City of West Linn

Planning & Development • 22500 Salamo Rd #1000 • West Linn, Oregon 97068
Telephone 503.656.4211 • Fax 503.656.4106 • westlinnoregon.gov

DEVELOPMENT REVIEW APPLICATION

For Office Use Only		
STAFF CONTACT Jennifer Arnold	PROJECT NO(S). SUB-17-03 & WAP-17-03	
NON-REFUNDABLE FEE(S) 2850-	REFUNDABLE DEPOSIT(S) 6600-	TOTAL 9450-

Type of Review (Please check all that apply):

- [ ] Annexation (ANX)
- [ ] Appeal and Review (AP) *
- [ ] Conditional Use (CUP)
- [ ] Design Review (DR)
- [ ] Easement Vacation
- [ ] Extraterritorial Ext. of Utilities
- [ ] Final Plat or Plan (FP)
- [ ] Flood Management Area
- [ ] Hillside Protection & Erosion Control
- [ ] Historic Review
- [ ] Legislative Plan or Change
- [ ] Lot Line Adjustment (LLA) */**
- [ ] Minor Partition (MIP) (Preliminary Plat or Plan)
- [ ] Non-Conforming Lots, Uses & Structures
- [ ] Planned Unit Development (PUD)
- [ ] Pre-Application Conference (PA) */**
- [ ] Street Vacation
- [x] Subdivision (SUB) 4200 + 2400
- [ ] Temporary Uses *
- [ ] Time Extension *
- [ ] Variance (VAR)
- [ ] Water Resource Area Protection/Single Lot (WAP)
- [x] Water Resource Area Protection/Wetland (WAP) 2600
- [ ] Willamette & Tualatin River Greenway (WRG) + 250
- [ ] Zone Change

Home Occupation, Pre-Application, Sidewalk Use, Sign Review Permit, and Temporary Sign Permit applications require different or additional application forms, available on the City website or at City Hall.

Site Location/Address:	Assessor's Map No.:	2 1E 25CC
	Tax Lot(s):	100 and 200
No address and 3015 Parker Rd., West Linn, OR 97068	Total Land Area:	+/- 3.52 acres

Brief Description of Proposal:
Preliminary Plat review for a subdivision.

Applicant Name: (please print) Noell and Carol Price
Phone: Contact Applicant's consultant
Address: 3015 Parker Rd.
Email: see below
City State Zip: West Linn, OR 97068

Owner Name (required): (please print) Same as Applicant, above
Phone:
Address:
Email:
City State Zip:

Consultant Name: (please print) Monty Hurley, P.E., PLS AKS Engineering & Forestry
Phone: (503) 563-6151
Address: 12965 SW Herman Rd., Suite 100
Email: monty@aks-eng.com
City State Zip: Tualatin, OR 97062

1. All application fees are non-refundable (excluding deposit). **Any overruns to deposit will result in additional billing.**
2. The owner/applicant or their representative should be present at all public hearings.
3. A denial or approval may be reversed on appeal. No permit will be in effect until the appeal period has expired.
4. **Three (3) complete hard-copy sets (single sided) of application materials must be submitted with this application. One (1) complete set of digital application materials must also be submitted on CD in PDF format. If large sets of plans are required in application please submit only two sets.**

* No CD required / ** Only one hard-copy set needed

The undersigned property owner(s) hereby authorizes the filing of this application, and authorizes on site review by authorized staff. I hereby agree to comply with all code requirements applicable to my application. Acceptance of this application does not infer a complete submittal. All amendments to the Community Development Code and to other regulations adopted after the application is approved shall be enforced where applicable. Approved applications and subsequent development is not vested under the provisions in place at the time of the initial application.

Applicant's signature — Carol J Price — Date 8/23/17

Owner's signature ***(required)*** — Carol J Price — Date 8/23/17

Land Use Application
For
Knollcrest Subdivision

Date: September 8, 2017

Submitted to: City of West Linn
22500 Salamo Road
West Linn, OR 97068

Applicant: Carol and Noell Price
3015 Parker Road
West Linn, OR 97068

AKS Engineering & Forestry
12965 SW Herman Road, Suite 100
Tualatin, OR 97062
(503) 563-6151

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Exhibits

Exhibit A: Subdivision Application Form

Exhibit B: Preliminary Subdivision Plans

Exhibit C: Natural Resources Assessment and Mitigation Plan

Exhibit D: Property Deed

Exhibit E: Neighborhood Meeting Documentation

Exhibit F: Pre-application Conference Summary

Exhibit G: Preliminary Stormwater Report

Exhibit H: Geotechnical Engineering Report

Land Use Application
For
Knollcrest Subdivision

Submitted to:	City of West Linn Planning Department 22500 Salamo Road West Linn, OR 97068
Applicant:	Carol and Noell Price 3015 Parker Road West Linn, OR 97068
Property Owner:	Carol and Noell Price 3015 Parker Road West Linn, OR 97068
Applicant's Consultant:	AKS Engineering & Forestry, LLC 12965 SW Herman Road, Suite 100 Tualatin, OR 97062 Contact(s): Zach Pelz, AICP Email: pelzz@aks-eng.com Phone: (503) 563-6151 Fax: (503) 563-6152
Site Location:	3015 and 3001 Parker Road, West Linn, OR
Assessor's Map:	Clackamas County Assessor's Map 2 1E 25CC Tax Lots 100 and 200
Site Size:	±3.52 Acres
Land Use Districts:	R-10

I. Executive Summary

This application includes a 12-lot subdivision of two existing properties, comprising +/- 3.52 acres, located at 3001 and 3015 Parker Road in West Linn. The subject properties were annexed into the City of West Linn on January 19, 2017 through Ordinance 1659 (West Linn Planning File Number ANX-16-02).

The subdivision includes lots that range in size from +/- 10,000 square feet to +/- 11,300 square feet with an average lot size of +/- 10,200 square feet. The 12-lot subdivision complies with the minimum (9 lots) and maximum (12 lots) density requirements for the City's R-10 Zoning District and is planned to provide needed housing to accommodate continued residential growth in the City of West Linn.

The application includes substantial preservation of natural resources located along the east side of the property. Approximately 1/2 acre of preserved Water Resource Area (WRA) located on Lots 7-11 will ensure the maintenance of habitat for local flora and fauna and stormwater function of the resource. Additionally, the majority of existing trees in the WRA are planned to be preserved.

The application will create important street and public utility connections. The subdivision includes a new street connection, originating at Parker Road and terminating in the northwest corner of the property, that will ultimately connect with Roxbury Drive west of the site. This new street connection will provide a critical link for the future development of the large parcels north of Parker Road and south of Ridge Lane. New stormwater, sanitary sewer, and water mains are also planned in the new street right-of-way and are stubbed to abutting properties.

The application also provides an important sanitary sewer connection for properties to the north. Currently, the City does not own property or control easements sufficient to accommodate potential development within a large area of land between Rosemont Road and Parker Road. The existing topography in this area currently makes it necessary to either install sanitary sewer pumping systems or trench excessively deep runs of pipe, both of which have been a deterrent to achieving planned growth in this area.

This application includes the City application forms, written materials, and preliminary plans necessary for City staff to review and determine compliance with the applicable approval criteria. The evidence is substantial and supports the City's approval of the application.

II. Site Description/Setting

The two properties included in this application comprise a total area of +/- 3.52 acres. The properties were annexed to the City of West Linn in January 2017 and are zoned R-10 (Single-family Residential Detached). A City-owned stormwater tract abuts the site's east boundary.

The Applicant's residence, accessed via a driveway from Parker Road, is located near the center of the site and is surrounded by a large grove of approximately 650 Douglas Fir and other coniferous trees that have been planted and harvested by the property owner, in accordance with the State's Forest Tax Deferral program, since the mid-1970s. Per West Linn Municipal Code Section 8.560, the trees that comprise this tree farm are exempt from the City's tree permit/preservation standards.

The site slopes from a maximum elevation of approximately 592-feet at the northwest corner of the property to a low point of approximately 521-feet in the southeast corner of the site, at an average grade of approximately 12 percent.

Abutting properties to the west and north are large, un- or underimproved properties that are designated for future residential development by the City's Comprehensive Plan.

III. Applicable Review Criteria

CITY OF WEST LINN COMMUNITY DEVELOPMENT CODE

Chapter 11 SINGLE-FAMILY RESIDENTIAL DETACHED, R-10

11.030 PERMITTED USES

The following are uses permitted outright in this zoning district

1. Single-family detached residential unit.

Response: The application anticipates that the lots resulting from this subdivision will host future single-family detached residences. The criterion can be met.

11.070 DIMENSIONAL REQUIREMENTS, USES PERMITTED OUTRIGHT AND USES PERMITTED UNDER PRESCRIBED CONDITIONS

Except as may be otherwise provided by the provisions of this code, the following are the requirements for uses within this zone:

1. The minimum lot size shall be 10,000 square feet for a single-family detached unit.

2. The minimum front lot line length or the minimum lot width at the front lot line shall be 35 feet.

3. The average minimum lot width shall be 50 feet.

4. Repealed by Ord. 1622.

5. Except as specified in CDC 25.070(C)(1) through (4) for the Willamette Historic District, the minimum yard dimensions or minimum building setback area from the lot line shall be:

a. For the front yard, 20 feet; except for steeply sloped lots where the provisions of CDC 41.010 shall apply.

b. For an interior side yard, seven and one-half feet.

c. For a side yard abutting a street, 15 feet.

d. For a rear yard, 20 feet.

6. The maximum building height shall be 35 feet, except for steeply sloped lots in which case the provisions of Chapter 41 CDC shall apply.

7. The maximum lot coverage shall be 35 percent.

8. The minimum width of an accessway to a lot which does not abut a street or a flag lot shall be 15 feet.

9. The floor area ratio shall be 0.45. Type I and II lands shall not be counted toward lot area when determining allowable floor area ratio, except that a minimum floor area ratio of 0.30 shall be allowed regardless of the classification of lands within the property. That 30 percent shall be based upon the entire property including Type I and II lands. Existing residences in excess of this standard may be replaced to their prior dimensions when damaged without the requirement that the homeowner obtain a non-conforming structures permit under Chapter 66 CDC.

10. The sidewall provisions of Chapter 43 CDC shall apply.

Response: Exhibit B shows that all 12 lots included in this application satisfy the applicable area and dimensional standards listed above. Additionally, at time of building permit submittal, the City will ensure building-specific standards, such as FAR, lot coverage, and building height are met. The applicable criteria are met.

Chapter 32 WATER RESOURCE AREA PROTECTION

32.010 PURPOSES

The purposes of this chapter are to:

A. Comply with Title 13 and Title 3 of Metro's Urban Growth Management Functional Plan while balancing resource protection with property rights and development needs.

B. Protect or improve water quality by filtering sediment and pollutants and absorbing excess nutrients for the protection of public health, safety and the environment and to comply with both state and federal laws and regulations, including the Clean Water Act and the Endangered Species Act.

C. Moderate storm water impacts by slowing, storing, filtering and absorbing storm water and to maintain storm water storage and conveyance to prevent or minimize flooding and erosion for the protection of public health and safety.

D. Prevent erosion and minimize sedimentation of water bodies by protecting root masses along streams that resist erosion and stabilize the stream bank and by protecting vegetation on steep slopes to maintain their stability.

E. Protect and improve the following functions and values of WRAs that enhance the value of fish and wildlife habitat:

1. Natural stream corridors that provide habitat and habitat connectivity for terrestrial wildlife;
2. Microclimate habitats that support species adapted to those conditions;
3. Shade to maintain healthy stream temperatures;
4. Vegetation to absorb and filter pollution and sediment that would otherwise contaminate the water body;
5. Sources of organic material that support the food chain;
6. Recruitment of large wood that enhances the habitat of fish bearing streams;
7. Moderation of stream flow by storing and delaying storm water runoff; and
8. Vegetated areas surrounding wetlands that, together with the wetland, provide vital habitat for birds, amphibians, and other species.

F. Provide mitigation standards and guidance to address water quality values and ecological functions and values lost through development within WRAs.

G. Encourage the use of habitat friendly development practices.

H. Minimize construction of structures and improvements where they are at risk of flooding, to enable natural stream migration and channel dynamics, and protect water resources from the potential harmful impacts of development.

I. Provide for uses and activities in WRAs that have negligible impact on such areas; and to provide for other uses that must be located in such areas in a way that will avoid or, when avoidance is not possible, minimize potential impacts.

Response: While they are not decision criteria, as shown in Exhibit B and described throughout this narrative, the application furthers the purpose of the City's Water Resource Area objectives, as expressed above.

32.020 APPLICABILITY

A. This chapter applies to all development, activity or uses within WRAs identified on the WRA Map. It also applies to all verified, unmapped WRAs. The WRA Map shall be amended to include the previously unmapped WRAs.

B. The burden is on the property owner to demonstrate that the requirements of this chapter are met, or are not applicable to the land, development activity, or other proposed use or alteration of land. The Planning Director may make a determination of applicability based on the WRA Map, field visits, and any other relevant maps, site plans and information, as to:

1. The existence of a WRA;

2. The exact location of the WRA; and/or

3. Whether the proposed development, activity or use is within the WRA boundary.

In cases where the location of the WRA is unclear or disputed, the Planning Director may require a survey, delineation, or sworn statement prepared by a natural resource professional/wetland biologist or specialist that no WRA exists on the site. Any required survey, delineation, or statement shall be prepared at the applicant's sole expense.

Response: The City's Water Resource Area (WRA) Map, adopted May 2014, indicates the presence of a north-south running stream on the City-owned property east of the subject site. Per Table 32-2: Required Width of WRA, the WRA extends 65-feet on either side of this stream. Exhibit B shows the extent of the WRA on the subject property.

32.030 PROHIBITED USES

Alteration, development, or use of real property designated as, and within, a WRA is strictly prohibited except as specifically allowed or exempted in this chapter.

Response: Exhibit B shows that alterations or development within the WRA on this site, except for a new stormwater facility located in the southeast corner of the site (Tract A), is not planned. Per 32.060.B below, stormwater facilities are permitted in the WRA. The criterion is met.

32.040 EXEMPTIONS

The following development, activities or uses are exempt from a WRA permit but must conform to any applicable requirements of this section.

A. Vegetation maintenance, planting and removal.

1. The routine maintenance of any existing WRA, consistent with the provisions of this chapter such as, but not limited to, removing pollutants, trash, unauthorized fill, and dead or dying vegetation that constitutes a hazard to life or property.

2. Removal of plants identified as nuisance, invasive or prohibited plants; provided, that after plant removal, re-vegetation of disturbed areas is performed pursuant to CDC 32.100.

3. The planting or propagation of plants identified as native plants on the Portland Plant List.

4. Maintenance of existing gardens, pastures, lawns, and landscape perimeters, including the installation of new irrigation systems within existing gardens, lawns, and landscape perimeters.

5. The use of pesticides and herbicides with applicable state (e.g., Oregon DEQ) permits.

B. Building, paving, grading, and testing.

1. Maintenance. Routine repair, maintenance and replacement of legally established above and below ground utilities and related components (including storm water catch basins, intakes, etc.), roads, driveways, paths, trails, fences and manmade water control facilities such as constructed ponds, wastewater facilities, and storm water treatment facilities that do not expand the disturbed area at grade or footprint, provided re-vegetation of disturbed areas or corridors is performed pursuant to CDC 32.100.

2. Trails. The establishment of unpaved trails constructed of non-hazardous, pervious materials with a maximum width of four feet in generalized corridors approved in a parks or trails master plan; provided, that:

   a. The trail is set back from the water resource at least 30 feet, except at stream crossing points or at points were the topography forces the trail closer to the stream.

   b. Foot bridge crossings shall be kept to a minimum. When the stream bank adjacent to the foot bridge is accessible (e.g., due to limited vegetation or topography), fences or railings shall be installed from the foot bridge and extend 15 feet beyond the terminus of the foot bridge to discourage trail users and pets from accessing the stream bank, disturbing wildlife and habitat areas, and causing vegetation loss, stream bank erosion and stream turbidity.

   c. Trails shall be designed to minimize disturbance to existing vegetation, work with natural contours, avoid the fall line on slopes where possible, and avoid areas with evidence of slope failure to ensure that trail runoff does not create channels in the WRA.

3. Site investigations. Temporary and minor clearing outside of wetlands not to exceed 200 square feet per acre or site, whichever is more; provided, that no individual area is greater than 200 feet in size, for the purpose of site investigations and pits for preparing soil profiles; provided, that such areas are restored to their original condition when the investigation is complete. While such temporary and minor clearing is exempt from the provisions of this chapter, it

is subject to all other City codes, including provisions for erosion control and tree removal.

4. Support structures for overhead power or communication lines where the support structures are outside of the WRA.

5. The installation, within the developed portions of street rights-of-way, of new utilities, the maintenance or replacement of existing utilities and street repaving projects.

C. Non-conforming structures.

1. Expansion of the principal non-conforming structure. Additions to the existing building footprint of a principal non-conforming structure within, or partially within, the WRA are exempt, and additionally exempt from Chapter 66 CDC, Non-Conforming Structures, as long as the addition(s) meets the following restrictions:

a. Re-vegetation of temporarily disturbed areas will be performed per CDC 32.100 after the addition is completed;

b. There is no net increase in storm water runoff flowing toward the water resource as a result of the addition(s);

c. The addition to the principal structure is not closer to the water resource than the existing principal structure;

d. If it is a lateral addition, it does not extend more than 25 feet laterally from the side of the existing principal structure;

e. The addition does not increase the footprint of the existing principal structure by more than 500 square feet, at any one time or incrementally;

f. Lateral additions to decks cannot come closer to the water resource than the existing deck;

g. Vertical additions to existing principal structures that comply with the maximum height requirements of the underlying zone are exempt.

2. Repair, replacement and removal of non-conforming structures.

a. Interior remodeling of a non-conforming structure.

b. Repair, maintenance, rehabilitation and replacement of non-conforming structures, accessory structures, utilities and related components, roads, driveways, paths, trails, fences, and manmade water and storm water control facilities that do not expand the disturbed area or footprint. Re-vegetation of temporarily disturbed areas or corridors pursuant to CDC 32.100 is required.

c. This section also applies in the event that a non-conforming structure burned down or was otherwise damaged by natural or other disaster. The structure could be re-built so long as the structure did not expand the original footprint and the original access driveway (PDA) was used.

d. Demolition and removal of non-conforming structure's impervious surfaces are exempt as long as the affected areas are restored with native vegetation pursuant to CDC 32.100.

D. New construction activities allowed in the WRA.

1. Structures shall be located out of the WRA, except that eaves, balconies, decks, "pop outs," and similar additions, may cantilever over the outer boundary of the WRA a maximum of five feet. No vertical supports may extend down to grade within the WRA.

2. Construction of an accessory structure, less than 120 square feet in size and under 10 feet tall, may be constructed to within 50 feet of the water resource or 10 feet behind the top of slope (ravine, per Figure 32-4), whichever is greater. No more than one accessory structure is permitted in the WRA. Accessory structures in the WRA that existed prior to January 1, 2006, may remain in place and not count against the limitation in new accessory structures.

3. Construction of a water permeable patio or deck within 30 inches of the original grade and construction of approved water permeable footpaths may be constructed to within 50 feet of the water resource or 10 feet behind the top of slope (ravine, per Figure 32-4), whichever is greater.

4. Fences may be built to within 50 feet of the water resource or behind the top of slope (ravine), whichever is greater.

E. Emergency activities. Actions authorized by the City Manager that must be taken immediately or within a period of time too short to fully comply with this chapter to:

1. Prevent immediate danger to life or property;

2. Prevent immediate threat of serious environmental degradation;

3. Restore existing utility service; or

4. Reopen a public thoroughfare to traffic.

However, after the emergency has passed any disturbed area shall be restored, pursuant to CDC 32.100.

F. Exempt areas.

1. The Tualatin or Willamette Rivers are regulated by Chapter 28 CDC and are not subject to this chapter. However, wetlands and buffers, regardless of their proximity to these rivers, are subject to this chapter. In areas where there is overlap with Chapter 28 CDC, this chapter shall prevail.

2. Existing enclosed or piped sections of streams, including any development at right angles to the enclosed or piped sections.

G. Metro Code Chapter 3.07 Urban Growth Management Functional Plan – Exempt uses and conditioned activities. Where construction of a residence was completed before January 1, 2006, the owners or residents shall not be restricted from engaging in any development that was allowed prior to September 22, 2005; unless such development required obtaining a land use decision, or a building, erosion control, or grading permit.

Response: Other than the removal of existing fencing, the application does not include any of the exempted activities listed above. The criteria do not apply.

32.050 APPLICATION

A. An application requesting approval for a use or activity regulated by this chapter shall be initiated by the property owner, or the owner's authorized

agent, and shall include an application form and the appropriate deposit or fee as indicated on the master fee schedule.

Response: Exhibit A includes a completed Development Review application signed by the property owner. Additionally, the application was submitted to the City with the appropriate development review fee. The criterion is met.

B. A pre-application conference shall be a prerequisite to the filing of the application.

Response: A pre-application conference to discuss the subject application was held on April 6, 2016. The criterion is met.

C. The applicant shall submit maps and diagrams at 11 by 17 inches and a written narrative addressing the approval criteria and requirements of this chapter, and any additional copies required by the Planning Director.

D. Where review of soil maps, Department of Geology and Mineral Industries (DOGAMI) maps, or on-site inspection by the City Engineer reveals evidence of slope failures or that WRA slopes are potentially unstable or prone to failure, geotechnical studies may be required to demonstrate that the proposed development will not cause, or contribute to, slope failure or increased erosion or sedimentation in the WRA or adversely impact surface or modify groundwater flow or hydrologic conditions. These geotechnical studies shall include all necessary measures to avoid or correct the potential hazard.

E. Applications proposing that streets or utilities cross water resources, or any other development that modifies the water resource, shall present evidence in the form of adopted utility master plans or transportation master plans, or findings from a registered Oregon civil engineer, certified engineering geologist or similarly qualified professional to demonstrate that the development or improvements are consistent with accepted engineering practices.

F. Site plan. The applicant shall submit a site plan which contains the following information, as applicable:

1. The name, address, and telephone number of the applicant, the scale (lineal) of the plan, and a north arrow.

2. Property lines, rights-of-way, easements, etc.

3. Topographic information at two-foot contour increments identifying both existing grades and proposed grade changes.

4. A slope map delineating slopes zero to 25 percent and over 25 percent.

5. Boundaries of the WRA, specifically delineating the water resource, and any riparian corridor boundary. If the proposal includes development of a wetland, a wetlands delineation prepared by a professional wetland specialist will be required. The wetland delineation may be required to be accepted or waived through the Department of State Lands (DSL) delineation review process.

6. Location of existing and proposed development, including all existing and proposed structures, accessory structures, any areas of fill or excavation, water resource crossings, alterations to vegetation, or other alterations to the site's natural state.

7. Identify the location and square footage of previously disturbed areas, areas that are to be temporarily disturbed, and area to be permanently disturbed or developed.

8. When an application proposes development within the WRA, an inventory of vegetation within the WRA, sufficient to categorize the existing condition of the WRA, including:

   a. The type and general quality of ground cover, including the identification of dominant species and any occurrence of non-native, invasive species;

   b. Square footage of ground cover; and

   c. Square footage of tree canopy as measured either through aerial photographs or by determining the tree drip lines. Where only a portion of a WRA is to be disturbed, the tree inventory need only apply to the impacted area. The remaining treed area shall be depicted by outlining the canopy cover.

9. Locations of all significant trees as defined by the City Arborist.

10. Identify adopted transportation, utility and other plan documents applicable to this proposal.

11. For cases processed under CDC 32.110 (hardship), provide the maximum disturbed area (MDA) calculations.

G. Construction management plan. The applicant shall submit a construction management plan which includes the following:

1. The location of proposed TDAs (site ingress/egress for construction equipment, areas for storage of material, construction activity areas, grading and trenching, etc.) that will subsequently be restored to original grade and replanted with native vegetation, shall be identified, mapped and enclosed with fencing per subsection (G)(3) of this section.

2. Appropriate erosion control measures consistent with Clackamas County Erosion Prevention and Sediment Control Planning and Design Manual, rev. 2008, and a tentative schedule of work.

3. The WRA shall be protected, prior to construction, with an anchored chain link fence (or equivalent approved by the City) at its perimeter that shall remain undisturbed, except as specifically authorized by the approval authority. Additional fencing to delineate approved TDAs may be required. Fencing shall be mapped and identified in the construction management plan and maintained until construction is complete.

H. Mitigation plan prepared in accordance with the requirements in CDC 32.090.

I. Re-vegetation plan prepared in accordance with the requirements in CDC 32.100.

J. The Planning Director may modify the submittal requirements per CDC 99.035.

K. The following additional requirements apply to applications being submitted under the alternative review process pursuant to CDC 32.070 and 32.080.

1. Identify the affected WRA and describe the functions it performs (see Table 32-4).

2. Provide a scaled map that delineates the proposed WRA boundaries determined to be sufficient to sustain the functions occurring at the site and a narrative that justifies the proposal, consistent with CDC 32.080.

3. Identify the recommended WRA boundary at the site with colored tape, survey markers or other easily identified means for field inspection by staff.

4. Consultant required for alternate review process.

   a. The narrative and analysis required by CDC 32.070 and 32.080 shall be prepared and signed by a qualified natural resource professional, such as a wildlife biologist, botanist, or hydrologist. The Planning Director shall determine the scope of work and specific products required from the consultant. The Planning Director may require a mitigation plan pursuant to CDC 32.090 and/or a re-vegetation plan pursuant to CDC 32.100.

   b. The Planning Director may waive the consultant requirement for simple or minor projects if he or she determines that it is not necessary in order to satisfy the requirements of this chapter.

Response: This application includes the applicable information as provided above. The criteria are met.

32.060 APPROVAL CRITERIA (STANDARD PROCESS)

No application for development on property containing a WRA shall be approved unless the approval authority finds that the proposed development is consistent with the following approval criteria, or can satisfy the criteria by conditions of approval:

A. WRA protection/minimizing impacts.

1. Development shall be conducted in a manner that will avoid or, if avoidance is not possible, minimize adverse impact on WRAs.

2. Mitigation and re-vegetation of disturbed WRAs shall be completed per CDC 32.090 and 32.100, respectively.

Response: Exhibit B shows that all 12 lots include a sufficient building area outside of the WRA and therefore no development, except a new stormwater facility as described below, is planned to occur within the WRA. The criterion is met.

B. Storm water and storm water facilities.

1. Proposed developments shall be designed to maintain the existing WRAs and utilize them as the primary method of storm water conveyance through the project site unless:

   a. The surface water management plan calls for alternate configurations (culverts, piping, etc.); or

b. Under CDC 32.070, the applicant demonstrates that the relocation of the water resource will not adversely impact the function of the WRA including, but not limited to, circumstances where the WRA is poorly defined or not clearly channelized.

Re-vegetation, enhancement and/or mitigation of the re-aligned water resource shall be required as applicable.

Response: Exhibit B shows that the site has been designed to maintain the existing WRA as the primary method of stormwater conveyance off-site. No re-alignment/relocation of the WRA is planned. The criteria are met.

2. Public and private storm water detention, storm water treatment facilities and storm water outfall or energy dissipaters (e.g., rip rap) may encroach into the WRA if:

a. Accepted engineering practice requires it;

b. Encroachment on significant trees shall be avoided when possible, and any tree loss shall be consistent with the City's Tree Technical Manual and mitigated per CDC 32.090;

c. There shall be no direct outfall into the water resource, and any resulting outfall shall not have an erosive effect on the WRA or diminish the stability of slopes; and

d. There are no reasonable alternatives available.

A geotechnical report may be required to make the determination regarding slope stability.

Response: Exhibit B shows that a new stormwater facility is planned to be located in the WRA at the southeast corner of the subject site. Given the existing topography of the site and the location of the WRA, this is the most practical and least impactful location to site the stormwater facility. Of the approximately 98 trees located in the WRA, the new stormwater facility will require the removal of 23 trees in this WRA. Of these trees that are required to be removed, 18 are exempt from the City's tree regulations due to health, species, or nursery stock (West Linn Municipal Code Sections 8.510 and 8.560). The plans show that this is the minimum tree removal necessary to accommodate on-site stormwater management. A mitigation plan for the removal of these trees is located in Exhibit C. Exhibit B shows that no direct outfall to the water resource will occur. The criteria are met.

3. Roadside storm water conveyance swales and ditches may be extended within rights-of-way located in a WRA. When possible, they shall be located along the side of the road furthest from the water resource. If the conveyance facility must be located along the side of the road closest to the water resource, it shall be located as close to the road/sidewalk as possible and include habitat friendly design features (treatment train, rain gardens, etc.).

4. Storm water detention and/or treatment facilities in the WRA shall be designed without permanent perimeter fencing and shall be landscaped with native vegetation.

5. Access to public storm water detention and/or treatment facilities shall be provided for maintenance purposes. Maintenance driveways

shall be constructed to minimum width and use water permeable paving materials. Significant trees, including roots, shall not be disturbed to the degree possible. The encroachment and any tree loss shall be mitigated per CDC 32.090. There shall also be no adverse impacts upon the hydrologic conditions of the site.

Response: Exhibit B shows that roadside stormwater conveyance systems are not located in a WRA. This Exhibit also shows that the stormwater facility in Tract A has been designed to not require permanent perimeter fencing in the WRA and is planned to be landscaped using native vegetation. Finally, access to the stormwater facility is located off Parker Road, immediately south of Tract A. The criteria are met.

C. Repealed by Ord. 1647.

D. WRA width. Except for the exemptions in CDC 32.040, applications that are using the alternate review process of CDC 32.070, or as authorized by the approval authority consistent with the provisions of this chapter, all development is prohibited in the WRA as established in Table 32-2 below:

Response: As described above, the application includes a new stormwater facility in the WRA, which is permitted by Table 32-2. The application does not include any additional development in the WRA. The criterion is met.

E. Roads, driveways and utilities.

1. New roads, driveways, or utilities shall avoid WRAs unless the applicant demonstrates that no other practical alternative exists. In that case, road design and construction techniques shall minimize impacts and disturbance to the WRA by the following methods:

a. New roads and utilities crossing riparian habitat areas or streams shall be aligned as close to perpendicular to the channel as possible.

b. Roads and driveways traversing WRAs shall be of the minimum width possible to comply with applicable road standards and protect public safety. The footprint of grading and site clearing to accommodate the road shall be minimized.

c. Road and utility crossings shall avoid, where possible:

1) Salmonid spawning or rearing areas;

2) Stands of mature conifer trees in riparian areas;

3) Highly erodible soils;

4) Landslide prone areas;

5) Damage to, and fragmentation of, habitat; and

6) Wetlands identified on the WRA Map.

2. Crossing of fish bearing streams and riparian corridors shall use bridges or arch-bottomless culverts or the equivalent that provides comparable fish protection, to allow passage of wildlife and fish and to retain the natural stream bed.

3. New utilities spanning fish bearing stream sections, riparian corridors, and wetlands shall be located on existing roads/bridges,

elevated walkways, conduit, or other existing structures or installed underground via tunneling or boring at a depth that avoids tree roots and does not alter the hydrology sustaining the water resource, unless the applicant demonstrates that it is not physically possible or it is cost prohibitive. Bore pits associated with the crossings shall be restored upon project completion. Dry, intermittent streams may be crossed with open cuts during a time period approved by the City and any agency with jurisdiction.

4. No fill or excavation is allowed within the ordinary high water mark of a water resource, unless all necessary permits are obtained from the City, U.S. Army Corps of Engineers and Oregon Department of State Lands (DSL).

5. Crossings of fish bearing streams shall be aligned, whenever possible, to serve multiple properties and be designed to accommodate conduit for utility lines. The applicant shall, to the extent legally permissible, work with the City to provide for a street layout and crossing location that will minimize the need for additional stream crossings in the future to serve surrounding properties.

Response: Exhibit B shows that impacts to the WRA are limited to a new stormwater facility necessary to treat and detain runoff from new impervious areas planned on the site. No impact to the water resource or fish bearing streams are planned. The criteria are met.

F. Passive recreation. Low impact or passive outdoor recreation facilities for public use including, but not limited to, multi-use paths and trails, not exempted per CDC 32.040(B)(2), viewing platforms, historical or natural interpretive markers, and benches in the WRA, are subject to the following standards:

1. Trails shall be constructed using non-hazardous, water permeable materials with a maximum width of four feet or the recommended width under the applicable American Association of State Highway and Transportation Officials (AASHTO) standards for the expected type and use, whichever is greater.

2. Paved trails are limited to the area within 20 feet of the outer boundary of the WRA, and such trails must comply with the storm water provisions of this chapter.

3. All trails in the WRA shall be set back from the water resource at least 30 feet except at stream crossing points or at points where the topography forces the trail closer to the water resource.

4. Trails shall be designed to minimize disturbance to existing vegetation, work with natural contours, avoid the fall line on slopes where possible, avoid areas with evidence of slope failure and ensure that trail runoff does not create channels in the WRA.

5. Foot bridge crossings shall be kept to a minimum. When the stream bank adjacent to the foot bridge is accessible (e.g., due to limited vegetation or topography), where possible, fences or railings shall be installed from the foot bridge and extend 15 feet beyond the terminus of the foot bridge to discourage trail users and pets from accessing the stream bank, disturbing wildlife and habitat areas, and causing vegetation loss, stream bank erosion and stream turbidity. Bridges shall not be made of continuous impervious materials or be treated with toxic substances that could leach into the WRA.

6. **Interpretive facilities (including viewpoints) shall be at least 10 feet from the top of the water resource's bankfull flow/OHW or delineated wetland edge and constructed with a fence between users and the resource. Interpretive signs may be installed on footbridges.**

Response: The application does not include passive recreational facilities in the WRA. The criteria do not apply

G. Daylighting Piped Streams.

1. **As part of any application, covered or piped stream sections shown on the WRA Map are encouraged to be "daylighted" or opened. Once it is daylighted, the WRA will be limited to 15 feet on either side of the stream. Within that WRA, water quality measures are required which may include a storm water treatment system (e.g., vegetated bioswales), continuous vegetative ground cover (e.g., native grasses) at least 15 feet in width that provides year round efficacy, or a combination thereof.**

2. **The re-opened stream does not have to align with the original piped route but may take a different route on the subject property so long as it makes the appropriate upstream and downstream connections and meet the standards of subsections (G)(3) and (4) of this section.**

3. **A re-aligned stream must not create WRAs on adjacent properties not owned by the applicant unless the applicant provides a notarized letter signed by the adjacent property owner(s) stating that the encroachment of the WRA is permitted.**

4. **The evaluation of proposed alignment and design of the reopened stream shall consider the following factors:**

   a. **The ability of the reopened stream to safely carry storm drainage through the area without causing significant erosion.**

   b. **Continuity with natural contours on adjacent properties, slope on site and drainage patterns.**

   c. **Continuity of adjacent vegetation and habitat values.**

   d. **The ability of the existing and proposed vegetation to filter sediment and pollutants and enhance water quality.**

   e. **Provision of water temperature conducive to fish habitat.**

5. **Any upstream or downstream WRAs or riparian corridors shall not apply to, or overlap, the daylighted stream channel.**

6. **When a stream is daylighted the applicant shall prepare and record a legal document describing the reduced WRA required by subsections (G)(1) and (5) of this section. The document will be signed by a representative of the City and recorded at the applicant's expense to better ensure long term recognition of the reduced WRA and reduced restrictions for the daylighted stream section.**

Response: The application does not utilize piped streams or stream segments for stormwater conveyance. The criteria do not apply.

H. The following habitat friendly development practices shall be incorporated into the design of any improvements or projects in the WRA to the degree possible:

1. Restore disturbed soils to original or higher level of porosity to regain infiltration and storm water storage capacity.

2. Apply a treatment train or series of storm water treatment measures to provide multiple opportunities for storm water treatment and reduce the possibility of system failure.

3. Incorporate storm water management in road rights-of-way.

4. Landscape with rain gardens to provide on-lot detention, filtering of rainwater, and groundwater recharge.

5. Use multi-functional open drainage systems in lieu of conventional curb-and-gutter systems.

6. Use green roofs for runoff reduction, energy savings, improved air quality, and enhanced aesthetics.

7. Retain rooftop runoff in a rain barrel for later on-lot use in lawn and garden watering.

8. Disconnect downspouts from roofs and direct the flow to vegetated infiltration/filtration areas such as rain gardens.

9. Use pervious paving materials for driveways, parking lots, sidewalks, patios, and walkways.

10. Reduce sidewalk width to a minimum four feet. Grade the sidewalk so it drains to the front yard of a residential lot or retention area instead of towards the street.

11. Use shared driveways.

12. Reduce width of residential streets and driveways, especially at WRA crossings.

13. Reduce street length, primarily in residential areas, by encouraging clustering.

14. Reduce cul-de-sac radii and use pervious and/or vegetated islands in center to minimize impervious surfaces.

15. Use previously developed areas (PDAs) when given an option of developing PDA versus non-PDA land.

16. Minimize the building, hardscape and disturbance footprint.

17. Consider multi-story construction over a bigger footprint.

Response: As described above, impacts to the WRA are limited to a new stormwater facility that will be used to treat and detain runoff from new impervious areas on site. The stormwater facility is planned to be planted with native vegetation and has also been designed to accommodate runoff from new sidewalks along the site's Parker Road frontage. The criteria are met.

32.070 ALTERNATE REVIEW PROCESS

This section establishes a review and approval process that applicants can use when there is reason to believe that the width of the WRA prescribed under

the standard process (CDC 32.060(D)) is larger than necessary to protect the functions of the water resource at a particular site. It allows a qualified professional to determine what water resources and associated functions (see Table 32-4 below) exist at a site and the WRA width that is needed to maintain those functions.

Response: The application does not require review through the alternative review process listed above. The criterion does not apply.

(…)

32.090 MITIGATION PLAN

A. A mitigation plan shall only be required if development is proposed within a WRA (including development of a PDA). (Exempted activities of CDC 32.040 do not require mitigation unless specifically stated. Temporarily disturbed areas, including TDAs associated with exempted activities, do not require mitigation, just grade and soil restoration and re-vegetation.) The mitigation plan shall satisfy all applicable provisions of CDC 32.100, Re-Vegetation Plan Requirements.

Response: Because the application includes a new stormwater facility that is partially located in the WRA, a mitigation plan has been prepared and is included in Exhibit C. The criterion is met.

B. Mitigation shall take place in the following locations, according to the following priorities (subsections (B)(1) through (4) of this section):

1. On-site mitigation by restoring, creating or enhancing WRAs.

2. Off-site mitigation in the same sub-watershed will be allowed, but only if the applicant has demonstrated that:

a. It is not practicable to complete mitigation on-site, for example, there is not enough area on-site; and

b. The mitigation will provide equal or superior ecological function and value.

3. Off-site mitigation outside the sub-watershed will be allowed, but only if the applicant has demonstrated that:

a. It is not practicable to complete mitigation on-site, for example, there is not enough area on-site; and

b. The mitigation will provide equal or superior ecological function and value.

4. Purchasing mitigation credits though DSL or other acceptable mitigation bank.

Response: Exhibit C shows that mitigation is planned to be provided in accordance with the applicable criteria listed above. The criteria are met.

C. Amount of mitigation.

1. The amount of mitigation shall be based on the square footage of the permanent disturbance area by the application. For every one square foot of non-PDA disturbed area, on-site mitigation shall require one square foot of WRA to be created, enhanced or restored.

2. For every one square foot of PDA that is disturbed, on-site mitigation shall require one half a square foot of WRA vegetation to be created, enhanced or restored.

3. For any off-site mitigation, including the use of DSL mitigation credits, the requirement shall be for every one square foot of WRA that is disturbed, two square feet of WRA shall be created, enhanced or restored. The DSL mitigation credits program or mitigation bank shall require a legitimate bid on the cost of on-site mitigation multiplied by two to arrive at the appropriate dollar amount.

Response: Exhibit C shows that mitigation is planned to be provided in accordance with the applicable criteria listed above. The criteria are met.

D. The Planning Director may limit or define the scope of the mitigation plan and submittal requirements commensurate with the scale of the disturbance relative to the resource and pursuant to the authority of Chapter 99 CDC. The Planning Director may determine that a consultant is required to complete all or a part of the mitigation plan requirements.

Response: The Planning Director has not indicated to the Applicant any special limitations or inclusions regarding the scope of the mitigation plan. Additionally, the mitigation plan was prepared by a professional natural resources scientist with AKS Engineering & Forestry. The criterion is met.

E. A mitigation plan shall contain the following information:

1. A list of all responsible parties including, but not limited to, the owner, applicant, contractor, or other persons responsible for work on the development site.

2. A map showing where the specific adverse impacts will occur and where the mitigation activities will occur.

3. A re-vegetation plan for the area(s) to be mitigated that meets the standards of CDC 32.100.

4. An implementation schedule, including timeline for construction, mitigation, mitigation maintenance, monitoring, and reporting. All in-stream work in fish bearing streams shall be done in accordance with the Oregon Department of Fish and Wildlife.

5. Assurances shall be established to rectify any mitigation actions that are not successful within the first three years. This may include bonding or other surety.

Response: Exhibit C shows that the mitigation plan includes the applicable elements as listed above. The criteria are met.

32.100 RE-VEGETATION PLAN REQUIREMENTS

A. In order to achieve the goal of re-establishing forested canopy, native shrub and ground cover and to meet the mitigation requirements of CDC 32.090 and vegetative enhancement of CDC 32.080, tree and vegetation plantings are required according to the following standards:

1. All trees, shrubs and ground cover to be planted must be native plants selected from the Portland Plant List.

2. Plant size. Replacement trees must be at least one-half inch in caliper, measured at six inches above the ground level for field grown trees or above the soil line for container grown trees (the one-half inch minimum size may be an average caliper measure, recognizing that trees are not uniformly round), unless they are oak or madrone which may be one gallon size. Shrubs must be in at least a one-gallon container or the equivalent in ball and burlap and must be at least 12 inches in height.

3. Plant coverage.

   a. Native trees and shrubs are required to be planted at a rate of five trees and 25 shrubs per every 500 square feet of disturbance area (calculated by dividing the number of square feet of disturbance area by 500, and then multiplying that result times five trees and 25 shrubs, and rounding all fractions to the nearest whole number of trees and shrubs; for example, if there will be 330 square feet of disturbance area, then 330 divided by 500 equals 0.66, and 0.66 times five equals 3.3, so three trees must be planted, and 0.66 times 25 equals 16.5, so 17 shrubs must be planted). Bare ground must be planted or seeded with native grasses or herbs. Non-native sterile wheat grass may also be planted or seeded, in equal or lesser proportion to the native grasses or herbs.

   b. Trees shall be planted between eight and 12 feet on center and shrubs shall be planted between four and five feet on center, or clustered in single species groups of no more than four plants, with each cluster planted between eight and 10 feet on center. When planting near existing trees, the dripline of the existing tree shall be the starting point for plant spacing measurements.

4. Plant diversity. Shrubs must consist of at least two different species. If 10 trees or more are planted, then no more than 50 percent of the trees may be of the same genus.

5. Invasive vegetation. Invasive non-native or noxious vegetation must be removed within the mitigation area prior to planting.

6. Tree and shrub survival. A minimum survival rate of 80 percent of the trees and shrubs planted is expected by the third anniversary of the date that the mitigation planting is completed.

7. Monitoring and reporting. Monitoring of the mitigation site is the ongoing responsibility of the property owner. Plants that die must be replaced in kind.

8. To enhance survival of tree replacement and plantings, the following practices are required:

   a. Mulching. Mulch new plantings a minimum of three inches in depth and 18 inches in diameter to retain moisture and discourage weed growth.

   b. Irrigation. Water new plantings one inch per week between June 15th to October 15th, for the three years following planting.

   c. Weed control. Remove, or control, non-native or noxious vegetation throughout maintenance period.

d. Planting season. Plant bare root trees between December 1st and February 28th, and potted plants between October 15th and April 30th.

e. Wildlife protection. Use plant sleeves or fencing to protect trees and shrubs against wildlife browsing and resulting damage to plants.

B. When weather or other conditions prohibit planting according to schedule, the applicant shall ensure that disturbed areas are correctly protected with erosion control measures and shall provide the City with funds in the amount of 125 percent of a bid from a recognized landscaper or nursery which will cover the cost of the plant materials, installation and any follow up maintenance. Once the planting conditions are favorable the applicant shall proceed with the plantings and receive the funds back from the City upon completion, or the City will complete the plantings using those funds.

Response: Exhibit C shows that revegetation is planned to be provided in accordance with the applicable criteria listed above. The criteria are met.

(…)

Chapter 46 OFF-STREET PARKING, LOADING AND RESERVOIR AREAS

46.020 APPLICABILITY AND GENERAL PROVISIONS

A. At the time a structure is erected or enlarged, or the use of a structure or unit of land is changed within any zone, parking spaces, loading areas and reservoir areas shall be provided in accordance with the requirements of this chapter unless other requirements are otherwise established as a part of the development approval process.

B. The provision and maintenance of off-street parking and loading spaces are the continuing obligation of the property owner.

C. No building or other permit shall be issued until plans are approved that show the property that is and will remain available for exclusive use as off-street parking and loading space as required by this chapter.

D. Required parking spaces and loading areas shall be improved to the standards contained in this chapter and shall be available for use at the time of the final building inspection except as provided in CDC 46.150.

Response: The application does not include new buildings or structures that warrant off-street parking or loading at this time. At time of building permit submittal, the City will ensure all applicable provisions of this Chapter have been met. The criteria can be met.

46.030 SUBMITTAL REQUIREMENTS

For any application requiring design review approval, which includes parking areas, the applicant shall submit, within the design review package, a plan drawn to scale showing all the elements necessary to indicate that the requirements of Chapter 55 CDC are met and it shall include but not be limited to:

A. The delineation of individual parking and loading spaces and their dimensions;

B. The identification of compact parking spaces;

C. The location of the circulation area necessary to serve spaces;

D. The access point(s) to streets, alleys, and properties to be served;

E. The location of curb cuts;

F. The location and dimensions of all landscaping, including the type and size of plant material to be used, as well as any other landscape material incorporated into the overall plan;

G. The proposed grading and drainage plans and the slope (percentage) of parking lot;

H. Specifications as to signs and bumper guards;

I. Identification of disabled parking spaces;

J. Location of pedestrian walkways and crossings; and

K. Location of bicycle racks.

Response: The application does not require design review. The above listed submittal requirements do not apply.

46.040 APPROVAL STANDARDS

Approval shall be based on the standards set forth in this chapter and Chapter 48 CDC, Access, Egress and Circulation; Chapter 52 CDC, Signs; and Chapter 54 CDC, Landscaping.

Response: The applicable standards of the above-referenced Chapters are responded to throughout this narrative.

46.050 JOINT USE OF A PARKING AREA

A. Joint use of required parking spaces may occur where two or more uses on the same or separate sites are able to share the same parking spaces because their parking demands occur at different times. Joint use of required parking spaces is allowed if the following documentation is submitted in writing to the Planning Director as part of a building or zoning permit application or land use review:

1. The names and addresses of the owners or tenants that are sharing the parking and the uses at those locations;

2. The location and number of parking spaces that are being shared;

3. An analysis showing that the peak parking times of the uses occur at different times and that the parking area will be large enough for the anticipated demands of both uses; and

4. A legal instrument such as an easement or deed restriction that guarantees access to the parking for all uses.

B. If a joint use arrangement is subsequently terminated, the requirements of this chapter will apply to each use separately.

Response: The application does not require approval for a joint use parking area. The criteria do not apply.

46.060 STORAGE IN PARKING AND LOADING AREAS PROHIBITED

Required parking spaces shall be available for the parking of passenger automobiles of residents, customers, patrons and employees only, and the required parking spaces shall not be used for storage of vehicles or materials or for the parking of trucks connected with the business or use with the exception of small (under one-ton) delivery trucks or cars.

Response: This application, which involves a residential subdivision, does not require the provision of a loading area. The criterion does not apply.

46.070 MAXIMUM DISTANCE ALLOWED BETWEEN PARKING AREA AND USE

A. Off-street parking spaces for single- and two-family dwellings shall be located on the same lot with the dwelling.

Response: The application does not include buildings or structures that warrant the provision of off-street parking at this time. At time of building permit submittal, the City will ensure that each lot includes off-street parking consistent with this section. The criterion can be met.

B. Off-street parking spaces for uses not listed in subsection A of this section shall be located not farther than 200 feet from an entryway to the building or use they are required to serve, measured in a straight line from the building, with the following exceptions:

1. Shared parking areas for commercial uses which require more than 40 parking spaces may provide for the spaces in excess of the required 40 spaces up to a distance of 300 feet from the entryway to the commercial building or use.

2. Industrial and manufacturing uses which require in excess of 40 spaces may locate the required spaces in excess of the 40 spaces up to a distance of 300 feet from the entryway to the building.

3. Employee parking areas for carpools and vanpools shall be located closer to the entryway to the building than general employee parking.

4. Stacked or valet parking is allowed if an attendant is present to move vehicles. If stacked parking is used for required parking spaces, the applicant shall ensure that an attendant will always be present when the lot is in operation. The requirements for minimum or maximum spaces and all parking area development standards continue to apply for stacked parking.

5. All disabled parking shall be placed closest to building entrances than all other parking. Appropriate ADA curb cuts and ramps to go from the parking lot to the ADA-accessible entrance shall be provided unless exempted by ADA code.

Response: The application seeks approval for a residential subdivision that is planned for future single-family homes, as described in Subsection A. The criteria do not apply.

46.080 COMPUTATION OF REQUIRED PARKING SPACES AND LOADING AREA

A. Where several uses occupy a single structure or unit of land, a combination of uses is included in one business, or a combination of uses in the same or separate buildings share a common parking area as in the case of a shopping center, the total off-street parking spaces and loading area shall be the sum of the requirements of the several uses, computed separately. For example, parking for an auto sales and repair business would be calculated using the "retail-bulky" calculation for the sales area and the "service and repair" calculation for the repair area. In another example, parking for a shopping

center with a grocery store, a restaurant, and a medical office would be calculated using the "general retail store" calculation for the grocery store, the "restaurant" calculation for the restaurant, and the "medical/dental clinics" calculation for the medical office. The total number of required parking spaces may be reduced by up to 10 percent to account for cross-patronage (when a customer visits several commercial establishments during one visit to the commercial center) of adjacent businesses or services in a commercial center with five or more separate commercial establishments.

B. To calculate building square footage as a basis for determining how many parking spaces are needed, the area measured shall be gross floor area under the roof measured from the faces of the structure, including all habitable floors and excluding only space devoted to covered off-street parking or loading.

C. Where employees are specified, the employees counted are the persons who work on the premises including proprietors, executives, professional people, production, sales, and distribution employees, during the largest shift.

D. Fractional space requirements shall be counted as a whole space.

E. On-street parking along the immediate property frontage(s) may be counted toward the minimum parking requirement with approval from the City Engineer.

F. When an office or commercial development is proposed which has yet to identify its tenants, the parking requirement shall be based upon the "office" or "general retail" categories, respectively.

G. As permitted uses are replaced with new permitted uses within an existing commercial or business center, modification of the number of parking spaces relative to the new mix of uses is not required unless other modifications of the site which require design review approval pursuant to Chapter 55 CDC are proposed.

Response: At time of building permit submittal, the above guidelines will be reviewed to ensure the appropriate number of off-street parking spaces are provided for each single-family residence.

46.090 MINIMUM PARKING SPACE REQUIREMENTS

MINIMUM PARKING SPACE REQUIREMENTS		
1.	Single-family residences	1 off-street space for each dwelling unit; may or may not be in garage or carport.

F. Maximum parking. Parking spaces (except for single-family and two-family residential uses) shall not exceed the minimum required number of spaces by more than 10 percent.

G. Parking reductions. An applicant may reduce parking up to 10 percent for development sites within one-quarter mile of a transit corridor or within a mixed-use commercial area, and up to 10 percent for commercial development sites adjacent to multi-family residential sites with the potential to accommodate more than 20 dwelling units.

H. For office, industrial, and public uses where there are more than 20 parking spaces for employees on the site, at least 10 percent of the required employee parking spaces shall be reserved for carpool use before 9:00 a.m. on weekdays. The spaces will be the closest to the building entrance, except for any disabled parking and those signed for exclusive customer use. The carpool/vanpool spaces shall be clearly marked "Reserved – Carpool/Vanpool Before 9:00 a.m."

I. Existing developments along transit streets or near transit stops may redevelop up to 10 percent of the existing parking spaces to provide transit-oriented facilities, including bus pullouts, bus stops and shelters, park and ride stations, and other similar facilities.

J. Development in water resource areas may reduce the required number of parking spaces by up to 25 percent. Adjacent improved street frontage with curb and sidewalk may also be counted towards the parking requirement at a rate of one parking space per 20 lineal feet of street frontage adjacent to the property.

Response: At time of building permit submittal, the City will ensure that each lot includes off-street parking for 1 vehicle per dwelling unit. The criteria can be met.

46.150 DESIGN AND STANDARDS

The following standards apply to the design and improvement of areas used for vehicle parking, storage, loading, and circulation:

A. Design standards.

1. "One standard parking space" means a minimum for a parking stall of eight feet in width and 16 feet in length. These stalls shall be identified as "compact." To accommodate larger cars, 50 percent of the required parking spaces shall have a minimum dimension of nine feet in width and 18 feet in length (nine feet by 18 feet). When multi-family parking stalls back onto a main driveway, the stalls shall be nine feet by 20 feet. Parking for development in water resource areas may have 100 percent compact spaces.

2. Disabled parking and maneuvering spaces shall be consistent with current federal dimensional standards and subsection B of this section and placed nearest to accessible building entryways and ramps.

3. Repealed by Ord. 1622.

4. Service drives shall be designed and constructed to facilitate the flow of traffic, provide maximum safety of traffic access and egress, and maximum safety of pedestrians and vehicular traffic on the site.

5. Each parking and/or loading space shall have clear access, whereby the relocation of other vehicles to utilize the parking space is not required.

6. Except for single- and two-family residences, any area intended to be used to meet the off-street parking requirements as contained in this chapter shall have all parking spaces clearly marked using a permanent paint. All interior drives and access aisles shall be clearly marked and signed to show direction of flow and maintain vehicular and pedestrian safety. Permeable parking surface spaces may have an alternative delineation for parking spaces.

7. Except for residential parking, and parking for public parks and trailheads, at least 50 percent of all areas used for the parking and/or storage and/or maneuvering of any vehicle, boat and/or trailer shall be improved with asphalt or concrete surfaces according to the same standards required for the construction and acceptance of City streets. The remainder of the areas used for parking may use a permeable paving surface designed to reduce surface runoff. Parking for public parks or trailheads may use a permeable paving surface designed to reduce surface runoff for all parking areas. Where a parking lot contains both paved and unpaved areas, the paved areas shall be located closest to the use which they serve.

8. Off-street parking spaces for single- and two-family residences shall be improved with an asphalt or concrete surface, or a permeable parking surface designed to reduce surface runoff, to specifications as approved by the Building Official. Other parking facilities for two- and single-family homes that are to accommodate additional vehicles, boats, recreational vehicles, and trailers, etc., need not be paved. All parking for multi-family residential development shall be paved with concrete or asphalt. Driveways shall measure at least 20 feet from the back of sidewalk to garage or the end of the parking pad to accommodate cars and sport utility vehicles without the vehicles blocking the public sidewalk.

9. Access drives from the street to off-street parking or loading areas shall be designed and constructed to facilitate the flow of traffic and provide maximum safety for pedestrian and vehicular traffic on the site. The number of access drives shall be limited to the minimum that will allow the property to accommodate and service the anticipated traffic. Access drives shall be clearly and permanently marked and defined through use of rails, fences, walls, or other barriers or markers on frontage not occupied by service drives.

10. Access drives shall have a minimum vision clearance as provided in Chapter 42 CDC, Clear Vision Areas.

11. Parking spaces along the boundaries of a parking lot or adjacent to interior landscaped areas or sidewalks shall be provided with a wheel stop at least four inches high located two feet back from the front of the parking stall. Such parking spaces may be provided without wheel stops if the sidewalks or landscaped areas adjacent the parking stalls are two feet wider than the minimum width.

12. Off-street parking and loading areas shall be drained in accordance with plans and specifications approved by the City Engineer. Storm drainage at commercial sites may also have to be collected to treat oils and other residue.

13. Artificial lighting on all off-street parking facilities shall be designed to deflect all light downward away from surrounding residences and so as not to create a hazard to the public use of any road or street.

14. Directional arrows and traffic control devices which are placed on parking lots shall be identified.

15. The maximum driveway grade for single-family housing shall be 15 percent. The 15 percent shall be measured along the centerline of the driveway only. Grades elsewhere along the driveway shall not apply. Variations require approval of a Class II variance by the Planning Commission pursuant to Chapter 75 CDC. Regardless, the last 18 feet

in front of the garage must maintain a maximum grade of 12 percent as measured along the centerline of the driveway only. Grades elsewhere along the driveway shall not apply.

16. Visitor or guest parking must be identified by painted "GUEST" or "VISITOR."

17. The parking area shall have less than a five percent grade. No drainage across adjacent sidewalks or walkways is allowed.

18. Commercial, office, industrial, and public parking lots may not occupy more than 50 percent of the main lot frontage of a development site. The remaining frontage shall comprise buildings or landscaping. If over 50 percent of the lineal frontage comprises parking lot, the landscape strip between the right-of-way and parking lot shall be increased to 15 feet wide and shall include terrain variations (e.g., one-foot-high berm) plus landscaping. The defensible space of the parking lot should not be compromised.

19. Areas of the parking lot improved with asphalt or concrete surfaces shall be designed into areas of 12 or less spaces through the use of defined landscaped area. Groups of 12 or less spaces are defined as:

    a. Twelve spaces in a row, provided there are no abutting parking spaces, as in the case when the spaces are abutting the perimeter of the lot; or

    b. Twelve spaces in a group with six spaces abutting together; or

    c. Two groups of 12 spaces abutting each other, but separated by a 15-foot-wide landscape area including a six-foot-wide walkway.

    d. Parking areas improved with a permeable parking surface may be designed using the configurations shown in subsections (A)(19)(a), (b) and (c) of this section except that groups of up to 18 spaces are allowed.

    e. The requirements of this chapter relating to total parking lot landscaping, landscaping buffers, perimeter landscaping, and landscaping the parking lot islands and interior may be waived or reduced pursuant to CDC 32.110(F) in a WRA application without a variance being required.

20. Pedestrian walkways shall be provided in parking areas having 20 or more spaces. Walkways or sidewalks shall be constructed between major buildings/activity areas (an example in multi-family housing: between recreation center, swimming pool, manager's office, park or open space areas, parking lots, etc.) within a development, between adjacent developments and the new development, as feasible, and between major buildings/activity areas within the development and adjacent streets and all adjacent transit stops. Internal parking lot circulation and design should maintain ease of access for pedestrians from streets and transit stops. Walkways shall be constructed using a material that visually contrasts with the parking lot and driveway surface. Walkways shall be further identifiable to pedestrians and motorists by grade separation, walls, curbs, surface texture (surface texture shall not interfere with safe use of wheelchairs, baby carriages, shopping carts, etc.), and/or landscaping. Walkways shall

be six feet wide. The arrangement and layout of the paths shall depend on functional requirements.

21. The parking and circulation patterns are easily comprehended and defined. The patterns shall be clear to minimize traffic hazards and congestion and to facilitate emergency vehicles.

22. The parking spaces shall be close to the related use.

23. Permeable parking spaces shall be designed and built to City standards.

Response: At time of future building permit submittal, the City will ensure that each lot conforms to those above-listed standards that are applicable to single-family residences. The applicable criteria can be met.

Chapter 48 ACCESS, EGRESS AND CIRCULATION

48.020 APPLICABILITY AND GENERAL PROVISIONS

A. The provisions of this chapter do not apply where the provisions of the Transportation System Plan or land division chapter are applicable and set forth differing standards.

B. All lots shall have access from a public street or from a platted private street approved under the land division chapter.

Response: Exhibit B shows that Lots 1-12 will have access from Deerhill Lane or Roxbury Drive, which will be dedicated to the City of West Linn upon approval and recordation of the Final Plat. The criteria are met.

C. No building or other permit shall be issued until scaled plans are presented to the City and approved by the City as provided by this chapter, and show how the access, egress, and circulation requirements are to be fulfilled. Access to State or County roads may require review, approval, and permits from the appropriate authority.

Response: Exhibit B includes scaled plans which illustrate how access, egress, and circulation requirements are met. The criterion is met.

D. Should the owner or occupant of a lot, parcel or building enlarge or change the use to which the lot, parcel or building is put, resulting in increasing any of the requirements of this chapter, it shall be unlawful and a violation of this code to begin or maintain such altered use until the provisions of this chapter have been met, and, if required, until the appropriate approval authority under Chapter 99 CDC has approved the change.

Response: Exhibit B shows the access, egress, and circulation requirements applicable to this subdivision. The criterion is met.

E. Owners of two or more uses, structures, lots, parcels, or units of land may agree to utilize jointly the same access and egress when the combined access and egress of both uses, structures, or parcels of land satisfies the requirements as designated in this code; provided, that satisfactory legal evidence is presented to the City Attorney in the form of deeds, easements, leases, or contracts to establish joint use. Copies of said instrument shall be placed on permanent file with the City Recorder.

F. Property owners shall not be compelled to access their homes via platted stems of flag lots if other driveways and easements are available and approved by the City Engineer.

Response: Exhibit B shows that Lots 6-8 are planned to share an access from Roxbury Drive/Deerhill Lane. A reciprocal access easement, for the exclusive benefit of these lots, will be recorded with the Final Plat. The criteria can be met.

48.025 ACCESS CONTROL

A. Purpose. The following access control standards apply to public, industrial, commercial and residential developments including land divisions. Access shall be managed to maintain an adequate level of service and to maintain the functional classification of roadways as required by the West Linn Transportation System Plan.

B. Access control standards.

1. Traffic impact analysis requirements. The City or other agency with access jurisdiction may require a traffic study prepared by a qualified professional to determine access, circulation and other transportation requirements. (See also CDC 55.125, Traffic Impact Analysis.)

Response: This 12-lot subdivision does not exceed the threshold for a traffic impact analysis as required per CDC Section 55.125. The criterion does not apply.

2. The City or other agency with access permit jurisdiction may require the closing or consolidation of existing curb cuts or other vehicle access points, recording of reciprocal access easements (i.e., for shared driveways), development of a frontage street, installation of traffic control devices, and/or other mitigation as a condition of granting an access permit, to ensure the safe and efficient operation of the street and highway system. Access to and from off-street parking areas shall not permit backing onto a public street.

Response: Exhibit B shows a new public street (Roxbury Drive/Deerhill Lane) that will intersect at Parker Road and will serve as a future connection with the existing Roxbury Drive to the west. This local street connection is planned by the City's 2016 TSP. The criterion is met.

3. Access options. When vehicle access is required for development (i.e., for off-street parking, delivery, service, drive-through facilities, etc.), access shall be provided by one of the following methods (planned access shall be consistent with adopted public works standards and TSP). These methods are "options" to the developer/subdivider.

a) Option 1. Access is from an existing or proposed alley or mid-block lane. If a property has access to an alley or lane, direct access to a public street is not permitted.

b) Option 2. Access is from a private street or driveway connected to an adjoining property that has direct access to a public street (i.e., "shared driveway"). A public access easement covering the driveway shall be recorded in this case to assure access to the closest public street for all users of the private street/drive.

c) **Option 3. Access is from a public street adjacent to the development lot or parcel. If practicable, the owner/developer may be required to close or consolidate an existing access point as a condition of approving a new access. Street accesses shall comply with the access spacing standards in subsection (B)(6) of this section.**

Response: Access to the lots in this subdivision will be provided by a new public street (Roxbury Drive/Deerhill Lane) as prescribed in 3.c) above. The criterion is met.

4. **Subdivisions fronting onto an arterial street. New residential land divisions fronting onto an arterial street shall be required to provide alleys or secondary (local or collector) streets for access to individual lots. When alleys or secondary streets cannot be constructed due to topographic or other physical constraints, access may be provided by consolidating driveways for clusters of two or more lots (e.g., includes flag lots and mid-block lanes).**

Response: The site does not front onto an arterial street. The criterion does not apply.

5. **Double-frontage lots. When a lot or parcel has frontage onto two or more streets, access shall be provided first from the street with the lowest classification. For example, access shall be provided from a local street before a collector or arterial street. When a lot or parcel has frontage opposite that of the adjacent lots or parcels, access shall be provided from the street with the lowest classification.**

Response: Exhibit B shows that Lots 1 and 12 will have frontage on Deerhill Lane and Parker Road. Both of these lots will be accessed by Deerhill Lane, which will be designated as a local street. The criterion is met.

6. **Access spacing.**

a. **The access spacing standards found in the adopted Transportation System Plan (TSP) shall be applicable to all newly established public street intersections and non-traversable medians. Deviation from the access spacing standards may be granted by the City Engineer if conditions are met as described in the access spacing variances section in the adopted TSP.**

b. **Private drives and other access ways are subject to the requirements of CDC 48.060.**

Response: Deerhill Lane will be a new local street that will intersect Parker Road, which is designated as a collector roadway in the City's 2016 TSP. Exhibit B shows that Deerhill Lane will be located approximately 203-feet east of Maxfield Drive and approximately 301-feet west of Chinook Court. This access spacing exceeds the 200-foot standard for local streets along a collector roadway per Table 15 of the 2016 TSP. The criterion is met.

7. **Number of access points. For single-family (detached and attached), two-family, and duplex housing types, one street access point is permitted per lot or parcel, when alley access cannot otherwise be provided; except that two access points may be permitted corner lots (i.e., no more than one access per street), subject to the access spacing standards in subsection (B)(6) of this section. The number of street access points for multiple family, commercial, industrial,**

and public/institutional developments shall be minimized to protect the function, safety and operation of the street(s) and sidewalk(s) for all users. Shared access may be required, in conformance with subsection (B)(8) of this section, in order to maintain the required access spacing, and minimize the number of access points.

__Response__: The application does not include accesses to individual lots. At time of future building permit submittal, the City will ensure the above standard is met. The criterion can be met.

8. Shared driveways. The number of driveway and private street intersections with public streets shall be minimized by the use of shared driveways with adjoining lots where feasible. The City shall require shared driveways as a condition of land division or site design review, as applicable, for traffic safety and access management purposes in accordance with the following standards:

a. Shared driveways and frontage streets may be required to consolidate access onto a collector or arterial street. When shared driveways or frontage streets are required, they shall be stubbed to adjacent developable parcels to indicate future extension. "Stub" means that a driveway or street temporarily ends at the property line, but may be extended in the future as the adjacent lot or parcel develops. "Developable" means that a lot or parcel is either vacant or it is likely to receive additional development (i.e., due to infill or redevelopment potential).

b. Access easements (i.e., for the benefit of affected properties) shall be recorded for all shared driveways, including pathways, at the time of final plat approval or as a condition of site development approval.

c. Exception. Shared driveways are not required when existing development patterns or physical constraints (e.g., topography, lot or parcel configuration, and similar conditions) prevent extending the street/driveway in the future.

__Response__: The application includes a reciprocal access easement for the exclusive benefit of Lots 6-8, that will allow these lots to be accessed via a single location on Roxbury Drive/Deerhill Lane. It is anticipated that the remaining lots will have individual access from Roxbury Drive or Deerhill Lane. The criteria can be met.

C. Street connectivity and formation of blocks required. In order to promote efficient vehicular and pedestrian circulation throughout the City, land divisions and large site developments shall produce complete blocks bounded by a connecting network of public and/or private streets, in accordance with the following standards:

1. Block length and perimeter. The maximum block length shall not exceed 800 feet or 1,800 feet along an arterial.

2. Street standards. Public and private streets shall also conform to Chapter 92 CDC, Required Improvements, and to any other applicable sections of the West Linn Community Development Code and approved TSP.

3. Exception. Exceptions to the above standards may be granted when blocks are divided by one or more pathway(s), in conformance with the provisions of CDC 85.200(C), Pedestrian and Bicycle Trails, or cases where extreme topographic (e.g., slope, creek, wetlands, etc.) conditions or compelling functional limitations preclude implementation, not just inconveniences or design challenges.

Response: Exhibit B shows that the application includes a new public street that will form the backbone for east-west movement in this area of the City (between Parker Road and Ridge Lane), as envisioned in the 2016 TSP. Roxbury Drive may be extended off-site by adjoining property owners and can be be intersected by future north-south streets that can provide a connected system of blocks in this area. The application does not create new blocks in and of itself. To the extent these criteria apply, they are or can be met.

48.030 MINIMUM VEHICULAR REQUIREMENTS FOR RESIDENTIAL USES

A. Direct individual access from single-family dwellings and duplex lots to an arterial street, as designated in the transportation element of the Comprehensive Plan, is prohibited for lots or parcels created after the effective date of this code where an alternate access is either available or is expected to be available by imminent development application. Evidence of alternate or future access may include temporary cul-de-sacs, dedications or stubouts on adjacent lots or parcels, or tentative street layout plans submitted at one time by adjacent property owner/developer or by the owner/developer, or previous owner/developer, of the property in question.

In the event that alternate access is not available as determined by the Planning Director and City Engineer, access may be permitted after review of the following criteria:

1. Topography.

2. Traffic volume to be generated by development (i.e., trips per day).

3. Traffic volume presently carried by the street to be accessed.

4. Projected traffic volumes.

5. Safety considerations such as line of sight, number of accidents at that location, emergency vehicle access, and ability of vehicles to exit the site without backing into traffic.

6. The ability to consolidate access through the use of a joint driveway.

7. Additional review and access permits may be required by State or County agencies.

Response: The application does not include lots that will directly access an arterial street. The criteria do not apply.

B. When any portion of any house is less than 150 feet from the adjacent right-of-way, access to the home is as follows:

1. One single-family residence, including residences with an accessory dwelling unit as defined in CDC 02.030, shall provide 10 feet of unobstructed horizontal clearance. Dual-track or other driveway designs that minimize the total area of impervious driveway surface are encouraged.

2. Two to four single-family residential homes equals a 14- to 20-foot-wide paved or all-weather surface. Width shall depend upon adequacy of line of sight and number of homes.

3. Maximum driveway grade shall be 15 percent. The 15 percent shall be measured along the centerline of the driveway only. Variations require approval of a Class II variance by the Planning Commission pursuant to Chapter 75 CDC. Regardless, the last 18 feet in front of the garage shall be under 12 percent grade as measured along the centerline of the driveway only. Grades elsewhere along the driveway shall not apply.

4. The driveway shall include a minimum of 20 feet in length between the garage door and the back of sidewalk, or, if no sidewalk is proposed, to the paved portion of the right-of-way.

Response: While the application does not include new homes, all 12 lots are able to accommodate future single-family residences that are not further than 150-feet from the Roxbury Drive/Deerhill Lane public right-of-way. At time of building permit submittal, the City will ensure the applicable criteria from above are met. The criteria can be met.

C. When any portion of one or more homes is more than 150 feet from the adjacent right-of-way, the provisions of subsection B of this section shall apply in addition to the following provisions.

1. A turnaround may be required as prescribed by the Fire Chief.

2. Minimum vertical clearance for the driveway shall be 13 feet, six inches.

3. A minimum centerline turning radius of 45 feet is required unless waived by the Fire Chief.

4. There shall be sufficient horizontal clearance on either side of the driveway so that the total horizontal clearance is 20 feet.

Response: While the application does not include new homes, all 12 lots are able to accommodate future single-family residences that are not further than 150-feet from the Roxbury Drive/Deerhill Lane public right-of-way. The criteria do not apply.

D. Access to five or more single-family homes shall be by a street built to full construction code standards. All streets shall be public. This full street provision may only be waived by variance.

Response: The application does not include non-public street access serving five or more lots. The criterion does not apply.

E. Access and/or service drives for multi-family dwellings shall be fully improved with hard surface pavement:

1. With a minimum of 24-foot width when accommodating two-way traffic; or

2. With a minimum of 15-foot width when accommodating one-way traffic. Horizontal clearance shall be two and one-half feet wide on either side of the driveway.

3. Minimum vertical clearance of 13 feet, six inches.

4. Appropriate turnaround facilities per Fire Chief's standards for emergency vehicles when the drive is over 150 feet long. Fire Department turnaround areas shall not exceed seven percent grade unless waived by the Fire Chief.

5. The grade shall not exceed 10 percent on average, with a maximum of 15 percent.

6. A minimum centerline turning radius of 45 feet for the curve.

Response: The application does not include multi-family dwellings. The criteria do not apply.

F. Where on-site maneuvering and/or access drives are necessary to accommodate required parking, in no case shall said maneuvering and/or access drives be less than that required in Chapters 46 and 48 CDC.

Response: The application does not include access drives as described in this subseection. The criteria do not apply.

G. The number of driveways or curb cuts shall be minimized on arterials or collectors. Consolidation or joint use of existing driveways shall be required when feasible.

Response: The application includes a 12-Lot subdivision where new lots will be accessed by a new local street that intersects Parker Road and thereby consolidates new accesses on a Collector to the greatest extent possible. The criterion is met.

H. In order to facilitate through traffic and improve neighborhood connections, it may be necessary to construct a public street through a multi-family site.

Response: The application does not include multi-family development. The criterion does not apply.

48.050 ONE-WAY VEHICULAR ACCESS POINTS

Where a proposed parking facility plan indicates only one-way traffic flow on the site, it shall be accommodated by a specific driveway serving the facility, and the entrance drive shall be situated closest to oncoming traffic, and the exit drive shall be situated farthest from oncoming traffic.

Response: The application does not include a parking lot/facility. The criterion does not apply.

48.060 WIDTH AND LOCATION OF CURB CUTS AND ACCESS SEPARATION REQUIREMENTS

A. Minimum curb cut width shall be 16 feet.

B. Maximum curb cut width shall be 36 feet, except along Highway 43 in which case the maximum curb cut shall be 40 feet. For emergency service providers, including fire stations, the maximum shall be 50 feet.

C. No curb cuts shall be allowed any closer to an intersecting street right-of-way line than the following:

1. On an arterial when intersected by another arterial, 150 feet.

2. On an arterial when intersected by a collector, 100 feet.

3. On an arterial when intersected by a local street, 100 feet.

4. On a collector when intersecting an arterial street, 100 feet.

5. On a collector when intersected by another collector or local street, 35 feet.

6. On a local street when intersecting any other street, 35 feet.

D. There shall be a minimum distance between any two adjacent curb cuts on the same side of a public street, except for one-way entrances and exits, as follows:

1. On an arterial street, 150 feet.

2. On a collector street, 75 feet.

3. Between any two curb cuts on the same lot or parcel on a local street, 30 feet.

E. A rolled curb may be installed in lieu of curb cuts and access separation requirements.

F. Curb cuts shall be kept to the minimum, particularly on Highway 43. Consolidation of driveways is preferred. The standard on Highway 43 is one curb cut per business if consolidation of driveways is not possible.

G. Adequate line of sight pursuant to engineering standards should be afforded at each driveway or accessway.

Response: The application does not include new residential dwellings or curb cuts that will provide access to the lots in this subdivision. At time of future building permit submittal, the City will ensure the applicable criteria from above are met. The criteria can be met.

48.070 PLANNING DIRECTOR'S AUTHORITY TO RESTRICT ACCESS APPEAL PROVISIONS

A. In order to provide for increased traffic movement on congested streets and eliminate turning movement problems, the Planning Director and the City Engineer, or his or her designee, may restrict the location of driveways on said street and require the location of driveways on adjacent streets upon the finding that the proposed access would:

1. Provide inadequate access for emergency vehicles; or

2. Cause or increase hazardous conditions to exist which would constitute a clear and present danger to the public health safety and general welfare.

B. A decision by the Planning Director may be appealed to the Planning Commission as provided by CDC 99.240(B).

Response: The site does not abut a street that has been identified as exhibiting operational deficiencies, including congestion or turning movement problems, by the TSP. The criteria do not apply.

48.080 BICYCLE AND PEDESTRIAN CIRCULATION

A. Within all multi-family developments (except two-family/duplex dwellings), each residential dwelling shall be connected to vehicular parking stalls, common open space, and recreation facilities by a pedestrian pathway system having a minimum width of six feet and constructed of an all-weather material. The pathway material shall be of a different color or composition from the driveway. (Bicycle routes adjacent to the travel lanes do not have to be of different color or composition.)

B. Bicycle and pedestrian ways within a subdivision shall be constructed according to the provisions in CDC 85.200(A)(3).

C. Bicycle and pedestrian ways at commercial or industrial sites shall be provided according to the provisions of Chapter 55 CDC, Design Review.

Response: Exhibit B shows that the subdivision (planned for single-family residences) includes bicycle and pedestrian ways as prescribed by CDC 85.200(A)(3). The applicable criteria are met.

Chapter 54 LANDSCAPING

54.020 APPROVAL CRITERIA

A. Every development proposal requires inventorying existing site conditions which include trees and landscaping. In designing the new project, every reasonable attempt should be made to preserve and protect existing trees and to incorporate them into the new landscape plan. Similarly, significant landscaping (e.g., bushes, shrubs) should be integrated. The rationale is that saving a 30-foot-tall mature tree helps maintain the continuity of the site, they are qualitatively superior to two or three two-inch caliper street trees, they provide immediate micro-climate benefits (e.g., shade), they soften views of the street, and they can increase the attractiveness, marketability, and value of the development.

Response: Exhibit B includes an inventory of existing trees on site. This Exhibit shows that more than 97% of the trees that are proposed to be removed are exempt from the City's tree preservation requirements, primarily due to their association with the tree farm on this site. This Exhibit also shows that the application preserves 75 trees that are located on the perimeter of the site and within the WRA. Exhibit C provides details associated with the mitigation and revegetation for affected existing vegetation. The criterion is met.

B. To encourage tree preservation, the parking requirement may be reduced by one space for every significant tree that is preserved in the parking lot area for a maximum reduction of 10 percent of the required parking. The City Parks Supervisor or Arborist shall determine the significance of the tree and/or landscaping to determine eligibility for these reductions.

Response: The application is not subject to the CDC requirements for parking lots. The criterion does not apply.

C. Developers must also comply with the municipal code chapter on tree protection.

Response: Exhibit B includes a tree preservation and removal plan, and tree inventory, that was prepared based upon the guidance in Chapter 8 of the City of West Linn Municipal Code. The criterion is met.

D. Heritage trees. Heritage trees are trees which, because of their age, type, notability, or historical association, are of special importance. Heritage trees are trees designated by the City Council following review of a nomination. A heritage tree may not be removed without a public hearing at least 30 days prior to the proposed date of removal. Development proposals involving land with heritage tree(s) shall be required to protect and save the tree(s). Further discussion of heritage trees is found in the municipal code.

Response: The site does not include any Heritage Trees. The criterion does not apply.

E. Landscaping – By type, location and amount.

1. Residential uses (non-single-family). A minimum of 25 percent of the gross area including parking, loading and service areas shall be landscaped, and may include the open space and recreation area requirements under CDC 55.100. Parking lot landscaping may be counted in the percentage.

2. Non-residential uses. A minimum of 20 percent of the gross site area shall be landscaped. Parking lot landscaping may be counted in the percentage.

Response: The application includes a subdivision that is intended for the future construction of single-family residences. The criteria do not apply.

3. All uses (residential uses (non-single-family) and non-residential uses):

a. The landscaping shall be located in defined landscaped areas which are uniformly distributed throughout the parking or loading area. There shall be one shade tree planted for every eight parking spaces. These trees shall be evenly distributed throughout the parking lot to provide shade. Parking lots with over 20 spaces shall have a minimum 10 percent of the interior of the parking lot devoted to landscaping. Pedestrian walkways in the landscaped areas are not to be counted in the percentage. The perimeter landscaping, explained in subsection (E)(3)(d) of this section, shall not be included in the 10 percent figure. Parking lots with 10 to 20 spaces shall have a minimum five percent of the interior of the parking lot devoted to landscaping. The perimeter landscaping, as explained above, shall not be included in the five percent. Parking lots with fewer than 10 spaces shall have the standard perimeter landscaping and at least two shade trees. Non-residential parking areas paved with a permeable parking surface may reduce the required minimum interior landscaping by one-third for the area with the permeable parking surface only.

b. The landscaped areas shall not have a width of less than five feet.

c. The soils, site, proposed soil amendments, and proposed irrigation system shall be appropriate for the healthy and long-term maintenance of the proposed plant species.

d. A parking, loading, or service area which abuts a street shall be set back from the right-of-way line by perimeter landscaping in the form of a landscaped strip at least 10 feet in width. When a parking, loading, or service area or driveway is contiguous to an adjoining lot or parcel, there shall be an intervening five-foot-wide landscape strip. The landscaped area shall contain:

1) Street trees spaced as appropriate to the species, not to exceed 50 feet apart on the average;

2) Shrubs, not to reach a height greater than three feet, six inches, spaced no more than five feet apart on the average; or

3) Vegetative ground cover such as grass, wildflowers, or other landscape material to cover 100 percent of the exposed ground within two growing seasons. No bark mulch shall be allowed except under the canopy of low level shrubs.

e. If over 50 percent of the lineal frontage of the main street or arterial adjacent to the development site comprises parking lot, the landscape strip between the right-of-way and parking lot shall be increased to 15 feet in width and shall include terrain variations (e.g., one-foot-high berm) plus landscaping. This extra requirement only applies to one street frontage.

f. A parking, loading, or service area which abuts a property line shall be separated from the property line by a landscaped area at least five feet in width and which shall act as a screen and noise buffer, and the adequacy of the screen and buffer shall be determined by the criteria set forth in CDC 55.100(C) and (D), except where shared parking is approved under CDC 46.050.

g. All areas in a parking lot not used for parking, maneuvering, or circulation shall be landscaped.

h. The landscaping in parking areas shall not obstruct lines of sight for safe traffic operation.

i. Outdoor storage areas, service areas (loading docks, refuse deposits, and delivery areas), and above-ground utility facilities shall be buffered and screened to obscure their view from adjoining properties and to reduce noise levels to acceptable levels at the property line. The adequacy of the buffer and screening shall be determined by the criteria set forth in CDC 55.100(C)(1).

j. Crime prevention shall be considered and plant materials shall not be located in a manner which prohibits surveillance of public and semi-public areas (shared or common areas).

k. Irrigation facilities shall be located so that landscaped areas can be properly maintained and so that the facilities do not interfere with vehicular or pedestrian circulation.

l. For commercial, office, multi-family, and other sites, the developer shall select trees that possess the following characteristics:

1) Provide generous "spreading" canopy for shade.

2) Roots do not break up adjacent paving.

3) Tree canopy spread starts at least six feet up from grade in, or adjacent to, parking lots, roads, or sidewalks unless the tree is columnar in nature.

4) No sticky leaves or sap-dripping trees (no honey-dew excretion).

5) No seed pods or fruit-bearing trees (flowering trees are acceptable).

6) Disease-resistant.

7) Compatible with planter size.

8) Drought-tolerant unless irrigation is provided.

9) Attractive foliage or form all seasons.

m. Plant materials (shrubs, ground cover, etc.) shall be selected for their appropriateness to the site, drought tolerance, year-round greenery and coverage, staggered flowering periods, and avoidance of nuisance plants (Scotch broom, etc.).

Response: The application does not include new residential home construction. At time of building permit submittal, the City will ensure the applicable criteria from above are met. The applicable criteria can be met.

F. Landscaping (trees) in new subdivision.

1. Street trees shall be planted by the City within the planting strips (minimum six-foot width) of any new subdivision in conformity with the street tree plan for the area, and in accordance with the planting specifications of the Parks and Recreation Department. All trees shall be planted during the first planting season after occupancy. In selecting types of trees, the City Arborist may determine the appropriateness of the trees to local conditions and whether that tree has been overplanted, and whether alternate species should be selected. Also see subsection (C) of this section.

2. The cost of street trees shall be paid by the developer of the subdivision.

3. The fee per street tree, as established by the City, shall be based upon the following:

a. The cost of the tree;

b. Labor and equipment for original placement;

c. Regular maintenance necessary for tree establishment during the initial two-year period following the City schedule of maintenance; and

d. A two-year replacement warranty based on the City's established failure rate.

G. Landscaping requirements in water resource areas (WRAs). Pursuant to CDC 32.110(E)(3) the requirements of this chapter relating to total site landscaping, landscaping buffers, landscaping around parking lots, and landscaping the parking lot interior may be waived or reduced in a WRA application without a variance being required.

Response: Exhibit B shows that new street trees will be planted in accordance with the City's standards. The criteria are met.

54.030 PLANTING STRIPS FOR MODIFIED AND NEW STREETS

All proposed changes in width in a public street right-of-way or any proposed street improvement shall, where feasible, include allowances for planting strips. Plans and specifications for planting such areas shall be integrated into the general plan of street improvements. This chapter requires any multi-family, commercial, or public facility which causes change in public right-of-way or street improvement to comply with the street tree planting plan and standards.

Response: Exhibit B shows that new street trees will be planted along the site's Parker Road Frontage and on both sides of the planned Deerhill Lane and Roxbury Drive, in accordance with the City's standards. The criteria are met.

54.040 INSTALLATION

A. All landscaping shall be installed according to accepted planting procedures.

B. The soil and plant materials shall be of good quality.

C. Landscaping shall be installed in accordance with the provisions of this code.

D. Certificates of occupancy shall not be issued unless the landscaping requirements have been met or other arrangements have been made and approved by the City such as the posting of a bond.

Response: Exhibit B shows that new street trees will be planted in accordance with the City's standards. The criteria are met.

54.050 PROTECTION OF STREET TREES

Street trees may not be topped or trimmed unless approval is granted by the Parks Supervisor or, in emergency cases, when a tree imminently threatens power lines.

Response: The application does not request approval to remove, top, or trim any existing street trees. The criterion does not apply.

54.060 MAINTENANCE

A. The owner, tenant and their agent, if any, shall be jointly and severally responsible for the maintenance of all landscaping which shall be maintained in good condition so as to present a healthy, neat, and orderly appearance and shall be kept free from refuse and debris.

B. All plant growth in interior landscaped areas shall be controlled by pruning, trimming, or otherwise so that:

1. It will not interfere with the maintenance or repair of any public utility;

2. It will not restrict pedestrian or vehicular access; and

3. It will not constitute a traffic hazard because of reduced visibility.

54.070 SPECIFICATION SUMMARY

SPECIFICATION SUMMARY	
4. Percentage of residential / multi-family site to be landscaped	25%

Response: The application does not include new residential home construction. At time of building permit submittal, the City will ensure the applicable criteria from above are met. The applicable criteria can be met.

Chapter 85 GENERAL PROVISIONS

85.010 PURPOSE

A. The purpose of the land division provisions of this code is to implement the Comprehensive Plan; to provide rules and standards governing the approval of plats of subdivisions (four lots or more) and partitions (three lots or fewer); to help direct the development pattern; to lessen congestion in the streets; to increase street safety; to efficiently provide water, sewage, and storm drainage service; and to conserve energy resources.

B. The purpose is further defined as follows:

1. To improve our sense of neighborhood and community and increase opportunities for socialization.
2. To comply with the State's Transportation Planning Rule (TPR), which seeks to encourage alternate forms of transportation and reduce reliance upon the private automobile and vehicle miles traveled by increasing accessibility within and between subdivisions and neighborhoods. This may be accomplished by designing an easily understood, interconnected pattern of streets, bicycle and foot paths, and accommodation of transit facilities. Cul-de-sacs are to be discouraged unless site conditions dictate otherwise.
3. To reduce pedestrian/vehicle conflicts and create a safe and attractive environment for pedestrians and bicyclists.
4. To protect natural resource areas such as drainageways, Willamette and Tualatin River greenways, creeks, habitat areas, and wooded areas as required by other provisions of this code or by the layout of streets and graded areas so as to minimize their disturbance.
5. To protect the natural features and topography by minimizing grading and site disturbance and by requiring proper erosion control techniques.
6. To arrange the lots and streets so as to minimize nuisance conditions such as glare, noise, and vibration.
7. To maximize passive solar heating benefits by orienting the streets on an east-to-west axis which increases exposure to the sun.
8. To arrange for the efficient layout of utilities and infrastructure as well as their extension to adjacent properties in a manner consistent with either adopted utility plans or sound engineering practices.
9. To arrange lots and roads to create reasonably buildable lots and acceptable driveway grades.
10. To encourage the arrangement of increased densities and smaller lots in proximity to needed services and schools as well as transportation corridors so as to reduce vehicle miles traveled and to encourage alternate modes of travel.
11. To encourage design experimentation and creativity.

12. To arrange for the mitigation of impacts generated by new development. These impacts include increased automobile, foot, and bicycle traffic. These impacts are to be mitigated at the developer's cost, by the provision of streets, sidewalks, bicycle and foot paths, and traffic control devices within, contiguous to, and nearby the development site. Similarly, increased demand on local infrastructure such as water lines, sanitary sewer lines, and storm drainage and detention facilities, should be offset by improving existing facilities or providing new ones.

Response: While they are not decision criteria, as shown in Exhibit B and throughout this narrative, the application furthers the purpose of the City's subdivision objectives as expressed above.

85.020 SCOPE – CONFORMITY REQUIRED

A. This division shall apply to all subdivisions and partitions within the City limits of West Linn.

B. No person shall subdivide or create a partition except in conformity with the provisions of this code and Chapter 92 ORS. Chapter 92 ORS states that all partitions and subdivisions of land require a final plat to be prepared by a registered professional land surveyor; all corners must be monumented, the partition or subdivision plat must be approved by the City and County surveyor, as appropriate, and recorded with the County recorder.

C. No building permit shall be issued for any parcel or lot which was created by subdivision or partition if it is not approved and in conformity with the provisions of this code.

D. No excavation of land or construction of any public or private improvement shall take place or be commenced except in conformity with the provisions of this code.

Response: The applicant is aware of the above-listed provisions. The criteria can be met.

85.030 SALE OR NEGOTIATION TO SELL LOT OR PARCEL PRIOR TO APPROVAL OF TENTATIVE PLAN

A. No person shall sell any lot in any subdivision to which approval is required until such approval is obtained. No person shall negotiate to sell any lot in a subdivision until the tentative plan has been approved.

B. A person may negotiate to sell any parcel in a partition for which approval of a tentative plan is required, but shall not sell a parcel prior to approval.

C. No building permits will be issued for tentatively approved lots or parcels. The final plat must be recorded before permits will be issued.

Response: The applicant is aware of the above-listed provisions. The criteria can be met.

85.040 SALE OF LOTS PROHIBITED UNTIL SUBDIVISION PLAT IS RECORDED

Repealed by Ord. 1636.

85.050 APPROVAL REQUIRED BEFORE CREATING STREET OR ROAD TO PARTITION LAND

A. No person shall create a street or road for the purpose of partitioning an area or tract of land without approval by the approval authority under the provisions of CDC 99.060(A) and (B).

B. No instrument dedicating land to public use shall be accepted for recording unless such instrument bears the approval of the Planning Director or City Engineer, as applicable, under the provisions of CDC 99.060(A) and (B), procedures for decision-making.

Response: The applicant is aware of the above-listed provisions. The criteria can be met.

85.060 INCOMPLETE APPLICATIONS – DECISION-MAKING PERIOD

A. The Director shall not accept incomplete applications; however, if an application for approval of a tentative plan for a subdivision or partition is incomplete, the Planning Director shall notify the applicant of the fact within 30 days of the receipt of the application and allow the applicant to provide the additional required information.

B. The approval authority shall take final action on an application for approval of a tentative plan for a subdivision or partition within 120 days after the application is found to be complete.

C. If action is not taken within the 120-day period, the applicant may apply to the circuit court for a writ of mandamus to compel the issuance of approval.

Response: The applicant is aware of the City's obligations as described above. The criteria can be met.

85.070 ADMINISTRATION AND APPROVAL PROCESS

A. The application shall be filed by the record owner(s) of the property or by an authorized agent who has a letter of authorization from the property owners of record. The burden of proof will be upon the applicant to demonstrate the validity of the ownership, if challenged.

Response: As shown in Exhibit A, the application was filed by the record property owner. The criterion is met.

B. Action on the application for a tentative plan shall be as provided by Chapter 99 CDC.

1. The Planning Director shall approve, deny, or approve with conditions an application for a partition subject to the provisions of CDC 85.200, 99.060(A), and 99.110. The Director's decision may be appealed to the City Council as provided by CDC 99.240(A).

2. The Planning Commission shall approve, deny, or approve with conditions an application for a tentative plan for a subdivision subject to the provisions of CDC 85.200, 99.060(B), and 99.110. A petition for review of the Planning Commission's decision may be filed as provided by CDC 99.240.

3. Action on the final plat shall be ministerial and taken by the Planning Director and City Engineer, and the Planning Director and City Engineer shall approve a final subdivision or partition plat upon the finding that the approval criteria set forth in CDC 89.050 have been satisfied. The Planning Director's and City Engineer's decision may be appealed to the Planning Commission by the applicant, and the Planning Commission shall make its decision based on testimony from the applicant and the Director.

Response: The applicant is aware of the City's obligations as described above. The criteria can be met.

85.080 SUBSTANTIAL DEVIATION FROM APPROVED PLAN PROHIBITED

A. **Approval of the tentative plan shall require that the final plat be in substantial conformance. Only such changes in the plat or map as are necessary for compliance with the terms of its approval, changes appropriate to meet accepted engineering practices due to grades or site conditions, or changes to satisfy legislative requirements are appropriate; however**

B. **Approval of the tentative plan for the proposed subdivision or the partition shall not constitute final acceptance of the plat of the proposed subdivision or partition for recording.**

Response: The applicant is aware of the above-listed provisions. The criteria can be met.

85.085 SUBDIVISION/PARTITION AMENDMENT TRIGGER

Amendments to subdivision/partitions shall be required when 10 percent or more of the housing type changes (e.g., from single-family units to multi-family units) from the tentatively approved plan, or when there is more than a 10 percent change in the number of units, or when the layout of streets and lots significantly changes.

Response: The applicant is aware of the above-listed provisions. The criteria can be met.

85.090 EXPIRATION OR EXTENSION OF APPROVAL

The final plat map shall be submitted to the Planning Director and recorded with the County within three years from the date of approval of the tentative plan, or as approved under CDC 99.325. If the final plat is not recorded by that time, the approval expires.

Response: The applicant is aware of the above-listed provisions. The criteria can be met.

85.100 NON-COMPLIANCE – BOND

A. **Non-compliance with an approved final plat shall be a violation of this code.**

B. **The development and associated conditions of approval shall be completed in accordance with the approved final plat before any occupancy permits will be issued except that when the City Engineer or Planning Director determines that immediate execution of any feature of an approved final plat is impractical due to climatic conditions, unavailability of materials, or other temporary condition, the Planning Director or City Engineer shall, as a precondition of the issuance of a required permit, require a cashier's check, cash, or other surety (generally 125 percent of an engineer's estimated cost of improvements), to secure execution of the feature at a time certain not to exceed one year.**

Response: The applicant is aware of the above-listed provisions. The criteria can be met.

85.110 STAGED DEVELOPMENT

The applicant may elect to develop the site in stages. Staged development shall be subject to the provisions of CDC 99.125. However, notwithstanding the provisions of CDC 99.125, in no case shall the time period for final platting and recording all stages with the County be greater than five years without refiling the application.

Response: Exhibit B shows that the subdivision is planned to be completed in a single phase. The criterion does not apply.

85.120 PARTIAL DEVELOPMENT

Where the tentative subdivision or partition plan is limited to only part of the potential development site, the approval authority may require that an applicant submit a tentative layout for the streets for the unsubdivided portion. A tentative street plan is required for sites where the unsubdivided portion of the property is greater than 300 percent of the minimum lot size allowed in the underlying zoning district.

Response: The application affects the entire site and therefore does not include a tentative layout for unsubdivided portions of the site. The criterion does not apply.

85.130 LAND DIVISION APPLICATION IN CONJUNCTION WITH OTHER LAND USE APPLICATIONS

As provided by CDC 99.070, a land division application filed under this code may be heard concurrently with another application, upon applicant's request.

Response: This application includes concurrent applications for a subdivision and a water resource area permit.

85.140 PRE-APPLICATION CONFERENCE REQUIRED

A. An applicant shall participate in a pre-application conference with staff prior to the submission of a complete tentative plan.

B. The Planning staff shall explain the applicable plan policies, ordinance provisions, opportunities, and constraints which may be applicable to the site and type of proposed land division.

C. The City Engineering staff shall explain the public improvement requirements which may be applicable to the site and type of proposed land division, including potential for the applicant to apply for a waiver of street improvements.

Response: A pre-application conference for the subject application was held on April 7, 2016. The criteria are met.

85.150 APPLICATION – TENTATIVE PLAN

A. The applicant shall submit a completed application which shall include:

1. The completed application form(s).

2. Copies of the tentative plan and supplemental drawings shall include one copy at the original scale plus one copy reduced in paper size not greater than 11 inches by 17 inches. The applicant shall also submit one copy of the complete application in a digital format acceptable to the City. When the application submittal is determined to be complete, additional copies may be required as determined by the Community Development Department.

3. A narrative explaining all aspects of land division per CDC 85.200.

B. The applicant shall pay the requisite fee.

Response: This application includes the applicable submittal requirements listed above. The criteria are met.

85.160 SUBMITTAL REQUIREMENTS FOR TENTATIVE PLAN

A. A City-wide map shall identify the site. A vicinity map covering one-quarter-mile radius from the development site shall be provided in the application showing existing subdivisions, streets, and unsubdivided land ownerships adjacent to the proposed subdivision and showing how proposed streets and utilities may be extended to connect to existing streets and utilities.

B. The tentative subdivision plan shall be prepared by a registered civil engineer and/or a licensed land surveyor. A stamp and signature of the engineer or surveyor shall be included on the tentative subdivision plan. A tentative minor partition plan (three lots or less) is only required to be drawn to scale and does not have to be prepared by an engineer or surveyor.

C. The tentative plan of a subdivision or partition shall be drawn at a scale not smaller than one inch equals 100 feet, or, for areas over 100 acres, one inch equals 200 feet.

D. The following general information shall be shown on the tentative plan of subdivision or partition:

1. Proposed name of the subdivision and streets; these names shall not duplicate nor resemble the name of any other subdivision or street in the City and shall be determined by the City Manager or designee. Street names should be easily spelled, pronounced, and of limited length. All new street names must, to the greatest extent possible, respect and be representative of the surrounding geography and existing street names. Street names should consider any prominent historical City figures or neighborhood themes that exist. Subdivision street names may not reference names of the builder or developer.

2. Date, north arrow, scale of drawing, and graphic bar scale.

3. Appropriate identification clearly stating the drawing as a tentative plan.

4. Location of the proposed division of land, with a tie to the City coordinate system, where established, and a description sufficient to define its location and boundaries, and a legal description of the tract boundaries.

5. Names and addresses of the owner, developer, and engineer or surveyor.

Response: This application includes the applicable submittal requirements listed above. The criteria are met.

E. The following existing conditions shall be shown on the tentative plan of a subdivision or partition:

1. The location, widths, and names of all existing or platted streets and rights-of-way within or adjacent to the tract (within 50 feet), together with easements and other important features such as section lines, donation land claim corners, section corners, City boundary lines, and monuments.

2. Contour lines related to the U.S. Geological Survey datum or some other established benchmark, or other datum approved by the Planning Director and having the following minimum intervals:

a. Two-foot contour intervals for ground slopes less than 20 percent.

b. Five-foot contour intervals for ground slopes exceeding 20 percent.

3. The location of any control points that are the basis for the applicant's mapping.

4. The location, by survey, and direction of all watercourses and areas subject to periodic inundation or storm drainageway overflow or flooding, including boundaries of flood hazard areas as established by the U.S. Army Corps of Engineers or the City zoning ordinance.

5. Natural features such as rock outcroppings, wetlands tied by survey, wooded areas, heritage trees, and isolated trees (six-inch diameter at five feet above grade) identified by size, type, and location. All significant trees and tree clusters identified by the City Arborist using the criteria of CDC 55.100(B)(2), and all heritage trees, shall be delineated. Trees on non-Type I and II lands shall have their "dripline plus 10 feet" protected area calculated per CDC 55.100(B)(2) and expressed in square feet, and also as a percentage of total non-Type I and II area.

6. Existing uses of the property, including location of all existing structures. Label all structures to remain on the property after platting.

7. Identify the size and location of existing sewers, water mains, culverts, drain pipes, gas, electric, and other utility lines within the site, and in the adjoining streets and property.

8. Zoning on and adjacent to the tract.

9. Existing uses to remain on the adjoining property and their scaled location.

10. The location of any existing bicycle or pedestrian ways.

11. The location of adjacent transit stops.

Response: This application includes the applicable submittal requirements listed above. The criteria are met.

F. The following proposed improvements shall be shown on the tentative plan or supplemental drawings:

1. The street – street location, proposed name, right-of-way width, and approximate radius of curves of each proposed street and street grades. Proposed street names shall comply with the street naming method explained in CDC 85.200(A)(12).

2. The type, method, and location of any erosion prevention and sediment control measures and/or facilities in accordance with the most current version of Clackamas County's Erosion/Sedimentation Control Plans Technical Guidance Handbook, which are necessary to prevent and control visible or measurable erosion as determined by the following criteria:

a. Deposition of soil, sand, dirt, dust, mud, rock, gravel, refuse, or any other organic or inorganic material exceeding one cubic foot in volume in a public right-of-way or public property, or into the City surface water management system either by direct deposit, dropping, discharge, or as a result of erosion; or

b. Flow of water over bare soils, turbid or sediment-laden flows, or evidence of on-site erosion such as rivulets or bare soil slopes, where the flow of water is not filtered or captured on the development site; or

c. Earth slides, mud flows, land slumping, slope failure, or other earth movement that is likely to leave the property of origin.

Additional on-site measures may later be required if original measures prove to be inadequate in meeting these attainment standards. For the purposes of this code, "one cubic foot in volume" is defined to include the volume of material, wet or dry, at the time of deposition and includes any water of a discolored or turbid nature.

3. Any proposed infrastructure improvements that address those identified in the City Transportation System Plan.

4. Any proposed bicycle or pedestrian paths. The location of proposed transit stops.

5. Any easement(s) – location, width, and purpose of the easement(s).

6. The configuration including location and approximate dimensions and area of each lot or parcel, and in the case of a subdivision, the proposed lot and block number.

