Planning and Economic Development Department
200 NE Moe Street | Poulsbo, Washington 98370
(360) 394-9748 | fax (360) 697-8269
www.cityofpoulsbo.com | plan&econ@cityofpoulsbo.com

MITIGATED DETERMINATION OF NONSIGNFICANCE (DNS)

Project Name:	Calavista Planned Residential Development & Preliminary Plat
Site Location:	19700 & 19840 Caldart Avenue NE, Poulsbo WA 98370
File No.:	P-05-08-19-01
Description of Proposal:	Develop 9.05 acres into 43 single family lot Planned Residential Development (PRD) and Preliminary Plat (PP). Project area is two existing properties with one home on each property. One home will be retained. Improvements include roads with parallel parking, open spaces with recreational amenities, and utility and stormwater facilities. Access is from Caldart Avenue and Halden Glen Court. Improvements along Caldart Avenue are proposed.
Applicant:	Caldart Poulsbo, LLC; c/o Barry Margolese; 105 S. Main St., Ste. 230; Seattle, WA 98104
Tax Parcel:	132601-3-065-2006 & 132601-3-003-2001
Lead Agency:	City of Poulsbo

The City of Poulsbo has determined that the above-described proposal does not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public on request. The terms of the mitigation are established in department memoranda and associated reports, attached to this decision.

This MDNS is issued under WAC 197-11-340; the lead agency will not act on this proposal for 14 days from the date below. Written comments concerning the MDNS may be submitted to the Poulsbo Planning and Economic Development Department, located at 200 NE Moe Street, Poulsbo, WA 98370, by 4:30 pm on June 11, 2020, 2020. Comment should discuss specific environmental issues associate with this proposal and identify how the MDNS does or does not address those issues.

Responsible Official: Karla Boughton

Position/Title: Planning and Economic Development Department Director
200 NE Moe Street
Poulsbo, WA 98370
(360) 394 -9748

Date: May 28, 2020

Signature:

APPEAL: Any agency or person may appeal this SEPA determination by filing a written appeal to the responsible official no later than 10 working days from the end of the comment period. Contact the responsible official to read or ask about the procedure for SEPA appeals.

Recommended Mitigations, if appropriate:

Earth

1. Development of the site shall comply with the recommendations of the Preliminary Stormwater Drainage Report dated April 20, 2020 or as amended.
2. Development of the site shall comply with the recommendations of the Geotechnical Engineering Report dated October 25, 2019, as clarified December 13, 2019 and February 13, 2020 or as amended. Recommendations in the report shall be incorporated in final design plans. Recommendations include observation and testing during construction; control of surface and near surface water during and after development; design and construction considerations for footings and foundations, foundation drainage, floor slabs, rockery and retaining wall, asphalt and concrete pavements; and earthwork for site preparation, groundwater concerns, excavations, permanent cut and fill slopes, structural fill, utility trench fill, wet weather earthwork, erosion control, and stormwater. All roof, footing, and wall drains are to be connected to the site stormwater system.
3. Erosion control measures must be implemented immediately to reduce a serious erosion hazard of cut soils in sloping areas. Immediate implementation of erosion control measures must be included in the Temporary Erosion and Sediment Control (TESC) Plan.

Water

4. All federal, state, and local permits must be obtained by the developer prior to construction drawing approval.
5. All Best Management Practices, avoidance, and minimization measures are required to be implemented with development of this proposal and in particular with stormwater outfall connection.
6. Maximum stormwater treatment is required for this project.

Plants

7. Tree protection measures shall be consistent with the Arborist Report dated February 20, 2020 and peer review recommendations dated December 19, 2019 and May 13, 2020 or as amended, and the site plan drawing set tree retention plan dated February 24,2020 or as amended.

Animals

8. It shall be the responsibility of the applicant to take all necessary steps to prevent the incidental taking of protected species under the Endangered Species Act through habitat modification or degradation during the life of the project or development authorized by this permit or approval. The applicant shall notify the City through its Public Works Superintendent and the Federal agencies with responsibility for enforcement of the Endangered Species Act immediately, in the event of any damage or degradation to salmon habitat by or from the project or the development subject to this permit or approval. In any such case, the applicant shall, at its sole cost and expense, take all actions necessary to prevent the furtherance of the damage or degradation and to restore the salmon habitat as required by the Federal, State, and local agencies with jurisdiction.

Historic and Cultural Preservation

9. While there are no known archaeological resources on this site, in the event archaeological artifacts are uncovered during construction, activity shall be halted immediately, and the State Historic Preservation Office and Tribes will be contacted.

Public Services

10. School mitigation fees are required for this project. Fees shall be paid prior to building permit issuance. Payment will be to the North Kitsap School District directly. Evidence of payment will be provided to the City.

Name: **Edie Berghoff** **Position/Title:** Associate Planner
Address: 200 NE Moe Street | Poulsbo, WA 98370 (360) 394-9748
Date: May 27, 2020 **Signature:** Edie Berghoff

Project Site Map

City of Poulsbo Planning Department

SEPA ENVIRONMENTAL CHECKLIST

200 NE Moe Street | Poulsbo, Washington 98370
(360) 394-9748 | fax (360) 697-8269
www.cityofpoulsbo.com | plan&econ@cityofpoulsbo.com

A. BACKGROUND

Name of proposed project, if applicable: CALAVISTA

Date Prepared:
MARCH 25, 2019

Name of Applicant:
CALDART POULSBO, LLC

Address:
105 S. MAIN ST, SUITE 230
SEATTLE, WA 98104

Phone Number:
(206) 910-2728

Contact:
BARRY MARGOLESE

Agency Requesting Checklist:
CITY OF POULSBO

Proposed timing or schedule (including phasing, if applicable):
SUBDIVISION TO OCCUR IN 2019. CONSTRUCTION TO BEGIN 2020.

Do you have any plans for future additions, expansions, or further activity related to or connected with this proposal? If yes, explain.
NO.

List any environmental information you know about that has been prepared, directly related to this proposal.
GEOTECHNICAL REPORT HAS BEEN PREPARED TO SUPPORT DEVELOPMENT OF SITE. REPORT SPECIFICALLY ADDRESSES INFILTRATION FEASIBILITY AND DEVELOPMENT ON STEEP SLOPES.
Refer to list of documents in staff memoranda.

Do you know whether applications are pending for governmental approvals or other proposals directly affecting the property covered by your proposal? If yes, explain.
NO.

List any government approvals or permits that will be needed for your proposal, if known.
CLEARING & GRADING PERMIT – CITY OF POULSBO
FOREST PRACTICES APPLICATION / NOTIFICATION – WADNR
NPDES – WADOE

Tree Cutting & Clearing Permit,
Final Plat,
~~HPA - DFW may be needed~~

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

THE PROPOSAL IS TO DEVELOP TWO PARCELS, TOTALING 9.05-ACRES, INTO A 43 LOT PLANNED RESIDENTIAL DEVERLOPMEMNT PLAT. EACH LOT WITHIN THE SUBDIVISION WILL BE UTILIZED FOR SINGLE-FAMILY RESIDENTIAL USE. RIGHT-OF-WAY WILL BE DEVELOPED AND DEDICATED TO SUPPORT TRAFFIC ACCESS. UTILITIES AND EXTENSIONS WILL BE CONSTRUCTED. STORMWATER MANAGEMENT FACILIITIES WILL BE CONSTRUCTED IN ACCORDANCE WITH LOCAL AND STATE AGENCY REGULATIONS.

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

THE PROPOSED DEVELOPMENT SITE IS LOCATED AT 19700 & 19840 CALDART AVENUE, IN THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 13, TOWNSHIP 26 NORTH, RANGE 1 EAST, W.M., IN KITSAP COUNTY, WASHINGTON. THE SITE IS SITUATED ON THE EAST SIDE OF “CALDART AVENUE” IN POULSBO, WASHINGTON.

TAX PARCELS INCLUDE: 132601-3-065-2006 & 132601-3-003-2001

B. ENVIRONMENTAL ELEMENTS	Agree	Disagree	Mitigate
1. Earth			
a. General description of the site (check one): ☐ flat ☐ rolling ☐ hilly ☐ steep ☒ slopes ☐ mountainous ☐ other.	✓		
b. What is the steepest slope on the site (approximate percent slope)? 36%	✓		
c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils. Poulsbo gravelly sandy loam, 0 to 15% slopes.	✓		
d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe. No.	✓		
e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill. 31,500 CY Cut 18,000 CY Fill The balance to be exported.	✓		
f. Could erosion occur as a result of clearing, construction or use? If so, generally describe. Yes. Construction activity and earth movement can result in erosion. Especially if significant rain falls during construction.	✓		
g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)? 45.1%	✓		
h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any. A Temporary Erosion and Sedimentation Control Plan will be developed and implemented during construction and development.	See Earth	Mitigaion	✓

2. Air			
a. **What types of emissions to the air would result from the proposal (i.e. dust, automobile, odors, industrial, wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known.** During construction there will be some dust and emissions from construction equipment. Upon project completion, the normal emissions associated with trips to residential developments by roadway vehicles can be expected.	✓		
b. **Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.** None known.	✓		
c. **Proposed measures to reduce or control emissions or other impacts to air, if any.** Fugitive dust will be managed with watering as needed.	✓		
3. Water			
a. *Surface:*			
1) **Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.** None onsite, but the “South Fork of Dogfish Creek” is located approximately 260 feet to the west.	✓		
2) **Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.** The proposal includes a discharge to the “South Fork of Dogfish Creek”.	✓		
3) **Estimate the amount of fill and dredge that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.** None.	✓		

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities, if known. No.	✓		
5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan. No.	✓		
6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge. No discharges of waste materials are intended, but it is possible that small amounts of auto or household wastes could enter the drainage system and end up being discharged to the "South Fork of Dogfish Creek".	See Water Mitigaion		✓
b. Ground:			
1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known. No.	✓		
2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: domestic sewage; industrial, containing the following chemicals.; agricultural; etc.…). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve. None. Sanitary sewerage will be discharged to the City of Poulsbo sanitary sewer system.	✓		
c. Water Runoff (including storm water):			
1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (including quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe. Stormwater generated onsite will be collected and routed through an onsite stormwater management facility, consisting of an underground detention vault with wet storage component for quantity control and quality enhancement. Discharges from this facility, including emergency overflows will be routed to a discharge point in the upper reaches of the "South Fork of Dogfish Creek".	✓		

2) **Could waste materials enter ground or surface waters? If so, generally describe.** Yes. It is possible that vehicular and typical household chemicals and components could enter the stormwater stream.	✓		
3) **Does the proposal alter or otherwise affect drainage patterns near the site? If so, describe.** No.	✓		
d. **Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:** The project will comply with Stormwater Management requirements to mitigate the effects of runoff which could negatively impact the basin.	See Water Mitigation		✓
4. Plants			
a. **Check types of vegetation found on the site:** ☒ Deciduous tree: alder, maple, aspen, other ☒ Evergreen tree: fir, cedar, pine, other ☒ Shrubs ☒ Grass ☐ Pasture ☐ Crop or grain ☐ Wet soil plants: cattail, buttercup, bulrush, skunk cabbage, other ☐ Water plants: water lily, eelgrass, milfoil, other ☐ Other types of vegetation	✓		
b. **What kind and amount of vegetation will be removed or altered?** All vegetation within the "Clearing Limits" established through permitting will be removed to support development of the project.	✓		
c. **List threatened or endangered species known to be on or near the site.** None known.	✓		
d. **Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any.** A Landscaping Plan will be prepared in compliance with PMC 18.130.30. 25% of the native trees are planned for retention and protection by recorded covenant and/or easement.	See Plants Mitigation		✓
e. **List all noxious weeds and invasive species known to be on or near the site.** None known.	✓		

5. Animals			
a. Check any birds and animals which have been observed on or near the site or are known to be on or near the site: ☒ Birds: hawk, heron, eagle, songbirds, other: ☐ Mammals: deer, bear, elk, beaver, other: ☐ Fish: bass, salmon, trout, herring, shellfish, other: Salmon are know to use the South Fork Dogfish Creek south of Lincoln Road	✓		
b. List any threatened or endangered species known to be on or near site. None known.	✓		
c. Is the site part of a migration route? If so, explain. Not known.	✓		
d. Proposed measures to preserve or enhance wildlife, if any. 25% of the native trees are scheduled for retention.	See Animals Mitigation		✓
e. List any invasive animal species known to be on or near the site. None known.	✓		
6. Energy and Natural Resources			
a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc. Electricity and Gas will be used for typical household needs. Heating, lighting, cooking etc.	✓		
b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe. No.	✓		
c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any. Buildings will be constructed to meet the current Washington State Energy Conservation codes.	✓		

7. Environmental Health

a.	**Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.** No.	✓		
1)	**Describe any known or possible contamination at the site from present or past uses.** None known.	✓		
2)	**Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.** None known.	✓		
3)	**Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.** None known.	✓		
4)	**Describe special emergency services that might be required.** No special emergency services will be required. Increased police and fire services as is normal for a single-family residential development will be required.	✓		
5)	**Proposed measures to reduce or control environmental health hazards, if any.** Fire Hydrants, fire flow and fire department and police access requirements will be met by the proposal.	✓		
b.	*Noise*			
1)	**What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?** None.	✓		
2)	**What types of levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.** Construction noise during normal business hours on a short-term basis during construction, and increased traffic and people noise on a long-term basis after site development.	✓		
3)	**Proposed measures to reduce or control noise impacts, if any.** Construction will be limited to normal business hours.	✓		

8. Land and Shoreline Use			
a. **What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.** The site is comprised of two parcels, each of which is under-developed with single-family residences. The surrounding properties are all utilized as single-family residential uses, except for the Cemetery on the north.	✓		
b. **Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses because of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or non-forest use?** No.	✓		
1) **Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:** No.	✓		
c. **Describe any structures on the site.** The northern parcel includes a manufactured home with several outbuildings. The southern parcel includes a two-story, stick-built home with a detached covered parking area.	✓		
d. **Will any structures be demolished? If so, what?** Yes. All structures on the northern parcel will be removed/demolished during development.	✓		
e. **What is the current zoning classification of the site?** Residential Low (4-5 DU/AC)	✓		
f. **What is the current comprehensive plan designation of the site?** Residential Low	✓		
g. **If applicable, what is the current shoreline master program designation of the site?** Not applicable.	✓		
h. **Has any part of the site been classified as a critical area by the city or county? If so, specify** There are some moderate hazard slopes onsite. Slopes have been assessed by a Licensed Geotechnical Engineer as part of the development proposal.	See Earth Mitigation		✓
i. **Approximately how many people would reside or work in the completed project?** Approximately 108 (43 * 2.5) people will reside in the completed project.	✓		
j. **Approximately how many people would the completed project displace?** Approximately 3 people will be displaced.	✓		

k. **Proposed measures to avoid or reduce displacement impacts, if any.** The southern home will be retained. 42 additional new homes will be provided.	✓		
l. **Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any.** The project complies with like zoning and is in compliance with the City's Comprehensive Plan.	✓		
m. **Proposed measures to reduce or control impacts to agricultural and forest lands of long-term commercial significance, if any.** None.	✓		
9. Housing			
a. **Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.** The proposal is for 43 lots for 43 detached single-family detached units. The project will provide middle-income housing.	✓		
b. **Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.** One middle-income home will be removed/demolished.	✓		
c. **Proposed measures to reduce or control housing impacts, if any.** The southern home will be retained. 42 additional new homes will be provided.	✓		
10. Aesthetics			
a. **What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?** Thirty-five foot maximum height with wood or wood like siding.	✓		
b. **What views in the immediate vicinity would be altered or obstructed?** None.	✓		
c. **Proposed measures to reduce or control aesthetic impacts, if any.** Significant trees will be retained when possible in the open spaces. Landscaping will be included throughout the development.	✓		
11. Light and Glare			
a. **What type of light or glare will the proposal produce? What time of day would it mainly occur?** Light from homes and streetlights would be noticed mainly at night.	✓		

b. Could light or glare from the finished project be a safety hazard or interfere with views? No.	✓		
c. What existing off-site sources of light or glare may affect your proposal? None.	✓		
d. Proposed measures to reduce or control light and glare impacts, if any. Street lighting will be designed to conform with City lighting requirements.	✓		
12. Recreation			
a. What designated and informal recreational opportunities are in the immediate vicinity? North Kitsap High School grounds are located about ½ mile south of the project. There is a pocket park in “Forest Rock Hills” development.	✓		
b. Would the proposed project displace any existing recreational uses? If so, describe. No.	✓		
c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any. The project proposal is a PRD, which requires implementation of recreational amenities based on the size of the project. The current proposal will require 2 active recreation amenities. One of which will be a trail system and the other will include a picnic area.	✓		
13. Historic and Cultural Preservation			
a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers? If so, specifically describe. The home on the southern parcel was built in 1920.	✓		
b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources. None known.	✓		

c	**Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.** No records were found on the Washington Information System for Architectural & Archaeological Records Data.	✓		
d.	**Proposed measures to reduce or control impacts, if any.** None.	See Historic and Cultural Preservation Mitigation		✓
14.	Transportation			
a.	**Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.** A northern access will be on to "Caldart Avenue". A southern access will be via an extension of "Halden Glen Court".	✓		
b.	**Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?** Kitsap Transit Route 90 has a stop near "Lincoln Road" on "Caldart Ave", approximately 1/2 mile from the site.	✓		
c.	**How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?** Off street parking of 2 spaces minimum per unit will be provided in individual driveways. Approximately 26 additional parking spaces will be provided throughout the project. No parking will be eliminated.	✓		
d.	**Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).** Yes. The proposal includes the construction of approximately 1,400 lineal feet of new public roads to serve the development. Approximately 400 feet of "Caldart Ave" frontage improvements are included. Approximately 300 feet of sidewalk will be installed along "Halden Glen Court" frontage.	✓		
e.	**Will the project use (or occur in the immediate vicinity of) water, rail or air transportation? If so, generally describe.** No.	✓		

f. **How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and non-passenger vehicles). What data or transportation models were used to make these estimates?** Approximately 412 vehicular trips per 2-way average will be generated. 32 trips are expected during the AM peak hour and 43 trips are expected during the PM peak hour. The peak hours of generation will occur between 7-9 AM and 4-6 PM. (Values calculated using Trip Generation by MicroTrans).	✓		
g. **Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.** No.	✓		
h. **Proposed measures to reduce or control transportation impacts, if any.** Impact fees will be paid to the City of Poulsbo.			✓ See Transportation Mitigation
15. Public Services			
a. **Would the project result in an increased need for public service (for example fire protection, police protection, health care, schools, other)? If so, generally describe.** A small increase in all of the above will be required.	✓		
b. **Proposed measures to reduce or control direct impacts on public services, if any.** Fire hydrants, fire flow and fire department and police access requirements will be met by the proposal. Impact fees for parks, schools and traffic impacts will be paid at final plat.			✓ See Public Services Mitigation
16. Utilities			
a. **Check the utilities currently available at the site:** ☒ electric ☒ natural gas ☒ water ☒ refuse service ☒ telephone, ☐ sanitary sewer ☒ septic system ☐ other.	✓		

b. **Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.** Electricity: Puget Sound Energy Services Water: City of Poulsbo Sanitary Sewer: City of Poulsbo Refuse Service: City of Poulsbo Recycling: City of Poulsbo Telephone: Century Link Cable: Comcast Natural Gas: Cascade Natural Gas	✓		

C. SIGNATURE

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

Signature: Ron Cleaver Jr Date Submitted: 4/18/2019

✓ Review and comments by

Edie Berghoff

Associate Planner

May 27, 2020

PLANNING AND ECONOMIC DEVELOPMENT
200 NE Moe Street | Poulsbo, Washington 98370
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MEMO

To: Karla Boughton, SEPA Responsible Official
From: Edie Berghoff | Associate Planner
Subject: SEPA DETERMINATION |
Calavista Planned Residential Development & Preliminary Plat | File No. P-05-08-19-01
Date: May 28, 2020

Applicant: Barry Margolese, Caldart Poulsbo LLC; 105 S Main Street, Suite 230; Seattle, WA 98104

Location: 19700 & 19840 Caldart Avenue NE, Poulsbo WA 98370

Project Description: Develop 9.05 acres into 43 single family lot Planned Residential Development (PRD) and Preliminary Plat (PP). Project area is two existing properties with one home on each property. One home will be retained. Improvements include roads with parallel parking, open spaces with recreational amenities, and utility and stormwater facilities. Access is from Caldart Avenue and Halden Glen Court. Improvements along Caldart Avenue are proposed.

Environmental Record/Exhibits:

The environmental review consisted of analysis based upon the following documents included in the environmental record:

- Site Plan Drawing Set; RDCJR Civil Engineering; February 24, 2020 revision.
- Environmental Checklist completed March 25, 2019 and received May 8, 2019.
- List of studies submitted and relied upon for SEPA analysis
  1. DFW1. Email; Stream type confirmation; Washington Department of Fish and Wildlife; October 18, 2019.
     Received October 18, 2019 the email identifies the majority of project discharge to a highly degraded non-fish bearing seasonal (Type Ns) segment of the South Fork Dogfish Creek, and indicates mitigation requirement for the proposal is not anticipated as all BMPs/avoidance and minimization measures are implemented.
  2. RCE1. Report; Preliminary Storm Drainage Report; RDCJR Civil Engineering; April 20, 2020 revision.
     Received April 21, 2020 this report reviews stormwater collection, treatment, and release.
     Compiled drainage report includes Reports ESC1 beginning on page 92, and SVC1 beginning on page 136.
  3. BHC1. Email; Calavista Peer Review – Storm; BHC Consultants, LLC; April 27, 2020.
     Peer review identifies all concerns are addressed and acknowledges future review of Final Stormwater Drainage Report with development drawing review.
  4. ESC 1. Report; Revised Limited Geotechnical Engineering Report; EnviroSound Consulting Inc.; December 19, 2019. *Document is RCE1 Appendix beginning on page 92.*
     Received December 20, 2019 this report evaluates subsurface soils and groundwater conditions for stormwater infiltration and aquifer recharge and provides preliminary geotechnical recommendations for project design.
  5. ESC2. Letter; [Geotechnical Report]; EnviroSound Consulting Inc.; December 13, 2019.
     Clarifying infiltration unsuitability at site and confirming onsite soils may not be suitable for fill.

6. ESC3. Letter; [Geotechnical Report]; EnviroSound Consulting Inc.; February 13, 2020.
   Clarifying revision date of drawings reviewed and indicating location of fault zone should not adversely impact the project.
7. AC1. Email; Peer Review – Calavista PRD – Geotechnical Report; Aspect Consulting, LLC; May 12, 2020.
   Peer review Received May 12, 2020 this email indicates all comments are suitably addressed.
8. SVC1. Technical Memorandum; Stream Assessment for Stormwater Outfall; Soundview Consultants LLC; September 24, 2019.
   Received May 8, 2019 this memorandum reviews drainage and stream conditions.
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- Poulsbo Municipal Code Title 15 Buildings and Construction
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- Poulsbo Municipal Code Chapter 16.20 Critical Areas
- Poulsbo Municipal Code Title 17 Land Division
- Poulsbo Municipal Code Title 18 Zoning Ordinance
- City of Poulsbo Land Use Comprehensive Plan and Appendices

Staff Amendments to the Environmental Checklist:

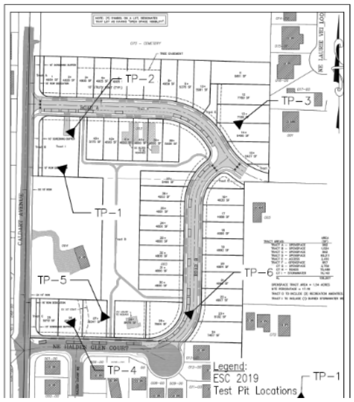
The following sections correspond with related categories of the environmental checklist submitted for the proposal, and clarify, amend, or add to that document.

Environmental Checklist Elements:

1. Earth

   A geotechnical engineering report evaluates subsurface soils, groundwater conditions, and seismic hazard. (ESC1). ESC1 describes the site as a generally west facing slope with elevations from approximately 370 feet in the northeast to 300 feet in the southwest with a flat western area and slopes in the central and eastern property ranging between 14 to 36 percent. Localized manmade slopes vary between 25 percent to approaching vertical are also noted in the report. (ESC1). No groundwater springs or standing surface water were observed. (ESC1).

   Six test pits between 8 and 11 feet deep identify forest duff overlying glacial till or till-like deposits with outwash deposits more prevalent in the north east area of the site. (ESC1).



Map 1 identifies location of soil test pits. Source: ESC1, Figure 2.

Erosion

Native glacial till located on the site is identified as having slight erosion hazard by the USDA Soil Survey. (ESC1). ESC1 indicates soil disturbance in sloping areas will cause serious erosion hazard and requires immediate implementation of erosion control measures with development. Immediate implementation of erosion control measures is recommended to be included in the Temporary Erosion and Sediment Control (TESC) Plan which the City requires with construction drawing review. Soil erosion potential can be minimized through landscaping after development. (ESC1).

Seismic Hazard

Kitsap County critical area mapping identifies an area through the middle of the site of moderate seismic hazard. ESC1 notes this should not have significant impact on the development and overall stability of the slopes due to the dense nature of the soils encountered in test pits. Seismic design parameters consistent with IBC and federal seismic data are provided in the report. (ESC1). The report acknowledges the project falls within the delineated areas of the Dabob Bay Fault Zone and Seattle Fault Zone, with the nearest known rupture located 10 miles away on Bainbridge Island. (ESC1 & ESC3).

Liquefaction is unlikely due to the underlying soils, although loose and/or saturated materials on the slopes have the potential for sloughing failures during seismic events. (ESC1). No recent landslides in the vicinity are identified. (ESC1).

Infiltration Potential

Poulsbo Critical Area Ordinance Table 16.20.315 - Fish and Wildlife Habitat Conservation Area Development Standards, identifies the upper reach of the South Fork of Dogfish Creek as the creek Headwater segment. In addition to buffer and its impervious or building setback, the table identifies maximum stormwater treatment, retention of forested wetland on the downstream side of Lincoln Road, and on-site infiltration of stormwater, where soils are appropriate, for new construction are required.

ESC1 states “Stormwater infiltration as required by City of Poulsbo Critical Areas Ordinance 16.20.515 – Development Standards for Critical Aquifer Recharge Areas is not feasible on the site due to the presence of glacial till.” ESC1 notes infiltration of stormwater, identifying that all roof, footing, and wall drains are to be connected to the stormwater system.

Conclusion

ESC1 concludes the proposed site development is feasible provided that recommendations in the report are incorporated in final design plans. Recommendations include observation and testing during construction; control of surface and near surface water during and after development; design and construction considerations for footings and foundations, foundation drainage, floor slabs, rockery and retaining wall, asphalt and concrete pavements; and earthwork for site preparation, groundwater concerns, excavations, permanent cut and fill slopes, structural fill, utility trench fill, wet weather earthwork, erosion control, and stormwater.

Peer Review

ESC1 is peer reviewed by the City’s consultant Aspect Consulting (AC). AC confirmed in email that ESC1 with supplemental letters ESC2 and ESC3 meets requirements of the CAO. (AC1).

Mitigation. Development consistent with geotechnical report, project drawings, and peer review is required in mitigation.

See also Engineering Department Memorandum.

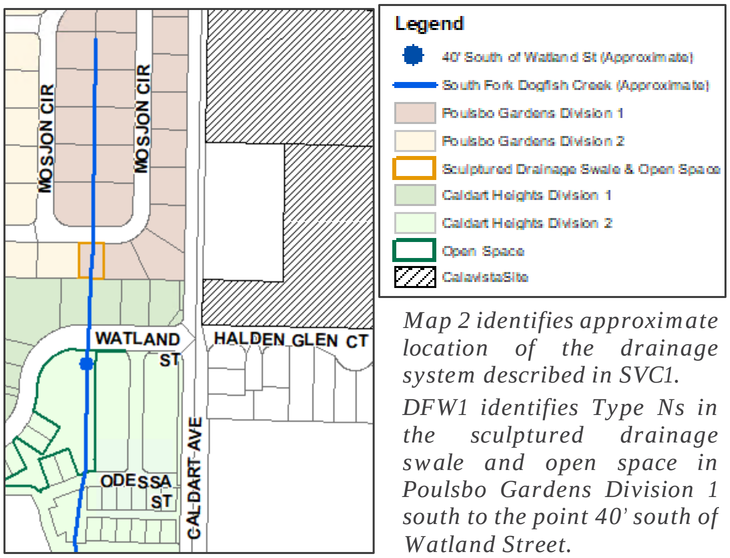
2. Air

   The checklist adequately addresses the issues of this section.

3. Water

   a. Surface

      The site is approximately 260 feet north and east of the South Fork Dogfish Creek upper reach. Caldart Avenue, a major City road, and residential development are located between the project and creek. Poulsbo Gardens was approved for development in two phases which occurred in 1986 and 2007. The first phase drawing shows a drainage swale and detention pond in the middle of and exiting under Mosjon Circle to disburse in a sculptured drainage swale and play area. (SVC1). Caldart Heights was approved for development in two phases which occurred in 2007 and 2012. The first phase includes development of Watland Street, a public roadway with sidewalks along both sides and single family residences along the north side. Watland Street includes a culvert carrying drainage provided by the Poulsbo Gardens development to Caldart Heights open space. Caldart Heights second phase includes development of an open space with the creek along the east edge. A state HPA permit was required for construction which includes Odessa Way, a private street built to minimum emergency access width of 20 feet with sidewalk provided on one side for pedestrian safety. Poulsbo Gardens and Caldart Heights development preceded adoption of the current CAO in 2017.



Map 2 identifies approximate location of the drainage system described in SVC1. DFW1 identifies Type Ns in the sculptured drainage swale and open space in Poulsbo Gardens Division 1 south to the point 40' south of Watland Street.

Poulsbo Critical Area Ordinance Table 16.20.315 - Fish and Wildlife Habitat Conservation Area Development Standards, identifies the upper reach of the South Fork of Dogfish Creek as the creek Headwater segment. The Headwater segment requires a 50 feet buffer and 25 feet impervious or building setback from the buffer. In addition, the table identifies the following requirements reviewed under Water and Earth sections of this document:

- Maximum stormwater treatment is required for new construction; retrofit existing impervious areas with minimum stormwater treatment when expansions or alterations trigger a major site plan amendment.
- Retain forested wetland at downstream side of Lincoln Road.
- Require on-site infiltration of stormwater, where soils are appropriate, for new construction; establish downspout disconnection program for existing development.

Stream Assessment

A stream assessment provides review of existing documents, other information sources and precipitation data, and describes the stream. (SVC1). Additional clarification is provided by the biologist. (SVC2). SVC1 identifies the headwaters segment is Type N beginning south of Watland Street, with identified fish use beginning well downstream of Lincoln Road, and potential fish use beginning downstream of the Odessa Way. SVC1 identifies existing reports indicate the first evidence of stream bed sorting is located in the Caldart Heights open space south of Watland Street, and concurs with prior stream investigations stating "SVC observations of this area indicate this as the beginning of a Type Ns water per PMC 16.20.310 and WAC 222-16-030 based on the first evidence of sorting of substrate observed and an area of scour (26 inches wide) with an average approximate OHWM and BFW of 30 inches. These channel characteristics indicate regular enough flow to be a seasonal system and not an ephemeral, stormwater driven system." SVC2 indicates the applicant will consider DFW1 stream type as appropriate for review of the project. SVC1 identifies the culvert under Watland Street will be upgraded to 24-inch diameter pipe; however, city staff confirmed the existing culvert ends are 24-inch diameter with a trash rack north of Watland Street. Any work completed to increase the size of the culvert will require review and permitting under DFW and City.

Site Visit with DFW and Tribe

An October 7, 2019 site visit with DFW representative, Tribe representative, applicant representatives, Poulsbo Gardens and Caldart Heights property owners, and City staff included discussion of where localized flooding and sorting of stream bed materials occur.

Localized Flooding. Localized flooding is identified in an open space tract south of Mosjon Circle by property owners in the Poulsbo Gardens development. Calavista PRD plans initially proposed locating storm discharge into the Poulsbo Gardens open space area. The applicant's representative identified a potential revised stormwater proposal with a new outfall location downstream in Watland Drive. All communications related to localized flooding at the site visit are verbal.

Streambed Sorting. DFW and Tribe representatives identified stream bed sorting in the Caldart Heights development, approximately 40 feet south of Watland Street. Stream bed sorting and Tribe representative indication of Ns or stream related feature north of the sorting location were verbal statements made at the gathering. DFW1 confirms the Type Ns stream between the bed sorting and south end of the Mosjon Circle culvert in an email to the applicant, copied to the City. DFW1 further states the "decision is to ensure that the stream doesn't get written off or lose its designation. However in its highly degraded state, I do not anticipate requiring mitigation for the proposed outfall as all as all BMPs/avoidance and minimization measures are implemented."

Conclusion.

Stormwater design revision in February 2020, shows a piped system discharging into the stream culvert under Watland Street. (Drawing sheet 18). The culvert is in the South Fork Dogfish Creek identified as a Type Ns stream in DFW1.

Final Storm Drainage Report and SVC2 agree to concur the stream segment crossing Watland Street is Type Ns.

See also Engineering Department Memorandum.

b. Ground

A Geotechnical Report was prepared for this project. (ESC1). ESC1 identifies the site is within an area of critical aquifer recharge due to shallow aquifer. PMC 16.20.515.B identifies a hydrogeological report is required for operations that propose a potential threat to groundwater according to Table 16.20.515 – Activities with Potential Threat to Groundwater. Residential development is not identified in the Table, and no hydrogeological report is required. (ESC1). PMC 16.20.515.D identifies developments above critical aquifer recharge areas require stormwater treatment and infiltration where soils permit and are determined feasible. ESC1 states "Stormwater infiltration as required by City of Poulsbo Critical Areas Ordinance 16.20.515 – Development Standards for Critical Aquifer Recharge Areas is not feasible on the site due to the presence of glacial till." ESC identified no seeps or ground water on the site surface.

Two residences are located on the property. The north property includes a well on the site which will be decommissioned. Health District records do not identify a second property utilizing the 2-party well. The south property residence shared a well with property to the south. The residence was connected to City water with development of Halden Glen plat on the property south. Both north and south properties are on septic systems which will be decommissioned. Decommissioning of septic and well are project condition of approval.

Conclusion.

Hydrogeological report is not required. Onsite infiltration is not feasible. ESC recommends site development roof, footing, and wall drains be directed to new stormwater quality and quantity control facilities. All new development will be connected to City water and sewer.

Mitigation. Development consistent with geotechnical report, project drawings, and peer review is identified in mitigation.

c. Water Runoff

A Preliminary Storm Drainage Report was prepared for the project. (RCE1). The site is in the South Fork Dogfish Creek drainage basin and provides runoff to the creek.

Poulsbo Critical Area Ordinance Table 16.20.315 - Fish and Wildlife Habitat Conservation Area Development Standards, identifies the upper reach of the South Fork of Dogfish Creek as the creek Headwater segment. In addition to buffer and its impervious or building setback, the table identifies maximum stormwater treatment, retention of forested wetland on the downstream side of Lincoln Road, and on-site infiltration of stormwater, where soils are appropriate, for new construction are required.

RCE1 identifies existing conditions of site runoff. Near the north project entrance from Caldart Avenue the site currently contributes runoff to a roadside ditch. (Drawing sheet 10). Pipes convey ditch water to catch basins on the west (opposite) side of Caldart Avenue and into a stormwater feature centered in Mosjon Circle, at the rear of lots in Poulsbo Gardens. The stormwater feature outlets at the south under Mosjon Circle, and into the open space tract of Poulsbo Gardens. The outlet pipe in the open space tract is the northern extent of the highly degraded South Fork of Dogfish Creek. (DFW1).

Developed project runoff will be directed to two discharge points. All roads and 39 of 43 lots stormwater will be directed to the north project entrance stormwater vault in Caldart PRD Tract I. Stormwater exits the site south along Caldart Avenue in a new piped conveyance system. (Drawing sheet 18). The system crosses Caldart Avenue and runs under the roadway gutter at the north side of Watland Street. The new piped conveyance will connect to the South Fork Dogfish Creek culvert carrying the seasonal creek segment under Watland Street. Four lots roof and footing drains, lots 25 through 28 fronting Halden Glen Court, will connect to a biopod unit located in the southern tip of Caldart PRD open space Tract C. (Drawing sheet 18) The biopod outlets to an existing south flowing storm pipe in Caldart Avenue. Stormwater from the biopod follows existing pipe to discharge in Odessa Way.

An October 7, 2019 site visit with DFW, Tribe, applicant representatives, property owners, and city staff included discussion of localized flooding. Localized flooding is identified in the open space tract south of Mosjon Circle by property owners in the Poulsbo Gardens development. RCE1 identifies proposed development will minimize this sites contribution to the stormwater feature in Mosjon Circle. Identified minimization is due to the site stormwater being piped south and existing pipes conveying ditch water west under Caldart Avenue being filled with CDF (controlled density fill). (Drawing sheet 11). RCE1 identifies the 100 year event discharge in the developed state will be less than the in the predeveloped state. Post development discharge is calculated less than the 25 year predevelopment discharge.

RCE1 reviews stormwater contributions from this site. ESC1 identifies that all roof, footing, and wall drains are to be connected to the stormwater system and identifies infiltration potential of the site is limited due to glacial till soils.

<u>Peer Review</u>.

Preliminary Stormwater Drainage Report is peer reviewed by BHC Consultants, LLC as the City's peer review consultant. BHC concludes the report is adequate for approval of the PRD and preliminary plat as designed.

Mitigation. Development consistent with stormwater drainage report, project drawings, and peer review is identified in mitigation.

See also Engineering Department Memorandum.

4. Plants

Creative Landscape Solutions (CLS) developed the Tree Retention Report provided with the application. (CLS1). Logging occurred on the north property in 1994 and the southern property prior to 2001. (ESC1).

PMC 18.180 and 18.260 regulate required retention of trees for this project. Twenty-five percent of significant trees are required to be retained. An alternative retention plan may be provided which combines significant trees and tree equivalents which combined provide tree retention equal to the minimum 25 percent tree retention for the project. Significant trees are 10 inches diameter measured 4.5 feet above ground surface (10" DBH). Tree equivalents combine smaller trees DBH to provide significant tree equal diameter measure.

CLS1 provides tree survey and data, and retention plan. Survey data indicates 194 significant trees are located on site, requiring retention of 49 significant trees. Retention of 38 significant trees, and 12 tree equivalents meets a total retention of 50 trees, or 25 percent of the significant trees, located on the site.

Sound Urban Forestry (SUF) provided peer review of the tree retention plan. SUF1 recommends CLS1 Tree Protection Fencing section of the report be a project condition of approval. Further, peer review identifies utilities construction will occur in the open space area which includes most of the trees identified for retention, and recommends a certified arborist be on site when trenching for utility installation takes place. CLS1 identifies installation of walking path meandering through retention trees in project open space should be observed by an ISA certified arborist to ensure minimal disruption of trees. Peer review concurs with the recommendation and identifies this as a project condition of approval. Tree protection fencing should be in place to keep equipment out of all areas to be preserved.

No endangered plant species are identified on the subject site. Chapter 15.35 PMC Tree Cutting and Clearing requires a permit or exemption prior to harvesting trees from this site. Implementation is through condition of approval.

Mitigation. Development consistent with arborist report, project drawings, and peer review is identified in mitigation.

5. Animals

   Stormwater form this site will be conveyed in a piped system to discharge into the South Fork Dogfish Creek at Watland Street and Odessa Way. A stream assessment reviews state and local sources to determine South Fork Dogfish Creek fish use. (SVC1). Lower reaches of South Fork Dogfish Creek are known to provide habitat for salmonids and other fish. (SVC1). Anadromous and resident fish usage, including Coho salmon and Fall Chum salmon, is documented approximately 1.5 miles downstream from the discharge. South Fork Dogfish Creek empties into Dogfish Creek approximately 2.5 miles and Liberty Bay 2.8 miles downstream from the stormwater outfall. Additional anadromous and resident fish are known to use Dogfish Creek and Liberty Bay.

Mitigation. Mitigation is identified for protection of endangered species.

6. Energy and Natural Resources

   The checklist adequately addresses the issues of this section.

7. Environmental Health

   The checklist adequately addresses the issues of this section. PMC 15.32 Regulation of Construction Hours reviews hours of construction.

8. Land and Shoreline Use

   The checklist adequately addresses the issues of this section.

9. Housing

   The checklist adequately addresses the issues of this section.

10. Aesthetics

    The checklist adequately addresses the issues of this section. PMC 18.260 Planned Residential Development requires home design differ on adjacent lots. Conditions of approval will address requirements.

11. Light and Glare

    The checklist adequately addresses the issues of this section. PMC 15.05 Outdoor Lighting Regulations identifies the city council finds and declares that the sky is an important aspect of our environment and that it is a necessary public purpose to regulate the use of outdoor light fixtures in the city of Poulsbo to minimize light pollution. Conditions of approval will address requirement of the use of shielded outdoor light fixtures wherever possible.

12. Recreation

    The checklist adequately addresses the issues of this section. PMC 18.260 Planned Residential Development requires open space and amenities for project residents. Conditions of approval will address requirements.

13. Historic and Cultural Preservation

    The checklist adequately addresses the issues of this section.

14. Transportation

    The checklist adequately addresses the issues of this section. PMC 18.70.080 requires two parking spaces on each lot. On street parking is required in PMC 18.140, and are provided for in Engineering standards. Conditions of approval will address on- and off-street parking.

    An adjacent property owner indicates a utility and access easement crosses the project site connecting Halden Glen Court to their property. The easement is shown over lots 26 and 27 on project drawings. (Drawing sheet 2).

    See also Engineering Department Memorandum.

15. Public Services

    North Kitsap School District (NKSD) has requested the City require impact fees for all residential development be imposed through environmental review.

   Mitigation. School impact fees for this residential project are identified in mitigation.

    The project will be subject to park impact fees as outlined in PMC 3.84. Conditions of approval will address the requirement.

16. Utilities

    The checklist adequately addresses the issues of this section.

    See also Engineering Department Memorandum.

Public Comments Received to Date and Related to Environmental Elements:

A Neighborhood Meeting for Calavista PRD was held April 16, 2019. Public interest focused on inclusion of rambler style home and preference to retain trees at the east property line in the vicinity of Calavista lot 19. No written comments were provided in response to the Neighborhood Meeting.

The Notice of Application was issued June 21, 2019. Five responses were received. Noted environmental concerns are surface water, traffic volume and access, construction traffic, public services (water pressure), tree retention, and stormwater discharge location.

An October 7, 2019 onsite meeting at the potential stormwater discharge location resulted in one additional response requesting stormwater from Calavista PRD be directed to the culvert in Watland Street and not to the Poulsbo Gardens development.

Conclusions and Recommendations:

The environmental review indicates that there are no significant adverse environmental impacts from the project proposal that cannot be mitigated through existing adopted Poulsbo land use regulations, or through the authority of SEPA. Therefore, a determination of non-significance is appropriate.

Recommended Mitigations, if appropriate:

Earth

1. Development of the site shall comply with the recommendations of the Preliminary Stormwater Drainage Report dated April 20, 2020 or as amended.
2. Development of the site shall comply with the recommendations of the Geotechnical Engineering Report dated October 25, 2019, as clarified December 13, 2019 and February 13, 2020 or as amended. Recommendations in the report shall be incorporated in final design plans. Recommendations include observation and testing during construction; control of surface and near surface water during and after development; design and construction considerations for footings and foundations, foundation drainage, floor slabs, rockery and retaining wall, asphalt and concrete pavements; and earthwork for site preparation, groundwater concerns, excavations, permanent cut and fill slopes, structural fill, utility trench fill, wet weather earthwork, erosion control, and stormwater. All roof, footing, and wall drains are to be connected to the site stormwater system.
3. Erosion control measures must be implemented immediately to reduce a serious erosion hazard of cut soils in sloping areas. Immediate implementation of erosion control measures must be included in the Temporary Erosion and Sediment Control (TESC) Plan.

Water

4. All federal, state, and local permits must be obtained by the developer prior to construction drawing approval.
5. All Best Management Practices, avoidance, and minimization measures are required to be implemented with development of this proposal and in particular with stormwater outfall connection.
6. Maximum stormwater treatment is required for this project.

Plants

7. Tree protection measures shall be consistent with the Arborist Report dated February 20, 2020 and peer review recommendations dated December 19, 2019 and May 13, 2020 or as amended, and the site plan drawing set tree retention plan dated February 24,2020 or as amended.

Animals

8. It shall be the responsibility of the applicant to take all necessary steps to prevent the incidental taking of protected species under the Endangered Species Act through habitat modification or degradation during the life of the project or development authorized by this permit or approval. The applicant shall notify the City through its Public Works Superintendent and the Federal agencies with responsibility for enforcement of the Endangered Species Act immediately, in the event of any damage or degradation to salmon habitat by or from the project or the development subject to this permit or approval. In any such case, the applicant shall, at its sole cost and expense, take all actions necessary to prevent the furtherance of the damage or degradation and to restore the salmon habitat as required by the Federal, State, and local agencies with jurisdiction.

Historic and Cultural Preservation

9. While there are no known archaeological resources on this site, in the event archaeological artifacts are uncovered during construction, activity shall be halted immediately, and the State Historic Preservation Office and Tribes will be contacted.

Public Services

10. School mitigation fees are required for this project. Fees shall be paid prior to building permit issuance. Payment will be to the North Kitsap School District directly. Evidence of payment will be provided to the City.

Name: **Edie Berghoff** **Position/Title:** Associate Planner
Address: 200 NE Moe Street | Poulsbo, WA 98370 (360) 394-9748
Date: May 27, 2020 **Signature:** Edie Berghoff

ENGINEERING DEPARTMENT
200 NE Moe Street | Poulsbo, Washington 98370
(360) 394-9882 | fax (360) 697-8269

To: Karla Boughton, SEPA Responsible Official
From: Anthony Burgess | Engineer 1
Subject: SEPA DETERMINATION | Calavista PRD | File No. P-05-08-19-01
Date: May 28, 2020

Applicant: Barry Margolese, Caldart Poulsbo LLC; 105 S Main Street, Suite 230; Seattle, WA 98104

Location: 19700 & 19840 Caldart Avenue NE, Poulsbo WA 98370

Project Description: The applicant proposes to develop 9.05 acres into a 43 single family lot Planned Residential Development (PRD) and Preliminary Plat (PP). Project area is two existing properties with one home on each property. One home will be retained. Improvements include roads with parallel parking, open spaces with recreational amenities, and utility and stormwater facilities. Access is from Caldart Avenue and Halden Glen Court. Improvements along Caldart Avenue are proposed.

Environmental Record/Exhibits:

The environmental review consisted of analysis based upon the following documents included in the environmental record:

- Site Plan Drawing Set; RDCJR Civil Engineering; February 24, 2020 revision.
- Environmental Checklist completed March 25, 2019 and received May 8, 2019.
- List of studies submitted and relied upon for SEPA analysis
    1. DFW. Email; Stream type confirmation; Washington Department of Fish and Wildlife; October 18, 2019.
       Received October 18, 2019 the email identifies the majority of project discharge to a highly degraded non-fish bearing seasonal (Type Ns) segment of the South Fork Dogfish Creek, and indicates mitigation requirement for the proposal is not anticipated as all BMPs/avoidance and minimization measures are implemented.
    2. RCE1. Report; Preliminary Storm Drainage Report; RDCJR Civil Engineering; April 20, 2020 revision.
       Received April 21, 2020 this report reviews stormwater collection, treatment, and release. Compiled drainage report includes Reports ESC1 beginning on page 92, and SVC1 beginning on page 136.
    3. BHC1. Email; Calavista Peer Review – Storm; BHC Consultants, LLC; April 27, 2020.
       Peer review identifies all concerns are addressed and acknowledges future review of Final Stormwater Drainage Report with development drawing review.
    4. ESC 1. Report; Revised Limited Geotechnical Engineering Report; EnviroSound Consulting Inc.; October 25, 2019.
       Received October 28, 2019 this report evaluates subsurface soils and groundwater conditions for stormwater infiltration and aquifer recharge and provides preliminary geotechnical recommendations for project design.

       Document is RCE1 Appendix beginning on page 92.
    5. ESC2. Letter; [Geotechnical Report]; EnviroSound Consulting Inc.; December 13, 2019.
       Clarifying infiltration unsuitability at site and confirming onsite soils may not be suitable for fill.
    6. ESC3. Letter; [Geotechnical Report]; EnviroSound Consulting Inc.; February 13, 2020.
       Clarifying revision date of drawings reviewed and indicating location of fault zone should not adversely impact the project.
    7. AC1. Email; Peer Review – Calavista PRD – Geotechnical Report; Aspect Consulting, LLC; May 12, 2020.
       Peer review Received May 12, 2020 this email indicates all comments are suitably addressed.

8. SVC1. Technical Memorandum; Stream Assessment for Stormwater Outfall; Soundview Consultants LLC; September 24, 2019.
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   Provided to DFW and Tribe for site consultation.
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    This report provides review of traffic impacts to local and regional road systems.

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- Poulsbo Municipal Code Title 18 Zoning Ordinance
- City of Poulsbo Land Use Comprehensive Plan and Appendices
- 2016 Transportation Comprehensive Plan Update
- 2016 Comprehensive Plan

Staff Amendments to the Environmental Checklist:

The following sections correspond with related categories of the environmental checklist submitted for the proposal, and clarify, amend or add to that document.

Environmental Checklist Elements:

1. Earth

   Geotechnical Report prepared by Envirosound Consultants

   The subject site lies within the central Puget Lowland. The lowland is part of a regional north-south trending trough that extends from southwestern British Columbia to near Eugene, Oregon. North of Olympia, Washington, this lowland is glacially carved with a depositional and erosional history including at least four separate glacial advance/retreats. The Puget Lowland is bounded on the west by the Olympic Mountains and on the east by the Cascade Range. The lowland is filled with glacial and nonglacial sediments consisting of interbedded gravel, sand, silt, till, and peat lenses. A review of the available geologic mapping indicates that the site is located in an area mapped at the contact between Vashon age glacial till (Qvt) and Vashon age glacial advance outwash (Qva).

   The subsurface conditions encountered in the explorations generally consisted of topsoil and forest duff overlying glacial till or till-like deposits and advance outwash deposits. The till and outwash deposits were generally interlayered in all of the explorations except test pit TP-3. Outwash deposits were more prevalent in the western portion of the subject property. Topsoil and forest duff at the site was between about 0.5 and 0.8 feet thick. Groundwater seepage was encountered in test pit TP-2 at a depth of about 7.5 bgs. The groundwater appeared to be perched on an underlying dense to very dense till layer. Groundwater seepage was not encountered in any of the other explorations. The subject property is shown in an area mapped as having no potential geologic hazards by the City of Poulsbo and native slopes at the site do not exceed 40 percent. The native slopes at the site appeared to be relatively stable with no significant sloughing noted at the time of the site visit.

The geotechnical report includes recommendations for site drainage, foundation design and construction, floor slab design and construction, retaining wall design and construction, asphalt pavement design and construction, earthwork considerations, site preparation, groundwater concerns, excavation, grading and fill, erosion control and stormwater. The geotechnical report also contains conclusions and recommendations regarding wet weather earthwork as follows below.

> *The soils encountered during explorations that are likely to be encountered during grading activities are granular but contain sufficient amounts of silt and fine sand to make them moisture sensitive. The soils would likely provide a suitable working surface under dry conditions; however, after exposure to rain and continual vehicle traffic, the native soils will degrade rapidly and require over excavation. Wet weather generally begins about October and continues through about May, although rainy periods may occur at any time of the year. Therefore, we recommend scheduling earthwork during the normal dry weather months of June through September. In our opinion, earthwork performed during the dry weather months would be less costly than wet weather earthwork.*

The geotechnical report includes the following findings:

> *Based on the findings of this investigation, it is our opinion that the proposed site development is feasible provided that recommendations in this report are incorporated in final design plans.Critical elements of the site development should be observed and tested by a qualified representative of EnviroSound. These include but are not limited to installation of any retaining wall construction, structural fill placement, foundation subgrade verification, slab on grade verification and subsurface drainage. We recommend that EnviroSound be involved in the process of planning the construction, configurations and elevations for the proposed structures. We also recommend that EnviroSound review updated plans, as these documents become available; to verify that geotechnical recommendations are being incorporated.*

City Staff has reviewed the materials submitted and concurs with the conclusions and recommendations of ESC. Additionally, the materials submitted have been reviewed by the City's stormwater peer reviewer BHC as the materials were used to complete the stormwater design. The City's peer reviewer concurs with the conclusions of the materials for these purposes as well. The project will be conditioned to comply with the recommendations of the geotechnical engineering in the Engineering Conditions of Approval. Geotechnical SEPA mitigations are not proposed for this project.

2. Water
   a. Surface
   b. Ground
   c. Water Runoff

<u>Storm Drainage Report Prepared by RDCJR Engineering</u>

The 9.05-acre site is composed of two parcels, both of which are underdeveloped with existing residential structures on them. Large portions of both properties remain undeveloped. The site

is well vegetated and includes second growth forest of Douglas Firs, Cedars, Hemlock, Madrona, Maple, Pine and Alders with sword ferns, shrubbery and groundcover. The site slopes generally to the west, with steeper portions on the east and flatter portions to the west, abutting Caldart Ave. The steepest onsite slope approaches 36%. The entire onsite land will be considered native in the predeveloped condition for stormwater management purposes. The parcel is bounded on all sides by Residential Low zoned properties, all of which currently are utilized as residential, except for the City of Poulsbo Cemetery on the north. There is no evidence of existing drainage or erosion problems on-site, and there are no wetland critical areas or their buffers on the site.

The upstream basin consists of two properties developed with single family residences. Western portions of each of these parcels drain as sheet flow to the subject parcel. The contributing area is 2.53-acres. This runoff will be allowed to enter the site as sheet flow and will be collected and routed through onsite stormwater treatment systems. Most of this sheet flow will be captured by a wall drainage system and routed through the onsite stormwater management facility. Additionally, a point source discharge onto the site occurs from one of the upstream properties in the northeast corner. The non-continuous flow from this point discharge appears to be from a landscaping feature and believed to be minor. This flow will be intercepted and routed appropriately through the onsite stormwater management facility.

The proposed 9.05-acre Planned Residential Development (PRD) will consist of 43 residential lots, associated drives, utilities and stormwater management facilities. The home on the southern parcel will be retained on one of the proposed lots. Stormwater vault discharge from the developed site, will be routed via closed conveyance from an onsite detention vault to a discharge point in the middle of an existing 24” N-12 pipe under Watland Street in the plat of Caldart Heights. Stormwater BioPod discharge from the developed site, will be to an existing catch basin very near the SW corner of the development along Caldart Ave.

Anecdotal evidence of capacity and flooding was noted early by the City in the upper reaches of the basin this project discharges into. Specifically, within a recreation tract in a southern portion of the Poulsbo Gardens plat. Due to these issues, the applicant searched for an opportunity to discharge further downstream within the same basin. That opportunity was found in Watland St, where an 18” diameter culvert crosses under this road. The currently proposed discharge location provides additional elevation and distance, alleviating this properties’ contribution to the known flooding upstream of the new discharge location.

With the onsite flow control proposed per the stormwater manual, runoff rates experienced offsite in the downstream basin will not be increased. There are no other known or anticipated problems with the downstream route to within one quarter mile of the discharge point.

The proposed stormwater treatment and retention facility was designed using the continuous-simulation runoff model per the currently adopted 2014 Department of Ecology Manual standard. The proposed treatment design will provide enhanced treatment with greater than the 95% minimum for stormwater runoff volumes from the pollution-generating surfaces traveling through the stormwater facility. This level of treatment is consistent with the requirements of the 2014 DOE manual. The Storm Report and proposed stormwater mitigation plan was reviewed by the City’s Stormwater Consultant BHC, and was found to fully comply with the stormwater design manual requirements and provide adequate quality treatment and protection for Endangered Species Act (ESA) listed species.

The Engineering Department concurs with the conclusions of the City’s peer reviewer and will not require additional SEPA mitigations for the project.

3. Transportation

TIA -Traffic Impact Analysis

The Calavista project proposes to construct a new residential plat consisting of 43 single-family dwelling units. Currently, two pre-existing homes exist on the properties proposed for development. One home will be retained. Therefore, the analysis will be for 41 new single-family homes. The development is proposed to be located along the east side of Caldart Avenue NE, north of Halden Glen Court. The development is proposing two accesses, one access to Caldart Avenue NE located approximately 650 feet north of Halden Glen Court and one access that will connect to the existing cul-de-sac at the east end of Halden Glen Court. The development will also create a stub end road on the east side of the development that will allow for future connectivity. The development is scheduled for occupancy by the end of 2022. The City requires a minimum of 5-years after build-out/occupancy for the horizon year; therefore, the year 2027 has been used as the horizon year in the analysis.

To determine current conditions, an initial Turning Movement count was performed by an independent firm, Traffic Count Consultants, in April 2019. These counts were performed at the primary intersections relative to this project's potential impact: SR-305 at Forest Rock Ln, 10th Ave NE at Forest Rock Ln, SR-305 at NE Lincoln Rd, 10th Ave NE at NE Lincoln Rd and Caldart Ave NE at NE Lincoln Rd. These counts were used to determine Peak Hour volumes (the busiest one-hour of a 24-hour study period) for analysis of Level of Service (LOS) for these intersections. Table 4 on page 8 of the TIA depicts the results of this count and summarizes the LOS of each intersection. The table identifies that each intersection is currently in better operating condition than the City of Poulsbo's concurrency standard of a minimum LOS E. The City's Minimum standard for LOS can be found in the transportation element of the Poulsbo comprehensive plan.

The designated land use for future development is defined as single-family detached housing. Table 5 on page 10 of the TIA shows the Average Daily Traffic (ADT) as well as AM and PM Peak traffic volumes. These future trips are used to determine future impact on the intersections of SR-305 at Forest Rock Ln, 10th Ave NE at Forest Rock Ln, SR-305 at NE Lincoln Rd, 10th Ave NE at NE Lincoln Rd and Caldart Ave NE at NE Lincoln Rd as these areas will receive the bulk of the impact of newly created traffic from the development of the site. Illustration of traffic movement can be found on Figure 3 on page 11 of the TIA. The 5-year horizon study of 2027 was used for future traffic delay analysis. This analysis utilized a 2.5-percent annual growth rate to account for background traffic growth in the site vicinity. Table 6 on page 13 of the TIA summarizes the 2027 horizon year LOS of the primary intersections. Each intersection with the exception of Forest Rock Lane at 10th Ave NE will continue to operate at an acceptable LOS E or better. The intersection of Forest Rock Ln at 10th Ave NE is identified as a City Accepted LOS of F per Table 17 of the 2016 Transportation Comprehensive Plan Update. This section of the Comprehensive plan further notes that while the City has adopted an LOS F for the intersection identified in Table 17, alternate mitigation measures for addressing these deficiencies are recommended. This is discussed under *Mitigation of intersection at Forest Rock Ln and 10th Ave* below.

In accordance with PMC 3.86.080, Traffic Impact Fees are required as mitigation for direct project impacts to local street systems and road improvement projects identified on the City's Transportation Improvement Program (TIP). Additionally, each project shall contribute a proportional share to the City's Transportation Demand Management (TDM) program. The Calavista PRD proportional share contribution to projects in the current TIP and to the TDM program is estimated to average $5,324.16 per lot, or $218,290.56. This mitigation fee shall be paid per lot prior to building permit issuance. If the Traffic Impact Fee Rate increases prior to building permit issuance, the developer will be responsible for paying the current rate at time of building permit issuance multiplied by the number of Average Weekday Trips (AWDT).

Mitigation of intersection at Forest Rock ln and 10th Ave

Table 6 on page 13 of the TIA illustrates year 2027 traffic conditions with and without the project moving forward. The intersection of 10th Ave at Forest Rock Ln will operate at a LOS of F with a delay of 184.2 sec without the proposed Calavista Project. With the project, the intersection will operate at a LOS of F with 199.0 sec of delay. This is increase in delay is due to an addition of 14 PM Peak trips to the intersection.

Per section 6.1 of the 2016 City's Transportation Comprehensive Plan Update, intersections with an adopted LOS F and existing LOS of F cannot be further degraded by proposed development without mitigation. The Future forecast LOS delay at the intersection of Forest Rock Ln and 10th Ave must maintain a maximum delay of 184.2 sec as identified in Table 6 of the submitted TIA. The Transportation Comprehensive Plan identifies alternate strategies to achieve needed mitigation which is proportional to the project's impact. Please see the below excerpt from section 6.1.1 of the 2016 Transportation Comprehensive Plan Update.

> *In those situations where it is not physically possible, economically viable, or socially desirable to meet forecast growth by adding new capacity (e.g., new lanes) in the same location where the demand appears, an alternative strategy may be employ alternative mitigation measures that address impacts associated with the adoption of these LOS F standards but do not necessarily add capacity. These measures may include Transportation Demand Management (TDM) or Transportation System Management (TSM) actions or projects. These strategies may divert the forecast traffic growth to other possibilities elsewhere, but more importantly may encourage and support other transportation modes including transit and non-motorized facilities, as well as safety improvements such as pedestrian enhancements, signal timing optimization, pavement striping, signage and lighting, geometric modifications or other measures intended to accomplish the same goals. Collectively, such strategies are described as Transportation Demand Management in this plan and the City's adopted TIP.*

This is also supported by Policy TR-2.5 of the 2016 Comprehensive Plan.

