundwater may occur in relation to inflow of water in the alluvial fan.

The greatest potential for seismic hazards on the site is rockfall and shallow landslides.

3 What policies and standards address geological hazards?

The GMA directs cities and counties to designate critical areas (RCW 36.70A.170) and adopt development regulations that protect critical areas (RCW 36.70A.060). Critical areas include geologically hazardous areas (RCW 36.70A.030[5][e]) that are defined as “areas that because of their susceptibility to erosion, sliding, earthquake, or other geological events, are not suited to the siting of commercial, residential, or industrial development consistent with public health or safety concerns” (RCW 36.70A.030[9]).

WAC 365-190-080(4)(a) provides additional guidance and generally directs that some geological hazards can be reduced or mitigated by engineering, design, or modified construction or mining practices so that risks to health and safety are acceptable, and notes that when technology cannot reduce risks to acceptable levels, building in geologically hazardous areas is best avoided.

Kittitas County has adopted the following GPOs:

Erosion/Landslide Hazards

GPO 2.76 Design provisions should be adequately reflected in the Kittitas County Building Code.

GPO 2.77 Natural resource-based access and activities should not be unduly restricted or prohibited in areas of known geologic hazards.

GPO 2.78 Risk of erosion should be considered accordingly throughout Kittitas County, based on localized rainfall average.

GPO 2.79 Kittitas County recognizes the policies of the proposed Snoqualmie Pass Subarea Comprehensive Plan regarding Snow Avalanche Hazard Areas, including possible hazards outside of the Snoqualmie Pass subarea.

Seismic Hazard Areas

GPO 2.80 Because of existing Kittitas County Building Code, the risk from tertiary effects does not indicate an unusual hazard at this time.

Volcanic Hazards

GPO 2.84 The planning of volcanic hazards should be addressed through Kittitas County emergency management procedures, better planning of warning, and emergency communications.

GPO 2.85 Manual disposal of ash fallout into bodies of water shall not be allowed; alternatives for the handling and disposal of ash fallout should be considered by Kittitas County in emergency management procedures.

Development standards in the zoning code include the following:

17A.06.010 Kittitas County Uniform Building Code. The Kittitas County adopted version of the Uniform Building Code contains provisions for geologically hazardous areas and shall apply to all such areas (Ord. 94-22 [part], 1994).

17A.06.015 Areas requiring specialized engineering. Areas identified as high risk erosion/landslide geologic hazard areas, including cliff or talus slopes, may require specialized engineering to ascertain the property is suitable for development purposes. The director is authorized to require such engineering (Ord. 94-22 [part], 1994).

17A.06.020 Natural resource based activities. Natural resource based activities shall not be unduly restricted or prohibited in areas of known geologic hazards (Ord. 94-22 [part], 1994).

17A.06.025 Areas of snow avalanche hazards - Snoqualmie Pass. In conjunction with the Uniform Building Code, Kittitas County shall enforce the policies contained within the Snoqualmie Pass Subarea Comprehensive Plan for avalanche hazard areas (Ord. 94-22 [part], 1994).

17A.06.035 Disposal of volcanic ash fallout. Intentional disposal of volcanic ash fallout into any bodies of water shall not be allowed (Ord. 94-22 [part], 1994).

Building Code. The county has adopted the International Building Code, which includes standards for design and construction for seismic hazards. The Building Code has general standards for foundations that address the stability of underlying soils (1802) and footings on or adjacent to slopes (1805.3). The building code does not provide guidance to determine whether technology will reduce risks to acceptable levels, or whether building in a specific geologically hazardous area is best avoided.

4 How would geology, topography, and soils pose risks or hazards to facilities or persons living in the proposed project area?

The project site was not explicitly mapped by DNR; however, hazard ratings for different types of landforms can be applied to the site. The westerly flat portion of the site has negligible geologic hazards (except for potential seismic hazards discussed below). The steep sloping easterly portion of the site has moderate to high potential rockfall and landslide and erosion hazard related to slope and soil type.

The on-site activity with the most extensive effects on existing topography and underlying geologic deposits is road construction on the easterly portion of the site. New roadways will be needed to meet current county grade standards. Existing logging roads on the site are generally too steep to meet subdivision standards. This will result in an entirely new roadway across very steep slopes from near the northern property line to the existing saddle or swale about a third of the way up the site. Other new roadways will be required in the steep sloping area in the easterly section of the site and on steep slopes in central portions of the site. Because of steep cross slopes, the area disturbed for side slopes for roadways will be extensive.

Erosion. Any disturbance of ground cover will increase the potential for erosion. Development of roads and housing on steep sites increases initial exposure because of the large area needed to "catch the slope" when creating a flat surface such as a road on a steep slope. On a 15 percent slope, the construction of a 26-foot-wide road surface with an uphill roadside ditch for drainage would result in a 2 to 1 side slope on either side that would extend about 5.50 feet to the point of intersection with existing grade. On a 30 percent slope, this lateral extent would be about 11 feet, on a 40 percent slope about 15 feet, and on a 70 percent slope about 25 feet.

Landslide and Rockfall. The potential for landslide is dependent on the character of underlying unconsolidated deposits and also on the dip slope of underlying bedrock. Deposits that are stable under natural conditions can be rendered subject to movement by a variety of human alterations including removal of materials from the toe of the slope, additional loading on the slope from the weight of fill for roads or homes, or through lubrication of the interface between permeable and impermeable deposits through changes in surface and groundwater flows from re-routing flows or from impervious surfaces. Information on the steeper easterly portion of the site is not well enough known to accurately assess risk and would need to be assessed on a case-by-case basis with infrastructure and housing construction. It is possible that there are large areas subject to landslide, but more likely that smaller isolated shallow landslide failures would occur.

Rockfall hazards are present in any case where bedrock is disturbed on slopes and rock is not removed to a stable surface. There are, however, limitations on the accuracy of field work and assessment in reliably identifying the extent of removal needed to achieve a stable rock face. Rockfall is common in the area and is present on the site, as indicated in Figure 3-33, on existing logging roads on the easterly portion of the site. These roads, however, were constructed to lesser standards for temporary use than would be expected for permanent subdivision roads.

Seismic and rockfall hazards are increased during seismic events that may mobilize otherwise stable formations.

Figure 3-33 Existing Rockfall on Marian Meadows site

Avalanche. Avalanche danger is present in any area with steep slopes and high snow accumulation. There are no landslide chutes identified on the property. However, areas of bedrock may mask the presence of snow movement because trees that otherwise would be displaced are not present. Large scale clearing of steep areas can lead to increased avalanche hazard through removal of trees and vegetation that otherwise immobilize snowfall and prevent its movement under natural conditions. Current information indicates a relatively low risk of avalanche on the site, based on current information.

Potential Risk. The potential risk to persons and properties from geologic hazards, other than alluvial fans and debris flow, is limited to the steeper easterly portion of the site and the portion of the flat site close to steep slopes and rock faces where falling rocks could move a substantial distance prior to coming to a risk. The risk to individuals is likely to be episodic from individual unexpected events of limited extent, rather than to landslides or earth movement over a large area. Persons living in an area of landslide, rockfall, or alluvial fan hazard, however, are exposed to a low level of probability of occurrence over a long period of time, which can lead to a relatively higher risk to a given individual.

The greatest potential for seismic hazards on the site are rockfall, shallow landslides, and debris flow across alluvial fans and water flow downgradient of the fans where water is likely to flow after dropping sediments on the fan.

5 What measures may reduce the effects of geology and soils on facilities and persons in the proposed project area?

Avoidance of development on the steep-sloping easterly portions of the site are the most effective means of reducing the risk to infrastructure, housing, and the people who use them. Alternatives 2 and 5 avoid the steepest portion of the site where rockfall and shallow landslides pose the greatest potential risk. Alternatives 2, 4, and 5 also avoid areas of potential debris flow and alluvial fans.

In addition, the portion of the flatter easterly portion of the site where rockfall or landslides may be deposited is at risk and includes the area generally east of and including the BPA transmission line easement.

Construction practices that over-excavate uphill areas of potential landslide or rockfall will reduce the risk of failure, but at a much greater cost of construction and with much greater displacement of vegetation. If not effectively stabilized, such cleared areas also would result in additional erosion.

Thorough and appropriate geotechnical evaluation before construction and during construction is essential to identifying and implementing appropriate risk-reducing measures. Evaluation during construction is essential because the nature of underlying geologic deposits cannot be accurately assessed from surface conditions. An alternative is extensive subsurface drilling; however, monitoring during construction with provisions to revise construction plans to meet specific performance standards is equally effective, if unforeseen conditions are adequately identified and mitigated.

3.12 SURFACE WATER RESOURCES

1 What surface water resources are present in the project area?

The Marian Meadows development site is located in the Easton sub-basin of the upper Yakima River watershed, EPA Hydrologic Unit Code (HUC) 17030001. The Yakima River watershed, upstream from Easton, covers approximately 188 square miles (USGS 1991), of which approximately 64 square miles are the Kachess River and Kachess Lake watershed.

The U.S. Geological Survey (USGS) has monitored stream flow for the Kachess River at Easton (Gaging station 12476000) from 1904 to 1978 and for the Yakima River at Easton (Gaging station 12477000) from 1910 to 1915 and from 1941 to 1955.

Silver Creek, a tributary of the upper Yakima River, has headwaters on Kachess and Easton Ridges. A portion of Silver Creek lies located approximately 0.25 mile west of the Marian Meadows development site. The creek’s discharge has not been gauged.

Kachess Lake Dam was constructed on the Kachess River in 1912 by the U.S. Bureau of Reclamation. Discharges to the Yakima River at Easton are regulated by dam operations. Shortly after 1925, the Easton Diversion Dam, Kittitas Canal, and distribution system for the Kittitas Reclamation District were completed (USGS 1991). The Kittitas Canal withdraws streamflow that is equivalent to 10 percent of the total annual flow in the Yakima River at Kiona, Washington.

On the Marian Meadows development site, there are several defined stream channels in the steep easterly portion of the site. The central and southerly streams are fed by springs and were observed to flow year-round based on field visits in June and September 2006 and July 2009. The southerly stream is used as a water source by residents to the south of the site, as evidenced by a number of plastic pipes providing conveyance, although it is not known whether this use is for domestic or irrigation purposes or whether water rights have been granted for this use.

Several dry watercourses have been mapped in field visits in the westerly portion of the site indicated in Figure 3-34. They appear to convey infrequent very high flows from the northerly and central watercourses and are likely related to alluvial fans that indicate infrequent but very high flows. These watercourses are up to 5 to 8 feet wide at the base and between 20 and 30 feet wide at their maximum extent. They generally drain to the south and southeast. The drainage courses become shallower in the southerly portions of the site, which may indicate a transition to sheet from or a transition to infiltration. The swales may have previously existed across properties to the south that have been recently regraded. Surface water from westerly portions of the site likely drain to Silver Creek and is currently channelized in roadside ditches along Sparks Road. It appears that the natural drainage from most of the site was previously to the south and more directly to the Yakima River.

Surface Water Quantity

Streamflow in the upper Yakima River has been regulated for almost a century, primarily for agriculture diversion and hydroelectric generation (USGS 1991). The 1980 Quackenbush Decision ordered that adequate streamflow be provided for salmon spawning in the upper Yakima River (USGS 1991). In 1994, pulsed flows were ordered by the court to further support spring out-migration of salmon.

The mean annual flow recorded at Kachess River at Easton (No. 12476000) and for the Yakima River at Easton (No. 12477000) are 292 cubic feet per second (cfs) and 592 cfs, respectively, for the periods of record (USGS 2008).

Surface Water Quality

Washington State surface water quality standards are defined in WAC 173-201A (2006) and were approved by the EPA in February 2008. The standards implement portions of the federal Clean Water Act. The upper Yakima basin is designated as Water Resource Inventory Area (WRIA) 39, as shown in Figure 3-34. The headwaters of Yakima River above Cle Elum have designated uses as core summer salmonid habitat for aquatic life (WAC 173-201A-200[1]) and extraordinary primary contact for recreational use (WAC 173-201A-200[2]).

The upper Yakima River above Cle Elum to its headwaters is classified as a class AA, which means it has the ability to support all beneficial uses to a high degree. This may include a range of use including human use and fish and wildlife habitat.

Floodplains in the project vicinity are shown in Figure 3-36 and do not extend into the Marian Meadows development site.

2 What regulations apply to surface water quantity or quality?

Regulations for surface water quantity are addressed in Section 3.13, Groundwater Resources below.

Wager quality standards are administered by Ecology to comply with the federal and state Clean Water Acts.

The standards found in WAC 173-201A-200(1) relate to both existing conditions and intended use. The numerical criteria for the core summer salmonid habitat designated use are as follows:

- Seven-day average of the daily maximum temperatures will be no more than 16 degrees Celsius (°C).
- One day lowest minimum dissolved oxygen will be above 9.5 mg/L.
- Turbidity will not exceed 5 nephelometric turbidity units (NTUs) over background when the background is 50 NTUs or less; or a 10 percent increase in turbidity when the background turbidity is more than 50 NTUs.
- pH will be within the range of 6.5 to 8.5.
- Fecal coliform organism levels must not exceed a geometric mean value of 50 colonies/100 ml.

The antidegradation policy is designed to protect surface water with a quality that is higher than the standards from being unduly degraded to the standards. The antidegradation policy has three tiers of protection:

- Tier I is used to ensure existing and designated uses are maintained and protected.

Tier II is used to ensure that waters of a higher quality than the criteria assigned in the

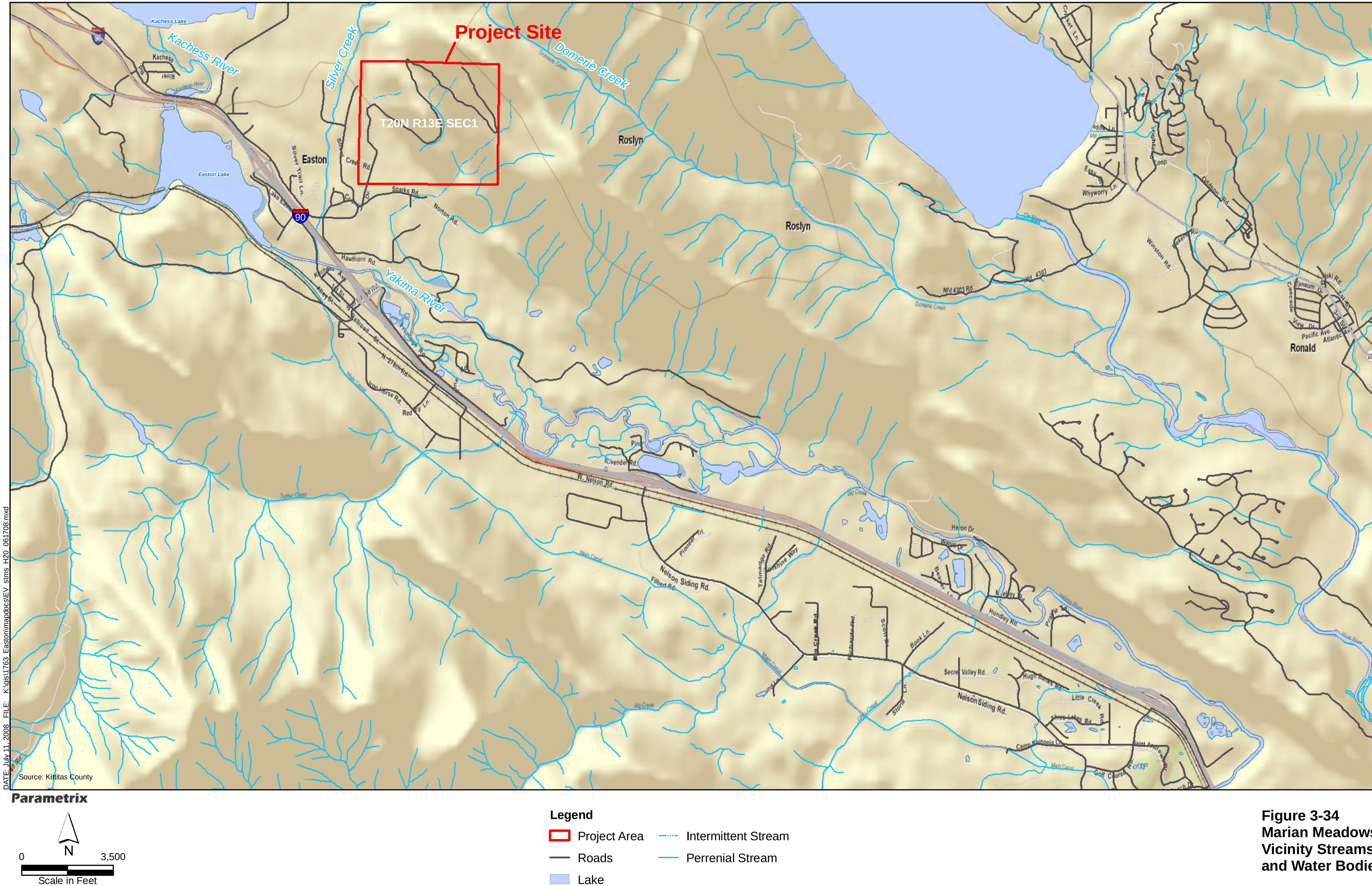
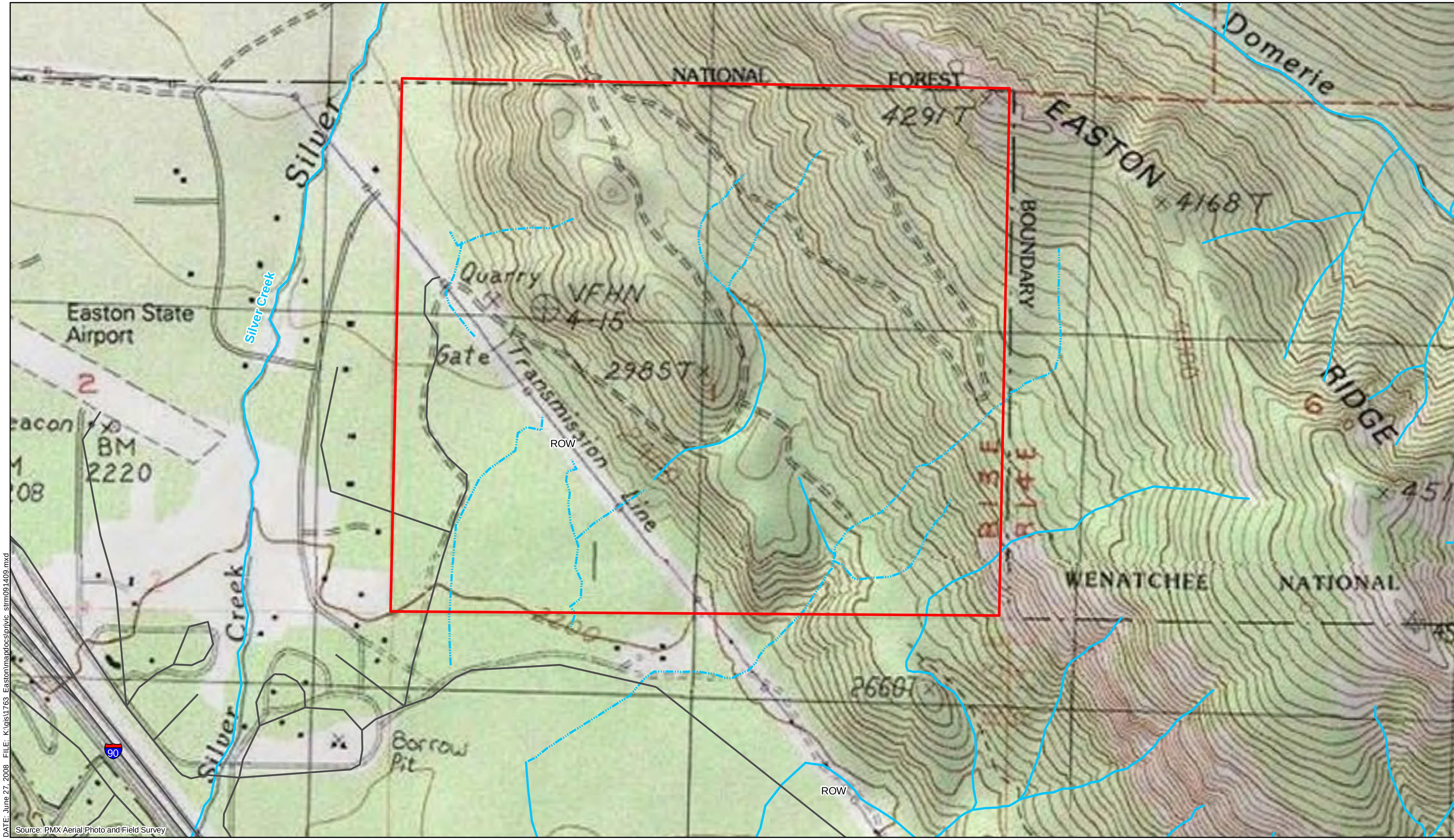