7. A street tree planting plan and schedule approved by the Parks Department.

8. Any land area to be dedicated to the City or put in common ownership.

9. Phase boundaries shall be shown.

Response: This application includes the applicable submittal requirements listed above. The criteria are met.

85.170 SUPPLEMENTAL SUBMITTAL REQUIREMENTS FOR TENTATIVE SUBDIVISION OR PARTITION PLAN

The following information shall be submitted to supplement the tentative subdivision plan:

A. General.

1. Narrative stating how the plan meets each of the applicable approval criteria and each subsection below.

2. Statement or affidavit of ownership of the tract (County Assessor's map and tax lot number).

3. A legal description of the tract.

4. If the project is intended to be phased, then such a proposal shall be submitted at this time with drawing and explanation as to when each phase will occur and which lots will be in each phase.

5. Where the land to be subdivided or partitioned contains only a part of the contiguous land owned by the developer, the Commission or Planning Director, as applicable, shall require a master plan of the

remaining portion illustrating how the remainder of the property may suitably be subdivided.

6. **Where the proposed subdivision site includes hillsides, as defined in CDC 02.030 Type I and II lands, or any lands identified as a hazard site in the West Linn Comprehensive Inventory Plan Report, the requirements for erosion control as described in CDC 85.160(F)(2) shall be addressed in a narrative.**

7. **Table and calculations showing the allowable number of lots under the zone and how many lots are proposed.**

8. **Map and table showing square footage of site comprising slopes by various classifications as identified in CDC 55.110(B)(3).**

Response: This application includes the applicable submittal requirements listed above. Regarding the allowable number of lots, per item 7 above, the site includes a net area of 2.81 acres. Per CDC Section 5.020, the R-10 district allows 4.35 dwelling units per net acre. This results in a total of 12.22 dwelling units allowed on the site. Additionally, Section 85.200.J.7 requires that the minimum density not be less than 70 percent of the maximum density allowed by the underlying zoning. This results in a minimum of 8.56 dwelling units on the site. The 12 lots included in this application are within the allowed density allowed on this site. The criteria are met.

B. Transportation.

1. **Centerline profiles with extensions shall be provided beyond the limits of the proposed subdivision to the point where grades meet, showing the finished grade of streets and the nature and extent of street construction. Where street connections are not proposed within or beyond the limits of the proposed subdivision on blocks exceeding 330 feet, or for cul-de-sacs, the tentative plat or partition shall indicate the location of easements that provide connectivity for bicycle and pedestrian use to accessible public rights-of-way.**

Response: Exhibit B shows the centerline profile of new and adjacent streets. The criterion is met.

2. **Traffic Impact Analysis (TIA).**

   a. **Purpose. The purpose of this section of the code is to implement Section 660-012-0045(2)(e) of the State Transportation Planning Rule that requires the City to adopt a process to apply conditions to development proposals in order to minimize adverse impacts to and protect transportation facilities. This section establishes the standards for when a proposal must be reviewed for potential traffic impacts; when a Traffic Impact Analysis must be submitted with a development application in order to determine whether conditions are needed to minimize impacts to and protect transportation facilities; what must be in a Traffic Impact Study; and who is qualified to prepare the study.**

   b. **Typical average daily trips. The latest edition of the Trip Generation manual, published by the Institute of Transportation Engineers (ITE) shall be used as the standards by which to gauge average daily vehicle trips.**

c. When required. A Traffic Impact Analysis may be required to be submitted to the City with a land use application, when the following conditions apply:

1) The development application involves one or more of the following actions:

(A) A change in zoning or a plan amendment designation; or

(B) Any proposed development or land use action that ODOT states may have operational or safety concerns along a State highway; and

(C) The development shall cause one or more of the following effects, which can be determined by field counts, site observation, traffic impact analysis or study, field measurements, crash history, Institute of Transportation Engineers Trip Generation manual; and information and studies provided by the local reviewing jurisdiction and/or ODOT:

(1) An increase in site traffic volume generation by 250 average daily trips (ADT) or more (or as required by the City Engineer); or

(2) An increase in use of adjacent streets by vehicles exceeding the 20,000-pound gross vehicle weights by 10 vehicles or more per day; or

(3) The location of the access driveway does not meet minimum intersection sight distance requirements, or is located where vehicles entering or leaving the property are restricted, or such vehicles queue or hesitate on the State highway, creating a safety hazard; or

(4) The location of the access driveway does not meet the access spacing standard of the roadway on which the driveway is located; or

(5) A change in internal traffic patterns that may cause safety problems, such as backup onto the highway or traffic crashes in the approach area.

Response: This application does not result in those traffic impacts listed above and does therefore not warrant a traffic impact analysis. The criteria of this section do not apply.

(…)

C. Grading.

1. If areas are to be graded, a plan showing the location of cuts, fill, and retaining walls, and information on the character of soils shall be provided. The grading plan shall show proposed and existing contours at intervals per CDC 85.160(E)(2).

2. The grading plan shall demonstrate that the proposed grading to accommodate roadway standards and create appropriate building sites is the minimum amount necessary.

Response: Exhibit B includes a preliminary grading plan depicting the above required information. The criteria are met.

D. Water.

1. A plan for domestic potable water supply lines and related water service facilities, such as reservoirs, etc., shall be prepared by a licensed engineer consistent with the adopted Comprehensive Water System Plan and most recently adopted updates and amendments.

2. Location and sizing of the water lines within the development and off-site extensions. Show on-site water line extensions in street stubouts to the edge of the site, or as needed to complete a loop in the system.

3. Adequate looping system of water lines to enhance water quality.

4. For all non-single-family developments, calculate fire flow demand of the site and demonstrate to the Fire Chief. Demonstrate to the City Engineer how the system can meet the demand.

Response: Exhibit B includes a preliminary utility plan depicting the above required information. The criteria are met.

E. Sewer.

1. A plan prepared by a licensed engineer shall show how the proposal is consistent with the Sanitary Sewer Master Plan and subsequent updates and amendments. Agreement with that plan must demonstrate how the sanitary sewer proposal will be accomplished and how it is efficient. The sewer system must be in the correct zone.

2. Sanitary sewer information will include plan view of the sanitary sewer lines, including manhole locations and depths. Show how each lot or parcel would be sewered.

3. Sanitary sewer lines shall be located in the public right-of-way, particularly the street, unless the applicant can demonstrate why the alternative location is necessary and meets accepted engineering standards.

4. Sanitary sewer line should be at a depth that can facilitate connection with down-system properties in an efficient manner.

5. The sanitary sewer line should be designed to minimize the amount of lineal feet in the system.

6. The sanitary sewer line shall minimize disturbance of natural areas and, in those cases where that is unavoidable, disturbance shall be

mitigated pursuant to the appropriate chapters (e.g., Chapter 32 CDC, Water Resource Area Protection).

7. Sanitary sewer shall be extended or stubbed out to the next developable subdivision or a point in the street that allows for reasonable connection with adjacent or nearby properties.

8. The sanitary sewer system shall be built pursuant to Department of Environmental Quality (DEQ), City, and Tri-City Service District sewer standards. This report should be prepared by a licensed engineer, and the applicant must be able to demonstrate the ability to satisfy these submittal requirements or standards at the pre-construction phase.

Response: Exhibit B includes a preliminary utility plan depicting the above required information. Additionally, the application includes a separate sanitary sewer easement and connection to the north property line that is able to facilitate potential future development of properties to the north. The criteria are met.

F. Storm. A proposal shall be submitted for storm drainage and flood control including profiles of proposed drainageways with reference to the most recently adopted Storm Drainage Master Plan.

Response: Exhibit B includes a utility plan depicting the above required information. A new stormwater management facility located in Tract A is planned to treat and detain runoff from all new impervious surfaces on site, before runoff is released back into Tanner Creek at pre-development runoff rates. A preliminary Stormwater Report is included in Exhibit G. The criteria are met.

85.180 REDIVISION PLAN REQUIREMENT

A redivision plan shall be required for a partition or subdivision, where the property could be developed at a higher density, under existing/proposed zoning, if all services were available and adequate to serve the use.

A. The redivision plan is a sketch plan. A land survey and an engineering drawing are not required except where there are unique soil, topographic, or geologic conditions. Under the provisions of CDC 99.035, administrative procedures, the Planning Director may require additional information.

B. The applicant shall submit a topographic map based on available information and a subdivision layout in accordance with standards set forth in this chapter and the zoning district in which the property is located.

C. A building permit issued shall be for a specified future lot or parcel and the building shall meet the setback provisions of the zoning district in which the property is located.

D. The redivision plan is considered a guide. Its purpose is to assure the efficient use of land and orderly growth. At such time as the property owner applies to redivide the land, a different proposal may be submitted for approval provided it meets all of the requirements. The redivision plan is not binding on the applicant or the City at the time a formal application is submitted under this chapter.

E. The Planning Director shall approve the redivision plan in the manner set forth in CDC 99.060(A)(2), except that no notice shall be given. The applicant may appeal the Planning Director's decision as provided by CDC 99.240(A).

F. The Planning Director's decision shall be based on the following findings:

1. The redivision plan complies with the applicable requirements of this chapter and zoning district in which the property is located.

2. There are adequate water and sewage systems available for the proposed use.

Response: Exhibit B shows that the application does not result in lots that can be further divided under the current zoning regime. The criteria do not apply.

85.190 ADDITIONAL INFORMATION REQUIRED AND WAIVER OF REQUIREMENTS

A. The Planning Director may require additional information as part of the application subject to the provisions of CDC 99.035(A).

B. The applicant may request a waiver of any requirements for the application subject to the provisions of CDC 99.035(B) and (C).

Response: As of the date of this submittal, the Planning Director has not requested information pursuant to A. above. Additionally, the application does not include a waiver of any of the submittal requirements as provided by B. above.

85.200 APPROVAL CRITERIA

No tentative subdivision or partition plan shall be approved unless adequate public facilities will be available to provide service to the partition or subdivision area prior to final plat approval and the Planning Commission or Planning Director, as applicable, finds that the following standards have been satisfied, or can be satisfied by condition of approval.

A. Streets.

1. General. The location, width and grade of streets shall be considered in their relation to existing and planned streets, to the generalized or reasonable layout of streets on adjacent undeveloped lots or parcels, to topographical conditions, to public convenience and safety, to accommodate various types of transportation (automobile, bus, pedestrian, bicycle), and to the proposed use of land to be served by the streets. The functional class of a street aids in defining the primary function and associated design standards for the facility. The hierarchy of the facilities within the network in regard to the type of traffic served (through or local trips), balance of function (providing access and/or capacity), and the level of use (generally measured in vehicles per day) are generally dictated by the functional class. The street system shall assure an adequate traffic or circulation system with intersection angles, grades, tangents, and curves appropriate for the traffic to be carried. Streets should provide for the continuation, or the appropriate projection, of existing principal streets in surrounding areas and should not impede or adversely affect development of adjoining lands or access thereto.

To accomplish this, the emphasis should be upon a connected continuous pattern of local, collector, and arterial streets rather than discontinuous curvilinear streets and cul-de-sacs. Deviation from this pattern of connected streets should only be permitted in cases of extreme topographical challenges including excessive slopes (35 percent-plus), hazard areas, steep drainageways, wetlands, etc. In such cases, deviations may be allowed but the connected continuous pattern must be reestablished once the topographic challenge is passed. Streets should be oriented with consideration of the sun, as

site conditions allow, so that over 50 percent of the front building lines of homes are oriented within 30 degrees of an east-west axis.

Internal streets are the responsibility of the developer. All streets bordering the development site are to be developed by the developer with, typically, half-street improvements or to City standards prescribed by the City Engineer. Additional travel lanes may be required to be consistent with adjacent road widths or to be consistent with the adopted Transportation System Plan (TSP) and any adopted updated plans.

An applicant may submit a written request for a waiver of abutting street improvements if the TSP prohibits the street improvement for which the waiver is requested. Those areas with numerous (particularly contiguous) under-developed or undeveloped tracts will be required to install street improvements. When an applicant requests a waiver of street improvements and the waiver is granted, the applicant shall pay an in-lieu fee equal to the estimated cost, accepted by the City Engineer, of the otherwise required street improvements. As a basis for this determination, the City Engineer shall consider the cost of similar improvements in recent development projects and may require up to three estimates from the applicant. The amount of the fee shall be established prior to the Planning Commission's decision on the associated application. The in-lieu fee shall be used for in kind or related improvements.

Streets shall also be laid out to avoid and protect tree clusters and significant trees, but not to the extent that it would compromise connectivity requirements per this subsection (A)(1), or bring the density below 70 percent of the maximum density for the developable net area. The developable net area is calculated by taking the total site acreage and deducting Type I and II lands; then up to 20 percent of the remaining land may be excluded as necessary for the purpose of protecting significant tree clusters or stands as defined in CDC 55.100(B)(2).

Response: Exhibit B shows that the subdivision includes a new public street, Roxbury Drive/Deerhill Lane, that has been designed to the City's local street standard. This new street intersects with Parker Road and provides an important east-west connection to the existing Roxbury Drive (to the west) as properties between the subject site and the Rosemont Summit Phase 3 Subdivision develop. Exhibit B also shows that the application includes half-street improvements along the site's Parker Road frontage that have been designed in accordance with the City's Collector street standards. Street improvements avoid impacts to the WRA, along the east side of the subject property, and significant tree clusters. The criteria are met.

2. Right-of-way widths shall depend upon which classification of street is proposed. The right-of-way widths are established in the adopted TSP.

Response: Per the 2016 TSP, Exhibit B shows that Roxbury Drive/Deerhill Lane has been designed to the City's Local Street standard and improvements along the site's Parker Road frontage have been designed to the City's Collector street standard. The criterion is met.

3. Street widths. Street widths shall depend upon which classification of street is proposed. The classifications and required cross sections are established in the adopted TSP.

The following table identifies appropriate street width (curb to curb) in feet for various street classifications. The desirable width shall be required unless the applicant or his or her engineer can demonstrate that site conditions, topography, or site design require the reduced minimum width. For local streets, a 12-foot travel lane may only be used as a shared local street when the available right-of-way is too narrow to accommodate bike lanes and sidewalks.

City of West Linn Roadway Cross- Section Standards		
Street Element	Characteristic	Width/ Options
Vehicle Lane Widths (Typical Widths)	Neighborhood Route	10-12 feet
	Local	10-12 feet
On-street parking	Neighborhood Route	Optional (8 feet typical width)
	Local	Optional (8 feet typical width)
Bicycle Lanes (Typical Widths)	Neighborhood Route	5 feet
Sidewalks (Typical Widths)	Neighborhood Route/ Local	6 feet
Landscape Strips	Can be included on all streets	6 feet typical (5 feet for arterials)

Response: Exhibit B shows that, per the City's Local street standard, Roxbury Drive/Deerhill Lane includes two 12-foot wide travel lanes, and per the City's Collector street standard, improvements to Parker Road will include a 12-foot travel lane and a 5-foot wide bike lane. The criteria are met.

4. The decision-making body shall consider the City Engineer's recommendations on the desired right-of-way width, pavement width and street geometry of the various street types within the subdivision after consideration by the City Engineer of the following criteria:

   a. The type of road as set forth in the Transportation Master Plan.

   b. The anticipated traffic generation.

   c. On-street parking requirements.

   d. Sidewalk and bikeway requirements.

   e. Requirements for placement of utilities.

   f. Street lighting.

   g. Drainage and slope impacts.

   h. Street trees.

   i. Planting and landscape areas.

   j. Existing and future driveway grades.

   k. Street geometry.

   l. Street furniture needs, hydrants.

Response: Exhibit B shows that new street improvements have been designed pursuant to the City Engineer's recommended improvements, as expressed at the April 2016 pre-application conference, and the 2016 TSP. The City Engineer has not indicated a desire for street improvements that vary from this guidance. The criterion is met.

5. Additionally, when determining appropriate street width, the decision-making body shall consider the following criteria:

a. When a local street is the only street serving a residential area and is expected to carry more than the normal local street traffic load, the designs with two travel and one parking lane are appropriate.

b. Streets intended to serve as signed but unstriped bike routes should have the travel lane widened by two feet.

c. Collectors should have two travel lanes and may accommodate some parking. Bike routes are appropriate.

d. Arterials should have two travel lanes. On-street parking is not allowed unless part of a Street Master Plan. Bike lanes are required as directed by the Parks Master Plan and Transportation Master Plan.

Response: Exhibit B shows that new street improvements have been designed pursuant to the City Engineer's recommended improvements, as expressed at the April 2016 pre-application conference, and the 2016 TSP. The City Engineer has not indicated a desire for street improvements that vary from this guidance. The criterion is met.

6. Reserve strips. Reserve strips or street plugs controlling the access to streets are not permitted unless owned by the City.

Response: The application does not include reserve strips. The criterion does not apply.

7. Alignment. All streets other than local streets or cul-de-sacs, as far as practical, shall be in alignment with existing streets by continuations of the centerlines thereof. The staggering of street alignments resulting in "T" intersections shall, wherever practical, leave a minimum distance of 200 feet between the centerlines of streets having approximately the same direction and otherwise shall not be less than 100 feet.

Response: Exhibit B shows that the application includes a new local street that will meet Parker Road at a "T" Intersection. This new intersection is approximately 203-feet east of the intersection of Maxfield Drive/Parker Road and more than 300-feet west of the intersection of Chinook Court/Parker Road. The criterion is met.

8. Future extension of streets. Where necessary to give access to or permit a satisfactory future subdivision of adjoining land, streets shall be extended to the boundary of the subdivision and the resulting dead-end streets may be approved without turnarounds. (Temporary turnarounds built to Fire Department standards are required when the dead-end street is over 100 feet long.)

Response: Exhibit B shows that Roxbury Drive terminates in a street stub at the west side of the site. This street stub will allow for the potential future extension of Roxbury Drive west, eventually connecting with Roxbury Drive in the Rosemont Summit Phase 3 subdivision. Exhibit B also shows that the eyebrow designed into Roxbury Drive/Deerhill Lane will accommodate fire truck turnarounds. The criterion is met.

9. Intersection angles. Streets shall be laid out to intersect angles as near to right angles as practical, except where topography requires lesser angles, but in no case less than 60 degrees unless a special intersection design is approved. Intersections which are not at right angles shall have minimum corner radii of 15 feet along right-of-way lines which form acute angles. Right-of-way lines at intersections with arterial streets shall have minimum curb radii of not less than 35 feet. Other street intersections shall have curb radii of not less than 25 feet. All radii shall maintain a uniform width between the roadway and the right-of-way lines. The intersection of more than two streets at any one point will not be allowed unless no alternative design exists.

Response: Exhibit B shows that Deerhill Lane will intersect Parker Road at a 90-degree angle and include a corner radius of 25-feet. The criteria are met.

10. Additional right-of-way for existing streets. Wherever existing street rights-of-way adjacent to or within a tract are of inadequate widths based upon the standards of this chapter, additional right-of-way shall be provided at the time of subdivision or partition.

Response: Sufficient right-of-way currently exists along Parker Road to satisfy the City's standard for a collector street. The criterion does not apply.

11. Cul-de-sacs.

a. New cul-de-sacs and other closed-end streets (not including stub streets intended to be connected) on sites containing less than five acres, or sites accommodating uses other than residential or mixed use development, are not allowed unless the applicant demonstrates that there is no feasible alternative due to:

1) Physical constraints (e.g., existing development, the size or shape of the site, steep topography, or a fish bearing stream or wetland protected by Chapter 32 CDC), or

2) Existing easements or leases.

b. New cul-de-sacs and other closed-end streets, consistent with subsection (A)(11)(a) of this section, shall not exceed 200 feet in length or serve more than 25 dwelling units unless the design complies with all adopted Tualatin Valley Fire and Rescue (TVFR) access standards and adequately provides for anticipated traffic, consistent with the Transportation System Plan (TSP).

c. New cul-de-sacs and other closed-end streets (not including stub streets intended to be connected) on sites containing five acres or more that are proposed to accommodate residential or mixed use development are prohibited unless barriers (e.g., existing development, steep topography, or a fish bearing stream or wetland protected by Chapter 32 CDC, or easements, leases or covenants established prior to May 1, 1995) prevent street extensions. In that case, the street shall not exceed 200 feet in length or serve more than 25 dwelling units, and its design shall comply with all adopted TVFR access standards and adequately provide for anticipated traffic, consistent with the TSP.

d. Applicants for a proposed subdivision, partition or a multifamily, commercial or industrial development accessed by an existing cul-de-sac/closed-end street shall demonstrate that the proposal is consistent with all applicable traffic standards and TVFR access standards.

e. All cul-de-sacs and other closed-end streets shall include direct pedestrian and bicycle accessways from the terminus of the street to an adjacent street or pedestrian and bicycle accessways unless the applicant demonstrates that such connections are precluded by physical constraints or that necessary easements cannot be obtained at a reasonable cost.

f. All cul-de-sacs/closed-end streets shall terminate with a turnaround built to one of the following specifications (measurements are for the traveled way and do not include planter strips or sidewalks).

Response: Exhibit B shows that the application does not include new cul-de-sacs or closed end streets or rely on existing cul-de-sacs. The criteria do not apply.

12. Street names. No street names shall be used which will duplicate or be confused with the names of existing streets within the City. Street names that involve difficult or unusual spellings are discouraged. Street names shall be subject to the approval of the Planning Commission or Planning Director, as applicable. Continuations of existing streets shall have the name of the existing street. Streets, drives, avenues, ways, boulevards, and lanes shall describe through streets. Place and court shall describe cul-de-sacs. Crescent, terrace, and circle shall describe loop or arcing roads.

Response: Exhibit B shows that the application will result in the creation of a new local street, intersecting with Parker Road and stubbing to the west property boundary. Per the City's 2016 TSP, this new street is able to eventually connect with Roxbury Drive. Based on guidance from City Engineering staff, the east-west segment of this new street will be named Roxbury Drive, in recognition of the future connection that is anticipated, and the north-south segment will be named Deerhill Lane. The criterion is met.

13. Grades and curves. Grades and horizontal/vertical curves shall meet the West Linn Public Works Design Standards.

Response: Exhibit B shows that the new local street meets City of West Linn street grade standards. To minimize site grading, the Applicant has requested approval from the City Engineer to slightly reduce the radius of the vertical curve near the south end of Deerhill Lane. The criterion can be met.

14. **Access to local streets. Intersection of a local residential street with an arterial street may be prohibited by the decision-making authority if suitable alternatives exist for providing interconnection of proposed local residential streets with other local streets. Where a subdivision or partition abuts or contains an existing or proposed major arterial street, the decision-making authority may require marginal access streets, reverse-frontage lots with suitable depth, visual barriers, noise barriers, berms, no-access reservations along side and rear property lines, and/or other measures necessary for adequate protection of residential properties from incompatible land uses, and to ensure separation of through traffic and local traffic.**

Response: The application does not result in any local/arterial street intersections. The criterion does not apply.

15. **Alleys. Alleys shall be provided in commercial and industrial districts unless other permanent provisions for access to off-street parking and loading facilities are made as approved by the decision-making authority. While alley intersections and sharp changes in alignment should be avoided, the corners of necessary alley intersections shall have radii of not less than 10 feet. Alleys may be provided in residential subdivisions or multi-family projects. The decision to locate alleys shall consider the relationship and impact of the alley to adjacent land uses. In determining whether it is appropriate to require alleys in a subdivision or partition, the following factors and design criteria should be considered:**

    a. **The alley shall be self-contained within the subdivision. The alley shall not abut undeveloped lots or parcels which are not part of the project proposal. The alley will not stub out to abutting undeveloped parcels which are not part of the project proposal.**

    b. **The alley will be designed to allow unobstructed and easy surveillance by residents and police.**

    c. **The alley should be illuminated. Lighting shall meet the West Linn Public Works Design Standards.**

    d. **The alley should be a semi-private space where strangers are tacitly discouraged.**

    e. **Speed bumps may be installed in sufficient number to provide a safer environment for children at play and to discourage through or speeding traffic.**

    f. **Alleys should be a minimum of 14 feet wide, paved with no curbs.**

Response: The application does not include an alley. The criteria do not apply.

16. **Sidewalks. Sidewalks shall be installed per CDC 92.010(H), Sidewalks. The residential sidewalk width is six feet plus planter strip as specified below. Sidewalks in commercial zones shall be constructed per subsection (A)(3) of this section. See also subsection C of this section. Sidewalk width may be reduced with City Engineer**

approval to the minimum amount (e.g., four feet wide) necessary to respond to site constraints such as grades, mature trees, rock outcroppings, etc., or to match existing sidewalks or right-of-way limitations.

Response: Exhibit B shows that new sidewalks are planned to be 6-feet wide and separated from the vehicle travel way by a planter strip. The criteria are met.

17. Planter strip. The planter strip is between the curb and sidewalk providing space for a grassed or landscaped area and street trees. The planter strip shall be at least 6 feet wide to accommodate a fully matured tree without the boughs interfering with pedestrians on the sidewalk or vehicles along the curbline. Planter strip width may be reduced or eliminated, with City Engineer approval, when it cannot be corrected by site plan, to the minimum amount necessary to respond to site constraints such as grades, mature trees, rock outcroppings, etc., or in response to right-of-way limitations.

Response: Exhibit B shows that new sidewalks are planned to be 6-feet wide and separated from the vehicle travel way by a 6-foot wide (as measured from the face of the curb) planter strip. At the April 2016, pre-application conference, Engineering staff indicated that a 5.5-foot wide planter strip would be required for all street improvements. The criteria are met.

18. Streets and roads shall be dedicated without any reservations or restrictions.

Response: Upon final plat approval, Roxbury Drive/Deerhill Lane will be dedicated to the City of West Linn without any reservations or restrictions. The criterion is met.

19. All lots in a subdivision shall have access to a public street. Lots created by partition may have access to a public street via an access easement pursuant to the standards and limitations set forth for such accessways in Chapter 48 CDC.

Response: Exhibit B shows that all lots in the subdivision will have access to a public street. The criterion is met.

20. Gated streets. Gated streets are prohibited in all residential areas on both public and private streets. A driveway to an individual home may be gated.

Response: The application does not include a gated street. The criterion does not apply.

21. Entryway treatments and street isle design. When the applicant desires to construct certain walls, planters, and other architectural entryway treatments within a subdivision, the following standards shall apply:

a. All entryway treatments except islands shall be located on private property and not in the public right-of-way.

b. Planter islands may be allowed provided there is no structure (i.e., brick, signs, etc.) above the curbline, except for landscaping. Landscaped islands shall be set back a minimum of 24 feet from the curbline of the street to which they are perpendicular.

c. All islands shall be in public ownership. The minimum aisle width between the curb and center island curbs shall be 14 feet. Additional width may be required as determined by the City Engineer.

d. Brick or special material treatments are acceptable at intersections with the understanding that the City will not maintain these sections except with asphalt overlay, and that they must meet the Americans with Disabilities Act (ADA) standards. They shall be laid out to tie into existing sidewalks at intersections.

e. Maintenance for any common areas and entryway treatments (including islands) shall be guaranteed through homeowners association agreements, CC&Rs, etc.

f. Under Chapter 52 CDC, subdivision monument signs shall not exceed 32 square feet in area.

Response: The application does not include entryway treatments as described above. The criteria do not apply.

22. Based upon the determination of the City Manager or the Manager's designee, the applicant shall construct or cause to be constructed, or contribute a proportionate share of the costs, for all necessary off-site improvements identified by the transportation analysis commissioned to address CDC 85.170(B)(2) that are required to mitigate impacts from the proposed subdivision. The proportionate share of the costs shall be determined by the City Manager or Manager's designee, who shall assume that the proposed subdivision provides improvements in rough proportion to identified impacts of the subdivision. Off-site transportation improvements will include bicycle and pedestrian improvements as identified in the adopted City of West Linn TSP.

Response: The application does not warrant a transportation analysis per Section 85.170(B)(2). The criteria do not apply.

B. Blocks and lots.

1. General. The length, width, and shape of blocks shall be designed with due regard for the provision of adequate building sites for the use contemplated; consideration of the need for traffic safety, convenience, access, circulation, and control; and recognition of limitations and opportunities of topography and solar access.

2. Sizes. The recommended block size is 400 feet in length to encourage greater connectivity within the subdivision. Blocks shall not exceed 800 feet in length between street lines, except for blocks adjacent to arterial streets or unless topographical conditions or the layout of adjacent streets justifies a variation. Designs of proposed intersections shall demonstrate adequate sight distances to the City Engineer's specifications. Block sizes and proposed accesses must be consistent with the adopted TSP. Subdivisions of five or more acres that involve construction of a new street shall have block lengths of no more than 530 feet. If block lengths are greater than 530 feet, accessways on public easements or right-of-way for pedestrians and cyclists shall be provided not more than 330 feet apart. Exceptions can be granted when prevented by barriers such as

topography, rail lines, freeways, pre-existing development, leases, easements or covenants that existed prior to May 1, 1995, or by requirements of Titles 3 and 13 of the UGMFP. If streets must cross water features protected pursuant to Title 3 UGMFP, provide a crossing every 800 to 1,200 feet unless habitat quality or the length of the crossing prevents a full street connection.

Response: The application does not result in the formation of new blocks. Nonetheless, the new local street has been designed to provide a potential future connection west to Roxbury Drive, as it currently exists in the Rosemont Summit Phase 3 Subdivision. As properties in this area develop, new blocks are able to utilize this Roxbury Drive connection to form blocks that meet the above standards. The criterion does not apply.

3. Lot size and shape. Lot or parcel size, width, shape, and orientation shall be appropriate for the location of the subdivision or partition, for the type of use contemplated, for potential utilization of solar access, and for the protection of drainageways, trees, and other natural features. No lot or parcel shall be dimensioned to contain part of an existing or proposed street. All lots or parcels shall be buildable. "Buildable" describes lots that are free of constraints such as wetlands, drainageways, etc., that would make home construction impossible. Lot or parcel sizes shall not be less than the size required by the zoning code unless as allowed by planned unit development (PUD).

Depth and width of properties reserved or laid out for commercial and industrial purposes shall be adequate to provide for the off-street parking and service facilities required by the type of use proposed.

Response: Exhibit B shows that new lots satisfy the lot size, width, and frontage requirements for new lots in the R-10 Zoning District and include a sufficient buildable area that is free of constraints such as wetlands, drainageways, etc. The criteria are met.

4. Access. Access to subdivisions, partitions, and lots shall conform to the provisions of Chapter 48 CDC, Access, Egress and Circulation.

Response: Responses to the applicable criteria in Chapter 48 are located above. The criterion is met.

5. Double frontage lots and parcels. Double frontage lots and parcels have frontage on a street at the front and rear property lines. Double frontage lots and parcels shall be avoided except where they are essential to provide separation of residential development from arterial streets or adjacent non-residential activities, or to overcome specific disadvantages of topography and orientation. A planting screen or impact mitigation easement at least 10 feet wide, and across which there shall be no right of access, may be required along the line of building sites abutting such a traffic artery or other incompatible use.

Response: The application does not include double frontage lots. The criterion does not apply.

6. Lot and parcel side lines. The lines of lots and parcels, as far as is practicable, should run at right angles to the street upon which they face, except that on curved streets they should be radial to the curve.

Response: Exhibit B shows that, to the extent practicable, lot lines run perpendicular to the abutting street. The criterion is met.

7. Flag lots. Flag lots can be created where it can be shown that no other reasonable street access is possible to achieve the requested land division. A single flag lot shall have a minimum street frontage of 15 feet for its accessway. Where two to four flag lots share a common accessway, the minimum street frontage and accessway shall be eight feet in width per lot. Common accessways shall have mutual maintenance agreements and reciprocal access and utility easements. The following dimensional requirements shall apply to flag lots:

   a. Setbacks applicable to the underlying zone shall apply to the flag lot.

   b. Front yard setbacks may be based on the rear property line of the lot or parcel which substantially separates the flag lot from the street from which the flag lot gains access. Alternately, the house and its front yard may be oriented in other directions so long as some measure of privacy is ensured, or it is part of a pattern of development, or it better fits the topography of the site.

   c. The lot size shall be calculated exclusive of the accessway; the access strip may not be counted towards the area requirements.

   d. The lot depth requirement contained elsewhere in this code shall be measured from the rear property line of the lot or parcel which substantially separates the flag lot from the street from which the flag lot gains access.

   e. As per CDC 48.030, the accessway shall have a minimum paved width of 12 feet.

   f. If the use of a flag lot stem to access a lot is infeasible because of a lack of adequate existing road frontage, or location of existing structures, the proposed lot(s) may be accessed from the public street by an access easement of a minimum 15-foot width across intervening property.

Response: Exhibit B shows that the application includes one flag lot (Lot 7). This flag lot is necessary to create a sufficient buildable area for Lots 6-8 that is located outside of the WRA while also providing a 15-foot wide frontage for Lot 7 on the abutting public street. Lots 6-8 will be accessed by a reciprocal access from Roxbury Drive/Deerhill Lane and a corresponding easement will be recorded with the final plat. The criteria are met.

8. Large lots or parcels. In dividing tracts into large lots or parcels which, at some future time, are likely to be redivided, the approval authority may:

   a. Require that the blocks be of such size and shape, and be so divided into building sites, and contain such easements and site restrictions as will provide for extension and opening of streets at intervals which will permit a subsequent division of any tract into lots or parcels of smaller size; or

   b. Alternately, in order to prevent further subdivision or partition of oversized and constrained lots or parcels, restrictions may be imposed on the subdivision or partition plat.

Response: The application does not result in large lots that can be further subdivided under the current R-10 lot dimensional standards. The criteria do not apply.

C. Pedestrian and bicycle trails.

1. Trails or multi-use pathways shall be installed, consistent and compatible with federal ADA requirements and with the Oregon Transportation Planning Rule, between subdivisions, cul-de-sacs, and streets that would otherwise not be connected by streets due to excessive grades, significant tree(s), and other constraints natural or manmade. Trails shall also accommodate bicycle or pedestrian traffic between neighborhoods and activity areas such as schools, libraries, parks, or commercial districts. Trails shall also be required where designated by the Parks Master Plan.

2. The all-weather surface (asphalt, etc.) trail should be eight feet wide at minimum for bicycle use and six feet wide at minimum for pedestrian use. Trails within 10 feet of a wetland or natural drainageway shall not have an all-weather surface, but shall have a soft surface as approved by the Parks Director. These trails shall be contained within a corridor dedicated to the City that is wide enough to provide trail users with a sense of defensible space. Corridors that are too narrow, confined, or with vegetative cover may be threatening and discourage use. Consequently, the minimum corridor width shall be 20 feet. Sharp curves, twists, and blind corners on the trail are to be avoided as much as possible to enhance defensible space. Deviations from the corridor and trail width are permitted only where topographic and ownership constraints require it.

3. Defensible space shall also be enhanced by the provision of a three- to four-foot-high matte black chain link fence or acceptable alternative along the edge of the corridor. The fence shall help delineate the public and private spaces.

4. The bicycle or pedestrian trails that traverse multi-family and commercial sites should follow the same defensible space standards but do not need to be defined by a fence unless required by the decision-making authority.

5. Except for trails within 10 feet of a wetland or natural drainageway, soft surface or gravel trails may only be used in place of a paved, all-weather surface where it can be shown to the Planning Director that the principal users of the path will be recreational, non-destination-oriented foot traffic, and that alternate paved routes are nearby and accessible.

6. The trail grade shall not exceed 12 percent except in areas of unavoidable topography, where the trail may be up to a 15 percent grade for short sections no longer than 50 feet. In any location where topography requires steeper trail grades than permitted by this section, the trail shall incorporate a short stair section to traverse the area of steep grades.

Response: Exhibit B shows that the subdivision does not include cul-de-sacs or closed end streets and includes a new public street intersection (complete with sidewalks) at Parker Road and a public street stub at the west property boundary. As properties to the west of the subject site develop, Roxbury Drive is able to be extended west to an eventual connection with Roxbury Drive in the Rosemont Summit Phase 3 Subdivision. Given the adequacy of pedestrian and bicycle connections included in this application, discrete paths/trails are not included in this application. The criteria do not apply.

E. Grading. Grading of building sites shall conform to the following standards unless physical conditions demonstrate the propriety of other standards:

1. All cuts and fills shall comply with the excavation and grading provisions of the Uniform Building Code and the following:

a. Cut slopes shall not exceed one and one-half feet horizontally to one foot vertically (i.e., 67 percent grade).

b. Fill slopes shall not exceed two feet horizontally to one foot vertically (i.e., 50 percent grade). Please see the following illustration.

Response: Exhibit B shows that cut and fill slopes are within the range allowed above. The criteria are met.

2. The character of soil for fill and the characteristics of lot and parcels made usable by fill shall be suitable for the purpose intended.

3. If areas are to be graded (more than any four-foot cut or fill), compliance with CDC 85.170(C) is required.

4. The proposed grading shall be the minimum grading necessary to meet roadway standards, and to create appropriate building sites, considering maximum allowed driveway grades.

5. Type I lands shall require a report submitted by an engineering geologist, and Type I and Type II lands shall require a geologic hazard report.

6. Repealed by Ord. 1635.

Response: Exhibit B shows that grading is the minimum necessary to accommodate acceptable street and driveway grades through the site. The site does not include grading on Type I/II lands. The applicable criteria are met.

7. On land with slopes in excess of 12 percent, cuts and fills shall be regulated as follows:

a. Toes of cuts and fills shall be set back from the boundaries of separate private ownerships at least three feet, plus one-fifth of the vertical height of the cut or fill. Where an exception is required from that requirement, slope easements shall be provided.

b. Cuts shall not remove the toe of any slope where a severe landslide or erosion hazard exists (as described in subsection (G)(5) of this section).

c. Any structural fill shall be designed by a registered engineer in a manner consistent with the intent of this code and standard engineering practices, and certified by that engineer that the fill was constructed as designed.

d. Retaining walls shall be constructed pursuant to Section 2308(b) of the Oregon State Structural Specialty Code.

e. **Roads shall be the minimum width necessary to provide safe vehicle access, minimize cut and fill, and provide positive drainage control.**

Response: Exhibit B shows that grading will result in slopes that exceed 12 percent. In these locations, grading has been designed with the above-listed standards. Specifically, cuts on the west side of the side and fills near the east side of the site are at least three feet from abutting properties. Additionally, the City's Landslide Hazards Map does not indicate the presence of landslide hazards on this site. A retaining wall is planned for a portion of the stormwater facility in Tract A and will be designed pursuant to Oregon Building Code requirements. New streets have been designed per the City's local street standard. The criteria are met.

8. **Land over 50 percent slope shall be developed only where density transfer is not feasible. The development will provide that:**

a. **At least 70 percent of the site will remain free of structures or impervious surfaces.**

b. **Emergency access can be provided.**

c. **Design and construction of the project will not cause erosion or land slippage.**

d. **Grading, stripping of vegetation, and changes in terrain are the minimum necessary to construct the development in accordance with subsection J of this section.**

Response: Exhibit B shows that the site is dominated by slopes of less than 25 percent. While there are a few very small areas of the site where slopes exceed 25 percent, most of these features appear to be manmade and grading in these areas is not anticipated to cause erosion or landslide problems. The criteria do not apply.

F. **Water.**

1. **A plan for domestic water supply lines or related water service facilities shall be prepared consistent with the adopted Comprehensive Water System Plan, plan update, March 1987, and subsequent superseding revisions or updates.**

2. **Adequate location and sizing of the water lines.**

3. **Adequate looping system of water lines to enhance water quality.**

4. **For all non-single-family developments, there shall be a demonstration of adequate fire flow to serve the site.**

5. **A written statement, signed by the City Engineer, that water service can be made available to the site by the construction of on-site and off-site improvements and that such water service has sufficient volume and pressure to serve the proposed development's domestic, commercial, industrial, and fire flows.**

Response: Exhibit B shows the planned water service to serve the subdivision. Water service has been designed per the City's standards for new residential subdivisions. The City Engineer confirmed at the April 2016 pre-application conference that adequate volume and pressure is available to serve the subject site. The criteria are met.

G. **Sewer.**

1. A plan prepared by a licensed engineer shall show how the proposal is consistent with the Sanitary Sewer Master Plan (July 1989). Agreement with that plan must demonstrate how the sanitary sewer proposal will be accomplished and how it is gravity-efficient. The sewer system must be in the correct basin and should allow for full gravity service.

2. Sanitary sewer information will include plan view of the sanitary sewer lines, including manhole locations and depth or invert elevations.

3. Sanitary sewer lines shall be located in the public right-of-way, particularly the street, unless the applicant can demonstrate why the alternative location is necessary and meets accepted engineering standards.

4. Sanitary sewer line should be at a depth that can facilitate connection with down-system properties in an efficient manner.

5. The sanitary sewer line should be designed to minimize the amount of lineal feet in the system.

6. The sanitary sewer line shall avoid disturbance of wetland and drainageways. In those cases where that is unavoidable, disturbance shall be mitigated pursuant to Chapter 32 CDC, Water Resource Area Protection, all trees replaced, and proper permits obtained. Dual sewer lines may be required so the drainageway is not disturbed.

7. Sanitary sewer shall be extended or stubbed out to the next developable subdivision or a point in the street that allows for reasonable connection with adjacent or nearby properties.

8. The sanitary sewer system shall be built pursuant to DEQ, City, and Tri-City Service District sewer standards. The design of the sewer system should be prepared by a licensed engineer, and the applicant must be able to demonstrate the ability to satisfy these submittal requirements or standards at the pre-construction phase.

9. A written statement, signed by the City Engineer, that sanitary sewers with sufficient capacity to serve the proposed development and that adequate sewage treatment plant capacity is available to the City to serve the proposed development.

Response: Exhibit B shows the planned sanitary sewer system to serve the subdivision. Sanitary sewer service has been designed by a licensed professional engineer per the City's, DEQ, and Tri-City Service District standards for new residential subdivisions. The design of the sanitary sewer system avoids impacts to wetlands and drainageways. Additionally, Exhibit B shows that sanitary sewer mains are stubbed at both the west and north property line to accommodate potential future development west and north of the subject site. The City Engineer confirmed at the April 2016 pre-application conference that adequate capacity is available to serve the subject site. The criteria are met.

H. Deleted during July 2014 supplement.

I. Utility easements. Subdivisions and partitions shall establish utility easements to accommodate the required service providers as determined by the City Engineer. The developer of the subdivision shall make accommodation for cable television wire in all utility trenches and easements so that cable can fully serve the subdivision.

Response: Exhibit B shows that a public utility easement is located along the frontage of each lot. The criterion is met.

J. Supplemental provisions.

1. Wetland and natural drainageways. Wetlands and natural drainageways shall be protected as required by Chapter 32 CDC, Water Resource Area Protection. Utilities may be routed through the protected corridor as a last resort, but impact mitigation is required.

Response: Exhibit B shows that the only impact to the onsite WRA is associated with a required stormater treatment and detention facility at the southeast corner of the site. Given the topography of the site, this is the only practical location for this facility. Exhibit C describes the extent of mitigation associated with placing the stormwater facility in this location. The criterion is met.

2. Willamette and Tualatin Greenways. The Willamette and Tualatin River Greenways shall be protected as required by Chapter 28 CDC, Willamette and Tualatin River Protection.

Response: The site is not located in the Willamette or Tualatin River Greenway. The criteria in Chapter 28 do not apply.

3. Street trees. Street trees are required as identified in the appropriate section of the municipal code and Chapter 54 CDC.

Response: Exhibit B shows the preliminary arrangement of street trees on site, pursuant to CDC Chapter 54. The criterion is met.

4. Lighting. All subdivision street or alley lights shall meet West Linn Public Works Design Standards.

Response: Prior to final plat approval, the City will ensure that street lights are provided in accordance with the City's standards. The criterion can be met.

5. Dedications and exactions. The City may require an applicant to dedicate land and/or construct a public improvement that provides a benefit to property or persons outside the property that is the subject of the application when the exaction is roughly proportional. No exaction shall be imposed unless supported by a determination that the exaction is roughly proportional to the impact of development.

Response: At time of final plat recording, public street improvements, rights-of-way, and underground utilities located in the public right-of-way will be dedicated to the City of West Linn. The criterion is met.

6. Underground utilities. All utilities, such as electrical, telephone, and television cable, that may at times be above ground or overhead shall be buried underground in the case of new development. The exception would be in those cases where the area is substantially built out and adjacent properties have above-ground utilities and where the development site's frontage is under 200 feet and the site is less than one acre. High voltage transmission lines, as classified by Portland General Electric or electric service provider, would also be exempted. Where adjacent future development is expected or

imminent, conduits may be required at the direction of the City Engineer. All services shall be underground with the exception of standard above-grade equipment such as some meters, etc.

Response: As shown in Exhibit B, an overhead electrical line is present along the frontage of the site and is planned to be located underground prior to final plat approval. The criterion is met.

7. Density requirement. Density shall occur at 70 percent or more of the maximum density allowed by the underlying zoning. These provisions would not apply when density is transferred from Type I and II lands as defined in CDC 02.030. Development of Type I or II lands are exempt from these provisions. Land divisions of three lots or less would also be exempt.

Response: Per CDC Section 5.020, the maximum density allowed in the R-10 District is 4.35 dwelling units per net acre. Minus new public rights-of-way, the site comprises a total area of 2.81 net acres, for a maximum density of 12.23 dwelling units (2.81 net acres x 4.35 dwelling units). Seventy-percent of this maximum density equals 8.56 dwelling units. This 12-lot subdivision is within the allowable density as provided per this section. The criterion is met.

8. Mix requirement. The "mix" rule means that developers shall have no more than 15 percent of the R-2.1 and R-3 development as single-family residential. The intent is that the majority of the site shall be developed as medium high density multi-family housing.

Response: The site does not include the above zoning designations. The criterion does not apply.

9. Heritage trees/significant tree and tree cluster protection. All heritage trees, as defined in the municipal code, shall be saved. Diseased heritage trees, as determined by the City Arborist, may be removed at his/her direction. All non-heritage trees and clusters of trees (three or more trees with overlapping dripline; however, native oaks need not have an overlapping dripline) that are considered significant by virtue of their size, type, location, health, or numbers shall be saved pursuant to CDC 55.100(B)(2). Trees are defined per the municipal code as having a trunk six inches in diameter or 19 inches in circumference at a point five feet above the mean ground level at the base of the trunk.

Response: The property does not include any heritage trees. Exhibit B, and the responses to Section 55.100 above, demonstrate that significant trees are protected pursuant to CDC Section 55.100(B)(2), as applicable. The applicable criteria are met.

Chapter 92 REQUIRED IMPROVEMENTS

92.010 PUBLIC IMPROVEMENTS FOR ALL DEVELOPMENT

The following improvements shall be installed at the expense of the developer and meet all City codes and standards:

A. Streets within subdivisions.

1. All streets within a subdivision, including alleys, shall be graded for the full right-of-way width and improved to the City's permanent

improvement standards and specifications which include sidewalks and bicycle lanes, unless the decision-making authority makes the following findings:

a. The right-of-way cannot be reasonably improved in a manner consistent with City road standards or City standards for the protection of wetlands and natural drainageways.

b. The right-of-way does not provide a link in a continuous pattern of connected local streets, or, if it does provide such a link, that an alternative street link already exists or the applicant has proposed an alternative street which provides the necessary connectivity, or the applicant has proven that there is no feasible location on the property for an alternative street providing the link.

2. When the decision-making authority makes these findings, the decision-making authority may impose any of the following conditions of approval:

a. A condition that the applicant initiate vacation proceedings for all or part of the right-of-way.

b. A condition that the applicant build a trail, bicycle path, or other appropriate way.

If the applicant initiates vacation proceedings pursuant to subsection (A)(2)(a) of this section, and the right-of-way cannot be vacated because of opposition from adjacent property owners, the City Council shall consider and decide whether to process a City-initiated street vacation pursuant to Chapter 271 ORS.

Construction staging area shall be established and approved by the City Engineer. Clearing, grubbing, and grading for a development shall be confined to areas that have been granted approval in the land use approval process only. Clearing, grubbing, and grading outside of land use approved areas can only be approved through a land use approval modification and/or an approved Building Department grading permit for survey purposes. Catch basins shall be installed and connected to pipe lines leading to storm sewers or drainageways.

Response: Exhibit B shows that new streets, and the improvements to Parker Road are designed pursuant to the City's standards for local and collector roadways, respectively. The applicable criteria are met.

B. Extension of streets to subdivisions. The extension of subdivision streets to the intercepting paving line of existing streets with which subdivision streets intersect shall be graded for the full right-of-way width and improved to a minimum street structural section and width of 24 feet.

Response: Exhibit B shows that Roxbury Drive is planned to be extended to the site's west property line to accommodate a potential future connection to the west. The criterion is met.

C. Local and minor collector streets within the rights-of-way abutting a subdivision shall be graded for the full right-of-way width and approved to the City's permanent improvement standards and specifications. The City

Engineer shall review the need for street improvements and shall specify whether full street or partial street improvements shall be required. The City Engineer shall also specify the extent of storm drainage improvements required. The City Engineer shall be guided by the purpose of the City's systems development charge program in determining the extent of improvements which are the responsibility of the subdivider.

Response: Exhibit B includes improvements along the site's Parker Road frontage pursuant to the guidance provided by the City Engineer at the April 2016 pre-application conference and the City of West Linn Public Works Design Standards. The criterion is met.

D. Monuments. Upon completion of the first pavement lift of all street improvements, monuments shall be installed and/or reestablished at every street intersection and all points of curvature and points of tangency of street centerlines with an iron survey control rod. Elevation benchmarks shall be established at each street intersection monument with a cap (in a monument box) with elevations to a U.S. Geological Survey datum that exceeds a distance of 800 feet from an existing benchmark.

Response: Prior to final plat approval, the City will ensure that survey monuments are reestablished in accordance with this section. The criterion can be met.

E. Surface drainage and storm sewer system. A registered civil engineer shall prepare a plan and statement which shall be supported by factual data and comply with the standards for the improvement of public and private drainage systems located in the West Linn Public Works Design Standards. Developers are encouraged to adapt storm water management approaches that make use of natural systems and infiltration to manage storm runoff, including the use of vegetated swales, rain gardens, and other like systems where appropriate.

Response: Exhibits B and H describe how surface drainage will be managed on site. These plans/reports were prepared by a registered civil engineer. The criterion is met.

F. Sanitary sewers. Sanitary sewers shall be installed to City standards to serve the subdivision and to connect the subdivision to existing mains.

1. If the area outside the subdivision to be directly served by the sewer line has reached a state of development to justify sewer installation at the time, the Planning Commission may recommend to the City Council construction as an assessment project with such arrangement with the subdivider as is desirable to assure financing his or her share of the construction.

2. If the installation is not made as an assessment project, the City may reimburse the subdivider an amount estimated to be a proportionate share of the cost for each connection made to the sewer by property owners outside of the subdivision for a period of 10 years from the time of installation of the sewers. The actual amount shall be determined by the City Administrator considering current construction costs.

Response: Exhibit B shows that the site includes sanitary sewer service, that is also stubbed to abutting properties, that has been designed in accordance with the City's standards for residential development. The criteria are met.

G. Water system. Water lines with valves and fire hydrants providing service to each building site in the subdivision and connecting the subdivision to City mains shall be installed. Prior to starting building construction, the design shall take into account provisions for extension beyond the subdivision and to adequately grid the City system. Hydrant spacing is to be based on accessible area served according to the City Engineer's recommendations and City standards. If required water mains will directly serve property outside the subdivision, the City may reimburse the developer an amount estimated to be the proportionate share of the cost for each connection made to the water mains by property owners outside the subdivision for a period of 10 years from the time of installation of the mains. If oversizing of water mains is required to areas outside the subdivision as a general improvement, but to which no new connections can be identified, the City may reimburse the developer that proportionate share of the cost for oversizing. The actual amount and reimbursement method shall be as determined by the City Administrator considering current or actual construction costs.

Response: Exhibit B includes a water system, inclusive of new valves and fire hydrants, that has been designed to the City's standards for residential subdivisions. The criterion is met.

H. Sidewalks.

1. Sidewalks shall be installed on both sides of a public street and in any special pedestrian way within the subdivision, except that in the case of primary or secondary arterials, or special type industrial districts, or special site conditions, the Planning Commission may approve a subdivision without sidewalks if alternate pedestrian routes are available.

   In the case of the double-frontage lots, provision of sidewalks along the frontage not used for access shall be the responsibility of the developer. Providing front and side yard sidewalks shall be the responsibility of the land owner at the time a request for a building permit is received. Additionally, deed restrictions and CC&Rs shall reflect that sidewalks are to be installed prior to occupancy and it is the responsibility of the lot or homeowner to provide the sidewalk, except as required above for double-frontage lots.

2. On local streets serving only single-family dwellings, sidewalks may be constructed during home construction, but a letter of credit shall be required from the developer to ensure construction of all missing sidewalk segments within four years of final plat approval pursuant to CDC 91.010(A)(2).

3. The sidewalks shall measure at least six feet in width and be separated from the curb by a six-foot minimum width planter strip. Reductions in widths to preserve trees or other topographic features, inadequate right-of-way, or constraints, may be permitted if approved by the City Engineer in consultation with the Planning Director.

4. Sidewalks should be buffered from the roadway on high volume arterials or collectors by landscape strip or berm of three and one-half-foot minimum width.

5. The City Engineer may allow the installation of sidewalks on one side of any street only if the City Engineer finds that the presence of any of the factors listed below justifies such waiver:

   a. The street has, or is projected to have, very low volume traffic density;

   b. The street is a dead-end street;

c. The housing along the street is very low density; or

d. The street contains exceptional topographic conditions such as steep slopes, unstable soils, or other similar conditions making the location of a sidewalk undesirable.

Response: Exhibit B shows that 6-foot wide sidewalks and 6-foot wide planter strips will be included on both sides of Roxbury Drive/Deerhill Lane and along the north side of Parker Road. The criteria are met.

I. Bicycle routes. If appropriate to the extension of a system of bicycle routes, existing or planned, the Planning Commission may require the installation of separate bicycle lanes within streets and separate bicycle paths.

Response: Exhibit B shows that, consistent with the 2016 TSP, the improvements along the north side of Parker Road will include a bike lane. The criterion is met.

J. Street name signs. All street name signs and traffic control devices for the initial signing of the new development shall be installed by the City with sign and installation costs paid by the developer.

K. Dead-end street signs. Signs indicating "future roadway" shall be installed at the end of all discontinued streets. Signs shall be installed by the City per City standards, with sign and installation costs paid by the developer.

L. Signs indicating future use shall be installed on land dedicated for public facilities (e.g., parks, water reservoir, fire halls, etc.). Sign and installation costs shall be paid by the developer.

M. Street lights. Street lights shall be installed and shall be served from an underground source of supply. The street lighting shall meet IES lighting standards. The street lights shall be the shoe-box style light (flat lens) with a 30-foot bronze pole in residential (non-intersection) areas. The street light shall be the cobra head style (drop lens) with an approximate 50-foot (sized for intersection width) bronze pole. The developer shall submit to the City Engineer for approval of any alternate residential, commercial, and industrial lighting, and alternate lighting fixture design. The developer and/or homeowners association is required to pay for all expenses related to street light energy and maintenance costs until annexed into the City.

N. Utilities. The developer shall make necessary arrangements with utility companies or other persons or corporations affected for the installation of underground lines and facilities. Electrical lines and other wires, including but not limited to communication, street lighting, and cable television, shall be placed underground.

O. Curb cuts and driveways. Curb cuts and driveway installations are not required of the subdivider at the time of street construction, but, if installed, shall be according to City standards. Proper curb cuts and hard-surfaced driveways shall be required at the time buildings are constructed.

P. Street trees. Street trees shall be provided by the City Parks and Recreation Department in accordance with standards as adopted by the City in the Municipal Code. The fee charged the subdivider for providing and maintaining these trees shall be set by resolution of the City Council.

Q. Joint mailbox facilities shall be provided in all residential subdivisions, with each joint mailbox serving at least two, but no more than eight, dwelling units. Joint mailbox structures shall be placed in the street right-of-way adjacent to roadway curbs. Proposed locations of joint mailboxes shall be designated on a copy of the tentative plan of the subdivision, and shall be approved as part of the tentative plan approval. In addition, sketch plans for the joint mailbox structures to be used shall be submitted and approved by the City Engineer prior to final plat approval.

Response: Prior to final plat approval, the City will ensure the applicable requirements above are met. The criteria can be met.

92.030 IMPROVEMENT PROCEDURES

In addition to other requirements, improvements installed by the developer, either as a requirement of these regulations or at the developer's own option, shall conform to the requirements of this title and permanent improvement standards and specifications adopted by the City and shall be installed in accordance with the following procedure:

A. Improvement work shall not be commenced until plans have been checked for adequacy and approved by the City. To the extent necessary for evaluation of the proposal, the improvement plans may be required before approval of the tentative plan of a subdivision or partition. Plans shall be prepared in accordance with the requirements of the City.

B. Improvement work shall not be commenced until the City has been notified in advance, and if work has been discontinued for any reason, it shall not be resumed until the City has been notified.

C. Improvements shall be constructed under the Engineer. The City may require changes in typical sections and details in the public interest if unusual conditions arise during construction to warrant the change.

D. All underground utilities, sanitary sewers, and storm drains installed in streets by the subdivider or by any utility company shall be constructed prior to the surfacing of the streets. Stubs for service connections for underground utilities and sanitary sewers shall be placed to a length obviating the necessity for disturbing the street improvements when service connections are made.

E. A digital and mylar map showing all public improvements as built shall be filed with the City Engineer upon completion of the improvements.

Response: The applicant is aware of the above-listed requirements. The criteria can be met.

92.050 CHANGES IN SUBDIVISION PHASE NUMBERS PROHIBITED

Subdivision phase numbers shall remain the same from tentative approval through final platting. The only permitted change would be the addition of an alphabetic suffix. For example, tentatively approved Columbia Heights III could be broken down at final platting into Columbia Heights III-A, III-B, III-C, etc. It could not be broken down numerically into Columbia Heights III, IV, and V.

Response: Exhibit B shows that the subdivision is planned to be completed in a single phase. The criterion does not apply.

Chapter 96 STREET IMPROVEMENT CONSTRUCTION

96.010 CONSTRUCTION REQUIRED

A. New construction.

1. **Building permits shall not be issued for the construction of any new building or structure, or for the remodeling of any existing building or structure, which results in an increase in size or includes a change in use, including building permits for single-family dwellings but excepting building permits for alteration or addition to an existing single-family dwelling, unless the applicant for said building permit agrees to construct street improvements as required by the land use decision authorizing the construction activity. The placement of new curbs and the drainage facilities required shall be determined by the City Manager or the Manager's designee.**

2. **If the building permit did not require a prior land use decision, the applicant shall construct street improvements which shall include curbs, sidewalks, drainage facilities, and pavement widening to meet new curbs, along all City streets which abut the property described in the building permits.**

3. **An applicant for a building permit may apply for a waiver of street improvements and the option to make a payment in lieu of construction. The option is available if the City Manager or the Manager's designee determines the transportation system plan does not include the street improvement for which the waiver is requested.**

4. **When an applicant applies for and is granted a waiver of street improvements under subsection (A)(3) of this section, the applicant shall pay an in-lieu fee equal to the estimated cost, accepted by the City Engineer, of the otherwise required street improvements. As a basis for this determination, the City Engineer shall consider the cost of similar improvements in recent development projects and may require up to three estimates from the applicant. The in-lieu fee shall be used for in kind or related improvements.**

(…)

D. Notwithstanding any other provisions of this chapter, in cases where the issuance of the building permit pertains to the construction or reconstruction of a building or structure within a large development owned by the same owner or owners, the City Council may, in its sole discretion, authorize the installation of street improvements of equivalent cost on another portion of the total development area.

Response: Exhibit B shows street improvements interior to the site and along the site's Parker Road frontage pursuant to the City's standards for local and collector roadways. The criteria are met.

96.020 STANDARDS

Street improvements shall be installed according to the City standards and shall be completed prior to the issuance of any occupancy permit for the new or remodeled structure or building. In unimproved areas of the City, the City Engineer may grant a time extension of the provisions of this section; provided, that the applicant provides sufficient security in amount and quantity satisfactory to the City Attorney to assure payment of such improvement costs.

Response: Exhibit B shows street improvements interior to the site and along the site's Parker Road frontage pursuant to the City's standards for local and collector roadways. The criteria are met.

IV. Conclusion

The required findings have been made and this written narrative and accompanying documentation demonstrate the application is consistent with the applicable provisions of the City of West Linn Community Development Code. The evidence in the record is substantial and supports approval of the application. Therefore, the City can rely on upon this information in its approval of the application.

Exhibit A: Subdivision Application Form

CITY OF West Linn

Planning & Development • 22500 Salamo Rd #1000 • West Linn, Oregon 97068
Telephone 503.656.4211 • Fax 503.656.4106 • westlinnoregon.gov

DEVELOPMENT REVIEW APPLICATION

For Office Use Only		
STAFF CONTACT	PROJECT NO(S).	
NON-REFUNDABLE FEE(S)	REFUNDABLE DEPOSIT(S)	TOTAL

Type of Review (Please check all that apply):

- [ ] Annexation (ANX)
- [ ] Appeal and Review (AP) *
- [ ] Conditional Use (CUP)
- [ ] Design Review (DR)
- [ ] Easement Vacation
- [ ] Extraterritorial Ext. of Utilities
- [ ] Final Plat or Plan (FP)
- [ ] Flood Management Area
- [ ] Hillside Protection & Erosion Control
- [ ] Historic Review
- [ ] Legislative Plan or Change
- [ ] Lot Line Adjustment (LLA) */**
- [ ] Minor Partition (MIP) (Preliminary Plat or Plan)
- [ ] Non-Conforming Lots, Uses & Structures
- [ ] Planned Unit Development (PUD)
- [ ] Pre-Application Conference (PA) */**
- [ ] Street Vacation
- [x] Subdivision (SUB)
- [ ] Temporary Uses *
- [ ] Time Extension *
- [ ] Variance (VAR)
- [ ] Water Resource Area Protection/Single Lot (WAP)
- [x] Water Resource Area Protection/Wetland (WAP)
- [ ] Willamette & Tualatin River Greenway (WRG)
- [ ] Zone Change

Home Occupation, Pre-Application, Sidewalk Use, Sign Review Permit, and Temporary Sign Permit applications require different or additional application forms, available on the City website or at City Hall.

Site Location/Address:

No address and 3015 Parker Rd., West Linn, OR 97068

Assessor's Map No.:	2 1E 25CC
Tax Lot(s):	100 and 200
Total Land Area:	+/- 3.52 acres

Brief Description of Proposal:

Preliminary plat review for a subdivision.

Applicant Name: (please print) Noell and Carol Price
Phone: Contact Applicant's consultant
Address: 3015 Parker Rd.
Email: see below
City State Zip: West Linn, OR 97068

Owner Name (required): (please print) Same as Applicant, above
Phone:
Address:
Email:
City State Zip:

Consultant Name: (please print) Monty Hurley, P.E., PLS AKS Engineering & Forestry
Phone: (503) 563-6151
Address: 12965 SW Herman Rd., Suite 100
Email: monty@aks-eng.com
City State Zip: Tualatin, OR 97062

1. All application fees are non-refundable (excluding deposit). **Any overruns to deposit will result in additional billing.**
2. The owner/applicant or their representative should be present at all public hearings.
3. A denial or approval may be reversed on appeal. No permit will be in effect until the appeal period has expired.
4. **Three (3) complete hard-copy sets (single sided) of application materials must be submitted with this application. One (1) complete set of digital application materials must also be submitted on CD in PDF format. If large sets of plans are required in application please submit only two sets.**

* No CD required / ** Only one hard-copy set needed

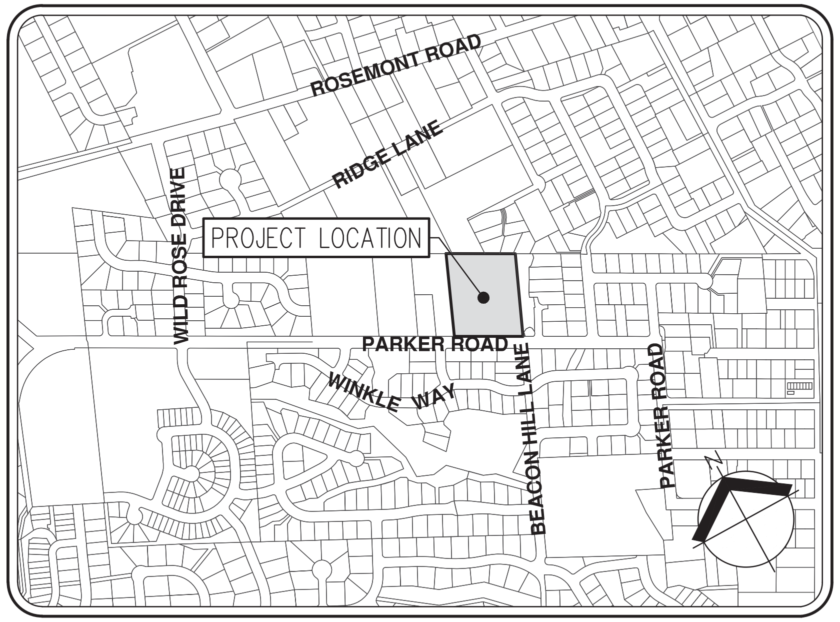
The undersigned property owner(s) hereby authorizes the filing of this application, and authorizes on site review by authorized staff. I hereby agree to comply with all code requirements applicable to my application. Acceptance of this application does not infer a complete submittal. All amendments to the Community Development Code and to other regulations adopted after the application is approved shall be enforced where applicable. Approved applications and subsequent development is not vested under the provisions in place at the time of the initial application.

[signature] 8/23/17 [signature] 8/23/17
Applicant's signature Date Owner's signature *(required)* Date
Carol J Price Carol J Price

Exhibit B: Preliminary Subdivision Plans

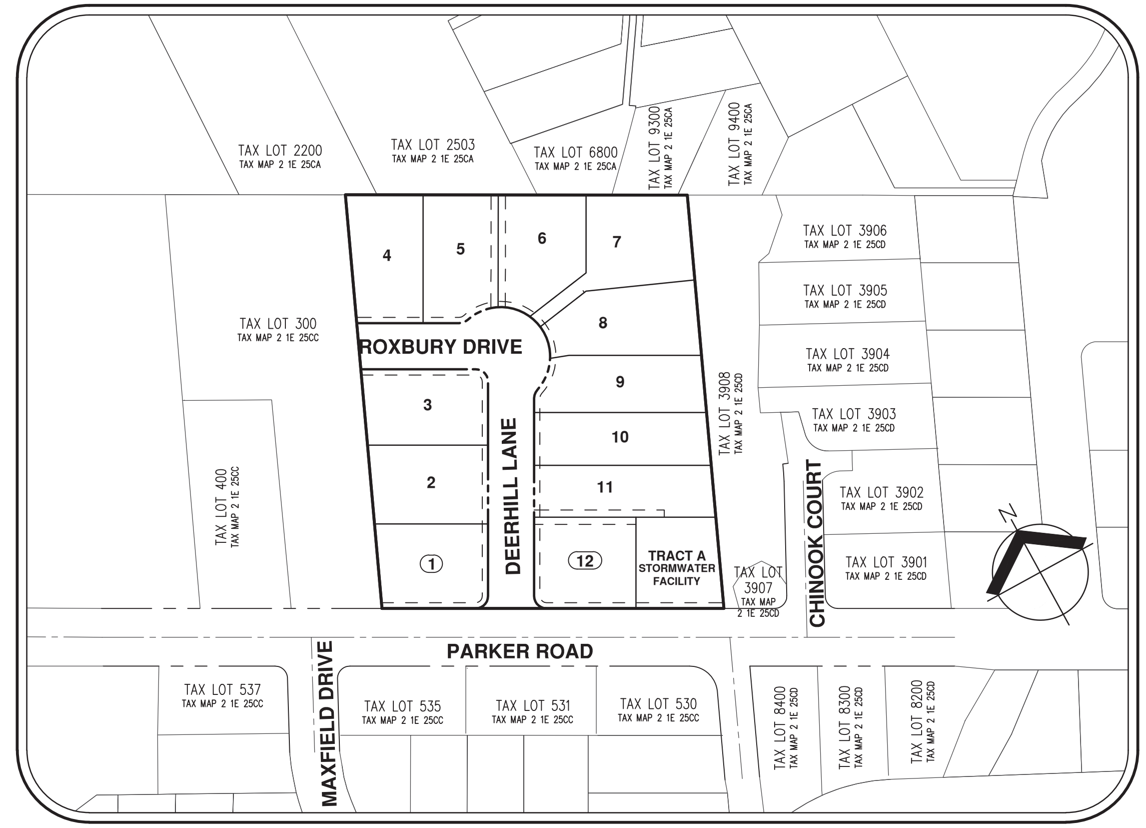
KNOLLCREST SUBDIVISION

PRELIMINARY SUBDIVISION PLANS



VICINITY MAP

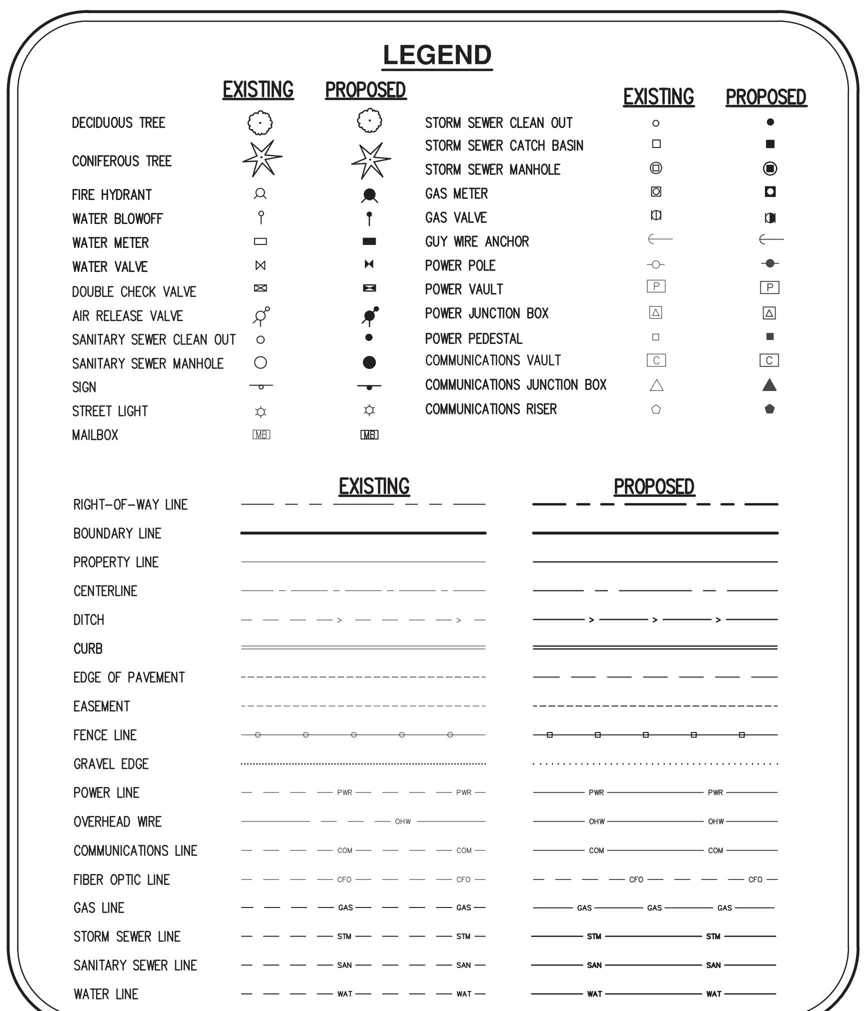
SCALE: 1" = 500'



SITE MAP

SCALE: 1" = 100'

LEGEND



OWNER/APPLICANT:

NOELL AND CAROL PRICE
3015 PARKER ROAD
WEST LINN, OR 97068

PLANNING/CIVIL ENGINEERING/SURVEYING LANDSCAPE ARCHITECTURE FIRM (APPLICANT'S CONSULTANT):

AKS ENGINEERING & FORESTRY, LLC
CONTACT: MONTY HURLEY
12965 SW HERMAN ROAD, SUITE 100
TUALATIN, OR 97062
PH: 503-563-6151
FAX: 503-563-6152

SITE LOCATION:

3001 AND 3015 PARKER ROAD
WEST LINN, OR 97068

SITE DESCRIPTION:

TAX LOT 100 AND 200, CLACKAMAS COUNTY ASSESSOR'S MAP 2 1E 25CC, LOCATED IN THE SOUTHWEST 1/4 OF THE SOUTHWEST 1/4 OF SECTION 25, TOWNSHIP 2 SOUTH, RANGE 1 EAST, WILLAMETTE MERIDIAN, CITY OF WEST LINN, CLACKAMAS COUNTY, OREGON

TOTAL SITE AREA:

153,355 SF± (3.52 ACRES±)

PROJECT PURPOSE:

TWELVE-LOT RESIDENTIAL SUBDIVISION FOR FUTURE SINGLE-FAMILY DETACHED HOMES IN THE R-10 ZONE WITH A STORMWATER FACILITY.

EXISTING LAND USE:

SINGLE-FAMILY HOME AND TREE FARM.

BENCHMARK:

VERTICAL DATUM: ELEVATIONS ARE BASED ON NGS BENCHMARK NO. QE1501, LOCATED ALONG HWY 99E AND THE JUNCTION OF INTERSTATE HWY 205
ELEVATION = 81.25 FEET (NAVD 88).

SHEET INDEX

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD STE 100
TUALATIN, OR 97062
P: 503.563.6151
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aks-eng.com
ENGINEERING · SURVEYING · NATURAL RESOURCES
FORESTRY · PLANNING · LANDSCAPE ARCHITECTURE

KNOLLCREST SUBDIVISION
WEST LINN OREGON
TAX LOTS 100 & 200 CLACKAMAS COUNTY TAX MAP 2 1E 25CC

COVER SHEET

DESIGNED BY: CLR
DRAWN BY: JMH
CHECKED BY: MBH
SCALE: AS NOTED
DATE: 09/05/2017

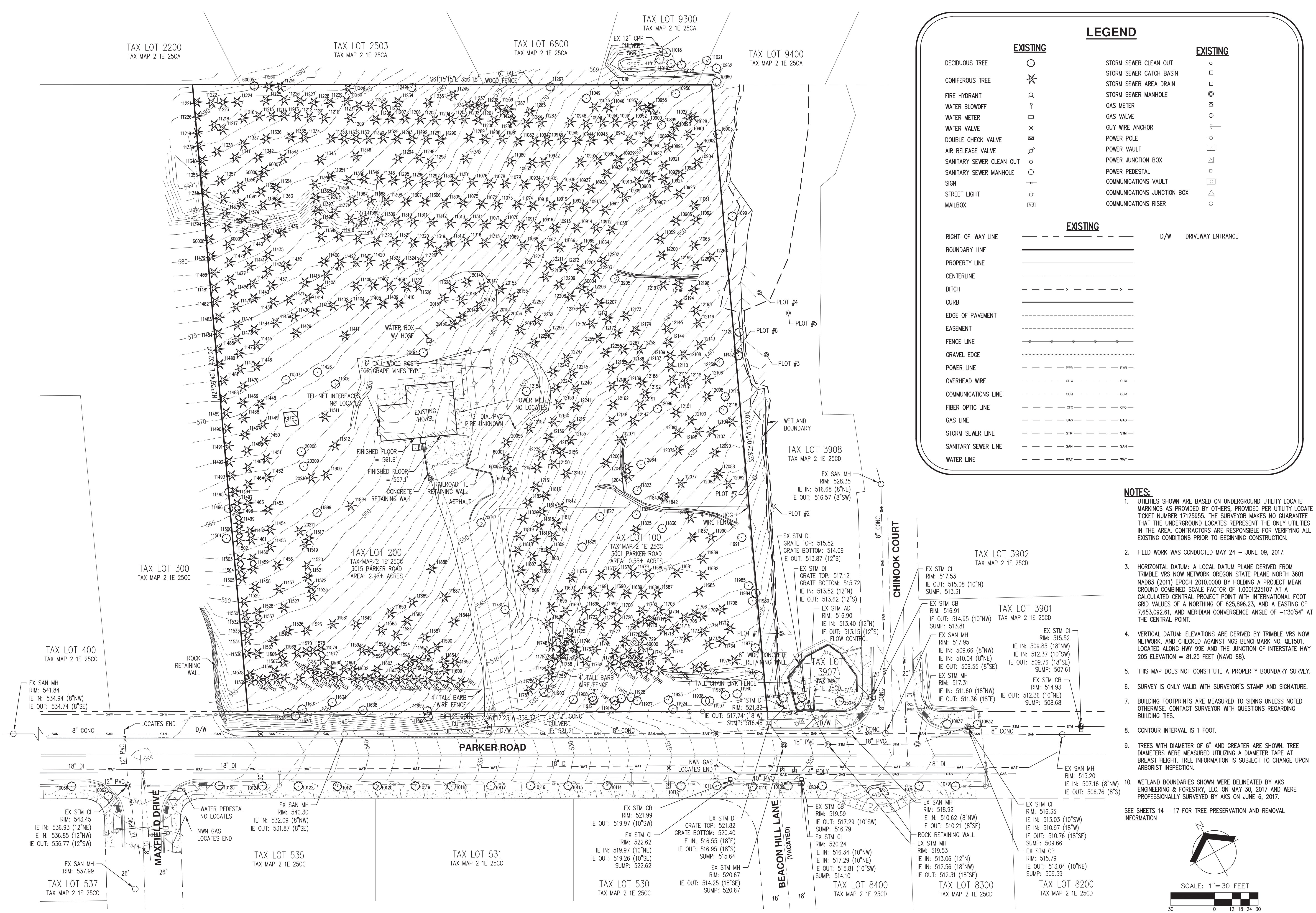
REGISTERED PROFESSIONAL ENGINEER
58542PE
OREGON
JULY 9, 2002
MONTGOMERY B. HURLEY
PRELIMINARY NOT FOR CONSTRUCTION
RENEWAL DATE: 6/30/19

REVISIONS

JOB NUMBER
5132

SHEET
01

AKS DRAWING FILE: 5132 COVER.DWG | LAYOUT: 01



NOTES:

1. UTILITIES SHOWN ARE BASED ON UNDERGROUND UTILITY LOCATE MARKINGS AS PROVIDED BY OTHERS, PROVIDED PER UTILITY LOCATE TICKET NUMBER 17125955. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND LOCATES REPRESENT THE ONLY UTILITIES IN THE AREA. CONTRACTORS ARE RESPONSIBLE FOR VERIFYING ALL EXISTING CONDITIONS PRIOR TO BEGINNING CONSTRUCTION.
2. FIELD WORK WAS CONDUCTED MAY 24 – JUNE 09, 2017.
3. HORIZONTAL DATUM: A LOCAL DATUM PLANE DERIVED FROM TRIMBLE VRS NOW NETWORK OREGON STATE PLANE NORTH 3601 NAD83 (2011) EPOCH 2010.0000 BY HOLDING A PROJECT MEAN GROUND COMBINED SCALE FACTOR OF 1.0001225107 AT A CALCULATED CENTRAL PROJECT POINT WITH INTERNATIONAL FOOT GRID VALUES OF A NORTHING OF 625,896.23, AND A EASTING OF 7,653,092.61, AND MERIDIAN CONVERGENCE ANGLE OF –1°30'54" AT THE CENTRAL POINT.
4. VERTICAL DATUM: ELEVATIONS ARE DERIVED BY TRIMBLE VRS NOW NETWORK, AND CHECKED AGAINST NGS BENCHMARK NO. QE1501, LOCATED ALONG HWY 99E AND THE JUNCTION OF INTERSTATE HWY 205 ELEVATION = 81.25 FEET (NAVD 88).
5. THIS MAP DOES NOT CONSTITUTE A PROPERTY BOUNDARY SURVEY.
6. SURVEY IS ONLY VALID WITH SURVEYOR'S STAMP AND SIGNATURE.
7. BUILDING FOOTPRINTS ARE MEASURED TO SIDING UNLESS NOTED OTHERWISE. CONTACT SURVEYOR WITH QUESTIONS REGARDING BUILDING TIES.
8. CONTOUR INTERVAL IS 1 FOOT.
9. TREES WITH DIAMETER OF 6" AND GREATER ARE SHOWN. TREE DIAMETERS WERE MEASURED UTILIZING A DIAMETER TAPE AT BREAST HEIGHT. TREE INFORMATION IS SUBJECT TO CHANGE UPON ARBORIST INSPECTION.
10. WETLAND BOUNDARIES SHOWN WERE DELINEATED BY AKS ENGINEERING & FORESTRY, LLC. ON MAY 30, 2017 AND WERE PROFESSIONALLY SURVEYED BY AKS ON JUNE 6, 2017.

SEE SHEETS 14 – 17 FOR TREE PRESERVATION AND REMOVAL INFORMATION

SCALE: 1"=30 FEET

30 0 12 18 24 30

AKS
AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD STE 100
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aks-eng.com
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FORESTRY · PLANNING · LANDSCAPE ARCHITECTURE

3015 PARKER ROAD

WEST LINN OREGON

TAX LOTS 100 & 200

CLACKAMAS COUNTY TAX MAP 2 1E 25CC

EXISTING CONDITIONS

DESIGNED BY:
DRAWN BY: ZJG
CHECKED BY: RDR
SCALE: AS NOTED
DATE: 6/27/2017

REGISTERED PROFESSIONAL LAND SURVEYOR
JANUARY 11, 2005
ROBERT D. RETTIG
60124LS
RENEWS: 12/31/18

REVISIONS

JOB NUMBER
5132

SHEET
02

AKS DRAWING FILE: 5132EXCOND.DWG | LAYOUT: 02

SLOPES TABLE

NUMBER	MIN SLOPE	MAX SLOPE	AREA (SQ FT)	ACRES	COLOR
1	0.00%	25.00%	142384.34	3.27	
2	25.01%	35.00%	6056.20	0.14	
3	35.01%	54506.39%	4914.87	0.11	

CONTOUR LEGEND

EXISTING GROUND CONTOUR (1 FT)
EXISTING GROUND CONTOUR (5 FT) ——575——

AKS
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FORESTRY · PLANNING · LANDSCAPE ARCHITECTURE

KNOLLCREST SUBDIVISION

WEST LINN OREGON
TAX LOTS 100 & 200 CLACKAMAS COUNTY TAX MAP 2 1E 25CC

PRELIMINARY SLOPE ANALYSIS

DESIGNED BY: CLR
DRAWN BY: JMH
CHECKED BY: MBH
SCALE: AS NOTED
DATE: 09/05/2017

REGISTERED PROFESSIONAL ENGINEER
OREGON
MONTGOMERY B. HURLEY
PRELIMINARY NOT FOR CONSTRUCTION
RENEWAL DATE: 6/30/19

REVISIONS

JOB NUMBER
5132

SHEET
03

AKS DRAWING FILE: 5132 SLOPE ANALYSIS.DWG | LAYOUT: 03

LEGEND

EXISTING GROUND CONTOUR (1 FT)		
EXISTING GROUND CONTOUR (5 FT)	600	
	CONIFEROUS	DECIDUOUS
EXISTING TREES TO BE PRESERVED		

DEMOLITION KEY NOTES

1. REMOVE EXISTING HOUSE. PROPERLY HAUL DEBRIS OFFSITE FOR DISPOSAL.
2. REMOVE SHED. PROPERLY HAUL DEBRIS OFFSITE FOR DISPOSAL.
3. REMOVE RETAINING WALL. PROPERLY HAUL DEBRIS OFFSITE FOR DISPOSAL.
4. REMOVE GRAPE ORCHARD.
5. REMOVE CONCRETE DECKING. PROPERLY HAUL DEBRIS OFFSITE FOR DISPOSAL.
6. REMOVE ASPHALT DRIVEWAY. PROPERLY HAUL DEBRIS OFFSITE FOR DISPOSAL.
7. REMOVE BARB WIRE FENCE.
8. REMOVE HOG WIRE FENCE.
9. REMOVE PVC PIPE.
10. REMOVE POWER METER.
11. REMOVE TEL NET INTERFACES.
12. REMOVE EXISTING CONCRETE CULVERT. PROPERLY HAUL DEBRIS OFFSITE FOR DISPOSAL.
13. REMOVE EXISTING MAILBOX.
14. REMOVE WATER BOX AND HOSE.
15. REMOVE/RELOCATE POWER POLE AND OVERHEAD WIRES. CONTRACTOR SHALL COORDINATE WITH THE UTILITY PROVIDERS.

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KNOLLCREST SUBDIVISION

WEST LINN OREGON

TAX LOTS 100 & 200 CLACKAMAS COUNTY TAX MAP 2 1E 25CC

PRELIMINARY DEMOLITION PLAN

DESIGNED BY:	CLR
DRAWN BY:	JMH
CHECKED BY:	MBH
SCALE:	AS NOTED
DATE: 09/05/2017	

REGISTERED PROFESSIONAL ENGINEER OREGON MONTGOMERY B. HURLEY
RENEWAL DATE: 6/30/19

REVISIONS

JOB NUMBER 5132

SHEET 04

AKS DRAWING FILE: 5132 TREES AND DEMO.DWG | LAYOUT: 04

CURVE TABLE				
CURVE	RADIUS	DELTA	LENGTH	CHORD
C1	13.00'	90°00'00"	20.42'	S73°42'37"W 18.38'
C2	13.00'	90°00'00"	20.42'	S16°17'23"E 18.38'
C3	13.00'	42°07'37"	9.56'	N82°21'11"W 9.34'
C4	51.50'	39°09'33"	35.20'	N83°50'13"W 34.52'
C5	51.50'	39°02'28"	35.09'	N44°44'13"W 34.42'
C6	51.50'	16°53'51"	15.19'	N16°46'04"W 15.13'
C7	51.50'	39°04'20"	35.12'	N11°13'02"E 34.44'
C8	51.50'	40°05'03"	36.03'	N50°47'43"E 35.30'
C9	13.00'	42°07'39"	9.56'	N49°46'25"E 9.34'
C10	13.00'	90°00'00"	20.42'	N16°17'23"W 18.38'

DEERHILL LANE/ ROXBURY DRIVE							
CURVE/TANGENT	BEGIN STATION	RADIUS	LENGTH	DELTA	CHORD	TANGENT/CHORD BEARING	END STATION
L1	8+58.50		407.50'			N28°42'37"E	12+66.00
C11	12+66.00	37.00'	58.12'	90°00'00"	52.33	N16°17'23"W	
L2	13+24.12		310.12'			N61°17'23"W	16+34.24

R-10 ZONE BUILDING SETBACKS

- 20.00' FRONT YARD SETBACK
- 20.00' REAR YARD SETBACK
- 7.50' SIDE YARD SETBACK
- 15.00' STREET SIDE YARD SETBACK

THE PURPOSE OF THIS PRELIMINARY PLAT IS TO SHOW THE LOT DIMENSIONS FOR PLANNING PURPOSES. THIS IS NOT A FINAL PLAT AND IS NOT TO BE USED FOR SURVEYING PURPOSES.

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KNOLLCREST SUBDIVISION

WEST LINN OREGON

TAX LOTS 100 & 200 CLACKAMAS COUNTY TAX MAP 2 1E 25CC

PRELIMINARY SUBDIVISION PLAT WITH BUILDING SETBACKS

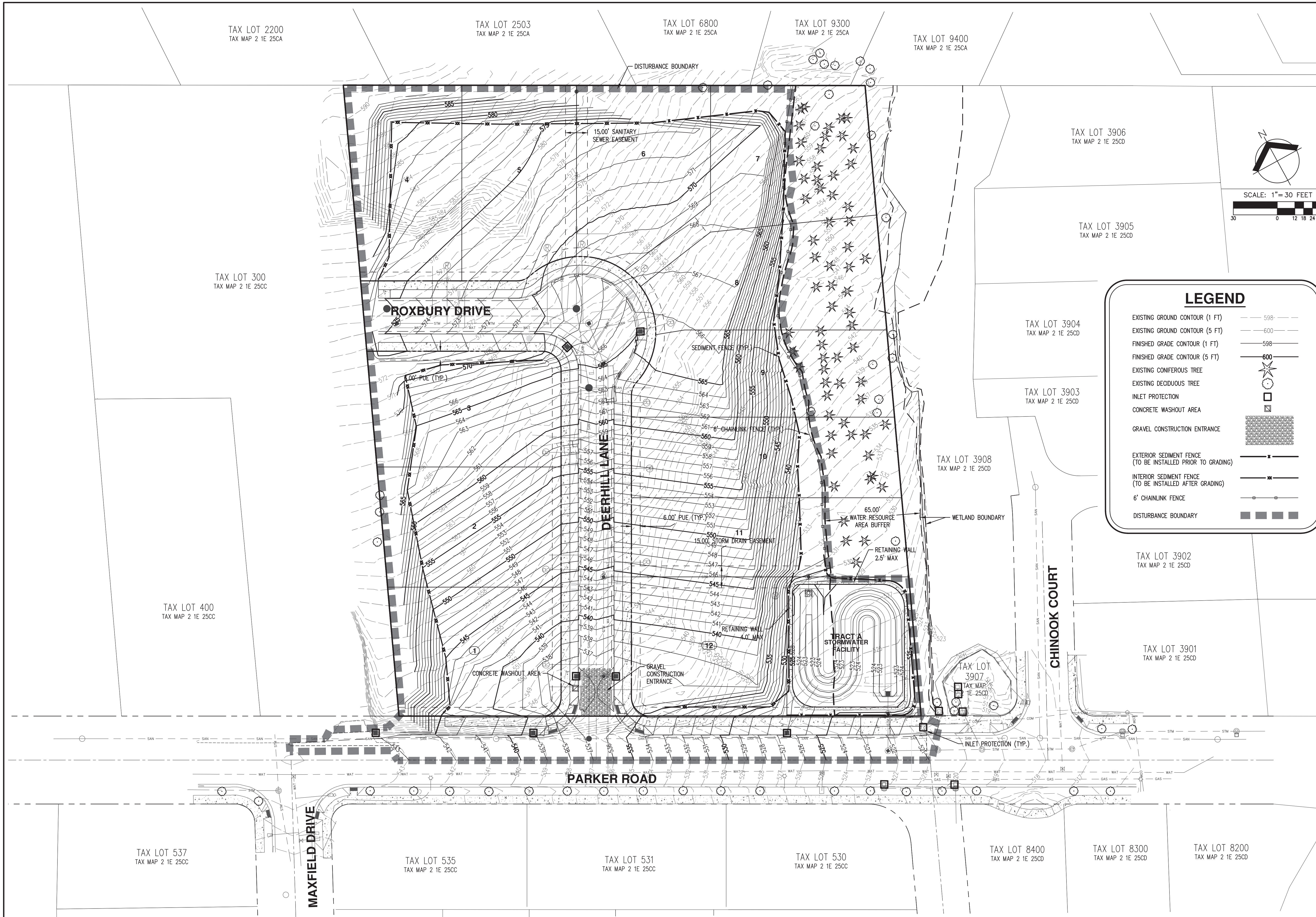
DESIGNED BY: CLR
DRAWN BY: JMH
CHECKED BY: MBH
SCALE: AS NOTED
DATE: 09/05/2017

REGISTERED PROFESSIONAL LAND SURVEYOR
PRELIMINARY NOT FOR CONSTRUCTION
OREGON
MONTGOMERY B. HURLEY
RENEWAL DATE: 6/30/19

REVISIONS

JOB NUMBER
5132

SHEET
05



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KNOLLCREST SUBDIVISION

WEST LINN OREGON

TAX LOTS 100 & 200 CLACKAMAS COUNTY TAX MAP 2 1E 25CC

PRELIMINARY GRADING AND EROSION AND SEDIMENT CONTROL PLAN

DESIGNED BY: CLR
DRAWN BY: JMH
CHECKED BY: MBH
SCALE: AS NOTED
DATE: 09/05/2017

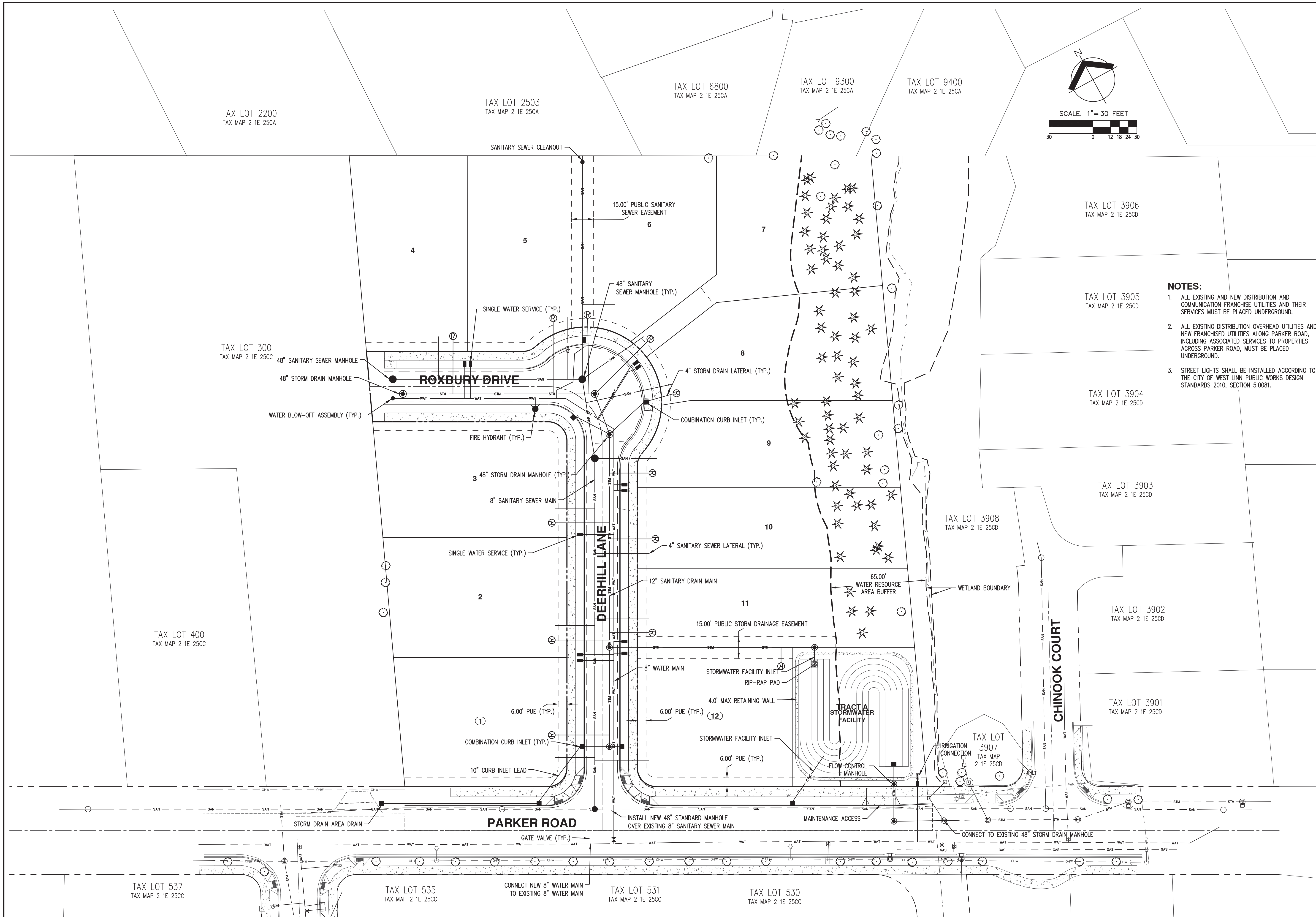
REGISTERED PROFESSIONAL ENGINEER
OREGON
MONTGOMERY B. HURLEY
RENEWAL DATE: 6/30/19

REVISIONS

JOB NUMBER
5132

SHEET
06

AKS DRAWING FILE: 5132 GRADING ESC.DWG | LAYOUT: 06



NOTES:

1. ALL EXISTING AND NEW DISTRIBUTION AND COMMUNICATION FRANCHISE UTILITIES AND THEIR SERVICES MUST BE PLACED UNDERGROUND.
2. ALL EXISTING DISTRIBUTION OVERHEAD UTILITIES AND NEW FRANCHISED UTILITIES ALONG PARKER ROAD, INCLUDING ASSOCIATED SERVICES TO PROPERTIES ACROSS PARKER ROAD, MUST BE PLACED UNDERGROUND.
3. STREET LIGHTS SHALL BE INSTALLED ACCORDING TO THE CITY OF WEST LINN PUBLIC WORKS DESIGN STANDARDS 2010, SECTION 5.0081.

