



HEARINGS EXAMINER MEETING AGENDA
Tuesday, August 6, 2019, 5:00 PM
City Hall, 616 NE 4th Avenue

I. CALL TO ORDER

II. INTRODUCTION AND INSTRUCTIONS

III. HEARING ITEM

- A. Public Hearing for the Green Mountain Planned Residential Development (PRD)
B1-POD Subdivision (File No. SUB18-04)
Presenter: Lauren Hollenbeck, Senior Planner

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- [Staff Report for Green Mountain PRD, POD-B-1 Subdivision \(SUB18-04\)](#)
- [1 Application Form and Fees](#)
 - [2 Narrative for B1 POD](#)
 - [3 PRD Narrative](#)
 - [4 GIS Packet with Vicinity Map](#)
 - [5 Preliminary Plans \(1st submittal\)](#)
 - [6 Preliminary Plans \(2nd submittal\)](#)
 - [7 PRD Master Plan Decision](#)
 - [8 Conceptual Open Space, Park and Landscape Master Plan](#)
 - [9 Pre-Application Site Plan](#)
 - [10 Pre-Application Report](#)
 - [12 Geotechnical Report for Phase 1](#)
 - [13 Critical Areas Report for PRD Phase 2](#)
 - [14 ELS Oak Mitigation Plan Memo](#)
 - [15 Advanced Oak Mitigation Plan](#)
 - [16 Tree Survey](#)
 - [17 Stormwater Plan](#)
 - [18 Stormwater Report](#)
 - [19 B1-POD South Phase Transportation Impact Analysis \(TIA\)](#)
 - [21 PRD Master Plan TIA](#)
 - [22 199th & 58th Pro Rata Payment Requirement Memo](#)
 - [23 Development Sign](#)
 - [24 300-ft Mailing labels](#)
 - [25 Completeness Review Letter](#)
 - [26 Incompleteness Review Letter](#)
 - [27 Notice of Application](#)
 - [35 Southwest Clean Air Agency \(SWCAA\) SEPA Comment](#)
 - [28 Notice of Public Hearing](#)
 - [29 SEPA Determination](#)
 - [30 SEPA Checklist](#)
 - [31 SEPA Cover Letter](#)
 - [32 SEPA Distribution List](#)
 - [34 Ecology SEPA Comment](#)
 - [35 Southwest Clean Air Agency \(SWCAA\) SEPA Comment](#)
 - [36 Alternative Site Plan](#)
 - [SUB18-04 Exhibit List](#)

IV. ADJOURNMENT

V. LAND USE DECISION

NOTE: The City of Camas welcomes and encourages the participation of all of its citizens in the public meeting process. A special effort will be made to ensure that persons with special needs have opportunities to participate. For more information, please call the City Clerk's Office at 360.817.1591.



STAFF REPORT

Green Mountain PRD Pod-B1

File No. SUB18-04 (consolidated files: SEPA18-27, CA18-16)

Type III

July 31, 2019

TO	Hearings Examiner	HEARING DATE	August 6, 2019
PROPOSAL	To develop Pod-B1, a 7.9-acre portion of the approved Green Mountain Mixed Use Planned Residential Development (PRD) into 111 residential lots.		
LOCATION	The site is located along NE Ingle Road in the NW ¼ of Section 20 and 21, Township 2 North, Range 3 East, of the Willamette Meridian; and described as tax parcels 986037307 and 173178000.		
APPLICANT	Sterling Design, Inc. 2208 E. Evergreen Blvd. Vancouver, WA 98661	CONTACT	Joel Stirling (360) 759-1794
APPLICATION SUBMITTED	November 1, 2018; Resubmitted April 1, 2019	APPLICATION COMPLETE	April 9, 2019
SEPA	The City issued a SEPA Determination of Non-significance (DNS) June 27, 2019, with a comment period that ended July 11, 2019 and an appeal period that ended July 25, 2019. The SEPA DNS was mailed to property owners June 26, 2019 and published in the Post Record on June 27, 2019. Legal publication #224260. No appeals were filed.		
PUBLIC NOTICES	Notice of Application was mailed to property owners within 300 feet of the site on April 17, 2019, and published in the Post Record on April 18, 2019. Legal publication #12360. Notice of public hearing was mailed to property owners within 300 feet of the site on July 17, 2019, and published in the Post Record July 18, 2019. Legal publication #235270.		

APPLICABLE LAW: The application was submitted on November 1, 2018 and the applicable codes are those codes that were in effect at the date of application's first submittal, and as specified in a development agreement. Camas Municipal Code (CMC) Title 16 Environment, Title 17 Land Development, and Title 18 Zoning, specifically (but not limited to): Chapter 17.11 Subdivision, Chapter 17.19 Design and Improvement Standards, Chapter 18.11 - Parking, Chapter 18.13 - Landscaping, Chapter 18.19 Design Review, and Chapter 18.55 Administrative Procedures. A recorded development agreement between the City and the applicant also governs certain requirements of the proposal. [Note: Citations from Camas Municipal Code (CMC) are indicated in **bold** type.]

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SUMMARY

Application has been made to the City of Camas for preliminary plat approval to subdivide two parcels totaling 7.9-acres within Pod B1 of Phase 2 of the approved Green Mountain PRD Master Plan community zoned Multi-Family Residential (MF-18). The preliminary plat proposal would segregate this area into 111 lots for 2 detached homes, 6 duplex buildings, 3 triplex buildings, and 22 four-plex buildings ranging in size from approximately 1,300 square feet to 4,662 square feet to accommodate front and alley loaded residential homes. The proposal includes trails, open space/park, private access roads, parking areas, and stormwater detention facilities.

The subject property is bordered by vacant land to the South designated as the Urban Village Area of the Master Plan, the Green Mountain Mixed Use PRD Phase 1 subdivision to the North, NE Ingle Rd to the West, and to the East is community open space that has been previously approved in the Green Mountain Mixed Use PRD.

The site is accessed from N. Boxwood Street and N. Dogwood Street. The site slopes downwards from the Northwest corner down to the Southeast portion of the site with a maximum slope of 15%. The entire project site is an open grassy field that contains two Oregon White Oak trees.

The proposed preliminary plat does or can comply with the applicable standards of the Camas Municipal Code (CMC) and Revised Code of Washington (RCW).

FINDINGS

Title 16 Environment

STATE ENVIRONMENTAL POLICY ACT (SEPA18-27)

CMC CHAPTER 16.07

A SEPA checklist was submitted and a Determination of Non Significance (DNS) was issued June 27, 2019 as the proposed development includes more than ten residential dwelling units per CMC 16.07.020.A.1. The comment period ended July 11, 2019 and comments were received from the Southwest Washington Clean Air Agency (SWCAA) concerning construction dust measures (Exhibit 35), Department of Archaeology and Historic Preservation (DAHP) requiring additional archaeological review and permits (Exhibit 33), and Department of Ecology concerning erosion control measures (Exhibit 34). The appeal period ended July 25, 2019 and no appeals were submitted.

FINDING: Staff finds the comments provided by SWCAA, DAHP and Ecology will need to be complied with.

ARCHAEOLOGICAL RESOURCE PRESERVATION

CMC CHAPTER 16.31

An archaeological predetermination report was prepared for the Green Mountain Mixed Use PRD Master Plan in its entirety, which includes Pod B1. The report and findings are not subject to the open public records act and as such, the City cannot disclose the results. Additional archaeological review including a final archaeological report will be required per the SEPA comment submitted by DAHP. A Site Alteration and Excavation Permit will also need to be obtained prior to any ground disturbing activity with Parcel 986037307 and any work within the adjoining Parcel 173178000 will need an Inadvertent Discovery Plan.

FINDING: A final archaeological report including appropriate permits required by DAHP will need to be submitted to DAHP for review and approval and the archaeological report sent to the tribes per CMC 16.31.160 and will be conditioned as such. Staff finds if potential artifacts are discovered during the course of construction, work must immediately cease and both State Department of Archaeological and Historic Preservation and the City must be notified.

CRITICAL AREAS (CA18-16)

CMC CHAPTER 16.51

CMC Chapter 16.53 Wetlands

The Green Mountain PRD Master Plan site overall contains wetlands. The applicant submitted the Critical Areas Report prepared by Ecological Land Services dated October 5, 2016 for Phase 2 of the PRD (Exhibit 13), which includes Pod B1. However, based on this report there are no identified wetlands or their associated buffers within the boundaries of this preliminary plat for Pod B1. Pod B1 does contain a man-made pond with a plastic-lined bottom that was created as part of the former golf course. This pond is considered an artificial wetland per CMC 16.53.010.C.2.b and therefore is exempt from the provisions of CMC Chapter 16.53.

CMC 16.61 Fish and Wildlife Habitat Conservation Areas-

Two Oregon White Oak trees were inventoried in Pod B1 as shown on Exhibit 16, which are identified as habitats of local importance under CMC 16.61.010.A. The applicant is proposing to remove both oak trees to accommodate the proposed development. The oak impacts will be mitigated for following the Development Agreement (DA) Exhibit E – Tree Preservation Plan (Exhibit 16). The Tree Preservation Plan requires that each development application of the Green Mountain PRD Master Plan will demonstrate that the number of protected trees are in compliance with Tree Preservation Plan. Per page 30 of the Green Mountain PRD Master Plan application narrative (Exhibit 3), if all the trees in Pod B1 are proposed for removal, the proposed Pod B1 development will still comply with the required tree retention per the Tree Preservation Plan.

Mitigation will be implemented through the Oregon White Oak Advance Mitigation Plan prepared by Ecological Land Services (ELS) dated February 24, 2016 (Exhibit 16) for removal of any Oregon White Oaks outside of Phase 1 of the PRD, which includes Pod B1. The plan essentially pre-mitigates any future impacts to the Oregon White Oaks located outside of Phase 1. ELS provided a memo dated May 2, 2019 (Exhibit 14) that indicated that the advance oak mitigation areas were installed in March 2016, are currently in the third year of monitoring and have exceeded their ecological performance to date.

CMC Chapter 16.59.060(C) Geotechnical Evaluation and Assessment-

The Green Mountain PRD Master Plan site overall has some areas that trigger geotechnical review and the PRD was conditioned (Conditioned #24) that each development phase of Green Mountain will need

to submit a Geotechnical Report (Exhibit 7). The Geotechnical Report for Phase 1 was submitted with this application (Exhibit 12), however Phase 1 does not include Pod B1. Clark County GIS mapping identifies a portion of the subject property within an area of slopes of ten percent or greater. As such, additional geotechnical review and approval will be required prior to building permit approval.

FINDING: Staff recommends a condition of approval that the applicant submit a site specific geotechnical report to the City for review and approval prior to building permit approval.

Title 17 Land Development

SUBDIVISIONS (SUB18-04)

CMC CHAPTER 17.11

CMC Chapter 17.11.030(D) Criteria for Preliminary Plat Approval:

The hearings examiner decision on application for preliminary plat approval shall be based on the following criteria:

1. The proposed subdivision is in conformance with the Camas Comprehensive Plan, Parks and Open Space Comprehensive Plan, Neighborhood Traffic Management Plan, and any other City adopted plans.

Comprehensive Plan

The subject property is designated as Multi-Family Low in the City's Comprehensive Plan, which includes the Multi-Family Residential (MF-10) zone designation. However, the PRD Master Plan governs the lot requirements and Pod B1 is listed as MF-18. Pod B1 is intended for attached townhomes or small detached lots to include two-detached, six-duplex, three-triplex and 22-fourplex buildings.

Neighborhood Goal L-3 states, "Create vibrant, stable and livable neighborhoods with a variety of housing choices that meet all stages in the life cycle and a range of affordability." The side building elevations on corner lots are highly visible from the street and should exhibit architectural variation similar to the front of the building façade, including landscaping, in order to avoid blank walls thereby supporting the city's goal of creating vibrant and livable neighborhoods in Camas.

Overall, the 2035 City of Camas Comprehensive Plan supports the subdivision through a number of land use policies such as the following:

- LU Policy 1.3: Maintain compatible use and design with the surrounding built and natural environments when considering new development or redevelopment.
- LU Policy 1.4: Ensure the park and recreation opportunities are distributed equitably throughout the City and work to achieve park and continuous trail corridors from Green Mountain to the Columbia River.
- LU Policy 2.4: Encourage mixed-use developments (residential and commercial) in order to support adjacent uses and reduce car trips, but not at the expense of job creation.
- LU Policy 3.1: Encourage a variety of housing typologies to support the overall density goal of six dwelling units per acre.
- LU Policy 3.3: Encourage connectivity between neighborhoods (vehicular and pedestrian) to support citywide connectivity and pedestrian access.
- LU Policy 3.4: Camas residents are protective of the small-town ambiance and family-friendliness of the community. Discourage exclusive neighborhoods, privacy wall, and gated communities.
- LU Policy 3.5: Where neighborhoods adjoin natural areas or trails, ensure connections through neighborhoods to enhance access to recreation amenities.

- LU Goal 4: Develop an interconnected network of parks, trails, and open space to support wildlife corridors and natural resources and enhance the quality of life for Camas residents and visitors.
- T Policy 1.3: Construct streets that are interconnected and avoid long cul-de-sacs or dead ends.

The proposed subdivision will help accommodate the projected growth through utilization of existing land. The proposed houses, when built, will provide housing opportunities to meet the needs of the community in accordance with the Housing element of the Comprehensive Plan. Through alternative plat designs, the applicant has proposed a final plat design consisting of a street layout that provides vehicular and pedestrian circulation that interconnects not only within the neighborhood but also with the adjoining area consistent with the Comprehensive plan policies identified above.

Parks and Open Space Plan

The Green Mountain PRD Master Plan includes an extensive park/open space/trail network for active and passive recreation (Exhibit 8). East of Pod B1 is a designated 14-acre community park per the approved PRD Master Plan. Although parks and trails are not required within the boundaries of Pod B1 per the PRD Master Plan, the applicant has elected to provide approximately 0.81-acres of open space area. Approximately 0.54-acres of that open space area is dedicated for a small park/open space area. As shown on the proposed preliminary landscape plan (Exhibit 6), trail connections from N Dogwood Street, N 90th Avenue and N Boxwood Street are shown to link to potential park amenities within the small open space/park. A meandering trail connection is also provided from the sidewalk along NE Ingle Road to the private street within Pod B1 as shown on the preliminary landscape plan (Exhibit 6) and should be a minimum 6-foot wide paved trail per the PRD Open Space, Park & Landscape Master Plan (Exhibit 8).

FINDING: Staff finds the applicant should provide play equipment and/or benches or other park amenities within the small open/space park area as shown on the preliminary landscape plan, if feasible. The neighborhood trails should be a minimum 6-foot wide paved trail consistent with the trail requirements of the PRD Open Space, Park & Landscape Master Plan. The trails and park amenities should be installed prior to final plat approval and conditioned as such.

Neighborhood Traffic Management Plan

The City has a Neighborhood Traffic Management Plan (NTM). The NTM plan identifies the need for installation of acceptable traffic calming features when a proposed development will create 700 Average Daily Trips (ADTs) or more.

A draft *Traffic Analysis Memorandum*, dated September 6, 2018, was prepared and submitted by Kittelson & Associates. The draft memo is an update to Kittelson & Assoc.'s original *Green Mountain Master Plan Transportation Impact Analysis (TIA)*, dated June 2014.

Kittelson referred to the 9th Edition of the Institute of Transportation Engineers (ITE) Manual in order to evaluate the average number of daily trips generated by the proposed development. Land use codes and ADT's were based on single family detached (#210), residential condominium/townhouse (#230), and the proposed number of units for each use. The draft memo estimates that this development will generate a total of 740 ADTs. This development meets or exceeds the 700 or more average daily trips (ADTs) that triggers the requirement for the installation of acceptable traffic calming features. Based on the proposed street layout and the projected ADTs, the applicant will be conditioned to install an acceptable traffic calming feature at the intersection of N Dogwood St. & N 90th Avenue and work with Staff to determine an acceptable traffic calming feature.

FINDING: Staff finds that, as conditioned, this development can or will meet the requirements for traffic calming as noted in the City's NTM plan.

2. Provisions have been made for water, storm drainage, erosion control and sanitary sewage disposal for the subdivision that are consistent with current standards and plans as adopted in the Camas Design Standard Manual.

Water: Water is available to the proposed development at five different locations, with the fifth location currently under construction. The 18-inch water main installed with the NE Ingle Road Improvements has an 8-inch water service stubbed at the northern end of the proposed development for future tie-in; the 18-inch water main located in N Boxwood Street has an 8-inch waterline on the north side in N 90th Avenue with an 8-inch stub for future development located on the south side; additionally the Green Mtn PRD Ph. 1D extended an 8-inch waterline thru the intersection of N 90th Avenue & N Dogwood Street as well as an 8-inch waterline stubbed to the end of Tract D for future development to the south. The 8-inch stub on the south side is currently under construction will be located at the future intersection of 'South Public Avenue' and N Boxwood Street.

The applicant's current design is not utilizing the existing 8-inch water service stub installed with the NE Ingle Road improvements, but instead is proposing to tie into NE Ingle Road approximately 70-feet north of the existing 8-inch water service stub. The design would extend the new 8-inch waterline thru Tract 'A' of Green Mtn Ph. 1A which is a private stormwater tract. This would require an access easement thru the tract from the adjoining HOA for construction and an access and maintenance easement to the City for the public waterline. Staff does not support this proposal and thereby recommends a conditional of approval that the applicant dead end the 8-inch waterline at the north boundary of the private access tract. Staff recommends the applicant extend 8-inch waterline shown in 'South Private Avenue', thru the proposed Trail Tract and tie into the existing 18-inch water main in NE Ingle Road. Additionally, staff recommends that a new hydrant be installed at the existing 8-inch water service stub on NE Ingle Road as the nearest hydrants on NE Ingle Road are located 300-feet to the south and 550-feet to the north and be conditioned as such.

Additionally, the applicant is proposing to extend the existing 8-inch waterline, at the intersection of N 90th Ave. & N Dogwood Street, south and west thru the center of the development and to install an 8-inch tee at the intersection of N 90th Avenue & proposed 'NE Alley'. An 18"x 8" tee to be installed with Green Mtn Ph. 2A, located at the proposed intersection of N Boxwood Lane & 'South Public Avenue', the applicant is to extend the 8-inch waterline located in 'South Public Avenue' east to tie into the 18-inch water main located in N Boxwood Street. Staff recommends a condition of approval that the applicant extend the 8-inch waterline located in the proposed 'South Public Avenue' east to N Boxwood Street.

The applicant is to provide adequate access and utility easements to the City over private streets, alleys, and access driveway tracts, at the time of final platting, for the purpose of inspection, maintenance and operation of said public water lines and conditioned as such.

Individual water services will be provided to each lot with meter boxes located in the proposed planter strips or at back of sidewalk in areas where the sidewalk is curb tight. Fire hydrants will also be installed in accordance with Camas Design Standards Manual (CDSM) and Fire Department requirements. Irrigation service(s) may also be installed to provide irrigation for landscaping needs. Any irrigation meter(s) proposed will be required to be privately owned and maintained by the HOA and will require acceptable backflow prevention devices. The water main, irrigation service(s), water services, and fire hydrants will be located within the public right-of-way that will serve the proposed lots.

FINDING: Staff finds that, as conditioned, the applicant can and will provide water system improvements consistent with the City's standards.

Storm Drainage: The preliminary stormwater technical information report (TIR), dated October 18, 2018 was prepared by Sterling Design, Inc. The proposed development is located on approximately 7.9 acres.

The stormwater design consists of routing all the stormwater from the site to a two cell stormwater facility that will provide treatment and detention. The facility is proposed to be located offsite on approximately 1.3 acres of property belonging to the Green Mtn PRD Urban Village parcel. CMC 17.19.040.3a requires that storm drainage facilities be located on site. However, on a case-by-case basis a storm drainage facility maybe located off-site provided 'the facility is adequately sized and appropriate agreements are in place for maintenance' for the storm drainage facility.

The City received correspondence from John Schmid, Metropolitan Land Group, LLC the owner of this proposed development, on March 20, 2019, stating the Green Mountain Land, LLC is in support of the stormwater facility being placed on the adjacent Green Mountain Land, LLC property. The correspondence also states that stormwater facility will be sized to accommodate this development, a portion of the Urban Village parcel, and a half-street portion of N Boxwood Street. Staff recommends a condition of approval that the applicant provide the City with a signed copy of the *Option Agreement*, which memorializes the agreement between the two property owners, prior to final engineering plan approval.

The stormwater treatment and detention facility is to be placed into a separate Tract and the City is to be granted right-of-entry for purposes of inspections and will be conditioned as such. The Homeowner's Association (HOA) responsibility for ownership and maintenance is to be fully outlined in the CC&R's and on the recorded plat.

The access to the storm facility is shown to be located at the southern end of 'West Private Street'. The applicant has proposed an 8-foot wide access ramp. This width does not meet standards as stated in the Camas Design Standards Manual. Staff finds the applicant will be conditioned to widen the access ramp to the storm facility a minimum 15-foot wide with a paved surface to the live storage elevation, a minimum 5-foot wide trail/pathway is to be provided around the perimeter of the pond, and a 10-foot by 15-foot paved pad around the storm control manhole is to be provided for accessibility and maintenance.

Prior to final engineering plan approval, a final stormwater report (TIR) is to be submitted to the City for review and approval that includes the required documentation, per Ecology's latest edition of the Stormwater Management Manual for Western Washington (SWMMWW), addressing the feasibility/infeasibility of LID BMPs and conditioned as such.

A note should be added to the face of the final plat that the storm drainage collection system that is located in the private tracts and easements; 'West Private Street', 'South Private Avenue', 'SE Alley', 'NE Alley', the 10-foot landscape buffer tract adjacent to Lots 14-23, storm easement adjacent to Lots 54-68, and the stormwater treatment and detention facility; will be owned and maintained by the Homeowners Association (HOA). Right-of-entry is to be granted to the City for inspection purposes of the stormwater treatment and detention facility and conditioned as such.

FINDING: Staff finds that, as conditioned, the applicant can and will make adequate provisions for stormwater control, conveyance, and water quality treatment.

Erosion Control: Adequate erosion control measures can or will be provided during the site improvements contemplated for this subdivision in accordance with adopted city standards. The Erosion Sediment Control (ESC) plans will ultimately be submitted to the City for review and approval prior to any ground disturbing activities. The applicant will be required to provide an Erosion Control Bond, per CMC 17.21.050.B.3, prior to final engineering plan approval.

Additionally, the applicant is to provide a copy of both their NPDES General Construction Stormwater Permit (GCSWP) and their Stormwater Pollution Prevention Plan (SWPPP). The SWPPP is a part of their

NPDES General Construction Stormwater Permit (GCSWP), which is issued by the Washington State Department of Ecology for ground disturbing activities equal to or greater than one acre. Staff recommends a condition of approval that the applicant will provide copies of the NPDES GCSWP and SWPPP. The copies are to be submitted to the City prior to final engineering plan approval.

FINDING: Staff finds that, as conditioned, adequate provisions for erosion control can or will be made.

Sanitary Sewage Disposal: There is an existing 10-inch gravity sewer main located on the west side of NE Ingle Road that is sufficiently sized to handle the proposed development. The existing 10-inch sanitary sewer main drains to the Goodwin Road Pump Station.

The applicant has proposed a gravity sewer system with manholes throughout the development. The current design proposes to extend the sanitary sewer line to the northern boundary (Lot #10) and then head due west through stormwater Tract 'A', which belongs to Green Mtn PRD Phase 1A, then head south to the existing 8-inch sanitary sewer lateral that was constructed with the NE Ingle Road improvements. Staff does not support this proposed layout and therefore staff recommends a condition of approval that this leg of the proposed system dead end at the north end of the private access tract (Lot 10). The sanitary leg located at the intersection of the proposed 'West Private Street' and 'South Private Avenue' is to be extended through the proposed 'Trail Tract' in order to tie into the existing 10-inch sanitary sewer main in NE Ingle Road.

The applicant is to provide adequate access and utility easements to the City over private streets, alleys, and access driveway tracts, at the time of final platting, for the purpose of inspection, maintenance, and operation of said public sanitary sewer lines.

FINDING: Staff finds that, as conditioned, adequate provisions for sanitary sewer disposal can or will be made.

Existing wells, septic tanks and septic drain fields: CMC 17.19.020 (A 3) requires abandonment of existing wells, septic tanks and septic drain fields. Existing water wells should be properly abandoned in accordance with State and County guidelines prior to final plat approval for the phase they may be located in.

FINDING: Staff finds that, as conditioned, adequate provisions can or will be made for water, storm drainage, erosion control, and sanitary sewage disposal that are consistent with the Camas Municipal Code and the Camas Design Standard Manual.

3. Provisions have been made for road, utilities, street lighting, street trees and other improvements that are consistent with the Six-Year Street Plan, the Camas Design Standards Manual and other State adopted standards and plans;

Roads:

[Public Roads]: NE Ingle Road, along the frontage of the proposed development, is an existing public roadway that is currently unimproved along the frontage Pod B1 South. NE Ingle Road is classified as a 2 or 3 lane collector. The proposed improvements will be a continuation of the frontage improvements, which were constructed with Green Mtn PRD Phase 1A. The frontage improvements along NE Ingle Road are to include road widening, installation of curb & gutter, sidewalk, planter strip, bike lane, and street lighting. At completion of the frontage improvements, the applicant will be conditioned to dedicate the right-of-way to the City.

The proposed development is bordered on the east and northeast by fully improved roads; N Boxwood Street and N 90th Avenue. Both improved roads consist of 60-foot right-of-way with 36-foot paved

surface, curb & gutter, sidewalk, and planter strips. The applicant will construct all interior roads (both public & private), alleys, and the half-street improvement of the proposed 'South Public Avenue' located along the southern boundary.

There are three (3) public roads, 'West Public Street', 'N Dogwood Street', and 'N 90th Avenue', that are proposed to consist of a 52-foot right-of-way, 28-feet paved surface, curb & gutter, detached 5-foot sidewalks and planter strips on both sides, with parking permitted on one-side only. There is an additional public road, 'South Public Avenue', that is to be constructed with a 36-foot half-width right-of-way, 24-foot paved surface, curb & gutter, 5-foot detached sidewalk and planter strip on one side, with parking permitted on one-side only. This will be a fully improved roadway in the future. The public roads, as proposed, are consistent with and will meet the standards set forth in the City's Design Standards Manual. At completion of the on-site public road improvements, the applicant will be required to dedicate all public right-of-way to the City.

[Private Roads]: The private tracts, 'SE Alley' and 'NE Alley', are proposed to be 26-foot wide tracts with 24-foot wide paved surfaces. No parking will be permitted on either side. As a condition of the Fire Marshal, these two tracts exceed the minimum alley standards in order to allow for access by an aerial fire truck to Lots 69-72 and Lots 73-85 as these lots are not accessible from a street frontage. Lots 86-111 will be accessible from N Boxwood Street and the proposed 'South Public Avenue'. Staff concurs with the proposed design.

The private road referenced as 'West Private Street', abutting Lots 1-9 and Lots 16-31, is proposed as a 48-foot wide tract, with a 28-foot wide paved surface, 5-foot wide detached sidewalks and planter strips on both sides, and parking permitted on one-side only. This road section, as proposed, is consistent with and will meet the standards set forth in the City's Design Standards Manual.

Private roads that exceed 150-feet in length require a hammerhead for turnaround. The proposed private road, 'West Private Street', which abuts Lots 15-31, exceeds the maximum 150-foot standard. However, in lieu of the hammerhead, the applicant is proposing to construct two alleys. The 'South Private Avenue' alley abutting Lots 24 and 39; and the 'SW Alley' between Lots 24-31 and Lots 32-39. 'South Private Avenue', abutting Lots 24 and 39, is proposed as a 20-foot wide tract with a 20-foot wide paved surface, no sidewalks, no parking on either side, and a larger corner radius to allow for fire and garbage access. Additionally, 'South Private Avenue' will provide access connection to 'West Private Street' and 'West Public Street'. The 'SW Alley' will consist of a 24-foot wide private tract, with 20-foot wide paved surface, no parking on either side, and larger corner radius at both ends of the alley. Staff concurs with the proposed design.

The private driveway access tract abutting Lots 10-15 is proposed as a 30-foot wide tract, with a 20-foot wide paved surface, and a 5-foot wide sidewalk on one side. The Camas Design Standards for a 30-foot wide private access tract requires the addition of a landscape strip, and no parking permitted on either sides. In order to comply with the Camas Design Standards for a 30-foot wide private driveway access tract, the applicant will be required through a condition of approval to construct the 5-foot wide sidewalk along the frontage of Lots 10-15, install a 4-foot wide planter strip along the side yard of Lot 9, and no parking will be permitted on either side of the private access tract. Additionally, the CC&R's should address that the residents served by the private access tract will be required to place their garbage and recycling cans at the end of the access tract at the private street for weekly or bi-weekly pickups due to the lack of a turnaround at the end of the access tract. Prior to final occupancy, an acceptable address monument and address signs should be installed at the end of the access tract where the access tract leaves the private road and will be conditioned as such.

Utilities, Street Lighting, Street Trees, and Other Improvements:

[Street Lighting]: LED Street lighting will be installed along all street frontage in accordance with the Camas Design Standards Manual (CDSM). Street light locations are to be shown on the construction plan. Draft electrical plans are to be submitted for review by the City prior to submittal to Clark Public Utilities.

Additionally, staff finds a conditional of approval is required that a plat note should be added to the face of the final plat that private streets with street lighting will have a separate meter and that maintenance of all light and power will be the responsibility of the Homeowner's Association.

[Driveways]: Lots 1-23 and 40-68 contain Front Loaded Garages. Per the City of Camas Street Details for driveways (ST14-16), the driveway throat cannot exceed 40% of the total lot frontage. With the lot widths at a minimum of 20-feet wide, the driveway throats would not be able to exceed 8-feet in width. Driveways are typically larger than 8-feet in width. Staff recommends a conditional of approval that shared driveways shall be provided between lots and as the driveway throat shall not exceed 40% of the total lot frontage.

[Street trees and Landscaping]: CMC 17.19.030.F.1 requires one 2-inch diameter street tree in the planter strip of the right-of-way, or similar location in the front yard of each dwelling unit, with the exception of flag lots and lots access by tracts. Of the proposed 111 lots, 83 street trees are proposed. Six lots, lots 10-15, are accessed by a tract and therefore are not required to provide a street tree. As such, the development needs an additional 22 street trees for compliance with this development standard. The proposed landscape plan does not show any street trees within the planter strip of the right-of-way or in the front yards of lots 1-23 and 40-68 that contain the Front Loaded Garages. With shared driveways as discussed in the above section, the applicant should be able to install additional street trees in front of lots 1-23 and lots 40-68. Prior to final engineering plan approval, the applicant is to show proposed driveway locations for each lot to ensure that street trees are not impacted and conditioned as such.

The applicant will also be required to provide acceptable fencing and landscaping behind lots 10-23 in accordance with CMC 17.19.030.D.6 *Double Frontage Lots* as further discussed under criterion 5 below. The street tree plantings and other landscaping as discussed throughout this report should be included on the landscaping plans with final engineering plan submittal for the site improvements. All landscaping should be installed or bonded for prior to final acceptance. Street trees adjacent to individual lots must be installed prior to final occupancy or bonded, and installed prior to expiration of the two year-warranty period, whichever comes first and conditioned as such.

[Parking]: The proposed average lot size falls below 7,400 square feet and as such, the applicant has provided 23 parking stalls adjacent to the open space tracts in compliance with CMC 17.19.040.B.10.e. This development standard requires the off-street parking to be located within a tract and will be conditioned as such. Subject to the requirements of CMC 18.13.060.A.E, parking areas are to be landscaped at all perimeters and provide a minimum 5-foot width of planting space.

FINDING: Staff finds that the applicant can or will make adequate provisions as conditioned for roads, utilities, street lighting, street trees, and other improvements that are consistent with the six-year street plan, the Camas Design Standard Manual and other state adopted standards and plans.

4. Provisions have been made for dedications, easements and reservations;

The applicant will be required to dedicate all public right-of-way at completion of the project, this includes the frontage on NE Ingle Road, 'West Public Street', N Dogwood Street, 'South Public Avenue', and N 90th Avenue.

The applicant should provide adequate access and utility easements to the City over private streets, alleys, and access driveway tracts, at the time of final platting, for the purpose of inspection, maintenance and operation of said public water and sanitary sewer lines.

The stormwater treatment and detention facility is to be placed in a separate Tract with the HOA responsible for ownership and maintenance. Additionally, the applicant will be required to grant the City right-of-entry for inspection purposes of the stormwater treatment and detention facility.

The open space/park areas and segments of trails should be placed in tracts and dedicated to the HOA.

A homeowner's association (HOA) will be required for this development. A copy of the CC&R's for the development will need to be submitted to the City for review and approval. The City is to receive a copy of the recorded CC&R's at time of Final Plat. Specifically, the applicant is to make provisions in the CC&R's for ownership and maintenance of the storm drainage systems, stormwater treatment & detention system, fencing, trails, park amenities, landscaping, irrigation, private roads, storm easements, open space/park and trail tracts outside of the City's right-of-way. Additionally, the applicant is to make adequate provisions for parking enforcement along private roads, alleys, and access tracts that are acceptable to the Fire Marshal. Further, all necessary easements, dedications, and tracts should be noted on the final plat.

FINDING: Staff finds that adequate provisions for dedications, easements and reservations as conditioned can or will be made by the applicant at the time of final platting.

5. The design, shape and orientation of the proposed lots are appropriate to the proposed use.

Lot sizes and dimensions: Pod B1 is designated with a MF-18 multi-family residential zone per the PRD Master Plan, with a minimum lot size requirement of 1,000 square feet. The proposed lots are between 1,300 square feet and 4,662 square feet with an average lot size of 1,770 square feet. The required minimum 20-foot lot width and 50-foot lot depth dimensional standards are met and shown on the preliminary plat (Exhibit 6) with the following required minimum setbacks for Pod B1: 1) Front Loaded Garage setbacks: front yard 18-feet, side yard 3-feet or 0-feet at attached lot line, side yard flanking a street 10-feet and side yard flanking an alley 5-feet, rear yard 10-feet; 2) Alley Loaded Garage setbacks: front yard 6-feet, side yard 3-feet or 0-feet at attached line, side yard flanking a street 10-feet and side yard flanking an alley 5-feet, rear yard 4-feet or 18-feet. Building envelopes in compliance with the setback requirements should be shown on the final plat.

Double-frontage lots: The preliminary plat proposed double frontage lots at Lots 10-23 adjacent to NE Ingle Road. *"Double Frontage lots shall be avoided"* per CMC 17.19.030.D.6 except where the lots are adjacent to an arterial or collector; NW Ingle Road is a Collector Road. Consistent with CMC 17.19.030.D.6.a, the applicant has provided a 10-ft. wide landscape tract along the rear property lines of Lots 10-23 as shown on the preliminary plat sheet (Exhibit 6). The landscape tract should include a minimum 2-inch caliper tree every thirty feet on center, three-foot tall shrubs the form a continuous screen and groundcover plants that fully cover the remainder of the landscape area per CMC 17.19.030.D.6.a. A 4-foot tall sight obscuring fence or masonry wall should be located at the line that separates the lot from the 10-foot tract per CMC Figure 17.19-1 and include columns or physical indentations every fifty lineal feet per CMC 17.19.030.D.6.b. Subject to CMC 17.19.030.D.6.D, a 20-foot

setback is required from the property line separating the lot from the tract. For consistency with 10-foot rear yard setback from Front Loaded Garages as required per the PRD Master Plan, staff finds a 10-foot setback is appropriate from the property line separating the lot from the tract as proposed. The rear building elevation facing NW Ingle Road should maintain the architectural design of the front building façade to avoid blank walls per CMC 17.19.030.D.6.c. Although lots 86-104 are considered double-frontage lots, the ten-foot landscape tract is not required as the front of the structures face NE Boxwood Street per CMC 17.19.030.D.6.a.i. Lots 86-104 must provide a pedestrian access to NE Boxwood Street per CMC 17.19.030.D.6.a.ii.

FINDING: Staff finds the proposed lot sizes conform to the requirement of the MF-18 zone and complies with the maximum allowable density of 18 du/acre. The application meets the multi-family development standards outlined in the PRD Master Plan. Lots 10-23 will need to comply with the development standards for double frontage lots in CMC 17.19.030.D.6(a-c).

6. The subdivision complies with the relevant requirements of the Camas land development and zoning codes, and all other relevant local regulations;

CMC Section 15.50.090 Clearing and Grading Standards:

CMC 15.50.090.A requires clearing and grading activities be conducted as to minimize potential adverse impacts to the vegetation, drainage and other natural features of the land. Clearing and grading should be conducted in a manner to preserve and enhance the city of Camas aesthetic character to include the preservation of unique landforms and natural features per CMC 15.50.090.E. Portions of the site exhibit slopes greater than 10%. Residential land development projects with steep slopes often include retaining walls for flatter lots. The proposed subdivision includes a 6 to 10-foot tall wall between lots 40 – 68 for lot design. To minimize clearing and grading and to further highlight the existing aesthetic landscape character of Camas, a revised clearing and grading plan should be submitted in compliance with CMC 18.17.060 *Retaining walls* prior to final engineering plan approval and conditioned as such.

CMC Chapter 18.19 Design Review:

Design Review is required for development within the multi-family zones pursuant to CMC 18.19.020. As previously noted, the property is located within the Multi-Family Residential MF-18 zone. Staff recommends a conditioned of approval that the applicant submit to the City for Design Review approval prior to final engineering plan approval.

CMC Section 18.07.030 Table 1 Sales Office Use:

The application did not propose a sales office for the development. The absence of approval of a sales office consolidated with this Type III hearing, will limit sales office at the time of development to six months as a Temporary Use per CMC 18.07.040 Table 2 (Note 4). The applicant may provide for the contingency that a sales office use may be necessary for longer than six months. Staff finds that special conditions for the installation, use and removal of the sales office are appropriate in accordance with CMC 18.43.050.F, and are provided with this report if the applicant is in agreement.

FINDING: As stated in the responses to criteria in this staff report and as conditioned herein, this proposal can or will meet all relevant codes, regulations, ordinances and other requirements as identified herein.

7. Appropriate provisions are made to address all impacts identified by the transportation impact study;

Traffic Impact Analysis

The applicant submitted a *Traffic Analysis Memorandum (Memo)*, dated September 6, 2018 which is an update to the original *Traffic Impact Analysis (TIA)* that was submitted with the Green Mountain PRD

Master Plan and dated June 2014. The updated Memo evaluated the estimated trip generations based on the number of lots (126). The report used the trip generation rates from the *ITE Trip Generation Manual (9th Edition, 2012)*, ITE code #230 Residential Condominium/Townhouse and ITE code #210 Single-Family Detached, in order to determine the number of trips generated per weekday.

The following information provided justification for the traffic study:

- Total Residential (126 units): The proposed development is expected to generate 740 ADTs, 57 AM peak hours (10 in & 47 out), and 67 PM peak hours (44 in & 23 out).
- Based on the number of average daily trips (ADTs) generated by the proposed development, and per the Camas Design Standard Manual, when the vehicles per day (VPD) are 200 vpd or more, a Traffic Study is required.
- The applicant's *Traffic Analysis Memorandum (Memo)* evaluated the potential mitigation needs to offsite roadways addressed in the original *Green Mountain PRD Master Plan Traffic Analysis*.

[Site-Generated Trips for Pod B1 South]:

Site-generated trips for Pod B1 South was evaluated based on the original design that consisted of 124 attached units and 2 single family detached homes. The development layout was revised in March 2019 to consist of 109 attached units and 2 single-family detached homes. This is a decrease in 15 attached units. The updated report used the *Trip Generation Manual (9th Edition)* to summarize the daily, the weekday AM peak hour, and weekday PM peak hour trips. Based on the original design, the trip generation is as follows:

- Residential Condominium/Townhouse (#230) /124 units/720 ADT/55 AM Peak Total/65 PM Peak Total
- Single-Family Detached (#210) / 2 units/20 ADT/2 AM Peak Total/2 PM Peak Total
- Total Residential (126 units) /740 ADT/57 AM Peak Total/67 PM Peak Total
- The revision to the original design will result in a reduction in Average Daily Trips (ADT), Total AM & Total PM Peak Hour Trips.

[Site-Generated Trips per Green Mountain PRD Master Plan & Remaining Trips]:

The Green Mountain PRD Master Plan estimated the total number of daily trips for all the residential phases and the commercial site to generate 13,980 new trips at full build-out.

The total number of daily trips for Phase 1, Phase 2, Phase 3, and Pod B1 will account for 6,338 ADTs. When these phases reach full build-out there will be: 7,642 Daily trips; 450 weekday AM Peak Hour trips; and 705 weekday PM Peak Hour trips remaining.

[Evaluation of Mitigation Requirements (MRs) & Recommendations]:

MR #1 - NE 199th Avenue & NE 58th Street (SR 500) (Clark County & WSDOT Jurisdiction):

The *Green Mountain PRD (GM PRD) Master Plan TIA* and the *Green Mountain PRD (GM PRD) Phase 3 TIA* identified a need for future intersection improvements. The *GM PRD Master Plan TIA* stated "it is expected that a nexus might ultimately be established between requiring construction of an eastbound right-turn lane and traffic volume increases ..." The *GM PRD Phase 3 TIA* stated that "WSDOT has identified a single-lane roundabout as the preferred long-turn improvement ..." and that "a proportionate share impact methodology will be developed in cooperation Clark County and WSDOT to support future design and construction ..." Additionally, subsequent developments adding trips to the intersection will be assessed a proportional share to mitigate payment" towards the improvements.

Recommendation for MR #1 - The *Green Mountain PRD (GM PRD) Master Plan TIA* and the *Green Mountain PRD (GM PRD) Phase 3 TIA* were reviewed by Clark County and WSDOT staff, due to the fact that this intersection is under their jurisdiction and is not located within Camas city limits. Clark

County staff evaluated the operating levels and standard delays and concurred with the finding in both TIA's that operating levels and standard delay times can achieve a LOS better than the County's minimum allowable LOS E for unsignalized intersections. Therefore, the County determined that this development can comply with adopted Concurrency Standards for corridors and unsignalized intersections under County jurisdiction.

WSDOT staff identified a single-lane roundabout, in lieu of the original single right-turn lane, as the preferred long-term improvement at the intersection. However, WSDOT also agreed that because of right-of-way constraints at the intersection, it wasn't possible for the GM PRD Phase 3 Applicant to mitigate for the supposed impacts through traditional construction improvements. The *GM PRD Phase 3 TIA* recommended a proportionate share payment towards design and construction of a single-lane roundabout at the intersection, by this phase and subsequent developments that add trips to this intersection.

- The proportionate share for Pod B1 would be based on the weekday PM Peak hour trips through this intersection, with a projected to contribution of 14 weekday PM peak hour trips.

The total payment amount was to be determined in coordination with WSDOT and Clark County. While City Staff and WSDOT agreed with this proposed mitigation approach and a condition of approval was issued with the GM PRD Phase 3 decision, there is no longer a mechanism to collect or hold the fees for said intersection improvements for the following reasons:

- WSDOT will not collect or hold funds for a project that is not in their Transportation System Plan (TSP).
- Clark County will not collect or hold funds for a project that is not warranted by its concurrency standards and the funds would be from a development that is not within its jurisdiction.
- The City of Camas will not collect or hold funds for a project outside its jurisdiction when there is no agency to receive the funds for a non-existent project.

For the reasons stated above, the City intends to issue a modification to the GM PRD Phase 3 decision to remove Condition of Approval #23, Final Order SUB17-03, for the proportionate share collection of funds for a single-lane roundabout at the intersection of NE 199th Avenue and 58th Street (SR-500). Based on the proposed modification to the GM PRD Phase 3 decision, staff finds that a condition requiring the applicant for GM PRD Pod B1 South to participate in a proportionate share payment toward design and construction of the single-lane roundabout is not warranted (Exhibit 22).

MR #2 - NE Ingle Road / NE Goodwin Road / NE 28 Street (City of Camas Jurisdiction):

The *Green Mountain PRD (GM PRD) Master Plan TIA* and the *Green Mountain PRD (GM PRD) Phase 3 TIA* identified a need for future improvements at this intersection as it would no longer meet the City's operating standards for 2029 "background conditions during the weekday PM peak hour and the total 2029 total traffic conditions during both the weekday AM and PM peak hours." The following improvements were recommended:

- Construct eastbound left-turn lane on NE Goodwin Rd. – *Completed*
- Construct westbound right-turn lane on NE 28th St. – *To be completed in 2019*
- Construct a 3-lane roadway section on NE 28th Street in conjunction with the Phase 2 improvements – *Completed*
- Construct a traffic signal at the intersection when the intersection no longer meets the City's performance standard of LOS 'D' and v/c of 0.90 or better. – *Recommended with Phase 3 development – currently under design*

Recommendation for MR #2 – Mitigation requirements for this intersection do not apply to Green Mountain PRD Pod B1 South. Staff concurs.

MR #3 - NE 192nd Avenue / NE 13th Street (City of Vancouver Jurisdiction):

The *Green Mountain PRD (GM PRD) Master Plan TIA* and the *Green Mountain PRD (GM PRD) Phase 3 TIA* identified a need for future improvements at this intersection which includes a northbound right-turn lane and a westbound right-turn lane on NE 13th Street at NE 192nd Avenue. The proportionate share for these improvements is to be based on the weekday PM peak hour trips for each phase with an assessed fee of \$391/Trip.

- Based on the original design and TIA Memo for GM PRD Pod B1 South, this phase is anticipated to add 31 trips to this intersection and would therefore be responsible for a proportionate share payment of \$12,121 or \$391/Trip towards the future improvements.

Recommendation for MR #3 – Staff recommends a condition of approval that the applicant will be required to pay the proportionate share payment of \$391/per DU for future improvements at the intersection of NE 13th St. / NE 192nd Ave. to the City of Vancouver.

[On-Site Access & Circulation]:

Pod B1 South is located south of Green Mountain PRD (GM PRD) Master Plan Phase 1A and Phase 1D, and between NE Ingle Road and N Boxwood Street. Access to and thru Pod B1 will be via the local roads constructed with GM PRD Master Plan Phases 1A, 1D, and Phase 2A. There will not be direct vehicular access to Pod B1 South via NE Ingle Road. Indirect access from NE Ingle Road via neighborhood circulation site access queueing indicates that there will be two vehicles or less during the weekday AM and PM peak hours. Staff finds that there were no additional impacts associated with the development's traffic impacts to the on-site roadways based on the applicant's *Traffic Analysis Memorandum*.

FINDING: Staff finds that, as conditioned, this development can or will meet any impacts identified by the transportation impact study.

8. Appropriate provisions for maintenance of commonly owned private facilities have been made;

A Homeowner's Association will be required for this development including Conditions, Covenants, and Restrictions (CC&R's) to ensure there are adequate and appropriate measures are in place for the perpetual ownership and maintenance of 'West Private Street', 'South Private Street', 'SW Alley', 'SE Alley', 'NE Alley', 30-foot private access tract adjacent to Lots 10-15, 10-foot landscape buffer adjacent to Lots 10-23, open spaces/park tracts, trail tracts, parking lots, private stormwater system located behind Lots 54-68, all private roads, alleys, and the stormwater facility located on the Urban Village parcel to the south. Additionally, the CC&R's are to state that the City shall have right-of-entry to inspect the stormwater facility.

FINDING: Staff finds that adequate provisions for maintenance of privately common owned facilities can or will be made as conditioned.

9. Appropriate provisions in accordance with RCW 58.17.110, are made for (a) the public health, safety, and general welfare, and (b) The public use and interest will be served by the platting of such subdivision and dedication;

Privately owned and maintained tracts will be provided for alleys, landscaping, trail connections, fencing and open spaces/park amenities. Furthermore, the applicant is providing adequate and appropriate utilities for stormwater, water, and sanitary sewer that will be dedicated to the public. The applicant will also provide sidewalks with the proposed street construction for adequate pedestrian mobility.

FINDING: As discussed throughout this report, staff finds that the subdivision can be conditioned to provide the appropriate provisions for public health, safety, general welfare, and assure safe walking conditions for pedestrians.

10. The application and plans shall be consistent with the applicable regulations of the adopted comprehensive plans, shoreline master plan, state and local environmental acts and ordinances in accordance with RCW36.70B.030.

FINDING: Staff concurs that the proposed subdivision can or will meet the requirements of RCW 58.17 and other applicable state and local laws that are in at the time of final platting. The final plat will be processed in accordance with the requirements of CMC 17.21.060.

PUBLIC COMMENTS

As of the writing of this staff report, staff received written SEPA public comments from the Department of Ecology, Southwest Washington Clean Air Agency and Department of Archaeology and Historic Preservation as previously discussed in this staff report.

CONCLUSION

Based on the above findings and discussion provided in this staff report, staff concludes that Green Mountain PRD B1-POD (SUB18-04) should be approved, because it does comply with the applicable standards if all of the conditions of approval are met.

RECOMMENDATION

Staff recommends APPROVAL of the preliminary plat of Green Mountain PRD B1-POD (SUB18-04) subject to the following conditions of approval:

CONDITIONS OF APPROVAL

Standard Conditions:

1. All construction plans will be prepared in accordance with City of Camas standards. The plans will be prepared by a licensed civil engineer in Washington State and submitted to the City for review and approval.
2. A 3% construction plan review and inspection fee shall be required for this development. The fee will be based on an engineer's estimate or construction bid. The specific estimate will be submitted to the City's engineering department for review and approval. The fee will be paid prior to the construction plans being signed and released to the applicant. Under no circumstances will the applicant be allowed to begin construction prior to approval of the construction plans.
3. Existing water wells, septic tanks and septic drain fields shall be properly abandoned in accordance with State and County guidelines prior to final plat approval.
4. Any entrance structures or signs proposed or required for this project will be reviewed and approved by the City. All designs will be in accordance with applicable City codes. The maintenance of the entrance structure will be the responsibility of the homeowners.
5. The applicant will be responsible for ensuring that private utilities; underground power, telephone, gas, CATV, street lights, and associated appurtenances are installed.
6. A 6-foot private utility easement (PUE) shall be located outside of the right-of-way on public streets and outside of the tracts on private streets.

7. A draft street lighting plan shall be submitted for review prior to final plan submittal to Clark Public Utility.
8. The applicant will be required to purchase all permanent traffic control signs, street name signs, street lighting and traffic control markings and barriers for the improved subdivision.
9. A homeowner's association (HOA) will be required and a copy of the CC&R's for the development will need to be submitted to the City for review and approval. The applicant shall provide the City with a copy of the recorded CC&R's at time of final plat recording.
10. The applicant shall make provisions in the CC&R's for ownership and maintenance of the storm drainage systems, fencing, walls, landscaping, irrigation, private roads, and tracts or easements outside of the City's right-of-way if applicable. Additionally, the applicant shall make adequate provisions for parking enforcement along private roads, alleys, and access tracts that are acceptable to the Fire Marshal. Further, all necessary easements and dedications should be noted on the final plat.
11. Final plat and final as-built construction drawing submittals shall meet the requirements of the CMC 17.11.060, CMC 17.01.050 and the Camas Design Standards Manual.
12. The applicant shall remove all temporary erosion prevention and sediment control measures from the site at the end of the two-year warranty period, unless otherwise directed by the Public Works Director.
13. Street names shall be reviewed and approved by the Building Department prior to final plat approval.
14. Building permits shall not be issued until this subdivision has been granted Final Acceptance and the final plat is recorded and approved by the Planning, Engineering, Building and Fire Departments.
15. Automatic fire sprinklers installed per NFPA 13D or 13R shall be required in all new residential structures.
16. If potential artifacts are discovered during the course of construction, work must immediately cease and both State Department of Archaeological and Historic Preservation and the City must be notified.

Special Conditions:

17. Prior to engineering plan approval, a final archaeological report including any necessary permits required by DAHP shall be submitted to DAHP for review and approval and sent to the tribes per CMC 16.31.160.
18. The applicant shall submit a site specific geotechnical report to the City for review and approval prior to building permit approval.
19. On corner lots, the side façade elevation facing the street shall provide architectural variation similar with the front building façade. Additional landscaping shall be provided along the street side façade but shall not impede necessary vision clearance requirements.
20. The applicant shall provide play equipment and/or benches or other park amenities within the small open/space park area as shown on the preliminary landscape plan if feasible.
21. The neighborhood trails shall be a minimum 6-foot wide paved trail consistent with the trail requirements of the PRD Open Space, Park & Landscape Master Plan.
22. The trails and park amenities shall be installed prior to final plat approval.

23. The applicant shall install an acceptable traffic calming feature at the intersection of N Dogwood Street & N 90th Avenue and work with Staff to determine an acceptable feature.
24. The applicant shall dead end the 8-inch waterline at the north boundary of the private access tract and extend the 8-inch waterline, shown in 'South Private Avenue', thru the proposed Trail Tract and tie into the 18-inch water main in NE Ingle Road. Additionally, a new hydrant shall be installed at the existing 8-inch water service stub on NE Ingle Road.
25. The applicant shall to extend the 8-inch waterline located in the proposed 'South Public Avenue' east to N Boxwood Street.
26. The applicant shall to provide adequate access and utility easements to the City over private streets, alleys, and access driveway tracts, at the time of final platting, for the purpose of inspection, maintenance, and operation of said public water and sanitary sewer lines.
27. The applicant shall provide the City with a signed copy of *Option Agreement* memorializing the agreement between the two property owners prior to final engineering plan approval.
28. The stormwater treatment and detention facility is to be placed in a separate Tract and the City shall be granted a right-of-entry to the stormwater treatment and detention facility for purposes of inspections. Additionally, the Homeowners Association's (HOA) responsibility for ownership and maintenance is to be fully outlined in the CC&R's and on the recorded plat.
29. The access ramp to the storm facility shall be widened to a minimum 15-wide paved surface to the live storage elevation. Additionally, a minimum 5-foot wide trail/pathway around the perimeter of the pond and a 10-foot by 15-foot paved pad around the storm control manhole to provide for accessibility and maintenance shall be provided.
30. Prior to final engineering plan approval, a final stormwater report (TIR) shall be submitted to the City for review and approval. The final stormwater report shall provide the required documentation per Ecology's latest edition of the Stormwater Management Manual for Western Washington (SWMMWW), addressing the feasibility/infeasibility of LID BMPs.
31. The storm drainage collection system located in private tracts and easements; 'West Private Street', 'South Private Avenue', 'SE Alley', 'NE Alley', the 10-foot landscape buffer tract adjacent to Lots 14-23, the storm easement adjacent to Lots 54-68, and the stormwater treatment and detention facility; will be owned and maintained by the Homeowners Association (HOA). Right-of-entry shall be granted to the City for inspection purposes of the stormwater treatment and detention facility.
32. Prior to final engineering plan approval, the applicant shall provide copies of the NPDES GCSWP and SWPPP.
33. The sanitary sewer segment located in the 30-foot private driveway tract shall dead end at the north end of the private access tract (Lot 10). The sanitary leg located at the intersection of the proposed 'West Private Street' and 'South Private Avenue' shall be extended through the proposed 'Trail Tract' and tie into the existing 10-inch sanitary sewer main NE Ingle Road.
34. The frontage improvements along NE Ingle Road shall include road widening, installation of curb & gutter, sidewalk, planter strip, bike lane, and street lighting. At completion of the NE Ingle Road frontage improvements, the applicant shall dedicate the right-of-way to the City.
35. At completion of all on-site public road improvements, the applicant shall dedicate all public right-of-way to the City.

36. The applicant shall install a 5-foot wide sidewalk along the frontage of Lots 10-15, a 4-foot wide planter strip along the side yard of Lot 9, and no parking shall be permitted on either side of the private driveway, within the 30-foot wide private access tract.
37. Provisions shall be included in the CC&R's that the residents served by the private access tract shall be required to place their garbage and recycling cans at the end of the access tract at the private street for weekly or bi-weekly pickups due to the lack of a turnaround at the end of the private access tract.
38. Prior to final occupancy, an acceptable address monument and address signs shall be installed at the end of the private access tract where the private access tract leaves the private road.
39. A note shall be added to the face of the final plat that the private streets with street lighting shall have a separate meter and that maintenance of all light and power shall be the responsibility of the Homeowner's Association.
40. The driveway throat shall not exceed 40% of the total lot frontage and therefore shared driveways shall be provided between lots where feasible.
41. Prior to final engineering plan approval, the applicant shall submit a plan to the City for review approval showing the location of proposed driveways to each lot to ensure that street trees are not impacted and can be accommodated.
42. Prior to Building Department issuing a Certificate of Occupancy, an additional 22 street trees shall be located within the planter strip or within the front yards of Lots 1-23 and 40-68.
43. Required trees shall be maintained in good health, and shall be promptly replaced (within six months) if damaged or in poor health, and a note to this effect shall be on the final plat document.
44. Prior to final engineering plan approval, the applicant shall submit a landscape plan for City review and approval that details the location, plant species, planting, irrigation and fencing notes and associated details for all required landscaping including but not limited to the landscape buffer and pedestrian trail tracts.
45. All landscaping shall be installed or bonded for prior to final plat acceptance.
46. Street trees adjacent to individual lots shall be installed prior to final occupancy or bonded, and installed prior to expiration of the two year-warranty period, whichever comes first.
47. The off-street parking areas shall be included within the adjacent open space tracts.
48. Parking areas shall be landscaped at all perimeters and provide a minimum 5-foot width of planting space per CMC 18.13.060.A and E.
49. All building envelopes and setbacks shall be shown on the final plat.
50. Lots 10-23 shall comply with the development standards for double frontage lots in CMC 17.19.030.D.6(a-d) to include:
 - a. A 10-foot landscape tract shall be located along the rear property lines of Lots 10-23,
 - b. The 10-foot landscape tract shall be planted with 2-inch caliper trees every thirty feet on center, three-foot tall shrubs that form a continuous screen and groundcover plants that fully cover the remainder of the landscape area,

- c. A 4-foot tall sight obscuring fence or masonry wall, located at the line that separates the lot from the 10-foot landscape tract, to include columns or physical indentations every fifty lineal feet, and
 - d. The rear building elevations facing NE Ingle Road shall maintain the architectural design of the front building façade to avoid blank walls.
51. Lots 86-104 shall provide a pedestrian access to NE Boxwood Street per CMC 17.19.030.D.6.a.ii.
 52. Prior to engineering plan approval, a revised clearing and grading plan shall be provided in compliance with CMC 18.17.060.
 53. Staff recommends a conditioned of approval that the applicant submit to the City for Design Review approval prior to final engineering plan approval.
 54. A single sales office in a model home for purpose of selling lots may be located within the development. Upon construction of the last unit, the model home/sales office shall be closed.
 55. The applicant shall pay the proportionate share payment of \$391/per DU for future improvements at the intersection of NE 13th St. / NE 192nd Ave. to the City of Vancouver.
 56. A note shall be added to the face of the final plat that a Homeowner's Association shall be required for this development including Conditions, Covenants, and Restrictions (CC&R's) to ensure there are adequate and appropriate measures are in place for the perpetual ownership and maintenance of 'West Private Street', 'South Private Street', 'SW Alley', 'SE Alley', 'NE Alley', 30-foot private access tract adjacent to Lots 10-15, 10-foot landscape buffer adjacent to Lots 10-23, landscaping, open spaces/park, trails, parking lots, private stormwater system located behind Lots 54-68 and within the landscape buffer tract, all private roads and alleys, and the stormwater facility located on the Urban Village parcel to the south. Additionally, the CC&R's are to state that the City shall have right-of-entry to inspect the stormwater facility.
 57. Plat notes shall be added to the face of the final plat regarding ownership and maintenance responsibilities of the individual Tracts.

Proposed Plat Notes:

1. A homeowner's association (HOA) will be required for this development. Copies of the CC&R's shall be submitted and on file with the City of Camas.
2. The homeowner's association is responsible for maintaining all private roads and associated infrastructure in this subdivision, including but not limited to the pavement, curbs, sidewalks, trail, fencing, landscaping, street lights and storm drainage utilities.
3. The following minimum setbacks shall apply per the PRD Master Plan:
 - a. Front Loaded Garage setbacks: Front yard 18-feet, Side yard 3-feet or 0-feet at attached lot line, Side yard flanking a street 10-feet and side yard flanking an alley 5-feet, rear yard 10-feet;
 - b. Alley Loaded Garage setbacks: Front yard 6-feet, Side yard 3-feet or 0-feet at attached line, Side yard flanking a street 10-feet and side yard flanking an alley 5-feet, Rear yard 4-feet or 18-feet.
4. No further short platting or subdividing will be permitted once the final plat has been recorded.
5. Building permits will not be issued by the Building Department until all subdivision improvements are completed and accepted by the City.

6. The lots in this subdivision are subject to traffic impact fees, school impact fees, and park/open space impact fees. Each new dwelling unit will be subject to the payment of appropriate impact fees at the time of building permit issuance or as otherwise provided by the city.
7. Prior to the Building Department issuing a Certificate of Occupancy, each lot shall install a minimum of one 2" caliper tree to be located in the planter strip or front yard of each lot as specified on the plat. Specified trees shall be maintained in good health, and damaged or dying trees shall be promptly replaced (within six months) by the homeowner.
8. Automatic fire sprinkler systems designed and installed in accordance with NFPA 13D are required in all structures.
9. The storm drainage collection system located in private tracts; 'West Private Street', 'South Private Avenue', 'SE Alley', 'NE Alley', the 10-foot landscape buffer tract adjacent to Lots 10-15, the storm easement adjacent to Lots 54-68, and the stormwater treatment and detention facility; shall be owned and maintained by the Homeowners Association (HOA). Right-of-entry shall be granted to the City for inspection purposes of the stormwater treatment and detention facility.
10. A Homeowner's Association shall be required for this development including Conditions, Covenants, and Restrictions (CC&R's) to ensure there are adequate and appropriate measures are in place for the perpetual ownership and maintenance of 'West Private Street', 'South Private Street', 'SW Alley', 'SE Alley', 'NE Alley', 30-foot private access tract adjacent to Lots 10-15, 10-foot landscape buffer adjacent to Lots 10-23, landscaping, open spaces/park, trails, parking lots, private stormwater system located behind Lots 54-68 and within the landscape buffer tract, all private roads and alleys, and the stormwater facility located on the Urban Village parcel to the south. Additionally, the CC&R's are to state that the City shall have right-of-entry to inspect the stormwater facility.



Community Development Department | Planning
616 NE Fourth Avenue | Camas, WA 98607
(360) 817-1568
communitydevelopment@cityofcamas.us

General Application Form

Case Number: CA18-116

Applicant Information

Applicant/Contact: Sterling Design, Inc./Joel Stirling Phone: (360) 759-1794

Address: 2208 E. Evergreen Blvd. Mail@SterlingDesign.biz

Street Address E-mail Address

Vancouver WA 98661

City State ZIP Code

Property Information

Property Address: None situated NE Ingle Road 173178-000 & 986037-307

Street Address County Assessor # / Parcel #

Camas WA 98666

City State ZIP Code

Zoning District MF-10 Site Size 7.89 acres

Description of Project

Brief description: Preliminary Subdivision application to develop B1-POD, a 7.89 acre portion of the approved Green Mountain Mixed Use PRD development into 128 residential lots.

Are you requesting a consolidated review per CMC 18.55.020(B)?

YES

☐

NO

☐

Permits Requested: ☐ Type I ☐ Type II ☒ Type III ☐ Type IV, BOA, Other

Property Owner or Contract Purchaser

Owner's Name: AE Green Mountain LLC Phone: (360) 771-8485

Last First

Address: 2551 W 1st Street

Street Address Apartment/Unit #

E mail Address: Washougal WA 98671

City State Zip

Signature

I authorize the applicant to make this application. Further, I grant permission for city staff to conduct site inspections of the property.

Signature:

Date: 10/29/2018

Note: If multiple property owners are party to the application, an additional application form must be signed by each owner. If it is impractical to obtain a property owner signature, then a letter of authorization from the owner is required.

Date Submitted:

Pre-Application Date:

Staff:

Related Cases #

☐ Electronic
Copy
Submitted

Validation of Fees

Application Checklist and Fees [April 1, 2018]

◊ Annexation	\$800 - 10% petition; \$3,400 - 60% petition	001-00-345-890-00	\$
◊ Appeal Fee		001-00-345-810-00	\$369.00 \$
◊ Archaeological Review		001-00-345-810-00	\$127.00 \$
◊ Binding Site Plan	\$1,742 + \$22 per unit	001-00-345-810-00	\$
◊ Boundary Line Adjustment		001-00-345-810-00	\$95.00 \$
◊ Comprehensive Plan Amendment		001-00-345-810-00	\$5,400.00 \$
◊ Conditional Use Permit			
Residential	\$3,167 + \$99 per unit	001-00-345-810-00	\$
Non-Residential		001-00-345-810-00	\$4,011.00 \$
◊ Continuance of Public Hearing		001-00-345-810-00	\$485.00 \$
◊ Critical or Sensitive Areas (fee per type) (x 3) CA10-16	(wetlands, steep slopes or potentially unstable soils, streams and watercourses, vegetation removal, wildlife habitat)	001-00-345-810-00	\$718.00 \$ 2,154
◊ Design Review			
Minor		001-00-345-810-00	\$401.00 \$
Committee		001-00-345-810-00	\$2,200.00 \$ 2,200 NO
◊ Development Agreement	\$2,000 first hearing; \$500 ea. add'l hearing/continuance	001-00-345-810-00	\$
◊ Engineering Department Review			
Review Fee	3% of estimated construction costs	001.00.345.830.20	\$
Modification to Approved Construction Plans		001.00.345.810.00	\$391.00 \$
◊ Fire Department Review			
Short Plat or other Development Review		115-09-345-830-10	\$132.00 \$
Short Plat or other Development Inspection		115-09-345-830-10	\$132.00 \$
Subdivision or PRD Review		115-09-345-830-10	\$164.00 \$ 164
Subdivision or PRD Inspection		115-09-345-830-10	\$164.00 \$ 164
Site Plan Review (commercial)		115-09-345-830-10	\$195.00 \$
Site Plan Inspection (commercial)		115-09-345-830-10	\$195.00 \$
◊ Home Occupation			
Minor - Notification (No fee)			\$0.00
Major		001-00-321-900-00	\$64.00 \$
◊ LI/BP Development	\$4,011 + \$38.00 per 1000 sf of GFA	001-00-345-810-00	\$
◊ Minor Modifications to approved development		001-00-345-810-00	\$320.00 \$
◊ Planned Residential Development	\$32 per unit + subdivision fees	001-00-345-810-00	\$
◊ Plat, Preliminary			
Short Plat	4 lots or less; \$1795.00 per lot	001-00-345-810-00	\$
Short Plat	5 lots or more; \$6,650 + \$234 per lot	001-00-345-810-00	\$
Subdivision	\$6,650 + \$234 per lot x (128 lots)	001-00-345-810-00	\$ 36,162
◊ Plat, Final:	Sub 10-04		
Short Plat		001-00-345-810-00	\$185.00 \$
Subdivision		001-00-345-810-00	\$2,200.00 \$
◊ Plat Modification/Alteration		001-00-345-810-00	\$1,108.00 \$
◊ Pre-Application (Type III or IV Permits)			
No fee for Type I or II			
General		001-00-345-810-00	\$327.00 \$
Subdivision		001-00-345-810-00	\$844.00 \$
◊ SEPA	SEPA 10-27	001-00-345-890-00	\$749.00 \$ 749
◊ Shoreline Permit		001-00-345-890-00	\$1,108.00 \$
◊ Sign Permit			
General Sign Permit	(Exempt if building permit is required)	001.00.322.400.00	\$37.00 \$
Master Sign Permit		001.00.322.400.00	\$116.00 \$
◊ Site Plan Review			
Residential	\$1,066 + \$31 per unit	001-00-345-830-10	\$
Non-Residential	\$2,665 + \$63 per 1000 sf of GFA	001-00-345-830-10	\$
Mixed Residential/Non Residential		001-00-345-830-10	\$
	\$3,758 + \$31 per res unit + \$63 per 1000 sf of GFA		
◊ Temporary Use Permit		001-00-321-990-00	\$74.00 \$
◊ Variance (Minor)		001-00-345-810-00	\$644.00 \$
◊ Variance (Major)		001-00-345-810-00	\$1,200.00 \$
◊ Zone Change (single tract)		001-00-345-810-00	\$3,100.00 \$

Adopted by RES 1023 AUG 2005; Revised by RES 1113 SEPT 2007; Revised by RES 1163 OCT 2009; Revised by RES 1204 NOV 2010;
 Revised by RES 15-001 JAN 2015; Revised by RES 15-007 MAY 2015; Revised by RES 15-018 DEC 2015; Revised by RES 16-019 NOV 2016;
 Revised by RES 17-015 NOV 2017; Revised by RES 18-003 APRIL 2018

For office use only

Total Fees Due: \$ 42,033 -2200

= 39,833

B1 Pod Project Narrative (Supplement to the Green Mountain Mixed Use PRD):

(Please refer to the Green Mountain Mixed Use PRD Narrative, included herein, immediately following this supplemental narrative for the B1 Pod portion of the project.

The Green Mountain PRD B1 Pod Subdivision proposal is to subdivide two parcels of land, serial number(s): 986037-307 and 173178-000, located in the NW ¼ quarter of Section(s) 20 & 21, Township 2 North, Range 3 East of the Willamette Meridian, Clark County, Washington, into 128 residential units utilizing the approved Master Plan Development Standards within the MF-18 section of the Green Mountain PRD Development. The site area is approximately 7.9 acres and currently is vacant land that was previously utilized in a portion of the Green Mountain Golf Course. The property topography slopes moderately from the north westerly property corner down to the south easterly property corner and currently contains construction debris from other phases, field grasses, weeds and 2 Oregon White Oak Trees, on it.

The site is zoned MF-18, under the Green Mountain PRD Pods definitions, and the comprehensive plan designation for the site is MFL. The Green Mountain PRD Master Planned Development was submitted and approved in 2014/2015 and is made up of a total of 283 acres of land. The Project Narrative submitted with the Approved PRD Master Planned Development is included here in, following this narrative, and the information contained within this Supplemental Narrative is Site Specific to the B1 Pod portion of the project and how it complies with the approval criterion within the Developer Agreement and Decision for the Green Mountain PRD Master Planned Development. The Green Mountain PRD Master Planned Development provided a broad overview of the proposed development with the understanding that each of the Development “Pods” would clarify how the proposed development configuration met the goals and intents of the Approved Master Plan.

The B1 Pod is located along NE Ingle Road, just to the south and east of the recently constructed Green Mountain Mixed Use PRD Phase 1D Subdivision. The project has Public Roads along the northern and southern boundaries and future phases of the Green Mountain PRD Project to the south and east.

Because the Green Mountain PRD B1 Pod Subdivision is part of a larger Approved Master Planned Development, all project studies/reports that were prepared for the Master Planned Development are applicable to the project and minimal new information was collected. Kittelson & Associates provided a Traffic Trip Generation Accounting Letter specific to the 128 Lot Design as required to supplement the original approved Traffic Study and their letter is included within the Land Use Application Materials. A Geotechnical Report was completed on the project by GeoPacific Engineering for the Master Planned Development to show feasibility of development and it is included also. Environmental Studies with Tree Inventory of the existing Oregon White Oaks on the property were completed by Ecological Land Services and their Reports are included within the Land Use Application.

The underlying zone of the property is zoned MF-10 however, the approval criteria within the Approved Master Planned Development governs the Lot Requirements within the B1 Pod and is listed as MF-18. The Density and Dimensions Table outlining the Lot Requirements, Density and Setbacks approved for the B1 Pod Phase are included in the following Table:

Green Mountain PRD PODs A-G and corresponding Camas Zones

	A POD	B POD	C POD
DENSITY	MF-24	MF-18	MF-10
Max. du/gross ac	24	18	10
Min. du/gross ac	6	6	6
STANDARD LOTS			
Min. lot SF	1,000 [a]	1,000[a]	3,000 [a]
Min. lot width	20	20	30
Min. lot depth	50	50	70
Max. Floor Area per du	No Max	No Max	No Max
SETBACKS			
Min. front/at garage	None	6/3@OS/18	10/18
Min. side	3 [1]	3 [1] [d]	3 [1] [d]
Min. side Flanking Street	None [e]	10 [d]	10 [d]
Min. rear <u>(garage @alley)</u>	None [e]	10 [b][c]	10[b][c]
LOT COVERAGE, Max.	None [c]	None	55%
BUILDING HEIGHT, Max.	60	45 [2]	35 [2]

a. Single Family Detached homes to be permitted. For SFD in A POD apply B Pod setbacks.

b. 10 foot rear yard for front access garage.

c. Minimum rear yard for alley accessed garage is either 4' or 18'.

d. Minimum side yard at alley is 5'.

e. Franchise utilities to be located in front or side yard easements abutting right of way.

1. The non-attached side of a dwelling unit shall be three feet, otherwise a zero-lot line is assumed.
2. Maximum building height: three stories and a basement but not to exceed maximum building height.

The proposed density of the B1 Pod is 16.4 units/acre which falls within the approved Density range of 6 – 18 units/acre. The proposed lots all exceed the minimum requirements of the Table as follows:

Proposed B1 Pod

- Minimum Lot Width: 20 feet
- Minimum Lot Depth: 60 feet
- Minimum lot size is 1,200 sq.ft.
- Maximum lot size is 2,736 sq.ft.

The Preliminary Project Narrative for the Green Mountain Mixed Use PRD (included herein) describes the B Pods as follows:

“B Pods: The master plan contains five B pods. B pods are intended to provide for attached townhomes or small detached lots. B1 is the largest B pod at approximately 7.6 acres. B1 is located west of central park and abuts the Urban Village located to the south. The other four B pods total 7.9 acres with the largest being 3.2 acres and these four pods are essentially surrounded by open space.”

Although Trails and Open Spaces are integrated into the B1 Pod phase of the project, the Master Plan Trail, Park, and Open Space Plan accounts for all of the requirements for the project. The Trails & Open Spaces that are located within the B1 Pod will be owned and maintained by a Home Owners Association (HOA) that will be created as part of the Subdivision. HOA dues will be collected from the future owners of the residential units and will be utilized for maintenance of all Private Improvements, including all or a portion of the offsite Stormwater Management Facility that will be located within an acre of property to the east of the B1 Pod.

CMC17.11.030.D (1 – 10):

Criteria for Preliminary Plat Approval. The hearing examiner decision on an application for preliminary plat approval shall be based on the following criteria:

1. The proposed subdivision is in conformance with the Camas comprehensive plan, parks and open space comprehensive plan, neighborhood traffic management plan, and any other city adopted plans;

The proposed Green Mountain PRD B1 Pod Subdivision is in substantial conformance with the Camas Comprehensive Plans, Parks and Open Space Comprehensive Plan, Neighborhood Traffic Management Plan, and all other City Adopted Plans.

2. Provisions have been made for water, storm drainage, erosion control and sanitary sewage disposal for the subdivision that are consistent with current standards and plans as adopted in the Camas Design Standard Manual;

Provisions have been made for water, storm drainage, erosion control and sanitary sewage disposal for the subdivision and they are consistent with the current standards and plans as adopted in the Camas Design Standard Manual. Stormwater management will take place within an offsite Stormwater Facility that may be utilized for additional stormwater associated with future pods within the Green Mountain PRD Development. At the time of the development of the B1 Pod, the offsite Stormwater Facility will be located within a portion of land that is an acre in size.

3. Provisions have been made for road, utilities, street lighting, street trees and other improvements that are consistent with the six-year street plan, the Camas Design Standard Manual and other state adopted standards and plans;

Roads, Utilities, Street Lighting, Street Trees and other required project improvements are consistent with the six-year street plan, the Camas Design Standard Manual and other State Adopted Standards and Plans are included herein. Improvements will be made to NE Ingle Road along the project frontage to bring the road up to the City of Camas Public Road Standards.

4. Provisions have been made for dedications, easements and reservations;

Dedications and easements are designed into the project as required by City of Camas Code.

5. The design, shape and orientation of the proposed lots are appropriate to the proposed use;

The design, shape and orientation of the proposed lots are appropriate to the proposed use and meet the minimum requirements outlined within the Approved Master Plan for the Green Mountain PRD Development.

6. The subdivision complies with the relevant requirements of the Camas land development and zoning codes, and all other relevant local regulations;

The subdivision complies with the relevant requirements of the Camas land development and zoning codes, and all other relevant local regulations.

7. Appropriate provisions are made to address all impacts identified by the transportation impact study;

There are no offsite improvements proposed as part of the project.

8. Appropriate provisions for maintenance of commonly owned private facilities have been made;

All commonly owned private facilities will be owned and maintained by a Home Owners Association (HOA) that will be formed and put in place to assure perpetual ownership and maintenance of all private facilities within the project.

9. Appropriate provisions, in accordance with RCW 58.17.110, are made for:
 - a. The public health, safety, and general welfare and for such open spaces, drainage ways, streets, or roads, alleys or other public ways, transit stops, potable water supplies, sanitary wastes, parks and recreation, playgrounds, schools and school grounds and all other relevant facts, including sidewalks and other planning features that assure safe conditions at school's bus shelter/stops, and for students who walk to and from school, and
 - b. The public use and interest will be served by the platting of such subdivision and dedication;

Provisions are made for public health, safety, and general welfare for open spaces, drainage ways, streets, roads, potable water supplies, sanitary wastes, parks and recreations, including sidewalks and other planning features that assure safe conditions at school bus shelter/stops, and for students who walk to and from school. The public use and interest will be served by the platting of such subdivision and dedication.

10. The application and plans shall be consistent with the applicable regulations of the adopted comprehensive plans, shoreline master plan, state and local environmental acts and ordinances in accordance with RCW 36.70B.030.

The Green Mountain PRD B1 Pod has been designed to be consistent with the applicable regulations of the comprehensive plans, shoreline master plan, state and local environmental acts and ordinances in accordance with RCW 36.70B.030.

A pre-application conference was held for the project on May 3, 2018 to review the proposed development and the report issued by the City of Camas is included within the Land Use Application Submittal Packet. The specific issues discussed in the conference have been reviewed and discussed with City of Camas Staff prior to the Land Use Application being filed and Final Construction Drawings along with a Final Plat will be submitted for review and approval prior to commencing construction of the project infrastructure.

STERLING DESIGN, INC. has prepared a Preliminary Plat for the project along with a Preliminary Engineering Plan, Grading & Erosion Control Plan, Preliminary Stormwater Technical Information Report demonstrating that the project is feasible. Water Quantity and Quality control for the new drainage from the required infrastructure and future home sites will be managed in an offsite facility that will be located within an area of 1 acre of land. The offsite stormwater facility may also be utilized for drainage from future Pods but will be sized only for the B1 Pod at the time of construction. All stormwater quality and water quantity control will be provided as required by City of Camas development code CMC14.02 and the SMMWW standards from Washington Department of Ecology.

The site currently has public road access from N. 90th Avenue, NE Boxwood Street, and N. Dogwood Street. New Public/Private Roads and Alleys will be extended through the project to provide for access to the new residential units. Sight distance has been verified at all proposed intersections and meets the minimum requirements of the City of Camas Design Standards.

Public sanitary sewer facilities were extended to the property as part of the Green Mountain Mixed Use PRD Ph1D and each new lot will be provided via. a 4" sanitary sewer lateral that is connected into the Public Sanitary Sewer system owned and operated by the City of Camas.

Public water facilities are available from the recent completed phases and public water will be provided to each new lot via. a water service connection to the Public Water system owned and operated by City of Camas

There are fire hydrants near the property, however, new hydrants will be installed as required to meet the spacing requirements of the City of Camas Fire Marshall. Since the project is proposing to utilize a 28-foot-wide paved Public Road section for access to the future residential units, all new units will utilize residential fire suppressant sprinkler systems.

All new residential units located on the site will be required to pay park, school, and traffic impact fees at the time of building permit issuance. These fees are collected to ensure that adequate facilities are available to serve new growth and development; promote orderly growth and development by requiring that new development pay a proportionate share of the cost of new established procedures and criteria so that specific developments do not pay arbitrary fees or duplicate fees for the same impact.

The development of this site into 128 residential units that meet the dimensional and area requirements of the Approved Green Mountain PRD Development, will aid in meeting the zoning and comprehensive plan goals for the area. The development of this site will improve public road and utility access to the area. The full build out of this development will provide housing consistent with the goals of the Growth Management Act and will provide housing that is compatible with the existing housing types located in the vicinity.

Project submittal materials:

- (1.) The required application form is included and the fee is included for the project application.
- (2.) A SEPA Checklist has been prepared for the project and is included herein.
- (3.) Land Use Application materials have been prepared utilizing the requirements found in the City of Camas Development Code along with the specific comments from the Pre-Application Conference Report.
- (4.) A Vicinity Map Showing the Location of the Site is included herein.
- (5.) Existing conditions are shown within the Preliminary Development Plans.
- (6.) A Preliminary Grading Plan is included within the Preliminary Development Plans.
- (7.) A Preliminary Stormwater Plan and Report are included within the Application Materials.
- (8.) A Geotechnical Report from the original Green Mountain PRD Development Application is included within the Land Use Application Materials.
- (9.) A Clark County Assessor's Map of Properties within 300 feet is included.
- (10.) Mailing Labels as required by CMC 18.55.110 are provided.
- (11.) A Traffic Trip Accounting report prepared by Kittelson & Associates is included within the Land Use Application Materials.
- (12.) All Open Spaces and Tract's will be owned and maintained by an HOA.
- (13.) The required Development Sign has been ordered for installation.
- (14.) 3 Copies and an Electronic Copy of the Land Use Application is provided.

Preliminary Plat Review

- (1.) The project design has been reviewed and discussed with City of Camas Staff and integrates roads, sidewalks, trails, and open space areas with the existing infrastructure installed with the existing phases of the Green Mountain PRD

Development and with the Approved Master Planned Development of future phases.

Engineering:

- (1.) All required Engineering Construction Plans and Details will be provided at the time of Final Construction Plan preparation and submittal. Conceptual Engineering information is provided with the Land Use Application to show points of connection for sanitary sewer and water systems along with feasibility of project grading and stormwater management.
- (2.) The owner of the B1 Pod project has purchased an area of the adjacent phase to the south and east, 1 acre in size, to be utilized for stormwater management. A design drawing for the adjacent Phase 1 Pod from Olson Engineering has been included within the Preliminary Plan Set to demonstrate that 1 acre of property is sufficient to feasibly locate a stormwater facility in for the B1 Pod. Stormwater management facilities will be designed and constructed to the minimum requirements of the City of Camas Design Manual and the Department of Ecology Manual.

Design Review:

At this time the project is only requesting Preliminary Plat Approval and Design Review will be submitted once an end user/builder has provided the required building elevations and plans.

Applications submitted for this project:

- Subdivision Type III
- SEPA Checklist
- Critical area review
- Fire department review

Please review the enclosed data and contact us if you have any questions or need any additional data.

Thank you for your assistance,



Joel G. Stirling, P.E.
STERLING DESIGN, INC.

CITY OF CAMAS

PRELIMINARY PROJECT NARRATIVE FOR

**GREEN MOUNTAIN
MIXED USE PRD**

Applicant:
Green Mountain Land, LLC
17933 NW Evergreen Parkway, Suite 300
Beaverton, OR 97006

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The following table lists the project team and contact information. Inquiries should be directed to Randy Printz as the primary point of contact.

Table 1: Project Team and Contact Information

Owner: Green Mountain Land, LLC	Green Mountain Land, LLC John Schmidt, owner representative 17933 NW Evergreen Parkway, Suite 300 Lake Oswego OR. 97006 503-597-7100 john.schmidt@metlandgroup.com
Legal Representation & Permitting Coordinator: 	Randy Printz Landerholm Law Firm P.O. Box 1086 Vancouver, WA 98660 (360) 696-3312 Randy.printz@landerholm.com
Civil Engineer and Surveying: 	Kurt Stonex, P.E., PLS Olson Engineering 222 E. Evergreen Blvd. Vancouver, WA 98660 (360) 695-1385 kurt@olsonengr.com
Project Designer and Landscape Architect:  <div> Western Planning Associates P.O. Box 2392 Lake Oswego, Oregon 97035 Phone: 503-294-0222 </div>	Bill Horning, RLA Western Planning PO Box 2392 Lake Oswego, OR. 97035 (503) 294-0222 bill@westernplanning.com
Traffic Engineer: 	Chris Brehmer, P.E. 610 SW Alder Street, Suite 700 Portland OR, 97205 (503) 228-5230 CBREHMER@kittelson.com

Introduction & Summary

This narrative is provided in support of Green Mountain Land, LLC's application to develop a portion of the Green Mountain area located in the City of Camas. The 283 acre multi phased mixed use master plan is designed with an array of compatible residential and commercial uses. There are also opportunities to locate public facilities such as police, fire or library. The Green Mountain neighborhood will contain a variety of residential forms, lot sizes and densities that will include both single-family and multi-family components. There are also opportunities for stand-alone and mixed use commercial uses.

The residential and commercial portions of the project have been thoughtfully designed to take advantage of and protect the critical areas on the property. Many of the areas proposed for development are functionally integrated with or oriented around the site's natural areas, proposed parks and trails. The Urban Village component of the project will have a dense and vibrant mix of commercial and multi-family uses that are located along a portion of the central park and other natural open space areas.

The Applicant and the City entered into a Development Agreement in 2014 (2014 DA) that addresses various aspects of the property's development. The Agreement contains a conceptual master plan and provisions relating to transportation, tree preservation, parks and open space, streetscapes and planning standards for specific areas of the project. This PRD application is required to be, and is, consistent with the provisions of the Development Agreement.

With this application, the Applicant is seeking preliminary plat approval for phase 1 and PRD approval for the entire project. The Applicant will submit for Final Plat, Site Plan and Design Review approvals as applicable prior to building permit issuance for each phase of the project. The PRD and preliminary plat approval reviews are subject to SEPA and a full SEPA checklist accompanies this application.

Project Location

The project site is comprised of nine legal lots further described as parcels: 172555-000, 172557-000, 172553-000, 172559-000, 173178-000, 172341-000, 171727-000, 171704-000, and 173165-000. The property is owned by Green Mountain land, LLC and totals 283 acres.

The property is located approximately five miles northwest of downtown Camas and is accessed on the southwest by Ingle Road and on the south by Goodwin Road. NE 48th Circle lies to the north and NE 222nd Avenue is to the east. The property contains varied topography, including slopes and level areas, upper and lower story vegetation, man-made ponds and Green Mountain Golf Course which is located on a large portion of the southerly half of the property.

Aside from the golf course, the non-golf course portion of the site is mostly vacant. Much of the non-golf course portion of the property has trees and understory vegetation. BPA power lines

exist on the north and beyond, as well as traversing a portion of the site. Adjacent properties surrounding the site are primarily vacant (to the east south and west, although three single family residences exist along Ingle Road); however, the Mountain Glen cluster subdivision lies to the north of the northerly BPA power lines.

Property Background

This site has a rich history with the City of Camas. In 2007, the City sought to update its Comprehensive Plan and add additional land to its Urban Growth Area (UGA) north of Lacamas Lake (NUGA). As part of that process, full capital facilities plans (CFP's) were required by the Growth Management Act (GMA) to be an integral part of any adopted Comprehensive Plan, including amendment of UGA's. In this case, the City and various stakeholders spent considerable time (years) and effort creating CFP's for sewer, water, transportation and other capital facilities for the NUGA, with analysis performed by WRG and Gray & Osborne (sewer and water) and Kittleson and Associates and DKS Associates (for transportation). The original Green Mountain owners were actively involved in assisting the City in these endeavors.

In addition to the CFP's, the City also analyzed what land uses and development intensities would be appropriate for various areas of the NUGA. This resulted in the City adopting Comprehensive Plan and Zoning designations for the entire NUGA, including Green Mountain. The Comprehensive Plan designations were recommended by the Planning Commission and adopted by the City Council in recognition of the CFP's, topography, proximity to streets and intersections and many other considerations, including the ability to provide urban services to the various areas within the NUGA.

At the December 3, 2007 City Council hearing, the City approved amendments to the City of Camas' Comprehensive Plan and Zoning Map, including the Comprehensive Plan designations of all lands within the expanded NUGA. Subsequently, Ordinances: 2501 (adopting revisions to the Comprehensive Land Use Map of the City of Camas and to the Zoning Map of the City of Camas); 2502 (adopting a Revised Comprehensive Plan in accordance with the goals and requirements of Chapter RCW 36.70A); and 2503 (adopting a revised Zoning Map in accordance with the goals and requirements of RCW Chapter 36.70A), were adopted by the City Council on December 17, 2007.

In early 2008, the City and various NUGA property owners embarked on a process to annex the NUGA. This process included pre-annexation agreements between the property owners and the City. This process culminated in the annexation of the Green Mountain property and other property north of Lacamas Lake under Ordinance No. 2512, dated April 21st, 2008. Subsequently, for Green Mountain, its Pre-Annexation Agreement with the City was replaced in its entirety with a new Development Agreement dated December 21st, 2009 (2009 DA). The primary purposes for the new DA was to assure that adequate capital facilities had been planned for the area (these 2009 DA provisions were satisfied through the City's subsequent adoption of new CFPs for transportation, sewer and water for the NUGA); and to provide a conceptual framework for the future development of the Green Mountain property. The 2009 DA has now expired.

In 2012, Green Mountain Land, LLC, acquired the property and has since been active in moving forward with in-depth engineering and critical area analysis. That technical information was used in creating the conceptual master plan that is part of the 2014 DA. Now, with even further refinement of the technical information related to the property, the Applicant is proposing a project that not only fits within the conceptual framework identified in the 2014 DA and underlying zoning, but with much greater detail and thought for design.

City of Camas Staff and the Applicant's team of representatives met on February 25, 2014 to discuss the project at a pre application conference. Key points of that discussion are discussed below:

- 1) City staff requested the Applicant determine the number of dwelling units. The maximum number of dwelling units has been established through the 2014 DA, including the location, type and density of those residences as addressed in this narrative.
- 2) The Applicant is seeking subdivision approval for phase 1. A preliminary plat with sufficient details is part of this application and complies with all of the City's preliminary plat requirements.
- 3) The Applicant has completed an extensive survey and data collection on the environmental conditions of the site. With this submittal, an archaeological survey, a critical areas report, a geotech investigation, and a tree survey have been prepared to address CMC title 16.
- 4) A traffic study has been submitted that has been prepared in accordance with the City's adopted Traffic impact Study Guidelines. The study addresses the project's full build out impacts to all affected the intersections over the life of the mixed use PRD and provides mitigation measures to assure that adequate levels of service are maintained.
- 5) A large community park and open space area has been centrally located such that it can be easily accessed from all corners of the project through the project's trail network, including much of the project's more dense residential areas. This area will serve as a central community gathering place and frame the expansive natural feel of the project as you continue past the site's main entrance.

Existing Conditions and Structures

The 283 acre Green Mountain site encompasses a broad range of natural site features and resources and includes the Green Mountain golf course and a BPA and natural gas transmission line. The 18 hole golf course is located in the lower and southern half of the site. This southern section also includes the southern half of the BPA easement, a gas transmission line, multiple wetlands, man-made ponds and ditches, a local tributary creek with adjoining oak grove and

some natural wooded areas. The northern half of the property is wooded except for the BPA easement and contains multiple terraces, and moderate to severe slopes. There are a few isolated small wetlands and several rock outcroppings. The northeast corner of the site contains the top of Green Mountain and portions of its west and southern slopes.

The site is bordered on the west by NE Ingle Road and on the south by NE Goodwin Road. The northern site boundary abuts an east west BPA transmission line and the Mountain Glenn rural cluster subdivision. The east site boundary abuts county owned land outside of the UGA and one parcel of privately held land; however the southern one third of the eastern boundary is inside the UGA and the Camas city limits and is zoned R6. Mid-point on the eastern boundary is large lot rural zoning outside the UGA.

The north portion of the Green Mountain site is currently zoned R-10; the central portion is zoned MF10; and the southeastern area includes approximately 15 acres of Community Commercial zoning at the intersection of Ingle Road and Goodwin Road. The remaining portion of this southeastern area is zoned R-6. The site's zoning permits up to 1840 units, without the use of any density bonus allowed by the City's development standards.

Project Description

In furtherance of the provisions of the City's PRD code, the Applicant has designed a community with blended densities and a variety of residential products. A great deal of thought has gone into the master plan's various densities, uses, locations and orientations, in order to maximize the project's harmony with its wealth of natural features and to create an integrated community that provides a broad range of housing opportunities that can be accessed by a broad range of citizens. The development will ultimately include the construction of up to 1,300 single and multi-family homes, common open spaces, parks, trails, landscaping, 8.8 acres of commercial/retail/office buildings, associated parking lots, access roads, stormwater treatment and detention facilities, utilities and other related infrastructural improvements.

To best accomplish this, the master plan has been designed with planning pods. Each planning pod will identify a certain number of lots, density range, lot size and type of residential unit. The master plan proposes eight planning pods of development. Each pod will be developed in phases. The sequence and timing of these phases will be determined by market conditions and other factors. It is expected that the first phase will break ground in the Summer of 2015 and full master plan build-out is anticipated by 2029.

The most intense use of the site will occur in the mixed-use Urban Village located on the southern portion of the site; with the density of development generally decreasing as development moves east and north. This will serve to frame and preserve the central natural feature of the site – Green Mountain and its steeper slopes by reducing the intensity of development on the steeper areas of the site and locating more intense development on the flatter previously developed portions of the site. For additional details on the number of homes, density and lot sizes please refer to the zoning section within this narrative.

CMC Title 16: SEPA

The State Environmental Policy Act (SEPA) requires the lead agency (in this case the City of Camas), to evaluate the probable significant adverse environmental impacts of a proposed action (in this case granting PRD and Preliminary Plat approval); and to make a Threshold Determination regarding whether additional analysis or information is necessary; or whether specific measures should be imposed to mitigate the project's adverse environmental impacts to moderate levels or below.

SEPA also requires project Applicants to submit a SEPA Checklist describing the project and its potential impact on both the natural and built environment. The Applicant has completed an extensive survey and data collection on the environmental conditions for Phase I of the master plan and less extensive data collection for the PRD as a whole. With this submittal, an archaeological survey, a critical areas report, a buffer modification plan, a geotechnical investigation and a tree survey/preservation plan have been prepared for the Phase I subdivision.

The SEPA checklist attendant to the Development Agreement entered into between the City and Green Mountain Land LLC in December of 2014, as well as the SEPA checklist accompanying this PRD application, address many environmental considerations for the PRD as a whole. These include, but are not limited to, transportation analysis for the full build out of the PRD, potential offsite storm water impacts to the hydrology, plant communities and wildlife habitat of areas adjacent to the site. In addition, reports on the transportation and archeological impacts for the entire PRD are included in this application. A full tree survey of the entire property has also been completed. Probable significant adverse environmental impacts not analyzed in conjunction with the Development Agreement or as part of Phase I, shall be analyzed in conjunction with each phase of future development.

CMC TITLE 18: Zoning

Zoning Maps and Districts – CMC 18.05

The 283 acre site is currently zoned for a mix of residential uses (R-10, MF-10 and R-6) and community commercial (CC) uses. Table 2 illustrates the existing zoning and the acreage of the property below.

Table 2 - Site Area Breakdown with Existing Zoning	
R10 zone	120.2 acres
R6 zone	54.3 acres
MF zone	93.3 acres
CC zone	15.4 acres
Total Site Area:	283.2

One of the foundational elements of the master plan for Green Mountain is an Urban Village. The Urban Village is located at the bottom of the hill along Goodwin and Ingle Road in the area of the property with the most intense historic development. The goal of the Urban Village is to create an environment that is pedestrian friendly, accessible to future mass transit, provides a mix of uses that are compatible, easily accessible and functionally integrated in a manner that creates a vibrant place to live work, shop or play.

One of the purposes of the city's PRD code is to allow the blending of zoning designations in conjunction with the integration of open space; this project achieves that through its blending of densities, housing types, open spaces and commercial uses.

If the property were to be developed without utilizing the City's PRD ordinance, the commercial uses would be functionally separated from the remainder of the project. The commercial area would also likely develop as a standard "blank wall" commercial center that is auto oriented with large amounts of surface parking. By functionally integrating the commercial and residential uses, in the PRD, substantial opportunities are presented to create specialty retail and other commercial space that may have residential uses on the second floor. It would also allow some of the commercial uses to be located in the interior of the Urban Village to further enhance the pedestrian opportunities to access goods and services. Opportunities are also created to architecturally blend the commercial uses with the residential uses.

Density and Dimensions – CMC 18.09

The master plan concept is implemented through the use of development pods with designated residential and commercial densities which are fully described below. Due to the unique nature of this master plan, the Applicant has created some custom design standards in addition to those otherwise provided for in the PRD ordinance. These were approved as part of the Development Agreement.

Master Plan Concept

The Green Mountain master plan concept focuses on utilizing the existing site conditions, resources and features to guide the simultaneous development of the open space plan and the distribution of the residential density. The master plan protects important site resources and features by locating the proposed 1300 dwelling units on the most developable 166 acres of the 267 acres of residential zoning. The master plan concept is implemented through the use of development pods with designated residential densities. The pod boundaries will be refined as each pod moves from concept into development and as more exact resource information is available. The pods and pod access have been designed to minimize impacts to steep slopes and existing site resource areas. The Green Mountain open space master plan integrates the pods and provides for community recreation and connectivity.

The Green Mountain open space master plan protects approximately thirty percent of this site. The open space system is integral to the Green Mountain community as a whole and is used to help define and enhance the center of the community. The Green Mountain open space components include the protection of the top of Green Mountain, a community wide trail system and a large central park connecting and interfacing with the mixed use Urban Village, located at the southern tip of the site. Central park includes a neighborhood park and wetland preservation area with surrounding trails.

The master plan provides for a wide array of residential housing. A key design objective was to locate the lowest density pods on sloping portions of the property. The north section of the site contains multiple terraces, steep to moderate slopes, some rock outcroppings and is predominately wooded in character. This area comprises about 40% of the total site area and the master plan designates only about 22% of the PRD density to this section of the property.

The south section of the land is defined by an intervening wooded steep slope visible from many areas of the lower section. The southern section of the site has large relatively flat areas and has 147 acres of residential zoning and 15 acres of commercial CC zoning. This 147 acres will provide for variety of housing types from multi family uses at the Urban Village to larger single family lots. These neighborhoods surrounding the Urban Village and central park will contain approximately 54% of the site density and the Urban Village will provide for the remaining 24%.

The Urban Village component of the master plan provides a community commercial and higher density residential mixed use village center for the Green Mountain community. The Urban village is approximately 33 acres in size and contains about 12.5 acres of multi-family zoned property and 15.2 acres of community commercial zoned property. The balance of this area is in open space and a circulator street. The village center area is intended to provide an opportunity for development of mixed use buildings including residential over retail or office, as well as, free standing commercial or public facility buildings. The village center will also integrate some free standing residential with replacement commercial acreage coming from mixed use or residential areas within the Urban Village.

Pod Descriptions

The master plan provides pods for the development of up to seven different residential densities. Five of the residential pods provide for a variety of single family detached lot sizes. One pod has an attached and detached housing unit option and one pod is located entirely within the Urban Village and designed for high density multiple family units. An eighth planning unit is the community commercial site at the core of the Urban Village.

A Pods – All three A pods are located in the Urban Village. All three pods are on the south end of the central park circulator street and are across from the park. Two of the pods also back up to the oak lined creek and trail extending into the neighborhoods to the east. These pods may develop as standalone multi-family sites or may combine with each other or the H pod (CC zone) to create the integrated Urban Village.

B Pods – The master plan contains five B pods. B pods are intended to provide for attached townhomes or small detached lots. B1 is the largest B pod at approximately 7.6 acres. B1 is located west of central park and abuts the Urban Village located to the south. The other four B pods total 7.9 acres with the largest being 3.2 acres and these four pods are essentially surrounded by open space.

C Pods – The master plan contains two C pods. These are alley accessed and front accessed small lots in the 4,000 sf range. Both of these pods are in the phase one plat. C1 has been combined with D1 to create the neighborhood north of the Entry Boulevard and west of central park. C2 is a predominately alley accessed neighborhood on the south side of the entry boulevard and west of the park and abuts the B1 pod to the south.

D Pods – There are six D pods totaling approximately 41.5 acres. All of the sites are in the lower southern portion of the property. This density range provides for approximately 5,000 sf lots. Most of these pods are over 5 acres. D1, D2 and D3 are in the phase one plat. D4-D6 are east of the BPA easement in neighborhoods where they could be combined with abutting E pods.

E Pods – There are four E pods. One on the north section, one in the central section and two in the south section. These pods are designed for lots in the 6,000 sf range but could vary between 5,000-9,000 sf. These pods average around 6.4 acres each and may be combined with adjoining D or F pods to create integrated multi lot size neighborhoods.

F Pods – There are four F pods and they are all in the north section. F1 has three sub areas (terraces) and is west of the BPA easement; the remaining pods are contiguous, total approximately 18.5 acres, are east of the BPA easement and are on relatively flat ground at the west base of Green Mountain. These pods are designed for lots in the 7,500 sf range and could vary from 6,000-14,999 sf.

G Pod – There is one G pod and it is located on the southwest lower flank of Green Mountain. Due to the steeper topography in this area these lots are planned to be in the 15,000 to 60,000 sf range.

H Pod – This is the Community Commercial zoned area in the mixed use Urban Village portion of the PRD. This area is 15.4 acres, but contains wetlands which reduce the overall developable area to approximately 8.8 acres. A minimum of 8.8 acres in the Urban Village will be developed with commercial uses. The proposed Urban Village standards will allow this area to develop with a dense and vibrant mix of mutually supporting residential and commercial uses.

Table 3 - Density and Dimensions PRD Pods A-G

	A POD	B POD	C POD
DENSITY	MF-24	MF-18	MF-10
Max. du/gac	24	18	10
Min. du/gac	6	6	6
STANDARD LOTS			
Min. lot SF	1,000[a]	1,000[a]	3,000 [a]
Min. lot width	20	20	30
Min. lot depth	50	50	70
Max.Floor Area per du	No Max	No Max	No Max
SETBACKS			
Min.front/at garage	None	6/3@OS/18	10/18
Min. side	3 [1]	3 [1][d]	3 [1][d]
Min. side Flanking Street	None [e]	10[d]	10[d]
Min. rear (garage @alley)	None [e]	10 [b][c]	10[b][c]
LOT COVERAGE, Max.	None [c]	None	55%
BUILDING HEIGHT, Max.	60	45 [2]	35 [2]

a. Single Family Detached homes to be permitted. For SFD in A POD apply B Pod setbacks.

b. 10 feet for front access garage.

c. Minimum rear yard for alley accessed garage is either 4' or 18'.

d. Minimum side yard at alley is 5'.

e. Franchise utilities to be located in front or side yard easements abutting right of way.

1. The non-attached side of a dwelling unit shall be three feet, otherwise a zero-lot line is assumed.

2. Maximum building height: three stories and a basement but not to exceed maximum building height.

Density Transfer Lots	D POD	E POD	F POD	G POD
DENSITY	R-5	R-6	R-7.5	R-20
Max. du/gac	8.7	7.2	5.8	2.1
DENSITY TRANSFER LOTS				
Min. lot size (sq ft)	3,500 [a]	4,200	5,250	14,000
Max. lot size (sq ft)	7,600	9,000	14,999	60,000
Min. lot width	40	50	60	90
Min. lot depth	80	80	80	100
LOT COVERAGE, Max.	45%	40%	40%	30%
BUILDING HEIGHT, MAX. (ft)	35	35	35	35
SETBACKS based on lot size	Up to 4,999 sq. ft.	5,000 to 7,499 sq. ft.	7,500 to 14,999 sq. ft.	15,000 to 60,000 sq. ft.
Min.front/at garage	10/18	15/18	20	30
Min. side and corner lot rear yard (ft)	4	5	5	15
Min. side yard flanking a street	10[d]	15[d]	15	30
Min. rear (garage @alley)	15[b][c]	20[b][c]	20[b][c]	30
Min. lot frontage on a cul-de-sac or curve (ft)	25	30	30	40

- a. Single Family detached homes to be permitted.
- b. 10 feet for front access garage.
- c. Minimum rear yard for alley accessed garage is either 4' or 18'.
- d. Minimum side yard at alley is 5'.

NOTE: POD lot sizes are not subject to lot size averaging.

Table 4 - Urban Village Area
Mixed Use, Community Commercial, A and B PODS

Urban Village Area	Minimum of 8.8 acres with ground floor Employment/Commercial Use (as provided for in 18.07.030 Table 1). Allow horizontal and vertical Mixed Use PODs H, A1, A2, A3, B5 and 100 Units at the Village Center
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The retail/commercial component of this site is envisioned to operate utilizing normal commercial hours of operations such as 9am – 9pm. Table 5 illustrates the existing zoning and the acreage of the property below.

Table 5 - Site Area Breakdown with Existing Zoning	
R10 zone	120.2 acres
R6 zone	54.3 acres
MF zone	93.3 acres
CC zone	15.4 acres
Total Site Area:	283.2

Applicable Development Standards/Review Criteria

Planned Residential Development (PRD) – CMC 18.23

The purposes of the PRD review is to ensure that the design of the site improvements and overall proposal are consistent with applicable standards, minimize adverse impacts on surrounding land uses, allow for and encourage flexibility in the design and foster innovation in design and construction while furthering the goals of the City’s Comprehensive Plan. The code allows for modifications to certain regulations when it can be demonstrated that such modification would preserve certain features such as open space.

CMC 18.23.030 provides the scope of development circumstances under which a PRD may be accomplished:

- A. A PRD may be allowed in all R, CC and MF zoning districts.*
- B. The minimum land area necessary to apply for a PRD shall be ten acres of contiguous land.*
- C. All land in which a PRD is to be developed shall be held and maintained in a single ownership, including but not limited to an individual, partnership, corporation, or homeowner's association. Evidence of such ownership shall be provided to the planning commission and city council before PRD approval.*
- D. Permissible uses within a PRD include any use listed as a permitted use or conditional use in the applicable zone, as per CMC Section 18.07.040 Table X, when approved as part of a master plan. Notwithstanding an approved master plan, incidental accessory buildings, incidental accessory structures, and home occupations may be authorized on a case by case basis.*
- E. A minimum of fifty percent to a maximum of seventy percent of the overall permitted density of the PRD must be single-family homes.*
- F. The multi-family component (two or more attached dwelling units) of a PRD shall ideally be developed toward the interior of the tract, rather than the periphery, to ensure compatibility with existing single-family residences that border the surrounding properties. Deviation from this requirement shall be requested during the preliminary*

master plan review, and specifically approved by the planning commission and city council.

G. Density standards and bonuses for a PRD shall be in accordance with CMC Sections 18.23.040 and 18.23.050

H. An equivalent amount of up to twenty percent of the developable area shall be set aside and developed as recreational open space in a PRD, and shall include the following:

- 1. Passive or active recreation concentrated in large usable areas;*
- 2. Provide trails and open space for connection and extension with the city's open space and trail plan, if feasible; and*
- 3. Be held under one ownership, and maintained by the ownership; or be held in common ownership by means of homeowners' association, and maintained by the homeowners' association. The open space and recreation areas shall be dedicated for public use and be maintained by the ownership or homeowners' association.*

The property proposed for development under the City's PRD provisions is zoned Community Commercial, Multi Family and Single Family Residential. The property is approximately 283 acres; and thus, exceeds the 10 acre minimum requirement. The property is held in sole ownership by Green Mountain Land LLC. The Applicants are only proposing uses in the PRD that are allowed in the underlying zones of the property.

Over 50% of the residential uses in the proposed PRD are single family homes. The attached multi-family units are contained primarily in the A and B pods. The A pods are all within the Urban Village and are centrally located between the primary commercial area of the site, the BPA easement, wetlands and Goodwin road. The B pods are small and scattered throughout the site, and only one abuts any existing single family residential homes (one existing single family home along Ingle Road).

Density standards under CMC18.23.040 are based on the gross area of the property being considered for the PRD. Open space, greenways, sensitive areas, parks, and recreation areas set aside within the tracts are required to be, and have been used, in the computation of the gross development area for the proposed PRD.

The maximum number of dwelling units for the proposed PRD is calculated in the following table. The tables provided for in CMC 18.09.040 and CMC 18.09.050 were utilized to establish the dwelling units per acre allowed under each residential zoning district.

Table 6 - Residential Density Calculation
R-10 - 120.2 @4.3/ Acres = 516 Units
R-6 – 54.3@ 7.2/Acres = 391 units
MF-10 – 93.3 @10/Acres = 933 units
Total – 1840 Units

The maximum allowable density from each zoning district, in conjunction with the area of each zoning district, (as provided for in CMC 18.23.040C) was utilized to create Table 6. As can be readily seen, the number of units proposed in the Applicant's PRD is substantially less than allowed by the underlying zoning. This disparity is increased further if one takes into consideration the density bonus allowed by the City's PUD and other ordinances, which this proposal does not utilize.

Preliminary Master Plan Requirements – CMC 18.23.070.

The City requires the following to occur in conjunction with an application for a PRD:

- A. Initial Conference. Schedule a pre-application conference to discuss and resolve conceptual problems prior to submission of the preliminary master plan related to such application.*

The Applicant has previously had a formal pre application conference with the City on the proposed master PRD plan. The pre application was conducted with the Applicant, their representatives and City staff on February 25, 2013. The meeting notes are included in this application and a general overview of the issues discussed that day are summarized in the project background section found within this narrative.

All of the items listed in the pre application notes have been addressed and are contained within this application. The Applicant has also met with the City on several occasions to discuss various aspects of the proposed project. The master plan, as part of the Development Agreement, has also been through several meetings and workshops and a public hearing before the City Council.

- B. Contents. The preliminary master plan shall include the following information:*

- 1. The legal description of the total site proposed for development;*

The legal description of the property is contained within the application.

- 2. The existing and proposed land uses within the development, and the existing and proposed location of all structures;*

The existing use of the property is a golf course open to the public. An application for preliminary plat approval of Phase I of the PRD has been filed in conjunction with the PRD. The subdivision of Phase I will create 201 residential lots. Single family residential structures will be constructed on the Phase 1 lots. An approximate 2,500 square foot clubhouse and recreation area will also be constructed as part of Phase I some time prior to issuance of the 99th building permit for the PRD. As future phases of the PRD are developed, additional Preliminary Plat Approval or Site Plan Approval processes will occur. As part of those processes, detailed plans relating to lot size and location and types and location of structures will be identified.

3. The proposed residential density for the development, which shall include the number and types of dwelling units;

The residential density over the entire property is approximately 4.5 dwelling units per acre. The residential density over the residentially zoned portions of the property is approximately 4.8 dwelling units per acre. The City's target density goal as provided for in the Comprehensive Plan is 6 dwelling units per acres. Without substantially impairing existing critical areas including slopes and wetlands, the Applicant cannot add much more density to this project.

The primary maximum number of dwelling units for the PRD is 1,300. The types of homes in the Green Mountain neighborhood will vary greatly between large single family residences in the northern portions of the PRD to apartments and other attached residential homes located in the southern portions of the property. The creation of density and location of lots and specific housing types have been intentionally arranged around appropriate topography, open space and recreational areas. The density has been designed to be sensitive to the critical areas on the site and to be functionally integrated and compatible with other phases of the project. Included in this narrative above is a more detailed discussion of the planning pods and the types of residences that they will contain.

4. Approved building envelopes will establish the setbacks for each lot or parcel in which development may occur;

In conjunction with each pod, setbacks have been established. These are identified in Table 3.

5. A site plan drawn to scale and depicting the following:

- a. The location of all areas to be conveyed, dedicated, or maintained as public or private streets; access and egress to the development showing proposed traffic circulation, parking areas, and pedestrian walks,*
- b. The proposed location of any residential buildings, and any other structures, including identification of all buildings as single-family, duplex, townhouse, apartment, condominium, designated manufactured home, or otherwise,*
- c. The location of areas to be maintained as common open space, and a description of the proposed use of those areas,*

- d. The location of areas to be maintained as open space network, if applicable,*
- e. Proposed lot or boundary lines for residential, open space, parks, and recreational areas, management or allocation purposes;*

A site plan complying with this section is part of this PRD application.

- 6. An accurate survey of the property showing the topography in five-foot contours, identifying slopes above fifteen percent, all existing, isolated trees six inches or more in diameter, all wooded areas, all existing streets, utility easements, drainage patterns, structures, and other improvements, the location of all easements and rights-of-way for utilities, including, but not limited to water, sanitary sewers, storm sewer, electricity, gas, telephone, and cable TV lines;*

A survey complying with this section is part of this PRD application.

- 7. A document containing agreements, provisions, and covenants regarding the establishment of a homeowner's association, which provides for the permanent ownership, maintenance, protection, and use of the planned development, including streets (if privately owned), storm drain facilities, utilities, common areas (e.g., storage areas, parking areas, and landscaping) open spaces, greenways, parks, and recreational areas;*

Included as part of this application is a description of the types of covenants conditions and restrictions (CC&Rs) that will ultimately be recorded with each subdivision and site plan as they are recorded. All CC&Rs will contain provisions that will provide for the funding, ownership and/or maintenance of all common areas and open spaces within the PRD.

- 8. A landscaping plan drawn to scale and demonstrating compliance with CMC Chapter 18.13 Landscaping of this title. Additionally, the landscape plan shall indicate the landscaping features such as screening, fences, lighting, and signage;*

An overall conceptual landscape plan for the PRD is part of this application. A detailed landscape plan for subdivision application for Phase I of the PRD is also part of this application.

Upper and lower story landscaping will occur as part of the construction of streets, parks, storm water facilities and other common areas. The Green Mountain PRD contains a series of community wide enhancements that connect the community and contribute to establishing a 'sense of place'. The following is a list of some of the planned PRD features:

1. Master Street Tree Plan coordinated to street type and the neighborhoods.
2. Consistent Community Entry signage, decorative street lighting and landscaping.
3. Pocket Parks in higher density areas (not in current open space calculation).
4. Landscape enhanced Entry Boulevard with bike lanes to Central Park.

5. Landscape enhanced storm pond edges.

9. *A development schedule outlining the expected schedule and phases of development;*

This master planned project will develop over a number of years. Construction could begin as early as the summer of 2015 and full build out likely will occur in 2025 or later.

10. *The calculation of all applicable impact fees. This shall be coordinated with the city prior to submission of the preliminary master plan.*

A table of all applicable impact fees is included with this application

Professional Preparation – CMC 18.23.080

All of the plans prepared as part of the master plan have been prepared by licensed architects, landscape architects, civil engineers and land surveyors certified in the state of Washington complying with the professional preparation guidelines of CMC 18.23.080,.

Approval Standards – CMC 18.23.100

Approval for a PRD shall be based on the following standards:

A. *The PRD conforms to:*

1. *The City of Camas Comprehensive Plan*

The parcels comprising the PRD have zoning that is consistent with and allowed by each parcel's Comprehensive Plan designation. While the City's Comprehensive Plan has hundreds of goals and policies, the City has identified four primary land use goals:

PRIMARY GOAL 1:

To support, maintain, and improve a community comprised largely of residential neighborhoods, industrial business parks, a downtown core and small commercial areas in an open and natural setting that serves the local community.

The Green Mountain Mixed Use PRD will be an extension of the existing developed Camas community. The PRD creates a unique neighborhood that is designed around the natural setting of the Green Mountain area. This includes Green Mountain itself and variety of other open space and natural areas created by critical areas and the BPA easement. The commercial component has been designed to occur within the Urban Village portion of the neighborhood. The Urban Village will create a vibrant live, work, shop area that will be integrated with the surrounding PRD neighborhood through landscaping and a series of parks, trails and open spaces.

PRIMARY GOAL 2:

To maintain the "small town" atmosphere and feel by preserving, protecting, and strengthening the vitality and stability of existing neighborhoods, while ensuring the compatibility of new developments.

Camas is a growing community. While many of the residents of the PRD neighborhood will work and shop in Camas, because of its location and surrounding topography, this project will not negatively affect existing neighborhoods in Camas. However, the Green Mountain PRD has been designed to be compatible with the small town feel of Camas, while helping to achieve the City's density goals established through its Comprehensive Plan as mandated by the Growth Management Act.

PRIMARY GOAL 3:

To offer a harmonious blend of opportunities for living, working, recreation, education, and cultural activities by protecting natural amenities, and balancing development of services with growth.

One of the primary purposes of the PRD is to create a "harmonious" blend of uses. The Urban Village component of the PRD will provide opportunities for living, working, shopping and recreating at the extensive park area adjacent to the Urban Village. All project components are connected by an extensive trail and pedestrian network. All urban services such as sanitary sewer, water and storm water will be constructed and provided as the project develops.

PRIMARY GOAL 4: To expand the existing permanent open space network and trails system throughout the City while preserving and protecting natural features, wildlife habitat, and critical areas from incompatible land uses.

The Green Mountain PRD will, through its development, dramatically expand the City's trail network by constructing a series of trails currently on the City's Park Plan and by providing an access trail to the top of Green Mountain. Construction of these trails and open space areas has been designed to be adjacent to and take advantage of natural areas such as wetland and habitat areas.

2. All provisions of the Camas Zoning Code which are not proposed for modification; 3. All engineering standards; 4. All other applicable local, state and federal regulations that are applicable to the project.

The proposed PRD is designed to meet all of the City's zoning, design and infrastructure requirements that are either allowed through the PRD process, the Development Agreement or the City's modification or exception process. Demonstration of this can be found in the preliminary drawings and technical reports attendant with this application. These include, but are not limited to, the Phase I subdivision reports relating to wetlands and wildlife habitat, preliminary engineering for storm water, sewer, water, streets and landscaping.

There is a substantial traffic study that was prepared by Kittelson and Associates that analyzes the full build out of the PRD. That study is part of this application. As future phases of the PRD are developed, they will go through a Preliminary Plat approval process or a Site Plan approval process. As part of those processes, preliminary engineering substantially similar to the materials filed with the Phase 1 subdivision application will be prepared and filed for review by the City. The Development Agreement also incorporates a full tree survey of the PRD area and establishes tree preservation requirements. No impacts to critical areas will occur; nor will construction of utilities or other infrastructure in any portion of the PRD occur, without having obtained all necessary local, state and federal permits.

B. Utilities and other public services necessary to serve the needs of the proposed development shall be made available, including open spaces, drainage ways, streets, alleys, other public ways, potable water, transit facilities, sanitary sewers, parks, playgrounds, schools, sidewalks, and other improvements that assure safe walking conditions for students who walk to and from school.

The technical reports and preliminary plat drawings demonstrate that all sewer, water, storm water, streets and pedestrian access ways are provided for in the Phase I preliminary plat. There is also an extensive trail and open space system that is identified on the PRD master plan and the parks and open space plan for the PRD as a whole. About 30% of the PRD will remain in open space connected by a series of parks and trails. The PRD contains a central park and other smaller parks connected by sidewalks or trails. Sidewalks will be provided throughout the project as each phase is completed, providing safe walking for school children. All residences in the project will pay school impact fees.

C. The probable adverse environmental impacts of the proposed development, together with any practical means of mitigating adverse impacts, have been considered such that the proposal shall not have an unacceptable adverse effect upon the quality of the environment, in accordance with CMC Title 16 and 43.21C RCW.

The PRD is subject to SEPA which has been addressed above. While this development, like any other development, creates adverse impacts to the environment, through the construction of code compliant infrastructure and compliance with all environmental regulations, including mitigation, this project's probable significant adverse environmental impacts will be reduced to levels that are moderate or below.

D. Approving the proposed development shall serve the public use and interest, and adequate provision has been made for the public health, safety, and general welfare.

Through compliance with all of the City's regulations relating to the PRD, utility infrastructure, transportation, payment of impact fees, preservation of open spaces and natural areas, construction of parks and trails and further implementation of the City's Comprehensive Plan, this project supports the public's health and serves the public interest.

E. The proposed development satisfies the standards and criteria as set forth in this chapter.

As identified in this section and other parts of the narrative, all of the City's development and zoning criteria will be met.

F. The proposed development shall be superior to, or more innovative than conventional development, and shall provide greater public benefit without additional probable adverse impacts to public health, safety, or the environment, than available through the use of conventional zoning and/or development standards.

In furtherance of the provisions of the City's PRD code, the Applicant has designed a neighborhood with blended densities and a variety of residential products. A great deal of thought has gone into the master plan's various densities, uses, locations and orientations, in order to maximize the project's harmony with its wealth of natural features and to create an integrated community that provides a broad range of housing opportunities that can be accessed by a broad range of citizens. This will be the first project of its kind in Camas that purposefully blends trails, parks, open spaces, a variety of housing choices and commercial uses into one cohesive and integrated neighborhood.

To best accomplish this, the master plan has been designed with planning pods. Each planning pod will identify a certain number of lots, density range, lot size and type of residential unit. The master plan proposes eight planning pod phases of development; the sequence and timing of these phases will be determined by market conditions and other factors. The most intense use of the site will occur in the mixed-use Urban Village located on the southern portion of the site. The density of the PRD generally decreases as development moves east and north to create fewer impacts to critical areas and slopes. This will serve to frame and preserve the central natural feature of the site – Green Mountain. For additional details on the number of homes, density and lot sizes please refer to the zoning section within this narrative.

The Applicant's designers have taken great care and thought about how to best integrate critical areas and created open space, trails and parks into the developed portions of the project. The Green Mountain Open Space Master Plan creates an open space system, that when completed, will comprise approximately one third of the Green Mountain project. The plan provides for level open spaces and includes a regional Central Park in the higher density portion of the planned community. The design of the Master Plan provides the Green Mountain residents with integrated and connected open spaces and a variety of recreational activities, including a large club house and related amenities.

The Green Mountain PRD site contains a number of outstanding physical features and uniquely diverse site features and environments within the Master Plan boundaries. The Open Space Master Plan has been designed to include these elements and distinctive features while integrating and connecting them to the urban community. The Green Mountain PRD site

contains the top and southwest quadrant of Green Mountain; a distinctive natural feature in the local landscape. The site has forests, hillsides, bluffs, rock outcroppings, wetlands, open flat areas, streams and native oak groves. These and similar features were identified through the use of site topographic mappings, site aerial photography, site resource studies and site observations.

In addition to this significant open space system, the PRD includes the development of an extensive trail system and Central Park; a combination neighborhood park and open space designed for the center of the community. This complex creates a combined 14 acre open space and park and includes a linear parkway. Central Park will be the focal point of the community. PRD plans also include a clubhouse and a number of high value design and landscape improvements that will work together to reinforce a ‘sense of place’ and make Green Mountain a quality community.

Open Space and Park Master Plan Components

The Green Mountain Open Space and Park Master Plan utilize the following five components to provide diverse recreational opportunities for the Green Mountain community. The Master Plan creates access from all neighborhood areas to the on-site and adjacent open space.

The majority of the planned open space will be protected natural areas, undeveloped except for trails and an occasional planned road crossing. These areas contain many of the site features referred to above and therefore provide a high-quality open space experience. The trail system provides community access to the open space and pedestrian connections for the neighborhoods. The Park Master Plan incorporates a Central Park and Open Space, and includes community amenities and Landscape Master Plan components. The following overviews these elements:

A. Open Space Area – The Green Mountain open space is a contiguous open space area linked by trails and only interrupted by an occasional planned road crossing and trail. The open space is unique in that it contains several distinct environments.

The northeast section of the open space encompasses the top and forested west and south flanks of Green Mountain (20 acres). The center of the north section includes the BPA easement that traverses the rolling topography characteristic of the upper terrace areas. Parallel to the BPA easement, but at a lower elevation, is an additional north section open space corridor containing a rock rim leading to the central section.

The central sections of the open space area provide forested east west connections to off site open spaces, creating wildlife corridors into and through the community. The central section of the site also contains a rapid and steep change of grade between the upper neighborhoods and neighborhoods in the south section. This grade change can be observed from the lower terrace as the power transmission lines expose some of the rock outcroppings in this steep wooded central section.

The south section is located in the large lower terrace at the base of the hill. This lower section is sloping to relatively flat topography and the site of the Green Mountain Golf Course. The lower section of the site contains over 70% of the homes and is the location of Central Park. This area is partially wooded and has both large open spaces and wooded areas. There are some wetland areas and groves of trees. At the south end of the site the contiguous open space provides access to a creek corridor with an adjacent native oak grove along parts of it.

B. Community Trail System – The City Park Master Plan has identified four trails on this site. One is a regional trail to be located in the BPA easement and three secondary trails. Two secondary trails traverse the site from Ingle Rd. to the east property line and one provides access to the top of Green Mountain. This plan guided the trail locations in the Green Mountain open space. The regional trail (T27) is shown on the plan along with the combined local trails (T29 & T30) and a trail (SU14) to the top of Green Mountain. These trails could become public trails. The combined length of these trails is approximately 2.4 miles depending on final location and layout. The PRD Plans show trail improvement and dedication standards that have been developed to respond to specific site topographic constraints. One unknown trail component at this time is the final location of the SU14 trail and its connection to the regional trail. Sections of SU14 from the connection to the regional trail to a trailhead at the base of the mountain may be provided through some of the neighborhoods on widened or enhanced sidewalks. If the SU14 trail to the top of Green Mountain is built privately this trail would likely be soft surface and primitive.

The Community Trail System also includes a series of significant neighborhood trail connections providing the adjoining neighborhoods with contiguous trails through open spaces or access to the overall system from neighborhood trailheads. There are three major components of the neighborhood trail system. In the north section a parallel corridor to the BPA has been designed to facilitate user access to the system. In the central section an 8 foot pathway/trail will meander along the circulator street abutting Central Park, connect to the regional trail and make a loop around the entire park. In the southwest section abutting the east west flowing creek a neighborhood trail will use the existing cart path as access along the creek through the adjoining oak grove. This trail will connect neighborhoods to the east and regional trail users to and through this section of the Urban Village. These neighborhood trails will provide over .5 mile of additional trails.

Final trail locations and connections will be developed as each phase moves forward with preliminary plans. Trail location and improvements will be adjusted to final site conditions while maintaining the connectivity illustrated by the Master Plan. In the event that the trails will be the sole responsibility of the development to build and eventually the HOA to maintain, improvement standards may be adjusted.

It is anticipated that the combined trail system will ultimately provide over 3 miles of connected on site trails.

C. Central Community Open Space and Park - This centrally located park provides the Green Mountain community with a wide variety of active recreational opportunities. Central

Park will create a large open space in the center of the urban community. The east side of Central Park is the location of the regional trail and is adjacent to planned neighborhoods. The park will have circulator street frontage on the other three sides, giving Central Park a major presence in the community. There is a linear parkway planned along this entire street frontage. The parkway will include a landscape enhanced streetscape and meandering pathway. This pathway will connect with the regional trail on the north and south ends of Central Park providing a walking, jogging, strolling loop around the entire 14 acre park.

The south section of Central Park is the north edge of the Urban Village. This section of the park encompasses a large on site wetland and buffer adjacent to the linear parkway. The north section of Central Park will contain a neighborhood park. The full extent of the facilities has yet to be determined.

Phase 1 Central Park plans propose the development of the most active northerly portion of the park. Phase 1 improvements include: park pathways; streetscape landscaping; decorative street lighting; play structure; and a large grass recreation field designed to accommodate informal practice games for all field sports (approx. field area 300' x 400'). This space will also serve as a location for community gatherings and events.

D. Residents' Clubhouse – Across the street north of the Phase 1 Central Park is a planned residents' Clubhouse. This community facility will provide a social gathering spot for small to medium sized groups. The clubhouse will contain a lounge, meeting rooms, early community orientation and reception areas, and eventual HOA offices. The facility will provide an outdoor pool, fireplace and similar amenities to members of the HOA.

E. Landscape Master Plan Components – The Green Mountain PRD contains a series of community wide enhancements that connect the community and contribute to establishing a 'sense of place'. The following is a list of some of the planned PRD features:

1. Master Street Tree Plan coordinated to street type and the neighborhoods.
2. Consistent Community Entry signage, decorative street lighting and landscaping.
3. Pocket Parks in higher density areas (not in current open space calculation).
4. Landscape enhanced Entry boulevard with bike lanes to Central Park.
5. Landscape enhanced storm pond edges.

LANDSCAPING

18.23.070.B.8 *A landscaping plan drawn to scale and demonstrating compliance with CMC Chapter 18.13 Landscaping of this title. Additionally, the landscape plan shall indicate the landscaping features such as screening, lighting and signage.*

This PRD is a very large site and expected to develop over many years. A Master Plan providing a framework for the Green Mountain Open Space, Park and Landscape improvements is part of the PRD application. Each of the Master Plan elements will be developed in phases as the

community develops. PRD landscape improvements will be implemented as each POD is platted or developed.

Phase 1 includes Master Plan PODs C1, C2, D1, D2 and portions of E1 and D6. Phase 1 has a variety of single family home sites sizes and a wide variety of landscape Master Plan improvements. Phase 1 includes implementation of the following Open Space and Landscape Master Plan components:

1. Master Street Tree Plan – All phases of the Green Mountain PRD will have Master Street Tree planting plans. These plans bring lasting value to the neighborhoods.

Trees are selected based on site soil conditions and civil engineering construction plans for any given phase. All selections are made to enhance the character and design of the neighborhood and compliment the setting. Street tree continuity will be maintained with any preceding phase(s). All street tree, common area shrub and ground cover plantings and maintenance will meet the characteristics and requirements specified in 18.13.050 A-E and G-S and the Urban Village will comply with section F, as appropriate. Final landscape construction plans prepared in conjunction with final construction plans will demonstrate compliance with these code sections, as applicable.

2. Entry Signage and Landscaping - Community Signage and complimentary landscaping. Schematic details illustrate the landscape character of this main community entry. The entry area will contain: a sign wall; some fencing; decorative street lights; widened street side planters and themed landscaping. This area connects to the Boulevard leading to Central Park. Detailed planting and irrigation plans will follow final Phase 1 construction grading plans.

3. North Section of Central Park – Central Park is a Park and Open space of around 14 acres. The North Section is the planned center of active recreation. Central Park is anticipated to have other active facilities in the Central and South sections, along the Parkway created by the circulator street abutting the west and south park edges.

The North Section to be developed with Phase 1 will provide an improved park for the Green Mountain Community of about 5 acres in size. Initial development plans are schematically illustrated on Sheet 6. Among other things, these initial improvements include: Parkway street frontage landscaping and ornamental lighting including 8' meandering neighborhood trail; entry shrub beds with specimen trees; play structure; 6' neighborhood connector trail; a section of the Regional Trail; and a 350'x400'+ grass recreation field. Final landscape construction plans including final grading and irrigation will be prepared at time of Park development, targeted for the later stages of Phase 1. It is anticipated that this park will continue to have modifications and improvements added to it.

4. Residents' Clubhouse – A meeting and gathering facility that includes an outdoor pool and barbeque area. The facility will include conference rooms, a “living room” for receptions and small gatherings. The building will initially be used as a “welcome” center but with the growth of the neighborhood will transition into a full time facility for the residents and is expected to ultimately house the HOA offices.

5. Additional Pedestrian facilities – Phase one improvement plans also call for the 300' extension of the 8' wide regional trail north of the park across 'C' Street. The trail will temporarily end in the neighborhood to the east but is planned to continue up the hill (see sheet 5). Additionally, Phase 1 will extend the regional trail south of the park for about 350' providing an additional walking access to the neighborhood. Eventually this section of the regional trail will be extended south to connect to the circulator street planned at the south edge of Central Park. Phase 1 also includes the extension of a sidewalk to the planned open space west of C1 and this path will provide a pedestrian connection when POD B2 develops.

6. Landscape enhanced storm pond edges – This enhancement is illustrated on sheet 6. Plans call for the landscaping of the storm pond edges. The ponds will be fenced with 4' black cyclone fencing placed approximately 15' back of property line. This area will be landscaped in predominately trees and shrubs providing screening and using plant materials consistent with the pond environment.

7. Chapter 18.13 Landscaping – As described in section 1 above, all common area and right of way plantings will comply with 18.13.050 A-S. Final landscape construction plans will be submitted to the city for review and approval along with the final engineering plans for each phase. 18.13.060- Parking – contains landscape standards for parking areas. Phase 1 plans show 35+ off street parking spaces in 6 different parking areas, and as required by lots smaller than 7,500 SF. These areas are dispersed throughout the neighborhood. One parking area will have double loaded stalls while all the rest are single loaded. All lots will have hedges screening the parking, and parking area trees.

All landscape improvements will comply with the standards found in 18.13.060. The Entry Planting schematic detail shown on sheet 6 illustrates the landscape architectural character to be implemented during final construction plan review. The detail is illustrative of the final landscaping, signage, decorative street lighting, master street tree plantings, fencing, screening and storm pond edge enhancements. This schematic will guide development of the final construction drawings with the intensity of planting being increased and decreased as appropriate to the ownership pattern and use requirements but in all cases will meet code requirements. If appropriate, such assurance as required by 18.13.070 will be provided.

G. The proposed development shall provide at least two access points (where a PRD does not have access to a primary or secondary arterial) that distribute the traffic impacts to adjacent streets in an acceptable manner.

The PRD, as depicted on the drawings, shall have two major access points and will likely have more as future Phases are developed.

Relationship to Adjacent Areas - CMC 18.23.110

The design and layout of a planned development shall take into account the integration and compatibility of the site to the surrounding areas. The perimeter of the planned development shall be so designed as to minimize any undesirable impact on adjacent

properties. Setbacks from the property lines of the planned development shall be comparable to, or compatible with, those of any existing development on adjacent properties. Or, if adjacent properties are undeveloped, then setbacks shall conform to the type of development that may be permitted on adjacent properties.

As can be seen from the above description of the project's design, extensive effort has been exercised to design a project that is sensitive to and integrates the variety of slopes, wetlands, habitat areas present around Green Mountain and the surrounding landscape. The project has not proposed development directly adjacent to existing development. To the west is property acquired by DNR for open space; to the north is a large BPA easement; to the north east is property owned by the County for a park; to the south east is property currently slated for development with zoning similar to that of the Green Mountain PRD in that location. To the south are largely wetlands and the Goodwin Road arterial.

CMC Title 13: Public Services

Water

This project will require connections to the existing potable water system owned by the City of Camas. The proposal to extend the water system to the site is consistent with the adopted Water Systems Plan. The water system is designed to provide adequate flow to the site (including fire). All of the commercial buildings that meet the size criteria will be fitted with internal sprinkler systems. Compliance with CMC Title 13 has been demonstrated in the schematic utility plan provided for in the preliminary engineering that identifies how water and water service will be extended to the future development areas of the site. The City has sufficient water capacity to serve this project as proposed.

Sanitary Sewer

Sanitary sewer will initially be sent through the conveyance system located in the Camas Meadows development as currently allowed by the City's General Sewer Plan. The City and the Applicant have discussed alternatives for the future that might involve taking sewer to the east through other portions of the North Urban Growth Area. The City and the property owners in that area will continue to work together to identify potential alternatives to more efficiently and cost effectively provide sewer to this area. The City's sewer treatment plant has capacity to serve this development as proposed.

Refuse Collection and Disposal

Residential garbage and recycling will be collected on a weekly basis. Commercial disposal details will be provided once specific user(s) are identified during the Preliminary Plat and Site Plan process.

Storm water Drainage

Storm water treatment and quantity control will be provided through wetponds and other traditional storm water facilities. These facilities will be located at various points within the project as determined by the Applicant's and City's engineers. Outflow from these facilities will go into either existing storm water ditches along Ingle Road or to existing culverts under Ingle Road. All of the storm water facilities will be designed to meet the requirements of the Western Washington Storm Water Manual and Camas' existing storm water regulations. The storm water facilities will be owned and maintained by a homeowner's association. Calculations and further information regarding the drainage facilities are included in the Stormwater Narrative for Green Mountain PRD prepared by Olson Engineering.

CMC Title 16: Critical Areas and Open Space

Archaeological Resource Preservation - CMC 16.31

The Applicant has prepared a full archeological report which has been submitted to the Department of Archeology and Historic Preservation, as well as, local Native American Tribes. Evidence of these certified mailings is included in this application.

Public view, open space protection and historic sites and structures – CMC 16.33

The Green Mountain open space master plan preserves and enhances approximately thirty percent of this site. The open space system is integral to the community master plan and is used to help define and enhance the center of the community. The open space components include the protection and view preservation of the top of Green Mountain, a community wide trail system and a large central park connecting and interfacing with the Mixed Use Urban Village, located at the southern tip of the site. More information on the open space protection provided by this project is located above in the portion of the narrative addressing the innovation of the PRD, as well as, the portion below addressing landscape and open spaces.

General provisions - CMC 16.51/Wetlands CMC 16.53

The purpose of this code section is to designate and classify ecologically sensitive and hazardous areas and to protect these areas and their functions and value, while allowing for some reasonable use of property. These critical area regulations shall apply as an overlay and in addition to zoning and other regulations, including the City of Camas' Design Standards Manual, and shall be reviewed concurrently under SEPA and development review.

The Application contains all of the environmental reports and analyses required by the City's code for the submittal of this application with particular attention to Phase 1. Because the PRD will be developed in many phases over many years, the specific impacts to particular wetlands and critical areas not associated with Phase I will not be known until those phases of the project are designed and proposed. This application does contain substantial information about the location of various critical areas located throughout the entire PRD. The PRD has been designed to minimize or avoid impacts to these areas. Phase I, which is being proposed for preliminary

plat approval concurrently with this PRD application, does have a full critical areas analysis that complies with all applicable regulations.

Ecological Land Services, professional wetlands and wildlife biologists, have prepared an extensive code compliant analysis of the Phase I impacts to regulated critical areas. That analysis finds that there are no wetlands located in Phase I; however, two wetlands are located within 300 feet of the project. The project encroaches within the base wetland buffers associated with Wetland D and Wetland G (see ELS report) located within the northern and southern portions of the project site, but outside of the Phase 1 area (Figure 8 of the CAR report prepared by ELS).

Four man-made ponds and two man-made ditches are located within the Phase 1 boundary. The man-made ponds and ditches located onsite were previously created as part of the existing golf course. The man-made ponds have engineered slopes, rubber liners, and have been maintained by the golf course. A piping system connects the water features to a pump house (south of the project area). Man-made Pond H (0.49 acres) is located to the northeast of the parking and clubhouse area and along the western edge of the golf course trail system. Man-made Pond I (0.73 acres) is located to the northwest of the parking and clubhouse area and parallels the main entrance to the golf course. Man-made Pond J (0.15 acres) is located to the south of the main entrance to the golf course and man-made Pond I. Other man made ditches and pond facilities are located in Phase 1 and throughout the PRD.

Adjacent Critical Areas

The City of Camas code section *16.53.030-Critical Area Report*, requires that all wetlands, buffer zones, water features, and other critical areas within 300 feet of the project area (Phase 1 site boundary) be discussed within the critical area report. Wetlands located outside of Phase 1 site boundary, but within 300 feet include Wetlands B, D, G, and O. Additional and more specific information on the location and type of wetlands on the site is contained within the ELS report attendant with this application.

Stream Habitat

The ordinary high water mark (OHWM) of Stream O was delineated onsite and determined to be a non-fish bearing seasonal (Type Ns) stream and is regulated locally by *CMC 16.61. CMC 16.61.040(D)*, requires Stream O (Type Ns) to have a 25-foot buffer.

Critical Aquifer Recharge Area - CMC 16.55

The master plan area is not located within a Critical Aquifer Recharge Category I Area.

Frequently Flooded Areas - CMC 16.57

The master plan boundary is not located within a frequently flooded area.

Geologically Hazardous Areas - CMC 16.59

The PRD contains a few areas that are mapped as triggering application of the Geo Hazard ordinance. A geotechnical report has been prepared by Geo Pacific Engineers that fully addresses

Phase I. As future phases of the PRD are platted, additional geotechnical review, as required by the City's code will be undertaken.

Designation of Fish and Wildlife Habitat Conservation Areas - CMC 16.61

The Washington Department of Fish and Wildlife (WDFW) maps priority Oregon white oak (*Quercus garryana*) stands within 300 feet of the Phase 1 project boundary. Clark County Geographic Information System (CCGIS) maps one wetland, one stream, and a non-riparian habitat conservation area within or adjacent to the Phase 1 project boundary (Figure 5 of the CAR report prepared by ELS). ELS has performed an extensive analysis of the area's wildlife and wildlife habitat. The ELS habitat and wildlife report analyzes all regulated species and habitats in an around phase I. For further information regarding regulated habitats and species as they pertain to this site, please see the ELS report attendant with this application.

Tree Preservation – CMC 18.31

To meet tree retention requirements regulated by the City of Camas, a tree survey was performed. An inventory of the onsite tree habitat was tabulated and provided to the City of Camas within Exhibit "E" of the Development Agreement (DA). See Appendix B for a copy of the "Tree Preservation Plan" to be followed by the Phase 1 project. Additional Tree Preservation Plan details are provided in the "Tree Preservation Plan" section of this report.

Oregon White Oak Habitat

Oregon white oak habitat was also located onsite by ELS. A total of 20 Oregon white oak trees were inventoried within or immediately adjacent to the phase 1 project boundary. Out of the twenty (20) total Oregon white oak trees, seven (7) measure 20 inches or greater diameter at breast height (dbh) and therefore are regulated by the tree preservation plan within the 2014 DA, (Exhibit E) governing the project.

Tree preservation plan – CMC 18.31

The non-Oregon white oak trees proposed for removal by the Phase 1 project have been inventoried and accounted for in the Tree Preservation Plan. The Tree Preservation Plan encompasses the entire PRD area (approximately 283 acres). The tree preservation plan divides the property into five "zones" that identify five distinct areas of future development. The zones were established to assure that acceptable numbers of trees were preserved throughout the property, not just in one isolated area rendering the remaining portions of the site bare of trees. The percentage of trees protected in a given zone varies from 34 percent to 77 percent, with the net result being that at least 50 percent of the existing trees across the overall property ownership will be preserved.

The Tree Preservation Plan identifies that Zone C will consist of development pods B1, B2, B3, C1, C2, D1, D2, D3, and E1 and will preserve 488 trees out of the 1,454 trees inventoried within the zone to provide a preservation of 34 percent of the trees within the zone. The Phase 1 development consists of all of the development pods listed under Zone C except pods B1, B2 and B3. The remaining Zone C area (Pod B1 located south of Phase 1 and B2 and B3) contains 222

trees. The Phase 1 development fully complies with the Tree Preservation Plan and with the future removal of the additional 222 trees when the remaining pods within the zone are developed, Zone C will still meet the full retention quantity of 488 trees. (Figure 8 and Appendix B of the CAR report prepared by ELS).

Oregon White Oak Impacts and Mitigation

The project design team worked to retain oak trees by altering the Phase 1 development and associated green space boundaries. Many oak trees will be retained within the green space area, leaving only seven jurisdictional Oregon white oaks within the Phase 1 project site that could not be avoided (Figure 9). The seven individual Oregon white oak trees to be impacted consist of the following oak tree numbers as referenced in CAR report; Oak Tree Numbers – 1, 2, 7, 21, 55, and 64. The oak impacts will be mitigated as provided for and required by the 2014 DA (Exhibit E). Mitigation for the seven Oregon white oak trees includes installing 1.5-inch caliper minimum stock replacement oaks at a 2:1 replacement ratio. The oak mitigation for Phase 1 oak impacts is proposed within the wetland buffer associated with Wetlands D over an area approximately 6,526 square feet in size to allow for 20-foot spacing of the trees allowing for mature canopy growth in the future (Figure 9 of the CAR report prepared by ELS).

Maintenance activities are to consist of controlling invasive species with mowing activities or herbicide application performed by a licensed herbicide applicator. Total percent cover of invasive species is to remain below 20-percent for the duration of the monitoring period.

CMC Title 17: Land Development

Subdivisions – CMC 17.11

The Applicant is seeking preliminary plat approval for Phase 1. The application shall be processed as Type III decision subject to the provisions of CMC Chapter 18.55.

Preliminary subdivision plat approval – CMC 17.11.30

A pre application conference was conducted in February of 2014, complying with CMC 17.11.30A. The purposes for Subdivision Plan review are to establish procedures to ensure that the design of site and improvements are consistent with applicable standards. Subdivision approval criteria are provided for in CMC 17.11.30B and are described as follows:

An application meeting all of the submittal requirements of CMC 17.11.30B has been submitted by the Applicant with this application.

CMC 17.11.30D. Criteria for Preliminary Plat Approval. The hearings examiner decision on an application for preliminary plat approval shall be based on the following criteria:

- 1. The proposed subdivision is in conformance with the Camas comprehensive plan, parks and open space comprehensive plan, neighborhood traffic management plan, and any other city adopted plans;*

Phase 1 conforms to the Camas Comprehensive plan by complying with the requirements for the underlying zone, the DA, and the PRD standards. Phase I will be compatible with the future development of the areas around Phase I as described in this PRD narrative. Phase I will construct park and open space and trail amenities as part of its development. Through compliance with all of the City's regulations relating to the PRD, utility infrastructure, transportation, payment of impact fees, preservation of open spaces and natural areas, construction of parks and trails and further implementation of the City's Comprehensive Plan, this subdivision supports and furthers the City's Comprehensive plan.

2. Provisions have been made for water, storm drainage, erosion control and sanitary sewage disposal for the subdivision that are consistent with current standards and plans as adopted in the Camas Design Standard Manual;

The technical reports and preliminary plat drawings demonstrate that all sewer, water, storm water, streets and pedestrian access ways are provided for in the Phase I preliminary plat. There is also an extensive trail and open space system that is identified on the PRD master plan and the parks and open space plan for the PRD as a whole. About 30% of the PRD will remain in open space connected by a series of parks and trails. The PRD contains a central park and other smaller parks connected by sidewalks or trails. Sidewalks will be provided throughout the project as each phase is completed, providing safe walking for school children. All residences in the project will pay school impact fees.

3. Provisions have been made for road, utilities, street lighting, street trees and other improvements that are consistent with the six-year street plan, the Camas Design Standard Manual and other state adopted standards and plans;

The proposed PRD is designed to meet all of the City's zoning, design and infrastructure requirements that are either allowed through the PRD process, the Development Agreement or the City's modification or exception process. Demonstration of this can be found in the preliminary drawings and technical reports attendant with this application. These include, but are not limited to, the Phase I subdivision reports relating to wetlands and wildlife habitat, preliminary engineering for storm water, sewer, water, streets and landscaping. There is a substantial traffic study that was prepared by Kittelson and Associates that analyzes the full build out of the PRD. That study is part of this application and fully analyzes all of Phase I's transportation impacts.

The Applicant has provided new roads, utilities, street lighting, street trees and other improvements as indicated in the proposed plans. All internal and external proposed improvements will comply with the City of Camas standards

4. Provisions have been made for dedications, easements and reservations;

The proposed internal and exterior road improvements are designed per the Camas Design Standard Manual. Additional easements will be addressed during final engineering. Please refer to the preliminary subdivision plan for more detailed information.

5. The design, shape and orientation of the proposed lots are appropriate to the proposed use;

A great deal of thought has gone into the master plan's various densities, uses, locations and orientations, in order to maximize the project's harmony with its extensive natural features and to create an integrated community that provides a broad range of housing opportunities that can be accessed by a range of citizens. Phase I is part of this plan. As can be seen, Phase I contains a variety of housing types and lot sizes that are oriented around this areas natural features. Phase I will provide a logical transition between the denser urban village to the south and the less dense larger lots of future phases to the north.

6. The subdivision complies with the relevant requirements of the Camas land development and zoning codes, and all other relevant local regulations;

The proposed phase 1 subdivision is designed to meet all of the City's zoning, design and infrastructure requirements that are either allowed through the Subdivision and PRD process, the Development Agreement or the City's modification or exception process. Demonstration of this can be found in the preliminary drawings and technical reports attendant with this application. These include, but are not limited to, the Phase I subdivision reports relating to wetlands and wildlife habitat, preliminary engineering for storm water, sewer, water, streets and landscaping.

7. Appropriate provisions are made to address all impacts identified by the transportation impact study;

There is a substantial traffic study that was prepared by Kittelson and Associates that analyzes the full build out of the Phase 1 subdivision. That study is part of this application.

8. Appropriate provisions for maintenance of commonly owned private facilities have been made;

Included as part of this application is a description of the types of covenants conditions and restrictions (CC&Rs) that will ultimately be recorded with each subdivision and site plan as they are recorded. All CC&Rs will contain provisions that will provide for the funding, ownership and/or maintenance of all common areas and open spaces within the PRD.

9. *Appropriate provisions, in accordance with RCW 58.17.110, are made for:*
- a. *The public health, safety, and general welfare and for such open spaces, drainage ways, streets, or roads, alleys or other public ways, transit stops, potable water supplies, sanitary wastes, parks and recreation, playgrounds, schools and school grounds and all other relevant facts, including sidewalks and other planning features that assure safe conditions at schools bus shelter/stops, and for students who walk to and from school, and*
 - b. *The public use and interest will be served by the platting of such subdivision and dedication;*

Through compliance with all of the City's regulations relating to the subdivision and PRD standards, utility infrastructure, transportation, payment of impact fees, preservation of open spaces and natural areas, construction of parks and trails and further implementation of the City's Comprehensive Plan, this project supports the public's health and serves the public interest.

10. *The application and plans shall be consistent with the applicable regulations of the adopted comprehensive plans, shoreline master plan, state and local environmental acts and ordinances in accordance with RCW 36.70B.030.*

ONSITE CRITICAL AREAS

The majority of the Phase 1 site boundary is located within existing open groomed fairways, paved parking lot, and a clubhouse structure associated with the active golf course. The topography is gently to moderately sloping to the south-southwest towards NE Goodwin Road and NE Ingle Road. Green Mountain is located offsite to the northeast. A 100-foot wide Bonneville Power Administration (BPA) high voltage transmission line easement is located within the central portion of the site (Figures 2 and 8).

The subdivision is designed to meet or exceed all of the City's Comprehensive Plan and State and local environmental regulations and ordinances in accordance with RCW 36.70B.030. Demonstration of this can be found in the preliminary drawings and technical reports attendant with this application. These include, but are not limited to, the Phase I subdivision reports relating to wetlands and wildlife habitat, preliminary engineering for storm water, sewer, water, streets, landscaping and zoning.

Phasing – CMC 17.11.040

The master plan proposes various phases of development, with the sequence and timing of the phases to be finalized over the course of the next several years. It is expected that Phase 1 will break ground in the Summer of 2015 and be completed by 2018 and full master plan build-out is estimated to occur prior to 2029. The phases have been designed to either "stand alone" to meet all regulatory requirements or will be able to meet all regulatory requirements, based upon

construction of infrastructure, loading, parking, stormwater, sewer, water, landscaping, etc., associated with preceding phases. The phasing plan submitted meets the requirements of CMC 17.11.040 and 18.23.

Exceptions - CMC 17.23.010 (A)

The Applicant is requesting an exception to the required 30' setback of the stormwater facility from the fronting rights-of-way. The Applicant is requesting that be reduced to 15 feet along Ingle Road and the project's entry road. The proposed location of the stormwater facilities are in the southwest portion of the site. Based upon the site's topography, this is the lowest (and thus most effective) area of the site to collect and treat storm water. Due to the slopes in this area, if the storm water facility were to be moved farther from Ingle road, large walls and substantial excavation and grading would be needed. Under this scenario only minimum landscaping would be required. The facility would be easily seen from Ingle Road.

The Applicant is proposing to reduce the distance to Ingle road and to the project's entry road to 15', but is also proposing to heavily landscape the facility with evergreen trees and lower story vegetation. A drawing depicting the location and type of this enhanced landscape buffer is provided with this application. The aesthetic view of the facilities will be greatly enhanced if the Applicant's request is granted.

The granting of this proposed exception will not be detrimental to the public welfare or injurious to other property within the vicinity of this proposed development, because it will better shield and landscape the proposed facility and require less severe excavation, grading and hard surfaces in this area. Refer to the Preliminary Subdivision Plan, which has been submitted with this application.

CMC Title 18: Land Development

Parking – CMC 18.11

The residential component of the project will contain a minimum of two offsite parking spaces that will comply with parking table CMC 18.11.130. As the commercial buildings develop within the Urban Village area and the retail/commercial tenants are determined, the parking spaces, ADA compliance, loading areas and landscaping areas between the parking will be depicted on the site plan and reviewed for compliance at that time. The parking lot design and layout will meet CMC 18.11 and the international parking code.

Signs – CMC 18.15

Schematic details illustrate the landscape character of this main community entry. The entry area will contain: a sign wall; some fencing; decorative street lights; widened street side planters and themed landscaping. This area connects to the boulevard leading to central park. Detailed planting and irrigation plans will follow final Phase 1 construction grading plans.

As the commercial buildings develop within the Urban Village area and the retail/commercial tenants are determined. All signs will comply with applicable City permitting and design standards at the time of installation.

Procedure – CMC 18.23.130

The Applicant is proceeding under a Type III review process pursuant to CMC 18.55 for the PRD and Subdivision components of the application.

Conclusion

The Applicant has provided a unique master plan concept that utilizes the site's unique natural features to guide the open space plan and the location and orientation of a wide array of residential housing types and densities. The open space components include the protection of the top of Green Mountain, a community wide trail system and a large central park connecting and interfacing with the mixed use Urban Village and other portions of the project. These are designed to meet the recreational and aesthetic needs of the existing and future residents of the City, while not compromising the environmental sensitivity of the area.

The project as designed will create an eclectic and vibrant neighborhood that will be integrated through its parks and trail system and will allow for shopping and employment opportunities close to home. As demonstrated in this narrative the proposal complies with all applicable City codes and furthers the goals of the City's adopted Comprehensive Plan.

DEVELOPER'S PACKET

Produced By:

Clark County Geographic Information System (GIS)



For:

Sterling Design, Inc.

Subject Property Account Number(s):

986037307
173178000

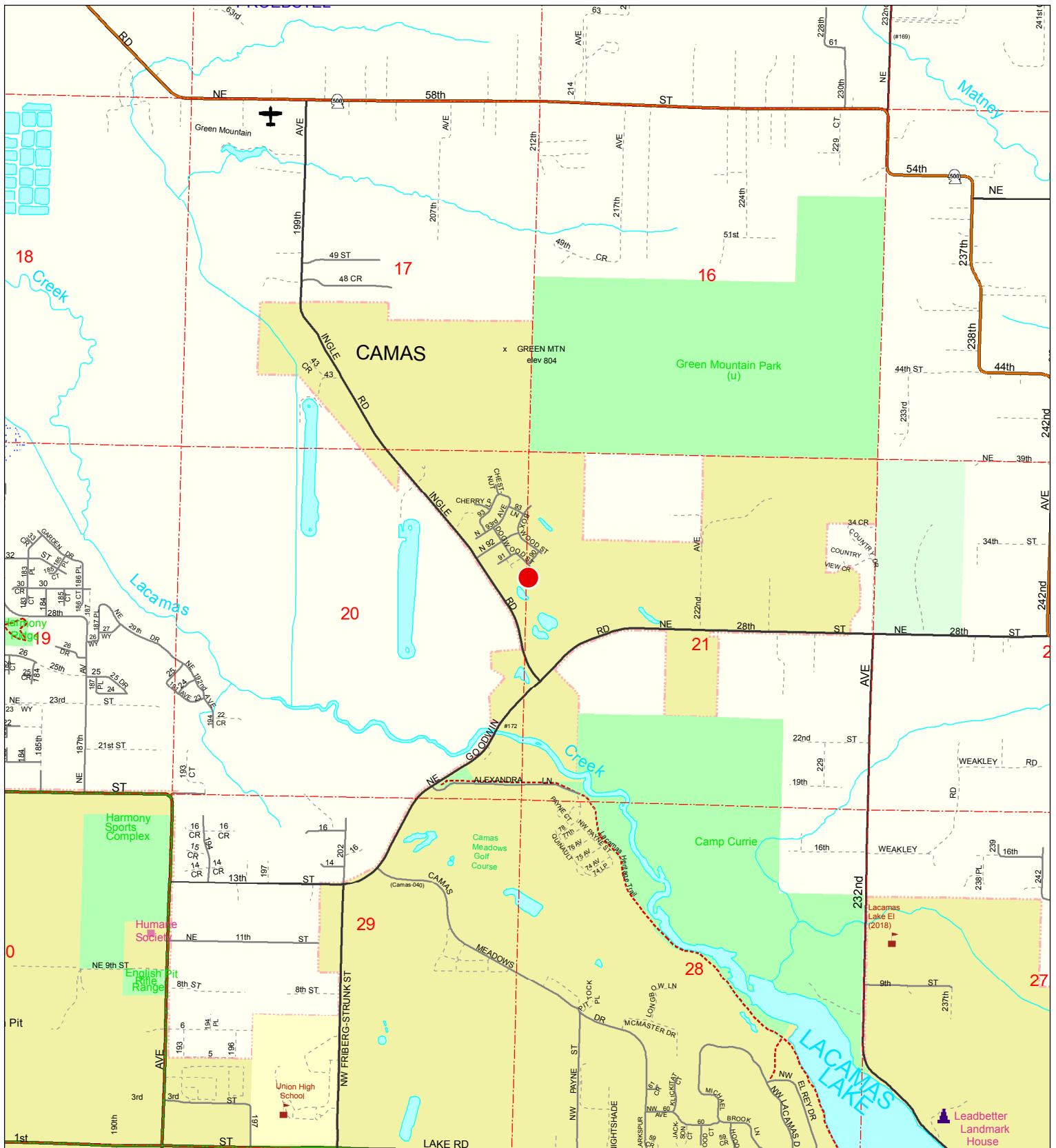
PDF # 203426

Printed: July 02, 2018

Expires: July 02, 2019

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General Location

Account: 986037307, 173178000
 Owner: AE GREEN MOUNTAIN LLC
 Address: 2551 W 1ST ST
 C/S/Z: WASHOUGAL, WA 98671

Printed on: July 02, 2018

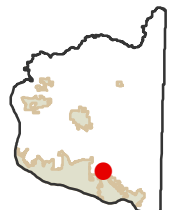


Geographic Information System

0 1,000 2,000 Feet

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.

● Location of Subject Property(s)



Property Information Fact Sheet

Mailing Information:

Account No.: 986037307, 173178000
Owner: AE GREEN MOUNTAIN LLC
Address: 2551 W 1ST ST
C/S/Z: WASHOUGAL, WA 98671

Assessed Parcel Size: 7.89 Ac

Property Type: PRIME DEVELOPABLE GROUND

PARCEL LOCATION FINDINGS:

Quarter Section(s): NW 1/4,S21,T2N,R3E,
NE 1/4,S20,T2N,R3E

Municipal Jurisdiction: Camas

Urban Growth Area: Camas

Zoning: MF-10, CC

Zoning Overlay: Airport Overlay - Zone C,
Gateway Corridor

Comprehensive Plan Designation: MFL,
COM

Columbia River Gorge NSA: No Mapping Indicators

Late-Comer Area: No Mapping Indicators

Trans. Impact Fee Area: Camas: Current,
Camas UGA: End Date Dec. 31, 2016

Park Impact Fee District: No Mapping Indicators

Neighborhood Association: No Mapping Indicators

School District: Evergreen

Elementary School: Harmony

Junior High School: Pacific

Senior High School: Union

Fire District: Camas Washougal FD

Sewer District: Rural/Resource

Water District: Camas

Wildland: No Mapping Indicators

Historic Sites: No Mapping Indicators

ENVIRONMENTAL CONSTRAINTS:

Soil Type(s): DoB, 100.0% of parcel

Hydric Soils: Non-Hydric, 100.0% of parcel

Flood Zone Designation: Outside Flood Area

CARA: Category 2 Recharge Areas

Liquefaction Susceptibility: Very Low, Low to Moderate, Very Low to Low

NEHRP: C

Slope: 0 - 5 percent, 65.8% of parcel

10 - 15 percent, 4.4%

5 - 10 percent, 29.8%

Landslide Hazards: No Mapping Indicators

Slope Stability: No Mapping Indicators

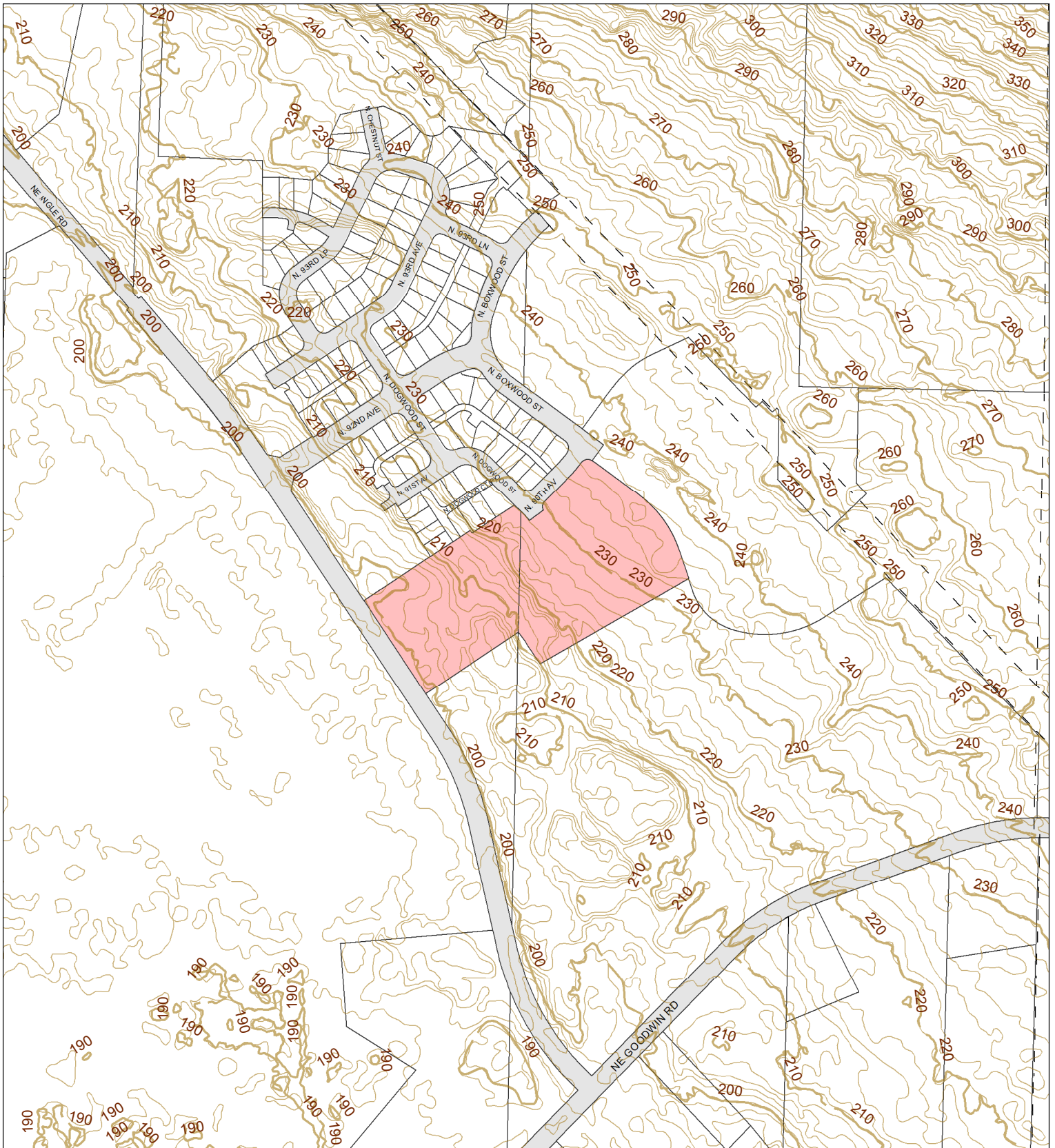
Priority Habitat and Species Areas: No Mapping Indicators

Priority Species Area Buffer: No Mapping Indicators

Priority Habitat Area Buffer: No Mapping Indicators

Archeological Predictive: High, 3.1% of parcel
Moderate-High, 96.9%

Archeological Site Buffers: Mapping Indicators Found





CLARK COUNTY, WASHINGTON
Geographic Information System

0 200 400 Feet

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Elevation Contours

Account: 986037307, 173178000
 Owner: AE GREEN MOUNTAIN LLC
 Address: 2551 W 1ST ST
 C/S/Z: WASHOUGAL, WA 98671

Subject Property(s)

Public Road

Transportation or Major Utility Easement

10' Elevation Contours

2' Elevation Contours

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23117	23116	23115
23120	23121	23122
23129	23128	23127

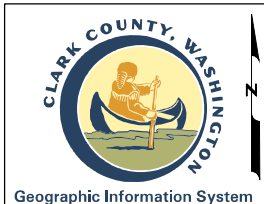
Developer's Packet: Page 3 of 16



2016 Aerial Photography


Account: 986037307, 173178000
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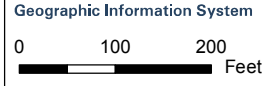


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 Subject Property(s)

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

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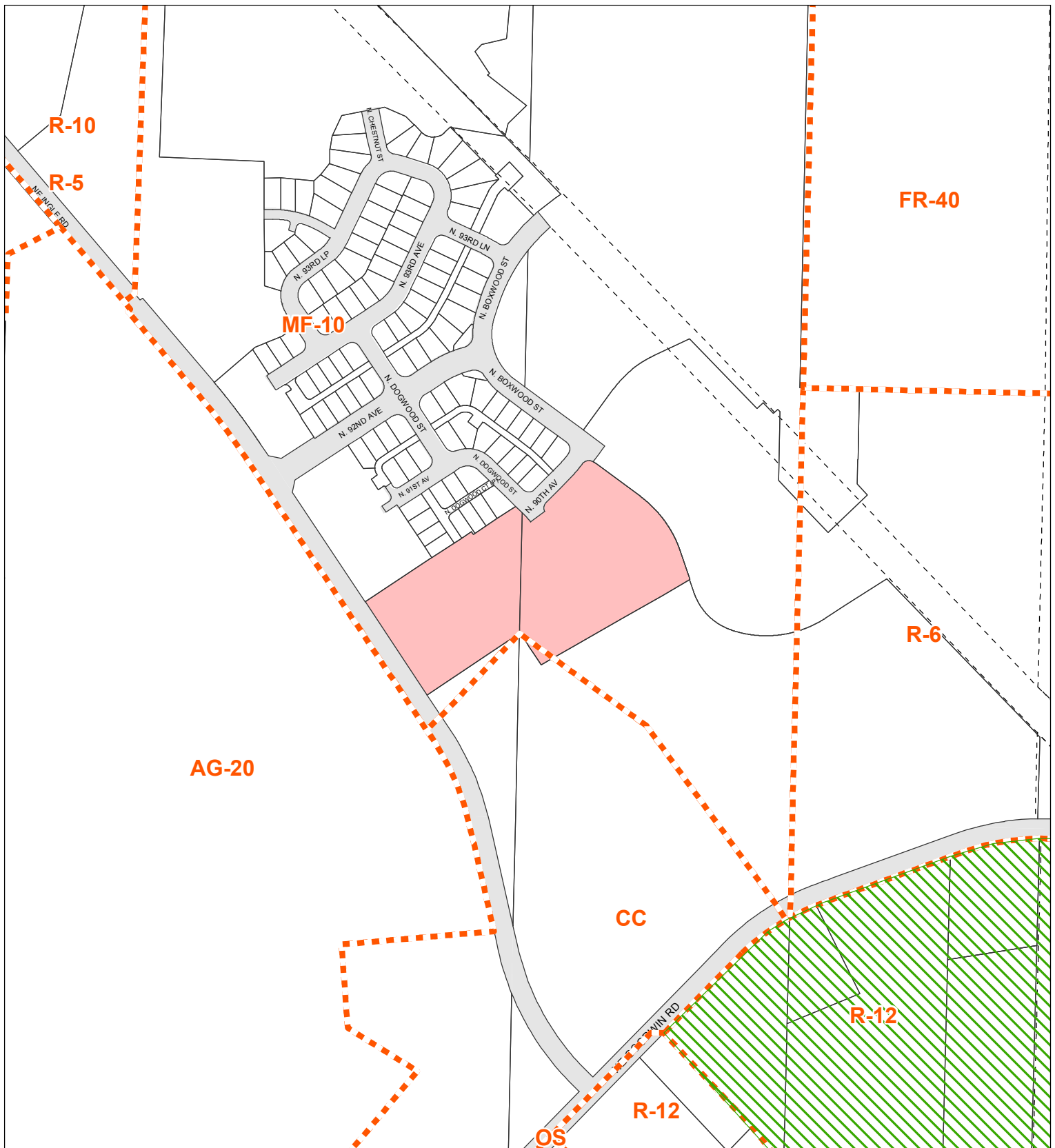
2016 Aerial Photography with Elevation Contours


Account: 986037307, 173178000
 Owner: AE GREEN MOUNTAIN LLC
 Address: 2551 W 1ST ST
 C/S/Z: WASHOUGAL, WA 98671

-  Subject Property(s)
-  2' Elevation Contours

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23129	23128	23127





Geographic Information System

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Zoning Designations

Account: 986037307, 173178000
 Owner: AE GREEN MOUNTAIN LLC
 Address: 2551 W 1ST ST
 C/S/Z: WASHOUGAL, WA 98671

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23129	23128	23127

Subject Property(s)

Public Road

Transportation or Major Utility Easement

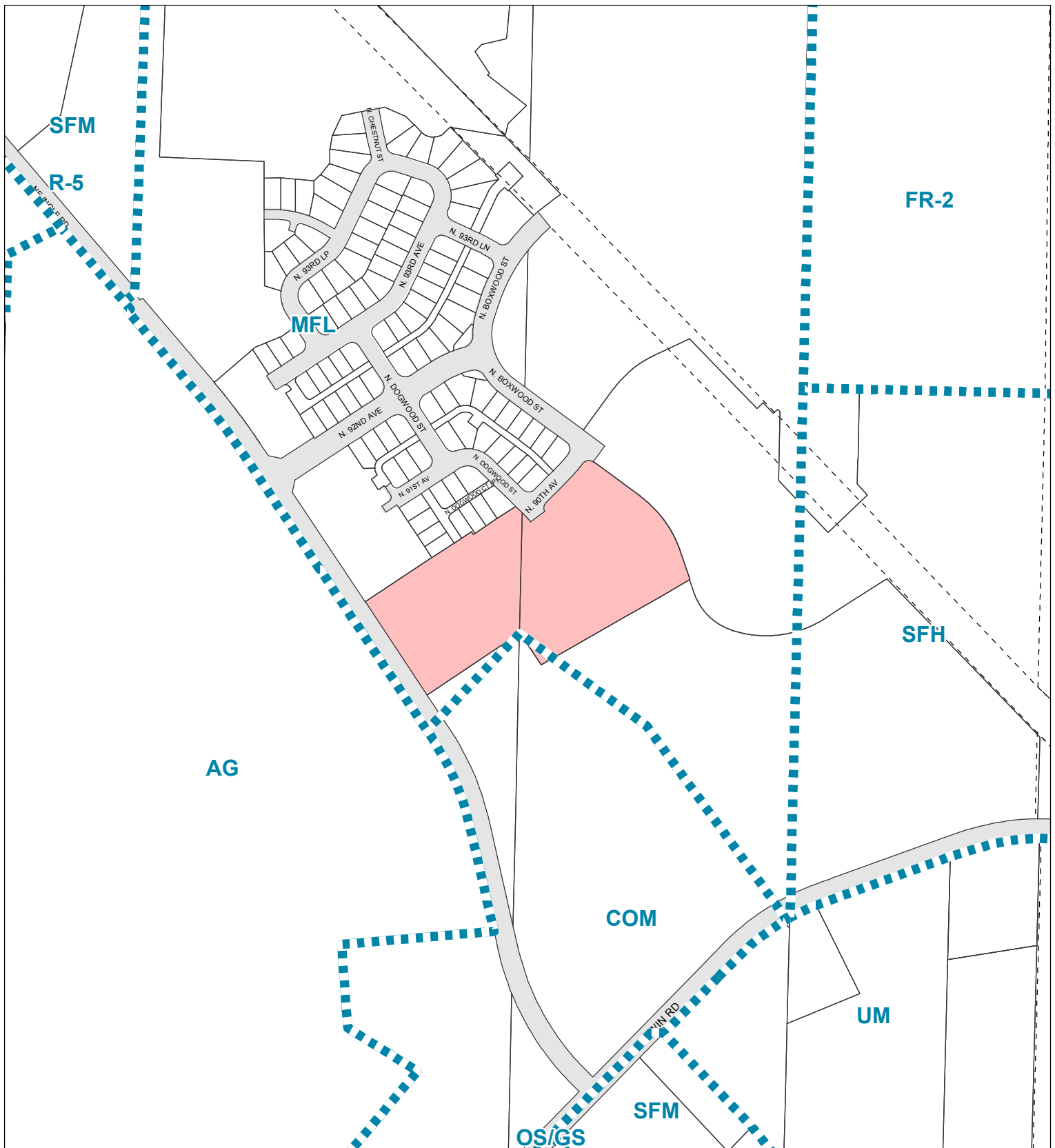
Zoning Boundary

Urban Holding - 10 (UH-10)

Urban Holding - 20 (UH-20)

Urban Holding - 40 (UH-40)

Surface Mining Overlay District



0 200 400 Feet

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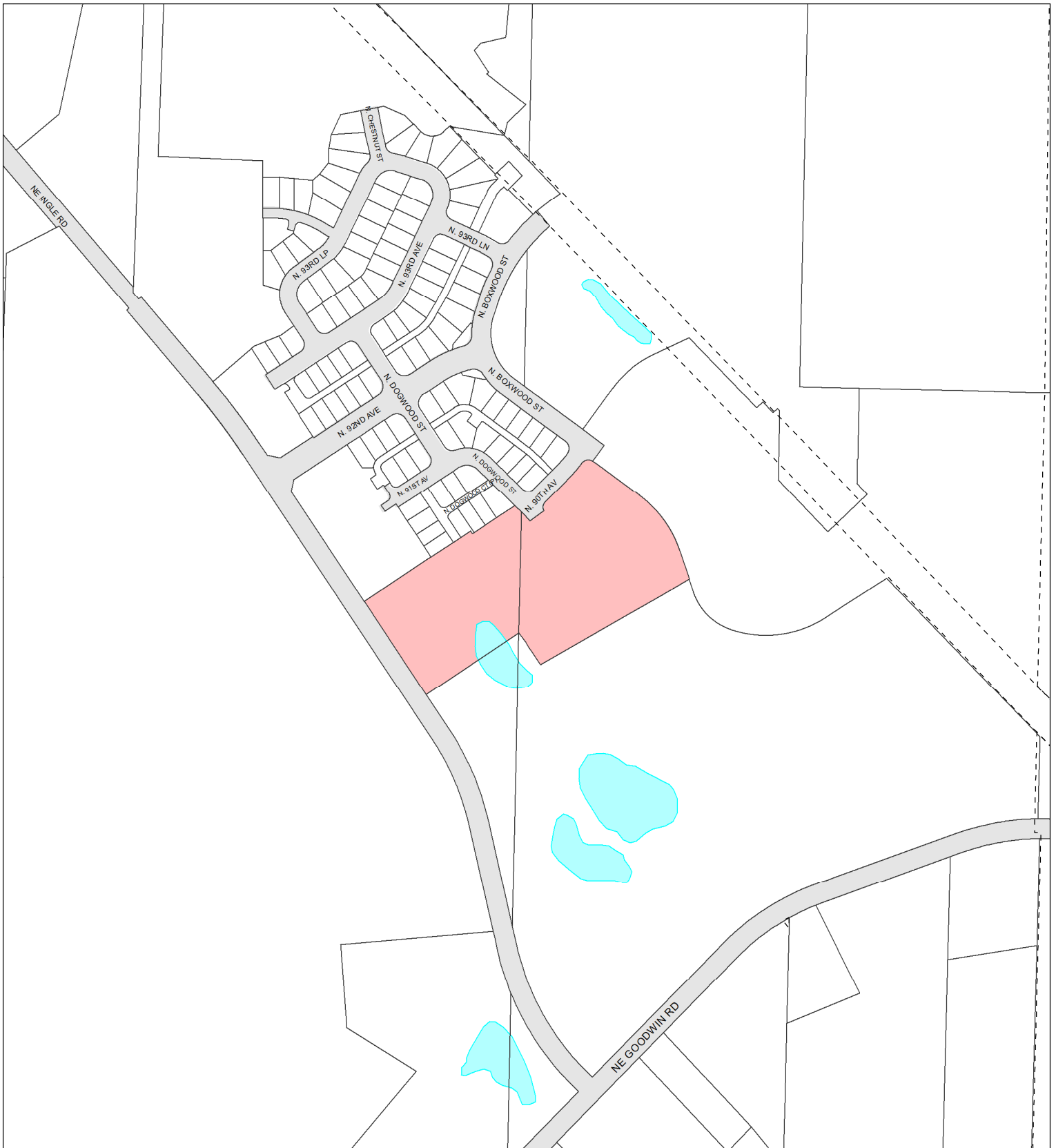
Comprehensive Plan Designations

Account: 986037307, 173178000
 Owner: AE GREEN MOUNTAIN LLC
 Address: 2551 W 1ST ST
 C/S/Z: WASHOUGAL, WA 98671

- Subject Property(s)
- Public Road
- Transportation or Major Utility Easement
- Comprehensive Plan Boundary
- Urban Reserve
- Industrial Reserve
- Railroad Industrial Reserve
- Mining
- Rural Center Mixed Use
- Columbia River Gorge Scenic Area

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Arterials, C-Tran Bus Routes, Parks & Trails

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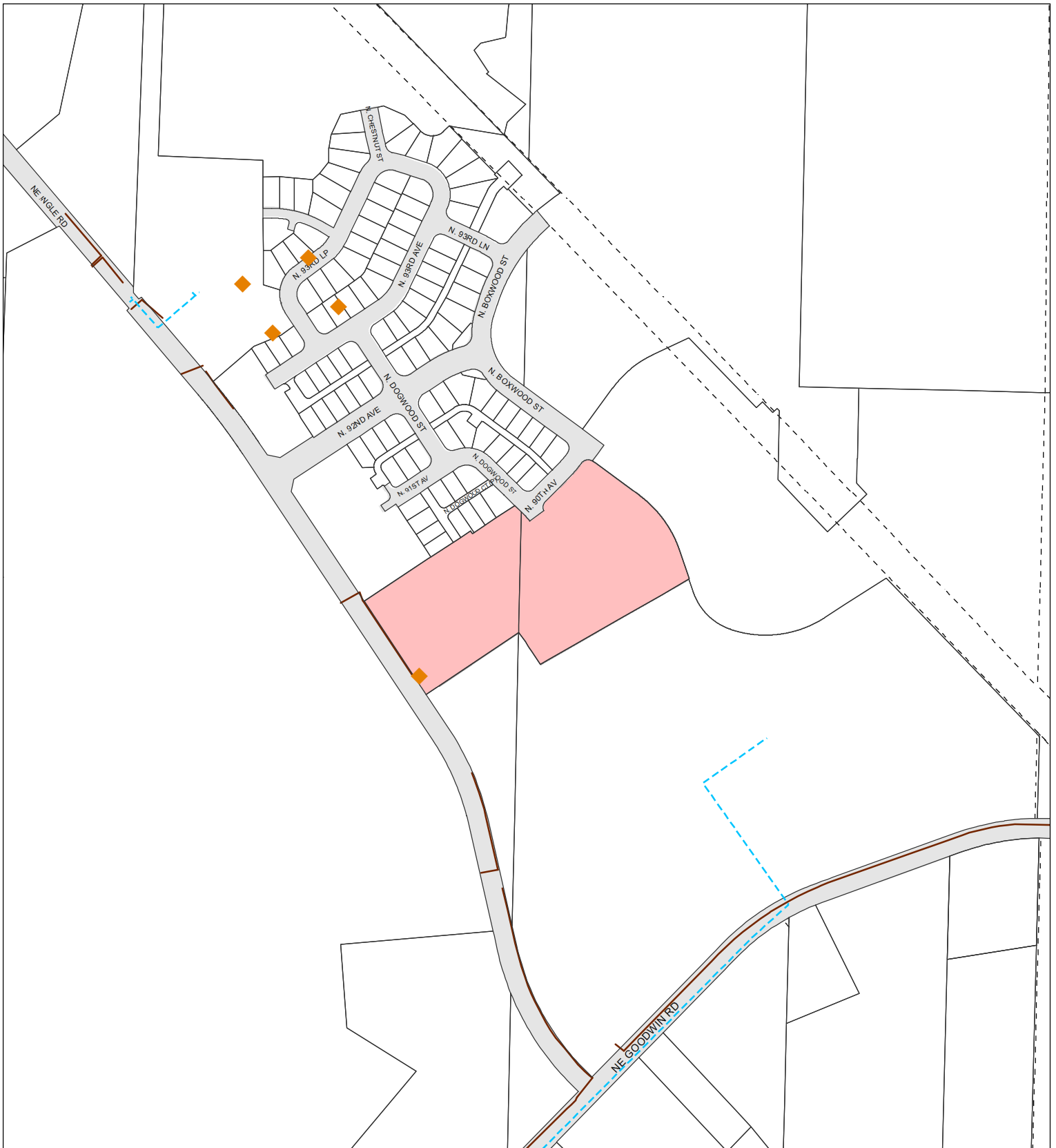
Geographic Information System

0 200 400 Feet

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- Subject Property(s)
- Public Road
- Transportation or Major Utility Easement
- Parks
- Trail
- C-Tran Route
- Principal Arterial
- Minor Arterial
- Collector
- Rural Major Collector
- Rural Minor Collector
- State Route
- Other
- Proposed Arterial
- Scenic Highway

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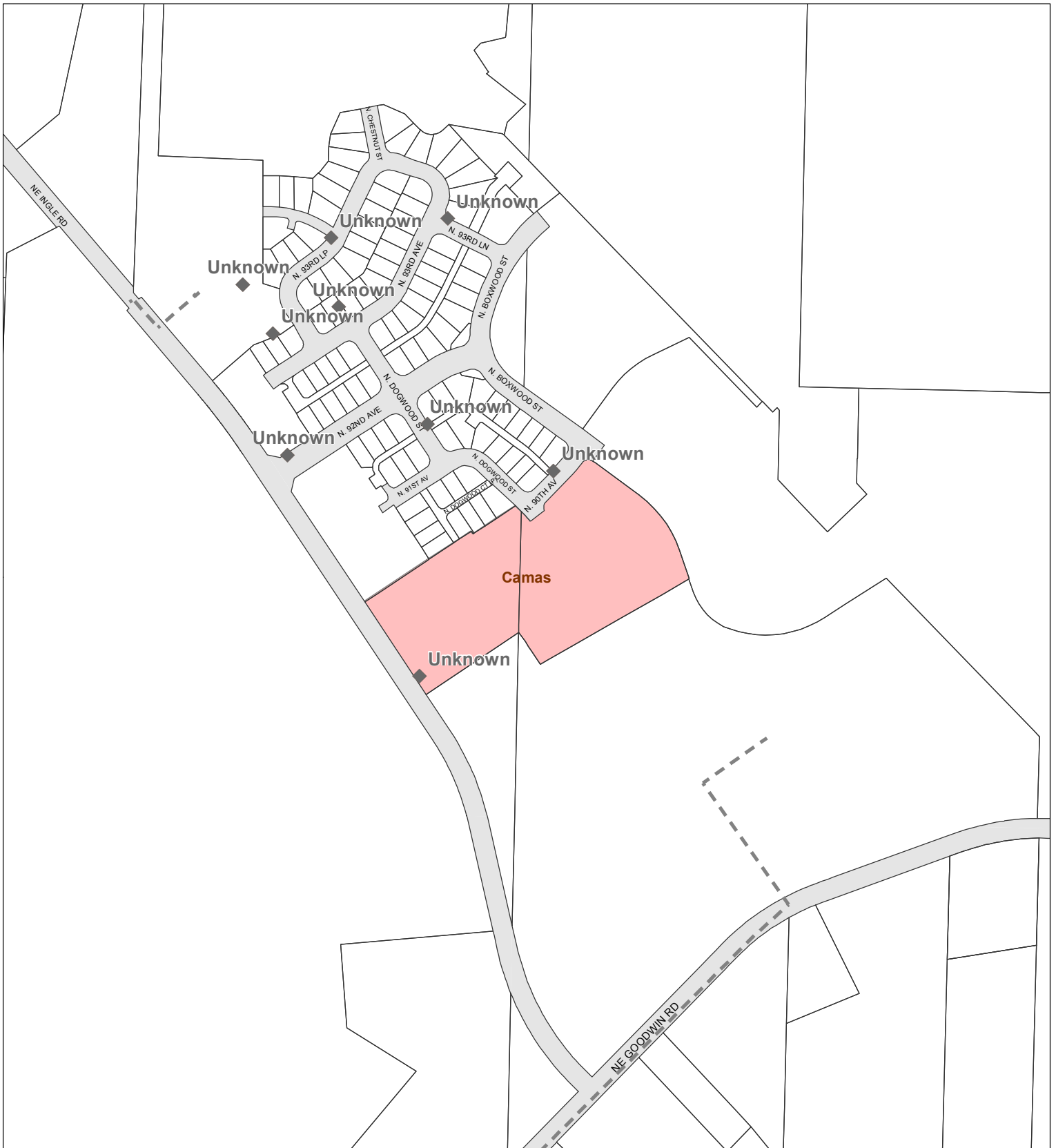
Water, Sewer, and Storm Systems


Account: 986037307, 173178000
 Owner: AE GREEN MOUNTAIN LLC
 Address: 2551 W 1ST ST
 C/S/Z: WASHOUGAL, WA 98671

- Subject Property(s)
- Public Road
- Transportation or Major Utility Easement
- Water Lines
- Sewer Lines
- Storm Water Lines
- 1-year Wellhead ZOC
- 5-year Wellhead ZOC
- 10-year Wellhead ZOC
- Hydrants

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CLARK COUNTY, WASHINGTON

Geographic Information System

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Water Systems

Account: 986037307, 173178000
 Owner: AE GREEN MOUNTAIN LLC
 Address: 2551 W 1ST ST
 C/S/Z: WASHOUGAL, WA 98671

Printed on: July 02, 2018

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<ul style="list-style-type: none"> Subject Property(s) Public Road Water District Boundary Unknown Size Water Line < 10" Water Line 	<ul style="list-style-type: none"> 10-20" Water Line > 20" Water Line No Flow Data Hydrant 0 - 499 GPM at 20 PSI 500 - 999 GPM at 20 PSI 	<ul style="list-style-type: none"> > 1000 - 1749 GPM at 20 PSI > 1750 GPM at 20 PSI Hydrant > 500' from parcel(s)
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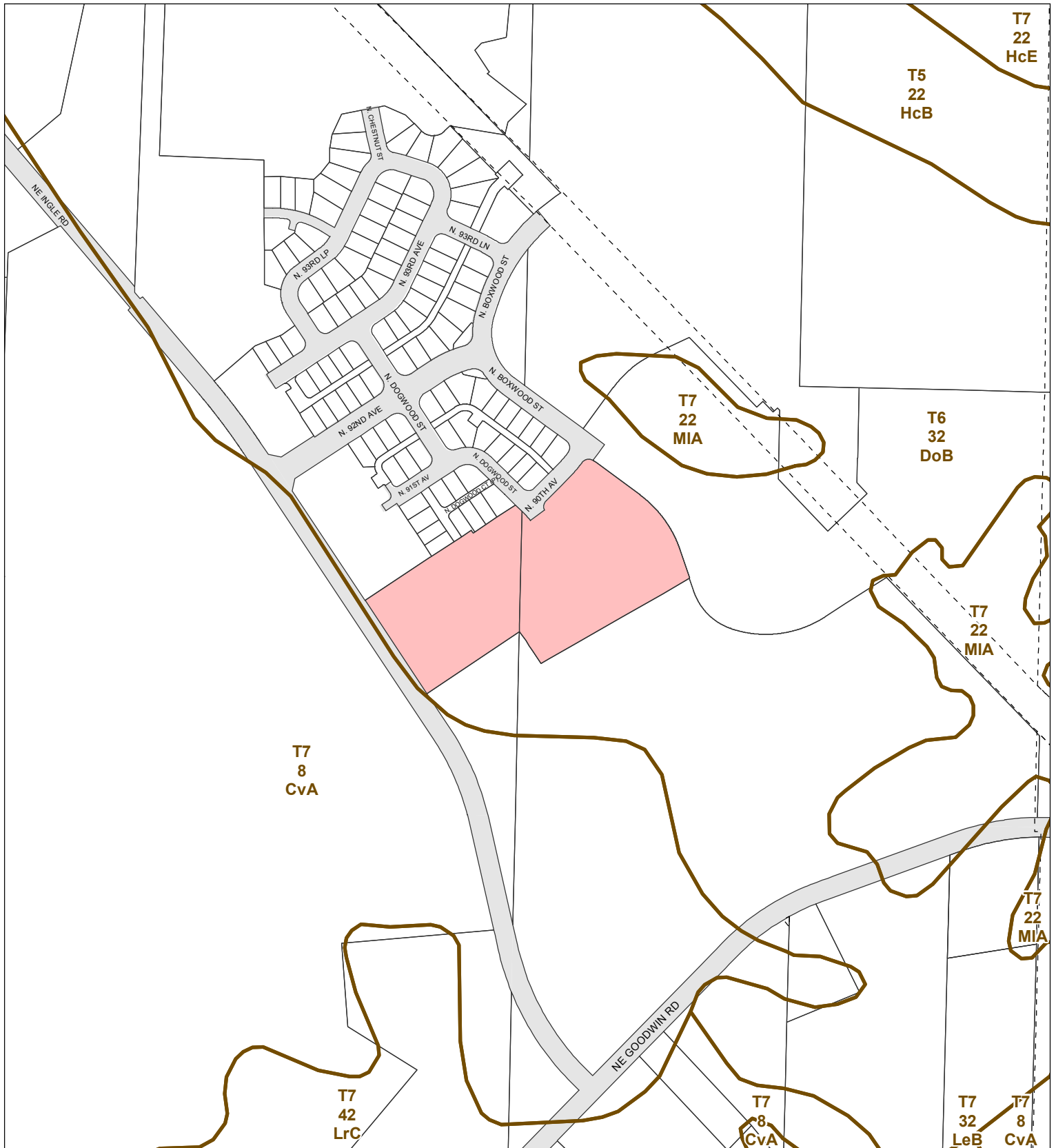
Hydrant Fire Flow Details

Account No.: 986037307, 173178000
Owner: AE GREEN MOUNTAIN LLC
Address: 2551 W 1ST ST
C/S/Z: WASHOUGAL, WA 98671

Water District(s)	Hydrant Data Update	Project Site Provider
Camas (There is currently no hydrant data for this district.)		

