City of Yelm
EST. 1924
WASHINGTON

SEPA #: 2021.0026

MITIGATED DETERMINATION OF NON-SIGNIFICANCE

Proponent:	AHBL, Inc
Description of Proposal:	Vista and Meadows at Mill Pond Subdivisions. Vista includes subdividing approximately 6.81 acres into 29 residential lots and Meadows includes subdividing approximately 5.04 acres into 21 residential lots.
Location of the Proposal:	10447 Mill Rd SE, Parcels 21725111100 and 21725111200 (Vista) and Parcel 22730220600 (Meadows)
Section/Township/Range:	Section 25 Township 17 Range 1E Quarter NE (Vista), Section 30 Township 17 Range 2E Quarter NW (Meadows)
Threshold Determination:	The City of Yelm as lead agency for this action has determined that this proposal does not have a probable significant adverse impact on the environment. Therefore, an environmental impact statement (EIS) will not be required under RCW 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public on request.
Mitigating Measures:	See Attachment A
Lead agency:	City of Yelm
Responsible Official:	Grant Beck, Community Development Director
Date of Issue:	July 7, 2021
Comment Deadline:	July 22, 2021
Appeal Deadline:	There is no local administrative appeal of a MDNS

Grant Beck, Community Development Director

This Mitigated Determination of Non-Significance (MDNS) is issued pursuant to Washington Administrative Code 197-11-340 (2). Comments must be submitted to Grant Beck, Community Development Department, at City of Yelm, 106 2nd St SE, Yelm, WA 98597, by July 22, 2021 at 5:00 P.M. The City of Yelm will not act on this proposal prior July 22, 2021 at 5:00 P.M.

DO NOT PUBLISH BELOW THIS LINE

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Copies to: All agencies/citizens on SEPA mailing list
Dept. of Ecology w/checklist

ATTACHMENT A

Project Number 2021.0026

Findings of Fact

A. This Mitigated Determination of Non Significance is based on the project as proposed and the impacts and potential mitigation measures reflected in the following environmental documents:

- Environmental Checklist (May 2021, prepared by AHBL)
- Mazama Pocket Gopher Report (February 2021, prepared by Land Services NW)
- Traffic Impact Analysis (May 2021, prepared by Heath & Associates)
- Preliminary Stormwater Report (May 2021, prepared by AHBL)

B. The City of Yelm is identified as a Critical Aquifer Recharge Area, a designated environmentally sensitive area. Potential Impacts to groundwater quality and quantity will be mitigated through measures that meet or exceed the standards in the Stormwater Management Manual for Western Washington, as published by the Washington State Department of Ecology.

C. The Mazama Pocket Gopher has been listed as a threatened species by the Washington Department of Fish and Wildlife since at least 2008. Yelm has protected this species through the implementation of the Critical Areas Code. In April, 2014, the U.S. Fish and Wildlife Service listed the Yelm subspecies of the Mazama Pocket Gopher as threatened under the Endangered Species Act. While the City of Yelm is not responsible for implementation or enforcement of the Endangered Species Act, it consults with the Service and provides notice to applicants that the pocket gopher is a federally protected species and a permit from the U.S. Fish and Wildlife Service may be required.

   A report conducted by Land Services NW, LLC found no evidence of gophers on the site. The survey noted numerous mounds that indicate moles, with no indicators for the Mazama Pocket Gopher.

D. The City of Yelm has adopted a concurrency management system as required by the Growth Management Act. Chapter 18.16 YMC (Concurrency Management) is designed to ensure that the improvements required to support development are available at the time of development.

   A concurrency determination may be issued for a proposal as it relates to transportation issues when: the development provides on-site frontage improvements; the project makes off-site improvements as necessary to provide for the safe movement of traffic; and the project makes a contribution to projects identified in the six year transportation improvement program in the form of a transportation facilities charge.

E. The City of Yelm and the Washington State Department of Transportation (WSDOT) have established a minimum intersection level of service (LOS) standard of “C” for all intersections

in the City's residential zones.

The traffic impact analysis (TIA) submitted as part of the application indicates that the project will generate an average of 472 average weekday daily trips per day, with a PM peak of 50 vehicles per hour. The current TIA indicates that, with average growth, the impacted intersections will stay within adopted standards.

The TIA suggests that the project should contribute to the construction of a left-turn lane along WA-507 at the intersection of WA-507 and Mill Road SE. The traffic analysis found that this development would generate 3.14% of peak hour traffic at the WA-507 and Mill Road SE intersection. Based on the project's estimated cost of $744,000, the project should contribute $23,361.60.

Mitigation Measures

1. The project shall make a contribution of $23,361.60 to the construction of a left-turn lane along WA-507 at the intersection of WA-507 and Mill Road SE.

City of Yelm

Fee	
Date Received	
By	
File No.	

Community Development Department ENVIRONMENTAL CHECKLIST

Instructions:

The State Environmental Policy Act (SEPA) requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. The purpose of this checklist is to provide information to help identify impacts from your proposal, to reduce or avoid impacts from the proposal if it can be done, and to help the City decide whether an EIS is required. An environmental impact statement (EIS) must be prepared for any proposal with probable significant adverse impacts on environmental quality.

This environmental checklist asks you to describe some basic information about your proposal. The City will use this checklist to determine whether the environmental impacts of your proposal are significant and require preparation of an EIS. You must answer each question accurately, carefully and to the best of your knowledge. Answer the questions briefly, but give the best description you can. In most cases, you should be able to answer the questions from your own observations or project plans without the need for experts. If you do not know the answer, or if a question does not apply to your proposal, write "do not know" or "does not apply". Complete answers to the questions now may avoid delays later. If the space provided is too small, feel free to attach additional sheets.

Some questions ask about governmental regulations, such as zoning, shoreline, and landmark designations. Answer these questions if you can. If you have problems, the city staff can assist you.

The checklist questions apply to all parts of your proposal even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. You may be asked to explain your answers or provide additional information for determining if there may be significant adverse impacts.

Nonproject Proposals Only:

Complete both the checklist (even though many questions may be answered "does not apply") and the **Supplemental Sheet for Nonproject Actions** (part D). For nonproject actions, the references in the checklist to the words "project," "applicant," and "property or site" should be read as "proposal," "proposer," and "affected geographic area," respectively.

CITY OF YELM
(Update to SEPA Checklist dated 4/28/2006)
ENVIRONMENTAL CHECKLIST

CITY USE ONLY
FEE: $150.00
DATE REC'D
BY:
FILE NO.

A. BACKGROUND

1. Name of proposed project, if any:

The Vista at Mill Pond

Vista and Meadows at Mill Pond

2. Name of applicant:

Sheri Greene, AHBL

3. Address, phone number and email address of applicant and of any other contact person:

Sheri Greene, AHBL
2215 N. 30th Street #300
Tacoma, WA 98403

Mill Pond Development LLC. c/o Matt Weber, PE AHBL
2215 N. 30th Street #300
Tacoma, WA 98403

4. Date checklist prepared:

May 5, 2021

5. Agency requesting checklist:

City of Yelm

6. Proposed timing or schedule (including phasing, if applicable):

Construction will commence upon issuance of site development permit. It is anticipated the site development permit will be issued in September 2021.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

No.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

SEPA Checklist, Mazama Pocket Gopher Recconnaisance, Geotechnical Report, Traffic Study

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

There is a proposed subdivision of 21 lots on the east side of Mill Road, at the intersection of 104th Road SE and Mill Road. The subdivision, "The Meadows at Mill Pond", was taken into consideration when the Traffic Impact Analysis was prepared for "The Vista at Mill Pond".

10. List any government approvals or permits that will be needed for your proposal, if known.

SEPA Determination, Preliminary Plat Approval, Site Development Permits, Building Permits, NPDES Permit

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page.

Project proposes construction of 29-lot residential subdivision and associated roadways. Services will include city water and sewer, and private drainage routed to onsite infiltration facilities.

21 lot residential subdivision for Meadows at Mill Pond is also part of this environmental review

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. You need not duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The site is located at 10447 Mill Road SE in the City of Yelm, Thurston County, parcel numbers 21725111100 and 21725111200.

Also parcel 22730220600

B. ENVIRONMENTAL ELEMENTS

1. **Earth**

a. General description of the site (circle one):
(flat,) rolling, (hilly,) steep slopes, mountainous, other _____

b. What is the steepest slope on the site (approximate percent slope)?

Slope are generally between 0% and 5% with the exception of the southern portion of the site which has a steeper incline of approximately 20%.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.

According to the NRCS Soil Survey, site soils consist primarily of Spanaway gravelly sandy loam.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

Not to our knowledge.

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.

The project is in preliminary design but it is anticipated there will be 13,725 cy of cut and 15,310 cy of fill, for a net import of 1,585 cy. Any imported material will be similar to existing and from a clean site. It is expected that earthwork will balance in the final design.

additional 2,180 cy cut and 1,760 cy fill for Meadows subdivision

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

Minimal erosion could occur during project construction. All applicable BMPs will be followed to prevent or minimize such impacts.

g. About what percent of the site will be covered with impervious surfaces after project construction such as asphalt or buildings?

Approximately 48% of the site will be covered by impervious surfaces from the construction of the roadways. Additional impervious surfaces will be added at the time of home construction.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

Proposed measures include the use of BMPs to minimize the risk of erosion during construction. A drainage plan will incorporate designs that convey and infiltrate stormwater away from the disturbed areas as much as possible.

2. **Air**

a. What types of emissions to the air would result from the proposal (i.e., dust, automobile exhaust, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known. **Construction will result in a temporary increase in air pollution, including emissions from equipment and dust from construction activities. Dust controls will include watering soils to prevent blowing of dust. Construction vehicles will be turned off when not in use to help control emissions. Construction activities and equipment will follow the appropriate regulations for controlling emissions to the air. Post-construction emissions would include emissions from vehicle trips associated with the development.**

Subject to ORCAA regulations

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

There are no known off-site sources of emissions or odors observed that might effect this proposal.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

Potential BMPs include using water sprays or other non-toxic dust control methods on unpaved roadways, preventing the tracking out of mud onto public streets, covering soil piles when practical, and minimizing work during periods of high winds. Additionally, to minimize air quality and odor issues caused by tailpipe emissions, BMPs will be used. Such BMPs include maintaining engines of construction equipment while also minimizing the idling of construction equipment.

3. **Water**

a. Surface Water

1) Is there any surface water body or wetland on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds)? If yes, describe type and provide names. State what stream or river it flows into?

No.

2) Will the project require any work over, in, or adjacent to (within 300 feet) the described waters? If yes, please describe and attach available plans.

Not applicable.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

There will be no fill or dredge material as a result of construction activities associated with this proposal.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

The project will not require surface water withdrawals or diversions.

5) Does the proposal lie within a 100-year floodplain? If so, note elevation on the site plan.

The project site does not lie within a 100-year floodplain.

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

No.

b. Groundwater:

1) Will groundwater be withdrawn, or will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.

Water will not be withdrawn; however stormwater runoff will be directed to stormwater treatment facilities and infiltrated onsite.

2) Describe the underlying aquifer with regard to quality and quantity, sensitivity, protection, recharge areas, etc.

The site is within an extremely sensitive aquifer area so all stormwater runoff from impervious surfaces will be treated prior to infiltrating onsite.

3) Describe waste material that will be discharged into or onto the ground from septic tanks or other sources, if any (such as domestic sewage; industrial byproducts; agricultural chemicals).

No waste material will be discharged to the ground. The homes will be served by the City of Yelm STEP collection system and holding tanks will be maintained by the city.

c. Water Runoff (including storm water):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

Stormwater from the roadways will be collected, treated and conveyed to an onsite bioretention infiltration basin. The individual homes will have onsite drywells to infiltrate roof runoff.

2) Could waste materials enter ground or surface waters? If so, generally describe.

No waste materials will enter ground or surface waters as a result of this proposal.

d. Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:

The project will provide source control of pollutants by providing treatment of stormwater by use of biorention. No other measures are proposed.

Subject to most current ECY SMMWW

4. **Plants**

a. Check or circle types of vegetation found on the site:

- X deciduous tree: alder, maple, oak, aspen, other
- X evergreen tree: fir, cedar, pine, other
- X shrubs
- X grasses
- ____ pasture
- ____ crops or grains
- ____ wet soil plants: cattail, buttercup, bulrush, skunk cabbage, other
- ____ water plants: water lily, eelgrass, milfoil, other
- ____ other types of vegetation

b. What kind and amount of vegetation will be removed or altered?

Most of the existing vegetation within the project area will be removed.

c. List threatened or endangered species known to be on or near the site.

None to our knowledge.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

Landscape design and buffer will be in accordance with the City of Yelm Municipal Code. Plans will be submitted to the city for approval.

Trees removed over 8 in diameter will be replaced at 1:1 basis

Subject to Chapter 18.55 YMC

5. **Animals**

a. Circle any birds and animals that have been observed on or near the site or are known to be on or near the site:

birds: hawk, heron, ducks, eagle, ~~songbirds~~,
other: _____
mammals: deer, bear, elk, beaver, other: **rabbits, mice**
fish: bass, salmon, trout, shellfish, other: _____

b. List any priority, threatened or endangered species known to be on or near the site.

Mazama Pocket Gopher

None to our knowledge.

c. Is the site part of a migration route? If so, explain.

The site is within the Pacific Flyway for Migratory Birds.

d. Proposed measures to preserve or enhance wildlife, if any:

No impacts are anticipated to wildlife, therefore no special measures are proposed.

Mazama Pocket Gopher Reconnaissance report by Land Services NW found no activity

6. **Energy and Natural Resources**

a. What kinds of energy (electric, natural gas, gasoline, heating oil, wood, solar etc.) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, transportation, etc.

The completed project will utilize electricity to provide for heating, cooling and lighting needs.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

No, this proposal will not have an impact on adjacent property's ability to utilize solar energy.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

Subject to 2018 IRC

The project will meet the 2015 Washington State Energy Code (WSEC). Other conservation features, such as LED lighting and low-flow plumbing fixtures, will be determined upon development.

7. **Environmental Health**

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spills, of hazardous waste, that could occur as a result of this proposal? If so, describe.

Construction BMPs required

There is the potential for construction equipment and personal vehicles to leak fuel, oil or other fluids necessary to operate the equipment/vehicles. This risk is typical of construction activities and vehicle trips associated with the development, and is minimal. The site will provide water quality treatment prior to infiltrating stormwater, further minimizing the risk of impacts.