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WEST LINN OREGON

TAX LOTS 100 & 200 CLACKAMAS COUNTY TAX MAP 2 1E 25CC

PRELIMINARY COMPOSITE UTILITY PLAN

DESIGNED BY:	CLR
DRAWN BY:	JMH
CHECKED BY:	MBH
SCALE:	AS NOTED
DATE: 09/05/2017	

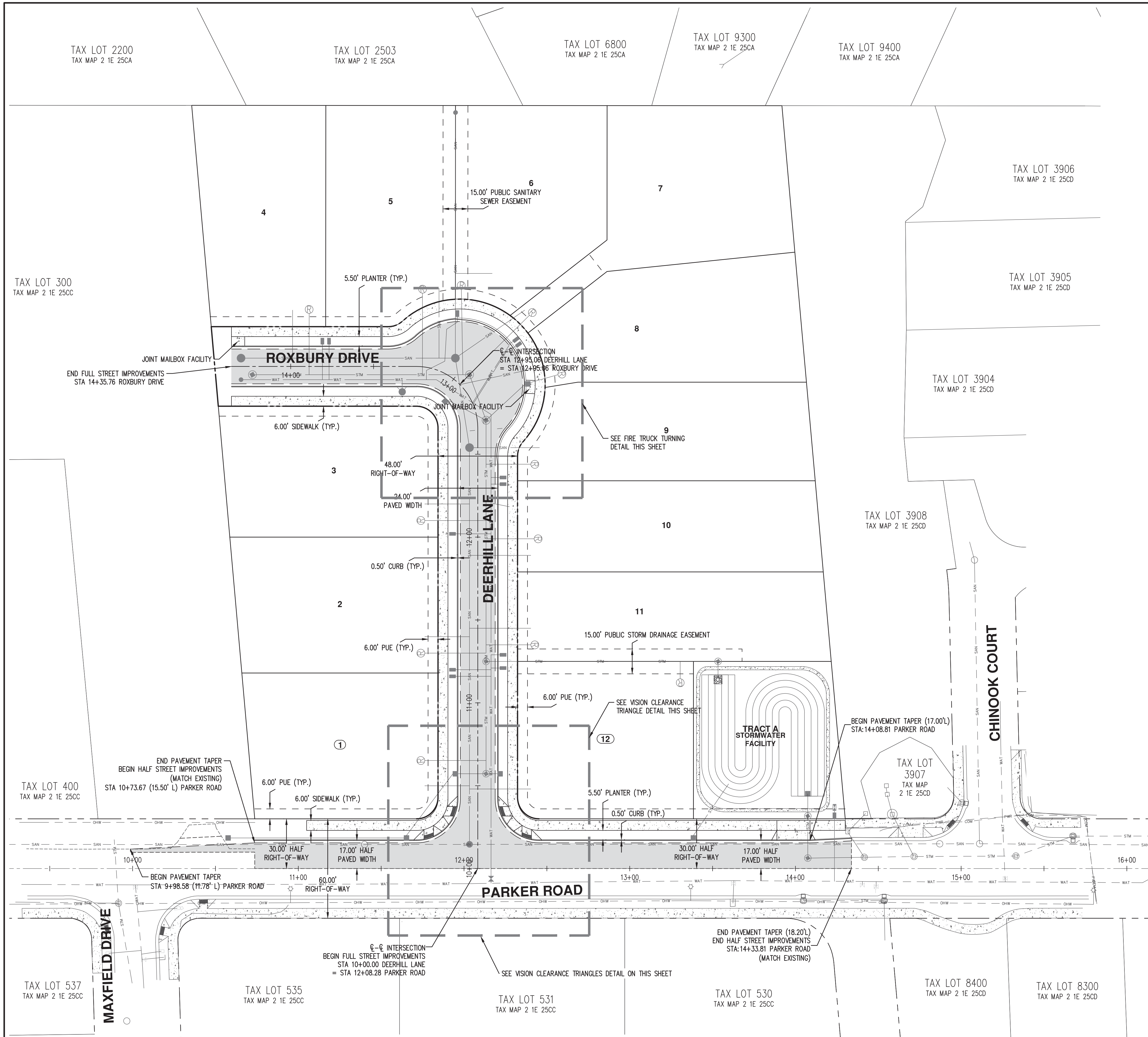
RENEWAL DATE: 6/30/19

REVISIONS

JOB NUMBER
5132

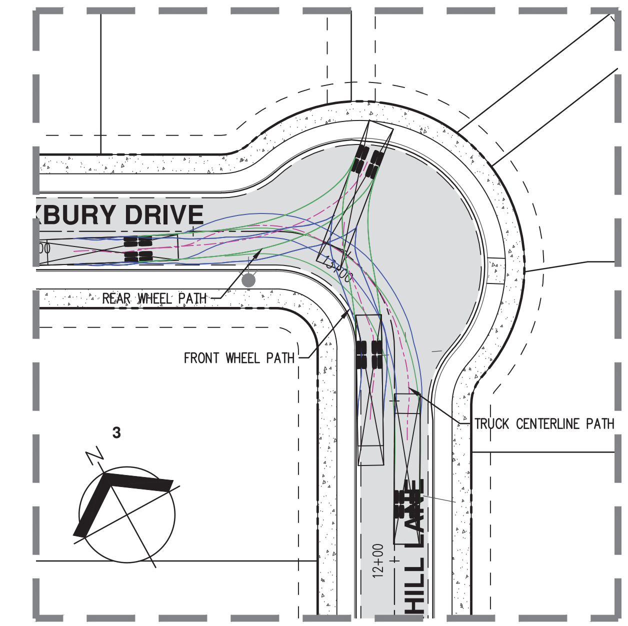
SHEET
07

AKS DRAWING FILE: 5132 COMP UTIL.DWG | LAYOUT: 07



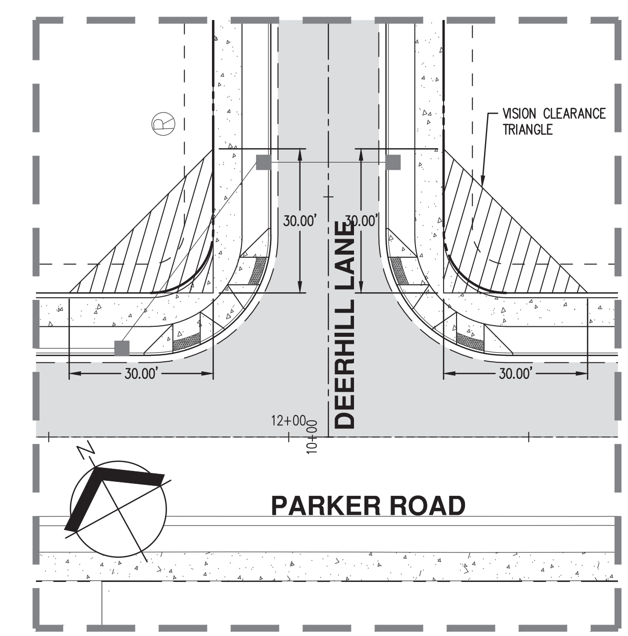
FIRE TRUCK TURNING DETAIL

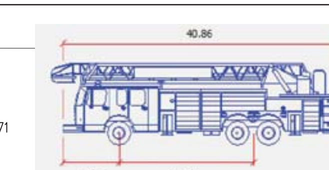
SCALE: 1" = 30'



VISION CLEARANCE TRIANGLE DETAIL

SCALE: 1" = 20'





FIRE TRUCK AND LADDER

SCALE: 1"=30 FEET

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WEST LINN OREGON

TAX LOTS 100 & 200 CLACKAMAS COUNTY TAX MAP 2 1E 25CC

PRELIMINARY STREET PLAN

DESIGNED BY:	CLR
DRAWN BY:	JMH
CHECKED BY:	MBH
SCALE:	AS NOTED

DATE: 09/05/2017

REGISTERED PROFESSIONAL ENGINEER OREGON MONTGOMERY B. HURLEY

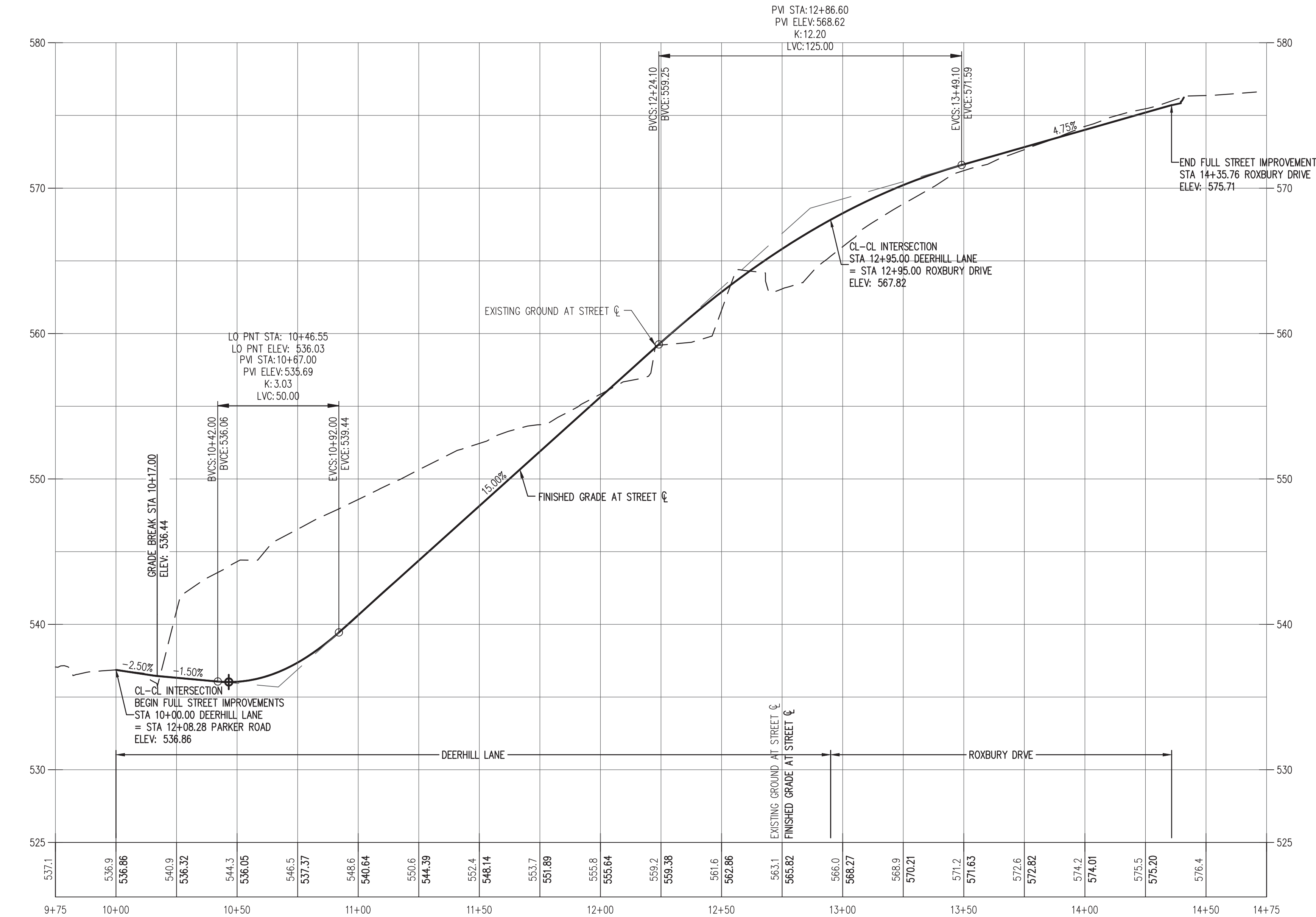
RENEWAL DATE: 6/30/19

REVISIONS

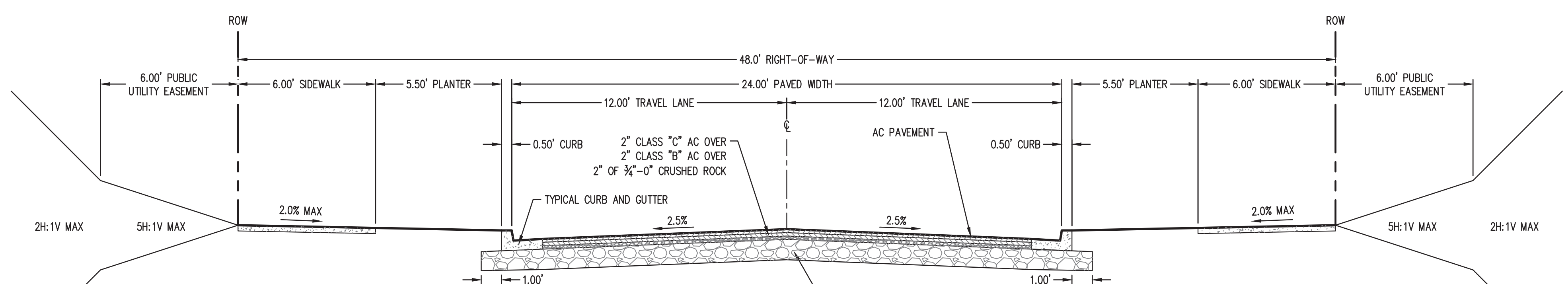
JOB NUMBER 5132

SHEET 08

AKS DRAWING FILE: 5132 STREET.DWG | LAYOUT: 08



DEERHILL LANE/ ROXBURY DRIVE
Hor. Scale: 1"= 30'
Vert. Scale: 1"= 5'



DEERHILL LANE/ ROXBURY DRIVE CROSS SECTION

STA 10+00.00 TO STA 14+35.76
NOT TO SCALE

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KNOLLCREST SUBDIVISION

WEST LINN OREGON
TAX LOTS 100 & 200 CLACKAMAS COUNTY TAX MAP 2 1E 25CC

PRELIMINARY DEERHILL LANE AND ROXBURY DRIVE PLAN & CROSS SECTION

DESIGNED BY:	CLR
DRAWN BY:	JMH
CHECKED BY:	MBH
SCALE:	AS NOTED

DATE: 09/05/2017

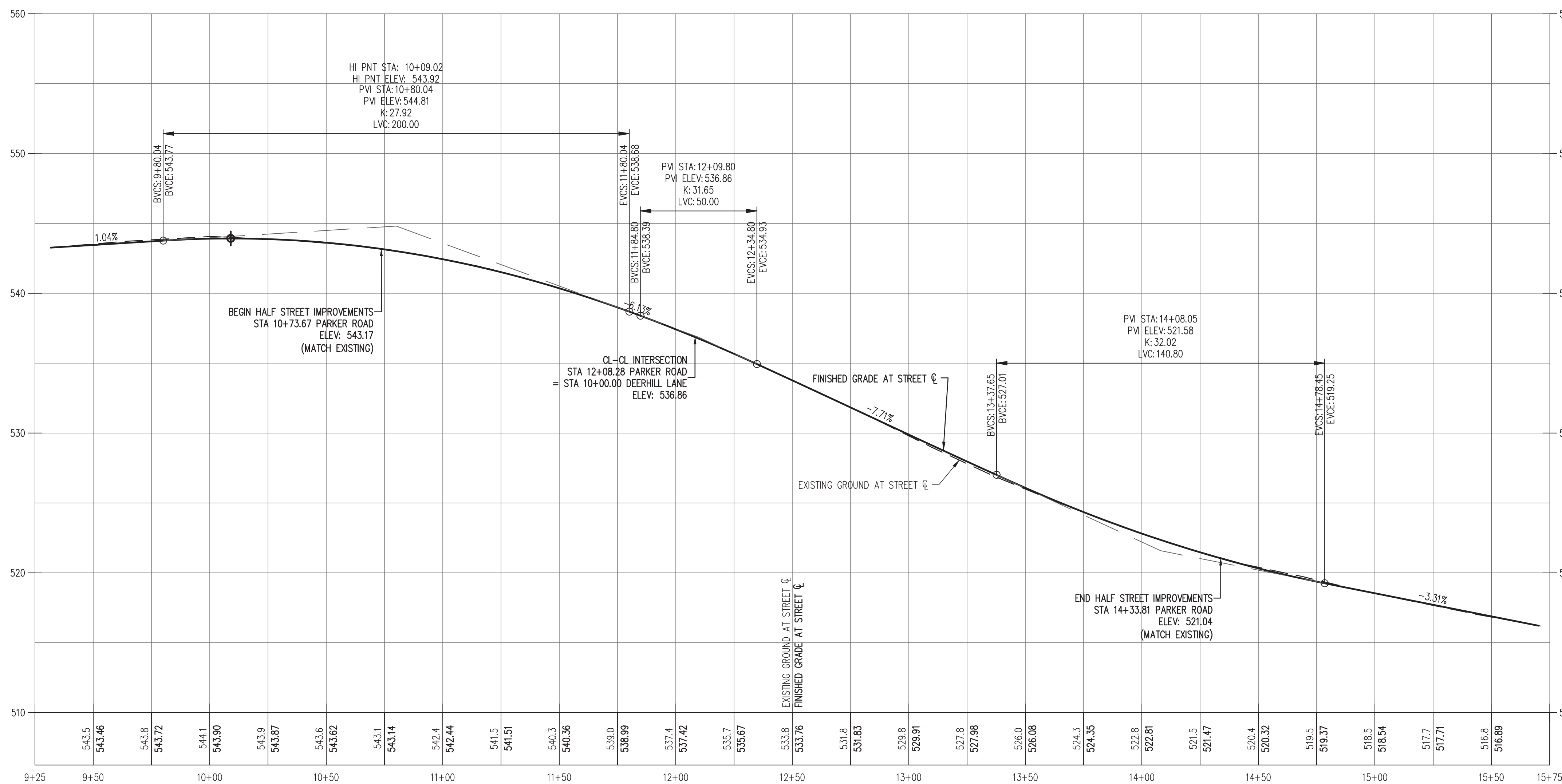
REGISTERED PROFESSIONAL ENGINEER
OREGON
MONTGOMERY B. HURLEY
PRELIMINARY NOT FOR CONSTRUCTION
RENEWAL DATE: 6/30/19

REVISIONS

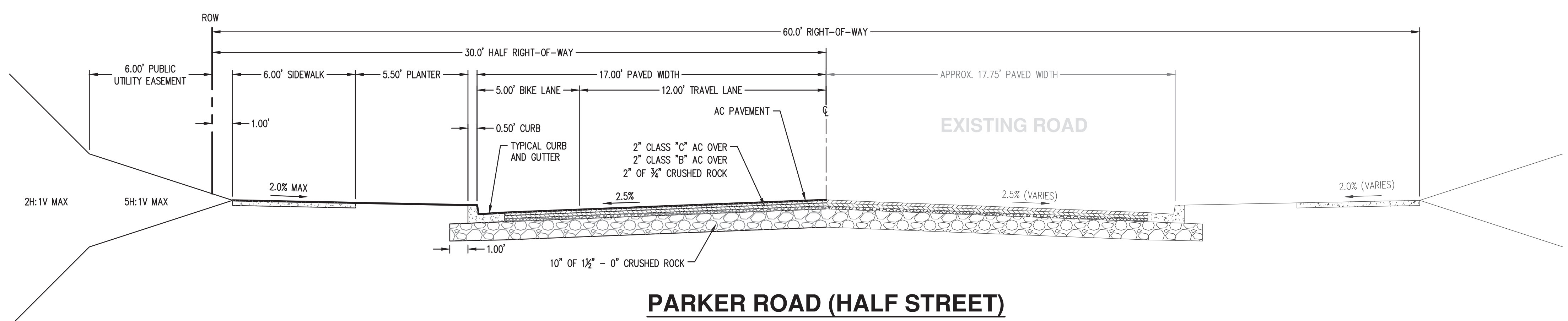
JOB NUMBER
5132

SHEET
09

AKS DRAWING FILE: 5132 STREET PROFILES.DWG | LAYOUT: 09



PARKER ROAD
Hor. Scale: 1"= 30'
Vert. Scale: 1"= 5'



PARKER ROAD (HALF STREET) CROSS SECTION

STA 10+73.67 TO STA 14+30.04
NOT TO SCALE

NOTE: STA 11+71.28 TO STA 12+45.28: INTERSECTION OF PARKER ROAD AND DEERHILL LANE

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WEST LINN OREGON

TAX LOTS 100 & 200 CLACKAMAS COUNTY TAX MAP 2 1E 25CC

PRELIMINARY PARKER ROAD PROFILE AND CROSS SECTION

DESIGNED BY: CLR
DRAWN BY: JMH
CHECKED BY: MBH
SCALE: AS NOTED
DATE: 09/05/2017

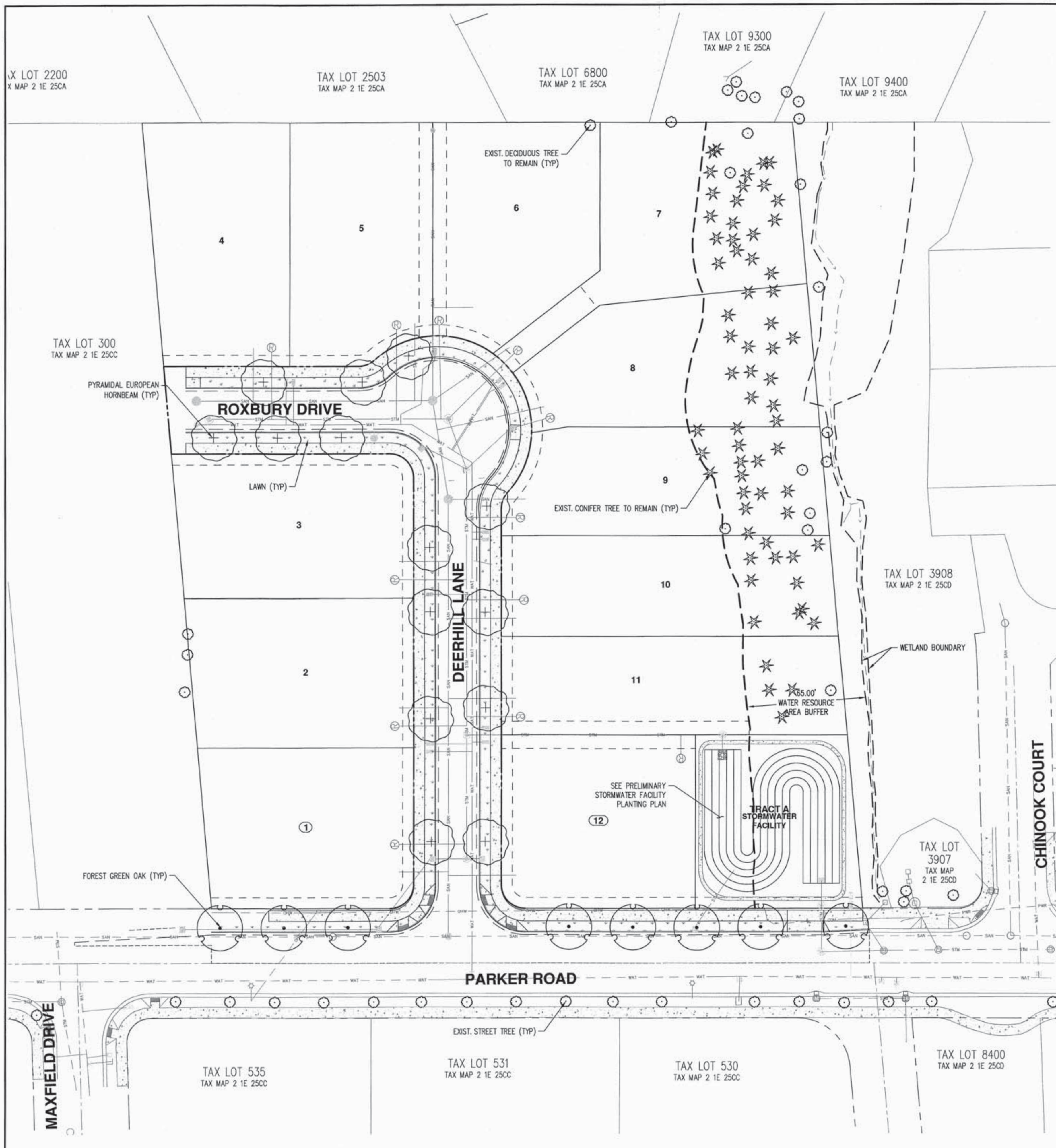
RENEWAL DATE: 6/30/19

REVISIONS

JOB NUMBER
5132

SHEET
10

AKS DRAWING FILE: 5132 STREET PROFILES.DWG | LAYOUT: 10



PLANT SCHEDULE

STREET TREES	QTY	BOTANICAL NAME	COMMON NAME	SIZE/CONTAINER	SPACING
	14	CARPINUS BETULUS 'FASTIGIATA'	PYRAMIDAL EUROPEAN HORNBEAN	2" CAL. B&B	AS SHOWN
	8	QUERCUS FRAINETTO 'FOREST GREEN'	FOREST GREEN OAK	2" CAL. B&B	AS SHOWN

GROUND COVERS	DESCRIPTION
	NORTHWEST SUPREME LAWN MIX – SUNMARK SEEDS (OR APPROVED EQUAL) 35% LOLIUM PERENNE V. DASHER 3, 35% LOLIUM PERENNE V. CUTTER II, 15% FESTUCA RUBRA V. GARNET, 15% FESTUCA RUBRA V WINDWARD APPLY AT A RATE OF 8 LBS PER 1,000 SQ FT OR AS RECOMMENDED BY SUPPLIER.

NOTES:

1. LANDSCAPING PLAN IS CONCEPTUAL AND INTENDED TO PORTRAY DESIGN INTENT. CHANGES TO MAY BE MADE PRIOR TO FINAL SUBMITTAL BASED ON FINAL SITE LAYOUT, DRIVEWAY AND UTILITY LOCATIONS, LIGHT POLES, SITE CONDITIONS, AVAILABILITY, ETC.
2. TREE PLANTINGS SHALL CONFORM TO APPLICABLE CITY OF WEST LINN STANDARDS, IN KEEPING WITH THE CITY'S STREET TREE PLAN FOR THE AREA, AND IN ACCORDANCE WITH THE PLANTING SPECIFICATIONS OF THE PARKS AND RECREATION DEPARTMENT. ALL TREES SHALL BE PLANTED DURING THE FIRST PLANTING SEASON AFTER OCCUPANCY.

SCALE: 1"=30 FEET

30 0 12 18 24 30

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KNOLLCREST SUBDIVISION

WEST LINN OREGON

TAX LOTS 100 & 200 CLACKAMAS COUNTY TAX MAP 2 1E 25CC

PRELIMINARY STREET TREE PLAN

DESIGNED BY: NKP
DRAWN BY: NKP
CHECKED BY: KAH
SCALE: AS NOTED
DATE: 09/05/2017

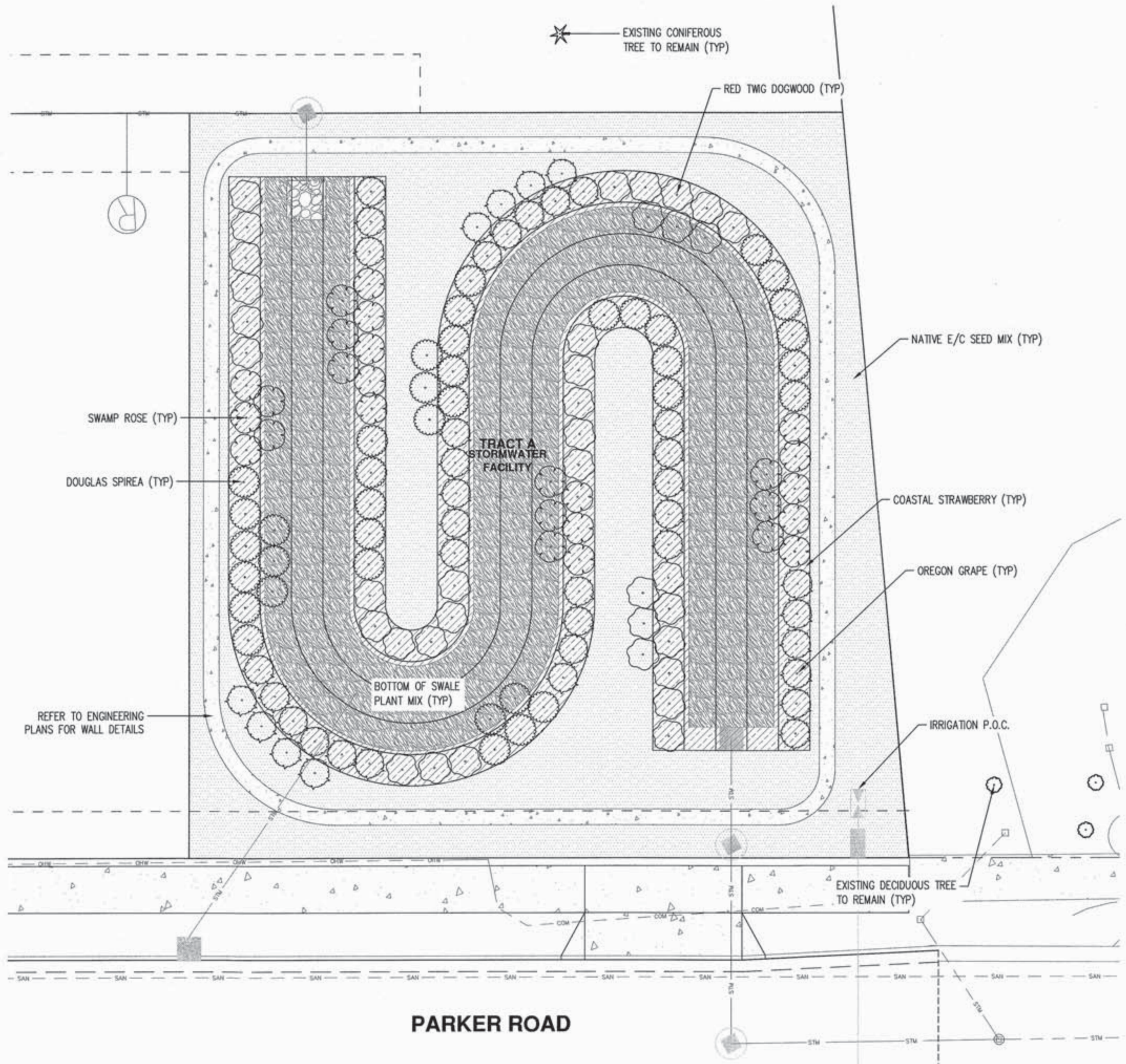
REGISTERED LANDSCAPE ARCHITECT
KIRSTI A. HAUSWALD
OREGON

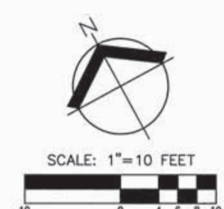
REVISIONS

JOB NUMBER 5132

SHEET 11

AKS DRAWING FILE: 5132 STREET TREES.DWG | LAYOUT: 11





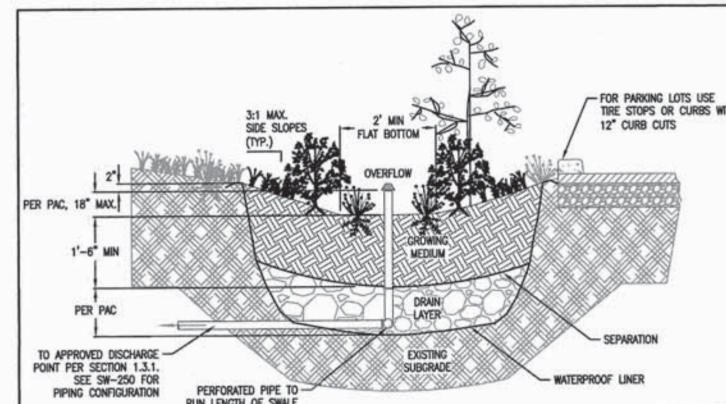
PLANT SCHEDULE

SHRUBS	QTY	BOTANICAL NAME	COMMON NAME	SIZE/CONTAINER	SPACING
	37	CORNUS SERICEA	RED TWIG DOGWOOD	1 GAL CONT.	AS SHOWN
	42	MAHONIA AQUIFOLIUM	OREGON GRAPE	1 GAL CONT.	AS SHOWN
	27	ROSA PISOCARPA	SWAMP ROSE	1 GAL CONT.	AS SHOWN
	38	SPIRAEA DOUGLASII	WESTERN SPIREA	1 GAL CONT.	AS SHOWN

GROUND COVERS	QTY	BOTANICAL NAME	COMMON NAME	SIZE/CONTAINER	SPACING
	1,439	FRAGARIA CHILOENSIS	COASTAL STRAWBERRY	1 GAL. CONT.	12" o.c.
	2,356 SF±	BOTTOM OF SWALE PLANT MIX (INSTALL 1.25' ON CENTER, GROUPED IN NATURAL LOOKING MASSES OF SAME SPECIES, MINIMUM OF 7 PLANTS PER GROUPING): 629 CAREX OBNUPTA/SLOUGH SEDGE, MIN. 1 GALLON CONTAINER, PLANTED AT 1.25' O.C. 628 JUNCUS PATENS/SPREADING RUSH, 1 GALLON CONTAINER, PLANTED AT 1.25' O.C. 628 SCIRPUS MICROCARPUS/SMALL-FRUITED BULRUSH, 1 GALLON CONTAINER, PLANTED AT 1.25' O.C. 1,885 PLANTS TOTAL			
	3,274 SF	NATIVE E/C SEED MIX (OR APPROVED EQUAL) – SUNMARK SEEDS MEADOW BARLEY (40%); CALIFORNIA BROME (35%); NATIVE RED FESCUE (15%); TUFTED HAIRGRASS (3%); SPIKE BENTGRASS (2%); SKY LUPINE (5%) APPLY AT A RATE OF 1 LB./1,000 SF OR AS RECOMMENDED BY SUPPLIER. APPLY ECOLIVE ORGANICS FROM SUNMARK SEEDS IN ADDITION TO THE NATIVE E/C SEED MIX AT A RATE OF 1.5 LBS./1,000 SF.			

NOTES:

1. STORMWATER FACILITY PLANTING PLAN IS CONCEPTUAL AND INTENDED TO PORTRAY DESIGN INTENT. CHANGES MAY BE MADE PRIOR TO FINAL SUBMITTAL BASED ON FINAL SITE LAYOUT, AVAILABILITY, ETC.
2. STORMWATER PLANTINGS SHALL CONFORM TO APPLICABLE CITY OF WEST LINN STANDARDS.



NOTES:

1. Detail intended as an example. Detail must match PAC assumptions and/or design report.
2. Dimensions:
   Width of swale: 6'-6" minimum
   Depth of swale (from top of growing medium to overflow elevation): per PAC
   Longitudinal slope of swale: 6.0% or less.
   Flat bottom width: 2' minimum.
   Side slopes of swale: per PAC, 3:1 maximum.
3. Setbacks:
   None required.
4. Overflow:
   Swales must connect to approved discharge point according to SWMM Section 1.3.1.
   Inlet elevation must allow for 2" of freeboard, minimum.
   Protect from debris and sediment with strainer or grate.
5. Piping must be ABS Sch.40, cast iron, or PVS Sch.40. 3" pipe required for facilities draining up to 1500 s.f., otherwise 4" min. pipe. Piping must have 1% grade and follow the Uniform Plumbing Code.
6. Drain Layer:
   Determined by designer. Options include, but are not limited to drain mat, 3/4" washed round rock, or other approved system.
   Separation between drain and growing medium:
   Use appropriate filter fabric or a gravel lens (3/4 – 1/4 inch washed, rock 2 to 3 inches deep), or as per approved design.
7. Growing Medium:
   18" minimum depth. Use sand/loam/compost 3-way mix, or approved mix that will support healthy plants.
   24" minimum depth is required if the lined facility is also meeting BDS landscape requirements.
8. Vegetation: Follow landscape plans otherwise refer to plant list in SWMM, Section 2.4.1. Minimum container size is #1 container. # of plantings per 100sf of facility area:
   Zone A (wet): 80 herbaceous plants OR 72 herbaceous plants and 4 small shrubs.
   Zone B (moderate to dry): 7 large or small shrubs AND 70 groundcover plants.
   The delineation between Zone A and B must be either at the outlet elevation or the check dam elevation, whichever is lowest.
   If project area is over 200 sf consider adding a tree.
9. Check Dams: Must be placed per PAC and be equal to the width of the swale.
10. Waterproof Liner: 30 mil EPDM, HDPE or approved equivalent.
11. Splash Block: Install 4-6" washed river rock or splash pad for erosion control at inlets and downspout.
12. Inspections: Call BDS IVR Inspection Line, (503) 823-7000, request 487. 3 inspections required.

– DRAWING NOT TO SCALE –

STORMWATER MANAGEMENT TYPICAL DETAILS

– Presumptive and Performance Design Approach –

Swale – lined

Bureau of Environmental Services

NUMBER SW-220 7-1-16

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KNOLLCREST SUBDIVISION

WEST LINN OREGON

TAX LOTS 100 & 200 CLACKAMAS COUNTY TAX MAP 2 1E 25CC

PRELIMINARY STORMWATER FACILITY PLANTING PLAN

DESIGNED BY:	NKP
DRAWN BY:	NKP
CHECKED BY:	KAH
SCALE:	AS NOTED
DATE: 09/05/2017	

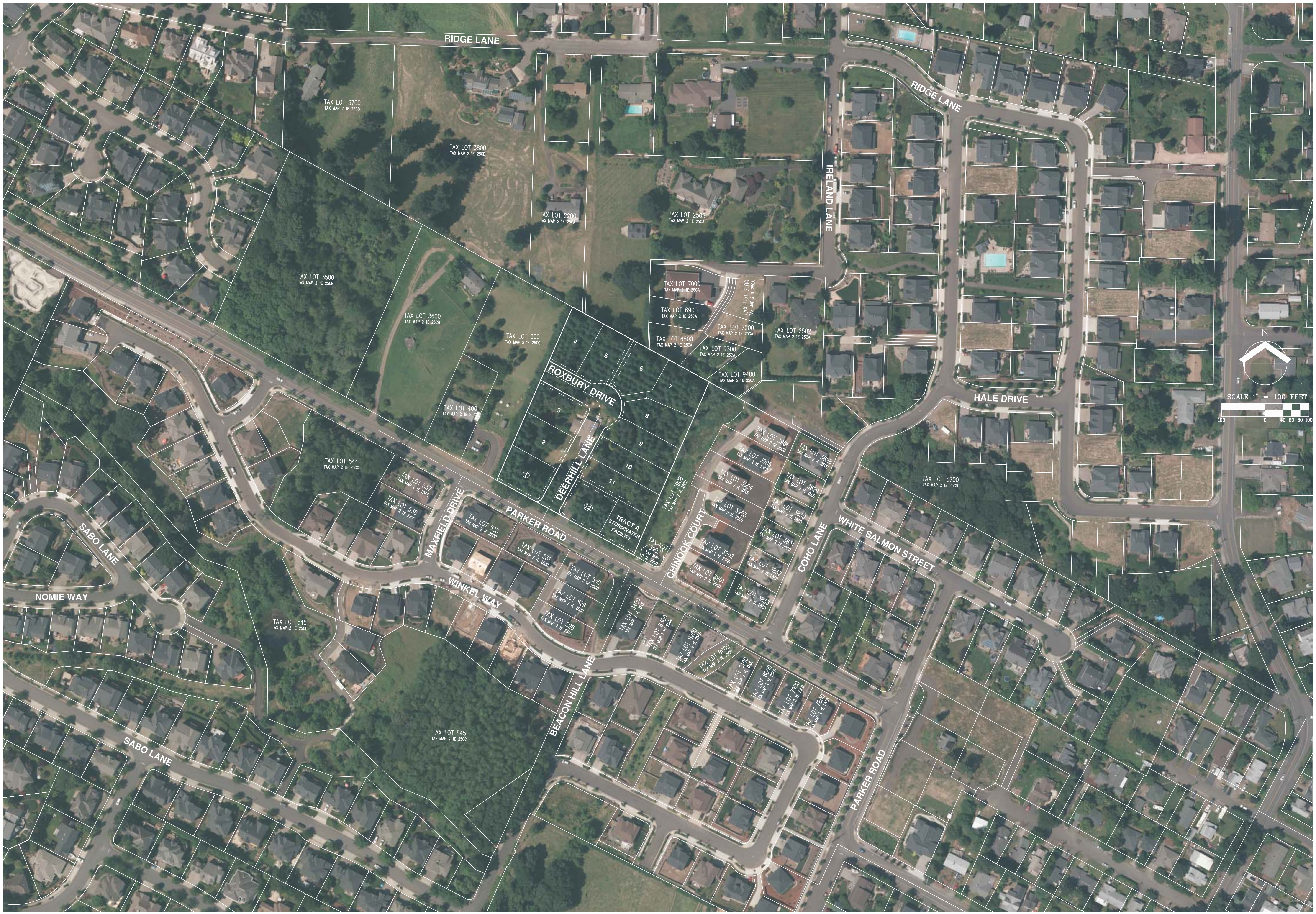
REGISTERED LANDSCAPE ARCHITECT KIRSTI A. HAUSWALD OREGON

REVISIONS

JOB NUMBER 5132

SHEET 12

AKS DRAWING FILE: 5132 STORMWATER FACILITY PLANTING.DWG | LAYOUT: 12



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KNOLLCREST SUBDIVISION

WEST LINN
OREGON
TAX LOTS 100 & 200
CLACKAMAS COUNTY TAX MAP 2 1E 25CC

PRELIMINARY AERIAL PHOTOGRAPH PLAN

DESIGNED BY:	CLR
DRAWN BY:	JMH
CHECKED BY:	MBH
SCALE:	AS NOTED
DATE: 09/05/2017	

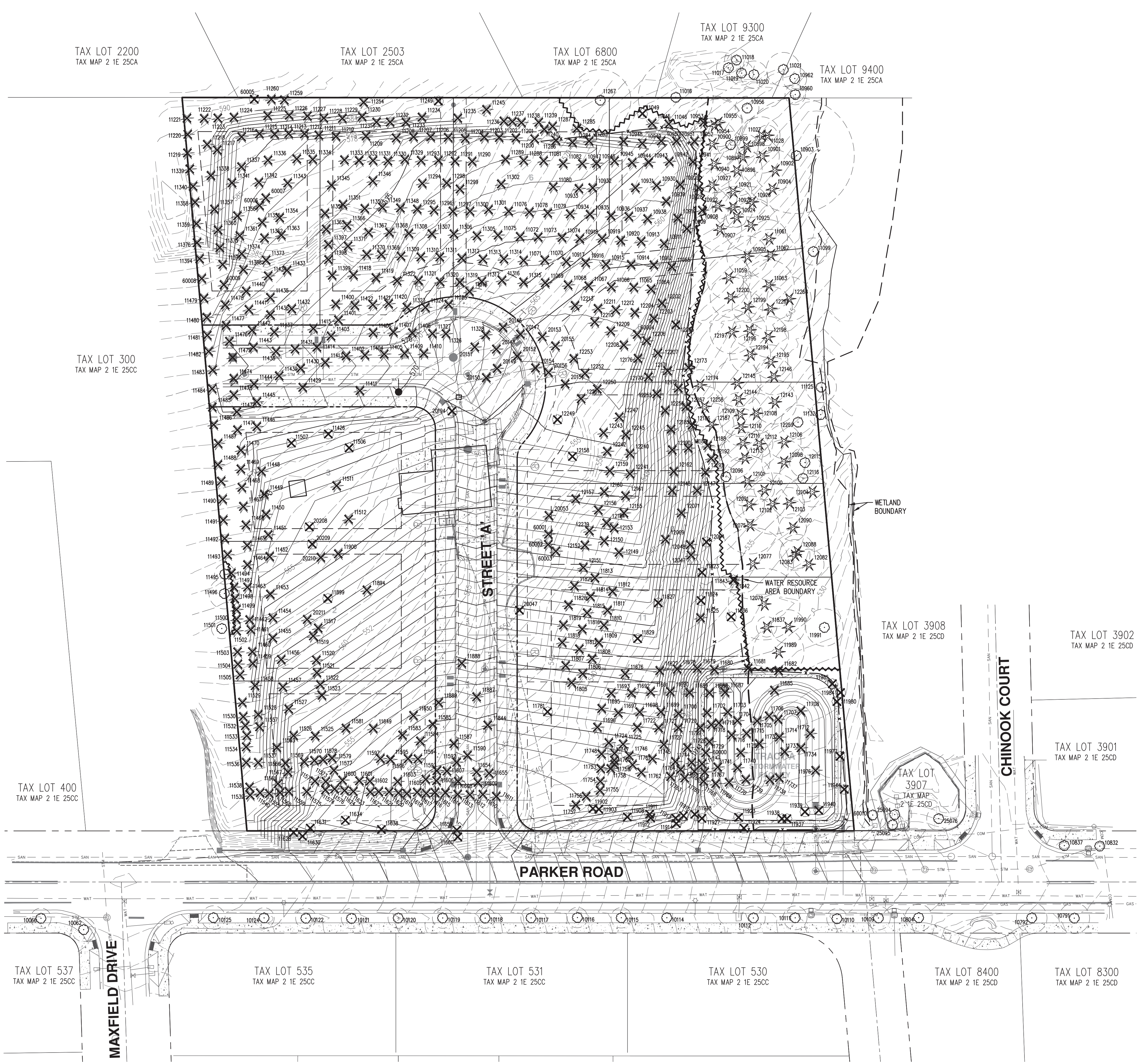
REGISTERED PROFESSIONAL ENGINEER
OREGON
MONTGOMERY B. HURLEY
RENEWAL DATE: 6/30/19

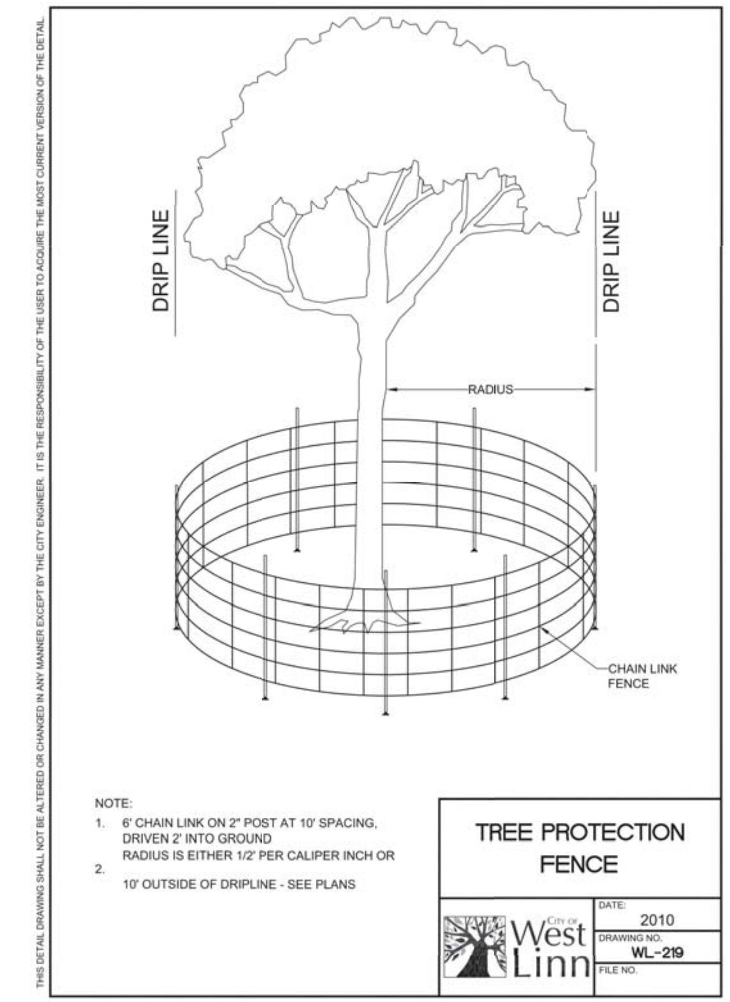
REVISIONS

JOB NUMBER
5132

SHEET
13

AKS DRAWING FILE: 5132 AERIAL PLAN.DWG | LAYOUT: 13





TREE PROTECTION FENCE NOTE:

TREE PROTECTION FENCE TO BE INSTALLED AS SHOWN ON THE PLANS. TREE PROTECTION FENCE IS SHOWN TO BE INSTALLED WITHIN THE ASSUMED DRIP LINE OF SOME TREES TO BE PRESERVED; HOWEVER, TREE PROTECTION FENCING LOCATIONS HAVE BEEN REVIEWED BY A CERTIFIED ARBORIST, AND THE TREE PROTECTION FENCING AS SHOWN SHOULD PROVIDE ADEQUATE PROTECTION FOR TREES TO BE PRESERVED BASED ON PROPOSED ADJACENT IMPACTS.

LEGEND

EXISTING GROUND CONTOUR (1 FT)	549
EXISTING GROUND CONTOUR (5 FT)	550
FINISHED GRADE CONTOUR (1 FT)	549
FINISHED GRADE CONTOUR (5 FT)	550
EXISTING CONIFEROUS TREE	
EXISTING DECIDUOUS TREE	
TREE REMOVAL	
TREE PROTECTION FENCE (TREE PROTECTION AREA)	
SEDIMENT FENCE	
ASSUMED DRIP LINE (1-FT RADIUS PER 1-IN OF DBH)	

PRELIMINARY

CERTIFIED ARBORIST

BRUCE R. BALDWIN
CERTIFICATE NUMBER: PN-6666A
EXPIRATION DATE: 12/31/17

N

SCALE: 1"= 30 FEET

30 0 12 18 24 30

AKS

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD STE 100
TUALATIN, OR 97062
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KNOLLCREST SUBDIVISION

WEST LINN OREGON

TAX LOTS 100 & 200 CLACKAMAS COUNTY TAX MAP 2 1E 25CC

PRELIMINARY TREE PRESERVATION AND REMOVAL PLAN

DESIGNED BY:	CLR
DRAWN BY:	JMH
CHECKED BY:	MBH
SCALE:	AS NOTED
DATE: 09/05/2017	

REGISTERED PROFESSIONAL ENGINEER
OREGON
MONTGOMERY B. HURLEY
RENEWAL DATE: 6/30/19

REVISIONS

JOB NUMBER
5132

SHEET
14

AKS DRAWING FILE: 5132 TREE.DWG | LAYOUT: 14

Detailed Tree Inventory for Knollcrest Subdivision

AKS Job No. 5132

Tree #	DBH (in.)	Equivalent DBH (in.)[1]	Tree Species Common Name (*Scientific name*)	Comments	Health Rating*	Structure Rating**	Exempt Tree***	Remove / Preserve
10062	7	7	Maple (*Acer sp.*)	**OFFSITE**	1	1	Yes (A)	Preserve
10066	6	6	Maple (*Acer sp.*)	**OFFSITE**	1	1	Yes (A)	Preserve
10109	7	7	Maple (*Acer sp.*)	**OFFSITE**	1	1	Yes (A)	Preserve
10110	6	6	Maple (*Acer sp.*)	**OFFSITE**	1	1	Yes (A)	Preserve
10111	7	7	Maple (*Acer sp.*)	**OFFSITE**	1	1	Yes (A)	Preserve
10112	7	7	Maple (*Acer sp.*)	**OFFSITE**	1	1	Yes (A)	Preserve
10114	3	3	Maple (*Acer sp.*)	**OFFSITE**	1	1	Yes (A)	Preserve
10115	6	6	Maple (*Acer sp.*)	**OFFSITE**	1	1	Yes (A)	Preserve
10116	6	6	Maple (*Acer sp.*)	**OFFSITE**	1	1	Yes (A)	Preserve
10117	6	6	Maple (*Acer sp.*)	**OFFSITE**	1	1	Yes (A)	Preserve
10118	6	6	Maple (*Acer sp.*)	**OFFSITE**	1	1	Yes (A)	Preserve
10119	6	6	Maple (*Acer sp.*)	**OFFSITE**	1	1	Yes (A)	Preserve
10120	6	6	Maple (*Acer sp.*)	**OFFSITE**	1	1	Yes (A)	Preserve
10121	6	6	Maple (*Acer sp.*)	**OFFSITE**	1	1	Yes (A)	Preserve
10122	6	6	Maple (*Acer sp.*)	**OFFSITE**	1	1	Yes (A)	Preserve
10124	6	6	Maple (*Acer sp.*)	**OFFSITE**	1	1	Yes (A)	Preserve
10125	7	7	Maple (*Acer sp.*)	**OFFSITE**	1	1	Yes (A)	Preserve
10791	9	9	Maple (*Acer sp.*)	**OFFSITE**	1	1	Yes (A)	Preserve
10792	9	9	Maple (*Acer sp.*)	**OFFSITE**	1	1	Yes (A)	Preserve
10804	8	8	Maple (*Acer sp.*)	**OFFSITE**	1	1	Yes (A)	Preserve
10832	2	2	Oregon Oak (*Quercus garryana*)	**OFFSITE**	1	1	Yes (A)	Preserve
10837	2	2	Oregon Oak (*Quercus garryana*)	**OFFSITE**	1	1	Yes (A)	Preserve
10896	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Preserve
10897	11	11	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Preserve
10898	7	7	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Preserve
10899	7, 8	11	Red Alder (*Alnus rubra*)	Codominant	1	1	Yes (A)	Preserve
10900	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Preserve
10901	10	10	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Preserve
10902	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Preserve
10903	34	34	Black Cottonwood (*Populus trichocarpa*)	**OFFSITE**	1	1	No	Preserve
10904	17	17	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Preserve
10905	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Preserve
10907	13	13	Douglas-fir (*Pseudotsuga menziesii*)	Scars	1	2	Yes (B)	Preserve
10908	16	16	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10909	17	17	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10910	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10911	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10912	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10913	9	9	Ponderosa Pine (*Pinus ponderosa*)	Codominant top	1	2	Yes (A), (B)	Remove
10914	11	11	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
10915	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10916	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10917	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10918	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10919	16	16	Douglas-fir (*Pseudotsuga menziesii*)	Codominant top	1	2	Yes (B)	Remove
10920	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10921	11	11	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Preserve
10922	8	8	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Preserve
10923	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Preserve
10924	6	6	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Preserve
10925	16	16	Douglas-fir (*Pseudotsuga menziesii*)	Large scar with sap flow	1	2	Yes (B)	Preserve
10926	9	9	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Preserve
10927	10	10	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Preserve
10928	8	8	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Remove
10929	17	17	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10930	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10931	17	17	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10932	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10933	17	17	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10934	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10935	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10936	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10937	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10938	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10939	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10940	17	17	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Preserve
10941	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10942	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10943	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10944	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10945	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10946	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10947	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10948	16	16	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10949	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10950	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10951	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10952	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10953	17	17	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
10954	17	17	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Preserve
10955	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Preserve
10956	6, 7	9	English Hawthorn (*Crataegus monogyna*)	Codominant; Scars; Cracks; Cavity; Decay	2	3	Yes (A)	Preserve
10960	6	6	Red Alder (*Alnus rubra*)	**OFFSITE**	1	1	Yes (A)	Preserve
10962	7	7	Red Alder (*Alnus rubra*)	**OFFSITE**	1	1	Yes (A)	Preserve
11016	21, 22	30	Oregon Oak (*Quercus garryana*)	**OFFSITE;** Codominant	1	1	No	Preserve
11017	6	6	Red Alder (*Alnus rubra*)	**OFFSITE**	1	1	Yes (A)	Preserve
11018	7	7	Red Alder (*Alnus rubra*)	**OFFSITE**	1	1	Yes (A)	Preserve
11019	7	7	Red Alder (*Alnus rubra*)	**OFFSITE**	1	1	Yes (A)	Preserve
11020	8	8	Red Alder (*Alnus rubra*)	**OFFSITE**	1	1	Yes (A)	Preserve
11021	10	10	Red Alder (*Alnus rubra*)	**OFFSITE**	1	1	Yes (A)	Preserve
11027	11	11	Black Cottonwood (*Populus trichocarpa*)		1	1	Yes (A)	Preserve
11028	6	6	Engelmann Spruce (*Picea engelmannii*)	Crooked	1	2	Yes (A), (B)	Preserve
11045	16	16	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11046	7	7	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11049	10	10	Cherry (*Prunus sp.*)		1	1	Yes (A)	Remove
11055	12	12	Douglas-fir (*Pseudotsuga menziesii*)	Crooked	1	2	Yes (B)	Remove
11059	13	13	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (B)	Preserve
11061	11	11	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Preserve
11062	15	15	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (B)	Preserve
11063	15	15	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (B)	Preserve

Detailed Tree Inventory for Knollcrest Subdivision

AKS Job No. 5132

Tree #	DBH (in.)	Equivalent DBH (in.)[1]	Tree Species Common Name (*Scientific name*)	Comments	Health Rating*	Structure Rating**	Exempt Tree***	Remove / Preserve
11064	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11065	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11066	13	13	Douglas-fir (*Pseudotsuga menziesii*)	Codominant top	1	2	Yes (B)	Remove
11067	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11068	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11069	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11070	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11071	9	9	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11072	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11073	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11074	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11076	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11078	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11079	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11080	18	18	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11081	11	11	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11082	16	16	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11099	8	8	Black Cottonwood (*Populus trichocarpa*)	**OFFSITE**	1	1	Yes (A)	Preserve
11125	9	9	Red Alder (*Alnus rubra*)	**OFFSITE**	1	1	Yes (A)	Preserve
11132	7	7	Red Alder (*Alnus rubra*)	**OFFSITE**	1	1	Yes (A)	Preserve
11200	11	11	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11201	10	10	Douglas-fir (*Pseudotsuga menziesii*)	Crooked	1	2	Yes (A), (B)	Remove
11202	8	8	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11203	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11204	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11205	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11206	11	11	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11207	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11208	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11209	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11210	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11211	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11212	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11213	10, 13	16	Douglas-fir (*Pseudotsuga menziesii*)	Codominant	1	1	Yes (B)	Remove
11214	11	11	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11215	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11216	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11217	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11218	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11219	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11220	19	19	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11221	20	20	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11222	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11223	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11224	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11225	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11226	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11227	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11228	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11229	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11230	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11231	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11232	11	11	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11233	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11234	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11235	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11236	12	12	Douglas-fir (*Pseudotsuga menziesii*)	Crooked	1	2	Yes (B)	Remove
11237	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11238	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11239	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11240	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11245	21	21	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11249	8, 9	12	English Hawthorn (*Crataegus monogyna*)	Codominant; Broken branches; Cracks; Dead branches	2	3	No	Remove
11254	18	18	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11259	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11260	17	17	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11267	17, 18	25	Oregon Oak (*Quercus garryana*)	Codominant	1	1	No	Preserve
11283	8, 8	11	Douglas-fir (*Pseudotsuga menziesii*)	Codominant	1	1	Yes (A), (B)	Remove
11284	11	11	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11285	17	17	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11286	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11287	6	6	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11288	16	16	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11289	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11290	12, 13	18	Douglas-fir (*Pseudotsuga menziesii*)	Codominant	1	1	Yes (B)	Remove
11291	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11292	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11293	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11294	16	16	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11295	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11296	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11297	7, 10	12	Douglas-fir (*Pseudotsuga menziesii*)	Codominant	1	2	Yes (B)	Remove
11298	16	16	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11299	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11300	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11301	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11302	17	17	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11305	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11306	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11307	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11308	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11309	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11310	11	11	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11311	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11312	11	11	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11313	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11314	6, 7, 12	15	Douglas-fir (*Pseudotsuga menziesii*)	Codominant	1	1	Yes (B)	Remove
11315	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11316	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11317	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove

Detailed Tree Inventory for Knollcrest Subdivision

AKS Job No. 5132

Tree #	DBH (in.)	Equivalent DBH (in.)[1]	Tree Species Common Name (*Scientific name*)	Comments	Health Rating*	Structure Rating**	Exempt Tree***	Remove / Preserve
11318	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11319	9	9	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11320	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11321	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11322	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11323	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11324	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11325	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11326	13	13	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (B)	Remove
11327	8	8	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11328	11	11	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11329	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11330	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11331	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11332	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11333	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11334	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11335	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11336	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11337	8, 9	12	Douglas-fir (*Pseudotsuga menziesii*)	Codominant	1	1	Yes (B)	Remove
11338	16	16	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11339	16	16	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11340	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11341	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11342	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11343	16	16	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11345	17	17	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11346	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11348	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11349	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11350	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11351	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11352	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11354	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11355	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11356	16	16	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11357	17	17	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11358	16	16	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11359	19	19	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11360	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11361	11	11	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11362	12, 13	18	Douglas-fir (*Pseudotsuga menziesii*)	Codominant with included bark	1	2	Yes (B)	Remove
11363	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11365	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11366	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11367	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11368	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11369	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11370	8	8	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11371	6, 6	8	Douglas-fir (*Pseudotsuga menziesii*)	Codominant	1	1	Yes (A), (B)	Remove
11373	17	17	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11374	11	11	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11375	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11376	18	18	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11394	21	21	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11395	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11396	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11397	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11398	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11399	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11400	12, 13	18	Douglas-fir (*Pseudotsuga menziesii*)	Codominant; Crooked	1	2	Yes (B)	Remove
11401	17	17	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11402	10	10	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (A), (B)	Remove
11403	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11404	7	7	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11405	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11406	11	11	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11407	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11408	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11409	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11410	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11411	24	24	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11413	10	10	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (A), (B)	Remove
11414	9	9	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (A), (B)	Remove
11415	9	9	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (A), (B)	Remove
11418	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11419	11	11	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (A), (B)	Remove
11420	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11421	11	11	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11422	7	7	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11426	12	12	Bigleaf Maple (*Acer macrophyllum*)		1	1	No	Remove
11429	8	8	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (A), (B)	Remove
11430	13	13	Ponderosa Pine (*Pinus ponderosa*)	Codominant top	1	2	Yes (B)	Remove
11431	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11432	17	17	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11433	8	8	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (A), (B)	Remove
11434	16	16	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (B)	Remove
11435	16	16	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11436	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11437	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11438	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11439	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11440	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11441	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11442	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11443	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11444	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11445	9, 13	16	Douglas-fir (*Pseudotsuga menziesii*)	Codominant	1	1	Yes (B)	Remove
11446	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11448	8	8	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove

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KNOLLCREST SUBDIVISION

WEST LINN OREGON

TAX LOTS 100 & 200 CLACKAMAS COUNTY TAX MAP 2 1E 25CC

PRELIMINARY TREE PRESERVATION AND REMOVAL TABLE

DESIGNED BY: CLR
DRAWN BY: JMH
CHECKED BY: MBH
SCALE: AS NOTED
DATE: 09/05/2017

REGISTERED PROFESSIONAL ENGINEER 58542PE OREGON JULY 9, 2002 MONTGOMERY B. HURLEY
PRELIMINARY NOT FOR CONSTRUCTION
RENEWAL DATE: 6/30/19

REVISIONS

JOB NUMBER 5132

SHEET 15

Detailed Tree Inventory for Knollcrest Subdivision

AKS Job No. 5132

Tree #	DBH (in.)	Equivalent DBH (in.)¹	Tree Species Common Name (*Scientific name*)	Comments	Health Rating*	Structure Rating**	Exempt Tree***	Remove / Preserve
11449	16	16	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11450	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11451	14, 16	21	Douglas-fir (*Pseudotsuga menziesii*)	Codominant	1	1	Yes (B)	Remove
11452	6	6	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11453	16	16	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11454	21	21	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11455	7	7	Western Redcedar (*Thuja plicata*)		1	1	Yes (A), (B)	Remove
11456	19	19	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11457	17	17	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11458	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11459	16	16	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11460	7	7	Western Redcedar (*Thuja plicata*)		1	1	Yes (A), (B)	Remove
11461	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11462	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11463	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11464	11	11	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11465	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11466	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11467	11	11	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11468	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11469	16	16	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11470	16	16	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11471	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11472	10, 10	14	Douglas-fir (*Pseudotsuga menziesii*)	Codominant	1	1	Yes (B)	Remove
11473	7	7	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11474	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11475	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11476	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11477	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11478	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11479	21	21	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11480	16	16	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11481	18	18	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11482	18	18	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11483	20	20	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11484	10, 16	19	Douglas-fir (*Pseudotsuga menziesii*)	Codominant	1	1	Yes (B)	Remove
11485	17	17	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11486	18	18	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11487	20	20	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11488	20	20	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11489	19	19	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11490	18	18	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11491	17	17	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11492	18	18	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11493	17	17	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11494	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11495	6	6	Cherry (*Prunus sp.*)		1	1	Yes (A)	Preserve
11496	6, 8, 9, 9, 9	19	Cherry (*Prunus sp.*)	**OFFSITE;** Codominant with many attachments at one point	1	2	No	Preserve
11497	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11498	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11499	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11500	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11501	6	6	Cherry (*Prunus sp.*)	**OFFSITE;** Lean (W)	1	1	Yes (A)	Preserve
11502	19	19	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11503	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11504	19	19	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11505	13, 13	18	Douglas-fir (*Pseudotsuga menziesii*)	Codominant	1	2	Yes (B)	Remove
11506	13	13	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (B)	Remove
11507	14, 20	24	Bigleaf Maple (*Acer macrophyllum*)	Codominant	1	1	No	Remove
11511	15	15	Western Redcedar (*Thuja plicata*)	Broken top	2	2	Yes (B)	Remove
11512	16	16	Western Redcedar (*Thuja plicata*)		1	1	Yes (B)	Remove
11517	7	7	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11519	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11520	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11521	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11522	9	9	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11523	9	9	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11525	19	19	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11526	16	16	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11527	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11528	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11529	19	19	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11530	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11532	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11533	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11534	6	6	Western Redcedar (*Thuja plicata*)		1	1	Yes (A), (B)	Remove
11536	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11537	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11538	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11539	18	18	Douglas-fir (*Pseudotsuga menziesii*)	Crooked; Broken top	2	2	Yes (B)	Remove
11540	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11555	11	11	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11557	17	17	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11559	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11560	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11561	9	9	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11563	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11566	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11567	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11569	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11570	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11571	8	8	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11573	8	8	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11574	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11575	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11576	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11577	11	11	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11578	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11579	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11581	14	14	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (B)	Remove

Detailed Tree Inventory for Knollcrest Subdivision

AKS Job No. 5132

Tree #	DBH (in.)	Equivalent DBH (in.)¹	Tree Species Common Name (*Scientific name*)	Comments	Health Rating*	Structure Rating**	Exempt Tree***	Remove / Preserve
11583	13, 14	19	Douglas-fir (*Pseudotsuga menziesii*)	Codominant	1	2	Yes (B)	Remove
11584	9	9	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11585	16	16	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11587	16	16	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11590	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11592	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11593	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11594	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11595	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11596	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11597	17	17	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11600	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11601	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11602	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11603	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11605	8	8	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11606	11	11	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11607	11	11	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11608	9	9	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11609	7	7	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11610	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11611	16	16	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11612	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11613	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11614	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11615	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11616	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11617	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11618	9	9	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11619	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11620	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11621	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11622	11	11	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11623	7, 8	7, 8	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11624	9	9	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11628	14, 14, 15, 19	31	Oregon Oak (*Quercus garryana*)	**OFFSITE;** Codominant	1	1	No	Remove
11630	9	9	Cherry (*Prunus sp.*)	**OFFSITE;** Broken top; Crooked	2	2	Yes (A)	Remove
11631	6	6	Oregon Oak (*Quercus garryana*)		1	2	No	Remove
11634	16	16	Oregon Oak (*Quercus garryana*)		1	1	No	Remove
11638	20	20	Oregon Oak (*Quercus garryana*)		1	1	No	Remove
11649	13	13	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (B)	Remove
11650	7	7	Engelmann Spruce (*Picea engelmannii*)	Lean (N)	1	2	Yes (A), (B)	Remove
11654	9	9	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11655	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11659	6	6	Oregon Oak (*Quercus garryana*)		1	1	No	Remove
11660	8	8	Oregon Oak (*Quercus garryana*)	**OFFSITE**	1	1	No	Remove
11676	15	15	Ponderosa Pine (*Pinus ponderosa*)	Codominant 10' from ground with included bark	1	2	Yes (B)	Remove
11677	8	8	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (A), (B)	Remove
11678	13	13	Ponderosa Pine (*Pinus ponderosa*)	Codominant top	1	2	Yes (B)	Remove
11679	13	13	Ponderosa Pine (*Pinus ponderosa*)	Codominant top	1	2	Yes (B)	Remove
11680	17	17	Ponderosa Pine (*Pinus ponderosa*)	Codominant 6' from ground with included bark	1	2	Yes (B)	Remove
11681	15	15	Ponderosa Pine (*Pinus ponderosa*)	Codominant top	1	1	Yes (B)	Remove
11682	7	7	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11685	13	13	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (B)	Remove
11687	12	12	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (B)	Remove
11688	11	11	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (A), (B)	Remove
11689	10	10	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (A), (B)	Remove
11690	10	10	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (A), (B)	Remove
11691	9	9	Ponderosa Pine (*Pinus ponderosa*)	Codominant top; Broken branches	1	2	Yes (A), (B)	Remove
11692	9	9	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (A), (B)	Remove
11693	12	12	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (B)	Remove
11695	6	6	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (A), (B)	Remove
11696	7	7	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11697	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11698	12	12	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (B)	Remove
11699	13	13	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (B)	Remove
11700	6	6	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Remove
11702	11	11	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Remove
11703	10	10	Engelmann Spruce (*Picea engelmannii*)	Sweep; Some dead foliage	2	2	Yes (A), (B)	Remove
11704	10	10	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Remove
11705	12	12	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (B)	Remove
11706	6	6	Willow (*Salix sp.*)	Crooked	1	2	Yes (A)	Remove
11707	10	10	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Remove
11708	8	8	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Remove
11712	9	9	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Remove
11714	8	8	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Remove
11715	10	10	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Remove
11716	7	7	Engelmann Spruce (*Picea engelmannii*)	Codominant with included bark; Sparse foliage	2	2	Yes (A), (B)	Remove
11717	7	7	Engelmann Spruce (*Picea engelmannii*)	Dead	3	3	Yes (A), (B)	Remove
11718	6	6	Bigleaf Maple (*Acer macrophyllum*)	Lean (E)	1	1	Yes (A)	Remove
11719	17	17	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11720	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11721	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11722	13	13	Douglas-fir (*Pseudotsuga menziesii*)	Sweep	1	1	Yes (B)	Remove
11724	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11725	8	8	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11727	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11728	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11729	9	9	Black Cottonwood (*Populus trichocarpa*)		1	1	Yes (A)	Remove
11730	11	11	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Remove
11732	7, 8	11	Engelmann Spruce (*Picea engelmannii*)	Codominant with included bark	1	2	Yes (A), (B)	Remove
11733	11	11	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Remove
11734	10	10	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Remove
11737	6, 8	10	Western Redcedar (*Thuja plicata*)	Very sparse foliage; Bore holes	3	2	Yes (A), (B)	Remove
11738	11	11	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Remove
11739	8	8	Western Redcedar (*Thuja plicata*)	Codominant stem previously removed; Sparse foliage	3	3	Yes (A), (B)	Remove
11740	9	9	Western Redcedar (*Thuja plicata*)	Very sparse foliage	3	2	Yes (A), (B)	Remove
11741	10	10	Western Redcedar (*Thuja plicata*)	Very sparse foliage	3	2	Yes (A), (B)	Remove
11742	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11743	6	6	Western Redcedar (*Thuja plicata*)		1	1	Yes (A), (B)	Remove

Detailed Tree Inventory for Knollcrest Subdivision

AKS Job No. 5132

Tree #	DBH (in.)	Equivalent DBH (in.)¹	Tree Species Common Name (*Scientific name*)	Comments	Health Rating*	Structure Rating**	Exempt Tree***	Remove / Preserve
11744	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11745	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11746	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11747	8	8	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11748	18	18	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11753	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11754	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11755	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11756	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11757	19	19	Douglas-fir (*Pseudotsuga menziesii*)	Sap flow	1	1	Yes (B)	Remove
11758	9	9	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11759	6	6	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11760	9	9	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11761	7	7	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11762	18	18	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11763	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11764	7	7	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11765	14	14	Douglas-fir (*Pseudotsuga menziesii*)	Sweep	1	2	Yes (B)	Remove
11766	6	6	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11767	8	8	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11768	10	10	Douglas-fir (*Pseudotsuga menziesii*)	Sweep	1	2	Yes (A), (B)	Remove
11769	8	8	Western Redcedar (*Thuja plicata*)	Sparse foliage	2	1	Yes (A), (B)	Remove
11770	16	16	Western Redcedar (*Thuja plicata*)	Snag	3	3	Yes (B)	Remove
11781	7	7	Pear (*Pyrus sp.*)		1	1	Yes (A)	Remove
11805	15	15	Ponderosa Pine (*Pinus ponderosa*)	Codominant top	1	1	Yes (B)	Remove
11806	14	14	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (B)	Remove
11807	14	14	Ponderosa Pine (*Pinus ponderosa*)	Codominant top	1	2	Yes (B)	Remove
11808	13	13	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (B)	Remove
11809	14	14	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (B)	Remove
11810	13	13	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (B)	Remove
11811	14	14	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (B)	Remove
11812	11	11	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (A), (B)	Remove
11813	11	11	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (A), (B)	Remove
11814	11	11	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (A), (B)	Remove
11815	12	12	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (B)	Remove
11816	9	9	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (A), (B)	Remove
11817	9	9	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (A), (B)	Remove
11818	21	21	Ponderosa Pine (*Pinus ponderosa*)	Codominant 5' from ground with included bark	1	2	Yes (B)	Remove
11819	10	10	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (A), (B)	Remove
11820	10	10	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (A), (B)	Remove
11821	14	14	Ponderosa Pine (*Pinus ponderosa*)	Codominant top	1	2	Yes (B)	Remove
11823	10	10	European White Birch (*Betula pendula*)	Lean (S); Bore holes; Broken branches; Dead branches	2	2	Yes (A)	Remove
11824	6	6	Bigleaf Maple (*Acer macrophyllum*)	Scars	1	2	Yes (A)	Remove
11825	9	9	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11827	6	6	English Hawthorn (*Crataegus monogyna*)		1	1	Yes (A)	Remove
11829	8	8	Ponderosa Pine (*Pinus ponderosa*)	Crooked	1	2	Yes (A), (B)	Remove
11836	6, 6, 7	11	English Hawthorn (*Crataegus monogyna*)	Codominant	1	1	Yes (A)	Remove
11837	6	6	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Preserve
11842	12	12	Ponderosa Pine (*Pinus ponderosa*)	Very crooked; Broken branches	2	3	Yes (B)	Remove
11843	13	13	Black Cottonwood (*Populus trichocarpa*)		1	1	No	Remove
11844	12	12	Western Redcedar (*Thuja plicata*)		1	1	Yes (B)	Remove
11887	6	6	Western Redcedar (*Thuja plicata*)		1	1	Yes (A), (B)	Remove
11888	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
11889	24	24	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
11894	16	16	Hemlock (*Tsuga sp.*)	Canopy one sided (E)	2	1	Yes (B)	Remove
11899	16	16	Red Alder (*Alnus rubra*)		1	1	No	Remove
11900	11	11	Western Redcedar (*Thuja plicata*)		1	1	Yes (A), (B)	Remove
11902	7	7	Cherry (*Prunus sp.*)	Very sparse foliage; Decay	3	3	Yes (A)	Remove
11903	7	7	Cherry (*Prunus sp.*)	Very sparse foliage; Decay	3	3	Yes (A)	Remove
11908	9, 10, 11	17	Cherry (*Prunus sp.*)	Codominant; Crooked; 9" & 10" stems topped for overhead wires	2	3	No	Remove
11911	9	9	Cherry (*Prunus sp.*)	Topped for overhead wires; No live foliage	3	3	Yes (A)	Remove
11912	13	13	Cherry (*Prunus sp.*)	Topped for overhead wires; No live foliage	3	3	No	Remove
11913	10	10	Cherry (*Prunus sp.*)	Topped for overhead wires; Decay	3	3	Yes (A)	Remove
11914	11	11	Cherry (*Prunus sp.*)	Topped for overhead wires; Decay	3	3	Yes (A)	Remove
11915	10	10	Cherry (*Prunus sp.*)	Scars; Cracks; Decay; Crooked	2	3	Yes (A)	Remove
11923	6, 6, 7, 8	14	Cherry (*Prunus sp.*)	Codominant; Crooked; Sparse foliage	3	2	No	Remove
11924	8	8	Cherry (*Prunus sp.*)	Crooked; Sparse foliage	3	2	Yes (A)	Remove
11927	6, 10, 12	17	Cherry (*Prunus sp.*)	Codominant; 6" stem removed; Pruned for overhead wires; Crooked; Dead top; Sparse foliage	3	3	No	Remove
11928	8, 8, 9	14	Cherry (*Prunus sp.*)	Codominant; Pruned for overhead wires; Crooked; Dead top; Sparse foliage	3	3	No	Remove
11937	6, 9	11	English Hawthorn (*Crataegus monogyna*)	Codominant; Sparse foliage; Crooked	2	2	Yes (A)	Remove
11938	6, 8	10	English Hawthorn (*Crataegus monogyna*)	Codominant; Sparse foliage; Crooked	2	2	Yes (A)	Remove
11939	7	7	English Hawthorn (*Crataegus monogyna*)	Dead	3	3	Yes (A)	Remove
11940	6	6	English Hawthorn (*Crataegus monogyna*)	Dead	3	3	Yes (A)	Remove
11944	7	7	Cherry (*Prunus sp.*)	Sparse foliage	2	2	Yes (A)	Remove
11976	14	14	Douglas-fir (*Pseudotsuga menziesii*)	Sweep	1	1	Yes (B)	Remove
11977	8, 11	14	Cherry (*Prunus sp.*)	Codominant; Crooked	1	2	No	Remove
11980	13	13	Cherry (*Prunus sp.*)	Lean (S); Sparse foliage; Cavities with decay; Broken branches	2	3	No	Remove
11984	14	14	Cherry (*Prunus sp.*)	Sparse foliage	2	1	No	Remove
11985	6	6	Cherry (*Prunus sp.*)	Lean (N)	1	2	Yes (A)	Remove
11989	15	15	Ponderosa Pine (*Pinus ponderosa*)	Codominant 6' from ground with included bark	1	2	Yes (B)	Preserve
11990	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Preserve
11991	8, 11	14	Cherry (*Prunus sp.*)	Codominant; Crooked	1	1	No	Preserve
12047	8	8	Ponderosa Pine (*Pinus ponderosa*)	Broken top	2	2	Yes (A), (B)	Remove
12048	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
12064	8	8	English Hawthorn (*Crataegus monogyna*)		1	1	Yes (A)	Remove
12069	9	9	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
12071	14	14	Douglas-fir (*Pseudotsuga menziesii*)	Codominant top	1	2	Yes (B)	Remove
12075	17	17	Ponderosa Pine (*Pinus ponderosa*)	Codominant top	1	2	Yes (B)	Preserve
12077	21	21	Ponderosa Pine (*Pinus ponderosa*)	Codominant 6' from ground	1	2	Yes (B)	Preserve
12078	21	21	Ponderosa Pine (*Pinus ponderosa*)	Many stems attached at one point	1	2	Yes (B)	Preserve
12082	9	9	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Preserve
12083	9	9	Ponderosa Pine (*Pinus ponderosa*)	Lean (W); Crooked	1	2	Yes (A), (B)	Preserve
12088	10	10	Engelmann Spruce (*Picea engelmannii*)	Codominant top	1	2	Yes (A), (B)	Preserve
12090	8	8	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Preserve
12091	9	9	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Preserve
12096	6	6	Oregon Oak (*Quercus garryana*)		1	1	No	Preserve
12098	13	13	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (B)	Preserve
12100	6	6	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Preserve

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KNOLLCREST SUBDIVISION

WEST LINN OREGON

TAX LOTS 100 & 200 CLACKAMAS COUNTY TAX MAP 2 1E 25CC

PRELIMINARY TREE PRESERVATION AND REMOVAL TABLE

DESIGNED BY: CLR
DRAWN BY: JMH
CHECKED BY: MBH
SCALE: AS NOTED
DATE: 09/05/2017

REGISTERED PROFESSIONAL ENGINEER
OREGON
MONTGOMERY B. HURLEY
RENEWAL DATE: 6/30/19

REVISIONS

JOB NUMBER
5132

SHEET
16

AKS DRAWING FILE: 5132 TREE TABLE.DWG | LAYOUT: 16

Detailed Tree Inventory for Knollcrest Subdivision

AKS Job No. 5132

Tree #	DBH (in.)	Equivalent DBH (in.)[1]	Tree Species Common Name (*Scientific name*)	Comments	Health Rating*	Structure Rating**	Exempt Tree***	Remove / Preserve
12101	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Preserve
12102	16, 18	24	Douglas-fir (*Pseudotsuga menziesii*)	Codominant	1	2	Yes (B)	Preserve
12103	9	9	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Preserve
12104	9	9	Cherry (*Prunus sp.*)		1	1	Yes (A)	Preserve
12106	10	10	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Preserve
12108	12	12	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (B)	Preserve
12109	13	13	Ponderosa Pine (*Pinus ponderosa*)	Codominant top	1	2	Yes (B)	Preserve
12110	11	11	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Preserve
12111	11	11	Ponderosa Pine (*Pinus ponderosa*)	Codominant top	1	2	Yes (A), (B)	Preserve
12112	8	8	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Preserve
12113	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Preserve
12115	9	9	Oregon Oak (*Quercus garryana*)		1	1	No	Preserve
12116	7	7	English Hawthorn (*Crataegus monogyna*)		1	1	Yes (A)	Preserve
12143	13	13	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (B)	Preserve
12144	14	14	Ponderosa Pine (*Pinus ponderosa*)	Codominant top	1	2	Yes (B)	Preserve
12145	14	14	Ponderosa Pine (*Pinus ponderosa*)	Codominant top	1	2	Yes (B)	Preserve
12146	11	11	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Preserve
12147	9	9	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
12148	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
12149	18	18	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
12150	11	11	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (A), (B)	Remove
12151	12	12	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (B)	Remove
12152	10	10	Western Redcedar (*Thuja plicata*)		1	1	Yes (A), (B)	Remove
12153	12	12	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (B)	Remove
12154	12	12	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (B)	Remove
12155	12	12	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (B)	Remove
12156	12	12	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (B)	Remove
12157	7	7	Western Redcedar (*Thuja plicata*)		1	1	Yes (A), (B)	Remove
12158	9	9	Apple (*Malus sp.*)	Broken branches; Cavities; Decay	2	2	Yes (A)	Remove
12159	11	11	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (A), (B)	Remove
12160	12	12	Ponderosa Pine (*Pinus ponderosa*)	Codominant top	1	2	Yes (B)	Remove
12161	12	12	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (B)	Remove
12162	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
12170	12	12	Douglas-fir (*Pseudotsuga menziesii*)	Codominant top	1	2	Yes (B)	Remove
12171	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
12172	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
12173	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
12174	9	9	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Preserve
12176	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
12185	13	13	Douglas-fir (*Pseudotsuga menziesii*)	Codominant top	1	2	Yes (B)	Remove
12186	11	11	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
12187	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Preserve
12188	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
12189	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
12190	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
12191	6	6	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
12192	6	6	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
12194	12	12	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (B)	Preserve
12195	10	10	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Preserve
12196	10	10	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Preserve
12197	13	13	Ponderosa Pine (*Pinus ponderosa*)	Codominant top	1	2	Yes (B)	Preserve
12198	12	12	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (B)	Preserve
12199	9	9	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (A), (B)	Preserve
12200	12	12	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (B)	Preserve
12202	8	8	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
12203	8	8	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
12204	11	11	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
12205	6	6	English Hawthorn (*Crataegus monogyna*)		1	1	Yes (A)	Remove
12206	9	9	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
12207	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
12208	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
12209	11	11	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
12210	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
12211	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
12212	11	11	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
12213	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
12239	10	10	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (A), (B)	Remove
12240	13	13	Ponderosa Pine (*Pinus ponderosa*)	codominant top	1	2	Yes (B)	Remove
12241	16	16	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (B)	Remove
12242	11	11	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (A), (B)	Remove
12243	14	14	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (B)	Remove
12245	14	14	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (B)	Remove
12247	14	14	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (B)	Remove
12249	6, 7	9	Apple (*Malus sp.*)	Codominant	1	1	Yes (A)	Remove
12250	17	17	Ponderosa Pine (*Pinus ponderosa*)	Codominant top	1	2	Yes (B)	Remove
12251	12	12	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (B)	Remove
12252	12	12	Ponderosa Pine (*Pinus ponderosa*)	Codominant top	1	2	Yes (B)	Remove
12253	7	7	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
12255	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
12256	10	10	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
12257	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
12258	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Preserve
12259	10	10	English Hawthorn (*Crataegus monogyna*)		1	1	Yes (A)	Preserve
12267	13	13	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (B)	Preserve
12268	13	13	Engelmann Spruce (*Picea engelmannii*)		1	1	Yes (B)	Preserve
20047	5	5	Plum (*Prunus sp.*)		1	1	Yes (A)	Remove
20053	12	12	Western Redcedar (*Thuja plicata*)		1	1	Yes (B)	Remove
20146	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
20147	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
20148	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
20149	17	17	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
20150	9	9	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (A), (B)	Remove
20151	18	18	Douglas-fir (*Pseudotsuga menziesii*)	Codominant top	1	2	Yes (B)	Remove
20152	15	15	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
20153	13	13	Ponderosa Pine (*Pinus ponderosa*)	Codominant top	1	2	Yes (B)	Remove
20154	13	13	Ponderosa Pine (*Pinus ponderosa*)	Codominant top	1	2	Yes (B)	Remove
20155	15	15	Ponderosa Pine (*Pinus ponderosa*)	Codominant top	1	2	Yes (B)	Remove
20156	18	18	Ponderosa Pine (*Pinus ponderosa*)	Codominant top	1	2	Yes (B)	Remove
20157	15	15	Ponderosa Pine (*Pinus ponderosa*)		1	1	Yes (B)	Remove
20194	6	6	Apple (*Malus sp.*)		1	1	Yes (A)	Remove

Detailed Tree Inventory for Knollcrest Subdivision

AKS Job No. 5132

Tree #	DBH (in.)	Equivalent DBH (in.)[1]	Tree Species Common Name (*Scientific name*)	Comments	Health Rating*	Structure Rating**	Exempt Tree***	Remove / Preserve
20208	8	8	Bigleaf Maple (*Acer macrophyllum*)		1	1	Yes (A)	Remove
20209	11	11	Bigleaf Maple (*Acer macrophyllum*)		1	1	Yes (A)	Remove
20210	25	25	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
20211	6	6	Western Redcedar (*Thuja plicata*)		1	1	Yes (A), (B)	Remove
25076	7	7	Red Alder (*Alnus rubra*)	**OFFSITE;** Some dead foliage	2	1	Yes (A)	Preserve
25094	10	10	Red Alder (*Alnus rubra*)	**OFFSITE**	1	1	Yes (A)	Preserve
25095	7	7	Red Alder (*Alnus rubra*)	**OFFSITE**	1	1	Yes (A)	Preserve
60000	12	12	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
60001	21	21	Western Redcedar (*Thuja plicata*)		1	1	Yes (B)	Remove
60002	14	14	Douglas-fir (*Pseudotsuga menziesii*)	Codominant top	1	2	Yes (B)	Remove
60003	11	11	Western Redcedar (*Thuja plicata*)		1	1	Yes (A), (B)	Remove
60004	14	14	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
60005	7, 11	13	Oregon Oak (*Quercus garryana*)	Some dead branches	2	2	No	Remove
60006	18	18	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
60007	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
60008	18	18	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
60009	13	13	Douglas-fir (*Pseudotsuga menziesii*)		1	1	Yes (B)	Remove
60010	9	9	Red Alder (*Alnus rubra*)		1	1	Yes (A)	Preserve

Total # of Existing Trees Inventoried = 716

Total # of Existing Onsite Trees Inventoried = 674
- Total # of Existing Onsite Trees to be Preserved = 75
- Total # of Existing Onsite Trees to be Removed = 599
  - Total # of Existing Onsite Trees to be Removed that are Exempt = 581
  - Total # of Existing Onsite Trees to be Removed that are Not Exempt = 18
    - *Total # of Existing Onsite Trees to be Removed that are Not Exempt, but are in Poor Condition = 7*

Total # of Existing Offsite Trees Inventoried = 42
- Total # of Existing Offsite Trees to be Preserved = 39
- Total # of Existing Offsite Trees to be Removed = 3
  - Total # of Existing Offsite Trees to be Removed that are Exempt = 1
  - Total # of Existing Offsite Trees to be Removed that are Not Exempt = 2

[1]Equivalent DBH (in.):
Equivalent DBH (in.) Based on Basal Area.

***Health Rating:**
1 = Good Health - A tree that exhibits typical foliage, bark, and root characteristics, for its respective species, shows no signs of infection or infestation, and has a high level of vigor and vitality.
2 = Fair Health - A tree that exhibits some abnormal health characteristics and/or shows some signs of infection or infestation, but may be reversed or abated with supplemental treatment.
3 = Poor Health - A tree that is in significant decline, to the extent that supplemental treatment would not likely result in reversing or abating its decline.

****Structure Rating:**
1 = Good Structure - A tree that exhibits typical physical form characteristics, for its respective species, shows no signs of structural defects of the canopy, trunk, and/or root system.
2 = Fair Structure - A tree that exhibits some abnormal physical form characteristics and/or some signs of structural defects, which reduce the structural integrity of the tree, but are not indicative of imminent physical failure, and may be corrected using arboricultural abatement methods.

3 = Poor Structure - A tree that exhibits extensively abnormal physical form characteristics and/or significant structural defects that substantially reduces the structural viability of the tree, cannot feasibly be abated, and are indicative of imminent physical failure.

*****Exempt Tree:**
"Yes (A)": Per the City of West Linn's Community Tree Ordinance, Chapter 8.510, trees listed above as exempt do not meet the City's definition of a tree. A tree is defined as: "Any woody, perennial plant, deciduous, evergreen, or coniferous, having a main stem or trunk of a minimum of 6 inch DBH for Oregon white oak, Pacific madrone, and Pacific dogwood, and 12 inch DBH for all other tree species."
"Yes (B)": Trees that were planted with the spacing and intent of being harvested for timber or as nursery stock as determined by a Certified Arborist are not regulated, therefore they are exempt from the City's tree ordinance.

Arborist Disclosure Statement:
Arborists are tree specialists who use their education, knowledge, training, and experience to examine trees, recommend measures to enhance the health of trees, and attempt to reduce the risk of living near trees. The Client and Jurisdiction may choose to accept or disregard the recommendations of the arborist, or seek additional advice. Arborists cannot detect every condition that could possibly lead to the structural failure of a tree. Trees are living organisms that fail in ways we do not fully understand. Conditions are often hidden within trees and below ground. Arborists cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specified period of time. Likewise, remedial treatments, like medicine, cannot be guaranteed. Trees can be managed, but they cannot be controlled. To live near trees is to accept some degree of risk. The only way to eliminate all risk associated with trees is to eliminate all trees. Neither this author nor AKS Engineering & Forestry, LLC have assumed any responsibility for liability associated with the trees on or adjacent to this site.

At the completion of construction, all trees should once again be reviewed. Land clearing and removal of adjacent trees can expose previously unseen defects and otherwise healthy trees can be damaged during construction.

PRELIMINARY
ISA
CERTIFIED ARBORIST
BRUCE R. BALDWIN
CERTIFICATE NUMBER: PN-6666A
EXPIRATION DATE: 12/31/17

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ENGINEERING · SURVEYING · NATURAL RESOURCES
FORESTRY · PLANNING · LANDSCAPE ARCHITECTURE

KNOLLCREST SUBDIVISION

WEST LINN OREGON
TAX LOTS 100 & 200 CLACKAMAS COUNTY TAX MAP 2 1E 25CC

PRELIMINARY TREE PRESERVATION AND REMOVAL TABLE

DESIGNED BY: CLR
DRAWN BY: JMH
CHECKED BY: MBH
SCALE: AS NOTED
DATE: 09/05/2017

REGISTERED PROFESSIONAL ENGINEER
58542PE
OREGON
JULY 9, 2002
MONTGOMERY B. HURLEY
PRELIMINARY NOT FOR CONSTRUCTION
RENEWAL DATE: 6/30/19

REVISIONS

JOB NUMBER
5132

SHEET
17

Exhibit C: Natural Resources Assessment and Mitigation Plan

Knollcrest Subdivision
West Linn, Oregon
Natural Resource Assessment

Date:	August 25, 2017
Prepared for:	Carol and Noell Price 3015 Parker Road West Linn, OR 97068
Prepared By:	Kayla Katkin, Natural Resource Specialist Stacey Reed, PWS, Senior Wetland Scientist AKS Engineering & Forestry, LLC
Assessor's Information:	Tax Map # 2 1E 25CC; Tax Lots # 100 and 200

12965 SW Herman Road, Suite 100
Tualatin, OR 97062
(503) 563-6151

Contents

Figures

Appendices

Introduction and Background

The project site is located at 3015 Parker Road in West Linn, Clackamas County, Oregon (Tax Lots 100 and 200 of Tax Map 2 1E 25CC; Figures 1 and 2). The project site is approximately 3.52 acres in size. Our study area included the adjacent tax lot to the east, in order to determine the extent of Water Resource Area (WRA) buffer that extends onto the project site. The boundary of a wetland was delineated on the adjacent tax lot to the east (Tax Lot 3908) in 2006 by Schott & Associates, which received concurrence by the Oregon Department of State Lands (DSL) under DSL file number WD# 06-0204. Since this delineation was greater than 5 years ago, a recent site visit was conducted by AKS Engineering & Forestry, LLC on May 30, 2017 to confirm the extent of the wetland. The current wetland boundary was determined to be slightly west of the 2006 wetland boundary, extending slightly onto the project site. A stream flows through the off-site wetland and is mapped on the City of West Linn's Local Wetland Inventory Map and Water Resource Area (WRA) map. The off-site stream and wetland require a 65-foot wide WRA buffer, which extends onto the project site.

The project consists of a 12 lot subdivision, referred to as the Knollcrest Subdivision. Site development requires that five lots will extend within the WRA. A conservation easement will be placed over the portions of these lots located in the WRA. Minor temporary encroachment on Lot 7 will occur for the removal of three trees within the WRA. According to the *Approval Criteria* of Chapter 85.200.B.3. of the City's Community Development Code (CDC), lots may extend into WRA's as long as there is sufficient area outside of those protected areas to locate a home on the lot. On-site restoration mitigation has been proposed to off-set the minor encroachment for tree removal.

A portion of the stormwater facility will be located within the WRA. According to Table 32-1 of Section 32.030 of the City's CDC, stormwater treatment and detention facilities are an allowed use in the WRA if no reasonable alternative exists. On-site enhancement mitigation will off-set the necessary encroachment for the stormwater facility. This memo has been prepared to meet City of West Linn CDC Chapter 32 *Water Resource Area Protection*.

Existing Site Conditions

A house, detached shed, and driveway are centrally located on Tax Lot 200. Tax Lot 100 is undeveloped. The site consists of a planted Douglas-fir, (*Pseudotsuga menziesii)* forest with a managed understory (lacking vegetation in the understory). The topography on the site slopes south-southeast, toward the off-site wetland and stormwater facility. A non-jurisdictional erosional fill was observed within the northeast portion of the project site (Photo D). The erosional rill is approximately 55 feet long and does not extend off-site. This feature appears to have been created during the heavy rains received this past spring and winter. The feature did not display defined bed or banks.

According to the Natural Resources Conservation Service (NRCS) soil map for Clackamas County, Oregon, and the Clackamas County hydric soils list, the following soil units are mapped within the study area (Figure 3):

- Cornelius silt loam with 8% to 15% slopes (Unit 23C), non-hydric, with 4% hydric Delena inclusions in depressions
- Delena silt loam with 3% to 12% slopes (Unit 30C), hydric, with 8% hydric Borges inclusions in depressions

Existing On-Site Protected Water Features

Stacey Reed, PWS, Senior Wetland Scientist, and Kayla Katkin, Natural Resource Specialist, conducted a site visit on May 30, 2017, to delineate wetland and water areas present on-site and directly adjacent to the project site in order to determine the extent of the WRA. The methodology used to determine the presence of wetlands followed the U.S. Army Corps of Engineers' (Corps') *Wetlands Delineation Manual* and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0). The National Wetland Plant List: 2016 Wetland Ratings* (Lichvar et al., 2016) was used to assign wetland indicator status for the appropriate region. Soils, vegetation, and indicators of hydrology were recorded at seven sample plot locations on standardized wetland determination data forms (Appendix A) to document site conditions.

Based on the May 30, 2017 site visit, the current wetland boundary was determined to be present further west than was delineated in 2006, and extends onto the project site. The wetland is located primarily off-site on Tax Lot 3908, but extends on to Tax Lot 200 briefly. The on-site wetland area is approximately 93 square feet. The wetland was dominated by reed canary grass (*Phalaris arundinacea*, FACW) as documented at Plot 4. Soils at Plot 4 met indicator F6 (Redox Dark Surface) and secondary wetland hydrology indicators.

The off-site perennial stream is ditched with approximately 1.5-feet wide by 3-feet tall banks. Approximately 1-2 inches of flow was observed within the stream channel during the May 30, 2017 site visit. The stream flows southerly and discharges into a storm grate in Parker Road.

The wetland boundary was flagged in the field and was professionally land surveyed by AKS Engineering & Forestry, LLC. The boundary was flagged based on the change in landform from low elevation wetland area to a high elevation landform lacking hydric soil and wetland hydrology indicators (per Upland Plots 1, 2, 3, 5, 6, and 7).

Extent of Water Resource Area (WRA)

According to Table 32-2 *Required Width of WRA* of Chapter 32.030 of the City's CDC, the width of a WRA varies depending on the type of feature (wetland or water) and the slope adjacent to the protected water resource. Based on the City's criteria, the required width associated with the wetland is 65 feet. Slopes adjacent to the wetland are not steep (less than 15%). The total area of the on-site WRA is approximately 24,937 square feet (0.57 acres), as shown on Existing Conditions Figure 6.

Existing Condition of the Water Resource Area

The existing condition of the on-site WRA was determined based on the presence of tree canopy and percent cover of native trees, shrubs, and groundcovers. The existing condition of the on-site WRA was documented at 2 plots (Plots A and B). The data sheets for the WRA plots are included in Appendix B and the plot locations are shown on Existing Conditions Figure 6. Representative photos documenting the existing condition of the on-site WRA are included in Appendix C.

The WRA on the site was determined to be in *marginal* condition due to the lack of diversity in the tree canopy and the high percentage of non-native and invasive plant species. Plot A represents a mixed shrub community in the WRA. This area includes invasive and non-native shrub and herb layer species and includes some of the planted tree community on-site. Due to the high percentage of non-native and invasive species and a lack of diversity in the tree canopy, the WRA associated with Plot A was determined to be in *marginal* condition. Plot B is dominated by planted Douglas-fir trees and contains minimal understory and was also determined to be in *marginal* condition.

Project

The site plan includes a 12 lot subdivision and a stormwater facility. The Site Plan is included as Figure 7. Lots 8-11 will extend into the WRA, but no ground disturbance will occur within the WRA for these lots. The WRA within these lots will be placed in a conservation easement, preventing future development from occurring within the WRA.

Three Douglas fir trees will be removed from the outermost edges of the WRA on Lot 7 to facilitate the preparation of a buildable lot. A total of approximately 95 square feet of WRA will be temporarily disturbed on Lot 7. The project also requires permanent impacts into the on-site WRA for the stormwater quality facility. Permanent encroachment into the WRA will be mitigated through on-site WRA enhancement.

Impact Evaluation

The stormwater quality facility within the WRA can be considered an allowed use according to Table 32-1 *Summary of Where Development and Activities May Occur in Areas Subject to This Chapter* of Chapter 32 *Water Resource Area Protection* of the West Linn CDC. There is an existing public storm drainage system in Parker Road to the south of the site that the stormwater system will connect to. The proposed location for the stormwater facility is in the lowest topographic point on site. Placing the stormwater facility, upslope and out of the WRA would not accommodate the runoff from lots south of the facility. Connecting to the existing manhole and stormline will minimize impacts to Parker Road. Therefore, the only feasible location for the stormwater facility is in the southeast corner of the site within the WRA, adjacent to Parker Road. The overall shape of the stormwater facility is designed to have minimal impacts to the WRA. The facility needs to be large enough to provide storage up to the 25 year storm event, with safe overflow conveyance of the 100-year storm event. Keeping the facility at the lowest topographic point, if the facility were made to be longer and narrower, it would encroach on more of the WRA. Therefore, the only feasible design for the facility is the shorter square shape.

The site plan includes enhancement of the remaining on-site WRA from *marginal* condition to *good* condition to off-set the functional loss for encroachment into the WRA. The non-native and invasive plants will be removed, and the WRA will be planted with native trees and shrubs to improve functions adjacent to the off-site stream and wetland. Enhancement of the on-site WRA will create a more diverse native terrestrial habitat and will improve water storage and stream flow moderation as the density of vegetation within the WRA will slow the flow of stormwater. Slowing the flow of water will increase the ability to retain sediment, absorb pollutants, and infiltrate stormwater.

Mitigation

The remaining WRA will be enhanced with native trees, woody shrubs and groundcover (see attached Site Plan Figure 7) to off-set the permanent WRA encroachment. The WRA enhancement meets the mitigation requirements set forth under Chapter 32.090 of the West Linn CDC. Enhancement mitigation exceeds the minimum ratios set forth under Section 32.090.C. with the exception of the amount of trees that will be planted. Due to the amount of densely planted Douglas-fir trees that are present on site, the amount of trees that will be planted as part of enhancement mitigation was reduced. The planting plan is included in Appendix D and provides a list of recommended vegetation species and plant quantities per requirements listed under Section 32.100.A.3.

To meet the mitigation requirements under Chapter 32.090 of the West Linn CDC, the property owner will maintain 80% survival of the enhancement plantings for a minimum period of three years after the plants have been installed. Any plant mortalities below 80% survival rate within this period will be replaced with the same or similar native vegetation species. Any newly sprouting non-native invasive species will be removed from the mitigation enhancement areas during the three year maintenance period. The attached planting plan provides further details on WRA mitigation monitoring and maintenance requirements.

Please do not hesitate to contact us with further questions.