HYDRANT INFORMATION:

Hydrant ID	Hydrant Owner	Main Diameter	Flow at 20 PSI	Test Date	Distance to site
Unknown	Unknown	0.0"	No Data	None	0 ft
Unknown	Camas	0.0"	No Data	None	47 ft
Unknown	Camas	0.0"	No Data	None	347 ft
Unknown	Camas	0.0"	No Data	None	495 ft





CLARK COUNTY, WASHINGTON

Geographic Information System

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Soil Types

Account: 986037307, 173178000
 Owner: AE GREEN MOUNTAIN LLC
 Address: 2551 W 1ST ST
 C/S/Z: WASHOUGAL, WA 98671

Subject Property(s)

Public Road

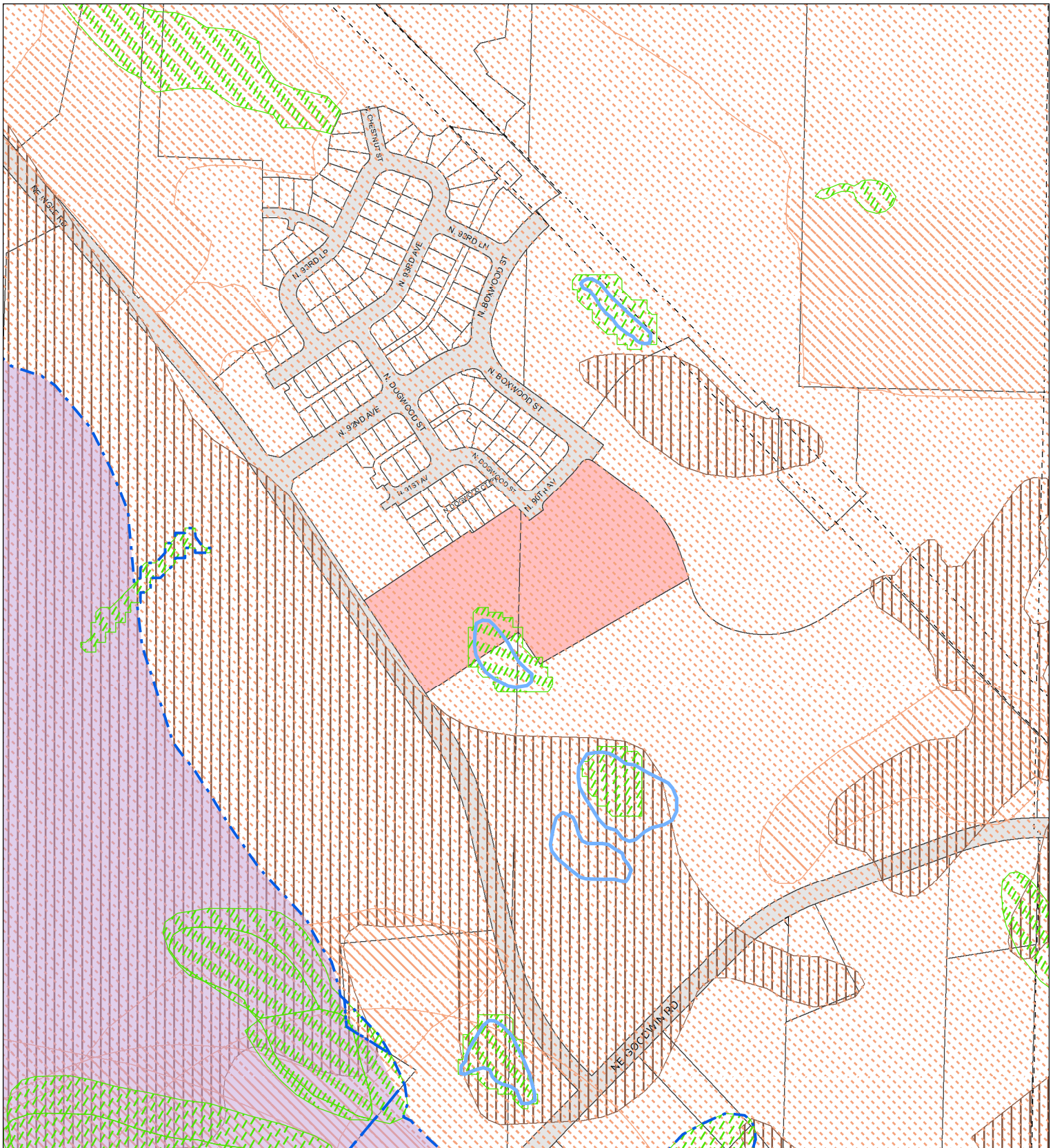
Transportation or Major Utility Easement

Soil Type Boundary

Printed on: July 02, 2018

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Geographic Information System

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Environmental Constraints I

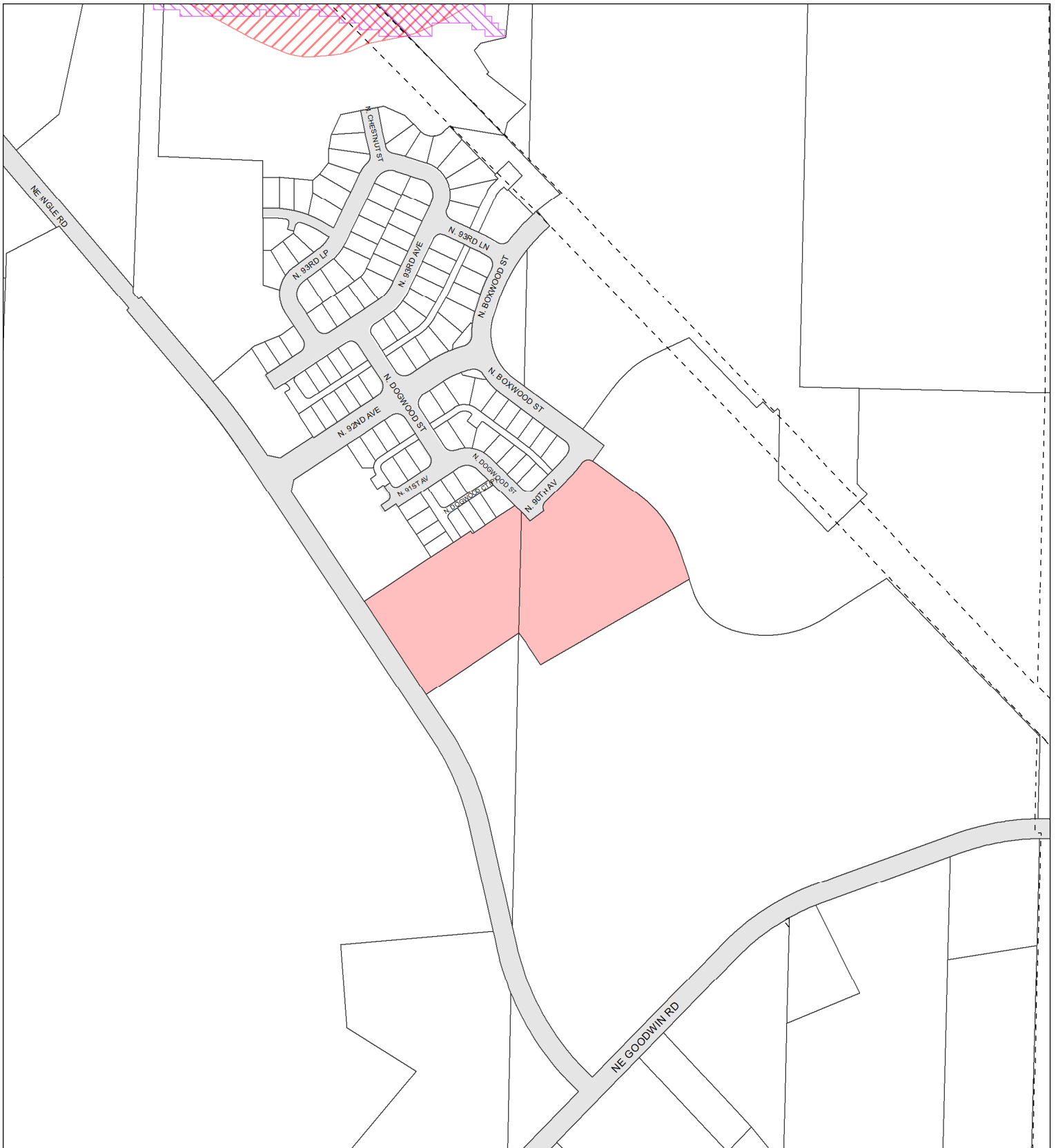
Account: 986037307, 173178000
 Owner: AE GREEN MOUNTAIN LLC
 Address: 2551 W 1ST ST
 C/S/Z: WASHOUGAL, WA 98671

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- Subject Property(s)
- Public Road
- Transportation or Major Utility Easement
- Hydric Soils
- Wetland Inventory
- Non-Riparian Habitat or Species Area

- CARA Category 1
- 100 year Floodplains
- Floodway
- Shorelines
- Stream



Environmental Constraints II

Account: 986037307, 173178000
 Owner: AE GREEN MOUNTAIN LLC
 Address: 2551 W 1ST ST
 C/S/Z: WASHOUGAL, WA 98671

Printed on: July 02, 2018



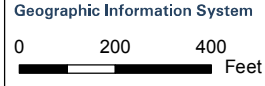
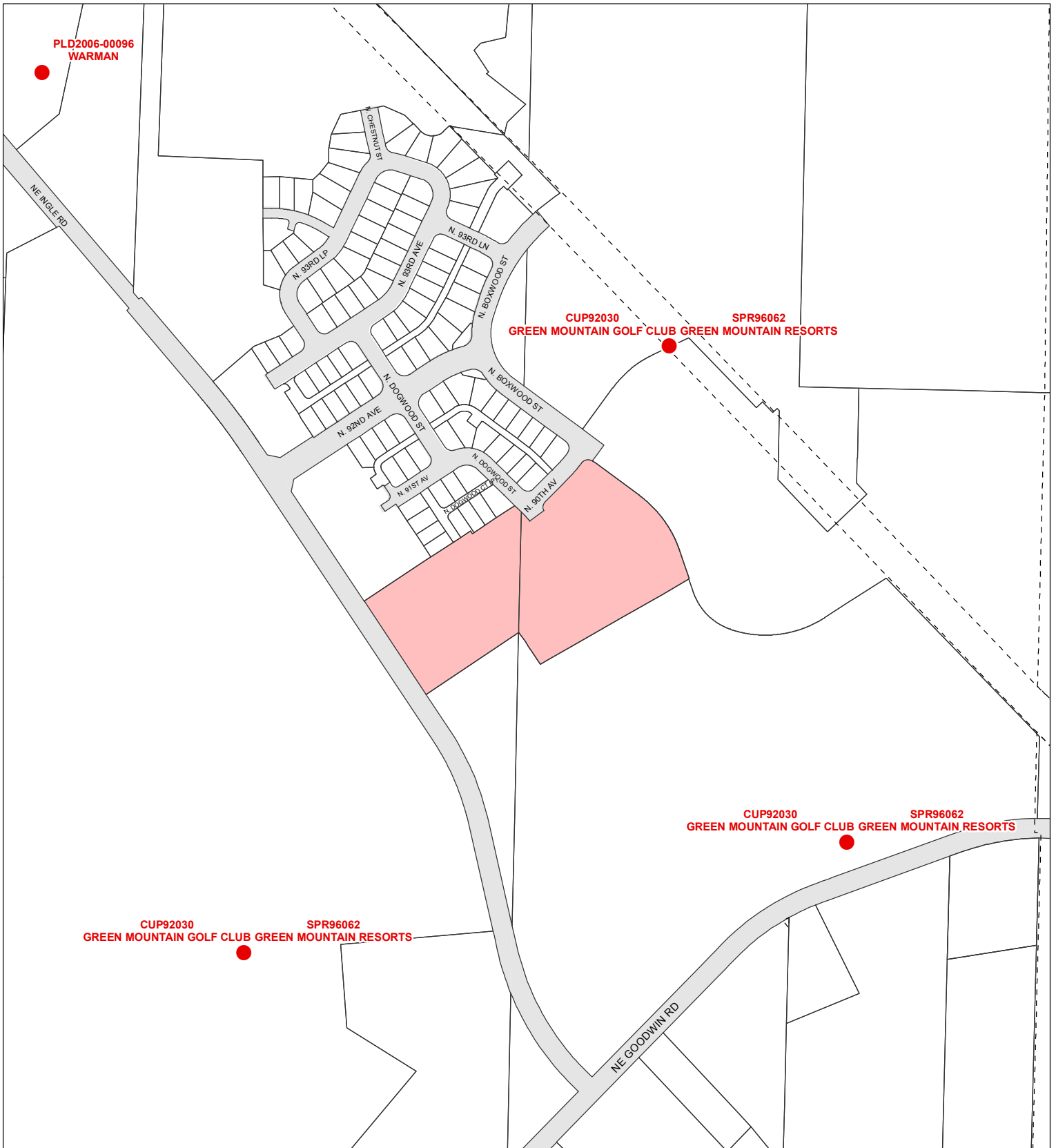
Geographic Information System

0 200 400 Feet

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- Subject Property(s)
- Public Road
- Transportation or Major Utility Easement
- Slopes > 15%
- Potentially Unstable Slope
- Historic or Active Landslide
- Severe Erosion Hazard Areas
- CCHR Historic Site
- NRHP Historic Site
- INV Historic Site

23117	23116	23115
23120	23121	23122
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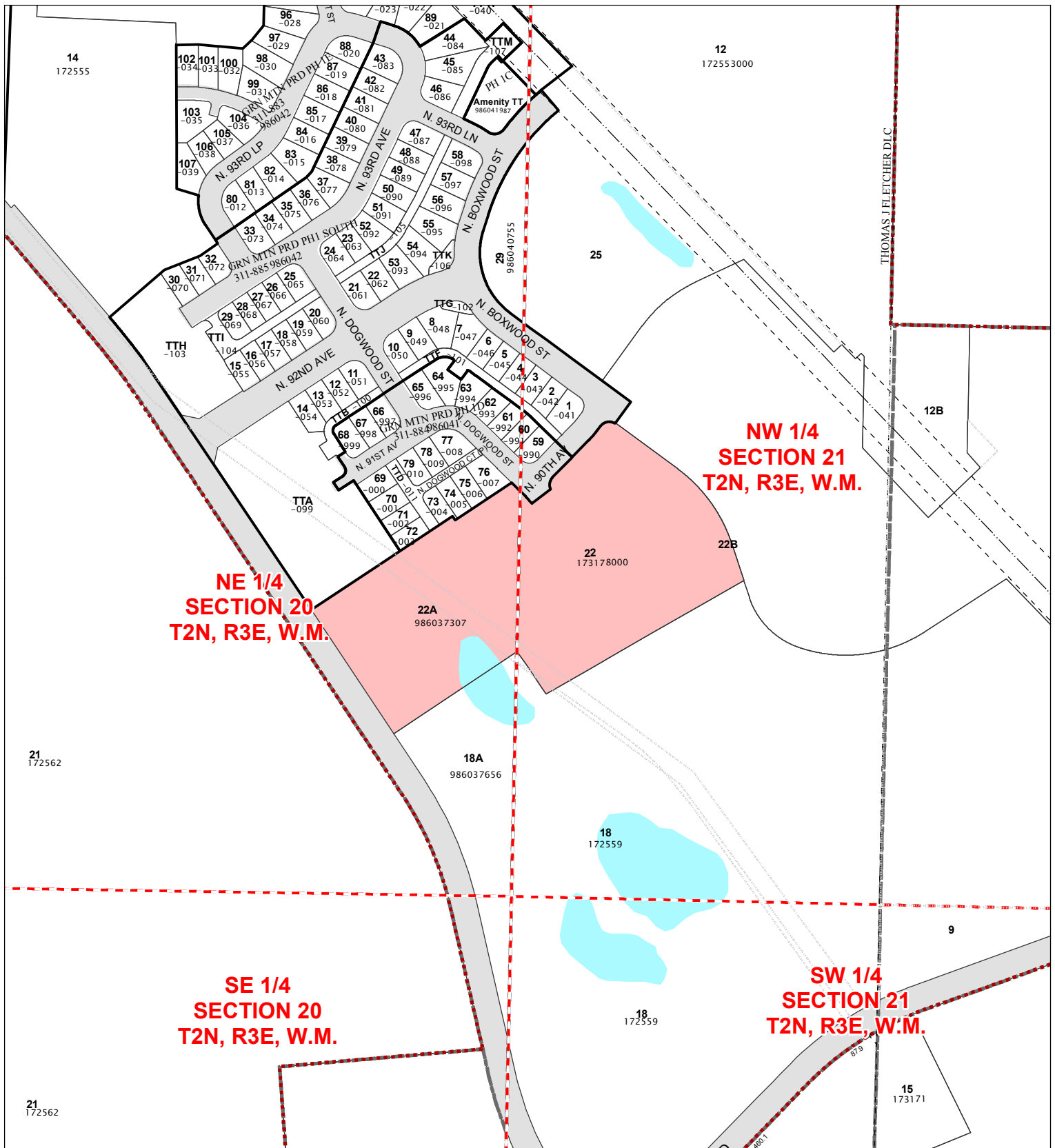
Adjacent Development

Account: 986037307, 173178000
 Owner: AE GREEN MOUNTAIN LLC
 Address: 2551 W 1ST ST
 C/S/Z: WASHOUGAL, WA 98671

- Subject Property(s)
- Public Road
- Transportation or Major Utility Easement
- Adjacent Development

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CLARK COUNTY, WASHINGTON

Geographic Information System

0 150 300 Feet

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Quarter Section Parcels

Account: 986037307, 173178000
 Owner: AE GREEN MOUNTAIN LLC
 Address: 2551 W 1ST ST
 C/S/Z: WASHOUGAL, WA 98671

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23129	23128	23127

Subdivision Lines

Donation Land Claim

Section Quarters

City Boundaries

Subject Property(s)

Road Right of Way - Actual Road May not Exist

Transportation or Major Utility Easement

PROJECT DESCRIPTION:

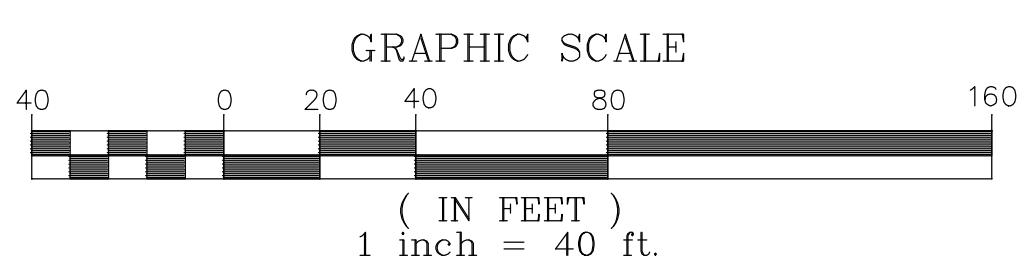
APPROVAL TO SUBDIVIDE B1 POD OF THE GREEN MOUNTAIN PRD DEVELOPMENT INTO A TOTAL OF 128 RESIDENTIAL LOT(S) FOR A COMBINATION OF ATTACHED AND DETACHED SINGLE FAMILY HOMES

DESIGN & DEVELOPMENT TEAM

PROPERTY OWNER: AE GREEN MOUNTAIN LLC
2551 W 1st STREET
WASHOUGAL WA, 98671

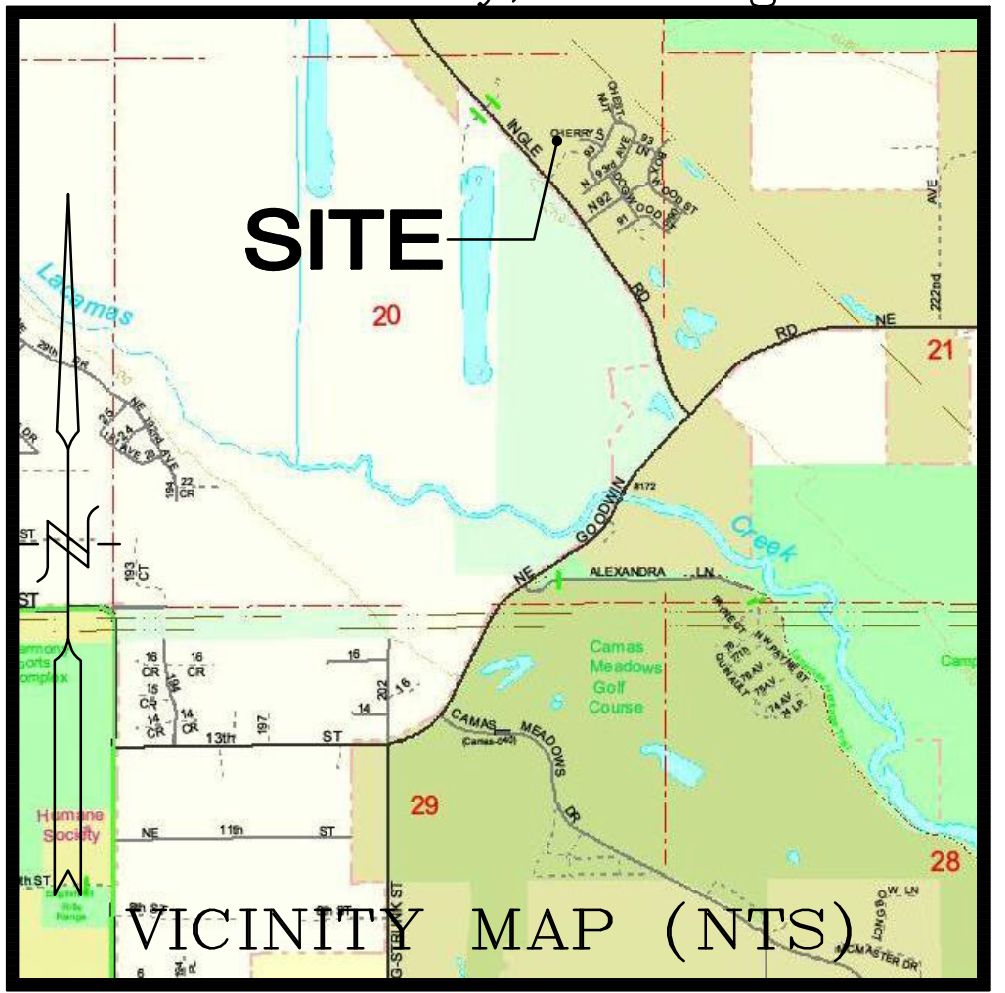
CIVIL ENGINEER/
LAND USE PLANNING: STERLING DESIGN, INC.
JOEL STIRLING, PE
2208 E. EVERGREEN BLVD.
VANCOUVER, WA 98661
(360) 759-1794
FAX: (360) 759-4983
EMAIL: Joel@SterlingDesign.biz

SURVEYOR: OLSEN ENGINEERING
222 E. EVERGREEN BLVD.
VANCOUVER, WA, 98660
PH: (360) 695-1385
FAX: (360) 695-8117
EMAIL: SURVEYING@OLSENENGR.COM



GREEN MOUNTAIN PRD

A Preliminary Plat within a portion of the NE 1/4 of Sec. 20, T2N., R3E., W.M. Clark County, Washington



SHEET INDEX

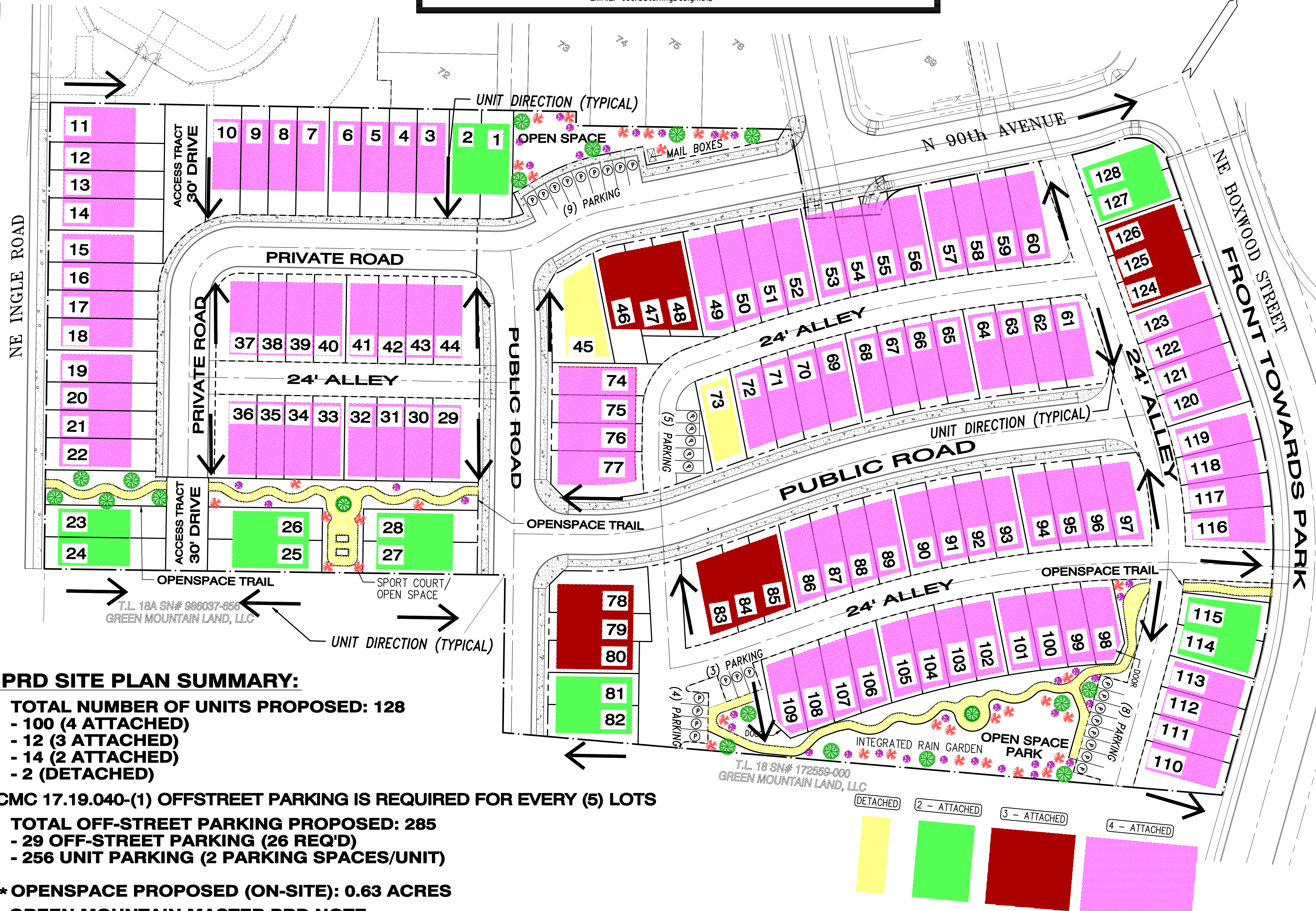
- PRD SITE PLAN COVER SHEET
- APPROVED GREEN MOUNTAIN PRD DEVELOPMENT STD'S & PHASING PLAN
- EXISTING CONDITIONS PLAN
- PRELIMINARY DEVELOPMENT PLAN B1-POD SOUTH
- PRELIMINARY GRADING PLAN
- PRELIMINARY ENGINEERING PLAN
- STORM FACILITY DESIGN (EXAMPLE FROM ADJACENT PROJECT)
- PRELIMINARY LANDSCAPE PLAN

LEGEND

- CURB & SIDEWALK
- PROPOSED EASEMENT
- PROPOSED LOT LINE
- EXISTING RIGHT-OF-WAY
- PROPOSED SANITARY SEWER LINE
- PROPOSED STORM SEWER LINE
- PROPOSED PERFORATED STORM LINE
- PROPOSED ROADWAY CENTERLINE
- EXISTING ELECTRIC
- EXISTING TELEPHONE LOCATE PAINT
- EXISTING WATER LOCATE PAINT
- EXISTING EDGE OF PAVEMENT/GRAVEL
- EXISTING SANITARY SEWER LINE
- EXISTING STORM LINE
- EXISTING FENCE
- EXISTING GROUND CONTOUR
- PROPOSED GROUND CONTOUR (1')
- DIRECTION OF STORMWATER FLOW
- EROSION CONTROL SILT FENCE
- INLET PROTECTION
- PROPOSED SANITARY CLEANOUT
- PROPOSED FIRE HYDRANT
- STD 1" WATER METER SERVICE
- PROPOSED MANHOLE
- PROPOSED DRYWELL
- PROPOSED CATCH BASIN
- PROPOSED COMBINATION CURB INLET
- PROPOSED STORMFILTER
- EXISTING POWER POLE WITH NUMBER AND DIRECTION OF OVERHEAD LINES
- EXISTING GUY ANCHOR
- EXISTING TELEPHONE PEDESTAL
- EXISTING STORM DRAIN MANHOLE
- EXISTING CATCH BASIN
- EXISTING ADA RAMP
- EXISTING ELECTRICAL SERVICE BOX
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY CLEANOUT
- EXISTING FIRE HYDRANT
- EXISTING WATER SERVICE
- EXISTING WATER VALVE
- PROPOSED STREET TREES 30' O.C.
- PROPOSED STREET LIGHT 70' SPACING

SITE DATA:

- TAX LOT(S): 22A, 22B & 22
- SERIAL NUMBER(S): 986037-307 & 173178-000
- SITE ADDRESS: NOT SITUATED
- AREA: 7.89 ACRES
- ZONING: MF-18
- COMPREHENSIVE PLAN: MFL



PRD SITE PLAN SUMMARY:

- TOTAL NUMBER OF UNITS PROPOSED: 128
- 100 (4 ATTACHED)
- 12 (3 ATTACHED)
- 14 (2 ATTACHED)
- 2 (DETACHED)

CMC 17.19.040-(1) OFFSTREET PARKING IS REQUIRED FOR EVERY (5) LOTS

- TOTAL OFF-STREET PARKING PROPOSED: 285
- 29 OFF-STREET PARKING (26 REQ'D)
- 256 UNIT PARKING (2 PARKING SPACES/UNIT)

* OPENSOURCE PROPOSED (ON-SITE): 0.63 ACRES

GREEN MOUNTAIN MASTER PRD NOTE:

- *REFER TO THE APPROVED GREEN MOUNTAIN DEVELOPMENT STANDARDS & PHASING PLAN FOR:
- OPEN SPACE DEDICATION THAT HAS BEEN COMPLETED AND APPROVED WITH GREEN MOUNTAIN PRD DEVELOPMENT STANDARDS & PHASING PLAN.
- DENSITY AND SETBACKS REQUIREMENTS FOR THIS PROJECT HAVE BEEN OUTLINED WITH THE GREEN MOUNTAIN PRD DEVELOPMENT STANDARDS & PHASING PLAN AS DEPICTED ON SHEET 2 OF 8.

PREPARED BY:
STERLING DESIGN, INC.
2208 E. EVERGREEN BLVD
VANCOUVER, WA 98661
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Mail@SterlingDesign.biz

STERLING
DESIGN, INC.

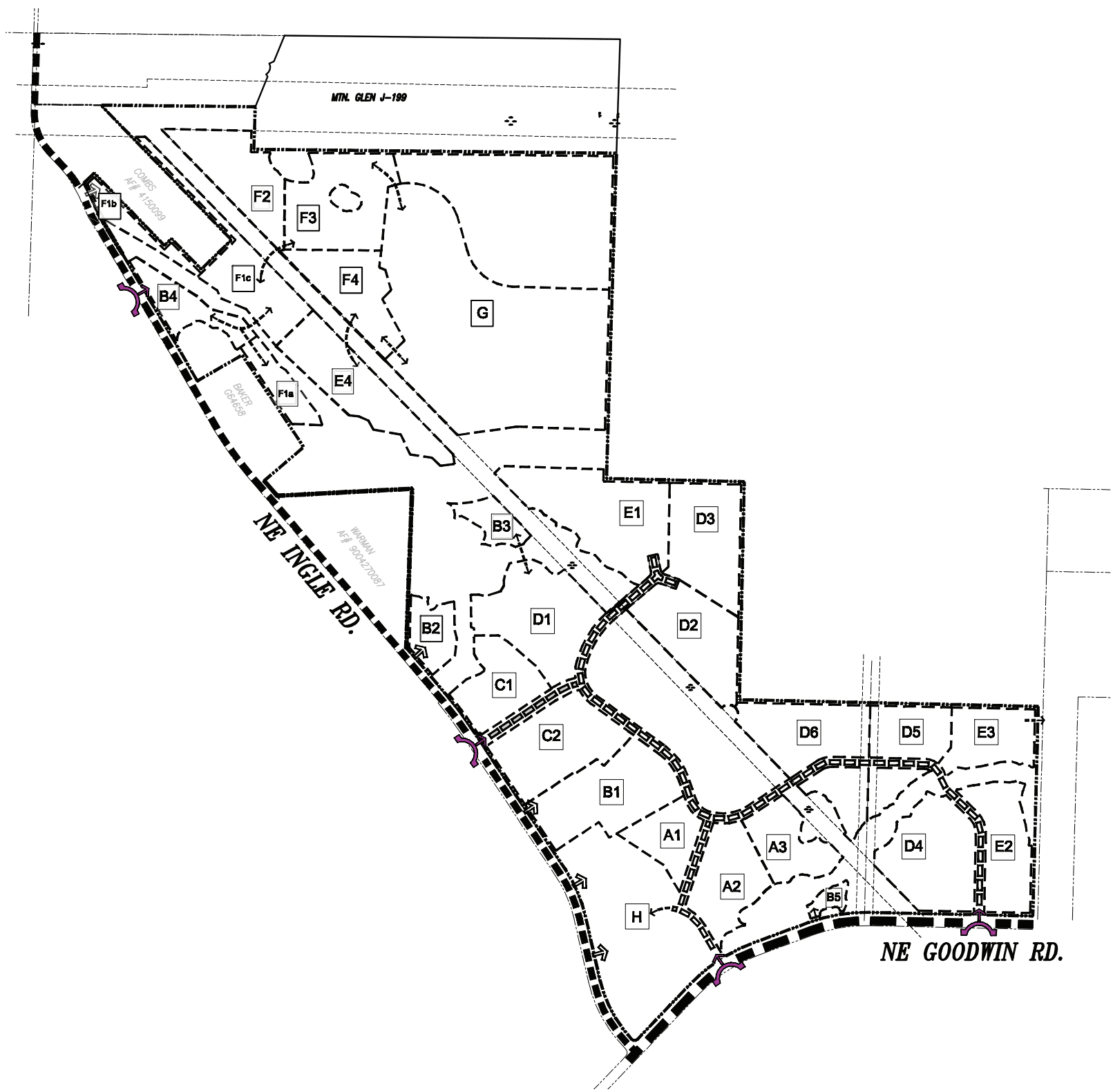
PRD SITE PLAN
COVER SHEET

Project:
GREEN MOUNTAIN
B1 POD

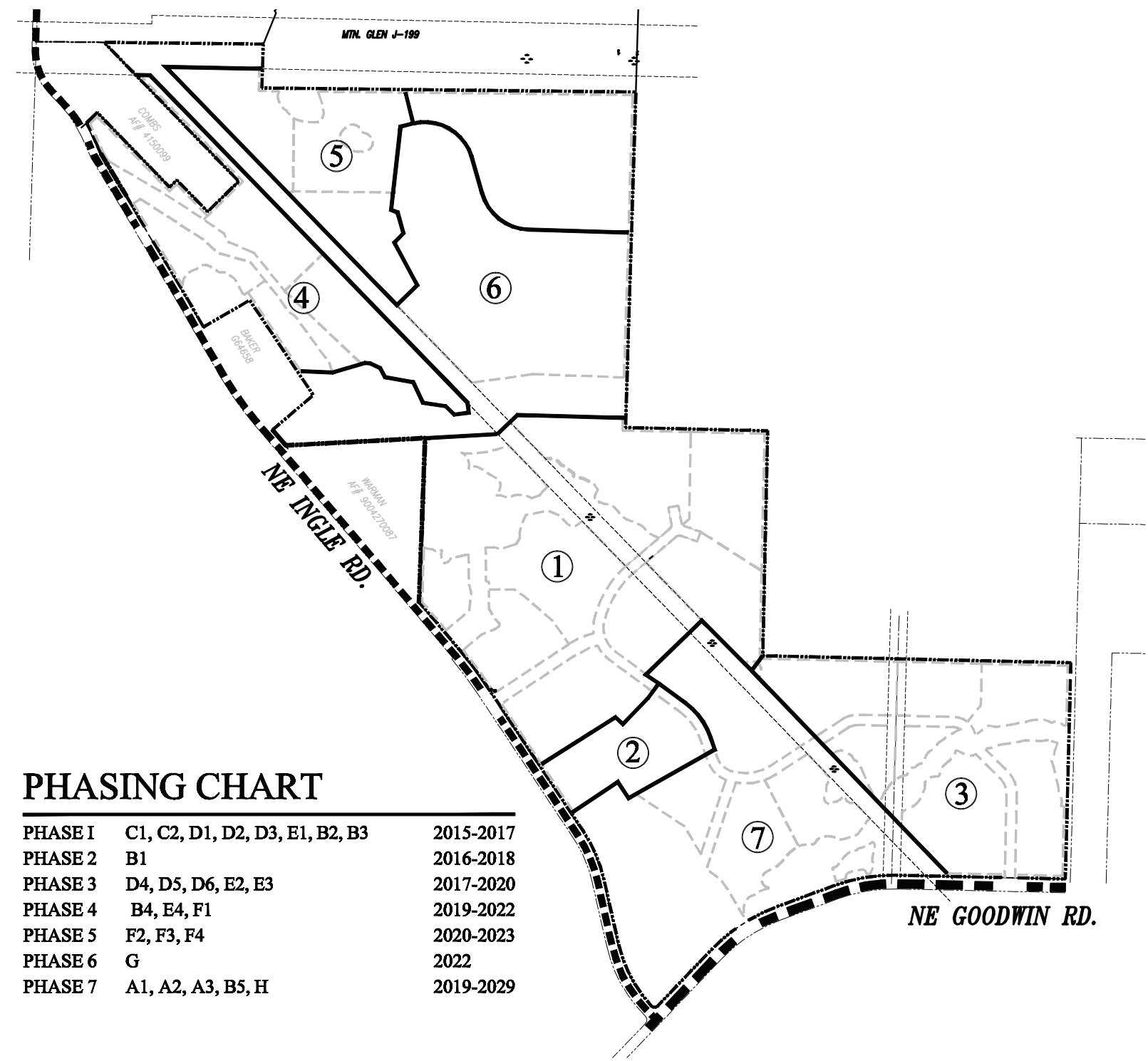


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Project Number: 791
Design/Drawn: JGS/BC
Drawing Date: OCT. 2018
Sheet 1 of 8 Sheet(s)

GREEN MOUNTAIN
DEVELOPMENT STANDARDS & PHASING PLAN



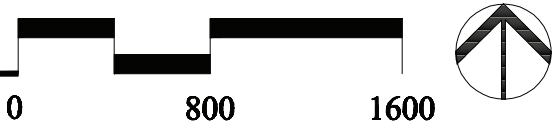
PLANNING UNITS



PHASING CHART

PHASE 1	C1, C2, D1, D2, D3, E1, B2, B3	2015-2017
PHASE 2	B1	2016-2018
PHASE 3	D4, D5, D6, E2, E3	2017-2020
PHASE 4	B4, E4, F1	2019-2022
PHASE 5	F2, F3, F4	2020-2023
PHASE 6	G	2022
PHASE 7	A1, A2, A3, B5, H	2019-2029

PHASING PLAN



PLANNING STANDARDS

URBAN VILLAGE AREA

URBAN VILLAGE AREA - Mixed Use, Community Commercial, A and B PODs	
Urban Village Area	Minimum of 8.8 acres with ground floor Employment/Commercial Use (as provided for in 18.07.030 Table 1). Allow horizontal and vertical Mixed Use PODs H, A1, A2, A3, B5 and 100 Units at the Village Center

DENSITY & DIMENSIONS

Green Mountain PRD PODs A-G and corresponding Camas Zones

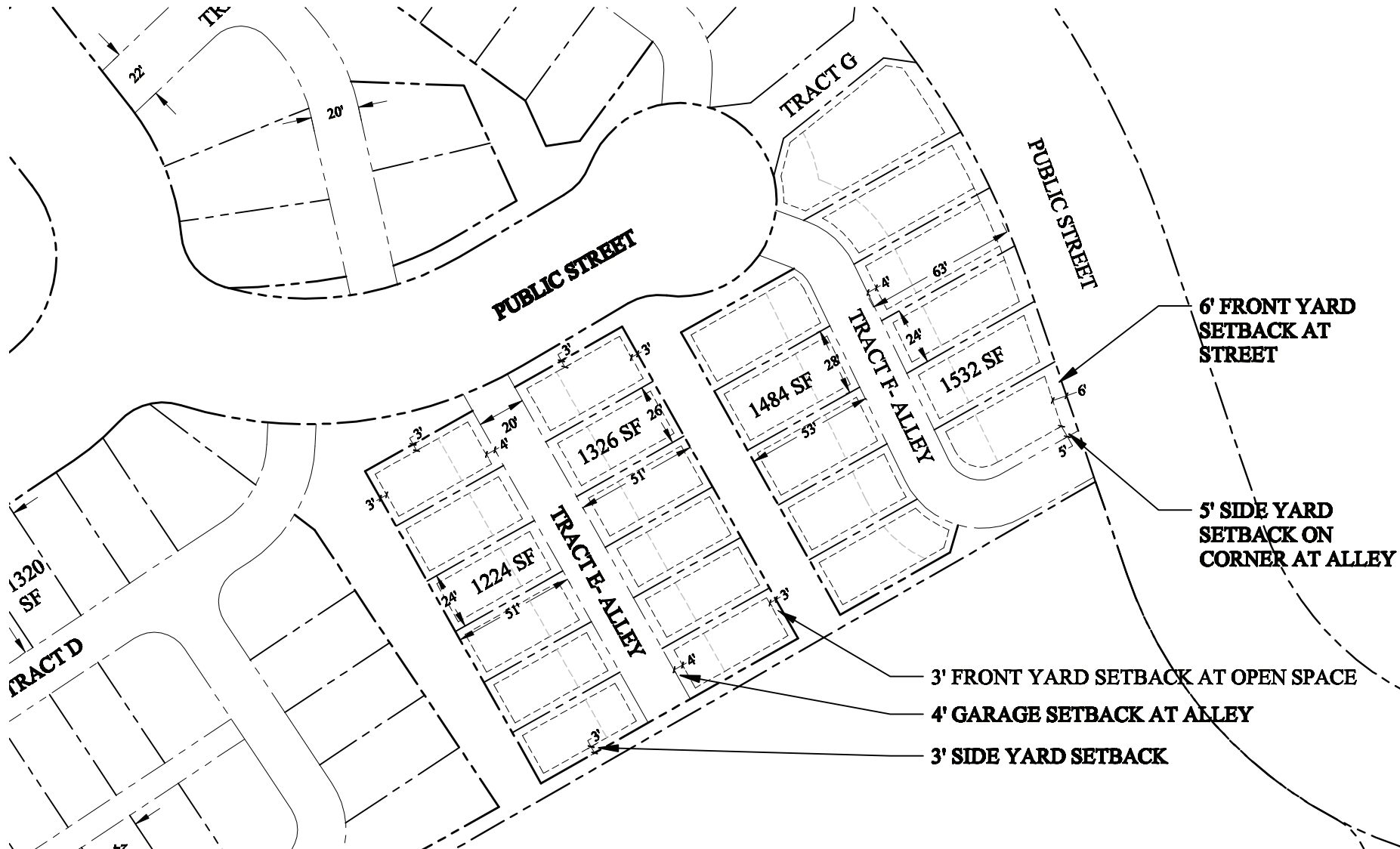
	A POD	B POD	C POD
DENSITY	MF-24	MF-18	MF-10
Max. du./gross ac.	24	18	10
Min. du./gross ac.	6	6	6
STANDARD LOTS			
Min. lot SF	1,000 [a]	1,000[a]	3,000 [a]
Min. lot width	20	20	30
Min. lot depth	50	50	70
Max. Floor Area per du.	No Max	No Max	No Max
SETBACKS			
Min. front/at garage	None	6/3@05/18	10/18
Min. side	3 [1]	3 [1] [d]	3 [1] [d]
Min. side flanking street	None [e]	10 [d]	10 [d]
Min. rear (garage @alley)	None [e]	10 [b][c]	10[b][c]
LOT COVERAGE, Max.	None [c]	None	55%
BUILDING HEIGHT, Max.		45 [2]	35 [2]

- a. Single Family Detached homes to be permitted. For SFD in A POD apply B Pod setbacks.
b. 10 foot rear yard for front access garage.
c. Minimum rear yard for alley accessed garage is either 4' or 18'.
d. Minimum side yard at alley is 5'.
e. Franchise utilities to be located in front or side yard easements abutting right of way.
1. The non-attached side of a dwelling unit shall be three feet, otherwise a zero-lot line is assumed.
2. Maximum building height: three stories and a basement but not to exceed maximum building height.

Density Transfer Lots	D POD	E POD	F POD	G POD
DENSITY	R-5	R-6	R-7.5	R-20
Max. du./gross ac.	8.7	7.2	5.8	2.1
DENSITY TRANSFER LOTS				
Min. lot size (sq. ft.)	3,500 [a]	4,200	5250	14,000
Max. lot size (sq. ft.)	7,600	9,000	14,999	60,000
Min. lot width	40	50	60	90
Min. lot depth	80	80	80	100
LOT COVERAGE, Max.	45%	40%	40%	30%
BUILDING HEIGHT, MAX. (ft.)	35	35	35	35
SETBACKS based on lot size				
Min. front/at garage	Up to 4,999 sq. ft.	5,000 to 7,499 sq. ft.	7,500 to 14,999 sq. ft.	15,000 to 60,000 sq. ft.
Min. front/at garage	10/18	15/18	20	30
Min. side and corner lot rear yard (ft.)	4	5	5	15
Min. side yard flanking a street	10[d]	15[d]	15	30
Min. rear (garage @alley)	15[b][c]	20[b][c]	20[b][c]	30
Min. lot frontage on a cul-de-sac or curves (ft.)	25	30	30	40

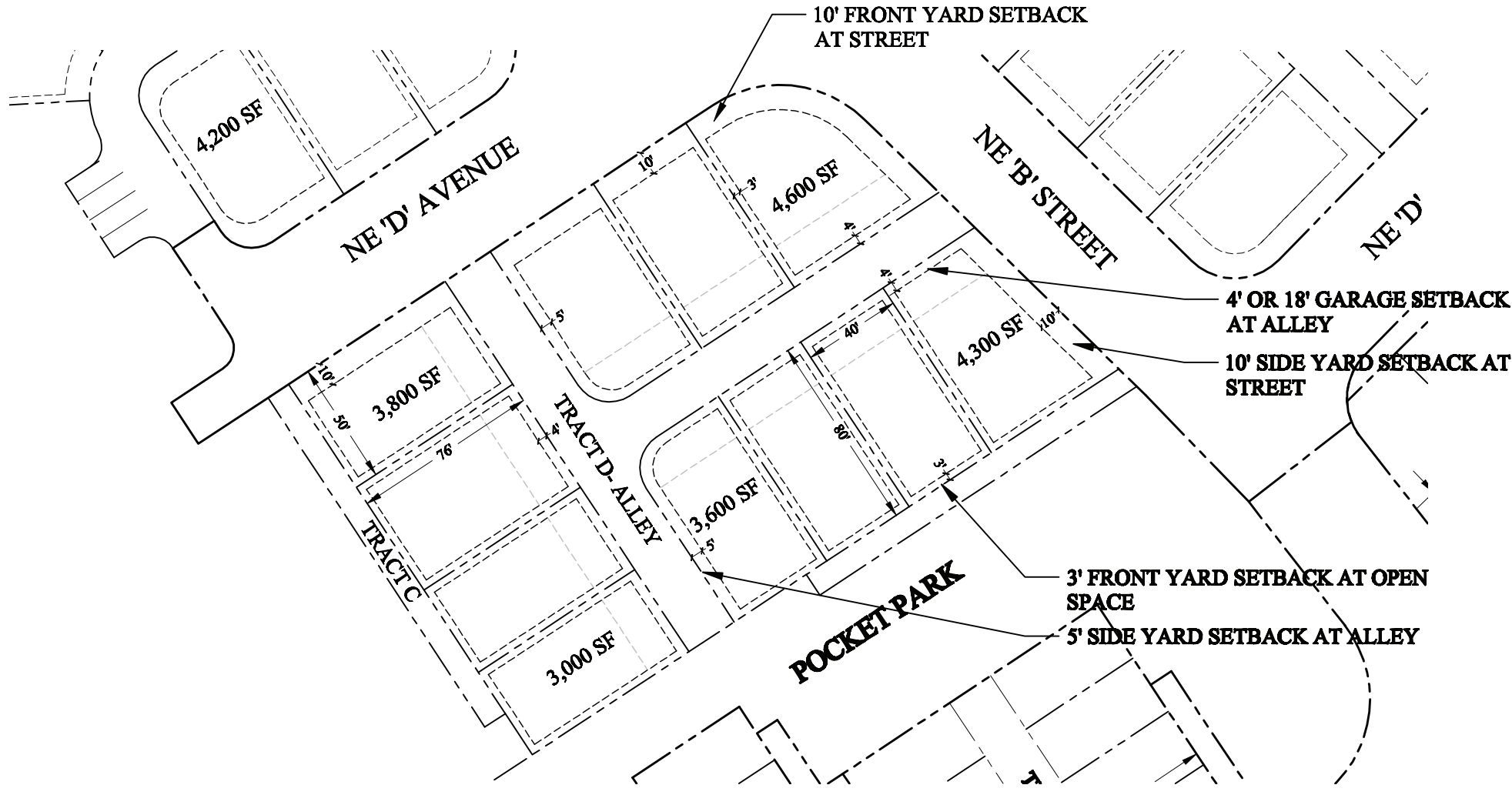
- a. Single Family detached homes to be permitted.
b. 10 foot rear yard for front access garage.
c. Minimum rear yard for alley accessed garage is either 4' or 18'.
d. Minimum side yard at alley is 5'.
NOTE: POD lot sizes are not subject to lot size averaging.

CAMAS, WASHINGTON
GREEN MOUNTAIN LAND, LLC.



POD B- TYPICAL LOT & DEVELOPMENT PATTERNS

LOT DIMENSIONS & BUILDING ENVELOPES



POD C- TYPICAL LOT & DEVELOPMENT PATTERNS

LOT DIMENSIONS & BUILDING ENVELOPES



Land Planning
Landscape
Architecture

P.O. BOX 2392
LAKE OSWEGO, OR
97035
503-294-0222

SCALE: AS NOTED

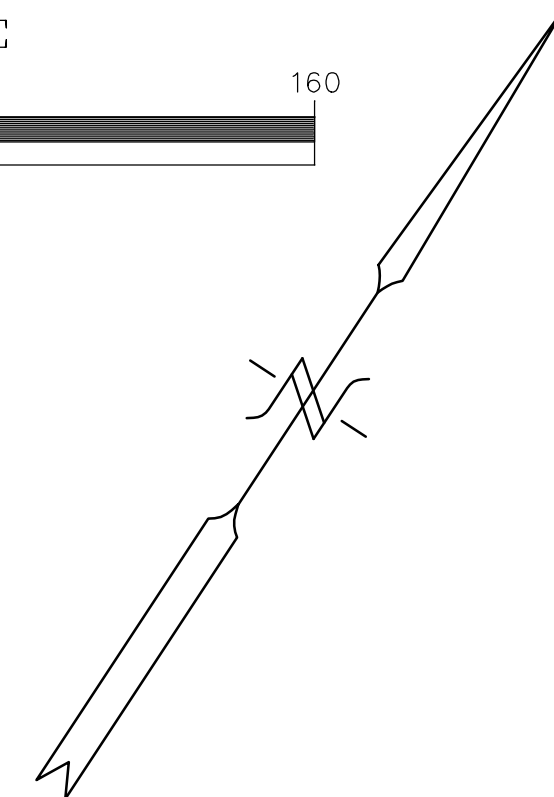
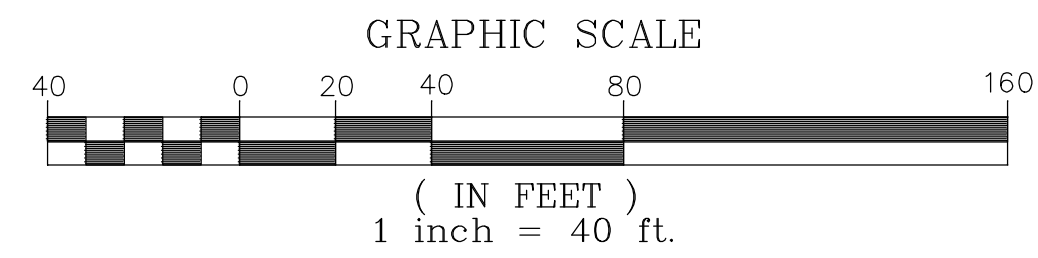
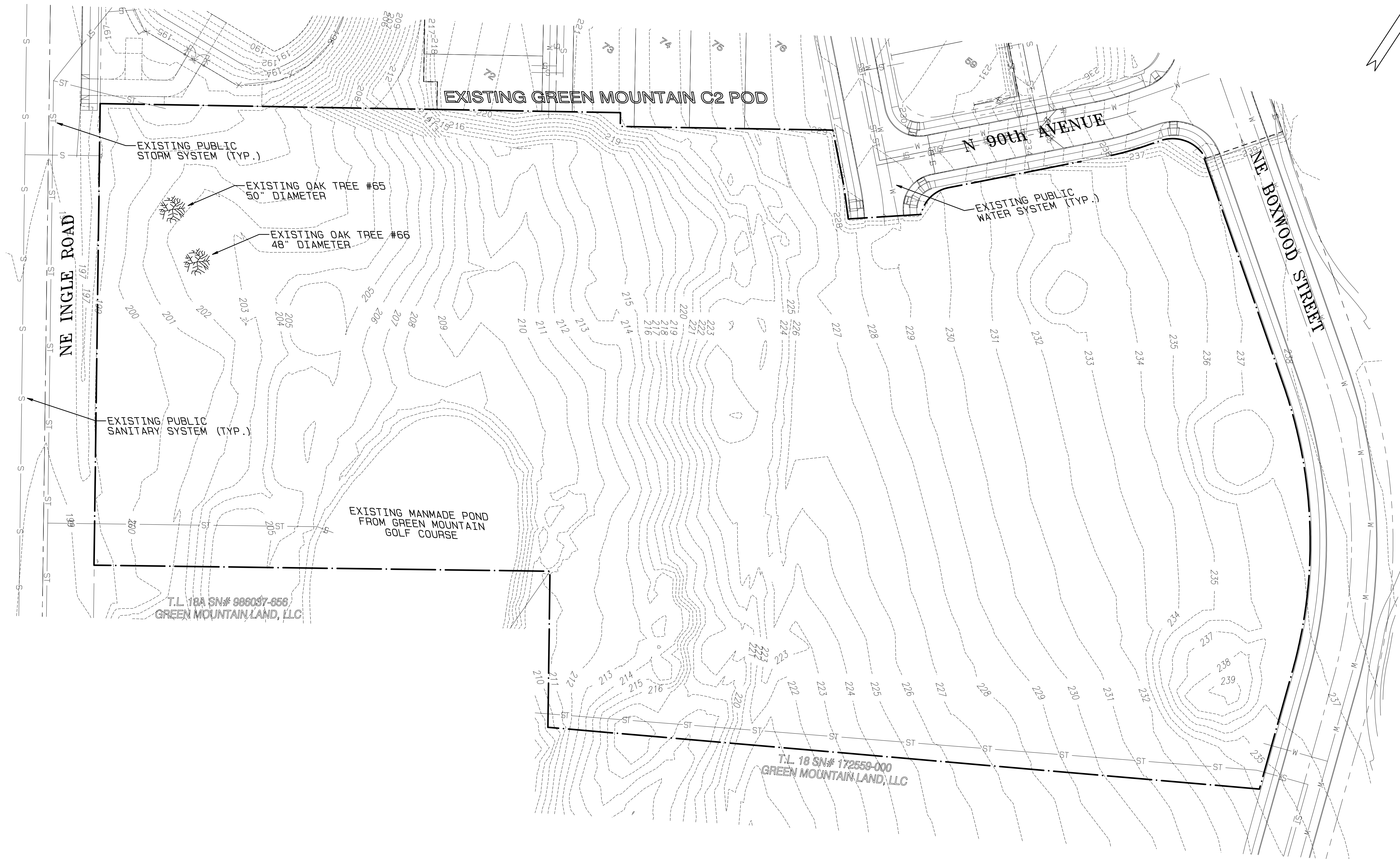
DESIGNED BY: WPH
DRAWN BY: SH
CHECKED BY: WPH

DATE: 01/29/15
REVISED:



WILLIAM F. HORNING
CERTIFICATE NO. 382

GREEN MOUNTAIN
DEVELOPMENT STANDARDS & PHASING PLAN
GREEN MOUNTAIN LAND, LLC.
CAMAS, WASHINGTON



SITE DATA:

- TAX LOT(S): 22A, 22B & 22
- SERIAL NUMBER(S): 986037-307 & 173178-000
- SITE ADDRESS: NOT SITUATED
- AREA: 7.89 ACRES
- ZONING: MF-18
- COMPREHENSIVE PLAN: MFL

PREPARED BY:
STERLING DESIGN, INC.
2208 E. EVERGREEN BLVD
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FAX (360) 759-4983
Mail@SterlingDesign.biz

**STERLING
DESIGN, INC.**

Sheet Description:
**EXISTING CONDITIONS
PLAN**

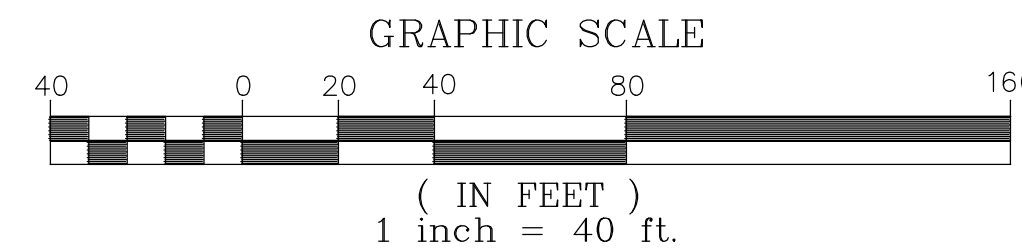
Project:
**GREEN MOUNTAIN
B1 POD**



Scale: **AS SHOWN**
Project Number: **791**
Design/Drawn: **JGS/BC**
Drawing Date: **OCT. 2018**
Sheet **3** of **8** Sheet(s)

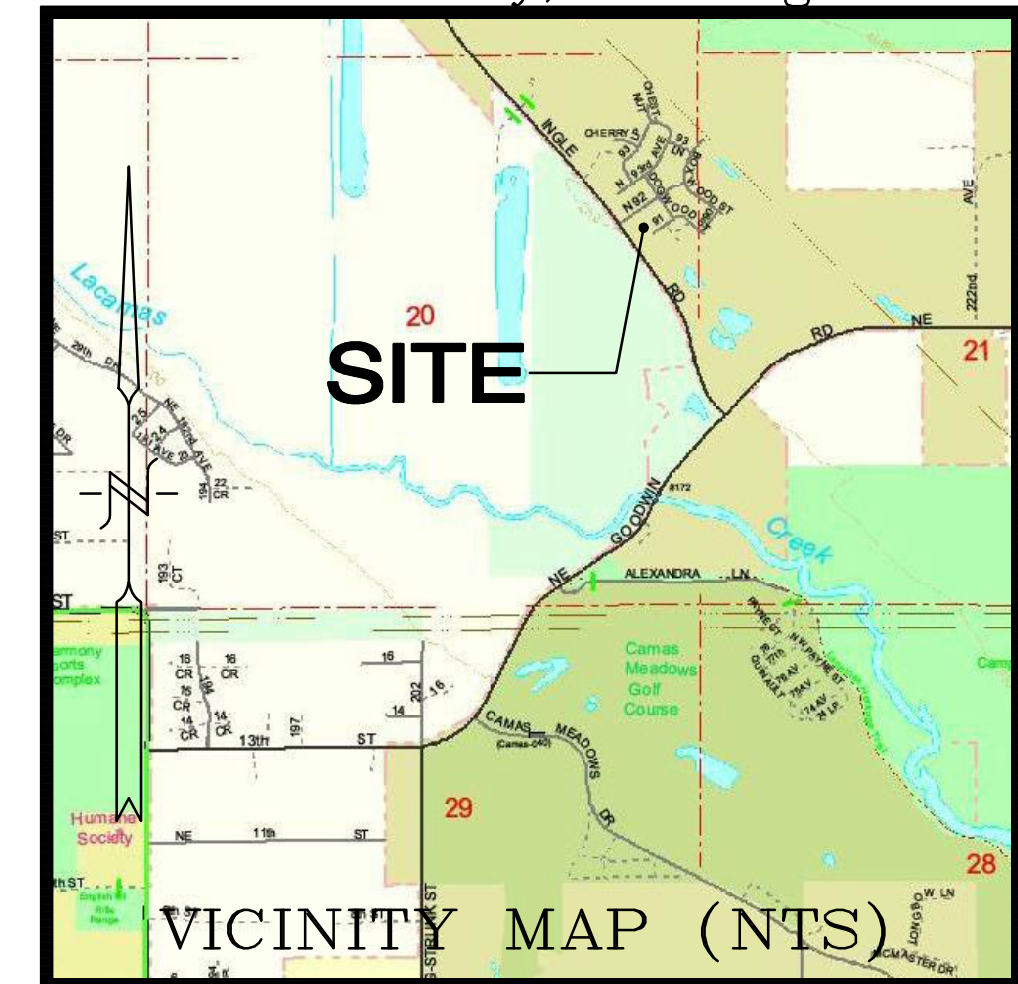
GREEN MOUNTAIN MASTER PRD NOTE:

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GREEN MOUNTAIN PRD

A Preliminary Plat within
a portion of the NE 1/4 of
Sec. 20, T2N., R3E., W.M.
Clark County, Washington



SITE DATA:

- TAX LOT(S): 22A, 22B & 22
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- SITE ADDRESS: NOT SITUATED
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- COMPREHENSIVE PLAN: MFL

CENTERLINE CURVE DATA

- | | |
|--|---|
| ① R=35.00ft
CH=49.60ft
A=55.12ft
T=35.15ft
EX=14.60ft
Delta=90 14'16" | ⑦ R=301.00ft
CH=48.51ft
A=48.56ft
T=24.33ft
EX=0.98ft
Delta=9 14'38" |
| ② R=70.00ft
CH=38.97ft
A=39.49ft
T=20.28ft
EX=2.88ft
Delta=32 19'17" | ⑧ R=699.00ft
CH=156.76ft
A=157.09ft
T=78.88ft
EX=4.44ft
Delta=12 52'34" |
| ③ R=100.00ft
CH=34.95ft
A=35.13ft
T=17.75ft
EX=1.56ft
Delta=20 07'40" | ⑨ R=269.46ft
CH=150.64ft
A=152.67ft
T=78.45ft
EX=11.19ft
Delta=32 27'48" |
| ④ R=1000.00ft
CH=98.32ft
A=98.36ft
T=49.22ft
EX=1.21ft
Delta=5 38'08" | ⑩ R=903.00ft
CH=202.51ft
A=202.93ft
T=101.90ft
EX=5.73ft
Delta=12 52'34" |
| ⑤ R=200.00ft
CH=70.78ft
A=71.16ft
T=35.96ft
EX=3.21ft
Delta=20 23'08" | ⑪ R=35.00ft
CH=39.96ft
A=42.53ft
T=24.33ft
EX=7.63ft
Delta=69 36'52" |
| ⑥ R=200.00ft
CH=70.78ft
A=71.16ft
T=35.96ft
EX=3.21ft
Delta=20 23'08" | |
| ⑥ R=800.00ft
CH=179.41ft
A=179.79ft
T=90.27ft
EX=5.08ft
Delta=12 52'34" | |

***APPROVED w/PRD MASTER PLAN**

Green Mountain PRD PODs A-G and corresponding Camas Zones

	A POD	B POD*	C POD
DENSITY	MF-24	MF-18	MF-10
Max. du./gross ac	24	18	10
Min. du./gross ac	6	6	6
STANDARD LOTS			
Min. lot SF	1,000 [a]	1,000[a]	3,000 [a]
Min. lot width	20	20	30
Min. lot depth	80	50	70
Max. Floor Area per du	No Max	No Max	No Max
SETBACKS			
Min. front/at garage	None	6/3@OS/18	10/18
Min. side	3 [1]	3 [1] [d]	3 [1] [d]
Min. side Flanking Street	None [e]	10 [d]	10 [d]
Min. rear [garage @alley]	None [e]	10 [b][c]	10 [b][c]
LOT COVERAGE, Max.	None [c]	None	55%
BUILDING HEIGHT, Max.	80	45 [2]	35 [2]

a. Single Family Detached homes to be permitted. For SFD in A POD apply B Pod setbacks.

b. 10 foot rear yard for front access garage.

c. Minimum rear yard for alley accessed garage is either 4' or 18'.

d. Minimum side yard at alley is 5'.

e. Franchise utilities to be located in front or side yard easements abutting right of way.

1. The non-attached side of a dwelling unit shall be three feet, otherwise a zero-lot line is assumed.
2. Maximum building height: three stories and a basement but not to exceed maximum building height.

PROPOSED PRELIMINARY PLAT SUMMARY:

Total Lots: 128
Total Site Area:
Minimum Lot Area:
Maximum Lot Area:
Average Lot Area:
Public Right of Way Dedication:
Privated Road Dedication:
Alleys:
Access Tract:
*** Openspace:**

*** PROPOSED SITE DENSITY: 16.2 LOTS/ACRE**

35,368, 840 sf (7.89 Acres)
1,200 sf.
2,736 sf
1,568 sf
50,435 sf
15,080 sf
42,878 sf
5,471 sf
28,610 sf

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FAX (360) 759-4993
Mail@SterlingDesign.biz

STERLING
DESIGN, INC.

Sheet Description:
**PROPOSED DEVELOPMENT
PLAN**

Project:
**GREEN MOUNTAIN
B1 POD**



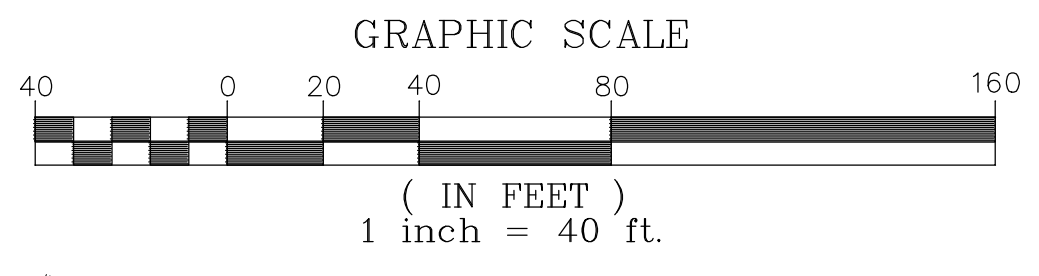
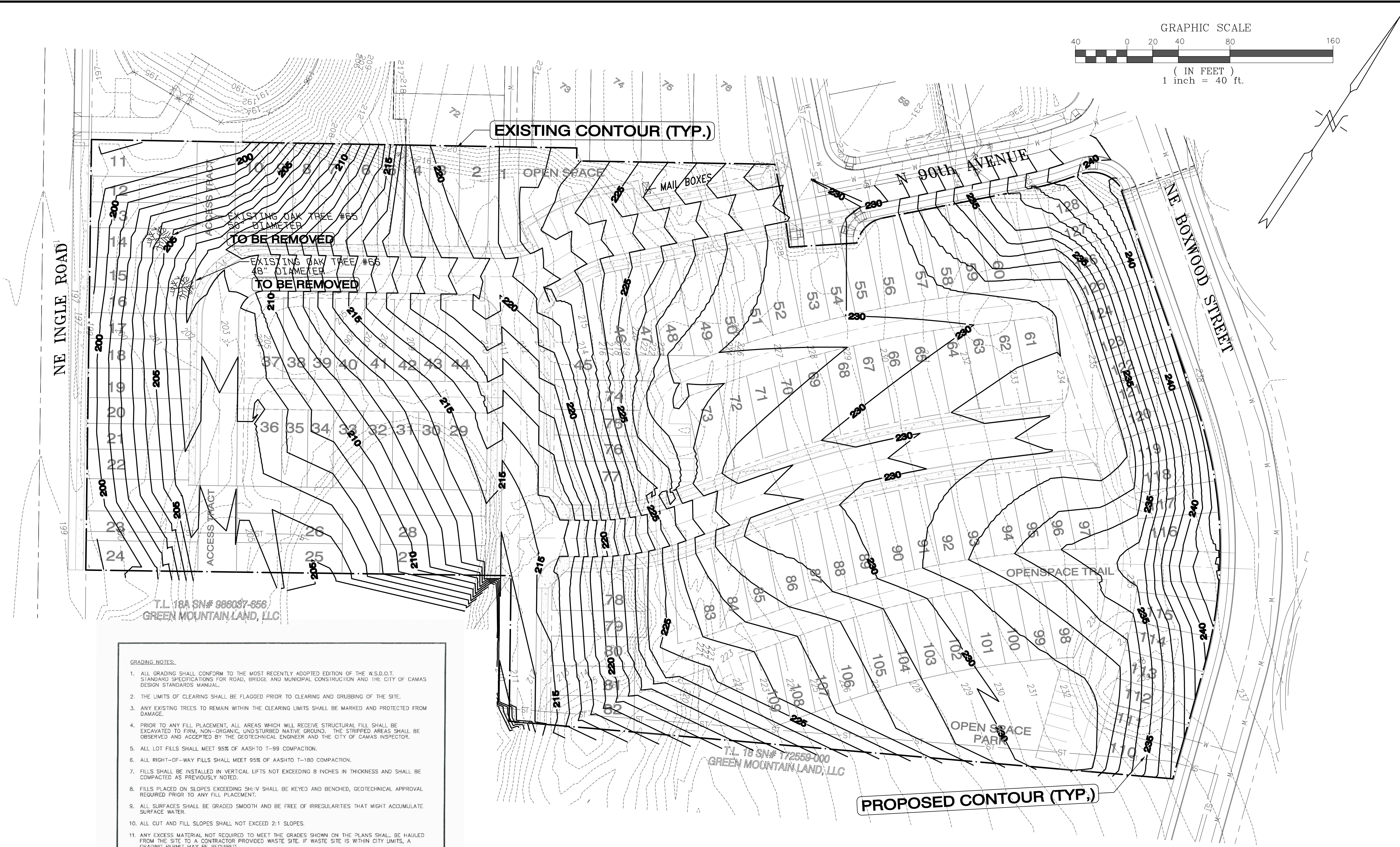
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Project Number: 791

Design/Drawn: JGS/BC

Drawing Date: OCT. 2018

Sheet 4 of 8 Sheet(s)



- GRADING NOTES:
1. ALL GRADING SHALL CONFORM TO THE MOST RECENTLY ADOPTED EDITION OF THE W.S.D.O.T. STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION AND THE CITY OF CAMAS DESIGN STANDARDS MANUAL.
 2. THE LIMITS OF CLEARING SHALL BE FLAGGED PRIOR TO CLEARING AND GRUBBING OF THE SITE.
 3. ANY EXISTING TREES TO REMAIN WITHIN THE CLEARING LIMITS SHALL BE MARKED AND PROTECTED FROM DAMAGE.
 4. PRIOR TO ANY FILL PLACEMENT, ALL AREAS WHICH WILL RECEIVE STRUCTURAL FILL SHALL BE EXCAVATED TO FIRM, NON-ORGANIC, UNDISTURBED NATIVE GROUND. THE STRIPPED AREAS SHALL BE OBSERVED AND ACCEPTED BY THE GEOTECHNICAL ENGINEER AND THE CITY OF CAMAS INSPECTOR.
 5. ALL LOT FILLS SHALL MEET 95% OF AASHTO T-99 COMPACTION.
 6. ALL RIGHT-OF-WAY FILLS SHALL MEET 95% OF AASHTO T-180 COMPACTION.
 7. FILLS SHALL BE INSTALLED IN VERTICAL LIFTS NOT EXCEEDING 8 INCHES IN THICKNESS AND SHALL BE COMPACTED AS PREVIOUSLY NOTED.
 8. FILLS PLACED ON SLOPES EXCEEDING 5H:1V SHALL BE KEYED AND BENCHED, GEOTECHNICAL APPROVAL REQUIRED PRIOR TO ANY FILL PLACEMENT.
 9. ALL SURFACES SHALL BE GRADED SMOOTH AND BE FREE OF IRREGULARITIES THAT MIGHT ACCUMULATE SURFACE WATER.
 10. ALL CUT AND FILL SLOPES SHALL NOT EXCEED 2:1 SLOPES.
 11. ANY EXCESS MATERIAL NOT REQUIRED TO MEET THE GRADES SHOWN ON THE PLANS SHALL BE HAULED FROM THE SITE TO A CONTRACTOR PROVIDED WASTE SITE, IF WASTE SITE IS WITHIN CITY LIMITS, A GRADING PERMIT MAY BE REQUIRED.
 12. ALL EXPOSED AND UNWORKED SOILS SHALL BE STABILIZED BY SUITABLE APPLICATION OF EROSION CONTROL BMP'S.
 13. ALL SURFACES REQUIRING VEGETATION SHALL BE ROUGHENED PRIOR TO SEEDING (I.E. WHEEL TRACKED PERPENDICULAR TO SURFACE FLOW TO REDUCE EROSION AND HELP VEGETATION).
 14. FINAL GEOTECHNICAL SUMMARY REPORT, INCLUDING ALL COMPACTION TESTING RESULTS, SHALL BE SUBMITTED UPON COMPLETION OF SITE GRADING WORK.

REV. NO.	DATE	BY	APPR.	CITY OF CAMAS - EROSION CONTROL DETAIL	DETAIL NO.
1	9/18/07	SCD	JC	GRADING NOTES	EC1
2	1/7/11	SCD	JC		

SITE DATA:

- TAX LOT(S): 22A, 22B & 22
- SERIAL NUMBER(S): 986037-307 & 173178-000
- SITE ADDRESS: NOT SITUATED
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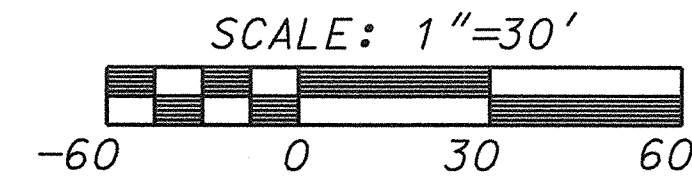
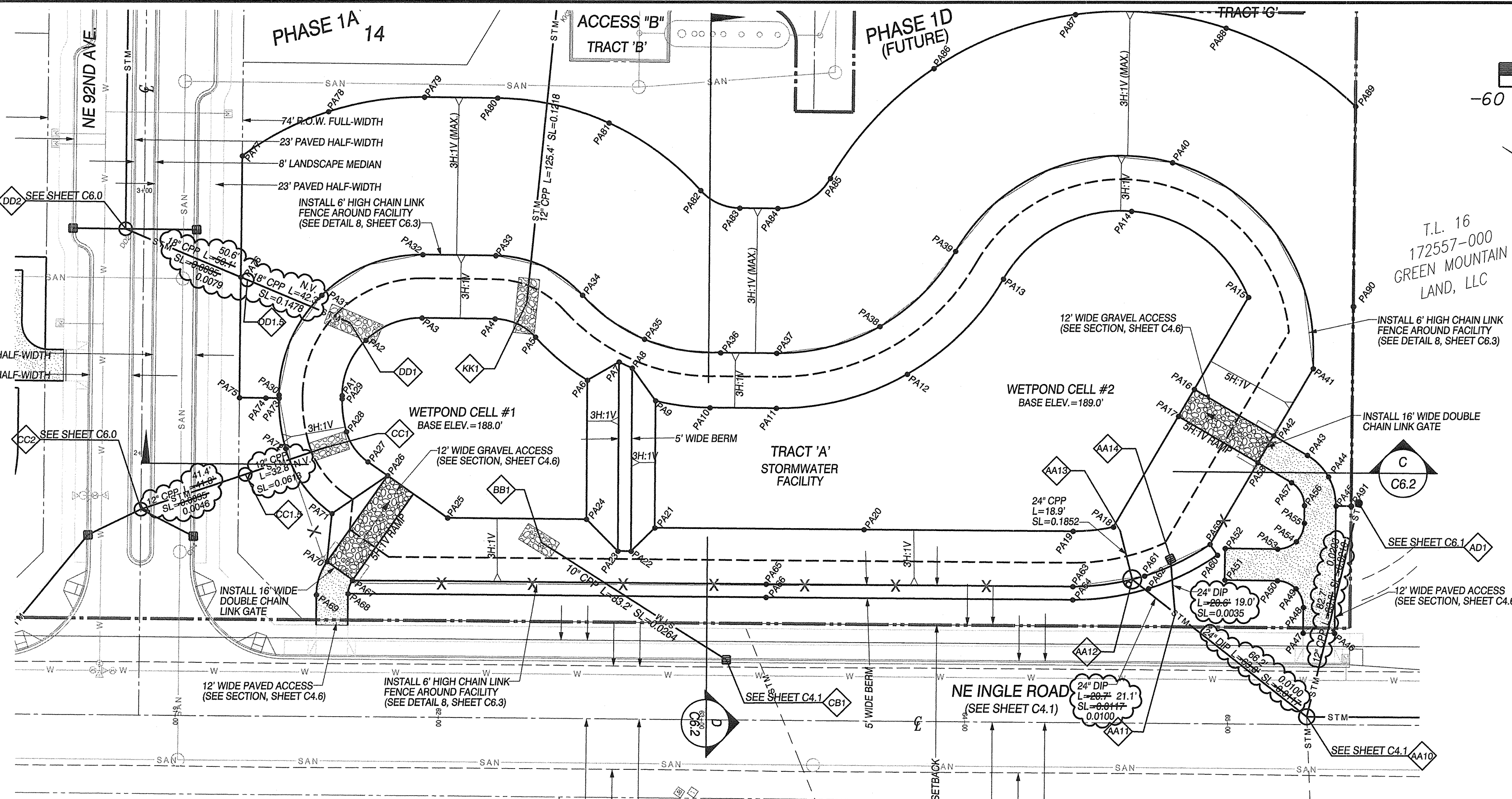
GRADING PLAN

Project:

GREEN MOUNTAIN
B1-B10PSOUTH

10/31/18

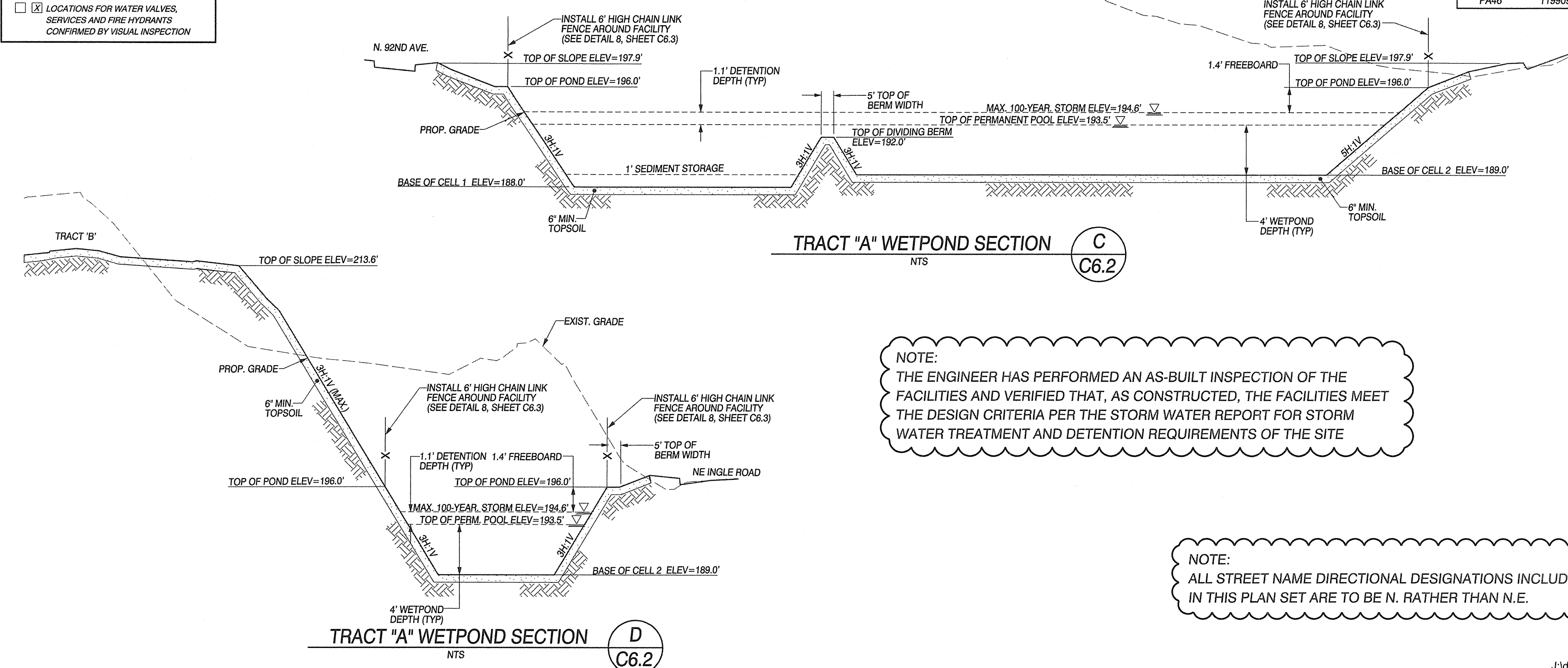
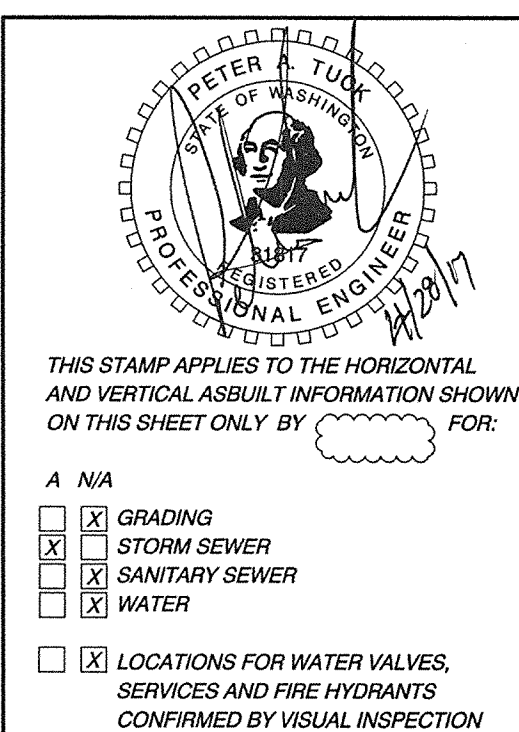
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Project Number: 791
Design/Drawn: JGS/B/C
Drawing Date: OCT. 2018
Sheet 5 of 8 Sheet(s)



- STORMWATER FACILITY CONSTRUCTION NOTES:
- 1) THE STORMWATER DRAINAGE FACILITY SHALL BE OWNED AND MAINTAINED BY THE H.O.A. WITH AN EASEMENT DEDICATED TO THE CITY OF CAMAS FOR ACCESS AND INSPECTION.
 - 2) THE CONTRACTOR SHALL ENSURE THAT ALL EROSION CONTROL MEASURES ARE IN PLACE AND IN WORKING CONDITION PRIOR TO COMMENCEMENT OF DRAINAGE FACILITY CONSTRUCTION.
 - 3) POND GRADING AND SEEDING SHALL OCCUR AS SOON AS POSSIBLE. ONCE SEEDING THE AREA SHALL BE WATERED AS REQUIRED TO GERMINATE AND MAINTAIN A HEALTHY GROWTH OF GRASS.
 - 4) VEGETATION FOR THE FACILITY SHOULD BE A SEED MIX CONSISTING OF:
30% CHATEAU KENTUCKY BLUEGRASS
40% COCHISE TURF, TALL FESCUE TYPE
30% DELAWARE DWARF PERENNIAL RYEGRASS
PREPARE GROUND, SEEDING RATE, FERTILIZER, AND MULCHING AS PER THE MANUFACTURER'S RECOMMENDATIONS.
 - 5) A 6 FOOT HIGH BLACK VINYL-COATED CYCLONE FENCE OR APPROVED EQUAL SHALL BE INSTALLED AROUND THE PERIMETER OF THE DRAINAGE FACILITY AND A STANDARD 16 FOOT WIDE GATE SHALL BE INSTALLED FOR POND ACCESS.

STORMWATER FACILITY STAKING TABLE							
POINT	NORTHING	EASTING	ELEV.	POINT	NORTHING	EASTING	ELEV.
PA1	120272.22	2499619.49	188.02	PA47	119919.10	2499749.11	197.86
PA2	120276.55	2499642.04	188.00	PA48	119924.49	2499757.30	197.86
PA3	120263.66	2499661.04	188.00	PA49	119930.83	2499761.60	197.73
PA4	120240.47	2499676.31	188.00	PA50	119938.34	2499760.15	197.41
PA5	120223.84	2499679.14	188.00	PA51	119955.05	2499749.16	196.50
PA6	120198.33	2499676.53	188.00	PA52	119961.65	2499759.18	196.50
PA7	120192.25	2499689.07	192.00	PA53	119944.94	2499770.18	197.41
PA8	120186.83	2499689.95	192.00	PA54	119940.65	2499776.51	197.65
PA9	120172.49	2499684.62	189.00	PA55	119942.09	2499784.03	197.86
PA10	120153.88	2499683.99	189.00	PA56	119945.76	2499789.60	197.86
PA11	120132.91	2499707.92	189.00	PA57	119954.74	2499794.09	197.34
PA12	120098.91	2499746.56	189.00	PA58	119969.54	2499793.15	196.00
PA13	120088.91	2499797.04	189.00	PA59	119967.28	2499757.22	196.00
PA14	120062.89	2499845.65	189.00	PA60	119962.62	2499755.39	196.00
PA15	120077.79	2499843.53	189.00	PA61	119981.18	2499733.32	196.00
PA16	120052.23	2499802.93	189.00	PA62	119977.29	2499730.18	196.00
PA17	120044.77	2499790.95	189.00	PA63	120001.62	2499714.70	196.00
PA18	120031.39	2499742.11	189.00	PA64	119988.85	2499710.54	196.00
PA19	120013.24	2499732.19	189.00	PA65	120098.70	2499650.21	196.00
PA20	120079.45	2499688.21	189.00	PA66	120095.93	2499646.05	196.00
PA21	120145.65	2499644.23	189.00	PA67	120229.59	2499563.26	196.00
PA22	120148.17	2499631.75	192.00	PA68	120228.19	2499558.18	196.00
PA23	120152.34	2499628.98	192.00	PA69	120237.91	2499551.11	196.00
PA24	120168.97	2499632.34	188.00	PA70	120241.58	2499563.73	196.00
PA25	120212.90	2499603.16	188.00	PA71	120250.42	2499579.92	196.00
PA26	120240.76	2499603.73	188.00	PA72	120278.65	2499590.63	196.00
PA27	120249.83	2499603.91	188.00	PA73	120291.59	2499605.25	196.00
PA28	120263.11	2499608.91	188.00	PA74	120295.76	2499602.50	196.00
PA29	120271.54	2499618.45	188.00	PA75	120304.12	2499597.01	197.65
PA30	120292.27	2499606.29	196.00	PA76	120329.41	2499635.42	201.52
PA31	120300.06	2499646.88	196.00	PA77	120354.70	2499673.84	206.58
PA32	120276.86	2499681.09	196.00	PA78	120336.98	2499706.20	210.29
PA33	120253.67	2499696.35	196.00	PA79	120309.85	2499731.20	213.11
PA34	120218.02	2499702.42	196.00	PA80	120286.66	2499746.47	215.03
PA35	120189.13	2499701.73	196.00	PA81	120246.31	2499762.32	215.06
PA36	120162.71	2499713.44	196.00	PA82	120202.99	2499760.51	213.95
PA37	120144.53	2499725.41	196.00	PA83	120186.99	2499763.23	212.46
PA38	120117.75	2499755.86	196.00	PA84	120174.96	2499771.23	211.80
PA39	120109.86	2499795.63	196.00	PA85	120164.74	2499791.93	211.86
PA40	120060.32	2499869.72	196.00	PA86	120155.60	2499848.75	212.34
PA41	119972.16	2499834.77	196.02	PA87	120122.49	2499895.82	213.57
PA42	119970.30	2499805.13	196.00	PA88	120072.11	2499923.63	213.12
PA43	119955.50	2499806.06	197.03	PA89	120014.64	2499926.56	209.51
PA44	119944.29	2499803.79	197.91	PA90	119972.77	2499862.97	188.78
PA45	119935.74	2499796.20	197.92	PA91	119930.91	2499799.98	197.97
PA46	119909.11	2499755.75	197.92				

EXAMPLE WETPOND DESIGN DEMONSTRATING THAT THE GREEN MOUNTAIN PRD B1 POD WILL BE ABLE TO CONSTRUCT A SIMILAR FACILITY WITHIN 1-ACRE OF OFF-SITE PROPERTY



NOTE: THE ENGINEER HAS PERFORMED AN AS-BUILT INSPECTION OF THE FACILITIES AND VERIFIED THAT, AS CONSTRUCTED, THE FACILITIES MEET THE DESIGN CRITERIA PER THE STORM WATER REPORT FOR STORM WATER TREATMENT AND DETENTION REQUIREMENTS OF THE SITE

NOTE: ALL STREET NAME DIRECTIONAL DESIGNATIONS INCLUDED IN THIS PLAN SET ARE TO BE N. RATHER THAN N.E.

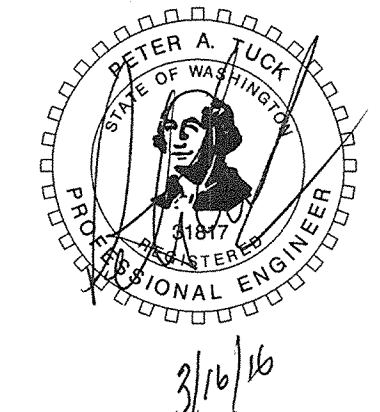
STORM SEWER NOTES	
AA10	SEE SHEET C4.1
AA11	STA 64+79.54 (42.15' LT-NE INGLE ROAD) INSTALL: (1) 18" - 45° WYE IE=183.30
AA12	STA 64+63.17 (54.87' LT-NE INGLE ROAD) INSTALL 12" STORM SEWER FLOW CONTROL MH. (SEE DETAIL 3, SHEET C6.3)
AA13	STA 64+58.45 (73.21' LT-NE INGLE ROAD) INSTALL 24" PIPE OUTLET WITH DEBRIS BARRIER. IE=190.00 (SEE DETAIL 6, SHEET C6.3)
AA14	STA 64+77.71 (62.64' LT-NE INGLE ROAD) INSTALL EMERGENCY OVERFLOW DITCH INLET RIM=195.00 IE=193.39 (SEE DETAIL SD6, SHEET C9.8)
BB1	STA 62+38.45 (67.00' LT-NE INGLE RD) INSTALL 10" OUTFALL W/HAND-PLACED RIP RAP. (SEE DETAIL 5, SHEET C6.3)
CC1	STA 2+02.92 (70.43' RT-NE 92ND AVE.) INSTALL 12" OUTFALL W/HAND-PLACED RIP RAP. (SEE DETAIL 5, SHEET C6.3)
CD1	STA 1+92.16 (39.50' RT-NE 92ND AVE.) INSTALL STD. STORM SEWER MH.
DD1	STA 2+50.61 (78.71' RT-NE 92ND AVE.) INSTALL 18" OUTFALL W/HAND-PLACED RIP RAP. (SEE DETAIL 5, SHEET C6.3)
DD1.3	STA 2+66.44 (39.50' RT-NE 92ND AVE.) INSTALL STD. STORM SEWER MH.
KK1	STA 1+74.86 (125.33' LT-NE 92ND AVE.) INSTALL 12" OUTFALL W/HAND-PLACED RIP RAP. (SEE DETAIL 5, SHEET C6.3)

J:\data\8000189001893018938\Engineering\Final\Phases 1A & 1B\Sheets\ASBUILTS\8938.e.ASBUILT.C6.2.storm facility A.dgn
M:\Microstation V8\pen tables\OCE table setup\OCE stormpond.tbl

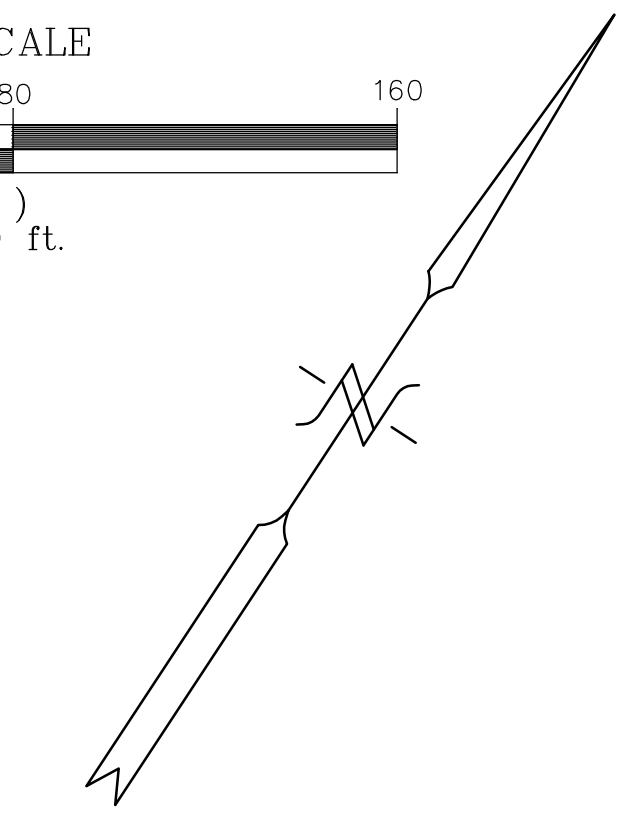
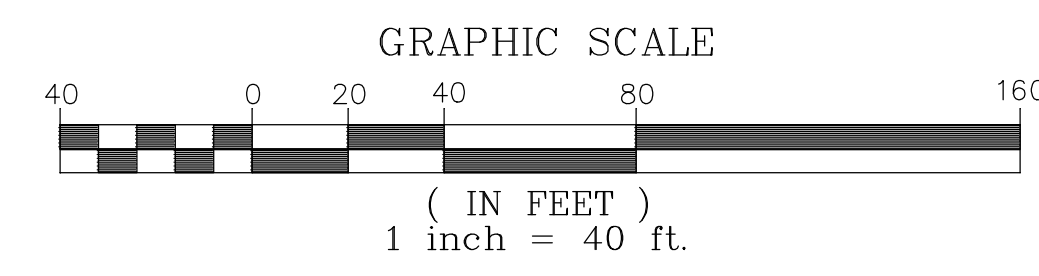
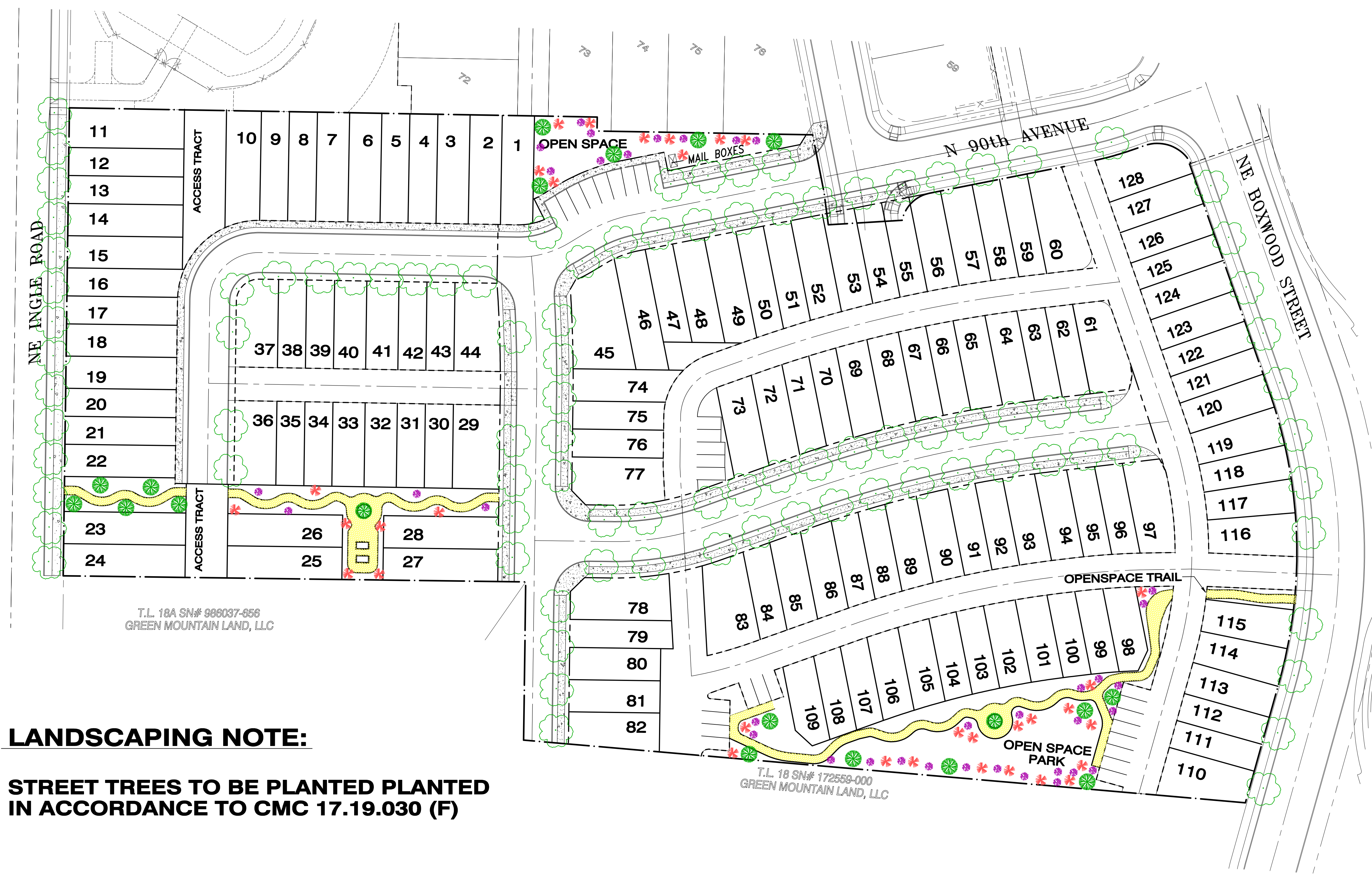
ASBUILTS

TRACT "A" STORMWATER FACILITY PLAN AND SECTIONS FOR:
GREEN MOUNTAIN MIXED USE P.R.D.
PHASES 1A & 1B

OLSON LAND SURVEYORS
ENGINEERS
ENGINEERING INC. 222 E. EVERGREEN BLVD., VANCOUVER, WA 98660
509.585.4885
509.585.9988

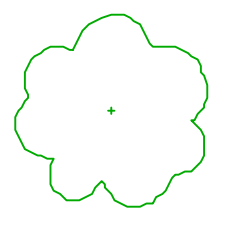


CHANGES / REVISIONS	
DESCRIPTION:	DATE:
STREET NAMES	6/17/16
STORM SEWER DEPTH	7/22/16
FENCE HEIGHT	8/16/16
DESIGNED: RWP	
DRAWN: RWP	
CHECKED: PAT	
DATE: MARCH 2016	
SCALE: H: 1"=30' V:	
COPYRIGHT 2016, OLSON ENGINEERING, INC.	
GREEN MOUNTAIN MIXED USE P.R.D. PHASES 1A & 1B	
8938.01.02	
SHEET	
C6.2	

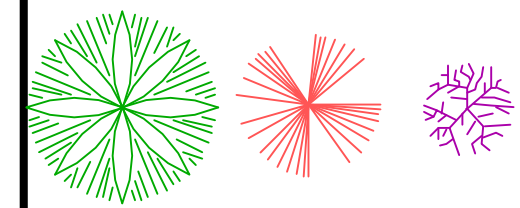


LANDSCAPING NOTE:

**STREET TREES TO BE PLANTED PLANTED
IN ACCORDANCE TO CMC 17.19.030 (F)**



OPENSOURCE LANDSCAPING



**EXACT SIZE, LOCATION, AND SPECIES OF PROPOSED PLANTINGS
SHALL BE FINALIZED DURING FINAL CONSTRUCTION PLAN REVIEW,
A FINAL LANDSCAPE PLAN WILL BE SUBMITTED FOR REVIEW
AND APPROVAL**

PREPARED BY:
STERLING DESIGN, INC.
2208 E. EVERGREEN BLVD
VANCOUVER, WA 98661
PH: (360) 759-1794
FAX: (360) 759-4983
Mail@SterlingDesign.biz

**STERLING
DESIGN, INC.**

Sheet Description:
**PRELIMINARY LANDSCAPE
PLAN**

Project:
**GREEN MOUNTAIN
B1 POD**

Scale: **AS SHOWN**
Project Number: **791**
Design/Drawn: **JGS/BC**
Drawing Date: **OCT. 2018**
Sheet **8** of **8** Sheet(s)

PROJECT DESCRIPTION:

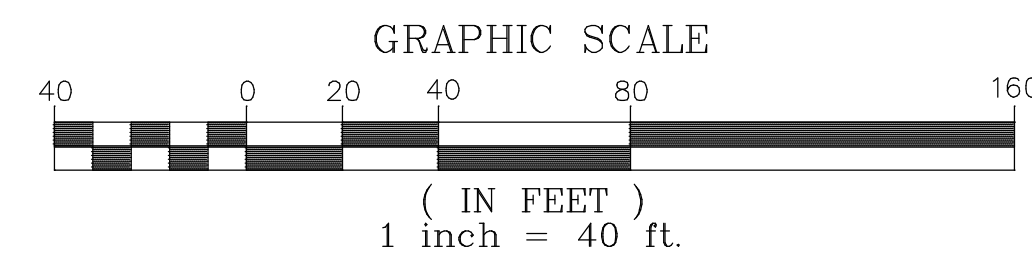
APPROVAL TO SUBDIVIDE B1 POD OF THE GREEN MOUNTAIN PRD DEVELOPMENT INTO A TOTAL OF 111 RESIDENTIAL LOT(S) FOR A COMBINATION OF ATTACHED AND DETACHED SINGLE FAMILY HOMES

DESIGN & DEVELOPMENT TEAM

PROPERTY OWNER:
AE GREEN MOUNTAIN LLC
2551 W 1st STREET
WASHOUGAL WA, 98671

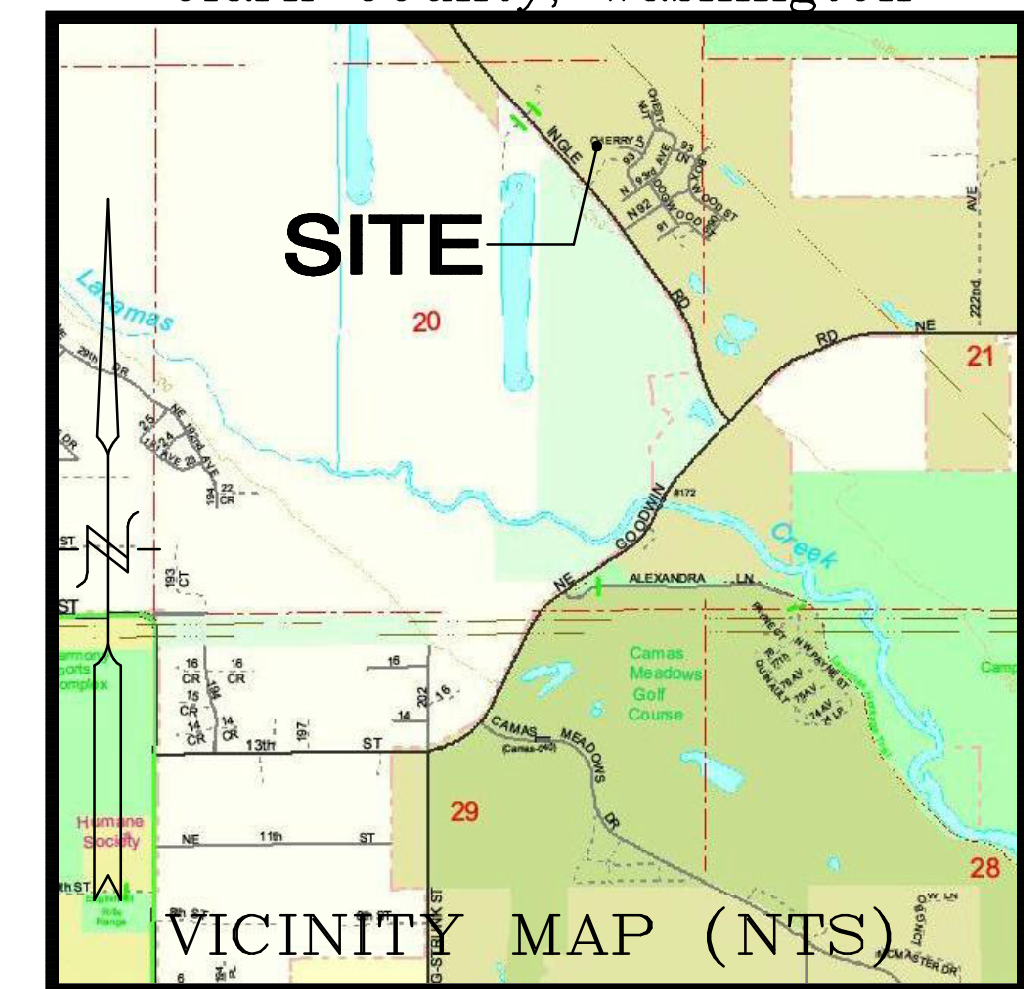
CIVIL ENGINEER/
LAND USE PLANNING:
STERLING DESIGN, INC.
JOEL STIRLING, PE
2208 E. EVERGREEN BLVD.
VANCOUVER, WA 98661
(360) 759-1794
FAX: (360) 759-4983
EMAIL: Joel@SterlingDesign.biz

SURVEYOR:
OLSEN ENGINEERING
222 E. EVERGREEN BLVD.
VANCOUVER WA, 98660
PH: (360) 695-1355
FAX: (360) 695-8117
EMAIL: SURVEYING@OLSENENGR.COM



GREEN MOUNTAIN PRD

A Preliminary Plat within a portion of the NE 1/4 of Sec. 20, T2N., R3E., W.M. Clark County, Washington



SHEET INDEX

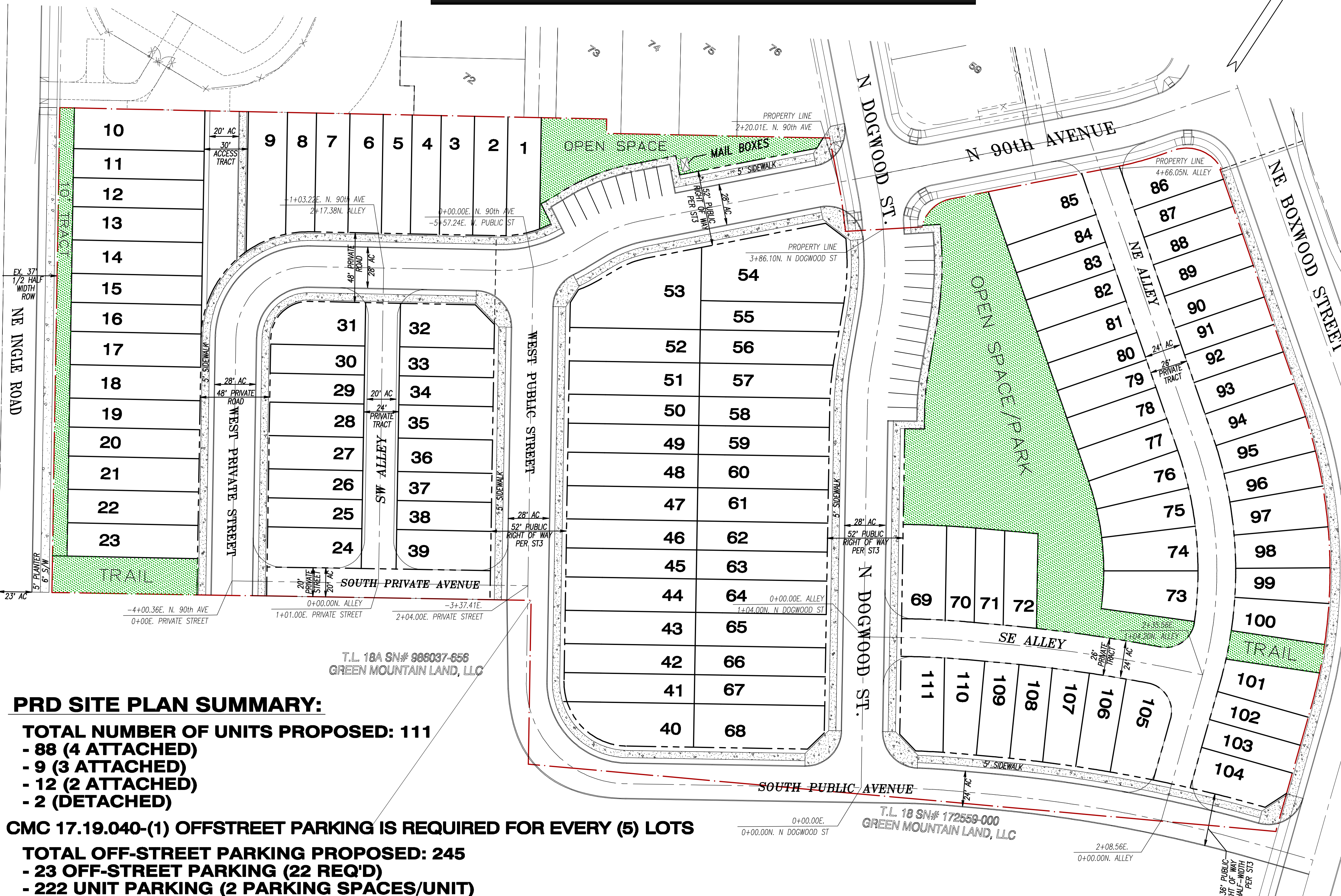
PRD SITE PLAN COVER SHEET	1
APPROVED GREEN MOUNTAIN PRD DEVELOPMENT STD'S & PHASING PLAN	2
EXISTING CONDITIONS PLAN	3
PRELIMINARY DEVELOPMENT PLAN B1-POD SOUTH	4
PRELIMINARY GRADING PLAN	5
PRELIMINARY DRAINAGE PLAN	6
PRELIMINARY UTILITY PLAN	7
PRELIMINARY LANDSCAPE PLAN	8

LEGEND

	CURB & SIDEWALK
	PROPOSED EASEMENT
	PROPOSED LOT LINE
	EXISTING RIGHT-OF-WAY
	PROPOSED SANITARY SEWER LINE
	PROPOSED STORM SEWER LINE
	PROPOSED PERFORATED STORM LINE
	PROPOSED ROADWAY CENTERLINE
	EXISTING ELECTRIC
	EXISTING TELEPHONE LOCATE PAINT
	EXISTING WATER LOCATE PAINT
	EXISTING EDGE OF PAVEMENT/GRAVEL
	EXISTING SANITARY SEWER LINE
	EXISTING STORM LINE
	EXISTING FENCE
	EXISTING GROUND CONTOUR
	PROPOSED GROUND CONTOUR (1')
	DIRECTION OF STORMWATER FLOW
	EROSION CONTROL SILT FENCE
	INLET PROTECTION
	PROPOSED SANITARY CLEANOUT
	PROPOSED FIRE HYDRANT
	STD 1" WATER METER SERVICE
	PROPOSED MANHOLE
	PROPOSED DRYWELL
	PROPOSED CATCH BASIN
	PROPOSED COMBINATION CURB INLET
	PROPOSED STORMFILTER
	EXISTING POWER POLE WITH NUMBER AND DIRECTION OF OVERHEAD LINES
	EXISTING GUY ANCHOR
	EXISTING TELEPHONE PEDESTAL
	EXISTING STORM DRAIN MANHOLE
	EXISTING CATCH BASIN
	EXISTING ADA RAMP
	EXISTING ELECTRICAL SERVICE BOX
	EXISTING SANITARY MANHOLE
	EXISTING SANITARY CLEANOUT
	EXISTING FIRE HYDRANT
	EXISTING WATER SERVICE
	EXISTING WATER VALVE
	PROPOSED STREET TREES 30' O.C.
	PROPOSED STREET LIGHT 70' SPACING

SITE DATA:

- TAX LOT(S): 22A, 22B & 22
- SERIAL NUMBER(S): 986037-307 & 173178-000
- SITE ADDRESS: NOT SITUATED
- AREA: 7.89 ACRES
- ZONING: MF-18
- COMPREHENSIVE PLAN: MFL



PRD SITE PLAN SUMMARY:

TOTAL NUMBER OF UNITS PROPOSED: 111

- 88 (4 ATTACHED)
- 9 (3 ATTACHED)
- 12 (2 ATTACHED)
- 2 (DETACHED)

CMC 17.19.040-(1) OFFSTREET PARKING IS REQUIRED FOR EVERY (5) LOTS

TOTAL OFF-STREET PARKING PROPOSED: 245

- 23 OFF-STREET PARKING (22 REQ'D)
- 222 UNIT PARKING (2 PARKING SPACES/UNIT)

* OPENSACE PROPOSED (ON-SITE): 0.81 ACRES

GREEN MOUNTAIN MASTER PRD NOTE:

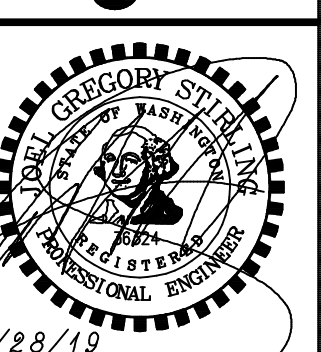
- *REFER TO THE APPROVED GREEN MOUNTAIN DEVELOPMENT STANDARDS & PHASING PLAN FOR:
 - OPEN SPACE DEDICATION THAT HAS BEEN COMPLETED AND APPROVED WITH GREEN MOUNTAIN PRD DEVELOPMENT STANDARDS & PHASING PLAN.
 - DENSITY AND SETBACKS REQUIREMENTS FOR THIS PROJECT HAVE BEEN OUTLINED WITH THE GREEN MOUNTAIN PRD DEVELOPMENT STANDARDS & PHASING PLAN AS DEPICTED ON SHEET 2 OF 8.

PREPARED BY:
STERLING DESIGN, INC.
2208 E. EVERGREEN BLVD
VANCOUVER, WA 98661
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Mail@SterlingDesign.biz

STERLING
DESIGN, INC.

PRD SITE PLAN
COVER SHEET

Project:
GREEN MOUNTAIN
B1 POD



Scale: AS SHOWN

Project Number: 791

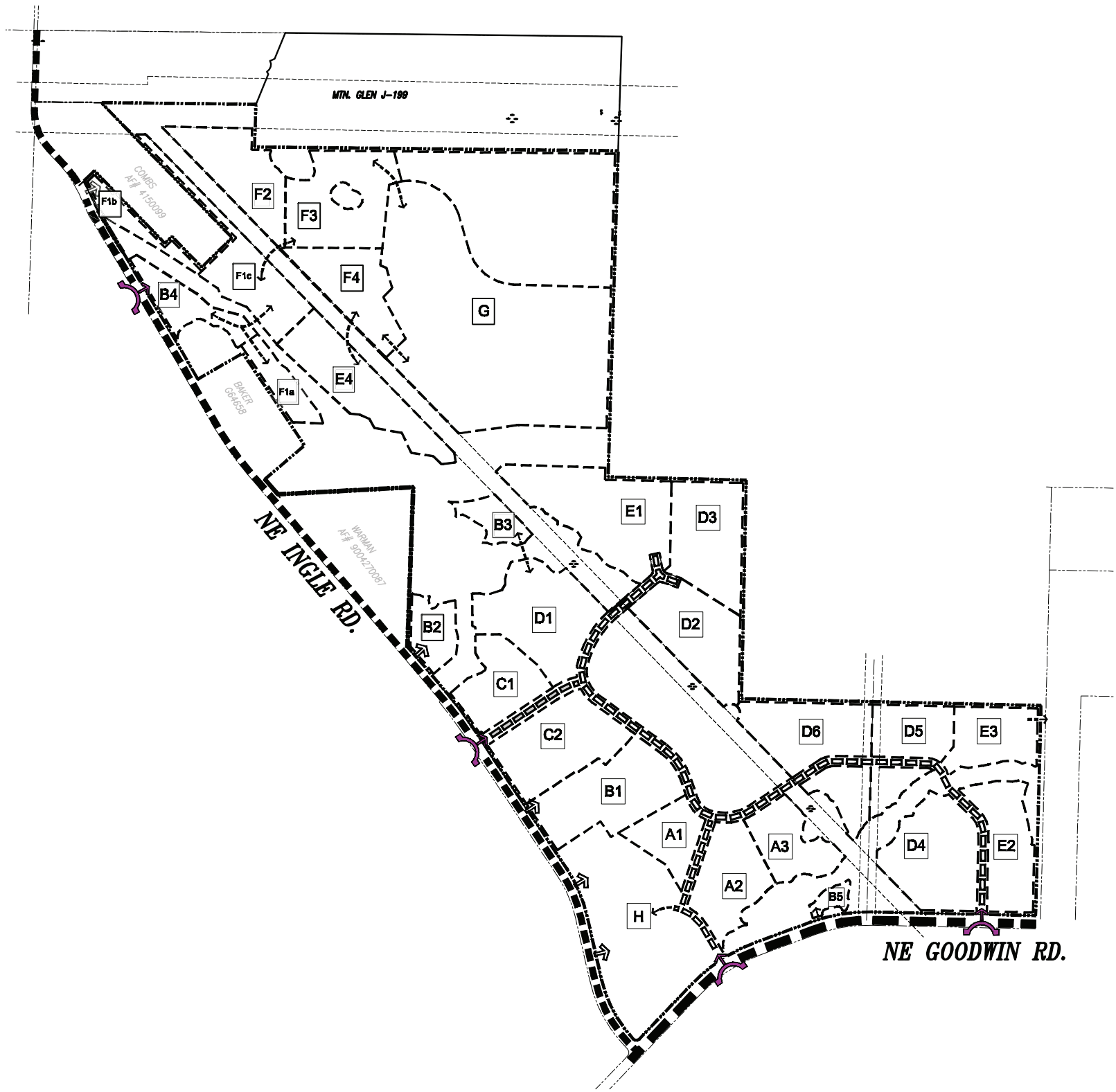
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Drawing Date: MAR. 2019

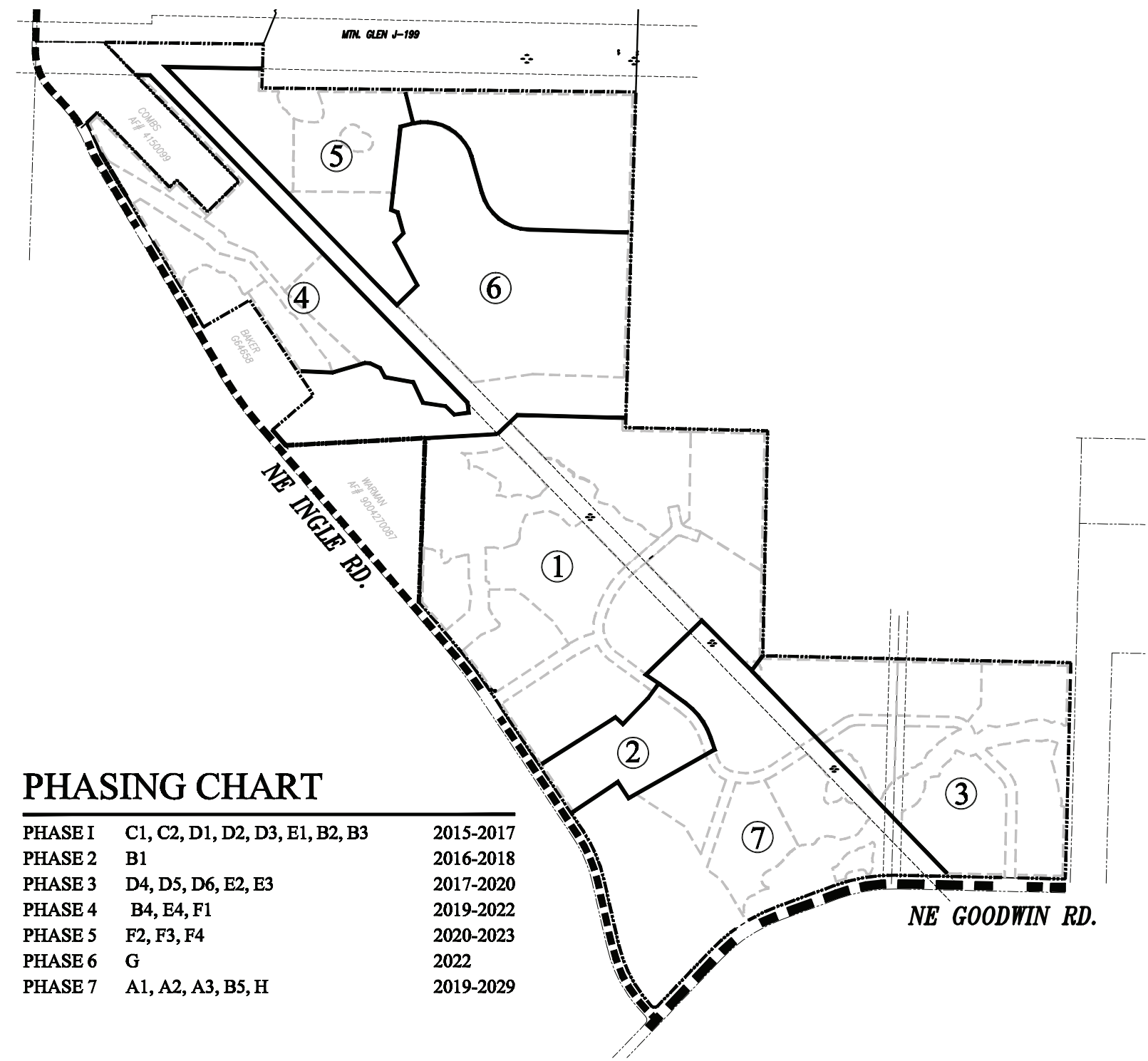
Sheet 1 of 8 Sheet(s)

GREEN MOUNTAIN
DEVELOPMENT STANDARDS & PHASING PLAN

CAMAS, WASHINGTON
GREEN MOUNTAIN LAND, LLC.



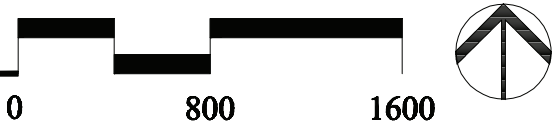
PLANNING UNITS



PHASING CHART

PHASE 1	C1, C2, D1, D2, D3, E1, B2, B3	2015-2017
PHASE 2	B1	2016-2018
PHASE 3	D4, D5, D6, E2, E3	2017-2020
PHASE 4	B4, E4, F1	2019-2022
PHASE 5	F2, F3, F4	2020-2023
PHASE 6	G	2022
PHASE 7	A1, A2, A3, B5, H	2019-2029

PHASING PLAN



PLANNING STANDARDS

URBAN VILLAGE AREA

URBAN VILLAGE AREA - Mixed Use, Community Commercial, A and B PODs	
Urban Village Area	Minimum of 8.8 acres with ground floor Employment/Commercial Use (as provided for in 18.07.030 Table 1). Allow horizontal and vertical Mixed Use PODs H, A1, A2, A3, B5 and 100 Units at the Village Center

DENSITY & DIMENSIONS

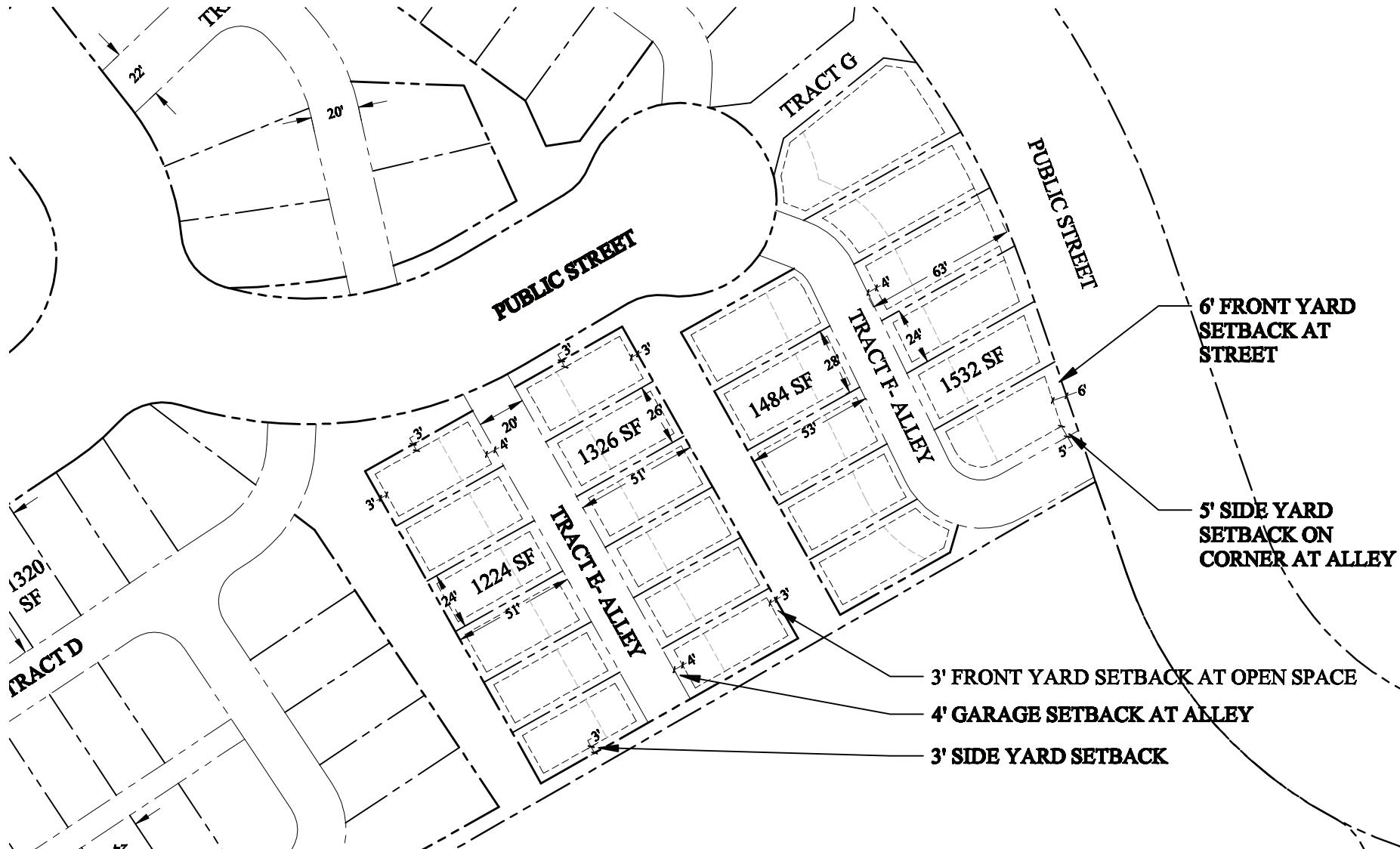
Green Mountain PRD PODs A-G and corresponding Camas Zones

	A POD	B POD	C POD
DENSITY	MF-24	MF-18	MF-10
Max. du./gross ac.	24	18	10
Min. du./gross ac.	6	6	6
STANDARD LOTS			
Min. lot SF	1,000 [a]	1,000[a]	3,000 [a]
Min. lot width	20	20	30
Min. lot depth	50	50	70
Max. Floor Area per du.	No Max	No Max	No Max
SETBACKS			
Min. front/at garage	None	6/3@OS/18	10/18
Min. side	3 [1]	3 [1] [d]	3 [1] [d]
Min. side Flanking Street	None [e]	10 [d]	10 [d]
Min. rear (garage @alley)	None [e]	10 [b][c]	10[b][c]
LOT COVERAGE, Max.	None [c]	None	55%
BUILDING HEIGHT, Max.	60	45 [2]	35 [2]

- a. Single Family Detached homes to be permitted. For SFD in A POD apply B Pod setbacks.
- b. 10 foot rear yard for front access garage.
- c. Minimum rear yard for alley accessed garage is either 4' or 18'.
- d. Minimum side yard at alley is 5'.
- e. Franchise utilities to be located in front or side yard easements abutting right of way.
1. The non-attached side of a dwelling unit shall be three feet, otherwise a zero-lot line is assumed.
2. Maximum building height: three stories and a basement but not to exceed maximum building height.

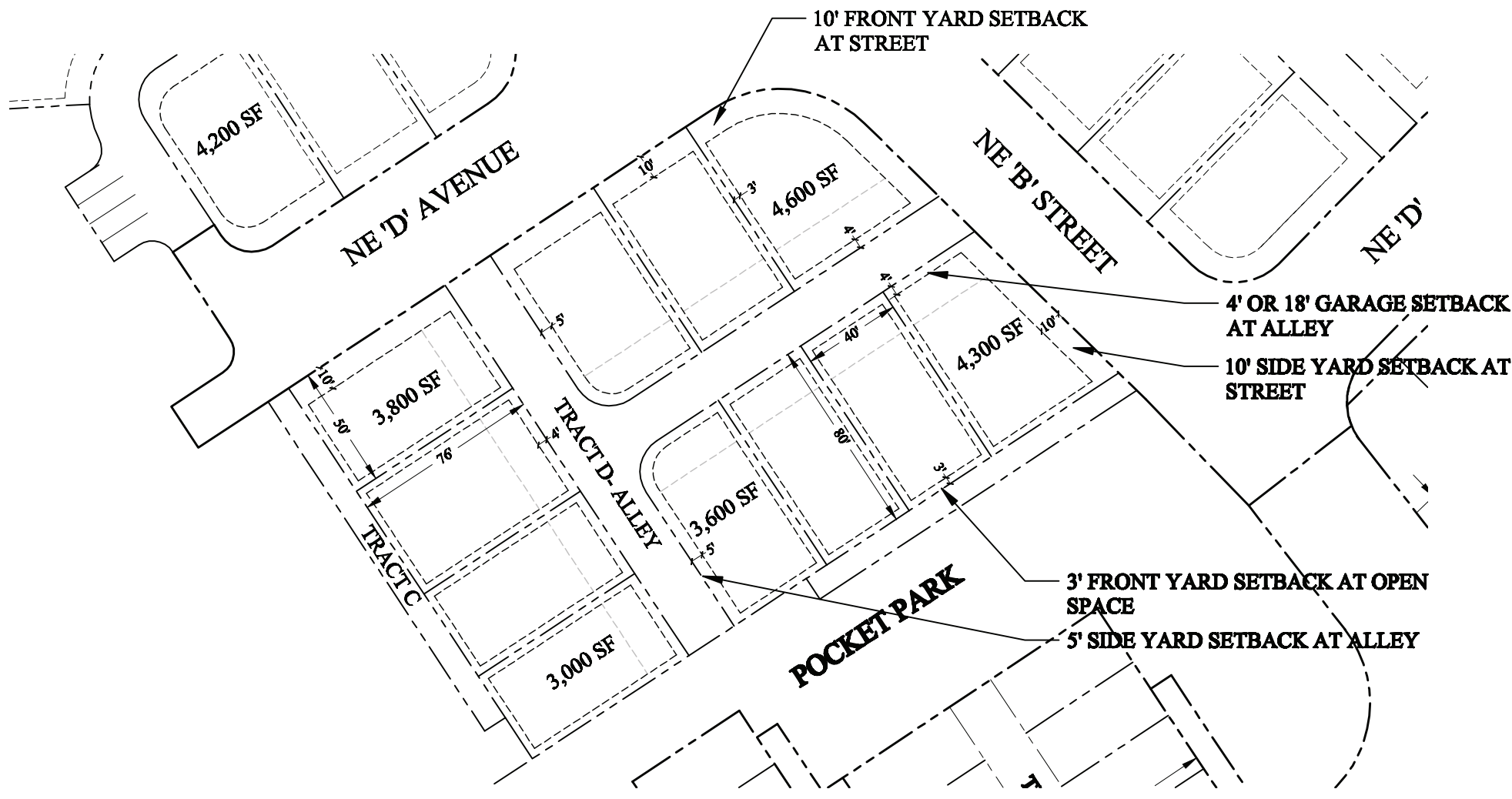
Density Transfer Lots	D POD	E POD	F POD	G POD
DENSITY	R-5	R-6	R-7.5	R-20
Max. du./gross ac.	8.7	7.2	5.8	2.1
DENSITY TRANSFER LOTS				
Min. lot size (sq. ft.)	3,500 [a]	4,200	5250	14,000
Max. lot size (sq. ft.)	7,600	9,000	14,999	60,000
Min. lot width	40	50	60	90
Min. lot depth	80	80	80	100
LOT COVERAGE, Max.	45%	40%	40%	30%
BUILDING HEIGHT, MAX. (ft.)	35	35	35	35
SETBACKS based on lot size	Up to 4,999 sq. ft.	5,000 to 7,499 sq. ft.	7,500 to 14,999 sq. ft.	15,000 to 60,000 sq. ft.
Min. front/at garage	10/18	15/18	20	30
Min. side and corner lot rear yard (ft.)	4	5	5	15
Min. side yard flanking a street	10[d]	15[d]	15	30
Min. rear (garage @alley)	15[b][c]	20[b][c]	20[b][c]	30
Min. lot frontage on a cul-de-sac or curve (ft.)	25	30	30	40

- a. Single Family detached homes to be permitted.
- b. 10 foot rear yard for front access garage.
- c. Minimum rear yard for alley accessed garage is either 4' or 18'.
- d. Minimum side yard at alley is 5'.
- NOTE: POD lot sizes are not subject to lot size averaging.



POD B- TYPICAL LOT & DEVELOPMENT PATTERNS

LOT DIMENSIONS & BUILDING ENVELOPES



POD C- TYPICAL LOT & DEVELOPMENT PATTERNS

LOT DIMENSIONS & BUILDING ENVELOPES



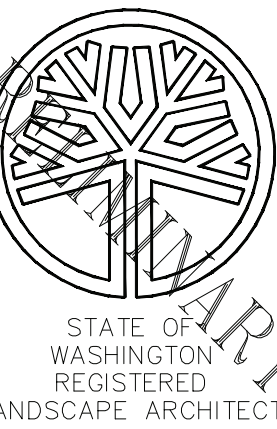
Land Planning
Landscape
Architecture

P.O. BOX 2392
LAKE OSWEGO, OR
97035
503-294-0222

SCALE: AS NOTED

DESIGNED BY: WPH
DRAWN BY: SH
CHECKED BY: WPH

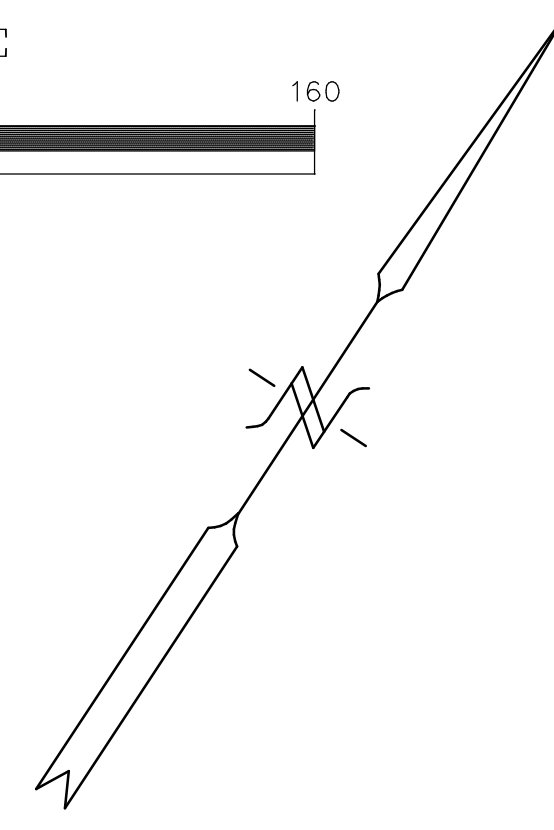
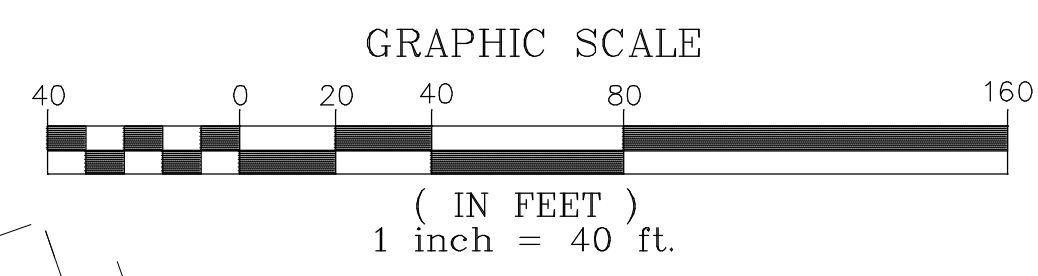
DATE: 01/29/15
REVISED:



WILLIAM F. HORNING
CERTIFICATE NO. 382

GREEN MOUNTAIN
DEVELOPMENT STANDARDS & PHASING PLAN
GREEN MOUNTAIN LAND, LLC.

CAMAS, WASHINGTON



SITE DATA:

- TAX LOT(S): 22A, 22B & 22
- SERIAL NUMBER(S): 986037-307 & 173178-000
- SITE ADDRESS: NOT SITUATED
- AREA: 7.89 ACRES
- ZONING: MF-18
- COMPREHENSIVE PLAN: MFL

PREPARED BY:
STERLING DESIGN, INC.
2208 E. EVERGREEN BLVD
VANCOUVER, WA 98661
PH. (360) 759-1794
FAX (360) 759-4993
Mail@SterlingDesign.biz

**STERLING
DESIGN, INC.**

Sheet Description:
**EXISTING CONDITIONS
PLAN**

Project:
**GREEN MOUNTAIN
B1 POD**

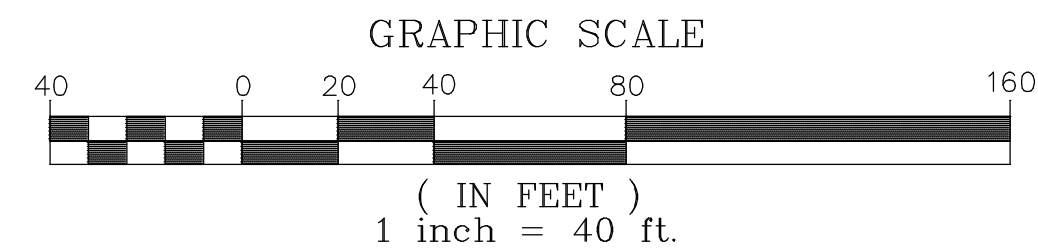


Scale: **AS SHOWN**
Project Number: **791**
Design/Drawn: **JGS/DJF**
Drawing Date: **MAR. 2019**
Sheet **3** of **8** Sheet(s)

GREEN MOUNTAIN MASTER PRD NOTE:

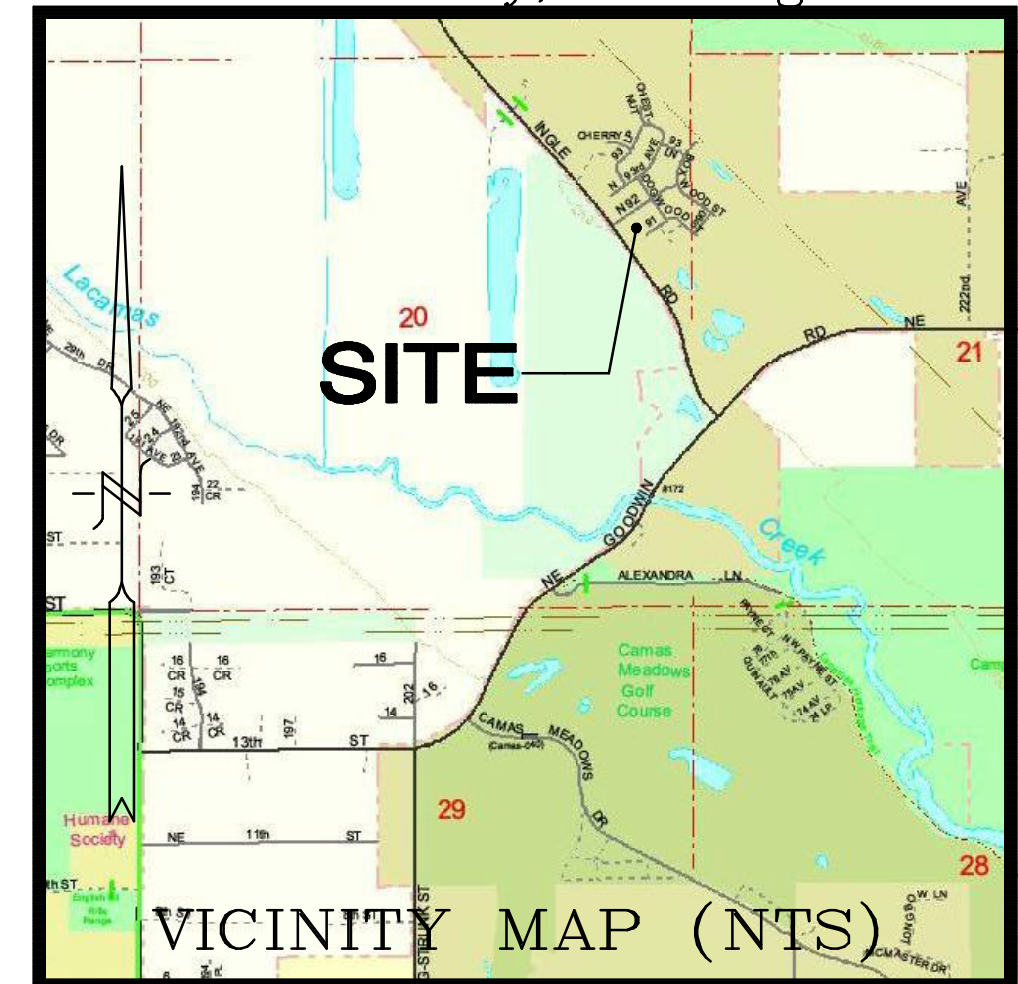
***REFER TO THE APPROVED GREEN MOUNTAIN DEVELOPMENT STANDARDS & PHASING PLAN FOR:**

- OPEN SPACE DEDICATION THAT HAS BEEN COMPLETED AND APPROVED WITH GREEN MOUNTAIN PRD DEVELOPMENT STANDARDS & PHASING PLAN.
- DENSITY AND SETBACKS REQUIREMENTS FOR THIS PROJECT HAVE BEEN OUTLINED WITH THE GREEN MOUNTAIN PRD DEVELOPMENT STANDARDS & PHASING PLAN



GREEN MOUNTAIN PRD

A Preliminary Plat within
a portion of the NE 1/4 of
Sec. 20, T2N., R3E., W.M.
Clark County, Washington



SITE DATA:

- TAX LOT(S): 22A, 22B & 22
- SERIAL NUMBER(S): 986037-307 & 173178-000
- SITE ADDRESS: NOT SITUATED
- AREA: 7.89 ACRES
- ZONING: MF-18
- COMPREHENSIVE PLAN: MFL

CENTERLINE CURVE DATA

- R=50.00ft
CH=70.86ft
A=78.75ft
T=50.21ft
EX=20.86ft
Delta=90 14'16"
- R=100.00ft
CH=65.67ft
A=58.41ft
T=28.98ft
EX=4.11ft
Delta=32 19'17"
- R=100.00ft
CH=34.95ft
A=35.13ft
T=17.75ft
EX=1.56ft
Delta=20 07'40"
- R=200.00ft
CH=45.90ft
A=46.00ft
T=23.10ft
EX=1.33ft
Delta=13 10'42"
- R=200.00ft
CH=31.04ft
A=31.07ft
T=15.57ft
EX=0.60ft
Delta=8 54'06"
- R=488.00ft
CH=35.78ft
A=35.79ft
T=17.90ft
EX=0.33ft
Delta=4 12'07"
- R=988.00ft
CH=183.76ft
A=184.02ft
T=92.28ft
EX=4.30ft
Delta=10 40'19"
- R=70.00ft
CH=98.99ft
A=109.96ft
T=70.00ft
EX=28.99ft
Delta=90 00'00"

*APPROVED w/PRD MASTER PLAN

Green Mountain PRD PODs A-G and corresponding Camas Zones

	A POD	B POD*	C POD
DENSITY	MF-24	MF-18	MF-10
Max. du./gross ac	24	18	10
Min. du./gross ac	6	6	5
STANDARD LOTS			
Min. lot SF	1,000 [a]	1,000[a]	3,000 [a]
Min. lot width	20	20	30
Min. lot depth	30	50	70
Max. Floor Area per du	No Max	No Max	No Max
SETBACKS			
Min. front/at garage	None	6/3@OS/18	10/18
Min. side	3 [1]	3 [1] [d]	3 [1] [d]
Min. side Flanking Street	None [e]	10 [d]	10 [d]
Min. rear [garage @alley]	None [e]	10 [b][c]	10 [b][c]
LOT COVERAGE, Max.	None [c]	None	55%
BUILDING HEIGHT, Max.	30	45 [2]	35 [3]

a. Single Family Detached homes to be permitted. For SFD in A POD apply B Pod setbacks.

b. 10 foot rear yard for front access garage.

c. Minimum rear yard for alley accessed garage is either 4' or 18'.

d. Minimum side yard at alley is 5'.

e. Franchise utilities to be located in front or side yard easements abutting right of way.

1. The non-attached side of a dwelling unit shall be three feet, otherwise a zero-lot line is assumed.

2. Maximum building height: three stories and a basement but not to exceed maximum building height.

T.L. 18A SN# 986037-656
GREEN MOUNTAIN LAND, LLC

PROPOSED PRELIMINARY PLAT SUMMARY:

Total Lots: 111

Total Site Area:

Minimum Lot Area:

Maximum Lot Area:

Average Lot Area:

Public Right of Way Dedication:

Privated Road Dedication:

Alleys:

Access Tract:

*** Openspace:**

*** PROPOSED SITE DENSITY: 14.1 LOTS/ACRE**

35,368, 840 sf (7.89 Acres)
1,300 sf.
4,622 sf
1,770 sf
61,841 sf
21,616 sf
21,145 sf
3,439 sf
35,390 sf

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DESIGN, INC.

Sheet Description:
PROPOSED DEVELOPMENT
PLAN

Project:
GREEN MOUNTAIN
B1 POD



08/28/19

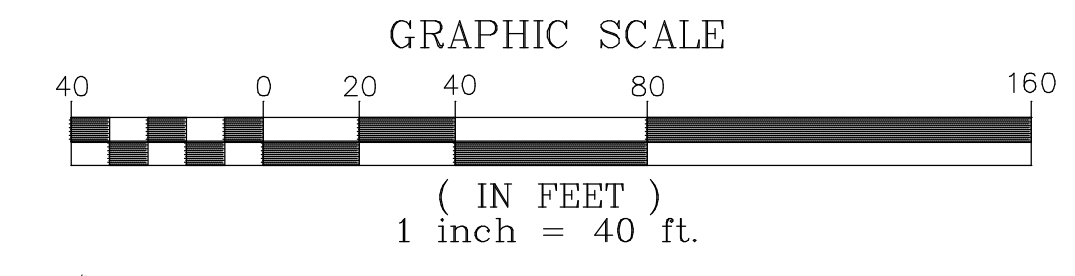
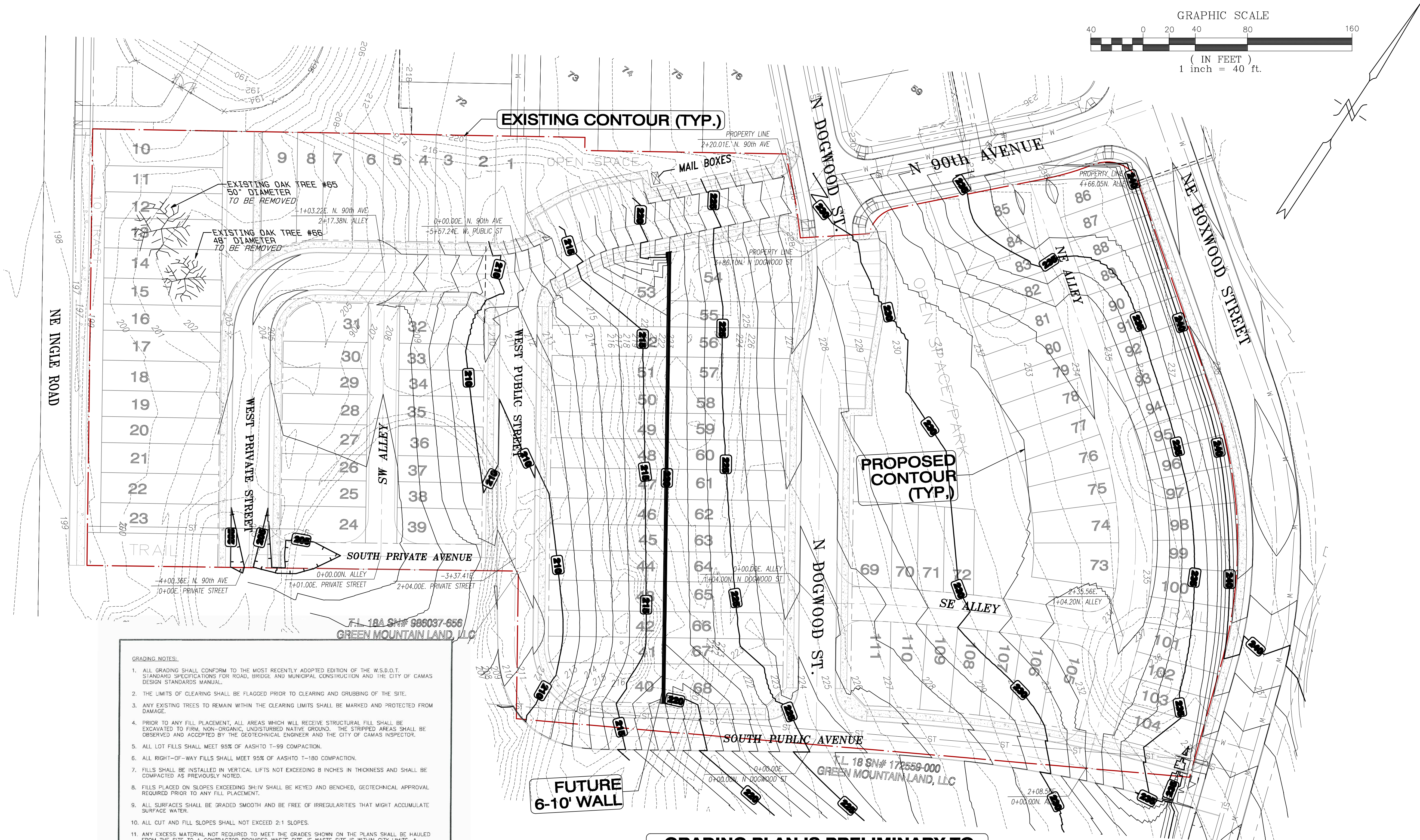
Scale: AS SHOWN

Project Number: 791

Design/
Drawn JGS/DJF

Drawing Date: MAR. 2019

Sheet 4 of 8 Sheet(s)



GRADING NOTES:

1. ALL GRADING SHALL CONFORM TO THE MOST RECENTLY ADOPTED EDITION OF THE W.S.D.O.T. STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION AND THE CITY OF CAMAS DESIGN STANDARDS MANUAL.
2. THE LIMITS OF CLEARING SHALL BE FLAGGED PRIOR TO CLEARING AND GRUBBING OF THE SITE.
3. ANY EXISTING TREES TO REMAIN WITHIN THE CLEARING LIMITS SHALL BE MARKED AND PROTECTED FROM DAMAGE.
4. PRIOR TO ANY FILL PLACEMENT, ALL AREAS WHICH WILL RECEIVE STRUCTURAL FILL SHALL BE EXCAVATED TO FIRM, NON-ORGANIC, UNDISTURBED NATIVE GROUND. THE STRIPPED AREAS SHALL BE OBSERVED AND ACCEPTED BY THE GEOTECHNICAL ENGINEER AND THE CITY OF CAMAS INSPECTOR.
5. ALL LOT FILLS SHALL MEET 95% OF AASHTO T-99 COMPACTION.
6. ALL RIGHT-OF-WAY FILLS SHALL MEET 95% OF AASHTO T-180 COMPACTION.
7. FILLS SHALL BE INSTALLED IN VERTICAL LIFTS NOT EXCEEDING 8 INCHES IN THICKNESS AND SHALL BE COMPACTED AS PREVIOUSLY NOTED.
8. FILLS PLACED ON SLOPES EXCEEDING 3:1:V SHALL BE KEYED AND BENCHED, GEOTECHNICAL APPROVAL REQUIRED PRIOR TO ANY FILL PLACEMENT.
9. ALL SURFACES SHALL BE GRADED SMOOTH AND BE FREE OF IRREGULARITIES THAT MIGHT ACCUMULATE SURFACE WATER.
10. ALL CUT AND FILL SLOPES SHALL NOT EXCEED 2:1 SLOPES.
11. ANY EXCESS MATERIAL NOT REQUIRED TO MEET THE GRADES SHOWN ON THE PLANS SHALL BE HAULED FROM THE SITE TO A CONTRACTOR PROVIDED WASTE SITE, IF WASTE SITE IS WITHIN CITY LIMITS, A GRADING PERMIT MAY BE REQUIRED.
12. ALL EXPOSED AND UNWORKED SOILS SHALL BE STABILIZED BY SUITABLE APPLICATION OF EROSION CONTROL BMP'S.
13. ALL SURFACES REQUIRING VEGETATION SHALL BE ROUGHENED PRIOR TO SEEDING (I.E. WHEEL TRACKED PERPENDICULAR TO SURFACE FLOW TO REDUCE EROSION AND HELP VEGETATION).
14. FINAL GEOTECHNICAL SUMMARY REPORT, INCLUDING ALL COMPACTION TESTING RESULTS, SHALL BE SUBMITTED UPON COMPLETION OF SITE GRADING WORK.

REV. NO.	DATE	BY	APPR.	DESCRIPTION
1	9/18/07	SCD	JC	
2	1/7/11	SCD	JC	

CITY OF CAMAS - EROSION CONTROL DETAIL
GRADING NOTES
DATE: 1-4-11
NOT TO SCALE

GRADING PLAN IS PRELIMINARY TO SHOW PROJECT FEASIBILITY & WILL BE ADJUSTED DURING FINAL CONSTRUCTION PLAN PREPARATION TO SHOW ALL GRADING AND EROSION CONTROL FACILITIES. ALL GRADING & EROSION CONTROL WILL BE PER THE CITY OF CAMAS STANDARDS.

APPROXIMATE GRADING QUANTITIES: (AS SHOWN)

CUT: 7,848 CU. YD.

FILL: 10,561 CU. YD.

IMPORT: 2,713 CU. YD.

ADJUSTED GRADING PLAN WILL LIMIT EXPORT TO BALANCE ONSITE GRADING AS MUCH AS POSSIBLE

SITE DATA:

- TAX LOT(S): 22A, 22B & 22
- SERIAL NUMBER(S): 986037-307 & 173178-000
- SITE ADDRESS: NOT SITUATED
- AREA: 7.89 ACRES
- ZONING: MF-18
- COMPREHENSIVE PLAN: MFL

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STERLING DESIGN, INC.

Sheet Description:

GRADING PLAN

Project:

GREEN MOUNTAIN B1 POD

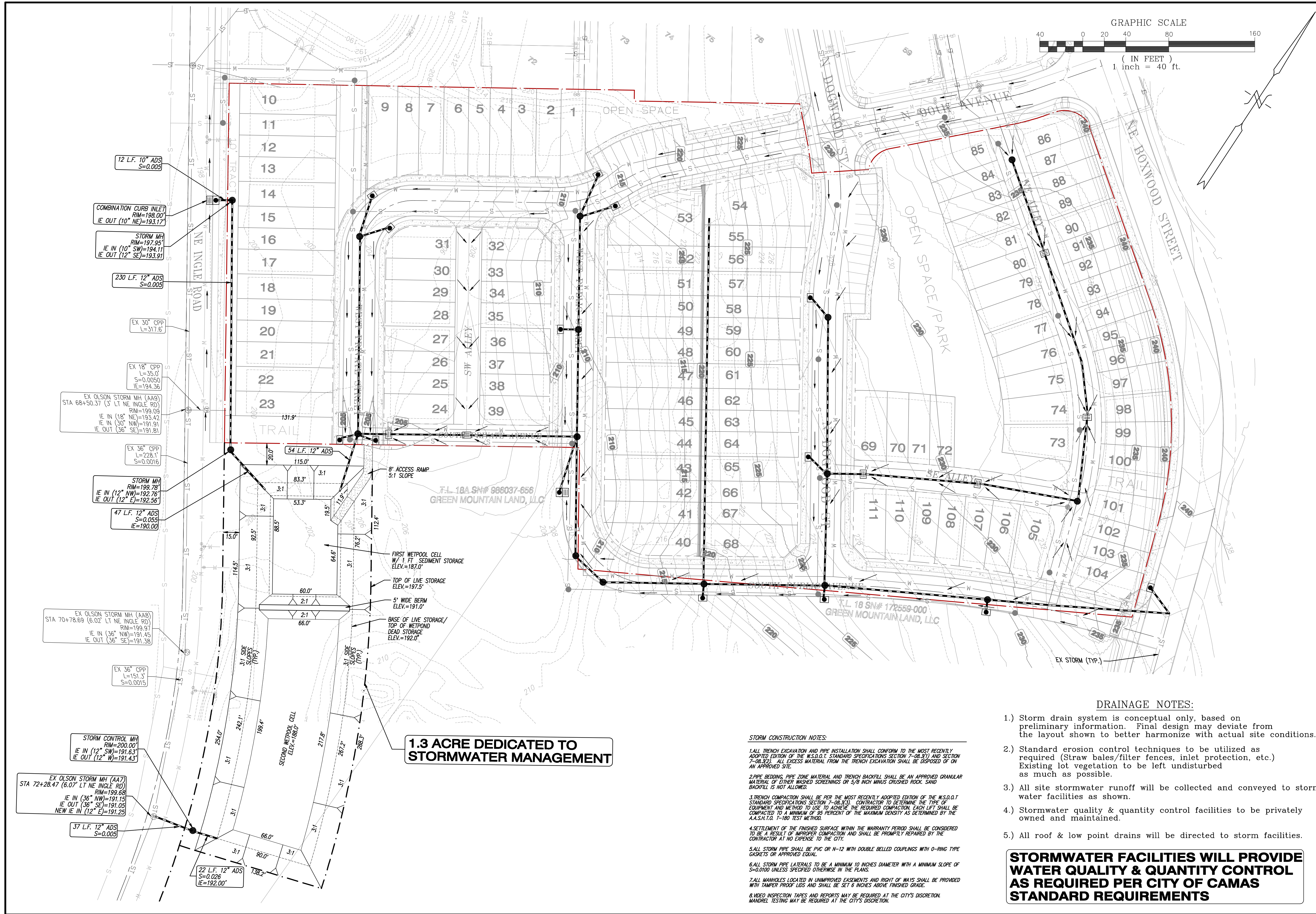
Scale: AS SHOWN

Project Number: 791

Design/Drawn: JGS/DJF

Drawing Date: MAR. 2019

Sheet 5 of 8 Sheet(s)



DRAINAGE NOTES:

- 1.) Storm drain system is conceptual only, based on preliminary information. Final design may deviate from the layout shown to better harmonize with actual site conditions.
- 2.) Standard erosion control techniques to be utilized as required (Straw bales/filter fences, inlet protection, etc.) Existing lot vegetation to be left undisturbed as much as possible.
- 3.) All site stormwater runoff will be collected and conveyed to stormwater facilities as shown.
- 4.) Stormwater quality & quantity control facilities to be privately owned and maintained.
- 5.) All roof & low point drains will be directed to storm facilities.

STORMWATER FACILITIES WILL PROVIDE WATER QUALITY & QUANTITY CONTROL AS REQUIRED PER CITY OF CAMAS STANDARD REQUIREMENTS

STORM CONSTRUCTION NOTES:

1. ALL TRENCH EXCAVATION AND PIPE INSTALLATION SHALL CONFORM TO THE MOST RECENTLY ADOPTED EDITION OF THE W.S.D.O.T. STANDARD SPECIFICATIONS SECTION 7-08.3(1) AND SECTION 7-08.3(2). ALL EXCESS MATERIAL FROM THE TRENCH EXCAVATION SHALL BE DISPOSED OF ON AN APPROVED SITE.
2. PIPE BEDDING, PIPE ZONE MATERIAL AND TRENCH BACKFILL SHALL BE AN APPROVED GRANULAR MATERIAL OF EITHER WASHED SCREENINGS OR 3/8 INCH MINUS CRUSHED ROCK. SAND BACKFILL IS NOT ALLOWED.
3. TRENCH COMPACTION SHALL BE PER THE MOST RECENTLY ADOPTED EDITION OF THE W.S.D.O.T. STANDARD SPECIFICATIONS SECTION 7-08.3(3). CONTRACTOR TO DETERMINE THE TYPE OF EQUIPMENT AND METHOD TO USE TO ACHIEVE THE REQUIRED COMPACTION. EACH LIFT SHALL BE COMPACTED TO A MINIMUM OF 95 PERCENT OF THE MAXIMUM DENSITY AS DETERMINED BY THE A.A.S.H.T.O. T-100 TEST METHOD.
4. SETTLEMENT OF THE FINISHED SURFACE WITHIN THE WARRANTY PERIOD SHALL BE CONSIDERED TO BE A RESULT OF IMPROPER COMPACTION AND SHALL BE PROMPTLY REPAIRED BY THE CONTRACTOR AT NO EXPENSE TO THE CITY.
5. ALL STORM PIPE SHALL BE PVC OR N-12 WITH DOUBLE BELLED COUPLINGS WITH O-RING TYPE GASKETS OR APPROVED EQUAL.
6. ALL STORM PIPE LATERALS TO BE A MINIMUM 10 INCHES DIAMETER WITH A MINIMUM SLOPE OF S=0.0100 UNLESS SPECIFIED OTHERWISE IN THE PLANS.
7. ALL MANHOLES LOCATED IN UNIMPROVED EASEMENTS AND RIGHT OF WAYS SHALL BE PROVIDED WITH TAMPER PROOF LIDS AND SHALL BE SET 6 INCHES ABOVE FINISHED GRADE.
8. VIDEO INSPECTION TAPES AND REPORTS MAY BE REQUIRED AT THE CITY'S DISCRETION. MANDREL TESTING MAY BE REQUIRED AT THE CITY'S DISCRETION.

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DESIGN, INC.

Sheet Description:
**PRELIMINARY
DRAINAGE PLAN**

Project:
**GREEN MOUNTAIN
B1 POD**



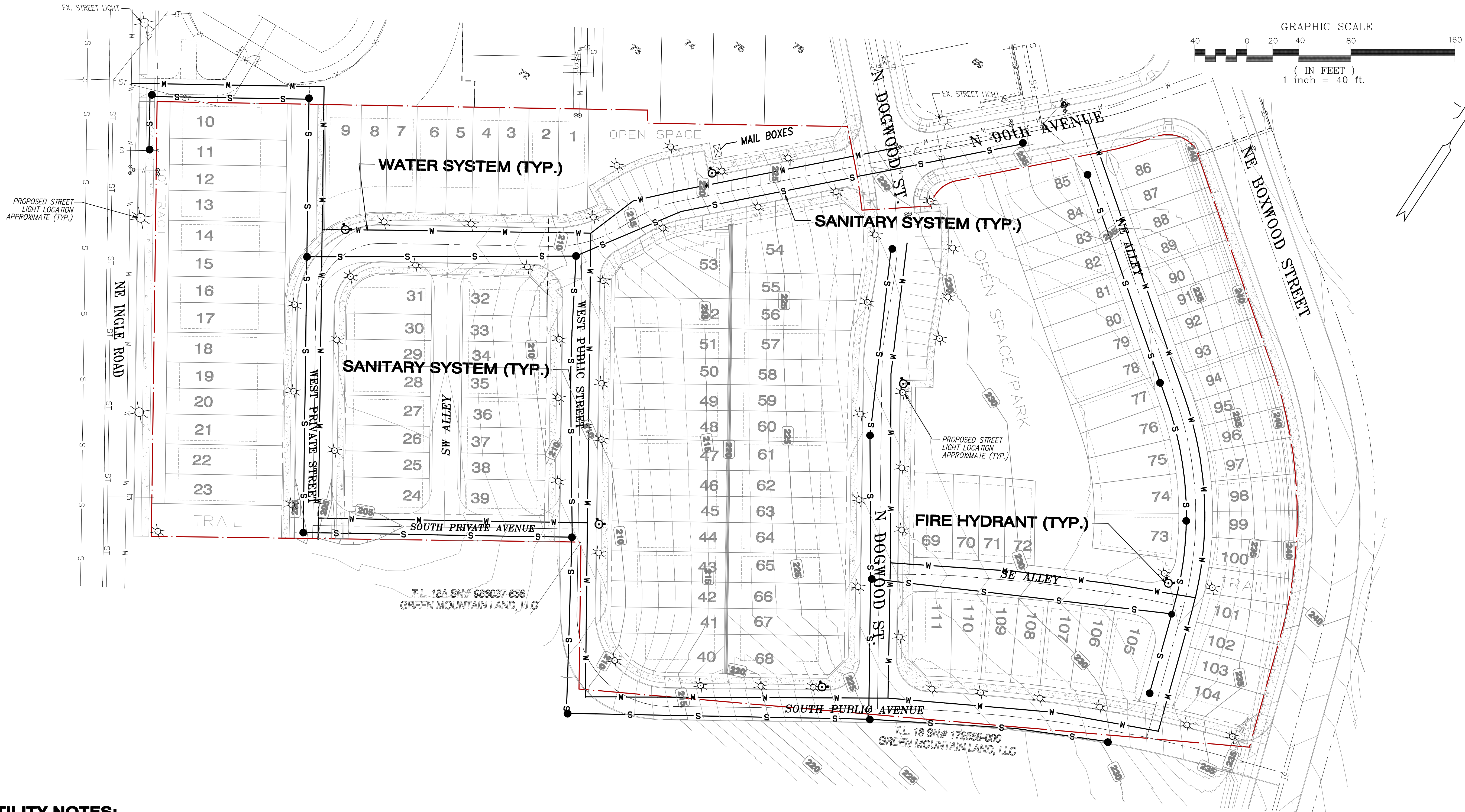
Scale: AS SHOWN

Project Number: 791

Design/Drawn: JGS/DJF

Drawing Date: MAR. 2019

Sheet 6 of 8 Sheet(s)



UTILITY NOTES:

PUBLIC WATER SYSTEM WILL BE EXTENDED ON-SITE FROM EXISTING WATER LINE WITHIN NE INGLE ROAD. (1) RESIDENTIAL WATER SERVICE WILL BE PROVIDED TO EACH LOT

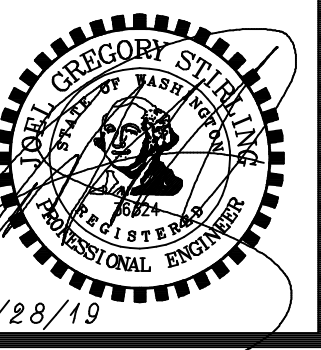
PUBLIC SANITARY SYSTEM WILL BE EXTENDED ON-SITE FROM EXISTING SANITARY LINE WITHIN NE INGLE ROAD. (1) SANITARY LATERAL SERVICE WILL BE PROVIDED TO EACH LOT

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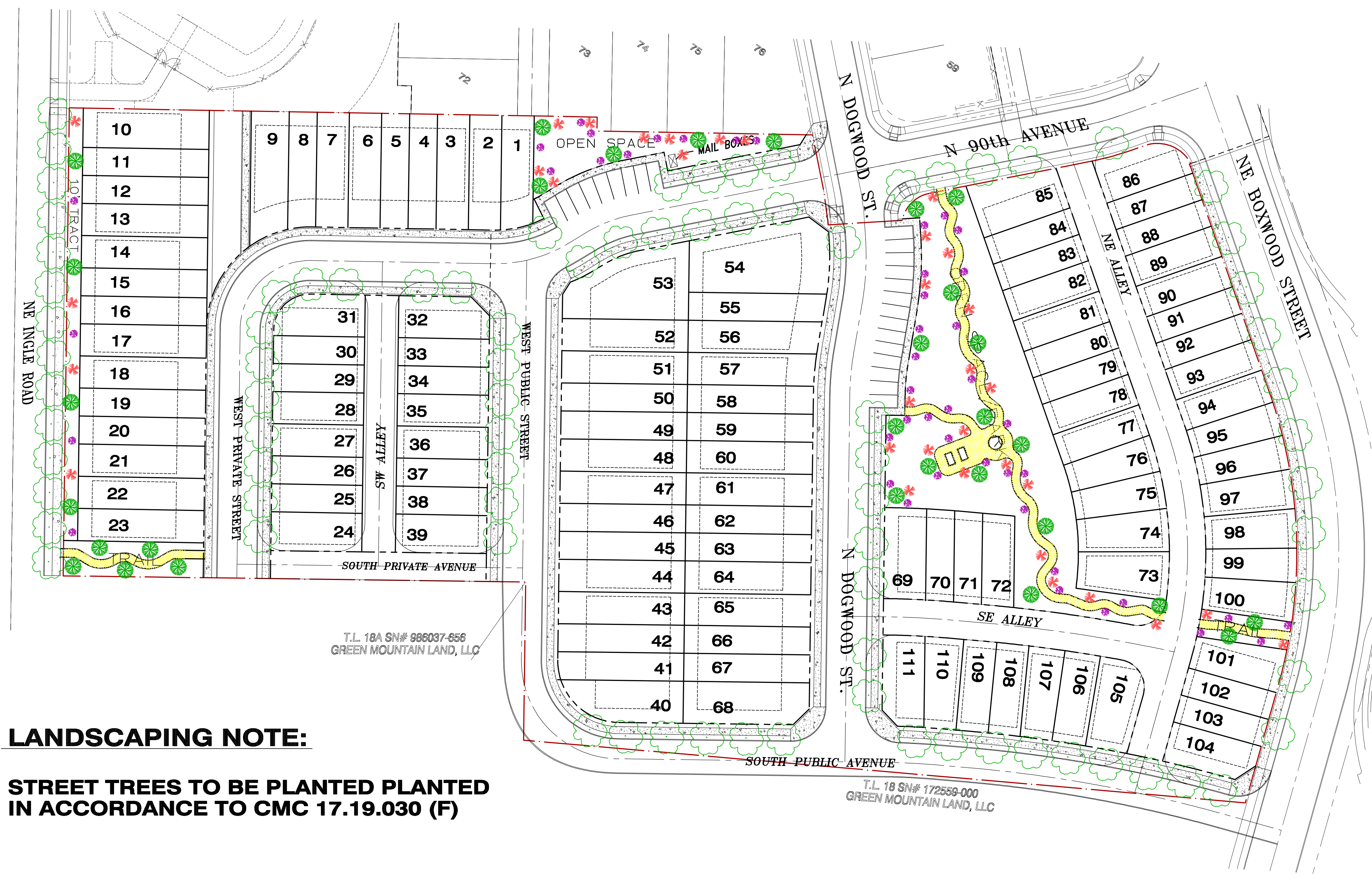
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Sheet Description:
UTILITY PLAN

Project:
**GREEN MOUNTAIN
B1 POD**



Scale: **AS SHOWN**
Project Number: **791**
Design/Drawn: **JGS/DJF**
Drawing Date: **MAR. 2019**
Sheet **7** of **8** Sheet(s)

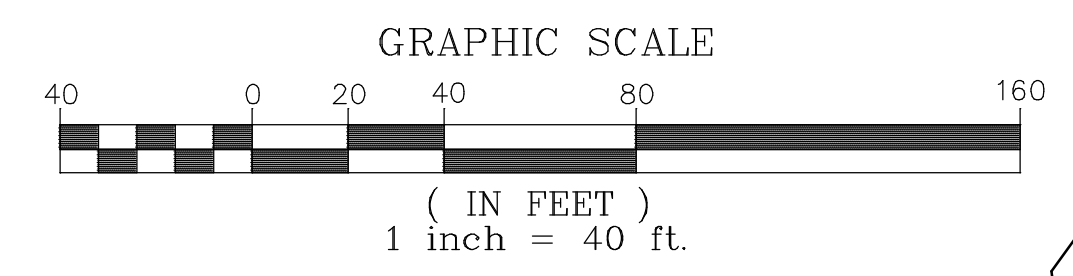


LANDSCAPING NOTE:

**STREET TREES TO BE PLANTED PLANTED
IN ACCORDANCE TO CMC 17.19.030 (F)**

OPENSACE LANDSCAPING

**EXACT SIZE, LOCATION, AND SPECIES OF PROPOSED PLANTINGS
SHALL BE FINALIZED DURING FINAL CONSTRUCTION PLAN REVIEW,
A FINAL LANDSCAPE PLAN WILL BE SUBMITTED FOR REVIEW
AND APPROVAL**



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**STERLING
DESIGN, INC.**

**PRELIMINARY LANDSCAPE
PLAN**

Project:
GREEN MOUNTAIN
B1 POD

Scale: AS SHOWN
Project Number: 791
Design/Drawn: JGS/DJF
Drawing Date: MAR. 2019
Sheet 8 of 8 Sheet(s)

08/28/19



NOTICE OF FINAL ORDER

To: Parties of Record and Applicants

From: Robert Maul, Planning Manager

Date: August 4th, 2015

This is to serve as Notice of Final Order on SUB14-02 (Green Mountain Planned Residential Development) Preliminary Master Plan and Preliminary Plat (Phase 1) that was adopted by the City Council on August 3, 2015.

Pursuant to Camas Municipal Code (CMC) 18.55.240 –Judicial Appeals, the City’s final decision (Final Order) may be appealed by a party of record with standing to file a land use petition in Clark County Superior Court. Such petition must be filed within twenty-one days after issuance of the decision, as provided in Chapter 36.70C RCW.

For further information regarding this specific application or planning issues in general, please contact Robert Maul, Planning Manager at (360) 817-1568.

Attachments: Final Order #SUB14-02 (Green Mountain PRD)

I. Summary

Zoning: Single-Family Residential (R-6), Single-Family Residential (R-10), Multi-Family (MF-10), and Community Commercial (CC)

Proposed Lots: PRD: 1,300 residential and commercial lots

Total site area: 283 acres

Open Spaces: 85 acres

Project History and Background:

In 2007, the City updated its Comprehensive Plan and Zoning map to include additional land to its North Urban Growth Area (NUGA) and developed capital facilities plans (sewer, water, and transportation) for the NUGA as required by GMA. In 2008, the NUGA area was annexed and the pre-annexation agreement created out of that process was soon replaced with a Development Agreement (DA) in 2009 that provided a conceptual framework for the future development of the Green Mountain property. Green Mountain, LLC purchased the property in 2012 and prepared updated technical information for the property. With the expiration of the 2009 DA coupled with the new technical information, a new DA was prepared and approved December 22, 2014 which contains a conceptual Master Plan for a mixed use planned residential development including requirements relating to parks and open space, transportation, tree preservation, planning standards, stormwater, streetscape and significant views for specific areas of the project. Additional history and background of the Development Agreement is set forth in Resolution 1315, Exhibit 55, recording number 5134733 AGR.

Physical Description:

The top of Green Mountain, including its western and southern slopes, stands at the northeast corner of the property. The northern portion of the property is generally forested with moderate to steep slopes and contains multiple terraces and rock outcroppings. The Green Mountain clubhouse and golf course sits on the southern half of the property on gentle to moderate slopes. The southern section also contains numerous wetlands, man-made ponds and ditches, a tributary creek with an adjoining oak grove and a gas transmission line. A BPA power line traverses the entire property. Adjacent to the site, to the north, is the Mountain Glenn subdivision with single-family residences. The site is bordered on the south by NE Goodwin Road and on the west by NE Ingle Road. Immediately to the east is a single-family residence zoned R-6; however County land outside of the UGA abuts a portion of the site to the east and is zoned large lot rural residential.

Proposed Action:

Application has been made to the City of Camas for planned residential development (PRD) and preliminary plat approval for a portion of the Green Mountain area, submitted December 30, 2014 and deemed complete on January 29, 2015 (Exhibit 57). The PRD proposal includes 1,300 single and multi-family residential homes, 8.8 acres of commercial/retail/office buildings, common open spaces, parks, trails, landscaping, associated parking lots, access roads, stormwater and detention facilities, utilities and other related infrastructural improvements. The master plan created development areas ("aka pods") with designated residential densities. The PRD will be developed in multiple phases with subsequent preliminary plat approval processes.

The preliminary plat proposal (City file number SUB14-02), which is Phase I of the PRD, would segregate 51.21 acres of this area into 201 lots ranging in size from 3,000 square feet to 15,200 square feet to accommodate front and alley loaded single-family residential homes. The proposal includes various tracts for open space and parks, access and parking, stormwater facilities, and a clubhouse. The proposed

preliminary plat is accessed off of NE Ingle Road and an extensive network of trails meanders throughout the site. The proposal also includes an exception request to the required development standard setback for stormwater facilities fronting rights-of-way. Additional flexibility in lots standards was proposed to coincide with the density and dimensional standards adopted in the Development Agreement. The applicant proposes several different "pods" to provide for a variety of single family detached lot sizes with up to seven different residential densities, not to exceed densities specified in the recorded DA.

This report includes the applicable approval criteria, followed by staff analysis, findings of compliance or non-compliance with the applicable codes and the DA, and a recommendation to the Planning Commission.

Planning Commission Hearing and Recommendation:

The Camas Planning Commission held a public hearing on May 12th, 2015 for this project proposal. Staff provided a detailed staff report and project presentation. The applicant followed with their proposal discussion. Public testimony was provided and the planning commission deliberated and provided a recommendation of approval as conditioned in the staff report including the recommended changes. The planning commission also recommended that the City Council consider negotiating with the applicant for a larger size public park for the project.

The applicant then subsequently requested that the city reopen the record since there was confusion related to public hearing dates as listed on the public notice sign on site. As such, staff posted a new public hearing notice to all of the owners within a 300' radius of the site as well as to all parties of record. The new hearing was held on June 16th, 2015. Additional public testimony was provided and is clearly in the record. The planning commission again deliberated on the project and offered another recommendation of approval with conditions. All of those conditions will be contained herein.

City Council Closed Record Hearing and Decision:

The City Council held a closed record meeting to consider the record on July 20, 2015. All exhibits and records of testimony are filed in the City of Camas. The list of exhibits is attached to this decision. The City Council concluded that the applicants sustained the burden of proof, that the proposed application does or can comply with the relevant approval standards of the Camas Municipal Code for a planned residential development, provided the applicant complies with the conditions of approval recommended by the Planning Commission or warranted by the facts and law to ensure the proposal does comply in fact with those standards. Therefore, the City approves the application subject to the conditions at the end of this final decision.

II. Discussion and Findings for Critical Areas (Title 16) and Sensitive Areas and Open Space

CMC 16.31 Archeological Resource Preservation

Findings: The applicant provided a detailed archaeological report for the PRD in its entirety, and for the first phase subdivision, as per CMC 16.31. Certified mailing labels to the impacted tribes dated December 19th, 2015 were provided with the application (Exhibit 52). The Washington State Department of Archaeology and Historic Preservation (DAHP) provided written comments for the SEPA determination (Exhibit 62). Additional archaeological review will be necessary for future phases of the development. The applicant will be required to coordinate and comply with any applicable DAHP regulations with all subsequent phases of the development prior to construction taking place for all respective phases, as per CMC16.31.050. A condition to this effect is warranted. Additionally, In the event that any archaeological or historic materials are encountered during project activity, work in the immediate area (initially allowing for a 100-foot buffer; this number may vary by circumstance) must stop and the following actions taken:

- a. Implement reasonable measures to protect the discovery site, including any appropriate stabilization or covering;

- b. Take reasonable steps to ensure the confidentiality of the discovery site; and
- c. Take reasonable steps to restrict access to the site of discovery.

The project proponent shall notify the concerned tribes and all appropriate city, county, state, and federal agencies, including the Washington State Department of Archaeology and Historical Preservation. (CMC 16.31.150(D))

Conclusion: As conditioned, this section can be met.

CMC 16.33 Public View, Open Space Protection and Historic Sites and Structures

Findings: The applicant has provided a detailed tree preservation approach with the recorded DA with regards to CMC16.33. Exhibit E in the DA provides a tree preservation strategy for each phase of the development. In total, 4,759 trees, or 50% will be retained for the overall site. Additionally, the site will see additional landscaping provided with the development of the subdivision phases and commercial spaces, in addition to parks development thereby raising the overall tree canopy of the development as it builds out.

The applicant is also proposing to provide an approximate total of 103 acres of open space for the development as a whole, which is close to 33% of the overall site area. Some of the open space will include a trail system, community park space, and natural environmental spaces such as wetlands and tree habitat mitigation areas. This section can be met as proposed.

The site does contain an existing structure that the applicant's archaeologist did recommend should be retained either in place, or elsewhere on site. DAHP did recommend that the structure should be retained, but if not possible then further consultation will be necessary to see if additional documentation of structure is warranted. A condition to this effect is warranted.

Conclusion: As conditioned, this section can be met.

CMC 16.53 Wetlands

Findings: The applicant provided a critical area report (CAR) which complies with the standards of CMC Chapter 16.53 Wetlands and CMC Chapter 16.61, and with additional email correspondences from the Ecological Land Services.

In brief, the applicant avoided impacting the wetland areas to the extent practical, and utilized the provisions for buffer reductions and demonstrated that mitigation of impacts could occur onsite.

The site overall contains several man-made and naturally occurring wetlands as listed in the CAR. The first phase of this development does not propose to fill any jurisdictional wetlands, nor does the first phase contain any jurisdictional wetlands. The applicant does propose to buffer average two buffers related to Wetland D and G. No net loss is proposed for the two buffer areas to be averaged as per the CAR.

The applicant proposes to set aside several areas for wetlands and their respective buffer areas in the development, but it is unclear if they will be contained in tracts. Preserved wetland areas and their associated buffers are required to be placed in tracts, as per CMC 16.51.240. A condition to this effect is warranted. Prior to final plat approval, private covenants will need to be submitted, and must include provisions for proper maintenance and protection of this tract. CMC§16.51.210, allows the city to require adequate protective mechanisms. The city may require permanent fencing and signs adjacent to the critical area tract to act as a clear demarcation between private and common spaces. There are a few areas that will be set aside for tracts that will tie into trail and open space. Clear demarcation along the trail lines shall be in place with signage along the boundaries between wetland boundaries, buffer and

recreational open space. Staff recommends that signs and fencing be installed along the final boundaries between housing lots and wetland areas with their respective buffers and shall be reviewed during engineering review. A condition to this effect will be included with this report.

Future phases that will impact jurisdictional wetland and/or their associated buffers will require additional review and approval by the city with those subsequent applications. A condition to this effect is warranted.

CMC 16.59 Geologically Hazardous Areas

Findings: The PRD site overall does have some areas that trigger a geotechnical review. The applicant has provided a detailed geotechnical report (Exhibit 46). The conclusion of the report is that phase 1 is considered low risk for geo-hazards. There are recommendations contained in the report that suggest having site preparation done in conformance with building code requirement with any excavation and grading of native and fill soils on site for when construction takes place. The applicant also acknowledges that further study is necessary for each respective phase. The applicant shall submit additional geological studies for each subsequent phase of this PRD.

Conclusions: As conditioned, this section can be met.

CMC 16.61 Fish and Wildlife Habitat Conservation Areas

Findings: The applicant's CAR did address the various elements listed in the CMC regarding habitat areas contained in this chapter. A comment letter was received by Washington State Department of Fish and Wildlife (WDFW) through the SEPA comment period (Exhibit 66). The applicant's consultant, Ecological Land Services, provided written responses to each concern raised by WDFW, which are as follows:

Oregon White Oak Habitat

The applicant is proposing to remove 8 oak trees with the first phase of the development that qualify for tree protection. The applicant, through its CAR, is going to mitigate for those trees at a higher replacement ratio than that is required in CMC16.51.120, which is normally 2 to 1. The applicant is proposing to provide Oak Tree mitigation within a buffer of a Category III wetland abutting Phase 1 as depicted in Figure 9 of the CAR. The applicant has also further discussed the oak tree habitat overall for the site with the WDFW, whereby they will look to provide an Oak Habitat Mitigation Bank up front for the rest of the development site to pre-mitigate for this and future phases. A detailed planting, mitigation and monitoring plan will be required to be provided to the city prior to any construction taking place on site. A condition to this effect is warranted.

Green Mountain Biodiversity Area

There has been some debate as to the accuracy of Clark County's mapping of a forested area in phase 1 if it qualifies as a Biodiversity Area. According to ELS, the young, deciduous forested area in the northern part of Phase 1 doesn't meet the definition of Biodiversity Area. If this conclusion is supported by WDFW the city will not require additional conditions for phase 1.

There are other areas within the PRD overall that do have mapped Biodiversity distinction that will require further review and analysis for those respective phases.

Townsend's Big-eared Bat

The developable portions of Phase 1 do not contain topography suitable for caves. According to the applicant, WDFW's main concern was potential habitat outside of the Phase 1 project area, but within the PRD. This area will need to be surveyed by WDFW and ELS biologists prior to any development in the potential habitat area.

Bradshaw's Lomatium

The documented Bradshaw's lomatium is outside the boundaries of Phase 1 and the PRD. The closest known location is about 0.25 miles from the nearest PRD boundary. According to ELS, WDFW didn't believe that there was suitable habitat within Phase 1 or the PRD for the lomatium, concurring with findings by ELS biologists and onsite maintenance staff knowledgeable about plants.

Conclusion: As conditioned, this section can be met.

III. Discussion and Findings for Preliminary Plat Criteria of Approval (CMC17.11.030)

The italicized text in boxes is the criteria of approval for preliminary plat applications per CMC§17.11.030(D) **(1 through10)**.

1. The proposed subdivision is in conformance with the Camas comprehensive plan, parks and open space comprehensive plan, neighborhood traffic management plan, and any other city adopted plans;

The applicant's narrative at pages 17 and 18 identifies that the proposed subdivision is in conformance with the Camas Comprehensive Plan (Comp Plan), 2014 Parks, Recreation and Open Space Plan (Parks Plan), Neighborhood Traffic Management Plan (NTM Plan) and any other city adopted plans.

The proposed subdivision will help accommodate the projected growth through well-planned utilization of existing land. The proposed houses, when built, will provide housing opportunities to meet the needs of the community in accordance with the Housing element of the Comprehensive Plan. The mixed-use urban village will allow for economic development opportunities and will be well integrated into the surrounding development. The parks and open space needs can be met with the development of park land and trail networks, in addition to preservation of open space and natural areas. Many of these elements were addressed in the DA.

PARKS AND OPEN SPACE PLAN: The applicant proposes to provide for open space and parks by utilizing five components to their development.

- Open Space Area: The applicant is proposing to retain approximately 33% of the site in open space both for active recreation and natural space preservation.
- Community Trail System: The trail system is proposed to have both regional and neighborhood trail networks. The required regional T27 Trail is shown to navigate through the entire development largely using the BPA easement. The applicant is proposing that the T27 trail will be 8' wide paved at the central park area then taper down to 6' paved where the grade goes up to 8%, then down to 4' compacted gravel surface over 8% in terrain. The applicant also proposes to provide neighborhood trails T29 and T30. Those trails are proposed to be 6' in width with compacted gravel surfacing from flat up to 8% grade, and 4' wide compacted gravel over 8% in grade. Over 3 miles of trails are proposed overall.
- Central Community Open Space and Park: In the center of the development is the proposed 14 acre central park. Five acres of which will be used for active recreational area to include appropriate amenities including, but not limited to playground equipment, open lawn area to accommodate field space, paved sport courts, water features, restrooms, and site furnishings to name a few.

- Residents' Clubhouse: The applicant is also proposing a private club house for use of the residents. The clubhouse will contain an outdoor pool, meeting rooms, lounge and will be owned and maintained by the HOA.
- Landscape Master Plan Components: The overall development will have a comprehensive landscape plan that will help tie the community's sense of place together.

Staff met with the parks development review committee on March 13th, 2015 to discuss the project. The following are a summary of comments from the review committee.

- Project appears to plan for the appropriate trails, public viewing area atop Green Mountain, and a neighborhood park as called for in the Parks and Open Space Plan. The committee appreciated seeing regional trail connection that is tied into the local community as well as seeing the development of viewing areas atop Green Mountain. (In discussions with a rep. of the applicant, the top of Green Mountain is heavily forested. The City has identified the desire to protect the natural backdrop of Lacamas Lake including Green Mountain). Additional discussion on balancing a viewing area with the natural backdrop should occur with the committee prior to final construction plan approvals on the GM trails.
- The committee was concerned with construction of trails on steep slopes. It was noted the plans indicate slopes up to 16% which they felt were too steep. They recommended that the design minimize slopes and not exceed 8- 12% except where it is determined to not to otherwise be practicable.
- Where trails cannot meet ADA, the committee is interested in offsetting this with design efforts elsewhere to incorporate ADA accessibility in trail design, picnic areas, viewing platforms, etc.
- The committee would like to see the trail on Green Mountain connect to the adjacent County lands and would like to see this coordinated with the County Parks Dept. This will coincide with the Clark County Parks Department's request that the proposed development contain trail linkages to the County Parks area trails that abut the site.
- The location of the park within the community is supported. There is some concern as to the amount of usable area and how it ultimately is improved. The connectivity of the park to the larger trail networks is applauded. The Parks Board will ultimately need to be involved in the review of the Park Design and improvements. The Park would be a City Park and the Committee would support improvements being Impact Fee Creditable.
- The committee is interested in walking the site with the developer at some point prior to finalizing construction plans.

Essentially, the applicant has clearly provided some thought towards the implementation of the necessary parks and open space requirements based on the parks master plan. They have also provided some additional elements that help make the project become more innovative in design than standard subdivisions. It is unclear, however, what the intent for development and final ownership of the five acre neighborhood park proposed in phase 1. The neighborhood parks element in the parks master plan envisions a city owned Public Park to serve the area. The design, development and parks credit plan for the five acre central park shall be finalized prior to final plat approval for phase 1. Taking into consideration the comments from the parks committee, and the required trail design standards as listed in the Parks Master Plan, staff will provide conditions as appropriate to ensure trail and parks development compliance.

Neighborhood Traffic Management Plan

The city has a Neighborhood Traffic Management Plan (NTM). This plan identifies the need for installation of acceptable traffic calming features when a proposed development will create 700 Average Daily Trips (ADT) or more.

The submitted Transportation Impact Analysis (TIA) clearly demonstrates that this threshold will be exceeded with the first phase of development.

The applicant has not identified traffic calming features other than the narrowed entry street and the majority of internal streets at 28 feet wide. Currently, there is no discussion of traffic calming elements for the remainder of Planning Pod 1 or the other six Planning Pods within the development, but it is expected to be addressed with the civil plans for those phases once submitted.

A condition of approval requiring installation of traffic calming elements in the number, type and location acceptable to the city engineer is warranted.

Prior to final engineering plan approval for any phase the applicant shall install acceptable traffic calming elements in the number, type and location deemed necessary by the City Engineer.

Staff finds that as conditioned the applicant can or will comply with the city's NTM plan.

Findings: Staff finds that the project as conditioned can be consistent with the city's comprehensive plans.

2. Provisions have been made for water, storm drainage, erosion control and sanitary sewage disposal for the subdivision that are consistent with current standards and plans as adopted in the Camas Design Standard Manual;

Findings:

Water:

There is an existing 8" dead end water line in NE Ingle Road that currently serves the golf course and clubhouse. In 2013 the city performed some limited water modeling at the applicant's request to determine available fire flows under various scenarios (see Technical Memorandum from Gray & Osborne, Inc. dated November 20, 2013 - exhibit #77).

The modeling showed that the existing system (and future 8" diam. extensions) can only provide adequate fire flows for the lower, southerly portion of the site near NE 28th Ave.

Fire flows were not adequate in the middle and northerly portions of the site without upsizing portions of the system as shown by the modeling results of scenario #2. With those improvements, adequate fire flow was only provided for a portion of proposed Phase 1 up to an approximate elevation of 270 to 280 feet.

Under scenario #3 adequate fire flows were provided for elevations of the site at or below 370 feet in elevation. In order to serve the portions of the site above 370 feet in elevation a booster pump station will need to be constructed.

Per the applicants Phase 1 grading plan it appears the highest lot elevation is approximately 330' on Lot #'s 184 & 185 in Phase 1H. Staff would note for the record that all lots in Phases 1A through Phase 1E appear to be located at or below 250 feet in elevation.

Prior to final engineering plan approval for any phase the applicant shall demonstrate that adequate fire flows are available for the lots proposed. A condition of approval to this effect is warranted.

Prior to final engineering plan approval for any phase the applicant shall demonstrate to the city's satisfaction that the proposed water system improvements being installed will provide adequate fire flows for the lots proposed.

Per Chapter 8 of the city's Water System Plan of June 2010 (WSP), multiple projects are identified for the Green Mountain area. The WSP identifies a future developer driven booster pump station (DE-5), a water storage facility (S-6), a 24" diameter transmission main (T-7) and a 12" developer funded NUGA transmission main (N-1) on or adjacent to the subject property. Some of these elements may be modified by the city depending on a number of factors including topographical issues. The applicant shall coordinate with the city through final engineering to determine the need, location and installation of these improvements as will be conditioned below.

To conform with the City's 2010 WSP, a condition of approval specifying the applicant's responsibility to design and construct the T-7 and N-1 transmission mains shown within and adjacent to the PRD per the WSP is warranted. Construction of the transmission mains through the PRD site and up to the water storage facility S-6, as applicable based on the final determination of its location, must be completed prior to final plat approval of the phase(s) the mains are located within or adjacent to, or to the extent necessary to achieve adequate fire flows. Additionally, a condition of approval specifying the applicant's responsibility to design and construct Booster Pump Station DE-5 is warranted. The Booster Station shall be constructed prior to final plat approval for any phase that has a lot located above 370 feet in elevation.

As noted above, the 2010 WSP identifies Reservoir S-6 located within the applicant's site. Due to the uncertainty regarding timing for the need for additional storage in the City's water system and in consideration of the size of the project, a condition is warranted requiring dedication of land suitable for construction of a 2.0 million gallon reservoir, if it's determined by the City that the location of the reservoir will be on the Applicant's site. Design and construction of the reservoir itself would be completed by the City. If it's determined that S-6 is to be located on the site, prior to Final Masterplan approval, the City and applicant shall enter into an agreement specifying the location and size of the land dedication for the reservoir and specifying timing of the required land dedication.

Prior to Final Masterplan approval, the City and applicant will determine the sizing and location of water facilities and any needed land for dedication for a reservoir. If it's determined that land is needed the City and applicant shall enter into an agreement specifying the location and size of the land dedication for the reservoir and specifying timing of the required land dedication.

Water wells, septic tanks and septic drain fields

It is unclear to staff if there are existing water wells on site as they are not identified on the existing conditions plans or in the application materials. Staff would note that CMC 17.19.020 (A 3) requires abandonment of existing wells, septic tanks and septic drain fields. Existing water wells shall be properly abandoned in accordance with State and County guidelines prior to final plat approval for the phase they may be located in. Transfer of any existing water rights to the City of Camas will also be required as part of the abandonment. A condition of approval to this effect is warranted.

Existing water wells shall either be properly abandoned in accordance with State and County guidelines prior to final plat approval or used exclusively for irrigation (nondrinking) purposes for the golf course or environmental mitigation areas. The city and the applicant shall explore the option at

the cessation of operation of the golf course of transferring water rights to the city for fair market value.

Staff finds that as conditioned the applicant can and will provide water system improvements consistent with the city's Engineering Standards and WSP.

Storm Drainage:

Staff would note for the record that although there are provisions for regional stormwater facilities in the DA at Section 6 and at CMC 17.19.040 (C 3a), the facilities proposed do not appear to provide a regional function.

The applicant has submitted a preliminary stormwater Technical Information Report (TIR) and storm plan for Planning Pod 1 (201 lots) consistent with the requirements of CMC 14.02, CMC 17.11.030 (B 8) and the Camas Stormwater Design Standards Manual (CSDSM).

For Planning Pod 1, the applicant is proposing 3 wet ponds for water quality and quantity control. The proposed wet ponds will provide phosphorus control in addition to basic treatment in accordance with the requirements of Section 5.04 of the CSDSM.

Two of the wet ponds do not meet the location requirements of CMC 17.19.030 (F 6) in that they are not setback a minimum of 30 feet from the street. The third wet pond will meet the minimum street setback requirement.

The applicant is requesting an exception to the requirements of CMC 17.19.030 (F 6) for the two wet ponds located on each side of the entry drive and adjacent to NE Ingle Road (Tracts A & H). The proposed locations are at or near the low point of Planning Pod 1 but are not located at the low point of the subject property.

Staff finds that the requested exception to the requirements of CMC 17.19.030.F.6 may be warranted provided the applicant be required to include enhanced landscaping, screening and fencing acceptable to the city prior to final engineering plan approval of any phase. A condition of approval to this effect is warranted.

Enhanced water quality and quantity control facilities landscaping, screening and attractive fencing style acceptable to the city shall be included on the final landscaping plan prior to approval of any phase.

Staff finds that as conditioned the applicant can or will provide adequate stormwater drainage for Planning Pod 1.

Erosion Control:

Adequate erosion control measures will be provided during the site improvements contemplated for this PRD in accordance with adopted city standards. The Erosion Sediment Control plans will ultimately be submitted to the city for review and approval prior to any ground disturbance.

CMC 17.21.030 requires submittal of an erosion control bond for ground disturbances of one acre or more.

Additionally, the applicant will prepare a Stormwater Pollution Prevention Plan (SWPPP) as part of their application for their general construction stormwater permit that is required through the Washington State Department of Ecology for ground disturbances of over one acre.

Staff finds that adequate provisions for erosion control can or will be made.

Sanitary Sewage Disposal:

Currently there is no public sanitary sewer system serving the Green Mountain area of Camas. The nearest sewer line is a 6" diameter STEP force main (no solids) that serves the LaCamas Lake Trailhead restroom facility located at NW Alexandria Lane and NE Goodwin Road approximately 2,200 feet southwest of the intersection of NE Ingle Road and NE Goodwin Road.

The General Sewer Plan Amendment of April 2010 (Sewer Plan) provides a plan on how the North Urban Growth Area (NUGA) will be sewerred. The NUGA is divided into six basins served by multiple regional pump stations and major force main and gravity piping systems. The Sewer Plan calls for traditional gravity sewer flows (including solids) from all six basins to be directed south and east along the north side of LaCamas Lake.

The subject property is located in Basin 1 as shown in the Sewer Plan. As described above, Basin 1 is shown in the Sewer Plan to be permanently serviced by the regional pump station and force main system along the north side of LaCamas Lake. The Applicant and the City have been working diligently over the last year to develop a design and financing plan to construct the permanent traditional gravity system as quickly as possible. It is currently anticipated that the City will design and construct the permanent system with a financial contribution by the applicant. However, to date, a final agreement has not been reached regarding the applicant's proportionate share or other responsibility for constructing the permanent system. As such, a condition is warranted to require the applicant to enter into an agreement with the City relating to sewer facilities that will provide for, among other things, the construction, general financing and timing of the construction of permanent sewer facilities that will serve the PRD.

Recognizing the size and extent of the permanent system, the Sewer Plan also provides for a temporary connection south to the city's existing STEP force main located within NE Goodwin Road at Alexandria Lane. The Sewer Plan provides the following guidance with respect to a temporary connection:

"As an interim stage, prior to full development, the possibility of temporarily partitioning off flows from developments within Basins I and II to the existing STEP system to the southwest is also addressed. Discharge to the STEP system should be temporary because flows from NUGA were not included in the original design of STEP conveyance, and high operation and maintenance costs and unfavorable downstream impacts to conveyance and WWTP facilities have led the City to conclude that further expansion of the STEP service is undesirable."

Since timing of the permanent system on the north side of LaCamas Lake is uncertain, should the permanent sewer system not be in place prior to engineering approval of Planning Pod 1, Staff finds there is adequate capacity in the existing STEP system on the south side of LaCamas Lake to temporarily serve approximately 300 ERU's which will provide service to the 201 lots included with the Phase 1, Planning Pod 1 of the Green Mountain PRD. . The applicant shall be responsible for constructing all on and off-site improvements necessary for the temporary system to serve their site. A condition of approval to this effect is warranted.

Additional Phases of the development beyond Planning Pod 1 will be required to direct conventional gravity sanitary sewer flows to the east and south along the north side of LaCamas Lake per the Sewer Plan. Should the permanent sewer system on the north side of LaCamas Lake not be constructed prior to engineering approval of subsequent phases, the City may accept additional sewer flows into the existing STEP system provided the applicant shows and the City confirms that there is adequate capacity in the STEP system at the time of engineering approval for each subsequent phase. In this scenario, the applicant shall be responsible for designing, constructing and permitting all improvements to continue using the STEP system. A condition of approval to this effect is warranted.

Proposed Condition: The applicant shall enter into an agreement with the city that will provide for the construction, general financing and timing of the construction of permanent sewer facilities that will serve the PRD. The applicant will be responsible for constructing all on and off-site improvements necessary for the temporary system to serve their site including abandonment and/or decommissioning of the large

community septic tanks. Should the permanent sewer system on the north side of LaCamas Lake not be constructed prior to engineering approval of subsequent phases, the City may accept additional sewer flows into the existing STEP system provided the applicant shows and the City confirms that there is adequate capacity in the STEP system at the time of engineering approval for each subsequent phase. In this scenario, the applicant shall be responsible for designing, constructing and permitting and abandoning/decommissioning all temporary improvements to continue using the STEP system.

The applicant is proposing to construct a sanitary sewer pump station near the intersection of NE Ingle Road and NE Goodwin Road on a city owned parcel. The Sewer Plan identifies a regional pump station at this location to serve portions of the NUGA it is feasible that the pump station may be used to provide both temporary and permanent service to the PRD. As such, portions of the pump station that may be used permanently could be a creditable improvement as it is intended to serve the entire basin.

If a regional pump station is proposed and constructed the applicant will need to enter into an agreement with the city that identifies the required improvements and what portions of the system improvements are creditable or reimbursable. A condition of approval to this effect is warranted.

Prior to installing a regional pump station the applicant shall enter into an agreement with the city that specifies the required pump station improvements and how the improvements will be credited and/or reimbursed.

As part of the temporary connection to the STEP system, the applicant will also be required to provide a solids retention system acceptable to the city as the existing STEP system is only suited to handle effluent flows (no solids). The applicant is proposing large underground community septic tanks that will allow the solids to settle out of the sewer prior to reaching the pump station. The proposed tank locations are shown in exhibit 71. One tank is proposed in the central park south of the proposed club house. The other two proposed tank locations are east of and adjacent to the two wet ponds located on each sides of the entry road.

Prior to final engineering plan approval for any phase the applicant shall be required to supply a sewer basin analysis and appropriate tank sizing and anti-buoyance calculations acceptable to the city. Additionally, the applicant will be required to complete an odor control analysis and provide odor control facilities for the large septic tanks and effluent line flowing to the pump station. The entire temporary system shall be designed and constructed such that the septic tanks may be abandoned or removed so the subdivision may be served via a conventional gravity system. Because the septic tanks provide a temporary service, the applicant shall be required to maintain all tanks according to the manufacturer's recommendations and City standards. Conditions of approval to this effect are warranted.

Staff finds that adequate provisions can or will be made for water, storm drainage, erosion control and sanitary sewage disposal which are consistent with the Camas Municipal Code, the Water System Plan, the General Sewer Plan Amendment and the Camas Design Standard Manual.

Conclusion: As conditioned, this section can be met.

3. Provisions have been made for road, utilities, street lighting, street trees and other improvements that are consistent with the six-year street plan, the Camas Design Standard Manual and other state adopted standards and plans;

Findings:

Roads:

NE Goodwin Road/NE 28th Street and NE Ingle Road are existing public roadways adjacent to and serving the subject property. These roads are rural in nature and do not include bike lanes, sidewalks, street lighting, turn lanes or other urban improvements.

NE Goodwin Road/NE 28th Street have a functional classification of arterial in the 2012 Traffic Impact Fee (TIF) update. The TIF designates NE Goodwin Road west of NE Ingle Road as a 5 lane arterial and as a 3 lane arterial east of NE Ingle Road. NE Ingle Road is classified as a collector street.

The TIF also identifies NE Goodwin Road/NE 28th Street east of NE Ingle Road as a North District TIF creditable improvement. Installation of a traffic signal at the intersection of NE Goodwin Road & NE Ingle Road is also TIF creditable.

As subsequent Planning Pods are developed adjacent to NE Goodwin Road/NE 28th Street and/or when traffic conditions warrant the signal, the applicant will be responsible to provide those improvements.

Prior to installing TIF eligible improvements the applicant shall enter into an agreement with the city that specifies the required improvements, the cost of those improvements and what portions of the improvements are creditable or reimbursable. A condition of approval to this effect is warranted.

Prior to installing half width street improvements along NE Goodwin Road/NE 28th Street or installing a traffic signal at the intersection of NE Goodwin Road & NE Ingle Road, the applicant shall enter into an agreement with the city specifying the improvements to be installed, the cost of those improvements and what part of the improvements are creditable or reimbursable. Right-of-way (ROW) dedication along NE Ingle Road and NE Goodwin Road shall be of sufficient width to provide a minimum paved width of 43' which shall include an 11' wide center left turn lane, two 5' wide bike lanes and two 11' travel lanes. Interior roadways, with the exception of the entry roadway, shall include ROW widths of 60' and/or 52' with respective paved widths of 36' and 28' for all interior streets with the exception of the entry roadway that is proposed at 74' ROW width with a landscape median island.

Internal street connections

Currently there is not an internal street connection proposed to the northerly half of the site. Planning pods B4, E4, F1a, F1c, F2, F3, F4 and G, a total of 69 acres of developable land, will be served by only one access point located at pod B4. These pods are located on the steeper portion of the site. Details as to final street grades, locations, etc. are not yet detailed enough to determine if the development as proposed will provide safe and reliable access during inclement weather including snow and ice events.

Planning pod F1b appears to be a stand-alone 2 acre pod with a separate access off of NE Ingle Road. This pod does not appear to be connected to other pods of the development by internal roadways or by the community wide trail system.

The northerly portion of this development appears to be a standard subdivision that is benefitting from the flexibility of the PRD provisions of the code.

The applicant has provided one layout at the Planning Commission hearing whereby they claim that to build an internal road connection to the northerly part of the site is impractical. However, there may still be some alternative layouts where some vehicular roadway connection could be made. Staff recommends that the applicant demonstrate to the city's satisfaction that this connection is not feasible. A condition of approval to this effect is warranted.

The applicant shall demonstrate to the city's satisfaction that it is not feasible to provide an internal street connection to the northerly portion of the site.

Study area intersections of concern

The applicant has provided a Traffic Impact Analysis (TIA) that evaluated the existing roadway system, traffic volumes, speeds, and crash history of the adjacent roadways and select intersections in the vicinity of the site. The TIA evaluated traffic operations based on Planning Pod 1 buildout in 2018 and the Master Plan buildout in 2029. The studied intersections fall within three jurisdictions; namely City of Camas, City of Vancouver and WSDOT.

NE 199th Ave. & NE 58th St. (SR-500)

Per the TIA this intersection located north of the site was identified with high crash rate for eastbound turning movements and under existing conditions currently meets WSDOT guidelines for an eastbound right turn lane.

Construction of a right turn lane at this location could require right-of-way acquisition and would likely impact one or more driveways. Planning Pod 1 at buildout will contribute 27 eastbound right turn trips at this intersection (18% of all turns). At full master plan buildout the development will contribute 138 eastbound right turns (73% of all turns). Given the small impact of Phase 1 no improvements were recommended in conjunction with Phase 1.

Staff finds that a nexus might ultimately be established between requiring construction of an eastbound right turn lane on NE 58th Street at NE 199th Avenue as traffic volume increases attributable to the proposed master plan development based on level of service and delay at the intersection.

Future preliminary plat applications should provide an updated TIA with an assessment as to the potential need for providing a right-turn taper or lane at this intersection. A condition of approval to this effect is warranted.

Prior to preliminary plat approval of each additional Planning Pod or phase the applicant shall submit an updated assessment as to the potential need for providing an eastbound right turn taper or lane at the intersection of NE 58th Avenue at NE 199th Street.

NE Goodwin Road/NE Ingle Road

Per the TIA, this intersection has a high crash history. The TIA makes several recommendations that will help improve safety at this intersection as follows:

- The TIA recommends relocating the stop bar on NE Ingle Road approximately 20 to 25 feet further south to improve sight distance with the initial site improvements of the first phase.
- The TIA recommends installing an eastbound left turn lane on NE Goodwin Road at NE Ingle Road with a minimum 100' of storage with the initial site improvements of the first phase.
- The TIA recommends installing a westbound right turn lane on NE Goodwin Road at NE Ingle Road with a minimum of 100' of storage prior to occupancy of the 203rd home.
- The TIA recommends that subsequent preliminary plat applications include an analysis of traffic operations at the intersection of NE Goodwin Road & NE Ingle Road and when warranted require the developer to install a traffic signal.

Conditions of approval to these effects are warranted.

- Prior to Final Acceptance of the first phase of improvements the applicant shall relocate the stop bar on NE Ingle Road as detailed in the construction plans and as directed by the city.
- Prior to Final Acceptance of the first phase of improvements the applicant shall install an eastbound left turn lane with a minimum 100' storage in NE Goodwin Road at NE Ingle Road.

- Prior to Final Acceptance of any phase that will yield a total preliminarily platted total of 203 or more homes, the applicant shall construct a westbound right turn lane with a minimum 100' of storage in NE Goodwin Road at NE Ingle Road.
- Half street improvements along the applicant's property frontage of Ingle Road shall be constructed in a manner to provide a minimum width of 43 feet of pavement.
- Subsequent preliminary plat applications shall include an updated TIA that analyzes traffic operations at the intersection of NE Goodwin Road & NE Ingle Road and when warranted the developer shall install the signal.

NE 192nd Avenue/NE 13th Street

Under existing conditions this intersection operates acceptably with the exception of the morning AM peak hour for southbound left turns on NE 192nd Avenue associated with students attending the Union High School.

The TIA projects that this intersection will not meet the City of Vancouver's LOS requirements in the 2029 background condition (completion of Planning Pod 1 only) or the 2029 total traffic condition (at full master plan buildout).

The TIA indicates that NE 192nd Ave is a 5 lane arterial TIF eligible route in the City of Vancouver. In the event that NE 192nd is widened to 5 lanes through the intersection of NE 13th Street the intersection will meet the City of Vancouver's intersection minimum LOS requirements. To mitigate total traffic conditions a westbound right turn lane on NE 13th Street would also be required. In the event that NE 192nd Ave is not widened a northbound right turn lane and a westbound right turn lane would be sufficient to mitigate the 2029 total traffic condition.

As the timing of corridor improvements on NE 192nd Ave. are unknown the TIA makes a recommendation that the developer be required to provide a proportionate share contributions to the City of Vancouver towards the construction of a northbound right turn lane on NE 192nd Avenue and an westbound right turn lane on NE 13th Avenue. Details of the proposed proportionate cost sharing methodology are include in Appendix "M" of the TIA. A condition of approval to this effect is warranted.

The applicant shall be conditioned to make the payment based upon this record with the City of Vancouver for proportionate share contributions towards the construction of a northbound right turn lane on NE 192nd Ave. and a westbound right turn lane on NE 13th Street. The agreement shall specify when proportionate share payments are triggered and the amount of those payments.

NE 242nd Avenue/NE 28th Street

Per the TIA this intersection currently meets WSDOT's guidelines for a left turn lane on the eastbound approach under existing conditions. At buildout of Planning Pod 1 the TIA finds that no eastbound left turn trips will be added to this intersection from the proposed development. At full master plan buildout the TIA projects that this development will add 9 eastbound left turns at this intersection.

Staff finds that the traffic impact fee payments made by this development for Phase 1 and future phases of the project will mitigate development impacts at the intersection and therefore require no additional mitigation.

Access spacing on NE 28th Street

As noted previously, NE 28th Street is designated as an arterial street. Intersection access spacing requirements for an arterial are a minimum of 660' to a maximum of 1,000 feet.

The proposed entry road into Planning Pod 3 off of NE 28th Street should be located a minimum of 660 feet to the west of the east project boundary in order to allow adjacent parcels to the east maximum

opportunities to locate their site access off of NE 28th Street. A condition of approval to this effect is warranted.

The applicant shall locate the proposed entry drive into Planning Pod 3 off of NE 28th Street a minimum of 660' west of the project's east boundary.

Alleys & Cul-de-sac's

The applicant is providing a number of alley loaded lots. Staff would note for the record that in accordance with CMC 17.19.040 (A 6) alleys are to be privately owned and maintained. The applicant is proposing a 20' tract width for the alleys where the code only requires an 18' Tract width. The code also requires a minimum paved width of 16'. The applicant shall meet or exceed the minimum alley requirements noted in the CMC. A condition of approval to this effect is warranted.

The applicant is also proposing several cul-de-sac's. The application materials show cul-de-sac radii at 40'. Staff would note for the record that per the CDSM the minimum ROW radius for a cul-de-sac where parking is prohibited is 43' with a minimum paved radius of 35'.

The applicant shall meet or exceed the minimum alley Tract and paved width requirements of the code. Cul-de-sac ROW radii shall meet the minimum 43' width of the Camas Design Standards Manual.

Utilities, Street Lighting, Street Trees, and Other Improvements:

The applicant can or will make adequate provisions for utilities as shown on the Preliminary Development Plans.

LED Street lighting will be installed along all street frontages within and adjacent to the proposed development.

CMC 17.19.030 (F 1) requires the applicant to install one 2 inch diameter tree in the front yard of each lot. The location of these trees should be shown on the final site improvement plans along with the enhanced landscaping to screen the stormwater facility. The applicant will also be required to provide acceptable fencing and landscaping along NE Ingle Road and NE Goodwin Road in accordance with CMC 17.19.040 (B 11c). The proposed fencing, landscaping and street tree plantings shall be included with the final engineering plan submittal for the site improvements. A condition of approval to this effect is warranted.

Prior to final engineering plan approval for any phase the applicant shall include a landscaping plan that details the location, number, plant species proposed, planting notes, fencing notes and associated details.

Staff finds that the applicant can or will make adequate provisions for roads, utilities, street lighting, street trees, and other improvements that are consistent with the six-year street plan, the Camas Design Standard Manual and other state adopted standards and plans.

Conclusion: As conditioned, this section can be met.

4. Provisions have been made for dedications, easements and reservations;

Findings and Conclusions: The applicant, through the final platting process shall make provisions to dedicate appropriate right of way, easements, and reservations as conditioned herein. This section can be met as conditioned.

5. The design, shape and orientation of the proposed lots are appropriate to the proposed use. In addition to meeting the minimum lot size density requirement, each residential lot must provide a

building envelope that allows a building that at least conforms to the developers own building restrictions (CC and R's). Therefore corner lots, lots with easements, or lots with environmental constraints may have to be larger than other lots in the subdivision;

Findings:

Design and Shape of lots: The proposed layouts of the lots in Phase 1 are based on the general pod layout for the overall PRD and contain lots from Pods D, C, and E. As discussed in the narrative on pages 8-12; the different Pods have densities and dimensional standards relative to current city zoning designations. These Pods are intended to have some flexibility built into them with regards to setbacks, housing type, and a range of dimensional standards. The pods for A, B and C are intended to be in line with higher density standards in the code (MF-10, 18, and 24), and pods D, E, F and G are modeled after zoning districts R-5, 6, 7.5, and 20 respectively. Pod standards for A, B and C were approved in the Development Agreement. The remaining pods are proposed with the PRD application.

As proposed, the lots contained in phase 1 generally comply with the applicant's own proposed lot standards table with the exception of the following lots. Pod D lots are supposed to have a maximum lot size of 7,600 square feet based on the applicant's dimensional table, which leaves lots 121, 141 and 168 as being too large. Lots located in Pod E have five lots that are too large based on the applicant's own table (182, 183, 184, 185, and 191). Staff recommends that the applicant either modify those lots, or provide a modified dimensional table that addresses maximum lot sizes. If the table is modified there should be a footnote that indicates that regardless of maximum lot size, and overall density for that respective Pod shall be maintained for this and all future phases.

Lots 70-75 are proposed to have vehicular access off of the alleyway shown and frontage and pedestrian access off of two access tracts (C and E). While staff supports the concept, there is a question as to how future lots in Pod B1 will interact with lots 73-75. The goal will be to ensure compatible integration between the two Pods. The applicant will need to provide this assurance when developing the future phases.