1) Describe special emergency services that might be required.

No special emergency services will be required other than those normally provided such as police and fire protection.

2) Proposed measures to reduce or control environmental health hazards, if any:

None are anticipated to be required. Specialized erosion and sediment control measures will be implemented if contaminated soils are detected during the construction process. Standard dust control measures will be implemented to mitigate dust emissions resulting from construction activities. Pursuant to State Law, 811 will be contacted prior to any digging activities to prevent damage to on-site utilities.

b. Noise

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment operation, other)?

There are no off-site sources of noise that will impact this proposal. The primary source of noise in the area is generated from vehicular traffic along 104th Ave SE and Mill Road SE.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

Temporary, short-term noise impacts typical of construction projects will occur with operation of equipment during construction. Construction activities will be restricted to the hours permitted under the Yelm Municipal Code. Long term noise will be minimal, and will be typical of residential developments.

3) Proposed measures to reduce or control noise impacts, if any: **To mitigate general noise impacts during the construction phase, measures such as locating stationary equipment away from receiving properties, limiting construction hours to the appropriate Yelm ordinance, turn off idling construction equipment, and train construction crews to avoid unnecessarily loud actions near residential areas will be employed.**

8. **Land and Shoreline Use**

a. What is the current use of the site and adjacent properties?

The site is currently single family residential.

Adjacent properties include SE Thurston Rural Fire Authority, Cochrane Park, Mill Pond elementary, and single family residences

b. Has the site been used for mineral excavation, agriculture or forestry? If so, describe.

Not to our knowledge.

c. Describe any structures on the site.

There is a single family residence and a covered outbuilding structure.

d. Will any structures be demolished? If so, what?

All structures will be demolished.

Need City of Yelm Demolition permit and ORCAA asbestos survey

e. What is the current comprehensive plan designation of the site?

R-4

f. What is the current zoning classification of the site?

R-4 Low Density Residential District

g. If applicable, what is the current shoreline master program designation of the site?

Does not apply.

h. Has any part of the site been classified as a "natural resource", "critical" or "environmentally sensitive" area? If so, specify.

The site lies within an extremely sensitive aquifer recharge area.

i. Approximately how many people would reside or work in the completed project?

Based on 2.5 persons per household, approximately 73 people will reside in the completed project.

j. Approximately how many people would the completed project displace?

There would be no displacements. The existing house is vacant.

k. Proposed measures to avoid or reduce displacement impacts, if any:

Does not apply.

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

The proposed project is permitted outright in the R4 zone. The project requires approval through the Preliminary Plat process to ensure it is compatible with existing and proposed land uses.

9. **Housing**

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

Project proposes 29 units and will likely be middle income.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

The existing residence and covered outbuilding will be demolished.

c. Proposed measures to reduce or control housing impacts, if any:

No special measures are proposed.

10. **Aesthetics**

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

The height of the structures will not exceed the maximum height allowed in the R4 zone. The exterior building materials will likely be wood.

Subject to City of Yelm Development Standards

b. What views in the immediate vicinity would be altered or obstructed?

The site will transition from a single family residence to an attractive residential neighborhood.

c. Proposed measures to reduce or control aesthetic impacts, if any:

Perimeter landscaping and/or sight obscuring fencing will screen the development.

11. **Light and Glare**

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

Exterior lighting from the houses and street lights will occur after dark, typical of a residential neighborhood.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

No. Lighting will be directed downward so as not to interfere with views or provide glare.

c. What existing off-site sources of light or glare may affect your proposal?

There are no off-site sources of light or glare that will impact the proposal.

d. Proposed measures to reduce or control light and glare impacts, if any:

Lighting fixtures will be shielded and lighting cast downward to reduce light and glare impacts. All lighting fixtures will meet City requirements for light spill.

12. **Recreation**

a. What designated and informal recreational opportunities are in the immediate vicinity? **Brookdale Golf Course is just north of the project site. Ball fields, football field and track are available for public use during non-school hours at Mill Pond Elementary, which abuts the southern boundary of the project.**

Cochrane Park also adjacent to site

b. Would the proposed project displace any existing recreational uses? If so, describe.

No.

c. Proposed measures to reduce or control impacts or provide recreation opportunities:

5% of the site will be open space with active recreation amenities.

13. **Historic and Cultural Preservation**

a. Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.

There are no known buildings, structures, or sites within the immediate vicinity of the project site that are listed on national, state, or local preservation registers.

b. Generally describe any landmarks or evidence of historic, archeological, scientific, or cultural importance known to be on or next to the site.

None to our knowledge.

c. Proposed measures to reduce or control impacts, if any:

If cultural or archeological objects are found during site preparation work, the Washington State Department of Archaeology and Historic Preservation will be notified, and appropriate measures will be taken.

14. **Transportation**

a. Identify sidewalks, trails, public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.

The site will be served by 104th Ave SE. Access for EVA only will be provided off of Mill Road SE.

Access to Meadows subdivision will be off of Mill Rd SE

b. Is site currently served by public transit? By what means? If not, what plans exist for transit service?

Thurston County's Intercity Transit provides route service between Lacey Corporate Center, Yelm and Olympia Transit Center. The nearest stop is at the intersection of Yelm Avenue and 3rd Street, approximately 2,530 feet northeast.

c. How many parking spaces would the completed project have? How many would the project eliminate?

Each residence will have garage and driveway parking.

Subject to City of Yelm Development Guidelines

d. Will the proposal require any new sidewalks, trails, roads or streets, or improvements to existing sidewalks, trails, roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

The project will require new roads and road improvements.

New internal roadways with frontage improvements, and frontage improvements and ROW dedication on 104th Ave SE and Mill Rd SE

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

No.

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.

Vehicular trips and peak volumes are noted in the Traffic Impact Analysis Report prepared by Heath and Associates, dated May 2021.

472 new average weekday daily trips, 37 during AM peak hour and 50 during PM peak hour

g. Proposed measures to reduce or control transportation impacts, if any:

Proposed measures to reduce or control transportation impacts are noted in the Traffic Impact Analysis Report prepared by Heath and Associates, dated May 2021.

Payment of traffic facilities charges & contribution to left-turn lane construction on WA-507 & Mill Rd SE

15. **Public Services**

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe:

Yes, typical public services including fire, police protection, health care, schools, and utility services will be required for this project.

b. Proposed measures to reduce or control direct impacts on public services, if any.

An increased tax base will help mitigate impacts. Payment of fire impact fee and school impact fee

16. **Utilities**

a. Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other.

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

Electricity - Puget Sound Energy
Water - City of Yelm
Sanitary Sewer - City of Yelm S.T.E.P.
Refuse Service - Rural Refuse
Telephone - Centurylink
Cable/Internet - Comcast

C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the City of Yelm is relying on them to make its decision.

Signature: _____
Date Submitted: **May 3, 2021**

MAZAMA POCKET GOPHER (*Thomomys Mazama)* RECONNAISSANCE REPORT

Prepared for Matthew Weber

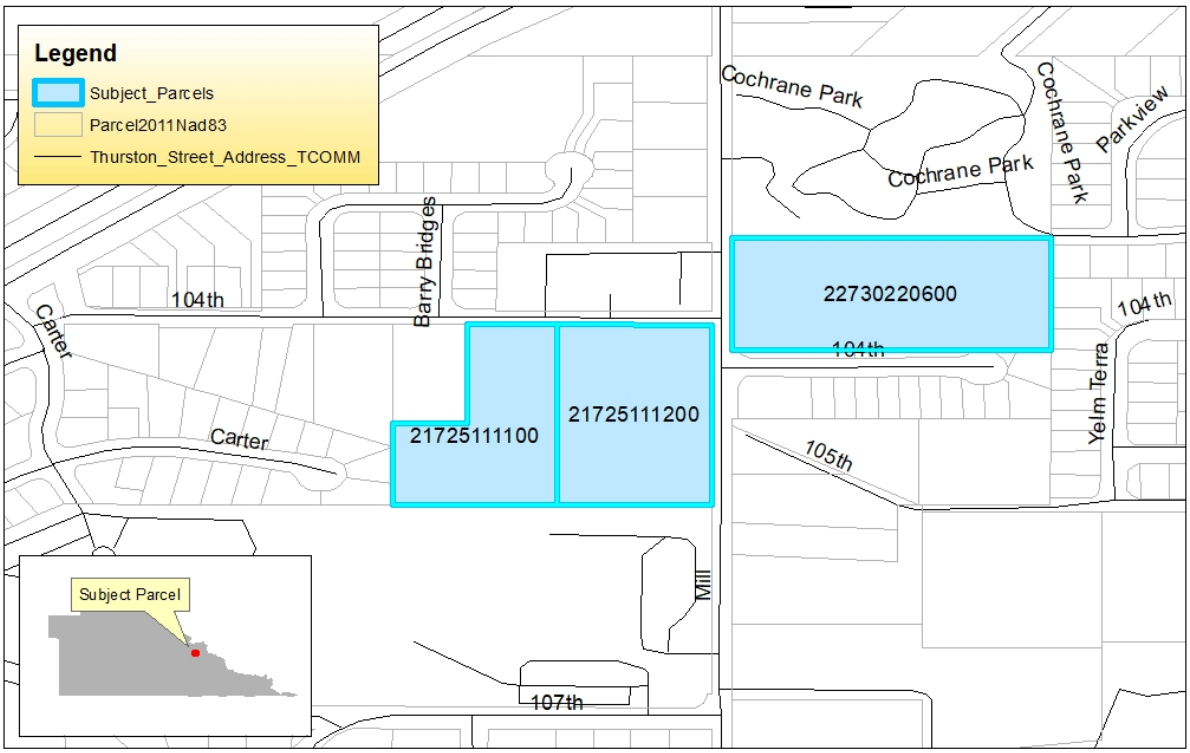
Prepared By:

ALEXANDER CALLENDER, M.S. PWS
LAND SERVICES NORTHWEST
OLYMPIA, WASHINGTON
February 22, 2021

1.0 INTRODUCTION

This report is the result of a Mazama Pocket Gopher(MPG) reconnaissance survey of the following parcels **(Figure 1)**:

- The 5.04-acre parcel #22730220600 at xx Mill Road SE Yelm, WA with the legal description of Section 30 Township 17 Range 2E Quarter NW NW COM NW SEC COR S 533F ONW LN POB E 664F S330F W 664F N 330F POB in Thurston County.
- The 3-acre parcel #21725111100 at xx 104th Avenue SE Yelm, WA with the legal description of 25-17-1E NE NE COM 330F W OF SE COR W330F N238F E150F N290F E180F S528F POB in Thurston County.
- The 3.81-acre parcel #21725111200 at 10447 Mill Road SE Yelm, WA with the legal description of Section 25 Township 17 Range 1E Quarter NE NE COM SE COR W 330F N 528F E330F S 528F LESS RD in Thurston County.



The Purpose of this report is to provide a study of the presence or absence of indicators of the Mazama Pocket Gopher (*Thomomys Mazama*) for the City of Yelm.

Mazama Pocket Gopher

Four subspecies of Mazama pocket gophers found in Thurston City are listed as threatened under the Endangered Species Act (ESA). Impacts to Mazama pocket gophers should be avoided or addressed through USFWS permitting processes**.** The presence of this species on a property may have regulatory implications that may limit the amount or type of development that can occur on a property in order to avoid "take" of the species. Take is defined under the ESA as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect any threatened or endangered species.

This study should allow the reader to assess whether the Mazama pocket gopher is likely to be found on site and what the implications of its presence or absence may have with regard to permitting a residence or other structures or development.

2.0 METHODS

2.1 Review of Existing Information

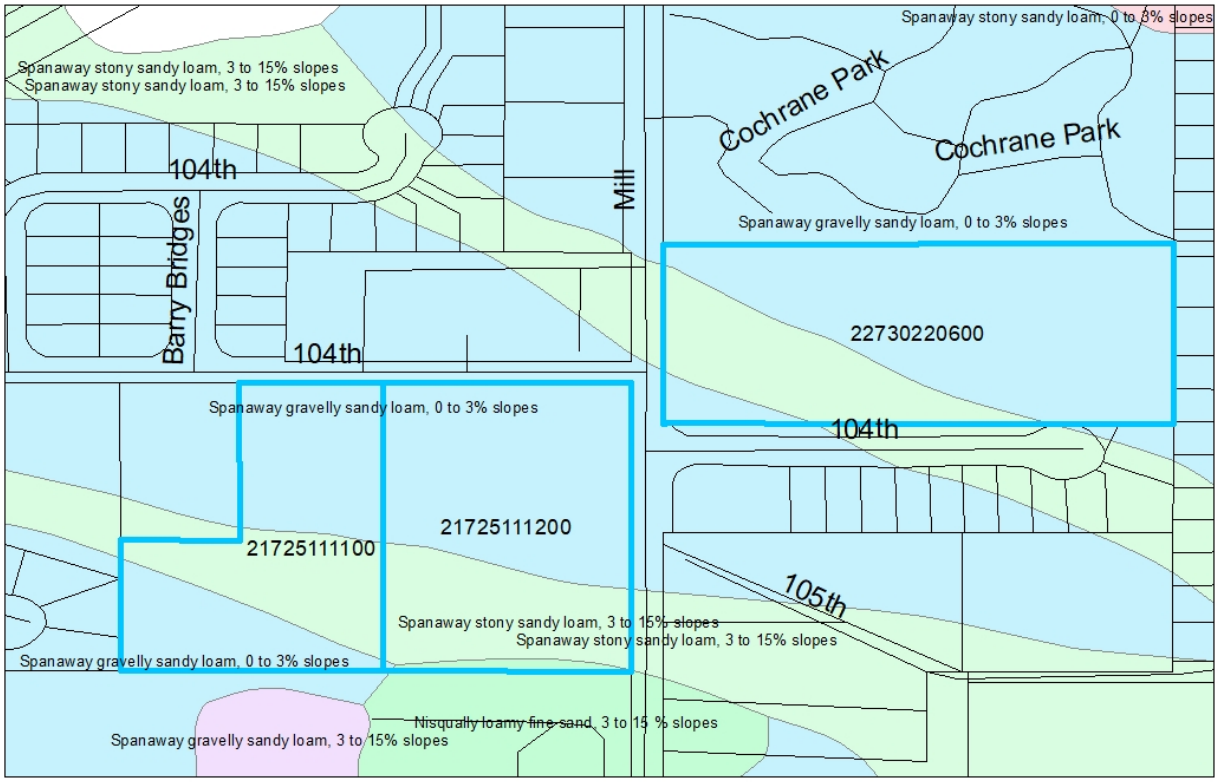
Background Review

Background information on the subject property was reviewed prior to field investigations and included the following:

- Thurston City Geodata Gopher Soils Shapefiles
- WDFW Priority Habitats and Species Information
- USFWS species list information
- WDFW species information

2.2 Summary of Existing Information

The existing information shows Nisqually loamy fine sand, 3 to 15 percent slopes, Spanaway gravelly sandy loam, 0 to 3 percent slopes, Spanaway stony sandy loam, 0 to 3 percent slopes, and Spanaway stony sandy loam 3 to 15 percent slopes, which are more and less preferred by the MPG. (**Figure 2) and (Attachment A)**



N LSNW Land Services Northwest 120 State Avenue NE PMB 190 Olympia, WA 98501 360.481.4208	Figure 2 USDA Soil Survey	0 125 250 500 Feet

Attachment A

Table 1. Soils known to be associated with Mazama pocket gopher occupancy.