Figure 3-34
Marian Meadows Vicinity Streams and Water Bodies



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Parametrix

N

0 800

Scale in Feet

- Intermittent Stream
- Perennial Stream
- Streets
- Project Site

Figure 3-35
Marian Meadows
Streams and Waterbodies in the Project Vicinity

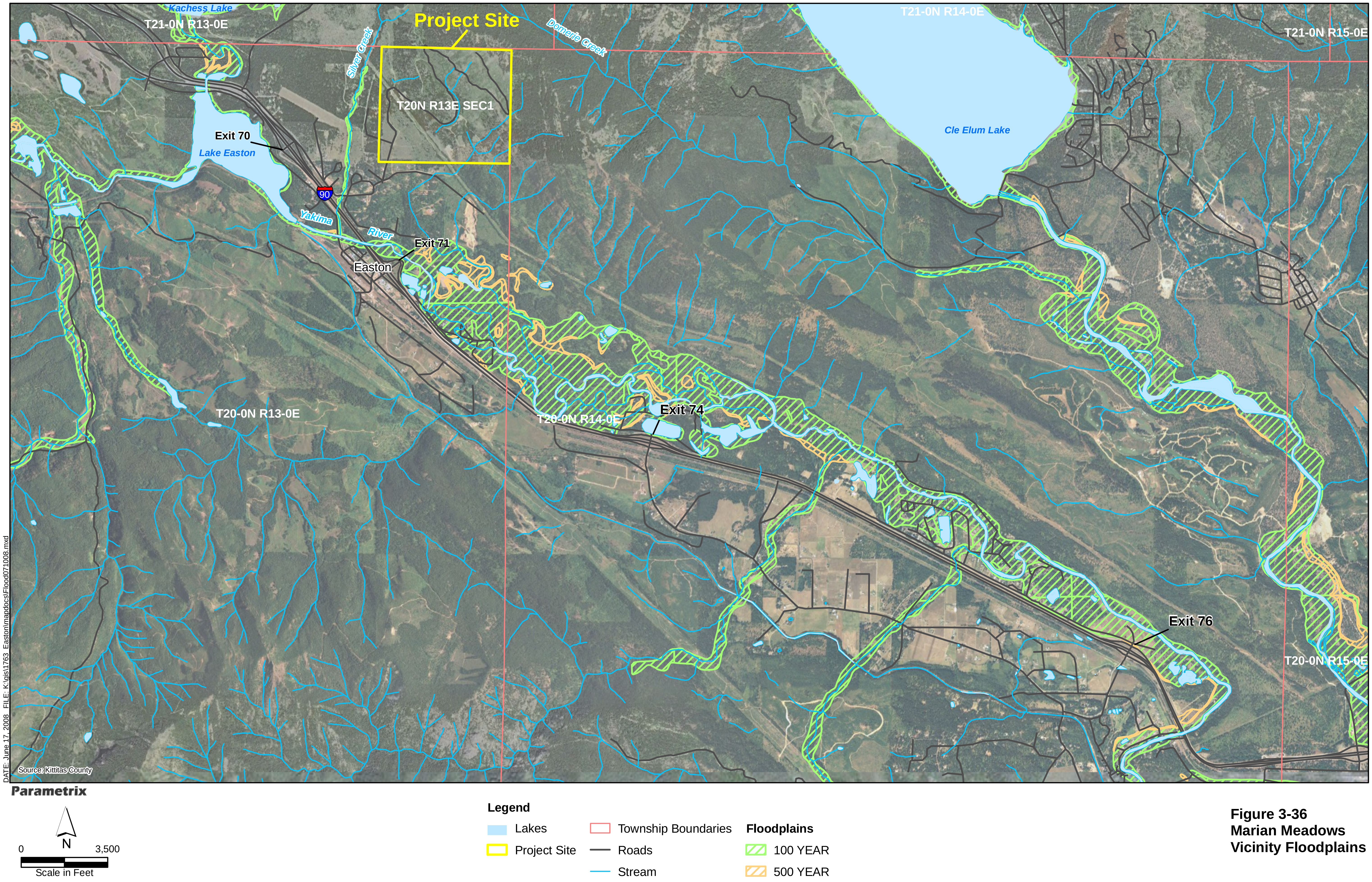


Figure 3-36
Marian Meadows
Vicinity Floodplains

- standards are not degraded by new or expanded sources of pollution from specific types of activities directly regulated by Ecology (e.g., NPDES, 401, 404, Forest Practices).
- Tier III is used when a high quality water is designated as an "outstanding resource water." The water quality and uses of these waters must be maintained and protected against all sources of pollution.

3 What regulations apply to development near streams or other waterbodies?

Kittitas County Code 17A.07.010 riparian habitat provides the following buffer areas for streams as indicated in Table 3-34:

Table 3-34 Kittitas County Stream Buffer Specifications

Type 1 waters	40–200 feet from ordinary high water mark (OHWM)
Type 2 waters	40–100 feet from OHWM.
Type 3 waters	20–50 feet from OHWM.
Type 4 waters	10–20 feet from the intersection with a Type 1, 2 or 3 water for a distance of 40 to 500 feet. From the point at which the buffer ends (40 to 500 feet upstream from the confluence), there shall be a 15-foot structural setback from the OHWM.
Type 5 waters	None required (buffering will be provided by the Type 1, 2 or 3 waters' buffers). Note: Building setbacks from a Type 5 water will be 15 feet, unless a buffer greater than or equal to the 15-foot setback is in place.

4 What stormwater regulations apply to runoff from the proposal?

Kittitas County has adopted the Ecology Stormwater Manual for Eastern Washington with local regulations in Kittitas County Code 12.6, Stormwater Management Standards and Guidelines. The manual provides a methodology for calculating runoff depending upon the severity of design storms based on a variety of factors with data derived primarily on past weather reports. It also includes a methodology for assessing rain-on-snow events.

The manual, however, does not assess the potential for hazards such as debris flows.

Kittitas County Code 12.06.060 provides the following basic requirements for stormwater management:

A. Discharge at Natural Location: All surface and stormwater runoff from a proposed development that would construct new or modify existing drainage facilities should be discharged at the natural location and not be diverted onto or away from the adjacent downstream property. Diversions may be allowed if it corrects an existing problem and meets federal and state regulations.

B. Tributary Area Analysis: Proposed developments shall identify the upstream tributary drainage area and provide an analysis of the pre-existing drainage, discharge, volume, and quality and an analysis of the impact of the proposal on the drainage system.

C. Proposed projects must control the peak rate runoff to not exceed the pre-development peak rates for the site (existing condition). The methods of peak rate runoff control may include detention, retention, and/or infiltration. On-site bio-filtration or treatment facilities in combination with infiltration systems is the preferred method for management of on-site stormwater and shall be considered before transporting stormwater off-site.

D. For all proposed developments requiring a drainage conveyance system, the conveyance system must be analyzed, designed, and constructed to handle existing off-site tributary flows and on-site stormwater flows caused by development of the project.

E. Developments involving clearing and grading and that propose new or modification of existing drainage facilities should include an erosion/sedimentation control plan providing measures to prevent sediment-laden runoff and pollutants from leaving the site during construction. Erosion/sedimentation control may be achieved by structural control measures (sediment trap or pond, or oil/water separators), covers (mulch, sodding, plastic covering) and/or construction practices (filter fabric and quarry rock driveway pads).

F. Maintenance and operation of all private stormwater facilities is the responsibility of the property owner or a properly formed homeowners association and shall be done in compliance with Kittitas County maintenance standards.

G. For the construction or modification of any stormwater facility other than roadside ditches, the applicant shall be required to have a construction bond. The construction bond shall be posted prior to beginning construction. The bond shall be in an amount sufficient to cover the cost of work on or off the site (Ord. 2005-30, 2005)

Various methods for managing stormwater are provided including discharge to surface water or infiltration.

The practice in Kittitas County typically has been to prepare detailed stormwater management plans for subdivisions after preliminary plat approval at the time of design of roads and other facilities. For this site, at least some reliance on infiltration is likely, given both soil conditions. This may be accommodated by standard roadside ditches, depending on the results of detailed analysis, or may include a combination of infiltration and overland conveyance through ditches that eventually would discharge to either Silver Creek or the Yakima River.

5 What stormwater facilities are included in the proposal and alternatives?

No specific designs for stormwater facilities are included at the preliminary plat stage. Such detailed designs are generally developed after preliminary approval and are reviewed and approved for compliance with engineering standards and installed prior to the final plat approval.

6 What impacts to surface water, flooding or other resources may be associated with the proposed and alternative means of stormwater management?

It is unlikely that water from the site will reach surface water streams except under the most extreme rain-on-snow conditions. All alternatives are likely to handle normal stormwater up to typical 2- and 10-year storms through standard facilities. It is likely that infiltration will be utilized as well as conveyance in roadside ditches.

The most significant hazard not addressed in standard engineering design is from isolated events leading to unpredictable volumes of water collecting in narrow canyons and causing catastrophic debris flows. Such an event has occurred periodically on the site as is evidenced by alluvial fans that have formed at the base of several drainages and several discontinuous drainage courses across the site. It is not clear, however, if these drainages connect with other surface waters. The channels generally become indistinct near the southern boundary of the site indicating either infiltration of water or human actions that have obliterated the channels.

Under normal conditions, any overland flow from the site would be intercepted by the ditch conveyance on Sparks Road and conveyed to Silver Creek. In the event of very large rainfall or rain-on-snow events with frozen ground, flow may exceed the capacity of the roadside ditches and establish channels along the path of least resistance in a southwesterly direction toward the Yakima River, and may result in flood damage to intervening improvements.

7 What are the likely cumulative impacts on surface water with development of nearby land at existing zoning densities or PUD densities?

The worst-case events are most likely under frozen ground conditions limiting infiltration. The additional impervious surfaces from any of the alternatives would not natural exceed runoff during a frozen ground condition.

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

Compliance with county stormwater management requirements and the Ecology Stormwater Manual for Eastern Washington will provide for normal runoff from rainfall events based on standard storm event models.

Conveyance of worst-case events that have occurred on the site as evidenced by alluvial fans and existing dry watercourses may reasonably be accommodated by a system of berms to contain overland sheet flow and conveyance of at least the volume of existing watercourses. This action should be based on data derived from detailed mapping and cross-sections of existing watercourses and may include upgrading of off-site conveyance.

3.13 GROUNDWATER RESOURCES

1 What groundwater resources are present in the project area?

Groundwater Occurrence

The Marian Meadows development site is located within what Jones and Vacarro (2006) classified as the Roslyn basin of the upper Yakima River watershed. The Roslyn basin is delineated by geologic structure and sedimentary deposits and runs from near Easton to south of Teanaway, covering an area of about 80 square miles. Deposits filling the basin consist of alluvial, lacustrine, and glacial deposits. The basin-fill deposits were divided into three hydrogeologic units, based on the information from 307 well logs (Jones and Vacarro 2006).

The uppermost unit is coarse-grained and between 0 and 360 feet thick, with a median and mean thickness of 80 feet as shown in Figure 3-37. The middle unit is clay and silt-rich lacustrine deposits, between 0 and 520 feet thick, with a median and mean thickness of 170 and 180 feet, respectively. The lowermost unit consists of coarse sands and gravels, with thickness of 0 to 240 feet and a median and mean thickness of 50 and 60 feet, respectively. This unit is less extensive than the upper two units, occurring only in the deeper parts of the basin (Jones and Vacarro 2006).

In the Easton area basin-fill sediments are less than 200 feet thick consisting of the uppermost unit. The middle and lower units are absent in this area but become existent about 3 miles south of Easton. The aquifer within the uppermost unit is likely to be unconfined in the Easton area.

Groundwater Movement

Currently, there are no published reports regarding groundwater movement in the Roslyn basin. As part of the Yakima River Basin Project, a joint study by the USGS, Yakama Nation, U.S. Bureau of Reclamation, and Ecology, a report on Hydrogeologic

What is an unconfined aquifer?

An unconfined aquifer is open to receive water from the surface. There is no overlying impervious rock layer.

What is specific capacity and transmissivity?

Specific capacity is a measure of the production of a well in an unconfined aquifer. It is a general indication of the amount of water that can be held in the voids between grains of solid material. It is calculated by the pumping rate divided by drawdown.

$$T = \frac{Q}{(h_0 - h)} \frac{2.3}{4\eth} \log \frac{2.25Tt}{r^2 S}$$

where,

$Q/(h0 – h)$ = specific capacity of the well (ft^3/ft drawdown),

T = transmissivity (ft^2/day),

t = period of pumping (day), and

S = aquifer storativity (dimensionless).

The estimated transmissivity of the aquifer in the Easton area ranges from 677 to 19,006 ft^2/d, with an average of 6,770 ft^2/d and a median of 5,240 ft^2/d. Based on the sediment grain-size character, the specific yield likely is in the range of 0.05 to 0.20.

Modeling and Assessment is pending. Based on thermal profiling of the riverbed, the portion of the Yakima River at Easton and below Easton ponds is a gaining reach (Vacarro and Malloy 2005; Vacarro 2007). This would imply that groundwater generally follows the trend of the Yakima River and moves toward the river throughout the gaining reach.

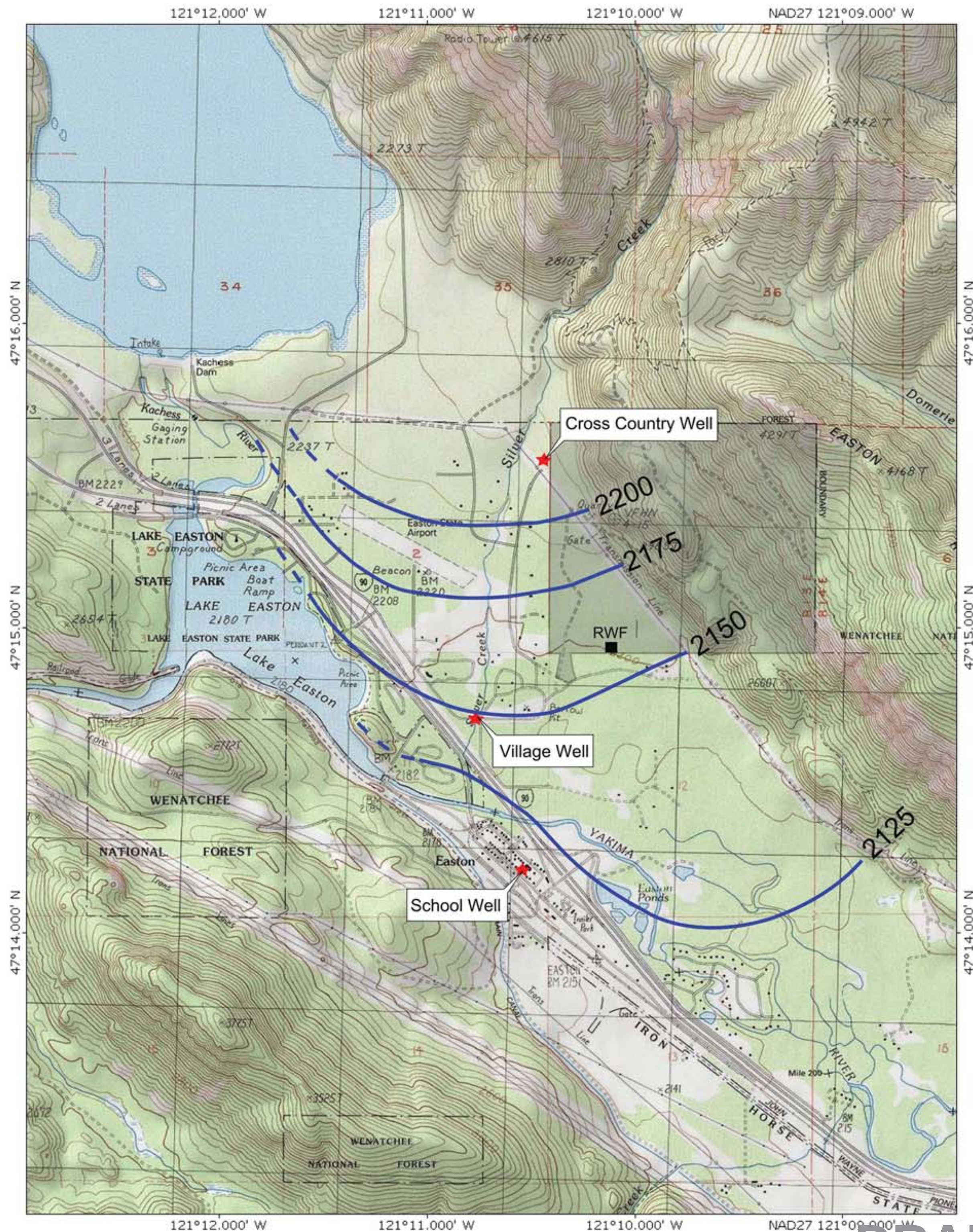
A contour map of the water table elevation was constructed using readily available well logs (Ecology 2008) for the Easton area (see Figure 3-37). The water table contours suggest that groundwater in the valley-fill near Easton flows southward or southeastward toward Lake Easton and the Yakima River. Depths to groundwater near Lake Easton and Silver Creek suggest these surface water features are losing to the aquifer, whereas at Easton Ponds and the nearby reach of Yakima River these features are gaining water from the aquifer. Groundwater in the valley-fill sediments at the Marian Meadows development site likely flows to the south-southeast.