> *For those roadway segments and intersections with an adopted LOS F designation, the City may implement mitigation measures that address impacts associated with adoption of the LOS F standard, but that do not necessarily add capacity. These mitigation measures may include transportation demand management (TDM) or transportation system management (TSM) actions or projects that encourage and support other transportation modes including transit and nonmotorized facilities, as well as safety improvements such as pedestrian enhancements, signal timing optimization, pavement striping, signage and lighting, geometric modifications or other measures.*

Furthermore, Policy TR-2.6 of the 2016 Comprehensive Plan states:

> *Development projects that contribute traffic to LOS F designated roadway segments and intersections may be required to partially or fully participate in funding or constructing the mitigation measures identified pursuant to Policy TR-2.5 if the mitigation project is not already part of the City's adopted TIP. These mitigation measures would be identified and developed through a Traffic Impact Assessment prepared pursuant to applicable sections of Poulsbo Municipal Code (PMC).*

The submitted TIA prepared by Gibson Traffic Consultants identified further degradation of the intersection of 10th Ave NE at Forest Rock Ln due to the proposed project and did not provide mitigation proportionate to its impact as required by the 2016 Comprehensive Plan Policies TR-2.5, TR-2.6 and the 2016 Transportation Comprehensive Plan Update section 6.1.1.

The developer shall provide proportionate mitigation for its direct impact to the intersection of 10th Ave NE at Forest Rock Ln in the form of constructed improvement or proportional monetary contribution as agreed upon by the City of Poulsbo. Proposal of this mitigation shall be in the form of an updated Traffic Impact Analysis submitted with application for Grading Permit. Agreement with the City regarding appropriate mitigation measure shall be required prior to Grading Permit release and mitigation measure in place prior to Final Plat.

With the proposed SEPA Mitigation, The Engineering Department finds that the TIA Prepared by Gibson Traffic Consultants February 2020 adequately addresses the City's Traffic Impact Analysis minimum requirements and PMC 14.04 Transportation Concurrency requirements.

Public Comments Received to Date and Related to Environmental Elements:

See Planning Department Memo

Conclusions and Recommendations:

The environmental review indicates that there are no significant adverse environmental impacts from the project proposal that cannot be mitigated through existing adopted Poulsbo land use regulations, or through the authority of SEPA. Therefore, a determination of non-significance is appropriate.

Recommended Mitigations, if appropriate:

The developer is to provide proportionate mitigation for its direct impact to the intersection of 10th Ave NE at Forest Rock Ln in the form of constructed improvement or proportional monetary contribution as agreed upon by the City of Poulsbo. Proposal of this mitigation shall be in the form of an updated Traffic Impact Analysis submitted with Final Engineering Drawing. Agreement with the City regarding appropriate mitigation measure shall be required prior to Grading Permit release and mitigation measure in place prior to Final Plat.

Name: Anthony Burgess

Position/Title: Engineer 1

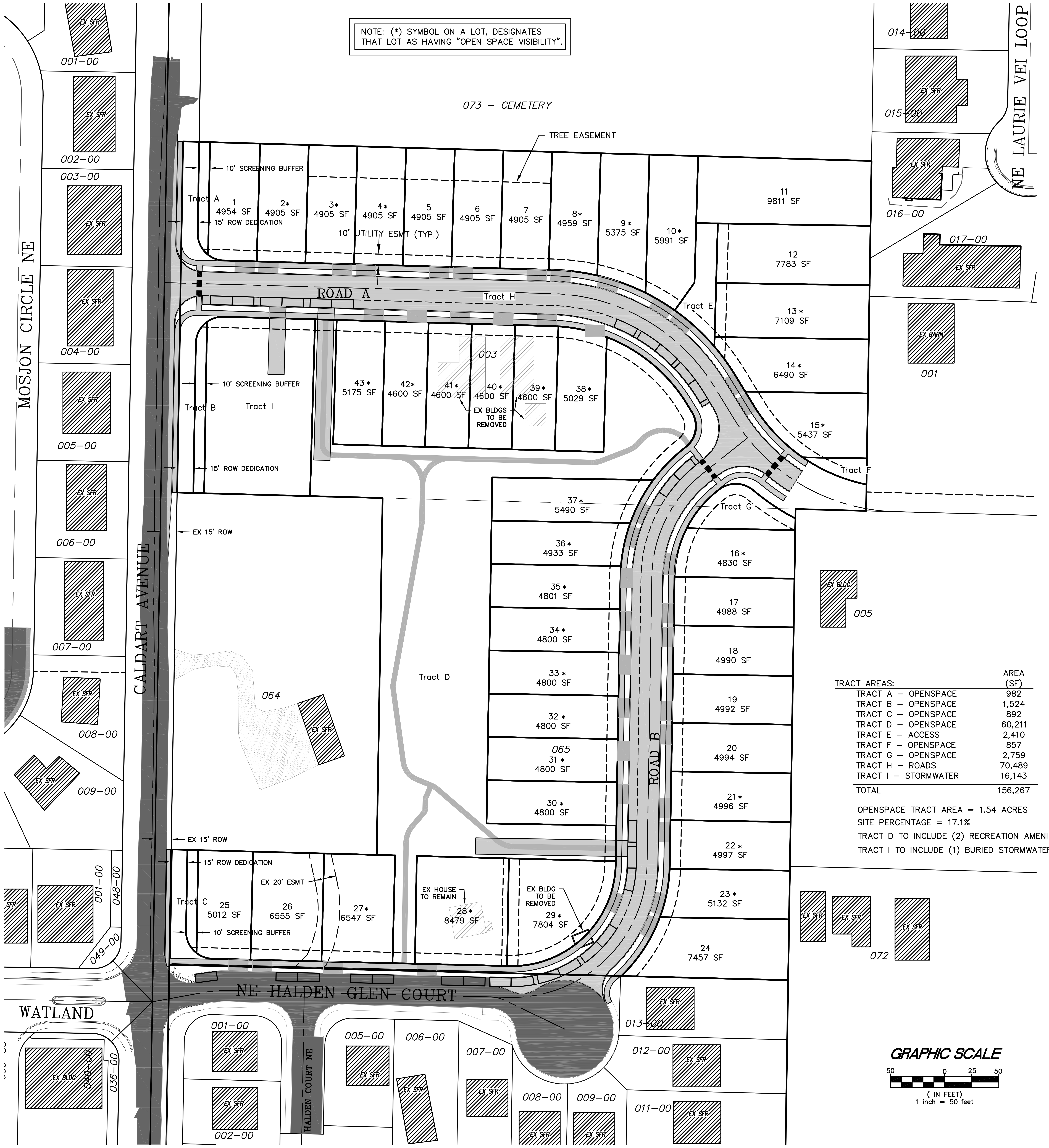
Address:
200 NE Moe Street
Poulsbo, WA 98370
(360) 394 - 9739

Date: 5/28/2020 **Signature:** Anthony Burgess

CALAVISTA – PRD SITE PLAN

SITE PLAN

NOTE: (*) SYMBOL ON A LOT, DESIGNATES THAT LOT AS HAVING "OPEN SPACE VISIBILITY".



TRACT AREAS:	AREA (SF)
TRACT A – OPENSPACE	982
TRACT B – OPENSPACE	1,524
TRACT C – OPENSPACE	892
TRACT D – OPENSPACE	60,211
TRACT E – ACCESS	2,410
TRACT F – OPENSPACE	857
TRACT G – OPENSPACE	2,759
TRACT H – ROADS	70,489
TRACT I – STORMWATER	16,143
TOTAL	156,267

OPENSPACE TRACT AREA = 1.54 ACRES

SITE PERCENTAGE = 17.1%

TRACT D TO INCLUDE (2) RECREATION AMENITIES.

TRACT I TO INCLUDE (1) BURIED STORMWATER WETVAULT.

ADJACENT PROPERTY OWNERS:

132601–3–073–2006
POULSBO CEMETERY

5191–000–016–0000
SLADE RICHARD A
& JUTHAMAS
1951 NE LAURIE VEI LOOP
POULSBO WA 98370

5191–000–017–0009
FLEMING SANDRA L
1957 NE LAURIE VEI LOOP
POULSBO WA 98370 8580

132601–3–001–2003
SVARDH MICHAEL L
& JOAN Y
PO BOX 350
HANSVILLE WA 98340

132601–3–005–2009
HUNTER BOBBY G
PO BOX 387
POULSBO WA 98370

132601–3–072–2007
TLC INVESTMENTS
PO BOX 986
POULSBO WA 98370

5631–000–013–0001
GREENE MEGAN
1670 NE HALDEN GLEN CT
POULSBO WA 98370

5631–000–012–0002
BREITMAYER ALEX
& SHELBURNE JENNIFER
1664 NE HALDEN GLEN CT
POULSBO WA 98370

5631–000–009–0007
KRENZELOK RICHARD
& SABRINA
1646 HALDEN GLEN CT NE
POULSBO WA 98370

5631–000–008–0008
BARTHA MICHAEL
1640 NE HALDEN GLEN CT
POULSBO WA 98370 5601

5631–000–007–0009
ROESLER NATHANIEL K
& AURORA G
1634 NE HALDEN GLEN CT
POULSBO WA 98370

5631–000–006–0000
BYE TORRE HOWARD D
& JOHN G
1628 NE HALDEN GLEN CT
POULSBO WA 98370

5631–000–005–0001
ANDERSON ROMAN
1622 NE HALDEN GLEN CT
POULSBO WA 98370

5631–000–001–0005
SURLES SCOTT N
& CHELSEA L
19619 HALDEN CT NE
POULSBO WA 98370 5503

4246–000–002–0004
MOSJON MANOR LLC
PO BOX 4508
ROLLING BAY WA 98061

4246–000–003–0003
HERRON STEPHEN M
19880 MOSJON CIRCLE NE
POULSBO WA 98370

4246–000–004–0002
NELSON HENRY K
& MARGARET J TRUSTEES
2402 E INIDAN PINK CIR
PAYSON AZ 85541 4184

4246–000–005–0001
CORRY MICHAEL & NICOLE
19830 MOSJON CIR NE
POULSBO WA 98370 8597

4246–000–006–0000
RICKE MICHAEL
19800 MOSJON CIR NE
POULSBO WA 98370 8597

4246–000–007–0009
LAWSON KATHERINE M
19770 MOSJON CIRCLE NE
POULSBO WA 98370

4246–000–008–0008
MURPHY AARON D
2454 NE KEVOS POND DR
POULSBO WA 98370 0057

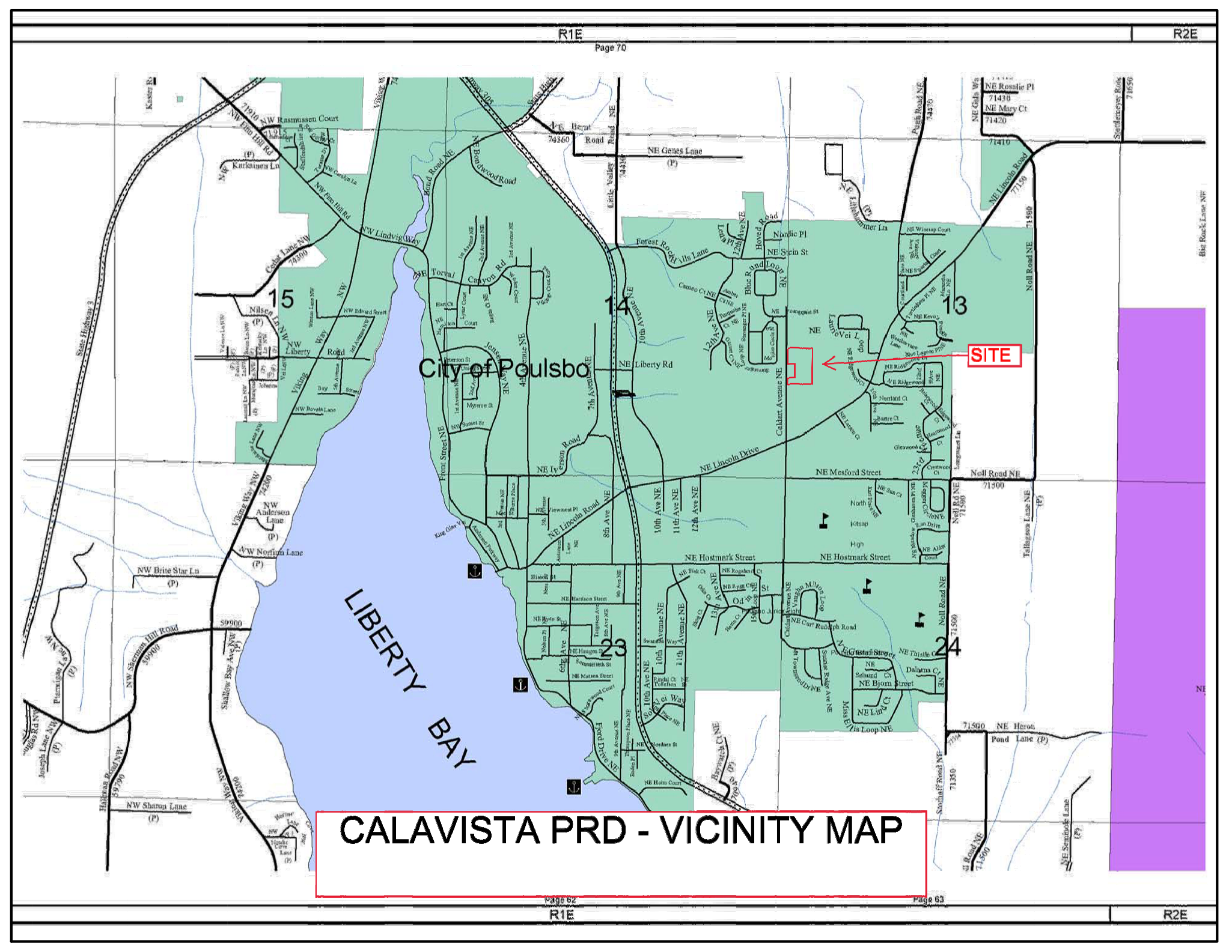
4246–000–009–0007
KLEPPE WAYNE K
& SANDRA L
19730 MOSJON CIRCLE NE
POULSBO WA 98370

5498–000–001–0007
KELLN BRENT M
& SHAUNA L
1597 NE WATLAND ST
POULSBO WA 98370

132601–3–064–2007
RAMIREZ JOSE LUIS
& LARIOS SONIA RAMIERZ
23618 DUNBAR PL NW
POULSBO WA 98370

UTILITIES:

POWER:	PUGET SOUND ENERGY SERVICES
WATER:	CITY OF POULSBO
SEWER:	CITY OF POULSBO
TELEPHONE:	CENTURYLINK
REFUSE:	CITY OF POULSBO
FIRE PROTECTION:	KITSAP COUNTY FIRE DISTRICT #18



CALAVISTA PRD - VICINITY MAP

SITE DATA

LOCATION: 19700 & 19840 CALDART AVE NE
POULSBO WA 98370

TAX PARCEL NOS.: 132601–3–065–2006 & 132601–3–003–2001

EXISTING ZONING: URBAN LOW RESIDENTIAL (UL)

INTENDED USE: 43 LOTS – SINGLE FAMILY RESIDENTIAL

NOTE: SURROUNDING ZONING IS ALL UL WITHIN 300 FEET OF SITE.

SITE AREAS:	AREA (ACRES)	% OF TOTAL
RESIDENTIAL	5.44	59.7
STORMWATER TRACT	0.37	4.1
OPENSPACE TRACTS	1.54	16.9
STREETS	1.67	19.4
TOTAL	9.02	100.0
DEVELOPED AREA		
PERVIOUS SURFACES	4.94	54.8
IMPERVIOUS SURFACES	4.08	45.2

OPEN SPACE NOTE: >10% OF THE SITE WILL BE SPECIFICALLY DEDICATED AND MAINTAINED IN OPEN SPACE TRACTS, AS WILL BE CREATED ON THE FACE OF THE FINAL PLAT.

OWNER OF RECORD & LEGAL DESCRIPTION: CALDART POULSBO LLC
105 S MAIN ST, STE 230
SEATTLE, WA 98104

132601–3–065–2006
LOT B SHORT PLAT NO. 6570R–1 RECORDED IN VOLUME 13 PAGE 114 OF SHORT PLATS, AUDITOR'S FILE NO. 9603040054 BEING AN AMENDMENT OF VOLUME 11 PAGE 98 OF SHORT PLATS, AUDITOR'S FILE NO. 9409280108/0109. BEING A PORTION OF THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER, SECTION 13, TOWNSHIP 26 NORTH, RANGE 2 EAST, W.M., KITSAP COUNTY, WASHINGTON. TOGETHER WITH EASEMENTS AS DEPICTED ON THE SHORT PLAT.

132601–3–003–2001
S 323' OF NW 1/4 NW 1/4 SW 1/4 EXC W 15FT FOR CO RD

SHEET INDEX	
#	Title
1	SITE PLAN
2	LOT DIMENSIONS
3	EXISTING TREE PLAN
4	TREE SURVEY DATA (1 OF 4)
5	TREE SURVEY DATA (2 OF 4)
6	TREE SURVEY DATA (3 OF 4)
7	TREE SURVEY DATA (4 OF 4)
8	TREE RETENTION PLAN
9	TREE RETENTION PLAN – TRACT D DETAIL
10	TESC PLAN
11	TESC DETAILS
12	COMPREHENSIVE GRADING PLAN
13	ROAD SECTIONS
14	CALDART – PLAN & PROFILE
15	ROAD A – PLAN & PROFILE
16	ROAD B – PLAN & PROFILE
17	WALLS – PLAN & PROFILES
18	COMPREHENSIVE UTILITY PLAN
19	CALDART STORM – PLAN & PROFILE
20	ROAD A STORM – PLAN & PROFILE
21	ROAD B STORM – PLAN & PROFILE
22	STORM INLET PLAN & PROFILE
23	STORM FACILITY PLAN & DETAILS
24	STORM OUTLET PLAN & PROFILE
25	STORM DETAILS (1 OF 2)
26	STORM DETAILS (2 OF 2)
27	CALDART SEWER PLAN & PROFILE
28	ROAD A SEWER – PLAN & PROFILE
29	ROAD B SEWER – PLAN & PROFILE
30	WATER PLAN

DESIGN MAK
DRAWN RDC
CHECKED MAK
SEC 13 T 26N R 1E
DISC NO ____ DATE 8/15/2018
SCALE AS NOTED

REV NO	REVISION DESCRIPTION	DATE	BY
1	REV. PER CITY COMMENTS, DATED 7/2019	7/22/19	RDC
2	REV. PER CITY COMMENTS, DATED 12/9/2019	12/12/19	RDC
3	REV. PER CITY COMMENTS, DATED 1/22/20	2/24/20	RDC

RON D. CLEAVER JR
43644
2/24/2020

PROJECT MANAGER: RON D CLEAVER JR
SIGNATURE:

TITLE
CALAVISTA – PRD
SITE PLAN

CLIENT
CALDART POULSBO LLC
C/O BARRY MARGOLESE
105 S. MAIN ST, SUITE 230
SEATTLE, WA 98104
(206) 910–2728

RDCJR
CIVIL ENGINEERING
3231 NE TOTTEN ROAD, SUITE 103
POULSBO, WA 98370
(360) 265–1037 CELL
RON@RDCJRENGINEERING.COM

SHEET 1 OF 30
FILE NO 1222

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CALAVISTA – PRD

LOT DIMENSIONS

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DESIGN	MAK
DRAWN	RDC
CHECKED	MAK

SEC 13 T 26N R 1E

DISC NO ____ DATE 8/15/2018

SCALE AS NOTED

REV NO	REVISION DESCRIPTION	DATE	BY
1	REV. PER CITY COMMENTS, DATED 7/2019	7/22/19	RDC
2	REV. PER CITY COMMENTS, DATED 12/9/2019	12/12/19	RDC
3	REV. PER CITY COMMENTS, DATED 1/22/20	2/24/20	RDC

RON D. CLEAVER JR
43644
2/24/2020

PROJECT MANAGER: RON D CLEAVER JR

SIGNATURE: ____

TITLE
CALAVISTA – PRD
LOT DIMENSIONS

CLIENT
CALDART POULSBO LLC
C/O BARRY MARGOLESE
105 S. MAIN ST, SUITE 230
SEATTLE, WA 98104
(206) 910-2728

RDCJR
CIVIL ENGINEERING
3231 NE TOTTEN ROAD, SUITE 103
POULSBO, WA 98370
(360) 265-1037 CELL
RON@RDCJRENGINEERING.COM

SHEET 2 OF 30

FILE NO 1222

CALAVISTA – PRD

EXISTING TREE PLAN

REV NO	REVISION DESCRIPTION	DATE	BY
1	REV. PER CITY COMMENTS, DATED 7/2019	7/22/19	RDC
2	REV. PER CITY COMMENTS, DATED 12/9/2019	12/12/19	RDC
3	REV. PER CITY COMMENTS, DATED 1/22/20	2/24/20	RDC

DESIGN MAK
DRAWN RDC
CHECKED MAK
SEC 13 T 26N R 1E
DISC NO ____ DATE 8/15/2018
SCALE AS NOTED

RON D. CLEAVER JR
STATE OF WASHINGTON
43644
REGISTERED PROFESSIONAL ENGINEER
2/24/2020

PROJECT MANAGER: RON D CLEAVER JR
SIGNATURE:

TITLE
CALAVISTA – PRD
EXISTING TREE PLAN

CLIENT
CALDART POULSBO LLC
C/O BARRY MARGOLESE
105 S. MAIN ST, SUITE 230
SEATTLE, WA 98104
(206) 910–2728

RDCJR
CIVIL ENGINEERING
3231 NE TOTTEN ROAD, SUITE 103
POULSBO, WA 98370
(360) 265–1037 CELL
RON@RDCJRENGINEERING.COM

SHEET 3 OF 30
FILE NO 1222

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CALAVISTA – PRD

TREE SURVEY DATA (1 OF 4)

Page **9** of **41**
Calavista

Onsite Tree Observations:

1	2	3	4	5	6	7		8	9	10			11				12		
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD				Tree credits	Viable tree credits	Retained tree credits
										Ret	Remove		Radius in feet						
										Viable	Non-viable	For site improve-ments	N	W	E	S			
1	677	Western red cedar	42	42	16			OK	Dead spur @ root crown, carpenter ants bark only, thin canopy, typical of species			1	16	16	16	16	1	1	
2	678	Colorado blue spruce	19	19	13			OK	Torque crack @ root crown up to 15' towards south, free flowing sap, spruce adelgid, dead wood, broken branches, typical of species			1	13	13	13	13	1	1	
3	679	Colorado blue spruce	22	22	16			OK	Vertical crack @ root crown up to 15' towards east, thin canopy, spruce adelgid, typical of species			1	16	16	16	16	1	1	
4	680	Colorado blue spruce	13	13	12			OK	Spruce adelgid, moss and lichen, typical of species, thin canopy			1	12	12	12	12	1	1	
5	681	Douglas fir	14	14	12			Poor	Exposed roots, co-dominant leaders with included bark x2 @ 20' up to 30', fused trunks		1		12	12	12	12	1		
6	682	Douglas fir	28	28	20			OK	Carpenter ants, thin canopy, typical of species			1	20	20	20	20	1	1	
7	683	Western red cedar	18	18	13			OK	Strong lateral, thin canopy, typical of species			1	13	13	13	13	1	1	
8	684	Western red cedar	18	18	16			OK	Tag on fence, dominant canopy, typical of species			1	16	16	16	16	1	1	
9	688	Hemlock	10	10	16			Poor	Girdling barbed wire, previous top loss, thin canopy		1		16	16	16	16	1		
10	689	Douglas fir	10	10	10			OK	Low live crown ratio < 30%, dead wood, broken branches, co-dominant canopy, typical of species			1	10	10	10	10	1	1	

Page **10** of **41**
Calavista

1	2	3	4	5	6	7		8	9	10			11				12		
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD				Tree credits	Viable tree credits	Retained tree credits
										Ret	Remove		Radius in feet						
										Viable	Non-viable	For site improve-ments	N	W	E	S			
11	690	Douglas fir	10	10	13			OK	Low live crown ratio < 30%, asymmetric canopy towards west, co-dominant canopy, nurse tree			1	13	13	13	13	1	1	
12	693	Douglas fir	11	11	10			Fair	No taper, abnormal bark, shedding bark, low live crown ratio < 30%		1		10	10	10	10	1		
13	694	Douglas fir	12	12	8			Fair	No taper, abnormal bark, shedding bark, popping bark, low live crown ratio < 10%		1		8	8	8	8	1		
14	695	Douglas fir	13	13	12			OK	Low live crown ratio < 20%, exposed roots, typical of species			1	12	12	12	12	1	1	
15	696	Douglas fir	14	14	10			Fair	Low live crown ratio < 10%, no taper, abnormal bark, shedding bark, popping bark, typical of species, carpenter ants bark only, woodpecker activity		1		10	10	10	10	1		
16	697	Douglas fir	11	11	16			Fair	Previous top loss, elongated branches, low live crown ratio < 10%		1		16	16	16	16	1		
17	698	Madrona	16, 14	21.5	20 south only			OK	Co-dominant leaders with included bark x2 @ root crown, lean towards south, dead wood, broken branches, typical of species, leaning on utility line			1	20 south only	20 south only	20 south only	20 south only	1	1	
18	699	Red alder	10	10	16			Poor	Failing towards east		1		16	16	16	16	1		
19	700	Madrona	14	14	18			OK	Lean towards east, blight, typical of species			1	18	18	18	18	1	1	

Page **11** of **41**
Calavista

1	2	3	4	5	6	7		8	9	10			11				12		
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD				Tree credits	Viable tree credits	Retained tree credits
										Ret	Remove		Radius in feet						
										Viable	Non-viable	For site improve-ments	N	W	E	S			
20	701	70	22	22	16			OK	Previous top loss, elongated branches, dominant canopy, dead wood, broken branches, typical of species			1	16	16	16	16	1	1	
21	702	Douglas fir	14	14	13			OK	Previous top loss, elongated branch, typical of species, abnormal bark, shedding bark			1	13	13	13	13	1	1	
22	703	Grand fir	16	16	14			OK	Free flowing sap, asymmetric canopy towards south, thin canopy			1	14	14	14	14	1	1	
23	704	Douglas fir	26	26	16			OK	Dead wood, broken branches, asymmetric canopy towards south, co-dominant canopy, typical of species			1	16	16	16	16	1	1	
24	705	Douglas fir	13	13	12			Fair	Co-dominant canopy, previous top loss, lean towards east, low live crown ratio < 20%		1		12	12	12	12	1		
25	706	Madrona	15, 18	23.5	26 south only			OK	Lean towards south, dead wood, broken branches, moss and lichen, blight, typical of species, co-dominant leaders with included bark x2 @ root crown, vertical crack @ root crown up to 8' towards west			1	26 south only	26 south only	26 south only	26 south only	1	1	
26	707	Bigleaf maple	10, 8, 12, 8	19.5	26 north only			OK	Co-dominant leaders with included bark x4 @ root crown, typical of species			1	26 north only	26 north only	26 north only	26 north only	1	1	

Page **12** of **41**
Calavista

1	2	3	4	5	6	7		8	9	10			11				12		
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD				Tree credits	Viable tree credits	Retained tree credits
										Ret	Remove		Radius in feet						
										Viable	Non-viable	For site improve-ments	N	W	E	S			
27	708	Douglas fir	37	37	18			OK	Abnormal bark, shedding bark, popping bark, carpenter ants bark only, asymmetric canopy towards south, dead wood, broken branches, co-dominant canopy			1	18	18	18	18	1	1	
28	709	Madrona	14, 4	14.5	28 south only			Fair	Co-dominant leaders with included bark x2 @ root crown, dead scaffold, vertical crack @ root crown up to 4' towards east		1		28 south only	28 south only	28 south only	28 south only	1		
29	710	Douglas fir	31	31	16 west only			OK	Co-dominant canopy, abnormal bark, shedding bark, popping bark, carpenter ants bark only, asymmetric canopy towards west, typical of species			1	16 west only	16 west only	16 west only	16 west only	1	1	
30	712	Douglas fir	14	14	14			Fair	Abnormal bark, shedding bark, suppressed canopy, previous top loss, low live crown ratio < 10%, dead wood, broken branches, carpenter ants		1		14	14	14	14	1		
31	713	Bigleaf maple	19	19	30 south only			Fair	Co-dominant leaders with included bark x2 @ 6', previous top loss, dead wood, broken branches, dead scaffold, asymmetric canopy towards south		1		30 south only	30 south only	30 south only	30 south only	1		

Page **13** of **41**
Calavista

1	2	3	4	5	6	7		8	9	10			11				12		
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD				Tree credits	Viable tree credits	Retained tree credits
										Ret	Remove		Radius in feet						
										Viable	Non-viable	For site improve-ments	N	W	E	S			
32	714	Douglas fir	23	23	14			Fair	Exposed roots, previous top loss, elongated branch, dead wood, broken branches, suppressed canopy, asymmetric canopy towards south, carpenter ants, woodpecker activity		1		14	14	14	14	1		
33	715	Douglas fir	28	28	16			OK	Asymmetric canopy towards south, dead wood, broken branches, elongated branches, previous top loss, typical of species	1			16	16	16	16	1	1	1
34	716	Bitter cherry	12, 13	17.5	16		Y	Fair	Co-dominant leaders with included bark x2 @ root crown, moss and lichen, previous top loss, asymmetric canopy towards south, failing @ root crown	1			16	16	16	16	1	1	1
35	721	Bitter cherry	12, 4	12.5	20 south only		Y	Fair	Co-dominant leaders with included bark x2 @ 1', gummosis, lean towards south, typical of species, large calloused wound @ root crown up to 6' towards north	1			20 south only	20 south only	20 south only	20 south only	1	1	1
36	722	Bitter cherry	12, 8	14.5	19		Y	Fair	Co-dominant leaders with included bark x2 @ 4', gummosis, lean towards south, dead wood, broken branches, typical of species	1			19	19	19	19	1	1	1
37	723	Douglas fir	18	18	16			OK	Asymmetric canopy towards south, exposed roots, carpenter ants bark only, dead wood, broken branches, dominant canopy, typical of species			1	16	16	16	16	1	1	

Page **14** of **41**
Calavista

1	2	3	4	5	6	7		8	9	10			11				12		
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD				Tree credits	Viable tree credits	Retained tree credits
										Ret	Remove		Radius in feet						
										Viable	Non-viable	For site improve-ments	N	W	E	S			
38	724	Madrona	18	18	24 south only			OK	Lean towards south, typical of species			1	24 south only	24 south only	24 south only	24 south only	1	1	
39	725	Silver maple	10, 10	14	24			Poor	Dead scaffold, co-dominant leaders with included bark x2 @ 1', dying		1		24	24	24	24	1		
40	726	Silver maple	10	10	15			Poor	Vertical crack @ root crown up to 30', dying		1		15	15	15	15	1		
41	727	Douglas fir	19	19	21 west only			Fair	Asymmetric canopy towards west, dead wood, broken branches, self-corrected lean, free flowing sap		1		21 west only	21 west only	21 west only	21 west only	1		
42	728	Douglas fir	14	14	12			OK	Co-dominant canopy, low live crown ratio < 20%, dead wood, broken branches, typical of species			1	12	12	12	12	1	1	
43	729	Silver maple	16	16	18			Poor	Lean towards west, serpentine trunk, previous top loss, dead wood, broken branches		1		18	18	18	18	1		
44	730	Douglas fir	21	21	16			OK	Abnormal bark, shedding bark, carpenter ants bark only, typical of species			1	16	16	16	16	1	1	
45	731	Silver maple	15	15	17			Poor	Previous top loss @ 40', weak laterals, vertical crack @ root crown up to 10' towards south		1		17	17	17	17	1		
46	732	Western red cedar	41	41	16			Fair	Racoon poop, cavity @ root crown up to 3' towards south, co-dominant leaders with included bark x2 @ 6', cavity @ root crown up to 6' towards south, woodpecker activity, carpenter ants		1		16	16	16	16	1		

DESIGN MAK
DRAWN RDC
CHECKED MAK
SEC 13 T 26N R 1E
DISC NO DATE 8/15/2018
SCALE AS NOTED

REV NO	REVISION DESCRIPTION	DATE	BY
1	REV. PER CITY COMMENTS, DATED 7/2019	7/22/19	RDC
2	REV. PER CITY COMMENTS, DATED 12/9/2019	12/12/19	RDC
3	REV. PER CITY COMMENTS, DATED 1/22/20	2/24/20	RDC

RON D. CLEAVER JR
2/24/2020

PROJECT MANAGER: RON D CLEAVER JR
SIGNATURE:

TITLE
CALAVISTA – PRD
TREE SURVEY DATA (1 OF 4)

CLIENT
CALDART POULSBO LLC
C/O BARRY MARGOLESE
105 S. MAIN ST, SUITE 230
SEATTLE, WA 98104
(206) 910–2728

RDCJR
CIVIL ENGINEERING
3231 NE TOTTEN ROAD, SUITE 103
POULSBO, WA 98370
(360) 265–1037 CELL
RON@RDCJRENGINEERING.COM

SHEET 4 OF 30
FILE NO 1222

CALAVISTA – PRD

TREE SURVEY DATA (2 OF 4)

Page **15** of **41**
Calavista

1	2	3	4	5	6	7		8	9	10			11				12		
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD Radius in feet				Tree credits	Viable tree credits	Retained tree credits
										Ret	Remove								
										Viable	Non-viable	For site improvements	N	W	E	S			
47	733	Western red cedar	14	14	15			OK	Self-corrected lean, asymmetric canopy towards west, suppressed canopy, typical of species			1	15	15	15	15	1	1	
48	734	Western red cedar	10	10	16			OK	Self-corrected lean towards west, typical of species			1	16	16	16	16	1	1	
49	735	Western red cedar	12	12	16			OK	Self-corrected lean, co-dominant canopy, asymmetric canopy towards west, typical of species			1	16	16	16	16	1	1	
50	736	Western red cedar	11	11	14			OK	Co-dominant canopy, asymmetric canopy towards south, typical of species			1	14	14	14	14	1	1	
51	737	Bigleaf maple	6, 10	11.5	16			Fair	Co-dominant leaders with included bark x2 @ root crown, suppressed canopy, low live crown ratio < 10%, self-corrected lean towards west		1		16	16	16	16	1		
52	738	Madrona	12, 13, 9	20	36			Fair	Co-dominant leaders with included bark x3 @ 1', suppressed canopy, dead scaffold, blight, typical of species		1		36	36	36	36	1		
53	739	Western red cedar	18, 13, 18, 10, 19, 17	39.5	14			OK	Co-dominant leaders with included bark x6 @ root crown, typical of species, racoon poop			1	14	14	14	14	1	1	
54	740	Douglas fir	17	17	14			OK	Dominant canopy, asymmetric canopy towards west, carpenter ants bark only, typical of species			1	14	14	14	14	1	1	

Page **16** of **41**
Calavista

1	2	3	4	5	6	7		8	9	10			11				12		
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD Radius in feet				Tree credits	Viable tree credits	Retained tree credits
										Ret	Remove								
										Viable	Non-viable	For site improvements	N	W	E	S			
55	743	Douglas fir	14	14	14			Fair	Self-corrected lean, previous top loss @ 50', asymmetric canopy towards west		1		14	14	14	14	1		
56	744	Madrona	11	11	28 west only			OK	Lean towards west, typical of species, dead wood, broken branches, suppressed canopy			1	28 west only	28 west only	28 west only	28 west only	1	1	
57	745	Douglas fir	16	16	14			OK	Exposed roots, girdled root? Low live crown ratio? Asymmetric canopy towards west, co-dominant canopy			1	14	14	14	14	1	1	
58	746	Douglas fir	13	13	10			OK	Suppressed canopy, asymmetric canopy towards west, exposed roots, girdled by Western red cedar roots			1	10	10	10	10	1	1	
59	747	Western red cedar	15	15	12			OK	Typical of species, dominant canopy, woodpecker activity, carpenter ants bark only			1	12	12	12	12	1	1	
60	748	Western red cedar	14, 14, 6, 12	24	14			OK	Co-dominant leaders with included bark x4 @ 2', suppressed canopy, dead spurs, typical of species			1	14	14	14	14	1	1	
61	749	Bigleaf maple	4, 8, 11, 9, 10, 8, 4	21.5	20			Poor	Co-dominant leaders with included bark x7 @ root crown, decay @ root crown, multiple cavities @ root crown		1		20	20	20	20	1		
62	750	Douglas fir	21	21	18			Fair	Dominant canopy, asymmetric canopy towards west, previous top loss, dead wood, broken branches, low live crown ratio < 30%		1		18	18	18	18	1		

Page **17** of **41**
Calavista

1	2	3	4	5	6	7		8	9	10			11				12		
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD Radius in feet				Tree credits	Viable tree credits	Retained tree credits
										Ret	Remove								
										Viable	Non-viable	For site improvements	N	W	E	S			
63	751	Madrona	12, 7	14	30 west only			Fair	Co-dominant leaders with included bark x2 @ 8', cavity @ root crown, suppressed canopy, typical of species		1		30 west only	30 west only	30 west only	30 west only	1		
64	752	Douglas fir	10	10	10			Fair	Previous top loss @ 50', supported by #751		1		10	10	10	10	1		
65	753	Douglas fir	15	15	14			OK	Low live crown ratio < 30%, asymmetric canopy towards northwest, co-dominant canopy, dead wood, broken branches, typical of species			1	14	14	14	14	1	1	
66	754	Madrona	17	17	22 west only			OK	Lean towards west, poor pruning with decay, co-dominant leaders with included bark x2 @ 5', typical of species			1	22 west only	22 west only	22 west only	22 west only	1	1	
67	755	Madrona	16	16	18 west only			OK	Lean towards west, typical of species			1	18 west only	18 west only	18 west only	18 west only	1	1	
68	756	Silver maple	15	15	17			Poor	Dying, poor, dead scaffold		1		17	17	17	17	1		
69	757	Bigleaf maple	15, 3, 8	17.5	22 south only		Y	Fair	Co-dominant leaders with included bark x3 @ root crown, asymmetric canopy towards south, moss and lichen, lean towards south	1			22 south only	22 south only	22 south only	22 south only	1	1	1
70	758	Bigleaf maple	9, 11, 6, 7, 9, 12	22.5	16		Y	Fair	Co-dominant leaders with included bark x6 @ root crown, moss and lichen, dead scaffold	1			16	16	16	16	1	1	1
71	759	Madrona	11	11	14		Y	Fair	Low live crown ratio < 5%, lean towards east	1			14	14	14	14	1	1	1

Page **18** of **41**
Calavista

1	2	3	4	5	6	7		8	9	10			11				12		
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD Radius in feet				Tree credits	Viable tree credits	Retained tree credits
										Ret	Remove								
										Viable	Non-viable	For site improvements	N	W	E	S			
72	760	Bigleaf maple	11	11	14			OK	Suppressed canopy, asymmetric canopy towards west, typical of species	1			14	14	14	14	1	1	1
73	761	Bigleaf maple	14, 9	16.5	17			OK	Co-dominant leaders with included bark x2 @ root crown, vertical crack @ root crown up to 35' towards north, asymmetric canopy towards north, typical of species	1			17	17	17	17	1	1	1
74	762	Madrona	15	15	18		Y	Fair	Co-dominant canopy, low live crown ratio < 10%, moss and lichen, multiple cavities	1			18	18	18	18	1	1	1
75	763	Bigleaf maple	10	10	14			OK	Low live crown ratio < 20%, moss and lichen, typical of species	1			14	14	14	14	1	1	1
76	765	Madrona	14	14	20		Y	Fair	Cavity @ root crown, exposed roots, lean towards south, typical of species	1			20	20	20	20	1	1	1
77	766	Bigleaf maple	9, 9, 15	19.5	15		Y	Fair	Co-dominant leaders with included bark x3 @ root crown, large cavity @ root crown	1			15	15	15	15	1	1	1
78	770	Hemlock	8, 7	10.5	9			Poor	Co-dominant leaders with included bark x2 @ root crown, perennial canker, moss and lichen, exposed roots, mostly dead		1		9	9	9	9	1		
79	771	Bigleaf maple	8, 5, 7	11.5	10		Y	Fair	Co-dominant leaders with included bark x3 @ root crown, cavity @ root crown up to 1'			1	10	10	10	10	1	1	
80	773	Douglas fir	11	11	10			OK	Co-dominant canopy, low live crown ratio < 10%, dead wood, broken branches, typical of species			1	10	10	10	10	1	1	

Page **19** of **41**
Calavista

1	2	3	4	5	6	7		8	9	10			11				12		
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD Radius in feet				Tree credits	Viable tree credits	Retained tree credits
										Ret	Remove								
										Viable	Non-viable	For site improvements	N	W	E	S			
81	775	Scouler willow	6, 16	17	18			Poor	Co-dominant leaders with included bark x2 @ 2', dead scaffold, dead wood, broken branches moss and lichen, dead top		1		18	18	18	18	1		
82	776	Douglas fir	12	12	12			OK	Moss and lichen, exposed roots, low live crown ratio < 15%, dead wood, broken branches, typical of species			1	12	12	12	12	1	1	
83	780	Red alder	11	11	14			Fair	Lean towards west, asymmetric canopy towards west, previous top loss		1		14	14	14	14	1		
84	782	Douglas fir	16	16	12			OK	Low live crown ratio < 20%, dead wood, broken branches, moss and lichen, typical of species			1	12	12	12	12	1	1	
85	783	Douglas fir	16	16	12			OK	Low live crown ratio < 15%, co-dominant canopy, dead wood, broken branches, moss and lichen, typical of species			1	12	12	12	12	1	1	
86	786	Red alder	9, 10	13.5	16			Fair	Co-dominant leaders with included bark x2 @ root crown, dead top, moss and lichen		1		16	16	16	16	1		
87	787	Scouler willow	5, 14	15	20			Fair	Co-dominant leaders with included bark x2 @ root crown, dead wood, broken branches		1		20	20	20	20	1		
88	788	Scouler willow	14	14	22			Fair	Moss and lichen, dead wood, broken branches, dead top		1		22	22	22	22	1		
89	792	Bigleaf maple	12	12	18			Fair	Co-dominant leaders with included bark x2 @ 5', weak leaders, moss and lichen, dead wood, low live crown ratio < 20%		1		18	18	18	18	1		

Page **20** of **41**
Calavista

1	2	3	4	5	6	7		8	9	10			11				12		
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD Radius in feet				Tree credits	Viable tree credits	Retained tree credits
										Ret	Remove								
										Viable	Non-viable	For site improvements	N	W	E	S			
90	793	Bigleaf maple	12	12	16			OK	Moss and lichen, asymmetric canopy towards west, self-corrected lean towards west, typical of species			1	16	16	16	16	1	1	
91	796	Douglas fir	17, 4	17.5	12			OK	Co-dominant leaders with included bark x2 @ 12', dominant canopy, dead wood, broken branches, moss and lichen, typical of species, co-dominant leaders with included bark x2 @ root crown			1	12	12	12	12	1	1	
92	797	Grand fir	14	14	14			OK	Exposed roots, dominant canopy, some free flowing sap @ 3' towards south, typical of species			1	14	14	14	14	1	1	
93	798	Bigleaf maple	13	13	14			OK	Tag on branch towards east, typical of species			1	14	14	14	14	1	1	
94	799	Red alder	6, 20, 10	23	18			Fair	Previous top loss multiple times, moss and lichen, dead top, co-dominant leaders with included bark x3 @ 3', dead scaffold, tag on branch towards east		1		18	18	18	18	1		
95	800	True fir	20	20	17			OK	Typical of species, dead wood, broken branches, moss and lichen, previous top loss, elongated branch			1	17	17	17	17	1	1	
96	801	Bigleaf maple	10	10	12			OK	Typical of species			1	12	12	12	12	1	1	
97	802	Western red cedar	31	31	16			OK	Thin canopy, drought stress, carpenter ants bark only, typical of species			1	16	16	16	16	1	1	
98	803	Red alder	10	10	14			Fair	Lean towards west, dead top		1		14	14	14	14	1		

DESIGN MAK
DRAWN RDC
CHECKED MAK
SEC 13 T 26N R 1E
DISC NO ____ DATE 8/15/2018
SCALE AS NOTED

REV NO	REVISION DESCRIPTION	DATE	BY
1	REV. PER CITY COMMENTS, DATED 7/2019	7/22/19	RDC
2	REV. PER CITY COMMENTS, DATED 12/9/2019	12/12/19	RDC
3	REV. PER CITY COMMENTS, DATED 1/22/20	2/24/20	RDC

RON D. CLEAVER JR
2/24/2020

SIGNATURE:

TITLE
CALAVISTA – PRD
TREE SURVEY DATA (2 OF 4)

CLIENT
CALDART POULSBO LLC
C/O BARRY MARGOLESE
105 S. MAIN ST, SUITE 230
SEATTLE, WA 98104
(206) 910–2728

PROJECT MANAGER: RON D CLEAVER JR

RDCJR
CIVIL ENGINEERING
3231 NE TOTTEN ROAD, SUITE 103
POULSBO, WA 98370
(360) 265–1037 CELL
RON@RDCJRENGINEERING.COM

SHEET 5 OF 30
FILE NO 1222

CALAVISTA – PRD

TREE SURVEY DATA (3 OF 4)

Page **21** of **41**
Calavista

1	2	3	4	5	6	7		8	9	10			11				12		
										Proposed Action			CRZ/TPZ/LOD						
													Radius in feet						
										Ret	Remove								
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Viable	Non-viable	For site improve-ments	N	W	E	S	Tree credits	Viable tree credits	Retained tree credits
99	804	Red alder	18	18	18			Fair	Dead wood, broken branches, cavity @ 10', moss and lichen, dead top, dead spur, vertical crack @ 4' up to 6' towards west		1		18	18	18	18	1		
100	805	True fir	18	18	19			OK	Girdling from #806, carpenter ants, woodpecker activity, typical of species			1	19	19	19	19	1	1	
101	806	Western red cedar	10	10	14			OK	Suppressed canopy, typical of species			1	14	14	14	14	1	1	
102	807	True fir	20	20	18			OK	Previous top loss, elongated branch, coning, dead wood, broken branches, exposed roots, typical of species			1	18	18	18	18	1	1	
103	808	Western red cedar	20	20	20			OK	Exposed roots, cavity @ root crown towards west, carpenter ants woodpecker activity, thin canopy, typical of species			1	20	20	20	20	1	1	
104	809	True fir	21	21	20			OK	Exposed roots, self-corrected lean towards north, typical of species			1	20	20	20	20	1	1	
105	810	Bigleaf maple	12	12	16			OK	Moss and lichen, typical of species			1	16	16	16	16	1	1	
106	811	Douglas fir	10	10	12			OK	Typical of species, co-dominant canopy, low live crown ratio < 30%, dead wood, broken branches			1	12	12	12	12	1	1	
107	812	Douglas fir	9, 8	12	14			Fair	Moss and lichen, co-dominant leaders with included bark x2 @ 4', low live crown ratio < 5%, dead wood, broken branches		1		14	14	14	14	1		

Page **22** of **41**
Calavista

1	2	3	4	5	6	7		8	9	10			11				12		
										Proposed Action			CRZ/TPZ/LOD						
													Radius in feet						
										Ret	Remove								
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Viable	Non-viable	For site improve-ments	N	W	E	S	Tree credits	Viable tree credits	Retained tree credits
108	813	Western red cedar	4, 6, 8	11	14			OK	Co-dominant leaders with included bark x3 @ root crown, twisted trunks, dominant canopy, typical of species			1	14	14	14	14	1	1	
109	814	Douglas fir	10	10	12			OK	Dominant canopy, previous top loss, elongated branches, dead wood, broken branches, typical of species			1	12	12	12	12	1	1	
110	815	True fir	11	11	16			Poor	Self-corrected lean towards north, calloused wound @ 4' up to 8', serpentine trunk, asymmetric canopy towards north		1		16	16	16	16	1		
111	816	Madrona	9, 9	12.5	24 north only			OK	Co-dominant leaders with included bark x2 @ root crown, lean towards north, asymmetric canopy towards north, blight, dead wood, broken branches, typical of species			1	24 north only	24 north only	24 north only	24 north only	1	1	
112	817	True fir	18	18	19			Fair	Co-dominant leaders with included bark x2 @ 15', moss and lichen, dominant canopy, dead wood, typical of species		1		19	19	19	19	1		
113	818	Madrona	14	14	16			OK	Self-corrected lean towards west, typical of species	1			16	16	16	16	1	1	1
114	819	Red alder	15	15	20			Poor	Vertical cracks in bark, previous top loss @ 12', weak laterals, dead wood, broken branches, dead scaffold		1		20	20	20	20	1		
115	820	Western red cedar	18	18	18			OK	Thin canopy, typical of species, exposed roots, nurse tree, strong leader, previous	1			18	18	18	18	1	1	1

Page **23** of **41**
Calavista

1	2	3	4	5	6	7		8	9	10			11				12		
										Proposed Action			CRZ/TPZ/LOD						
													Radius in feet						
										Ret	Remove								
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Viable	Non-viable	For site improve-ments	N	W	E	S	Tree credits	Viable tree credits	Retained tree credits
									top loss @ 15', elongated branches										
116	821	Douglas fir	20	20	16		Y	Fair	Horizontal crack @ 22', free flowing sap, laminated root rot, calloused wound @ 6'	1			16	16	16	16	1	1	1
117	822	Madrona	13, 8	15.5	17			OK	Co-dominant leaders with included bark x2 @ 1', blight, typical of species	1			17	17	17	17	1	1	1
118	823	Madrona	9, 2	9	16			OK	Co-dominant leaders with included bark x2 @ root crown, typical of species, lean towards south	1			12	12	12	12	1	1	1
119	824	Madrona	9	9	18			OK	Lean towards north, blight, cavity @ 15' up to 18' towards south	1			16	16	16	16	1	1	1
120	825	Madrona	9	9	12			OK	Typical of species	1			16	16	16	16	1	1	1
121	826	Madrona	9	9	14			OK	Asymmetric canopy towards south, typical of species	1			10	10	10	10	1	1	1
122	827	Madrona	12	12	14			OK	Serpentine trunk, typical of species	1			14	14	14	14	1	1	1
123	828	Douglas fir	17	17	14			OK	Dominant canopy, dead wood, broken branches, typical of species	1			14	14	14	14	1	1	1
124	829	Western red cedar	16, 10, 10	21.5	16			OK	Co-dominant leaders with included bark x3 @ 2', spur @ 25', horizontal crack @ 25' towards east	1			16	16	16	16	1	1	1
125	830	Red alder	14	14	18			Poor	Mostly dead		1		18	18	18	18	1		
126	831	Douglas fir	22	22	16			OK	Dominant canopy, dead wood, broken branches, typical of species	1			16	16	16	16	1	1	1

Page **24** of **41**
Calavista

1	2	3	4	5	6	7		8	9	10			11				12		
										Proposed Action			CRZ/TPZ/LOD						
													Radius in feet						
										Ret	Remove								
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Viable	Non-viable	For site improve-ments	N	W	E	S	Tree credits	Viable tree credits	Retained tree credits
127	832	Madrona	16, 16	22.5	18			Good	Co-dominant leaders with included bark x2 @ root crown, typical of species, blight	1			18	18	18	18	1	1	1
128	833	Western red cedar	4, 15, 13	20	16			OK	Co-dominant leaders with included bark x3 @ 1', co-dominant canopy, typical of species, cavity @ root crown towards northwest	1			16	16	16	16	1	1	1
129	834	Douglas fir	14	14	14			OK	Hanger, co-dominant canopy, previous top loss, elongated branch, asymmetric canopy towards south, typical of species	1			14	14	14	14	1	1	1
130	835	Douglas fir	14	14	16		Y	Fair	Low live crown ratio < 25%, co-dominant leaders with included bark x2 @ 40	1			16	16	16	16	1	1	1
131	836	Madrona	9	9	16 north only		Y	Fair	Dead wood, broken branches, moss and lichen, blight	1			16 north only	16 north only	16 north only	16 north only	1	1	1
132	837	True fir	24	24	16			OK	Moss and lichen, carpenter ants bark only, woodpecker activity, dominant canopy, hangers	1			16	16	16	16	1	1	1
133	838	Madrona	21	21	26			OK	Serpentine trunk, typical of species	1			26	26	26	26	1	1	1
134	839	Douglas fir	14	14	17			OK	Carpenter ants, dead wood, broken branches, typical of species	1			17	17	17	17	1	1	1
135	840	Bitter cherry	15	15	20		Y	Fair	Gummosis, self-corrected lean towards south, multiple cavities	1			20	20	20	20	1	1	1

Page **25** of **41**
Calavista

1	2	3	4	5	6	7		8	9	10			11				12		
										Proposed Action			CRZ/TPZ/LOD						
													Radius in feet						
										Ret	Remove								
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Viable	Non-viable	For site improve-ments	N	W	E	S	Tree credits	Viable tree credits	Retained tree credits
136	841	True fir	14	14	20			OK	Ivy @ root crown up to 10', aphid, typical of species, thin canopy			1	20	20	20	20	1	1	
137	842	True fir	5, 7, 12, 12, 12	22.5	12			OK	Aphid, co-dominant leaders with included bark x5 @ root crown, typical of species, dead wood, broken branches, dominant canopy			1	12	12	12	12	1	1	
138	843	Western red cedar	37	37	16			OK	Co-dominant leaders with included bark x3 @ 25', typical of species, free flowing sap			1	16	16	16	16	1	1	
139	844	Red alder	10	10	12			Fair	Dead top, moss and lichen, typical of species		1		12	12	12	12	1		
140	845	Madrona	12	12	8			Fair	Cavity @ root crown up to 12' towards north, co-dominant leaders with included bark x2 @ 8'		1		8	8	8	8	1		
141	846	Douglas fir	15	15	16			OK	Co-dominant canopy, moss and lichen, typical of species			1	16	16	16	16	1	1	
142	847	Douglas fir	14	14	16			Fair	Co-dominant leaders with included bark x2 @ 20', weak laterals, lean towards south, exposed roots, dead wood, broken branches		1		16	16	16	16	1		
143	848	Red alder	6, 5, 4, 7	11	12			Fair	Co-dominant leaders with included bark x4 @ root crown, dead scaffold, dead wood, dead top		1		12	12	12	12	1		
144	849	Douglas fir	12	12	14			Fair	Asymmetric canopy towards north, co-dominant leaders with included bark x2 @ 50', thin canopy		1		14	14	14	14	1		

Page **26** of **41**
Calavista

1	2	3	4	5	6	7		8	9	10			11				12		
										Proposed Action			CRZ/TPZ/LOD						
													Radius in feet						
										Ret	Remove								
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Viable	Non-viable	For site improve-ments	N	W	E	S	Tree credits	Viable tree credits	Retained tree credits
145	850	Douglas fir	13	13	12			Fair	Torque crack @ 6' up to 10' towards south, dead wood, broken branches, low live crown ratio < 15%, fused spur @ root crown up to 12'		1		12	12	12	12	1		
146	851	Douglas fir	12	12	16			Fair	Co-dominant canopy, exposed roots, moss and lichen, dead wood, broken branches, low live crown ratio < 15%		1		16	16	16	16	1		
147	852	Douglas fir	10	10	16			OK	Low live crown ratio < 20%, dead wood, broken branches, typical of species, co-dominant canopy			1	16	16	16	16	1	1	
148	853	Douglas fir	10	10	10			Fair	Co-dominant leaders with included bark x2 @ 40', dead wood, broken branches, co-dominant canopy		1		10	10	10	10	1		
149	854	Douglas fir	10	10	12			Fair	Serpentine trunk, previous top loss, weak laterals, moss and lichen		1		12	12	12	12	1		
150	855	Douglas fir	13	13	12			OK	Co-dominant canopy, epicormic branch formation @ 10' towards west, typical of species			1	12	12	12	12	1	1	
151	856	Douglas fir	10	10	10 south only			Fair	Asymmetric canopy towards south, lean towards south, low live crown ratio < 10%, previous top loss		1		10 south only	10 south only	10 south only	10 south only	1		
152	857	Douglas fir	16	16	12			OK	Co-dominant canopy, moss and lichen, exposed roots, dominant canopy, previous top loss, elongated branch			1	12	12	12	12	1	1	

DESIGN MAK
DRAWN RDC
CHECKED MAK
SEC 13 T 26N R 1E
DISC NO ____ DATE 8/15/2018
SCALE AS NOTED

REV NO	REVISION DESCRIPTION	DATE	BY
1	REV. PER CITY COMMENTS, DATED 7/2019	7/22/19	RDC
2	REV. PER CITY COMMENTS, DATED 12/9/2019	12/12/19	RDC
3	REV. PER CITY COMMENTS, DATED 1/22/20	2/24/20	RDC

43644
2/24/2020

PROJECT MANAGER: RON D CLEAVER JR

SIGNATURE:

TITLE
CALAVISTA – PRD
TREE SURVEY DATA (3 OF 4)

CLIENT
CALDART POULSBO LLC
C/O BARRY MARGOLESE
105 S. MAIN ST, SUITE 230
SEATTLE, WA 98104
(206) 910-2728

RDCJR
CIVIL ENGINEERING
3231 NE TOTTEN ROAD, SUITE 103
POULSBO, WA 98370
(360) 265-1037 CELL
RON@RDCJRENGINEERING.COM

SHEET 6 OF 30
FILE NO 1222

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CALAVISTA – PRD

TREE SURVEY DATA (4 OF 4)

Page **27** of **41**
Calavista

1	2	3	4	5	6	7		8	9	10			11				12		
										Proposed Action			CRZ/TPZ/LOD Radius in feet						
										Ret	Remove								
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Viable	Non-viable	For site improve-ments	N	W	E	S	Tree credits	Viable tree credits	Retained tree credits
153	858	Douglas fir	16	16	17			Fair	Self-corrected lean towards south, serpentine trunk, previous top loss, elongated branch, moss and lichen, dead wood, broken branches, typical of species		1		17	17	17	17	1		
154	859	Madrona	10	10	14			OK	Self-corrected lean towards east, co-dominant leaders with included bark x2 @ 12', blight, asymmetric canopy towards east, moss and lichen, typical of species			1	14	14	14	14	1	1	
155	860	Douglas fir	11	11	12			OK	Asymmetric canopy towards south, low live crown ratio < 25%, dead wood, broken branches, typical of species, exposed roots			1	12	12	12	12	1	1	
156	861	Madrona	12	12	14			OK	Dead wood, broken branches, blight, serpentine trunk, typical of species			1	14	14	14	14	1	1	
157	862	Madrona	11	11	16			OK	Typical of species, co-dominant leaders with included bark x2 @ 22'			1	16	16	16	16	1	1	
158	863	Madrona	11	11	12			OK	Typical of species			1	12	12	12	12	1	1	
159	864	Madrona	10	10	16			Poor	Dead wood, broken branches, dieback		1		16	16	16	16	1		
160	865	Madrona	12, 11	16.5	16			OK	Co-dominant leaders with included bark x2 @ root crown, some drought stress, typical of species			1	16	16	16	16	1	1	
161	866	Red alder	10	10	14			Fair	Top dead, moss and lichen, canker		1		14	14	14	14	1		

Page **28** of **41**
Calavista

1	2	3	4	5	6	7		8	9	10			11				12		
										Proposed Action			CRZ/TPZ/LOD Radius in feet						
										Ret	Remove								
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Viable	Non-viable	For site improve-ments	N	W	E	S	Tree credits	Viable tree credits	Retained tree credits
162	867	Douglas fir	14	14	14		Y	Fair	Exposed roots, previous top loss, elongated branches, dead wood, broken branches, dominant canopy			1	14	14	14	14	1	1	
163	868	Scouler willow	15	15	16			Fair	Co-dominant leaders with included bark x3 @ 5', dead wood, broken branches, dead top		1		16	16	16	16	1		
164	869	Madrona	16	16	16			OK	Self-corrected lean towards west, dead wood, broken branches, suppressed canopy			1	16	16	16	16	1	1	
165	870	Western red cedar	24	24	18			Poor	Self-corrected lean towards southwest, cavity @ root crown up to 3' towards north, large cavity @ 30' up to 40'		1		18	18	18	18	1		
166	871	Scouler willow	17	17	17		Y	Fair	Exposed roots, moss and lichen, co-dominant leaders with included bark x2 @ 6', dead wood, broken branches			1	17	17	17	17	1	1	
167	872	Sequoia	25	25	16			Poor	Dying, drought stress		1		16	16	16	16	1		
168	873	Douglas fir	16	16	18		Y	Fair	Previous top loss @ 70', weak leaders, low live crown ratio < 20%			1	18	18	18	18	1	1	
169	874	Douglas fir	15	15	15			OK	Previous top loss, elongated branch, dominant canopy, dead wood, broken branches, typical of species			1	15	15	15	15	1	1	
170	875	True fir	12	12	12		Y	Fair	Co-dominant canopy, asymmetric canopy towards west, dead wood, broken branches, low live crown ratio < 20%			1	12	12	12	12	1	1	

Page **29** of **41**
Calavista

1	2	3	4	5	6	7		8	9	10			11				12		
										Proposed Action			CRZ/TPZ/LOD Radius in feet						
										Ret	Remove								
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Viable	Non-viable	For site improve-ments	N	W	E	S	Tree credits	Viable tree credits	Retained tree credits
171	876	True fir	16	16	16			OK	Girdling root towards west, co-dominant canopy, dead wood, broken branches, typical of species			1	16	16	16	16	1	1	
172	877	Douglas fir	13	13	14			OK	Dominant canopy, dead wood, broken branches, typical of species			1	14	14	14	14	1	1	
173	878	Silver maple	10, 15, 18, 14	29	18		Y	Fair	Co-dominant leaders with included bark x4 @ root crown, large cavity @ 4' up to 12' towards south, dead scaffold, hangers, previous failures			1	18	18	18	18	1	1	
174	879	Western red cedar	28	28	18			OK	Tag tied to Laurel on north side, thin canopy, coning, drought stressed			1	18	18	18	18	1	1	
175	882	River birch	17	17	18			OK	Woodpecker activity, carpenter ants, typical of species			1	18	18	18	18	1	1	
176	883	River birch	12	12	16			OK	Co-dominant canopy, carpenter ants, woodpecker activity, typical of species			1	16	16	16	16	1	1	
177	884	River birch	26	26	21			OK	Co-dominant leaders with included bark x2 @ 30', carpenter ants, woodpecker activity, co-dominant canopy			1	21	21	21	21	1	1	
178	885	River birch	22	22	16			OK	Co-dominant canopy, carpenter ants, woodpecker activity, typical of species			1	16	16	16	16	1	1	
179	886	River birch	25	25	14			OK	Lean towards north, carpenter ants, woodpecker activity, typical of species, #882 through #886 tags ties to raspberry pole			1	14	14	14	14	1	1	

Page **30** of **41**
Calavista

1	2	3	4	5	6	7		8	9	10			11				12		
										Proposed Action			CRZ/TPZ/LOD Radius in feet						
										Ret	Remove								
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Viable	Non-viable	For site improve-ments	N	W	E	S	Tree credits	Viable tree credits	Retained tree credits
180	888	Western red cedar	15	15	16			OK	Spur @ 15' towards south, previous top loss @ 50', typical of species	1			16	16	16	16	1	1	1
181	889	Douglas fir	24	24	14			OK	Moss and lichen, typical of species	1			14	14	14	14	1	1	1
182	890	Bigleaf maple	17	17	17		Y	Fair	Nurse tree, exposed roots, roots intertwined with Western red cedar, typical of species	1			17	17	17	17	1	1	1
183	891	Western red cedar	20, 17, 14	29.5	17			OK	Co-dominant leaders with included bark x3 @ root crown, carpenter ants, woodpecker activity, nurse tree, twisted girdled trunks	1			17	17	17	17	1	1	1
184	892	Western red cedar	10	10	10			OK	Unable to assess due to blackberries			1	10	10	10	10	1	1	
185	893	Western red cedar	11	11	11			OK	Unable to assess due to blackberries			1	11	11	11	11	1	1	
186	894	Western red cedar	12	12	12			OK	Unable to assess due to blackberries			1	12	12	12	12	1	1	
187	895	Western red cedar	12	12	12			OK	Unable to assess due to blackberries			1	12	12	12	12	1	1	
188	896	Western red cedar	15	15	15			OK	Unable to assess due to blackberries			1	15	15	15	15	1	1	
189	897	Western red cedar	13	13	13			OK	Unable to assess due to blackberries			1	13	13	13	13	1	1	
190	898	Western red cedar	20	20	20			OK	Unable to assess due to blackberries			1	20	20	20	20	1	1	

Page **31** of **41**
Calavista

1	2	3	4	5	6	7		8	9	10			11				12		
										Proposed Action			CRZ/TPZ/LOD Radius in feet						
										Ret	Remove								
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Viable	Non-viable	For site improve-ments	N	W	E	S	Tree credits	Viable tree credits	Retained tree credits
191	899	Western red cedar	11	11	11			OK	Unable to assess due to blackberries			1	11	11	11	11	1	1	
192	900	Douglas fir	13	13	13			OK	Unable to assess due to blackberries			1	13	13	13	13	1	1	
193	901	Western red cedar	12	12	12			OK	Unable to assess due to blackberries			1	12	12	12	12	1	1	
194	902	Douglas fir	12	12	12			OK	Unable to assess due to blackberries			1	12	12	12	12	1	1	
195	16	Douglas fir	5	5	6			OK	Typical of species	1			6	6	6	6	1	1	1
196	17	Douglas fir	6	6	6			OK	Hanger, typical of species	1			6	6	6	6	1	1	1
197	18	Douglas fir	6	6	6			OK	Typical of species	1			6	6	6	6	1	1	1
198	19	Douglas fir	9	9	8			OK	Typical of species	1			8	8	8	8	1	1	1
199	20	Douglas fir	5	5	6			OK	Typical of species, asymmetric canopy towards west	1			6	6	6	6	1	1	1
200	21	Douglas fir	6	6	9			OK	Douglas fir, asymmetric canopy towards west, typical of species	1			9	9	9	9	1	1	1
201	22	Douglas fir	7	7	4			OK	Typical of species	1			4	4	4	4	1	1	1
202	23	Douglas fir	4	4	6			OK	Typical of species	1			6	6	6	6	1	1	1
203	24	Douglas fir	7	7	7			OK	Typical of species	1			7	7	7	7	1	1	1
204	25	Douglas fir	6	6	4			OK	Typical of species	1			4	4	4	4	1	1	1
205	26	Douglas fir	4	4	4			OK	Typical of species	1			4	4	4	4	1	1	1
206	27	Douglas fir	8	8	6			OK	Typical of species	1			6	6	6	6	1	1	1

Page **32** of **41**
Calavista

1	2	3	4	5	6	7		8	9	10			11				12		
										Proposed Action			CRZ/TPZ/LOD Radius in feet						
										Ret	Remove								
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Viable	Non-viable	For site improve-ments	N	W	E	S	Tree credits	Viable tree credits	Retained tree credits
207	28	Douglas fir	7	7	4			OK	Typical of species	1			4	4	4	4	1	1	1
208	29	Douglas fir	8	8	5			OK	Typical of species	1			5	5	5	5	1	1	1
209	30	Bigleaf maple	9	9	10			OK	Previous top loss @ 25', typical of species	1			10	10	10	10	1	1	1
210	31	Bigleaf maple	8	8	8			OK	Typical of species	1			8	8	8	8	1	1	1
211	32	Douglas fir	7	7	6			OK	Typical of species	1			6	6	6	6	1	1	1
212	33	Bigleaf maple	6	6	6			OK	Typical of species	1			6	6	6	6	1	1	1
213	34	Bigleaf maple	6	6	8			OK	Co-dominant leaders with included bark x2 @ 15', typical of species	1			8	8	8	8	1	1	1
214	35	Bigleaf maple	7	7	9			OK	Typical of species, moss and lichen	1			9	9	9	9	1	1	1
215	36	Western red cedar	7	7	10			OK	Nurse tree, typical of species	1			10	10	10	10	1	1	1
216	37	Douglas fir	6	6	5			OK	Typical of species	1			5	5	5	5	1	1	1
217	38	Douglas fir	5	5	5			OK	Typical of species	1			5	5	5	5	1	1	1
218	39	Douglas fir	6	6	5			OK	Moss and lichen, typical of species	1			5	5	5	5	1	1	1
219	40	Douglas fir	5	5	6			OK	Typical of species, low live crown ratio < 30%	1			6	6	6	6	1	1	1
220	41	Douglas fir	5	5	6			OK	Typical of species	1			6	6	6	6	1	1	1
221	42	Madrona	8	8	15 east only			OK	Typical of species, lean towards east	1			15	15	15	15	1	1	1
										65	57	99					221	164	65

DESIGN	MAK
DRAWN	RDC
CHECKED	MAK

SEC 13 T 26N R 1E
DISC NO ____ DATE 8/15/2018
SCALE AS NOTED

REV NO	REVISION DESCRIPTION	DATE	BY
1	REV. PER CITY COMMENTS, DATED 7/2019	7/22/19	RDC
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3	REV. PER CITY COMMENTS, DATED 1/22/20	2/24/20	RDC

RON D. CLEAVER JR
43644
2/24/2020

PROJECT MANAGER: RON D CLEAVER JR
SIGNATURE:

TITLE
CALAVISTA – PRD
TREE SURVEY DATA (4 OF 4)

CLIENT
CALDART POULSBO LLC
C/O BARRY MARGOLESE
105 S. MAIN ST, SUITE 230
SEATTLE, WA 98104
(206) 910-2728

RDCJR
CIVIL ENGINEERING
3231 NE TOTTEN ROAD, SUITE 103
POULSBO, WA 98370
(360) 265-1037 CELL
RON@RDCJRENGINEERING.COM

SHEET 7 OF 30
FILE NO 1222

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CALAVISTA – PRD

TREE RETENTION PLAN

TREE DENSITY CALCULATION	
TOTAL NUMBER OF SIGNIFICANT TREES	194
TOTAL NUMBER OF ONSITE VIABLE TREES	137
TOTAL NUMBER OF TREE CREDITS	194
TOTAL HEALTHY TREE CREDITS	137
TOTAL UNHEALTHY TREE CREDITS	57
REQUIRED TREE DENSITY (194 *25%)	49
NUMBER OF RETAINED TREES <10"	38
NUMBER OF RETAINED TREES >10" (122" EQUIVALENT / 10" = 12 TREE CREDITS)	12
TOTAL NUMBER OF RETAINED TREE CREDITS (38 + 12)	50
REQUIRED MITIGATION	0

ALL RETAINED TREES IN THIS TABLE WILL BE PRESERVED IN OPEN SPACE TRACTS OR IN "TREE RETENTION" EASEMENTS THAT WILL HAVE SPECIFIC MAINTENANCE LANGUAGE AND OTHER NOTES REGARDING USES AND LIMITATIONS.