Mazama Pocket Gopher Preference	Soil Type
More Preferred (formerly High and Medium Preference Soils)	Nisqually loamy fine sand, 0 to 3 percent slopes Nisqually loamy fine sand, 3 to 15 percent slopes Spanaway-Nisqually complex, 2 to 10 percent slopes Cagey loamy sand Indianola loamy sand, 0 to 3 percent slopes Spanaway gravelly sandy loam, 0 to 3 percent slopes Spanaway gravelly sandy loam, 3 to 15% slopes
Less Preferred (formerly Low Preference Soils)	Alderwood gravelly sandy loam, 0 to 3 percent slopes Alderwood gravelly sandy loam, 3 to 15 percent slopes Everett very gravelly sandy loam, 0 to 3 percent slopes Everett very gravelly sandy loam, 3 to 15 percent slopes Indianola loamy sand, 3 to 15 percent slopes Kapowsin silt loam, 3 to 15 percent slopes McKenna gravelly silt loam, 0 to 5 percent slopes Norma fine sandy loam Norma silt loam Spana gravelly loam Spanaway stony sandy loam, 0 to 3 percent slopes Spanaway stony sandy loam, 3 to 15 percent slopes Yelm fine sandy loam, 0 to 3 percent slopes Yelm fine sandy loam, 3 to 15 percent slopes

The WDFW Priority Habitats and Species Map shows the Mazama pocket gopher (*Thomomys Mazama*) was found within 600 feet of the subject parcels in 2013. (**Appendix B**).

2.3 2021 Mazama Pocket Gopher Reconnaissanc Protocol

The Thurston County Mazama Pocket Gopher Protocol was adapted for use. Since the survey is out of the recommended season, the results are for discussion purposes.

A. General Information – 2021 Approach

1. The MPG review season will run June 1-October 31, 2021.
N/A Reconnaissance only.
2. The protocol described in this memorandum will only apply to properties not known to be occupied by MPG since April 2014, the date of the federal listing.

The property was not known to be occupied by the MPG since April 2014.

3. Negative determinations will be valid for the length of the underlying City permit or approval, per City code.

The determination is negative.

4. Qualified consultants may perform field reviews and submit results for City evaluation, per the CAO. Consultants must have received training from USFWS at one of the two trainings offered in May/June 2019 and is certified to conduct these surveys.

Alex Callender is qualified as a consultant as he received training and certification during the May 2019 class conducted by the United States Fish and Wildlife Service.

B. In-Office Procedures

1. Staff will review land use applications to determine if the MPG field screening protocols described in this memorandum must be initiated for the following:

a. Within 600 feet of a site known to have positive MPG occurrence ; or

The property was within 600 feet of a known positive MPG occurrence..

b. On or within 300 feet of a soil type known to be associated with MPG occupancy.

The existing information shows Nisqually loamy fine sand, 3 to 15 percent slopes, Spanaway gravelly sandy loam, 0 to 3 percent slopes, and Spanaway stony sandy loam, 0 to 3 percent slopes, and Spanaway stony sandy loam 3 to 15 percent slopes which are more and less preferred by the MPG.

2. City staff will determine if other factors preclude the need for field screening. See Preliminary assessment below.

N/A

3. City staff will notify applicants if their application cannot be excluded from further review

N/A

4. Applicants may hire a consultant to perform field review, or may request that field review be conducted by City staff according to the protocol described in this memorandum.

5. City staff will review critical area reports submitted by consultants.

6. For sites to be screened by the City, staff will coordinate site visits with landowners/applicants, ensure advance notification and property access, and develop site visit schedules.

7. For sites where no MPG activity is observed, the City will provide applicants with a project condition that requires them to stop construction activity and alert the City and USFWS if evidence of MPG occupancy is observed.

N/A - No activity observed.

8. City of Yelm landowners who know or learn that Mazama pocket gophers are present on their property can move forward with their proposed development by: 1) proposing mitigation to the City as directed in the City's Critical Areas Ordinance (Title 24 TCC); or 2) contacting USFWS directly to discuss the review, assessment, and mitigation process most appropriate for their site(s) and proposed activities; or 3) waiting to participate in the yet to be completed Thurston City HCP.

C. Preliminary Assessment

As land use applications are received, properties mapped with or within 300 feet of gopher and/or prairie soils undergo the following preliminary assessment in-office.

1. For properties or project areas that appear to meet City criteria below, an internal review is conducted by staff biologist to determine if the project may be released from the full gopher review process. The following criteria may release a project from further gopher review:

- Locations west of the Black River, or on the Steamboat Island or Cooper Point peninsulas.

  N/A

- Sites submerged for 30 consecutive days or more since October 31, 2017.

  N/A

- Sites covered with impervious surfaces (as defined in CAO Chapter 17.15 and Title 24).
- Fully forested (>30%) sites with shrub and fern understory.

  There was a small area that was fully forested and not surveyed. It is demarcated in Appendix C.

- Sites that consist of slopes greater than 40 percent, or that contain landslide hazard areas (per existing City regulations).

  N/A

- Sites on less preferred MPG soils north of Interstate 5.

  N/A

- Building to take place in the footprint of an existing structure (also mobile home replacements in the same footprint).

  N/A

- Mobile home replacements in existing lots in an existing mobile home park.

  N/A

- Heating oil tank removal

  N/A

- Foundation repair

  N/A

- Projects which lie >300 feet from mapped gopher soils.

  The parcel is within 300 feet of mapped gopher soils.

2. If a property and/or project area do not meet internal review criteria, the project is put on a list to be scheduled for full MPG review during the appropriate seasonal review period.

3. In addition to the in-office preliminary assessment, the City may, if time allows, visit properties prior to the first gopher review in order to screen for prairie habitat. This screening process focuses on the presence or absence of native prairie plants, Oregon white oak trees (Quercus garryana), or Mima mounds protected under the Critical Areas Ordinance (CAO).

No Oregon oaks were found on site. No mima mounds exist on site. No regulated prairies were found on site.

D. Implementation Measures

In order to ensure the review process runs efficiently, the following measures will be implemented as part of the 2019 screening approach. These are intended to reduce costs and staff time, and ensure that MPG screening requests, especially those associated with building permit applications, are screened during the screening season.

1. No soil verification will be required in conjunction with MPG field screening.

2. Site mowing or brushing will be required to initiate first site visits, where necessary and feasible, and completed two to four weeks in advance of the site visit.

The ground was visible.

3. No further screening will be conducted in 2019 following the detection of MPG mounds on a property. The City will notify landowners that MPG evidence has been detected within two weeks.

The Mazama pocket gopher mounds were **not** found.

4. At the end of the 2019 season, City staff will provide data regarding MPG occupancy to USFWS.

5. No additional site visit will be required if indeterminate mounds are detected, if the full number of required visits has been completed.

N/A

6. The City will prioritize project specific applications over non-project applications. This will help ensure that applicants that have projects ready for construction will receive necessary permits and may initiate construction in a timely manner.

E. Site Visit Overview

City field personnel or hired consultants will conduct field observations to determine MPG presence on sites with potential habitat. These site visits will be conducted as follows:

1. All valid site visits must be conducted from June 1 through October 31, 2019. Site visits outside that survey window will not be considered valid.

The site visit was conducted on February 19, 2021.

2. A site or parcel is considered to be the entire property, not just the footprint of the proposed project.

The entire parcel was surveyed except for a forested area which is demarcated in the Appendix C.

3. Sites with less preferred soils (see Attachment A) will be visited two (2) times, at least 30 days apart.

This was a reconnaissance survey for discussion. There was only one survey conducted.

4. Sites with more preferred soils (see Attachment A) will be visited two (2) times, at least 30 days apart.

The existing information shows Nisqually loamy fine sand, 3 to 15 percent slopes, Spanaway gravelly sandy loam, 0 to 3 percent slopes, and Spanaway stony sandy loam, 0 to 3 percent slopes, and Spanaway stony sandy loam, 3 to 15 percent slopes, which are more and less preferred by the MPG.

The site was surveyed on February 19, 2021.

5. Site conditions must be recorded on a data sheet or similar information documented in narrative form. A template data sheet can be found on the County website at http://www.co.thurston.wa.us/permitting/gopher-reviews/index.html

The data sheet is provided in Appendix C.

6. Document and describe which areas of the parcel cannot be screened due to limited accessibility and/or dense understory. This should be depicted on an aerial or site plan submitted to the City.

The entire parcel was surveyed.

7. The ground must be easily visible to ensure mound observation and identification. Request mowing if necessary to ensure visibility. Wait two to three weeks after mowing before beginning screening.

The ground was visible.

http://www.co.thurston.wa.us/permitting/gopher-reviews/index.html F. Detailed Field Methodology

1. The survey crew orients themselves with the layout of the property using aerial maps, and strategizes their route for walking through the property.

2. Start GPS to record survey route.

3. Walk the survey transects methodically, slowly walking a straight line and scanning an area approximately 2-3 meters to the left and right as you walk, looking for mounds. Transects should be no more than five (5) meters apart when conducted by a single individual.

The project area was surveyed in 5 meter transects as directed.

4. If the survey is performed by a team, walk together in parallel lines approximately 5 meters apart while you are scanning left to right for mounds.

The survey was conducted according to the protocol.

5. At each mound found, stop and identify it as a MPG or mole mound. If it is a MPG mound, identify it as a singular mound or a group (3 mounds or more) on a data sheet to be submitted to the City. (City has developed data sheets for your use on http://www.co.thurston.wa.us/permitting/gopher-reviews/index.html)

The mounds found on site were typical of moles which are round, clumpy and the show was in a linear fashion. No MPG mounds were found.

6. Record all positive MPG mounds, likely MPG mounds, and MPG mound groups in a GPS unit that provides a date, time, georeferenced point, and other required information in City GPS data instruction for each MPG mound. Submit GPS data in a form

acceptable to the City. City GPS Data instruction can be found at http://www.co.thurston.wa.us/permitting/gopher-reviews/index.html

N /A

7. Photograph all MPG mounds or MPG mound groups. At a minimum, photograph MPG mounds or MPG mound groups representative of MPG detections on site.

No MPG mounds found.

8. Photos of mounds should include one that has identifiable landscape features for reference. In order to accurately depict the presence of gopher activity on a specific property, the following series of photos should be submitted to the City:
   - At least one up-close photo to depict mound characteristics
     No MPG mounds were found.
   - At least one photo depicting groups of mounds as a whole (when groups are encountered).
     N/A
   - At least one photo depicting gopher mounds with recognizable landscape features in the background, at each location where mounds are detected on a property
     N/A
   - Photos can be taken with the GPS unit or a separate, camera, preferably a camera with locational features (latitude, longitude)
     N/A
   - Photo point description or noteworthy landscape or other features to aid in relocation. Additional photos to be considered.
     Photos are found in Appendix A
   - The approximate building footprint location from at least two cardinal directions.
     N/A
   - Landscape photos to depict habitat type and in some cases to indicate why not all portions of a property require gopher screening.
     Appendix A Photos

9. Describe and/or quantify what portion and proportion of the property was screened, and record your survey route and any MPG mounds found on either an aerial or parcel map.

10. If MPG mounds are observed on a site, that day's survey effort should continue until the entire site is screened and all mounds present identified, but additional site visits are not required.

No mounds were found.

11. In order for the City to accurately review Critical Area Reports submitted in lieu of City field inspections the information collected in the field (GPS, data sheets, field notes, transect representations on aerial, etc.) shall be filed with the City. GPS

No mounds were found, the information was submitted in an acceptable format.

3.0 CURRENT CONDITIONS AND METHODS

Land Services Northwest conducted a survey on February 19, 2021, walking the area and looking for signs of the MPG in accordance with the protocol.

The 5.04-acre parcel #22730220600 is a flat partially treed lot with single-family homes on small lots to the south and west. A public park is located to the north and a fire station to the west.

The 3.81-acre parcel #21725111200 is a relatively flat property with an incline to the south. There is a single-family residence and outbuilding on the parcel. An elementary school is located to the south, a fire station and single-family residences to the north, and single-family residences on small lots to the east and west.

The 3-acre parcel #21725111100 is a relatively flat parcel with an incline to the south. An elementary school and single-family residences on small lots are located to the west, a fire station and single-family residences on small lots to the north, and the above parcel to the east.

The area was walked in a linear fashion with transects approximately 5 meters apart. All areas were surveyed except for buildings and some small trash piles. GPS locations were recorded if the MPG mounds were encountered. All of this is in accordance with the most recently approved protocol approved by the US Fish and Wildlife Service. Only one survey was conducted as this was a reconnaissance survey.

4.0 RESULTS

No Mazama pocket gophers were found on site. No regulated prairies or Oregon oaks were encountered on site either.