This interpretation is confirmed by a geologist field visit and the observation that the bed of Silver Creek at Sparks Road is about 10 to 20 feet higher than the bottom of a former gravel pit across Pit Way to the east. The bottom of the gravel pit is generally dry, or has very shallow ponding, which indicates that the water table lies at or below that level. It follows that Silver Creek would lose water to the aquifer under this condition. The observation that Silver Creek dries up every year also is consistent with this interpretation.

Groundwater Recharge

Vacarro and Olsen (2007) estimated that groundwater recharge in the Easton area averaged 20 inches per year (in./yr) under predevelopment conditions and now averages 50 in./yr (current conditions). The estimate was developed with a precipitation-runoff modeling approach for this portion of the upper Yakima basin, which takes into account precipitation, temperature, land cover and use, soil properties, and irrigation application rates.

This interpretation is generally confirmed by calculation of the specific capacity for five wells in the Easton area (see Figure 3-38).



Source: PgG

DRAFT

Parametrix 557-1763-007/03(19) 9/09 (B)

N

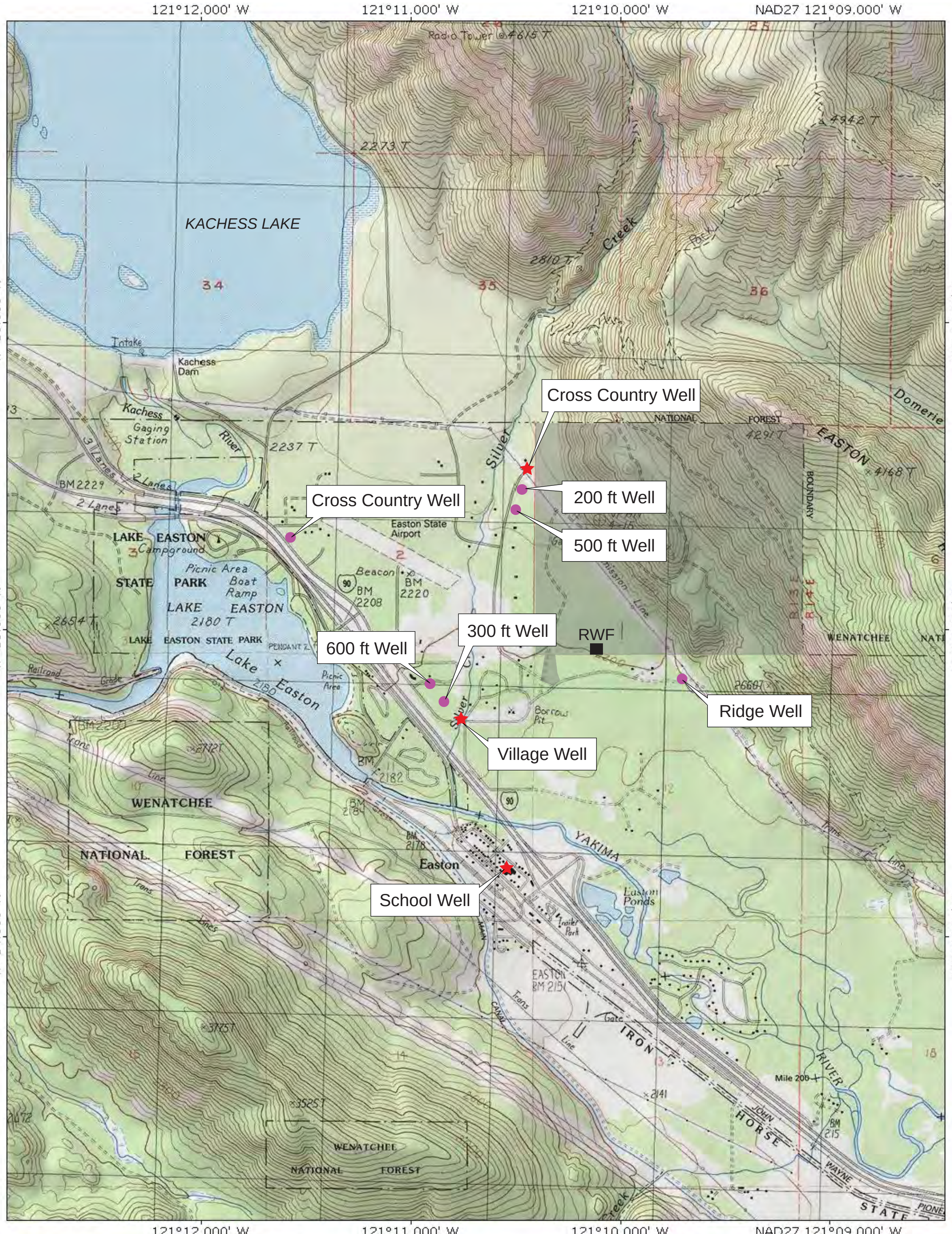
0 4,000
Scale in Feet

2200 Groundwater Elevation Contour (dashed where inferred)

Marian Meadows Development site

RWF Proposed Reclaimed Water Facility

Figure 3-37
Marian Meadows
Groundwater Contours



Source: PgG

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Parametrix 557-1763-007/03(19) 9/09 (B)

N

0 4,000

Scale in Feet

Marian Meadows Development site

RWF Proposed Reclaimed Water Facility

Existing Easton Village Well

Model Observation Wells

Figure 3-38
Marian Meadows Major Wells in the Project Vicinity

Groundwater Quality

Easton's water supply is primarily provided by the Easton Water District (formerly Kittitas Water Conservation District No. 3). Groundwater is supplied by two production wells—No. 1 (Cross Country Well Village Well) and No. 2 (Village Well), while well No. 3 (School Well) is used only for emergency supply.

Groundwater quality was assessed based on information from the Easton Water District wells. Water from these wells meets drinking water quality standards under WAC 173-200 (SENTRY 2008). Iron and manganese have been found to exceed secondary or aesthetic drinking water quality standards in wells No. 1 and No. 2. Specific conductance for well No. 2 was 90 µmhos/cm and 116 and 180 µmhos/cm at well No. 1 Nitrate-as-N values average 0.25 mg/L and 0.19 mg/L at well No.1 and No. 2, respectively, which are well below the standard of 10 mg/L. The groundwater is slightly to moderately hard.

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

Groundwater, like the other waters of the state, is considered to be a public resource. A discussion of state water rights is provided in a separate subsection below.

The Kittitas County Comprehensive Plan includes the following policies relating to groundwater.

Kittitas County recognizes the importance of groundwater to the economic well being of the area. This section shall not impair or interfere with any lawful right to withdraw and/or use groundwater. (see Section 2.2[B] Water-rights). Kittitas County currently understands the importance of a groundwater recharge study of the Yakima River Basin as a whole.

GPO 2.91A Kittitas County shall ensure that citizens' water-rights are adequately addressed and protected to the fullest extent in any groundwater study conducted by any governmental entity, including state and federal agencies.

GPO 2.91B The County shall support the development of a comprehensive review of the water resources in the county.

GPO 2.109F It is the policy of Kittitas County to recognize the water-rights of citizens and entities within its borders as determined in the Yakima basin general adjudication and not to impair or adversely affect the water-rights of its citizens by any action of county government.

3 How does water-rights law apply to new groundwater withdrawals in the area?

In the Yakima River basin, groundwater resources are generally considered to be interconnected with surface water and are essentially governed by the same water rights, although there are different procedures for processing surface and groundwater rights.

Washington State water law is similar to other western states in that all water resources are essentially owned by the public. The granting of a water right is the assignment by the public of the right to use water for a beneficial purpose. This right does not vest a person with an ownership interest, but only authorizes a right to use the water. The establishment of beneficial use refers to the type of use, the location to which the water is applied, and the measure and limit of the water right. In general, water rights are allocated based on “first in time, first in right.” That means that the water rights that were established earlier in time take precedence over water rights obtained later. The date at which the application of water to a beneficial use initially occurred is called the priority date. In times of water shortages, that priority allows the user to continue to withdraw water to the detriment of all those who have later priority dates (“junior rights”). In turn, the user must cease withdrawing water if it will impair the use of water by those who have earlier priority dates (“senior rights”).

Water rights in the Yakima River basin have been in a state adjudication since October 1977 and have been completed for many sub-basins. The adjudication involves thousands of parties spread over the entire 6,062-square-mile basin. The general adjudication does not create new water rights, it only confirms existing water rights. It will result in a judgment setting forth all confirmed water rights with “priority” dates so that in times of shortage all water-right holders will know who is and who is not entitled to exercise their rights. As an additional complexity, there are also uncertainties over federal and Indian reserved water rights being addressed.

What is the statutory basis of water rights in Washington State?

Prior to statehood in 1889, water rights were regulated by federal law and common law practices.

One of the major federal actions prior to statehood was the negotiation of treaties with Indian tribes. These treaties established rights to take fish in usual and accustomed places in common with others. This treaty provision has led to the corollary interpretation that water must be provided in rivers and streams to preserve fish runs.

Prior to 1917, water generally was appropriated by persons wishing to irrigate or use water for other purposes without specific oversight or a provision to resolve conflicts. In 1917, the Washington State Legislature enacted the first comprehensive water code, which is codified in RCW 90.03.

In 1945 the Legislature extended the water rights program to groundwater through RCW 90.44.050

In 1975 the Legislature added the requirement that sufficient water flow be reserved for fish in streams in which all water is not currently appropriated. No in-stream flows have been established by the statute for the Yakima River because water rights already had been allocated in excess of low summer stream flows.

The Easton sub-basin is one of the areas in which water rights have been adjudicated. The major water withdrawal in the Easton basin is for the Kittitas Reclamation District water intake on the Yakima River just above Easton, which is used to irrigate lands a considerable distance down the valley.

Federal actions to preserve water rights conferred by Indian treaties for fishing rights and reservation use also affect water rights in the basin. The 1980 Quackenbush Decision ordered that adequate streamflow be provided for salmon spawning in the upper Yakima River (USGS 1991). In 1994, pulsed flows were ordered by the court to further support spring out-migration of salmon.

There are two methods of establishing groundwater withdrawals. Both options establish a priority date and are subject to the premise that water rights that were established earlier in time take precedent over water rights obtained later.

Small withdrawals are provided an “exemption” from the process for certification provided in RCW 90.44. This regulation does not provide an exemption from any applicable laws, but only exempts the withdrawal from the Ecology’s administrative process of issuing a withdrawal permit after investigating whether it will interfere with existing water rights. Withdrawals exempt from the permit process include:

- For single or group domestic uses in an amount not exceeding 5,000 gallons a day.
- The watering of a lawn or a non-commercial garden not exceeding 0.50 acre in area.
- For stock-watering purposes.
- For an industrial purpose in an amount not exceeding 5,000 gallons a day.

For non-exempt withdrawals, a permit is required under RCW 90.44.050 that requires Ecology to ascertain that the permit will not interfere with other water rights.

Very little, if any, processing of new applications for groundwater withdrawals is occurring in the Yakima River basin. More than 400 pending water-right applications are pending in WRIA 37, the oldest of which were filed in 1973. Within a few miles radius of the Marian Meadows site, nine other applications have been filed, the oldest of which was filed in 1980.

The essential holdup of new application processing is due largely to a Memorandum of Understanding (MOU) between Ecology and the Yakama Nation relating to federally granted water rights to tribes. Under this MOU, no application will be evaluated until the Yakima Groundwater Study is completed. This study is underway by the USGS, in cooperation with the U.S. Bureau of Reclamation, Ecology, and the Yakama Indian Nation, and will evaluate the hydrologic system in the Yakima River basin, including groundwater and surface water interactions and relationships.

Ecology has the authority to curtail exempt groundwater withdrawals. For example, in *Postemav. Pollution Control Hearings Bd.*, 142 Wn.2d 68, 94-95, 11 P.3d 726 (2000), the Supreme Court held that where Ecology has closed a surface water source to new withdrawals, it may prohibit new groundwater withdrawals that “will have any effect on the flow or level of the surface water.” Ecology also has authority under RCW 90.44.130 “to limit withdrawals by appropriators of groundwater so as to enforce the maintenance of a safe sustaining yield from the groundwater body.” RCW 18.104.040(4)(g) also authorizes Ecology to limit well construction in areas “requiring intensive control of withdrawals in the interest of sound management of the groundwater resource.” Depending on the specific facts and circumstances, these statutes could affect exempt withdrawals just as they could affect withdrawals for other purposes.

A petition for closure of the Upper Kittitas watershed to further withdrawals was submitted to Ecology in 2006. In response to that petition, Ecology agreed with Kittitas County to enter into a study of groundwater resources in the area and take appropriate action when the study is completed. Ecology has adopted additional interim standards that apply to the area, including the following (Ecology 2008):

- New residential development relying on the groundwater exemption is limited to a maximum of 5,000 gpd for **all lots** (WAC 173-539A-050[1]). In calculating use, either 1,250 gpd for domestic and irrigation purposes is presumed, or if a condition is recorded as a covenant 350 gpd may be assumed (WAC 173-539A-050[3]). This may result in 4 to 14 units per exempt well.
- New residences on parcels of less than 10 acres that were created after March 28, 2002, that rely on a new use of the groundwater exemption are limited to 1,250 gpd (WAC 173-539A-050[3]).
- New residential structures on parcels that were created on or before March 28, 2002, within upper Kittitas County and that will rely on a new use of the groundwater exemption shall be limited to 5,000 gpd (WAC 173-539A-050[4]). This is not a change from the existing law.
- Hydrogeologic assessments that may be required by Kittitas County are to be reviewed by Kittitas County and Ecology and must meet specific requirements. It is inferred that conditions will be imposed based on the reports using SEPA authority (WAC 173-539A-060).
- Measurement and reporting of water use is required of exempt withdrawals (WAC 173-539A-070).

Transfer of water rights is one mechanism for new development to obtain water, in the absence of new water rights being granted. The water-rights transfer accomplished for the Suncadia development near Roslyn is an example of this transfer. All water-rights changes and transfers in the Yakima basin are being processed through one of the eastern Washington County Water Conservancy Boards. Such water-right transfers occur on a regular basis, especially between agricultural properties. A Conservancy Board is active in Kittitas County.

The process for locating and transferring an appropriate water right can be time consuming and difficult. The majority of water rights available for acquisition is likely to be for irrigation and will have a period of use limited to the irrigation season. Because water markets are not well established in Washington, there is no baseline for the price of water rights. Most sales are private and cost per acre-foot is generally not reported. Current estimates of water-right costs range from $1,000 to $5,000 per acre-foot and depend on a number of factors including priority date and seasonal restrictions.

The major existing groundwater right in the areas is for the Easton Water District for 137 ac-ft per year. An application for additional water rights of 112 ac-ft has been pending since 1990.

4 What effects will the alternatives have on groundwater resources?

Water withdrawal for domestic use will reduce groundwater resources in the area. It is likely that the major effect will be the cumulative effect of reduction in overall resources available in the watershed for other beneficial uses, including agriculture, fish habitat, and recreation.

The use of sewage treatment faculties that return domestic water to groundwater can reduce the loss of groundwater resources and decrease watershed-wide effects. This is about equally effective whether water returned to groundwater is from a sewage treatment plant or septic tanks. Discharge to groundwater may be beneficial in maintaining low summer flows in surface water because groundwater is much less subject to loss through evaporation.

5 What risks to groundwater will occur during construction?

The major potential impact to groundwater on this site during construction is contamination from spills of fuel, lubricants, or hazardous materials. The depth to groundwater reduces some of the risk. Implementation of hazardous material control strategies during construction will also reduce this risk potential.

6 How would the adequacy of groundwater resources for existing uses be affected by the project over the long term?

Because of the apparent productivity of the local aquifer, it is unlikely that users in proximity that use groundwater for domestic purposes will be directly affected by additional groundwater withdrawal to serve any of the alternatives.

The alternatives will contribute to watershed-wide impacts of groundwater withdrawal because groundwater availability will be reduced for a variety of uses including agriculture, aquatic habitat, and recreation.

These impacts are intended to be addressed in consideration of granting new water rights in the basin.

7 What are the likely cumulative impacts on groundwater with development of nearby land at existing zoning densities or at PUD densities?

Because of the apparent productivity of the local aquifer, it is not likely that the level of additional withdrawal from cumulative development at rural or PUD densities will adversely affect existing uses that depend on groundwater that are in proximity.

The impacts of cumulative development will increase the watershed-wide impacts of groundwater withdrawal because water availability will be reduced for a variety of uses including agriculture, aquatic habitat, and recreation.