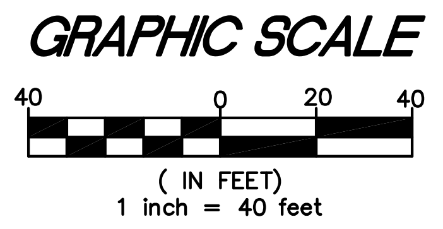
SITE SPECIFIC TREE PROTECTION MEASURES:

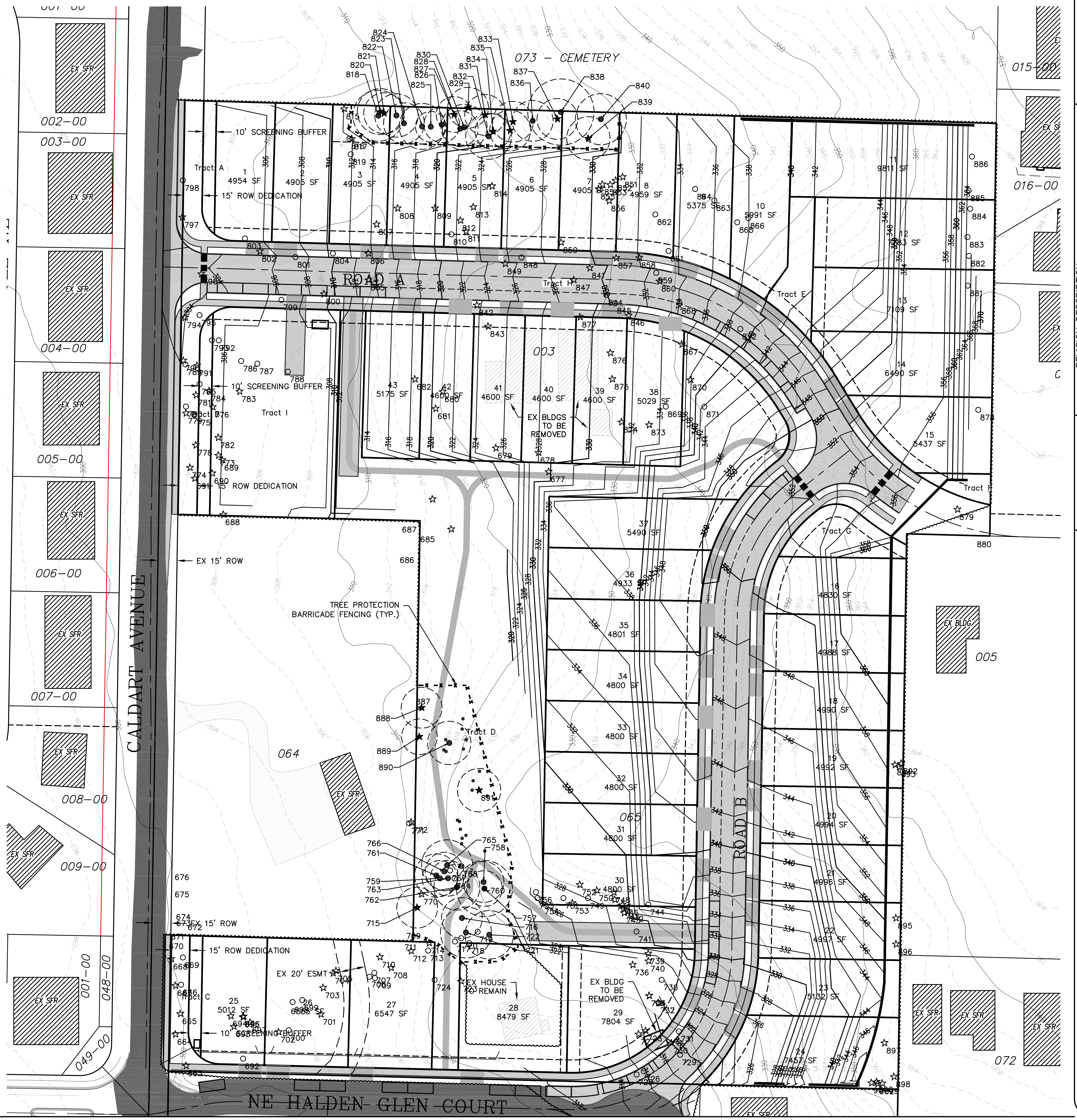
1. ALL TREE PROTECTION EASEMENT AREAS WILL BE PROTECTED ALONG CLEARING LIMIT AREAS WITH ORANGE BARRICADE STYLE FENCING.

2. TREE RETENTION EASEMENTS WILL BE ESTABLISHED FOR TREES TO BE RETAINED THAT ARE LOCATED ON "LOT" AREAS. SPECIFICALLY ON LOTS 3-7.

3. TREES RETAINED WITHIN "OPEN SPACE TRACTS" WILL NOT NEED EASEMENTS. SEE TRACT D.

4. TREES SMALLER THAN 10" DBH ARE BEING SAVED IN TRACT D . THESE SAVED TREES ARE BEING COUNTED FOR RETENTION CREDIT OF 1 TREE UNIT PER 10 INCHES SAVED. SEE "TREE RETENTION PLAN - TRACT D" SHEET 9 FOR DETAIL AND NOTES.





18.180.070 TREE PROTECTION MEASURES.

A. PRIOR TO INITIATING TREE REMOVAL AND LAND ALTERATION ON THE SITE, TREES AND VEGETATED AREAS IDENTIFIED DURING LAND USE PERMIT APPROVAL TO BE PRESERVED SHALL BE PROTECTED FROM POTENTIALLY DAMAGING ACTIVITIES.

1. TREE RETENTION TRACT(S), OPEN SPACE TRACT(S) OR OTHER PROTECTIVE MECHANISM SHALL BE DEPICTED ON ALL SUBMITTED CONSTRUCTION OR LAND ALTERATION PLANS, INCLUDING BUT NOT LIMITED TO LAND CLEARING AND GRADING PERMITS, FINAL LANDSCAPE PLANS, AND ENGINEERING CONSTRUCTION DRAWINGS.
2. TREE RETENTION TRACT(S), OPEN SPACE TRACT(S), OR OTHER PROTECTIVE MECHANISM SHALL BE SHOWN ON THE FACE OF THE PLAT, BINDING SITE PLAN OR SIMILAR DOCUMENTS, WITH A NOTE ON THE FACE DESCRIBING THE PURPOSE FOR LONG-TERM RETENTION.
3. THE RETAINED TREES SHOULD BE DRAWN TO SCALE, PROTECTIVE MEASURES INCLUDED IN THE CONSTRUCTION NOTES, AND THE DETAIL FOR PROTECTION FENCING INCLUDED.

B. BEFORE LAND CLEARING, FILLING OR ANY LAND ALTERATION APPROVED THROUGH A LAND CLEARING OR GRADING PERMIT, THE APPLICANT:

1. SHALL INSTALL A VISIBLE PROTECTIVE TREE FENCING ALONG THE OUTER EDGE AND COMPLETELY SURROUNDING THE PROTECTED AREA (DRIPLINE/CRITICAL ROOT ZONE) OF ALL PROTECTED TREES OR GROUPS OF TREES. FENCES SHALL BE CONSTRUCTED OF CHAIN LINK OR OTHER APPROVED MATERIAL AND AT LEAST FOUR FEET HIGH, UNLESS OTHER TYPE OF FENCING IS AUTHORIZED BY THE REVIEW AUTHORITY.
2. SHALL PROHIBIT EXCAVATION OR COMPACTION OF EARTH OR OTHER POTENTIALLY DAMAGING ACTIVITIES WITHIN THE BARRIERS.
3. SHALL MAINTAIN THE PROTECTIVE BARRIERS IN PLACE UNTIL THE REVIEW AUTHORITY AUTHORIZES THEIR REMOVAL OR A FINAL CERTIFICATE OF OCCUPANCY IS ISSUED, WHICHEVER OCCURS FIRST.
4. SHALL ENSURE THAT ANY LANDSCAPING DONE IN THE PROTECTED ZONE SUBSEQUENT TO THE REMOVAL OF THE BARRIERS SHALL BE ACCOMPLISHED WITH LIGHT MACHINERY OR HAND LABOR.
5. IN ADDITION TO THE ABOVE, THE PLANNING DIRECTOR MAY REQUIRE THE FOLLOWING:

a. COVER WITH MULCH TO A DEPTH OF AT LEAST SIX INCHES OR WITH PLYWOOD OR SIMILAR MATERIAL THE AREAS ADJOINING THE CRITICAL ROOT ZONE OF A TREE IN ORDER TO PROTECT ROOTS FROM DAMAGE CAUSED BY HEAVY EQUIPMENT.

b. MINIMIZE ROOT DAMAGE BY EXCAVATING A TWO-FOOT-DEEP TRENCH, AT EDGE OF CRITICAL ROOT ZONE, TO CLEANLY SEVER THE ROOTS OF TREES TO BE RETAINED.

c. HAVE CORRECTIVE PRUNING PERFORMED ON PROTECTED TREES IN ORDER TO AVOID DAMAGE FROM MACHINERY OR BUILDING ACTIVITY.

d. MAINTAIN TREES THROUGHOUT CONSTRUCTION PERIOD BY WATERING AND FERTILIZING.

C. DIRECTIONAL FELLING OF TREES SHALL BE USED TO AVOID DAMAGE TO TREES DESIGNATED FOR RETENTION.

D. ALL CONSTRUCTION ACTIVITIES, INCLUDING STAGING AND TRAFFIC AREAS, SHALL BE PROHIBITED WITHIN FIVE FEET OF THE DRIPLINE OF THE PROTECTED TREES.

E.WHERE TREE RETENTION AREAS ARE REMOTE FROM AREAS OF LAND DISTURBANCE AND WHEN APPROVED BY THE PLANNING DIRECTOR, ALTERNATIVE FORMS OF TREE PROTECTION MAY BE USED IN LIEU OF THE TREE PROTECTION FENCING; PROVIDED, THAT RETAINED TREES ARE COMPLETELY SURROUNDED WITH CONTINUOUS ROPE OR FLAGGING AND ARE ACCOMPANIED BY "TREE SAVE AREA--KEEP OUT" SIGNS.

F.THE REVIEW AUTHORITY MAY REQUIRE ADDITIONAL TREE PROTECTION MEASURES AS CONDITIONS OF APPROVAL, WHICH ARE CONSISTENT WITH ACCEPTED URBAN FORESTRY PRACTICES. (ORD. 2013-04 § 2 (EXH. A (PART)), 2013)

18.180.080 LONG-TERM TREE PROTECTION AND MAINTENANCE.

A. THE TREES RETAINED AS REQUIRED BY THIS CHAPTER SHALL BE PRESERVED AND MAINTAINED AS ESTABLISHED IN THE CONDITIONS OF THE LAND DEVELOPMENT APPROVAL.

B. THE TREE RETENTION TRACT(S), OPEN SPACE TRACT(S) OR OTHER PERMANENT PROTECTIVE MECHANISMS FOR TREE RETENTION SHALL BE OWNED AND MAINTAINED THROUGH A HOMEOWNERS' ASSOCIATION OR OTHER COMMON OWNERSHIP. THE FACE OF THE PLAT, BINDING SITE PLAN OR SIMILAR DOCUMENT SHALL INCLUDE A STATEMENT(S) THAT THE PROJECT'S HOMEOWNERS' ASSOCIATION OR OTHER COMMON OWNERSHIP WILL OWN AND MAINTAIN THE TREE RETENTION TRACTS, AND ENFORCE ANY ACTIVITIES CONTRARY TO THE RETENTION AND PRESERVATION OF THE TREES.

C. THE TREES RETAINED AS REQUIRED BY THIS CHAPTER MAY BE REMOVED TO REMEDY A HAZARDOUS TREE OR PUBLIC SAFETY REASONS ONLY, AND UPON REVIEW AND APPROVAL OF THE PLANNING DIRECTOR AND CITY ARBORIST.

D. PRUNING OF TREES RETAINED AS REQUIRED BY THIS CHAPTER MAY BE PERMITTED FOR MAINTENANCE AND HEALTH OF TREE(S) OR OTHER JUSTIFICATIONS FOUND ACCEPTABLE BY THE CITY, AND UPON REVIEW AND APPROVAL OF THE PLANNING DIRECTOR AND CITY ARBORIST.

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RON D. CLEAVER JR
43644
2/24/2020

PROJECT MANAGER: RON D CLEAVER JR
SIGNATURE:

TITLE
CALAVISTA – PRD
TREE RETENTION PLAN

CLIENT
CALDART POULSBO LLC
C/O BARRY MARGOLESE
105 S. MAIN ST, SUITE 230
SEATTLE, WA 98104
(206) 910–2728

RDCJR
CIVIL ENGINEERING
3231 NE TOTTEN ROAD, SUITE 103
POULSBO, WA 98370
(360) 265–1037 CELL
RON@RDCJRENGINEERING.COM

SHEET 8 OF 30
FILE NO 1222

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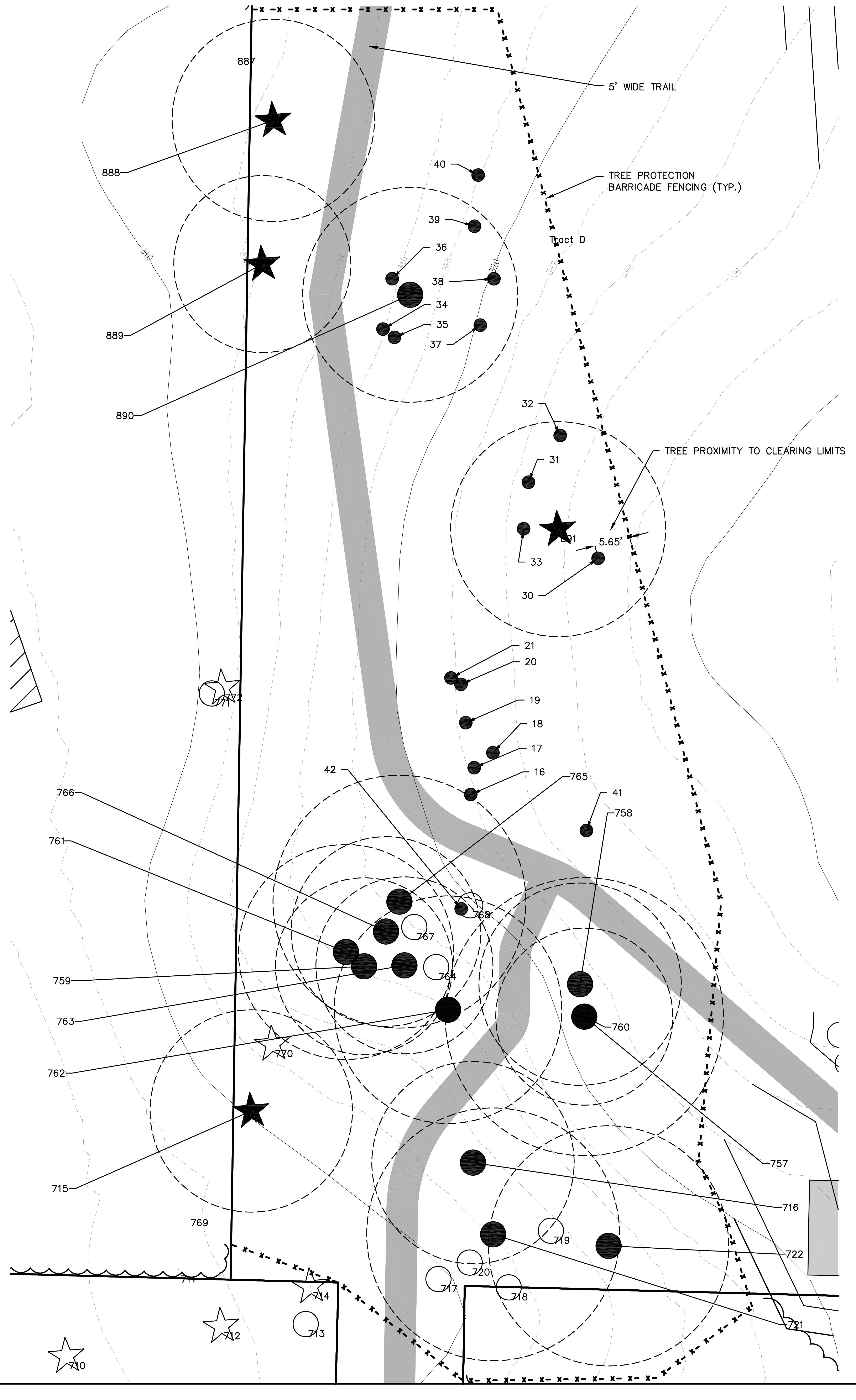
CALAVISTA – PRD

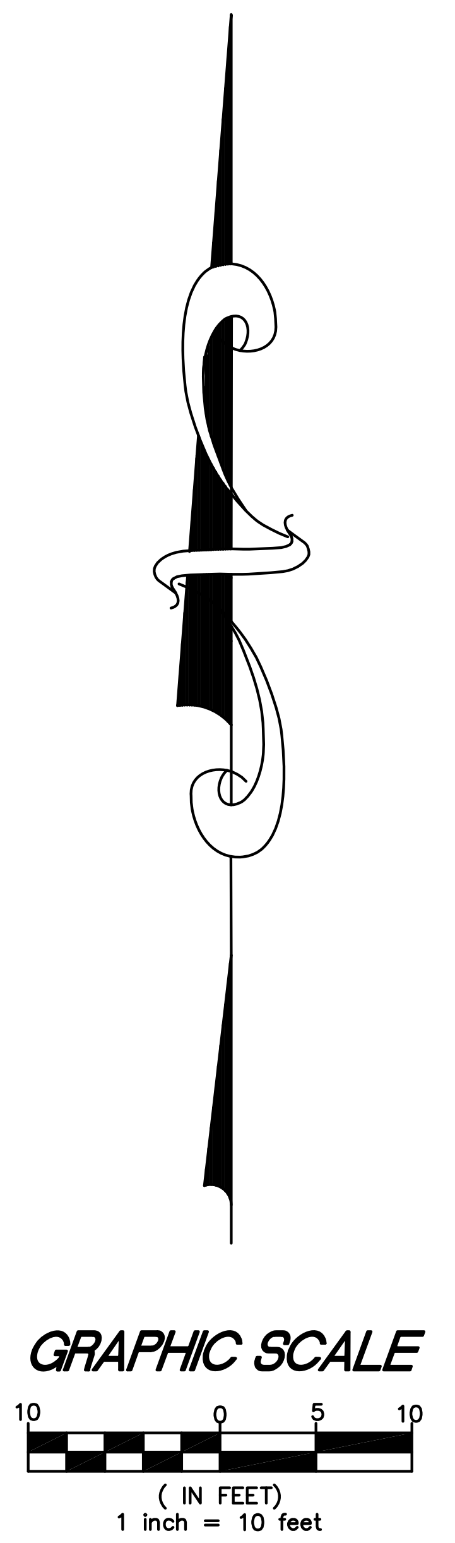
TREE RETENTION PLAN – TRACT D DETAIL



TREES SMALLER THAN 10" DBH BEING SAVED FOR CREDIT

TAG #	SPECIES	DBH(INCHES)
16	DOUGLAS FIR	5
17	DOUGLAS FIR	6
18	DOUGLAS FIR	6
19	DOUGLAS FIR	9
20	DOUGLAS FIR	5
21	DOUGLAS FIR	6
30	BIG LEAF MAPLE	9
31	BIG LEAF MAPLE	8
32	DOUGLAS FIR	7
33	BIG LEAF MAPLE	6
34	BIG LEAF MAPLE	6
35	BIG LEAF MAPLE	7
36	WESTERN RED CEDAR	7
37	DOUGLAS FIR	6
38	DOUGLAS FIR	5
39	DOUGLAS FIR	6
40	DOUGLAS FIR	5
41	DOUGLAS FIR	5
42	MADRONA	8

TOTAL DBH OF SMALL TREES RETAINED = 122 INCHES



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CALAVISTA – PRD
TREE RETENTION PLAN – TRACT D DETAIL

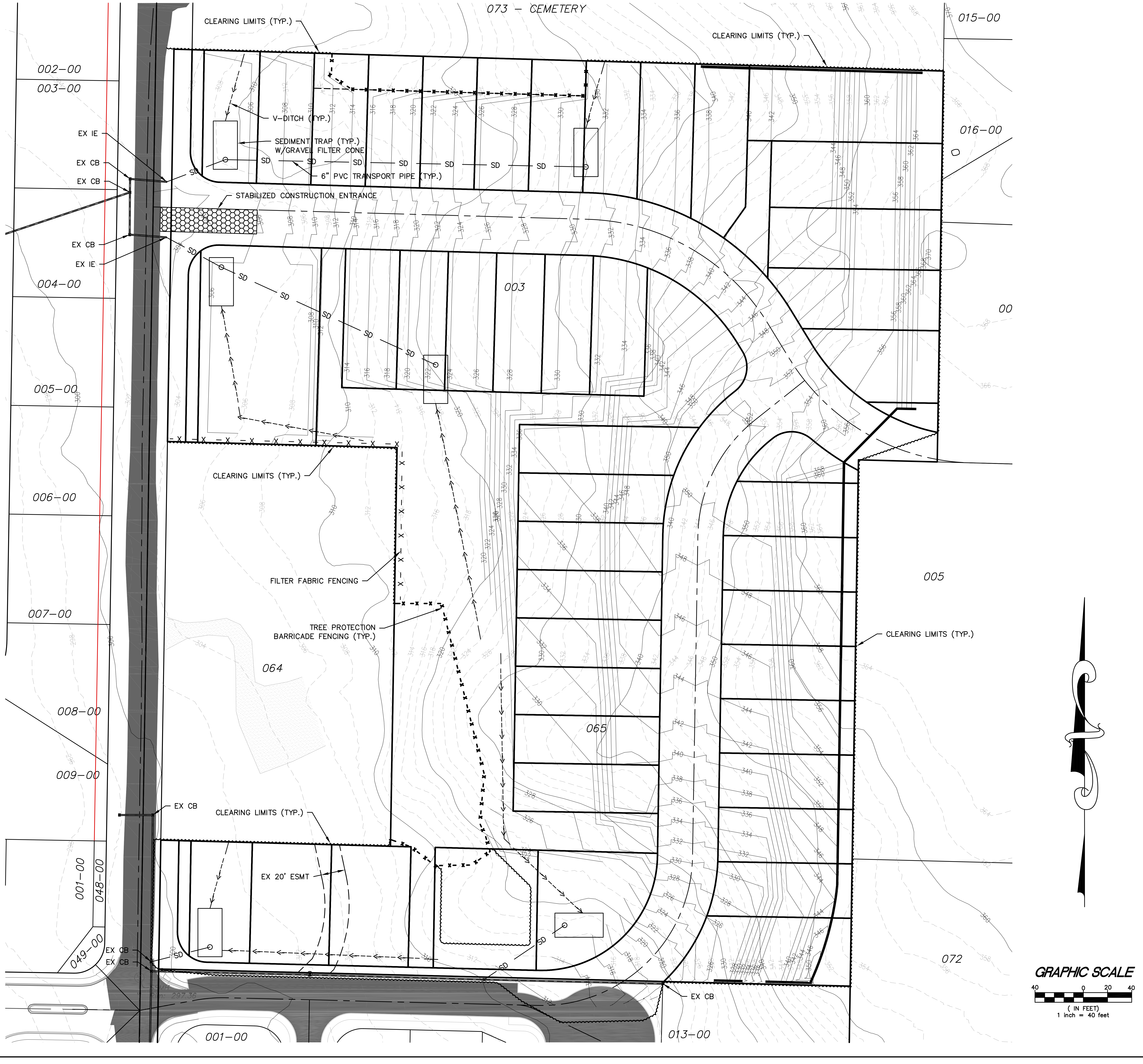
CLIENT
CALDART POULSBO LLC
C/O BARRY MARGOLESE
105 S. MAIN ST, SUITE 230
SEATTLE, WA 98104
(206) 910-2728

RDCJR
CIVIL ENGINEERING
3231 NE TOTTEN ROAD, SUITE 103
POULSBO, WA 98370
(360) 265-1037 CELL
RON@RDCJRENGINEERING.COM

SHEET 9 OF 30
FILE NO 1222

CALAVISTA – PRD

TESC PLAN



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43644
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TITLE
CALAVISTA – PRD
TESC PLAN

CLIENT
CALDART POULSBO LLC
C/O BARRY MARGOLESE
105 S. MAIN ST, SUITE 230
SEATTLE, WA 98104
(206) 910-2728

RDCJR
CIVIL ENGINEERING
3231 NE TOTTEN ROAD, SUITE 103
POULSBO, WA 98370
(360) 265-1037 CELL
RON@RDCJRENGINEERING.COM

SHEET 10 OF 30

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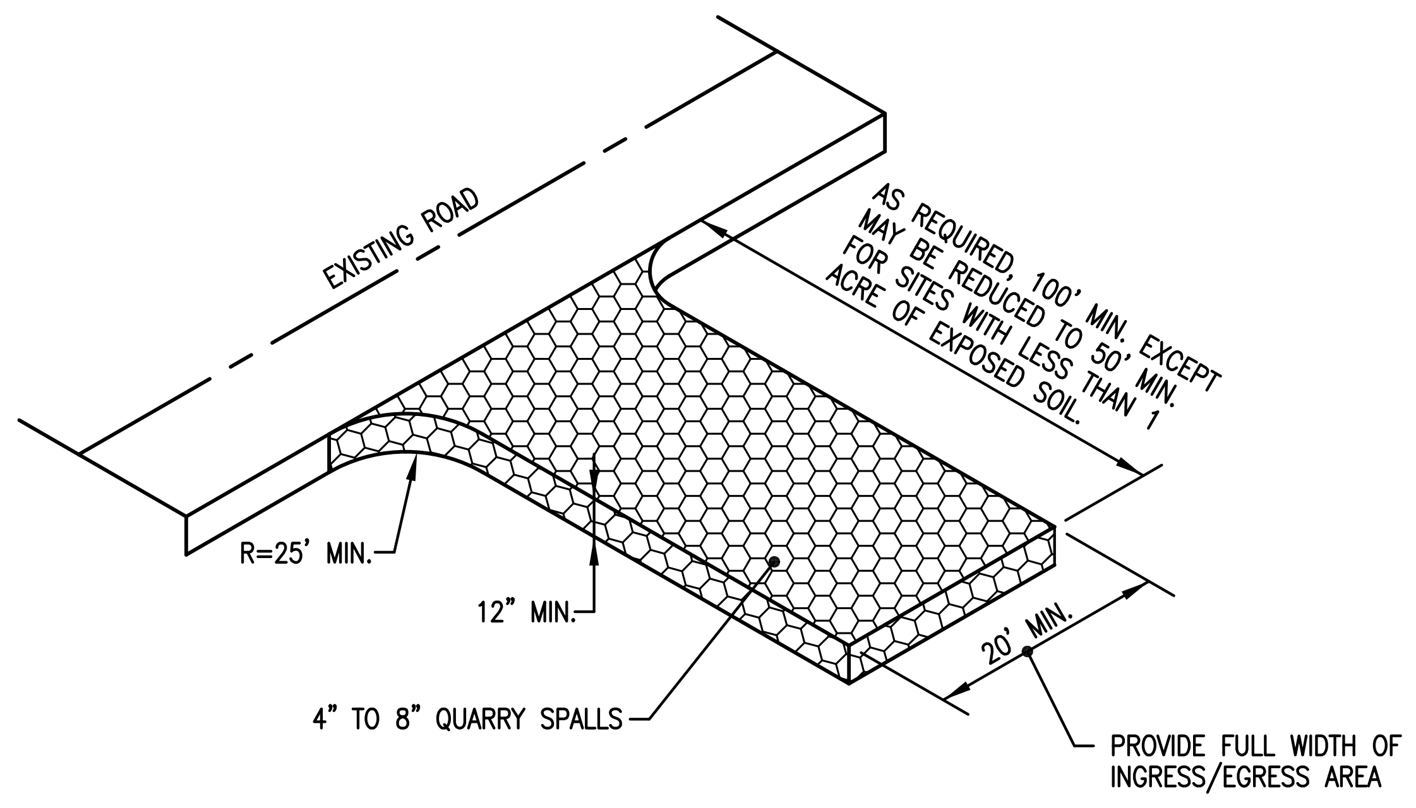
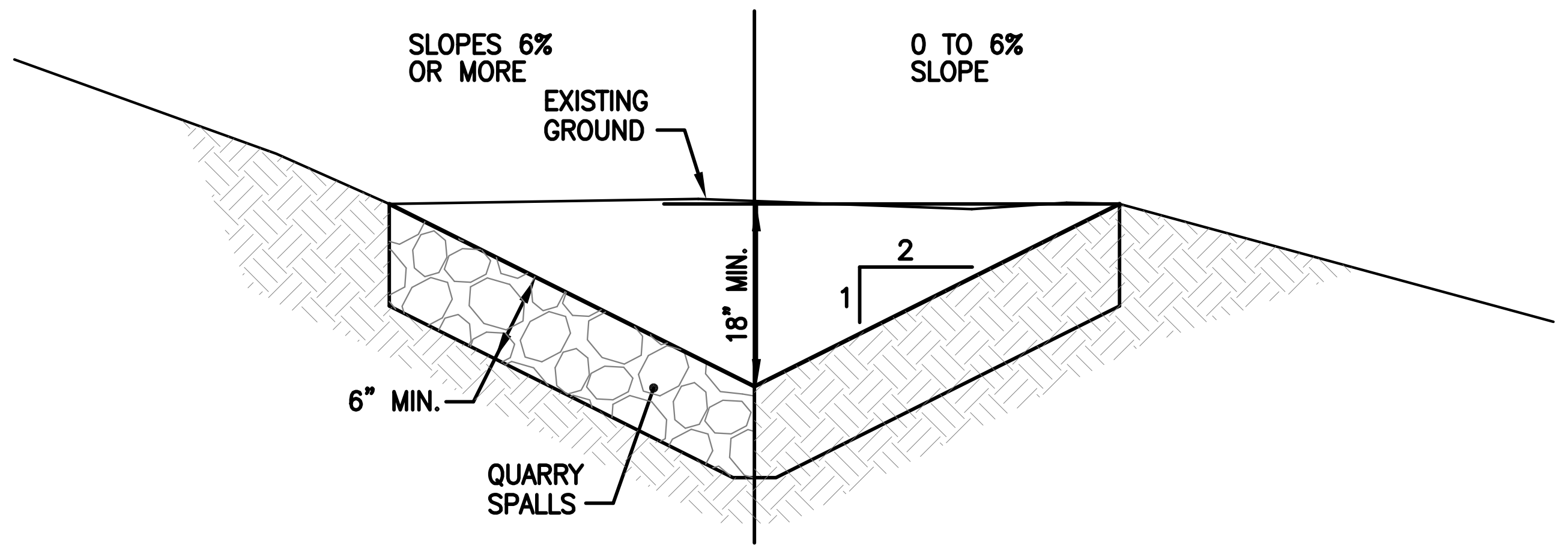
CALAVISTA – PRD

TESC DETAILS



CONSTRUCTION STABILIZATION ENTRANCE

NTS



V–DITCH

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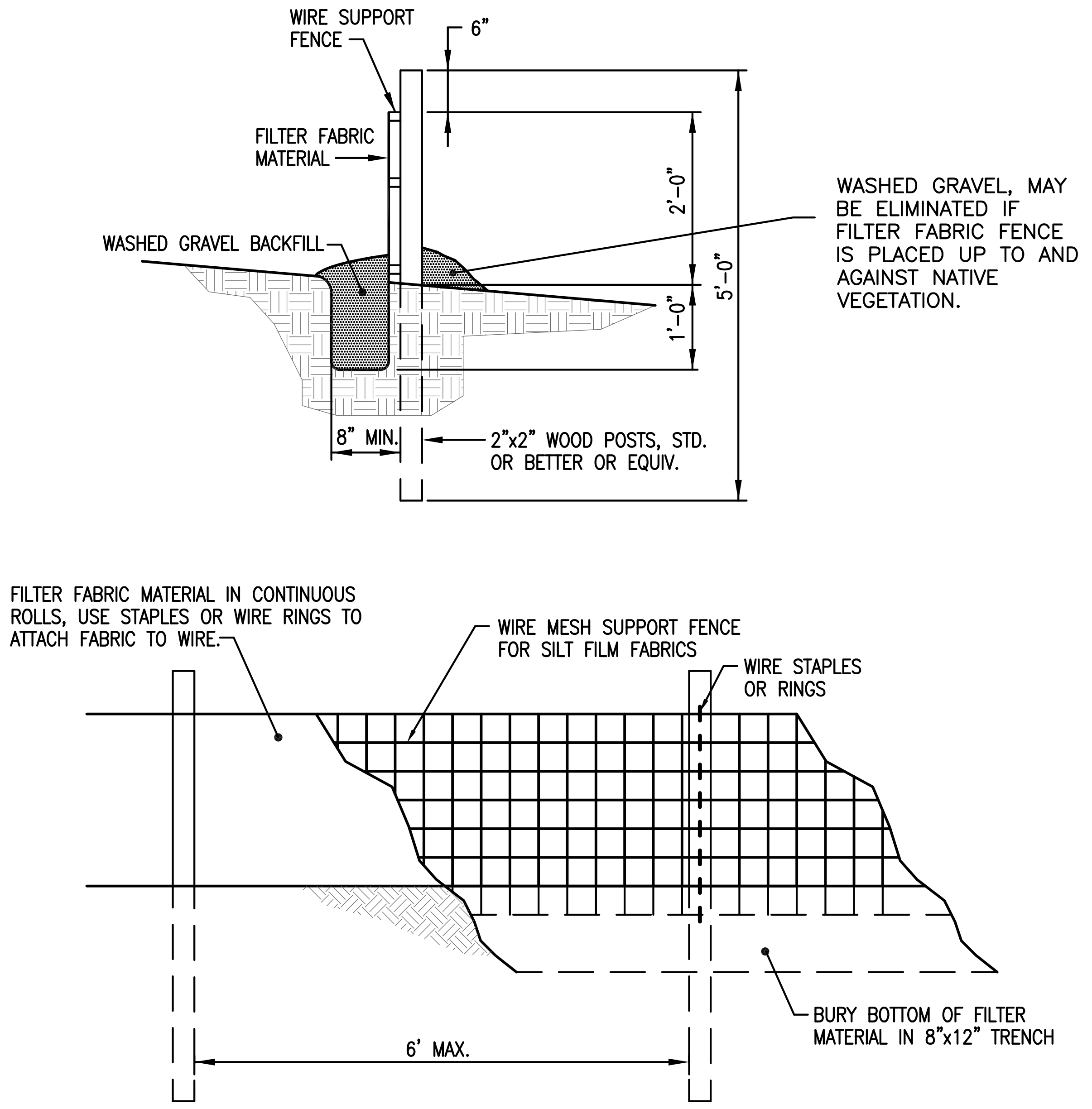

FILTER FABRIC FENCE DETAIL

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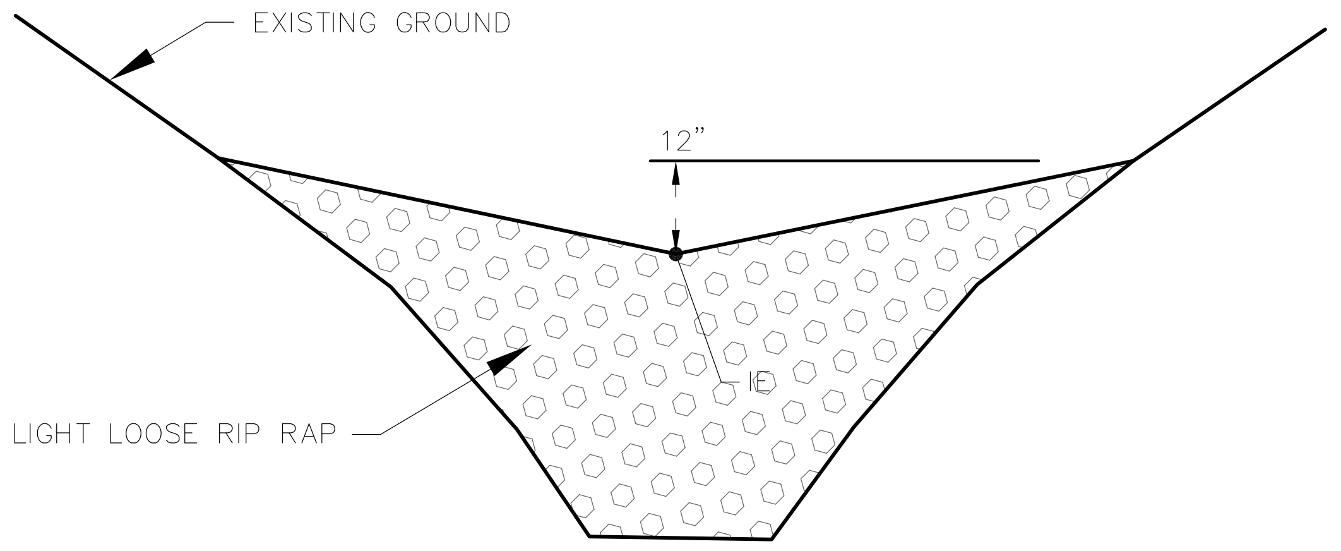
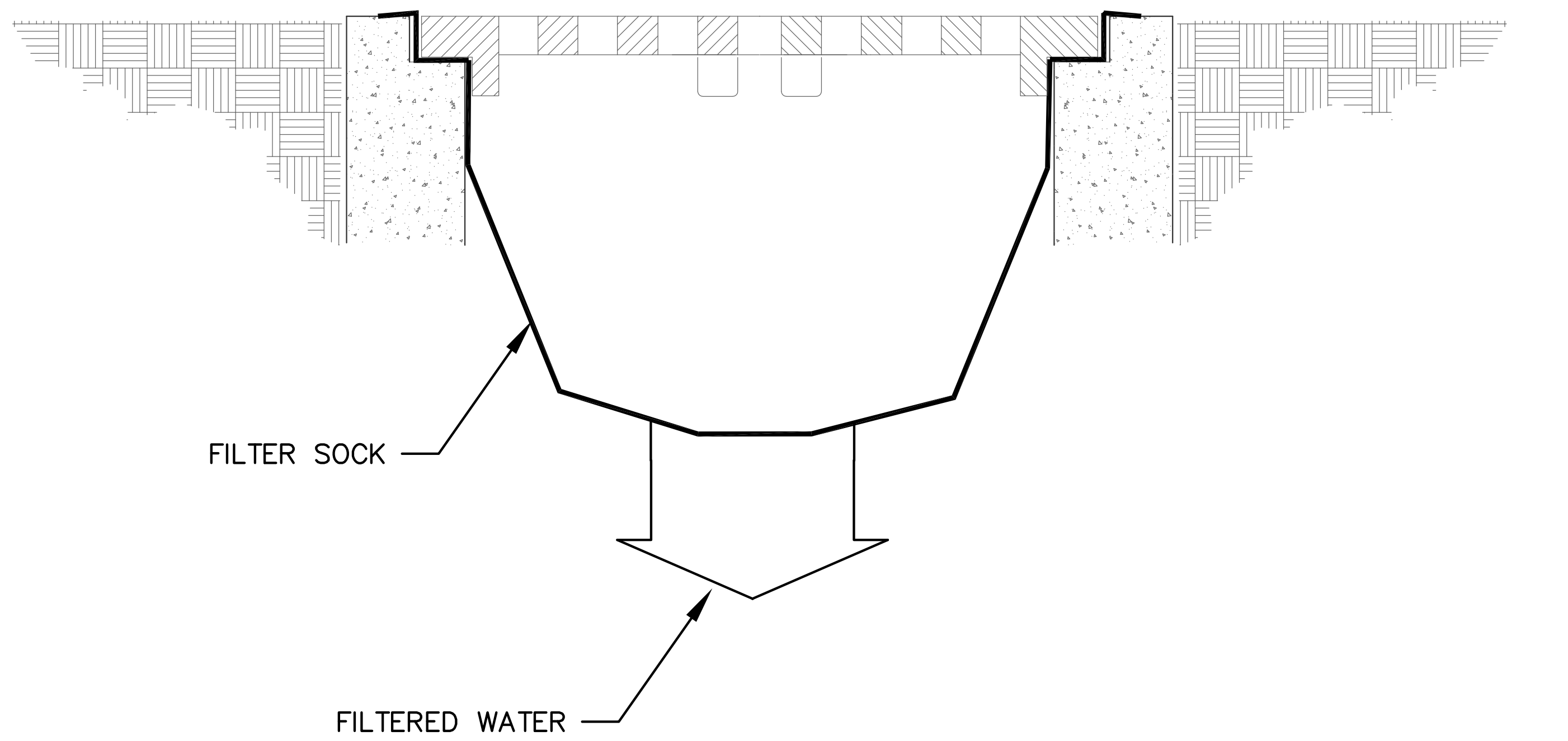
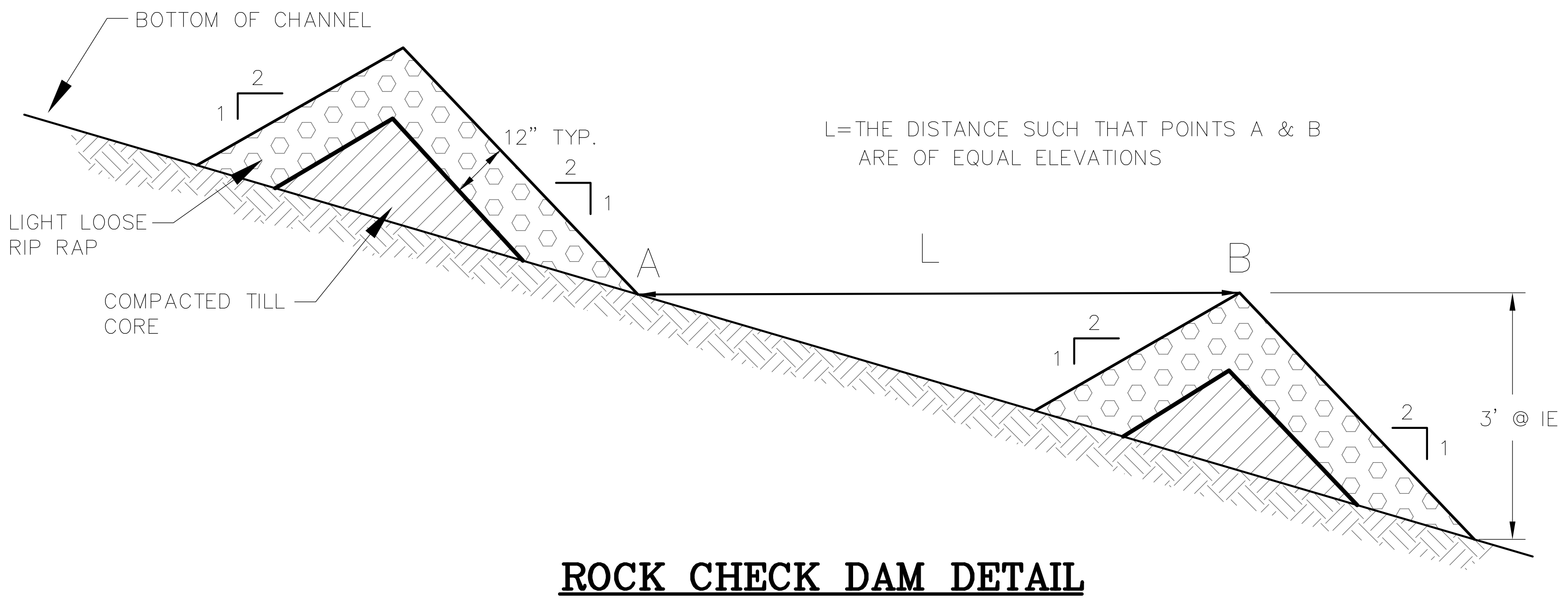




CATCH BASIN INLET PROTECTION DETAIL



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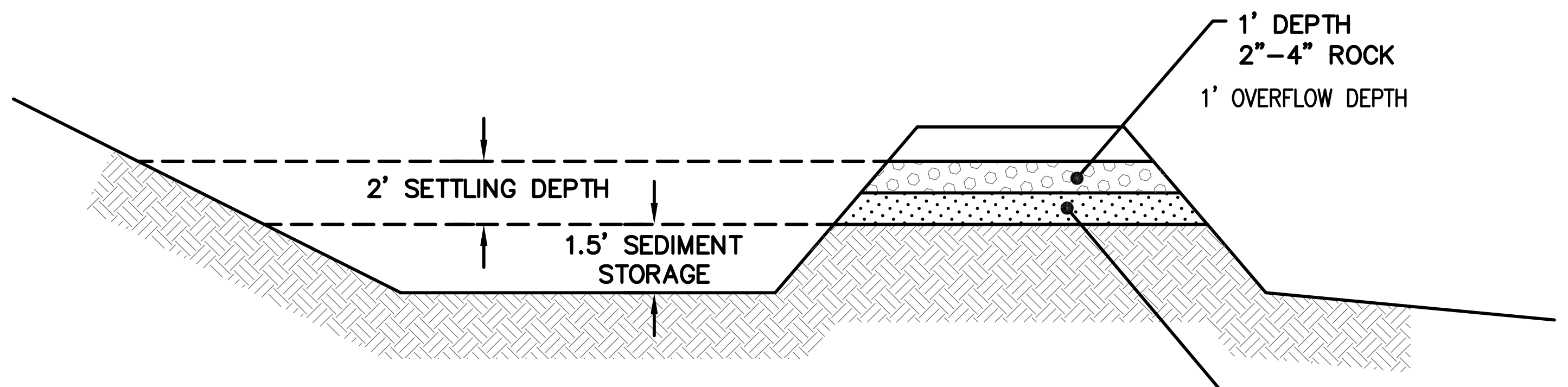

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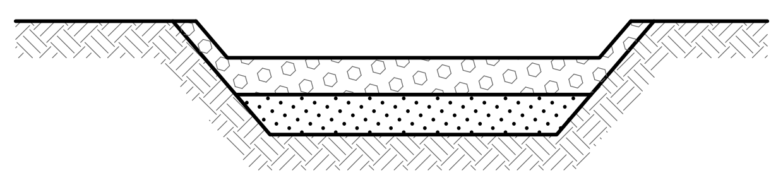

SEDIMENT TRAP OUTLET

SEDIMENT TRAP

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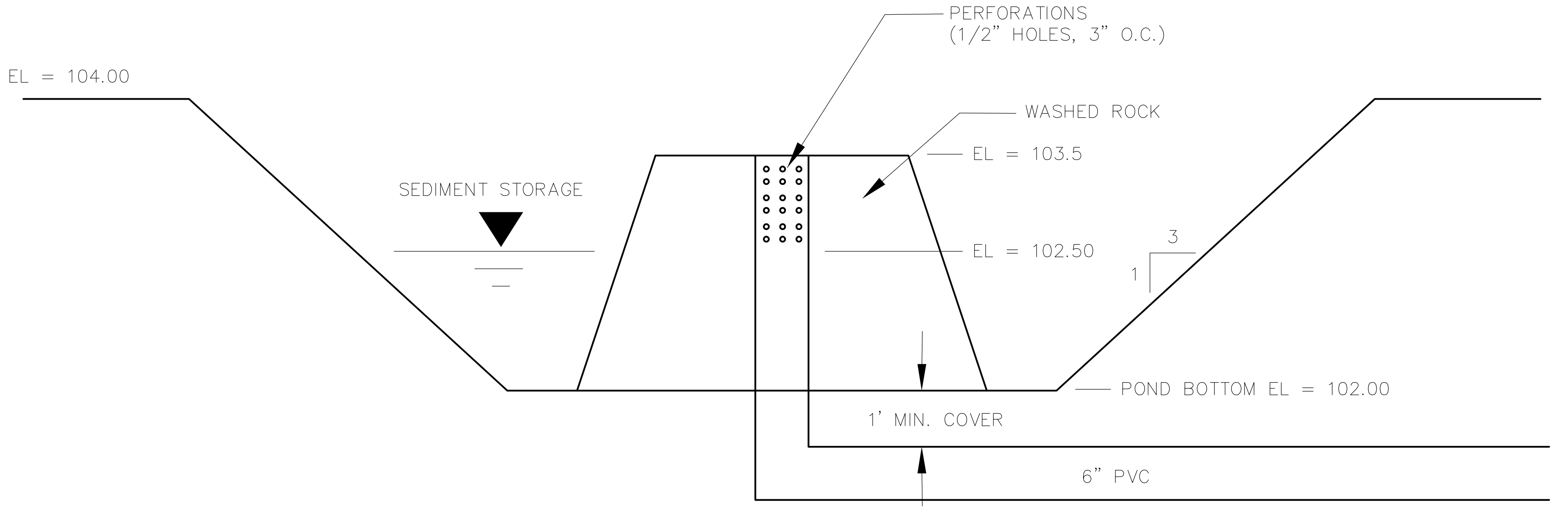

STANDPIPE AND GRAVEL FILTER CONE
FOR TEMPORARY SEDIMENT TRAP

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43644
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TITLE CALAVISTA – PRD
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CLIENT
CALDART POULSBO LLC
C/O BARRY MARGOLESE
105 S. MAIN ST, SUITE 230
SEATTLE, WA 98104
(206) 910-2728

PROJECT MANAGER: RON D CLEAVER JR
SIGNATURE:

RDCJR
CIVIL ENGINEERING
3231 NE TOTTEN ROAD, SUITE 103
POULSBO, WA 98370
(360) 265-1037 CELL
RON@RDCJRENGINEERING.COM

SHEET 11 OF 30
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CALAVISTA – PRD

COMPREHENSIVE GRADING PLAN

GEOTECHNICAL RECOMMENDATION NOTES:

EARTHWORK CONSIDERATIONS

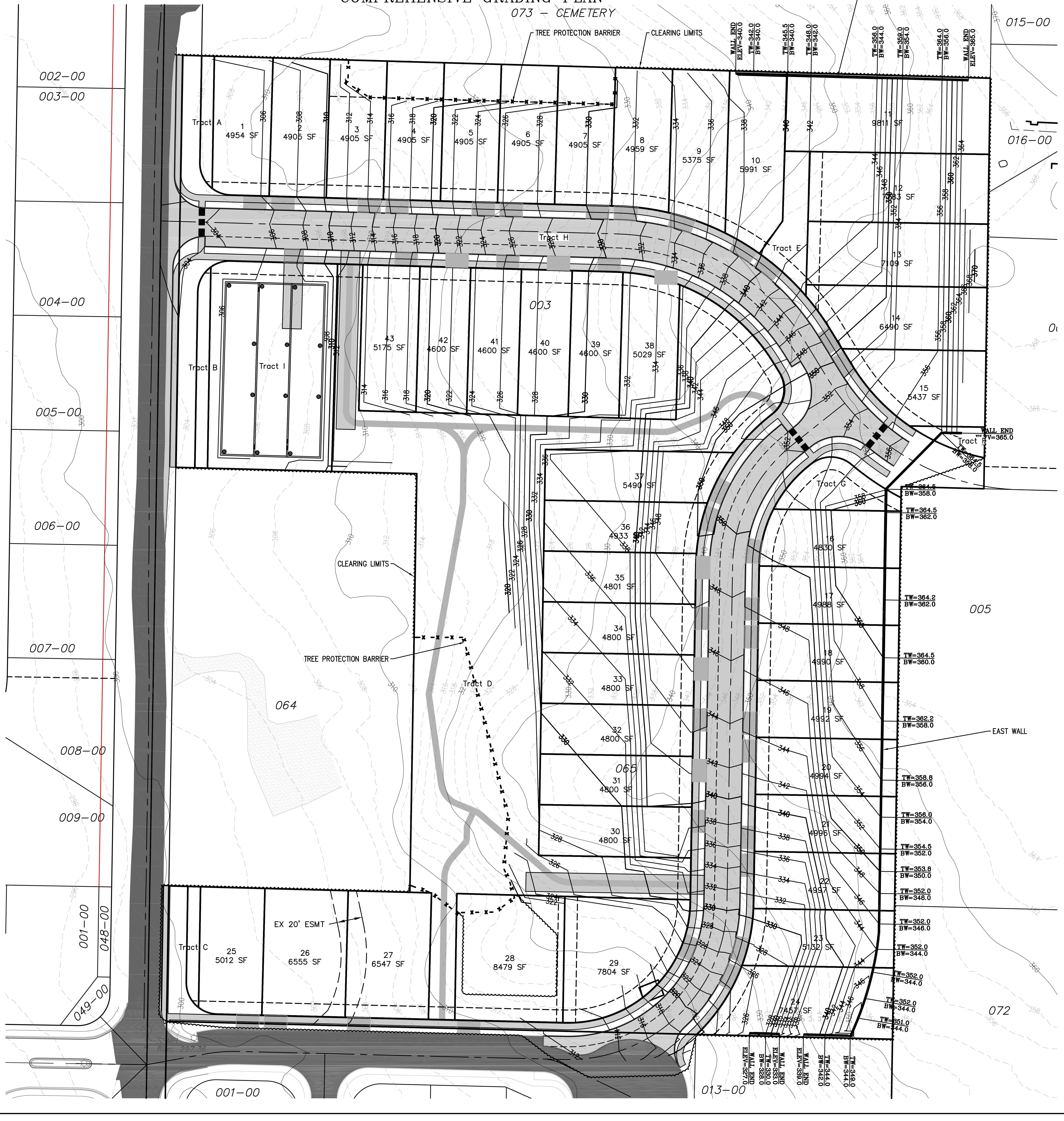
DURING WET WEATHER CONDITIONS, WHICH ARE TYPICALLY PRESENT FROM OCTOBER THROUGH APRIL, SUBGRADE STABILITY PROBLEMS AND GRADING DIFFICULTIES MAY DEVELOP DUE TO HIGH MOISTURE CONTENT IN THE SOIL, DISTURBANCE OF SENSITIVE SOILS AND/OR THE PRESENCE OF PERCHED GROUNDWATER. THEREFORE, WE RECOMMEND THAT EARTHWORK ACTIVITY BE PERFORMED DURING THE DRY SEASON. IF WORK MUST PROCEED IN WET WEATHER, WE RECOMMEND FOLLOWING THE GUIDELINES PRESENTED IN THE WET WEATHER SECTION OF THIS REPORT.