All lots that take access off of alleyways shall ensure that the fronts of the houses face public and private streets and access tracts. A condition to this effect is warranted.

As will be discussed further in section 18.23.110 of this report, the applicant has only shown layouts for lots contained in phase 1. No other phase or their respective pods have been proposed to have any lot or road layout. As such it is difficult to determine overall internal and abutting compatibility of the phases as they related to a master plan. That said, the applicant has worked in good faith towards developing a master plan with the city. As such, the city will allow for a more detailed final master plan to be submitted prior to the final plat approval for phase 1.

Conclusions: As conditioned herein, this section can be met.

6. The subdivision complies with the relevant requirements of the Camas subdivision and zoning codes, and all other relevant local regulations;

Findings and Conclusions:

SALES OFFICE USE: The application did not propose a sales office for the development. The absence of approval of a sales office consolidated with this Type III hearing, will limit a sales office at the time of development to six months as a Temporary Use per CMC§ 18.07.040 Table 2(Note 4). The applicant may provide for the contingency that a sales office may be necessary for longer than six months. Staff finds that special conditions for the installation, use and removal of the sales office are appropriate in accordance with CMC§18.43.050(F), and are provided with this report if the applicant is in agreement.

PHASING: Pursuant to CMC17.11.040, a phasing plan “shall be submitted at the time of preliminary plat approval”. The applicant has shown a phasing plan in both the DA and with the PRD application thereby meeting this section.

Staff finds that the development can be conditioned to meet the relevant requirements of zoning and phasing.

7. Appropriate provisions are made to address all impacts identified by the transportation impact study;

See section 3 listed above.

8. Appropriate provisions for maintenance of privately owned common facilities have been made;

Finding and Conclusion: The applicant has provided a draft copy of CC&R’s with the application, which will provide maintenance guidelines and requirements for the private facilities. This section can be met.

9. Appropriate provisions, in accordance with RCW 58.17.110, are made for: The public health, safety, and general welfare and for such open spaces, drainage ways, streets, or roads, alleys or other public ways, transit stops, potable water supplies, sanitary wastes, parks and recreation, playgrounds, schools and school grounds and all other relevant facts, including sidewalks and other planning features that assure safe walking conditions for students who only walk to and from school; and the public use and interest will be served by the platting of such subdivision and dedication.

Finding and Conclusion: The applicant is proposing privately owned and maintained tracts for stormwater facilities, off-street parking and open spaces. The internal roadways are proposed to be dedicated as public roadways and some private. The applicant is providing adequate and appropriate utilities for stormwater, water, and sanitary sewer that will also be dedicated to the public. An internal public trail and a neighborhood park consistent with the 2014 Parks, Recreation and Open Space Comprehensive Plan will be provided by the applicant. The applicant will also provide sidewalks with the proposed street construction to provide adequate pedestrian mobility. This section can be met as proposed.

10. The application and plans shall be consistent with the applicable regulations of the adopted comprehensive plans, shoreline master plan, state and local environmental acts and ordinances in accordance with RCW 36.70B.030.

Findings and Conclusion: Staff finds that the preliminary subdivision application can or will be consistent with the requirements of the Camas Municipal Code, the City of Camas comprehensive plan, SEPA requirements and the previously approved Development Agreement as modified by the proposed conditions at the conclusion of this report.

IV. Discussion and Findings for Planned Residential Development Criteria of Approval CMC18.23.030, Approval Standards CMC 18.23.100, and Relationship to adjacent areas.

CMC 18.23.030.A-H Planned residential developments shall be established under the following criteria:

A. A PRD may be allowed in all R and MF zoning districts.

The overall site for the proposed PRD has 267.5 acres of residentially zoned land and 15.8 acres of commercial. In anticipation of this PRD, the applicant worked with staff to revise the CMC to allow for

contiguous commercial land to be part of the PRD pursuant to Ordinance 15-008 (Exhibit 75), which was adopted on March 16th, 2015.

This section can be met as proposed.

B. The minimum land area necessary to apply for a PRD shall be ten acres of contiguous land.

The overall site is 283 acres in area thereby meeting this section.

C. All land in which a PRD is to be developed shall be held and maintained in a single ownership, including but not limited to an individual, partnership, corporation, or homeowner's association. Evidence of such ownership shall be provided to the planning commission and city council before PRD approval.

All records provided to the city by the applicant provide certification that the 283 acres are under one ownership. This section can be met.

D. Permissible uses within a PRD include any use listed as a permitted use or conditional use in the applicable zone, as per CMC Section 18.07.040 Table 2, when approved as part of a master plan. Notwithstanding an approved master plan, incidental accessory buildings, incidental accessory structures, and home occupations may be authorized on a case by case basis.

The Development Agreement that accompanied this application did vest the applicant with the codes in effect at the time of recording, which was the end of 2014. This section can be met as proposed. However, if there are future uses proposed in either the residential or commercial sections of the development that will require conditional use permits, then appropriate review and approval from the city will be required. A condition to this effect is warranted.

E. A minimum of fifty percent to a maximum of seventy percent of the overall permitted density of the PRD must be single family homes.

The mixture of densities and housing types proposed by the applicant will comply with this section. The applicant's narrative on page 13 addresses this requirement. As proposed, this can be met.

F. The multifamily component (two or more attached dwelling units) of a PRD shall ideally be developed toward the interior of the tract, rather than the periphery, to ensure compatibility with existing single-family residences that border the surrounding properties. Deviation from this requirement shall be requested during the preliminary master plan review, and specifically approved by the planning commission and city council.

The overall general layout for the PRD has been approved through the Development Agreement. Overall, the layout does essentially higher density, multi-level units surrounding the commercial core. The units and densities do then transition out to lower densities as you head north and east on the site. As proposed, the higher density multi-family units are not directly on the periphery. This section can be met as proposed.

G. Density standards and bonuses for a PRD shall be in accordance with CMC Sections 18.23.040 and 18.23.050.

This section was addressed through the recorded DA. As such, this can be met as proposed.

H. An equivalent amount of up to twenty percent of the developable area shall be set aside and developed as recreational open space in a PRD, and shall include the following:

- 1. Passive or active recreation concentrated in large usable areas;*
- 2. Provide trails and open space for connection and extension with the city's open space and trail plan, if feasible; and*

3. Be held under one ownership, and maintained by the ownership; or be held in common ownership by means of homeowner's association, and maintained by the homeowner's association. The open space and recreation areas shall be dedicated for public use and be maintained by the ownership or homeowners' association.

As evidenced earlier in this report and in the applicant materials, the applicant has set aside close to 33% of the site for open space. This includes usable park space, trails, and natural open areas such as wetlands. As will be conditioned herein, open space areas for stormwater tracts, wetlands and other common areas will be maintained by the homeowners association with provisions for maintenance to be listed in CC&R's.

The trail system proposed is extensive through the site. The city's comprehensive parks plan anticipates a public regional trail in the area (T27) and neighborhood trails (T29 and T30). As discussed earlier in this report, the parks and open space component can be met through the proposal and conditions contained herein.

CMC 18.23.100.A-H Approval for a PRD shall be based on the following standards:

A. The proposed PRD conforms to:

- 1. The City of Camas' comprehensive plan;*
- 2. All provisions of the Camas Zoning Code which are not proposed for modification;*
- 3. Engineering design standards; and*
- 4. Any other applicable city, state, federal regulations, policies, or plans, except those standards proposed for modification.*

Findings and Conclusion: The applicant's narrative addresses this section on pages 17-19. Staff concurs that this application complies with this subsection. Comp plan elements have been addressed, the provisions of the CMC are either met, or conditioned herein, and compliance with all other state and federal regulations are required.

The city has a Neighborhood Traffic Management Plan (NTM). This plan identifies the need for installation of acceptable traffic calming features when a proposed development will create 700 Average Daily Trips (ADT) or more.

The submitted Transportation Impact Analysis (TIA) clearly demonstrates that this threshold will be exceeded with the first phase of development.

The applicant has not identified traffic calming features other than the narrowed entry street and the majority of internal streets at 28 feet wide. There is no discussion of traffic calming elements for the remainder of Planning Pod 1 or the other six Planning Pods within the development.

A condition of approval requiring installation of traffic calming elements in the number, type and location acceptable to the city engineer is warranted.

Prior to final engineering plan approval for any phase the applicant shall install acceptable traffic calming elements in the number, type and location deemed necessary by the City Engineer.

B. Utilities and other public services necessary to serve the needs of the proposed development shall be made available, including open spaces, drainageways, streets, alleys, other public ways, potable water, transit facilities, sanitary sewers, parks, playgrounds, schools, sidewalks, and other improvements that assure safe walking conditions for students who walk to and from school.

Findings and Conclusion:

Water:

There is an existing 8" dead end water line in NE Ingle Road that currently serves the golf course and clubhouse. In 2013 the city performed some limited water modeling at the applicant's request to determine available fire flows under various scenarios (see Technical Memorandum from Gray & Osborne, Inc. dated November 20, 2013 - exhibit # 77).

The modeling showed that the existing system (and future 8" diam. extensions) can only provide adequate fire flows for the lower, southerly portion of the site near NE 28th Ave.

Fire flows were not adequate in the middle and northerly portions of the site without upsizing portions of the system as shown by the modeling results of scenario #2. With those improvements, adequate fire flow was only provided for a portion of proposed Phase 1 up to an approximate elevation of 270 to 280 feet.

Under scenario #3 adequate fire flows were provided for elevations of the site at or below 370 feet in elevation. In order to serve the portions of the site above 370 feet in elevation a booster pump station will need to be constructed.

Per the applicants Phase 1 grading plan it appears the highest lot elevation is approximately 330' on Lot #'s 184 & 185 in Phase 1H. Staff would note for the record that all lots in Phases 1A through Phase 1E appear to be located at or below 250 feet in elevation.

Prior to final engineering plan approval for any phase the applicant shall demonstrate that adequate fire flows are available for the lots proposed. A condition of approval to this effect is warranted.

Prior to final engineering plan approval for any phase the applicant shall demonstrate to the city's satisfaction that the proposed water system improvements being installed will provide adequate fire flows for the lots proposed.

Per Chapter 8 of the city's Water System Plan of June 2010 (WSP), multiple projects are identified for the Green Mountain area. The WSP identifies a future developer driven booster pump station (DE-5), a water storage facility (S-6), a 24" diameter transmission main (T-7) and a 12" developer funded NUGA transmission main (N-1) on or adjacent to the subject property. Some of these elements may be modified by the city depending on a number of factors including topographical issues. The applicant shall coordinate with the city through final engineering to determine the need, location and installation of these improvements as will be conditioned below.

To conform with the City's 2010 WSP, a condition of approval specifying the applicant's responsibility to design and construct the T-7 and N-1 transmission mains shown within and adjacent to the PRD per the WSP is warranted. Construction of the transmission mains through the PRD site and up to the water storage facility S-6, if appropriate based on the final determination of its location, must be completed prior to final plat approval of the phase(s) the mains are located within or adjacent to, or to the extent necessary to achieve adequate fire flows. Additionally, a condition of approval specifying the applicant's responsibility to design and construct Booster Pump Station DE-5 is warranted. The Booster Station shall be constructed prior to final plat approval for any phase that has a lot located above 370 feet in elevation.

The applicant shall design and construct transmission mains T-7 and N-1 within the Planned Residential Development area per the Camas Water System Plan of June 2010. Construction of the transmission mains shall be completed prior to final plat approval of the phase(s) the mains are located within, or adjacent to, or to the extent necessary to achieve adequate fire flows. The applicant shall also design and construct Booster Station DE-5 prior to final plat approval for any phase that has a lot located above 370 feet in elevation.

As noted above, the 2010 WSP identifies Reservoir S-6 located within the applicant's site. Due to the uncertainty regarding timing for the need for additional storage in the City's water system and in consideration of the size of the project, a condition is warranted requiring dedication of land suitable for construction of a 2.0 million gallon reservoir if it's determined that the location of the reservoir is on the site. Design and construction of the reservoir itself would be completed by the City. If it's determined that S-6 is to be located on the site, prior to Final Masterplan approval, the City and applicant shall enter into an agreement specifying the location and size of the land dedication for the reservoir and specifying timing of the required land dedication.

Prior to Final PRD Masterplan approval, the City and applicant will determine the sizing and location of water facilities and any needed land for dedication for a reservoir. If it's determined that land is needed the City and applicant shall enter into an agreement specifying the location and size of the land dedication for the reservoir and specifying timing of the required land dedication.

Existing wells, septic tanks and septic drain fields

It is unclear to staff if there are existing water wells on site as they are not identified on the existing conditions plans or in the application materials. Staff would note that CMC 17.19.020 (A 3) requires abandonment of existing wells, septic tanks and septic drain fields. Existing water wells shall be properly abandoned in accordance with State and County guidelines prior to final plat approval for the phase they may be located in. Transfer of any existing water rights to the City of Camas will also be required as part of the abandonment. A condition of approval to this effect is warranted.

Existing water wells shall either be properly abandoned in accordance with State and County guidelines prior to final plat approval or used exclusively for irrigation (nondrinking) purposes for the golf course or environmental mitigation areas. The city and the applicant shall explore the option at the cessation of operation of the golf course of transferring water rights to the city for fair market value. Staff finds that as conditioned the applicant can and will provide water system improvements consistent with the city's Engineering Standards and WSP.

Storm Drainage:

Staff would note for the record that although there are provisions for regional stormwater facilities in the DA at Section 6 and at CMC 17.19.040 (C 3a), the facilities proposed do not appear to provide a regional function.

The applicant has submitted a preliminary stormwater Technical Information Report (TIR) and storm plan for Planning Pod 1 (203 lots) consistent with the requirements of CMC 14.02, CMC 17.11.030 (B 8) and the Camas Stormwater Design Standards Manual (CSDSM).

For Planning Pod 1, the applicant is proposing 3 wet ponds for water quality and quantity control. The proposed wet ponds will provide phosphorus control in addition to basic treatment in accordance with the requirements of Section 5.04 of the CSDSM.

Two of the wet ponds do not meet the location requirements of CMC 17.19.030 (F 6) in that they are not setback a minimum of 30 feet from the street. The third wet pond will meet the minimum street setback requirement.

The applicant is requesting an exception to the requirements of CMC 17.19.030 (F 6) for the two wet ponds located on each side of the entry drive and adjacent to NE Ingle Road (Tracts A & H). The proposed locations are at or near the low point of Planning Pod 1 but are not located at the low point of the subject property.

Staff finds that the requested exception to the requirements of CMC 17.19.030.F.6 may be warranted provided the applicant be required to include enhanced landscaping, screening and fencing acceptable to the city prior to final engineering plan approval of any phase. A condition of approval to this effect is warranted.

Enhanced water quality and quantity control facilities landscaping, screening and attractive fencing style acceptable to the city shall be included on the final landscaping plan prior to approval of any phase.

Staff finds that as conditioned the applicant can or will provide adequate stormwater drainage for Planning Pod 1.

Erosion Control:

Adequate erosion control measures will be provided during the site improvements contemplated for this PRD in accordance with adopted city standards. The Erosion Sediment Control plans will ultimately be submitted to the city for review and approval prior to any ground disturbance.

CMC 17.21.030 requires submittal of an erosion control bond for ground disturbances of one acre or more.

Additionally, the applicant will prepare a Stormwater Pollution Prevention Plan (SWPPP) as part of their application for their general construction stormwater permit that is required through the Washington State Department of Ecology for ground disturbances of over one acre.

Staff finds that adequate provisions for erosion control can or will be made.

Sanitary Sewage Disposal:

Currently there is no public sanitary sewer system serving the Green Mountain area of Camas. The nearest sewer line is a 6" diameter STEP force main (no solids) that serves the LaCamas Lake Trailhead restroom facility located at NW Alexandria Lane and NE Goodwin Road approximately 2,200 feet southwest of the intersection of NE Ingle Road and NE Goodwin Road.

The General Sewer Plan Amendment of April 2010 (Sewer Plan) provides a plan on how the North Urban Growth Area (NUGA) will be sewerred. The NUGA is divided into six basins served by multiple regional pump stations and major force main and gravity piping systems. The Sewer Plan calls for traditional gravity sewer flows (including solids) from all six basins to be directed south and east along the north side of LaCamas Lake.

The subject property is located in Basin 1 as shown in the Sewer Plan. As described above, Basin 1 is shown in the Sewer Plan to be permanently serviced by the regional pump station and force main system along the north side of LaCamas Lake. The Applicant and the City have been working diligently over the last year to develop a design and financing plan to construct the permanent traditional gravity system as quickly as possible. It is currently anticipated that the City will design and construct the permanent system with a financial contribution by the applicant. However, to date, a final agreement has not been reached regarding the applicant's proportionate share or other responsibility for constructing the permanent system. As such, a condition is warranted to require the applicant to enter into an agreement with the City relating to sewer facilities that will provide for, among other things, the construction, general financing and timing of the construction of permanent sewer facilities that will serve the PRD.

Recognizing the size and extent of the permanent system, the Sewer Plan also provides for a temporary connection south to the city's existing STEP force main located within NE Goodwin Road at Alexandria Lane. The Sewer Plan provides the following guidance with respect to a temporary connection:

"As an interim stage, prior to full development, the possibility of temporarily partitioning off flows from developments within Basins I and II to the existing STEP system to the southwest is also addressed. Discharge to the STEP system should be temporary because flows from NUGA were not included in the

original design of STEP conveyance, and high operation and maintenance costs and unfavorable downstream impacts to conveyance and WWTP facilities have led the City to conclude that further expansion of the STEP service is undesirable.”

Since timing of the permanent system on the north side of LaCamas Lake is uncertain, should the permanent sewer system not be in place prior to engineering approval of Planning Pod 1, Staff finds there is adequate capacity in the existing STEP system on the south side of LaCamas Lake to temporarily serve approximately 300 ERU's which will provide service to the 203 lots included with the Phase 1, Planning Pod 1 of the Green Mountain PRD. The applicant shall be responsible for constructing all on and off-site improvements necessary for the temporary system to serve their site. A condition of approval to this effect is warranted.

Additional Phases of the development beyond Planning Pod 1 will be required to direct conventional gravity sanitary sewer flows to the east and south along the north side of LaCamas Lake per the Sewer Plan. Should the permanent sewer system on the north side of LaCamas Lake not be constructed prior to engineering approval of subsequent phases, the City may accept additional sewer flows into the existing STEP system provided the applicant shows and the City confirms that there is adequate capacity in the STEP system at the time of engineering approval for each subsequent phase. In this scenario, the applicant shall be responsible for designing, constructing and permitting all improvements to continue using the STEP system. A condition of approval to this effect is warranted.

Proposed Condition: The applicant shall enter into an agreement with the city that will provide for the construction, general financing and timing of the construction of permanent sewer facilities that will serve the PRD. The applicant will be responsible for constructing all on and off-site improvements necessary for the temporary system to serve their site including abandonment and/or decommissioning of the large community septic tanks. Should the permanent sewer system on the north side of LaCamas Lake not be constructed prior to engineering approval of subsequent phases, the City may accept additional sewer flows into the existing STEP system provided the applicant shows and the City confirms that there is adequate capacity in the STEP system at the time of engineering approval for each subsequent phase. In this scenario, the applicant shall be responsible for designing, constructing and permitting and abandoning/decommissioning all temporary improvements to continue using the STEP system.

The applicant is proposing to construct a sanitary sewer pump station near the intersection of NE Ingle Road and NE Goodwin Road on a city owned parcel. The Sewer Plan identifies a regional pump station at this location to serve portions of the NUGA. The pump station may be used to provide both temporary and permanent service to the PRD. As such, portions of the pump station that may be used permanently could be a creditable improvement as it is intended to serve the entire basin.

If a regional pump station is proposed and constructed the applicant will need to enter into an agreement with the city that identifies the required improvements and what portions of the system improvements are creditable or reimbursable. A condition of approval to this effect is warranted.

Prior to installing a regional pump station the applicant shall enter into an agreement with the city that specifies the required pump station improvements and how the improvements will be credited and/or reimbursed.

As part of the temporary connection to the STEP system, the applicant will also be required to provide a solids retention system acceptable to the city as the existing STEP system is only suited to handle effluent flows (no solids). The applicant is proposing large underground community septic tanks that will allow the solids to settle out of the sewer prior to reaching the pump station. The proposed tank locations are shown in exhibit 71. One tank is proposed in the central park south of the proposed club house. The other two proposed tank locations are east of and adjacent to the two wet ponds located on each sides of the entry road.

Prior to final engineering plan approval for any phase the applicant shall be required to supply a sewer basin analysis and appropriate tank sizing and anti-buoyance calculations acceptable to the city. Additionally, the applicant will be required to complete an odor control analysis and provide odor control facilities for the large septic tanks and effluent line flowing to the pump station. The entire temporary system shall be designed and constructed such that the septic tanks may be abandoned or removed so the subdivision may be served via a conventional gravity system. Because the septic tanks provide a temporary service, the applicant shall be required to maintain all tanks according to the manufacturer's recommendations and City standards. Conditions of approval to this effect are warranted.

Prior to final engineering plan approval of any phase the applicant shall submit a sewer basin analysis, tank sizing and anti-buoyance calculations acceptable to the city. The applicant will also be responsible for providing appropriate odor control for the temporary system including the large community septic tanks as well as the downstream system to the pump station. The entire temporary system shall be designed and constructed such that the septic tanks may be abandoned or removed so the subdivision may be served via a conventional gravity system. Because the septic tanks provide a temporary service, the applicant shall be required to maintain all tanks according to the manufacturer's recommendations and City standards.

Staff finds that adequate provisions can or will be made for water, storm drainage, erosion control and sanitary sewage disposal which are consistent with the Camas Municipal Code, the Water System Plan, the General Sewer Plan Amendment and the Camas Design Standard Manual.

C. The probable adverse environmental impacts of the proposed development, together with any practical means of mitigating adverse impacts, have been considered such that the proposal shall not have an unacceptable adverse effect upon the quality of the environment, in accordance with CMC Title 16 and 43.21C RCW.

Findings and Conclusion: The applicant's narrative addresses this section on page 19. Staff has also provided findings earlier in this report that either finds compliance with the application, or that the application can be conditioned to comply with city standards. Staff concurs that this application complies with this subsection as proposed and/or conditioned herein.

D. Approving the proposed development shall serve the public use and interest, and adequate provision has been made for the public health, safety, and general welfare.

Findings and Conclusion: The applicant's narrative addresses this section on page 19. Staff concurs that this application complies with this subsection as proposed and/or conditioned herein.

E. The proposed development satisfies the standards and criteria set forth in this chapter.

Findings and Conclusion: The applicant's narrative addresses this section on page 20. Staff concurs that this application complies with this subsection as proposed and/or conditioned herein.

F. The proposed development shall be superior to, or more innovative than conventional development, and shall provide greater public benefit without additional probable adverse impacts to public health, safety, or the environment, than available through the use of the conventional zoning and/or development standards.

Findings and Conclusion: The applicant has taken great care to coordinate with staff over a period of time to develop a master plan that can be superior and more innovative than conventional development. The plan integrates a variety of housing types and densities throughout the development rather than having one district simply abut another. Additionally, the incorporation of an Urban Village with recreational opportunities throughout the development can help create a community that is livable and well integrated in concept. As proposed and conditioned herein, this section can be met.

G. The proposed development shall provide at least two access points (where a PRD does not have access to a primary or secondary arterial) that distribute the traffic impacts to adjacent street in an acceptable manner.

Findings and Conclusion: The applicant has proposed at least two access points off of NE Goodwin Road and 8 access points off of NE Ingle Road. This subsection can be met as proposed.

H. Preliminary approval does not constitute approval to obtain any building permits or begin construction of the project.

18.23.110: Relationship to adjacent areas.

The design and layout of a planned development shall take into account the integration and compatibility of the site to the surrounding areas. The perimeter of the planned development shall be so designed as to minimize any undesirable impact on adjacent properties. Setbacks from the property lines of the planned development shall be comparable to, or compatible with, those of any existing development on adjacent properties. Or, if adjacent properties are undeveloped, then setbacks shall conform to the type of development that may be permitted on adjacent properties.

Pods D2, D3, D5, D6, and some of E1 and E2, all abut land that is located within Clark County jurisdiction that is currently zoned FR-40, which is agricultural based zoning at 40 acre minimum. To design an urban development to “bevel” lot sizes would be impractical. The same premise will apply to pods F2 and F3 at the northern end of the development.

Pods B2, B4, F1a, F1b, and F1c all internally abut lots located within the city limits and have could have beveling standards apply to them. The easterly boundaries of pods E2 and E3 will abut land in the city limits that will likely get developed. Compatibility to that abutting land hasn’t necessarily been provided to the city. The applicant will need to demonstrate how these respective pods can be comparable to and compatible with these existing lots.

Currently, the conceptual master plan with proposed pod types leave some questions to staff with regards to compatibility and the relationship with the initial first phase and its respective pods and future phases. While the applicant has provided some detail in the written narrative, actual conceptual layouts are not available to determine compatibility with the rest of the development. Most immediate are the proposed phase lines contained on page 3 of 25 from the plan set do not match up with the posed phase 1 preliminary plat on page 23 of 25. As such, it is difficult to discern the relationship for the first phase with pods B1, B2, B3 and a portion of E1. There are proposed roads that could conceivably move into those phases, but because there are no lot layouts, road networks, or access compatibility staff has a difficulty in finding compliance without that additional information. Additionally, it is difficult to determine

how they future phase will link in with one-another. Staff finds that a final PRD master plan is appropriate that shall contain the following elements:

- The location of all areas to be conveyed, dedicated, or maintained as public or private streets; access and egress to the development showing proposed traffic circulation, parking areas, and pedestrian walks, (for all phases and pods)
- The proposed location of any residential buildings, and any other structures, including identification of all buildings as single-family, duplex, townhouse, apartment, condominium, designated manufactured home, or otherwise, (for all phases and pods)
- The location of areas to be maintained as common open space, and a description of the proposed use of those areas, (for all phases and pods)

A condition to this effect is warranted.

Conclusions: As conditions, this section can be met.

DECISION

Based on the findings, discussion, and conclusions provided or incorporated herein, the public record of this case, the City hereby approves SUB 14-02, Preliminary Master Plan of a Planned Residential Development and preliminary plat approval (Phase I), subject to the following conditions of approval:

V. Conditions of Approval

CONDITIONS OF APPROVAL (SUB14-02)

Engineering:

1. Prior to final engineering plan approval for any phase the applicant shall install acceptable traffic calming elements in the number, type and location deemed necessary by the City Engineer.
2. Prior to final engineering plan approval for any phase the applicant shall demonstrate to the city's satisfaction that the proposed water system improvements being installed will provide adequate fire flows for the lots proposed.
3. Prior to final engineering the city and the applicant will determine the sizing and location of water facilities and any needed land for dedication for a reservoir.
4. Existing water wells shall either be properly abandoned in accordance with State and County guidelines prior to final plat approval or used exclusively for irrigation (nondrinking) purposes for the golf course or environmental mitigation areas. The city and the applicant shall explore the option at the cessation of operation of the golf course of transferring water rights to the city for fair market value.
5. Enhanced water quality and quantity control facilities landscaping, screening and attractive fencing style acceptable to the city shall be included on the final landscaping plan prior to approval of any phase.
6. The applicant and the City have been extensively working on an agreement to create a public-private partnership to fund and construct sewer facilities that will benefit and more efficiently serve the NUGA, including the Green Mountain area. It is anticipated that the agreement will be completed and will go before the City Council in July or August of this year. The agreement contemplates the applicant funding and constructing a pump station and temporary sewer lines that will carry effluent up to approximately 300 ERU's which will connect to existing STEP system

sewer lines in the Camas Meadows area. The agreement also contemplates the applicant funding a percentage of the permanent traditional gravity sewer facilities to be constructed by the City to the east of Green Mountain which will eventually connect to Everett Street. Upon completion of the permanent city constructed facilities, the city intends to redirect all of the effluent then going south, to the east to Everett Street. Upon that occurrence, the applicant shall properly decommission the then existing on site holding tanks. In the event that the City and the applicant do not reach final consensus on the agreement, the issue of the final sewer design for Green Mountain shall be referred to the city's hearing examiner.

7. Prior to installing a regional pump station the applicant shall enter into an agreement with the city that specifies the required pump station improvements and how the improvements will be credited and/or reimbursed.
8. Prior to final engineering plan approval of any phase the applicant shall submit a sewer basin analysis, tank sizing and anti-buoyance calculations acceptable to the city. The applicant will also be responsible for providing appropriate odor control for the temporary system including the large community septic tanks as well as the downstream system to the pump station. The entire temporary system shall be designed and constructed such that the septic tanks may be abandoned or removed so the subdivision may be served via a conventional gravity system. Because the septic tanks provide a temporary service, the applicant shall be required to maintain all tanks according to the manufacturer's recommendations and City standards.
9. Prior to installing half width street improvements along NE Goodwin Road/NE 28th Street or installing a traffic signal at the intersection of NE Goodwin Road & NE Ingle Road, the applicant shall enter into an agreement with the city specifying the improvements to be installed, the cost of those improvements and what part of the improvements are creditable or reimbursable. Right-of-way (ROW) dedication along NE Ingle Road and NE Goodwin Road shall be of sufficient width to provide a minimum paved width of 43' which shall include an 11' wide center left turn lane, two 5' wide bike lanes and two 11' travel lanes. Interior roadways shall include ROW widths of 60' and/or 52' with respective paved widths of 36' and 28'.
10. Prior to preliminary plat approval of each additional Planning Pod or phase the applicant shall submit an updated assessment as to the potential need for providing an eastbound right turn taper or lane at the intersection of NE 58th Avenue at NE 199th Street.
11. Prior to Final Acceptance of the first phase of improvements the applicant shall relocate the stop bar on NE Ingle Road as detailed in the construction plans and as directed by the city.
12. Prior to Final Acceptance of the first phase of improvements the applicant shall install an eastbound left turn lane with a minimum 100' storage in NE Goodwin Road at NE Ingle Road.
13. Prior to Final Acceptance of any phase that will yield a total preliminarily platted total of 203 or more homes, the applicant shall construct a westbound right turn lane with a minimum 100' of storage in NE Goodwin Road at NE Ingle Road.
14. Half street improvements along the applicant's property frontage of Ingle Road shall be constructed in a manner to provide a minimum width of 43 feet of pavement.
15. Subsequent preliminary plat applications shall include an updated TIA that analyzes traffic operations at the intersection of NE Goodwin Road & NE Ingle Road and when warranted the developer shall install the signal.
16. The applicant shall pay to the City of Vancouver a proportionate share contribution towards the construction of a northbound right turn lane on NE 192nd Avenue and a westbound right turn lane on 13th Avenue. The timing of payments shall be as provided for in the Transportation Impact Analysis prepared by Kittleson and Associates which is (Exhibits 43 and 44 of the record in this case and which is also Exhibit D of the Development Agreement).
17. At the time of the development of either Pod E2 or D4 (whichever occurs first), the applicant and the city shall identify the location of the access to Goodwin Road/28th Street. The access shall be located approximately 500 feet west of the applicant's east property line.

18. The applicant shall meet or exceed the minimum alley Tract and paved width requirements of the code. Cul-de-sac ROW radii shall meet the minimum 43' width of the Camas Design Standards Manual.
19. Prior to final engineering plan approval for any phase the applicant shall include a landscaping plan that details the location, number, plant species proposed, planting notes, fencing notes and associated details
20. Prior to final engineering plan approval for any phase the applicant shall install acceptable traffic calming elements in the number, type and location deemed necessary by the City Engineer.
21. Prior to Final Masterplan approval, the applicant shall demonstrate to the city's satisfaction that it is not feasible to provide an internal street connection to the northerly portion of the site. If the City determines it is reasonably feasible, the applicant shall be required to construct the internal street connection prior to the final plat for Phase 4.

Planning:

22. The applicant shall comply with all conditions of approval for the Washington State Department of Archaeology Historic Preservation prior to any construction taking place in the area affected by the conditions.
23. At the time of the development of any phase containing any jurisdictional wetlands, the wetlands shall be placed in separate tracts and clear signage and demarcation approved by the city shall be installed at appropriate wetland and buffer boundaries.
24. The applicant shall submit additional geotechnical studies for each subsequent phase of this PRD.
25. A single sales office in a model home for purposes of selling lots within the development may be located within each phase. Upon construction of the last unity in a phase, the model home/sales office in that phase shall be closed.
26. Prior to the Building Department issuing a Certificate of Occupancy, each lot shall install a minimum of one 2" caliper tree to be located in the planter strip or front yard of each lot, as specified on the plat. Required trees shall be maintained in good health, and damaged or dying trees shall be promptly replaced (within six months) by the homeowner. This condition shall be noted on the final plat.
27. The applicant has provided a phasing plan for Phases 1A through 1I. All future subdivisions shall have phasing plan reviewed and approved by the city.
28. Final landscaping plans shall include fencing along rear and side yards of residential lots, which are adjacent to open space tracts. A minimum 4-foot, continuous, uniform fence shall be installed prior to final acceptance of each phase, or other demarcation as acceptable by the city.
29. Future phases that will impact jurisdictional wetland and/or their associated buffers will require additional review and approval by the city with those subsequent applications.
30. All multi-family attached dwelling units (townhouses), apartment buildings, and commercial structures shall be subject to design review prior to final site plan approval, and/or building permit issuance.
31. The applicant shall construct the public park as provided for on sheet 5 of the drawings and shall work with the city on the parks impact fee update to further enhance the park consistent with the provisions of the Development Agreement. The Parks Advisory Board will be provided the opportunity to review and comment on the park design. Final design of the park will be consistent with the Conditions of Approval and the Development Agreement.
32. Trail connection from the upper part of Green Mountain to Clark County Parks land to the east will be required at the development of phases 5 and 6 (as currently proposed).

33. Final trail design and approval for both regional trails and the neighborhood trails will be required prior to final engineering approval for each applicable phase substantially consistent with the trails specifications provided for in Exhibit C of the Development Agreement.
34. For oak habitats, consistent with the ELS report and concurrence by WDFW, a detailed planting, mitigation and monitoring plan will be required to be provided to the City prior to final engineering or any construction on the site, in areas where such construction would adversely impact oak trees.
35. Compatible integration for lots 73-75 with Pod B1 shall be done with the review and approval of Phase 2 that contains that pod.
36. All lots that take access off of alleyways shall ensure that the fronts of the houses face public, private streets and access tracts.
37. Prior to final plat approval for Phase 1, the applicant shall submit for and receive Conceptual or Schematic master plan approval for all non A Pods not affected by Phase 1A-1I. The plan should be substantial similar to the conceptual/typical pod descriptions provided for in the application for Pods B and C. The conceptual plan will also provide a conceptual internal transportation circulation plan. For the A Pods and commercial center, the applicant shall provide the city with a narrative description and other acceptable assurances that the conceptual plan for those pods will provide the integration and compatibility of the transportation and pedestrian connectivity, land uses, architectural design, and landscaping speaking to an overall theme of innovative and superior design.
38. If warranted, additional archaeological review may be necessary for subsequent phases of this project.
39. In the event that any archaeological or historic materials are encountered during project activity, work in the immediate area (initially allowing for a 100-foot buffer; this number may vary by circumstance) must stop and the following actions taken:
 - a. Implement reasonable measures to protect the discovery site, including any appropriate stabilization or covering;
 - b. Take reasonable steps to ensure the confidentiality of the discovery site; and
 - c. Take reasonable steps to restrict access to the site of discovery.
 - d. The project proponent shall notify the concerned tribes and all appropriate city, county, state, and federal agencies, including the Washington State Department of Archaeology and Historical Preservation. (CMC 16.31.150(D))

Fire:

40. Low Flow Life Safety Residential Fire Sprinklers (NFPA 13D) required in all new dwellings: Dead ends over 400 feet. CMC (Camas Municipal Code) 17.19.040.14, CMC 17.19.030.D.5.d
41. Low Flow Life Safety Residential Fire Sprinklers are required where structure(s) are accessed by a flag lot, access tract, or private road. CMC 17.19.030.D.5.c, 17.19.040.A.7
42. Low Flow Life Safety Residential Fire Sprinklers that comply with 13D or 13R are required in all buildings abutting a street designed and constructed with less than 36 feet of pavement width.
43. In the unusual case where a subdivision is not required to have residential sprinklers, any new single family residence or duplex to be used as a model home or home sales office shall have Low Flow Life Safety Residential Fire Sprinklers installed. CMC 15.17.050
44. The distance from a required fire hydrant may be doubled when Low Flow Life Safety Residential Fire Sprinklers are installed throughout a fully sprinklered subdivision. CMC 17.19.040.C.4.a. Distance shall be reduced by 100 feet for dead end roads or single point access. For Green Mountain PRD the maximum hydrant spacing shall be 900 feet or less.

45. Establishing Hydrant Flow Tests per NFPA 24 (National Fire Protection Association) utilizing a Washington State Licensed Fire Sprinkler Contractor may be waived when Low Flow Life Safety Residential Fire Sprinklers are installed throughout a fully sprinklered subdivision. 17.15.030.D.C
46. Low Flow Life Safety Residential Fire Sprinklers are required where minimum hydrant water flow from the closest hydrant is not met. CMC 17.19.040.C.4.a, CMC 15.04.010.D (IFC Appendix B, Fire Flow) A Washington State Licensed Fire Sprinkler Contractor meeting NFPA 24 Fire Flow guidelines may be hired to establish the gallons per minute (fire flow). A permit is required with the fire marshal's office prior to the flow test.
47. An approved address sign, in accordance with the Camas Municipal Code, must be posted for each residence where the flag lot leaves the public road or access tract. CMC 17.19.030.D.5.d
48. When access grades exceed those specified in CMC 17.19.040.12.b, Low Flow Life Safety Residential Fire Sprinklers are required to be installed. CMC 17.19.040.12.b.iii.
49. Underground oil tank removal requires a permit with the fire marshal's office following IFC (International Fire Code) 3404.2.14
50. Any existing structures that are scheduled to be torn down may be considered for fire department training.
51. Any blasting that may be needed for this location is required to follow the CMC Blasting Code and requires a permit with the fire marshal's office. CMC 15.40
52. Any gates serving two or more homes is required to follow the gate code CMC 12.36
53. Gated access to two or more homes is required to have Low Flow Life Safety Residential Fire Sprinklers installed CMC 12.36.040.J
54. A second means of a fully constructed normal access to a subdivision may be waived when Low Flow Life Safety Residential Fire Sprinklers are installed. Each request will be evaluated for possible approval and will include factors such as grade, wild land urban interface, distance of dead ends, density, street widths and so on.
55. Currently fire Impact Fees of .20 cents per square foot are waived when Low Flow Life Safety Residential Fire Sprinklers are installed.
56. Currently 13D Permit fees are waived when Low Flow Life Safety Residential Fire Sprinklers are installed. However permit submittals are still required.
57. No building, structure or development regulated by the building and/or fire code shall be erected, constructed, enlarged, altered, repaired, moved, converted or demolished unless a separate permit for each building, structure or development has first been obtained from the fire department. Camas Municipal Code 15.04.030.D.12a.
58. Dead end fire apparatus access roads in excess of 150 feet in length shall be provided with approved provisions for the turning around of fire apparatus. 35 foot radius cul-de-sac is acceptable. IFC 503.2.5 Flexibility on length possible when entire subdivision is sprinklered.
59. Automatic fire sprinkler system designed and installed in accordance with NFPA 13D is required in all new dwellings. IFC B 105, CMC 17.19
60. Onsite fire hydrants required contact fire department for locations. IFC Appendix C Sec. C 105
61. Required distance from a fire hydrant may be increased when approved automatic fire sprinklers are installed in the entire subdivision. IFC C 105, CMC 17.19
62. Contact the building department for street names and addresses. CMC 17.19.040 (b) (7) Ord. 2421
63. Separate permits with the Fire Marshal's office and the public works dept. for private access gates/barriers. IFC D 103.5, CMC 12.36
64. A separate permit with the Fire Marshal's office is required for any underground tank removal/disposal or abandoning in place. IFC 105.7.5, 3404.2.13.1.4

65. Approved monument provisions required to be made for the addressing of flag lots or access driveways. Address numbers shall be plainly legible and clearly visible and must be posted for each residence where the flag lot access or easement leaves the public road, one monument shall be used for multiple addresses. IFC 505.1, CMC 17.19.030-D-5-G
66. Contact the fire marshal's office for residential water line supply installation guidelines regarding water flow for Life Safety Fire Sprinkler Systems. Items to discuss, early involvement with your fire sprinkler contractor, 1 1/4" minimum supply line. Larger supply line may be required if there are long runs or significant elevation gain, and valve shut off at the meter shall be a flow through type such as a ball valve, gate valve type, minimizing 90 degree connections decreasing friction loss. (360-834-6191 option 2)
67. Third Party Wildland Urban Interface study by Third Party evaluations on each lot may be waived when entire subdivision has life safety residential fire sprinklers installed.
68. A separate permit with the Fire Marshal's office required for any blasting performed on site. IFC 105.6.15, CMC 1540
69. Any structure needing to be demolished may be evaluated for use as a CWFD training burn. Please contact 360-834-6191 for further information.
70. Street signs to include hundred block designations.

Plat Notes:

1. A homeowners association (HOA) will be required for this development. Copies of the C.C. & R's shall be submitted and on file with the City of Camas.
2. Each phase of the subdivision plats shall contain the approved density and dimensional standards table as approved with this development.
3. Building permits will not be issued by the Building Department until all subdivision improvements are completed and Final Acceptance has been issued by the City.
4. Automatic life safety residential fire sprinkler system designed and installed in accordance with NFPA 13D is required in all new dwellings.
5. The lots in this subdivision are subject to traffic impact fees, school impact fees, fire impact fees and park/open space impact fees. Each new dwelling will be subject to the payment of appropriate impact fees at the time of building permit issuance.
6. Prior to the Building Department issuing a Certificate of Occupancy, each lot shall install a minimum of one 2" caliper tree to be located in the planter strip or front yard of each lot, as specified on the plat. Required trees shall be maintained in good health, and damaged or dying trees shall be promptly replaced (within six months) by the homeowner.

VI. Appeals

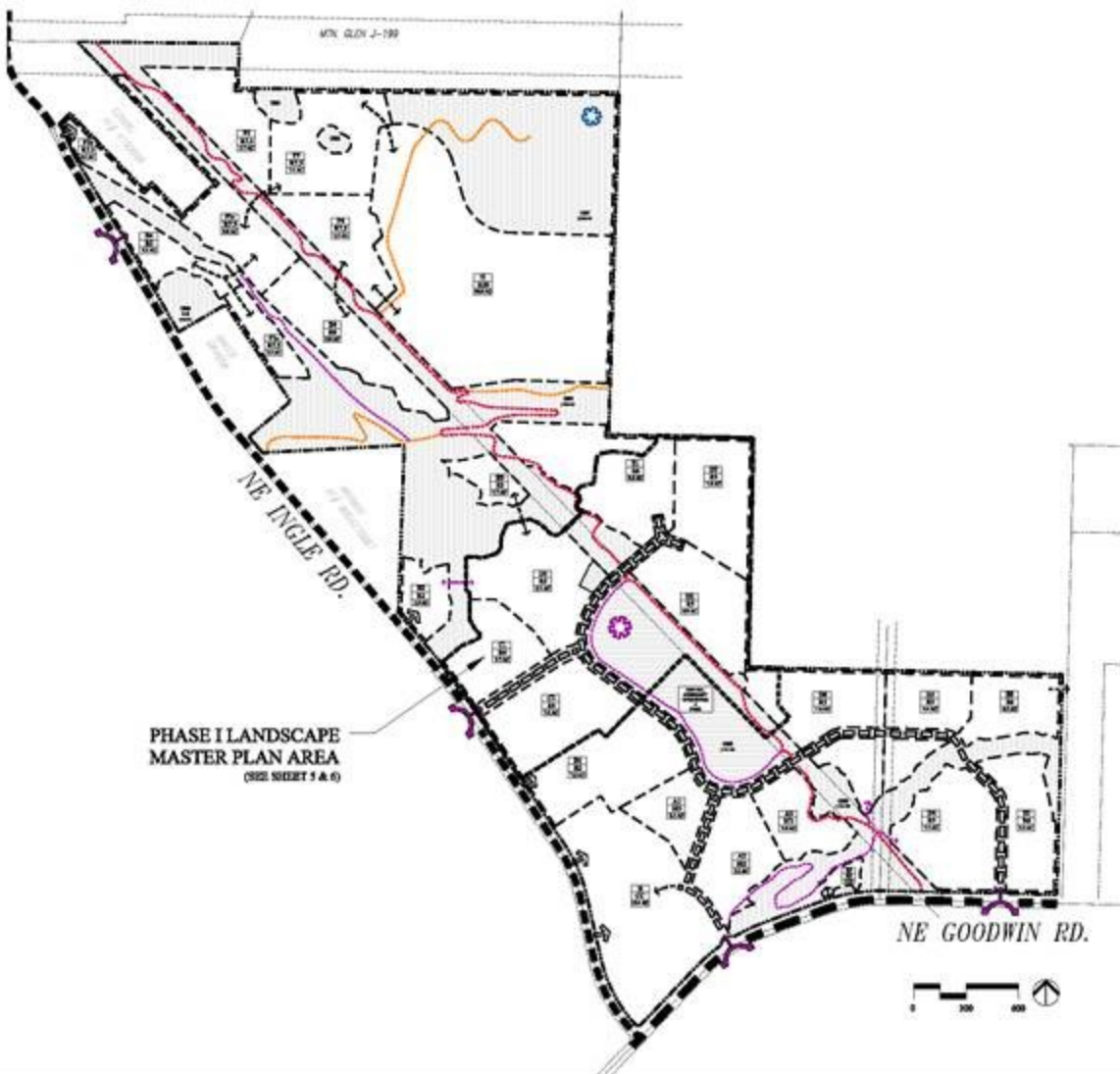
18.55.240 - Judicial appeals.

The city's final decision on an application may be appealed by a party of record with standing to file a land use petition in Clark County superior court. Such petition must be filed within twenty-one days after issuance of the decision, as provided in Chapter 36.70C RCW.

GREEN MOUNTAIN

CONCEPTUAL OPEN SPACE, PARK & LANDSCAPE MASTER PLAN

CAMAS, WASHINGTON
GREEN MOUNTAIN LAND, LLC.



LEGEND

PARK & OPEN SPACE COMPONENTS

PARKS & OPEN SPACE AREAS
(+ 89 * ACRES TOTAL)

CENTRAL COMMUNITY OPEN SPACE & PARK
[+14 AC]

TOP OF GREEN MOUNTAIN
[+20 AC]

COMMUNITY TRAIL SYSTEM (LOCATION SHOWN IS CONCEPTUAL)

REGIONAL TRAIL T27
TYPICAL BASEMENT WIDTH 24 FEET ** PLUS SWITCHBACK AREAS
8' WIDE AT CENTRAL PARK, PAVED
6' WIDE FLAT UP TO 8% TRAIL GRADE, PAVED
4' WIDE IN STEEP TERRAIN (8% - 16% TRAIL GRADE), COMPACTED GRAVEL

T29 / T30 / RUIA
TYPICAL BASEMENT WIDTH 24 FEET ** PLUS SWITCHBACK AREAS
8' WIDE FLAT UP TO 8% TRAIL GRADE, COMPACTED GRAVEL
4' WIDE IN STEEP TERRAIN (8% - 16% TRAIL GRADE), COMPACTED GRAVEL

NEIGHBORHOOD TRAILS
EASEMENTS IN COMMON AREA TRACTS
8' WIDE FLAT UP TO 8% TRAIL GRADE, PAVED
4' WIDE IN STEEP TERRAIN (8% - 16% TRAIL GRADE), COMPACTED GRAVEL

* DOES NOT INCLUDE POCKET PARKS

** WHERE NOT ADJACENT TO A PUBLIC RIGHT OF WAY

LANDSCAPE MASTER PLAN COMPONENTS

ENTRY BOULEVARD

IDENTIFICATION & LANDSCAPED ENTRY

GREEN MOUNTAIN CLUB HOUSE



Land Planning
Landscape
Architecture

PLACER
LAKESIDE, WA
98601-4000

SCALE: AS SHOWN
DESIGNED BY: NTS
DRAWN BY: NTS
CHECKED BY: NTS

DATE: 01/24/18
REVISED:



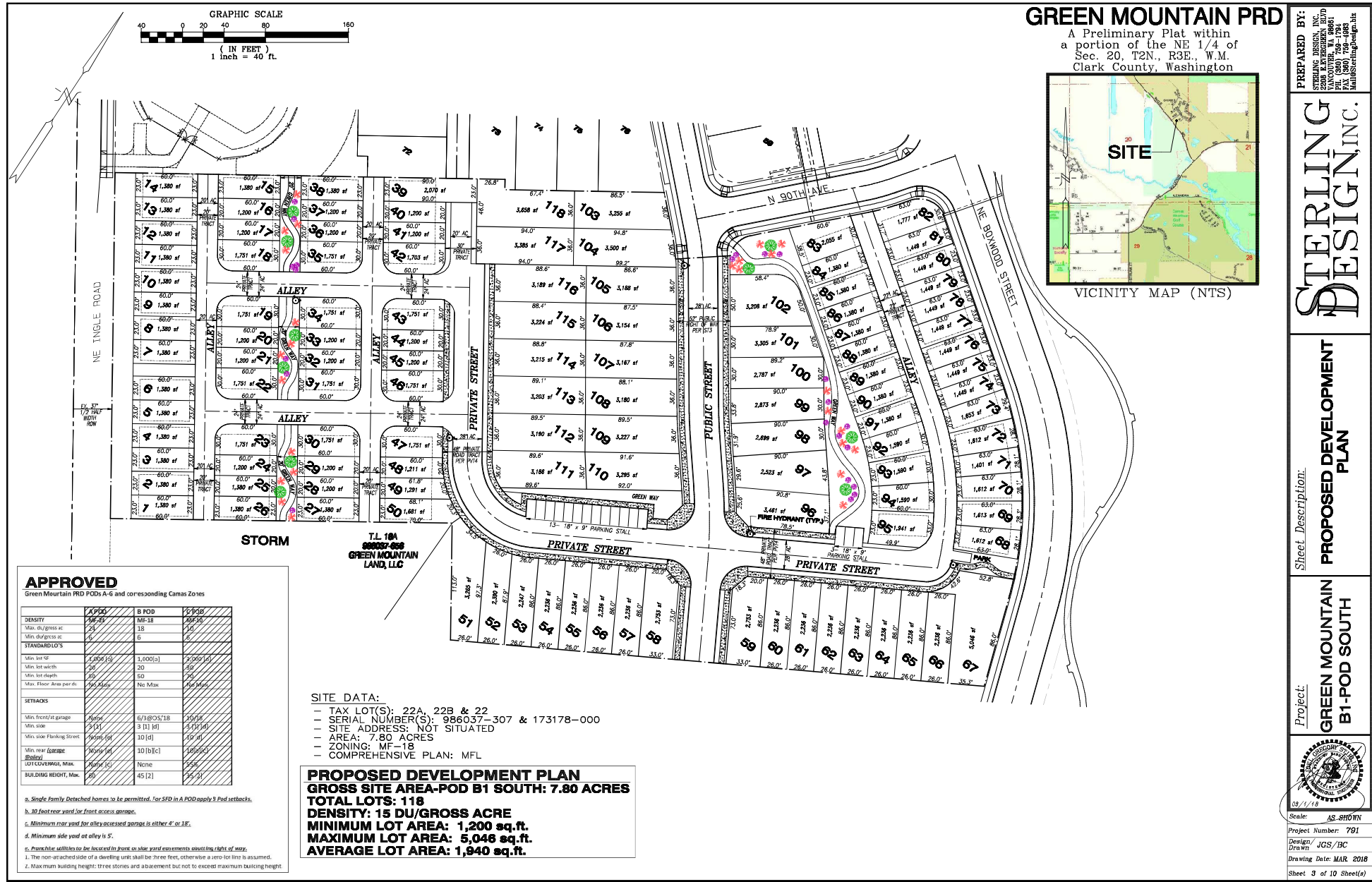
"WESLEY T. GIBSON"
CERTIFICATE NO. 262

GREEN MOUNTAIN
CONCEPTUAL OPEN SPACE, PARK & LANDSCAPE MASTER PLAN
GREEN MOUNTAIN LAND, LLC.

CAMAS, WASHINGTON

4
of
25

Exhibit 8





**Pre-Application Meeting
Green Mountain PRD Pods B1 and B2
File# PA18-28**

Thursday, May 3, 2018
2:30pm, Council Chambers
616 NE Fourth Avenue, Camas, WA 98607

Applicant / Contact:

Applicant:

Sterling Design, Inc.
Joel Stirling
2208 E Evergreen Blvd
Vancouver WA 98661
Ph: (360)759-1794
Email: joel@sterling-design.biz

Contact:

Same

Representing City of Camas:

Lauren Hollenbeck, Senior Planner
Randy Miller, Fire Marshal
Anita Ashton, Engineering Project Manager
Bob Cunningham, Building Official

Location:

NE Ingle Road
Parcel #'s 986037-307, 173178-000, 172555-000

Zoning:

MF-18

Project Description:

Applicant is proposing to subdivide 12.64 acres into 183 single-family and multi-family residential lots.

NOTICE: Notwithstanding any representation by City staff at a pre-application conference, staff is not authorized to waive any requirement of the City Code. Any omission or failure by staff to recite to an applicant all relevant applicable code requirements shall not constitute a waiver by the City of any standard or requirement. [CMC 18.55.060 (C)] This pre-application conference shall be valid for a period of 180 days from the date it is held. If no application is filed within 180 days of the conference or meeting, the applicant must schedule and attend another conference before the City will accept a permit application. [CMC 18.55.060 (D)] Any changes to the code or other applicable laws, which take effect between the pre-application conference and submittal of an application, shall be applicable. [CMC 18.55.060 (D)]. **A link to the Camas Municipal Code (CMC) can be found on the City of Camas website, <http://www.cityofcamas.us/> on the main page under "Business and Development".**

PLANNING DIVISION

LAUREN HOLLENBECK (360) 817-7253

An application for a subdivision is considered a Type III permit. Applicable codes for preliminary plat development include Title 16 Environment, Title 17 Land Development, and Title 18 Zoning of the Camas Municipal Code ("CMC"), which can be found on the city website. Please note it remains the applicant's responsibility to review the CMC and address all applicable provisions. The following pre-application notes are based on the application materials and site plan submitted to the City on April 10, 2018:

Application Requirements

Your proposal will need to comply with the general application requirements per **CMC Section 18.55.110** in addition to the specific application requirements outlined in **CMC Section 17.11.030.B** for a preliminary subdivision plat. The following is an excerpt from the requirements of CMC Section 17.11.030.B (see code section for full text):

1. A completed city application form(s) and required fee(s);

Fees will be based on the adopted fees at the time of application submittal. The current fees include the following:

1. Preliminary Plat	\$6,650+\$234 per lot
2. Design Review (major)	\$2,200.00
3. SEPA	\$749.00
4. Critical Areas Review	\$718.00 (per type)
5. Fire Department Review	\$296.00
6. Building Permit and Plan Review	based on the valuation of the project
7. Engineering Review	3% of estimated construction costs

2. A completed and signed SEPA checklist;
3. Complete applications for other required land use proposals applicable to the proposal;
4. A vicinity map showing location of the site;
5. All existing conditions shall be delineated on the site plan including the information outlined in CMC 17.11.030.B.6 (a-o);
6. A preliminary grading plan as slopes are greater than ten percent;
7. Preliminary stormwater plan and report;
8. A geotechnical report consistent with CMC Chapter 16.59 as development is proposed on slopes greater than ten percent
9. A copy of the Clark County assessor's map which show the location of each property within 300 feet of the subdivision;
10. One set of mailing labels for all property owners as provided in CMC Section 18.55.110;
11. A traffic study
12. A narrative addressing ownership and maintenance of open spaces, stormwater facilities, public trails and critical areas, and the applicable approval criteria (CMC Section 17.11.030.D) and standards of the Camas Municipal Code. It should also address any proposed building conditions or restrictions.
13. A development sign must be posted on site per CMC Section 18.55.110.H (1-5).
14. Necessary drawings- three sets and an electronic copy (send as a PDF by email or on a disc). All documents and reports submitted as separate pdf copies.

Preliminary Plat Review (comments provided in red text are in addition to the previous PA18-23 pre-application meeting comments)-

The following comments are based on the site plan materials submitted with this Pre Application. If considerable changes are not made, the Community Development director will require a PRD amendment per CMC 18.55.

Overall comments

1. The proposed preliminary plat will need to comply with all the applicable conditions of approval in the PRD in addition to the recorded Development Agreement.
2. A PRD shall provide more creative and innovative designs than through conventional zoning or subdivisions and design and layout shall take into consideration the integration and compatibility of the site and surrounding areas.
3. PRD Condition #36, lots that take access from alleyways, shall front public/private streets and access tracts (unless it fronts an open space area) **the lots that face an open space, how are they addressed? "Alley" is defined as a narrow street primarily for vehicular service access to the rear or side of properties otherwise abutting on another street.**
 - A plan identifying the different housing typologies and location of front façade of the building shall be provided at application submittal.
 - Lots may face open space areas but need to be larger **and have appropriate pedestrian access to the front door.** A good example is 2 Creeks at Camas Meadows Drive (36-ft.-45ft. wide). **Open spaces are still too narrow, some places only show a 15-ft.- 24ft. wide space.**
 - **Pod B1- Lots 19-26 facing a fence? Lots 1-18, how is the front door accessed?**
 - **Pod B2- Lots 1-14, how is the front door accessed?**
4. Per CMC 17.19.030.B, blocks shall be wide enough for two tiers of lots, **except where abutting a major street or prevented by topographical conditions or size of the property, in which case the approval authority may approve a single tier.**
 - Lots **38-48** in Pod B1 and Lots **19-28 (exception due to topo?)** and Lots **43-50** in B2 do not comply with this requirement.
5. Per CMC 17.19.030.D.3, the building envelopes need to be shown on the plat. Lot width is measured at the front of the building envelope.
6. Each dwelling unit within a new development shall be landscaped with at least one tree per CMC 17.19.030.F.
7. **Per CMC 17.19.040.B.10.e, if the average lot size is less than 7,500 square feet, one additional off-street parking space is required for every 5 units and shall be located within a common tract.**
8. There are no driveways (due to setbacks) and street parking for alley-loads. A parking plan showing all off-street parking is required at application submittal. **Some of this required parking is shown on-street in both pods; needs to be off-street. These off-street parking spaces should be placed throughout the plat and not concentrated in one area (need better parking solution).**
9. The grading plan identified the location of walls but wall heights shall also be included on the plan. Retaining wall height requirements are found in CMC 18.17.060. **Provide wall heights.**

B1 POD

10. Lots **66-80** NE Boxwood Street shall continue with the streetscape street section approved with Phase 2 of the PRD (see attachments) **However, pedestrian access from sidewalk to front door of these homes shall be provided and therefore this cross section shall be modified to eliminate the fence.**
11. Per CMC 17.19.030.D.6.a (i-ii), for rear-loaded garages, the lot must provide pedestrian access to the arterial or collector if feasible **and shall be shown on the plans.**

12. Per CMC 17.19.040.B.6.a, streets and ped/bicycle paths shall extend to the boundaries of the plat to ensure access to neighboring properties. (see additional comments from Engineering)
13. Lots 73-76 in the plat to the west face the sides of proposed lots 101 and 117. Lots in this area should face towards Lots 73-76.

B2 POD

14. Per CMC 18.23.110, *The perimeter of the planned development shall be so designed as to minimize any undesirable impact on adjacent properties.* As such, the beveling standards shall apply if applicable.
15. PRD Condition #28, 4-ft. fence is required
16. The Master Plan requires a trail connection to the east including open space where there are proposed lots.

Design Review (major)

Design Review is required for new development within multi-family zones per CMC 18.19.020. Design Review is a Type II decision and reviewed by the Design Review Committee. The standards applicable to this property for Design Review are found in the Camas Design Review Manual to include *Standard Principles & Guidelines* in addition to the *Specific Principles & Guidelines* for Gateways & Corridors (applicable to Pod B1 only) and Multi-Family Uses.

-Again, because this is a PRD we will be looking to be sure there is architectural variation that is also carried to the side of the units on corner lots (no blank walls).

A submittal for Design Review shall include a site plan drawing, a detailed landscape plan, exterior elevations, building materials and colors, lighting specs and plan, and sign plan (optional). A final Design Review decision may be consolidated and issued with the Preliminary Plat decision.

Tree retention

Per Exhibit E of the Development Agreement, the applicant shall demonstrate that the number of trees protected will meet or exceed the amount listed in the "Tree Preserved" column. Demonstrate that the proposal will not preclude the preservation of the minimum number of trees required to be preserved for that zone when it is fully developed. Two Oregon White Oaks located in Pod B1 adjacent to NE Ingle Road are highly visible and shall be incorporated into the land use design where feasible.

SEPA

Your proposal is not categorically exempt from the requirements of the State Environmental Policy Act (SEPA) per CMC Section 16.07.020.A and C as the proposed subdivision is more than ten residential units and contains critical areas.

Critical Areas Review

Per city mapping and Clark County GIS, steep slopes, wetlands and fish and wildlife habitat conservation areas are identified within the property. Per CMC Section 16.51.130, a critical areas report prepared by a qualified professional is required if a proposed development is within or adjacent to a critical area. The general requirements for a critical areas report is found in CMC Section 16.51.140. The City's code contains additional requirements for each type of critical area:

- 1) Wetlands are addressed in CMC Section 16.53.030. If impacts to critical areas (or wetland) are anticipated, then an analysis of alternative designs must be included as a demonstration of the effort to avoid impacts per **CMC Section 16.53.050.D. Avoidance, minimization and mitigation shall be required.**
- 2) Per PRD condition #24, a geotech report is required. Geologically Hazardous Areas are addressed in CMC Section 16.59.060 and 16.59.070.
- 3) Fish and Wildlife Habitat Conservation Areas are addressed in CMC Section 16.61.020.

Archeological Review

Need to comply with the conditions of the archaeological permit issued with the PRD.

ENGINEERING DIVISION

ANITA ASHTON (360) 817-7231

General Requirements:

1. Construction plans shall be prepared by a licensed Washington State engineer in accordance with City of Camas Design Standards Manual (CSDM).
2. The applicant shall locate facilities per CMC 5.45.365.
3. Existing wells and septic tanks and septic drain fields shall be abandoned in accordance with state and county guide lines per CMC 17.19.020 (A3).
4. The applicant will be responsible for all traffic control signs, street name signs, pavement markings and street lighting per CMC 17.19.030 (I) (J). LED street lighting is a requirement for all street lighting.
5. The applicant will be responsible for the design and submittal of the utility plan showing the locations for underground power, telephone, gas, CATV, street lights and associated appurtenances.
6. A 3% plan review and inspection fee will be required per resolution number 1023. The fee will be based on an engineer's estimate or construction bid. The fee is due prior to approved construction drawings being released by the City.
7. Regulations for installation of public improvements, improvement agreements, bonding, final platting, and final acceptance can be found at CMC 17.21.

Traffic/Transportation:

8. An update to the original transportation impact analysis (TIA) for Green Mountain PRD Master Plan, will be required in accordance with the City's adopted Traffic Impact Study Guidelines.
9. The updated traffic summary for Pod B1 South and Pod B2 North shall include:
Speed surveys, traffic counts, site distance evaluation, AM and PM peak volumes, trip distribution and assignment, signal warrants, turn pocket analysis, with and without project analysis for the current year, build out year and may include the future 5 year and 20 year analysis depending on the additional number of dwelling units in addition to the approved total from the Green Mt PRD. Evaluation of additional off-site intersections will be required once trip generation and distribution information is determined. Contact the City Engineer for trip distribution acceptance and the identification of specific study intersections.
10. If the proposed development generates more than 700 ADT, acceptable traffic calming measures will be required in accordance with the Neighborhood Traffic Manual.

Streets:

11. NE Ingle Road is designated as a collector street, As such, minimum intersection access spacing of 330' is required, provisions for a left turn pocket are required, residential access to NE Ingle Road is prohibited and uniform fencing and landscaping is required along NE Ingle Road.
12. The access into B2 Pod North exceeds the maximum access spacing requirements of 600-feet for a roadway classified as collector. A request for a deviation from the maximum access spacing requirement is to be submitted to the City Engineer.
13. The proposed 24'-30' Rear Load Alley, as indicated on the B2 Pod North plans, does not meet the minimum Intersection & Driveway Setback requirement of 110' on a collector. This access will not be supported.
14. Half width street improvements and ROW dedication will be required along NE Ingle Road per CMC 17.19.040 (B2 & B5).
15. Street tree planting is required in accordance with CMC 17.19.030 (F).

16. Private streets to four or less dwelling units, if proposed, will need to meet the provisions of CMC 17.19.040 (A). *20' Tract Width, 12' Pavement Width, Sidewalk optional, no parking on both sides.*
17. Per CMC 17.19.040 Private streets greater than 300' long shall meet the requirements of Table 17.19.040-1(D). *Tract width 48' Pavement 28', five-foot detached sidewalks required on both sides of the street, with planter strip. No parking on one side.*
18. Public street requirements are found in CMC 17.19.040 (B). For street grades, centerline curve radii, and curb return radii requirements see CMC 17.19.040 (B12).
19. ADA compliant pedestrian ramps and ADA compliant street crossings are required. To provide ADA compliant pedestrian ramps and street crossings careful evaluation of street profile grades and intersection site grading will be required.
20. Streets should extend to the boundaries of the plat where appropriate to ensure access and circulation to neighboring properties per CMC 17.19.040 (B6a).
21. The applicant shall provide a circulation plan that includes the proposed development and properties within 600-ft. The plan needs to show the access points for vehicles, pedestrians, bicycles, and transit per CMC 17.19.040 (B.10.a).
22. The application narrative shall specifically address the approval criteria CMC 17.11.030 (D) Plat approval criteria and CMC 18.23.100. PRD approval standards.
23. LED street lighting is to be installed along all street frontages within and adjacent to the proposed development, in accordance with CDSM.
24. All private streets, with street lighting, are to have separate meters and the maintenance of all lights and power will be the responsibility of the Owner/Homeowner's Association.

Stormwater:

25. Per CMC 14.02 Stormwater Control, stormwater treatment and detention shall be designed in accordance with the latest edition of Ecology's Stormwater Management Manual for Western Washington (2014 SWMMWW) and the City of Camas Stormwater Design Standards Manual.
26. Stormwater facilities are to meet the minimum 30-foot setback from the roadway, per CMC 17.19.030 (F.6).
27. Stormwater facilities are to be in separate tracts, which are to include landscaping and fencing.
28. Maintenance of stormwater facilities will be the responsibility of the owner/HOA per CMC 17.19.040 (C3).
29. This development is subject to payment of stormwater utility fees in accordance with the provisions of CMC 13.89.
30. Storm easements, if required, will be shown on the construction drawings.
31. The location of the stormwater facility for Pod B1 South is shown to be on the adjacent parcel to the south. The parcel to the south is not a part of Pod B1 South, but is located on Pod H, which is zoned commercial. **Pod B1 South is to have stormwater detained and treated on-site.**
32. The stormwater facility for Pod B2 North appears to impact the wetland area located to the south of this Pod. Stormwater facilities are only allowed in the buffers of wetlands with low habitat function, provided, the facilities are built on the outer edge of the buffer and do not degrade the existing buffer function and are designed to blend with the natural landscape, per CMC 16.53.050 (C.3).

Erosion Control

33. The applicant shall provide an erosion control bond will be required for land-disturbing activities of an acre or more, prior to release of approved construction plans, per CMC 17.21.030.
34. The applicant shall provide a copy of their NPDES Construction Stormwater General Permit and their Stormwater Pollution Prevention Plan (SWPPP), prior to release of approved construction plans.

Water:

35. There is an existing 18-inch water main located in the northbound lane of NE Ingle Road. This waterline extends north past the proposed Pod B1 South and dead ends at the northern most limits of Tract H (stormwater facility) of GM PRD Ph. 1A & 1B.
36. The applicant will be required to design and construct the water main for Pod B1 South, which will require connection to both the 18-inch water main located in NE Ingle Road and the water main located in NE Boxwood Street.
37. The applicant will be required to design and construct the extension of the 18-inch water main, located in NE Ingle Road, northwest to the limits of Pod B2 North. Additionally, the applicant will be required to design and construct the water main that will serve Pod B2 North. This system is to be connected to the existing system located in N Cherry Street in order to provide a loop system for this Pod.
38. Both Pod B1 South and Pod B2 North shall provide a separate service and water meter to each of the lots located within these Pods.
39. Applicant shall demonstrate that there are adequate fire flows available for both Pods.
40. A 10-foot separation shall be maintained between water and sanitary sewer lines.

Sanitary Sewer:

41. There is an existing 10-inch gravity sanitary sewer line, located in the southbound lane of NE Ingles Road, which was installed as a condition of Phase 1. The existing gravity main flows to the new NS-STS Goodwin Road Pump Station. The 10-inch sanitary mainline is currently capped with a temporary sanitary sewer cleanout at the northern most limits of the improvements for Phase 1A of the PRD.
42. The existing sanitary sewer line extends past the proposed Pod B1 South therefore the applicant will be required to design and construct a new 8-inch gravity sewer main to serve Pod B1 South, with 6-inch laterals provided to each lot.
43. As the existing sanitary sewer main does not extend northwest to the proposed Pod B2 North site, the applicant will be required to extend the mainline to the northwestern most boundary of Pod B2 North and design and construct the 8-inch sanitary sewer system to serve Pod B2 North and install 6-inch lateral for each lot.
44. A 10-foot separation shall be maintained between water and sanitary sewer lines.

Parks/Trails:

45. Trails to be designed and constructed in accordance with the GM PRD Master Plan.

Impact Fees (collected at time of building permit):

- This development is located in the North (NUGA) District
- Single Family Detached:
 - Traffic Impact Fees - \$8,495.00
 - School Impact Fees (Camas) - \$5,371.00
 - School Impact Fees (Evergreen) - \$6,100.00
 - Park/Open Space - \$2,290.00
 - Fire - \$0.20 psf
- Duplex (both sides):
 - Traffic Impact Fees - \$12,159.00
 - School Impact Fees (Camas) - \$10,742.00
 - School Impact Fees (Evergreen) - \$15,282.00 (multi-family)
 - Park/Open Space - \$4,580.00
 - Fire - \$0.20 psf

- Apartment (per DU):
 - Traffic Impact Fees - \$5,580.00
 - School Impact Fees (Camas) - \$5,371.00
 - School Impact Fees (Evergreen) - \$7,641.00 (multi-family)
 - Park/Open Space - \$1,717.00
 - Fire - \$0.20 psf
- Residential Condo/Townhouses:
 - Traffic Impact Fees - \$4,331.00
 - School Impact Fees (Camas) - \$5,371.00
 - School Impact Fees (Evergreen) - \$6,100.00
 - Park/Open Space - \$2,290.00
 - Fire - \$0.20 psf

System Development Charges (Residential):

- This development is located in the North (NUGA) District
- Water
 - 3/4" meter - \$7,310.00 + \$380.00 connect fee
 - 1" meter - \$12,183 + \$422.00 connection fee
- Sewer
 - Residential - \$4,420.00 + \$164.00 STEP/STEF Inspection

BUILDING DIVISION

BOB CUNNINGHAM (360) 817-1568

1. Existing structures need an asbestos survey and demolition permit.
2. Decommissioning of septic tanks and drainfields through Clark County Department of Health
3. The structures will be reviewed under the most current building codes as adopted by The State of Washington.
4. The structural drawings and calculations shall be prepared and stamped by a Professional Engineer licensed by the State of Washington.
5. The placement of buildings and structures on or adjacent to slopes steeper than one unit vertical in three units horizontal shall conform to Sections R403.1.7.1 through R403.1.7.4. A geotechnical reports may be required
6. Geotechnical engineer's report required
7. The required fire distance between buildings and property line shall be in accordance with the International Building Codes.
8. The required fire suppression system shall be in accordance with IBC and other applicable codes standards and shall be reviewed by the Camas Fire Marshal's office.
9. Storm sewer disposal and connections shall identified on the approved plans.
10. All lots shall be provided a storm drain lateral at the lowest practical location.
11. Storm water from adjacent properties and existing developments should be taken into consideration.
12. System Development Charges and Impact fees shall be assessed prior to permits
13. An approved monument sign for posting addresses shall be provided at all Flag lots, the monument sign, location and design a shall be noted on the Plat.
14. Impact fees and System Development charges shall be applicable

FIRE DEPARTMENT**RANDY MILLER (360) 834-6191**

1. NFPA 13D Residential Fire Sprinklers required in all new dwellings.
2. Water supply line from the meter into the house shall be sized per the fire sprinkler contractors design calculations or a 2 inch lines shall be installed.
3. For any flag lot or access driveway that is not clearly visible from the main road an address monument shall be located at the point the access leaves the main road and shall be substantial and permanent in nature.
4. A fire department turnaround is required when the dead end exceeds 150 ft. Contact our office if there are terrain constraints that will require alternate methods.
5. Provide an obstructed emergency access plan such as towing signs on any private road or access.
6. For questions or to request inspections contact the Fire Marshal's Office via *Camas Connect* (see attached for details). Otherwise please call our inspection line at 360-891-6191 x1.



Real-World Geotechnical Solutions
Investigation • Design • Construction Support

Revised December 3, 2014
Project No. 13-3186

John O'Neil
Metropolitan Land Group, LLC
17933 NW Evergreen Parkway, Suite 300
Beaverton, Oregon 97006

SUBJECT: PRELIMINARY GEOTECHNICAL ENGINEERING REPORT
GREEN MOUNTAIN - PHASE 1
NE INGLE ROAD & NE 28TH STREET
CAMAS, WASHINGTON

This report presents the results of a geotechnical engineering study conducted by GeoPacific Engineering, Inc. (GeoPacific) for the above-referenced project. The purpose of our investigation was to evaluate subsurface conditions at the site and to provide geotechnical recommendations for site development. This geotechnical study was performed in accordance with GeoPacific Proposal No. P-4836, dated April 30, 2014, and your subsequent authorization of our proposal and *General Conditions for Geotechnical Services*. This report is considered Preliminary because a final grading plan has not been developed.

SITE DESCRIPTION AND PROPOSED DEVELOPMENT

The Green Mountain site is located on the north side of NE Goodwin Road and east of NE Ingle Road in the City of Camas, Clark County, Washington. The property includes several tax lots that total approximately 281.6 acres. Topography on the southern portion of the site is flat to gently sloping with grades of about 5 to 10 percent. Steeper slopes (up to 35 percent grade) are present on Green Mountain, which is a basalt cinder cone, located in the northern portion of the site. Near vertical slopes are present at the base of Green Mountain where basalt bedrock is exposed.

Phase 1 is approximately 51 acres and located in the southern portion of the site, which is part of the Green Mountain Golf Course. Topography is flat to gently sloping with grades generally about 5 to 20 percent. Improvements include several structures, parking areas and driveways, cart tracks, manmade ponds, and fairways. Vegetation consists of short grasses and sparse trees.

It is our understanding that the proposed development will consist of a subdivision for single family homes, new streets, and associated underground utilities. A grading plan has not been provided for our review; however, we anticipate maximum cuts and fills will be on the order of about 12 feet due to the sloping topography and filling of existing ponds.

REGIONAL AND LOCAL GEOLOGIC SETTING

Regionally, the subject site lies within the Willamette Valley/Puget Sound lowland, a broad structural depression situated between the Coast Range on the west and the Cascade Range on the east. A series of discontinuous faults subdivide the Willamette Valley into a mosaic of fault-bounded, structural blocks (Yeats et al., 1996). Uplifted structural blocks form bedrock highlands, while down-warped structural blocks form sedimentary basins.

The low-lying portion of the site is underlain by the Quaternary aged (last 1.6 million years) Willamette Formation, a catastrophic flood deposits associated with repeated glacial outburst flooding of the Willamette Valley (Trimble, 1963; Yeats et al., 1996; Phillips, 1987). The last of these outburst floods occurred about 10,000 years ago. These deposits typically consist of horizontally layered, micaceous, silty sand with gravel that is underlain by medium dense to dense gravel.

The Willamette Formation is underlain by a gravel conglomerate interbedded with siltstone and sandstone. Evarts (2006) indicates the age of the conglomerate is poorly constrained but is likely Pliocene to Pleistocene in age (10,000 to 5.3 million years ago). The conglomerate is partially cemented with the upper portion moderately weathered.

The northern portion of the Green Mountain site is underlain by Basaltic Andesite of Green Mountain (Evarts, 2006). The gray basaltic andesite lava flows erupted from a cinder cone on Green Mountain during the Pleistocene (2.6 to 5.3 million years ago). The basalt contains weathered ash, trace quartzite pebbles, and fine grained xenoliths (Evarts, 2006).

A portion of the site is underlain by Miocene to Pleistocene age (16 to 0.5 million years ago) terrigenous sedimentary rocks belonging to the Troutdale Formation (Evarts, 2006). The Troutdale Formation is informally divided into an upper and lower member. Lithologies in the upper member include lenticular layers of volcanoclastic (vitric) sand, quartzite-bearing gravel, fine-grained sand, silt and clay, micaceous quartz-rich sand, and conglomerate with a cumulative average thickness of 100 to 150 feet. The lower member consists primarily of laminated silty clay and sand with reported thicknesses in water well logs of up to 800 feet. These sediments vary from weakly-consolidated to well-indurated.

REGIONAL SEISMIC SETTING

At least four potential source zones capable of generating damaging earthquakes are thought to exist in the region. These include the Lacamas Creek-Sandy River Fault, Portland Hills Fault Zone, Gales Creek-Newberg-Mt. Angel Structural Zone, and the Cascadia Subduction Zone, as discussed below.

Lacamas Creek-Sandy River Fault

The Lacamas Creek Fault is recognized based on a fault shear contact between Oligocene (30 million years old) volcanic rocks and the Troutdale Formation, and a series of prominent geomorphic lineaments with a cumulative length of 24 miles (Mundorff, 1964; Beeson et al., 1989). The Sandy River Fault, interpreted from gravity and borehole data, forms a possible right stepping, 7-mile-long extension of the Lacamas Creek Fault that vertically displaces the Columbia River Basalt by 1,300 feet (Beeson et al., 1989; Geomatrix Consultants, 1995). A 1989, M3.9 earthquake in the vicinity may have occurred on the Lacamas Creek Fault. A comprehensive seismic hazard study commissioned by the Oregon Department of Transportation concluded that

the Lacamas Creek-Sandy River Fault Zone is potentially active with a possible rupture length of greater than 25 miles. The Lacamas Creek Fault is mapped as being ½ mile southwest of the subject site (Figure 1).

Portland Hills Fault Zone

The Portland Hills Fault Zone is a series of NW-trending faults that include the central Portland Hills Fault, the western Oatfield Fault, and the eastern East Bank Fault. These faults occur in a northwest-trending zone that varies in width between 3.5 and 5.0 miles. The combined three faults vertically displace the Columbia River Basalt by 1,130 feet and appear to control thickness changes in late Pleistocene (approx. 780,000 years) sediment (Madin, 1990). The Portland Hills Fault occurs along the Willamette River at the base of the Portland Hills, and is about 13 miles southwest of the site. The Oatfield Fault occurs along the western side of the Portland Hills, and is about 16 miles southwest of the site. The accuracy of the fault mapping is stated to be within 500 meters (Wong, et al., 2000). No historical seismicity is correlated with the mapped portion of the Portland Hills Fault Zone, but in 1991 a M3.5 earthquake occurred on a NW-trending shear plane located 1.3 miles east of the fault (Yelin, 1992). Although there is no definitive evidence of recent activity, the Portland Hills Fault Zone is assumed to be potentially active (Geomatrix Consultants, 1995).

Gales Creek-Newberg-Mt. Angel Structural Zone

The Gales Creek-Newberg-Mt. Angel Structural Zone is a 50-mile-long zone of discontinuous, NW-trending faults that lies about 36 miles southwest of the subject site. These faults are recognized in the subsurface by vertical separation of the Columbia River Basalt and offset seismic reflectors in the overlying basin sediment (Yeats et al., 1996; Werner et al., 1992). A geologic reconnaissance and photogeologic analysis study conducted for the Scoggins Dam site in the Tualatin Basin revealed no evidence of deformed geomorphic surfaces along the structural zone (Unruh et al., 1994). No seismicity has been recorded on the Gales Creek Fault or Newberg Fault; however, these faults are considered to be potentially active because they may connect with the seismically active Mount Angel Fault and the rupture plane of the 1993 M5.6 Scotts Mills earthquake (Werner et al. 1992; Geomatrix Consultants, 1995).

Cascadia Subduction Zone

The Cascadia Subduction Zone is a 680-mile-long zone of active tectonic convergence where oceanic crust of the Juan de Fuca Plate is subducting beneath the North American continent at a rate of 4 cm per year (Goldfinger et al., 1996). A growing body of geologic evidence suggests that prehistoric subduction zone earthquakes have occurred (Atwater, 1992; Carver, 1992; Peterson et al., 1993; Geomatrix Consultants, 1995). This evidence includes: (1) buried tidal marshes recording episodic, sudden subsidence along the coast of northern California, Oregon, and Washington, (2) burial of subsided tidal marshes by tsunami wave deposits, (3) paleoliquefaction features, and (4) geodetic uplift patterns on the Oregon coast. Radiocarbon dates on buried tidal marshes indicate a recurrence interval for major subduction zone earthquakes of 250 to 650 years with the last event occurring 300 years ago (Atwater, 1992; Carver, 1992; Peterson et al., 1993; Geomatrix Consultants, 1995). The inferred seismogenic portion of the plate interface lies approximately 50 miles west of the Portland Basin at depths of between 20 and 40 kilometers below the surface.

FIELD EXPLORATION

Our site-specific exploration for Phase 1 was conducted on May 23rd, 2014. A total of 13 exploratory test pits were excavated with a medium sized trackhoe to depths ranging between 5 and 9 feet at the approximate locations shown on Figure 2. Test pits TP-1 and TP-12 are outside of the Phase 1 boundary due to a reconfiguration of the layout and are not presented. The previous investigation for the entire Green Mountain site consisted of 25 exploratory test pits excavated November 5th through 7th, 2013. Five test pits from the previous investigation are located within Phase 1 – test pits TP-1, TP-10, TP-13, TP-15, and TP-16. Test pits from the 2013 investigation for the entire Green Mountain site will be referred to as TP-1 (2013), TP-10 (2013), TP-13 (2013), TP-15 (2013), and TP-16 (2013). It should be noted that exploration locations were located in the field by pacing or taping distances from apparent property corners and other site features shown on the plans provided. As such, the locations of the explorations should be considered approximate.

A GeoPacific geologist continuously monitored the field exploration program and logged the borings. Soils observed in the explorations were classified in general accordance with the Unified Soil Classification System. During exploration, our geologist also noted geotechnical conditions such as soil consistency, moisture and groundwater conditions. Logs of test pits are attached to this report. The following report sections are based on the exploration program and summarize subsurface conditions encountered at the site.

Undocumented Fill – Undocumented fill was encountered directly at the ground surface in test pits TP-2, TP-3, TP-4, TP-7, TP-8, TP-10, TP-11, and TP-13. The fill generally consisted of brown, medium stiff to stiff, silt (ML) with gravel, clay, and sand and medium dense, silty sand (SM). The fill extended to a depth of 1.5 to 3.5 feet. It is likely that other areas of undocumented fill exist in the vicinity of the existing structures, driveways, and the throughout the golf course.

Topsoil Horizon – The ground surface in test pits TP-5, TP-6, TP-9, TP-1 (2013), TP-10 (2013), TP-13 (2013), TP-15 (2013), and TP-16 (2013) was directly underlain by a low to highly organic topsoil horizon. The dark brown silt (OL-ML) contained trace amounts of sand and contained fine roots throughout. The topsoil horizon was loose and extended to a depth of 6 to 18 inches.

Colluvial Soil – Colluvial soil, formed by downward migration of material under gravitational forces, was encountered beneath the topsoil horizon in test pit TP-15. These soils generally consisted of stiff to very stiff, silty clay (CL) to clayey silt (ML) with weathered basalt that displayed strong orange and gray mottling. In explorations, the colluvial soil extended to a depth of 3 feet in test pit TP-15.

Buried Topsoil Horizon – A low organic, buried topsoil horizon was encountered beneath the fill in test pit TP-8. The buried topsoil horizon was on the order of 6 inches in thickness - extending to a depth of 3 feet.

Fine Grained Catastrophic Flood Deposits (Willamette Formation) – Underlying the topsoil horizon in test pits TP-5, TP-6, TP-9, TP-1 (2013), TP-10 (2013), and TP-13 (2013); the buried topsoil horizon in test pit TP-8; and the fill in test pits TP-2, TP-4, TP-7, TP-10, and TP-13 was fine grained catastrophic flood deposits. These soils generally consisted of stiff to very stiff, light brown, clayey silt (ML) with trace sand that displayed subtle to strong orange and gray mottling. Where encountered, the flood deposits generally extended to a depth of 3 to 7 feet and beyond the maximum depth of exploration in test pits TP-4, TP-7, TP-8, and TP-1 (2013) excavated to a maximum depth of 8.5 feet.

Conglomerate – Underlying the topsoil horizon in test pits TP-15 (2013) and TP-16 (2013); the fill in test pit TP-3, and the fine grained catastrophic flood deposits in test pits TP-2, TP-5, TP-6, TP-9, TP-10, TP-13, TP-10 (2013), and TP-13 (2013) was dense to very dense subrounded gravel (GM) with sandy, clayey silt matrix; dense, silty sand (SM); and stiff silt (ML) with subrounded gravel. The conglomerate was partially cemented and extended beyond the maximum depth of exploration (6 to 10.5 feet).

Soil Moisture and Groundwater

On May 23, 2014 and November 5 through 7, 2013, soils encountered in test pits were moist to wet. Groundwater seepage was encountered in test pits TP-2, TP-5 through TP-9, TP-13, TP-1 (2013), TP-13 (2013), TP-15 (2013) and TP-16 (2013) at depths of 2 to 8.5 feet. Discharge was visually estimated at ¼ to 2 gallons per minute. In test pit TP-1 (2013), the static groundwater level rose to a depth of 2 feet after the test pit had been left open for a time period of several hours. Experience has shown that temporary perched storm-related groundwater conditions often occur within the surface soils over fine-grained native deposits such as those beneath the site, particularly during the wet season. It is anticipated that groundwater conditions will vary depending on the season, local subsurface conditions, changes in site utilization, and other factors.

SLOPE STABILITY

For the purpose of evaluating slope stability, we: (1) reviewed regional 1:24,000 scale topography by the U.S. Geological Survey and published geologic mapping, (2) reviewed 1:150 scale topographic survey mapping of the site by Olson Engineering, Inc., (3) performed a geological reconnaissance of the site, and (4) evaluated subsurface soil conditions in exploratory test pits. Regional slope stability mapping of Clark County, Washington published by the Washington Department of Natural Resources Division of Geology identifies an area of potential instability on the southwest side of Green Mountain (Fiksdal, 1975). This area roughly correlates with the near vertical rock exposures at the base of Green Mountain that is north of the Phase 1 area. No mapped landslides are indicated in the Phase 1 study area on more recent geologic mapping conducted by Evarts (2006).

Based on the data review, field reconnaissance and site exploration, the slope instability hazard for the Phase 1 portion of the Green Mountain property is considered to be low. Slopes in the Phase 1 area are on the order of 5 to 20 percent. Slope geomorphology at the site is generally smooth and uniform - consistent with relative stability. Subsurface explorations indicate the site is generally underlain by stiff to very-stiff, clayey silt (ML) loess underlain by dense to very dense, silty gravel (GM). These materials are generally characterized by moderate to high shear strength and a relatively high resistance to slope instability on gentle slopes. The Phase 1 area is considered generally suitable for development.

PRELIMINARY CONCLUSIONS AND RECOMMENDATIONS

Our investigation indicates that the proposed development is geotechnically feasible, provided that the recommendations of this report are incorporated into the design and construction phases of the project. The primary geotechnical constraint to development is the presence of fill throughout the site. Up to 5 feet of fill was encountered in the exploratory test pits. It is anticipated that fill is prevalent throughout the fairway areas of the golf course where sand traps, ponds, and sculpted topography have been created.

Stormwater Disposal

Soil conditions at the site generally consist of fine grained flood deposits (consisting of clayey silt with sand) underlain by coarse grained, partially cemented conglomerate consisting of subrounded gravel with a clayey silt matrix and trace sand. Orange and gray mottling was observed in near surface soils in all explorations. Soil moisture conditions were moist to wet and perched groundwater seepage was encountered in test pits TP-2, TP-5 through TP-9, TP-13, TP-1 (2013), TP-13 (2013), TP-15 (2013) and TP-16 (2013) at depths of 2 to 8.5 feet. Static groundwater was measured at a depth of 2 feet below the ground surface in test pit TP-1 (2013). Soil mottling, the presence of clay soils, and the prevalent groundwater seepage indicates the soils will likely accept little runoff – if any. Soils with moderate permeability are already saturated with perched groundwater. We would expect soil conditions to behave more as Soil Group 4 soils than Soil Group 3 soils outlined in the Western Washington Continuous Simulation Hydrology Model.

Site Preparation

Due to the presence of fill through the site, areas of proposed construction and areas to receive fill should be cleared of vegetation and existing fill soils should then be removed to stiff or dense native soils. Organic soils are likely present at the bottom of the ponds and should be removed to stiff, native soils. Inorganic debris and organic materials from clearing should be removed from the site. It is likely that the existing fill may be reused as engineered fill provided that they are properly moisture conditioned and free of organic or inorganic debris. Organic-rich root zones should then be stripped from construction areas of the site or where engineered fill is to be placed. Depth of stripping is estimated to average 8+ inches. The final depth of soil removal will be determined on the basis of a site inspection after the stripping/ excavation has been performed. Stripped topsoil should preferably be removed from the site. Any remaining topsoil should be stockpiled only in designated areas and stripping operations should be observed and documented by the geotechnical engineer or his representative.

Remaining undocumented fills and any subsurface structures (dry wells, basements, driveway and landscaping fill, old utility lines, septic leach fields, etc.) should be removed and the excavations backfilled with engineered fill. Fill in excess of 5 feet was encountered directly at the ground surface in test pits for this investigation. Sculpted topography in the vicinity of the fairways indicates the presence of fill. We anticipate that other areas of fill may exist in the vicinity of the existing structures, parking lots, and driveways.

Engineered Fill

All grading for the proposed construction should be performed as engineered grading in accordance with the applicable building code at time of construction with the exceptions and additions noted herein. Proper test frequency and earthwork documentation usually requires daily observation and testing during stripping, rough grading, and placement of engineered fill. Imported fill material must be approved by the geotechnical engineer prior to being imported to the site. Oversize material greater than 6 inches in size should not be used within 3 feet of foundation footings, and material greater than 12 inches in diameter should not be used in engineered fill.

Engineered fill should be compacted in horizontal lifts not exceeding 8 inches using standard compaction equipment. We recommend that engineered fill be compacted to at least 90% of the maximum dry density determined by ASTM D1557 (Modified Proctor) or equivalent. Field density testing should conform to ASTM D2922 and D3017, or D1556. All engineered fill should be observed and tested by the project geotechnical engineer or his representative. Typically, one density test is performed for at least every 2 vertical feet of fill placed or every 500 yd³, whichever

requires more testing. Because testing is performed on an on-call basis, we recommend that the earthwork contractor be held contractually responsible for test scheduling and frequency.

Site earthwork will be impacted by soil moisture and shallow groundwater conditions. Earthwork in wet weather would likely require extensive use of cement or lime treatment, or other special measures, at considerable additional cost compared to earthwork performed under dry-weather conditions.

Excavating Conditions and Utility Trenches

We anticipate that on-site soils can be excavated using conventional heavy equipment such as trackhoes to a depth of 9 feet. All temporary cuts in excess of 4 feet in height should be sloped in accordance with U.S. Occupational Safety and Health Administration (OSHA) regulations (29 CFR Part 1926), or be shored. The existing native soil is classified as Type B Soil and temporary excavation side slope inclinations as steep as 1H:1V may be assumed for planning purposes. This cut slope inclination is applicable to excavations above the water table only. Maintenance of safe working conditions, including temporary excavation stability, is the responsibility of the contractor. Actual slope inclinations at the time of construction should be determined based on safety requirements and actual soil and groundwater conditions.

Soft, saturated soils and groundwater may be encountered in utility trenches, particularly during the wet season. We anticipate that dewatering systems consisting of ditches, sumps and pumps would be adequate for control of perched groundwater. Regardless of the dewatering system used, it should be installed and operated such that in-place soils are prevented from being removed along with the groundwater. Trench bottom stabilization, such as one to two feet of compacted crushed aggregate base, may be necessary in deeper trenches.

Vibrations created by traffic and construction equipment may cause some caving and raveling of excavation walls. In such an event, lateral support for the excavation walls should be provided by the contractor to prevent loss of ground support and possible distress to existing or previously constructed structural improvements.

PVC pipe should be installed in accordance with the procedures specified in ASTM D2321. We recommend that trench backfill be compacted to at least 95% of the maximum dry density obtained by Modified Proctor ASTM D1557 or equivalent. Initial backfill lift thickness for a ¾"-0 crushed aggregate base may need to be as great as 4 feet to reduce the risk of flattening underlying flexible pipe. Subsequent lift thickness should not exceed 1 foot. If imported granular fill material is used, then the lifts for large vibrating plate-compaction equipment (e.g. hoe compactor attachments) may be up to 2 feet, provided that proper compaction is being achieved and each lift is tested. Use of large vibrating compaction equipment should be carefully monitored near existing structures and improvements due to the potential for vibration-induced damage.

Adequate density testing should be performed during construction to verify that the recommended relative compaction is achieved. Typically, one density test is taken for every 4 vertical feet of backfill on each 200-lineal-foot section of trench.

Erosion Control Considerations

During our field exploration program, we did not observe soil types that would be considered highly susceptible to erosion, except in areas of steeply sloping topography. In our opinion, the primary concern regarding erosion potential will occur during construction, in areas that have been stripped of vegetation. Erosion at the site during construction can be minimized by implementing the

project erosion control plan, which should include judicious use of straw bales and silt fences. If used, these erosion control devices should be in place and remain in place throughout site preparation and construction.

Erosion and sedimentation of exposed soils can also be minimized by quickly re-vegetating exposed areas of soil, and by staging construction such that large areas of the project site are not denuded and exposed at the same time. Areas of exposed soil requiring immediate and/or temporary protection against exposure should be covered with either mulch or erosion control netting/blankets. Areas of exposed soil requiring permanent stabilization should be seeded with an approved grass seed mixture, or hydroseeded with an approved seed-mulch-fertilizer mixture.

Wet Weather Earthwork

Soils underlying the site are likely to be moisture sensitive and may be difficult to handle or traverse with construction equipment during periods of wet weather. Earthwork is typically most economical when performed under dry weather conditions. Earthwork performed during the wet-weather season will probably require expensive measures such as cement treatment or imported granular material to compact fill to the recommended engineering specifications. If earthwork is to be performed or fill is to be placed in wet weather or under wet conditions when soil moisture content is difficult to control, the following recommendations should be incorporated into the contract specifications.

- Earthwork should be performed in small areas to minimize exposure to wet weather. Excavation or the removal of unsuitable soils should be followed promptly by the placement and compaction of clean engineered fill. The size and type of construction equipment used may have to be limited to prevent soil disturbance. Under some circumstances, it may be necessary to excavate soils with a backhoe to minimize subgrade disturbance caused by equipment traffic;
- The ground surface within the construction area should be graded to promote run-off of surface water and to prevent the ponding of water;
- Material used as engineered fill should consist of clean, granular soil containing less than 5 percent fines. The fines should be non-plastic. Alternatively, cement treatment of on-site soils may be performed to facilitate wet weather placement;
- The ground surface within the construction area should be sealed by a smooth drum vibratory roller, or equivalent, and under no circumstances should be left uncompacted and exposed to moisture. Soils which become too wet for compaction should be removed and replaced with clean granular materials;
- Excavation and placement of fill should be observed by the geotechnical engineer to verify that all unsuitable materials are removed and suitable compaction and site drainage is achieved; and
- Bales of straw and/or geotextile silt fences should be strategically located to control erosion.

If cement or lime treatment is used to facilitate wet weather construction, GeoPacific should be contacted to provide additional recommendations and field monitoring.

Anticipated Foundations

The proposed residential structures may be supported on shallow foundations bearing on competent undisturbed, native soils and/or engineered fill, appropriately designed and constructed as recommended in this report. Foundation design, construction, and setback requirements should conform to the applicable building code at the time of construction. For maximization of bearing strength and protection against frost heave, spread footings should be embedded at a minimum depth of 18 inches below exterior grade. The recommended minimum widths for continuous footings supporting wood-framed walls without masonry are 12 inches for single-story, 15 inches for two-story, and 18 inches for three-story structures. Minimum foundation reinforcement should consist of a No. 4 bar at the top of the stem walls, and a No. 4 bar at the bottom of the footings. Concrete slab-on-grade reinforcement should consist of No. 4 bars placed on 24-inch centers in a grid pattern.

The anticipated allowable soil bearing pressure is 1,500 lbs/ft² for footings bearing on competent, native soil and/or engineered fill. A maximum chimney and column load of 30 kips is recommended for the site. The recommended maximum allowable bearing pressure may be increased by 1/3 for short-term transient conditions such as wind and seismic loading. For heavier loads, the geotechnical engineer should be consulted. The coefficient of friction between on-site soil and poured-in-place concrete may be taken as 0.40, which includes no factor of safety. The maximum anticipated total and differential footing movements (generally from soil expansion and/or settlement) are 1 inch and ¾ inch over a span of 20 feet, respectively. We anticipate that the majority of the estimated settlement will occur during construction, as loads are applied. Excavations near structural footings should not extend within a 1H:1V plane projected downward from the bottom edge of footings.

Footing excavations should penetrate through topsoil and any loose soil to competent subgrade that is suitable for bearing support. All footing excavations should be trimmed neat, and all loose or softened soil should be removed from the excavation bottom prior to placing reinforcing steel bars. Due to the moisture sensitivity of on-site native soils, foundations constructed during the wet weather season may require overexcavation of footings and backfill with compacted, crushed aggregate.

Our recommendations are for house construction incorporating raised wood floors and conventional spread footing foundations. If living space of the structures will incorporate basements, a geotechnical engineer should be consulted to make additional recommendations for retaining walls, water-proofing, underslab drainage and wall subdrains. After site development, a Final Soil Engineer's Report should either confirm or modify the above recommendations.

Pavement Design

For design purposes, we used an estimated resilient modulus of 9,000 for compacted native soil. Table 1 presents our recommended minimum pavement section for dry weather construction.

Table 1. Recommended Minimum Dry-Weather Pavement Section

Material Layer	Light-duty Public Streets	Compaction Standard
Asphaltic Concrete (AC)	3 in.	92%/ 92% of Rice Density AASHTO T-209
Crushed Aggregate Base ¾"-0 (leveling course)	2 in.	95% of Modified Proctor AASHTO T-180
Crushed Aggregate Base 1½"-0	8 in.	95% of Modified Proctor AASHTO T-180
Subgrade	12 in.	95% of Modified Proctor AASHTO T-180 or equivalent

Any pockets of organic debris or loose fill encountered during ripping or tilling should be removed and replaced with engineered fill (see *Site Preparation* Section). In order to verify subgrade strength, we recommend proof-rolling directly on subgrade with a loaded dump truck during dry weather and on top of base course in wet weather. Soft areas that pump, rut, or weave should be stabilized prior to paving. If pavement areas are to be constructed during wet weather, the subgrade and construction plan should be reviewed by the project geotechnical engineer at the time of construction so that condition specific recommendations can be provided. The moisture sensitive subgrade soils make the site a difficult wet weather construction project.

During placement of pavement section materials, density testing should be performed to verify compliance with project specifications. Generally, one subgrade, one base course, and one asphalt compaction test is performed for every 100 to 200 linear feet of paving.

Seismic Design

Structures should be designed to resist earthquake loading in accordance with the methodology described in the 2010 ASCE-7 Standard. We recommend Site Class D be used for design. Design values determined for the site using the USGS (United States Geological Survey) *U.S. Seismic Design Maps* tool (Version 3.1.0) are summarized in Table 2, presented on the following page.

Table 2. Recommended Earthquake Ground Motion Parameters (2010 ASCE-7)

Parameter	Value
Location (Lat, Long), degrees	45.646, -122.457
Mapped Spectral Acceleration Values (MCE):	
Peak Ground Acceleration	0.374
Short Period, S_s	0.880 g
1.0 Sec Period, S_1	0.375 g
Soil Factors for Site Class D:	
F_a	1.148
F_v	1.650
Residential Site Value = $2/3 \times F_a \times S_s$	0.673 g
Residential Seismic Design Category	D_0

Soil liquefaction is a phenomenon wherein saturated soil deposits temporarily lose strength and behave as a liquid in response to earthquake shaking. Soil liquefaction is generally limited to loose, granular soils located below the water table. Following development, on-site soils will consist predominantly of engineered fill or native fine-grained soils above the water table, which are not considered susceptible to liquefaction. Therefore, it is our opinion that special design or construction measures are not required to mitigate the effects of liquefaction.

Drainage

The upslope side of retaining walls and perimeter footings should be provided with a drainage system consisting of 3-inch diameter, slotted, flexible plastic pipe embedded in a minimum of 1 ft³ per lineal foot of clean, free-draining gravel or 1 1/2" - 3/4" drain rock. The drain pipe and surrounding drain rock should be wrapped in non-woven geotextile (Mirafi 140N, or approved equivalent) to minimize the potential for clogging and/or ground loss due to piping. Water collected from the footing drains should be directed into the local storm drain system or other suitable outlet. A minimum 0.5 percent fall should be maintained throughout the drain and non-perforated pipe outlet. Down spouts and roof drains should not be connected to the foundation drains in order to reduce the potential for clogging. The footing drains should include clean-outs to allow periodic maintenance and inspection. Grades around the proposed structure should be sloped such that surface water drains away from the building. Footing drains are recommended to prevent detrimental effects of groundwater on foundations, and should not be expected to eliminate all potential sources of water entering a crawlspace or beneath a slab-on-grade. An adequate grade to a low point outlet drain in any crawlspace areas is required by code. Underslab drains are sometimes added beneath the slab when placed over soils of low permeability and shallow, perched groundwater.

UNCERTAINTIES AND LIMITATIONS

We have prepared this report for the owner and their consultants for use in design of this project only. This report should be provided in its entirety to prospective contractors for bidding and estimating purposes; however, the conclusions and interpretations presented in this report should not be construed as a warranty of the subsurface conditions. Experience has shown that soil and groundwater conditions can vary significantly over small distances. Inconsistent conditions can occur between explorations that may not be detected by a geotechnical study. If, during future site operations, subsurface conditions are encountered which vary appreciably from those described herein, GeoPacific should be notified for review of the recommendations of this report, and revision of such if necessary.

Sufficient geotechnical monitoring, testing and consultation should be provided during construction to confirm that the conditions encountered are consistent with those indicated by explorations. The checklist attached to this report outlines recommended geotechnical observations and testing for the project. Recommendations for design changes will be provided should conditions revealed during construction differ from those anticipated, and to verify that the geotechnical aspects of construction comply with the contract plans and specifications.

Within the limitations of scope, schedule and budget, GeoPacific attempted to execute these services in accordance with generally accepted professional principles and practices in the fields of geotechnical engineering and engineering geology at the time the report was prepared. No warranty, expressed or implied, is made. The scope of our work did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous or toxic substances in the soil, surface water, or groundwater at this site.

We appreciate this opportunity to be of service.

Sincerely,

GEOPACIFIC ENGINEERING, INC.

Beth K. Rapp
Senior Geotechnical Staff



James D. Imbrie, P.E.
Principal Geotechnical Engineer

Attachments: References

Figure 1 – Vicinity Map

Figure 2 – Site and Exploration Plan

Test Pit Logs – TP-2 through TP-11, & TP-13

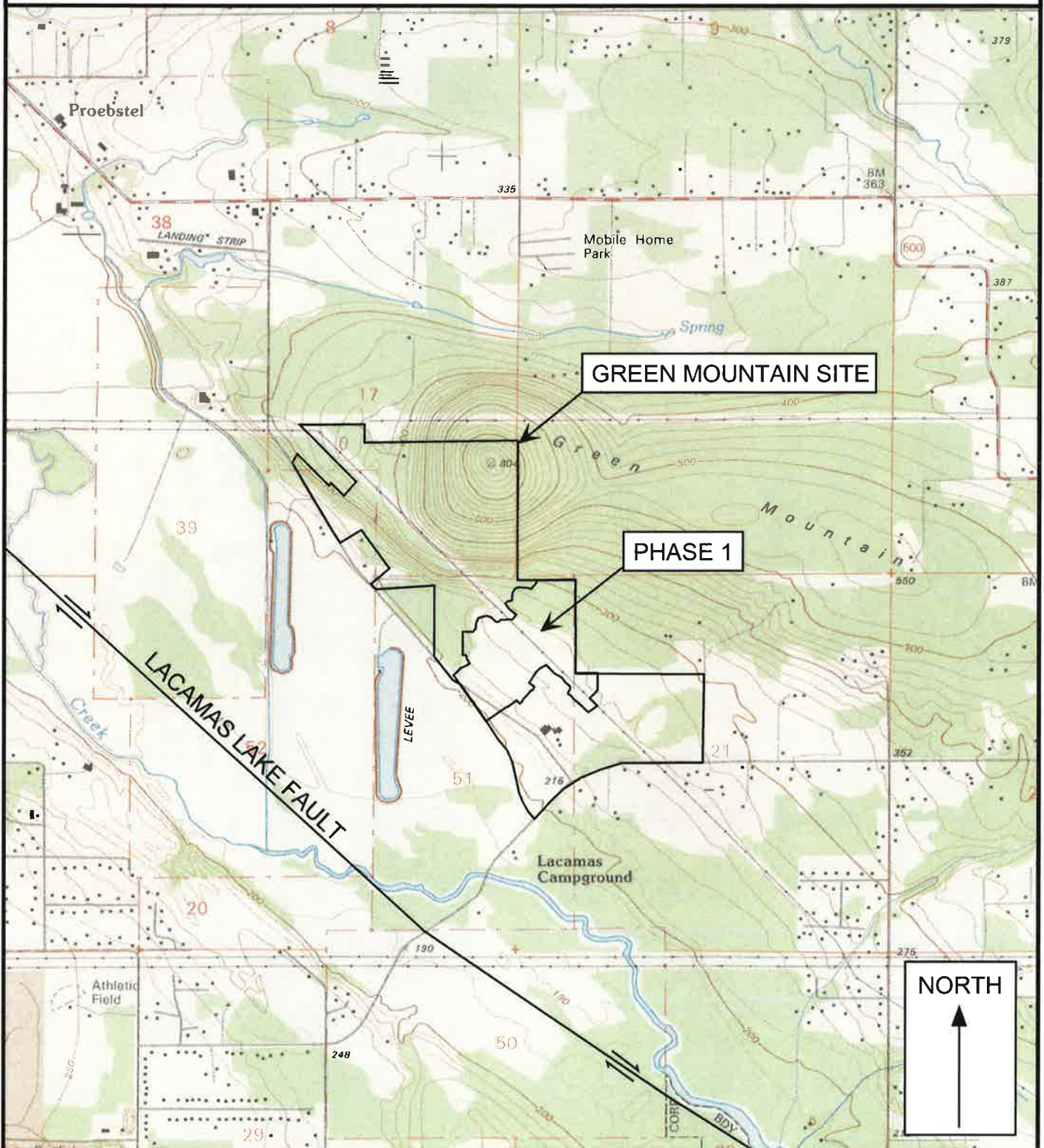
Test Pit Logs from Previous Study – TP-1 (2013), TP-10 (2013), TP-13 (2013),
TP-15 (2013) & TP-16 (2013)

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Legend

Approximate Scale 1 in = 2,000 ft

Date: 11/25/2014

Drawn by: EKR

Base map: U.S. Geological Survey 7.5 minute Topographic Map Series, Lacamas Creek, Washington Quadrangle, 1990.

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Camas, Washington

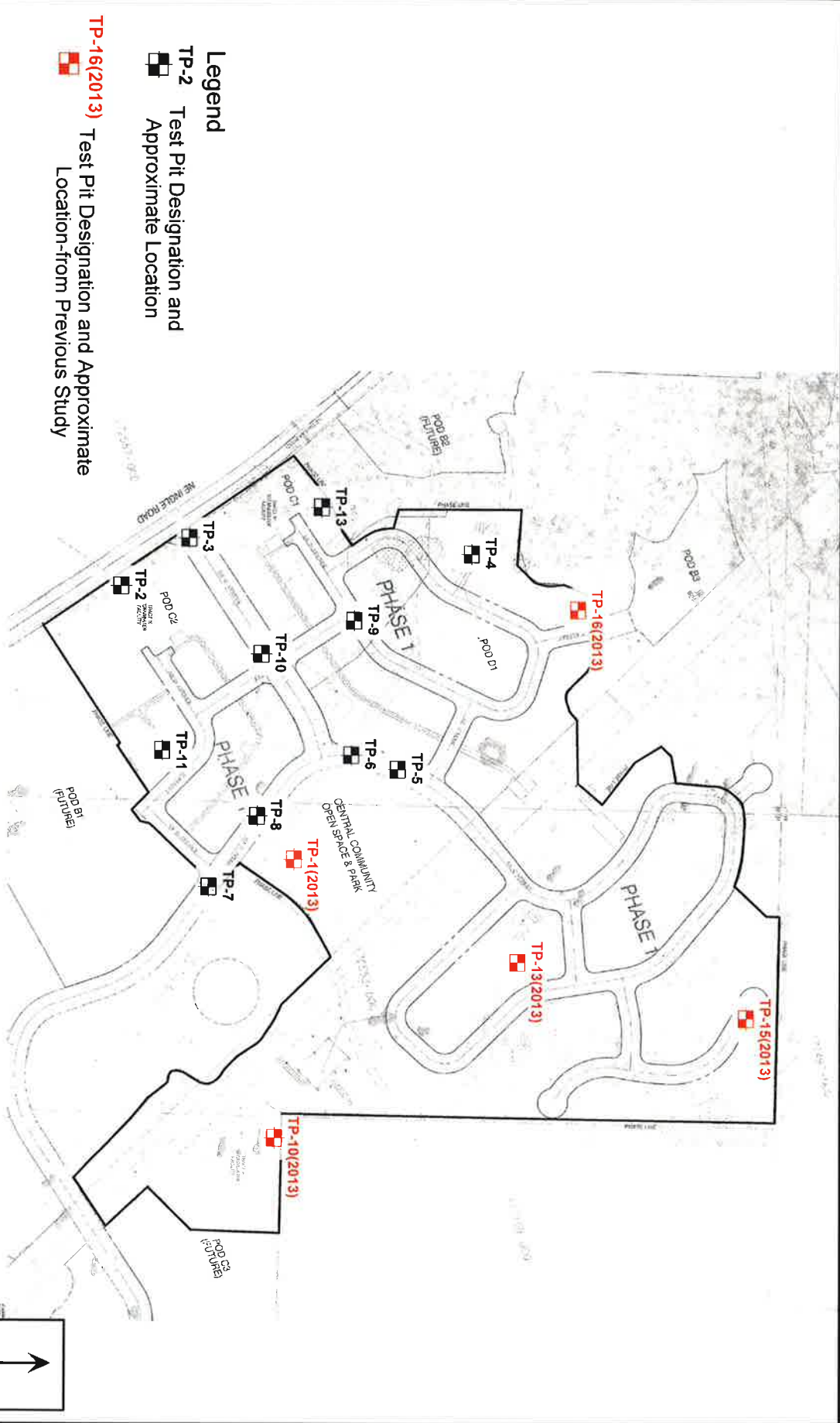
Project No. 13-3186

FIGURE 1



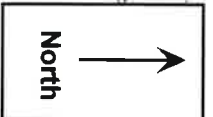
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SITE PLAN AND EXPLORATION LOCATIONS



0 400'
APPROXIMATE SCALE 1"=400'

Base map provided by Olson Engineering Dated November 2014.







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TEST PIT LOG

Project: Green Mountain Phase 1
Camas, Washington

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Test Pit No. **TP-2**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	3.0					Stiff to very stiff, SILT (ML), trace sand, brown, moderately organic, trace roots throughout, 6 inch topsoil developed at surface, strong orange and gray mottling, trace black staining, moist (Fill)
2	1.5					
3	4.5					Stiff to very stiff, clayey SILT (ML), trace sand, brown, micaceous, subtle orange and gray mottling, trace black staining, moist (Fine Grained Catastrophic Flood Deposits)
4	3.5					
5						
6						
7						Dense, subrounded GRAVEL (GM), trace clayey silt matrix, trace sand, brown to gray, trace black staining, partially cemented, strong orange and gray mottling, gravel is up to 9 inches in diameter, well graded, moist to wet (Conglomerate)
8						
9						Test Pit Terminated at 8.5 Feet.
10						Note: Groundwater seepage encountered at 7 - 8 feet. Discharge visually estimated at 1/2 gallon per minute.
11						
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/23/2014

Logged By: B. Rapp

Surface Elevation:



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TEST PIT LOG

Project: Green Mountain Phase 1
Camas, Washington

Project No. 13-3186

Test Pit No. **TP-3**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	4.5					Stiff to very stiff, SILT (ML), trace subrounded gravel, brown, with inorganic debris (asphalt), trace roots throughout, 6 inch thick topsoil developed at surface, strong orange and gray mottling, trace black staining, moist (Fill)
2	4.5					
3	4.5					
4	3.5					Stiff to very stiff, sandy SILT (ML), trace subrounded gravel, brown, micaceous, subtle to strong orange and gray mottling, trace black staining, moist (Conglomerate)
5						
6						
7						Dense, subrounded GRAVEL (GM), trace clayey silt matrix, trace sand, brown to gray, trace black staining, partially cemented, strong orange and gray mottling, gravel is up to 9 inches in diameter, well graded, moist to wet (Conglomerate)
8						
9						
10						Test Pit Terminated at 8.5 Feet. Note: No seepage or groundwater encountered.
11						
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/23/2014

Logged By: B. Rapp

Surface Elevation:



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TEST PIT LOG

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Camas, Washington

Project No. 13-3186

Test Pit No. **TP-4**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	4.5					Stiff to very stiff, sandy SILT (ML), trace subrounded gravel, gray, trace organic debris, trace roots throughout, 6 inch thick topsoil developed at surface, subtle to strong orange and gray mottling, trace black staining, moist (Fill)
2	4.0					
3	3.5					Stiff to very stiff, sandy SILT (ML), light brown, micaceous, strong orange and gray mottling, trace black staining, moist (Fine Grained Catastrophic Flood Deposits)
4	3.0					
5						
6						
7						
8						Test Pit Terminated at 8 Feet. Note: No seepage or groundwater encountered.
9						
10						
11						
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/23/2014

Logged By: B. Rapp

Surface Elevation:




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TEST PIT LOG

Project: Green Mountain Phase 1
Camas, Washington

Project No. 13-3186

Test Pit No. **TP-5**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	4.5					Low to moderately organic, SILT (OL-ML), dark brown, fine roots throughout, loose, moist (Topsoil)
2	2.0					
3	2.5					Stiff to very stiff, sandy SILT (ML), light brown, micaceous, subtle to strong orange and gray mottling, trace black staining, moist (Fine Grained Catastrophic Flood Deposits)
4	2.5					
5						
6						
7						Medium dense to dense, silty SAND (SM), brown to blue gray below 8.5 feet, subtle to strong orange and gray mottling, sand is fine to medium grained, partially lithified, trace black staining, moist (Conglomerate)
8						
9						Test Pit Terminated at 9 Feet.
10						
11						Note: Groundwater seepage encountered at 7.5 feet. Discharge visually estimated at 1/4 gallon per minute.
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/23/2014

Logged By: B. Rapp

Surface Elevation:




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TEST PIT LOG

Project: Green Mountain Phase 1
Camas, Washington

Project No. 13-3186

Test Pit No. **TP-6**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	2.5					Low organic, SILT (OL-ML), dark brown, roots throughout, loose, moist (Topsoil)
2	4.5					
3	3.5					Stiff to very stiff, sandy SILT (ML), light brown, micaceous, subtle to strong orange and gray mottling, trace black staining, moist (Fine Grained Catastrophic Flood Deposits)
4	4.0					
5						
6						
7						Medium dense to dense, silty SAND (SM), trace subrounded gravel, brown, strong orange and gray mottling, sand is fine to medium grained, partially lithified, trace black staining, moist (Conglomerate)
8						
9						Test Pit Terminated at 8.5 Feet.
10						Note: Groundwater seepage encountered at 4.5 feet. Discharge visually estimated at 1/4 gallon per minute.
11						
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/23/2014
Logged By: B. Rapp
Surface Elevation:





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TEST PIT LOG

Project: Green Mountain Phase 1
Camas, Washington

Project No. 13-3186

Test Pit No. **TP-7**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	4.0					Stiff to very stiff, sandy SILT (ML), trace subrounded gravel, light brown, trace roots throughout, 6 inch thick topsoil developed at surface, strong orange and gray mottling, trace black staining, moist (Fill)
2	4.0					
3	2.0					
4	2.5					Stiff to very stiff, sandy SILT (ML), light brown, micaceous, strong orange and gray mottling, trace black staining, moist (Fine Grained Catastrophic Flood Deposits)
5						
6						
7						
8						
9						Test Pit Terminated at 8.5 Feet.
10						Note: Groundwater seepage encountered at 5.5 - 6.5 feet. Discharge visually estimated at 1/4 gallon per minute.
11						
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/23/2014

Logged By: B. Rapp

Surface Elevation:






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Camas, Washington

Project No. 13-3186

Test Pit No. **TP-8**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	2.0					Stiff to very stiff, sandy SILT (ML), light brown, trace roots throughout, 6 inch thick topsoil developed at surface, strong orange and gray mottling, moist (Fill)
2	2.5					Low organic, SILT (OL-ML), gray, trace fine roots throughout, loose, moist (Buried Topsoil)
3	2.0					
4	1.5					Stiff to very stiff, sandy SILT (ML), light brown, micaceous, strong orange and gray mottling, trace black staining, moist (Fine Grained Catastrophic Flood Deposits)
5						
6						
7						
8						
9						Test Pit Terminated at 8.5 Feet.
10						Note: Groundwater seepage encountered at 5.5 - 7.5 feet. Discharge visually estimated at 1/2 gallon per minute.
11						
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/23/2014

Logged By: B. Rapp

Surface Elevation:




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TEST PIT LOG

Project: Green Mountain Phase 1
Camas, Washington

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Test Pit No. **TP-9**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	4.0					Moderately organic, SILT (OL-ML), trace gravel fill, dark brown, fine roots throughout, loose, moist (Topsoil)
2	3.5					
3	4.5					Stiff to very stiff, clayey SILT (ML), trace sand, brown, micaceous, subtle orange and gray mottling, trace roots to 3 feet, trace black staining, moist (Fine Grained Catastrophic Flood Deposits)
4	4.5					
5						
6						
7						
8						Dense, subrounded GRAVEL (GM), trace clayey silt matrix, trace sand, brown to gray, trace black staining, partially cemented, strong orange and gray mottling, moist to wet (Conglomerate)
9						Test Pit Terminated at 8.5 Feet.
10						
11						Note: Groundwater seepage encountered at 7.5 feet. Discharge visually estimated at 1/4 gallon per minute.
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/23/2014

Logged By: B. Rapp

Surface Elevation:



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Camas, Washington

Project No. 13-3186

Test Pit No. **TP-10**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	4.0					Stiff to very stiff, SILT (ML), trace sand, brown, trace inorganic debris, trace roots throughout, 6 inch topsoil developed at surface, strong orange and gray mottling, moist (Fill)
2	4.0					
3	4.5					Stiff to very stiff, sandy SILT (ML), trace clay, light brown, micaceous, subtle to strong orange and gray mottling, trace black staining, moist (Fine Grained Catastrophic Flood Deposits)
4	4.5					
5						
6						
7						Dense to very dense, subrounded GRAVEL (GM), trace clayey silt matrix, trace sand, brown to gray, trace black staining, partially cemented, strong orange and gray mottling, gravel is up to 6 inches in diameter, well graded, moist (Conglomerate)
8						
9						Test Pit Terminated at 8.5 Feet.
10						Note: No seepage or groundwater encountered.
11						
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/23/2014

Logged By: B. Rapp

Surface Elevation:



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TEST PIT LOG

Project: Green Mountain Phase 1
Camas, Washington

Project No. 13-3186

Test Pit No. **TP-11**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	2.5					Stiff to very stiff, sandy SILT (ML), trace gravel, light brown, trace fine roots throughout, 6 inch thick topsoil developed at surface, moist (Fill)
2	4.5					Low to moderately organic, SILT (OL-ML), brown, trace fine roots throughout, moist (Buried Topsoil)
3	3.5					
4	3.0					Stiff to very stiff, sandy SILT (ML), light brown, subtle to strong orange and gray mottling, moist (Fill)
5						Test Pit Terminated at 5 Feet due to Buried Water Line Tape.
6						
7						Note: No groundwater or seepage encountered.
8						
9						
10						
11						
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/23/2014
Logged By: B. Rapp
Surface Elevation:




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TEST PIT LOG

Project: Green Mountain Phase 1
Camas, Washington

Project No. 13-3186

Test Pit No. **TP-13**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	1.5					Stiff, sandy SILT (ML), trace clay, light brown, trace roots throughout, 6 inch thick topsoil developed at surface, strong orange and gray mottling, moist (Fill)
2	2.0					
3	2.5					
4	4.0					Stiff to very stiff, sandy SILT (ML), light brown, micaceous, strong orange and gray mottling, trace black staining, moist (Fine Grained Catastrophic Flood Deposits)
5						
6						
7						Dense to very dense, subrounded GRAVEL (GM), trace silty sand matrix, brown to gray, trace black staining, strong orange and gray mottling, gravel is up to 12 inches in diameter, moist (Conglomerate)
8						
9						Test Pit Terminated at 8.5 Feet.
10						Note: Groundwater seepage encountered at 8.5 feet. Discharge visually estimated at 1/4 gallon per minute.
11						
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/23/2014

Logged By: B. Rapp

Surface Elevation:





14835 SW 72nd Avenue
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Green Mountain
Camas, Washington

Project No. 13-3186

Test Pit No. **TP-1**
(2013)

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	0.5					Moderately organic, sandy SILT (OL-ML), dark brown, roots throughout, loose, moist (Topsoil)
2	1.0					Medium stiff, sandy SILT (ML), brown, micaceous, strong orange and gray mottling, moist to wet (Fine Grained Catastrophic Flood Deposits)
3	1.0					
4	0.5					Test Pit Terminated at 4 Feet for Infiltration Testing. Note: Groundwater seepage encountered at 3 feet. Discharge visually estimated at less than 1 gallon per minute. Static groundwater at 2 Feet at Completion of Infiltration Testing.
5						
6						
7						
8						
9						
10						
11						
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 11/5-7/2013

Logged By: B. Rapp

Surface Elevation:



14835 SW 72nd Avenue
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Green Mountain
Camas, Washington

Project No. 13-3186

Test Pit No. **TP-10**
(2013)

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	2.0					Moderately organic, SILT (OL-ML), dark brown, fine roots throughout, loose, moist (Topsoil)
2	2.0					Stiff to very stiff, sandy SILT (ML), trace clay, light brown, micaceous, strong orange and gray mottling, trace black staining, moist (Fine Grained Catastrophic Flood Deposits)
3	1.5					
4	3.5					
5						Dense, subrounded GRAVEL (GM), trace sandy silt matrix, light brown to gray, trace black staining, strong orange and gray mottling, micaceous, moist (Conglomerate)
6						
7						Test Pit Terminated at 6 Feet.
8						Note: No seepage or groundwater encountered.
9						
10						
11						
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 11/5-7/2013

Logged By: B. Rapp

Surface Elevation:




14835 SW 72nd Avenue
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Green Mountain Phase 1
Camas, Washington

Project No. 13-3186

Test Pit No. **TP-13**
(2013)

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1						Moderately organic, SILT (OL-ML), brown, fine roots throughout, loose, moist (Topsoil)
2	1.5					Medium stiff to very stiff, sandy SILT (ML), trace clay, light brown, micaceous, strong orange and gray mottling, trace black staining, moist (Fine Grained Catastrophic Flood Deposits)
3	3.0					
4						
5						Dense, subrounded GRAVEL (GM), trace sandy silt matrix, trace clay, light brown to gray, trace black staining, well graded, strong orange and gray mottling, micaceous, moist (Conglomerate)
6						
7						
8						
9						Test Pit Terminated at 9 Feet.
10						
11						Note: Groundwater seepage encountered at 8 feet. Discharge visually estimated at 1 gallon per minute.
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 11/5-7/2013

Logged By: B. Rapp

Surface Elevation:




14835 SW 72nd Avenue
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Green Mountain Phase 1
Camas, Washington

Project No. 13-3186

Test Pit No. **TP-15**
(2013)

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	1.5					Moderately organic, SILT (OL-ML), with basalt fragments, dark brown, fine roots throughout, loose, moist (Topsoil)
2	3.5					Stiff to very stiff, silty CLAY (CL) to clayey SILT (ML), with gray weathered basalt, light reddish-brown, trace fine roots throughout, strong orange and gray mottling, black staining, moist (Colluvial Soil)
3						
4						
5						
6						Medium dense, silty SAND (SM) with interbeds of stiff, sandy SILT (ML), light brown, micaceous, sand is fine to medium grained, strong orange and gray mottling, trace black staining, moist (Conglomerate)
7						
8						
9						
10						
11						Test Pit Terminated at 10.5 Feet.
12						Note: Groundwater seepage encountered at 2 feet. Discharge visually estimated at 1 gallon per minute.

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 11/5-7/2013

Logged By: B. Rapp

Surface Elevation:



14835 SW 72nd Avenue
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Green Mountain
Camas, Washington

Project No. 13-3186

Test Pit No. **TP-16**
(2013)

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	0.5					Moderately organic, SILT (OL-ML), dark brown, fine roots throughout, loose, moist (Topsoil)
2	2.0					
3	3.5					
4	2.0					Medium dense, silty SAND (SM) with interbeds of stiff, sandy SILT (ML), light brown to gray, micaceous, sand is coarse to medium grained, strong orange and gray mottling, trace black staining, moist to wet (Conglomerate)
5						
6						
7						
8						
9						
10						Test Pit Terminated at 9 Feet.
11						Note: Groundwater seepage encountered at 3.5 to 6.5 feet. Discharge visually estimated at 2 gallons per minute.
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 11/5-7/2013

Logged By: B. Rapp

Surface Elevation:



Critical Areas Report
for
Green Mountain PRD Phase 2
City of Camas, Washington


Prepared for:
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October 5 2016

SIGNATURES

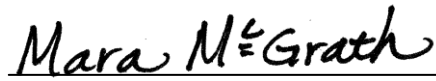
The information in this report was prepared under the supervision and direction of the undersigned:



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Appendix A

Wetland Determination Data Forms

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INTRODUCTION

This critical areas report has been prepared by Ecological Land Services, Inc. (ELS) on behalf of CLB Washington Options Solutions, LLC for Phase 2 of the Green Mountain Planned Residential Development into single-family residential lots with park, trails, and open space (PRD, City File No. SUB14-02). This approximately 85-acre site is located at 2817 NE Ingle Road in the City of Camas, Clark County, Washington. Parcels involved with this report include portions of Clark County Parcel Numbers 173178000, 986037307, 172555000, and 172557000. The study area falls within portions of Sections 17, 20, and 21, Township 2 North, Range 3 East of the Willamette Meridian (Figure 1). This report summarizes the findings of critical areas onsite in accordance with the *City of Camas Municipal Code (CMC) Wetlands Chapter 16.53, Fish and Wildlife Habitat Conservation Areas Chapter 16.61, and Sensitive Areas and Open Space Chapter 18.31*.

METHODOLOGY

ELS methodology follows the U.S. Army Corps of Engineers Routine Determination Method described in the Wetland Delineation Manual (Environmental Laboratory 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0) (U.S. Army Corps of Engineers 2010). For regulatory purposes under the Clean Water Act (Section 404), the Environmental Protection Agency (EPA) defines wetlands as “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (EPA 2014). Wetlands are regulated as “Waters of the United States” by the U.S. Army Corps of Engineers (Corps), as “Waters of the State” by the Washington Department of Ecology (Ecology), and locally by the City of Camas.

ELS biologists conducted site visits on February 29, 2016 and March 1, 2016 to collect vegetation, soils, and hydrology data, and to make determinations about the presence or absence of critical areas onsite. We identified and delineated seven wetlands onsite, identified in this report as Wetlands B, D, G, J, L, M, and O (Figure 2). The letters A, C, E, F, H, I, K, and N were omitted from the numbering scheme. ELS biologists flagged wetland boundaries with consecutively numbered pin flagging or tape flagging labeled “WETLAND BOUNDARY”. Vegetation, hydrology, and soil data were collected from thirteen test plots to determine presence or absence of positive wetland indicators (Appendix A). Topographical changes were also utilized to assist wetland boundary delineation. Wetland boundary lines and test plot locations were recorded by ELS using a hand-held Trimble GPS unit capable of sub-meter accuracy.

SITE DESCRIPTION

The majority of the study area is located north of NE Goodwin Road, south of NE 48th Circle (on the southwest slope of Green Mountain), and east of NE Ingles Road (Figures 1 and 2). The former Green Mountain Golf Course, which closed in February 2016, encompasses a large portion of the PRD. The northwestern corner of the PRD is an undeveloped mixed deciduous-coniferous forest. Topography slopes generally to the south and southwest, with the lowest topographical location being in the southernmost corner of the site. Maintained drainage ditches and 4 man-made ponds are located throughout the former golf course (3 ponds have been filled during Phase 1 of construction). Surrounding land use includes residential and forest coverage to the north and east, and mixed residential and agricultural uses to the south and west. Approximately 65 Oregon white oak trees were inventoried within the PRD Phase 2 boundaries, outside of the Phase 1 development. Most of the Oregon white oak trees within Phase 2 are located within the riparian corridor.

SOILS

The National Resources Conservation Service map depicts six soil units onsite (Table 1): Cove silty clay loam, 0 to 3 percent slopes (CvA), Dollar loam, 0 to 5 percent slopes (DoB), Lauren gravelly loam, 0 to 8 percent slopes (LgB), McBee silt loam, coarse variant, 0 to 3 percent slopes (MIA), and Olympic stony clay loams, 3 to 30 and 30 to 60 percent slopes (OmE and OmF, respectively) (NRCA 2014; Figure 3).

Cove silty clay loam (CvA) is characterized as a very poorly drained soil with a very low capacity for the most limiting layer to transmit water, and an average depth to water table ranging from 0 to 12 inches below ground surface (BGS). This soil is generally formed on flood plains and a typical profile includes silty clay loam from 0 to 4 inches, clay from 4 to 36 inches, and gravelly silty clay loam from 36 to 60 inches BGS. Cove silty clay loam is in Hydrologic Group D¹. Soils in Group D have high run-off potential when thoroughly wet and subsurface water movement ranges from restricted to very restricted. Cove silty clay loam is included on the National Hydric Soils List (NRCS 2015).

Dollar loam (DoB) is characterized as a moderately well drained soil with a very low to moderately low capacity of the most limiting layer to transmit water, and an average depth to water table of 18 to 30 inches BGS. This soil is generally found on terraces and is formed from alluvium. A typical profile includes loam from 0 to 60 inches BGS. Dollar

¹ Hydrologic Group D: soils with high runoff potential when thoroughly wet and water movement through the soil is restricted or very restricted. Group D soils typically have greater than 40 percent clay, less than 50 percent sand, and have clayey textures. In some areas they also have shrink-swell potential. All soils with a depth to a water-permeable layer that is less than 20 inches and all soils with a water table within 24 inches from the surface are in this group, although some have dual classifications if they can be adequately drained.

loam is in Hydrologic Group C². Soils in Group C have a moderately high runoff potential when thoroughly wet; subsurface transmission is somewhat restricted. Dollar loam is not on the National Hydric Soils List (NRCS 2015).

Lauren gravelly loam (LgB) is characterized as a somewhat excessively drained soil with a moderately high to high capacity of the most limiting layer to transmit water, and an average depth to water table of more than 80 inches BGS. This soil is generally found on terraces and is formed from alluvium with volcanic ash. A typical profile consists of gravelly medial loam from 0 to 6 inches, very gravelly medial loam from 6 to 33 inches, very gravelly coarse sandy loam from 33 to 44 inches, and very gravelly loamy coarse sand from 44 to 60 inches BGS. Lauren gravelly loam is in Hydrologic Group B³. Soils in Group B have a moderately low runoff potential when thoroughly wet, subsurface transmission is unimpeded. Lauren gravelly loam is not on the National Hydric Soils List (NRCS 2015).

McBee silt loam, coarse variant (MIA), is characterized as a somewhat poorly drained soil with a moderately high to high capacity of the most limiting layer to transmit water, and an average depth to water table of about 0 inches BGS. This soil is generally found in depressions and drainageways, and is formed from alluvium. A typical profile consists of silt loam from 0 to 4 inches, loam from 11 to 19 inches, gravelly fine sandy loam from 19 to 44 inches, and very gravelly loamy sand from 44 to 62 inches BGS. McBee silt loam, coarse variant, is in both Hydrologic Group B and C. McBee silt loam is listed as hydric on the National Hydric Soils List (NRCS 2015).

Olympic stony clay loams (OmE and OmF) are characterized as well drained soils with a moderately high capacity for the most limiting layer to transmit water, and an average depth to water table of more than 80 inches BGS. These soils are generally found on mountain slopes, and are formed from residuum and colluvium from igneous rock. Typical profiles include stony clay loam from 0 to 13 inches, clay loam from 13 to 44 inches, and gravelly clay loam from 44 to 60 inches BGS. Olympic stony clay loams are in Hydrologic Group C, and are not included on the National Hydric Soils List (NRCS 2015).

² Hydrologic Group C: soils with moderately high runoff potential when thoroughly wet and water transmission through the soil is somewhat restricted. Group C soils typically have between 20 percent and 40 percent clay, and less than 50 percent sand. Some soils having clay, silty clay, or sandy clay textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments.

³ Hydrologic Group B: soils with moderately low runoff potential when thoroughly wet and water transmission through the soil is unimpeded. Group B soils typically have between 10 percent and 20 percent clay and 50 percent to 90 percent sand, and have loamy sand or sandy loam textures. Some soils having loam, silt loam, silt, or sandy clay loam textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments.

Soil Type Distribution Onsite

NRCS maps depict hydric soils CvA and MIA in the southern and central portions of the site where topography forms natural concavities and, consequently, a number of the wetland areas were observed (Figure 3). Non-hydric soils DoB, and OmF are the dominant soil types and are depicted within the northern and central portions of the site. Some wetlands were delineated within non-hydric soils, and likely exist in these areas due to human activities and topography, leading to surface ponding.

Evaluated wetland soils consisted of silty clay loams, clay loams, and silty sand with very dark grayish brown (10YR 3/2), very dark gray (10YR 3/1), and depleted gray (10YR 4/1 and 5/1) hues (Appendix A). Redoximorphic concentrations observed in wetland areas consisted of yellowish browns (10YR 4/6, 5/6, and 5/8), grayish brown (10YR 5/2), yellowish red (5YR 4/6, 5/6 and 5/8), reddish gray (10YR 5/2), and strong browns (7.5YR 4/4, 4/6, and 5/6). The soil profiles meet the criteria for hydric soil indicators A11 (depleted below dark surface), F3 (depleted matrix), and F6 (redox dark surface).

Evaluated upland soils included silty clay loams, gravelly clay loams, and silt loams with brown (10YR 3/3), lighter grayish brown (10YR 5/2, 4/3 and 4/2), and dark yellowish brown (10YR 4/4 and 4/6) hues (Appendix A). Redoximorphic concentrations were observed in select upland test plots; however, they were too faint, deep, or not thick enough in the soil profile to meet hydric soil indicators.

Table 1. Summary of NRCS Soil Survey Data

Soil Series	Unit Symbol	Percent Slope	Hydrologic Soil Group	Drainage Class	Hydric Soil
Cove silty clay loam	CvA	0 to 3	D	Very poorly drained	Yes
Dollar loam	DoB	0 to 5	C	Moderately well drained	No
Lauren gravelly loam	LgB	0 to 8	B	Somewhat excessively drained	No
McBee silt loam	MIA	0 to 3	B/D	Somewhat poorly drained	Yes
Olympic stony clay loam	OmE	3 to 30	C	Well drained	No
Olympic stony clay loam	OmF	30 to 60	C	Well drained	No

ELS biologists' soil observations generally matched NRCS mapped soil series; however, the majority of the wetlands onsite were delineated in areas where non-hydric soils were mapped, and conversely uplands were located in areas where hydric soils were mapped.

NRCS soil series data and mapping practices are based on general, regional soil characteristics and may not accurately display variations in the local soil conditions. The presence or absence of hydric soil does not conclude an area as wetland or upland. Along with hydric soils, hydrology and wetland vegetation must also be present to

determine an area as jurisdictional wetland. Due to localized, micro-variations in topography and hydrology, wetlands may be found in areas where hydric soils have not been mapped by the soil survey.

VEGETATION

Plant species are recorded on the attached wetland delineation data sheets (Appendix A). The indicator categories following the common and scientific names indicate the likelihood of a species to be found in wetlands. Listed from most-likely to least-likely to be found in wetlands, the indicator categories are:

- **OBL** (obligate wetland) – Almost always occur in wetlands.
- **FACW** (facultative wetland) – Usually occur in wetlands, but may occur in non-wetlands.
- **FAC** (facultative) – Occur in wetlands and non-wetlands.
- **FACU** (facultative upland) – Usually occur in non-wetlands, but may occur in wetlands.
- **UPL** (obligate upland) – Almost never occur in wetlands.
- **NI** (no indicator) – Status not yet determined.

The wetlands onsite have diverse strata from emergent, to scrub-shrub, to forested. Dominant wetland vegetation included Oregon white oak (*Quercus garryana*, FACU), Oregon ash (*Fraxinus latifolia*, FACW), Sitka willow (*Salix sitchensis*, FACW), nootka rose (*Rosa nutkana*, FAC), peafruit rose (*Rosa pisocarpa*, FAC), salmonberry (*Rubus spectabilis*, FAC), spiraea (*Spiraea douglasii*, FACW), and pacific ninebark (*Physocarpus capitatus*, FACW) in the tree and shrub layers. Broadleaf cattail (*Typha latifolia*, OBL), water parsley (*Oenanthe sarmentosa*, OBL), reed canarygrass (*Phalaris arundinacea*, FACW), soft rush (*Juncus effusus*, FACW), slough sedge (*Carex obnupta*, OBL), and sawbeak sedge (*Carex stipata*, OBL) were common in the herbaceous stratum.

The uplands are dominated by a former golf course in the central and southern portion of the study area and mixed coniferous-deciduous forest in the northern, non-developed portions of the study area. The former golf course is planted with non-native grasses and has widely spaced deciduous trees, namely bigleaf maple (*Acer macrophyllum*, FACU), Oregon ash, and Oregon white oak. The mixed coniferous-deciduous forest is dominated by upland trees and shrubs including Douglas-fir (*Pseudotsuga menziesii*, FACU), Oregon white oak, western red-cedar (*Thuja plicata*, FAC), and bigleaf maple.

Riparian corridors are dominated by upland trees and shrubs including black cottonwood (*Populus trichocarpa*, FAC), beaked hazelnut (*Corylus cornuta*, FACU), red huckleberry (*Vaccinium parvifolium*, FACU), vine maple (*Acer circinatum*, FAC), snowberry (*Symphoricarpos albus*, FACU), and salal (*Gaultheria shallon*, FACU).

Dominant upland herbaceous plants along the edges of the former golf course and riparian corridors included sword fern (*Polystichum munitum*, FACU), reed canarygrass, bluegrass spp. (*Poa* spp., FAC), red fescue (*Festuca rubra*, FAC), tall fescue (*Schedonorus arundinaceus* FAC), bull thistle (*Cirsium vulgare*, FACU), fringed cup (*Tellima grandiflora*, FACU), trailing blackberry (*Rubus ursinus*, FACU), and Himalayan blackberry (*Rubus armeniacus*, FAC).

HYDROLOGY

Site topography is elevated to the north centrally, near the summit of Green Mountain, directing drainage patterns to the northwest, west, and south. Wetlands B, D, G, J, K, L, and M receive hydrology from seasonally high groundwater tables, precipitation, and surface runoff from surrounding uplands. Hydrology within Wetland B mainly infiltrates, as no surface outlet was observed during the time of the site visit. Wetland D receives additional hydrology from a man-made ditch, located east of the wetland, and has a ditch outlet in which water drains during times of high precipitation. During times of regular rainfall, water infiltrates within Wetland D. Wetland G has a series of existing ditches throughout, conveying hydrology out of the wetland to the west. Hydrology within Wetland J mainly infiltrates, however no surface ponding was observed during the time of the site visit. Hydrology within Wetland L is conveyed to the north to the Type Np stream, Stream A. Wetland M hydrology is conveyed offsite within a manmade ditch. Wetland O receives the majority of its hydrology from water seeping from an onsite man-made pond, and outlets to a mapped Type Ns stream directly to the southwest.

Wetland hydrology indicators included shallow water table (within 12 inches of the soil surface), soil saturation (within 12 inches of the soil surface), surface inundation, geomorphic position, passing the FAC-neutral test, and oxidized rhizospheres among living roots. Indicators of wetland hydrology present during the site visit are recorded on the attached wetland determination data forms (Appendix A).

NATIONAL & LOCAL WETLANDS INVENTORY

National Wetland Inventory (NWI) does not map the presence of any wetlands onsite. One palustrine, emergent, temporary flooded (PEMA) wetland is mapped approximately 1,000 feet to the south of the southern edge of the study area (USFWS 2013; Figure 4). Clark County's local wetland inventory (LWI) maps wetlands in approximately the same location as the ELS-delineated Wetland B (eastern portion) and Wetland D. LWI also maps wetlands which correspond with two of the onsite man-made ponds (Figure 5). ELS findings are somewhat similar to the general landscape position of local inventory wetlands mapped onsite, although we identified additional wetlands within the study area.

Wetland maps such as NWI and LWI maps should be used with discretion as they are typically used to gather wetland information about a region and, because of the large scale necessary for regional mapping, are limited in accuracy for localized analyses.

CRITICAL AREAS DISCUSSION

Wetland Categorization

The wetland ratings are according to the *Washington State Wetlands Rating System for Western Washington, Revised* (Rating System) (Hruby 2014; Figure 2; Appendix B). Wetlands B, D, G, and O ratings are according to the *Washington State Wetlands Rating System for Western Washington, Revised* (Hruby 2004; Appendix C). A discussion pertaining to the reasoning behind utilizing the 2004 Rating System for Wetlands B, D, G, and O is contained within the section titled “*Vested Wetlands*.” See Table 2 for a summary of wetlands onsite.

Wetland B

Wetland B is a 4.48-acre onsite, Category III, forested and scrub-shrub, slope wetland, which lies in the central western portion of the study area, and extends outside of the study area to the west. Wetland B scored moderate for habitat functions (21 points), low for hydrologic functions (5 points), and low improving water quality (14 points).

Wetland D

Wetland D is a 0.99-acre Category III, forested, scrub-shrub, and emergent, depressional wetland, which lies in the central portion of the study area. Wetland D scored low for habitat functions (18 points), hydrologic functions (8 points), and improving water quality (14 points).

Wetland G

Wetland G is a 1.94-acre, Category III, scrub-shrub and emergent, slope wetland, which lies in the central portion of the study area. Wetland G contains areas of upland hummocks, with existing ditches located in the northwestern and northeastern portions of the wetland. Wetland G scored low for habitat functions (16 points), hydrologic functions (5 points), and for improving water quality (14 points). A historic retaining/farm pond is located directly south of Wetland G, which was constructed between 1990 and 2002 (Figure D-1; Appendix D). No wetland signature was visible in historical imagery prior to pond construction.

Wetland J

Wetland J is a 0.61-acre, Category III, scrub-shrub and emergent, slope wetland, which lies in the south-central portion of the study area. Water leaves the wetland without being impounded, and no surface ponding was present or evidence of previous ponding. Wetland J scored moderate for habitat functions (6 points), moderate for hydrologic functions (5 points), and moderate for improving water quality (6 points).

Wetland L

Wetland L is a 0.07-acre, Category III, scrub-shrub and emergent, slope wetland, which lies in the easternmost portion of the study area and outlets to Type Np stream (Stream A) via an underground culvert. Wetland L scored moderate for habitat functions (5 points), moderate for hydrologic functions (5 points), and moderate for improving water quality (6 points).

Wetland M

Wetland M is a 0.07-acre, Category III, forested and scrub-shrub, slope wetland, which lies in the central western portion of the study area. Wetland M scored moderate for habitat functions (6 points), moderate for hydrologic functions (5 points), and moderate for improving water quality (5 points).

Wetland O

Wetland O is a 0.02-acre, Category IV, scrub-shrub and emergent, slope wetland, which lies in the south-central portion of the study area. The wetland outlets to a Type Ns stream (Stream B). Wetland O scored low for habitat functions (13 points), hydrologic functions (1 points), and for improving water quality (12 points).

Exempt Wetlands

CMC 16.53.010(C)(2)(b) states that wetlands created from nonwetland sites, including but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, stormwater facilities, farm ponds, and landscape amenities, are considered artificial wetlands. Wetlands considered artificial according to *CMC* shall be exempt from the provisions of *CMC Chapter 16.53 Wetlands*, provided that they are otherwise consistent with the provisions of other local, state, and federal laws and requirements.

Located south of Wetland G is a small, historic farm pond which was created from an upland site sometime between 1990 and 2002 (Figure D-1; Appendix D). As the historic farm pond south of Wetland G was man-made from uplands, it shall be considered exempt from City of Camas regulation and, therefore, no buffers are required.

Wetland Buffer Requirements

CMC 16.53.040 uses the following three parameters in determining wetland buffer widths for wetlands:

- 1) Wetland categorization per the Rating System
- 2) Habitat score from the Rating System
- 3) Proposed land use intensity

Category III wetlands with proposed high land use intensity and habitat scores greater than 5 according to the Rating System, are required to have buffers as designated in *CMC Table 16.53.040-3*. Category III wetlands with habitat scores equal to or less than

four according to the Rating System, are required to have buffers as designated in *CMC Table 16.53.040-1*. Wetland buffers are summarized in Table 2.

Table 2. Summary of Wetlands Onsite

Wetland Name (size)	Cowardin Classification ¹ /HGM	State/Local Classification ²	Habitat Score ²	Proposed Land Use Intensity ³	Standard Buffer Width ⁴ (feet)
Wetland B (4.48 acres onsite)	FO, SS, EM/slope	Category III ⁷	21	High	80 ⁵
Wetland D (0.99 acres)	SS & EM/depressional	Category III ⁷	18	High	80 ⁵
Wetland G (1.94 acres)	SS & EM/slope	Category III ⁷	16	High	80 ⁵
Wetland J (0.61 acres)	SS & EM/slope	Category III	6	High	135
Wetland L (0.07 acres)	SS & EM/slope	Category III	5	High	120
Wetland M (0.07 acres)	FO & SS/slope	Category III	6	High	135
Wetland O (0.02 acres)	SS & EM/slope	Category IV ⁷	13	High	50 ⁵

¹Cowardin *et al.* 1979

²According to Hruby 2014 and Hruby 2004

³According to *CMC Table 16.53.040-4*

⁴According to *CMC Table 16.53.040-1* and *Table 16.53.040-3*

⁵See section "Vested Wetlands" for buffer designations

Vested Wetlands

The buffers for wetlands B, D, G and O were previously established by the City of Camas according to a *Critical Areas Report* produced in December 2014, under past approvals for the Green Mountain PRD. Under City File No. SUB14-02, the city granted PRD approval for a 1,300 lot multi-phased, multi-use development, and subdivision approval for 201 lots. Those approvals impacted critical areas relating to Wetlands B, D, G and O; thus triggering the City's regulations. Because of this, the Applicant was required to perform critical area analyses compliant with the City's protocols. This analysis resulted in the City establishing the classification and buffer standards for these wetlands under the municipal code active at the time. Table 3 depicts the wetland type and buffers for Wetlands B, D, G, and O previously established by the City.

Table 3. Wetlands Vested from December 2014 Critical Areas Report

Wetland Name (size)	Cowardin Classification ¹ /HGM	State/Local Classification ²	Habitat Score ²	Proposed Land Use Intensity ³	Standard Buffer Width ⁴ (feet)
Wetland B (4.48 acres onsite)	FO & SS/slope	Category III	21	High	80
Wetland D (0.99 acres)	SS & EM/depressional	Category III	18	High	80
Wetland G (1.94 acres)	SS & EM/slope	Category III	16	High	80
Wetland O (0.02 acres)	FO/slope	Category IV	13	High	50

¹Cowardin *et al.* 1979²According to Hruby 2004³According to CMC Table 16.53.040-4⁴According to CMC Table 16.53.040-1**Functionally Isolated Buffers**

According to CMC 16.53.040(B)(4)(b)(i), functionally isolated buffers are areas in which the buffer is functionally isolated from the wetland and does not protect the wetland from adverse impacts. These areas include preexisting roads, structures, or vertical separation. Wetland buffers have been designated as functionally isolated where paved and gravel roads, gravel trails, and buildings are located within PRD Phase 2 (Figure 2). These functionally isolating features intersecting the wetland buffers disrupt the natural infiltration system the buffer provides for the wetland, removing the potential for the buffer to provide adequate protection of the wetland from surrounding uses.

Fish and Wildlife Habitat Conservation Areas

CMC Chapter 16.61 regulates Fish and Wildlife Habitat Conservation Areas, which include areas with which state or federally designated endangered, threatened, and sensitive species have a primary association, state priority habitats and areas associated with state priority species, habitats of local importance (Oregon white oak and Camas lily), naturally occurring ponds under 20 acres, waters of the state, bodies of water planted with game fish by a governmental or tribal entity, and state natural area preserves and natural resource conservation areas (CMC 16.61.010(A)).

Streams

Washington Department of Natural Resources (DNR) Forest Practice Maps indicate the presence of one undefined stream, originating offsite to the east within the central portion of the study area (Figure 7). This stream is mapped as flowing through the former golf course, into the forested area, and offsite under NE Ingles Road. ELS biologists did not locate a natural defined channel or the presence of surface water in the areas mapped by the DNR as having a stream. Instead, several wetlands are present in roughly the trajectory of the mapped stream (Figure 2). ELS biologists did identify two streams onsite:

Stream A

Stream A originates offsite to the east, flows southwesterly through the southern portion of the study area, and drains offsite to the south into a roadside ditch along NW Goodwin Road (Figure 2; Table 4). This stream has flow year round, and therefore, is considered perennial, is not known to be used by fish, and does not meet the physical criteria to be used by fish. Stream A is approximately 3- to 5-feet in diameter at bank-full-width, and consists mainly of riffles with no apparent pools. Stream substrate consists of mainly small cobble and sand/sediment. Stream A is not mapped on the DNR Forest Practice Map (Figure 7).

Stream B

Stream B is a Type Ns (non-fish, seasonal) stream (Figure 2; Table 4). This stream originates onsite, near the location of one of the former golf course ponds and Wetland O, and flows southwesterly and offsite into a roadside ditch along NE Ingle Road. This stream had an approximate bank-full-width of 1- to 2-feet during the time of the site visit, and stream substrate consisted of mainly small cobble and sand. Stream B is not mapped on the DNR Forest Practice Map (Figure 7).

Table 4. Summary of Streams Onsite

Stream Name	DNR Stream Type	Stream Buffer Width ¹ (feet)
Stream A	Type Np (non-fish, perennial)	50
Stream B	Type Ns (non-fish, seasonal)	25

¹According to *CMC 16.61.040(D)*, stream buffer widths shall be measured outward, on the horizontal plane, from the ordinary high water mark. This determination is preliminary until reviewed, modified and/or approved by the City of Camas.

Oregon White Oak

The study area has previously been assessed for Oregon white oak, which is included in the *Oregon White Oak Advance Mitigation Plan for Green Mountain Mixed Use PRD* prepared by *Ecological Land Services, Inc.* on February 24, 2016 (City File No. SUB14-02).

Ponds

Per *CMC 16.53.010(C)(2)(b)*, artificial wetlands are exempt from the provisions of *Chapter 16.53*. Artificial wetlands are considered by the City of Camas to be wetlands created from non-wetland sites including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, stormwater facilities, farm ponds, and landscape amenities. The 4 remaining onsite ponds were created as part of the former golf course and have plastic-lined bottoms, and therefore, require no buffers or further regulation from *CMC*.

LIMITATIONS

ELS personnel base the conclusions contained within this report on standard scientific methodology and best professional judgment. In our opinion, local, state, and federal regulatory agencies should agree with the findings presented in this report.

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. There are no other warranties, express or implied. The services performed were consistent with our agreement with our client. This report is prepared solely for the use of our client and may not be used or relied upon by a third party for any purpose. Any such use or reliance will be at such party's risk.

The opinions and recommendations contained in this report apply to conditions existing when services were performed. ELS is not responsible for the impacts of any changes in environmental standards, practices, or regulations after the date of this report. ELS does not warrant the accuracy of supplemental information incorporated in this report that was supplied by others.

REFERENCES

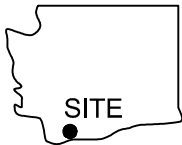
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U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) Wetlands Mapper. September 2013. Online document:
<http://www.fws.gov/wetlands/Data/Mapper.html>. Accessed March 2016.

Figures

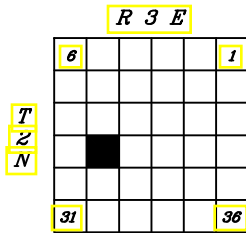
Figure 1	Vicinity Map
Figure 2	Critical Areas Map
Figure 2	Critical Areas Map (oversized)
Figure 3	Soil Survey Map
Figure 4	National Wetlands Inventory
Figure 5	Clark County Critical Areas Map
Figure 6	WDFW Priority Habitat and Species
Figure 7	DNR Stream Type Map
Photoplates	1-5

WASHINGTON



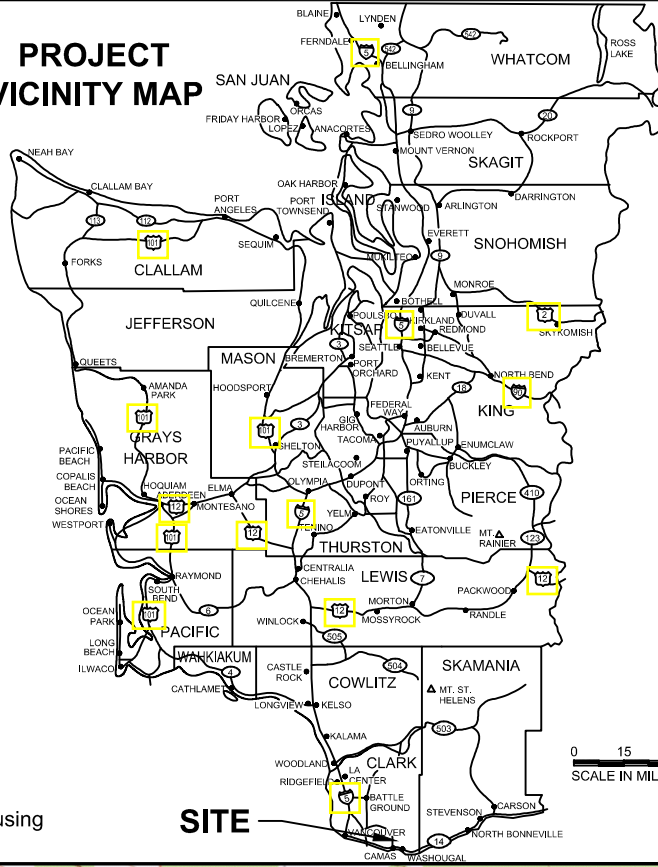
45.6471° Latitude
-122.4560° Longitude

LOCATION MAP



NOTE:
USGS topographic quadrangle map reproduced using
MAPTECH Inc., Terrain Navigator Pro software.

PROJECT VICINITY MAP



SITE

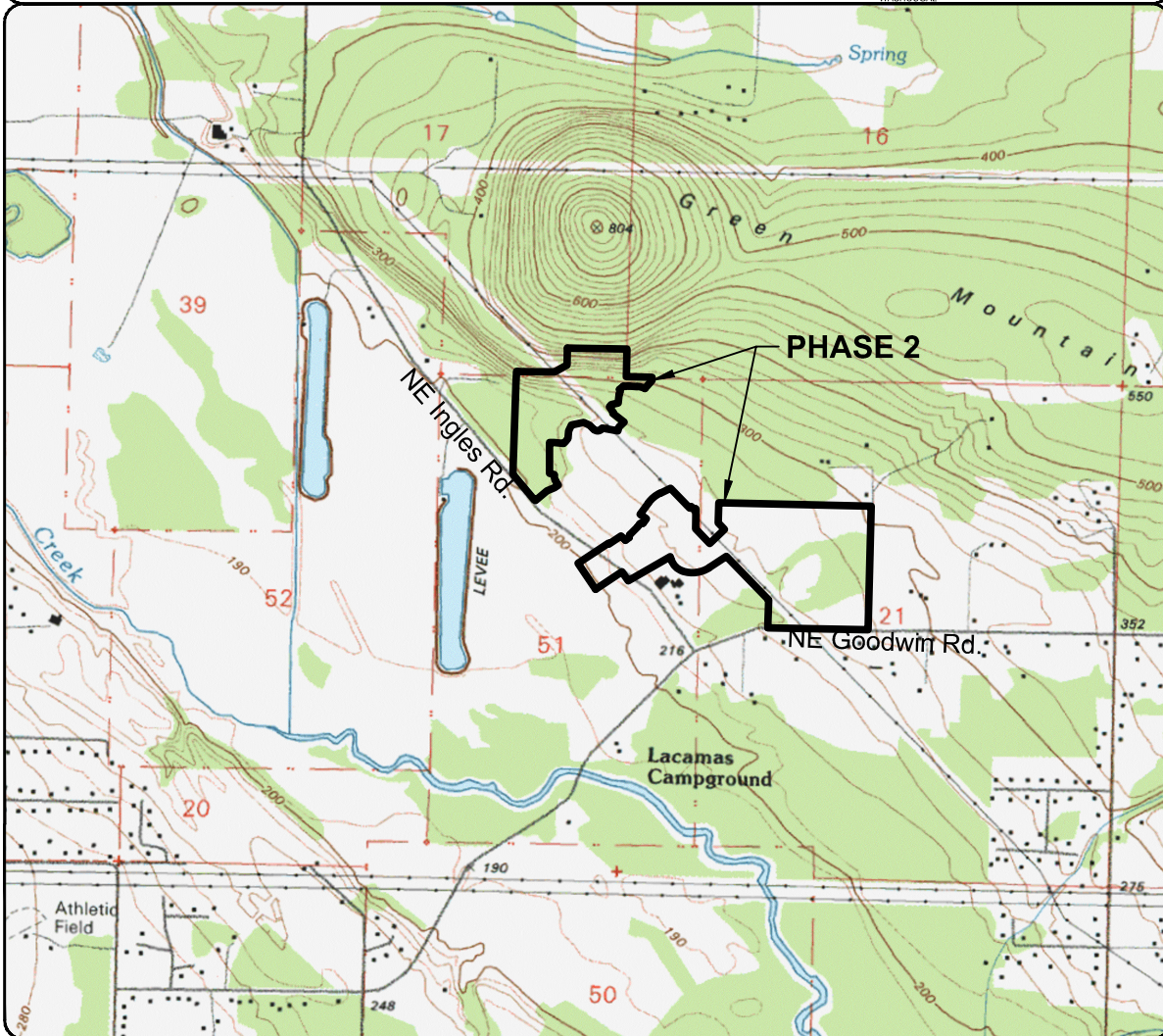
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SCALE IN MILES

Figure 1
VICINITY MAP

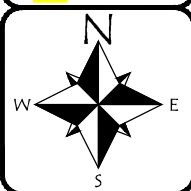
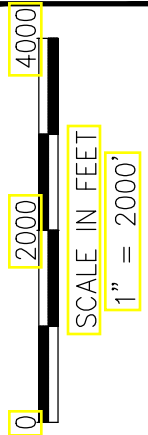
Green Mountain Mixed Use PRD Phase 2
CLB Washington Options Solutions LLC
City of Camas, Clark County, Washington
Section 20, Township 2N, Range 3E, W.M.

DATE: 7/28/16
DWN: JJK
REQ. BY: MM
PRJ. MGR: MM
CHK:
PROJECT NO: 2415.01

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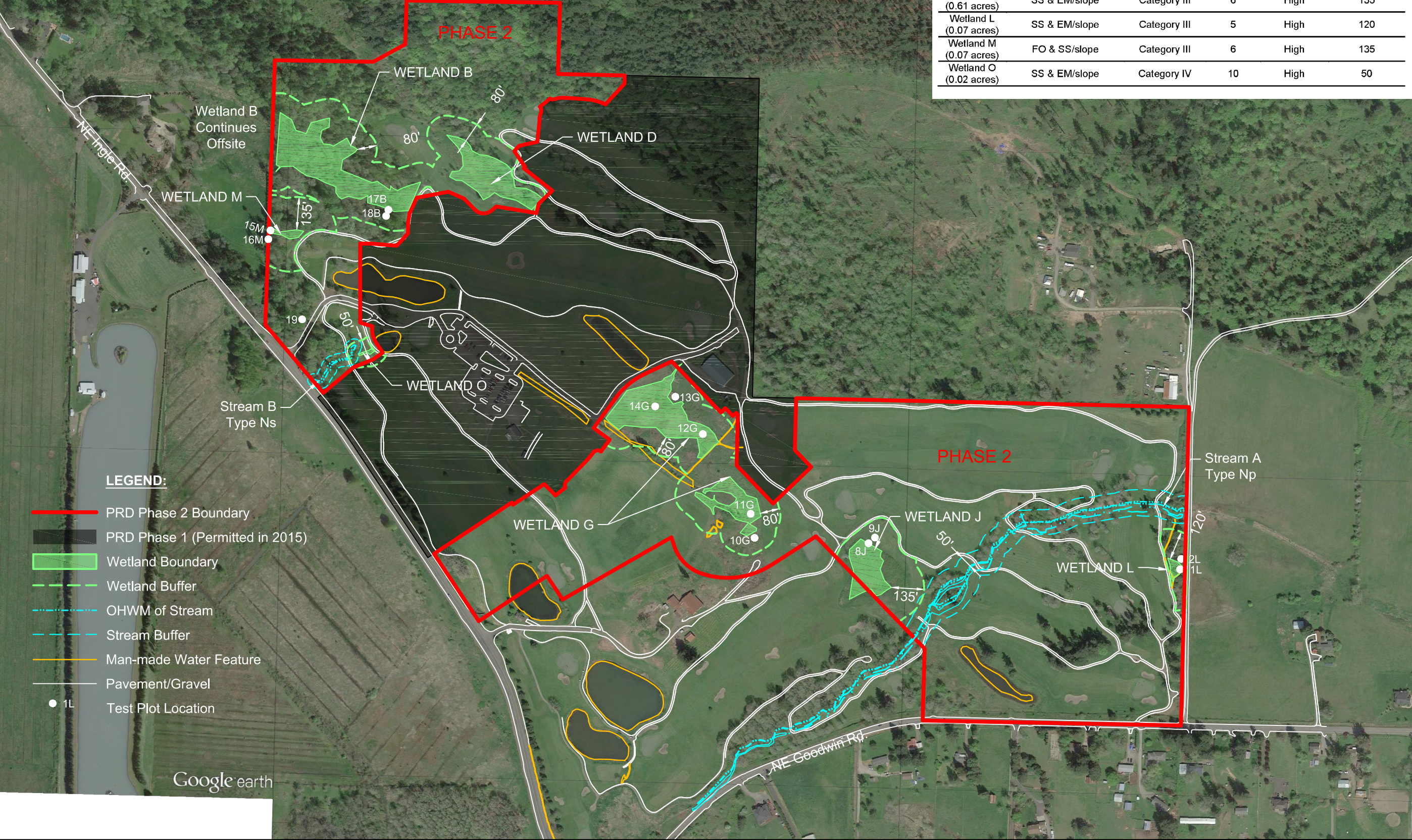


PHASE 2



7/28/2016 1:52 PM s:\ELSWA\Clark\Camas\2415-clb washington options solutions llc\2415.01-green mountain phase 2\2415.01-figures\2415.01_SM-PHS2.dwg Jennifer

- NOTE(S):**
1. Aerial photo provided by Google Earth™.
 2. Wetlands delineated on February 29 and March 1, 2016. Wetland flags surveyed by Olson Engineering.
 3. Streams and man-made water features mapped using a hand-held GPS unit with ±0.5m accuracy.
 4. Man-made water features considered exempt from jurisdictional regulation.
 5. Wetlands B, D, G, and O vested per City File No. SUB14-02.



Wetland Name (size)	Cowardin Classification/HGM	State/Local Classification	Habitat Score	Proposed Land Use Intensity	Standard Buffer Width (feet)
Wetland B (4.48 acres onsite)	FO, SS, EM/slope	Category III	19	High	80
Wetland D (0.99 acres)	SS & EM/depressional	Category III	15	High	80
Wetland G (1.94 acres)	SS & EM/slope	Category III	17	High	80
Wetland J (0.61 acres)	SS & EM/slope	Category III	6	High	135
Wetland L (0.07 acres)	SS & EM/slope	Category III	5	High	120
Wetland M (0.07 acres)	FO & SS/slope	Category III	6	High	135
Wetland O (0.02 acres)	SS & EM/slope	Category IV	10	High	50

LEGEND:

- PRD Phase 2 Boundary
- PRD Phase 1 (Permitted in 2015)
- Wetland Boundary
- Wetland Buffer
- OHWM of Stream
- Stream Buffer
- Man-made Water Feature
- Pavement/Gravel
- Test Plot Location

Figure 2

CRITICAL AREAS MAP

Green Mountain Mixed Use PRD Phase 2

CLB Washington Options Solutions, LLC

City of Camas, Clark County, Washington

Section 20, Township 2N, Range 3E, W.M.

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Ecological Land Services

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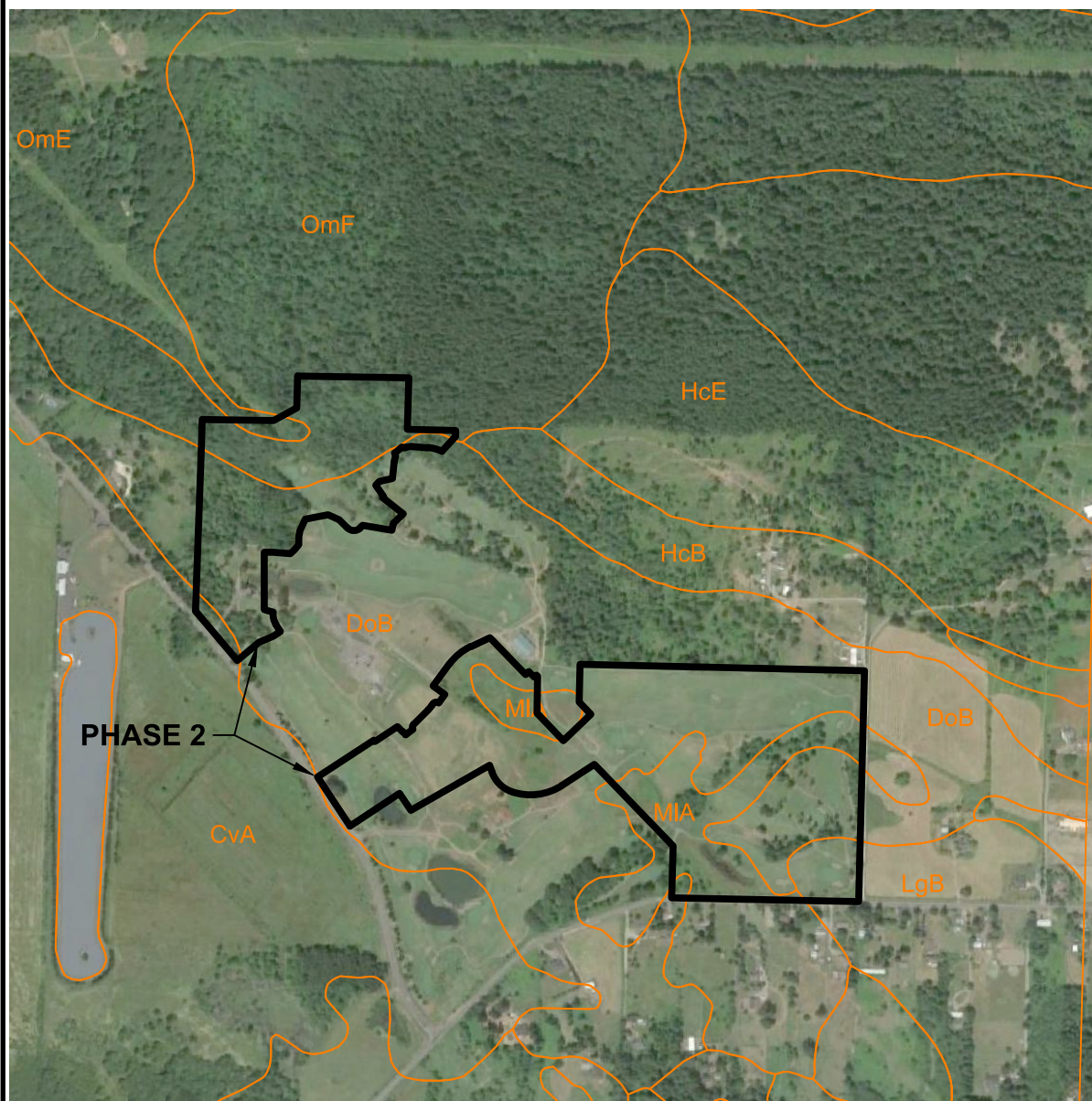
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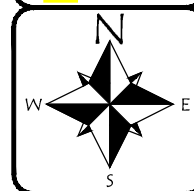


LEGEND:

- CvA** Cove silty clay loam, 0 to 3 percent slopes. Hydric.
- DoB** Dollar loam, 0 to 5 percent slopes. Not hydric.
- MIA** McBee silt loam, coarse variant, 0 to 3 percent slopes. Not hydric.
- OmE** Olympic stony clay loam, 3-30 percent slopes. Not hydric.
- OmF** Olympic stony clay loam, 30 to 60 percent slopes. Not hydric.

NOTE(S):

1. Map provided on-line by NRCS at web address:
<http://websoilsurvey.nrcs.usda.gov/app/>



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Figure 3
 SOIL SURVEY MAP
 Green Mountain Mixed Use PRD Phase 2
 CLB Washington Options Solutions LLC
 City of Camas, Clark County, Washington
 Section 20, Township 2N, Range 3E, W.M.



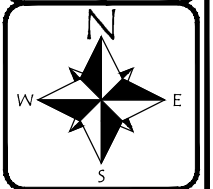
No mapped wetlands indicated onsite by US Fish & Wildlife Service.

LEGEND:

-  Freshwater Emergent Wetland
-  Freshwater Forested/Shrub Wetland

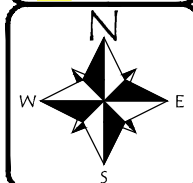
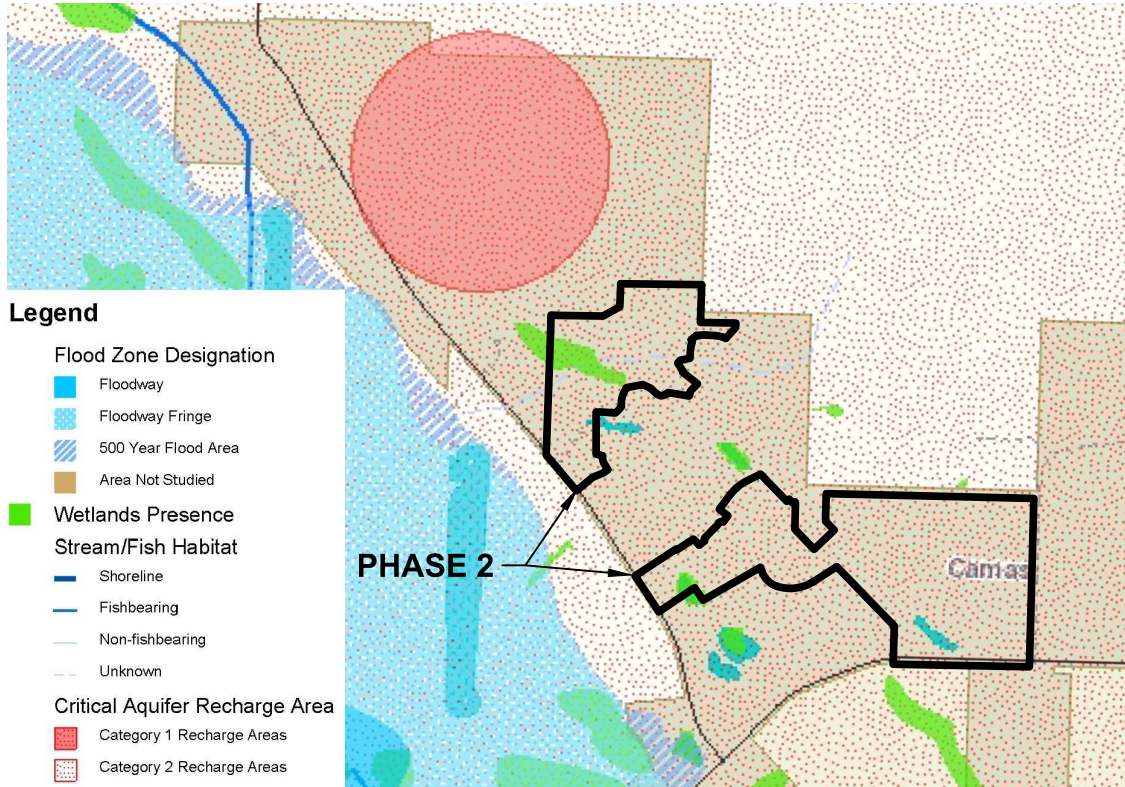
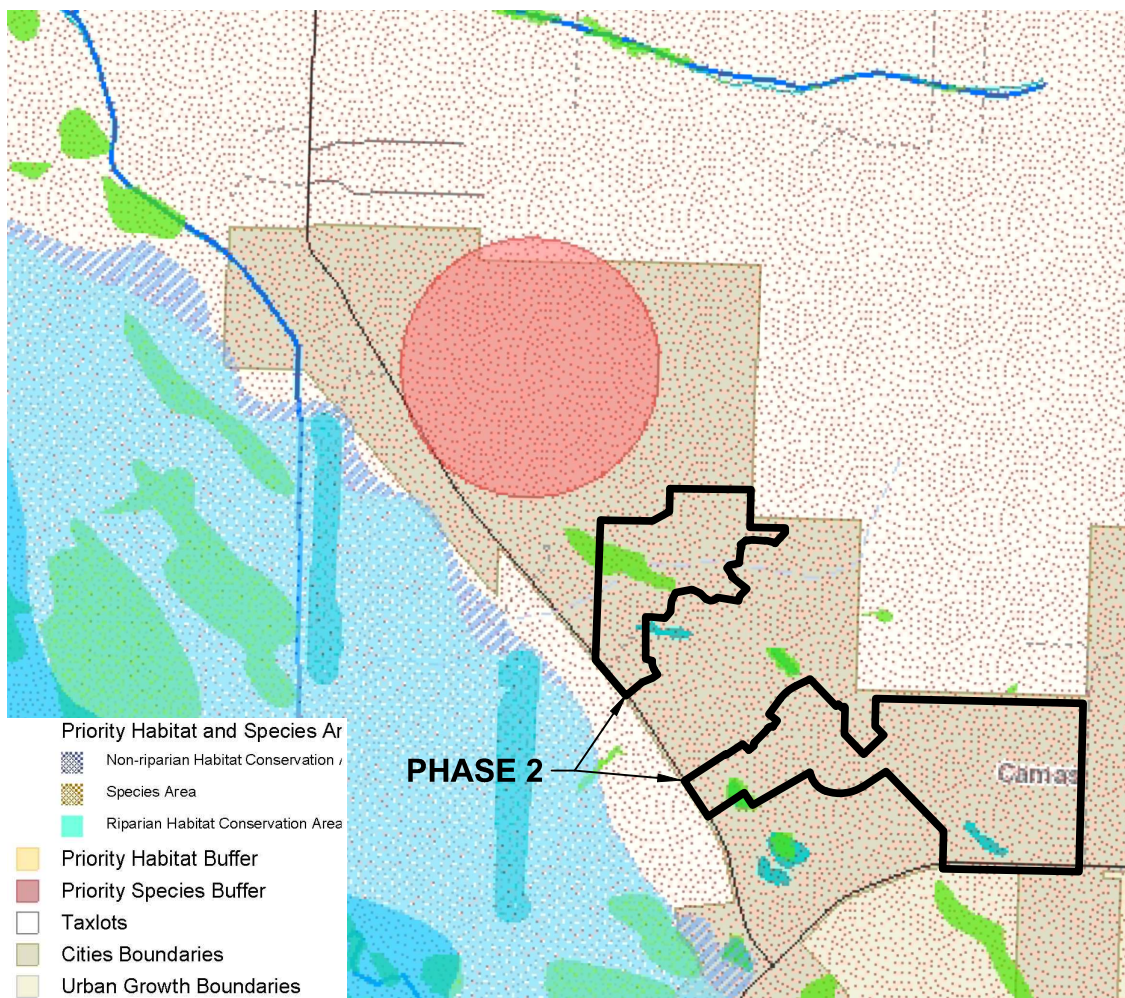
NOTE(S):

1. Map provided on-line by US Fish & Wildlife Service at web address:
<http://www.fws.gov/wetlands/data/index.html>



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Figure 4
NATIONAL WETLANDS INVENTORY
Green Mountain Mixed Use PRD Phase 2
CLB Washington Options Solutions LLC
City of Camas, Clark County, Washington
Section 20, Township 2N, Range 3E, W.M.



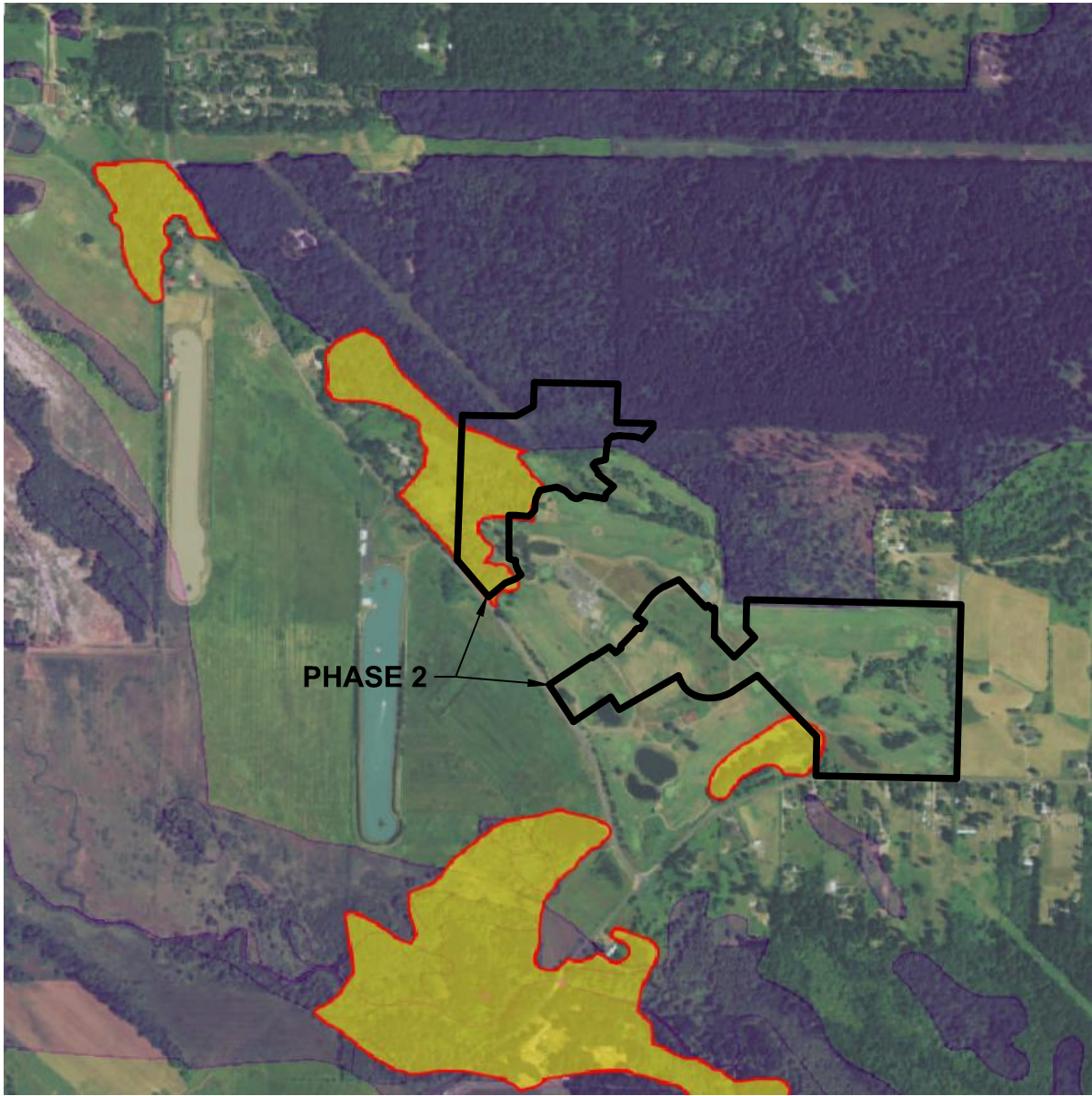
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

Figure 5

CLARK COUNTY CRITICAL AREAS MAP
Green Mountain Mixed Use PRD Phase 2
CLB Washington Options Solutions LLC
City of Camas, Clark County, Washington
Section 20, Township 2N, Range 3E, W.M.

NOTE: Map provided on-line by Clark County, Washington at web address: <http://gis.clark.wa.gov/imf/imf.jsp?site=zoning>



LEGEND:

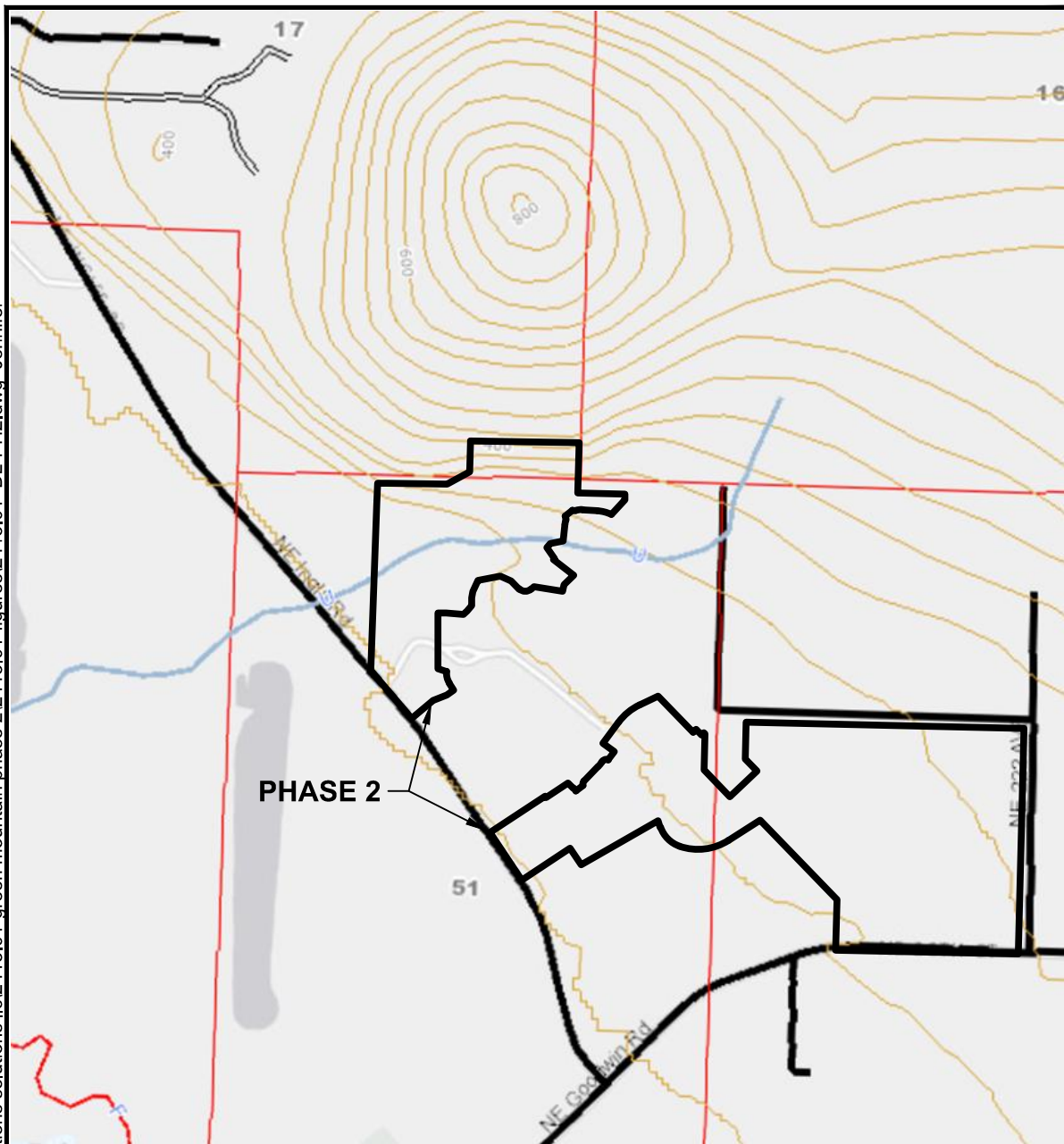
-  Oak Woodland
-  Biodiversity Areas and Corridor



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Figure 6
WDFW PRIORITY HABITAT AND SPECIES
Green Mountain Mixed Use PRD Phase 2
CLB Washington Options Solutions LLC
City of Camas, Clark County, Washington
Section 20, Township 2N, Range 3E, W.M.



Streams
Streams

- Type S
- Type F
- Type N, Np, Ns
- U, unknown
- X, non-typed per WAC 222-16

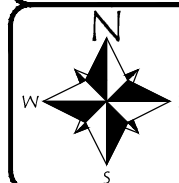
Water Type Break
Water Type Break

Water Bodies
Water Bodies

- Flats/Gravel Bars
- Ice
- Man Made Features
- Open Water
- Wet Area

Contours - 40ft. Interval
Contours - 40ft. Interval

NOTE: Map provided on-line by Washington State
Department of Natural Resources at web address:
<https://fortress.wa.gov/dnr/protectiongis/fpamt/index.html>



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Figure 7
DNR STREAM TYPE MAP
Green Mountain Mixed Use PRD Phase 2
CLB Washington Options Solutions LLC
City of Camas, Clark County, Washington
Section 20, Township 2N, Range 3E, W.M.



Above: North view of the northwestern portion of Wetland B. Photo taken March 1, 2016.

Below: Northeast view of the northwestern portion of Wetland B. Photo taken March 1, 2016.



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DATE: 3/10/16
DWN: JM
PRJ. MGR: MM
PROJ.#: 2048.01

Photoplate 1
SITE PHOTOS
Green Mountain PRD
Green Mountain Land, LLC
City of Camas, Washington



Above: West view of the scrub-shrub and emergent vegetation of Wetland G. Photo taken February 29, 2016.



Above: Northwestern view of the scrub-shrub and emergent vegetation of Wetland G with the BPA easement in the background. Photo taken February 29, 2016.



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PROJ.#: 2048.01

Photoplate 2
SITE PHOTOS
Green Mountain PRD
Green Mountain Land, LLC
City of Camas, Washington



Above: Northeastern view of Stream N, forked on the southeast portion of the project site. Photo taken February 29, 2016.

Below: Northwestern view of Wetland J with the BPA easement bisecting the wetland. Photo taken February 29, 2016.



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DATE: 3/10/2016
DWN: JM
PRJ. MGR: MM
PROJ.#: 2048.01

Photoplate 3
SITE PHOTOS
Green Mountain PRD
Green Mountain Land, LLC
City of Camas, Washington



Above: Northwestern view of Wetland B, which extends offsite to the northwest.
Photo taken March 1, 2016.



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Fax: (360) 414-9305

DATE: 3/10/2016
DWN: JM
PRJ. MGR: MM
PROJ.#: 2048.01

Photoplate 4
SITE PHOTOS
Green Mountain PRD
Green Mountain Land, LLC
City of Camas, Washington



Above: Southeastern view of Wetland J. Photo taken February 29, 2016.



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DATE: 3/10/2016
DWN: JM
PRJ. MGR: MM
PROJ.#: 2048.01

Photoplate 5
SITE PHOTOS
Green Mountain PRD
Green Mountain Land, LLC
City of Camas, Washington

Appendix A

Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Green Mountain PRD City/County: Camas/Clark Sampling Date: 2/29/2016
 Applicant/Owner: Green Mountain Land, LLC State: WA Sampling Point: 1L
 Investigator(s): M. McGrath, F. Naglich, J. Madriz, L. Hoffmann Section, Township, Range: 20, 2N, 3E
 Landform (hillslope, terrace, etc.): footslope Local relief: Concave Slope (%): 0-3%
 Subregion (LRR): A2 Lat: 45.6471 Long: -122.4560 Datum: NAD83
 Soil Map Unit Name: MIA, McBee silt loam NWI classification: none
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain Remarks.)
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Area "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soils Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Remarks: Test plot located within Wetland L. All three wetland parameters are met, therefore the test plot was sampled within a wetland.	

VEGETATION (Use scientific names)

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet	
1. _____	%			Number of Dominant Species That Are OBL, FACW, or FAC:	5 (A)
2. _____	%				
3. _____	%			Total Number of Dominant Species Across All Strata:	5 (B)
4. _____	%				
Total Cover:	%			Percent of Dominant Species That Are OBL, FACW, or FAC	100 (A/B)
Sapling/Shrub Stratum (Plot size: 15 ft. radius)				Prevalence Index worksheet	
1. <i>Rosa nutkana</i>	20%	yes	FAC	Total % Cover of:	Multiply by:
2. <i>Physocarpus capitatus</i>	20%	yes	FACW	OBL species	x 1=
3. <i>Spiraea douglasii</i>	10%	yes	FACW	FACW species	x 2=
4. _____	%			FAC species	x 3=
5. _____	%			FACU species	x 4=
Total Cover:	50%			UPL species	x 5=
Herb Stratum (Plot size: 5 ft radius)				Column Totals:	(A) (B)
1. <i>Phalaris arundinacea</i>	80%	yes	FACW	Prevalence Index = B/A=	
2. <i>Carex stipata</i>	20%	yes	OBL	Hydrophytic Vegetation Indicators:	
3. _____	%			<input type="checkbox"/> 1 – Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 – Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)	
4. _____	%			<input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)	
5. _____	%			¹ Indicators of hydric soil and wetland hydrology Must be present, unless disturbed or problematic.	
6. _____	%			Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
7. _____	%				
8. _____	%				
Total Cover:	100%				
Woody Vine Stratum (Plot size: 15 ft radius)					
1. _____	%				
2. _____	%				
Total Cover:	%				
% Bare Ground in Herb Stratum 0%					

Remarks: Trace amount of *Rubus ursinus* (FACU). The dominance test was met due to over 50% of dominant species being OBL, FACW, or FAC.

SOIL

Sampling Point: 1L

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-8	10YR 4/2	100%		%			silty clay loam	
8-16	10YR 4/1	60%	7.5YR 5/8	40%	C	M	silty clay loam	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils

☐ Histosal (A1)
☐ Histic Epipedon (A2)

☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Minerals (S1)
☐ Sandy Gleyed Matrix (S4)

☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

☐ Loamy Mucky Mineral (F1) (except MLRA 1)
☐ Loamy Gleyed Matrix (F2)
☒ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)

☐ 2 cm Muck (A10)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present?

Yes☒ No☐

Remarks: Hydric soil indicator F3 was met due to a layer having a depleted matrix with 60% or more chroma of 2 or less and is at least 6 inches thick, beginning within 10 inches of the soil surface. Redox concentrations are present, which is required in soils with matrix colors of 4/2.

HYDROLOGY

Wetland Hydrology Indicators:

Secondary Indicators
(2 or more required)

Primary Indicators (min. of one required; check all that apply)

☐ Surface Water (A1)
☒ High Water Table (A2)
☒ Saturation (A3)
☐ Water Marks (B1)
☐ Sediment Deposits (B2)
☐ Drift Deposits (B3)
☐ Algal Mat or crust (B4)
☐ Iron Deposits (B5)
☐ Surface Soil Cracks (B6)
☐ Inundation Visible on Aerial Imagery (B7)

☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, & 4B)
☐ Salt Crust (B11)
☐ Aquatic Invertebrates (B13)
☐ Hydrogen Sulfide Odor (C1)
☐ Oxidized Rhizospheres along Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Stunted or Stressed Plants (D1) (LRR A)
☐ Other (Explain in Remarks)

☐ Water Stained Leaves (B9)
☐ Drainage Patterns (B10)
☐ Dry-Season Water Table (C2)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☒ FAC-Neutral Test (D5)
☐ Raised Ant Mounds (D6) (LRR A)
☐ Frost-Heave Hummocks (D4)

Field Observations:

Wetland Hydrology Present?

Surface Water Present? Yes☐ No☒ Depth (Inches): _____
Water Table Present? Yes☒ No☐ Depth (Inches): 7
Saturation Present? Yes☒ No☐ Depth (Inches): 7
(Includes Capillary fringe)

Yes☒ No☐

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:Wetland hydrology was observed as water table and soil saturation at 7 inches below ground surface. Required depth of water table and saturation to be considered wetland hydrology is 12 inches, therefore primary indicators A2 and A3 are met.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Green Mountain PRD		City/County: Camas/Clark	Sampling Date: 2/29/2016
Applicant/Owner: Green Mountain Land, LLC		State: WA	Sampling Point: 2L
Investigator(s): M. McGrath, F. Naglich, J. Madriz, L. Hoffmann		Section, Township, Range: 20, 2N, 3E	
Landform (hillslope, terrace, etc.): footslope		Local relief: Convex	Slope (%): 0-3%
Subregion (LRR): A2	Lat: 45.6471	Long: -122.4560	Datum: NAD83
Soil Map Unit Name: MIA, McBee silt loam		NWI classification: none	
Are climatic / hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (If no, explain Remarks.)			
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> significantly disturbed?		Area "Normal Circumstances" present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> naturally problematic?		(If needed, explain any answers in Remarks.)	

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Hydric Soils Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks: Test plot located northeast of Wetland L. No wetland indicators were present, therefore the test plot was sampled within an upland area.	

VEGETATION (Use scientific names)

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet
1. _____	____%	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
2. _____	____%	_____	_____	
3. _____	____%	_____	_____	
4. _____	____%	_____	_____	
Total Cover:	____%			
Sapling/Shrub Stratum (Plot size: 15 ft. radius)				
1. <i>Corylus cornuta</i>	70%	yes	FACU	Prevalence Index worksheet Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1= _____ FACW species _____ x 2= _____ FAC species _____ x 3= _____ FACU species _____ x 4= _____ UPL species _____ x 5= _____ Column Totals: (A) _____ (B) _____ Prevalence Index = B/A= _____
2. <i>Rubus ursinus</i>	30%	yes	FACU	
3. <i>Vaccinium parvifolium</i>	20%	no	FACU	
4. <i>Rosa nutkana</i>	10%	no	FAC	
5. _____	____%	_____	_____	
Total Cover:	110%			
Herb Stratum (Plot size: 5 ft radius)				
1. <i>Polystichum munitum</i>	30%	yes	FACU	Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 – Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> 2 – Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
2. <i>Tellima grandiflora</i>	15%	yes	FACU	
3. <i>Juncus effusus</i>	5%	no	FACW	
4. _____	____%	_____	_____	
5. _____	____%	_____	_____	
6. _____	____%	_____	_____	
7. _____	____%	_____	_____	
8. _____	____%	_____	_____	
Total Cover:	50%			
Woody Vine Stratum (Plot size: 15 ft radius)				
1. _____	____%	_____	_____	¹ Indicators of hydric soil and wetland hydrology Must be present, unless disturbed or problematic.
2. _____	____%	_____	_____	
Total Cover:	____%			
% Bare Ground in Herb Stratum 50%				Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks: 50% of bare ground in the herbaceous stratum was covered in leaf matter. Hydrophytic vegetation is not present because the number of OBL, FACW, and FAC plant observed within the vicinity of the test plot was less than 50% of the dominant vegetation present.				

SOIL

Sampling Point: 2L

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16	10YR 3/4	80%	5YR 4/6	20%			sandy clay loam	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

☐ Histosal (A1)

☐ Sandy Redox (S5)

☐ 2 cm Muck (A10)

☐ Histic Epipedon (A2)

☐ Stripped Matrix (S6)

☐ Red Parent Material (TF2)

☐ Black Histic (A3)

☐ Loamy Mucky Mineral (F1) (except MLRA 1)

☐ Very Shallow Dark Surface (TF12)

☐ Hydrogen Sulfide (A4)

☐ Loamy Gleyed Matrix (F2)

☐ Other (Explain in Remarks)

☐ Depleted Below Dark Surface (A11)

☐ Depleted Matrix (F3)

☐ Thick Dark Surface (A12)

☐ Redox Dark Surface (F6)

☐ Sandy Mucky Minerals (S1)

☐ Depleted Dark Surface (F7)

☐ Sandy Gleyed Matrix (S4)

☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils

³Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks: No hydric soil indicators were met because the chroma of the soil sample was too high.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (min. of one required; check all that apply)

☐ Surface Water (A1)

☐ High Water Table (A2)

☐ Saturation (A3)

☐ Water Marks (B1)

☐ Sediment Deposits (B2)

☐ Drift Deposits (B3)

☐ Algal Mat or crust (B4)

☐ Iron Deposits (B5)

☐ Surface Soil Cracks (B6)

☐ Inundation Visible on Aerial Imagery (B7)

☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, & 4B)

☐ Salt Crust (B11)

☐ Aquatic Invertebrates (B13)

☐ Hydrogen Sulfide Odor (C1)

☐ Oxidized Rhizospheres along Living Roots (C3)

☐ Presence of Reduced Iron (C4)

☐ Recent Iron Reduction in Tilled Soils (C6)

☐ Stunted or Stressed Plants (D1) (LRR A)

☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

☐ Water Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)

☐ Drainage Patterns (B10)

☐ Dry-Season Water Table (C2)

☐ Saturation Visible on Aerial Imagery (C9)

☐ Geomorphic Position (D2)

☐ Shallow Aquitard (D3)

☐ FAC-Neutral Test (D5)

☐ Raised Ant Mounds (D6) (LRR A)

☐ Frost-Heave Hummocks (D4)

Field Observations:

Surface Water Present? Yes ☐ No ☒

Water Table Present? Yes ☐ No ☒

Saturation Present? Yes ☒ No ☐

Depth (Inches): _____

Depth (Inches): _____

Depth (Inches): 15

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:Although soil saturation is present, wetland hydrology indicator A3 is not met because soil saturation is required to be at 12 inches below soil surface to be considered wetland hydrology.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Green Mountain PRD City/County: Camas/Clark Sampling Date: 2/29/2016
 Applicant/Owner: Green Mountain Land, LLC State: WA Sampling Point: 8J
 Investigator(s): M. McGrath, F. Naglich, J. Madriz, L. Hoffmann Section, Township, Range: 20, 2N, 3E
 Landform (hillslope, terrace, etc.): footslope Local relief: Concave Slope (%): 0-3%
 Subregion (LRR): A2 Lat: 45.6471 Long: -122.4560 Datum: NAD83
 Soil Map Unit Name: MIA, McBee silt loam NWI classification: none
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain Remarks.)
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Area "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soils Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: Test plot located within the northern portion of Wetland J. All three wetland parameters are met, therefore the test plot was sampled within a wetland.	

VEGETATION (Use scientific names)

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet
1. _____	____%	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
2. _____	____%	_____	_____	
3. _____	____%	_____	_____	
4. _____	____%	_____	_____	
Total Cover:	____%			
Sapling/Shrub Stratum (Plot size: 15 ft. radius)				
1. _____	____%	_____	_____	Prevalence Index worksheet Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1= _____ FACW species _____ x 2= _____ FAC species _____ x 3= _____ FACU species _____ x 4= _____ UPL species _____ x 5= _____ Column Totals: (A) _____ (B) _____ Prevalence Index = B/A = _____
2. _____	____%	_____	_____	
3. _____	____%	_____	_____	
4. _____	____%	_____	_____	
5. _____	____%	_____	_____	
Total Cover:	____%			
Herb Stratum (Plot size: 5 ft radius)				
1. <i>Phalaris arundinacea</i>	80%	yes	FACW	Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 – Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 – Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
2. <i>Lotus corniculatus</i>	15%	no	FAC	
3. <i>Schedonorus arundinaceus</i>	5%	no	FAC	
4. _____	____%	_____	_____	
5. _____	____%	_____	_____	
6. _____	____%	_____	_____	
7. _____	____%	_____	_____	
8. _____	____%	_____	_____	
Total Cover:	100%			
Woody Vine Stratum (Plot size: 15 ft radius)				
1. _____	____%	_____	_____	¹ Indicators of hydric soil and wetland hydrology Must be present, unless disturbed or problematic.
2. _____	____%	_____	_____	
Total Cover:	____%			
% Bare Ground in Herb Stratum <u>0%</u>				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

Remarks: The dominance test was met due to over 50% of dominant species being OBL, FACW, or FAC.

SOIL

Sampling Point: 8J

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16	10YR 3/2	60%	7.5YR 4/6	40%	C	M	silty clay loam	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils

☐ Histosal (A1)

☐ Sandy Redox (S5)

☐ 2 cm Muck (A10)

☐ Histic Epipedon (A2)

☐ Stripped Matrix (S6)

☐ Red Parent Material (TF2)

☐ Very Shallow Dark Surface (TF12)

☐ Other (Explain in Remarks)

☐ Black Histic (A3)

☐ Loamy Mucky Mineral (F1) (except MLRA 1)

☐ Hydrogen Sulfide (A4)

☐ Loamy Gleyed Matrix (F2)

☐ Depleted Below Dark Surface (A11)

☐ Depleted Matrix (F3)

☐ Thick Dark Surface (A12)

☒ Redox Dark Surface (F6)

☐ Sandy Mucky Minerals (S1)

☐ Depleted Dark Surface (F7)

☐ Sandy Gleyed Matrix (S4)

☐ Redox Depressions (F8)

³Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present?

Yes☒ No☐

Remarks: Hydric soil indicator F6 was met because the layer was at least 4 inches thick within the upper 12 inches of the soil, and had a matrix value of 3 or less, and a chroma of 2 or less, with 5% or more distinct or prominent redox concentrations.

HYDROLOGY

Wetland Hydrology Indicators:

Secondary Indicators
(2 or more required)

Primary Indicators (min. of one required; check all that apply)

☐ Surface Water (A1)

☐ High Water Table (A2)

☒ Saturation (A3)

☐ Water Marks (B1)

☐ Sediment Deposits (B2)

☐ Drift Deposits (B3)

☐ Algal Mat or crust (B4)

☐ Iron Deposits (B5)

☐ Surface Soil Cracks (B6)

☐ Inundation Visible on Aerial Imagery (B7)

☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, & 4B)

☐ Salt Crust (B11)

☐ Aquatic Invertebrates (B13)

☐ Hydrogen Sulfide Odor (C1)

☒ Oxidized Rhizospheres along Living Roots (C3)

☐ Presence of Reduced Iron (C4)

☐ Recent Iron Reduction in Tilled Soils (C6)

☐ Stunted or Stressed Plants (D1) (LRR A)

☐ Other (Explain in Remarks)

☐ Water Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)

☐ Drainage Patterns (B10)

☐ Dry-Season Water Table (C2)

☐ Saturation Visible on Aerial Imagery (C9)

☐ Geomorphic Position (D2)

☐ Shallow Aquitard (D3)

☐ FAC-Neutral Test (D5)

☐ Raised Ant Mounds (D6) (LRR A)

☐ Frost-Heave Hummocks (D4)

Field Observations:

Surface Water Present? Yes☐ No☒ Depth (Inches): _____

Water Table Present? Yes☐ No☒ Depth (Inches): _____

Saturation Present? Yes☒ No☐ Depth (Inches): 5

(Includes Capillary fringe)

Wetland Hydrology Present?