8 What risks to groundwater quality and domestic water sources would result from the proposal and alternatives?

The major risk to groundwater quality and domestic supply is the potential for failure of the sewage treatment facility to meet discharge standards, as discussed in Section 3.5, Utilities. Discharge of untreated wastewater would cause the average nitrate concentration in groundwater to increase to approximately 15 mg-N/L (within a plume that would migrate downgradient from the infiltration pond). For full buildout of Marian Meadows, with 443 ERUs, the nitrate concentration would increase to approximately 19 mg-N/L. These values would be far above the background concentration in the aquifer of 0.22 mg-N/L and would exceed the drinking water standard of 10 mg-N/L. (The concentrations of other dissolved compounds in the untreated wastewater plume might also exceed the drinking water standards.)

Several domestic wells are located along the southern edge of the Marian Meadows property, adjacent to the proposed infiltration pond. The exact direction of the plume migration cannot be predicted with available information but will be generally to the south or southeast. The exact locations of neighboring domestic wells are not known, but they potentially could be affected by the plume for a period of time.

The somewhat rectangular plume would migrate at a rate of approximately one foot per day. Thus, a single well that pumped the average concentration in the plume would experience concentrations that rise to near the maximum concentrations reported above, then decrease to values unaffected by the upset condition, over the course of several months to a year. In all, the plume would persist for many years in the aquifer before reaching the river.

3.14 VEGETATION AND WETLANDS

1 What vegetation is present in the project area?

The project area is the area generally bounded by Kachess Lake to the north, I-90 to the west, the Wenatchee National Forest to the east, and the Yakima River floodplain to the south. The area consists primarily of second-growth mixed coniferous-deciduous forest and residential areas (primarily to the southwest), which are characterized by houses, lawns and livestock pastures, and associated outbuildings. Residential development to the south and west is mostly relatively low density (5- to 8-acre lots), but there are pockets of higher density residential areas as well as 0.25-acre lots (Figure 3-40). Most of the residential development has retained conifer forest cover on the individual parcels. Large areas of mid-successional conifer forests exist on the forest land to the north, with a mixture of open conifer, rock outcroppings, and cliffs to the east. Wildfires moved through the area, primarily to the east and southeast of the property in 1999.

The property is located on the southwest-facing slopes of Easton Ridge, which divides the Yakima River drainage from Domerie Creek and the Cle Elum River drainage. The project site varies considerably between the westerly, flat portion of the site (about 120 acres) and the easterly steep-sloping portion (about 400 acres). Vegetation found on the project site reflects a combination of natural and managed disturbance, topography, and historical and current management/use.

There are six types of vegetation communities that occur on the project site:

1. Disturbed areas (two locations of past rock extraction activities);
2. Early successional conifer forest (including clear-cut areas and burn areas);
3. Conifer;
4. Open conifer;
5. Wetland and stream (riparian); and
6. Right-of-way (occurs beneath the BPA transmission lines).

What is an early successional forest?

Early successional habitat occurs in a forest after a natural or human disturbance such as a fallen tree, wind, or fire. This stage in forest land is brief. The forest canopy (without management) will close, and the early successional vegetation will disappear in favor of a more mature forest.

Table 3-35 reflects the approximate composition of vegetation communities within the project site. On the Marian Meadows property, the vegetation communities differ from one another based on stand structure and to a lesser degree species composition, as well as vegetative characteristics (for example, canopy coverage and presence or lack of understory and herbaceous layers).

Table 3-35 Vegetation Communities Comprising Marian Meadows

Vegetation Community	Approximate Acreage of Total Site (acres)	Approximate Percent of Total Site (%)
Disturbed	6.5	1
Early Successional Conifer	332.8	59
Conifer	51.8	9
Open Conifer	155.1	28
Wetland and Stream (Riparian)	1.6	Less than 1
Right-of-Way	12.9	2

Westerly Site Only

Early successional forest on the westerly, flat portion of the site consists primarily of a young, coniferous sapling plantation as a result of planting activities following fairly recent (late 1990s) timber harvest (Figure 3-39). There is little to no canopy coverage in most portions of this area, where harvest methods predominantly included clear-cutting. Approximately 90 acres of the westerly flat portion of the site are characterized by the early successional conifer type of vegetation community. A few locations scattered throughout the westerly, flat portion of the site can be characterized as open conifer (approximately 13 acres), with low tree densities and limited canopy coverage in a few locations where mature trees remain.

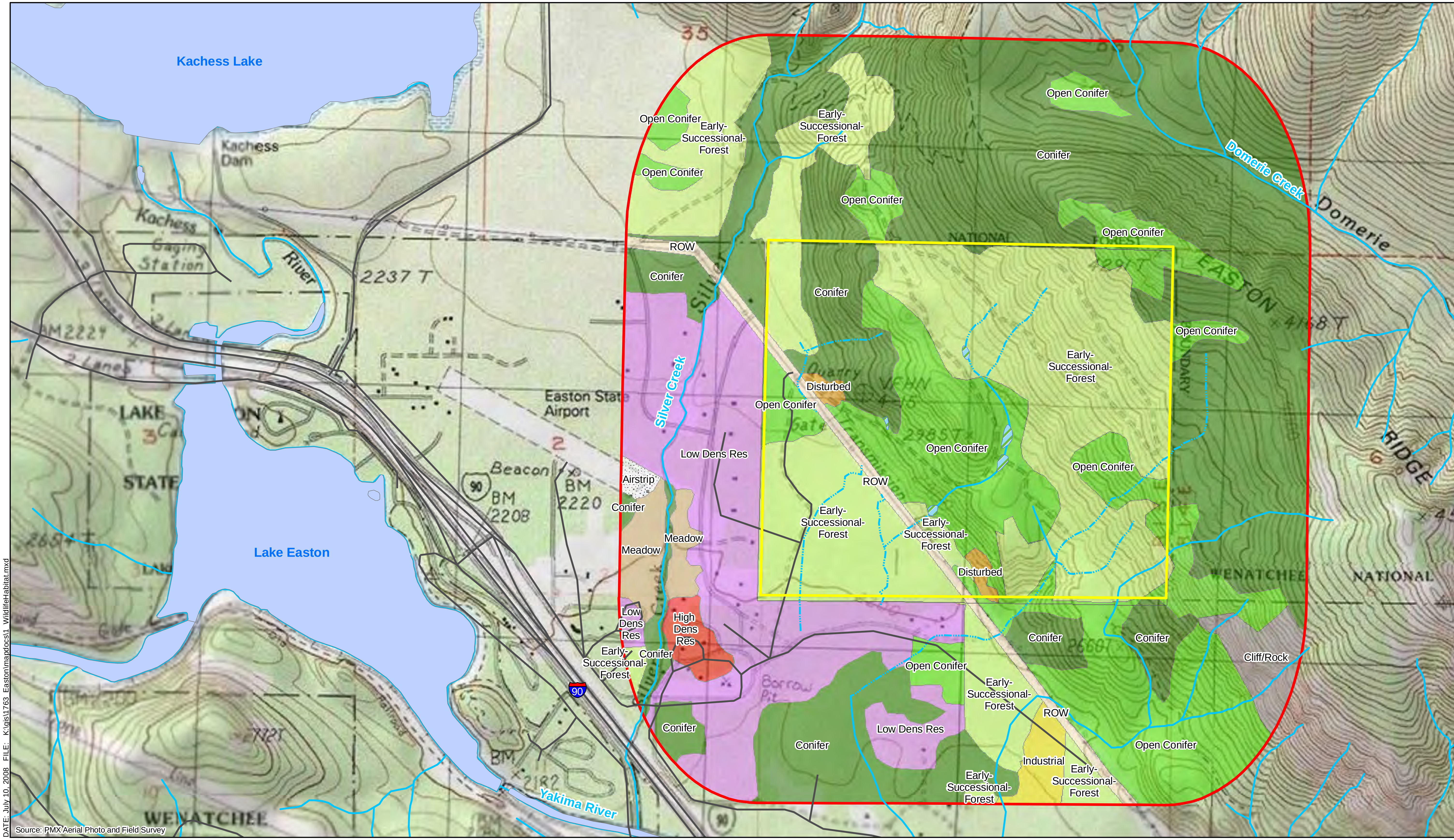
Vegetation in the early successional conifer and open conifer associations in the westerly part of the site consists of a widely scattered mix of shrubs, young conifers, and some mature black cottonwood (*Populus balsamifera*) trees. Dominant conifers include Douglas fir (*Pseudotsuga menziesii*) with lesser amounts of lodgepole pine (*Pinus contorta*) and western red cedar (*Thuja plicata*). Young stands with trees less than 8 inches in diameter are the predominant structural type occurring in this portion of the project site. Where shrub/scrub vegetation is present, the shrub layer consists primarily of common snowberry (*Symphoricarpos albus*), beaked hazelnut (*Corylus cornuta*), ocean spray (*Holodiscus discolor*), and vine maple (*Acer circinatum*). Herbaceous vegetation is very sparse, with scattered patches of diffuse knapweed (*Centaurea diffusa*) existing throughout much of the flat western portion of the property.

The BPA transmission line easement that separates the eastern and western portions of the site is characterized by shrubs, small trees (scrub), and disturbed areas (off-road vehicle tracks, etc.), particularly along the dirt roads within the right-of-way. Land beneath the transmission lines is maintained to be unforested. Approximately 13 acres of the total project site are characterized by this type of vegetation community.

Easterly Portion of the Site

The easterly, steep portion of the site comprises areas of older, second-growth coniferous forest and younger, regenerating open conifer vegetation (Figure 3-39). The vegetation associated with these areas is primarily a result of past logging activities (selective logging conducted in the late 1980s and early 1990s). The early successional conifer forest vegetation in this portion of the project site primarily results from the fires that swept through in 1999. Approximately 243 acres of this portion of the project site are characterized by the early successional conifer forest community. Other vegetation communities occurring on this portion of the project site include approximately 142 acres of open conifer and 52 acres of conifer vegetation associations.

Vegetation in this portion of the site is dominated by Douglas fir, with lesser amounts of black cottonwood, grand fir (*Abies grandis*) and western red cedar. The shrub layer consists of redstem ceanothus (*Ceanothus sanguineus*), red flowering currant (*Ribes sanguineum*), western serviceberry (*Amelanchier alnifolia*), Scouler's willow (*Salix scouleriana*), and lesser amounts of common hawthorn (*Crataegus monogyna*). Ground cover is limited in the easterly, sloping portion of the property. The eastside mixed conifer forest possesses elevation ranges of 1,000 to 7,000 feet, mostly between 3,000 and 5,500 feet. Stand canopy structure is generally diverse, although single-layer forest canopies are currently more common than multi-layered forests with snags and large woody debris (Crawford 2007). Shrub layers in this portion of the project site are mostly open; partial closure occurs in few places, mostly limited to successional growth areas where fires occurred and within critical areas (streams, steep slopes, etc.). Moderately large, mature conifer trees (up to 24 inches in diameter) are scattered throughout the easterly portion of the property, mostly concentrated along the steepest west- and south-facing slopes beneath the lower bench. Larger snags and some coarse woody debris have been maintained in the open conifer and conifer communities in this area, and also exist in portions of the early successional forest areas primarily where the fire passed through in 1999.



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Parametrix

N

0 1,200

Scale in Feet

Project Site
Half Mile Buffer of Project Site
Intermittent Stream
Perennial Stream
Streets

Vegetation Type

Conifer
Open Conifer
Meadow
Early-Successional-Forest
Cliff/Rock
Disturbed
High Dens Residential
Industrial
Low Dens Residential
Airstrip
Utility ROW
Field Inventoried Wetlands
Lake

Figure 3-39
Marian Meadows
Generalized Land Cover
and Habitat Types

Moist areas within the eastern portion of the property are characterized by red alder (*Alnus rubra*), thimbleberry (*Rubus parviflorus*), devil's club (*Oplopanax horridus*), slough sedge (*Carex obnupta*), red elderberry (*Sambucus racemosa*), and lesser amounts of false Solomon's seal (*Smilacina racemosa*). The wetland and riparian vegetation associations occur on approximately 1.6 acres of this portion of the project site. Please see Question 2 in this wetlands section for additional information on wetland communities.

Project Vicinity

Vegetation in this area has been most affected by timber harvesting and fire suppression. Timber harvesting has focused on large shade-intolerant species in mid- and late-seral forests, leaving shade-tolerant species. Fire suppression enforces those logging priorities by promoting less fire-resistant, shade-intolerant trees. The resultant stands at all seral stages tend to lack snags, have high tree density, and are composed of smaller and more shade-tolerant trees. Mid-seral forest structure is currently 70 percent more abundant than in historical, native systems. Late-seral forests of shade-intolerant species are now essentially absent. Early-seral forest abundance is similar to that found historically but lacks snags and other legacy features. Historically, large open ponderosa pine stands were almost immune to damage from frequent, low-intensity fires that burned across the landscape. Removal of the large pine component, in growth of smaller trees at high density, and fuel buildups in the understory all make fire a much more damaging disturbance agent now than it was historically (Agee 1993).

Silver Creek and its associated riverine wetlands and riparian vegetation areas are located approximately 300 feet from the northwest corner of the project site. Silver Creek flows in a southwesterly direction into the Yakima River approximately 0.5 mile southwest of the project site. Silver Creek tends to dry up in the summer in dry years, which is consistent with the function of the immediate project area as a groundwater infiltration area. There is a dam on the creek north of the development site formerly used for water supply (Mayo 2008).

The upper Yakima River watershed originates near the crest of the Cascade Range, upstream of Keechelus Lake on Snoqualmie Pass. The Yakima River flows 214 miles southeastward from Keechelus Dam to its confluence with the Columbia River at approximately river mile 335. The general area of the Upper Yakima Valley west of Cle Elum is characterized by ranges of coniferous forest in the upper elevations to shrub-steppe in the lower watershed (Haring 2001). Overall, the existing land cover in the Yakima basin in 2003 was approximately 50 percent non-forested or rangeland, 29 percent forested, 21 percent agricultural, and less than 1 percent urban developed land (Tri-County Water Resources Agency 2003).

What is a wetland?

For an area to be classified as a wetland there are three characteristics that must be present under normal conditions. The three characteristics are:

1. The presence of vegetation that grows in water or waterlogged soils (hydrophytic vegetation).
2. The presence of wetland hydrology.
3. The presence of moist (hydric) soils.

2 What wetlands are present in the area?

Wetlands in the area are generally associated with surface waterbodies and streams, or with locations where groundwater surfaces and recharges surface water as described in the geology and groundwater sections above. The U.S. Department of Agriculture (USDA) soil survey for Kittitas County maps hydric soils, which are generally rare in the area.

The project site vicinity wetlands are characterized by National Wetlands Inventory (NWI)-mapped wetlands that primarily are associated with rivers, streams, and lakes. Riverine wetlands associated with Silver Creek and the Yakima River are mapped in the vicinity. NWI-mapped wetlands associated with Silver Creek are located just north of the northwest corner of the project site. Palustrine wetlands are mapped in the area of the confluence of an unclassified stream and the Yakima River, approximately 1.1 miles to the south/southeast of the project site, and just northeast of the Sun Island development. A small, palustrine wetland is mapped about 0.25 mile north of the project site, approximately halfway between Silver Creek to the west and the tip of Domerie Creek to the east. This is the general area of the headwaters of the Domerie Creek drainage, on the other side of Easton Ridge (Figure 3-40).

No wetlands were identified in the westerly, flat portion of the site during field visits conducted in October 2006 (Raedeke Associates 2006) or in June 2008 and July 2009 by Parametrix, Inc.

Wetlands are primarily limited to the benched portion of land in the easterly part of the project site (Figure 3-41). Wetlands occur in two geomorphic settings in this portion of the project site including groundwater discharge points along hillslopes, and linear depressions within the riparian zone of the DNR Type N stream.

A hillside seep where water daylights at the ground’s surface occurs along the existing logging road leading up to the bench. The area surrounding the seep is characterized by fast-growing deciduous tree species including red alder and black cottonwood, understory shrubs of redstem ceanothus, and tapered rush (*Juncus accuminatus*), Watson’s willow herb (*Epilobium ciliatum*), and dagger-leaf rush (*Juncus ensifolius*). Because of the presence of all three wetland characteristics, this area would qualify as a jurisdictional wetland.

Wetland Classification System

Riverine wetlands are wetlands contained within a channel. Water is usually, but not always, flowing in the riverine system.

Palustrine wetlands include all non-tidal wetlands dominated by trees, shrubs, persistent emergent vegetation, or emergent mosses or lichens. They also can occur in some tidal areas of low salinity.

Lacustrine wetlands have all of the following characteristics: located in a depression; lacking areas with greater than 30 percent areal coverage of vegetation; and the total area (including any open water) exceeds 20 acres.

Wetlands are also associated with the DNR Type N stream running in a southwesterly direction through the project site, from the upper slopes through the bench, down to the base of the ridge, and almost to the BPA transmission line easement. These wetlands are confined to areas immediately adjacent to the stream channel at lower gradient (less steep) points along the stream’s course. These areas are primarily located where the stream runs alongside the logging road providing access to the mid-bench and upper portions of the project site, along the east side of the road at the first major switchback. These wetlands are dominated by red alder (*Alnus rubra*), thimbleberry (*Rubus parviflorus*), devil's club (*Oplopanax horridus*), slough sedge (*Carex obnupta*), red elderberry (*Sambucus racemosa*), and lesser amounts of false Solomon's seal (*Smilacina racemosa*). Because other portions of this stream and its on-site tributaries are ephemeral (seasonal/intermittent) and traverse areas of steep topography, hydrology is likely not present for long enough periods during the growing season for areas adjacent to those portions of the streams to meet wetland criteria, and qualify as jurisdictional (regulated) wetlands. Hydrophytic vegetation was not present in additional streamside areas investigated during the June 2008 field visit.

The hillside seep identified above can be classified as palustrine, shrub-scrub under the U.S. Fish and Wildlife Service (USFWS) wetland classification methodology (Cowardin et al 1992). These wetlands are characterized by woody vegetation that is less than 20 feet tall, and are generally dominated by true shrubs and young trees. Wetlands associated with the DNR Type N stream traversing the project site are generally not located within the active channel; thus, these wetlands would not be considered riverine wetlands. Wetlands associated with the stream in its upper reaches can be classified as palustrine forested wetlands, characterized by woody vegetation that is over 20 feet tall and possessing an overstory of trees, an understory of young trees and shrubs, and an herbaceous layer. A potential wetland area inventoried at the base of the DNR Type N stream just east of the BPA transmission line easement can be classified as a palustrine, emergent wetland, characterized by erect, rooted herbaceous hydrophytes that are present for the majority of the growing season.