STRUCTURAL FILL

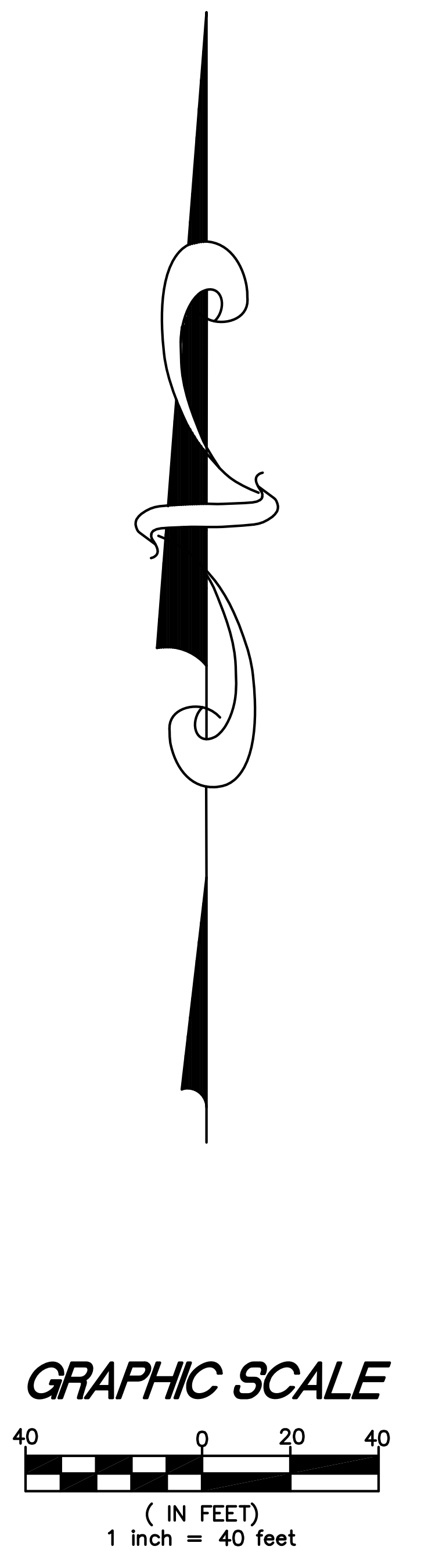
THE GLACIAL TILL SOILS PRESENT AT THE SITE ARE MOISTURE SENSITIVE DUE TO THEIR HIGH FINES CONTENT AND WILL NOT LIKELY BE SUITABLE FOR USE AS STRUCTURAL FILL DURING WET WEATHER CONDITIONS. SOILS WITH A HIGH FINES CONTENT MAY BE DIFFICULT TO COMPACT IF THE MOISTURE CONTENT IS NOT AT OR BELOW THE OPTIMUM MOISTURE CONTENT. THE ONSITE GRANULAR OUTWASH SOILS MAY BE SUITABLE FOR USE AS STRUCTURAL FILL, PROVIDED THEY ARE FREE OF ORGANIC OR DELETERIOUS MATERIAL, AND ARE PLACED IN ACCORDANCE WITH THE RECOMMENDATIONS PRESENTED IN THIS REPORT.

IF THE EARTHWORK IS TO TAKE PLACE DURING THE NORMALLY WET PERIOD OF THE YEAR, PROVISIONS SHOULD BE IN PLACE FOR EXPORT OF WET, MOISTURE SENSITIVE SOIL AND IMPORT OF GRANULAR STRUCTURAL FILL MATERIAL. IMPORTED STRUCTURAL FILL SHOULD CONSIST OF WELL-GRADED GRAVEL AND/OR SAND WITH A MAXIMUM GRAIN SIZE OF 3 INCHES AND LESS THAN 5 PERCENT FINES (MATERIAL PASSING THE U.S. STANDARD NO. 200 SIEVE). IF CONSTRUCTION OCCURS DURING DRY PERIODS THE FINES CONTENT CAN BE INCREASED TO 10 PERCENT. ALL MATERIAL PROPOSED FOR USE AS STRUCTURAL FILL SHOULD BE APPROVED BY A REPRESENTATIVE OF THE GEOTECHNICAL ENGINEER.

STRUCTURAL FILL SHOULD BE PLACED IN LOOSE LIFTS NO MORE THAN 12 INCHES THICK, MOISTURE CONDITIONED AS NECESSARY (MOISTURE CONTENT OF SOIL SHOULD BE WITHIN 2 PERCENT OF OPTIMUM MOISTURE) AND COMPACTED TO AT LEAST 95 PERCENT OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM TEST METHOD D-1557. ADDITIONAL LIFTS SHOULD NOT BE PLACED IF THE PREVIOUS LIFT DID NOT MEET THE REQUIRED DRY DENSITY OR IF SOIL CONDITIONS ARE NOT STABLE. NOTE THAT, ALTHOUGH IN PLACE DENSITY TESTING OF FILL IS FREQUENTLY USED AS THE PRIMARY CRITERION FOR ACCEPTANCE OF FILL, IT SHOULD NOT BE THE ONLY CRITERION. IF, IN THE JUDGMENT OF THE GEOTECHNICAL ENGINEER OR HIS REPRESENTATIVE, PLACED FILL IS NOT SUITABLE IT SHOULD BE REJECTED REGARDLESS OF IN PLACE DENSITY TEST RESULTS. AS AN EXAMPLE, FILL THAT IS COMPACTED WET OF THE OPTIMUM MOISTURE CONTENT MAY EXHIBIT "PUMPING" BEHAVIOR EVEN IF IN PLACE DENSITY TEST RESULTS INDICATE GREATER THAN 95 PERCENT COMPACTION HAS BEEN ACHIEVED. IN SUCH A SITUATION, THE FILL SHOULD BE REMOVED AND REPLACED WITH DRIER MATERIAL.



GRADING QUANTITIES
31,500 CY CUT
18,000 CY FILL
13,500 CY EXPORT



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105 S. MAIN ST, SUITE 230
SEATTLE, WA 98104
(206) 910-2728

RDCJR
CIVIL ENGINEERING
3231 NE TOTTEN ROAD, SUITE 103
POULSBO, WA 98370
(360) 265-1037 CELL
RON@RDCJRENGINEERING.COM

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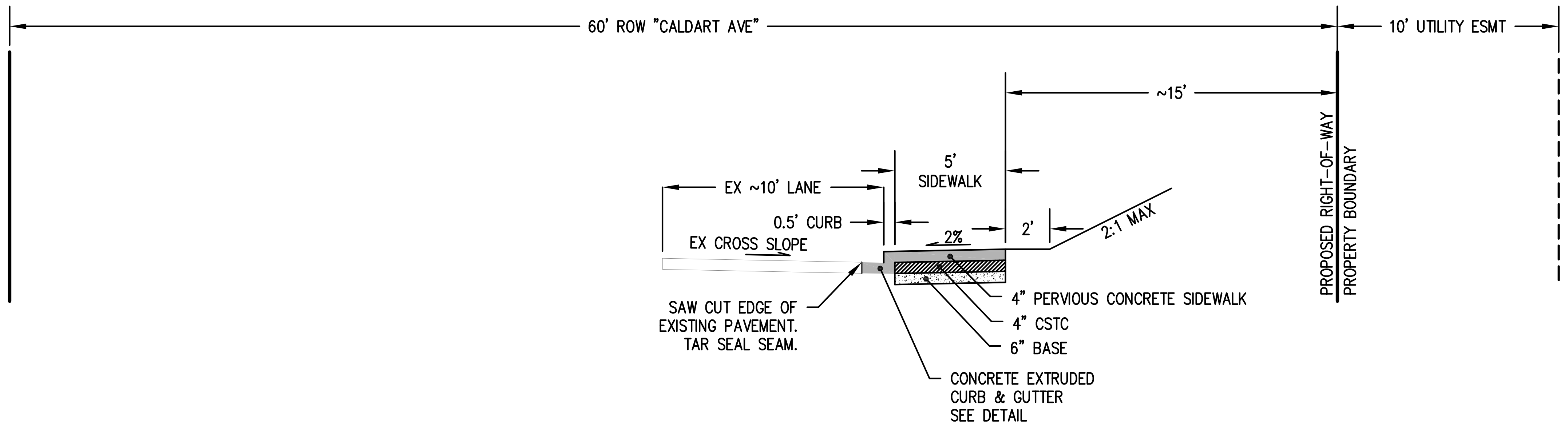
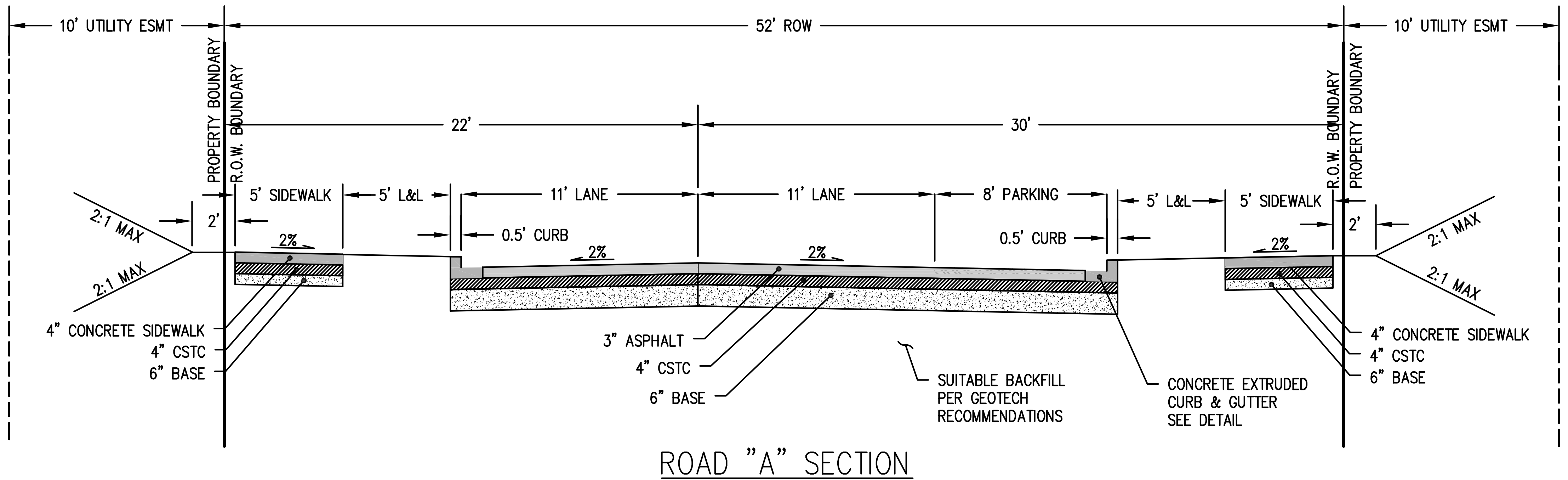
CALAVISTA – PRD

ROAD SECTIONS



"CALDART AVE"
FRONTAGE IMPROVEMENT SECTION
NTS



ROAD "A" SECTION
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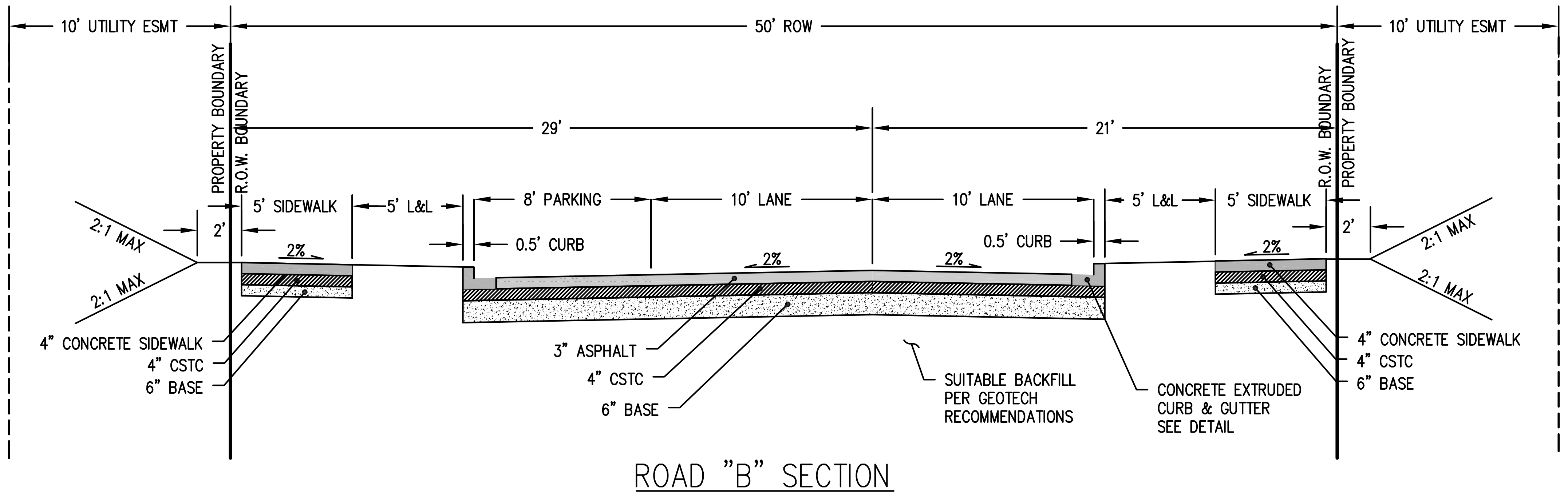

ROAD "B" SECTION
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CALAVISTA – PRD
ROAD SECTIONS

CLIENT
CALDART POULSBO LLC
C/O BARRY MARGOLESE
105 S. MAIN ST, SUITE 230
SEATTLE, WA 98104
(206) 910-2728

PROJECT MANAGER: RON D CLEAVER JR

RDCJR
CIVIL ENGINEERING
3231 NE TOTTEN ROAD, SUITE 103
POULSBO, WA 98370
(360) 265-1037 CELL
RON@RDCJRENGINEERING.COM

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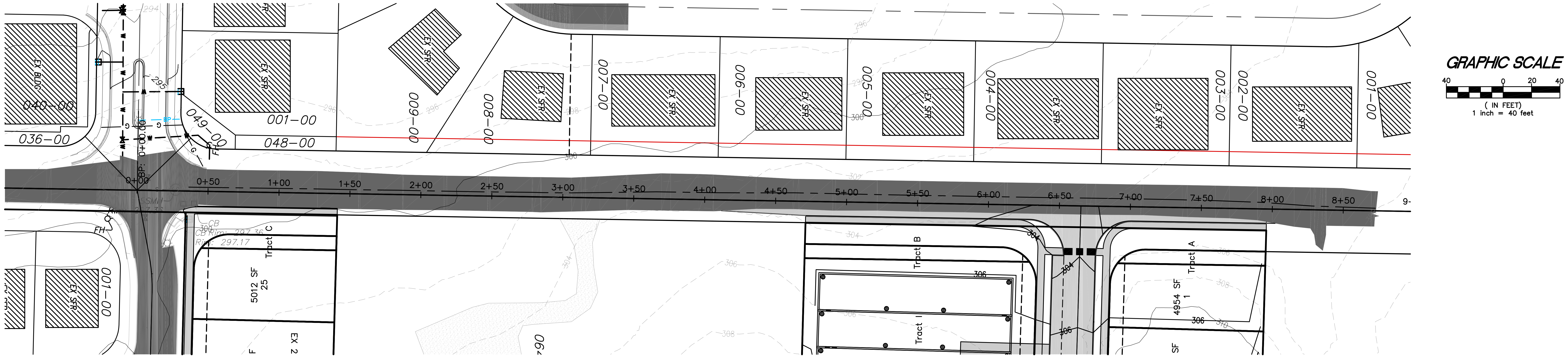
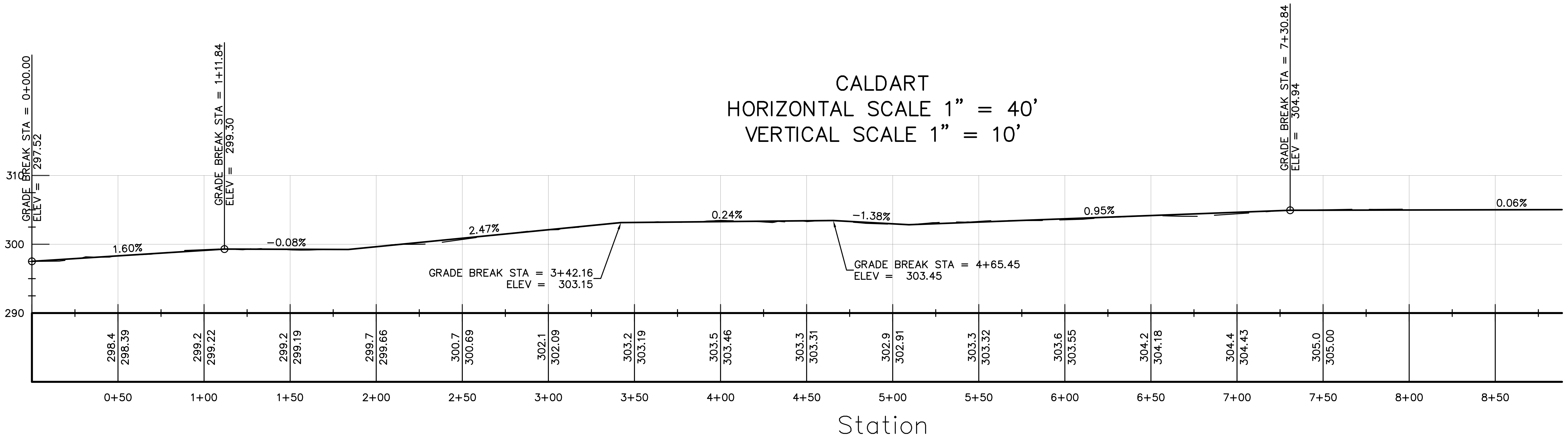
CALAVISTA – PRD

CALDART – PLAN & PROFILE



CALDART
HORIZONTAL SCALE 1" = 40'
VERTICAL SCALE 1" = 10'



DESIGN MAK
DRAWN RDC
CHECKED MAK
SEC 13 T 26N R 1E
DISC NO ____ DATE 8/15/2018
SCALE AS NOTED

REV NO	REVISION DESCRIPTION	DATE	BY
1	REV. PER CITY COMMENTS, DATED 7/2019	7/22/19	RDC
2	REV. PER CITY COMMENTS, DATED 12/9/2019	12/12/19	RDC
3	REV. PER CITY COMMENTS, DATED 1/22/20	2/24/20	RDC

RON D. CLEAVER JR
43644
2/24/2020

TITLE
CALAVISTA – PRD
CALDART – PLAN & PROFILE

CLIENT
CALDART POULSBO LLC
C/O BARRY MARGOLESE
105 S. MAIN ST, SUITE 230
SEATTLE, WA 98104
(206) 910-2728

PROJECT MANAGER: RON D CLEAVER JR
SIGNATURE:

RDCJR
CIVIL ENGINEERING
3231 NE TOTTEN ROAD, SUITE 103
POULSBO, WA 98370
(360) 265-1037 CELL
RON@RDCJRENGINEERING.COM

SHEET 14 OF 30
FILE NO 1222

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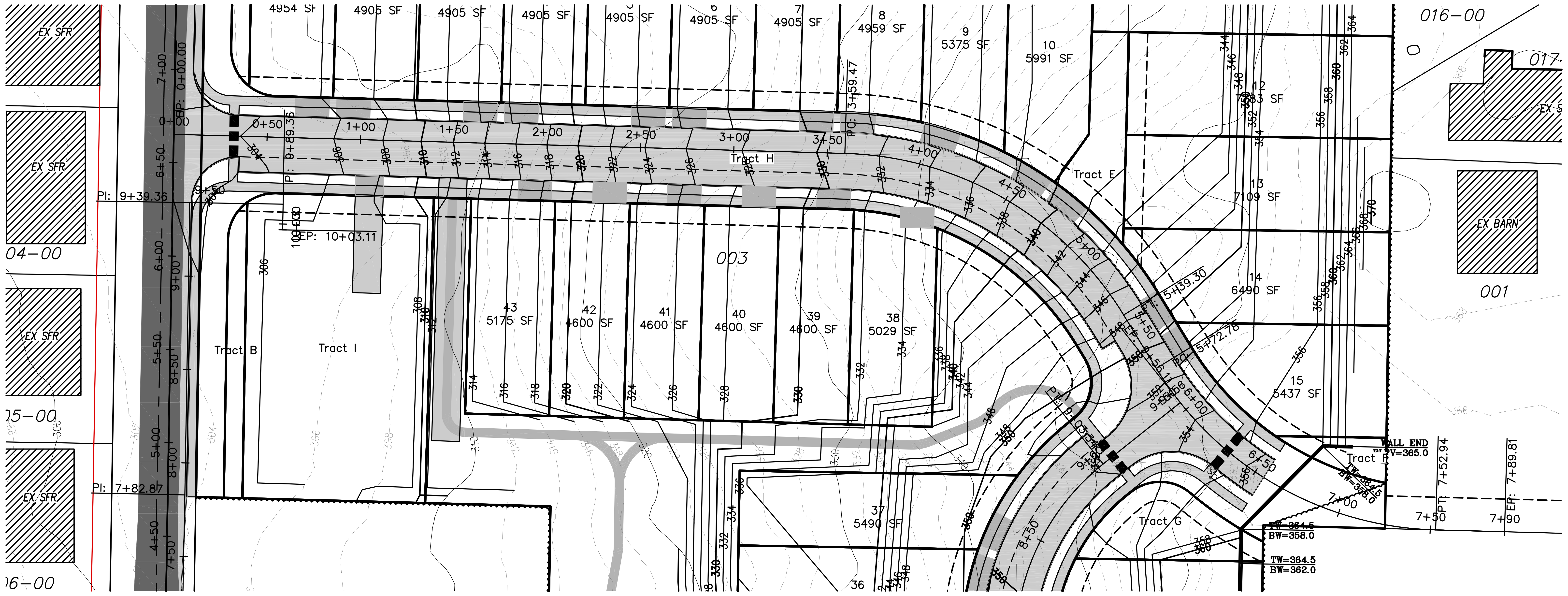
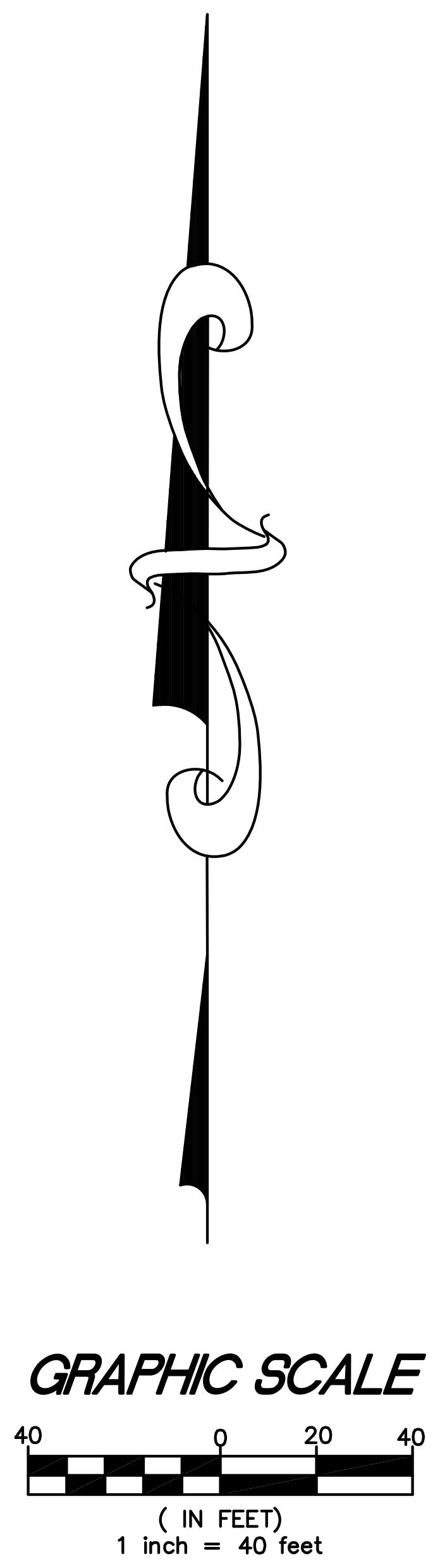
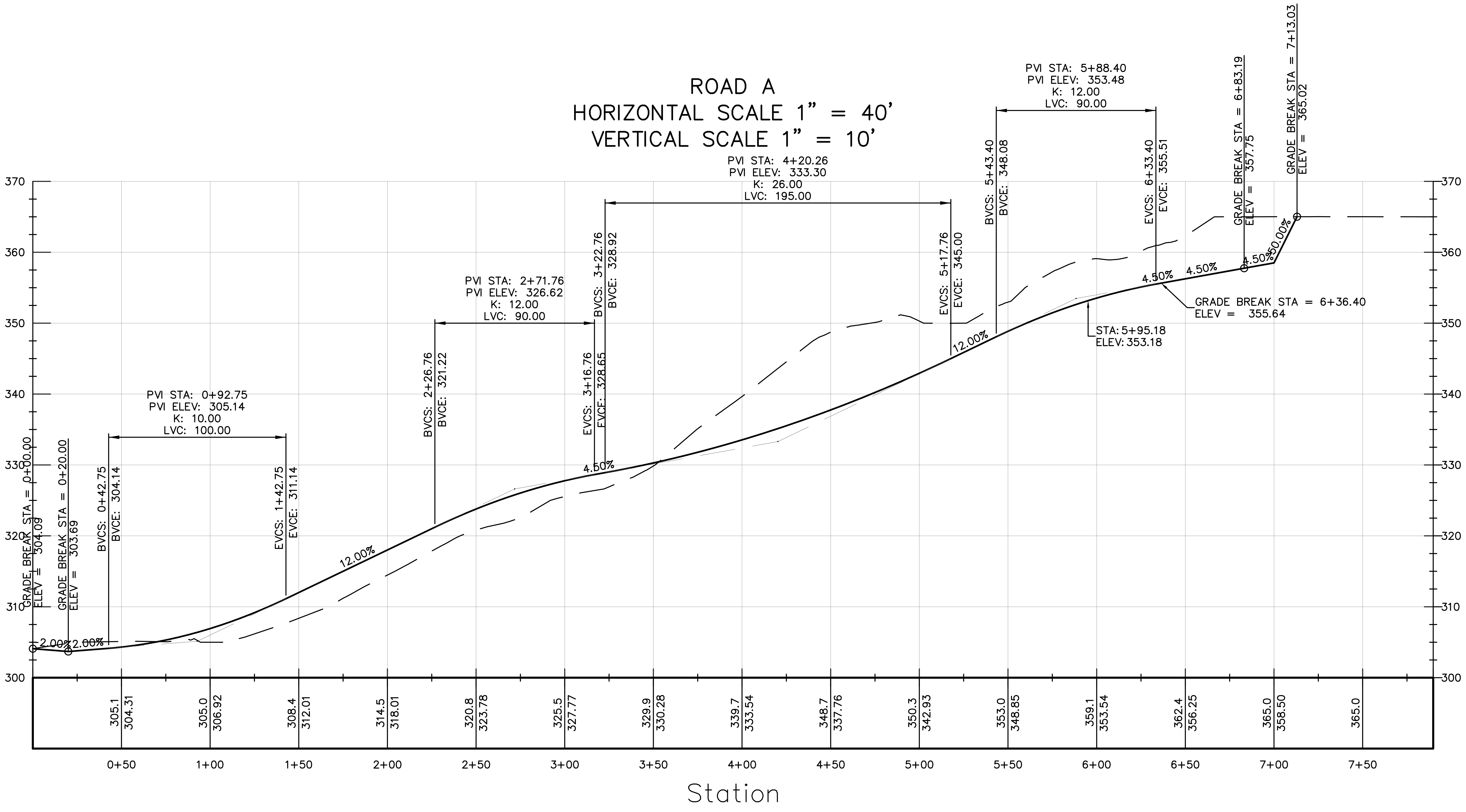
CALAVISTA – PRD

ROAD A – PLAN & PROFILE







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DESIGN MAK
DRAWN RDC
CHECKED MAK
SEC 13 T 26N R 1E
DISC NO ____ DATE 8/15/2018
SCALE AS NOTED

RON D. CLEAVER JR
43644
2/24/2020

PROJECT MANAGER: RON D CLEAVER JR
SIGNATURE:

TITLE
CALAVISTA – PRD
ROAD A – PLAN & PROFILE

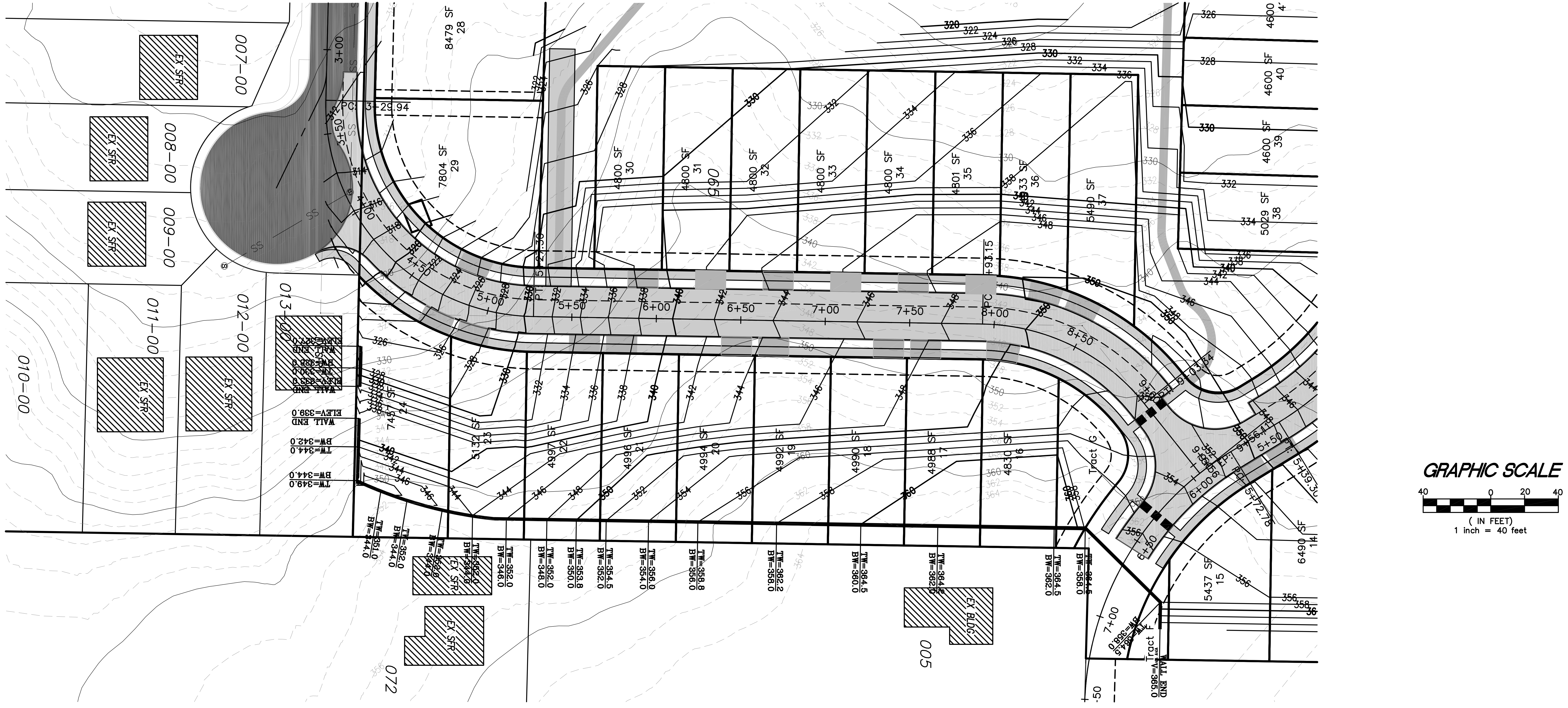
CLIENT
CALDART POULSBO LLC
C/O BARRY MARGOLESE
105 S. MAIN ST, SUITE 230
SEATTLE, WA 98104
(206) 910–2728

RDCJR
CIVIL ENGINEERING
3231 NE TOTTEN ROAD, SUITE 103
POULSBO, WA 98370
(360) 265–1037 CELL
RON@RDCJRENGINEERING.COM

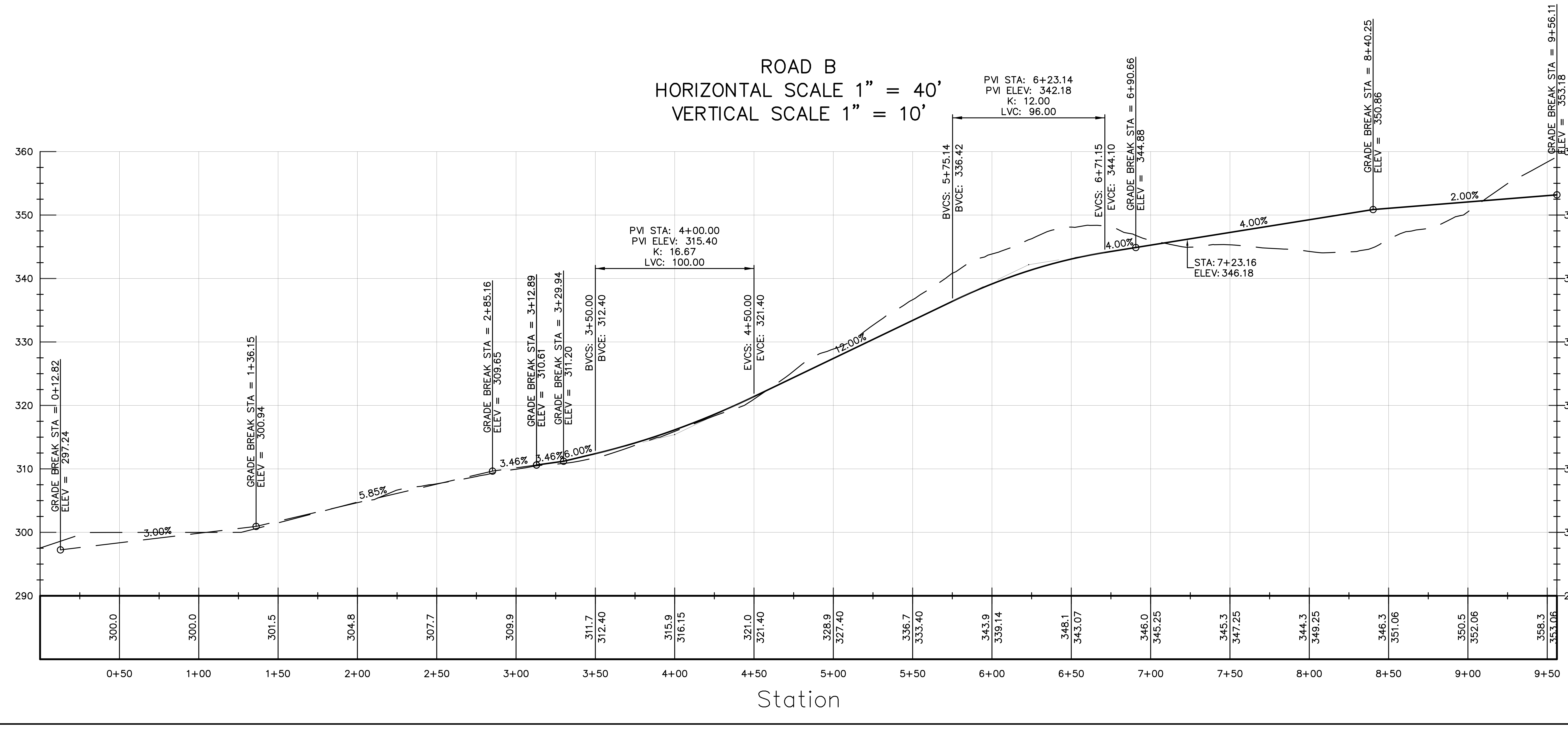
SHEET 15 OF 30
FILE NO 1222

CALAVISTA – PRD

ROAD B – PLAN & PROFILE



ROAD B
HORIZONTAL SCALE 1" = 40'
VERTICAL SCALE 1" = 10'



REV NO	REVISION DESCRIPTION	DATE	BY
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DESIGN MAK
DRAWN RDC
CHECKED MAK
SEC 13 T 26N R 1E
DISC NO ____ DATE 8/15/2018
SCALE AS NOTED

RON D. CLEAVER JR
STATE OF WASHINGTON
43644
REGISTERED PROFESSIONAL ENGINEER
2/24/2020

PROJECT MANAGER: RON D CLEAVER JR **SIGNATURE:**

TITLE CALAVISTA – PRD
ROAD B – PLAN & PROFILE

CLIENT
CALDART POULSBO LLC
C/O BARRY MARGOLESE
105 S. MAIN ST, SUITE 230
SEATTLE, WA 98104
(206) 910-2728

RDCJR
CIVIL ENGINEERING
3231 NE TOTTEN ROAD, SUITE 103
POULSBO, WA 98370
(360) 265-1037 CELL
RON@RDCJRENGINEERING.COM

SHEET 16 OF 30
FILE NO 1222

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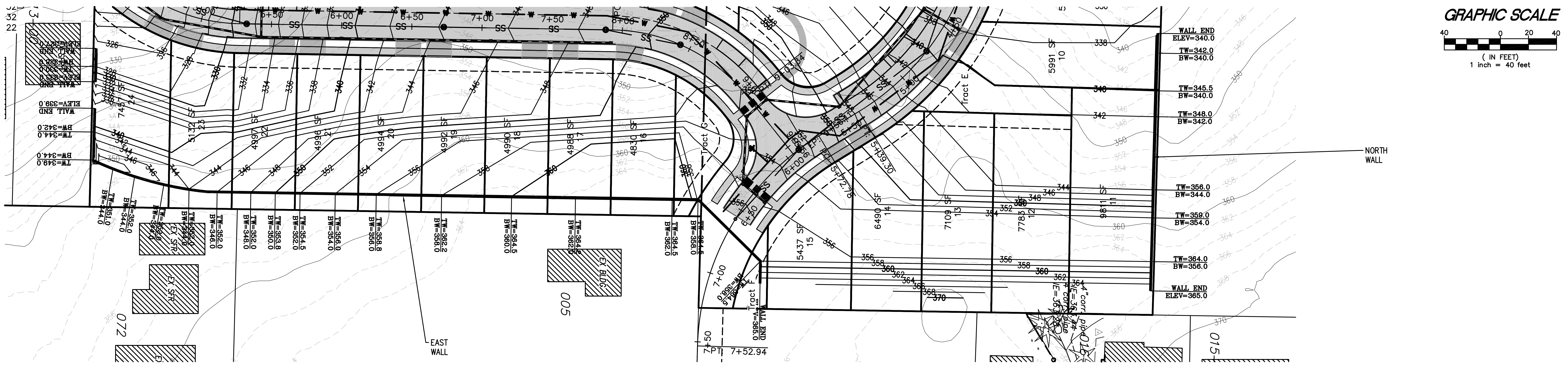
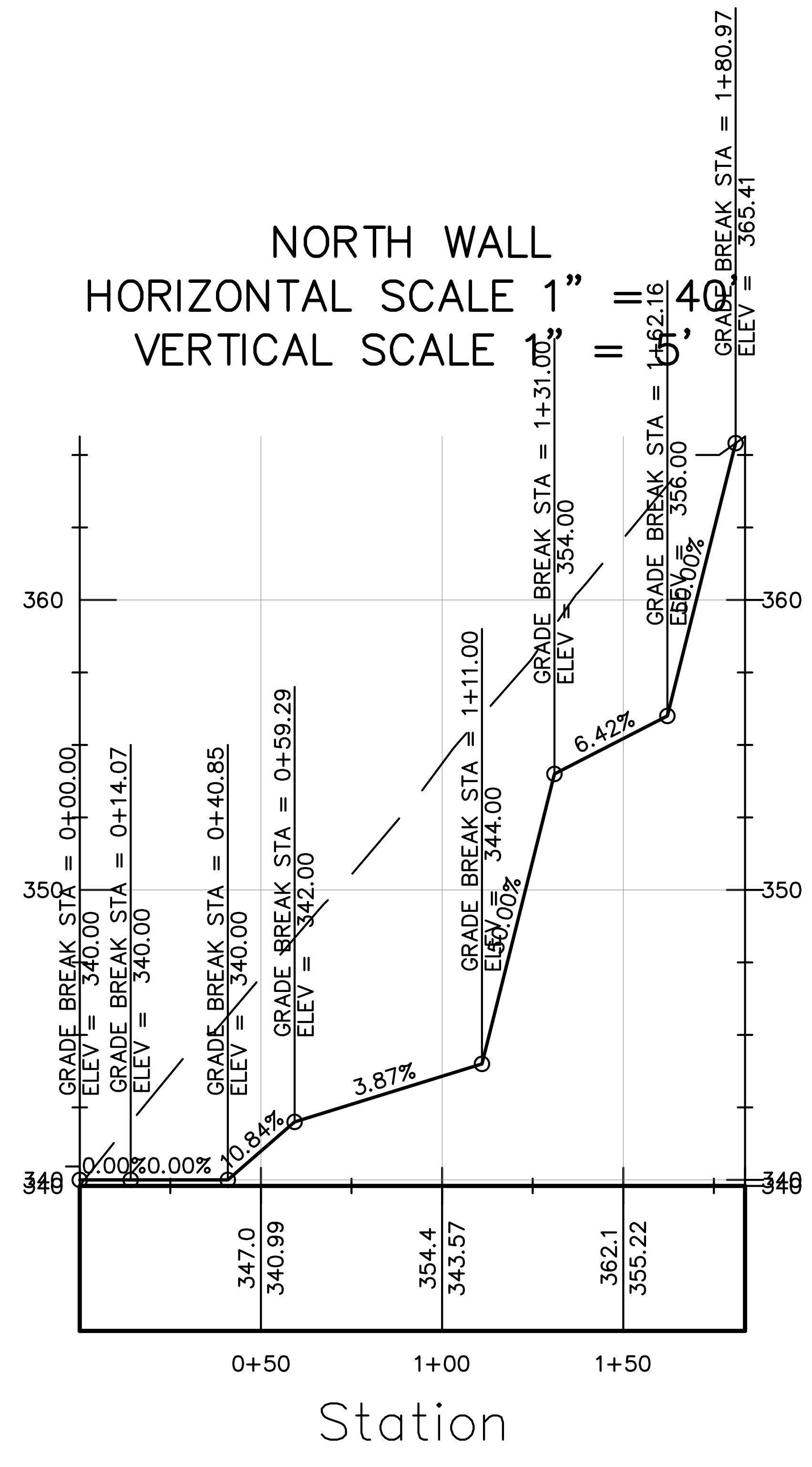
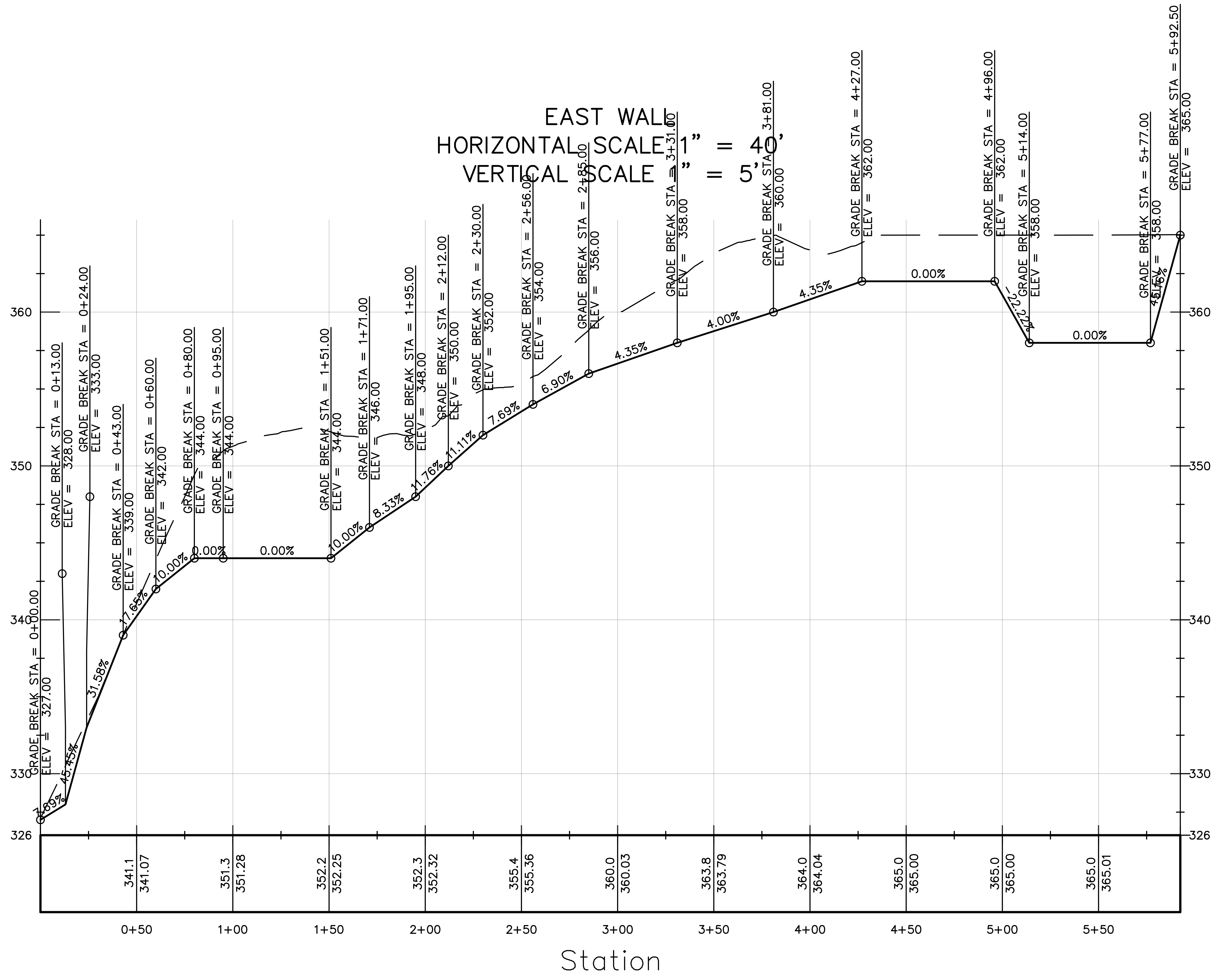
CALAVISTA – PRD

WALLS – PLAN & PROFILES







DESIGN MAK
DRAWN RDC
CHECKED MAK
SEC 13 T 26N R 1E
DISC NO ___ DATE 8/15/2018
SCALE AS NOTED

REV NO	REVISION DESCRIPTION	DATE	BY
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3	REV. PER CITY COMMENTS, DATED 1/22/20	2/24/20	RDC

RON D. CLEAVER JR
2/24/2020

PROJECT MANAGER: RON D CLEAVER JR **SIGNATURE:**

TITLE
CALAVISTA – PRD
WALLS – PLAN & PROFILES

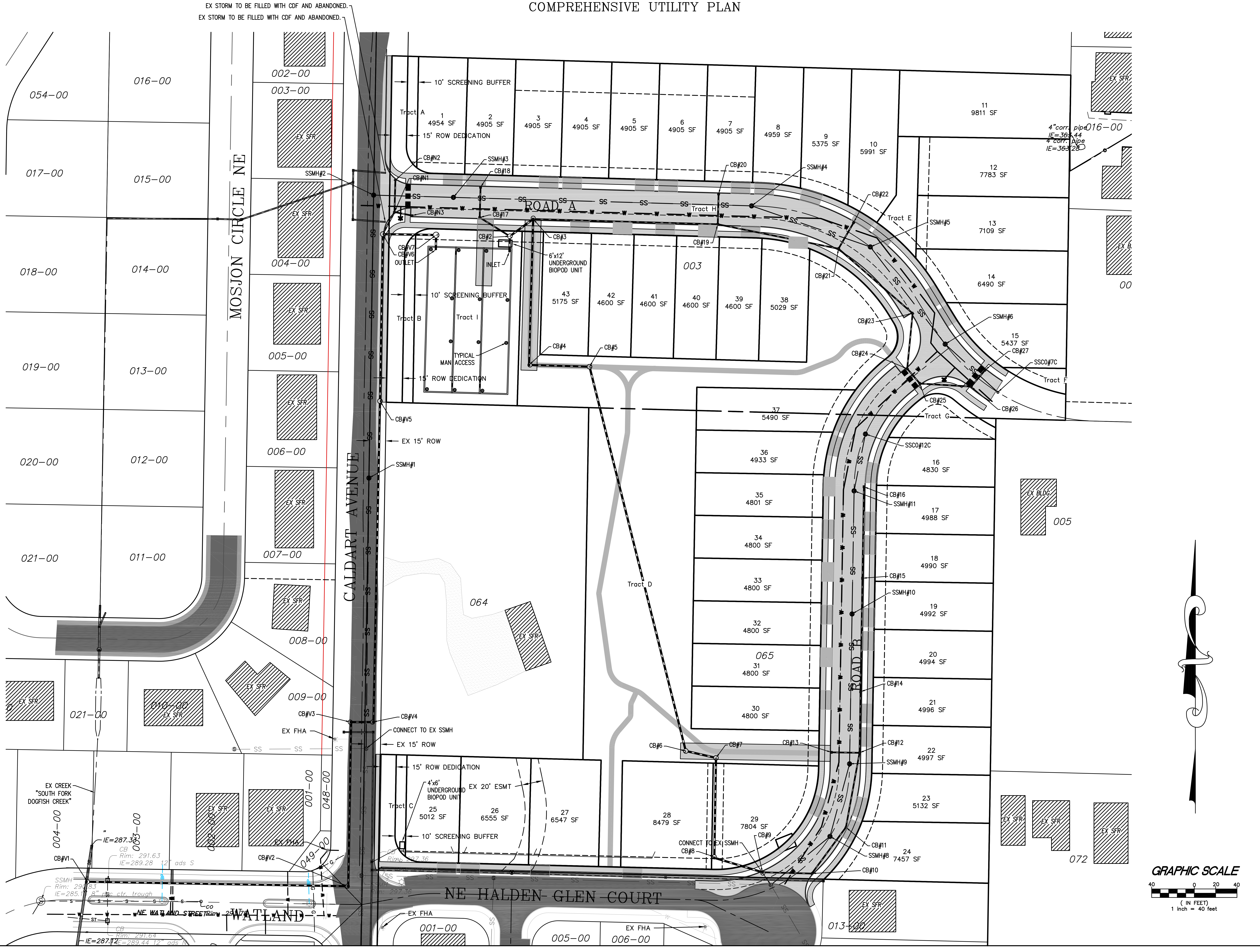
CLIENT
CALDART POULSBO LLC
C/O BARRY MARGOLESE
105 S. MAIN ST, SUITE 230
SEATTLE, WA 98104
(206) 910-2728

RDCJR
CIVIL ENGINEERING
3231 NE TOTTEN ROAD, SUITE 103
POULSBO, WA 98370
(360) 265-1037 CELL
RON@RDCJRENGINEERING.COM

SHEET 17 OF 30
FILE NO 1222

CALAVISTA – PRD

COMPREHENSIVE UTILITY PLAN



REV NO	REVISION DESCRIPTION	DATE	BY
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DESIGN MAK
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CHECKED MAK
SEC 13 T 26N R 1E
DISC NO ____ DATE 8/15/2018
SCALE AS NOTED

RON D. CLEAVER JR
43644
2/24/2020

PROJECT MANAGER: RON D CLEAVER JR
SIGNATURE:

TITLE
CALAVISTA – PRD
COMPREHENSIVE UTILITY PLAN

CLIENT
CALDART POULSBO LLC
C/O BARRY MARGOLESE
105 S. MAIN ST, SUITE 230
SEATTLE, WA 98104
(206) 910–2728

RDCJR
CIVIL ENGINEERING
3231 NE TOTTEN ROAD, SUITE 103
POULSBO, WA 98370
(360) 265–1037 CELL
RON@RDCJRENGINEERING.COM

SHEET 18 OF 30
FILE NO 1222

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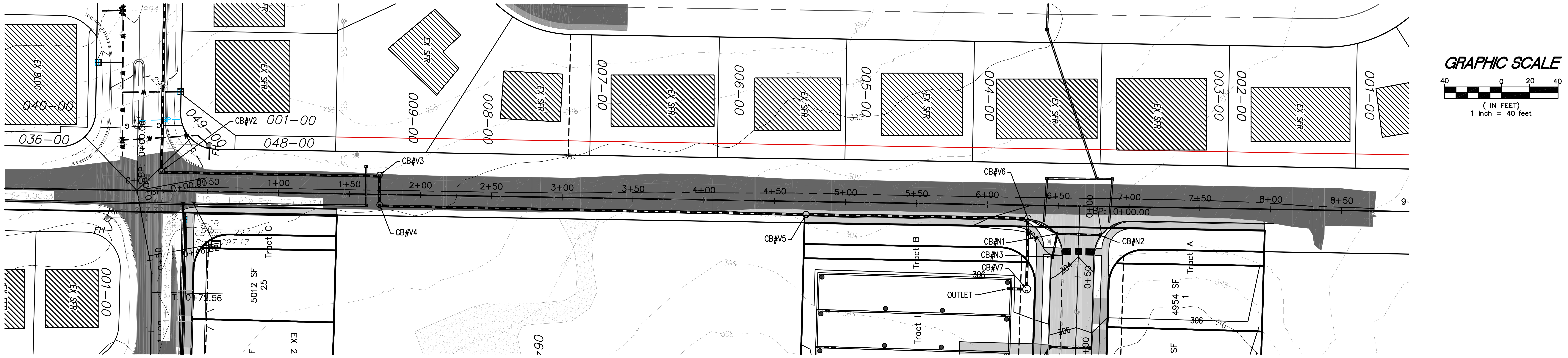
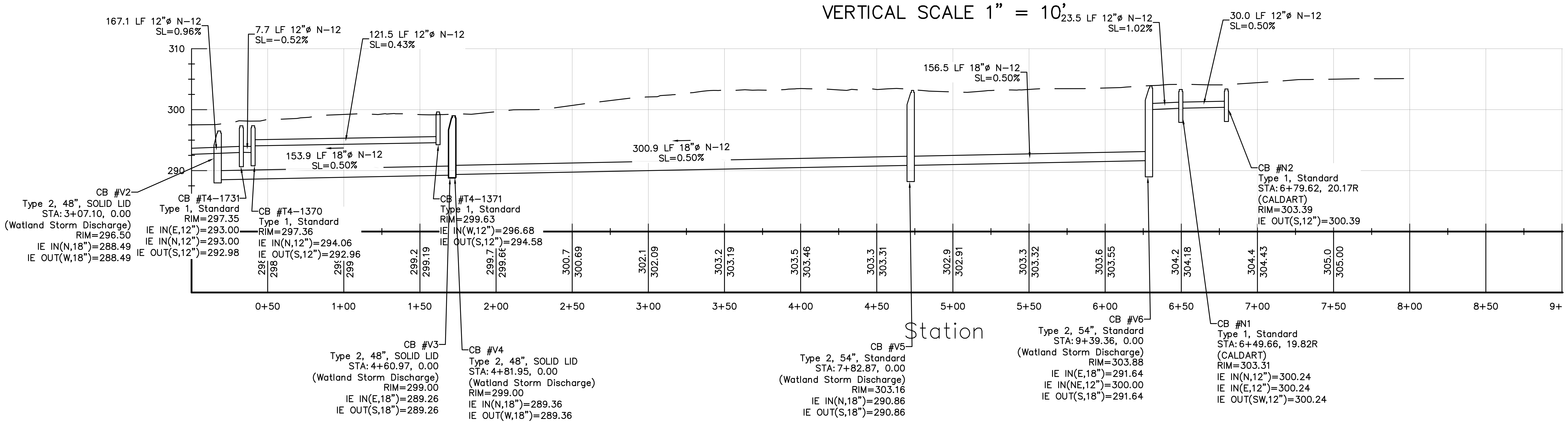
CALAVISTA – PRD

CALDART STORM – PLAN & PROFILE



CALDART STORM
HORIZONTAL SCALE 1" = 40'
VERTICAL SCALE 1" = 10'



NOTE: SOME STORM CATCHMENTS ON THIS
SHEET ARE TIED TO A DIFFERENT PROFILE
AS NOTED IN THE STRUCTURE TEXT.
SEE SHEET 24.