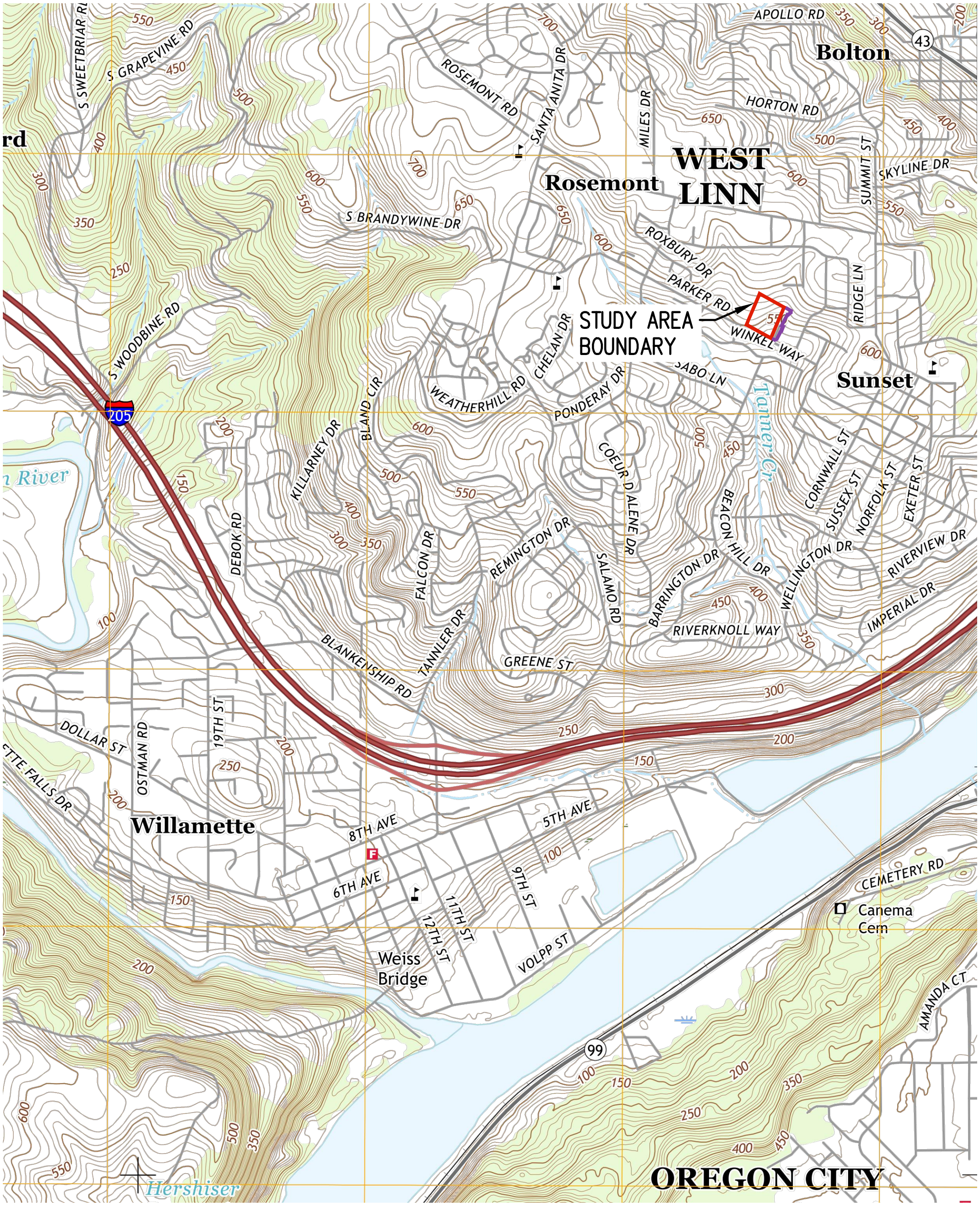
List of Preparers

Stacey Reed

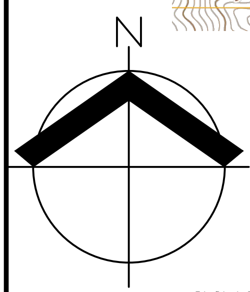
K. Katkin

Stacey Reed, PWS
Senior Wetland Scientist
Fieldwork and Report QA/QC

Kayla Katkin
Natural Resource Specialist
Fieldwork and Report Preparation



USGS 7.5' TOPOGRAPHIC SERIES
QUADRANGLE: CANBY, OR (2017)



SCALE 1" = 2000 FEET

2000 0 2000

DATE: 08/24/2017

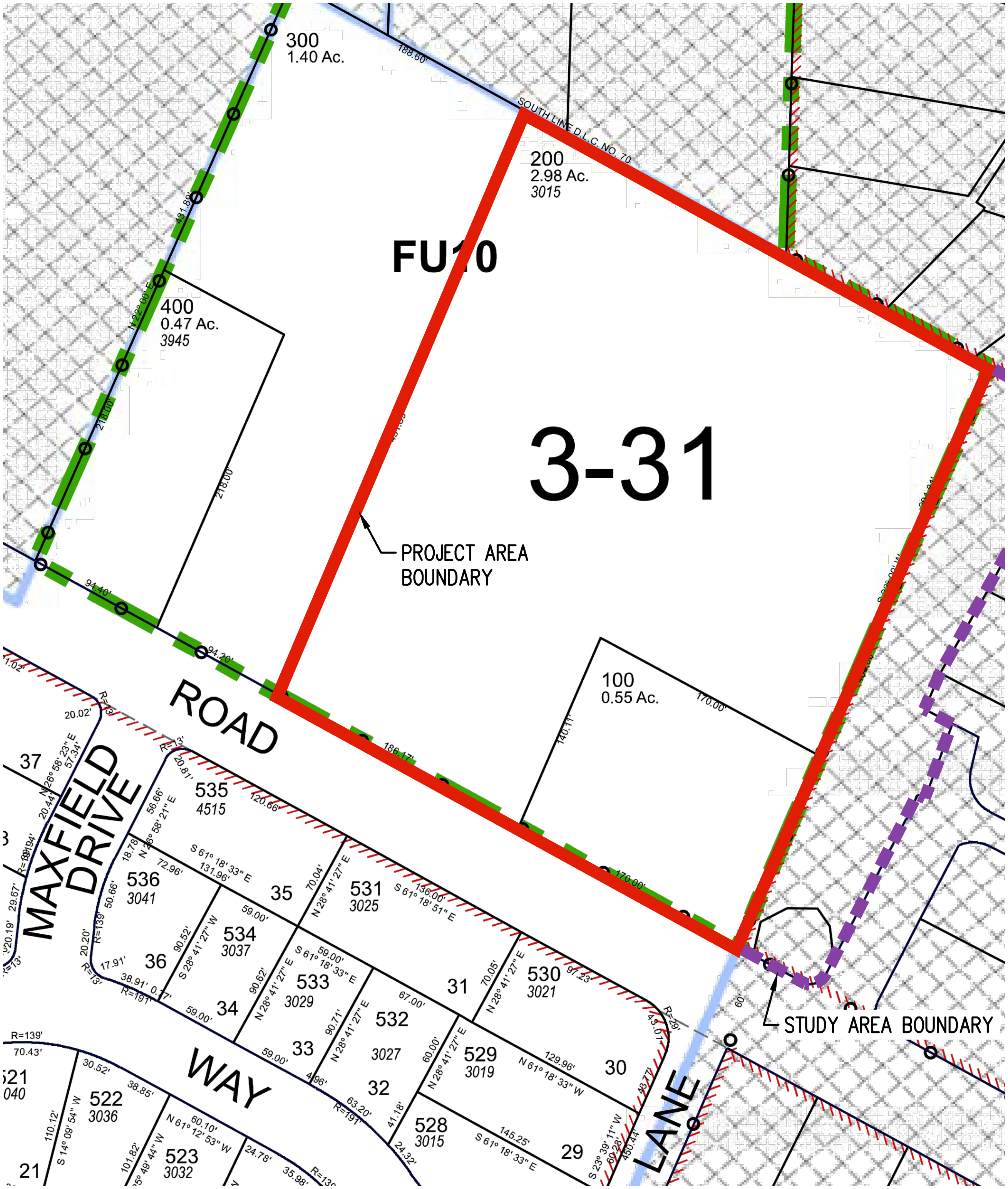
USGS VICINITY MAP
KNOLLCREST SUBDIVISION NATURAL RESOURCE ASSESSMENT

FIGURE 1

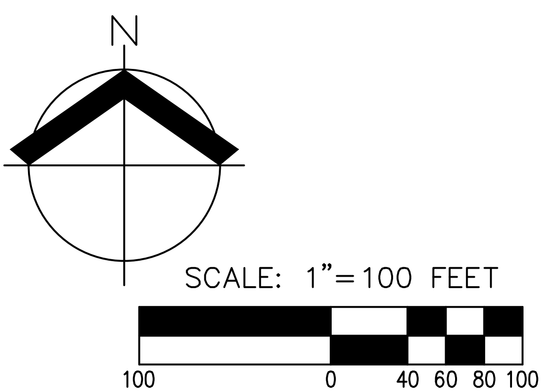
AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD SUITE 100
TUALATIN, OR 97062 www.aks-eng.com
PHONE: 503.563.6151 FAX: 503.563.6152

AKS

DRWN: KMK
CHKD: SAR
AKS JOB: 5132



TAX LOTS 100 AND 200
TAX MAP 2 1E 25CC
CLACKAMAS COUNTY



SCALE: 1"=100 FEET

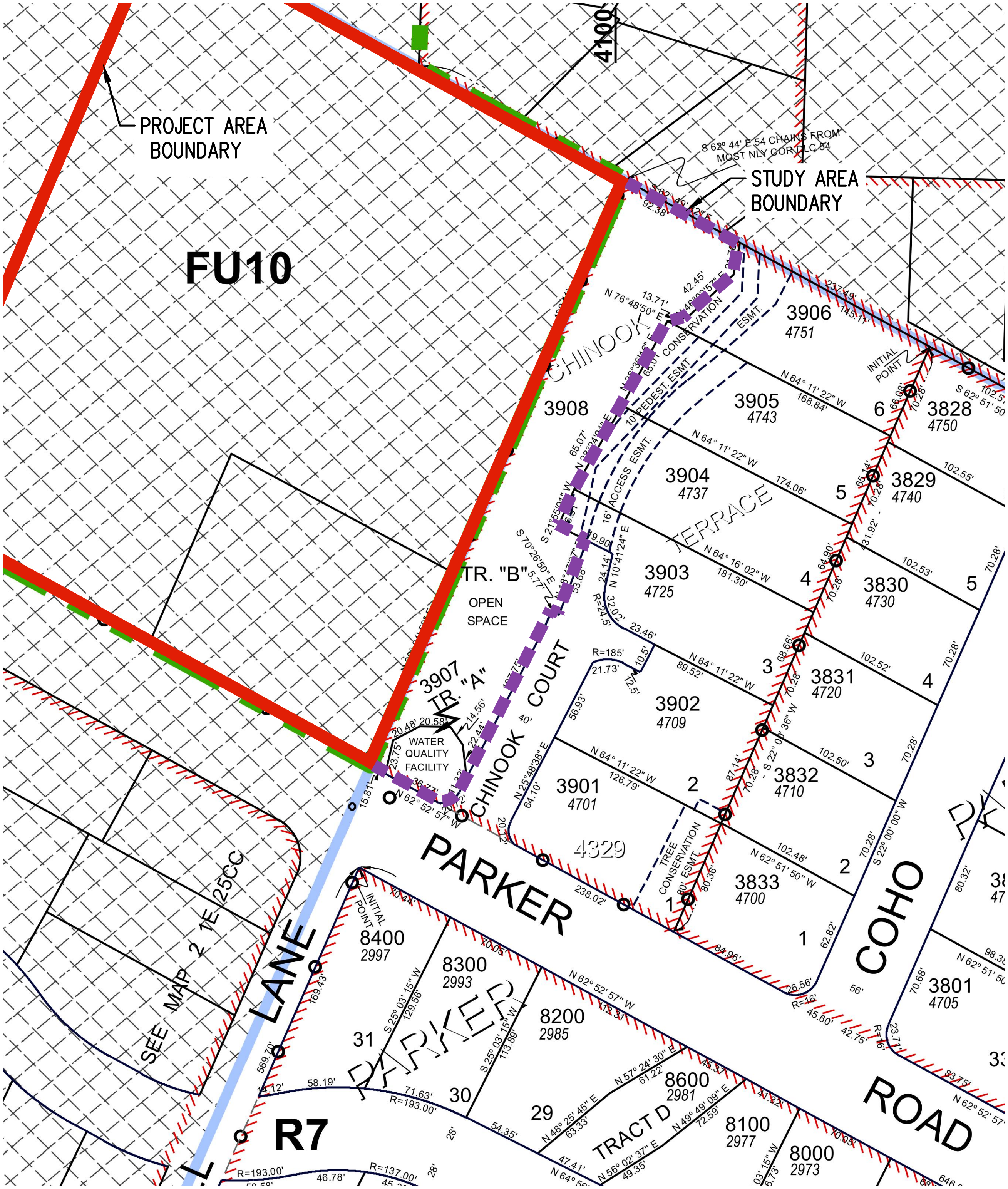
DATE: 08/24/2017

TAX MAP (MAP 2 1E 25CC)
KNOLLCREST SUBDIVISION NATURAL RESOURCE ASSESSMENT

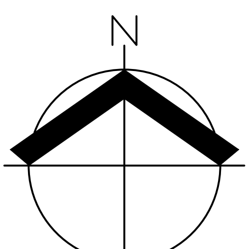
FIGURE
2A

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD SUITE 100
TUALATIN, OR 97062 www.aks-eng.com
PHONE: 503.563.6151 FAX: 503.563.6152

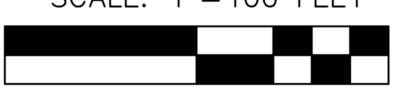
DRWN: KMK
CHKD: SAR
AKS JOB:
5132



TAX LOTS 3907 AND 3908
TAX MAP 2 1E 25CD
CLACKAMAS COUNTY



SCALE: 1"=100 FEET



DATE: 08/24/2017

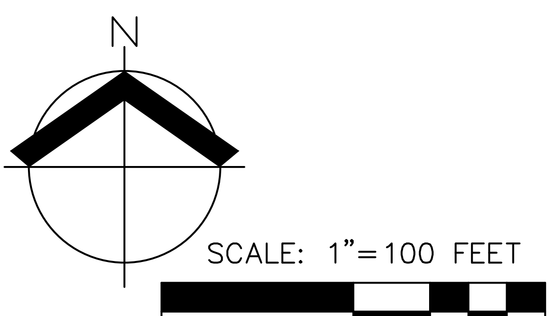
TAX MAP (MAP 2 1E 25CD)
KNOLLCREST SUBDIVISION NATURAL RESOURCE ASSESSMENT

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD SUITE 100
TUALATIN, OR 97062 www.aks-eng.com
PHONE: 503.563.6151 FAX: 503.563.6152

FIGURE **2B**
DRWN: KMK
CHKD: SAR
AKS JOB: 5132

MAP UNIT SYMBOL	MAP UNIT NAME
23C	CORNELIUS SILT LOAM, 8-15% SLOPES; NON-HYDRIC
30C	DELENA SILT LOAM, 3-12% SLOPES; HYDRIC

NRCS WEB SOIL SURVEY FOR
CLACKAMAS COUNTY



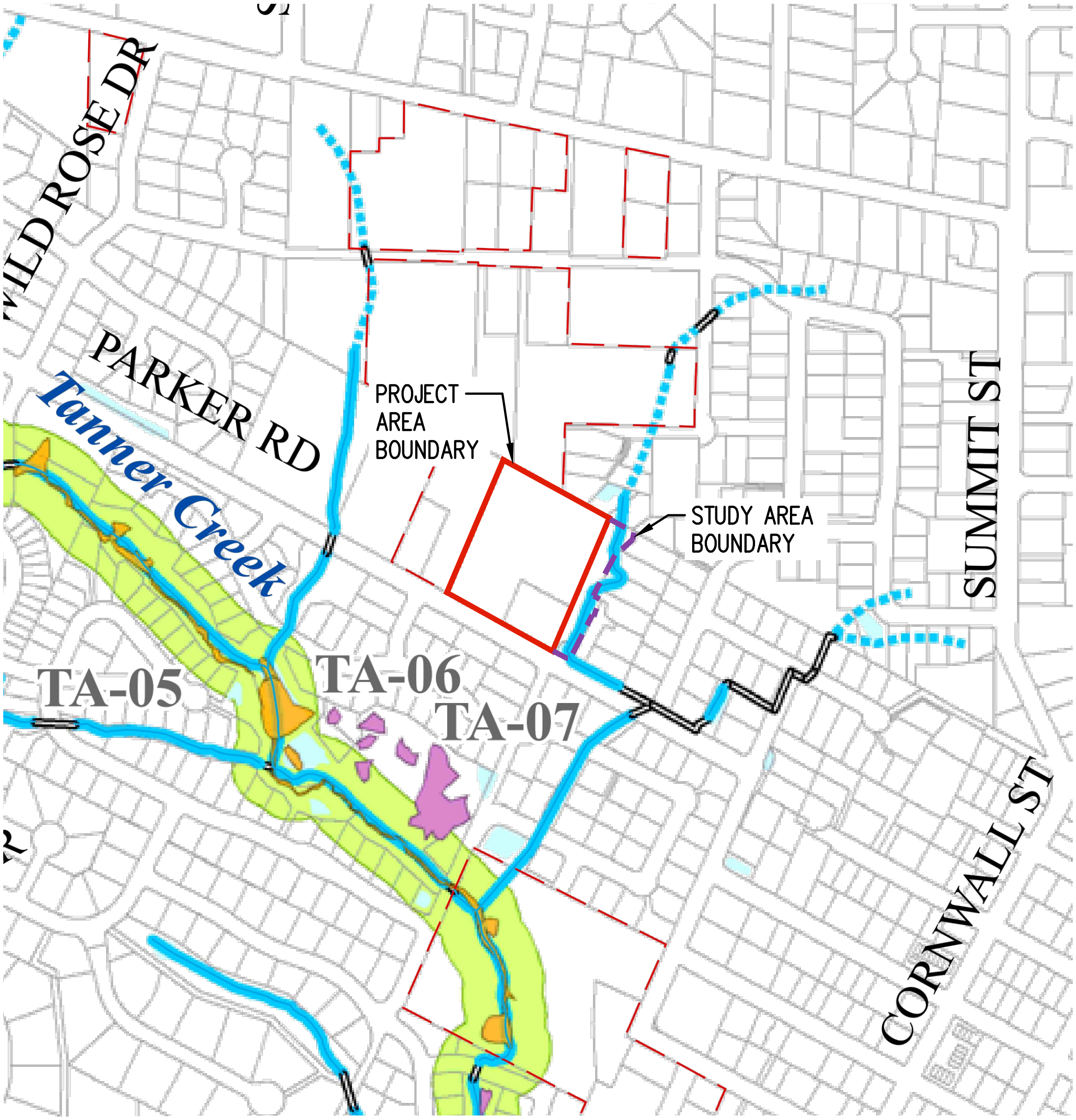
DATE: 08/24/2017

NRCS SOIL SURVEY MAP
KNOLLCREST SUBDIVISION NATURAL RESOURCE ASSESSMENT

FIGURE **3**

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD SUITE 100
TUALATIN, OR 97062 www.aks-eng.com
PHONE: 503.563.6151 FAX: 503.563.6152

DRWN: KMK
CHKD: SAR
AKS JOB: 5132



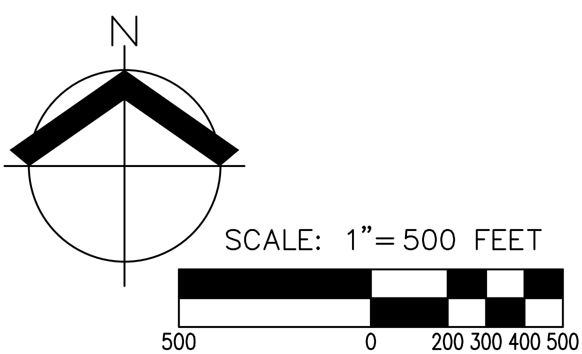
Goal 5 Significant Riparian Corridors*

- Significant Riparian Corridors
- Streams
- Ephemeral Stream
- Piped Segments
- Upper Stream Reach of Fish Inventory 2003/2004 Survey

Goal 5 Wetland Inventory**

- Locally Significant Wetlands, DSL 2005
- Other Wetlands, DSL 2005
- TA-05 Specific Wetland Identifier
- Rivers & Ponds
- West Linn City Limits
- Taxlot Base Map***

CITY OF WEST LINN
WATER RESOURCE AREA (WRA) MAP
MAY, 2014



DATE: 08/24/2017

CITY OF WEST LINN WRA MAP
KNOLLCREST SUBDIVISION NATURAL RESOURCE ASSESSMENT

FIGURE 4

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD SUITE 100
TUALATIN, OR 97062 www.aks-eng.com
PHONE: 503.563.6151 FAX: 503.563.6152

DRWN: KMK
CHKD: SAR
AKS JOB: 5132

Stream Lines

Significant Riparian Goal 5

Metro Habitat Protection
Published October 2005

Habitat Conservation Area

Allow Development

CITY OF WEST LINN
HABITAT CONSERVATION MAP
OCTOBER, 2005
GIS

N

SCALE: 1"=100 FEET

100 0 40 60 80 100

DATE: 08/24/2017

CITY OF WEST LINN HCA MAP
KNOLLCREST SUBDIVISION NATURAL RESOURCE ASSESSMENT

FIGURE
5

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD SUITE 100
TUALATIN, OR 97062 www.aks-eng.com
PHONE: 503.563.6151 FAX: 503.563.6152

DRWN: KMK
CHKD: SAR
AKS JOB:
5132

LEGEND - COLOR COPY

OFF-SITE WETLAND AREA

ON-SITE WETLAND AREA: 93 SF± (0.002 ACRES±)

ON-SITE WATER RESOURCE AREA (WRA): MARGINAL CONDITION: 24,937 SF± (0.57 ACRES±)

WETLAND BOUNDARY SHOWN WAS DELINEATED BY AKS ENGINEERING & FORESTRY, LLC ON MAY 30, 2017 AND WAS PROFESSIONALLY SURVEYED BY AKS ON MAY 31, 2017.

N

SCALE: 1"=60 FEET

60 0 24 36 48 60

ON 11 X 17

DATE: 08/21/2017

EXISTING CONDITIONS MAP
NATURAL RESOURCE ASSESSMENT

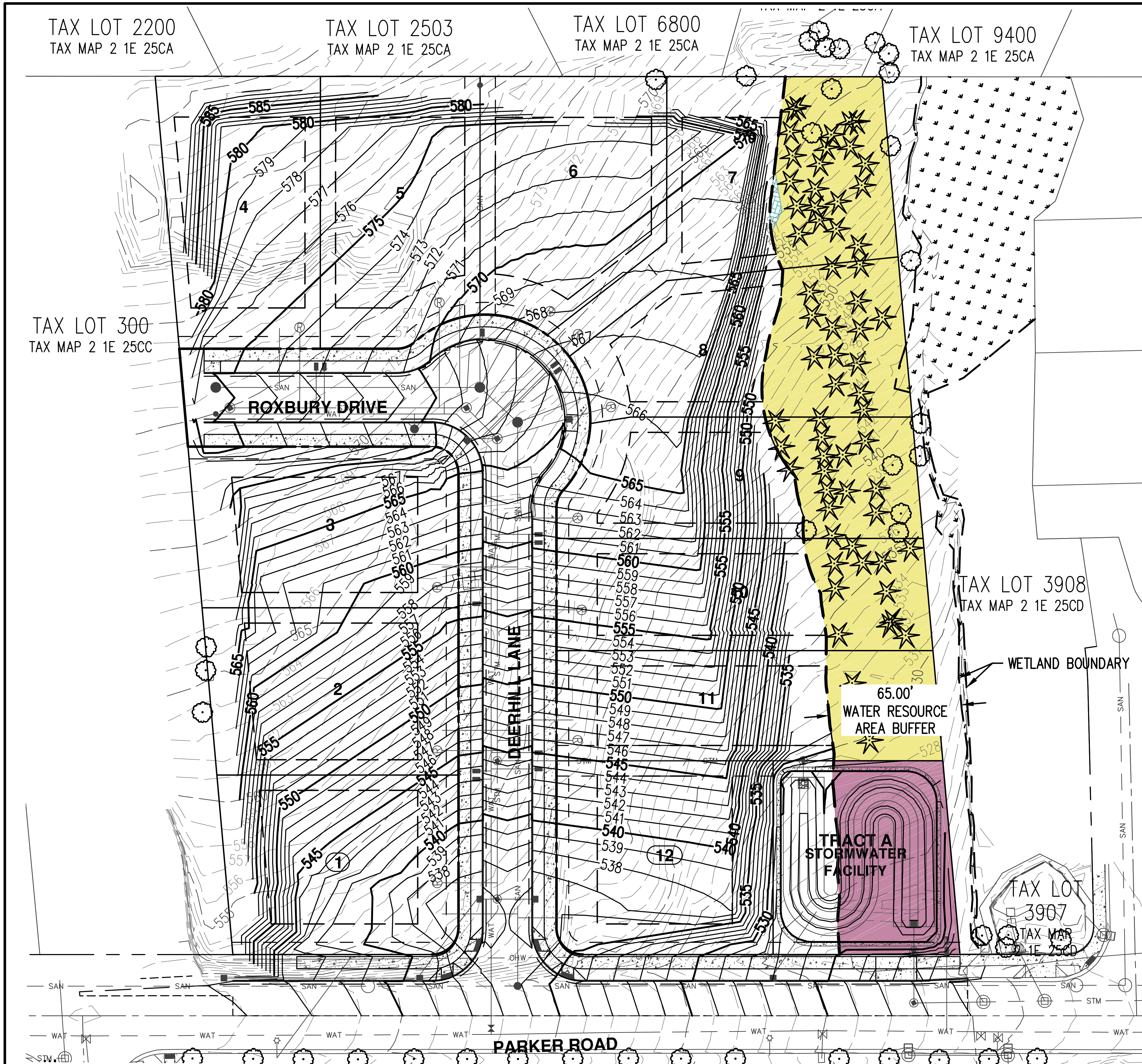
KNOLLCREST SUBDIVISION

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
TUALATIN, OR 97062
P: 503.563.6151 F: 503.563.6152 aks-eng.com

FIGURE 6

DRWN: KMK
CHKD: SAR
AKS JOB: 5132

DWG: 5132 NRA EXCOND FIGURE | FIGURE 6



LEGEND – COLOR COPY

- TEMPORARY WRA IMPACTS: 95 SF
- PERMANENT WRA IMPACTS: 5,327 SF
- WRA ENHANCEMENT AREA: 19,612 SF (TO BE PLANTED WITH NATIVE TREES AND SHRUBS TO MEET GOOD CONDITION)
- WETLAND AREA
- BUILDING SETBACKS

NOTE: WRA TO BE PLACED IN CONSERVATION EASEMENT.

SCALE: 1"=50 FEET

50 0 20 30 40 50

DATE: 08-21-2017

SITE PLAN	FIGURE 7
KNOLLCREST SUBDIVISION	
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD, STE 100 TUALATIN, OR 97062 P: 503.563.6151 F: 503.563.6152 aks-eng.com	DRWN: CLR CHKD: MBH AKS JOB: 5132

DWG: 5132 SITE PLAN | 17

Appendix A: Wetland Determination Data Sheets

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Knollcrest Subdivision | City/County: West Linn/ Clackamas | Sampling Date: 5/30/2017

Applicant/Owner: Carol and Noell Price | State: OR | Sampling Point: **1**

Investigator(s): Kayla Katkin and Stacey Reed | Section, Township, Range: 25CC 2S 1E

Landform (hillslope, terrace, etc.): Hillslope | Local relief (concave, convex, none): Concave | Slope (%): <5%

Subregion (LRR): A, Northwest Forests and Coast | Lat: | Long: | Datum:

Soil Map Unit Name: (30C) Delena Silt Loam, 3% to 12% Slopes | NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks)

Are Vegetation ___ ,Soil ___ , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X 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.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X

Precipitation: According to the NWS Portland station, 0.00 inches of rainfall was received on the day of the site visit and 0.46 inches within the two weeks prior.

Remarks: Plot is located approximately 6" from channel with water.

VEGETATION

Tree Stratum (Plot size: 30' r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 10' r)			
1.			
2.			
3.			
4.			
5.			
	0% = Total Cover		
Herb Stratum (Plot size: 5' r)			
1. *Holcus lanatus*	80%	Yes	FAC
2. *Phalaris arundinacea*	10%	No	FACW
3. *Agrostis capillaris*	10%	No	FAC
4. *Dipsacus fullonum*	2%	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	102% = Total Cover		
Woody Vine Stratum (Plot size: 10' r)			
1.			
2.			
	0% = Total Cover		
% Bare Ground in Herb Stratum 0%			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	10	x 2 = 20
FAC species	92	x 3 = 276
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	102 (A)	296 (B)

Prevalence Index = B/A = 2.90

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks:

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/3	100					SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (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)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum 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)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 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 (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):	
Water Table Present?	Yes ___	No X	Depth (inches):	>16"
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches):	>16"

Wetland Hydrology Present? **Yes** ___ **No** X

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: Knollcrest Subdivision City/County: West Linn/ Clackamas Sampling Date: 5/30/2017

Applicant/Owner: Carol and Noell Price State: OR Sampling Point: **2**

Investigator(s): Kayla Katkin and Stacey Reed Section, Township, Range: 25CC 2S 1E

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): <5%

Subregion (LRR): A, Northwest Forests and Coast Lat: ___ Long: ___ Datum: ___

Soil Map Unit Name: (30C) Delena Silt Loam, 3% to 12% Slopes NWI classification: ___

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks)

Are Vegetation ___ ,Soil ___ , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 ___	No **X**
Hydric Soil Present?	Yes ___	No **X**
Wetland Hydrology Present?	Yes ___	No **X**

Is the Sampled Area within a Wetland? **Yes** ___ **No** **X**

Precipitation: According to the NWS Portland station, 0.00 inches of rainfall was received on the day of the site visit and 0.46 inches within the two weeks prior.

Remarks: Plot is located approximately 3' away from the creek. Creek is approximately 1.5' wide with 3' tall banks and flow observed at the bottom.

VEGETATION

Stratum / Species	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30' r)			
1. *Acer macrophyllum*	10%	Yes	FACU
2. *Pseudotsuga menziesii*	10%	Yes	FACU
3. *Corylus cornuta*	10%	Yes	FACU
4. *Thuja plicata*	5%	No	FAC
	35% = Total Cover		
Sapling/Shrub Stratum (Plot size: 10' r)			
1.			
2.			
3.			
4.			
5.			
	0% = Total Cover		
Herb Stratum (Plot size: 5' r)			
1. *Schedonorus arundinaceus*	35%	Yes	FAC
2. *Echinochloa crus-galli*	25%	Yes	FAC
3. *Asclepias fascicularis*	20%	Yes	FAC
4. *Agrostis capillaris*	15%	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	95% = Total Cover		
Woody Vine Stratum (Plot size: 10' r)			
1.			
2.			
	0% = Total Cover		

% Bare Ground in Herb Stratum 5%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	100	x 3 = 300
FACU species	20	x 4 = 80
UPL species	0	x 5 = 0
Column Totals:	120 (A)	380 (B)

Prevalence Index = B/A = 3.17

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ___ **No** **X**

Remarks:

SOIL

Sampling Point: **2**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/2	100					SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (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)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ___ **No** **X**

Remarks: Many insects observed in soils.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum 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)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 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 (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):	
Water Table Present?	Yes ___	No X	Depth (inches):	>16"
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches):	>16"

Wetland Hydrology Present? Yes ___ **No** **X**

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: Knollcrest Subdivision City/County: West Linn/ Clackamas Sampling Date: 5/30/2017

Applicant/Owner: Carol and Noell Price State: OR Sampling Point: 3

Investigator(s): Kayla Katkin and Stacey Reed Section, Township, Range: 25CC 2S 1E

Landform (hillslope, terrace, etc.): Hillsope Local relief (concave, convex, none): Sl. Convex Slope (%): <5%

Subregion (LRR): A, Northwest Forests and Coast Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: (30C) Delena Silt Loam, 3% to 12% Slopes NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)

Are Vegetation ____ ,Soil ____ , or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? **Yes** ____ **No** X

Precipitation: According to the NWS Portland station, 0.00 inches of rainfall was received on the day of the site visit and 0.46 inches within the two weeks prior.

Remarks: Plot is located approximately 10' from the channel.

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30' r)			
1. *Corylus cornuta*	5%	Yes	FACU
2.			
3.			
4.			
	5% = Total Cover		
Sapling/Shrub Stratum (Plot size: 10' r)			
1.			
2.			
3.			
4.			
5.			
	0% = Total Cover		
Herb Stratum (Plot size: 5' r)			
1. *Phalaris arundinacea*	90%	Yes	FACW
2. *Agrostis capillaris*	10%	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100% = Total Cover		
Woody Vine Stratum (Plot size: 10' r)			
1.			
2.			
	0% = Total Cover		

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	90	x 2 = 180
FAC species	10	x 3 = 30
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	100 (A)	210 (B)

Prevalence Index = B/A = 2.10

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- ____ 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/2	100					SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (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)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks: No ORZ or redox features were observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum 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)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 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 (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):	
Water Table Present?	Yes ___	No X	Depth (inches):	>16"
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches):	>16"

Wetland Hydrology Present? **Yes** ___ **No** X

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: Knollcrest Subdivision   City/County: West Linn/ Clackamas   Sampling Date: 5/30/2017

Applicant/Owner: Carol and Noell Price   State: OR   Sampling Point: **4**

Investigator(s): Kayla Katkin and Stacey Reed   Section, Township, Range: 25CC 2S 1E

Landform (hillslope, terrace, etc.): Toeslope   Local relief (concave, convex, none): Concave   Slope (%): <3%

Subregion (LRR): A, Northwest Forests and Coast   Lat: ____   Long: ____   Datum: ____

Soil Map Unit Name: (30C) Delena Silt Loam, 3% to 12% Slopes   NWI classification: ____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed?   Are "Normal Circumstances" present? Yes X 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 **X**	No ____
Hydric Soil Present?	Yes **X**	No ____
Wetland Hydrology Present?	Yes **X**	No ____

Is the Sampled Area within a Wetland? **Yes X** **No** ____

Precipitation: According to the NWS Portland station, 0.00 inches of rainfall was received on the day of the site visit and 0.46 inches within the two weeks prior.

Remarks:

VEGETATION

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30' r)			
1.			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 10' r)			
1.			
2.			
3.			
4.			
5.			
	0% = Total Cover		
Herb Stratum (Plot size: 5' r)			
1. *Phalaris arundinacea*	90%	Yes	FACW
2. *Veronica americana*	5%	No	OBL
3. *Juncus effusus*	5%	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100% = Total Cover		
Woody Vine Stratum (Plot size: 10' r)			
1.			
2.			
	0% = Total Cover		

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	95	x 2 =	190
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		195 (B)

Prevalence Index = B/A = 1.95

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes X** **No** ____

Remarks:

SOIL

Sampling Point: 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/3	70	7.5YR 4/6	30	C	M/ PL	SiL	
6-14	10YR 3/1	90	7.5YR 3/4	10	C	M/ PL	SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (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)
_X_ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ________

Depth (inches): ________

Hydric Soil Present? Yes _X_ **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum 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)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 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)
_X_ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
_X_ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No _X_	Depth (inches):	___
Water Table Present?	Yes ___	No _X_	Depth (inches):	>14"
Saturation Present? (includes capillary fringe)	Yes ___	No _X_	Depth (inches):	>14"

Wetland Hydrology Present? Yes _X_ **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: Knollcrest Subdivision City/County: West Linn/ Clackamas Sampling Date: 5/30/2017

Applicant/Owner: Carol and Noell Price State: OR Sampling Point: **5**

Investigator(s): Kayla Katkin and Stacey Reed Section, Township, Range: 25CC 2S 1E

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 5%-10%

Subregion (LRR): A, Northwest Forests and Coast Lat: ____ Long: ____ Datum: ____

Soil Map Unit Name: (30C) Delena Silt Loam, 3% to 12% Slopes NWI classification: ____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)

Are Vegetation ____ ,Soil ____ , or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 **X**	No ____
Hydric Soil Present?	Yes ____	No **X**
Wetland Hydrology Present?	Yes ____	No **X**

Is the Sampled Area within a Wetland? **Yes** ____ **No X**

Precipitation: According to the NWS Portland station, 0.00 inches of rainfall was received on the day of the site visit and 0.46 inches within the two weeks prior.

Remarks: Plot is located approximately 6" from channel.

VEGETATION

Tree Stratum (Plot size: 30' r)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer macrophyllum*	5%	Yes	FACU
2. *Pseudotsuga menziesii*	5%	Yes	FACU
3. *Corylus cornuta*	5%	Yes	FACU
4.			
	15% = Total Cover		
Sapling/Shrub Stratum (Plot size: 10' r)			
1. *Symphoricarpos albus*	5%	Yes	FACU
2.			
3.			
4.			
5.			
	5% = Total Cover		
Herb Stratum (Plot size: 5' r)			
1. *Agrostis capillaris*	40%	Yes	FAC
2. *Phalaris arundinacea*	40%	Yes	FACW
3. *Echinochloa crus-galli*	10%	No	FAC
4. *Juncus effusus*	5%	No	FACW
5. *Asclepias fascicularis*	5%	No	FAC
6. *Dipsacus fullonum*	2%	No	FAC
7. *Taraxacum officinale*	2%	No	FACU
8.			
9.			
10.			
11.			
	104% = Total Cover		
Woody Vine Stratum (Plot size: 10' r)			
1.			
2.			
	0% = Total Cover		

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	45	x 2 = 90
FAC species	57	x 3 = 171
FACU species	17	x 4 = 68
UPL species	0	x 5 = 0
Column Totals:	119 (A)	329 (B)

Prevalence Index = B/A = 2.76

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes X No** ____

Remarks:

SOIL

Sampling Point: **5**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	100					SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (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)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum 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)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 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 (D7)

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):	
Water Table Present?	Yes		No	X	Depth (inches):	>12"
Saturation Present? (includes capillary fringe)	Yes		No	X	Depth (inches):	>12"

Wetland Hydrology Present? Yes ___ **No** X

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: Knollcrest Subdivision City/County: West Linn/ Clackamas Sampling Date: 5/30/2017

Applicant/Owner: Carol and Noell Price State: OR Sampling Point: **6**

Investigator(s): Kayla Katkin and Stacey Reed Section, Township, Range: 25CC 2S 1E

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): <5%

Subregion (LRR): A, Northwest Forests and Coast Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: (30C) Delena Silt Loam, 3% to 12% Slopes NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)

Are Vegetation ____ ,Soil ____ , or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 ____	No **X**
Hydric Soil Present?	Yes ____	No **X**
Wetland Hydrology Present?	Yes ____	No **X**

Is the Sampled Area within a Wetland? **Yes** ____ **No** **X**

Precipitation: According to the NWS Portland station, 0.00 inches of rainfall was received on the day of the site visit and 0.46 inches within the two weeks prior.

Remarks: Plot is located approximately 6" from channel.

VEGETATION

Tree Stratum (Plot size: 30' r)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Corylus cornuta*	75%	Yes	FACU
2.			
3.			
4.			
	75% = Total Cover		
Sapling/Shrub Stratum (Plot size: 10' r)			
1. *Rubus armeniacus*	20%	Yes	FAC
2. *Symphoricarpos albus*	10%	Yes	FACU
3.			
4.			
5.			
	30% = Total Cover		
Herb Stratum (Plot size: 5' r)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	0% = Total Cover		
Woody Vine Stratum (Plot size: 10' r)			
1. *Hedera helix*	40%	Yes	FACU
2.			
	40% = Total Cover		

% Bare Ground in Herb Stratum 100%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	20	x 3 =	60
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	70 (A)		260 (B)

Prevalence Index = B/A = 3.71

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vascular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ____ **No** **X**

Remarks:

SOIL

Sampling Point: **6**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	100					SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (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)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum 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)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 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 (D7)

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):	
Water Table Present?	Yes		No	X	Depth (inches):	>12"
Saturation Present? (includes capillary fringe)	Yes		No	X	Depth (inches):	>12"

Wetland Hydrology Present? **Yes** ___ **No** **X**

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: Knollcrest Subdivision City/County: West Linn/ Clackamas Sampling Date: 5/30/2017

Applicant/Owner: Carol and Noell Price State: OR Sampling Point: 7

Investigator(s): Kayla Katkin and Stacey Reed Section, Township, Range: 25CC 2S 1E

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Sl. Concave Slope (%): <5%

Subregion (LRR): A, Northwest Forests and Coast Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: (30C) Delena Silt Loam, 3% to 12% Slopes NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)

Are Vegetation ____ ,Soil ____ , or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? Yes ____ No X

Precipitation: According to the NWS Portland station, 0.00 inches of rainfall was received on the day of the site visit and 0.46 inches within the two weeks prior.

Remarks: Plot is located approximately 3' away from the creek. Creek is approximately 1.5' wide with 3' tall banks and flow observed at the bottom.

VEGETATION

Tree Stratum (Plot size: 30' r)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Corylus cornuta*	15%	Yes	FACU
2. *Acer macrophyllum*	10%	Yes	FACU
3.			
4.			
	25% = Total Cover		
Sapling/Shrub Stratum (Plot size: 10' r)			
1. *Rubus armeniacus*	40%	Yes	FAC
2. *Corylus cornuta*	20%	Yes	FACU
3. *Crataegus monogyna*	20%	Yes	FAC
4. *Rosa pisocarpa*	15%	No	FAC
5. *Symphoricarpos albus*	5%	No	FACU
	100% = Total Cover		
Herb Stratum (Plot size: 5' r)			
1. *Holcus lanatus*	90%	Yes	FAC
2. *Agrostis capillaris*	5%	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	95% = Total Cover		
Woody Vine Stratum (Plot size: 10' r)			
1.			
2.			
	0% = Total Cover		

% Bare Ground in Herb Stratum 5%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	170	x 3 = 510
FACU species	35	x 4 = 140
UPL species	0	x 5 = 0
Column Totals:	205 (A)	650 (B)

Prevalence Index = B/A = 3.17

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vascular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: 7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-13	10YR 3/2	100					SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (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)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ **No** X

Remarks: Many insects observed in soils.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum 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)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 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 (D7)

Field Observations:

	Yes	No	Depth (inches):
Surface Water Present?		X	
Water Table Present?		X	>13"
Saturation Present? (includes capillary fringe)		X	>13"

Wetland Hydrology Present? Yes ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix B: WRA Plot Data Sheets

Water Resource Area (WRA) Condition Assessment for City of West Linn Natural Resource Assessment

Site: Knollcrest Subdivision
Job Number: 5132
Investigators: Kayla Katkin and Stacey Reed
Date: 5/30/2017

Community: Douglas fir / Mixed Shrub
Location: Eastern Portion of Study Area
Plot ID: Plot A

Tree species, % Cover, Native, Invasive - 30 foot radius, >5% cover:			55%
* *Pseudotsuga menziesii*	Douglas-fir	native	45%
* *Prunus emarginata*	bitter cherry	native	10%

Shrub species, % Cover, Native, Invasive - 30 foot radius, >5% cover:			85%
* *Corylus cornuta*	beaked hazelnut	native	40%
* *Crataegus monogyna*	English hawthorn	non-native	20%
Rubus armeniacus	Himalayan blackberry	invasive	10%
Symphoricarpos albus	common snowberry	native	10%
Oemleria cerasiformis	oso-berry	native	5%

Herb Species, % Cover, Native, Invasive - 10 foot radius, >5% cover:			45%
* *Hedera Helix*	English ivy	invasive	40%
* *Juncus effusus*	lamp rush	native	5%

* Dominant

Total Cover 185%

	Absolute areal cover
% Tree canopy:	**55%**
% Cover by natives:	115%
% Invasive:	50%
% Non-native:	20%
	185%

Corridor Condition: Marginal

Site: Knollcrest Subdivision
Job Number: 5132
Investigators: Kayla Katkin and Stacey Reed
Date: May 30, 2017

Community: Douglas-fir Planted Forest
Location: Westernmost portion of WRA
Plot ID: Plot B

Tree species, % Cover, Native, Invasive - 30 foot radius, >5% cover: 55%

*	*Pseudotsuga menziesii*	Douglas fir	native	50%
	Crataegus monogyna	English hawthorn	non-native	5%

Shrub species, % Cover, Native, Invasive - 30 foot radius, >5% cover: 10%

*	*Rubus armeniacus*	Himalayan blackberry	invasive	10%

Herb Species, % Cover, Native, Invasive - 10 foot radius, >5% cover: 5%

*	*Polystichum munitum*	pineland sword fern	native	5%

* Dominant

Total Cover 70%

	Absolute areal cover
% Tree canopy:	**55%**
% Cover by natives:	55%
% Invasive:	10%
% Non-native:	5%
	70%

Corridor Condition: Marginal

Appendix C: Representative Ground-Level Photographs

Photo A. View facing north with the western wetland boundary in view.

Photo B. View west of VECO Plot A degraded condition vegetated corridor. This area contains some native species, but lacks canopy and contains invasive species.

Photo C. View facing west from within degraded condition vegetated corridor. Trees are planted with generally no understory.

Photo D. View facing west of non-jurisdictional erosional rill.

Photos taken by Kayla Katkin, May 30, 2017

Appendix D: Knollcrest Subdivision WRA Planting Specifications

Water Resource Area (WRA) Enhancement Planting Specifications

Planting specifications for the restoration of 95 square feet of temporarily disturbed WRA.

Scientific Name	Common Name	Size*	Spacing/Seeding Rate	Quantity
Shrubs (total 5)				
Polystichum munitum	Sword fern	2 gallon	4-5 feet on center	2
Mahonia aquifolium	tall Oregon Grape	1 gallon	4-5 feet on center	1
Sambucus racemosa	red elderberry	1 gallon	4-5 feet on center	1
Symphoricarpos albus	common snowberry	1 gallon	4-5 feet on center	1
Seed Mix				
Agrostis exarata	spike bentgrass	seed	1 lb pls/acre	As needed for bare soil areas >25 square feet
Deschampsia elongata	slender hairgrass	seed	2 lbs pls/acre	

**Bare root plants may be substituted for container plants based on availability. If bare root plants are used, they must be planted during the late winter/early spring dormancy period.*

Planting specifications for the re-vegetation enhancement of 19,612 SF of WRA to off-set permanently disturbed WRA.

Scientific Name	Common Name	Size*	Spacing/Seeding Rate	Quantity
Trees (total 30)				
Rhamnus purshiana	cascara	2 gallon	8-12 feet on center	15
Prunis emarginata	bitter cherry	2 gallon	8-12 feet on center	15
Shrubs (total 981)				
Rosa gymnocarpa	baldhip rose	1 gallon	4-5 feet on center	197
Mahonia aquifolium	tall Oregon grape	1 gallon	4-5 feet on center	196
Almelanchier alnifolia	serviceberry	1 gallon	4-5 feet on center	196
Sambucus racemosa	red elderberry	1 gallon	4-5 feet on center	196
Symphoricarpos albus	common snowberry	1 gallon	4-5 feet on center	196
Seed Mix				
Agrostis exarata	spike bentgrass	seed	1 lb pls/acre	As needed for bare soil areas >25 square feet
Deschampsia elongata	slender hairgrass	seed	2 lbs pls/acre	

**Bare root plants may be substituted for container plants based on availability. If bare root plants are used, they must be planted during the late winter/early spring dormancy period.*

Planting and Maintenance Notes (per City of West Linn Chapter 32.100 Re-Vegetation Plan Requirements)

1. All trees, shrubs and ground cover to be planted must be native plants selected from the Portland Plant List.

2. Plant Size. Shrubs must be in at least a 1-gallon container or the equivalent in ball and burlap and must be at least 12 inches in height.

3. When planting near existing trees, the dripline of the existing tree must be the starting point for plant spacing measurements.

4. Invasive Vegetation. Invasive non-native or noxious vegetation must be removed within the mitigation area prior to planting.

5. Tree and Shrub Survival. A minimum survival rate of 80% of the trees and shrubs planted is expected by the third anniversary of the date that the mitigation planting is completed.

Monitoring and Reporting. Monitoring of the mitigation site is the ongoing responsibility of the property owner. Plants that die must be replaced in kind.

Mulching. Mulch new plantings a minimum of 3 inches in depth and 18 inches in diameter to retain moisture and discourage weed growth.

Irrigation. Water new plantings 1 inch per week between June 15th and October 15th for the three years following planting.

Planting Season. Plant bare root trees between December 1st and February 28th, and potted plants between October 15th and April 30th.

Wildlife Protection. Use plant sleeves or fencing to protect trees and shrubs against wildlife browsing and resulting damage to plants.

Exhibit D: Property Deed

First American Title

Customer Service Department
121 SW Morrison St., Suite 300
Portland, OR 97204
Phone: 503.219.TRIO (8746)
Fax: 503.790.7872
Email: cs.portland@firstam.com
Date: 6/21/2016

OWNERSHIP INFORMATION

Owner:	Noell Price	Parcel #:	00377782
Coowner:		Ref Parcel #:	21E25CC00100
Site:	97068	TRS:	T: 02S R: 01E S: 25 Q: SW
Mail:	3015 S Parker Rd West Linn OR 97068	County:	Clackamas

PROPERTY DESCRIPTION

Map Grid:	686-J7
Census Tract:	020600 Block: 3050
Neighborhood:	PARKER CREST
School Dist:	3J WEST LINN-WILSONVILLE
Subdiv/Plat:	
Land Use:	ATIM TIMBER
Zoning:	Clackamas Co.-FU10 Future Urbanizable 10 Acre District
Watershed:	Abernethy Creek-Willamette River
Legal:	Section 25 Township 2S Range 1E Quarter CC TAX LOT 00100|Y

ASSESSMENT AND TAXATION

Market Land:	$127,658
Market Impr:	$0
Market Total:	$127,658 (2015)
% Improved:	
Assessed Total:	$234 (2015)
Levy Code:	003-031
Tax:	$4.07 (2015)
Millage Rate:	17.3897

PROPERTY CHARACTERISTICS

Bedrooms:		Building Area:		Year Built:	
Baths, Total:	0.00	First Floor:		Eff Year Built:	
Baths, Full:		Second Floor:		Lot Size:	.55 Acres
Baths, Half:		Basement Fin:		Lot Size:	23,958 SqFt
Total Units:		Basement Unfin:		Lot Width:	
# Stories:	0.00	Basement Total:		Lot Depth:	
# Fireplaces:		Attic Fin:		Roof Material:	
Cooling:	No	Attic Unfin:		Roof Shape:	
Heating:		Attic Total:			
Ext Walls:		Garage:			
Building Style:				Const Type:	0.0

SALES AND LOAN INFORMATION

Owner	Date	Doc #	Sale Price	Deed Type	Loan Amt	Loan Type
PRICE LIVING TRUST	10/18/10	0000065643		Quit Claim		
	10/06/10	2010-065643				Conv/Unk

First American Title

Customer Service Department
121 SW Morrison St., Suite 300
Portland, OR 97204
Phone: 503.219.TRIO (8746)
Fax: 503.790.7872
Email: cs.portland@firstam.com
Date: 6/21/2016

OWNERSHIP INFORMATION

Owner:	Noell Price	Parcel #:	00377826
Coowner:		Ref Parcel #:	21E25CC00200
Site:	3015 S Parker Rd West Linn 97068	TRS:	T: 02S R: 01E S: 25 Q: SW
Mail:	3015 S Parker Rd West Linn OR 97068	County:	Clackamas

PROPERTY DESCRIPTION

Map Grid:	686-J6
Census Tract:	020600 Block: 3050
Neighborhood:	PARKER CREST
School Dist:	3J WEST LINN-WILSONVILLE
Subdiv/Plat:	
Land Use:	ATIM TIMBER
Zoning:	Clackamas Co.-FU10 Future Urbanizable 10 Acre District
Watershed:	Abernethy Creek-Willamette River
Legal:	Section 25 Township 2S Range 1E Quarter CC TAX LOT 00200|Y

ASSESSMENT AND TAXATION

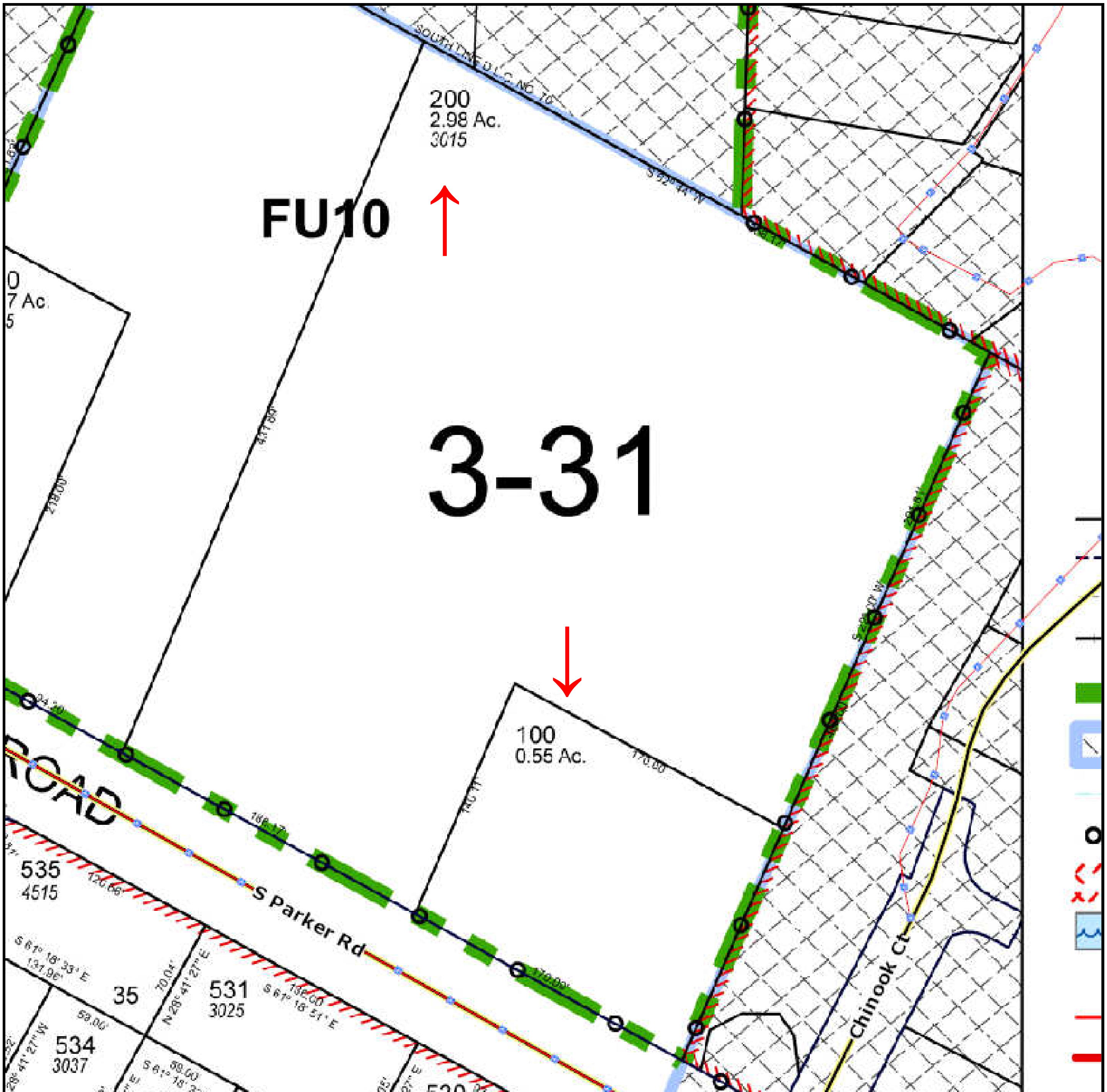
Market Land:	$232,474
Market Impr:	$171,000
Market Total:	$403,474 (2015)
% Improved:	42
Assessed Total:	$202,402 (2015)
Levy Code:	003-031
Tax:	$3,332.68 (2015)
Millage Rate:	17.3897

PROPERTY CHARACTERISTICS

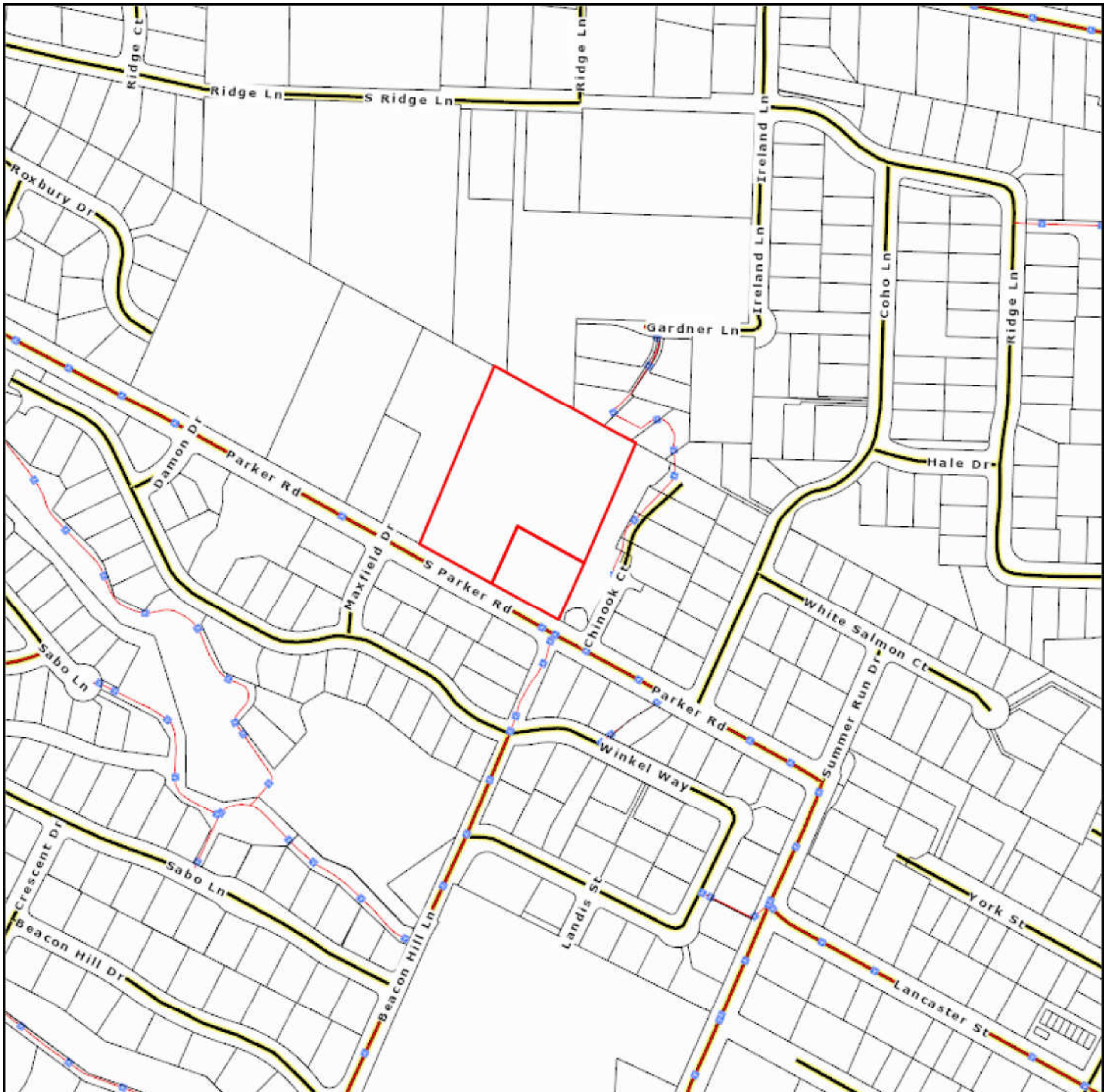
Bedrooms:	3	Building Area:	2,388 SqFt	Year Built:	1974
Baths, Total:	2.00	First Floor:	1,724 SqFt	Eff Year Built:	
Baths, Full:	2	Second Floor:		Lot Size:	2.98 Acres
Baths, Half:		Basement Fin:	434 SqFt	Lot Size:	129,809 SqFt
Total Units:	1	Basement Unfin:		Lot Width:	
# Stories:	1.00	Basement Total:	434 SqFt	Lot Depth:	
# Fireplaces:	1	Attic Fin:		Roof Material:	
Cooling:	No	Attic Unfin:		Roof Shape:	
Heating:	Forced Air	Attic Total:			
Ext Walls:	2	Garage:			
Building Style:	14 Single family res, class 4			Const Type:	6.0

SALES AND LOAN INFORMATION

Owner	Date	Doc #	Sale Price	Deed Type	Loan Amt	Loan Type
PRICE NOELL H TR	10/06/10	0000065643		Grant		Conv/Unk
PRICE,NOELL H & CAROL F	03/15/10	0000015829		Trust	$306,000	Conv/Unk



First American Title



First American Title

This map/plat is being furnished as an aid in locating the herein described land in relation to adjoining streets, natural boundaries and other land, and is not a survey of the land depicted. Except to the extent a policy of title insurance is expressly modified by endorsement, if any, the company does not insure dimensions, distances, location of easements, acreage or other matters shown thereon.

geoAdvantage

3/3

Clackamas County Official Records
Sherry Hall, County Clerk

2010-065643

01443038201000656430030038

$57.00

10/18/2010 02:20:05 PM

D-D Cnt=1 Stn=9 DIANNAW
$15.00 $10.00 $16.00 $16.00

MAIL TAX STATEMENTS TO:
Trustee of the Price Living Trust
3015 Parker Road
West Linn, OR 97068

AFTER RECORDING RETURN TO:
Jeffrey G. Moore, Attorney
Saalfeld Griggs, PC
PO Box 470
Salem, OR 97308

WARRANTY DEED

Noell H. Price and ***Carol F. Price***, husband and wife, Grantors, convey to ***Noell H. Price and Carol F. Price, Trustees of the Price Living Trust dated*** October 6, ***2010, and any amendments thereto,*** Grantee, the following described real property situated in the County of Clackamas, State of Oregon:

See Exhibit "A" attached hereto and made a part hereof by this reference.

Grantors covenant that Grantors are seized of an indefeasible estate in the real property described above in fee simple, that Grantors have good right to convey the property, that the property is free from encumbrances except as specifically set forth herein, and that Grantors warrant and will defend the title to the property against all persons who may lawfully claim the same by, through, or under Grantors, provided that the foregoing covenants are limited to the extent of coverage available to Grantors under any applicable standard or extended policies of title insurance, it being the intention of the Grantors to preserve any existing title insurance coverage.

This deed is executed to partially fund a trust of Grantors, and the true and actual consideration stated in terms of dollars is NONE.

The following is the notice as required by Oregon law: "BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON TRANSFERRING FEE TITLE SHOULD INQUIRE ABOUT THE PERSON'S RIGHTS, IF ANY, UNDER ORS 195.300, 195.301 AND 195.305 TO 195.336 AND SECTIONS 5 TO 11, CHAPTER 424, OREGON LAWS 2007, AND SECTIONS 2 TO 9 AND 17, CHAPTER 855, OREGON LAWS 2009. THIS INSTRUMENT DOES NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY THAT THE UNIT OF LAND BEING TRANSFERRED IS A LAWFULLY ESTABLISHED LOT OR PARCEL, AS DEFINED IN ORS 92.010 OR 215.010, TO VERIFY THE APPROVED USES OF THE LOT OR PARCEL, TO DETERMINE ANY LIMITS ON LAWSUITS AGAINST FARMING OR FOREST PRACTICES, AS DEFINED IN ORS 30.930, AND TO INQUIRE ABOUT THE RIGHTS OF NEIGHBORING

PROPERTY OWNERS, IF ANY, UNDER ORS 195.300, 195.301 AND 195.305 TO 195.336 AND SECTIONS 5 TO 11, CHAPTER 424, OREGON LAWS 2007, AND SECTIONS 2 TO 9 AND 17, CHAPTER 855, OREGON LAWS 2009."

WITNESS Grantors' hand this 6th day of October, 2010.

Noell H. Price

Noell H. Price

Carol F. Price

Carol F. Price

STATE OF OREGON)
) ss.
COUNTY OF MARION)

On this 6th day of October, 2010 personally appeared the above named ***Noell H. Price*** and ***Carol F. Price*** and acknowledged the foregoing instrument to be their voluntary act and deed.

Before me:

OFFICIAL SEAL
REBECCA ANN RIFE
NOTARY PUBLIC - OREGON
COMMISSION NO. 436986
MY COMMISSION EXPIRES APR. 7, 2013

Notary Public for Oregon
My Commission Expires: 4/7/13

EXHIBIT "A"

Part of the Julia Ann Lewis, D.L.C. No. 54 located in the Southwest quarter of the Section 25, T. 2S, R. 1E., of the W.M., in Clackamas County, Oregon, described as follows:

BEGINNING at a stake in the Northeast boundary line of said D.L.C. 758.46 feet, South 63° East from a stone set in said Northeast boundary line, South 63° East, 26 chains from the North corner of said claim; thence South 22° West 462 feet to the center of the County Road No. 375; thence South 63° East along the center of said County Road, a distance of 1089.54 to the Southwest corner of the tract conveyed to Howard M. Colton, et ux, by Deed Book 592, Page 441, said point being the true point of beginning of the tract herein to be described; thence North 22° East, a distance of 462 feet to a stone set in the Northeasterly boundary line of said claim that is 54 chains South 63° East, from the most Northerly corner of said claim; thence North 63° West, along the Northeasterly boundary line of said D.L.C., a distance of 356.17 feet to the Northeast corner of that tract conveyed by contract to Ronald N. Milner, et ux, by Recorder's Fee No. 70-10154; thence South 22° West along the East line of the Milner Tract, a distance of 462 feet to a point in the center of the County Road No. 375; thence South 63° East, along said center line, a distance of 356.17 feet to the point of beginning.

Exhibit E: Neighborhood Meeting Documentation

August 21, 2017

Neighborhood Meeting Minutes: 3001 and 3015 Parker Road, West Linn
Meeting Date: August 15, 2017
Time: 6:00 PM
Location: West Linn Adult Community Center, 1180 Rosemont Road, West Linn

In preparation for the submission of a land use application for a subdivision for the subject property, the applicant conducted a neighborhood meeting in accordance with applicable City regulations. Zach Pelz from AKS Engineering & Forestry was present. The meeting began with a presentation by Zach Pelz, which explained the City's decision-making process as it relates to residential subdivisions, including a general timeline of key points between submittal of the application and the City's final decision (e.g., staff's completeness review, public notice and comment period, staff report available, Planning Commission Public Hearing, etc.). Zach Pelz also provided a brief history of the property, including the recent annexation to the City of West Linn in January 2017, and the City's prior decisions to apply a low-density residential Comprehensive Plan Map designation to the property.

Zach also provided an overview of the subdivision, including lot dimensional characteristics, areas preserved for natural resource and habitat protection, and public and private improvements. Following the presentation attendees asked questions about the project. The following is a record of the questions asked and the answers that were provided.

Item	Question	Response
1	How many lots will this subdivision be?	This application is for a 12-lot subdivision.
2	Why are the cars from this subdivision going onto Parker Road and not Rosemont Road?	Because the property fronts onto Parker Road, the City requires a new public street connection onto Parker Road. This property does not abut Rosemont Road and as such there is not a way to make a connection to Rosemont Road.
3	What other impacts will there be from this development, and how are they accounted for?	The site zoning is R10 and as such the City supports development of single-family homes on this site.
4	What will happen with the existing trees? Will they be replaced?	There are about 700 Douglas Fir trees on the site as part of a commercial tree farm on the site. Many of the trees will be removed, and as they are part of a commercial tree farm are exempt from the City's tree preservation requirements. There are trees in the natural resource buffer that will remain.

Item	Question	Response
5	A concern was raised about storm drainage that goes into a storm facility that the City owns.	The storm facility in question is not on this property. The City provides maintenance for that facility, and any questions/ concerns about it should be addressed directly to them. This site will have its own storm water facility in a tract on the southeast side of the property.
6	Is there a plan that shows future roadways on adjacent undeveloped properties?	For a subdivision of this size, the City doesn't require a shadow plat that shows adjacent properties. The City's TSP does show a connection from Roxbury Drive.
7	When will the trees be cut?	The site grading will be the first part of construction after the land use approvals. It likely won't be this year.
8	How many people own this property?	There is one property owner who owns both parcels.
9	Do residents of West Linn get to vote on the subdivision application?	No, there is not a vote. This application will be decided on by the Planning Commission at a public hearing.
10	Why are we talking about building new homes when another development down the road hasn't been selling?	Those properties are not owned by our client. Our client and the City both believe there is a need for additional housing. It is hard to say why the other homes haven't sold, it could be any number of reasons.
11	What happens if this development gets started and the market crashes? Could this possibly be a half-finished development?	It is possible.
12	What trees are being preserved on the property? Are they non-exempt trees?	They are being preserved because they are part of the natural resource buffer.
13	A concern was raised about schools and capacity and when additional schools would be built.	The school district does review the City's plans for future development so they can plan accordingly.
14	Do you know where the school boundaries are for the different schools in West Linn?	Those boundaries are already in place, and the maps are available on the West Linn-Wilsonville School District website.
15	How is the 65' natural resource buffer measured?	In this case, the buffer is measured approximately from the center of the waterway.
16	Will there be fencing along the edge of the buffer?	Fencing is not required, but it will have signs denoting the resource protection area.

Item	Question	Response
17	Will fencing be installed along the rear property lines of the other lots?	Any fencing will be at the discretion of the builder.
18	Isn't it a good idea for the City to communicate with the school board about future needs?	The City and the school board do have regular meetings and coordinate with future capacity needs.
19	How close is the property to Parker Road?	The north side of Parker Road will have a 6-foot planter strip and a 6-foot sidewalk, and beyond the sidewalk will be the private lot.
20	Will trees be planted to accommodate the ones that will be removed? Will this development have a nature trail?	There will be additional trees planted in the natural resource area. This area does not have a nature trail that is planned.
21	Does the City of West Linn have restrictions on how much vegetation can be removed?	The City of West Linn does have restrictions on what can be removed for non-exempt trees. Of the 700 or so trees on the site, over 650 are exempt due to their tree farm status. For the non-exempt trees that are removed, trees will be planted for mitigation purposes.
22	Can you explain why the road is being shown at that location?	The road is in that location due to the existing grade of the site.
23	When are you planning to reapply for R-7 on this site?	The applicant is not planning to apply for a zone change to R-7.
24	Can the location of the stub street to the west be modified?	The street stub shown on the Applicant's plans is intended to facilitate a future connection with Roxbury Drive west of the site, pursuant to the City's 2016 TSP.
25	Is there a neighborhood nearby that has comparable lot sizes?	Most of the properties in the area were PUD's and are slightly smaller than what is being proposed with these R-10 lots.
26	Are these plans available online?	They are not currently online. People are welcome to take photos of them. Once the application is submitted the application materials will be available on the City's website.
27	Will the existing house remain?	The existing house will be demolished.
28	Do you know what builder might build the homes on these lots?	At this point, we don't know who will build these homes.

Item	Question	Response
29	Will there be a traffic signal at Parker Road and Salamo Road?	It will be a while before a signal is warranted in that location. It is possible that they may install stop signs at that location.

The meeting concluded at approximately 7:10 PM.

Sincerely,
AKS ENGINEERING & FORESTRY, LLC

Zach Pelz, AICP

AKS ENGINEERING & FORESTRY

AKS ENGINEERING & FORESTRY, LLC
12965 SW Herman Road, Suite 100, Tualatin, OR 97062
P: (503) 563-6151 F: (503) 563-6152

OFFICES IN: TUALATIN, OR - VANCOUVER, WA - SALEM-KEIZER, OR

Parker Road	Neighborhood Meeting
August 15, 2017	West Linn Adult Community Center
6:00 p.m.	1180 Rosemont Road, West Linn, OR 97068

PLEASE PRINT CLEARLY

Printed Name	Full Mailing Address	Email Address	Zip Code	Phone #
CHAITALI CHATTOPADHYAY	4748 GARDNER LN WEST LINN OR 97068	bubujsr@yahoo.com	97068	503 682 9141
SANDIP CHATTOPADHYAY	4748 Gardner Ln West Linn, OR 97068	sandip.chattopadhyay@gmail.com	97068	5033347173

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OFFICES IN: TUALATIN, OR - VANCOUVER, WA - SALEM-KEIZER, OR

Parker Road	Neighborhood Meeting
August 15, 2017	West Linn Adult Community Center
6:00 p.m.	1180 Rosemont Road, West Linn, OR 97068

PLEASE PRINT CLEARLY

Printed Name	Full Mailing Address	Email Address	Zip Code	Phone #
CHRIS MORGAN	3800 RIDGE LN WESTLINN 97068	cmorganmd@gmail.com	97068	503-655-7336
Mike Kroeger	4751 Chinook ct. West Linn, OR	mskroeger@gmail.com	97068	414-690-1474
DOUG BIRMINGHAM	13467 S.E. Shannon Clackamas, OR. 97015		97015	503) 828-8615

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ENGINEERING & FORESTRY

OFFICES IN: TUALATIN, OR - VANCOUVER, WA - SALEM-KEIZER, OR

Parker Road	Neighborhood Meeting
August 15, 2017	West Linn Adult Community Center
6:00 p.m.	1180 Rosemont Road, West Linn, OR 97068

PLEASE PRINT CLEARLY

Printed Name	Full Mailing Address	Email Address	Zip Code	Phone #
CARLOS LANDAZURI	4715 Coho Ln West Lin	carlos_landazuri@ hotmail.com	97068	503-342-6304
Dick Person	4880 Ireland Ln WL	dparson40 @Gmail.Com	97068	503-557-7940
MARCUS CASSAR	4734 Gardner Ln West Linn OR	aussieboy150@gmail .com	97068	503-8944855
CRAIG LIDDELL	3950 Ridge Ln West Linn	cjliddell@ gmail.com	97068	503-655-2322

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OFFICES IN: TUALATIN, OR - VANCOUVER, WA - SALEM-KEIZER, OR

Parker Road	Neighborhood Meeting
August 15, 2017	West Linn Adult Community Center
6:00 p.m.	1180 Rosemont Road, West Linn, OR 97068

PLEASE PRINT CLEARLY

Printed Name	Full Mailing Address	Email Address	Zip Code	Phone #
ALICE RICHMOND	3939 Parker Rd W.L. 97068	—	97068	5037230101
Carol Koran	3945 Parker Rd WL 97068	cjkoran@comcast.net	97068	503-650-2460
DOROTHY METCALF	4709 CHINOOK CT.	dorthemet@MSN.COM	97068	503-656-1132
SUE HONE	4720 Coho Lane WL	rayhone52@gmail.com	97068	908-581-4743
Mary Weisshaar Terry "	3019 Winkel Way	tweisshaar@gmail	97068	503-303-4481
DALE WALKER	4766 Coho LN	dwwalker@fastmail.us	97068	503 908 8947
Bill Relyea	3016 Sabo Lane	wrelyea@comcast.net	97068	503 634 1292

oregon bridge delivery partners

Project:	Computed:	Date:	
Subject:	Checked:	Date:	
Task:	Page:	of:	
Job #:	No:		

Sign In Sheet -

Name:	Address
J. Milliron	4515 Mayfield Dr.
Gary/Gail Wattock	3021 W. Nickel Way
Kaye Sue Stone	4720 Coho Lane
Maitali Chattopadhyay	4748 Gardner Lane
Douglas Birmingham	13467 SE Shannon View.

CURVE TABLE

CURVE	RADIUS	DELTA	LENGTH	CHORD
C1	13.00'	90°00'00"	20.42'	S73°42'37"W 18.38'
C2	13.00'	90°00'00"	20.42'	S16°17'23"E 18.38'
C3	13.00'	42°07'37"	9.56'	N82°21'11"W 9.34'
C4	51.50'	39°09'33"	35.20'	N83°50'13"W 34.52'
C5	51.50'	39°02'28"	35.09'	N44°44'13"W 34.42'
C6	51.50'	16°53'51"	15.19'	N16°46'04"W 15.13'
C7	51.50'	39°04'20"	35.12'	N11°13'02"E 34.44'
C8	51.50'	40°05'03"	36.03'	N50°47'43"E 35.30'
C9	13.00'	42°07'39"	9.56'	N49°46'25"E 9.34'
C10	13.00'	90°00'00"	20.42'	N16°17'23"W 18.38'

STREET 'A' ALIGNMENT TABLE

CURVE/TANGENT	BEGIN STATION	RADIUS	LENGTH	DELTA	CHORD	TANGENT/CHORD BEARING	END STATION
L1	10+00.00		30.00'			N28°42'37"E	10+30.00
L2	10+30.00		236.00'			N28°42'37"E	12+66.00
C11	12+66.00	37.00'	58.12'	90°00'00"	52.33	N16°17'23"W	
L3	13+24.12		121.72'			N61°17'23"W	14+45.84

R-10 ZONE BUILDING SETBACKS
- 20.00' FRONT YARD SETBACK
- 20.00' REAR YARD SETBACK
- 7.50' SIDE YARD SETBACK
- 15.00' STREET SIDE YARD SETBACK

THE PURPOSE OF THIS PRELIMINARY PLAT IS TO SHOW THE LOT DIMENSIONS FOR PLANNING PURPOSES. THIS IS NOT A FINAL PLAT AND IS NOT TO BE USED FOR SURVEYING PURPOSES.

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3015 PARKER ROAD

WEST LINN OREGON
TAX LOTS 100 & 200 CLACKAMAS COUNTY TAX MAP 2 1E 25CC

PRELIMINARY SUBDIVISION PLAT WITH BUILDING SETBACKS

DESIGNED BY: CLR
DRAWN BY: JMH
CHECKED BY: MBH
SCALE: AS NOTED
DATE: 08/07/2017

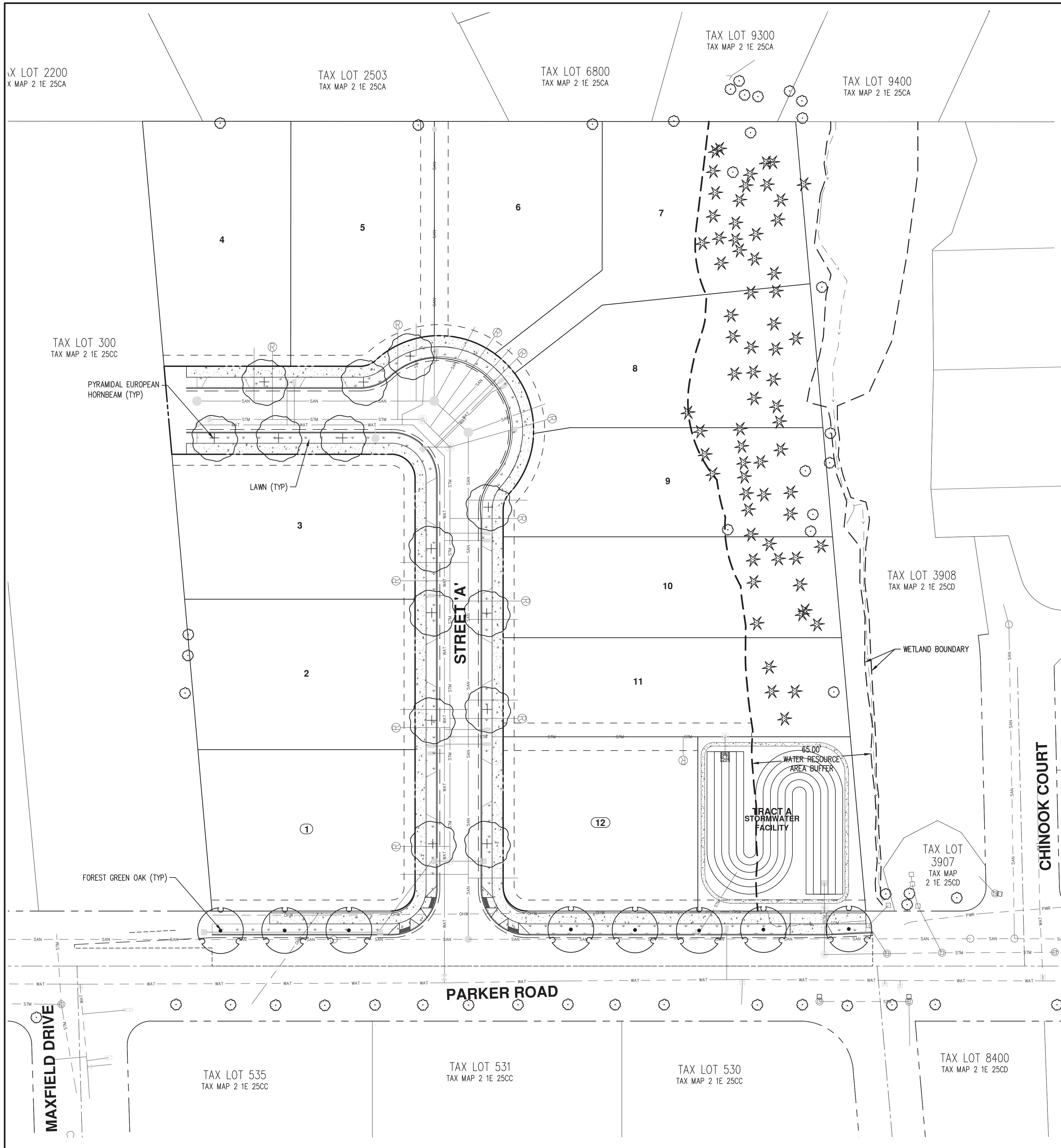
REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON
MONTGOMERY B. HURLEY
RENEWAL DATE: 6/30/19
PRELIMINARY NOT FOR CONSTRUCTION

REVISIONS

JOB NUMBER 5132

SHEET 10

AKS DRAWING FILE: 5132 PLAT W SETBACK.DWG | LAYOUT: 10



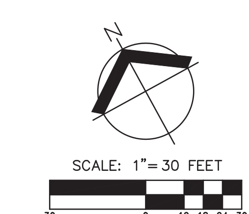
PLANT SCHEDULE

STREET TREES	QTY	BOTANICAL NAME	COMMON NAME	SIZE/CONTAINER	SPACING
	14	CARPINUS BETULUS 'FASTIGIATA'	PYRAMIDAL EUROPEAN HORNBEAN	2" CAL. B&B	AS SHOWN
	8	QUERCUS FRAINETTO 'FOREST GREEN'	FOREST GREEN OAK	2" CAL. B&B	AS SHOWN

GROUND COVERS	QTY	DESCRIPTION
	1,240 SF	NORTHWEST SUPREME LAWN MIX – SUNMARK SEEDS (OR APPROVED EQUAL) 35% LOLIUM PERENNE V. DASHER 3, 35% LOLIUM PERENNE V. CUTTER II, 15% FESTUCA RUBRA V. GARNET, 15% FESTUCA RUBRA V WINDWARD APPLY AT A RATE OF 8 LBS PER 1,000 SQ FT OR AS RECOMMENDED BY SUPPLIER.

GENERAL NOTES:

1. TREE PLANTING PLAN IS INTENDED TO PORTRAY DESIGN INTENT. CHANGES TO TREE VARIETY, SPACING, ETC BASED ON SITE CONDITIONS AND/OR AVAILABILITY MAY BE MADE BY THE LANDSCAPE CONTRACTOR PRIOR TO FINAL INSTALLATION WHERE ALLOWED BY CITY OF WEST LINN STANDARDS.
2. LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR VERIFYING PLANT AND MATERIAL QUANTITIES. IF DISCREPANCIES OCCUR, DESIGN INTENT PREVAILS OVER QUANTITIES LISTED.
3. LANDSCAPE, IRRIGATION AND ONGOING MAINTENANCE IN FRONT OF INDIVIDUAL LOTS SHALL BE THE RESPONSIBILITY OF THE HOMEBUILDER AT TIME OF LOT BUILD–OUT, AND SHALL BE THE ONGOING RESPONSIBILITY OF THE ADJACENT LOT OWNER THEREAFTER.
4. IT IS THE CONTRACTOR'S RESPONSIBILITY TO SUPPLY STOCK THAT MEETS ANSI 760.1–1996 AND CITY OF WEST LINN TREE TECHNICAL MANUAL STANDARDS. ALL PLANTS AND TREES INSTALLED WITHIN THE CITY OF WEST LINN SHALL CONFORM WITH AMERICAN ASSOCIATION OF STANDARDS, ANSI Z60.1, SPECIFICATIONS FOR ACCEPTANCE OF NURSERY TREES AT THE TIME OF DELIVERY, IN ALL WAYS.
5. PLANTS SHALL BE SOUND, HEALTHY, VIGOROUS, AND FREE OF PLANT DISEASE AND INSECT PESTS AND THEIR EGGS. CONTAINER STOCK SHALL BE GROWN FOR AT LEAST 8–MONTHS IN CONTAINERS IN WHICH DELIVERED AND SHALL NOT BE ROOT BOUND OR HAVE GIRDLING ROOTS. TREES SHALL NOT HAVE BEEN TOPPED OR HEADED. PLANTS AND TREES WITH BROKEN TOPS, BRANCHES OR INJURED TRUNKS SHALL BE REJECTED.
6. TREE STAKES: SUPPORT STAKES SHALL BE TREATED 2–INCH DIAMETER PINE OR EQUAL, TWO STAKES PER TREE. NO CROSS BRACE SHALL BE USED. AFTER INSTALLATION, STAKES SHALL BE TRIMMED SO THAT THE BRANCHES CLEAR THE TOP OF THE STAKE. TREE TIES: TWIST BRACE, FABRIC–REINFORCED RUBBER (3/8–INCH MINIMUM), OR EQUIVALENT APPROVED BY THE CITY OF WEST LINN SHALL BE USED AND INSTALLED IN A FIGURE EIGHT FASHION TO SUPPORT THE TREE TO THE STAKES.
7. TREE GRATES: WHERE SIDEWALK WIDTH IS LESS THAN 8–FEET AND NEW TREES WILL BE INSTALLED IN A TREE WELL, METAL TREE GRATES SHALL BE USED AND APPROVED BY PUBLIC WORKS. MINIMUM SIZE GRATES SHALL BE 4'X 4'UNLESS SPECIFIED OTHERWISE. ALL TREE GRATES SHALL BE MOUNTED IN FRAMES INSET INTO A CONCRETE FOUNDATION WITHIN THE SIDEWALK OR SURFACE MATERIAL AND SHALL BE FLUSH WITH THE SURROUNDING SURFACE
8. PLANTING: ADEQUATE TOPSOIL SHALL BE PROVIDED FOR HEALTHY PLANT ESTABLISHMENT IN ALL PLANTER STRIPS. TOPSOIL STOCKPILED AND REUSED FROM ON–SITE OR IMPORTED FORM OTHER SOURCES SHALL BE ACCEPTABLE. TOPSOIL SHALL BE RICH DARK BROWN IN COLOR, HAVE SUFFICIENT ORGANIC CONTENT FOR PLANT GROWTH, BE FREE DRAINING, AND FREE OF ANY EXTRANEOUS MATERIAL HARMFUL TO PLANT GROWTH. ALL DEBRIS, WOOD CHIPS, PAVEMENT, CONCRETE AND ROCKS OVER 2–INCHES IN DIAMETER SHALL BE REMOVED FROM THE PLANTING PIT TO A MINIMUM OF 24–INCH DEPTH, UNLESS SPECIFIED. TREES IN A CONFINED PLANTER PIT OR SIDEWALK AREA: THE PLANTING HOLE SHALL BE EXCAVATED TO A MINIMUM OF 30–INCHES DEEP X THE WIDTH OF THE EXPOSED AREA.
9. IRRIGATION: NEWLY INSTALLED TREES, INCLUDING DROUGHT TOLERANT SPECIES, ARE DEPENDENT UPON SUPPLEMENTAL IRRIGATION UNTIL ESTABLISHED, TYPICALLY FOR TWO YEARS. PERIODS OF EXTREME HEAT, WIND OR DROUGHT MAY REQUIRE MORE OR LESS WATER THAN RECOMMENDED IN THESE SPECIFICATIONS. THE METHOD AND AMOUNT THAT IS APPLIED MAY VARY DEPENDING UPON SOIL COMPOSITION, HEAT, WIND, COMPANION PLANTINGS, RAINFALL AMOUNTS. THE WATERING OF TREES OR THEIR REPLACEMENTS SHALL FOLLOW THE STANDARDS SET FORTH IN THIS MANUAL. NEW TREES DURING THE ESTABLISHMENT PERIOD (1–2 YEARS) TREES SHOULD BE WATERED THOROUGHLY TO THEIR ROOT DEPTH AS FREQUENTLY AS NEEDED. THE MINIMUM STANDARDS SHALL BE AS FOLLOWS: 3 MONTHS IN THE GROUND: 4 TIMES PER MONTH OR AS NECESSARY; 6 MONTHS IN THE GROUND: 2 TIMES PER MONTH OR AS NECESSARY; 12 MONTHS IN THE GROUND: 1 TIME PER MONTH OR AS NECESSARY.
10. PRUNING: ALL STREET TREES MUST BE PRUNED TO ISA STANDARDS FOR SHADE TREES. STREET TREES HAVING BRANCHES PROJECTING INTO THE STREET OR SIDEWALK SHALL BE PRUNED BY THE OWNERS OF THE PROPERTY ADJACENT TO WHERE THE TREES ARE GROWING AND SHALL BE DONE ACCORDING TO THE REQUIREMENTS FOR TREE BRANCH CLEARANCE OVER STREET AND SIDEWALK AREAS. LIMBS OF TREES MAY BE ALLOWED TO PROJECT OVER THE SIDEWALK AREA AT AN ELEVATION OF NOT LESS THAN 7 1/2 FEET ABOVE THE SIDEWALK LEVEL, AND OVER THE STREET AREA AT AN ELEVATION OF NOT LESS THAN 10 FEET ABOVE THE STREET LEVEL. HOWEVER, ON ANY STREET DESIGNATED AS AN ARTERIAL AND WHERE PARKING HAS BEEN PROHIBITED, LIMBS OF TREES SHALL BE PRUNED TO A HEIGHT OF NOT LESS THAN 13 FEET ABOVE THE STREET LEVEL.
11. MULCH: SCREENED UNTREATED WOOD CHIPS, BARK DUST OR APPROVED EQUAL, SPREAD TO A 2–INCH DEPTH OUT TO THE EDGE OF THE ROOT BALL. THE MULCH SHOULD BE KEPT AT LEAST TWO INCHES AWAY FROM THE TRUNK AND SHALL BE APPLIED TO EACH TREE. MOWER GUARDS: FOR TREES IN TURF AREAS REQUIRING REGULAR MOWING, THE TREE STEM SHALL BE PROTECTED WITH TREEGUARD OR EQUIVALENT.



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3015 PARKER ROAD

WEST LINN OREGON

TAX LOTS 100 & 200 CLACKAMAS COUNTY TAX MAP 2 1E 25CC

PRELIMINARY STREET TREE PLAN

DESIGNED BY:	CLR
DRAWN BY:	JMH
CHECKED BY:	MBH
SCALE:	AS NOTED

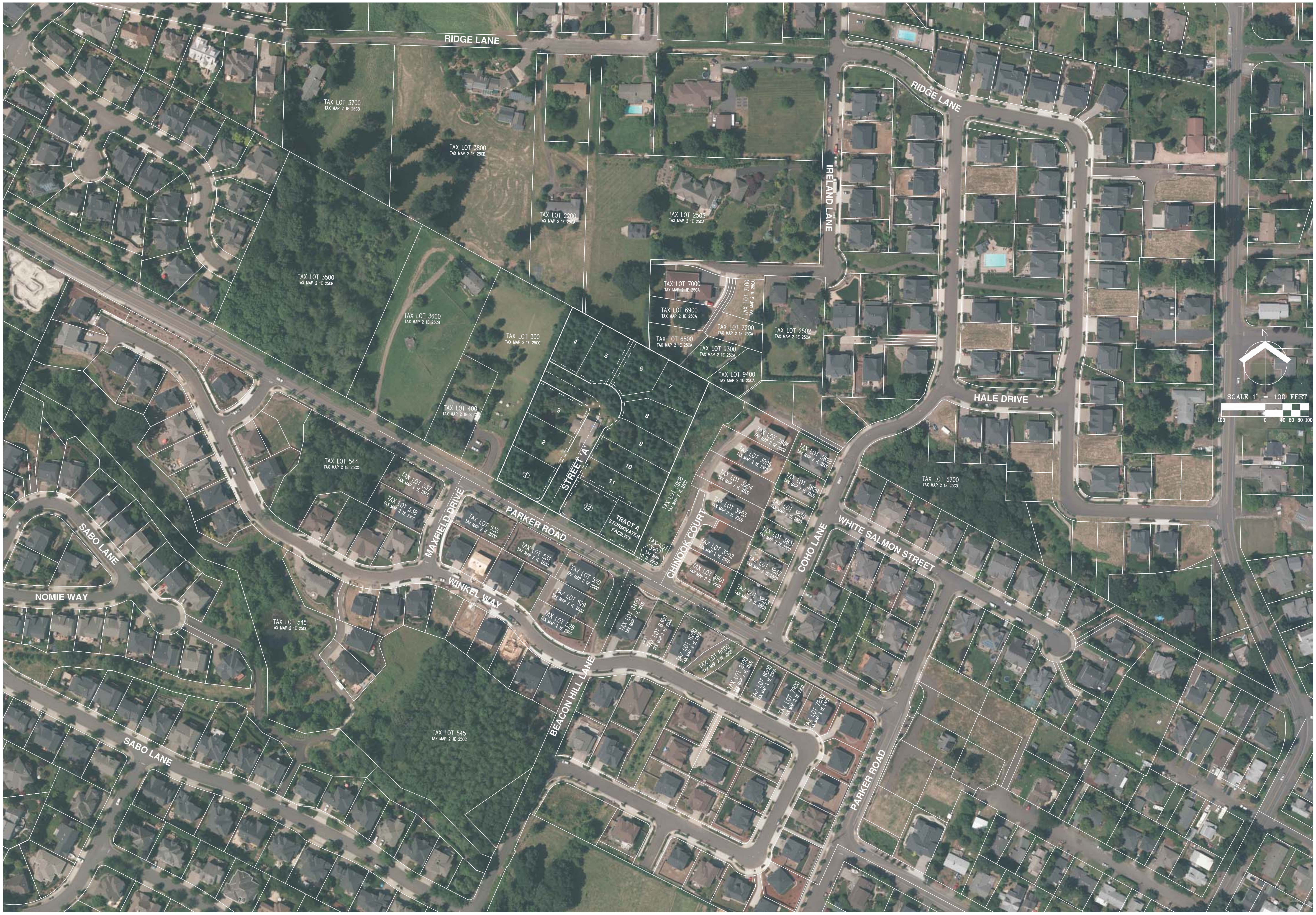
DATE: 08/07/2017

REGISTERED PROFESSIONAL ENGINEER 58542PE OREGON JULY 9, 2002 MONTGOMERY B. HURLEY
PRELIMINARY NOT FOR CONSTRUCTION
RENEWAL DATE: 6/30/19

REVISIONS

JOB NUMBER 5132

SHEET 16



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3015 PARKER ROAD

WEST LINN OREGON
TAX LOTS 100 & 200 CLACKAMAS COUNTY TAX MAP 2 1E 25CC

PRELIMINARY AERIAL PHOTOGRAPH PLAN

DESIGNED BY:	CLR
DRAWN BY:	JMH
CHECKED BY:	MBH
SCALE:	AS NOTED

DATE: 08/07/2017

REGISTERED PROFESSIONAL ENGINEER
58542PE
OREGON
JULY 9, 2002
MONTGOMERY B. HURLEY
PRELIMINARY NOT FOR CONSTRUCTION
RENEWAL DATE: 6/30/19

REVISIONS

JOB NUMBER
5132

SHEET
17

AKS DRAWING FILE: 5132 AERIAL PLAN.DWG | LAYOUT: 17

AFFIDAVIT OF MAILING

STATE OF OREGON)

)ss

COUNTY OF Washington)

I, Justin Tynan, being duly sworn, depose and say that on July 25, 2017, I caused to have mailed to each of the persons on the attached list a notice of a meeting to discuss a proposed development located at 3001 & 3015 Parker Road, a copy of which notice so mailed is attached hereto and made a part of hereof.

I further state that said notices were enclosed in envelopes plainly addressed to said persons and were deposited on the date indicated above in the United States Post Office with postage prepaid thereon.

Signature

Subscribed and sworn to, or affirmed, before me this 25 day of July, 2017.

OFFICIAL STAMP
GOLDIE MARIE HAMILTON
NOTARY PUBLIC-OREGON
COMMISSION NO. 950615
MY COMMISSION EXPIRES MAY 17, 2020

Notary Public for the State of Oregon

My Commission Expires May 17, 2020

TUALATIN · VANCOUVER · SALEM-KEIZER
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WWW.AKS-ENG.COM
12965 SW HERMAN RD., SUITE 100 · TUALATIN, OR 97062
P: (503) 563-6151 F: (503) 563-6152

July 25, 2017

Ref: Neighborhood Meeting Notice
3001 and 3015 Parker Road (Clackamas County Assessor's Map 21E25CC Lots 100 and 200), West Linn, OR 97068

Dear Interested Party:

AKS Engineering & Forestry, LLC is working with Noell and Carol Price (the Applicant), regarding the properties located at 3001 and 3015 Parker Road in West Linn. The Applicant plans to submit a request to the City of West Linn for a Subdivision to create lots for single-family homes. Prior to submitting this application to the City, we would like to discuss the project in more detail with you. We have scheduled a neighborhood meeting for:

Tuesday, August 15, 2017 at 6:00 PM
West Linn Adult Community Center
1180 Rosemont Road
West Linn, OR 97068

The meeting will be held in the **Maple Room**. A meeting sign will be posted near the building entrance and on the classroom door on the date of the meeting.

The purpose of this meeting is to provide a forum for surrounding property owners/residents to review the project and to identify issues so they can be considered before the formal application is submitted. This meeting gives you the opportunity to share any special information you know about the property involved. We will try to answer questions related to how the project meets relevant development standards consistent with West Linn's land use regulations.

Please note that this will be an informational meeting on preliminary plans. These plans may change slightly before the application is submitted to the City. Depending upon the type of application, you may receive an official notice from the City of West Linn of your opportunity to participate either by submitting written comments, and/or attending a public hearing.

I look forward to discussing this project with you. If you have questions, but will be unable to attend, please feel free to call me at 503-563-6151.

Sincerely,
AKS ENGINEERING & FORESTRY, LLC

Zach Pelz, AICP

EVANS JOHN G
4000 S RIDGE LN
WEST LINN, OR 97068-2929

GUEST CLAUDIA B TRUSTEE
4027 S RIDGE LN
WEST LINN, OR 97068-2917

HUFFMAN GARY D
4025 S RIDGE LN
WEST LINN, OR 97068-2917

MURPHY TIMOTHY P CO-TRUSTEE
4960 IRELAND LN
WEST LINN, OR 97068-2902

HUGET MATTHEW A & SHONA L
4722 IRELAND LN
WEST LINN, OR 97068-2954

PARSON RICHARD A TRUSTEE
4880 S IRELAND LN
WEST LINN, OR 97068-2953

KAPILA AARTI & DINESH K JAIN
4782 COHO LN
WEST LINN, OR 97068-2987

MACK PETER & PAMELA
4786 COHO LN
WEST LINN, OR 97068-2987

TOLLESON SOMMER
4788 COHO LN
WEST LINN, OR 97068-2987

WALKER DALE V JR TRUSTEE
4766 COHO LN
WEST LINN, OR 97068-2987

CHAN KING
4762 COHO LN
WEST LINN, OR 97068-2987

CHATTOPADHYAY SANDIP CO-TRUSTEE
4748 GARDNER LN
WEST LINN, OR 97068-2450

HARROD RENATA
4744 GARDNER LN
WEST LINN, OR 97068-2450

KUPPER DANIEL
4740 GARDNER LN
WEST LINN, OR 97068-2450

TINSLEY RYAN T & KERRY H
4730 GARDNER LN
WEST LINN, OR 97068-2450

GILLAM LAURIE A TRUSTEE
4734 GARDNER LN
WEST LINN, OR 97068-2450

MENSCH JOHN ROBERT & HOLLY
4790 COHO LN
WEST LINN, OR 97068-2987

NESS PETER & LISA
4792 COHO LN
WEST LINN, OR 97068-2987

NIU DONG TRUSTEE
4794 COHO LN
WEST LINN, OR 97068-2987

MOORE WILLIAM E TRUSTEE
4798 COHO LN
WEST LINN, OR 97068-2987

FULMER JAMES DAVID TRUSTEE
4823 IRELAND LN
WEST LINN, OR 97068-2981

WESTLUND ANDREW N & VALORIE A
4835 IRELAND LN
WEST LINN, OR 97068-2981

CITY OF WEST LINN
22500 SALAMO RD #600
WEST LINN, OR 97068-8306

CITY OF WEST LINN
22500 SALAMO RD #600
WEST LINN, OR 97068-8306

RELYEA BILL
PARKER CREST NA PRESIDENT
3016 SABO LN
WEST LINN, OR 97068

RICHMOND ALICE KELLEDJIAN
3939 PARKER RD
WEST LINN, OR 97068-2905

RICHMOND ALICE
3939 PARKER RD
WEST LINN, OR 97068-2905

ALLEN JESSE
3303 RIDGE LN
WEST LINN, OR 97068-2915

MORGAN JANET E & CHRISTOPHER
3800 S RIDGE LN
WEST LINN, OR 97068-2956

PRICE NOELL H TRUSTEE
3015 S PARKER RD
WEST LINN, OR 97068-2965

PRICE NOELL H TRUSTEE
3015 S PARKER RD
WEST LINN, OR 97068-2965

KORAN WILLIAM E & CAROL J
3945 PARKER RD
WEST LINN, OR 97068-2905

KORAN WILLIAM E & CAROL J
3945 S PARKER RD
WEST LINN, OR 97068-2905

SCHMIDT KELA H
3155 WINKEL WAY
WEST LINN, OR 97068-2166

IVEY RAY & CAROLE
4539 DAMON DR
WEST LINN, OR 97068-2163

MARTINSON RICHARD A & CAROLYN J
4501 DAMON DR
WEST LINN, OR 97068-2163

GORDON MICHAEL C & TONIA
3128 WINKEL WAY
WEST LINN, OR 97068-2166

VIEGAS DEBRA J
3116 WINKEL WAY
WEST LINN, OR 97068-2166

SCHLEEF DANIEL & TARA
3110 WINKEL WAY
WEST LINN, OR 97068-2166

BURTON SCOTT ALLAN & SAMANTHA R
3102 WINKEL WAY
WEST LINN, OR 97068-2166

AHLERS CHARLES W
3040 WINKEL WAY
WEST LINN, OR 97068-2165

DURDAN LUANNE
3036 WINKEL WAY
WEST LINN, OR 97068-2165

KNOPF G WILLIAM TRUSTEE
8641 S WILLOW DR
TEMPE, AZ 85284-2473

TISHKO SARA M
3024 WINKEL WAY
WEST LINN, OR 97068-2165

ROSENLOF JANIS J
3020 WINKEL WAY
WEST LINN, OR 97068-2165

DAVIS JOE D & JUDITH M
3014 WINKEL WAY
WEST LINN, OR 97068-2165

PIERCE DONALD H & SHANIE
3010 WINKEL WAY
WEST LINN, OR 97068-2165

BRUNDAGE DAVID & DAMERON
3015 WINKEL WAY
WEST LINN, OR 97068-2165

WEISSHAAR TERRENCE A & MARY A
3019 WINKEL WAY
WEST LINN, OR 97068-2165

WALTUCH GARY S CO-TRUSTEE
3021 WINKEL WAY
WEST LINN, OR 97068-2165

HUNTER MATTHEW D & LAUREN E
3025 WINKEL WAY
WEST LINN, OR 97068-2165

JUNG MATTHEW T
3027 WINKEL WAY
WEST LINN, OR 97068-2165

BUNCE BRANDON
3029 WINKEL WAY
WEST LINN, OR 97068-2165

ELLIS RICHARD L
3037 WINKEL WAY
WEST LINN, OR 97068-2165

MILLIRON JAMES C & SUSAN J
4515 MAXFIELD DR
WEST LINN, OR 97068-2164

LUTZE VIRGINIA K
3041 WINKEL WAY
WEST LINN, OR 97068-2165

COX VERNE E & SHIRLEY B
4512 MAXFIELD DR
WEST LINN, OR 97068-2164

GOODMAN ERIK D & ANNETTE M
4524 MAXFIELD DR
WEST LINN, OR 97068-2164

TONE STACI L
3103 WINKEL WAY
WEST LINN, OR 97068-2166

WATKINS JEAN ELLEN TRUSTEE
3109 WINKEL WAY
WEST LINN, OR 97068-2166

HOY SHAWN & MELISSA
709 SPRINGTREE LN
WEST LINN, OR 97068-5176

MOORE MICHAEL G & STEPHANIE J
3133 WINKEL WAY
WEST LINN, OR 97068-2166

CITY OF WEST LINN
22500 SALAMO RD #600
WEST LINN, OR 97068-8306

CITY OF WEST LINN
22500 SALAMO RD #600
WEST LINN, OR 97068-8306

HICKMAN AUTUMN TRUSTEE
4705 COHO LN
WEST LINN, OR 97068-2970

LANDAZURI CARLOS TRUSTEE
4715 COHO LN
WEST LINN, OR 97068-2970

PINA LAWRENCE G
2920 WHITE SALMON ST
WEST LINN, OR 97068-2968

VAN GORDON BROCK A
2916 WHITE SALMON ST
WEST LINN, OR 97068-2963

SUN SUSAN S & BENEDICT H
2919 WHITE SALMON ST
WEST LINN, OR 97068-2963

JOYNER HEATHER
2925 WHITE SALMON ST
WEST LINN, OR 97068-2968

RANDOL RYAN & ABBY
4750 COHO LN
WEST LINN, OR 97068-2972

SUPPERSTEIN SCOTT M & SUZAN M
4740 COHO LN
WEST LINN, OR 97068-2972

ROENSCH JONATHAN & NICHOLA
4730 COHO LN
WEST LINN, OR 97068-2972

HONE RAYMOND M & SUSAN M
4720 COHO LN
WEST LINN, OR 97068-2972

LAO SAN & LY CHHEAU
PO BOX 483
LAKE OSWEGO, OR 97034-0053

FRANK DONALD H & ANNE S
4700 COHO LN
WEST LINN, OR 97068-2972

CITY OF WEST LINN
22500 SALAMO RD #600
WEST LINN, OR 97068-8306

GUILFORD ROSS L TRUSTEE
4701 CHINOOK CT
WEST LINN, OR 97068-2830

METCALF DOROTHY ELLEN & THOMAS
4709 CHINOOK CT
WEST LINN, OR 97068-2830

GOODRICH BRIAN P & HEATHER C
4725 CHINOOK CT
WEST LINN, OR 97068-2830

BROMLEY JESS & SARAH
4737 CHINOOK CT
WEST LINN, OR 97068-2830

WILK PHILIP S & CHRISTINA J
4743 CHINOOK CT
WEST LINN, OR 97068-2830

KROEGER VICTORIA G & MICHAEL S
4751 CHINOOK CT
WEST LINN, OR 97068-2830

CITY OF WEST LINN
22500 SALAMO RD #600
WEST LINN, OR 97068-8306

ERNE JAMES D & KAREN L
2998 WINKEL WAY
WEST LINN, OR 97068-2168

TRAN ANDREW & MY HO
2986 WINKEL WAY
WEST LINN, OR 97068-2168

STEWART BRANDON
2982 WINKEL WAY
WEST LINN, OR 97068-2168

WANG YIZHI & JIANJI YANG
2978 WINKEL WAY
WEST LINN, OR 97068-2168

DOWNS AARON & JESSICA
2974 WINKEL WAY
WEST LINN, OR 97068-2168

RUNCKEL ERIC J W & LESLIE KAY
2966 WINKEL WAY
WEST LINN, OR 97068-2168

STEINBAUGH JOHN A
2946 WINKEL WAY
WEST LINN, OR 97068-2168

NAKAI HIROYUKI
2914 WINKEL WAY
WEST LINN, OR 97068-2168

PERKINS MICHAEL J & CYNTHIA D
2906 WINKEL WAY
WEST LINN, OR 97068-2168

ROTKOWSKI AARON M & SARA A
2902 WINKEL WAY
WEST LINN, OR 97068-2168

MIDLES ADAM MAURICE & DANA LEE
2965 WINKEL WAY
WEST LINN, OR 97068-2168

DUMBROW JOEL
2973 WINKEL WAY
WEST LINN, OR 97068-2168

KIM ROK SANG
2977 WINKEL WAY
WEST LINN, OR 97068-2168

HOWLEY JOSEPH & BRIGITTE
2985 WINKEL WAY
WEST LINN, OR 97068-2168

US BANK NA TRUSTEE
PO BOX 64142
SAINT PAUL, MN 55164-0142

CARTER RUTH C
PO BOX 1528
LAKE OSWEGO, OR 97035-0728

CITY OF WEST LINN
22500 SALAMO RD #600
WEST LINN, OR 97068-8306

AFFIDAVIT OF POSTING

STATE OF OREGON)

)ss

COUNTY OF Washington)

I, Justin Tynan, being duly sworn, depose and say that on July 25, 2017, I personally posted the notice indicating the site may be proposed for a Subdivision application.