The general area of the Upper Yakima Valley west of Cle Elum is also characterized by NWI-mapped wetlands that are associated with bodies of water. In addition to the NWI-mapped wetlands described above, lacustrine wetlands associated with Lake Easton, Kachess Lake, and Cle Elum Lake are mapped in the general area by the NWI. Wetlands associated with the Cle Elum River (both north and south of the lake), the Waptus River, and Gold Creek are mapped by the NWI, as are palustrine wetlands along French Canyon Creek and Box Canyon Creek. NWI-mapped lacustrine wetlands are associated with many areas of open water occurring along streams/creeks (Delate Creek) in the general area, and on the slopes of Mount Daniel. NWI-mapped wetlands of all three types described above are present along stretches of the Cooper River between State Creek and Delate Creek.

The Washington Natural Heritage Program (WNHP) database has no record of any high quality natural heritage wetland or other natural heritage features occurrence in the Public Land Survey System's (PLSS) Sections, Township and Range within which the project site is located (DNR 2008).

See Appendix A for the list of rare plants known to occur in Kittitas County, Washington (DNR 2008). This list indicates that one federally listed (endangered) plant species, nine federal plant species of concern, and 32 additional state-listed plant species are known to occur in Kittitas County. None of the listed plant species appearing on this list were observed during the June 2008 field visit.

3 What policies and standards address wetlands

The GMA directs cities and counties to designate critical areas (RCW 36.70A.170) and adopt development regulations that protect critical areas (RCW 36.70A.060). Critical areas include wetlands.

Kittitas County has adopted the following general goals, policies, and objectives:

Wetlands

Wetlands play a significant role in the reduction of water pollution, erosion, siltation, and flooding, and provide significant wildlife, fisheries, and plant habitats; their destruction or impairment may result in increased public and private costs or property losses.

GPO 2.54 Kittitas County should accept landowner claims that a defined wetlands is artificial unless the determining regulatory agency deemed otherwise based on the I-V tiered wetland rating system outlined in this policy document.

GPO 2.55 Kittitas County should accept the premise that the substantial irrigated agricultural activities enhance and maintain some wetlands environments within this area.

GPO 2.56 Kittitas County should encourage the development of a regulatory program for wetlands protection that is both sufficiently flexible to allow reasonable use and enjoyment of private property and generally consistent with the requirements of the Growth Management Act.

GPO 2.57 Kittitas County should encourage the implementation of wetlands protection strategies that will achieve, to the maximum extent practicable, a zero net loss of natural wetlands acreage, functions, and values and, if reasonably possible, a gain of wetlands habitat in the long term.

GPO 2.58 Any wetlands protection measures imposed by Kittitas County should not interfere with stock water or irrigation water-rights recognized in the Acquavella adjudication process.

GPO 2.59 Any wetlands protection measures imposed by Kittitas County should not interfere with a person's ability to engage in existing agricultural land use activity associated with his property. Agricultural land use activities include, but are not limited to, the grazing and watering of livestock, plowing, seeding, cultivation, harvesting for the production of crops; upland soil and water conservation practices, the maintenance of farm for stock ponds, irrigation ditches, drainage ditches, underground drainage systems and farm roads, and the control of noxious weeds.

GPO 2.60 Preliminary determinations by the Kittitas County Planning Department concerning the potential presence of wetlands that may be impacted by an activity requiring a permit or approval from the County department should be based on data contained in the U.S. Fish and Wildlife Service Inventory for Kittitas County. The Fish and Wildlife Service Inventory should be augmented over time with more specific information concerning wetlands location, class, and type generated through the administration of the wetlands protection program.

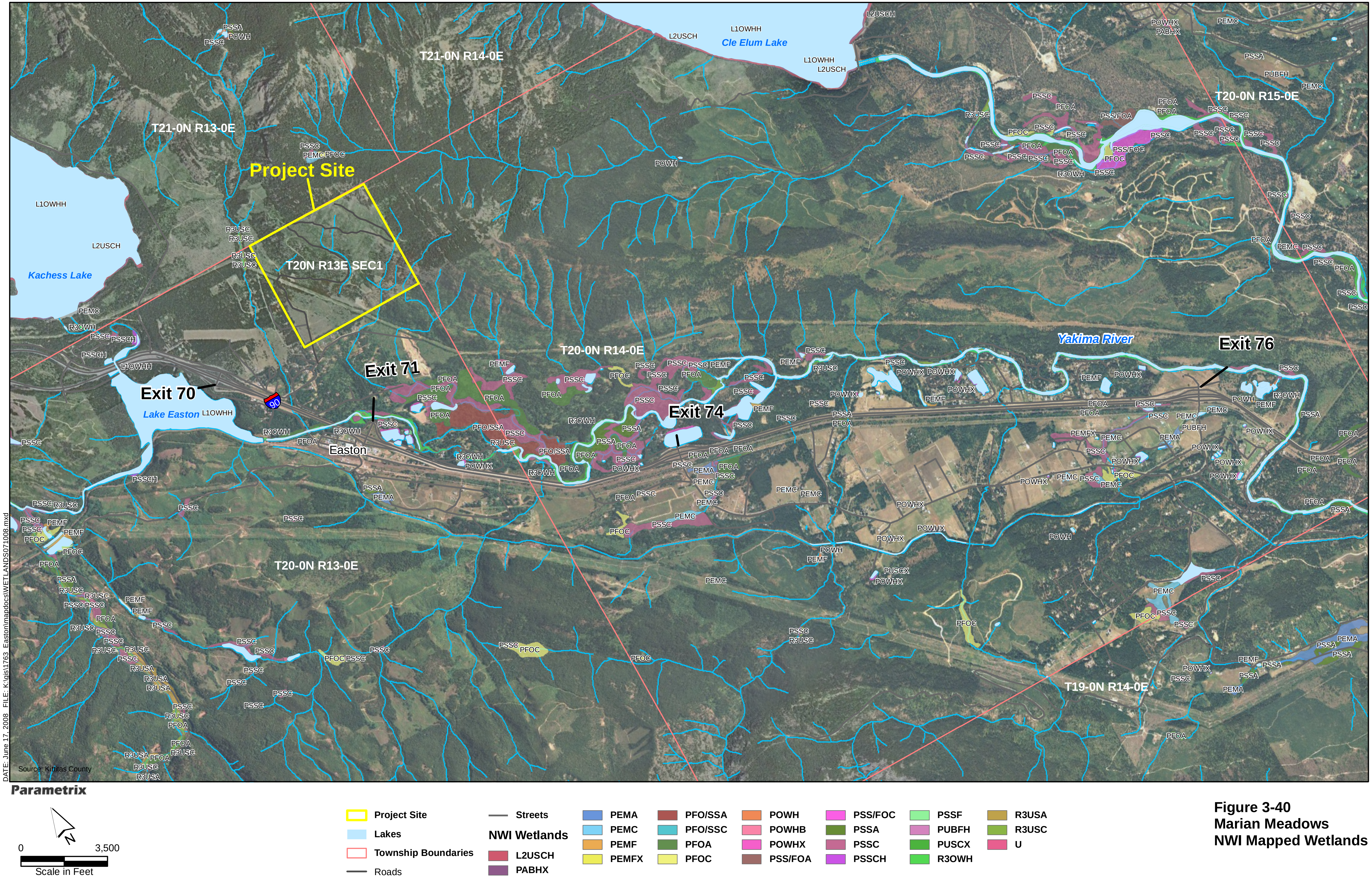
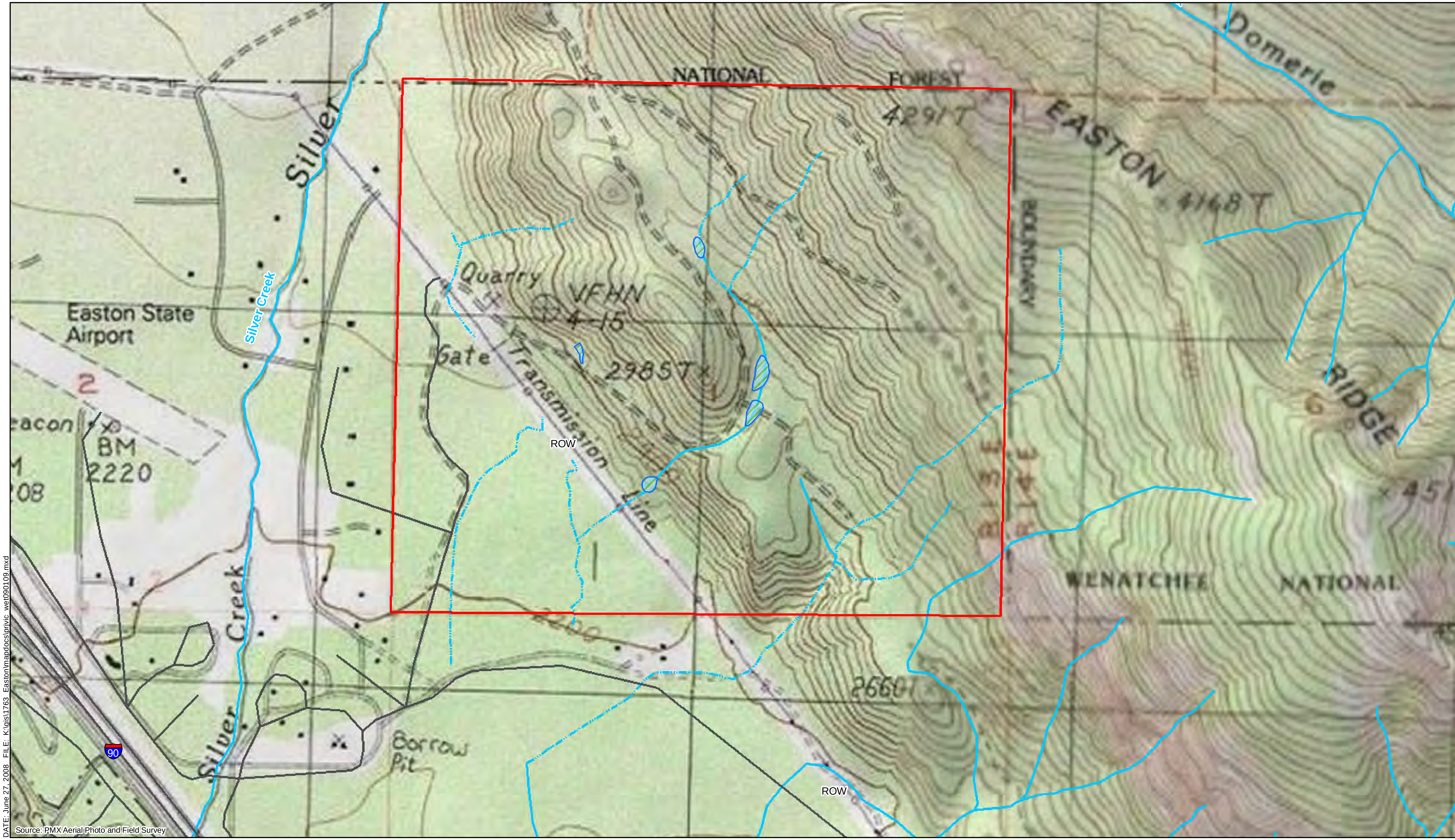


Figure 3-40
Marian Meadows
NWI Mapped Wetlands



Parametrix

N

0 800

Scale in Feet

Field Inventoried Wetlands

Intermittent Stream

Perennial Stream

Project Site

Streets

Figure 3-41
Marian Meadows
Wetlands in
the Project Vicinity

GPO 2.61 Water conservation and enhancement shall take precedence over inadvertent and/or unintentional wetland regulation and preservation.

GPO 2.62 Kittitas County should give positive tax incentives to private property owners who maintain, reclaim, or enhance class I, II, III, and IV wetlands.

GPO 2.63 Kittitas County should support or encourage the purchase and dedication of lands by public or private organizations for wetlands and apply sound management principles to said property.

4 What effects would construction of the proposal have on vegetation and wetlands?

Alternative 1 would involve residential development in the vicinity of existing wetlands in the bench area of the easterly portion of the site. Direct impacts will depend on the size of buffers included in the proposal. Regardless of the preservation of wetlands or the size of buffers, some change in the hydrologic conditions that support the wetlands can be expected either from diverting water that currently infiltrates into the ground and recharges the wetlands, or through additional discharge of stormwater into watercourses and to the wetland. In either case, the natural hydroperiod of the wetlands would change and have a ripple effect on functions.

With the buffers currently required by Kittitas County codes, much of the upland area used by wetland-related species, such as amphibians, during a part of their lifestage would be reduced. This may have an impact on a number of functions, most seriously to the area available for foraging. Even with more extensive buffers than required by county codes, some impacts would be experienced from displacement of upland habitat.

Proximity impacts from residential use from noise, light, and domestic animals likely would affect animals using wetland areas and contribute to a decline in populations.

Residential development would impede animal movement and likely lead to less effective movement between wetlands on the site and other wetlands in the vicinity. The development would also reduce the effectiveness of habitat use and possibly lead to isolation of populations that would be less likely to recover if subjected to catastrophic decline due to disease or factors such as fire.

Alternatives 2 and 5 would have much less impact on wetlands in the easterly portion of the site because the area would remain undeveloped and subject to disturbance only on the cycle of one a decade or less often for forest management practices. Some disturbance could be expected from recreational activities, but at a much lower intensity than from residential use.

Alternative 3 would involve residential development in the vicinity of existing wetlands in the bench area of the easterly portion of the site. Direct impacts will be somewhat less than Alternative 1 because of the lower intensity of use and would also depend on the size of buffers included in the proposal. Regardless of the preservation of wetlands or the size of buffers, some change in the hydrologic conditions that support the wetlands can be expected either from diverting water that currently infiltrates into the ground and recharges the wetlands, or through additional discharge of stormwater into watercourses and to the wetlands; however, the magnitude would be lower than Alternative 1. In either case, the natural hydroperiod of the wetlands would change and have a ripple effect on functions.

With the buffers required by Kittitas County codes, much of the upland area used by wetland-related species, such as amphibians, during a part of their lifestage would be reduced. This may have an impact on a number of functions, most seriously to the area available for foraging. Even with more extensive buffers than required by county codes, some impacts would be experienced from displacement of upland habitat; however, some habitat value likely would remain due to the larger lot size.

Proximity impacts from residential use from noise, light, and domestic animals, impedance of animal movement, and the potential for isolation of populations would occur, but at a lower level than Alternative 1.

Alternative 4 would have similar impacts as Alternative 1 on wetlands because development is clustered in the flatter bench area where the wetlands are present.

5 What permanent effects on vegetation and wetlands would result from the proposal and the potential for other development in the area?

Cumulative impacts of other development in the vicinity likely would not affect the wetlands on the easterly portion of the site because they are effectively isolated from the location of additional development by a steep sloping area.

6 What measures can reduce permanent effects on vegetation and wetlands?

The most effective mitigation of impacts on wetlands is from avoidance of development in proximity, as illustrated in Alternatives 2 and 5.

Other mitigation measures include:

- Manage vegetation and impervious areas to preserve as much area as possible for natural infiltration of rainfall into the ground to provide natural recharge.
- Manage stormwater to reduce peak flows and avoid discharge into wetlands, or utilize infiltration systems that mimic natural infiltration.
- Provide water quality treatment to reduce adverse effects of fertilizers, herbicides, and pesticides on wetland-related animal communities.
- Provide buffers and manage vegetation to reduce proximity impacts to wetlands and provide an area for upland habitat for key lifecycle stages adjacent to wetlands.

Off-site mitigation, including contribution to mitigation banks, can compensate for impacts that cannot be effectively mitigated on the site.

3.15 FISH AND WILDLIFE

1 What fish species and habitat are present in the project area?

The project site is located in WRIA 39—Upper Yakima River. The streams on the project site do not support fish species due to the intermittent or seasonal flows, or are too small and too shallow to provide adequate fish habitat for resident fish species. However, the streams on the project site do contribute to the general habitat and species in the project vicinity.

On the flat western portion of the project site, there are two swales that originate in the vicinity of the transmission line corridor and extend south-southwest to near the southern property boundary where they lose definition either because water infiltrates or because the continuation of the swale to the south has been obliterated by grading on adjacent properties. This swale is mapped as a Type N (non-fish bearing) stream by DNR, and may intermittently convey snowmelt. There was no evidence of surface flow or channel scouring during an October 25, 2006, site visit by the applicant's consultant (Raedeke Associates 2006) or by Parametrix staff in June 2008 and June 2009.

On the steep eastern portion of the site, there are four non-fish bearing streams. On the far south portion of the site a stream originates in a spring system near the eastern end of the site and flows to the southeast down a steep swale and off the site. A small stream originates in local runoff in the southeastern portion of the upper area and flows over basalt cliffs and off the site. A stream in the central portion of the site flows to the south between two ridges then flows to the east immediately south of the main access road to the south. This stream channel is up to 5 feet wide and 8 inches deep in places and originates in a wetland complex. It disappears in an alluvial fan on the flat westerly portion of the site. A fourth stream originates on the far northern portion of the site from local runoff and groundwater from a steep ravine. It flows down a steep ravine near the northern property line and disappears in an alluvial fan.

What is the bench area?

The bench area is located in the eastern portion of the site. The "bench" is where the land levels out for a short distance in the middle of the steep slope.

Water from these streams largely infiltrates to groundwater. Although none of the streams support fish, they do provide some aquatic habitat that may support amphibians. All of these streams contribute water to recharge of waters in the major waterbodies in the project vicinity. These waterbodies include Silver Creek, Yakima River, Kachess Lake, Kachess River, Keechelus Lake,, Lake Easton, and Cle Elum Lake (Figure 3-34).

Silver Creek drains a large area between Kachess and Cle Elum lakes and passes just west of the western boundary of the project site, entering the Yakima River approximately 0.5 mile southwest of the site. Silver Creek dries up in late summer on dry years south of the National Forest boundary. Resident cutthroat trout were identified in the stream reach upstream of the dam from electrofishing surveys in the 1990s (Mayo 2008; WDFW PHS June 20, 2008). The culverts under I-90 and Sparks Road are mapped as partial fish passage barriers (Salmonscape 2008). Silver Creek does not have current or historical salmonid use (Haring 2001).