REV NO	REVISION DESCRIPTION	DATE	BY
1	REV. PER CITY COMMENTS, DATED 7/2019	7/22/19	RDC
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DESIGN MAK
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SEC 13 T 26N R 1E
DISC NO ____ DATE 8/15/2018
SCALE AS NOTED

RON D. CLEAVER JR
43644
2/24/2020

PROJECT MANAGER: RON D CLEAVER JR
SIGNATURE:

TITLE
CALAVISTA – PRD
CALDART STORM – PLAN & PROFILE

CLIENT
CALDART POULSBO LLC
C/O BARRY MARGOLESE
105 S. MAIN ST, SUITE 230
SEATTLE, WA 98104
(206) 910–2728

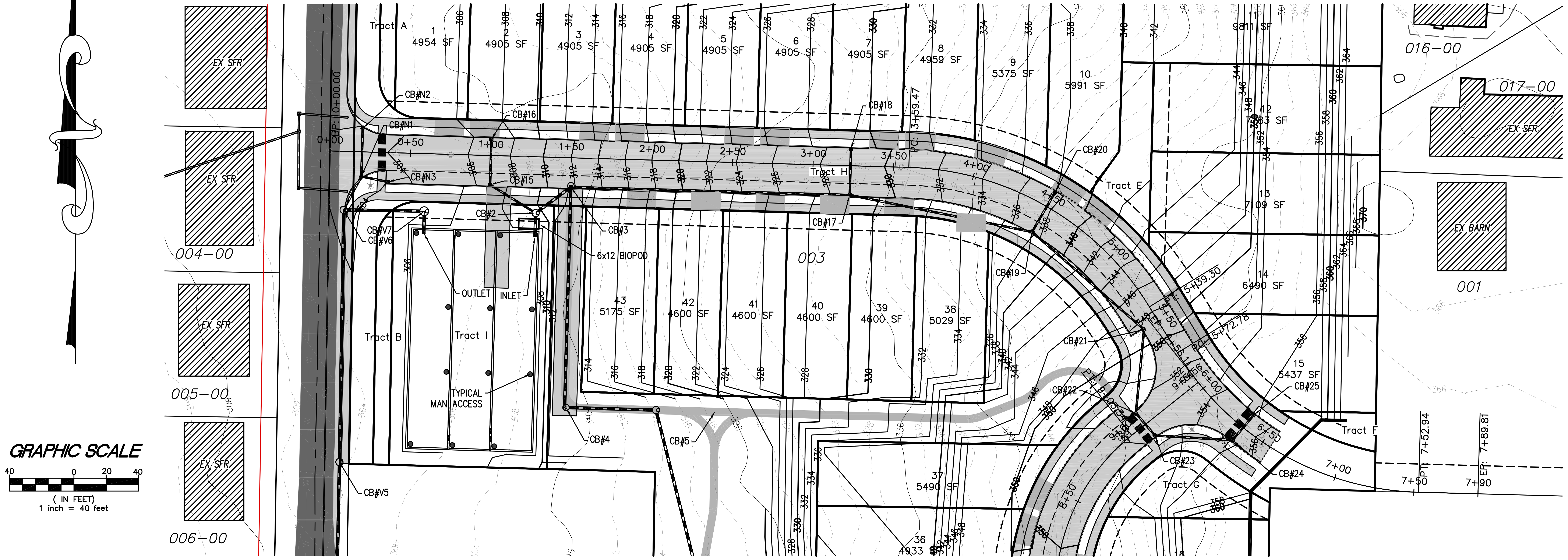
RDCJR
CIVIL ENGINEERING
3231 NE TOTTEN ROAD, SUITE 103
POULSBO, WA 98370
(360) 265–1037 CELL
RON@RDCJRENGINEERING.COM

SHEET 19 OF 30

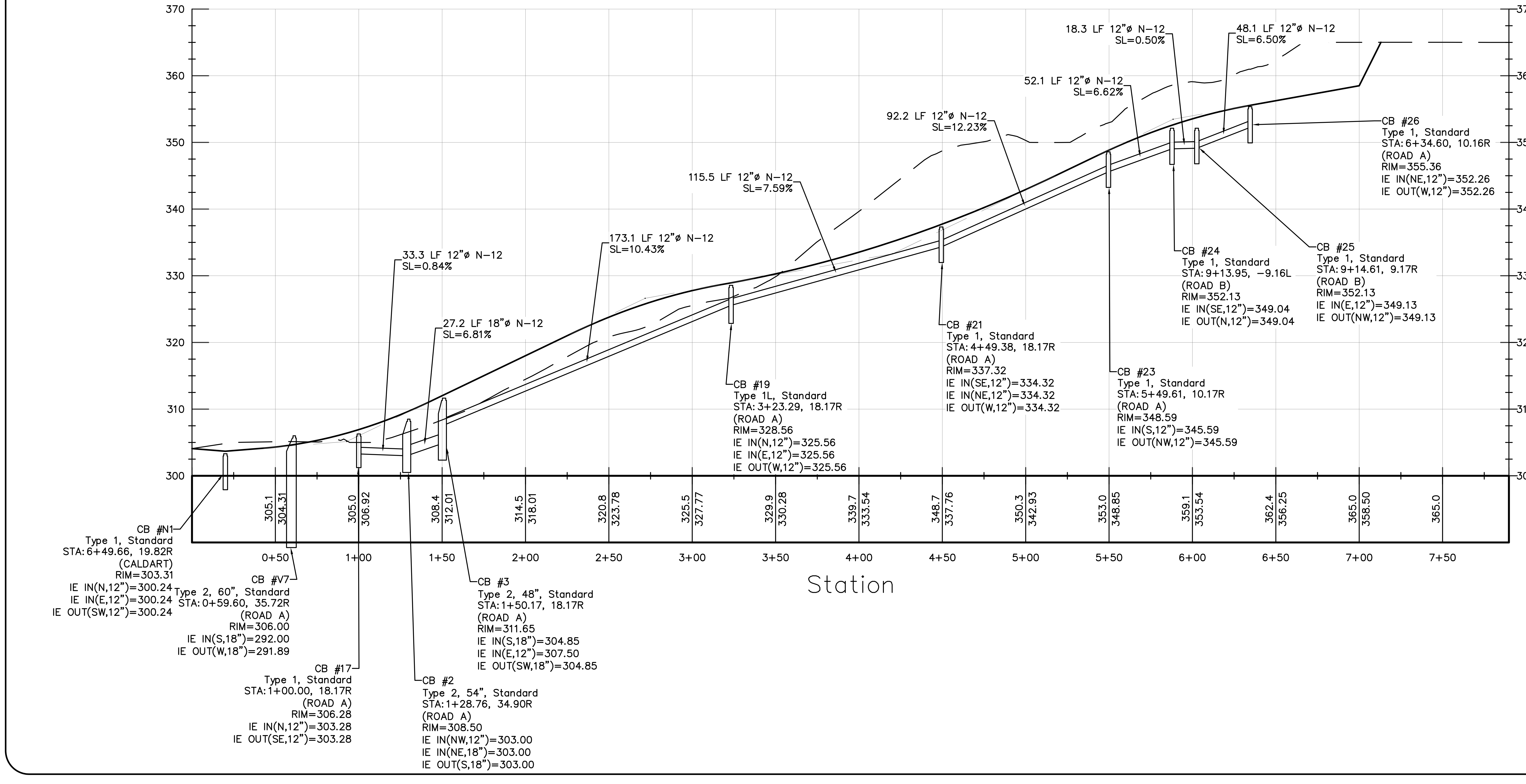
FILE NO 1222

CALAVISTA – PRD

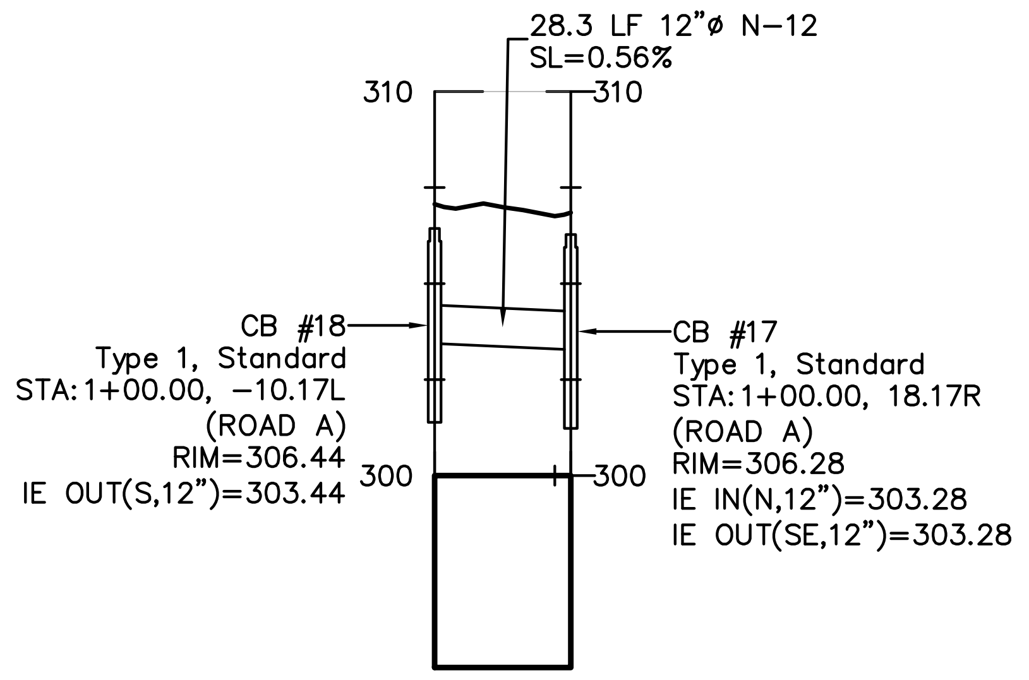
ROAD A STORM – PLAN & PROFILE



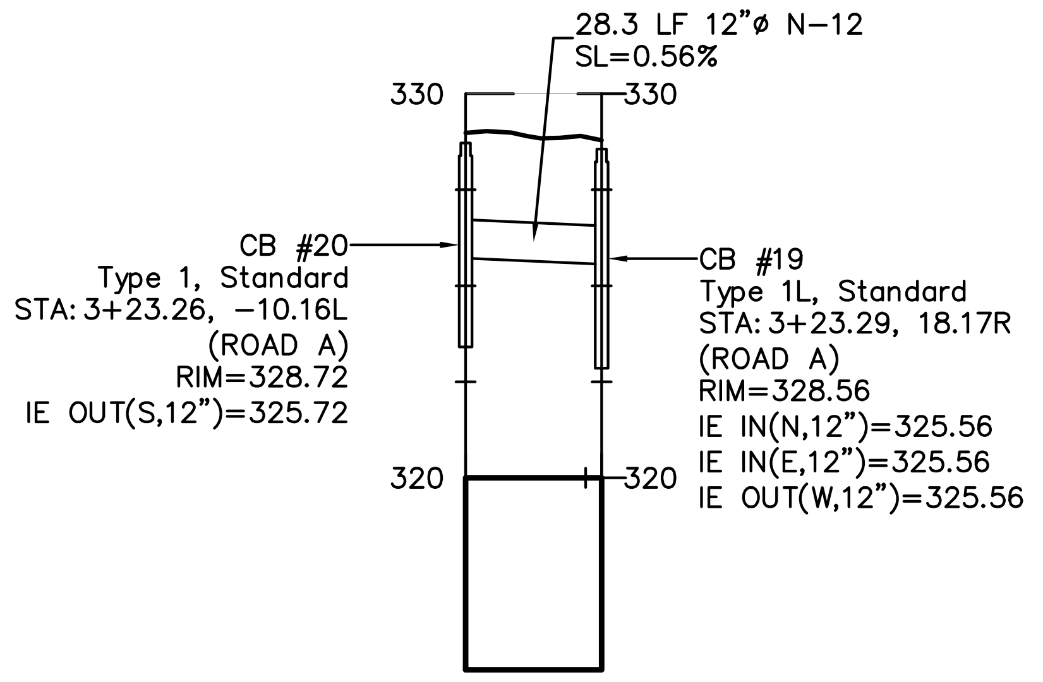
ROAD A STORM
HORIZONTAL SCALE 1" = 40'
VERTICAL SCALE 1" = 10'



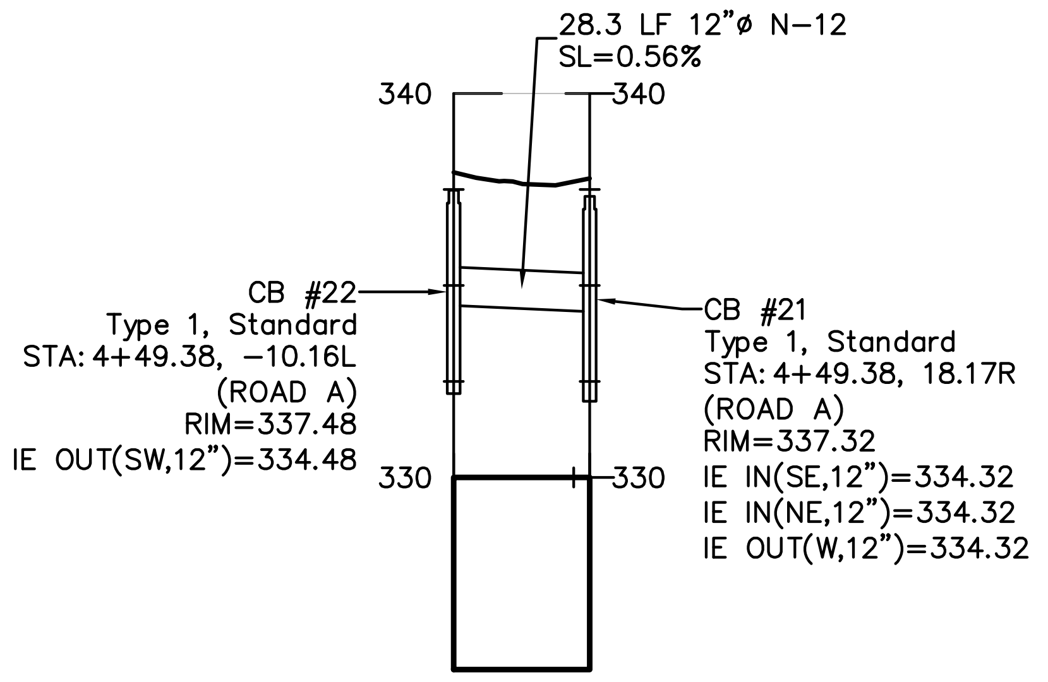
18–17
HORIZONTAL SCALE 1" = 40'
VERTICAL SCALE 1" = 5'



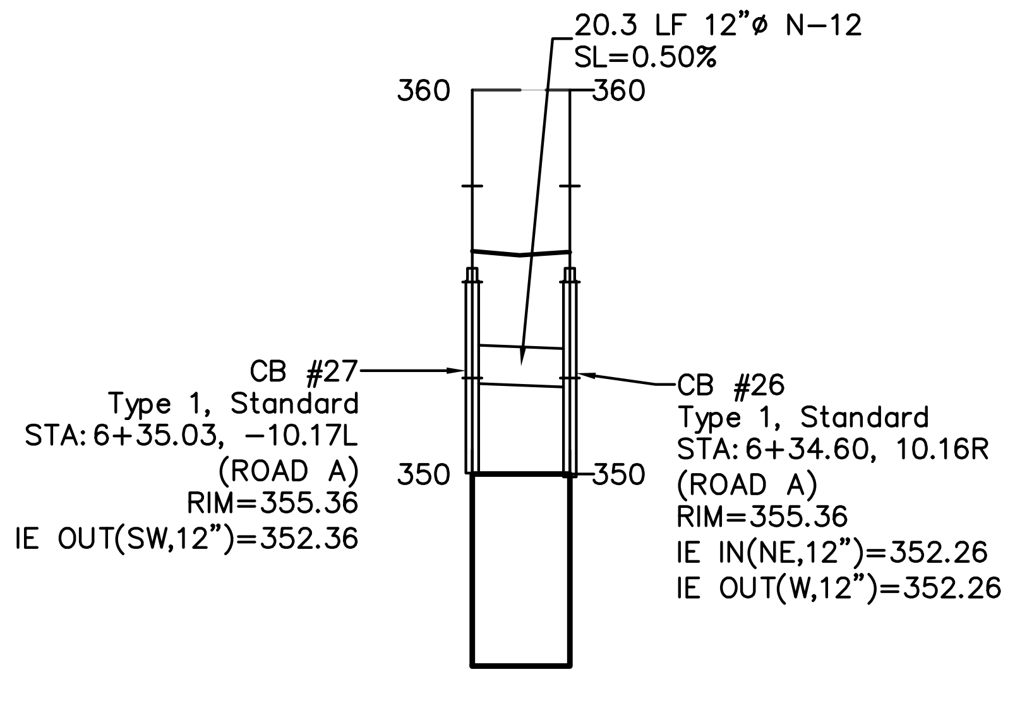
20–19
HORIZONTAL SCALE 1" = 40'
VERTICAL SCALE 1" = 5'



22–21
HORIZONTAL SCALE 1" = 40'
VERTICAL SCALE 1" = 5'



27–26
HORIZONTAL SCALE 1" = 40'
VERTICAL SCALE 1" = 5'



DESIGN MAK
DRAWN RDC
CHECKED MAK
SEC 13 T 26N R 1E
DISC NO ____ DATE 8/15/2018
SCALE AS NOTED

REV NO	REVISION DESCRIPTION	DATE	BY
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3	REV. PER CITY COMMENTS, DATED 1/22/20	2/24/20	RDC

RON D. CLEAVER JR
2/24/2020

PROJECT MANAGER: RON D CLEAVER JR
SIGNATURE:

TITLE
CALAVISTA – PRD
ROAD A STORM – PLAN & PROFILE

CLIENT
CALDART POULSBO LLC
C/O BARRY MARGOLESE
105 S. MAIN ST, SUITE 230
SEATTLE, WA 98104
(206) 910–2728

RDCJR
CIVIL ENGINEERING
3231 NE TOTTEN ROAD, SUITE 103
POULSBO, WA 98370
(360) 265–1037 CELL
RON@RDCJRENGINEERING.COM

SHEET 20 OF 30
FILE NO 1222

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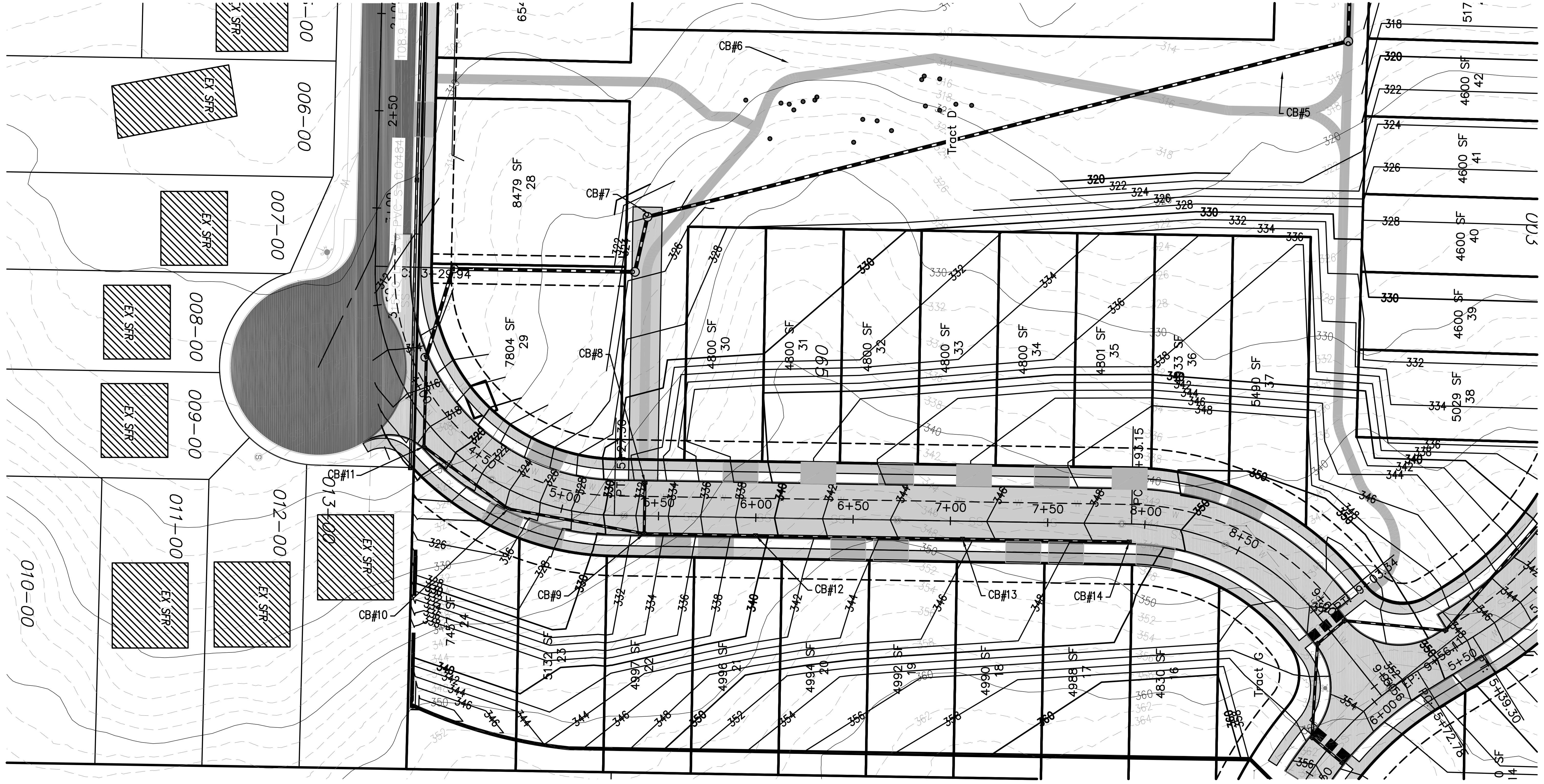
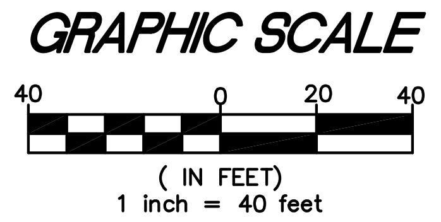
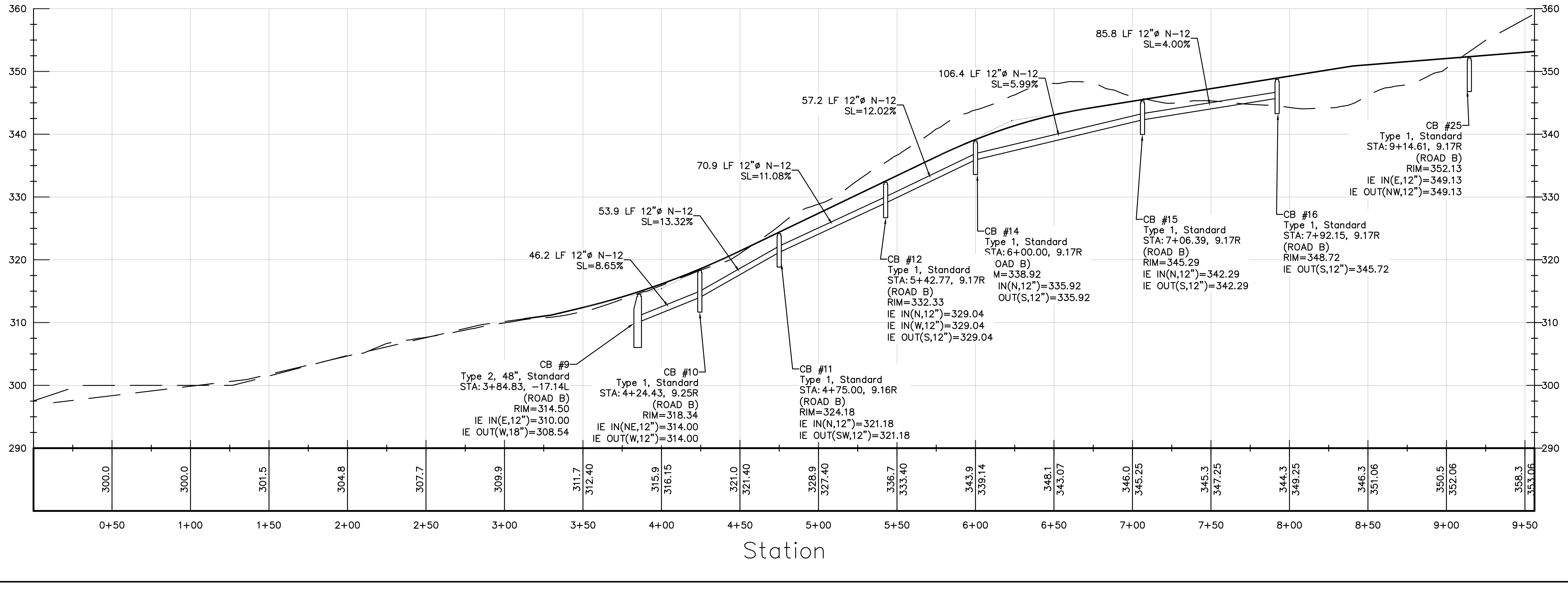
CALAVISTA – PRD

ROAD B STORM – PLAN & PROFILE





ROAD B STORM
HORIZONTAL SCALE 1" = 40'
VERTICAL SCALE 1" = 10'



DESIGN MAK
DRAWN RDC
CHECKED MAK
SEC 13 T 26N R 1E
DISC NO ____ DATE 8/15/2018
SCALE AS NOTED

REV NO	REVISION DESCRIPTION	DATE	BY
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RON D. CLEAVER JR
43644
2/24/2020

PROJECT MANAGER: RON D CLEAVER JR
SIGNATURE:

TITLE
CALAVISTA – PRD
ROAD B STORM – PLAN & PROFILE

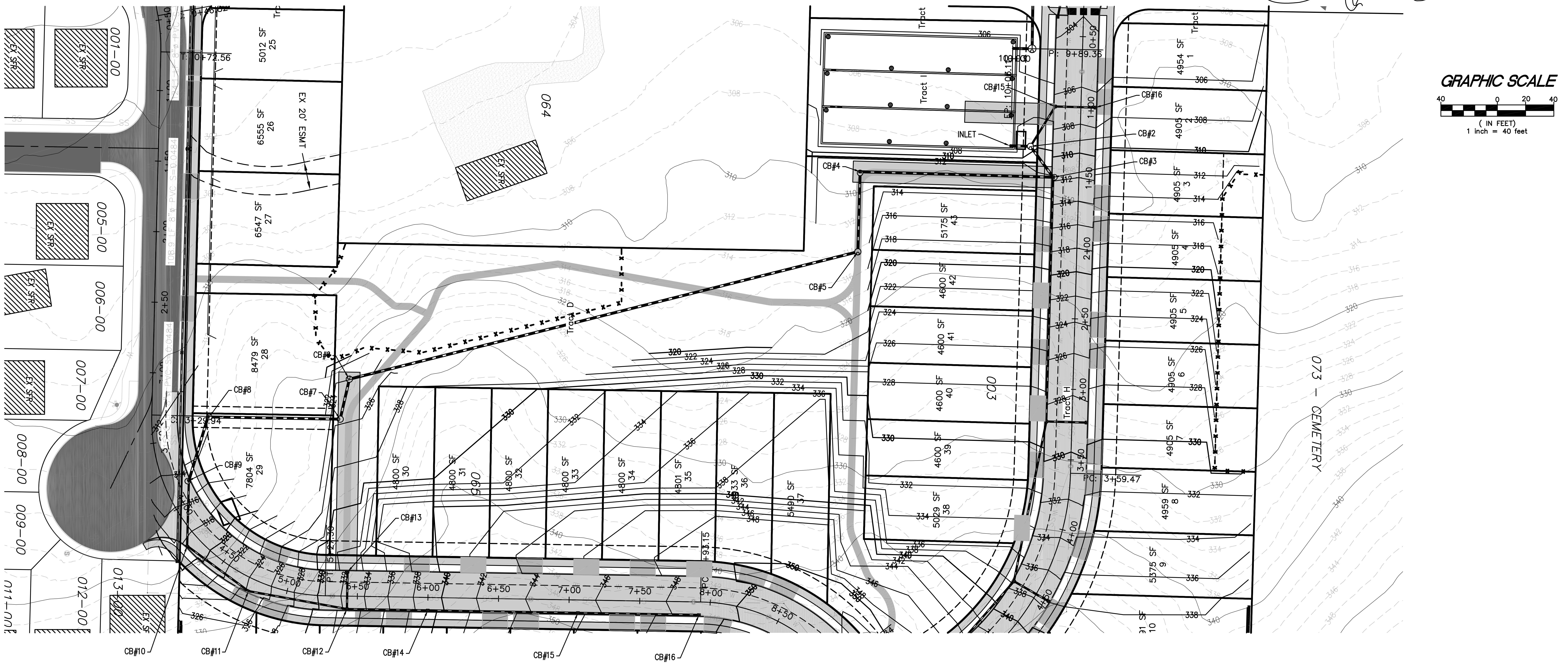
CLIENT
CALDART POULSBO LLC
C/O BARRY MARGOLESE
105 S. MAIN ST, SUITE 230
SEATTLE, WA 98104
(206) 910–2728

RDCJR
CIVIL ENGINEERING
3231 NE TOTTEN ROAD, SUITE 103
POULSBO, WA 98370
(360) 265–1037 CELL
RON@RDCJRENGINEERING.COM

SHEET 21 OF 30
FILE NO 1222

CALAVISTA – PRD

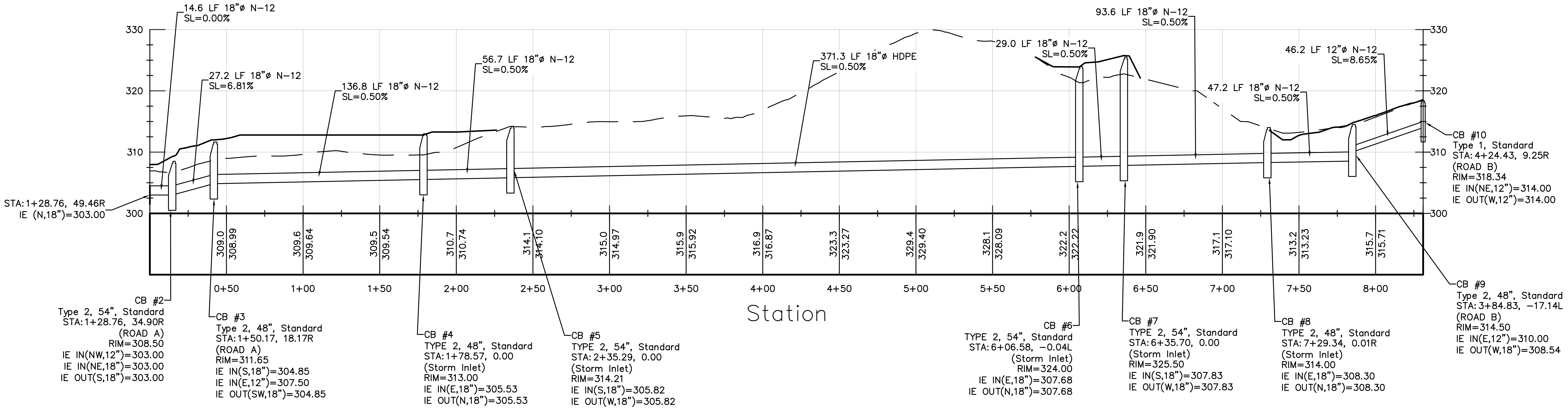
STORM INLET PLAN & PROFILE



Storm Inlet

HORIZONTAL SCALE 1" = 40'

VERTICAL SCALE 1" = 10'



CB #2
Type 2, 54", Standard
STA:1+28.76, 34.90R
(ROAD A)
RIM=308.50
IE IN(NW,12")=303.00
IE IN(NE,18")=303.00
IE OUT(S,18")=303.00

CB #3
Type 2, 48", Standard
STA:1+50.17, 18.17R
(ROAD A)
RIM=311.65
IE IN(S,18")=304.85
IE IN(E,12")=307.50
IE OUT(SW,18")=304.85

CB #4
TYPE 2, 48", Standard
STA:1+78.57, 0.00
(Storm Inlet)
RIM=313.00
IE IN(E,18")=305.53
IE OUT(N,18")=305.53

CB #5
TYPE 2, 54", Standard
STA:2+35.29, 0.00
(Storm Inlet)
RIM=314.21
IE IN(S,18")=305.82
IE OUT(W,18")=305.82

CB #6
TYPE 2, 54", Standard
STA:6+06.58, –0.04L
(Storm Inlet)
RIM=324.00
IE IN(E,18")=307.68
IE OUT(N,18")=307.68

CB #7
TYPE 2, 54", Standard
STA:6+35.70, 0.00
(Storm Inlet)
RIM=325.50
IE IN(S,18")=307.83
IE OUT(W,18")=307.83

CB #8
TYPE 2, 48", Standard
STA:7+29.34, 0.01R
(Storm Inlet)
RIM=314.00
IE IN(E,18")=308.30
IE OUT(N,18")=308.30

CB #9
Type 2, 48", Standard
STA:3+84.83, –17.14L
(ROAD B)
RIM=314.50
IE IN(E,12")=310.00
IE OUT(W,18")=308.54

CB #10
Type 1, Standard
STA:4+24.43, 9.25R
(ROAD B)
RIM=318.34
IE IN(NE,12")=314.00
IE OUT(W,12")=314.00

DESIGN MAK
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CHECKED MAK
SEC 13 T 26N R 1E
DISC NO ____ DATE 8/15/2018
SCALE AS NOTED

REV NO	REVISION DESCRIPTION	DATE	BY
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RON D. CLEAVER JR
43644
2/24/2020

PROJECT MANAGER: RON D CLEAVER JR

SIGNATURE:

TITLE
CALAVISTA – PRD
STORM INLET PLAN & PROFILE

CLIENT
CALDART POULSBO LLC
C/O BARRY MARGOLESE
105 S. MAIN ST, SUITE 230
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(206) 910-2728

RDCJR
CIVIL ENGINEERING
3231 NE TOTTEN ROAD, SUITE 103
POULSBO, WA 98370
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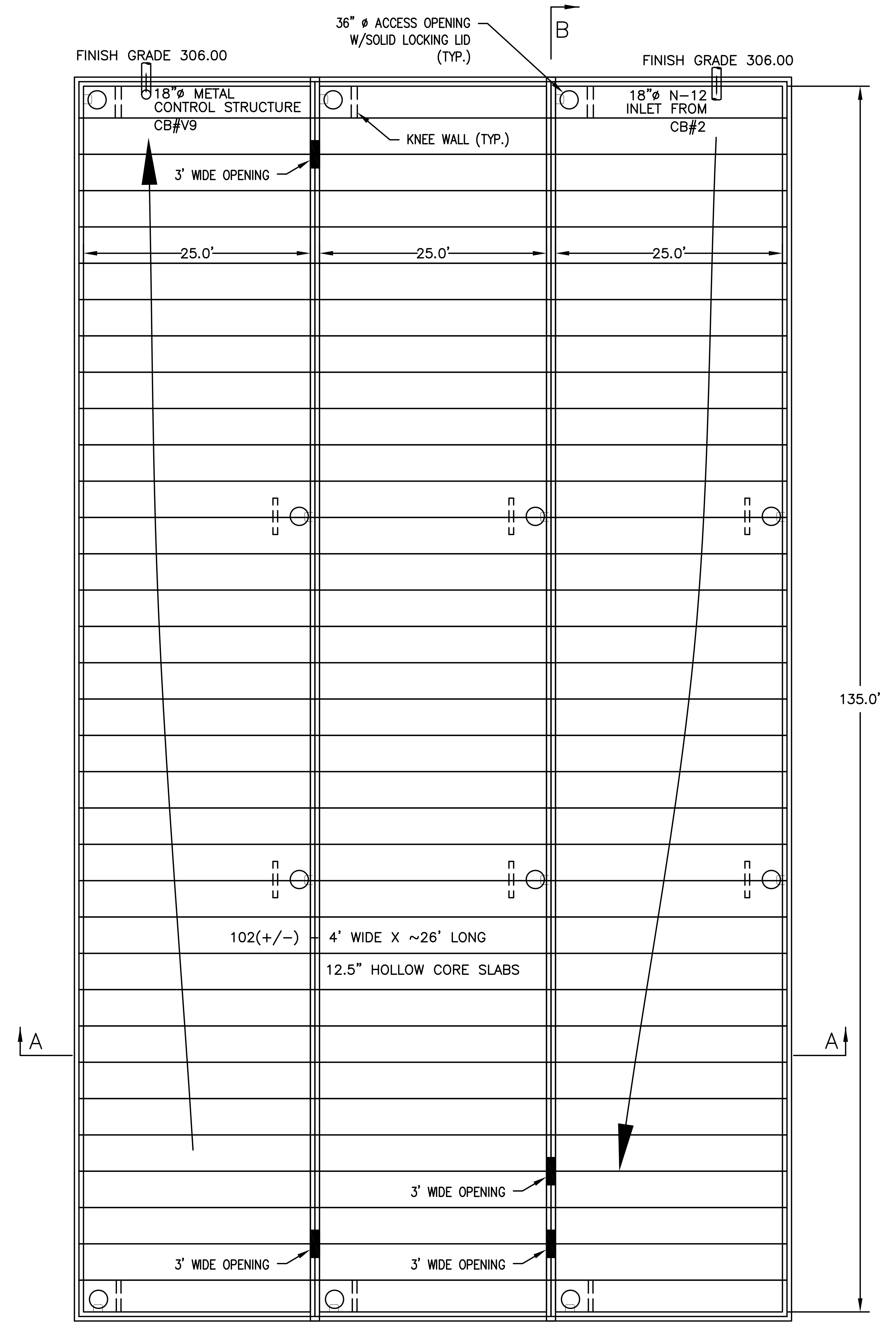
SHEET 22 OF 30

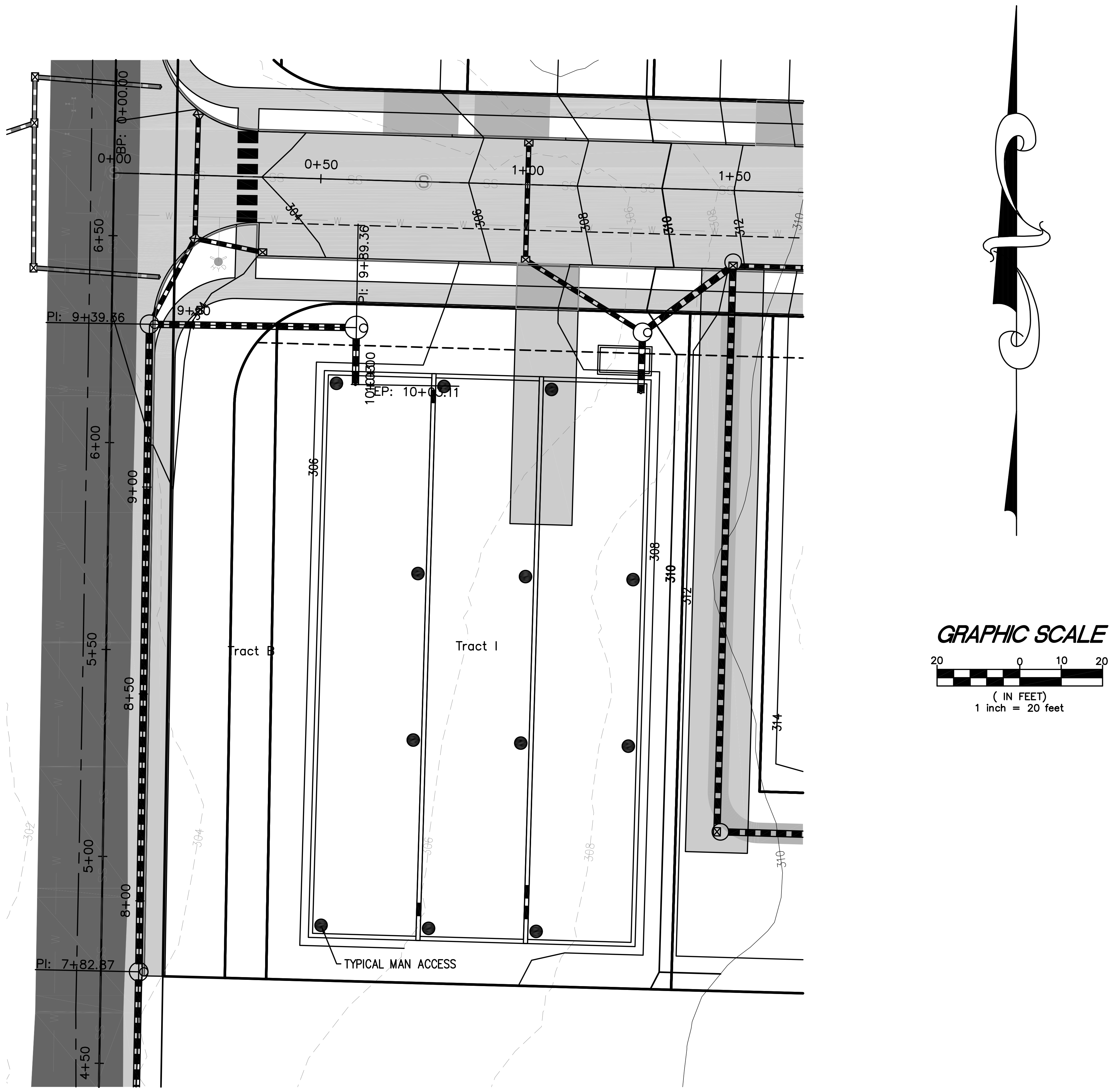
FILE NO 1222

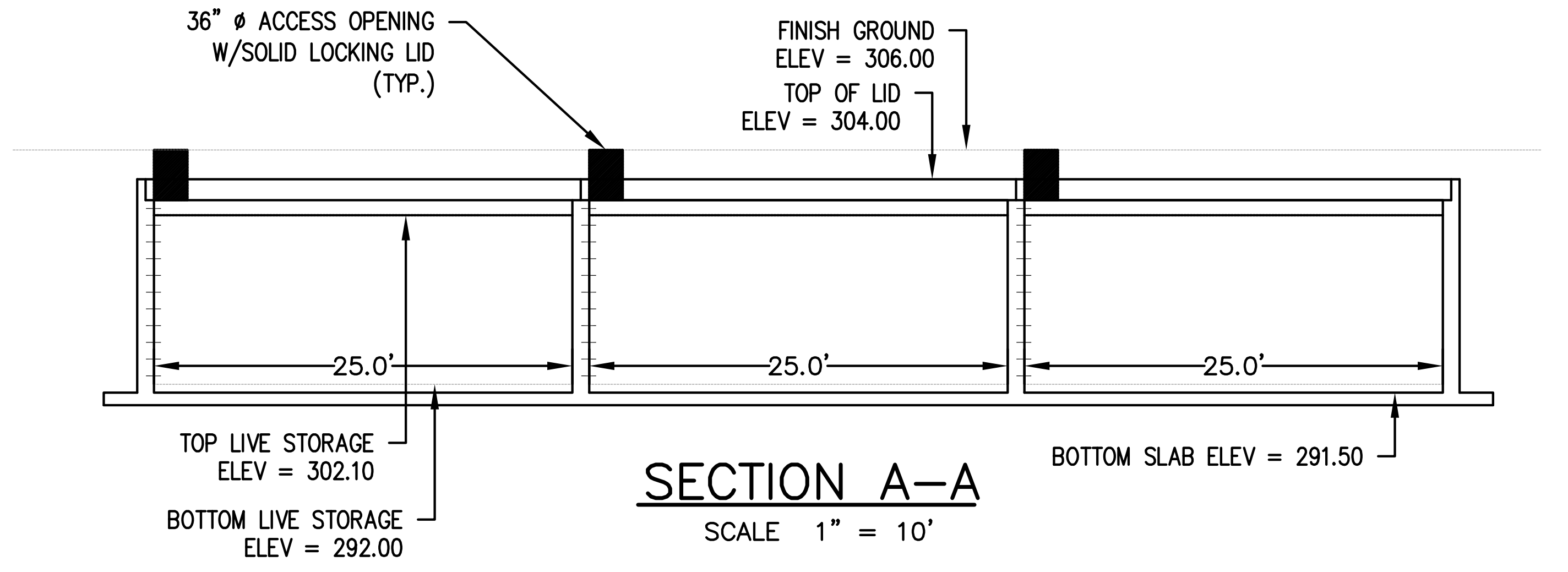
CALAVISTA – PRD

STORM FACILITY PLAN & DETAILS

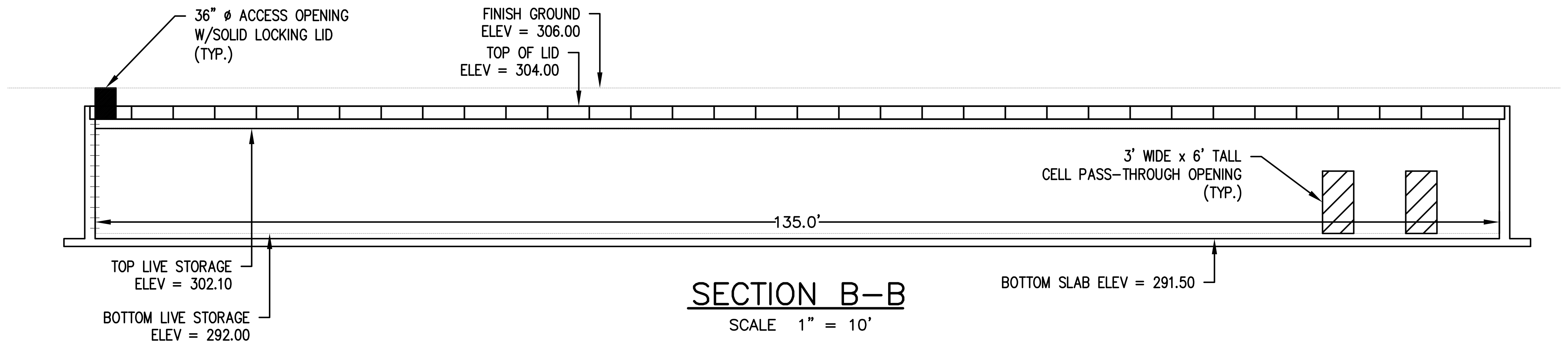


STORM WATER DETENTION
VAULT PLAN
SCALE 1" = 10'





SECTION A–A
SCALE 1" = 10'



SECTION B–B
SCALE 1" = 10'

DESIGN MAK
DRAWN RDC
CHECKED MAK
SEC 13 T 26N R 1E
DISC NO ___ DATE 8/15/2018
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RON D. CLEAVER JR
43644
2/24/2020

PROJECT MANAGER: RON D CLEAVER JR
SIGNATURE:

TITLE
CALAVISTA – PRD
STORM FACILITY PLAN & DETAILS

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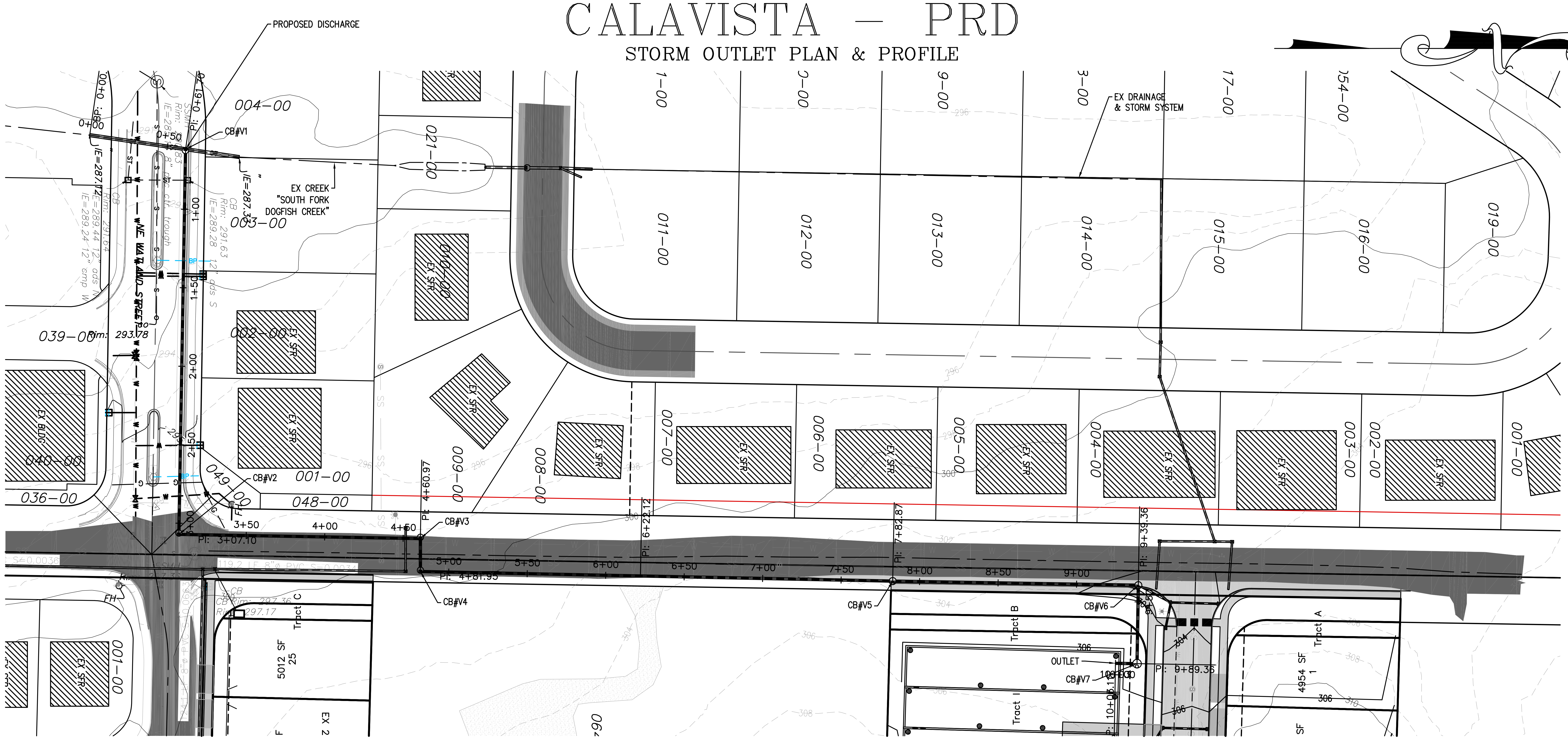
SHEET 23 OF 30
FILE NO 1222

CALAVISTA — PRD

STORM OUTLET PLAN & PROFILE

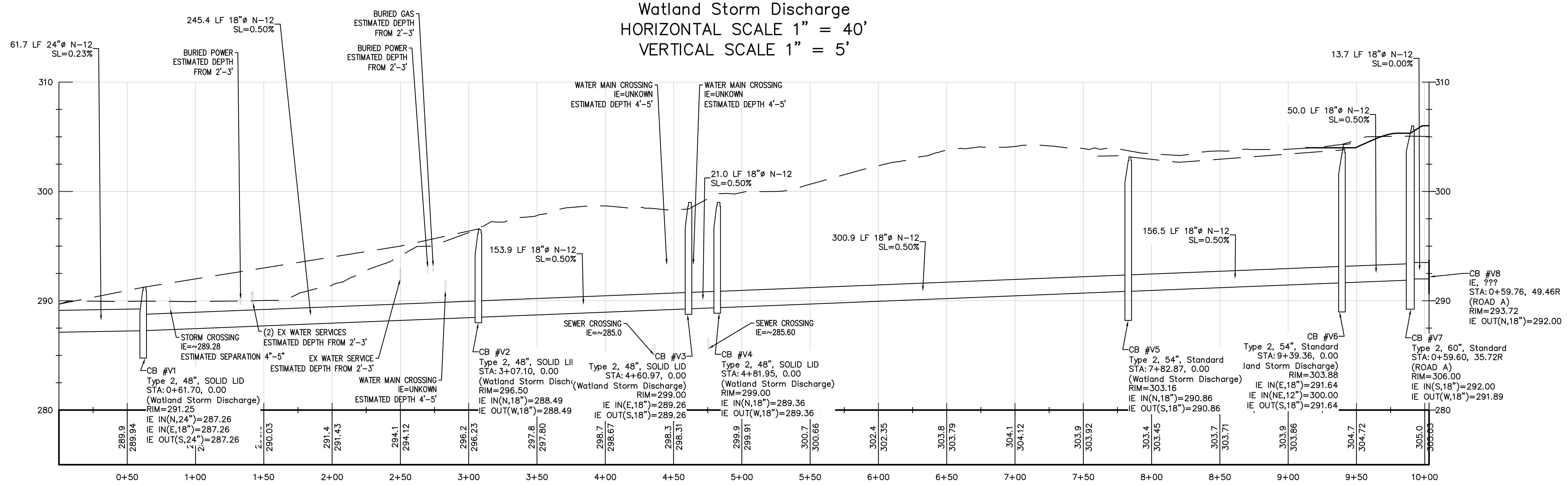


GRAPHIC SCALE

40 0 20 40

(IN FEET)
1 inch = 40 feet

Watland Storm Discharge
HORIZONTAL SCALE 1" = 40'
VERTICAL SCALE 1" = 5'



DESIGN	MAK
DRAWN	RDC
CHECKED	MAK

SEC 13 T 26N R 1E

DISC NO ____ DATE 8/15/2018

SCALE AS NOTED

REV NO	REVISION DESCRIPTION	DATE	BY
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3	REV. PER CITY COMMENTS, DATED 1/22/20	2/24/20	RDC

RON D. CLEAVER JR
43644

2/24/2020

PROJECT MANAGER: RON D CLEAVER JR

SIGNATURE:

TITLE
CALAVISTA — PRD
STORM OUTLET PLAN & PROFILE

CLIENT
CALDART POULSBO LLC
C/O BARRY MARGOLESE
105 S. MAIN ST, SUITE 230
SEATTLE, WA 98104
(206) 910-2728

RDCJR
CIVIL ENGINEERING
3231 NE TOTTEN ROAD, SUITE 103
POULSBO, WA 98370
(360) 265-1037 CELL
RON@RDCJRENGINEERING.COM

SHEET 24 OF 30

FILE NO 1222

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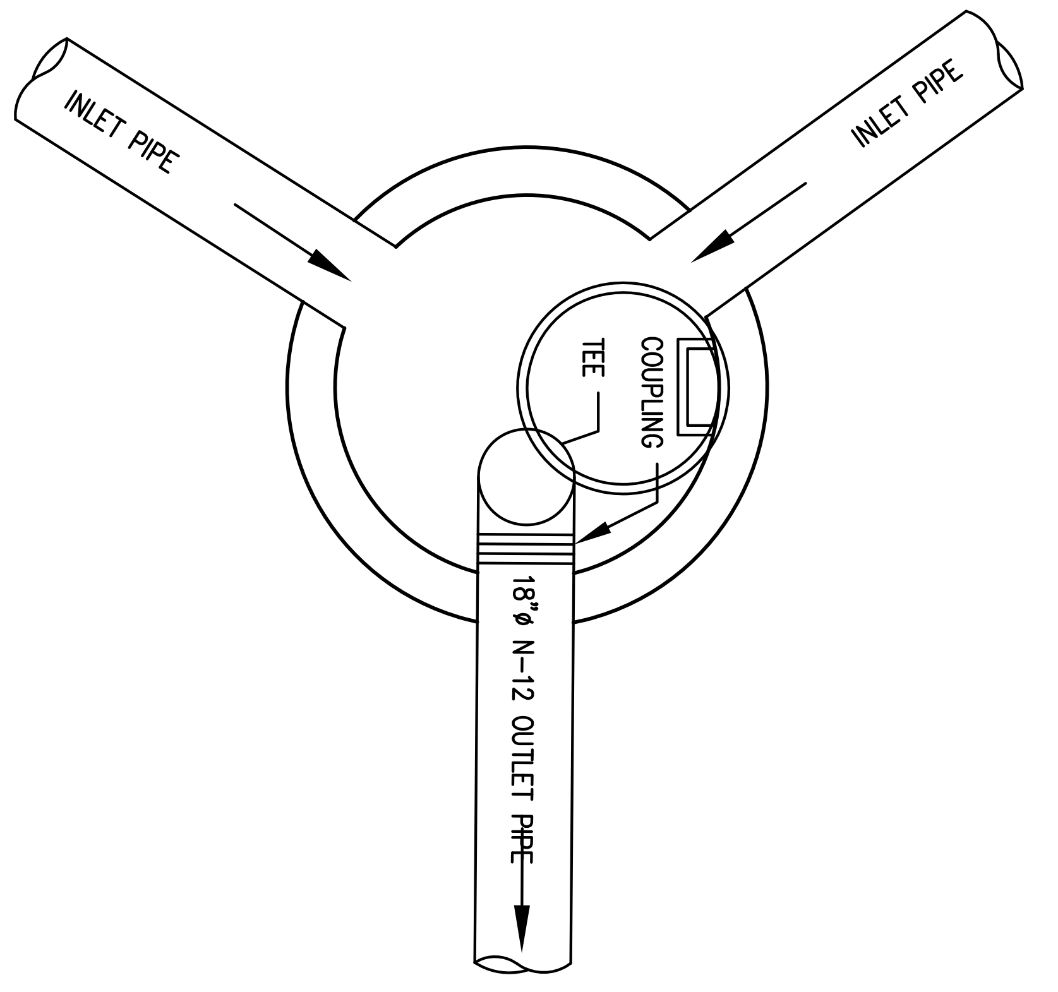
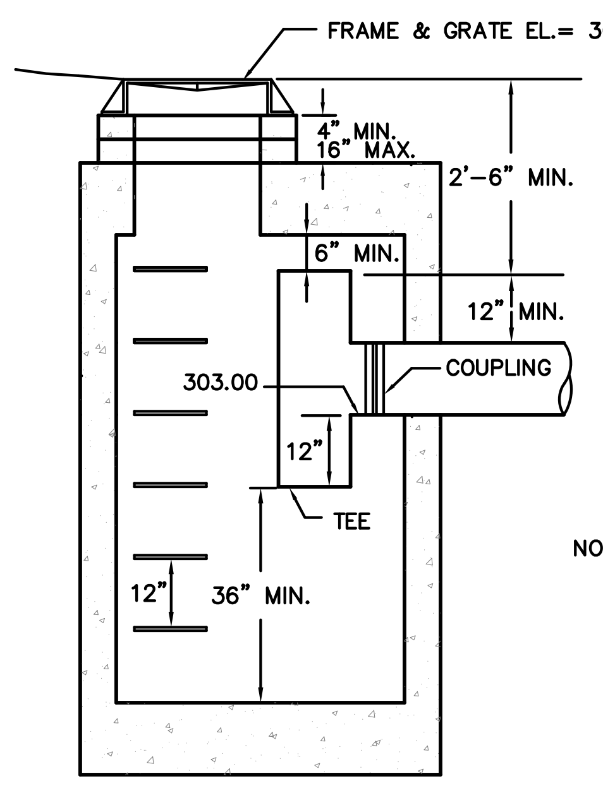
CALAVISTA – PRD

STORM DETAILS (1 OF 2)



PLAN VIEW



ELEVATION

N.T.S.

NOTES:
1. METAL PARTS: CORROSION RESISTANT GALVANIZED PIPE PARTS TO HAVE ASPHALT TREATMENT 1.
2. FRAME & LADDER OR STEPS OFFSET SO:
   A. CLEAMOUT GATE IS VISIBLE FROM TOP
   B. CLIMB-DOWN SPACE IS CLEAR OF RISER AND CLEANOUT GATE.
3. IF METAL OUTLET PIPE CONNECTS TO CEMENT CONCRETE PIPE: OUTLET PIPE TO HAVE SMOOTH O.D. EQUAL TO CONCRETE PIPE LESS THAN 1/4".

CB# 2 DETAIL
48" OIL/WATER SEPARATOR

NO SCALE

STORM AND GRADING MATERIAL SPECIFICATIONS

1. CATCH BASIN	TYPE I, W.S.D.O.T. STANDARD PLAN B-5.20-01 TYPE IL, W.S.D.O.T. STANDARD PLAN B-5.40-01 TYPE 30, PACIFIC INTERNATIONAL PIPE ENTERPRISES TYPE 30 TYPE II, W.S.D.O.T. STANDARD PLAN B-10.20-00, TYPE II WITH FLOW RESTRICTOR, 60" MIN. DIAMETER, W.S.D.O.T. STANDARD PLAN B-10.40-00.
2. FRAME & GRATE:	VANED GRATE, W.S.D.O.T. STANDARD PLAN B-30.30-00 (AS NOTED ON PLANS). STANDARD FRAME AND GRATE, W.S.D.O.T. STANDARD B-30.50-00. BEEHIVE GRATE OLYMPIC FOUNDRY, INC. PART NO. 60BH (OR EQ.)
3. SOLID METAIL COVER:	3 BOLT LOCKING TYPE, OLYMPIC FOUNDRY TYPE MH 30D/T OR EQUAL FOR TYPE II CATCH BASINS. OLYMPIC FOUNDRY TYPE SM 605 OR W.S.D.O.T. STANDARD PLAN B-2 (OR EQUAL) FOR TYPE I CATCH BASINS.
4. STORM SEWER PIPE:	*CONCRETE PIPE PER W.S.D.O.T. 9-05.7(1) & 9-05.7(2) *CORRUGATED HIGH DENSITY POLYETHYLENE PIPE (HDPE), ADS N-12 OR HANCOR Hi-Q (ASSHTO M294 TYPE S)
5. DOWN SPOUT:	ADS N-12 (OR EQUAL.) TIGHTLINE:
6. PIPE BEDDING:	W.S.D.O.T. 9-03.12(3) GRAVEL BACKFILL FOR PIPE BEDDING.
7. STRUCTURAL:	IMPORTED STRUCTURAL FILL / TRENCH BACKFILL PER W.S.D.O.T. 9-03.19
8. SPALLS:	W.S.D.O.T. 9-13.1, LOOSE RIPRAP IN SIZES RANGING FROM 3" TO 1/3 CUBIC FOOT.
9. INITIAL BACKFILL:	NATIVE MATERIAL OBTAINED FROM EXCAVATION PER W.S.D.O.T. 7-08.3(3)
10. REMAINING BACKFILL:	NATIVE MATERIAL OBTAINED FROM EXCAVATION PER W.S.D.O.T. 2-09.3(1)E.
11. PAVEMENT SECTION:	ASPHALT CONCRETE HMA 1/2" (PG 58-22) TOP COURSE, W.S.D.O.T. 9-03.9(3) BASE COURSE, W.S.D.O.T. 9-03.10
12. YARD DRAIN:	NDS-1214 12"x12" CB (OR EQUAL)

CONSTRUCTION NOTES

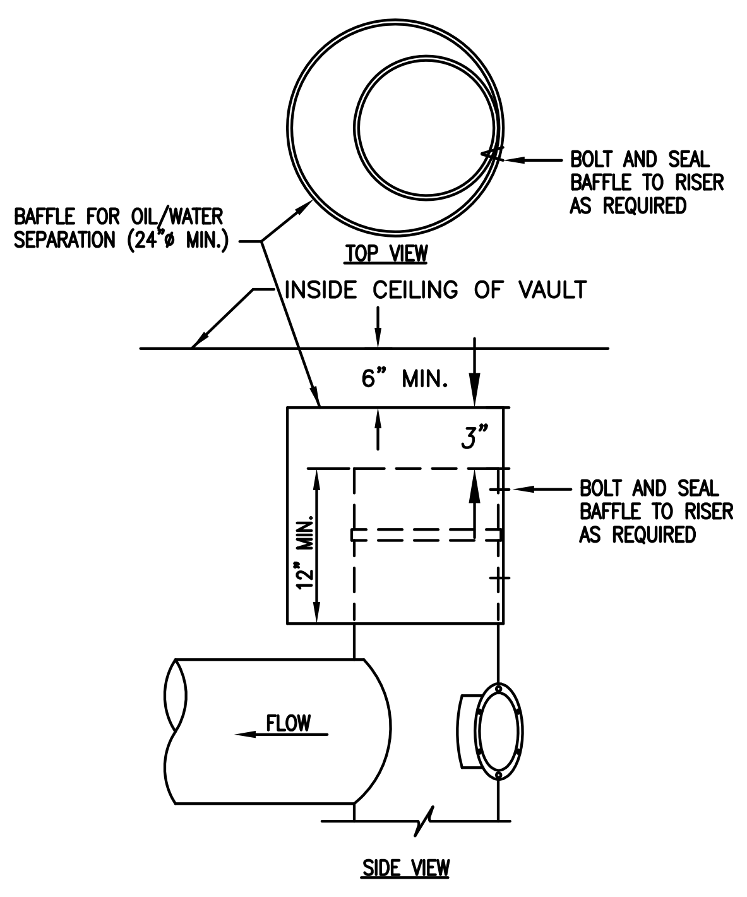
1. ALL WORK SHALL BE IN CONFORMANCE WITH THE LATEST REVISION OF THE "2000" STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION" AS JOINTLY ADOPTED BY WASHINGTON STATE DEPARTMENT OF TRANSPORTATION AND THE AMERICAN PUBLIC WORKS ASSOCIATION (WASHINGTON STATE CHAPTER).
2. ANY REVISIONS TO THESE PLANS MUST BE REVIEWED AND APPROVED BY CITY PRIOR TO ANY IMPLEMENTATION IN THE FIELD.
3. THE LOCATIONS OF EXISTING UTILITIES SHOWN ON THIS PLAN ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL CONTACT THE "UNDERGROUND LOCATE" CENTER AND NON-SUBSCRIBING INDIVIDUAL UTILITY COMPANIES 48 HOURS IN ADVANCE OF THE COMMENCEMENT OF ANY CONSTRUCTION ACTIVITY (PHONE #1-800-424-5555). THE CONTRACTOR SHALL PROVIDED PROTECTION OF EXISTING UTILITIES FROM DAMAGE CAUSED BY CONTRACTOR OPERATIONS.
4. DRAINAGE SYSTEM SHALL BE INSTALLED AND FUNCTIONING PRIOR TO INSTALLATION OF PAVING.
5. CONTRACTOR SHALL HAVE AVAILABLE, AT THE SITE AT ALL TIMES DURING CONSTRUCTION, A SET OF APPROVED FINAL CONSTRUCTION PLANS.
6. BEFORE WORKING IN COUNTY RIGHT-OF-WAY, THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS REQUIRED.
7. ALL SLOPES SHALL BE AS NOTED ON THE PLANS.
8. CONTRACTOR WILL BE RESPONSIBLE FOR ALL TRAFFIC CONTROL REQUIRED AS A RESULT OF HIS/HER OPERATIONS.
9. CONTRACTOR SHALL USE A PROFESSIONAL LAND SURVEYOR FOR ALL CONSTRUCTION STAKING.
10. UNLESS OTHERWISE INDICATED ON PLANS, ALL STORM SEWER PIPE HAS BEEN SIZED TO MEET MANNING'S ROUGHNESS COEFFICIENT, N = 0.012. THE CONTRACTOR SHALL HAVE THE OPTION TO:
    A. INSTALL STORM SEWER PIPE AS INDICATED ON PLANS USING PIPE WHICH MEETS, n=0.012
    B. OR PROVIDE "ENGINEER" W/REVISED PLANS W/DIAMETERS AND OR SLOPE ADJUSTMENTS AS REQUIRED.