Yes☒ No☐

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:Wetland hydrology primary indicator A3 was met because soil saturation was present 5 inches below the soil surface, and soil saturation 12 inches and shallower is considered wetland hydrology.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Green Mountain PRD		City/County: Camas/Clark		Sampling Date: 2/29/2016	
Applicant/Owner: Green Mountain Land, LLC		State: WA		Sampling Point: 9J	
Investigator(s): M. McGrath, F. Naglich, J. Madriz, L. Hoffmann		Section, Township, Range: 20, 2N, 3E			
Landform (hillslope, terrace, etc.): footslope		Local relief: Convex		Slope (%): 0-3%	
Subregion (LRR): A2		Lat: 45.6471	Long: -122.4560	Datum: NAD83	
Soil Map Unit Name: MIA, McBee silt loam		NWI classification: none			
Are climatic / hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (If no, explain Remarks.)					
Are Vegetation <input checked="" type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> significantly disturbed? Area "Normal Circumstances" present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>					
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> naturally problematic? (If needed, explain any answers in Remarks.)					

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soils Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks: Test plot located northeast of Wetland J. Vegetation significantly disturbed due to golf course maintenance. Although hydrophytic vegetation is present, the test plot is determined to not be sampled within a wetland because no hydric soils or wetland hydrology is present.	

VEGETATION (Use scientific names)

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet
1. _____	%	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
2. _____	%	_____	_____	
3. _____	%	_____	_____	
4. _____	%	_____	_____	
Total Cover:	%			
Sapling/Shrub Stratum (Plot size: 15 ft. radius)				
1. _____	%	_____	_____	Prevalence Index worksheet Total % Cover of: _____ Multiply by: OBL species _____ x 1= _____ FACW species _____ x 2= _____ FAC species _____ x 3= _____ FACU species _____ x 4= _____ UPL species _____ x 5= _____ Column Totals: (A) _____ (B) _____ Prevalence Index = B/A= _____
2. _____	%	_____	_____	
3. _____	%	_____	_____	
4. _____	%	_____	_____	
5. _____	%	_____	_____	
Total Cover:	%			
Herb Stratum (Plot size: 5 ft radius)				
1. <i>Lolium perenne</i>	90%	yes	FAC	Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 – Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 – Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
2. <i>Lotus corniculatus</i>	5%	no	FAC	
3. <i>Schedonorus arundinaceus</i>	5%	no	FAC	
4. _____	%	_____	_____	
5. _____	%	_____	_____	
6. _____	%	_____	_____	
7. _____	%	_____	_____	
8. _____	%	_____	_____	
Total Cover:	100%			
Woody Vine Stratum (Plot size: 15 ft radius)				
1. _____	%	_____	_____	¹ Indicators of hydric soil and wetland hydrology Must be present, unless disturbed or problematic.
2. _____	%	_____	_____	
Total Cover:	%			
% Bare Ground in Herb Stratum <u>0%</u>				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

Remarks: The dominance test was met due to over 50% of dominant species being OBL, FACW, or FAC.

SOIL

Sampling Point: 9J

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-10	10YR 3/3	50%		%			silty clay loam	See Remarks Below
0-10	10YR 3/2	50%		%			silty clay loam	See Remarks Below
10-16	10YR 3/2	85%	5YR 4/6	15%	C	M	silty clay loam	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils

☐ Histosal (A1)
☐ Histic Epipedon (A2)

☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Minerals (S1)
☐ Sandy Gleyed Matrix (S4)

☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

☐ Loamy Mucky Mineral (F1) (except MLRA 1)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)

☐ 2 cm Muck (A10)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present?

Yes ☐ No ☒

Remarks: Soil profile consisted of a mixed matrix from 0 to 10 inches below soil surface. Soil is not hydric because the chroma of the soil profile from 0-10 inches below the soil surface is too high (above 2).

HYDROLOGY

Wetland Hydrology Indicators:

Secondary Indicators
(2 or more required)

Primary Indicators (min. of one required; check all that apply)

☐ Surface Water (A1)
☐ High Water Table (A2)
☐ Saturation (A3)
☐ Water Marks (B1)
☐ Sediment Deposits (B2)
☐ Drift Deposits (B3)
☐ Algal Mat or crust (B4)
☐ Iron Deposits (B5)
☐ Surface Soil Cracks (B6)
☐ Inundation Visible on Aerial Imagery (B7)

☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, & 4B)
☐ Salt Crust (B11)
☐ Aquatic Invertebrates (B13)
☐ Hydrogen Sulfide Odor (C1)
☐ Oxidized Rhizospheres along Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Stunted or Stressed Plants (D1) (LRR A)
☐ Other (Explain in Remarks)

☐ Water Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
☐ Drainage Patterns (B10)
☐ Dry-Season Water Table (C2)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☐ FAC-Neutral Test (D5)
☐ Raised Ant Mounds (D6) (LRR A)
☐ Frost-Heave Hummocks (D4)

Field Observations:

Wetland Hydrology Present?

Surface Water Present? Yes ☐ No ☒ Depth (Inches): _____
Water Table Present? Yes ☐ No ☒ Depth (Inches): _____
Saturation Present? Yes ☐ No ☒ Depth (Inches): _____
(Includes Capillary fringe)

Yes ☐ No ☒

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:No wetland hydrology indicators were met at this test plot.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Green Mountain PRD City/County: Camas/Clark Sampling Date: 2/29/2016
 Applicant/Owner: Green Mountain Land, LLC State: WA Sampling Point: 10G
 Investigator(s): M. McGrath, F. Naglich, J. Madriz, L. Hoffmann Section, Township, Range: 20, 2N, 3E
 Landform (hillslope, terrace, etc.): footslope Local relief: Convex Slope (%): 0-5%
 Subregion (LRR): A2 Lat: 45.6471 Long: -122.4560 Datum: NAD83
 Soil Map Unit Name: DoB, Dollar loam NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain Remarks.)
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Area "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soils Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks: Test plot located southeast of the southern depression of Wetland G and northwest of Wetland U. Although hydrophytic vegetation is present, no hydric soil or wetland hydrology indicators were present, therefore the test plot is determined to not be located within a wetland.	

VEGETATION (Use scientific names)

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet
1. <i>Quercus garryana</i>	20%	yes	FACU	Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>60</u> (A/B)
2. _____	%			
3. _____	%			
4. _____	%			
Total Cover:	20%			
Sapling/Shrub Stratum (Plot size: 15 ft. radius)				
1. <i>Rubus ursinus</i>	20%	yes	FACU	Prevalence Index worksheet Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1= _____ FACW species _____ x 2= _____ FAC species _____ x 3= _____ FACU species _____ x 4= _____ UPL species _____ x 5= _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A= _____
2. _____	%			
3. _____	%			
4. _____	%			
5. _____	%			
Total Cover:	20%			
Herb Stratum (Plot size: 5 ft radius)				
1. <i>Festuca rubra</i>	30%	yes	FAC	Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 – Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 – Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ 4 - Morphological Adaptations ¹ (Provide supporting data In Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
2. <i>Schedonorus arundinaceus</i>	30%	yes	FAC	
3. _____	%			
4. _____	%			
5. _____	%			
6. _____	%			
7. _____	%			
8. _____	%			
Total Cover:	60%			
Woody Vine Stratum (Plot size: 15 ft radius)				
1. <i>Rubus armeniacus</i>	30%	yes	FAC	¹ Indicators of hydric soil and wetland hydrology Must be present, unless disturbed or problematic.
2. _____	%			
Total Cover:	30%			
% Bare Ground in Herb Stratum <u>40%</u>				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

Remarks: Trace amount of *Juncus effusus* (FACW) and *Phalaris arundinacea* (FACW). 40% of bareground covered in unknown dead weed. The dominance test was met due to over 50% of dominant species being OBL, FACW, or FAC.

SOIL

Sampling Point: 10G

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10YR 3/3	100%		%			silt loam	
12-16	10YR 3/3	50%		%			silt loam	See Remarks Below
12-16	10YR 4/6	50%		%			Silt loam	See Remarks Below
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

☐ Histosal (A1)

☐ Sandy Redox (S5)

☐ 2 cm Muck (A10)

☐ Histic Epipedon (A2)

☐ Stripped Matrix (S6)

☐ Red Parent Material (TF2)

☐ Black Histic (A3)

☐ Loamy Mucky Mineral (F1) (except MLRA 1)

☐ Very Shallow Dark Surface (TF12)

☐ Hydrogen Sulfide (A4)

☐ Loamy Gleyed Matrix (F2)

☐ Other (Explain in Remarks)

☐ Depleted Below Dark Surface (A11)

☐ Depleted Matrix (F3)

☐ Thick Dark Surface (A12)

☐ Redox Dark Surface (F6)

☐ Sandy Mucky Minerals (S1)

☐ Depleted Dark Surface (F7)

☐ Sandy Gleyed Matrix (S4)

☐ Redox Depressions (F8)

³Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks: Soil profile consisted of a mixed matrix from 12 to 16 inches below the soil surface.

HYDROLOGY

Wetland Hydrology Indicators:

Secondary Indicators (2 or more required)

Primary Indicators (min. of one required; check all that apply)

☐ Surface Water (A1)

☐ High Water Table (A2)

☐ Saturation (A3)

☐ Water Marks (B1)

☐ Sediment Deposits (B2)

☐ Drift Deposits (B3)

☐ Algal Mat or crust (B4)

☐ Iron Deposits (B5)

☐ Surface Soil Cracks (B6)

☐ Inundation Visible on Aerial Imagery (B7)

☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, & 4B)

☐ Salt Crust (B11)

☐ Aquatic Invertebrates (B13)

☐ Hydrogen Sulfide Odor (C1)

☐ Oxidized Rhizospheres along Living Roots (C3)

☐ Presence of Reduced Iron (C4)

☐ Recent Iron Reduction in Tilled Soils (C6)

☐ Stunted or Stressed Plants (D1) (LRR A)

☐ Other (Explain in Remarks)

☐ Water Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)

☐ Drainage Patterns (B10)

☐ Dry-Season Water Table (C2)

☐ Saturation Visible on Aerial Imagery (C9)

☐ Geomorphic Position (D2)

☐ Shallow Aquitard (D3)

☐ FAC-Neutral Test (D5)

☐ Raised Ant Mounds (D6) (LRR A)

☐ Frost-Heave Hummocks (D4)

Field Observations:

Surface Water Present? Yes ☐ No ☒

Water Table Present? Yes ☐ No ☒

Saturation Present? Yes ☐ No ☒

(Includes Capillary fringe)

Depth (Inches): _____

Depth (Inches): _____

Depth (Inches): _____

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Green Mountain PRD City/County: Camas/Clark Sampling Date: 2/29/2016
 Applicant/Owner: Green Mountain Land, LLC State: WA Sampling Point: 11G
 Investigator(s): M. McGrath, F. Naglich, J. Madriz, L. Hoffmann Section, Township, Range: 20, 2N, 3E
 Landform (hillslope, terrace, etc.): footslope Local relief: Concave Slope (%): 0-3%
 Subregion (LRR): A2 Lat: 45.6471 Long: -122.4560 Datum: NAD83
 Soil Map Unit Name: MIA, McBee silt loam NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain Remarks.)
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Area "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soils Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Remarks: Test plot located within the southwestern depression of Wetland G. All three wetland parameters are met, therefore the test plot was sampled within a wetland.	

VEGETATION (Use scientific names)

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet
1. _____	%	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
2. _____	%	_____	_____	
3. _____	%	_____	_____	
4. _____	%	_____	_____	
Total Cover:	%			
Sapling/Shrub Stratum (Plot size: 15 ft. radius)				
1. <i>Typha latifolia</i>	80%	yes	OBL	Prevalence Index worksheet Total % Cover of: _____ Multiply by: OBL species _____ x 1= _____ FACW species _____ x 2= _____ FAC species _____ x 3= _____ FACU species _____ x 4= _____ UPL species _____ x 5= _____ Column Totals: (A) _____ (B) _____ Prevalence Index = B/A = _____
2. _____	%	_____	_____	
3. _____	%	_____	_____	
4. _____	%	_____	_____	
5. _____	%	_____	_____	
Total Cover:	80%			
Herb Stratum (Plot size: 5 ft radius)				
1. <i>Phalaris arundinacea</i>	50%	yes	FACW	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> 1 – Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 – Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
2. <i>Juncus effusus</i>	50%	yes	FACW	
3. _____	%	_____	_____	
4. _____	%	_____	_____	
5. _____	%	_____	_____	
6. _____	%	_____	_____	
7. _____	%	_____	_____	
8. _____	%	_____	_____	
Total Cover:	100%			
Woody Vine Stratum (Plot size: 15 ft radius)				
1. _____	%	_____	_____	¹ Indicators of hydric soil and wetland hydrology Must be present, unless disturbed or problematic.
2. _____	%	_____	_____	
Total Cover:	%			
% Bare Ground in Herb Stratum <u>0%</u>				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

Remarks: The dominance test was met due to over 50% of dominant species being OBL, FACW, or FAC.

SOIL

Sampling Point: 11G

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2	10YR 5/1	100%		%			silty clay loam	
2-16	10YR 5/1	60%	10YR 4/6	40%	C	M	silty clay loam	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils

☐ Histosal (A1)

☐ Sandy Redox (S5)

☐ 2 cm Muck (A10)

☐ Histic Epipedon (A2)

☐ Stripped Matrix (S6)

☐ Red Parent Material (TF2)

☐ Very Shallow Dark Surface (TF12)

☐ Other (Explain in Remarks)

☐ Black Histic (A3)

☐ Loamy Mucky Mineral (F1) (except MLRA 1)

☐ Loamy Gleyed Matrix (F2)

☒ Depleted Matrix (F3)

☐ Redox Dark Surface (F6)

☐ Depleted Dark Surface (F7)

☐ Redox Depressions (F8)

☐ Hydrogen Sulfide (A4)

☐ Depleted Below Dark Surface (A11)

☐ Thick Dark Surface (A12)

☐ Sandy Mucky Minerals (S1)

☐ Sandy Gleyed Matrix (S4)

³Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes☒ No☐

Remarks: Hydric soil indicator F3 was met due to a layer having a depleted matrix with 60% or more chroma of 2 or less and is at least 6 inches thick, beginning within 10 inches of the soil surface. A value of 4 or more and a chroma of 2 or less was observed within the soil profile, which is required in a depleted matrix.

HYDROLOGY

Wetland Hydrology Indicators:

Secondary Indicators (2 or more required)

Primary Indicators (min. of one required; check all that apply)

☐ Surface Water (A1)

☒ High Water Table (A2)

☒ Saturation (A3)

☐ Water Marks (B1)

☐ Sediment Deposits (B2)

☐ Drift Deposits (B3)

☐ Algal Mat or crust (B4)

☐ Iron Deposits (B5)

☐ Surface Soil Cracks (B6)

☐ Inundation Visible on Aerial Imagery (B7)

☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, & 4B)

☐ Salt Crust (B11)

☐ Aquatic Invertebrates (B13)

☐ Hydrogen Sulfide Odor (C1)

☒ Oxidized Rhizospheres along Living Roots (C3)

☐ Presence of Reduced Iron (C4)

☐ Recent Iron Reduction in Tilled Soils (C6)

☐ Stunted or Stressed Plants (D1) (LRR A)

☐ Other (Explain in Remarks)

☐ Water Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)

☐ Drainage Patterns (B10)

☐ Dry-Season Water Table (C2)

☐ Saturation Visible on Aerial Imagery (C9)

☐ Geomorphic Position (D2)

☐ Shallow Aquitard (D3)

☐ FAC-Neutral Test (D5)

☐ Raised Ant Mounds (D6) (LRR A)

☐ Frost-Heave Hummocks (D4)

Field Observations:

Surface Water Present? Yes☐ No☒ Depth (Inches): _____

Water Table Present? Yes☒ No☐ Depth (Inches): 10

Saturation Present? Yes☒ No☐ Depth (Inches): 0

(Includes Capillary fringe)

Wetland Hydrology Present? Yes☒ No☐

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:Water seeping in at approximately 7 inches. Primary wetland hydrology indicators A2 and A3 were met because both water table and soil saturation were present within 12 inches of the soil surface.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Green Mountain PRD		City/County: Camas/Clark		Sampling Date: 2/29/2016	
Applicant/Owner: Green Mountain Land, LLC		State: WA		Sampling Point: 12G	
Investigator(s): M. McGrath, F. Naglich, J. Madriz, L. Hoffmann		Section, Township, Range: 20, 2N, 3E			
Landform (hillslope, terrace, etc.): footslope		Local relief: Convex		Slope (%): 0-3%	
Subregion (LRR): A2		Lat: 45.6471	Long: -122.4560	Datum: NAD83	
Soil Map Unit Name: MIA, McBee silt loam		NWI classification: none			
Are climatic / hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (If no, explain Remarks.)					
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> significantly disturbed? Area "Normal Circumstances" present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>					
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> naturally problematic? (If needed, explain any answers in Remarks.)					

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soils Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks: Test plot located within Wetland G. Although hydrophytic vegetation is present, the test plot was determined to not be sampled within a wetland because no wetland hydrology was present within 12 inches of the soil surface, the chroma from 0-12 inches below ground surface in the soil profile is too high, and the layer from 12-18 inches is technically a depleted matrix based on value and chroma, however the layer begins too deep within the soil profile to meet hydric soil specifications of an F3.	

VEGETATION (Use scientific names)

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet	
1. _____	____%	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC:	3 (A)
2. _____	____%	_____	_____	Total Number of Dominant Species Across All Strata:	4 (B)
3. _____	____%	_____	_____		
4. _____	____%	_____	_____		
Total Cover:	____%			Percent of Dominant Species That Are OBL, FACW, or FAC	75 (A/B)
Sapling/Shrub Stratum (Plot size: 15 ft. radius)				Prevalence Index worksheet Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1= _____ FACW species _____ x 2= _____ FAC species _____ x 3= _____ FACU species _____ x 4= _____ UPL species _____ x 5= _____ Column Totals: (A) _____ (B) _____ Prevalence Index = B/A= _____	
1. <i>Spiraea douglasii</i>	60%	yes	FACW		
2. <i>Rubus ursinus</i>	15%	yes	FACU		
3. _____	____%	_____	_____		
4. _____	____%	_____	_____		
5. _____	____%	_____	_____		
Total Cover:	75%				
Herb Stratum (Plot size: 5 ft radius)				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 – Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 – Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)	
1. <i>Schedonorus arundinaceus</i>	50%	yes	FAC		
2. _____	____%	_____	_____		
3. _____	____%	_____	_____		
4. _____	____%	_____	_____		
5. _____	____%	_____	_____		
6. _____	____%	_____	_____		
7. _____	____%	_____	_____		
8. _____	____%	_____	_____		
Total Cover:	50%				
Woody Vine Stratum (Plot size: 15 ft radius)				¹ Indicators of hydric soil and wetland hydrology Must be present, unless disturbed or problematic.	
1. <i>Rubus armeniacus</i>	5%	yes	FAC		
2. _____	____%	_____	_____		
Total Cover:	5%				
% Bare Ground in Herb Stratum 50%				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

Remarks: The dominance test was met due to over 50% of dominant species being OBL, FACW, or FAC.

SOIL

Sampling Point: 12G

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10YR 3/3	100%		%			silty clay loam	
12-18	10YR 4/2	90%	10YR 4/4	10%	C	M	silty clay loam	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

☐ Histosal (A1)

☐ Sandy Redox (S5)

☐ 2 cm Muck (A10)

☐ Histic Epipedon (A2)

☐ Stripped Matrix (S6)

☐ Red Parent Material (TF2)

☐ Black Histic (A3)

☐ Loamy Mucky Mineral (F1) (except MLRA 1)

☐ Very Shallow Dark Surface (TF12)

☐ Hydrogen Sulfide (A4)

☐ Loamy Gleyed Matrix (F2)

☐ Other (Explain in Remarks)

☐ Depleted Below Dark Surface (A11)

☐ Depleted Matrix (F3)

☐ Thick Dark Surface (A12)

☐ Redox Dark Surface (F6)

☐ Sandy Mucky Minerals (S1)

☐ Depleted Dark Surface (F7)

☐ Sandy Gleyed Matrix (S4)

☐ Redox Depressions (F8)

³Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present?

Yes☐ No☒

Remarks: Hydric soil indicators were not met due to the chroma from 0-12 inches below ground surface in the soil profile having a chroma that is too high. Additionally, the layer from 12-18 inches is technically a depleted matrix based on value and chroma, however the layer begins too deep within the soil profile to meet hydric soil specifications of an F3.

HYDROLOGY

Wetland Hydrology Indicators:

Secondary Indicators
(2 or more required)

Primary Indicators (min. of one required; check all that apply)

☐ Surface Water (A1)

☐ High Water Table (A2)

☐ Saturation (A3)

☐ Water Marks (B1)

☐ Sediment Deposits (B2)

☐ Drift Deposits (B3)

☐ Algal Mat or crust (B4)

☐ Iron Deposits (B5)

☐ Surface Soil Cracks (B6)

☐ Inundation Visible on Aerial Imagery (B7)

☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, & 4B)

☐ Salt Crust (B11)

☐ Aquatic Invertebrates (B13)

☐ Hydrogen Sulfide Odor (C1)

☐ Oxidized Rhizospheres along Living Roots (C3)

☐ Presence of Reduced Iron (C4)

☐ Recent Iron Reduction in Tilled Soils (C6)

☐ Stunted or Stressed Plants (D1) (LRR A)

☐ Other (Explain in Remarks)

☐ Water Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)

☐ Drainage Patterns (B10)

☐ Dry-Season Water Table (C2)

☐ Saturation Visible on Aerial Imagery (C9)

☐ Geomorphic Position (D2)

☐ Shallow Aquitard (D3)

☐ FAC-Neutral Test (D5)

☐ Raised Ant Mounds (D6) (LRR A)

☐ Frost-Heave Hummocks (D4)

Field Observations:

Surface Water Present?

Yes☐ No☒

Water Table Present?

Yes☒ No☐

Saturation Present?

Yes☒ No☐

(Includes Capillary fringe)

Depth (Inches): _____

Depth (Inches): 18

Depth (Inches): 16

Wetland Hydrology Present?

Yes☐ No☒

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:Although the water table and soil saturation are present, the depth below the soil surface is too deep. For indicators A2 and A3 to be considered wetland hydrology, saturation and/water table must be present within 12 inches of the soil surface.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Green Mountain PRD City/County: Camas/Clark Sampling Date: 2/29/2016
 Applicant/Owner: Green Mountain Land, LLC State: WA Sampling Point: 13G
 Investigator(s): M. McGrath, F. Naglich, J. Madriz, L. Hoffmann Section, Township, Range: 20, 2N, 3E
 Landform (hillslope, terrace, etc.): footslope Local relief: Convex Slope (%): 0-3%
 Subregion (LRR): A2 Lat: 45.6471 Long: -122.4560 Datum: NAD83
 Soil Map Unit Name: MIA, McBee silt loam NWI classification: none
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain Remarks.)
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Area "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soils Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Remarks: Test plot located northeast of the northern portion of Wetland G. Although hydrophytic vegetation and wetland hydrology are present, the test plot was determined to not be sampled within a wetland because the vegetation was not strongly hydrophytic, and soils within this test plot did not meet any hydric soil indicators because they lacked any trace of redoximorphic concentrations.	

VEGETATION (Use scientific names)

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet	
1. _____	%			Number of Dominant Species That Are OBL, FACW, or FAC:	3 (A)
2. _____	%				
3. _____	%			Total Number of Dominant Species Across All Strata:	4 (B)
4. _____	%				
Total Cover:	%			Percent of Dominant Species That Are OBL, FACW, or FAC	75 (A/B)
Sapling/Shrub Stratum (Plot size: 15 ft. radius)				Prevalence Index worksheet	
1. _____	%			Total % Cover of:	Multiply by:
2. _____	%			OBL species	x 1=
3. _____	%			FACW species	x 2=
4. _____	%			FAC species	x 3=
5. _____	%			FACU species	x 4=
Total Cover:	%			UPL species	x 5=
Herb Stratum (Plot size: 5 ft radius)				Column Totals:	(A) (B)
1. <i>Schedonorus arundinaceus</i>	50%	yes	FAC	Prevalence Index = B/A=	
2. <i>Phalaris arundinacea</i>	50%	yes	FACW		
3. <i>Cirsium vulgare</i>	30%	yes	FACU		
4. _____	%			Hydrophytic Vegetation Indicators:	
5. _____	%			<input type="checkbox"/> 1 – Rapid Test for Hydrophytic Vegetation	
6. _____	%			<input checked="" type="checkbox"/> 2 – Dominance Test is >50%	
7. _____	%			<input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹	
8. _____	%			4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)	
Total Cover:	130%			<input type="checkbox"/> Wetland Non-Vascular Plants ¹	
Woody Vine Stratum (Plot size: 15 ft radius)				<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)	
1. <i>Rubus armeniacus</i>	20%	yes	FAC	¹ Indicators of hydric soil and wetland hydrology	
2. _____	%			Must be present, unless disturbed or problematic.	
Total Cover:	20%			Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
% Bare Ground in Herb Stratum 0%					

Remarks: The dominance test was met due to over 50% of dominant species being OBL, FACW, or FAC.

SOIL

Sampling Point: 13G

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-9	10YR 3/2	100%		%			silty clay loam	
9-16	10YR 4/2	100%		%			silty clay loam	See Remarks Below
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils

☐ Histosol (A1)
☐ Histic Epipedon (A2)

☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Minerals (S1)
☐ Sandy Gleyed Matrix (S4)

☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

☐ Loamy Mucky Mineral (F1) (except MLRA 1)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)

☐ 2 cm Muck (A10)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present?

Yes☐ No☒

Remarks: Mixed charcoal and rocks. The soils within this test plot did not meet hydric soil indicator F3 because a soil with a value of 4 and chroma of 2 requires redoximorphic concentrations. Additionally, the soils did not meet hydric soil indicator F6 because matrix colors of 3/2 require 5% or more distinct or prominent redoximorphic concentrations.

HYDROLOGY

Wetland Hydrology Indicators:

Secondary Indicators
(2 or more required)

Primary Indicators (min. of one required; check all that apply)

☐ Surface Water (A1)
☒ High Water Table (A2)
☒ Saturation (A3)
☐ Water Marks (B1)
☐ Sediment Deposits (B2)
☐ Drift Deposits (B3)
☐ Algal Mat or crust (B4)
☐ Iron Deposits (B5)
☐ Surface Soil Cracks (B6)
☐ Inundation Visible on Aerial Imagery (B7)

☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, & 4B)
☐ Salt Crust (B11)
☐ Aquatic Invertebrates (B13)
☐ Hydrogen Sulfide Odor (C1)
☐ Oxidized Rhizospheres along Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Stunted or Stressed Plants (D1) (LRR A)
☐ Other (Explain in Remarks)

☐ Water Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
☐ Drainage Patterns (B10)
☐ Dry-Season Water Table (C2)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☐ FAC-Neutral Test (D5)
☐ Raised Ant Mounds (D6) (LRR A)
☐ Frost-Heave Hummocks (D4)

Field Observations:

Wetland Hydrology Present?

Surface Water Present? Yes☐ No☒ Depth (Inches): _____
Water Table Present? Yes☒ No☐ Depth (Inches): 6
Saturation Present? Yes☒ No☐ Depth (Inches): 2
(Includes Capillary fringe)

Yes☒ No☐

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:Water table and saturation were both present within 12 inches of the soil surface, meeting hydrology indicators A2 and A3.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Green Mountain PRD City/County: Camas/Clark Sampling Date: 2/29/2016
 Applicant/Owner: Green Mountain Land, LLC State: WA Sampling Point: 14G
 Investigator(s): M. McGrath, F. Naglich, J. Madriz, L. Hoffmann Section, Township, Range: 20, 2N, 3E
 Landform (hillslope, terrace, etc.): footslope Local relief: Concave Slope (%): 0-3%
 Subregion (LRR): A2 Lat: 45.6471 Long: -122.4560 Datum: NAD83
 Soil Map Unit Name: MIA, McBee silt loam NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain Remarks.)
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Area "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soils Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Remarks: Test plot located within the northern portion of Wetland G. All three wetland parameters are met, therefore the test plot was sampled within a wetland.	

VEGETATION (Use scientific names)

Tree Stratum (Plot size: <u>30</u> ft radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet
1. _____	%	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
2. _____	%	_____	_____	
3. _____	%	_____	_____	
4. _____	%	_____	_____	
Total Cover:	%			
Sapling/Shrub Stratum (Plot size: <u>15</u> ft. radius)				
1. <u>Typha latifolia</u>	80%	yes	OBL	Prevalence Index worksheet Total % Cover of: _____ Multiply by: OBL species _____ x 1= _____ FACW species _____ x 2= _____ FAC species _____ x 3= _____ FACU species _____ x 4= _____ UPL species _____ x 5= _____ Column Totals: (A) _____ (B) _____ Prevalence Index = B/A= _____
2. _____	%	_____	_____	
3. _____	%	_____	_____	
4. _____	%	_____	_____	
5. _____	%	_____	_____	
Total Cover:	80%			
Herb Stratum (Plot size: <u>5</u> ft radius)				
1. <u>Phalaris arundinacea</u>	100%	yes	FACW	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> 1 – Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 – Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data In Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
2. _____	%	_____	_____	
3. _____	%	_____	_____	
4. _____	%	_____	_____	
5. _____	%	_____	_____	
6. _____	%	_____	_____	
7. _____	%	_____	_____	
8. _____	%	_____	_____	
Total Cover:	100%			
Woody Vine Stratum (Plot size: <u>15</u> ft radius)				
1. _____	%	_____	_____	¹ Indicators of hydric soil and wetland hydrology Must be present, unless disturbed or problematic.
2. _____	%	_____	_____	
Total Cover:	%			
% Bare Ground in Herb Stratum <u>0%</u>				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

Remarks: The dominance test was met due to over 50% of dominant species being OBL, FACW, or FAC.

SOIL

Sampling Point: 14G

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6	10YR 4/1	100%		%			silty clay loam	
6-16	10YR 5/1	80%	7.5YR 4/6	20%	C	M	clay loam	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils

☐ Histosal (A1)
☐ Histic Epipedon (A2)

☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Minerals (S1)
☐ Sandy Gleyed Matrix (S4)

☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

☐ Loamy Mucky Mineral (F1) (except MLRA 1)
☐ Loamy Gleyed Matrix (F2)
☒ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)

☐ 2 cm Muck (A10)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present?
Yes☒ No☐

Remarks: Hydric soil indicator F3 was met due to a layer having a depleted matrix with 60% or more chroma of 2 or less and is at least 6 inches thick, beginning within 10 inches of the soil surface. A depleted matrix requires a value of 4 or more, and a chroma of 2 or less, which was observed within the soil profile.

HYDROLOGY

Wetland Hydrology Indicators:

Secondary Indicators
(2 or more required)

Primary Indicators (min. of one required; check all that apply)

☐ Surface Water (A1)
☒ High Water Table (A2)
☒ Saturation (A3)
☐ Water Marks (B1)
☐ Sediment Deposits (B2)
☐ Drift Deposits (B3)
☐ Algal Mat or crust (B4)
☐ Iron Deposits (B5)
☐ Surface Soil Cracks (B6)
☐ Inundation Visible on Aerial Imagery (B7)

☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, & 4B)
☐ Salt Crust (B11)
☐ Aquatic Invertebrates (B13)
☐ Hydrogen Sulfide Odor (C1)
☒ Oxidized Rhizospheres along Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Stunted or Stressed Plants (D1) (LRR A)
☐ Other (Explain in Remarks)

☐ Water Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
☐ Drainage Patterns (B10)
☐ Dry-Season Water Table (C2)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☐ FAC-Neutral Test (D5)
☐ Raised Ant Mounds (D6) (LRR A)
☐ Frost-Heave Hummocks (D4)

Field Observations:

Surface Water Present? Yes☐ No☒ Depth (Inches): _____
Water Table Present? Yes☒ No☐ Depth (Inches): 12
Saturation Present? Yes☒ No☐ Depth (Inches): 0
(Includes Capillary fringe)

Wetland Hydrology Present?
Yes☒ No☐

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:Water table and saturation were both present within 12 inches of the soil surface, meeting hydrology indicators A2 and A3. Additionally, oxidized rhizospheres among living roots were observed, which is a primary wetland hydrology indicator (C3).

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Green Mountain PRD City/County: Camas/Clark Sampling Date: 3/01/2016
 Applicant/Owner: Green Mountain Land, LLC State: WA Sampling Point: 15M
 Investigator(s): M. McGrath, F. Naglich, J. Madriz, L. Hoffmann Section, Township, Range: 20, 2N, 3E
 Landform (hillslope, terrace, etc.): footslope Local relief: Convex Slope (%): 0-5%
 Subregion (LRR): A2 Lat: 45.6471 Long: -122.4560 Datum: NAD83
 Soil Map Unit Name: DoB, Dollar loam NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain Remarks.)
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Area "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soils Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Remarks: Test plot located adjacent to the southern boundary of Wetland M. Although hydrophytic vegetation and wetland hydrology are present, the test plot was not considered to be contained within a wetland due to the lack of redoximorphic concentrations required to be present within hydric soils with a matrix of 3/1.	

VEGETATION (Use scientific names)

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet	
1. <i>Quercus garryana</i>	20%	yes	FACU	Number of Dominant Species That Are OBL, FACW, or FAC:	3 (A)
2. _____	%				
3. _____	%				
4. _____	%				
Total Cover:	20%			Total Number of Dominant Species Across All Strata:	5 (B)
				Percent of Dominant Species That Are OBL, FACW, or FAC	60 (A/B)
Sapling/Shrub Stratum (Plot size: 15 ft. radius)				Prevalence Index worksheet	
1. <i>Oemleria cerasiformis</i>	15%	yes	FACU	Total % Cover of:	Multiply by:
2. <i>Thuja plicata</i>	10%	yes	FAC	OBL species	x 1=
3. <i>Rubus ursinus</i>	5%	no	FACU	FACW species	x 2=
4. _____	%			FAC species	x 3=
5. _____	%			FACU species	x 4=
Total Cover:	30%			UPL species	x 5=
Herb Stratum (Plot size: 5 ft radius)				Column Totals:	(A) (B)
1. <i>Phalaris arundinacea</i>	90%	yes	FAC	Prevalence Index = B/A=	
2. _____	%			Hydrophytic Vegetation Indicators:	
3. _____	%			<input type="checkbox"/> 1 – Rapid Test for Hydrophytic Vegetation	
4. _____	%			<input checked="" type="checkbox"/> 2 – Dominance Test is >50%	
5. _____	%			<input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹	
6. _____	%			4 - Morphological Adaptations ¹ (Provide supporting data In Remarks or on a separate sheet)	
7. _____	%			<input type="checkbox"/> Wetland Non-Vascular Plants ¹	
8. _____	%			<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)	
Total Cover:	90%			¹ Indicators of hydric soil and wetland hydrology Must be present, unless disturbed or problematic.	
Woody Vine Stratum (Plot size: 15 ft radius)				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
1. <i>Rubus armeniacus</i>	10%	yes	FAC		
2. _____	%				
Total Cover:	10%				
% Bare Ground in Herb Stratum 10%					
Remarks: Trace amount of <i>Corylus cornuta</i> (FACU). The dominance test was met due to over 50% of dominant species being OBL, FACW, or FAC.					

SOIL

Sampling Point: 15M

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16	10YR 3/1	100%		%			gravelly clay loam	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

☐ Histosal (A1)

☐ Sandy Redox (S5)

☐ 2 cm Muck (A10)

☐ Histic Epipedon (A2)

☐ Stripped Matrix (S6)

☐ Red Parent Material (TF2)

☐ Black Histic (A3)

☐ Loamy Mucky Mineral (F1) (except MLRA 1)

☐ Very Shallow Dark Surface (TF12)

☐ Hydrogen Sulfide (A4)

☐ Loamy Gleyed Matrix (F2)

☐ Other (Explain in Remarks)

☐ Depleted Below Dark Surface (A11)

☐ Depleted Matrix (F3)

☐ Thick Dark Surface (A12)

☐ Redox Dark Surface (F6)

☐ Sandy Mucky Minerals (S1)

☐ Depleted Dark Surface (F7)

☐ Sandy Gleyed Matrix (S4)

☐ Redox Depressions (F8)

³Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks: Soils did not meet any of the requirements for hydric soils because although the matrix meets the color criteria of an F6, a matrix of 3/1 requires 2% or more redoximorphic concentrations.

HYDROLOGY

Wetland Hydrology Indicators:

Secondary Indicators (2 or more required)

Primary Indicators (min. of one required; check all that apply)

☐ Surface Water (A1)

☒ High Water Table (A2)

☒ Saturation (A3)

☐ Water Marks (B1)

☐ Sediment Deposits (B2)

☐ Drift Deposits (B3)

☐ Algal Mat or crust (B4)

☐ Iron Deposits (B5)

☐ Surface Soil Cracks (B6)

☐ Inundation Visible on Aerial Imagery (B7)

☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, & 4B)

☐ Salt Crust (B11)

☐ Aquatic Invertebrates (B13)

☐ Hydrogen Sulfide Odor (C1)

☐ Oxidized Rhizospheres along Living Roots (C3)

☐ Presence of Reduced Iron (C4)

☐ Recent Iron Reduction in Tilled Soils (C6)

☐ Stunted or Stressed Plants (D1) (LRR A)

☐ Other (Explain in Remarks)

☐ Water Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)

☐ Drainage Patterns (B10)

☐ Dry-Season Water Table (C2)

☐ Saturation Visible on Aerial Imagery (C9)

☐ Geomorphic Position (D2)

☐ Shallow Aquitard (D3)

☐ FAC-Neutral Test (D5)

☐ Raised Ant Mounds (D6) (LRR A)

☐ Frost-Heave Hummocks (D4)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (Inches): _____

Water Table Present? Yes ☒ No ☐ Depth (Inches): 1

Saturation Present? Yes ☒ No ☐ Depth (Inches): 0

(Includes Capillary fringe)

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:Water table and saturation were both present within 12 inches of the soil surface, meeting hydrology indicators A2 and A3.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Green Mountain PRD City/County: Camas/Clark Sampling Date: 3/01/2016
 Applicant/Owner: Green Mountain Land, LLC State: WA Sampling Point: 16M
 Investigator(s): M. McGrath, F. Naglich, J. Madriz, L. Hoffmann Section, Township, Range: 20, 2N, 3E
 Landform (hillslope, terrace, etc.): footslope Local relief: Convex Slope (%): 0-5%
 Subregion (LRR): A2 Lat: 45.6471 Long: -122.4560 Datum: NAD83
 Soil Map Unit Name: DoB, Dollar loam NWI classification: none
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain Remarks.)
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Area "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soils Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Remarks: Test plot located southwest of the most southwestern portion of Wetland M. No wetland indicators were present, therefore the test plot was sampled within an upland area.	

VEGETATION (Use scientific names)

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet	
1. <i>Quercus garryana</i>	30%	yes	FACU	Number of Dominant Species That Are OBL, FACW, or FAC:	3 (A)
2. <i>Pseudotsuga menziesii</i>	30%	yes	FACU	Total Number of Dominant Species Across All Strata:	6 (B)
3. _____	%			Percent of Dominant Species That Are OBL, FACW, or FAC	50 (A/B)
4. _____	%				
Total Cover:	60%				
Sapling/Shrub Stratum (Plot size: 15 ft. radius)				Prevalence Index worksheet	
1. <i>Thuja plicata</i>	20%	yes	FAC	Total % Cover of:	Multiply by:
2. <i>Cornus sericea</i>	15%	yes	FACW	OBL species	x 1= _____
3. <i>Rubus ursinus</i>	10%	yes	FACU	FACW species	x 2= _____
4. _____	%			FAC species	x 3= _____
5. _____	%			FACU species	x 4= _____
Total Cover:	45%			UPL species	x 5= _____
Herb Stratum (Plot size: 5 ft radius)				Column Totals:	(A) (B)
1. _____	%			Prevalence Index = B/A= _____	
2. _____	%			Hydrophytic Vegetation Indicators:	
3. _____	%			<input type="checkbox"/> 1 – Rapid Test for Hydrophytic Vegetation	
4. _____	%			<input type="checkbox"/> 2 – Dominance Test is >50%	
5. _____	%			<input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹	
6. _____	%			<input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data In Remarks or on a separate sheet)	
7. _____	%			<input type="checkbox"/> Wetland Non-Vascular Plants ¹	
8. _____	%			<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)	
Total Cover:	%			¹ Indicators of hydric soil and wetland hydrology Must be present, unless disturbed or problematic.	
Woody Vine Stratum (Plot size: 15 ft radius)				Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
1. <i>Rubus armeniacus</i>	90%	yes	FAC		
2. _____	%				
Total Cover:	90%				
% Bare Ground in Herb Stratum 100%					

Remarks: Trace amount of *Phalaris arundinacea* (FACW). Hydrophytic vegetation is not present because only 50% of dominant species are OBL, FACW, or FAC.

SOIL

Sampling Point: 16M

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-8	10YR 3/2	100%		%			gravelly clay loam	
8-16	10YR 3/3	99%	7.5YR 4/6	1%	C	M	gravelly clay loam	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

☐ Histosal (A1)

☐ Sandy Redox (S5)

☐ 2 cm Muck (A10)

☐ Histic Epipedon (A2)

☐ Stripped Matrix (S6)

☐ Red Parent Material (TF2)

☐ Black Histic (A3)

☐ Loamy Mucky Mineral (F1) (except MLRA 1)

☐ Very Shallow Dark Surface (TF12)

☐ Hydrogen Sulfide (A4)

☐ Loamy Gleyed Matrix (F2)

☐ Other (Explain in Remarks)

☐ Depleted Below Dark Surface (A11)

☐ Depleted Matrix (F3)

☐ Thick Dark Surface (A12)

☐ Redox Dark Surface (F6)

☐ Sandy Mucky Minerals (S1)

☐ Depleted Dark Surface (F7)

☐ Sandy Gleyed Matrix (S4)

☐ Redox Depressions (F8)

³Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks:No hydric soil indicators were met because a matrix of 3/2 requires 5% or more redoximorphic concentrations, in which none were observed. The layer from 8-16 inches has a chroma that is too high to meet any hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Secondary Indicators
(2 or more required)

Primary Indicators (min. of one required; check all that apply)

☐ Surface Water (A1)

☐ High Water Table (A2)

☐ Saturation (A3)

☐ Water Marks (B1)

☐ Sediment Deposits (B2)

☐ Drift Deposits (B3)

☐ Algal Mat or crust (B4)

☐ Iron Deposits (B5)

☐ Surface Soil Cracks (B6)

☐ Inundation Visible on Aerial Imagery (B7)

☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, & 4B)

☐ Salt Crust (B11)

☐ Aquatic Invertebrates (B13)

☐ Hydrogen Sulfide Odor (C1)

☐ Oxidized Rhizospheres along Living Roots (C3)

☐ Presence of Reduced Iron (C4)

☐ Recent Iron Reduction in Tilled Soils (C6)

☐ Stunted or Stressed Plants (D1) (LRR A)

☐ Other (Explain in Remarks)

☐ Water Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)

☐ Drainage Patterns (B10)

☐ Dry-Season Water Table (C2)

☐ Saturation Visible on Aerial Imagery (C9)

☐ Geomorphic Position (D2)

☐ Shallow Aquitard (D3)

☐ FAC-Neutral Test (D5)

☐ Raised Ant Mounds (D6) (LRR A)

☐ Frost-Heave Hummocks (D4)

Field Observations:

Surface Water Present? Yes ☐ No ☒

Water Table Present? Yes ☐ No ☒

Saturation Present? Yes ☐ No ☒

Depth (Inches): _____

Depth (Inches): _____

Depth (Inches): _____

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:No wetland hydrology was observed at or near this test plot.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Green Mountain PRD City/County: Camas/Clark Sampling Date: 3/01/2016
 Applicant/Owner: Green Mountain Land, LLC State: WA Sampling Point: 17B
 Investigator(s): M. McGrath, F. Naglich, J. Madriz, L. Hoffmann Section, Township, Range: 20, 2N, 3E
 Landform (hillslope, terrace, etc.): footslope Local relief: Concave Slope (%): 0-5%
 Subregion (LRR): A2 Lat: 45.6471 Long: -122.4560 Datum: NAD83
 Soil Map Unit Name: DoB, Dollar loam NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain Remarks.)
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Area "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soils Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
Remarks: Test plot located within the southern portion of Wetland B. All three wetland parameters are met, therefore the test plot was sampled within a wetland.			

VEGETATION (Use scientific names)

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet	
1. <i>Fraxinus latifolia</i>	30%	yes	FACW	Number of Dominant Species That Are OBL, FACW, or FAC:	6 (A)
2. _____	%				
3. _____	%				
4. _____	%			Total Number of Dominant Species Across All Strata:	6 (B)
Total Cover:	30%			Percent of Dominant Species That Are OBL, FACW, or FAC	100 (A/B)
Sapling/Shrub Stratum (Plot size: 15 ft. radius)				Prevalence Index worksheet	
1. <i>Oenanth sarmentosa</i>	15%	yes	OBL	Total % Cover of:	Multiply by:
2. <i>Rosa pisocarpa</i>	10%	yes	FAC	OBL species	x 1=
3. <i>Rubus ursinus</i>	5%	no	FACU	FACW species	x 2=
4. <i>Populus trichocarpa</i>	5%	no	FAC	FAC species	x 3=
5. _____	%			FACU species	x 4=
Total Cover:	35%			UPL species	x 5=
Herb Stratum (Plot size: 5 ft radius)				Column Totals:	(A) (B)
1. <i>Juncus sp.</i>	10%	yes	FAC	Prevalence Index = B/A=	
2. <i>Rumex sp.</i>	5%	yes	FAC	Hydrophytic Vegetation Indicators:	
3. _____	%			<input type="checkbox"/> 1 – Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 – Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)	
4. _____	%			<input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)	
5. _____	%				
6. _____	%				
7. _____	%				
8. _____	%				
Total Cover:	15%				
Woody Vine Stratum (Plot size: 15 ft radius)				¹ Indicators of hydric soil and wetland hydrology Must be present, unless disturbed or problematic.	
1. <i>Rubus armeniacus</i>	10%	yes	FAC	Hydrophytic Vegetation Present?	
2. _____	%			Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Total Cover:	10%				
% Bare Ground in Herb Stratum 85%					

Remarks: 20% of bare ground was covered in moss. The dominance test was met due to over 50% of dominant species being OBL, FACW, or FAC.

SOIL

Sampling Point: 17B

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16	10YR 3/2	95%	5YR 4/6	5%	C	RC	sandy silt loam	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

☐ Histosal (A1)

☐ Sandy Redox (S5)

☐ 2 cm Muck (A10)

☐ Histic Epipedon (A2)

☐ Stripped Matrix (S6)

☐ Red Parent Material (TF2)

☐ Black Histic (A3)

☐ Loamy Mucky Mineral (F1) (except MLRA 1)

☐ Very Shallow Dark Surface (TF12)

☐ Hydrogen Sulfide (A4)

☐ Loamy Gleyed Matrix (F2)

☐ Other (Explain in Remarks)

☐ Depleted Below Dark Surface (A11)

☐ Depleted Matrix (F3)

☒ Redox Dark Surface (F6)

☐ Thick Dark Surface (A12)

☒ Redox Dark Surface (F7)

☐ Sandy Mucky Minerals (S1)

☐ Depleted Dark Surface (F7)

☐ Sandy Gleyed Matrix (S4)

☐ Redox Depressions (F8)

³Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes☒ No☐

Remarks: Hydric soil indicator F6 was met because the layer was at least 4 inches thick within the upper 12 inches of the soil, and had a matrix value of 3 or less, and a chroma of 2 or less, with 5% or more distinct or prominent redox concentrations.

HYDROLOGY

Wetland Hydrology Indicators:

Secondary Indicators (2 or more required)

Primary Indicators (min. of one required; check all that apply)

☒ Surface Water (A1)

☐ High Water Table (A2)

☒ Saturation (A3)

☐ Water Marks (B1)

☐ Sediment Deposits (B2)

☐ Drift Deposits (B3)

☐ Algal Mat or crust (B4)

☐ Iron Deposits (B5)

☐ Surface Soil Cracks (B6)

☐ Inundation Visible on Aerial Imagery (B7)

☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, & 4B)

☐ Salt Crust (B11)

☐ Aquatic Invertebrates (B13)

☐ Hydrogen Sulfide Odor (C1)

☐ Oxidized Rhizospheres along Living Roots (C3)

☐ Presence of Reduced Iron (C4)

☐ Recent Iron Reduction in Tilled Soils (C6)

☐ Stunted or Stressed Plants (D1) (LRR A)

☐ Other (Explain in Remarks)

☐ Water Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)

☐ Drainage Patterns (B10)

☐ Dry-Season Water Table (C2)

☐ Saturation Visible on Aerial Imagery (C9)

☐ Geomorphic Position (D2)

☐ Shallow Aquitard (D3)

☐ FAC-Neutral Test (D5)

☐ Raised Ant Mounds (D6) (LRR A)

☐ Frost-Heave Hummocks (D4)

Field Observations:

Surface Water Present? Yes☐ No☒

Water Table Present? Yes☒ No☐

Saturation Present? Yes☒ No☐

Depth (Inches): _____

Depth (Inches): 4-6

Depth (Inches): 0

Wetland Hydrology Present? Yes☒ No☐

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:Water table and saturation were both present within 12 inches of the soil surface, meeting hydrology indicators A2 and A3.

US Army Corps of Engineers

Western Mountains, Valleys and Coast – FINAL Version 2

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Green Mountain PRD City/County: Camas/Clark Sampling Date: 3/01/2016
 Applicant/Owner: Green Mountain Land, LLC State: WA Sampling Point: 18B
 Investigator(s): M. McGrath, F. Naglich, J. Madriz, L. Hoffmann Section, Township, Range: 20, 2N, 3E
 Landform (hillslope, terrace, etc.): footslope Local relief: Convex Slope (%): 0-5%
 Subregion (LRR): A2 Lat: 45.6471 Long: -122.4560 Datum: NAD83
 Soil Map Unit Name: DoB, Dollar loam NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain Remarks.)
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Area "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Hydric Soils Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks: Test plot located north of Wetland B. No wetland indicators were present, therefore the test plot was sampled within an upland area.	

VEGETATION (Use scientific names)

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet	
1. <i>Populus trichocarpa</i>	70%	yes	FAC	Number of Dominant Species That Are OBL, FACW, or FAC:	1 (A)
2. _____	%				
3. _____	%				
4. _____	%			Total Number of Dominant Species Across All Strata:	6 (B)
Total Cover:	70%				16 (A/B)
				Percent of Dominant Species That Are OBL, FACW, or FAC	
				Prevalence Index worksheet	
				Total % Cover of:	Multiply by:
Sapling/Shrub Stratum (Plot size: 15 ft. radius)				OBL species	x 1=
1. <i>Gaultheria shallon</i>	30%	yes	FACU	FACW species	x 2=
2. <i>Rubus ursinus</i>	30%	yes	FACU	FAC species	x 3=
3. <i>Symphoricarpos albus</i>	20%	yes	FACU	FACU species	x 4=
4. <i>Acer circinatum</i>	15%	no	FAC	UPL species	x 5=
5. <i>Oemleria cerasiformis</i>	5%	no	FACU	Column Totals:	(A) (B)
Total Cover:	100%			Prevalence Index = B/A=	
Herb Stratum (Plot size: 5 ft radius)				Hydrophytic Vegetation Indicators:	
1. <i>Polystichum munitum</i>	30%	yes	FACU	<input type="checkbox"/> 1 – Rapid Test for Hydrophytic Vegetation	
2. <i>Galium aparine</i>	25%	yes	FACU	<input type="checkbox"/> 2 – Dominance Test is >50%	
3. _____	%			<input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹	
4. _____	%			<input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)	
5. _____	%			<input type="checkbox"/> Wetland Non-Vascular Plants ¹	
6. _____	%			<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)	
7. _____	%				
8. _____	%				
Total Cover:	55%				
Woody Vine Stratum (Plot size: 15 ft radius)				¹ Indicators of hydric soil and wetland hydrology Must be present, unless disturbed or problematic.	
1. _____	%				
2. _____	%				
Total Cover:	%				
% Bare Ground in Herb Stratum 45%				Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Remarks: Hydrophytic vegetation is not present because the number of OBL, FACW, and FAC plant observed within the vicinity of the test plot was less than 50% of the dominant vegetation present.					

SOIL

Sampling Point: 18B

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10YR 3/3	100%		%			silty loam	
12-16	10YR 3/3	95%	10YR 4/6	5%	C	M	silty loam	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

☐ Histosal (A1)

☐ Sandy Redox (S5)

☐ 2 cm Muck (A10)

☐ Histic Epipedon (A2)

☐ Stripped Matrix (S6)

☐ Red Parent Material (TF2)

☐ Black Histic (A3)

☐ Loamy Mucky Mineral (F1) (except MLRA 1)

☐ Very Shallow Dark Surface (TF12)

☐ Hydrogen Sulfide (A4)

☐ Loamy Gleyed Matrix (F2)

☐ Other (Explain in Remarks)

☐ Depleted Below Dark Surface (A11)

☐ Depleted Matrix (F3)

☐ Thick Dark Surface (A12)

☐ Redox Dark Surface (F6)

☐ Sandy Mucky Minerals (S1)

☐ Depleted Dark Surface (F7)

☐ Sandy Gleyed Matrix (S4)

☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils

³Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks: No hydric soil indicators were met within the soil profile because the chroma of the sample was too high.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (min. of one required; check all that apply)

☐ Surface Water (A1)

☐ High Water Table (A2)

☐ Saturation (A3)

☐ Water Marks (B1)

☐ Sediment Deposits (B2)

☐ Drift Deposits (B3)

☐ Algal Mat or crust (B4)

☐ Iron Deposits (B5)

☐ Surface Soil Cracks (B6)

☐ Inundation Visible on Aerial Imagery (B7)

☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, & 4B)

☐ Salt Crust (B11)

☐ Aquatic Invertebrates (B13)

☐ Hydrogen Sulfide Odor (C1)

☐ Oxidized Rhizospheres along Living Roots (C3)

☐ Presence of Reduced Iron (C4)

☐ Recent Iron Reduction in Tilled Soils (C6)

☐ Stunted or Stressed Plants (D1) (LRR A)

☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

☐ Water Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)

☐ Drainage Patterns (B10)

☐ Dry-Season Water Table (C2)

☐ Saturation Visible on Aerial Imagery (C9)

☐ Geomorphic Position (D2)

☐ Shallow Aquitard (D3)

☐ FAC-Neutral Test (D5)

☐ Raised Ant Mounds (D6) (LRR A)

☐ Frost-Heave Hummocks (D4)

Field Observations:

Surface Water Present? Yes ☐ No ☒

Water Table Present? Yes ☐ No ☒

Saturation Present? Yes ☐ No ☒

(Includes Capillary fringe)

Depth (Inches): _____

Depth (Inches): _____

Depth (Inches): _____

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:No indicators of wetland hydrology were observed at or near the test plot.

Appendix B

Wetland Rating Forms for Western Washington (2014 Rating System)

Wetland Rating Figure 1 150' Offset – South

Wetland Rating Figure 2 1 KM Offset – South

Wetland Rating Figure 3 150' Offset – North

Wetland Rating Figure 4 1 KM Offset – North

Wetland Rating Figure 5 303(d) Listed Waters and TMDLs for WRIA

Wetland name or number J

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland J Date of site visit: 2/29/2016 & 3/01/2016

Rated by J. Madriz, L. Hoffmann, and M. McGrath Trained by Ecology? Yes Date of training 09/2015

HGM Class used for rating Slope Wetland has multiple HGM classes? Y x N

NOTE: Form is not complete without the figures requested (figures can be combined).

Source of base aerial photo/map Google Earth (2015)

OVERALL WETLAND CATEGORY III (based on functions x or special characteristics)

1. Category of wetland based on FUNCTIONS

 Category I – Total score = 23 – 27

 Category II – Total score = 20 – 22

 X Category III – Total score = 16 – 19

 Category IV – Total score = 9 – 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
<i>Circle the appropriate ratings</i>				
Site Potential	L	L	L	
Landscape Potential	M	M	H	
Value	H	M	M	TOTAL
Score Based on Ratings	6	5	6	17

**Score for each
function based
on three
ratings**
(order of ratings
is not
important)

9 = H,H,H

8 = H,H,M

7 = H,H,L

7 = H,M,M

6 = H,M,L

6 = M,M,M

5 = H,L,L

5 = M,M,L

4 = M,L,L

3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	I II
Wetland of High Conservation Value	I
Bog	I
Mature Forest	I
Old Growth Forest	I
Coastal Lagoon	I II
Interdunal	I II III IV
None of the above	N/A

Wetland name or number J_____

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (<i>can be added to map of hydroperiods</i>)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (<i>can be added to another figure</i>)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	1
Hydroperiods	H 1.2	1
Plant cover of dense trees, shrubs, and herbaceous plants	S 1.3	1
Plant cover of dense, rigid trees, shrubs, and herbaceous plants (<i>can be added to figure above</i>)	S 4.1	1
Boundary of 150 ft buffer (<i>can be added to another figure</i>)	S 2.1, S 5.1	1
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	2
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	5a
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	5b

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

NO – go to 2

YES – the wetland class is **Tidal Fringe** – go to 1.1

- 1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

NO – Saltwater Tidal Fringe (Estuarine)

YES – Freshwater Tidal Fringe

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

NO – go to 3

YES – The wetland class is **Flats**

*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?

- ☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

NO – go to 4

YES – The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

- ☒ The wetland is on a slope (*slope can be very gradual*),
☒ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
☒ The water leaves the wetland **without being impounded**.

NO – go to 5

YES – The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?

- ☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☐ The overbank flooding occurs at least once every 2 years.

Wetland name or number J

NO – go to 6

YES – The wetland class is **Riverine** **NOTE:**

The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

NO – go to 7

YES – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

NO – go to 8

YES – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

*If you are still unable to determine which of the above criteria apply to your wetland, or if you have **more than 2 HGM classes** within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number J

SLOPE WETLANDS	
Water Quality Functions - Indicators that the site functions to improve water quality	
S 1.0. Does the site have the potential to improve water quality?	
S 1.1. Characteristics of the average slope of the wetland: <i>(a 1% slope has a 1 ft vertical drop in elevation for every 100 ft of horizontal distance)</i> Slope is 1% or less points = 3 Slope is > 1%-2% points = 2 Slope is > 2%-5% points = 1 Slope is greater than 5% points = 0	2
S 1.2. <u>The soil 2 in below the surface (or duff layer) is true clay or true organic (use NRCS definitions):</u> Yes = 3 No = 0	0
S 1.3. Characteristics of the plants in the wetland that trap sediments and pollutants: Choose the points appropriate for the description that best fits the plants in the wetland. <i>Dense means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 in.</i> Dense, uncut, herbaceous plants > 90% of the wetland area points = 6 Dense, uncut, herbaceous plants > ½ of area points = 3 Dense, woody, plants > ½ of area points = 2 Dense, uncut, herbaceous plants > ¼ of area points = 1 Does not meet any of the criteria above for plants points = 0	3
Total for S 1	Add the points in the boxes above 5

Rating of Site Potential If score is: 12 = H 6-11 = M x 0-5 = L

Record the rating on the first page

S 2.0. Does the landscape have the potential to support the water quality function of the site?	
S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? Yes = 1 No = 0	1
S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other sources Yes = 1 No = 0	0
Total for S 2	Add the points in the boxes above 1

Rating of Landscape Potential If score is: x 1-2 = M 0 = L

Record the rating on the first page

S 3.0. Is the water quality improvement provided by the site valuable to society?	
S 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? Yes = 1 No = 0	1
S 3.2. Is the wetland in a basin or sub-basin where water quality is an issue? <i>At least one aquatic resource in the basin is on the 303(d) list.</i> Yes = 1 No = 0	1
S 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? <i>Answer YES if there is a TMDL for the basin in which unit is found.</i> Yes = 2 No = 0	2
Total for S 3	Add the points in the boxes above 4

Rating of Value If score is: x 2-4 = H 1 = M 0 = L

Record the rating on the first page

Wetland name or number 1

SLOPE WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream erosion

S 4.0. Does the site have the potential to reduce flooding and stream erosion?

S 4.1. Characteristics of plants that reduce the velocity of surface flows during storms: Choose the points appropriate for the description that best fits conditions in the wetland. *Stems of plants should be thick enough (usually > 1/8 in), or dense enough, to remain erect during surface flows.*

0

Dense, uncut, **rigid** plants cover > 90% of the area of the wetland

points = 1

All other conditions

points = 0

Rating of Site Potential If score is: **1 = M** x **0 = L**

Record the rating on the first page

S 5.0. Does the landscape have the potential to support the hydrologic functions of the site?

S 5.1. Is more than 25% of the area within 150 ft upslope of wetland in land uses or cover that generate excess surface runoff? Yes = 1 No = 0

Yes = 1 No = 0

1

Rating of Landscape Potential If score is: x 1 = M 0 = L

Record the rating on the first page

S 6.0. Are the hydrologic functions provided by the site valuable to society?

S 6.1. Distance to the nearest areas downstream that have flooding problems:

The sub-basin immediately down-gradient of site has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds) points

points = 2

1

Surface flooding problems are in a sub-basin farther down-gradient

points = 1

No flooding problems anywhere downstream

points = 0

S 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?

Yes = 2 No = 0

0

Total for S 6

Add the points in the boxes above

1

Rating of Value If score is: 2-4 = H x 1 = M 0 = L

Record the rating on the first page

NOTES and FIELD OBSERVATIONS:

Wetland name or number J

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class. Check the Cowardin plant classes in the wetland. Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

- | | | |
|---|----------------------------------|----------|
| <input type="checkbox"/> Aquatic bed | 4 structures or more: points = 4 | 1 |
| <input checked="" type="checkbox"/> Emergent | 3 structures: points = 2 | |
| <input checked="" type="checkbox"/> Scrub-shrub (areas where shrubs have > 30% cover) | 2 structures: points = 1 | |
| <input type="checkbox"/> Forested (areas where trees have > 30% cover) | 1 structure: points = 0 | |
| <i>If the unit has a Forested class, check if:</i> | | |
| <input type="checkbox"/> The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon | | |

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

- | | | |
|--|-------------------------------------|----------|
| <input type="checkbox"/> Permanently flooded or inundated | 4 or more types present: points = 3 | 1 |
| <input type="checkbox"/> Seasonally flooded or inundated | 3 types present: points = 2 | |
| <input checked="" type="checkbox"/> Occasionally flooded or inundated | 2 types present: points = 1 | |
| <input checked="" type="checkbox"/> Saturated only | 1 type present: points = 0 | |
| <input type="checkbox"/> Permanently flowing stream or river in, or adjacent to, the wetland | | |
| <input type="checkbox"/> Seasonally flowing stream in, or adjacent to, the wetland | | |
| <input type="checkbox"/> Lake Fringe wetland | 2 points | |
| <input type="checkbox"/> Freshwater tidal wetland | 2 points | |

H 1.3. Richness of plant species

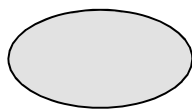
Count the number of plant species in the wetland that cover at least 10 ft².

*Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. **Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

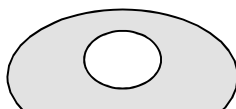
- | | | |
|------------------------------|------------|----------|
| If you counted: > 19 species | points = 2 | 1 |
| 5 - 19 species | points = 1 | |
| < 5 species | points = 0 | |

H 1.4. Interspersion of habitats

Decide from the diagrams below whether interspersions among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



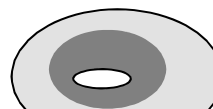
None = 0 points



Low = 1 point

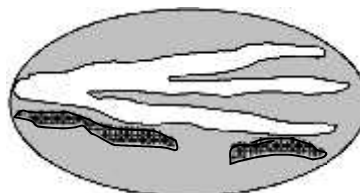
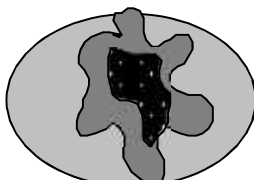
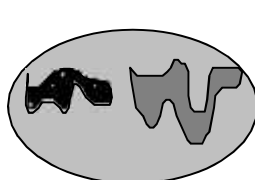


Moderate = 2 points



1

All three diagrams in this row are **HIGH** = 3 points



Wetland name or number J

<p>H 1.5. Special habitat features:</p> <p>Check the habitat features that are present in the wetland. <i>The number of checks is the number of points.</i></p> <p><input type="checkbox"/> Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long).</p> <p><input type="checkbox"/> Standing snags (dbh > 4 in) within the wetland</p> <p><input type="checkbox"/> Undercut banks are present for at least 6.6 ft (2 m) and/or overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m)</p> <p><input type="checkbox"/> Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (<i>cut shrubs or trees that have not yet weathered where wood is exposed</i>)</p> <p><input type="checkbox"/> At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (<i>structures for egg-laying by amphibians</i>)</p> <p><input type="checkbox"/> Invasive plants cover less than 25% of the wetland area in every stratum of plants (<i>see H 1.1 for list of strata</i>)</p>		0
Total for H 1	Add the points in the boxes above	4

Rating of Site Potential If score is: 15-18 = H 7-14 = M x 0-6 = L *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?

<p>H 2.1. Accessible habitat (include <i>only habitat that directly abuts wetland unit</i>).</p> <p>Calculate: % undisturbed habitat <u>0</u> + [(% moderate and low intensity land uses)/2] <u>0</u> = <u>0</u> %</p> <p>If total accessible habitat is:</p> <p>> 1/3 (33.3%) of 1 km Polygon points = 3</p> <p>20-33% of 1 km Polygon points = 2</p> <p>10-19% of 1 km Polygon points = 1</p> <p>< 10% of 1 km Polygon points = 0</p>		0
<p>H 2.2. Undisturbed habitat in 1 km Polygon around the wetland.</p> <p>Calculate: % undisturbed habitat <u>43</u> + [(% moderate and low intensity land uses)/2] <u>10</u> = <u>53</u> %</p> <p>Undisturbed habitat > 50% of Polygon points = 3</p> <p>Undisturbed habitat 10-50% and in 1-3 patches points = 2</p> <p>Undisturbed habitat 10-50% and > 3 patches points = 1</p> <p>Undisturbed habitat < 10% of 1 km Polygon points = 0</p>		3
<p>H 2.3. Land use intensity in 1 km Polygon: If</p> <p>> 50% of 1 km Polygon is high intensity land use points = (- 2)</p> <p>≤ 50% of 1 km Polygon is high intensity points = 0</p>		0
Total for H 2	Add the points in the boxes above	4

Rating of Landscape Potential If score is: x 4-6 = H 1-3 = M < 1 = L *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?

H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.*

Site meets ANY of the following criteria: points = 2

- ☐ It has 3 or more priority habitats within 100 m (see next page)
- ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists)
- ☐ It is mapped as a location for an individual WDFW priority species
- ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources
- ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan

X Site has 1 or 2 priority habitats (listed on next page) within 100 m points = 1

Site does not meet any of the criteria above points = 0

Rating of Value If score is: 2 = H x 1 = M 0 = L *Record the rating on the first page*

Wetland name or number J

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. <http://wdfw.wa.gov/publications/00165/wdfw00165.pdf> or access the list from here: <http://wdfw.wa.gov/conservation/phs/list/>)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: **NOTE:** *This question is independent of the land use between the wetland unit and the priority habitat.*

- **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
- **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).
- **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.
- **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.
- **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).
- ☒ **Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).
- **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- **Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).
- **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.
- **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number J

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type	Category
<i>Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.</i>	
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.5 ppt <div style="text-align: right;"> Yes – Go to SC 1.1 No = Not an estuarine wetland </div>	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? <div style="text-align: right;"> Yes = Category I No - Go to SC 1.2 </div>	Cat. I
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are <i>Spartina</i> , see page 25) — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed grassland. — The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. <div style="text-align: right;"> Yes = Category I No = Category II </div>	Cat. I Cat. II
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? <div style="text-align: right;"> Yes – Go to SC 2.2 No – Go to SC 2.3 </div> SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? <div style="text-align: right;"> Yes = Category I No = Not a WHCV </div> SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf <div style="text-align: right;"> Yes – Contact WNHP/WDNR and go to SC 2.4 No = Not a WHCV </div> SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? <div style="text-align: right;"> Yes = Category I No = Not a WHCV </div>	Cat. I
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? <i>Use the key below. If you answer YES you will still need to rate the wetland based on its functions.</i> SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? <div style="text-align: right;"> Yes – Go to SC 3.3 No – Go to SC 3.2 </div> SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? <div style="text-align: right;"> Yes – Go to SC 3.3 No = Is not a bog </div> SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? <div style="text-align: right;"> Yes = Is a Category I bog No – Go to SC 3.4 </div> NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? <div style="text-align: right;"> Yes = Is a Category I bog No = Is not a bog </div>	Cat. I

Wetland name or number J_____

<p>SC 4.0. Forested Wetlands</p> <p>Does the wetland have at least <u>1 contiguous acre</u> of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? <i>If you answer YES you will still need to rate the wetland based on its functions.</i></p> <ul style="list-style-type: none"> — Old-growth forests (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. — Mature forests (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). <p>Yes = Category I No = Not a forested wetland for this section</p>	<p>Cat. I</p>
<p>SC 5.0. Wetlands in Coastal Lagoons</p> <p>Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?</p> <ul style="list-style-type: none"> — The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks — The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (<i>needs to be measured near the bottom</i>) <p>Yes – Go to SC 5.1 No = Not a wetland in a coastal lagoon</p> <p>SC 5.1. Does the wetland meet all of the following three conditions?</p> <ul style="list-style-type: none"> — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed grassland. — The wetland is larger than 1/10 ac (4350 ft²) <p>Yes = Category I No = Category II</p>	<p>Cat. I</p> <p>Cat. II</p>
<p>SC 6.0. Interdunal Wetlands</p> <p>Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? <i>If you answer yes you will still need to rate the wetland based on its habitat functions.</i></p> <p>In practical terms that means the following geographic areas:</p> <ul style="list-style-type: none"> — Long Beach Peninsula: Lands west of SR 103 — Grayland-Westport: Lands west of SR 105 — Ocean Shores-Copalis: Lands west of SR 115 and SR 109 <p>Yes – Go to SC 6.1 No = Not an interdunal wetland for rating</p> <p>SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? Yes = Category I No – Go to SC 6.2</p> <p>SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? Yes = Category II No – Go to SC 6.3</p> <p>SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? Yes = Category III No = Category IV</p>	<p>Cat I</p> <p>Cat. II</p> <p>Cat. III</p> <p>Cat. IV</p>
<p>Category of wetland based on Special Characteristics</p> <p>If you answered No for all types, enter "Not Applicable" on Summary Form</p>	<p>N/A</p>

Wetland name or number J

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Wetland name or number L

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland L Date of site visit: 2/29/2016 & 3/01/2016

Rated by J. Madriz, L. Hoffmann, and M. McGrath Trained by Ecology? Yes Date of training 09/2015

HGM Class used for rating Slope Wetland has multiple HGM classes? Y x N

NOTE: Form is not complete without the figures requested (figures can be combined).

Source of base aerial photo/map Google Earth (2015)

OVERALL WETLAND CATEGORY III (based on functions x or special characteristics)

1. Category of wetland based on FUNCTIONS

 Category I – Total score = 23 – 27

 Category II – Total score = 20 – 22

 X Category III – Total score = 16 – 19

 Category IV – Total score = 9 – 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
<i>Circle the appropriate ratings</i>				
Site Potential	L	L	L	
Landscape Potential	M	M	M	
Value	H	M	M	TOTAL
Score Based on Ratings	6	5	5	16

**Score for each
function based
on three
ratings**
(order of ratings
is not
important)

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	I II
Wetland of High Conservation Value	I
Bog	I
Mature Forest	I
Old Growth Forest	I
Coastal Lagoon	I II
Interdunal	I II III IV
None of the above	N/A

Wetland name or number L

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (<i>can be added to map of hydroperiods</i>)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (<i>can be added to another figure</i>)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	1
Hydroperiods	H 1.2	1
Plant cover of dense trees, shrubs, and herbaceous plants	S 1.3	1
Plant cover of dense, rigid trees, shrubs, and herbaceous plants (<i>can be added to figure above</i>)	S 4.1	1
Boundary of 150 ft buffer (<i>can be added to another figure</i>)	S 2.1, S 5.1	1
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	2
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	5a
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	5b

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

NO – go to 2

YES – the wetland class is **Tidal Fringe** – go to 1.1

- 1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

NO – Saltwater Tidal Fringe (Estuarine)

YES – Freshwater Tidal Fringe

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

NO – go to 3

YES – The wetland class is **Flats**

*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?

- ☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

NO – go to 4

YES – The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

- ☒ The wetland is on a slope (*slope can be very gradual*),
☒ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
☒ The water leaves the wetland **without being impounded**.

NO – go to 5

YES – The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?

- ☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☐ The overbank flooding occurs at least once every 2 years.

Wetland name or number L

NO – go to 6

YES – The wetland class is **Riverine** **NOTE:**

The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

NO – go to 7

YES – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

NO – go to 8

YES – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

*If you are still unable to determine which of the above criteria apply to your wetland, or if you have **more than 2 HGM classes** within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number L

SLOPE WETLANDS		
Water Quality Functions - Indicators that the site functions to improve water quality		
S 1.0. Does the site have the potential to improve water quality?		
S 1.1. Characteristics of the average slope of the wetland: <i>(a 1% slope has a 1 ft vertical drop in elevation for every 100 ft of horizontal distance)</i> Slope is 1% or less points = 3 Slope is > 1%-2% points = 2 Slope is > 2%-5% points = 1 Slope is greater than 5% points = 0		2
S 1.2. <u>The soil 2 in below the surface (or duff layer)</u> is true clay or true organic <i>(use NRCS definitions)</i> : Yes = 3 No = 0		0
S 1.3. Characteristics of the plants in the wetland that trap sediments and pollutants: Choose the points appropriate for the description that best fits the plants in the wetland. <i>Dense means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 in.</i> Dense, uncut, herbaceous plants > 90% of the wetland area points = 6 Dense, uncut, herbaceous plants > ½ of area points = 3 Dense, woody, plants > ½ of area points = 2 Dense, uncut, herbaceous plants > ¼ of area points = 1 Does not meet any of the criteria above for plants points = 0		3
Total for S 1 Add the points in the boxes above		5

Rating of Site Potential If score is: 12 = H 6-11 = M x 0-5 = L

Record the rating on the first page

S 2.0. Does the landscape have the potential to support the water quality function of the site?		
S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? Yes = 1 No = 0		1
S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other sources Yes = 1 No = 0		0
Total for S 2 Add the points in the boxes above		1

Rating of Landscape Potential If score is: x 1-2 = M 0 = L

Record the rating on the first page

S 3.0. Is the water quality improvement provided by the site valuable to society?		
S 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? Yes = 1 No = 0		1
S 3.2. Is the wetland in a basin or sub-basin where water quality is an issue? <i>At least one aquatic resource in the basin is on the 303(d) list.</i> Yes = 1 No = 0		1
S 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? <i>Answer YES if there is a TMDL for the basin in which unit is found.</i> Yes = 2 No = 0		2
Total for S 3 Add the points in the boxes above		4

Rating of Value If score is: x 2-4 = H 1 = M 0 = L

Record the rating on the first page

Wetland name or number L

<u>SLOPE WETLANDS</u>	
Hydrologic Functions - Indicators that the site functions to reduce flooding and stream erosion	
S 4.0. Does the site have the potential to reduce flooding and stream erosion?	
S 4.1. Characteristics of plants that reduce the velocity of surface flows during storms: Choose the points appropriate for the description that best fits conditions in the wetland. <i>Stems of plants should be thick enough (usually > $\frac{1}{8}$ in), or dense enough, to remain erect during surface flows.</i> Dense, uncut, rigid plants cover > 90% of the area of the wetland All other conditions	0 points = 1 points = 0

Rating of Site Potential If score is: 1 = M x 0 = L

Record the rating on the first page

S 5.0. Does the landscape have the potential to support the hydrologic functions of the site?	
S 5.1. Is more than 25% of the area within 150 ft upslope of wetland in land uses or cover that generate excess surface runoff?	1 Yes = 1 No = 0

Rating of Landscape Potential If score is: x 1 = M 0 = L

Record the rating on the first page

S 6.0. Are the hydrologic functions provided by the site valuable to society?	
S 6.1. Distance to the nearest areas downstream that have flooding problems: The sub-basin immediately down-gradient of site has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds) Surface flooding problems are in a sub-basin farther down-gradient No flooding problems anywhere downstream	1 points = 2 points = 1 points = 0
S 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	0 Yes = 2 No = 0
Total for S 6	1 Add the points in the boxes above

Rating of Value If score is: 2-4 = H x 1 = M 0 = L

Record the rating on the first page

NOTES and FIELD OBSERVATIONS:

Wetland name or number L

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class. Check the Cowardin plant classes in the wetland. Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

- | | | |
|---|----------------------------------|----------|
| <input type="checkbox"/> Aquatic bed | 4 structures or more: points = 4 | 1 |
| <input checked="" type="checkbox"/> Emergent | 3 structures: points = 2 | |
| <input checked="" type="checkbox"/> Scrub-shrub (areas where shrubs have > 30% cover) | 2 structures: points = 1 | |
| <input type="checkbox"/> Forested (areas where trees have > 30% cover) | 1 structure: points = 0 | |
| <i>If the unit has a Forested class, check if:</i> | | |
| <input type="checkbox"/> The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon | | |

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

- | | | |
|---|-------------------------------------|----------|
| <input type="checkbox"/> Permanently flooded or inundated | 4 or more types present: points = 3 | 2 |
| <input type="checkbox"/> Seasonally flooded or inundated | 3 types present: points = 2 | |
| <input checked="" type="checkbox"/> Occasionally flooded or inundated | 2 types present: points = 1 | |
| <input checked="" type="checkbox"/> Saturated only | 1 type present: points = 0 | |
| <input checked="" type="checkbox"/> Permanently flowing stream or river in, or adjacent to, the wetland | | |
| <input type="checkbox"/> Seasonally flowing stream in, or adjacent to, the wetland | | |
| <input type="checkbox"/> Lake Fringe wetland | 2 points | |
| <input type="checkbox"/> Freshwater tidal wetland | 2 points | |

H 1.3. Richness of plant species

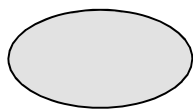
Count the number of plant species in the wetland that cover at least 10 ft².

*Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. **Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

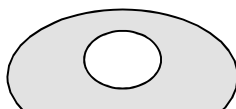
- | | | |
|------------------------------|------------|----------|
| If you counted: > 19 species | points = 2 | 1 |
| 5 - 19 species | points = 1 | |
| < 5 species | points = 0 | |

H 1.4. Interspersion of habitats

Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



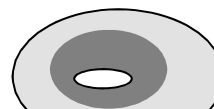
None = 0 points



Low = 1 point

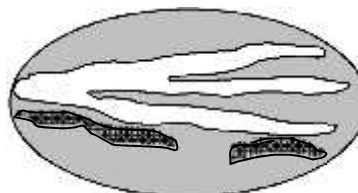
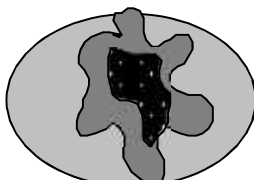
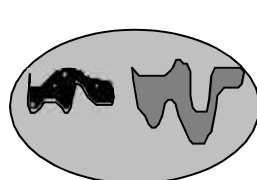


Moderate = 2 points



1

All three diagrams in this row are **HIGH** = 3points



Wetland name or number L

<p>H 1.5. Special habitat features:</p> <p>Check the habitat features that are present in the wetland. <i>The number of checks is the number of points.</i></p> <p><input type="checkbox"/> Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long).</p> <p><input type="checkbox"/> Standing snags (dbh > 4 in) within the wetland</p> <p><input type="checkbox"/> Undercut banks are present for at least 6.6 ft (2 m) and/or overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m)</p> <p><input type="checkbox"/> Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (<i>cut shrubs or trees that have not yet weathered where wood is exposed</i>)</p> <p><input type="checkbox"/> At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (<i>structures for egg-laying by amphibians</i>)</p> <p><input checked="" type="checkbox"/> Invasive plants cover less than 25% of the wetland area in every stratum of plants (<i>see H 1.1 for list of strata</i>)</p>		1
Total for H 1	Add the points in the boxes above	6

Rating of Site Potential If score is: 15-18 = H 7-14 = M x 0-6 = L *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?

<p>H 2.1. Accessible habitat (include <i>only habitat that directly abuts wetland unit</i>).</p> <p>Calculate: % undisturbed habitat <u>0</u> + [(% moderate and low intensity land uses)/2] <u>0</u> = <u>0</u> %</p> <p>If total accessible habitat is:</p> <p>> 1/3 (33.3%) of 1 km Polygon points = 3</p> <p>20-33% of 1 km Polygon points = 2</p> <p>10-19% of 1 km Polygon points = 1</p> <p>< 10% of 1 km Polygon points = 0</p>		0
<p>H 2.2. Undisturbed habitat in 1 km Polygon around the wetland.</p> <p>Calculate: % undisturbed habitat <u>45</u> + [(% moderate and low intensity land uses)/2] <u>9.5</u> = <u>54.5</u> %</p> <p>Undisturbed habitat > 50% of Polygon points = 3</p> <p>Undisturbed habitat 10-50% and in 1-3 patches points = 2</p> <p>Undisturbed habitat 10-50% and > 3 patches points = 1</p> <p>Undisturbed habitat < 10% of 1 km Polygon points = 0</p>		3
<p>H 2.3. Land use intensity in 1 km Polygon: If</p> <p>> 50% of 1 km Polygon is high intensity land use points = (- 2)</p> <p>≤ 50% of 1 km Polygon is high intensity points = 0</p>		0
Total for H 2	Add the points in the boxes above	3

Rating of Landscape Potential If score is: 4-6 = H x 1-3 = M < 1 = L *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?

H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.*

Site meets ANY of the following criteria: points = 2

- ☐ It has 3 or more priority habitats within 100 m (see next page)
- ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists)
- ☐ It is mapped as a location for an individual WDFW priority species
- ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources
- ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan
- ☒ Site has 1 or 2 priority habitats (listed on next page) within 100 m points = 1

Site does not meet any of the criteria above points = 0

Rating of Value If score is: 2 = H x 1 = M 0 = L *Record the rating on the first page*

Wetland name or number L

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. <http://wdfw.wa.gov/publications/00165/wdfw00165.pdf> or access the list from here: <http://wdfw.wa.gov/conservation/phs/list/>)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: **NOTE:** *This question is independent of the land use between the wetland unit and the priority habitat.*

- **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
- **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).
- **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.
- **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.
- ☒ **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).
- ☒ **Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).
- **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- **Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).
- **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.
- **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number L

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type	Category
<i>Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.</i>	
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.5 ppt <div style="text-align: right;">Yes – Go to SC 1.1 No = Not an estuarine wetland</div>	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? <div style="text-align: right;">Yes = Category I No - Go to SC 1.2</div>	Cat. I
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are <i>Spartina</i> , see page 25) — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed grassland. — The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. <div style="text-align: right;">Yes = Category I No = Category II</div>	Cat. I Cat. II
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? <div style="text-align: right;">Yes – Go to SC 2.2 No – Go to SC 2.3</div> SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? <div style="text-align: right;">Yes = Category I No = Not a WHCV</div> SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf <div style="text-align: right;">Yes – Contact WNHP/WDNR and go to SC 2.4 No = Not a WHCV</div> SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? <div style="text-align: right;">Yes = Category I No = Not a WHCV</div>	Cat. I
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? <i>Use the key below. If you answer YES you will still need to rate the wetland based on its functions.</i> SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? <div style="text-align: right;">Yes – Go to SC 3.3 No – Go to SC 3.2</div> SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? <div style="text-align: right;">Yes – Go to SC 3.3 No = Is not a bog</div> SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? <div style="text-align: right;">Yes = Is a Category I bog No – Go to SC 3.4</div> <p>NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog.</p> SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? <div style="text-align: right;">Yes = Is a Category I bog No = Is not a bog</div>	Cat. I

Wetland name or number L

<p>SC 4.0. Forested Wetlands</p> <p>Does the wetland have at least <u>1 contiguous acre</u> of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? <i>If you answer YES you will still need to rate the wetland based on its functions.</i></p> <ul style="list-style-type: none"> — Old-growth forests (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. — Mature forests (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). <p>Yes = Category I No = Not a forested wetland for this section</p>	<p>Cat. I</p>
<p>SC 5.0. Wetlands in Coastal Lagoons</p> <p>Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?</p> <ul style="list-style-type: none"> — The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks — The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (<i>needs to be measured near the bottom</i>) <p>Yes – Go to SC 5.1 No = Not a wetland in a coastal lagoon</p> <p>SC 5.1. Does the wetland meet all of the following three conditions?</p> <ul style="list-style-type: none"> — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed grassland. — The wetland is larger than 1/10 ac (4350 ft²) <p>Yes = Category I No = Category II</p>	<p>Cat. I</p> <p>Cat. II</p>
<p>SC 6.0. Interdunal Wetlands</p> <p>Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? <i>If you answer yes you will still need to rate the wetland based on its habitat functions.</i></p> <p>In practical terms that means the following geographic areas:</p> <ul style="list-style-type: none"> — Long Beach Peninsula: Lands west of SR 103 — Grayland-Westport: Lands west of SR 105 — Ocean Shores-Copalis: Lands west of SR 115 and SR 109 <p>Yes – Go to SC 6.1 No = not an interdunal wetland for rating</p> <p>SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? Yes = Category I No – Go to SC 6.2</p> <p>SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? Yes = Category II No – Go to SC 6.3</p> <p>SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? Yes = Category III No = Category IV</p>	<p>Cat I</p> <p>Cat. II</p> <p>Cat. III</p> <p>Cat. IV</p>
<p>Category of wetland based on Special Characteristics</p> <p>If you answered No for all types, enter "Not Applicable" on Summary Form</p>	<p>N/A</p>

Wetland name or number L

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Wetland name or number M

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland M Date of site visit: 2/29/2016 & 3/01/2016
Rated by J. Madriz, L. Hoffmann, and M. McGrath Trained by Ecology? Yes Date of training 09/2015
HGM Class used for rating Slope Wetland has multiple HGM classes? Y x N

NOTE: Form is not complete without the figures requested (figures can be combined).

Source of base aerial photo/map Google Earth (2015)

OVERALL WETLAND CATEGORY III (based on functions x or special characteristics)

1. Category of wetland based on FUNCTIONS

 Category I – Total score = 23 – 27

 Category II – Total score = 20 – 22

 X Category III – Total score = 16 – 19

 Category IV – Total score = 9 – 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
Circle the appropriate ratings				
Site Potential	L	M	L	
Landscape Potential	L	L	H	
Value	H	M	M	
Score Based on Ratings	5	5	6	TOTAL 16

**Score for each
function based
on three
ratings**
(order of ratings
is not
important)

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	I II
Wetland of High Conservation Value	I
Bog	I
Mature Forest	I
Old Growth Forest	I
Coastal Lagoon	I II
Interdunal	I II III IV
None of the above	N/A

Wetland name or number M

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (<i>can be added to map of hydroperiods</i>)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (<i>can be added to another figure</i>)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	3
Hydroperiods	H 1.2	3
Plant cover of dense trees, shrubs, and herbaceous plants	S 1.3	3
Plant cover of dense, rigid trees, shrubs, and herbaceous plants (<i>can be added to figure above</i>)	S 4.1	3
Boundary of 150 ft buffer (<i>can be added to another figure</i>)	S 2.1, S 5.1	3
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	4
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	5a
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	5b

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

NO – go to 2

YES – the wetland class is **Tidal Fringe** – go to 1.1

- 1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

NO – Saltwater Tidal Fringe (Estuarine)

YES – Freshwater Tidal Fringe

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

NO – go to 3

YES – The wetland class is **Flats**

*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?

- ☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

NO – go to 4

YES – The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

- ☒ The wetland is on a slope (*slope can be very gradual*),
☒ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
☒ The water leaves the wetland **without being impounded**.

NO – go to 5

YES – The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?

- ☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☐ The overbank flooding occurs at least once every 2 years.

Wetland name or number M

NO – go to 6

YES – The wetland class is **Riverine** **NOTE:**

The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

NO – go to 7

YES – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

NO – go to 8

YES – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

*If you are still unable to determine which of the above criteria apply to your wetland, or if you have **more than 2 HGM classes** within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number M

SLOPE WETLANDS		
Water Quality Functions - Indicators that the site functions to improve water quality		
S 1.0. Does the site have the potential to improve water quality?		
S 1.1. Characteristics of the average slope of the wetland: <i>(a 1% slope has a 1 ft vertical drop in elevation for every 100 ft of horizontal distance)</i> Slope is 1% or less points = 3 Slope is > 1%-2% points = 2 Slope is > 2%-5% points = 1 Slope is greater than 5% points = 0		2
S 1.2. <u>The soil 2 in below the surface (or duff layer)</u> is true clay or true organic <i>(use NRCS definitions)</i> : Yes = 3 No = 0		0
S 1.3. Characteristics of the plants in the wetland that trap sediments and pollutants: Choose the points appropriate for the description that best fits the plants in the wetland. <i>Dense means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 in.</i> Dense, uncut, herbaceous plants > 90% of the wetland area points = 6 Dense, uncut, herbaceous plants > ½ of area points = 3 Dense, woody, plants > ½ of area points = 2 Dense, uncut, herbaceous plants > ¼ of area points = 1 Does not meet any of the criteria above for plants points = 0		3
Total for S 1 Add the points in the boxes above		5

Rating of Site Potential If score is: 12 = H 6-11 = M x 0-5 = L

Record the rating on the first page

S 2.0. Does the landscape have the potential to support the water quality function of the site?		
S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? Yes = 1 No = 0		0
S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other sources Yes = 1 No = 0		0
Total for S 2 Add the points in the boxes above		0

Rating of Landscape Potential If score is: 1-2 = M x 0 = L

Record the rating on the first page

S 3.0. Is the water quality improvement provided by the site valuable to society?		
S 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? Yes = 1 No = 0		1
S 3.2. Is the wetland in a basin or sub-basin where water quality is an issue? <i>At least one aquatic resource in the basin is on the 303(d) list.</i> Yes = 1 No = 0		1
S 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? <i>Answer YES if there is a TMDL for the basin in which unit is found.</i> Yes = 2 No = 0		2
Total for S 3 Add the points in the boxes above		4

Rating of Value If score is: x 2-4 = H 1 = M 0 = L

Record the rating on the first page

Wetland name or number M

<u>SLOPE WETLANDS</u>	
Hydrologic Functions - Indicators that the site functions to reduce flooding and stream erosion	
S 4.0. Does the site have the potential to reduce flooding and stream erosion?	
S 4.1. Characteristics of plants that reduce the velocity of surface flows during storms: Choose the points appropriate for the description that best fits conditions in the wetland. <i>Stems of plants should be thick enough (usually > $\frac{1}{8}$ in), or dense enough, to remain erect during surface flows.</i> Dense, uncut, rigid plants cover > 90% of the area of the wetland All other conditions	1 points = 1 points = 0

Rating of Site Potential If score is: x **1** = M **0** = L

Record the rating on the first page

S 5.0. Does the landscape have the potential to support the hydrologic functions of the site?	
S 5.1. Is more than 25% of the area within 150 ft upslope of wetland in land uses or cover that generate excess surface runoff? <div style="text-align: right;">Yes = 1 No = 0</div>	0

Rating of Landscape Potential If score is: **1** = M x **0** = L

Record the rating on the first page

S 6.0. Are the hydrologic functions provided by the site valuable to society?	
S 6.1. Distance to the nearest areas downstream that have flooding problems: The sub-basin immediately down-gradient of site has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds) Surface flooding problems are in a sub-basin farther down-gradient No flooding problems anywhere downstream	1 points = 2 points = 1 points = 0
S 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? <div style="text-align: right;">Yes = 2 No = 0</div>	0
Total for S 6 <div style="text-align: right;">Add the points in the boxes above</div>	1

Rating of Value If score is: **2-4** = H x **1** = M **0** = L

Record the rating on the first page

NOTES and FIELD OBSERVATIONS:

Wetland name or number M

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class. Check the Cowardin plant classes in the wetland. Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

- | | | |
|---|----------------------------------|----------|
| <input type="checkbox"/> Aquatic bed | 4 structures or more: points = 4 | 1 |
| <input type="checkbox"/> Emergent | 3 structures: points = 2 | |
| <input checked="" type="checkbox"/> Scrub-shrub (areas where shrubs have > 30% cover) | 2 structures: points = 1 | |
| <input checked="" type="checkbox"/> Forested (areas where trees have > 30% cover) | 1 structure: points = 0 | |
| <i>If the unit has a Forested class, check if:</i> | | |
| <input type="checkbox"/> The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon | | |

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

- | | | |
|--|-------------------------------------|----------|
| <input type="checkbox"/> Permanently flooded or inundated | 4 or more types present: points = 3 | 0 |
| <input type="checkbox"/> Seasonally flooded or inundated | 3 types present: points = 2 | |
| <input type="checkbox"/> Occasionally flooded or inundated | 2 types present: points = 1 | |
| <input checked="" type="checkbox"/> Saturated only | 1 type present: points = 0 | |
| <input type="checkbox"/> Permanently flowing stream or river in, or adjacent to, the wetland | | |
| <input type="checkbox"/> Seasonally flowing stream in, or adjacent to, the wetland | | |
| <input type="checkbox"/> Lake Fringe wetland | 2 points | |
| <input type="checkbox"/> Freshwater tidal wetland | 2 points | |

H 1.3. Richness of plant species

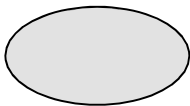
Count the number of plant species in the wetland that cover at least 10 ft².

*Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. **Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

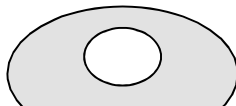
- | | | |
|------------------------------|------------|----------|
| If you counted: > 19 species | points = 2 | 1 |
| 5 - 19 species | points = 1 | |
| < 5 species | points = 0 | |

H 1.4. Interspersion of habitats

Decide from the diagrams below whether interspersions among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



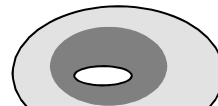
None = 0 points



Low = 1 point

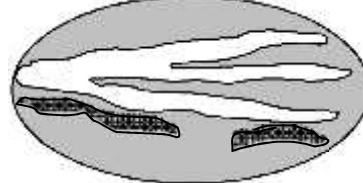
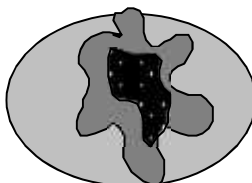
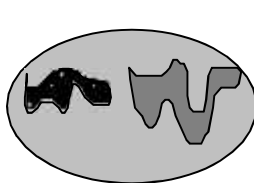


Moderate = 2 points



1

All three diagrams
in this row
are **HIGH** = 3points



Wetland name or number M

<p>H 1.5. Special habitat features:</p> <p>Check the habitat features that are present in the wetland. <i>The number of checks is the number of points.</i></p> <p><input type="checkbox"/> Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long).</p> <p><input type="checkbox"/> Standing snags (dbh > 4 in) within the wetland</p> <p><input type="checkbox"/> Undercut banks are present for at least 6.6 ft (2 m) and/or overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m)</p> <p><input type="checkbox"/> Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (<i>cut shrubs or trees that have not yet weathered where wood is exposed</i>)</p> <p><input type="checkbox"/> At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (<i>structures for egg-laying by amphibians</i>)</p> <p><input type="checkbox"/> Invasive plants cover less than 25% of the wetland area in every stratum of plants (<i>see H 1.1 for list of strata</i>)</p>	<p>0</p>
<p>Total for H 1</p>	<p>3</p>

Rating of Site Potential If score is: **15-18 = H** **7-14 = M** x **0-6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?		
H 2.1. Accessible habitat (include <i>only habitat that directly abuts wetland unit</i>). Calculate:	% undisturbed habitat <u>28</u> + [(% moderate and low intensity land uses)/2] <u>10.5</u> = <u>38.5</u> %	3
If total accessible habitat is:		
> 1/3 (33.3%) of 1 km Polygon	points = 3	
20-33% of 1 km Polygon	points = 2	
10-19% of 1 km Polygon	points = 1	
< 10% of 1 km Polygon	points = 0	
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. Calculate:	% undisturbed habitat <u>65</u> + [(% moderate and low intensity land uses)/2] <u>10.5</u> = <u>70.5</u> %	3
Undisturbed habitat > 50% of Polygon	points = 3	
Undisturbed habitat 10-50% and in 1-3 patches	points = 2	
Undisturbed habitat 10-50% and > 3 patches	points = 1	
Undisturbed habitat < 10% of 1 km Polygon	points = 0	
H 2.3. Land use intensity in 1 km Polygon: If		0
> 50% of 1 km Polygon is high intensity land use	points = (- 2)	
≤ 50% of 1 km Polygon is high intensity	points = 0	
Total for H 2	Add the points in the boxes above	6

Rating of Landscape Potential If score is: x 4-6 = H 1-3 = M < 1 = L *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?

H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.*

Site meets ANY of the following criteria: points = 2

- It has 3 or more priority habitats within 100 m (see next page)
- It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists)
- It is mapped as a location for an individual WDFW priority species
- It is a Wetland of High Conservation Value as determined by the Department of Natural Resources
- It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan

X Site has 1 or 2 priority habitats (listed on next page) within 100 m points = 1

Site does not meet any of the criteria above points = 0

Rating of Value If score is: **2 = H** x **1 = M** **0 = L** *Record the rating on the first page*

Wetland name or number M

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. <http://wdfw.wa.gov/publications/00165/wdfw00165.pdf> or access the list from here: <http://wdfw.wa.gov/conservation/phs/list/>)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: **NOTE:** *This question is independent of the land use between the wetland unit and the priority habitat.*

— **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

X **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

— **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

— **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

X **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

— **Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

— **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

— **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

— **Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).

— **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

— **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

— **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

— **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number M

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type	Category
<i>Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.</i>	
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.5 ppt <div style="text-align: right;">Yes – Go to SC 1.1 No = Not an estuarine wetland</div>	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? <div style="text-align: right;">Yes = Category I No - Go to SC 1.2</div>	Cat. I
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are <i>Spartina</i> , see page 25) — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed grassland. — The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. <div style="text-align: right;">Yes = Category I No = Category II</div>	Cat. I Cat. II
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? <div style="text-align: right;">Yes – Go to SC 2.2 No – Go to SC 2.3</div> SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? <div style="text-align: right;">Yes = Category I No = Not a WHCV</div> SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf <div style="text-align: right;">Yes – Contact WNHP/WDNR and go to SC 2.4 No = Not a WHCV</div> SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? <div style="text-align: right;">Yes = Category I No = Not a WHCV</div>	Cat. I
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? <i>Use the key below. If you answer YES you will still need to rate the wetland based on its functions.</i> SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? <div style="text-align: right;">Yes – Go to SC 3.3 No – Go to SC 3.2</div> SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? <div style="text-align: right;">Yes – Go to SC 3.3 No = Is not a bog</div> SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? <div style="text-align: right;">Yes = Is a Category I bog No – Go to SC 3.4</div> NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? <div style="text-align: right;">Yes = Is a Category I bog No = Is not a bog</div>	Cat. I

Wetland name or number M

<p>SC 4.0. Forested Wetlands</p> <p>Does the wetland have at least <u>1 contiguous acre</u> of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? <i>If you answer YES you will still need to rate the wetland based on its functions.</i></p> <ul style="list-style-type: none"> — Old-growth forests (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. — Mature forests (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). <p>Yes = Category I No = Not a forested wetland for this section</p>	<p>Cat. I</p>
<p>SC 5.0. Wetlands in Coastal Lagoons</p> <p>Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?</p> <ul style="list-style-type: none"> — The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks — The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (<i>needs to be measured near the bottom</i>) <p>Yes – Go to SC 5.1 No = Not a wetland in a coastal lagoon</p> <p>SC 5.1. Does the wetland meet all of the following three conditions?</p> <ul style="list-style-type: none"> — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed grassland. — The wetland is larger than 1/10 ac (4350 ft²) <p>Yes = Category I No = Category II</p>	<p>Cat. I</p> <p>Cat. II</p>
<p>SC 6.0. Interdunal Wetlands</p> <p>Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? <i>If you answer yes you will still need to rate the wetland based on its habitat functions.</i></p> <p>In practical terms that means the following geographic areas:</p> <ul style="list-style-type: none"> — Long Beach Peninsula: Lands west of SR 103 — Grayland-Westport: Lands west of SR 105 — Ocean Shores-Copalis: Lands west of SR 115 and SR 109 <p>Yes – Go to SC 6.1 No = not an interdunal wetland for rating</p> <p>SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? Yes = Category I No – Go to SC 6.2</p> <p>SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? Yes = Category II No – Go to SC 6.3</p> <p>SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? Yes = Category III No = Category IV</p>	<p>Cat I</p> <p>Cat. II</p> <p>Cat. III</p> <p>Cat. IV</p>
<p>Category of wetland based on Special Characteristics</p> <p>If you answered No for all types, enter "Not Applicable" on Summary Form</p>	<p>N/A</p>

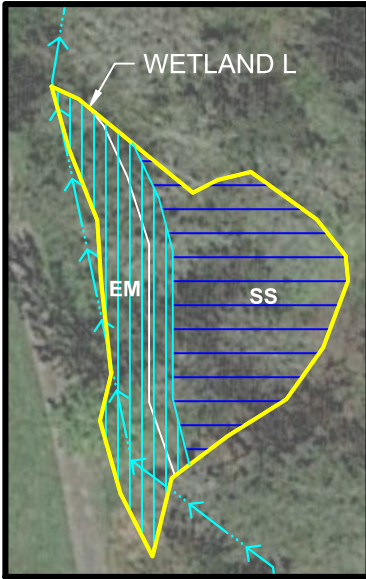
Wetland name or number M

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WETLAND L DETAIL
1" = 40'



LEGEND:

- Wetland Unit Boundary
- 150' Wetland Offset
- Cowardin Vegetation Class Division
- Occasionally Flooded or Inundated
- Saturated Only
- Seasonally Flooded or Inundated
- Permanently Flowing Stream

- EM Emergent
- SS Scrub/shrub
- FO Forested

Wetland G (2004 Rating System)

- H 1.1/H 1.4 - Emergent and scrub-shrub. Moderate interspersions.
- H 1.2 - Seasonally flooded, occasionally flooded, saturated only.
- S 1.3 - Dense, ungrazed, herbaceous vegetation > 90% of wetland area.
- S 3.1 - Dense, uncut, **rigid** vegetation > 1/2 area of wetland.
- S 2. - Residential, urban areas, or golf courses are within 150 ft. upslope of the wetland.

Wetland J

- H 1.1/H 1.4 - Emergent, scrub-shrub. Low interspersions.
- H 1.2 - Occasionally flooded, saturated only.
- S 1.3 - Dense, uncut, herbaceous plants > 1/2 of the wetland area.
- S 4.1 - All other conditions.
- S 2.1 - > 10% of the area within 150 ft. on the uphill side of the wetland in land uses that generate pollutants.

Wetland L

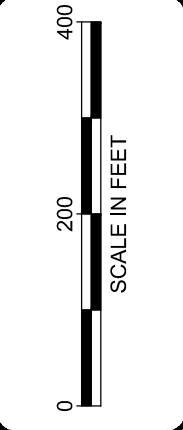
- H 1.1/H 1.4 - Emergent, scrub-shrub. Low interspersions.
- H 1.2 - Occasionally flooded, saturated only, permanently flowing stream in or adjacent to the wetland.
- S 1.3 - Dense, uncut, herbaceous plants > 1/2 of the wetland area.
- S 4.1 - All other conditions.
- S 2.1 - > 10% of the area within 150 ft. on the uphill side of the wetland in land uses that generate pollutants.
- S 5.1 - > 25% of the area within 150 ft. upslope of wetland in land uses or cover that generate excess surface runoff.

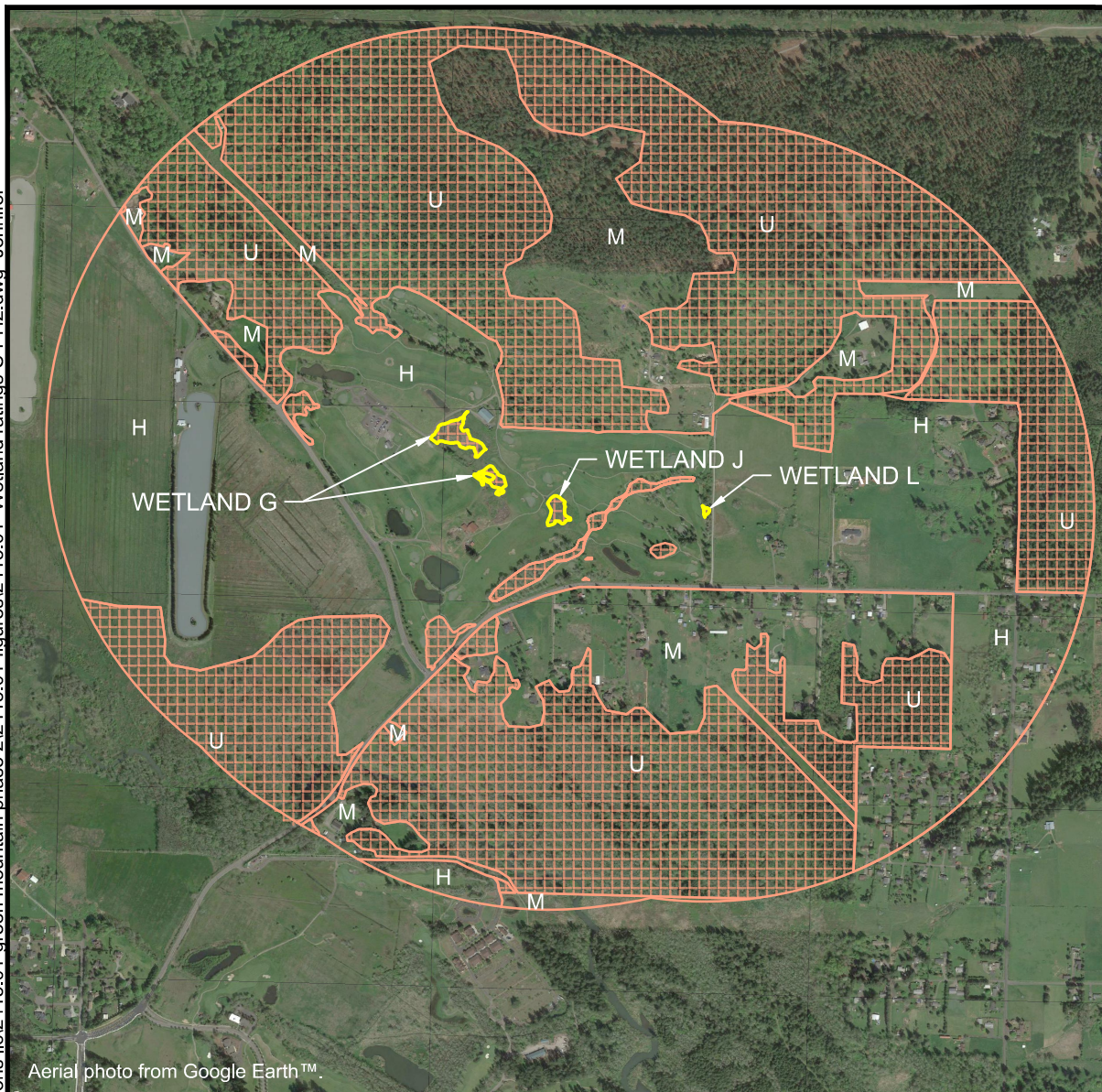
NOTE(S):
1. Aerial photo from Google Earth™.

1157 3rd Ave., Suite 220A
Longview, WA 98632
Phone: (360) 578-1371
Fax: (360) 414-9305
www.eco-land.com

DATE: 7/28/16
DWN: JKJ
REQ. BY: MM
PRJ. MGR: MM
CHK:
PROJECT NO:
2415.01

Wetland Rating Figure 1
150' OFFSET - SOUTH
Green Mountain Mixed Use PRD Phase 2
CLB Washington Options Solutions LLC
City of Camas, Clark County, Washington
Section 20, Township 2N, Range 3E, W.M.





Aerial photo from Google Earth™.

LEGEND:

- Wetland Unit Boundary
- U Undisturbed Habitat
- H High Intensity Land Use
- M Moderate/Low Intensity Land Use

WETLAND G

- H 2.1 - Accessible habitat is < 10% of 1 km Polygon (0%).
- H 2.2 - Undisturbed habitat 10-50% of Polygon and in 1-3 patches (45%).
- H 2.3 - ≤ 50% of polygon is high land use intensity (38%).

WETLAND J

- H 2.1 - Accessible habitat is < 10% of 1 km Polygon (0%).
- H 2.2 - Undisturbed habitat 10-50% of Polygon and in 1-3 patches (43%).
- H 2.3 - ≤ 50% of polygon is high land use intensity (35%).

WETLAND L

- H 2.1 - Accessible habitat is <10% of 1 km Polygon (9.5%).
- H 2.2 - Undisturbed habitat > 50% of polygon (54.5%).
- H 2.3 - ≤ 50% of polygon is high land use intensity (38%).

Wetland Rating Figure 2
1 KM OFFSET - SOUTH

Green Mountain Mixed Use PRD Phase 2
CLB Washington Options Solutions LLC
City of Camas, Clark County, Washington
Section 20, Township 2N, Range 3E, W.M.

DATE: 7/28/16
DWN: JKJ
REQ. BY: MM
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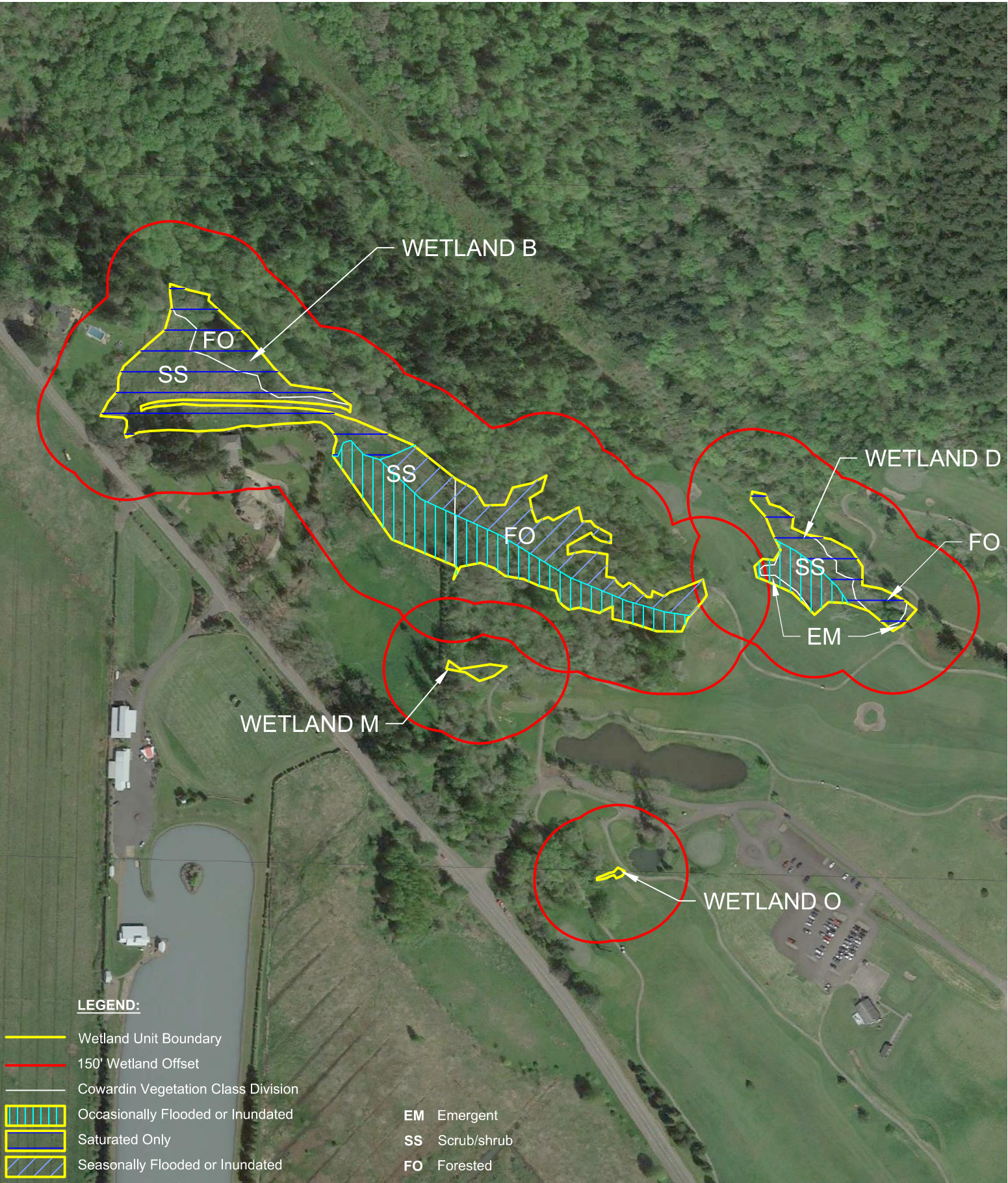


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SCALE IN FEET



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NOTE(S):
1. Aerial photo from Google Earth™.

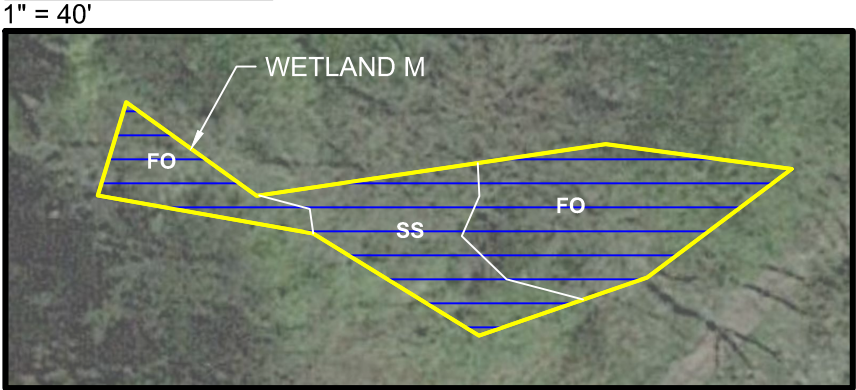
Wetland B (2004 Rating System)
H 1.1/H 1.4 - Scrub-shrub, forested, forested has 3 out of 5 strata. Moderate interspersions.
H 1.2 - Seasonally flooded, occasionally flooded, saturated only.
S 1.3 - Dense, ungrazed, herbaceous vegetation > 90% of wetland area.
S 3.1 - Dense, uncut, **rigid** vegetation > 1/2 area of wetland.
S 2. - Residential, urban areas, or golf courses are within 150 ft. upslope of the wetland.

Wetland D (2004 Rating System)
H 1.1/H 1.4 - Emergent and scrub-shrub. Moderate interspersions.
H 1.2 - Seasonally flooded, occasionally flooded, saturated only.
D 1.1/D 3.1 - Wetland has an intermittently flowing, OR highly constricted, permanently flowing outlet.
D 2. - Residential, urban areas, or golf courses are within 150 ft. upslope of the wetland.
D 3.2 - Marks are at least 0.5 ft. to <2 ft. from surface or bottom of outlet

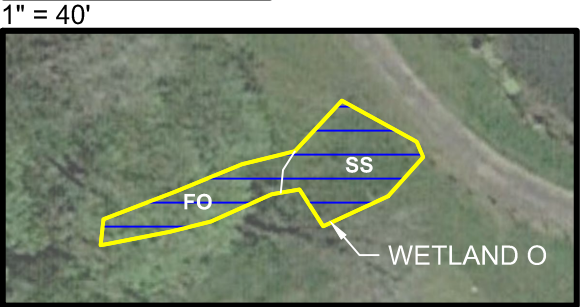
Wetland M
H 1.1/H 1.4 - Scrub-shrub, forested. Low interspersions.
H 1.2 - Saturated only.
S 1.3 - Dense, uncut, herbaceous plants > 1/2 of the wetland area.
S 4.1 - Dense, uncut, **rigid** plants cover > 90% of the area of the wetland.
S 2.1 - < 10% of the area within 150 ft. on the uphill side of the wetland in land uses that generate pollutants.
S 5.1 - < 25% of the area within 150 ft. upslope of wetland in land uses or cover that generate excess surface runoff.

Wetland O (2004 Rating System)
H 1.1/H 1.4 - Forested. No interspersions.
H 1.2 - Seasonally flooded and saturated only.
S 1.3 - Dense, ungrazed, herbaceous vegetation > 90% of wetland area.
S 3.1 - More than 3/4 of area is grazed, mowed, tilled or vegetation is not rigid
S 2. - Residential, urban areas, or golf courses are within 150 ft. upslope of the wetland.

WETLAND M DETAIL



WETLAND O DETAIL

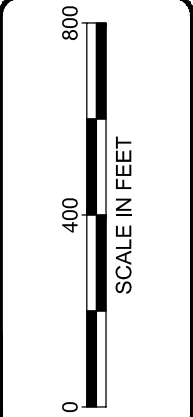


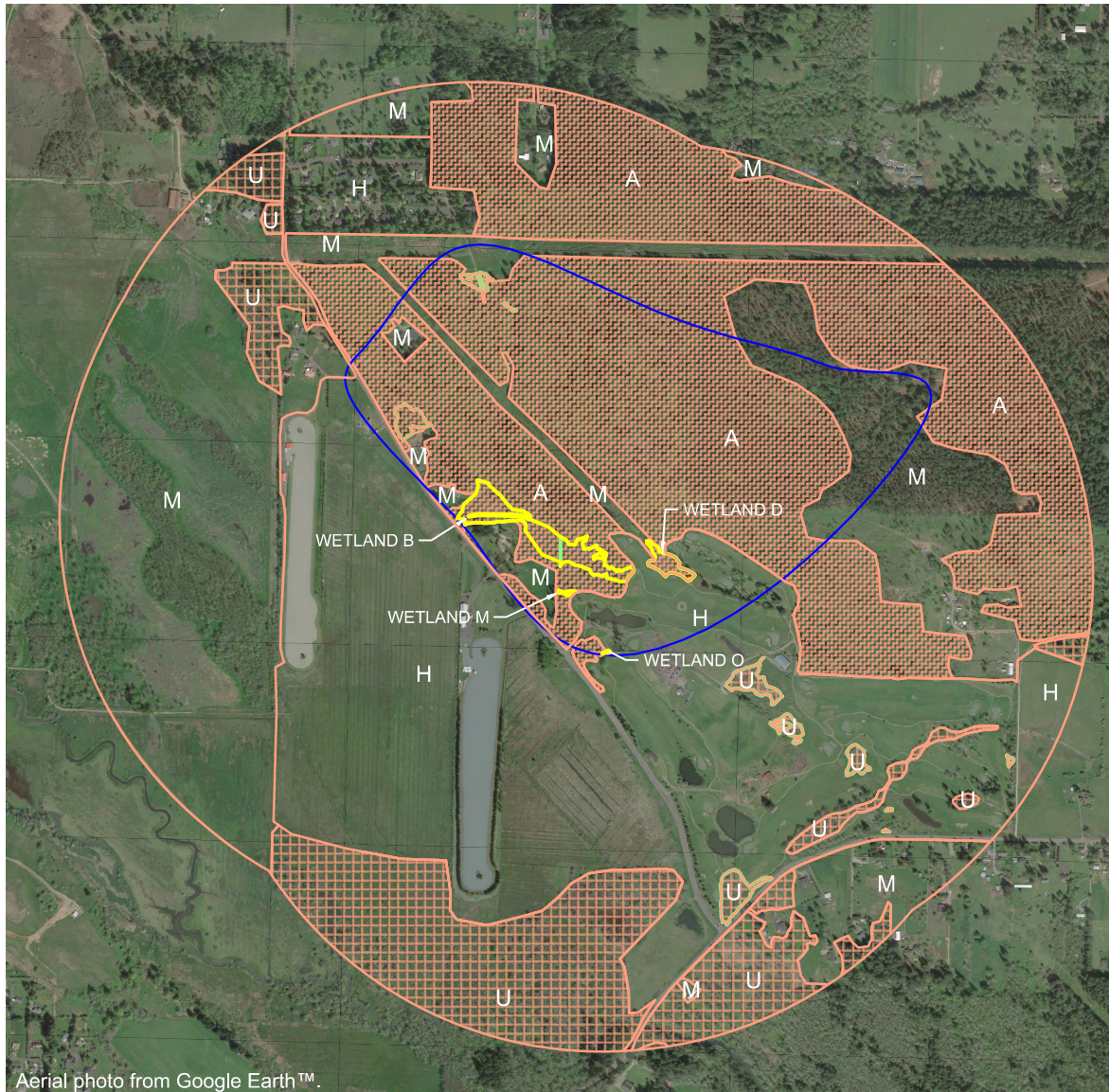
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Ecological Land Services

DATE: 7/28/16
DWN: JKL
REQ. BY: MM
PRJ. MGR: MM
CHK:
PROJECT NO:
2415.01

Wetland Rating Figure 3
150' OFFSET - NORTH
Green Mountain Mixed Use PRD Phase 2
CLB Washington Options Solutions LLC
City of Camas, Clark County, Washington
Section 20, Township 2N, Range 3E, W.M.





Aerial photo from Google Earth™.

LEGEND:

- Wetland Unit Boundary
- A Accessible Habitat
- U Undisturbed Habitat
- H High Intensity Land Use
- M Moderate/Low Intensity Land Use
- Contributing Basin

WETLAND B

- H 2.1 - Accessible habitat is 20-33% of 1 km Polygon (28%).
- H 2.2 - Undisturbed habitat 10-50% of Polygon and in 1-3 patches (35%).
- H 2.3 - ≤ 50% of polygon is high land use intensity (35%).

WETLAND D

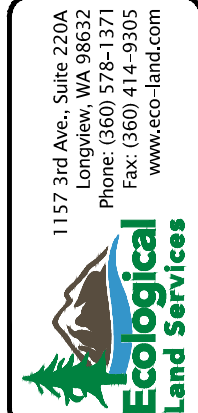
- D4.3 - Area of contributing basin is 10 to 100 times area of unit.
- D 5.3 - < 25% of the contributing basin is covered with intensive human land uses.
- H 2.1 - Accessible habitat is > 1/3 of 1 km Polygon (45.5%).
- H 2.2 - Undisturbed habitat > 50% of Polygon.
- H 2.3 - ≤ 50% of polygon is high land use intensity (38%).

WETLAND M

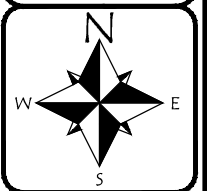
- H 2.1 - Accessible habitat is > 1/3 of 1 km Polygon (38.5%).
- H 2.2 - Undisturbed habitat > 50% of Polygon.
- H 2.3 - ≤ 50% of polygon is high land use intensity (38%).

WETLAND O

- H 2.1 - Accessible habitat is < 10% of 1 km Polygon (9%).
- H 2.2 - Undisturbed habitat is 10-50% and in > 3 patches.
- H 2.3 - ≤ 50% of polygon is high land use intensity (48%).



1157 3rd Ave., Suite 220A
Longview, WA 98632
Phone: (360) 578-1371
Fax: (360) 414-9305
www.eco-land.com



DATE: 7/28/16
DWN: JKJ
REQ. BY: MM
PRJ. MGR: MM
CHK:
PROJECT NO: 2415.01

Wetland Rating Figure 4
1 KM OFFSET - NORTH
Green Mountain Mixed Use PRD Phase 2
CLB Washington Options Solutions LLC
City of Camas, Clark County, Washington
Section 20, Township 2N, Range 3E, W.M.

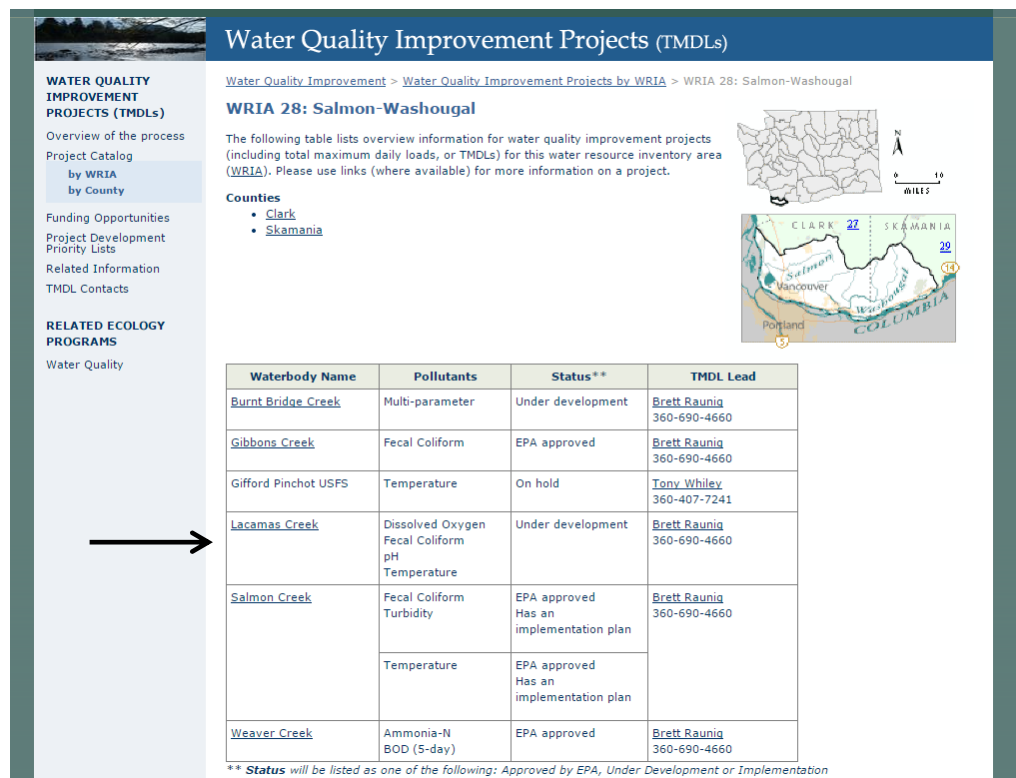
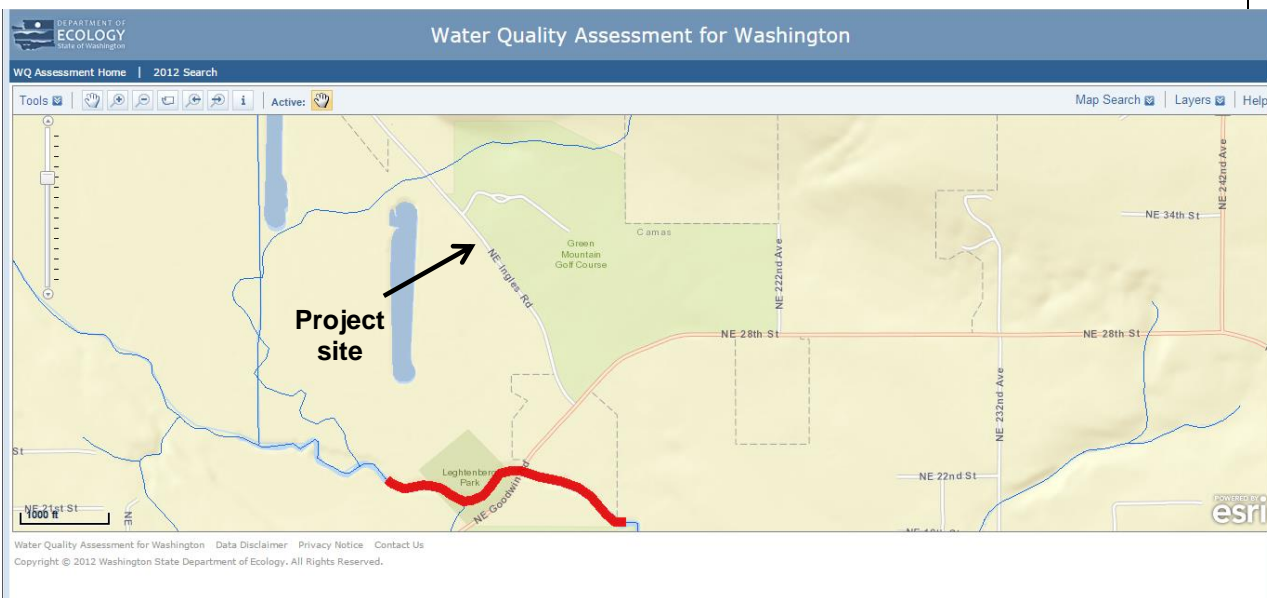


Figure 5b: There are listed TMDLs for the basin in which the wetland unit is found.



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DATE: 3/21/2016
DWN: JM
PRJ. MGR: MM
PROJ.#: 2048.01

Wetland Rating Figure 5
303(d) LISTED WATERS AND
TMDLs FOR WR1A
Green Mountain PRD
Green Mountain Land, LLC
City of Camas, Washington

Appendix C

Wetland Rating Forms for Western Washington (2004 Rating System)

Wetland name or number: Wetland B

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 – Updated July 2006 to increase accuracy and reproducibility among users

Name of wetland (if known): Wetland B

Date of site visit: Oct. 2013

Rated by A. Aberle Trained by Ecology? Yes X No _____ Date of Training: Oct. 2006

SECTION: 20 TOWNSHIP: 2N RANGE: 3E Is S/T/R in Appendix D? Yes X No _____

Map of wetland unit: Figure _____ Estimated size 4.48 acres

DRAFT SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I _____ II _____ III X IV _____

Category I = Score ≥ 70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions

14

Score for Hydrologic Functions

5

Score for Habitat Functions

21

TOTAL Score for functions

40

Category based on SPECIAL CHARACTERISTICS of wetland

I _____ II _____ Does not Apply X

Final Category (choose the “highest” category from above)

III

Check the appropriate type and class of wetland being rated.

Wetland Type		Wetland Class	
Estuarine		Depressional	
Natural Heritage Wetland		Riverine	
Bog		Lake-fringe	
Mature Forest		Slope	X
Old Growth Forest		Flats	
Coastal Lagoon		Freshwater Tidal	
Interdunal			
None of the above	X	Check if unit has multiple HGM classes present	<input type="checkbox"/>

Comments

Does the wetland being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. <i>Has the wetland been documented as a habitat for any Federally listed Threatened or Endangered animal or plant species (T/E species)?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		X
SP2. <i>Has the wetland unit been documented as habitat for any State listed Threatened or Endangered animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category 1 Natural Heritage Wetlands (see p. 19 of data form).		X
SP3. <i>Does the wetland contain individuals of Priority species listed by the WDFW for the state?</i>		X
SP4. <i>Does the wetland have a local significance in addition to its functions?</i> For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		X

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Comments Formal priority and habitat species request has been completed.

Classification of Wetland Units in Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the wetland usually controlled by tides (i.e. except during floods)?

☒ NO – go to 2 ☐ YES – the wetland class is **Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? ☐ YES – **Freshwater Tidal Fringe** ☐ NO – **Saltwater Tidal Fringe (Estuarine)**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is rated as an **Estuarine** wetland. Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term “Estuarine” wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

☒ NO – go to 3 ☐ YES – The wetland class is **Flats**

If your wetland can be classified as a “Flats” wetland, use the form for **Depressional** wetlands.

3. Does the wetland **meet both** of the following criteria?

- ☐ The vegetated part of the wetland is on the shores of a body of open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;
- ☐ At least 30% of the open water area is deeper than 6.6 ft (2 m)?

☒ NO – go to 4 ☐ YES – The wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the wetland **meet all** of the following criteria?

- ☒ The wetland is on a slope (*slope can be very gradual*),
- ☒ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
- ☒ The water leaves the wetland **without being impounded**?
NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks(depressions are usually <3ft diameter and less than 1 foot deep).*

☐ NO - go to 5 ☒ YES – The wetland class is **Slope**

Comments

5. Does the entire wetland unit *meet all* of the following criteria?

- ☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river
- ☐ The overbank flooding occurs at least once every two years.

NOTE: The riverine unit can contain depressions that are filled with water when the river is not flooding.

☐ NO - go to 6 ☐ **YES** – The wetland class is **Riverine**

6. Is the wetland in a topographic depression in which water ponds, or is saturated to the surface, at some time of the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

☐ NO – go to 7 ☐ **YES** – The wetland class is **Depressional**

7. Is the wetland located in a very flat area with no obvious depression and no overbank flooding. The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☐ NO – go to 8 ☐ **YES** – The wetland class is **Depressional**

8. Your wetland seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

<i>HGM Classes within the wetland unit being rated</i>	<i>HGM Class to Use in Rating</i>
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine along stream within boundary	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

Comments

[illegible]

Comments

S Slope Wetlands		Points (only 1 score per box)
HYDROLOGIC FUNCTIONS - Indicators that wetland unit functions to reduce flooding and stream erosion		
S	S 3. Does the wetland have the <u>potential</u> to reduce flooding and erosion?	(see p. 68)
S	<p>S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during storms. <i>Choose the points appropriate for the description that best fit conditions in the wetland. (stems of plants should be thick enough (usually > 1/8 in), or dense enough, to remain erect during surface flows)</i></p> <p>Dense, uncut, rigid vegetation covers >90% of area of the wetland. points = 6</p> <p>Dense, uncut, rigid vegetation >1/2 area of wetland points = 3</p> <p>Dense, uncut, rigid vegetation >1/4 area of wetland points = 1</p> <p>More than 3/4 of area is grazed, mowed, tilled or vegetation is not rigid points = 0</p>	3
S	<p>S 3.2 Characteristics of slope wetland that holds back small amounts of flood flows: The slope wetland has small surface depressions that can retain water over at least 10% of its area.</p> <p>YES points = 2</p> <p>NO points = 0</p>	2
S	Add the points in the boxes above	5
S	<p>S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?</p> <p>Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? <i>Note which of the following conditions apply.</i></p> <p><input type="checkbox"/> Wetland has surface runoff that drains to a river or stream that has flooding problems</p> <p><input type="checkbox"/> Other _____</p> <p><i>Answer NO if the major source of water is controlled by a reservoir (e.g. wetland is a seep that is on the downstream side of a dam.)</i></p> <p><input type="checkbox"/> YES multiplier is 2 <input checked="" type="checkbox"/> NO multiplier is 1</p>	(see p. 70)
S	<p>TOTAL - Hydrologic Functions Multiply the score from S 3 by S 4</p> <p>Add score to table on p. 1</p>	5

Comments

These questions apply to wetlands of all HGM classes**HABITAT FUNCTIONS – Indicators that wetland functions to provide important habitat****Points**
(only 1 score per box)**H 1. Does the wetland have the potential to provide habitat for many species?****H 1.1 Vegetation structure (see p. 72)**

Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres.

- ☐ Aquatic bed
☐ Emergent plants
☒ Scrub/shrub (areas where shrubs have >30% cover)
☒ Forested (areas where trees have >30% cover)

If the unit has a forested class check if:

- ☒ Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon

Add the number of vegetation types that qualify. If you have:

4 types or more	points = 4
3 types	points = 2
2 types	points = 1
1 type	points = 0

Map of Cowardin vegetation classes**Figure__**

2

H 1.2 Hydroperiods (see p. 73)

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ acre to count. (See text for description of hydroperiods.)

- | | | |
|--|-------------------------|------------|
| <input type="checkbox"/> Permanently flooded or inundated | 4 or more types present | points = 3 |
| <input checked="" type="checkbox"/> Seasonally flooded or inundated | 3 types present | points = 2 |
| <input checked="" type="checkbox"/> Occasionally flooded or inundated | 2 types present | points = 1 |
| <input checked="" type="checkbox"/> Saturated only | | |
| <input type="checkbox"/> Permanently flowing stream or river in, or adjacent to, the wetland | | |
| <input type="checkbox"/> Seasonally flowing stream or river in, or adjacent to, the wetland | | |
| <input type="checkbox"/> Lake-fringe wetland = 2 points | | |
| <input type="checkbox"/> Freshwater tidal wetland = 2 points | | |

Figure__

2

H 1.3 Richness of Plant Species (see p. 75)

Count the number of plant species in the wetland that cover at least 10 ft². (Different patches of the same species can be combined to meet the size threshold.)

You do not have to name the species.

Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle.

If you counted: > 19 species points = 2

5 - 19 species points = 1

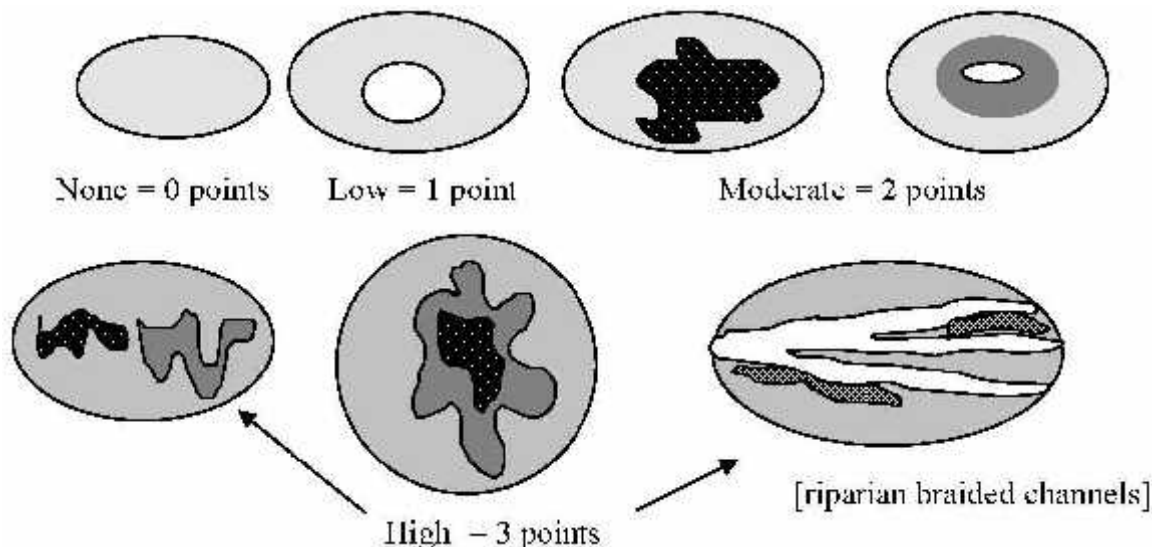
List species below if you want to: <5 species points = 0

2

Total for page 6

H 1.4 Interspersion of habitats (see p. 76)

Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.



NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". **Use map of Cowardin vegetation classes**

H 1.5 Special Habitat Features: (see p. 77)

Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.

- ☒ Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long).
- ☒ Standing snags (diameter at bottom >4 inches) in the wetland
- ☐ Undercut banks are present for at least 6.6 ft. (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m)
- ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet turned grey/brown*)
- ☐ At least ¼ acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*)
- ☒ Invasive plants cover less than 25% of the wetland area in each stratum of plants

Note: The 20% stated in early printings of the manual on page 78 is an error

H 1. TOTAL Score – potential for providing habitat
Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5

Figure__

1

3

10

Comments:

H 2. Does the wetland have the opportunity to provide habitat for many species?)	
<p>H 2.1 <u>Buffers</u> (<i>see p. 80</i>) <i>Choose the description that best represents condition of buffer of wetland. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."</i></p> <p><input type="checkbox"/> 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer. (relatively undisturbed also means no grazing, no landscaping, no daily human use) Points = 5</p> <p><input type="checkbox"/> 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water >50% circumference. Points = 4</p> <p><input type="checkbox"/> 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4</p> <p><input type="checkbox"/> 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >25% circumference. Points = 3</p> <p><input checked="" type="checkbox"/> 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3</p> <p>If buffer does not meet any of the three criteria above</p> <p><input type="checkbox"/> No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2</p> <p><input type="checkbox"/> No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing or lawns are OK Points = 2</p> <p><input type="checkbox"/> Heavy grazing in buffer. Points = 1</p> <p><input type="checkbox"/> Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland) Points = 0</p> <p><input type="checkbox"/> Buffer does not meet any of the criteria above. Points = 1</p> <p style="text-align: right;">Aerial photo showing buffers</p>	<p>Figure__</p> <p style="text-align: center;">3</p>
<p>H 2.2 <u>Corridors and Connections</u> (<i>see p. 81</i>)</p> <p>H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (<i>dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor</i>).</p> <p style="text-align: center;"><input type="checkbox"/> YES = 4 points (<i>go to H 2.3</i>) <input checked="" type="checkbox"/> NO = go to H 2.2.2</p> <p>H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? OR a Lake-fringe wetland, if it does not have an undisturbed corridor as in the question above?</p> <p style="text-align: center;"><input checked="" type="checkbox"/> YES = 2 points (<i>go to H 2.3</i>) <input type="checkbox"/> NO = H 2.2.3</p> <p>H 2.2.3 Is the wetland:</p> <p style="padding-left: 40px;">within 5 mi (8km) of a brackish or salt water estuary OR</p> <p style="padding-left: 40px;">within 3 mi of a large field or pasture (>40 acres) OR</p> <p style="padding-left: 40px;">within 1 mi of a lake greater than 20 acres?</p> <p style="text-align: center;"><input type="checkbox"/> YES = 1 point <input type="checkbox"/> NO = 0 points</p>	<p style="text-align: center;">2</p>

Total for page 5

H 2.3 Near or adjacent to other priority habitats listed by WDFW (see p. 82)

Which of the following priority habitats are within 330ft (100m) of the wetland? (*NOTE: the connections do not have to be relatively undisturbed.*)

These are DFW definitions. Check with your local DFW biologist if there are any questions

- ☐ **Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.8 ha (2 acres).
- ☐ **Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft.
- ☐ **Old-growth forests:** (Old-growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age.
- ☐ **Mature forests:** Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest.
- ☐ **Prairies:** Relatively undisturbed areas (as indicated by dominance of native plants) where grasses and/or forbs form the natural climax plant community.
- ☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ☐ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages
- ☒ **Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component of the stand is 25%.
- ☒ **Urban Natural Open Space:** A priority species resides within or is adjacent to the open space and uses it for breeding and/or regular feeding; and/or the open space functions as a corridor connecting other *priority habitats*, especially those that would otherwise be isolated; and/or the open space is an isolated remnant of natural habitat larger than 4 ha (10 acres) and is surrounded by urban development.
- ☐ **Estuary/Estuary-like:** Deepwater tidal habitats and adjacent tidal wetlands, usually semi-enclosed by land but with open, partly obstructed or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. The salinity may be periodically increased above that of the open ocean by evaporation. Along some low-energy coastlines there is appreciable dilution of sea water. Estuarine habitat extends upstream and landward to where ocean-derived salts measure less than 0.5ppt. during the period of average annual low flow. Includes both estuaries and lagoons.
- ☐ **Marine/Estuarine Shorelines:** Shorelines include the intertidal and subtidal zones of beaches, and may also include the backshore and adjacent components of the terrestrial landscape (e.g., cliffs, snags, mature trees, dunes, meadows) that are important to shoreline associated fish and wildlife and that contribute to shoreline function (e.g., sand/rock/log recruitment, nutrient contribution, erosion control).

If wetland has **3 or more** priority habitats = **4 points**

If wetland has **2** priority habitats = **3 points**

If wetland has **1** priority habitat = **1 point**

No habitats = 0 points

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)

3

<p>H 2.4 Wetland Landscape (<i>choose the one description of the landscape around the wetland that best fits</i>) (<i>see p. 84</i>)</p> <p>There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5</p> <p>The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5</p> <p>There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3</p> <p>The wetland is Lake-fringe on a lake with disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 3</p> <p>There is at least 1 wetland within ½ mile. points = 2</p> <p>There are no wetlands within ½ mile. points = 0</p>	3
<p>H 2. TOTAL Score -opportunity for providing habitat <i>Add the scores in the column above</i></p>	
<p>TOTAL for H 1 from page 14</p>	10
<p>Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1</p>	21

Comments

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

Wetland Type	Category
<p><i>Check off any criteria that apply to the wetland. Select the appropriate Category (from dropdown menu in Category column) when the appropriate criteria are met.</i></p>	
<p>SC 1.0 Estuarine wetlands (see p. 86)</p> <p>Does the wetland meet the following criteria for Estuarine wetlands?</p> <div style="margin-left: 20px;"> <input type="checkbox"/> The dominant water regime is tidal, <input type="checkbox"/> Vegetated, and <input type="checkbox"/> With a salinity greater than 0.5 ppt. <input type="checkbox"/> YES = Go to SC 1.1 <input checked="" type="checkbox"/> NO </div>	
<p>SC 1.1 Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?</p> <div style="margin-left: 20px;"> <input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO go to SC 1.2 </div>	Cat. I
<p>SC 1.2 Is the wetland at least 1 acre in size and meets at least two of the following three conditions? YES = Category I NO = Category II</p> <div style="margin-left: 20px;"> <input type="checkbox"/> The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native <i>Spartina</i> spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of <i>Spartina</i> would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of <i>Spartina</i> in determining the size threshold of 1 acre. <input type="checkbox"/> At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. <input type="checkbox"/> The wetland has at least 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. </div>	Cat. I Cat. II Dual rating I/II

<p>SC 2.0 Natural Heritage Wetlands (see p. 87) Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species.</p> <p>SC 2.1 Is the wetland being rated in a Section/Township/Range that contains a Natural Heritage wetland? (<i>this question is used to screen out most sites before you need to contact WNHP/DNR</i>) S/T/R information from Appendix D <input checked="" type="checkbox"/> or accessed from WNHP/DNR web site <input type="checkbox"/></p> <p>YES <input checked="" type="checkbox"/> – contact WNHP/DNR (see p. 79) and go to SC 2.2 NO <input type="checkbox"/></p> <p>SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as or as a site with state threatened or endangered plant species? <input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO = not in a Heritage Wetland</p>	<p>Cat. I</p>
<p>SC 3.0 Bogs (see p. 87) Does the wetland (or part of the wetland) meet both the criteria for soils and vegetation in bogs? <i>Use the key below to identify if the wetland is a bog. If you answer yes you will still need to rate the wetland based on its functions.</i></p> <ol style="list-style-type: none"> Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils) Yes <input type="checkbox"/> - go to Q. 3 No <input checked="" type="checkbox"/> go to Q. 2 Does the wetland have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? Yes <input type="checkbox"/> - go to Q. 3 No <input checked="" type="checkbox"/> - Is not a bog for purpose of rating Does the wetland have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the “bog” species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes <input type="checkbox"/> – Is a bog for purpose of rating No <input checked="" type="checkbox"/> -go to Q. 4 NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16” deep. If the pH is less than 5.0 and the “bog” plant species in Table 3 are present, the wetland is a bog. <ol style="list-style-type: none"> Is the wetland forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann’s spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover (> 30% coverage of the total shrub/herbaceous cover)? YES <input type="checkbox"/> = Category I NO <input checked="" type="checkbox"/> Is not a bog for purpose of rating 	<p>Cat. I</p>

<p>SC 4.0 Forested Wetlands (see p. 90) Does the wetland have at least 1 acre of forest that meets one of these criteria for the Department of Fish and Wildlife's forests as priority habitats? <i>If you answer yes you will still need to rate the wetland based on its functions.</i></p> <p><input type="checkbox"/> Old-growth forests: (west of Cascade crest) Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more.</p> <p>NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter.</p> <p><input type="checkbox"/> Mature forests: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.</p> <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO not a forested wetland with special characteristics</p>	<p>Cat. I</p>
<p>SC 5.0 Wetlands in Coastal Lagoons (see p. 91) Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?</p> <p><input type="checkbox"/> The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks</p> <p><input type="checkbox"/> The lagoon in which the wetland is located contains surface water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (<i>needs to be measured near the bottom</i>)</p> <p><input type="checkbox"/> YES = Go to SC 5.1 NO <input checked="" type="checkbox"/> not a wetland in a coastal lagoon</p> <p>SC 5.1 Does the wetland meet all of the following three conditions?</p> <p><input type="checkbox"/> The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of invasive plant species (see list of invasive species on p. 74).</p> <p><input type="checkbox"/> At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.</p> <p><input type="checkbox"/> The wetland is larger than 1/10 acre (4350 square feet)</p> <p>YES <input type="checkbox"/> = Category I NO <input type="checkbox"/> = Category II</p>	

<p>SC 6.0 Interdunal Wetlands (see p. 93) Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? <input type="checkbox"/> YES = Go to SC 6.1 <input checked="" type="checkbox"/> NO -- not an interdunal wetland for rating <i>If you answer yes you will still need to rate the wetland based on its functions.</i> In practical terms that means the following geographic areas: <ul style="list-style-type: none"> • Long Beach Peninsula – lands west of SR103 • Grayland-Westport- lands west of SR 105 • Ocean Shores-Copalis- lands west of SR 115 and SR 109 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is one acre or larger? <input type="checkbox"/> YES = Category II <input type="checkbox"/> NO go to SC 6.2 SC 6.2 Is the wetland between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre,? <input type="checkbox"/> YES = Category III </p>	 Cat.II Cat.III
<p>Category of wetland based on Special Characteristics Choose the “highest” rating if wetland falls into several categories, and record on p. 1. If you answered NO for all types enter “Not Applicable” on p. 1. </p>	N/A

Comments

The wetland has been previously disturbed, therefore, it is not high quality undisturbed wetland. Based on ELS observations on-site, the wetland does not contain state threatened or endangered species.

Wetland name or number: Wetland D

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 – Updated July 2006 to increase accuracy and reproducibility among users

Name of wetland (if known): Wetland D

Date of site visit: Oct. 2013

Rated by A. Aberle Trained by Ecology? Yes X No _____ Date of Training: Oct. 2006

SECTION: 20 TOWNSHIP: 2N RANGE: 3E Is S/T/R in Appendix D? Yes X No ___

Map of wetland unit: Figure 2 Estimated size 0.99 acres

DRAFT SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I _____ II _____ III X IV _____

Category I = Score ≥ 70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions

14

Score for Hydrologic Functions

8

Score for Habitat Functions

18

TOTAL Score for functions

40

Category based on SPECIAL CHARACTERISTICS of wetland

I _____ II _____ Does not Apply X

Final Category (choose the “highest” category from above)

III

Check the appropriate type and class of wetland being rated.

Wetland Type		Wetland Class	
Estuarine		Depressional	X
Natural Heritage Wetland		Riverine	
Bog		Lake-fringe	
Mature Forest		Slope	
Old Growth Forest		Flats	
Coastal Lagoon		Freshwater Tidal	
Interdunal			
None of the above	X	Check if unit has multiple HGM classes present	<input type="checkbox"/>

Comments

Does the wetland being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. <i>Has the wetland been documented as a habitat for any Federally listed Threatened or Endangered animal or plant species (T/E species)?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		X
SP2. <i>Has the wetland unit been documented as habitat for any State listed Threatened or Endangered animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category 1 Natural Heritage Wetlands (see p. 19 of data form).		X
SP3. <i>Does the wetland contain individuals of Priority species listed by the WDFW for the state?</i>		X
SP4. <i>Does the wetland have a local significance in addition to its functions?</i> For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		X

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Comments Formal priority and habitat species request has been completed.

Classification of Wetland Units in Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the wetland usually controlled by tides (i.e. except during floods)?

☒ NO – go to 2 ☐ YES – the wetland class is **Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? ☐ YES – **Freshwater Tidal Fringe** ☐ NO – **Saltwater Tidal Fringe (Estuarine)**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is rated as an **Estuarine** wetland. Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term “Estuarine” wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

☒ NO – go to 3 ☐ YES – The wetland class is **Flats**

If your wetland can be classified as a “Flats” wetland, use the form for **Depressional** wetlands.

3. Does the wetland **meet both** of the following criteria?

- ☐ The vegetated part of the wetland is on the shores of a body of open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;
- ☐ At least 30% of the open water area is deeper than 6.6 ft (2 m)?

☒ NO – go to 4 ☐ YES – The wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the wetland **meet all** of the following criteria?

- ☐ The wetland is on a slope (*slope can be very gradual*),
- ☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
- ☐ The water leaves the wetland **without being impounded**?
NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks(depressions are usually <3ft diameter and less than 1 foot deep).*

☒ NO - go to 5 ☐ YES – The wetland class is **Slope**

Comments

5. Does the entire wetland unit *meet all* of the following criteria?

- ☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river
- ☐ The overbank flooding occurs at least once every two years.

NOTE: The riverine unit can contain depressions that are filled with water when the river is not flooding.

☒ **NO** – go to 6 ☐ **YES** – The wetland class is **Riverine**

6. Is the wetland in a topographic depression in which water ponds, or is saturated to the surface, at some time of the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

☐ **NO** – go to 7 ☒ **YES** – The wetland class is **Depressional**

7. Is the wetland located in a very flat area with no obvious depression and no overbank flooding. The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☐ **NO** – go to 8 ☐ **YES** – The wetland class is **Depressional**

8. Your wetland seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

<i>HGM Classes within the wetland unit being rated</i>	<i>HGM Class to Use in Rating</i>
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine along stream within boundary	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

Comments

D	Depressional and Flats Wetlands WATER QUALITY FUNCTION – Indicators that the wetland unit functions to improve water quality	Points (only 1 score per box)
D	D 1. Does the wetland have the <u>potential</u> to improve water quality?	<i>(see p.38)</i>
D	D 1.1 Characteristics of surface water flows out of the wetland: Unit is a depression with no surface water leaving it (no outlet) points = 3 Wetland has an intermittently flowing, OR highly constricted, permanently flowing outlet points = 2 Wetland has an unconstricted, or slightly constricted, surface outlet (<i>permanently flowing</i>) points = 1 Unit is a “flat” depression (Q. 7 on key), or in the Flats class, with permanent surface outflow and no obvious natural outlet and/or outlet is a man-made ditch points = 1 (if ditch is not permanently flowing treat unit as “intermittently flowing”) <div style="text-align: right;">Provide photo or drawing</div>	Figure__ <div style="text-align: center;">2</div>
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (use NRCS definitions) YES points = 4 NO points = 0	<div style="text-align: center;">0</div>
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest class): Wetland has persistent, ungrazed, vegetation > = 95% of area points = 5 Wetland has persistent, ungrazed, vegetation > = 1/2 of area points = 3 Wetland has persistent, ungrazed vegetation > = 1/10 of area points = 1 Wetland has persistent, ungrazed vegetation < 1/10 of area points = 0 <div style="text-align: right;">Map of Cowardin vegetation classes</div>	Figure 8B <div style="text-align: center;">3</div>
D	D1.4 Characteristics of seasonal ponding or inundation. <i>This is the area of the wetland that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 yrs.</i> Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0 <div style="text-align: right;">Map of Hydroperiods</div>	Figure 9B <div style="text-align: center;">2</div>
D	Total for D 1 <i>Add the points in the boxes above</i>	<div style="text-align: center;">7</div>
D	D 2. Does the wetland have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? <i>Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.</i> <input type="checkbox"/> Grazing in the wetland or within 150 ft <input type="checkbox"/> Untreated stormwater discharges to wetland <input type="checkbox"/> Tilled fields or orchards within 150 ft of wetland <input type="checkbox"/> A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging <input checked="" type="checkbox"/> Residential, urban areas, golf courses are within 150 ft of wetland <input type="checkbox"/> Wetland is fed by groundwater high in phosphorus or nitrogen <input type="checkbox"/> Other _____ <input checked="" type="checkbox"/> YES multiplier is 2 <input type="checkbox"/> NO multiplier is 1	<i>(see p.44)</i> <div style="text-align: center;">multiplier</div> <div style="text-align: center;">2</div>
D	TOTAL - Water Quality Functions Multiply the score from D1 by D2 <div style="text-align: right;"><i>Add score to table on p. 1</i></div>	<div style="text-align: center;">14</div>

D	Depressional and Flats Wetlands	Points
	HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream degradation	
	D 3. Does the wetland have the <u>potential</u> to reduce flooding and erosion?	<i>(see p.46)</i>
D	D 3.1 Characteristics of surface water flows out of the wetland unit Unit is a depression with no surface water leaving it (no outlet) points = 4 Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2 Unit is flat depression (Q. 7 on key), or in the Flats class, with permanent surface outflow and no obvious natural outlet and/or is a man-made ditch points = 1 <i>(If ditch is not permanently flowing treat unit as "intermittently flowing")</i> Unit has an unconstricted, or slightly constricted, surface outlet (permanently flowing) points = 0	Figure__ 2
D	D 3.2 Depth of storage during wet periods <i>Estimate the height of ponding above the bottom of the outlet. For units with no outlet measure from the surface of permanent water or deepest part (if dry).</i> Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 The wetland is a "headwater" wetland points = 5 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3 Wetland is flat (yes to Q 2 or Q. 7 on key) but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft points = 0	Figure__ 3
D	D 3.3 Contribution of wetland to storage in the watershed <i>Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.</i> The area of the basin is less than 10 times the area of unit points = 5 The area of the basin is 10 to 100 times the area of the unit points = 3 The area of the basin is more than 100 times the area of the unit points = 0 Entire unit is in the FLATS class points = 5	Figure__ 3
D	Total for D 3 <i>Add the points in the boxes above</i>	8
D	D 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion? Answer YES if the wetland is in a location in the watershed where the flood storage, or reduction in water velocity it provides, helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. <i>Note which of the following indicators of opportunity apply.</i> <input type="checkbox"/> Wetland is in a headwater of a river or stream that has flooding problems <input type="checkbox"/> Wetland drains to a river or stream that has flooding problems <input type="checkbox"/> Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems <input type="checkbox"/> Other _____ <input type="checkbox"/> YES multiplier is 2 <input checked="" type="checkbox"/> NO multiplier is 1	<i>(see p.49)</i> multiplier 1
D	TOTAL - Hydrologic Functions Multiply the score from D 3 by D 4 <i>Add score to table on p. 1</i>	8

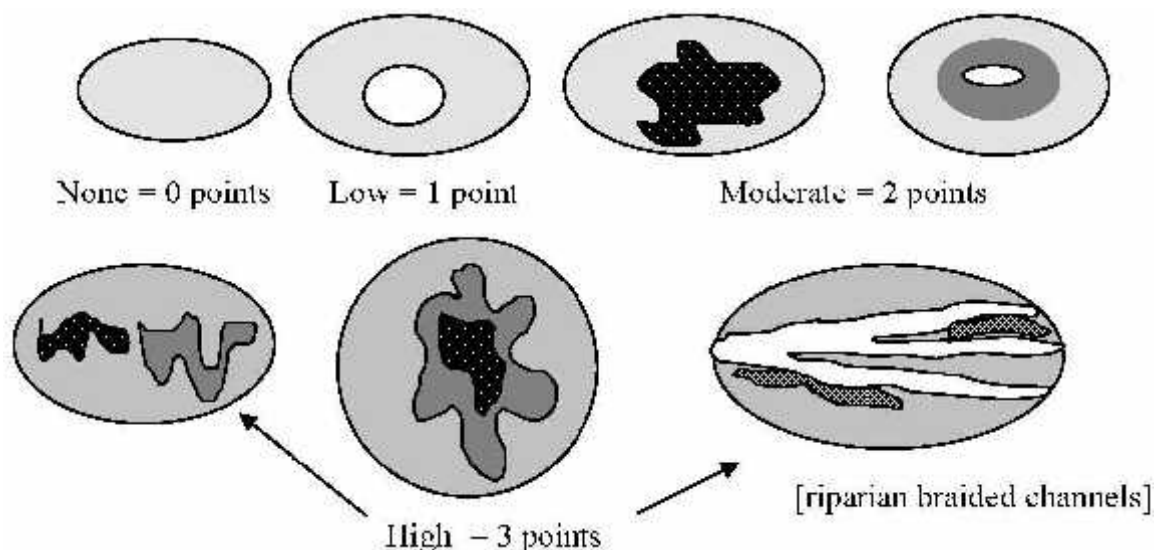
Comments Go to Page 13

<i>These questions apply to wetlands of all HGM classes</i>		Points (only 1 score per box)								
HABITAT FUNCTIONS – Indicators that wetland functions to provide important habitat										
H 1. Does the wetland have the <u>potential</u> to provide habitat for many species?										
<p>H 1.1 <u>Vegetation structure</u> (see p. 72)</p> <p><i>Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres.</i></p> <p> <input type="checkbox"/> Aquatic bed <input checked="" type="checkbox"/> Emergent plants <input checked="" type="checkbox"/> Scrub/shrub (areas where shrubs have >30% cover) <input checked="" type="checkbox"/> Forested (areas where trees have >30% cover) </p> <p><i>If the unit has a forested class check if:</i></p> <p> <input type="checkbox"/> Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon </p> <p><i>Add the number of vegetation types that qualify. If you have:</i></p> <table> <tr> <td>4 types or more</td> <td>points = 4</td> </tr> <tr> <td>3 types</td> <td>points = 2</td> </tr> <tr> <td>2 types</td> <td>points = 1</td> </tr> <tr> <td>1 type</td> <td>points = 0</td> </tr> </table> <p>Map of Cowardin vegetation classes</p>		4 types or more	points = 4	3 types	points = 2	2 types	points = 1	1 type	points = 0	<p>Figure</p> <p>2</p>
4 types or more	points = 4									
3 types	points = 2									
2 types	points = 1									
1 type	points = 0									
<p>H 1.2 <u>Hydroperiods</u> (see p. 73)</p> <p><i>Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ acre to count. (See text for description of hydroperiods.)</i></p> <p> <input type="checkbox"/> Permanently flooded or inundated <input checked="" type="checkbox"/> Seasonally flooded or inundated <input checked="" type="checkbox"/> Occasionally flooded or inundated <input checked="" type="checkbox"/> Saturated only <input type="checkbox"/> Permanently flowing stream or river in, or adjacent to, the wetland <input type="checkbox"/> Seasonally flowing stream or river in, or adjacent to, the wetland <input type="checkbox"/> Lake-fringe wetland = 2 points <input type="checkbox"/> Freshwater tidal wetland = 2 points </p>		<p>Figure</p> <p>2</p>								
<p>H 1.3 <u>Richness of Plant Species</u> (see p. 75)</p> <p><i>Count the number of plant species in the wetland that cover at least 10 ft². (Different patches of the same species can be combined to meet the size threshold.)</i></p> <p><i>You do not have to name the species.</i></p> <p><i>Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle.</i></p> <p><i>If you counted:</i></p> <table> <tr> <td>> 19 species</td> <td>points = 2</td> </tr> <tr> <td>5 - 19 species</td> <td>points = 1</td> </tr> <tr> <td><5 species</td> <td>points = 0</td> </tr> </table> <p><i>List species below if you want to:</i></p>		> 19 species	points = 2	5 - 19 species	points = 1	<5 species	points = 0	<p>1</p>		
> 19 species	points = 2									
5 - 19 species	points = 1									
<5 species	points = 0									

Total for page 5

H 1.4 Interspersion of habitats (*see p. 76*)

Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.



NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes

H 1.5 Special Habitat Features: (*see p. 77*)

Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.

- ☐ Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long).
- ☐ Standing snags (diameter at bottom >4 inches) in the wetland
- ☐ Undercut banks are present for at least 6.6 ft. (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m)
- ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet turned grey/brown*)
- ☒ At least ¼ acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*)
- ☒ Invasive plants cover less than 25% of the wetland area in each stratum of plants

Note: The 20% stated in early printings of the manual on page 78 is an error

H 1. TOTAL Score – potential for providing habitat
Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5

Comments:

Figure

2

2

9

H 2. Does the wetland have the opportunity to provide habitat for many species?)	
<p>H 2.1 <u>Buffers</u> (<i>see p. 80</i>) <i>Choose the description that best represents condition of buffer of wetland. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."</i></p> <p><input type="checkbox"/> 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer. (relatively undisturbed also means no grazing, no landscaping, no daily human use) Points = 5</p> <p><input type="checkbox"/> 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water >50% circumference. Points = 4</p> <p><input type="checkbox"/> 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4</p> <p><input type="checkbox"/> 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >25% circumference. Points = 3</p> <p><input type="checkbox"/> 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3</p> <p style="text-align: center;">If buffer does not meet any of the three criteria above</p> <p><input checked="" type="checkbox"/> No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2</p> <p><input type="checkbox"/> No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing or lawns are OK Points = 2</p> <p><input type="checkbox"/> Heavy grazing in buffer. Points = 1</p> <p><input type="checkbox"/> Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland) Points = 0</p> <p><input type="checkbox"/> Buffer does not meet any of the criteria above. Points = 1</p> <p style="text-align: right;">Aerial photo showing buffers</p>	<p>Figure__</p> <p style="text-align: center;">2</p>
<p>H 2.2 <u>Corridors and Connections</u> (<i>see p. 81</i>)</p> <p>H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (<i>dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor</i>).</p> <p style="text-align: center;"><input type="checkbox"/> YES = 4 points (<i>go to H 2.3</i>) <input checked="" type="checkbox"/> NO = go to H 2.2.2</p> <p>H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? OR a Lake-fringe wetland, if it does not have an undisturbed corridor as in the question above?</p> <p style="text-align: center;"><input type="checkbox"/> YES = 2 points (<i>go to H 2.3</i>) <input checked="" type="checkbox"/> NO = H 2.2.3</p> <p>H 2.2.3 Is the wetland:</p> <p style="padding-left: 40px;">within 5 mi (8km) of a brackish or salt water estuary OR within 3 mi of a large field or pasture (>40 acres) OR within 1 mi of a lake greater than 20 acres?</p> <p style="text-align: center;"><input checked="" type="checkbox"/> YES = 1 point <input type="checkbox"/> NO = 0 points</p>	<p style="text-align: center;">1</p>

Total for page 3

H 2.3 Near or adjacent to other priority habitats listed by WDFW (see p. 82)

Which of the following priority habitats are within 330ft (100m) of the wetland? (*NOTE: the connections do not have to be relatively undisturbed.*)

These are DFW definitions. Check with your local DFW biologist if there are any questions

- ☐ **Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.8 ha (2 acres).
- ☐ **Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft.
- ☐ **Old-growth forests:** (Old-growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age.
- ☐ **Mature forests:** Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest.
- ☐ **Prairies:** Relatively undisturbed areas (as indicated by dominance of native plants) where grasses and/or forbs form the natural climax plant community.
- ☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ☐ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages
- ☒ **Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component of the stand is 25%.
- ☒ **Urban Natural Open Space:** A priority species resides within or is adjacent to the open space and uses it for breeding and/or regular feeding; and/or the open space functions as a corridor connecting other *priority habitats*, especially those that would otherwise be isolated; and/or the open space is an isolated remnant of natural habitat larger than 4 ha (10 acres) and is surrounded by urban development.
- ☐ **Estuary/Estuary-like:** Deepwater tidal habitats and adjacent tidal wetlands, usually semi-enclosed by land but with open, partly obstructed or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. The salinity may be periodically increased above that of the open ocean by evaporation. Along some low-energy coastlines there is appreciable dilution of sea water. Estuarine habitat extends upstream and landward to where ocean-derived salts measure less than 0.5ppt. during the period of average annual low flow. Includes both estuaries and lagoons.
- ☐ **Marine/Estuarine Shorelines:** Shorelines include the intertidal and subtidal zones of beaches, and may also include the backshore and adjacent components of the terrestrial landscape (e.g., cliffs, snags, mature trees, dunes, meadows) that are important to shoreline associated fish and wildlife and that contribute to shoreline function (e.g., sand/rock/log recruitment, nutrient contribution, erosion control).

If wetland has **3 or more** priority habitats = **4 points**

If wetland has **2** priority habitats = **3 points**

If wetland has **1** priority habitat = **1 point**

No habitats = 0 points

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)

3

<p>H 2.4 Wetland Landscape (<i>choose the one description of the landscape around the wetland that best fits</i>) (<i>see p. 84</i>)</p> <p>There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5</p> <p>The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5</p> <p>There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3</p> <p>The wetland is Lake-fringe on a lake with disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 3</p> <p>There is at least 1 wetland within ½ mile. points = 2</p> <p>There are no wetlands within ½ mile. points = 0</p>	3
<p>H 2. TOTAL Score -opportunity for providing habitat <i>Add the scores in the column above</i></p>	9
<p>TOTAL for H 1 from page 14</p>	
<p>Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1</p>	18

Comments

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

Wetland Type	Category
<p><i>Check off any criteria that apply to the wetland. Select the appropriate Category (from dropdown menu in Category column) when the appropriate criteria are met.</i></p>	
<p>SC 1.0 Estuarine wetlands (see p. 86)</p> <p>Does the wetland meet the following criteria for Estuarine wetlands?</p> <div style="margin-left: 20px;"> <input type="checkbox"/> The dominant water regime is tidal, <input type="checkbox"/> Vegetated, and <input type="checkbox"/> With a salinity greater than 0.5 ppt. <input type="checkbox"/> YES = Go to SC 1.1 <input checked="" type="checkbox"/> NO </div>	
<p>SC 1.1 Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?</p> <div style="margin-left: 20px;"> <input type="checkbox"/> YES = Category I <input type="checkbox"/> NO go to SC 1.2 </div>	Cat. I
<p>SC 1.2 Is the wetland at least 1 acre in size and meets at least two of the following three conditions? YES = Category I NO = Category II</p> <div style="margin-left: 20px;"> <input type="checkbox"/> The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native <i>Spartina</i> spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of <i>Spartina</i> would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of <i>Spartina</i> in determining the size threshold of 1 acre. <input type="checkbox"/> At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. <input type="checkbox"/> The wetland has at least 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. </div>	Cat. I Cat. II Dual rating I/II

<p>SC 2.0 Natural Heritage Wetlands (see p. 87) Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species.</p> <p>SC 2.1 Is the wetland being rated in a Section/Township/Range that contains a Natural Heritage wetland? (<i>this question is used to screen out most sites before you need to contact WNHP/DNR</i>)</p> <p>S/T/R information from Appendix D <input checked="" type="checkbox"/> or accessed from WNHP/DNR web site <input type="checkbox"/></p> <p>YES <input checked="" type="checkbox"/> – contact WNHP/DNR (see p. 79) and go to SC 2.2 NO <input type="checkbox"/></p> <p>SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as or as a site with state threatened or endangered plant species?</p> <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO = not in a Heritage Wetland</p>	<p>Cat. I</p>
<p>SC 3.0 Bogs (see p. 87) Does the wetland (or part of the wetland) meet both the criteria for soils and vegetation in bogs? <i>Use the key below to identify if the wetland is a bog. If you answer yes you will still need to rate the wetland based on its functions.</i></p> <ol style="list-style-type: none"> Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils) Yes <input type="checkbox"/> - go to Q. 3 No <input checked="" type="checkbox"/> go to Q. 2 Does the wetland have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? Yes <input type="checkbox"/> - go to Q. 3 No <input checked="" type="checkbox"/> - Is not a bog for purpose of rating Does the wetland have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the “bog” species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes <input type="checkbox"/> – Is a bog for purpose of rating No <input checked="" type="checkbox"/> -go to Q. 4 NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16” deep. If the pH is less than 5.0 and the “bog” plant species in Table 3 are present, the wetland is a bog. <ol style="list-style-type: none"> Is the wetland forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann’s spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover (> 30% coverage of the total shrub/herbaceous cover)? YES <input type="checkbox"/> = Category I NO <input checked="" type="checkbox"/> Is not a bog for purpose of rating 	<p>Cat. I</p>

<p>SC 4.0 Forested Wetlands (see p. 90) Does the wetland have at least 1 acre of forest that meets one of these criteria for the Department of Fish and Wildlife's forests as priority habitats? <i>If you answer yes you will still need to rate the wetland based on its functions.</i></p> <p><input type="checkbox"/> Old-growth forests: (west of Cascade crest) Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more.</p> <p>NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter.</p> <p><input type="checkbox"/> Mature forests: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.</p> <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO not a forested wetland with special characteristics</p>	<p>Cat. I</p>
<p>SC 5.0 Wetlands in Coastal Lagoons (see p. 91) Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?</p> <p><input type="checkbox"/> The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks</p> <p><input type="checkbox"/> The lagoon in which the wetland is located contains surface water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (<i>needs to be measured near the bottom</i>)</p> <p><input type="checkbox"/> YES = Go to SC 5.1 NO <input checked="" type="checkbox"/> not a wetland in a coastal lagoon</p> <p>SC 5.1 Does the wetland meet all of the following three conditions?</p> <p><input type="checkbox"/> The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of invasive plant species (see list of invasive species on p. 74).</p> <p><input type="checkbox"/> At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.</p> <p><input type="checkbox"/> The wetland is larger than 1/10 acre (4350 square feet)</p> <p>YES <input type="checkbox"/> = Category I NO <input type="checkbox"/> = Category II</p>	

<p>SC 6.0 Interdunal Wetlands (see p. 93) Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? <input type="checkbox"/> YES = Go to SC 6.1 <input checked="" type="checkbox"/> NO -- not an interdunal wetland for rating <i>If you answer yes you will still need to rate the wetland based on its functions.</i> In practical terms that means the following geographic areas: <ul style="list-style-type: none"> • Long Beach Peninsula – lands west of SR103 • Grayland-Westport- lands west of SR 105 • Ocean Shores-Copalis- lands west of SR 115 and SR 109 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is one acre or larger? <input type="checkbox"/> YES = Category II <input type="checkbox"/> NO go to SC 6.2 SC 6.2 Is the wetland between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre,? <input type="checkbox"/> YES = Category III </p>	 Cat.II Cat.III
<p>Category of wetland based on Special Characteristics Choose the “highest” rating if wetland falls into several categories, and record on p. 1. If you answered NO for all types enter “Not Applicable” on p. 1. </p>	N/A

Comments

The wetland has been previously disturbed, therefore, it is not high quality undisturbed wetland. Based on ELS observations on-site, the wetland does not contain state threatened or endangered species.

Wetland name or number: Wetland G

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 – Updated July 2006 to increase accuracy and reproducibility among users

Name of wetland (if known): Wetland G

Date of site visit: Oct. 2013

Rated by A. Aberle Trained by Ecology? Yes X No _____ Date of Training: Oct. 2006

SECTION: 20 & 21 TOWNSHIP: 2N RANGE: 3E Is S/T/R in Appendix D? Yes X No _____

Map of wetland unit: Figure__ Estimated size 1.94 acres

DRAFT SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I _____ II _____ III X IV _____

Category I = Score ≥ 70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions

14

Score for Hydrologic Functions

5

Score for Habitat Functions

16

TOTAL Score for functions

36

Category based on SPECIAL CHARACTERISTICS of wetland

I _____ II _____ Does not Apply X

Final Category (choose the “highest” category from above)

III

Check the appropriate type and class of wetland being rated.

Wetland Type		Wetland Class	
Estuarine		Depressional	
Natural Heritage Wetland		Riverine	
Bog		Lake-fringe	
Mature Forest		Slope	X
Old Growth Forest		Flats	
Coastal Lagoon		Freshwater Tidal	
Interdunal			
None of the above	X	Check if unit has multiple HGM classes present	<input type="checkbox"/>

Comments

Does the wetland being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. <i>Has the wetland been documented as a habitat for any Federally listed Threatened or Endangered animal or plant species (T/E species)?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		X
SP2. <i>Has the wetland unit been documented as habitat for any State listed Threatened or Endangered animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category 1 Natural Heritage Wetlands (see p. 19 of data form).		X
SP3. <i>Does the wetland contain individuals of Priority species listed by the WDFW for the state?</i>		X
SP4. <i>Does the wetland have a local significance in addition to its functions?</i> For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		X

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Comments Formal priority and habitat species request has been completed.

Classification of Wetland Units in Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the wetland usually controlled by tides (i.e. except during floods)?

☒ NO – go to 2 ☐ YES – the wetland class is **Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? ☐ YES – **Freshwater Tidal Fringe** ☐ NO – **Saltwater Tidal Fringe (Estuarine)**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is rated as an **Estuarine** wetland. Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term “Estuarine” wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

☒ NO – go to 3 ☐ YES – The wetland class is **Flats**

If your wetland can be classified as a “Flats” wetland, use the form for **Depressional** wetlands.

3. Does the wetland **meet both** of the following criteria?

- ☐ The vegetated part of the wetland is on the shores of a body of open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;
- ☐ At least 30% of the open water area is deeper than 6.6 ft (2 m)?

☒ NO – go to 4 ☐ YES – The wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the wetland **meet all** of the following criteria?

- ☒ The wetland is on a slope (*slope can be very gradual*),
- ☒ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
- ☒ The water leaves the wetland **without being impounded**?
NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks(depressions are usually <3ft diameter and less than 1 foot deep).*

☐ NO - go to 5 ☒ YES – The wetland class is **Slope**

Comments

5. Does the entire wetland unit *meet all* of the following criteria?

- ☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river
- ☐ The overbank flooding occurs at least once every two years.

NOTE: The riverine unit can contain depressions that are filled with water when the river is not flooding.

☐ NO - go to 6 ☐ **YES** – The wetland class is **Riverine**

6. Is the wetland in a topographic depression in which water ponds, or is saturated to the surface, at some time of the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

☐ NO – go to 7 ☐ **YES** – The wetland class is **Depressional**

7. Is the wetland located in a very flat area with no obvious depression and no overbank flooding. The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☐ NO – go to 8 ☐ **YES** – The wetland class is **Depressional**

8. Your wetland seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

<i>HGM Classes within the wetland unit being rated</i>	<i>HGM Class to Use in Rating</i>
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine along stream within boundary	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

Comments

[illegible]

S Slope Wetlands		Points (only 1 score per box)
HYDROLOGIC FUNCTIONS - Indicators that wetland unit functions to reduce flooding and stream erosion		
S	S 3. Does the wetland have the <u>potential</u> to reduce flooding and erosion?	(see p. 68)
S	<p>S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during storms. <i>Choose the points appropriate for the description that best fit conditions in the wetland. (stems of plants should be thick enough (usually > 1/8 in), or dense enough, to remain erect during surface flows)</i></p> <p>Dense, uncut, rigid vegetation covers >90% of area of the wetland. points = 6</p> <p>Dense, uncut, rigid vegetation >1/2 area of wetland points = 3</p> <p>Dense, uncut, rigid vegetation >1/4 area of wetland points = 1</p> <p>More than 3/4 of area is grazed, mowed, tilled or vegetation is not rigid points = 0</p>	3
S	<p>S 3.2 Characteristics of slope wetland that holds back small amounts of flood flows: The slope wetland has small surface depressions that can retain water over at least 10% of its area.</p> <p>YES points = 2</p> <p>NO points = 0</p>	2
S	<i>Add the points in the boxes above</i>	5
S	<p>S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?</p> <p>Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? <i>Note which of the following conditions apply.</i></p> <p><input checked="" type="checkbox"/> Wetland has surface runoff that drains to a river or stream that has flooding problems</p> <p><input type="checkbox"/> Other _____</p> <p><i>Answer NO if the major source of water is controlled by a reservoir (e.g. wetland is a seep that is on the downstream side of a dam.)</i></p> <p><input checked="" type="checkbox"/> YES multiplier is 2 <input type="checkbox"/> NO multiplier is 1</p>	<p>(see p. 70)</p> <p>multiplier</p> <p><u>2</u></p>
S	<p>TOTAL - Hydrologic Functions Multiply the score from S 3 by S 4 <i>Add score to table on p. 1</i></p>	5

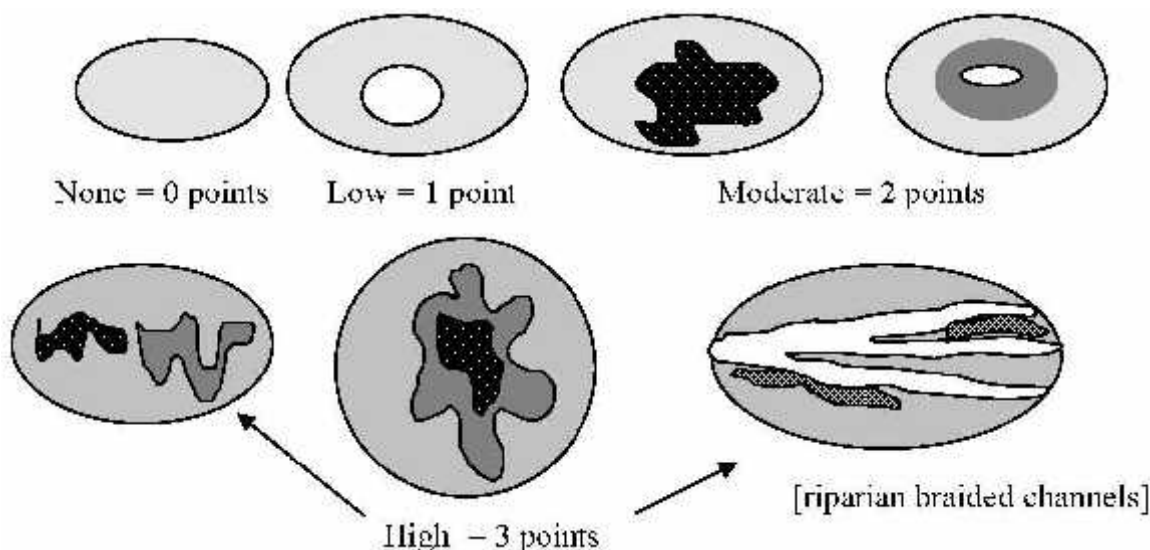
Comments

[illegible]

Total for page 4

H 1.4 Interspersion of habitats (see p. 76)

Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.



NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes

H 1.5 Special Habitat Features: (see p. 77)

Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.

- ☐ Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long).
- ☒ Standing snags (diameter at bottom >4 inches) in the wetland
- ☐ Undercut banks are present for at least 6.6 ft. (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m)
- ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet turned grey/brown*)
- ☐ At least ¼ acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*)
- ☐ Invasive plants cover less than 25% of the wetland area in each stratum of plants

Note: The 20% stated in early printings of the manual on page 78 is an error

H 1. TOTAL Score – potential for providing habitat

Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5

Comments:

Figure

1

2

7

H 2. Does the wetland have the opportunity to provide habitat for many species?)		Figure__
<p>H 2.1 <u>Buffers</u> (see p. 80)</p> <p>Choose the description that best represents condition of buffer of wetland. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."</p> <p><input type="checkbox"/> 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer. (relatively undisturbed also means no grazing, no landscaping, no daily human use) Points = 5</p> <p><input type="checkbox"/> 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water >50% circumference. Points = 4</p> <p><input type="checkbox"/> 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4</p> <p><input type="checkbox"/> 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >25% circumference. Points = 3</p> <p><input type="checkbox"/> 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3</p> <p>If buffer does not meet any of the three criteria above</p> <p><input checked="" type="checkbox"/> No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2</p> <p><input type="checkbox"/> No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing or lawns are OK Points = 2</p> <p><input type="checkbox"/> Heavy grazing in buffer. Points = 1</p> <p><input type="checkbox"/> Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland) Points = 0</p> <p><input type="checkbox"/> Buffer does not meet any of the criteria above. Points = 1</p> <p style="text-align: right;">Aerial photo showing buffers</p>	2	
<p>H 2.2 <u>Corridors and Connections</u> (see p. 81)</p> <p>H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor).</p> <p><input type="checkbox"/> YES = 4 points (go to H 2.3) <input checked="" type="checkbox"/> NO = go to H 2.2.2</p> <p>H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? OR a Lake-fringe wetland, if it does not have an undisturbed corridor as in the question above?</p> <p><input type="checkbox"/> YES = 2 points (go to H 2.3) <input checked="" type="checkbox"/> NO = H 2.2.3</p> <p>H 2.2.3 Is the wetland:</p> <p>within 5 mi (8km) of a brackish or salt water estuary OR</p> <p>within 3 mi of a large field or pasture (>40 acres) OR</p> <p>within 1 mi of a lake greater than 20 acres?</p> <p><input checked="" type="checkbox"/> YES = 1 point <input type="checkbox"/> NO = 0 points</p>	1	

Total for page_3_

H 2.3 Near or adjacent to other priority habitats listed by WDFW (see p. 82)

Which of the following priority habitats are within 330ft (100m) of the wetland? (*NOTE: the connections do not have to be relatively undisturbed.*)

These are DFW definitions. Check with your local DFW biologist if there are any questions

- ☐ **Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.8 ha (2 acres).
- ☐ **Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft.
- ☐ **Old-growth forests:** (Old-growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age.
- ☐ **Mature forests:** Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest.
- ☐ **Prairies:** Relatively undisturbed areas (as indicated by dominance of native plants) where grasses and/or forbs form the natural climax plant community.
- ☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ☐ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages
- ☒ **Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component of the stand is 25%.
- ☒ **Urban Natural Open Space:** A priority species resides within or is adjacent to the open space and uses it for breeding and/or regular feeding; and/or the open space functions as a corridor connecting other *priority habitats*, especially those that would otherwise be isolated; and/or the open space is an isolated remnant of natural habitat larger than 4 ha (10 acres) and is surrounded by urban development.
- ☐ **Estuary/Estuary-like:** Deepwater tidal habitats and adjacent tidal wetlands, usually semi-enclosed by land but with open, partly obstructed or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. The salinity may be periodically increased above that of the open ocean by evaporation. Along some low-energy coastlines there is appreciable dilution of sea water. Estuarine habitat extends upstream and landward to where ocean-derived salts measure less than 0.5ppt. during the period of average annual low flow. Includes both estuaries and lagoons.
- ☐ **Marine/Estuarine Shorelines:** Shorelines include the intertidal and subtidal zones of beaches, and may also include the backshore and adjacent components of the terrestrial landscape (e.g., cliffs, snags, mature trees, dunes, meadows) that are important to shoreline associated fish and wildlife and that contribute to shoreline function (e.g., sand/rock/log recruitment, nutrient contribution, erosion control).

If wetland has **3 or more** priority habitats = **4 points**

If wetland has **2** priority habitats = **3 points**

If wetland has **1** priority habitat = **1 point**

No habitats = 0 points

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)

3

<p>H 2.4 Wetland Landscape (<i>choose the one description of the landscape around the wetland that best fits</i>) (<i>see p. 84</i>)</p> <p>There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5</p> <p>The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5</p> <p>There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3</p> <p>The wetland is Lake-fringe on a lake with disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 3</p> <p>There is at least 1 wetland within ½ mile. points = 2</p> <p>There are no wetlands within ½ mile. points = 0</p>	3
<p>H 2. TOTAL Score -opportunity for providing habitat <i>Add the scores in the column above</i></p>	7
<p>TOTAL for H 1 from page 14</p>	9
<p>Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1</p>	16

Comments

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

Wetland Type	Category
<p><i>Check off any criteria that apply to the wetland. Select the appropriate Category (from dropdown menu in Category column) when the appropriate criteria are met.</i></p> <p>SC 1.0 Estuarine wetlands (see p. 86)</p> <p>Does the wetland meet the following criteria for Estuarine wetlands?</p> <div style="margin-left: 20px;"> <input type="checkbox"/> The dominant water regime is tidal, <input type="checkbox"/> Vegetated, and <input type="checkbox"/> With a salinity greater than 0.5 ppt. <input type="checkbox"/> YES = Go to SC 1.1 <input checked="" type="checkbox"/> NO </div>	
<p>SC 1.1 Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? <input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO go to SC 1.2</p>	Cat. I
<p>SC 1.2 Is the wetland at least 1 acre in size and meets at least two of the following three conditions? YES = Category I NO = Category II</p> <div style="margin-left: 20px;"> <input type="checkbox"/> The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native <i>Spartina</i> spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of <i>Spartina</i> would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of <i>Spartina</i> in determining the size threshold of 1 acre. <input type="checkbox"/> At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. <input type="checkbox"/> The wetland has at least 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. </div>	Cat. I Cat. II Dual rating I/II

<p>SC 2.0 Natural Heritage Wetlands (see p. 87) Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species.</p> <p>SC 2.1 Is the wetland being rated in a Section/Township/Range that contains a Natural Heritage wetland? (<i>this question is used to screen out most sites before you need to contact WNHP/DNR</i>)</p> <p>S/T/R information from Appendix D <input checked="" type="checkbox"/> or accessed from WNHP/DNR web site <input type="checkbox"/></p> <p>YES <input type="checkbox"/> – contact WNHP/DNR (see p. 79) and go to SC 2.2 NO <input checked="" type="checkbox"/></p> <p>SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as or as a site with state threatened or endangered plant species?</p> <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO = not in a Heritage Wetland</p>	<p>Cat. I</p>
<p>SC 3.0 Bogs (see p. 87) Does the wetland (or part of the wetland) meet both the criteria for soils and vegetation in bogs? <i>Use the key below to identify if the wetland is a bog. If you answer yes you will still need to rate the wetland based on its functions.</i></p> <ol style="list-style-type: none"> Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils) Yes <input type="checkbox"/> - go to Q. 3 No <input checked="" type="checkbox"/> go to Q. 2 Does the wetland have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? Yes <input type="checkbox"/> - go to Q. 3 No <input checked="" type="checkbox"/> - Is not a bog for purpose of rating Does the wetland have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the “bog” species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes <input type="checkbox"/> – Is a bog for purpose of rating No <input checked="" type="checkbox"/> -go to Q. 4 NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16” deep. If the pH is less than 5.0 and the “bog” plant species in Table 3 are present, the wetland is a bog. <ol style="list-style-type: none"> Is the wetland forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann’s spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover (> 30% coverage of the total shrub/herbaceous cover)? YES <input type="checkbox"/> = Category I NO <input checked="" type="checkbox"/> Is not a bog for purpose of rating 	<p>Cat. I</p>

<p>SC 4.0 Forested Wetlands (see p. 90) Does the wetland have at least 1 acre of forest that meets one of these criteria for the Department of Fish and Wildlife's forests as priority habitats? <i>If you answer yes you will still need to rate the wetland based on its functions.</i></p> <p><input type="checkbox"/> Old-growth forests: (west of Cascade crest) Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more.</p> <p>NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter.</p> <p><input type="checkbox"/> Mature forests: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.</p> <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO not a forested wetland with special characteristics</p>	<p>Cat. I</p>
<p>SC 5.0 Wetlands in Coastal Lagoons (see p. 91) Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?</p> <p><input type="checkbox"/> The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks</p> <p><input type="checkbox"/> The lagoon in which the wetland is located contains surface water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (<i>needs to be measured near the bottom</i>)</p> <p><input type="checkbox"/> YES = Go to SC 5.1 NO <input checked="" type="checkbox"/> not a wetland in a coastal lagoon</p> <p>SC 5.1 Does the wetland meet all of the following three conditions?</p> <p><input type="checkbox"/> The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of invasive plant species (see list of invasive species on p. 74).</p> <p><input type="checkbox"/> At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.</p> <p><input type="checkbox"/> The wetland is larger than 1/10 acre (4350 square feet)</p> <p>YES <input type="checkbox"/> = Category I NO <input type="checkbox"/> = Category II</p>	

<p>SC 6.0 Interdunal Wetlands (see p. 93) Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? <input type="checkbox"/> YES = Go to SC 6.1 <input checked="" type="checkbox"/> NO -- not an interdunal wetland for rating <i>If you answer yes you will still need to rate the wetland based on its functions.</i> In practical terms that means the following geographic areas: <ul style="list-style-type: none"> • Long Beach Peninsula – lands west of SR103 • Grayland-Westport- lands west of SR 105 • Ocean Shores-Copalis- lands west of SR 115 and SR 109 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is one acre or larger? <input type="checkbox"/> YES = Category II <input checked="" type="checkbox"/> NO go to SC 6.2 SC 6.2 Is the wetland between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre,? <input type="checkbox"/> YES = Category III </p>	 Cat.II Cat.III
<p>Category of wetland based on Special Characteristics Choose the “highest” rating if wetland falls into several categories, and record on p. 1. If you answered NO for all types enter “Not Applicable” on p. 1. </p>	N/A

Comments

The wetland has been previously disturbed, therefore, it is not high quality undisturbed wetland. Based on ELS observations on-site, the wetland does not contain state threatened or endangered species.

Wetland name or number: Wetland O

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 – Updated July 2006 to increase accuracy and reproducibility among users

Name of wetland (if known): Wetland O

Date of site visit: Oct. 2013

Rated by A. Aberle Trained by Ecology? Yes X No _____ Date of Training: Oct. 2006

SECTION: 20 TOWNSHIP: 2N RANGE: 3E Is S/T/R in Appendix D? Yes X No __

Map of wetland unit: Figure__ Estimated size 0.02 acres

DRAFT SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I _____ II _____ III _____ IV X

Category I = Score ≥ 70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions

12

Score for Hydrologic Functions

1

Score for Habitat Functions

13

TOTAL Score for functions

26

Category based on SPECIAL CHARACTERISTICS of wetland

I _____ II _____ Does not Apply X

Final Category (choose the “highest” category from above)

IV

Check the appropriate type and class of wetland being rated.

Wetland Type		Wetland Class	
Estuarine		Depressional	
Natural Heritage Wetland		Riverine	
Bog		Lake-fringe	
Mature Forest		Slope	X
Old Growth Forest		Flats	
Coastal Lagoon		Freshwater Tidal	
Interdunal			
None of the above	X	Check if unit has multiple HGM classes present	<input type="checkbox"/>

Comments

Does the wetland being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. <i>Has the wetland been documented as a habitat for any Federally listed Threatened or Endangered animal or plant species (T/E species)?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		X
SP2. <i>Has the wetland unit been documented as habitat for any State listed Threatened or Endangered animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category 1 Natural Heritage Wetlands (see p. 19 of data form).		X
SP3. <i>Does the wetland contain individuals of Priority species listed by the WDFW for the state?</i>		X
SP4. <i>Does the wetland have a local significance in addition to its functions?</i> For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		X

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Comments Formal priority and habitat species request has been completed.

Classification of Wetland Units in Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the wetland usually controlled by tides (i.e. except during floods)?

☒ NO – go to 2 ☐ YES – the wetland class is **Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? ☐ YES – **Freshwater Tidal Fringe** ☐ NO – **Saltwater Tidal Fringe (Estuarine)**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is rated as an **Estuarine** wetland. Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term “Estuarine” wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

☒ NO – go to 3 ☐ YES – The wetland class is **Flats**

If your wetland can be classified as a “Flats” wetland, use the form for **Depressional** wetlands.

3. Does the wetland **meet both** of the following criteria?

- ☐ The vegetated part of the wetland is on the shores of a body of open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;
- ☐ At least 30% of the open water area is deeper than 6.6 ft (2 m)?

☒ NO – go to 4 ☐ YES – The wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the wetland **meet all** of the following criteria?

- ☒ The wetland is on a slope (*slope can be very gradual*),
- ☒ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
- ☒ The water leaves the wetland **without being impounded**?
NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks(depressions are usually <3ft diameter and less than 1 foot deep).*

☐ NO - go to 5 ☒ YES – The wetland class is **Slope**

Comments

5. Does the entire wetland unit *meet all* of the following criteria?

- ☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river
- ☐ The overbank flooding occurs at least once every two years.

NOTE: The riverine unit can contain depressions that are filled with water when the river is not flooding.

☐ NO - go to 6 ☐ **YES** – The wetland class is **Riverine**

6. Is the wetland in a topographic depression in which water ponds, or is saturated to the surface, at some time of the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

☐ NO – go to 7 ☐ **YES** – The wetland class is **Depressional**

7. Is the wetland located in a very flat area with no obvious depression and no overbank flooding. The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☐ NO – go to 8 ☐ **YES** – The wetland class is **Depressional**

8. Your wetland seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

<i>HGM Classes within the wetland unit being rated</i>	<i>HGM Class to Use in Rating</i>
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine along stream within boundary	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

Comments

[illegible]

S Slope Wetlands		Points (only 1 score per box)
HYDROLOGIC FUNCTIONS - Indicators that wetland unit functions to reduce flooding and stream erosion		
S	S 3. Does the wetland have the <u>potential</u> to reduce flooding and erosion?	(see p. 68)
S	<p>S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during storms. <i>Choose the points appropriate for the description that best fit conditions in the wetland. (stems of plants should be thick enough (usually > 1/8 in), or dense enough, to remain erect during surface flows)</i></p> <p>Dense, uncut, rigid vegetation covers >90% of area of the wetland. points = 6</p> <p>Dense, uncut, rigid vegetation >1/2 area of wetland points = 3</p> <p>Dense, uncut, rigid vegetation >1/4 area of wetland points = 1</p> <p>More than 3/4 of area is grazed, mowed, tilled or vegetation is not rigid points = 0</p>	1
S	<p>S 3.2 Characteristics of slope wetland that holds back small amounts of flood flows: The slope wetland has small surface depressions that can retain water over at least 10% of its area.</p> <p>YES points = 2</p> <p>NO points = 0</p>	0
S	<i>Add the points in the boxes above</i>	1
S	<p>S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?</p> <p>Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? <i>Note which of the following conditions apply.</i></p> <p><input checked="" type="checkbox"/> Wetland has surface runoff that drains to a river or stream that has flooding problems</p> <p><input type="checkbox"/> Other _____</p> <p><i>Answer NO if the major source of water is controlled by a reservoir (e.g. wetland is a seep that is on the downstream side of a dam.)</i></p> <p><input checked="" type="checkbox"/> YES multiplier is 2 <input type="checkbox"/> NO multiplier is 1</p>	<p>(see p. 70)</p> <p>multiplier</p> <p><u>2</u></p>
S	<p>TOTAL - Hydrologic Functions Multiply the score from S 3 by S 4 <i>Add score to table on p. 1</i></p>	1

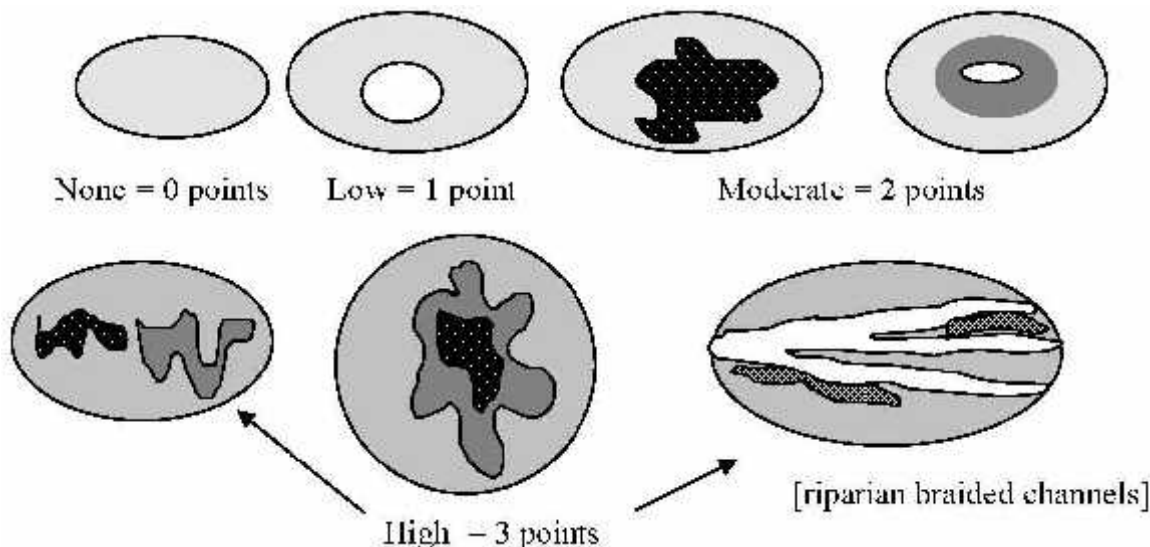
Comments

[illegible]

Total for page 1

H 1.4 Interspersion of habitats (see p. 76)

Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.



NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes

H 1.5 Special Habitat Features: (see p. 77)

Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.

- ☐ Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long).
- ☐ Standing snags (diameter at bottom >4 inches) in the wetland
- ☐ Undercut banks are present for at least 6.6 ft. (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m)
- ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet turned grey/brown*)
- ☐ At least ¼ acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*)
- ☐ Invasive plants cover less than 25% of the wetland area in each stratum of plants

Note: The 20% stated in early printings of the manual on page 78 is an error

H 1. TOTAL Score – potential for providing habitat
Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5

Comments:

Figure

1

0

4

H 2. Does the wetland have the opportunity to provide habitat for many species?)		Figure__
<p>H 2.1 <u>Buffers</u> (<i>see p. 80</i>)</p> <p><i>Choose the description that best represents condition of buffer of wetland. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."</i></p> <p><input type="checkbox"/> 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer. (relatively undisturbed also means no grazing, no landscaping, no daily human use) Points = 5</p> <p><input type="checkbox"/> 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water >50% circumference. Points = 4</p> <p><input type="checkbox"/> 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4</p> <p><input type="checkbox"/> 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >25% circumference. Points = 3</p> <p><input type="checkbox"/> 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3</p> <p>If buffer does not meet any of the three criteria above</p> <p><input checked="" type="checkbox"/> No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2</p> <p><input type="checkbox"/> No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing or lawns are OK Points = 2</p> <p><input type="checkbox"/> Heavy grazing in buffer. Points = 1</p> <p><input type="checkbox"/> Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland) Points = 0</p> <p><input type="checkbox"/> Buffer does not meet any of the criteria above. Points = 1</p> <p style="text-align: right;">Aerial photo showing buffers</p>		2
<p>H 2.2 <u>Corridors and Connections</u> (<i>see p. 81</i>)</p> <p>H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (<i>dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor</i>).</p> <p style="text-align: center;"><input type="checkbox"/> YES = 4 points (<i>go to H 2.3</i>) <input checked="" type="checkbox"/> NO = go to H 2.2.2</p> <p>H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? OR a Lake-fringe wetland, if it does not have an undisturbed corridor as in the question above?</p> <p style="text-align: center;"><input type="checkbox"/> YES = 2 points (<i>go to H 2.3</i>) <input checked="" type="checkbox"/> NO = H 2.2.3</p> <p>H 2.2.3 Is the wetland:</p> <p style="padding-left: 40px;">within 5 mi (8km) of a brackish or salt water estuary OR</p> <p style="padding-left: 40px;">within 3 mi of a large field or pasture (>40 acres) OR</p> <p style="padding-left: 40px;">within 1 mi of a lake greater than 20 acres?</p> <p style="text-align: center;"><input checked="" type="checkbox"/> YES = 1 point <input type="checkbox"/> NO = 0 points</p>		1

Total for page 3

H 2.3 Near or adjacent to other priority habitats listed by WDFW (see p. 82)

Which of the following priority habitats are within 330ft (100m) of the wetland? (*NOTE: the connections do not have to be relatively undisturbed.*)

These are DFW definitions. Check with your local DFW biologist if there are any questions

- ☒ **Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.8 ha (2 acres).
- ☐ **Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft.
- ☐ **Old-growth forests:** (Old-growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age.
- ☐ **Mature forests:** Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest.
- ☐ **Prairies:** Relatively undisturbed areas (as indicated by dominance of native plants) where grasses and/or forbs form the natural climax plant community.
- ☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ☐ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages
- ☐ **Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component of the stand is 25%.
- ☒ **Urban Natural Open Space:** A priority species resides within or is adjacent to the open space and uses it for breeding and/or regular feeding; and/or the open space functions as a corridor connecting other *priority habitats*, especially those that would otherwise be isolated; and/or the open space is an isolated remnant of natural habitat larger than 4 ha (10 acres) and is surrounded by urban development.
- ☐ **Estuary/Estuary-like:** Deepwater tidal habitats and adjacent tidal wetlands, usually semi-enclosed by land but with open, partly obstructed or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. The salinity may be periodically increased above that of the open ocean by evaporation. Along some low-energy coastlines there is appreciable dilution of sea water. Estuarine habitat extends upstream and landward to where ocean-derived salts measure less than 0.5ppt. during the period of average annual low flow. Includes both estuaries and lagoons.
- ☐ **Marine/Estuarine Shorelines:** Shorelines include the intertidal and subtidal zones of beaches, and may also include the backshore and adjacent components of the terrestrial landscape (e.g., cliffs, snags, mature trees, dunes, meadows) that are important to shoreline associated fish and wildlife and that contribute to shoreline function (e.g., sand/rock/log recruitment, nutrient contribution, erosion control).