The sign(s) was posted at Parker Road, by driveway

Signature

Subscribed and sworn to, or affirmed, before me this 25 day of July, 2017.

OFFICIAL STAMP
GOLDIE MARIE HAMILTON
NOTARY PUBLIC-OREGON
COMMISSION NO. 950615
MY COMMISSION EXPIRES MAY 17, 2020

Notary Public for the State of Oregon

My Commission Expires May 17, 2020


3015


3015


This site may be subject to a proposed Subdivision
Please join us to discuss the project at a
Neighborhood Meeting
3015

TUALATIN · VANCOUVER · SALEM-KEIZER
12965 SW HERMAN RD., SUITE 100 · TUALATIN, OR 97062
AKS ENGINEERING & FORESTRY
WWW.AKS-ENG.COM
P: (503) 563-6151 F: (503) 563-6152

July 25, 2017

Ref: Neighborhood Meeting Notice
3001 and 3015 Parker Road (Clackamas County Assessor's Map 21E25CC Lots 100 and 200), West Linn, OR 97068

Dear Interested Party:

AKS Engineering & Forestry, LLC is working with Noell and Carol Price (the Applicant), regarding the properties located at 3001 and 3015 Parker Road in West Linn. The Applicant plans to submit a request to the City of West Linn for a Subdivision to create lots for single-family homes. Prior to submitting this application to the City, we would like to discuss the project in more detail with you. We have scheduled a neighborhood meeting for:

Tuesday, August 15, 2017 at 6:00 PM
West Linn Adult Community Center
1180 Rosemont Road
West Linn, OR 97068

The meeting will be held in the **Maple Room**. A meeting sign will be posted near the building entrance and on the classroom door on the date of the meeting.

The purpose of this meeting is to provide a forum for surrounding property owners/residents to review the project and to identify issues so they can be considered before the formal application is submitted. This meeting gives you the opportunity to share any special information you know about the property involved. We will try to answer questions related to how the project meets relevant development standards consistent with West Linn's land use regulations.

Please note that this will be an informational meeting on preliminary plans. These plans may change slightly before the application is submitted to the City. Depending upon the type of application, you may receive an official notice from the City of West Linn of your opportunity to participate either by submitting written comments, and/or attending a public hearing.

I look forward to discussing this project with you. If you have questions, but will be unable to attend, please feel free to call me at 503-563-6151.

Sincerely,
AKS ENGINEERING & FORESTRY, LLC

Zach Pelz, AICP

7016 2140 0000 3731 0432

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☒ Return Receipt (hardcopy) $ 2.75	
☐ Return Receipt (electronic) $	
☐ Certified Mail Restricted Delivery $	Postmark Here
☐ Adult Signature Required $	
☐ Adult Signature Restricted Delivery $	
Postage $ .46	
Total Postage and Fees $ 6.56	

WILSONVILLE OR 97070 JUN 27 2017 USPS

Sent To Bill Relyea

Street and Apt. No., or PO Box No. 3016 Sabo Lane

City, State, ZIP+4® West Linn, OR 97068

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

Exhibit F: Pre-application Conference Summary

City of West Linn

PRE-APPLICATION CONFERENCE MEETING
SUMMARY NOTES

April 7, 2016

SUBJECT: Application for a 12 lot subdivision, Planned Unit Development (PUD), Annexation, Zone Change and Water Resource Area (WRA) permit at 3015 and 3001 Parker Road.

FILE: PA-16-03

ATTENDEES: Applicants: Carol and Noelle Price, Zach Pelz, Monty Hurley, Ed Brockman, William Relyea, Gail Holmes
Staff: Peter Spir, Daren Wyss (Planning), Khoi Le (Engineering)

The following is a summary of the meeting discussion provided to you from staff meeting notes. Additional information may be provided to address any "follow-up" items identified during the meeting. These comments are PRELIMINARY in nature. Please contact the Planning Department with any questions regarding approval criteria, submittal requirements, or any other planning-related items. Please note disclaimer statement below.

SITE INFORMATION:

Site Address:	3015 and 3001 Parker Road (21E25CC tax lot 100 and 200)
Site Area:	154,545 square feet / 3.54 acres
Neighborhood:	Parker Crest NA
Comp. Plan:	Low Density Residential
Zoning:	Currently Clackamas County zone: FU-10
Applicable code:	CDC Chapter 32: Water Resource Area (WRA) permit
	CDC Chapter 85: Land Division
	CDC Chapter 24: PUD
	CDC Chapter 105: Zone and Plan Change
	CDC Chapter 81: Boundary Changes

PROJECT DETAILS: The site slopes downhill from north to south at an average grade of 15 percent. The site is dominated by a Christmas tree farm. There is one single family home on the site. A tributary to Tanner Creek lies to the east of the property. The Water Resource Area (WRA) boundary associated with the creek extends onto the applicant's property. The property is in Clackamas County and zoned FU-10. The property must be annexed to the city and a zone designation established prior to development applications being submitted. The City of West Linn Comprehensive Plan designation for this area is "Low Density Residential" which is compatible with R-7 to R-40 zoning. With the passage of Senate Bill (SB) 1573, West Linn's voter approved annexation process is under review. Annexations must also go through Metro. Please see: http://www.oregonmetro.gov/tools-partners/data-resource-center/annexation-and-boundary-change-information. Annexation to the Tri-City Service District and withdrawl from the Clackamas County Enhanced Law Enforcement District is also required. Once annexed, the proposal is to develop a 12 lot subdivision/PUD. Lots would be in the 6,100-9,569 square foot range. A street to access the lots will come off Parker Road and stub out to the property to the west. Utility stub outs and easements to facilitate adjacent development is required.

Perimeter tracts for tree protection are not required by code and could free up sufficient land for a non-PUD application. Storm water facility location in the WRA boundary requires compliance with CDC 32.060(B). No removal of trees prior to annexation. Contact Khoi Le at kle@westlinnoregon.gov for Engineering comments and Ty Darby at tdarby@tvfr.com for TVFR comments.

PROCESS: For annexation, Boundary Changes (Chapter 81) and Zone Change (Chapter 105) apply. The CDC is online at http://westlinnoregon.gov/cdc. Metro Code Chapter 3.09 "Local Government Boundary Changes" applies: http://www.oregonmetro.gov/sites/default/files/309_eff_071112__final.pdf. (The applicability of West Linn Municipal Code section 2.915 "Annexations" is also under post SB 1573 review.) Oregon Department of Revenue mapping standards must be met. Additional information on the annexation procedure is available from the City of West Linn Planning Department.

Submit a completed application form to the Planning Department. The fee for annexation is $15,000 plus $1,000 per acre. (The zone change fees are included in the annexation fee.) The annexation process takes from 9-12 months.

The post annexation applications require a neighborhood meeting per CDC 99.038. Please follow those requirements very carefully. The host neighborhood association (NA) is the Parker Crest Neighborhood Association (ParkerCrestNA@westlinnoregon.gov). There are no other NAs within 500 feet. Any substantive changes to the proposed subdivision design between the neighborhood meeting and the date of submittal of the application to the City shall require repeating the 99.038 process. No NA meeting is required for annexation and zone changes that do not require a comprehensive plan/map change per 99.038

The land use applications include subdivision (Chapter 85), PUD (Chapter 24), and WRA permit (Chapter 32). Submit the application form, signed by the property owner, to the Planning Department. Required specialist studies include an arborist's tree inventory, WRA boundary delineation and may also include a geotechnical and a traffic study.
The deposit for a subdivision is $4,200 plus $200 per lot. The final plat fee is $2,000. There is also a $500 fee for final site inspection. The deposit for a WRA is $2,600 and an inspection fee of $250. A PUD has a deposit fee of $4,200 plus $400 per acre.

The City has 30 days to determine if the application is complete or not. If the application is not complete, the applicant has 180 days to make it complete or provide written notice to staff that no other information will be provided. Once the submittal is deemed complete, staff will provide notice per CDC Chapter 99 and schedule a public hearing with the Planning Commission. Appeals of the Planning Commission's decision are heard by City Council.

DISCLAIMER: This summary discussion covers issues identified to date. It does not imply that these are the only issues. The burden of proof is on the applicant to demonstrate that all approval criteria have been met. These notes do not constitute an endorsement of the proposed application ***or provide any assurance of potential outcomes***. Staff responses are based on limited material presented at this pre-application meeting. New issues, requirements, etc. could emerge as the application is developed. ***A new pre-application conference would have to be scheduled after 18 months and these notes would no longer be valid. Any changes to the CDC standards may require a different design or submittal. Typical land use applications can take 6-10 months from beginning to end.***

Property Address: 3015-3001 Parker Rd – West Linn, OR 97068
12-Lot Subdivision Development

TRANSPORTATION
Minimum Required Improvement:

- Parker Rd Street Improvement
  - Right of way shall be minimum 60' wide for two 12' travel lane with 5' bike lane plus 6" curb, 5.5' planter, and 6' sidewalk on both sides.
  - Current right of way is approximately 62'. No additional dedication is needed.
- New Road Improvement
  - Right of way shall be 48' wide for two 12' travel lane plus 6" curb, 5.5' planter, and 6' sidewalk on both sides.
  - 5.5' planter.
  - 6'sidewalk.
  - 0.5' curb and gutter.
  - Minimum curb radius: 20' at Ridge Lane and 25' at Rosemont Rd.
  - Center line radius must be designed in accordance with AASHTO Roadway Standard Design Guidelines.

- Reference: Chinook Terrace Subdivision, Rosemont Pointe Subdivision.

- Street trees: coordinate with Parks Department to install appropriate number and tree species.
  - Parks Contact: Mike Perkins
    503-723-2554
    mperkins@westlinnoregon.gov

- Street lightings:
  - Coordinate with City to install appropriate number and type of pole and decorative fixtures or
  - Coordinate with PGE to install appropriate number and type of pole and LED fixtures. Normally, pole will be bronze, 30' height with 6' or 8" mast arm and LED Beta fixture.
  - PGE Contact: Jeff Steigleder
    503-849-6548
    jeffery.steigleder@pgn.com

- All existing and new distribution and communication franchised utilities and their services must be placed underground.
  - PGE Contact: Chris Jewett
    503-672-5481
    chris.jewett@pgn.com

- Development shall pay all applicable Transportation and Parks SDC fees.

TRAFFIC

- Review CDC Chapter 85 Section 85.170.B.2 whether a Traffic Impact Analysis is required.

SURFACE WATER (STORM SEWER)
Minimum Required Improvement:

- Run-off generated from new impervious area: new street, street widening and sidewalk must be captured, treated, detained and conveyed to nearest public stormwater system.
- Onsite run-off generated from new impervious area of greater than 500 square feet must be captured, treated, and conveyed to nearest public stormwater system.
- Onsite run-off generated from new impervious are of greater than 5000 square feet must be captured, treated, detained and conveyed to nearest public stormwater system.
- Proposed public water quality/detention facility must be placed in a tract dedicated to the City.
- Stormwater report analysis shall be required.
- Existing storm along Rosemont Rd and Ridge Ln shall be improved appropriately to accommodate additional discharge from the development. A new culvert across Ridge Ln will be required.
- Reference: Chinook Terrace Subdivision, Rosemont Pointe Subdivision.

WASTER WATER (SANITARY SEWER)
Minimum Required Improvement:

- Existing public sanitary sewer main is on Parker Rd for connection. Stub out and/or easement for future extension will be required.
- Reference: Rosemont Summit Subdivision, Partition Plat 2000-063 and Gregory Estate Subdivision.
- Development shall pay all applicable Sanitary Sewer SDC fees.

DOMESTIC WATER
Minimum Required Improvement:

- Existing 8" DI water main is on Parker Rd for connection.
- New water main installed in new street to serve the development is preferred to be looped if possible. Stub out and/or easement for future extension will be required.
- Development shall pay all applicable Water SDC fees.

OTHER RELATED IMPROVEMENTS

- All existing distribution overhead utilities and new franchised utilities along the development frontage including associated services properties across street must be placed underground.

Exhibit G: Preliminary Stormwater Report

Knollcrest Subdivision

Preliminary Stormwater Report

Date:	August, 2017
Client:	Noell and Carol Price
Engineering Contact:	Monty Hurley, PE, PLS
Engineering Firm:	AKS Engineering & Forestry, LLC.
AKS Project #:	5132

REGISTERED PROFESSIONAL
ENGINEER
58542PE
PRELIMINARY
OREGON
JULY 9, 2002
MONTGOMERY B. HURLEY

RENEWAL DATE: 6/30/19

AKS
ENGINEERING & FORESTRY

12965 SW Herman Road, Suite 100
Tualatin, OR 97062
P: (503) 563-6151
www.aks-eng.com

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Appendices

Preliminary Stormwater Report

KNOLLCREST SUBDIVISION
WEST LINN, OREGON

1.0 Purpose of Report

The purpose of this report is to analyze the effects the proposed development will have on the existing stormwater conveyance system; document the criteria, methodology, and informational sources used to design the proposed stormwater system; and present the results of the preliminary hydraulic analysis.

2.0 Project Location/Description

The proposed subdivision will be located on the north side of Parker Road, just east of the intersection of Parker Road and Maxfield Drive, at the existing addresses 3001 & 3015 Parker Road in West Linn, Oregon (Tax Lots 100 & 200, Clackamas County Tax Map 2 1E 25CC). The subject site is ±3.55 acres in size.

This project site will consist of twelve lots, with one new stormwater facility at the southeast corner of the property.

3.0 Regulatory Design Criteria

Section 2 of the City of West Linn's *Public Works Design Standards* provides design requirements for treating and controlling runoff from new developments located in the City and was used to guide the design of the proposed stormwater facilities. For situations that are not specifically addressed in those standards, the City of Portland *Stormwater Management Manual* was used as guidance.

3.1 STORMWATER QUANTITY

Per the City of West Linn's *Public Works Design Standards,* Section 2.0041 Stormwater Detention and/or Treatment:

> *B. All development creating 500 sq. ft. or more of new impervious area will be required to provide treatment of the stormwater runoff from the new impervious area. For development or redevelopment creating more than 5,000 sq. ft. of new impervious area, treatment as well as detention will be required.*

The proposed project's site improvements will create ±61,340 square feet of new impervious area (It is assumed that each lot produces 2,500 square feet of impervious area on average). Therefore, stormwater detention will be required. A stormwater facility has been designed to limit the post-developed discharge rate to that of the pre-developed discharge rate for the 2-, 5-, 10-, and 25- year storm events per Section 2.0013 of the City's *Public Works Design Standards*.

3.2 STORMWATER QUALITY

Per the City of West Linn's *Public Works Design Standards,* Section 2.0041 Stormwater Detention and/or Treatment:

> *1. For commercial or residential site redevelopment, all newly created impervious area, whether or not replacing existing impervious area, may be required to provide*

stormwater treatment to bring site discharge into compliance with current City water quality requirement.

Stormwater quality will be met by routing runoff from the new impervious area and lot area to the stormwater conveyance system in the new street. The stormwater collected in the street will be routed to the new stormwater facility sized per the City of Portland's *Stormwater Management Manual* Sections 2.3.4.11 and 2.3.4.12, which will be in Tract A at the southeast corner of the site. The stormwater facility will consist of a swale with pond storage above the water quality volume, to achieve stormwater quality, as well as detention. Due to existing topography and grades, a portion of frontage improvements along Parker Road (Basin Y) will be unable to be routed into the stormwater facility. To make up for this untreated area, we are treating existing impervious runoff from Parker Road (See section 5.4.4).

4.0 Design Methodology

The Santa Barbara Urban Hydrograph (SBUH) Method was used to analyze stormwater runoff from the site. This method utilizes the Natural Resources Conservation Service (NRCS) Type 1A 24-hour storm distribution. HydroCAD 8.5 computer software aided in the analysis. Representative CN numbers were obtained from the City of Portland *Stormwater Management Manual* dated August 2016 and are included in Appendix J.

5.0 Design Parameters

5.1 DESIGN STORMS

Per City of West Linn requirements, the stormwater analysis utilized the 24-hour storm for the evaluation and design of the existing and proposed stormwater facilities. The following 24-hour rainfall intensities were utilized as the design storms for the recurrence intervals:

Table 5-1: Rainfall Intensities	
Recurrence Interval (Years)	**Total Precipitation Depth (Inches)**
WQ	0.83
2	2.40
5	2.90
10	3.40
25	3.90
100	4.40

5.2 PRE-DEVELOPED SITE CONDITIONS

5.2.1 Site Topography

Existing on-site grades generally vary from ±4% to ±25%, with the site draining south towards Trillium Creek. The site has a high point of ±593 feet near the northwest corner of the property and a low point of ±513 feet near the southeast corner of the property.

5.2.2 Land Use

The existing site consists of an existing home with associated outbuildings and a tree farm.

5.3 SOIL TYPE

The soils beneath the project site and associated drainage basins are classified as Delena silt loam and Cornelius silt loam, according to the U.S. Department of Agriculture (USDA) Soil Survey for Clackamas County. The following table outlines the Hydrologic Soil Group ratings for the soil types:

Table 5-2: Hydrologic Soil Group Ratings		
NRCS Map Unit Identification	NRCS Soil Classification	Hydrologic Soil Group Rating
23C	Cornelius silt loam, 8 to 15% slopes	C
30C	Delena silt loam, 3 to 12% slopes	C/D

Further information on these soil types is included in the NRCS Soil Resource Report located in Appendix I.

5.4 POST-DEVELOPED SITE CONDITIONS

5.4.1 Site Topography

The on-site slopes will be modified with cuts, fills, and retaining walls to accommodate the proposed construction.

5.4.2 Land Use

The post-developed site land use will consist of a twelve-lot single family residential subdivision with streets, associated underground utilities, and a stormwater facility.

5.4.3 Post-Developed Input Parameters

See HydroCAD analyses in the attached appendices.

5.4.4 Description of Off-Site Contributing Basins

After improvements have been made, a portion of Parker Road will be situated at grades that convey stormwater runoff to the onsite catchments, and to the stormwater facility. The stormwater facility has been sized to accommodate this additional runoff area for detention and treatment. Currently, runoff from northwest of the site travels past the project site frontage along Parker Road. After improvements have been made, this runoff will be conveyed to the stormwater facility on site. The facility will allow this runoff to flow through.

6.0 Design Methodology

6.1 PROPOSED STORMWATER CONDUIT SIZING AND INLET SPACING

The on-site catch-basins will be spaced to properly convey stormwater runoff. The storm system pipes will be sized using Manning's equation to convey the peak flows from the 100-year storm event per the City of West Linn's *Public Works Design Standards*, Section 2.0013.C.6.

6.2 PROPOSED STORMWATER QUANTITY CONTROL FACILITY

The proposed stormwater runoff shall be directed to an existing stormwater network in Parker Road. The stormwater facility will follow the City of West Linn's *Public Works Design Standards* Section 2.0013 for detention requirements. The following table outlines the results of the detention pond outflow.

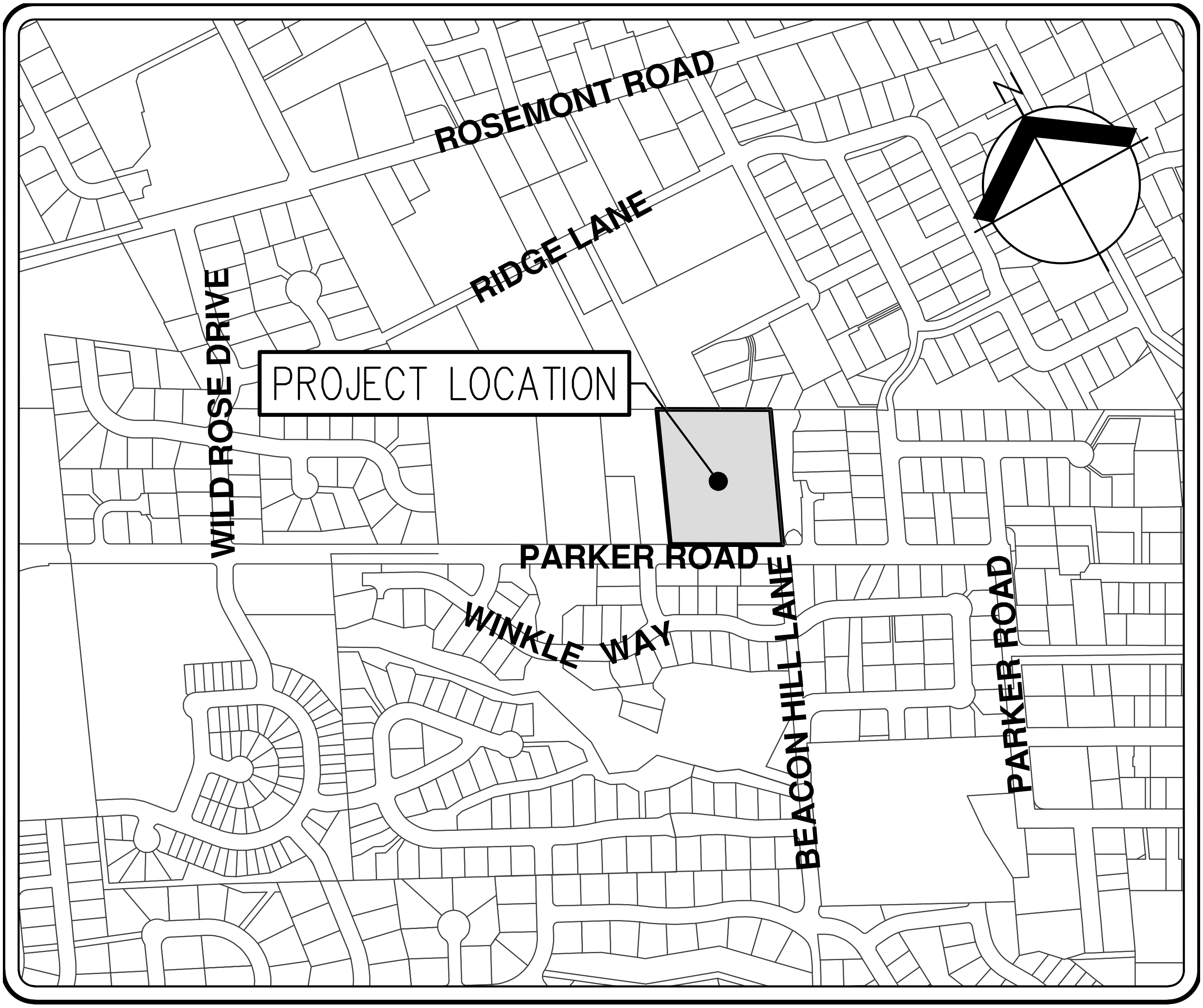
Table 6-1: Peak Pre-and Post-Development Flow Comparison			
Recurrence Interval (Years)	Peak Pre-Development Flow (cfs)	Post-Development Release Rate (cfs)	Peak Flow Increase or (Decrease) (cfs)
2	0.44	0.40	(0.04)
5	0.74	0.66	(0.08)
10	1.08	0.87	(0.21)
25	1.45	1.05	(0.40)
100	1.85	2.95	1.10

6.3 PROPOSED STORMWATER QUALITY CONTROL FACILITY

The project will utilize a stormwater facility designed per the City of Portland's *Stormwater Management Manual* Section 2.3.4 and Appendix A.3 to provide water quality treatment. Appendix A.3 requires that a rate-based stormwater treatment facility provide a water quality flow calculated using the rational method, see calculations in Appendix D.

APPENDIX A

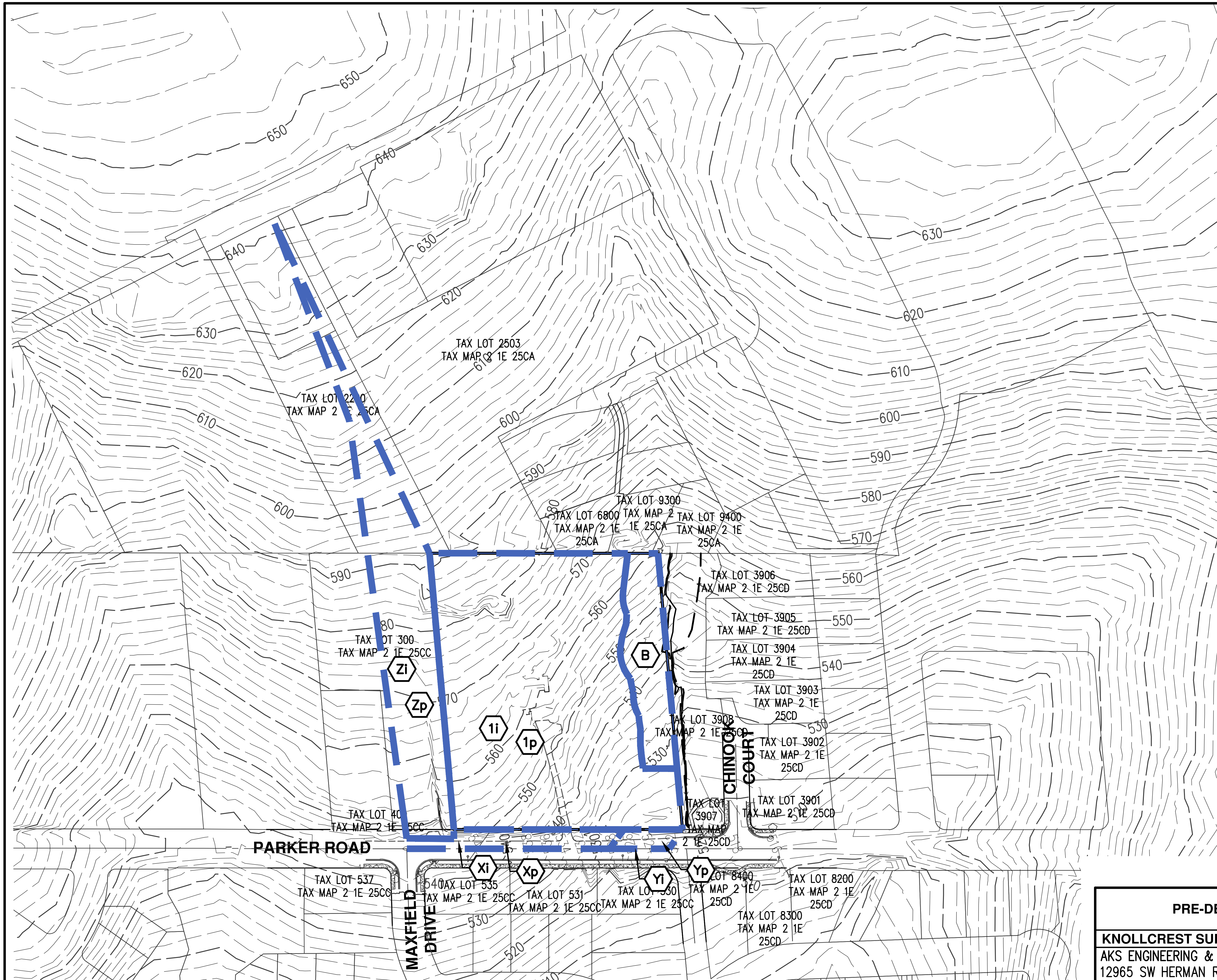
VICINITY MAP



VICINITY MAP

APPENDIX B

PRE-DEVELOPED BASIN DELINEATION



SCALE: 1"=150 FEET

150 0 60 90 120 150

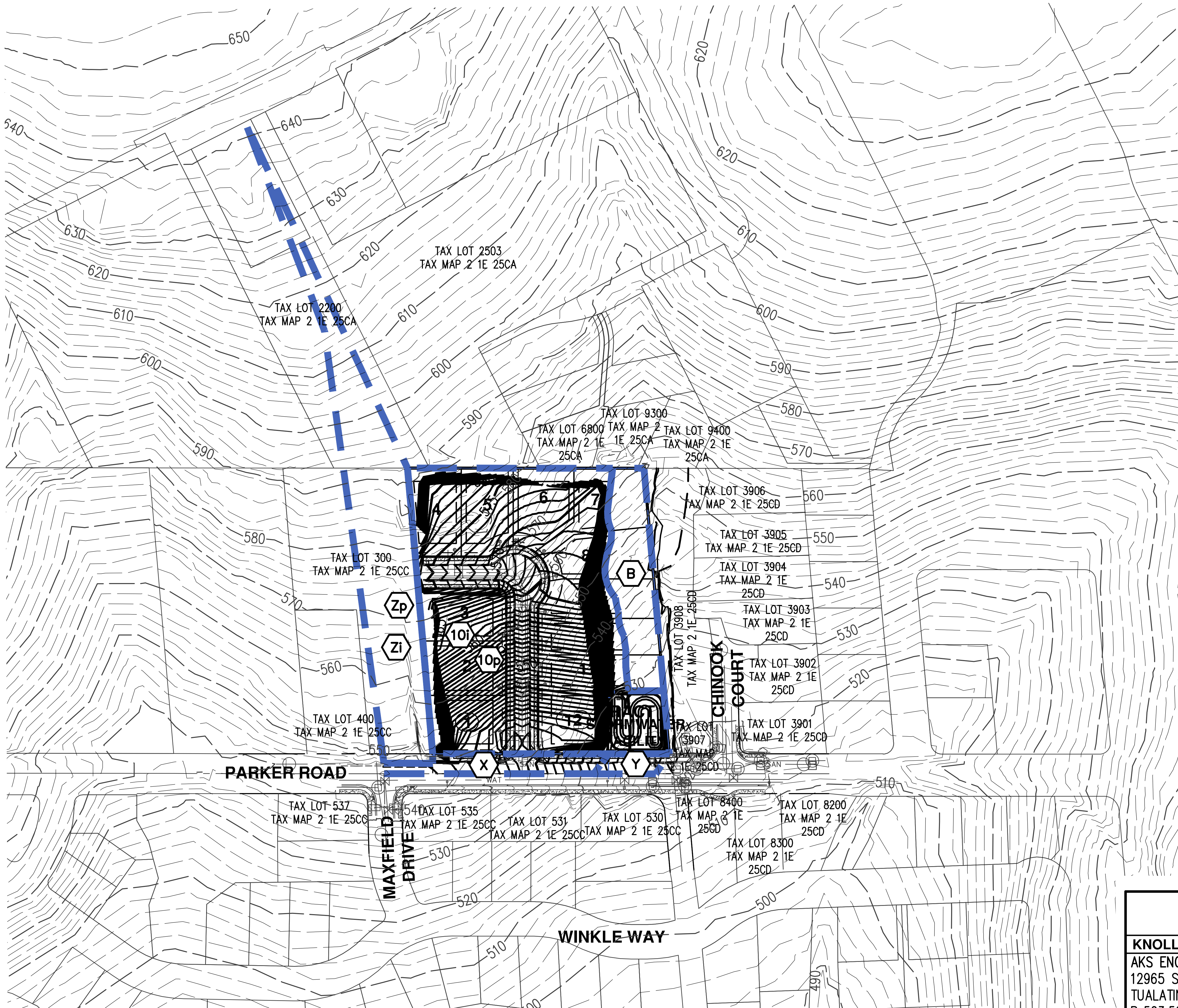
DATE: 08-22-2017

PRE-DEVELOPED BASIN DELINEATION	FIGURE
KNOLLCREST SUBDIVISION	**2-1**
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD, STE 100 TUALATIN, OR 97062 P: 503.563.6151 F: 503.563.6152 aks-eng.com	DRWN: CLR CHKD: MBH AKS JOB: 5132

DWG: 5132 PRE DEV | PRE DEV

APPENDIX C

POST DEVELOPED BASIN DELINEATION



SCALE: 1"=150 FEET

150 0 60 90 120 150

DATE: 08-22-2017

POST-DEVELOPED BASIN DELINEATION	FIGURE 3-1
KNOLLCREST SUBDIVISION	
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD, STE 100 TUALATIN, OR 97062 P: 503.563.6151 F: 503.563.6152 aks-eng.com	DRWN: CLR CHKD: MBH AKS JOB: 5132

DWG: 5132 POST DEV | POST DEV

APPENDIX D

STORMWATER QUALITY CALCULATIONS

STORMWATER QUALITY CALCULATIONS

Client: Noell and Carol Price
Project: Knollcrest Subdivision
AKS Job No.: 5132
Date: 8/22/2017
Done By: CLR
Checked By: MBH

IMPERVIOUS AREA

Total Site Area:	3.52	acres	
Total Site Area:	153,335	square feet (sf)	
Site Impervious Area:	52,582	square feet (sf)	(Assumed 2,500 sf per lot)
Offsite Impervious Area:	11,958	square feet (sf)	
Basin Zi:	3,200	square feet (sf)	
Impervious Area Requiring Treatment:	61,340	*square feet (sf)	
Impervious Area Requiring Treatment:	1.41	acres	

*Basin Zi is not required to be treated

WATER QUALITY FLOW CALCULATIONS

(Rational method, for water quality flow calculation)

$Q=C*I*A$

C:	0.9		(C value for impervious area)
I:	0.19	in/hr	(City of Portland Stormwater Management Manual: Appendix A)
A:	1.41	acres	(Total impervious area (sf) treated by the pond divided by 43,560)
Q:	0.24	cfs	

STORMWATER FACILITY DESIGN & CALCULATIONS

Hydraulic Design Criteria

Manning's #: 0.25

Maximum Depth of WQ Pool: 4 ft

Avoid direct flow across WQ pond to avoid short circuiting

Swale Sizing Design:

Slope	Bottom Width	Manning's #	Side Slope	Depth of Swale	Design Length	Bottom of Pool Elev.
(ft/ft)	(ft)	"n"	H:V	(ft)	(ft)	(ft)
0.005	4	0.25	4	2	220	522.00

Pond Calculations:

Minimum Orifice Diameter	Max. Pool Elev., 100-yr Flow	Top of Pond
(in)	(ft)	(ft)
1.00	524.71	525.75

Water Quality Flow Hydraulic Calculations:

Q	Flow Depth	Flow Area	Wp	R	Velocity
(cfs)	(ft)	(sf)	(ft)	(ft)	(fps)
0.24	0.30	1.56	6.47	0.24	0.15

Check Against Design Criteria:

	Calculated		Meet Design Criteria?			
Min. Hydraulic Residence Time:	24.4	minutes	**Yes**	>	9	min
Minimum Freeboard:	1.0	feet	**Yes**	≥	1	foot
Minimum Swale Length:	220.0	feet	**Yes**	>	100	feet
Maximum Pool Depth:	2.71	feet	**Yes**	<	4	feet
Maximum Velocity:	0.15	fps	**Yes**	<	0.9	fps

APPENDIX E

HYDRAFLOW SWALE ANALYSIS

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Thursday, Aug 3 2017

Swale Sizing Analysis

Trapezoidal

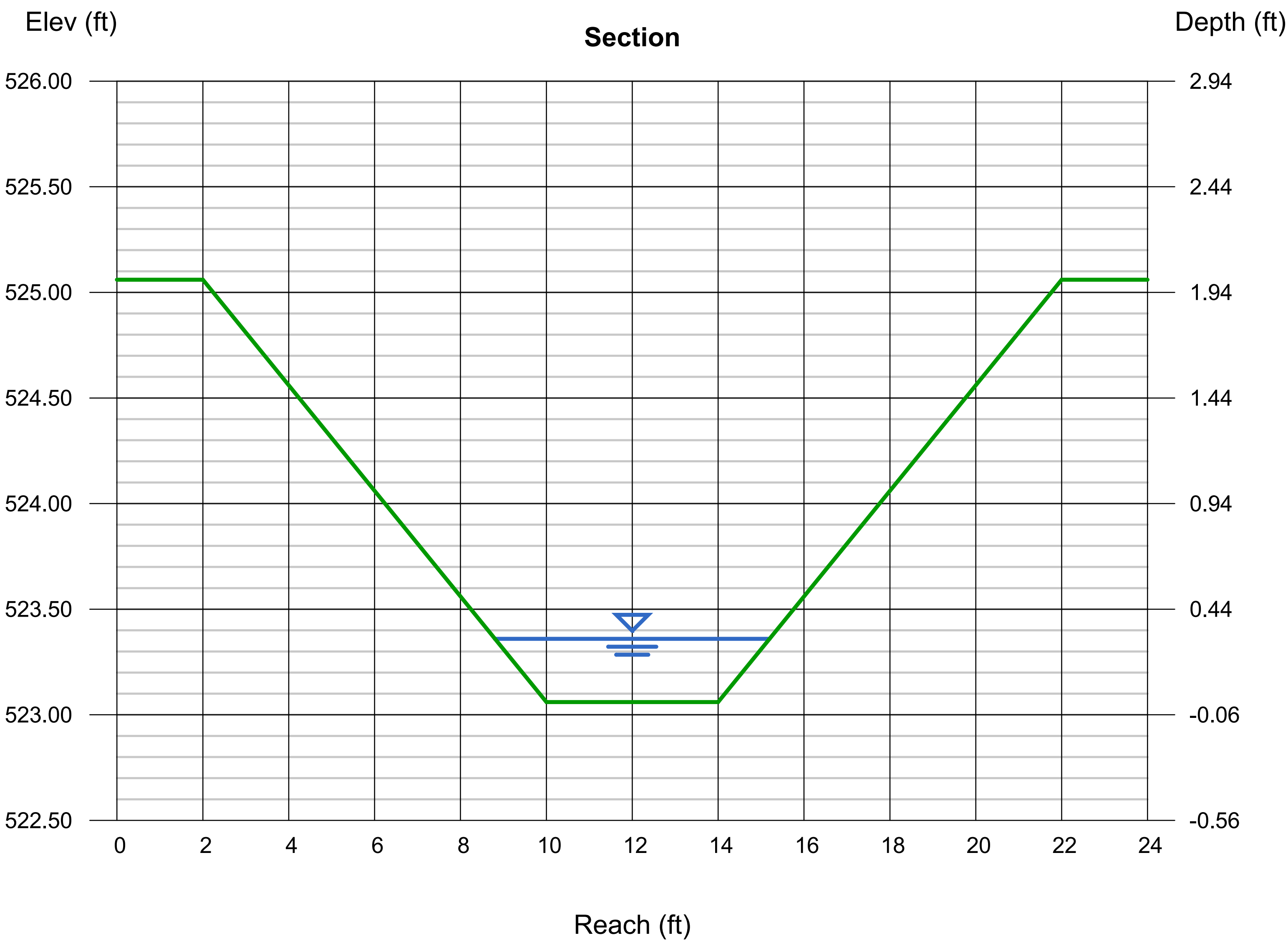
Bottom Width (ft)	= 4.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 2.00
Invert Elev (ft)	= 523.06
Slope (%)	= 0.50
N-Value	= 0.250

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.24

Highlighted

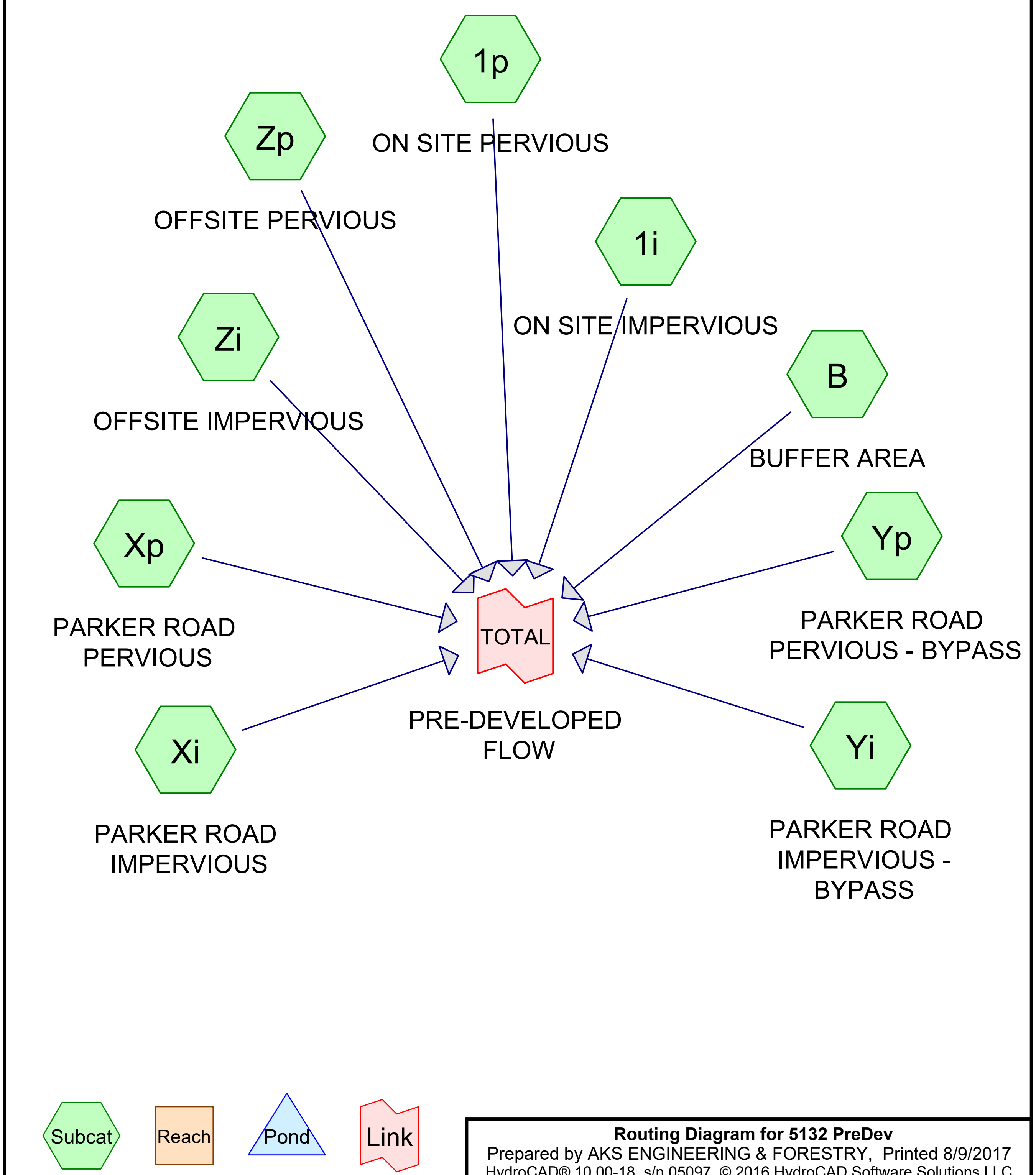
Depth (ft)	= 0.30
Q (cfs)	= 0.240
Area (sqft)	= 1.56
Velocity (ft/s)	= 0.15
Wetted Perim (ft)	= 6.47
Crit Depth, Yc (ft)	= 0.05
Top Width (ft)	= 6.40
EGL (ft)	= 0.30



APPENDIX F

PRE-DEVELOPED SITE HYDROCAD ANALYSIS

2, 5, 10 & 25 YEAR STORMS



Routing Diagram for 5132 PreDev
Prepared by AKS ENGINEERING & FORESTRY, Printed 8/9/2017
HydroCAD® 10.00-18 s/n 05097 © 2016 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.334	79	50-75% Grass cover, Fair, HSG C (Xp, Yp, Zp)
0.335	98	Impervious Area (1i, Xi, Yi, Zi)
0.452	82	Woods/grass comb., Fair, HSG D (B)
2.813	72	Woods/grass comb., Good, HSG C (1p)
0.122	79	Woods/grass comb., Good, HSG D (1p)
5.058	**77**	**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1i: ON SITE IMPERVIOUS Runoff Area=5,766 sf 100.00% Impervious Runoff Depth>2.17"
Tc=5.0 min CN=0/98 Runoff=0.07 cfs 0.024 af

Subcatchment 1p: ON SITE PERVIOUS Runoff Area=127,882 sf 0.00% Impervious Runoff Depth>0.47"
Flow Length=468' Tc=26.7 min CN=72/0 Runoff=0.10 cfs 0.114 af

Subcatchment B: BUFFER AREA Runoff Area=19,707 sf 0.00% Impervious Runoff Depth>0.91"
Flow Length=250' Slope=0.1080 '/' Tc=26.3 min CN=82/0 Runoff=0.06 cfs 0.034 af

Subcatchment Xi: PARKER ROAD Runoff Area=4,244 sf 100.00% Impervious Runoff Depth>2.17"
Tc=5.0 min CN=0/98 Runoff=0.05 cfs 0.018 af

Subcatchment Xp: PARKER ROAD Runoff Area=4,514 sf 0.00% Impervious Runoff Depth>0.77"
Tc=5.0 min CN=79/0 Runoff=0.01 cfs 0.007 af

Subcatchment Yi: PARKER ROAD Runoff Area=1,400 sf 100.00% Impervious Runoff Depth>2.17"
Tc=5.0 min CN=0/98 Runoff=0.02 cfs 0.006 af

Subcatchment Yp: PARKER ROAD Runoff Area=1,378 sf 0.00% Impervious Runoff Depth>0.77"
Tc=5.0 min CN=79/0 Runoff=0.00 cfs 0.002 af

Subcatchment Zi: OFFSITE IMPERVIOUS Runoff Area=3,200 sf 100.00% Impervious Runoff Depth>2.17"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.013 af

Subcatchment Zp: OFFSITE PERVIOUS Runoff Area=52,222 sf 0.00% Impervious Runoff Depth>0.76"
Flow Length=958' Tc=20.8 min CN=79/0 Runoff=0.13 cfs 0.076 af

Link TOTAL: PRE-DEVELOPED FLOW Inflow=0.44 cfs 0.294 af
Primary=0.44 cfs 0.294 af

Total Runoff Area = 5.058 ac Runoff Volume = 0.294 af Average Runoff Depth = 0.70"
93.37% Pervious = 4.722 ac 6.63% Impervious = 0.335 ac

Summary for Subcatchment 1i: ON SITE IMPERVIOUS

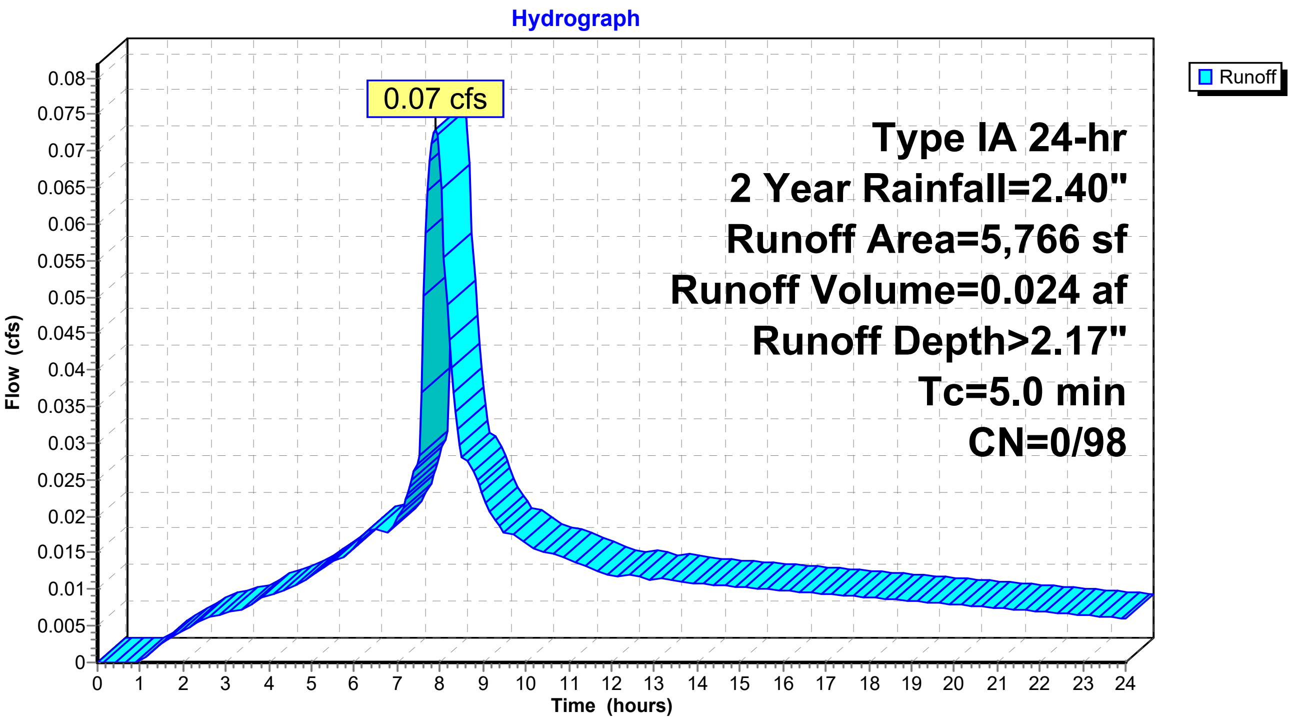
Runoff = 0.07 cfs @ 7.90 hrs, Volume= 0.024 af, Depth> 2.17"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 Year Rainfall=2.40"

	Area (sf)	CN	Description
*	5,766	98	Impervious Area
	5,766		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 1i: ON SITE IMPERVIOUS



Summary for Subcatchment 1p: ON SITE PERVIOUS

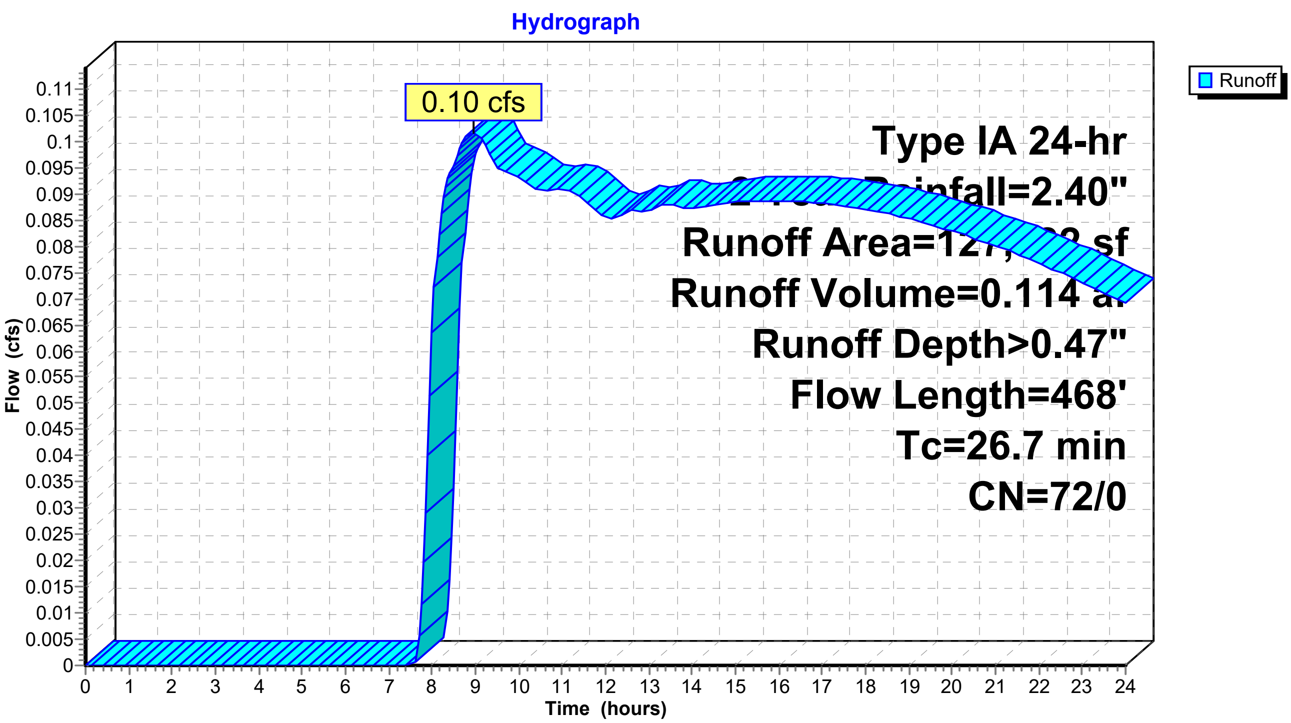
Runoff = 0.10 cfs @ 8.93 hrs, Volume= 0.114 af, Depth> 0.47"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 Year Rainfall=2.40"

Area (sf)	CN	Description
122,556	72	Woods/grass comb., Good, HSG C
5,326	79	Woods/grass comb., Good, HSG D
127,882	72	Weighted Average
127,882		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.4	156	0.1020	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.40"
7.1	126	0.1020	0.30		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.40"
1.2	186	0.1400	2.62		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.7	468	Total			

Subcatchment 1p: ON SITE PERVIOUS



Summary for Subcatchment B: BUFFER AREA

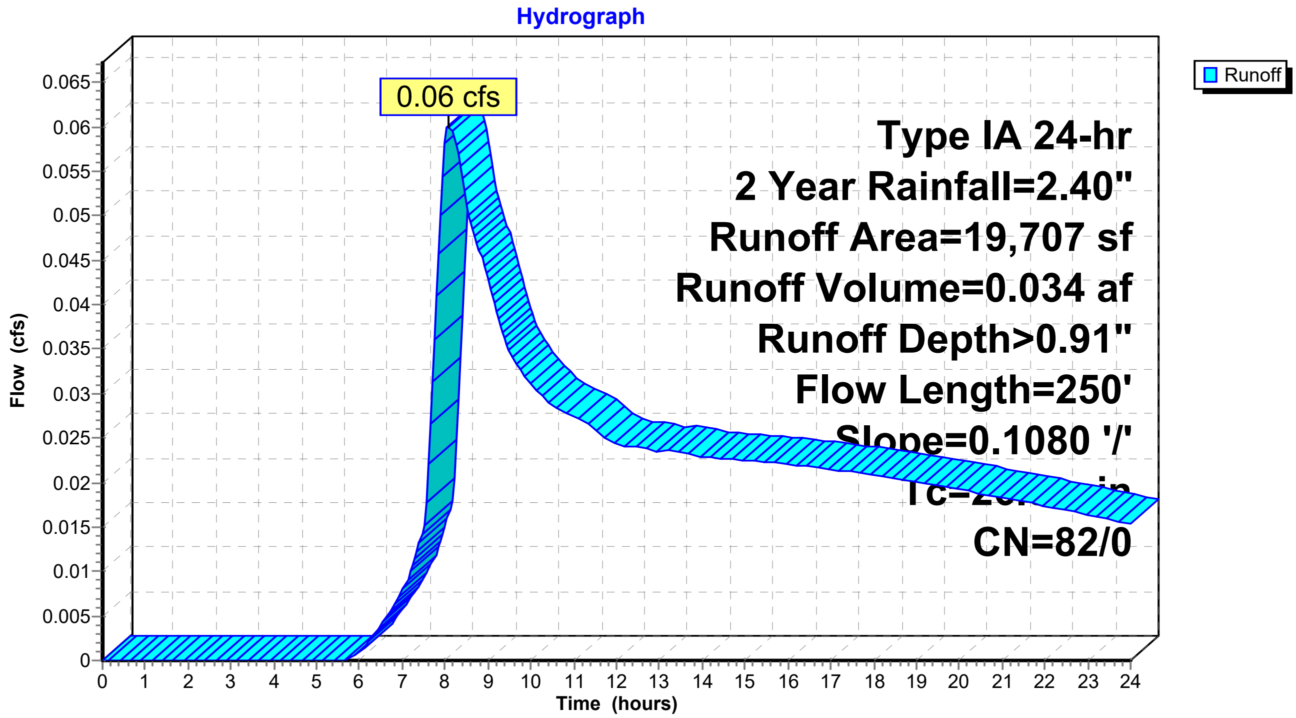
Runoff = 0.06 cfs @ 8.08 hrs, Volume= 0.034 af, Depth> 0.91"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 Year Rainfall=2.40"

Area (sf)	CN	Description
19,707	82	Woods/grass comb., Fair, HSG D
19,707		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.3	250	0.1080	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.40"

Subcatchment B: BUFFER AREA



Summary for Subcatchment Xi: PARKER ROAD IMPERVIOUS

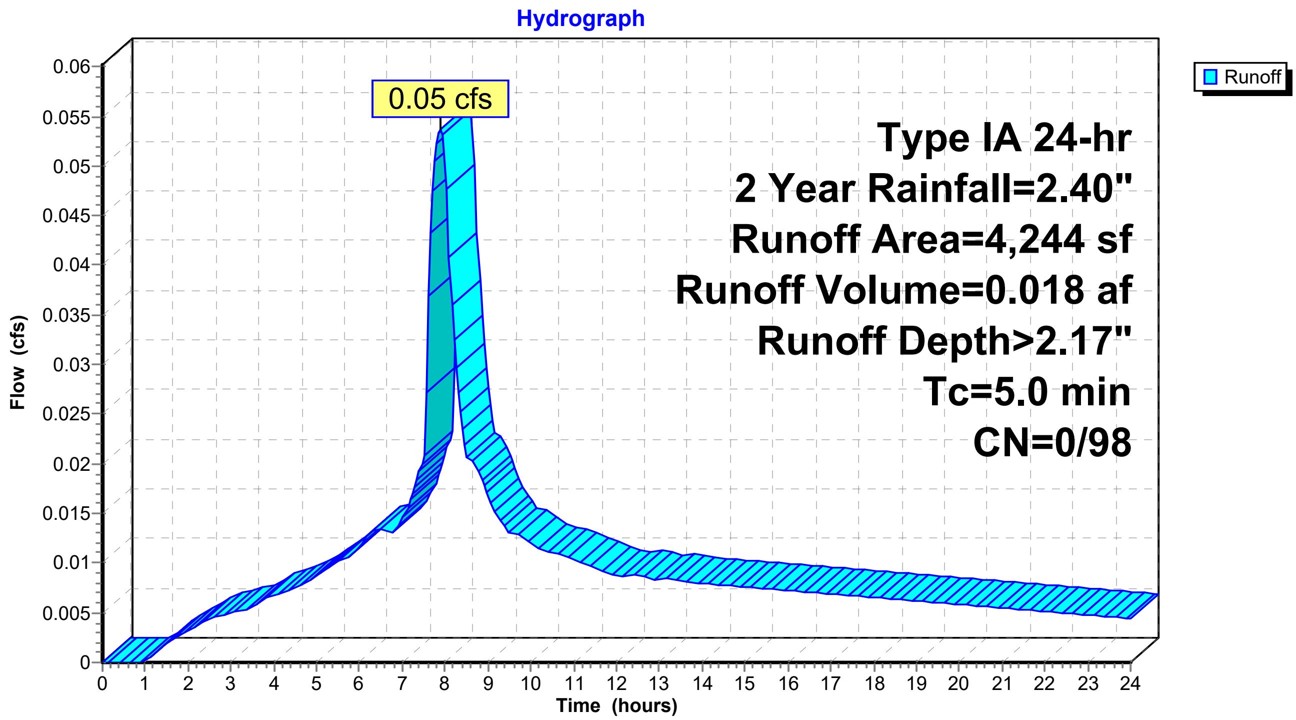
Runoff = 0.05 cfs @ 7.90 hrs, Volume= 0.018 af, Depth> 2.17"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 Year Rainfall=2.40"

	Area (sf)	CN	Description
*	4,244	98	Impervious Area
	4,244		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Xi: PARKER ROAD IMPERVIOUS



Summary for Subcatchment Xp: PARKER ROAD PERVIOUS

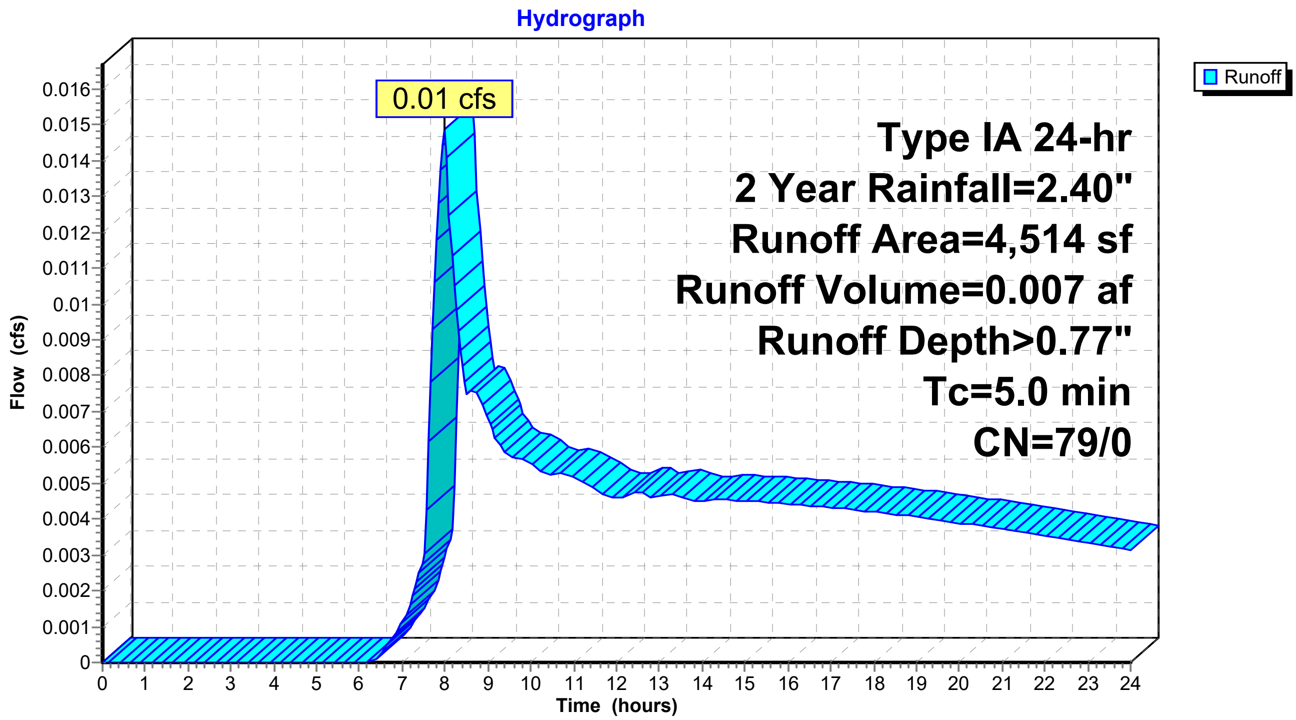
Runoff = 0.01 cfs @ 7.99 hrs, Volume= 0.007 af, Depth> 0.77"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 Year Rainfall=2.40"

Area (sf)	CN	Description
4,514	79	50-75% Grass cover, Fair, HSG C
4,514		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Xp: PARKER ROAD PERVIOUS



Summary for Subcatchment Yi: PARKER ROAD IMPERVIOUS - BYPASS

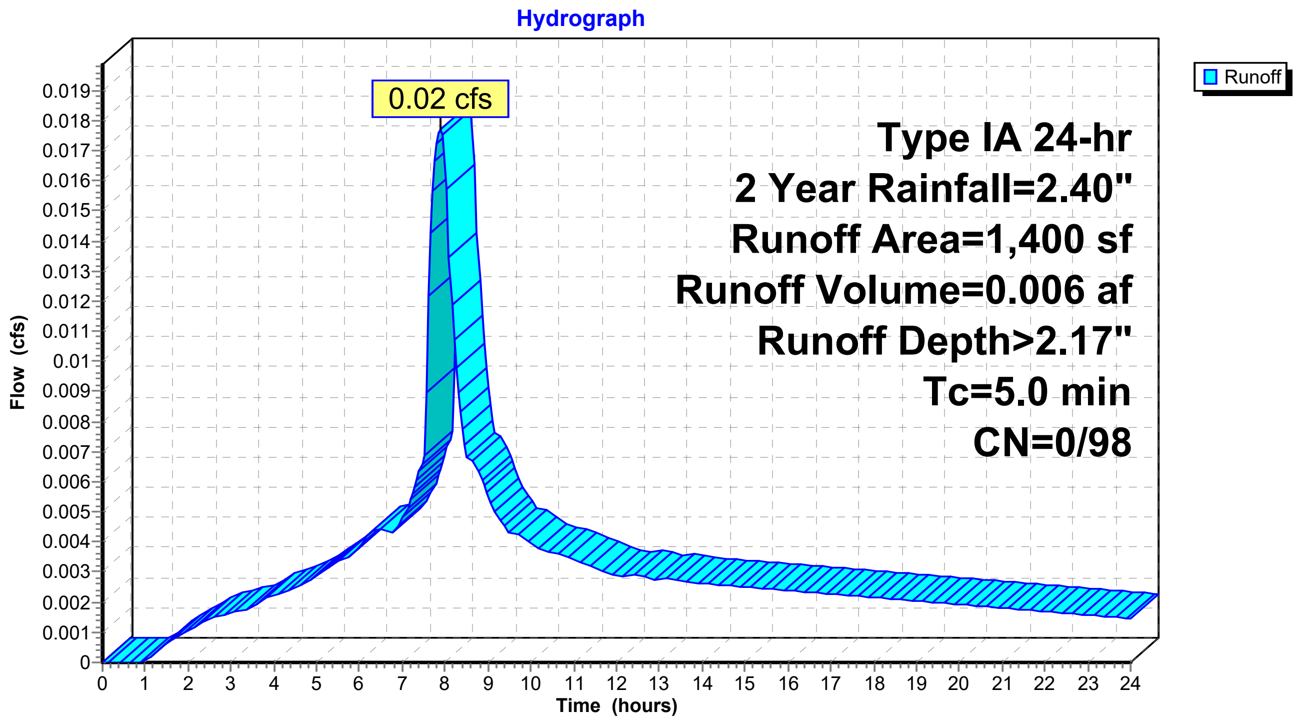
Runoff = 0.02 cfs @ 7.90 hrs, Volume= 0.006 af, Depth> 2.17"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 Year Rainfall=2.40"

	Area (sf)	CN	Description
*	1,400	98	Impervious Area
	1,400		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Yi: PARKER ROAD IMPERVIOUS - BYPASS



Summary for Subcatchment Yp: PARKER ROAD PERVIOUS - BYPASS

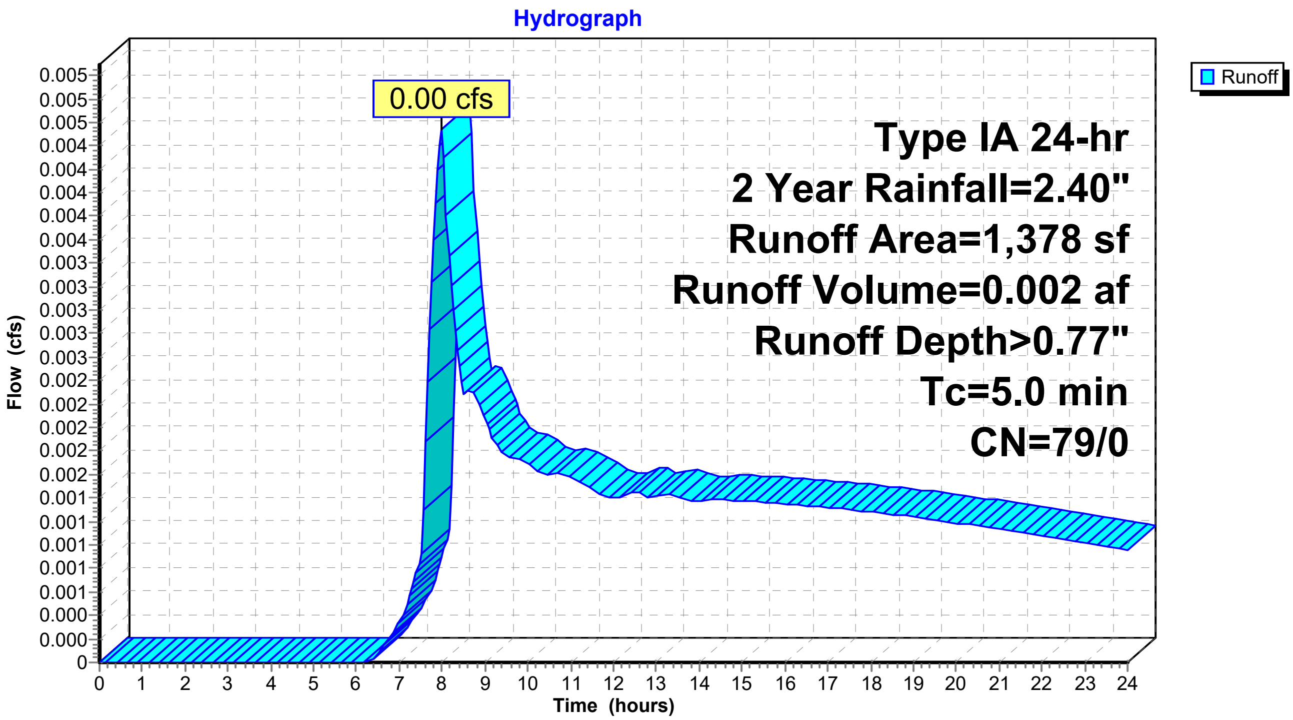
Runoff = 0.00 cfs @ 7.99 hrs, Volume= 0.002 af, Depth> 0.77"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 Year Rainfall=2.40"

Area (sf)	CN	Description
1,378	79	50-75% Grass cover, Fair, HSG C
1,378		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Yp: PARKER ROAD PERVIOUS - BYPASS



Summary for Subcatchment Zi: OFFSITE IMPERVIOUS

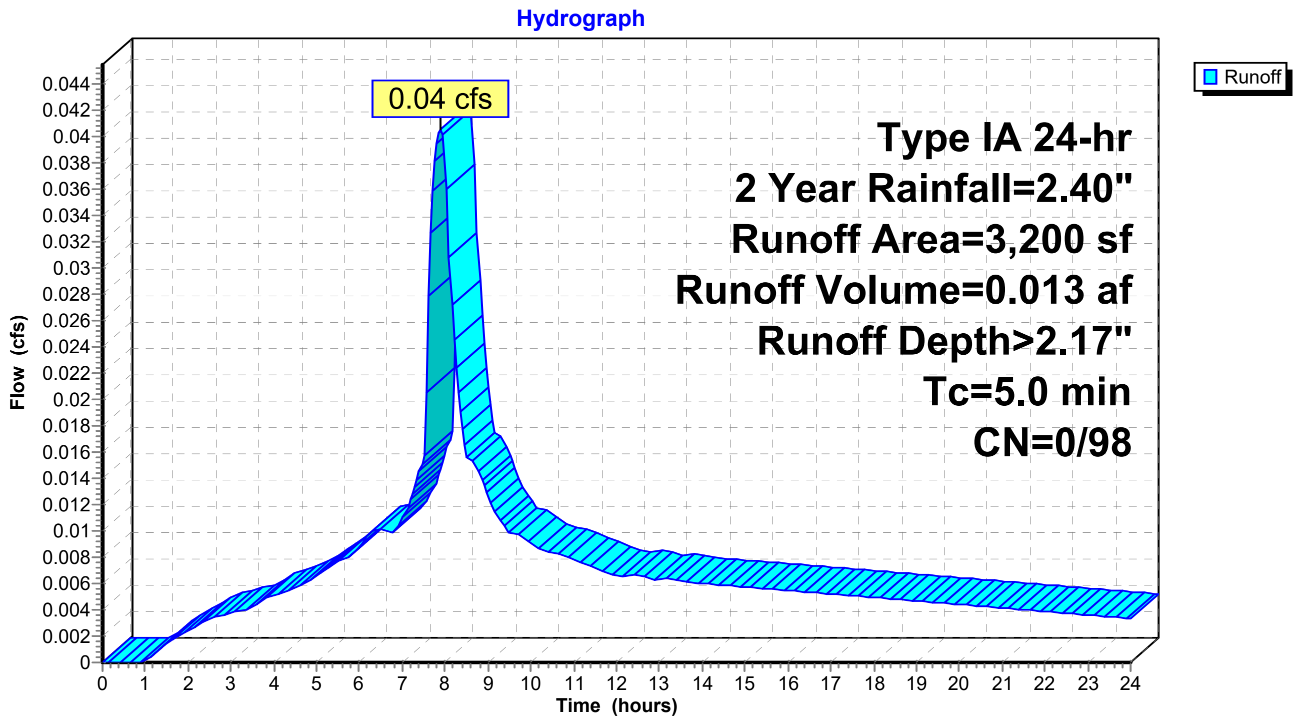
Runoff = 0.04 cfs @ 7.90 hrs, Volume= 0.013 af, Depth> 2.17"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 Year Rainfall=2.40"

	Area (sf)	CN	Description
*	3,200	98	Impervious Area
	3,200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Zi: OFFSITE IMPERVIOUS



Summary for Subcatchment Zp: OFFSITE PERVIOUS

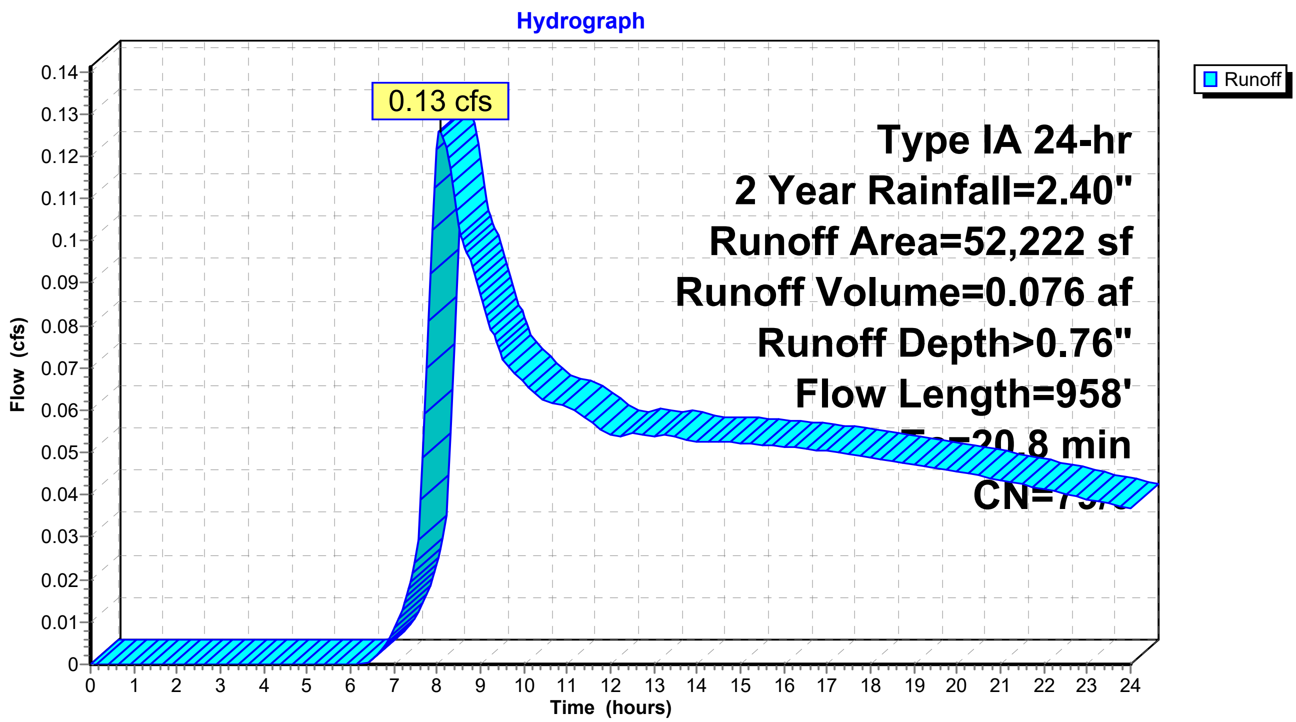
Runoff = 0.13 cfs @ 8.07 hrs, Volume= 0.076 af, Depth> 0.76"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 Year Rainfall=2.40"

Area (sf)	CN	Description
52,222	79	50-75% Grass cover, Fair, HSG C
52,222		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	300	0.0750	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.40"
4.7	658	0.1100	2.32		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
20.8	958	Total			

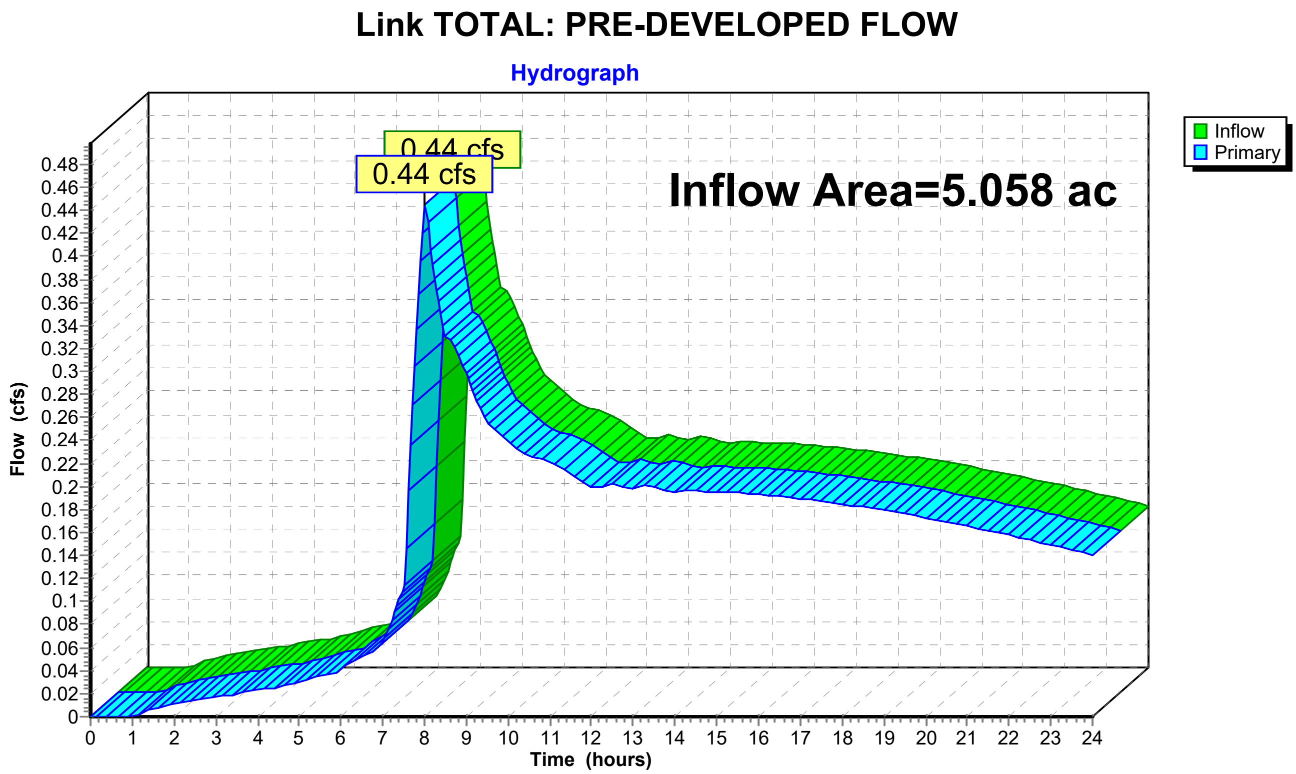
Subcatchment Zp: OFFSITE PERVIOUS



Summary for Link TOTAL: PRE-DEVELOPED FLOW

Inflow Area = 5.058 ac, 6.63% Impervious, Inflow Depth > 0.70" for 2 Year event
Inflow = 0.44 cfs @ 8.02 hrs, Volume= 0.294 af
Primary = 0.44 cfs @ 8.02 hrs, Volume= 0.294 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1i: ON SITE IMPERVIOUS Runoff Area=5,766 sf 100.00% Impervious Runoff Depth>2.66"
Tc=5.0 min CN=0/98 Runoff=0.09 cfs 0.029 af

Subcatchment 1p: ON SITE PERVIOUS Runoff Area=127,882 sf 0.00% Impervious Runoff Depth>0.73"
Flow Length=468' Tc=26.7 min CN=72/0 Runoff=0.21 cfs 0.180 af

Subcatchment B: BUFFER AREA Runoff Area=19,707 sf 0.00% Impervious Runoff Depth>1.28"
Flow Length=250' Slope=0.1080 '/' Tc=26.3 min CN=82/0 Runoff=0.09 cfs 0.048 af

Subcatchment Xi: PARKER ROAD Runoff Area=4,244 sf 100.00% Impervious Runoff Depth>2.66"
Tc=5.0 min CN=0/98 Runoff=0.07 cfs 0.022 af

Subcatchment Xp: PARKER ROAD Runoff Area=4,514 sf 0.00% Impervious Runoff Depth>1.11"
Tc=5.0 min CN=79/0 Runoff=0.02 cfs 0.010 af

Subcatchment Yi: PARKER ROAD Runoff Area=1,400 sf 100.00% Impervious Runoff Depth>2.66"
Tc=5.0 min CN=0/98 Runoff=0.02 cfs 0.007 af

Subcatchment Yp: PARKER ROAD Runoff Area=1,378 sf 0.00% Impervious Runoff Depth>1.11"
Tc=5.0 min CN=79/0 Runoff=0.01 cfs 0.003 af

Subcatchment Zi: OFFSITE IMPERVIOUS Runoff Area=3,200 sf 100.00% Impervious Runoff Depth>2.66"
Tc=5.0 min CN=0/98 Runoff=0.05 cfs 0.016 af

Subcatchment Zp: OFFSITE PERVIOUS Runoff Area=52,222 sf 0.00% Impervious Runoff Depth>1.10"
Flow Length=958' Tc=20.8 min CN=79/0 Runoff=0.21 cfs 0.110 af

Link TOTAL: PRE-DEVELOPED FLOW Inflow=0.74 cfs 0.425 af
Primary=0.74 cfs 0.425 af

Total Runoff Area = 5.058 ac Runoff Volume = 0.425 af Average Runoff Depth = 1.01"
93.37% Pervious = 4.722 ac 6.63% Impervious = 0.335 ac

Summary for Subcatchment 1i: ON SITE IMPERVIOUS

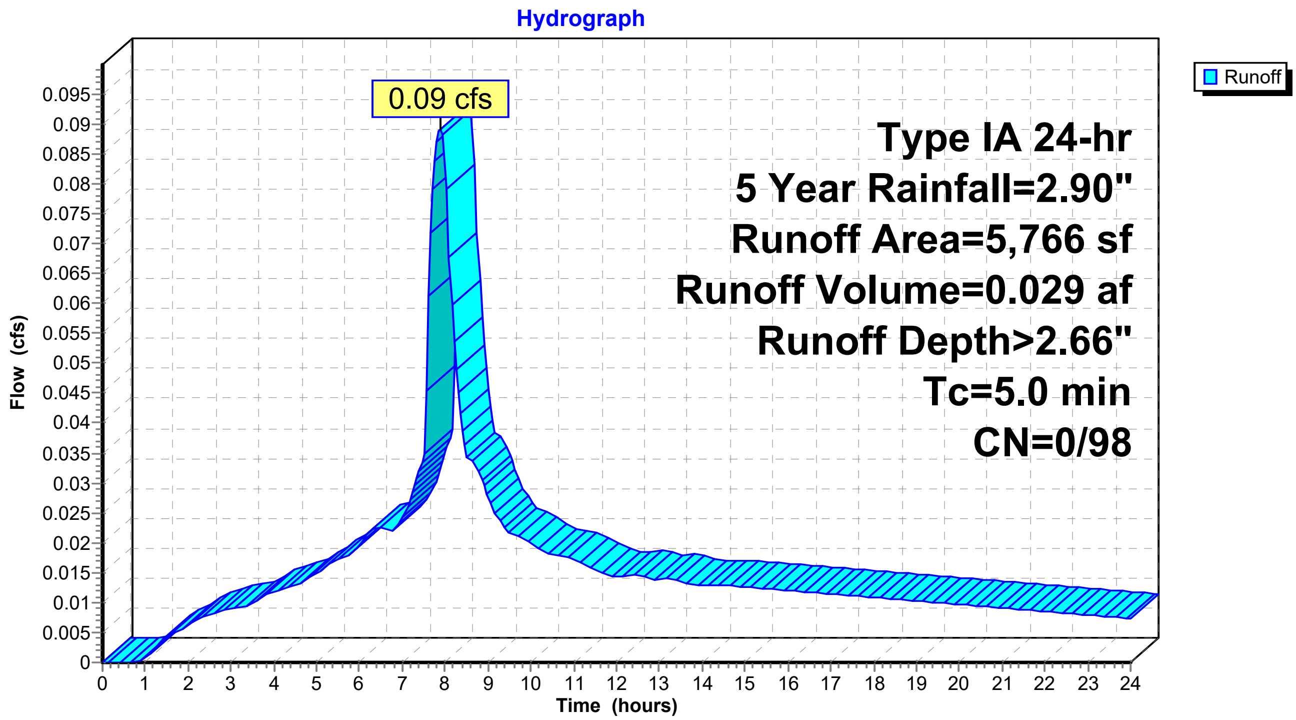
Runoff = 0.09 cfs @ 7.90 hrs, Volume= 0.029 af, Depth> 2.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5 Year Rainfall=2.90"

	Area (sf)	CN	Description
*	5,766	98	Impervious Area
	5,766		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 1i: ON SITE IMPERVIOUS



Summary for Subcatchment 1p: ON SITE PERVIOUS

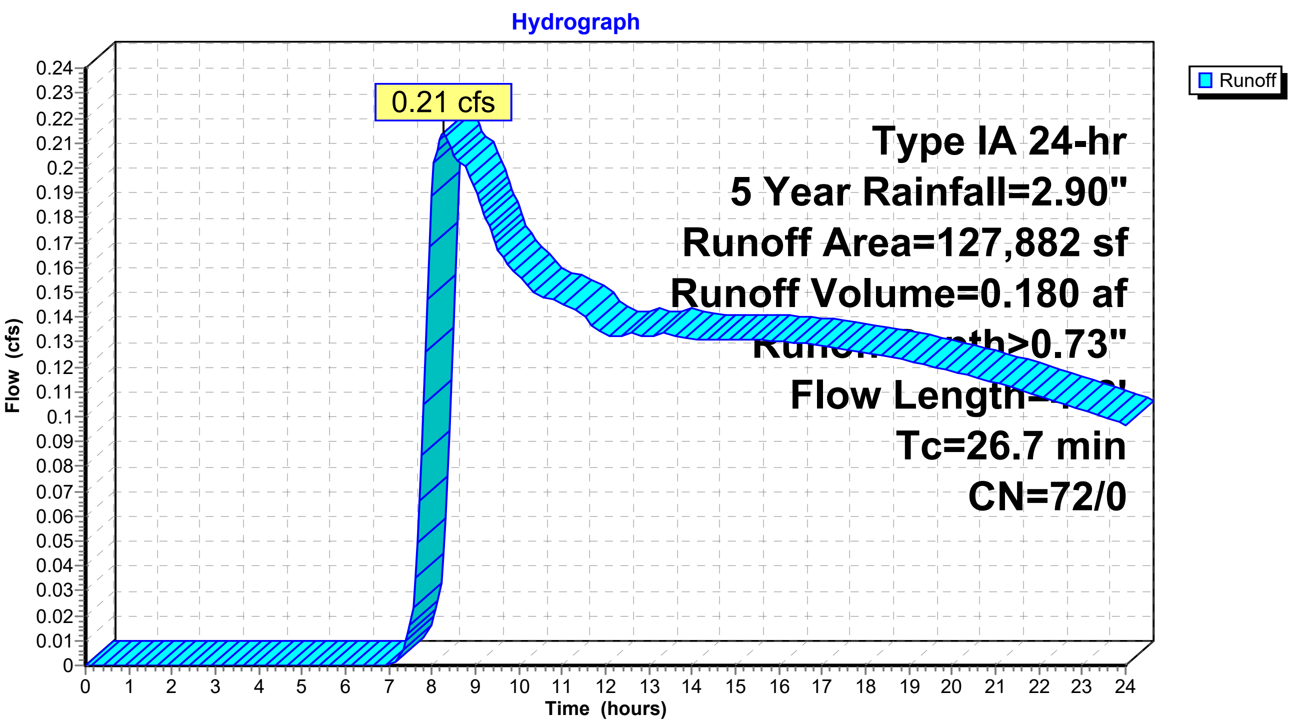
Runoff = 0.21 cfs @ 8.26 hrs, Volume= 0.180 af, Depth> 0.73"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5 Year Rainfall=2.90"

Area (sf)	CN	Description
122,556	72	Woods/grass comb., Good, HSG C
5,326	79	Woods/grass comb., Good, HSG D
127,882	72	Weighted Average
127,882		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.4	156	0.1020	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.40"
7.1	126	0.1020	0.30		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.40"
1.2	186	0.1400	2.62		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.7	468	Total			

Subcatchment 1p: ON SITE PERVIOUS



Summary for Subcatchment B: BUFFER AREA

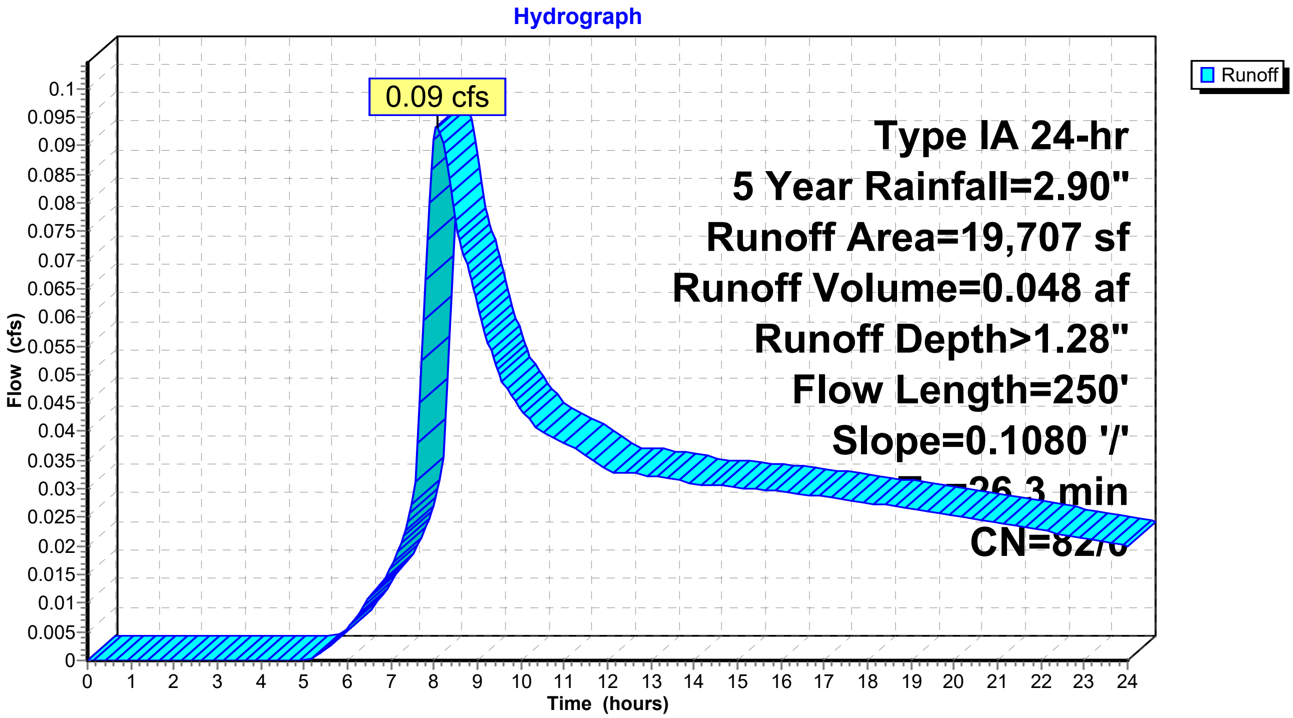
Runoff = 0.09 cfs @ 8.07 hrs, Volume= 0.048 af, Depth> 1.28"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5 Year Rainfall=2.90"

Area (sf)	CN	Description
19,707	82	Woods/grass comb., Fair, HSG D
19,707		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.3	250	0.1080	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.40"

Subcatchment B: BUFFER AREA



Summary for Subcatchment Xi: PARKER ROAD IMPERVIOUS

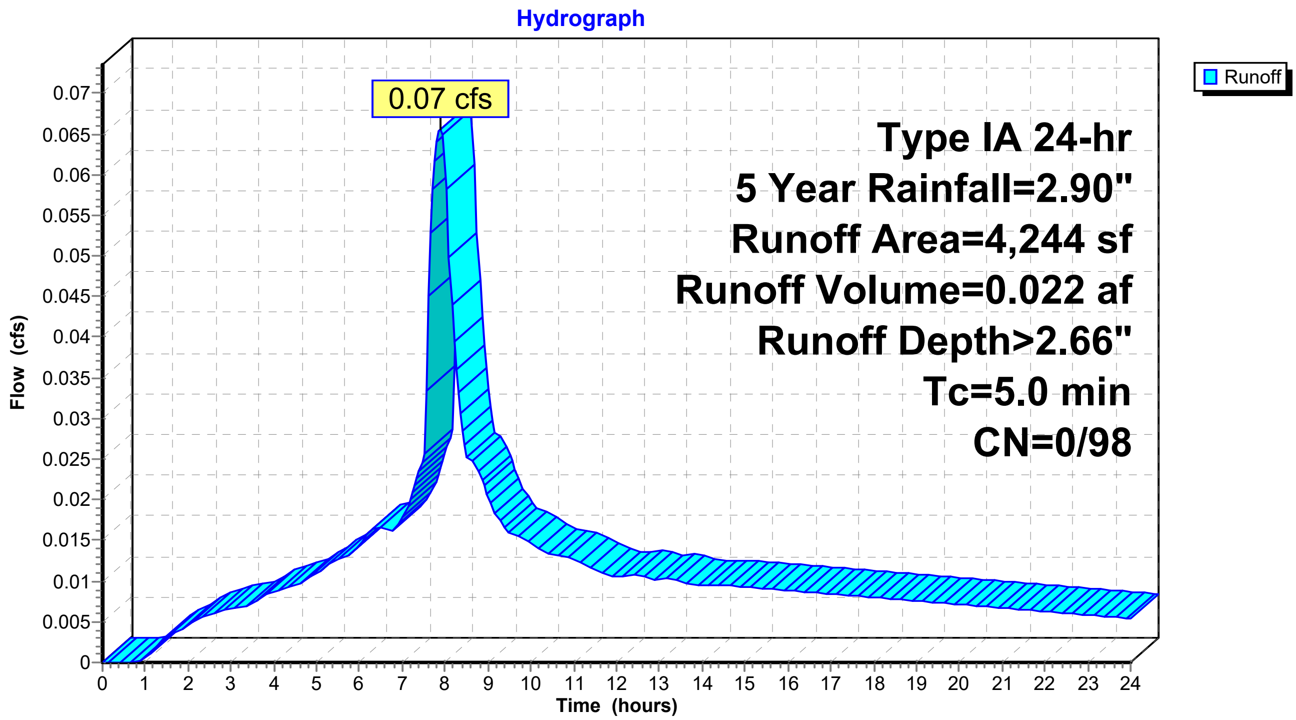
Runoff = 0.07 cfs @ 7.90 hrs, Volume= 0.022 af, Depth> 2.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5 Year Rainfall=2.90"

	Area (sf)	CN	Description
*	4,244	98	Impervious Area
	4,244		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Xi: PARKER ROAD IMPERVIOUS



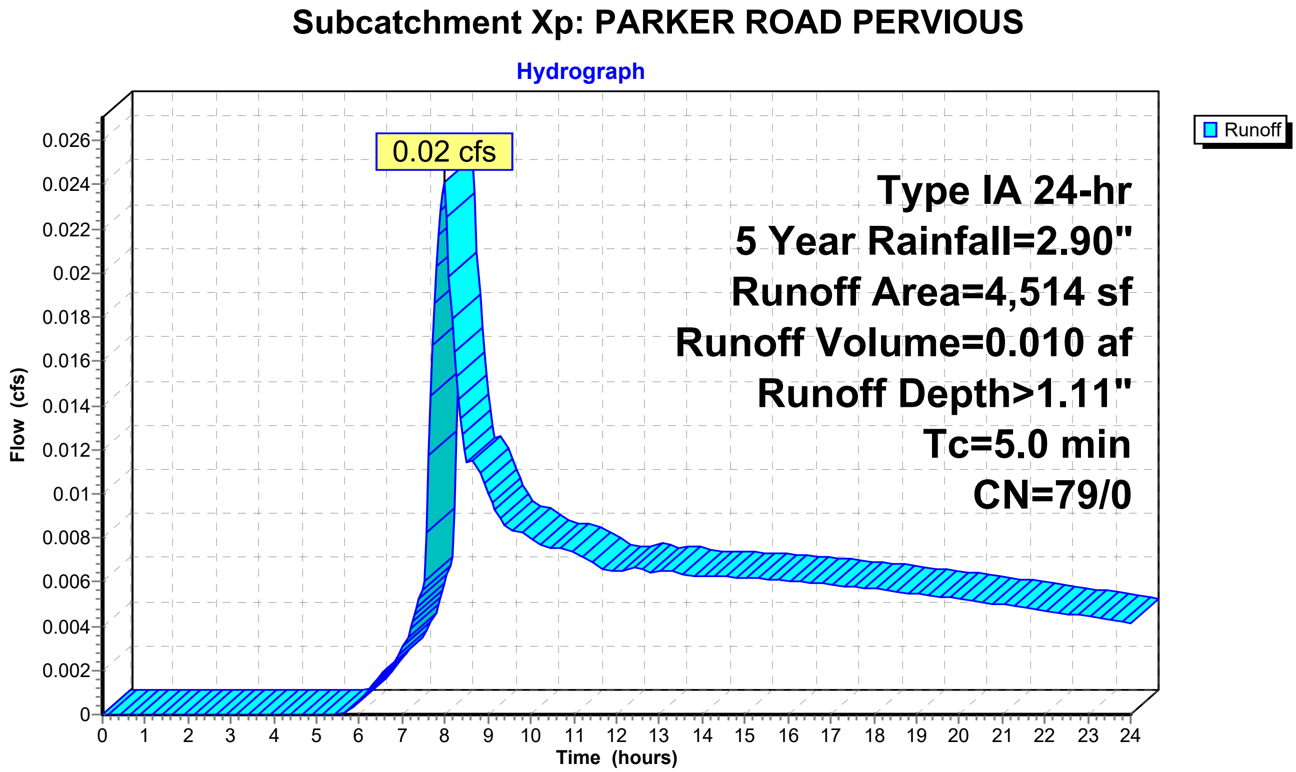
Summary for Subcatchment Xp: PARKER ROAD PERVIOUS

Runoff = 0.02 cfs @ 7.99 hrs, Volume= 0.010 af, Depth> 1.11"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5 Year Rainfall=2.90"

Area (sf)	CN	Description
4,514	79	50-75% Grass cover, Fair, HSG C
4,514		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**



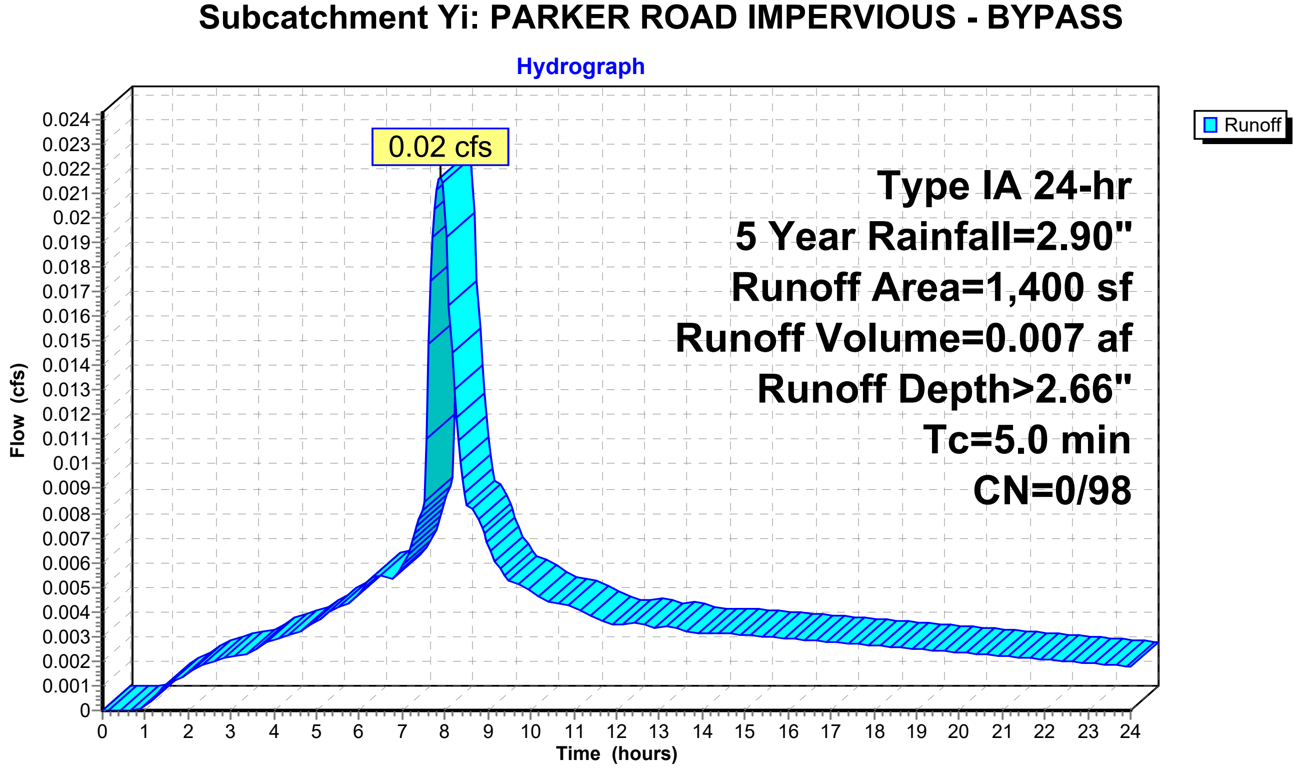
Summary for Subcatchment Yi: PARKER ROAD IMPERVIOUS - BYPASS