ROAD & STORM DRAINAGE CONSTRUCTION INSPECTION REQUIREMENTS AND SCHEDULES

1. THE CONTRACTOR SHALL NOTIFY THE CITY ENGINEER TO ARRANGE INSPECTION SCHEDULES FOR THOSE PHASES OF WORK CHECKED BELOW. INSPECTION SCHEDULES SHALL BE ARRANGED PRIOR TO PROCEEDING TO THE NEXT PHASE OF WORK. INSPECTIONS IN ADDITION TO THOSE INDICATED MAY BE REQURED BY THE CITY. THE CONTRACTOR SHALL VERIFY THE INSPECTIONS REQUIRED WITH THE CITY AND SHALL ARRANGE INSPECTIONS SCHEDULES BY CONTACTING THE CITY PUBLIC WORKS DEPARTMENT.
   - ✓ A. IMPLEMENTATION OF VARIOUS PHASES OF TEMPORARY EROSION AND SEDIMENTATION CONTROL PLANS.
   - ✓ B. PLACEMENT OF THE MAJOR DRAINAGE STRUCTURES PRIOR TO BACKFILLING, INCLUDUING OVERFLOW SYSTEMS.
   - ✓ C. PRIOR TO THE INSTALLATION OF ORIFICE CONTROL STRUCTURE.
   - ✓ D. COMPLETION OF SUBGRADE PREPARATION
   - ✓ E. COMPLETION OF PLACEMENT OF GRAVEL BASE.
   - ✓ F. COMPLETION OF FINE GRADING PRIOR TO PAVING.
   - ✓ G. COMPLETION OF PAVEMENT INSTALLATIONS.
2. IF ADEQUATE INSPECTION IS NOT CALLED FOR BEFORE COMPLETION OF THE PAVEMENT CONSTRUCTION, IT MAY BE NECESSARY FOR CORE DRILLING AND TESTING TO BE PERFORMED TO ASSURE AN ACCEPTABLE QUALITY OF ROADWAY. WHEN CORE DRILLING IS FOUND TO BE NECESSARY, THE CONTRACTOR WILL BE BILLED AND HELD RESPONSIBLE FOR ALL COSTS INCURRED.

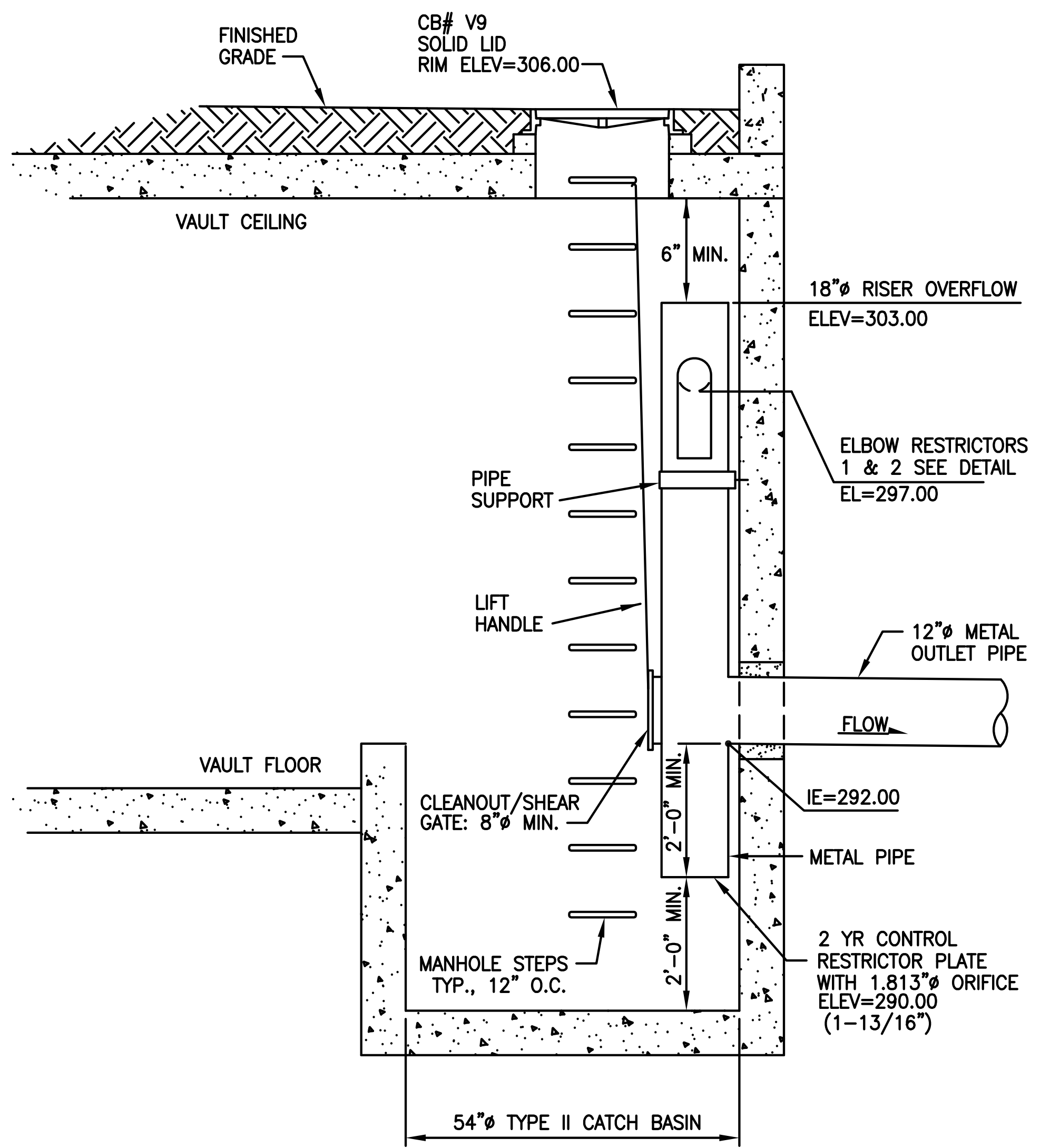
GRADING NOTES

1. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN THE EVENT OR DISCOVERY OF POOR SOILS, GROUNDWATER OR DISCREPANCIES IN THE EXISTING CONDITIONS AS NOTED ON THE PLANS.
2. MAXIMUM SLOPE STEEPNESS SHALL BE 2:1 HORIZONTAL: VERTICAL FOR CUT AND FILL SLOPES.
3. UNLESS OTHERWISE SPECIFIED, ALL EMBANKMENTS IN THE PLAN SET SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 2-03.3(14)B OF THE WSDOT STANDARD SPECIFICATIONS. EMBANKMENT COMPACTIONS SHALL CONFORM TO SECTION 2-03.3(14)C, METHOD B OF SAID STANDARD SPECIFICATION.
4. EMBANKMENTS DESIGNED TO IMPOUND WATER SHALL BE COMPACTED TO 95% MAXIMUM DENSITY PER SECTION 2-03.3(14)C, METHOD C OF WSDOT STANDARD SPECIFICATIONS.
5. ALL AREAS RECEIVING FILL MATERIAL SHALL BE PREPARED BY REMOVING VEGETATION, NONCOMPLYING FILL, TOPSOIL AND OTHER UNSUITABLE MATERIAL, BY SCARIFYING THE SURFACE TO PROVIDE A BOND WITH THE NEW FILL, AND WHERE THE SLOPES ARE STEEPER THAN 3 HORIZONTAL TO 1 VERTICAL AND THE HEIGHT IS GREATER THAN 5 FT., BY BENCHING INTO SOUND COMPETENT MATERIAL AS DETERMINED BY A SOILS ENGINEER.



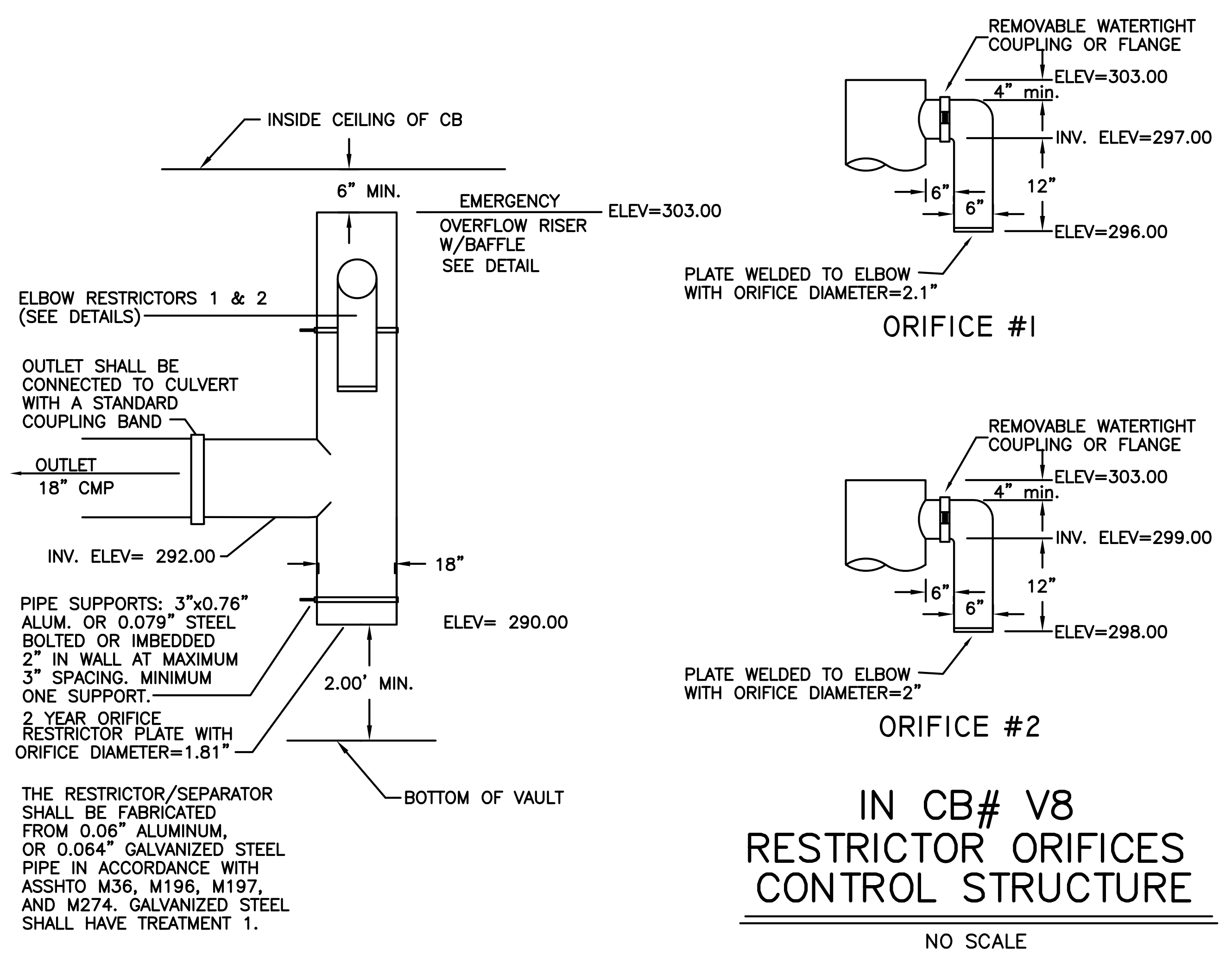
CONTROL STRUCTURE RISER DETAIL

NO SCALE



CB# V8 CONTROL STRUCTURE

NO SCALE



OUTLET SHALL BE CONNECTED TO CULVERT WITH A STANDARD COUPLING BAND

PIPE SUPPORTS: 3"x0.76" ALUM. OR 0.079" STEEL BOLTED OR IMBEDDED 2" IN WALL AT MAXIMUM 3" SPACING. MINIMUM ONE SUPPORT.

2 YEAR ORIFICE RESTRICTOR PLATE WITH ORIFICE DIAMETER=1.81"

THE RESTRICTOR/SEPARATOR SHALL BE FABRICATED FROM 0.06" ALUMINUM, OR 0.064" GALVANIZED STEEL PIPE IN ACCORDANCE WITH ASSHTO M36, M196, M197, AND M274. GALVANIZED STEEL SHALL HAVE TREATMENT 1.

ORIFICE #1

ORIFICE #2

IN CB# V8 RESTRICTOR ORIFICES CONTROL STRUCTURE

NO SCALE

DESIGN MAK
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CHECKED MAK
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DISC NO ____ DATE 8/15/2018
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RON D. CLEAVER JR 43644

2/24/2020

PROJECT MANAGER: RON D CLEAVER JR
SIGNATURE:

TITLE
CALAVISTA – PRD
STORM DETAILS (1 OF 2)

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C/O BARRY MARGOLESE
105 S. MAIN ST, SUITE 230
SEATTLE, WA 98104
(206) 910-2728

RDCJR
CIVIL ENGINEERING
3231 NE TOTTEN ROAD, SUITE 103
POULSBO, WA 98370
(360) 265-1037 CELL
RON@RDCJRENGINEERING.COM

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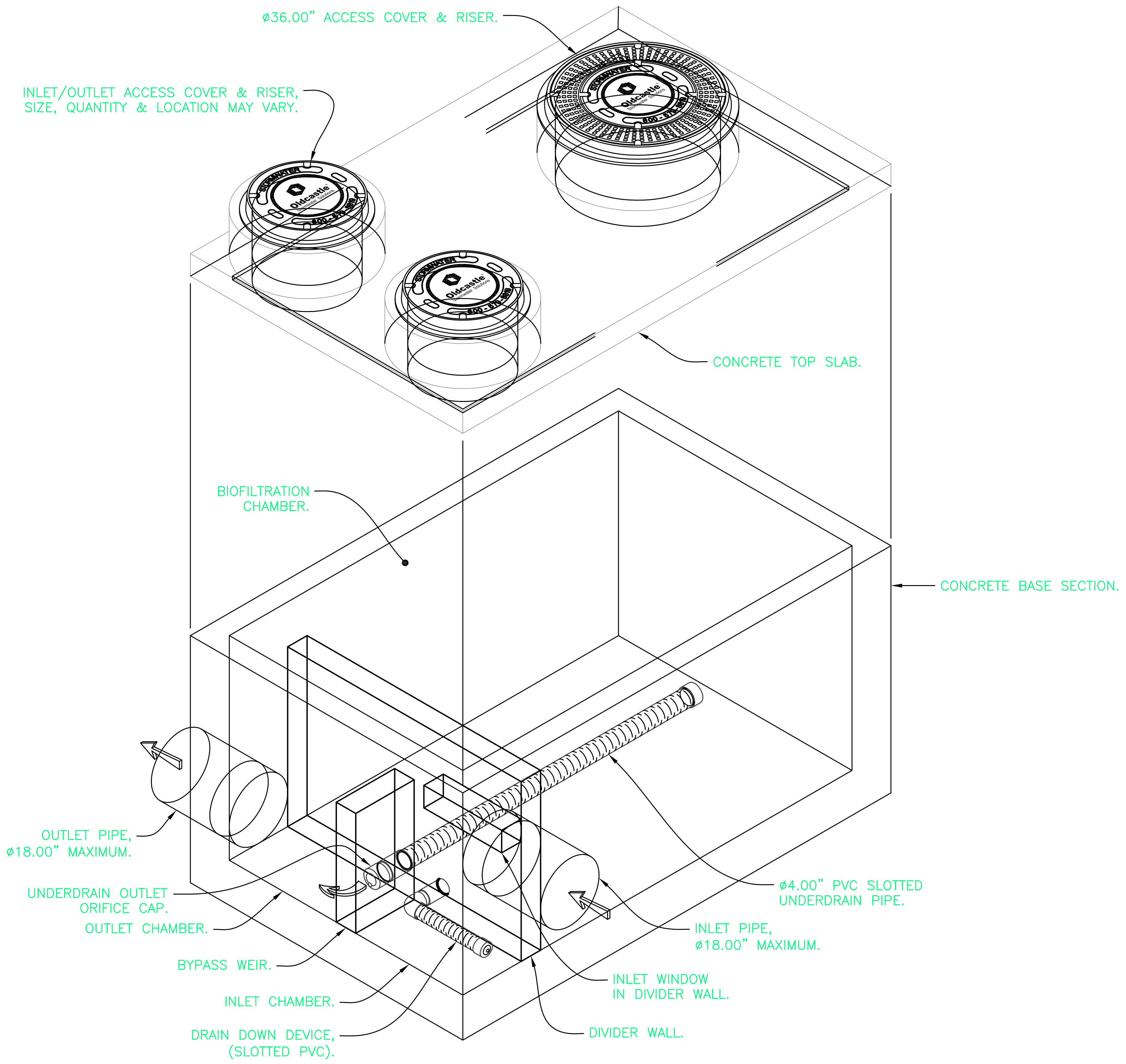
FILE NO 1222

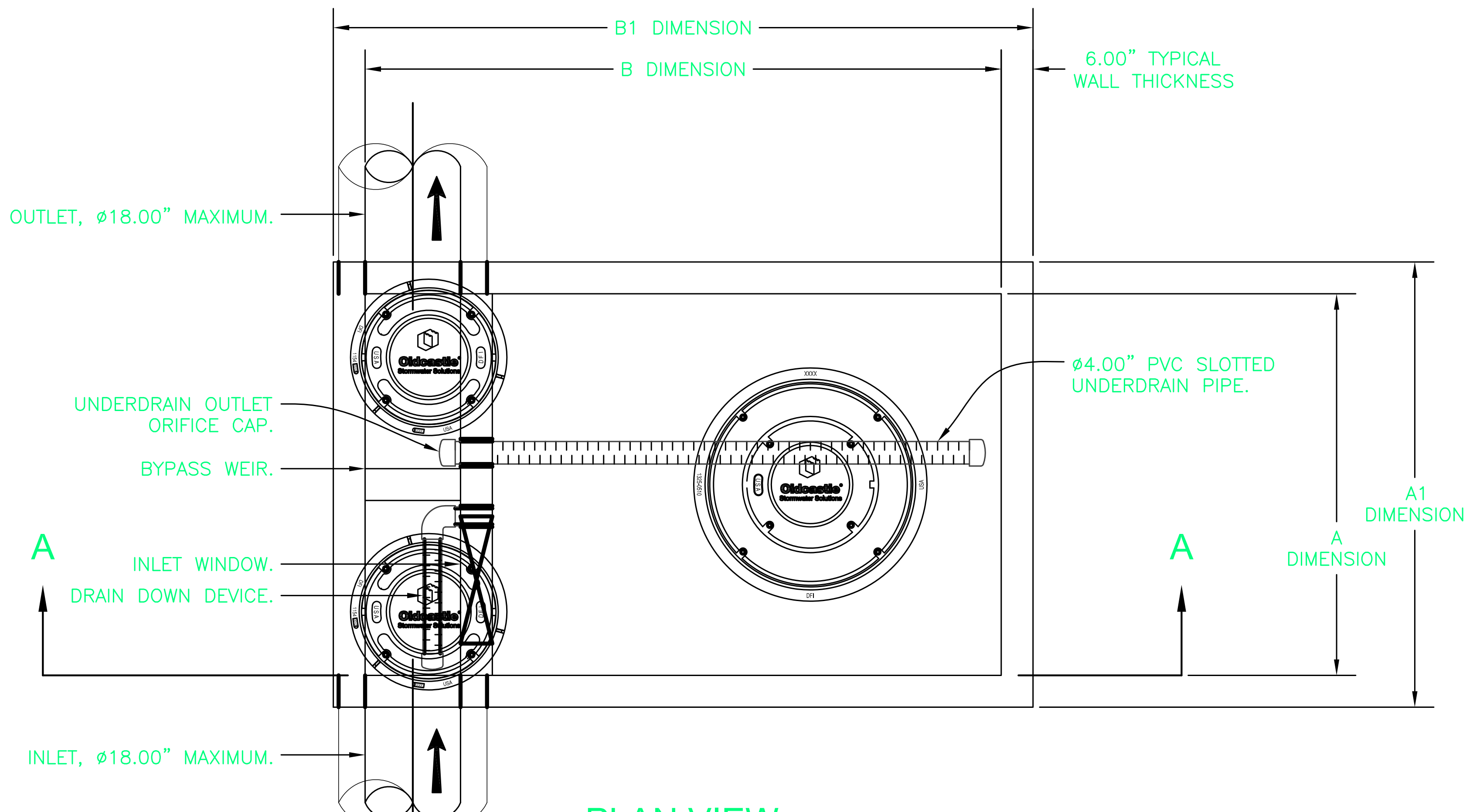
CALAVISTA — PRD

STORM DETAILS (2 OF 2)



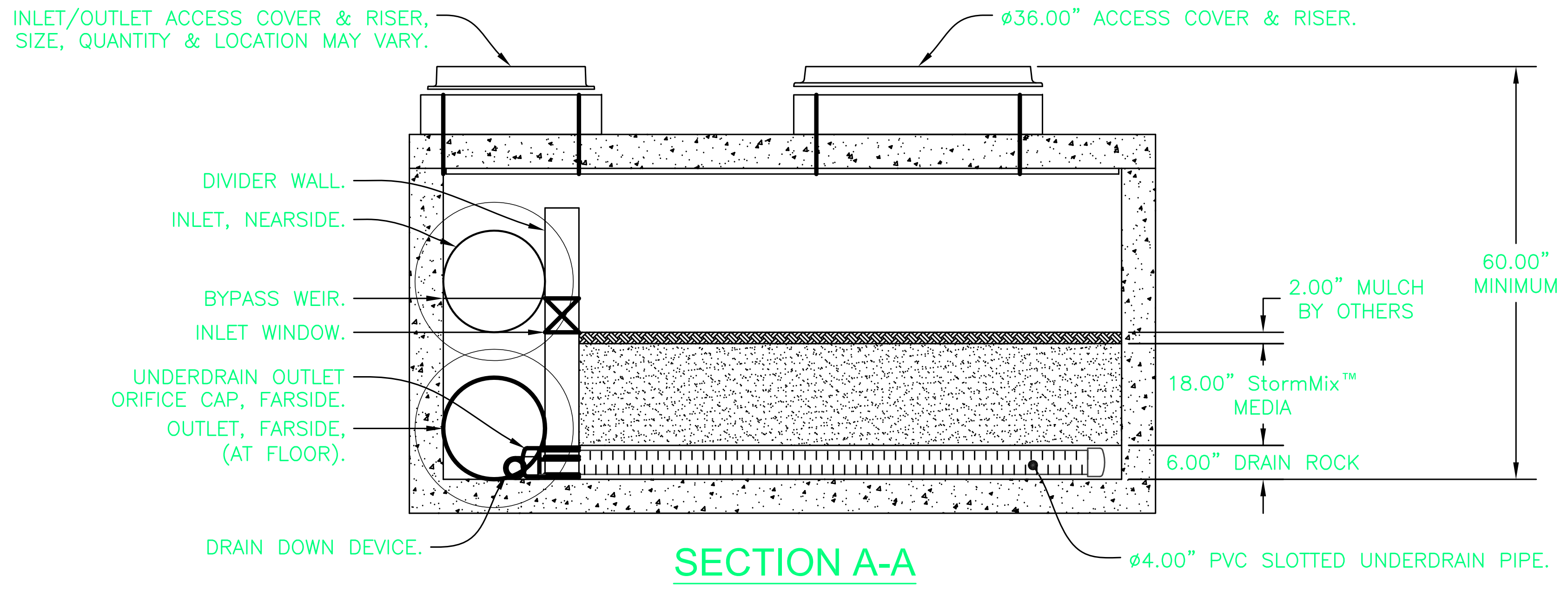
ISOMETRIC VIEW

FILTER MEDIA & DRAIN ROCK NOT SHOWN FOR CLARITY.
SCALE: 1X



PLAN VIEW

TOP SLAB NOT SHOWN IN THIS VIEW FOR CLARITY, ACCESS COVERS SHOWN IN PHANTOM.



SECTION A-A

NOTES:

1. CONTACT OLDCASTLE STORMWATER FOR ENGINEERING ASSISTANCE AND DETAIL DRAWINGS.
2. CONCRETE COMPONENTS SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C890 & C913.

US Patents Pending

Bioretention/
Biofiltration

BioPod™ Biofilter Underground
Vault with Internal Bypass

Oldcastle®
INFRASTRUCTURE
Ph: 800.579.8819 | oldcastlestormwater.com

DRAWING NO.	REV	ECO		DATE
BPU-IB	NA		ECO–0156 NEW 10/4/18	JPR 10/4/18 SHEET 1 OF 2

[1] All Dimensions Are Nominal
[2] Based on an WA Ecology GULD Approval for Basic, Enhanced & Phosphorus. At 1.60 gpm/sf Media Surface Area.
[3] Based on an NJCAT Verification & NJ DEP Certification. At 1.80 gpm/sf Media Surface Area.

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STORM DETAILS (2 OF 2)

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SEATTLE, WA 98104
(206) 910–2728

RDCJR
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POULSBO, WA 98370
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SHEET 26 OF 30
FILE NO 1222

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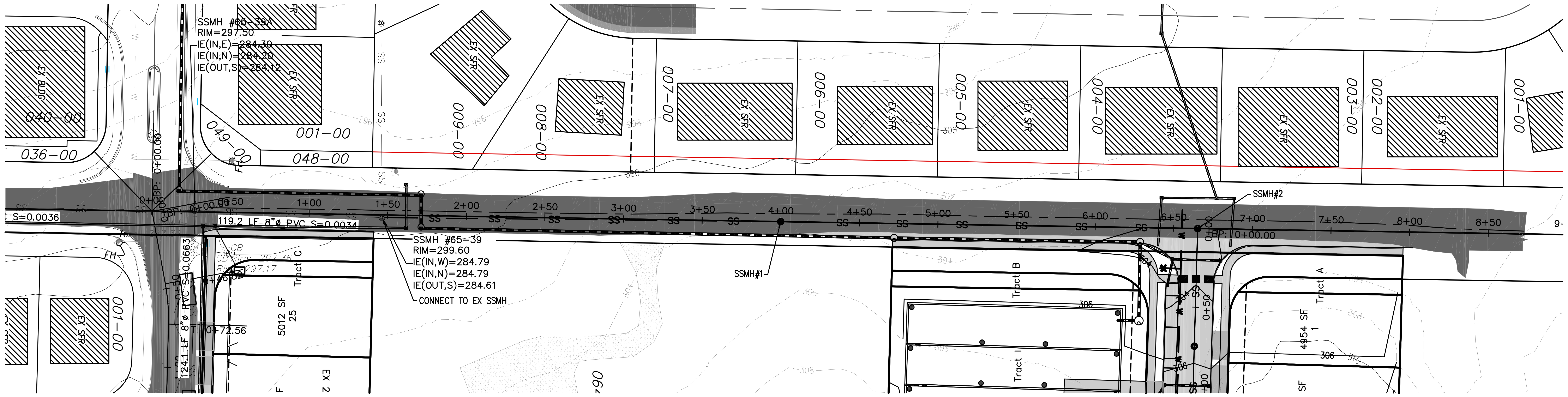
CALAVISTA – PRD

CALDART SEWER PLAN & PROFILE

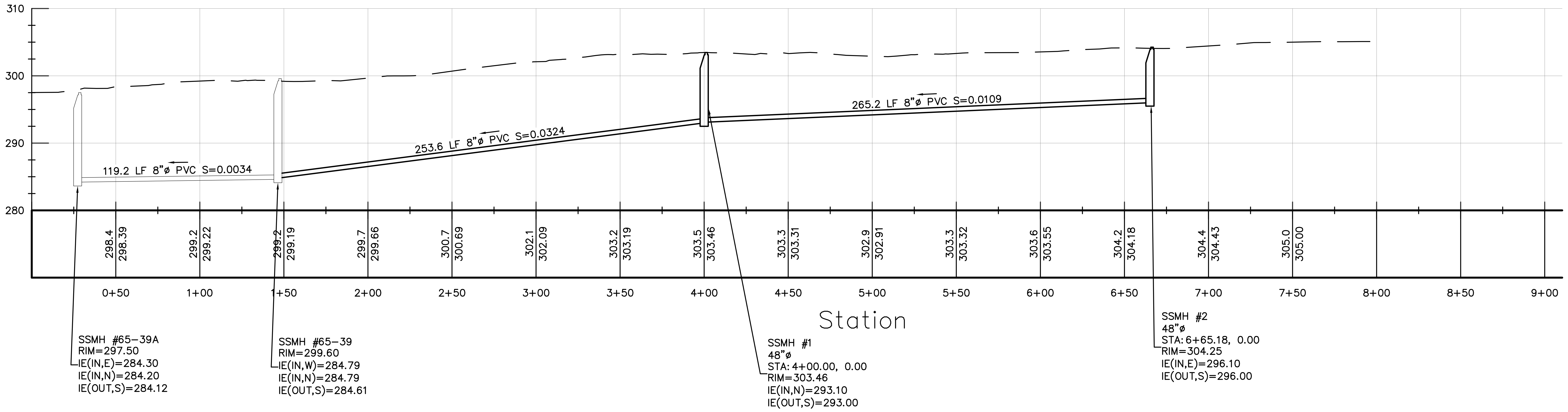


GRAPHIC SCALE

40 0 20 40

(IN FEET)
1 inch = 40 feet

CALDART SEWER
HORIZONTAL SCALE 1" = 40'
VERTICAL SCALE 1" = 10'



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POULSBO, WA 98370
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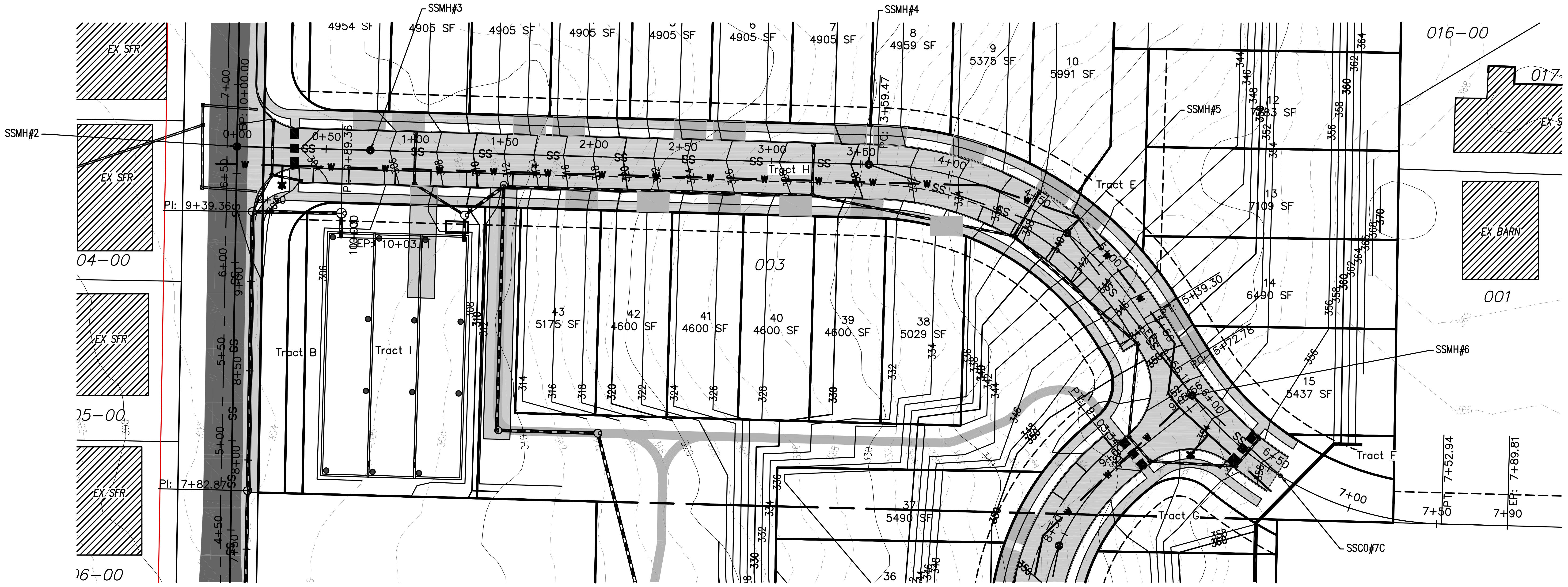
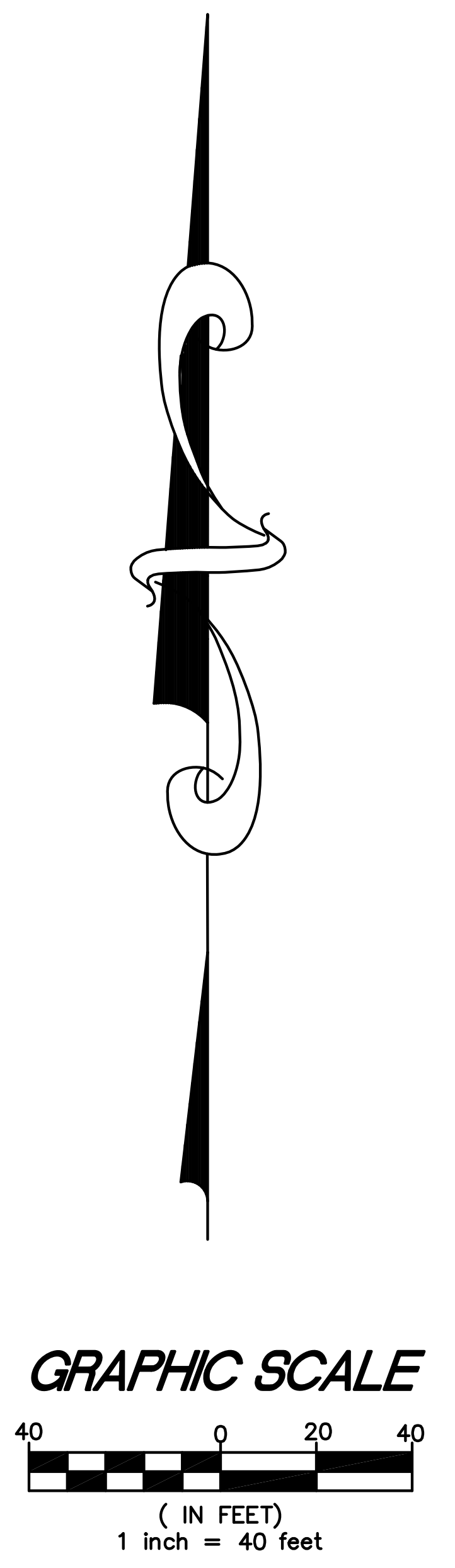
SHEET 27 OF 30
FILE NO 1222

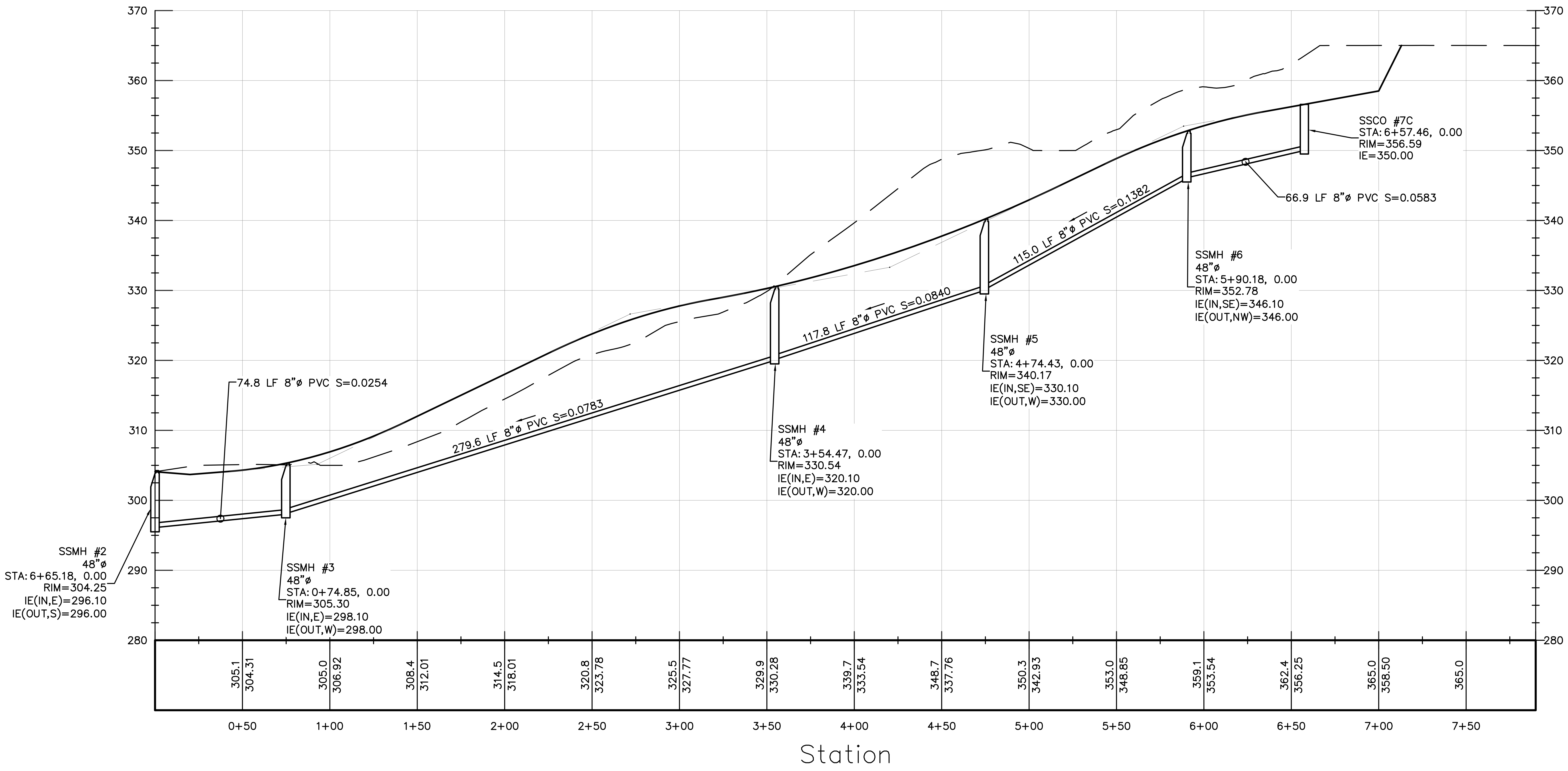
CALAVISTA – PRD

ROAD A SEWER – PLAN & PROFILE





ROAD A SEWER
HORIZONTAL SCALE 1" = 40'
VERTICAL SCALE 1" = 10'



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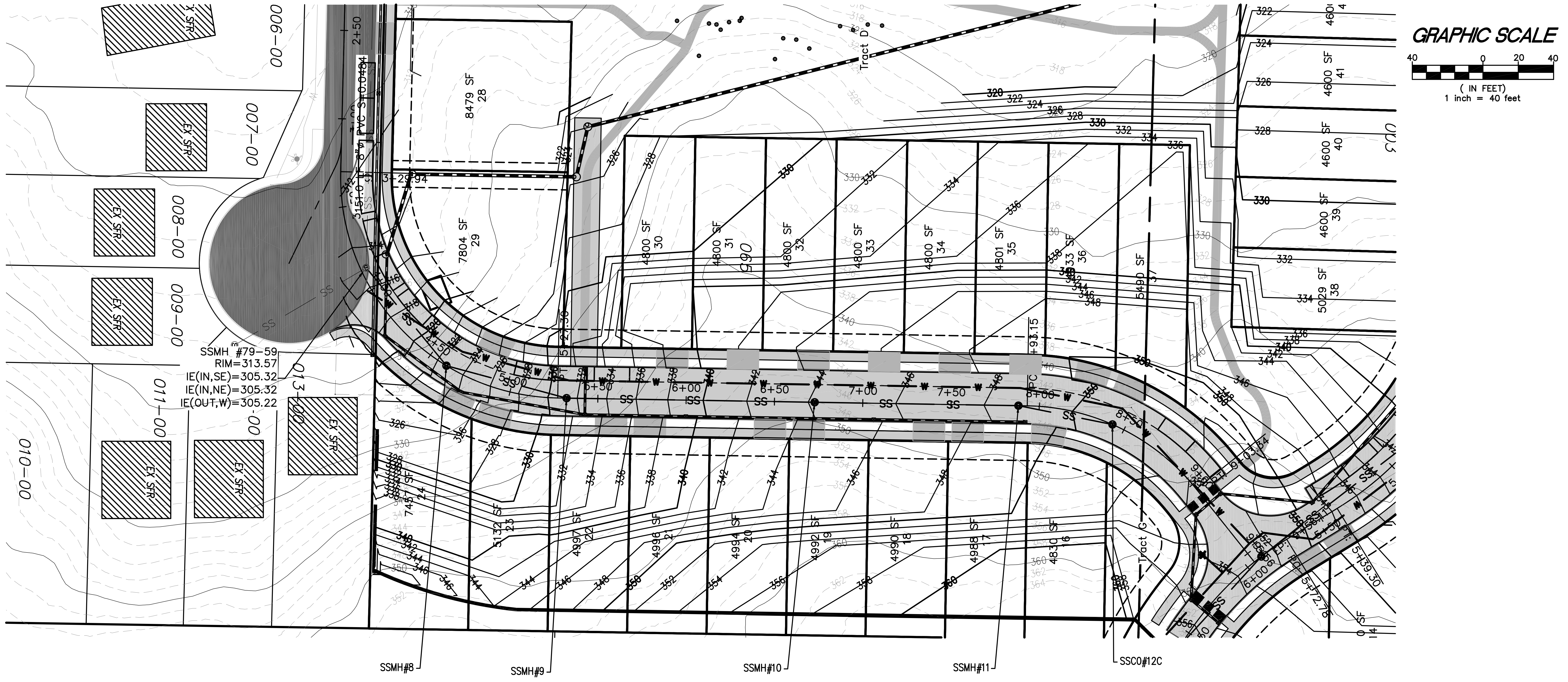
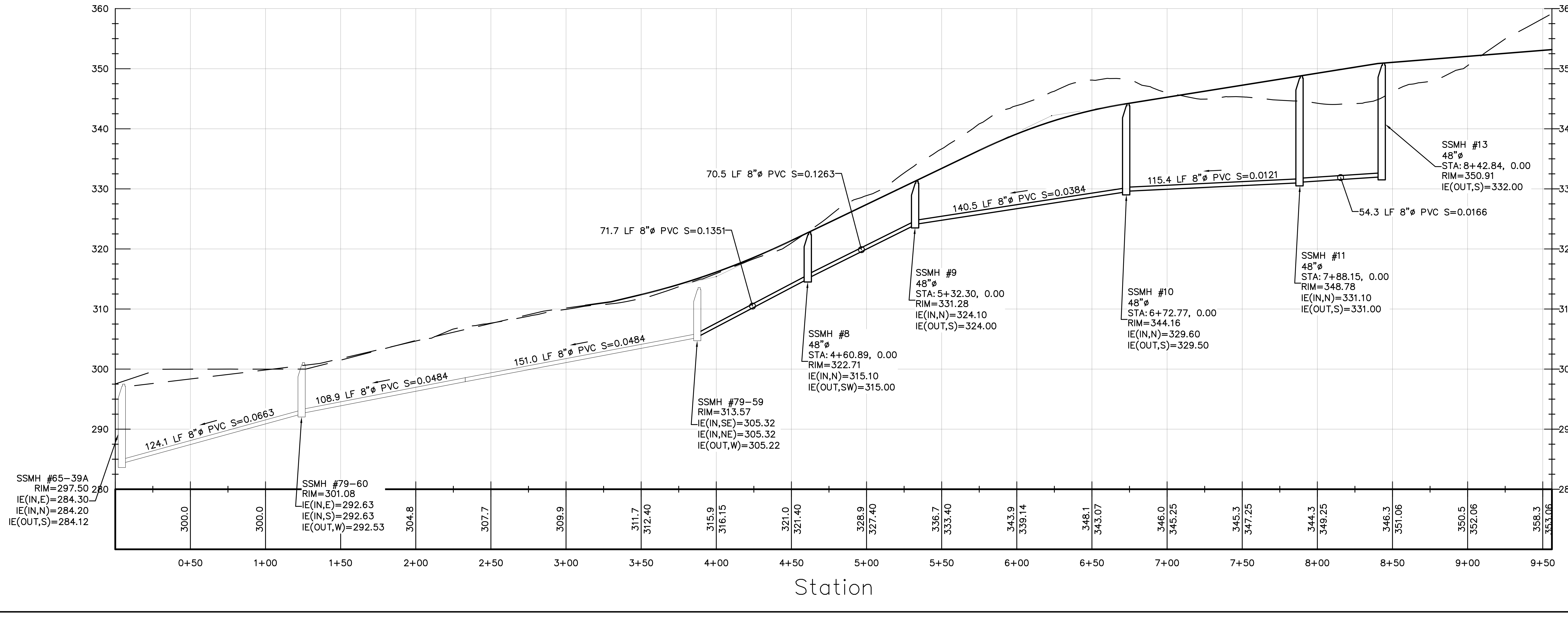
SHEET 28 OF 30
FILE NO 1222

CALAVISTA – PRD

ROAD B SEWER - PLAN & PROFILE



ROAD B SEWER
HORIZONTAL SCALE 1" = 40'
VERTICAL SCALE 1" = 10'



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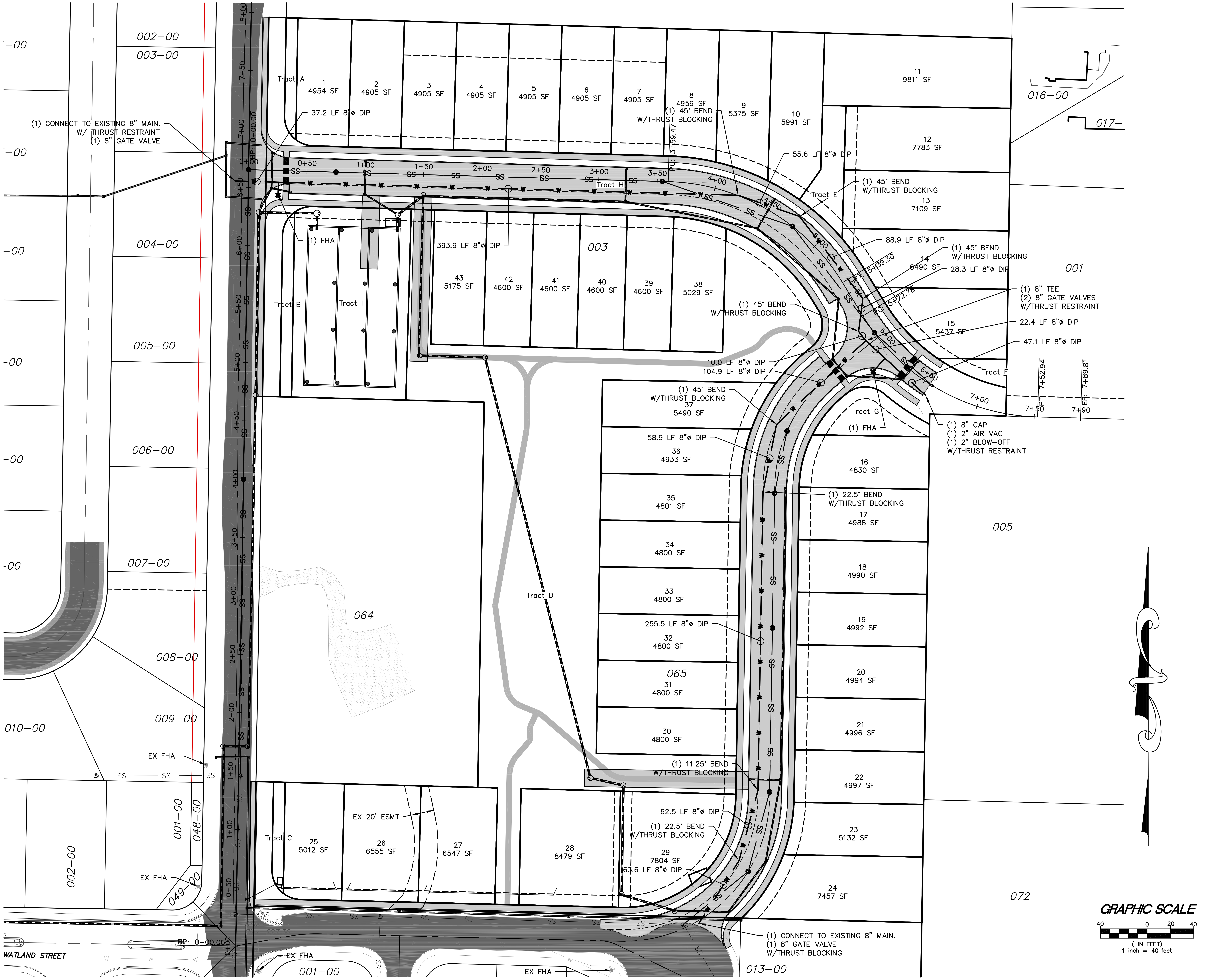
SHEET 29 OF 30
FILE NO 1222

CALAVISTA – PRD

WATER PLAN

NOTE: WATER MAINS ARE TYPICALLY LOCATED 10' AWAY FROM SEWER MAINS.



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WATER PLAN

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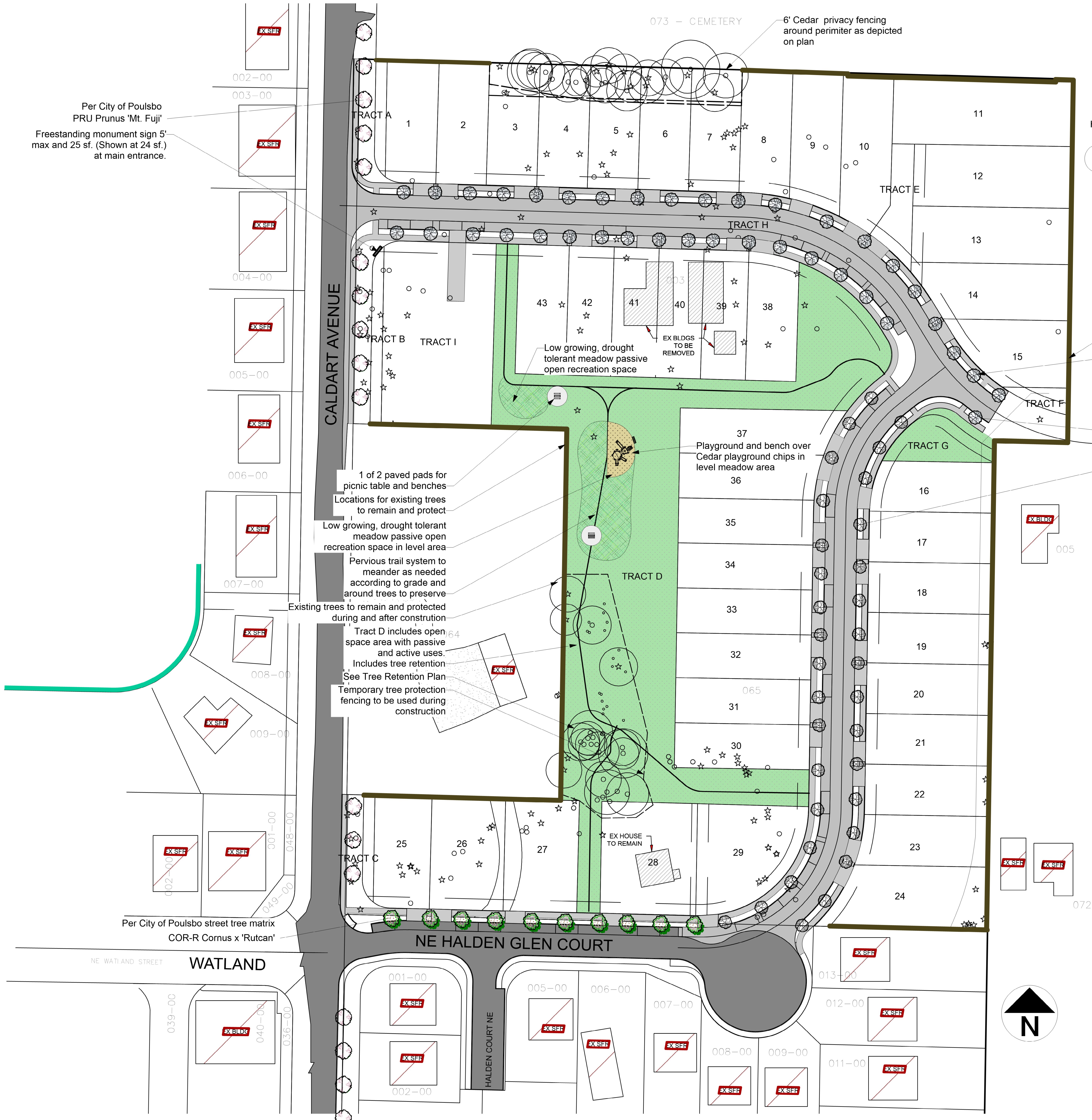
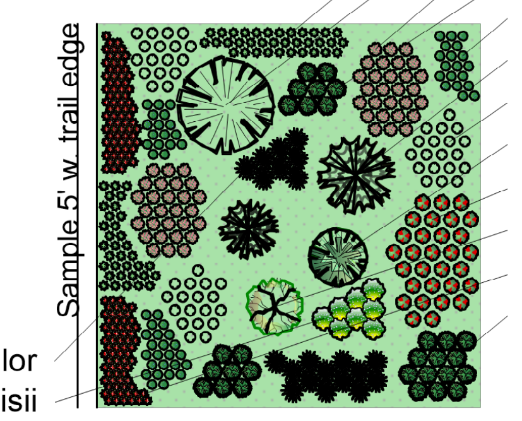




1 Recreational open space planting detail: typical planting style in a sample 100x100' area
Scale: 1" = 50'-0"

Low growing, drought tolerant meadow passive open recreation space ▨

Open space area with passive and active uses. Includes tree retention 🟩

Suggested native understory plants used to restore the passive and recreational open space under native tree canopy. Use random array of native plants below with proper spacing. See Detail 1 for sample planting layout:

Ground cover: 4" planted 18" O.C. or 1G. planted 3' O.C.
Fragaria chilloensis, Beach Strawberry
Arctostaphylos uva ursi, Kinnickinick
Arctostaphylos columbiana – Hairy Manzanita
Linnaea borealis – Twin Flower
Oxalis oregano – Redwood Sorrel
Trillium ovatum – Western Trillium

Small shrubs:1 G. at least 12"H. planted 3' O.C.
Cornus Kelsii, Kelsii Dogwood
Mahonia repens, nervosa
Gaultheria shallon – Salal
Lupinus polyphyllus – Large-Leaved Lupine
Polystichum munitum – Western Sword Fern

Medium shrubs: 1 G. at least 12"H. planted 4' O.C.
Cornus Sericea, Red Osier Dogwood
Rosa nutkana – Nootka Rose
Rosa pisocarpa – Cluster Rose
Spirea douglasii – Hardhack
Symphoricarpos albus – Common Snowberry
Vaccinium ovalifolium – Evergreen Huckleberry
Vaccinium membranaceum – Black Huckleberry
Vaccinium parvifolium – Red Huckleberry

Large shrubs: 1 G. at least 18"H. planted 5' O.C.
Holodiscus discolor – Oceanspray
Lonicera involucrata – Black Twinberry
Mahonia aquifolium – Tall Oregongrape
Myrica californica – Pacific Wax Myrtle
Oemleria cerasiformis – Indian Plum
Philadelphus lewisii – Mock Orange
Physocarpus capitus – Pacific Ninebark
Ribes sanguineum – Flowering Red Currant
Rhododendron macrophylum or R. albiflorum – Western Rhododendron
Rubus parviflorus – Thimbleberry
Rubus spectabilis – Salmonberry

General Notes

1. Plant in fall or spring for best results. Plant list is based on inventory commonly available in the Pacific Northwest. Not all plants are available year round. Availability changes both seasonally and annually according to what growers can provide. If an alternative plant is needed due to lack of availability, please see the landscape architect for a substitution.
   Dig and store native plants available on-site prior to excavation. Dig a rootball twice the size of the plant. For larger conifers use a backhoe with tree spade attachment. Store the plants in containers in their native soil. Water regularly prior to planting.
   Street trees planted 25' O.C. whenever possible. Where space does not allow, plant evenly up 35' O.C. As per plan.
2. Dimensions: Dimensions and layout of existing and proposed site layout are based on provided Civil site plan. The landscape plan was added to the site plan.
3. Planting beds: 50% 3-way mix, 50% native soil. Top dress all beds with organic compost 3"d. Native planting beds: 100 native soil.
   Amend soil annually with 2-3"d. Organic compost to be used as mulch in lieu of bark. Mulch is mantatory with little to no irrigation to retain moisture around plants and amend poor soil.
   If possible store and cover any nutrient rich native soil scraped from the site and re-use in planting beds and meadow areas. See soil storage guidelines.
   Remove all weeds from soil before replacing
4. Amend soil in all beds annually with 3" organic compost
5. Irrigation: Xeriscaping methods have been used in planting beds, which do not require permanent irrigation. Use temporary irrigation during warm months until established. Plants are drought tolerant once established and watering can be reduced after 3 years. Microclimates, weather variability, sunlight, and site conditions will vary greatly and influence watering needs for each area over time. In general water plants 2x per week for the first 3 months or the first summer if the first 3 months are wet weather, then approximately 3x/month during the warm months for the next 2 years. Water as needed after that time. Leaf structure, fullness, color, and changes to plant habit will determine whether water should be reduced or increased over time. Never water between 10 a.m. and 6 p.m. to reduce water lost to evaporation. If you have an automatic irrigatino system, adjust your controller regularly to accommodate weather conditions. Also, install a rain sensor to shut off the device when it rains.There are no assigned watering days, but never water a zone more than three days a week. Plan to "water, rest, water" by watering zones in increments, with rest periods to give water time to travel toward the roots. Light sprinkling only settles the dust and does little to alleviate drought stress of plants growing in hot, dry soil. Instead of light daily waterings, give plants a weekly soaking. When watering, allow the soil to become wet to a depth of 5 to 6 inches. This type of watering allows moisture to penetrate into the soil area where roots can readily absorb it. A soil watered deeply retains moisture for several days, while one wet only an inch or so is dry within a day.
   Consult with the irrigation technician or horticulturalist annually to determine adjustments to water quantity and frequency.
6. Lighting: In general, keep lighting low and to a minimum to reduce light pollution.
7. Requests to substitute any product, technique, or material shall be submitted in writing to Architect for approval. Samples, product information, and drawings shall be required prior to substitution approval. Proposed substitution shall be of equal quality and performance specification to that originally specified.
8. Contractor is responsible for the safety, actions and conduct of her or his employees and his subcontractors' employees while in the project area, adjacent areas and in the building and its vicinity.
9. Contractor shall review these plans thoroughly, make a detailed site visit, and shall immediately bring any inconsistency, site layout problem, or any other request for clarification to the Landscape Architect for resolution prior to the delivery of any bid.
10. Contractor is responsible for ensuring that all sitework and structures meet both International and County building codes
11. Call before you Dig: 1-800-424-5555 to avoid disrupting utilities

Plant Legend: D: Deciduous, E: Evergrn, SE: Semi Evergrn, P: Perennial, GC: Ground Cover, DT: Drought Tol., DR: Deer Resist

ID	Qty	Botanical Name	Common Name	Scheduled Size	Remarks
AME-PD	33	Amelanchier 'Princess Diana'	Princess Diana Serviceberry	2" C. 30' O.C.	D, DT, N, DR, small street tree, white flowers
BETU-J	38	Betula utilis var 'Jaquemontii'	Whitebarked Himalayan Birch	2" C. 30' O.C.	D, DT, narrow street tree, white bark
COR-R	10	Cornus x 'Rutcan'	Constellation Dogwood	2" C. 30' O.C.	D, DT, Street tree, year round interest

CALL TWO WORKING DAYS
BEFORE YOU DIG
811
UTILITIES UNDERGROUND LOCATION CENTER

STATE OF WASHINGTON REGISTERED LANDSCAPE ARCHITECT
Emily Russell
Emily Russell
CERTIFICATE NO.1272

EMILY RUSSELL
Landscape Architecture

Emily Russell, PLA, ASLA
360-990-1720
www.russelldesignsource.com
emily@russelldesignsource.com

245 4th Street #501
Bremerton WA 98337

Consultant

Project Title
Calavista
Caldart Ave
Poulsbo, WA

Drawing Title
Schematic Xeriscape Landscape Plan

Project Manager
Project ID: Landscape layout
Drawn By: Emily Russell
Scale: 1"=50'
Reviewed By
Date: 10.22.19, Rev. 3.2.20
CAD File Name: Calavista
Drawing No.: L-1 of 1

DFW1

From: Siu, Nam (DFW)
To: Alison Osullivan; Edie Berghoff
Subject: FW: Caldart Heights HPAs
Date: Friday, October 18, 2019 3:04:49 PM

Please see below

From: Siu, Nam (DFW)
Sent: Friday, October 18, 2019 3:02 PM
To: 'Ron Cleaver Jr' <ron@rdcjrengineering.com>
Cc: Barry Margolese <barry@amalani.com>
Subject: RE: Caldart Heights HPAs

Hi Ron,

I have discussed this and reviewed the supporting materials with my supervisor. Although it is severely degraded, it is clear that this is the very upper extent of the stream/watershed (Dogfish Creek South Fork), and was historically either a wetland or Type 5 or NS stream. Because there was a HPA permit at the location designating it as a NS stream (as mentioned in previous emails), at this time my decision is to stay consistent with that previous determination. That said, this decision is to ensure that the stream doesn't get written off or lose its designation. However in its highly degraded state, I do not anticipate requiring mitigation for the proposed outfall as all as all BMPs/avoidance and minimization measures are implemented. The same goes for any work the community HOA wants to proposed.