The Yakima River between Lake Easton and the confluence with the Cle Elum River is considered to support bull trout, spring Chinook, summer steelhead, and coho salmon (Haring 2001). Reaches of the Yakima River between Easton Dam and Cle Elum River and between Easton Dam and Keechelus Dam are considered high priority reaches for preservation for spring Chinook and coho salmon because the reaches support large, often continuous blocks of high-quality habitat (Entrix 2004; WDFW 2002; Salmonscape 2008).

A number of the lakes and ponds in the general vicinity of the project site, including Easton Ponds (former gravel pits) and Lake Easton, are stocked with brown trout and/or rainbow trout. Kachess Lake supports a kokanee population as well as rainbow trout, cutthroat, burbot, and bull trout (WDFW PHS June 20, 2008).

2 What terrestrial species and habitat are present in the project area?

A diverse mix of wildlife species uses the project site's upland, riparian, and wetland habitats, including deer, elk, coyote, snowshoe hare, small mammals (voles and mice), snakes and lizards, and birds, such as dark-eyed junco, chipping sparrow, and spotted towhee. The flat western portion of the project site was clearcut in the 1980s and 1990s. Vegetation in this section includes small trees, shrubs, and grasses.

The BPA transmission line easement that separates the eastern and western portions of the site is maintained to remove large trees. Land cover in the right-of-way consists of shrubs, small trees, and disturbed areas, particularly along access roads.

The steep eastern portion of the site supports a mixture of second-growth conifer forest, regenerating clearcut, and open-canopy conifer forests that developed following logging activities in the 1990s. Dominant tree species include replanted Douglas fir (*Pseudotsuga menziesii*) and ponderosa pine (*Pinus ponderosa*).

The stream network on and above the bench supports narrow riparian and wetland habitats with red alder (*Alnus rubra*), swamp gooseberry (*Ribes lacustre*), slough sedge (*Carex obnupta*), and large-leaved sedge (*Carex amplifolia*) (Raedeke Associates 2006). This vegetation provides potential habitat for amphibians, birds, and small mammals.

> A complete list of wildlife species potentially occurring in the project area is presented in Appendix A.

Near the project site there are large areas of conifer forests on National Forest land to the north, a mixture of open conifer and rock outcroppings and cliffs to the east, and residential development to the south and west. The residential developments have relatively low population density but there are pockets of higher-density residential areas as well.

Wildlife species that have been documented or that may occur in the project area were identified through literature review, field visits, and reports from local residents. In all, 9 amphibian, 6 reptile, 97 bird, and 61 mammal species may use the project area based on general habitat and species information. Wildlife species are discussed below by major taxonomic groups that potentially use the site. Endangered, threatened, sensitive, and candidate species are discussed in Question 3 of this section.

Reptiles and Amphibians: The amphibian and reptile species potentially occurring on the project site include three species of salamanders, the rough-skinned newt, four frogs, western toad, two lizards, and four snakes. Because the site lacks ponds and has limited areas of wetlands with open water, species that require still-water habitat for breeding are likely present only as adults or dispersing juveniles in terrestrial habitats. The stream network on the eastern portion of the site may provide suitable habitat for tailed frogs, Pacific giant salamanders, and rough-skinned newts. Pacific tree frogs and long-toed salamanders may breed in temporary ponds that occur in roadside ditches. Many of the amphibian species use a variety of upland habitats as adults. The reptile species most likely present on the site include the common garter snake, western terrestrial garter snake, northern alligator lizard, and western fence lizard. Other snake species, such as rubber boa, could occur in habitats that have adequate cover.

Birds: Overall, approximately 97 bird species have ranges that overlap the site (Washington Nature Mapping Project 2008). Breeding bird survey data indicate that 82 species are confirmed, probable, or potential breeding species within approximately 3 miles of the site (Seattle Audubon Society 2008). Some of these bird species make substantial use of the clear-cuts, whereas other species are dependent on the open or closed-canopy forests (e.g., warblers) or riparian habitats (e.g., song sparrow).

Please refer to Appendix A, Table A-1, for a list of the bird species that potentially occur near the project site.

Please refer to Appendix A, Table A-2, for a list of the mammal species that potentially occur near the project site.

Mammals: A wide variety of mammals occurs in the central Cascade Mountains and up to 60 mammal species potentially occur on or near the project site. Of these, mule/black-tailed deer, elk, snowshoe hare, Douglas squirrel, chipmunk, coyote, voles, and cougar have been documented on the site by Raedeke Associates (2006), Parametrix (site visit in December 2007), anecdotal information from local residents, or WSDOT and U.S. Forest Service reports.

The open habitat of the western portion of the site provides potential habitat for small mammals such as shrews, pocket gophers, voles, mice, skunks, and weasels. Squirrels and chipmunks likely occur throughout the site. These small mammals are important prey for carnivorous mammals, hawks, owls, ravens, and crows. Other species of small mammals rely on the dense forest canopy and/or shrub layers such as found in the eastern portion of the site.

Ten species of bats that use forested habitat in the central Cascade Mountains may occur on the site. Several of the species forage for insects by flying over clear-cut and burned forests as well as along streams and wetlands. The Marian Meadows site clear-cuts and open conifer forests are likely used by foraging bats.

Carnivores including black bear, cougar, coyote, bobcat, skunk, weasel, and raccoon are present in the project vicinity and may occur on the site. The mid- and large-sized carnivores have large home ranges and move throughout the region, including habitats on the opposite side of I-90 (see connectivity discussion below). Grizzly bear, gray wolf, pine marten, and fisher are mammal species with extremely large home ranges that could periodically use habitats in the project vicinity.

Mountain goats also occur in the project vicinity. The primary habitat requirement for mountain goat is rugged terrain, such as steep, rocky cliffs, rock pinnacles, ledges, and talus slides (Washington Nature Mapping Project 2008). Mountain goats typically use areas near treeline, but move to lower elevation cliffs in winter. They also use conifer forest for cover and feed mostly on early successional vegetation in meadows and slides. The area immediately north and northeast of the Marian Meadows site is delineated as a regular concentration area (Kachess Lake Winter Range) for mountain goats as shown in Figure 3-42 (WDFW PHS digital data, June 20, 2008).

Deer and Elk: Elk (*Cervus elaphus*) and mule/black-tailed deer (*Odocoileus hemionus*) are found in the general project vicinity. Both species occur on the project site at various times of the year. Both are game species; winter range and calving areas are designated priority habitats by WDFW.

Elk are present in the area surrounding the Marian Meadows site throughout the year (Singleton and Lehmkuhl 2000). The level of elk and deer use in the project vicinity during winter months varies from year to year depending on snow accumulations. Raedeke Associates (2006) reported that deer and elk use of the Marian Meadows project site was moderately low. Residents of the area, however, report frequent elk use (Jensen 2007).

The Domerie Flats elk winter concentration area occurs in the project vicinity, extending from just within the eastern boundary of the Marian Meadows site, eastward along the Yakima River and to an area below Cle Elum Lake Dam, approximately 4 miles east of Marian Meadows (WDFW PHS digital data, June 20, 2008). Most use of the winter concentration area occurs along the Yakima River riparian area and near the Cle Elum River, where more than 100 elk congregate. The Marian Meadows property is at the edge of the wintering area and receive use primarily during migration periods and relatively mild winters.

Raedeke Associates (1999) conducted a radio telemetry study of nine elk in the Marian Meadows project area. In that study, elk made frequent use of the river valley bottom immediately south of the Marian Meadows project area during winter and summer periods. Some of the monitored elk moved between Kachess Lake and I-90, while others passed on the east side of the lake northeast of the Marian Meadows site. Although Raedeke Associates (2006) reports that the 1999 telemetry showed that elk generally avoided the more developed areas surrounding the Marian Meadows project site, the 1999 radio telemetry data do include a number of “winter elk” and “summer elk” locations very close to the Marian Meadows site. Anecdotal information from local residences, including photographic evidence submitted with scoping letters, indicates that elk use the flat western portion of the property during the fall and winter, if snow is not too deep. Elk regularly move through remnant patches of habitat within the matrix of low-density residential development as they move to and from the Yakima River floodplain wintering areas during seasonal migrations. The degree to which elk can move through the residential area is limited by the presence of tall property fences and dogs at some of the properties.

The elk in the project vicinity are part of a sub-herd of the Colockum herd (WDFW 1997). The Colockum elk herd ranges over 1,600 square miles between the Columbia River and the Cascade crest and U.S. Highway 2 to the north and I-90 to the south (WDFW 2006). Generally, this sub-herd winters along the Yakima and Cle Elum rivers and has summer ranges near Kachess Lake and at higher elevations. Overall, the Colockum herd survey data suggest a declining elk population trend between 1995 and 2006 (Bernatowicz 2006). WDFW, however, has recently been managing this sub-herd with special harvests to control increasing numbers of elk in agricultural areas and more developed areas (Bernatowicz 2006).

Human disturbance of elk can cause increased energetic demands, decreased reproductive success, increased predation, and the avoidance of habitats that would otherwise be utilized (Storlie 2006). Research on elk in other areas found that the negative impact of roads generally increases with increased human use (Wisdom et al. 2005a; Pedersen et al. 1980). The avoidance of roads in open habitat is greater than in forested areas. Powell and Lindzey (2003) found elk avoid areas within 1.2 miles of major roads in summer and 0.6 mile in winter in open habitat in Wyoming. Wisdom et al. (2005b) found that off-road vehicle use had the greatest negative impact on elk compared to other recreational activities. The project site and vicinity receives substantial off-road vehicle and snowmobile use. In response, elk may move through less desirable areas as they migrate to and from winter range areas.

Mule/Black-tailed Deer—Little information is available on the historical or current condition of the deer range in the upper Yakima watershed. An increased incidence of fires and altered timber harvest practices have probably reduced woody browse since the 1980s. Residential development in prime winter range is adversely affecting the overall mule deer population in the region (WDFW 2007).

Wildlife Corridors: There are limited data on wildlife corridors in the Marian Meadows project vicinity. To assess the overall wildlife connectivity issues for the DEIS, biologists reviewed information from the WSDOT I-90 studies, an elk telemetry study completed for the Suncadia development (originally known as the MountainStar Resort) near Roslyn (Raedeke Associates 1999), and other literature.

The I-90 corridor presents a significant barrier to wildlife movement and results in numerous wildlife deaths from vehicle collisions. In addition, the checkerboard ownership pattern (alternating sections of federal and private ownership), increasing residential development, and historical timber harvests have created substantial barriers to movement and a general lack of habitat connectivity in the region. The I-90 corridor is widely considered to present a bottleneck for movement of terrestrial species in the Central Cascades.

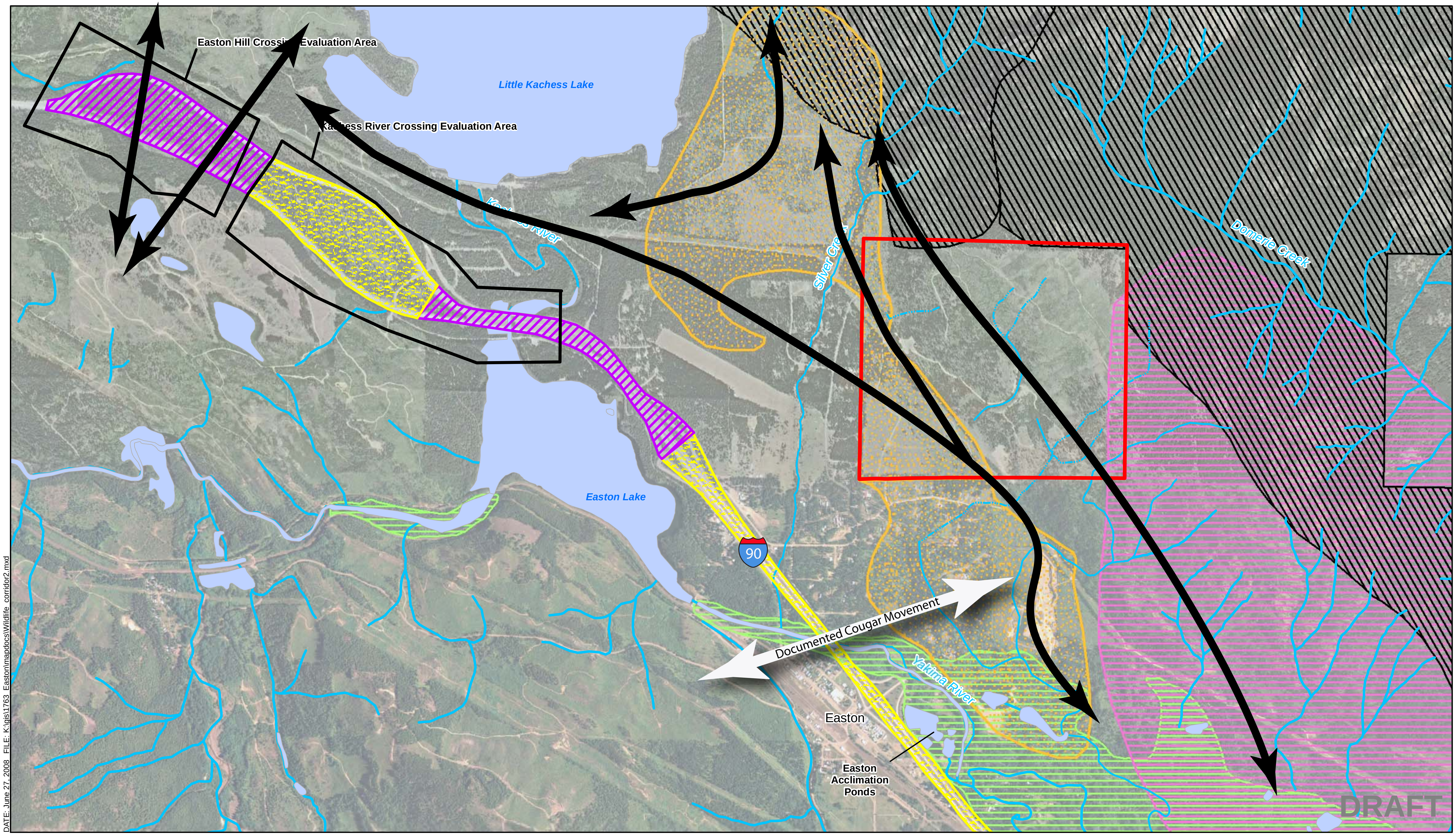
In a collaborative study, WSDOT, along with the U.S. Forest Service, WDFW, USFWS, and various non-governmental organizations, have identified various “Connectivity Emphasis Areas” (CEAs) where WSDOT will improve terrestrial wildlife movement through the I-90 corridor between Snoqualmie Pass and Easton in conjunction with highway improvements. The Marian Meadows project site is located 1.2 miles east of the nearest I-90 CEA, which is located at Kachess River. Another CEA is on the Easton Hill portion of the highway, just west of the Kachess River CEA.

In the Easton Hill segment of I-90, elk road-kills were documented in all four seasons of the year in the 1990 to 1998 period (Singleton and Lehmkuhl 2000). These observations indicate that some elk regularly attempt to cross I-90 even though most often remain on one side of the highway. Between 1990 and 1998, there were no deer road-kills along I-90 near the project, because most deer had moved to the Cle Elum area (Singleton and Lehmkuhl 2000).

Raedeke Associates (1999) found that radio-telemetered elk (captured near Roslyn) generally made seasonal migrations along the north side of I-90 and along the Yakima River. The elk made substantial use of the river valley bottom immediately south of the Marian Meadows project area. In addition, I-90 bridges over the Yakima River facilitate some elk passing between Kachess Lake and the north side of I-90. Singleton and Lehmkuhl (2000) reported that in the Yakima River Valley (primarily east of Easton Hill), human disturbance, development, and the presence of riparian cover serve to funnel animal movement. There is a relatively unimpeded corridor for elk movement south of the site on the north side of the Yakima River. Because of the lack of bridges, residential development is limited to the south bank of the river leaving an area of forest for animal movement as far as the Cascadia development.

Another indication that wildlife move through the project area is provided by data from studies of cougar (*Felis concolor*) movement. Maletzke et al. (2005) found that subadult cougars periodically cross I-90 south of the project area and regularly use habitats on and near the project site. Crossings of I-90 by bobcat, coyote, and black bear have shown some concentration west of the town of Easton (Singleton and Lehmkuhl 2000). They also found that five of six existing bridge underpasses are used by mule deer. A wide variety of small mammals have been documented moving across the I-90 corridor through the existing drainage culverts.

On the Marian Meadows project site, the presence of residential development along much of the boundary of the western portion of the site likely affects the degree to which terrestrial species can move between habitats in uplands and riparian zones along Silver Creek and the Yakima River. Elk not only pass through the flat western portion of the project site, they also use the upper slopes and drainages as they move between the Kachess Lake area and the Yakima River Valley. The eastern portion of the site is bordered by conifer forests and rocky slopes and allows for essentially unimpeded terrestrial wildlife movement.



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Scale in Feet

WFDW PHS Data

- Mountain Goat Habitat
- Elk Winter Range
- Upper Yakima Riparian Area

WSDOT I-90 Information

- Area with High Elk/Deer Roadkill
- Area with Moderate Elk/Deer Roadkill
- Crossing Evaluation Areas

- Project Site
- Area of Fall and Early Winter Elk Use
- Lake

- Intermittent Stream
- Perennial Stream

Figure 3-42
Marian Meadows
Wildlife Use and Corridors

The stream network in this section likely provides important connectivity for amphibians, small mammals, and other species that use habitat on the site and on adjacent National Forest and state lands. Based on the available data, a generalized depiction of big game ranges and movement corridors is presented in Figure 3-42.

3 What federal and state threatened, endangered, and candidate species, and species of concern occur in the project area?

The USFWS (2008) lists 10 fish, wildlife, and plant species that are endangered, threatened, or candidates for listing under the Endangered Species Act (ESA) (16 United States Code [USC] 1531 et seq.; 50 CFR 402) that occur in Kittitas County (Appendix A). None of these federally listed or candidate species have been documented in the project area. Several of these species may occur in suitable habitat on adjacent lands managed by the U.S. Forest Service. The following paragraphs describe the potential occurrence and habitat associations of threatened and endangered wildlife species that may occur in the project vicinity. Additional information about these species is available in Appendix A.