Runoff = 0.02 cfs @ 7.90 hrs, Volume= 0.007 af, Depth> 2.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5 Year Rainfall=2.90"

	Area (sf)	CN	Description
*	1,400	98	Impervious Area
	1,400		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**



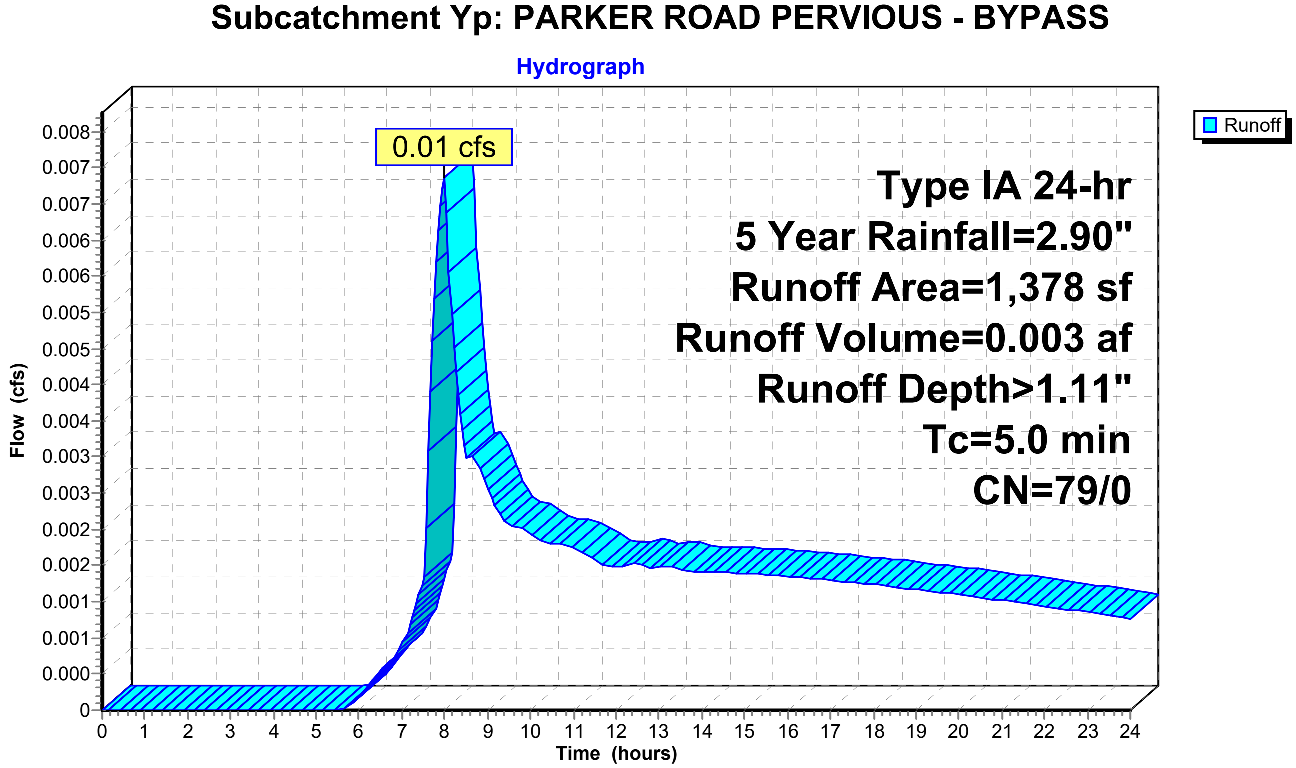
Summary for Subcatchment Yp: PARKER ROAD PERVIOUS - BYPASS

Runoff = 0.01 cfs @ 7.99 hrs, Volume= 0.003 af, Depth> 1.11"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5 Year Rainfall=2.90"

Area (sf)	CN	Description
1,378	79	50-75% Grass cover, Fair, HSG C
1,378		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**



Summary for Subcatchment Zi: OFFSITE IMPERVIOUS

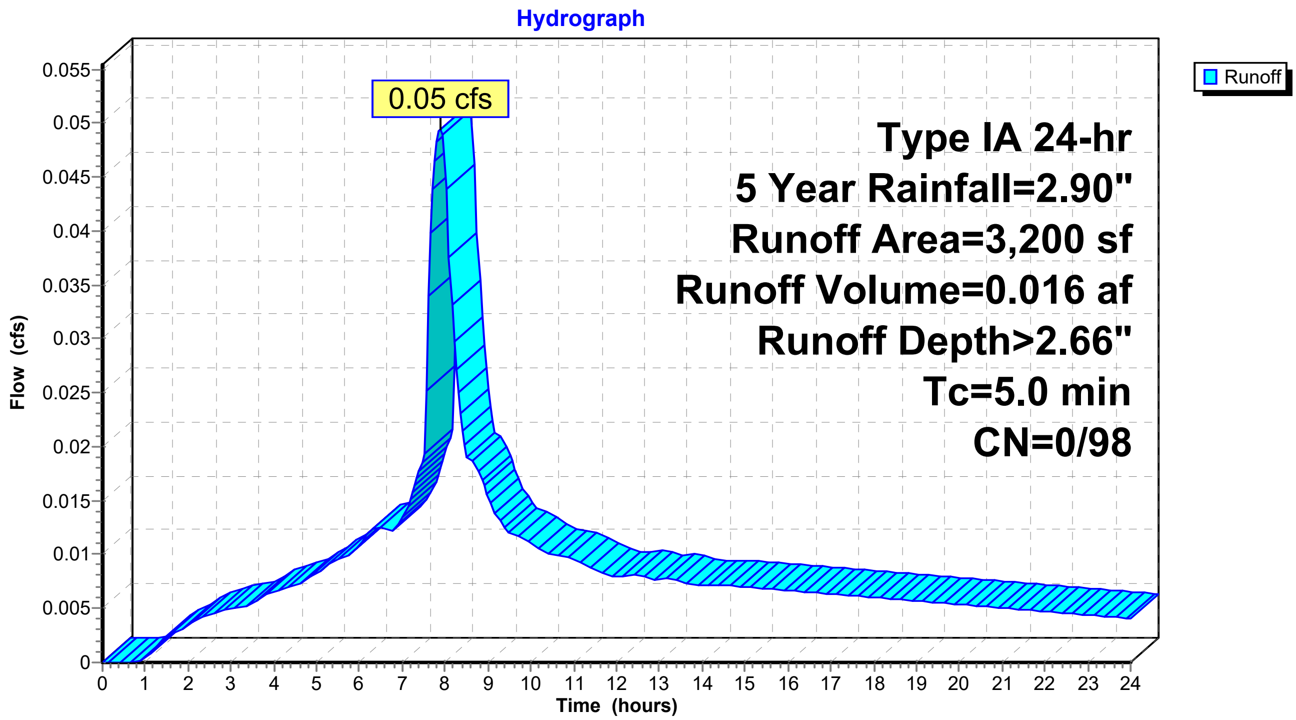
Runoff = 0.05 cfs @ 7.90 hrs, Volume= 0.016 af, Depth> 2.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5 Year Rainfall=2.90"

	Area (sf)	CN	Description
*	3,200	98	Impervious Area
	3,200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Zi: OFFSITE IMPERVIOUS



Summary for Subcatchment Zp: OFFSITE PERVIOUS

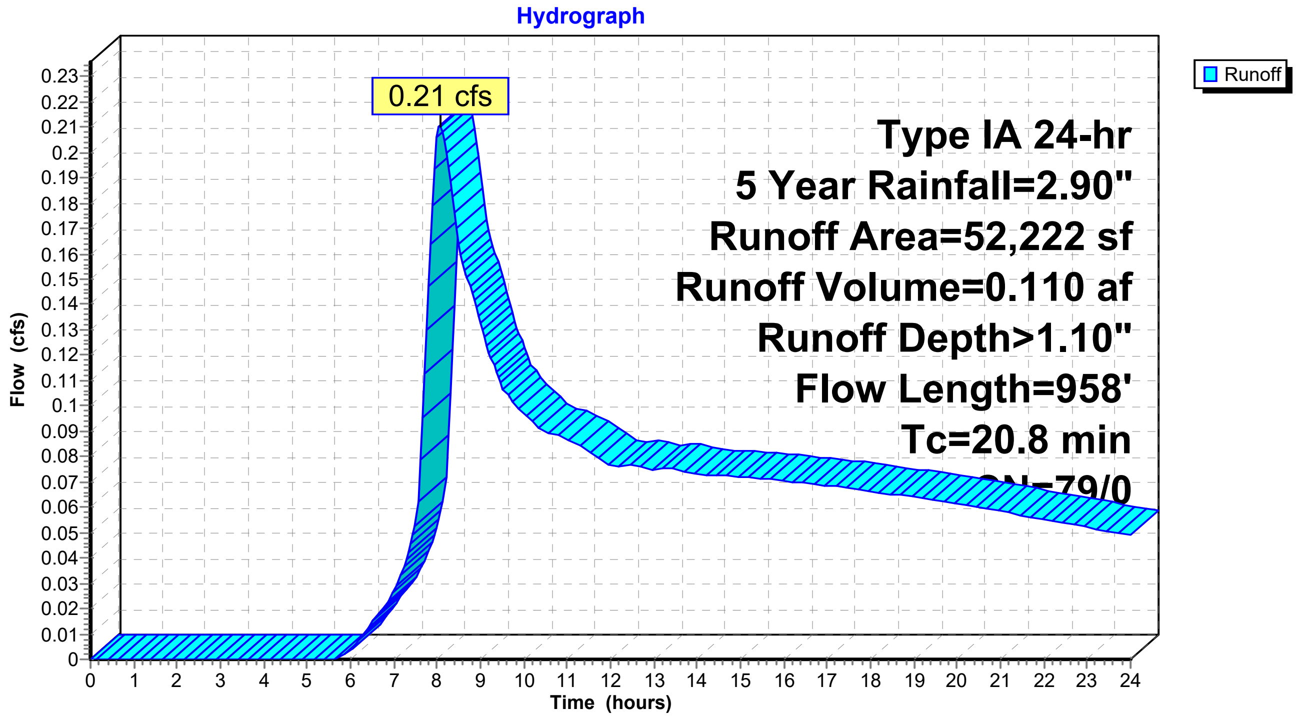
Runoff = 0.21 cfs @ 8.06 hrs, Volume= 0.110 af, Depth> 1.10"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5 Year Rainfall=2.90"

Area (sf)	CN	Description
52,222	79	50-75% Grass cover, Fair, HSG C
52,222		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	300	0.0750	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.40"
4.7	658	0.1100	2.32		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
20.8	958	Total			

Subcatchment Zp: OFFSITE PERVIOUS

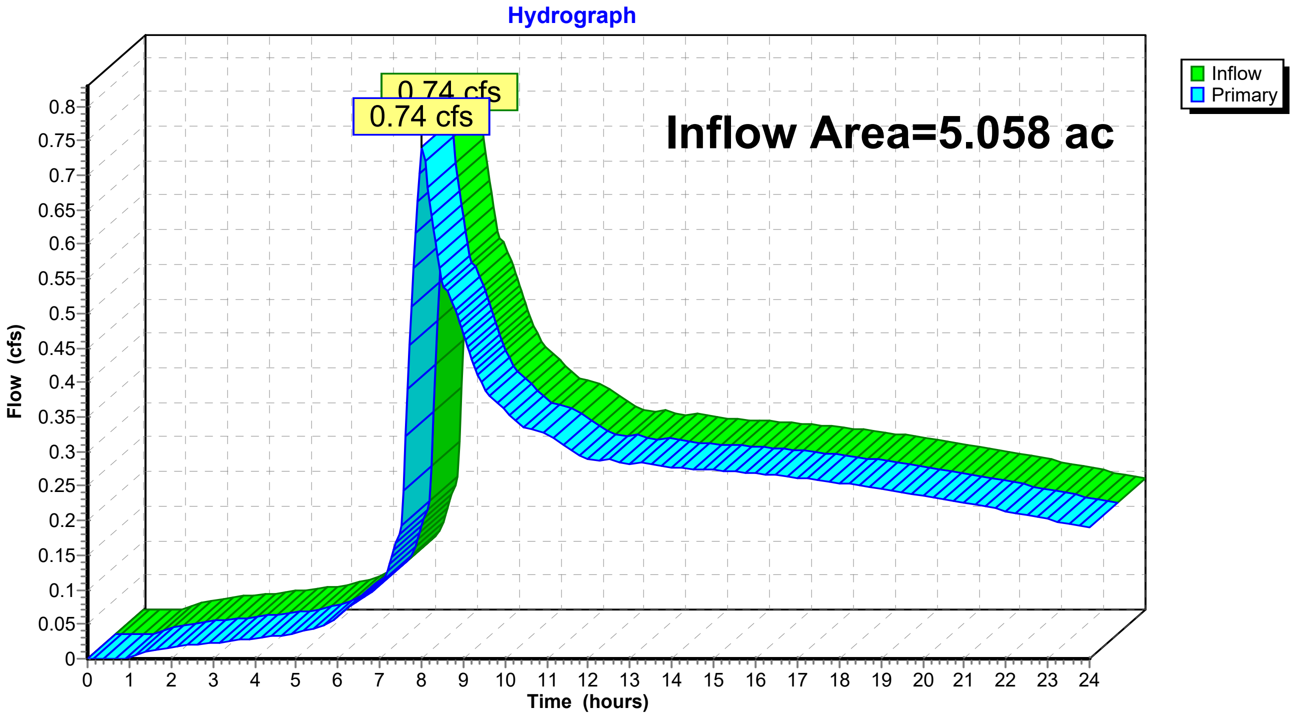


Summary for Link TOTAL: PRE-DEVELOPED FLOW

Inflow Area = 5.058 ac, 6.63% Impervious, Inflow Depth > 1.01" for 5 Year event
Inflow = 0.74 cfs @ 8.02 hrs, Volume= 0.425 af
Primary = 0.74 cfs @ 8.02 hrs, Volume= 0.425 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link TOTAL: PRE-DEVELOPED FLOW



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1i: ON SITE IMPERVIOUS Runoff Area=5,766 sf 100.00% Impervious Runoff Depth>3.16"
Tc=5.0 min CN=0/98 Runoff=0.11 cfs 0.035 af

Subcatchment 1p: ON SITE PERVIOUS Runoff Area=127,882 sf 0.00% Impervious Runoff Depth>1.04"
Flow Length=468' Tc=26.7 min CN=72/0 Runoff=0.37 cfs 0.254 af

Subcatchment B: BUFFER AREA Runoff Area=19,707 sf 0.00% Impervious Runoff Depth>1.68"
Flow Length=250' Slope=0.1080 '/' Tc=26.3 min CN=82/0 Runoff=0.13 cfs 0.063 af

Subcatchment Xi: PARKER ROAD Runoff Area=4,244 sf 100.00% Impervious Runoff Depth>3.16"
Tc=5.0 min CN=0/98 Runoff=0.08 cfs 0.026 af

Subcatchment Xp: PARKER ROAD Runoff Area=4,514 sf 0.00% Impervious Runoff Depth>1.48"
Tc=5.0 min CN=79/0 Runoff=0.03 cfs 0.013 af

Subcatchment Yi: PARKER ROAD Runoff Area=1,400 sf 100.00% Impervious Runoff Depth>3.16"
Tc=5.0 min CN=0/98 Runoff=0.03 cfs 0.008 af

Subcatchment Yp: PARKER ROAD Runoff Area=1,378 sf 0.00% Impervious Runoff Depth>1.48"
Tc=5.0 min CN=79/0 Runoff=0.01 cfs 0.004 af

Subcatchment Zi: OFFSITE IMPERVIOUS Runoff Area=3,200 sf 100.00% Impervious Runoff Depth>3.16"
Tc=5.0 min CN=0/98 Runoff=0.06 cfs 0.019 af

Subcatchment Zp: OFFSITE PERVIOUS Runoff Area=52,222 sf 0.00% Impervious Runoff Depth>1.47"
Flow Length=958' Tc=20.8 min CN=79/0 Runoff=0.30 cfs 0.147 af

Link TOTAL: PRE-DEVELOPED FLOW Inflow=1.08 cfs 0.569 af
Primary=1.08 cfs 0.569 af

Total Runoff Area = 5.058 ac Runoff Volume = 0.569 af Average Runoff Depth = 1.35"
93.37% Pervious = 4.722 ac 6.63% Impervious = 0.335 ac

Summary for Subcatchment 1i: ON SITE IMPERVIOUS

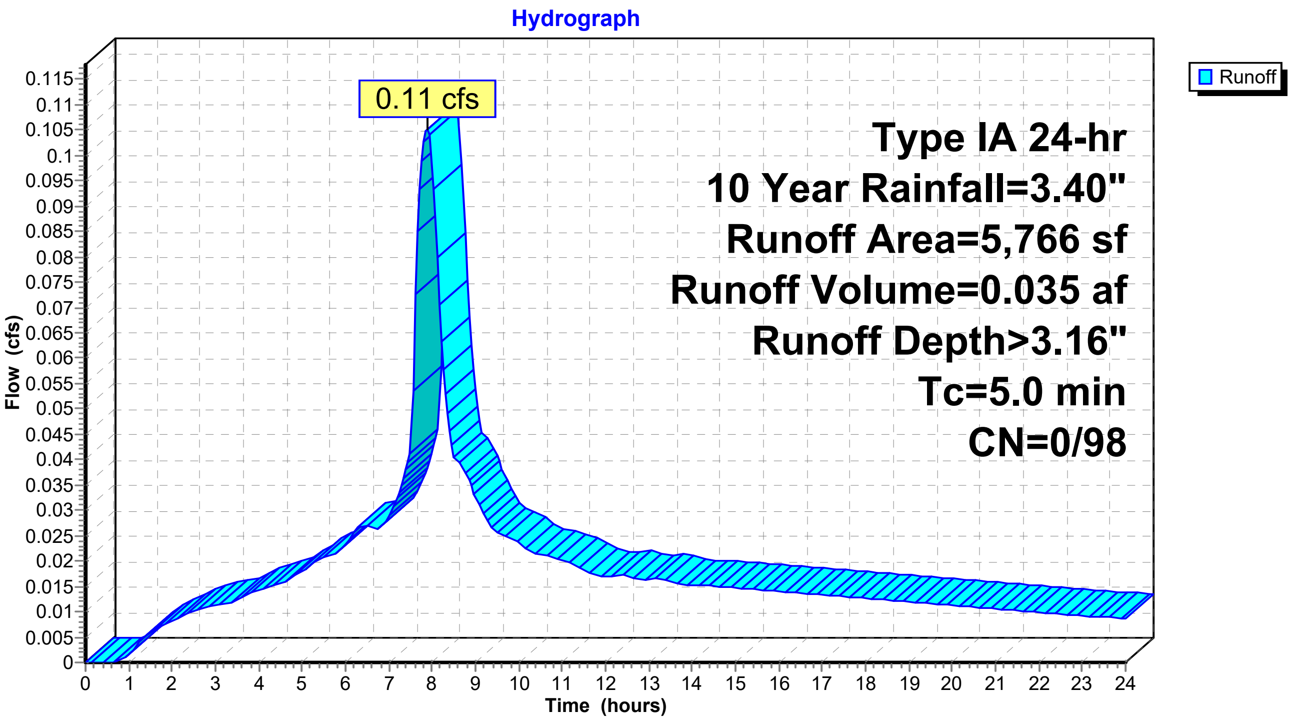
Runoff = 0.11 cfs @ 7.90 hrs, Volume= 0.035 af, Depth> 3.16"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 Year Rainfall=3.40"

	Area (sf)	CN	Description
*	5,766	98	Impervious Area
	5,766		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 1i: ON SITE IMPERVIOUS



Summary for Subcatchment 1p: ON SITE PERVIOUS

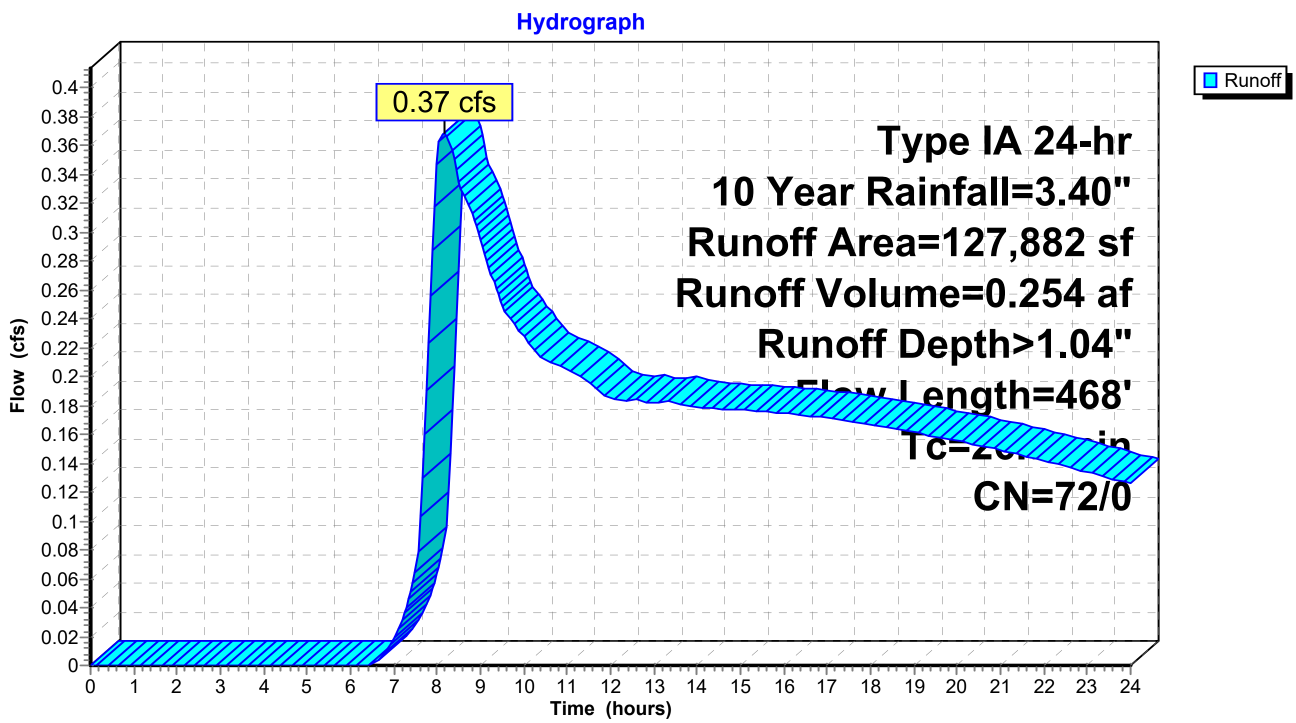
Runoff = 0.37 cfs @ 8.16 hrs, Volume= 0.254 af, Depth> 1.04"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 Year Rainfall=3.40"

Area (sf)	CN	Description
122,556	72	Woods/grass comb., Good, HSG C
5,326	79	Woods/grass comb., Good, HSG D
127,882	72	Weighted Average
127,882		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.4	156	0.1020	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.40"
7.1	126	0.1020	0.30		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.40"
1.2	186	0.1400	2.62		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.7	468	Total			

Subcatchment 1p: ON SITE PERVIOUS



Summary for Subcatchment B: BUFFER AREA

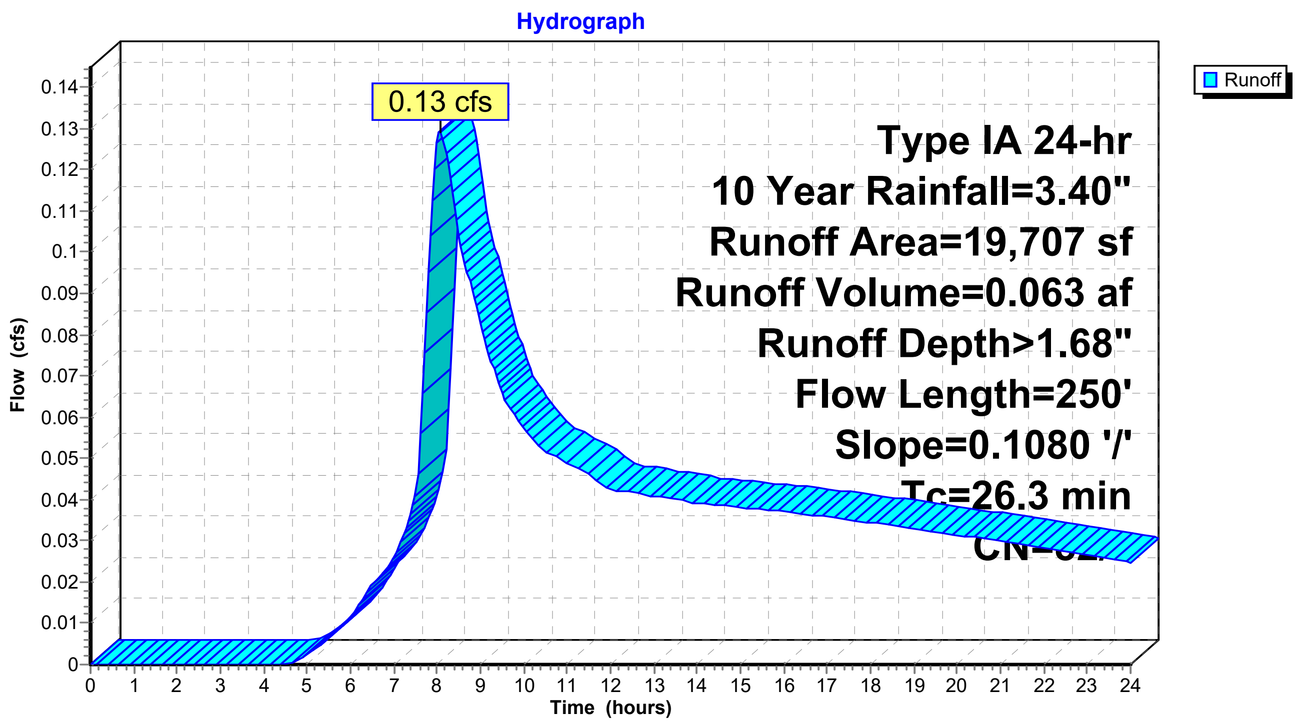
Runoff = 0.13 cfs @ 8.06 hrs, Volume= 0.063 af, Depth> 1.68"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 Year Rainfall=3.40"

Area (sf)	CN	Description
19,707	82	Woods/grass comb., Fair, HSG D
19,707		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.3	250	0.1080	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.40"

Subcatchment B: BUFFER AREA



Summary for Subcatchment Xi: PARKER ROAD IMPERVIOUS

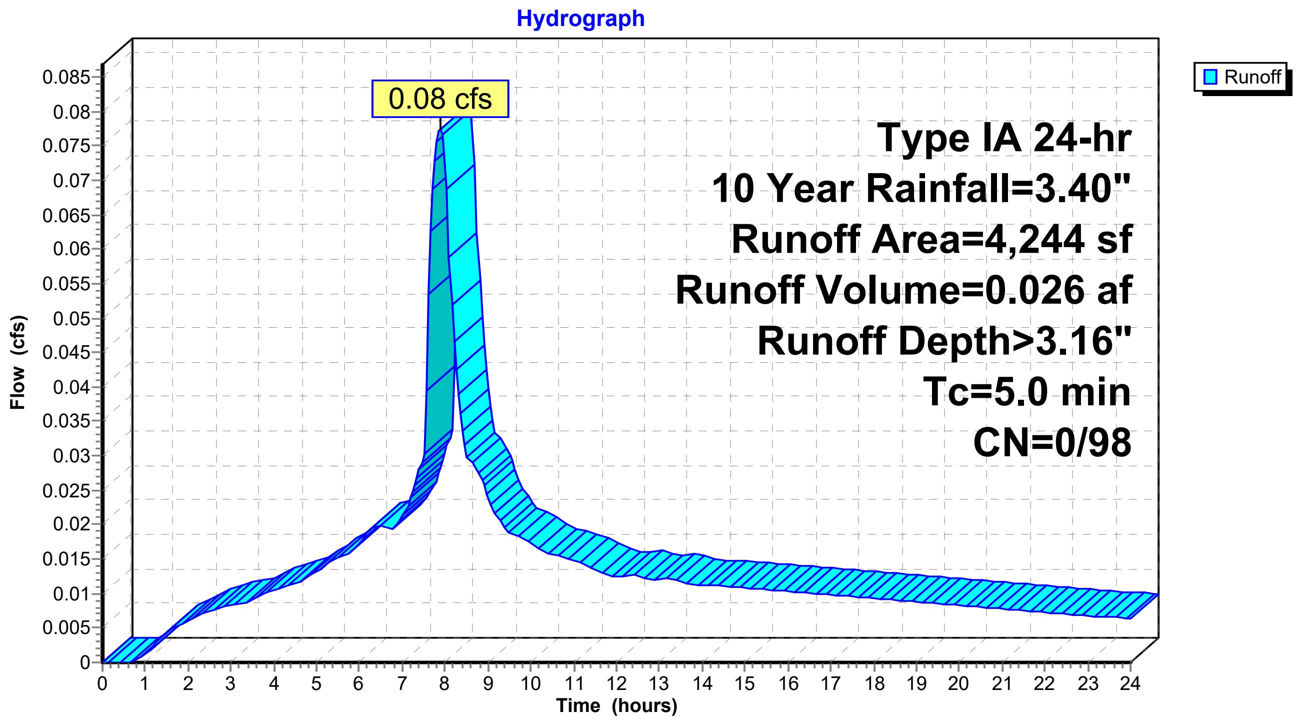
Runoff = 0.08 cfs @ 7.90 hrs, Volume= 0.026 af, Depth> 3.16"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 Year Rainfall=3.40"

	Area (sf)	CN	Description
*	4,244	98	Impervious Area
	4,244		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Xi: PARKER ROAD IMPERVIOUS



Summary for Subcatchment Xp: PARKER ROAD PERVIOUS

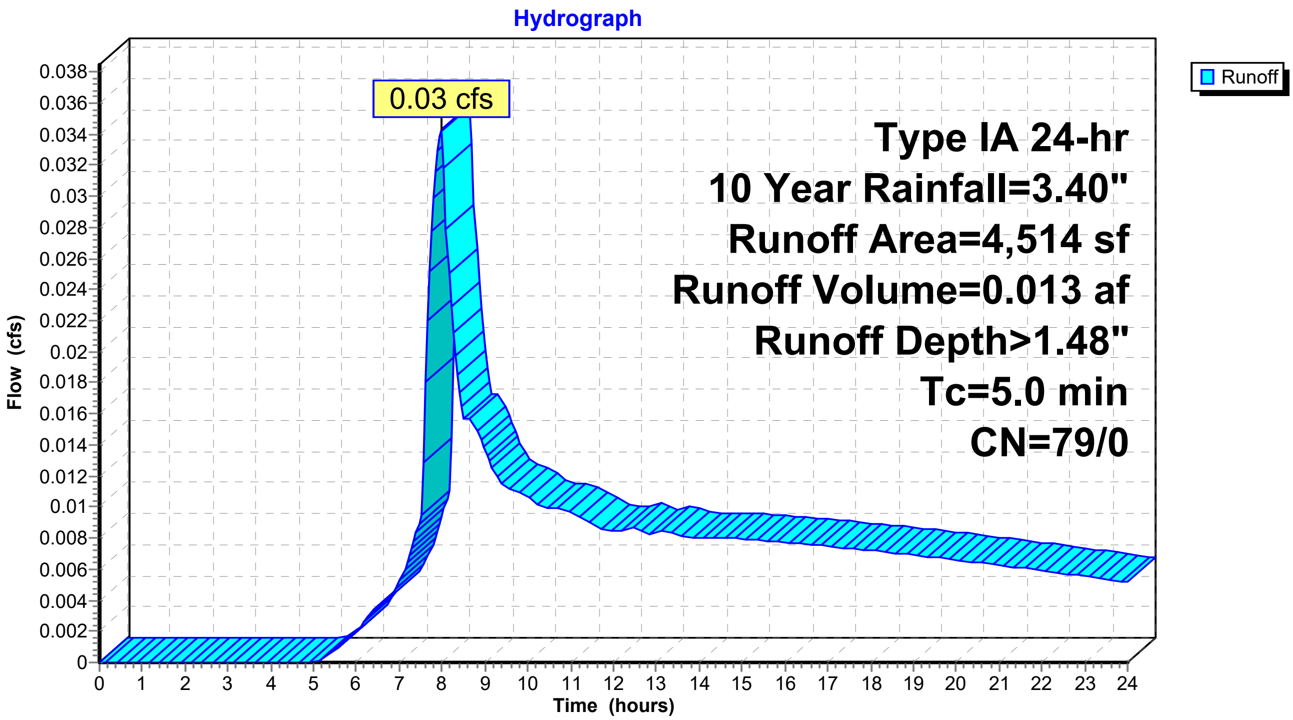
Runoff = 0.03 cfs @ 7.98 hrs, Volume= 0.013 af, Depth> 1.48"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 Year Rainfall=3.40"

Area (sf)	CN	Description
4,514	79	50-75% Grass cover, Fair, HSG C
4,514		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Xp: PARKER ROAD PERVIOUS



Summary for Subcatchment Yi: PARKER ROAD IMPERVIOUS - BYPASS

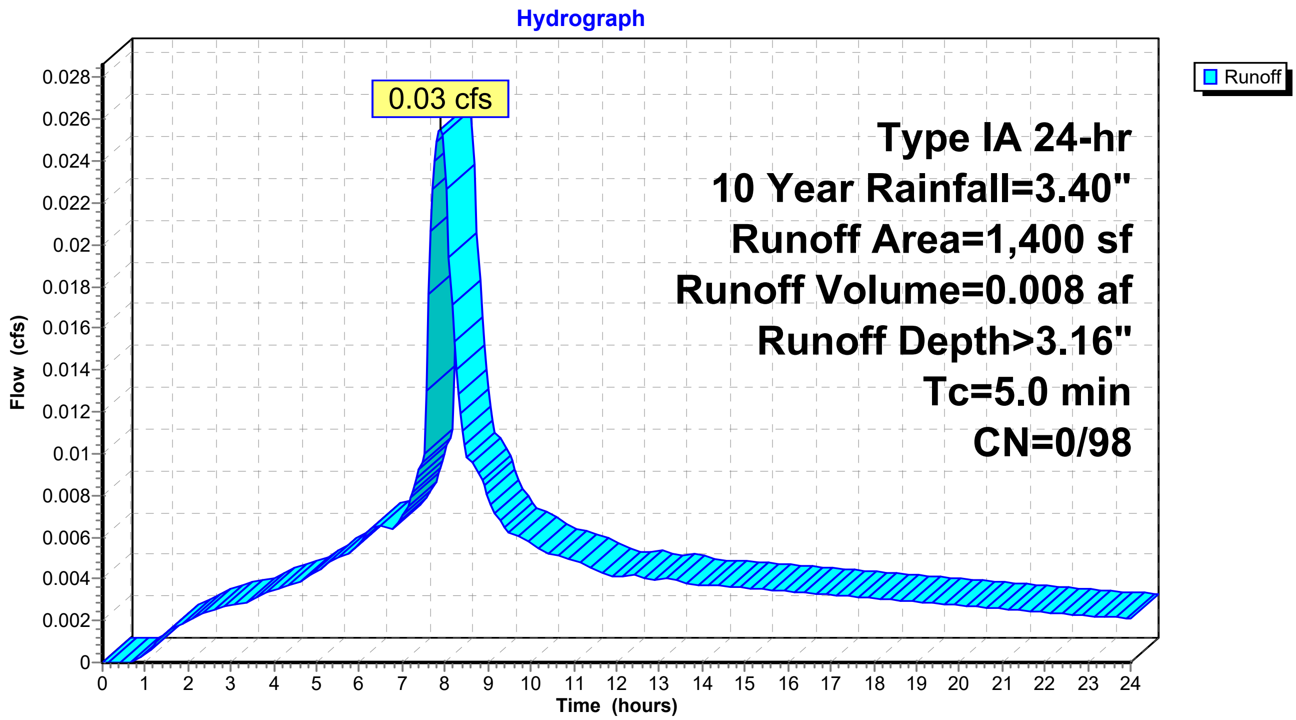
Runoff = 0.03 cfs @ 7.90 hrs, Volume= 0.008 af, Depth> 3.16"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 Year Rainfall=3.40"

	Area (sf)	CN	Description
*	1,400	98	Impervious Area
	1,400		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Yi: PARKER ROAD IMPERVIOUS - BYPASS



Summary for Subcatchment Yp: PARKER ROAD PERVIOUS - BYPASS

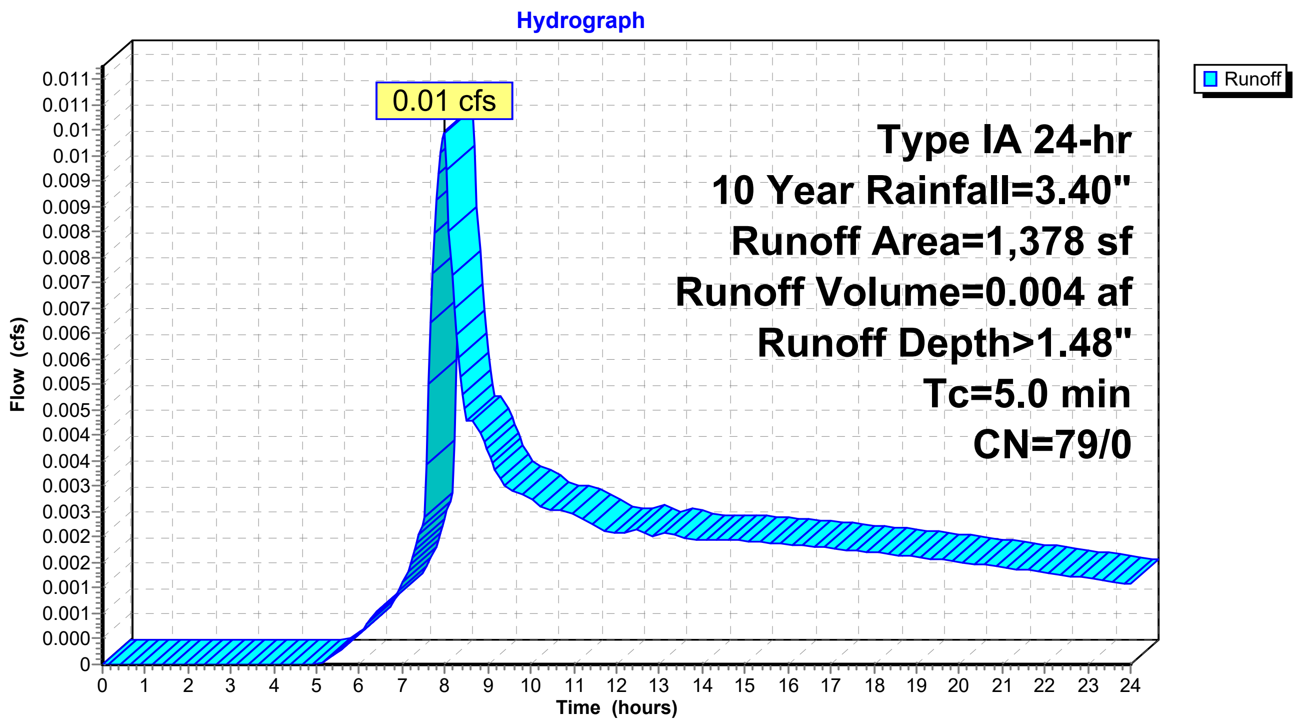
Runoff = 0.01 cfs @ 7.98 hrs, Volume= 0.004 af, Depth> 1.48"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 Year Rainfall=3.40"

Area (sf)	CN	Description
1,378	79	50-75% Grass cover, Fair, HSG C
1,378		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Yp: PARKER ROAD PERVIOUS - BYPASS



Summary for Subcatchment Zi: OFFSITE IMPERVIOUS

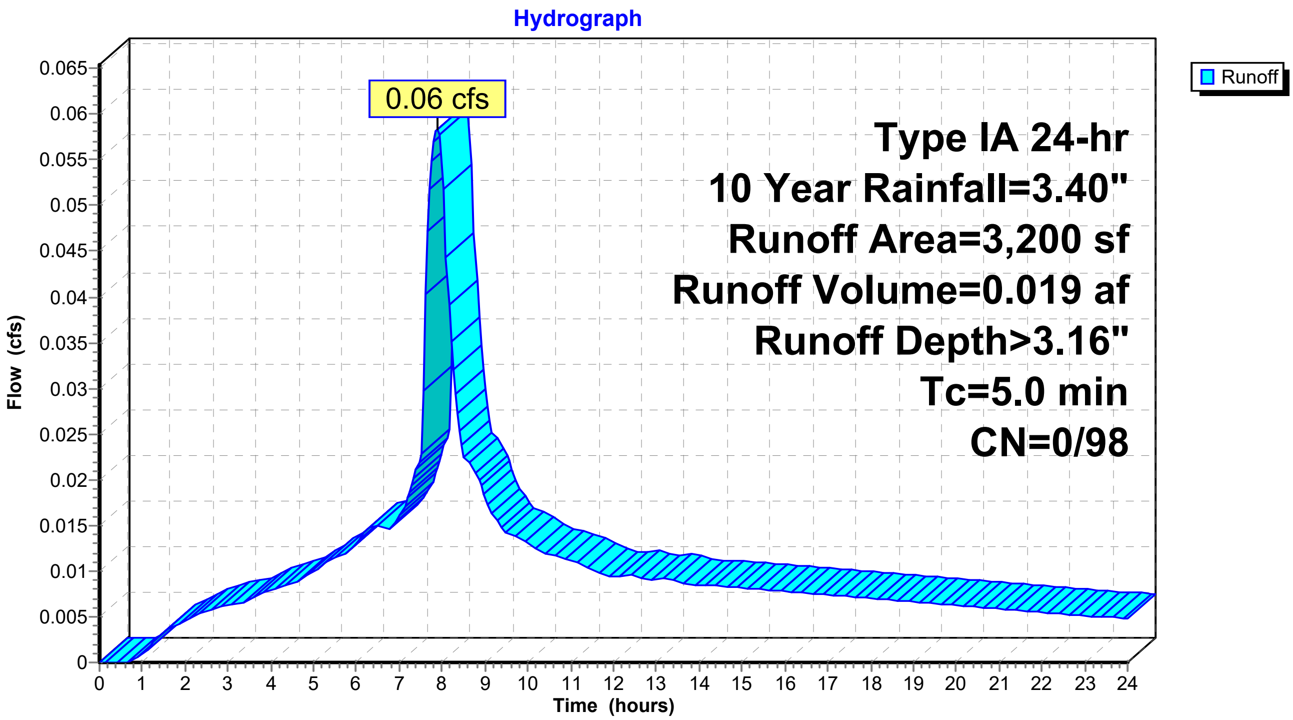
Runoff = 0.06 cfs @ 7.90 hrs, Volume= 0.019 af, Depth> 3.16"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 Year Rainfall=3.40"

	Area (sf)	CN	Description
*	3,200	98	Impervious Area
	3,200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Zi: OFFSITE IMPERVIOUS



Summary for Subcatchment Zp: OFFSITE PERVIOUS

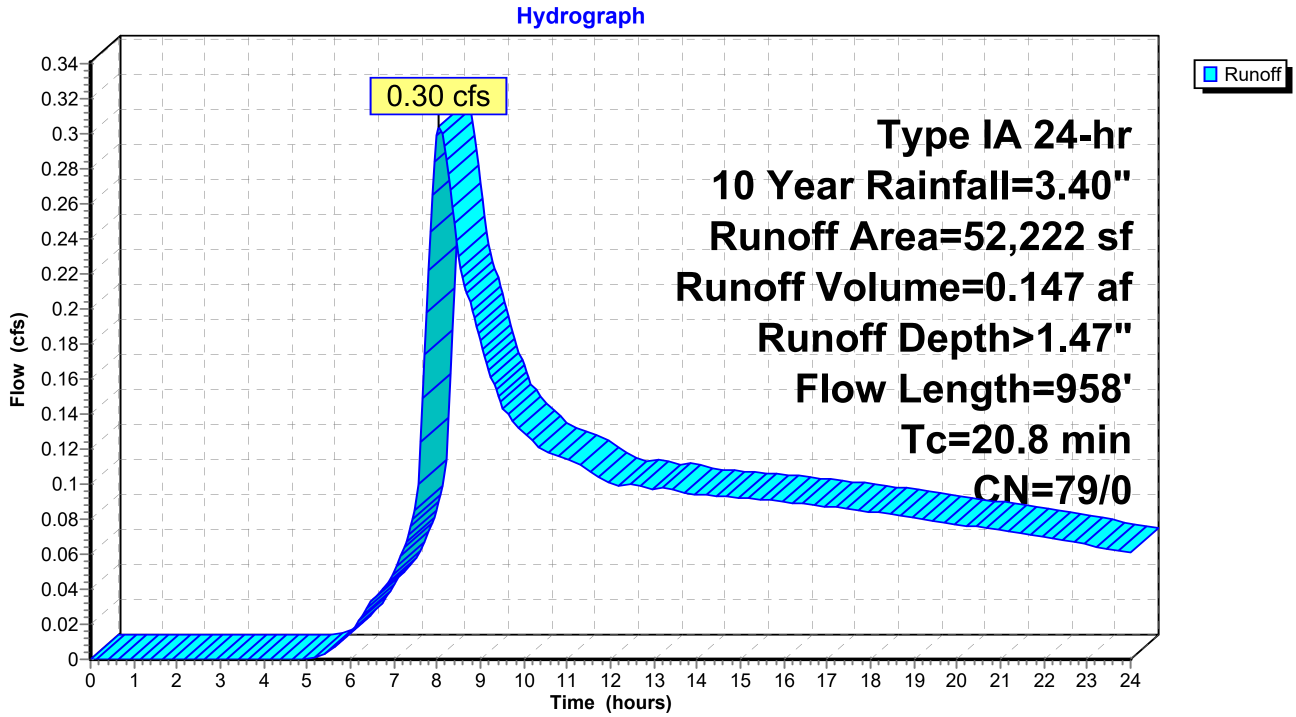
Runoff = 0.30 cfs @ 8.05 hrs, Volume= 0.147 af, Depth> 1.47"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 Year Rainfall=3.40"

Area (sf)	CN	Description
52,222	79	50-75% Grass cover, Fair, HSG C
52,222		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	300	0.0750	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.40"
4.7	658	0.1100	2.32		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
20.8	958	Total			

Subcatchment Zp: OFFSITE PERVIOUS

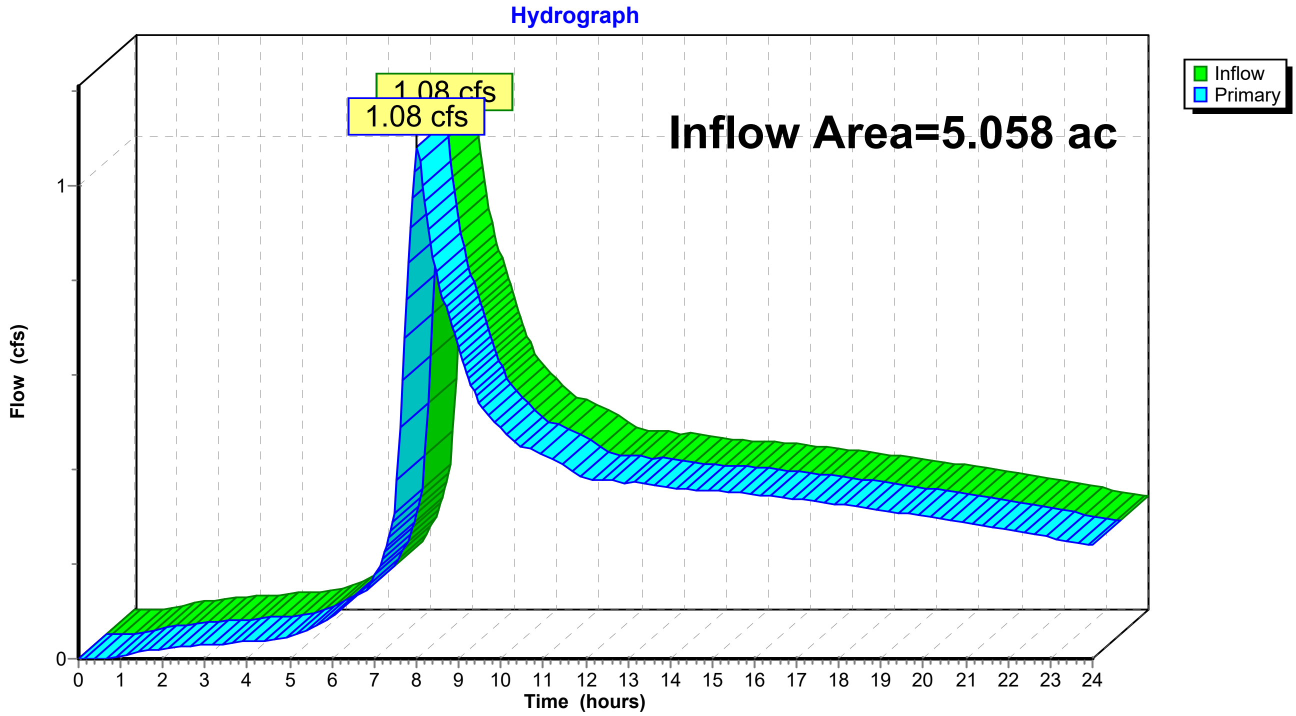


Summary for Link TOTAL: PRE-DEVELOPED FLOW

Inflow Area = 5.058 ac, 6.63% Impervious, Inflow Depth > 1.35" for 10 Year event
Inflow = 1.08 cfs @ 8.02 hrs, Volume= 0.569 af
Primary = 1.08 cfs @ 8.02 hrs, Volume= 0.569 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link TOTAL: PRE-DEVELOPED FLOW



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1i: ON SITE IMPERVIOUS Runoff Area=5,766 sf 100.00% Impervious Runoff Depth>3.66"
Tc=5.0 min CN=0/98 Runoff=0.12 cfs 0.040 af

Subcatchment 1p: ON SITE PERVIOUS Runoff Area=127,882 sf 0.00% Impervious Runoff Depth>1.37"
Flow Length=468' Tc=26.7 min CN=72/0 Runoff=0.55 cfs 0.334 af

Subcatchment B: BUFFER AREA Runoff Area=19,707 sf 0.00% Impervious Runoff Depth>2.09"
Flow Length=250' Slope=0.1080 '/' Tc=26.3 min CN=82/0 Runoff=0.17 cfs 0.079 af

Subcatchment Xi: PARKER ROAD Runoff Area=4,244 sf 100.00% Impervious Runoff Depth>3.66"
Tc=5.0 min CN=0/98 Runoff=0.09 cfs 0.030 af

Subcatchment Xp: PARKER ROAD Runoff Area=4,514 sf 0.00% Impervious Runoff Depth>1.88"
Tc=5.0 min CN=79/0 Runoff=0.05 cfs 0.016 af

Subcatchment Yi: PARKER ROAD Runoff Area=1,400 sf 100.00% Impervious Runoff Depth>3.66"
Tc=5.0 min CN=0/98 Runoff=0.03 cfs 0.010 af

Subcatchment Yp: PARKER ROAD Runoff Area=1,378 sf 0.00% Impervious Runoff Depth>1.88"
Tc=5.0 min CN=79/0 Runoff=0.01 cfs 0.005 af

Subcatchment Zi: OFFSITE IMPERVIOUS Runoff Area=3,200 sf 100.00% Impervious Runoff Depth>3.66"
Tc=5.0 min CN=0/98 Runoff=0.07 cfs 0.022 af

Subcatchment Zp: OFFSITE PERVIOUS Runoff Area=52,222 sf 0.00% Impervious Runoff Depth>1.86"
Flow Length=958' Tc=20.8 min CN=79/0 Runoff=0.41 cfs 0.186 af

Link TOTAL: PRE-DEVELOPED FLOW Inflow=1.45 cfs 0.723 af
Primary=1.45 cfs 0.723 af

Total Runoff Area = 5.058 ac Runoff Volume = 0.723 af Average Runoff Depth = 1.71"
93.37% Pervious = 4.722 ac 6.63% Impervious = 0.335 ac

Summary for Subcatchment 1i: ON SITE IMPERVIOUS

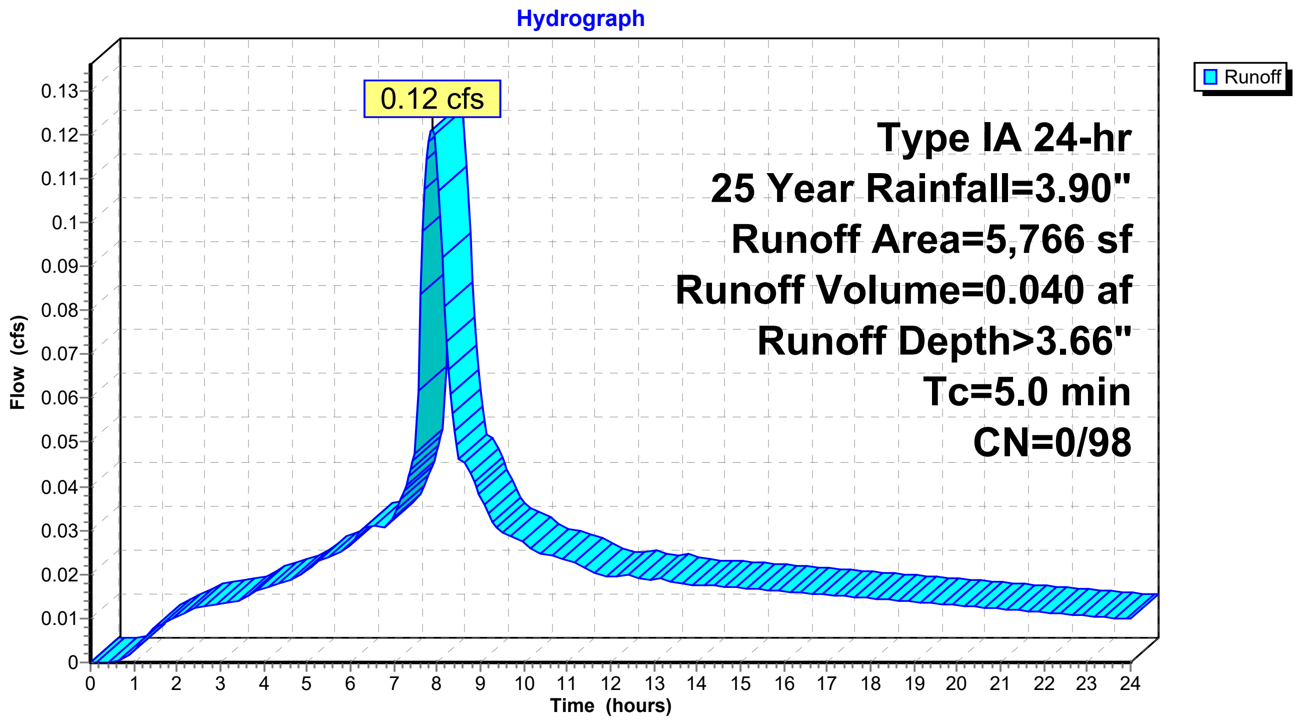
Runoff = 0.12 cfs @ 7.90 hrs, Volume= 0.040 af, Depth> 3.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

	Area (sf)	CN	Description
*	5,766	98	Impervious Area
	5,766		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 1i: ON SITE IMPERVIOUS



Summary for Subcatchment 1p: ON SITE PERVIOUS

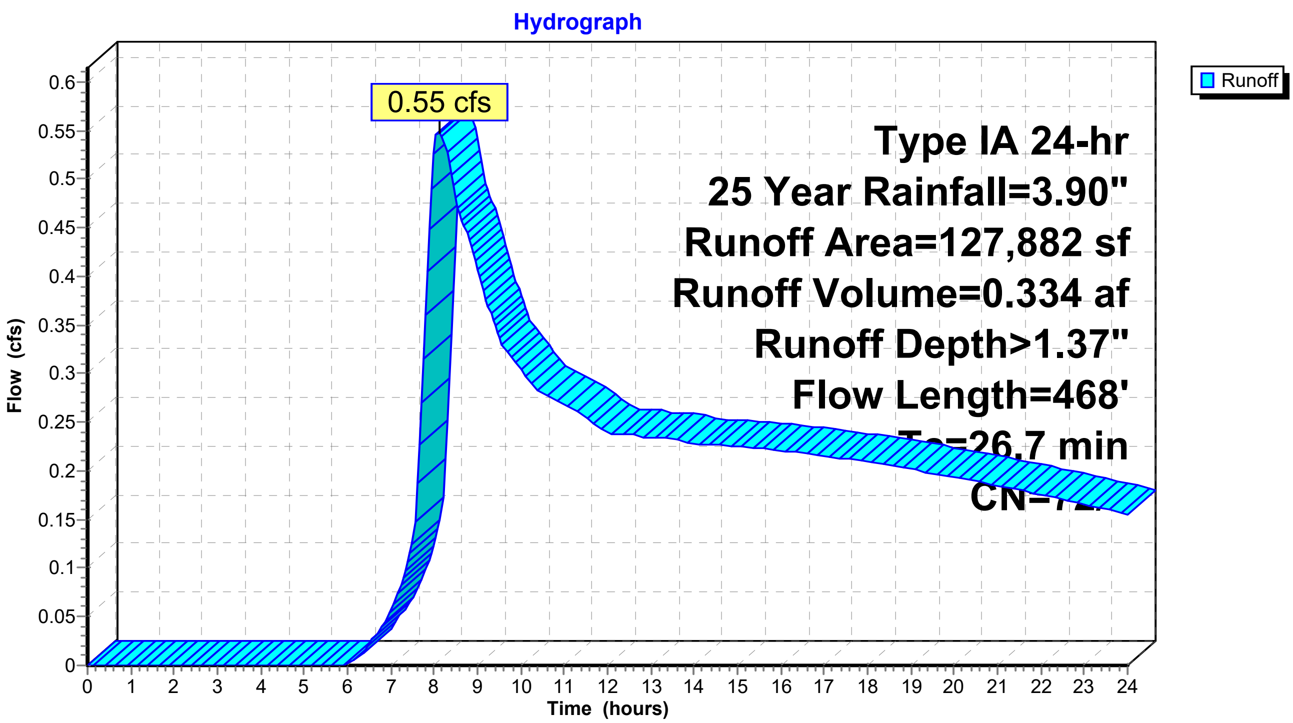
Runoff = 0.55 cfs @ 8.11 hrs, Volume= 0.334 af, Depth> 1.37"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
122,556	72	Woods/grass comb., Good, HSG C
5,326	79	Woods/grass comb., Good, HSG D
127,882	72	Weighted Average
127,882		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.4	156	0.1020	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.40"
7.1	126	0.1020	0.30		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.40"
1.2	186	0.1400	2.62		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.7	468	Total			

Subcatchment 1p: ON SITE PERVIOUS



Summary for Subcatchment B: BUFFER AREA

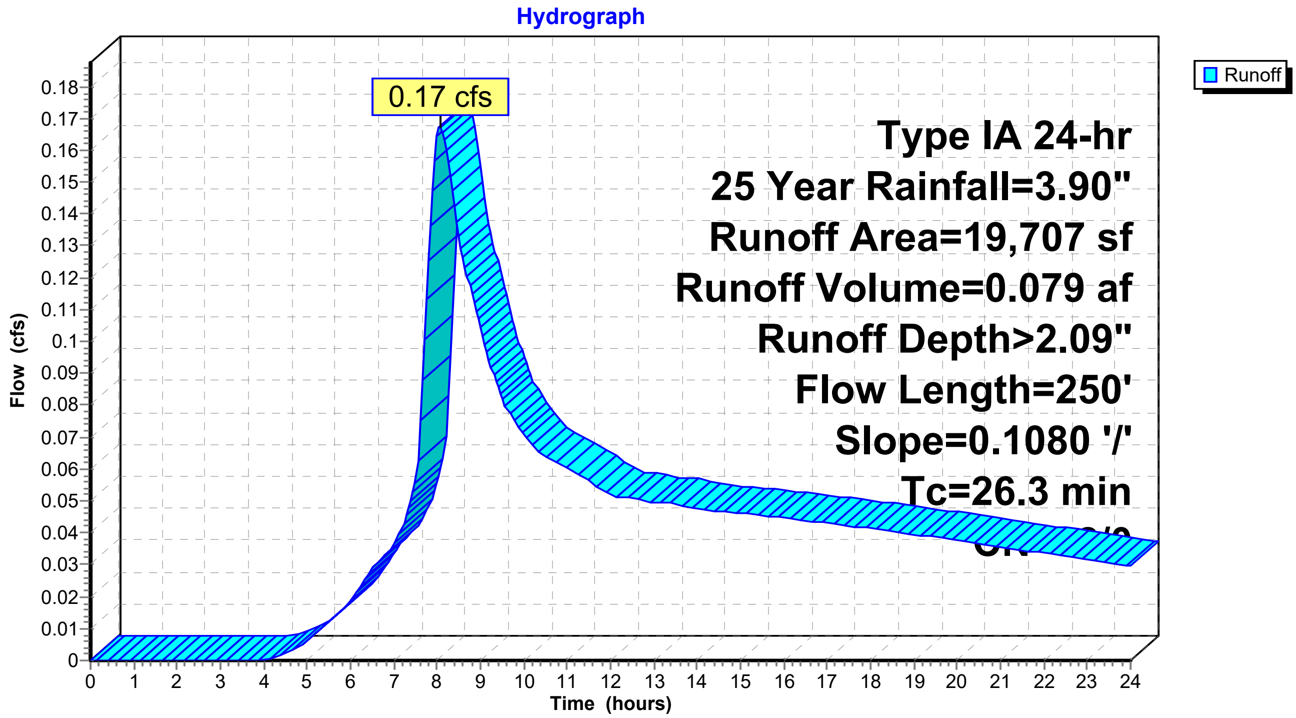
Runoff = 0.17 cfs @ 8.06 hrs, Volume= 0.079 af, Depth> 2.09"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
19,707	82	Woods/grass comb., Fair, HSG D
19,707		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.3	250	0.1080	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.40"

Subcatchment B: BUFFER AREA



Summary for Subcatchment Xi: PARKER ROAD IMPERVIOUS

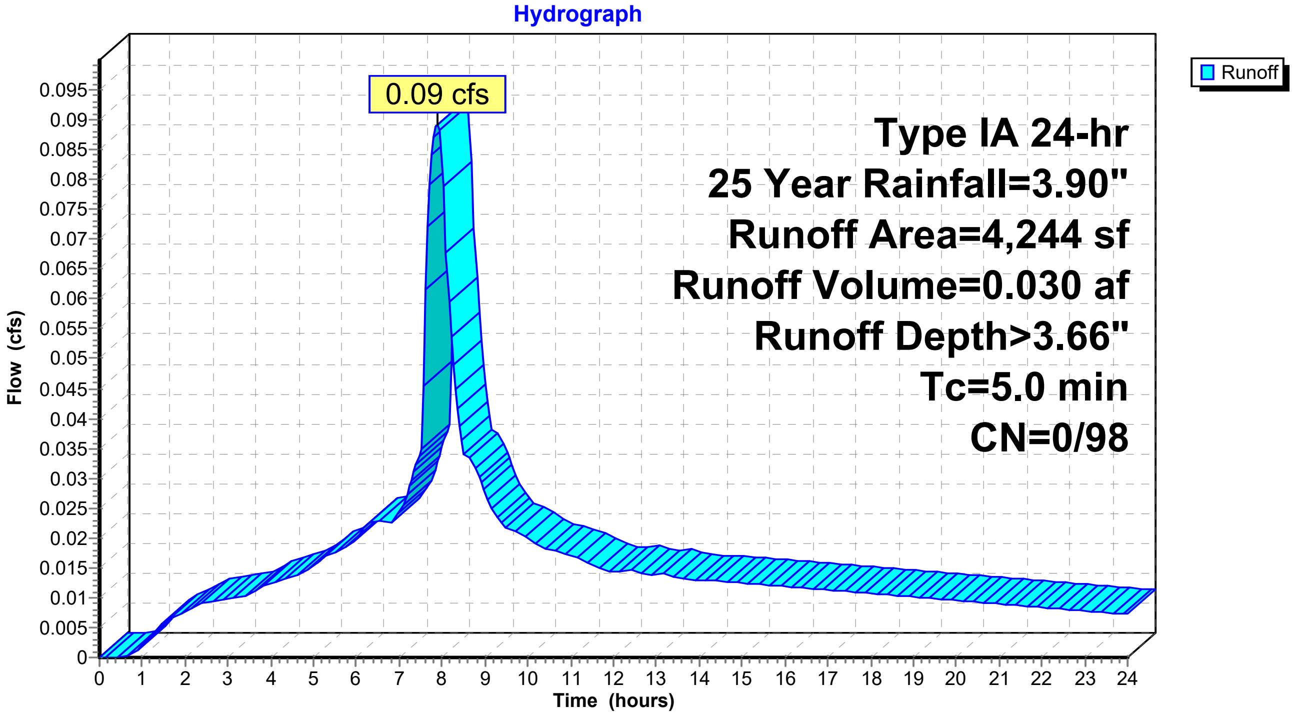
Runoff = 0.09 cfs @ 7.90 hrs, Volume= 0.030 af, Depth> 3.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

	Area (sf)	CN	Description
*	4,244	98	Impervious Area
	4,244		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Xi: PARKER ROAD IMPERVIOUS



Summary for Subcatchment Xp: PARKER ROAD PERVIOUS

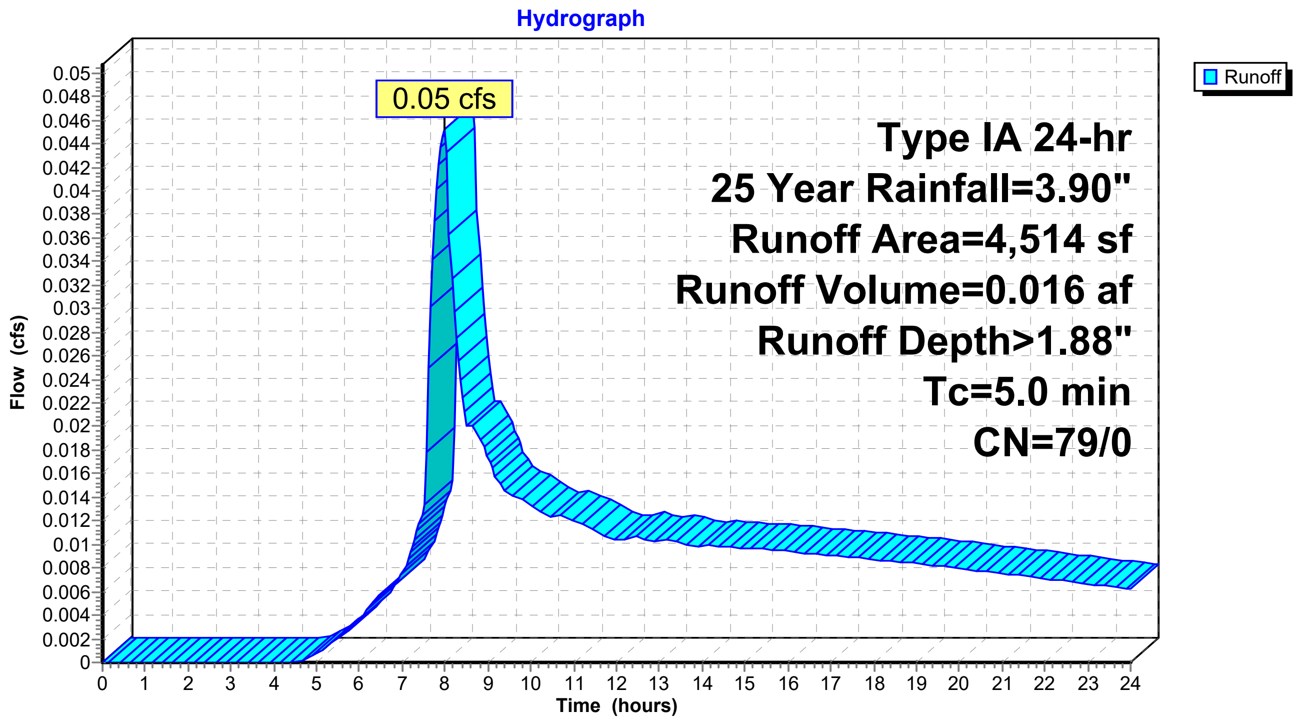
Runoff = 0.05 cfs @ 7.98 hrs, Volume= 0.016 af, Depth> 1.88"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
4,514	79	50-75% Grass cover, Fair, HSG C
4,514		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Xp: PARKER ROAD PERVIOUS



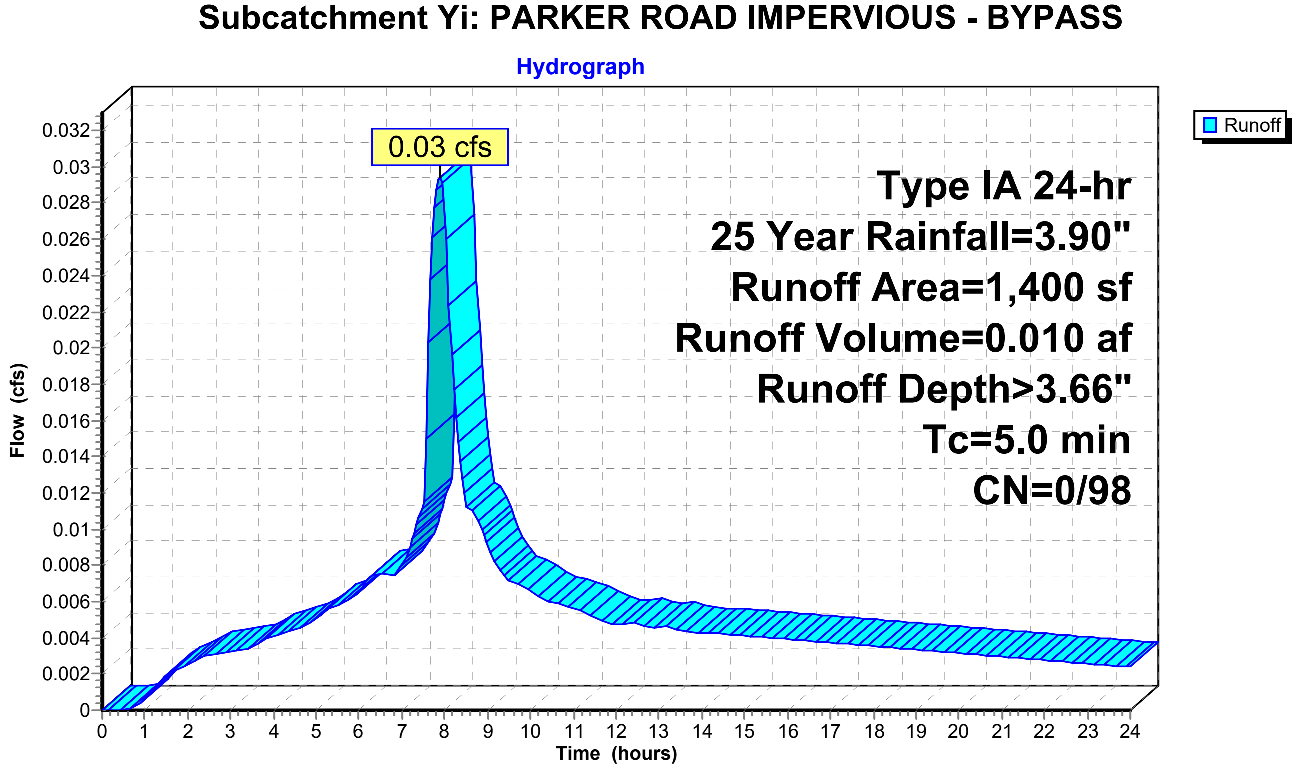
Summary for Subcatchment Yi: PARKER ROAD IMPERVIOUS - BYPASS

Runoff = 0.03 cfs @ 7.90 hrs, Volume= 0.010 af, Depth> 3.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

	Area (sf)	CN	Description
*	1,400	98	Impervious Area
	1,400		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**



Summary for Subcatchment Yp: PARKER ROAD PERVIOUS - BYPASS

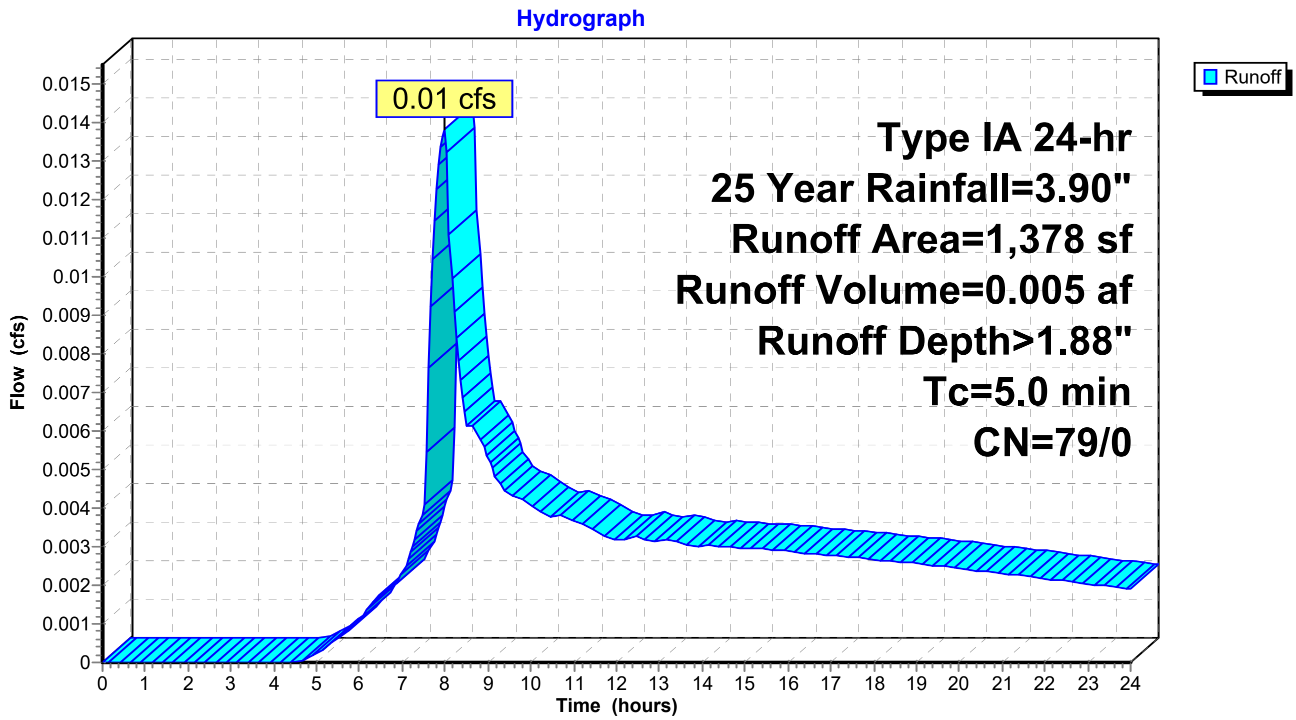
Runoff = 0.01 cfs @ 7.98 hrs, Volume= 0.005 af, Depth> 1.88"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
1,378	79	50-75% Grass cover, Fair, HSG C
1,378		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Yp: PARKER ROAD PERVIOUS - BYPASS



Summary for Subcatchment Zi: OFFSITE IMPERVIOUS

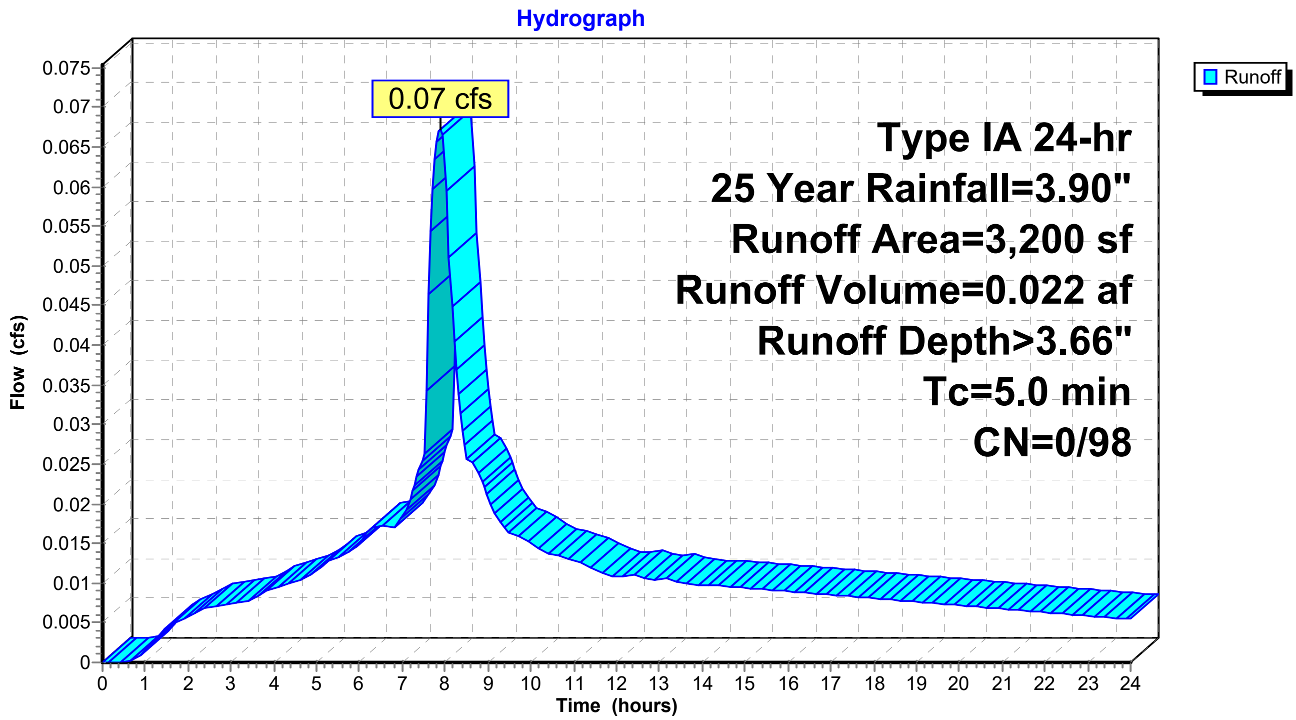
Runoff = 0.07 cfs @ 7.90 hrs, Volume= 0.022 af, Depth> 3.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

	Area (sf)	CN	Description
*	3,200	98	Impervious Area
	3,200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Zi: OFFSITE IMPERVIOUS



Summary for Subcatchment Zp: OFFSITE PERVIOUS

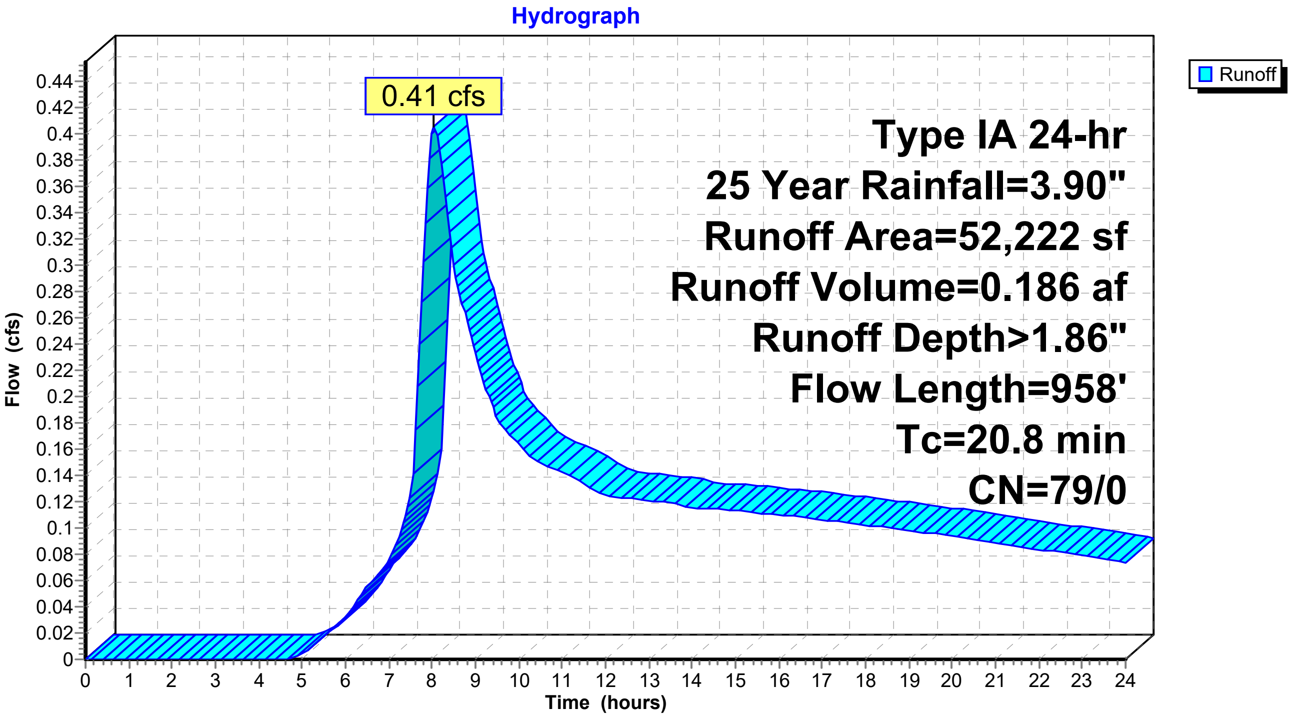
Runoff = 0.41 cfs @ 8.05 hrs, Volume= 0.186 af, Depth> 1.86"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
52,222	79	50-75% Grass cover, Fair, HSG C
52,222		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	300	0.0750	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.40"
4.7	658	0.1100	2.32		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
20.8	958	Total			

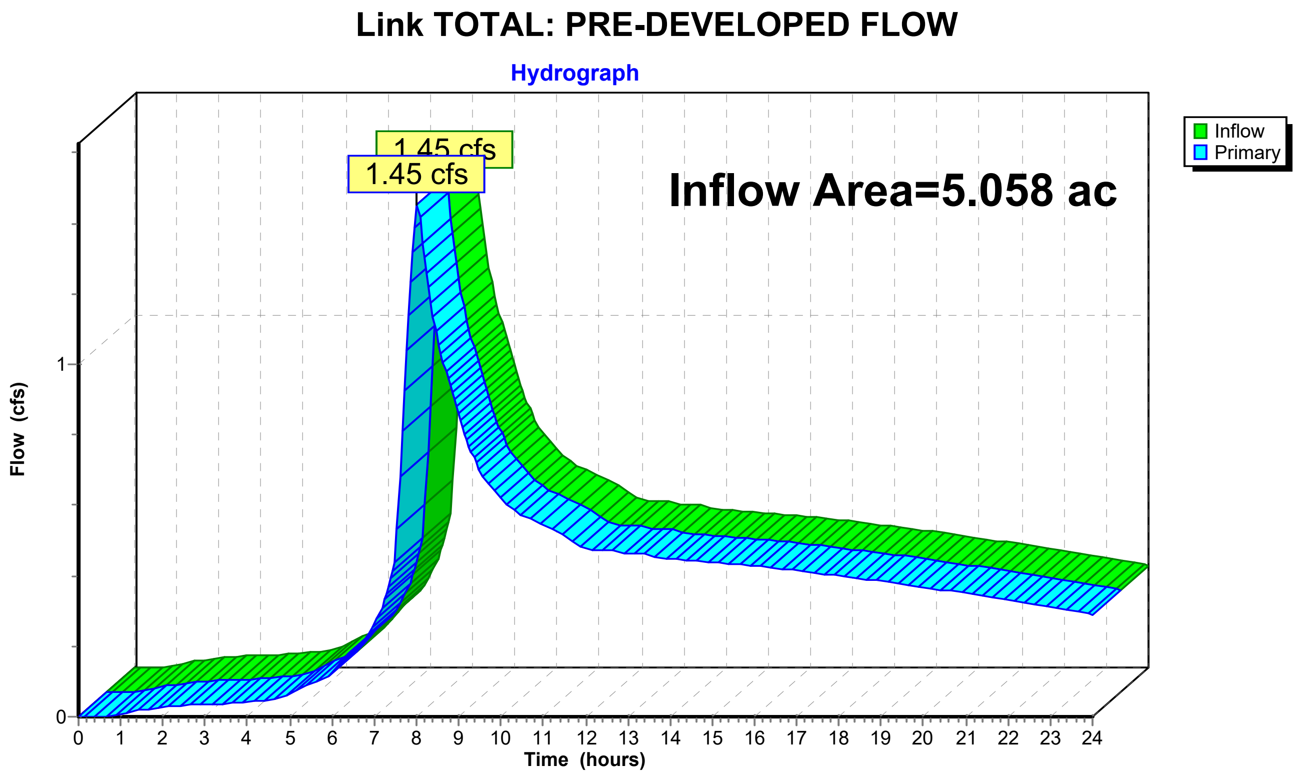
Subcatchment Zp: OFFSITE PERVIOUS



Summary for Link TOTAL: PRE-DEVELOPED FLOW

Inflow Area = 5.058 ac, 6.63% Impervious, Inflow Depth > 1.71" for 25 Year event
Inflow = 1.45 cfs @ 8.02 hrs, Volume= 0.723 af
Primary = 1.45 cfs @ 8.02 hrs, Volume= 0.723 af, Atten= 0%, Lag= 0.0 min

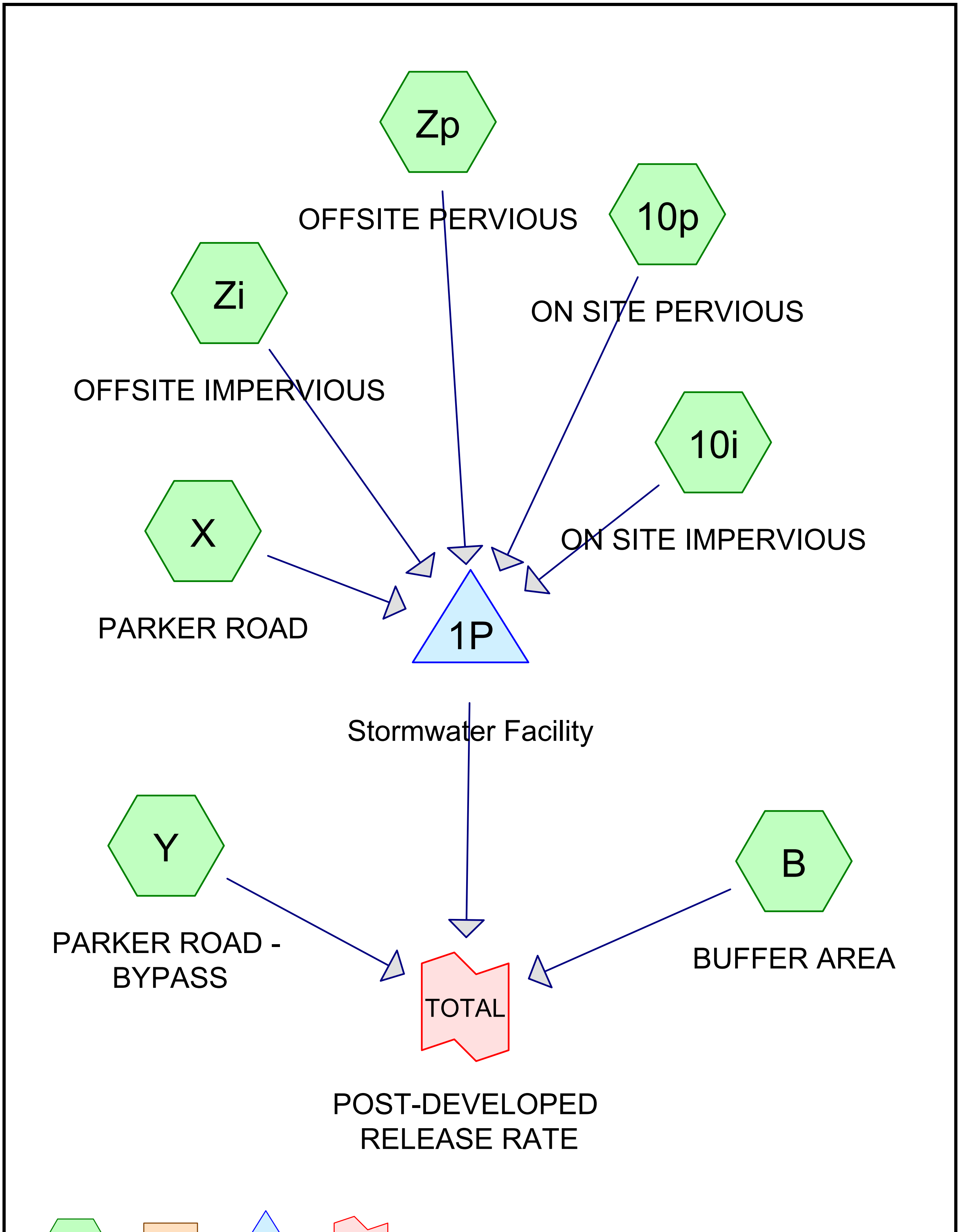
Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs



APPENDIX G

POST-DEVELOPED SITE HYDROCAD ANALYSIS

2, 5, 10 & 25 YEAR STORMS



Routing Diagram for 5132 PostDev
Prepared by AKS ENGINEERING & FORESTRY, Printed 8/9/2017
HydroCAD® 10.00-18 s/n 05097 © 2016 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.689	98	12 Lots @ 2500 sf each (10i)
1.199	79	50-75% Grass cover, Fair, HSG C (Zp)
1.739	74	>75% Grass cover, Good, HSG C (10p)
0.122	80	>75% Grass cover, Good, HSG D (10p)
0.338	98	Impervious Area (X, Y, Zi)
0.518	98	Impervious ROW (10i)
0.452	82	Woods/grass comb., Fair, HSG D (B)
5.058	**83**	**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 10i: ON SITE IMPERVIOUS Runoff Area=52,582 sf 100.00% Impervious Runoff Depth>2.17"
Tc=5.0 min CN=0/98 Runoff=0.67 cfs 0.218 af

Subcatchment 10p: ON SITE PERVIOUS Runoff Area=81,066 sf 0.00% Impervious Runoff Depth>0.55"
Tc=5.0 min CN=74/0 Runoff=0.14 cfs 0.085 af

Subcatchment B: BUFFER AREA Runoff Area=19,707 sf 0.00% Impervious Runoff Depth>0.91"
Flow Length=250' Slope=0.1080 '/' Tc=26.3 min CN=82/0 Runoff=0.06 cfs 0.034 af

Subcatchment X: PARKER ROAD Runoff Area=8,758 sf 100.00% Impervious Runoff Depth>2.17"
Tc=5.0 min CN=0/98 Runoff=0.11 cfs 0.036 af

Subcatchment Y: PARKER ROAD - Runoff Area=2,778 sf 100.00% Impervious Runoff Depth>2.17"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.012 af

Subcatchment Zi: OFFSITE IMPERVIOUS Runoff Area=3,200 sf 100.00% Impervious Runoff Depth>2.17"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.013 af

Subcatchment Zp: OFFSITE PERVIOUS Runoff Area=52,222 sf 0.00% Impervious Runoff Depth>0.76"
Flow Length=958' Tc=20.8 min CN=79/0 Runoff=0.13 cfs 0.076 af

Pond 1P: Stormwater Facility Peak Elev=523.32' Storage=2,767 cf Inflow=1.06 cfs 0.429 af
Outflow=0.35 cfs 0.417 af

Link TOTAL: POST-DEVELOPED RELEASE RATE Inflow=0.40 cfs 0.462 af
Primary=0.40 cfs 0.462 af

Total Runoff Area = 5.058 ac Runoff Volume = 0.475 af Average Runoff Depth = 1.13"
69.44% Pervious = 3.512 ac 30.56% Impervious = 1.545 ac

Summary for Subcatchment 10i: ON SITE IMPERVIOUS

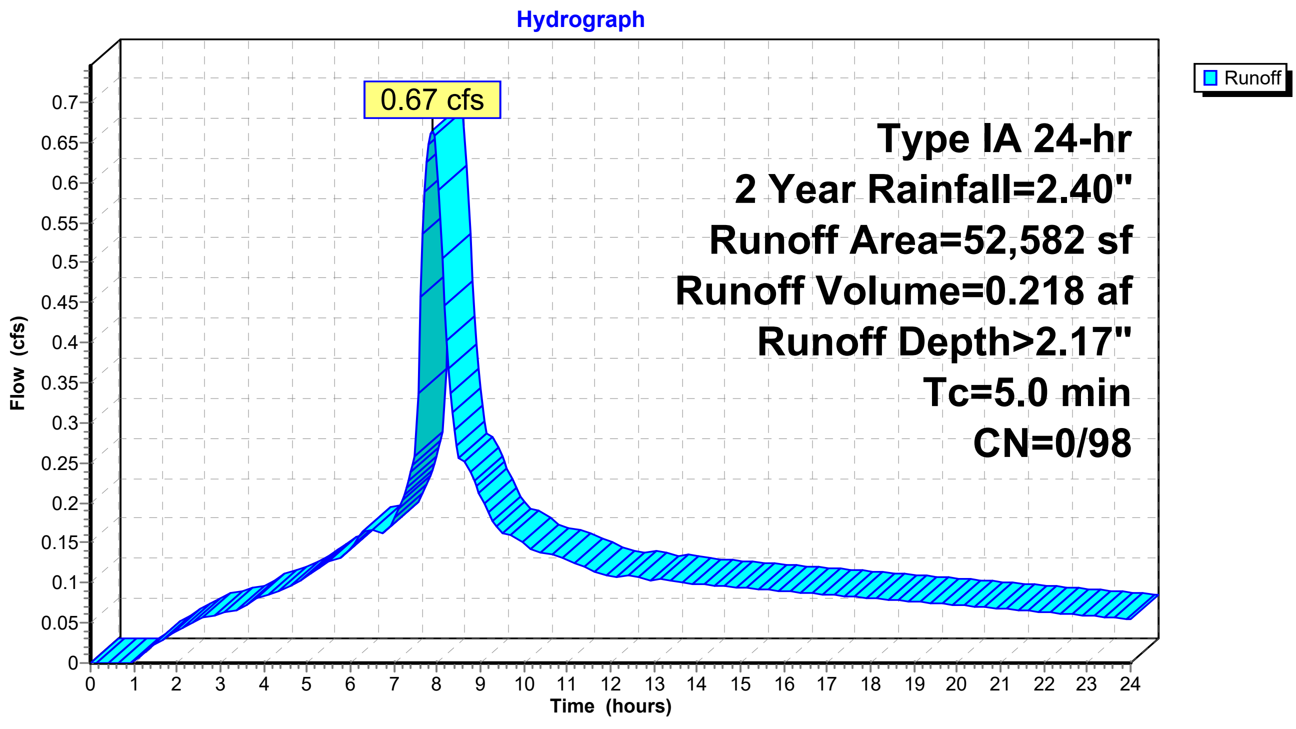
Runoff = 0.67 cfs @ 7.90 hrs, Volume= 0.218 af, Depth> 2.17"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 Year Rainfall=2.40"

	Area (sf)	CN	Description
*	22,582	98	Impervious ROW
*	30,000	98	12 Lots @ 2500 sf each
	52,582	98	Weighted Average
	52,582		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 10i: ON SITE IMPERVIOUS



Summary for Subcatchment 10p: ON SITE PERVIOUS

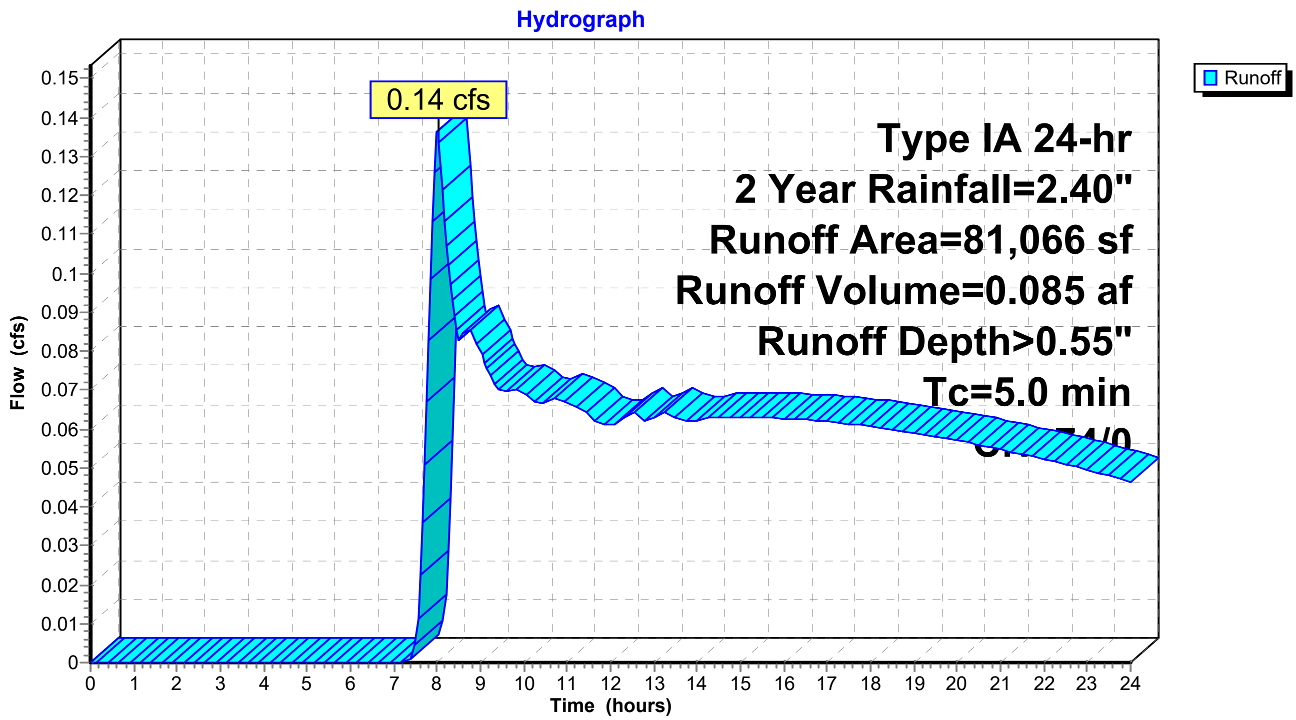
Runoff = 0.14 cfs @ 8.01 hrs, Volume= 0.085 af, Depth> 0.55"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 Year Rainfall=2.40"

Area (sf)	CN	Description
75,740	74	>75% Grass cover, Good, HSG C
5,326	80	>75% Grass cover, Good, HSG D
81,066	74	Weighted Average
81,066		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 10p: ON SITE PERVIOUS



Summary for Subcatchment B: BUFFER AREA

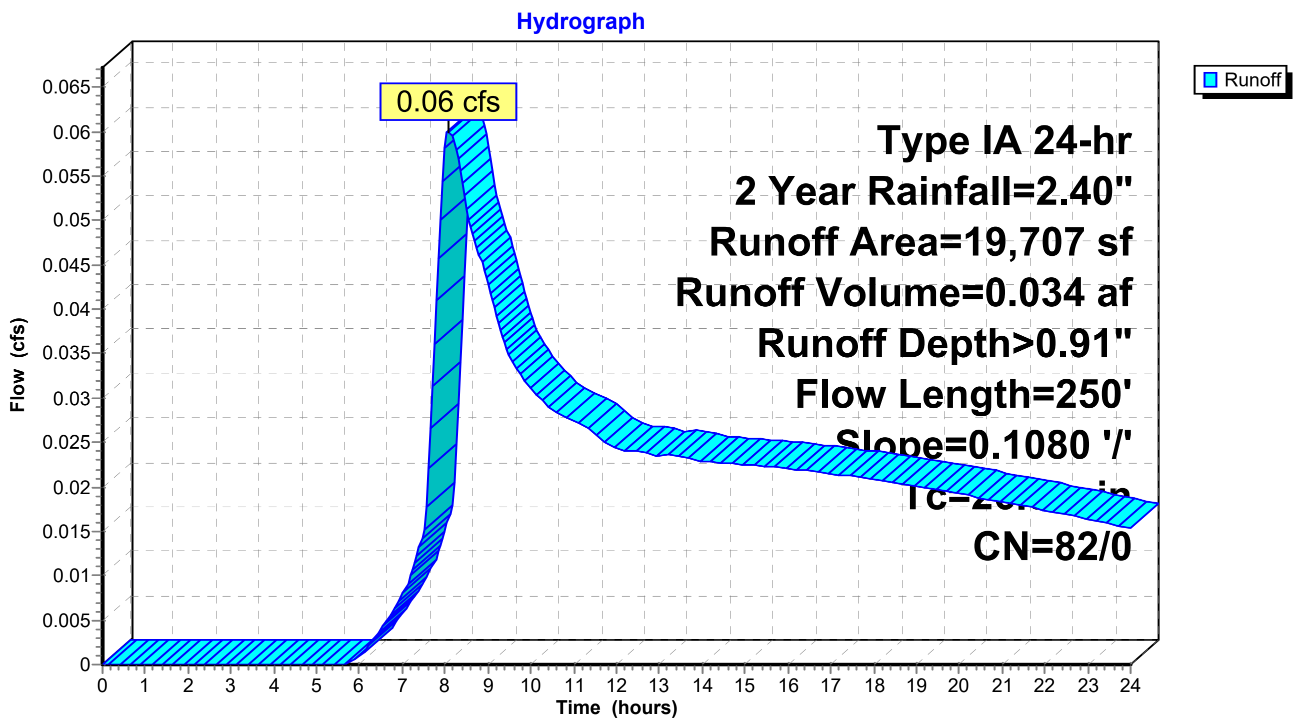
Runoff = 0.06 cfs @ 8.08 hrs, Volume= 0.034 af, Depth> 0.91"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 Year Rainfall=2.40"