Please let me know if you have any questions.

Nam Siu
Area Habitat Biologist, North Kitsap and Bainbridge Island
Habitat Program, Region 6, Port Orchard Office
Washington Department of Fish and Wildlife
Nam.Siu@dfw.wa.gov
(360)522-6035

From: Ron Cleaver Jr <ron@rdcjrengineering.com>

Sent: Monday, October 14, 2019 3:02 PM
To: Siu, Nam (DFW) <Nam.Siu@dfw.wa.gov>
Cc: Barry Margolese <barry@amalani.com>
Subject: RE: Caldart Heights HPAs

Hi Nam,

Understand. If it's a stream, that's what it is. Just don't want to hamper abilities of us or the local HOA if not necessary.

Regardless of WDFW and City status; I think we'll be able to install the culvert replacement. So I'm not worried about construction of the facility necessary for the Calavista development to move forward.

If it is a creek per WDFW, we'll have to get an HPA and I expect that some kind of mitigations will be required. If it's not a creek per WDFW, and is outside of the creek buffer, then would expect that may relieve us from needing a HPA, although not necessarily, but would limit the need for mitigations, perhaps altogether eliminate mitigations.

The actual impact for the culvert replacement can have a very low impact if needed. Limited to a trench over the top of the existing culvert to within 6" of existing channel. We will likely have to limit impacts to the drainage due to City Comprehensive Plan designation anyway, regardless of WDFW designation. The City may require some kind of mitigation separate from HPA mitigation, especially if no HPA is required.

Bottom line, I don't think the Calavista project is getting out of doing something. But once we are gone, the HOA will be hamstrung with what they can do, if it's a creek vs. a drainage channel. Especially in the way of channel maintenance or excavation to fix their localized flooding, north of "Watland St".

If this is a creek or isn't, we likely can't do any excavation in the channel for them, they will have to do it separate from our construction action.

The Calavista project owner needs to be able to negotiate construction terms with the HOA. We don't want to be seen as the ones that got the creek status upgraded unnecessarily. They might not forgive us if we don't at least make an attempt at keeping the storm drainage channel status as-is.

Do you see what I'm getting at?

Thanks,
Ron

From: Siu, Nam (DFW) <Nam.Siu@dfw.wa.gov>
Sent: Monday, October 14, 2019 1:49 PM
To: Ron Cleaver Jr <ron@rdcjrengineering.com>

Subject: RE: Caldart Heights HPAs

Hi Ron,

I'm going to look into this further. But one of the things I'm going off of is the GPS coordinates in that permit I sent, it has the project noting the NS stream right next to the area where we met.
N 47.74186, W 122.62859

Thanks,

Nam Siu
Area Habitat Biologist, North Kitsap and Bainbridge Island
Habitat Program, Region 6, Port Orchard Office
Washington Department of Fish and Wildlife
Nam.Siu@dfw.wa.gov
(360)522-6035

From: Ron Cleaver Jr <ron@rdcjrengineering.com>
Sent: Monday, October 14, 2019 9:24 AM
To: Siu, Nam (DFW) <Nam.Siu@dfw.wa.gov>
Subject: RE: Caldart Heights HPAs

Hi Nam,

In light of the email below, are you looking into this further or is the earlier determination of Ns going to stand?

Just want to know if I'm waiting for an email from you that will never arrive.

Thanks,
Ron

From: Ron Cleaver Jr
Sent: Friday, October 11, 2019 11:52 AM
To: Siu, Nam (DFW) <Nam.Siu@dfw.wa.gov>
Cc: Barry Margolese <barry@amalani.com>
Subject: RE: Caldart Heights HPAs

Hi Nam,

NOTE: new email address.

Was there another HPA not referenced below that was for the Poulsbo Gardens site?

The two HPAs reference below were for construction of the “Caldart Heights” plat to the south.

I am thinking there is a chance the stream still doesn’t begin until south of “Watland St”.

The emails to and from Jeff Davis below reference the two HPAs on the “Caldart Heights” project. Can you confirm if there is another HPA related to “Poulsbo Gardens”?

Thanks,
Ron

From: Barry Margolese <barry@amalani.com>
Sent: Friday, October 11, 2019 11:39 AM
To: Ron Cleaver Jr <ron@rdcjrengineering.com>
Subject: Fwd: Caldart Heights HPAs

What is implication of this?

---------- Forwarded message ---------
From: **Siu, Nam (DFW)** <Nam.Siu@dfw.wa.gov>
Date: Fri, Oct 11, 2019, 10:41 AM
Subject: RE: Caldart Heights HPAs
To: Ron Cleaver Jr <ron@team4eng.com>, Don Babineau <don@soundviewconsultants.com>, Barry Margolese <barry@amalani.com>, eric_sharon@hotmail.com <eric_sharon@hotmail.com>, schmidt.brent@gmail.com <schmidt.brent@gmail.com>
Cc: Michael J. Bateman <mbateman@cityofpoulsbo.com>, Edie Berghoff (eberghoff@cityofpoulsbo.com) <eberghoff@cityofpoulsbo.com>, Alison Osullivan <aosullivan@suquamish.nsn.us>

Hi All,

I found one of the HPAs that Alison referenced in the email below (see attached). The location of the HPA is at the drainage next to the mailboxes where we met. It appears that it was previously typed as a NS stream by my predecessor (who is now one of our directors). Accordingly, to stay consistent with historical information and our previous determination, at this time I am determining this segment of drainage from the mailboxes down to be a NS stream.

Please let me know if you have any questions.

Nam Siu
Area Habitat Biologist, North Kitsap and Bainbridge Island
Habitat Program, Region 6, Port Orchard Office
Washington Department of Fish and Wildlife
Nam.Siu@dfw.wa.gov
(360)522-6035

From: Alison Osullivan <aosullivan@suquamish.nsn.us>
Sent: Tuesday, October 8, 2019 9:05 AM
To: Edie Berghoff (eberghoff@cityofpoulsbo.com) <eberghoff@cityofpoulsbo.com>; Siu, Nam (DFW) <Nam.Siu@dfw.wa.gov>
Cc: Michael J. Bateman <mbateman@cityofpoulsbo.com>
Subject: FW: Caldart Heights HPAs

Not sure what all the HPAs were for……if Nam could look them up that would be great……..I would like to know where the revegetation areas were supposed to be…………this is a great example why mitigation doesn't work. Avoid, avoid, avoid.

My letter attached specifically references origination of the stream being the wetland in Poulsbo Gardens which is what I was saying yesterday.

Alison

-----Original Message-----
From: Jeff Davis
Sent: Thursday, December 14, 2006 3:21 PM
To: ron.team4@earthlink.net
Cc: bberezowsky@cityofpoulsbo.com; Alison Osullivan
Subject: Re: Caldart Heights HPAs

Ron,
I need to know specifically what the City needs from WDFW as far as these HPA's go.

HPA ST-F9930-01: The stream relocation and associated culverts (A and B) look fine. Culvert C can be completed at a later date. The revegetation is a condition of the HPA as mitigation for the impacts to the stream channel. WDFW cannot buy-off on this portion of the HPA until the revegetation is complete. In fact, by not replanting within 1 year of the completion of the project, this is legally a violation of the permit. I would not want to pursue this violation unless we couldn't work something out. I recommend that the applicant request a time extension of the HPA. This would allow this work to continue and come into compliance with the original HPA. I can legally extend and modify this HPA up to February 27, 2009.

HPA 100617-1: The placement of the stormwater outfalls can be completed at a later date. I recommend that the applicant request a time extension for the HPA. I can legally extend this HPA up to February 18, 2010.

WDFW will work out our concerns regarding the HPA with the applicant and yourself. At this point, WDFW would not want the City to delay your project due to our HPA issues. This email will serve as our formal response to your request. Please contact me if you have any further questions.

Jeff

Jeff Davis
Assistant Regional Habitat Program Manager WA. Dept. of Fish & Wildlife
502 High St., Suite 112
Port Orchard, WA 98366
(360) 895-3965
(360) 876-1894 fax
davisjpd@dfw.wa.gov

>>> "Ron Cleaver" <ron.team4@earthlink.net> 12/14/2006 11:50 AM >>>
Jeff,

Thanks again for coming out and inspecting the "Caldart Heights" site in Poulsbo, WA.

This email will attempt to resolve open issues with some old HPAs that we are trying to get closure on.

You can reference an email I sent you earlier on 12/7/06 and your response to that email on 12/12/06 to refresh yourself if needed.

From your response, you mentioned two HPAs that you had concerns about or that had uncompleted work. Those HPAs were: 100617-1 and F9930-01.

100617-1;

The rip-rap pads will not be constructed until their final location is known. The multifamily units have been modified since our original HPA application. They will most likely not be installed until after, or during, the final landscaping of the relocated creek is done. You may be saying to yourself, "Why bother apply for it in the first place then?" Answer: We had to get this HPA, due to City requirement, to demonstrate to the City that the proposed discharge method was approvable.

We should just be able to withdraw this HPA application at this time and reapply when really needed, but we need to be able to maintain the ability to discharge in this manner to the creek in the future. Please write in your final response letter that this HPA has expired and that the applicant can reapply when necessary.

F9930-01;

The crossing under Drive C has been left intact on purpose. The developer wanted to maintain unimpeded access for existing residences that use this as a driveway during Phase 1 construction. There was nowhere to safely divert traffic during this portion of the construction. The southern most crossing was also not needed for Phase 1 construction. These improvements are planned for Phase 2 of the development of "Caldart Heights". Phase 2 construction is scheduled to begin next spring. The developer will have to apply for a new HPA next year for construction of this culvert crossing. The new culvert will be installed per the original HPA plan.

All other culvert legs are installed properly with rock pads at the inlet and outlet per plan. I trust that you inspected these legs and that they were not the reason for an unacceptable inspection.

The final vegetation planting has not occurred at this time. We have a new landscaping plan (See attached pdfs) that covers planting of the relocated creek swale. I do not think we had a landscape plan at the time we applied for the HPA, we just noted that plantings would be installed. We have a real plan now and the City has made the developer post a Construction Bond for the landscaping of the entire site in order to get "Final Plat" (See attached pdf of Final Plat Map) acceptance for Phase 1. Planting is scheduled to occur in the summer next year. Please make a finding that the developer has well intentioned plans. I hope that the proposed plans and bonding will be satisfactory at this point regarding this HPA.

With regard to Stormwater quality runoff concerns: The developer, his contractor and a representative from our office met onsite to discuss the turbidity and the filter fabric fencing issues you mentioned. The contractor has fixed several portions of filter fabric fencing that were "laying over".
The contractor is also going to cover all exposed soils and areas where grasses have not been established with straw to reduce turbidity concerns.

I hope that the work that has been performed to date regarding these expired HPAs can be approved and that future work that needs to be accomplished can be done so under new HPAs. Please draft a letter to this effect and forward it to myself and the City of Poulsbo

Please let me know if you have any additional questions or concerns.

Thanks,

Ron Cleaver Jr

5819 NE Minder Rd

Poulsbo, WA 98370

360-297-5560

360-297-7951 fax

<mailto:ron.team4@earthlink.net> ron.team4@earthlink.net

}

RCE1

ESC1 - Pg. 92

SVC1 - Pg. 136

PRELIMINARY STORM DRAINAGE REPORT

FOR:

CALAVISTA – PRD/PLAT

LOCATED IN: SEC 13, TWP 26 N, RGE 1 E, W.M.
KITSAP COUNTY, WASHINGTON

Assessor's Account No.:
132601-3-065-2006
132601-3-003-2001

April 11, 2019
Revised: October 14, 2019
Revised: December 12, 2019
Revised: February 4, 2020
Revised: April 20, 2020

FOR:
CALDART POULSBO LLC (c/o Barry Margolese)
105 S MAIN ST STE 230
SEATTLE WA 98104
(206) 910-2728

PREPARED BY:
RDCJR Engineering
3231 NE Totten Road, Suite 103
Poulsbo, WA. 98370
(360) 265-1037

RON D. CLEAVER JR
43644
Ron Cleaver Jr

4/20/2020

"I hereby state that this Drainage Report has been prepared by me or under my supervision and meets the standard care and expertise which is usual and customary in this community of professional engineers. The analysis has been prepared utilizing procedures and practices specified by the City of Poulsbo and within the standard accepted practices of the industry. I understand that the City of Poulsbo does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities prepared by me."

Contents

Figures

Appendix

I. LOCATION

The project consists of two parcels; 132601-3-065-2006 & 132601-3-003-2001.

The site is located on the east side of Caldart Ave, just south of the Cemetery and north of “NE Halden Glen Court”.

The site includes two addresses; 19700 & 19840 CALDART AVE NE, POULSBO, WA 98370. Both addresses have existing homes on them.

The site is a portion of the Southwest quarter of Section 13, Township 26 North, Range 1 East, W.M., in Kitsap County.

(Figure 1 – Vicinity Map).

II. EXISTING SITE CONDITIONS

The 9.05-acre site is composed of two parcels, both of which are underdeveloped with existing residential structures on them. Large portions of both properties remain undeveloped. The site is well vegetated and includes second growth forest of Douglas Firs, Cedars, Hemlock, Madrona, Maple, Pine and Alders with sword ferns, shrubbery and groundcover. The site slopes generally to the west, with steeper portions on the east and flatter portions to the west, abutting Caldart Ave. The steepest onsite slope approaches 36%. The entire onsite land will be considered native in the predeveloped condition for stormwater management purposes.

(Figure 2 – Predeveloped Site Conditions Map).

The parcel is bounded on all sides by Residential Low zoned properties, all of which currently are utilized as residential, except for the City of Poulsbo Cemetery on the north.

There is no evidence of existing drainage or erosion problems on-site.

There are no wetland critical areas or their buffers on the site.

Existing trees, larger than 10” dbh, have been reviewed by an ISA Certified Arborist and mapped by survey to document existing site coverage.

The soils on-site per the NRCS Soil Survey include:

22	Kapowsin gravelly ashy loam, 0 to 6 percent slopes	14%
39	Poulsbo gravelly sandy loam, 0 to 6 percent slopes	46%
40	Poulsbo gravelly sandy loam, 6 to 15 percent slopes	40%

“Poulsbo” soils predominate the site and are considered Hydrologic Group “C”.

(Figure 3 – Soils Map).

A site-specific study of the soils onsite was conducted by a Licensed Geotechnical Engineer, who generated a report (ESC19-010.1), dated October 25, 2019. The report indicates infeasibility of infiltration due to proximity of till layer.

(Appendix G – Geotechnical Report).

III. UPSTREAM BASIN

Properties to the east include the following two tax parcels:
1. 132601-3-005-2009, owned by HUNTER BOBBY G
2. 132601-3-001-2003, owned by SVARDH MICHAEL L & JOAN Y

Each of these properties is developed with single family residences. Western portions of each of these parcels drains as sheet flow to the subject parcel. The contributing area is 2.53-acres. This runon will be allowed to enter the site as sheet flow and will be collected and routed through onsite stormwater treatment systems. Most of this sheet flow will be captured by a wall drainage system and routed through the onsite stormwater management facility.

Additionally, a point source discharge has been discovered onto the site in the northeast corner of the site from property in the “Fjellvue” plat.
3. 5191-000-016-0000, owned by SLADE RICHARD A & JUTHAMAS
4. 5191-000-017-0009, owned by FLEMING SANDRA L

The non-continuous flow from this point discharge appears to be from a landscaping feature and believed to be minor. We have collected survey information on this discharge and will intercept this flow and route it as appropriate through the onsite stormwater management facility.

(Figure 2 – Predeveloped Site Conditions Map).

IV. DOWNSTREAM ANALYSIS

The “Area of Study” begins at the discharge location and ends at the crossing under “Lincoln Road”, near “Caldart Cottages”.

EXISTING DOWNSTREAM

Stormwater runoff from the site currently flows westerly as sheet and shallow flow until intercepted by roadside ditches and stormwater catch basins along “Caldart Ave”. Closed conveyance from the northern portion of the site is routed under “Caldart Ave” and into “Poulsbo Gardens, Div. 1”, where it discharges to an open swale in the middle of “Mosjon Circle”. The runoff in the swale runs due south, behind several homes on either side, until it is routed via 18” CMP culvert under “Mosjon Circle” and discharged into a well-manicured recreation tract, a portion of a platted development called “Poulsbo Gardens, Div. 1”. The swale in the recreation tract is sloped to the south. Stormwater leaves “Poulsbo Gardens, Div. 1” via the sloped swale into a southerly plat named, “Caldart Heights”. Within “Caldart Heights” the stream travels southerly on the common boundary between Parcels 5498-000-003-0005 (Lot 3) & 5498-000-004-0004 (Lot 4) in a 20’ wide (10’ on each lot) “Native Vegetation Buffer”, then crosses under “NE Watland Street” in a 24” N-12 pipe (~101 LF), then through a 40’ “Native Vegetation Buffer” within an open space tract in an open channel, then crosses under “NE Odessa Way” in a 24” N-12 pipe (~81 LF), then through a 20’ “Native Vegetation Buffer” within an open space tract in an open channel, finally crossing under “NE Fontaine Way” in a 24” N-12 pipe (~35 LF) prior to leaving the plat of “Caldart Heights”. Stormwater continues southerly through privately owned parcel 142601-4-030-2005, further southerly through “Caldart Cottages”, further southerly through property owned by “St. Olafs”, before turning west in “Wilderness Park”. At some point along this route the drainage becomes the named “South Fork of Dogfish Creek”. “Dogfish Creek” discharges to “Liberty Bay”, a portion of the “Puget Sound”.

PROPOSED DOWNSTREAM

Stormwater vault discharge from the developed site, will be routed via closed conveyance from an onsite detention vault to a discharge point in the middle of an existing 24” N-12 pipe under “Watland Street” in the plat of “Caldart Heights”.

Stormwater BioPod discharge from the developed site, will be to an existing catch basin very near the SW corner of the development along, “Caldart Ave”.

(Figure 4 – Downstream Map).
(Figure 4B – Downstream Map).

Table 2-1 data for downstream

1. There is no evidence of contamination of surface waters. There is potential for contamination due to a new residential development area with vehicular traffic. It is unlikely that contaminated waters from the development will ever reach the surface waters of “Dogfish Creek”. The developed area will be constructed in a manner which will contain spills. All collected runoff will be routed to a spill-control quality treatment device which will provide oil/water separation prior to routing through a quality enhancement facility and a detention vault facility. The detention vault will have a hydraulic residence time that allows for additional settling of sediments, located in the bottom portion of the facility for deposition. The outlet control orifice will act as an additional separator.
2. No overtopping, scouring, or bank sloughing evidence is present. There is some deposition occurring in front of erosion control weirs, positioned in the bottom of the stream channel by the City in the recreation tract, located in “Poulsbo Gardens, Div.1.
3. Significant destruction for aquatic habitat or organisms (i.e. severe siltation or incision in a stream) due to the proposed discharge is not likely given the flood routing, the hydraulic residence time in the detention vault and stormwater quality enhancement provided.

4. There was no evidence found which would support or indicate a potential for contamination of ground water.

Portions of “Dogfish Creek” are listed on the Department of Ecology’s 303d list, for low dissolved oxygen, bacteria, turbidity and temperature.

(Appendix D – DOE 303d Listing for Dogfish Creek).

Known Flooding Issue

Anecdotal evidence of capacity and flooding was noted early by the City in the upper reaches of this basin. Specifically, within a recreation tract in a southern portion of the “Poulsbo Gardens” plat, where we originally considered discharging stormwater to a well-manicured and maintained recreation tract with lawns and a sculpted drainage channel. The actual stream channel appears to be maintained with hand tools and has erosion control sedimentation weirs installed, which are limiting flows. South of this tract is the plat of “Caldart Heights”. The stream channel within this plat is well defined and includes a very even gradient between 1-2% across the entire plat. Low gradient drainages can occasionally experience flooding if not well maintained. The elevation and character of the channel just south of the “Poulsbo Gardens” plat and within the “Caldart Heights” plat, appears to be less than well maintained. It is overgrown and likely contributing to the localized flooding in the “Poulsbo Gardens” recreation tract.

Due to known flooding in the channel noted above, the applicant searched for an opportunity to discharge further downstream. That opportunity was found in “Watland St”, where a culvert crosses under this road. The currently proposed discharge location provides additional elevation and distance, alleviating known flooding upstream of the new discharge location. Alleviation is also provided by removal of runoff volumes from this upper channel segment, via re-routed stormwater via closed conveyance.

With the onsite flow control proposed, runoff rates experienced offsite in the downstream will not be increased and localized flooding is not expected to be exacerbated beyond anecdotally experienced event levels. There are no other known or anticipated problems (with continued maintenance) with the downstream route to within one quarter mile of the discharge, identified as the “study area” during the Level 1 Analysis. The “study area” is limited to portions of the discharge pathway to the crossing under “Lincoln Road”. No construction in the stream channel or it’s buffers, beyond connection to an existing culvert under “Watland Street”, are currently proposed.

Habitat Biologist & WDFW Review of Downstream

Soundview Consultants was hired to review the downstream for this project. Their stream assessment concluded that the drainage channel in the “Poulsbo Gardens, Div.1” recreation tract was a man-made storm drainage channel and that the “South Fork of Dogfish Creek” begins at the culvert end on the south side of “Watland Street” within the “Caldart Heights” plat. The stream assessment also evaluated the stream channel within the Level 1 downstream

threshold area and found no other concerns. The stream assessment evaluation continued beyond the Level 1 threshold area to examine the downstream, approximately 1 mile from the proposed discharge location. Scour, associated with changing land use and localized channel characteristics was noted within “Wilderness Park”, approximately one-half mile downstream. Soundview staff observed no recent signs of significant streambank erosion anywhere within the one-mile assessment. Compliance with current stormwater regulations, per the Washington State Department of Ecology and City of Poulsbo will provide the mitigation required to avoid negative impacts to the downstream.
(Attachment H – Stream Assessment Memo).

A representative from the Washington Department of Fish and Wildlife was also asked to review all subject materials and the actual stream to make a final determination of the beginning point of the “South Fork of Dogfish Creek”. Based on all the evidence, including physical observation, WDFW has decided that the origin of the creek is at the southern culvert end, within the recreation tract, within “Poulsbo Gardens, Div.1”.

V. SUMMARY OF PROPOSED DEVELOPMENT

The proposed 9.05-acre Planned Residential Development (PRD) will consist of 43 residential lots, associated drives, utilities and Stormwater management facilities. The home on the southern parcel will be retained on one of the proposed lots.

Per City of Poulsbo Zoning Map; The site is zoned Residential Low (RL, 4-5 DU/AC). The proposal is consistent with the current zoning and comprehensive plan.

A Geotechnical Engineer was hired to ascertain the ability to infiltrate stormwater onsite. Infiltration was determined to be infeasible due to presence of low permeable soils (till).

(Appendix G – Geotechnical Report).

The proposed development includes grading, construction of roads, utilities and Stormwater management facilities to support the new residential plat.

(Figure 5 – Developed Conditions Map).

City water and sewer will be extended into the site.

The site grading will result in 31,500 yd^3 of cut and 18,000 yd^3 of fill to accomplish the overall site grading. Excess material will be exported to an approved receiving site.

Developed site areas (acres) include:	Impervious	Pervious	Total
Proposed Lots	2.47	2.97	5.44
Tract A	0	0.02	0.02
Tract B	0	0.06	0.06

Tract C	0		0.02		0.02
Tract D	0.11		1.28		1.38
Tract E	0.06		0		0.06
Tract F	0		0.02		0.02
Tract G	0		0.06		0.06
Tract H	1.22		0.40		1.62
Tract I	0.23		0.14		0.37
Totals	4.08	+	4.97	=	9.05

New Pollution Generating Hard Surface Total = 77,053 SF (1.77-acres).
Replaced Pollution Generating Hard Surface Total = 0 SF (Assumed native in predeveloped condition.)

“PostDev” Basin areas (acres) include:	Impervious		Pervious		Total
Lot – Roof Allowance	1.74		0		1.74
Lot – Drive/Other Allowance	0.44		0		0.44
Lot – L&L	0		2.47		2.47
Tract A – L&L	0		0		0
Tract B – L&L	0		0		0
Tract C – L&L	0		0		0
Tract D – IMP	0.09		0		0.09
Tract D – Native	0		0.25		0.25
Tract D – L&L	0		0.93		0.93
Tract E – IMP	0.06		0		0.06
Tract F – L&L	0		0.02		0.02
Tract G – L&L	0		0.06		0.06
Tract H – IMP	1.17		0		1.17
Tract H – L&L	0		0.40		0.40
Tract I – IMP	0.23		0		0.23
Tract I – L&L	0		0.14		0.14
005 Hunter (existing pasture)	0		0.78		0.78
001 Svardh (existing pasture)	0		1.75		1.75
Totals	3.73	+	6.80	=	10.52

“Bypass” Basin areas (acres) include:	Impervious	Pervious	Total
Frontage Imp	0.12	0	0.12
Tract A – L&L	0	0.02	0.02
Tract B – L&L	0	0.06	0.06
Tract C – L&L	0	0.02	0.02
Tract D – IMP	0.02	0	0.02
Tract D – L&L	0	0.10	0.10
Halden – IMP	0.05	0	0.05
Lot 25 – IMP	0.06	0	0.06
Lot 25 – L&L	0	0.06	0.06

Lot 26 – IMP	0.06		0		0.06
Lot 26 – L&L	0		0.09		0.09
Lot 27 – IMP	0.06		0		0.06
Lot 27 – L&L	0		0.09		0.09
Lot 28 – IMP	0.06		0		0.06
Lot 28 – L&L	0		0.14		0.14
Lot 29 – IMP	0.06		0		0.06
Lot 29 – L&L	0		0.12		0.12
Tract H – IMP	0.05		0		0.05
Totals	0.53	+	0.70	=	1.23

(Appendix A – Basin Area Worksheet).

Applicable design standards include:

- City of Poulsbo Construction Standards.
- Stormwater Management Manual for Western Washington, amended 2014
- Low Impact Development Technical Guidance manual for Puget Sound, 2012

Additional permits required may include, but are not limited to:

- Clearing and Grading Permits from City of Poulsbo
- NPDES Construction Stormwater General Permit

VI. SUMMARY OF COMPLIANCE WITH STORMWATER REQUIREMENTS

The predeveloped basin includes some impervious surfacing. No credit for existing impervious surfacing will be utilized in the stormwater design. The existing development site includes less than 35% impervious surfacing coverage. Per Figure I-2.4.1 Flow Chart for Determining Requirements for New Development resulted in “All Minimum Requirements apply to the new and replaced hard surfaces and converted vegetation areas”.

(Appendix J – Figure I-2.4.1 New Development Flowchart).

MINIMUM REQUIREMENTS #1 - 9

Minimum Requirement #1: Preparation of Stormwater Site Plans

A preliminary stormwater site plan is included in the Preliminary Plat (PRD) review package. A final stormwater site plan will be submitted with the final construction plans.

Minimum requirement #2: Construction Stormwater Pollution Prevention (SWPPP)

A SWPPP will be submitted with the construction plans. A “TESC Plan” and associated details will be provided in the construction plans.

Minimum Requirement #3: Source Control of Pollution

Source control BMPs will be applied to the project. A “TESC Plan” and associated details will be provided in the construction plans.

Minimum Requirement #4: Preservation of Natural Drainage Systems and Outfalls
Stormwater discharge from the site will be to an existing drainage, somewhat south of the original discharge location in the upper reaches of the “South Fork of Dogfish Creek”. The current discharge point is near the proposed northern access connection to the plat. Due to localized flooding in this immediate downstream; This storm discharge location will be abandoned, in favor of discharge point to the south on “Watland St” to avoid an upper segment of the downstream that has some historical flooding within the “Poulsbo Gardens, Div.1” plat. Stormwater will receive quantity control and quality enhancement treatment prior to discharge, ensuring clean water is discharged into the downstream. The downstream beyond the connection point in “Watland Street” will be maintained. Relocation of the discharge location is necessary due to elevation constraints in the onsite detention system. The existing conveyance systems near the existing downstream are too shallow to maintain the existing route.

Minimum Requirement #5: On-site Stormwater Management
Compliance with List#2, as follows;
Lawn and Landscaped Areas:

- Soils will be amended.

Roofs:

- Full dispersion is infeasible because it requires retention preservation of too much land in native vegetation and would make development of the land infeasible. There is also a practical lack of downslope space for the required flow paths.
- Bioretention is infeasible for several inner-connected reasons, outlined as follows: Existing site constraints, including an existing easement in the SW corner of the site, slopes in excess of 8% covering much of the high ground on the eastside of the parcels, the existing primary discharge location being in the northern end of the parcels and the need to ensure general development feasibility; leave the SW corner of the norther access connection as the primary location to position a surface mounted Bioretention facility (or any facility for that matter). This location could house a Bioretention facility if not for the elevation constraints that make it infeasible to do so. The elevation is constrained by the need for quantity control storage and a useable discharge elevation, tied to a downstream discharge. If infiltration was selected over detention, proximity to the till layer would not provide the required 3-foot separation. Bioretention is therefore infeasible as a method for treating the overall onsite development.
- Downspout Dispersion is infeasible. Dispersion requires downstream flow paths from each downspout, where each downspout is limited to 700 SF of contributing surface area. All these flow paths have slope restriction which cannot be provided.
- Perforated Stub-out Connection is infeasible. This BMP requires native soils and relatively mild slopes, neither of which will be present across much of the developed site.

Other Hard Surfaces:

- Full dispersion is infeasible because it requires retention preservation of too much land in native vegetation and would make development of the land infeasible. There is also a practical lack of downslope space for the required flow paths.
- Permeable Pavement is infeasible. Permeable pavement must be installed at slopes under 5% and utilizes native soils for infiltration. The required infiltrative soils cannot be provided.
- Bioretention is infeasible for several inner-connected reasons, outlined as follows: Existing site constraints, including an existing easement in the SW corner of the site, slopes in excess of 8% covering much of the high ground on the eastside of the parcels, the existing primary discharge location being in the northern end of the parcels and the need to ensure general development feasibility; leave the SW corner of the norther access connection as the primary location to position a surface mounted Bioretention facility (or any facility for that matter). This location could house a Bioretention facility if not for the elevation constraints that make it infeasible to do so. The elevation is constrained by the need for quantity control storage and a useable discharge elevation, tied to a downstream discharge. If infiltration was selected over detention, proximity to the till layer would not provide the required 3-foot separation. Bioretention is therefore infeasible as a method for treating the overall onsite development.
- Sheet Flow Dispersion is infeasible due to lack of space for downstream flow pathways.

Minimum Requirement #6: Runoff Treatment

Figure V-2.1.1 Treatment Facility Selection Flow Chart from the DOE manual was utilized to determine runoff treatment needs.

Step 1: Identify Pollutants of Concern and Perform Off-site Analysis: Soundview Consultants and WDFW were both consulted to determine the location of and type of stream that stormwater will be discharged to. The stream at the discharge location is a type “N”, which is flowing through an existing 24” culvert under “Watland”. The stream is in an upper reach and tributary to the “South Fork of Dogfish Creek”, which becomes a type “F” stream, approximately 2500’ to the south of the proposed discharge connection point, in “Wilderness Park”.

Step 2: Determine if an Oil Control Facility is Required: The proposal is not a “high-use” site, nor does it include traffic volumes that would warrant an Oil Control Facility. Not required.

Step 3: Determine if Infiltration for Pollutant Removal is Practicable: Infiltration was deemed infeasible by the Geotechnical Engineering Consultant that reviewed onsite soils and found them to be too shallow to be effective. Not required.

Step 4: Determine if Phosphorus Control is Required: The downstream was reviewed on the WADOE Water Quality Atlas, which did not include any listings for phosphorus in the downstream all the way to the receiving waters of “Liberty Bay”. Not required.

Step 5: Determine if Enhanced Treatment is Required: Uses which would require “Enhanced” treatment are as follows:

- Industrial Project Sites
- Commercial Project Sites
- Multi-family Residential Project Sites
- High AADT roads.

This site does not meet any criteria requiring “Enhanced Treatment”, as outlined in the WADOE manual. Not required.

Step 6: Apply a Basic Treatment Facility: Stormwater quality mitigation will be provided by a proprietary stormwater quality enhancement facility, which has General Use Level Designation (GULD) approval by the Washington State Department of Ecology for “basic” stormwater treatment. The treatment facility will be sized to handle the peak 15-minute flow rate using WWHM 2012, as required.

(Appendix K - Figure V-2.1.1 Treatment Facility Selection Flow Chart)

Minimum Requirement #7: Flow Control

Stormwater quantity mitigation will be provided through live storage in an underground detention vault. The vault will treat approximately 7.99-acres of developed area, plus approximately 2.53-acres of upstream contributing area. Total PostDev basin is 10.53-acres. The stormwater management facilities will treat a developed basin that includes Public stormwater. The stormwater management facilities will therefore be turned over to the City upon completion of the project and will be maintained by the City.

Minimum Requirement #8: Wetlands Protection

The project will not discharge to a wetland.

Minimum Requirement #9: Operation and Maintenance

An operation and maintenance manual will be prepared and provided as required, prior to construction plan approval.

VII. HYDROLOGIC/HYDRAULIC ANALYSIS

The project was modelled utilizing the 2012 Western Washington Hydrology Model by Clear Creek Solutions.

Development coverage is outlined in Appendix A.

(Appendix A – Basin Area Worksheet)

Quantity Control Mitigation

PostDev Basin
Includes a detention vault designed to provide water quantity treatment. Furthermore, the detention vault size is based on allowable release rates as determined by WWHM 2012 modeling software that has been configured to account for the undetained release of Stormwater from the “Bypass” Basin. The resultant vault is 135’ long x 75’ wide x 11’ deep (live storage). The vault includes a system of interior walls to promote a longer hydraulic residence time for additional pollutant removal. Peak inflow to the vault will be 6.40 cfs. The vault is will include multiple access covers to ensure adequate maintenance access. The vault will also be designed to accommodate access to the access covers on the top of the facility.

Discharge from the developed site will be limited by an outlet control device on the discharge end of the vault, with the following configuration:

Interior Vault Ceiling Elevation = 303.00
Peak Stage Elevation = 302.10
2” diameter orifice (+7.00) Elevation = 299.00
2.1” diameter orifice (+5.00) Elevation = 297.00
1.813” (1-13/16”) diameter orifice (+0.00) Elevation = 292.00
Bottom of Live Storage Elevation = 292.00

Discharge Information:	Vault	Bypass	Total (all flows reported in cfs)
2-Yr Event	0.2821	0.2208	0.5029
10-Yr Event	0.5503	0.2838	0.8341
100-Yr Event	0.9893	0.3519	1.3412

(Appendix B –WWHM 2012 Report)

Quality Enhancement Mitigation

Stormwater quality enhancement facilities are designed to accommodate the peak 15-minute flow rate from the developed basin.

Calavista runoff rates for the ‘PostDev’ basin:
The ‘online’ peak 15-minute flow rate is 0.2338 cfs.
The ‘offline’ peak 15-minute flow rate is 0.1479 cfs.

Calavista runoff rates for the ‘Bypass’ basin:
The ‘online’ peak 15-minute flow rate is 0.1057 cfs.
The ‘offline’ peak 15-minute flow rate is 0.0581 cfs.

(Appendix B –WWHM 2012 Report)

Stormwater quality mitigation will be provided by a “BioPod” system sized to accommodate the applicable peak 15-minute flow rate. These units are sized based on a hydraulic loading rate of 1.6 gallons / minute (0.0036 cfs) per square foot of media surface area.

The BioPod unit required to treat the ‘PostDev’, ‘online’ flow above would be an 8’x12’ unit.
The BioPod unit required to treat the ‘PostDev’, ‘offline’ flow above would be a 6’x12’ unit.

For the ‘PostDev’ basin; The ‘offline’ 6’x12’ underground model w/internal bypass unit is being selected because it has a buried vault configuration that allows for more flexibility in placement and configuration and includes an internal bypass capable of accommodating the excess flow from the developed site.

The BioPod unit required to treat the ‘Bypass, ‘online’ flow above would be a 4’x12’ unit.
The BioPod unit required to treat the ‘Bypass’, ‘offline’ flow above would be a 4’x6’ unit.

For the ‘Bypass’ basin; The ‘offline’ 4’x6’ underground model w/internal bypass unit is being selected because it has a buried vault configuration that allows for more flexibility in placement and configuration and includes an internal bypass capable of accommodating the excess flow from the developed site.

(Appendix I – BioPod Submittal Package)

Conveyance Capacity (Onsite Mitigated Basin)

Conveyance calculations were performed to ensure that all closed conveyance pipes are sized properly to handle the design flows for the project. Several conditions have been examined for the conveyance system to ensure overall viability. All pipes in the plan set have been configured as required by the parameters identified in the conveyance capacity worksheet, so that free flow conditions are provided throughout.

(Appendix C –Conveyance Capacity Worksheet (Onsite Mitigated Basin)).

Erosion Control

The development site will include a Temporary Erosion Control Plan, to be implemented during construction. “Appendix 7 – Sediment Potential Worksheet” is included in this report to aid in the scoping, selection and sizing of appropriate BMPs. The overall score from this worksheet is 210, meaning that the site has high potential for erosion during grading activities. Care must be taken to ensure that appropriate BMPs are in place and appropriate materials are on hand to deal with erosion events as they occur. This project will require an erosion control plan and a Certified Erosion Control Lead onsite during construction, until the site is permanently stabilized.

(See Appendix E – Appendix 7 Sediment Potential Worksheet)

Conveyance Capacity (Overall Discharge Basin)

The overall discharge basin was reviewed to check the conveyance capacity from the ultimate discharge location associated with the culvert under “Watland St”. The overall basin was found to include approximately 22.5-acres. The basin was divided into uses with 3.5-acres of cemetery and the remainder of the basin given a conservative cover of 4 du/ac. The basin was analyzed two different ways.

1. WWHM 2012 Method; this method was done for comparison to the rational method. It resulted in 18.5 cfs, during the 100-yr event.
2. Rational Method; this method resulted in a 100-yr event release of ~34 cfs.

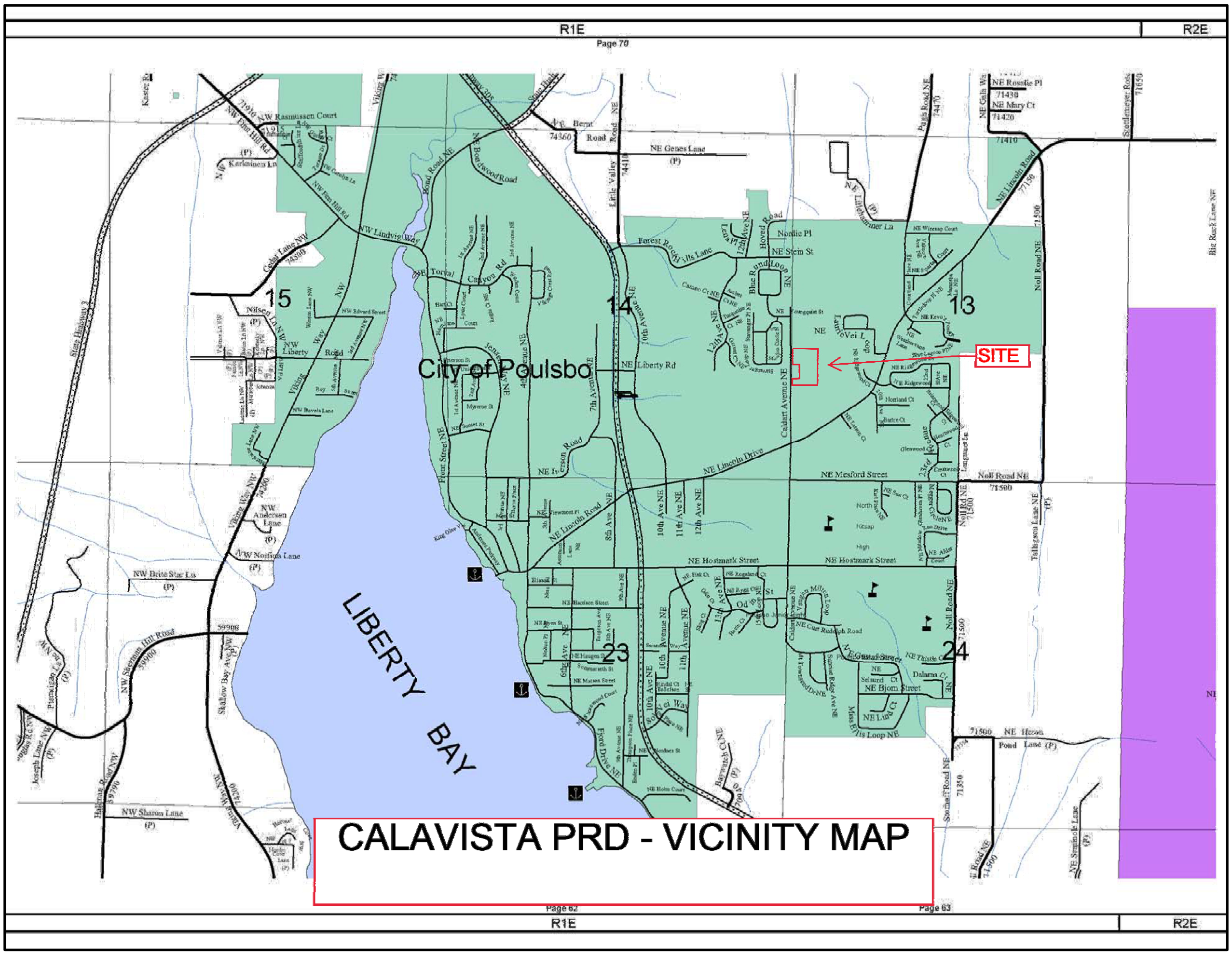
A more realistic peak flow that will be experienced at the discharge location will be much less, and more in line with the WWHM 2012 basin study. The Calavista contribution to the overall 18.5 cfs will typically be approximately 1.3 cfs or 7% of the overall flow volume during peak 100-yr events. During emergency overflow situations, this percentage would increase significantly to approximately 30%, assuming only “Calavista” was in overflow and excess runoff was not contributing flows to the downstream conveyance from elsewhere in the basin (an unlikely occurrence). Regular and routine storm events, like the 2-yr event, have lower flows of 0.5 cfs of contributed flow from the “Calavista” developed site.

(Appendix F –Conveyance Capacity Worksheet (Overall Discharge Basin)).

VIII. OPERATIONS AND MAINTENANCE

An operations and maintenance manual will be prepared and submitted, as required by the City.

CALAVISTA — PRD



19700 & 19840 CALDART AVE NE
POULSBO WA 98370

132601-3-065-2006 & 132601-3-003-2001

FIG 1 — VICINITY MAP

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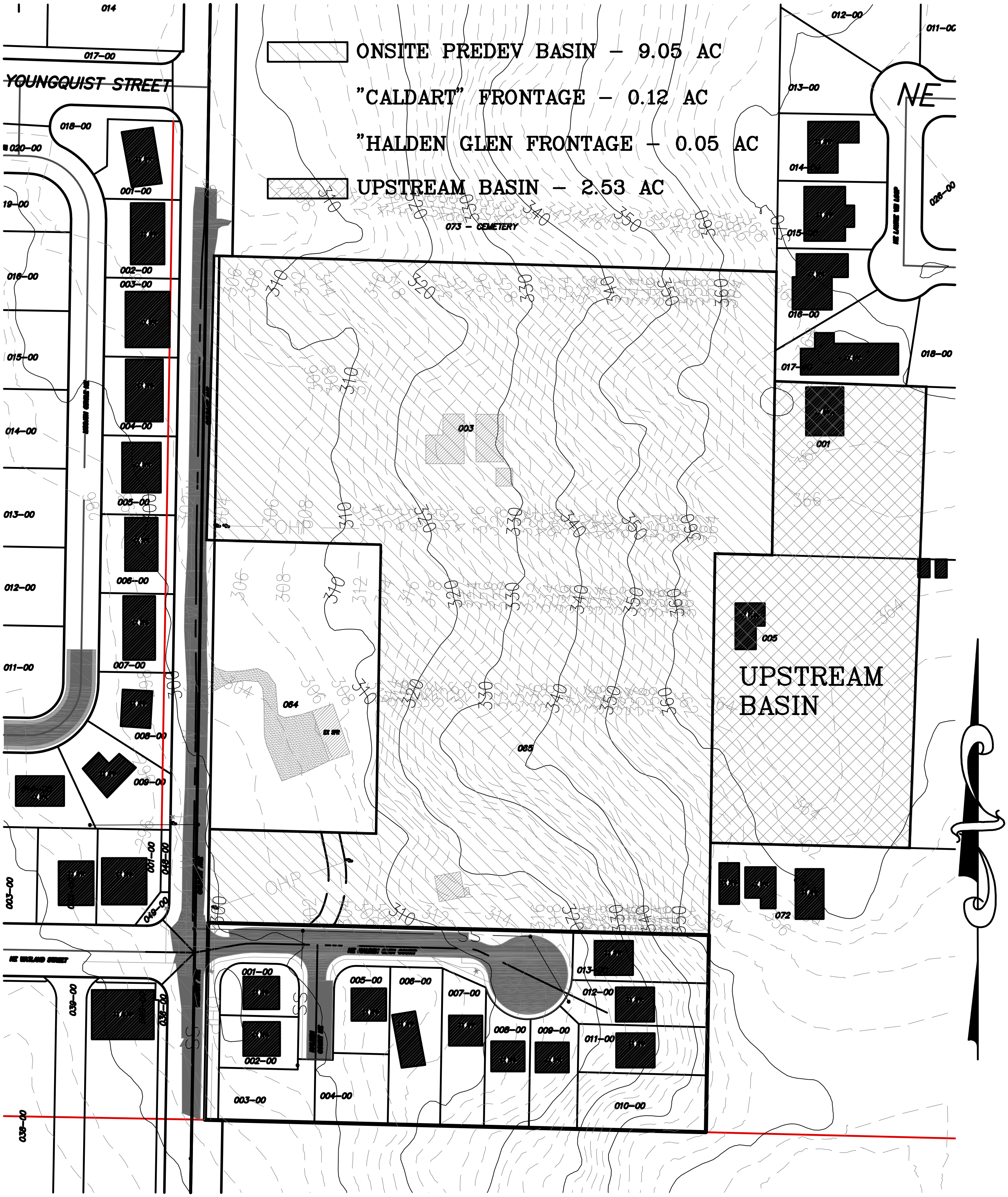
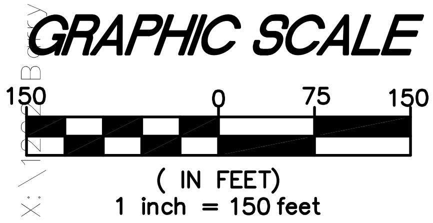
CALAVISTA – PRD





THIS MAP SHOWS BASIN AREAS.
SEE APPENDIX A FOR EXISTING
COVERAGE BREAKDOWN.

FIG 2 – PREDEVELOPED CONDITIONS MAP

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Soil Map—Kitsap County Area, Washington
(Calavista)

Map Scale: 1:1,560 if printed on A portrait (8.5" x 11") sheet.

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 Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

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 1:24,000.

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: Kitsap County Area, Washington
Survey Area Data: Version 14, Sep 10, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 29, 2016—Sep 27, 2016

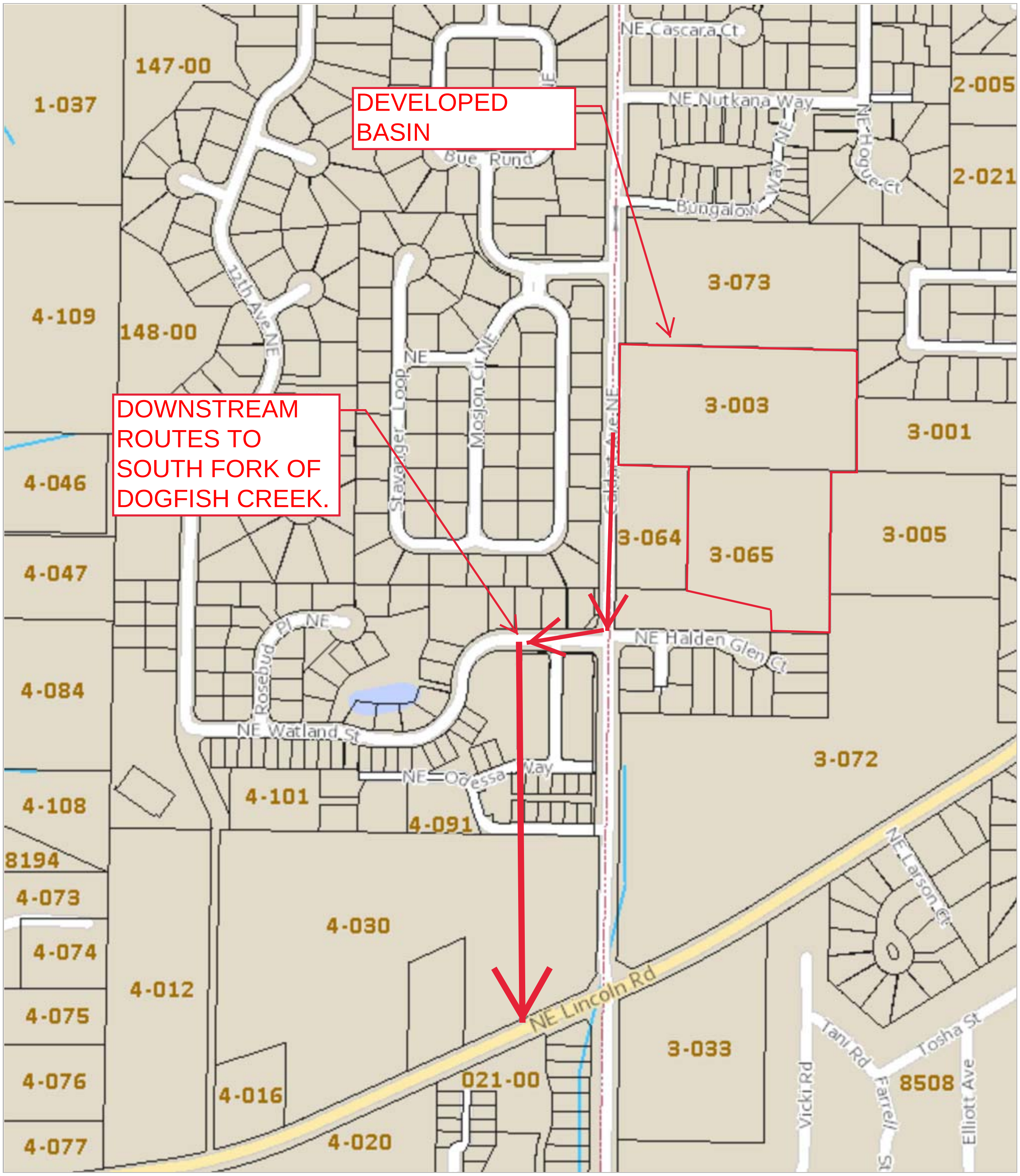
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
22	Kapowsin gravelly ashy loam, 0 to 6 percent slopes	1.7	14.1%
39	Poulsbo gravelly sandy loam, 0 to 6 percent slopes	5.5	46.1%
40	Poulsbo gravelly sandy loam, 6 to 15 percent slopes	4.8	39.8%
Totals for Area of Interest		**12.0**	**100.0%**

Map Scale: 1 : 4,800

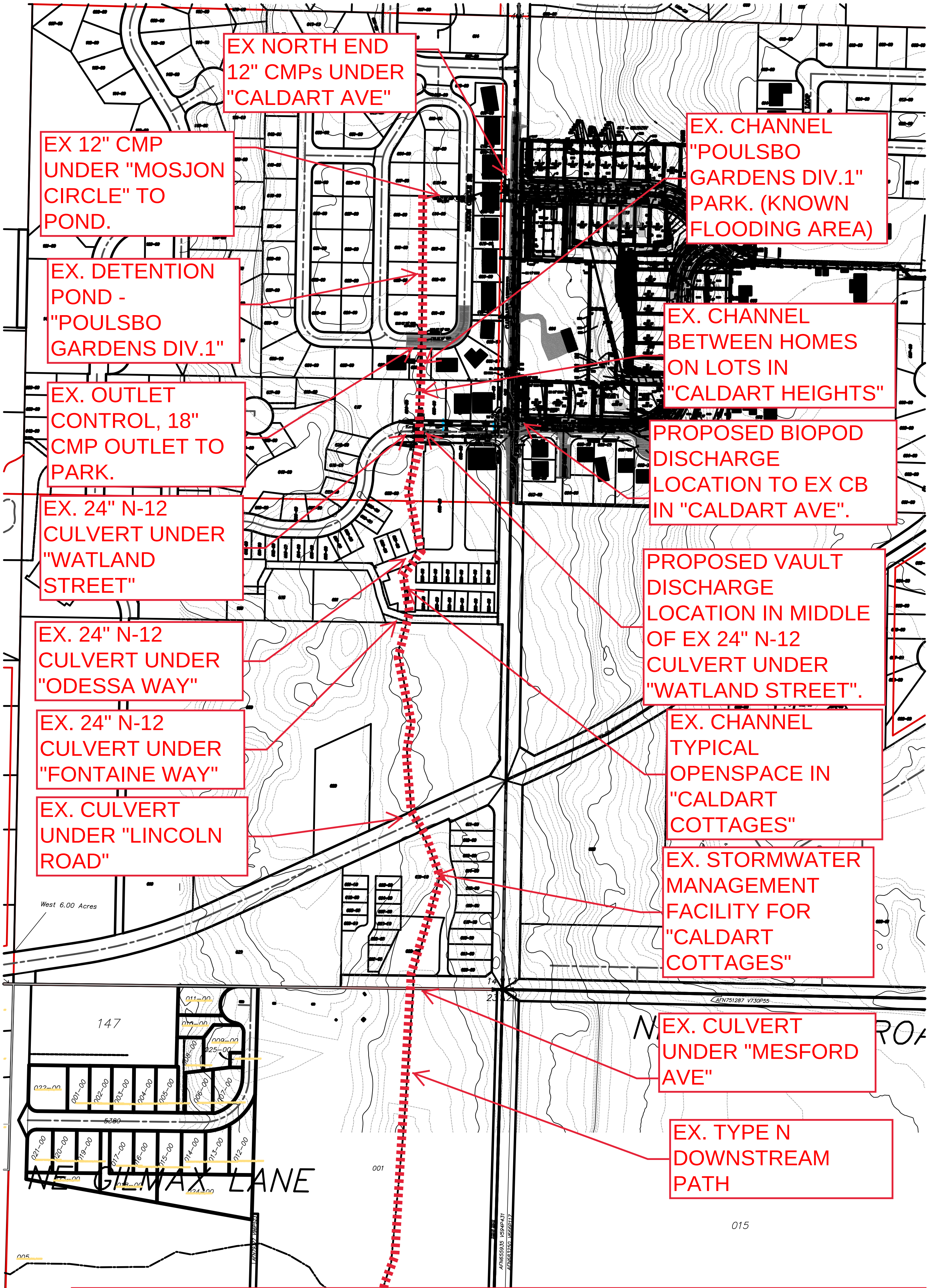
Printed: Friday. Dec 7, 2018



** This map is not a substitute for field survey **

Comments

FIG 4 - DOWNSTREAM MAP



EX NORTH END 12" CMPs UNDER "CALDART AVE"

EX 12" CMP UNDER "MOSJON CIRCLE" TO POND.

EX. DETENTION POND - "POULSBO GARDENS DIV.1"

EX. OUTLET CONTROL, 18" CMP OUTLET TO PARK.

EX. 24" N-12 CULVERT UNDER "WATLAND STREET"

EX. 24" N-12 CULVERT UNDER "ODESSA WAY"

EX. 24" N-12 CULVERT UNDER "FONTAINE WAY"

EX. CULVERT UNDER "LINCOLN ROAD"

EX. CHANNEL "POULSBO GARDENS DIV.1" PARK. (KNOWN FLOODING AREA)

EX. CHANNEL BETWEEN HOMES ON LOTS IN "CALDART HEIGHTS"

PROPOSED BIOPOD DISCHARGE LOCATION TO EX CB IN "CALDART AVE".

PROPOSED VAULT DISCHARGE LOCATION IN MIDDLE OF EX 24" N-12 CULVERT UNDER "WATLAND STREET".

EX. CHANNEL TYPICAL OPENSPACE IN "CALDART COTTAGES"

EX. STORMWATER MANAGEMENT FACILITY FOR "CALDART COTTAGES"

EX. CULVERT UNDER "MESFORD AVE"

EX. TYPE N DOWNSTREAM PATH

FIG 4B - DOWNSTREAM MAP 1"=350'

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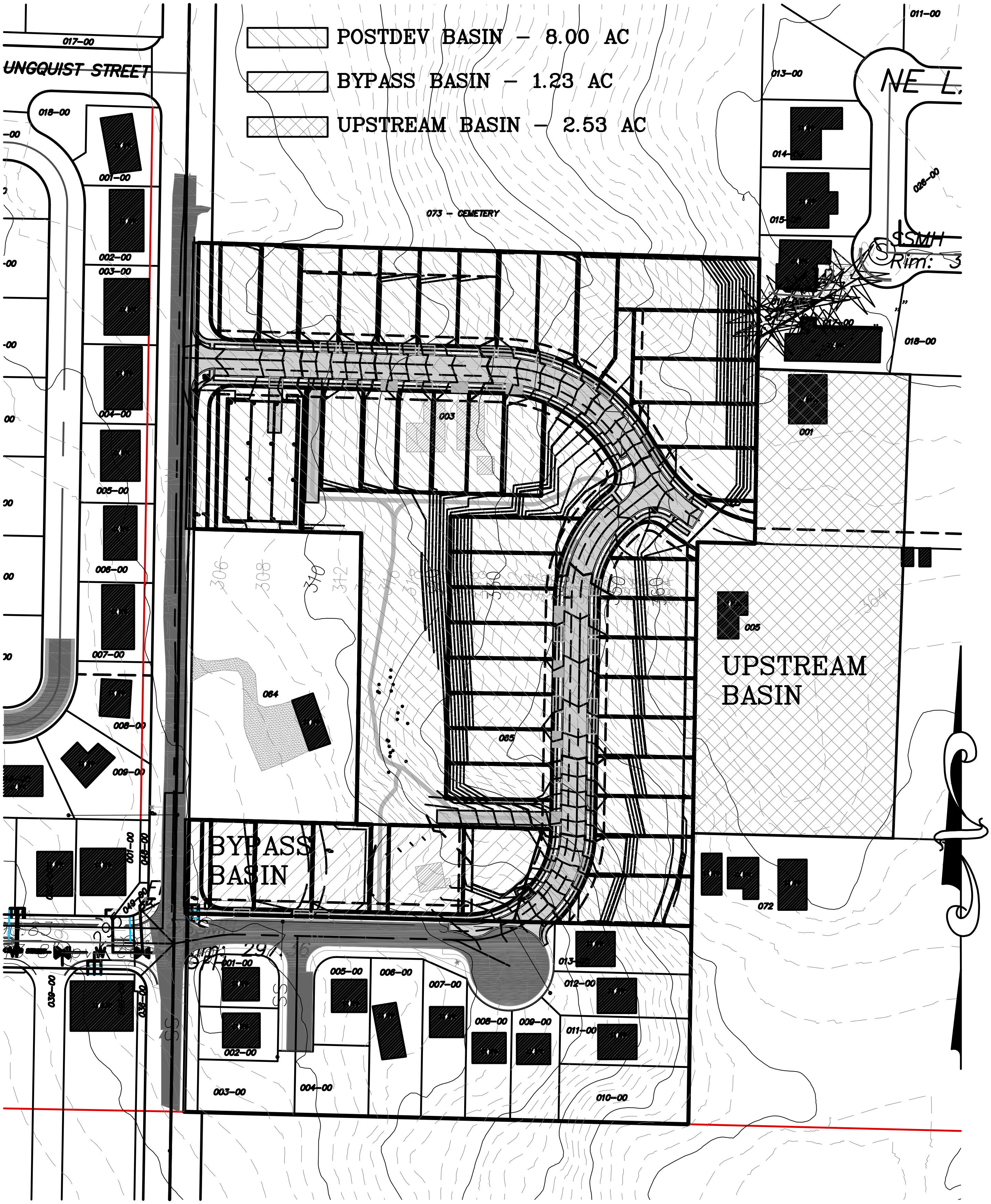
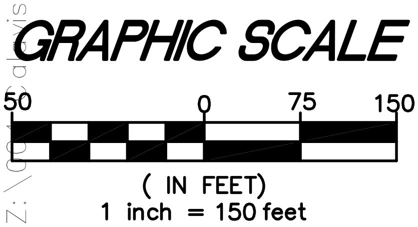
CALAVISTA – PRD

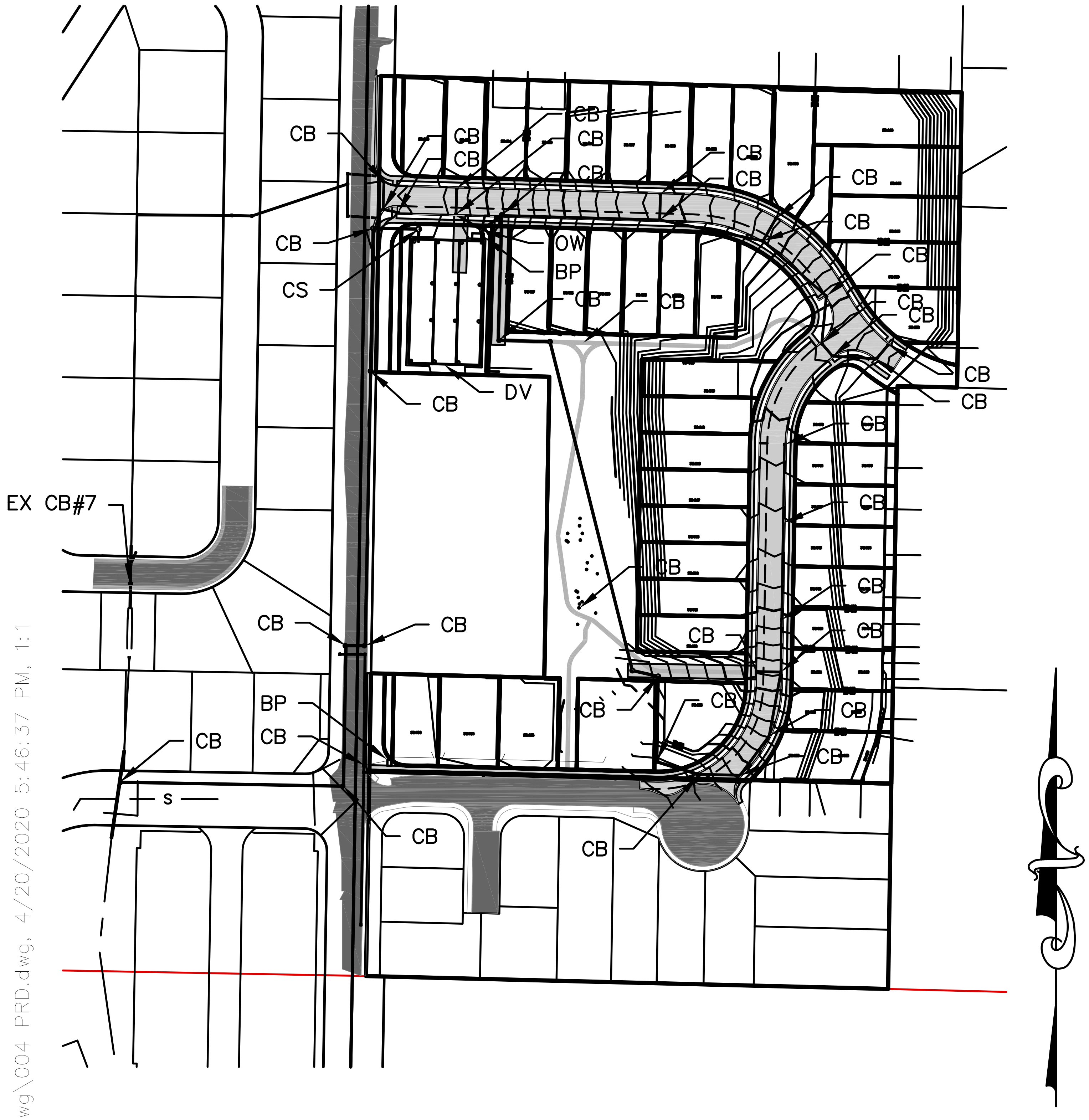




THIS MAP SHOWS BASIN AREAS.
SEE APPENDIX A FOR PROPOSED USE
COVERAGE BREAKDOWN.