If wetland has **3 or more** priority habitats = **4 points**

If wetland has **2** priority habitats = **3 points**

If wetland has **1** priority habitat = **1 point**

No habitats = 0 points

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)

3

<p>H 2.4 Wetland Landscape (<i>choose the one description of the landscape around the wetland that best fits</i>) (<i>see p. 84</i>)</p> <p>There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5</p> <p>The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5</p> <p>There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3</p> <p>The wetland is Lake-fringe on a lake with disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 3</p> <p>There is at least 1 wetland within ½ mile. points = 2</p> <p>There are no wetlands within ½ mile. points = 0</p>	3
<p>H 2. TOTAL Score -opportunity for providing habitat <i>Add the scores in the column above</i></p>	9
<p>TOTAL for H 1 from page 14</p>	4
<p>Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1</p>	13

Comments

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

Wetland Type	Category
<p><i>Check off any criteria that apply to the wetland. Select the appropriate Category (from dropdown menu in Category column) when the appropriate criteria are met.</i></p> <p>SC 1.0 Estuarine wetlands (<i>see p. 86</i>)</p> <p>Does the wetland meet the following criteria for Estuarine wetlands?</p> <div style="margin-left: 20px;"> <input type="checkbox"/> The dominant water regime is tidal, <input type="checkbox"/> Vegetated, and <input type="checkbox"/> With a salinity greater than 0.5 ppt. <input type="checkbox"/> YES = Go to SC 1.1 <input checked="" type="checkbox"/> NO </div>	
<p>SC 1.1 Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? <input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO go to SC 1.2</p>	Cat. I
<p>SC 1.2 Is the wetland at least 1 acre in size and meets at least two of the following three conditions? YES = Category I NO = Category II</p> <div style="margin-left: 20px;"> <input type="checkbox"/> The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native <i>Spartina</i> spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of <i>Spartina</i> would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of <i>Spartina</i> in determining the size threshold of 1 acre. <input type="checkbox"/> At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. <input type="checkbox"/> The wetland has at least 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. </div>	Cat. I Cat. II Dual rating I/II

<p>SC 2.0 Natural Heritage Wetlands (see p. 87) Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species.</p> <p>SC 2.1 Is the wetland being rated in a Section/Township/Range that contains a Natural Heritage wetland? (<i>this question is used to screen out most sites before you need to contact WNHP/DNR</i>)</p> <p>S/T/R information from Appendix D <input checked="" type="checkbox"/> or accessed from WNHP/DNR web site <input type="checkbox"/></p> <p>YES <input type="checkbox"/> – contact WNHP/DNR (see p. 79) and go to SC 2.2 NO <input checked="" type="checkbox"/></p> <p>SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as or as a site with state threatened or endangered plant species?</p> <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO = not in a Heritage Wetland</p>	<p>Cat. I</p>
<p>SC 3.0 Bogs (see p. 87) Does the wetland (or part of the wetland) meet both the criteria for soils and vegetation in bogs? <i>Use the key below to identify if the wetland is a bog. If you answer yes you will still need to rate the wetland based on its functions.</i></p> <ol style="list-style-type: none"> Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils) Yes <input type="checkbox"/> - go to Q. 3 No <input checked="" type="checkbox"/> go to Q. 2 Does the wetland have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? Yes <input type="checkbox"/> - go to Q. 3 No <input checked="" type="checkbox"/> - Is not a bog for purpose of rating Does the wetland have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the “bog” species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes <input type="checkbox"/> – Is a bog for purpose of rating No <input checked="" type="checkbox"/> -go to Q. 4 NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16” deep. If the pH is less than 5.0 and the “bog” plant species in Table 3 are present, the wetland is a bog. <ol style="list-style-type: none"> Is the wetland forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann’s spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover (> 30% coverage of the total shrub/herbaceous cover)? YES <input type="checkbox"/> = Category I NO <input checked="" type="checkbox"/> Is not a bog for purpose of rating 	<p>Cat. I</p>

<p>SC 4.0 Forested Wetlands (see p. 90) Does the wetland have at least 1 acre of forest that meets one of these criteria for the Department of Fish and Wildlife's forests as priority habitats? <i>If you answer yes you will still need to rate the wetland based on its functions.</i></p> <p><input type="checkbox"/> Old-growth forests: (west of Cascade crest) Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more.</p> <p>NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter.</p> <p><input type="checkbox"/> Mature forests: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.</p> <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO not a forested wetland with special characteristics</p>	<p>Cat. I</p>
<p>SC 5.0 Wetlands in Coastal Lagoons (see p. 91) Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?</p> <p><input type="checkbox"/> The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks</p> <p><input type="checkbox"/> The lagoon in which the wetland is located contains surface water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (<i>needs to be measured near the bottom</i>)</p> <p><input type="checkbox"/> YES = Go to SC 5.1 NO <input checked="" type="checkbox"/> not a wetland in a coastal lagoon</p> <p>SC 5.1 Does the wetland meet all of the following three conditions?</p> <p><input type="checkbox"/> The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of invasive plant species (see list of invasive species on p. 74).</p> <p><input type="checkbox"/> At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.</p> <p><input type="checkbox"/> The wetland is larger than 1/10 acre (4350 square feet)</p> <p>YES <input type="checkbox"/> = Category I NO <input type="checkbox"/> = Category II</p>	

<p>SC 6.0 Interdunal Wetlands (see p. 93) Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? <input type="checkbox"/> YES = Go to SC 6.1 <input checked="" type="checkbox"/> NO -- not an interdunal wetland for rating <i>If you answer yes you will still need to rate the wetland based on its functions.</i> In practical terms that means the following geographic areas: <ul style="list-style-type: none"> • Long Beach Peninsula – lands west of SR103 • Grayland-Westport- lands west of SR 105 • Ocean Shores-Copalis- lands west of SR 115 and SR 109 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is one acre or larger? <input type="checkbox"/> YES = Category II <input checked="" type="checkbox"/> NO go to SC 6.2 SC 6.2 Is the wetland between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre,? <input type="checkbox"/> YES = Category III </p>	 Cat.II Cat.III
<p>Category of wetland based on Special Characteristics Choose the “highest” rating if wetland falls into several categories, and record on p. 1. If you answered NO for all types enter “Not Applicable” on p. 1. </p>	N/A

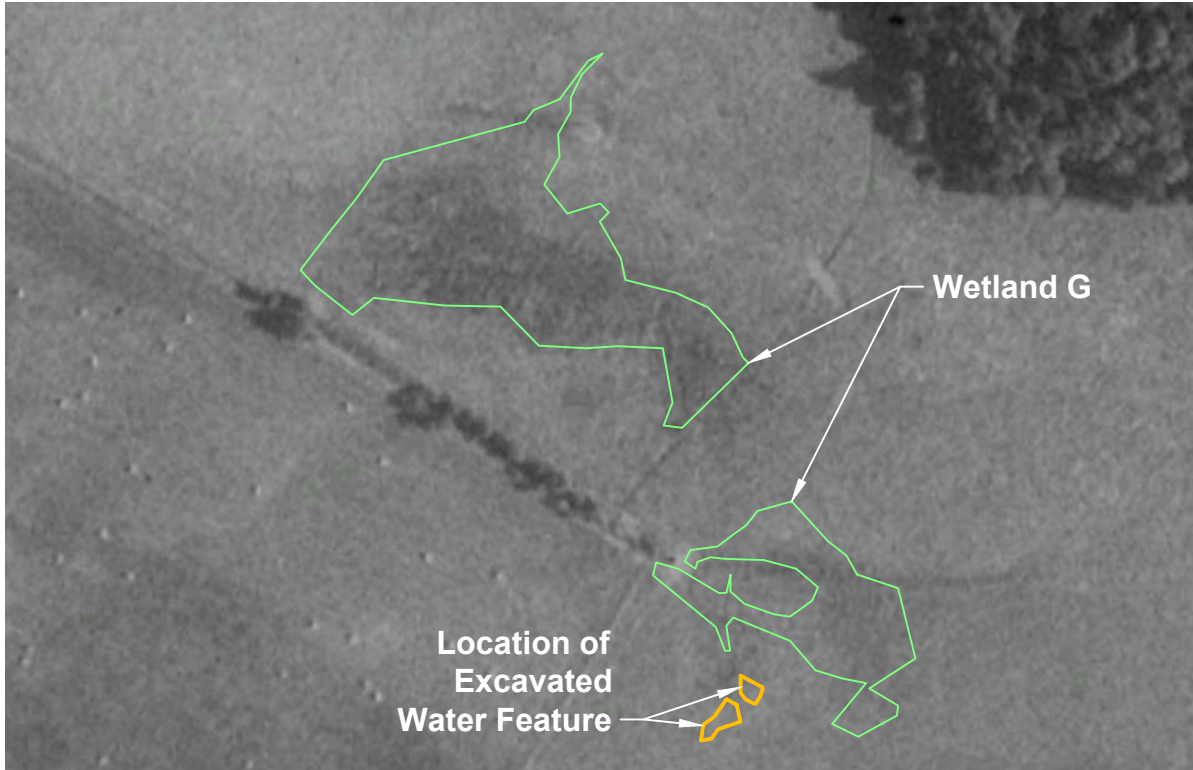
Comments

The wetland has been previously disturbed, therefore, it is not high quality undisturbed wetland. Based on ELS observations on-site, the wetland does not contain state threatened or endangered species.

Appendix D

Historic Aerial Photos

Figure D-1 Wetland G Historic Aerials



GOOGLE EARTH AERIAL 7-14-1990



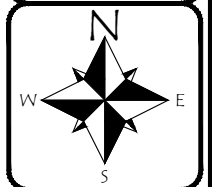
GOOGLE EARTH AERIAL 4-30-2002

LEGEND:

- Wetland Boundary
- Man-made Water Feature

NOTE(S):

1. Historic aerial photos provided by Google Earth™.



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DATE: 4/21/16
DWN: JKJ
REQ. BY: MM
PRJ. MGR: MM
CHK:
PROJECT NO: 2048.01

Figure D-1
WETLAND G HISTORIC AERIALS
Green Mountain Mixed Use PRD
Green Mountain Land, LLC
City of Camas, Clark County, Washington
Section 20, Township 2N, Range 3E, W.M.



Memo

To: Lauren Hollenbeck, Senior Planner, City of Camas

From: Mara McGrath, Senior Ecologist, Ecological Land Services, Inc.

Date: May 2, 2019

Subject: Green Mountain Planned Residential Development - B1 Pod | SUB18-04

This memo addresses items no. 7 and 8 in the City of Camas' Incompleteness Review Letter for SUB18-04, Green Mountain PRD. The City's incompleteness items are in italics, followed by Ecological Land Service's response in regular font.

7. *A[s] stated in the pre-application meeting notes, a critical areas report is required for the proposed removal of Oregon White Oaks with this development to include an analysis of alternative designs that demonstrates an effort to avoid impacts. A mitigation plan is required.*

A mitigation plan has already been prepared for the two oaks, identified as #65 and #66, proposed to be removed in B1 Pod. Ecological Land Services prepared a February 2016 *Oregon White Oak Advance Mitigation Plan*, which is attached. The advance oak mitigation accounted for 52 Oregon white oaks that would be removed and mitigated in advance of project impacts. These two Oregon white oak (#65 and #66) near the western boundary of B1 Pod were included in the tally of 52 oaks included in the advance mitigation. The advance oak mitigation areas were installed in March 2016 and are entering their third year of monitoring. The advance oak mitigation areas have exceeded their ecological performance standards in plant survival and invasive plant cover. The Year 2 monitoring report is attached.

8. *Please confirm whether or not Wetland G and its buffer is located within the boundaries of this plat and if so, a critical areas report addressing this wetland and its buffer will be required.*

Wetland G and its buffer lie outside of the B1 Pod's project boundary.



**Oregon White Oak
Advance Mitigation Plan**

for

Green Mountain Mixed Use PRD

City of Camas, Washington

City File No. SUB14-02

Prepared for:

Green Mountain Land, LLC

17933 NW Evergreen Parkway, Suite 300

Beaverton, Oregon 97003

(503) 597-7100

Prepared by:

Ecological Land Services, Inc.

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ELS #2048.01

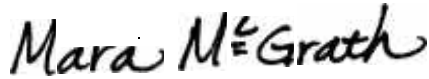
February 24, 2016

Signature Page

The information in this report was compiled and prepared under the supervision and direction of the undersigned.

A handwritten signature in black ink, appearing to read 'Joyce B. Madriz'.

Joyce Madriz
Biologist

A handwritten signature in black ink, appearing to read 'Mara McGrath'.

Mara McGrath, PWS
Senior Ecologist

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Photoplates

Photoplates 1 - 4

Introduction

Ecological Land Services, Inc. (ELS) has prepared this Oregon white oak advance mitigation plan for the Green Mountain Planned Residential Development (PRD) in anticipation of impacts to Oregon white oak as future phases of the PRD, excluding Phase 1, are developed. The proposal is for phased development of the property into single-family and multi-family residential lots with park, trails, and open space. The property is at 2317 NE Ingle Road within the city limits of Camas, in portions of Section 20 and 21, Township 2 North, Range 3 East of the Willamette Meridian (Figure 1). Oregon white oak impacts within the Phase 1 development are addressed in a separate mitigation plan (ELS 2016).

ELS biologists have identified 52 Oregon white oak trees within the PRD boundaries, excluding Phase 1's development area. Future impacts to Oregon white oak will be mitigated by the measures described in this advance oak mitigation plan to maintain the existing oak habitat functions over the long-term. The proposed mitigation is designed to avoid, minimize, and mitigate impacts to oak habitat to be impacted by the project by:

1. Protecting existing oaks by setting aside mature oak habitat in a preservation area;
2. Establishing oak woodland habitat by planting oak in an establishment area;
3. Enhancing the understory of both oak mitigation areas with three-tiered, native shrub understory;
4. Improving habitat features in the mitigation areas by installing horizontal logs and bird boxes, and;
5. Physically and legally protecting the oak mitigation areas.

This Oregon white oak advance mitigation plan was prepared according to Camas Municipal Code (CMC) 16.61.010(A) (3)(a)(i) and (ii) and the guidance provided in the Washington Department of Fish & Wildlife (WDFW) *Management Recommendations for Washington's Priority Habitats: Oregon White Oak Woodlands* (Larsen and Morgan 1998). Specifically, these regulations require that oaks greater than 20 inches diameter breast height (dbh) be classified as habitats of local importance (CMC 16.61.010(A) (3)(a)(i)) and that oak stands greater than one acre, when found to be valuable to fish and wildlife (CMC 16.61.010(A) (3)(a)(ii)), are regulated as priority habitat.

Local Regulatory Authority

Under the CMC 16.61.010(A) (3)(a), Oregon white oaks are identified as habitats of local importance when (i) oaks have a 20-inch dbh; (ii) are found to be valuable to fish and wildlife, used by priority species, or have a large canopy in stands of oak trees greater than 1 acre; and (iii) all snags of Oregon white oaks unless hazardous as deemed by an arborist. Mitigation for Oregon white oaks follows CMC 16.61.030 (A) (1), (2)(a) and (4) *Mitigation Standards*. This advance mitigation plan meets the general mitigation sequencing and performance standards (in italics) as follows:

CMC 16.61.030 (A) (1), (2)(a), and (4)

Applicants shall demonstrate that reasonable efforts have been examined with the intent to mitigate impacts to critical areas. When an alteration to a critical area is proposed, mitigation can be accomplished through a variety of methods. Generally, avoiding the impact altogether is the preferred option. Methods to reduce impacts and mitigate for them should follow a series of steps taken in sequential order:

Avoidance and Minimization

Avoiding the regulated oaks and oak groves will be a primary consideration when designing future phases of the PRD, outside of Phase 1. The grading plan for subsequent phases has not been developed; however, oaks will be avoided where reasonably possible as provided for in the City's code.

Mitigation

The PRD plan proposes advance mitigation in a two-fold strategy of: oak establishment/enhancement and oak preservation/enhancement along the Type Np stream (Stream N) in the southern part of the PRD. The goal of this oak mitigation plan is to preserve and establish oak woodland habitat at least one year in advance of anticipated impacts to oaks as future phases of the PRD are developed. Impacts to Oregon white oaks for the Phase 1 development are addressed in a concurrent oak mitigation plan: *Oregon White Oak Mitigation Plan for Green Mountain Mixed Use PRD – Phase 1, City of Camas, Washington* (ELS 2016).

1. *Applicants proposing activities subject to this chapter shall demonstrate that the activity:*
 - a. *Substantially maintains the level of habitat functions and values as characterized and documented using best available science, and;*

The proposed advance mitigation plan uses the best available science on Oregon white oak restoration to maintain the level of habitat functions after impacting the project site by enhancing two Oregon white oak mitigation areas: an establishment/enhancement area along the central portion of the Type Np stream corridor (Stream N), and a preservation/enhancement area along the eastern end of the Stream N corridor. Both mitigation areas will be established at least one year in advance of anticipated impacts, thereby lowering the temporal loss of habitat functions and risk of failure.
 - b. *Minimizes habitat disruption or alteration beyond the extent required to undertake the proposal.*

For unavoidable disruptions and alterations to the habitat, construction activities will be designed to minimize construction impacts to every extent practicable along the drip line of existing Oregon white oaks. Temporary construction fencing will be installed along the perimeters of the advance mitigation areas to demarcate the areas to prevent damage from heavy equipment during construction. If unintentional impacts occur to Oregon white oak, then the post-construction protection measures will be implemented. See the subsection titled *Specifications for Site Preparation, Planting, & Maintenance*.
2. *If it is determined that habitat designation under this chapter will incur a net loss in functions and values, all losses shall be mitigation on-site as a first priority, and off-site thereafter.*

All mitigation for oak habitat impacts will take place onsite.

 - a. *Where on-site mitigation that could adequately address the loss is infeasible, the applicant shall consult with a qualified habitat restoration specialist, the city, and the Washington State Department of Fish and Wildlife regarding off-site mitigation. Mitigation shall prioritize the preservation and restoration of Lower Washougal River instream and riparian habitat, and should be guided by the*

Washougal River Subbasin chapter of the Lower Columbia Salmon Recovery Plan.

The proposed advance mitigation plan consists only of onsite mitigation. No offsite mitigation will be required.

4. *Subject to individual circumstances, potential mitigation measures may include, but are not limited to, the following:*

a. *Establishment of buffers;*

A 1.5-acre oak establishment/enhancement area and a 1.3-acre oak preservation/enhancement area are proposed. The advance oak mitigation areas do not have buffers.

b. *Requirement of a performance bond, when necessary to ensure completion and success of the proposed mitigation;*

If necessary to satisfy City requirements, the Applicant will prepare a cost estimate for financial assurances and secure a performance bond.

c. *Avoiding the impact all together by not taking a certain action or parts of an action;*

Oaks will be avoided to every extent possible, but it is anticipated that some oaks will not be able to be reasonably avoided based on the site's topography and future grading.

d. *Exploring alternative on-site locations to avoid or reduce impacts of activities;*

Avoiding the regulated oaks and oak groves will be a primary consideration when designing the PRD. Parks and open spaces will be purposefully sited in locations where oaks are growing to reduce the impact of project activities.

e. *Preserving important vegetation and natural habitat features by establishing buffers or by limiting clearing or alteration;*

The existing native overstory and understory vegetation will be maintained in the advance oak mitigation areas, except for clearing for the addition of understory native shrubs as well as the construction of necessary road crossings and pedestrian trails.

f. *Replacing invasive exotic plants with native species (refer to the Clark County Native Plant Communities Guide or other relevant publications for guidance);*

Both advance mitigation areas will be establishing indigenous, non-invasive shrubs and tree species. Non-native, invasive species, namely Himalayan blackberry and reed canarygrass, will be cleared from the two oak mitigation areas prior to plant installation and controlled as a part of maintenance, thereafter.

g. *Prohibiting introduction of invasive plant species in habitat areas;*

Performance standards 1g, 1h, 1i and 2h, 2i, and 2j address non-native invasive plant within the mitigation areas and control measures if they are found.

h. *Enhancing, restoring, or replacing vegetation or other habitat features and functions;*

The advance oak establishment/enhancement area is designed to compensate for future oak impacts resulting from subsequent phases of the PRD and replace

the oak habitat (based on overstory canopy cover) after approximately 10 years. The oaks, associated plants, and habitat features will improve the vegetative structure and offer greater wildlife habitat potential along the Type Np stream corridor than currently exists.

The oak preservation/enhancement area will compensate for future oak impacts incurred during subsequent phases of the PRD. Native shrubs will be installed in portions of the understory that will benefit from an understory stratum to enhance species diversity and habitat structure.

- i. Using native plants where appropriate when planting within habitat areas (refer to the Clark County Native Plant Communities Guide or other relevant publications for guidance);*
Overstory trees that are commonly associated with western Washington oak woodlands and appropriate for this site will be planted within the oak establishment/enhancement area. Native shrubs will be planted in areas that will benefit from a shrub stratum within the oak preservation/enhancement area.
- j. Managing access to habitat areas, including exclusionary barriers for livestock, if needed;*
Natural barriers will be installed as needed where the oak mitigation areas adjoin wetland buffers and residential lots. All oak mitigation area boundaries will be identified by signs.
- k. Using existing stream crossings whenever a review of suitability, capacity, access and location, habitat impacts of alternatives, maintenance, liability, and economics indicate the existing crossing is feasible;*
Does not apply.
- l. Constructing new stream crossings, when necessary, in conformance to the water crossing structure standards in WAC 220-110-070 (Hydraulic Code Rules), which are incorporated by reference;*
Does not apply.
- m. Seasonally restricting construction activities;*
Exposed soils may be seeded to stabilize soils or for weed control, as site conditions warrant. The mitigation areas will be planted during the late fall to early spring, when plants are dormant and will have best success of transplanting.
- n. Implementing best management practices and integrated management practices;*
The most recent available data was used in preparing this PRD advance oak mitigation plan for current management practices on optimal oak sizes (Devine and Harrington 2010), site preparation (Campbell 2004), competition (Clements *et al.* 2011 and Gould *et al.* 2011), herbivory (Clements *et al.* 2011), and site management and maintenance after planting of Oregon white oaks and other native species (Campbell 2004).
- o. Monitoring or review of impacts and assurance of stabilization of the area;*
A 10-year monitoring plan is proposed.

p. Establishing performance measures or bonding;

Within this report, performance standards have been established.

q. Establishing conservation covenants and other mechanisms to ensure long-term preservation or maintenance of mitigation actions;

The mitigation areas will be protected in perpetuity with a conservation covenant or similar legal mechanism once the surrounding development has been developed per the PRD plan. This conservation covenant will allow for future plantings of oaks, if ecologically appropriate, and would need to accommodate the following: 1) trails per the PRD plan and/or the City of Camas Parks & Open Space Plan, and 2) unavoidable road crossings to allow access to the inner part of the PRD.

r. Utilizing low-impact development techniques;

The most recent available data on oak restoration were used to minimize development impacts within the project site. This includes the most current, practical, and appropriate methods for establishing Oregon white oaks.

s. Promoting water quality by limiting the use of lawn and garden chemicals in habitat areas; and/or

Lawn and garden chemicals will be used sparingly, if at all, and only as necessary to control invasive plants.

t. Avoiding topsoil removal and minimizing topsoil compaction.

Topsoil will be retained in the oak mitigation areas. Prior to planting, the mitigation areas will be ripped and tilled where appropriate to loosen the soil and reduce competing plants.

B. Nonindigenous Species Shall not be Introduced Via Mitigation. No plant, wildlife, or fish species not indigenous to the region shall be introduced, via mitigation, into a habitat conservation area.

Existing non-native, invasive species will be removed as part of the advance mitigation plan; none will be intentionally introduced via mitigation.

C. Mitigation Should Result in Contiguous Corridors. In accordance with an advance mitigation plan, mitigation sites should preferably be located by the following and in priority order:

1. On-site and contiguous to wildlife habitat corridors; or

Mitigation areas will be onsite, within the PRD. The oak preservation/enhancement and oak establishment/enhancement areas will be located along an existing perennial stream corridor (Stream N).

2. Off-site that is adjacent to the subject site and contiguous to wildlife habitat corridors; or

Does not apply. Mitigation areas will be onsite, within the PRD.

3. Mitigation within the natural open space network, as identified in the comprehensive plan and open space plan, may be allowed for off-site mitigation or in place of onsite mitigation, where development and mitigation will result in an isolating effect on the habitat.

Mitigation areas will be onsite, within the PRD.

Site Description

The majority of the subject site is located north of NE Goodwin Road, south of NE 48th Circle (on the southwest slope of Green Mountain), and east of NE Ingles Road (Figures 1 and 2). Green Mountain Golf Course encompasses a large portion of the PRD. The first portion of the golf course opened Thanksgiving 1999. The course later expanded into a 13-hole course on May 2000 and into a full 18-hole course on July 2000. The northwestern corner of the PRD is an undeveloped mixed deciduous-coniferous forest.

The PRD consists of 10 parcels covering approximately 283 acres. A total of 52 Oregon white oak trees were inventoried within the PRD boundaries, outside of the Phase 1 development (Figure 2). Oak impacts within Phase 1 are addressed in a separate mitigation plan (ELS 2016).

Methods

ELS staff inventoried the property for Oregon white oaks during multiple occasions in 2013, 2014, and 2015. The most recent site visit occurred on January 11, 2016. We measured the diameter of the oaks using standard forestry protocols for measuring diameter at breast height (dbh). The location of the oaks was surveyed by a handheld Trimble GPS with sub-meter accuracy. The drip radius was measured by calculating the distance between the trunk and the outer extent of the canopy (with leaves) in inches. The oak drip radii were converted into areas to determine total canopy cover.

Plan Description

This plan describes a series of mitigation measures that will be implemented to avoid, minimize, and compensate for future impacts to Oregon white oaks functions by establishing two advance mitigation areas: 1) an oak establishment/enhancement area and 2) an oak preservation/enhancement area (Figures 2, 3, and 4).

AVOIDANCE MEASURES

The grading plan for subsequent phases has not been developed; however, oaks will be avoided where reasonably possible as provided for in the City's code. Avoiding the regulated oaks and oak groves will be a primary consideration when designing the subsequent phases of the PRD.

MINIMIZATION MEASURES

In addition to the avoidance measures made possible by the preliminary plat redesign, the following minimization measures will further reduce impacts to Oregon white oaks and minimize habitat disruption beyond the extent required to undertake the proposal. The minimization measures are as follows:

1. Install temporary construction fencing around the two separate oak mitigation areas identified as the oak establishment/enhancement area, in the central portion of the Type Np stream corridor (Stream N), and the oak preservation/enhancement area along the eastern end of the Stream N corridor.
2. Design site grading to avoid construction activity to every extent practicable within the drip line of the existing Oregon white oaks within the oak mitigation areas.

3. If unintentional impacts occur to Oregon white oak, then the post-construction protection measures will be implemented. See the subsection titled *Specifications for Site Preparation, Planting, & Maintenance*.

COMPENSATION MEASURES

To compensate for future oak impacts, a two-fold strategy is proposed (Table 1). The Applicant proposes establishing an:

- 1) oak establishment/enhancement area of 1.5 acres, and
- 2) oak preservation/enhancement area of 1.3 acres.

The two-fold approach will compensate for future losses in existing habitat functions from removing existing oaks by: 1) replacing oak habitat on a canopy cover basis after approximately 10 years, 2) offsetting temporal losses of habitat functions by preserving an existing, mature oak stand and 3) establishing oak woodland habitat at least one year before impacts occur to reduce the risk of failure and lower temporal losses of habitat functions.

Within the oak establishment/enhancement area, the Applicant will plant Oregon white oaks and native trees associated with western Washington oak woodlands at a 2:1 ratio, remove non-native, invasive plants from the riparian corridor associated with the Type Np stream (Stream N), as well as install large woody debris, bird boxes, and native shrubs.

Within the oak preservation/enhancement area, the Applicant will preserve Oregon white oak woodland at a 3:1 ratio, remove non-native, invasive plants from the riparian corridor associated with Stream N, place large woody debris, install bird boxes, and plant native shrubs.

The oak mitigation areas will be legally protected for conservation purposes once adjacent portions of the PRD develop and protective language will be incorporated into the CC&Rs. They will be physically demarcated by natural barriers where appropriate and oak habitat signs.

Table 1. Oregon white oak habitat impacts and advance mitigation

Impacts		Advance Mitigation					
Total Oaks	Estimated Oak Canopy Cover (sf) ¹	Type	Canopy Impact Break-down	Ratio (canopy cover)	Required Canopy Cover (sf) ²	Required Area (acres)	Goals
52	49,400	Oak Preservation/ Understory Enhancement	18,876 sf	3:1	56,628	1.3	<ul style="list-style-type: none"> To offset temporal loss To protect oak habitat To enhance understory diversity and structure
		Oak Establishment/ Understory Enhancement	30,524 sf	2:1	61,048 sf + 4,356 sf pedestrian paths = 65,404 sf	1.5 ³	<ul style="list-style-type: none"> To replace oak habitat at approx. 10 years To enhance understory diversity and structure

¹ We estimated canopy cover of 1,000 square feet per tree or an estimated drip diameter of about 32 feet per tree. The estimated canopy covers errors on the high side, as some of the oaks do not have completely circular canopies.

² The canopy cover within the oak preservation/enhancement area is based on an estimate of 1,000 square feet per tree for oaks 20 inches dbh and 700 square feet per tree for oaks 20 inches.

³ 0.1 acres added oak establishment/understory enhancement area to compensate for the estimated area to be occupied by pedestrian paths.

GOALS, OBJECTIVES, AND PERFORMANCE STANDARDS

The goal of this Oregon white oak advance mitigation plan is to substantially maintain the existing Oregon white oak habitat functions over the long-term by establishing, preserving, and enhancing oak woodlands to compensate for future impacts to oaks in subsequent phases of the PRD (ELS 2016). To accomplish this, the following objectives and performance standards are appropriate to ensure that this Oregon white oak advance mitigation plan succeeds.

Vegetative Structure

Oak Establishment/Enhancement Area

Objective 1. Establish Oregon white oak woodland habitat to compensate for impacts to the existing oak habitat functions and establish a native shrub understory to enhance vegetative structure and habitat functions.

Performance Standard 1a. Planted Oregon white oak and other native trees and shrubs in the established/enhanced oak woodland will achieve at least 90 percent survival in Year 1. Dead plants will be replaced if this performance standard is not met.

Performance Standard 1b. Planted Oregon white oak and other native trees and shrubs in the established/enhanced oak woodland will achieve at least 80 percent survival in Year 2. Dead plants will be replaced if this performance standard is not met.

Performance Standard 1c. Planted Oregon white oak and other native trees and shrubs in the established/enhanced oak woodland will achieve at least 75 percent survival in Year 3. Dead plants will be replaced if this performance standard is not met.

Performance Standard 1d. By Year 5, the established/enhanced oak woodland will have a minimum 25 percent cover by native trees and 10 percent cover by native shrubs. Dead plants will be replaced if this performance standard is not met.

Performance Standard 1e. By Year 7, the established/enhanced oak woodland will have a minimum 35 percent cover by native trees and 15 percent cover by native shrubs. Dead plants will be replaced if this performance standard is not met.

Performance Standard 1f. By Year 10, the established/enhanced oak woodland will have a minimum 50 percent cover by native trees and 30 percent cover by shrubs. Dead plants will be replaced if this performance standard is not met.

Performance Standard 1g. In all years, non-native invasive plant species, except for reed canarygrass, will not exceed 10 percent cover within the mitigation area.

Performance Standard 1h. In all years, non-native invasive plant species infestations cover 200 square feet or more, but not sampled as a part of the monitoring methods, will be documented by species and location, and control measures will be implemented.

Performance Standard 1i. In all years, state-listed Class A noxious weeds, non-native knotweeds (*Polygonum cuspidatum*, *P. polystachyum*, *P. sachalinense*, and *P. bohemicum*), and English ivy (*Hedera helix*) will be eradicated from the mitigation area.

Oak Preservation/Enhancement Area

Objective 2. Preserve Oregon white oak woodland habitat to compensate for temporal loss of habitat functions, protect oak habitat, and establish a native shrub understory to enhance vegetative structure and habitat functions.

Performance Standard 2a. Preserve 1.3 acres of existing Oregon white oak woodland along the eastern end of the Type Np stream corridor (Stream N). This performance standard is completed when the 1.3-acre area is documented in the first annual monitoring report.

Performance Standard 2b. Planted native shrubs in the preserved/enhanced oak woodland will achieve at least 90 percent survival in Year 1. Dead plants will be replaced if this performance standard is not met.

Performance Standard 2c. Planted native shrubs in the preserved/enhanced oak woodland will achieve at least 80 percent survival in Year 2. Dead plants will be replaced if this performance standard is not met.

Performance Standard 2d. Planted native shrubs in the preserved/enhanced oak woodland will achieve at least 75 percent survival in Year 3. Dead plants will be replaced if this performance standard is not met.

Performance Standard 2e. By Year 5, the preserved/enhanced oak woodland will have a minimum 10 percent cover by native shrubs. Dead plants will be replaced if this performance standard is not met.

Performance Standard 2f. By Year 7, the preserved/enhanced oak woodland will have a minimum 15 percent cover by native shrubs. Dead plants will be replaced if this performance standard is not met.

Performance Standard 2g. By Year 10, the preserved/enhanced oak woodland will have a minimum 30 percent cover by native shrubs. Dead plants will be replaced if this performance standard is not met.

Performance Standard 2h. In all years, non-native invasive plant species, except for reed canarygrass, will not exceed 10 percent cover within the mitigation area.

Performance Standard 2i. In all years, non-native invasive plant species infestations covering 200 square feet or more, but not sampled as a part of the monitoring methods, will be documented by species and location, and control measures will be implemented.

Performance Standard 2j. In all years, state-listed Class A noxious weeds, non-native knotweeds (*Polygonum cuspidatum*, *P. polystachyum*, *P. sachalinense*, and *P. bohemicum*), and English ivy (*Hedera helix*) will be eradicated from the mitigation area.

Table 2. Performance standards for vegetation by monitored year

	Percent Survival and Cover					
	Year 1	Year 2	Year 3	Year 5	Year 7	Year 10
Tree Strata						
Survival	90%	80%	75%	--	--	--
Cover ¹	--	--	--	25%	35%	50%
Shrub Strata						
Survival	90%	80%	75%	--	--	--
Cover ¹	--	--	--	10%	15%	30%
Invasive Plants						
Cover of non-native, invasive plant, excluding reed canarygrass	<10%	<10%	<10%	<10%	<10%	<10%

¹ Includes naturally recruited species.

Habitat Structure

Objective 3. Install habitat features to favor small mammals and birds to compensate for impacts to the existing oak habitat functions.

Performance Standard 3a. Install at least three horizontal logs per acre within the oak preservation/enhancement area and oak establishment/enhancement area. The performance standard is completed when the horizontal logs are installed and documented in the first annual monitoring report.

Performance Standard 3b. Install a minimum of four bird boxes within each mitigation area. This performance standard is completed when the bird boxes are installed and documented in the first annual monitoring report.

Long-term Protection

Objective 4. Demarcate the advance oak mitigation areas.

Performance Standard 4a. Install oak habitat signs on metal or wood posts at minimum of 100-foot intervals or 1 per lot along the perimeters of the oak preservation/enhancement area and the oak establishment/enhancement area bordering the development. The signs will state language similar to the following: “oak habitat boundary” and “please respect native plants and wildlife, protection of this natural area is in your care.” This performance standard is completed when signs are installed and documented in the first annual monitoring report.

Performance Standard 4b. Install natural barriers as needed around the perimeters of the oak preservation/enhancement area and the oak establishment/enhancement area. This performance standard is completed when the natural barriers are installed and documented in the first annual monitoring report.

Objective 5. Provide legally binding protection for the advance oak mitigation areas.

Performance Standard 5a. A permanent and irrevocable conservation covenant or similar legal mechanism will be established for the oak preservation/enhancement and the oak establishment/enhancement areas. The performance standard is completed when the City approves the conservation covenant or similar legal mechanism.

Performance Standard 5b. Language to protect the native vegetation within the oak preservation/enhancement and the oak establishment/enhancement areas will be incorporated into the CC&Rs. The performance standard is completed when a copy of the final CC&Rs is provided to the City.

Responsible Parties

The Applicant (or Successors as assigned) will be responsible for implementing this Oregon White Oak Advance Mitigation Plan, which includes preserving existing oaks, planting native trees and shrubs, installing wildlife habitat features, and physically and legally protecting the advance mitigation areas. The Applicant (or Successors as assigned) also will conduct the prescribed maintenance and monitoring during the 10-year monitoring period or longer if warranted by contingency actions.

Functional Assessment

EXISTING CONDITIONS

The Green Mountain property was converted into a golf course in 1990 and expanded farther the year after. Currently, the central part of the PRD site is an active golf course that is regularly mowed. The northern western area is an undeveloped mixed deciduous-coniferous forest.

Vegetation

Oak Preservation/Enhancement Area

Within the Type Np stream corridor in the oak preservation/enhancement area, the overstory is primarily comprised of widely spaced Oregon white oak (*Quercus garryana*), Oregon ash (*Fraxinus latifolia*) and black cottonwood (*Populus balsamifera*). The understory of the preservation area is vegetated with mowed grasses associated with the golf course, oxeeye

daisy (*Leucanthemum vulgare*), reed canarygrass (*Phalaris arundinacea*), and Himalayan blackberry (*Rubus armeniacus*).

Oak Establishment/Enhancement Area

The overstory of the establishment/enhancement area is sparse, but where a tree layer is present, it is comprised of widely spaced Oregon white oak and red alder (*Alnus rubra*). The shrub layer is also sparse and limited to a narrow section of the riparian corridor. Where present, the shrub layer is comprised of common snowberry (*Symphoricarpos albus*), pacific ninebark (*Physocarpus capitatus*), beaked hazelnut (*Corylus cornuta*), nootka rose (*Rosa nutkana*), peafruit rose (*Rosa pisocarpa*), and sword fern (*Polystichum munitum*). The herbaceous understory is primarily comprised of reed canarygrass, Canada thistle (*Cirsium arvense*), common plantain (*Plantago major*) oxeye daisy, and Himalayan blackberry.

Soils

The Natural Resources Conservation Service (NRCS 2012) designates soils on the project site as 1) Dollar loam (DoB) 0-5% slopes, 2) Olympic stony clay loams (OmE and OmF) 3-30% and 30-60% slopes, 3) McBee silt loam coarse variant (MIA) 0-3% slopes, and 4) Cove silty clay loam (CvA) 0-3% slopes. DoB soils are characterized moderately deep, moderately well drained soil occurring on low ridges next to depressional areas. OmE and OmF soils are characterized by very deep, well drained soil occurring on high ridges along the mountain slopes. CvA soils are characterized by very deep, poorly drained soil occurring on concave drainage ways and in large flat old lakebeds. MIA soils are characterized by very deep, somewhat poorly drained soil occurring in drainage ways and depressions.

Habitat

Oak Preservation/Enhancement Area

The existing habitat conditions for the 1.3-acre oak preservation/enhancement area consist of mature oaks with an open, sparsely vegetated understory and a non-fish bearing perennial stream bisecting it. The preservation/establishment area has low wildlife habitat potential to due regular mowing and use by the golf course.

Oak Establishment/Enhancement Area

The existing habitat conditions for the 1.5-acre oak establishment/enhancement area consists most of mowed grasses for the golf course and a partially vegetated (trees and shrubs) riparian corridor along the Type Np stream (Stream N). The BPA easement bisects this proposed mitigation area. The establishment/enhancement area has low wildlife habitat potential due to regular mowing and use by the golf course.

PROPOSED CONDITIONS

Vegetation

The vegetation proposed within the advance oak mitigation areas will primarily consist of native, non-invasive species associated with western Washington oak woodlands. Non-native, invasive species will be controlled following the performance standards (1g, 1h, 1i, 2h, 2i, and 2j).

Soils

Soils within the mitigation areas will be ripped and tilled where appropriate as preparation for areas of planting, but otherwise will not be impacted and may improve over time as it will no longer be part of an active golf course.

Habitat

Invasive, non-native species will be removed from the mitigation areas, and native species associated within western Washington oak woodlands will be planted.

The oak preservation/enhancement area consists of individual oaks, but lacks understory structure. The proposed multi-strata native shrub layer will improve vegetative structure in the largely open understory, which will benefit wildlife habitat over the long-term. Horizontal logs, from trees felled onsite, and bird boxes will also be installed to improve habitat structure and wildlife functions.

The oak establishment/enhancement area will consist of planted Oregon white oaks, other native trees, and native shrubs to improve the vegetative structure and wildlife habitat potential. Like the oak preservation/enhancement area above, horizontal logs and birds boxes are proposed to improve wildlife habitat. The mitigation areas will promote a continual healthy oak woodland habitat with associated birds and small mammals.

REPRODUCTIVE POTENTIAL

Acorn production varies widely among oak and the success of regeneration depends largely on the availability of fruits that mature and escape predation. Oaks that grow in an open environment, such as the proposed oak preservation/enhancement area, generally produce more acorns than trees suppressed by other overstory trees (Olympia Forestry Sciences Laboratory 2004; Beck 1992). Beck (1992) describes oak reproduction as sporadic even under ideal circumstances because of predation, the limited seed viability, the precise germination requirements (30 percent moisture and cool conditions), and the low survival rate of seedlings if they do germinate. Once a mature fruit falls to the ground, it must have adequate moisture and soil or leaf litter to germinate as a seedling. With the correct environmental conditions, the slow growing seedlings typically emerge in the spring.

The oak trees within the oak preservation/enhancement area are widely spaced and have broad, spreading crowns that dominate the overstory canopy cover. The oaks are producing fruit, as we observed abundant acorns on the ground during our October 2015 and January 2016 field investigations; however, we also observed evidence of predation by birds and at least one squirrel cache. We did not observe any oak seedlings with the oak preservation/enhancement area, likely due to animal predation and the regular mowing associated with the active golf course.

WILDLIFE ANALYSIS

The proposed plan has been designed with specific elements to avoid or minimize impacts to the existing habitat of wildlife species or evidence of species that were observed onsite. The trees and shrubs specified will provide nesting, roosting, and escape habitat for birds (and some mammals). Many of the fruits, seeds, twigs, and leaves of the planted trees and shrubs will provide a food source for birds, mammals, and insects. In addition, bees frequent bigleaf maple flowers as a nectar source. Oak acorns, which we observed in abundance near the oak preservation/enhancement area, are a good food source for birds and

mammals. Several habitat features are also proposed to promote wildlife habitat functions: 1) large woody debris will provide horizontal cover for small mammals and enrich the soil as they decay and 2) bird boxes with varied diameter entry holes will offer immediate nesting habitat. Although this oak mitigation is tailored to the wildlife species observed onsite, the native plants and habitat features proposed will benefit all wildlife species common to the area, including insects, amphibians, birds, and mammals.

Corvids

Corvids, specifically American crows, jays, and ravens, are opportunistic omnivores and may use the project site for foraging. To minimize impacts to potential corvid foraging habitat, this plan proposes two oak mitigation areas. The oak preservation/enhancement area is dominated by mature Oregon white oak, a potential food source for corvids. The oaks in this mitigation area are currently producing acorns. We also anticipate that the planted oaks in the oak establishment/enhancement area will produce acorns when they reach reproductive maturity and may provide a food source for corvids in the long-term.

Songbirds

Songbirds use the project site for foraging, nesting, and roosting. This plan proposes the following measures to minimize impacts to songbird habitat following many of the recommendations in Link (1999): 1) install a minimum of three large horizontal logs per acre in the oak mitigation areas to add mature habitat structure that is currently lacking, 2) plant a mix of native understory shrubs to establish a three-tiered shrub canopy in the mitigation areas, 3) install a minimum of four bird boxes with varied diameter entry holes in each of the mitigation areas, 4) plant Oregon white oak in the oak establishment/enhancement area, and 5) preserve existing mature oak trees in the oak preservation/enhancement area.

Raptors

Turkey vultures and red-tailed hawk were identified during a wildlife survey (ELS 2009) and may use the project site occasionally for foraging. To minimize impacts to potential raptor habitat, all existing mature trees and snags will be preserved within the oak mitigation areas.

Woodpeckers

Woodpeckers, such as the northern flicker and pileated wood pecker, may occasionally use the project site for foraging. Northern flickers frequently forage on the ground or downed, rotten logs (Cornell 2003). To minimize impacts to potential woodpecker foraging habitat, the following mitigation measures are proposed: 1) install a minimum of three large horizontal logs per acre the oak mitigation areas to add mature habitat structure that is currently lacking, 2) plant a mix of native understory shrubs to establish a three-tiered shrub canopy in the mitigation areas, 3) install a minimum of four bird boxes with varied diameter entry holes in each of the mitigation areas, 4) plant Oregon white oak in the oak establishment/ enhancement area, and 5) preserve existing mature oak trees in the oak preservation/ enhancement area.

Small Mammals

Small mammals, such as rabbits and squirrels, likely use the project site for foraging and nesting. To minimize impacts to small mammal habitat, this mitigation proposes: 1) preserving existing mature oaks along an existing stream corridor to provide a vegetated wildlife corridor and potential food sources, 2) planting Oregon white oaks in oak establishment/enhancement area to provide a future oak-dominated overstory, and 3)

planting a vegetatively diverse shrub understory in the mitigation areas to provide cover and potential food sources.

Large mammals

Columbia black-tailed deer, black bear, and coyote may occasionally use the project site for limited resting and feeding as they migrate through corridors to other habitat areas. When implemented, this advance mitigation plan will continue to provide limited foraging and resting habitat for these mammals in the two oak mitigation areas.

Implementation Plan

PLANTING SCHEDULE AND EQUIPMENT

The native trees and shrubs will be installed in the advance mitigation areas during the late fall to early spring when the plants are dormant and the soil moisture conditions are favorable for planting. The shrubs are intended to create an intertwining, three-tiered understory stratum that provides for wildlife habitat, protection, and food and mimics the less disturbed, existing native understory habitat onsite (Figures 2, 3, and 4).

The following equipment may be used to prepare and install habitat features and plants within the oak mitigation areas: brush hog, weed eater, excavator, tractor, rototiller, tree shovel, garden shovel, and power auger. Heavy equipment will avoid the drip zone of preserved and planted trees and shrubs to prevent soil compaction.

Table 3. Specifications for planting the advance oak mitigation areas

Species	Spacing (feet on center)	Size ¹	Quantity		
			A. Preservation/ Enhancement Area (1.3 ac)	Establishment/Enhancement Areas	
				B. Tree & Shrub Strata (1.4 ac)	C. Shrub Stratum (0.1 ac)
Tree Stratum					
Bigleaf maple (<i>Acer macrophyllum</i> , FACU)	10	18-36 inch bareroot	--	50	--
Red alder (<i>Alnus rubra</i> , FAC)	10	18-36 inch bareroot	--	150	--
Oregon ash (<i>Fraxinus latifolia</i> , FACW)	10	18-36 inch bareroot	--	150	--
Oregon white oak (<i>Quercus garryana</i> , FACU)	14	1 gal or similar	--	175	--
Total Trees			--	525	--
Shrub Stratum					
Tall understory					
Vine maple (<i>Acer circinatum</i> , FAC)	6	18-36 inch bareroot	--	25	--
Western serviceberry (<i>Amelanchier alnifolia</i> , FACU)	6	18-36 inch bareroot	25	50	--
Black hawthorn (<i>Crataegus douglasii</i> , FAC)	6	18-36 inch bareroot	25	25	--
Oceanspray (<i>Holodiscus discolor</i> , FACU)	6	18-36 inch bareroot	25	50	--
Mid-understory					
Nootka rose (<i>Rosa nutkana</i> , FAC)	6	18-36 inch bareroot	150	150	15
Peafruit rose (<i>Rosa pisocarpa</i> , FAC)	6	18-36 inch bareroot	150	150	15
Common snowberry (<i>Symphoricarpos albus</i> , FACU)	6	18-36 inch bareroot	150	150	15
Low understory					
Tall Oregon grape (<i>Mahonia aquifolia</i> , FACU)	6	1-gal or ~10 in ³ “cone-tainer”	50	25	--
Sword fern (<i>Polystichum munitum</i> , FACU)	6	1-gal or bareroot	25	25	--
Total Shrubs			600	650	45
				1,295	
Herbaceous Stratum					
Native Upland Seed Mix		15 to 25 lb/ac	10 to 20 lbs	11 to 21 lbs	0.75 to 1.5 lbs
Total Seed Mix			21.75 to 42.5 lbs		

¹ 1-gal = 1 gallon container

SPECIFICATIONS FOR SITE PREPARATION, PLANTING & MAINTENANCE

Prepare Mitigation Areas

- Install silt fencing where necessary to control runoff from the development or temporary construction fencing along the perimeters of the mitigation areas bordering the development.
- Mechanically remove existing non-native species, namely Himalayan blackberry, English holly, and reed canarygrass within the mitigation areas. Selectively apply herbicide by hand as necessary to control regrowth of invasive plants.
- Rip or till soils in planting areas as needed to loosen compact soils and clear existing vegetation in planting areas.

Install Large Woody Debris

- Install a minimum of 3 horizontal logs per acre in the advance oak mitigation areas.

Horizontal Log Specifications

- a. Logs from trees felled onsite, especially Oregon white oak, Oregon ash, and bigleaf maple;
- b. At least 12-inches diameter for at least 20 feet in length;
- c. With lateral branches retained;
- d. Of hard to medium decay, and;
- e. With ends rough cut, mashed or ripped.

Install Natural Barriers and Habitat Signs

- Install natural barriers as needed where the oak mitigation areas adjoin wetland buffers and residential lots.
- Install durable, plastic oak habitat signs at a minimum of 100-foot intervals or 1 per lot on metal or wood post around the perimeters of the mitigation areas.

General Plant Specifications

- Plant the native trees and shrubs during the late fall to early spring (October-March) at the spacing identified in Table 3.
- Group the plants in uneven patches dominated by a single species, with patches interspersed among one another.
- All plant materials will be kept cool and moist prior to installation.
- All plant materials will have well developed roots and sturdy stems, with an appropriate root to shoot ratio.
- No damaged or desiccated roots or diseased plants will be accepted.

Plant Oaks

- Plant the oaks in groups of 2 to 5 individuals.
- Dig the receiving hole wider than the size of the root system.
- Plant the tree with the root collar at or slightly higher than ground level to allow for settling.

- Backfill the hole with soil about one-half full, lightly tamping to remove any air pockets.
- Place a small amount of native soil collected from the soil surface around existing oaks to provide beneficial mycorrhizae. Finish filling the hole with soil.
- Irrigate the root zone.
- Install a minimum of 3-inch depth by 4-foot diameter mulch layer around the base of planted oaks. The mulch will be comprised of chipped, clean wood. Avoid placing mulch directly against the plant stems.
- Install tree shelters as needed.

Plant Bareroot/Containerized Trees and Shrubs

- Dig the receiving hole several inches wider than the size of the root system.
- Position the planted species' root collar so that they are at or slightly above the level of the surrounding soil to allow for settling.
- Back the hole with soil.
- Gently compact the soil around the planted species to eliminate air spaces.
- Install a minimum of 3-inch depth by 4-foot diameter mulch layer around the base of planted species. The mulch will comprised of chipped, clean wood. Avoid placing mulch directly against plant stems.
- Install tree shelters as needed.
- Irrigate all newly installed plants as site and weather conditions warrant.

Sow Seed Mix

- Seed areas tilled for shrub planting in advance oak mitigation areas with a native upland grass-legume mix of 15 to 25 lb/acre to control regrowth of invasive species.

Install Bird Boxes

- Install a minimum of four cedar bird boxes in each mitigation area. The bird boxes will have variable diameter holes to target different bird species (Link 1999) and will be at least 12 feet above the ground surface on posts or existing trees.

Post-construction Protection

If unintentional impacts occur to existing Oregon white oaks within the mitigation areas, then the following repair measures should be implemented as appropriate:

- Prune any damaged roots.
- Spread peat moss or moist topsoil over exposed roots.
- Cut damaged tree limbs above the collar at the trunk or main branch.
- Aerate any compacted soil over the root zone with hand tools or light machinery.

Maintain Mitigation Areas

The preserved and planted trees and shrubs will be maintained as often as necessary to ensure that the specified performance standards are met. The maintenance includes the following:

- Inspect the plantings at least once annually, or more often as appropriate, and maintain to achieve the performance standards specified in the subsection titled “Mitigation Goals, Objectives, & Performance Standards.”
- Irrigate planted trees and shrubs during the dry season for the first 2 to 3 years after planting. Water should be delivered at a minimum rate of 1 gallon every 4 weeks (Campbell 2004). Adjust as necessary based on site and weather conditions.
- Remove competing vegetation from around the base of plant species during first 2 to 3 years after planting and as needed thereafter.
- Replace mulch as needed to suppress competing vegetation.
- Inspect tree shelters to ensure they are upright, stable, and likely to remain so for another year (Clements *et al.* 2011, Devin and Harrington 2010). Ensure that the terminal shoot of the planted species is not ensnared in the wall of the tree shelter. Remove tree shelters when species is robust enough to withstand browse or shelter is impeding growth.
- Replace dead or failed plants to meet the minimum annual performance standards (Table 2). Replaced plants will be installed as described for the original installation.
- If trees have become well established by the end of the monitoring period, then thin trees to achieve density for oak woodlands of 30 to 60 percent tree cover (Campbell 2004) or approximately 100 to 200 trees/acre.

Minor corrective actions will be undertaken as necessary as a part of routine maintenance and will be documented in the subsequent monitoring report.

Corrective actions include, but are not limited to, the following:

- Replant trees or shrubs.
- Implement a fertilizing schedule.
- Repair damaged limbs or prune dead branches.
- Substitute the anti-herbivore device, such as installing a different type of tree shelter, painting lower stems with sanded latex paint, or spraying herbivore deterrent.

Monitoring Plan

This Oregon white oak advance mitigation plan establishes a 10-year monitoring plan with quantitative performance standards. The monitoring will commence the first growing season after the mitigation areas are completed and extend for a 10-year period. The goal of the monitoring will be to determine if the previously stated performance standards are being met (Table 2). Annual reports will be submitted to City of Camas by December 31 of each monitored year.

MONITORING PLOTS

During the first annual monitoring event, monitoring plots will be established as follows:

- A minimum of 2 monitoring plots in the oak establishment/enhancement area and
- A minimum of 3 monitoring plots in the oak preservation/enhancement area.

The monitoring plots will be staked with metal t-posts and identification tags. Their locations will be identified by GPS and placed on an as-built site map that will accompany the

monitoring reports. Permanent photo points will be established at each monitoring plot and directions documented on the site map.

VEGETATION

To assess the status of the vegetation within the advance oak mitigation areas, the vegetation monitoring will measure the following:

1. Total density of planted native trees and shrubs (to determine survival rate)
2. Percent aerial cover of planted and naturally recruiting native trees and shrubs
3. Percent aerial cover of non-native, invasive plants
4. Change in the plant community over time (from photo points)

FAUNA

To assess the development of wildlife habitat within the advance oak mitigation areas, wildlife monitoring will document the following:

1. Presence of large woody debris
2. Usage of bird boxes
3. Insect use
4. Amphibian use
5. Bird use
6. Mammal use
7. Level of herbivory

SOILS AND HYDROLOGY

If the planted species show poor or failed growth, soil moisture and soil nutrients may also be monitored during the growing season. If necessary, soil moisture will be monitored monthly during the growing season and soil nutrients will be assessed annually during the growing season. Corrective actions will be taken as appropriate based on the soil moisture and soil nutrient data. These actions include, but are not limited to, a revised irrigation schedule and a fertilization schedule.

MONITORING REPORT

The annual monitoring reports will contain at least the following:

- Location map and as-built map and revised plant quantity table as needed
- Historic description of project, including dates of plant installation, current year of monitoring, and restatement of performance standards
- Description of monitoring methods
- Documentation of large woody debris, bird boxes, natural barriers, and oak habitat signs
- Documentation of plant survival, cover, and overall development of the Oregon white oak habitat within the advance oak mitigation areas
- Assessment of non-native, invasive plant species and recommendations for management
- Assessment of site hydrology and soils, only if they appear to be limiting plant survival

- Assessment of surrounding land use, use by humans, and use by wild and domestic animals
- Observations of wildlife, including, insects, amphibians, birds, and mammals
- Photographs from permanent photo points
- Summary of maintenance and contingency measures proposed for the next season and completed for the past season

Adaptive Management Plan

If the performance standards are not met by the fifth year of monitoring, or at an earlier time if necessary, an adaptive management plan will be developed and implemented. All adaptive management actions will be undertaken only after consulting and gaining approval from the City of Camas. The Applicant (or Successors as assigned) will complete an adaptive management plan that describes 1) the need for adaptive management, 2) proposed actions, 3) time-frame for completing actions, and 4) any additional maintenance and monitoring, if necessary.

Legal Protection

The oak establishment/enhancement and oak preservation/enhancement areas will have a conservation covenant or similar legal mechanism to protect them in perpetuity. The conservation covenant will accommodate trails per the PRD plan and/or the City of Camas Parks & Open Space Plan and unavoidable road crossings to allow access to inner part of the site. The legal mechanism will be recorded after adjacent areas have developed.

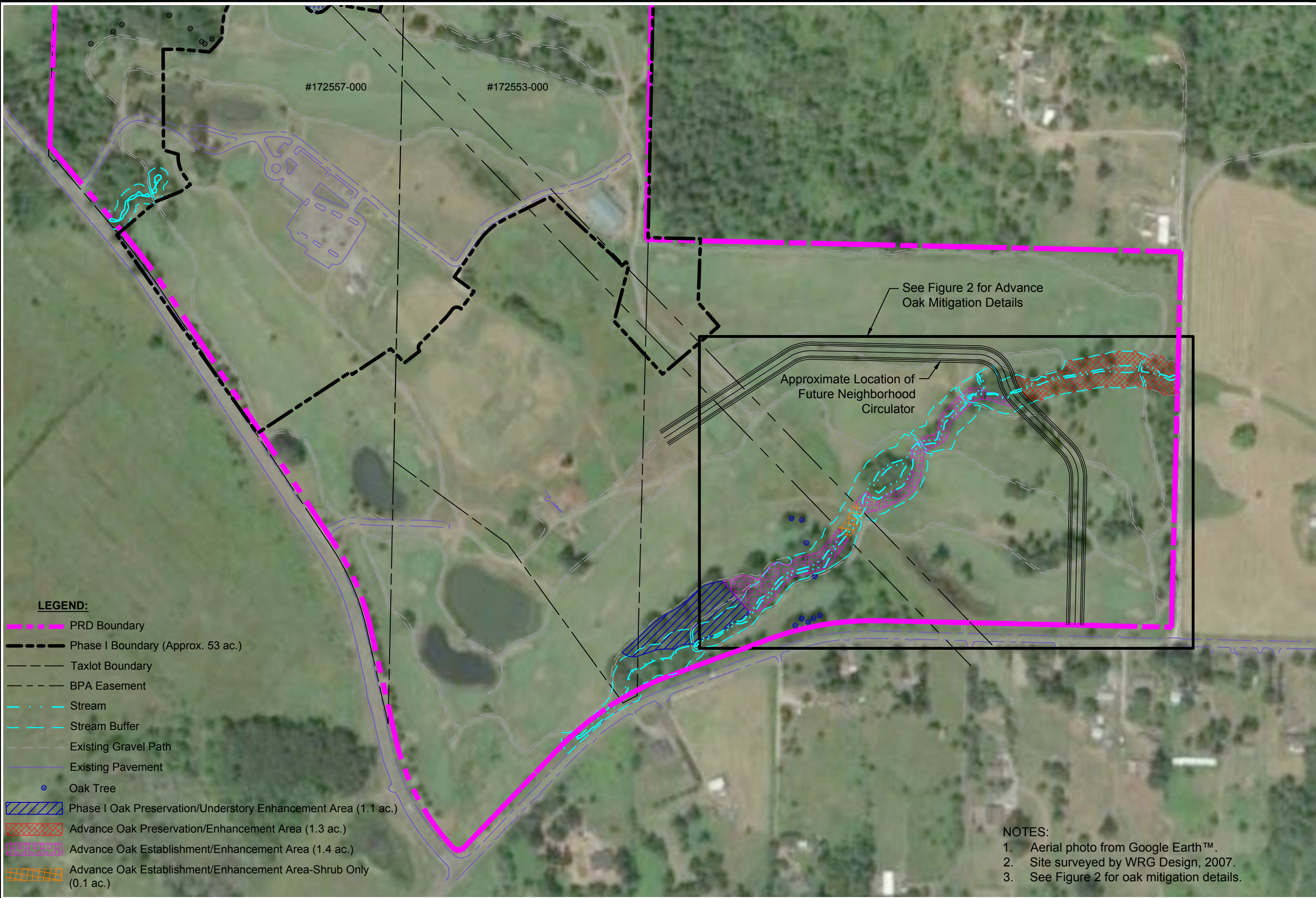
The homeowners association for PRD will be responsible for the maintenance and monitoring of the advance oak mitigation areas for the 10-year period. The vegetation within the advance oak mitigation areas will be protected and conserved in the homeowners association's by-laws to ensure that they are maintained for conservation purposes. Neither the Applicant nor the future homeowners association are responsible for acts of nature that damage or kill trees, including sudden oak death syndrome, fungal disease, windthrow or ice storms.

References

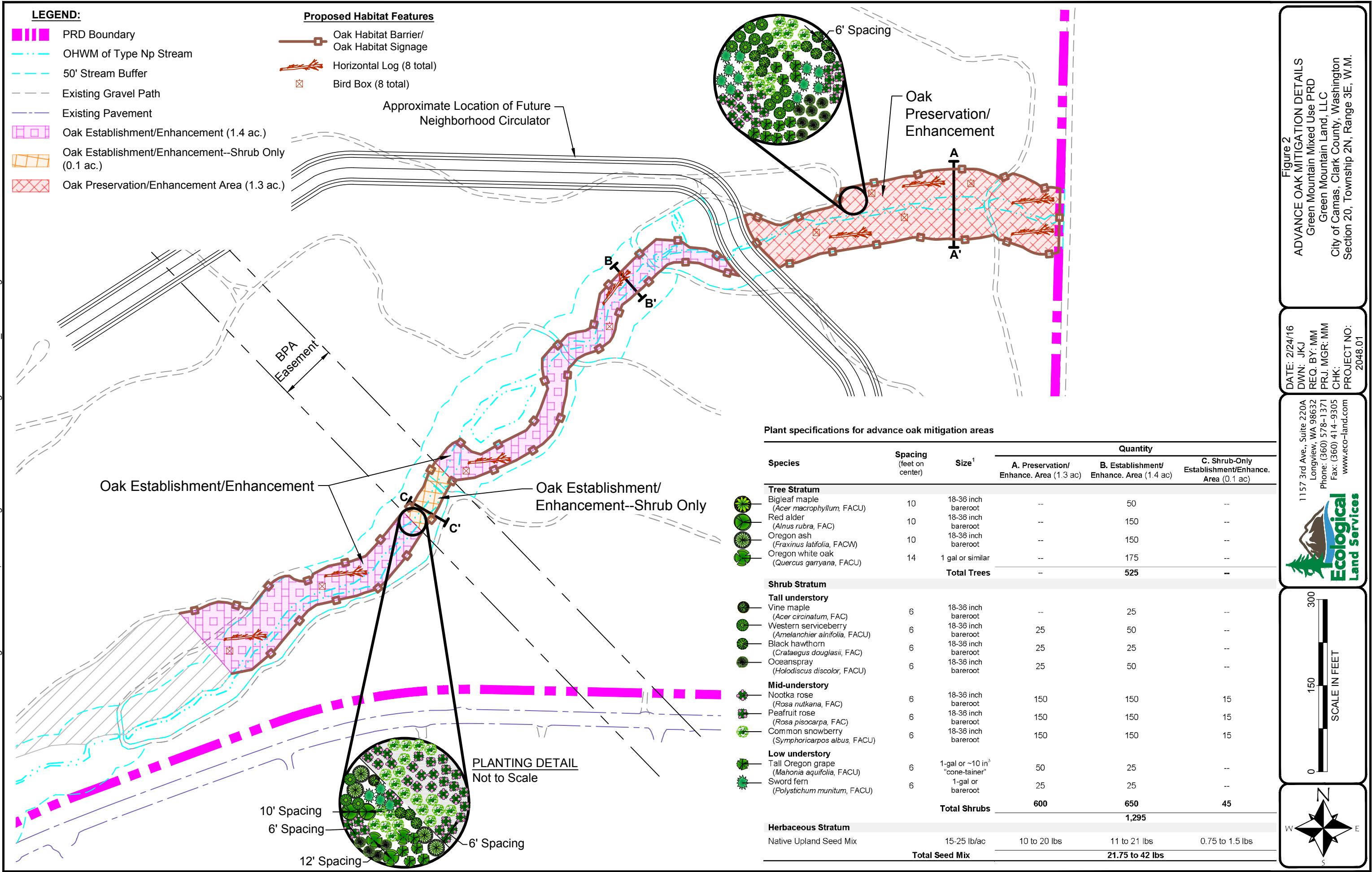
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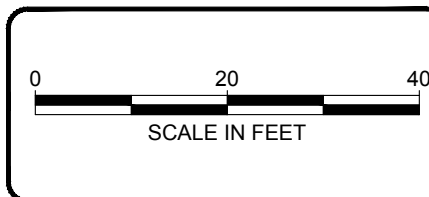
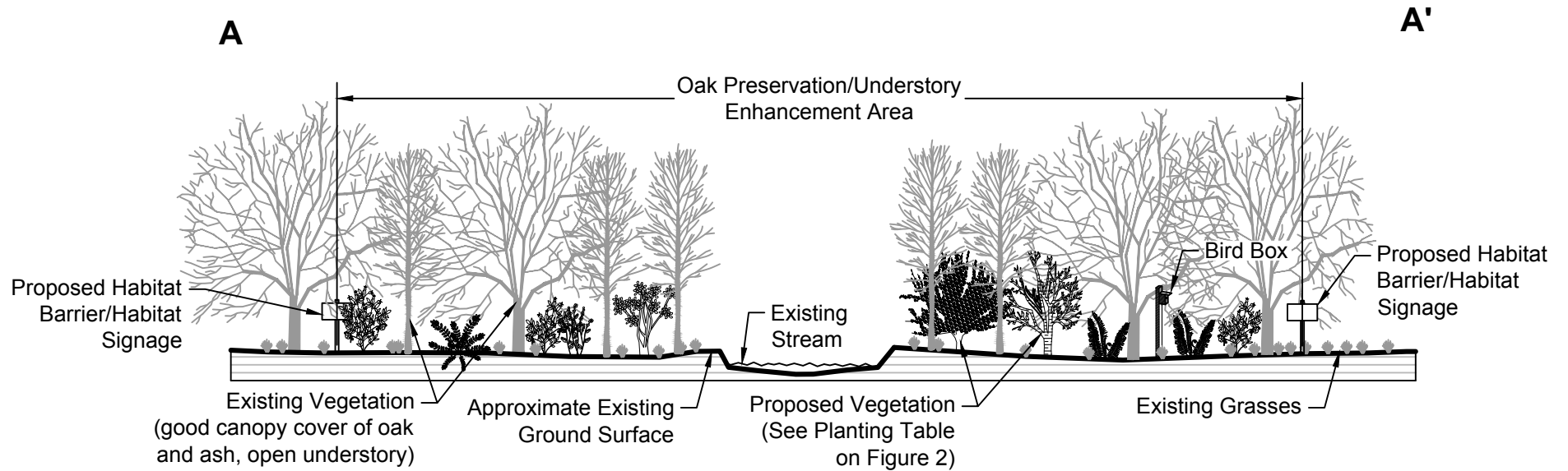
Figures

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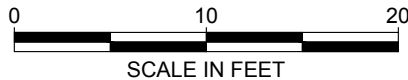
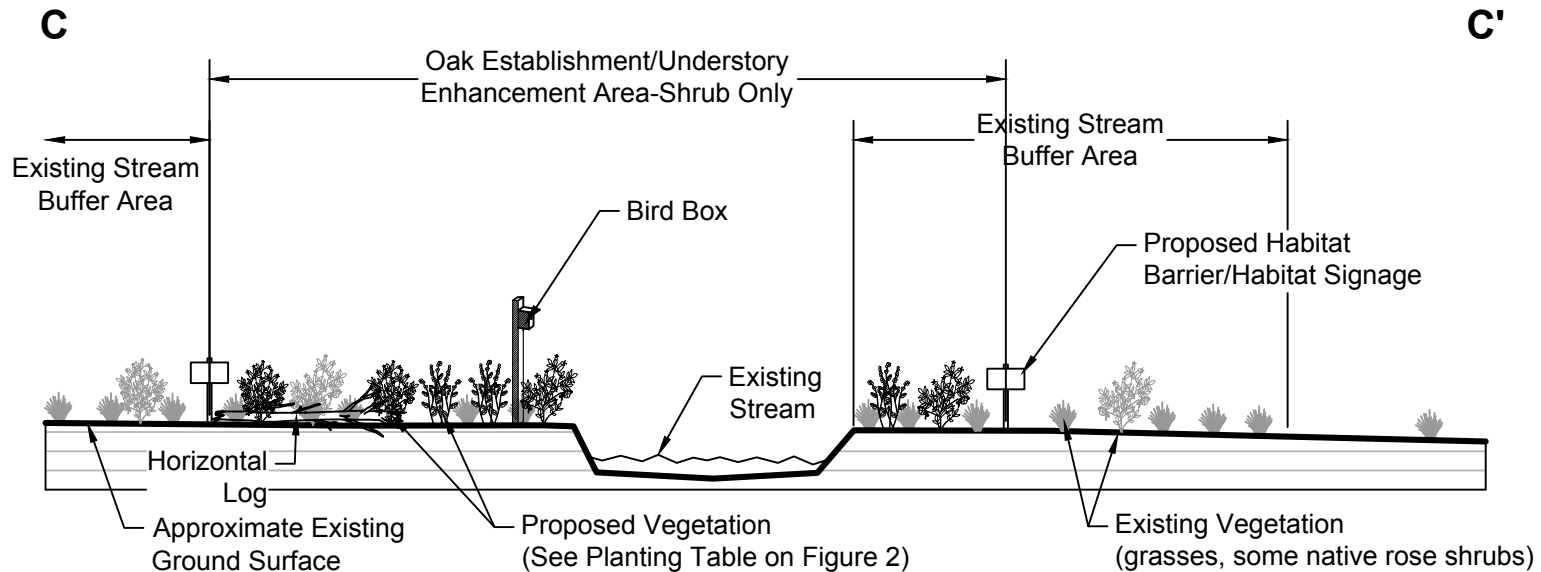
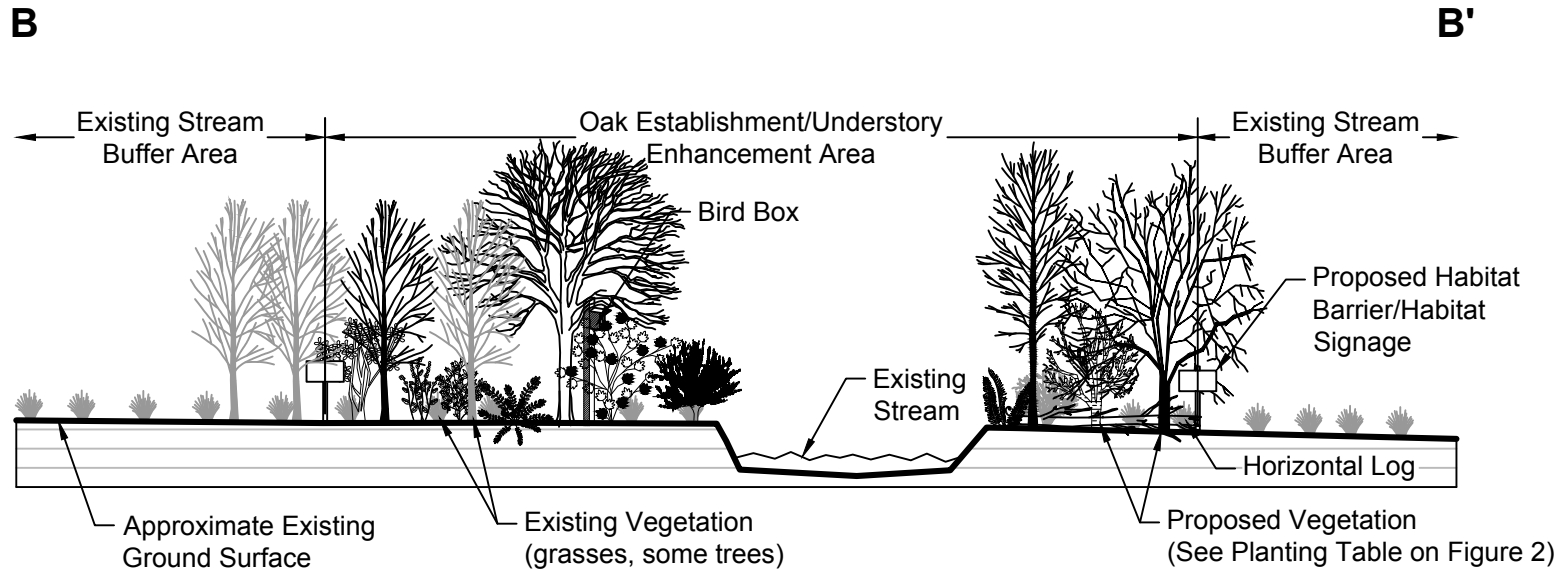




1157 3rd Ave., Suite 220A
Longview, WA 98632
Phone: (360) 578-1371
Fax: (360) 414-9305
www.eco-land.com

DATE: 2/24/16
DWN: JKJ
REQ. BY: MM
PRJ. MGR: MM
CHK:
PROJECT NO:
2048.01

Figure 3
CROSS SECTION A
Green Mountain Mixed Use PRD
Green Mountain Land, LLC
City of Camas, Clark County, Washington
Section 20, Township 2N, Range 3E, W.M.



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Figure 4
CROSS SECTIONS B & C
Green Mountain Mixed Use PRD
Green Mountain Land, LLC
City of Camas, Clark County, Washington
Section 20, Township 2N, Range 3E, W.M.

Photoplates



Above: View northeast showing Stream N and its buffer within the proposed advance oak establishment/enhancement area.

Below: View northeast showing Stream N and its buffer within the proposed advance oak establishment/enhancement area. A cart trail and forested and scrub-shrub riparian area are in the background.



1157 3rd Ave., Suite 220A
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DATE: 2/4/16
DWN: JM
PRJ. MGR: MM
PROJ.#: 2048.01

Photoplate 1
SITE PHOTOS
Green Mountain Land Mixed
Use PRD
Green Mountain Land, LLC
City of Camas, Washington



Above: View northeast showing the Stream N buffer within the proposed advance oak establishment/enhancement area. Oregon white oaks are widely spaced.

Below: View southwest showing the northwest bank of Stream N and its buffer within the proposed advance oak establishment/enhancement area. The BPA easement is in the background.



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Fax: (360) 414-9305

DATE: 2/4/16
DWN: JM
PRJ. MGR: MM
PROJ.#: 2048.01

Photoplate 2
SITE PHOTOS
Green Mountain Land Mixed
Use PRD
Green Mountain Land, LLC
City of Camas, Washington



Above: View southwest along southeast bank of Stream N showing its buffer and proposed advance oak establishment/enhancement area.

Below: View north showing Stream N's buffer within the BPA easement and proposed advance oak preservation/enhancement area to be planted with shrubs only.



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Phone: (360) 578-1371
Fax: (360) 414-9305

DATE: 2/4/16
DWN: JM
PRJ. MGR: MM
PROJ.#: 2048.01

Photoplate 3
SITE PHOTOS
Green Mountain Land Mixed
Use PRD
Green Mountain Land, LLC
City of Camas, Washington



Above: View east showing Stream N and its buffer within the proposed advance oak preservation/enhancement area. Oregon white oak, Oregon ash, and black cottonwood are widely spaced in this area.

Below: View southwest from near the PRD eastern boundary showing Stream N and its buffer within the proposed advance oak preservation/enhancement area.



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Longview, WA 98632
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Fax: (360) 414-9305

DATE: 2/4/16
DWN: JM
PRJ. MGR: MM
PROJ.#: 2048.01

Photoplate 4
SITE PHOTOS
Green Mountain Land Mixed
Use PRD
Green Mountain Land, LLC
City of Camas, Washington



December 26, 2018

Mr. Robert Maul, Planning Manager
Camas City Hall
616 NE 4th Avenue
Camas, WA 98607

Re: Year 2 Monitoring Report for the Green Mountain Advanced Oregon White Oak Mitigation City of
Camas File No. SUB14-02

Mr. Maul:

Enclosed is the Year 2 monitoring report for the Green Mountain Advanced Oregon White Oak Mitigation Site in Camas, Washington. Overall, the Advance Oak mitigation site is thriving. Please review the enclosed information and if you have any questions or concerns do not hesitate to contact me at 360-835-9082 or sarah@eco-land.com.

Sincerely,

Sarah Fitzpatrick
Biologist

Enclosed: Advanced Oregon White Oak Mitigation Year 2 Monitoring Report for Green Mountain PRD



ADVANCED OAK MITIGATION YEAR 2 MONITORING REPORT

December 21, 2018



Green Mountain PRD
Camas, Washington

Prepared for

Lennar Northwest, Inc.
11807 NE 99th Street, Suite 1170
Vancouver, WA 98682
(360) 258-7879

Prepared by

Ecological Land Services, Inc.

1157 3rd Avenue, Suite 220A • Longview, WA 98632
(360) 578-1371 • Project Number 2070.04

**Year Two
Advanced Oak Mitigation Monitoring Report
for
Green Mountain PRD
December 21, 2018**

Project Name: Advanced Oak Mitigation Monitoring

Location: Camas, Washington

City of Camas File No: SUB14-02

Permittee: Lennar Northwest, Inc.
11807 NE 99th Street, Suite 1170
Vancouver, WA 98682
(360) 258-7879

Consultant: Ecological Land Services, Inc. – Sarah Fitzpatrick
1157 3rd Avenue, Suite 220
Longview, WA 98632
(360) 578-1371

Monitoring Year: Year Two, 2018

¼ Section: NW, SW **Section:** 20, 21 **Township:** 2N **Range:** 3E

Tax Parcel #: 172559000, 986042356 **WRIA:** 28 Salmon-Washougal

Latitude/Longitude: 45° 38' 37.12" N, 122 ° 27' 12.01" W

Directions: From Highway 14, take exit 10 for 192nd Avenue, turn right on NE 13th Street, continue onto Goodwin Road, and turn left onto NE Ingle Road.

Impact Acreage: 1.13 (49,400 square feet)

Habitat Type Impacted: Oregon white oak woodland

Mitigation Implementation Information

Monitoring Party: Ecological Land Services, Inc.

Responsible Party: Lennar Northwest, Inc.

Mitigation Designer: Mara McGrath
Ecological Land Services, Inc.

Planting Contractor: Green Mountain Landscape Crew
Ecological Land Services, Inc.

Planting Installation March 2016

As-built and Year 1 Monitoring June 6, 2017

Year 2 Monitoring June 27, 2018

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Figures and Photoplates

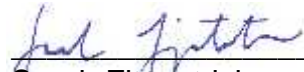
Figure 1	Advanced Oak Mitigation As-Built
Photoplates 1-3	Site Photos

Appendix A

Field Data

Signatures

The information and data in this report were compiled and prepared under the supervision and direction of the undersigned.



Sarah Fitzpatrick
Biologist



Mara McGrath, PWS
Senior Biologist/Principal

Introduction

This Year 2 monitoring report has been prepared to monitor the success of the advanced Oregon white oak mitigation established at the Green Mountain Planned Residential Development (PRD), located north of NE Goodwin Road, east of NE Ingles Road, and south of NE 48th Circle (on the southwest slope of Green Mountain). The development project consists of phased development of the property into single-family and multi-family residential lots with park, trails, and open space. In preparation for construction of the project, 52 Oregon white oaks will be impacted. To compensate for this impact, the project included a mitigation plan to establish, preserve, and enhance Oregon white oak habitat in advance in the southeast portion of the PRD site. The entire advanced mitigation area is a narrow strip of existing oak woodland, with the Oak Establishment and Enhancement area occupying the southwest portion of the strip, and the Oak Preservation and Enhancement area occupying the northeast portion.

This Year 2 monitoring report summarizes the results of the second year of monitoring to track the success of the mitigation plan since its implementation and to provide guidance to ensure future success of the mitigation areas.

Mitigation Plan Overview

The mitigation project consists of conducting advanced oak mitigation within Phase 2 of the PRD to compensate for removal of oaks that will occur for construction of the PRD. Fifty-two (52) Oregon white oaks were identified within the boundaries of the PRD and will be impacted. To compensate for this impact, the project proposed the following:

- to plant Oregon white oak and native trees and shrubs at a 2:1 ratio within an oak establishment/enhancement area, and
- to preserve oak woodland at a 3:1 ratio within an oak preservation/enhancement area, and to enhance this preservation/enhancement area by the planting of native shrubs.

The establishment area encompasses the southwestern portion of the advanced oak mitigation area, while the preservation area encompasses the northeastern portion. Both are generally flat with a canopy of mature oak and cottonwood trees, and a Type Np stream flowing along the southeast border.

Methods

ELS biologists conducted the Year 2 monitoring on June 27, 2018. Monitoring methods included counting planted species in monitoring plots in the oak establishment/enhancement and preservation/enhancement areas, assessing cover of non-native, invasive species within these mitigation areas, recording observations of wildlife, and taking photos.

Vegetation

The vegetation monitoring plots sizes are 30-foot diameter for tree and shrub density and cover. To determine the tree and shrub density (for percent survival), individual stems are counted. To determine percent cover, aerial cover is estimated to 1 percent for trees, shrubs, and herbaceous plants. The definition of trees, shrubs, and herbaceous plants is according to the U.S. Army Corps of Engineers (2010).

Results: Goals, Objectives, and Performance Standards

The goal of the Oregon white oak advanced mitigation plan is to substantially maintain the existing Oregon white oak habitat functions over the long-term by establishing, preserving, and enhancing oak woodlands to compensate for future impacts to oaks in subsequent phases of the PRD (ELS 2016).

Vegetative Structure

Oak Establishment/Enhancement Area

Objective 1. Establish Oregon white oak woodland habitat to compensate for impacts to the existing oak habitat functions and establish a native shrub understory to enhance vegetative structure and habitat functions.

Performance Standard 1b. Planted Oregon white oak and other native trees and shrubs in the established/enhanced oak woodland will achieve at least 80 percent survival in Year 2. Dead plants will be replaced if this performance standard is not met.

- **Year 2 – Achieved.** Planted Oregon white oak and native trees and shrubs in the established/enhanced oak woodland area had greater than 80 percent survival. See Table 1 below for average survival within the mitigation areas, and Appendix A for exact plant counts.

Performance Standard 1g. In all years, non-native invasive plant species, except for reed canarygrass, will not exceed 10 percent cover within the mitigation area.

- **Year 2 – Achieved.** Non-native, invasive plant species, including reed canarygrass, did not exceed 10 percent cover within the mitigation area. See Table 2 below for average invasive plant cover and Appendix A for exact percentages.

Oak Preservation/Enhancement Area

Objective 2. Preserve Oregon white oak woodland habitat to compensate for temporal loss of habitat functions, protect oak habitat, and establish a native shrub understory to enhance vegetative structure and habitat functions.

Performance Standard 2c. Planted native shrubs in the preserved/enhanced oak woodland will achieve at least 80 percent survival in Year 2. Dead plants will be replaced if this performance standard is not met.

- **Year 2 – Achieved.** Native shrubs in the preserved/enhanced oak area achieved greater than 80 percent survival. See Table 1 below for average survival within the mitigation areas and Appendix A for exact plant counts.

Performance Standard 2h. In all years, non-native invasive plant species, except for reed canarygrass, will not exceed 10 percent cover within the mitigation area.

- **Year 2 – Achieved.** Non-native, invasive plant species, including reed canarygrass, did not exceed 10 percent cover within the mitigation area. See Table 2 below for average invasive plant cover and Appendix A for exact invasive percentages.

Table 1. Average percent survival of native trees & shrubs by community, Year 2

Habitat Type	Average Percent Survival
	Tree & Shrub
Oak Establishment/Enhancement	111.5
Oak Preservation/Enhancement	118.3

Table 2. Average percent cover of native & invasive herbaceous species by community, Year 2

Habitat Type	Average Percent Cover
	Invasive Species
Oak Establishment/Enhancement	0.0
Oak Preservation/Enhancement	6.7

Table 3. Performance standards for vegetation by monitored year

	Percent Survival and Cover					
	Year 1	Year 2	Year 3	Year 5	Year 7	Year 10
Tree & Strata						
Survival ¹	90%	80%	75%	--	--	--
Cover ¹	--	--	--	25%	35%	50%
Shrub Strata						
Survival ¹	90%	80%	75%	--	--	--
Cover ¹	--	--	--	10%	15%	30%
Invasive Plants						
Cover of non-native, invasive plant, excluding reed canarygrass	<10%	<10%	<10%	<10%	<10%	<10%

¹Includes naturally recruited species.

Long Term Protection

Objective 4. Demarcate the advanced oak mitigation areas.

Performance Standard 4a. Install oak habitat signs on metal or wood posts at minimum of 100-foot intervals or 1 per lot along the perimeters of the oak preservation/ enhancement area and the oak establishment/enhancement area bordering the development. The signs will state language similar to the following: “oak habitat boundary” and “please respect native plants and wildlife, protection of this natural area is in your care.” This performance standard is completed when signs are installed and documented in the first annual monitoring report.

- **Year 2 – Not Achieved.** Habitat signs were not installed during the mitigation site’s second year. It is anticipated that habitat signs will be installed once heavy equipment work for construction of Phase 2 has ceased and will be documented in the subsequent monitoring report.

Performance Standard 4b. Install natural barriers as needed around the perimeters of the oak preservation/enhancement area and the oak establishment/enhancement area. This performance standard is completed when the natural barriers are installed and documented in the first annual monitoring report.

- **Year 2 – Not Achieved.** This performance standard has not yet been achieved, as construction for Phase 2 has not commenced. Fencing is anticipated to be installed in lieu of natural barriers around the perimeters of the mitigation areas

once heavy equipment work for the construction of Phase 2 has ceased and will be documented in the subsequent monitoring report.

Objective 5. Provide legally binding protection for the advanced oak mitigation areas.

Performance Standard 5a. A permanent and irrevocable conservation covenant or similar legal mechanism will be established for the oak preservation/enhancement and the oak establishment/enhancement areas. The performance standard is completed when the City approves the conservation covenant or similar legal mechanism.

- **Year 2 – Not Achieved.** It is anticipated that a conservation covenant will be recorded by 2019, and will therefore be addressed in the Year 3 Monitoring Report.

Performance Standard 5b. Language to protect the native vegetation within the oak preservation/enhancement and the oak establishment/enhancement areas will be incorporated into the CC&Rs. The performance standard is completed when a copy of the final CC&Rs is provided to the City.

- **Year 2 – Not Achieved.** Protection of vegetation within the mitigation areas will be incorporated into the CC&Rs in 2019, and will be similar to the CC&Rs language used in Phase 1 of the PRD.

Conclusions

Overall, the Green Mountain advanced oak mitigation site has been successful in its second monitoring year, as measured by the plant survival standards and invasive plant cover standards determined in the *Oregon White Oak Advance Mitigation Plan* (ELS 2016). Plantings met and exceeded the year two survival standard of 80 percent, and invasive plant cover was well below the highest threshold of 10 percent. Multiple volunteer trees and shrubs were observed within monitoring plots, and bird species were observed within the mitigation area. Long-term protection standards are in progress and are anticipated to be complete by Year 3 monitoring.

Maintenance Summary and Recommendations

To maintain the success of planted species and control any invasive plants, maintenance will be conducted regularly during the 2019 growing season. The Year 3 monitoring will be conducted in 2019.

References

City of Camas Municipal Code. 2018. *Critical Areas Ordinance Chapter 16.62 – Fish and Wildlife Habitat Conservation Areas*. December 2018.

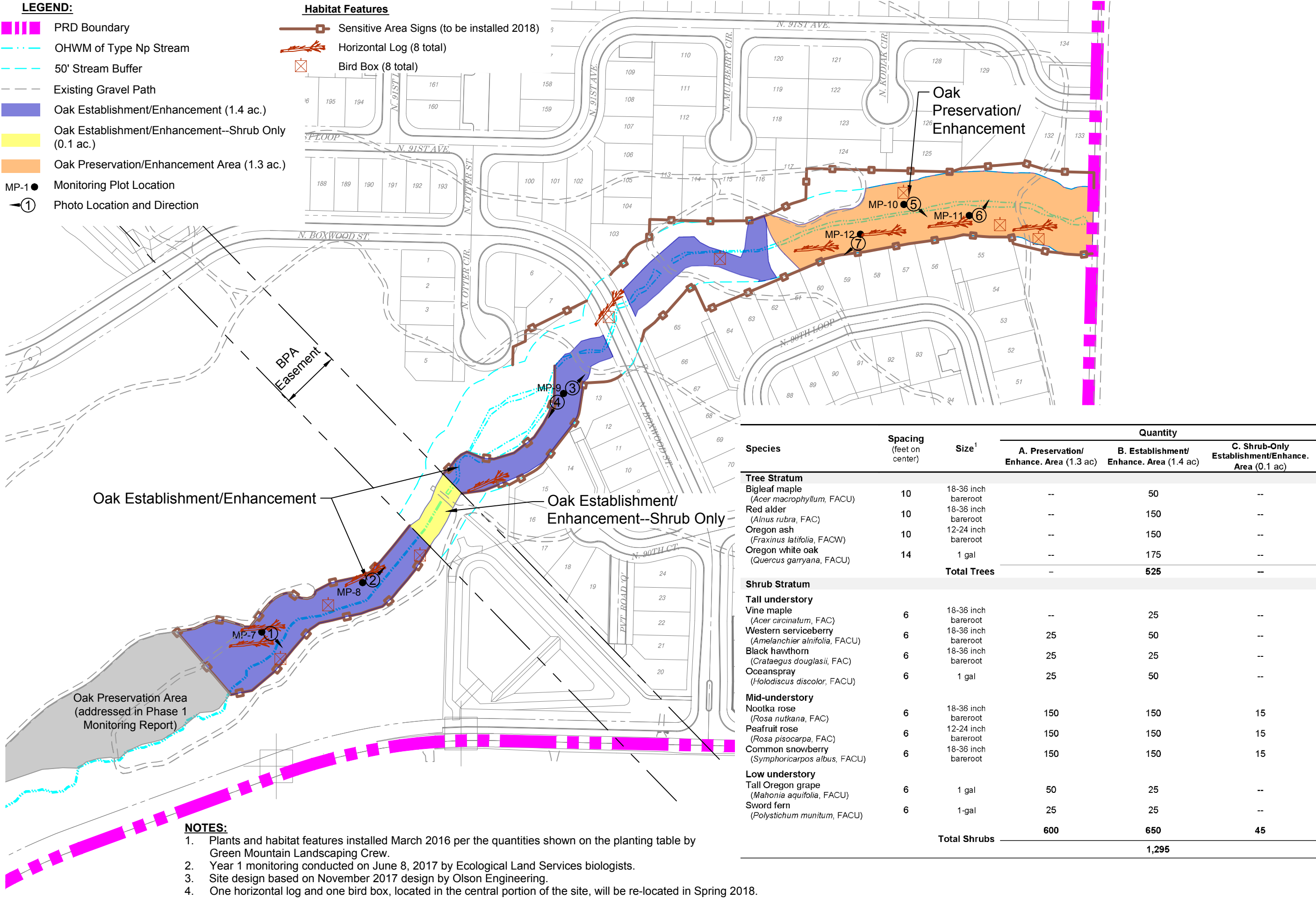
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U.S. Army Corps of Engineers (USACE). 2010. *Final Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)*, ed. J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-08-13. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

FIGURES AND PHOTOPLATES

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Species	Spacing (feet on center)	Size ¹	Quantity		
			A. Preservation/ Enhance. Area (1.3 ac)	B. Establishment/ Enhance. Area (1.4 ac)	C. Shrub-Only Establishment/Enhance. Area (0.1 ac)
Tree Stratum					
Bigleaf maple (<i>Acer macrophyllum</i> , FACU)	10	18-36 inch bareroot	--	50	--
Red alder (<i>Alnus rubra</i> , FAC)	10	18-36 inch bareroot	--	150	--
Oregon ash (<i>Fraxinus latifolia</i> , FACW)	10	12-24 inch bareroot	--	150	--
Oregon white oak (<i>Quercus garryana</i> , FACU)	14	1 gal	--	175	--
Total Trees			--	525	--
Shrub Stratum					
Tall understory					
Vine maple (<i>Acer circinatum</i> , FAC)	6	18-36 inch bareroot	--	25	--
Western serviceberry (<i>Amelanchier alnifolia</i> , FACU)	6	18-36 inch bareroot	25	50	--
Black hawthorn (<i>Crataegus douglasii</i> , FAC)	6	18-36 inch bareroot	25	25	--
Oceanspray (<i>Holodiscus discolor</i> , FACU)	6	1 gal	25	50	--
Mid-understory					
Nootka rose (<i>Rosa nutkana</i> , FAC)	6	18-36 inch bareroot	150	150	15
Peafruit rose (<i>Rosa pisocarpa</i> , FAC)	6	12-24 inch bareroot	150	150	15
Common snowberry (<i>Symphoricarpos albus</i> , FACU)	6	18-36 inch bareroot	150	150	15
Low understory					
Tall Oregon grape (<i>Mahonia aquifolia</i> , FACU)	6	1 gal	50	25	--
Sword fern (<i>Polystichum munitum</i> , FACU)	6	1-gal	25	25	--
Total Shrubs			600	650	45
			1,295		

Figure 1

ADVANCE OAK MITIGATION AS-BUILT

Green Mountain Mixed Use PRD

Green Mountain Land, LLC

City of Camas, Clark County, Washington

Section 20, Township 2N, Range 3E, W.M.

DATE: 12/27/17

DWN: JKL

REQ. BY: MM

PRJ. MGR: MM

CHK:

PROJECT NO:

2048.05

1157 3rd Ave., Suite 220A

Longview, WA 98632

Phone: (360) 578-1371

Fax: (360) 414-9305

www.eco-land.com

0 150 300

SCALE IN FEET



Photo 1: view southeast from MP-7, located in the southwest portion of the oak establishment/enhancement area. This photo shows the progress of plantings at Year 2.



Photo 2: view northeast from MP-8, located in the southwest portion of the oak establishment/enhancement area. This photo shows the progress of plantings at Year 2.



Photo 3: view northeast from MP-9, located in the central portion of the oak establishment/enhancement area. This photo shows the progress of plantings at Year 2.



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DATE: 7/2/18
DWN: KL
PRJ. MGR: MM
PROJ.#:
2048.03

Photoplate 1
Site Photos (Year 2)
Green Mountain Mixed Use PRD-Advance Oak
Mitigation
City of Camas, Clark County, Washington
Section 20, Township 2N, Range 3E, W.M.



Photo 4: view southwest from MP-9, located in the central portion of the oak establishment/enhancement area. This photo shows the progress of plantings at Year 2.



Photo 5: view southeast from MP-10 showing plantings on the southern side of the Type Np stream, within the central portion of the oak preservation/enhancement area. This photo shows the progress of plantings at Year 2.



Photo 6: view northeast from MP-11, located in the eastern portion of the oak preservation/enhancement area. This photo shows the progress of plantings at Year 2.



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DATE: 7/2//18
DWN: KL
PRJ. MGR: MM
PROJ.#:
2048.03

Photoplate 2
Site Photos (Year 2)
Green Mountain Mixed Use PRD-Advance Oak
Mitigation
City of Camas, Clark County, Washington
Section 20, Township 2N, Range 3E, W.M.



Photo 7: view southwest from MP-12, located in the western portion of the oak preservation/enhancement area. This photo shows the progress of plantings at Year 2.

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1157 3rd Ave., Suite 220A
Longview, WA 98632
Phone: (360) 578-1371
Fax: (360) 414-9305

DATE: 7/2//18
DWN: KL
PRJ. MGR: MM
PROJ.#:
2048.03

**Photoplate 3
Site Photos (Year 2)**
Green Mountain Mixed Use PRD-Advance Oak
Mitigation
City of Camas, Clark County, Washington
Section 20, Township 2N, Range 3E, W.M.

APPENDIX A

Field Data

Density	Oak Establishment/Enhancement			Oak Preservation/Enhancement		
	MP-7	MP-8	MP-9	MP-10	MP-11	MP-12
Trees and Shrubs						
<i>Acer macrophyllum</i> (bigleaf maple)	2		2		2	
<i>Alnus rubra</i> (red alder)	2	2		3	2	
<i>Fraxinus latifolia</i> (Oregon ash)					3	
<i>Quercus garryana</i> (Oregon white oak)			5		2	
<i>Acer circinatum</i> (vine maple)		2				
<i>Amelanchier alnifolia</i> (western serviceberry)	2		1			2
<i>Crataegus douglasii</i> (black hawthorn)						
<i>Holodiscus discolor</i> (ocean spray)		1	1	2		
<i>Rosa</i> sp. (rose species)	3	14	4	3	8	2
<i>Symphoricarpos albus</i> (snowberry)	2	2	3	3	2	5
<i>Mahonia aquifolia</i> (tall Oregon grape)						3
<i>Polystichum munitum</i> (sword fern)		2	2			
snowberry volunteer		1	1		1	
ash volunteer						3
cottonwood volunteer			1			
rose volunteer					2	2
hawthorn volunteer	1					
slough sedge volunteer						1
Total Tree & Shrub Density	12	24	20	11	22	18
Baseline Tree & Shrub Density¹	11	20	19	11	21	12
Average Percent Survival by MP	109	120	105	100	105	150

¹Baseline density based on as-built data

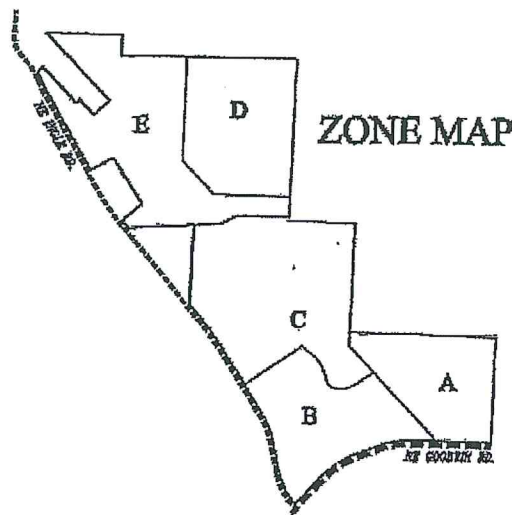
Percent Cover	Oak Establishment/Enhancement			Oak Preservation/Enhancement		
	MP-7	MP-8	MP-9	MP-10	MP-11	MP-12
Emergent/Herbaceous						
<i>Cirsium arvense</i> -Class C weed ²	0.1	0.1	0.1	1	0.1	0.5
<i>Cirsium vulgare</i> -Class C weed ²	0.1	0.1	0.1	2	0.1	0.1
<i>Rubus armeniacus</i> -Class C weed ²	0.1	0.5	0.1	3	0.1	0.1
<i>Senecio jacobaea</i> -Class B weed ²	0.1	0.1	0.1	10	1	2
Total Invasive Species Cover	0	0.8	0	16	1.3	2.7
Average Invasive Species Cover by Habitat	0.3			6.7		

²Based on the Washington State Noxious Weed List

Note: Use 0.1% cover for species identified with “trace” amounts of cover.

EXHIBIT E**Tree Preservation Plan**

Zone	Pods Included in Zone	Total Trees in Zone	Trees Preserved	Percentage of Trees Preserved
Zone A (Southeast)	D4, D5, D6 E2, E3	170	90	39%
Zone B (South)	H (CC), A1, A2, A3, B5	342	265	77%
Zone C (Central)	B1, B2, B3, C1, C2, D1, D2, D3, E1	1,454	488	34%
Zone D (Northeast)	G	3,524	2,345	67%
Zone E (Northwest)	B4, E4, F1, F2, F3, F4	4,040	1,571	39%
<u>Total Site</u>		<u>9,589</u>	<u>4,759</u>	<u>50%</u>



The Tree Preservation Plan is based on a complete tree survey of the entire Property. This survey finds that nearly 9,600 trees are present on the property. The Property has been divided into five "zones" that identify five distinct areas of future development. The zones were established to assure that acceptable numbers of trees were preserved throughout the Property, not just in one isolated area rendering the remaining portions of the site bare of trees. The percentage of trees protected in a given zone varies from 34% to 77%, with the net result being that at least 50% of the existing trees on the Property will be preserved.

Compliance with the Tree Preservation Plan will take place with each future development application (Preliminary Plat or Site Plan Review), at which time the applicant will demonstrate that the number of trees protected will meet or exceed the amount listed in the "Trees Preserved" column in the above

table. In the event that a given development application covers only part of a zone, the applicant shall demonstrate that the current development application will not preclude the preservation of the minimum number of trees required to be preserved for that zone when the zone is fully developed. In addition to the trees that will be preserved, thousands of trees will be planted as part of the development's landscape requirements, including in parks, open spaces, streetscapes, and residential areas.

Consistent with Camas City code, Oregon White Oak trees over 20" dbh are considered habitats of local importance, as well as Oregon White Oaks that form a grove of one acre or larger. Such oaks shall be considered jurisdictional for the purposes of this Tree Preservation Plan. Any jurisdictional Oregon White Oak trees shall be mitigated for at a 2:1 stem count ratio and installed within an appropriate area on site. Oregon white oak trees installed as mitigation will be 1.5" caliper at a minimum. Where possible, oaks will be planted within vegetation voids associated with riparian corridors, oak groves and green space to increase oak habitat connectivity across the site. The location of oak plantings shall be at the direction of a professional biologist or certified arborist.



May 5, 2015

Robert Maul, Planning Director
City of Camas
161 NE 4th Avenue
Camas, WA 98607

Re: Green Mountain Planned Residential Development and Phase 1 Response to WDFW
Comments

Dear Mr. Maul:

Please accept this as a response to George Fornes' letter on behalf of the Washington Department of Fish and Wildlife (WDFW), dated March 17, 2015, regarding Oregon white oak woodlands, Green Mountain Biodiversity Area, Townsend's big-eared bat, Bradshaw's lomatium, and wetlands.

Oregon White Oak Woodlands

Ecological Land Services, Inc. biologists identified 20 Oregon white oaks on or immediately adjacent to the proposed Phase 1 project area. The regulations applicable to these oaks are found in the City's code, which was adopted through a formal public process, including review by the WDFW. While WDFW recommends that all the oaks within Phase 1 be considered priority habitat based on its management recommendations¹, the regulations applicable to this project are found in CCC 16.61.010(A) (3)(a)(i) and CCC 16.61.010(A)(3)(a)(ii). Specifically, these regulations require that oaks greater than 20 inches diameter breast height (dbh) be classified as habitats of local importance (CCC 16.61.010(A) (3)(a)(i)) and that oak stands greater than one acre, when found to be valuable to fish and wildlife (CCC 16.61.010(A) (3)(a)(ii)), are regulated as priority habitat. The Applicant's proposal complies with the applicable requirements of the City's code.

The oaks to be impacted on Phase 1 are located on or adjacent to an active golf course. While the oaks by themselves have the potential to provide overstory habitat, the understory is heavily impacted by planted grass, regular mowing of the golf course fairways and rough, and other landscaping and maintenance activities. Few native species are present and understory structure is virtually non-existent. From an ecological standpoint, the understory lacks species diversity and habitat structure, providing low functions.

AVOIDANCE AND MINIMIZATION

Avoiding the regulated oaks and oak groves was a primary consideration when designing the PRD, including Phase 1. The Applicant and engineering team have re-examined the proposed Phase 1 grading plan, which was created after finalizing the design of Phase 1, to determine if any oaks could be avoided. Oak 2, a 22.5-inch dbh tree, will now be avoided because of its

¹ Larsen, E. and J.Morgan 1998. Management recommendations for Washington's priority habitats: Oregon white oak woodlands. Washington Department of Fish and Wildlife. Olympia, Washington. 37 pgs.

proximity to the site boundary and its location in which minimal grading is proposed. The remaining oaks lie in areas that require 2- to 3.5-feet of grading and cannot be reasonably avoided. The grading plan for subsequent phases has not been created; however, oaks will be avoided where reasonably possible as provided for in the City's code.

MITIGATION

To mitigate for the oaks being removed, we recommend a two-fold strategy of: 1) oak establishment/understory enhancement; and 2), oak preservation/understory enhancement. WDFW's letter commented that the proposed 2:1 stem count ratio was not adequate to replace the functions of mature oak to be removed and that temporal loss of habitat function was a concern. To address these issues, we propose direct establishment of oaks and enhancement of the understory, as well as a separate oak preservation and understory enhancement area. The two-fold approach will replace oak habitat on a canopy cover basis after approximately 10 years. This will preserve and enhance a mature oak grove to offset temporal loss and protect oak habitat over the long-term. We propose mitigating half of the impacts through establishment/ enhancement at a 4:1 and the other half of the impacts through preservation/enhancement at a 6:1.

Oak Establishment/Enhancement Area

The proposed oak establishment/enhancement area is located around the buffers of Wetlands B and D, much of which is currently part of an active golf course. Once the mitigation area is established, the existing high intensity land use will cease and the buffers will return to more natural conditions. To replace oaks removed, large caliper (minimum 1.5-inch diameter) ball & burlap oaks will be planted within the establishment/enhancement area along with overstory trees commonly associated with western Washington oak woodlands and appropriate for this site (Table 1)². This will compensate for 50 percent of the oak canopy cover removed and replace all of the oak habitat (based on overstory canopy cover) after about 10 years (Table 2; Exhibits A and B). The oaks and associated trees will offer greater wildlife habitat than currently exists on the site. The trees will also provide a valuable food source for wildlife when they reach reproductive maturity. In the long-term, cavities, snags, and downed trees will provide good wildlife habitat.

The approximately 6,500 square foot (0.15 acre) oak planting area that was originally proposed in the southern buffer of Wetland D³ will be expanded to accommodate additional area for planting trees and shrubs appropriate for western Washington oak woodlands. Figure 2 shows potential oak mitigation areas in the buffers of Wetlands B and D that set aside a larger area for mitigation than is actually needed (Exhibit B). The precise planting area will be determined at a later date pending further analysis of ecological and site layout considerations. Any extra area not used for the Phase 1 mitigation may be used for advance mitigation for the subsequent phases.

² Larsen and Morgan 1998

³ Ecological Land Services, Inc. Dec 2014

Native shrubs commonly associated with western Washington oak woodlands (Table 1)³ will be installed within the establishment/enhancement area to bolster species diversity and habitat structure. Thus, the understory will benefit from removing the existing land use, planting native shrubs, and allowing native colonizing species to take root in the area. Although most species of oaks do not produce acorns for several decades⁴, natural oak regeneration will be possible in the future under protected status of the oak establishment/enhancement area. These elements will improve the habitat functions of the understory beyond its existing low functions.

To ensure its long-term protection, the oak establishment/enhancement area will be protected in perpetuity with a conservation covenant or similar legal mechanism once the surrounding development has been developed per the PRD plan.

Table 1. Planting specifications for the oak establishment/understory enhancement area

Species	Approximate Spacing (feet on center)	Plant Material Specifications	Approx. Quantity
Tree stratum			
Bigleaf maple (<i>Acer macrophyllum</i> , FACU)	10	18-36 inch bareroot	To be determined
Oregon ash (<i>Fraxinus latifolia</i> , FACW)	10	18-36 inch bareroot or container	
Oregon white oak (<i>Quercus garryana</i> , FACU)	14	1.5-inch caliper B&B	
		Tree Density	Approx. 200 trees/acre
Shrub stratum			
Western serviceberry (<i>Amelanchier alnifolia</i> , FACU)	6-7	18-36 inch bareroot	To be determined
Oceanspray (<i>Holodiscus discolor</i> , FACU)	6-7	18-36 inch bareroot	
Tall Oregon-grape (<i>Mahonia aquifolium</i> , FACU)	6-7	12 to 18 inch bareroot or container	
Nootka rose (<i>Rosa nutkana</i> , FAC)	6-7	18-36 inch bareroot	To be determined
Common snowberry (<i>Symphoricarpos albus</i> , FACU)	6-7	18-36 inch bareroot	
		Shrub Density	Approx. 500 shrubs/acre

⁴ Loftis, D. and C. McGee, eds. 1993. Oak Regeneration: Serious problems, Practical recommendations. General Technical Report SE-84. Ashville, North Carolina. U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station.

Oak Preservation/Enhancement Area

The oak preservation/enhancement area is proposed to compensate for 50 percent of the oak canopy impacts by setting aside existing oak habitat along a riparian corridor in the southern PRD (Table 2; Exhibits A and B). The exact boundaries of this mitigation area shown on Figure 2 are to be determined pending ecological and site design considerations. The oak preservation/enhancement area will mitigate for temporal loss, protect oak habitat, and enhance the understory with native shrubs commonly associated with oak woodlands. To enhance species diversity and habitat structure, native shrubs will be installed in selected portions of the understory that are more open and will benefit from an understory stratum.

The area is well suited for preservation because a portion of it lies within the outer 50 percent of a Type Np stream buffer that could be subject to future development through buffer averaging. The oak preservation/enhancement area has greater plant species diversity across all strata with an overstory *and* understory habitat structure, unlike the species diversity and habitat structure associated with the impacted oaks; thus, the preservation/enhancement area will exceed the habitat functions currently provided by the oaks to be impacted. By preserving an established and well developed oak stand, **the project will lower the temporal loss and risk of failure with strictly replacement-based mitigation.** Like the oak establishment/enhancement area, the oak preservation/enhancement area will be protected in perpetuity with a conservation covenant or similar legal mechanism once the surrounding development has been developed per the PRD plan. The conservation covenant will allow for future plantings of oaks, if ecologically appropriate, and would need to accommodate the following:

1. Trails per the PRD plan and/or the City of Camas Parks & Open Space Plan
2. Unavoidable road crossings to allow access to inner part of the site

Table 2. Oregon white oak habitat impacts and mitigation

Impacts		Mitigation						
Total Oaks ¹	Estimated Oak Canopy Cover (sf) ²	Type	Canopy Impact Break-down	Ratio (canopy cover)	Required Canopy Cover (sf) ³	Required Area (acres)	Goals	Location/ Notes
19	15,400	Oak Establishment/ Understory Enhancement	7,700 (50% impact)	4:1	30,800	0.7	<ul style="list-style-type: none"> To replace oak habitat at approx. 10 yrs To enhance understory diversity and structure 	<ul style="list-style-type: none"> Establish area in Wetlands B & D buffers Plant native understory shrubs
		Oak Preservation/ Understory Enhancement	7,700 (50% impact)	6:1	46,200	1.1	<ul style="list-style-type: none"> To offset temporal loss To protect oak habitat To enhance understory diversity and structure 	<ul style="list-style-type: none"> Preserve oak stand along Type Np stream Plant native understory shrubs

¹ Oak 1, 7, 9, 55, 58, 64, and 121 are locally regulated oaks that are proposed to be removed.

² We estimated canopy cover of 1,000 square feet per tree or an estimated drip diameter of about 32 feet per tree. The estimated canopy cover errs on the high side, as some of the oaks do not have completely circular canopies.

³ The canopy cover within the oak preservation/enhancement area is based on an estimate of 1,000 square feet per tree for oaks 20 inches dbh and 700 square feet per tree for oaks 20 inches. See Exhibits A and B.

MITIGATION RATIOS RATIONALE

Mitigation ratios on a few projects (generally public projects) provided as examples by the WDFW have ranged from 5:1 to 8:1 based on amount of canopy cover removed⁵. We propose a 4:1 for oak habitat establishment, which we believe accomplishes the goal of increasing the quality of oak habitat over a reasonable period of time and is more consistent with mitigation ratios typically applied to a private development. The ratio is warranted because:

- Large oak (1.5-inch caliper, ball & burlap) trees will be planted. A 6:1 ratio for canopy cover was required for a residential project in Klickitat County and oaks were specified to be 3 feet tall or a 2 gallon container. The ball & burlap oaks proposed for the Phase 1 mitigation will be considerably larger and are anticipated to outpace the growth of a smaller tree with proper planting and maintenance. Based on our analysis of estimated growth rates of oaks in the area, oaks can be expected to grow approximately 0.7 feet/year. Thus, we anticipate a 7-foot increase in canopy cover over a 10 year period for properly planted and maintained oak trees. The large caliper ball & burlap oak should achieve approximately 75 percent canopy cover after 10 years.

⁵ Information provided by George Fornes, WDFW, April 22, 2015 email

- The establishment area will be coupled with a preservation area at a 6:1. Coupling direct establishment with preservation is similar to the WSDOT SR14 widening project, which both restored and preserved oak habitat (Mitigation ratios were higher with this state-funded project).

ADVANCE OAK MITIGATION

Outside of Phase 1, the subsequent phases of the PRD will also impact oaks; the exact number to be determined pending ecological considerations and site design constraints (Exhibits A and B). Avoidance will always be considered as it is one of the regulatory factors in identifying oaks that may or may not be appropriate to remove; green spaces and parks are already planned in areas with high concentrations of oaks. To be proactive, the Applicant proposes to establish potential advance oak mitigation areas within the Type Np stream corridor and several associated wetland buffers in the southern PRD. Other advanced mitigation areas may be identified onsite as well, including, but not limited to, any surplus buffer area around Wetlands B and D not used for Phase 1 mitigation. Advanced mitigation could potentially take place offsite as well, which would involve further consultation with WDFW.

The advance mitigation is proposed at a 2:1 ratio based on canopy cover impacts. This ratio is warranted because oak and associated trees and shrubs will be established many years before future phases are to be developed. Furthermore, the advance mitigation will have lower temporal loss and risk of failure than concurrent mitigation. Specific annual performance standards will have to be met before credits can be "withdrawn" from the advance mitigation site. An advance oak mitigation plan will be prepared in consultation with WDFW and will be submitted within 6 months of the approval of the PRD, creating the possibility for the first advanced mitigation plantings to take place in the fall/winter of 2015-2016.

Green Mountain Biodiversity Area

The northern portion of Phase 1 is mapped as the Green Mountain Biodiversity Area. According to the WDFW, the area is mapped because it consists of mature conifer forest of large size (approximately 300 acres) located within rapidly expanding development, with high value as refugia/remnant habitat and regular small concentrations of blacktail deer. The area in the northern portion of the site that is mapped as a biodiversity area differs in species, age class, and community structure from offsite forest to the north that is mapped as the same biodiversity area; thus it does not meet the regulatory criteria to be classified as a biodiversity area.

OFFSITE MAPPED AREA

The forested area immediately north of the northern project boundary consists of a mature coniferous forest dominated by Douglas-fir. We estimate the stand to be 70 to 75 years. This mature Douglas-fir forest provides a nearly 100 percent coniferous overstory cover. The understory consists of native shrubs and herbaceous species. Understory density is low because of shading by the overstory. This area is within the mapped Green Mountain Biodiversity Area and meets the PHS designation as we understand it.

ONSITE MAPPED AREA

In contrast, the area that lies within the mapped Green Mountain Biodiversity Area in the northern portion of Phase 1 differs from the dense coniferous forest located in the mapped area offsite. The young forested area onsite is comprised of approximately 15 percent coniferous trees and 85 percent deciduous. The mixed deciduous overstory is 20 to 25 years and dominated by red alder and black cottonwood in the overstory. Douglas-fir and grand fir, the only two species of conifer observed, occupy subordinate positions in the overstory, along with Scouler willow and bigleaf maple. The understory is notably denser than the offsite mapped area because it receives more sunlight than the understory offsite to the north. Shrubs and herbaceous species are fairly dense in the northern portion of Phase 1, and are predominately native (although English holly and Himalayan blackberry are present). Although this area falls within the mapped Green Mountain Biodiversity Area, it is a young, mixed deciduous forest that is structurally different from the offsite mapped area and does not meet the PHS designation of a *mature conifer forest*.

Both the onsite mapped area and offsite logged area have different species composition, age class, and structure from the offsite coniferous forested area to the north and do not satisfy the criteria necessary to be classified as a Biodiversity Area. At some point in the future, the mapped Biodiversity Area will likely need to be amended by WDFW after ground-truthing because there is a discrepancy between the mapping and forest types on the ground (young mixed deciduous forest onsite and the land to the immediate east of the Phase 1 project area that was logged about 5 years ago and has current logging activity are mapped as within the designated Green Mountain Biodiversity Area). Prior to developing subsequent phases in the forested area north of Phase 1, the area will be surveyed by ELS and WDFW biologists to determine its Biodiversity Area status.

Townsend's Big-Eared Bat

The developable areas within Phase 1 do not support topography suitable caves. However, rock outcrops and areas that may contain caves exist in the northern part of the PRD and outside of the Phase 1 project area. Thus, any cave or cave-like feature, if present, would be located in areas that are topographically steep, within the BPA powerline easement, or otherwise non-developable areas. Ecological Land Services biologists and the Applicant have surveyed the proposed Phase 1 project area extensively and no caves or hibernaculums were located within the developable areas. Based on the lack of caves or hibernaculums within the proposed developable area and the lack of bats observed during field investigations, no known bat habitat will be impacted by Phase 1. Field surveys with WDFW biologists will be conducted prior to development of subsequent phases in areas with potential habitat.

Bradshaw's Lomatium

Bradshaw's lomatium (*Lomatium bradshawii*) usually occupies remnant low-elevation grasslands and prairies in wet, seasonally flooded areas adjacent to streams and small rivers⁶.

⁶ Washington Natural Heritage Program rare plant information. Online at: <http://www1.dnr.wa.gov/nhp/refdesk/fguide/pdf/lobr.pdf>.

The lomatium is typically found in transitional areas between wetlands and uplands. This type of habitat may be present in undisturbed stream and wetland buffers onsite; however, the majority of the site is actively used as a golf course. The species typically blooms late April through the first week of May, although flowering may be earlier this spring because of the drier conditions. Fruits are set mid-May to early July and are helpful in positively identifying the species.

Bradshaw's lomatium has been identified in southern Clark County. The nearest identified population is approximately 0.25 miles from the closest PRD boundary⁵.

Rare plant surveys were conducted by Ecological Land Services biologists during the species' flowering period in April and May 2009⁷ and periodic site visits in 2013 and 2014. No Bradshaw's lomatium were identified within the PRD boundaries during these surveys. Additionally, the superintendent for the golf course has a Bachelor's of Science in Horticulture and extensive knowledge of the site and its plants. He can positively identify Bradshaw's lomatium and has never observed the species within the boundaries of the PRD during his many years as superintendent at the course.

Wetlands

WETLAND RATINGS

The *Critical Areas Report* was submitted on December 31, 2014⁸. The Department of Ecology adopted a new wetland rating system that went into effect January 1, 2015. The City's code incorporates the most recent version of Ecology's regulations on this issue. Because the application was submitted to the City prior to Ecology's adoption of the new regulations, under *RCW 58.17.033*, the application is required to be subject to those rules and regulations in effect at the time of the application submittal. Thus, Ecology's 2004 wetland rating system was used in this case.

WETLAND BUFFER REDUCTION WITH ENHANCEMENT

The combined buffer reduction allowed under *CCC 16.53.050(C)(1)(c)* and described in the December 2014 *critical areas report* meets the requirements of *CCC 16.53.050 (C)(1)(a) Lower Impact Land Uses* and *CCC 16.53.050 (C)(1)(b) Restoration* in the following ways:

CCC 16.53.050(C)(1)(a) Lower Impact Land Uses. The buffer widths recommended for proposed land uses with high-intensity impacts to wetlands can be reduced to those recommended for moderate-intensity impacts if both of the following criteria are met:

- i. A relatively undisturbed, vegetated corridor at least one hundred feet wide is protected between the wetland and any other priority habitats that are present as defined by the Washington State Department of Fish and Wildlife; and*

This criteria is met because the wetland is located near the offsite mapped Green Mountain Biodiversity Area.

⁷ Ecological Land Services, Inc. July 2009. Rare Plant Survey for Green Mountain, Camas, Washington. Prepared for GM Camas, LLC.

⁸ Ecological Land Services, Inc. Dec 2014

- ii. *Measures to minimize the impacts of the land use adjacent to the wetlands are applied, such as infiltration of stormwater, retention of as much native vegetation and soils as possible, direction of noise and light away from the wetland, and other measures that may be suggested by a qualified wetlands professional.*

Stormwater is being detained and treated according to the most recent *Stormwater Management Manual for Western Washington*. The wetland buffer area to be enhanced is located in part of an active golf course, and is not dominated by native plants. Native shrubs are proposed to enhance the existing vegetation. Native soils will not be disturbed, except as necessary to plant the proposed shrubs. Street lights and outdoor residential lighting will be fitted with glare protectors to minimize light impacts. Additional measures to minimize dust impacts are described below.

Table 2. Measures to minimize disturbance impacts

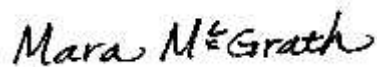
Disturbance	Measures to minimize disturbance impacts	Specific measures to minimize disturbance impacts
Lights	<ul style="list-style-type: none"> ▪ Direct lights away from the wetland 	Street lights will be directed away from the wetland and appropriate glare protections will be installed. Outside residential lighting will have appropriate glare protections or be low-wattage to avoid light impacts.
Change in water regime	<ul style="list-style-type: none"> ▪ Infiltrate or treat new runoff from surfaces 	All stormwater runoff will be treated per the most recent <i>Stormwater Management Manual for Western Washington</i> . Hydrology to existing wetlands will be maintained.
Dust	<ul style="list-style-type: none"> ▪ BMPs for dust 	<p>A gravel construction access will be constructed.</p> <p>Silt fencing will be temporarily installed around the boundaries of the construction area where runoff may occur.</p> <p>Contractor will follow BMPs to control sediment from all ground-disturbing activities.</p>

CCC 16.53.030(C)(1)(b) Restoration. Buffer widths may be reduced up to twenty-five percent if the buffer is restored or enhanced from a pre-project condition that is disturbed (e.g. dominated by invasive species), so that functions of the post-project wetland and buffer are equal or greater. To the extent possible, restoration should provide a vegetated corridor of a minimum one hundred feet wide between the wetland and any other priority habitat areas as defined by the Washington State Department of Fish and Wildlife. The habitat corridor must be protected for the entire distance between the wetland and the priority habitat area by some type of permanent legal protection such as a covenant or easement.

The December 2014 *Critical Areas Report* described the proposed enhancement plan for the southern buffer of Wetland D. The buffer to be enhanced is located in a part of an active golf course that is dominated by non-native grass species. The enhancement plan specifies native shrubs and herbaceous species to enhance the existing plant community and improve the species diversity and habitat structure beyond its existing low conditions⁹. The enhanced buffer will be protected in perpetuity with a conservation easement or similar legal mechanism once the surrounding development has been developed per the PRD plan.

We can be contacted at 350-578-1371 with any questions or concerns.

Respectfully,



Mara McGrath
Ecologist



Francis Naglich
President/Wetland Biologist

cc: John Schmidt, Metropolitan Land Group, LLC
Randy Printz, Landerholm

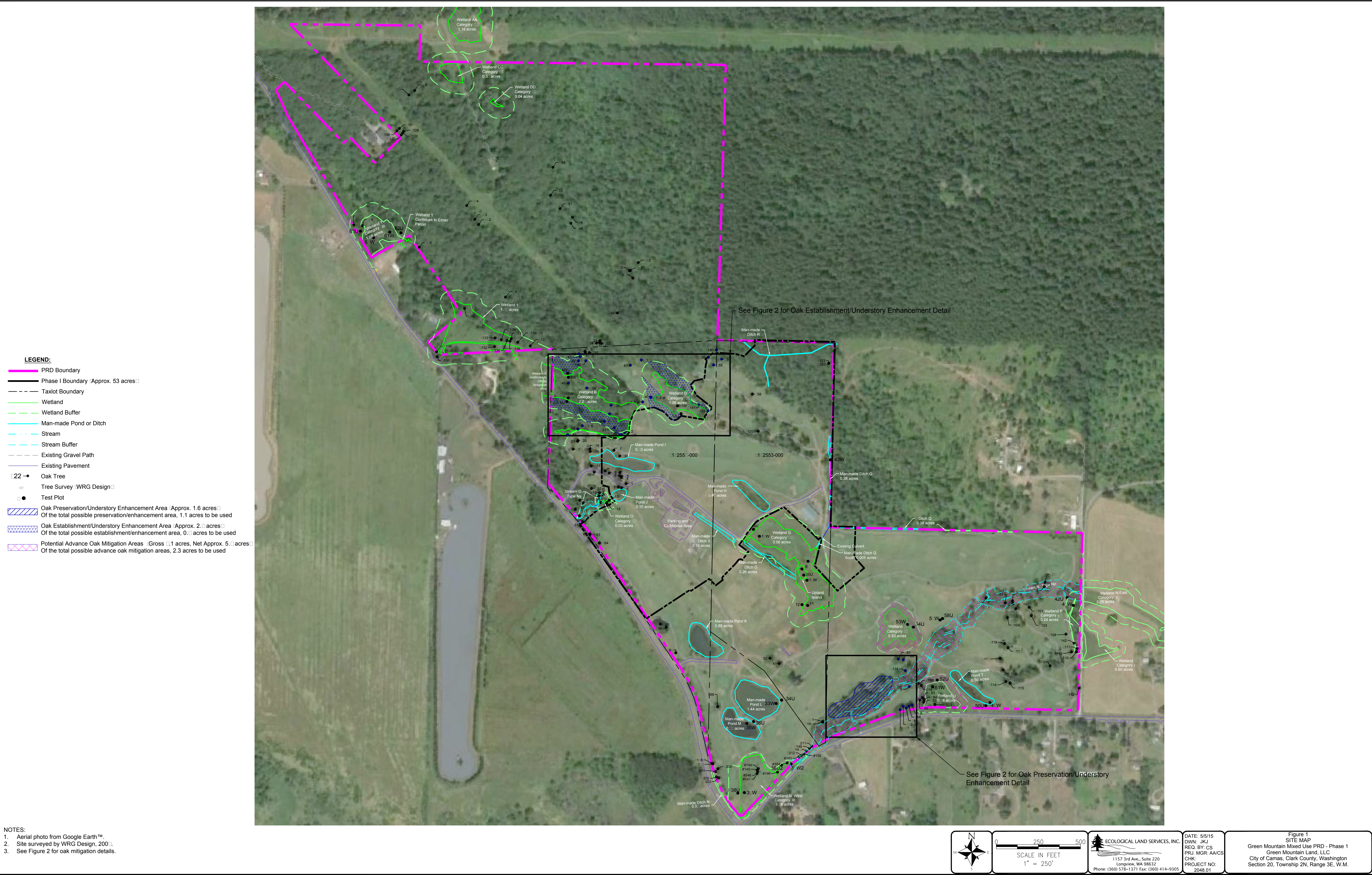
Attachments:

- Figure 1 Site Map
- Figure 2 Oak Mitigation Details
- Exhibit A Oak Summary by Phase, Oak Detail by Pod
- Exhibit B Concurrent and Advance Mitigation Summary

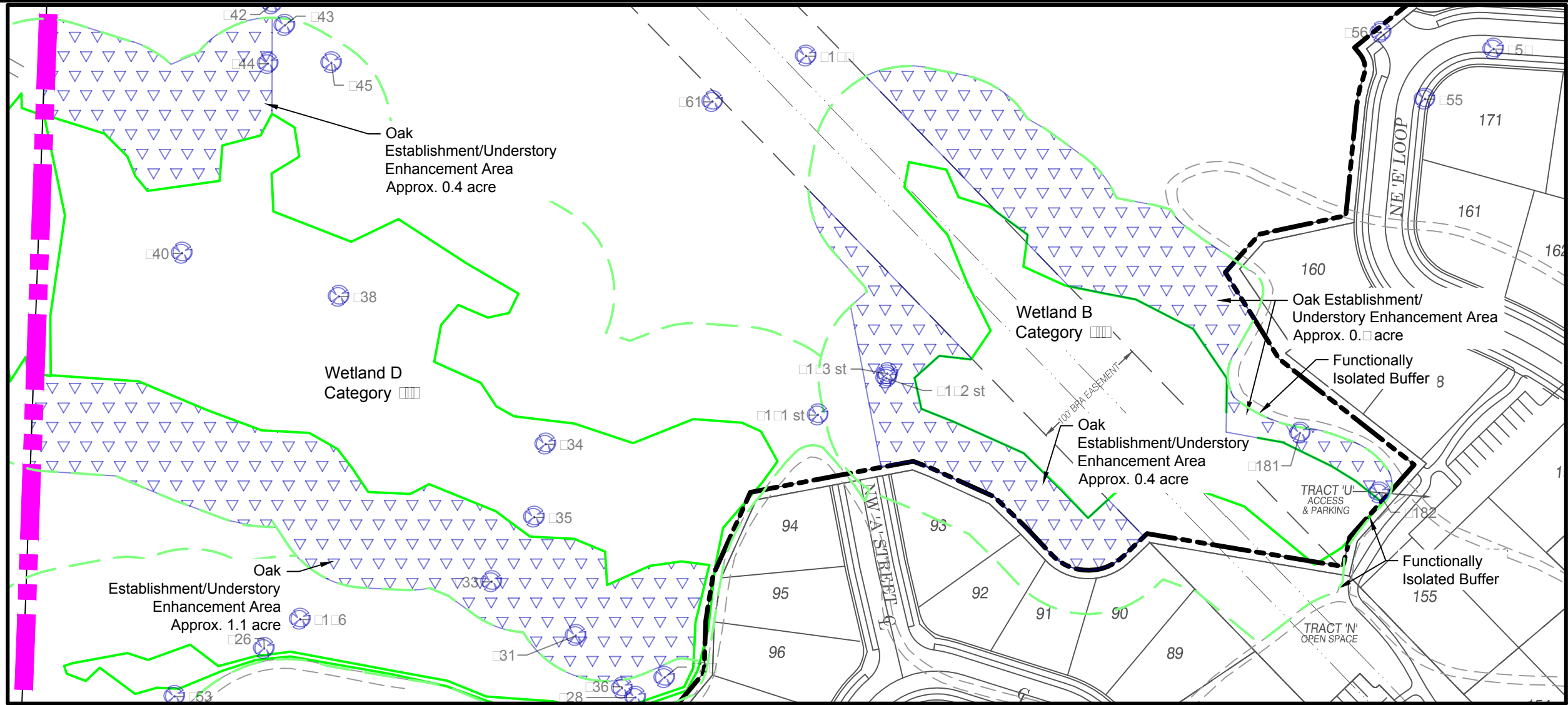
⁹ Table 5 in Ecological Land Services, Inc. Dec 2014

Attachments

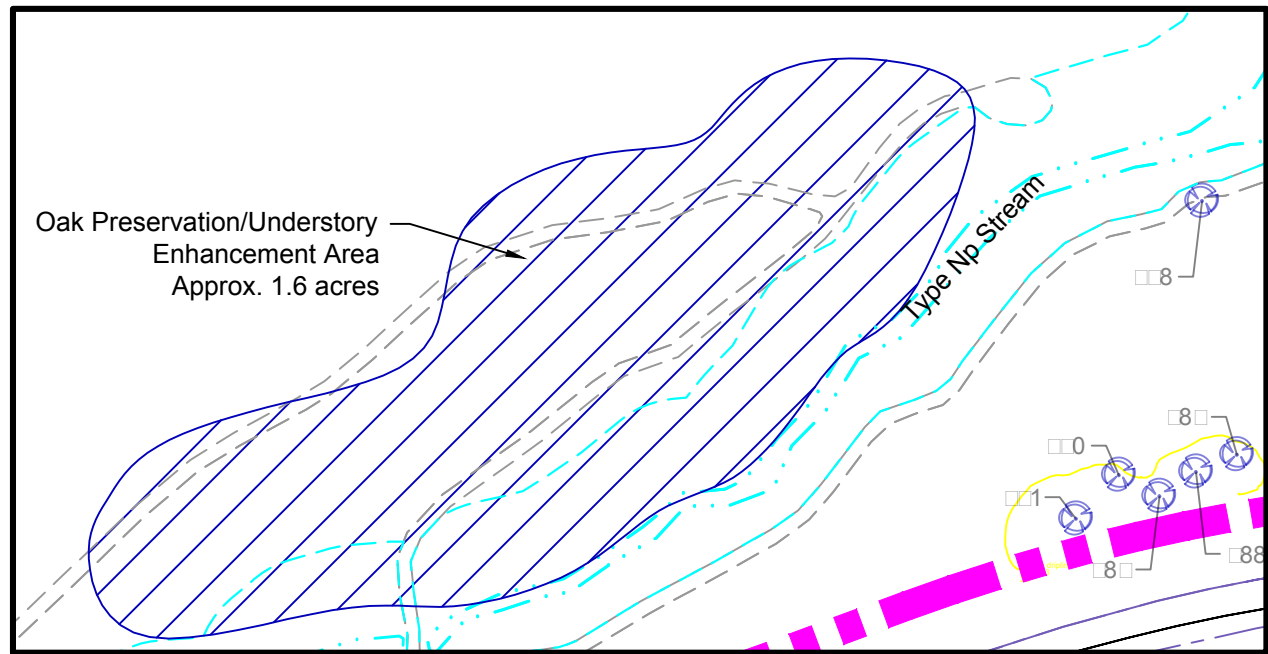
Figure 1	Site Map
Figure 2	Oak Mitigation Details
Exhibit A	Oak Summary by Phase, Oak Detail by Pod
Exhibit B	Concurrent and Advance Mitigation Summary



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Oak Establishment/Understory Enhancement



Oak Preservation/Understory Enhancement

LEGEND:

- PRD Boundary
- Phase I Boundary
- Wetland
- Wetland Buffer
- OHWM of Type Np Stream
- 50' Stream Buffer
- Existing Gravel Path
- Existing Pavement
- Oak Establishment/Understory Enhancement Area Approx. 2.4 acres Of the total possible establishment/enhancement area, 0.4 acres to be used
- Oak Preservation/Understory Enhancement Area Approx. 84 Oak Trees with an Average DBH of 12" Covering 1.6 acres Of the total possible preservation/enhancement area, 1.1 acres to be used
- Existing Oak Tree

ECOLOGICAL LAND SERVICES, INC.
1157 3rd Ave., Suite 220
Longview, WA 98632
Phone: (360) 578-1371 Fax: (360) 414-9305

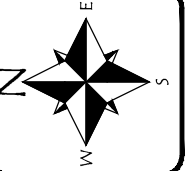
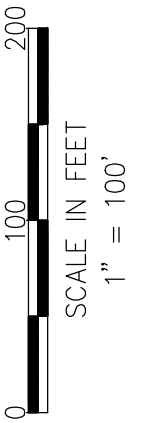


Figure 2
OAK MITIGATION DETAILS
Green Mountain Mixed Use PRD - Phase 1
Green Mountain Land, LLC
City of Camas, Clark County, Washington
Section 20, Township 2N, Range 3E, W.M.

DATE: 5/5/15
DWN: JKJ
REQ. BY: CS
PRJ. MGR: AA/CS
CHK:
PROJECT NO:
2048.01

Exhibit A
Oak Tally

Oak Summary by Phase

Phase	Total Oaks	Total Canopy Cover (sf)
Phase 1	19	15,400
Other Phases	52	49,400

Oak Detail by Pod

Pod	Number of Oaks	Oak Id.	Diameter (inches)	Est canopy cover (sf)	Notes
A1	2	32	32.6	1,000	
		41	37.5	1,000	
A2	2	71	33.0	1,000	
		189	32.0	1,000	
A3	3	80	24.0	1,000	Broken upper trunk
		81	28.5	1,000	
		124a	20.2	1,000	
		124b	24.0		
B1	3	65	50.0	1,000	Downed oak
		66	48.0	1,000	
		67	66.0	1,000	
B2	0	0			
B3	1	61	19.0	700	
B4	0	0			
B5	3	188	24.1	1,000	
		98	26.7	1,000	
		86	19.7	1,000	
C1	8	1	25.0	1,000	Phase 1
		3	15.0	700	
		4	14.5	700	
		5	17.5	700	
		6	19.5	700	
		62	18.0	700	
		63	13.0	700	
		64	25.0	1,000	
C2	0	0			Phase 1
D1	5	7	31.7	1,000	Phase 1
		8a	18.0	700	
		8b	18.0		
		9	22.0	1,000	
		29	12.0	700	
		30	18.0	700	
D2	1	121	26.0	1,000	Phase 1
D3	2	122	8.0	700	Phase 1
		123	10.0	700	
D4	7	116	18.5	700	
		115	18.4	700	
		114	22.7	1,000	
		117	14.7	1,000	
		119	26.6	1,000	
		118a	16.6		
		118b	18.5		
		118c	23.7	1,000	
		104	26.8	1,000	
E1	3	58	26.1	1,000	Phase 1
		55	21.3	1,000	
		57	13.0	700	

Exhibit A
Oak Tally

Pod	Number of Oaks	Oak Id.	Diameter (inches)	Est canopy cover (sf)	Notes
E2	5	101	19.0	700	Snag Snag
		103	17.7	700	
		113	18.7	700	
		109	17.0	700	
		108	21.8	1,000	
E4	3	72	24.0	1,000	
		73a	25.0	1,000	
		73b	31.0		
		74a	13.0		
		74b	23.0	1,000	
		74c	30.0		
F1a	0	0			
F1b	0	0			
F1c	5	106	22.0	1,000	
		107	14.0	700	
		120	28.0	1,000	
		127	23.0	1,000	
		128	19.0	700	
F2	2	78	35.0	1,000	
		79	25.0	1,000	
F3	0	0			
F4	0	0			
G	9	93	16.0	700	
		70	14.0	700	
		92	15.0	700	
		69a	16.0	700	
		69b	16.0		
		48	16.0	700	
		49a	14.0	700	
		49b	14.0		
		51	13.0	700	
		52	13.0	700	
		54	18.0	700	
H	7	68		1,000	
		198		1,000	
		199		1,000	
		200		1,000	
		201		1,000	
		202		1,000	
		203		1,000	
				64,800	

Total Oaks all Pods = 71

Total Phase 1 Oaks = 19

Total Advance Mitigation Oaks = 52

NOTE: Trees with multi-trunks listed as a,b,c etc.

Exhibit B
Concurrent and Advance Mitigation Summary

Phase 1 Concurrent Mitigation								
	No. Oaks	Avg. Canopy Cover (sf)	Canopy Cover Impacted (sf)					
Total oaks impacted in Phase 1	19							
Jursidictional oaks (> 20 inches dbh)	7	1,000	7,000					
Non-jurisdictional oaks (< 20 inches dbh)	12	700	8,400					
Total canopy to mitigate for in Phase 1			15,400					
	Location			Mitigation ratio (to 1)	Area Required (sf)	Area Required (acres)	Available acres in target mitigation area	Surplus in target mitigation area (acres)
Use establishment/enhancement to mitigate for 50% of the impact	Buffers of Wetlands B and D		7,700	4	30,800	0.7	2.7	2.0
Use preservation/enhancement of existing oak grove to mitigate for other 50%	Type Np stream corridor		7,700	6	46,200	1.1	1.6	0.5
Advance Oak Mitigation								
	No. Oaks		Canopy Cover Impacted (sf)	Mitigation ratio (to 1)	Area Required (sf)	Area Required (acres)	Available acres in target mitigation area (with 20% area reduction)	Surplus in target mitigation area (acres)
Total oaks impacted in phases outside of Phase 1	52		49,400	2	98,800	2.3	5.7	3.4
Note:								
1. Canopy cover estimated based on 1,000 sf for oaks > 20 inches dbh and 700 sf for oaks < 20 inches.								
2. Advance oak mitigation area total reduced by 20 percent to account for future site design and/or ecological constraints.								



State of Washington

Ecological Land Services, LLC

Southwest Region 5 2108 Grand Boulevard, Vancouver, WA 98661

Telephone (206) 211-2110 Fax (206) 211-2111

May 8, 2015

Robert Maul
Planning Manager, City of Camas
616 NE 4th Avenue
Camas, WA 98607

RE: Follow-up to Comments on Green Mountain Planned Residential Development

Dear Mr. Maul:

The Washington Department of Fish and Wildlife (WDFW) submitted a comment letter dated March 17, 2015, drawing attention to Oregon white oak woodlands, the Green Mountain Biodiversity Area, Townsend's big-eared bat, Bradshaw's lomatium, and wetlands at the site of the proposed Green Mountain Planned Residential Development. Since then we have been in contact with the staff of Ecological Land Services, Inc. (ELS), and have had fruitful discussions around these issues. We received a copy of the ELS letter dated May 5, 2015, and offer this letter as an update to our ongoing discussions.

In general we are in agreement with the findings and conceptual mitigation strategy presented in the May 5, 2015 ELS letter. While some fine-tuning of the particulars of the mitigation may still be appropriate, we feel that adequate opportunity exists on the site to successfully mitigate for the impacts of Phase 1. Future phases of the overall master plan will also need to be analyzed in greater detail as appropriate. WDFW supports the concept of advance mitigation to help offset impacts of future phases.

Oregon White Oak Woodlands

Oak Establishment and Preservation/Enhancement Areas

The Oregon white oak mitigation strategy presented in the May 5, 2015, ELS letter will, over time, replace the oak habitat removed for Phase 1. The methods of calculation, ratios applied, and targeted tree densities are consistent with suggestions made by WDFW. The strategy provides opportunity to determine some of the details of implementation at a later date; WDFW would greatly appreciate being a party to those future planning efforts.

Advance Oak Mitigation

WDFW supports the concept of advance mitigation to help offset impacts of future phases. We look forward to continuing discussions of this strategy (including appropriate ratios for trees outside of the active golf course) with project proponents.

Green Mountain Biodiversity Area

WDFW concurs that the portion of the Green Mountain Biodiversity Area that is mapped in the northern portion of Phase 1 does not actually meet the definition of a biodiversity area. Other portions of the overall master plan include areas that likely do meet the definition. As noted in the ELS letter, WDFW requests that project proponents consult with us to assess mapped biodiversity areas outside of Phase 1 prior to developing subsequent phases.

Townsend's Big-Eared Bat

WDFW concurs that Phase 1 does not support caves/hibernaculums for Townsend's big-eared bat. Other portions of the overall master plan may include such areas. As noted in the ELS letter, WDFW requests that project proponents consult with us to assess potential Townsend's big-eared bat habitat prior to developing subsequent phases.

Bradshaw's Lomatium

While this plant has been found in the vicinity, WDFW concurs that suitable habitat is not likely to occur within the project boundary.

Wetlands

WDFW appreciates the clarification in the ELS letter regarding wetland ratings and disturbance minimization measures.

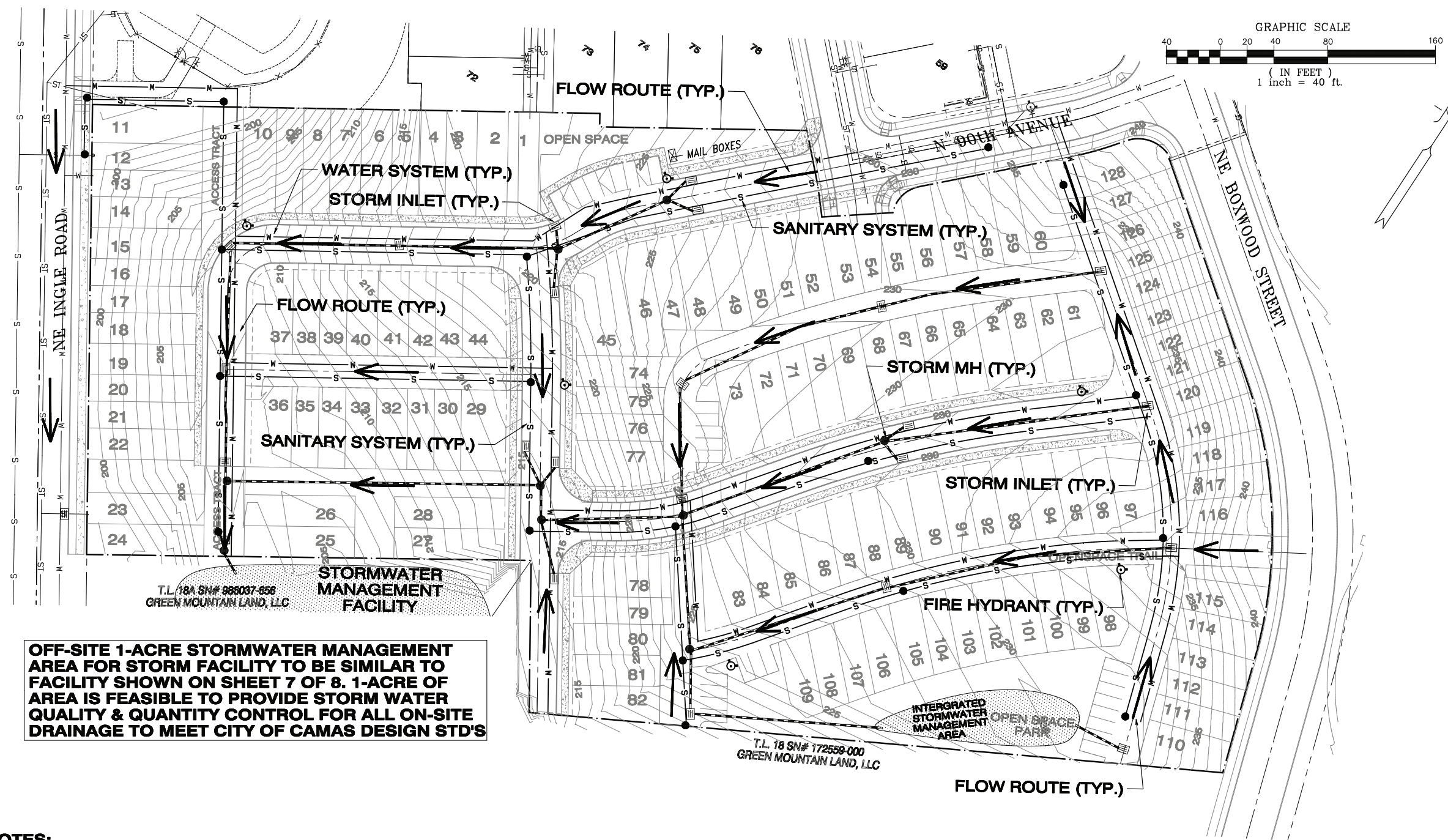
We thank you for the opportunity to provide further input. Please contact me should you have any questions or need additional information.

Sincerely,



George Fornes, Habitat Biologist
George.Fornes@dfw.wa.gov, 360-906-6731

cc: Dave Howe, WDFW Region 5 Habitat Program Manager
Keith Folkerts, WDFW Land Use Policy Lead
Francis Naglich, Ecological Land Services, Inc.
Mara McGrath, Ecological Land Services, Inc.



OFF-SITE 1-ACRE STORMWATER MANAGEMENT AREA FOR STORM FACILITY TO BE SIMILAR TO FACILITY SHOWN ON SHEET 7 OF 8. 1-ACRE OF AREA IS FEASIBLE TO PROVIDE STORM WATER QUALITY & QUANTITY CONTROL FOR ALL ON-SITE DRAINAGE TO MEET CITY OF CAMAS DESIGN STD'S

UTILITY NOTES:

PUBLIC WATER SYSTEM WILL BE EXTENDED ON-SITE FROM EXISTING WATER LINE WITHIN NE INGLE ROAD. (1) RESIDENTIAL WATER SERVICE WILL BE PROVIDED TO EACH LOT

PUBLIC SANITARY SYSTEM WILL BE EXTENDED ON-SITE FROM EXISTING SANITARY LINE WITHIN NE INGLE ROAD. (1) SANITARY LATERAL SERVICE WILL BE PROVIDED TO EACH LOT

STORM CONSTRUCTION NOTES:

- 1. ALL TRENCH EXCAVATION AND PIPE INSTALLATION SHALL CONFORM TO THE MOST RECENTLY ADOPTED EDITION OF THE W.S.D.O.T. STANDARD SPECIFICATIONS SECTION 7-08.3(1) AND SECTION 7-08.3(2). ALL EXCESS MATERIAL FROM THE TRENCH EXCAVATION SHALL BE DISPOSED OF ON AN APPROVED SITE.
- 2. PIPE BEDDING, PIPE ZONE MATERIAL AND TRENCH BACKFILL SHALL BE AN APPROVED GRANULAR MATERIAL OF OTHER WASHED SCREENINGS OR 3/8 INCH MINUS CRUSHED ROCK SAND. BACKFILL IS NOT ALLOWED.
- 3. TRENCH COMPACTION SHALL BE PER THE MOST RECENTLY ADOPTED EDITION OF THE W.S.D.O.T. STANDARD SPECIFICATIONS SECTION 7-08.3(3). CONTRACTOR TO DETERMINE THE TYPE OF EQUIPMENT AND METHOD TO USE TO ACHIEVE THE REQUIRED COMPACTION. EACH LIFT SHALL BE COMPACTED TO A MINIMUM OF 95 PERCENT OF THE MAXIMUM DENSITY AS DETERMINED BY THE A.A.S.H.T.O. T-180 TEST METHOD.
- 4. SETTLEMENT OF THE FINISHED SURFACE WITHIN THE WARRANTY PERIOD SHALL BE CONSIDERED TO BE A RESULT OF IMPROPER COMPACTION AND SHALL BE PROMPTLY REPAIRED BY THE CONTRACTOR AT NO EXPENSE TO THE CITY.
- 5. ALL STORM PIPE SHALL BE PVC OR N-12 WITH DOUBLE BELLED COUPLINGS WITH O-RING TYPE GASKETS OR APPROVED EQUAL.
- 6. ALL STORM PIPE LATERALS TO BE A MINIMUM 10 INCHES DIAMETER WITH A MINIMUM SLOPE OF S=0.0100 UNLESS SPECIFIED OTHERWISE IN THE PLANS.
- 7. ALL MANHOLES LOCATED IN UNIMPROVED EASEMENTS AND RIGHT OF WAYS SHALL BE PROVIDED WITH TAMPER PROOF LIDS AND SHALL BE SET 6 INCHES ABOVE FINISHED GRADE.
- 8. VIDEO INSPECTION TAPES AND REPORTS MAY BE REQUIRED AT THE CITY'S DISCRETION. MANDREL TESTING MAY BE REQUIRED AT THE CITY'S DISCRETION.

DRAINAGE NOTES:

- 1.) Storm drain system is conceptual only, based on preliminary information. Final design may deviate from the layout shown to better harmonize with actual site conditions.
- 2.) Standard erosion control techniques to be utilized as required (Straw bales/filter fences, inlet protection, etc.) Existing lot vegetation to be left undisturbed as much as possible.
- 3.) All site stormwater runoff will be collected and conveyed to storm-water facilities as shown.
- 4.) Stormwater quality & quantity control facilities to be privately owned and maintained.
- 5.) All roof & low point drains will be directed to storm facilities.

STORMWATER FACILITIES WILL PROVIDE WATER QUALITY & QUANTITY CONTROL AS REQUIRED PER CITY OF CAMAS STANDARD REQUIREMENTS

PREPARED BY:
STERLING DESIGN, INC.
2400 N. EVERETT BLVD
VANCOUVER, WA 98661
PH (360) 759-1794
FAX (360) 759-4983
Mail@SterlingDesign.biz

STERLING
DESIGN, INC.

ENGINEERING PLAN

GREEN MOUNTAIN
B1 POD

Project:



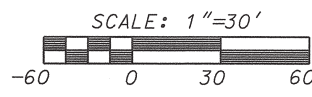
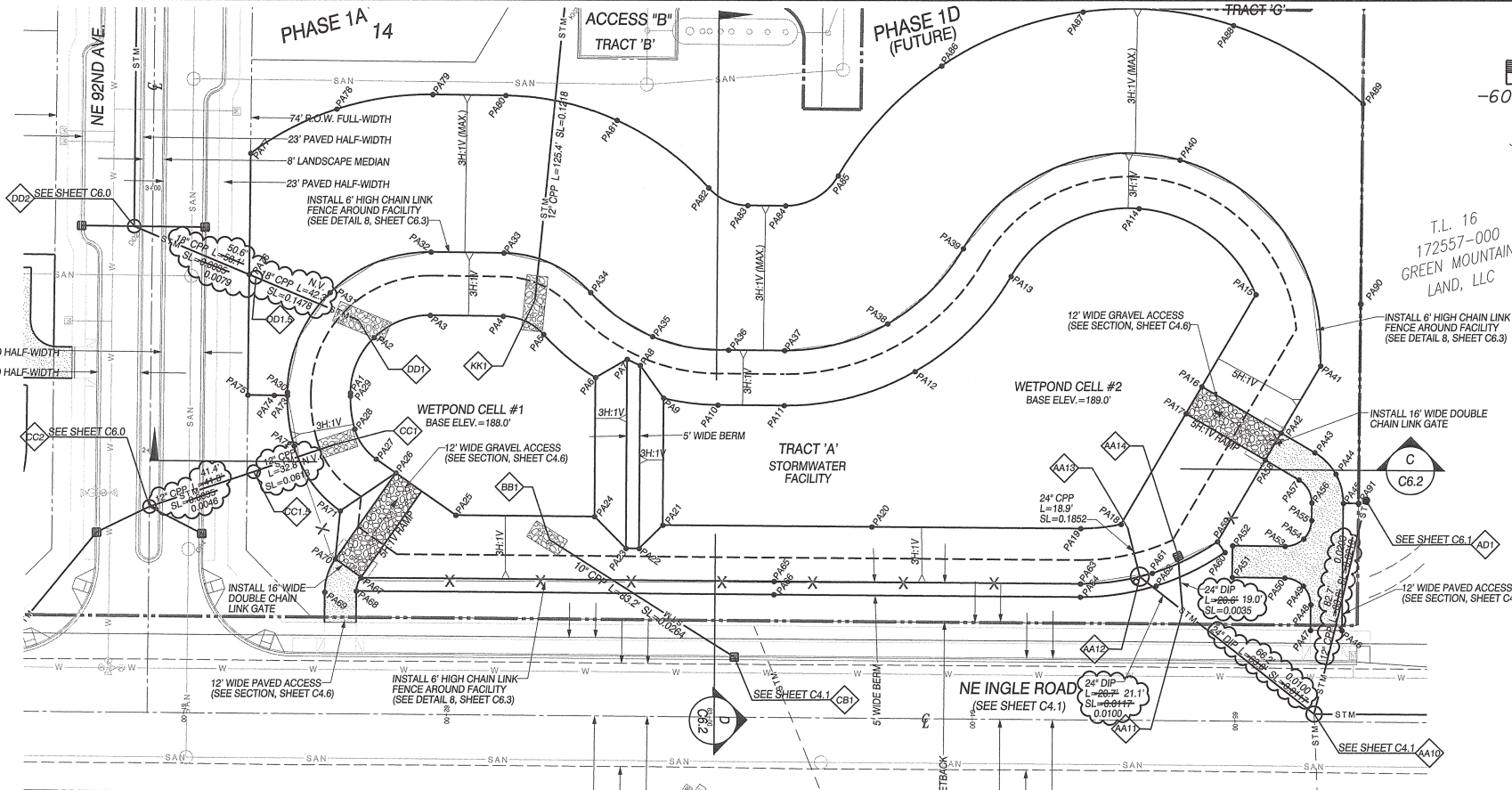
Scale: AS SHOWN

Project Number: 791

Design/ Drawn: JGS/BC

Drawing Date: OCT. 2018

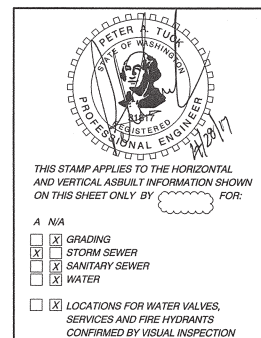
Sheet 6 of 8 Sheet(s)



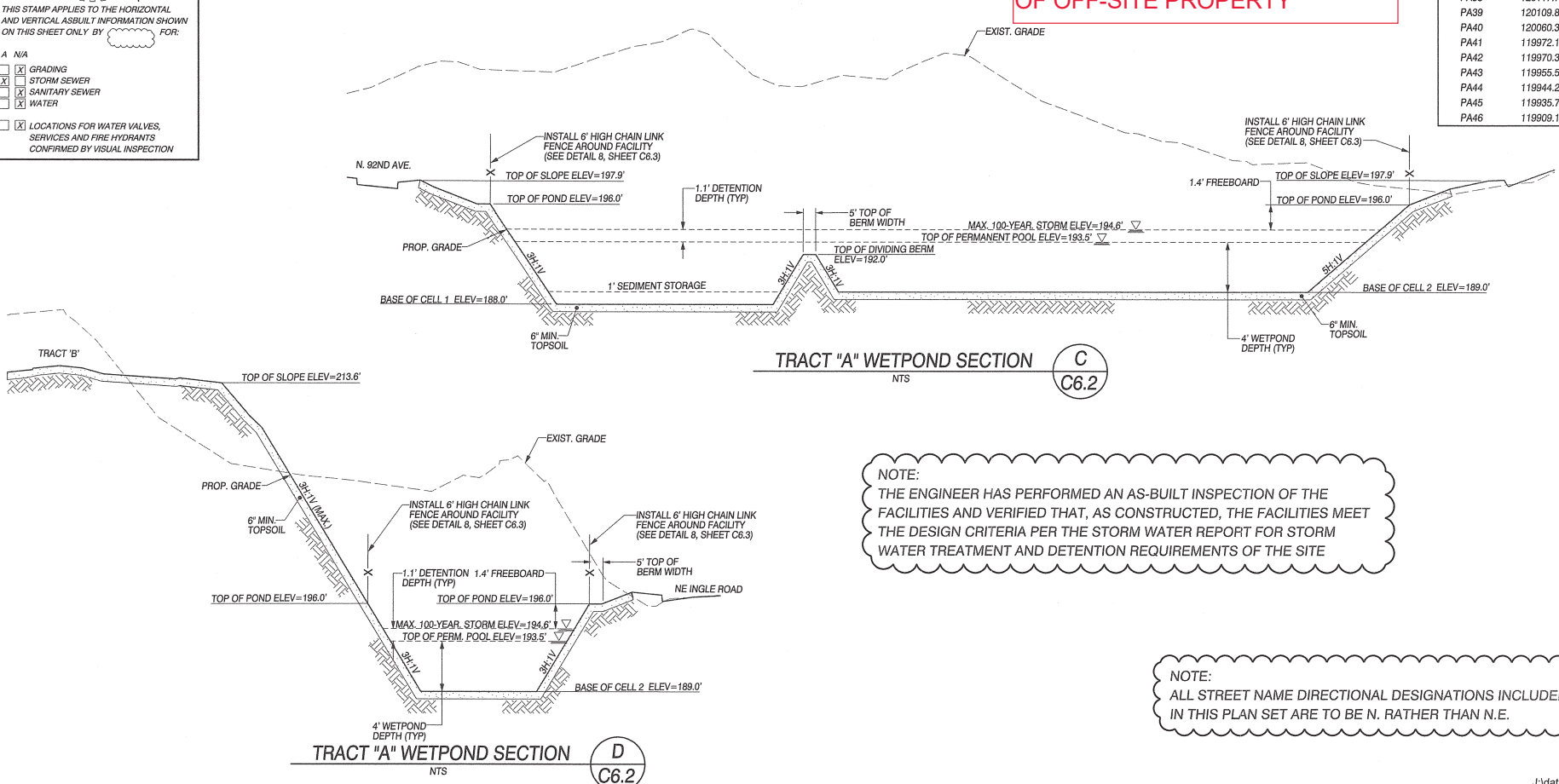
- STORMWATER FACILITY CONSTRUCTION NOTES:
- 1) THE STORMWATER DRAINAGE FACILITY SHALL BE OWNED AND MAINTAINED BY THE H.O.A. WITH AN EASEMENT DEDICATED TO THE CITY OF CAMAS FOR ACCESS AND INSPECTION.
 - 2) THE CONTRACTOR SHALL ENSURE THAT ALL EROSION CONTROL MEASURES ARE IN PLACE AND IN WORKING CONDITION PRIOR TO COMMENCEMENT OF DRAINAGE FACILITY CONSTRUCTION.
 - 3) POND GRADING AND SEEDING SHALL OCCUR AS SOON AS POSSIBLE. ONCE SEEDING THE AREA SHALL BE WATERED AS REQUIRED TO GERMINATE AND MAINTAIN A HEALTHY GROWTH OF GRASS.
 - 4) VEGETATION FOR THE FACILITY SHOULD BE A SEED MIX CONSISTING OF:
30% CHATEAU KENTUCKY BLUEGRASS
40% COCHISE TURF, TALL FESCUE TYPE
30% DELAWARE DWARF PERENNIAL RYEGRASS
PREPARE GROUND, SEEDING RATE, FERTILIZER, AND MULCHING AS PER THE MANUFACTURER'S RECOMMENDATIONS.
 - 5) A 6 FOOT HIGH BLACK VINYL-COATED CYCLONE FENCE OR APPROVED EQUAL SHALL BE INSTALLED AROUND THE PERIMETER OF THE DRAINAGE FACILITY AND A STANDARD 16 FOOT WIDE GATE SHALL BE INSTALLED FOR POND ACCESS.

STORMWATER FACILITY STAKING TABLE						
POINT	NORTHING	EASTING	ELEV.	POINT	NORTHING	EASTING
PA1	120272.22	2499619.49	188.02	PA47	119919.10	2499749.11
PA2	120276.55	2499642.04	188.00	PA48	119924.49	2499757.30
PA3	120263.66	2499661.04	188.00	PA49	119930.83	2499761.60
PA4	120240.47	2499676.31	188.00	PA50	119938.34	2499760.15
PA5	120223.84	2499679.14	188.00	PA51	119955.05	2499749.16
PA6	120198.33	2499676.53	188.00	PA52	119961.65	2499758.18
PA7	120192.25	2499688.07	192.00	PA53	119944.94	2499770.18
PA8	120186.83	2499689.95	192.00	PA54	119940.65	2499776.51
PA9	120172.49	2499684.62	189.00	PA55	119942.09	2499784.03
PA10	120153.88	2499693.99	189.00	PA56	119945.76	2499789.60
PA11	120132.91	2499707.92	189.00	PA57	119954.74	2499794.09
PA12	120098.91	2499746.56	189.00	PA58	119969.54	2499793.15
PA13	120089.91	2499797.04	189.00	PA59	119987.28	2499757.22
PA14	120062.89	2499845.65	189.00	PA60	119962.62	2499755.39
PA15	120007.79	2499843.53	189.00	PA61	119981.18	2499733.32
PA16	120005.23	2499802.93	189.00	PA62	119977.29	2499730.18
PA17	120004.47	2499790.95	189.00	PA63	120001.62	2499714.70
PA18	120001.39	2499742.11	189.00	PA64	119998.85	2499710.54
PA19	120013.24	2499732.19	189.00	PA65	120098.70	2499650.21
PA20	120079.45	2499688.21	189.00	PA66	120095.93	2499646.05
PA21	120145.65	2499644.23	189.00	PA67	120229.59	2499563.26
PA22	120148.17	2499631.75	192.00	PA68	120228.19	2499558.18
PA23	120152.34	2499628.98	192.00	PA69	120237.91	2499551.11
PA24	120168.97	2499632.34	188.00	PA70	120241.58	2499563.73
PA25	120212.90	2499603.16	188.00	PA71	120250.42	2499579.92
PA26	120240.76	2499603.73	188.00	PA72	120278.65	2499590.63
PA27	120249.93	2499603.91	188.00	PA73	120291.59	2499605.25
PA28	120263.11	2499608.91	188.00	PA74	120295.76	2499602.50
PA29	120271.54	2499618.45	188.00	PA75	120304.12	2499597.01
PA30	120292.27	2499606.29	196.00	PA76	120329.41	2499635.42
PA31	120300.06	2499646.88	196.00	PA77	120354.70	2499673.84
PA32	120276.86	2499681.09	196.00	PA78	120336.98	2499706.20
PA33	120253.67	2499696.35	196.00	PA79	120309.85	2499731.20
PA34	120218.02	2499702.42	196.00	PA80	120286.66	2499746.47
PA35	120189.13	2499701.73	196.00	PA81	120246.31	2499762.32
PA36	120162.71	2499713.44	196.00	PA82	120202.99	2499760.51
PA37	120144.53	2499725.41	196.00	PA83	120186.99	2499763.23
PA38	120117.75	2499755.86	196.00	PA84	120174.96	2499771.23
PA39	120109.86	2499795.63	196.00	PA85	120164.74	2499791.93
PA40	120060.32	2499869.72	196.00	PA86	120155.60	2499848.75
PA41	119972.16	2499834.77	196.02	PA87	120122.49	2499895.82
PA42	119970.30	2499805.13	196.00	PA88	120072.11	2499923.63
PA43	119955.50	2499806.06	197.03	PA89	120014.64	2499926.56
PA44	119944.29	2499803.79	197.91	PA90	119972.77	2499862.97
PA45	119935.74	2499796.20	197.92	PA91	119930.91	2499799.38
PA46	119909.11	2499755.75	197.92			

EXAMPLE WETPOND DESIGN DEMONSTRATING THAT THE GREEN MOUNTAIN PRD B1 POD WILL BE ABLE TO CONSTRUCT A SIMILAR FACILITY WITHIN 1-ACRE OF OFF-SITE PROPERTY



- THIS STAMP APPLIES TO THE HORIZONTAL AND VERTICAL AS-BUILT INFORMATION SHOWN ON THIS SHEET ONLY BY: FOR:
- A N/A
 - X GRADING
 - X STORM SEWER
 - X SANITARY SEWER
 - X WATER
 - X LOCATIONS FOR WATER VALVES, SERVICES AND FIRE HYDRANTS CONFIRMED BY VISUAL INSPECTION



NOTE: THE ENGINEER HAS PERFORMED AN AS-BUILT INSPECTION OF THE FACILITIES AND VERIFIED THAT, AS CONSTRUCTED, THE FACILITIES MEET THE DESIGN CRITERIA PER THE STORM WATER REPORT FOR STORM WATER TREATMENT AND DETENTION REQUIREMENTS OF THE SITE

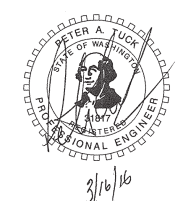
NOTE: ALL STREET NAME DIRECTIONAL DESIGNATIONS INCLUDED IN THIS PLAN SET ARE TO BE N. RATHER THAN N.E.

STORM SEWER NOTES	
AA10	SEE SHEET C4.1
AA11	STA 64+79.54 (42.15' LT-NE INGLE ROAD) INSTALL: (1) 18" - 45' WYE IE=193.30
AA12	STA 64+63.17 (54.87' LT-NE INGLE ROAD) INSTALL 12" STORM SEWER FLOW CONTROL MH. (SEE DETAIL 3, SHEET C6.3)
AA13	STA 64+58.45 (73.21' LT-NE INGLE ROAD) INSTALL 24" PIPE OUTLET WITH DEBRIS BARRIER. IE=190.00 (SEE DETAIL 6, SHEET C6.3)
AA14	STA 64+77.71 (62.64' LT-NE INGLE ROAD) INSTALL EMERGENCY OVERFLOW DITCH INLET RIM=195.00 IE=193.38 (SEE DETAIL SD6, SHEET C9.8)
BB1	STA 62+38.45 (67.00' LT-NE INGLE RD) INSTALL 10" OUTFALL W/ HAND-PLACED RIP RAP. (SEE DETAIL 5, SHEET C6.3)
CC1	STA 2+02.92 (70.43' RT-NE 92ND AVE.) INSTALL 12" OUTFALL W/ HAND-PLACED RIP RAP. (SEE DETAIL 5, SHEET C6.3)
CC1.5	STA 1+92.16 (39.50' RT-NE 92ND AVE.) INSTALL STD. STORM SEWER MH.
DD1	STA 2+50.61 (78.71' RT-NE 92ND AVE.) INSTALL 18" OUTFALL W/ HAND-PLACED RIP RAP. (SEE DETAIL 5, SHEET C6.3)
DD1.5	STA 2+66.44 (39.50' RT-NE 92ND AVE.) INSTALL STD. STORM SEWER MH.
KK1	STA 1+74.86 (125.33' LT-NE 92ND AVE.) INSTALL 12" OUTFALL W/ HAND-PLACED RIP RAP. (SEE DETAIL 5, SHEET C6.3)

ASBUILTS

TRACT "A" STORMWATER FACILITY PLAN AND SECTIONS FOR:
GREEN MOUNTAIN MIXED USE P.R.D.
PHASES 1A & 1B

OLSON LAND SURVEYORS
ENGINEERS
ENGINEERING INC. 222 E. EVERGREEN BLVD., VANCOUVER, WA 98660
360.585.1335
360.585.2937



CHANGES / REVISIONS	
DESCRIPTION:	DATE:
STREET NAMES	6/17/16
STORM SEWER DEPTH	7/22/16
FENCE HEIGHT	8/16/16
DESIGNED: RWP	
DRAWN: RWP	
CHECKED: PAT	
DATE: MARCH 2016	
SCALE: H: 1"=30' V:	
COPYRIGHT 2016, OLSON ENGINEERING, INC.	
GREEN MOUNTAIN MIXED USE P.R.D. PHASES 1A & 1B	
8938.01.02	
SHEET	
C6.2	



2208 E. Evergreen Blvd., Vancouver, WA 98661
Ph: (360) 759-1794 Fx: (360) 759-4983
Email: Mail@SterlingDesign.biz

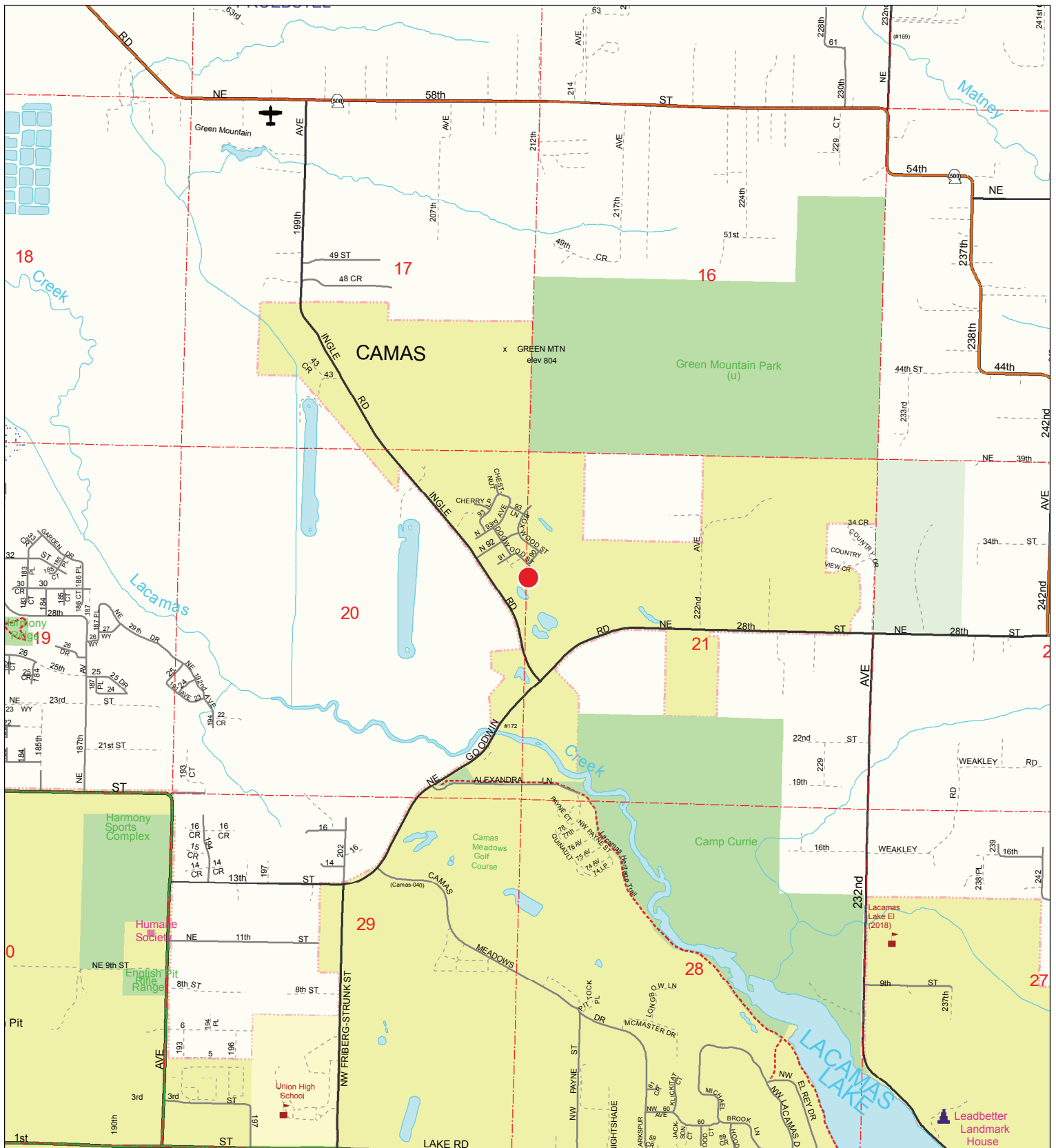
PRELIMINARY TECHNICAL INFORMATION REPORT

Green Mountain PRD B1 Pod Subdivision

October 2018

Prepared by: Joel G. Stirling, P.E.





General Location

Account: 986037307, 173178000
 Owner: AE GREEN MOUNTAIN LLC
 Address: 2551 W 1ST ST
 C/S/Z: WASHOUGAL, WA 98671

Printed on: July 02, 2018

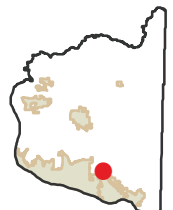


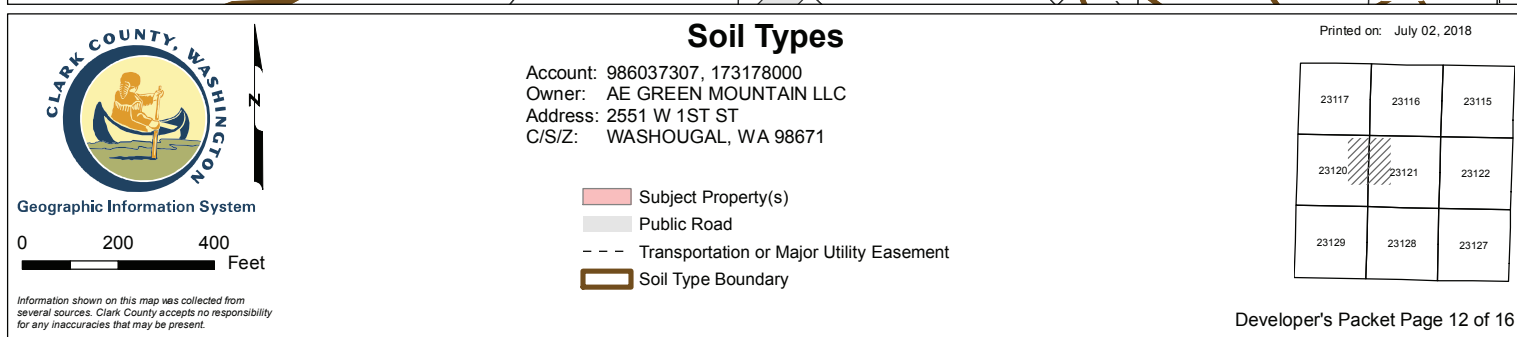
Geographic Information System

0 1,000 2,000 Feet

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.

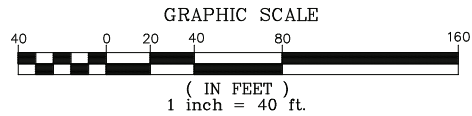
● Location of Subject Property(s)





GREEN MOUNTAIN MASTER PRD NOTE:

- *REFER TO THE APPROVED GREEN MOUNTAIN DEVELOPMENT STANDARDS & PHASING PLAN FOR:**
- **OPEN SPACE DEDICATION THAT HAS BEEN COMPLETED AND APPROVED WITH GREEN MOUNTAIN PRD DEVELOPMENT STANDARDS & PHASING PLAN.**
 - **DENSITY AND SETBACKS REQUIREMENTS FOR THIS PROJECT HAVE BEEN OUTLINED WITH THE GREEN MOUNTAIN PRD DEVELOPMENT STANDARDS & PHASING PLAN AS DEPICTED ON SHEET 2 OF 8.**



GREEN MOUNTAIN PRD

A Preliminary Plat within
a portion of the NE 1/4 of
Sec. 20, T2N., R3E., W.M.
Clark County, Washington

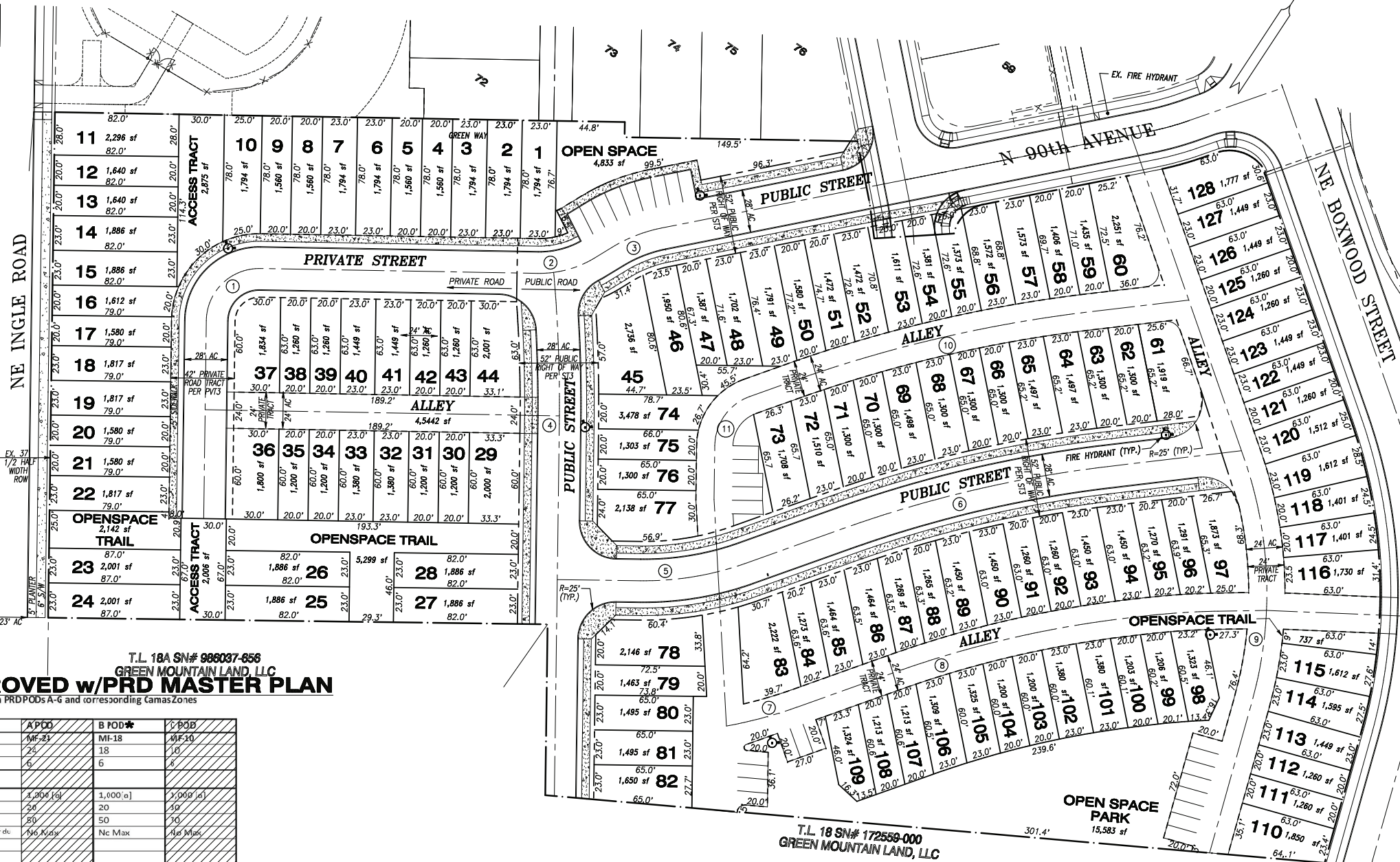


SITE DATA:

- TAX LOT(S): 22A, 22B & 22
- SERIAL NUMBER(S): 986037-307 & 173178-000
- SITE ADDRESS: NOT SITUATED
- AREA: 7.89 ACRES
- ZONING: MF-18
- COMPREHENSIVE PLAN: MFL

CENTERLINE CURVE DATA

- | | |
|---|--|
| ①
R=35.00ft
CH=49.60ft
A=55.12ft
T=35.15ft
EX=14.60ft
Delta=90 14'16" | ⑦
R=301.00ft
CH=48.51ft
A=48.56ft
T=24.33ft
EX=0.98ft
Delta=9 14'38" |
| ②
R=70.00ft
CH=38.97ft
A=39.49ft
T=20.28ft
EX=2.88ft
Delta=32 19'17" | ⑧
R=699.00ft
CH=156.76ft
A=157.09ft
T=78.88ft
EX=4.44ft
Delta=12 52'34" |
| ③
R=100.00ft
CH=34.95ft
A=35.13ft
T=17.75ft
EX=1.56ft
Delta=20 07'40" | ⑨
R=269.46ft
CH=150.64ft
A=152.67ft
T=78.45ft
EX=11.19ft
Delta=32 27'48" |
| ④
R=1000.00ft
CH=98.32ft
A=98.36ft
T=49.22ft
EX=1.21ft
Delta=5 38'08" | ⑩
R=903.00ft
CH=202.51ft
A=202.93ft
T=101.90ft
EX=5.73ft
Delta=12 52'34" |
| ⑤
R=200.00ft
CH=70.78ft
A=71.16ft
T=35.96ft
EX=3.21ft
Delta=20 23'08" | ⑪
R=35.00ft
CH=39.96ft
A=42.53ft
T=24.33ft
EX=7.63ft
Delta=69 36'52" |
| ⑥
R=200.00ft
CH=70.78ft
A=71.16ft
T=35.96ft
EX=3.21ft
Delta=20 23'08" | |



***APPROVED w/PRD MASTER PLAN**

	A POD	B POD*	C POD
DENSITY*	MF-18	MF-18	MF-18
Max. du./gross ac	25	18	10
Min. du./gross ac	6	6	4
STANDARD LOTS			
Min. lot size	1,200 [a]	1,000 [a]	1,000 [a]
Min. lot width	20	20	20
Min. lot depth	50	50	30
Max. Floor Area per du.	No Max	No Max	No Max
SETBACKS			
Min. front/at garage	None	6' [3] @ OS, 18'	10' [18]
Min. side	3' [1]	3' [1] [d]	1' [1] [d]
Min. side flanking street	None [e]	10' [d]	10' [d]
Min. rear [garage @ alley]	None [e]	10' [b] [c]	10' [b] [c]
LOT COVERAG, Max.	None [c]	Ncne	35%
BUILDING HEIGHT, Max.	60	45 [2]	35 [2]

- a. Single Family Detached homes to be permitted. For SFD in A POD apply 3 Pod setbacks.
- b. 10 foot rear yard for front access garage.
- c. Minimum rear yard for alley accessed garage is either 4' or 18'.
- d. Minimum side void at alley is 5'.
- e. Fanchise utilities to be located in front of side yard easements abutting right of way.
1. The non-attached side of a dwelling unit shall be three feet, otherwise a zero-foot line is assumed.
2. Maximum building height: three stories and abasement but not to exceed maximum building height.

PROPOSED PRELIMINARY PLAT SUMMARY:

Total Lots: 128
Total Site Area:
Minimum Lot Area:
Maximum Lot Area:
Average Lot Area:
Public Right of Way Dedication:
Privated Road Dedication:
Alleys:
Access Tract:
*** Openspace:**

*** PROPOSED SITE DENSITY: 16.2 LOTS/ACRE**

35,368, 840 sf (7.89 Acres)
1,200 sf.
2,736 sf
1,568 sf
50,435 sf
15,080 sf
42,878 sf
5,471 sf
28,610 sf

PREPARED BY:
STERLING DESIGN, INC.
2200 N. EVERETT BLVD
VANCOUVER, WA 98661
PH (360) 759-1704
FAX (360) 759-4983
Mail@SterlingDesign.biz

STERLING
DESIGN, INC.

Sheet Description:
**PROPOSED DEVELOPMENT
PLAN**

Project:
**GREEN MOUNTAIN
B1 POD**



Scale: AS SHOWN

Project Number: 791

Design/ Drawn/ JGS/BC

Drawing Date: OCT. 2018

Sheet 4 of 8 Sheet(s)

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Soils Map
Preliminary Development Plan

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- I – Option Agreement to purchase up to 1 acre offsite for stormwater management facilities
- II – Wet Pond Stormwater Management Design Information
- III – Geotechnical Report
- IV – Maintenance Manual

List of References:

Stormwater Management Manual for Western Washington dated 2014.
City of Camas Municipal Code as amended prior to March, 2014

Green Mountain PRD B1 Pod Subdivision

Section A – Project Overview

The Green Mountain PRD B1 Pod Subdivision proposal is to subdivide two parcels of land, serial number(s): 986037-307 and 173178-000, located in the NW ¼ quarter of Section(s) 20 & 21, Township 2 North, Range 3 East of the Willamette Meridian, Clark County, Washington, into 128 residential units utilizing the approved Master Plan Development Standards within the MF-18 section of the Green Mountain PRD Development. The site area is approximately 7.9 acres and currently is vacant land that was previously utilized in a portion of the Green Mountain Golf Course. The property topography slopes moderately from the north westerly property corner down to the south easterly property corner and currently contains construction debris from other phases, field grasses, weeds and 2 Oregon White Oak Trees, on it.

The site is zoned MF-18, under the Green Mountain PRD Pods definitions, and the comprehensive plan designation for the site is MFL. The Green Mountain PRD Master Planned Development was submitted and approved in 2014/2015 and is made up of a total of 283 acres of land. The Project Narrative submitted with the Approved PRD Master Planned Development is included here in, following this narrative, and the information contained within this Supplemental Narrative is Site Specific to the B1 Pod portion of the project and how it complies with the approval criterion within the Developer Agreement and Decision for the Green Mountain PRD Master Planned Development. The Green Mountain PRD Master Planned Development provided a broad overview of the proposed development with the understanding that each of the Development “Pods” would clarify how the proposed development configuration met the goals and intents of the Approved Master Plan.

The B1 Pod is located along NE Ingle Road, just to the south and east of the recently constructed Green Mountain Mixed Use PRD Phase 1D Subdivision. The project has Public Roads along the northern and southern boundaries and future phases of the Green Mountain PRD Project to the south and east.

Construction of the Green Mountain PRD B1 Pod Subdivision will consist of grading approximately 7.9 acres of the site for construction of utilities, Alley's, public roads, private roads, building pads, and open spaces. Stormwater facilities will be located to the south and east of the residential development within an acre of land that the project owner has secured for the purposes of constructing stormwater management facilities in a location that maybe combined with facilities from future phases. For the purposes of the Land Use Application and Approvals, the proposed stormwater facilities are depicted using the design and cross sections from the adjacent stormwater 2 celled wet pond that was recently constructed with the D1 Pod. Due to the high groundwater, flat topography and existing soils in the vicinity of the facilities, a 2 celled wet pond is a good fit to be placed along NE Ingle Road. Also, the stormwater facility discharges to the Lacamas Creek Contributing Water Shed which requires enhanced treatment prior to discharge to

the natural flow routes. Wet ponds provide the required level of treatment to meet the water quality and quantity control levels within the Lacamas Creek Contributing Water Shed and final design details for the facility will be provided at the time of Final Construction Plan Preparation since the facility configuration will not impact the proposed development of the B1 Pod.

Section B – Minimum Requirements

The Green Mountain PRD B1 Pod Subdivision proposal contains only one threshold discharge area (TDA) and is subject to minimum requirements 1 – 9. As required by CMC 14.02, the property is defined as follows: **Pre-developed Condition** - The native vegetation and soils that existed at a site prior to the influence of Euro-American settlement. The pre-developed condition shall be assumed to be a forested land cover unless reasonable, historic information is provided that indicates the site was prairie prior to settlement.

Section C – Soils Evaluation

The “Soil Survey of Clark County, Washington” printed by the United States Department of Agriculture Soil Conservation Service (SCS), in cooperation with Washington Agriculture Experiment Station maps the soils on site as Dollar loam (DoB) which is listed within Soils Group (SG) 3 for WWHM calculation purposes and are also categorized as AASHO A-4 soils. Infiltration rates of 0.06-0.20 inches per hour are typical for these soil types. Although infiltration is not being considered for the primary quantity control management system, it is recognized that there is a small amount of natural infiltration that will occur throughout the project which makes the proposed stormwater management system conservative.

Section D – Source Control

The development activity includes landscaping and lawn/vegetation and maintenance of stormwater drainage and treatment systems. Source control will be the responsibility of each of the new property owners within the subdivision.

Section E – Onsite Stormwater Management BMPs

There are no specific applicable onsite stormwater management BMPs that apply to the proposed site improvements. All site runoff will be treated as required within an offsite 2

celled wet pond stormwater management facility that is designed to provide water quality control to meet the minimum stormwater quality control requirements of the SWWMM and the City of Camas. All flows from the developed project will be detained to pre-European-development runoff durations, and released to the pre-developed flow paths.

Section F – Runoff Treatment and Design

Enhance stormwater treatment is required for this project and will be met through the use of a 2 celled wet pond designed in compliance with City of Camas Municipal Code. Initial installation cost and the expenses associated with long-term maintenance are expected to be typical of developments of this size. There are no pollution-generating pervious surfaces (PGPS) on this project

The proposed Stormwater Management Facility will be designed according to the latest Stormwater Management Manual for Western Washington and will be sized as needed to treat at least 91% of all runoff based on the Water Quality flows calculated by the WWHM computer program.

Section G – Flow Control Analysis and Design

Stormwater flow rates and durations will be controlled using a 2 celled wet pond stormwater management facility that will be constructed just to the south and east of the proposed project within an acre of property that will be designated for the purposes of stormwater management.

Section H – Flow Control System Plan

See Engineering Plans.

Section I – Wetlands Protection

There are no wetlands on the property or immediately adjacent to the property.

Section J – Other Permits

Coverage under the Washington State NPDES Construction Stormwater General Permit will be obtained prior to construction.

Section K – Conveyance System Analysis and Design

See Engineering Plans for entire conveyance system design. The project is located on a property with considerable slope therefore all conveyance systems will convey the predicted 100 year flows to the proposed stormwater management facilities.

Section L – Offsite Analysis

As required by Camas Municipal Code, a representative of STERLING DESIGN, INC. visited the site and followed the downstream flow route to a point in the receiving water more than ¼ of a mile from the site in order to analyze existing conditions and potential impacts of this development activity. This analysis looked for indications of excessive sedimentation, stream bank erosion, polluted discharges to ground water contributing to recharge zones, violations of water quality standards, and spills and discharges of priority pollutants as well as for potential impacts to public health and safety and private or public facilities downstream. All storm water from the site will connect to a public stormwater system that was recently installed within NE Ingle Road. The existing conveyance conveys all stormwater to a discharge point that is on the west side of NE Ingle Road. From the discharge point the stormwater flows in a south westerly flow path to a tributary that flows into Lacamas Lake. Stormwater flows from the proposed Green Mountain PRD B1 Pod Subdivision will continue to follow historical flow routes and will not be rerouted to another drainage basin. The designed stormwater system mimics the pre-developed condition by managing developed stormwater flow rates and discharging to the pre-development flow path. This project will not have a significant adverse impact on the downstream and/or upstream drainage system.

Section M – Groundwater Monitoring Program

Ground water monitoring is not a requirement for single family residential developments and it is unlikely that there is any threat to ground water from the proposed Green Mountain PRD B1 Pod project.

Section N – Maintenance and Operations Manual

Stormwater facilities will be privately owned and maintained per City of Camas Stormwater code CMC 14.02 and pages 7-24 and 7-25 of 2014 Stormwater Management Manual for Western Washington, Volume V.

**Appendix I: Option Agreement to purchase up to 1 acre offsite for stormwater
management facilities**

OPTION AGREEMENT

This Option Agreement (this "Agreement") is entered into as of this ____ day of _____, 2018 (the "Effective Date"), between Green Mountain Land LLC, a Washington limited liability company ("GML"), and AE Green Mountain, LLC, a Washington limited liability company ("AE").

Recitals

- A. AE is the owner of that certain real property described on Exhibit A attached hereto (the "AE Property").
- B. GML is the owner of that certain real property described on Exhibit B attached hereto (the "GML Property").
- C. AE wishes to acquire an option to either purchase, or obtain an easement to use, a portion of the GML Property for the purpose of constructing and operating a stormwater detention facility on such property for the benefit of the AE Property. GML is willing to grant such an option pursuant to the terms and conditions set forth below.

Agreement

Now, therefore, for the sum of \$10 paid by AE to GML, and for certain other valuable consideration, the receipt and sufficiency of which are hereby acknowledged by GML and AE, GML and AE hereby agree as follows:

1. AE's Notice. On or before May 1, 2019, AE may provide written notice to GML ("AE's Notice") that it desires to acquire fee title to, or an easement to use, a certain portion of that portion of the GML Property that is depicted on the drawing attached as Exhibit C hereto, not to exceed one acre in size, for the purpose of constructing and operating a stormwater detention facility (the "Facility") on such property. AE's Notice shall identify the property that AE intends to be the subject of the purchase and sale agreement or easement agreement; such property shall hereinafter be referred to as the "Designated Property." AE's Notice shall (a) specify the precise location and configuration of the Designated Property and (b) indicate whether AE intends to acquire fee title to the Designated Property or to obtain an easement to use the Designated Property. If AE's Notice is not given to GML on or before May 1, 2019, AE shall have no further right to acquire fee title to or an easement with respect to any portion of the GML Property, and AE's rights under this Agreement shall terminate.

2. Designated Property. The precise location and configuration of the Designated Property are subject to the written approval of GML, and such approval shall not be unreasonably withheld. It shall be deemed reasonable for GML to withhold such approval if fewer than two hundred (200) feet of the Designated Property abut Ingle Road or if the length of the Designated Property that abuts Ingle Road is less than one and one-half (1.5) times the length of either the northern or southern boundary line of the Designated Property. (The foregoing sentence is not intended to include an exclusive list of reasons for which GML may reasonably withhold its approval of the location and configuration of the Designated Property.) GML shall

notify AE within fourteen (14) days after GML's receipt of AE's Notice if GML approves of the Designated Property.

3. Purchase and Sale Agreement/Easement Agreement. If GML notifies AE, within fourteen (14) days after GML's receipt of AE's Notice, that GML approves of the Designated Property, GML and AE shall use commercially reasonable efforts to enter into a purchase and sale agreement (if AE's Notice states that AE desires to acquire fee title to the Designated Property) or easement agreement (if AE's Notice states that AE desires to acquire an easement to use the Designated Property) with respect to the Designated Property. Among other things, such purchase and sale agreement or easement agreement shall:

(a) Obligate AE to pay to GML, upon the closing of the sale of the Designated Property to AE or at the time of the parties' execution of the easement agreement, the sum of \$5.17 per square foot (\$225,205 per acre) for the Designated Property. The closing of the sale or the execution of the easement agreement shall occur thirty (30) days after the date on which AE has given notice to GML that AE has received final engineering approval for the Facility.

(b) Require GML to reasonably cooperate with AE, at no out-of-pocket cost or expense to GML, in connection with AE's efforts to seek appropriate governmental permits and approvals for the construction and operation of the Facility, which reasonable cooperation may include the execution of commercially reasonable applications.

(c) Provide that the Facility shall not in any manner materially interfere with vehicular or pedestrian access from Ingle Road to the GML Property or with vehicular or pedestrian access from the GML Property to Ingle Road.

(d) If an easement agreement is entered into, (i) require AE to reimburse GML for AE's share of all real property taxes and assessments imposed or assessed against the Designated Property and/or the Facility, as such share is reasonably determined by GML; (ii) allow GML to terminate the easement and AE's rights with respect to the Designated Property in the event of AE's breach of the easement agreement, following written notice to AE of the breach and a reasonable opportunity to cure such breach; and (iii) give GML the right at any time to convey the Designated Property to AE by bargain and sale deed and obligate AE to accept such conveyance, provided that if the Designated Property is not then a legal lot or parcel that may be lawfully conveyed to AE, GML shall be responsible for the creation of such legal lot or parcel and for all costs and expenses associated therewith, and AE shall reasonably cooperate with GML in connection with the creation of such legal lot or parcel.

(e) If a purchase and sale agreement is entered into, provide that (i) GML shall have no obligation to provide any title insurance to AE with respect to the Designated Property; (ii) such property shall be conveyed by GML to AE by bargain and sale deed; and (iii) in the event the Designated Property is not then a legal lot or parcel that may be lawfully conveyed separately to AE, GML and AE shall reasonably cooperate with each other to create, a separate, legal lot or parcel for the Designated Property that may be lawfully conveyed to AE; provided, however, that (A) AE shall pay all costs and expenses relating to the creation of such legal lot or parcel and promptly reimburse GML for any such costs or expenses incurred by

GML, and (B) in no event shall GML be obligated to take any action or otherwise cooperate if GML reasonably believes that the creation of such new lot or parcel will have a material adverse effect on the development of the remainder of the GML Property or any portion thereof.

(f) Obligate AE to indemnify GML for, hold GML harmless from, and defend GML against (with counsel reasonably acceptable to GML) any and all claims, losses, actions or causes of action, liabilities, judgments, damages, and costs and expenses arising or resulting from the construction and/or operation or use of the Facility and any acts or omissions of AE or any of AE's employees, agents, contractors, subcontractors, or tenants in connection with the Designated Property or the Facility.

(g) Provide that the Facility shall be constructed and operated at AE's sole cost and expense.

(h) Allow GML to relocate the Facility to another location on the GML Property that is reasonably acceptable to AE in order to accommodate the development of the GML Property, provided that the relocated Facility's capacity and function shall not be materially diminished as the result of such relocation and further provided that all costs and expenses relating to such relocation shall be borne by GML.

(i) Provide that AE shall use its reasonable best efforts to design the Facility such that it may be expanded to accommodate stormwater from the GML Property and that, upon GML's request, the Facility shall be expanded to accommodate stormwater from the GML Property, provided that GML pays all costs and expenses in connection with such expansion.

(j) State that the agreement shall bind and inure to the benefit of all future owners of the GML Property and the AE Property (subject to the restrictions set forth in Section 4 below) to the same extent that GML and AE are bound and benefited thereunder.

If a purchase and sale agreement or easement agreement that is acceptable to GML and AE has not been entered into between GML and AE within sixty (60) days after GML's receipt of AE's Notice, AE shall have no further right or option to purchase or obtain an easement with respect to any portion of the GML Property, and AE's rights under this Agreement shall terminate.

4. Assignment. AE may not assign this Agreement or its rights hereunder without GML's prior written consent, which may be withheld in GML's sole discretion unless the proposed assignee is an entity that (a) acquires the AE Property from AE and (b) is owned and controlled by M. Allan Evridge, in which event GML's consent to the assignment shall not be unreasonably withheld. It shall be deemed reasonable for GML to withhold its consent to any proposed assignment if the assignee does not assume AE's duties and obligations under this Agreement pursuant to an assignment and assumption agreement that is acceptable to GML.

5. Notices. All notices or other communications required or permitted under this Agreement shall be in writing and shall be (a) personally delivered (including by means of professional messenger service), which notices and communications shall be deemed given on the date of their receipt at the office of the addressee; (b) sent by registered or certified mail, postage prepaid, return receipt requested, which notices and communications shall be deemed given two (2) business days after the date of their deposit in the United States mail; or (c) sent by

overnight delivery using a nationally recognized overnight courier service, which notices and communications shall be deemed given one business day after the date of their deposit with such courier. Notices shall be sent to the following addresses:

To GML: Green Mountain Land LLC
Attention: John O'Neil
17933 N.W. Evergreen Parkway, Suite 300
Beaverton, Oregon 97006

With a copy to: Schwabe, Williamson & Wyatt, P.C.
Attention: James F. Dulcich
1211 S.W. Fifth Avenue, Suite 1900
Portland, Oregon 97204

To AE: AE Green Mountain, LLC
Attention: Allan Evridge
2551 W. 1st Street
Washougal, Washington 98671

Notice of change of address shall be given by written notice in the manner detailed in this Section 5. Notices may be given by a party or a party's attorney or agent.

6. Successors and Assigns. Subject to the limitations on assignment set forth in Section 4 above, this Agreement shall be binding on and shall inure to the benefit of the successors and assigns of GML and AE.

7. Attorney Fees. In the event that either party to this Agreement institutes a suit, action, arbitration, or other legal proceeding of any nature whatsoever, relating to this Agreement or to the rights or obligations of the parties with respect thereto, the prevailing party shall be entitled to recover from the losing party the prevailing party's reasonable attorney, paralegal, accountant, expert witness (whether or not called to testify at trial or other proceeding) and other professional fees and all other fees, costs, and expenses actually incurred and reasonably necessary in connection therewith, including but not limited to deposition transcript and court reporter costs, as determined by the judge or arbitrator at trial or other proceeding, and including such fees, costs and expenses incurred in any appellate or review proceeding, or in collecting any judgment or award, or in enforcing any decree rendered with respect thereto, in addition to all other amounts provided for by law. This cost and attorney fees provision shall apply with respect to any litigation or other proceedings in bankruptcy court, including litigation or proceedings related to issues unique to bankruptcy law.

8. Entire Agreement. This Agreement (including any exhibits attached to it) is the final expression of, and contains the entire agreement between the parties with respect to the subject matter of the Agreement and supersedes all prior letters of intent and understandings with respect to the subject matter of the Agreement. This Agreement may not be modified, changed, supplemented, or terminated, nor may any obligations under it be waived, except by written instrument signed by the party to be charged or by its agent duly authorized in writing or as

otherwise expressly permitted herein. The parties do not intend to confer any benefit on any person, firm, or corporation other than the parties hereto.

9. Counterparts. This Agreement may be executed in counterparts, each of which will be considered an original and all of which together will constitute one and the same agreement.

10. Time. GML and AE hereby acknowledge and agree that time is strictly of the essence with respect to each and every term, condition, obligation, and provision of this Agreement. Unless otherwise specified, in computing any period of time described in this Agreement, the day of the act or event after which the designated period of time begins to run is not to be included and the last day of the period so computed is to be included, unless the last day is a Saturday, Sunday, or legal holiday, in which event the period shall run until the end of the next day that is not a Saturday, Sunday, or legal holiday.

This Agreement is deemed effective as of the Effective Date set forth above.