ALPINE ESTATES
TRAFFIC IMPACT ANALYSIS

ALSO KNOWN AS:
THE VISTA AT MILL POND
AND
THE MEADOWS AT MILL POND

City of Yelm, WA

05/03/2021

Prepared for: Matt Weber
AHBL

May 2021

ALPINE ESTATES
TRAFFIC IMPACT ANALYSIS

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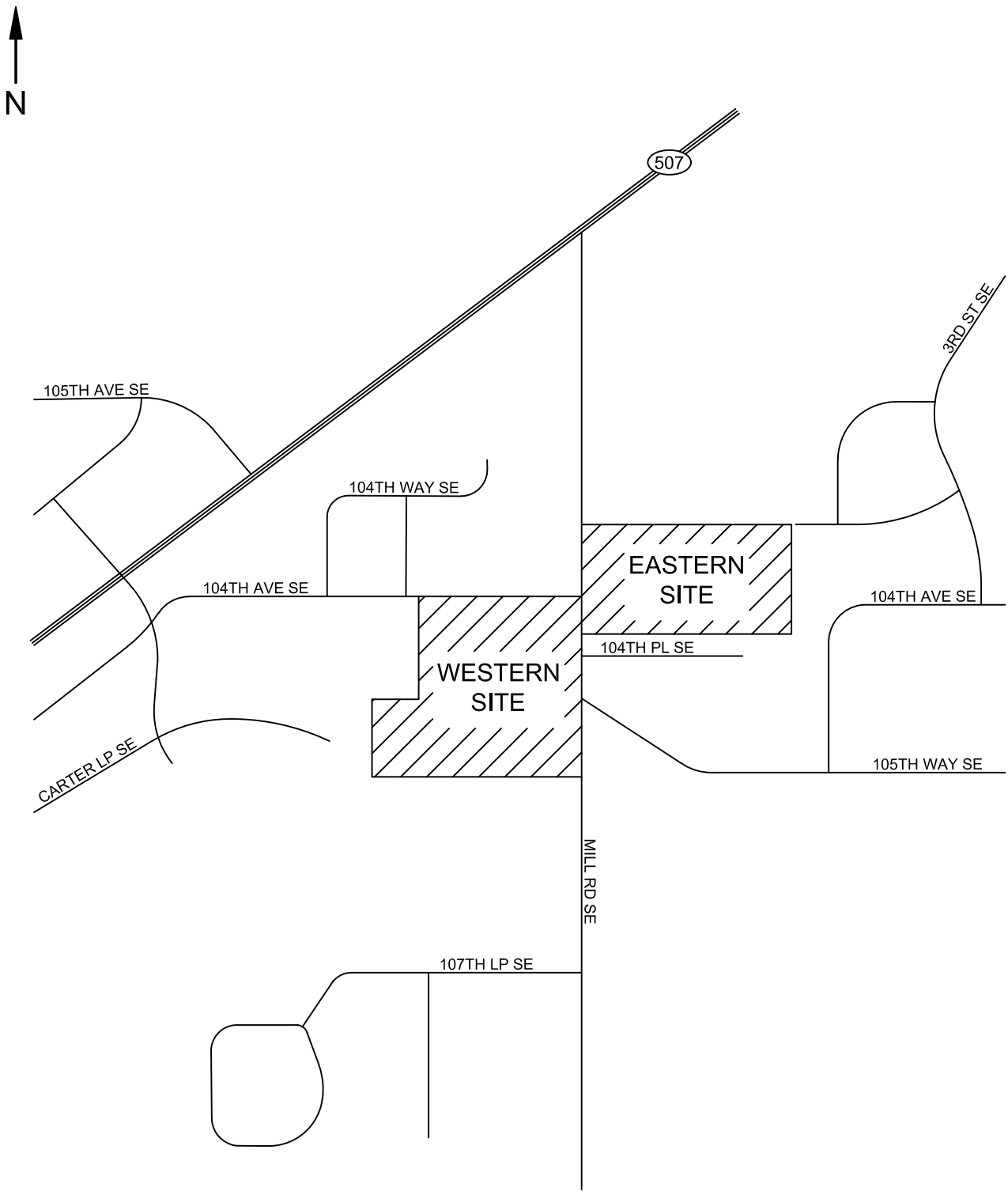
1. INTRODUCTION

The main goals of this study focus on the assessment of existing roadway conditions and forecasts of newly generated project traffic. The first task includes the review of general roadway information on the adjacent streets serving the subject site and gathering existing vehicular volumes within a defined study area. Forecasts of future traffic and dispersion patterns on the street system are then determined using established trip generation and distribution techniques. As a final step, appropriate conclusions and mitigation measures are defined, if needed.

2. PROJECT DESCRIPTION

Alpine Estates proposes for the construction of up to 50 single-family dwelling units in the city of Yelm. The subject site comprises a western portion encompassing 29 lots within tax parcel #'s: 2172511-1100 & -1200 (6.81-acres) and an eastern portion encompassing 21 lots within tax parcel #: 2273022-0600 (5.04-acres). The western portion of the subject site is bordered to the north by 104th Avenue SE and the two portions are bisected by Mill Road SE. The eastern site is currently undeveloped. The western site contains a residential structure—which is to be demolished prior to new construction. Access to the western site is proposed via one driveway extending south from 104th Avenue SE. Access to the eastern site is proposed via one new easterly roadway extension of 104th Avenue SE from Mill Road SE into the subject site. A site map of the general vicinity is illustrated in Figure 1. Conceptual site plans are presented in Figures 2A and 2B for the western and eastern sites, respectively.



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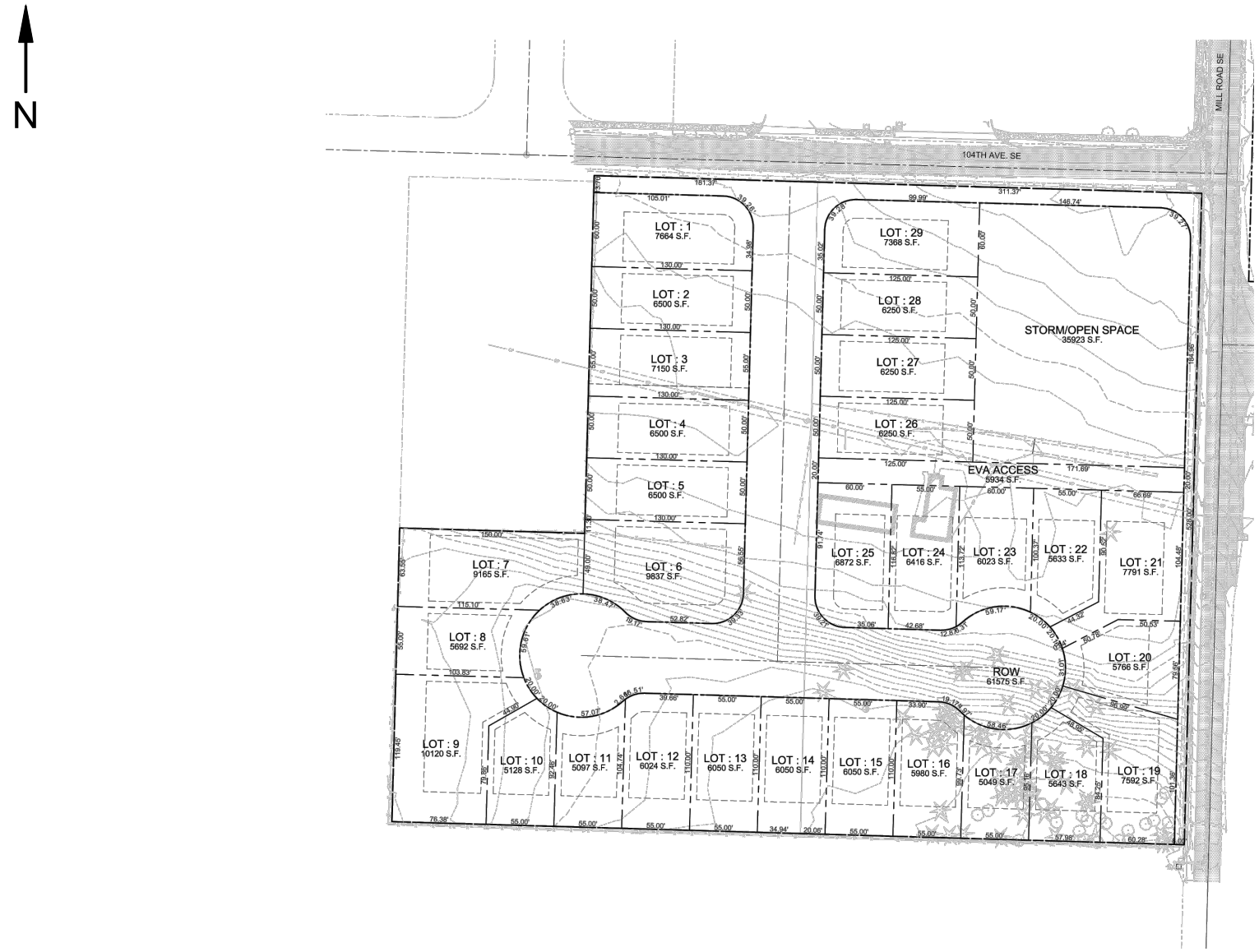
ALPINE ESTATES

VICINITY MAP & ROADWAY SYSTEM
FIGURE 1



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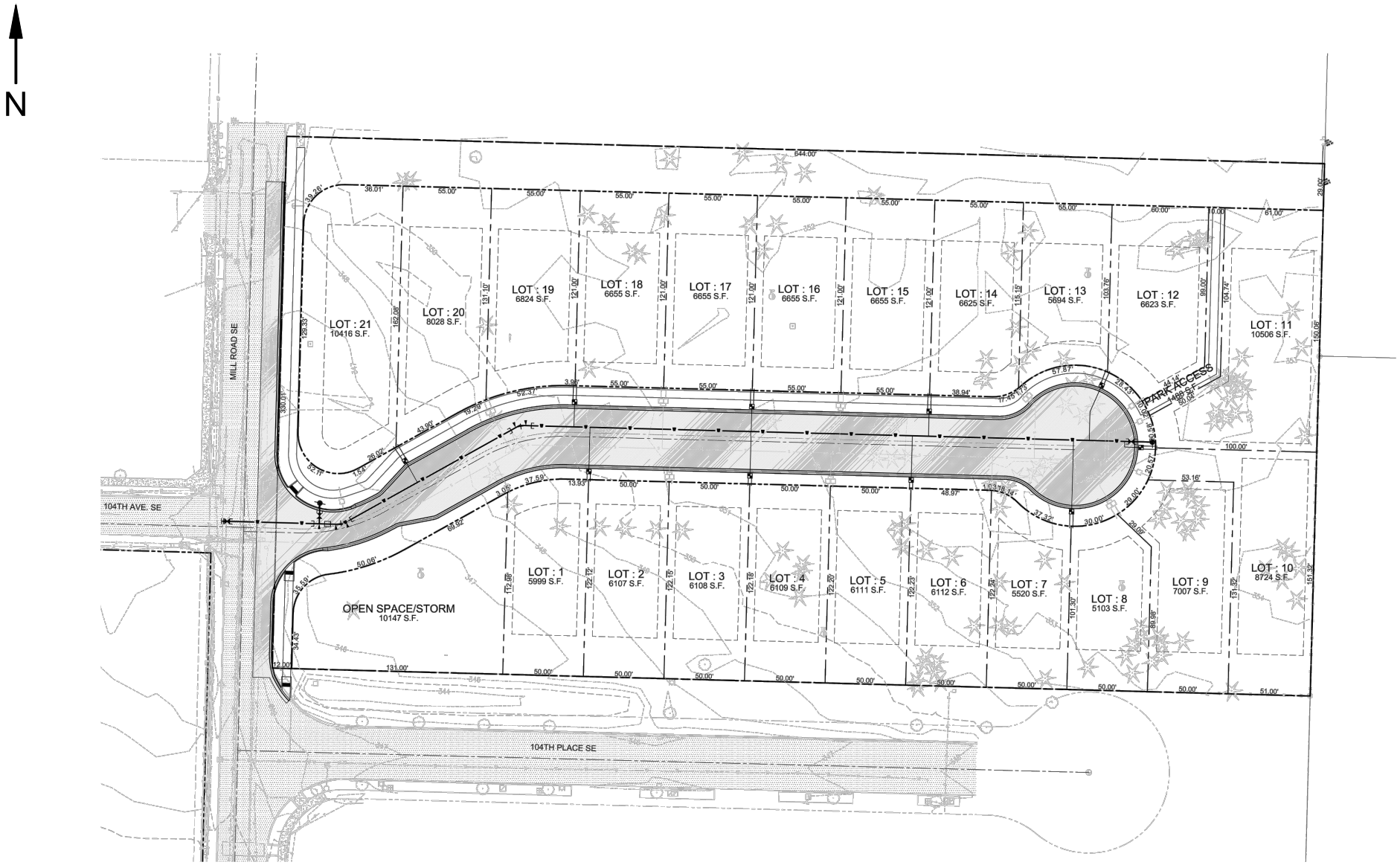
ALPINE ESTATES

WESTERN SITE PLAN
FIGURE 2A

PO Box 397 Puyallup, WA 98371 (253) 770 1401 heathtraffic.com



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ALPINE ESTATES

EASTERN SITE PLAN
FIGURE 2B

PO Box 397 Puyallup, WA 98371 (253) 770 1401 heathtraffic.com

3. EXISTING CONDITIONS

3.1 Existing Street System

The major roadways surrounding the subject site are listed and described below.

WA-507: is a two- to three-lane designated state highway located north of the subject site. WA-507 provides regional access from Centralia to Spanaway. Travel lanes are approximately 10- to 11-feet in width. Shoulders are primarily composed of paved segments 2- to 6-feet in width followed by grass/gravel. The posted speed limit in the site vicinity is 25- to 40-mph. The posted speed limit decreases to 25 mph as it approaches the city center and increases to 40-mph west of Mill Road SE.

Mill Road SE: is a two-lane neighborhood collector street bisecting the subject site. Travel lanes are approximately 10- to 15-feet in width. Segments of curb, gutter and detached sidewalk are available north of 104th Avenue SE. Elsewhere, no formal shoulder treatment is available. The posted speed limit is 25-mph.