Area (sf)	CN	Description
19,707	82	Woods/grass comb., Fair, HSG D
19,707		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.3	250	0.1080	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.40"

Subcatchment B: BUFFER AREA



Summary for Subcatchment X: PARKER ROAD

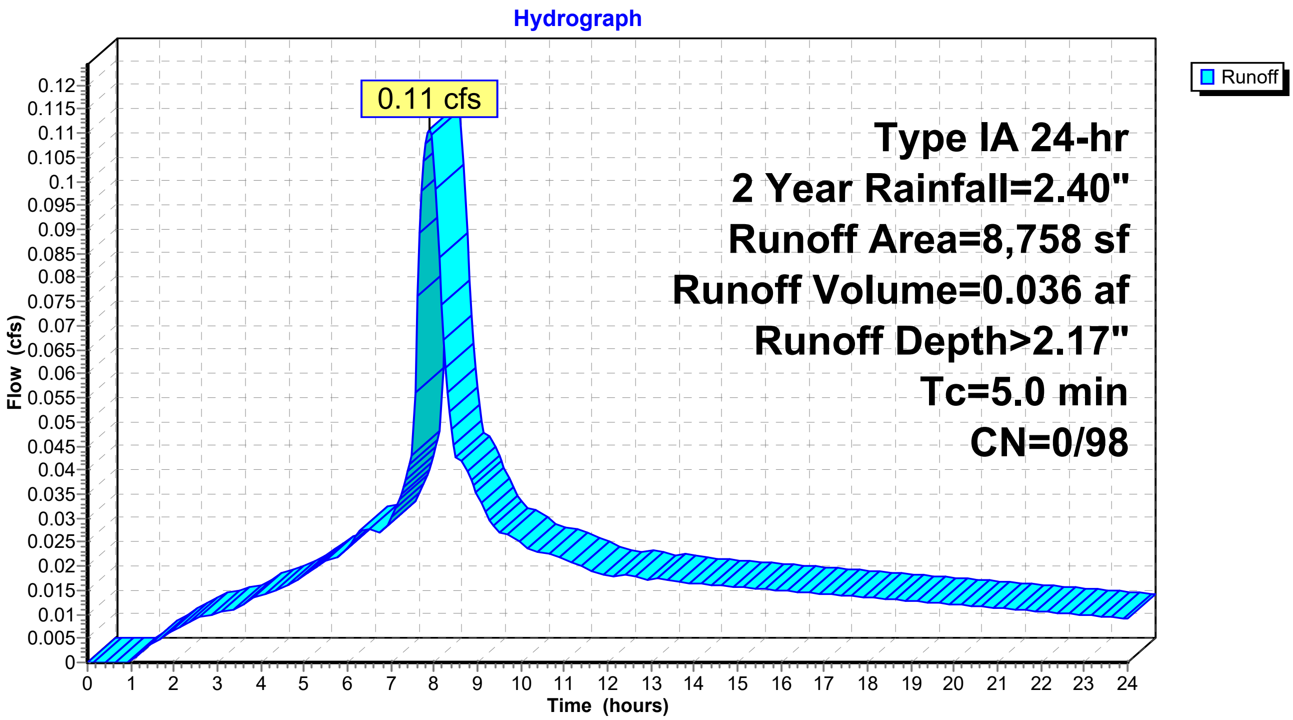
Runoff = 0.11 cfs @ 7.90 hrs, Volume= 0.036 af, Depth> 2.17"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 Year Rainfall=2.40"

	Area (sf)	CN	Description
*	8,758	98	Impervious Area
	8,758		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment X: PARKER ROAD



Summary for Subcatchment Y: PARKER ROAD - BYPASS

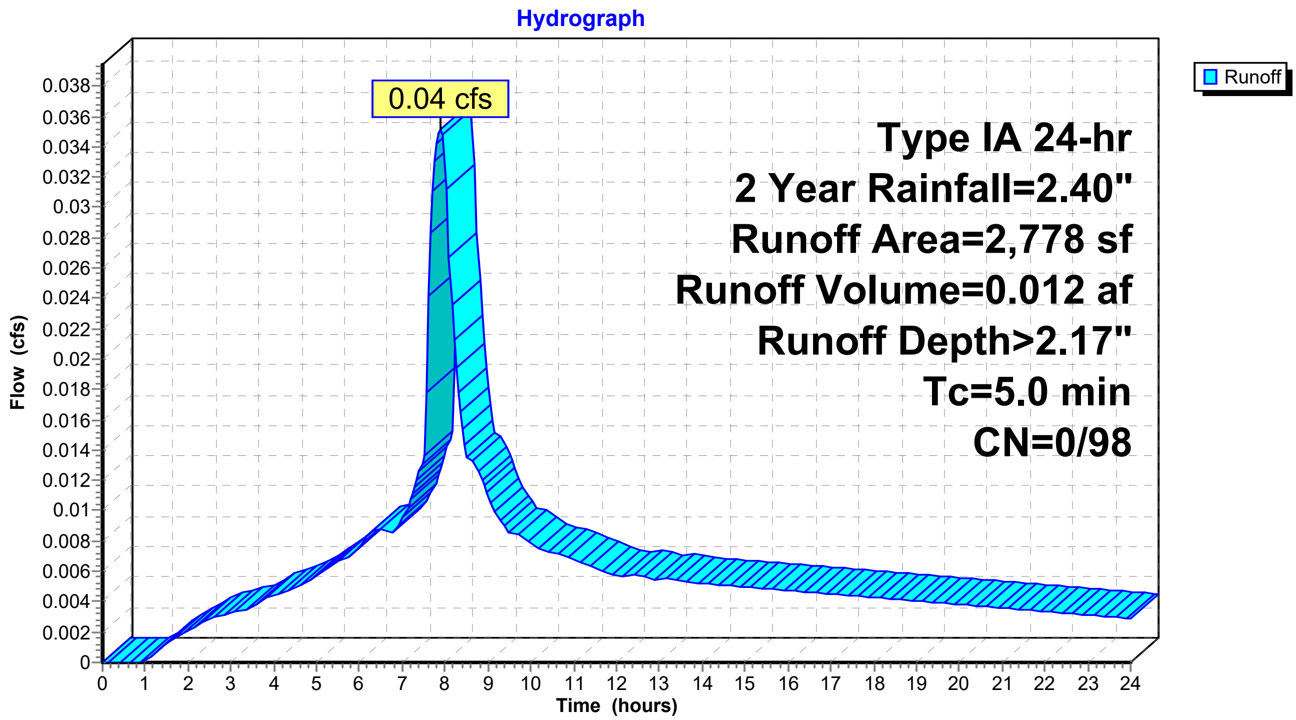
Runoff = 0.04 cfs @ 7.90 hrs, Volume= 0.012 af, Depth> 2.17"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 Year Rainfall=2.40"

	Area (sf)	CN	Description
*	2,778	98	Impervious Area
	2,778		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Y: PARKER ROAD - BYPASS



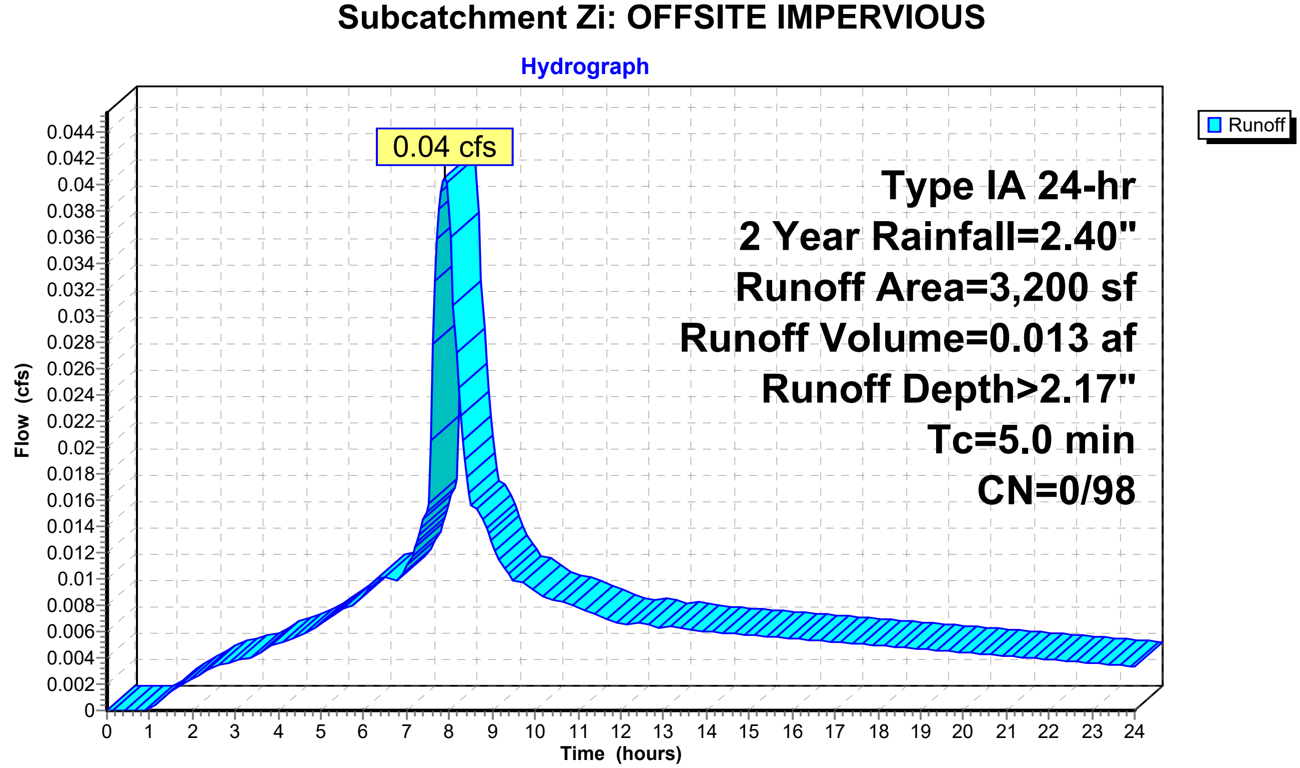
Summary for Subcatchment Zi: OFFSITE IMPERVIOUS

Runoff = 0.04 cfs @ 7.90 hrs, Volume= 0.013 af, Depth> 2.17"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 Year Rainfall=2.40"

	Area (sf)	CN	Description
*	3,200	98	Impervious Area
	3,200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**



Summary for Subcatchment Zp: OFFSITE PERVIOUS

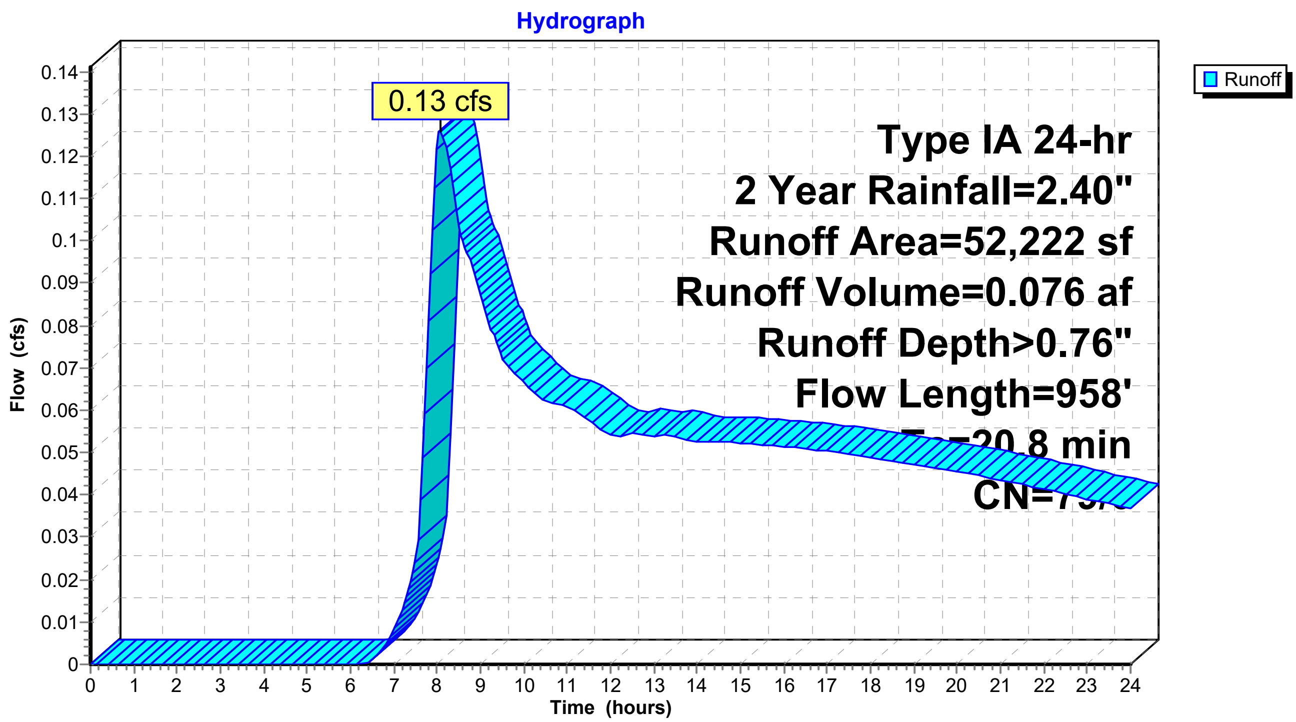
Runoff = 0.13 cfs @ 8.07 hrs, Volume= 0.076 af, Depth> 0.76"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 Year Rainfall=2.40"

Area (sf)	CN	Description
52,222	79	50-75% Grass cover, Fair, HSG C
52,222		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	300	0.0750	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.40"
4.7	658	0.1100	2.32		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
20.8	958	Total			

Subcatchment Zp: OFFSITE PERVIOUS



Summary for Pond 1P: Stormwater Facility

Inflow Area = 4.542 ac, 32.62% Impervious, Inflow Depth > 1.13" for 2 Year event
Inflow = 1.06 cfs @ 7.98 hrs, Volume= 0.429 af
Outflow = 0.35 cfs @ 9.42 hrs, Volume= 0.417 af, Atten= 67%, Lag= 86.3 min
Primary = 0.35 cfs @ 9.42 hrs, Volume= 0.417 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 523.32' @ 9.42 hrs Surf.Area= 3,284 sf Storage= 2,767 cf

Plug-Flow detention time= 90.0 min calculated for 0.417 af (97% of inflow)
Center-of-Mass det. time= 70.3 min (826.0 - 755.7)

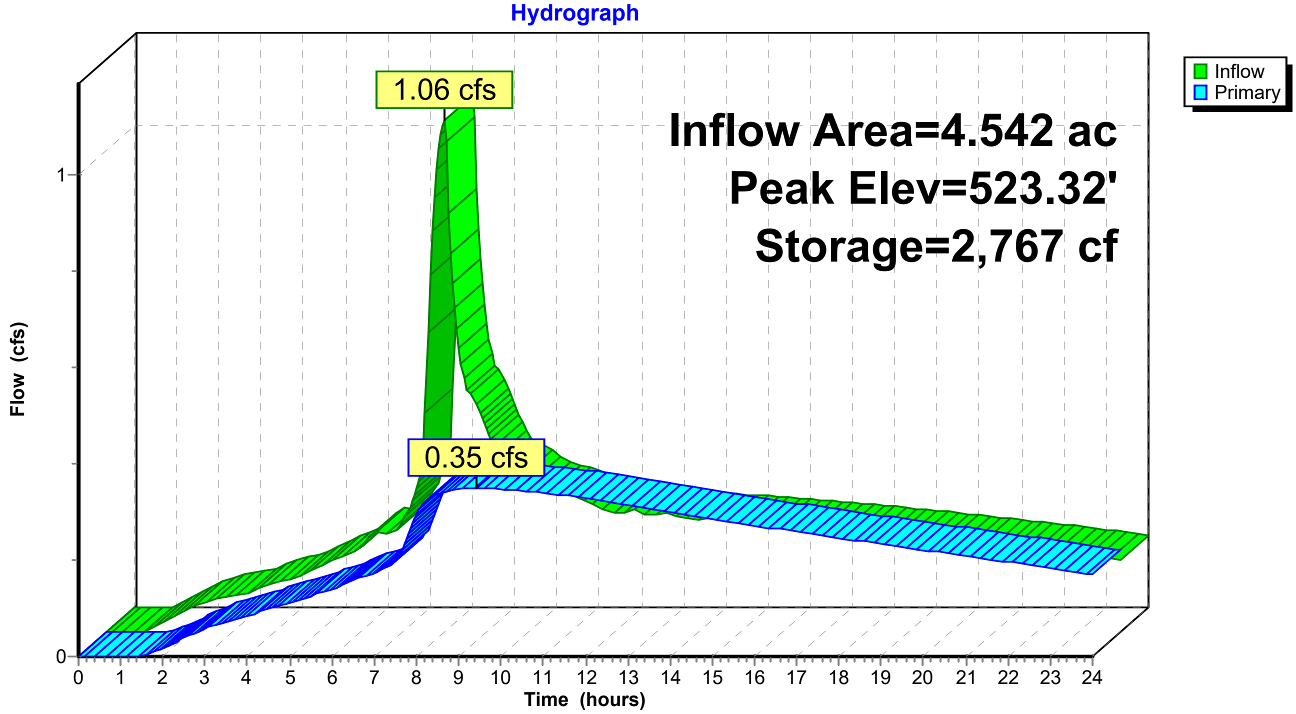
Volume	Invert	Avail.Storage	Storage Description
#1	522.00'	15,510 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
522.00	897	0	0
523.00	2,700	1,799	1,799
524.00	4,504	3,602	5,401
525.00	6,286	5,395	10,796
525.75	6,286	4,715	15,510

Device	Routing	Invert	Outlet Devices
#1	Device 2	522.00'	**2.0' long (Profile 17) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 1.97 2.46 2.95 Coef. (English) 2.84 3.13 3.26 3.30 3.31 3.31
#2	Device 5	522.00'	**3.5" Vert. WQ Orifice** C= 0.600
#3	Device 5	523.40'	**6.5" Vert. Orifice** C= 0.600
#4	Device 5	524.50'	**2.0' long (Profile 17) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 1.97 2.46 2.95 Coef. (English) 2.84 3.13 3.26 3.30 3.31 3.31
#5	Primary	520.00'	**12.0" Round Culvert** L= 15.0' Ke= 0.500 Inlet / Outlet Invert= 520.00' / 518.50' S= 0.1000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.35 cfs @ 9.42 hrs HW=523.32' TW=0.00' (Dynamic Tailwater)
└─**5=Culvert** (Passes 0.35 cfs of 6.35 cfs potential flow)
  ├─**2=WQ Orifice** (Orifice Controls 0.35 cfs @ 5.23 fps)
  │ └─**1=Broad-Crested Rectangular Weir** (Passes 0.35 cfs of 9.81 cfs potential flow)
  ├─**3=Orifice** (Controls 0.00 cfs)
  └─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

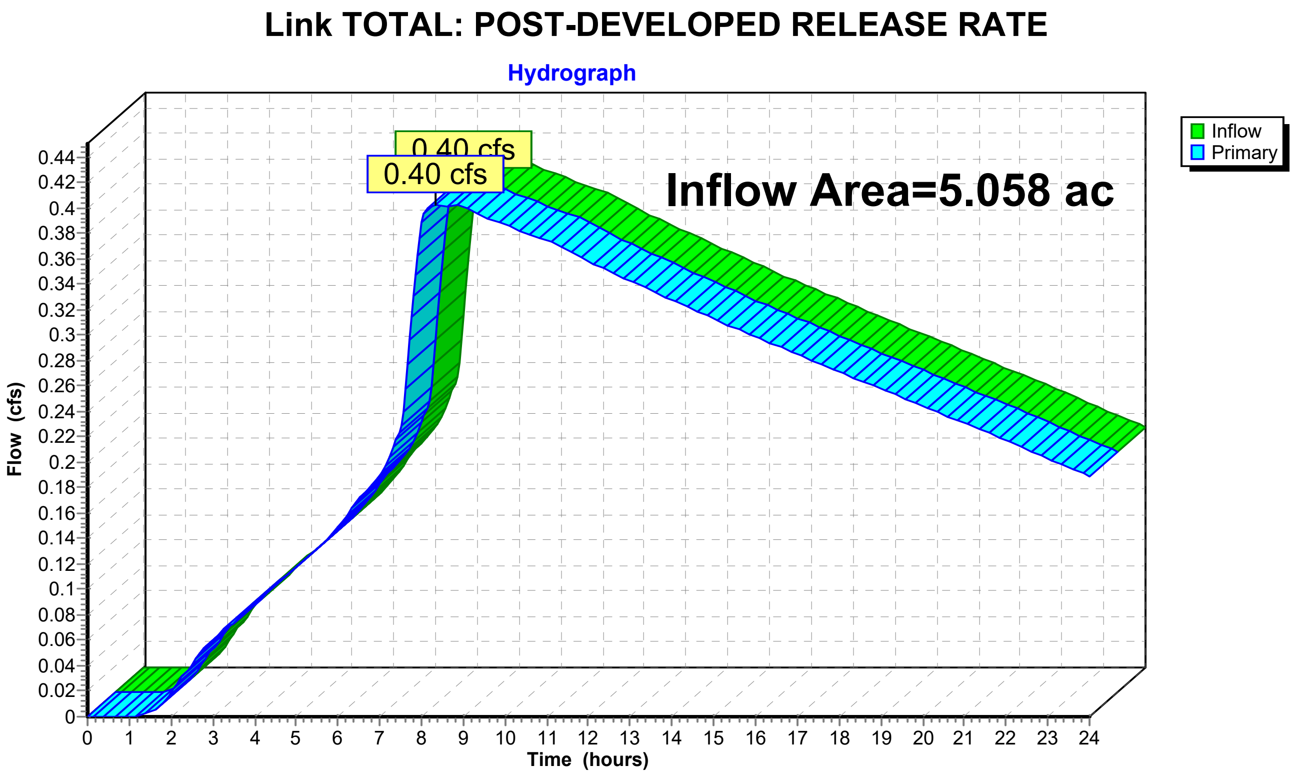
Pond 1P: Stormwater Facility



Summary for Link TOTAL: POST-DEVELOPED RELEASE RATE

Inflow Area = 5.058 ac, 30.56% Impervious, Inflow Depth > 1.10" for 2 Year event
Inflow = 0.40 cfs @ 8.32 hrs, Volume= 0.462 af
Primary = 0.40 cfs @ 8.32 hrs, Volume= 0.462 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 10i: ON SITE IMPERVIOUS Runoff Area=52,582 sf 100.00% Impervious Runoff Depth>2.66"
Tc=5.0 min CN=0/98 Runoff=0.81 cfs 0.268 af

Subcatchment 10p: ON SITE PERVIOUS Runoff Area=81,066 sf 0.00% Impervious Runoff Depth>0.84"
Tc=5.0 min CN=74/0 Runoff=0.27 cfs 0.131 af

Subcatchment B: BUFFER AREA Runoff Area=19,707 sf 0.00% Impervious Runoff Depth>1.28"
Flow Length=250' Slope=0.1080 '/' Tc=26.3 min CN=82/0 Runoff=0.09 cfs 0.048 af

Subcatchment X: PARKER ROAD Runoff Area=8,758 sf 100.00% Impervious Runoff Depth>2.66"
Tc=5.0 min CN=0/98 Runoff=0.14 cfs 0.045 af

Subcatchment Y: PARKER ROAD - Runoff Area=2,778 sf 100.00% Impervious Runoff Depth>2.66"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.014 af

Subcatchment Zi: OFFSITE IMPERVIOUS Runoff Area=3,200 sf 100.00% Impervious Runoff Depth>2.66"
Tc=5.0 min CN=0/98 Runoff=0.05 cfs 0.016 af

Subcatchment Zp: OFFSITE PERVIOUS Runoff Area=52,222 sf 0.00% Impervious Runoff Depth>1.10"
Flow Length=958' Tc=20.8 min CN=79/0 Runoff=0.21 cfs 0.110 af

Pond 1P: Stormwater Facility Peak Elev=523.64' Storage=3,884 cf Inflow=1.46 cfs 0.570 af
Outflow=0.55 cfs 0.544 af

Link TOTAL: POST-DEVELOPED RELEASE RATE Inflow=0.63 cfs 0.607 af
Primary=0.63 cfs 0.607 af

Total Runoff Area = 5.058 ac Runoff Volume = 0.632 af Average Runoff Depth = 1.50"
69.44% Pervious = 3.512 ac 30.56% Impervious = 1.545 ac

Summary for Subcatchment 10i: ON SITE IMPERVIOUS

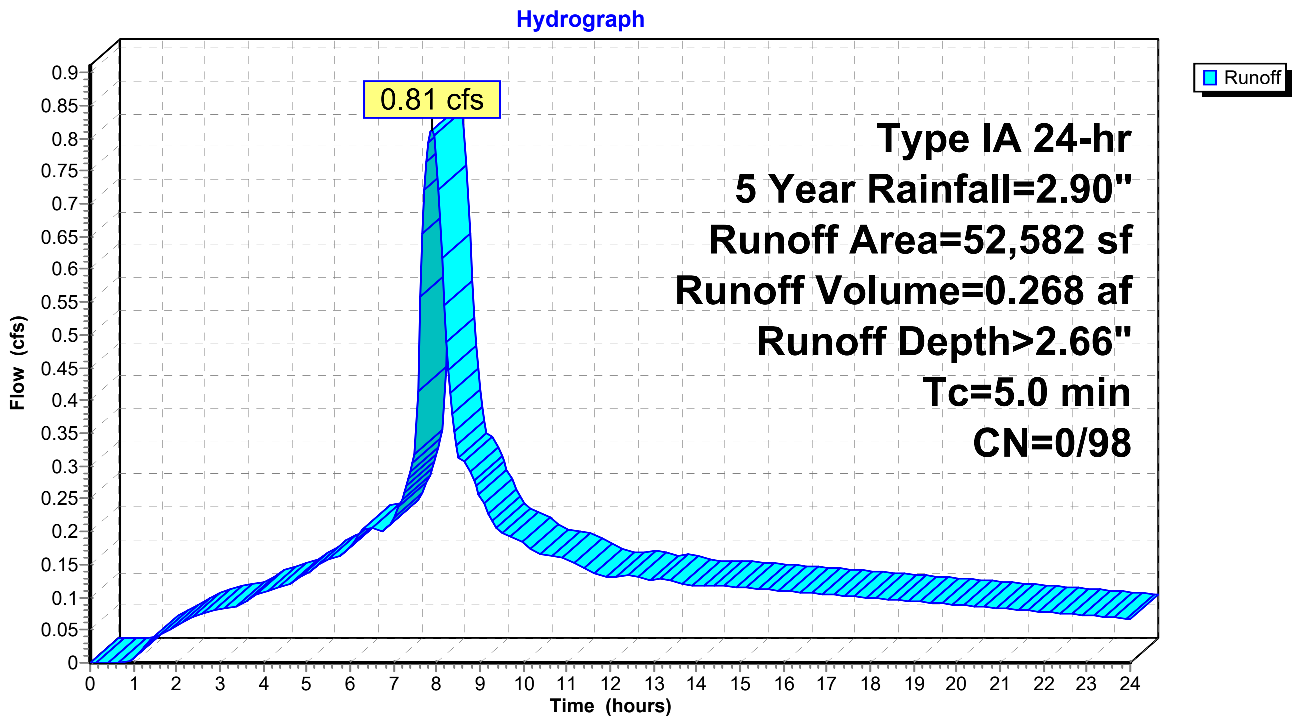
Runoff = 0.81 cfs @ 7.90 hrs, Volume= 0.268 af, Depth> 2.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5 Year Rainfall=2.90"

	Area (sf)	CN	Description
*	22,582	98	Impervious ROW
*	30,000	98	12 Lots @ 2500 sf each
	52,582	98	Weighted Average
	52,582		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 10i: ON SITE IMPERVIOUS



Summary for Subcatchment 10p: ON SITE PERVIOUS

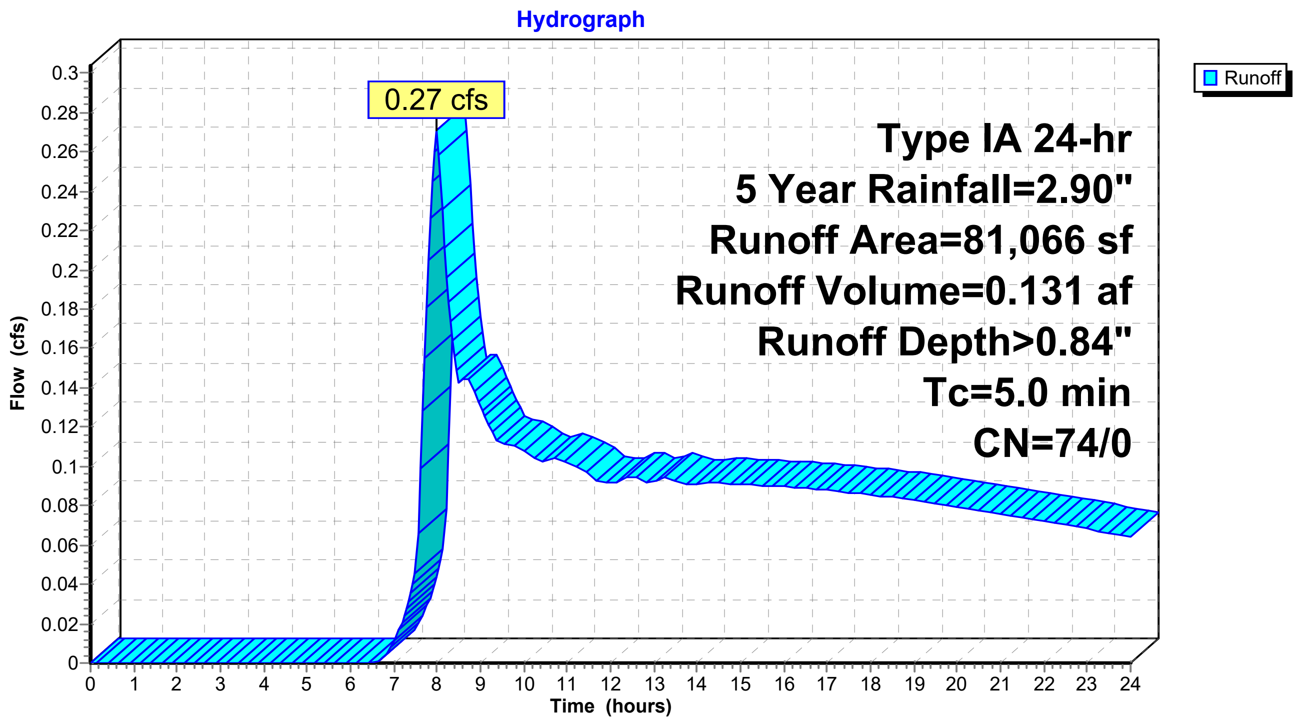
Runoff = 0.27 cfs @ 8.00 hrs, Volume= 0.131 af, Depth> 0.84"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5 Year Rainfall=2.90"

Area (sf)	CN	Description
75,740	74	>75% Grass cover, Good, HSG C
5,326	80	>75% Grass cover, Good, HSG D
81,066	74	Weighted Average
81,066		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 10p: ON SITE PERVIOUS



Summary for Subcatchment B: BUFFER AREA

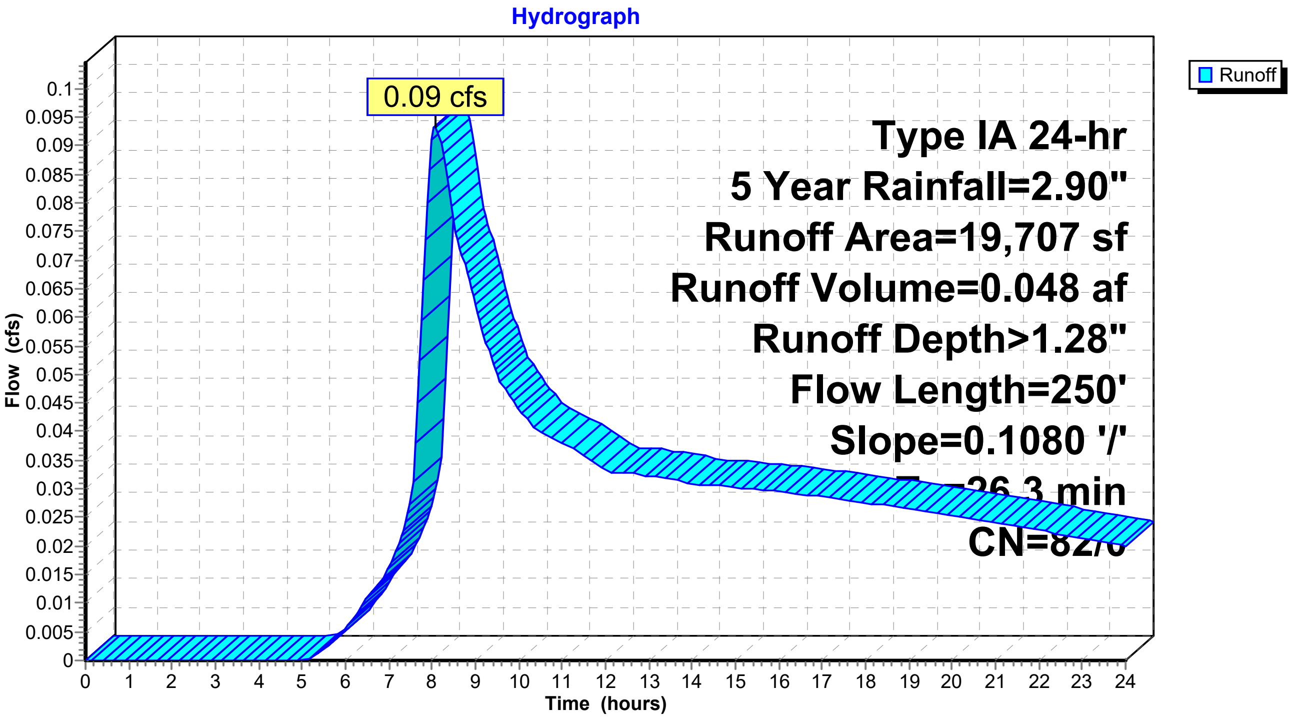
Runoff = 0.09 cfs @ 8.07 hrs, Volume= 0.048 af, Depth> 1.28"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5 Year Rainfall=2.90"

Area (sf)	CN	Description
19,707	82	Woods/grass comb., Fair, HSG D
19,707		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.3	250	0.1080	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.40"

Subcatchment B: BUFFER AREA



Summary for Subcatchment X: PARKER ROAD

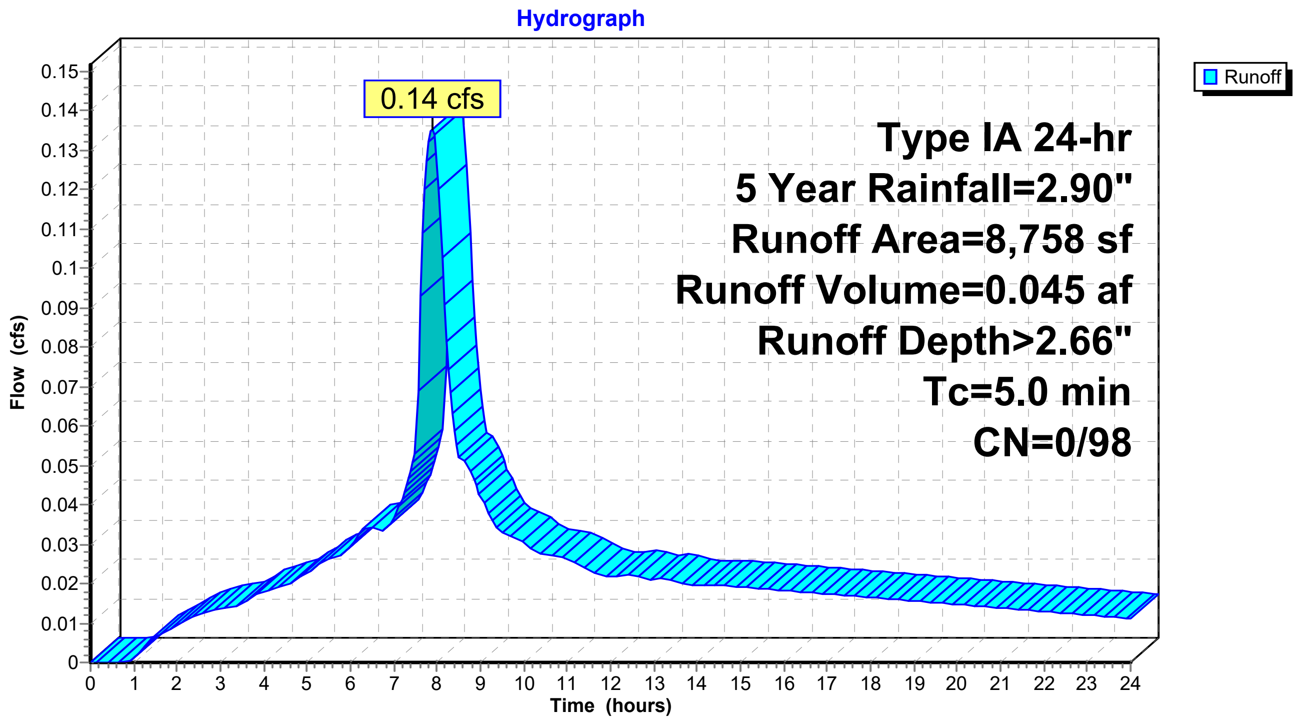
Runoff = 0.14 cfs @ 7.90 hrs, Volume= 0.045 af, Depth> 2.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5 Year Rainfall=2.90"

	Area (sf)	CN	Description
*	8,758	98	Impervious Area
	8,758		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment X: PARKER ROAD



Summary for Subcatchment Y: PARKER ROAD - BYPASS

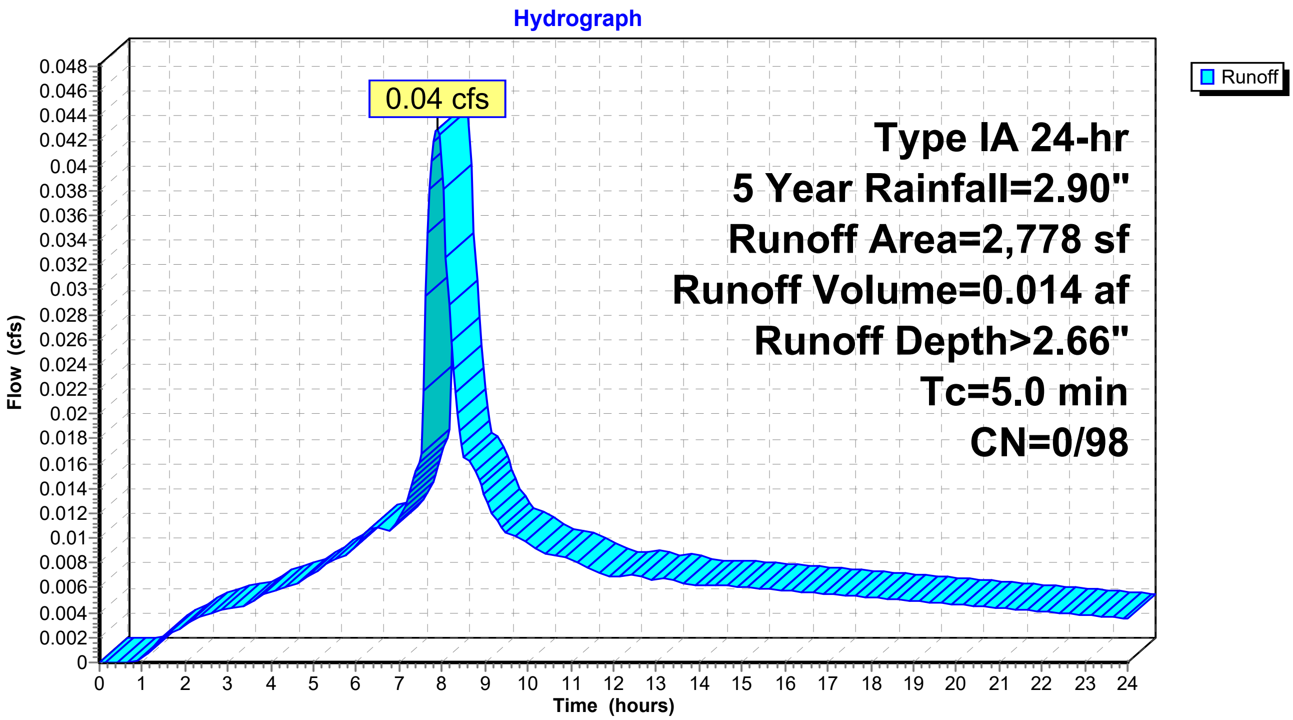
Runoff = 0.04 cfs @ 7.90 hrs, Volume= 0.014 af, Depth> 2.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5 Year Rainfall=2.90"

	Area (sf)	CN	Description
*	2,778	98	Impervious Area
	2,778		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Y: PARKER ROAD - BYPASS



Summary for Subcatchment Zi: OFFSITE IMPERVIOUS

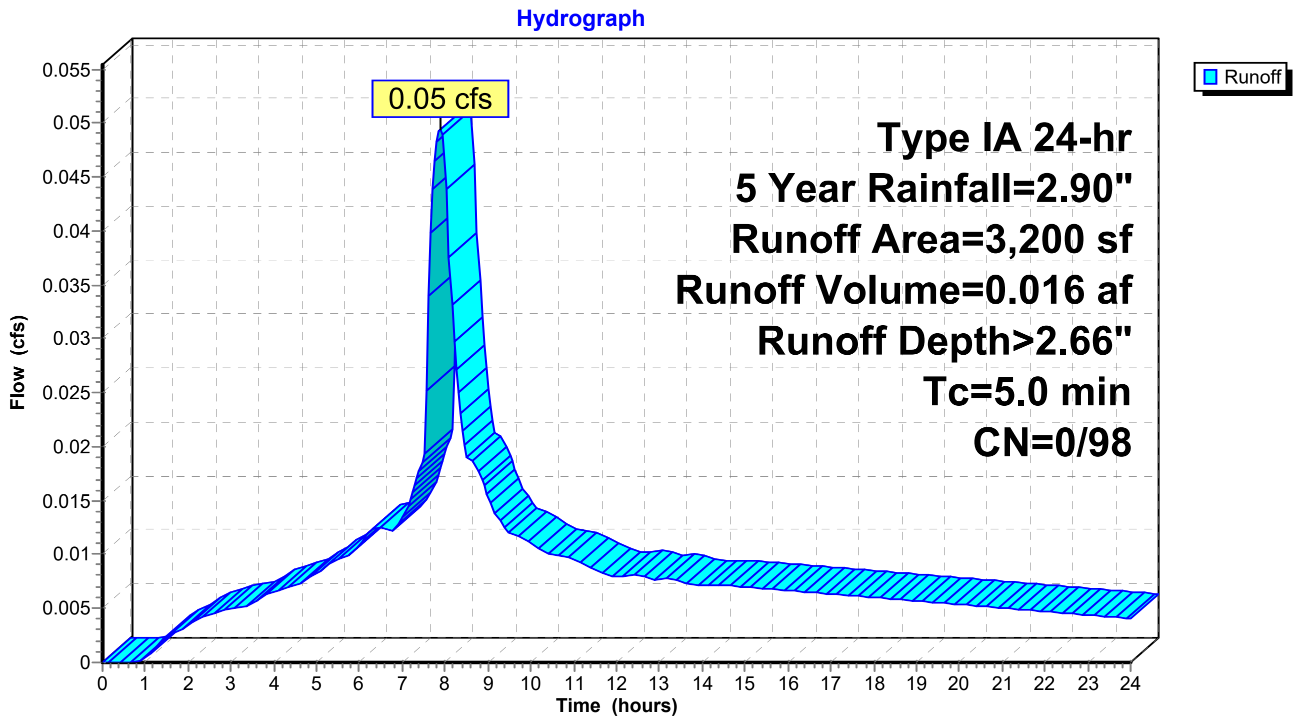
Runoff = 0.05 cfs @ 7.90 hrs, Volume= 0.016 af, Depth> 2.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5 Year Rainfall=2.90"

	Area (sf)	CN	Description
*	3,200	98	Impervious Area
	3,200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Zi: OFFSITE IMPERVIOUS



Summary for Subcatchment Zp: OFFSITE PERVIOUS

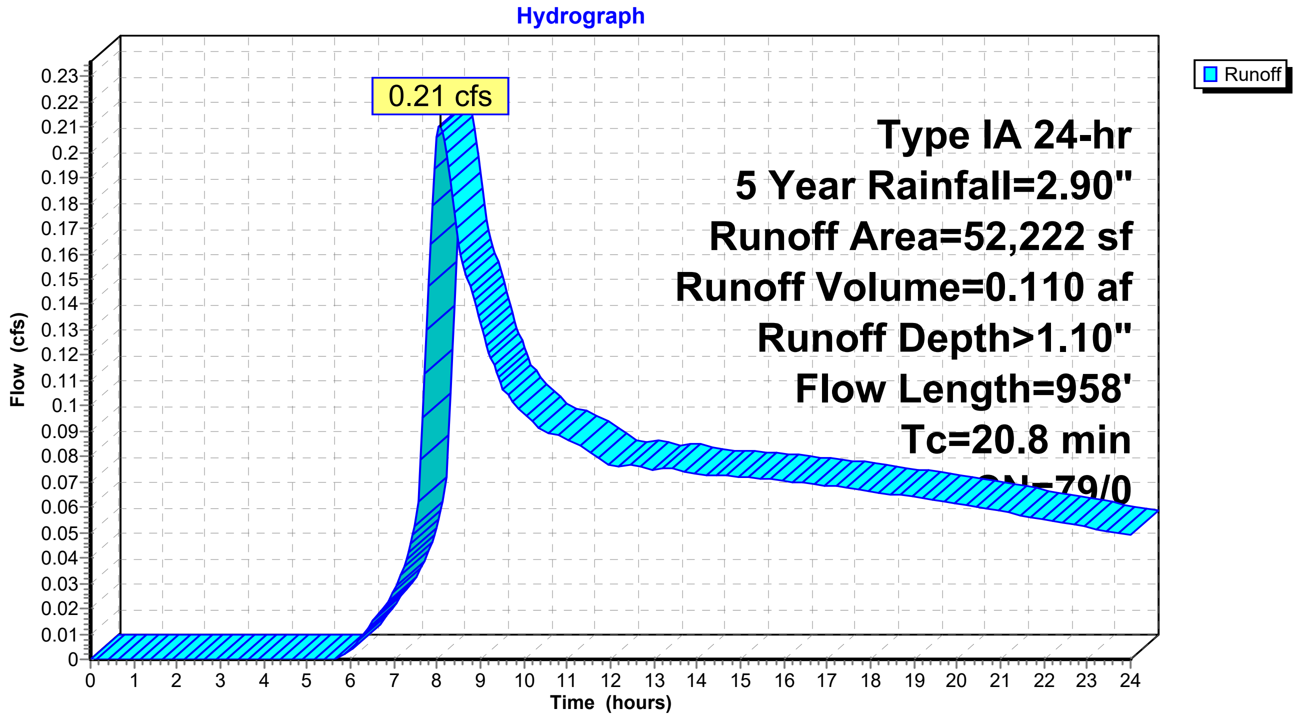
Runoff = 0.21 cfs @ 8.06 hrs, Volume= 0.110 af, Depth> 1.10"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5 Year Rainfall=2.90"

Area (sf)	CN	Description
52,222	79	50-75% Grass cover, Fair, HSG C
52,222		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	300	0.0750	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.40"
4.7	658	0.1100	2.32		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
20.8	958	Total			

Subcatchment Zp: OFFSITE PERVIOUS



Summary for Pond 1P: Stormwater Facility

Inflow Area = 4.542 ac, 32.62% Impervious, Inflow Depth > 1.51" for 5 Year event
Inflow = 1.46 cfs @ 7.98 hrs, Volume= 0.570 af
Outflow = 0.55 cfs @ 9.07 hrs, Volume= 0.544 af, Atten= 62%, Lag= 65.7 min
Primary = 0.55 cfs @ 9.07 hrs, Volume= 0.544 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 523.64' @ 9.07 hrs Surf.Area= 3,849 sf Storage= 3,884 cf

Plug-Flow detention time= 110.3 min calculated for 0.544 af (96% of inflow)
Center-of-Mass det. time= 80.0 min (830.8 - 750.8)

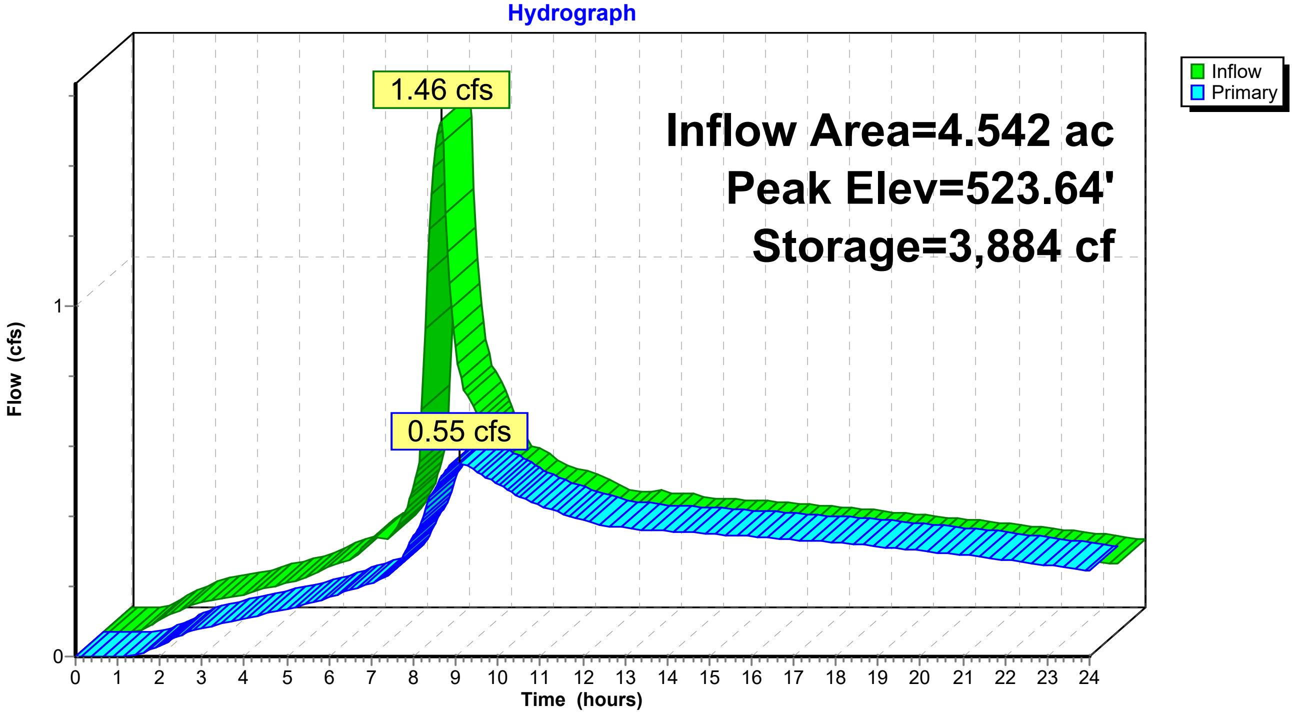
Volume	Invert	Avail.Storage	Storage Description
#1	522.00'	15,510 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
522.00	897	0	0
523.00	2,700	1,799	1,799
524.00	4,504	3,602	5,401
525.00	6,286	5,395	10,796
525.75	6,286	4,715	15,510

Device	Routing	Invert	Outlet Devices
#1	Device 2	522.00'	**2.0' long (Profile 17) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 1.97 2.46 2.95 Coef. (English) 2.84 3.13 3.26 3.30 3.31 3.31
#2	Device 5	522.00'	**3.5" Vert. WQ Orifice** C= 0.600
#3	Device 5	523.40'	**6.5" Vert. Orifice** C= 0.600
#4	Device 5	524.50'	**2.0' long (Profile 17) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 1.97 2.46 2.95 Coef. (English) 2.84 3.13 3.26 3.30 3.31 3.31
#5	Primary	520.00'	**12.0" Round Culvert** L= 15.0' Ke= 0.500 Inlet / Outlet Invert= 520.00' / 518.50' S= 0.1000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.55 cfs @ 9.07 hrs HW=523.64' TW=0.00' (Dynamic Tailwater)
└─**5=Culvert** (Passes 0.55 cfs of 6.70 cfs potential flow)
  ├─**2=WQ Orifice** (Orifice Controls 0.39 cfs @ 5.88 fps)
  │ └─**1=Broad-Crested Rectangular Weir** (Passes 0.39 cfs of 13.71 cfs potential flow)
  ├─**3=Orifice** (Orifice Controls 0.16 cfs @ 1.66 fps)
  └─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Stormwater Facility

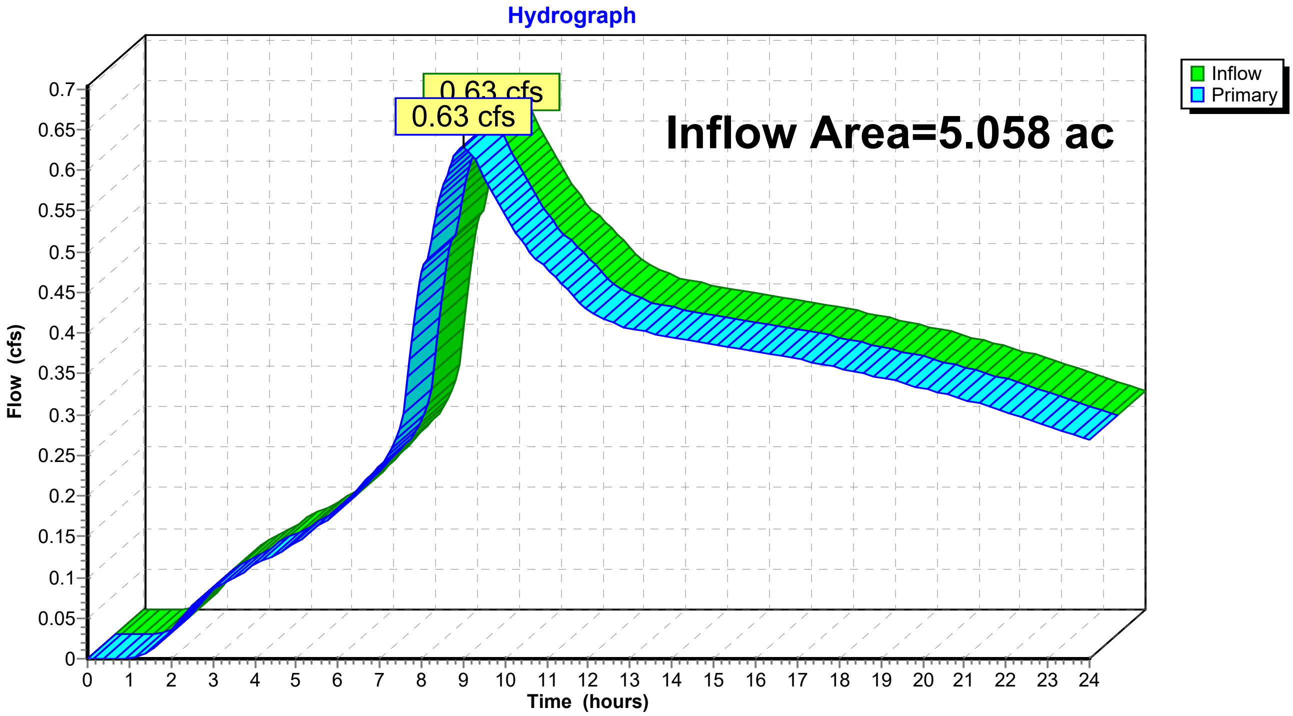


Summary for Link TOTAL: POST-DEVELOPED RELEASE RATE

Inflow Area = 5.058 ac, 30.56% Impervious, Inflow Depth > 1.44" for 5 Year event
Inflow = 0.63 cfs @ 8.99 hrs, Volume= 0.607 af
Primary = 0.63 cfs @ 8.99 hrs, Volume= 0.607 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link TOTAL: POST-DEVELOPED RELEASE RATE



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 10i: ON SITE IMPERVIOUS Runoff Area=52,582 sf 100.00% Impervious Runoff Depth>3.16"
Tc=5.0 min CN=0/98 Runoff=0.96 cfs 0.318 af

Subcatchment 10p: ON SITE PERVIOUS Runoff Area=81,066 sf 0.00% Impervious Runoff Depth>1.17"
Tc=5.0 min CN=74/0 Runoff=0.43 cfs 0.181 af

Subcatchment B: BUFFER AREA Runoff Area=19,707 sf 0.00% Impervious Runoff Depth>1.68"
Flow Length=250' Slope=0.1080 '/' Tc=26.3 min CN=82/0 Runoff=0.13 cfs 0.063 af

Subcatchment X: PARKER ROAD Runoff Area=8,758 sf 100.00% Impervious Runoff Depth>3.16"
Tc=5.0 min CN=0/98 Runoff=0.16 cfs 0.053 af

Subcatchment Y: PARKER ROAD - Runoff Area=2,778 sf 100.00% Impervious Runoff Depth>3.16"
Tc=5.0 min CN=0/98 Runoff=0.05 cfs 0.017 af

Subcatchment Zi: OFFSITE IMPERVIOUS Runoff Area=3,200 sf 100.00% Impervious Runoff Depth>3.16"
Tc=5.0 min CN=0/98 Runoff=0.06 cfs 0.019 af

Subcatchment Zp: OFFSITE PERVIOUS Runoff Area=52,222 sf 0.00% Impervious Runoff Depth>1.47"
Flow Length=958' Tc=20.8 min CN=79/0 Runoff=0.30 cfs 0.147 af

Pond 1P: Stormwater Facility Peak Elev=523.83' Storage=4,645 cf Inflow=1.89 cfs 0.718 af
Outflow=0.85 cfs 0.673 af

Link TOTAL: POST-DEVELOPED RELEASE RATE Inflow=0.96 cfs 0.753 af
Primary=0.96 cfs 0.753 af

Total Runoff Area = 5.058 ac Runoff Volume = 0.798 af Average Runoff Depth = 1.89"
69.44% Pervious = 3.512 ac 30.56% Impervious = 1.545 ac

Summary for Subcatchment 10i: ON SITE IMPERVIOUS

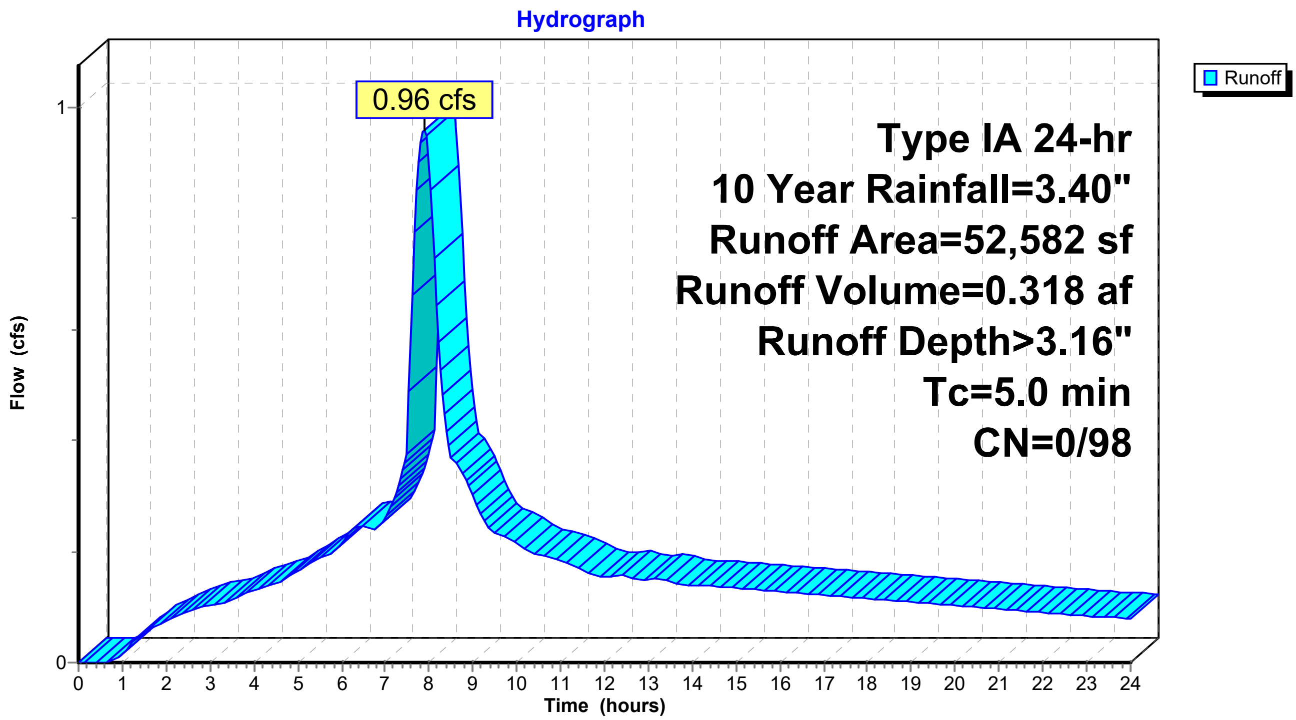
Runoff = 0.96 cfs @ 7.90 hrs, Volume= 0.318 af, Depth> 3.16"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 Year Rainfall=3.40"

	Area (sf)	CN	Description
*	22,582	98	Impervious ROW
*	30,000	98	12 Lots @ 2500 sf each
	52,582	98	Weighted Average
	52,582		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 10i: ON SITE IMPERVIOUS



Summary for Subcatchment 10p: ON SITE PERVIOUS

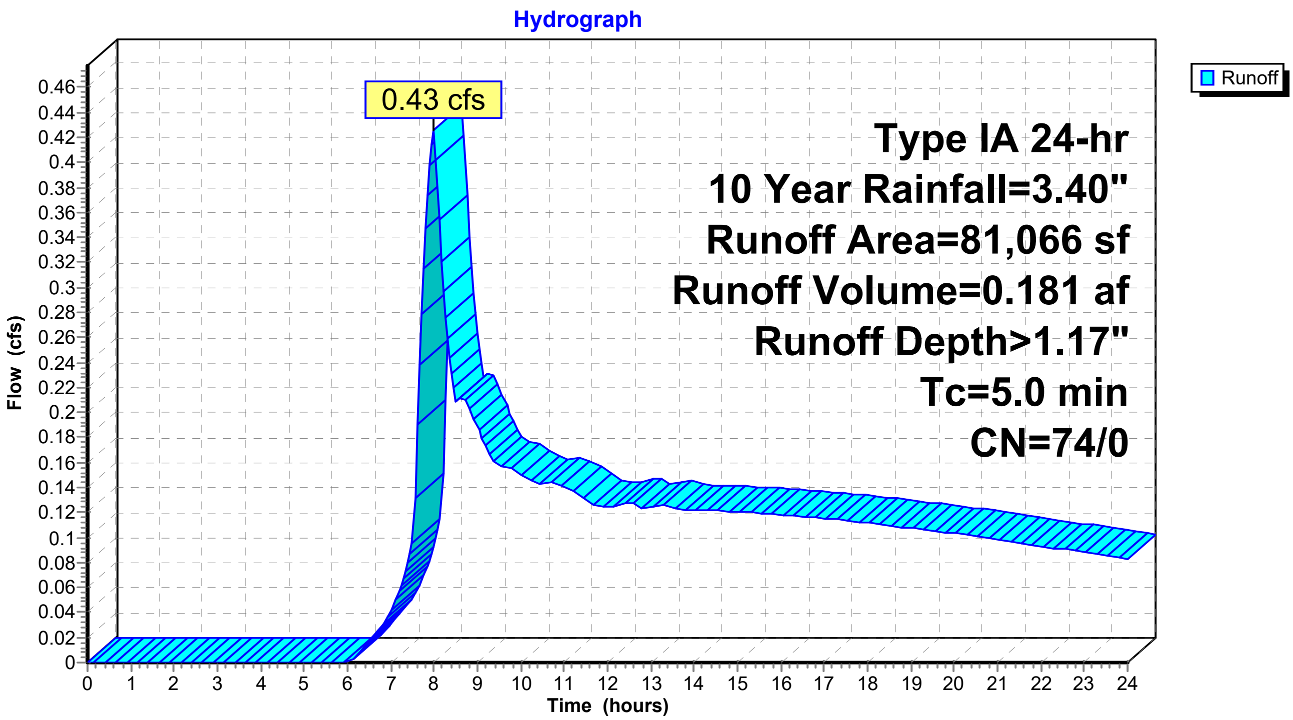
Runoff = 0.43 cfs @ 7.99 hrs, Volume= 0.181 af, Depth> 1.17"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 Year Rainfall=3.40"

Area (sf)	CN	Description
75,740	74	>75% Grass cover, Good, HSG C
5,326	80	>75% Grass cover, Good, HSG D
81,066	74	Weighted Average
81,066		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 10p: ON SITE PERVIOUS



Summary for Subcatchment B: BUFFER AREA

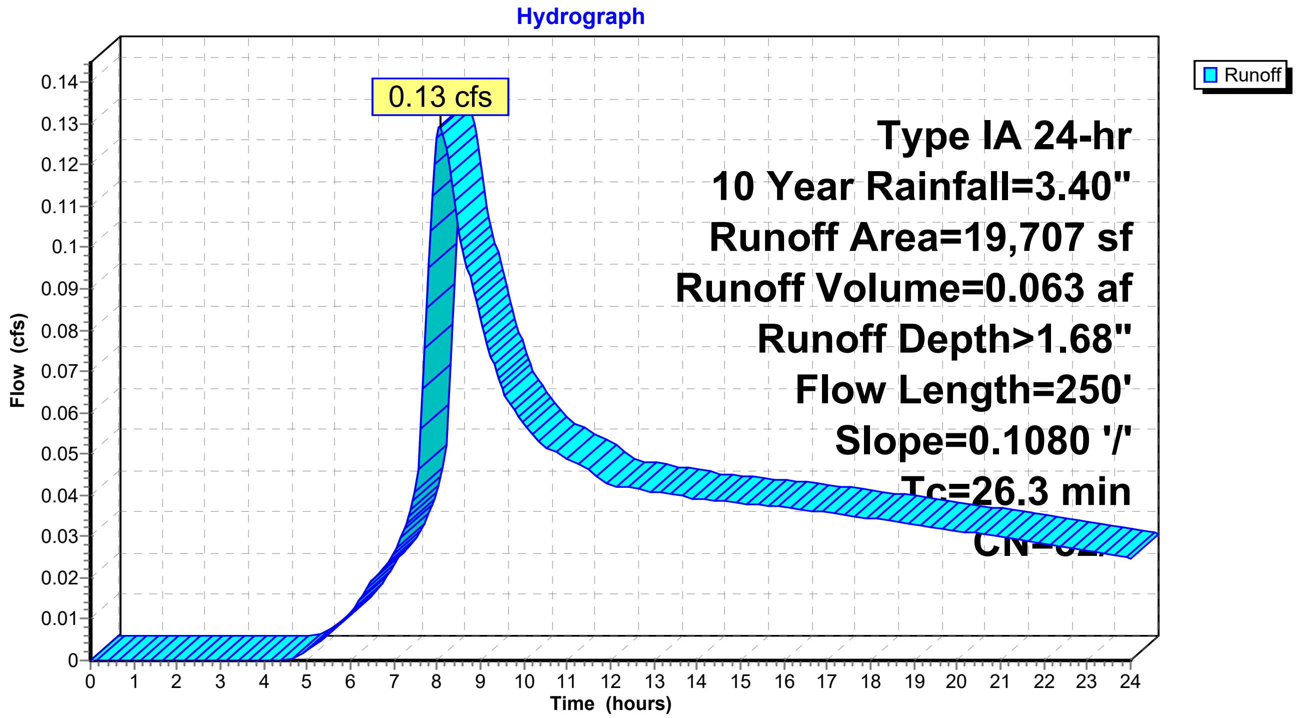
Runoff = 0.13 cfs @ 8.06 hrs, Volume= 0.063 af, Depth> 1.68"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 Year Rainfall=3.40"

Area (sf)	CN	Description
19,707	82	Woods/grass comb., Fair, HSG D
19,707		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.3	250	0.1080	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.40"

Subcatchment B: BUFFER AREA



Summary for Subcatchment X: PARKER ROAD

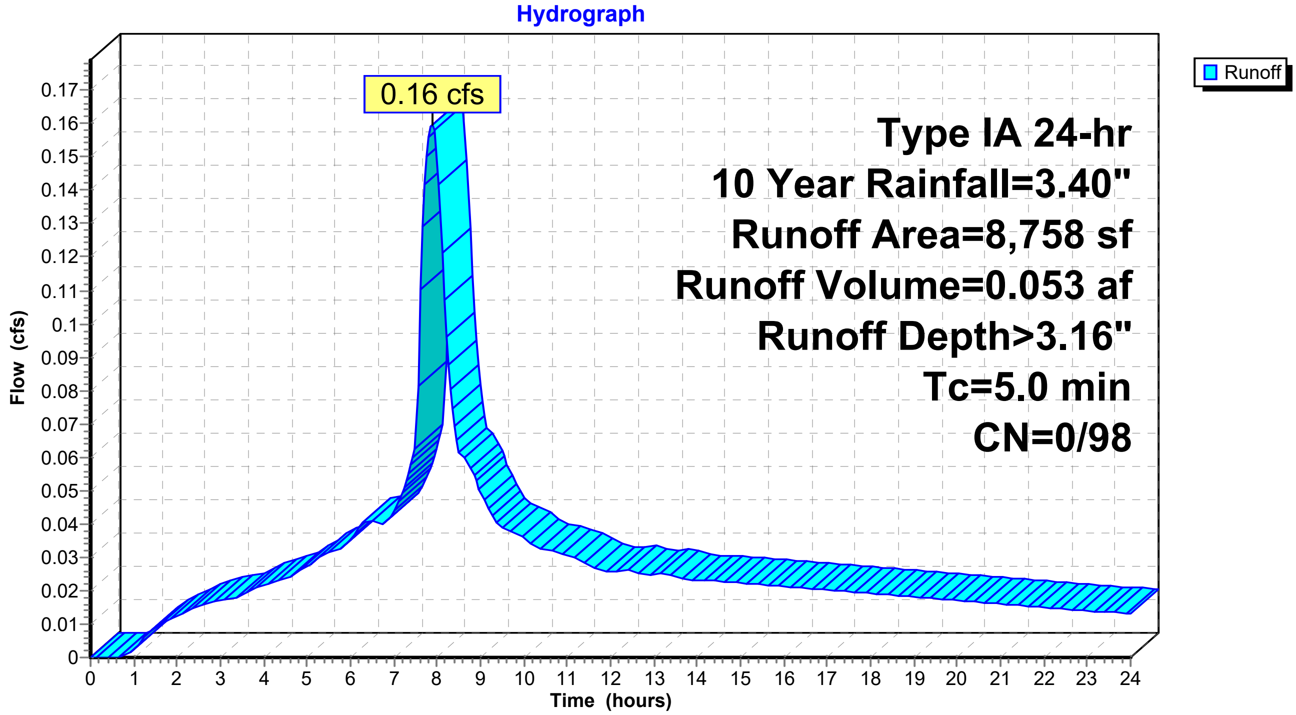
Runoff = 0.16 cfs @ 7.90 hrs, Volume= 0.053 af, Depth> 3.16"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 Year Rainfall=3.40"

	Area (sf)	CN	Description
*	8,758	98	Impervious Area
	8,758		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment X: PARKER ROAD



Summary for Subcatchment Y: PARKER ROAD - BYPASS

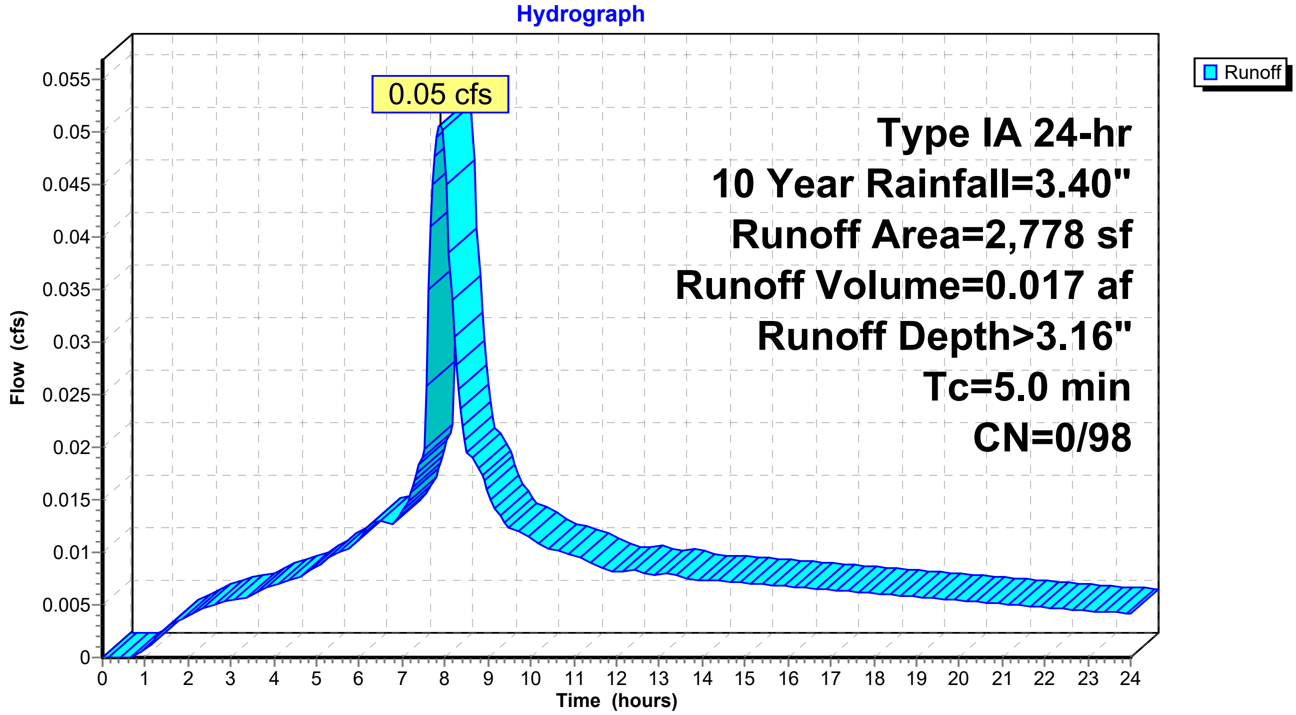
Runoff = 0.05 cfs @ 7.90 hrs, Volume= 0.017 af, Depth> 3.16"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 Year Rainfall=3.40"

	Area (sf)	CN	Description
*	2,778	98	Impervious Area
	2,778		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Y: PARKER ROAD - BYPASS



Summary for Subcatchment Zi: OFFSITE IMPERVIOUS

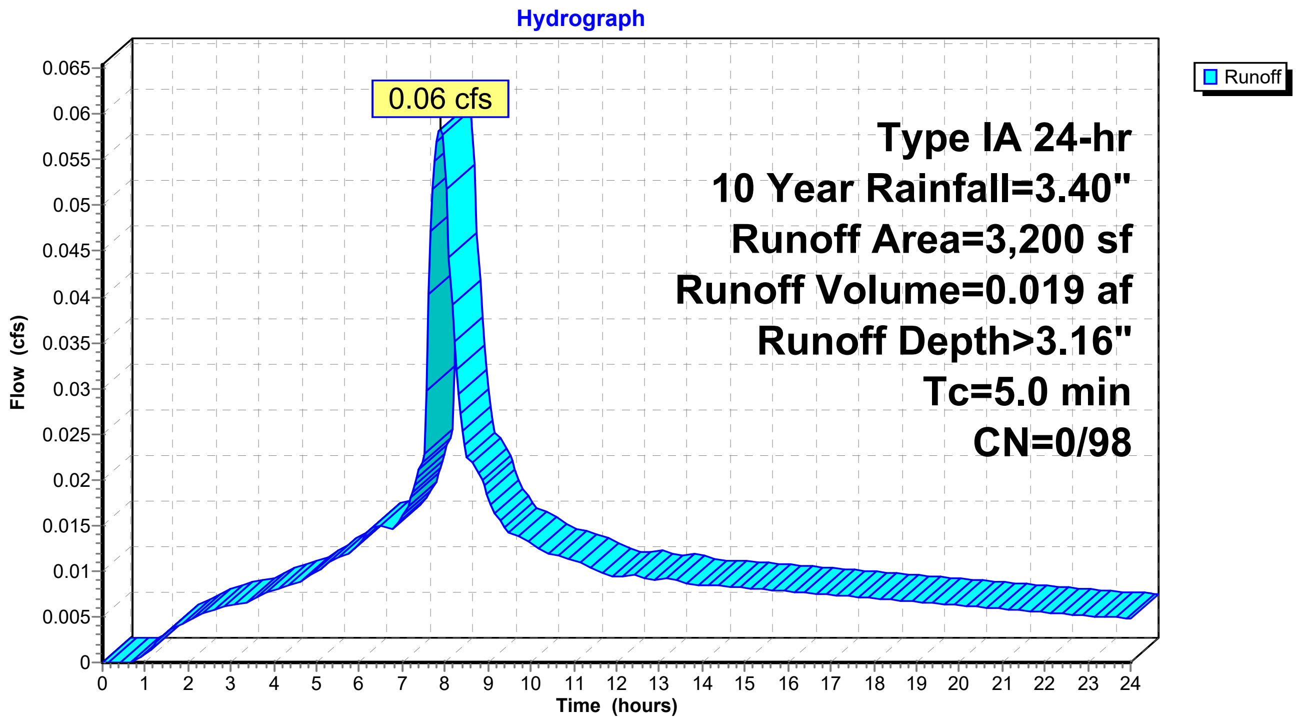
Runoff = 0.06 cfs @ 7.90 hrs, Volume= 0.019 af, Depth> 3.16"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 Year Rainfall=3.40"

	Area (sf)	CN	Description
*	3,200	98	Impervious Area
	3,200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Zi: OFFSITE IMPERVIOUS



Summary for Subcatchment Zp: OFFSITE PERVIOUS

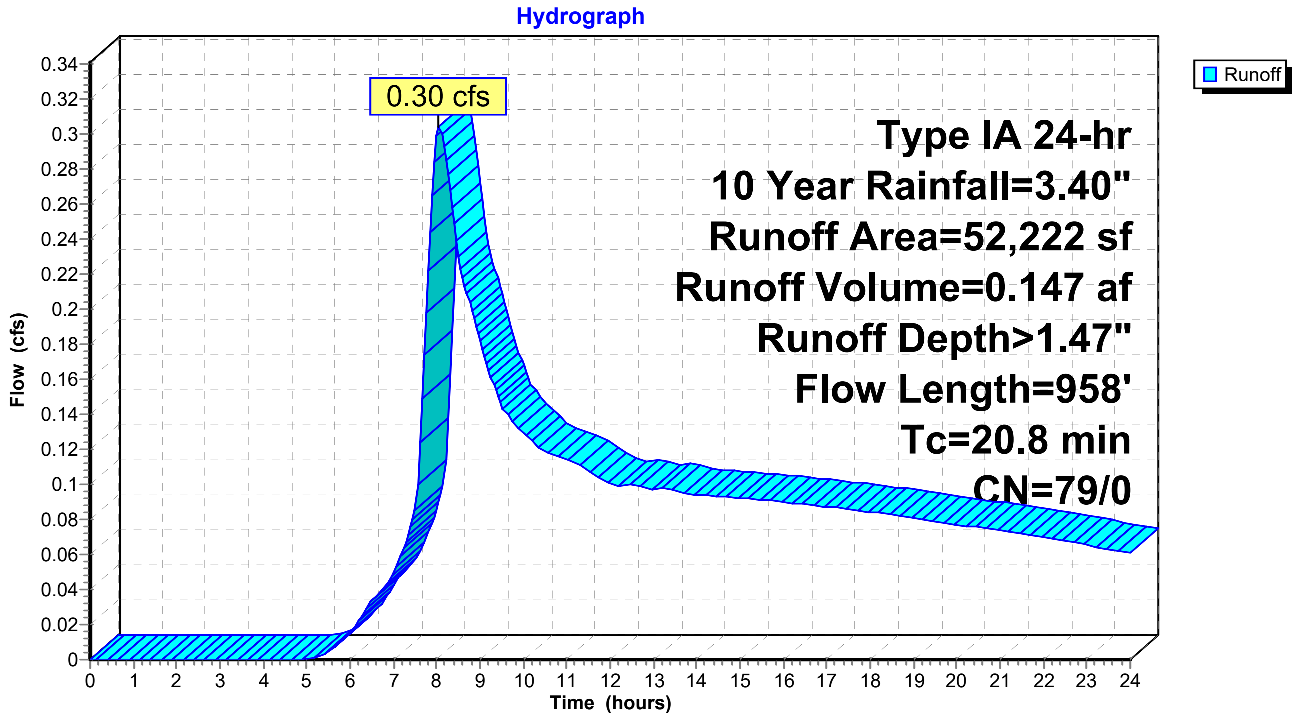
Runoff = 0.30 cfs @ 8.05 hrs, Volume= 0.147 af, Depth> 1.47"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 Year Rainfall=3.40"

Area (sf)	CN	Description
52,222	79	50-75% Grass cover, Fair, HSG C
52,222		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	300	0.0750	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.40"
4.7	658	0.1100	2.32		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
20.8	958	Total			

Subcatchment Zp: OFFSITE PERVIOUS



Summary for Pond 1P: Stormwater Facility

Inflow Area = 4.542 ac, 32.62% Impervious, Inflow Depth > 1.90" for 10 Year event
Inflow = 1.89 cfs @ 7.98 hrs, Volume= 0.718 af
Outflow = 0.85 cfs @ 8.72 hrs, Volume= 0.673 af, Atten= 55%, Lag= 44.4 min
Primary = 0.85 cfs @ 8.72 hrs, Volume= 0.673 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 523.83' @ 8.72 hrs Surf.Area= 4,190 sf Storage= 4,645 cf

Plug-Flow detention time= 111.8 min calculated for 0.673 af (94% of inflow)
Center-of-Mass det. time= 69.3 min (815.0 - 745.7)

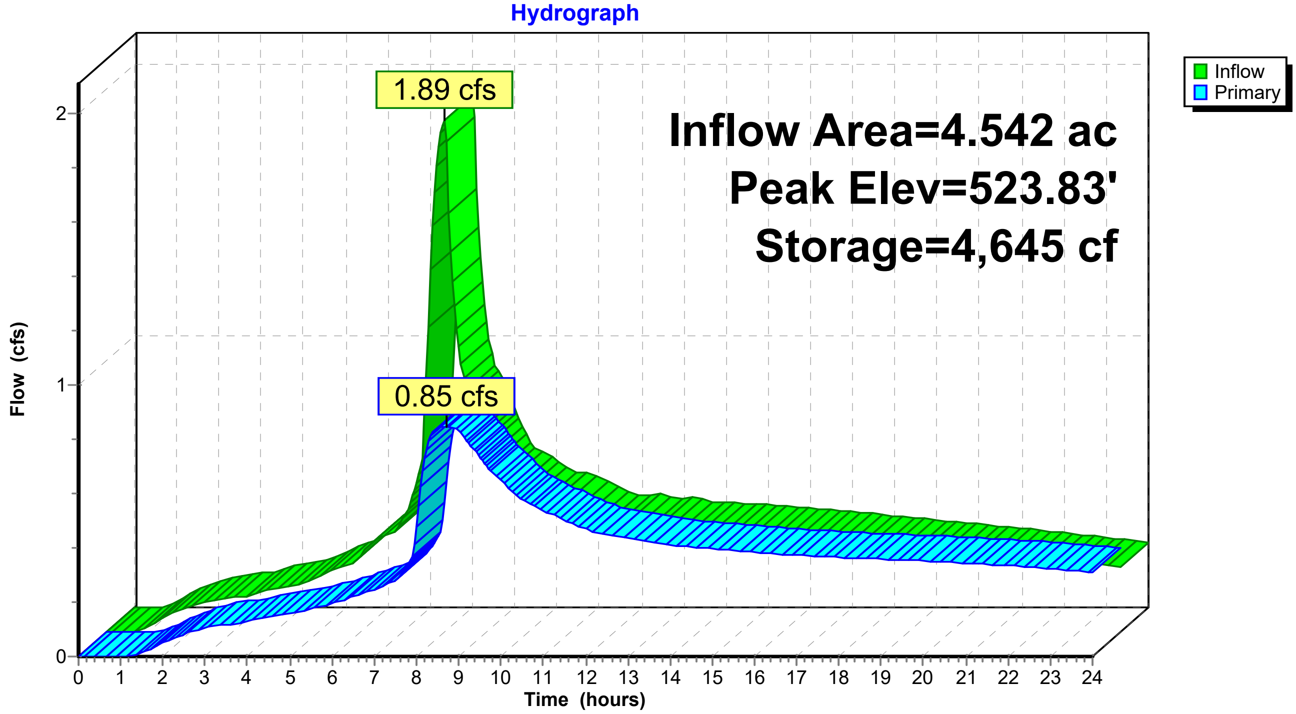
Volume	Invert	Avail.Storage	Storage Description
#1	522.00'	15,510 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
522.00	897	0	0
523.00	2,700	1,799	1,799
524.00	4,504	3,602	5,401
525.00	6,286	5,395	10,796
525.75	6,286	4,715	15,510

Device	Routing	Invert	Outlet Devices
#1	Device 2	522.00'	**2.0' long (Profile 17) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 1.97 2.46 2.95 Coef. (English) 2.84 3.13 3.26 3.30 3.31 3.31
#2	Device 5	522.00'	**3.5" Vert. WQ Orifice** C= 0.600
#3	Device 5	523.40'	**6.5" Vert. Orifice** C= 0.600
#4	Device 5	524.50'	**2.0' long (Profile 17) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 1.97 2.46 2.95 Coef. (English) 2.84 3.13 3.26 3.30 3.31 3.31
#5	Primary	520.00'	**12.0" Round Culvert** L= 15.0' Ke= 0.500 Inlet / Outlet Invert= 520.00' / 518.50' S= 0.1000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.85 cfs @ 8.72 hrs HW=523.83' TW=0.00' (Dynamic Tailwater)
└─**5=Culvert** (Passes 0.85 cfs of 6.90 cfs potential flow)
  ├─**2=WQ Orifice** (Orifice Controls 0.42 cfs @ 6.24 fps)
  │ └─**1=Broad-Crested Rectangular Weir** (Passes 0.42 cfs of 16.23 cfs potential flow)
  ├─**3=Orifice** (Orifice Controls 0.43 cfs @ 2.22 fps)
  └─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Stormwater Facility

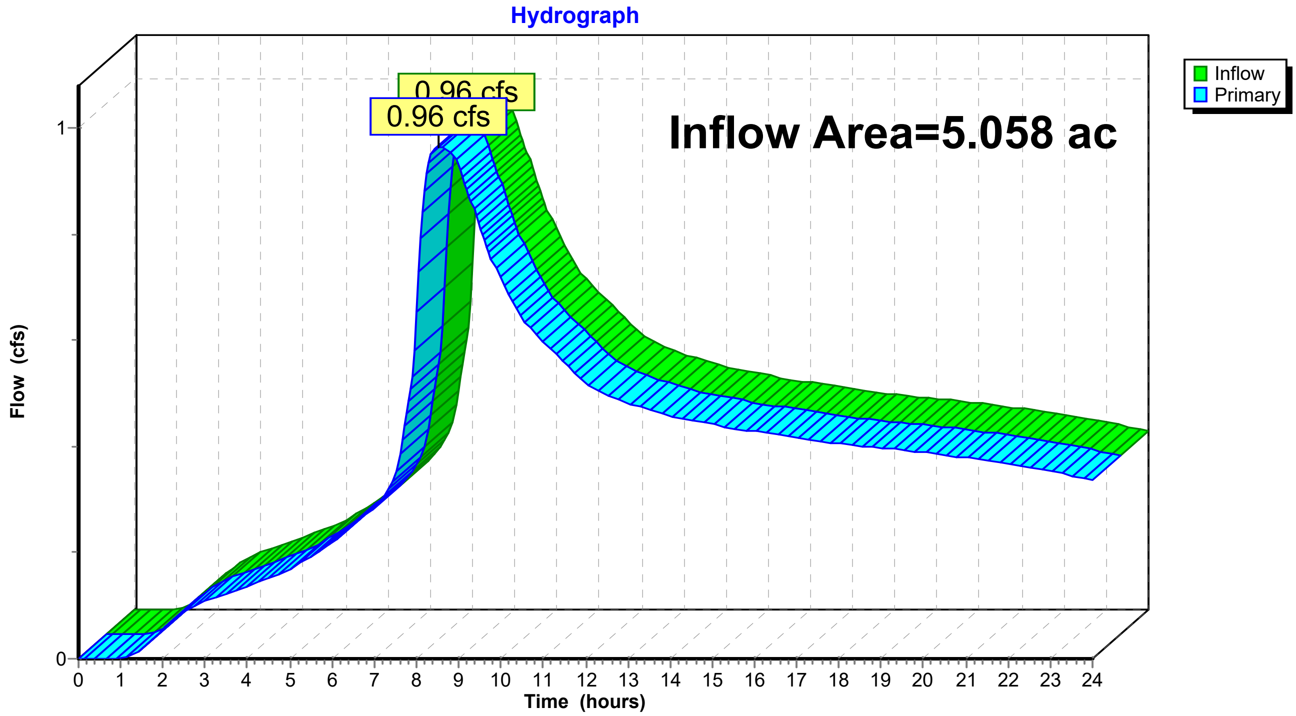


Summary for Link TOTAL: POST-DEVELOPED RELEASE RATE

Inflow Area = 5.058 ac, 30.56% Impervious, Inflow Depth > 1.79" for 10 Year event
Inflow = 0.96 cfs @ 8.50 hrs, Volume= 0.753 af
Primary = 0.96 cfs @ 8.50 hrs, Volume= 0.753 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link TOTAL: POST-DEVELOPED RELEASE RATE



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 10i: ON SITE IMPERVIOUS Runoff Area=52,582 sf 100.00% Impervious Runoff Depth>3.66"
Tc=5.0 min CN=0/98 Runoff=1.11 cfs 0.368 af

Subcatchment 10p: ON SITE PERVIOUS Runoff Area=81,066 sf 0.00% Impervious Runoff Depth>1.52"
Tc=5.0 min CN=74/0 Runoff=0.60 cfs 0.236 af

Subcatchment B: BUFFER AREA Runoff Area=19,707 sf 0.00% Impervious Runoff Depth>2.09"
Flow Length=250' Slope=0.1080 '/' Tc=26.3 min CN=82/0 Runoff=0.17 cfs 0.079 af

Subcatchment X: PARKER ROAD Runoff Area=8,758 sf 100.00% Impervious Runoff Depth>3.66"
Tc=5.0 min CN=0/98 Runoff=0.18 cfs 0.061 af

Subcatchment Y: PARKER ROAD - Runoff Area=2,778 sf 100.00% Impervious Runoff Depth>3.66"
Tc=5.0 min CN=0/98 Runoff=0.06 cfs 0.019 af

Subcatchment Zi: OFFSITE IMPERVIOUS Runoff Area=3,200 sf 100.00% Impervious Runoff Depth>3.66"
Tc=5.0 min CN=0/98 Runoff=0.07 cfs 0.022 af

Subcatchment Zp: OFFSITE PERVIOUS Runoff Area=52,222 sf 0.00% Impervious Runoff Depth>1.86"
Flow Length=958' Tc=20.8 min CN=79/0 Runoff=0.41 cfs 0.186 af

Pond 1P: Stormwater Facility Peak Elev=524.04' Storage=5,602 cf Inflow=2.33 cfs 0.873 af
Outflow=1.12 cfs 0.811 af

Link TOTAL: POST-DEVELOPED RELEASE RATE Inflow=1.29 cfs 0.909 af
Primary=1.29 cfs 0.909 af

Total Runoff Area = 5.058 ac Runoff Volume = 0.972 af Average Runoff Depth = 2.31"
69.44% Pervious = 3.512 ac 30.56% Impervious = 1.545 ac

Summary for Subcatchment 10i: ON SITE IMPERVIOUS

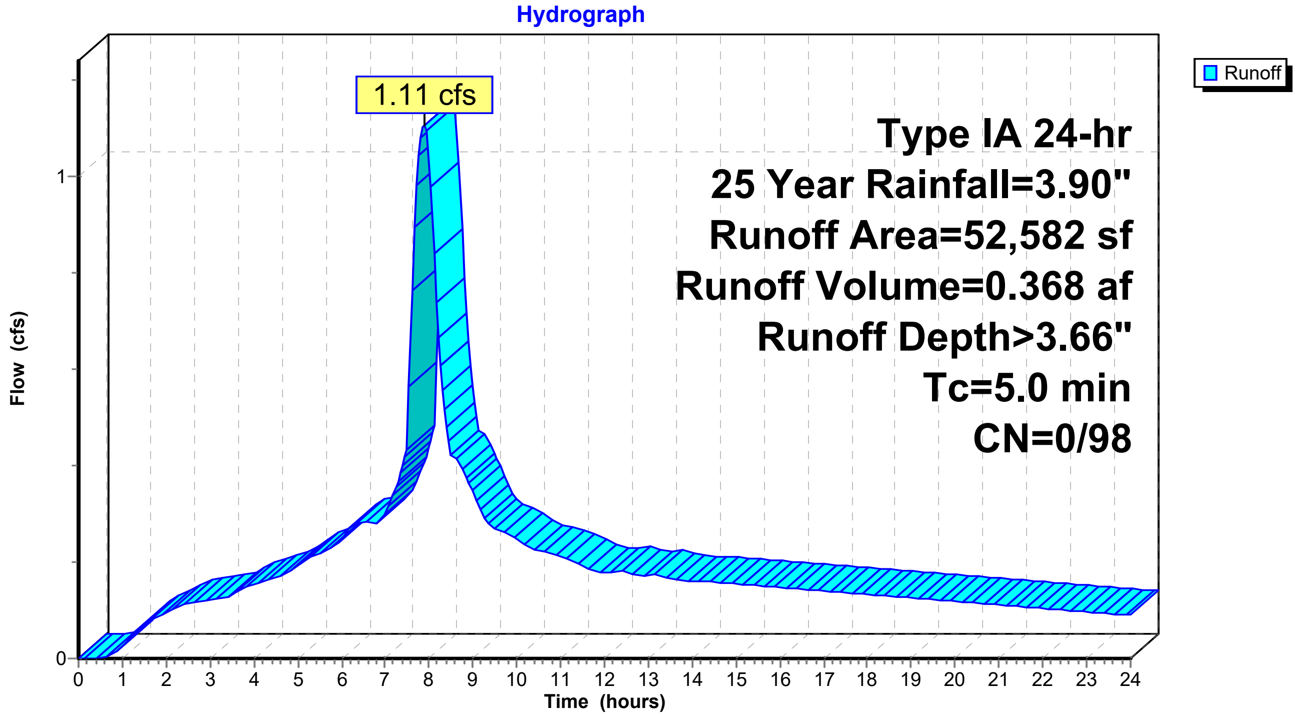
Runoff = 1.11 cfs @ 7.90 hrs, Volume= 0.368 af, Depth> 3.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

	Area (sf)	CN	Description
*	22,582	98	Impervious ROW
*	30,000	98	12 Lots @ 2500 sf each
	52,582	98	Weighted Average
	52,582		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 10i: ON SITE IMPERVIOUS



Summary for Subcatchment 10p: ON SITE PERVIOUS

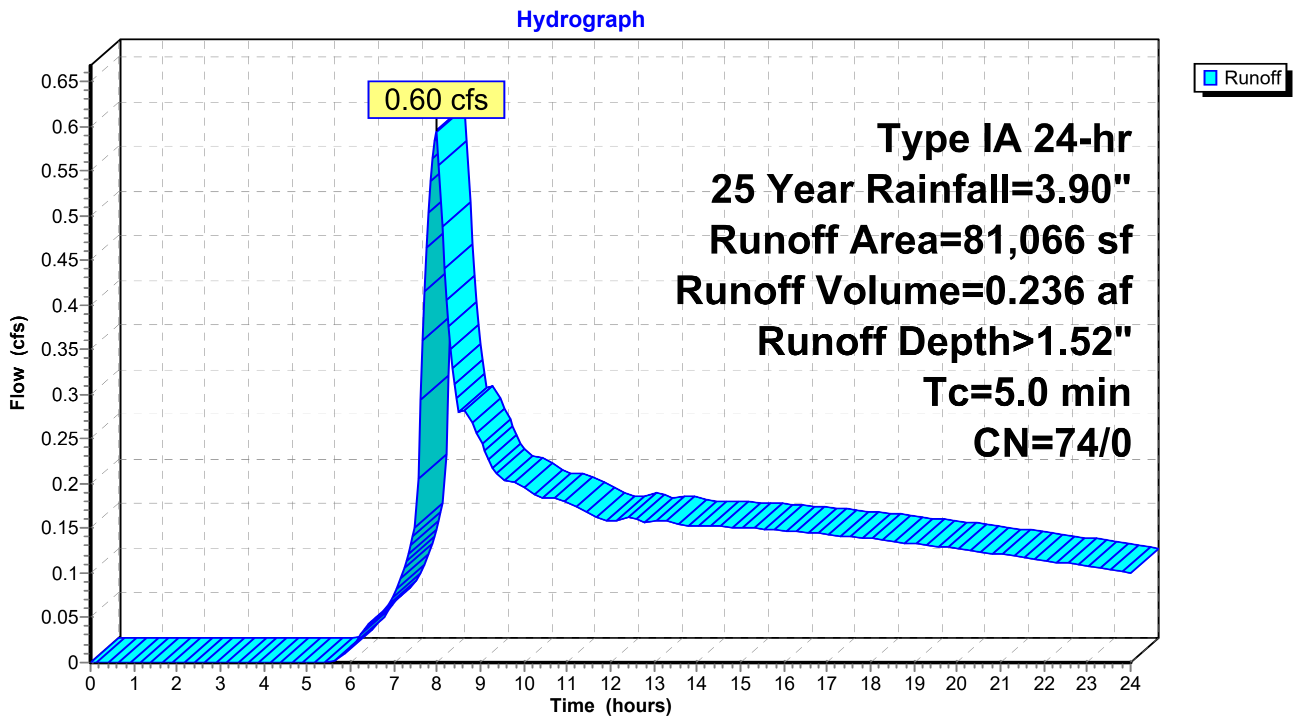
Runoff = 0.60 cfs @ 7.99 hrs, Volume= 0.236 af, Depth> 1.52"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
75,740	74	>75% Grass cover, Good, HSG C
5,326	80	>75% Grass cover, Good, HSG D
81,066	74	Weighted Average
81,066		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 10p: ON SITE PERVIOUS



Summary for Subcatchment B: BUFFER AREA

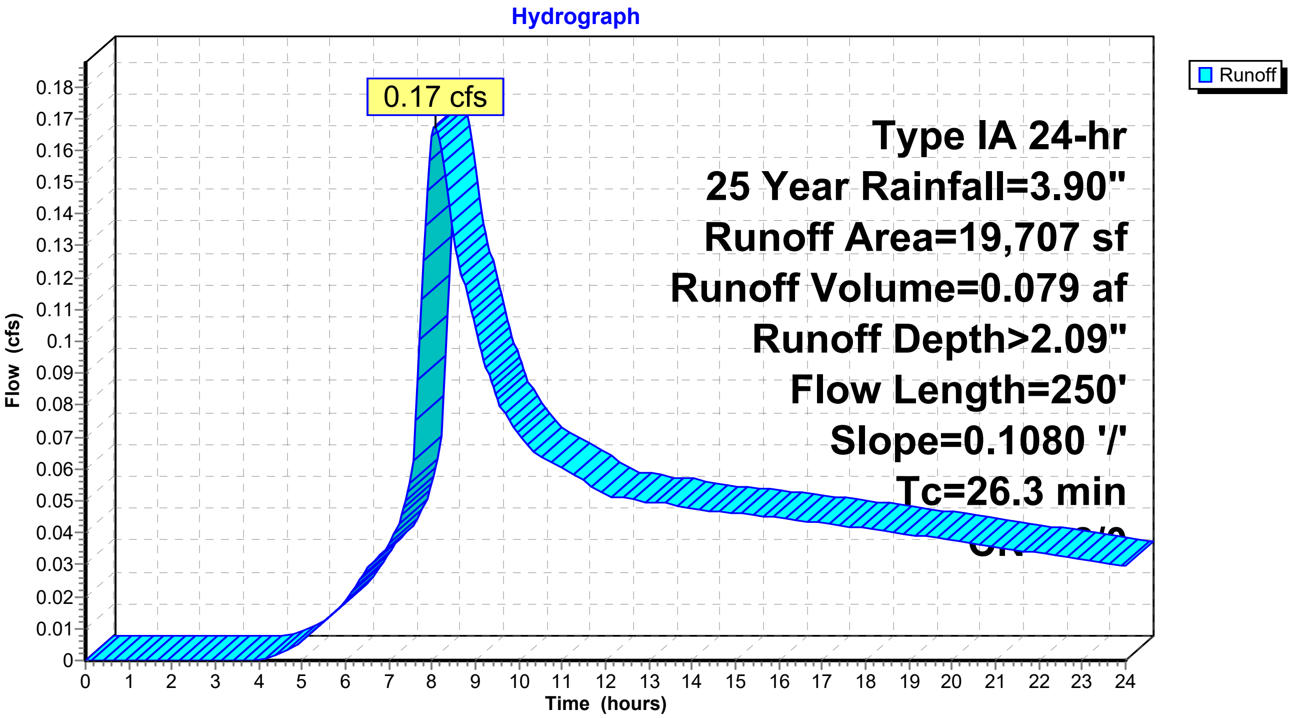
Runoff = 0.17 cfs @ 8.06 hrs, Volume= 0.079 af, Depth> 2.09"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
19,707	82	Woods/grass comb., Fair, HSG D
19,707		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.3	250	0.1080	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.40"