GREEN MOUNTAIN LAND LLC, a
Washington limited liability company

AE GREEN MOUNTAIN, LLC, a
Washington limited liability company

By: _____
John O'Neil, Manager

By: M. Allen Forsberg

By: TERRELL GROUP MANAGEMENT,
LLC, an Oregon limited liability
company
Its: Manager

Name: M. Allen Forsberg

Title: Manager

By: _____
Patrick Terrell, Managing Member

**EXHIBIT A
TO
OPTION AGREEMENT**

(Legal description of the AE Property)



LAND SURVEYORS
ENGINEERS

(360) 695-1385
222 E. Evergreen Blvd.
Vancouver, WA
98660

LEGAL DESCRIPTION FOR GREEN MOUNTAIN LAND LLC
ADJUSTED PARCEL 1 WEST

July 27, 2017

A parcel of land in the Thomas J. Fletcher Donation Land Claim No. 51 and the East half of Section 20, and the West half of Section 21 all in Township 2 North, Range 3 East of the Willamette Meridian in the City of Camas, Clark County, Washington, being a portion of that parcel of land described under Exhibit C as "Parcel 1", recorded under Auditor's File No. 5237696 BLA, recorded December 4, 2015, records of said county, described as follows:

COMMENCING at the Northwest corner of said Section 21;

THENCE South $88^{\circ} 40' 59''$ East, along the North line of the Northwest quarter of said Section 21, a distance of 830.93 feet to the East line of the Thomas J. Fletcher Donation Land Claim No. 51;

THENCE South $01^{\circ} 13' 25''$ West, along said East line, a distance of 1315.09 feet to the North line of the South half of said Northwest quarter;

THENCE South $88^{\circ} 42' 01''$ East, along said North line, a distance of 180.00 feet to the most Easterly, Northwest corner of said "Parcel 1";

THENCE along the Westerly lines of said "Parcel 1" the following courses:

THENCE South $01^{\circ} 17' 59''$ West, a distance of 214.50 feet;

THENCE South $43^{\circ} 42' 01''$ East, a distance of 97.00 feet;

THENCE South $46^{\circ} 17' 59''$ West, a distance of 217.43 feet;

THENCE North $43^{\circ} 42' 01''$ West, a distance of 217.20 feet;

THENCE North $01^{\circ} 17' 59''$ East, a distance of 209.50 feet;

THENCE North $44^{\circ} 04' 38''$ West, a distance of 10.00 feet;

THENCE South $45^{\circ} 55' 22''$ West, a distance of 18.00 feet;

THENCE North $44^{\circ} 04' 38''$ West, a distance of 45.00 feet;

THENCE South $45^{\circ} 55' 22''$ West, a distance of 25.00 feet;

THENCE North $44^{\circ} 04' 38''$ West, a distance of 293.00 feet;

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JMB



LAND SURVEYORS
ENGINEERS

(360) 695-1385
222 E. Evergreen Blvd.
Vancouver, WA
98660

THENCE South $64^{\circ} 48' 03''$ West, a distance of 119.90 feet to a point on a 325.00 foot radius curve to the left;

THENCE along said 325.00 foot radius curve to the left (the long chord of which bears South $50^{\circ} 35' 01''$ West, a distance of 159.64 feet), an arc distance of 161.29 feet;

THENCE South $36^{\circ} 21' 59''$ West, a distance of 152.00 feet;

THENCE South $53^{\circ} 38' 01''$ East, a distance of 82.00 feet;

THENCE South $36^{\circ} 21' 59''$ West, a distance of 60.08 feet to a point on a non-tangent 25.00 foot radius curve to the right and the TRUE POINT OF BEGINNING;

THENCE leaving said Westerly lines, and along said 25.00 foot radius curve to the right (the long chord of which bears South $55^{\circ} 55' 31''$ East, a distance of 2.00 feet), an arc distance of 2.00 feet;

THENCE South $53^{\circ} 38' 01''$ East, a distance of 171.47 feet to a point on a 345.00 foot radius curve to the right;

THENCE along said 345.00 foot radius curve to the right (the long chord of which bears South $36^{\circ} 10' 39''$ East, a distance of 206.98 feet), an arc distance of 210.22 feet;

THENCE South $18^{\circ} 43' 16''$ East, a distance of 89.02 feet to a point on the South line of said "Parcel 1";

THENCE along the Southerly lines of said "Parcel 1" the following courses:

THENCE South $60^{\circ} 11' 05''$ West, a distance of 517.11 feet;

THENCE North $33^{\circ} 35' 50''$ West, a distance of 116.84 feet;

THENCE South $56^{\circ} 24' 10''$ West, a distance of 337.32 feet to a point on the Northeasterly right-of-way line of Northeast Ingle Road as conveyed to Clark County by deed recorded under Auditor's File Number 4217481 D, said point being 30.00 feet from, when measured perpendicular to, the centerline of said Road;

THENCE North $33^{\circ} 35' 50''$ West, along said right-of-way line, a distance of 334.36 feet to a point on the Westerly line of said "Parcel 1";

THENCE along the Westerly lines of said "Parcel 1" the following courses:

THENCE North $56^{\circ} 38' 34''$ East, leaving said Northeasterly right-of-way line, a distance of 384.01 feet;

THENCE South $33^{\circ} 21' 26''$ East, a distance of 10.00 feet;

THENCE North $56^{\circ} 38' 34''$ East, a distance of 154.02 feet;

THENCE South $45^{\circ} 33' 03''$ East, a distance of 41.94 feet to a point on a 174.00 foot radius curve to the right;

THENCE along said 174.00 foot radius curve to the right (the long chord of which bears South $41^{\circ} 41' 00''$ East, a distance of 23.47 feet), an arc distance of 23.49 feet;

THENCE North $52^{\circ} 11' 03''$ East, a distance of 52.78 feet to a point on a non-tangent 25.00 foot radius curve to the right;

THENCE along said 25.00 foot radius curve to the right (the long chord of which bears North $10^{\circ} 50' 12''$ East, a distance of 27.68 feet), an arc distance of 29.33 feet;

THENCE North $44^{\circ} 26' 57''$ East, a distance of 116.20 feet to a point on a 226.00 foot radius curve to the left;

THENCE along said 226.00 foot radius curve to the left (the long chord of which bears North $40^{\circ} 24' 28''$ East, a distance of 31.86 feet), an arc distance of 31.88 feet;

THENCE North $36^{\circ} 21' 59''$ East, a distance of 10.37 feet to a point on a 25.00 foot radius curve to the right, said point bears South $79^{\circ} 04' 29''$ West, from the TRUE POINT OF BEGINNING;

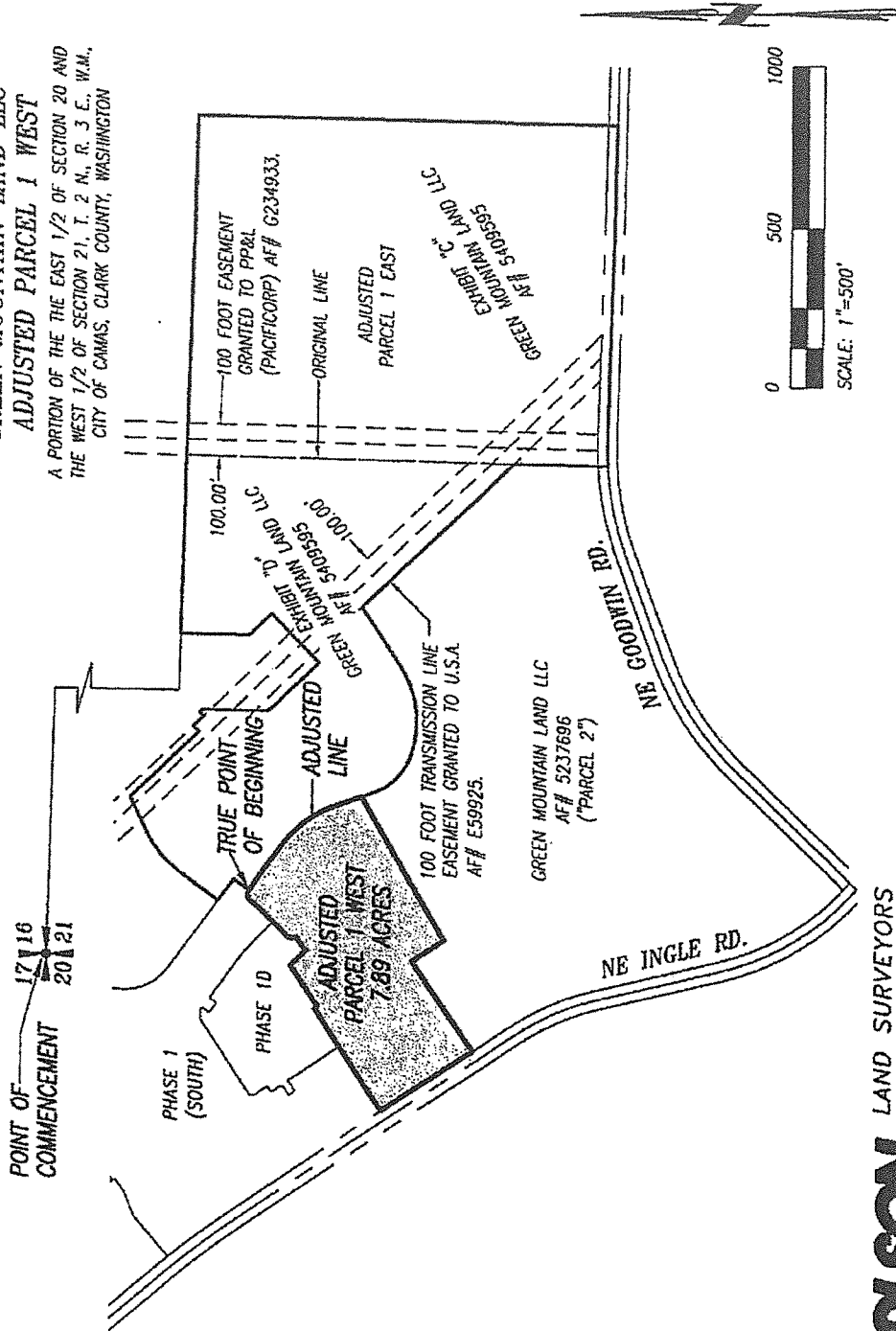
THENCE along said 25.00 foot radius curve (the long chord of which bears North $79^{\circ} 04' 29''$ East, a distance of 33.91 feet), an arc distance of 37.27 feet to the TRUE POINT OF BEGINNING.

Containing 7.89 acres, more or less.



SKETCH TO ACCOMPANY LEGAL DESCRIPTION FOR
GREEN MOUNTAIN LAND LLC
ADJUSTED PARCEL 1 WEST

A PORTION OF THE EAST 1/2 OF SECTION 20 AND
THE WEST 1/2 OF SECTION 21, T. 2 N., R. 3 E., W.M.,
CITY OF CANAS, CLARK COUNTY, WASHINGTON



OLSON LAND SURVEYORS
ENGINEERS
ENGINEERING INC., 222 E. EVERGREEN BLVD., VANCOUVER, WA 98660
1-800-695-1285
1-203-293-8038

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LAND SURVEYORS
ENGINEERS

(360) 695-1385
222 E. Evergreen Blvd.
Vancouver, WA
98660

LEGAL DESCRIPTION FOR GREEN MOUNTAIN LAND LLC
PARCEL 2

June 21, 2016

A parcel of land in the Thomas J. Fletcher Donation Land Claim No. 51, the Northeast quarter of Section 20, and the Southeast quarter of Section 17 all in Township 2 North, Range 3 East of the Willamette Meridian in Clark County, Washington, described as follows:

COMMENCING at the Southeast corner of said Section 17;

THENCE North $01^{\circ} 45' 46''$ East, along the East line of said Southeast quarter, 293.65 feet to the North line of Parcel 1 as described in Exhibit C of that Lot Segregation recorded under Auditor's File Number 5244964 BLA, records of Clark County, Washington and the TRUE POINT OF BEGINNING;

THENCE North $89^{\circ} 08' 23''$ West, along said North line, 633.51 feet;

THENCE South $01^{\circ} 45' 46''$ West, along said North line, 180.54 feet;

THENCE South $61^{\circ} 08' 05''$ West, along said North line, 149.41 feet;

THENCE North $89^{\circ} 08' 23''$ West, along said North line and the Westerly projection thereof, 406.50 feet to a point on the Northerly projection of the East line of that parcel of land conveyed to Ronald D. Warman and Rhonda Warman, husband and wife, by deed recorded under Auditor's File No. 9004270087, records of Clark County, Washington and the TRUE POINT OF BEGINNING;

THENCE South $89^{\circ} 08' 23''$ East, along the Westerly projection of said North line, 60.01 feet to the most Westerly Northwest corner of said Parcel 1;

THENCE South $02^{\circ} 04' 33''$ West, along the West line of said Parcel 1, a distance of 693.82 feet to the most Westerly Southwest corner thereof;

THENCE South $87^{\circ} 55' 27''$ East, along the South line of said Parcel 1, a distance of 315.67 feet to an angle point;



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THENCE South 00° 12' 48" East, along the West line of said Parcel 1, a distance of 50.91 feet to an angle point on the Northwesterly line of New Tax Lot 12 as described in Exhibit D of that Lot Segregation recorded under Auditor's File No. 5229224 BLA, records of Clark County, Washington;

THENCE along the Northwesterly line of said Exhibit D parcel the following courses;

THENCE South 00° 12' 48" East, 326.26 feet;

THENCE South 72° 58' 30" East, 52.44 feet to a point on a 101.00 foot radius non-tangent curve the left;

THENCE along said 101.00 foot radius non-tangent curve to the left (the long chord of which bears South 13° 07' 19" East, 69.87 feet), an arc distance of 71.34 feet;

THENCE South 33° 21' 26" East, 48.91 feet;

THENCE South 55° 00' 30" West, 48.70 feet;

THENCE South 68° 07' 19" West, 86.89 feet;

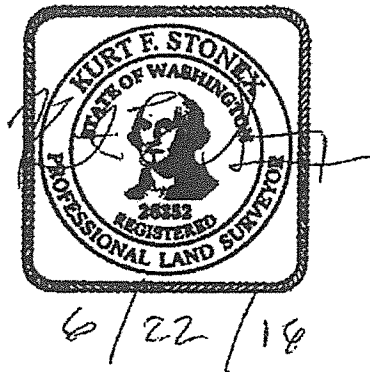
THENCE South 49° 42' 41" West, 162.78 feet to a point on a 2030.00 foot radius non-tangent curve to the left, said point being on the Northeasterly right-of-way line of Northeast Ingle Road as conveyed to Clark County by deed recorded under Auditor's File No. 4217481 D, said point being 30.00 feet from, when measured perpendicular to, the centerline of said Northeast Ingle Road;

THENCE leaving said Northwesterly line, along said right-of-way line and said 2030.00 foot radius non-tangent curve to the left (the long chord of which bears North 40° 12' 15" West, 15.52 feet), an arc distance of 15.52 feet;

THENCE North 40° 25' 24" West, along said right-of-way line, 353.90 feet to the East line of said Warman parcel;

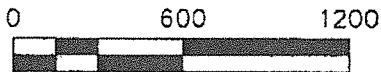
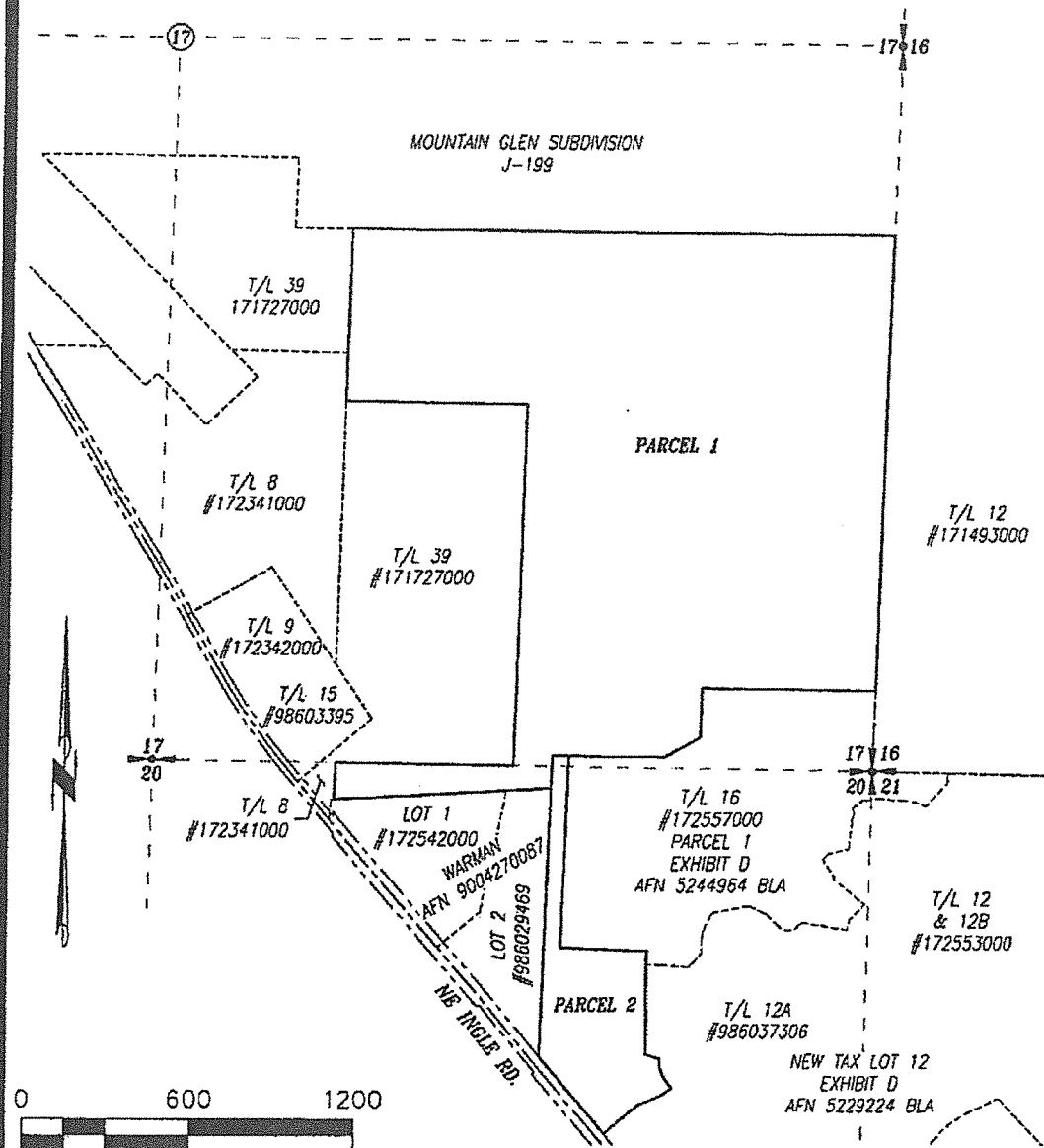
THENCE North 02° 04' 33" East, along the East line of said Warman parcel and the Northerly projection thereof, a distance of 1092.13 feet to the TRUE POINT OF BEGINNING;

Contains 6.17 acres, more or less.



SKETCH TO ACCOMPANY LEGAL DESCRIPTIONS
FOR GREEN MOUNTAIN LAND LLC
PARCELS 1 & 2

SE1/4 SECTION 17 & NE1/4 SECTION 20, T. 2 N., R. 3 E., W.M.,
CITY OF CAMAS, CLARK COUNTY, WASHINGTON



OLSON LAND SURVEYORS
ENGINEERS
ENGINEERING INC. 222 E. EVERGREEN BLVD., VANCOUVER, WA 98660

1-360-695-1385
1-503-289-9936

**EXHIBIT B
TO
OPTION AGREEMENT**

(Legal description of the GML Property)



~~LAND SURVEYORS~~
ENGINEERS

(360) 695-1385
222 E. Evergreen Blvd.
Vancouver, WA
98660

EXHIBIT B

LEGAL DESCRIPTION FOR GREEN MOUNTAIN LAND LLC

December 10, 2015

A parcel of land in the Thomas J. Fletcher Donation Land Claim No. 51 and the East half of Section 20, and the West half of Section 21 all in Township 2 North, Range 3 East of the Willamette Meridian in Clark County, Washington, described as follows:

COMMENCING at the Northwest corner of said Section 21;

THENCE South $88^{\circ} 40' 59''$ East, along the North line of the Northwest quarter of said Section 21, a distance of 830.93 feet to the East line of the Thomas J. Fletcher Donation Land Claim No. 51;

THENCE South $01^{\circ} 13' 25''$ West, along said East line, a distance of 1315.09 feet to the North line of the South half of said Northwest quarter;

THENCE South $88^{\circ} 42' 01''$ East, along said North line, a distance of 180.00 feet;

THENCE South $01^{\circ} 17' 59''$ West, leaving said North line, a distance of 214.50 feet;

THENCE South $43^{\circ} 42' 01''$ East, a distance of 97.00 feet;

THENCE South $46^{\circ} 17' 59''$ West, a distance of 217.43 feet;

THENCE North $43^{\circ} 42' 01''$ West, a distance of 217.20 feet;

THENCE North $01^{\circ} 17' 59''$ East, a distance of 209.50 feet;

THENCE North $44^{\circ} 04' 38''$ West, a distance of 10.00 feet;

THENCE South $45^{\circ} 55' 22''$ West, a distance of 18.00 feet;



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THENCE North 44° 04' 38" West, a distance of 45.00 feet;

THENCE South 45° 55' 22" West, a distance of 25.00 feet;

THENCE North 44° 04' 38" West, a distance of 293.00 feet;

THENCE South 64° 48' 03" West, a distance of 119.90 feet to a point of a 325.00 foot radius curve to the left;

THENCE along said 325.00 foot radius curve to the left (the long chord of which bears South 50° 35' 01" West, a distance of 159.64 feet), an arc distance of 161.29 feet;

THENCE South 36° 21' 59" West, a distance of 152.00 feet;

THENCE South 53° 38' 01" East, a distance of 82.00 feet;

THENCE South 36° 21' 59" West, a distance of 60.08 feet to a point on a 25.00 foot radius non-tangent curve to the left;

THENCE along said 25.00 foot radius non-tangent curve to the left (the long chord of which bears South 79° 04' 29" West, a distance of 33.91 feet), an arc distance of 37.27 feet;

THENCE South 36° 21' 59" West, a distance of 10.37 feet to a point on a 226.00 foot radius curve to the right;

THENCE along said 226.00 foot radius curve to the right (the long chord of which bears South 40° 24' 28" West, a distance of 31.86 feet), an arc distance of 31.88 feet;

THENCE South 44° 26' 57" West, a distance of 116.20 feet to a point on a 25.00 foot radius curve to the left;

THENCE along said 25.00 radius curve to the left (the long chord of which bears South 10° 50' 12" West, a distance of 27.68 feet), an arc distance of 29.33 feet;



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ENGINEERS

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Vancouver, WA
98660

THENCE South $52^{\circ} 11' 03''$ West, a distance of 52.78 feet to a point on a 174.00 foot radius non-tangent curve to the left;

THENCE along said 174.00 foot radius non-tangent curve to the left (the long chord of which bears North $41^{\circ} 41' 00''$ West, a distance of 23.47 feet), an arc distance of 23.49 feet;

THENCE North $45^{\circ} 33' 03''$ West, a distance of 41.94 feet;

THENCE South $56^{\circ} 38' 34''$ West, a distance of 154.02 feet;

THENCE North $33^{\circ} 21' 26''$ West, a distance of 10.00 feet;

THENCE South $56^{\circ} 38' 34''$ West, a distance of 384.01 feet to the Northeasterly right-of-way line of Northeast Ingle Road as conveyed to Clark County by deed recorded under Auditor's File Number 4217481 D, said point being 30.00 from, when measured perpendicular to, the centerline of said Road;

THENCE South $33^{\circ} 35' 50''$ East, along said right-of-way line, a distance of 334.36 feet to the TRUE POINT OF BEGINNING;

THENCE North $56^{\circ} 24' 10''$ East, leaving said right-of-way line, a distance of 337.32 feet;

THENCE South $33^{\circ} 35' 50''$ East, a distance of 116.84 feet;

THENCE North $60^{\circ} 11' 05''$ East, a distance of 517.11 feet;

THENCE South $18^{\circ} 43' 16''$ East, a distance of 40.08 feet to a point on a 180.00 foot radius curve to the left;

THENCE along said 180.00 foot radius curve to the left (the long chord of which bears South $44^{\circ} 53' 37''$ East, a distance of 158.79 feet), an arc distance of 164.45 feet to a point of compound curvature with a 330.00 foot radius curve to the left;



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THENCE along said 330.00 foot radius curve to the left (the long chord of which bears North $83^{\circ} 01' 06''$ East, a distance of 288.45 feet), an arc distance of 298.52 feet;

THENCE North $57^{\circ} 06' 11''$ East, a distance of 219.78 feet;

THENCE South $44^{\circ} 04' 38''$ East, a distance of 645.44 feet;

THENCE South $01^{\circ} 37' 56''$ West, a distance of 296.43 feet to a point on the centerline of Northeast Goodwin Road, said point being a point on a 955.00 foot radius non-tangent curve to the left;

THENCE along said centerline, and along said 955.00 foot radius non-tangent curve to the left (the long chord of which bears South $78^{\circ} 15' 35''$ West, a distance of 277.41 feet), an arc distance of 278.40 feet;

THENCE South $69^{\circ} 54' 30''$ West, along said centerline, a distance of 354.84 feet to a point on a 955.00 foot radius curve to the left;

THENCE along said centerline, and along said 955.00 foot radius curve to the left (the long chord of which bears South $56^{\circ} 56' 15''$ West, a distance of 428.71 feet), an arc distance of 432.40 feet;

THENCE South $43^{\circ} 58' 00''$ West, along said centerline, a distance of 494.48 feet to a point of intersection with the Southerly projection of the Northeasterly right-of-way line of said Northeast Ingle Road, said point being 30.00 from, when measured perpendicular to, the centerline of said Road;

THENCE North $46^{\circ} 15' 59''$ West, along said Northeasterly right-of-way line and the Southerly projection thereof, a distance of 39.01 feet to a point on a 770.00 foot radius curve to the right;



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222 E. Evergreen Blvd.
Vancouver, WA
98660

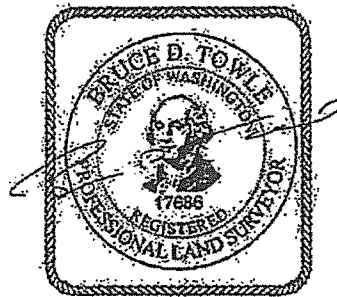
THENCE along said right-of-way line, and along said 770.00 foot radius curve to the right (the long chord of which bears North 29° 32' 51" West, a distance of 443.01 feet), an arc distance of 449.36 feet;

THENCE North 12° 49' 45" West, along said right-of-way line, a distance of 392.70 feet to a point on an 830.00 foot radius curve to the left;

THENCE along said right-of-way line, and along said 830.00 foot radius curve to the left (the long chord of which bears North 23° 12' 47" West, a distance of 299.21 feet), an arc distance of 300.85 feet;

THENCE North 33° 35' 50" West, along said right-of-way line, a distance of 129.00 feet to the TRUE POINT OF BEGINNING.

Contains 35.38 Acres, more or less.



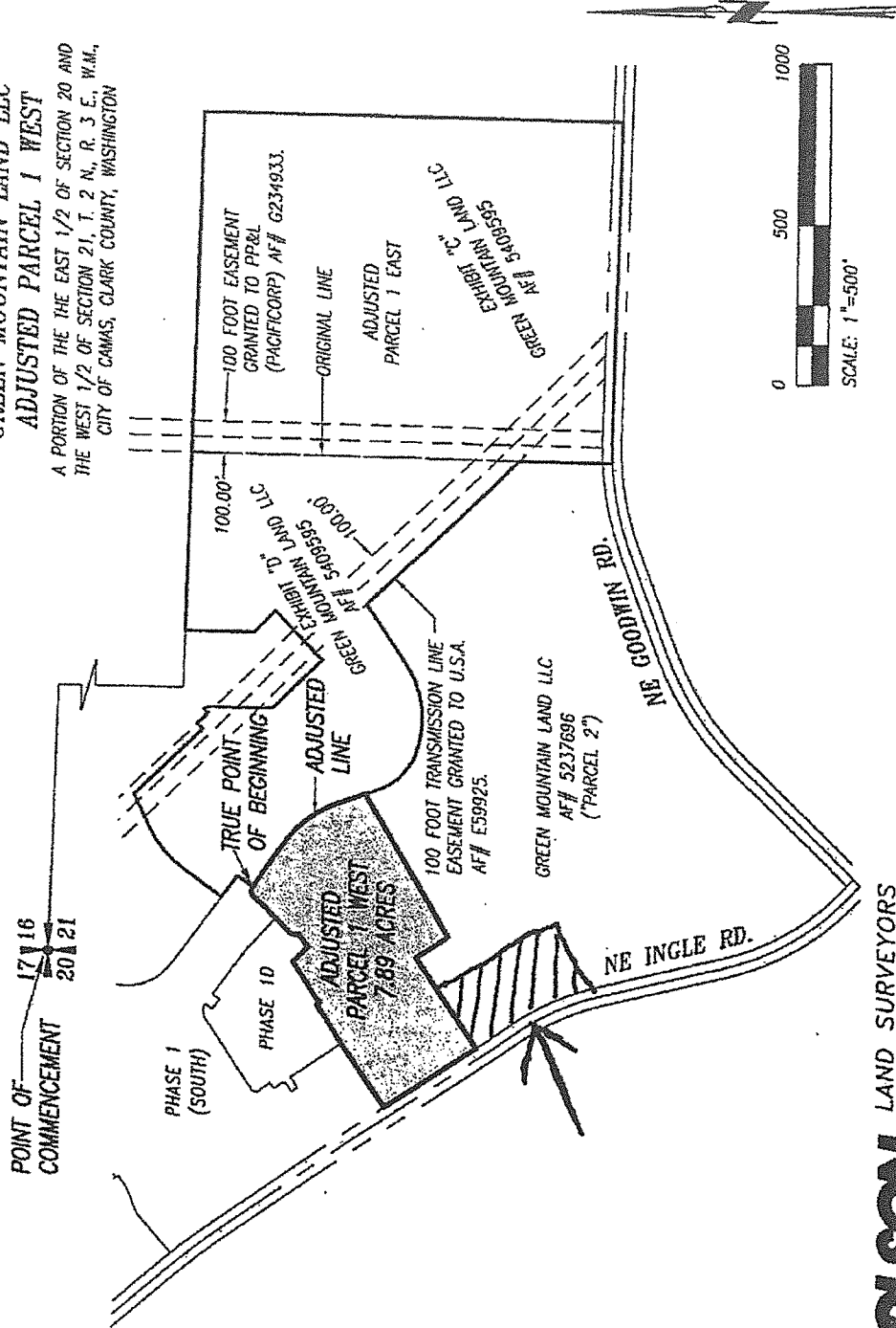
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**EXHIBIT C
TO
OPTION AGREEMENT**

**(Depiction of the portion of the GML Property from
which the Designated Property may be specified by AE)**

SKETCH TO ACCOMPANY LEGAL DESCRIPTION FOR
 GREEN MOUNTAIN LAND LLC
 ADJUSTED PARCEL 1 WEST

A PORTION OF THE EAST 1/2 OF SECTION 20 AND
 THE WEST 1/2 OF SECTION 21, T. 2 N., R. 3 E., W.M.,
 CITY OF CAMAS, CLARK COUNTY, WASHINGTON



OLSON LAND SURVEYORS
 ENGINEERS

ENGINEERING INC. 222 E. EVERGREEN BLVD., VANCOUVER, WA 98660
 L-150-495-1485
 L-201-288-4536

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Appendix II: Wet Pond Stormwater Management Design Information

BMP T10.40 Combined Detention and Wetpool Facilities

Purpose and Definition

Combined detention and WQ wetpool facilities have the appearance of a detention facility but contain a permanent pool of water as well. The following design procedures, requirements, and recommendations cover differences in the design of the stand-alone WQ facility when combined with detention storage. The following combined facilities are addressed:

- Detention/wetpond (basic and large)
- Detention/wetvault
- Detention/stormwater wetland.

There are two sizes of the combined wetpond, a basic and a large, but only a basic size for the combined wetvault and combined stormwater wetland. The facility sizes (basic and large) are related to the pollutant removal goals. See Chapter 3 for more information about treatment performance goals.

Applications and Limitations

Combined detention and water quality facilities are very efficient for sites that also have detention requirements. The water quality facility may often be placed beneath the detention facility without increasing the facility surface area. However, the fluctuating water surface of the live storage will create unique challenges for plant growth and for aesthetics alike.

The basis for pollutant removal in combined facilities is the same as in the stand-alone WQ facilities. However, in the combined facility, the detention function creates fluctuating water levels and added turbulence. For simplicity, the positive effect of the extra live storage volume and the negative effect of increased turbulence are assumed to balance, and are thus ignored when sizing the wetpool volume. For the combined detention/stormwater wetland, criteria that limit the extent of water level fluctuation are specified to better ensure survival of the wetland plants.

Unlike the wetpool volume, the live storage component of the facility should be provided above the seasonal high water table.

Combined Detention and Wetpond (Basic and Large)

Typical design details and concepts for a combined detention and wetpond are shown in Figures 10.9 and 10.10. The detention portion of the facility shall meet the design criteria and sizing procedures set forth in Volume 3.

Sizing Procedure

The sizing procedure for combined detention and wetponds are identical to those outlined for wetponds and for detention facilities. The wetpool volume for a combined facility shall be equal to or greater than the total volume of runoff from the 6-month, 24-hour storm event. Alternatively, the 91st percentile, 24-hour runoff volume estimated by an approved continuous runoff model may be used to size the wetpool. Follow the standard procedure specified in Volume III to size the detention portion of the pond.

Detention and Wetpool Geometry

- The wetpool and sediment storage volumes shall not be included in the required detention volume.
- The "Wetpool Geometry" criteria for wetponds (see BMP T10.10) shall apply with the following modifications/clarifications:

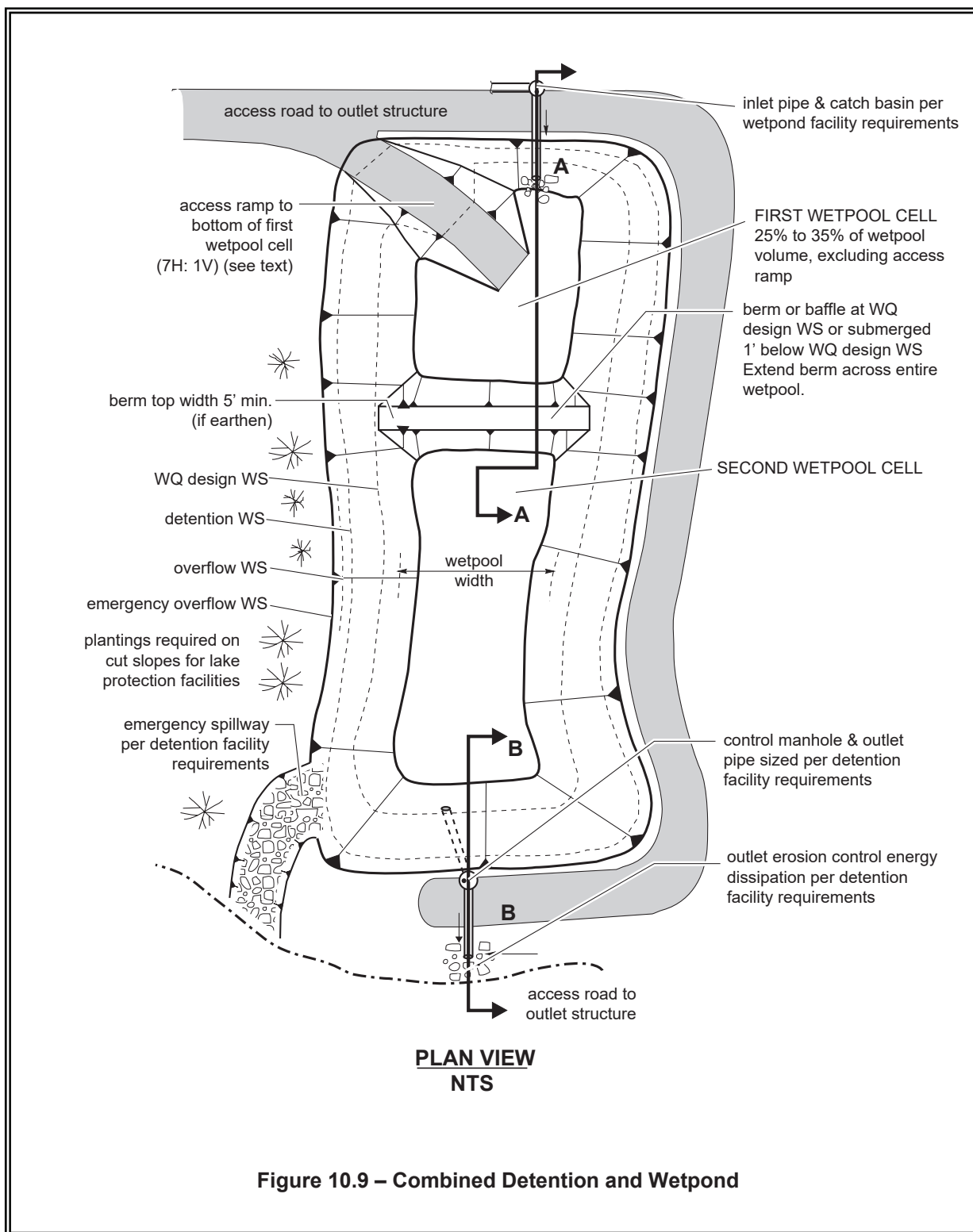
Criterion 1: The permanent pool may be made shallower to take up most of the pond bottom, or deeper and positioned to take up only a limited portion of the bottom. Note, however, that having the first wetpool cell at the inlet allows for more efficient sediment management than if the cell is moved away from the inlet. Wetpond criteria governing water depth must, however, still be met. See Figure 10.11 for two possibilities for wetpool cell placement.

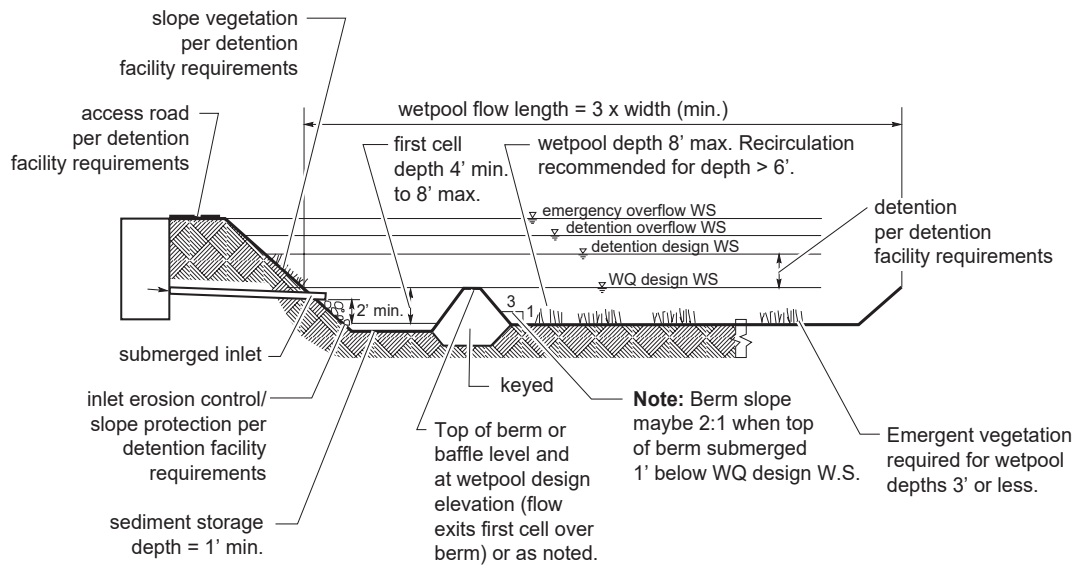
Intent: This flexibility in positioning cells is provided to allow for multiple use options, such as volleyball courts in live storage areas in the drier months.

Criterion 2: The minimum sediment storage depth in the first cell is 1-foot. The 6 inches of sediment storage required for detention ponds does not need to be added to this, but 6 inches of sediment storage must be added to the second cell to comply with the detention sediment storage requirement.

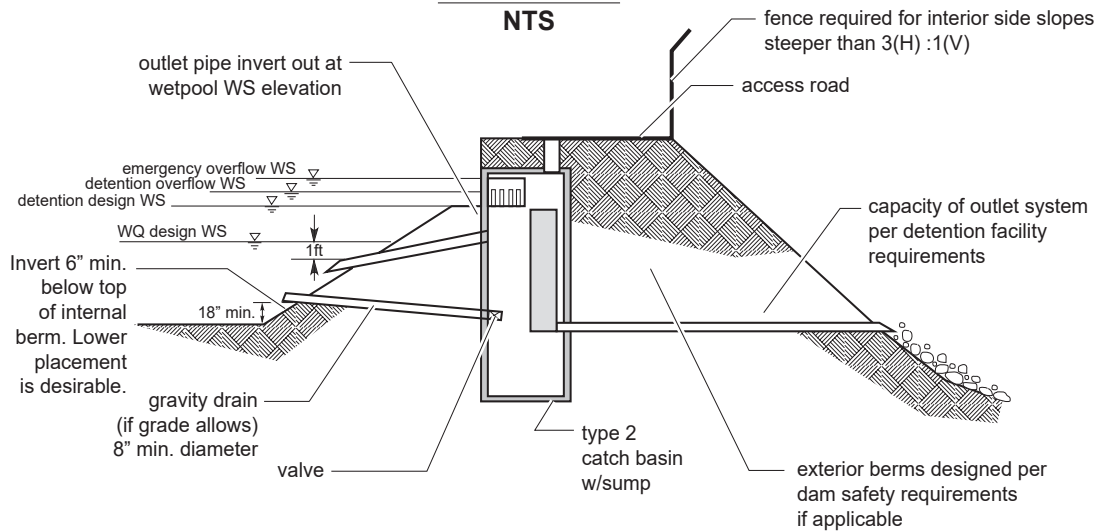
Berms, Baffles, and Slopes

Same as for wetponds (see BMP T10.10).





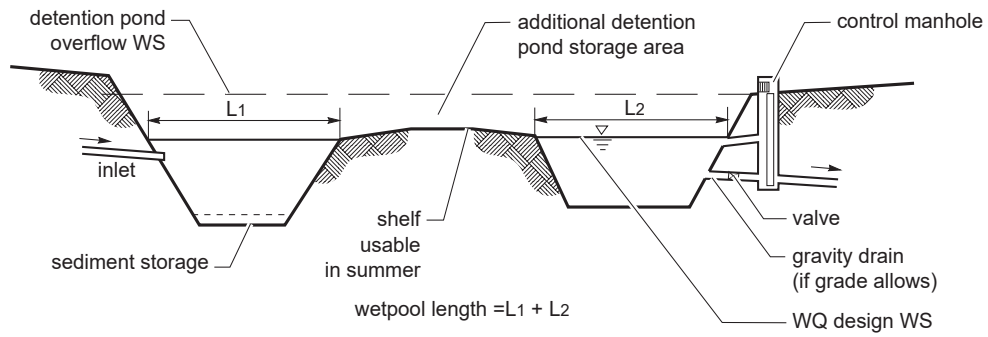
SECTION A-A NTS



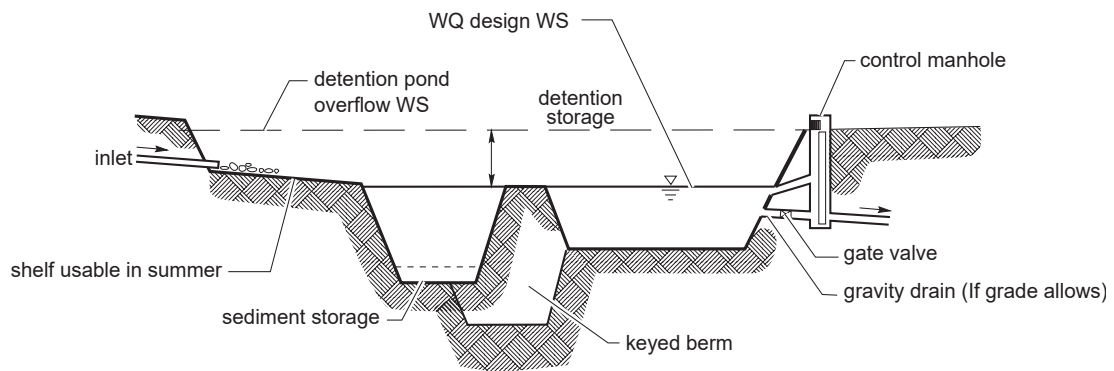
Note: See detention facility requirements for location, interior & exterior sideslopes, and setback requirements.

SECTION B-B NTS

Figure 10.10 – Combined Detention and Wetpond (Continued)



SECTION VIEW
NTS



SECTION VIEW
NTS

Note: These examples show how the combined detention/wetpool can be configured to allow for "shelves" for joint use opportunities in dry weather. Other options may also be acceptable.

Figure 10.11 – Alternative Configurations of Detention and Wetpool Areas

Inlet and Outlet

The "Inlet and Outlet" criteria for wetponds shall apply with the following modifications:

- A sump must be provided in the outlet structure of combined ponds.
- The detention flow restrictor and its outlet pipe shall be designed according to the requirements for detention ponds (see Volume III).

Access and Setbacks

Same as for wetponds.

Planting Requirements

Same as for wetponds.

Combined Detention and Wetvault

The sizing procedure for combined detention and wetvaults is identical to those outlined for wetvaults and for detention facilities. The wetvault volume for a combined facility shall be equal to or greater than the total volume of runoff from the 6-month, 24-hour storm event. Alternatively, the 91st percentile, 24-hour runoff volume estimated by an approved continuous runoff model may be used to size the wetpool portion of vault. Follow the standard procedure specified in Volume 3 to size the detention portion of the vault.

The design criteria for detention vaults and wetvaults must both be met, except for the following modifications or clarifications:

- The minimum sediment storage depth in the first cell shall average 1-foot. The 6 inches of sediment storage required for detention vaults does not need to be added to this, but 6 inches of sediment storage must be added to the second cell to comply with detention vault sediment storage requirements.
- The oil retaining baffle shall extend a minimum of 2 feet below the WQ design water surface.

Intent: The greater depth of the baffle in relation to the WQ design water surface compensates for the greater water level fluctuations experienced in the combined vault. The greater depth is deemed prudent to better ensure that separated oils remain within the vault, even during storm events.

Note: If a vault is used for detention as well as water quality control, the facility may not be modified to function as a baffle oil/water separator as allowed for wetvaults in BMP T10.20. This is because the added pool fluctuation in the combined vault does not allow for the quiescent conditions needed for oil separation.

Combined Detention and Stormwater Wetland

The sizing procedure for combined detention and stormwater wetlands is identical to those outlined for stormwater wetlands and for detention facilities. Follow the procedure specified in BMP T10.30 to determine the

stormwater wetland size. Follow the standard procedure specified in Volume III to size the detention portion of the wetland.

The design criteria for detention ponds and stormwater wetlands must both be met, except for the following modifications or clarifications:

- The "Wetland Geometry" criteria for stormwater wetlands (see BMP T10.30) are modified as follows:
- The minimum sediment storage depth in the first cell is 1-foot. The 6 inches of sediment storage required for detention ponds does not need to be added to this, nor does the 6 inches of sediment storage in the second cell of detention ponds need to be added.

Intent: Since emergent plants are limited to shallower water depths, the deeper water created before sediments accumulate is considered detrimental to robust emergent growth. Therefore, sediment storage is confined to the first cell which functions as a presettling cell.

The "Inlet and Outlet" criteria for wetponds shall apply with the following modifications:

- A sump must be provided in the outlet structure of combined facilities.
- The detention flow restrictor and its outlet pipe shall be designed according to the requirements for detention ponds (see Volume III).

The "Planting Requirements" for stormwater wetlands are modified to use the following plants which are better adapted to water level fluctuations:

Scirpus acutus (hardstem bulrush)	2 - 6' depth
Scirpus microcarpus (small-fruited bulrush)	1 - 2.5' depth
Sparganium emersum (burreed)	1 - 2' depth
Sparganium eurycarpum (burreed)	1 - 2' depth
Veronica sp. (marsh speedwell)	0 - 1' depth

In addition, the shrub *Spirea douglasii* (Douglas spirea) may be used in combined facilities.

Water Level Fluctuation Restrictions: The difference between the WQ design water surface and the maximum water surface associated with the 2-year runoff shall not be greater than 3 feet. If this restriction cannot be met, the size of the stormwater wetland must be increased. The additional area may be placed in the first cell, second cell, or both. If placed in the second cell, the additional area need not be planted with wetland vegetation or counted in calculating the average depth.

Intent: This criterion is designed to dampen the most extreme water level fluctuations expected in combined facilities to better ensure that fluctuation-tolerant wetland plants will be able to survive in the facility. It is not intended to protect native wetland plant communities and is not to be applied to natural wetlands.

BMP T10.40 Combined Detention and Wetpool Facilities

Purpose and Definition

Combined detention and WQ wetpool facilities have the appearance of a detention facility but contain a permanent pool of water as well. The following design procedures, requirements, and recommendations cover differences in the design of the stand-alone WQ facility when combined with detention storage. The following combined facilities are addressed:

- Detention/wetpond (basic and large)
- Detention/wetvault
- Detention/stormwater wetland.

There are two sizes of the combined wetpond, a basic and a large, but only a basic size for the combined wetvault and combined stormwater wetland. The facility sizes (basic and large) are related to the pollutant removal goals. See Chapter 3 for more information about treatment performance goals.

Applications and Limitations

Combined detention and water quality facilities are very efficient for sites that also have detention requirements. The water quality facility may often be placed beneath the detention facility without increasing the facility surface area. However, the fluctuating water surface of the live storage will create unique challenges for plant growth and for aesthetics alike.

The basis for pollutant removal in combined facilities is the same as in the stand-alone WQ facilities. However, in the combined facility, the detention function creates fluctuating water levels and added turbulence. For simplicity, the positive effect of the extra live storage volume and the negative effect of increased turbulence are assumed to balance, and are thus ignored when sizing the wetpool volume. For the combined detention/stormwater wetland, criteria that limit the extent of water level fluctuation are specified to better ensure survival of the wetland plants.

Unlike the wetpool volume, the live storage component of the facility should be provided above the seasonal high water table.

Combined Detention and Wetpond (Basic and Large)

Typical design details and concepts for a combined detention and wetpond are shown in Figures 10.9 and 10.10. The detention portion of the facility shall meet the design criteria and sizing procedures set forth in Volume 3.

Sizing Procedure

The sizing procedure for combined detention and wetponds are identical to those outlined for wetponds and for detention facilities. The wetpool volume for a combined facility shall be equal to or greater than the total volume of runoff from the 6-month, 24-hour storm event. Alternatively, the 91st percentile, 24-hour runoff volume estimated by an approved continuous runoff model may be used to size the wetpool. Follow the standard procedure specified in Volume III to size the detention portion of the pond.

Detention and Wetpool Geometry

- The wetpool and sediment storage volumes shall not be included in the required detention volume.
- The "Wetpool Geometry" criteria for wetponds (see BMP T10.10) shall apply with the following modifications/clarifications:

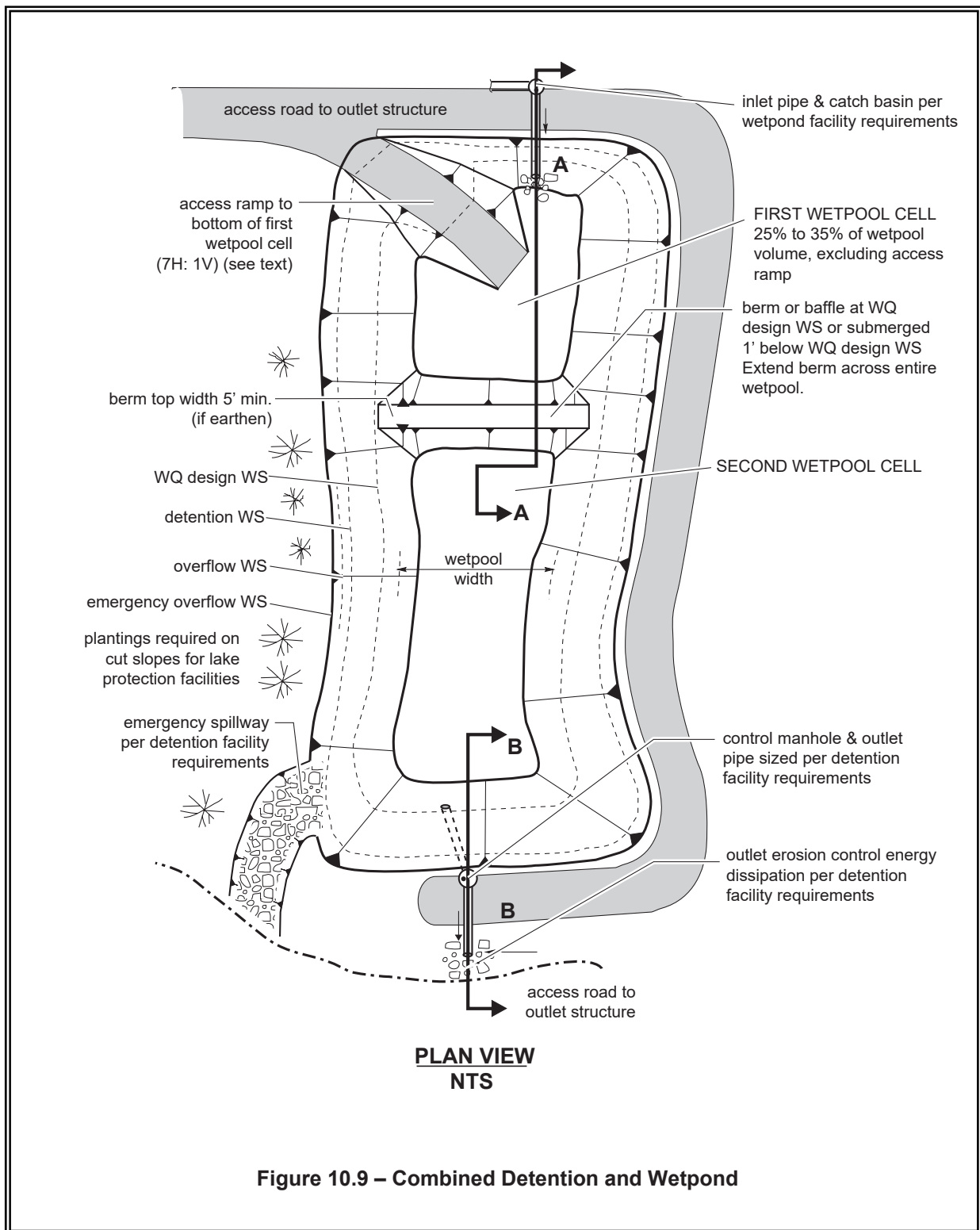
Criterion 1: The permanent pool may be made shallower to take up most of the pond bottom, or deeper and positioned to take up only a limited portion of the bottom. Note, however, that having the first wetpool cell at the inlet allows for more efficient sediment management than if the cell is moved away from the inlet. Wetpond criteria governing water depth must, however, still be met. See Figure 10.11 for two possibilities for wetpool cell placement.

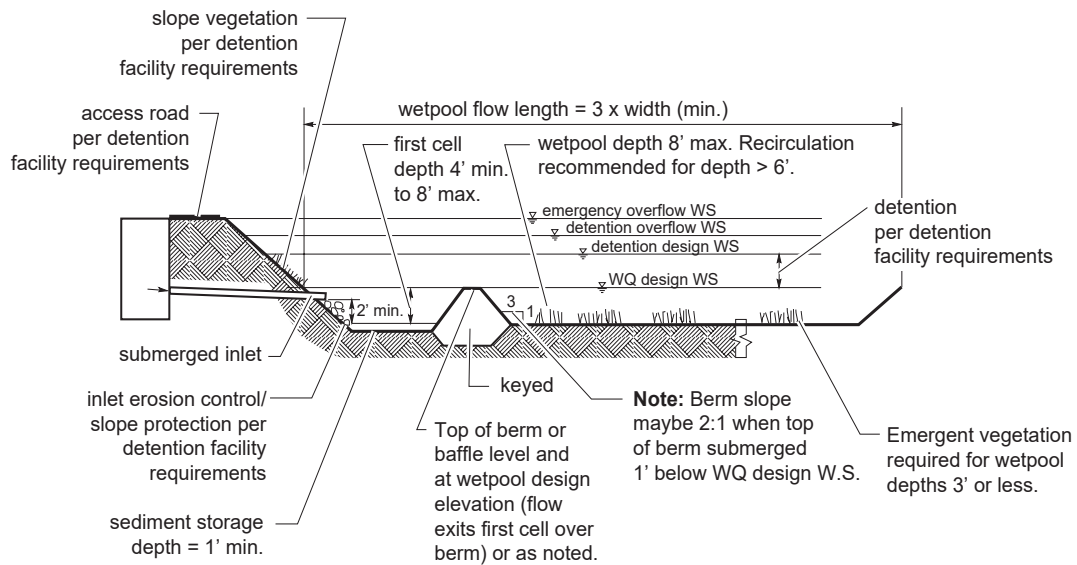
Intent: This flexibility in positioning cells is provided to allow for multiple use options, such as volleyball courts in live storage areas in the drier months.

Criterion 2: The minimum sediment storage depth in the first cell is 1-foot. The 6 inches of sediment storage required for detention ponds does not need to be added to this, but 6 inches of sediment storage must be added to the second cell to comply with the detention sediment storage requirement.

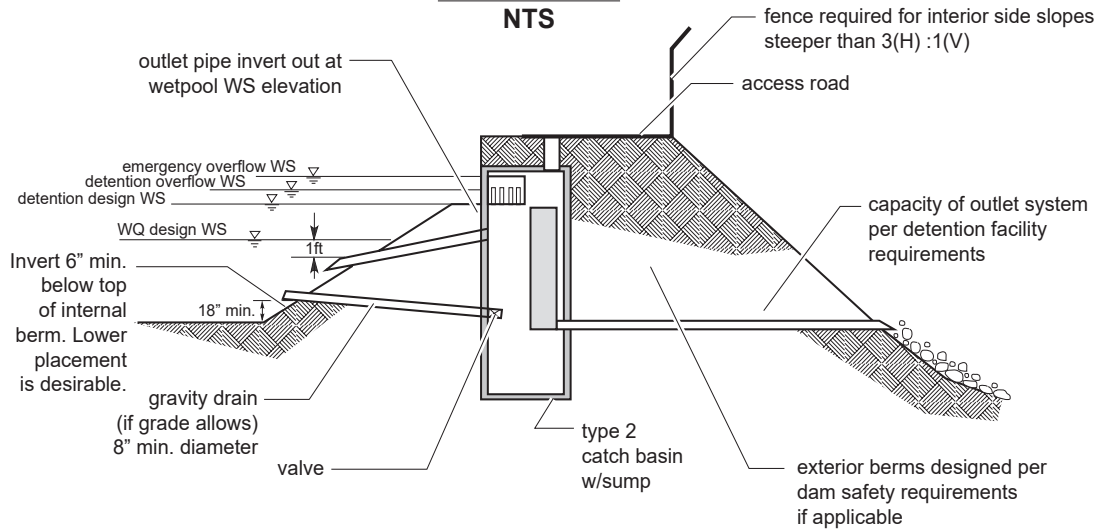
Berms, Baffles, and Slopes

Same as for wetponds (see BMP T10.10).





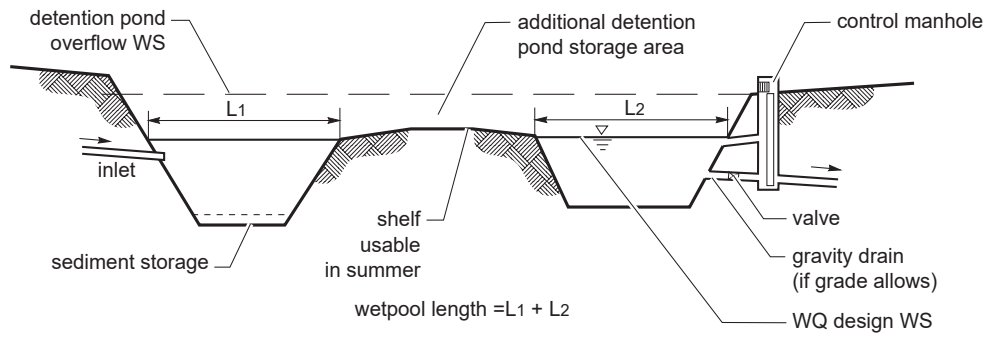
SECTION A-A NTS



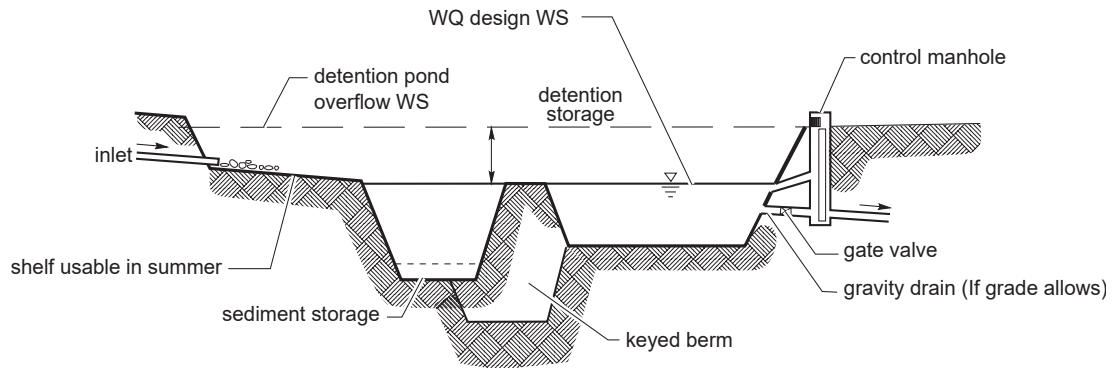
Note: See detention facility requirements for location, interior & exterior sideslopes, and setback requirements.

SECTION B-B NTS

Figure 10.10 – Combined Detention and Wetpond (Continued)



SECTION VIEW
NTS



SECTION VIEW
NTS

Note: These examples show how the combined detention/wetpool can be configured to allow for "shelves" for joint use opportunities in dry weather. Other options may also be acceptable.

Figure 10.11 – Alternative Configurations of Detention and Wetpool Areas

Inlet and Outlet

The "Inlet and Outlet" criteria for wetponds shall apply with the following modifications:

- A sump must be provided in the outlet structure of combined ponds.
- The detention flow restrictor and its outlet pipe shall be designed according to the requirements for detention ponds (see Volume III).

Access and Setbacks

Same as for wetponds.

Planting Requirements

Same as for wetponds.

Combined Detention and Wetvault

The sizing procedure for combined detention and wetvaults is identical to those outlined for wetvaults and for detention facilities. The wetvault volume for a combined facility shall be equal to or greater than the total volume of runoff from the 6-month, 24-hour storm event. Alternatively, the 91st percentile, 24-hour runoff volume estimated by an approved continuous runoff model may be used to size the wetpool portion of vault. Follow the standard procedure specified in Volume 3 to size the detention portion of the vault.

The design criteria for detention vaults and wetvaults must both be met, except for the following modifications or clarifications:

- The minimum sediment storage depth in the first cell shall average 1-foot. The 6 inches of sediment storage required for detention vaults does not need to be added to this, but 6 inches of sediment storage must be added to the second cell to comply with detention vault sediment storage requirements.
- The oil retaining baffle shall extend a minimum of 2 feet below the WQ design water surface.

Intent: The greater depth of the baffle in relation to the WQ design water surface compensates for the greater water level fluctuations experienced in the combined vault. The greater depth is deemed prudent to better ensure that separated oils remain within the vault, even during storm events.

Note: If a vault is used for detention as well as water quality control, the facility may not be modified to function as a baffle oil/water separator as allowed for wetvaults in BMP T10.20. This is because the added pool fluctuation in the combined vault does not allow for the quiescent conditions needed for oil separation.

Combined Detention and Stormwater Wetland

The sizing procedure for combined detention and stormwater wetlands is identical to those outlined for stormwater wetlands and for detention facilities. Follow the procedure specified in BMP T10.30 to determine the

stormwater wetland size. Follow the standard procedure specified in Volume III to size the detention portion of the wetland.

The design criteria for detention ponds and stormwater wetlands must both be met, except for the following modifications or clarifications:

- The "Wetland Geometry" criteria for stormwater wetlands (see BMP T10.30) are modified as follows:
- The minimum sediment storage depth in the first cell is 1-foot. The 6 inches of sediment storage required for detention ponds does not need to be added to this, nor does the 6 inches of sediment storage in the second cell of detention ponds need to be added.

Intent: Since emergent plants are limited to shallower water depths, the deeper water created before sediments accumulate is considered detrimental to robust emergent growth. Therefore, sediment storage is confined to the first cell which functions as a presettling cell.

The "Inlet and Outlet" criteria for wetponds shall apply with the following modifications:

- A sump must be provided in the outlet structure of combined facilities.
- The detention flow restrictor and its outlet pipe shall be designed according to the requirements for detention ponds (see Volume III).

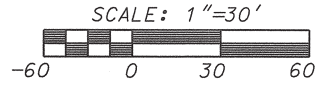
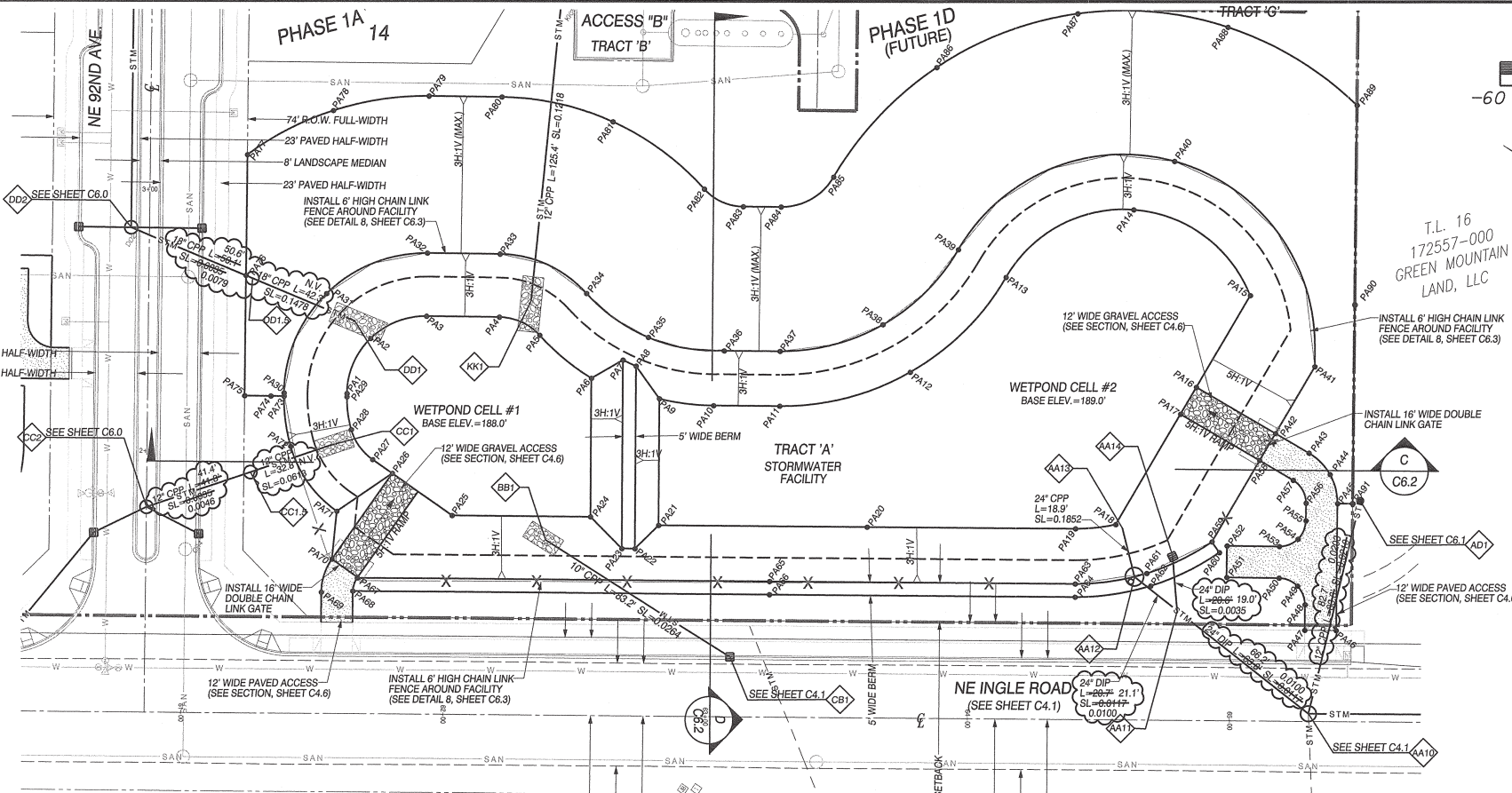
The "Planting Requirements" for stormwater wetlands are modified to use the following plants which are better adapted to water level fluctuations:

Scirpus acutus (hardstem bulrush)	2 - 6' depth
Scirpus microcarpus (small-fruited bulrush)	1 - 2.5' depth
Sparganium emersum (burreed)	1 - 2' depth
Sparganium eurycarpum (burreed)	1 - 2' depth
Veronica sp. (marsh speedwell)	0 - 1' depth

In addition, the shrub *Spirea douglasii* (Douglas spirea) may be used in combined facilities.

Water Level Fluctuation Restrictions: The difference between the WQ design water surface and the maximum water surface associated with the 2-year runoff shall not be greater than 3 feet. If this restriction cannot be met, the size of the stormwater wetland must be increased. The additional area may be placed in the first cell, second cell, or both. If placed in the second cell, the additional area need not be planted with wetland vegetation or counted in calculating the average depth.

Intent: This criterion is designed to dampen the most extreme water level fluctuations expected in combined facilities to better ensure that fluctuation-tolerant wetland plants will be able to survive in the facility. It is not intended to protect native wetland plant communities and is not to be applied to natural wetlands.

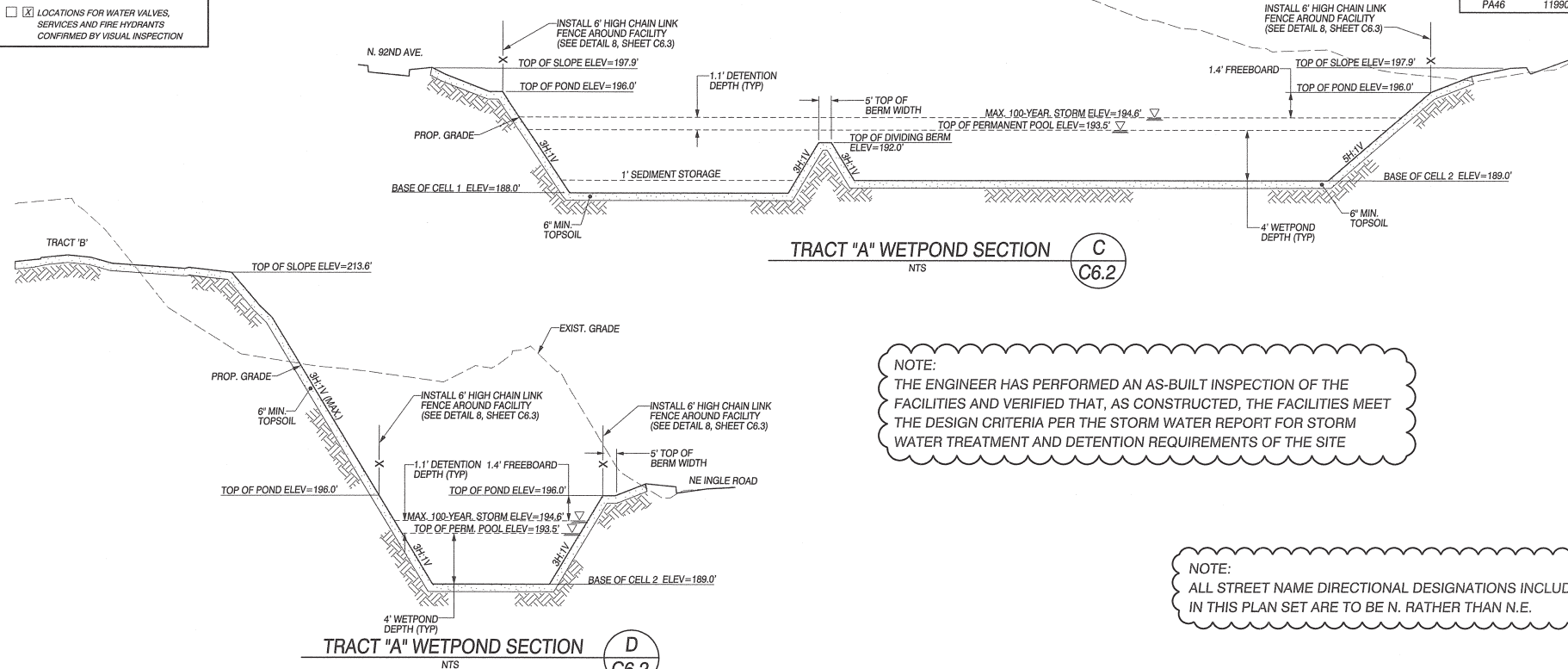
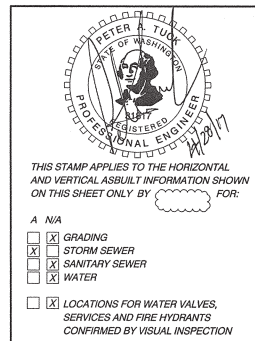


- STORMWATER FACILITY CONSTRUCTION NOTES:
- 1) THE STORMWATER DRAINAGE FACILITY SHALL BE OWNED AND MAINTAINED BY THE H.O.A. WITH AN EASEMENT DEDICATED TO THE CITY OF CAMAS FOR ACCESS AND INSPECTION.
 - 2) THE CONTRACTOR SHALL ENSURE THAT ALL EROSION CONTROL MEASURES ARE IN PLACE AND IN WORKING CONDITION PRIOR TO COMMENCEMENT OF DRAINAGE FACILITY CONSTRUCTION.
 - 3) POND GRADING AND SEEDING SHALL OCCUR AS SOON AS POSSIBLE. ONCE SEEDING THE AREA SHALL BE WATERED AS REQUIRED TO GERMINATE AND MAINTAIN A HEALTHY GROWTH OF GRASS.
 - 4) VEGETATION FOR THE FACILITY SHOULD BE A SEED MIX CONSISTING OF:
30% CHATEAU KENTUCKY BLUEGRASS
40% COCHISE TURF, TALL FESCUE TYPE
30% DELAWARE DWARF PERENNIAL RYEGRASS
PREPARE GROUND, SEEDING RATE, FERTILIZER, AND MULCHING AS PER THE MANUFACTURER'S RECOMMENDATIONS.
 - 5) A 6 FOOT HIGH BLACK VINYL-COATED CYCLONE FENCE OR APPROVED EQUAL SHALL BE INSTALLED AROUND THE PERIMETER OF THE DRAINAGE FACILITY AND A STANDARD 16 FOOT WIDE GATE SHALL BE INSTALLED FOR POND ACCESS.

STORMWATER FACILITY STAKING TABLE

POINT	NORTHING	EASTING	ELEV.	POINT	NORTHING	EASTING	ELEV.
PA1	120272.22	2499619.49	188.02	PA47	119919.10	2499749.11	197.86
PA2	120276.55	2499642.04	188.00	PA48	119924.49	2499757.30	197.86
PA3	120263.66	2499661.04	188.00	PA49	119930.83	2499761.60	197.73
PA4	120240.47	2499676.31	188.00	PA50	119938.34	2499760.15	197.41
PA5	120223.84	2499679.14	188.00	PA51	119955.05	2499749.16	196.50
PA6	120198.33	2499676.53	188.00	PA52	119961.65	2499758.18	196.50
PA7	120192.25	2499688.07	192.00	PA53	119944.94	2499770.18	197.41
PA8	120186.83	2499689.95	192.00	PA54	119940.65	2499776.51	197.65
PA9	120172.49	2499684.62	189.00	PA55	119942.09	2499784.03	197.86
PA10	120153.88	2499693.99	189.00	PA56	119945.76	2499789.60	197.86
PA11	120132.91	2499707.92	189.00	PA57	119954.74	2499794.09	197.34
PA12	120098.91	2499746.56	189.00	PA58	119969.54	2499793.15	196.00
PA13	120089.91	2499797.04	189.00	PA59	119987.28	2499757.22	196.00
PA14	120062.89	2499845.65	189.00	PA60	119962.62	2499755.39	196.00
PA15	120007.79	2499843.53	189.00	PA61	119981.18	2499733.32	196.00
PA16	120005.23	2499802.93	189.00	PA62	119977.29	2499730.18	196.00
PA17	120004.47	2499790.95	189.00	PA63	120001.62	2499714.70	196.00
PA18	120001.39	2499742.11	189.00	PA64	119998.85	2499710.54	196.00
PA19	120013.24	2499732.19	189.00	PA65	120098.70	2499650.21	196.00
PA20	120079.45	2499688.21	189.00	PA66	120095.93	2499646.05	196.00
PA21	120145.65	2499644.23	189.00	PA67	120229.59	2499563.26	196.00
PA22	120148.17	2499631.75	192.00	PA68	120228.19	2499558.18	196.00
PA23	120152.34	2499628.98	192.00	PA69	120237.91	2499551.11	196.00
PA24	120168.97	2499632.34	188.00	PA70	120241.58	2499563.73	196.00
PA25	120212.90	2499603.16	188.00	PA71	120250.42	2499579.92	196.00
PA26	120240.76	2499603.73	188.00	PA72	120278.65	2499590.63	196.00
PA27	120249.93	2499603.91	188.00	PA73	120291.59	2499605.25	196.00
PA28	120263.11	2499608.91	188.00	PA74	120295.76	2499602.50	196.00
PA29	120271.54	2499618.45	188.00	PA75	120304.12	2499597.01	197.65
PA30	120292.27	2499606.29	196.00	PA76	120329.41	2499635.42	201.52
PA31	120300.06	2499646.88	196.00	PA77	120354.70	2499673.84	206.58
PA32	120276.86	2499681.09	196.00	PA78	120336.98	2499706.20	210.29
PA33	120253.67	2499696.35	196.00	PA79	120309.85	2499731.20	213.11
PA34	120218.02	2499702.42	196.00	PA80	120286.66	2499746.47	215.03
PA35	120189.13	2499701.73	196.00	PA81	120246.31	2499762.32	215.06
PA36	120162.71	2499713.44	196.00	PA82	120202.99	2499760.51	213.95
PA37	120144.53	2499725.41	196.00	PA83	120186.99	2499763.23	212.46
PA38	120117.75	2499755.86	196.00	PA84	120174.96	2499771.23	211.90
PA39	120109.86	2499795.63	196.00	PA85	120164.74	2499791.93	211.86
PA40	120060.32	2499869.72	196.00	PA86	120155.60	2499848.75	212.34
PA41	119972.16	2499834.77	196.02	PA87	120122.49	2499895.82	213.57
PA42	119970.30	2499805.13	196.00	PA88	120072.11	2499923.63	213.12
PA43	119955.50	2499806.06	197.03	PA89	120014.64	2499926.56	209.51
PA44	119944.29	2499803.79	197.91	PA90	119972.77	2499862.97	198.78
PA45	119935.74	2499796.20	197.92	PA91	119930.91	2499799.38	197.97
PA46	119909.11	2499755.75	197.92				

EXAMPLE WETPOND DESIGN DEMONSTRATING THAT THE GREEN MOUNTAIN PRD B1 POD WILL BE ABLE TO CONSTRUCT A SIMILAR FACILITY WITHIN 1-ACRE OF OFF-SITE PROPERTY



NOTE: THE ENGINEER HAS PERFORMED AN AS-BUILT INSPECTION OF THE FACILITIES AND VERIFIED THAT, AS CONSTRUCTED, THE FACILITIES MEET THE DESIGN CRITERIA PER THE STORM WATER REPORT FOR STORM WATER TREATMENT AND DETENTION REQUIREMENTS OF THE SITE

NOTE: ALL STREET NAME DIRECTIONAL DESIGNATIONS INCLUDED IN THIS PLAN SET ARE TO BE N. RATHER THAN N.E.

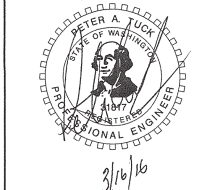
STORM SEWER NOTES

- AA10 SEE SHEET C4.1
- AA11 STA 64+79.54 (42.15' LT-NE INGLE ROAD) INSTALL: (1) 18" - 45" WYE IE=193.30
- AA12 STA 64+63.17 (54.87' LT-NE INGLE ROAD) INSTALL 12" STORM SEWER FLOW CONTROL MH. (SEE DETAIL 3, SHEET C6.3)
- AA13 STA 64+58.45 (73.21' LT-NE INGLE ROAD) INSTALL 24" PIPE OUTLET WITH DEBRIS BARRIER. IE=190.00 (SEE DETAIL 6, SHEET C6.3)
- AA14 STA 64+77.71 (62.64' LT-NE INGLE ROAD) INSTALL EMERGENCY OVERFLOW DITCH INLET RIM=195.00 IE=193.38 (SEE DETAIL SD6, SHEET C9.8)
- BB1 STA 62+38.45 (67.00' LT-NE INGLE RD) INSTALL 10" OUTFALL W/ HAND-PLACED RIP RAP. (SEE DETAIL 5, SHEET C6.3)
- CC1 STA 2+02.92 (70.43' RT-NE 92ND AVE.) INSTALL 12" OUTFALL W/ HAND-PLACED RIP RAP. (SEE DETAIL 5, SHEET C6.3)
- CC1.5 STA 1+92.16 (39.50' RT-NE 92ND AVE.) INSTALL STD. STORM SEWER MH.
- DD1 STA 2+50.61 (78.71' RT-NE 92ND AVE.) INSTALL 18" OUTFALL W/ HAND-PLACED RIP RAP. (SEE DETAIL 5, SHEET C6.3)
- DD1.5 STA 2+66.44 (39.50' RT-NE 92ND AVE.) INSTALL STD. STORM SEWER MH.
- KK1 STA 1+74.86 (125.33' LT-NE 92ND AVE.) INSTALL 12" OUTFALL W/ HAND-PLACED RIP RAP. (SEE DETAIL 5, SHEET C6.3)

ASBUILTS

TRACT "A" STORMWATER FACILITY PLAN AND SECTIONS FOR:
GREEN MOUNTAIN MIXED USE P.R.D.
PHASES 1A & 1B

OLSON LAND SURVEYORS
ENGINEERS
ENGINEERING INC. 222 E. EVERGREEN BLVD., VANCOUVER, WA 98660



CHANGES / REVISIONS	
DESCRIPTION:	DATE:
STREET NAMES	6/17/16
STORM SEWER DEPTH	7/22/16
FENCE HEIGHT	8/16/16
DESIGNED: RWP	
DRAWN: RWP	
CHECKED: PAT	
DATE: MARCH 2016	
SCALE: H: 1"=30' V:	
COPYRIGHT 2016, OLSON ENGINEERING, INC.	
GREEN MOUNTAIN MIXED USE P.R.D. PHASES 1A & 1B	
8938.01.02	
SHEET	
C6.2	

Appendix III: Geotechnical Report



Real-World Geotechnical Solutions
Investigation • Design • Construction Support

Revised December 3, 2014
Project No. 13-3186

John O'Neil
Metropolitan Land Group, LLC
17933 NW Evergreen Parkway, Suite 300
Beaverton, Oregon 97006

SUBJECT: PRELIMINARY GEOTECHNICAL ENGINEERING REPORT
GREEN MOUNTAIN - PHASE 1
NE INGLE ROAD & NE 28TH STREET
CAMAS, WASHINGTON

This report presents the results of a geotechnical engineering study conducted by GeoPacific Engineering, Inc. (GeoPacific) for the above-referenced project. The purpose of our investigation was to evaluate subsurface conditions at the site and to provide geotechnical recommendations for site development. This geotechnical study was performed in accordance with GeoPacific Proposal No. P-4836, dated April 30, 2014, and your subsequent authorization of our proposal and *General Conditions for Geotechnical Services*. This report is considered Preliminary because a final grading plan has not been developed.

SITE DESCRIPTION AND PROPOSED DEVELOPMENT

The Green Mountain site is located on the north side of NE Goodwin Road and east of NE Ingle Road in the City of Camas, Clark County, Washington. The property includes several tax lots that total approximately 281.6 acres. Topography on the southern portion of the site is flat to gently sloping with grades of about 5 to 10 percent. Steeper slopes (up to 35 percent grade) are present on Green Mountain, which is a basalt cinder cone, located in the northern portion of the site. Near vertical slopes are present at the base of Green Mountain where basalt bedrock is exposed.

Phase 1 is approximately 51 acres and located in the southern portion of the site, which is part of the Green Mountain Golf Course. Topography is flat to gently sloping with grades generally about 5 to 20 percent. Improvements include several structures, parking areas and driveways, cart tracks, manmade ponds, and fairways. Vegetation consists of short grasses and sparse trees.

It is our understanding that the proposed development will consist of a subdivision for single family homes, new streets, and associated underground utilities. A grading plan has not been provided for our review; however, we anticipate maximum cuts and fills will be on the order of about 12 feet due to the sloping topography and filling of existing ponds.

REGIONAL AND LOCAL GEOLOGIC SETTING

Regionally, the subject site lies within the Willamette Valley/Puget Sound lowland, a broad structural depression situated between the Coast Range on the west and the Cascade Range on the east. A series of discontinuous faults subdivide the Willamette Valley into a mosaic of fault-bounded, structural blocks (Yeats et al., 1996). Uplifted structural blocks form bedrock highlands, while down-warped structural blocks form sedimentary basins.

The low-lying portion of the site is underlain by the Quaternary aged (last 1.6 million years) Willamette Formation, a catastrophic flood deposits associated with repeated glacial outburst flooding of the Willamette Valley (Trimble, 1963; Yeats et al., 1996; Phillips, 1987). The last of these outburst floods occurred about 10,000 years ago. These deposits typically consist of horizontally layered, micaceous, silty sand with gravel that is underlain by medium dense to dense gravel.

The Willamette Formation is underlain by a gravel conglomerate interbedded with siltstone and sandstone. Evarts (2006) indicates the age of the conglomerate is poorly constrained but is likely Pliocene to Pleistocene in age (10,000 to 5.3 million years ago). The conglomerate is partially cemented with the upper portion moderately weathered.

The northern portion of the Green Mountain site is underlain by Basaltic Andesite of Green Mountain (Evarts, 2006). The gray basaltic andesite lava flows erupted from a cinder cone on Green Mountain during the Pleistocene (2.6 to 5.3 million years ago). The basalt contains weathered ash, trace quartzite pebbles, and fine grained xenoliths (Evarts, 2006).

A portion of the site is underlain by Miocene to Pleistocene age (16 to 0.5 million years ago) terrigenous sedimentary rocks belonging to the Troutdale Formation (Evarts, 2006). The Troutdale Formation is informally divided into an upper and lower member. Lithologies in the upper member include lenticular layers of volcanoclastic (vitric) sand, quartzite-bearing gravel, fine-grained sand, silt and clay, micaceous quartz-rich sand, and conglomerate with a cumulative average thickness of 100 to 150 feet. The lower member consists primarily of laminated silty clay and sand with reported thicknesses in water well logs of up to 800 feet. These sediments vary from weakly-consolidated to well-indurated.

REGIONAL SEISMIC SETTING

At least four potential source zones capable of generating damaging earthquakes are thought to exist in the region. These include the Lacamas Creek-Sandy River Fault, Portland Hills Fault Zone, Gales Creek-Newberg-Mt. Angel Structural Zone, and the Cascadia Subduction Zone, as discussed below.

Lacamas Creek-Sandy River Fault

The Lacamas Creek Fault is recognized based on a fault shear contact between Oligocene (30 million years old) volcanic rocks and the Troutdale Formation, and a series of prominent geomorphic lineaments with a cumulative length of 24 miles (Mundorff, 1964; Beeson et al., 1989). The Sandy River Fault, interpreted from gravity and borehole data, forms a possible right stepping, 7-mile-long extension of the Lacamas Creek Fault that vertically displaces the Columbia River Basalt by 1,300 feet (Beeson et al., 1989; Geomatrix Consultants, 1995). A 1989, M3.9 earthquake in the vicinity may have occurred on the Lacamas Creek Fault. A comprehensive seismic hazard study commissioned by the Oregon Department of Transportation concluded that

the Lacamas Creek-Sandy River Fault Zone is potentially active with a possible rupture length of greater than 25 miles. The Lacamas Creek Fault is mapped as being ½ mile southwest of the subject site (Figure 1).

Portland Hills Fault Zone

The Portland Hills Fault Zone is a series of NW-trending faults that include the central Portland Hills Fault, the western Oatfield Fault, and the eastern East Bank Fault. These faults occur in a northwest-trending zone that varies in width between 3.5 and 5.0 miles. The combined three faults vertically displace the Columbia River Basalt by 1,130 feet and appear to control thickness changes in late Pleistocene (approx. 780,000 years) sediment (Madin, 1990). The Portland Hills Fault occurs along the Willamette River at the base of the Portland Hills, and is about 13 miles southwest of the site. The Oatfield Fault occurs along the western side of the Portland Hills, and is about 16 miles southwest of the site. The accuracy of the fault mapping is stated to be within 500 meters (Wong, et al., 2000). No historical seismicity is correlated with the mapped portion of the Portland Hills Fault Zone, but in 1991 a M3.5 earthquake occurred on a NW-trending shear plane located 1.3 miles east of the fault (Yelin, 1992). Although there is no definitive evidence of recent activity, the Portland Hills Fault Zone is assumed to be potentially active (Geomatrix Consultants, 1995).

Gales Creek-Newberg-Mt. Angel Structural Zone

The Gales Creek-Newberg-Mt. Angel Structural Zone is a 50-mile-long zone of discontinuous, NW-trending faults that lies about 36 miles southwest of the subject site. These faults are recognized in the subsurface by vertical separation of the Columbia River Basalt and offset seismic reflectors in the overlying basin sediment (Yeats et al., 1996; Werner et al., 1992). A geologic reconnaissance and photogeologic analysis study conducted for the Scoggins Dam site in the Tualatin Basin revealed no evidence of deformed geomorphic surfaces along the structural zone (Unruh et al., 1994). No seismicity has been recorded on the Gales Creek Fault or Newberg Fault; however, these faults are considered to be potentially active because they may connect with the seismically active Mount Angel Fault and the rupture plane of the 1993 M5.6 Scotts Mills earthquake (Werner et al. 1992; Geomatrix Consultants, 1995).

Cascadia Subduction Zone

The Cascadia Subduction Zone is a 680-mile-long zone of active tectonic convergence where oceanic crust of the Juan de Fuca Plate is subducting beneath the North American continent at a rate of 4 cm per year (Goldfinger et al., 1996). A growing body of geologic evidence suggests that prehistoric subduction zone earthquakes have occurred (Atwater, 1992; Carver, 1992; Peterson et al., 1993; Geomatrix Consultants, 1995). This evidence includes: (1) buried tidal marshes recording episodic, sudden subsidence along the coast of northern California, Oregon, and Washington, (2) burial of subsided tidal marshes by tsunami wave deposits, (3) paleoliquefaction features, and (4) geodetic uplift patterns on the Oregon coast. Radiocarbon dates on buried tidal marshes indicate a recurrence interval for major subduction zone earthquakes of 250 to 650 years with the last event occurring 300 years ago (Atwater, 1992; Carver, 1992; Peterson et al., 1993; Geomatrix Consultants, 1995). The inferred seismogenic portion of the plate interface lies approximately 50 miles west of the Portland Basin at depths of between 20 and 40 kilometers below the surface.

FIELD EXPLORATION

Our site-specific exploration for Phase 1 was conducted on May 23rd, 2014. A total of 13 exploratory test pits were excavated with a medium sized trackhoe to depths ranging between 5 and 9 feet at the approximate locations shown on Figure 2. Test pits TP-1 and TP-12 are outside of the Phase 1 boundary due to a reconfiguration of the layout and are not presented. The previous investigation for the entire Green Mountain site consisted of 25 exploratory test pits excavated November 5th through 7th, 2013. Five test pits from the previous investigation are located within Phase 1 – test pits TP-1, TP-10, TP-13, TP-15, and TP-16. Test pits from the 2013 investigation for the entire Green Mountain site will be referred to as TP-1 (2013), TP-10 (2013), TP-13 (2013), TP-15 (2013), and TP-16 (2013). It should be noted that exploration locations were located in the field by pacing or taping distances from apparent property corners and other site features shown on the plans provided. As such, the locations of the explorations should be considered approximate.

A GeoPacific geologist continuously monitored the field exploration program and logged the borings. Soils observed in the explorations were classified in general accordance with the Unified Soil Classification System. During exploration, our geologist also noted geotechnical conditions such as soil consistency, moisture and groundwater conditions. Logs of test pits are attached to this report. The following report sections are based on the exploration program and summarize subsurface conditions encountered at the site.

Undocumented Fill – Undocumented fill was encountered directly at the ground surface in test pits TP-2, TP-3, TP-4, TP-7, TP-8, TP-10, TP-11, and TP-13. The fill generally consisted of brown, medium stiff to stiff, silt (ML) with gravel, clay, and sand and medium dense, silty sand (SM). The fill extended to a depth of 1.5 to 3.5 feet. It is likely that other areas of undocumented fill exist in the vicinity of the existing structures, driveways, and the throughout the golf course.

Topsoil Horizon – The ground surface in test pits TP-5, TP-6, TP-9, TP-1 (2013), TP-10 (2013), TP-13 (2013), TP-15 (2013), and TP-16 (2013) was directly underlain by a low to highly organic topsoil horizon. The dark brown silt (OL-ML) contained trace amounts of sand and contained fine roots throughout. The topsoil horizon was loose and extended to a depth of 6 to 18 inches.

Colluvial Soil – Colluvial soil, formed by downward migration of material under gravitational forces, was encountered beneath the topsoil horizon in test pit TP-15. These soils generally consisted of stiff to very stiff, silty clay (CL) to clayey silt (ML) with weathered basalt that displayed strong orange and gray mottling. In explorations, the colluvial soil extended to a depth of 3 feet in test pit TP-15.

Buried Topsoil Horizon – A low organic, buried topsoil horizon was encountered beneath the fill in test pit TP-8. The buried topsoil horizon was on the order of 6 inches in thickness - extending to a depth of 3 feet.

Fine Grained Catastrophic Flood Deposits (Willamette Formation) – Underlying the topsoil horizon in test pits TP-5, TP-6, TP-9, TP-1 (2013), TP-10 (2013), and TP-13 (2013); the buried topsoil horizon in test pit TP-8; and the fill in test pits TP-2, TP-4, TP-7, TP-10, and TP-13 was fine grained catastrophic flood deposits. These soils generally consisted of stiff to very stiff, light brown, clayey silt (ML) with trace sand that displayed subtle to strong orange and gray mottling. Where encountered, the flood deposits generally extended to a depth of 3 to 7 feet and beyond the maximum depth of exploration in test pits TP-4, TP-7, TP-8, and TP-1 (2013) excavated to a maximum depth of 8.5 feet.

Conglomerate – Underlying the topsoil horizon in test pits TP-15 (2013) and TP-16 (2013); the fill in test pit TP-3, and the fine grained catastrophic flood deposits in test pits TP-2, TP-5, TP-6, TP-9, TP-10, TP-13, TP-10 (2013), and TP-13 (2013) was dense to very dense subrounded gravel (GM) with sandy, clayey silt matrix; dense, silty sand (SM); and stiff silt (ML) with subrounded gravel. The conglomerate was partially cemented and extended beyond the maximum depth of exploration (6 to 10.5 feet).

Soil Moisture and Groundwater

On May 23, 2014 and November 5 through 7, 2013, soils encountered in test pits were moist to wet. Groundwater seepage was encountered in test pits TP-2, TP-5 through TP-9, TP-13, TP-1 (2013), TP-13 (2013), TP-15 (2013) and TP-16 (2013) at depths of 2 to 8.5 feet. Discharge was visually estimated at ¼ to 2 gallons per minute. In test pit TP-1 (2013), the static groundwater level rose to a depth of 2 feet after the test pit had been left open for a time period of several hours. Experience has shown that temporary perched storm-related groundwater conditions often occur within the surface soils over fine-grained native deposits such as those beneath the site, particularly during the wet season. It is anticipated that groundwater conditions will vary depending on the season, local subsurface conditions, changes in site utilization, and other factors.

SLOPE STABILITY

For the purpose of evaluating slope stability, we: (1) reviewed regional 1:24,000 scale topography by the U.S. Geological Survey and published geologic mapping, (2) reviewed 1:150 scale topographic survey mapping of the site by Olson Engineering, Inc., (3) performed a geological reconnaissance of the site, and (4) evaluated subsurface soil conditions in exploratory test pits. Regional slope stability mapping of Clark County, Washington published by the Washington Department of Natural Resources Division of Geology identifies an area of potential instability on the southwest side of Green Mountain (Fiksdal, 1975). This area roughly correlates with the near vertical rock exposures at the base of Green Mountain that is north of the Phase 1 area. No mapped landslides are indicated in the Phase 1 study area on more recent geologic mapping conducted by Evarts (2006).

Based on the data review, field reconnaissance and site exploration, the slope instability hazard for the Phase 1 portion of the Green Mountain property is considered to be low. Slopes in the Phase 1 area are on the order of 5 to 20 percent. Slope geomorphology at the site is generally smooth and uniform - consistent with relative stability. Subsurface explorations indicate the site is generally underlain by stiff to very-stiff, clayey silt (ML) loess underlain by dense to very dense, silty gravel (GM). These materials are generally characterized by moderate to high shear strength and a relatively high resistance to slope instability on gentle slopes. The Phase 1 area is considered generally suitable for development.

PRELIMINARY CONCLUSIONS AND RECOMMENDATIONS

Our investigation indicates that the proposed development is geotechnically feasible, provided that the recommendations of this report are incorporated into the design and construction phases of the project. The primary geotechnical constraint to development is the presence of fill throughout the site. Up to 5 feet of fill was encountered in the exploratory test pits. It is anticipated that fill is prevalent throughout the fairway areas of the golf course where sand traps, ponds, and sculpted topography have been created.

Stormwater Disposal

Soil conditions at the site generally consist of fine grained flood deposits (consisting of clayey silt with sand) underlain by coarse grained, partially cemented conglomerate consisting of subrounded gravel with a clayey silt matrix and trace sand. Orange and gray mottling was observed in near surface soils in all explorations. Soil moisture conditions were moist to wet and perched groundwater seepage was encountered in test pits TP-2, TP-5 through TP-9, TP-13, TP-1 (2013), TP-13 (2013), TP-15 (2013) and TP-16 (2013) at depths of 2 to 8.5 feet. Static groundwater was measured at a depth of 2 feet below the ground surface in test pit TP-1 (2013). Soil mottling, the presence of clay soils, and the prevalent groundwater seepage indicates the soils will likely accept little runoff – if any. Soils with moderate permeability are already saturated with perched groundwater. We would expect soil conditions to behave more as Soil Group 4 soils than Soil Group 3 soils outlined in the Western Washington Continuous Simulation Hydrology Model.

Site Preparation

Due to the presence of fill through the site, areas of proposed construction and areas to receive fill should be cleared of vegetation and existing fill soils should then be removed to stiff or dense native soils. Organic soils are likely present at the bottom of the ponds and should be removed to stiff, native soils. Inorganic debris and organic materials from clearing should be removed from the site. It is likely that the existing fill may be reused as engineered fill provided that they are properly moisture conditioned and free of organic or inorganic debris. Organic-rich root zones should then be stripped from construction areas of the site or where engineered fill is to be placed. Depth of stripping is estimated to average 8+ inches. The final depth of soil removal will be determined on the basis of a site inspection after the stripping/ excavation has been performed. Stripped topsoil should preferably be removed from the site. Any remaining topsoil should be stockpiled only in designated areas and stripping operations should be observed and documented by the geotechnical engineer or his representative.

Remaining undocumented fills and any subsurface structures (dry wells, basements, driveway and landscaping fill, old utility lines, septic leach fields, etc.) should be removed and the excavations backfilled with engineered fill. Fill in excess of 5 feet was encountered directly at the ground surface in test pits for this investigation. Sculpted topography in the vicinity of the fairways indicates the presence of fill. We anticipate that other areas of fill may exist in the vicinity of the existing structures, parking lots, and driveways.

Engineered Fill

All grading for the proposed construction should be performed as engineered grading in accordance with the applicable building code at time of construction with the exceptions and additions noted herein. Proper test frequency and earthwork documentation usually requires daily observation and testing during stripping, rough grading, and placement of engineered fill. Imported fill material must be approved by the geotechnical engineer prior to being imported to the site. Oversize material greater than 6 inches in size should not be used within 3 feet of foundation footings, and material greater than 12 inches in diameter should not be used in engineered fill.

Engineered fill should be compacted in horizontal lifts not exceeding 8 inches using standard compaction equipment. We recommend that engineered fill be compacted to at least 90% of the maximum dry density determined by ASTM D1557 (Modified Proctor) or equivalent. Field density testing should conform to ASTM D2922 and D3017, or D1556. All engineered fill should be observed and tested by the project geotechnical engineer or his representative. Typically, one density test is performed for at least every 2 vertical feet of fill placed or every 500 yd³, whichever

requires more testing. Because testing is performed on an on-call basis, we recommend that the earthwork contractor be held contractually responsible for test scheduling and frequency.

Site earthwork will be impacted by soil moisture and shallow groundwater conditions. Earthwork in wet weather would likely require extensive use of cement or lime treatment, or other special measures, at considerable additional cost compared to earthwork performed under dry-weather conditions.

Excavating Conditions and Utility Trenches

We anticipate that on-site soils can be excavated using conventional heavy equipment such as trackhoes to a depth of 9 feet. All temporary cuts in excess of 4 feet in height should be sloped in accordance with U.S. Occupational Safety and Health Administration (OSHA) regulations (29 CFR Part 1926), or be shored. The existing native soil is classified as Type B Soil and temporary excavation side slope inclinations as steep as 1H:1V may be assumed for planning purposes. This cut slope inclination is applicable to excavations above the water table only. Maintenance of safe working conditions, including temporary excavation stability, is the responsibility of the contractor. Actual slope inclinations at the time of construction should be determined based on safety requirements and actual soil and groundwater conditions.

Soft, saturated soils and groundwater may be encountered in utility trenches, particularly during the wet season. We anticipate that dewatering systems consisting of ditches, sumps and pumps would be adequate for control of perched groundwater. Regardless of the dewatering system used, it should be installed and operated such that in-place soils are prevented from being removed along with the groundwater. Trench bottom stabilization, such as one to two feet of compacted crushed aggregate base, may be necessary in deeper trenches.

Vibrations created by traffic and construction equipment may cause some caving and raveling of excavation walls. In such an event, lateral support for the excavation walls should be provided by the contractor to prevent loss of ground support and possible distress to existing or previously constructed structural improvements.

PVC pipe should be installed in accordance with the procedures specified in ASTM D2321. We recommend that trench backfill be compacted to at least 95% of the maximum dry density obtained by Modified Proctor ASTM D1557 or equivalent. Initial backfill lift thickness for a ¾"-0 crushed aggregate base may need to be as great as 4 feet to reduce the risk of flattening underlying flexible pipe. Subsequent lift thickness should not exceed 1 foot. If imported granular fill material is used, then the lifts for large vibrating plate-compaction equipment (e.g. hoe compactor attachments) may be up to 2 feet, provided that proper compaction is being achieved and each lift is tested. Use of large vibrating compaction equipment should be carefully monitored near existing structures and improvements due to the potential for vibration-induced damage.

Adequate density testing should be performed during construction to verify that the recommended relative compaction is achieved. Typically, one density test is taken for every 4 vertical feet of backfill on each 200-lineal-foot section of trench.

Erosion Control Considerations

During our field exploration program, we did not observe soil types that would be considered highly susceptible to erosion, except in areas of steeply sloping topography. In our opinion, the primary concern regarding erosion potential will occur during construction, in areas that have been stripped of vegetation. Erosion at the site during construction can be minimized by implementing the

project erosion control plan, which should include judicious use of straw bales and silt fences. If used, these erosion control devices should be in place and remain in place throughout site preparation and construction.

Erosion and sedimentation of exposed soils can also be minimized by quickly re-vegetating exposed areas of soil, and by staging construction such that large areas of the project site are not denuded and exposed at the same time. Areas of exposed soil requiring immediate and/or temporary protection against exposure should be covered with either mulch or erosion control netting/blankets. Areas of exposed soil requiring permanent stabilization should be seeded with an approved grass seed mixture, or hydroseeded with an approved seed-mulch-fertilizer mixture.

Wet Weather Earthwork

Soils underlying the site are likely to be moisture sensitive and may be difficult to handle or traverse with construction equipment during periods of wet weather. Earthwork is typically most economical when performed under dry weather conditions. Earthwork performed during the wet-weather season will probably require expensive measures such as cement treatment or imported granular material to compact fill to the recommended engineering specifications. If earthwork is to be performed or fill is to be placed in wet weather or under wet conditions when soil moisture content is difficult to control, the following recommendations should be incorporated into the contract specifications.

- Earthwork should be performed in small areas to minimize exposure to wet weather. Excavation or the removal of unsuitable soils should be followed promptly by the placement and compaction of clean engineered fill. The size and type of construction equipment used may have to be limited to prevent soil disturbance. Under some circumstances, it may be necessary to excavate soils with a backhoe to minimize subgrade disturbance caused by equipment traffic;
- The ground surface within the construction area should be graded to promote run-off of surface water and to prevent the ponding of water;
- Material used as engineered fill should consist of clean, granular soil containing less than 5 percent fines. The fines should be non-plastic. Alternatively, cement treatment of on-site soils may be performed to facilitate wet weather placement;
- The ground surface within the construction area should be sealed by a smooth drum vibratory roller, or equivalent, and under no circumstances should be left uncompacted and exposed to moisture. Soils which become too wet for compaction should be removed and replaced with clean granular materials;
- Excavation and placement of fill should be observed by the geotechnical engineer to verify that all unsuitable materials are removed and suitable compaction and site drainage is achieved; and
- Bales of straw and/or geotextile silt fences should be strategically located to control erosion.

If cement or lime treatment is used to facilitate wet weather construction, GeoPacific should be contacted to provide additional recommendations and field monitoring.

Anticipated Foundations

The proposed residential structures may be supported on shallow foundations bearing on competent undisturbed, native soils and/or engineered fill, appropriately designed and constructed as recommended in this report. Foundation design, construction, and setback requirements should conform to the applicable building code at the time of construction. For maximization of bearing strength and protection against frost heave, spread footings should be embedded at a minimum depth of 18 inches below exterior grade. The recommended minimum widths for continuous footings supporting wood-framed walls without masonry are 12 inches for single-story, 15 inches for two-story, and 18 inches for three-story structures. Minimum foundation reinforcement should consist of a No. 4 bar at the top of the stem walls, and a No. 4 bar at the bottom of the footings. Concrete slab-on-grade reinforcement should consist of No. 4 bars placed on 24-inch centers in a grid pattern.

The anticipated allowable soil bearing pressure is 1,500 lbs/ft² for footings bearing on competent, native soil and/or engineered fill. A maximum chimney and column load of 30 kips is recommended for the site. The recommended maximum allowable bearing pressure may be increased by 1/3 for short-term transient conditions such as wind and seismic loading. For heavier loads, the geotechnical engineer should be consulted. The coefficient of friction between on-site soil and poured-in-place concrete may be taken as 0.40, which includes no factor of safety. The maximum anticipated total and differential footing movements (generally from soil expansion and/or settlement) are 1 inch and ¾ inch over a span of 20 feet, respectively. We anticipate that the majority of the estimated settlement will occur during construction, as loads are applied. Excavations near structural footings should not extend within a 1H:1V plane projected downward from the bottom edge of footings.

Footing excavations should penetrate through topsoil and any loose soil to competent subgrade that is suitable for bearing support. All footing excavations should be trimmed neat, and all loose or softened soil should be removed from the excavation bottom prior to placing reinforcing steel bars. Due to the moisture sensitivity of on-site native soils, foundations constructed during the wet weather season may require overexcavation of footings and backfill with compacted, crushed aggregate.

Our recommendations are for house construction incorporating raised wood floors and conventional spread footing foundations. If living space of the structures will incorporate basements, a geotechnical engineer should be consulted to make additional recommendations for retaining walls, water-proofing, underslab drainage and wall subdrains. After site development, a Final Soil Engineer's Report should either confirm or modify the above recommendations.

Pavement Design

For design purposes, we used an estimated resilient modulus of 9,000 for compacted native soil. Table 1 presents our recommended minimum pavement section for dry weather construction.

Table 1. Recommended Minimum Dry-Weather Pavement Section

Material Layer	Light-duty Public Streets	Compaction Standard
Asphaltic Concrete (AC)	3 in.	92%/ 92% of Rice Density AASHTO T-209
Crushed Aggregate Base ¾"-0 (leveling course)	2 in.	95% of Modified Proctor AASHTO T-180
Crushed Aggregate Base 1½"-0	8 in.	95% of Modified Proctor AASHTO T-180
Subgrade	12 in.	95% of Modified Proctor AASHTO T-180 or equivalent

Any pockets of organic debris or loose fill encountered during ripping or tilling should be removed and replaced with engineered fill (see *Site Preparation* Section). In order to verify subgrade strength, we recommend proof-rolling directly on subgrade with a loaded dump truck during dry weather and on top of base course in wet weather. Soft areas that pump, rut, or weave should be stabilized prior to paving. If pavement areas are to be constructed during wet weather, the subgrade and construction plan should be reviewed by the project geotechnical engineer at the time of construction so that condition specific recommendations can be provided. The moisture sensitive subgrade soils make the site a difficult wet weather construction project.

During placement of pavement section materials, density testing should be performed to verify compliance with project specifications. Generally, one subgrade, one base course, and one asphalt compaction test is performed for every 100 to 200 linear feet of paving.

Seismic Design

Structures should be designed to resist earthquake loading in accordance with the methodology described in the 2010 ASCE-7 Standard. We recommend Site Class D be used for design. Design values determined for the site using the USGS (United States Geological Survey) *U.S. Seismic Design Maps* tool (Version 3.1.0) are summarized in Table 2, presented on the following page.

Table 2. Recommended Earthquake Ground Motion Parameters (2010 ASCE-7)

Parameter	Value
Location (Lat, Long), degrees	45.646, -122.457
Mapped Spectral Acceleration Values (MCE):	
Peak Ground Acceleration	0.374
Short Period, S_s	0.880 g
1.0 Sec Period, S_1	0.375 g
Soil Factors for Site Class D:	
F_a	1.148
F_v	1.650
Residential Site Value = $2/3 \times F_a \times S_s$	0.673 g
Residential Seismic Design Category	D_0

Soil liquefaction is a phenomenon wherein saturated soil deposits temporarily lose strength and behave as a liquid in response to earthquake shaking. Soil liquefaction is generally limited to loose, granular soils located below the water table. Following development, on-site soils will consist predominantly of engineered fill or native fine-grained soils above the water table, which are not considered susceptible to liquefaction. Therefore, it is our opinion that special design or construction measures are not required to mitigate the effects of liquefaction.

Drainage

The upslope side of retaining walls and perimeter footings should be provided with a drainage system consisting of 3-inch diameter, slotted, flexible plastic pipe embedded in a minimum of 1 ft³ per lineal foot of clean, free-draining gravel or 1 1/2" - 3/4" drain rock. The drain pipe and surrounding drain rock should be wrapped in non-woven geotextile (Mirafi 140N, or approved equivalent) to minimize the potential for clogging and/or ground loss due to piping. Water collected from the footing drains should be directed into the local storm drain system or other suitable outlet. A minimum 0.5 percent fall should be maintained throughout the drain and non-perforated pipe outlet. Down spouts and roof drains should not be connected to the foundation drains in order to reduce the potential for clogging. The footing drains should include clean-outs to allow periodic maintenance and inspection. Grades around the proposed structure should be sloped such that surface water drains away from the building. Footing drains are recommended to prevent detrimental effects of groundwater on foundations, and should not be expected to eliminate all potential sources of water entering a crawlspace or beneath a slab-on-grade. An adequate grade to a low point outlet drain in any crawlspace areas is required by code. Underslab drains are sometimes added beneath the slab when placed over soils of low permeability and shallow, perched groundwater.

UNCERTAINTIES AND LIMITATIONS

We have prepared this report for the owner and their consultants for use in design of this project only. This report should be provided in its entirety to prospective contractors for bidding and estimating purposes; however, the conclusions and interpretations presented in this report should not be construed as a warranty of the subsurface conditions. Experience has shown that soil and groundwater conditions can vary significantly over small distances. Inconsistent conditions can occur between explorations that may not be detected by a geotechnical study. If, during future site operations, subsurface conditions are encountered which vary appreciably from those described herein, GeoPacific should be notified for review of the recommendations of this report, and revision of such if necessary.

Sufficient geotechnical monitoring, testing and consultation should be provided during construction to confirm that the conditions encountered are consistent with those indicated by explorations. The checklist attached to this report outlines recommended geotechnical observations and testing for the project. Recommendations for design changes will be provided should conditions revealed during construction differ from those anticipated, and to verify that the geotechnical aspects of construction comply with the contract plans and specifications.

Within the limitations of scope, schedule and budget, GeoPacific attempted to execute these services in accordance with generally accepted professional principles and practices in the fields of geotechnical engineering and engineering geology at the time the report was prepared. No warranty, expressed or implied, is made. The scope of our work did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous or toxic substances in the soil, surface water, or groundwater at this site.

We appreciate this opportunity to be of service.

Sincerely,

GEOPACIFIC ENGINEERING, INC.

Beth K. Rapp
Senior Geotechnical Staff



James D. Imbrie, P.E.
Principal Geotechnical Engineer

Attachments: References

Figure 1 – Vicinity Map

Figure 2 – Site and Exploration Plan

Test Pit Logs – TP-2 through TP-11, & TP-13

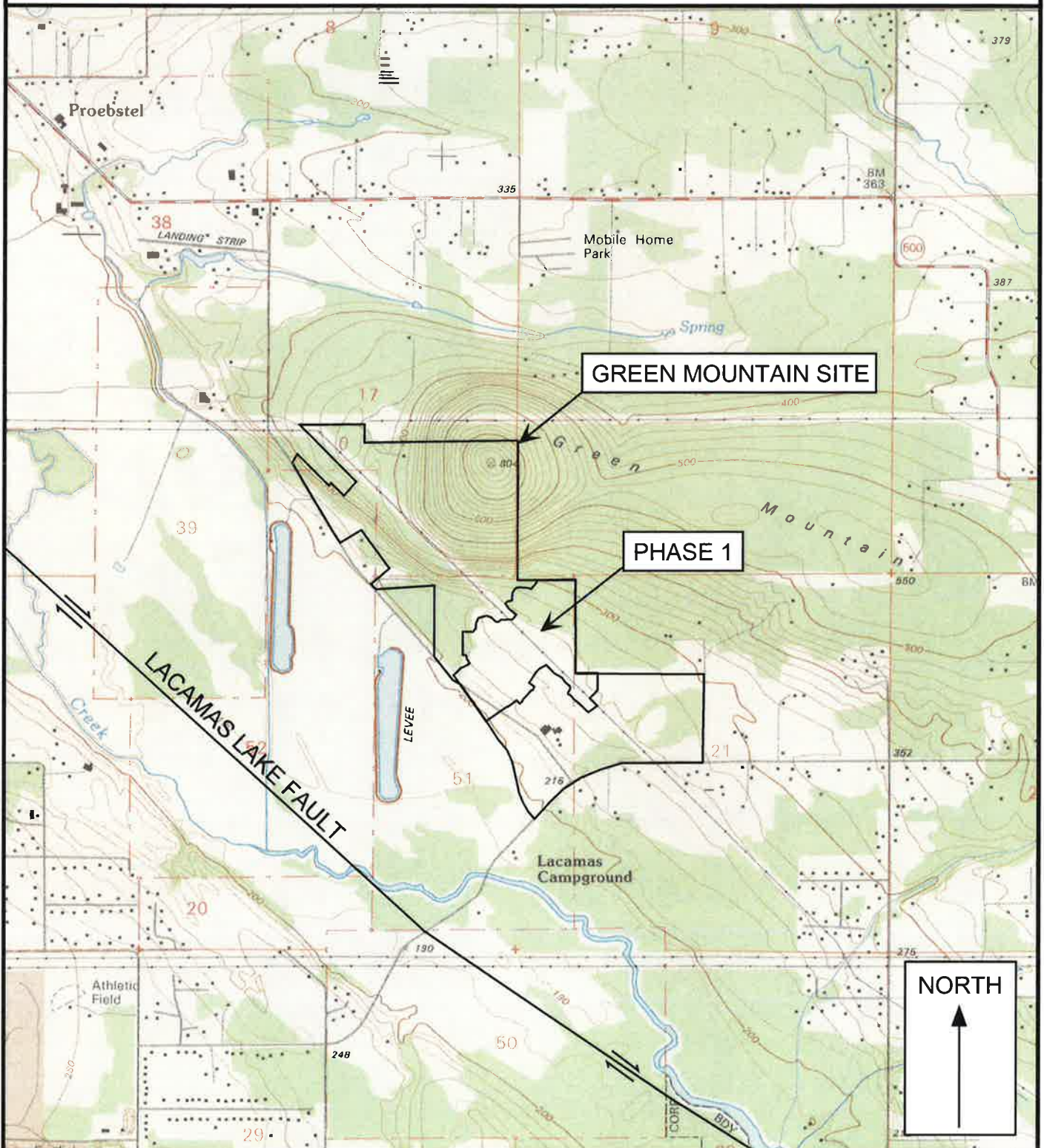
Test Pit Logs from Previous Study – TP-1 (2013), TP-10 (2013), TP-13 (2013),
TP-15 (2013) & TP-16 (2013)

REFERENCES

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Legend

Approximate Scale 1 in = 2,000 ft

Date: 11/25/2014

Drawn by: EKR

Base map: U.S. Geological Survey 7.5 minute Topographic Map Series, Lacamas Creek, Washington Quadrangle, 1990.

Project: Green Mountain Phase 1
Camas, Washington

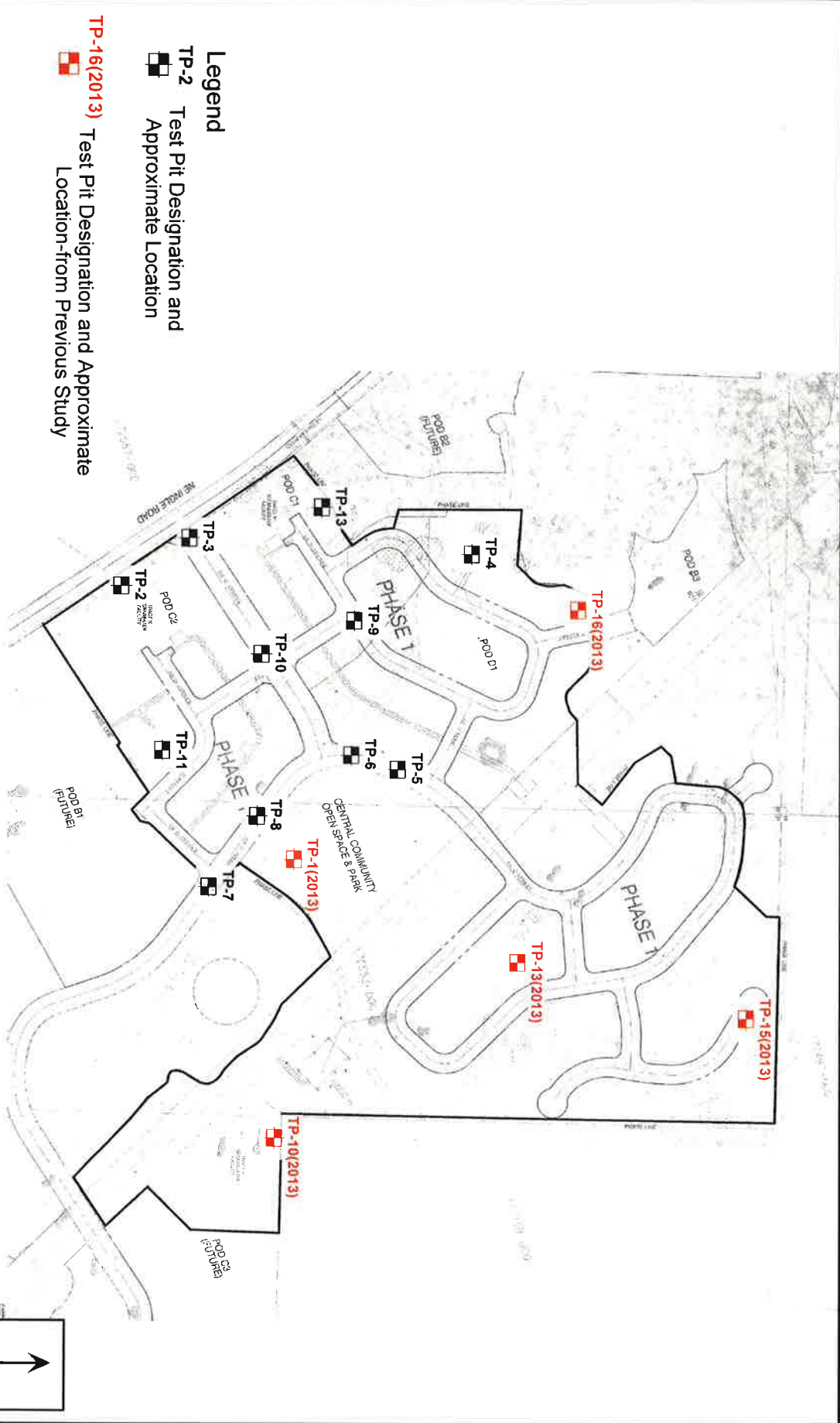
Project No. 13-3186

FIGURE 1



14835 SW 72nd Avenue
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

SITE PLAN AND EXPLORATION LOCATIONS



0 400'
APPROXIMATE SCALE 1"=400'

Base map provided by Olson Engineering Dated November 2014.

Project: Green Mountain Phase 1 Camas, Washington	Project No. 13-3186	Date: 10/2/2014 Drawn by: EKR	FIGURE 2
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TEST PIT LOG

Project: Green Mountain Phase 1
Camas, Washington

Project No. 13-3186

Test Pit No. **TP-2**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	3.0					Stiff to very stiff, SILT (ML), trace sand, brown, moderately organic, trace roots throughout, 6 inch topsoil developed at surface, strong orange and gray mottling, trace black staining, moist (Fill)
2	1.5					
3	4.5					Stiff to very stiff, clayey SILT (ML), trace sand, brown, micaceous, subtle orange and gray mottling, trace black staining, moist (Fine Grained Catastrophic Flood Deposits)
4	3.5					
5						
6						
7						Dense, subrounded GRAVEL (GM), trace clayey silt matrix, trace sand, brown to gray, trace black staining, partially cemented, strong orange and gray mottling, gravel is up to 9 inches in diameter, well graded, moist to wet (Conglomerate)
8						
9						Test Pit Terminated at 8.5 Feet.
10						Note: Groundwater seepage encountered at 7 - 8 feet. Discharge visually estimated at 1/2 gallon per minute.
11						
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/23/2014

Logged By: B. Rapp

Surface Elevation:



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TEST PIT LOG

Project: Green Mountain Phase 1
Camas, Washington

Project No. 13-3186

Test Pit No. **TP-3**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	4.5					Stiff to very stiff, SILT (ML), trace subrounded gravel, brown, with inorganic debris (asphalt), trace roots throughout, 6 inch thick topsoil developed at surface, strong orange and gray mottling, trace black staining, moist (Fill)
2	4.5					
3	4.5					
4	3.5					Stiff to very stiff, sandy SILT (ML), trace subrounded gravel, brown, micaceous, subtle to strong orange and gray mottling, trace black staining, moist (Conglomerate)
5						
6						
7						Dense, subrounded GRAVEL (GM), trace clayey silt matrix, trace sand, brown to gray, trace black staining, partially cemented, strong orange and gray mottling, gravel is up to 9 inches in diameter, well graded, moist to wet (Conglomerate)
8						
9						
10						Test Pit Terminated at 8.5 Feet. Note: No seepage or groundwater encountered.
11						
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/23/2014

Logged By: B. Rapp

Surface Elevation:



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TEST PIT LOG

Project: Green Mountain Phase 1
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Test Pit No. **TP-4**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	4.5					Stiff to very stiff, sandy SILT (ML), trace subrounded gravel, gray, trace organic debris, trace roots throughout, 6 inch thick topsoil developed at surface, subtle to strong orange and gray mottling, trace black staining, moist (Fill)
2	4.0					
3	3.5					Stiff to very stiff, sandy SILT (ML), light brown, micaceous, strong orange and gray mottling, trace black staining, moist (Fine Grained Catastrophic Flood Deposits)
4	3.0					
5						
6						
7						
8						Test Pit Terminated at 8 Feet. Note: No seepage or groundwater encountered.
9						
10						
11						
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/23/2014

Logged By: B. Rapp

Surface Elevation:




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TEST PIT LOG

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Camas, Washington

Project No. 13-3186

Test Pit No. **TP-5**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	4.5					Low to moderately organic, SILT (OL-ML), dark brown, fine roots throughout, loose, moist (Topsoil)
2	2.0					
3	2.5					Stiff to very stiff, sandy SILT (ML), light brown, micaceous, subtle to strong orange and gray mottling, trace black staining, moist (Fine Grained Catastrophic Flood Deposits)
4	2.5					
5						
6						
7						Medium dense to dense, silty SAND (SM), brown to blue gray below 8.5 feet, subtle to strong orange and gray mottling, sand is fine to medium grained, partially lithified, trace black staining, moist (Conglomerate)
8						
9						Test Pit Terminated at 9 Feet.
10						
11						Note: Groundwater seepage encountered at 7.5 feet. Discharge visually estimated at 1/4 gallon per minute.
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/23/2014

Logged By: B. Rapp

Surface Elevation:




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TEST PIT LOG

Project: Green Mountain Phase 1
Camas, Washington

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Test Pit No. **TP-6**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	2.5					Low organic, SILT (OL-ML), dark brown, roots throughout, loose, moist (Topsoil)
2	4.5					
3	3.5					Stiff to very stiff, sandy SILT (ML), light brown, micaceous, subtle to strong orange and gray mottling, trace black staining, moist (Fine Grained Catastrophic Flood Deposits)
4	4.0					
5						
6						
7						Medium dense to dense, silty SAND (SM), trace subrounded gravel, brown, strong orange and gray mottling, sand is fine to medium grained, partially lithified, trace black staining, moist (Conglomerate)
8						
9						Test Pit Terminated at 8.5 Feet.
10						Note: Groundwater seepage encountered at 4.5 feet. Discharge visually estimated at 1/4 gallon per minute.
11						
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/23/2014

Logged By: B. Rapp

Surface Elevation:





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TEST PIT LOG

Project: Green Mountain Phase 1
Camas, Washington

Project No. 13-3186

Test Pit No. **TP-7**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	4.0					Stiff to very stiff, sandy SILT (ML), trace subrounded gravel, light brown, trace roots throughout, 6 inch thick topsoil developed at surface, strong orange and gray mottling, trace black staining, moist (Fill)
2	4.0					
3	2.0					
4	2.5					Stiff to very stiff, sandy SILT (ML), light brown, micaceous, strong orange and gray mottling, trace black staining, moist (Fine Grained Catastrophic Flood Deposits)
5						
6						
7						
8						
9						Test Pit Terminated at 8.5 Feet.
10						Note: Groundwater seepage encountered at 5.5 - 6.5 feet. Discharge visually estimated at 1/4 gallon per minute.
11						
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/23/2014

Logged By: B. Rapp

Surface Elevation:






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TEST PIT LOG

Project: Green Mountain Phase 1
Camas, Washington

Project No. 13-3186

Test Pit No. **TP-8**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	2.0					Stiff to very stiff, sandy SILT (ML), light brown, trace roots throughout, 6 inch thick topsoil developed at surface, strong orange and gray mottling, moist (Fill)
2	2.5					Low organic, SILT (OL-ML), gray, trace fine roots throughout, loose, moist (Buried Topsoil)
3	2.0					
4	1.5					Stiff to very stiff, sandy SILT (ML), light brown, micaceous, strong orange and gray mottling, trace black staining, moist (Fine Grained Catastrophic Flood Deposits)
5						
6						
7						
8						
9						Test Pit Terminated at 8.5 Feet.
10						Note: Groundwater seepage encountered at 5.5 - 7.5 feet. Discharge visually estimated at 1/2 gallon per minute.
11						
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/23/2014

Logged By: B. Rapp

Surface Elevation:




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TEST PIT LOG

Project: Green Mountain Phase 1
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Project No. 13-3186

Test Pit No. **TP-9**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	4.0					Moderately organic, SILT (OL-ML), trace gravel fill, dark brown, fine roots throughout, loose, moist (Topsoil)
2	3.5					
3	4.5					Stiff to very stiff, clayey SILT (ML), trace sand, brown, micaceous, subtle orange and gray mottling, trace roots to 3 feet, trace black staining, moist (Fine Grained Catastrophic Flood Deposits)
4	4.5					
5						
6						
7						
8						Dense, subrounded GRAVEL (GM), trace clayey silt matrix, trace sand, brown to gray, trace black staining, partially cemented, strong orange and gray mottling, moist to wet (Conglomerate)
9						Test Pit Terminated at 8.5 Feet.
10						
11						Note: Groundwater seepage encountered at 7.5 feet. Discharge visually estimated at 1/4 gallon per minute.
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/23/2014

Logged By: B. Rapp

Surface Elevation:



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TEST PIT LOG

Project: Green Mountain Phase 1
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Test Pit No. **TP-10**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	4.0					Stiff to very stiff, SILT (ML), trace sand, brown, trace inorganic debris, trace roots throughout, 6 inch topsoil developed at surface, strong orange and gray mottling, moist (Fill)
2	4.0					
3	4.5					Stiff to very stiff, sandy SILT (ML), trace clay, light brown, micaceous, subtle to strong orange and gray mottling, trace black staining, moist (Fine Grained Catastrophic Flood Deposits)
4	4.5					
5						
6						
7						Dense to very dense, subrounded GRAVEL (GM), trace clayey silt matrix, trace sand, brown to gray, trace black staining, partially cemented, strong orange and gray mottling, gravel is up to 6 inches in diameter, well graded, moist (Conglomerate)
8						
9						Test Pit Terminated at 8.5 Feet.
10						Note: No seepage or groundwater encountered.
11						
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/23/2014

Logged By: B. Rapp

Surface Elevation:



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TEST PIT LOG

Project: Green Mountain Phase 1
Camas, Washington

Project No. 13-3186

Test Pit No. **TP-11**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	2.5					Stiff to very stiff, sandy SILT (ML), trace gravel, light brown, trace fine roots throughout, 6 inch thick topsoil developed at surface, moist (Fill)
2	4.5					Low to moderately organic, SILT (OL-ML), brown, trace fine roots throughout, moist (Buried Topsoil)
3	3.5					
4	3.0					Stiff to very stiff, sandy SILT (ML), light brown, subtle to strong orange and gray mottling, moist (Fill)
5						Test Pit Terminated at 5 Feet due to Buried Water Line Tape.
6						
7						Note: No groundwater or seepage encountered.
8						
9						
10						
11						
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/23/2014
Logged By: B. Rapp
Surface Elevation:




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TEST PIT LOG

Project: Green Mountain Phase 1
Camas, Washington

Project No. 13-3186

Test Pit No. **TP-13**

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	1.5					Stiff, sandy SILT (ML), trace clay, light brown, trace roots throughout, 6 inch thick topsoil developed at surface, strong orange and gray mottling, moist (Fill)
2	2.0					
3	2.5					
4	4.0					Stiff to very stiff, sandy SILT (ML), light brown, micaceous, strong orange and gray mottling, trace black staining, moist (Fine Grained Catastrophic Flood Deposits)
5						
6						
7						Dense to very dense, subrounded GRAVEL (GM), trace silty sand matrix, brown to gray, trace black staining, strong orange and gray mottling, gravel is up to 12 inches in diameter, moist (Conglomerate)
8						
9						Test Pit Terminated at 8.5 Feet.
10						Note: Groundwater seepage encountered at 8.5 feet. Discharge visually estimated at 1/4 gallon per minute.
11						
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/23/2014

Logged By: B. Rapp

Surface Elevation:





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TEST PIT LOG

Project: Green Mountain
Camas, Washington

Project No. 13-3186

Test Pit No. **TP-1**
(2013)

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	0.5					Moderately organic, sandy SILT (OL-ML), dark brown, roots throughout, loose, moist (Topsoil)
2	1.0					Medium stiff, sandy SILT (ML), brown, micaceous, strong orange and gray mottling, moist to wet (Fine Grained Catastrophic Flood Deposits)
3	1.0					
4	0.5					Test Pit Terminated at 4 Feet for Infiltration Testing. Note: Groundwater seepage encountered at 3 feet. Discharge visually estimated at less than 1 gallon per minute. Static groundwater at 2 Feet at Completion of Infiltration Testing.
5						
6						
7						
8						
9						
10						
11						
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 11/5-7/2013

Logged By: B. Rapp

Surface Elevation:



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TEST PIT LOG

Project: Green Mountain
Camas, Washington

Project No. 13-3186

Test Pit No. **TP-10**
(2013)

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	2.0					Moderately organic, SILT (OL-ML), dark brown, fine roots throughout, loose, moist (Topsoil)
2	2.0					Stiff to very stiff, sandy SILT (ML), trace clay, light brown, micaceous, strong orange and gray mottling, trace black staining, moist (Fine Grained Catastrophic Flood Deposits)
3	1.5					
4	3.5					
5						Dense, subrounded GRAVEL (GM), trace sandy silt matrix, light brown to gray, trace black staining, strong orange and gray mottling, micaceous, moist (Conglomerate)
6						
7						Test Pit Terminated at 6 Feet.
8						Note: No seepage or groundwater encountered.
9						
10						
11						
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 11/5-7/2013

Logged By: B. Rapp

Surface Elevation:




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TEST PIT LOG

Project: Green Mountain Phase 1
Camas, Washington

Project No. 13-3186

Test Pit No. **TP-13**
(2013)

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1						Moderately organic, SILT (OL-ML), brown, fine roots throughout, loose, moist (Topsoil)
2	1.5					Medium stiff to very stiff, sandy SILT (ML), trace clay, light brown, micaceous, strong orange and gray mottling, trace black staining, moist (Fine Grained Catastrophic Flood Deposits)
3	3.0					
4						
5						Dense, subrounded GRAVEL (GM), trace sandy silt matrix, trace clay, light brown to gray, trace black staining, well graded, strong orange and gray mottling, micaceous, moist (Conglomerate)
6						
7						
8						
9						Test Pit Terminated at 9 Feet.
10						
11						Note: Groundwater seepage encountered at 8 feet. Discharge visually estimated at 1 gallon per minute.
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 11/5-7/2013

Logged By: B. Rapp

Surface Elevation:




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TEST PIT LOG

Project: Green Mountain Phase 1
Camas, Washington

Project No. 13-3186

Test Pit No. **TP-15**
(2013)

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	1.5					Moderately organic, SILT (OL-ML), with basalt fragments, dark brown, fine roots throughout, loose, moist (Topsoil)
2	3.5					Stiff to very stiff, silty CLAY (CL) to clayey SILT (ML), with gray weathered basalt, light reddish-brown, trace fine roots throughout, strong orange and gray mottling, black staining, moist (Colluvial Soil)
3						
4						
5						
6						Medium dense, silty SAND (SM) with interbeds of stiff, sandy SILT (ML), light brown, micaceous, sand is fine to medium grained, strong orange and gray mottling, trace black staining, moist (Conglomerate)
7						
8						
9						
10						
11						Test Pit Terminated at 10.5 Feet.
12						Note: Groundwater seepage encountered at 2 feet. Discharge visually estimated at 1 gallon per minute.

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 11/5-7/2013

Logged By: B. Rapp

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TEST PIT LOG

Project: Green Mountain
Camas, Washington

Project No. 13-3186

Test Pit No. **TP-16**
(2013)

Depth (ft)	Pocket Penetrometer (tons/ft ²)	Sample Type	In-Situ Dry Density (lb/ft ³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	0.5					Moderately organic, SILT (OL-ML), dark brown, fine roots throughout, loose, moist (Topsoil)
2	2.0					
3	3.5					
4	2.0					Medium dense, silty SAND (SM) with interbeds of stiff, sandy SILT (ML), light brown to gray, micaceous, sand is coarse to medium grained, strong orange and gray mottling, trace black staining, moist to wet (Conglomerate)
5						
6						
7						
8						
9						
10						Test Pit Terminated at 9 Feet.
11						Note: Groundwater seepage encountered at 3.5 to 6.5 feet. Discharge visually estimated at 2 gallons per minute.
12						

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 11/5-7/2013

Logged By: B. Rapp

Surface Elevation:

Appendix IV: Maintenance Manual



City of Camas



Storm Sewer Systems

Operation & Maintenance Manual

Public &
Private Systems

September 2009

City of Camas



Storm Sewer Systems

Operation & Maintenance Manual

Public & Private Systems

September 2009

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Operation & Maintenance Manual

Introduction

Public & Private Systems

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Background

Everything, whether it be public or privately owned, roads, parking lots, residential developments, commercial or industrial developments, or school facilities have various components that make up a storm sewer system. These components consist of conveyance pipes, catch basins, manholes, roadside ditches, stormwater facilities (such as drywells, bioswales, detention ponds, wet ponds, oil/water separators), landscaping (both hardscape and softscape), and any other structure that collects, conveys, controls, and/or treats stormwater. Regardless of the component, all storm sewer systems eventually discharge into 'waters of the state' which are our streams, rivers, lakes, wetlands, and groundwater.

Under the Federal Clean Water Act (FCWA) and in compliance with the Department of Ecology's NPDES Phase II Permit 'waters of the state' are to be protected from contamination. This in turn protects threatened and endangered species under the Federal Endangered Species Act (FESA).

One way to protect 'waters of the state' is to provide the proper maintenance of all storm sewer system components. It is the responsibility of the City of Camas to ensure that all components of the storm sewer system are properly maintained and operated. The City is responsible for those components that are located within the City's right-of-way, such as the conveyance pipes, manholes, catch basins, and roadside ditches. There are also a few specific stormwater ponds that are the responsibility of the City. However, the majority of the storm facilities are owned and maintained by the property owners as private facilities. These property owners include, but are not limited to, Homeowners Associations (HOA's), property manager companies, school districts, and commercial/industrial site owners.

Purpose of the Manual

This manual is intended to help, both public and private operators, meet the requirements for proper maintenance and operation of the various storm sewer system components. Proper maintenance will help to assure that:

- Storm sewer facilities operate as they were designed;
- Storm sewer systems are cleaned of the pollutants that they trap, such as sediment and oils, so that storm sewer systems are not overwhelmed and in so doing become pollutant sources;
- Pollutant sources are removed, or minimized, prior to entering the storm sewer system.

Along with keeping a site from flooding, properly maintained storm sewers can help reduce surface water and groundwater pollution. Most sites have some type of stormwater control component designed to limit the environmental and flooding damage caused by stormwater runoff. These components require more labor intensive maintenance than a system of pipes and catch basins.

It is the intent of the City to conduct yearly inspections of storm sewer facilities, preferably late spring/early summer to allow maintenance to occur late summer, prior to the fall rainy season. See Appendix A for an example of a *Storm Sewer System Maintenance Notification* form.

Manual Layout

The manual breaks out the various storm sewer system components and the general maintenance activities required for said component. For each component or activity this manual will:

- Briefly describe the component type, e.g. facility or activity.
- List the water quality and non-water quality result of each facility or activity.
- List the *Best Management Practices (BMP's)* needed to meet the water quality and general maintenance requirements.

Additional information may be found in other manuals, such as the Washington Department of Ecology's *2005 Stormwater Management Manual for Western Washington, Vols. IV and V*, or site specific Operation and Maintenance (O&M) Manuals.

Maintenance is performed as a means to obtain specific results. The maintenance results, as listed below, are specified for each drainage feature or activity. They include maintaining performance and appearance of the facility, and the need to prevent maintenance work itself from becoming a pollutant source or damaging habitat.

Maintenance Results (R1-R10)

Water Quality Results:

- R1 Avoid or minimize sediment and pollutant discharges from the work area.
- R2 Prevent parking areas, roads, drainage systems, and drainage facilities from becoming pollutant sources.
- R3 Avoid or minimize vegetation removal.
- R4 Preserve native vegetation.

Infrastructure Maintenance Results:

- R5 Protect public safety and health.
- R6 Prevent catastrophic infrastructure failures.
- R7 Maintain and/or restore the intended infrastructure function.
- R8 Prevent and/or reduce flooding.
- R9 Protect infrastructure.
- R10 Meet public expectations for aesthetics.

Storm sewer facility refers to specific drainage features, such as catch basins, pipes, ditches, ponds, biofiltration swales, and infiltration systems. Activities refer to maintenance tasks associated with operating and maintaining stormwater facilities such as vegetation management and small repair projects. Depending on the extent of the maintenance, some property owners may be able to handle storm sewer maintenance themselves. Often, however, depending on the type of maintenance, the property owners will contract out the work. Landscapers are often employed to maintain vegetated facilities, such as swales and pond areas.

Heavier work, like cleaning catch basins, ditch inlets, outlet structures, or drywells often requires special equipment, such as trucks that can vacuum out sediment. When located within the city right-of-way, maintenance is typically the responsibility of the City. For those located on private

property a contractor would need to be contacted to perform this work. Check phone book listings, such as sewer and cleaning contractors, tank cleaning, and environmental and ecological services. Check with the contractor to ensure that all materials are disposed of according to solid waste and hazardous materials regulations. *Ultimately, the generator of the waste or hazardous material is responsible for proper disposal.*

Special Facilities:

Manufactured storm sewer facilities, such as leaf compost filters and oil/water separators often have maintenance requirements and manuals specified or written by the manufacturer. Also, larger or more complex storm sewer facilities may include specifications for maintenance and vegetation management that provide specific detail above and beyond this manual. Where the *Public Works Director* determines that these manuals or plans provide an equal or greater level of maintenance and water quality protection, then these procedures shall be followed by the owner. The Public Works Director must approve these individual maintenance plans, specifications, or manuals.

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Operation & Maintenance Procedures

Vegetated Facilities

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Biofiltration Swales

Biofiltration swales use grass or other dense vegetation to filter sediment and oily materials out of stormwater. Usually they look like flat-bottomed channels with grass growing in them. Swales are stormwater treatment devices that must be properly maintained to sustain pollutant removal capacity.

Maintenance Results

- R1 Avoid or minimize sediment and pollutant discharges from the surrounding area.
- R2 Prevent parking areas, roads, drainage systems, and drainage facilities from becoming pollutant sources.
- R7 Maintain or restore the intended infrastructure function.
- R10 Meet public expectations for aesthetics.

Procedures

Inspection

Swales are easy to inspect and need to be well maintained to treat stormwater. Make frequent visual inspections, at least once every 6 months and after storm events of >0.50 inch rainfall/24 hours, for problems such as channeling flow, rills, bare ground, sediment accumulation, oily material, and debris. Maintain adequate grass growth and eliminate bare spots.

Identify and remove pollutant sources that are discharging to the swale.

Maintain access to inlet and outlet structures for pollutant removal, and to grass swale for mowing and noxious weed removal.

Cleaning

Remove leaves, litter, sediment, oily materials, and grass cuttings when mowing or at any time that it is observed in the swale as this can cause blockage of inlets and outlets.

Clear inlets, outlets, curb cuts, and level spreaders of debris to prevent blockage of stormwater flow.

Use a rake and shovel to remove, by hand, sediment accumulations greater than 2-inches thick that cover grass areas; avoid vegetation removal. Reseed bare areas.

Vegetation Management

Mow to keep grass at the maximum height (9-inches). Mow to no less than 4-inches in height and a minimum of four cuttings per year. Remove clippings from the swale.

If a swale has an underdrain system, vehicular traffic (other than grass mowing equipment) on the swale bottom is to be avoided to prevent damage to the underdrain pipes.

Preserve healthy vegetation or reestablish vegetation where needed. Seed bare spots.

Blackberry removal is required and should be done 2-3 times a year. Pesticide use is **not** allowed. After cutting down of blackberries, vines are to be bagged and removed from the area.

Use appropriate BMP's to cover bare soils. BMP's include hydroseeding or mulches.

Trees and shrubbery are not allowed to grow within the biofiltration swale as they interfere with the facility's function and maintenance activities. Any cut trees should be salvaged for habitat enhancement or converted to mulch or firewood.

Storm sewer facilities are, in effect, water body buffers where pesticides and fertilizers are not to be used. See Vegetation Management in Storm Sewer Systems for more information.

Repairs

Often swales have problems due to flooding or erosion. Where possible, correct the underlying problem before trying to repair the symptom.

Level spreaders must be in proper working order for swales to function properly. Where level spreaders are damaged, sunken, or bypassed by erosion, repair them to design standards.

If there is a problem with grass dying due to the swale being flooded during the wet season, there are two options: convert the swale vegetation to a plant variety that can stand being flooded or find a way to fix the swale so it drains better.

Call the Public Works Department at 817-7231 for information on approved plants. **Design modifications to any storm sewer facility cannot be made without prior approval from the City of Camas.**

Filter Strips

Filter strips are linear strips of grass that remove sediment and oils from stormwater by filtering it. Stormwater is treated as it runs across the filter. Usually, filter strips are placed along the edge of linear paved areas, such as parking lots and roads. Where designed filter strips are installed; road shoulders should only be graded to maintain level flow off the road.

Maintenance Results

- R1 Avoid or minimize sediment and pollutant discharges from the area.
- R2 Prevent parking areas, roads, drainage systems, and drainage facilities from becoming pollutant sources.
- R7 Maintain or restore the intended infrastructure function.
- R10 Meet public expectations for aesthetics.

Procedures

Inspection

Filter strips are easy to inspect and need to be well maintained to treat stormwater. Make frequent visual inspections for problems such as channeling flow, rills, bare ground, oily material, and debris.

Identify and remove pollutant sources.

Cleaning

Clear inlets and outlets to prevent blockage.

Remove litter when mowing or litter accumulates.

Use a rake and/or shovel to remove sediment and debris accumulations greater than 2-inches thick that cover grass areas; avoid vegetation removal. Remove sediment and re-level the slope to an even surface so that water spreads and does not form channels. Reseed bare areas.

Vegetation Management

Mow to keep grass at the optimum height (6-inches). Mow to no less than 4-inches in height and a minimum of four cutting per year.

Remove clippings from the treatment area. They may be spread elsewhere on site where they will not reenter the stormwater facility.

Preserve healthy vegetation or reestablish vegetation where needed. Seed bare spots.

Use appropriate BMP's to cover bare soils. BMP's include hydroseeding or mulches.

Storm sewer facilities are, in effect, water body buffers where pesticides and fertilizers are not to be used. See Vegetation Management in Storm Sewer Systems for more information.

Repairs

Where possible, correct the underlying problem before trying to repair the symptom.

The flow spreader must be level and spread flow evenly across the filter strip. Immediately repair any defects in the flow spreader.

If ruts develop, fill them with coarse soil, level the surface and reseed.

Detention Ponds/Facility

Detention pond facilities are designed to hold and slowly release stormwater by use of a pond and a specially designed control structure. Styles vary greatly from well manicured to natural appearing. Generally, native vegetation is preferred for reduced maintenance and enhance wildlife habitat. Some facilities are designed to appear as natural water bodies or are in a park-like setting.

Maintenance Results

- R1 Avoid or minimize sediment and pollutant discharges from the work area.
- R2 Prevent parking areas, roads, drainage systems, and drainage facilities from becoming pollutant sources.
- R3 Avoid or minimize vegetation removal.
- R7 Maintain or restore the intended infrastructure function.
- R8 Prevent or reduce flooding.
- R10 Meet public expectations for aesthetics.

Procedures

Inspection

Facilities should be inspected, at a minimum, once a year. Inspect the facility for litter, dead vegetation, invasion of trees and noxious weeds, accumulated sediment, oil and other pollutants. Identify pollutant sources to the facility.

Cleaning

Remove litter when litter accumulates.

Remove any pollutants greater in volume than a surface sheen.

Remove trees and noxious weeds that are growing within the pond, on side slopes/berms, or within the emergency overflow area.

Remove sediment when it accumulates to 10 percent of the designed pond depth (plans can be obtained for Public Works Department). Sediment removal should be undertaken during the summer months (drier time of the year). Ponds are not to be altered from the original approved design without prior permission from the City of Camas.

Material Handling

Disposal of waste, e.g. sediment or standing water, from the maintenance of these facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Vegetation Management

Where a facility has a natural area (open space/buffer/wetlands), vegetation management should be timed to avoid or minimize impacts on wildlife. An example is a facility used by breeding birds such as red-winged black birds.

Mow, or rotary weed trim, vegetation to match surrounding area or sustain any other intended use of the facility, such as wildlife habitat or recreation area.

Use mechanical methods to control weeds. Pesticides, herbicides and fertilizers are not to be used in stormwater control facilities. See Vegetation Management in Storm Sewer Systems for more information.

If plants need replacing, please contact the City for a list of native plants.

Trees are not allowed to grow in the pond, on emergency overflows, or on berms. Trees can block flows and roots can lead to berm failure.

Trees and shrubbery may be allowed to grow around the perimeter of the pond unless growth interferes with the facility function or maintenance activities.

Blackberry removal is required and should be done 2-3 times a year. Pesticide use is **not** allowed around water. After cutting down of blackberries, vines are to be bagged and removed from the area.

Repairs

Repair and seed bare areas. Repair eroded slopes when rills form. Use cover BMP's on exposed soils.

Rodent holes in a dam or berm can serve as a means of piping water out of the pond. Remove the rodents, preferably by trapping, and repair the dam or berm. Check with the Washington Department of Fish and Wildlife before removing a game animal or fur-bearer, for example muskrat, beaver, and nutria.

Where applicable, repair the pond liner if it is visible and repair or replace where there are more than three holes greater than 1/4-inch diameter.

If berms or dams show signs of settlement or sinkholes, serious problems may be occurring. Consult a licensed professional engineer to determine the cause of the settlement or sinkhole. Spillway areas should be completely covered by minimum of 12-inches of rock. **Design modifications to any storm sewer facility cannot be made without prior approval from the City of Camas.**

Infiltration Facilities (Basins/Ponds/Trenches)

Infiltration facilities dispose of water by holding it in an area where it can soak into the ground. These are open facilities that may either drain rapidly and have grass bases, or have perpetual ponds where water levels rise and fall with stormwater flows. Infiltration facilities may be designed to handle all of the runoff from an area or they may overflow and bypass larger storms.

Since the facility is designed to pass water into the ground, generally after passing through a sediment trap/manhole, anything that can cause the base to clog will reduce the performance and is a large concern. Generally, infiltration basins are managed like detention ponds, but with greater emphasis on maintaining the capacity to infiltrate stormwater.

Maintenance Results

- R1 Avoid or minimize sediment and pollutant discharges from the area.
- R2 Prevent parking areas, roads, drainage systems, and drainage facilities from becoming pollutant sources.
- R3 Avoid or minimize vegetation removal.
- R7 Maintain or restore the intended infrastructure function.
- R8 Prevent or reduce flooding.
- R10 Meet public expectations for aesthetics.

Procedures

Inspection

During the first year after construction, the sediment trap shall be monitored after every large storm (>1-inch per 24 hours) and monthly from October 1 through May 31 to ensure the facility is draining as intended.

Check once per year after a rainstorm to see if the facility is draining as intended. Inspect all features of the facility annually.

A thorough inspection of the observation points should be made if there is a decrease in retention basin capacity. Inspection points can include monitoring ports built into the base of the facility and water table depth monitoring wells. Water levels in these inspection points can provide information about the performance of the facility. It will probably require a licensed professional engineer or other professional trained in hydraulics to interpret the information.

Identify and remove pollutant sources to the facility. Inspect the facility for oil and other pollutants and remove any pollutants greater in volume than a surface sheen.

Cleaning

Trash is to be removed as it accumulates.

Remove sediment when it accumulates to 2-inches or if the facility does not drain between storms or meet 90 percent of design capabilities.

If the facility has a sediment trap/manhole, clean out the sediment when one-half foot accumulates.

Materials Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Vegetation Management

Where a facility has a natural area (open space/buffer/wetlands), vegetation management should be timed to avoid or minimize impacts on wildlife. An example is a facility used by breeding birds such as red-winged black birds.

Mow, or rotary weed trim, vegetation to match surrounding area or sustain any other intended use of the facility, such as wildlife habitat or recreation area.

Use mechanical methods to control weeds. Pesticides, herbicides and fertilizers are not to be used in stormwater control facilities. See Vegetation Management in Storm Sewer Systems for more information.

If plants need replacing, please contact the City for a list of native plants.

Trees should not be allowed to grow in the pond, over the trench, on emergency overflows, or on berms that are greater than 4-feet in height. Trees can block flows and roots can lead to berm failure. Remove any trees growing on emergency overflows, berms greater than 4-feet in height, or within the pond.

Trees and shrubbery should be allowed to grow around the perimeter of the facility unless growth interferes with the facility function or maintenance activities. Any cut trees should be salvaged for habitat enhancement or converted to mulch or firewood.

Repairs

If the facility is overflowing for a storm that is it was designed to infiltrate, it needs to be repaired. This may require removing accumulated sediment and cleaning or rebuilding the system so that it works according to design.

Repair and seed bare areas. Repair eroded slopes when rills form. Use cover BMP's on exposed soils.

Rodent holes on a dam or berm can serve as a means of piping water out of the pond. Remove the rodents, preferably by trapping, and repair the dam or berm. Check with the Washington Department of Fish and Wildlife before removing a game animal or fur-bearer, for example muskrat, beaver, and nutria.

Spillway areas should be completely covered with more a minimum of 12-inches of rock.

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Wet Biofiltration Ponds, Swales, and Treatment Wetlands

Wet biofiltration swales and treatment wetlands use dense wetland vegetation and settling to filter sediment and oily materials out of stormwater. These stormwater treatment devices must be properly maintained to sustain pollutant removal capacity. In some cases, biofiltration swales that were designed to drain between storms remain wet and need to be rebuilt or converted to wetland swales. A designed wet biofiltration swale uses wetland plants instead of grass.

Maintenance Results

- R1 Avoid or minimize sediment and pollutant discharges from the area.
- R2 Prevent parking areas, roads, drainage systems, and drainage facilities from becoming pollutant sources.
- R7 Maintain or restore the intended infrastructure function.
- R10 Meet public expectations for aesthetics.

Procedures

Inspection

Swales are easy to inspect and need to be well maintained to treat stormwater. Make frequent visual inspections for problems such as bare ground, sediment and oily material.

Identify and remove sources of pollutants to the swale.

Cleaning

Clear inlets and outlets of debris in order to prevent blockage.

Remove litter and trash when it collects.

Where possible, use a rake and/or shovel to remove sediment accumulations greater than 2-inches thick in 10 percent of the treatment area.

Vegetation Management

Sparse vegetation or dense clumps of cattail do not properly treat stormwater. Try to find the cause of the problem and fix it to ensure dense vegetation. Cut back excessive cattail shoots. Normally, wetland vegetation does not need to be harvested unless there is an excessive die back that causes water quality problems.

If there is a problem with grass dying due to the swale being flooded during the wet season, there are two options: plant varieties that can stand being flooded or find a way to fix the swale so it drains better. Call the Public Works Department at 817-7231 for information on plants and possible swale modifications.

Outside of the treatment area, preserve healthy vegetation or reestablish vegetation where needed. Seed bare spots. Use cover BMP's on bare soils.

Trees and shrubbery should be allowed to grow unless they interfere with facility function or maintenance activities. Any cut trees should be salvaged for habitat enhancement or converted to mulch or firewood.

Stormwater control facilities are, in effect, water body buffers in which pesticides and fertilizer are not used. See Vegetation Management in Stormwater Control Facilities for more information.

Repairs

Often swales have problems due to flooding or erosion. Where possible, correct the underlying problem before trying to repair the symptom.

Repair any defect that causes the wet swale to dry out during the wet season.

Replace stormwater facility signs that are broken, damaged, or stolen.

Drainage Ditches

Ditches are often manmade open-channels that carry only stormwater. These ditches are maintained to prevent localized flooding by draining stormwater. Maintenance includes removing sediment, debris, litter, and overgrown vegetation.

Many manmade drainage ditches carry water when it is not raining. This water comes from groundwater seepage and wetlands. These ditches can be recognized by the presence of wetland plants, such as cattails. Any work that disturbs these channels is probably subject to a variety of environmental regulations and may require an HPA permit from the Washington Department of Fish and Wildlife. Contact the Washington Department of Fish and Wildlife and the City of Camas Public Works Department before beginning any work.

Maintenance Results

- R1 Avoid or minimize sediment and pollutant discharges from the area.
- R2 Prevent parking areas, roads, drainage systems, and drainage facilities from becoming pollutant sources.
- R3 Avoid or minimize vegetation removal.
- R4 Preserve natives plants.
- R7 Maintain or restore the intended infrastructure function.
- R8 Prevent or reduce flooding.
- R9 Protect infrastructure.

Procedures

Inspection

Inspect ditches during routine site maintenance or at least once per year.

Cleaning

Land disturbing activities that remove vegetation or disturb soil are subject to erosion/sediment control requirements per CMC 15.32. A good time to clean drainage ditches is during the growing season, when it's easiest to reestablish vegetation.

Cleaning or excavating within seasonally dry or ditched watercourses may require an HPA from WDFW. Consult the official state DNR water type maps or contact the City of Camas for assistance in determining whether watercourses are typed streams (e.g. type 1, 2, 3, 4 or 5) that are regulated by WDFW. *Contact VTDFW Region Five office for additional information on whether specific watercourses are regulated under the State Hydraulic Code, or if unmapped streams are encountered.*

If feasible, remove small amounts of sediment by hand when performing routine site maintenance.

Vegetation should only be removed when it reduces free movement of water through the ditch. Never remove more vegetation than is absolutely needed.

Only remove sediment when it reaches 20 percent of the ditch depth or affects the historic or designed hydraulic capacity.

Alternate cleaning areas with undisturbed areas, leaving undisturbed sections to act as sediment trapping filters between worked areas.

Trap sediment that is generated by ditch maintenance to keep it from entering water bodies. Use sediment-trapping BMP's such as bio-filter bags at the lower end of each excavated area.

Prevent sediment from eroding when ditch work is performed. Perform work during dry weather unless there is an emergency, such as property or road flooding.

Vegetate bare soils by hydroseeding or cover bare soils with an approved BMP. Hand seed for smaller areas.

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Operation & Maintenance Procedures

Stormwater Structures

Public & Private Systems

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Catch Basins and Curb Inlets

Catch basins and curb inlets trap sediment and some oils that are washed off the road surface during a storm event. This sediment and the oils if not removed from the basins and inlets have the potential to pollute water bodies. They need to be inspected and cleaned at a minimum annually, more often if necessary; to remove accumulated sediment, fluids, and trash.

Maintenance Results

- R1 Avoid or minimize sediment and pollutant discharges from the work area.
- R2 Prevent parking areas, roads, drainage systems, facilities, and property from becoming pollutant sources.
- R7 Maintain or restore the intended infrastructure function
- R8 Prevent or reduce flooding.
- R9 Protect infrastructure.

Procedures

Inspection

Inspect catch basins and curb inlets at least once per year, more often if necessary.

Periodically inspect the catch basin or curb inlets and surrounding areas for pollutants, such as leaks from dumpsters, minor spills, and oil dumping. Act to have the pollutant source removed. Ensure that grass clippings and leave debris is not being blown into the streets.

Cleaning

Clean catch basins and curb inlets when they become one third full in order to maintain sediment-trapping capacity. Catch basin, curb inlet, and manhole cleaning should be performed in a manner that keeps removed sediment and contaminated water from being discharged back into the storm sewer.

Clean putrid materials from the catch basins and curb inlets when discovered or reported.

Keep the inlet grates cleared of debris and litter.

Safety

Work inside underground structures (e.g. manholes) requires special OSHA-required confined space equipment and procedures. The most practical option may be to contract with a sewer-cleaning contractor for this work.

Materials Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Removed sediment must be disposed of in the garbage as solid waste. Contaminated water should be disposed of in a sanitary sewer after oils are removed using oil absorbent materials or other mechanical means. Used oil absorbents should be recycled or disposed according to the manufacture's instructions.

Repairs

Repair any damages that prevent the catch basin or curb inlet from functioning as designed. An example is a broken or missing outlet elbow.

Follow the Procedures described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

Debris Barriers/Trash Racks

Debris barriers and trash racks are barred covers to pipe openings. They prevent large objects from entering pipes and keeps pets and people out of the pipes as well. In cases where there is fish migration, maintaining unblocked trash racks allows fish passage.

Maintenance Results

- R1 Avoid or minimize sediment and pollutant discharges from the work area.
- R2 Prevent parking areas, roads, drainage systems, and drainage facilities from becoming pollutant sources.
- R5 Protect public safety and health.
- R6 Prevent catastrophic infrastructure failures.
- R7 Maintain or restore the intended infrastructure function.
- R8 Prevent or reduce flooding.
- R9 Protect infrastructure.

Procedures

Inspection

Inspect debris barriers and trash racks at least once per year in the fall.

Cleaning

Clean debris barriers and trash racks when debris is plugging more than 20 percent of the openings or when obstruction to fish passages are created. Consult the Washington Department of Wildlife is in a fish-bearing waterway.

Repairs

Immediately replace missing racks and bars.

Replace bars that are deteriorated to the point where they may be easily removed.

Straighten bent bars back into position.

Follow the Procedures described in the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

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Energy Dissipaters

Energy dissipaters are critical for preventing erosion at storm drain outfalls. There are a variety of designs, including wire gabion baskets, rock splash pads, trenches, and specially designed pools or manholes.

Maintenance Results

- R1 Avoid or minimize sediment and pollutant discharges from the work area.
- R2 Prevent parking areas, roads, drainage systems, and drainage facilities from becoming pollutant sources.
- R7 Maintain or restore the intended infrastructure function.
- R8 Prevent or reduce flooding.
- R9 Protect infrastructure.

Procedures

Inspection

Inspect at least once per year.

Cleaning

Remove any accumulated litter.

Dispersion trenches: remove sediment from pipe when it reaches 20 percent of the pipe diameter.

Repairs

Rock splash pads: replace missing or moved rocks to cover exposed soil and meet design standards.

Dispersion trenches: repair conditions that cause concentrated flow along the trench. Clean pipe perforations when one-half of them are plugged or if flows bypass or overflow the trench.

Manhole/Chamber: when the structure deteriorates to one-half its original size or it becomes structurally unsound, replace it to the design standards.

Follow the practice described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

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Manholes

Manholes are large cylindrical vaults usually set at storm sewer pipe connections. Unless you have OSHA approved training and equipment, never enter a manhole. There is a considerable risk of poisonous gas and injury.

Maintenance Results

- R1 Avoid or minimize sediment and pollutant discharges from the work area.
- R2 Prevent parking areas, roads, drainage systems, and drainage facilities from becoming pollutant sources.
- R7 Maintain or restore the intended infrastructure function.
- R8 Prevent or reduce flooding.
- R9 Protect infrastructure.

Procedures

Inspection

Inspect the manhole once per year. Check frame and lid for cracks and wear, such as rocking lids or lids move by traffic.

Periodically inspect the manhole and surrounding areas for pollutants such as leaks from dumpsters, minor spills, and oil dumping. Take action to have the pollutant source removed.

Cleaning

Clean manholes when there is a blockage of the stormwater channel. Cleaning should be performed in a way that ensures removed sediment and water is not discharged back into the storm sewer.

Safety

Never enter a confined space without proper training and safety gear. Work inside underground structures requires special OSHA-required confined space equipment and procedures. The most practical option may be to contract with a sewer-cleaning contractor.

Materials Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Removed sediment must be disposed of in the garbage as solid waste. Contaminated water should be disposed of in a sanitary sewer after oils are removed using oil absorbent materials or other mechanical means. Used oil absorbents should be recycled or disposed according to the manufacture's instructions.

Repairs

Repair all security and access features so they are fully functional. This includes locking lids, cover, and ladder rungs.

Replace broken parts or lids that rock or are moved by traffic.

Follow the practice described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

Oil/Water Separators and Buried Wet Vaults

An oil/water separator is an underground vault that treats stormwater by mechanically separating oil from water. The oil rises to the surface and floats on the water and sediment settles to the bottom. Buried wet vaults are similar to oil/water separators in that they are sub-surface vaults that separate sediment and floating materials from stormwater.

These facilities have special problems for maintenance and should be serviced by contractors. The main issues are working in confined spaces and properly handling any sludge and oil cleaned from vaults or oil/water separators. Manufacturer's recommendations for maintenance should be followed at a minimum.

Maintenance Results

- R1 Avoid or minimize sediment and pollutant discharges from the work area.
- R2 Prevent parking areas, roads, drainage systems, and drainage facilities from becoming pollutant sources.
- R7 Maintain or restore the intended infrastructure function.
- R9 Protect infrastructure.

Procedures

Inspection

Periodically check stormwater flow out of the facility. It should be clear and not have a thick visible oil sheen.

Annually check for cracks large enough to let soil enter the vault, broken or defective plates and baffles, and crushed or damaged pipes.

Periodically inspect the surrounding areas for pollutants, such as leaks from dumpsters, minor spills, and oil dumping. Take action to the pollutant source removed.

Cleaning

Remove trash and litter from the vault, inlet, and piping.

Remove oil when it reaches one-inch thickness.

Remove sediment when it accumulates to 6-inches in depth.

Safety

Work inside underground structures requires special OSHA-required confined space equipment and procedures. The most practical option may be to contract with a sewer-cleaning contractor.

Materials Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid

Waste handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Removed sediment must be disposed of in the garbage as solid waste. Contaminated water should be disposed of in a sanitary sewer after oils are removed using oil absorbent materials or other mechanical means. Used oil absorbents should be recycled or disposed according to the manufacture's instructions.

Repairs

Repair any cracked or defective plates or baffles. Cracks are repaired so that no cracks greater than 1/4-inch are present. Repair any leaks that allow water levels to drop and cause oil to be washed from the unit.

Repair all security and access features so they are fully functional. This includes locking lids, covers, and ladder rungs.

Follow the practice described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

Flow Control Structures/Flow Restrictors

Flow control structures and flow restrictors direct or restrict flow in or out of a facility. Outflow controls on detention facilities are a common example where flow control structures slowly release stormwater at a specific rate. If these flow controls are damaged, plugged, bypassed, or not working properly, the facility could overtop or be releasing water at too high of a rate. This would likely damage streams habitat and property. Site plans should have detailed drawings showing how the flow control structures should appear. Consult a licensed professional engineer or the City of Camas Public Works Department for assistance.

Maintenance Results

- R2 Prevent parking areas, roads, drainage systems, and drainage facilities from becoming pollutant sources.
- R7 Maintain or restore the intended infrastructure function.
- R9 Protect infrastructure.

Procedures

Inspection

Inspect at least once per year for all features listed under Cleaning and Repairs, or when a facility does not drain properly or other problems occur.

Cleaning

Remove sediment within 18-inches of the bottom of an orifice plate.

Remove trash and debris that may block the orifice plate.

Remove any trash or debris that may block an overflow pipe.

Safety

Work inside underground structures requires special OSHA-required confined space equipment and procedures. The most practical option may be to contract with a sewer-cleaning contractor.

Materials Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Removed sediment must be disposed of in the garbage as solid waste. Contaminated water should be disposed of in a sanitary sewer after oils are removed using oil absorbent materials or other mechanical means. Used oil absorbents should be recycled or disposed according to the manufacturer's instructions.

Repairs

Repair or replace to original design specification any outlet orifice that is enlarged, bypassed, or damaged.

Make certain that overflow outlets are not blocked.

Structures should be securely in place and within 10 percent of vertical.

Repair outlet pipe structures that have leaking connections or holes not specified by the design.

Repair or replace a non-functional or damaged cleanout gate.

Repair or replace damaged orifice plates to original design specification.

No outflow controls can be modified with approval of the City of Camas Public Works Department engineer.

Follow the practice described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

Storm Sewer/Drain Pipe

Storm sewer pipes convey stormwater. Storm pipes are constructed of many different types of materials and are sometimes perforated to allow groundwater to be collected by the storm system. Storm pipes are cleaned to remove sediment or blockages when problems are identified. Storm pipes must be clear of obstructions and breaks to prevent localized flooding.

Maintenance Results

- O1 Avoid or minimize sediment and pollutant discharges from the work area.
- O2 Prevent parking areas, roads, drainage systems, and drainage facilities from becoming pollutant sources.
- O7 Maintain or restore the intended infrastructure function.
- O8 Prevent or reduce flooding.
- O9 Protect infrastructure.

Procedures

Inspection

Pipes are difficult to inspect requiring special equipment and training. Usually, if a problem occurs the owner needs to call a sewer or plumbing contractor to inspect, repair, or clean pipelines.

Cleaning

Clean pipes when sediment depth is greater than 20 percent of pipe diameter. When cleaning a pipe, minimize sediment and debris discharges from pipes to the storm sewer. Install downstream debris traps (where applicable) before cleaning and then remove material.

Generally, use mechanical methods to remove root obstructions from inside storm sewer pipes. Do not put root-dissolving chemicals in storm sewer pipes. If there is a problem, remove the vegetation over the line.

Safety

Work inside underground structures requires special OSHA-required confined space equipment and procedures. The most practical option may be to contract with a sewer-cleaning contractor.

Materials Handling

Sediment and debris from pipes should be disposed in the garbage as solid waste. Pick out any rocks first.

Repairs

Repair or replace pipes when a dent or break closes more than 20 percent of the pipe diameter.

Repair or replace pipes damaged by rust or deterioration.

Follow the practice described under the Activity: Installation, Repair, and Replacement of Enclosed Drainage Systems.

Underground Detention Systems

Some detention systems consist of underground tanks or vaults that are usually placed under paved areas. They hold and slowly release stormwater runoff from roofs and pavement.

Tanks and vaults are confined spaces where work requires special OSHA-required training and equipment.

Maintenance Results

- R1 Avoid or minimize sediment and pollutant discharges from the work area.
- R2 Prevent parking areas, roads, drainage systems, and drainage facilities from becoming pollutant sources.
- R7 Maintain or restore the intended infrastructure function.
- R9 Protect infrastructure.

Procedures

Inspection

Inspect annually for the features listed under Cleaning and Repairs.

Periodically inspect the manhole and surrounding areas for pollutants such as leaks from dumpsters, minor spills, and oil dumping. Take action to have the pollutant source removed.

Cleaning

Remove trash and litter from the vault, inlet, and piping.

Clean air vents that have one-half of their area plugged.

Remove sediment when it accumulates to 1/10th the depth of a rectangular vault or 1/10th the diameter of a round tank or pipe.

Safety

Work inside underground structures requires special OSHA-required confined space equipment and procedures. The most practical option may be to contract with a sewer-cleaning contractor.

Materials Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Removed sediment must be disposed of in the garbage as solid waste. Contaminated water should be disposed of in a sanitary sewer after oils are removed using oil absorbent materials or other mechanical means. Used oil absorbents should be recycled or disposed according to the manufacture's instructions.

Repairs

Repair any cracked or defective plates or baffles. Cracks are repaired so that no cracks greater than 1/4-inch are present.

Any part of a tank or pipe that is bent out of shape more than 10 percent of its design shape must be replaced or repaired.

Repair any joints that are cracked and allow soil into the facility.

Repair all security and access features so they are fully functional. This includes locking lids, covers, and ladder rungs.

Follow the practice described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

Operation & Maintenance Procedures

Special Facilities

Public & Private Systems

September 2009

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Drywells

Drywells are perforated, open-bottomed manholes used to infiltrate stormwater into the ground. While not the intended use, drywells trap sediment and some of the oil pollutants in stormwater runoff. Drywells are more likely to fill with oily sediment in areas that lack swales or other treatment facilities. Fine oil sediment can clog drywells and lead to localized street flooding. Also, pollutants discharged into drywells can migrate into groundwater. Drywells were often installed in closed topographic depressions, areas with will-drained soils, or areas having inadequate storm sewers. Often, drywells contain groundwater.

Maintenance Results

- R1 Avoid or minimize sediment and pollutant discharges from the work area.
- R2 Prevent parking areas, roads, drainage systems, and drainage facilities from becoming pollutant sources.
- R7 Maintain or restore the intended infrastructure function.
- R8 Prevent or reduce flooding.
- R9 Protect infrastructure.

Procedures

Inspection

Drywells should be inspected at least once a year and no less than once every five years.

Periodically inspect the manhole and surrounding areas for pollutants such as leaks from dumpsters, minor spills, and oil dumping. Take action to have the pollutant source removed.

If a problem with flooding or slow drainage occurs, observe or inspect the drywell for infiltration rate and observe water level depths if monitoring wells are installed.

Cleaning

Clean out drywells when sediment depth is greater than 1/3 of the distance between the vase and inlet pipe.

Drywell cleaning should be performed in a way that makes certain removed sediment and water is not discharged back into the storm sewer.

Safety

Work inside underground structures requires special OSHA-required confined space equipment and procedures. The most practical option may be to contract with a sewer-cleaning contractor.

Materials Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Removed sediment must be disposed of in the garbage as solid waste. Contaminated water should be disposed of in a sanitary sewer after oils are removed using oil absorbent materials or other mechanical means. Used oil absorbents should be recycled or disposed according to the manufacture's instructions.

Repairs

If the drywell does not dissipate stormwater, it should be replaced or repaired.

It is possible to restore some drywell capacity by water-jetting clogged openings.

Another option is installing a new drywell or drainage trench, and converting the clogged drywell into a sediment trap. This has the advantage of providing a sediment trap and some amount of spill trapping. The sediment trap conversion requires grouting the holes, covering the base with concrete, and adding piping. Alterations to any storm facility **cannot** be done without approval from the City of Camas.

If there is standing water in a drywell, it probably is into the water table. Drywells in the water table should be rebuilt to prevent stormwater from going directly into groundwater.

Repair all security and access features so they are fully functional. This includes locking lids, covers, and ladder rungs.

Follow the practice described under the Activity: Installation, Repair, and Replacement of Enclosed Drainage Systems.

StormFilter™ (Leaf Compost Filter)

The StormFilter is a patented system for treating stormwater. The systems have evolved during the last 10 years from very simple above ground filter beds to a variety of vault devices containing cylindrical filters filled with leaf compost pellets. StormFilter facilities consist of cartridges filled with one or a combination of media. Media can be selected to target pollutants specific to a particular site. The cartridges are housed in pre-cast or cast in-place concrete vaults or in a steel catch basin configuration. Each configuration uses baffles to promote settling of solids and separation of oils and other floatable materials. The majority of pollutants are captured by the media and held in the cartridges. Some additional settling will occur in the inlet and cartridge bays of each vault.

Maintenance Results

- R1 Avoid or minimize sediment and pollutant discharges from the work area.
- R2 Prevent parking areas, roads, drainage systems, and drainage facilities from becoming pollutant sources.
- R7 Maintain or restore the intended infrastructure function.
- R9 Protect infrastructure.

Procedures

Inspection

Inspect the StormFilter every six months. The inspection should determine sediment depth and the specific maintenance and repairs needed.

Inspect annually for cracks large enough to let soil enter the vault, broken or defective plates and baffles, and crushed or damaged pipes.

Periodically inspect the manhole and surrounding areas for pollutants such as leaks from dumpsters, minor spills, and oil dumping. Take action to have the pollutant source removed.

Cleaning

Remove trash and litter from the vault, inlet, and piping.

Remove sediment when it accumulates to 6-inches in depth in settling chambers.

Remove sediment when it accumulates on filter media.

Replace media cartridges per manufacture's recommendation.

Safety

Work inside underground structures requires special OSHA-required confined space equipment and procedures. The most practical option may be to contract with a sewer-cleaning contractor.

Materials Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid

Waste handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Removed sediment must be disposed of in the garbage as solid waste. Contaminated water should be disposed of in a sanitary sewer after oils are removed using oil absorbent materials or other mechanical means. Used oil absorbents should be recycled or disposed according to the manufacture's instructions.

Repairs

Repair any cracked or defective plates or baffles. Cracks are repaired so that no cracks greater than 1/4-inch are found.

Replace media cartridges if it takes longer than an hour for water to empty through media or if water frequently overflows the treatment chamber. Replace defective cartridges.

Repair all security and access features so they are fully functional. This includes locking lids, covers, and ladder rungs.

Follow the practice described under the Activity: Installation, Repair, and Replacement of Enclosed Drainage Systems.

Infiltration Systems (work in-progress)

Due to the dominance of clay soils within the City of Camas, infiltrations systems are not allowed, except on a case-by-case basis.

Maintenance Results

- R1 Avoid or minimize sediment and pollutant discharges from the work area.
- R2 Prevent parking areas, roads, drainage systems, and drainage facilities from becoming pollutant sources.
- R7 Maintain or restore the intended infrastructure function.
- R10 Meet public expectations for aesthetics

Procedures

Inspection

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Operation & Maintenance Procedures

Miscellaneous Activities

Public & Private Systems

September 2009

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Fences, Gates, and Water Quality Signs

Fences are installed around the perimeter of storm sewer facilities as a means of protecting the public, as they restrict entrance to the facility. Gates are installed to allow for maintenance access. Gates will be secured shut, typically with a double lock system that allows access to the City and to the property owner's maintenance crew.

Water Quality Signs are installed on the fences, or on sign poles, within public view as a means of educating the public as to the presence of a storm sewer facility. These signs also have a number located in the upper right hand corner that is cross referenced, at the City, to an address and maintenance responsibility.

Maintenance Results

- R5 Protect public safety and health.
- R7 Maintain or restore the intended infrastructure function.
- R9 Protect infrastructure.

Procedures

Inspection

Inspect fences, gates, and water quality signs during facility maintenance.

Repairs

Repair any opening that allows entry into the facility, including access beneath the fence.

Replace any missing gates.

Repair broken gate hinges or gates which do not close and lock properly.

Replace any missing signs or signs that have more than a 20 percent unreadable surface.

Repair sign posts that lean more than 8-inches off vertical.

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Access Roads and Easements

Most stormwater facilities have access roads to bring in heavy equipment for facility maintenance. These roads should be maintained for inspection access and ease of equipment access.

Maintenance Results

- R1 Avoid or minimize sediment and pollutant discharges from the work area.
- R2 Prevent parking areas, roads, drainage systems, and drainage facilities from becoming pollutant sources.
- R7 Maintain or restore the intended infrastructure function.
- R10 Meet public expectations for aesthetics.

Procedures

Inspection

Inspect once a year or when facilities are maintained.

Cleaning

Remove litter when mowing or when there is any accumulation.

Remove any debris that blocks roads or may damage tires.

Vegetation Management

Manage vegetation as for the rest of the facility. Trees and shrubs may be removed from access roads and easements if they block access for necessary maintenance or will prevent or harm intended stormwater facility function. Use of pesticides is prohibited unless prior approval is received from the City.

Repairs

Correct any bare or eroded soils by seeding or a cover BMP.

Repair road surfaces when they may lead to erosion or limit equipment access.

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Pavement Sweeping

Pavement sweeping is performed as a means of removing sand, dirt, and litter from streets and curb gutters. Sweeping also reduces dust during dry weather. Pavement sweeping is also part of storm sewer maintenance procedure because it limits the amount of sediment washed into the storm sewer facilities. The water quality procedure for street sweeping focuses on sediment removal and disposal. Reducing the amount of sediment washed into catch basins, curb inlets, detention facilities, drywells, and other facilities can save money because sweeping is generally cheaper than removing sediment from facilities. Sweeping also helps protect facilities from clogging with sediment.

Maintenance Results

- R2 Prevent parking areas, roads, drainage systems, and drainage facilities from becoming pollutant sources.
- R5 Protect public safety and health.
- R10 Meet public expectations for aesthetics.

Procedures

Inspection

Inspect on a weekly basis, depending on traffic volumes.

Cleaning

Sweep the site to help keep sediment from entering storm sewer systems and water bodies.

Sweeping is especially useful for cleaning up work areas.

Sweeping can be as easy as using a couple of push brooms or as involved as using mechanical methods.

Materials Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Sweepings should be disposed of as solid waste or under a program permitted by the Southwest Washington Health District.

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Operation & Maintenance Procedures

Enclosed Storm Sewers System

Public & Private Systems

September 2009

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Installation, Repair, and Replacement of Enclosed Drainage Systems

This chapter includes tasks such as repair and replacement of pipe, catch basins, drywells, and manholes. It also includes drainage projects that add new pipes, catch basins, or infiltration structures. New drainage projects are subject to regulations under CMC 15.36 Erosion/Sediment Control Plans.

Maintenance Results

- R1 Avoid or minimize sediment and pollutant discharges from the work area.
- R2 Prevent parking areas, roads, drainage systems, and drainage facilities from becoming pollutant sources.
- R7 Maintain or restore the intended infrastructure function.
- R8 Prevent or reduce flooding.

Procedures

Cleaning

Avoid or minimize vegetation removal. If work is near a stream or wetland, there are regulatory requirements that must be met.

Prevent debris, oils, cleaning agents, and sediment from entering waterways.

Avoid or minimize work in wet weather. This will reduce the problems of containing sediment.

Carry spill control kit on-site to contain and clean up possible small spills in the work area, e.g. oil spills.

Protect our storm systems:

- Install sediment traps around curb inlets and catch basins, e.g. biobags or gravel filled pillows.
- Install catch basin inserts.
- Sweep or vacuum dust and debris from the repair job. Do not wash materials into storm sewers.
- Place stockpiles away from drainage ways, wetlands, and natural wetland and habitat buffers. Cover stockpiles or contain them with berms or other containment devices.
- At stream crossings, trap material using screens or another approved form of containment. Use containment BMP's to protect roadside ditches during wet weather.

Ensure that along with the approved erosion/sediment control measures that are in-place prior to construction, that there is an emergency sediment control kit for unexpected problems; e.g. trench dewatering. This should include:

- Sediment bag,
- Additional biobags and catch basin inserts,
- Push brooms and flat edge shovels.

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Minor Culvert Repair (not in a natural stream)

This activity is for the replacement or repair of culverts and inlets. It applies only to structures that are in ditches that are specifically for storm drainage. These are ditches that do not carry water during dry weather. If there is any question about whether the ditch is a storm drain or a stream, consult with the Washington Department of Fish and Wildlife and the City of Camas Public Works Department.

Maintenance Results

- R1 Avoid or minimize sediment and pollutant discharges from the work area.
- R3 Avoid or minimize vegetation removal.
- R7 Maintain or restore the intended infrastructure function.
- R8 Prevent or reduce flooding.
- R9 Protect infrastructure.

Procedures

Comply with erosion/sediment control requirements in CMC 15.32.

Avoid or minimize vegetation removal. If work is near a stream or wetland, there are likely to be regulatory requirements.

Other than to address a threat to public safety or property due to flooding, perform work during the dry season.

Minimize soil disturbance.

Use sediment controls to trap any sediment and prevent sediment from entering the storm sewer and water bodies. Sediment trapping BMP's are to be used to the extent practical during emergencies. An emergency sediment control kit is highly recommended.

Use cover BMP's to prevent erosion of bare soil. Vegetate bare soils.

Major Culvert Repair (at a Stream Crossing)

This activity is the replacement or repair of culverts and inlets bridging a stream or ditch with flowing water during dry weather. If there is any question about whether the ditch is a storm drain or a stream, consult the Washington Department of Fish and Wildlife and the City of Camas Public Works Department.

These projects must meet all regulatory requirements.

- SEPA
- Shoreline
- HPA Permit
- Flood Plain

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Operation & Maintenance Procedures

Vegetation Management

Public & Private Systems

April 2009

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General Goals and Philosophy

The City of Camas recognizes the special importance of the rivers, streams, wetlands, ponds, and stormwater control and treatment facilities. The sensitive nature of such habitat, their plant and animal communities, and their direct link with other waterways require that we establish specific policies to ensure their health. All landscape management decisions for controlling unwanted vegetation, diseases, and pests should follow Integrated Pest Management (IPM) principles and decision-making rationale. These are as follows:

- Proper planning and management decisions begin the IPM process.
- Cultural methods of vegetation and pest control are preferred and are first employed.
- Mechanical means of vegetation and pest control are next in line of preference, and are utilized where feasible.
- Biological methods of vegetation and pest control are considered before chemical means, where they are feasible.
- Botanical and synthetic pesticides are used only when no other feasible methods exist.

General Procedures

Use Only Appropriate Plants

The City of Camas has adopted a list of approved plants for use in development projects, and to assist homeowners in choosing appropriate plantings. The list also has prohibited undesirable plants. Only plants approved for use on the City of Camas Plant List are allowed for use within the City's right-of-way, storm sewer facilities, and wetland buffers.

Mulching

Mulches and other ground coverings are useful during the installation and restoration of landscapes as well as their ongoing maintenance. Mulches meet a variety of needs. They suppress weeds, help to retain moisture around plants, reduce possible erosion, and provide visual enhancement.

Always consider the possible impacts when using mulches, which may include:

- Inadvertent introduction of non-native plants and diseases to the site.
- Leaching of substances such as tannins from the mulch into nearby waterways.
- Migration of mulch material in waterways.
- Nutrient leaching into waterways.

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Vegetation and Pest Management in Storm Sewer Facilities

Storm sewer facilities include biofiltration treatment swales, treatment wetlands, treatment ponds, detention ponds, open channels, and infiltration basins. Stormwater control facilities discharge to surface water or groundwater directly or through pipes or ditches. Facilities are built to remove pollutants and to control the discharge rate of stormwater.

Generally, vegetation should be maintained to blend into surrounding areas. Storm sewer facilities can also provide habitat for birds, amphibians, and other aquatic life. Promoting native vegetation, where feasible, improves habitat. Swales often blend into intensively managed landscapes. Pond perimeters can include native vegetation.

The use of pesticides, and in most cases fertilizer, is not compatible with the task of pollutant removal or where there is a direct discharge of stormwater to streams and groundwater.

Features of Storm Sewer Facilities:

- There is a mix of native and non-native plants.
- Generally not used by the public.
- Include areas managed to promote design function, such as turf in swales.
- Managed landscapes may be nearby.
- May be used by fish and wildlife.

Objectives for Storm Sewer Facilities:

- Maintain healthy plant communities.
- Avoid or minimize need for chemical intervention.
- Control invasive plants where feasible.
- No bare soil areas are allowed.
- Tolerance for natural appearance and weeds.

Procedures

The vegetation management focus is in establishing and maintaining healthy low-maintenance native plantings and sustaining the design function of vegetated filters, such as biofiltration swales. This includes controlling invasive plants where feasible, and planting cover on bare soils.

Only use plants on the City of Camas approved plant list.

In some cases, the original plantings may not be appropriate for the actual conditions at a facility. One example is a frequently flooded swale that cannot support normal turf. In cases like this, replace turf with appropriate wetland plants if the underlying drainage problem cannot be fixed.

Consider the use of soil amendments, such as compost before using fertilizer.

Limit mulch use to covering bare soil while establishing plantings.

Chemical use should be avoided within 25 feet of any area that holds or conveys surface water or stormwater. This includes the base of a biofiltration swale.

Trees or shrubs that hinder accessibility to access roads may be trimmed (or removed if within the access road) when access is required for maintenance by heavy equipment.

Trees that pose a risk to stormwater structures due to root growth should be removed and replaced by smaller shrubs.

Vegetation and Pest Management in Wetland Areas

Constructed wetlands are built to treat stormwater. As water bodies, treatment wetlands connect to streams and groundwater. Constructed wetlands also play host to insects, fish, amphibian, and birds that are sensitive to horticultural chemicals. Because of this, chemical use should be avoided or minimized in wetland buffers. Wetland management has a low tolerance for invasive or non-native plants.

Procedures listed here apply only to those parts of a constructed wetland that are not subject to inundation or saturation during the growing season.

Features of Constructed Wetlands:

- Limited public access.
- Plants may or may not be well established, depending on age and condition.
- May provide fish and wildlife habitat.

Objectives for Constructed Wetlands:

- Maintain health plant communities.
- Avoid or minimize need for chemical intervention.
- Low tolerance of invasive and non-native plants.
- Bare soil areas are not allowed.

Procedures

There should be a plan for establishing and maintaining vegetation in a newly constructed wetland facility. If there is a plan, follow it. If there is not a plan, follow these Procedures. Maintenance focuses on establishing and sustaining healthy native plantings. This includes more vigorously controlling invasive plants. It also includes covering for bare soil.

Only use plants on the City of Camas approved plant list.

Consider the use of soil amendments such as compost before using fertilizer.

Limit mulch use to covering bare soil while establishing plantings.

Chemical intervention is to be minimized and is to be avoided, whenever possible, within 25 feet of areas subject to inundation during the growing season.

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Operation & Maintenance Procedures

Example “Storm Sewer System Maintenance Notification”

Public & Private Systems

April 2009

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CITY OF CAMAS

STORM SEWER SYSTEM MAINTENANCE NOTIFICATION

Date Inspected: _____
 Facility Name (subdivision/commercial/industrial): _____
 Address or Location: _____
 Contact Information: _____
 Complete Maintenance by: _____ Re-inspected on: _____

TYPE OF FACILITY:

Detention Pond: Wet _____ Extended Dry _____ Other _____

Water Quality Swale: Yes No Wetlands in Vicinity: Yes No Possible

Other Comments: _____

GENERAL LOCATION SKETCH: Show approximate dimensions, north arrow, structure locations, access location, name of nearest road, etc. As-Builts Available: Yes No

Facility Check List:

Item	Yes	No
Located Access		
Located Inlet		
Located Outlet		
Located Orifice		
Slopes (Note Excess)		
Fenced / Gated		
Needs a Lock		
1-3 Photos Taken		
Outlet Type: Standpipe, Grated, Pipe, Open Channel, Other		

Other Comments: _____

GENERAL MAINTENANCE NEEDS:

Mowing Ability: _____% Weed Eater Ability (due to fence/steep slopes): _____%

Remove the following: Blackberries Scotch broom Thistle Trees in Pond/Swale Cattails

Silt Removal Needed: Yes No If Yes, From: Inlet / Outlet Structure Pond / Swale

Inlet Protection: Adequate / Inadequate Outlet Protection: Adequate / Inadequate

Overflow Protection: Adequate / Inadequate Protection Needs: additional rock / vegetation removal

Trash Debris and/or Vegetation Removal Needed: Yes No

Erosion Damage: Severe Minor None Recommended Repairs: _____

Vegetation: Dense Average Sparse Needs: Replacement Additional Seeding

Additional Work Needed After Initial Vegetation Removal: yes / no

Description: _____

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851 SW 6th AVENUE, SUITE 600
PORTLAND, OR 97204
P 503.228.5230 F 503.273.8169

MEMORANDUM

Date: September 6, 2018 Project #: 23187

To: Curleigh Carothers, PE; City of Camas

cc: Jeff Barsness, Washington State Department of Transportation (WSDOT)
David Jardin, Clark County Public Works Department
Joel Stirling, Sterling Design, Inc.

From: Chris Brehmer, PE & Kelly Laustsen, PE; Kittelison & Associates, Inc.

Project: Green Mountain B1 South Phase

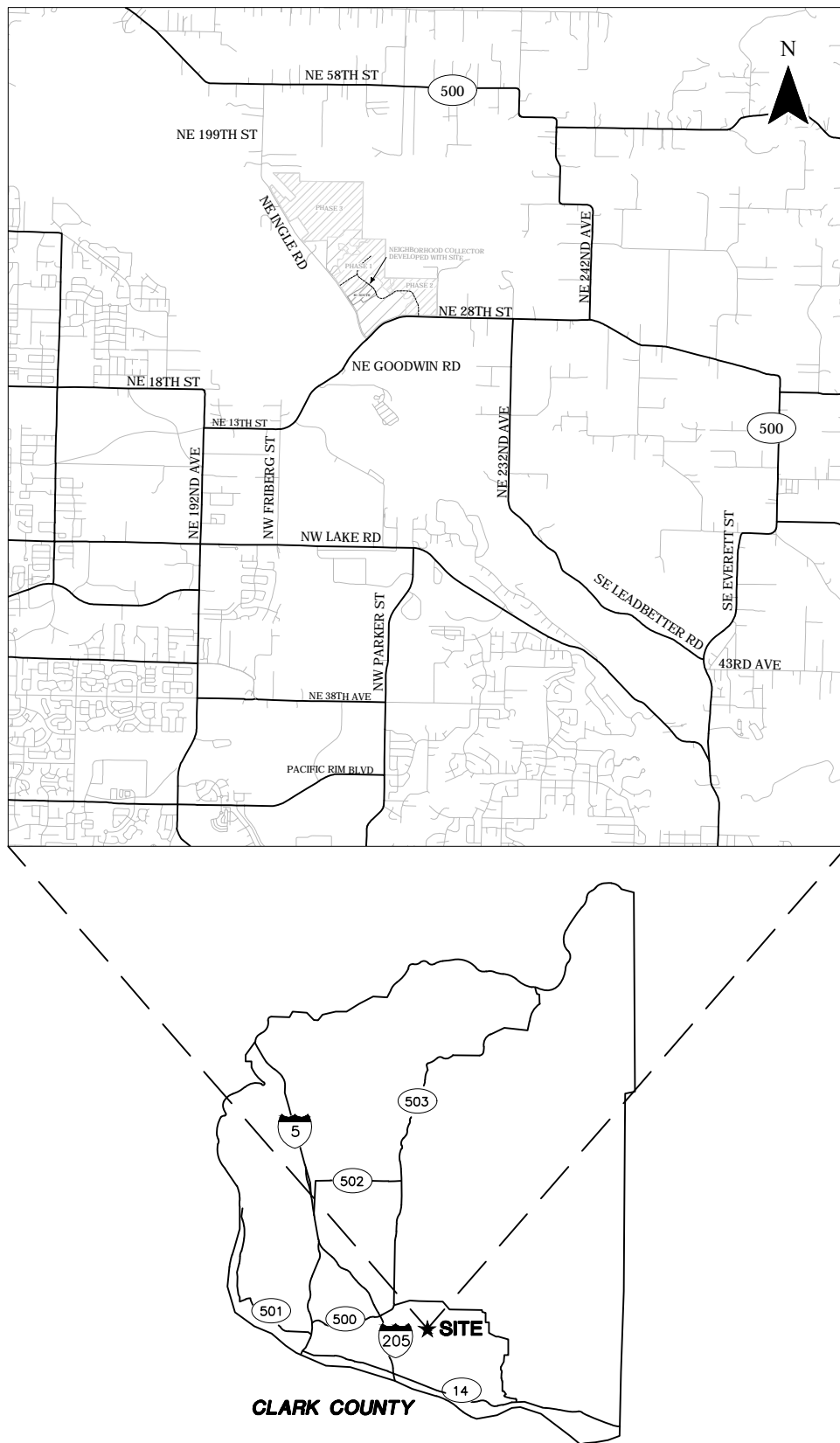
Subject: Transportation Compliance

This memorandum provides transportation compliance documentation supporting the B1 South Phase of the proposed Green Mountain Master Plan development to be located immediately east of NE Ingle Road and north of NE Goodwin Road in Camas, Washington. The contents of this memorandum are based on the recommendations provided in the *Green Mountain Master Plan Transportation Impact Analysis (TIA)*, prepared by Kittelison & Associates, Inc. and dated June 2014 (provided in *Appendix A*). This memorandum documents current project phase trip generation relative to the overall master plan and the applicability of mitigation measures identified in the master plan TIA to the current phase of development.

BACKGROUND

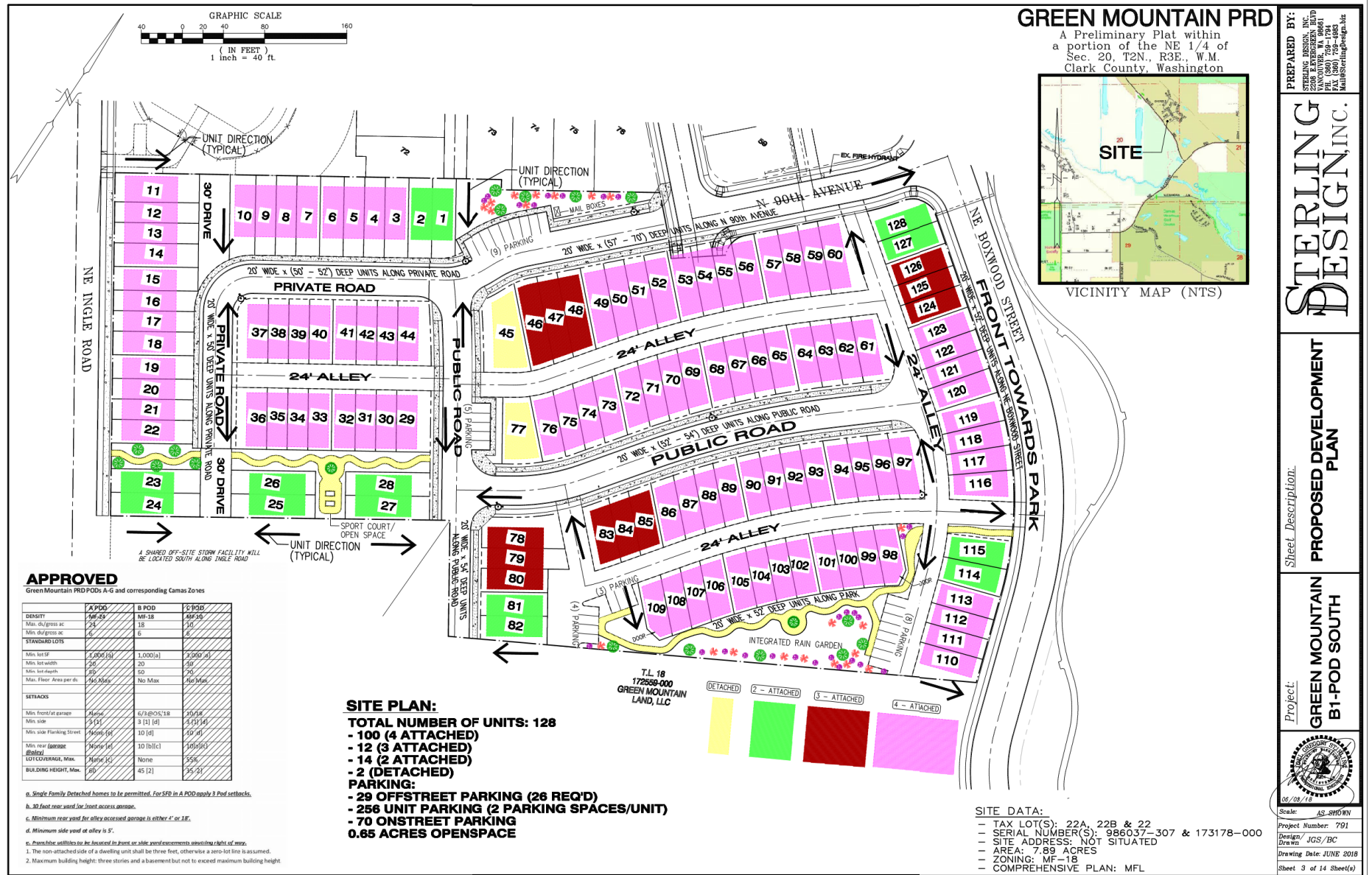
The TIA for the Green Mountain Master Plan provided a near- and long-term analysis for full buildout of the Green Mountain site, including 283-acres of mixed-use development. A mix of residential and commercial uses is planned for the full site in accordance with the zoning. The master plan assumed eight phases of the development, the first, second and third of which are currently underway.

Figure 1 illustrates the site vicinity and location of the Master Plan site, as well as the B1 South Phase. Development of the B1 South Phase of the site is currently proposed, with the site plan shown in Figure 2. This phase consists of 128 residential units accessed via the public roadway connection to NE Ingle Road built with Phase 1. The Phase 1 site plan is provided in *Appendix B* for reference, as the B1 South Phase is located immediately south of the site.



Site Vicinity
Camas, Washington

Figure
1



Conceptual Site Plan
Camas, Washington

Figure
2

SCOPE OF THE REPORT

This analysis identifies the transportation-related impacts associated with the B1 South Phase of the proposed Green Mountain Master Plan development and was prepared in accordance with the recommendations outlined in the Master Plan TIA. It documents the following:

- The number of site-generated trips (daily, weekday AM peak hour, weekday PM peak hour) estimated with the B1 South Phase.
- The number of site-generated trips (daily, weekday AM peak hour, weekday PM peak hour) previously debited by approved site development applications on the master plan site.
- An accounting of the number of site-generated trips (daily, weekday AM peak hour, weekday PM peak hour) remaining assuming approval of the B1 South Phase subdivision application.
- Evaluation of outstanding mitigation needs (as appropriate consistent with the Master Plan recommendations) involving:
 - Assessment of proportionate share contribution at NE 199th Avenue/NE 58th Street (SR 500);
 - NE Ingle Road/NE Goodwin Road intersection operations; and
 - Assessment of proportionate share contribution at NE 192nd Avenue/NE 13th Street intersection.
- On-site access and circulation.
- Conclusions and recommendations.

ANALYSIS METHODOLOGY

As with the Master Plan TIA, all level of service analyses described in this report were performed in accordance with the procedures stated in the *2010 Highway Capacity Manual* (Reference 1).

To ensure that this analysis was based on a reasonable worst-case scenario, the peak 15 minute flow rate during the peak hour analysis periods was used in the evaluation of all intersection levels of service. For this reason, the analysis reflects conditions that are only likely to occur for 15 minutes out of each average peak hour.

CURRENT PROPOSED DEVELOPMENT PLAN

The B1 South Phase consists of 124 attached units and 2 single-family detached homes and is expected to be completed by 2020. It is located in the southwest portion of the overall site, directly south of Phase 1. Access will be provided via the neighborhood collector built with Phase 1, which connects to NE Ingle Road. In the future, this neighborhood collector will connect to Phase 3 of the site.

Trip Generation

Trip generation estimates for the proposed development were generated based on information provided in the standard reference manual *Trip Generation, 9th Edition* published by the Institute of Transportation Engineers (ITE – Reference 2). Table 1 summarizes the daily, weekday AM, and weekday PM peak-hour trips for the B1 South Phase assumed development.

Table 1: Trip Generation Estimate – B1 South Phase

Land Use	ITE Code	Size	Daily	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
Residential Condominium/ Townhouse	230	124 units	720	55	9	46	65	43	22
Single-Family Detached Housing	210	2 units	20	2	1	1	2	1	1
Total Residential (126 units)			740	57	10	47	67	44	23

Table 2 summarizes the overall master plan trip generation and then deducts for the cumulative Phase 1¹, Phase 2¹ Phase 3, and B1 South Phase trips to summarize the number of net new trips that will remain vested.

¹ While previous traffic analysis assumed 215 units in Phase 1, Phase 1 as platted consists of 201 units. While previous traffic analysis assumed 230 units in Phase 2, Phase 2 is now platted for 228 units. The updated trip totals are shown in Table 2.

Table 2: Master Plan Trip Generation and Build-out Debiting (Includes Phase 1, 2 and 3)

Land Use	ITE Code	Size	Daily	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
Apartment	220	536 units	3,570	275	55	220	330	215	115
Single-Family Detached Housing	210	764 units	7,270	575	145	430	765	480	285
Total Residential (1,300 units)			10,840	850	200	650	1,095	695	400
Internalization (6% Daily,54% PM)			630	0	0	0	60	30	30
Shopping Center	820	90,000 square feet	6,340	145	90	55	560	270	290
Internalization (10% Daily, 11% PM)			630	0	0	60	30	30	
Pass-By Trips (34%)			1,940	50	25	25	170	85	85
Total Vested Trips			17,180	995	290	705	1,655	965	690
Less Internalization			1,260	0	0	0	120	60	60
Less Pass-by trips			1,940	50	25	25	170	85	85
Vested Net New Trips for Full Build-out			13,980	945	265	680	1,365	820	545
Deduct for Net New Trips for Phase 1			1,914	150	40	110	200	125	75
Deduct for Net New Trips for Phase 2			2,170	170	40	130	230	145	85
Deduct for Net New Trips for Phase 3			1,514	120	30	90	160	100	60
Deduct for Net New Trips for B1 South Phase¹			740	55	10	45	70	45	25
Remaining Trips			7,642	450	145	305	705	405	300

¹Consistent with the accounting for the other phases, peak hour trips have been rounded to the nearest five trips for the overall trip generation debiting.

As seen in Table 2, after accounting for Phase 1, Phase 2, Phase 3 and B1 South Phase development, a total of 7,642 daily; 450 weekday AM peak hour; and 705 weekday PM peak hour trips remain in the master plan approval.