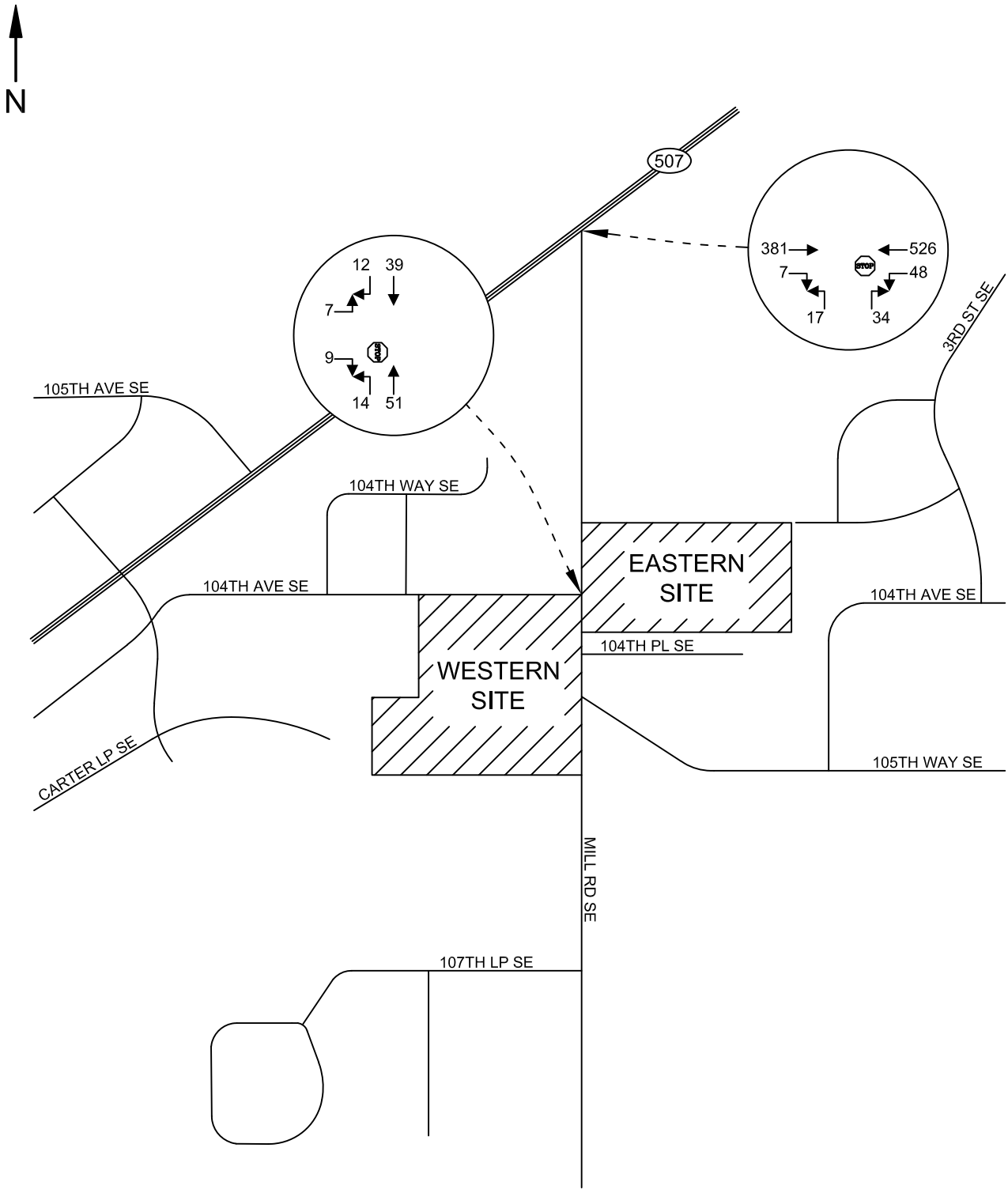
104th Avenue SE: is a two-lane local roadway partially bordering the subject site to the north. Total roadway width is approximately 22- to 28-feet in width. Curb, gutter and detached sidewalk are provided along the northern side of the roadway. Grass/gravel is generally provided along the southern side.

3.2 Existing Peak Hour Volumes and Travel Patterns

Field data for this study was obtained and collected in March of 2021. Traffic counts were performed at the following study intersections:

- WA-507 & Mill Road SE
- 104th Avenue SE & Mill Road SE

Field data for all outlying study intersections was collected between 4:00–6:00 PM, which generally reflects the highest levels of congestion with respect to traffic and delays during a 24-hour period. The one hour reflecting highest overall roadway volumes (peak hour) was then derived from these counts. Existing PM peak hour volumes observed on-site and at the study intersections are illustrated in Figure 3. Additionally, vehicular volumes associated with the Fire Station driveway located opposite the proposed project access on 104th Avenue SE were observed. During the PM peak hour, one inbound fire truck movement was noted. Full-count sheets have been included in the appendix.



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ALPINE ESTATES

EXISTING PM PEAK HOUR VOLUMES
FIGURE 3

3.3 Roadway Improvements

A review of the proposed City of Yelm 2020-2025 Capital Improvement Program indicates that improvement projects are currently planned in the vicinity of the site. Descriptions of the nearest projects are provided below in Table 1 below.

Table 1: Transportation Improvement Projects

Name	Location	Improvement
Mill Rd SE Sidewalk	104th Ave SE to 107th Lp SE	Construct sidewalks along Mill Rd SE to provide connections to Mill Pond ES & Ridgeline MS
Cochrane Park Multi-use Path	Cochrane Park	Construct multi-use path along the norther portion of Cochrane Park
2nd Street Sidewalk	Cochraine Park to Mosman Ave	Construct sidewalks to provide connections to Cochrane Park, Mill Pond ES & Ridgeline MS
Mosman Ave Improvements (Ph 1-3)	Longmire St SW to Clark Rd	Construct roadway improvements and roadway extensions NW to Longmire St SW and SE to Clark Rd SE
1s St Streetscape	Jefferson Ave to Skate Park	Streetscape improvements
Yelm Ave Streetscape	1st St S to 4th St SE	Streetscape improvements

In addition, the City of Yelm's 20-Year Transportation Plan Update identifies the following projects:

Y11 Parkview Drive (New Connection)
This project intends to construct a new local access road from Mill Road to Parkview Drive on the south side of Cochrane Park, connecting 3rd Street to Mill road. The project proposes the dedication of 30 feet along the north side of the property so as to allow future right-of-way for a future local roadway.

Y6A Mill Road/SR 507 Intersection Realignment Project Description
This project intends to realign the intersection of Mill Road and SR 507 to collector standards with a dedicated left turn pocket on SR 507. The cost is 2008 dollars was identified as $600,000.

3.4 Non-Motorist Traffic

Pedestrian and bicycle activity were observed on the nearby street segments studied for this project. Observations were made during routine peak hour movement counts at the study intersections. No pedestrians or bicyclists were noted at the study intersection of WA-507 & Mill Road SE. Approximately 10 pedestrians and 2 bicyclists were noted at the study intersection of Mill Road SE & 104th Avenue SE during the PM peak hour.

Right-of-way dedication shall be required along the project frontage on Mill Road SE and 104th Avenue SE as part of site development to install sidewalks to City standards. Additionally, the project would construct sidewalk infrastructure internally. Improvement projects expanding non-motorist facilitates are outlined in the City's TIP list, providing additional opportunities for safe non-motorist transport to project residents.

3.5 Transit Service

A review of the Intercity Transit service system indicates that Route 94 provides bus service in the vicinity of the proposed Alpine Estates development. The Route provides service between Lacey Corporate Center, Yelm and Olympia Transit Center. The nearest stops in relation to the subject site are provided at the intersection of Yelm Avenue & 3rd Street (~2,530' northeast). Weekday/ weekend service is provided from 6:40 AM – 9:45 PM with approximately 60-minute headways. Refer to the Intercity Transit Route Finder for more detailed information.

3.6 Existing Level of Service

Peak hour delays were determined through the use of the *Highway Capacity Manual* 6th Edition. Capacity analysis is used to determine level of service (LOS) which is an established measure of congestion for transportation facilities. The range[1] for intersection level of service is LOS A to LOS F with the former indicating the best operating conditions

---

[1] *Signalized Intersections - Level of Service*

Level of Service	Control Delay per Vehicle (sec)
A	≤10
B	> 10 and ≤20
C	> 20 and ≤35
D	> 35 and ≤55
E	> 55 and ≤80
F	> 80

Stop Controlled Intersections – Level of Service

Level of Service	Control Delay per Vehicle (sec)
A	≤10
B	> 10 and ≤15
C	> 15 and ≤25
D	> 25 and ≤35
E	> 35 and ≤50
F	> 50

Highway Capacity Manual, 6th Edition

with low control delays and the latter indicating the worst conditions with heavy control delays. Detailed descriptions of intersection LOS are given in the 2016 Highway Capacity Manual. Level of service calculations were made through the use of the *Synchro 10* analysis program. For side-street stop-controlled intersections, LOS is determined by the approach with the highest delay. Table 2 summarizes existing LOS and delays for the key intersections of study.

Table 2: Existing PM Peak Hour Level of Service

Delays given in seconds per vehicle

Intersection	Control	Movement	LOS	Delay
WA-507 & Mill Rd SE	Stop	NB	B	14.9
104th Ave SE& Mill Rd SE	Stop	EB	A	9.0

Existing PM peak hour conditions are shown to operate at LOS B or better indicating mild delays at the intersections of study.

3.7 Access & Sight Distance

Access to the western portion of the subject site is proposed via one new driveway extending south from 104th Avenue SE opposite an existing driveway for the SE Thurston Fire Station. Access to the eastern portion of the subject site is proposed via an easterly roadway extension of 104th Avenue SE from Mill Road SE into the subject site. Sight distance observations were performed at the proposed accesses to ensure that traffic can exit the site with sufficient visibility to safely enter the respective roadways. The speed limit on both access roads (Mill Road SE and 104th Avenue SE[2]) at the proposed project access locations is 25-mph. In accordance with established AASHTO standards, a minimum entering sight distance of 280 feet is required. Based on preliminary measurements, no sight deficiencies are identified at either access location.

Moreover, minimal vehicular volumes were observed (1 inbound movement during the critical PM peak hour) at the Fire Station driveway located opposite the proposed access off 104th Avenue SE. Aligning the accesses as shown in the site plan provides the best location for the project's access. Given the anticipated trip generation (see following section) of the proposed development and the low observed traffic volumes associated with the Fire Station access, no intersection conflicts are identified at this time. Driver's would need to yield right of way to emergency vehicles, as needed.

[2] As the speed limit is not posted on 104th Avenue E, the City standard of 25 mph is assumed.

4. FORECAST TRAFFIC DEMAND AND ANALYSIS

4.1 Project Trip Generation

Trip generation is used to determine the magnitude of project impacts on the surrounding street system. This is usually denoted by the quantity or specific number of new trips that enter and exit a project during a designated time period, such as a specific peak hour (AM or PM) or an entire day. Data presented in this report was taken from the Institute of Transportation Engineer's publication *Trip Generation,* 10th Edition. The designated land use for this project is defined as Single-Family Detached Housing (LUC 210). Dwelling units was used as the input variable and average rates were used to determine trip ends. Table 3 on the following page summarizes the estimated project trip generation for both the western and eastern portions of the proposed subject site. Included are the average weekday daily traffic (AWDT) and the AM and PM peak hours. Refer to the appendix for trip generation output.

Table 3: Project Trip Generation

Land Use	Site	Size	AWDT	AM Peak-Hour Trips			PM Peak-Hour Trips		
				In	Out	Total	In	Out	Total
Single-Family (LUC 210)	Western Site	29 dwelling units	**274**	5	16	**21**	18	11	**29**
	Eastern Site	21 dwelling units	**198**	4	12	**16**	13	8	**21**
	Total		**472**	9	28	**37**	31	19	**50**

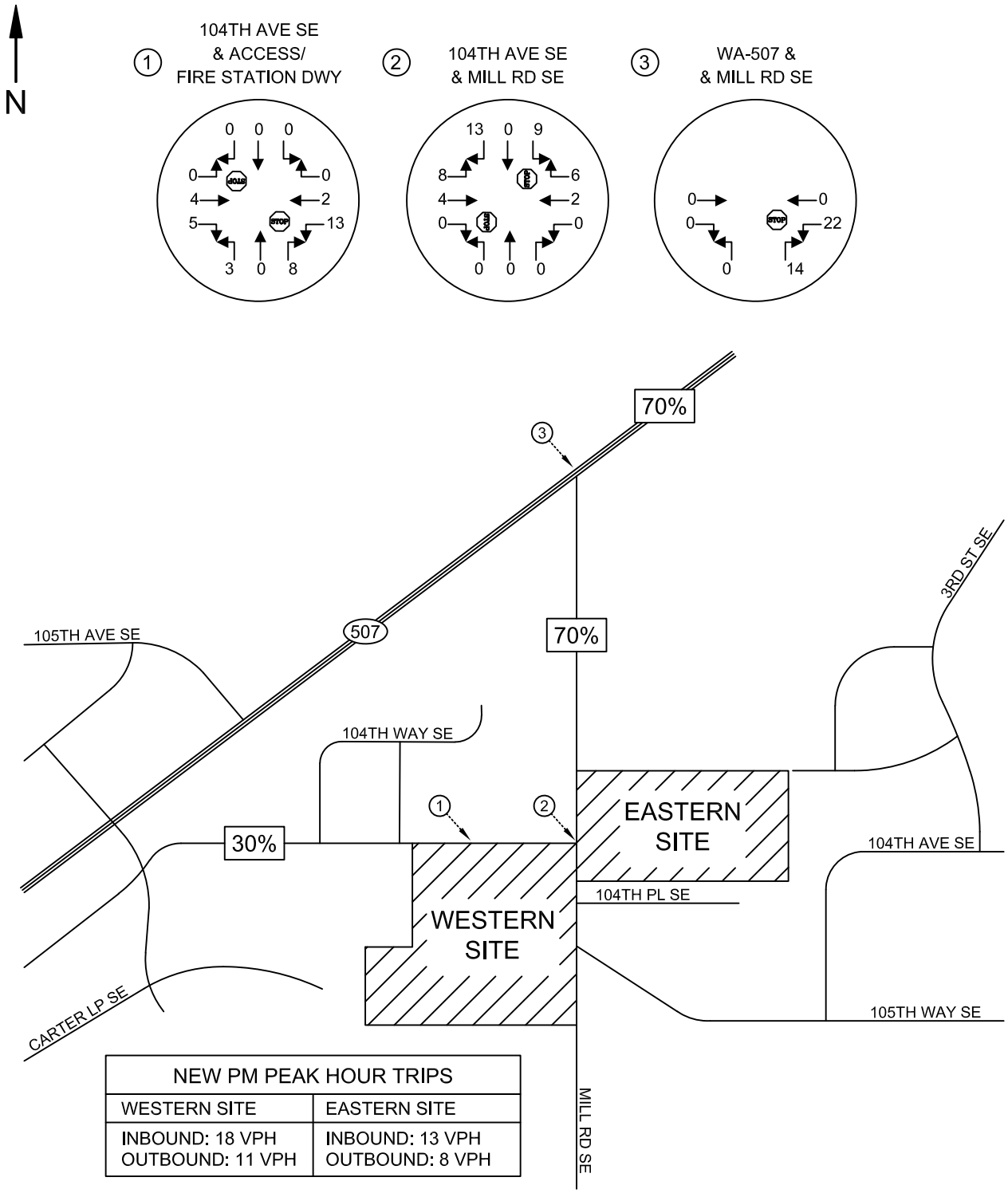
Based on the data presented in Table 3, the project is anticipated to generate 472 new average weekday daily trips with 37 trips (9 in/28 out) occurring during the AM peak hour and 50 trips (31 in/19 out) occurring during the PM peak hour.