Subcatchment B: BUFFER AREA



Summary for Subcatchment X: PARKER ROAD

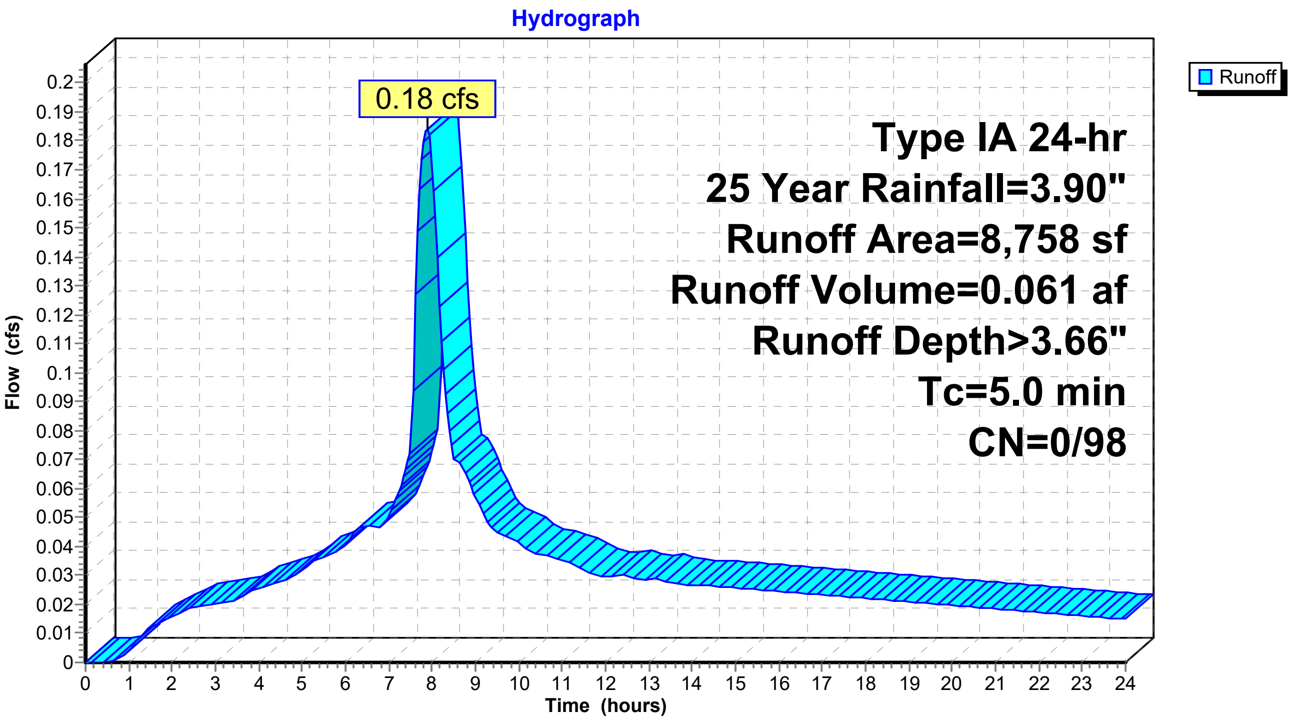
Runoff = 0.18 cfs @ 7.90 hrs, Volume= 0.061 af, Depth> 3.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

	Area (sf)	CN	Description
*	8,758	98	Impervious Area
	8,758		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment X: PARKER ROAD



Summary for Subcatchment Y: PARKER ROAD - BYPASS

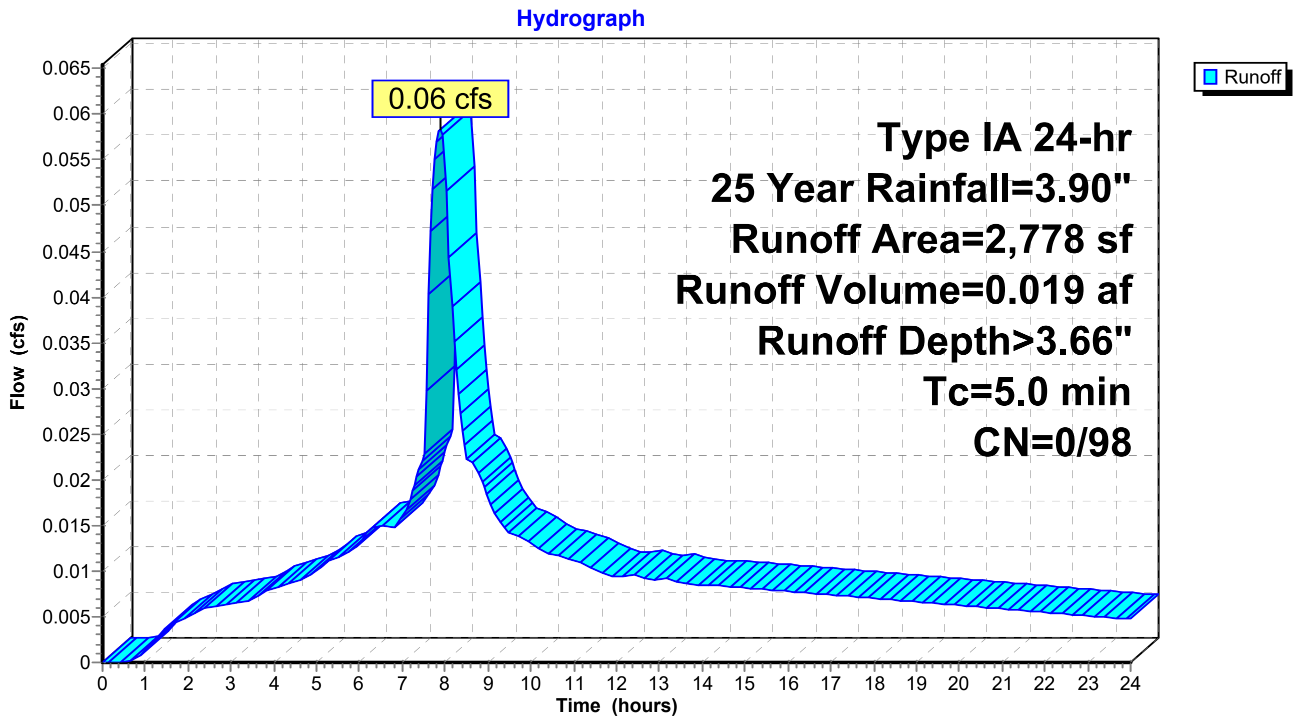
Runoff = 0.06 cfs @ 7.90 hrs, Volume= 0.019 af, Depth> 3.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

	Area (sf)	CN	Description
*	2,778	98	Impervious Area
	2,778		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Y: PARKER ROAD - BYPASS



Summary for Subcatchment Zi: OFFSITE IMPERVIOUS

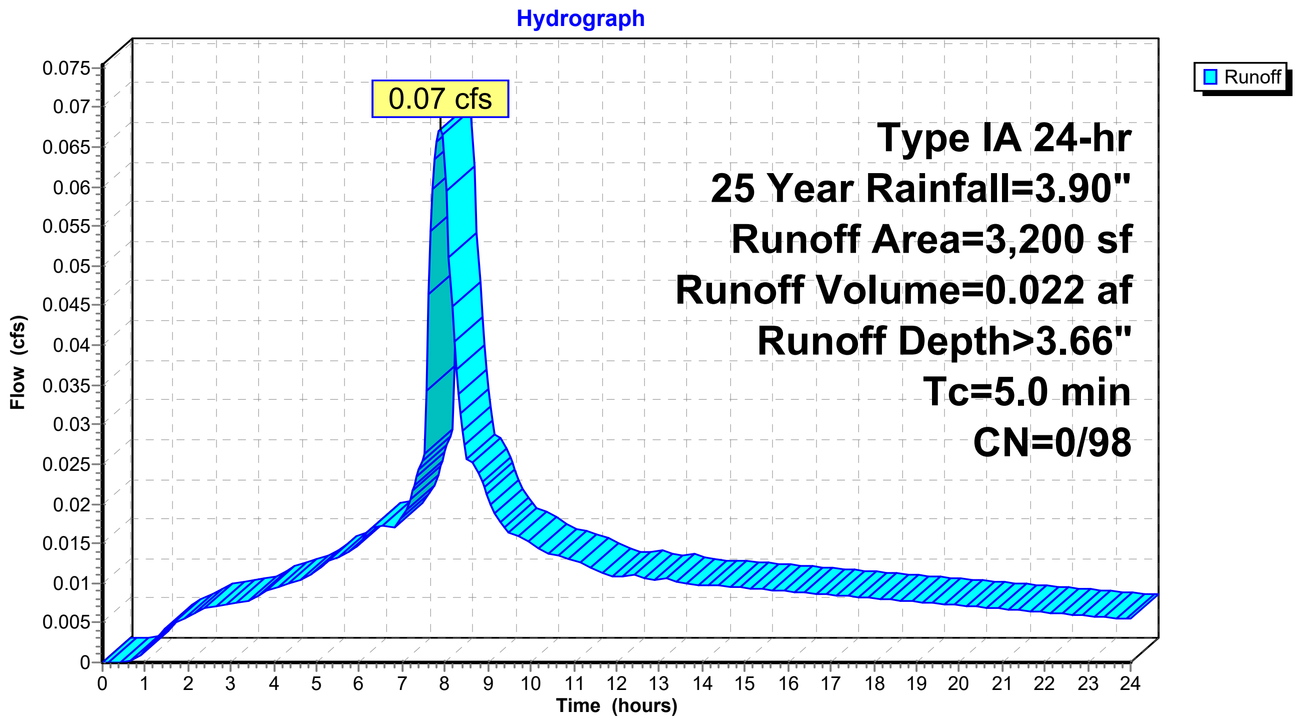
Runoff = 0.07 cfs @ 7.90 hrs, Volume= 0.022 af, Depth> 3.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

	Area (sf)	CN	Description
*	3,200	98	Impervious Area
	3,200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Zi: OFFSITE IMPERVIOUS



Summary for Subcatchment Zp: OFFSITE PERVIOUS

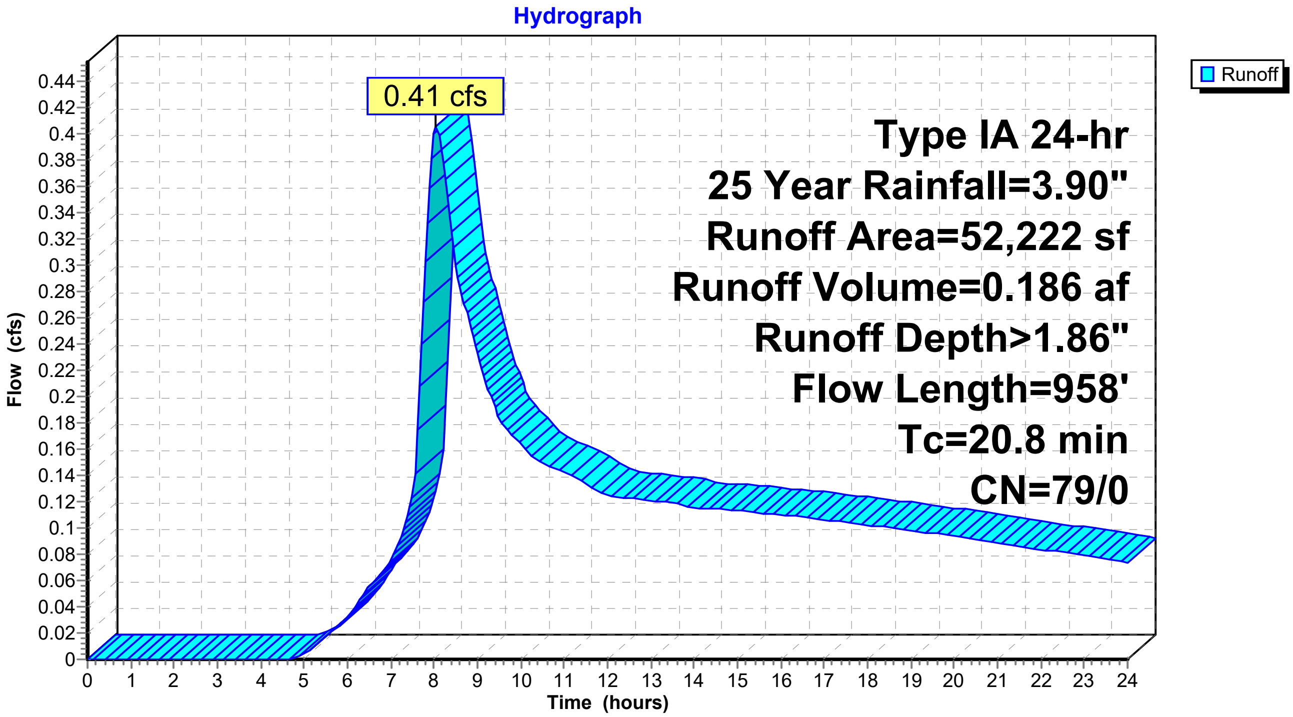
Runoff = 0.41 cfs @ 8.05 hrs, Volume= 0.186 af, Depth> 1.86"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
52,222	79	50-75% Grass cover, Fair, HSG C
52,222		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	300	0.0750	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.40"
4.7	658	0.1100	2.32		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
20.8	958	Total			

Subcatchment Zp: OFFSITE PERVIOUS



Summary for Pond 1P: Stormwater Facility

Inflow Area = 4.542 ac, 32.62% Impervious, Inflow Depth > 2.31" for 25 Year event
Inflow = 2.33 cfs @ 7.98 hrs, Volume= 0.873 af
Outflow = 1.12 cfs @ 8.49 hrs, Volume= 0.811 af, Atten= 52%, Lag= 30.6 min
Primary = 1.12 cfs @ 8.49 hrs, Volume= 0.811 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 524.04' @ 8.49 hrs Surf.Area= 4,583 sf Storage= 5,602 cf

Plug-Flow detention time= 105.6 min calculated for 0.811 af (93% of inflow)
Center-of-Mass det. time= 57.6 min (798.5 - 740.9)

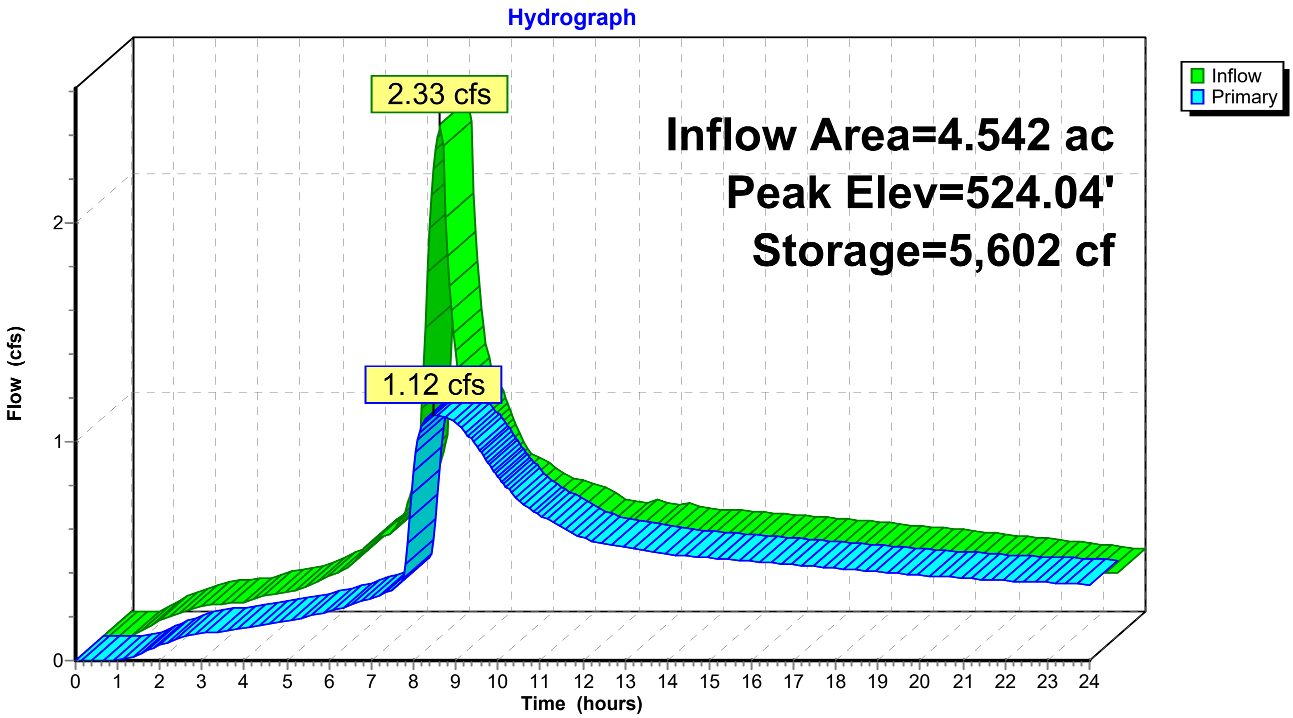
Volume	Invert	Avail.Storage	Storage Description
#1	522.00'	15,510 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
522.00	897	0	0
523.00	2,700	1,799	1,799
524.00	4,504	3,602	5,401
525.00	6,286	5,395	10,796
525.75	6,286	4,715	15,510

Device	Routing	Invert	Outlet Devices
#1	Device 2	522.00'	**2.0' long (Profile 17) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 1.97 2.46 2.95 Coef. (English) 2.84 3.13 3.26 3.30 3.31 3.31
#2	Device 5	522.00'	**3.5" Vert. WQ Orifice** C= 0.600
#3	Device 5	523.40'	**6.5" Vert. Orifice** C= 0.600
#4	Device 5	524.50'	**2.0' long (Profile 17) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 1.97 2.46 2.95 Coef. (English) 2.84 3.13 3.26 3.30 3.31 3.31
#5	Primary	520.00'	**12.0" Round Culvert** L= 15.0' Ke= 0.500 Inlet / Outlet Invert= 520.00' / 518.50' S= 0.1000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.12 cfs @ 8.49 hrs HW=524.04' TW=0.00' (Dynamic Tailwater)
└─**5=Culvert** (Passes 1.12 cfs of 7.12 cfs potential flow)
  ├─**2=WQ Orifice** (Orifice Controls 0.44 cfs @ 6.63 fps)
  │ └─**1=Broad-Crested Rectangular Weir** (Passes 0.44 cfs of 19.30 cfs potential flow)
  ├─**3=Orifice** (Orifice Controls 0.68 cfs @ 2.94 fps)
  └─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Stormwater Facility

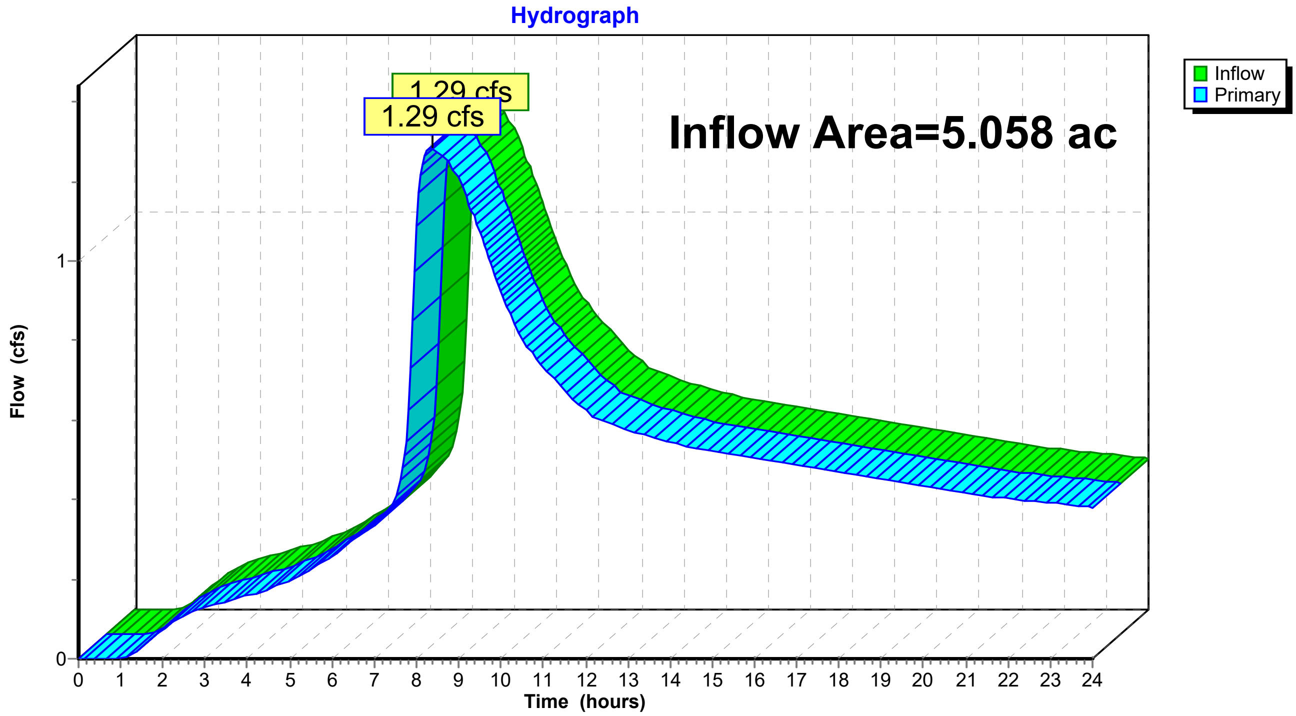


Summary for Link TOTAL: POST-DEVELOPED RELEASE RATE

Inflow Area = 5.058 ac, 30.56% Impervious, Inflow Depth > 2.16" for 25 Year event
Inflow = 1.29 cfs @ 8.37 hrs, Volume= 0.909 af
Primary = 1.29 cfs @ 8.37 hrs, Volume= 0.909 af, Atten= 0%, Lag= 0.0 min

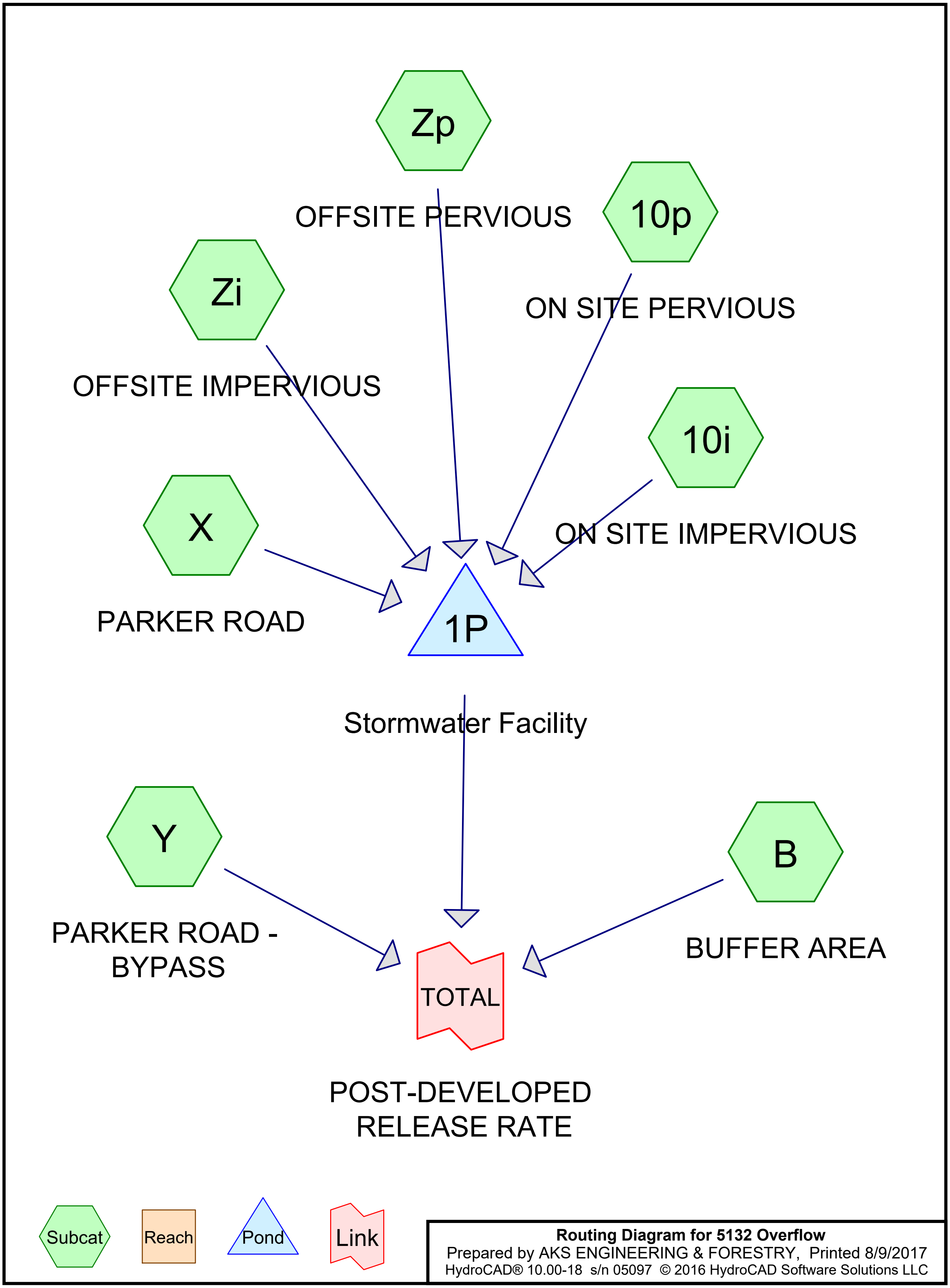
Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link TOTAL: POST-DEVELOPED RELEASE RATE



APPENDIX H

EMERGENCY OVERFLOW CALCULATIONS
100 YEAR STORM FOR POST-DEVELOPED SITE



Routing Diagram for 5132 Overflow
Prepared by AKS ENGINEERING & FORESTRY, Printed 8/9/2017
HydroCAD® 10.00-18 s/n 05097 © 2016 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.689	98	12 Lots @ 2500 sf each (10i)
1.199	79	50-75% Grass cover, Fair, HSG C (Zp)
1.739	74	>75% Grass cover, Good, HSG C (10p)
0.122	80	>75% Grass cover, Good, HSG D (10p)
0.338	98	Impervious Area (X, Y, Zi)
0.518	98	Impervious ROW (10i)
0.452	82	Woods/grass comb., Fair, HSG D (B)
5.058	**83**	**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 10i: ON SITE IMPERVIOUS Runoff Area=52,582 sf 100.00% Impervious Runoff Depth>4.16"
Tc=5.0 min CN=0/98 Runoff=1.25 cfs 0.418 af

Subcatchment 10p: ON SITE PERVIOUS Runoff Area=81,066 sf 0.00% Impervious Runoff Depth>1.89"
Tc=5.0 min CN=74/0 Runoff=0.78 cfs 0.293 af

Subcatchment B: BUFFER AREA Runoff Area=19,707 sf 0.00% Impervious Runoff Depth>2.52"
Flow Length=250' Slope=0.1080 '/' Tc=26.3 min CN=82/0 Runoff=0.21 cfs 0.095 af

Subcatchment X: PARKER ROAD Runoff Area=8,758 sf 100.00% Impervious Runoff Depth>4.16"
Tc=5.0 min CN=0/98 Runoff=0.21 cfs 0.070 af

Subcatchment Y: PARKER ROAD - Runoff Area=2,778 sf 100.00% Impervious Runoff Depth>4.16"
Tc=5.0 min CN=0/98 Runoff=0.07 cfs 0.022 af

Subcatchment Zi: OFFSITE IMPERVIOUS Runoff Area=3,200 sf 100.00% Impervious Runoff Depth>4.16"
Tc=5.0 min CN=0/98 Runoff=0.08 cfs 0.025 af

Subcatchment Zp: OFFSITE PERVIOUS Runoff Area=52,222 sf 0.00% Impervious Runoff Depth>2.27"
Flow Length=958' Tc=20.8 min CN=79/0 Runoff=0.51 cfs 0.227 af

Pond 1P: Stormwater Facility Peak Elev=524.71' Storage=9,031 cf Inflow=2.80 cfs 1.033 af
Outflow=2.68 cfs 0.846 af

Link TOTAL: POST-DEVELOPED RELEASE RATE Inflow=2.95 cfs 0.963 af
Primary=2.95 cfs 0.963 af

Total Runoff Area = 5.058 ac Runoff Volume = 1.150 af Average Runoff Depth = 2.73"
69.44% Pervious = 3.512 ac 30.56% Impervious = 1.545 ac

Summary for Subcatchment 10i: ON SITE IMPERVIOUS

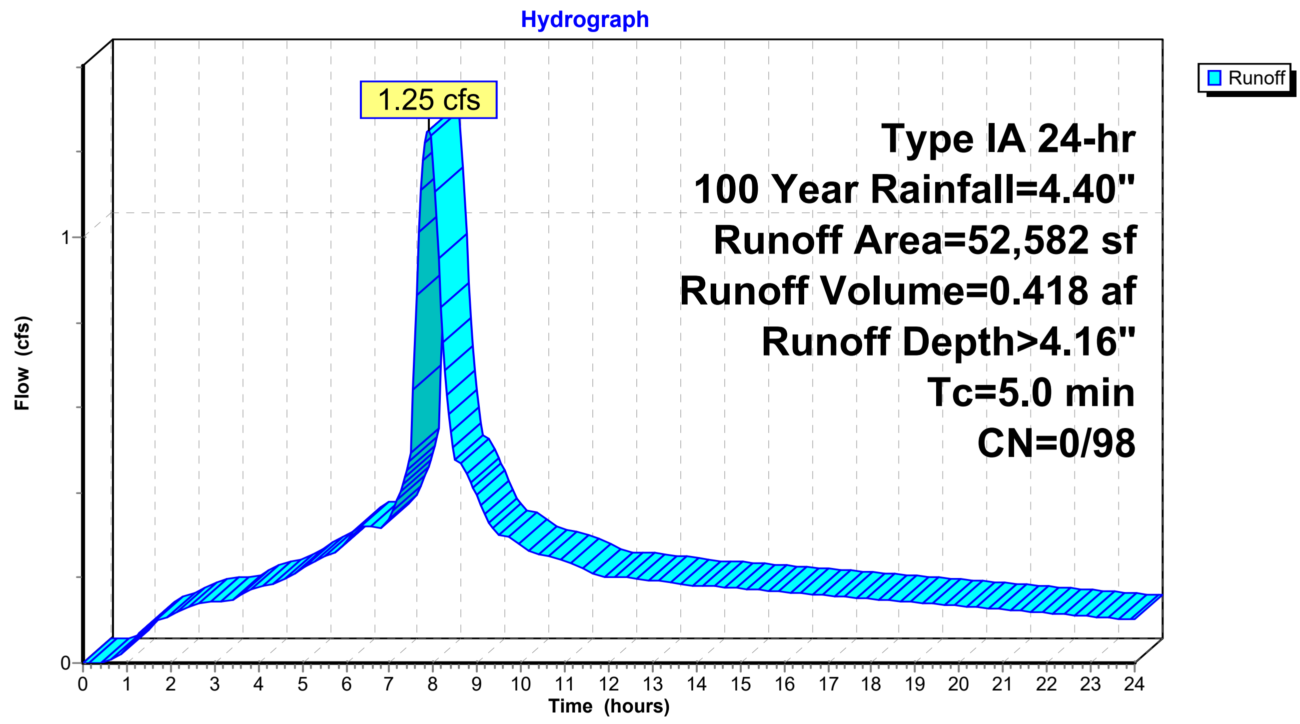
Runoff = 1.25 cfs @ 7.90 hrs, Volume= 0.418 af, Depth> 4.16"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 Year Rainfall=4.40"

	Area (sf)	CN	Description
*	22,582	98	Impervious ROW
*	30,000	98	12 Lots @ 2500 sf each
	52,582	98	Weighted Average
	52,582		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 10i: ON SITE IMPERVIOUS



Summary for Subcatchment 10p: ON SITE PERVIOUS

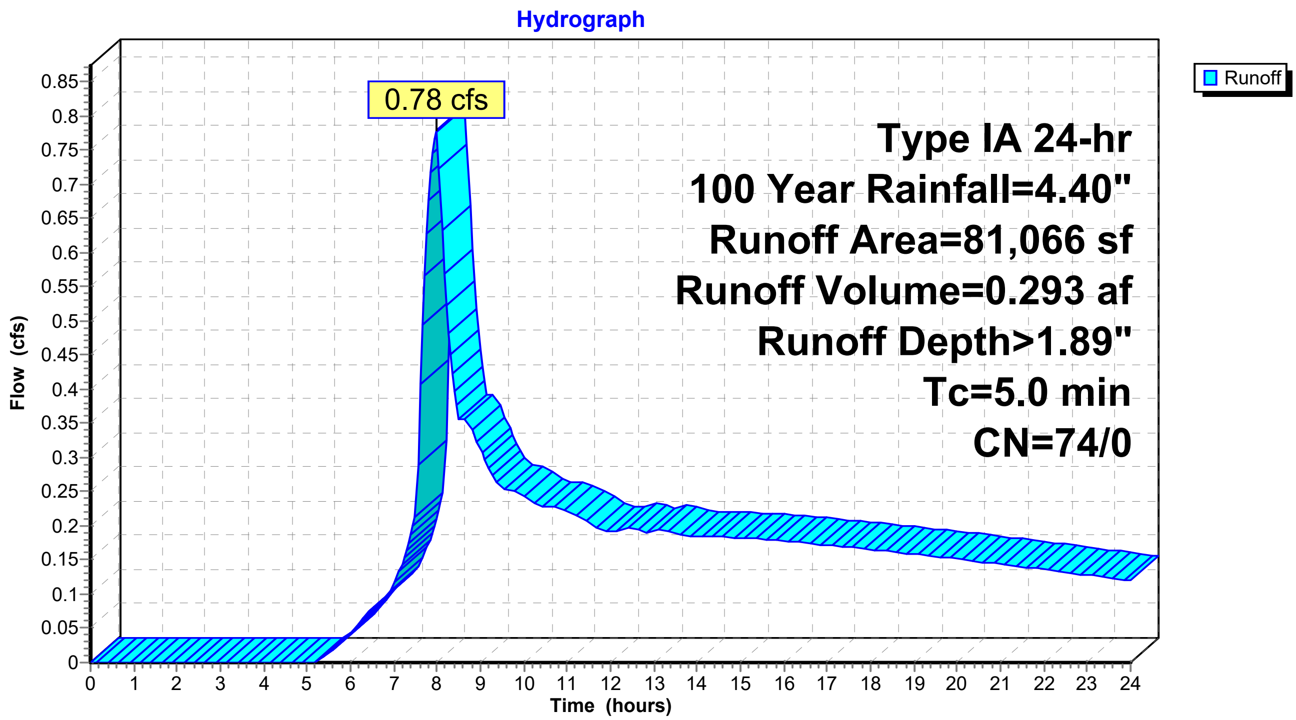
Runoff = 0.78 cfs @ 7.98 hrs, Volume= 0.293 af, Depth> 1.89"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 Year Rainfall=4.40"

Area (sf)	CN	Description
75,740	74	>75% Grass cover, Good, HSG C
5,326	80	>75% Grass cover, Good, HSG D
81,066	74	Weighted Average
81,066		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 10p: ON SITE PERVIOUS



Summary for Subcatchment B: BUFFER AREA

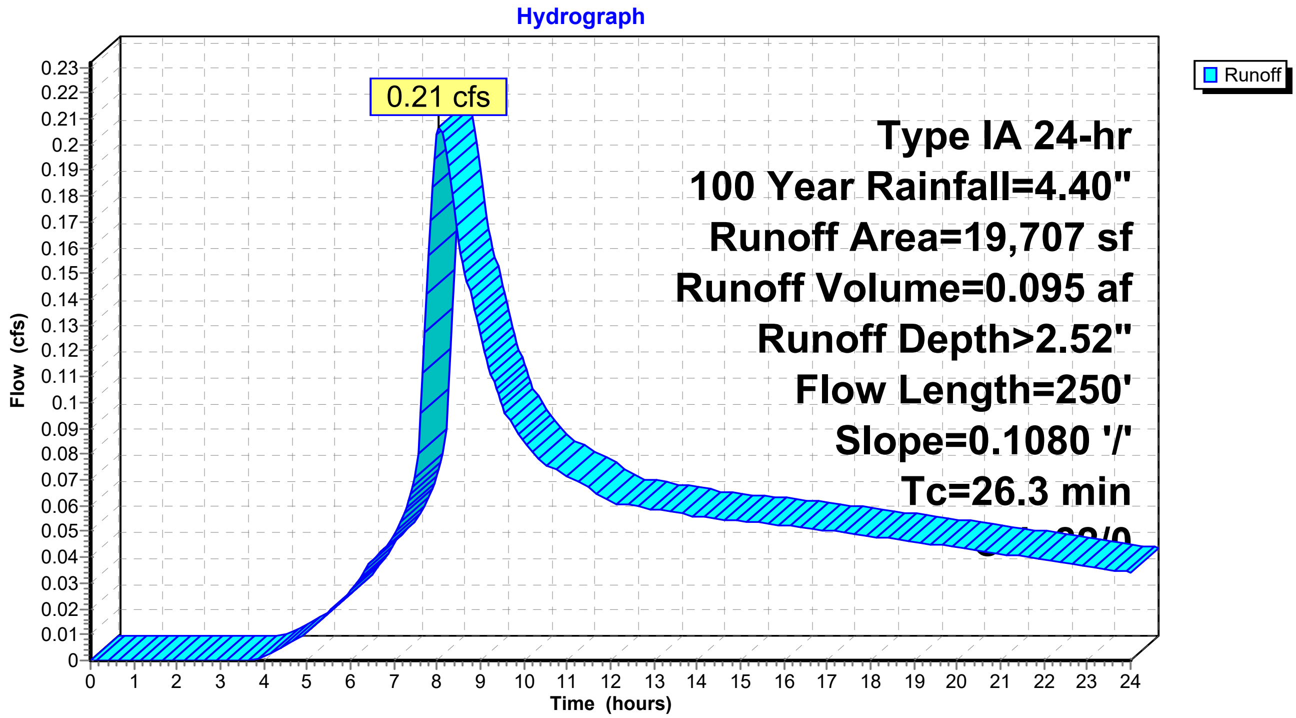
Runoff = 0.21 cfs @ 8.05 hrs, Volume= 0.095 af, Depth> 2.52"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 Year Rainfall=4.40"

Area (sf)	CN	Description
19,707	82	Woods/grass comb., Fair, HSG D
19,707		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.3	250	0.1080	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.40"

Subcatchment B: BUFFER AREA



Summary for Subcatchment X: PARKER ROAD

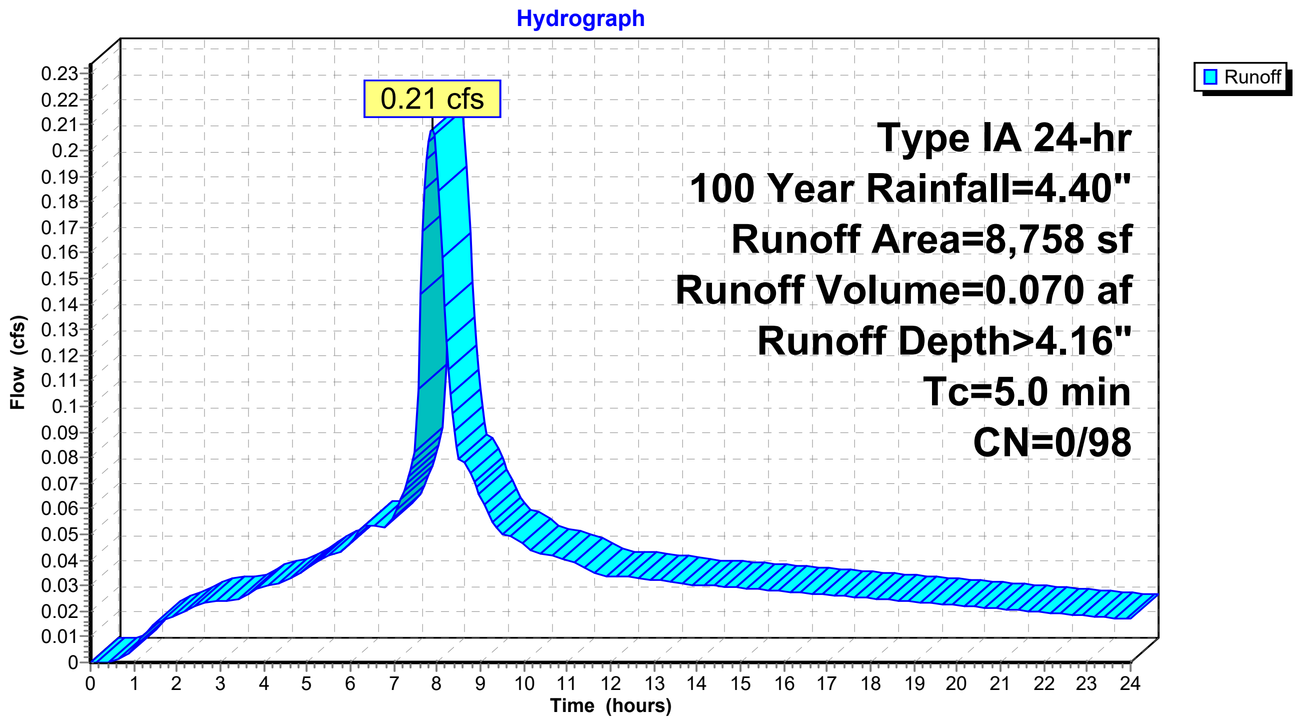
Runoff = 0.21 cfs @ 7.90 hrs, Volume= 0.070 af, Depth> 4.16"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 Year Rainfall=4.40"

	Area (sf)	CN	Description
*	8,758	98	Impervious Area
	8,758		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment X: PARKER ROAD



Summary for Subcatchment Y: PARKER ROAD - BYPASS

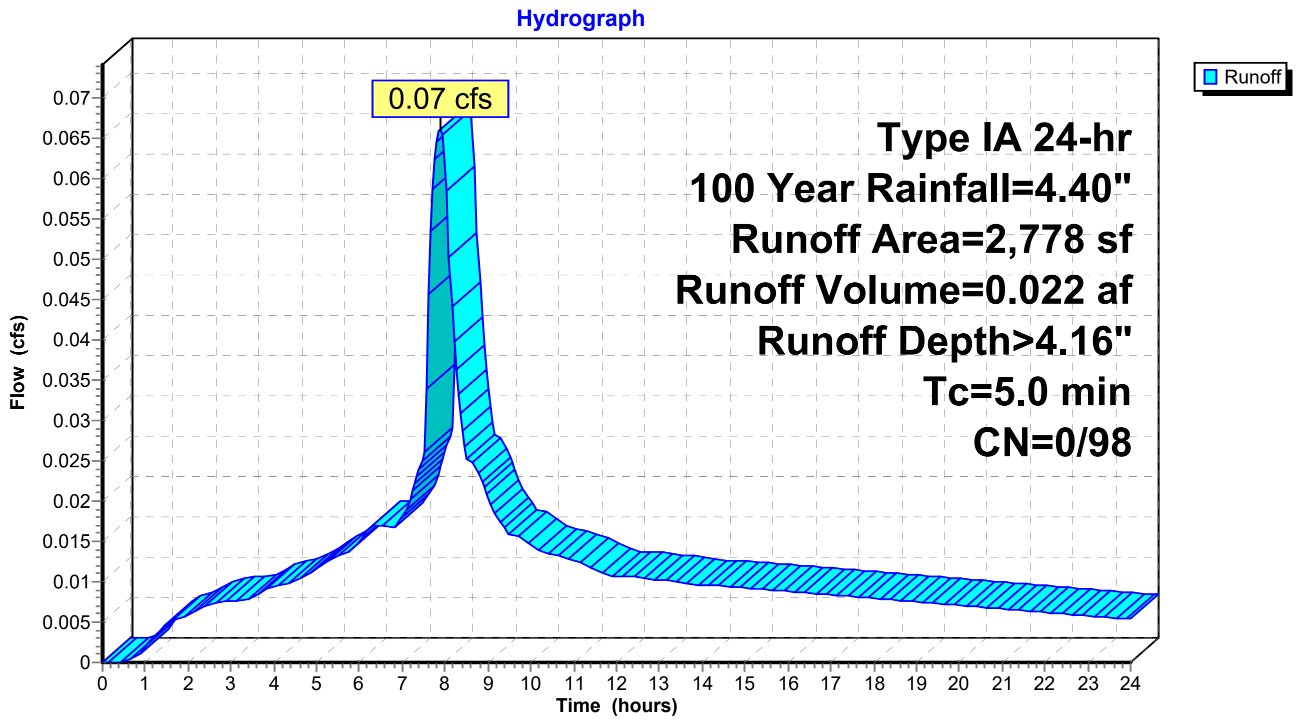
Runoff = 0.07 cfs @ 7.90 hrs, Volume= 0.022 af, Depth> 4.16"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 Year Rainfall=4.40"

	Area (sf)	CN	Description
*	2,778	98	Impervious Area
	2,778		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Y: PARKER ROAD - BYPASS



Summary for Subcatchment Zi: OFFSITE IMPERVIOUS

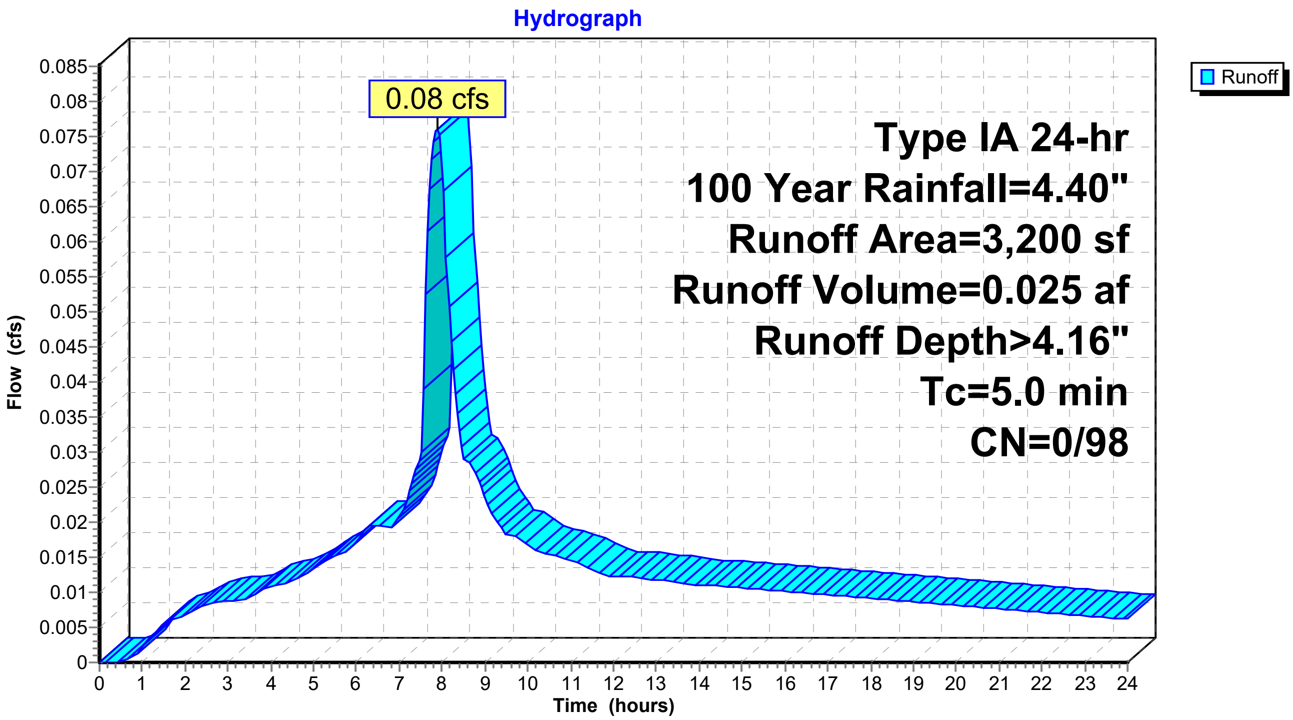
Runoff = 0.08 cfs @ 7.90 hrs, Volume= 0.025 af, Depth> 4.16"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 Year Rainfall=4.40"

	Area (sf)	CN	Description
*	3,200	98	Impervious Area
	3,200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Zi: OFFSITE IMPERVIOUS



Summary for Subcatchment Zp: OFFSITE PERVIOUS

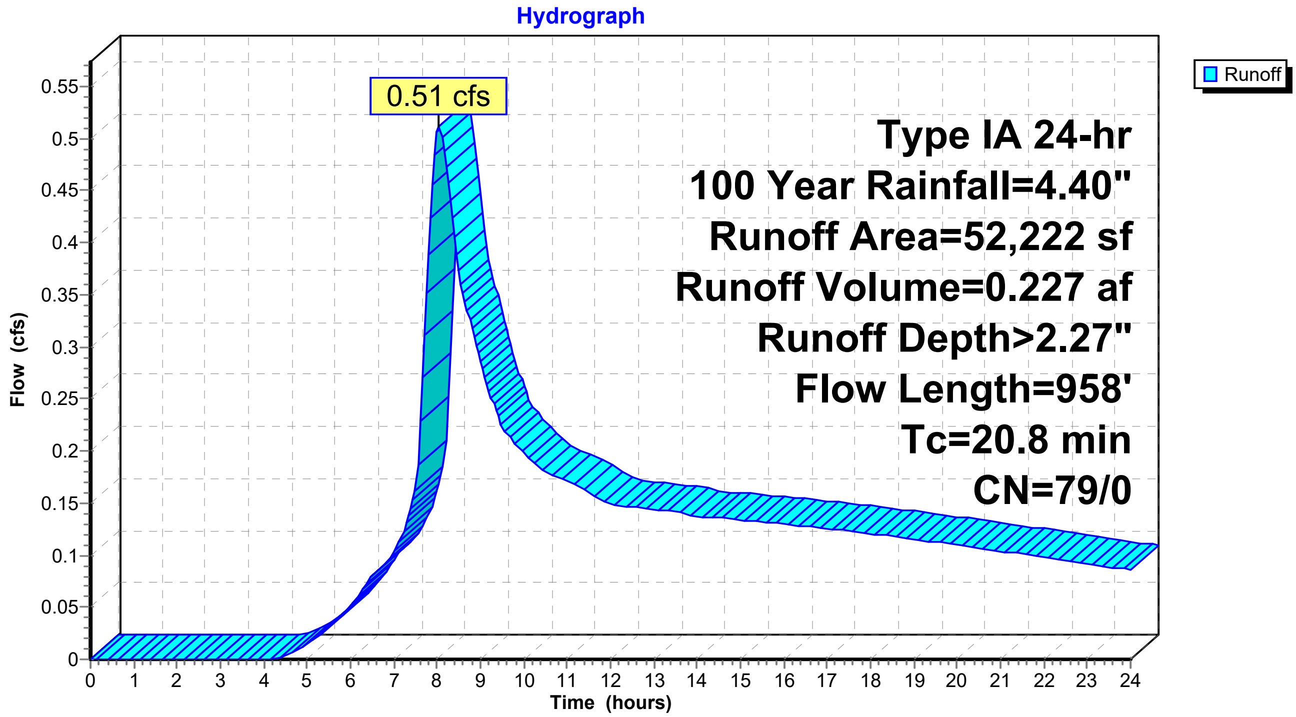
Runoff = 0.51 cfs @ 8.04 hrs, Volume= 0.227 af, Depth> 2.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 Year Rainfall=4.40"

Area (sf)	CN	Description
52,222	79	50-75% Grass cover, Fair, HSG C
52,222		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	300	0.0750	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.40"
4.7	658	0.1100	2.32		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
20.8	958	Total			

Subcatchment Zp: OFFSITE PERVIOUS



Summary for Pond 1P: Stormwater Facility

Inflow Area = 4.542 ac, 32.62% Impervious, Inflow Depth > 2.73" for 100 Year event
Inflow = 2.80 cfs @ 7.98 hrs, Volume= 1.033 af
Outflow = 2.68 cfs @ 8.03 hrs, Volume= 0.846 af, Atten= 4%, Lag= 3.3 min
Primary = 2.68 cfs @ 8.03 hrs, Volume= 0.846 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 524.71' @ 8.03 hrs Surf.Area= 5,764 sf Storage= 9,031 cf

Plug-Flow detention time= 207.6 min calculated for 0.846 af (82% of inflow)
Center-of-Mass det. time= 92.0 min (828.4 - 736.4)

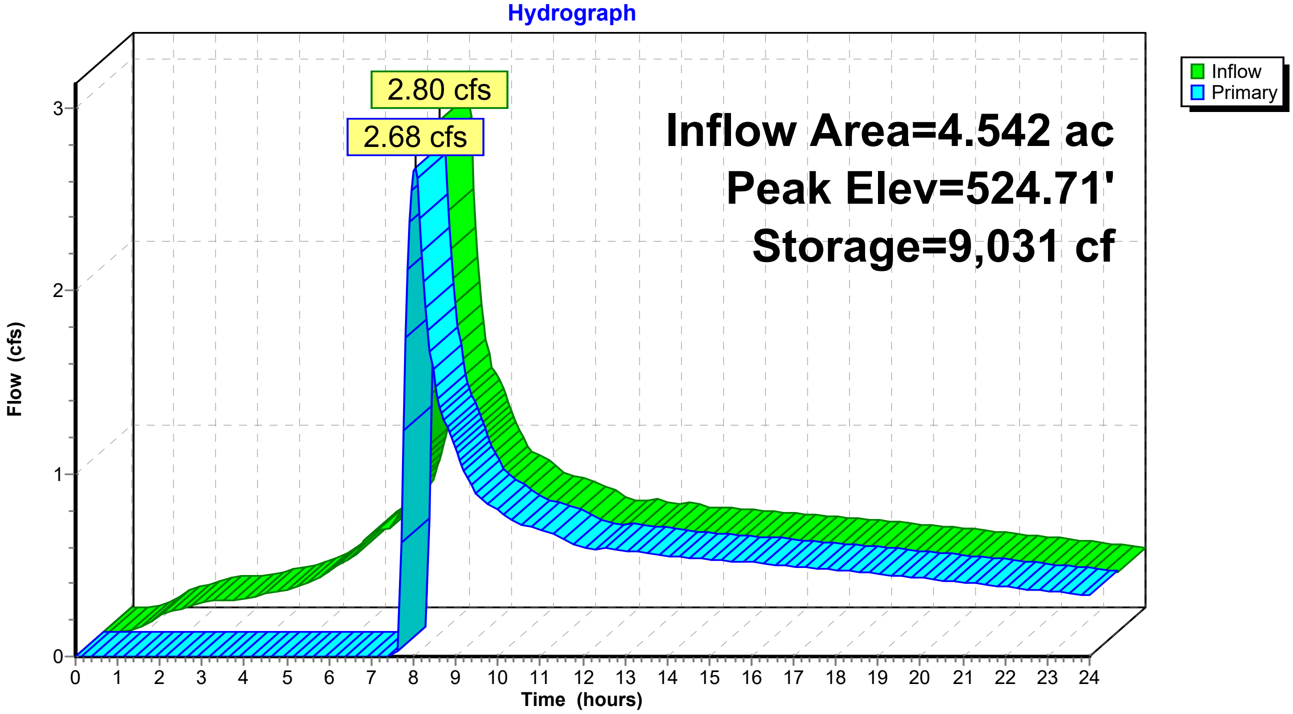
Volume	Invert	Avail.Storage	Storage Description
#1	522.00'	15,510 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
522.00	897	0	0
523.00	2,700	1,799	1,799
524.00	4,504	3,602	5,401
525.00	6,286	5,395	10,796
525.75	6,286	4,715	15,510

Device	Routing	Invert	Outlet Devices
#1	Device 2	524.50'	**10.0' long (Profile 17) Overflow Weir** Head (feet) 0.49 0.98 1.48 1.97 2.46 2.95 Coef. (English) 2.84 3.13 3.26 3.30 3.31 3.31
#2	Primary	520.00'	**12.0" Round Culvert** L= 15.0' Ke= 0.500 Inlet / Outlet Invert= 520.00' / 518.50' S= 0.1000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.66 cfs @ 8.03 hrs HW=524.71' TW=0.00' (Dynamic Tailwater)
↑—**2=Culvert** (Passes 2.66 cfs of 7.76 cfs potential flow)
  ↑—**1=Overflow Weir** (Weir Controls 2.66 cfs @ 1.29 fps)

Pond 1P: Stormwater Facility

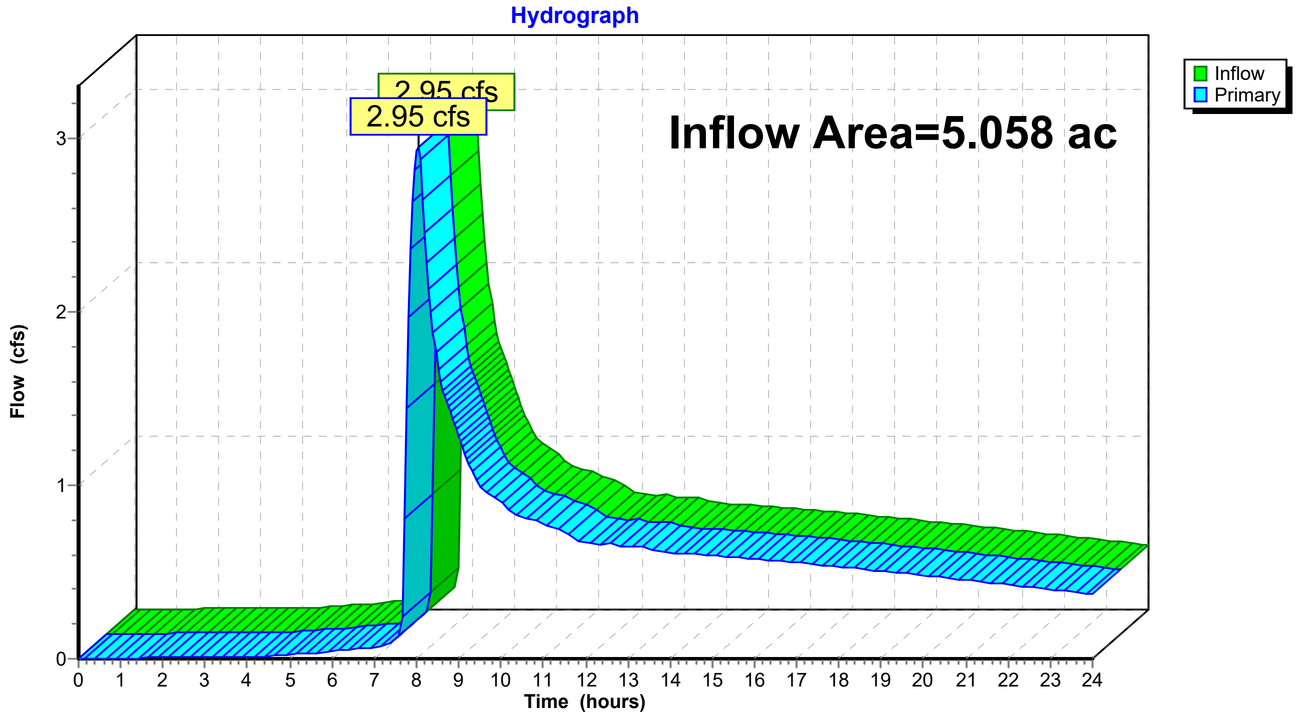


Summary for Link TOTAL: POST-DEVELOPED RELEASE RATE

Inflow Area =	5.058 ac,	30.56% Impervious,	Inflow Depth > 2.28"	for 100 Year event
Inflow =	2.95 cfs @	8.03 hrs, Volume=	0.963 af	
Primary =	2.95 cfs @	8.03 hrs, Volume=	0.963 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

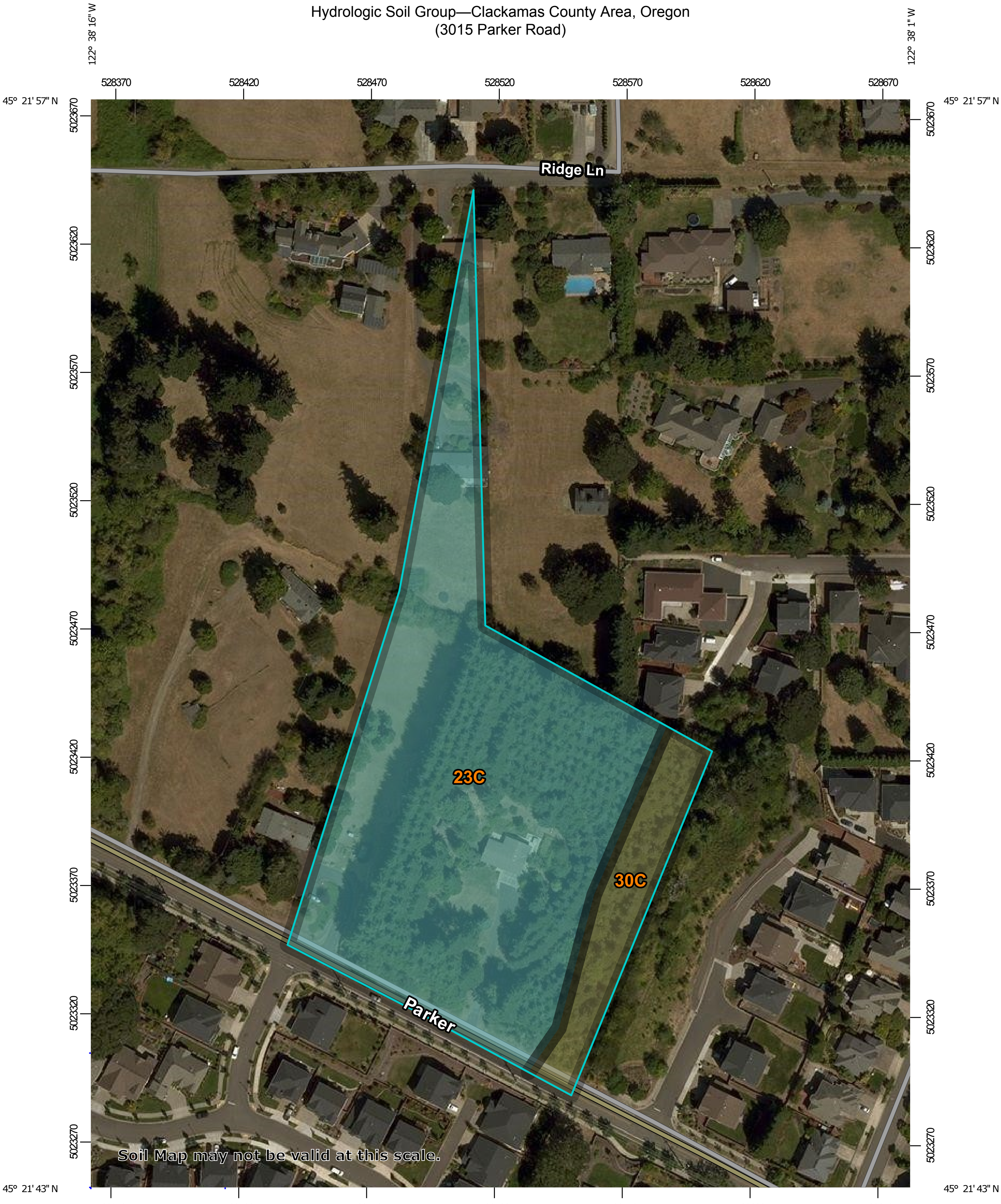
Link TOTAL: POST-DEVELOPED RELEASE RATE



<u>APPENDIX I</u>

USDA NRCS SOIL RESOURCE REPORT

Hydrologic Soil Group—Clackamas County Area, Oregon
(3015 Parker Road)



Map Scale: 1:2,070 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 30, 60, 120, 180

Feet: 0, 100, 200, 400, 600

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clackamas County Area, Oregon
Survey Area Data: Version 11, Sep 16, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 26, 2014—Sep 5, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Clackamas County Area, Oregon (OR610)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
23C	Cornelius silt loam, 8 to 15 percent slopes	C	4.7	87.3%
30C	Delena silt loam, 3 to 12 percent slopes	C/D	0.7	12.7%
Totals for Area of Interest			**5.4**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX J
RUNOFF CURVE NUMBERS

Table A-2. Curve Numbers for Urban Areas

Cover type and hydrological condition	Average percent impervious area	Curve Numbers by Hydrologic Soil Group			
		A	B	C	D
Open Space (lawns, parks, golf courses, cemeteries, etc.):					
Poor condition (grass cover <50%)		68	79	86	89
Fair condition (grass cover 50-75%)		49	69	79	84
Good condition (grass cover >75%)		39	61	74	80
Impervious Area:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	93
Urban Districts:					
Commercial and business	85	85	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	82
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82

Soil Conservation Service, Urban Hydrology for Small Watersheds, Technical Release 55, pp. 2.5-2.8, June 1986.

Table A-3. Runoff Curve Numbers for Other Agricultural Lands

Cover type and hydrological condition	Hydrologic Condition	Curve Numbers by Hydrologic Soil Group			
		A	B	C	D
Pasture, grassland, or range-continuous forage for grazing:					
<50% ground cover or heavily grazed with no mulch	Poor	68	79	86	89
50 to 75% ground cover and not heavily grazed	Fair	49	69	79	84
>75% ground cover and lightly or only occasionally grazed	Good	39	61	74	80
Meadow-continuous grass, protected from grazing and generally mowed for hay		30	58	71	78
Brush-weed-grass mixture with brush as the major element:					
<50% ground cover	Poor	48	67	77	83
50-75% ground cover	Fair	35	56	70	77
>75% ground cover	Good	30	48	65	73
Woods-grass combination (orchard or tree farm)	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods					
Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning	Poor	45	66	77	83
Woods are grazed by not burned, and some forest litter covers the soil	Fair	36	60	73	79
Woods are protected from grazing and litter and brush adequately cover the soil	Good	30	55	70	77

Soil Conservation Service, Urban Hydrology for Small Watersheds, Technical Release 55, pp. 2.5-2.8, June 1986.

Exhibit H: Geotechnical Report

Real-World Geotechnical Solutions
Investigation • Design • Construction Support

August 16, 2017
Project No. 17-4661

Carol and Noell Price
3015 Parker Road
West Linn, OR 97068

CC: Zach Pelz, AKS Engineering & Forestry; pelzz@aks-eng.com

Via email with hard copies mailed upon request

**SUBJECT: GEOTECHNICAL ENGINEERING REPORT
PARKER ROAD SUBDIVISION
3001 AND 3015 PARKER ROAD
WEST LINN, CLACKAMAS COUNTY, OREGON**

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-6149, dated June 29, 2017, and your subsequent authorization of our proposal and *General Conditions for Geotechnical Services*.

SITE DESCRIPTION AND PROPOSED DEVELOPMENT

The subject site is located on the north side of Parker Road in the City of West Linn, Clackamas County, Oregon. The site is located approximately 0.65 miles east of the intersection with Salamo Road and just west of Chinook Court. The site totals approximately 3.52 acres in size. Topography on the site is gently to moderately sloping down to the southeast at grades of 10 to 20 percent. There is an existing single family home and driveway located in the middle of the site. Vegetation consists mostly of dense, planted trees with short grasses in the vicinity of the house and driveway.

Based on our review of preliminary plans provided by AKS Engineering & Forestry, we understand that the proposed development will consist of a 12 lot subdivision for the construction of single family homes, a stormwater facility, a new public street, and associated underground utilities. We anticipate cuts and fills on the order of 15 feet or less.

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 subject site is underlain by Quaternary age (last 1.6 million years) loess, a windblown silt deposit that mantles uplands in the Tualatin Basin (Madin, 1990). The loess, included as a member of the Willamette Formation, generally consists of massive silt with localized buried paleosols indicating numerous depositional episodes which most likely followed catastrophic flooding events in the Willamette Valley, the last of which occurred about 10,000 years ago.

According to the *Generalized Geologic Map of the Willamette Lowland, (U.S. Geological Survey, Gannett and Caldwell, 1988)*, the loess is underlain by the Columbia River Basalt Formation. The Miocene aged (about 14.5 to 16.5 million years ago) Columbia River Basalts are a thick sequence of lava flows which form the crystalline basement of the Tualatin Valley. The basalts are composed of dense, finely crystalline rock that is commonly fractured along blocky and columnar vertical joints. Individual basalt flow units typically range from 25 to 125 feet thick and interflow zones are typically vesicular, scoriaceous, brecciated, and sometimes include sedimentary rocks.

REGIONAL SEISMIC SETTING

At least three major fault zones capable of generating damaging earthquakes are thought to exist in the vicinity of the subject site. These include the Portland Hills Fault Zone, the Gales Creek-Newberg-Mt. Angel Structural Zone, and the Cascadia Subduction Zone.

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 reportedly 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 located approximately 3.5 miles southwest of the site. The Oatfield Fault occurs along the western side of the Portland Hills, and is located approximately 2.8 miles southwest of the site. The East Bank Fault occurs along the eastern margin of the Willamette River, and is located approximately 7.3 miles northeast of the site. The accuracy of the fault mapping is stated to be within 500 meters (Wong, et al., 2000).

According to the USGS Earthquake Hazards Program, the fault was originally mapped as a down-to-the-northeast normal fault, but has also been mapped as part of a regional-scale zone of right-lateral, oblique slip faults, and as a steep escarpment caused by asymmetrical folding above a south-west dipping, blind thrust fault. The Portland Hills fault offsets Miocene Columbia River Basalts, and Miocene to Pliocene sedimentary rocks of the Troutdale Formation. No fault scarps on surficial Quaternary deposits have been described along the fault trace, and the fault is mapped as buried by the Pleistocene aged Missoula flood deposits. 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 17 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 (the fault closest to the subject site); 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).

According to the USGS Earthquake Hazards Program, the Mount Angel fault is mapped as a high-angle, reverse-oblique fault, which offsets Miocene rocks of the Columbia River Basalts, and Miocene and Pliocene sedimentary rocks. The fault appears to have controlled emplacement of the Frenchman Spring Member of the Wanapum Basalts, and thus must have a history that predates the Miocene age of these rocks. No unequivocal evidence of deformation of Quaternary deposits has been described, but a thick sequence of sediments deposited by the Missoula floods covers much of the southern part of the fault trace.

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 roughly along the Oregon Coast at depths of 20 and 40 kilometers below the ocean surface.

FIELD EXPLORATION

Our site-specific exploration for this report was conducted on August 8, 2017. A total of 5 exploratory test pits were excavated with a backhoe to depths ranging between 8.5 and 15 feet at the approximate locations shown on Figure 2. Test pit 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 staff member continuously monitored the field exploration program and logged the test pits. Soils observed in the explorations were classified in general accordance with the Unified Soil Classification System. Rock hardness was classified in accordance with Table 1, modified from the ODOT Rock Hardness Classification Chart. During exploration, our staff member 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.

Table 1. Rock Hardness Classification Chart

ODOT Rock Hardness Rating	Field Criteria	Unconfined Compressive Strength	Typical Equipment Needed For Excavation
Extremely Soft (R0)	Indented by thumbnail	<100 psi	Small excavator
Very Soft (R1)	Scratched by thumbnail, crumbled by rock hammer	100-1,000 psi	Small excavator
Soft (R2)	Not scratched by thumbnail, indented by rock hammer	1,000-4,000 psi	Medium excavator (slow digging with small excavator)
Medium Hard (R3)	Scratched or fractured by rock hammer	4,000-8,000 psi	Medium to large excavator (slow to very slow digging), typically requires chipping with hydraulic hammer or mass excavation)
Hard (R4)	Scratched or fractured w/ difficulty	8,000-16,000 psi	Slow chipping with hydraulic hammer and/or blasting
Very Hard (R5)	Not scratched or fractured after many blows, hammer rebounds	>16,000 psi	Blasting

SUBSURFACE CONDITIONS

Results of the field exploration program indicate the site is underlain by topsoil horizon, Loess, Residual Soil, and Columbia River Basalt. The observed soil and groundwater conditions are summarized below.

Soil

Topsoil Horizon: Directly underlying the ground surface in test pits TP-1 through TP-5 was a topsoil horizon consisting of brown, low organic SILT (OL-ML). The topsoil horizon was generally very stiff, dry, contained fine to medium roots throughout, and extended to depths of 12 to 16 inches.

Loess – Underlying the topsoil horizon in test pits TP-1 through TP-4, we observed loess consisting of silty CLAY (CL) to clayey SILT (ML). The loess was generally hard due to dessication, brownish gray to reddish brown in color with trace fine roots and abundant mottling. In test pits TP-2 to TP-4, the loess extended to depths of 2.5 to 5.5 feet. In test pit TP-1, loess extended to 12.5 feet where refusal was met on hard rock (R4)

Residual Soil: Underlying the loess in test pits TP-2 through TP-4 and the topsoil horizon in TP-5, we observed residual soil resulting from in-place weathering of the underlying Columbia River Basalt Formation. The residual soil generally consisted of CLAY (CL) to silty CLAY (CL), contained weathered basalt fragments, and was generally characterized by a stiff to hard consistency. In test pits TP-2, TP-3, and TP-5, the residual soil extended to depths of 3.5 to 6.5 feet. In test pit TP-4, the residual soil extended beyond the maximum depth of exploration (15 feet).

Columbia River Basalt Formation: Underlying the Residual Soil in test pits TP-2, TP-3, and TP-5, and from 9 to 10 feet in test pit TP-4, we encountered weathered basalt belonging to the Columbia River Basalt Formation. The gray basalt was soft (R2) to medium hard (R3) in test pits TP-2 through TP-4, and extremely soft (R0) to soft (R2) in TP-5. The basalt was light reddish brown and contained a matrix of silt to clayey silt. In test pits TP-2, TP-3, and TP-5, this material was excavatable with a medium sized backhoe to depths of 8.5 to 9 feet where practical refusal was met on hard basalt (R4)

Groundwater

On August 8, 2017, neither static groundwater nor groundwater seepage was encountered in test pits to a depth of 15 feet below the ground surface. Regional geologic mapping indicates static groundwater is present between approximately 235 to 265 feet below the ground surface (Snyder, 2008). However, experience has shown that temporary perched groundwater conditions often occur 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.

CONCLUSIONS AND RECOMMENDATIONS

Based on our review, we consider the proposed development to be geotechnically feasible, provided that the recommendations of this report are incorporated into the design and construction phases of the project. In our opinion, the primary geotechnical concern associated with development at the site is the presence of relatively shallow bedrock throughout most of the site. Based on our review of the preliminary grading plan, proposed cuts of up to 15 feet are planned in the southeastern portion of the site. Practical refusal was experienced on bedrock at depths of 12.5, 9, 8.5, and 9 feet bgs in test pits TP-1, TP-2, TP-3, and TP-5, respectively, with the medium sized backhoe utilized for our subsurface explorations. Use of heavy excavation equipment and rock chippers may be needed to excavate below these depths.

Our explorations indicate the soils on site are stiff to very stiff and are suitable for development utilizing conventional spread footing foundations. The following report sections provide recommendations for site development and construction in accordance with the current applicable codes and local standards of practice.

Site Preparation

Areas of proposed buildings, streets, and areas to receive fill should be cleared of vegetation and any organic and inorganic debris. Existing fill should be completely removed. We did not encounter undocumented fill material in our explorations. However, it is likely that undocumented fill exists in the vicinity of the existing house and structures. Existing buried structures such as septic tanks, should be demolished and any cavities structurally backfilled. Inorganic debris should be removed from the site.

Organic-rich topsoil should then be stripped from construction areas of the site, or where engineered fill is to be placed. The estimated depth range necessary for removal of topsoil in wooded areas is approximately 12 to 16 inches. The estimated depth range for removal of topsoil in grass areas is approximately 4 to 6 inches. However, deeper stripping to remove large tree roots or other organics may be necessary in localized areas. It is possible that portions of the topsoil containing medium to large roots, but not much other organic content, may be remediated by ripping/tilling, root-picking, and recompacting.

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 either be completely removed from the site or placed as landscape fill in areas not planned for structures. 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.

Once topsoil stripping and removal of organic and inorganic debris is approved in a particular area, the area must be ripped or tilled to a depth of 12 inches, moisture conditioned, root-picked, and compacted in-place prior to the placement of engineered fill or crushed aggregate base for pavement. Exposed subgrade soils should be evaluated by the geotechnical engineer. For large areas, this evaluation is normally performed by proof-rolling the exposed subgrade with a fully loaded scraper or dump truck. For smaller areas where access is restricted, the subgrade should be evaluated by probing the soil with a steel probe. Soft/loose soils identified during subgrade preparation should be compacted to a firm and unyielding condition, over-excavated and replaced with engineered fill (as described below), or stabilized with rock prior to placement of engineered fill. The depth of overexcavation, if required, should be evaluated by the geotechnical engineer at the time of construction.

Engineered Fill

In general, we anticipate that soils from planned cuts and utility trench excavations will be suitable for use as engineered fill provided they are adequately moisture conditioned prior to compacting. Imported fill material should be reviewed by GeoPacific 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 percent of the maximum dry density determined by ASTM D1557 (Modified Proctor). On-site soils may be wet or dry of optimum; therefore, we anticipate that moisture conditioning of native soil will be necessary for compaction operations.

Proper test frequency and earthwork documentation usually requires daily observation and testing during stripping, rough grading, and placement of engineered fill. Field density testing should generally conform to ASTM D2922 and D3017, or D1556. Engineered fill should be periodically 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 cubic yards, 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.

Spread 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 12 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 homes. Minimum foundation reinforcement should consist of one No. 4 bar at the top of stem wall, and one No. 4 bar at the bottom of the footing.

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/ft^2 for footings bearing on competent, native soil and/or engineered fill. A maximum chimney and column load of 50 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 0.42, 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 or slab-on-grade foundations, 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.

Concrete Slabs-on-Grade

Preparation of areas beneath concrete slab-on-grade floors should be performed as recommended in the *Site Preparation* section of this report. Care should be taken during excavation for foundations and floor slabs, to avoid disturbing subgrade soils. If subgrade soils have been adversely impacted by wet weather or otherwise disturbed, the surficial soils should be scarified to a minimum depth of 8 inches, moisture conditioned to within about 3 percent of optimum moisture content, and compacted to engineered fill specifications. Alternatively, disturbed soils may be removed and the removal zone backfilled with additional crushed rock.

For evaluation of the concrete slab-on-grade floors using the beam on elastic foundation method, a modulus of subgrade reaction of 150 kcf (87 pci) should be assumed for the stiff native silt soils anticipated at subgrade depth. This value assumes the concrete slab system is designed and constructed as recommended herein, with a minimum thickness of crushed rock of 8 inches beneath the slab.

Interior slab-on-grade floors should be provided with an adequate moisture break in living/heated areas. The capillary break material should consist of ODOT open graded aggregate per ODOT Standard Specifications 02630-2. The minimum recommended thickness of capillary break materials on re-compacted soil subgrade is 8 inches. The total thickness of crushed aggregate will be dependent on the subgrade conditions at the time of construction, and should be verified visually by proof-rolling. Under-slab aggregate should be compacted to at least 90% of its maximum dry density as determined by ASTM D1557 or equivalent.

In areas where moisture will be detrimental to floor coverings or equipment inside the proposed structure, appropriate vapor barrier and damp-proofing measures should be implemented. Appropriate design professionals should be consulted regarding vapor barrier and damp proofing systems, ventilation, building material selection and mold prevention issues, which are outside GeoPacific's area of expertise.

Footing and Roof Drains

Construction should include typical measures for controlling subsurface water beneath the homes, including positive crawlspace drainage to an adequate low-point drain exiting the foundation, visqueen covering the expose ground in the crawlspace, and crawlspace ventilation (foundation vents). The homebuyers should be informed and educated that some slow flowing water in the crawlspaces is considered normal and not necessarily detrimental to the home given these other design elements incorporated into its construction. Appropriate design professionals should be consulting regarding crawlspace ventilation, building material selection and mold prevention issues, which are outside GeoPacific's area of expertise.

Down spouts and roof drains should collect roof water in a system separate from the footing drains to reduce the potential for clogging. Roof drain water should be directed to an appropriate discharge point and storm system well away from structural foundations. Grades should be sloped downward and away from buildings to reduce the potential for ponded water near structures.

If the proposed structures will have a raised floor, and no concrete slab-on-grade floors in living spaces are used, perimeter footing drains would not be required based on soil conditions encountered at the site and experience with standard local construction practices. Where it is desired to reduce the potential for moist crawl spaces, footing drains may be installed. If concrete slab-on-grade floors are used, perimeter footing drains should be installed as recommended below.

Where necessary, perimeter footing drains should consist of 3 or 4-inch diameter, perforated plastic pipe embedded in a minimum of 1 ft^3 per lineal foot of clean, free-draining 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. A minimum 0.5 percent fall should be maintained throughout the drain and non-perforated pipe outlet. In our opinion, footing drains may outlet at the curb, or on the back sides of lots where sufficient fall is not available to allow drainage to meet the street. Figure 3 presents a typical perimeter footing drain detail.

Excavating Conditions and Utility Trenches

We anticipate that on-site soils can generally be excavated using conventional heavy equipment such as scrapers and trackhoes. However, as indicated on the attached test pit logs, hard (R4) bedrock was encountered in the test pits at relatively shallow depths which may increase the difficulty of excavation in portions of the site where large cuts or deep underground utilities are proposed. Practical refusal was experienced on bedrock at depths of 12.5, 9, 8.5, and 9 feet bgs in test pits TP-1, TP-2, TP-3, and TP-5, respectively, with the medium sized backhoe utilized for our subsurface explorations. Use of heavy excavation equipment and rock chippers may be needed to excavate below these depths.

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, near surface, native soils classify as Type B Soil and shallow, 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.

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.

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 90 percent 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. 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 wattles 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
- Geotextile silt fences, straw wattles, and fiber rolls 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.

Pavement Design

We understand that a new street is proposed to access the proposed lots. For design purposes, we assumed an ADT of 120 vehicles by assuming 10 trips per day per house. If a higher ADT is anticipated, GeoPacific should be consulted for additional recommendations. We assumed an estimated resilient modulus of 6,000 for compacted native soil. Table 2 presents our recommended minimum pavement section for dry weather construction. Pavement calculations are attached to this report.

Table 2. Recommended Minimum Dry-Weather Pavement Section for New Streets

Material Layer	Section Thickness (in.)	Compaction Standard
Asphaltic Concrete (AC)	3	91%/ 92% of Rice Density AASHTO T-209
Crushed Aggregate Base ¾”-0 (leveling course)	2	95% of Modified Proctor ASTM D1557
Crushed Aggregate Base 1½”-0	8	95% of Modified Proctor ASTM D1557
Subgrade	12	90% of Modified Proctor ASTM D1557 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

The Oregon Department of Geology and Mineral Industries (Dogami), Oregon HazVu: 2017 Statewide GeoHazards Viewer indicates that the site is in an area where *very strong* ground shaking is anticipated during an earthquake (Oregon HazVu, 2017). Structures should be designed to resist earthquake loading in accordance with the methodology described in the 2015 International Building Code (IBC) with applicable Oregon Structural Specialty Code (OSSC) revisions (current 2014). We recommend Site Class D be used for design per the OSSC, Table 1613.5.2 and as defined in ASCE 7, Chapter 20, Table 20.3-1. Design values determined for the site using the USGS (United States Geological Survey) 2017 Seismic Design Maps Summary Report are summarized in Table 3, and are based upon existing soil conditions.

Table 3. Recommended Earthquake Ground Motion Parameters (2017 USGS)

Parameter	Value
Location (Lat, Long), degrees	45.364, -122.635
Mapped Spectral Acceleration Values (MCE):	
Peak Ground Acceleration PGA_M	0.448
Short Period, S_s	0.949 g
1.0 Sec Period, S_1	0.408 g
Soil Factors for Site Class D:	
F_a	1.120
F_v	1.592
Residential Site Value = 2/3 x F_a x S_s	0.709 g
Residential Seismic Design Category	D

The Oregon Department of Geology and Mineral Industries (DOGAMI), Oregon HazVu: 2017 Statewide GeoHazards Viewer indicates that the site is considered to be at a *low* risk for soil liquefaction during an earthquake. 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. The subsurface profile observed within our test pit explorations, which extended to a maximum depth of 15 feet bgs, indicated that the site is underlain stiff to very stiff fine-grained soils and bedrock, above the water table, which are not generally considered susceptible to liquefaction. Regional geologic mapping indicates static groundwater is present between approximately 235 to 265 feet below the ground surface (Snyder, 2008).

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. 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.

For SRS

Staci R. Shub
Geotechnical Staff

Daniel Thabault, E.I.
Engineering Staff

REGISTERED PROFESSIONAL ENGINEER
90013PE
OREGON
MAY 22, 2015
BENJAMIN G. ANDERSON
Expires: 12/31/17

Benjamin G. Anderson, P.E.
Project Engineer

Attachments: References
Figure 1 – Vicinity Map
Figure 2 – Site and Exploration Plan
Figure 3 – Footing and Drain Detail
Test Pit Logs (TP-1 – TP-5)
Pavement Calculations

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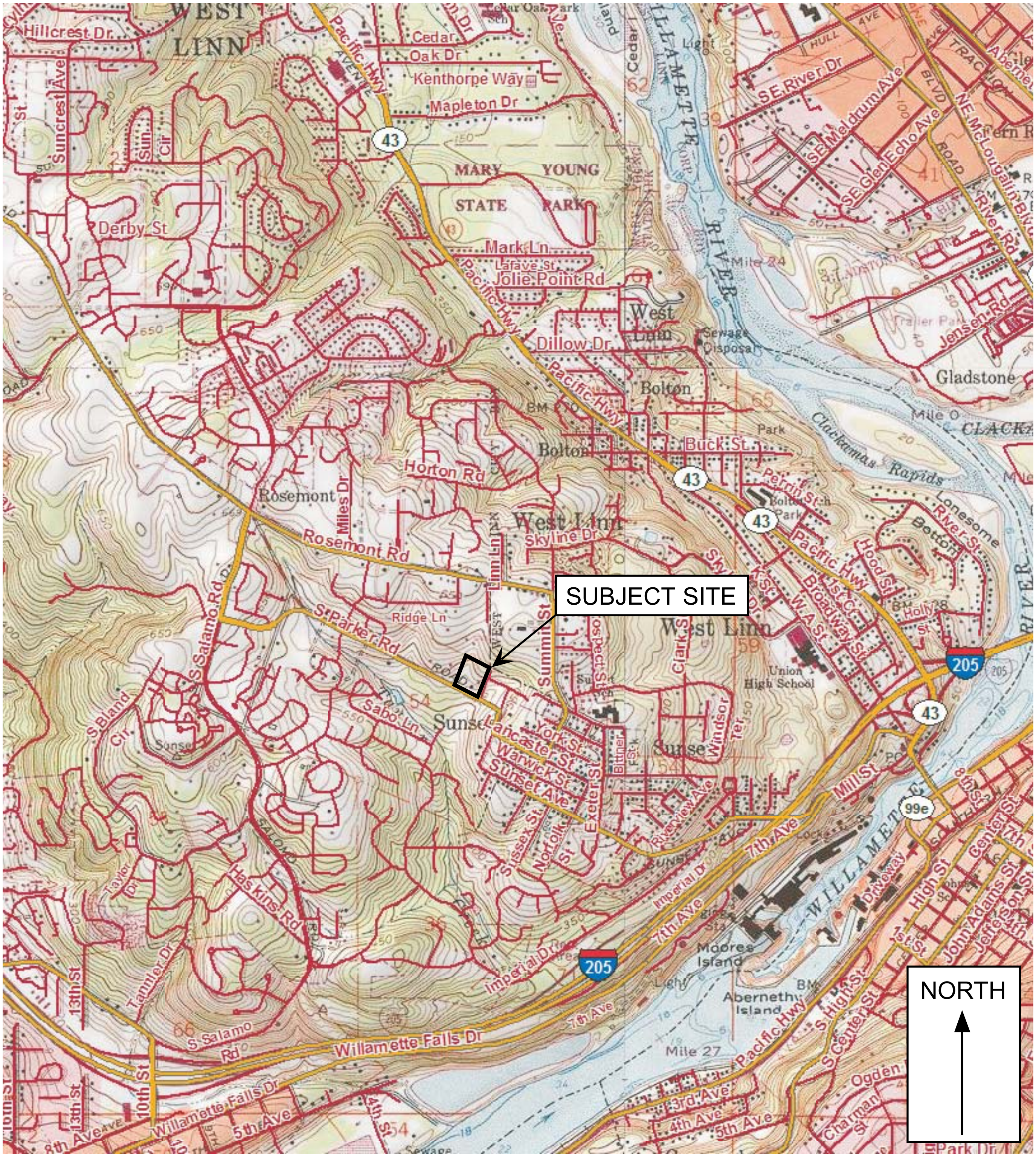
VICINITY MAP



Legend

Approximate Scale 1 in = 2,000 ft

Date: 8/18/2017
Drawn by: SRS

Base map: U.S. Geological Survey 7.5 minute Topographic Map Series, Canby, Oregon Quadrangle, 1961 (Photorevised 1985).

Project: Parker Road Subdivision West Linn, Oregon	Project No. 17-4661	FIGURE 1

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SITE PLAN AND EXPLORATION LOCATIONS

Legend

TP-1 Test Pit Designation and Approximate Location

Date: 8/9/2017
Drawn by: SRS

0 80'
APPROXIMATE SCALE 1"=80'

Project: Parker Road Subdivision West Linn, Oregon	Project No. 17-4661	FIGURE 2

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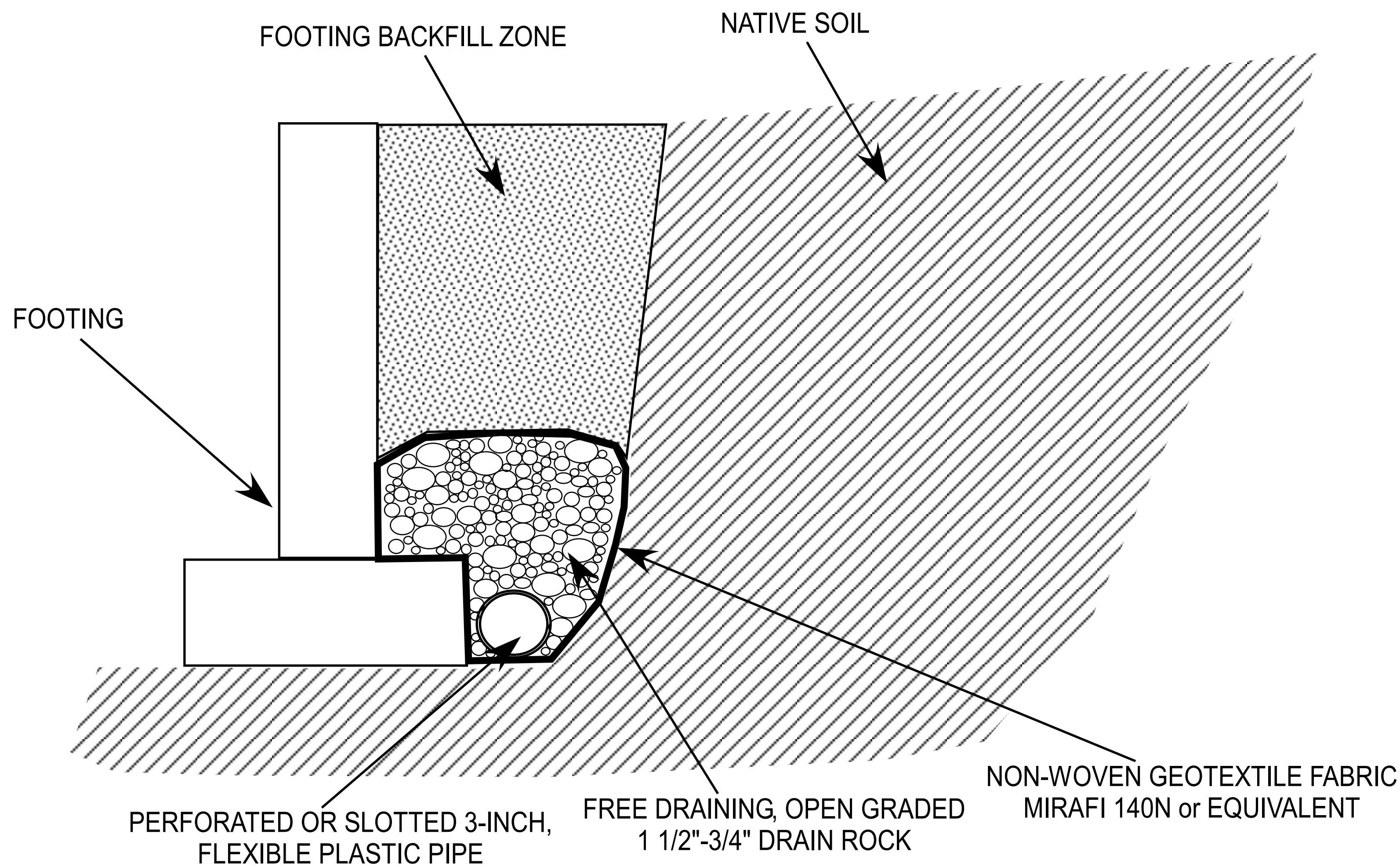
TYPICAL PERIMETER FOOTING DRAIN DETAIL



Notes:
1) Drain rock should contain no more than 5 percent fines passing the U.S. No. 200 Sieve.
2) Trench bottom and drain pipe should be sloped to drain to approved discharge location.

Date: 4/29/2016
Drawn by: BLC

Project: Parker Road Subdivision West Linn, Oregon	Project No. 17-4661	FIGURE 3

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TEST PIT LOG

Project: Parker Road Subdivision, West Linn, Oregon	Project No. 17-4661	Test Pit No. **TP- 1**

Depth (ft)	Pocket Penetrometer (tons/ft^2)	Sample Type	In-Situ Dry Density (lb/ft^3)	Moisture Content (%)	Water Bearing Zone	Material Description
1						Low organic SILT (OL-ML), brown, heavily rooted throughout, trace yellow mottling, very stiff, dry (Topsoil)
2						Silty CLAY (CL) to clayey SILT (ML), hard due to desiccation, brownish gray to light reddish brown, micaceous, trace fine roots, black staining, abundant orange mottling, dry to damp (Loess)
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						Test pit terminated at 12.5 feet due to practical refusal on hard rock (R4).
14						
15						Note: No seepage or groundwater encountered.
16						
17						

LEGEND

Bag Sample (100 to 1,000 g) · Bucket Sample (5 Gal. Bucket) · Shelby Tube Sample · Seepage · Water Bearing Zone · Water Level at Abandonment

Date Excavated: 8/8/2017
Logged By: S. Shub
Surface Elevation:

14835 SW 72nd Avenue
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Parker Road Subdivision West Linn, Oregon	Project No. 17-4661	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**
						Low organic SILT (OL-ML), brown, heavily rooted throughout, trace yellow mottling, very stiff, dry (Topsoil)
1						
2						Silty CLAY (CL) to clayey SILT (ML), hard due to desiccation, brownish gray to light reddish brown, micaceous, trace fine roots, black staining, abundant orange mottling, dry (Loess)
3						Very stiff to hard, silty CLAY (CL), light brown, micaceous, trace roots throughout, subtle orange, red, and gray mottling, damp (Residual Soil)
4						
5						
6						
7						
8						Soft to Medium hard (R2-R3), highly weathered BASALT, light brown to reddish brown matrix of silt to clayey silt, light gray, black staining, subtle yellow and orange mottling, micaceous, damp to moist (Columbia River Basalt)
9						
10						Test pit terminated at 9 feet due to practical refusal on hard rock (R4).
11						Note: No seepage or groundwater encountered.
12						
13						
14						
15						
16						
17						

LEGEND

100 to 1,000 g — Bag Sample
5 Gal. Bucket — Bucket Sample
Shelby Tube Sample
Seepage
Water Bearing Zone
Water Level at Abandonment

Date Excavated: 8/8/2017
Logged By: S. Shub
Surface Elevation:

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TEST PIT LOG

Project: Parker Road Subdivision, West Linn, Oregon	Project No. 17-4661	Test Pit No. **TP-3**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	**Material Description**
1						Low organic SILT (OL-ML), brown, heavily rooted throughout, trace yellow mottling, very stiff, dry (Topsoil)
2 3						Silty CLAY (CL) to clayey SILT (ML), hard due to desiccation, brownish gray to light reddish brown, micaceous, trace fine roots, black staining, abundant orange mottling, dry (Loess)
4 5 6						Very stiff to hard, silty CLAY (CL), light brown, micaceous, trace roots throughout, subtle orange, red, and gray mottling, damp (Residual Soil)
7 8						Soft to Medium hard (R2-R3), highly weathered BASALT, light brown to reddish brown matrix of silt to clayey silt, light gray, black staining, subtle yellow and orange mottling, micaceous, damp to moist (Columbia River Basalt)
9 10 11 12 13 14 15 16 17						Test pit terminated at 8.5 feet due to practical refusal on hard rock (R4). Note: No seepage or groundwater encountered.

LEGEND

100 to 1,000 g — Bag Sample
5 Gal. Bucket — Bucket Sample
Shelby Tube Sample
Seepage
Water Bearing Zone
Water Level at Abandonment

Date Excavated: 8/8/2017
Logged By: S. Shub
Surface Elevation:

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TEST PIT LOG

Project: Parker Road Subdivision, West Linn, Oregon	Project No. 17-4661	Test Pit No. **TP-4**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
0–1						Low organic SILT (OL-ML), brown, heavily rooted throughout, trace yellow mottling, very stiff, dry (Topsoil)
1–5						Silty CLAY (CL) to clayey SILT (ML), hard due to desiccation, brownish gray to light reddish brown, micaceous, trace fine roots, black staining, abundant orange mottling, trace burn zone at 1.5 feet, dry (Loess)
5–8.9						Very stiff to hard, silty CLAY (CL), light brown, micaceous, trace roots throughout, subtle orange, red, and gray mottling, damp (Residual Soil)
8.9–10						Extremely soft to very soft (R0-R1), highly weathered BASALT, light brown to reddish brown matrix of silt to clayey silt, light gray, black staining, subtle yellow and orange mottling, micaceous, damp to moist (Columbia River Basalt)
10–15						Very stiff to hard, silty CLAY (CL), trace silt, reddish brown, micaceous, subtle orange, dark red, and gray mottling, moist (Residual Soil)
15						Test pit terminated at 15 Feet.
						Note: No seepage or groundwater encountered.

LEGEND

100 to 1,000 g — Bag Sample
5 Gal. Bucket — Bucket Sample
Shelby Tube Sample
Seepage
Water Bearing Zone
Water Level at Abandonment

Date Excavated: 8/8/2017
Logged By: S. Shub
Surface Elevation:

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TEST PIT LOG

Project: Parker Road Subdivision, West Linn, Oregon	Project No. 17-4661	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
0–1.3						Low organic SILT (OL-ML), brown, heavily rooted throughout, trace yellow mottling, very stiff, dry (Topsoil)
1.3–3.5						Very stiff to hard, CLAY (CL), trace silt, light reddish brown, micaceous, trace roots throughout, subtle orange mottling, trace gravel bottom 8 inches, damp (Residual Soil)
3.5–9						Soft to Medium hard (R2-R3), highly weathered BASALT, light brown to reddish brown matrix of silt to clayey silt, light gray, black staining, subtle yellow and orange mottling, micaceous, damp to moist (Columbia River Basalt)
9						Test pit terminated at 9 feet due to practical refusal on hard rock (R4).
						Note: No seepage or groundwater encountered.

Depth scale: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17

LEGEND

5 Gal. Bucket

100 to 1,000 g

Bag Sample | Bucket Sample | Shelby Tube Sample | Seepage | Water Bearing Zone | Water Level at Abandonment

Date Excavated: 8/8/2017
Logged By: S. Shub
Surface Elevation:

```
==================================================

              DARWin(tm) - Pavement Design

              A Proprietary AASHTOWARE(tm)
                Computer Software Product

      --------------------------------------

           Flexible Structural Design Module


--------------------------------------------------

Project Description
   17-4661 - Parker Road Subdivision - New Street Pavement Section

Flexible Structural Design Module Data
   18-kip ESALs Over Initial Performance Period: 30,414
                      Initial Serviceability: 4.2
                     Terminal Serviceability: 2.5
                       Reliability Level (%): 85
                   Overall Standard Deviation: .44
          Roadbed Soil Resilient Modulus (PSI): 6,000
                          Stage Construction: 1

                  Calculated Structural Number: 2.02

Specified Layer Design
                                       Layer: 1
                        Material Description: New Asphalt
                    Structural Coefficient (Ai): .44
                      Drainage Coefficient (Mi): 1
                      Layer Thickness (Di) (in): 3.00
                            Calculated Layer SN: 1.32

                                       Layer: 2
                        Material Description: 1-1/2"-0 Crushed Aggregate
                    Structural Coefficient (Ai): .12
                      Drainage Coefficient (Mi): 1
                      Layer Thickness (Di) (in): 2.00
                            Calculated Layer SN: .24

                                       Layer: 3
                        Material Description: 3/4-0 Crushed Aggregate
                    Structural Coefficient (Ai): .12
                      Drainage Coefficient (Mi): 1
                      Layer Thickness (Di) (in): 8.00
                            Calculated Layer SN: .96

                          Total Thickness (in): 13.00
                           Total Calculated SN: 2.52
```

DARWin(tm) - Pavement Design

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Computer Software Product

Flexible Structural Design Module

```
Simple ESAL Calculation
             Initial Performance Period (years): 20
            Initial Two-Way Daily Traffic (ADT): 120
% Heavy Trucks (of ADT) FHWA Class 5 or Greater: 3
            Number of Lanes In Design Direction: 1
       Percent of All Trucks In Design Lane (%): 100
         Percent Trucks In Design Direction (%): 50
     Average Initial Truck Factor (ESALs/truck): 1.8
            Annual Truck Factor Growth Rate (%): 0
            Annual Truck Volume Growth Rate (%): 3
                                         Growth: Simple

              Total Calculated Cumulative Esals: 30,414
```