Trip Distribution and Assignment

The distribution of site-generated trips onto the study area roadway system was estimated utilizing the trip distribution provided in the Master Plan TIA. Appendix C illustrates the trip assignment.

EVALUATION OF OUTSTANDING MITIGATION NEEDS

The Master Plan TIA identified recommended mitigations for intersections not meeting standards under background and/or total traffic conditions. As part of each phase's transportation compliance letter, the TIA recommended evaluation of the following:

- Need for an eastbound right-turn lane at NE 199th Avenue/NE 58th Street (SR 500). As part of the Phase 3 Transportation Compliance Letter, this recommendation was adapted to provide a proportionate share contribution to a future roundabout, per direction from WSDOT.
- NE Ingle Road/NE Goodwin Road operations (including traffic signal warrant analysis).

- Assessment of proportionate share contribution at NE 192nd Avenue/NE 13th Street.

NE 199th Avenue/NE 58th Street (SR 500)

The Master Plan TIA recommended that future subdivision applications provide an updated assessment as to the potential need for providing a right-turn taper or lane at NE 199th Avenue/NE 58th Street (SR 500), considering both the need for a right-turn taper or lane and delay with the northbound left-turn. Based on subsequent discussions with WSDOT and Clark County staff, WSDOT has identified a single-lane roundabout as the preferred mitigation at the intersection in lieu of installation of a westbound right-turn lane. Recognizing the cost of designing and constructing a roundabout exceeds the impacts associated with the Green Mountain Master Plan and represents an “ultimate” long-term improvement need, WSDOT and Clark County will coordinate to administer a proportionate share impact mitigation methodology.

Payment of proportionate share mitigation towards the future roundabout will allow Green Mountain Master Plan development (as well as other subsequent development) a basis to satisfy transportation concurrency while providing a funding mechanism to allow the public agencies to advance intersection improvements. The proportionate cost share of intersection improvements attributable to Green Mountain B1 South Phase will be based on weekday PM peak hour trips through the intersection. The B1 South Phase is projected to add 14 site-generated trips to the intersection during the weekday PM peak hour (refer to Appendix C).

NE Ingle Road/NE Goodwin Road

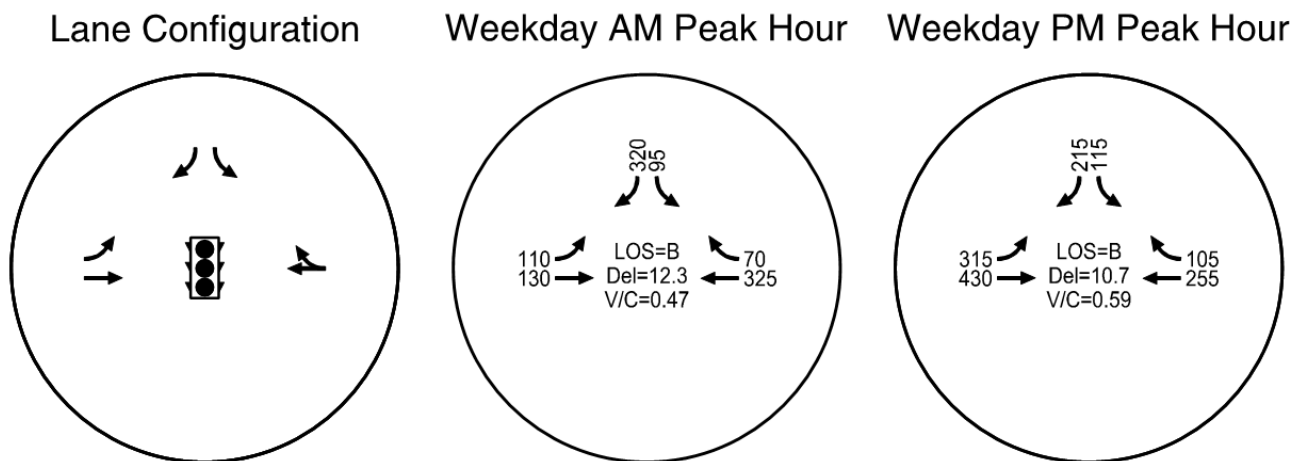
In the Master Plan TIA, the intersection of NE Ingle Road/NE Goodwin Road was projected to not meet City of Camas intersection operating standards in the 2029 background conditions during the weekday PM peak hour and the 2029 total traffic conditions during both the weekday AM and PM peak hours. Therefore, the following series of mitigations were recommended in conjunction with the Master Plan development:

- Construct an eastbound left-turn lane on NE Goodwin Road at NE Ingle Road with the first Phase 1 trip (*completed*).
- Construct a westbound right-turn lane on NE Goodwin Road at NE Ingle Road with the 203rd Phase 1 trip (prior to occupancy of 203rd single family home on site). The right-turn lane should provide at least 100 feet of storage (*this improvement was reprioritized after signalization of NE Goodwin Road at NE Ingle Road. It is anticipated that the right-turn lane will be constructed prior to or in-conjunction with completion of the phase that fronts Goodwin Road in the turn-lane area*).

- Construct a three-lane roadway section (with center two-way left-turn lane) on NE Goodwin Road along the site frontage in conjunction with standard frontage improvements as adjacent development occurs (*will be constructed with Phase 2 development*).
- Upon completion of Phase 1 site development (including construction of the eastbound left-turn lane on NE Goodwin Road at NE Ingle Road with Phase 1), the developer shall monitor the need for installation of a traffic signal with each future subdivision application at the intersection and construct a traffic signal when the intersection no longer satisfies City of Camas performance standard (LOS "D" and v/c of 0.90 or better) and the intersection volumes meet traffic signal warrants (subject to direction from the City of Camas) (*recommended with Phase 3 site development*).

Signalized intersection operations are provided in Exhibit 1 assuming Phase 1, Phase 2, Phase 3 and B1 South Phase site development as well as approved background traffic. Given ongoing construction activity in the area, traffic counts previously collected in October 2016 for the Phase 2 TCL were used with four years of growth added² to inform an updated operations analysis. The count sheets are provided in Appendix D. Appendix E contains the 2020 total traffic conditions traffic operations worksheets.

Exhibit 1: NE Ingle Road/NE Goodwin Road 2020 Total Traffic Lane Configuration and Operations



As seen in Exhibit 1, with buildout of the B1 South Phase and the prior approved master plan development phases, the intersection is projected to satisfy City of Camas performance standard (LOS "D" and v/c of 0.90 or better).

² Based on direction provided in the original traffic study, a 1% growth was applied to City of Camas roadways.

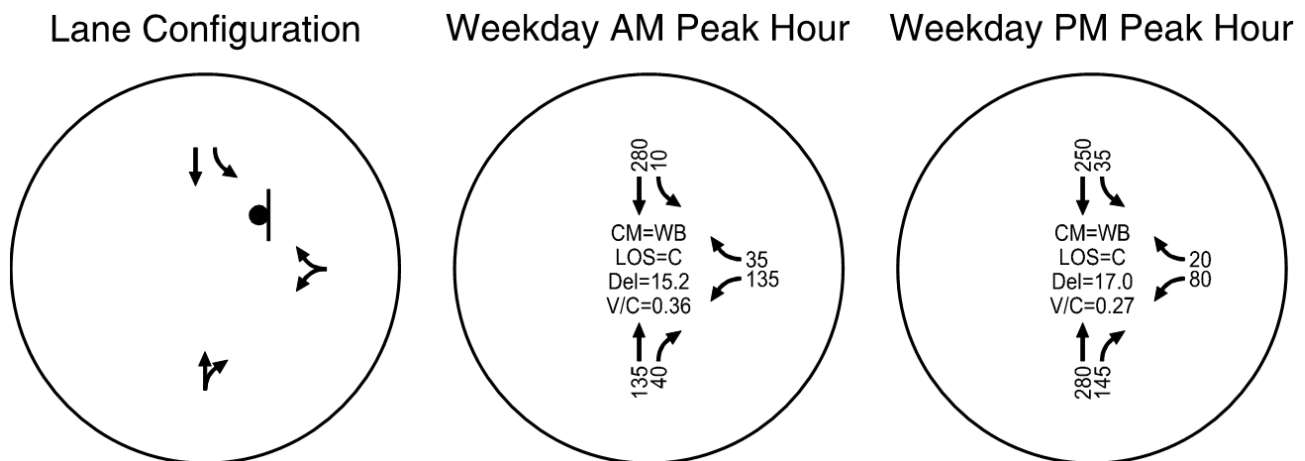
NE 192nd Avenue/NE 13th Street

The Master Plan TIA identified a proportionate cost sharing methodology to fund future construction of a northbound right-turn lane and a westbound right-turn lane on NE 13th Avenue at NE 192nd Avenue, provided in *Appendix F*. Under this methodology, each weekday PM peak hour trip would be assessed a fee of \$391. Based on the B1 South Phase trip assignment (refer to *Appendix C*), the B1 South Phase adds 31 trips to the intersection of NE 192nd Avenue/NE 13th Street and therefore should be responsible for contributing \$12,121 towards future improvements at the intersection.

ON-SITE CIRCULATION AND OPERATIONS

As seen in Figure 2, the B1 South Phase is located in the southwest portion of the overall site, immediately south of Phase 1. Access will be provided via a local roadway off the neighborhood circulator that connects to NE Ingle Road, developed with Phase 1. The neighborhood circulator will be located along the east edge of the B1 South Phase and connect to Phase 2 and NE 28th Street in the future. All trips were assumed to utilize the neighborhood circulator access on NE Ingle Road developed with Phase 1. The Phase 1 access was analyzed in the April 2015 memorandum *Phase 1 Access Assessment*, provided in *Appendix G*. Operations were reassessed with the additional B1 South Phase trips, as well as through trips on NE Ingle Road associated with prior approved phases and background growth. The weekday AM and PM peak hour operations are shown in Exhibit 2. *Appendix E* contains the traffic operations worksheets.

Exhibit 2: NE Ingle Road Neighborhood Circulator Site Access – 2020 Total Traffic Lane Configuration and Operations



As seen in the exhibit, the access is projected to operate acceptably during both the weekday AM and PM peak hours. The anticipated 95th percentile queueing is provided in Table 3. Queues are rounded up to the nearest 25 feet.

Table 3: NE Ingle Road/Neighborhood Circulator Site Access Queueing – 2020 Total Traffic Conditions

Intersection	Movement	95 th Percentile Queue (feet)	
		Weekday AM Peak Hour	Weekday PM Peak Hour
Ingle Road/Neighborhood Circulator (Site Access)	Westbound left-/right-turn	50	50
	Northbound right-turn/through	<25	<25
	Southbound left-turn	<25	<25

As seen in Table 5, 95th percentile queues are anticipated to be two vehicles or less during the weekday AM and PM peak hours.

FINDINGS AND RECOMMENDATIONS

Based on the results of the transportation compliance letter, the B1 South Phase of the Green Mountain Master Plan can be developed while maintaining acceptable levels of service at the study intersections assuming provision of identified off-site mitigation measures. The primary findings and recommendations of this study are summarized below.

Trip Generation

- Phase B1 South includes 124 attached units and 2 single family homes and is estimated to generate 740 daily trips, 57 net new AM peak hour trips, and 67 net new PM peak hour trips.
- After accounting for Phases 1-3 and the B1 South Phase site development; a total of 7,642 daily; 450 weekday AM peak hour; and 705 weekday PM peak hour trips remain vested in the master plan approval.

NE 199th Avenue/NE 58th Street (SR 500) Intersection

- WSDOT has identified a single-lane roundabout as the preferred long-term improvement at the intersection.
- A proportionate share impact methodology will be developed in cooperation with Clark County and WSDOT to support future design and construction of a roundabout.
- Green Mountain Phase 3, B1 South Phase and other subsequent developments adding trips to the intersection will be assessed a proportionate share mitigation payment based on the number of peak hour trips they add to the intersection.
- The B1 South Phase is projected to add 14 trips during the weekday PM peak hour.

NE Ingle Road/NE Goodwin Road Intersection

- With the planned signalization (by a prior Master Plan development phase) and addition of trips associated with the B1 South Phase, the intersection of NE Ingle/NE Goodwin Road is projected to satisfy City operating standards.

NE 192nd Avenue/NE 13th Street Intersection

- The B1 South Phase is projected to add 31 weekday PM peak hour trips to the intersection of NE 192nd Avenue/NE 13th Street. This trip impact triggers a proportionate cost share of \$12,121 (\$391 per trip) based on the mitigation methodology presented in the Master Plan TIA.

Recommendations

- The following should be provided in conjunction with Phase 3 site development:
 - Contribution of a proportionate share payment towards design and construction of a single-lane roundabout at the intersection of NE 199th Avenue/NE 58th Street (payment amount to be determined in coordination with WSDOT and Clark County based on 14 PM peak hour trips added).
 - Contribution of \$12,121 towards future improvements at NE 192nd Avenue/NE 13th Street.
 - On-site and off-site landscaping and any above ground utilities at internal roadways should be provided per City of Camas standards.

We trust this letter adequately addresses the traffic impacts associated with the proposed Green Mountain Master Plan B1 South Phase site development. Please contact us if you have questions or comments regarding the contents of this report or the analysis performed.

REFERENCES

1. Transportation Research Board 2010. Highway Capacity Manual. 2010.
2. Institute of Transportation Engineers. *Trip Generation Manual*, 9th Edition. 2012.

**KITTELSON & ASSOCIATES, INC.**

TRANSPORTATION ENGINEERING / PLANNING

610 SW Alder Street, Suite 700, Portland, OR 97205 P 503.228.5230 F 503.273.8169

MEMORANDUM

Date: November 20, 2014 Project #: 13865

To: Curleigh Carothers, P.E.; City of Camas

cc: Ryan Lopossa, P.E.; City of Vancouver
Jeff Barsness, P.E.; Washington State Department of Transportation
David Jardin, Clark County
Randy Printz, Landerholm Law Firm
John Schmidt and John O'Neil; Green Mountain Land, LLC

From: Chris Brehmer, P.E., Kelly Laustsen, and Ribeka Toda; Kittelson & Associates, Inc.

Project: Green Mountain Master Plan

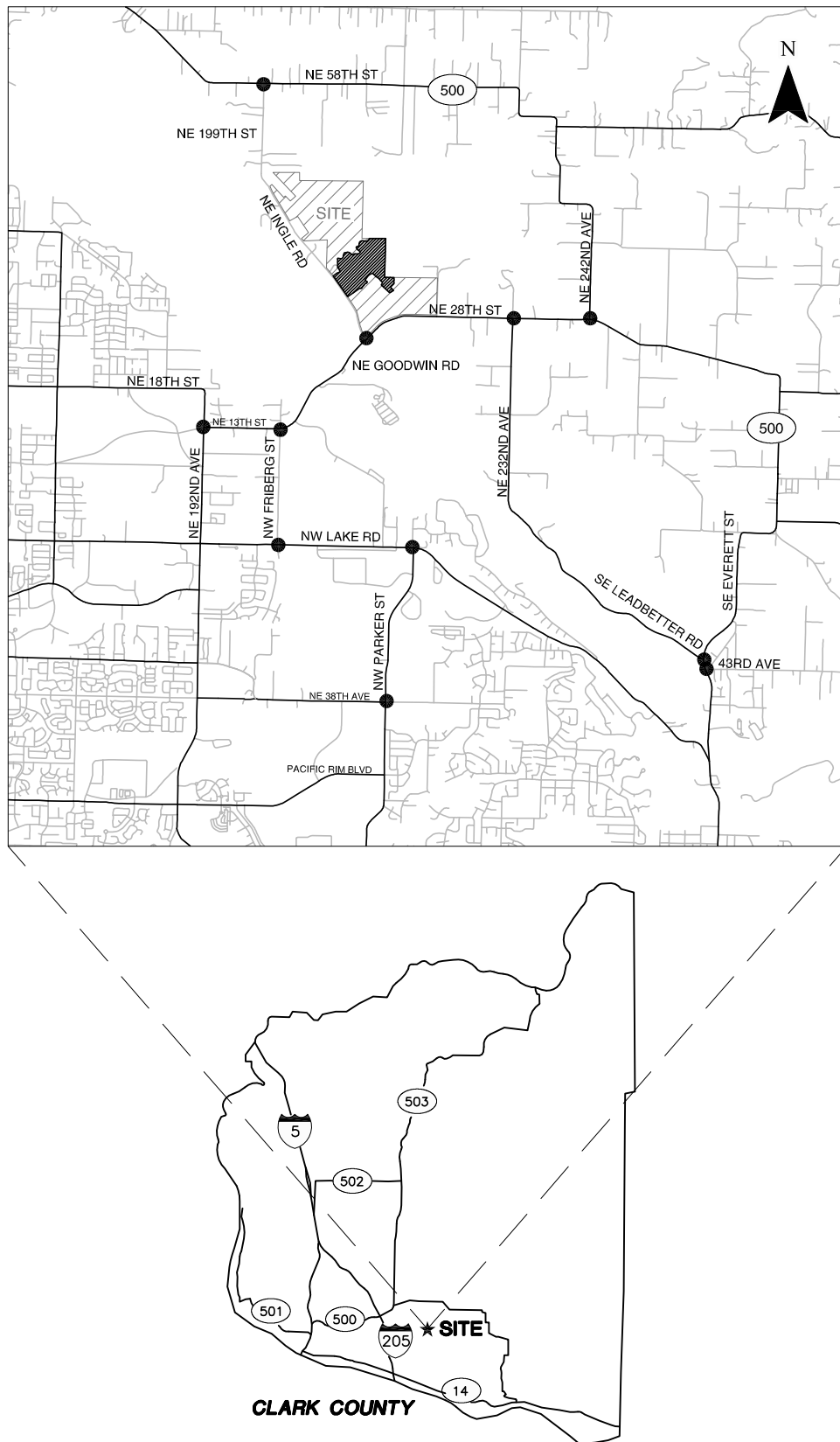
Subject: Transportation Impact Analysis

This memorandum documents the results of the transportation impact analysis prepared by Kittelson & Associates, Inc. (KAI) for the proposed Green Mountain Master Plan development to be located at the northeast corner of NE Ingle Road and NE Goodwin Road in Camas, Washington. This study concludes that Phase 1 of the site can be developed as proposed while maintaining safe and acceptable traffic operations at the study intersections assuming provision of an eastbound left-turn lane on NE Goodwin Road at NE Ingle Road. Further transportation improvements are recommended to accommodate full build-out of the proposed development. The methodology of our analysis, pertinent findings, and our recommendations are documented in this memorandum.

INTRODUCTION

Green Mountain Land, LLC is in the process of preparing a master plan to establish a mixed-use development on the 283-acre site. Green Mountain Golf Course is currently located on a large portion of the property; otherwise the site is vacant. The site is currently zoned for a mix of residential uses (R-10, MF-10 and R-6) and Community Commercial (CC). Figure 1 illustrates the site vicinity map.

The master plan proposes eight phases of development, with the sequence and timing of phases largely market dependent. It is expected that Phase 1 will be completed by 2018 and full master plan build-out will be assumed by 2029 for traffic impact assessment purposes.



● - Study Intersections

Site Vicinity
Camas, Washington

Figure
1

Figure 2 illustrates a conceptual image of the master plan site vision. A mix of residential and commercial uses is planned in accordance with the zoning, with a mixed use village proposed to better integrate the commercially zoned portion of the property. The village would be located at the southwest corner of the project and will encompass approximately twenty-four acres. Further project details are provided later in this report.

SCOPE OF THE REPORT

This analysis identifies the transportation-related impacts associated with the proposed Green Mountain Master Plan development and was prepared in accordance with City of Camas transportation impact analysis requirements. The study scope and overall study area for this project were selected based on a review of the local transportation system and direction provided by City of Camas, City of Vancouver, Clark County, and Washington Department of Transportation (WSDOT) staff.

Operational analyses were performed at the following intersections:

- NE 199th Avenue/NE 58th Street (SR 500, WSDOT maintained)
- NE 192nd Avenue/NE 13th Street (City of Vancouver maintained)
- NW Friberg Street/NE Goodwin Road
- NE Ingle Road/NE Goodwin Road
- NE 232nd Avenue/NE 28th Street
- NE 242nd Avenue (SR 500)/NE 28th Street (WSDOT maintained)
- NW Friberg Street/NW Lake Road
- NW Parker Street/NW Lake Road
- NE Everett Street (SR 500)/SE Leadbetter Road
- NW Parker Street/NE 38th Avenue
- NE Everett Street (SR 500)/NE 43rd Avenue (WSDOT maintained)
- Site-Access Driveways

GREEN MOUNTAIN

CONCEPTUAL MASTER PLAN FOR A MIXED USE PRD

CAMAS, WASHINGTON
GREEN MOUNTAIN LAND, LLC. 11/19/14

EXHIBIT B

TOTAL SITE AREA 283.3 AC

SITE AREA TABLE

R10 ZONE	119.7 AC
R6 ZONE	54.8 AC
MF10 ZONE	93.0 AC
CC ZONE	15.8 AC

RESIDENTIAL DENSITY CALCULATION

R-10	119.7 @ 4.3 / ACRES = 515 UNITS
R-6	54.8 @ 7.2 / ACRES = 395 UNITS
MF-10	93.0 @ 10 / ACRES = 930 UNITS

TOTAL 1840 UNITS

DENSITY TABLE

POD	ACRES	APPROXIMATE LOT SIZE RANGE	MAXIMUM UNITS/LOTS
A	12.2 (A1-A3)	800	219
B	15.5 (B1-B5)	1000-3000	217
C	11.9 (C1-C2)	3000-5000	95
D	41.3 (D1-D6)	4000-6000	309
E	26.5 (E1-E4)	4200-7200	172
F	28.6 (F1-F4)	5200-9000	157
G	30.0 (G1-G4)	15,000-40,000	31
H	15.4 (H1)		100

TOTALS 181.4 AC 1300

*40% OF G (TOTAL 30 ACRES) TO BE PRESERVED OPEN SPACE

PARK & OPEN SPACE	99.3 ± AC
NEIGHBORHOOD CIRCULATOR	8.2 ± AC
ARTERIAL & COLLECTOR FRONTAGE	
ORIENTATION (CLOCKWISE & INFLUENCE)	1.8 ± AC

--- URBAN VILLAGE AREA (H, A1, A2, A3, B1)
A COMMERCIAL, MIXED USE AND RESIDENTIAL COMMUNITY CENTER (± 33.5 AC GROSS, 14.2 AC NET)

CIRCULATION COMPONENTS

ARTERIAL	---
COLLECTOR	---
NEIGHBORHOOD CIRCULATOR	--- (SEE KEY FOR KEY)
NEIGHBORHOOD CONNECTOR	---
COMMUNITY ENTRIES & ACCESS POINTS	--- (SEE KEY FOR KEY)

NOTE:
This plan shows the number of units within the park and open space area in the preliminary stages of the design. While not numbers per se, they are a guide to the number of units in the proposed plan. The number of units is a guide to the number of units in the proposed plan. The number of units is a guide to the number of units in the proposed plan.



Plan provided by Western
Planning Associates,
11/19/14

Conceptual Master Plan
Camas, Washington

Figure
2

As required by the City of Camas, a transportation impact study was prepared to address the following transportation issues:

- Year 2014 existing land use and transportation system conditions within the site vicinity during the weekday a.m. and p.m. peak hours;
- Planned developments and transportation improvements in the study area;
- Trip generation and distribution estimates for the proposed development;
- Forecast year 2018 background traffic conditions without the proposed development during the weekday a.m. and p.m. peak hours;
- Forecast year 2018 total traffic conditions with the completion of Phase 1 of the proposed development during the weekday a.m. and p.m. peak hours;
- Forecast year 2029 background traffic conditions without the proposed development during the weekday a.m. and p.m. peak hours;
- Forecast year 2029 total traffic conditions with full build-out and occupancy of the proposed development during the weekday a.m. and p.m. peak hours;
- Level of service analyses for the study intersections; and
- On-site access and circulation.

Conclusions and recommendations are provided following the operational analysis.

ANALYSIS METHODOLOGY

All level of service analyses described in this report were performed in accordance with the procedures stated in the *2000 Highway Capacity Manual* (Reference 1). A description of level of service and the criteria by which they are determined is presented in *Appendix "A"*. *Appendix "A"* also indicates how level of service is measured and what is generally considered the acceptable range of level of service.

To ensure that this analysis was based on a reasonable worst-case scenario, the peak 15 minute flow rate during the peak hour analysis periods was used in the evaluation of all intersection levels of service. For this reason, the analysis reflects conditions that are only likely to occur for 15 minutes out of each average peak hour. Traffic conditions during other weekday hours and throughout the weekend will likely be better than those described in this report.

At the City of Vancouver-maintained NE 192nd Avenue/NE 13th Street intersection, the peak 15-minute flow rate was assessed by applying the peak 15-minute volume across the hour and not applying a peak hour factor in accordance with guidance provided by the City.

Operating Standards

The study intersections are each operated and maintained by one of three impacted jurisdictions: WSDOT, the City of Vancouver, or the City of Camas. Each of these jurisdictions has their own operating standards. WSDOT requires LOS "E" or better for non-HSS (Highways of Statewide Significance) in urban areas, City of Vancouver requires LOS "E" or better and a v/c ratio of less than 0.95 for signalized intersections. The City of Camas requires LOS "D" or better and a v/c ratio of 0.90 or better for all intersections. Table 1 lists the study intersections, the responsible jurisdiction, and the corresponding operating standard.

Table 1: Operating Standards at Study Intersections

ID	Study Intersection	Jurisdiction	Standard
1	NE 199 th Avenue/NE 58 th Street (SR 500)	WSDOT	LOS "C" for non-HSS in rural area ¹
2	NE 192 nd Avenue/NE 13 th Street	Vancouver	LOS "E" and v/c ratio less than 0.95
3	NW Friberg Street/NE Goodwin Road	Camas	LOS "D" and v/c of 0.90 or better
4	NE Ingle Road/NE Goodwin Road	Camas	LOS "D" and v/c of 0.90 or better
5	NE 232 nd Avenue/NE 28 th Street	Camas	LOS "D" and v/c of 0.90 or better
6	NE 242 nd Avenue (SR 500)/NE 28 th Street	WSDOT	LOS "C" for non-HSS in rural area ¹
7	NW Friberg Street/NW Lake Road	Camas	LOS "D" and v/c of 0.90 or better
8	NW Parker Street/NW Lake Road	Camas	LOS "D" and v/c of 0.90 or better
9	NE Everett Street (SR 500)/SE Leadbetter Road	WSDOT	LOS "C" for non-HSS in rural area ¹
10	NW Parker Street/NE 38 th Avenue	Camas	LOS "D" and v/c of 0.90 or better
11	NE Everett Street (SR 500)/NE 43 rd Avenue	WSDOT	LOS "C" for non-HSS in rural area ¹

¹The City of Camas TIF Update applied the WSDOT standard for facilities in urban areas (LOS "E" for non-HSS in urban area). Based on conversations with WSDOT, the standard for rural areas is currently applicable to the WSDOT study intersections.

Source: City of Camas Traffic Impact Fee Update (Reference 2)

Turn Lane Guidelines

For roadways under Washington State jurisdiction, such as SR 500, WSDOT has defined traffic-volume based turn lane guidelines within the *WSDOT Design Manual* (Reference 3). Left-turn lane guidelines are provided in section 1310.04(2)(a) while right-turn lane guidelines are provided in section 1310.04(3).

EXISTING CONDITIONS

The existing conditions analysis identifies site conditions and the current operational and geometric characteristics of roadways within the study area. These conditions will be compared with future conditions later in this report.

The site of the proposed development and surrounding study area was visited and inventoried in March 2014. At that time, information was collected regarding site conditions, adjacent land uses, existing traffic operations, and transportation facilities in the study area.

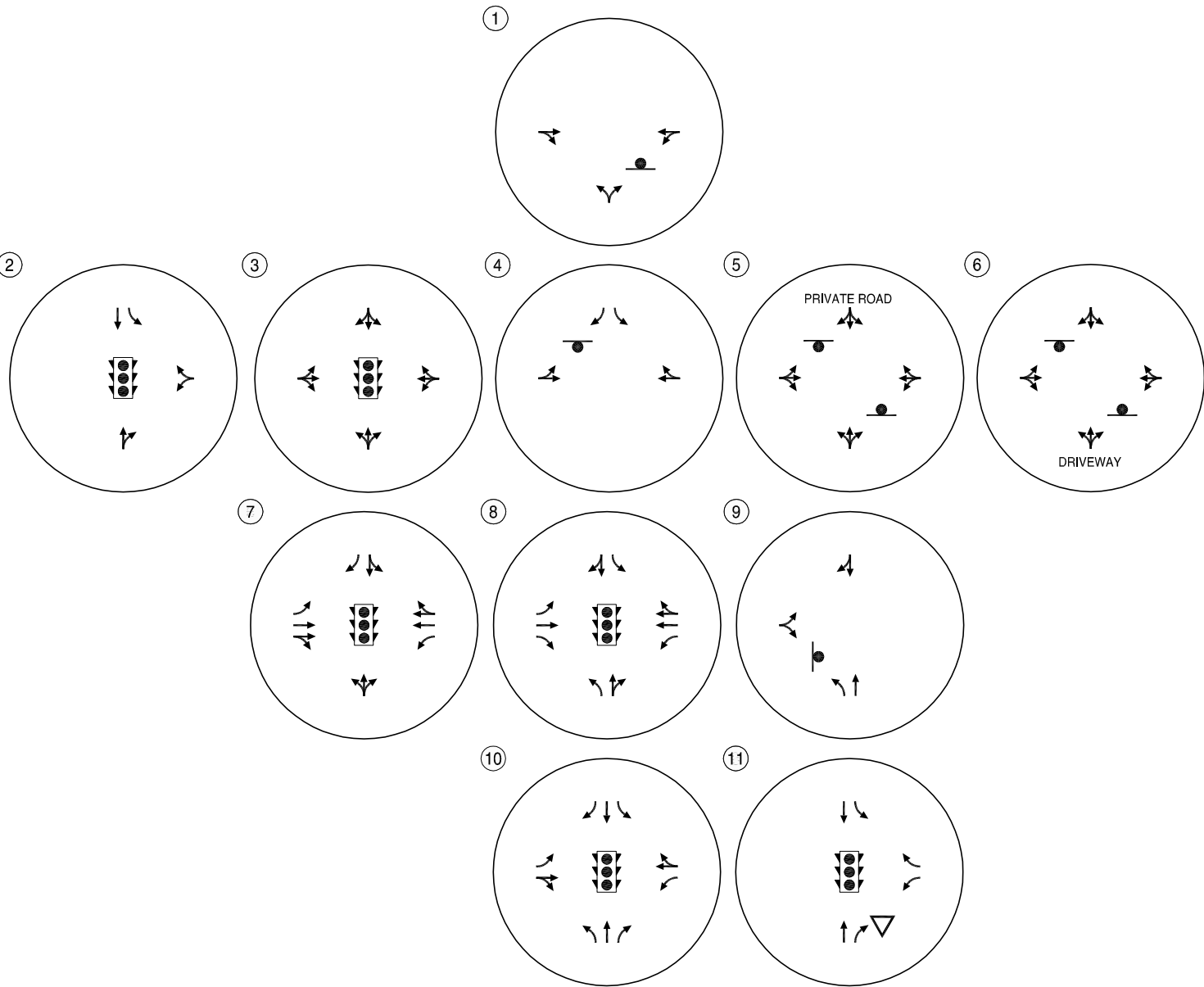
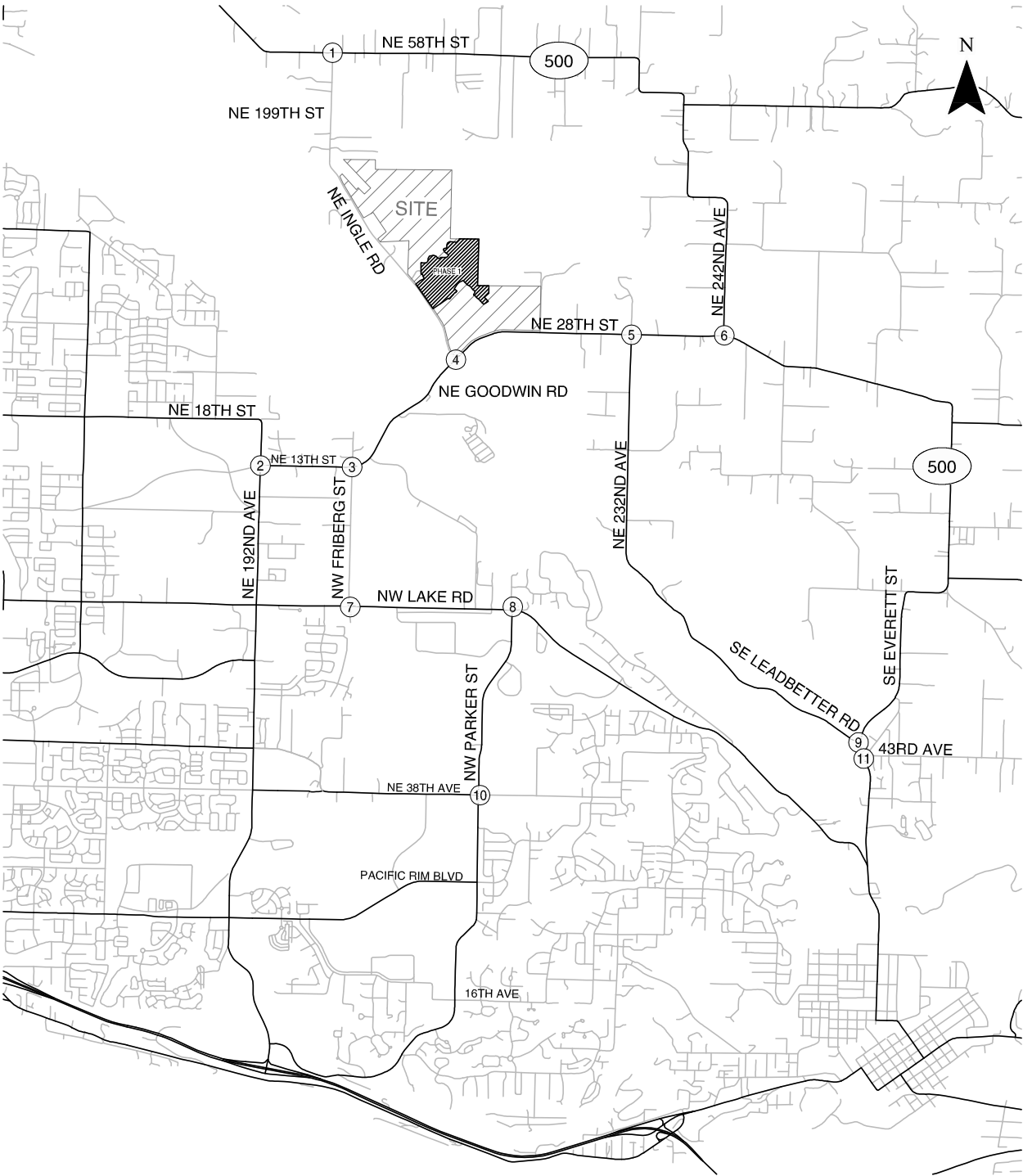
Site Conditions and Adjacent Land Uses

The area encompassed by the master plan site is largely undeveloped. The southwest corner of the property is occupied by the Green Mountain Golf Course, a portion of which is proposed to remain open after completion of the Phase 1 master plan development. The areas surrounding the site are also largely undeveloped, with a few single family homes situated along NE 28th Street, NE 199th Avenue, and SR 500.

Transportation Facilities

Table 2 provides a summary of key transportation facilities in the site vicinity and Figure 3 illustrates the existing lane configurations and traffic control devices at the study intersections.

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- STOP SIGN
- TRAFFIC SIGNAL
- YIELD SIGN

Existing Lane Configurations and Traffic Control Devices
Camas, Washington

Figure
3

Table 2: Existing Transportation Facilities and Roadway Designations

Roadway	Classification ¹	Cross-Section	Speed Limit (mph)	Side-Walks?	Bicycle Lanes?	Median?	On-Street Parking?
NE 13 th Street / NE Goodwin Road / NE 28 th Street	Arterial	5-lane	40	Yes	Yes	Yes	None
SR 500	Non-HSS ²	2-lane	50	None	None	None	None
NE Ingle Road / NE 199 th Avenue	Collector	2-lane	50	None	None	None	None
NE 192 nd Avenue	Arterial	2-lane	40	Partial	None	None	None
SE 192 nd Avenue	Arterial	5-lane	40	Partial	None	None	None
NW Friberg Street / NE 202 nd Avenue	Arterial	2-lane	40	Partial	None	None	None
SE 1 st Street / NW Lake Road	Arterial	5-lane	40	Yes	Yes	Yes	None
NW Parker Street	Arterial	5-lane	35	Yes	Yes	None	None
NE Everett Road	Arterial	2-lane	35	None	None	None	None
NW Pacific Rim Blvd./ SE 34 th Street	Arterial	5-lane	40	Yes	None	Yes	None

¹ Source: City of Camas Traffic Impact Fee Update (Reference 2)

² HSS = Highways of Statewide Significance

Pedestrian and Bicycle Facilities

Neither sidewalks nor striped bicycle facilities are provided in the vicinity of the site on either NE Ingle Road or NE Goodwin Road/NE 28th Street.

Transit Facilities

The C-Tran *Camas Connector* Dial-A-Ride service currently operates within a portion of the study area, with a northern boundary of Lake Road, western boundary of Parker Street, and eastern boundary of SR 500. This service operates by accepting telephone calls from riders to be taken to a location inside a defined boundary. The hours of operation are Monday through Friday from 5:30 a.m. to 9:15 a.m. and 2:00 p.m. to 7:00 p.m. No service is available on holidays (Reference 4).

Crash Analysis

The crash histories of the study intersections were reviewed in an effort to identify potential intersection safety issues. Crash records were obtained from WSDOT. The data represents records between January 1, 2008 and November 30, 2013. The crash rate was calculated to determine the number of crashes per million entering vehicles (MEV). Generally speaking, a crash rate greater than 1.0 crashes per MEV suggests locations where crash patterns should be reviewed in greater detail.

A brief discussion of the crash data at key intersections is presented after Table 3. There were no fatalities reported at the study intersections during the time periods studied. *Appendix "B" contains the crash data.*

As shown in Table 3, the two intersections where the highest crash rates were observed were NE 199th Avenue/NE 58th Street and NE Ingle Road/NE Goodwin Road. At all other intersections, the observed crash rates are well below 1.0 crash per million entering vehicles.

Table 3: Intersection Crash Histories (1/1/2008 - 11/30/2013)

Intersection	Total	Collision Type						Severity		Crash Rate Crashes/ MEV ²
		Rear End	Turn -ing	Angle	Pedes -trian	Fixed Object	Road way Ditch	PDO ¹	Injury	
1. NE 199 th Ave / NE 58 th St (SR 500)	7	0	0	4	0	3	0	5	2	0.57
2. NE 192 nd Ave / NE 13 th St	8	1	6	0	0	1	0	4	4	0.27
3. NE Friberg St / NE Goodwin Rd	5	1	3	1	0	0	0	3	2	0.32
4. NE Ingle Rd / NE Goodwin Rd	16	4	0	5	1	4	2	11	5	1.03
5. NE 232 nd Ave / NE 28 th St	3	0	0	1	0	2	0	2	1	0.25
6. NE 242 nd Ave (SR 500)/ NE 28 th St	4	0	0	2	0	1	1	2	2	0.30
7. NW Friberg St / NW Lake Rd	6	3	0	1	0	2	0	6	0	0.24
8. NW Parker St / NW Lake Rd	3	0	1	0	0	2	0	3	0	0.12
9. NE Everett St (SR 500)/ SE Leadbetter Rd	5	0	0	0	0	3	2	2	3	0.54
10. NW Parker St / NE 38 th Ave	9	0	5	4	0	0	0	6	3	0.29
11. NE Everett St (SR 500) / NE 43 rd Ave	7	1	5	0	0	1	0	3	4	0.36

¹ PDO = Property Damage Only | ² MEV = Million Entering Vehicles

NE 199th Avenue/NE 58th Street (SR 500)

The second highest crash rate, 0.57, occurs at the intersection of NE 199th Avenue/NE 58th Street. There have been seven reported collisions, including four angle collisions and three fixed-object collisions at this intersection. The crash data was reviewed in an effort to identify potential trends. Three of the angle crashes involved vehicles making a northbound left turn from NE 199th Avenue to NE 58th Street; another involved an eastbound vehicle turning right from NE 58th Street to NE 199th Avenue. Of the three fixed object collisions, two involved utility poles and one involved a domestic animal. Collisions with domestic animals are challenging to eliminate and one of the collisions with the utility poles involved a driver asleep at the wheel. Four of the seven crashes occurred during wet road surface conditions. Given the relatively low number of reported collisions

and the unusual nature of three of the seven collisions (the three fixed-object collisions), there are no safety-based mitigation measures recommended at this intersection at this time in conjunction with site development. If an eastbound right-turn lane is added to the intersection in the future (which is currently warranted as will be described later in this report), it may provide safety benefits.

NE Ingle Road/NE Goodwin Road

The highest crash rate, 1.03, occurs at the intersection of NE Ingle Road/NE Goodwin Road. There have been reported collisions including 4 four rear-end collisions, 5 five angle collisions, 4 fixed-object collisions (involving a utility pole, a mailbox, a boulder, and a wood sign post), 2 roadway ditch collisions, and a pedestrian collision at this intersection. As discussed later in this report, the Green Mountain Master Plan proposes to construct an exclusive eastbound left-turn lane on NE Goodwin Road at NE Ingle Road in conjunction with the Phase 1 site development. Providing an eastbound left-turn lane and potential related reconfiguration of the southbound stop bar location (refer to sight distance discussion below) in conjunction with Phase 1 site development could provide a safety benefit at this intersection.

Two of the angle collisions involved vehicles exceeding reasonably safe speeds while making a westbound right-turn at the intersection. One of the recommended mitigation measures for the 2029 full build-out scenario of the proposed development is the addition of a westbound right-turn lane at this intersection, which could provide a safety benefit for turning vehicles. Additional long-term mitigation measures anticipated in conjunction with site development include constructing a three-lane roadway section on NE Goodwin Road along the site frontage and signaling the intersection when warranted.

Intersection Sight Distance

Intersection sight distance was observed at the study intersections and was found to meet applicable city or WSDOT standards, with the exception of the sight distance at the NE Ingle Road/NE Goodwin Road intersection. As shown in Exhibit 1 below, the stop bar on NE Ingle Road is set back approximately 25 feet from the edge of NE Goodwin Road.

Exhibit 1: Stop Bar on NE Ingle Road at NE Goodwin Road



Image source: Google Maps (right image)

As indicated in Exhibit 2, vehicles currently pull past the stop bar to obtain sufficient sight distance to then execute a turning maneuver. Regardless of the proposed site development, we recommend that the City of Camas consider potential improvements to enhance the intersection sight distance, such as relocating the stop bar closer to NE Goodwin Road.

Exhibit 2: Vehicle Waiting to Make Left-Turn from NE Ingle Road to NE Goodwin Road



Existing Traffic Operations

Manual turning-movement counts were conducted at the study intersections in March and April 2014. The counts were conducted on a typical mid-week day during the morning peak period (7:00 to 9:00 a.m.) and the evening peak period (4:00 to 6:00 p.m.) per City requirements. Individual Intersection peak hours were then identified for operational analysis purposes.

Figures 4 and 5 provide a summary of the existing turning-movement counts, which are rounded to the nearest five vehicles per hour for the weekday a.m. and p.m. peak hours, respectively. *Appendix “C” contains the traffic count worksheets used in this study.*

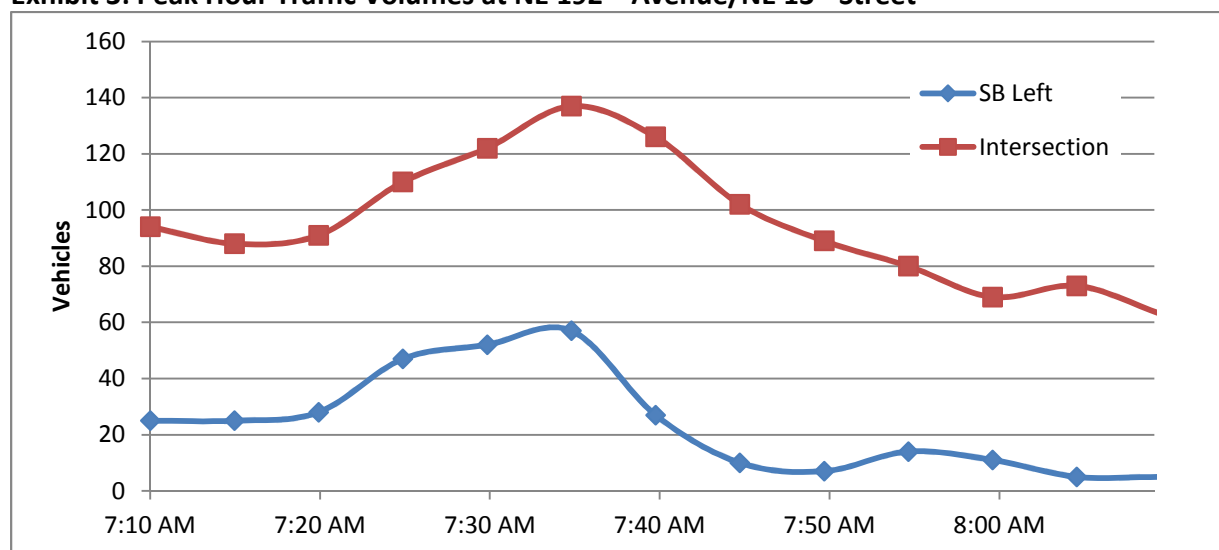
As shown in Figures 4 and 5, the study intersections operate acceptably during both study periods. *Appendix “D” contains the existing conditions traffic operations worksheets.*

Operations at NE 192nd Avenue / NE 13th Street

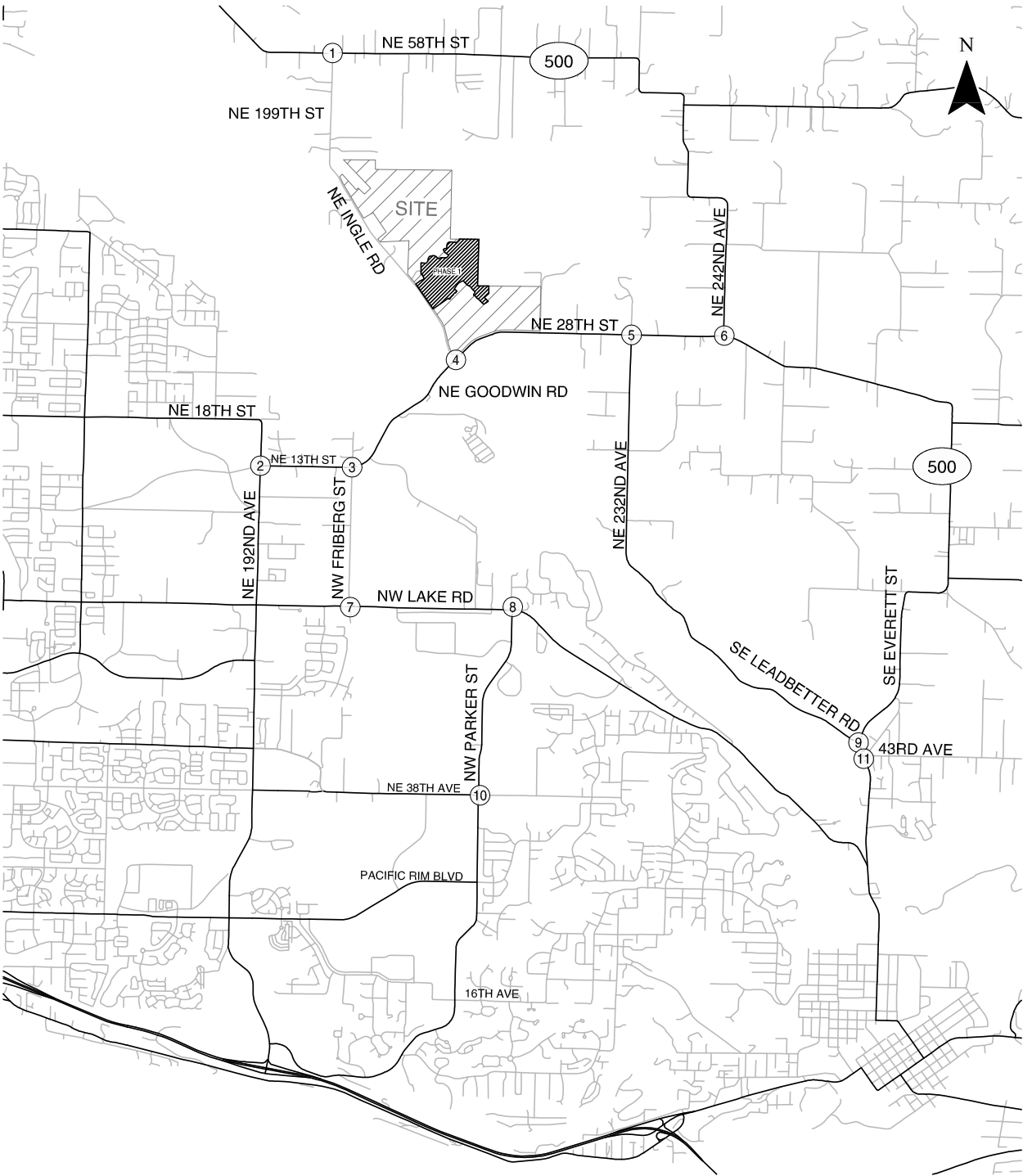
As noted in the “Analysis Methodology” section, analysis of the City of Vancouver-maintained NE 192nd Avenue/NE 13th Street intersection involved application of the peak 15-minute flow rate across the hour and not applying a peak hour factor. This analysis methodology is in accordance with guidance provided by the City.

During the weekday AM peak hour, significant peaking occurs at the intersection related to vehicles accessing Union High School on NW Friberg Street. In particular, the southbound left-turning volume peaks in advance of the school start at 7:45 AM, as shown in Exhibit 3. During this “peak of the peak” period, queueing for the southbound left-turn lane sometimes exceeds the available striped storage (approximately 160 feet). Based on field observation, heightened delays and queueing for the southbound left-turn movement are contained to about fifteen minutes in advance of the school start, during which time some southbound left-turning vehicles do not clear through the intersection during each cycle. After this time, volumes decrease significantly and left-turning vehicles consistently clear through the intersection in a single cycle.

Exhibit 3: Peak Hour Traffic Volumes at NE 192nd Avenue/NE 13th Street

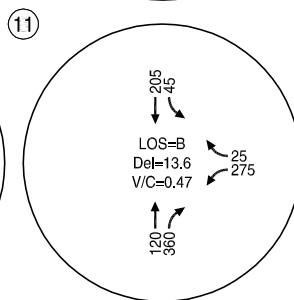
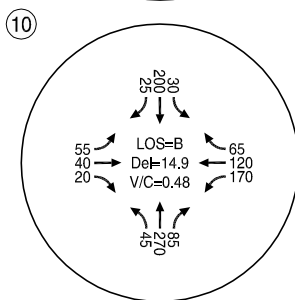
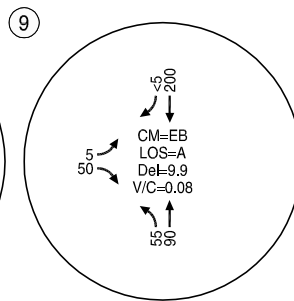
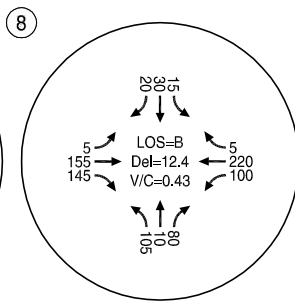
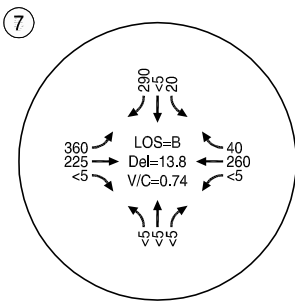
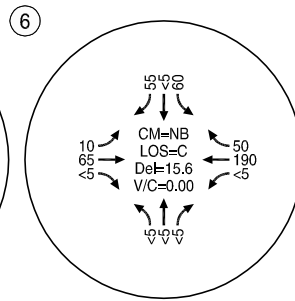
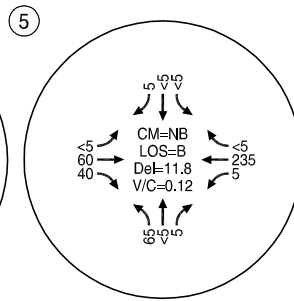
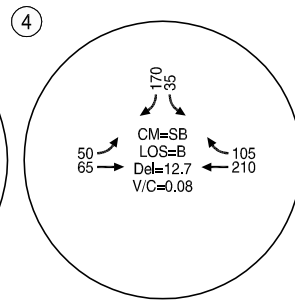
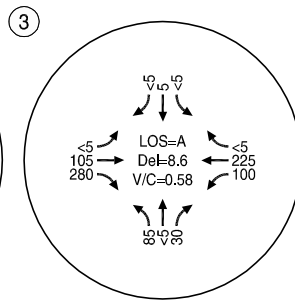
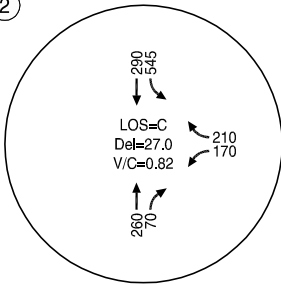


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★ Volumes and operations based on 4 x peak 15 minutes and a peak hour factor of 1.0

★ ②

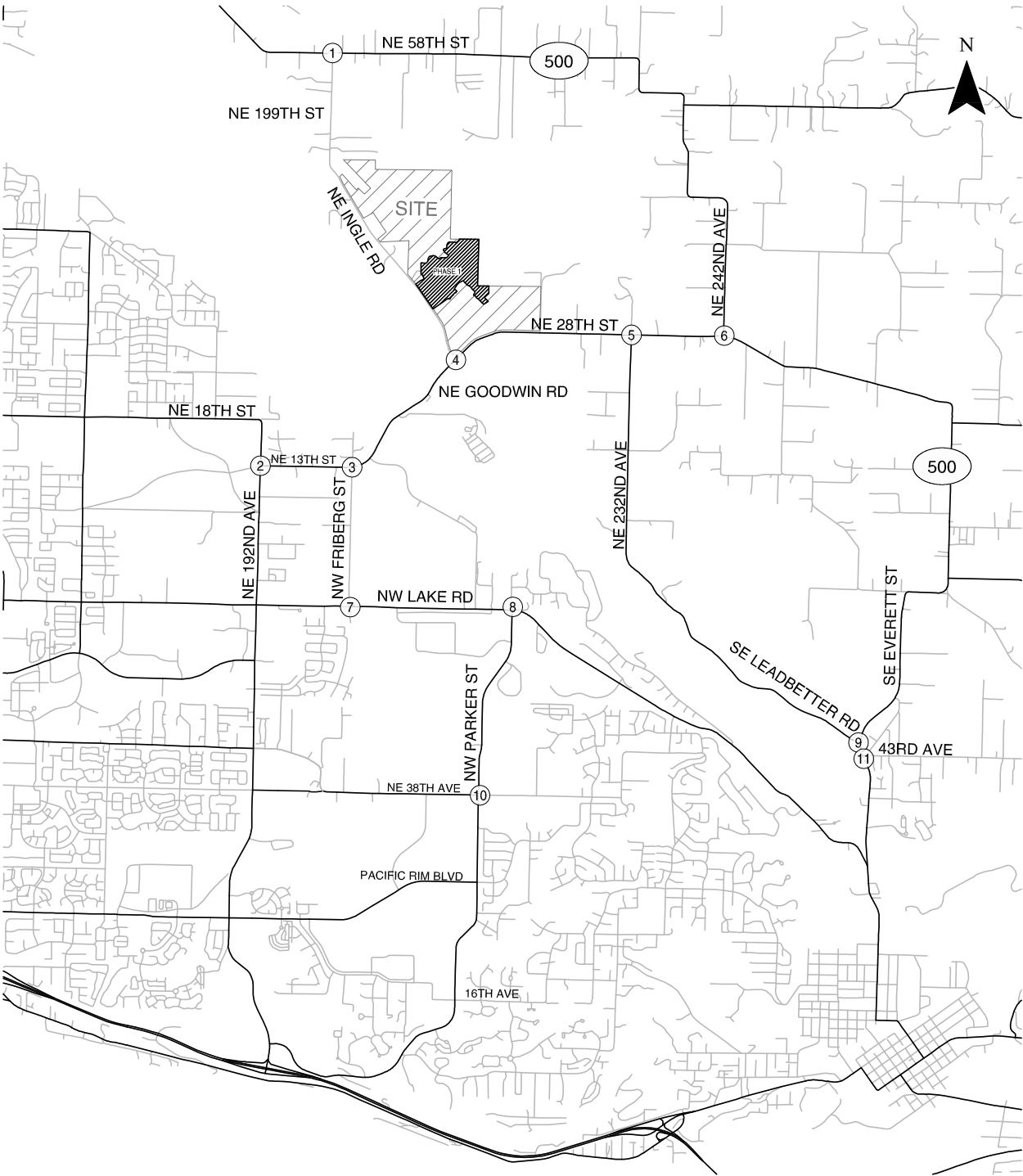


CM = CRITICAL MOVEMENT (TWSC)
LOS = INTERSECTION LEVEL OF SERVICE (SIG) / CRITICAL MOVEMENT
LEVEL OF SERVICE (TWSC)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIG) / CRITICAL
MOVEMENT CONTROL DELAY (TWSC)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
TWSC = TWO-WAY STOP CONTROL

Existing Intersection Operations
Weekday AM Peak Hour
Camas, Washington

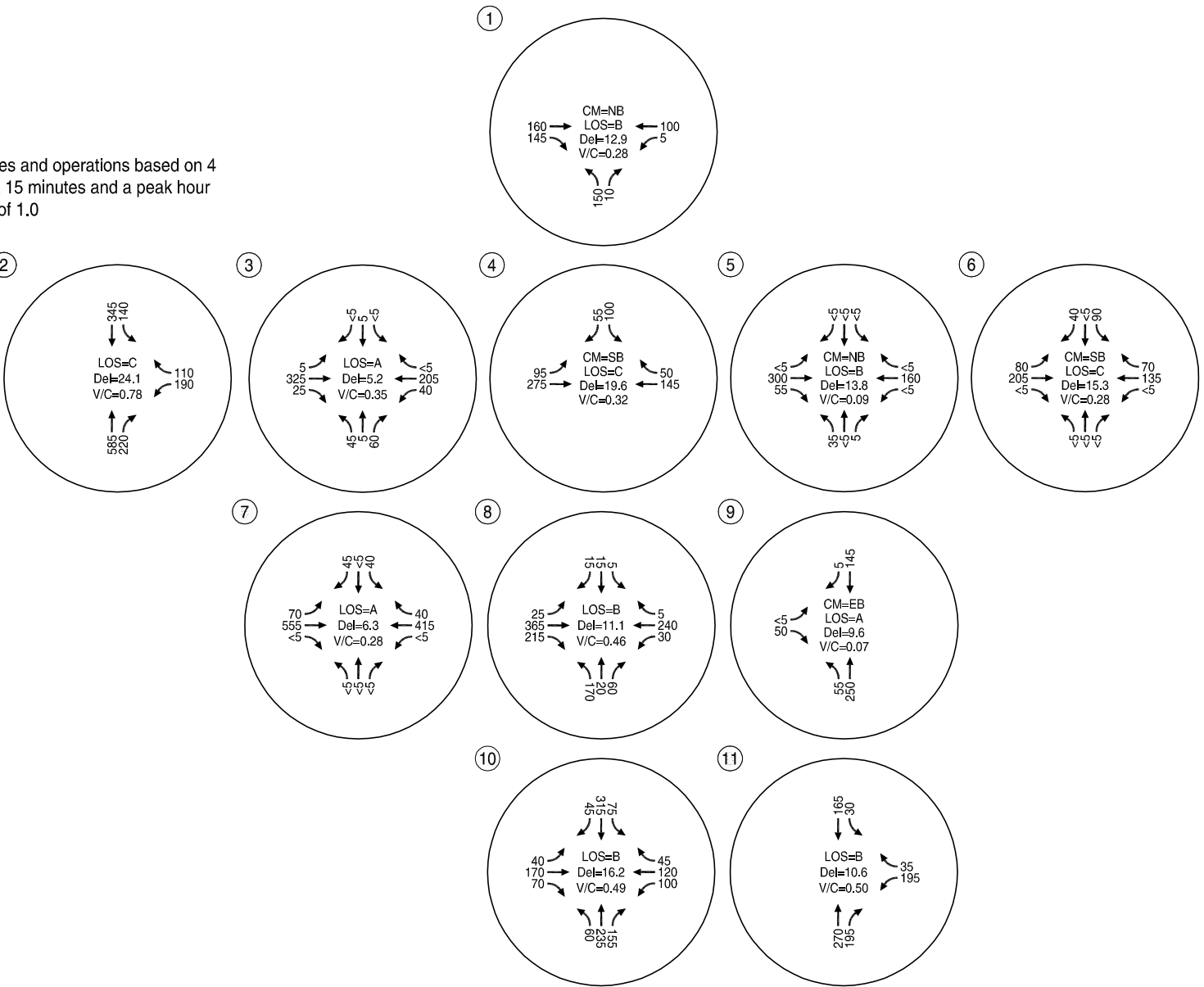
Figure
4

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★ Volumes and operations based on 4 x peak 15 minutes and a peak hour factor of 1.0

★ ②



CM = CRITICAL MOVEMENT (TWSC)
LOS = INTERSECTION LEVEL OF SERVICE (SIG) / CRITICAL MOVEMENT
LEVEL OF SERVICE (TWSC)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIG) / CRITICAL
MOVEMENT CONTROL DELAY (TWSC)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
TWSC = TWO-WAY STOP CONTROL

Existing Intersection Operations
Weekday PM Peak Hour
Camas, Washington

Figure
5

TRAFFIC IMPACT ANALYSIS

The traffic impact analysis identifies how the study area's transportation system will operate upon phased build-out of the proposed master plan site. A horizon year of 2018 was selected to assess conditions with build-out of Phase 1 while a 15-year 2029 horizon year was assumed for site build-out. The impact of site-generated weekday a.m. and p.m. peak hour trips was examined as follows:

- Planned developments and transportation improvements in the study area were identified and accounted for;
- Trip generation and distribution estimates for the proposed development were prepared for Phase 1 and full build-out of the proposed development;
- Forecast year 2018 background traffic conditions without the proposed development were analyzed at the study intersections;
- Forecast year 2018 total traffic conditions with completion of Phase 1 of the proposed development were analyzed at the study intersections;
- Forecast year 2029 background traffic conditions without the proposed development were analyzed at the study intersections;
- Forecast year 2029 total traffic conditions with full build-out and occupancy of the proposed development were analyzed at the study intersections; and
- On-site circulation and site-access operations were evaluated.

Proposed Development Plan

Green Mountain Land, LLC is proposing to master plan the 283-acre site with mixed-use development. Green Mountain Golf Course is currently located on a large portion of the master plan property. We understand that a portion of the existing Green Mountain Golf Course may remain temporarily available for use after completion of Phase 1 site development and that, ultimately, the golf course will be closed prior to full master plan build-out. No effort has been made to account for "credit" for existing trips to and from the golf course for the purposes of this transportation impact analysis report.

The master plan proposes eight phases of development, with the sequence and timing of phases to be finalized pending market conditions. It is expected that Phase 1 will be completed by 2018 and full master plan build-out is assumed by 2029 for traffic impact assessment purposes. A mix of residential and commercial uses is planned in accordance with the zoning, with a mixed use village proposed to better integrate the commercially zoned portion of the property. The application seeks

approval of an overlay zone for a portion of the site intended for an urban village. The village would be located at the southwest corner of the project and will encompass approximately twenty-four acres.

For traffic impact study purposes, Phase 1 is assumed to consist of a residential component with 215 single-family detached homes. Full build-out of the master plan residential component assumed construction of up to 536 apartment units and 764 single-family detached homes. The retail portion of the proposed development plan was assumed to develop after Phase 1 and was assumed to be a 90,000 square-foot shopping center for trip generation purposes¹.

Access to Phase 1 development is anticipated along NE Ingle Road, with additional access added to NE Goodwin Road during later stages of the development. Final details of the number and location of site access points will be defined during preparation of individual site plan applications, therefore appropriate planning level assumptions have been made for master planning purposes. The proposed master plan anticipates two public street neighborhood circulator connections to NE Goodwin Road serving the site in conjunction with two public street neighborhood circulator connections along NE Ingle Road. The commercial site is expected to have direct driveway access to NE Ingle Road. Some residential areas (not individual residence driveways) not served by the anticipated neighborhood circulator facilities may also seek direct access to NE Ingle Road or NE Goodwin Road as appropriate.

Trip Generation

Trip generation estimates for the proposed development were generated based on information provided in the standard reference manual *Trip Generation, 9th Edition* published by the Institute of Transportation Engineers (ITE – Reference 7). The internal and pass-by trip rates applied to each land use were also determined from ITE's *Trip Generation, 9th Edition*. Table 4 summarizes the daily, weekday a.m., and weekday p.m. peak-hour trips for the Phase 1 assumed development while Table 5 summarizes the complete master plan site trip generation estimate. All daily trips have been rounded to the nearest ten and all peak hour trips have been rounded to the nearest five trips.

¹ The unit mix for phase 1 and buildout was developed based on a reasonable worst-case scenario. Final development may result in a less-intense mix of residential units.

Table 4: Trip Generation Estimate – Phase 1

Land Use	ITE Code	Size	Daily	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
Single-Family Detached Housing	210	215 units	2,050	160	40	120	215	135	80

Table 5: Trip Generation Estimate – Build-out (Includes Phase 1)

Land Use	ITE Code	Size	Daily	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
Apartment	220	536 units	3,570	275	55	220	330	215	115
Single-Family Detached Housing	210	764 units	7,270	575	145	430	765	480	285
Total Residential (1,300 units)			10,840	850	200	650	1,095	695	400
Internalization (6% Daily, 5% PM)			630	0	0	0	60	30	30
Shopping Center	820	90,000 square feet	6,340	145	90	55	560	270	290
Internalization (10% Daily, 11% PM)			630	0	0	0	60	30	30
Pass-By Trips (34%)			1,940	50	25	25	170	85	85
Total Trips			17,180	995	290	705	1,655	965	690
Less Internalization			1,260	0	0	0	120	60	60
Less Pass-by trips			1,940	50	25	25	170	85	85
Net New Trips for Full Build-out			13,980	945	265	680	1,365	820	545

Trip Distribution

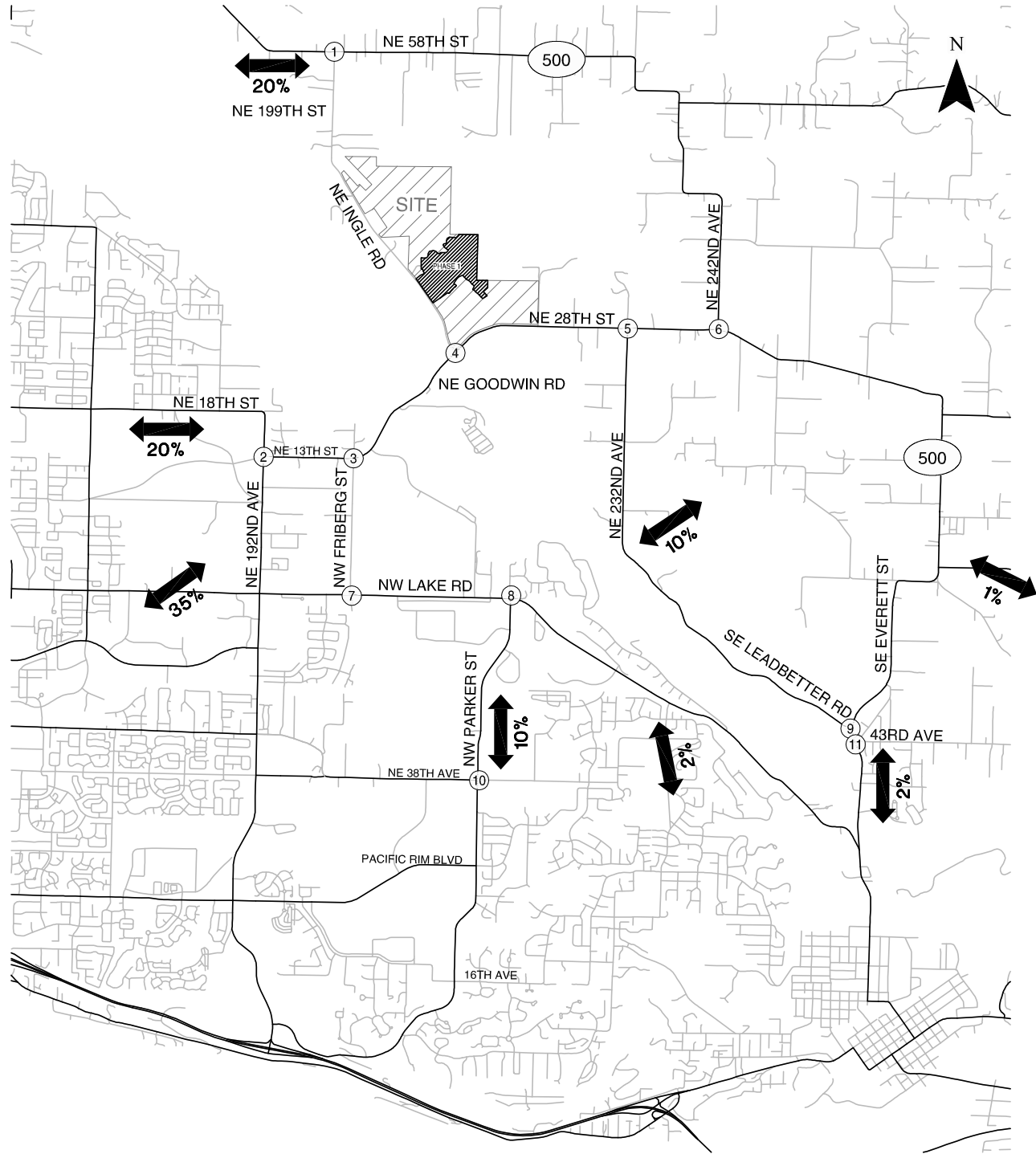
The distribution of site-generated trips onto the study area roadway system was estimated based on a review of surrounding roadway characteristics, existing uses, the 2035 travel demand model maintained by the Southwest Washington Regional Transportation Council (RTC), and review agency guidance. Trip distribution patterns were developed separately for the residential and retail trips. Figure 6 illustrates the trip distribution patterns for the residential and retail trips.

Trip Assignment

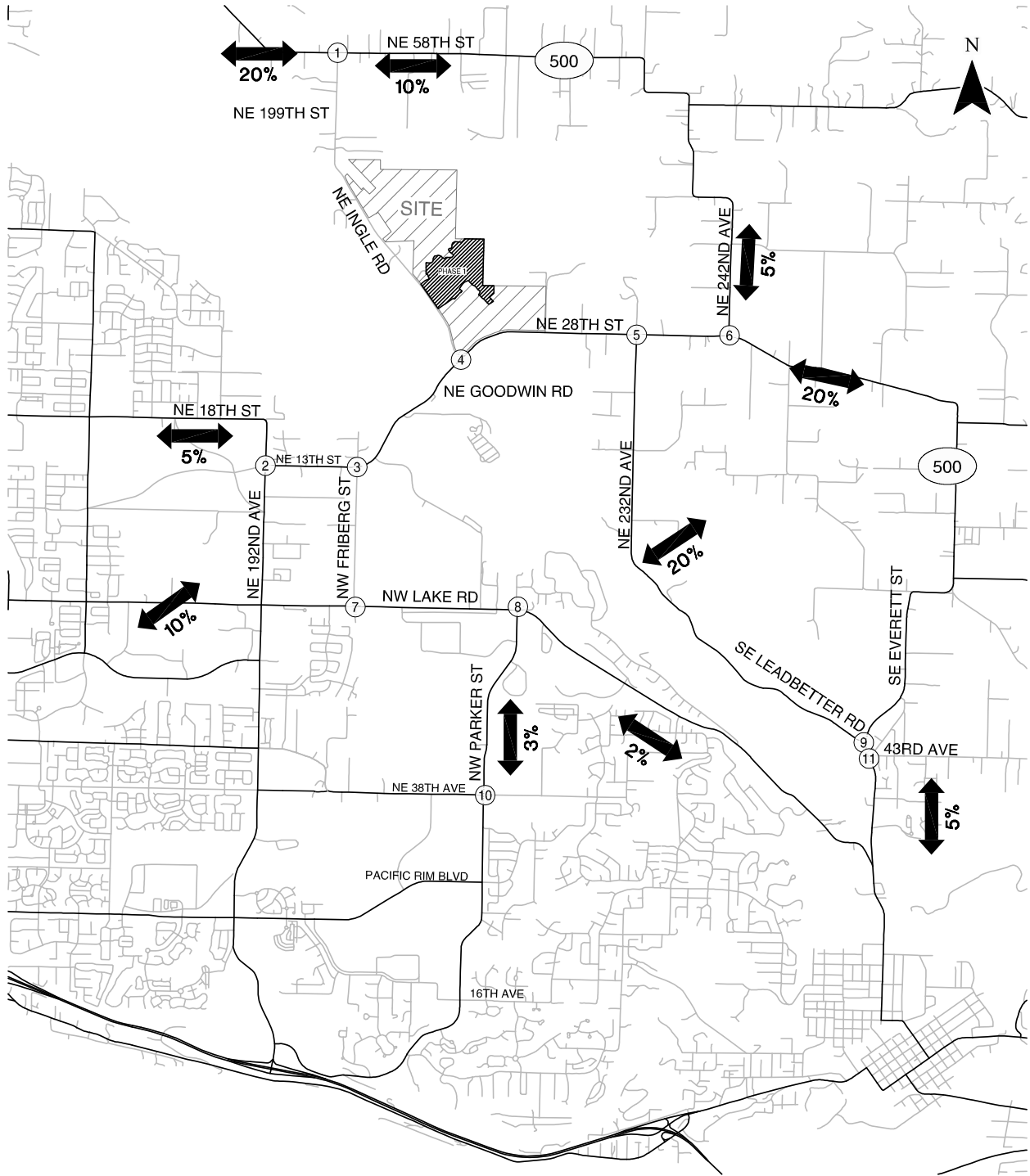
The weekday a.m. and p.m. peak hour site trips shown in Tables 4 and 5 were assigned to the roadway network based on the trip distribution patterns shown in Figure 6. Figures 7 through 10 show the assignment of site-generated trips during the weekday a.m. and p.m. peak hours for Phase 1 and at Build-out. Note that the site-generated build-out volumes shown in Figures 9 and 10 include the Phase 1 site-generated trips and thus reflect the total number of trips generated. A figure showing the assignment of pass-by trips is provided in Appendix “E”.

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RESIDENTIAL DISTRIBUTION:



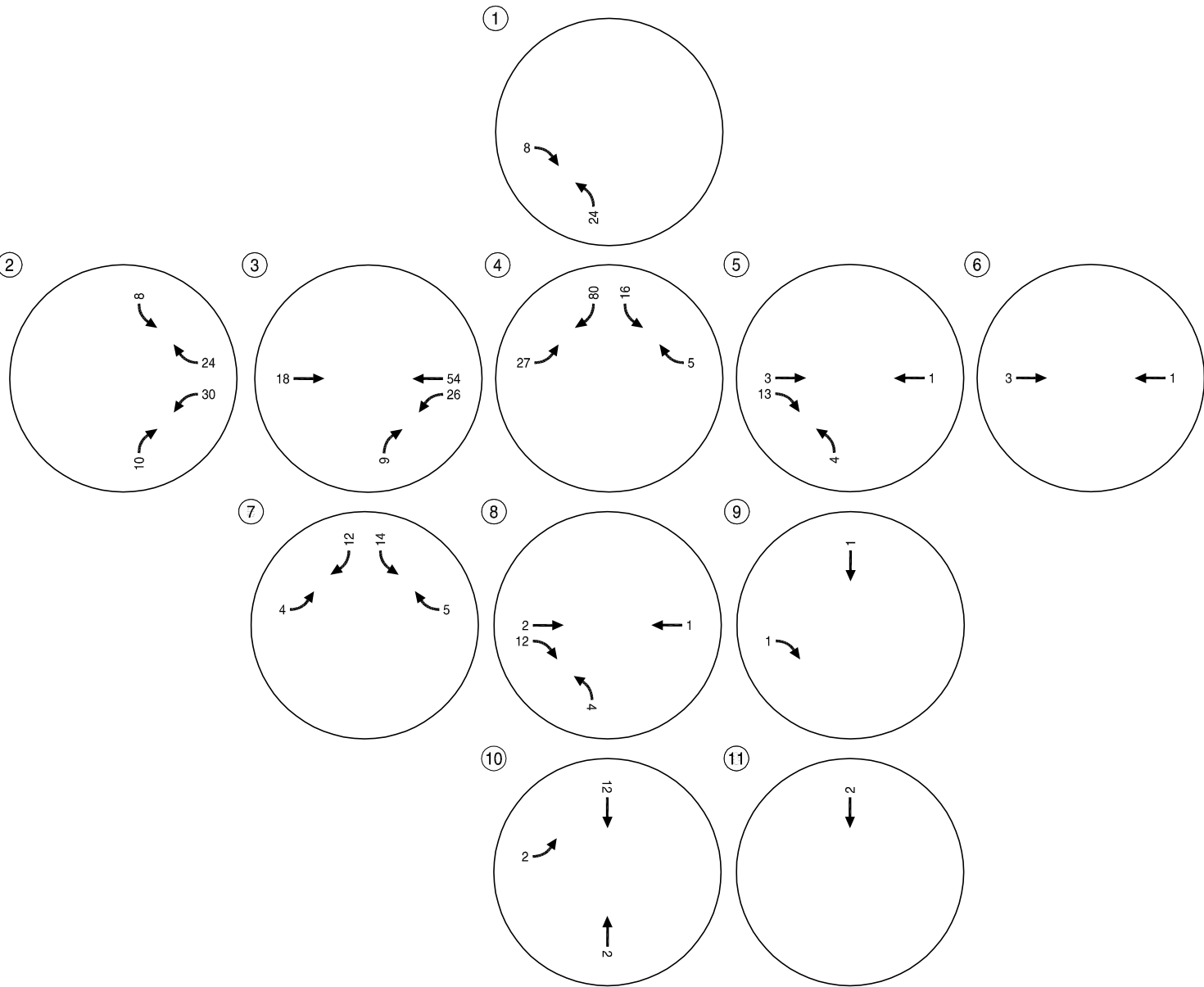
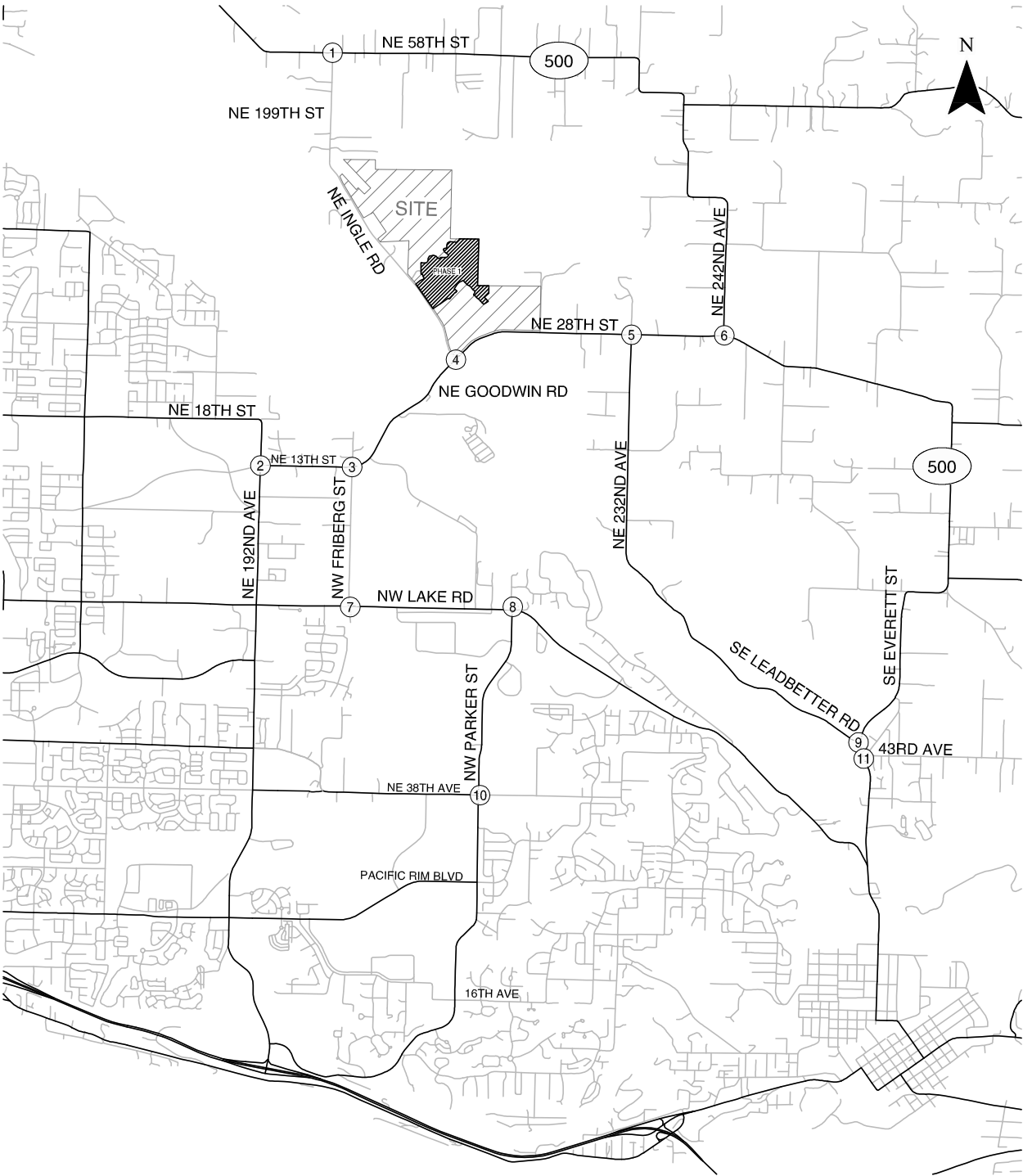
RETAIL DISTRIBUTION:



Estimated Trip Distribution Pattern
Camas, Washington

Figure
6

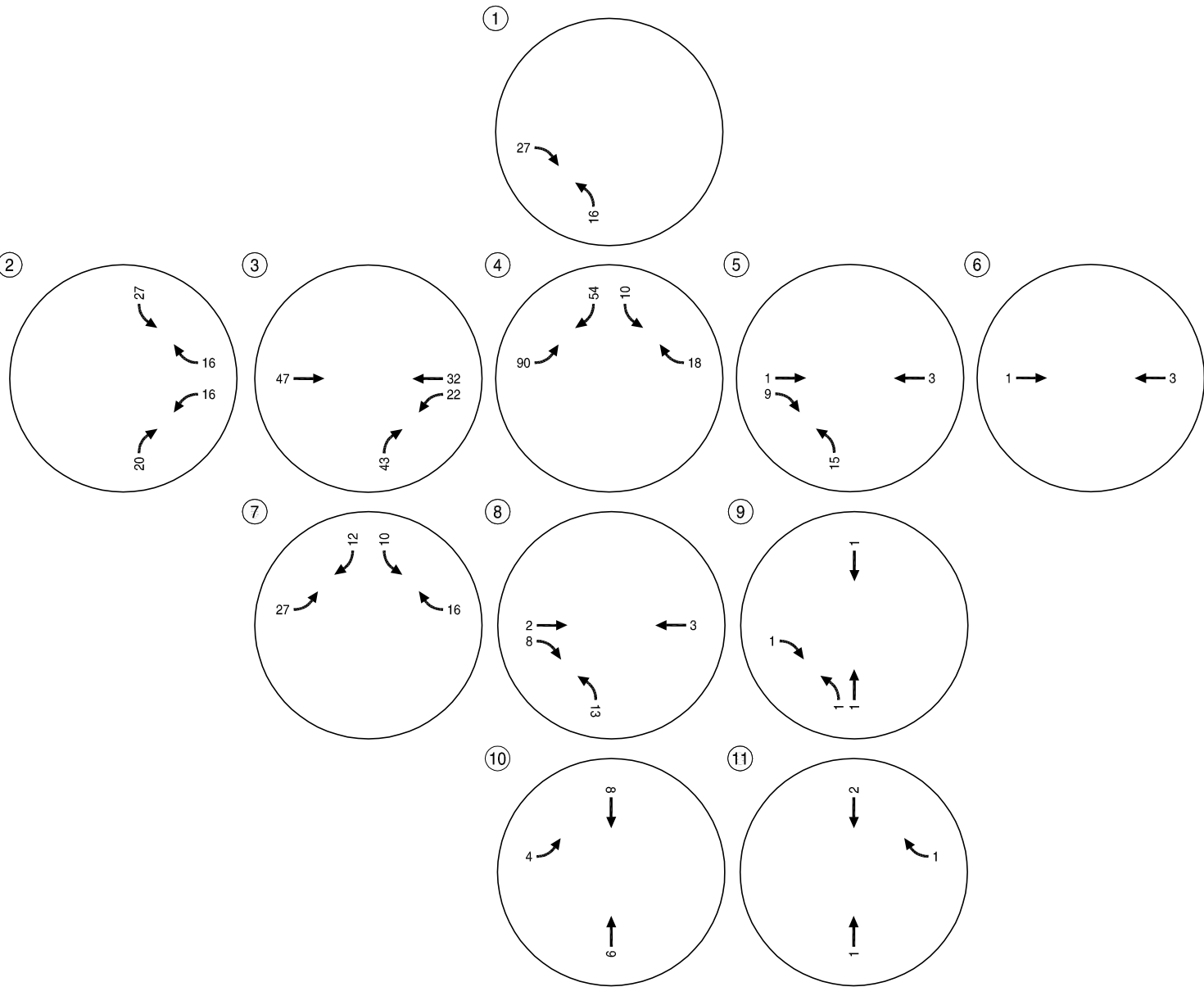
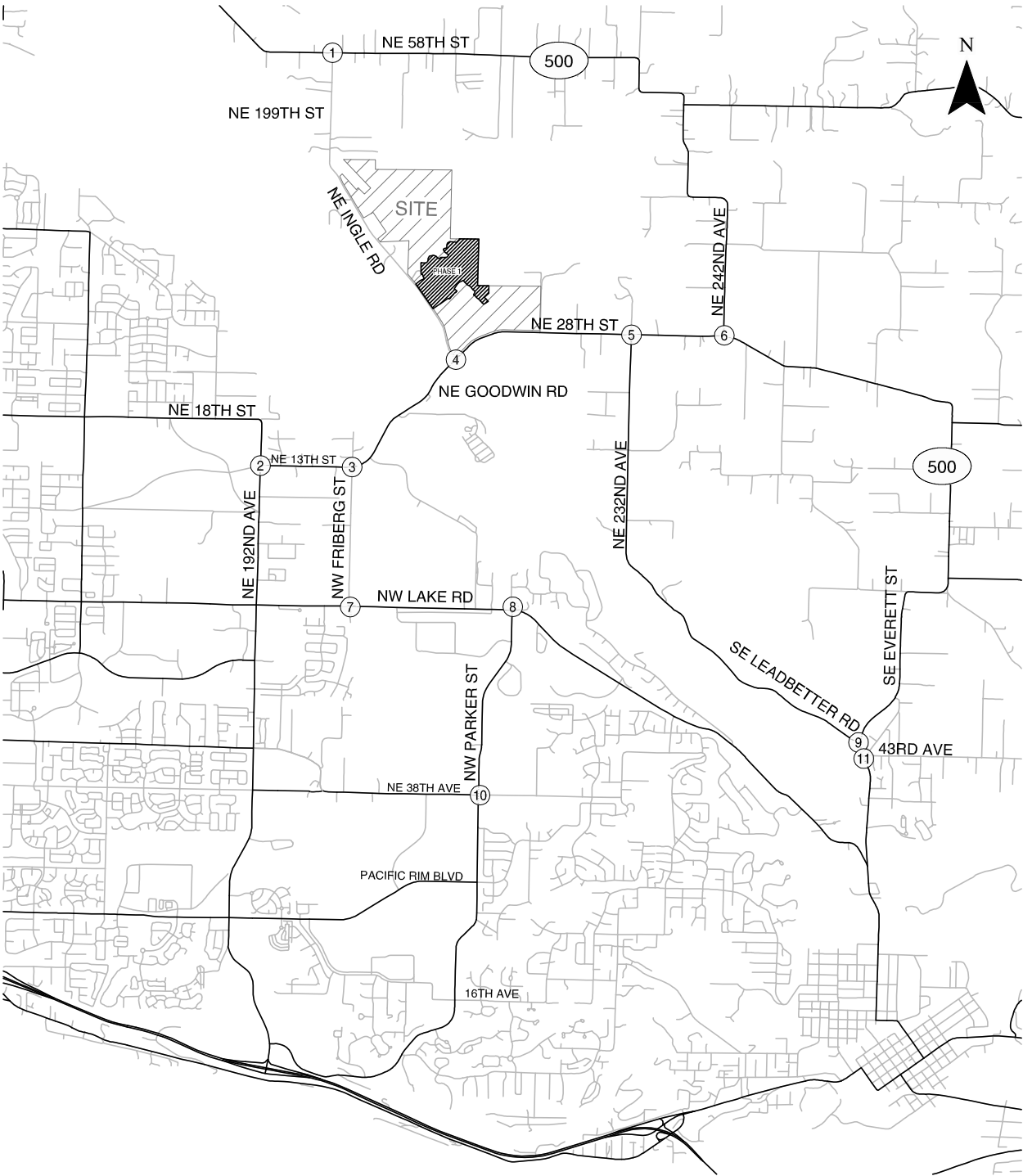
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Total Estimated Trip Assignment - Phase 1
Weekday AM Peak Hour
Camas, Washington

Figure
7

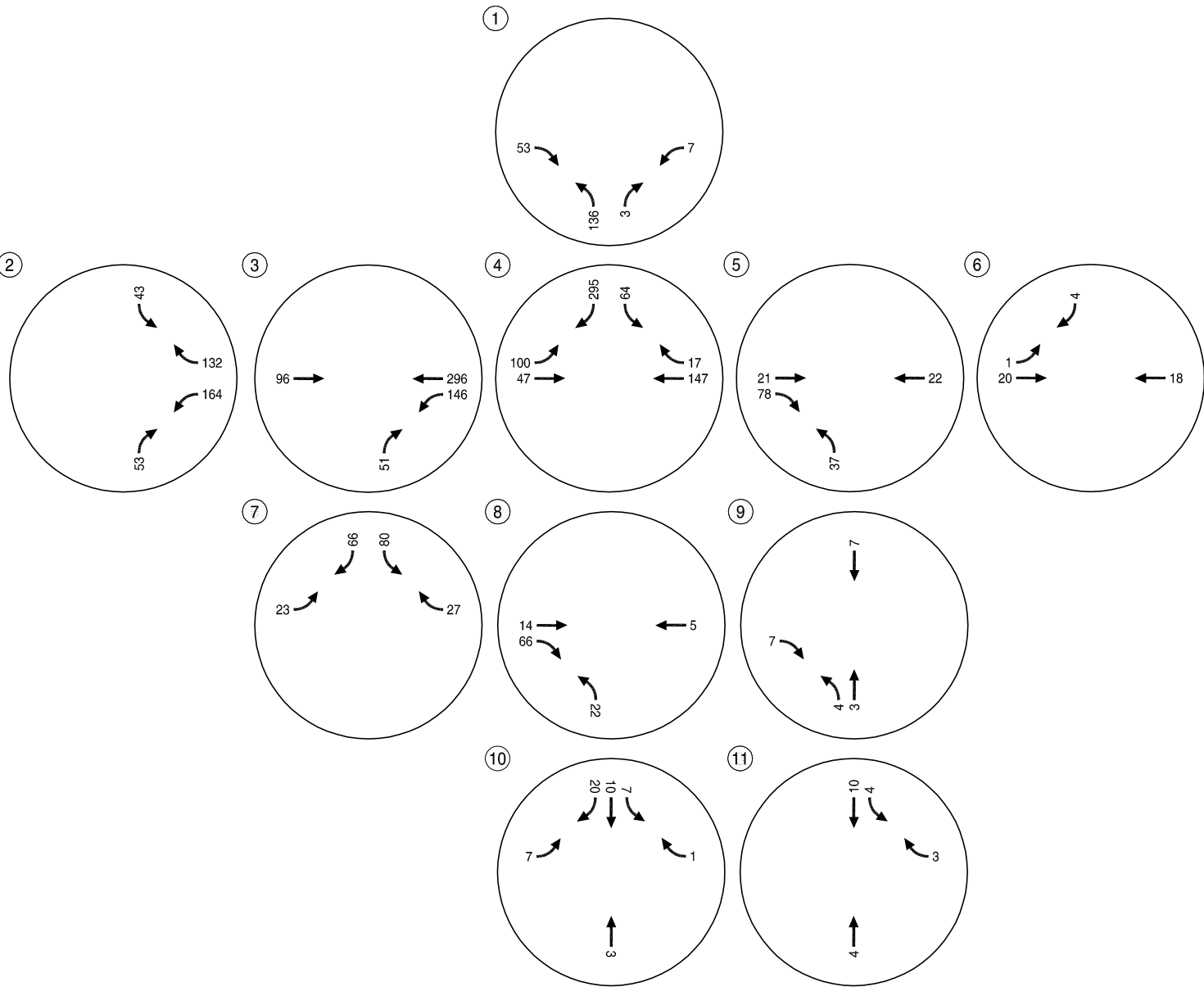
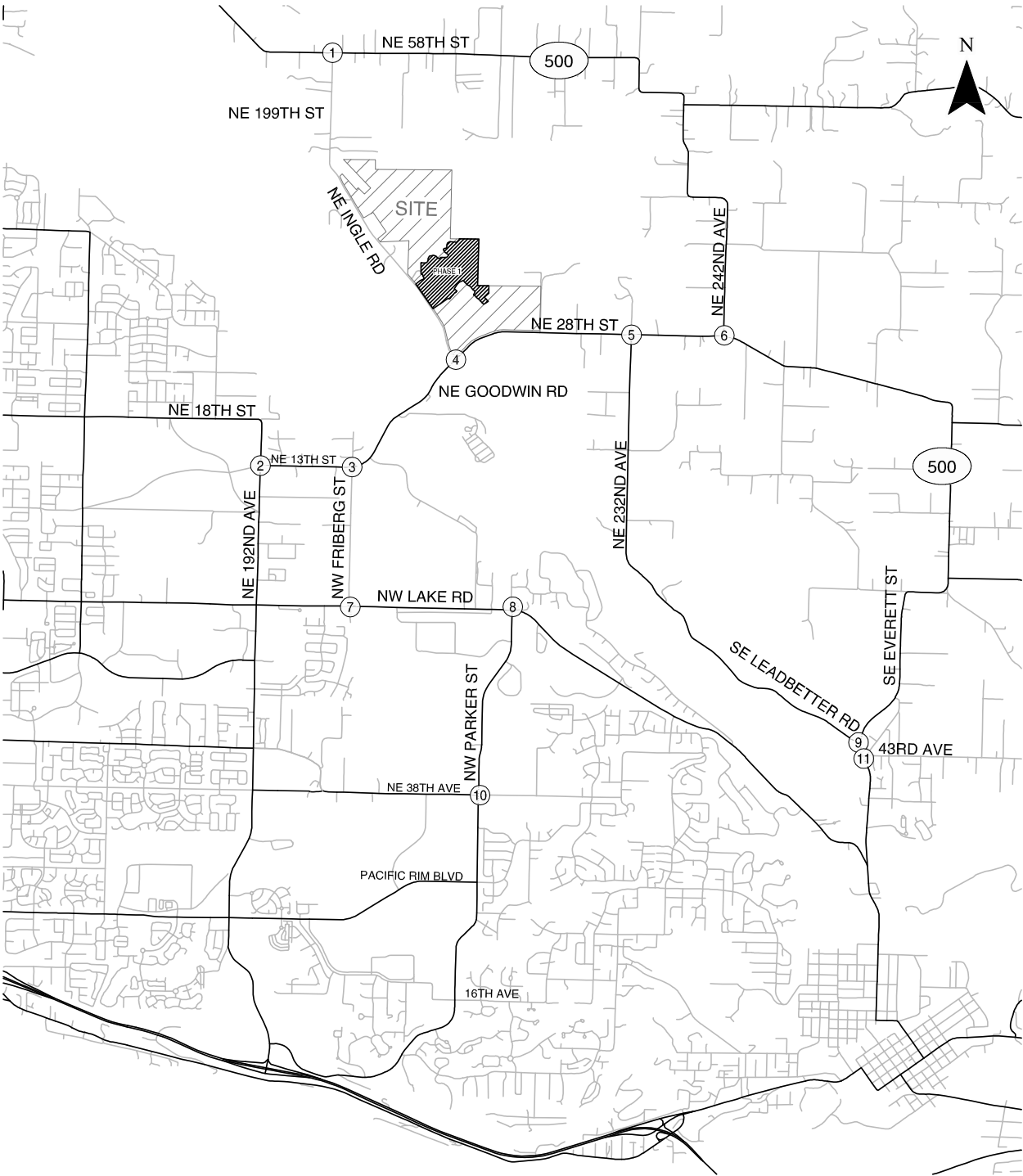
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Total Estimated Trip Assignment - Phase 1
Weekday PM Peak Hour
Camas, Washington

Figure
8

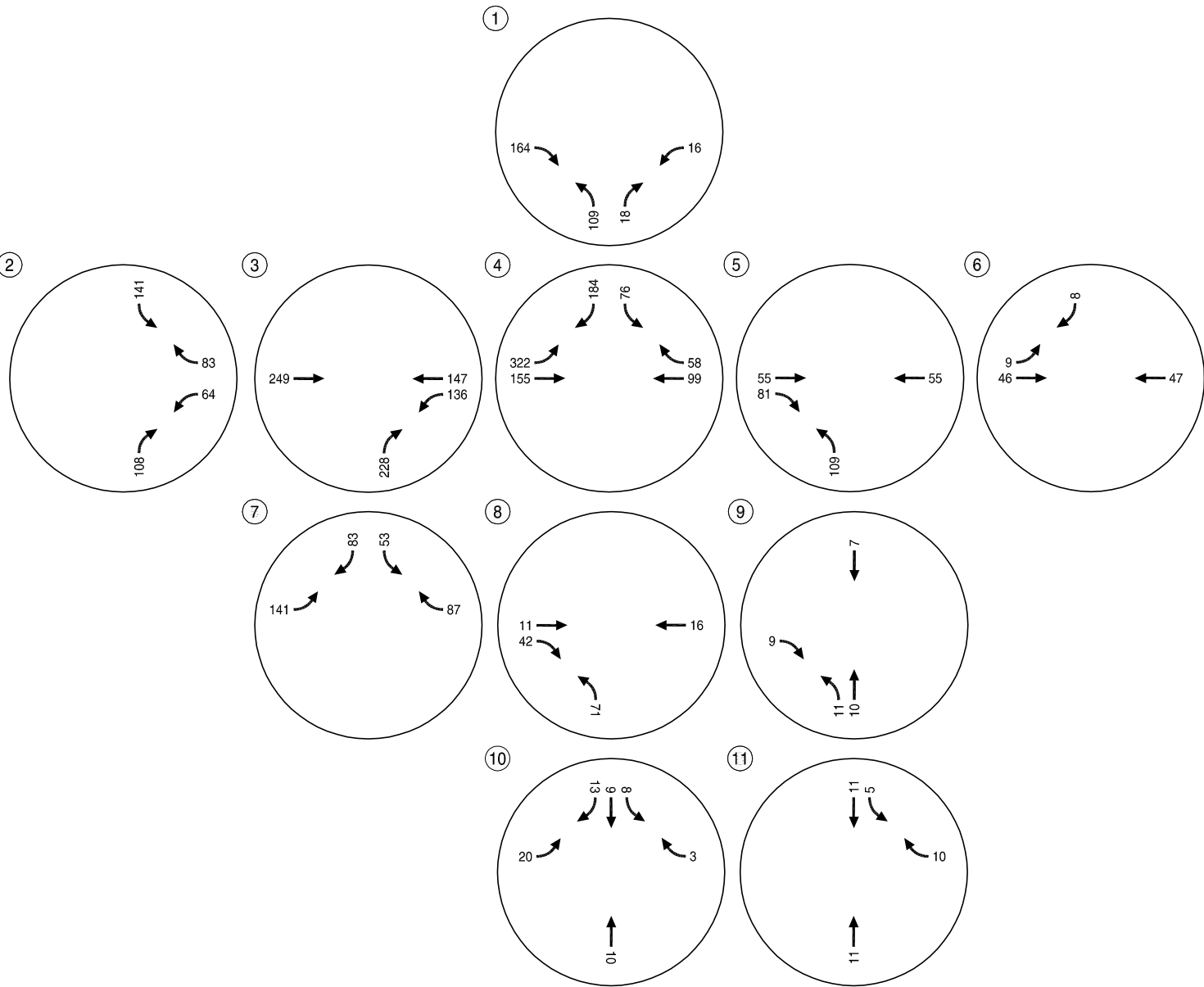
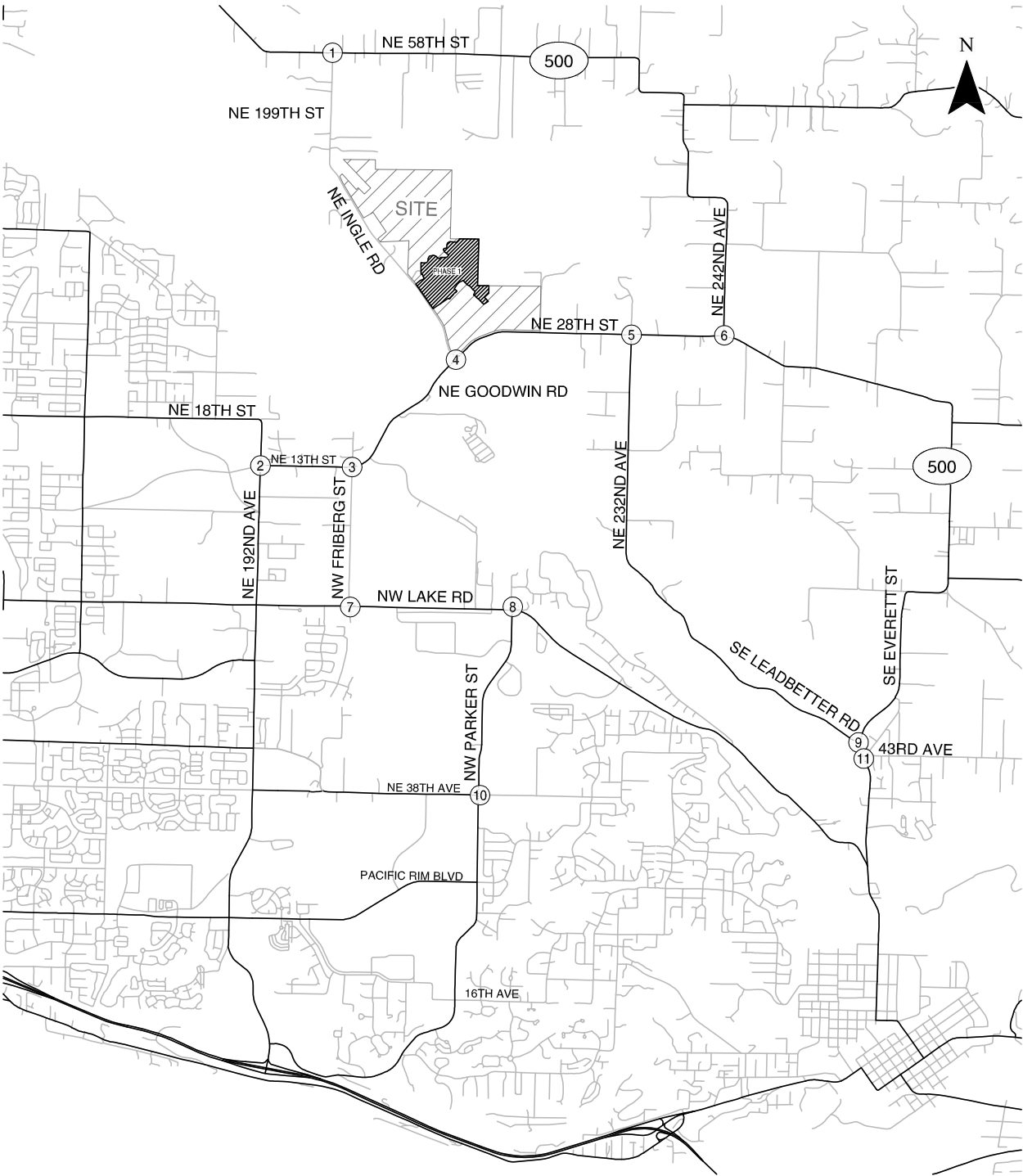
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Total Estimated Trip Assignment - Full Build-Out
Weekday AM Peak Hour
Camas, Washington

Figure
9

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Total Estimated Trip Assignment - Full Build-Out
Weekday PM Peak Hour
Camas, Washington

Figure
10

2018 Background Traffic Conditions

The 2018 background traffic analysis projects how the study area's transportation system will operate during the year that Phase 1 of the proposed development is expected to be completed. This analysis includes traffic growth due to previously approved in-process developments within the study area, but does not include traffic from any of the proposed Green Master Plan development phases. Per agency direction, no growth was applied to City of Camas roadways and a 2% growth rate was applied to City of Vancouver roadways (Reference 8).

Planned Developments and Transportation Improvements

City of Camas staff identified 13 local development projects that are approved but not yet occupied. These in-process developments include:

- | | |
|--------------------------------|--------------------------------|
| ▪ Lake Hills | ▪ Deerhaven Subdivision |
| ▪ Two Creeks | ▪ Hadley's Glen |
| ▪ The Summit at Columbia Vista | ▪ Millshore Downs |
| ▪ Parker Village | ▪ Fisher Creek Campus |
| ▪ The Hills at Round Lake | ▪ Lacamas Prairie |
| ▪ North Hills Subdivision | ▪ 192 nd Plaza West |
| ▪ Brady Road Subdivision | |

Appendix "F" contains the data received pertaining to the in-process trips.

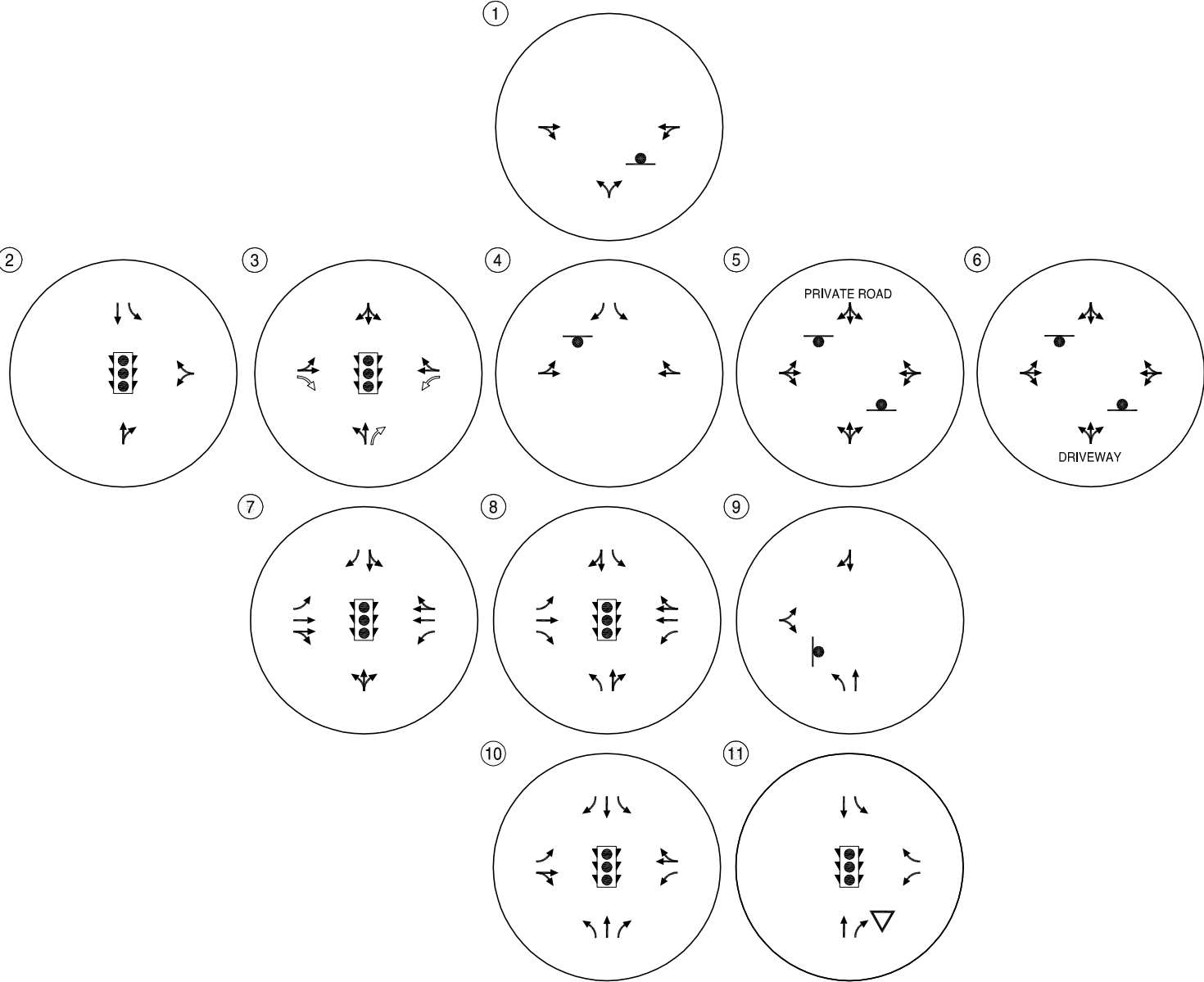
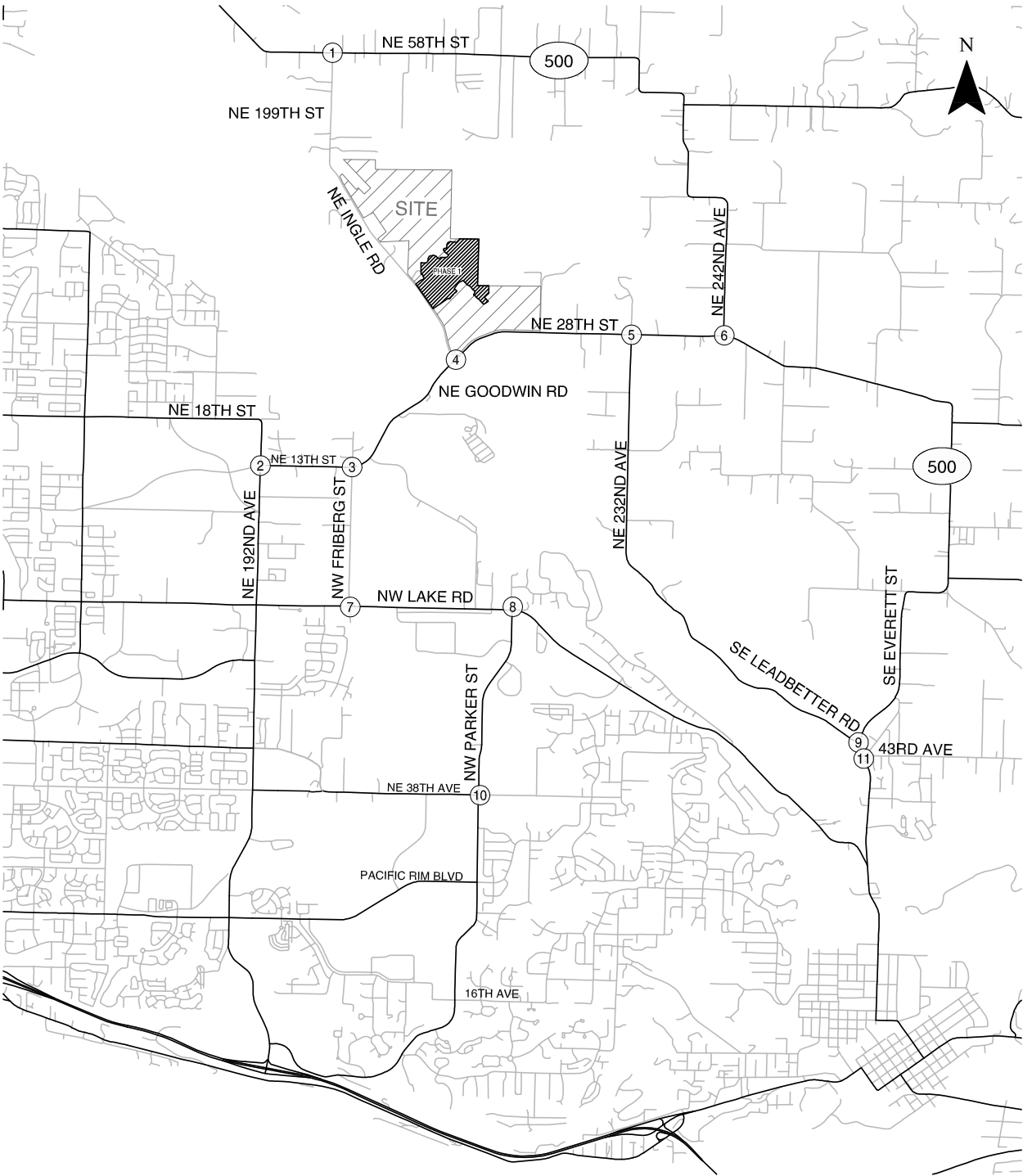
Planned and funded transportation improvements within the study area include the widening of NW Friberg Street (between Lake Road and NE 13th Street) and the addition of a westbound left-turn lane, northbound right-turn lane, and eastbound right-turn lane at the NW Friberg Street/NE Goodwin Road intersection. Figure 11 shows the lane configuration and traffic control devices assumed in the 2018 analysis.

Traffic Operations

Figures 12 and 13 summarize the year 2018 background traffic operations analysis results at the study intersections for the weekday a.m. and weekday p.m. peak-hours, respectively. The projected turning movement counts are rounded to the nearest five vehicles per hour. As shown, the study intersections operate acceptably during the weekday a.m. and weekday p.m. peak periods in the 2018 background conditions.

Appendix "G" contains the 2018 background conditions traffic operations worksheets.

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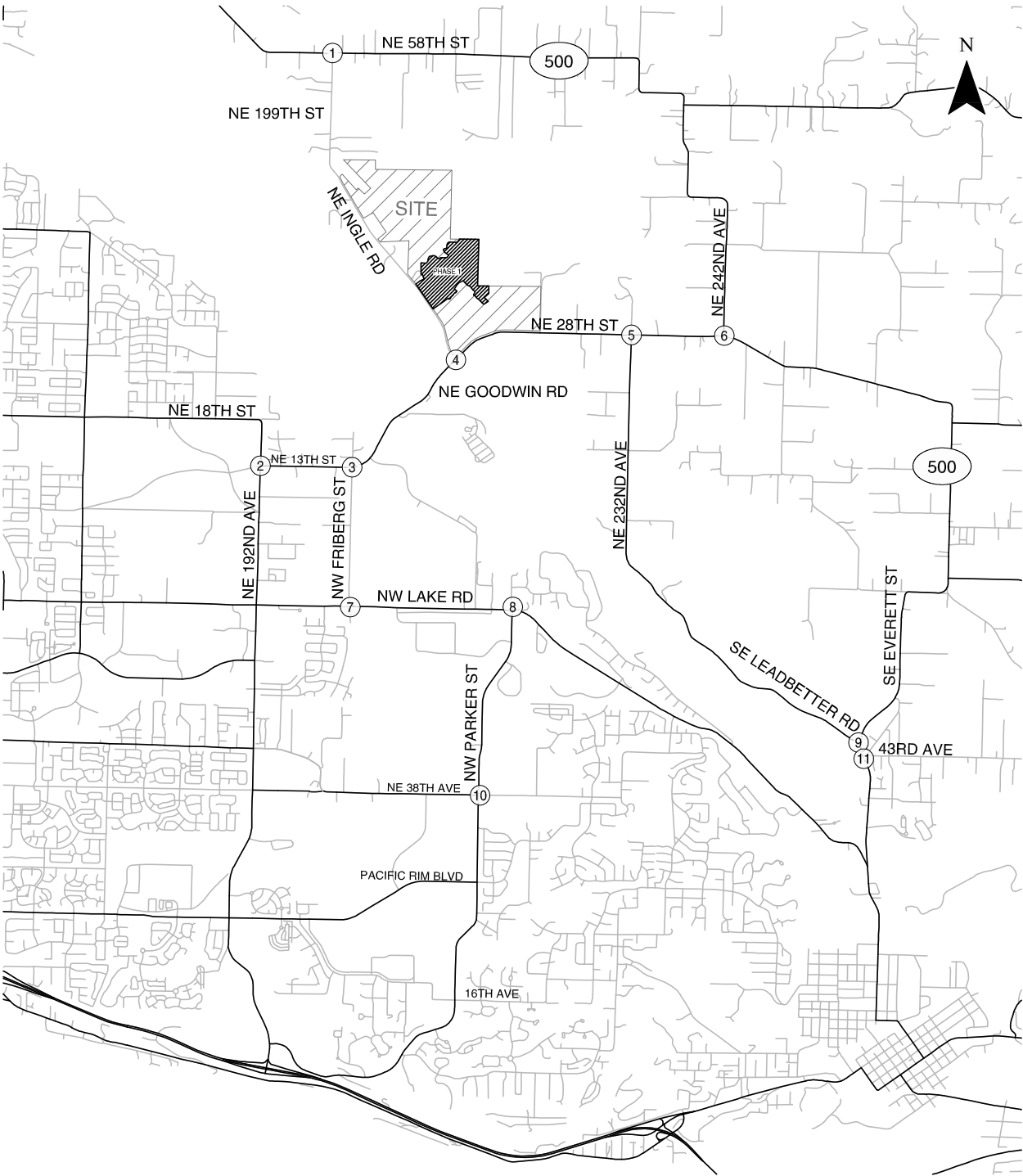


- STOP SIGN
- TRAFFIC SIGNAL
- YIELD SIGN
- PLANNED IMPROVEMENT

Year 2018 Lane Configurations and Traffic Control Devices
Camas, Washington

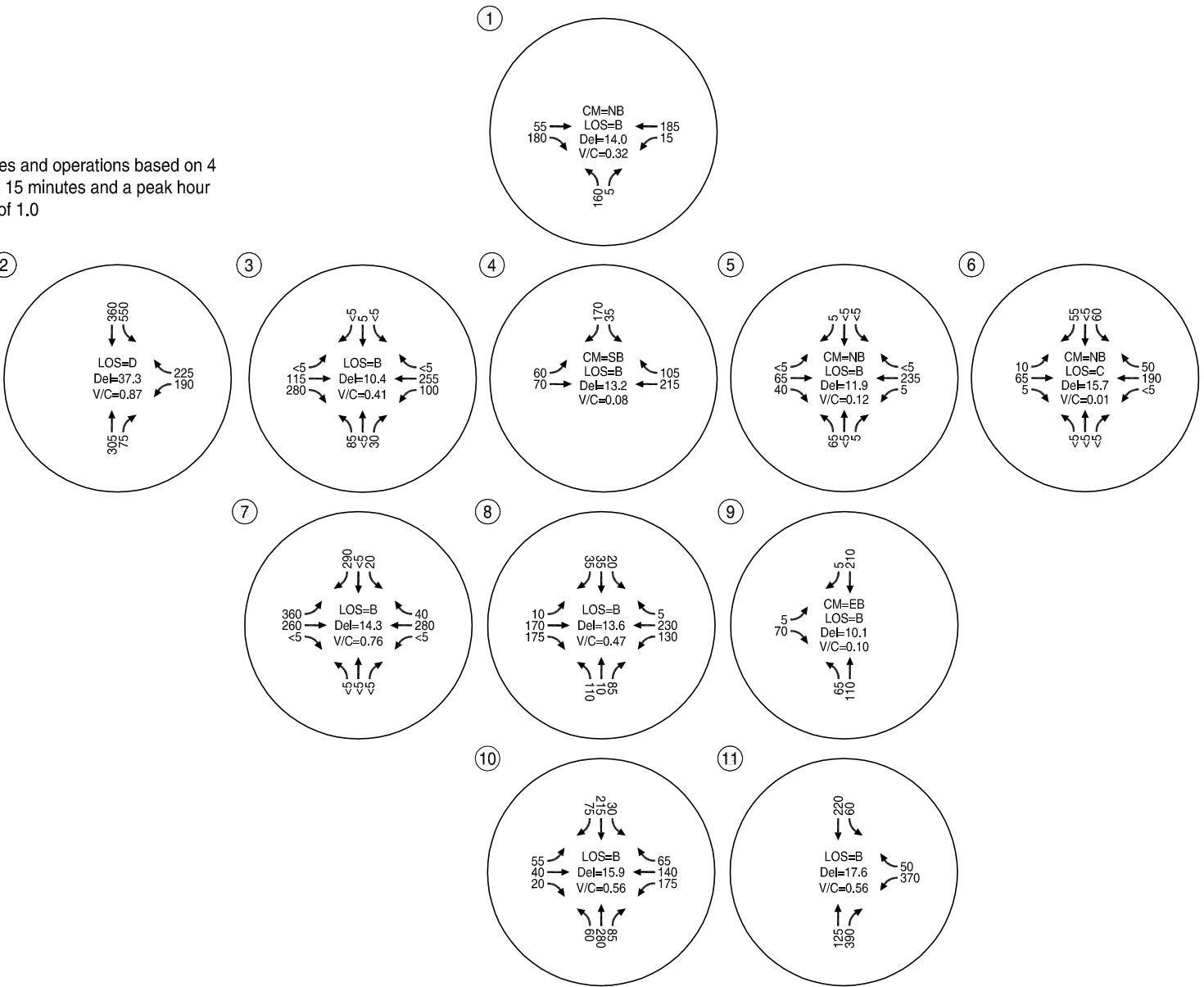
Figure
11

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★ Volumes and operations based on 4 x peak 15 minutes and a peak hour factor of 1.0

★ ②

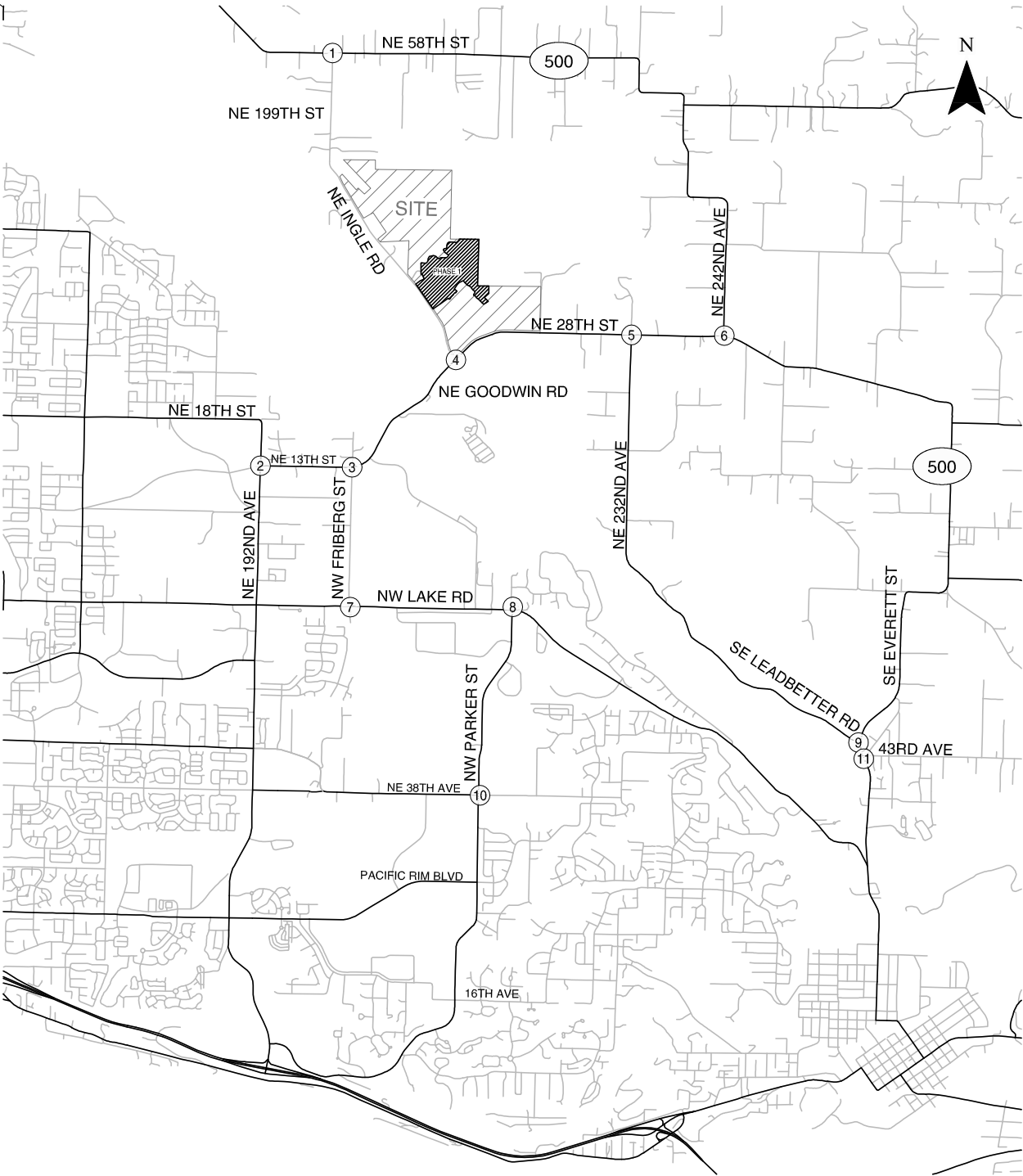


CM = CRITICAL MOVEMENT (TWSC)
LOS = INTERSECTION LEVEL OF SERVICE (SIG) / CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIG / CRITICAL MOVEMENT CONTROL DELAY (TWSC)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
TWSC = TWO-WAY STOP CONTROL

2018 Background Conditions
Weekday AM Peak Hour
Camas, Washington

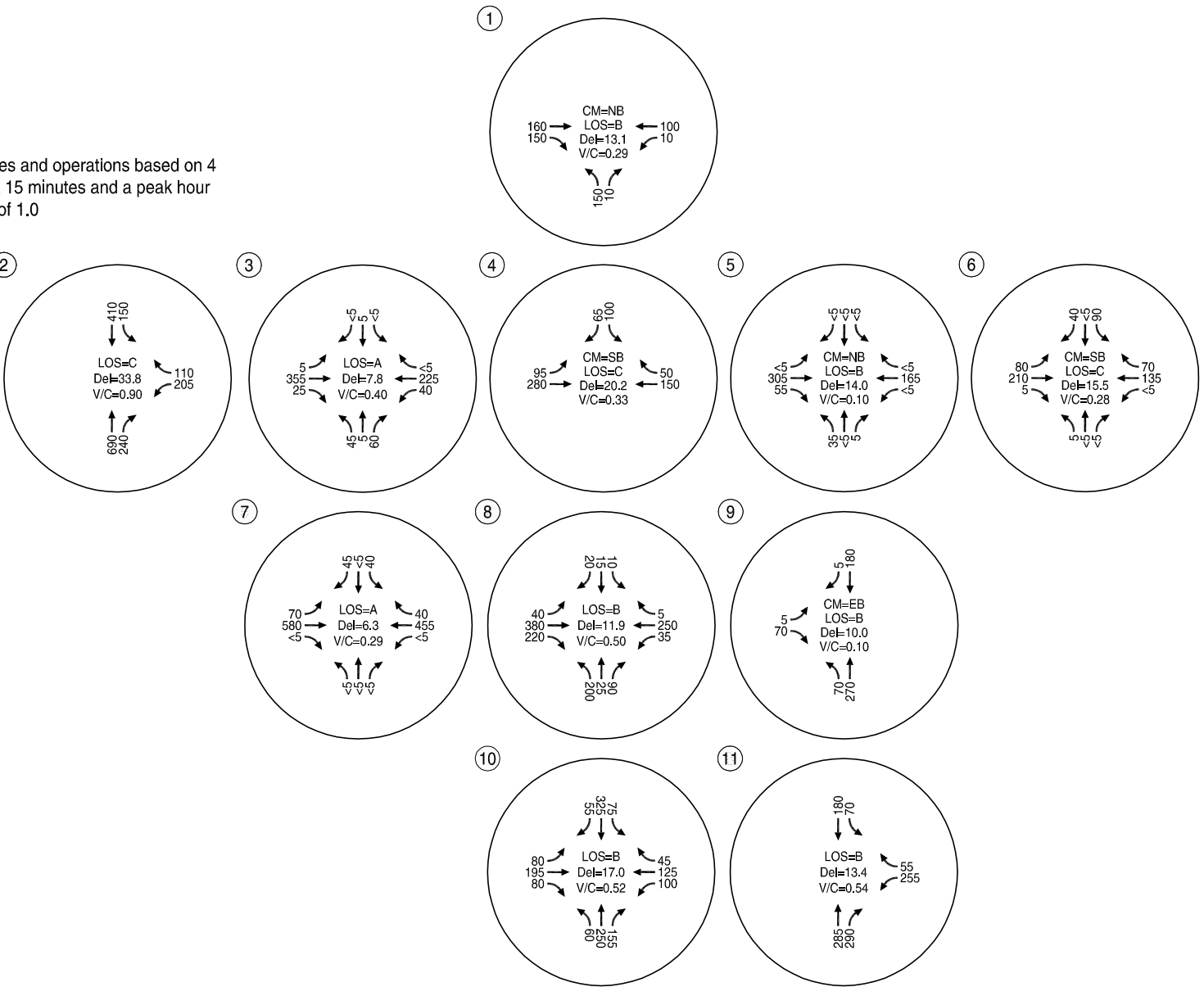
Figure
12

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★ Volumes and operations based on 4 x peak 15 minutes and a peak hour factor of 1.0

★ ②



CM = CRITICAL MOVEMENT (TWSC)
LOS = INTERSECTION LEVEL OF SERVICE (SIG) / CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIG / CRITICAL MOVEMENT CONTROL DELAY (TWSC)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
TWSC = TWO-WAY STOP CONTROL

2018 Background Conditions
Weekday PM Peak Hour
Camas, Washington

Figure
13

2018 Total Traffic Conditions

The year 2018 total traffic analysis forecasts how the study area's transportation system will operate with the addition of traffic from Phase 1 of the proposed development. Phase 1 site-generated trips were added to the 2018 background traffic volumes at the study intersections to arrive at the total traffic volumes.

All lane configurations are consistent with background conditions with the exception of the intersection of NE Ingle Road/NE Goodwin Road. The developer proposes to construct an exclusive eastbound left-turn lane on NE Goodwin Road at NE Ingle Road in conjunction with the Phase 1 site development. Consequently, provision of the turn lane was assumed for the total traffic analysis.

Traffic Operations

Figures 14 and 15 summarize the year 2018 total traffic operations analysis results at the study intersections for the weekday a.m. and weekday p.m. peak-hours, respectively. The projected turning movement counts are rounded to the nearest five vehicles per hour. As shown, all but one of the study intersections are forecast to operate acceptably during the weekday a.m. and p.m. peak periods under 2018 total traffic conditions. The southbound movement at the intersection of NE Ingle Road/NE Goodwin Road is anticipated to operate at a LOS E during the weekday p.m. peak hour. Operations at this intersection could be mitigated with the addition of an eastbound right-turn lane. Based on a sensitivity analysis, this mitigation is triggered by the 203rd unit to be constructed. Up until this point, the southbound left-turn lane is forecast to operate at a LOS D. Table 6 provides the operations at NE Ingle Road/NE Goodwin Road during the weekday PM peak hour supporting the sensitivity analysis.

Table 6: NE Ingle Road/NE Goodwin Road Operations Assessment – weekday PM peak hour

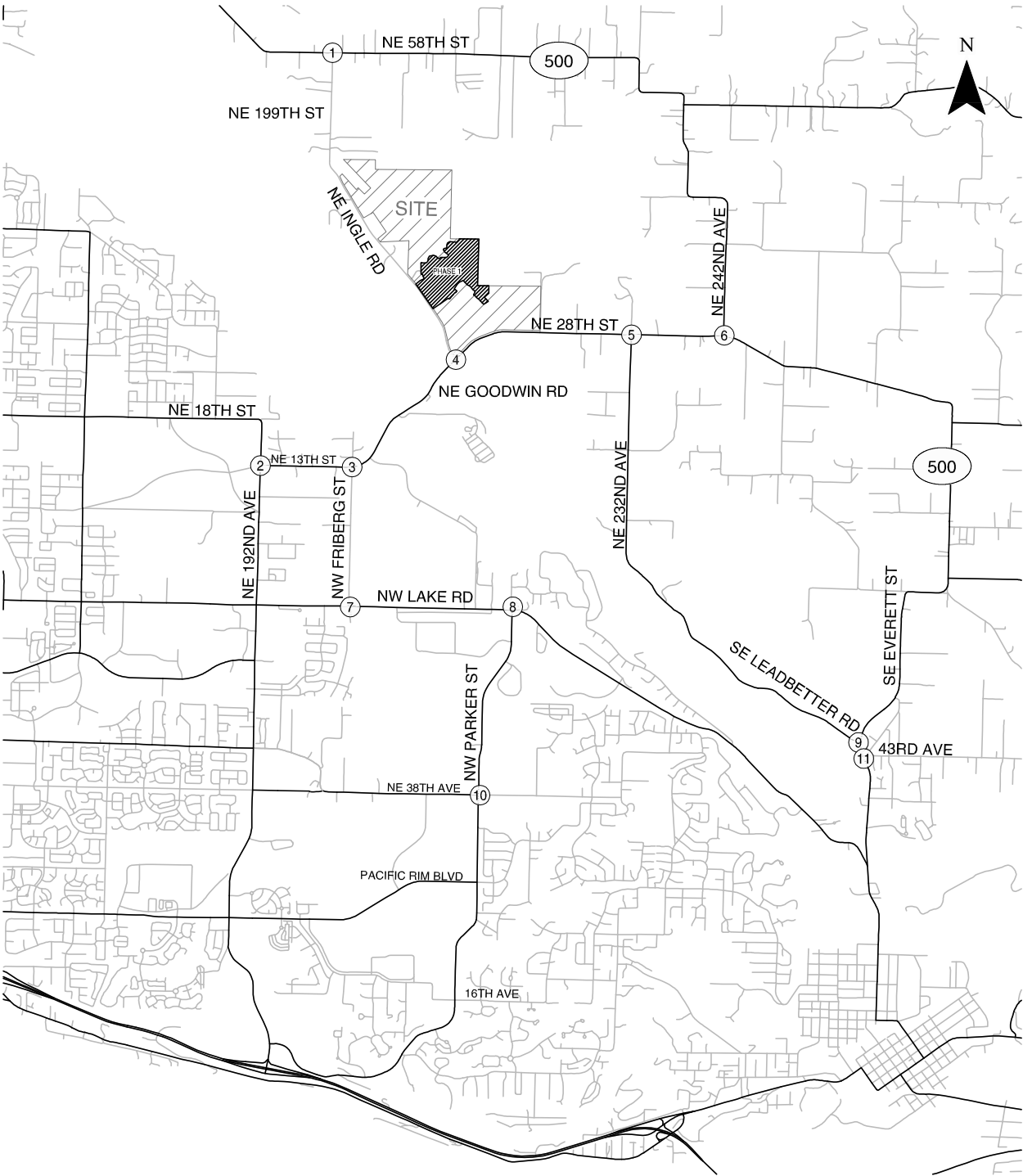
Scenario	Critical Movement	LOS	v/c ratio
2018 Background Conditions	SBL	C	0.33
2018 Background + 200 Homes	SBL	D	0.52
2018 Background + 203 homes	SBL	E	0.53
2018 Total Traffic (215 homes)	SBL	E	0.53
2018 Total Traffic (2015 homes) – mitigated ¹	SBL	D	0.51

Notes: LOS = Level of Service; v/c ratio = volume-to-capacity ratio

¹Mitigation includes provision of westbound right-turn lane

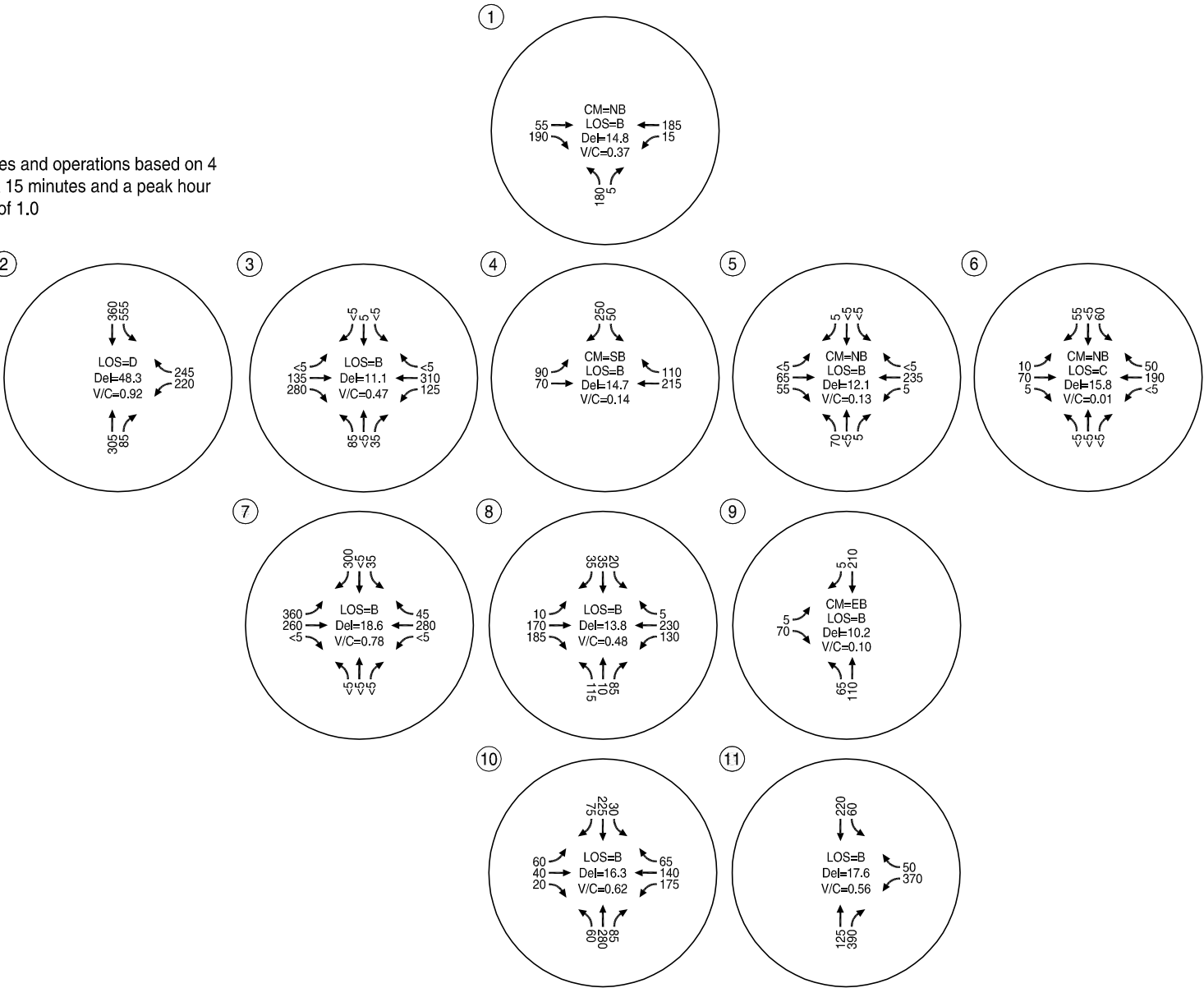
Appendix "H" contains the 2018 total traffic conditions traffic operations worksheets. Appendix "I" contains the traffic operations worksheets supporting the sensitivity analysis at NE Ingle Road/NE Goodwin Road.

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★ Volumes and operations based on 4 x peak 15 minutes and a peak hour factor of 1.0

★ ②

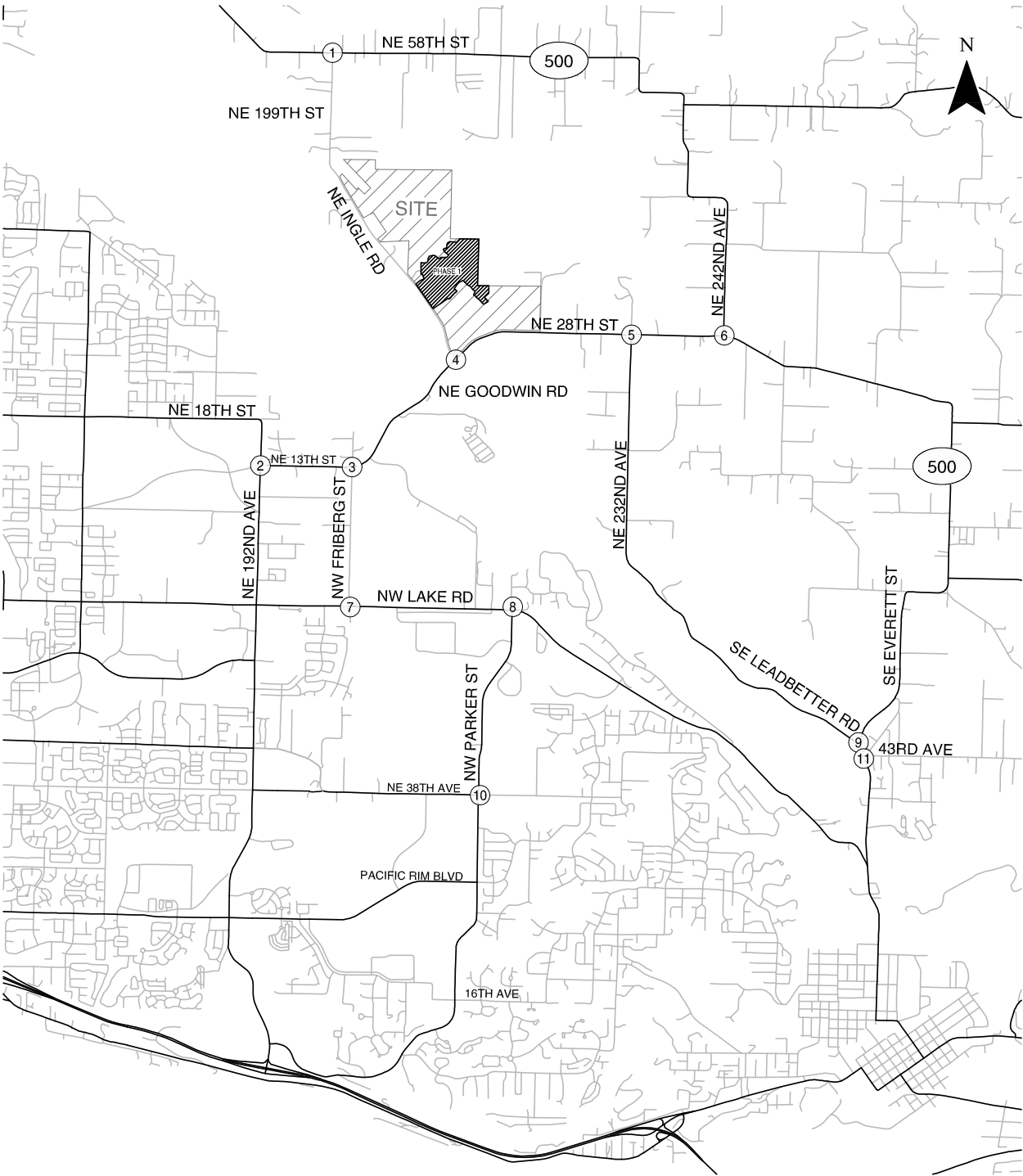


CM = CRITICAL MOVEMENT (TWSC)
LOS = INTERSECTION LEVEL OF SERVICE (SIG) / CRITICAL MOVEMENT
LEVEL OF SERVICE (TWSC)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIG / CRITICAL
MOVEMENT CONTROL DELAY (TWSC)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
TWSC = TWO-WAY STOP CONTROL

2018 Total Traffic Conditions (Phase 1)
Weekday AM Peak Hour
Camas, Washington

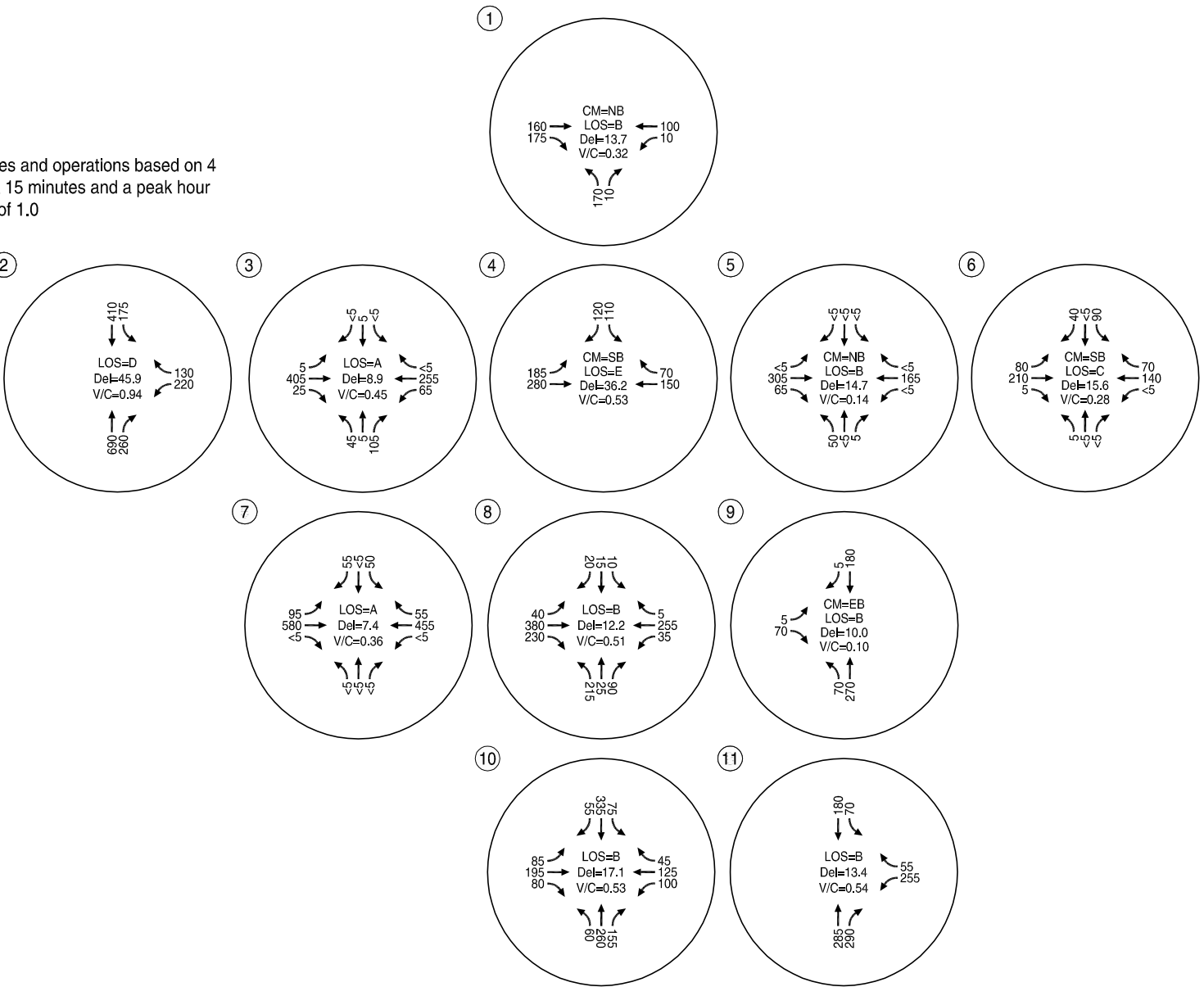
Figure
14

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★ Volumes and operations based on 4 x peak 15 minutes and a peak hour factor of 1.0

★ ②



CM = CRITICAL MOVEMENT (TWSC)
LOS = INTERSECTION LEVEL OF SERVICE (SIG) / CRITICAL MOVEMENT
LEVEL OF SERVICE (TWSC)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIG / CRITICAL
MOVEMENT CONTROL DELAY (TWSC)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
TWSC = TWO-WAY STOP CONTROL

2018 Total Traffic Conditions (Phase 1)
Weekday PM Peak Hour
Camas, Washington

Figure
15

2029 Background Traffic Conditions

The 2029 background traffic analysis identifies how the study area's transportation system will operate with regional growth, including completion of Phase 1 development. No further funded transportation improvement projects were identified at the study intersections that would be in place prior to the year 2029. In addition to the previously described in-process development, a one percent annual growth rate was applied to the 2018 background traffic volumes on City of Camas roadways to account for regional growth in the area per staff direction. Continued use of a two percent annual growth rate was assumed to the City of Vancouver roadways (NE 192nd Avenue).

The same lane configurations used in the 2018 analysis were assumed, with the exception of the configuration at NE Ingle Road/NE Goodwin Road. As previously noted, the developer proposes to construct an exclusive eastbound left-turn lane at the intersection in conjunction with the Phase 1 site development so this turn lane was assumed for the 2029 analysis. Signal timings were optimized with the assumption that signals in the area will be re-timed in the next fifteen years. In addition, some peak hour factors (PHF) were increased to account for future traffic changes, including:

- PHF increased to 0.80 in the a.m. peak hour at NW Friberg Street/NE Goodwin Road and NE 242nd Avenue/NE 28th Street
- PHF increased to 0.75 in the a.m. peak hour at NW Friberg Street/NW Lake Road; NW Parker Street/NW Lake Road; and NW Parker Street/NE 38th Avenue

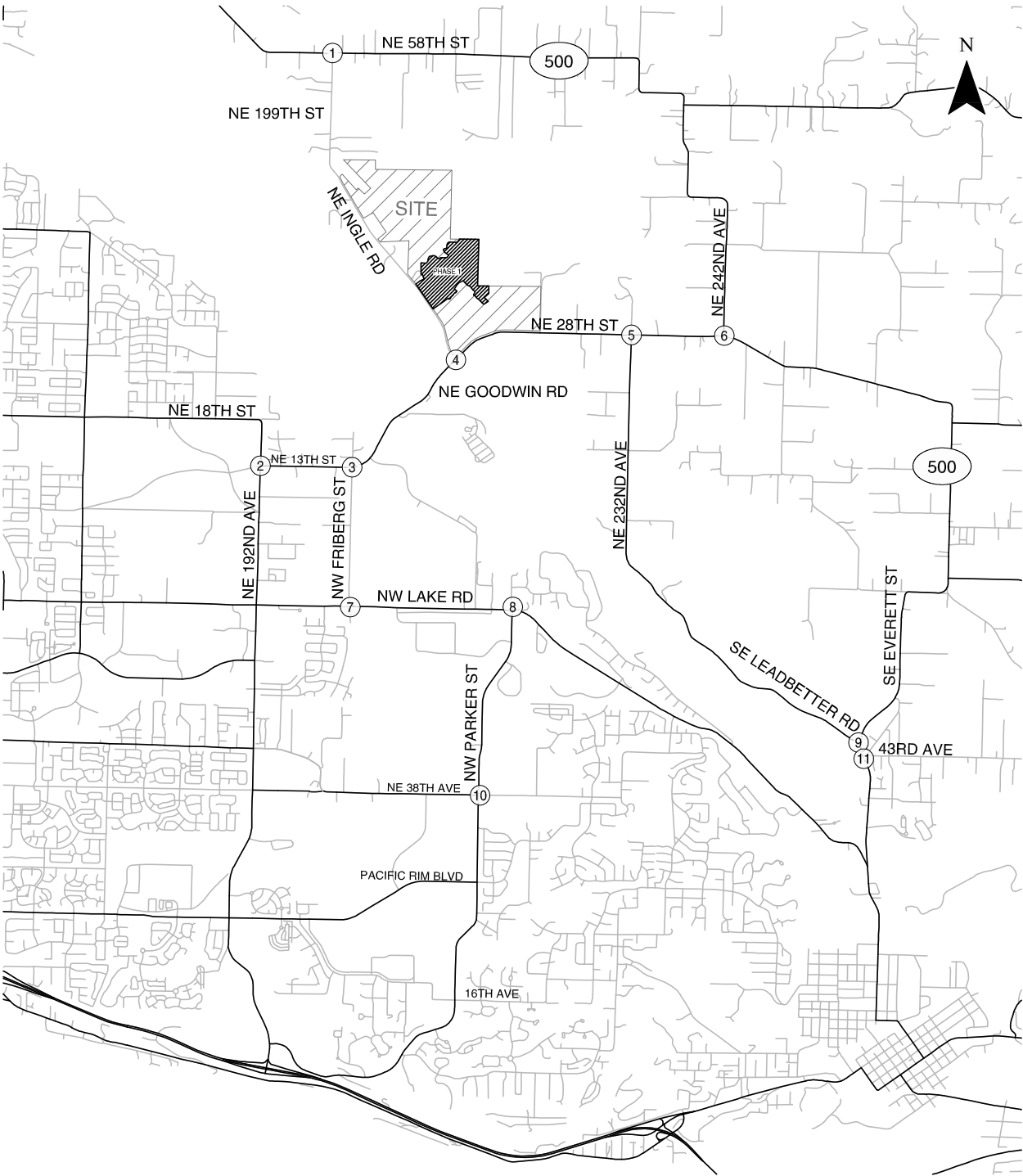
Traffic Operations

Figures 16 and 17 summarize the year 2029 background traffic operations analysis results at the study intersections for the weekday a.m. and weekday p.m. peak-hours, respectively. As illustrated in the figures, all but two of the study intersections are forecast to operate acceptably:

- The intersection of NE 192nd Avenue/NE 13th Street is projected to operate at a LOS E and over-capacity during the weekday a.m. peak hour and LOS F and over-capacity during the p.m. peak hour.
- The southbound approach to the intersection of NE Ingle Road/NE Goodwin Road is projected to operate at a LOS E during the weekday p.m. peak hour (with provision of the westbound right-turn lane recommended in conjunction with Phase 1 site development).

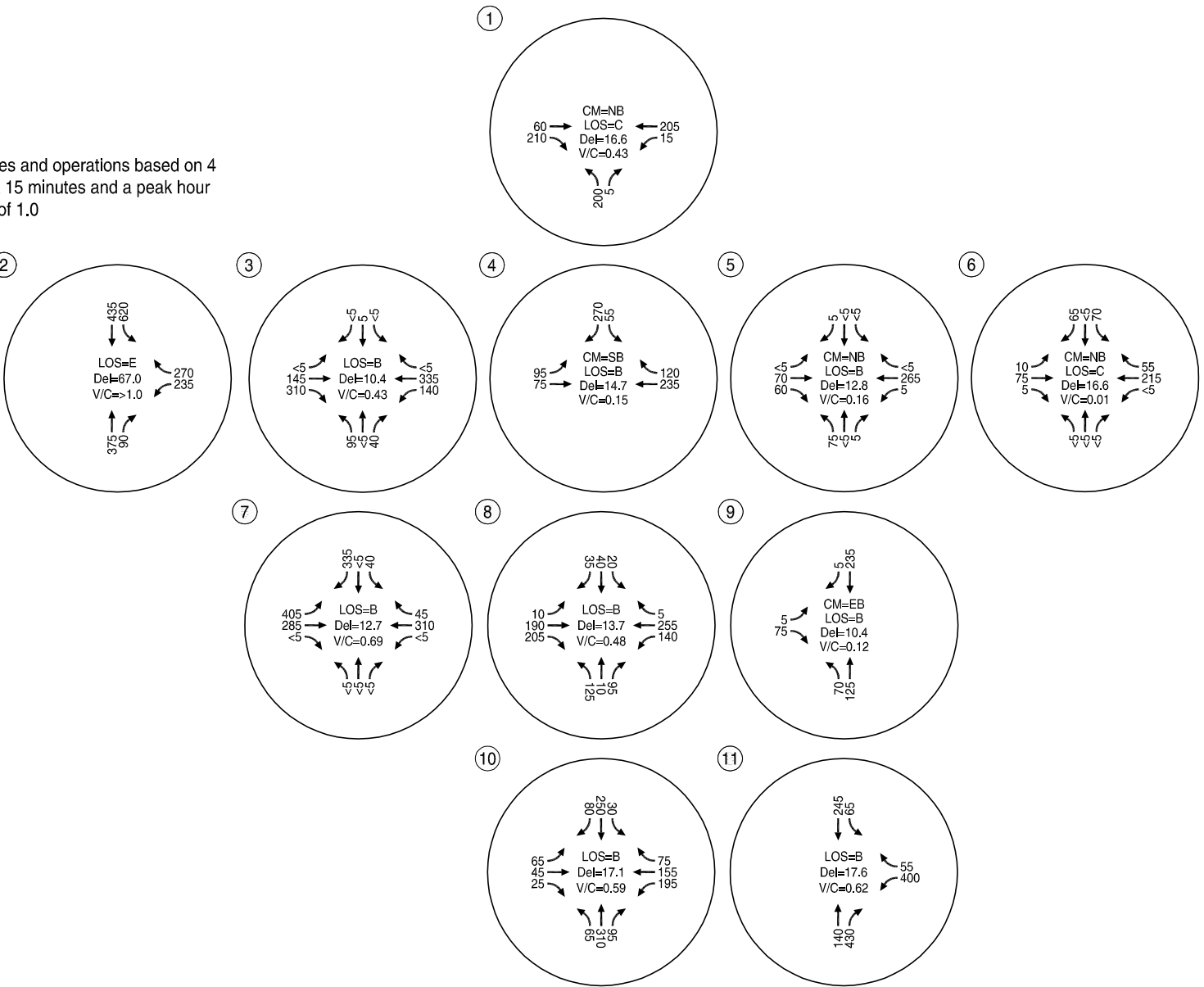
Appendix "J" contains the 2029 background conditions traffic operations worksheets.

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★ Volumes and operations based on 4 x peak 15 minutes and a peak hour factor of 1.0

★ ②

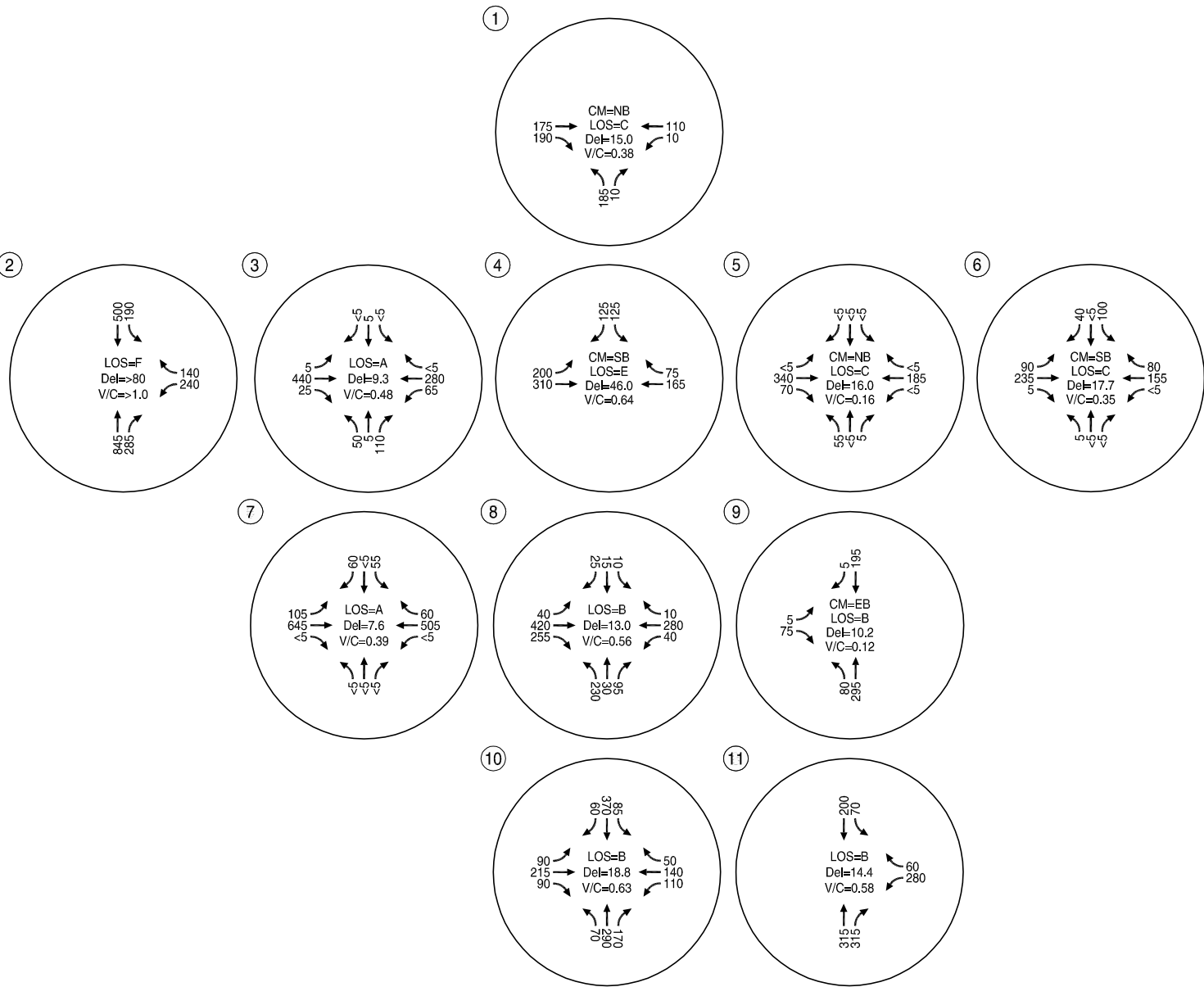
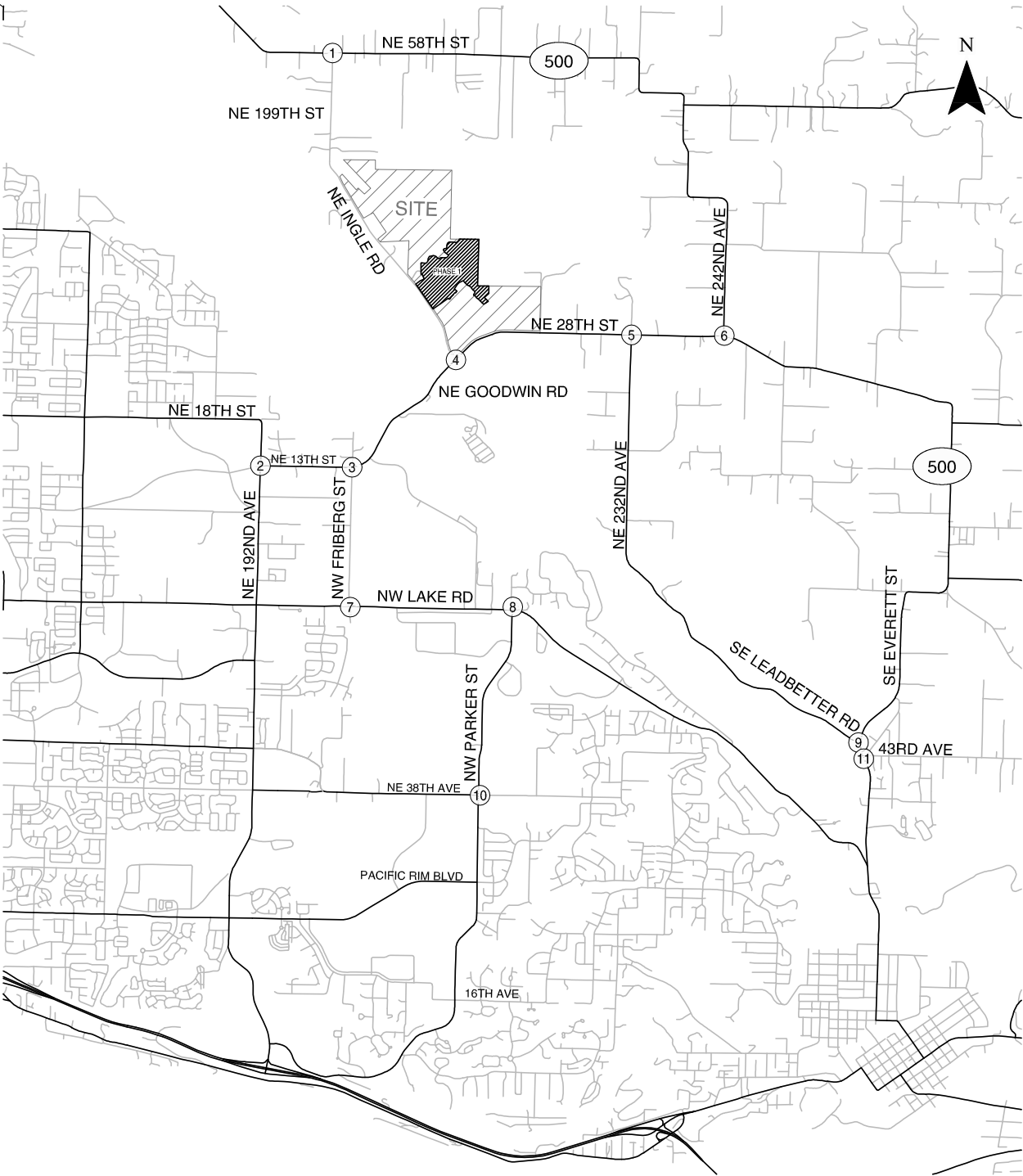


CM = CRITICAL MOVEMENT (TWSC)
LOS = INTERSECTION LEVEL OF SERVICE (SIG) / CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIG / CRITICAL MOVEMENT CONTROL DELAY (TWSC)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
TWSC = TWO-WAY STOP CONTROL

2029 Background Conditions
Weekday AM Peak Hour
Camas, Washington

Figure
16

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CM = CRITICAL MOVEMENT (TWSC)
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LEVEL OF SERVICE (TWSC)
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MOVEMENT CONTROL DELAY (TWSC)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
TWSC = TWO-WAY STOP CONTROL

2029 Background Conditions
Weekday PM Peak Hour
Camas, Washington

Figure
17

2029 Total Traffic Conditions

The year 2029 total traffic analysis forecasts how the study area's transportation system will operate with full build-out of the proposed master plan development. The year 2029 background traffic volumes were added to the full build-out site-generated traffic to arrive at the total traffic volumes.

Traffic Operations

Figures 18 and 19 summarize the year 2029 total traffic operations analysis results at the study intersections for the weekday a.m. and weekday p.m. peak-hours, respectively. The projected turning movement counts are rounded to the nearest five vehicles per hour. As shown, the following study intersections do not meet standards during either the weekday a.m. or p.m. peak periods:

- NE 199th Avenue/NE 58th Street (SR 500) (weekday a.m. and p.m. peak hours)
- NE 192nd Avenue/NE 13th Street (weekday a.m. and p.m. peak hours, previously was failing during background a.m. and p.m. peak hours)
- NE Ingle Road/NE Goodwin Road (weekday a.m. and p.m. peak hours, previously was failing during background p.m. peak hour)

Potential mitigation measures for these intersections are discussed later in the report.

Appendix "K" contains the 2029 total traffic conditions traffic operations worksheets.

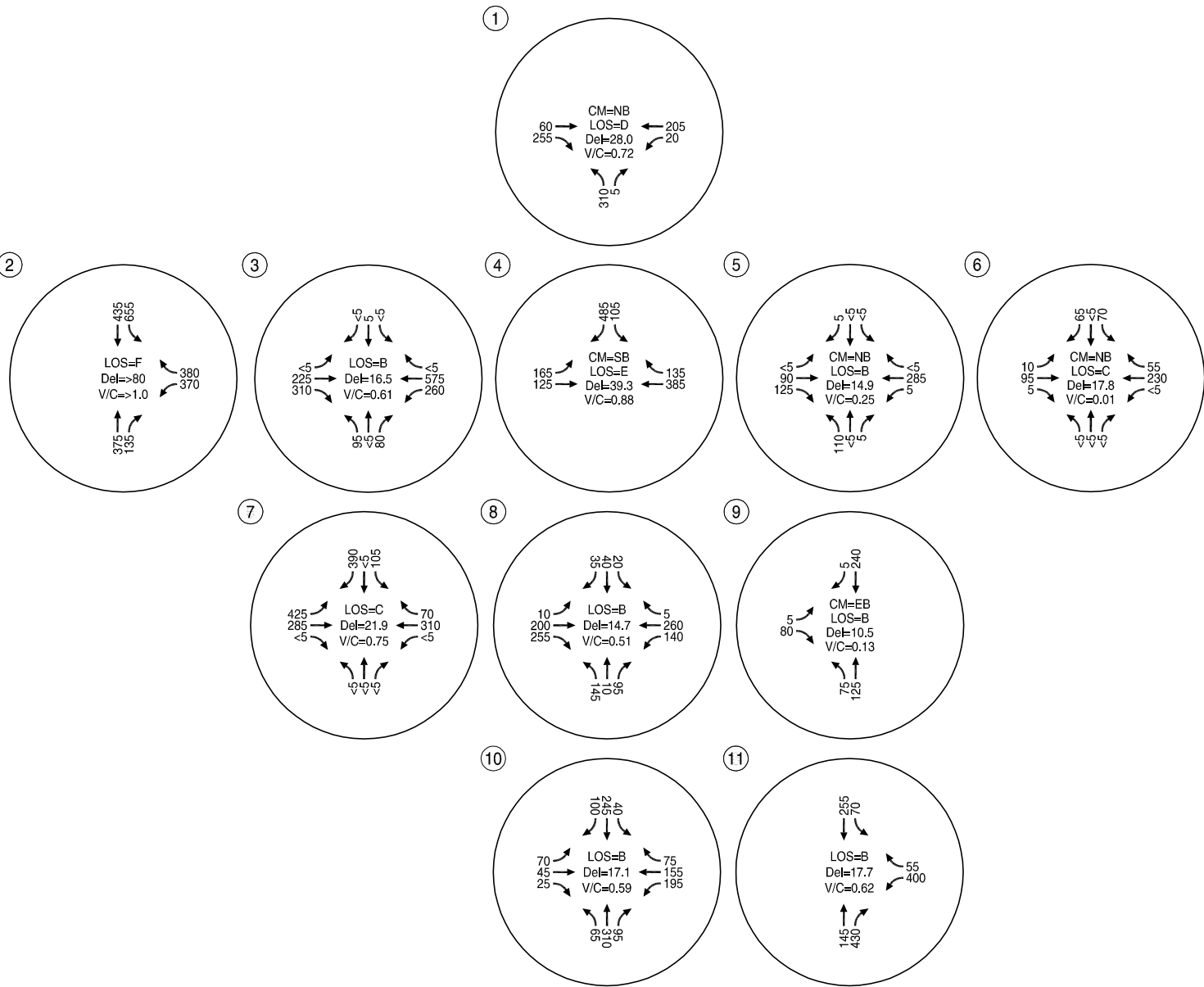
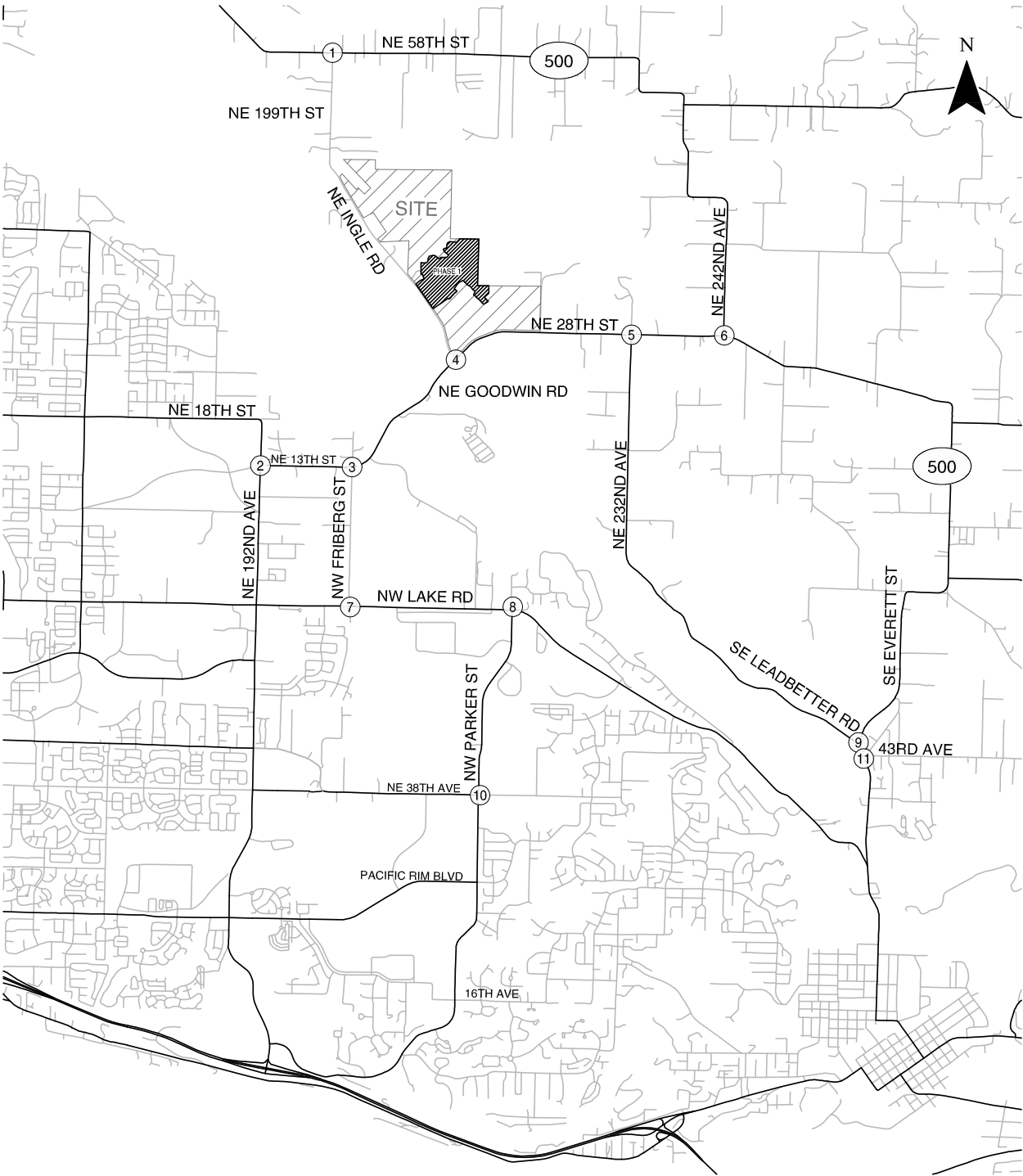
Turn-Lane Considerations

As referenced under the "Analysis Methodology," roadways under Washington State jurisdiction are subject to the turn lane guidelines contained in the *WSDOT Design Manual* (Reference 3). The potential need for turn-lanes at each study intersection was reviewed for the analysis scenarios. Intersections that meet turn-lane guidelines are further discussed below.

NE 199th Avenue/NE 58th Street (SR 500)

Traffic volumes at the intersection of NE 199th Avenue/NE 58th Street (SR 500) meet WSDOT's guidelines for an eastbound right-turn lane on NE 58th Street under existing conditions and all future scenarios during both the weekday a.m. and p.m. peak hour. Construction of a right-turn lane could require right-of-way acquisition and will likely impact one or more private driveways along NE 58th Street (depending on the length of the deceleration lane constructed).

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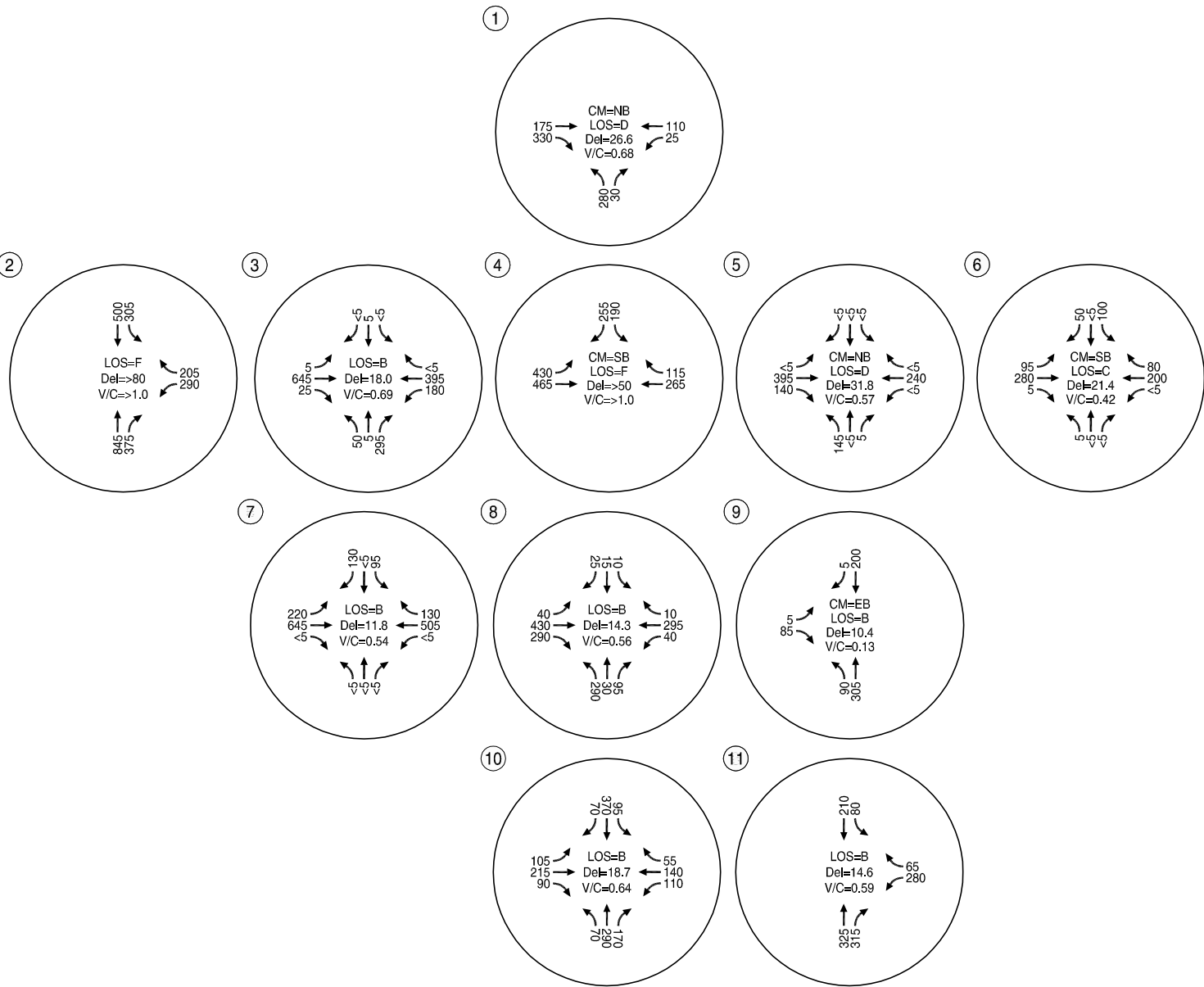
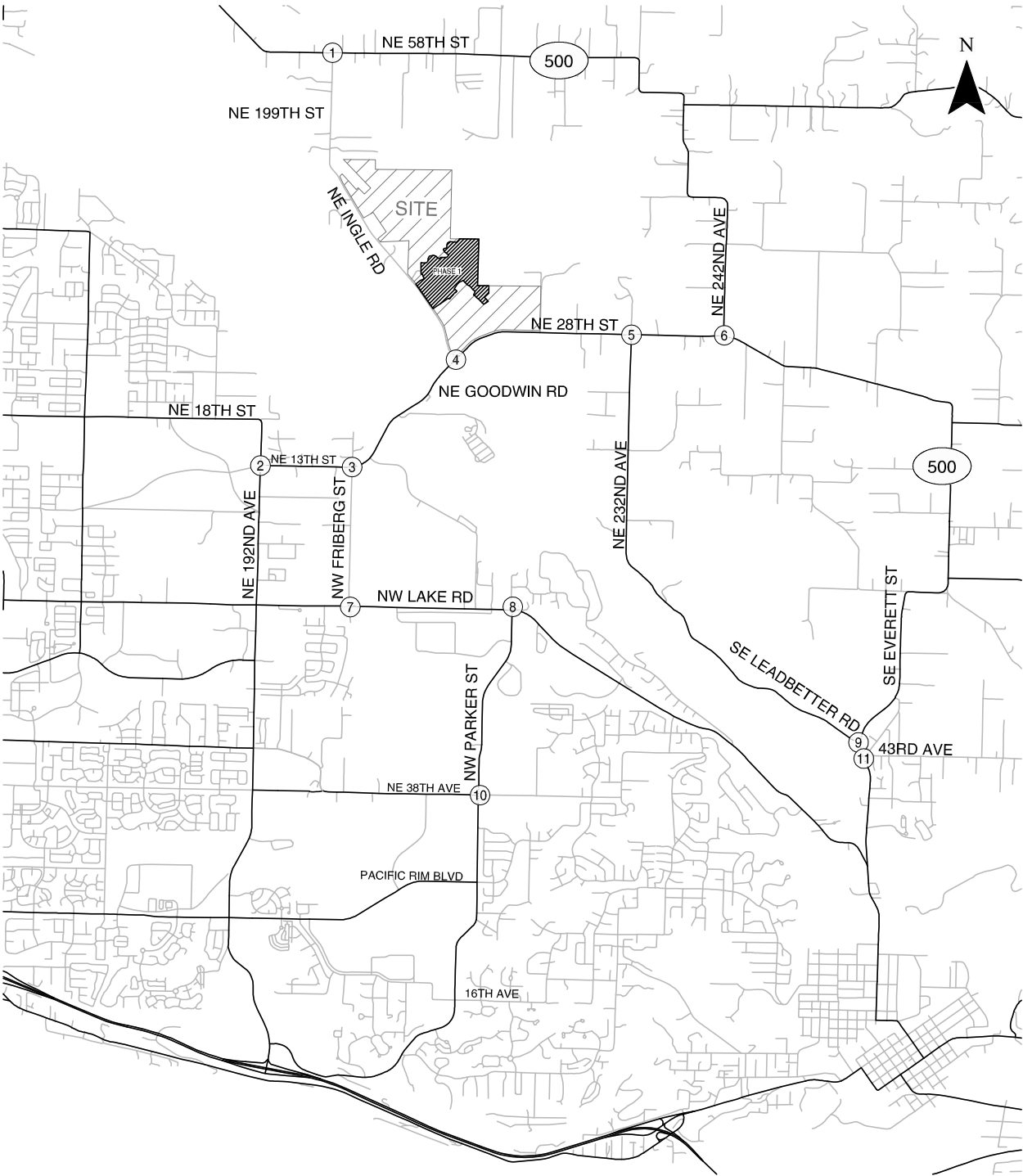


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MOVEMENT CONTROL DELAY (TWSC)
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TWSC = TWO-WAY STOP CONTROL

2029 Total Traffic Conditions (Build Out)
Weekday AM Peak Hour
Camas, Washington

Figure
18

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TWSC = TWO-WAY STOP CONTROL

2029 Total Traffic Conditions (Build Out)
Weekday PM Peak Hour
Camas, Washington

Figure
19

The table below assesses volumes at the intersection for various horizon year scenarios and the impact of the proposed development.

Table 7: NE 199th Avenue/NE 58th Street (SR 500) Eastbound Right-Turn Lane Assessment

Scenario	Eastbound Right-Turn (EBRT) Volume	Meets Guideline?	Development-Added EBRT Trips	Impact of Development
2014 Existing Traffic – AM Peak	180	Yes	-	-
2014 Existing Traffic – PM Peak	145	Yes	-	-
2018 Background Traffic – AM Peak	180	Yes	8 (Phase 1)	4%
2018 Background Traffic – PM Peak	150	Yes	27 (Phase 1)	18%
2029 Background Traffic – AM Peak	210	Yes	45 (Build-out)	21%
2029 Background Traffic – PM Peak	190	Yes	138 (Build-out)	73%

The recorded crash history at the intersection was reviewed to identify potential safety issues that an eastbound right-turn lane might address. No crashes were reported involving vehicles making an eastbound right-turn. Given the lack of crash history and the relatively small impact of Phase 1, no improvements are recommended in conjunction with Phase 1. Nonetheless, given the amount of site-generated traffic that will be added to the eastbound right-turn movement as future phases of the master plan build-out, if right turn crashes materially increased, it is possible that a nexus could be established between requiring construction of an eastbound right-turn lane and traffic volume increases attributable to master plan trip development. Accordingly, we recommend that future site plan applications prepared subsequent to Phase 1 provide an updated assessment as to the potential need for providing a right-turn taper or lane at the intersection.

NE 242nd Avenue (SR 500)/NE 28th Street

Traffic volumes at the intersection of NE 242nd Avenue (SR 500)/NE 28th Street meet WSDOT's guidelines for a left-turn lane on the eastbound approach under existing conditions and all future scenarios during the weekday p.m. peak hour. The table below assesses volumes at the intersection for each horizon year scenario and the impact of the proposed development. *As shown in the table, the Phase 1 development does not add any trips to the eastbound left-turn lane.* The trips generated by build-out of the master plan development are from the retail component and total less than 10.

Table 8: NE 242nd Avenue (SR 500)/NE 28th Street Eastbound Left-Turn Lane Assessment

Scenario	Eastbound Left-Turn Volume	Meets Guidelines? (Recommended Storage)	Development-Added Trips	Impact of Development
2014 Existing Traffic – AM Peak	10	No	-	-
2014 Existing Traffic – PM Peak	80	Yes (100 feet)	-	-
2018 Background Traffic – AM Peak	10	No	0 (Phase 1)	0%
2018 Background Traffic – PM Peak	80	Yes (100 feet)	0 (Phase 1)	0%
2029 Background Traffic – AM Peak	10	No	2 (Build-out)	20%
2029 Background Traffic – PM Peak	90	Yes (100 feet)	9 (Build-out)	10%

The recorded crash history at the intersection was reviewed to identify potential safety issues that an eastbound left-turn lane might address. While two angle crashes were reported from vehicles making a southbound left-turn, no crashes were reported involving vehicles making an eastbound left-turn.

Based on our review of the information provided above, we find no basis for recommending improvements to the NE 242nd Avenue (SR 500)/NE 28th Street intersection in conjunction with Phase 1 site development. We base this conclusion on the proposed development adding no trips to the left-turn movement in question, the lack of crash history related to left-turns, and the general lack of a nexus given the small trip impact of the proposed Phase 1 development at this location.

Planned Future Intersection Improvements

The 2012 *City of Camas Traffic Impact Fee Update Report* (Reference 2) identifies the future need to widen NE 28th Street to have a center left-turn lane from Ingle Road to NE 242nd Avenue. A related project would create a new NE 242nd Avenue extension south of NE 28th Street. Given the City's planned improvements, we recommend the City of Camas make a finding that the traffic impact fee payments made by the master plan for Phase 1 and future phases of the project mitigate development impacts at the intersection, and therefore require no additional mitigation.

Recommended Mitigations

As discussed above, all study intersections meet operating standards under existing and 2018 background and total traffic conditions for both the weekday a.m. and p.m. peak hours. Four intersections do not meet operating standards in 2029 under background and/or total traffic conditions; each is discussed below.

NE 199th Avenue/NE 58th Street (SR 500)

The minor street northbound left-turn at the intersection of NE 199th Avenue/NE 58th Street (SR 500) is projected to not meet current WSDOT standards in the 2029 total traffic conditions during the weekday a.m. and p.m. peak hours. The intersection is projected to operate at a volume-to-capacity (v/c) ratio of 0.72 and LOS D during the a.m. peak hour and v/c ratio of 0.70 and LOS D during the p.m. peak hour. It is therefore not within WSDOT's LOS requirement (LOS C) for non-HSS facilities in rural areas. The intersection is three-legged and stop-controlled on the northbound approach. The northbound left-turn is the critical movement at the intersection, with all other movements operating at a LOS A and well under capacity. During both the weekday a.m. and p.m. peak hours, the northbound left-turn is 3 seconds or less over the delay threshold between LOS C and LOS D. In the event that the area around the intersection urbanizes before build-out, the WSDOT performance standard will shift to LOS E and the intersection would operate within WSDOT standards.

As discussed in the *Turn-Lane Considerations* section above, the intersection currently meets warrants for an eastbound right-turn lane, which would improve operations for northbound left-turning vehicles to a LOS C during the 2029 total traffic conditions. As also discussed above, it is expected that a nexus might ultimately be established between requiring construction of an eastbound right-turn lane and traffic volume increases attributable to master plan trip development, based on LOS and delay at the intersection. Accordingly, we recommend that future site plan applications prepared subsequent to Phase 1 provide an updated assessment as to the potential need for providing a right-turn taper or lane at the intersection, considering both the need for a right-turn taper or lane and delay with the northbound left-turn.

Appendix "L" contains the traffic operations worksheets supporting the potential mitigations at NE 199th Avenue/NE 58th Street (SR 500).

NE 192nd Avenue/NE 13th Street

The intersection of NE 192nd Avenue/NE 13th Street is projected to not meet standards in the 2029 background conditions and the 2029 total traffic conditions during both the weekday a.m. and p.m. peak hours. The intersection operates over-capacity in all four of these scenarios and at a LOS F during the weekday p.m. peak hour in the background conditions and weekday a.m. and p.m. peak hours in the total traffic scenarios.

Potential Future City of Vancouver Improvements

The City of Vancouver has identified NE 192nd Avenue as ultimately requiring five travel lanes (two southbound through lanes, a center left-turn lane, and two northbound through lanes) and includes

the widening on the City's Traffic Impact Fee (TIF) program project list. Because no near-term funding has been programmed for the future five-lane section, the existing section was assumed to be in place in 2029 for the purposes of this traffic study. Widening by the City of Vancouver or others in the interim would add capacity and change the intersection operations.

In the event that NE 192nd Avenue is widened to five lanes through the NE 13th Street intersection, the intersection is projected to meet City of Vancouver intersection operating standards under 2029 background conditions. To mitigate total traffic conditions, a westbound right-turn lane would also be required. In the event that 192nd Avenue is not widened, a northbound right-turn lane and westbound right-turn lane would be sufficient to mitigate 2029 total traffic conditions (mitigation assumes maintaining operations equivalent to or better than those experienced under 2029 background conditions with site build-out but does not fully accommodate forecast queuing).

Potential Master Plan Development Mitigation Options

As noted above, the provision of a northbound right-turn lane and westbound right-turn lane would offer more than sufficient capacity to mitigate the impact of the master plan site build-out while also providing additional capacity to allow for future growth and development. Therefore, we recommend the Green Mountain Master Plan provide a proportionate share contribution towards the construction of a northbound right-turn lane and a westbound right-turn lane on NE 13th Avenue. The City of Vancouver has successfully administered pro-rata share contribution collection systems at other intersections, allowing each development impacting a failing intersection to contribute a "fair-share" of the mitigation cost.

Appendix "M" identifies a proposed proportionate cost sharing methodology. Under this methodology, each trip would be assessed a fee of \$391. Therefore the Green Mountain development contribution at full build-out would be approximately \$123,600. *Details of the cost estimate, capacity generated by the improvements, and impact of the proposed development supporting the proportionate share calculations are provided in Appendix "M."*

It should be noted that the NE 192nd Avenue/NE 13th Street intersection is listed on the City of Vancouver's TIF program project list. In the case of the Green Mountain Master plan, any TIF credits issued by the City of Vancouver would only be redeemable for development impacts in Vancouver (not Camas).

NE Ingle Road/NE Goodwin Road

The intersection of NE Ingle Road/NE Goodwin Road is projected to not meet City of Camas intersection operating standards in the 2029 background conditions during the weekday p.m. peak

hour and the 2029 total traffic conditions during both the weekday a.m. and p.m. peak hours. In order to mitigate 2029 background conditions, a two-way left-turn lane could potentially be provided east of the intersection to facilitate southbound left-turns, which are the critical movement at the intersection.

The City's long-term plans anticipate significant reconstruction of the intersection and the approaching roadways as recorded in the 2012 *City of Camas Traffic Impact Fee Update* (Reference 2). Identified improvement needs include:

- Installation of a traffic signal at NE Ingle Road/NE Goodwin Road;
- The extension of a new collector roadway from NE Ingle Road south to NE 232nd Avenue;
- Widening of NE Goodwin Road from two to three lanes between NE Ingle Road and NE 232nd Avenue; and
- Widening of NE Goodwin Road from two to five lanes NE between Friberg Street and NE Ingle Road.

Considering the Green Mountain Master Plan project location and traffic impacts at the intersection, we recommend the following series of mitigations in conjunction with the proposed development:

- Construct an eastbound left-turn lane on NE Goodwin Road at NE Ingle Road with the first Phase 1 trip.
- Construct a westbound right-turn lane on NE Goodwin Road at NE Ingle Road with the 203rd Phase 1 trip (prior to occupancy of 203rd single family home on site). The right-turn lane should provide at least 100 feet of storage. (Note, in the long-term future, the City could consider restriping the right-turn lane to a shared through/right lane when widening of NE Goodwin Road west of NE Ingle Road develops two westbound receiving lanes).
- Construct a three-lane roadway section (with center two-way left-turn lane) on NE Goodwin Road along the site frontage in conjunction with standard frontage improvements as adjacent development occurs.
- Upon completion of Phase 1 site development (including construction of the eastbound left-turn lane and westbound right-turn lane on NE Goodwin Road at NE Ingle Road with Phase 1), the developer shall monitor the need for installation of a traffic signal with each future site plan application at the intersection and construct a traffic signal when the intersection no longer satisfies City of Camas performance standard (LOS "D" and v/c of 0.90 or better) *and* the intersection volumes meet traffic signal warrants (subject to direction from the City of Camas).

- The monitoring effort is recommended to require preparation of then-current traffic counts, assessment of traffic signal warrants based on build-out of the then-current site plan application (and all other approved development), and a summary report prepared by a licensed professional engineer. The study should consider potential turn movement re-routing that is expected to occur at the NE Goodwin Road/NE Ingle Road intersection as new connections to the master plan site are made to NE Goodwin Road east of NE Ingle Road.

On-site Circulation and Operations

We recommend that a detailed review of on-site circulation and operations be prepared in conjunction with each future site plan application. This review will provide an opportunity to consider site-specific details when they become available and should include consideration of vehicular, pedestrian, and delivery vehicle paths.

On-site landscaping, signage and any above-ground utilities should be provided appropriately to ensure that adequate sight distance is provided and maintained and should be considered as part of future site plan applications.

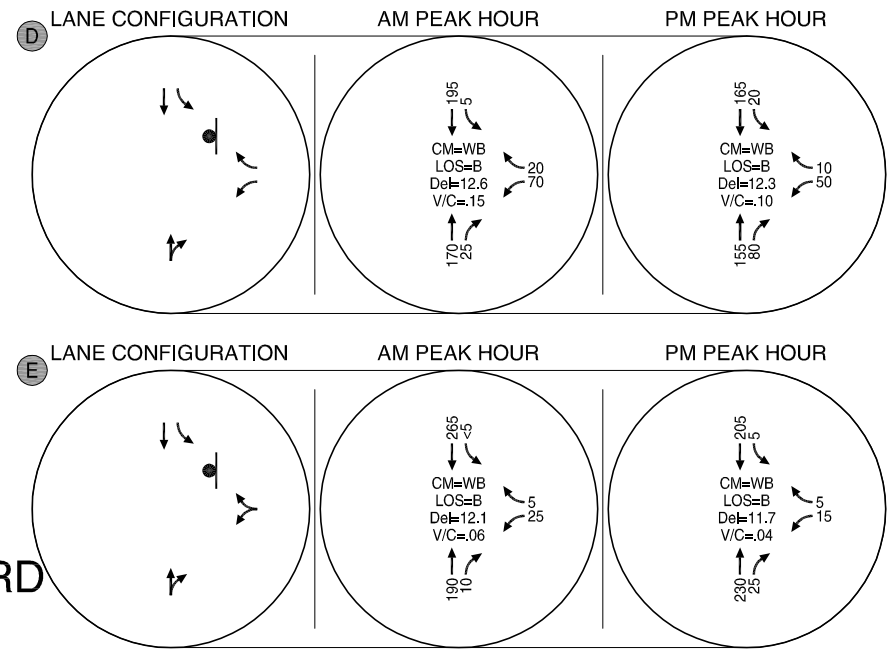
Access Requirements

The City of Camas requires a minimum intersection spacing of 330 feet on three lane collector streets. This spacing should be maintained with the proposed development.

Phase 1 Access Operations

The portion of the site that will be developed with Phase 1 is noted in Figure 2. As seen, two access points are proposed for the Phase 1 development. The proposed lane configuration at these accesses and operations is shown in Figure 20. The developer has proposed to maintain access to the existing golf course in conjunction with the Phase 1 development. The existing gravel maintenance only access will be improved to provide an interim main access to the remaining portion of the golf course (reduced to eight holes). The proposed interim golf course access is located approximately 400 feet south of the proposed southern access, which meets the City's intersection spacing requirements for a collector street noted above.

Appendix "N" contains the traffic operations worksheets for the Phase 1 access operations.



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CM = CRITICAL MOVEMENT (TWSC)
 LOS = INTERSECTION LEVEL OF SERVICE (SIG) / CRITICAL MOVEMENT
 LEVEL OF SERVICE (TWSC)
 Del = INTERSECTION AVERAGE CONTROL DELAY (SIG / CRITICAL
 MOVEMENT CONTROL DELAY (TWSC)
 V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
 TWSC = TWO-WAY STOP CONTROL

2018 Site Access Lane Configurations
 and Operations (Phase 1)
 Camas, Washington

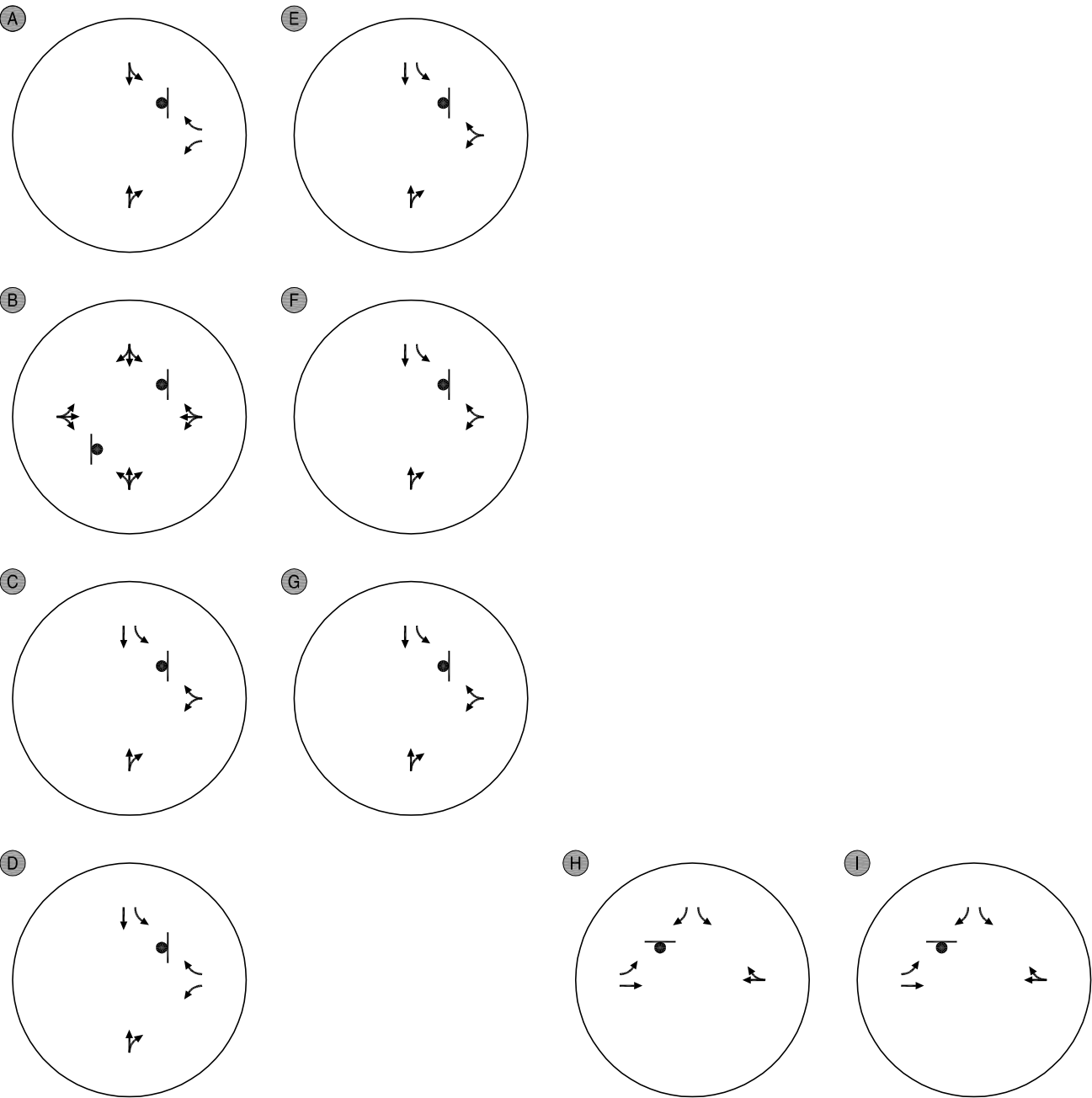
Figure
 20

Build-out Access Operations

An additional five access points on NE Ingle Road and two access points on NE Goodwin Road are anticipated with full build-out of the development. The exact location of the access points may change as the plans for the development are refined. We assessed operations at these access points assuming the lane configuration shown in Figure 21. As seen in the figure, we expect NE Ingle Road will be developed with a center two-way left-turn lane (TWLTL) through access "C" and NE Goodwin Road will be developed with a TWLTL along the site frontage. Operations at the site accesses for the weekday a.m. and p.m. peak hours are shown in Figures 22 and 23. As seen in the figures, all access points operate at a LOS "C" or better, with the exception of the eastern access on NE Goodwin Road. The southbound left-turn movement at this intersection operates at a LOS D during the weekday p.m. peak hour.