4.2 Distribution & Assignment

Trip distribution describes the anticipated travel routes for inbound and outbound project traffic during the peak hour study period. Trip distribution percentages are based on the location of nearby major arterials and amenities. PM peak hour trips are primarily comprised of commuter-based (returning home) and recreational-based trips. All southwestbound project-generated trips were assigned to 104th Avenue SE and subsequently Carter Street SE and WA-507. All trips to/from the north and east were assigned north via Mill Road SE and subsequently WA-507. Anticipated distribution percentages and travel routes are illustrated in Figure 4.

4.3 Future Peak Hour Volumes

A 3-year horizon of 2024 was used for future traffic delay analysis. Forecast 2024 background traffic volumes were derived by applying a 2.5 percent compound annual growth rate to the existing volumes shown in Figure 3. This growth rate was derived via historic WSDOT volumes observed on WA-507 in the vicinity of the subject site, which indicated a 2.35% annual growth rate from 2015 to 2019. Moreover, pipeline volumes associated with The Hutch development were included in forecast volumes. Forecast 2024 PM peak hour volumes without project are shown in Figure 5 while Figure 6 illustrates forecast 2024 volumes with the addition of project-generated traffic.



NEW PM PEAK HOUR TRIPS	
WESTERN SITE	EASTERN SITE
INBOUND: 18 VPH OUTBOUND: 11 VPH	INBOUND: 13 VPH OUTBOUND: 8 VPH

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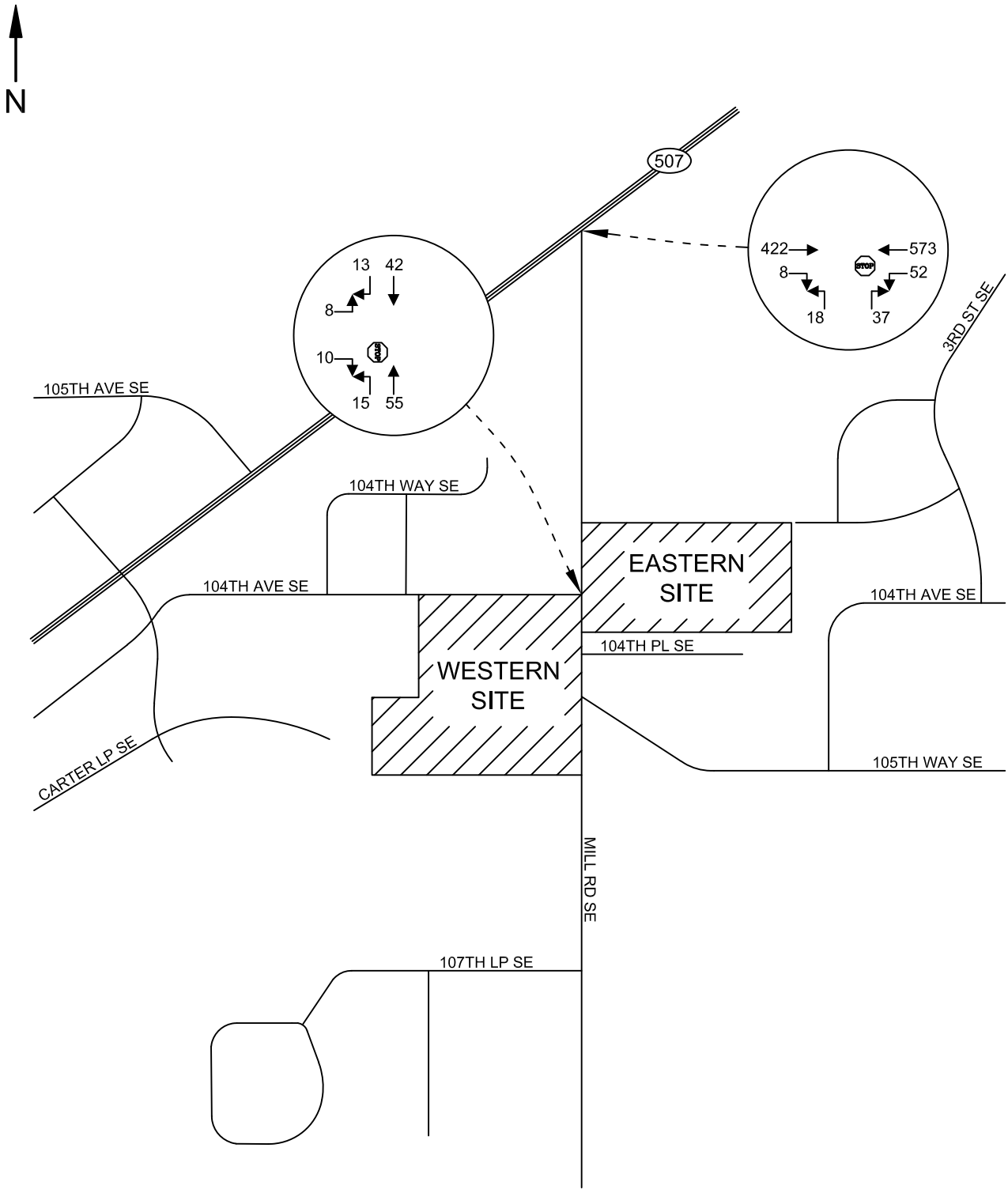
PM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT
FIGURE 4



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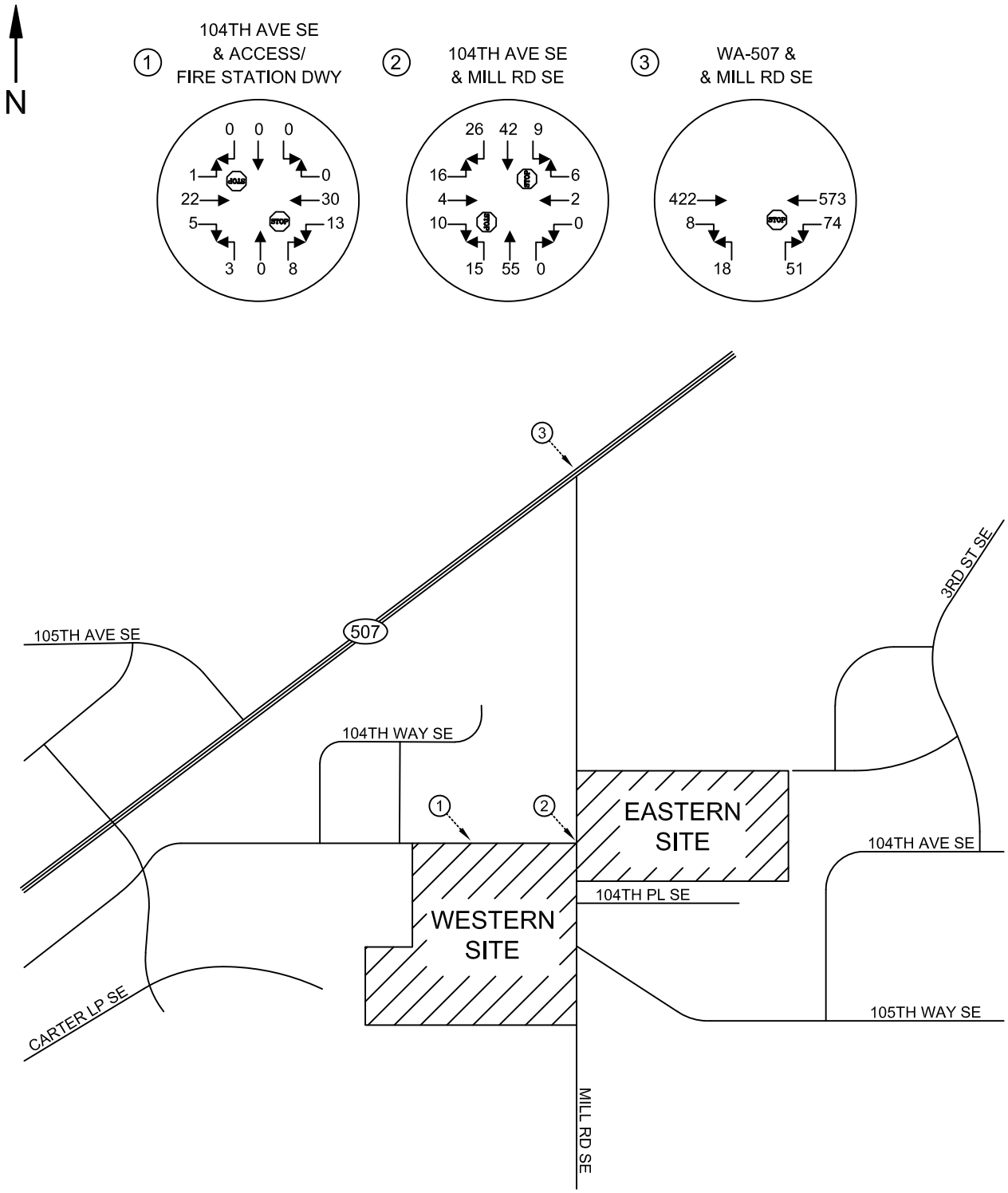
ALPINE ESTATES

FORECAST 2024 PM PEAK HOUR BACKGROUND VOLUMES
FIGURE 5



HEATH & ASSOCIATES

TRAFFIC AND CIVIL ENGINEERING

ALPINE ESTATES

FORECAST 2024 PM PEAK HOUR VOLUMES WITH PROJECT
FIGURE 6

4.4 Future Level of Service

Level of service analyses were made of the future PM peak hour volumes without (background) and with project related trips added to the key roadways and intersections. This analysis once again involved the use of the *Synchro 10* analysis program. Delays for the study intersections and proposed accesses under future conditions are shown below in Table 4.

Table 4: Forecast 2024 PM Peak Hour Level of Service

Delays given in Seconds Per Vehicle

		Without Project		With Project	
Intersection	**Control**	**LOS**	**Delay**	**LOS**	**Delay**
WA-507 & Mill Rd SE	Stop	C	16.3	C	16.3
104th Ave SE & Mill Rd SE	Stop	A	9.0	A	9.5
104th Ave SE & Access	Stop	-	-	A	8.6

Forecast 2024 PM peak hour delays are shown to operate with LOS C or better conditions with or without the proposed development. No LOS deficiencies are identified at the proposed access or study intersections as a result of the development.

4.5 Left Turn Lane Warrant

Left turn lanes are a means of providing necessary storage space for left turning vehicles at intersections. For this impact study, procedures prescribed by the WSDOT Design Manual Exhibit 1310-7a were used to ascertain storage requirements at the following study/access intersections:

- WA-507 & Mill Road SE – **Warranted**
- 104th Avenue SE (Eastern Site Access) & Mill Road SE – **Not Warranted**
- 104th Avenue SE & Western Site Access – **Not Warranted**

Based on *present* conditions as well as forecast 2024 PM peak hour volumes with project traffic – a left turn lane *would be warranted* at the intersection of WA-507 & Mill Road SE. This intersection was identified under the City's 20-Year Plan for realignment and a dedicated left-turn pocket on WA-507. As intersection improvements were identified as needed in 2009, it is recommended that the project participate in a pro rata contribution to assist in project funding proportional to the subject development.

5. CONCLUSIONS AND MITIGATION MEASURES

Alpine Estates proposes for the construction of up to 50 single-family dwelling units in the city of Yelm. The subject site entails a western portion (29 lots) within tax parcel #'s: 2172511-1100 & -1200 and an eastern portion (21 lots) comprised within tax parcel #: 2273022-0600. All existing on-site structures are to be demolished prior to new construction. Access to the project is illustrated in the site plans (see Figures 2A and 2B). Access to the western site is proposed via one new driveway extending south from 104th Avenue SE opposite an existing Fire Station driveway. Access to the eastern site is proposed via an easterly roadway extension of 104th Avenue SE from Mill Road SE in the subject site. The eastern site is dedicating 30 feet along the north side of the property to provide the City with right-of-way as part of their future connectivity plans with constructing a local access roadway between Mill Road SE and 3rd Street Se.

The fully constructed project is anticipated to generate 472 new average daily trips with 37 trips occurring in the AM peak hour and 50 trips in the PM peak hour. Existing and forecast level of service (LOS) at the study intersections are shown to be acceptable, operating with LOS C or better conditions. A left-turn warrant analysis indicates that a left-turn lane along WA-507 at Mill Road SE is warranted under present conditions. According to the City's 20-Year Transportation Improvement Plan, this intersection was planned for realignment and a left-turn lane on WA-507.

Based on the analysis above, recommended mitigation is as follows:

1. The City has a planned improvement project located at WA-507 & Mill Road SE that intends to improve the alignment and construct a left-turn lane along WA-507. It is recommended that the project participate in a proportional cost-share based on the number of entering vehicular trips through this intersection. Based on the forecast 2024 PM peak hour analysis, the following is identified:

   Total Intersection Peak Hour Volumes: 1146
   Project Trips: 36
   Project Proportion: 3.14%

   Based on a proportional contributing share, the subject development is recommended to contribute approximately 3.14 percent of the project cost. According to the City's Plan, the project was estimated to cost $600,000 in 2008

dollars. Adjusted for inflation, the project would cost approximately $744,000 in 2021.

Therefore: $744,000 x 3.14% = $23,361.60.

2. The subject development would also be responsible for Transportation Facilities Charge per City of Yelm requirements. The City imposes a fee of $1,497.00 per PM peak hour trip. One existing single-family residence exists on-site. Given the reduction for the on-site structure, the fee therefore calculates as follows:

   49 trips x $1,497.00 = $73,353.00.

Exact fees will be calculated by the City at the time of building permit issuance. It is recommended that the project's Transportation Facilities Charge be allocated to the WA-507 & Mill Road SE intersection improvements. No other mitigation is recommended at this time.