What is the Endangered Species Act?

The Endangered Species Act of 1973 provides for the conservation of species that are endangered or threatened throughout all or a significant portion of their range, and the conservation of the ecosystems on which they depend (NOAA 2008).

In addition to the 10 federally listed or candidate species, 39 other species that are state endangered, threatened, sensitive, and candidate species potentially occur in the project vicinity (Appendix A, Table A-3).

Bull Trout: The bull trout is listed as threatened under the ESA and is a candidate for listing as a state endangered, threatened, or sensitive species. Bull trout are found in the Yakima River, Kachess River, and Kachess Lake (Salmonscape 2008). The USFWS has designated the Yakima, Kachess, and Cle Elum rivers, as well as Keechelus, Kachess, and Cle Elum lakes as critical habitat for bull trout (USFWS 2002). No bull trout are known to enter Silver Creek or the unnamed stream that drains the eastern portion of the project site and enters the Yakima River 1.7 miles downstream in the vicinity of the Easton Ponds.

Gray Wolf: The gray wolf is listed as endangered under the ESA in Washington State and is on the state list of endangered species. Wolves occur in remote areas with low human disturbance and adequate amounts of prey. The species may be recolonizing the Cascade Mountains. A pack with pups was discovered in July 2008 in western Okanogan and northern Chelan counties and represents the first fully documented breeding by wolves in the state since the 1930s (WDFW 2008). It is possible that the gray wolf may occur in the project vicinity on an infrequent basis because packs can have territories of up to 350 square miles. The high level of human activity in the project vicinity would likely prevent wolves from using the site.

Grizzly Bear: The grizzly bear is listed as threatened under the ESA in Washington State and is on the state list of endangered species. Grizzly bears use a wide variety of habitats in areas with low levels of human disturbance. Suitable habitat occurs throughout the Cascade Mountains north of Snoqualmie Pass, but most sightings have been in the North Cascades and northeastern Washington. One observation occurred in 1994 approximately 4 miles north-northwest of the Marian Meadows property (WDFW PHS June 20, 2008). However, the existing level of development and human disturbance in the area precludes regular use of the project site and surrounding areas.

Canada Lynx: The Canada lynx is listed as threatened under the ESA throughout the contiguous United States and is on the state list of threatened species. Lynx are primarily found in high-elevation forests of northcentral and northeast Washington, primarily in Okanogan, Chelan, Ferry, Stevens, and Pend Oreille counties (Stinson 2001). Lynx rely on a mosaic of dense, early successional forest (which provides foraging habitat) and older forests with large woody debris (which provide den sites). Based on the absence of these habitat elements, along with the low elevation and distance from known areas of lynx use, the Marian Meadows project area is not likely to support Canada lynx.

Fisher: The Pacific fisher is a candidate for listing under the ESA and is on the state list of endangered species. Fishers are associated with dense coniferous forest with large amounts of snags and logs. Between 1955 and 1999, there were three observations of fishers in counties bordering Kittitas County (Raedeke Associates 1999). With the existing level of development, past timber harvest, and human activity in the project vicinity, the Marian Meadows site does not likely provide suitable fisher habitat.

Marbled Murrelet: The marbled murrelet is listed as threatened under the ESA and is on the state list of threatened species. Marbled murrelets are seabirds that depend upon old-growth forests, or forests with an older tree component, for nesting habitat (Hamer and Nelson 1995; Ralph et al. 1995). The nearest observation of marbled murrelets during the breeding season occurred near Snoqualmie Pass, approximately 14 miles from the project area. There is no suitable nesting habitat on or near the Marian Meadows site.

Northern Spotted Owl: The northern spotted owl is listed as threatened under the ESA and is on the state list of endangered species. Spotted owls use structurally diverse, coniferous forests with dense canopy cover, large trees, snags, and logs. These conditions are typically found in old-growth forest, but spotted owls in the eastern Cascades have been observed using smaller trees and more open stands. The nearest known spotted owl activity site is approximately 2 miles northeast of the Marian Meadows site. The USFWS has designated critical habitat for spotted owls in Kittitas County but the project site is not within the mapped area.

What are Priority Species?

Priority species are those fish and wildlife species that require special efforts to ensure their survival because of their low numbers, sensitivity to habitat alteration, tendency to form vulnerable aggregations, or because they are of commercial, recreational, or tribal importance. The WDFW is responsible for priority habitats and species in Washington and provides information on their website: http://wdfw.wa.gov/hab/phspage.htm.

4 State Listed and Priority Habitats and Species

State-listed species are those native fish and wildlife species legally designated as endangered (WAC 232-12-014), threatened (WAC 232-12-011), or sensitive (WAC 232-12-011). State candidate species are those fish and wildlife species that will be reviewed by WDFW for possible listing as endangered, threatened, or sensitive. Collectively, these species along with all federally listed or candidate species are state species of concern. The state species of concern listed in Appendix A have general distributions that overlap the project area.

Priority habitats are habitat types or elements with unique or significant value to a diverse assemblage of species. WDFW (2008) identified one priority habitat area near the Marian Meadows site. This is the Upper Yakima riparian area—an area of floodplains and wetland complexes along the Upper Yakima River approximately 0.5 mile south of the project site. WDFW (2008) reports that this area is used by beavers, wintering bald eagles, and big game.

5 What policies and standards apply to aquatic and terrestrial habitat?

The GMA directs cities and counties to designate critical areas (RCW 36.70A.170) and adopt development regulations that protect critical areas (RCW 36.70A.060) Critical areas include fish and wildlife habitat.

Kittitas County has adopted the following general goals, policies, and objectives:

Wetlands

Wetlands play a significant role in the reduction of water pollution, erosion, siltation, and flooding, and provide significant wildlife, fisheries, and plant habitats; their destruction or impairment may result in increased public and private costs or property losses.

GPO 2.54 Kittitas County should accept landowner claims that a defined wetland is artificial unless the determining regulatory agency deemed otherwise based on the I-V tiered wetland rating system outlined in this policy document.

Fish and Wildlife Habitat Conservation Areas

Habitat conservation areas contain habitat for migrating waterfowl, game and food fish, and species that are threatened or endangered, and provide for greater species diversity. These areas provide recreational resources and more stable ecosystems. Their disturbance could result in irreversible loss of important habitat and species diversity and therefore loss of economic resources. The intent is to maintain species in suitable habitats within their natural geographic distribution to prevent the creation of isolated sub-populations.

Habitat Conservation

GPO 2.86 Matching conservation moneys - When available, matching conservation moneys should be offered to all landowners on a first-come, first-serve basis for the purpose of maintaining and enhancing wildlife and its habitat in Kittitas County.

GPO 2.87 The Washington State Department of Fish and Wildlife should offer educational programs to the general public so that taxpayers and landowners may better understand the many benefits that wildlife provides.

GPO 2.88 Kittitas County expert technical help should be available to those wishing to develop land that contains, or potentially contains any of the various critical areas defined by these definitions.

GPO 2.89 Information and regulations should be understandable by citizens. (a) An inventory of available information shall be prepared and maintained which shows the location of Fish and Wildlife Habitat and Conservation Areas and this information shall be made available to the landowners at the Planning Department. (b) Planning staff shall prepare materials, which enable citizens to clearly understand the location of critical areas on and adjacent to their property.

Habitat of Local Importance

GPO 2.90 It shall be the policy that the Kittitas County Board of Commissioners shall carefully consider each nomination separately and only within the public hearing process.

GPO 2.91 The County shall encourage economically feasible incentives for the protection and enhancement of designated Habitats of Local Importance.

6 What effects on wildlife and fish would occur during construction?

Road construction and excavation for water and sewage infrastructure would occur during infrastructure construction. Equipment noise and human activity associated with these activities would likely result in the displacement of some animals from suitable habitat within and adjacent to the project site. Construction activities would be temporary; however, the extent to which productive habitat would persist would vary by alternative.

No streams occur on the western portion of the site, therefore, no effects on fish or aquatic resources are anticipated during the infrastructure construction. Given the flat nature of the westerly portion of the site and the generally high rates of infiltration, movement of sediment to Silver Creek would occur only if construction activities leave earth exposed to erosion during periods of very heavy rainfall, snowmelt, or rain-on-snow events. If construction activities take place during such periods, best management practices would be necessary to minimize the risk of increased sediment delivery.

7 What permanent effects on wildlife and fish would result from the proposal and alternatives?

Impacts Common to All Alternatives: Conversion of existing habitat to areas of human development would occur under all five alternatives. Immediately following the rezone and preliminary plat, habitat conditions on almost all portions of the Marian Meadows site would be similar to current conditions. Except in areas that have been converted to road surface, existing vegetation would continue to provide habitat for wildlife species that are present in the area. Areas of standing or flowing water on the site would continue to provide habitat for amphibian species. No fish habitat has been documented on the site. Changes in land cover conditions, however, may influence habitat conditions in fish-bearing streams nearby.

Over time, however, residential development and increased human presence would reduce the amount of suitable habitat for many species, as well as the quality of remaining habitat. Land surface that currently supports forest and shrub vegetation would be converted to housing, roadways, and lawns or other ornamental plantings with reduced structural diversity. Use of the site would change from the current pattern of occasional daytime recreational use to one of residential use; human activity would become a permanent feature of the landscape instead of a temporary interruption.

Animals that currently use the Marian Meadows site would be displaced into suitable habitat in adjacent areas, resulting in potential conflicts with animals already in those locations. Small mammal populations would decrease due to habitat loss, pest control, and the predatory behavior of household pets. Birds and mammals that rely on small mammals as prey would in turn be displaced from the site. Many songbird species are highly mobile and would continue using portions of the site where suitable nesting or foraging habitat persists.

Under all alternatives, the presence of residences with associated clearing of vegetation and introduction of noise, light, and domestic animals would discourage elk and other sensitive species such as mule deer from using the site. The likely continued use of the site for off-road vehicle use would further curtail habitat use. White-tailed deer, which are less sensitive than mule deer or elk to human disturbance, may become a nuisance due to foraging patterns that utilize ornamental plantings and vegetable gardens.

Elk likely would continue to use the site as a migration corridor for movement between the summer habitat to the north and winter range along the Yakima and Cle Elum rivers. The BPA transmission line corridor through the site would likely be the main corridor for movement. Elk can tolerate some human disturbance during migration and may tend to move quickly through the Marian Meadows property during periods with low levels of human use, such as at night or in the early morning. Most elk migration through the site occurs when snow has accumulated at high elevations but remains relatively sparse in the valley bottoms. Much of the migration period, therefore, may not coincide with the winter off-road vehicle season because snow cover at the Marian Meadows site may not be sufficient for snowmobile use. The residential use of the site, however, may curtail access to high-elevation habitats to the west until later in the season when migration corridors at higher elevations become open due to snow melt. The degradation of corridors for movement between available habitat areas may contribute to overall trends of elk population decline (Bernatowicz 2006).

Reduced canopy cover may modify the amount and timing of spring snowmelt flow in the swale that passes through the center of the preliminary plat area. Peak runoff volumes may become greater, because more snow would fall to the ground instead of being intercepted by foliage. With fewer trees providing shade, snowmelt would occur more rapidly and would likely occur over a shorter time period. Compared to current conditions, briefer, heavier flows would be more likely to carry sediment from the Marian Meadows site and deliver it to nearby waterbodies. Excess sediment that reaches fish-bearing waters may interfere with the ability of fish to spawn, rest, or forage. The nearest fish-bearing stream, Silver Creek, is separated from the Marian Meadows site by more than 1,000 feet of flat ground, most of which has dense forest vegetation. Runoff from the project site is unlikely to enter Silver Creek. Similarly, the Yakima River is more than 3,000 feet from the project site; fish habitat conditions in the Yakima River are also unlikely to be affected by residential development at the project site.

Alternative 1, the applicant's PUD proposal with 443 units, would result in residential development throughout the site, with attendant effects on wildlife species and habitat. The flat, western portion of the site would be divided into approximately 225 individual lots. The eastern portion of the site (except for the highest-elevation areas in the northeastern corner) would also be converted to residential use, although with larger lot sizes. Wetlands and stream corridors on the site would become isolated and fragmented and lose much of their habitat value. Wildlife would be affected as follows:

- The intensity of residential use would substantially impair migration of large mammals such as elk and mule deer.
- The relatively narrow BPA transmission line easement corridor would be bounded on one side by lots, which would create substantial sources of disturbance from noise, lights, and animals such as dogs.
- The potential migration corridor through the upper portion of the site would be impaired to an even greater extent by the subdivision of the less steep sloping lands across which herds would be most likely to travel.

The northeastern corner of the site would be retained as open space managed for forestry. This portion of the site is least suitable for use by elk as a migration corridor because of its elevation and steep terrain. The impairment of movement could restrict the access of elk herds to summer habitat on public lands to the west, contributing to lower use of those areas.

Tenure scenarios would not make a substantial difference to the impact, except that a large proportion of recreational users may reduce proximity impacts on weekdays or seasons when they are less likely to be present.

Under Alternative 2, full PUD density on the western portion of the site only with up to 443 units, the amount of area subject to residential development would be less than under Alternative 1. Development would not occur in the Easton State Airport Safety Zone or in the area of geological hazards associated with the alluvial fan; the area of residential development would be reduced somewhat compared to Alternative 1. Because of the inclusion of multi-family housing, the total number of residents would be the same, but the area of greatest habitat modification and permanent human presence would be smaller.

The steep, eastern portion of the property would be retained in resource use with forest practices occurring on a rotation of once every few decades. Similar to current conditions, episodes of increased human presence and associated disturbance would be occasional, rather than the permanent presence that would occur with residential development. This area would continue to provide potential wildlife habitat and could serve as a migration corridor. The steep terrain in that part of the site, however, makes it a less productive habitat area and limits its effectiveness as a migration corridor for elk and other large animals. Human disturbance for forest practices would occur on the cycle of one a decade or less and would have only temporary impacts on habitat, although the structure of vegetation would change and affect species use. Some disturbance could be expected from recreational activities, but at a much lower intensity than from residential use.

The BPA transmission line easement on the lower portion of the site would be more effective as a migration corridor because:

- It would be bounded by about half as many lots as Alternative 1 and therefore less of the corridor would be subject to proximity of impacts from noise, light, and domestic animals.
- A wider corridor also would be provided within the alluvial fan and rockfall hazard areas in the south-central portion of the site left in open space, which would reduce proximity impacts, depending on the use. If these areas were used for active recreational use, proximity impacts would be expected, but likely would be less constant.

These factors likely would reduce the proximity impacts from noise, light, and pets. Compared to Alternative 1, wildlife use of the site would likely be greater, except where adjacent use is at the highest intensity.

Tenure scenarios would not make a substantial difference to the impact, except that a large proportion of recreational users may reduce proximity impacts on weekdays or seasons when they are less likely to be present.

Alternative 3, No Action Alternative with 3-acre lots, with up to 147 lots would result in substantially less residential development than Alternative 1 or 2. The flat, western portion of the site would be divided into approximately 40 to 50 lots. Similar to Alternative 1, no portions of the site would be set aside for forest production or to avoid the Easton State Airport Safety Zone or geological hazard areas.

Most of the Marian Meadows site would be subject to habitat modification and human disturbance, but the intensity of the effect would be lower. The wetlands and stream corridors would have fewer lots in proximity and would be less isolated and fragmented compared to Alternative 1. Habitat value for species sensitive to human disturbance would be reduced compared to current conditions, however.

The intensity of human use along the BPA transmission line corridor would be much lower compared to Alternative 1 due to:

- The presence of 17 lots on the corridor that are much larger and deeper lots. Because of this design, the sources of disturbance from noise, light, and domestic animals would be substantially fewer and farther away from the corridor.
- Lots on the east side of the BPA transmission line corridor could presumably be accessed from the road at the upper end of the parcel, and therefore the potential corridor for movement would extend east to the base of the slope.

The corridor would be more effective for animal movement if fencing were prohibited within and east of the BPA transmission line corridor to allow unrestricted north-south movement.

The potential migration corridor through the upper portion of the site would be impaired by subdivision into large lots because a continuous corridor would not be provided. Species that are less sensitive to human disturbance, such as white-tailed deer, may become acclimatized to the human presence in the area, but elk and mule deer are likely to avoid the area.

Tenure scenarios would not make a substantial difference to the impact, except that a large proportion of recreational users together with large lots may reduce proximity impacts on weekdays or seasons when they are less likely to be present. This alternative would have less impact on wildlife than Alternative 1, largely because some habitat value would be retained on large lots and because fewer lots would result in less proximity impacts.

Alternative 4, PUD with reduced density on the entire site with about 195 lots, would result in the development of fewer residential lots than either Alternative 1 or 2. Similar to Alternative 2, no development would occur in the Easton State Airport Safety Zone or in geological hazard areas. Average lot sizes would be larger than under Alternative 1 or 2, resulting in lower human population density. In the long term, some habitat loss and species displacement would occur in the eastern portion of the site, but this would be limited to a smaller area than under Alternative 1 or 3. The wetland area on the upper portion of the site and the most sensitive stream corridors would be retained in open space, resulting in less habitat fragmentation in those areas. The steep terrain in the eastern part of the site, however, makes it a less productive habitat area and limits its effectiveness as a migration corridor.

Compared to Alternative 1, the BPA transmission line corridor on the lower portion of the site would function more effectively as a migration route because it would be:

- Bounded by fewer lots.
- A wider corridor would be provided within the alluvial fan and rockfall hazard areas in the south-central portion of the site that would be left as an open space area.

All of these factors likely would reduce the proximity impacts from noise, light, and domestic animals. The potential for the BPA transmission line corridor to be used as an elk migration route would be much greater than under Alternative 1 or 2 and probably less than under Alternative 3. Habitat use on the upper, easterly portion of the site would be greater than under Alternatives 1 and 3 but less than under Alternative 2. The habitat value of the western part of the site would be similar to Alternative 2, depending on the use of the open space areas. The upper portions of the easterly part of the site would remain undeveloped, but these areas have less value for wildlife habitat and wildlife movement.