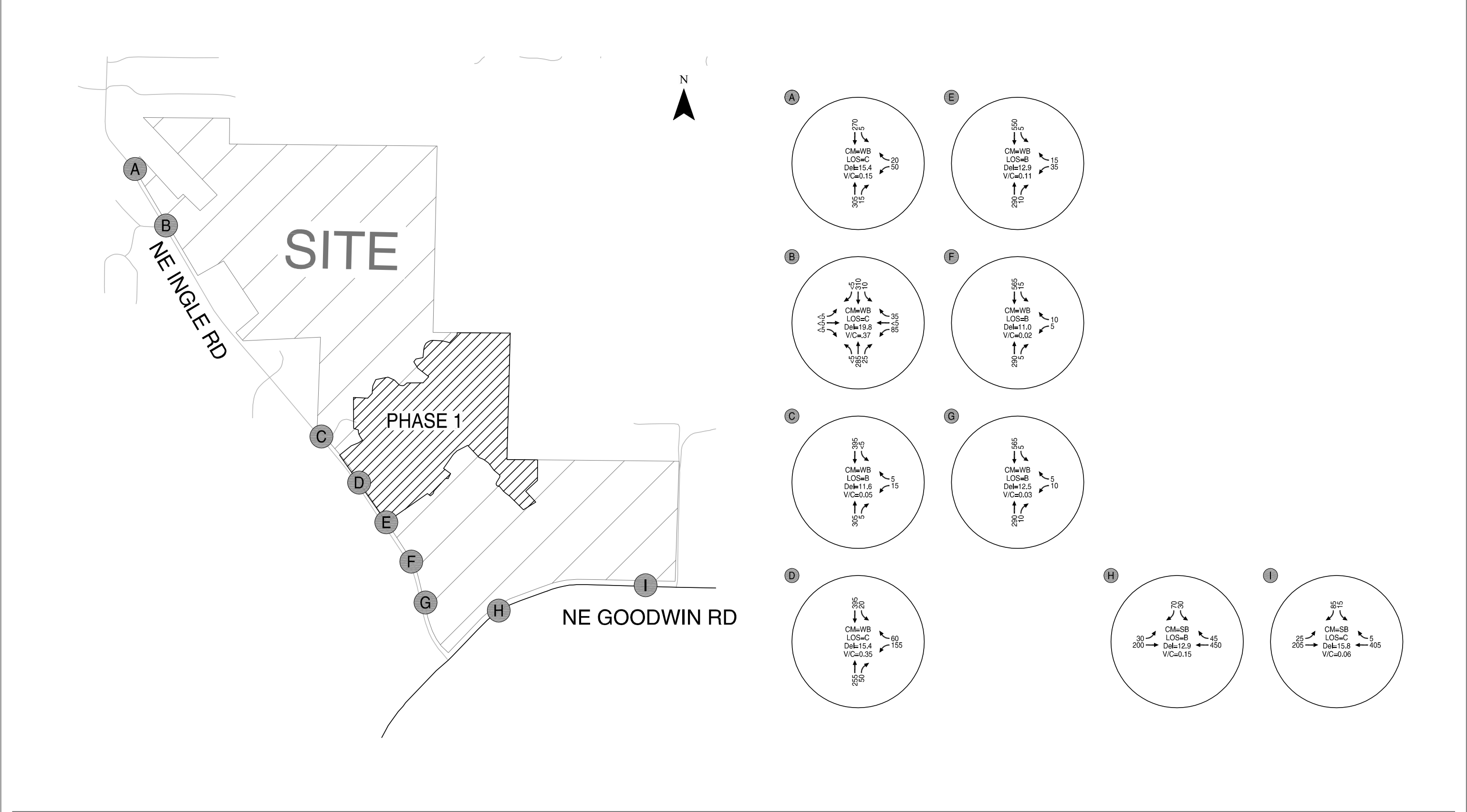
We recommend further evaluation of potential right-turn deceleration lane needs be considered at the time of site plan application. This evaluation should consider the potential need for southbound left-turn lanes or northbound right-turn lanes along NE Ingle Road at the remaining access points as well as corresponding turn lane queue storage requirements. *Appendix "O" contains the traffic operations worksheets for the full build-out access operations.*

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Site Access Lane Configurations and Traffic Control Devices (Buildout)
Camas, Washington

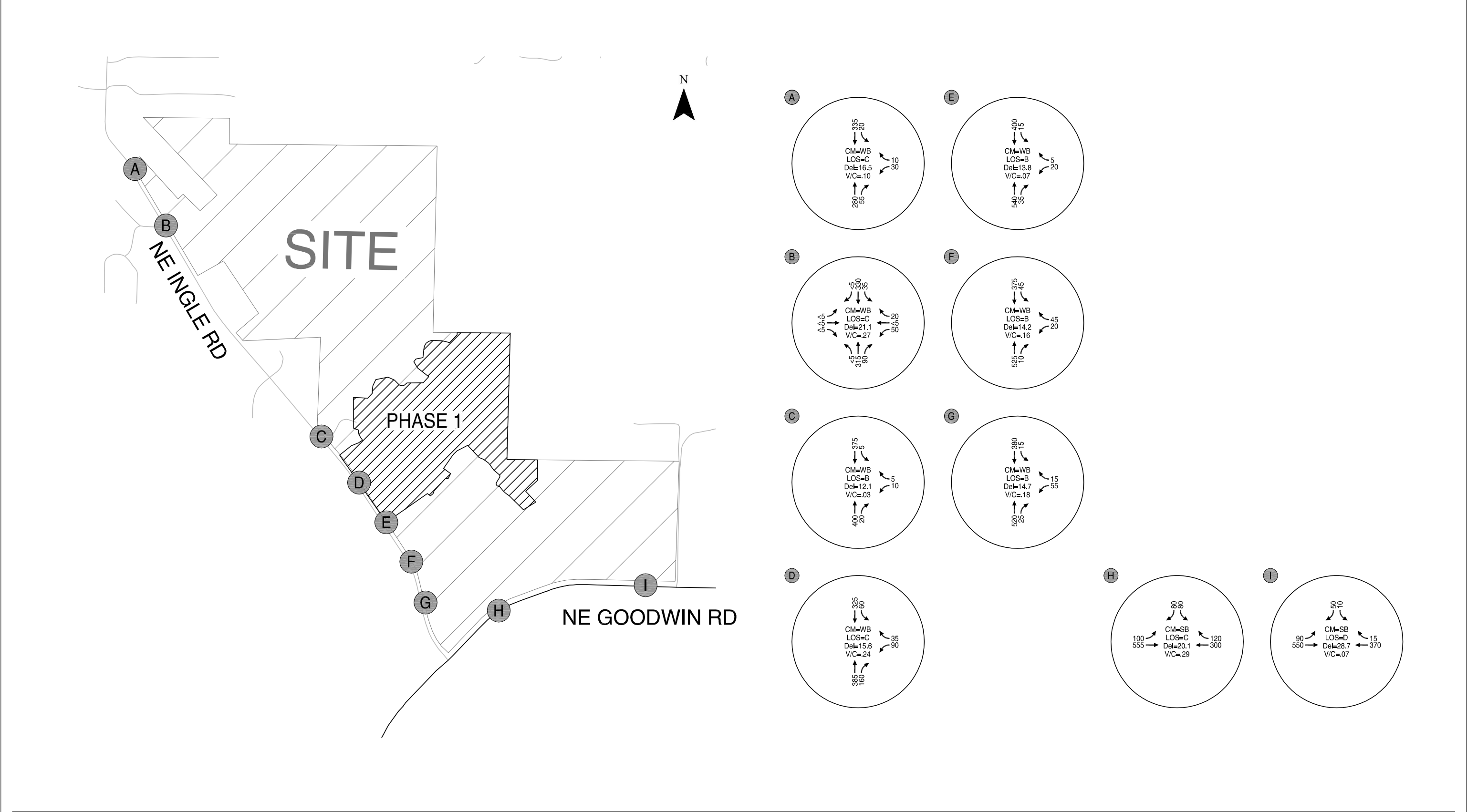
Figure
21



CM = CRITICAL MOVEMENT (TWSC)
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MOVEMENT CONTROL DELAY (TWSC)
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TWSC = TWO-WAY STOP CONTROL

2029 Site Access Operations (Build Out)
Weekday AM Peak Hour
Camas, Washington

Figure
22



CM = CRITICAL MOVEMENT (TWSC)
LOS = INTERSECTION LEVEL OF SERVICE (SIG) / CRITICAL MOVEMENT
Del = INTERSECTION AVERAGE CONTROL DELAY (SIG / CRITICAL
MOVEMENT CONTROL DELAY (TWSC)
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TWSC = TWO-WAY STOP CONTROL

2029 Site Access Operations (Build Out)
Weekday PM Peak Hour
Camas, Washington

Figure
23

TRANSPORTATION COMPLIANCE LETTER

This master plan traffic study documents the transportation implications of the proposed development at build-out. There are on-site access, circulation, turn lane, and driveway location and design considerations that will need to be addressed when specific site plan applications are made. Further, the phasing and timing of master plan build-out is likely to evolve over time to adapt to market conditions. Accordingly, it is recommended that a transportation compliance letter be prepared for each preliminary plat or site plan application to address on-site transportation, access and pedestrian standards and to ensure that the mitigation measures provided for in this report are applied at the appropriate phase of development. The transportation compliance letter should also document the trip generation of each phase of development to ensure that the total number of trips generated from future development does not exceed the number of trips vested under the Development Agreement.

We recommend each transportation compliance letter could document:

- The number of site-generated trips (daily, weekday a.m. peak hour, weekday p.m. peak hour) estimated to be used by the then-current proposed site development application.
- The number of site-generated trips (daily, weekday a.m. peak hour, weekday p.m. peak hour) previously used by approved site development applications on the master plan site.
- An accounting of the number of site-generated trips (daily, weekday a.m. peak hour, weekday p.m. peak hour) remaining assuming approval of the then-current site plan application.
 - Note: In the event that a future site plan application is projected to use more trips than were previously assumed through the master plan, additional traffic capacity/concurrency analysis would be triggered (unless a traffic count cordon-study of the master plan campus demonstrates the number of trips generated by the site is less than projected by standard ITE trip rates and thus the overall development impact actually is less than or equal to the number of trips assumed by the master plan).
- Evaluation of outstanding mitigation needs (as appropriate consistent with the Master Plan recommendations) at the intersections of:
 - Need for an eastbound right-turn lane at NE 199th Avenue/NE 58th Street (SR 500)
 - NE Ingle Road/NE Goodwin Road (including traffic signal warrant analysis)

FINDINGS AND RECOMMENDATIONS

Based on the results of the transportation impact analysis, Phase 1 of the Green Mountain Master Plan (estimated to generate 2,050 daily trips and 215 net new p.m. peak hour trips) can be developed while maintaining acceptable levels of service and safety at the study intersections without any required off-site mitigations. The primary findings and recommendations of this study are summarized below.

Existing Conditions

- All of the study intersections currently operate acceptably during the weekday a.m. and p.m. peak hours.

Proposed Development Activities

- Phase 1 site development includes 215 residential units. It is estimated to generate 160 net new a.m. peak hour trips (40 in and 120 out) and 215 net new p.m. peak hour trips (135 in and 80 out).
- Build-out of the site development includes 1,300 residential units and 90,000 square feet of retail use. Build-out (including Phase 1) is collectively estimated to generate a total of 995 net new a.m. peak hour trips (290 in and 705 out) and 1,655 net new p.m. peak hour trips (965 in and 690 out).
- Access to Phase 1 of the site will be provided via two full movement driveways on NW Ingle Road. In the future when the site is built out, access will be provided on both NW Ingle Road and NW Goodwin Road.

Year 2018 Background Traffic Conditions

- Year 2018 background conditions (without construction of the Green Mountain mixed-use development) were estimated assuming completion of approved in-process developments within the study area and an annual 2% growth rate on City of Vancouver roadways.
- Operational analyses indicate that the study intersections are forecast to continue to operate acceptably.

Year 2018 Total Traffic Conditions

- Year 2018 total traffic conditions were estimated assuming completion of approved in-process developments within the study area plus Phase 1 of the proposed development.
- Operational analyses indicate that the study intersections are forecast to continue to operate acceptably under 2018 total traffic conditions with one exception:
 - The southbound movement at the intersection of NE Ingle Road/NE Goodwin Road is projected to operate at a LOS E during the weekday p.m. peak hour. This failure is triggered by the 203rd single family residential unit in Phase 1 of the development.

Year 2029 Background Traffic Conditions

- Year 2029 background conditions (with construction of only Phase 1 of proposed development but no further phases) were estimated assuming the same in-process developments included in the 2018 analysis as well as a one percent growth rate on City of Camas roadways and two percent growth rate on City of Vancouver roadways.
- Operational analyses indicate that the study intersections are forecast to continue to operate acceptably under year 2029 background traffic conditions with two exceptions:
 - The intersection of NE 192nd Avenue/NE 13th Street is projected to operate at a LOS E and over-capacity during the weekday a.m. peak hour and LOS F and over-capacity during the weekday p.m. peak hour,
 - The southbound approach to the intersection of NE Ingle Road/NE Goodwin Road is projected to operate at a LOS F during the weekday p.m. peak hour.

Year 2029 Total Traffic Conditions

- Year 2029 total traffic conditions were estimated assuming year 2029 background traffic and complete build-out of the proposed Green Mountain development.
- Operational analyses indicate that the study intersections are forecast to continue to operate acceptably under year 2029 total traffic conditions, with the exception of:
 - NE 199th Avenue/NE 58th Street (SR 500) (weekday a.m. and p.m.)
 - NE 192nd Avenue/NE 13th Street (weekday a.m. and p.m.)
 - NE Ingle Road/NE Goodwin Road (weekday a.m. and p.m.)

Turn-Lane Considerations

- An assessment of turn-lane need was conducted for each study intersection.
- The intersection of NE 199th Avenue/NE 58th Street (SR 500) meets WSDOT's guidelines for a right-turn lane on the eastbound approach under existing conditions and all future scenarios during both the weekday a.m. and p.m. peak hour.
 - The crash history indicates that no crashes were recorded between 2008-2013 involving vehicles making an eastbound right-turn.
 - Given the lack of crash history related to eastbound right-turns and the relatively small impact of Phase 1 (eight eastbound right-turn trips during the weekday a.m. peak hour, 27 eastbound right-turn trips during the weekday p.m. peak hour), no improvements are recommended in conjunction with Phase 1.
 - In the future, the provision of a right-turn taper or lane could be considered if suggested by the crash history at the intersection.
- The intersection of NE 242nd Avenue (SR 500)/NE 28th Street meets WSDOT's guidelines for a left-turn lane on the eastbound approach under existing conditions and all future scenarios during the weekday p.m. peak hour.
 - The crash history indicates that no crashes were recorded between 2008-2013 involving vehicles making an eastbound left-turn.
 - The City's long-term plans include a traffic signal and southbound left-turn lane at NE 242nd Avenue (SR 500)/NE 28th Street.
 - Given the lack of recorded crash history, the small impact of the proposed development (no Phase 1 eastbound left-turns and less than 10 at master plan build-out), and future improvement plans at this intersection, no turn-lane improvements are recommended with Phase 1 site development.

Recommendations

- Regardless of the proposed master plan application, we recommend that the City of Camas consider potential improvements to the intersection of NE Ingle Road/NE Goodwin Road to address intersection sight distance limitations associated with the location of the stop bar, such as relocating the stop bar.
- The following improvements should be provided in conjunction with site development:
 - Phase 1 Site Development

- An eastbound left-turn lane with 100 feet of storage should be provided at NE Ingle Road/NE Goodwin Road.
- A westbound right-turn lane on NE Goodwin Road at NE Ingle Road prior to occupancy of the 203rd single family home in Phase 1. The right-turn lane should provide at least 100 feet of storage.
- On-site and off-site landscaping and any above ground utilities at the site-access driveways and internal roadways should be provided appropriately to ensure that adequate sight-distance is maintained.
- For Phase 1 and all future phases, a Transportation Compliance Letter as described above should be prepared by a licensed professional engineer and submitted with the then-current site plan application.
- Full Build-Out of Site Development (items to be assessed in Transportation Compliance Letter unless otherwise mitigated):
 - Future site plan applications should provide an updated assessment as to the potential need for providing an eastbound right-turn taper or lane at the 199th Avenue (SR 500)/NE 58th Street intersection unless otherwise deemed mitigated by the project or others.
 - Pay a proportionate “fair-share” financial contribution towards capacity mitigations at the intersection of NE 192nd Avenue/NE 13th Street. This contribution would partially fund the eventual construction of a northbound right-turn lane on NE 192nd Avenue and a westbound right-turn lane on NE 13th Avenue.
- Mitigations will be needed to improve NE Ingle Road/NE Goodwin Road in 2029. We recommend the following:
 - The applicant construct a three-lane section (with center two-way left-turn lane) on NE Goodwin Road along the site frontage.
 - The applicant assess traffic volumes and signal warrants at NE Ingle Road/NE Goodwin Road with each phase of development and construct a traffic signal and related appurtenances when the intersection no longer satisfies City of Camas performance standard (LOS “D” and v/c of 0.90 or better) and intersection volumes meet traffic signal warrants.

- On-site and off-site landscaping and any above ground utilities at the site-access driveways and internal roadways should be provided appropriately to ensure that adequate sight-distance is maintained.

We trust this letter adequately addresses the traffic impacts associated with the proposed Green Mountain Master Plan development. Please contact us if you have any questions or comments regarding the contents of this report or the analysis performed.

REFERENCES

1. Transportation Research Board 2000. Highway Capacity Manual. 2000.
2. DKS Associates. *City of Camas Traffic Impact Fee Update*. May 2012.
3. Washington State Department of Transportation. *Design Manual*. July 2013.
4. C-Tran. <http://www.c-tran.com>. May 2014.
5. Oregon Department of Transportation Research Section. *SPR 667 Assessment of Statewide Intersection Safety Performance*. June 2011.
6. American Association of State Highway and Transportation Officials. *Highway Safety Manual*. 2010.
7. Institute of Transportation Engineers. *Trip Generation Manual*, 9th Edition. 2012.
8. City of Vancouver. *Traffic Study Guidelines*. December 2013.



Appendix B Phase 2 Transportation Compliance Letter



MEMORANDUM

Date: November 8, 2016 Project #: 20495

To: Curleigh Carothers, P.E.; City of Camas

cc: Ralph Emerson, CLB Washington Option Solutions, LLC
Kurt Stonex, P.E., Mike Odren, Stacey Hickman; Olson Engineering

From: Chris Brehmer, P.E., Kelly Laustsen; Kittelson & Associates, Inc.

Project: Green Mountain Phase 2

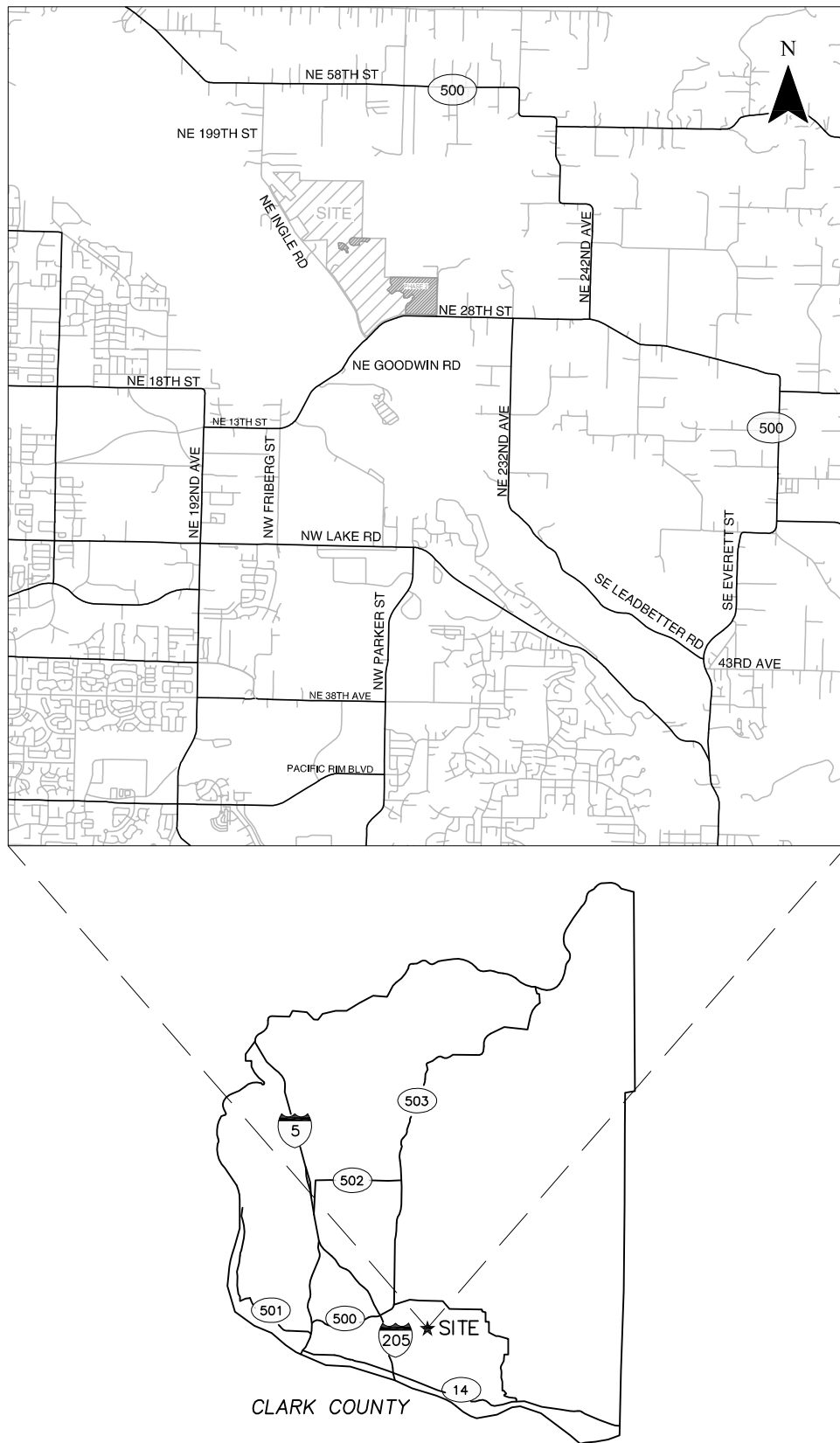
Subject: Transportation Compliance Letter

This memorandum provides a transportation compliance letter to support Phase 2 of the proposed Green Mountain Master Plan development to be located at the northeast corner of NE Ingle Road and NE Goodwin Road in Camas, Washington. The contents of this memorandum are based on the recommendations provided in the *Green Mountain Master Plan Transportation Impact Analysis (TIA)*, prepared by Kittelson & Associates, Inc. and dated June 2014 (provided in *Appendix A*). The intent of this memorandum is to document the trip generation of Phase 2 and ensure that the mitigation measures provided in the Masterplan TIA are applied at the appropriate phase of development.

BACKGROUND

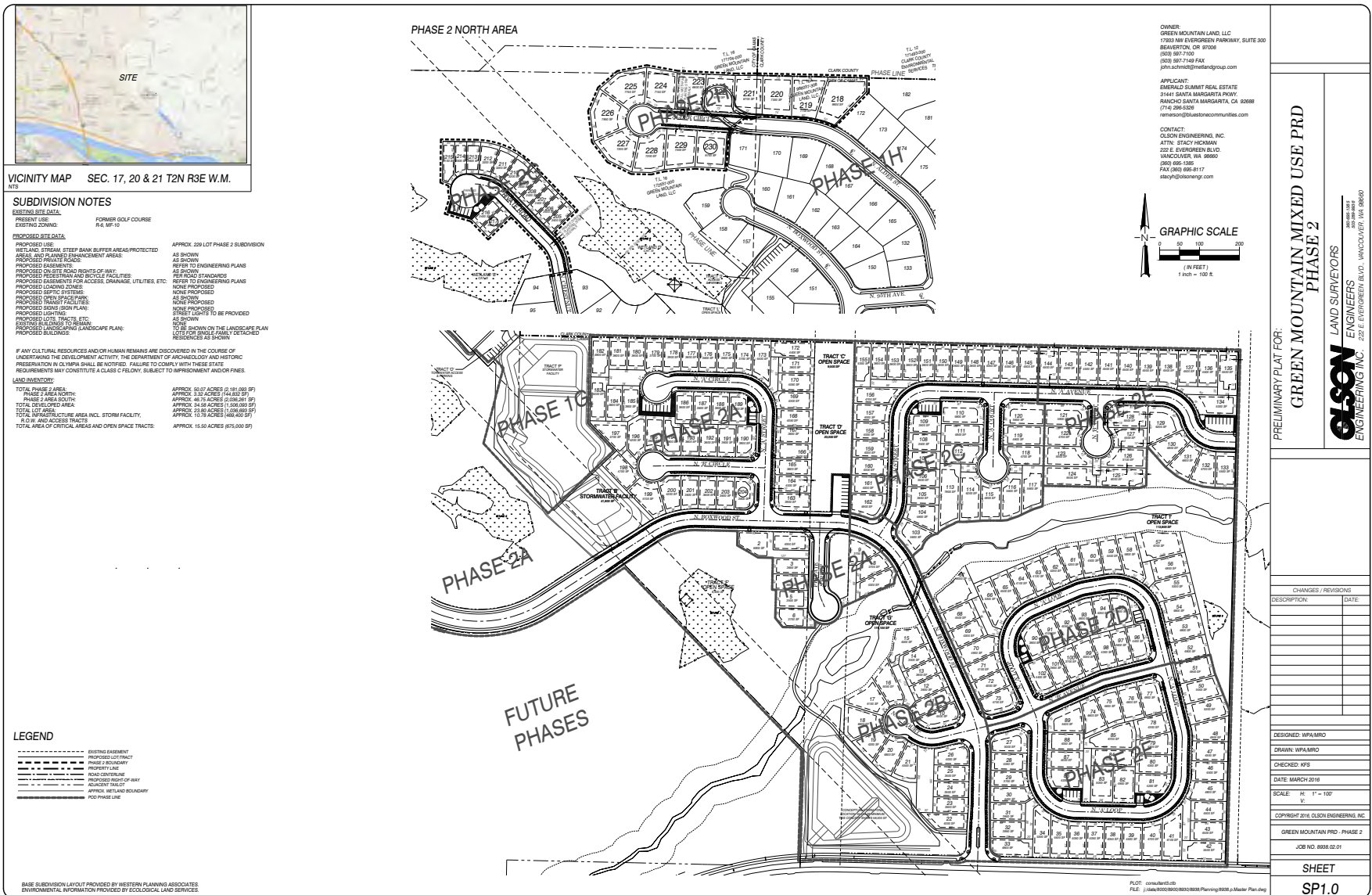
The TIA for the Green Mountain Master Plan developed in 2014 provided a near- and long-term analysis for full buildout of the Green Mountain site, including 283-acres of mixed-use development. The master plan includes eight phases of the development, the first of which is currently underway.

Figure 1 illustrates the site vicinity and location of the Master Plan site. A mix of residential and commercial uses is planned in accordance with the zoning. Development of Phase 2 of the site is currently proposed, with the site plan shown in Figure 2. Phase 2 includes development of 230 residential units with an additional access via NE 28th Street.



Site Vicinity
Camas, Washington

Figure
1



SCOPE OF THE REPORT

This analysis identifies the transportation-related impacts associated with Phase 2 of the proposed Green Mountain Master Plan development and was prepared in accordance with the recommendations outlined in the Master Plan TIA. It documents the following:

- The number of site-generated trips (daily, weekday a.m. peak hour, weekday p.m. peak hour) estimated with Phase 2.
- The number of site-generated trips (daily, weekday a.m. peak hour, weekday p.m. peak hour) previously debited by approved site development applications on the master plan site.
- An accounting of the number of site-generated trips (daily, weekday a.m. peak hour, weekday p.m. peak hour) remaining assuming approval of the Phase 2 subdivision application.
- Evaluation of outstanding mitigation needs (as appropriate consistent with the Master Plan recommendations) involving:
 - Need for an eastbound right-turn lane at NE 199th Avenue/NE 58th Street (SR 500)
 - NE Ingle Road/NE Goodwin Road intersection operations
 - Assessment of proportionate share contribution at NE 192nd Avenue/NE 13th Street intersection
- On-site access and circulation.
- Conclusions and recommendations.

ANALYSIS METHODOLOGY

As with the Master Plan TIA, all level of service analyses described in this report were performed in accordance with the procedures stated in the *2000 Highway Capacity Manual* (Reference 1). A description of level of service and the criteria by which they are determined is presented in *Appendix B*. *Appendix B* also indicates how level of service is measured and what is generally considered the acceptable range of level of service.

To ensure that this analysis was based on a reasonable worst-case scenario, the peak 15 minute flow rate during the peak hour analysis periods was used in the evaluation of all intersection levels of service. For this reason, the analysis reflects conditions that are only likely to occur for 15 minutes out of each average peak hour. Traffic conditions during other weekday hours and throughout the weekend will likely be better than those described in this report.

CURRENT PROPOSED DEVELOPMENT PLAN

Phase 2 consists of 230 single-family detached homes and is expected to be completed by 2018. Phase 2 is primarily located in the southeast portion of the overall site, with access anticipated on NE 28th Street via a neighborhood circulator. As part of Phase 2, two pods adjacent to and northwest of Phase 1 will also be constructed. Phase 2 will be connected to Phase 1 via the extension of N. Boxwood Street, as shown in the site plan in Figure 1. The proposed master plan anticipates two public street neighborhood circulator connections to NE Goodwin Road serving the site in conjunction with two public street neighborhood circulator connections along NE 28th Street.

Trip Generation

Trip generation estimates for the proposed development were generated based on information provided in the standard reference manual *Trip Generation, 9th Edition* published by the Institute of Transportation Engineers (ITE – Reference 2). Table 1 summarizes the daily, weekday a.m., and weekday p.m. peak-hour trips for the Phase 2 assumed development. All daily trips have been rounded to the nearest ten and all peak hour trips have been rounded to the nearest five trips.

Table 1: Trip Generation Estimate – Phase 2

Land Use	ITE Code	Size	Daily	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
Single-Family Detached Housing	210	230 units	2,190	175	45	130	230	145	85

Table 2 summarizes the overall master plan trip generation and then deducts for the Phase 1¹ and Phase 2 trips to summarize the number of net new trips that will remain vested.

¹ While approved for 215 units, Phase 1 now consists of 201 units. The updated trip totals are shown in Table 2 with the full trip generation provided in *Appendix C*.

Table 2: Master Plan Trip Generation and Build-out Debiting (Includes Phase 1 and Phase 2)

Land Use	ITE Code	Size	Daily	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
Apartment	220	536 units	3,570	275	55	220	330	215	115
Single-Family Detached Housing	210	764 units	7,270	575	145	430	765	480	285
Total Residential (1,300 units)			10,840	850	200	650	1,095	695	400
Internalization (6% Daily,54% PM)			630	0	0	0	60	30	30
Shopping Center	820	90,000 square feet	6,340	145	90	55	560	270	290
Internalization (10% Daily, 11% PM)			630	0	0	0	60	30	30
Pass-By Trips (34%)			1,940	50	25	25	170	85	85
Total Vested Trips			17,180	995	290	705	1,655	965	690
Less Internalization			1,260	0	0	0	120	60	60
Less Pass-by trips			1,940	50	25	25	170	85	85
Vested Net New Trips for Full Build-out			13,980	945	265	680	1,365	820	545
Deduct for Net New Trips for Phase 1			1,915	150	40	110	200	125	75
Deduct for Net New Trips for Phase 2			2,190	175	45	130	230	145	85
Remaining Trips			9,885	620	180	440	935	550	385

As seen in Table 2, after accounting for Phase 1 and Phase 2; 9,885 daily; 620 weekday a.m. peak hour; and 935 weekday p.m. peak hour trips remain in the master plan approval.

Trip Distribution and Assignment

The distribution of site-generated trips onto the study area roadway system was estimated utilizing the trip distribution provided in the Master Plan TIA. The majority of trips are anticipated to use the new access on NE Goodwin Road, while a small portion of trips may utilize the neighborhood circulator access on NE Ingle Road developed with Phase 1. *Appendix D* illustrates the trip assignment.

EVALUATION OF OUTSTANDING MITIGATION NEEDS

The Master Plan TIA included recommended mitigations for intersections not meeting standards under background and/or total traffic conditions. As part of each phase's transportation compliance letter, it recommended evaluation of the following:

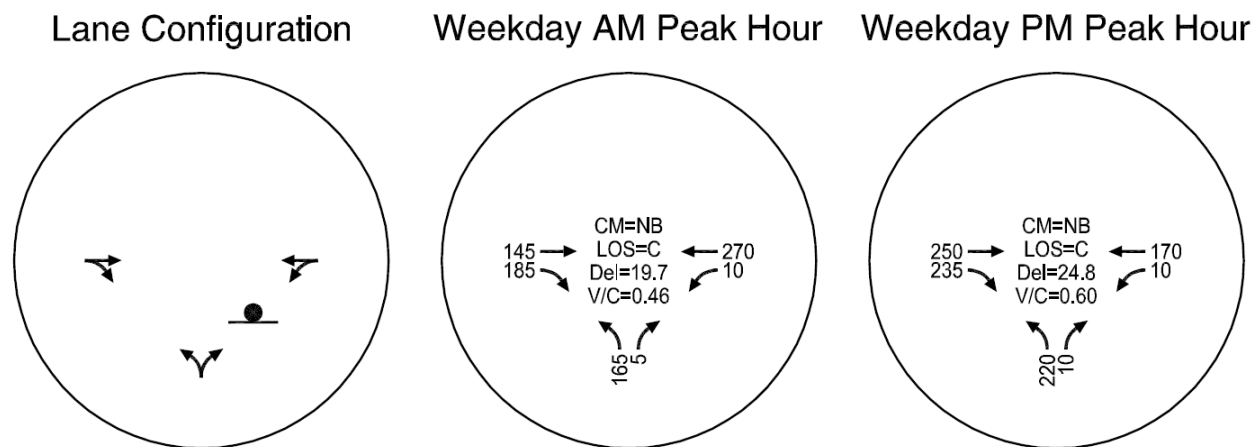
- Need for an eastbound right-turn lane at NE 199th Avenue/NE 58th Street (SR 500)
- NE Ingle Road/NE Goodwin Road operations (including traffic signal warrant analysis)
- Assessment of proportionate share contribution at NE 192nd Avenue/NE 13th Street

Updated traffic counts were collected in October 2016 at NE 199th Avenue/NE 58th Street and NE Ingle Road/NE Goodwin Road to inform an updated operations analysis. The count sheets are provided in *Appendix E*. The results are discussed below.

NE 199th Avenue/NE 58th Street (SR 500)

The Master Plan TIA recommended that future subdivision applications provide an updated assessment as to the potential need for providing a right-turn taper or lane at NE 199th Avenue/NE 58th Street (SR 500), considering both the need for a right-turn taper or lane and delay with the northbound left-turn. Year 2018 total traffic conditions were analyzed using the same approach from the Master Plan TIA, accounting for in-process developments (details are provided in *Appendix F*), Green Mountain Phase 1, and Green Mountain Phase 2. The lane configuration and projected operations under 2018 total traffic conditions are shown in Exhibit 1. *Appendix G* contains the 2018 total traffic conditions traffic operations worksheets.

Exhibit 1: NE 199th Avenue/NE 58th Street (SR 500) Total Traffic Lane Configuration and Operations



As seen in the exhibit, the minor street northbound left-turn at the intersection of NE 199th Avenue/NE 58th Street (SR 500) is projected to satisfy WSDOT standards during the weekday a.m. and p.m. peak hours. The intersection is projected to operate at a volume-to-capacity (v/c) ratio of 0.46 and LOS C during the a.m. peak hour and v/c ratio of 0.60 and LOS C during the p.m. peak hour. It therefore complies with WSDOT's LOS requirement (LOS C) for non-HSS facilities in rural areas.

Roadways under Washington State jurisdiction are subject to the turn lane guidelines contained in the *WSDOT Design Manual* (Reference 3). Traffic volumes at the intersection of NE 199th Avenue/NE 58th Street (SR 500) meet WSDOT's guidelines for an eastbound right-turn lane on NE 58th Street under existing conditions and all future scenarios during both the weekday a.m. and p.m. peak hour (consistent with findings from the Master Plan TIA). Construction of a right-turn lane could require right-of-way acquisition and will likely impact one or more private driveways along NE 58th Street (depending on the length of the deceleration lane constructed).

The table below assesses volumes at the intersection for various horizon year scenarios and the impact of the proposed development.

Table 3: NE 199th Avenue/NE 58th Street (SR 500) Eastbound Right-Turn Lane Assessment

Scenario	Eastbound Right-Turn (EBRT) Volume	Meets Guideline?	Development-Added EBRT Trips	Impact of Development
2016 Existing Traffic – AM Peak	156	Yes	-	-
2016 Existing Traffic – PM Peak	161	Yes	-	-
2018 Background Traffic – AM Peak	178	Yes	8 (Phase 1)	4%
2018 Background Traffic – PM Peak	206	Yes	25 (Phase 1)	12%
2018 Total Traffic – AM Peak	187	Yes	9 (Phase 2)	5%
2018 Total Traffic – PM Peak	235	Yes	29 (Phase 2)	12%

The findings in Table 3 are consistent with those presented in the June 2014 TIA. Given that no homes are yet occupied at the development site and no material changes relative to the proposed development plan have occurred since approval of the TIA, no right-turn improvements are recommended in conjunction with Phase 2. Consistent with the master plan approval conditions, future subdivision applications should continue to assess the potential need for providing a right-turn taper or lane at the intersection.

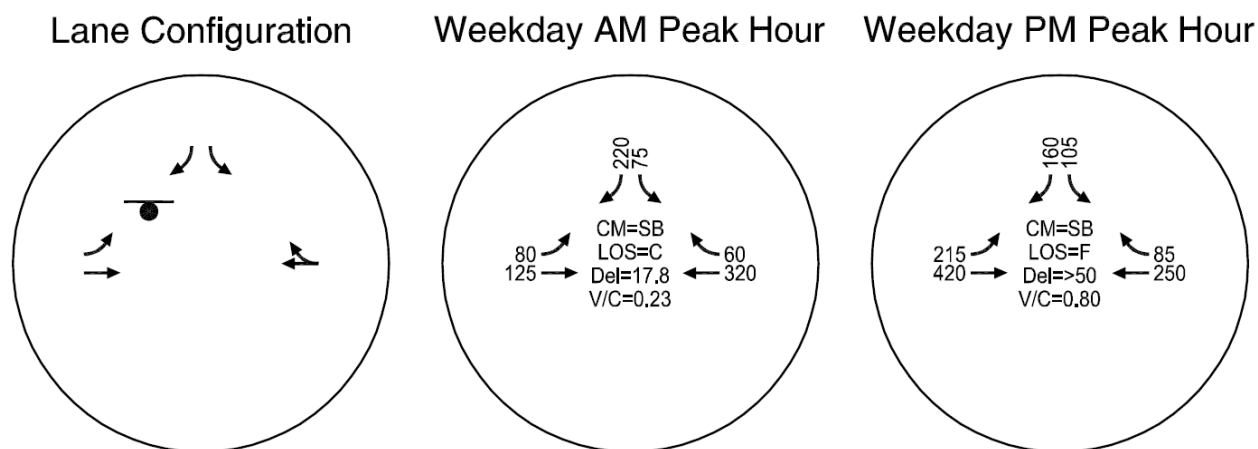
NE Ingle Road/NE Goodwin Road

In the Master Plan TIA, the intersection of NE Ingle Road/NE Goodwin Road was projected to not meet City of Camas intersection operating standards in the 2029 background conditions during the weekday p.m. peak hour and the 2029 total traffic conditions during both the weekday a.m. and p.m. peak hours. Therefore, the following series of mitigations were recommended in conjunction with the proposed development:

- Construct an eastbound left-turn lane on NE Goodwin Road at NE Ingle Road with the first Phase 1 trip (*currently under construction*).
- Construct a westbound right-turn lane on NE Goodwin Road at NE Ingle Road with the 203rd Phase 1 trip (prior to occupancy of 203rd single family home on site). The right-turn lane should provide at least 100 feet of storage. (*Phase 1 was reduced to 201 homes, so construction of the westbound right-turn lane has not yet occurred*).
- Construct a three-lane roadway section (with center two-way left-turn lane) on NE Goodwin Road along the site frontage in conjunction with standard frontage improvements as adjacent development occurs (*applicable to Phase 2 development*).
- Upon completion of Phase 1 site development (including construction of the eastbound left-turn lane on NE Goodwin Road at NE Ingle Road with Phase 1), the developer shall monitor the need for installation of a traffic signal with each future subdivision application at the intersection and construct a traffic signal when the intersection no longer satisfies City of Camas performance standard (LOS "D" and v/c of 0.90 or better) *and* the intersection volumes meet traffic signal warrants (subject to direction from the City of Camas) (*discussion provided below*).

Operations of the intersection as a stop-controlled intersection are provided in Exhibit 2 assuming Phase 1 and 2 site development as well as approved background traffic. *Appendix G* contains the 2018 total traffic conditions traffic operations worksheets.

Exhibit 2: NE Ingle Road/NE Goodwin Road 2018 Total Traffic Lane Configuration and Operations



As seen in Exhibit 2, the southbound left-turn at NE Ingle/NE Goodwin Road is projected to operate at a LOS F during the weekday p.m. peak hour with buildout of Phase 2 but operates under capacity with a v/c ratio of 0.80. Installation of a westbound right-turn lane (previously recommended with development of the 203rd home) is recommended with Phase 2 site development and will improve intersection operations compared to those reported in Exhibit 2. Further, to meet City of Camas standards, provision of a center two-way left-turn lane is recommended on NE Goodwin Road east of NE Ingle Road to accommodate two stage southbound left-turns. Operations with these mitigations are shown in Table 4. *Appendix H* contains the supporting traffic operations worksheets.

Table 4: NE Ingle Road/NE Goodwin Road 2018 Total Traffic Operations

Scenario	Weekday AM Peak Hour		Weekday PM Peak Hour	
	Delay	v/c	Delay	v/c
Current Intersection Configuration (refer to Exhibit 2)	17.8 (LOS C)	0.23	87.9 (LOS F)	0.80
Provision of a westbound right-turn lane	17.1 (LOS C)	0.22	75.1 (LOS F)	0.74
Provision of a TWLTL on NE Goodwin Road	12.5 (LOS B)	0.15	25.8 (LOS D)	0.41

Note: Operations shown are for the critical movement (southbound left-turn)
TWLTL = Two-way left-turn lane

Recognizing that the intersection satisfies City of Camas performance standards with these recommended mitigations, installation of a traffic signal is not recommended with Phase 2 development. Per the Master Plan conditions of approval, the developer shall monitor the need for installation of a traffic signal with future subdivision applications.

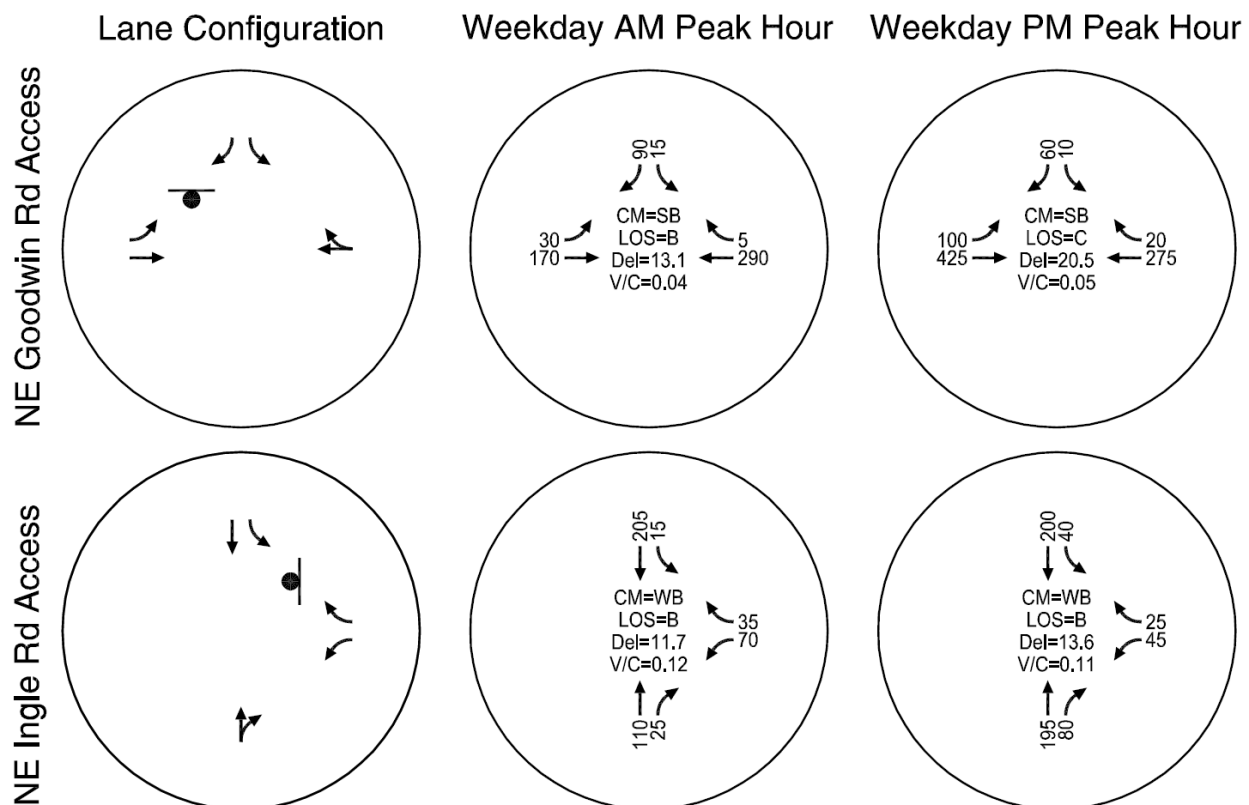
NE 192nd Avenue/NE 13th Street

The Master Plan TIA identified a proposed proportionate cost sharing methodology to fund future construction of a northbound right-turn lane and a westbound right-turn lane on NE 13th Avenue at NE 192nd Avenue, provided in *Appendix I*. Under this methodology, each weekday p.m. peak hour trip would be assessed a fee of \$319. Based on the Phase 2 trip assignment (refer to *Appendix D*), Phase 2 adds 103 trips to the intersection of NE 192nd Avenue/NE 13th Street and therefore should be responsible for contributing \$32,857 towards future improvements at the intersection.

ON-SITE CIRCULATION AND OPERATIONS

As seen in Figure 2, Phase 2 is located in the southeast portion of the overall site, with access anticipated on NE 28th Street (NE Goodwin Road) via a neighborhood circulator. Phase 2 will be connected to Phase 1 via the extension of N. Boxwood Street, as shown in the site plan in Figure 1. Therefore, some trips were assumed to utilize the neighborhood circulator access on NE Ingle Road developed with Phase 1. The proposed lane configuration for the access on NE 28th Street (NE Goodwin Road) and weekday a.m. and p.m. peak hour operations are shown in Exhibit 3. The operations for the access on NE Ingle Road developed with Phase 1 are also shown. *Appendix J* contains the traffic operations worksheets for the Phase 2 access operations.

Exhibit 3: Site Accesses – 2018 Total Traffic Lane Configuration and Operations



As seen in the exhibit, both accesses are projected to operate acceptably during both the weekday a.m. and p.m. peak hours. Anticipated queueing is provided in Table 4.

Table 5: Site Access Queueing – 2018 Total Traffic Conditions

Location	Movement	95 th Percentile Queue	
		Weekday AM Peak Hour	Weekday PM Peak Hour
NE Goodwin Road/ Site Access	Eastbound left-turn	25	25
	Westbound right-turn	<25	<25
	Southbound left-turn	25	25
	Southbound right-turn	25	25
NE Ingle Road/ Site Access	Westbound left-turn	25	25
	Westbound right-turn	25	25
	Southbound left-turn	25	25

As seen in table three, 95th percentile queues are anticipated to be one vehicle or less.

On-site landscaping, signage and any above-ground utilities should be provided appropriately to ensure that adequate sight distance is provided and maintained.

FINDINGS AND RECOMMENDATIONS

Based on the results of the transportation impact analysis, Phase 2 of the Green Mountain Master Plan can be developed while maintaining acceptable levels of service and safety at the study intersections without any required off-site mitigations. The primary findings and recommendations of this study are summarized below.

Trip Generation

- Phase 2 includes 230 single family homes and is estimated to generate 2,190 daily trips, 175 net new a.m. peak hour trips, and 230 net new p.m. peak hour trips.
- After accounting for Phase 1 and Phase 2; 9,885 daily; 620 weekday a.m. peak hour; and 935 weekday p.m. peak hour trips remain in the master plan approval.

NE 199th Avenue/NE 58th Street (SR 500)

- Consistent with prior analysis, the intersection of NE 199th Avenue/NE 58th Street (SR 500) continues to satisfy WSDOT's guidelines for a right-turn lane on the eastbound approach under existing conditions and all future scenarios during both the weekday a.m. and p.m. peak hours.
 - Given the lack of crash history related to eastbound right-turns and the relatively small impact of Phase 2 (nine eastbound right-turn trips during the weekday a.m.

peak hour, 29 eastbound right-turn trips during the weekday p.m. peak hour), no improvements are recommended in conjunction with Phase 2.

- In the future, the provision of a right-turn taper or lane could be considered if suggested by the crash history at the intersection or intersection operations.

NE Ingle Road/NE Goodwin Road

- The southbound left-turn at NE Ingle/NE Goodwin Road is projected to operate at a LOS F and below capacity with buildout of Phase 2.
- Construction of a westbound right-turn lane on NE Goodwin Road at NE Ingle Road with at least 100 feet of storage and provision of a two-way left-turn lane on NE Goodwin Road east of NE Ingle Road are recommended with Phase 2 development. With these mitigations in place, the intersection satisfies City of Camas operating standards.

NE 192nd Avenue/NE 13th Street

- Phase 2 is forecast to add 103 weekday p.m. peak hour trips to the intersection of NE 192nd Avenue/NE 13th Street. This equates to a proportionate cost share of \$32,857 (\$391 per trip) based on the proposed methodology presented in the Master Plan TIA.

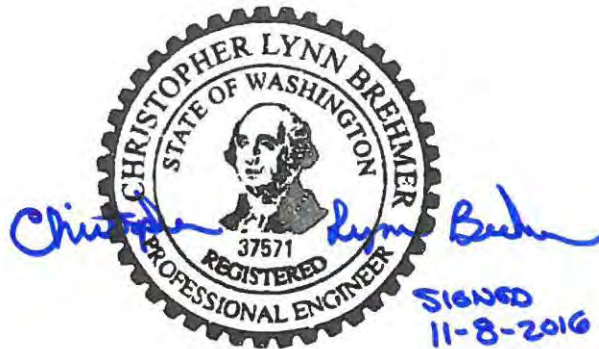
Recommendations

- The following should be provided in conjunction with site development:
 - Construction of a three-lane roadway section (with center two-way left-turn lane) on NE Goodwin Road along the site frontage in conjunction with standard frontage improvements.
 - Construction of a westbound right-turn lane on NE Goodwin Road at NE Ingle Road with at least 100 feet of storage and provision of a two-way left-turn lane on NE Goodwin Road east of NE Ingle Road.
 - Contribution of \$32,857 towards future improvements at NE 192nd Avenue/NE 13th Street.
 - On-site and off-site landscaping and any above ground utilities at the site-access driveways and internal roadways should be provided appropriately to ensure that adequate sight-distance is maintained.

We trust this letter adequately addresses the traffic impacts associated with the proposed Green Mountain Master Plan Phase 2 site development. Please contact us if you have any questions or comments regarding the contents of this report or the analysis performed.

REFERENCES

1. Transportation Research Board 2000. Highway Capacity Manual. 2000.
2. Institute of Transportation Engineers. *Trip Generation Manual*, 9th Edition. 2012.
3. Washington State Department of Transportation. *Design Manual*. July 2013.



Appendix C Phase 3 Trip Assignment



Total Estimated Trip Assignment - Phase 3
Weekday AM Peak Hour
Camas, Washington

Figure
C-1



Total Estimated Trip Assignment - Phase 3
Weekday PM Peak Hour
Camas, Washington

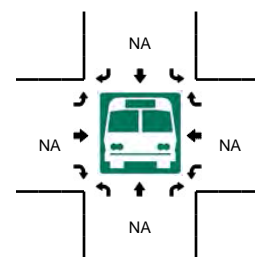
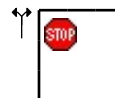
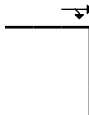
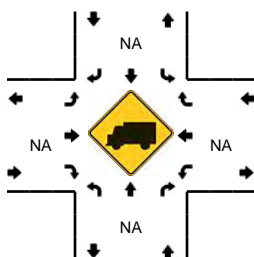
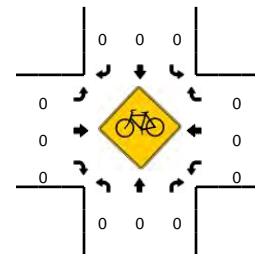
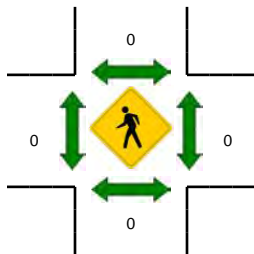
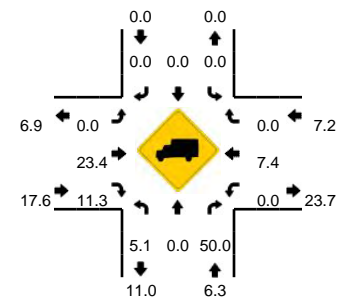
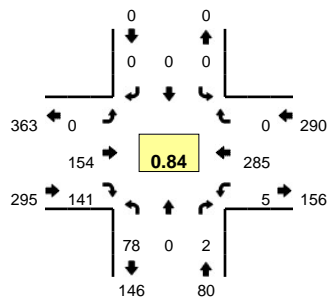
Figure
C-2

Appendix D Traffic Counts

LOCATION: NE 199th Ave -- NE 58th St
CITY/STATE: Vancouver, WA

QC JOB #: 14399101
DATE: Tue, May 02 2017

Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:40 AM -- 7:55 AM

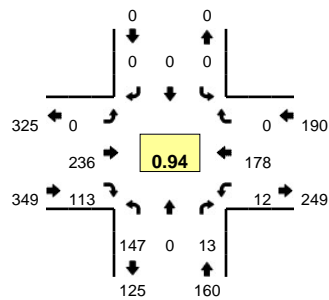


5-Min Count Period Beginning At	NE 199th Ave (Northbound)				NE 199th Ave (Southbound)				NE 58th St (Eastbound)				NE 58th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	7	0	0	0	0	0	0	0	0	5	16	0	1	16	0	0	45	
7:05 AM	9	0	1	0	0	0	0	0	0	8	12	0	1	20	0	0	51	
7:10 AM	8	0	0	0	0	0	0	0	0	9	11	0	0	10	0	0	38	
7:15 AM	8	0	1	0	0	0	0	0	0	16	12	0	0	22	0	0	59	
7:20 AM	5	0	0	0	0	0	0	0	0	13	12	0	2	25	0	0	57	
7:25 AM	8	0	0	0	0	0	0	0	0	10	11	0	0	26	0	0	55	
7:30 AM	9	0	0	0	0	0	0	0	0	8	11	0	0	28	0	0	56	
7:35 AM	9	0	0	0	0	0	0	0	0	13	14	0	0	28	0	0	64	
7:40 AM	5	0	0	0	0	0	0	0	0	16	11	0	1	28	0	0	61	
7:45 AM	8	0	0	0	0	0	0	0	0	18	18	0	0	24	0	0	68	
7:50 AM	12	0	0	0	0	0	0	0	0	12	12	0	2	30	0	0	68	
7:55 AM	2	0	0	0	0	0	0	0	0	9	8	0	0	22	0	0	41	663
8:00 AM	4	0	0	0	0	0	0	0	0	14	14	0	0	8	0	0	40	658
8:05 AM	5	0	0	0	0	0	0	0	0	13	11	0	0	22	0	0	51	658
8:10 AM	3	0	1	0	0	0	0	0	0	12	7	0	0	22	0	0	45	665
8:15 AM	7	0	1	0	0	0	0	0	0	7	4	0	2	19	0	0	40	646
8:20 AM	7	0	0	0	0	0	0	0	0	12	12	0	1	27	0	0	59	648
8:25 AM	2	0	0	0	0	0	0	0	0	12	7	0	1	18	0	0	40	633
8:30 AM	7	0	0	0	0	0	0	0	0	11	13	0	0	8	0	0	39	616
8:35 AM	6	0	0	0	0	0	0	0	0	7	1	0	0	20	0	0	34	586
8:40 AM	12	0	0	0	0	0	0	0	0	8	11	0	0	11	0	0	42	567
8:45 AM	3	0	0	0	0	0	0	0	0	14	6	0	0	14	0	0	37	536
8:50 AM	3	0	0	0	0	0	0	0	0	20	5	0	1	12	0	0	41	509
8:55 AM	3	0	0	0	0	0	0	0	0	6	8	0	0	24	0	0	41	509
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	100	0	0	0	0	0	0	0	0	184	164	0	12	328	0	0	788	
Heavy Trucks	4	0	0	0	0	0	0	0	0	36	8	0	0	16	0	0	64	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

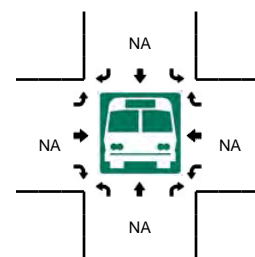
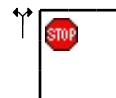
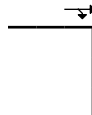
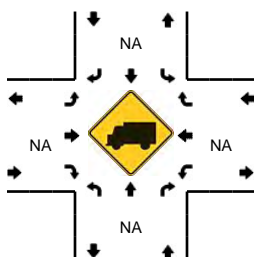
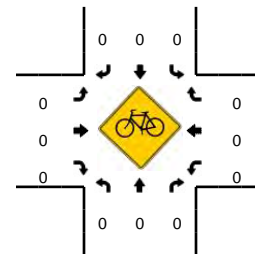
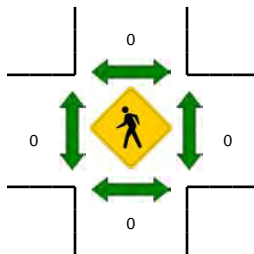
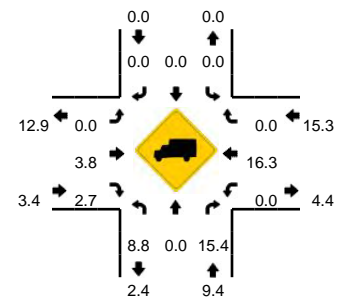
Comments:

LOCATION: NE 199th Ave -- NE 58th St
CITY/STATE: Vancouver, WA

QC JOB #: 14399102
DATE: Tue, May 02 2017



Peak-Hour: 4:05 PM -- 5:05 PM
Peak 15-Min: 4:35 PM -- 4:50 PM



5-Min Count Period Beginning At	NE 199th Ave (Northbound)				NE 199th Ave (Southbound)				NE 58th St (Eastbound)				NE 58th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	8	0	2	0	0	0	0	0	0	17	8	0	0	12	0	0	47	
4:05 PM	3	0	1	0	0	0	0	0	0	25	7	0	2	21	0	0	59	
4:10 PM	14	0	0	0	0	0	0	0	0	11	6	0	2	19	0	0	52	
4:15 PM	6	0	3	0	0	0	0	0	0	25	13	0	0	15	0	0	62	
4:20 PM	11	0	0	0	0	0	0	0	0	24	8	0	1	14	0	0	58	
4:25 PM	23	0	3	0	0	0	0	0	0	16	8	0	0	14	0	0	64	
4:30 PM	16	0	1	0	0	0	0	0	0	23	7	0	2	7	0	0	56	
4:35 PM	13	0	1	0	0	0	0	0	0	16	10	0	2	15	0	0	57	
4:40 PM	9	0	0	0	0	0	0	0	0	21	7	0	1	16	0	0	54	
4:45 PM	18	0	0	0	0	0	0	0	0	22	14	0	1	19	0	0	74	
4:50 PM	8	0	2	0	0	0	0	0	0	13	8	0	0	15	0	0	46	
4:55 PM	9	0	1	0	0	0	0	0	0	28	15	0	1	10	0	0	64	
5:00 PM	17	0	1	0	0	0	0	0	0	12	10	0	0	13	0	0	53	
5:05 PM	11	0	2	0	0	0	0	0	0	20	7	0	0	18	0	0	58	698
5:10 PM	8	0	1	0	0	0	0	0	0	17	8	0	0	17	0	0	51	697
5:15 PM	13	0	0	0	0	0	0	0	0	21	11	0	1	10	0	0	56	691
5:20 PM	14	0	2	0	0	0	0	0	0	22	12	0	3	9	0	0	62	695
5:25 PM	17	0	1	0	0	0	0	0	0	17	14	0	1	13	0	0	63	694
5:30 PM	12	0	0	0	0	0	0	0	0	18	12	0	0	15	0	0	57	695
5:35 PM	10	0	0	0	0	0	0	0	0	22	16	0	0	12	0	0	60	698
5:40 PM	15	0	1	0	0	0	0	0	0	18	7	0	0	11	0	0	52	696
5:45 PM	13	0	0	0	0	0	0	0	0	18	14	0	2	10	0	0	57	679
5:50 PM	10	0	0	0	0	0	0	0	0	21	14	0	0	16	0	0	61	694
5:55 PM	8	0	1	0	0	0	0	0	0	19	15	0	1	12	0	0	56	686
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	160	0	4	0	0	0	0	0	0	236	124	0	16	200	0	0	740	
Heavy Trucks	4	0	0		0	0	0		0	8	0		0	32	0		44	
Pedestrians		0				0				0				0			0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																		
Stopped Buses																		

Comments:

Appendix E In-Process Developments

Kelly Laustsen

From: Curleigh (Jim) Carothers <jcarothers@cityofcamas.us>
Sent: Monday, May 15, 2017 11:58 AM
To: Kelly Laustsen
Cc: Norm Wurzer
Subject: FW: In process traffic for Green Mountain Phase 3

Kelly,
Here is the list that you requested. Do you have the trip distribution information for all of the below listed developments?

James E. Carothers, P.E.
Engineering Manager/City Engineer



616 NE 4th Avenue
Camas, WA 98607
360-817-7230
360-834-1535 FAX
jcarothers@cityofcamas.us

From: Norm Wurzer
Sent: Friday, May 12, 2017 3:31 PM
To: Curleigh (Jim) Carothers <jcarothers@cityofcamas.us>
Cc: Wes Heigh <WHeigh@cityofcamas.us>
Subject: RE: In process traffic for Green Mountain Phase 3

Curleigh,
Please let me know if you need additional.

Name	% build-out Oct 2016	% build-out May 2017
Lake Hills	60%	Same
Two Creeks	50%	Same
Summit at Columbia Vista	82%	Same
Parker Village	45%	Same
Hills at Round Lake	50%	Same
North Hills Subdivision	10%	30%
Brady Rd Sub (Kates Cove)	86%	100%
Deerhaven Subdivision	22%	50%
Hadley's Glen	73%	100%
Windust	0%	0%
Fisher Crk Camp. Bldgs 1,2&3	100%	100% (building 4 proposed)
CJ Dens	0%	0%

Norm Wurzer
Engineer I

City of Camas
Office: 360.817.7235
Cell: 360.772.2945
nwurzer@cityofcamas.us



From: Curleigh (Jim) Carothers
Sent: Wednesday, May 10, 2017 10:05 AM
To: Wes Heigh
Cc: Norm Wurzer
Subject: FW: In process traffic for Green Mountain Phase 3

Wes,
Are you or Norm able to check on updated in-process traffic for GM PRD Phase 3?

James E. Carothers, P.E.
Engineering Manager/City Engineer



616 NE 4th Avenue
Camas, WA 98607
360-817-7230
360-834-1535 FAX
jcarothers@cityofcamas.us

From: Kelly Laustsen [<mailto:klaustsen@kittelson.com>]
Sent: Tuesday, May 09, 2017 7:14 PM
To: Curleigh (Jim) Carothers <jcarothers@cityofcamas.us>
Subject: In process traffic for Green Mountain Phase 3

Hi Curleigh,

We are now working on the Phase 3 Green Mountain study and I wanted to check if there are any changes in the in-process development we assumed for Phase 2. I've attached the appendix from Phase 2 detailing our assumptions.

Best,

Kelly M Laustsen, PE
Senior Engineer

[Kittelson & Associates, Inc.](#)
Transportation Engineering / Planning
503.535.7439 (direct)
214.886.5338 (cell)

From: Curleigh (Jim) Carothers [<mailto:jcarothers@cityofcamas.us>]
Sent: Tuesday, October 18, 2016 9:37 AM
To: Kelly Laustsen
Cc: Chris Brehmer; Wes Heigh; Norm Wurzer
Subject: RE: In process traffic for Green Mountain Phase 2

289 Single Family dwelling units.

James E. Carothers, P.E.
Engineering Manager/City Engineer



616 NE 4th Avenue

Camas, WA 98607

360-817-7230

360-834-1535 FAX

jcarothers@cityofcamas.us

From: Kelly Laustsen [<mailto:klaustsen@kittelson.com>]

Sent: Monday, October 17, 2016 8:19 AM

To: Curleigh (Jim) Carothers <jcarothers@cityofcamas.us>

Cc: Chris Brehmer <CBREHMER@kittelson.com>; Wes Heigh <WHeigh@cityofcamas.us>; Norm Wurzer <NWurzer@cityofcamas.us>

Subject: RE: In process traffic for Green Mountain Phase 2

Thanks for this information – it is very helpful. What is the unit count/type of the CJ Dens development? We'll use this to estimate the AM trip distribution.

Best,

Kelly M Laustsen
Senior Engineer

[Kittelson & Associates, Inc.](#)

Transportation Engineering / Planning

503.535.7439 (direct)

214.886.5338 (cell)

From: Curleigh (Jim) Carothers [<mailto:jcarothers@cityofcamas.us>]

Sent: Thursday, October 13, 2016 2:23 PM

To: Kelly Laustsen

Cc: Chris Brehmer; Wes Heigh; Norm Wurzer

Subject: RE: In process traffic for Green Mountain Phase 2

Kelly,
Please see the % buildout information in the attached email.

Please note the following:

- Lacamas Prairie is in the County. On GoogleEarth, there are 56 houses built in the latest aerial. You may check with Clark County if you want a more updated buildout number.
- It appears as though two buildings have been constructed in Lake 1 Plaza (if I have the right development (between 15th and 20th east side of SE 192nd)). Vancouver might be able to tell you the % buildout of this development.
- I notice that you did not have CJ Dens on the list. Please see the attached PM peak hour trip distribution. They preceded Green Mountain PRD with their decision and should be counted as in-process. They have yet to start their development.

Please let me know if you need any additional information.

James E. Carothers, P.E.
Engineering Manager/City Engineer



616 NE 4th Avenue
Camas, WA 98607
360-817-7230
360-834-1535 FAX
jcarothers@cityofcamas.us

From: Kelly Laustsen [<mailto:klaustsen@kittelson.com>]
Sent: Monday, October 10, 2016 3:07 PM
To: Curleigh (Jim) Carothers <jcarothers@cityofcamas.us>
Cc: Chris Brehmer <CBREHMER@kittelson.com>
Subject: In process traffic for Green Mountain Phase 2

Hi Curleigh,

We are working on the supplemental analysis for Phase 2 of the Green Mountain Master Plan we recently discussed with you. Could you provide an update on which of the following in-process developments have been completed since our original TIA and no longer need to be included? We'll plan to use the same growth rates applied in the original TIA.

- Lake Hills
- Two Creeks
- The Summit at Columbia Vista
- Parker Village
- The Hills at Round Lake
- North Hills Subdivision
- Brady Road Subdivision
- Deerhaven Subdivision
- Hadley's Glen
- Millshore Downs
- Fisher Creek Campus
- Lacamas Prairie
- 192nd Plaza West

Thanks!

Kelly M Laustsen
Senior Engineer

[Kittelson & Associates, Inc.](#)
Transportation Engineering / Planning
610 SW Alder St, Suite 700
Portland, Oregon 97205
503.228.5230
503.535.7439 (direct)
214.886.5338 (cell)

[Streetwise](#) [Twitter](#) [Facebook](#)

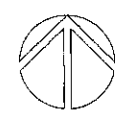
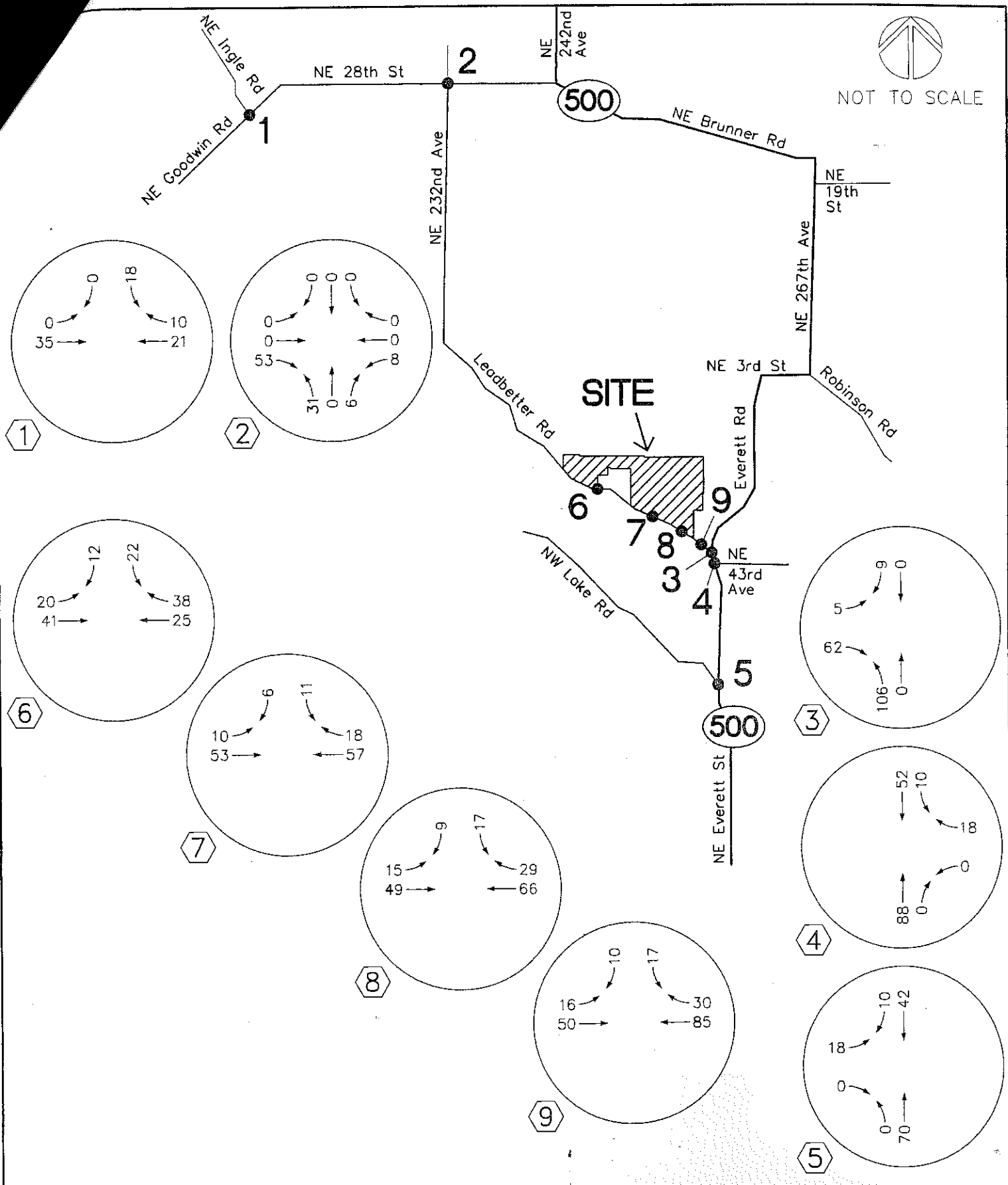


SUSTAINABILITY AT WORK
GOLD CERTIFIED

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8






NOT TO SCALE

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Appendix F 2022 Total Traffic Conditions Worksheets

Intersection







Int Delay, s/veh 5.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	155	202	11	288	192	5
Future Vol, veh/h	155	202	11	288	192	5
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	85	85	85	85	85	85
Heavy Vehicles, %	23	6	20	5	5	50
Mvmt Flow	182	238	13	339	226	6

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	666
Stage 1	-	-	301
Stage 2	-	-	365
Critical Hdwy	-	4.3	6.45
Critical Hdwy Stg 1	-	-	5.45
Critical Hdwy Stg 2	-	-	5.45
Follow-up Hdwy	-	2.38	3.545
Pot Cap-1 Maneuver	-	1049	420
Stage 1	-	-	744
Stage 2	-	-	696
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	1049	414
Mov Cap-2 Maneuver	-	-	414
Stage 1	-	-	744
Stage 2	-	-	686




Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	23.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	418	-	-	1049	-
HCM Lane V/C Ratio	0.554	-	-	0.012	-
HCM Control Delay (s)	23.8	-	-	8.5	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	3.3	-	-	0	-

Intersection							
Int Delay, s/veh	6.4						
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Vol, veh/h	103	129	332	68	91	291	
Future Vol, veh/h	103	129	332	68	91	291	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	200	-	-	100	50	0	
Veh in Median Storage, #	-	0	0	-	0	-	
Grade, %	-	0	0	-	0	-	
Peak Hour Factor	93	93	93	93	93	93	
Heavy Vehicles, %	10	6	5	6	15	5	
Mvmt Flow	111	139	357	73	98	313	
Major/Minor	Major1		Major2		Minor2		
Conflicting Flow All	357	0	-	0	717	357	
Stage 1	-	-	-	-	357	-	
Stage 2	-	-	-	-	360	-	
Critical Hdwy	4.2	-	-	-	6.55	6.25	
Critical Hdwy Stg 1	-	-	-	-	5.55	-	
Critical Hdwy Stg 2	-	-	-	-	5.55	-	
Follow-up Hdwy	2.29	-	-	-	3.635	3.345	
Pot Cap-1 Maneuver	1159	-	-	-	378	680	
Stage 1	-	-	-	-	680	-	
Stage 2	-	-	-	-	678	-	
Platoon blocked, %	-	-	-	-	-	-	
Mov Cap-1 Maneuver	1159	-	-	-	342	680	
Mov Cap-2 Maneuver	-	-	-	-	449	-	
Stage 1	-	-	-	-	680	-	
Stage 2	-	-	-	-	613	-	
Approach	EB		WB		SB		
HCM Control Delay, s	3.7		0		14.8		
HCM LOS					B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2	
Capacity (veh/h)	1159	-	-	-	449	680	
HCM Lane V/C Ratio	0.096	-	-	-	0.218	0.46	
HCM Control Delay (s)	8.4	-	-	-	15.2	14.7	
HCM Lane LOS	A	-	-	-	C	B	
HCM 95th %tile Q(veh)	0.3	-	-	-	0.8	2.4	

Intersection







Int Delay, s/veh 8.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	268	265	11	183	242	11
Future Vol, veh/h	268	265	11	183	242	11
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	88	88	88	88	88	88
Heavy Vehicles, %	4	2	0	6	4	0
Mvmt Flow	305	301	13	208	275	13

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	688
Stage 1	-	-	455
Stage 2	-	-	233
Critical Hdwy	-	4.1	6.44
Critical Hdwy Stg 1	-	-	5.44
Critical Hdwy Stg 2	-	-	5.44
Follow-up Hdwy	-	2.2	3.536
Pot Cap-1 Maneuver	-	982	409
Stage 1	-	-	635
Stage 2	-	-	801
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	982	403
Mov Cap-2 Maneuver	-	-	403
Stage 1	-	-	635
Stage 2	-	-	789

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	32.1
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	409	-	-	982	-
HCM Lane V/C Ratio	0.703	-	-	0.013	-
HCM Control Delay (s)	32.1	-	-	8.7	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	5.3	-	-	0	-

Intersection							
Int Delay, s/veh	8.2						
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Vol, veh/h	289	436	259	103	116	203	
Future Vol, veh/h	289	436	259	103	116	203	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	200	-	-	100	50	0	
Veh in Median Storage, #	-	0	0	-	0	-	
Grade, %	-	0	0	-	0	-	
Peak Hour Factor	89	89	89	89	89	89	
Heavy Vehicles, %	3	2	2	3	1	2	
Mvmt Flow	325	490	291	116	130	228	
Major/Minor	Major1		Major2		Minor2		
Conflicting Flow All	291	0	-	0	1430	291	
Stage 1	-	-	-	-	291	-	
Stage 2	-	-	-	-	1139	-	
Critical Hdwy	4.13	-	-	-	6.41	6.22	
Critical Hdwy Stg 1	-	-	-	-	5.41	-	
Critical Hdwy Stg 2	-	-	-	-	5.41	-	
Follow-up Hdwy	2.227	-	-	-	3.509	3.318	
Pot Cap-1 Maneuver	1265	-	-	-	149	748	
Stage 1	-	-	-	-	761	-	
Stage 2	-	-	-	-	307	-	
Platoon blocked, %	-	-	-	-	-	-	
Mov Cap-1 Maneuver	1265	-	-	-	~ 111	748	
Mov Cap-2 Maneuver	-	-	-	-	192	-	
Stage 1	-	-	-	-	761	-	
Stage 2	-	-	-	-	228	-	
Approach	EB		WB		SB		
HCM Control Delay, s	3.5		0		28		
HCM LOS					D		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2	
Capacity (veh/h)	1265	-	-	-	192	748	
HCM Lane V/C Ratio	0.257	-	-	-	0.679	0.305	
HCM Control Delay (s)	8.8	-	-	-	56.1	11.9	
HCM Lane LOS	A	-	-	-	F	B	
HCM 95th %tile Q(veh)	1	-	-	-	4.1	1.3	
Notes							
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon							

MOVEMENT SUMMARY

 **Site: 101 [Weekday AM PeakHour]**

NE 199th/58th
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NE 199th St											
3	L2	209	5.0	0.204	10.9	LOS B	1.0	25.6	0.37	0.66	34.0
18	R2	5	50.0	0.204	6.5	LOS A	1.0	25.6	0.37	0.66	32.0
Approach		214	6.1	0.204	10.8	LOS B	1.0	25.6	0.37	0.66	34.0
East: NE 58th											
1	L2	12	20.0	0.315	11.6	LOS B	1.8	46.2	0.44	0.52	35.9
6	T1	313	5.0	0.315	5.1	LOS A	1.8	46.2	0.44	0.52	36.4
Approach		325	5.6	0.315	5.4	LOS A	1.8	46.2	0.44	0.52	36.4
West: NE 58th											
2	T1	168	23.0	0.339	4.1	LOS A	2.1	58.8	0.12	0.41	37.4
12	R2	220	6.0	0.339	4.0	LOS A	2.1	58.8	0.12	0.41	36.5
Approach		388	13.4	0.339	4.0	LOS A	2.1	58.8	0.12	0.41	36.9
All Vehicles		927	9.0	0.339	6.1	LOS A	2.1	58.8	0.29	0.50	36.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: \\kittelson.com\\fs\\H_Projects\\21\\21282 - Green Mountain Phase 3\\199th&58th Intersection\\199th&58th roundabout updated.sip7

MOVEMENT SUMMARY

 **Site: 101 [Weekday PM PeakHour]**

NE 199th/58th
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NE 199th St											
3	L2	263	4.0	0.269	11.4	LOS B	1.4	35.5	0.46	0.70	33.9
18	R2	12	0.0	0.269	5.4	LOS A	1.4	35.5	0.46	0.70	33.0
Approach		275	3.8	0.269	11.2	LOS B	1.4	35.5	0.46	0.70	33.9
East: NE 58th											
1	L2	12	0.0	0.211	11.0	LOS B	1.1	28.9	0.46	0.53	36.5
6	T1	199	6.0	0.211	5.3	LOS A	1.1	28.9	0.46	0.53	36.3
Approach		211	5.7	0.211	5.6	LOS A	1.1	28.9	0.46	0.53	36.3
West: NE 58th											
2	T1	291	4.0	0.451	3.9	LOS A	3.4	86.8	0.12	0.40	37.8
12	R2	288	2.0	0.451	4.0	LOS A	3.4	86.8	0.12	0.40	36.6
Approach		579	3.0	0.451	3.9	LOS A	3.4	86.8	0.12	0.40	37.2
All Vehicles		1065	3.7	0.451	6.1	LOS A	3.4	86.8	0.27	0.50	36.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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HCM 2010 Signalized Intersection Summary

104: NE Goodwin Rd & NE Ingle Rd













9/29/2017

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	103	129	332	68	91	291		
Future Volume (veh/h)	103	129	332	68	91	291		
Number	7	4	8	18	1	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1727	1792	1810	1792	1652	1810		
Adj Flow Rate, veh/h	111	139	357	73	98	313		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93		
Percent Heavy Veh, %	10	6	5	6	15	5		
Cap, veh/h	451	887	545	459	425	415		
Arrive On Green	0.08	0.49	0.30	0.30	0.27	0.27		
Sat Flow, veh/h	1645	1792	1810	1524	1573	1538		
Grp Volume(v), veh/h	111	139	357	73	98	313		
Grp Sat Flow(s),veh/h/ln	1645	1792	1810	1524	1573	1538		
Q Serve(g_s), s	1.4	1.4	5.8	1.2	1.7	6.3		
Cycle Q Clear(g_c), s	1.4	1.4	5.8	1.2	1.7	6.3		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	451	887	545	459	425	415		
V/C Ratio(X)	0.25	0.16	0.66	0.16	0.23	0.75		
Avail Cap(c_a), veh/h	616	1685	1169	985	924	904		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	6.8	4.7	10.4	8.7	9.7	11.4		
Incr Delay (d2), s/veh	0.3	0.1	1.3	0.2	0.3	2.8		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	0.6	0.7	3.1	0.5	0.7	0.3		
LnGrp Delay(d),s/veh	7.1	4.8	11.7	8.9	9.9	14.2		
LnGrp LOS	A	A	B	A	A	B		
Approach Vol, veh/h		250	430		411			
Approach Delay, s/veh		5.8	11.2		13.2			
Approach LOS		A	B		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				20.8		13.2	6.6	14.2
Change Period (Y+Rc), s				4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s				32.0		20.0	6.0	22.0
Max Q Clear Time (g_c+I1), s				3.4		8.3	3.4	7.8
Green Ext Time (p_c), s				2.9		1.0	0.1	2.4
Intersection Summary								
HCM 2010 Ctrl Delay	10.7							
HCM 2010 LOS	B							

HCM 2010 Signalized Intersection Summary

104: NE Goodwin Rd & NE Ingle Rd












9/29/2017

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	289	436	259	103	116	203		
Future Volume (veh/h)	289	436	259	103	116	203		
Number	7	4	8	18	1	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1845	1863	1863	1845	1881	1863		
Adj Flow Rate, veh/h	325	490	291	116	130	228		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89		
Percent Heavy Veh, %	3	2	2	3	1	2		
Cap, veh/h	652	1060	529	445	372	328		
Arrive On Green	0.17	0.57	0.28	0.28	0.21	0.21		
Sat Flow, veh/h	1757	1863	1863	1568	1792	1583		
Grp Volume(v), veh/h	325	490	291	116	130	228		
Grp Sat Flow(s),veh/h/ln	1757	1863	1863	1568	1792	1583		
Q Serve(g_s), s	4.0	5.5	4.7	2.0	2.2	4.8		
Cycle Q Clear(g_c), s	4.0	5.5	4.7	2.0	2.2	4.8		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	652	1060	529	445	372	328		
V/C Ratio(X)	0.50	0.46	0.55	0.26	0.35	0.69		
Avail Cap(c_a), veh/h	937	1719	886	745	952	841		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	6.2	4.5	10.9	9.9	12.1	13.1		
Incr Delay (d2), s/veh	0.6	0.3	0.9	0.3	0.6	2.6		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	1.9	2.8	2.6	0.9	1.1	4.3		
LnGrp Delay(d),s/veh	6.8	4.8	11.8	10.2	12.7	15.8		
LnGrp LOS	A	A	B	B	B	B		
Approach Vol, veh/h		815	407		358			
Approach Delay, s/veh		5.6	11.3		14.6			
Approach LOS		A	B		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				24.3		11.4	10.2	14.1
Change Period (Y+Rc), s				4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s				33.0		19.0	12.0	17.0
Max Q Clear Time (g_c+I1), s				7.5		6.8	6.0	6.7
Green Ext Time (p_c), s				4.9		0.9	0.5	3.4
Intersection Summary								
HCM 2010 Ctrl Delay			9.1					
HCM 2010 LOS			A					

HCM 2010 Signalized Intersection Summary

104: NE Goodwin Rd & NE Ingle Rd












9/29/2017

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	103	129	332	68	91	291		
Future Volume (veh/h)	103	129	332	68	91	291		
Number	7	4	8	18	1	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1727	1792	1807	1900	1652	1810		
Adj Flow Rate, veh/h	111	139	357	73	98	313		
Adj No. of Lanes	1	1	1	0	1	1		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93		
Percent Heavy Veh, %	10	6	5	5	15	5		
Cap, veh/h	423	928	489	100	418	408		
Arrive On Green	0.07	0.52	0.34	0.34	0.27	0.27		
Sat Flow, veh/h	1645	1792	1456	298	1573	1538		
Grp Volume(v), veh/h	111	139	0	430	98	313		
Grp Sat Flow(s),veh/h/ln	1645	1792	0	1754	1573	1538		
Q Serve(g_s), s	1.4	1.5	0.0	8.0	1.8	6.9		
Cycle Q Clear(g_c), s	1.4	1.5	0.0	8.0	1.8	6.9		
Prop In Lane	1.00			0.17	1.00	1.00		
Lane Grp Cap(c), veh/h	423	928	0	589	418	408		
V/C Ratio(X)	0.26	0.15	0.00	0.73	0.23	0.77		
Avail Cap(c_a), veh/h	569	1554	0	1045	853	833		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	7.2	4.7	0.0	10.8	10.6	12.5		
Incr Delay (d2), s/veh	0.3	0.1	0.0	1.8	0.3	3.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	0.7	0.8	0.0	4.1	0.8	5.8		
LnGrp Delay(d),s/veh	7.6	4.7	0.0	12.5	10.9	15.5		
LnGrp LOS	A	A		B	B	B		
Approach Vol, veh/h		250	430		411			
Approach Delay, s/veh		6.0	12.5		14.4			
Approach LOS		A	B		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				23.1		13.8	6.7	16.4
Change Period (Y+Rc), s				4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s				32.0		20.0	6.0	22.0
Max Q Clear Time (g_c+I1), s				3.5		8.9	3.4	10.0
Green Ext Time (p_c), s				3.2		1.0	0.1	2.4
Intersection Summary								
HCM 2010 Ctrl Delay			11.8					
HCM 2010 LOS			B					

HCM 2010 Signalized Intersection Summary

104: NE Goodwin Rd & NE Ingle Rd

9/29/2017

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	289	436	259	103	116	203		
Future Volume (veh/h)	289	436	259	103	116	203		
Number	7	4	8	18	1	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1845	1863	1858	1900	1881	1863		
Adj Flow Rate, veh/h	325	490	291	116	130	228		
Adj No. of Lanes	1	1	1	0	1	1		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89		
Percent Heavy Veh, %	3	2	2	2	1	2		
Cap, veh/h	596	1110	419	167	360	318		
Arrive On Green	0.16	0.60	0.33	0.33	0.20	0.20		
Sat Flow, veh/h	1757	1863	1265	504	1792	1583		
Grp Volume(v), veh/h	325	490	0	407	130	228		
Grp Sat Flow(s),veh/h/ln	1757	1863	0	1769	1792	1583		
Q Serve(g_s), s	4.1	5.7	0.0	7.9	2.5	5.3		
Cycle Q Clear(g_c), s	4.1	5.7	0.0	7.9	2.5	5.3		
Prop In Lane	1.00			0.29	1.00	1.00		
Lane Grp Cap(c), veh/h	596	1110	0	586	360	318		
V/C Ratio(X)	0.55	0.44	0.00	0.70	0.36	0.72		
Avail Cap(c_a), veh/h	890	1657	0	809	774	684		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	6.9	4.4	0.0	11.4	13.5	14.7		
Incr Delay (d2), s/veh	0.8	0.3	0.0	1.5	0.6	3.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	1.9	2.9	0.0	4.0	1.3	4.7		
LnGrp Delay(d),s/veh	7.6	4.6	0.0	13.0	14.2	17.7		
LnGrp LOS	A	A		B	B	B		
Approach Vol, veh/h		815	407		358			
Approach Delay, s/veh		5.8	13.0		16.4			
Approach LOS		A	B		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				27.5		11.9	10.4	17.0
Change Period (Y+Rc), s				4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s				35.0		17.0	13.0	18.0
Max Q Clear Time (g_c+I1), s				7.7		7.3	6.1	9.9
Green Ext Time (p_c), s				5.4		0.8	0.5	3.2
Intersection Summary								
HCM 2010 Ctrl Delay			10.1					
HCM 2010 LOS			B					

Appendix G Signal Warrant Worksheets

Signal Warrant Assessment

Project #:	21282
Project Name:	Gr Mt Phase 3
Analyst:	KML
Date:	9/29/2017
Intersection:	Ingle/Goodwin
Scenario:	2022 TT Volumes

Volume Adjustment Factor =	1.0
North-South Approach =	Minor
East-West Approach =	Major
Major Street Thru Lanes =	1
Minor Street Thru Lanes =	1
Speed > 40 mph?	Yes
Population < 10,000?	No
Warrant Factor	70%
Peak Hour or Daily Count?	Peak Hour

Note: Add'l data input on sheet "Warrant 3".

Warrant Summary

Warrant	Name	Analyzed?	Met?
#1	Eight-Highest	Yes	Yes
#2	Four-Hour	Yes	Yes
#3	Peak Hour	Yes	Yes

**This signal warrant shall be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.*

Select Type Of Major Street Approach From Dropdown Menu

Rural Minor Arterial

Select Type Of Minor Street Approach From Dropdown Menu

Rural Major Collector

Note: traffic volume profile for weekday (if weekend is desired, tab "vol profile" needs to be adjusted)

Traffic Volumes

Hour		Major Street		Minor Street		Major St. Adj. Factor	Minor St. Adj. Factor
Begin	End	EB	WB	NB	SB		
5:00 PM	6:00 PM	725	362	0	218	1.00	1.00
2nd	Highest Hour	717	358	0	194	0.99	0.89
3rd	Highest Hour	652	325	0	168	0.90	0.77
4th	Highest Hour	587	293	0	166	0.81	0.76
5th	Highest Hour	489	244	0	147	0.67	0.68
6th	Highest Hour	481	240	0	145	0.66	0.67
7th	Highest Hour	456	228	0	140	0.63	0.65
8th	Highest Hour	407	203	0	129	0.56	0.59
9th	Highest Hour	147	73	0	28	0.20	0.13
10th	Highest Hour	391	195	0	117	0.54	0.54
11th	Highest Hour	375	187	0	115	0.52	0.53
12th	Highest Hour	367	183	0	115	0.51	0.53
13th	Highest Hour	358	179	0	112	0.49	0.52
14th	Highest Hour	358	179	0	94	0.49	0.43
15th	Highest Hour	293	146	0	91	0.40	0.42
16th	Highest Hour	253	126	0	65	0.35	0.30
17th	Highest Hour	212	106	0	65	0.29	0.30
18th	Highest Hour	163	81	0	44	0.22	0.20
19th	Highest Hour	147	73	0	28	0.20	0.13
20th	Highest Hour	98	49	0	23	0.13	0.11
21st	Highest Hour	49	24	0	12	0.07	0.05
22nd	Highest Hour	41	20	0	9	0.06	0.04
23rd	Highest Hour	24	12	0	9	0.03	0.04
24th	Highest Hour	24	12	0	7	0.03	0.03

Data Input



KITTELSON & ASSOCIATES, INC.
610 SW Alder, Suite 700
Portland, Oregon 97205
(503) 228-5230

Project #: 21282
Project Name: Gr Mt Phase 3
Analyst: KML
Date: 9/29/2017
File: C:\Users\klaustsen\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.MSO\Copy of Signal Warrant Analysis - goodwin&ingle.xls>Data Input
Intersection: Ingle/Goodwin
Scenario: 2022 TT Volumes

Analysis Traffic Volumes

Hour	Begin	End	Major Street		Minor Street	
			EB	WB	NB	SB
5:00 PM	6:00 PM		725	362	0	218
2nd	Highest Hour		717	358	0	194
3rd	Highest Hour		652	325	0	168
4th	Highest Hour		587	293	0	166
5th	Highest Hour		489	244	0	147
6th	Highest Hour		481	240	0	145
7th	Highest Hour		456	228	0	140
8th	Highest Hour		407	203	0	129
9th	Highest Hour		147	73	0	28
10th	Highest Hour		391	195	0	117
11th	Highest Hour		375	187	0	115
12th	Highest Hour		367	183	0	115
13th	Highest Hour		358	179	0	112
14th	Highest Hour		358	179	0	94
15th	Highest Hour		293	146	0	91
16th	Highest Hour		253	126	0	65
17th	Highest Hour		212	106	0	65
18th	Highest Hour		163	81	0	44
19th	Highest Hour		147	73	0	28
20th	Highest Hour		98	49	0	23
21st	Highest Hour		49	24	0	12
22nd	Highest Hour		41	20	0	9
23rd	Highest Hour		24	12	0	9
24th	Highest Hour		24	12	0	7

Warrant Summary

Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	Yes
#2	Four-Hour Vehicular volume	Yes	Yes
#3	Peak Hour	Yes	Yes
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-

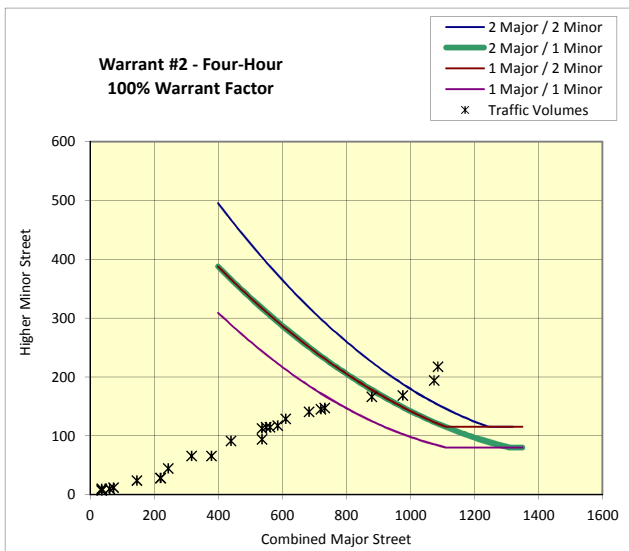
Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Minor
East-West Approach =	Major
Major Street Thru Lanes =	1
Minor Street Thru Lanes =	1
Speed > 40 mph?	Yes
Population < 10,000?	No
Warrant Factor	70%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	81%
Major Street: 8th-Highest Hour / Peak Hour	56%
Minor Street: 4th-Highest Hour / Peak Hour	76%
Minor Street: 8th-Highest Hour / Peak Hour	59%

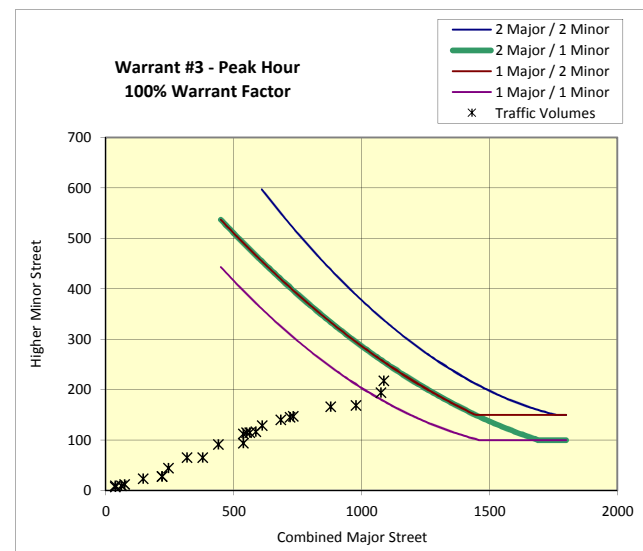
Warrant #1 - Eight Hour

Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	500	150	4	No	No
	B	750	75	4	No	No
80%	A	400	120	8	Yes	Yes
	B	600	60	8	Yes	Yes
70%	A	350	105	12	Yes	Yes
	B	525	53	13	Yes	Yes

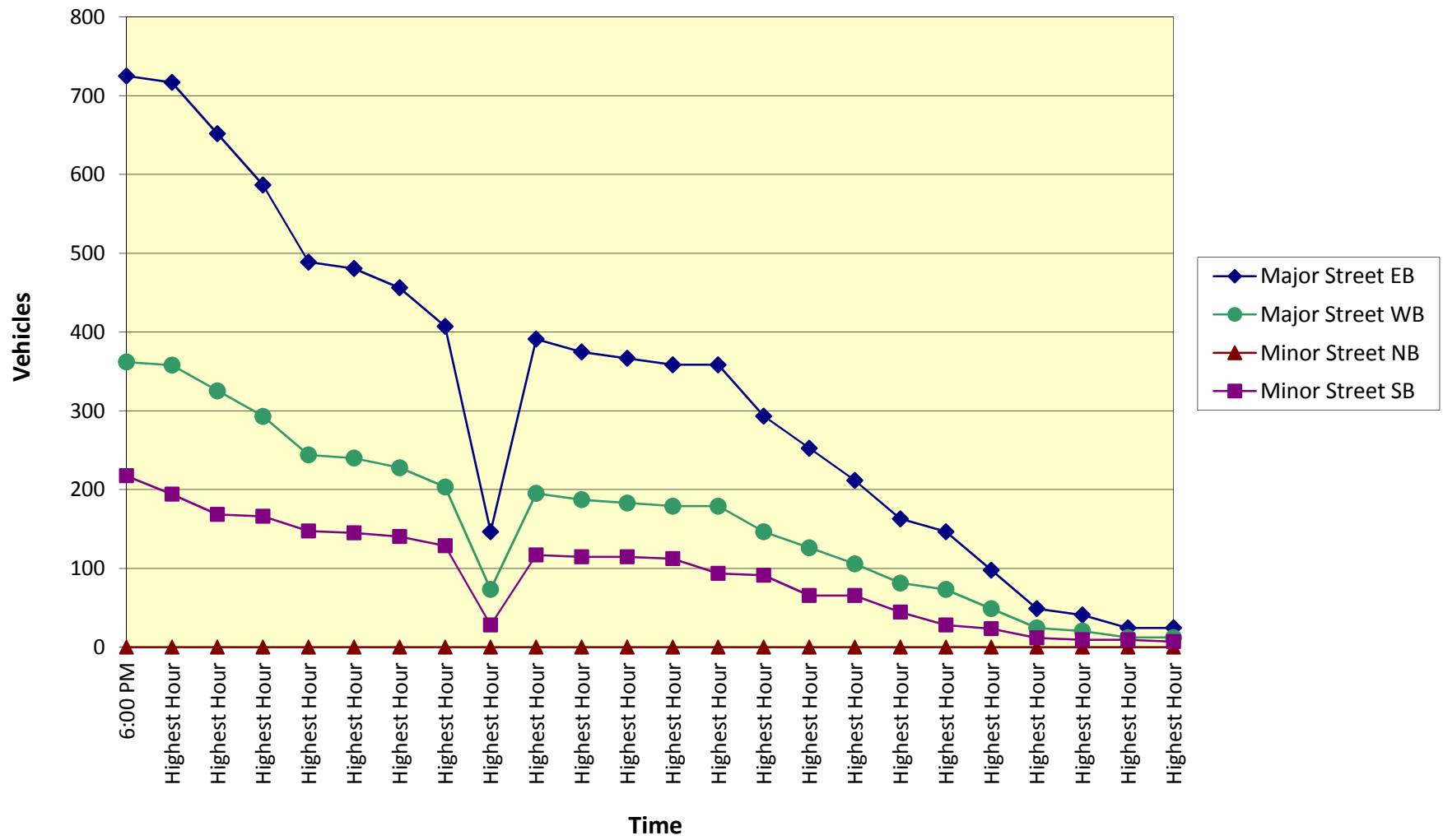
Warrant #2 - Four-Hour 100% Warrant Factor



Warrant #3 - Peak Hour 100% Warrant Factor



Volume Plot



Volume Plot

Traffic Volumes					
Hour		Major Street		Minor Street	
Begin	End	EB	WB	NB	SB
5:00 PM	6:00 PM	725	362	0	218
2nd	Highest Hour	717	358	0	194
3rd	Highest Hour	652	325	0	168
4th	Highest Hour	587	293	0	166
5th	Highest Hour	489	244	0	147
6th	Highest Hour	481	240	0	145
7th	Highest Hour	456	228	0	140
8th	Highest Hour	407	203	0	129
9th	Highest Hour	147	73	0	28
10th	Highest Hour	391	195	0	117
11th	Highest Hour	375	187	0	115
12th	Highest Hour	367	183	0	115
13th	Highest Hour	358	179	0	112
14th	Highest Hour	358	179	0	94
15th	Highest Hour	293	146	0	91
16th	Highest Hour	253	126	0	65
17th	Highest Hour	212	106	0	65
18th	Highest Hour	163	81	0	44
19th	Highest Hour	147	73	0	28
20th	Highest Hour	98	49	0	23
21st	Highest Hour	49	24	0	12
22nd	Highest Hour	41	20	0	9
23rd	Highest Hour	24	12	0	9
24th	Highest Hour	24	12	0	7

100% Warrant Met
70% Warrant Met

Number of lanes for moving traffic on each approach (Major Street) 1
Number of lanes for moving traffic on each approach (Minor Street) 1
Warrant Factor 70%
Row Index for VLOOKUP 1

Lookup Table								
Condition A - Minimum Vehicular Volume								
Lanes			Combined Major Street			Higher Minor Street		
Index	Major Street	Minor Street	100%	80%	70%	100%	80%	70%
1	1	1	500	400	350	150	120	105
2	2 or more	1	600	480	420	150	120	105
3	2 or more	2 or more	600	480	420	200	160	140
4	1	2 or more	500	400	350	200	160	140
Condition B - Interruption of Continuous Traffic								
Lanes			Combined Major Street			Higher Minor Street		
Index	Major Street	Minor Street	100%	80%	70%	100%	80%	70%
1	1	1	750	600	525	75	60	53
2	2 or more	1	900	720	630	75	60	53
3	2 or more	2 or more	900	720	630	100	80	70
4	1	2 or more	750	600	525	100	80	70

Vehicles per hour on major street (100% Volume) 500
Vehicles per hour on major street (80% Volume) 400
Vehicles per hour on major street (70% Volume) 350
Vehicles per hour on higher-volume minor-street approach (100% Volume) 150
Vehicles per hour on higher-volume minor-street approach (80% Volume) 120
Vehicles per hour on higher-volume minor-street approach (70% Volume) 105

Vehicles per hour on major street (100% Volume) 750
Vehicles per hour on major street (80% Volume) 600
Vehicles per hour on major street (70% Volume) 525
Vehicles per hour on higher-volume minor-street approach (100% Volume) 75
Vehicles per hour on higher-volume minor-street approach (80% Volume) 60
Vehicles per hour on higher-volume minor-street approach (70% Volume) 53

Calculations									
Combined Major Street	Higher Minor Street	Major Plus Minor	Hourly Rank	Condition A			Condition B		
				100%	80%	70%	100%	80%	70%
1087	218	1305	1	Yes	Yes	Yes	Yes	Yes	Yes
1075	194	1269	2	Yes	Yes	Yes	Yes	Yes	Yes
977	168	1145	3	Yes	Yes	Yes	Yes	Yes	Yes
879	166	1045	4	Yes	Yes	Yes	Yes	Yes	Yes
733	147	880	5	N	Yes	Yes	N	Yes	Yes
721	145	866	6	N	Yes	Yes	N	Yes	Yes
684	140	824	7	N	Yes	Yes	N	Yes	Yes
611	129	739	8	N	Yes	Yes	N	Yes	Yes
220	28	248	18	N	N	N	N	N	N
586	117	703	9	N	N	Yes	N	N	Yes
562	115	676	10	N	N	Yes	N	N	Yes
550	115	664	11	N	N	Yes	N	N	Yes
537	112	650	12	N	N	Yes	N	N	Yes
537	94	631	13	N	N	N	N	N	Yes
440	91	531	14	N	N	N	N	N	N
379	65	444	15	N	N	N	N	N	N
318	65	383	16	N	N	N	N	N	N
244	44	289	17	N	N	N	N	N	N
220	28	248	18	N	N	N	N	N	N
147	23	170	20	N	N	N	N	N	N
73	12	85	21	N	N	N	N	N	N
61	9	70	22	N	N	N	N	N	N
37	9	46	23	N	N	N	N	N	N
37	7	44	24	N	N	N	N	N	N
				4	8	12	4	8	13

Warrant Summary							
Warrant Factor	Condition	Major Street Requirement	Minor Street Requirement	Hours That Condition Is Met	Threshold	Condition for Warrant Factor Met?	Signal Warrant Met?
100%	A	500	150	4	8	No	No
	B	750	75	4	8	No	
80%	A	400	120	8	8	Yes	Yes
	B	600	60	8	8	Yes	
70%	A	350	105	12	8	Yes	Yes
	B	525	53	13	8	Yes	

Is Warrant #1 met based on the applicable warrant factor?

Yes

Traffic Volumes						Calculations			
Hour		Major Street		Minor Street		Combined Major Street	Higher Minor Street	Threshold	Is Threshold Met?
Begin	End	EB	WB	NB	SB				
5:00 PM	6:00 PM	725	362	0	218	1087	218	60	Yes
2nd	Highest Hour	717	358	0	194	1075	194	60	Yes
3rd	Highest Hour	652	325	0	168	977	168	60	Yes
4th	Highest Hour	587	293	0	166	879	166	60	Yes
5th	Highest Hour	489	244	0	147	733	147	69	Yes
6th	Highest Hour	481	240	0	145	721	145	71	Yes
7th	Highest Hour	456	228	0	140	684	140	76	Yes
8th	Highest Hour	407	203	0	129	611	129	91	Yes
9th	Highest Hour	147	73	0	28	220	28	249	No
10th	Highest Hour	391	195	0	117	586	117	97	Yes
11th	Highest Hour	375	187	0	115	562	115	103	Yes
12th	Highest Hour	367	183	0	115	550	115	107	Yes
13th	Highest Hour	358	179	0	112	537	112	110	Yes
14th	Highest Hour	358	179	0	94	537	94	110	No
15th	Highest Hour	293	146	0	91	440	91	144	No
16th	Highest Hour	253	126	0	65	379	65	169	No
17th	Highest Hour	212	106	0	65	318	65	197	No
18th	Highest Hour	163	81	0	44	244	44	235	No
19th	Highest Hour	147	73	0	28	220	28	249	No
20th	Highest Hour	98	49	0	23	147	23	294	No
21st	Highest Hour	49	24	0	12	73	12	343	No
22nd	Highest Hour	41	20	0	9	61	9	351	No
23rd	Highest Hour	24	12	0	9	37	9	369	No
24th	Highest Hour	24	12	0	7	37	7	369	No

12

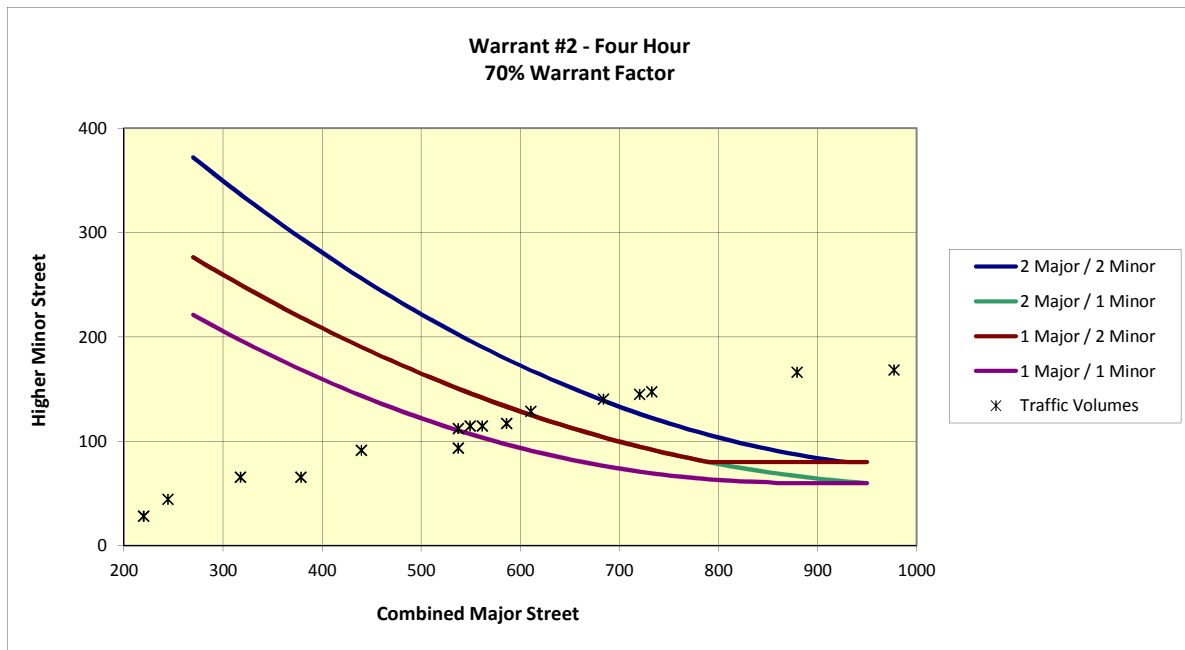
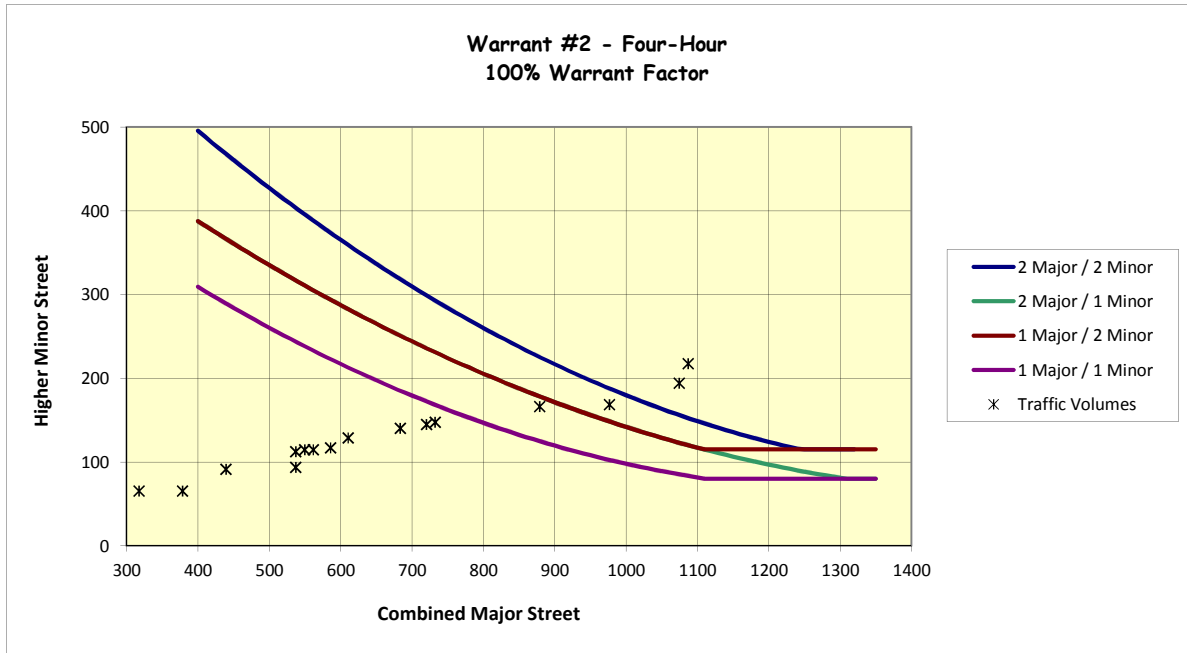
Number of lanes for moving traffic on each approach (Major Street)	1
Number of lanes for moving traffic on each approach (Minor Street)	1
Warrant Factor	70%
Row Index for VLOOKUP	5

Lookup Table							
Index	Major Street	Minor Street	Break Point	x ²	x	c	alt
1	1	1	1110	0.00027	0.73003	557.978	80
2	2 or more	1	1310	0.00023	0.73144	643.445	80
3	2 or more	2 or more	1280	0.00031	0.97877	858.973	115
4	1	2 or more	1110	0.00023	0.73144	643.445	115
5	1	1	790	0.00044	0.76930	396.803	60
6	2 or more	1	930	0.00037	0.76954	457.134	60
7	2 or more	2 or more	860	0.00049	1.03083	614.734	80
8	1	2 or more	790	0.00037	0.76954	457.134	80

100% Factor
70% Factor

Is Warrant #2 met based on the applicable warrant factor?

Yes



Traffic Volumes						Calculations			
Hour		Major Street		Minor Street		Combined Major Street	Higher Minor Street	Threshold	Is Threshold Met?
Begin	End	EB	WB	NB	SB				
5:00 PM	6:00 PM	725	362	0	218	1087	218	75	Yes
2nd	Highest Hour	717	358	0	194	1075	194	75	Yes
3rd	Highest Hour	652	325	0	168	977	168	81	Yes
4th	Highest Hour	587	293	0	166	879	166	96	Yes
5th	Highest Hour	489	244	0	147	733	147	130	Yes
6th	Highest Hour	481	240	0	145	721	145	134	Yes
7th	Highest Hour	456	228	0	140	684	140	145	No
8th	Highest Hour	407	203	0	129	611	129	171	No
9th	Highest Hour	147	73	0	28	220	28	370	No
10th	Highest Hour	391	195	0	117	586	117	180	No
11th	Highest Hour	375	187	0	115	562	115	190	No
12th	Highest Hour	367	183	0	115	550	115	195	No
13th	Highest Hour	358	179	0	112	537	112	200	No
14th	Highest Hour	358	179	0	94	537	94	200	No
15th	Highest Hour	293	146	0	91	440	91	245	No
16th	Highest Hour	253	126	0	65	379	65	276	No
17th	Highest Hour	212	106	0	65	318	65	310	No
18th	Highest Hour	163	81	0	44	244	44	354	No
19th	Highest Hour	147	73	0	28	220	28	370	No
20th	Highest Hour	98	49	0	23	147	23	419	No
21st	Highest Hour	49	24	0	12	73	12	472	No
22nd	Highest Hour	41	20	0	9	61	9	482	No
23rd	Highest Hour	24	12	0	9	37	9	500	No
24th	Highest Hour	24	12	0	7	37	7	500	No

6

Number of lanes for moving traffic on each approach (Major Street) 1
Number of lanes for moving traffic on each approach (Minor Street) 1
Warrant Factor 70%
Row Index for VLOOKUP 5

Lookup Table							
Index	Major Street	Minor Street	Break Point	x ²	x	c	alt
1	1	1	1460	0.00021	0.74072	734.125	100
2	2 or more	1	1760	0.00015	0.67328	809.779	100
3	2 or more	2 or more	1690	0.00023	0.93419	1081.658	150
4	1	2 or more	1450	0.00015	0.67328	809.779	150
5	1	1	1040	0.00035	0.80083	529.197	75
6	2 or more	1	1160	0.00025	0.73111	586.099	75
7	2 or more	2 or more	1130	0.00033	0.95887	762.050	100
8	1	2 or more	1020	0.00025	0.73111	586.099	100

100% Factor
70% Factor

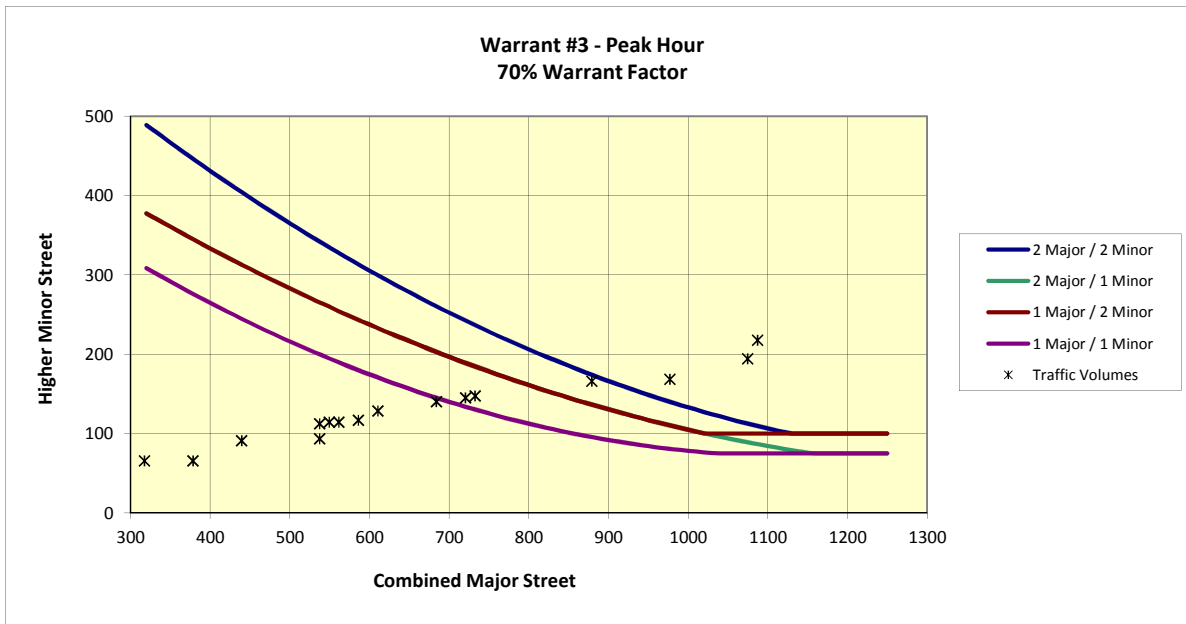
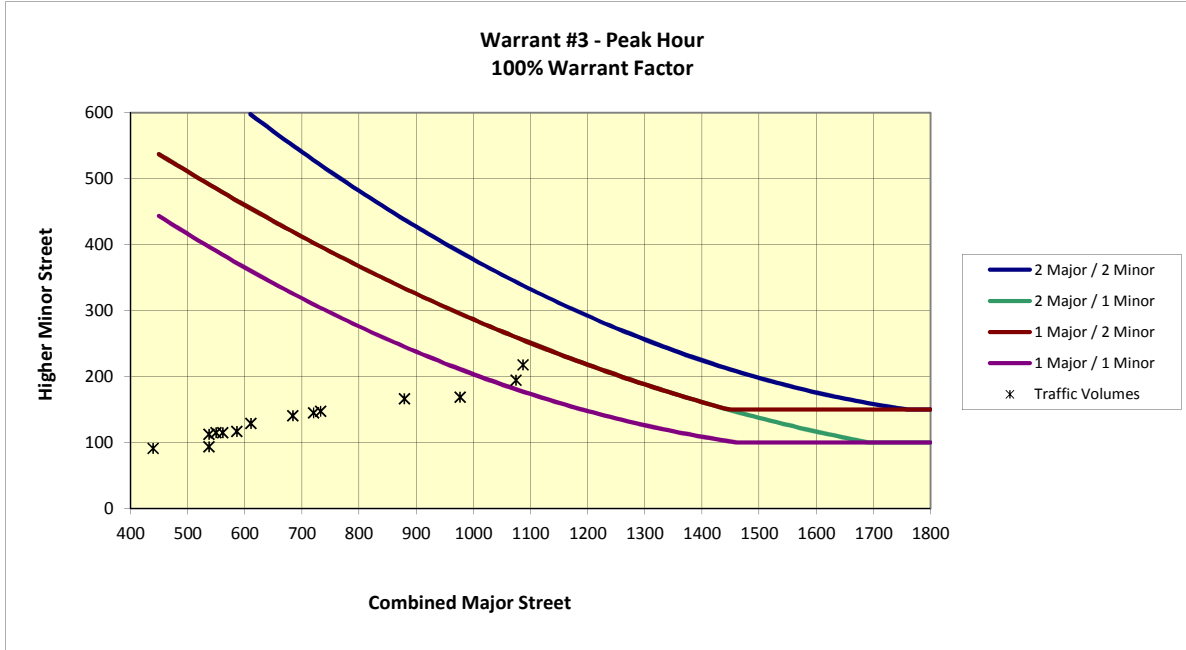
Is Warrant #3 met based on the applicable warrant factor?

Yes

Condition A Criteria		
	NB	SB
Total Stopped Delay Per Vehicle On Minor Approach (sec)	0.0	24.0
Number Of Lanes On Minor Street Approach	0	1
Vehicle-Hours Of Stopped Delay On Minor Approach	0.00	1.45
	No	No
Volume on Minor Street Approach During Same Hour	0	218
	No	Yes
Total Entering Volume On All Approaches During Same Hour	1304.5	
Number of Approaches to Intersection	3	
	Yes	

Is Warrant #3 met based on Condition A criteria?

No



War #3 - Peak HR (Graph)

Appendix H Proportion Share Calculations
at NE 192nd Avenue/NE 13th Street

Proposed Proportionate Share Contribution at NE 192nd Avenue/NE 13th Avenue

Cost Estimate:

Item	Unit Cost	Length	Cost	Notes
Northbound right-turn lane and westbound right-turn lane	\$ 280,000	1	\$ 280,000	Cost estimate attached.
Total			\$ 280,000	

Note: Cost estimate may not account for all ROW impacts

Proportionate Share Calculation:

Intersection volume without development (2029 Background Scenario)	1901
Intersection volume with development (2029 Total Traffic Scenario)	2346
Trips added by development (2346-1901)	445
Capacity of intersection with improvement (see attached Synchro output sheet)	2487
Additional volume accommodated with improvements (2487-1901)	586
Proportionate share cost per trip (\$280,000/586)	\$ 478
Proportionate share of capacity used by development (445/586)	0.759
Proposed proportionate share contribution (\$478 per trip * 445 trips)	\$ 212,600

Note: Assumed proportion of total volume by movement stays consistent with 2029

OLSON ENGINEERING INC.

1111 BROADWAY, VANCOUVER, WA 98660 (360) 695-1385

Green Mtn. - Right Turn Lane @ NE 192nd Avenue & NE 13th Street - Cost Estimate (Option I) North Bound Right & West Bound Right

Item #	Description	Unit Of Measure	Quantity	Unit Price	Total Price
GENERAL CONDITIONS					
1	Mobilization	LS	1	\$ 10,000.00	\$ 10,000.00
2	Clearing & Grubbing (Remove Hedge & Trees, etc.)	LS	1	\$ 2,400.00	\$ 2,400.00
3	Stripping 6" & Haul Off	CY	235	\$ 9.00	\$ 2,115.00
				Total	\$ 14,515.00
DEMOLITION					
4	AC Removal (Exist'g Edge Road & Exist'g Driveways To Ba	SF	2,070	\$ 1.00	\$ 2,070.00
5	Remove Exist'g Driveway Culvert (24 LF)	LS	1	\$ 300.00	\$ 300.00
6	Relocate Exist'g Mail Boxes	EA	5	\$ 125.00	\$ 625.00
7	Relocate Exist'g Signs	EA	3	\$ 125.00	\$ 375.00
				Total	\$ 3,370.00
EROSION CONTROL					
8	Silt Fence	LF	700	\$ 1.75	\$ 1,225.00
9	Hydroseed & Mulch Right - Of - Way	SF	14,000	\$ 0.30	\$ 4,200.00
10	Erosion Control Maintenance	LS	1	\$ 1,600.00	\$ 1,600.00
				Total	\$ 7,025.00
SITWORK					
<u>North Bound Right & West Bound Right</u>					
11	Sawcut	LF	930	\$ 2.00	\$ 1,860.00
12	Mass Grading & Haul Off	CY	480	\$ 10.00	\$ 4,800.00
13	Finish Grade	SF	6,345	\$ 0.30	\$ 1,903.50
14	Geotextile Fabric	SY	765	\$ 0.90	\$ 688.50
15	1½"- Crushed Rock (0.85')	TN	385	\$ 20.00	\$ 7,700.00
16	Asphaltic Concrete (0.85') Class ½" 64-22 HMA	TN	410	\$ 135.00	\$ 55,350.00
17	Curb & Gutter	LF	840	\$ 10.00	\$ 8,400.00
18	Sidewalk / Pedestrian Ramp	SF	4,275	\$ 4.00	\$ 17,100.00
19	Detectable Warning Surface	SF	10	\$ 25.00	\$ 250.00
20	Driveway Drop	EA	5	\$ 25.00	\$ 125.00
21	Driveway Approach (5)	SF	560	\$ 4.50	\$ 2,520.00
22	Pedestrian/Signal Modifications	LS	1	\$ 33,000.00	\$ 33,000.00
23	Traffic Control	LS	1	\$ 10,000.00	\$ 10,000.00
				Total	\$ 143,697.00
SITWORK					
<u>Pave Existing Driveways To Right - Of -Way</u>					
24	Removal AC / Gravel (Back Of Sidewalk To Right - Of - Wa	SF	1,435	\$ 1.00	\$ 1,435.00
25	Finish Grade	SF	1,435	\$ 0.30	\$ 430.50
26	Geotextile Fabric	SY	175	\$ 0.90	\$ 157.50
27	1½"- Crushed Rock (0.67')	TN	70	\$ 20.00	\$ 1,400.00
28	Asphaltic Concrete (0.25') Class ½" 64-22 HMA	TN	30	\$ 135.00	\$ 4,050.00
				Total	\$ 7,473.00

STORM

29	Stormfilter Catch Basin (2 - Cart.)	EA	2	\$	12,000.00	\$	24,000.00
30	Infiltration Trench (50 LF)	EA	2	\$	2,500.00	\$	5,000.00
Total							\$ 29,000.00

STRIPING & SIGNAGE













31	Solid Double Yellow Line	LF	470	\$	1.00	\$	470.00
32	Solid White Line	LF	810	\$	0.50	\$	405.00
33	White Thermoplastic Stop Bar (Extend Existing)	EA	1	\$	660.00	\$	660.00
34	Crosswalk Marking (Extend Existing)	EA	1	\$	750.00	\$	750.00
Total							\$ 2,285.00













Subtotal Construction Costs	\$	207,365.00
Soft Cost (20%)	\$	41,473.00
Contingency (15%)	\$	31,104.75
Total Construction Costs	\$	279,942.75

Proportionate Share Calculations
102: NE 13th St & NE 192nd Ave

Intersection Capacity with Improvements

6/17/2014






						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	262	217	730	445	318	515
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.7	5.4	5.8	5.7	5.4
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	0.96	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1595	1863	1527	1787	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1595	1863	1527	1787	1863
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	305	252	849	517	370	599
RTOR Reduction (vph)	0	54	0	41	0	0
Lane Group Flow (vph)	305	198	849	476	370	599
Confl. Peds. (#/hr)		2		8	8	
Heavy Vehicles (%)	2%	0%	2%	2%	1%	2%
Turn Type	pm+ov		pm+ov		Prot	
Protected Phases	6	3	4	6	3	8
Permitted Phases		6		4		
Actuated Green, G (s)	25.6	55.5	63.7	89.3	29.9	99.3
Effective Green, g (s)	25.6	55.5	63.7	89.3	29.9	99.3
Actuated g/C Ratio	0.19	0.41	0.47	0.66	0.22	0.73
Clearance Time (s)	5.8	5.7	5.4	5.8	5.7	5.4
Vehicle Extension (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	333	650	872	1002	393	1359
v/s Ratio Prot	c0.17	0.07	c0.46	0.09	c0.21	0.32
v/s Ratio Perm		0.06		0.22		
v/c Ratio	0.92	0.30	0.97	0.48	0.94	0.44
Uniform Delay, d1	54.2	27.3	35.4	11.7	52.2	7.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	28.3	0.1	23.9	0.1	30.5	0.1
Delay (s)	82.4	27.4	59.3	11.8	82.7	7.4
Level of Service	F	C	E	B	F	A
Approach Delay (s)	57.5		41.3			36.2
Approach LOS	E		D			D
Intersection Summary						
HCM Average Control Delay			42.7		HCM Level of Service	D
HCM Volume to Capacity ratio			0.95			
Actuated Cycle Length (s)			136.1		Sum of lost time (s)	16.9
Intersection Capacity Utilization			84.7%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	252	209	674	428	306	476
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.7	5.4	5.8	5.7	5.4
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1595	1863	1531	1787	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1595	1863	1531	1787	1863
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	293	243	784	498	356	553
RTOR Reduction (vph)	0	65	0	46	0	0
Lane Group Flow (vph)	293	178	784	452	356	553
Confl. Peds. (#/hr)		2		8	8	
Heavy Vehicles (%)	2%	0%	2%	2%	1%	2%
Turn Type	pm+ov		pm+ov		Prot	
Protected Phases	6	3	4	6	3	8
Permitted Phases		6		4		
Actuated Green, G (s)	23.9	51.8	56.8	80.7	27.9	90.4
Effective Green, g (s)	23.9	51.8	56.8	80.7	27.9	90.4
Actuated g/C Ratio	0.19	0.41	0.45	0.64	0.22	0.72
Clearance Time (s)	5.8	5.7	5.4	5.8	5.7	5.4
Vehicle Extension (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	337	658	843	984	397	1342
v/s Ratio Prot	c0.17	0.06	c0.42	0.09	c0.20	0.30
v/s Ratio Perm		0.05		0.21		
v/c Ratio	0.87	0.27	0.93	0.46	0.90	0.41
Uniform Delay, d1	49.3	24.4	32.5	11.3	47.4	7.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	19.9	0.1	16.3	0.1	21.6	0.1
Delay (s)	69.2	24.4	48.8	11.5	69.0	7.1
Level of Service	E	C	D	B	E	A
Approach Delay (s)	48.9		34.3			31.3
Approach LOS	D		C			C
Intersection Summary						
HCM Average Control Delay			36.2		HCM Level of Service	D
HCM Volume to Capacity ratio			0.91			
Actuated Cycle Length (s)			125.5		Sum of lost time (s)	16.9
Intersection Capacity Utilization			80.5%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Appendix I Phase 3 Access Operations Worksheets

HCM 2010 TWSC
303: NE Ingle Rd & Phase 3 Site Access

9/28/2017




Intersection						
Int Delay, s/veh	2.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	70	17	159	23	6	230
Future Vol, veh/h	70	17	159	23	6	230
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	0	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	78	19	177	26	7	256
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	458	189	0	0	202	0
Stage 1	189	-	-	-	-	-
Stage 2	269	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	565	858	-	-	1382	-
Stage 1	848	-	-	-	-	-
Stage 2	781	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	562	858	-	-	1382	-
Mov Cap-2 Maneuver	562	-	-	-	-	-
Stage 1	848	-	-	-	-	-
Stage 2	777	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	11.8	0		0.2		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 562 858 1382	-	-		
HCM Lane V/C Ratio	-	- 0.138 0.022 0.005	-	-		
HCM Control Delay (s)	-	- 12.4 9.3 7.6	-	-		
HCM Lane LOS	-	- B A A	-	-		
HCM 95th %tile Q(veh)	-	- 0.5 0.1 0	-	-		

HCM 2010 TWSC
304: NE Ingle Rd & Phase 3 Shared Dwy

9/28/2017

Intersection

Int Delay, s/veh 0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	1	181	1	0	300
Future Vol, veh/h	2	1	181	1	0	300
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	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	2	1	201	1	0	333

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	535	202	0	0	202	0
Stage 1	202	-	-	-	-	-
Stage 2	333	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	510	844	-	-	1382	-
Stage 1	837	-	-	-	-	-
Stage 2	731	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	510	844	-	-	1382	-
Mov Cap-2 Maneuver	510	-	-	-	-	-
Stage 1	837	-	-	-	-	-
Stage 2	731	-	-	-	-	-

Approach	WB		NB		SB
HCM Control Delay, s	11.2		0		0
HCM LOS	B				






Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	- 587	1382	-
HCM Lane V/C Ratio	-	- 0.006	-	-
HCM Control Delay (s)	-	- 11.2	0	-
HCM Lane LOS	-	- B	A	-
HCM 95th %tile Q(veh)	-	- 0	0	-

HCM 2010 TWSC
303: NE Ingle Rd & Phase 3 Site Access

9/28/2017

Intersection

Int Delay, s/veh 1.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	46	11	234	78	20	258
Future Vol, veh/h	46	11	234	78	20	258
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	0	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	51	12	260	87	22	287




Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	634	303	0
Stage 1	303	-	-
Stage 2	331	-	-
Critical Hdwy	6.4	6.2	4.1
Critical Hdwy Stg 1	5.4	-	-
Critical Hdwy Stg 2	5.4	-	-
Follow-up Hdwy	3.5	3.3	2.2
Pot Cap-1 Maneuver	446	741	1223
Stage 1	754	-	-
Stage 2	732	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	438	741	1223
Mov Cap-2 Maneuver	438	-	-
Stage 1	754	-	-
Stage 2	719	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.5	0	0.6
HCM LOS	B		

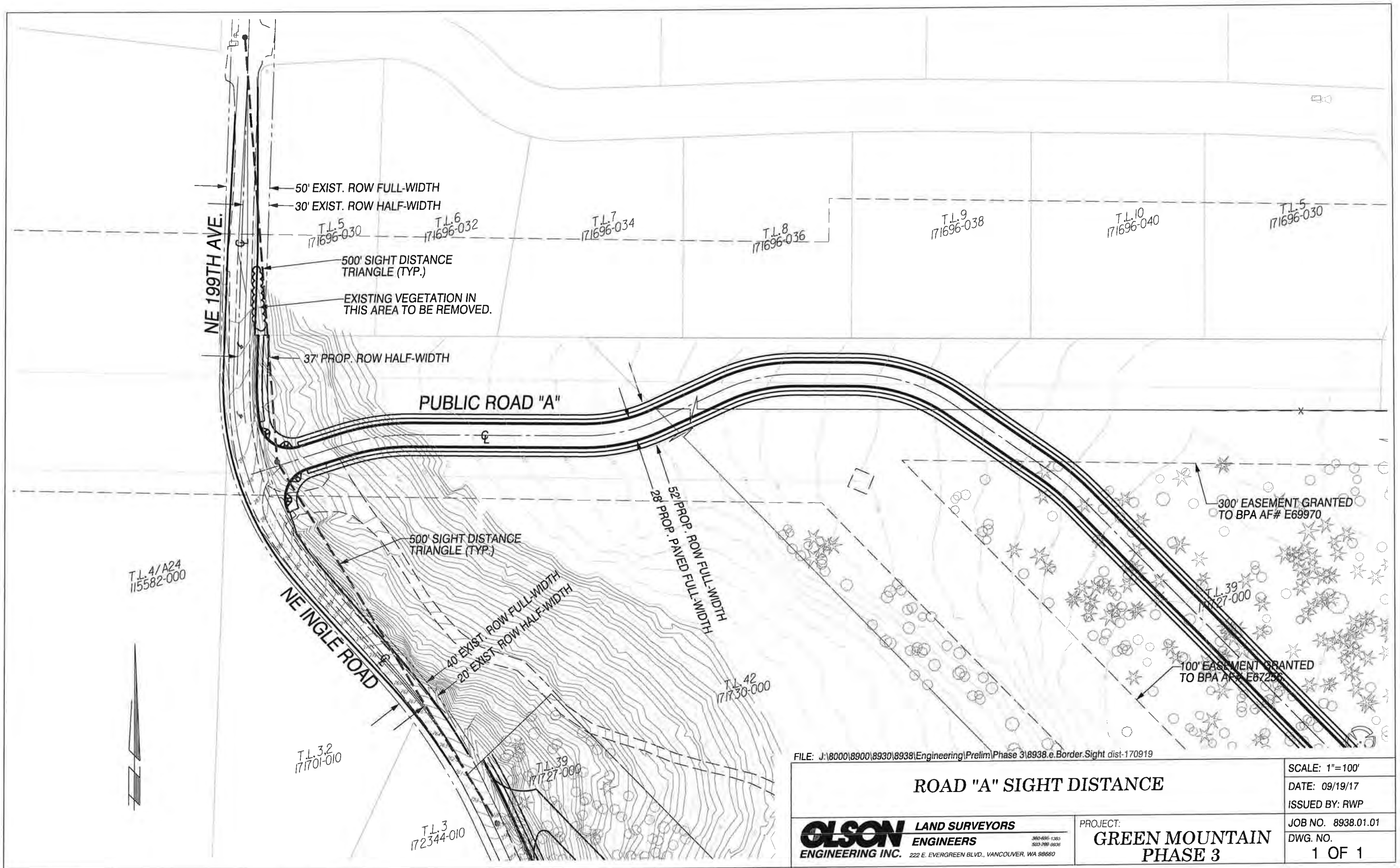
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT
Capacity (veh/h)	-	- 438 741 1223	-	-
HCM Lane V/C Ratio	-	- 0.117 0.016 0.018	-	-
HCM Control Delay (s)	-	- 14.3 9.9 8	-	-
HCM Lane LOS	-	- B A A	-	-
HCM 95th %tile Q(veh)	-	- 0.4 0 0.1	-	-

HCM 2010 TWSC
304: NE Ingle Rd & Phase 3 Shared Driveway

9/28/2017

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	1	311	2	0	304
Future Vol, veh/h	1	1	311	2	0	304
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	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	1	1	346	2	0	338
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	685	347	0	0	348	0
Stage 1	347	-	-	-	-	-
Stage 2	338	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	417	701	-	-	1222	-
Stage 1	720	-	-	-	-	-
Stage 2	727	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	417	701	-	-	1222	-
Mov Cap-2 Maneuver	417	-	-	-	-	-
Stage 1	720	-	-	-	-	-
Stage 2	727	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	11.9		0		0	
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 523	1222	-		
HCM Lane V/C Ratio	-	- 0.004	-	-		
HCM Control Delay (s)	-	- 11.9	0	-		
HCM Lane LOS	-	- B	A	-		
HCM 95th %tile Q(veh)	-	- 0	0	-		

Appendix J Sight Distance Exhibits



FILE: J:\8000\8900\8930\8938\Engineering\Prelim\Phase 3\8938.e.Border.Sight dist-170919

ROAD "A" SIGHT DISTANCE

OLSON LAND SURVEYORS
ENGINEERS
ENGINEERING INC. 222 E. EVERGREEN BLVD., VANCOUVER, WA 98660

PROJECT:
**GREEN MOUNTAIN
PHASE 3**

SCALE: 1"=100'
DATE: 09/19/17
ISSUED BY: RWP
JOB NO. 8938.01.01
DWG. NO.
1 OF 1



Memorandum

To: Joe Turner, Hearing Examiner

From: Robert Maul, Planning Manager

Date: July 31, 2019

Re: Green Mountain PRD Pod B1 (SUB18-04)

The original Green Mountain Planned Residential Development (SUB14-03) required a traffic study from the applicant to analyze impacts to regional intersections and roadways for the entire multi-phase development. One possible off-site intersection identified early on is north of the project site located in Clark County's jurisdiction on a State Route (SR 500) at NE 199th Avenue and NE 58th Street. At the time of the original development application this intersection did not meet failure warrants for phase 1 or 2, but monitoring concurrency would indicate when the intersection met failure.

Phase 3 of the Green Mountain PRD (SUB17-03) did trigger the requirement for off-site mitigation via concurrency for pro-rata share mitigation payments to be made by the applicant. The final order for Phase 3 did include a condition for the applicant to coordinate with Washington State Department of Transportation and Clark County for making pro-rata payments to meet their obligation to mitigate off site impacts. During the coordination both agencies have indicated that they are not currently in a position to do the intersection improvements anytime soon, so they have declined to enter into an agreement with the applicant to make those payments. Attached to this memo is an email chain that provides correspondence from both agencies declining to enter into an agreement with the applicant, or other designees to collect funds for off-site impacts. As such, the City will not be conditioning the applicant for Pod B1 to provide any off site mitigation pro-rata share payments, or improvements for NE 199th Avenue and NE 58th Street.

Robert Maul

From: Curleigh (Jim) Carothers
Sent: Tuesday, May 21, 2019 4:58 PM
To: Shawn R. MacPherson
Cc: Phil Bourquin; Robert Maul
Subject: FW: 199th/58th intersection mitigation for Green Mt. PRD
Attachments: AGREEMENT TO ESTABLISH AND COLLECT A TRANSPORTATION MITIGATION FEE FOR T....pdf; 8938.DA-COVENANT.PDF

Shawn,

We have a draft of an agreement from Randy Printz for the collection of money for future improvements to 199th and 58th Street (County Road meets State Route). Both the County and the State have refused to participate in this agreement and the County will not collect nor hold the funds for these improvements. I am fairly certain that the State will not do so, either, based on the email response below.

My thought is to have a meeting to discuss how to address this COA for GM PRD Phase 3.

- Wednesday 3:30 to 5:00
- Friday 10:30 to noon and 1:00 to 2:00

Please let me know if you can meet in any of the above windows. Thanks.

James E. Carothers, P.E.
Engineering Manager/City Engineer



616 NE 4th Avenue
Camas, WA 98607
360-817-7230
360-834-1535 FAX
jcarothers@cityofcamas.us

From: Barsness, Jeff [mailto:BarsneJ@wsdot.wa.gov]
Sent: Tuesday, May 21, 2019 1:59 PM
To: Randall B. Printz <Randy.Printz@landerholm.com>; Jardin, David <David.Jardin@clark.wa.gov>; Curleigh (Jim) Carothers <jcarothers@cityofcamas.us>; Steve Wall <SWall@cityofcamas.us>; Robert Maul <RMaul@cityofcamas.us>
Cc: Kurt Stonex <kurt@olsonengr.com>; Qayoumi, Ahmad <Ahmad.Qayoumi@clark.wa.gov>
Subject: RE: 199th/58th intersection mitigation for Green Mt. PRD

Sorry to take so long on this, things move a little slower here than at the County. I have also presented this to our staff and have gotten a similar response to Clark County's concerning signing the agreement. Even though we agree with the intent of the agreement, because WSDOT does not have a project at this intersection, is not collecting the funds, and is not the lead agency conditioning this requirement we respectfully decline the opportunity to be a signatory on this agreement. We do appreciate the hard work and dedication everyone has put into this agreement.

Jeff Barsness
Development Services Engineer

WSDOT SW Region
11018 NE 51st Circle
Vancouver, WA 98682
360-905-2059
barsnej@wsdot.wa.gov

From: Randall B. Printz <Randy.Printz@landerholm.com>
Sent: Tuesday, May 21, 2019 12:07 PM
To: Jardin, David <David.Jardin@clark.wa.gov>; Barsness, Jeff <Barsnej@wsdot.wa.gov>; Curleigh (Jim) Carothers <jcarothers@cityofcamas.us>; Steve Wall <SWall@cityofcamas.us>; Robert Maul <RMaul@cityofcamas.us>
Cc: Kurt Stonex <kurt@olsonengr.com>; Qayoumi, Ahmad <Ahmad.Qayoumi@clark.wa.gov>
Subject: RE: 199th/58th intersection mitigation for Green Mt. PRD

Jeff/Steve:

Here is the final form of the agreement without the County. Jeff, if you could print and execute it and then send that original to Steve for signature, I will then pick it up and have it signed by Green Mt. I will then circulate a fully executed copy to everyone. Thanks.

Randall B. Printz | Attorney at Law


Legal advisors. Trusted advocates.
805 Broadway Street, Suite 1000
P.O. Box 1086
Vancouver, WA 98666-1086
T: 360-600-8846 | T: 360-696-3312 | F:
www.landerholm.com

From: Randall B. Printz
Sent: Tuesday, May 21, 2019 11:58 AM
To: Jardin, David <David.Jardin@clark.wa.gov>; 'Jeff Barsness' <barsnej@wsdot.wa.gov>; Curleigh (Jim) Carothers <jcarothers@cityofcamas.us>; Steve Wall <SWall@cityofcamas.us>; Robert Maul <RMaul@cityofcamas.us>
Cc: Kurt Stonex <kurt@olsonengr.com>; Safayi, Ali <Ali.Safayi@clark.wa.gov>; Shafer, Greg <Greg.Shafer@clark.wa.gov>; Qayoumi, Ahmad <Ahmad.Qayoumi@clark.wa.gov>
Subject: RE: 199th/58th intersection mitigation for Green Mt. PRD

David, I have edited the agreement to remove the County as a party and will be sending it out shortly to the other parties. Please, however, confirm that the County agrees with the City and WSDOT's per lot fee requirement for this intersection as the appropriate mitigation for this intersection with respect to the Green Mountain PRD project. Thanks.

From: Jardin, David <David.Jardin@clark.wa.gov>
Sent: Wednesday, May 8, 2019 2:44 PM
To: Randall B. Printz <Randy.Printz@landerholm.com>; 'Jeff Barsness' <barsnej@wsdot.wa.gov>; Curleigh (Jim) Carothers <jcarothers@cityofcamas.us>; Steve Wall <SWall@cityofcamas.us>; Robert Maul <RMaul@cityofcamas.us>
Cc: Kurt Stonex <kurt@olsonengr.com>; Safayi, Ali <Ali.Safayi@clark.wa.gov>; Shafer, Greg <Greg.Shafer@clark.wa.gov>; Qayoumi, Ahmad <Ahmad.Qayoumi@clark.wa.gov>
Subject: RE: 199th/58th intersection mitigation for Green Mt. PRD

Good Afternoon;

I have presented and discussed the proposed Agreement with individuals from our finance department, Prosecuting Attorney's Office, Development Engineering, and our Public Works Director's office. The discussions raised concerns with each of the offices with regard to the county's collection of monies from a development under the City of Camas jurisdiction. Based on the county's discussions and conclusions, the county respectfully declines the opportunity to be a party to the [Agreement to Establish and Collect a Transportation Mitigation Fee for the Intersection of 58th Street/199th Street](#).



David Jardin
Concurrency Engineer
PUBLIC WORKS DEVELOPMENT ENGINEERING

564.397.4354 Direct
www.clark.wa.gov/public-works



From: Randall B. Printz [<mailto:Randy.Printz@landerholm.com>]
Sent: Friday, April 26, 2019 5:13 PM
To: 'Jeff Barsness'; Curleigh (Jim) Carothers; Steve Wall; Robert Maul; Jardin, David
Cc: Kurt Stonex
Subject: RE: 199th/58th intersection mitigation for Green Mt. PRD

CAUTION: This email originated from outside of Clark County. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Everyone, after reviewing the agreement I previously sent and thinking about it a little more, I think there could have been a little more clarity in the agreement with respect to the payment mechanism and number of trips through the intersection. We have all agreed that for every PM Peak hour trip that the future phases of Green Mountain put through the subject intersection, a fee of \$1,015 should be paid. What was lacking in the previous agreement that I sent you, was a clear mechanism for how that would be calculated on a subdivision by subdivision or site plan approval basis. It would likely have occurred as it currently is for the pro rata share payments at 192nd/ 1st, but I thought I should probably put some clarifying language in the agreement. The only other change that I made, was to add another party who is now in title to a portion of the property that we are talking about. Let me know if this agreement is acceptable and I will circulate for signature. Thanks.

Randall B. Printz | Attorney at Law



805 Broadway Street, Suite 1000
P.O. Box 1086
Vancouver, WA 98666-1086

From: Randall B. Printz

Sent: Monday, April 8, 2019 4:39 PM

To: 'Jeff Barsness' (barsnej@wsdot.wa.gov) <barsnej@wsdot.wa.gov>; Curleigh (Jim) Carothers <jcarothers@cityofcamas.us>; Steve Wall <SWall@cityofcamas.us>; Robert Maul <RMaul@cityofcamas.us>; Jardin, David <David.Jardin@clark.wa.gov>

Cc: Kurt Stonex <kurt@olsonengr.com>

Subject: 199th/58th intersection mitigation for Green Mt. PRD

This is a follow up to the previously agreed upon PM peak hour trip amount that would be paid at the time of building permit as mitigation for the Green Mountain PRD's future (all portions of the PRD except for phases 1,2 and 3, which already have mitigation payment amounts established) impacts to the 58th Street (SR 500)/ 199th Street intersection. To refresh everyone's memory, Green Mountain PRD, at the outset of its land use planning process, completed a traffic study for the full buildout of the PRD. Subsequently, a Development Agreement was entered into between the City and the Developer and applications for a Planned Residential Development were submitted to the City. The PRD contained a master plan for the entire PRD, as well as, the above mentioned traffic study.

After full public and agency review, including multiple public hearings, the Development Agreement and PRD were approved with conditions by the City. The approved PRD, based upon a recommendation in the traffic study, required that the 199th/58th intersection be monitored as each phase of the development occurred. That monitoring was done by Kittelson and at Phase 3 preliminary plat process, it was determined that some mitigation was appropriate. With input from Kittelson, Olson WSDOT, Clark County and the City, an agreement was reached for phase 3 that required a per trip payment for the lots in Phase 3. These payments were to go toward the potential construction of a round-a-bout.

At that time, it was also discussed by WSDOT, the City and the developer that it would be nice to not have to go through the same exercise for each future phase of the PRD; and if possible, the parties should try and analyze the rest of the PRD's impact to this intersection in the context of the area's future buildout. Amongst Kittelson, Olson and WSDOT that analysis was completed and a per PM peak hour trip fee was developed for application to the trips that would be generated after phase 3 for the Green Mountain PRD. As evidenced by an email dated 11/07/2018 from Jeff, WSDOT agreed with the per PM Peak hour trip cost for the remaining trips:

Kurt,

Thanks for revising the estimate. WSDOT is in agreement with the new estimated cost per trip of \$1015.

Jeff

The City and the County also agreed with the cost per trip. In the case of the County, David Jardin indicated:

Thank you for allowing county comment on your efforts to ensure future mitigations, at the intersection NE 199th Avenue/SR 500 (NE 58th Street), as a result of transportation impacts with the development of Green Mountain PRD. The county would like to ensure that the funds collected, per PM Peak Hour vehicle trip, are available for county use should there be an intersection improvement project at this location. The county staff would like our Prosecuting Attorney's (PA's) Office to review any proposed language, prior to issuance of any decision, to ensure;

- *Collected money's will be available to a county capital project and/or private development intersection improvement at this location*

- *The mechanism/process that the funds would be requested and distributed to the county and/or private development*

I think all of the parties involved: the City, the County, WSDOT and the developer agree that the funds collected should be able to be used by either the County, the City, WSDOT or a development that is conditioned upon constructing the round a bout. Having spoken with all of the governmental entities, the only question I have is which entity wants to collect and hold the money. Obviously, on the development side, we don't care which entity has the money, we simply want to know who to write the check to. Attached is a simple letter agreement to be signed by Green Mountain, the City, the County and WSDOT that obligates the payment of the now established mitigation fee; such payment to be made, like other impact fees, at the time of building permit issuance.

I have attached a proposed draft agreement and an Exhibit A which depicts the area upon which the fee will be charged. I have left a blank for which entity will collect and hold the money. Please send me any comments you have or redline the agreement and I will put into final form and circulate for signature. Also, please let me know which entity should collect and hold the money. Thanks.

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CAMAS WA, 98607

DEPT. OF NATURAL RESOURCES
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OLYMPIA WA, 98504

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GREEN MOUNTAIN PH 1 HOA
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BELLEVUE WA, 98006

PROVINCE JOSEPH II & PROVINCE
9032 N DOGWOOD ST
CAMAS WA, 98607

~~GREEN MOUNTAIN PHASE MASTER~~
~~C/O BLUE MOUNTAIN COMMUNITY~~
~~BELLEVUE WA, 98006~~

STABILE MARY L
9110 N DOGWOOD ST
CAMAS WA, 98607



COMMUNITY DEVELOPMENT DEPARTMENT

616 NE 4th Avenue
Camas, WA 98607
www.ci.camass.wa.us

April 9, 2019

Joel Stirling
Sterling Design, Inc.
2208 E. Evergreen Blvd.
Vancouver, WA 98661
Sent via email Mail@SterlingDesign.biz

RE: Green Mountain POD B1 Subdivision (SUB18-04)

Dear Joel Stirling,

The purpose of this letter is to inform you that the above application submitted on November 1st, 2018 and resubmitted April 1st have been deemed complete in accordance with Camas Municipal Code (CMC) Section 18.55.130. Staff will begin reviewing the application and contact you should we have questions/comments.

If you have any questions, please contact me at (360) 817-7253.

Respectfully,

A handwritten signature in black ink that reads "Lauren Hollenbeck". The signature is written in a cursive, flowing style.

Lauren Hollenbeck
Senior Planner

Cc: Anita Ashton, Engineering Project Manager
Robert Maul, Planning Manager



November 27th, 2018

Joel Stirling
Sterling Design, Inc.
2208 E. Evergreen Blvd.
Vancouver, WA 98661

RE: Green Mountain PRD B1-POD (SUB18-04)

Dear Mr. Stirling,

Thank you for your application submittal for the Green Mountain PRD B1-POD (SUB18-04). There are items that remain to be addressed with your application. The purpose of this letter is to inform you that the above application submitted on November 1st, 2018, has been deemed incomplete in accordance with Camas Municipal Code (CMC) Section 18.55.130. You have 180 days from the date of application to submit the missing information pursuant to CMC 18.55.130.C. If the below requested information is submitted, staff will again verify whether the application is complete.

Items necessary for completeness:

1. Per CMC 18.55.110(H), Prior to an application being deemed complete and Type III applications are scheduled for public hearing, the applicant shall post one four-foot by eight-foot sign per road frontage. The sign shall be attached to the ground with a minimum of two four-inch by four-inch posts or better. Attached is an example.
2. Per CMC 17.11.030.B.6(e), show location of street lights.
3. Per CMC 17.11.030.B.7(d), identify the quantities of cut and fill on the preliminary grading plans.
4. Per pre-application note #9, the location and height of walls shall be shown on the preliminary grading plans.
5. Per pre-application note #21, a circulation plan shall be provided per CMC 17.19.040.B.10.a.
6. Per the pre-application notes, demonstrate how the proposed development is in compliance with the Tree Preservation Plan, Exhibit E of the DA. To date, how many trees have been preserved in Zone C? Provide an exhibit similar to the attached example.
7. As stated in the pre-application notes, a critical areas report is required for the proposed removal of the Oregon White Oaks with this development to include an analysis of alternative designs that demonstrates an effort to avoid impacts. A mitigation plan is required.
8. Please confirm whether or not Wetland G and its buffer is located within the boundaries of this plat and if so, a critical areas report addressing this wetland and its buffer will be required.
9. As stated in the pre-application notes, stormwater treatment and detention shall be onsite (engineering note #31).

Other preliminary project issues noted by staff to be addressed:

10. Per CMC 17.19.030.F, at least one tree shall be provided for each new dwelling unit.
11. Reference Table 17.19.040-1:
 - a. Private street abutting lots 2-10 and 37-44 to be 48' wide, 28' paved, with sidewalks both side
 - b. Access Tract abutting lots 23-26 is not approved
 - c. Private street abutting lots 16-21 to be extended to south edge of parcel, abutting lots 23-26, with turn around.
 - d. Access Tract abutting lots 11-15 to be 30' wide with 20' paved, with sidewalk on one side.
 - e. Alley abutting lots 29-36 to be a private street, 42' wide, 28' paved with sidewalk one side.
 - f. Alley abutting lots 98-109 to be a private street, 48' wide, 28' paved with sidewalks on both sides.

Additional comments will be provided during further review of your application. If you have any questions, please contact me at (360) 817-7253.

Respectfully,



Lauren Hollenbeck,
Senior Planner



Notice of Application

Green Mountain PRD B1 – POD Subdivision

File No. SUB18-04

“NOTICE IS HEREBY GIVEN” that an application for “Green Mountain PRD B1 –POD” a 111 lot multi-family residential subdivision development requesting preliminary plat approval was received on November 1, 2018, resubmitted April 1, 2019 and deemed technically complete on April 9, 2019. A public hearing is required for the Subdivision, and will be scheduled at a later time. A separate public notice for the public hearing will be mailed to all property owners within 300-feet of the subject development and published in the Post Record.

LOCATION: The 7.89-acre site is zoned multi-family residential (MF-18) in the City of Camas. The site is located east of Ingle Road in the NW 1/4 of Section 20 & 21, Township 2 North, Range 3 East; Camas, WA, Parcel Numbers:173178000 & 986037307.

APPLICATION MATERIALS: The application included the following: project narrative; preliminary plans; preliminary stormwater report; traffic information; environmental reports; SEPA checklist, archaeological predetermination* and other required submittal documents. These documents are available for viewing at the Community Development Department (616 NE 4th Avenue, Camas, WA) during regular business hours Monday – Friday 8am-5pm.

Questions/Comments: For questions related to this application, please contact Lauren Hollenbeck, Senior Planner, at (360) 817-7253 or by email at communitydevelopment@cityofcamas.us.

*consistent with RCW 42.56.300, Archaeological information is exempt from public disclosure.

Published in the Post Record on 4/18/19

Legal publication No. 182360

Posted on bulletin boards at Camas City Hall and the Camas Library and on the City's website.

Mailed to property owners within 300-feet on 4/17/19



11815 NE 99th Street, Suite 1294
Vancouver, WA 98682
(360) 574-3058
www.swcleanair.org

July 2, 2019

Attn: City of Camas, SEPA Official
Community Development Department
616 NE Fourth Avenue
Camas WA 98607

RE: Green Mountain PRD B1-POD Subdivision; SEPA18-21

SEPA Official:

The Southwest Clean Air Agency (SWCAA) was recently notified that your agency has issued/will issue a SEPA Determination for the above project. Please be advised that SWCAA administers/enforces a number of regulations that may apply to the proposed project. The applicability of these regulations depends on the exact nature of the project in question. The following section provides a brief summary of the requirements for the general types of activity that may be affected by this project.

Construction Dust [SWCAA 400 - General Regulations for Air Pollution Sources]:

- Construction and earthmoving activities have the potential to generate excessive dust emissions if reasonable control measures are not implemented. SWCAA Regulation 400-040(2) requires that “no person shall cause or permit the emission of particulate matter from any stationary source to be deposited beyond the property under direct control of the owner or operator of the stationary source in sufficient quantity to interfere unreasonably with the use and enjoyment of the property upon which the material is deposited”. Furthermore, SWCAA Regulation 400-040(8)(a) requires that “the owner or operator of any source of fugitive dust shall take reasonable precautions to prevent fugitive dust from becoming airborne and shall maintain and operate the source to minimize emissions”.
- Common control measures to mitigate the emission of dust from construction and earthmoving activities include: application of water before and during earthmoving operations, application of water to disturbed surface areas (including access roads and staging areas) after earthmoving operations, application of chemical dust control products and/or surfactants, limiting access to open/disturbed areas, reducing equipment/vehicle speeds, establishing vegetative cover on inactive areas and ceasing operations altogether during high wind events.
- Violations of SWCAA Regulation 400-040 may result in civil penalties being assessed against the project operator and/or property owner.

The proponent of this project may contact SWCAA at 360-574-3058 for more information regarding the agency's requirements. Notification forms, permit applications, regulations and other information are available on the internet at <http://www.swcleanair.org>.

Sincerely,

Duane Van Johnson
Air Quality Specialist II



Notice of Public Hearing

Green Mountain PRD B1 - POD Subdivision

File No. SUB18-04

A public hearing for the “Green Mountain PRD B1 - POD” will be held on **Tuesday, August 6, 2019, at 5:00 p.m.** or soon thereafter, at City Hall, 616 NE 4th Avenue, Camas, WA. The Green Mountain PRD B1 - POD Subdivision was submitted by Sterling Design, Inc. for the owner, AE Green Mountain LLC, on November 1, 2018 and was deemed technically complete on April 1, 2019. The applicant requests approval of a 111-lot subdivision. The proposed project is located east of NE Ingle Road on 7.98 acres [*Tax Parcel: 173178000 & 986037307*]. The project area is zoned multi-family residential (MF-18).

Questions/Comments: The public hearing will follow the quasi-judicial process described within Camas Municipal Code §18.55.180. Public comments and questions are encouraged, and there are several opportunities available to interested citizens. Comments related to this development may be submitted as follows: (1) In person by testifying at the public hearing; (2) by regular mail to Planning Division staff, Lauren Hollenbeck, Senior Planner, at the Camas City Hall, 616 NE 4th Avenue, Camas, WA 98607; (3) by phone (360) 817-7253 or by email to: communitydevelopment@cityofcamas.us.

Application Materials: The Green Mountain PRD B1-POD preliminary plat (subdivision) application included the following: Project Narrative; Preliminary Plans; Pre-Application meeting notes; SEPA checklist, Preliminary Stormwater Report; Traffic Study; Environmental Reports; and Archaeological Predetermination* and other required submittal documents. These documents are available for viewing at the Community Development Department (616 NE 4th Avenue, Camas, WA) during regular business hours Monday – Friday 8am-5pm.

Participate: All citizens are entitled to have equal access to the services, benefits and programs of the City of Camas. Please contact the City Clerk at (360) 817-1591 for special accommodations if needed. The City will provide translators for non-English speaking persons who request assistance at least three working days prior to a public meeting.

More Information: The public hearing agenda and supporting documents will be available for review on the City’s website at the “Minutes, Agendas & Videos” link within the drop-down menu that is labeled “Your Government” or follow this link: <http://www.cityofcamas.us/yourgovernment/minuteagendavideo>.

*Consistent with RCW 42.56.300, Archaeological information is exempt from public disclosure.

Published in the Post Record on July 18, 2019 [Legal Publication #235270]

Posted at Camas City Hall, Camas Library, City of Camas web site at: <http://www.cityofcamas.us>

Mailed to property owners within 300-feet on July 17, 2019

Green Mountain PRD B1-POD (SUB18-04)
Preliminary Plat





State Environmental Policy Act
Determination of Non-Significance

CASE NO: SEPA 18-27 Green Mountain PRD B1 - POD Subdivision

APPLICANT: Sterling Design, Inc.
Joel Sterling
2208 East Evergreen Blvd
Vancouver, WA 98661

REQUEST: To subdivide 7.89 acres into 111 residential lots.

Location: To the East of NE Ingle Road and approx. a ¼ mile North of NE Goodwin Road in Camas, WA.

Legal Description: The property is located in the NW ¼ of Sections 20 & 21, Township 2 North, Range 3 East, of the Willamette Meridian; and described as tax parcels 173178-000 and 986037-307.

SEPA Determination: Determination of Non-Significance (DNS)

Comment Deadline: Thursday, July 11, 2019, at 5:00 p.m.

As lead agency under the State Environmental Policy Act (SEPA) Rules [Chapter 197-11, Washington Administrative Code (WAC)], the City of Camas must determine if there are possible significant adverse environmental impacts associated with this proposal. The options include the following:

- DS = Determination of Significance (The impacts cannot be mitigated through conditions of approval and, therefore, requiring the preparation of an Environmental Impact Statement (EIS).
- MDNS = Mitigated Determination of Non-Significance (The impacts can be addressed through conditions of approval), or;
- DNS = Determination of Non-Significance (The impacts can be addressed by applying the Camas Municipal Code).

Determination:

Determination of Non-Significance (DNS). The City of Camas, as lead agency for review of this proposal, has determined that this proposal does not have a probable significant adverse impact on the environment. An Environmental Impact Statement (EIS) is not required under RCW 43.21C.030(2)(e). This decision was made after review of a completed environmental checklist, and other information on file with the City of Camas.

Date of Publication & Comment Period:

Publication date of this DNS is June 27, 2019, and is issued under WAC 197-11-340. The lead agency will not act on this proposal until the close of the 14-day comment period, which ends on **July 11, 2019**. Comments may be sent by email to communitydevelopment@cityofcamas.us.

SEPA Appeal Process:

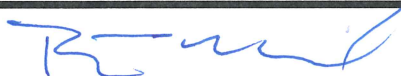
An appeal of this SEPA determination and any required mitigation, must be filed with the Community Development Department within fourteen (14) calendar days following the last day of the comment period. The letter of appeal should contain the following information.

1. The case number designated by the City of Camas and the name of the applicant; and,
2. The name and signature of each person or group (petitioners) and a statement showing that each petitioner is entitled to file an appeal as described under Title 16 of the Camas Municipal Code. If multiple parties file a single petition for review, the petition shall designate one party as the contact representative with the City Planner. All contact with the City Planner regarding the petition, including notice, shall be with this contact person.

The appeal request and appropriate fee of **\$383** must be submitted to the Community Development Department between 8:00 a.m., and 5:00 p.m., Monday through Friday, at the address listed below:

Appeal to the City of Camas SEPA Official
Community Development Department
616 NE Fourth Avenue
Camas, Washington 98607

Responsible Official: Robert Maul (360) 817-1568

 Robert Maul, Planning Manager and Responsible Official	June 27, 2019 Date of publication
--	--

Green Mountain PRD B1-POD (SUB18-04)
Preliminary Plat



WAC 197-11-960 Environmental checklist.

ENVIRONMENTAL CHECKLIST

Purpose of checklist:

The State Environmental Policy Act (SEPA), chapter 43.21C RCW, requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. An environmental impact statement (EIS) must be prepared for all proposals with probable significant adverse impacts on the quality of the environment. The purpose of this checklist is to provide information to help you and the agency identify impacts from your proposal (and to reduce or avoid impacts from the proposal, if it can be done) and to help the agency decide whether an EIS is required.

Instructions for applicants:

This environmental checklist asks you to describe some basic information about your proposal. Governmental agencies use this checklist to determine whether the environmental impacts of your proposal are significant, requiring preparation of an EIS. Answer the questions briefly, with the most precise information known, or give the best description you can.

You must answer each question accurately and carefully, to the best of your knowledge. In most cases, you should be able to answer the questions from your own observations or project plans without the need to hire experts. If you really 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 unnecessary delays later.

Some questions ask about governmental regulations, such as zoning, shoreline, and landmark designations. Answer these questions if you can. If you have problems, the governmental agencies 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. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Use of checklist for nonproject proposals:

Complete this checklist for nonproject proposals, even though questions may be answered "does not apply." IN ADDITION, complete 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.

A. BACKGROUND

1. Name of proposed project, if applicable: **Green Mountain PRD Pod B1 Subdivision**

2. Name of applicant: **STERLING DESIGN, INC.**

3. Address and phone number of applicant and contact person:

2208 E. Evergreen Blvd.

Vancouver, WA 98661

contact: Joel Stirling, PE

4. Date checklist prepared: **10-29-18**

5. Agency requesting checklist: **City of Camas**

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

Construction in the Summer of 2019

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.

Environmental Studies were prepared for the Green Mountain PRD Master Plan by Ecological Land Services, Inc. No wetlands were found on the B1 Pod portion of the project and no wetland buffers from other Phases of the project impact the B1 Pod portion of the project. The Environmental Studies included providing an inventory of the existing Oregon White Oak Trees that are located within the boundaries of the Green Mountain PRD Master Plan along with a plan for preservation of trees throughout the project. The B1 Pod of the project does contain 2 Oregon White Oak Trees, both which will be removed as part of the development process as shown within the approved Tree Inventory Master Plan.

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. **No.**

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

Subdivision Approval for Plat Recording and infrastructure installation construction plans will be approved by the City of Camas for the project.

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.

The Green Mountain PRD B1 Pod Subdivision is a proposal to subdivide approximately 7.9 acres of property zoned for residential development within the City of Camas MF-18 zoning district. The proposed B1 Pod subdivision is part of a larger Master Planned Development that was submitted and approved in 2014/2015 with the understanding that each Pod (phase) of the project would be submitted for additional Land Use review and approval prior to construction to assure compliance with the approved Master Plan. The B1 Pod portion of the property will be divided into a total of 111 new single family residential building lots as follows: 2 for detached homes, 9 units will be

attached homes in a triplex configuration, 12 units will be attached homes in a duplex configuration and 88 units will be for attached homes in a four plex configuration. All required utilities and transportation infrastructure have been extended to the B1 Pod by development of other portions of the Green Mountain PRD Master Planned Project.

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. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The project will be constructed on Parcels: SN986037307 & SN173178000 and is located the NW 1/4 of Section 21, T2N., R3E. The properties currently are vacant land and do not have an address. Vicinity Map, Topographic Map and other Site Plans are included within the Land Use Application Materials.

EVALUATION FOR
AGENCY USE ONLY

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)? **15%**

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.

Soil types on site are mapped as Dollar Loam (DoB) which are listed in Soil Group 3 within the Western Washington Stormwater Manual. It is unknown if the property was ever used for agriculture however it is likely given that the majority of the Clark County area was utilized for farming/ranching activities. The most recent use of the property was for a Golf Course.

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

No. A geotechnical study has been completed for the Green Mountain PRD Master Plan by GeoPacific Engineering to demonstrate that development of the B1 Pod is feasible. Additional geotechnical review and approval will be done during the Final Construction Plan review/approval processes.

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

The property will be graded as needed for roads, residential building sites, utility installation, and stormwater management facilities. It is likely that up to 50,000 cu.yds. of earth will be graded, moved, cut and filled. All grading activities will be monitored by a geotechnical engineer licensed in the State of Washington and grading activities will be certified as needed for future infrastructure/residential unit installation.

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

Yes, prior to construction a grading and erosion control plan will be approved by the City of Camas and will be implemented during the construction process to limit the potential erosion on the project.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

80%

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

Approval of a grading and erosion control plan by the City of Camas.

a. **Air**

a. What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known.

Construction vehicles will emit exhaust during the construction phase of the project and will likely create dust during dry periods. Following residential unit construction the completed project will have typical residential emissions from all 128 residential units.

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

None known.

EVALUATION FOR
AGENCY USE ONLY

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

None

3. **Water**

a. Surface:

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

There are existing streams and ponds in the vicinity of the B1 Pod but not on the property itself. There are several manmade ponds that were associated with the previous use of the property as a Golf Course that will be filled as needed. All stormwater runoff from the B1 Pod will be managed as required by City of Camas Development Standards prior to being released to the natural flow routes.

- 2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

No

- 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.

None

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

No

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

No

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. Ground:

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

No other than natural infiltration of stormwater that will occur within the yard areas of the future home sites and limited natural infiltration of stormwater within the stormwater facilities.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

None

EVALUATION FOR
AGENCY USE ONLY

c. Water runoff (including stormwater):

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 runoff from the residential units and the new streets will be collected within a closed conduit pipe network and conveyed to stormwater management facilities for both water quality and quantity control as required by the City of Camas and the Washington State Department of Ecology. Stormwater facilities have been designed utilizing the Western Washington Hydrology Manual and discharge from the facilities will flow south and west to a large shared stormwater facility prior to release to the natural drainage routes. There is an existing stormwater conveyance system located within NE Ingle Road which will convey the controlled stormwater to discharge location where it eventually flows into the Lacamas contributing basin.

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

No. The proposed stormwater management facilities are designed to limit the potential for waste materials from the residential units and the public/private road surfaces to leave the property. Stormwater facilities will be maintained regularly as needed.

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

Stormwater management facilities will be installed with the project and maintained in perpetuity with the completed homes.

4. Plants

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

X _____ deciduous tree: alder, maple, aspen, **other**

X _____ evergreen tree: fir, cedar, pine, **other**

X _____ **shrubs**

X _____ **grass**

X _____ **pasture**

_____ crop or grain

_____ wet soil plants: cattail, buttercup, bullrush, 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?

All existing vegetation will be removed during the grading and infrastructure installation processes.

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

None known

EVALUATION FOR
AGENCY USE ONLY

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

There are no plans for specific use of native plants within the project and all vegetation will be removed during the site grading and infrastructure installation process.

5. Animals

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

birds: hawk, heron, eagle, **songbirds**, other:

mammals: **deer**, bear, elk, beaver, other:

fish: bass, salmon, trout, herring, shellfish, other:

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

None known

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

It is likely that birds migrate within the vicinity of the property, as they do throughout the City of Camas region, however the site is not being utilized as a destination or nesting site for migrating birds.

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

None

6. Energy and natural resources

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

Completed residential units will utilize electricity and natural gas for the typical energy needs of residential dwellings.

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

No

- 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:

All residential units will obtain building permits from the City of Camas prior to construction and will be designed to comply with all required energy codes.

7. Environmental health

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

No. Project is for residential development.

- 1) Describe special emergency services that might be required.

None, project will only need typical emergency services required for residential development.

EVALUATION FOR
AGENCY USE ONLY

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

All residential units will be connected to City of Camas water and sanitary sewer systems.

b. Noise

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

There are public roads that are adjacent to and serve the proposed project which generate traffic noises. There are other Land Use Approved Pods within the Green Mountain PRD that are not developed yet and will impact the B1 Pod in the future once they are built with traffic noise and residential uses. During construction of the residential units and road infrastructure there will be noise from construction equipment within the Green Mountain PRD Development.

- 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.

During construction of the project infrastructure and residential units there will be noise from construction. Following project build out there will be typical residential use noises which include but are not limited to traffic and residential uses.

3) Proposed measures to reduce or control noise impacts, if any:

None

8. Land and shoreline use

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

The site currently is vacant land that was used as a Golf Course. Adjacent portions of the Green Mountain PRD Development have been built out and other portions are still vacant lands.

b. Has the site been used for agriculture? If so, describe.

It is unknown if the property has ever been used for agriculture but it is likely that at some point it was used for agriculture or ranching since the majority of the Clark County area was used in this capacity.

c. Describe any structures on the site.

None

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

N/A

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

City of Camas zoning district MF-18

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

MFL

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

N/A

EVALUATION FOR
AGENCY USE ONLY

h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.

No

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

111 residential units will be constructed within the project. Based on the 2010 Census of the City of Camas the average household size was 2.91 therefore approximately 323 people will reside within the completed project.

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

None

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

None

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

Approval through the City of Camas review and approval processes.

9. Housing

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

111 middle income residential units will be constructed within the completed project.

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

None

- c. Proposed measures to reduce or control housing impacts, if any: **None**

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?

City of Camas Building Code limits structures to 35' in height. Exterior building materials will be Hardy Plank or other materials consistent with the structures that are being build within adjacent Pods of the Green Mountain PRD Development.

- b. What views in the immediate vicinity would be altered or obstructed? **None**

- c. Proposed measures to reduce or control aesthetic impacts, if any: **None**

11. Light and glare

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

Street lights and vehicle lights at night along with lighting typically associated with residential uses.

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

No

EVALUATION FOR
AGENCY USE ONLY

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

Other residential units and vehicles utilizing the adjacent street/transportation network. Existing offsite street lights will also impact the development.

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

None

12. Recreation

- a. What designated and informal recreational opportunities are in the immediate vicinity?

The Green Mountain PRD Master Plan has a generous network of trails and parks that are integrated with the overall development plan and will be interconnected to the sidewalks and open space trails within the B1 Pod.

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

No, the Green Mountain Golf Course was closed several years ago and is no longer operational.

b. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

The B1 Pod portion of the Green Mountain PRD Project will interconnect the sidewalks, trails, and openspaces to the Master Planned Trail, Parks, and Openspaces.

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.

No

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

None

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

An archaeological pre-determination was completed at the property and a recommendation of "no further work needed" was sent to the Washington State Department of Archaeology and Historic Preservation (DAHP). DAHP concurred that no further work is needed at the property.

14. Transportation

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

NE Ingle Road, NE Goodwin Road, NE 28th Street, NE 192nd Avenue, and State Route 500 will all be utilized to access the property.

c. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

No. Over 1 mile away.

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

Residential units will provide a minimum of 2 parking spaces per residential unit and, along with on street parking, there are an additional 23 off street parking spaces that will be provided throughout the project.

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

Yes, new Public/ Private Roads and Alleys will be constructed within the proposed project to provide access to the residential units. NE Ingle Road, a Public Road, will also be improved with additional pavement, curb and sidewalk along the projects western boundary.

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

EVALUATION FOR
AGENCY USE ONLY

No, the proposal is for a residential development.

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

The project is expected to generate 653 new daily trips, 51 new A.M. peak hour and 58 new P.M. peak hour trips.

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

Construction of new public/private roads within the development and construction of improvements to NE Ingle Road along the project western boundary.

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, 111 new residential households will require additional public services.

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

Impact fees are assessed to the project to help offset immediate impacts on public services and long term taxes from the future home owner's will continue to support the impacts on public services.

16. Utilities

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

- c. 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.

City of Camas Public Sanitary Sewer and Water will be extended to each new residential unit for service, NW Natural Gas will provide natural gas, Clark Public Utilities will provide electricity and franchise utilities will be provided as available within the area.

C. SIGNATURE

Under the penalty of perjury, the above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: 

Name of signee: Joel G. Stirling, PE

Position and Agency/Organization: Owner & Lead Professional Engineer/STERLING DESIGN, INC.

Date Submitted: 3/29/2019



Date Published: June 27, 2019

To Whom It May Concern:

Please find enclosed a Determination of Non-Significance (DNS) for the **Green Mountain PRD B1-POD Subdivision (SEPA18-21)** that was issued pursuant to the State Environmental Policy Act (SEPA) Rules, Chapter 197-11, Washington Administrative Code. The enclosed review comments reflect evaluation of the environmental checklist by the lead agency as required by WAC 197-11-330(1)(a)(i).

The following materials were submitted with the initial application:

1. Application and fees
2. GIS packet with vicinity map
3. Mailing labels
4. Narrative
5. Preliminary plans
6. SEPA checklist
7. Pre-Application report
8. Preliminary stormwater plan and report
9. Geotechnical report
10. Traffic Information
11. Environmental report
12. Existing significant tree information

The application materials are available for review upon request from the Community Development Department.

Written comments may be submitted on this determination within fourteen (14) days of its issuance, after which the DNS will be reconsidered in light of the comments received.

Please address all correspondence to:

City of Camas, SEPA Official
Community Development Department
616 NE Fourth Avenue
Camas, Washington 98607
communitydevelopment@cityofcamas.us

Distribution:

Applicant
Bureau of Indian Affairs
C-Tran
Camas School District
Camas City Administrator, Peter Capell
Camas Building Official, Bob Cunningham
Camas Community Development Director, Phil Bourquin
Camas Engineering Department Managers and Staff
Camas Fire Department, Randy Miller
Camas Finance Director, Cathy Huber Nickerson
Camas Mayor and City Council Members
Camas Parks and Recreation, Jerry Acheson
Hearings Examiner, Joe Turner
Camas Planning Manager and Staff
Camas Police Chief, Mitch Lackey
Camas Public Works Director, Steve Wall
Camas Public Library, Connie Urquhart
Camas-Washougal Post Record
Chinook Indian Nation
Cultural Resource Program, Cowlitz Indian Tribe
Cultural Resource Program, Yakama Indian Nation
Clark County Department of Environmental Services
Clark County Public Works – Development Engineering Program
Clark County Department of Transportation
Clark County Natural Resources Council
Clark Public Utilities
Department of Ecology
Department of Fish and Wildlife, Region 5
Department of Natural Resources, SEPA Center
Southwest Clean Air Agency
US Army Corps of Engineers
Vancouver-Clark Parks and Recreation
Washington Office of Archaeology & Historic Preservation
Washington State Department of Transportation
Washington State Parks and Recreation Commission, Environmental Program
Property Owners within 300 feet (*mailed the SEPA Determination & map*)

Green Mountain PRD B1-Pod (SEPA18-27)

Mailed submittals through

United States Postal Service
On 6/26/19

US Army Corps of Engineers
Seattle Dist. Regulatory Branch
PO Box C-3755
Seattle, WA 98124-2255

Chinook Indian Nation
P.O. Box 368
Bay Center, WA 98527

Johnson Meninick
Yakama Indian Nation
Cultural Resources Program
PO Box 151
Toppenish, WA 98948

Clifford Washines
Yakama Indian Nation
Cultural Resources Program
PO Box 151
Toppenish, WA 98948

Southwest Clean Air Agency
11815 NE 99th Street, Suite 1294
Vancouver, WA 98682-2454

Parks and Recreation Commission
Environmental Program Manager
P.O. Box 42650
Olympia, WA 98504-2650

Sterling Design, Inc.
Joel Sterling
2208 East Evergreen Blvd.
Vancouver, WA 98661

Electronic submittals

sent on 6/26/19

Dept. of Ecology – [send separate email to place on SEPA Register](#)

Environmental Review
PO Box 47703
Olympia, WA 98504-7703
separegister@ecy.wa.gov

C-Tran Data Analyst
Development Review
PO Box 2529
Vancouver, WA 98668
devrev@c-tran.org

Dept. of Natural Resources
SEPA Center
PO Box 47015
Olympia, WA 98504-7015
sepacenter@dnr.wa.gov

Camas School District #117
Attn: Heidi Rosenberg
841 NE 22nd Avenue
Camas, WA 98607
heidirosenberg@camas.wednet.edu

WSDOT – Engineering Services
Jeff Barsness
11018 NE 51st Circle
Vancouver, WA 98682
barsnej@wsdot.wa.gov

Brian Haug
Bureau of Indian Affairs
911 NE 11th Avenue
Portland, OR 97232
brian.haug@bia.gov

Camas Washougal Post Record
425 NE 4th Avenue
Camas, WA 98607
dawn.feldhaus@camaspostrecord.com
kelly.moyer@camaspostrecord.com

Yakama Indian Nation
Environmental Resources
Elizabeth Sanchey
esanchey@yakama.com

Dept. of Archeological & Historic Preservation
SEPA contact is
Greg Griffith, 360 586-3073
SEPA docs are not emailed to individual staff
sepa@dahp.wa.gov

Clark County Natural Resources
John S. Karpinski
2612 E 20th Street
Vancouver, WA 98661-4641
karpjd@comcast.net

David Jardin, Concurrency Engineer
Clark County Public Works
PO Box 9810
Vancouver, WA 98666-9810
David.Jardin@clark.wa.gov

Washington Dept. of Fish & Wildlife
5525 11th Street
Ridgefield, WA 98642
R5Planning@dfw.wa.gov

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Construction Design Manager
PO Box 8900
Vancouver, WA 98668
dtetz@clarkpud.com

Lynn Smith, Clark Public Utilities
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lsmith@clarkpud.com

Vancouver-Clark Parks & Recreation
PO Box 1995
Vancouver, WA 98668-1995
parksrec@cityofvancouver.us

Clark County
Department of Environmental Services
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Vancouver, WA 98666-9810
kevin.tyler@clark.wa.gov

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Camas, WA 98607
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Camas, WA 98607
bcarter@cityofcamas.us

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Steve Durspek (Engineering)
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Anita Ashton (Engineering Project Manager)
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James Hodges (Engineering Project Manager)
jhodges@cityofcamas.us

Phil Bourquin (Community Development Director)
pbourquin@cityofcamas.us
Bob Cunningham (Building Official)
bcunningham@cityofcamas.us

Note:
There will be occasions when Planning Commission, Hearings Examiner or SMRC will receive the SEPA Distribution copy. Add or remove as needed.

Commissioner Tim Hein
3512 NW Logan Court
Camas, WA 98607
cthein89@comcast.net

Commissioner Bryan Beel
1821 NW 21st Court
Camas, WA 98607
bryandb@gmail.com

Cowlitz Indian Tribe
Cultural Resources
P.O. Box 2547
Longview, WA 98632
permitreview@cowlitz.org

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2535 NW Ivy Street
Camas, WA 98607
dchaney@cityofcamas.us

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Camas, WA 98607
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Camas, WA 98607
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Steve Hogan
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Camas, WA 98607
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Mitch Lackey (Police Chief)
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Randy Miller (Fire)
rmiller@cityofcamas.us

Connie Urquhart (Library Director)
curquhart@cityofcamas.us

Jerry Acheson (Parks & Recreation Manager)
jacheson@cityofcamas.us

Robert Maul (Planning Manager)
rmaul@cityofcamas.us

Community Development Email
communitydevelopment@cityofcamas.us

Commissioner Jim Short
4636 NW Walden Street
Camas, WA 98607
gymshorts@comcast.net

Commissioner Troy Hull
2034 NW Douglas Loop
Camas, WA 98607
hullteam@comcast.net

When applicable – Send to the Camas Hearings Examiner
Joe Turner, AICP
jtpc@frontier.com

Note: When needing to send to adjoining cities, Clark County, the Port of Camas-Washougal and the Airport.

Clark County Community
Development
P.O. Box 9810
Vancouver, WA 98666-9810
susan.ellinger@clark.wa.gov

City of Vancouver
Community Planning
P.O. Box 1995
Vancouver, WA 98668-1995

City of Washougal
Community Development
1701 C Street
Washougal, WA 98671
Mitch.Kneipp@cityofwashougal.us

Port of Camas-Washougal
Dave Ripp
24 South A Street
Washougal, WA 9867
david@portcw.com



STATE OF WASHINGTON
 DEPARTMENT OF ECOLOGY

PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300
 711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

July 11, 2019

Robert Maul, Planning Manager
 City of Camas
 Community Development Department
 616 Northeast Fourth Avenue
 Camas, WA 98607

Dear Robert Maul:

Thank you for the opportunity to comment on the determination of nonsignificance for the Green Mountain PRD B1-POD Subdivision Project (SEPA18-27) as proposed by Sterling Design, Inc. The Department of Ecology (Ecology) reviewed the environmental checklist and has the following comment(s):

**WATER RESOURCES/DAM SAFETY OFFICE:
 Joe Witczak, Office Manager (360) 407-6603**

Under RCW 90.03.350, a Dam Safety construction permit is required for those dams, which impound a volume of 10 acre-feet or more of water or other liquids above ground level. To determine if a Dam Safety construction permit is required for your project, the applicant must submit a set of construction plans to:

Joe Witczak
 WA Department of Ecology
 Dam Safety Office
 P.O. Box 47600
 Olympia, WA 98504-7600

For more information, please contact Joe Witczak by e-mail at jwit461@ecy.wa.gov or by telephone at (360) 407-6603.

**WATER QUALITY/WATERSHED RESOURCES UNIT:
 Chris Montague-Breakwell (360) 407-6364**

Erosion control measures must be in place prior to any clearing, grading, or construction. These control measures must be effective to prevent stormwater runoff from carrying soil and other pollutants into surface water or stormdrains that lead to waters of the state. Sand, silt, clay particles, and soil will damage aquatic habitat and are considered to be pollutants.

Any discharge of sediment-laden runoff or other pollutants to waters of the state is in violation of Chapter 90.48 RCW, Water Pollution Control, and WAC 173-201A, Water

Quality Standards for Surface Waters of the State of Washington, and is subject to enforcement action.

Construction Stormwater General Permit:

The following construction activities require coverage under the Construction Stormwater General Permit:

1. Clearing, grading and/or excavation that results in the disturbance of one or more acres **and** discharges stormwater to surface waters of the State; and
2. Clearing, grading and/or excavation on sites smaller than one acre that are part of a larger common plan of development or sale, if the common plan of development or sale will ultimately disturb one acre or more **and** discharge stormwater to surface waters of the State.
 - a) This includes forest practices (including, but not limited to, class IV conversions) that are part of a construction activity that will result in the disturbance of one or more acres, **and** discharge to surface waters of the State; and
3. Any size construction activity discharging stormwater to waters of the State that Ecology:
 - a) Determines to be a significant contributor of pollutants to waters of the State of Washington.
 - b) Reasonably expects to cause a violation of any water quality standard.

If there are known soil/ground water contaminants present on-site, additional information (including, but not limited to: temporary erosion and sediment control plans; stormwater pollution prevention plan; list of known contaminants with concentrations and depths found; a site map depicting the sample location(s); and additional studies/reports regarding contaminant(s)) will be required to be submitted.

You may apply online or obtain an application from Ecology's website at: [http://www.ecy.wa.gov/programs/wq/stormwater/construction/- Application](http://www.ecy.wa.gov/programs/wq/stormwater/construction/-Application). Construction site operators must apply for a permit at least 60 days prior to discharging stormwater from construction activities and must submit it on or before the date of the first public notice.

Ecology's comments are based upon information provided by the lead agency. As such, they may not constitute an exhaustive list of the various authorizations that must be obtained or legal requirements that must be fulfilled in order to carry out the proposed action.

If you have any questions or would like to respond to these comments, please contact the appropriate reviewing staff listed above.

Department of Ecology
Southwest Regional Office

(MLD:201903659)

cc: Charlotte Lattimore, WR/DSO
Joe Witczak, WR/DSO
Chris Montague-Breakwell, WQ
Joel Sterling, Sterling Design, Inc. (Proponent)



11815 NE 99th Street, Suite 1294
Vancouver, WA 98682
(360) 574-3058
www.swcleanair.org

July 2, 2019

Attn: City of Camas, SEPA Official
Community Development Department
616 NE Fourth Avenue
Camas WA 98607

RE: Green Mountain PRD B1-POD Subdivision; SEPA18-21

SEPA Official:

The Southwest Clean Air Agency (SWCAA) was recently notified that your agency has issued/will issue a SEPA Determination for the above project. Please be advised that SWCAA administers/enforces a number of regulations that may apply to the proposed project. The applicability of these regulations depends on the exact nature of the project in question. The following section provides a brief summary of the requirements for the general types of activity that may be affected by this project.

Construction Dust [SWCAA 400 - General Regulations for Air Pollution Sources]:

- Construction and earthmoving activities have the potential to generate excessive dust emissions if reasonable control measures are not implemented. SWCAA Regulation 400-040(2) requires that “no person shall cause or permit the emission of particulate matter from any stationary source to be deposited beyond the property under direct control of the owner or operator of the stationary source in sufficient quantity to interfere unreasonably with the use and enjoyment of the property upon which the material is deposited”. Furthermore, SWCAA Regulation 400-040(8)(a) requires that “the owner or operator of any source of fugitive dust shall take reasonable precautions to prevent fugitive dust from becoming airborne and shall maintain and operate the source to minimize emissions”.
- Common control measures to mitigate the emission of dust from construction and earthmoving activities include: application of water before and during earthmoving operations, application of water to disturbed surface areas (including access roads and staging areas) after earthmoving operations, application of chemical dust control products and/or surfactants, limiting access to open/disturbed areas, reducing equipment/vehicle speeds, establishing vegetative cover on inactive areas and ceasing operations altogether during high wind events.
- Violations of SWCAA Regulation 400-040 may result in civil penalties being assessed against the project operator and/or property owner.

The proponent of this project may contact SWCAA at 360-574-3058 for more information regarding the agency's requirements. Notification forms, permit applications, regulations and other information are available on the internet at <http://www.swcleanair.org>.

Sincerely,

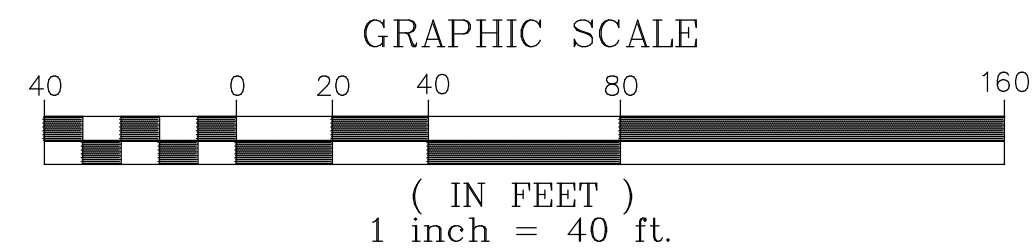
Duane Van Johnson
Air Quality Specialist II



GREEN MOUNTAIN MASTER PRD NOTE:

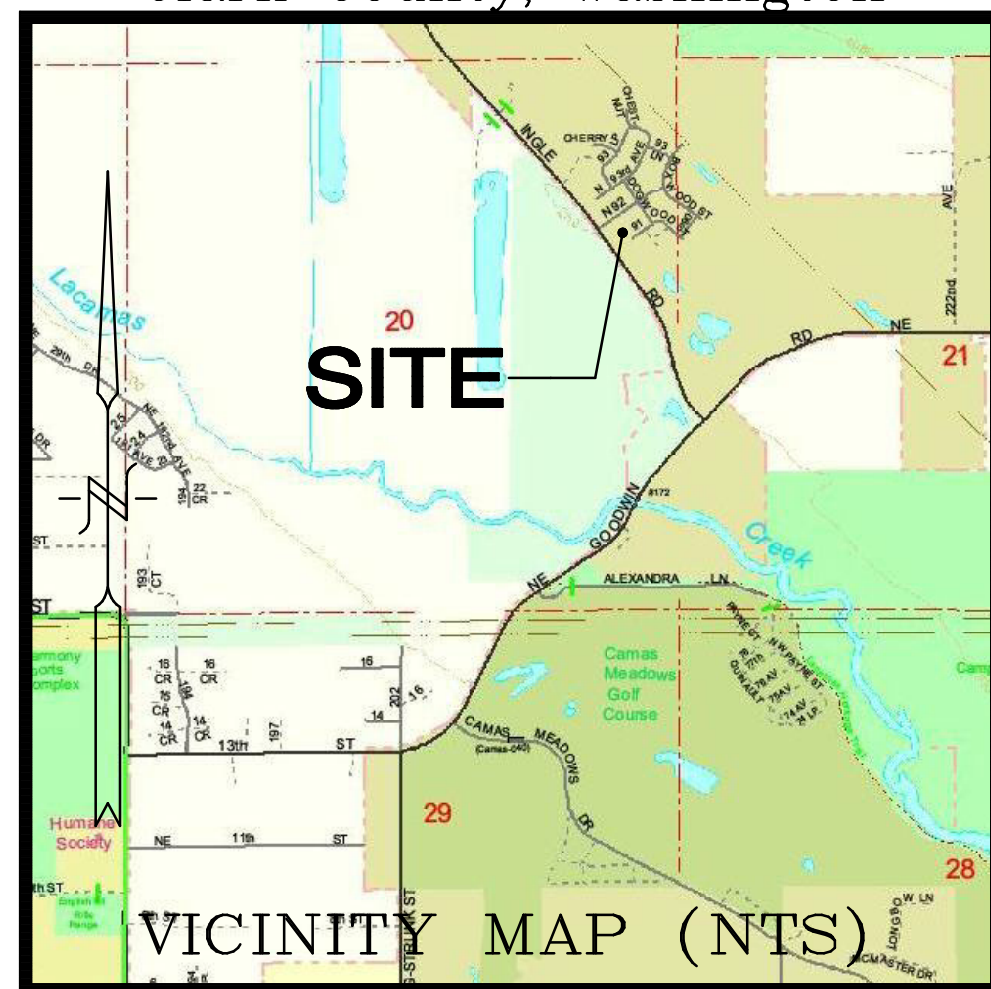
***REFER TO THE APPROVED GREEN MOUNTAIN DEVELOPMENT STANDARDS & PHASING PLAN FOR:**

- OPEN SPACE DEDICATION THAT HAS BEEN COMPLETED AND APPROVED WITH GREEN MOUNTAIN PRD DEVELOPMENT STANDARDS & PHASING PLAN.
- DENSITY AND SETBACKS REQUIREMENTS FOR THIS PROJECT HAVE BEEN OUTLINED WITH THE GREEN MOUNTAIN PRD DEVELOPMENT STANDARDS & PHASING PLAN AS DEPICTED ON SHEET 2 OF 8.



GREEN MOUNTAIN PRD

A Preliminary Plat within
a portion of the NE 1/4 of
Sec. 20, T2N., R3E., W.M.
Clark County, Washington



SITE DATA:

- TAX LOT(S): 22A, 22B & 22
- SERIAL NUMBER(S): 986037-307 & 173178-000
- SITE ADDRESS: NOT SITUATED
- AREA: 7.89 ACRES
- ZONING: MF-18
- COMPREHENSIVE PLAN: MFL

CENTERLINE CURVE DATA

- | | |
|--|---|
| ① R=35.00ft
CH=49.60ft
A=55.12ft
T=35.15ft
EX=14.60ft
Delta=90 14'16" | ⑦ R=301.00ft
CH=48.51ft
A=48.56ft
T=24.33ft
EX=0.98ft
Delta=9 14'38" |
| ② R=70.00ft
CH=38.97ft
A=39.49ft
T=20.28ft
EX=2.88ft
Delta=32 19'17" | ⑧ R=699.00ft
CH=156.76ft
A=157.09ft
T=78.88ft
EX=4.44ft
Delta=12 52'34" |
| ③ R=100.00ft
CH=34.95ft
A=35.13ft
T=17.75ft
EX=1.56ft
Delta=20 07'40" | ⑨ R=269.46ft
CH=150.64ft
A=152.67ft
T=78.45ft
EX=11.19ft
Delta=32 27'48" |
| ④ R=1000.00ft
CH=98.32ft
A=98.36ft
T=49.22ft
EX=1.21ft
Delta=5 38'08" | ⑩ R=903.00ft
CH=202.51ft
A=202.93ft
T=101.90ft
EX=5.73ft
Delta=12 52'34" |
| ⑤ R=200.00ft
CH=70.78ft
A=71.16ft
T=35.96ft
EX=3.21ft
Delta=20 23'08" | ⑪ R=35.00ft
CH=39.96ft
A=42.53ft
T=24.33ft
EX=7.63ft
Delta=69 36'52" |
| ⑥ R=200.00ft
CH=70.78ft
A=71.16ft
T=35.96ft
EX=3.21ft
Delta=20 23'08" | |
| ⑦ R=800.00ft
CH=179.41ft
A=179.79ft
T=90.27ft
EX=5.08ft
Delta=12 52'34" | |

***APPROVED w/PRD MASTER PLAN**

Green Mountain PRD PODs A-G and corresponding Camas Zones

	A POD	B POD*	C POD
DENSITY	MF-24	MF-18	MF-10
Max. du./gross ac	24	18	10
Min. du./gross ac	6	6	5
STANDARD LOTS			
Min. lot SF	1,000 [a]	1,000 [a]	3,000 [a]
Min. lot width	20	20	30
Min. lot depth	80	50	70
Max. Floor Area per du	No Max	No Max	No Max
SETBACKS			
Min. front/at garage	None	6/3@OS/18	10/18
Min. side	3 [1]	3 [1] [d]	3 [1] [d]
Min. side Flanking Street	None [e]	10 [d]	10 [d]
Min. rear [garage @alley]	None [e]	10 [b] [c]	10 [b] [c]
LOT COVERAGE, Max.	None [c]	None	55%
BUILDING HEIGHT, Max.	80	45 [2]	35 [2]

a. Single Family Detached homes to be permitted. For SFD in A POD apply B Pod setbacks.

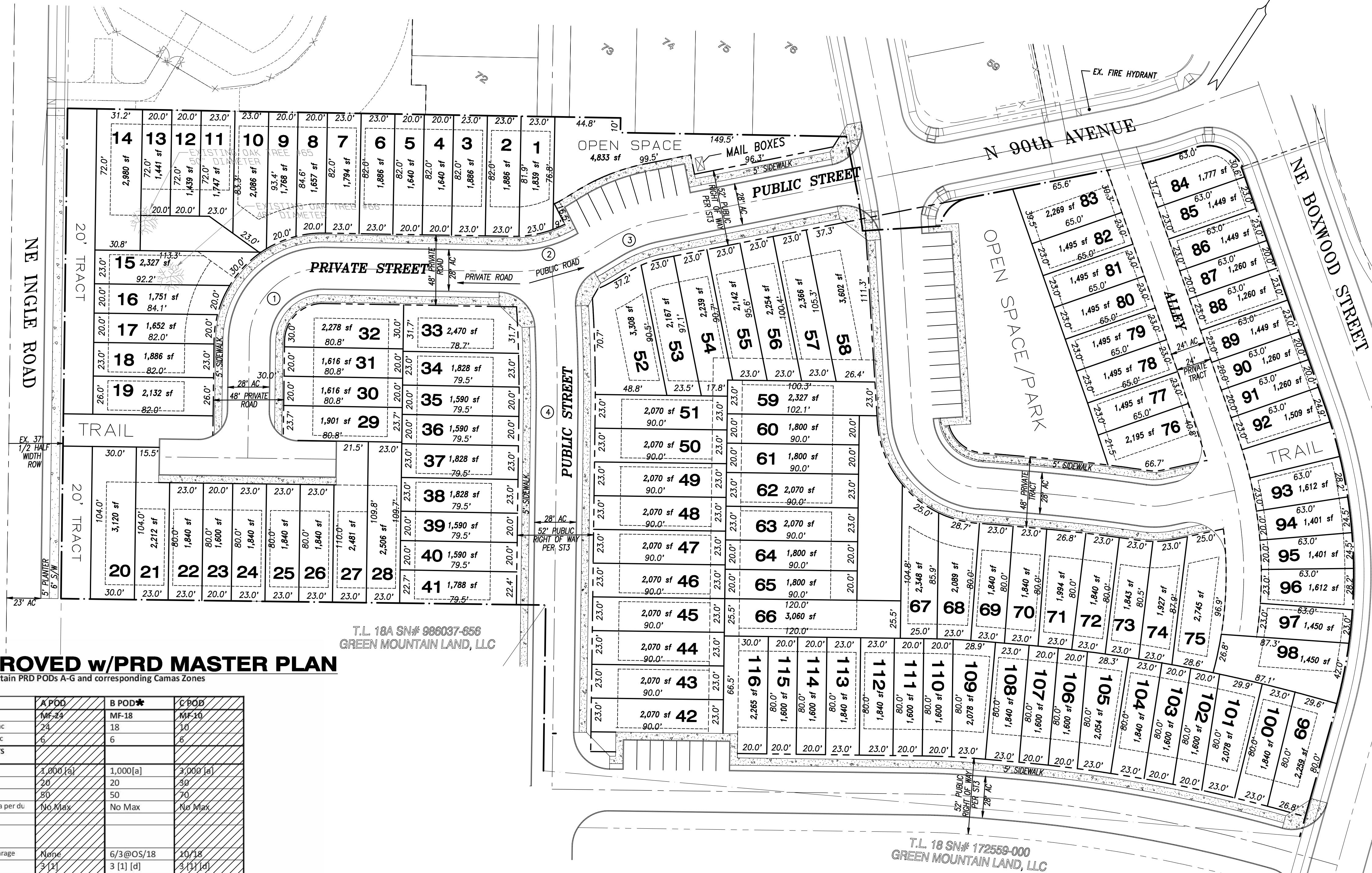
b. 10 foot rear yard for front access garage.

c. Minimum rear yard for alley accessed garage is either 4' or 18'.

d. Minimum side yard at alley is 5'.

e. Franchise utilities to be located in front or side yard easements abutting right of way.

1. The non-attached side of a dwelling unit shall be three feet, otherwise a zero-lot line is assumed.
2. Maximum building height: three stories and a basement but not to exceed maximum building height.

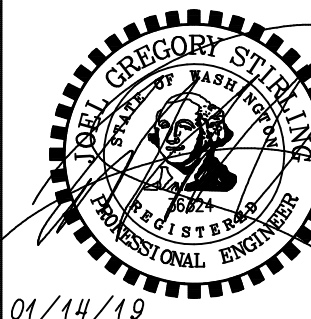


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STERLING
DESIGN, INC.

Sheet Description:
**PROPOSED DEVELOPMENT
PLAN**

Project:
**GREEN MOUNTAIN
B1 POD**



Scale: AS SHOWN

Project Number: 791

Design/
Drawn JGS/BC

Drawing Date: JAN. 2019

Sheet 1 of 1 Sheet(s)

SUB18-04 Green Mountain PRD Mixed Use B1 - POD Subdivision

Exhibit	Title	Date
1	Application Form & Fees	11/2/2018
2	B1-POD Narrative	11/2/2018
3	PRD Narrative	12/1/2014
4	GIS Packet wVicinity Map	7/2/2018
5	Preliminary Plans - 1st submittal	10/31/2018
6	Preliminary Plans - 2nd submittal	3/28/2019
7	PRD Master Plan Decision	8/4/2015
8	Conceptual Open Space, Park & Landscape Master Plan	
9	Pre-App Site Plan	3/1/2018
10	Pre-Application Report	5/3/2018
11	PRD Master Plan_Archaeological Pre-Determination Report	12/17/2014
12	PRD Phase 1_Geotechnical Report	12/3/2014
13	PRD Phase 2_Critical Areas Report	10/5/2016
14	ELS Oak Mitigation Plan Memo	5/2/2019
15	Advanced Oak Mitigation Plan	2/24/2016
16	Tree Survey	5/5/2015
17	Stormwater Plan	10/31/2018
18	Stormwater Report	10/31/2018
19	BI-POD South Phase TIA	9/6/2018
20	PRD Phase 3 TIA	10/5/2017
21	PRD Master Plan TIA	11/20/2014
22	199th & 58th Pro Rata Payment Requirement Memo	7/31/2019
23	Development Sign	
24	300-ft Mailing labels	11/2/2018
25	Completeness Review Letter	4/9/2019
26	Incompleteness Review letter	11/27/2018
27	Notice of Application	4/9/2019
28	Notice of Public Hearing	7/18/2019
29	SEPA Determination	7/27/2019
30	SEPA Checklist	3/29/2019
31	SEPA Cover Letter	7/27/2019
32	SEPA Distribution List	7/26/2019
33	DAHP SEPA Comment	7/10/2019
34	Ecology SEPA Comment	7/11/2019
35	SWCAA SEPA Comment	7/2/2019
36	Alternative Site Plan	1/26/2019