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	381	7	48	526	17	34
Future Vol, veh/h	381	7	48	526	17	34
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	1	1	2	1	1
Mvmt Flow	393	7	49	542	18	35

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	400	0	1037	397
Stage 1	-	-	-	-	397	-
Stage 2	-	-	-	-	640	-
Critical Hdwy	-	-	4.11	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	-	-	2.209	-	3.509	3.309
Pot Cap-1 Maneuver	-	-	1164	-	257	655
Stage 1	-	-	-	-	681	-
Stage 2	-	-	-	-	527	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1164	-	242	655
Mov Cap-2 Maneuver	-	-	-	-	242	-
Stage 1	-	-	-	-	681	-
Stage 2	-	-	-	-	495	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	14.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	417	-	-	1164	-
HCM Lane V/C Ratio	0.126	-	-	0.043	-
HCM Control Delay (s)	14.9	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-

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Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	9	14	51	39	12
Future Vol, veh/h	7	9	14	51	39	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	9	11	17	63	48	15

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	153	56	63	0	-	0
Stage 1	56	-	-	-	-	-
Stage 2	97	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	841	1013	1546	-	-	-
Stage 1	969	-	-	-	-	-
Stage 2	929	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	832	1013	1546	-	-	-
Mov Cap-2 Maneuver	832	-	-	-	-	-
Stage 1	958	-	-	-	-	-
Stage 2	929	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	1.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1546	-	925	-	-
HCM Lane V/C Ratio	0.011	-	0.021	-	-
HCM Control Delay (s)	7.4	0	9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

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Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	422	8	52	573	18	37
Future Vol, veh/h	422	8	52	573	18	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	1	1	2	1	1
Mvmt Flow	435	8	54	591	19	38

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	443	0	1138	439
Stage 1	-	-	-	-	439	-
Stage 2	-	-	-	-	699	-
Critical Hdwy	-	-	4.11	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	-	-	2.209	-	3.509	3.309
Pot Cap-1 Maneuver	-	-	1122	-	224	620
Stage 1	-	-	-	-	652	-
Stage 2	-	-	-	-	495	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1122	-	208	620
Mov Cap-2 Maneuver	-	-	-	-	208	-
Stage 1	-	-	-	-	652	-
Stage 2	-	-	-	-	459	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	16.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	376	-	-	1122	-
HCM Lane V/C Ratio	0.151	-	-	0.048	-
HCM Control Delay (s)	16.3	-	-	8.4	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0.1	-

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Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	10	15	55	42	13
Future Vol, veh/h	8	10	15	55	42	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	10	12	19	68	52	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	166	60	68	0	-	0
Stage 1	60	-	-	-	-	-
Stage 2	106	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	827	1008	1540	-	-	-
Stage 1	965	-	-	-	-	-
Stage 2	921	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	816	1008	1540	-	-	-
Mov Cap-2 Maneuver	816	-	-	-	-	-
Stage 1	952	-	-	-	-	-
Stage 2	921	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	1.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1540	-	913	-	-
HCM Lane V/C Ratio	0.012	-	0.024	-	-
HCM Control Delay (s)	7.4	0	9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

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Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	422	8	74	573	18	51
Future Vol, veh/h	422	8	74	573	18	51
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	1	1	2	1	1
Mvmt Flow	435	8	76	591	19	53

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	443	0	1182	439
Stage 1	-	-	-	-	439	-
Stage 2	-	-	-	-	743	-
Critical Hdwy	-	-	4.11	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	-	-	2.209	-	3.509	3.309
Pot Cap-1 Maneuver	-	-	1122	-	211	620
Stage 1	-	-	-	-	652	-
Stage 2	-	-	-	-	472	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1122	-	190	620
Mov Cap-2 Maneuver	-	-	-	-	190	-
Stage 1	-	-	-	-	652	-
Stage 2	-	-	-	-	424	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1	16.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	390	-	-	1122	-
HCM Lane V/C Ratio	0.182	-	-	0.068	-
HCM Control Delay (s)	16.3	-	-	8.4	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0.2	-

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Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	16	4	10	0	2	6	15	55	0	9	42	26
Future Vol, veh/h	16	4	10	0	2	6	15	55	0	9	42	26
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	1	2	1	2	2	2	1	1	2	2	1	1
Mvmt Flow	17	4	11	0	2	7	16	60	0	10	46	28

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	177	172	60	180	186	60	74	0	0	60	0	0
Stage 1	80	80	-	92	92	-	-	-	-	-	-	-
Stage 2	97	92	-	88	94	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.52	6.21	7.12	6.52	6.22	4.11	-	-	4.12	-	-
Critical Hdwy Stg 1	6.11	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.018	3.309	3.518	4.018	3.318	2.209	-	-	2.218	-	-
Pot Cap-1 Maneuver	787	721	1008	782	708	1005	1532	-	-	1544	-	-
Stage 1	931	828	-	915	819	-	-	-	-	-	-	-
Stage 2	912	819	-	920	817	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	770	708	1008	759	695	1005	1532	-	-	1544	-	-
Mov Cap-2 Maneuver	770	708	-	759	695	-	-	-	-	-	-	-
Stage 1	921	822	-	905	810	-	-	-	-	-	-	-
Stage 2	894	810	-	899	811	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.5	9	1.6	0.9
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1532	-	-	825	904	1544	-	-
HCM Lane V/C Ratio	0.011	-	-	0.04	0.01	0.006	-	-
HCM Control Delay (s)	7.4	0	-	9.5	9	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-

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Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	22	5	13	30	0	3	0	8	0	0	0
Future Vol, veh/h	1	22	5	13	30	0	3	0	8	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	100	2	2	2	2	100	2	2	2	100	100	100
Mvmt Flow	1	24	5	14	33	0	3	0	9	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	33	0	0	29	0	0	90	90	27	94	92	33
Stage 1	-	-	-	-	-	-	29	29	-	61	61	-
Stage 2	-	-	-	-	-	-	61	61	-	33	31	-
Critical Hdwy	5.1	-	-	4.12	-	-	7.12	6.52	6.22	8.1	7.5	7.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	7.1	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	7.1	6.5	-
Follow-up Hdwy	3.1	-	-	2.218	-	-	3.518	4.018	3.318	4.4	4.9	4.2
Pot Cap-1 Maneuver	1124	-	-	1584	-	-	895	800	1048	701	645	818
Stage 1	-	-	-	-	-	-	988	871	-	753	686	-
Stage 2	-	-	-	-	-	-	950	844	-	782	709	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1124	-	-	1584	-	-	888	792	1048	690	639	818
Mov Cap-2 Maneuver	-	-	-	-	-	-	888	792	-	690	639	-
Stage 1	-	-	-	-	-	-	987	870	-	752	680	-
Stage 2	-	-	-	-	-	-	941	836	-	775	708	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	2.2	8.6	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	999	1124	-	-	1584	-	-	-
HCM Lane V/C Ratio	0.012	0.001	-	-	0.009	-	-	-
HCM Control Delay (s)	8.6	8.2	0	-	7.3	0	-	0
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	-

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Preliminary Stormwater Report

PREPARED FOR:

Mill Pond Development, LLC.
Fircrest, WA 98466

PROJECT:

The Meadows at Mill Pond
Yelm, Washington
2210152.10

PREPARED BY:

J. Matthew Weber, PE
Principal

DATE:

May 2021

Preliminary Stormwater Report

PREPARED FOR:

Mill Pond Development, LLC.
Fircrest, WA 98466

PROJECT:

The Meadows at Mill Pond
Yelm, Washington
2210152.10

PREPARED BY:

J. Matthew Weber, PE
Principal

DATE:

May 2021

05/05/2021

I hereby state that this Preliminary Stormwater Report for The Meadows at Mill Pond has been prepared by me or under my supervision, and meets the standard of care and expertise that is usual and customary in this community for professional engineers. I understand that City of Yelm does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities prepared by me.

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Appendix B

Conveyance Calculations

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B-2..... WWHM Report

Appendix C

Geotechnical Report
South Sound Geotechnical Consulting, April 20, 2021

1.0 Project Overview

The following hydrology report summarizes the storm drainage analysis and design for a 21-lot development located at the northeast corner of 104th Place SE and Mill Road SE, in Yelm, Washington. The land is currently vacant land. The project includes the addition of 21 residential lots for single-family homes, a new roadway and sidewalks, a pedestrian pathway connecting to Cochrane Memorial Park to the north, sewer, water services, and stormwater facilities to treat and dispose of the project's stormwater. The proposed roadway features and utilities will be extended from Mill Road SE. The individual homes will also have onsite infiltration drywells and/or trenches to infiltrate roof runoff.

Frontage improvements along Mill Road SE will be required and will include a 19-foot travel lane, a 7 foot planter strip and a 5 foot sidewalk. Right of way dedication will be required

The 4.88-acre site (5.03 acres to centerline) is located in Section 30, Township 17 North, Range 2 East, W.M. The Thurston County tax parcel number associated with the project is 22730220600.

The increased stormwater runoff resulting from the addition of impervious area will be treated and retained in accordance with the most recent Washington State Department of Ecology (DOE) *Stormwater Management Manual for Western Washington (SMMWW)*.

2.0 Summary of Minimum Requirements

This project is subject to the *SMMWW* and is a new development that will add more than 10,000 square feet of impervious surfaces; therefore, all Minimum Requirements (MR) apply to this project.

2.1 MR 1 – Preparation of Stormwater Site Plans

This report and the project plans represent the Stormwater Site Plan for this project and satisfy MR 1.

2.2 MR 2 - Construction Stormwater Pollution Prevention

A Construction Stormwater Pollution Prevention Plan will be prepared for the site development permit application.

2.3 MR 3 – Source Control of Pollution

Pollution source control will be provided for the site by separating roof runoff from pollution generating surfaces. The residential roads should be maintained and cleaned of debris, garbage, and sediment, as required.

The Construction SWPPP, to be prepared for the site development application, will provide details on the control of pollution during construction.

2.4 MR 4 – Preservation of Natural Drainage Systems and Outfalls

The project proposes to infiltrate all stormwater runoff, so all runoff will be retained in the developed condition. There are no natural drainage systems or outfalls to preserve.

2.5 MR 5 – Onsite Stormwater Control

This project will meet the LID performance standard. The onsite soils have a high infiltration capacity, and all runoff will be retained onsite through treatment systems and infiltration facilities. The LID Performance Standard will be met by infiltrating all stormwater runoff from the site. Refer to Section 10.0 for facility sizing.

2.6 MR 6 – Runoff Treatment

Over 5,000 square feet of pollution generating impervious surface (PGIS) will be added as part of these improvements; therefore, runoff treatment is required for this site. Stormwater runoff from pollution generating surfaces will be conveyed to a combination bio-retention swale and infiltration pond for treatment and disposal through infiltration. The bio-retention portion of the facility is sized to treat at least 91 percent of the total runoff volume as calculated using the Western Washington Hydrology Model (WWHM 2012) meeting the *SMMWW* treatment requirement. Refer to Section 10.0 for facility sizing.

2.7 MR 7 – Flow Control

The project exceeds the thresholds for new development projects and must provide flow control. Proposed flow control is achieved with the use of an infiltration pond that will infiltrate 100 percent of runoff. Refer to Section 10.0 for facility sizing.

2.8 MR 8 – Wetlands Protection

To our knowledge, there are no wetlands on or adjacent to the site.

2.9 MR 9 – Basin/Watershed Planning

To our knowledge, there are no existing basin plans.

2.10 MR 10 – Operation and Maintenance

The stormwater system for the roadway improvements will be publicly owned and maintained. The City of Yelm shall be responsible for the operation and maintenance of the public stormwater facilities. An Operation and Maintenance Plan consisting of maintenance checklists for stormwater management will be prepared during the site development application process.

Operation and maintenance for drainage facilities constructed for each lot shall be the responsibility of the individual owners.

3.0 Existing Conditions

The site is presently covered with grass and evergreen trees, with slopes ranging from 0 to 5 percent. Presently, it appears the site infiltrates directly into the ground with no offsite runoff.

4.0 Soils Reports

Site soils are identified by the NRCS Web Soil Survey as Spanaway gravelly sandy loam and Spanaway stony sandy loam, a Type A soil. This soil is characterized as very deep, somewhat excessively drained.

Soil test holes were dug in the vicinity of the proposed project stormwater facility and observations confirm that the soil types match the SCS soil description. A soil log map showing the location of the test holes is included in the geotechnical report. Geotechnical Testing Laboratory observed an infiltration rate of greater than 100 in/hr. Design rate of 45 in/hr is recommended by Geotechnical Testing Laboratory. A design rate of 20 in/hr was utilized for preliminary stormwater calculations.

Please see Appendix C for the complete South Sound Geotechnical Consulting report.

5.0 Wells

To our knowledge, there are no known wells in the vicinity.

Each lot will be served by the City of Yelm STEP collection system. The holding tank will be maintained by the City and pumped on a regular basis. Domestic water will be provided by the City of Yelm water distribution system.

6.0 Fuel Tanks

No fuel tanks were observed at the project site.

7.0 Sub-Basin Description

Review of available GIS topographic information indicates that there is minimal potential of runoff from pervious surfaces of adjacent properties. Runoff from a portion of the existing fronting Mill Road SE will be collected and managed in the proposed stormwater facilities

The entire proposed project runoff will be infiltrated on-site. To our knowledge there are no existing or anticipated impacts to the downstream basin area.

8.0 Analysis of the 100-Year Flood

Federal Emergency Management Agency (FEMA) mapping does not indicate flooding in the immediate area. Please see the exhibit in Appendix A-4.

9.0 Aesthetic Considerations for Facilities

The proposed bio-retention/infiltration facility will be located within the propose open space tract. The facility is designed with a maximum storage depth of 1.75 feet and side slopes will not exceed 3:1 to blend in with the surround landscaped area.

10.0 Facility Sizing and Downstream Analysis

The project site is modelled as a single basin for stormwater facility sizing. Proposed impervious surfaces associated with the existing and proposed roads were calculated based on the concept site plan layout. An additional 500 square feet of impervious surfaces per lot was assumed for driveways (1,500 sf for flag lots).

Roof area is assumed to be 2,500 square feet per lot. The roof runoff will be infiltrated on each lot; therefore, this area is removed from the basin area tributary to the proposed bio-retention/infiltration facility. The stormwater system was sized and analyzed using WWHM.

The following table summarizes the existing and proposed areas tributary to the proposed stormwater facility.