Alternative 5, PUD on westerly portion of the site with about 124 to 147 lots, would result in the development of fewer residential lots than any of the other alternatives. The amount of area in which development would occur would be similar to Alternative 2, but the density of development would be similar to Alternative 4. The eastern portion of the site would be retained as open space. Similar to current conditions, episodes of increased human presence and associated disturbance would be occasional, rather than the permanent presence that would occur with residential development. The steep terrain in the eastern part of the site, however, makes it a less productive habitat area and limits its effectiveness as a migration corridor. Habitat use in the upper, eastern portion of the site would likely be similar to that expected under Alternative 2.

The configuration of lots adjacent to the BPA transmission line corridor on the lower portion of the site would be the same as under Alternative 4. For the reasons identified above, therefore, the corridor would function somewhat more effectively as a migration route than under Alternative 1 or 2, and probably less effectively than under Alternative 3.

8 What are the likely cumulative impacts with development of nearby land at densities similar to the proposal?

Subdivision of parcels large enough to accommodate 3-acre lots (excluding the airport) could create an additional 130 lots for a total of about 330 lots in the area outside Marian Meadows. The majority of these new lots would be located south of Sparks Road where existing lots are larger, including several parcels 10 acres and larger.

If development reflecting this density of the PUD development were applied to the area as a whole, most of the existing parcels larger than 2 acres could be subdivided. Subdivision of eligible parcels (excluding the airport) into parcels 3-acres in size could create an additional 570 lots in the area for a total of about

700 future residences outside Marian Meadows. These lots would be spread throughout the area because many of the existing 3- to 5-acre lots could be further divided.

Under either of these cumulative impact scenarios, anticipated future development in the vicinity of the Marian Meadows site will contribute to further losses of wildlife habitat, potential degradation of fish habitat, and increased levels of human disturbance. Increased density of residential development in the upper Yakima River Valley floodplain will further constrain the movement of elk and other large mammals through the area, presenting barriers to movement between summer and winter habitat areas.

9 What measures could reduce the effects of the proposal and alternatives on aquatic species, and terrestrial wildlife species and habitat?

Measures that could be taken to reduce the impacts on aquatic and terrestrial wildlife species and their habitats are as follows:

1. Habitat values can be enhanced by vegetation management plans for the site that provide a range of forage types and habitat niches for a variety of species, rather than managing for a monoculture of marketable evergreen species.
2. Mitigation for animal movement, specifically movement of elk between summer forage areas at higher elevations to the west and winter concentration areas to the east, could be provided by:
    a) Providing wider corridors for movement through the site. The area extending from the BPA transmission line corridor to the foot of steep slopes east of the corridor may be considered an effective corridor if open space to the north and south is preserved. The retention of open space in the eastern portions of the site may contribute to animal movement, but the steep terrain in this area limits its effectiveness as a travel corridor.
    b) Limiting the number of residences adjacent to the migration corridor would reduce proximity impacts associated with noise, light, and disturbance by domestic animals.
    c) Preserving and enhancing very dense evergreen buffers between development and the migration corridor would reduce the proximity impacts.
    d) Prohibiting off-road use of the migration corridor during times when elk are likely to be using the migration corridor would reduce the impacts of human disturbance.
    e) Prohibiting the construction of fences within and east of the BPA transmission line corridor.
3. If construction activities take place during periods of heavy rainfall or snowmelt, the potential for sediment delivery to off-site fish-bearing streams should be minimized through the implementation of best management practices, such as silt fencing.
4. An unrelated project that will affect habitat productivity in the vicinity is the WSDOT proposal to install several new bridges and culverts designed to reduce barriers to wildlife travel as part of the

I-90-Snoqualmie Pass East widening project. When the first portion of the project (from Hyak to Keechelus Dam) is complete (projected for 2015), wildlife habitat on either side of I-90 will be reconnected, possibly creating new opportunities for travel between summer and winter habitat areas. When funding becomes available, WSDOT will design and construct the remaining 10 project miles from Keechelus Dam to Easton, which will enhance wildlife movement in the vicinity of the Marian Meadows proposal.

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Kittitas County, Marian Meadows EIS Distribution List

LOCAL GOVERNMENT AGENCIES
- Board of County Commissioners
- Community Development Services
- Fire Marshal
- Environmental Health
- Communications (KITTCOM)
- Prosecuting Attorney
- Public Works
- Sheriff
- Kittitas Conservation District
- Kittitas County Fire District No. 3 (Eason)
- Kittitas County Hospital District No. 2
- Easton School District
- Easton Water District

LIBRARIES
- Easton School District Library
- Carpenter Memorial Library, Cle Elum
- Central Washington University Library, Ellensburg
- Ellensburg Public Library
- Roslyn Library

STATE AGENCIES
- Department of Commerce
- Department of Ecology, Headquarters
- Department of Ecology, Central Region
- Department of Fish and Wildlife
- Department of Health
- Office of the Governor
- Department of Natural Resources
- Department of Transportation
- Department of Transportation, Aviation Division
- Office of Archaeology and Historic Preservation
- State Parks and Recreation Commission
- State Patrol

FEDERAL AGENCIES
- Bonneville Power Administration
- Federal Aviation Administration
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- U.S. Forest Service, Wenatchee Ranger District

INDIAN TRIBES
- Yakama Nation
- Colville Confederated Tribes

UTILITIES
- Broadstripe Communication
- Puget Sound Energy
- Qwest Communications

NEWSPAPERS
- Ellensburg Daily Record
- Northern Kittitas County Tribune

ORGANIZATIONS
- Alpine Lakes Protection Society
- Easton Village Division I Road Maintenance Association
- Kittitas Audubon Society

APPENDIX A

State-Listed Candidate, Sensitive, and Priority Species

APPENDIX A State-Listed Candidate, Sensitive, and Priority Species[6]

Table A-1. Washington-listed, candidate, sensitive, and priority species[6] that have distributions overlapping the project area.

Species	Federal/State Status	Habitat Requirements	Occurrence near Project Site
Silver-bordered fritillary (*Boloria selene*)	None/State Candidate	Wet meadows, bogs, marshes; Violets are host plants. Favorite nectar sources are composite flowers[7]	Not likely due to lack of suitable habitat
Kokanee (*Oncorhynchus nerka*)	Priority Species (criteria 3)	Deep, cool lakes and reservoirs; spawning occurs in tributaries in fine gravel located in clean riffles[2]	Occurs in Kachess Lake but project site streams do not provide suitable habitat
Larch Mountain salamander (*Plethodon larselli*)	Species of Concern/ Sensitive	Shady, moss-covered talus slopes, cave entrances and older closed canopy forests[1,3]	No PHS occurrences in project vicinity (WDFW PHS June __, 2008). Nearest known occurrence is near Snoqualmie Pass. Unlikely to occur due to lack of talus and older closed canopy forests.
Western Toad (*Bufo boreas*)	Species of Concern/ Candidate	Requires breeding ponds that retain surface water for at least several months during spring and summer; can use wide variety of riparian and upland habitats[3]	No PHS occurrences in project vicinity (WDFW PHS June __, 2008). No breeding habitat present on project site. Adults and juveniles from nearby areas could use site later in year after breeding season.
Sharptail Snake (*Contia tenuis*)	Species of Concern/ Senstive	Generally restricted to low elevations, in moist rotting logs or stable talus slopes, near streams or other moist habitats[3]	No PHS occurrences in project vicinity (WDFW PHS June __, 2008). Known to occur approximately 6 miles east of the project (Raedeke Associates (1999). Could occur in project area, particularly on eastern portion near the streams
Great Blue Heron *(Ardea herodias*)	Priority Species (2)	Marshes, mud flats, and agricultural areas; nests in trees near large streams, rivers, lakes or wetlands	No PHS occurrences in project vicinity (WDFW PHS June __, 2008). Nearest heron rookeries are located near Kachess River downstream of Kachess Dam. No suitable foraging habitat present in the project area.
Bald Eagle (*Haliaeetus leucocephalus*)	Species of Concern/ Threatened	Nests in large trees near lakes and rivers. Breeding areas, winter communal roosts, winter concentrations, and regularly used perch trees in breeding areas are Washington Priority Areas. Wintering eagles concentrate where food is abundant and human disturbance relatively low. During the day, bald	There are two known bald eagle nesting territories in the upper Kittitas County (Cle Elum Lake and Cle Elum Exit)[4.] None of the nests are within 5 miles of the project site. Not likely to use project site due to lack of large trees and open water. Forages along Yakima River.

Species	Federal/State Status	Habitat Requirements	Occurrence near Project Site
		eagles forage of fish, waterfowl, and mammal carrion.	
Golden Eagle (*Aquila chrysaetos*)	None/ Candidate	Open dry forests with large trees or nesting cliffs. Forage on small mammals, carrion	No PHS occurrences in project vicinity (WDFW PHS June __, 2008). No suitable nesting habitat in project vicinity. Dry Creek Cliffs approximately 8 miles Northeast of the project may have suitable nesting habitat.
Merlin (*Falco columbarius*)	None/ Candidate	May rarely breed in suitable forests that mimic boreal conditions along the Cascade crest[5]	No PHS occurrences in project vicinity (WDFW PHS June __, 2008). Forests on project site are not suitable for breeding. Could occur during migration.[5]
Northern goshawk (*Accipiter gentilis*)	Species of Concern/	All forest above Ponderosa Pine are potential breeding habitats[5]. On the east side, all conifer forests provide habitat except early seral and open forests[8]	There are known northern goshawk nests in the general vicinity, including one approximately 6 miles east-southeast of the site (Raedeke Associates 1999). No suitable habitat on site due to low tree canopy cover. Potential habitat may exist on adjacent USFS lands. Occurs in region year-round.[5]
Peregrine Falcon (*Falco peregrinus*)	Species of Concern/ Sensitive	Nests on cliffs, usually near water. Forages on birds in wide variety of open habitats.[5]	No PHS occurrences in project vicinity (WDFW PHS June __, 2008). Project site does not have nesting or foraging habitat. Nearest potential nesting cliffs are over 1 mile from site.
Flammulated owl (*Otus flammeolus*)	None/ Candidate	mature Ponderosa pine, Douglas fir, or mixed coniferous forests with a thick understory[5]	No PHS occurrences in project vicinity (WDFW PHS June __, 2008). Potential foraging habitat exists in the open conifer forest on the western portion of the site, but nesting is unlikely due to the young age of the stands.
Great Gray Owl (*Strix nebulosa*)	None/Monitor	Open conifer and deciduous forests.	No PHS occurrences in project vicinity (WDFW PHS June __, 2008). Older PHS record of individual in 1997 in the upper Silver Creek drainage approximately 4 miles from the site (Raedeke Associates 1999)
Vaux's Swift (*Chaetura vauxi*)	None/ Candidate	Nesting habitat is forest, either coniferous or mixed, but primarily old growth with snags for nesting and roosting[5]	No PHS occurrences in project vicinity (WDFW PHS June __, 2008). Swifts were observed approximately 6 miles east of the

Species	Federal/State Status	Habitat Requirements	Occurrence near Project Site
			project site (Raedeke Associates 1999). Suitable roosting habitat in the open conifer forest on western portion of site. Adjacent USFS land likely provides suitable nesting habitat.
Pileated woodpecker (*Dryocopus pileatus*)	None/ Candidate	Any forest type (broadleaved, coniferous, or mixed) with trees large enough for roosting and nesting, In eastern Cascades trees are normally greater than 28 inches dbh.[5, 10] Forage in stands that are at least 40 years of age (Raedeke Associates (1999)	No PHS occurrences in project vicinity (WDFW PHS June __, 2008). Suitable foraging and roosting habitat in the open conifer forest on western portion of site. Adjacent USFS land and some residential areas likely provide suitable nesting habitat.
Black-backed Woodpecker (*Picoides arcticus*)	None/ Candidate	Mature or old-growth conifer forests, especially forests of spruce, larch, fir, pine, and hemlock.[5] Nest in tall, small diameter recently dead trees or stumps and mature and old-growth trees.	No PHS occurrences in project vicinity (WDFW PHS June __, 2008). Due to logging history, there is no suitable habitat on the project site. Suitable habitat on nearby USFS land.
Townsend's Big-eared Bat (*Corynorhinus townsendii*)	Species of Concern/ Candidate	Caves and old buildings	No PHS occurrences in project vicinity (WDFW PHS June __, 2008). No suitable habitat on the project site.
Wolverine (*Gulo gulo*)	Species of Concern/ Candidate	Montane forests	No PHS occurrences in project vicinity (WDFW PHS June __, 2008). Unlikely to occur in project vicinity due to existing human development in area
Palouse Milk-vetch (*Astragalus arrectus*)	None/Threatened	Grassy hillsides, sagebrush flats, river bluffs, and open ponderosa pine/Douglas fir forests in grassy or shrub dominated openings growing on all aspects in soil ranging from rocky and dry to moist and rich. Associated species include oceanspray, snowberry, bitterbrush, Douglas's brodiaea, balsamroot, and lupine. Elevation: 1000 to 4000 feet.	Potential habitat occurs on project site
Bristly Sedge (*Carex comosa*)	None/Sensitive	Marshes, lake shores, and wet meadows. Elevation ranges from 50 to 2000 feet.	No suitable habitat on project site
Few-flowered Sedge (*Carex pauciflora*)	None/Sensitive	Marshes, lake shores, and wet meadows. Elevation ranges from 50 to 2000 feet.	No suitable habitat on project site
Thompson's Chaenactis (*Chaenactis thompsonii*)	None/Sensitive	Dry rocky slopes and ridges at elevations ranging from about 4900-8000 ft (1500-2150 m) in serpentine soils.	Project site is not suitable habitat
Bristle-flowered Collomia (*Collomia macrocalyx*)	None/Sensitive	Dry open habitats, east of the Cascade Mountains. In Washington, the species has been found on talus, rock outcrops and lithosols.	Potential habitat occurs on project site

Species	Federal/State Status	Habitat Requirements	Occurrence near Project Site
Clustered Lady's-slipper (Cypripedium fasciculatum)	Species of Concern/Sensitive	Mid- to late seral Douglas fir or ponderosa pine overstories with a closed herbaceous layer and variable shrub layer, mostly on northerly aspects. 1200 feet to more than 5000 feet	Potential habitat occurs on project site
Wenatchee Larkspur (*Delphinium viridescens*)	Species of Concern/ Threatened	From 1800 to 4200 feet, in moist meadows, moist microsites in open coniferous forests, springs, seeps and riparian areas.	Potential habitat occurs on project site
Swamp Gentian (*Gentiana douglasiana*)	None/Sensitive	Wet to moist meadows. In Washington it has been found from 20 to 3050 feet	No suitable habitat on project site
Longsepal Globemallow (*Iliamna longisepala*)	None/Sensitive	Can be found along gravelly streamsides in the open shrub-steppe and open ponderosa pine and Douglas fir forests. The species also occurs on open hillsides in microsites not immediately adjacent to a stream channel	Potential habitat occurs on project site
Howell's Rush (*Juncus howellii*)	None/Threatened	Moist areas in the mountains.	Potential habitat occurs on project site
Hoover's Desert-parsley (*Lomatium tuberosum*)	Species of Concern/Sensitive	Loose talus most typically on east to north facing slopes within the big sagebrush/bluebunch wheatgrass vegetation zone. The species is also known from drainage channels of open ridgetops and talus on south to southwest facing slopes in the western portion of its distribution. Elevation: 600-2300 feet.	Potential habitat occurs on project site
Nuttall's Sandwort (*Minuartia nuttallii* ssp. *fragilis*)	None/Threatened	Open, gravelly benches or limestone talus from open sagebrush hills to alpine slopes at an elevation of 5413 to 7874 ft.	Project site is not suitable habitat
Branching Montia (*Montia diffusa*)	None/Sensitive	Moist forests in the lowland and lower montane zones. It is occasionally located in xeric soil or disturbed sites. Associate species include Douglas fir, ocean-spray and miner's lettuce	Potential habitat occurs on project site
Coyote Tobacco (*Nicotiana attenuata*)	None/Sensitive	Dry, sandy bottom lands, dry rocky washes, and in other dry open places. 400 to 10,000 feet.	Potential habitat occurs on project site
Adder's-tongue (*Ophioglossum pusillum*)	None/Threatened	Pastures, old fields, roadside ditches, and flood plain woods in seasonally wet, rather acid soil. Elevations from 40 to 2300 feet.	Potential habitat occurs on project site
Fuzzytongue Penstemon (*Penstemon eriantherus* var. *whitedii*)	None/Sensitive	West facing slopes of small canyons, and in dry and rocky habitats in the foothills from 525 to 3835 feet (160-1160 meters) elevation. It has been observed in antelope bitterbrush/Indian ricegrass, purple sage/wheatgrass and rabbitbrush/bluebunch wheatgrass plant communities	No suitable habitat on project site
Sticky Goldenweed (*Pyrrocoma hirta* var. *sonchifolia*)	None/Sensitive	Meadows and open or sparsely wooded slopes in the foothills and at moderate elevations. Known from about 5 locations in WA.	Potential habitat occurs on project site
Wenatchee Mountain Checker-mallow (*Sidalcea*	Endangered/ Endangered	Most abundant in moist meadows that have surface water or saturated upper soil profiles into early summer. Also found in	Potential habitat occurs on project site

Species	Federal/State Status	Habitat Requirements	Occurrence near Project Site
oregana var. *calva*)		somewhat open coniferous stands dominated by Douglas fir and/or Ponderosa pine and along the edge of shrub and hardwood thickets.	
Seely's Silene (*Silene seelyi*)	Species of Concern/Sensitive	Shaded crevices in ultramafic to basaltic cliffs and rock outcrops, and occasionally among boulders in talus. Occurs from 1500 to 6300 feet in elevation	Potential habitat occurs on project site
Western Ladies-tresses (*Spiranthes porrifolia*)	None/Sensitive	Wet meadows, along streams, in bogs, and on seepage slopes. Elevation 60-6800 feet.	Potential habitat occurs on project site
Bristly Sedge (*Carex comosa)*	None/Sensitive	Marshes, lake shores, and wet meadows. Elevation ranges from 50 to 2000 feet.	No suitable habitat on project site

[1] Natureserve (2008), [2] Scott and Crossman (1973), [3] Dvornich et al. (1997), [4] WDFW (2008), [5] Seattle Audubon Society (2008b), [6]. WDFW Species of Concern website (http://wdfw.wa.gov/wlm/diversty/soc/soc.htm, accessed June 7, 2008), [7] Opler (2006), [8] Washington NatureMapping Program (2008), [9] WNHP (2008), [10] Rodrick and Milner (1991