	Area (sf)	Area (ac)
Total Basin Area	218,519	5.017
Roof Area	52,500	1.205
Total Area to Facility (Total – roof)	166,019	3.811
Offsite Pavement & Sidewalk	5,727	0.131
Onsite Pavement	22,723	0.522
Onsite Sidewalk	5,026	0.115
Onsite Driveway	12,500	0.287
Lawn/Landscape	120,043	2.756

10.1 Conveyance

The conceptual conveyance system consists of catch basins and under-ground pipe. Conveyance calculations will be provided during the site development application process.

10.2 Treatment

Runoff quality control is provided by a bio-retention swale with a minimum of 18 inches of treatment soil mix that extends along the side slopes 1 foot above the bottom of the cell. The bottom width is 4 feet with a length of 85 feet, side slopes are 3:1, and the maximum design water depth is 6 inches. Runoff is introduced to the swale from the conveyance pipe provided with a rock pad protection.

The standard bio-retention soil mix will be utilized, which has a soil infiltration rate of 12 inches per hour. Based on the size of the tributary area, a Ksat Safety Factor of 4 is applied to the treatment soil infiltration, resulting in a design rate of 3 inches per hour. As discussed in Section 4.0, a design infiltration rate of 20 inches per hour was used for the underlying soil.

The bio-retention facility will receive runoff for basins with greater than 5,000 square feet of PGIS and is therefore designed so that the bottom of the treatment soil mix is a minimum of 3 feet above the seasonal high groundwater elevation.

The bioretention area is provided with a maximum 6 inches of ponding prior to primary overflow. Given a design infiltration rate of 3 inches per hour, the design drawdown time is 2 hours, which is less than the maximum allowed 24-hour drawdown.

The WWHM models shows that the propose bio-retention swale will infiltrate 98.09 percent of the total runoff through the treatment soil mix exceeded the minimum required of 91%.

Runoff volumes that exceed the bio-retention capacity overflows to the adjacent un-lined infiltration portion of the facility.

10.3 Flow Control

Stormwater runoff enters the infiltration portion of the stormwater facility as overflow along the entire length of the swale. The infiltration pond provides a 14 ft by 85 ft un-lined infiltration surface with a design infiltration rate of 20 in/hr. WWHM results show that the infiltration pond can infiltrate 100 percent of the tributary runoff with a maximum storage depth of 1.25 feet.

10.4 Roof Runoff

Stormwater for the roof area of the homes will be infiltrated in individual drywells. The drywells will be sized in accordance with *SMMWW* Volume 3, Chapter 3, Section 3.1.1 - BMP T5.10A Downspout Full Infiltration System. See Appendix B-1 for the roof downspout system detail.

11.0 Covenants Dedications, Easements

The storm management facility for this site will remain privately owned and maintained. A maintenance agreement should be executed to ensure future maintenance of the facilities.

12.0 Property Owners Association Articles of Incorporation

Not applicable.

13.0 Conclusion

The proposed project involves site improvements associated with a 21-lot development. The project includes clearing, grading, erosion control, utility improvements, and stormwater management facilities. The site, as proposed, will meet the requirements of the most recent Department of Ecology *Stormwater Management Manual for Western Washington (SMMWW)*. This report and associated plans have been prepared within the guidelines established by the City of Yelm for stormwater management.

This analysis is based on data and records either supplied to or obtained by AHBL. These documents are referenced within the text of the analysis. The analysis has been prepared using procedures and practices within the standard accepted practices of the industry.

AHBL, Inc.

Matt Weber, PE
Principal

MW

May 2021

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Preliminary Stormwater Report

PREPARED FOR:

Mill Pond Development, LLC.
Fircrest, WA 98466

PROJECT:

The Vista at Mill Pond
Yelm, Washington
2210152.10

PREPARED BY:

J. Matthew Weber, PE
Principal

DATE:

May 2021

Preliminary Stormwater Report

PREPARED FOR:

Mill Pond Development, LLC.
Fircrest, WA 98466

PROJECT:

The Vista at Mill Pond
Yelm, Washington
2210152.10

05/05/2021

I hereby state that this Preliminary Stormwater Report for The Vista at Mill Pond has been prepared by me or under my supervision, and meets the standard of care and expertise that is usual and customary in this community for professional engineers. I understand that City of Yelm does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities prepared by me.

PREPARED BY:

J. Matthew Weber, PE
Principal

DATE:

May 2021

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Geotechnical Report
South Sound Geotechnical Consulting, April 20, 2021

1.0 Project Overview

The following hydrology report summarizes the storm drainage analysis and design for a 29-lot development located at the southwest corner of 104th Avenue SE and Mill Road SE, in Yelm, Washington. The land is currently developed as a single-family residence. The project includes the addition of 29 residential lots for single-family homes, new roadways and sidewalks, sewer, water services, and stormwater facilities to treat and dispose of the project's stormwater. The proposed roadway features and utilities will be extended from both 104th Avenue SE and Mill Road SE. The individual homes will also have onsite infiltration trenches and/or drywells to infiltrate roof runoff.

Frontage improvements along 104th Avenue SE will be required and will include an 11-foot travel lane, 7.5 foot parking lane, 6 foot planter strip and 5 foot sidewalk. Right of way dedication will be required. The frontage along Mill Road SE was recently improved with new sidewalks as part of a grant awarded to the city.

The 6.81-acre site (7.22 acres to centerlines) is located in Section 25, Township 17 North, Range 1 East, W.M. The Thurston County tax parcel numbers associated with the project are 21725111100 and 21725111200.

The increased stormwater runoff resulting from the addition of impervious area will be treated and retained in accordance with the most recent Washington State Department of Ecology (DOE) *Stormwater Management Manual for Western Washington (SMMWW)*.

2.0 Summary of Minimum Requirements

This project is subject to the *SMMWW* and is a new development that will add more than 10,000 square feet of impervious surfaces; therefore, all Minimum Requirements (MR) apply to this project.

2.1 MR 1 – Preparation of Stormwater Site Plans

This report and the project plans represent the Stormwater Site Plan for this project and satisfy MR 1.

2.2 MR 2 - Construction Stormwater Pollution Prevention

A Construction Stormwater Pollution Prevention Plan will be prepared for the site development permit application.

2.3 MR 3 – Source Control of Pollution

Pollution source control will be provided for the site by separating roof runoff from pollution generating surfaces. The residential roads should be maintained and cleaned of debris, garbage, and sediment, as required.

The Construction SWPPP, to be prepared for the site development application, will provide details on the control of pollution during construction.

2.4 MR 4 – Preservation of Natural Drainage Systems and Outfalls

The project proposes to infiltrate all stormwater runoff, so all runoff will be retained in the developed condition. There are no natural drainage systems or outfalls to preserve.

2.5 MR 5 – Onsite Stormwater Control

This project will meet the LID performance standard. The onsite soils have a high infiltration capacity, and all runoff will be retained onsite through treatment systems and infiltration trenches. The LID Performance Standard will be met by infiltrating all stormwater runoff from the site. Refer to Section 10.0 for facility sizing.

2.6 MR 6 – Runoff Treatment

Over 5,000 square feet of pollution generating impervious surface (PGIS) will be added as part of these improvements; therefore, runoff treatment is required for this site. Stormwater runoff from pollution generating surfaces will be conveyed to a combination bio-retention swale and infiltration pond for treatment and disposal through infiltration. The bio-retention portion of the facility is sized to treat at least 91 percent of the total runoff volume as calculated using the Western Washington Hydrology Model (WWHM 2012) meeting the *SMMWW* treatment requirement. Refer to Section 10.0 for facility sizing.

2.7 MR 7 – Flow Control

The project exceeds the thresholds for new development projects and must provide flow control. Proposed flow control is achieved with the use of an infiltration pond that will infiltrate 100 percent of runoff. Refer to Section 10.0 for facility sizing.

2.8 MR 8 – Wetlands Protection

To our knowledge, there are no wetlands on or adjacent to the site.

2.9 MR 9 – Basin/Watershed Planning

To our knowledge, there are no existing basin plans.

2.10 MR 10 – Operation and Maintenance

The stormwater system will be publicly owned and maintained. The City of Yelm shall be responsible for the operation and maintenance of the stormwater facilities. An Operation and Maintenance Plan consisting of maintenance checklists for stormwater management. Will be prepared during the site development application process

3.0 Existing Conditions

The site is presently covered with grass and evergreen trees, with slopes generally ranging from 0 to 5 percent with a steeper incline towards the south side of the property. The existing residence and outbuildings will be demolished. Presently, the site infiltrates directly into the ground with no offsite runoff.

4.0 Soils Reports

Site soils are identified by the NRCS Web Soil Survey as Spanaway gravelly sandy loam and Spanaway stony sandy loam, a Type A soil. This soil is characterized as very deep, somewhat excessively drained.

Soil test holes were dug in the vicinity of the proposed project stormwater facility and observations confirm that the soil types match the SCS soil description. A soil log map showing the location of the test holes is included in the geotechnical report. Geotechnical Testing Laboratory observed an infiltration rate of greater than 100 in/hr. Design rate of 45 in/hr is recommended by Geotechnical Testing Laboratory. A design rate of 20 in/hr was utilized for preliminary stormwater calculations.

Please see Appendix C for the complete South Sound Geotechnical Consulting report

5.0 Wells

There is a private well located on the property This well is planned to be abandoned prior to final plat.

Each lot will be served by the City of Yelm STEP collection system. The holding tank will be maintained by the City and pumped on a regular basis. Domestic water will be provided by the City of Yelm water distribution system.

6.0 Fuel Tanks

No fuel tanks were observed at the project site.

7.0 Sub-Basin Description

Review of available GIS topographic information indicates that there is minimal potential of runoff from pervious surfaces of adjacent properties. Runoff from a portion of the existing Mill Road SE and 104th Ave. SE will be collected and managed in the proposed stormwater facilities

The entire proposed project runoff will be infiltrated on-site. To our knowledge there are no existing or anticipated impacts to the downstream basin area.

8.0 Analysis of the 100-Year Flood

Federal Emergency Management Agency (FEMA) mapping does not indicate flooding in the immediate area. Please see the exhibit in Appendix A-4.

9.0 Aesthetic Considerations for Facilities

The proposed bio-retention/infiltration facility will be located within the propose open space tract. The facility is designed with a maximum storage depth of 3 feet and side slopes will not exceed 3:1. The south side of the facility is shown with 5:1 slopes to blend in with the surround landscaped area and provide easier maintenance access.

10.0 Facility Sizing and Downstream Analysis

The project site is modelled as a single basin for stormwater facility sizing. Proposed impervious surfaces associated with the existing and proposed roads were calculated based on the concept site plan layout. An additional 500 square feet of impervious surfaces per lot was assumed for driveways (1,500 sf for flag lots).

Roof area is assumed to be 2,500 square feet per lot. The roof runoff will be infiltrated on each lot; therefore, this area is removed from the basin area tributary to the proposed bio-retention/infiltration facility. The stormwater system was sized and analyzed using WWHM.

The following table summarizes the existing and proposed areas tributary to the proposed stormwater facility.

	Area (sf)	Area (ac)
Total Basin Area	303,026	6.957
Roof Area	72,500	1.664
Total Area to Facility (Total – roof)	230,526	5.292
Offsite Pavement & Sidewalk	12,234	0.281
Onsite Pavement	38,411	0.882
Onsite Sidewalk	4,430	0.102
Onsite Driveway	17,500	0.402
Lawn/Landscape	157,951	3.626

9.1 Conveyance

The conceptual conveyance system consists of catch basins and under-ground pipe. Conveyance calculations will be provided during the site development application process.

9.2 Treatment

Runoff quality control is provided by a bio-retention swale with a minimum of 18 inches of treatment soil mix that extends along the side slopes 1 foot above the bottom of the cell. The bottom width is 4 feet with a length of 120 feet, side slopes are 3:1, and the maximum design water depth is 6 inches. Runoff is introduced to the swale from the conveyance pipes provided with a rock pad protection.

The standard bio-retention soil mix will be utilized, which has a soil infiltration rate of 12 inches per hour. Based on the size of the tributary area, a Ksat Safety Factor of 4 is applied to the treatment soil infiltration, resulting in a design rate of 3 inches per hour. As discussed in Section 4.0, a design infiltration rate of 20 inches per hour was used for the underlying soil.

The bio-retention facility will receive runoff for basins with greater than 5,000 square feet of PGIS and is therefore designed so that the bottom of the treatment soil mix is a minimum of 3 feet above the seasonal high groundwater elevation.

The bioretention area is provided with a maximum 6 inches of ponding prior to primary overflow. Given a design infiltration rate of 3 inches per hour, the design drawdown time is 2 hours, which is less than the maximum allowed 24-hour drawdown.

The WWHM models shows that the propose bio-retention swale will infiltrate 97.09 percent of the total runoff through the treatment soil mix exceeded the minimum required of 91%.

Runoff volumes that exceed the bio-retention capacity overflows to the adjacent un-lined infiltration portion of the facility.

9.3 Flow Control

Stormwater runoff enters the infiltration portion of the stormwater facility as overflow along the entire length of the swale. The infiltration pond provides a 4 ft by 120 ft un-lined infiltration surface with a design infiltration rate of 20 in/hr. WWHM results show that the infiltration pond can infiltrate 100 percent of the tributary runoff with a maximum storage depth of 2.5 feet.

9.4 Roof Runoff

Stormwater for the roof area of the homes will be infiltrated in individual drywells. The drywells will be sized in accordance with *SMMWW* Volume 3, Chapter 3, Section 3.1.1 - BMP T5.10A Downspout Full Infiltration System. See Appendix B-1 for the roof downspout system detail.

10.0 Covenants Dedications, Easements

The storm management facility for this site will remain privately owned and maintained. A maintenance agreement should be executed to ensure future maintenance of the facilities.

11.0 Property Owners Association Articles of Incorporation

Not applicable.

12.0 Conclusion

The proposed project involves site improvements associated with a 29-lot development. The project includes clearing, grading, erosion control, utility improvements, and stormwater management facilities. The site, as proposed, will meet the requirements of the most recent Department of Ecology *Stormwater Management Manual for Western Washington (SMMWW)*.

This report and associated plans have been prepared within the guidelines established by the City of Yelm for stormwater management.

This analysis is based on data and records either supplied to or obtained by AHBL. These documents are referenced within the text of the analysis. The analysis has been prepared using procedures and practices within the standard accepted practices of the industry.

AHBL, Inc.

Matt Weber, PE
Principal

May 2021