FIG 5 – DEVELOPED CONDITIONS MAP

CALAVISTA – PRD



LEGEND

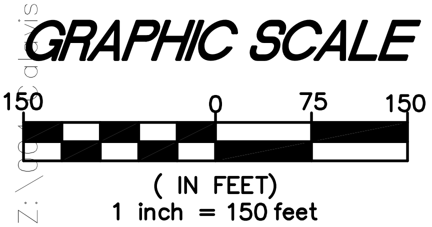
CB = CATCH BASIN (TYPE 1 & 2)

OW = TYPE 2 CB W/ OIL/WATER SEPARATOR

BP = BIOPOD VAULT (WATER QUALITY)

DV = DETENTION VAULT

CS = CONTROL STRUCTURE (OUTLET CONTROL)



DISCHARGE AT "WATLAND" MAP

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APPENDIX A - BASIN AREA WORKSHEET

LOT #	AREA (SF)	PREDEV NATIVE	POSTDEV NATIVE	L & L ALLOWANCE	ROOF ALLOWANCE	DRIVEWAY ALLOWANCE	OTHER IMP ALLOWANCE	Total Lot Impervious
1	4954	4954		2454	2000.0	500	0	2500.0
2	4905	4905		2405	2000.0	500	0	2500.0
3	4905	4905		2405	2000.0	500	0	2500.0
4	4905	4905		2405	2000.0	500	0	2500.0
5	4905	4905		2405	2000.0	500	0	2500.0
6	4905	4905		2405	2000.0	500	0	2500.0
7	4905	4905		2405	2000.0	500	0	2500.0
8	4959	4959		2459	2000.0	500	0	2500.0
9	5375	5375		2875	2000.0	500	0	2500.0
10	5991	5991		3491	2000.0	500	0	2500.0
11	9811	9811		7311	2000.0	500	0	2500.0
12	7783	7783		5283	2000.0	500	0	2500.0
13	7109	7109		4609	2000.0	500	0	2500.0
14	6490	6490		3990	2000.0	500	0	2500.0
15	5437	5437		2937	2000.0	500	0	2500.0
16	4830	4830		2330	2000.0	500	0	2500.0
17	4988	4988		2488	2000.0	500	0	2500.0
18	4990	4990		2490	2000.0	500	0	2500.0
19	4992	4992		2492	2000.0	500	0	2500.0
20	4994	4994		2494	2000.0	500	0	2500.0
21	4996	4996		2496	2000.0	500	0	2500.0
22	4997	4997		2497	2000.0	500	0	2500.0
23	5132	5132		2632	2000.0	500	0	2500.0
24	7457	7457		4957	2000.0	500	0	2500.0
25	5012	5012		2512	2000.0	500	0	2500.0
26	6555	6555		4055	2000.0	500	0	2500.0
27	6547	6547		4047	2000.0	500	0	2500.0
28	8479	8479		5979	2000.0	500	0	2500.0
29	7804	7804		5304	2000.0	500	0	2500.0
30	4800	4800		2300	2000.0	500	0	2500.0
31	4800	4800		2300	2000.0	500	0	2500.0
32	4800	4800		2300	2000.0	500	0	2500.0
33	4800	4800		2300	2000.0	500	0	2500.0
34	4800	4800		2300	2000.0	500	0	2500.0
35	4801	4801		2301	2000.0	500	0	2500.0
36	4933	4933		2433	2000.0	500	0	2500.0
37	5490	5490		2990	2000.0	500	0	2500.0
38	5029	5029		2529	2000.0	500	0	2500.0
39	4600	4600		2100	2000.0	500	0	2500.0
40	4600	4600		2100	2000.0	500	0	2500.0
41	4600	4600		2100	2000.0	500	0	2500.0
42	4600	4600		2100	2000.0	500	0	2500.0
43	5175	5175		2675	2000.0	500	0	2500.0
MAX	9811.0							2500.0
MIN	4600.0							2500.0
AVG	5510.2							2500.0
TOTAL (SF)	**236940.0**	**236940.0**	**0.0**	**129440.0**	**86000.0**	**21500.0**	**0.0**	**107500.0**
TOTAL (AC)	**5.44**	**5.44**	**0.00**	**2.97**	**1.97**	**0.49**	**0.00**	**2.47**

TRACT AREAS

	SF	AC	Description
TRACT A	982.0	0.02	**Openspace Tract**
TRACT B	2591.0	0.06	**Openspace Tract**
TRACT C	892.0	0.02	**Openspace Tract**
TRACT D	60211.0	1.38	**Openspace Tract**
TRACT E	2410.0	0.06	**Access Tract**
TRACT F	857.0	0.02	**Road Tract**
TRACT G	2759.0	0.06	**Road Tract**
TRACT H	70489.0	1.62	**Road Tract**
TRACT I	16143.0	0.37	**Stormwater Tract**
Total	**157334.0**	**3.61**	

SITE AREA TABLE

	SF	AC	Notes
Lots	236940.0	5.44	**Total Lot Area**
TRACT A	982.0	0.02	**Openspace Tract**
TRACT B	2591.0	0.06	**Openspace Tract**
TRACT C	892.0	0.02	**Openspace Tract**
TRACT D	60211.0	1.38	**Openspace Tract**
TRACT E	2410.0	0.06	**Access Tract**
TRACT F	857.0	0.02	**Road Tract**
TRACT G	2759.0	0.06	**Road Tract**
TRACT H	70489.0	1.62	**Road Tract**
TRACT I	16143.0	0.37	**Stormwater Tract**
Total Site	**394274.0**	**9.05**	

ONSITE AREA BREAKDOWN

	IMPERVIOUS		PERVIOUS		
	SF	AC	SF	AC	Percent Impervious Coverage
Lots	107500.0	2.47	129440.0	2.97	**45.4%**
TRACT A	0.0	0.00	982.0	0.02	**0.0%**
TRACT B	0.0	0.00	2591.0	0.06	**0.0%**
TRACT C	0.0	0.00	892.0	0.02	**0.0%**
TRACT D	4670.0	0.11	55541.0	1.28	**7.8%**
TRACT E	2410.0	0.06	0.0	0.00	**100.0%**
TRACT F	0.0	0.00	857.0	0.02	**0.0%**
TRACT G	0.0	0.00	2759.0	0.06	**0.0%**
TRACT H	53143.0	1.22	17346.0	0.40	**75.4%**
TRACT I	10125.0	0.23	6018.0	0.14	**62.7%**
Totals	**177848.0**	**4.08**	**216426.0**	**4.97**	**45.1%**

Overall Area = 9.05 AC
Percent Impervious = 45.1%

Openspace Area = 1.48 AC
Percent Openspace = 16.4%

STORM BASIN - Upstream

	IMPERVIOUS	PERVIOUS
	AC	AC
005 Hunter (Pasture)	-	0.78
001 Svardh (Pasture)	-	1.75
Frontage (Native)	-	0.12
Totals	0.00	2.65

Total Area = **2.65** ***AC***

STORM BASIN - PreDev

	IMPERVIOUS	PERVIOUS
	AC	AC
Onsite (Native)	-	9.05
Frontage (Native)	-	0.12
Halden (L&L)	-	0.05
005 Hunter (Pasture)	-	0.78
001 Svardh (Pasture)	-	1.75
Totals	0.00	11.75

Overall Area = **11.75** ***AC***

STORM BASIN - Bypass

	IMPERVIOUS	PERVIOUS
	AC	AC
Frontage Imp	0.12	-
Tract A - L&L	-	0.02
Tract B - L&L	-	0.06
Tract C - L&L	-	0.02
Tract D - IMP	0.02	-
Tract D - L&L	-	0.10
Halden - IMP	0.05	-
Lot 25 - IMP	0.06	-
Lot 25 - L&L	-	0.06
Lot 26 - IMP	0.06	-
Lot 26 - L&L	-	0.09
Lot 27 - IMP	0.06	-
Lot 27 - L&L	-	0.09
Lot 28 - IMP	0.06	-
Lot 28 - L&L	-	0.14
Lot 29 - IMP	0.06	-
Lot 29 - L&L	-	0.12
Tract H - IMP	0.05	-
Tract H - L&L	-	0.00
Totals	0.53	0.70

Total Area = **1.23** ***AC***

STORM BASIN - PostDev

	IMPERVIOUS AC	PERVIOUS AC
Lot - Roof Allowance	1.74	-
Lot - Drive/Other Allowance	0.44	-
Lot - Lawn & Landscaping Allowance	-	2.47
Tract A - L&L	-	0.00
Tract B - L&L	-	0.00
Tract C - L&L	-	0.00
Tract D - IMP	0.09	-
Tract D - Native	-	0.25
Tract D - L&L	-	0.93
Tract E - IMP	0.06	-
Tract F - L&L	-	0.02
Tract G - L&L	-	0.06
Tract H - IMP	1.17	-
Tract H - L&L	-	0.40
Tract I - IMP	0.23	-
Tract I - L&L	-	0.14
005 Hunter (Pasture)	-	0.78
001 Svardh (Pasture)	-	1.75
Totals	**3.73**	**6.80**

Overall Area = 10.52 AC

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	19.12.5.004
Site Name:	Calavista
Site Address:	XXX Caldart Ave
City:	Poulsbo
Report Date:	12/12/2019
Gage:	Seatac
Data Start:	1948/10/01
Data End:	2009/09/30
Timestep:	15 Minute
Precip Scale:	1.167
Version Date:	2019/09/13
Version:	4.2.17

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Mod	9.17
C, Pasture, Flat	2.53
C, Lawn, Mod	0.05
Pervious Total	11.75
Impervious Land Use	acre
Impervious Total	0
Basin Total	11.75

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

PostDev

Bypass: No

GroundWater: No

Pervious Land Use	acre
C, Pasture, Flat	2.53
C, Lawn, Flat	4.02
C, Forest, Mod	0.25
Pervious Total	6.8

Impervious Land Use	acre
ROADS FLAT	0.15
ROADS MOD	1.4
ROOF TOPS FLAT	1.74
DRIVEWAYS FLAT	0.44
Impervious Total	3.73

Basin Total	10.53

Element Flows To:

Surface	Interflow	Groundwater
Vault 1	Vault 1	

Bypass

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
C, Lawn, Flat	0.7
Pervious Total	0.7
Impervious Land Use	acre
ROADS MOD	0.24
ROOF TOPS FLAT	0.23
DRIVEWAYS FLAT	0.06
Impervious Total	0.53
Basin Total	1.23

Element Flows To:

Surface	Interflow	Groundwater

Routing Elements

Predeveloped Routing

Mitigated Routing

Vault 1

Width:	75 ft.	
Length:	135 ft.	
Depth:	12 ft.	
Discharge Structure		
Riser Height:	11 ft.	
Riser Diameter:	18 in.	
Orifice 1 Diameter:	1.813 in.	Elevation:0 ft.
Orifice 2 Diameter:	2.1 in.	Elevation:5 ft.
Orifice 3 Diameter:	2 in.	Elevation:7 ft.

Element Flows To:

Outlet 1	Outlet 2

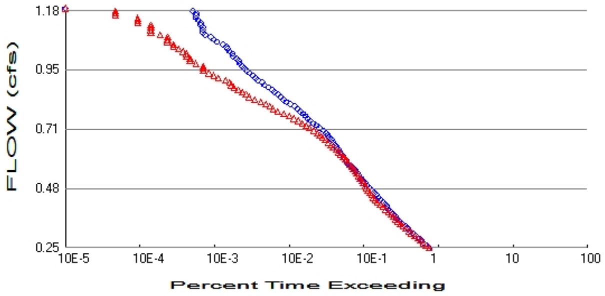
Vault Hydraulic Table

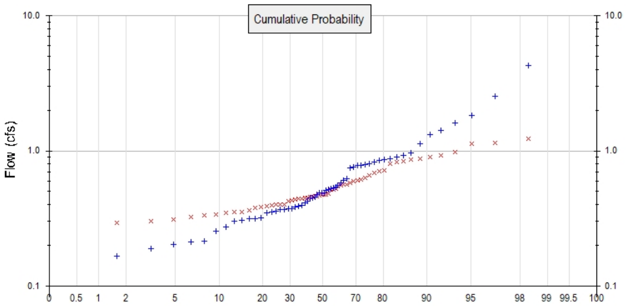
Stage(feet)	**Area(ac.)**	**Volume(ac-ft.)**	**Discharge(cfs)**	**Infilt(cfs)**
0.0000	0.232	0.000	0.000	0.000
0.1333	0.232	0.031	0.032	0.000
0.2667	0.232	0.062	0.046	0.000
0.4000	0.232	0.093	0.056	0.000
0.5333	0.232	0.124	0.065	0.000
0.6667	0.232	0.155	0.072	0.000
0.8000	0.232	0.186	0.079	0.000
0.9333	0.232	0.216	0.086	0.000
1.0667	0.232	0.247	0.092	0.000
1.2000	0.232	0.278	0.097	0.000
1.3333	0.232	0.309	0.103	0.000
1.4667	0.232	0.340	0.108	0.000
1.6000	0.232	0.371	0.112	0.000
1.7333	0.232	0.402	0.117	0.000
1.8667	0.232	0.433	0.121	0.000
2.0000	0.232	0.464	0.126	0.000
2.1333	0.232	0.495	0.130	0.000
2.2667	0.232	0.526	0.134	0.000
2.4000	0.232	0.557	0.138	0.000
2.5333	0.232	0.588	0.142	0.000
2.6667	0.232	0.619	0.145	0.000
2.8000	0.232	0.650	0.149	0.000
2.9333	0.232	0.681	0.152	0.000
3.0667	0.232	0.712	0.156	0.000
3.2000	0.232	0.743	0.159	0.000
3.3333	0.232	0.774	0.162	0.000
3.4667	0.232	0.805	0.166	0.000
3.6000	0.232	0.836	0.169	0.000
3.7333	0.232	0.867	0.172	0.000
3.8667	0.232	0.898	0.175	0.000
4.0000	0.232	0.929	0.178	0.000
4.1333	0.232	0.960	0.181	0.000
4.2667	0.232	0.991	0.184	0.000
4.4000	0.232	1.022	0.187	0.000
4.5333	0.232	1.053	0.189	0.000
4.6667	0.232	1.084	0.192	0.000
4.8000	0.232	1.115	0.195	0.000
4.9333	0.232	1.146	0.198	0.000

5.0667	0.232	1.177	0.231	0.000
5.2000	0.232	1.208	0.256	0.000
5.3333	0.232	1.239	0.275	0.000
5.4667	0.232	1.270	0.290	0.000
5.6000	0.232	1.301	0.303	0.000
5.7333	0.232	1.332	0.316	0.000
5.8667	0.232	1.363	0.327	0.000
6.0000	0.232	1.394	0.338	0.000
6.1333	0.232	1.425	0.348	0.000
6.2667	0.232	1.456	0.358	0.000
6.4000	0.232	1.487	0.367	0.000
6.5333	0.232	1.518	0.376	0.000
6.6667	0.232	1.549	0.384	0.000
6.8000	0.232	1.580	0.393	0.000
6.9333	0.232	1.611	0.401	0.000
7.0667	0.232	1.642	0.437	0.000
7.2000	0.232	1.673	0.465	0.000
7.3333	0.232	1.704	0.487	0.000
7.4667	0.232	1.735	0.505	0.000
7.6000	0.232	1.766	0.522	0.000
7.7333	0.232	1.797	0.538	0.000
7.8667	0.232	1.828	0.553	0.000
8.0000	0.232	1.859	0.568	0.000
8.1333	0.232	1.890	0.581	0.000
8.2667	0.232	1.921	0.594	0.000
8.4000	0.232	1.952	0.607	0.000
8.5333	0.232	1.983	0.619	0.000
8.6667	0.232	2.014	0.631	0.000
8.8000	0.232	2.045	0.643	0.000
8.9333	0.232	2.076	0.654	0.000
9.0667	0.232	2.107	0.666	0.000
9.2000	0.232	2.138	0.676	0.000
9.3333	0.232	2.169	0.687	0.000
9.4667	0.232	2.200	0.697	0.000
9.6000	0.232	2.231	0.708	0.000
9.7333	0.232	2.262	0.718	0.000
9.8667	0.232	2.293	0.728	0.000
10.000	0.232	2.324	0.737	0.000
10.133	0.232	2.355	0.747	0.000
10.267	0.232	2.386	0.756	0.000
10.400	0.232	2.417	0.765	0.000
10.533	0.232	2.448	0.775	0.000
10.667	0.232	2.479	0.784	0.000
10.800	0.232	2.510	0.792	0.000
10.933	0.232	2.541	0.801	0.000
11.067	0.232	2.572	1.084	0.000
11.200	0.232	2.603	2.223	0.000
11.333	0.232	2.634	3.709	0.000
11.467	0.232	2.665	5.161	0.000
11.600	0.232	2.696	6.245	0.000
11.733	0.232	2.727	6.866	0.000
11.867	0.232	2.758	7.457	0.000
12.000	0.232	2.789	7.955	0.000
12.133	0.232	2.820	8.420	0.000
12.267	0.000	0.000	8.859	0.000

Analysis Results

POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1	
Total Pervious Area:	11.75
Total Impervious Area:	0

Mitigated Landuse Totals for POC #1	
Total Pervious Area:	7.5
Total Impervious Area:	4.26

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.501074
5 year	0.900593
10 year	1.255522
25 year	1.825535
50 year	2.351006
100 year	2.974166

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.502925
5 year	0.694609
10 year	0.834089
25 year	1.025053
50 year	1.178296
100 year	1.341197

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1949	0.776	0.614
1950	0.844	0.601
1951	0.963	0.858
1952	0.321	0.323
1953	0.274	0.332
1954	0.395	0.389
1955	0.608	0.396
1956	0.580	0.566
1957	0.512	0.517
1958	0.453	0.379

1959	0.382	0.346
1960	0.800	0.825
1961	0.374	0.565
1962	0.255	0.312
1963	0.371	0.433
1964	0.517	0.402
1965	0.415	0.470
1966	0.304	0.353
1967	0.898	0.595
1968	0.475	0.582
1969	0.448	0.480
1970	0.370	0.441
1971	0.488	0.517
1972	0.760	0.632
1973	0.351	0.399
1974	0.486	0.474
1975	0.622	0.528
1976	0.448	0.427
1977	0.215	0.351
1978	0.358	0.439
1979	0.212	0.477
1980	1.412	0.721
1981	0.308	0.472
1982	0.863	0.929
1983	0.523	0.460
1984	0.316	0.336
1985	0.188	0.442
1986	0.785	0.544
1987	0.745	0.683
1988	0.313	0.300
1989	0.204	0.363
1990	2.518	1.152
1991	1.134	0.801
1992	0.422	0.382
1993	0.366	0.292
1994	0.166	0.271
1995	0.488	0.398
1996	1.322	0.974
1997	0.922	0.874
1998	0.392	0.457
1999	1.600	0.840
2000	0.347	0.454
2001	0.098	0.449
2002	0.532	0.655
2003	0.879	0.556
2004	0.825	0.897
2005	0.554	0.451
2006	0.543	0.462
2007	4.292	1.234
2008	1.825	1.131
2009	0.787	0.704

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	4.2924	1.2338
2	2.5181	1.1520
3	1.8248	1.1307

4	1.6000	0.9743
5	1.4123	0.9293
6	1.3215	0.8974
7	1.1341	0.8742
8	0.9631	0.8577
9	0.9221	0.8403
10	0.8976	0.8245
11	0.8791	0.8009
12	0.8629	0.7211
13	0.8439	0.7039
14	0.8248	0.6834
15	0.8004	0.6554
16	0.7866	0.6321
17	0.7846	0.6141
18	0.7764	0.6010
19	0.7604	0.5952
20	0.7447	0.5821
21	0.6216	0.5658
22	0.6084	0.5649
23	0.5797	0.5561
24	0.5543	0.5436
25	0.5428	0.5277
26	0.5316	0.5170
27	0.5232	0.5169
28	0.5168	0.4800
29	0.5118	0.4765
30	0.4879	0.4738
31	0.4878	0.4718
32	0.4864	0.4697
33	0.4746	0.4621
34	0.4531	0.4604
35	0.4477	0.4573
36	0.4475	0.4536
37	0.4215	0.4507
38	0.4149	0.4492
39	0.3953	0.4421
40	0.3920	0.4409
41	0.3824	0.4390
42	0.3739	0.4327
43	0.3707	0.4267
44	0.3701	0.4021
45	0.3659	0.3994
46	0.3577	0.3984
47	0.3509	0.3959
48	0.3472	0.3886
49	0.3210	0.3817
50	0.3160	0.3790
51	0.3131	0.3632
52	0.3077	0.3532
53	0.3038	0.3508
54	0.2739	0.3461
55	0.2549	0.3359
56	0.2152	0.3324
57	0.2118	0.3234
58	0.2037	0.3123
59	0.1877	0.2997
60	0.1656	0.2917
61	0.0976	0.2708

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.2505	15956	15958	100	Pass
0.2718	14756	14626	99	Pass
0.2930	13569	13306	98	Pass
0.3142	12453	12256	98	Pass
0.3354	11443	11302	98	Pass
0.3566	10468	10207	97	Pass
0.3778	9668	9349	96	Pass
0.3991	8941	8622	96	Pass
0.4203	8224	7839	95	Pass
0.4415	7634	7161	93	Pass
0.4627	7035	6556	93	Pass
0.4839	6536	6102	93	Pass
0.5051	6100	5704	93	Pass
0.5264	5651	5298	93	Pass
0.5476	5304	4939	93	Pass
0.5688	4973	4594	92	Pass
0.5900	4650	4201	90	Pass
0.6112	4378	3850	87	Pass
0.6324	4132	3531	85	Pass
0.6537	3865	3238	83	Pass
0.6749	3623	3018	83	Pass
0.6961	3377	2840	84	Pass
0.7173	3144	2719	86	Pass
0.7385	2947	2571	87	Pass
0.7597	2755	2438	88	Pass
0.7810	2584	2338	90	Pass
0.8022	2404	2231	92	Pass
0.8234	2233	2105	94	Pass
0.8446	2088	2016	96	Pass
0.8658	1973	1907	96	Pass
0.8870	1847	1805	97	Pass
0.9083	1754	1720	98	Pass
0.9295	1659	1637	98	Pass
0.9507	1560	1554	99	Pass
0.9719	1454	1471	101	Pass
0.9931	1325	1367	103	Pass
1.0143	1256	1285	102	Pass
1.0356	1186	1213	102	Pass
1.0568	1133	1139	100	Pass
1.0780	1076	1057	98	Pass
1.0992	1020	983	96	Pass
1.1204	966	910	94	Pass
1.1416	921	836	90	Pass
1.1629	876	767	87	Pass
1.1841	835	708	84	Pass
1.2053	784	657	83	Pass
1.2265	737	599	81	Pass
1.2477	697	551	79	Pass
1.2689	661	505	76	Pass
1.2902	615	455	73	Pass
1.3114	543	399	73	Pass
1.3326	498	360	72	Pass
1.3538	447	320	71	Pass

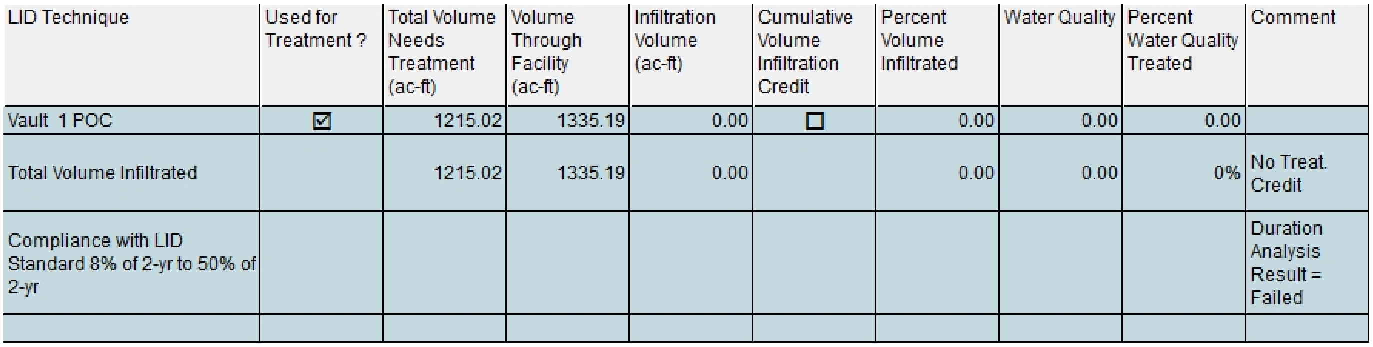
1.3750	409	286	69	Pass
1.3962	378	248	65	Pass
1.4175	349	215	61	Pass
1.4387	326	180	55	Pass
1.4599	297	149	50	Pass
1.4811	274	131	47	Pass
1.5023	250	118	47	Pass
1.5235	221	103	46	Pass
1.5448	196	89	45	Pass
1.5660	179	73	40	Pass
1.5872	164	62	37	Pass
1.6084	149	56	37	Pass
1.6296	137	50	36	Pass
1.6508	126	44	34	Pass
1.6721	112	39	34	Pass
1.6933	99	36	36	Pass
1.7145	93	34	36	Pass
1.7357	81	30	37	Pass
1.7569	75	24	32	Pass
1.7782	69	21	30	Pass
1.7994	64	18	28	Pass
1.8206	57	15	26	Pass
1.8418	54	15	27	Pass
1.8630	50	15	30	Pass
1.8842	47	12	25	Pass
1.9055	45	10	22	Pass
1.9267	42	10	23	Pass
1.9479	38	9	23	Pass
1.9691	37	9	24	Pass
1.9903	34	8	23	Pass
2.0115	32	7	21	Pass
2.0328	31	6	19	Pass
2.0540	28	6	21	Pass
2.0752	23	5	21	Pass
2.0964	21	5	23	Pass
2.1176	19	5	26	Pass
2.1388	16	4	25	Pass
2.1601	15	3	20	Pass
2.1813	15	3	20	Pass
2.2025	15	3	20	Pass
2.2237	14	3	21	Pass
2.2449	14	2	14	Pass
2.2661	13	2	15	Pass
2.2874	12	2	16	Pass
2.3086	12	1	8	Pass
2.3298	12	1	8	Pass
2.3510	11	1	9	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0.4377 acre-feet
On-line facility target flow:	0.2338 cfs.
Adjusted for 15 min:	0.2338 cfs.
Off-line facility target flow:	0.1479 cfs.
Adjusted for 15 min:	0.1479 cfs.

LID Report



LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Vault 1 POC	☑	1215.02	1335.19	0.00	☐	0.00	0.00	0.00	
Total Volume Infiltrated		1215.02	1335.19	0.00		0.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Failed

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

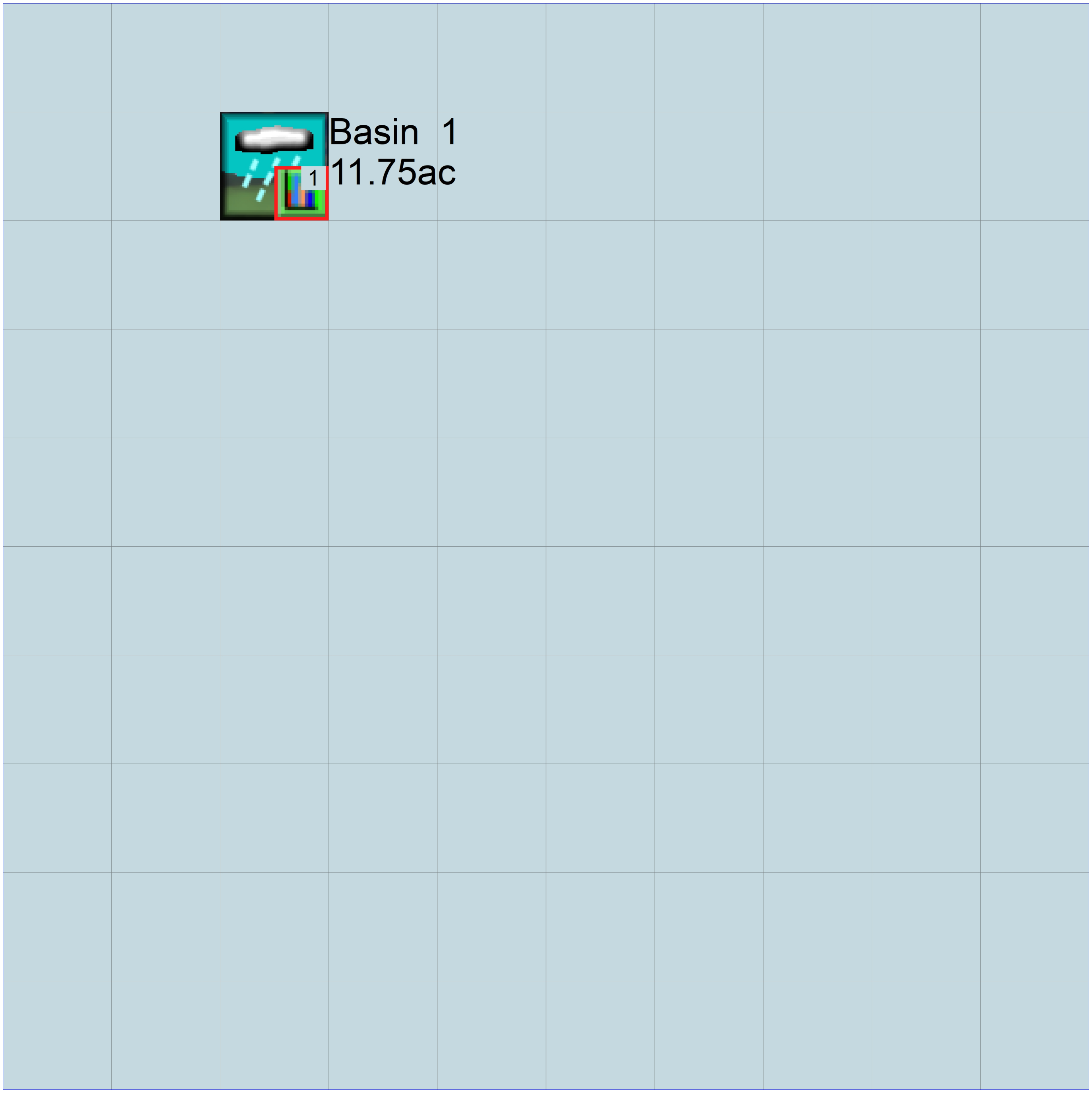
No PERLND changes have been made.

IMPLND Changes

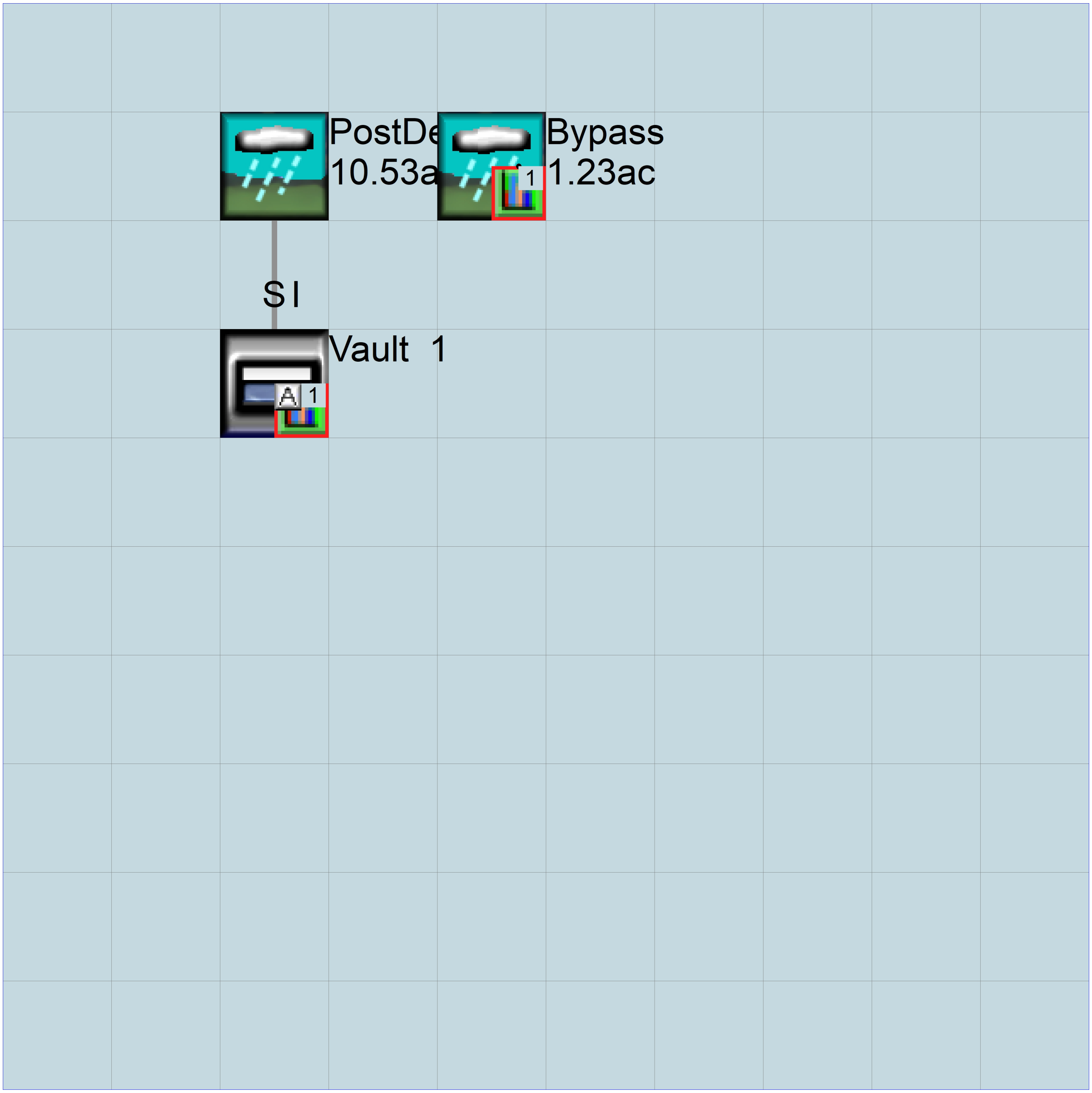
No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM        26   19.12.5.004.wdm
MESSU      25   Pre19.12.5.004.MES
           27   Pre19.12.5.004.L61
           28   Pre19.12.5.004.L62
           30   POC19.12.5.0041.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      11
      PERLND      13
      PERLND      17
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  1                   MAX                     1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
   11     C, Forest, Mod          1    1    1    1   27    0
   13     C, Pasture, Flat        1    1    1    1   27    0
   17     C, Lawn, Mod            1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   11         0    0    1    0    0    0    0    0    0    0    0    0
   13         0    0    1    0    0    0    0    0    0    0    0    0
   17         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY
```

```
  PRINT-INFO
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   11         0    0    4    0    0    0    0    0    0    0    0    0    1    9
   13         0    0    4    0    0    0    0    0    0    0    0    0    1    9
   17         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   11         0    0    0    0    0    0    0    0    0    0    0
   13         0    0    0    0    0    0    0    0    0    0    0
   17         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   11              0       4.5      0.08       400       0.1       0.5     0.996
   13              0       4.5      0.06       400      0.05       0.5     0.996
   17              0       4.5      0.03       400       0.1       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   11              0         0         2         2         0         0         0
   13              0         0         2         2         0         0         0
   17              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                               ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   11            0.2       0.5      0.35         6       0.5       0.7
   13           0.15       0.4       0.3         6       0.5       0.4
   17            0.1      0.25      0.25         6       0.5      0.25
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
              ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   11              0         0         0         0       2.5         1         0
   13              0         0         0         0       2.5         1         0
   17              0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                      in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
```

```
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  11                        9.17     COPY   501     12
PERLND  11                        9.17     COPY   501     13
PERLND  13                        2.53     COPY   501     12
PERLND  13                        2.53     COPY   501     13
PERLND  17                        0.05     COPY   501     12
PERLND  17                        0.05     COPY   501     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                 ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                           in  out                           ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                      ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
  END HYDR-PARM1
```

```
  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                         ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit       for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.167          PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.167          IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM        26   19.12.5.004.wdm
MESSU      25   Mit19.12.5.004.MES
           27   Mit19.12.5.004.L61
           28   Mit19.12.5.004.L62
           30   POC19.12.5.0041.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      13
      PERLND      16
      PERLND      11
      IMPLND       1
      IMPLND       2
      IMPLND       4
      IMPLND       5
      RCHRES       1
      COPY         1
      COPY       501
      COPY       601
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Vault  1                    MAX                     1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1        1    1
  501        1    1
  601        1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
   13     C, Pasture, Flat        1    1    1    1   27    0
   16     C, Lawn, Flat           1    1    1    1   27    0
   11     C, Forest, Mod          1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***
```

```
  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   13         0    0    1    0    0    0    0    0    0    0    0    0
   16         0    0    1    0    0    0    0    0    0    0    0    0
   11         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   13         0    0    4    0    0    0    0    0    0    0    0    0    1    9
   16         0    0    4    0    0    0    0    0    0    0    0    0    1    9
   11         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   13         0    0    0    0    0    0    0    0    0    0    0
   16         0    0    0    0    0    0    0    0    0    0    0
   11         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   13              0       4.5      0.06       400      0.05       0.5     0.996
   16              0       4.5      0.03       400      0.05       0.5     0.996
   11              0       4.5      0.08       400       0.1       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   13              0         0         2         2         0         0         0
   16              0         0         2         2         0         0         0
   11              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                               ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   13           0.15       0.4       0.3         6       0.5       0.4
   16            0.1      0.25      0.25         6       0.5      0.25
   11            0.2       0.5      0.35         6       0.5       0.7
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
              ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   13              0         0         0         0       2.5         1         0
   16              0         0         0         0       2.5         1         0
   11              0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                       in  out           ***
     1      ROADS/FLAT            1    1    1   27    0
     2      ROADS/MOD             1    1    1   27    0
     4      ROOF TOPS/FLAT        1    1    1   27    0
     5      DRIVEWAYS/FLAT        1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***
```

```
  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    1         0    0    1    0    0    0
    2         0    0    1    0    0    0
    4         0    0    1    0    0    0
    5         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         0    0    4    0    0    0    1    9
    2         0    0    4    0    0    0    1    9
    4         0    0    4    0    0    0    1    9
    5         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    1         0    0    0    0    0
    2         0    0    0    0    0
    4         0    0    0    0    0
    5         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    1            400      0.01       0.1       0.1
    2            400      0.05       0.1      0.08
    4            400      0.01       0.1       0.1
    5            400      0.01       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1              0         0
    2              0         0
    4              0         0
    5              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
    2              0         0
    4              0         0
    5              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
PostDev***
PERLND  13                        2.53     RCHRES   1      2
PERLND  13                        2.53     RCHRES   1      3
PERLND  16                        4.02     RCHRES   1      2
PERLND  16                        4.02     RCHRES   1      3
PERLND  11                        0.25     RCHRES   1      2
PERLND  11                        0.25     RCHRES   1      3
IMPLND   1                        0.15     RCHRES   1      5
IMPLND   2                         1.4     RCHRES   1      5
IMPLND   4                        1.74     RCHRES   1      5
IMPLND   5                        0.44     RCHRES   1      5
```

```
Bypass***
PERLND  16                         0.7     COPY   501     12
PERLND  16                         0.7     COPY   601     12
PERLND  16                         0.7     COPY   501     13
PERLND  16                         0.7     COPY   601     13
IMPLND   2                        0.24     COPY   501     15
IMPLND   2                        0.24     COPY   601     15
IMPLND   4                        0.23     COPY   501     15
IMPLND   4                        0.23     COPY   601     15
IMPLND   5                        0.06     COPY   501     15
IMPLND   5                        0.06     COPY   601     15

******Routing******
PERLND  13                        2.53     COPY     1     12
PERLND  16                        4.02     COPY     1     12
PERLND  11                        0.25     COPY     1     12
IMPLND   1                        0.15     COPY     1     15
IMPLND   2                         1.4     COPY     1     15
IMPLND   4                        1.74     COPY     1     15
IMPLND   5                        0.44     COPY     1     15
PERLND  13                        2.53     COPY     1     13
PERLND  16                        4.02     COPY     1     13
PERLND  11                        0.25     COPY     1     13
RCHRES   1                           1     COPY   501     16
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                 ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                           in  out                           ***
    1     Vault  1                1    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************* PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                      ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *        *  *  *  *  *         ***
    1        0  1  0  0    4  0  0  0  0       0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
    1             1      0.03       0.0       0.0       0.5       0.0
```

```
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                         ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1            0         4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   92    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.232438  0.000000  0.000000
  0.133333  0.232438  0.030992  0.032570
  0.266667  0.232438  0.061983  0.046062
  0.400000  0.232438  0.092975  0.056414
  0.533333  0.232438  0.123967  0.065141
  0.666667  0.232438  0.154959  0.072830
  0.800000  0.232438  0.185950  0.079781
  0.933333  0.232438  0.216942  0.086173
  1.066667  0.232438  0.247934  0.092123
  1.200000  0.232438  0.278926  0.097711
  1.333333  0.232438  0.309917  0.102997
  1.466667  0.232438  0.340909  0.108024
  1.600000  0.232438  0.371901  0.112827
  1.733333  0.232438  0.402893  0.117434
  1.866667  0.232438  0.433884  0.121867
  2.000000  0.232438  0.464876  0.126145
  2.133333  0.232438  0.495868  0.130282
  2.266667  0.232438  0.526860  0.134291
  2.400000  0.232438  0.557851  0.138185
  2.533333  0.232438  0.588843  0.141971
  2.666667  0.232438  0.619835  0.145659
  2.800000  0.232438  0.650826  0.149257
  2.933333  0.232438  0.681818  0.152769
  3.066667  0.232438  0.712810  0.156202
  3.200000  0.232438  0.743802  0.159562
  3.333333  0.232438  0.774793  0.162852
  3.466667  0.232438  0.805785  0.166077
  3.600000  0.232438  0.836777  0.169241
  3.733333  0.232438  0.867769  0.172347
  3.866667  0.232438  0.898760  0.175397
  4.000000  0.232438  0.929752  0.178396
  4.133333  0.232438  0.960744  0.181345
  4.266667  0.232438  0.991736  0.184246
  4.400000  0.232438  1.022727  0.187103
  4.533333  0.232438  1.053719  0.189917
  4.666667  0.232438  1.084711  0.192689
  4.800000  0.232438  1.115702  0.195423
  4.933333  0.232438  1.146694  0.198118
  5.066667  0.232438  1.177686  0.231677
  5.200000  0.232438  1.208678  0.256922
  5.333333  0.232438  1.239669  0.275087
  5.466667  0.232438  1.270661  0.290305
  5.600000  0.232438  1.301653  0.303779
  5.733333  0.232438  1.332645  0.316061
  5.866667  0.232438  1.363636  0.327458
  6.000000  0.232438  1.394628  0.338163
  6.133333  0.232438  1.425620  0.348305
  6.266667  0.232438  1.456612  0.357980
  6.400000  0.232438  1.487603  0.367254
  6.533333  0.232438  1.518595  0.376182
  6.666667  0.232438  1.549587  0.384805
  6.800000  0.232438  1.580579  0.393158
  6.933333  0.232438  1.611570  0.401268
```

```
    7.066667  0.232438  1.642562  0.437184
    7.200000  0.232438  1.673554  0.465391
    7.333333  0.232438  1.704545  0.487023
    7.466667  0.232438  1.735537  0.505841
    7.600000  0.232438  1.766529  0.522949
    7.733333  0.232438  1.797521  0.538857
    7.866667  0.232438  1.828512  0.553852
    8.000000  0.232438  1.859504  0.568117
    8.133333  0.232438  1.890496  0.581777
    8.266667  0.232438  1.921488  0.594922
    8.400000  0.232438  1.952479  0.607621
    8.533333  0.232438  1.983471  0.619927
    8.666667  0.232438  2.014463  0.631882
    8.800000  0.232438  2.045455  0.643521
    8.933333  0.232438  2.076446  0.654873
    9.066667  0.232438  2.107438  0.665962
    9.200000  0.232438  2.138430  0.676809
    9.333333  0.232438  2.169421  0.687432
    9.466667  0.232438  2.200413  0.697847
    9.600000  0.232438  2.231405  0.708067
    9.733333  0.232438  2.262397  0.718105
    9.866667  0.232438  2.293388  0.727971
    10.00000  0.232438  2.324380  0.737675
    10.13333  0.232438  2.355372  0.747227
    10.26667  0.232438  2.386364  0.756633
    10.40000  0.232438  2.417355  0.765901
    10.53333  0.232438  2.448347  0.775038
    10.66667  0.232438  2.479339  0.784050
    10.80000  0.232438  2.510331  0.792943
    10.93333  0.232438  2.541322  0.801721
    11.06667  0.232438  2.572314  1.084085
    11.20000  0.232438  2.603306  2.223417
    11.33333  0.232438  2.634298  3.709934
    11.46667  0.232438  2.665289  5.161806
    11.60000  0.232438  2.696281  6.245272
    11.73333  0.232438  2.727273  6.866221
    11.86667  0.232438  2.758264  7.457654
    12.00000  0.232438  2.789256  7.955003
    12.13333  0.232438  2.820248  8.420597
  END FTABLE  1
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.167          PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.167          IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
COPY   601 OUTPUT MEAN   1 1     48.4      WDM    901 FLOW     ENGL      REPL
RCHRES   1 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL      REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1001 STAG     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        2
PERLND     PWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    2

  MASS-LINK        3
```

```
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13

  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15

  MASS-LINK       16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK   16

END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

Disclaimer

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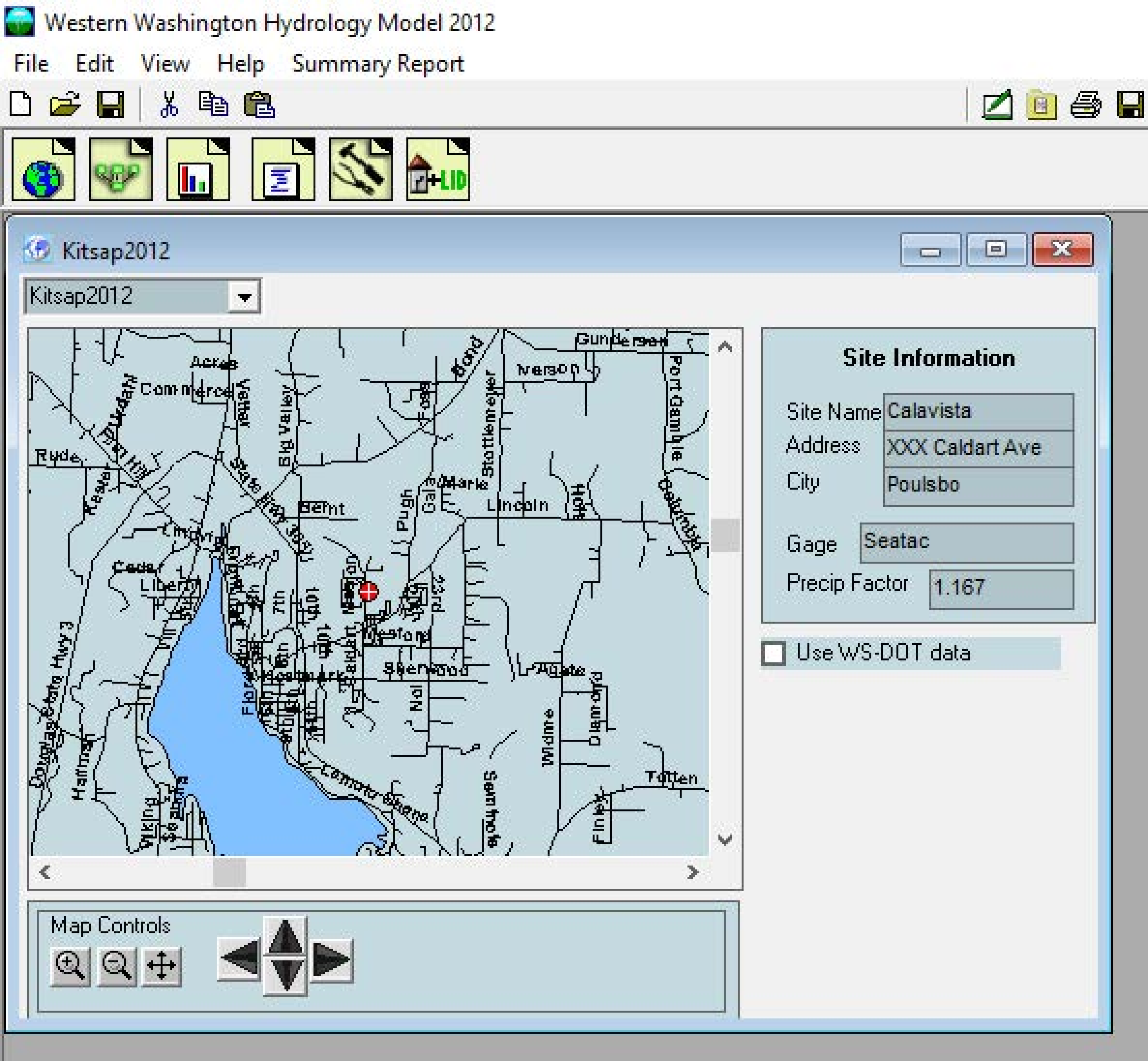
Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com



Site Information

Site Name: Calavista

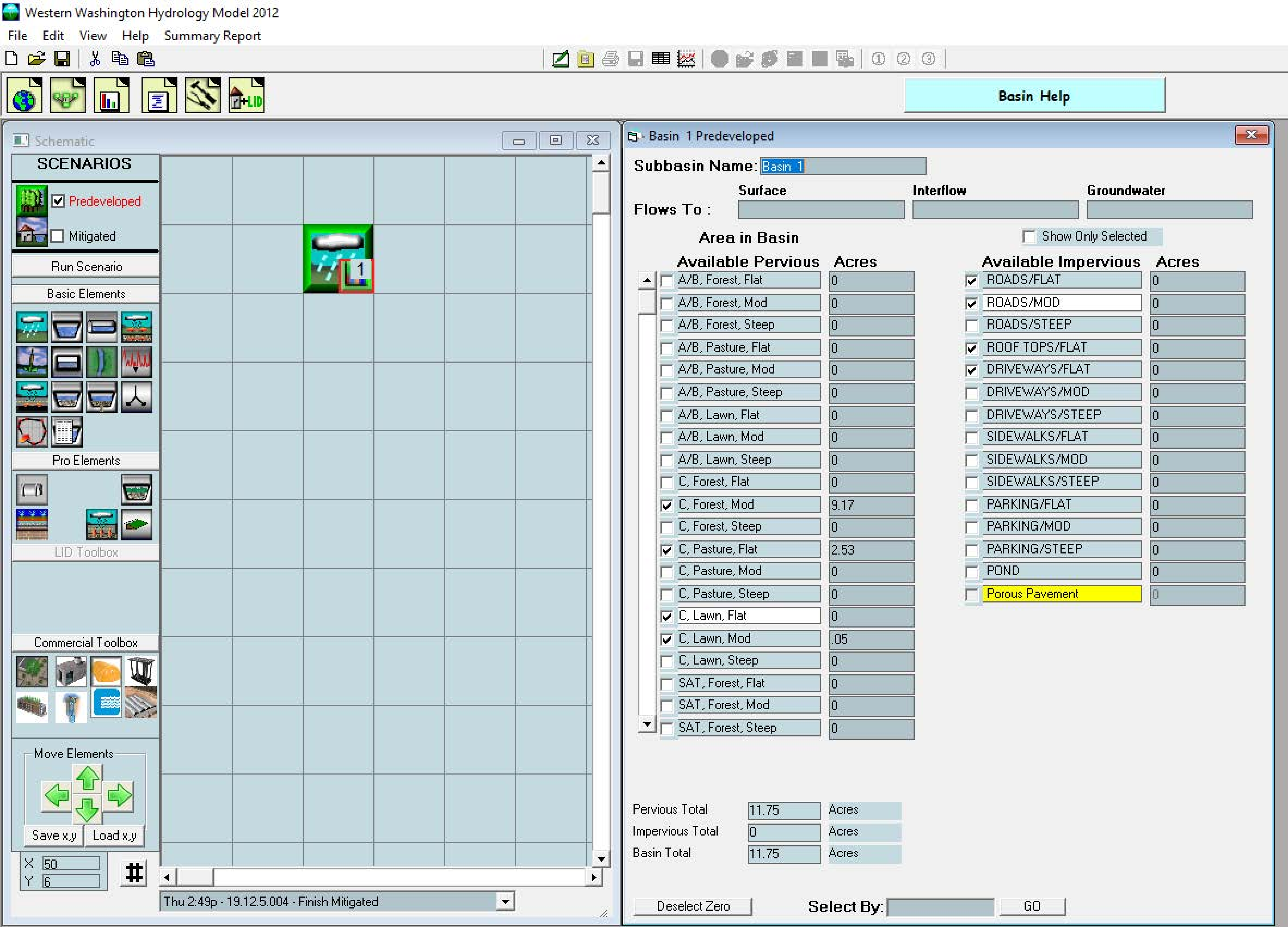
Address: XXX Caldart Ave

City: Poulsbo

Gage: Seatac

Precip Factor: 1.167

☐ Use WS-DOT data



☑ Predeveloped

☐ Mitigated

X 50

Y 6

Thu 2:49p - 19.12.5.004 - Finish Mitigated

Basin 1 Predeveloped

Subbasin Name: Basin 1

	Surface	Interflow	Groundwater
Flows To :			

Area in Basin

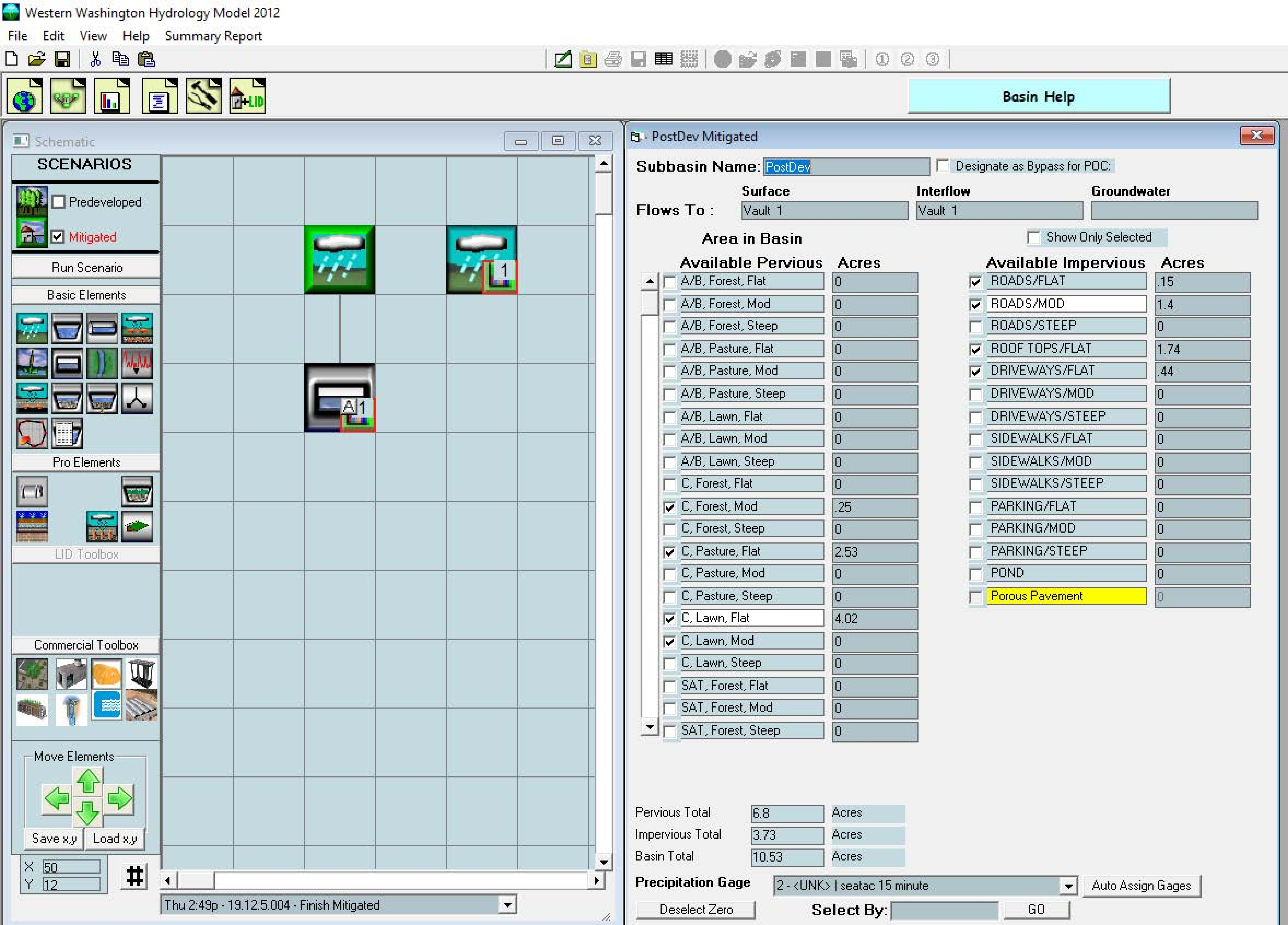
☐ Show Only Selected

	Available Pervious	Acres
☐	A/B, Forest, Flat	0
☐	A/B, Forest, Mod	0
☐	A/B, Forest, Steep	0
☐	A/B, Pasture, Flat	0
☐	A/B, Pasture, Mod	0
☐	A/B, Pasture, Steep	0
☐	A/B, Lawn, Flat	0
☐	A/B, Lawn, Mod	0
☐	A/B, Lawn, Steep	0
☐	C, Forest, Flat	0
☑	C, Forest, Mod	9.17
☐	C, Forest, Steep	0
☑	C, Pasture, Flat	2.53
☐	C, Pasture, Mod	0
☐	C, Pasture, Steep	0
☑	C, Lawn, Flat	0
☑	C, Lawn, Mod	.05
☐	C, Lawn, Steep	0
☐	SAT, Forest, Flat	0
☐	SAT, Forest, Mod	0
☐	SAT, Forest, Steep	0

	Available Impervious	Acres
☑	ROADS/FLAT	0
☑	ROADS/MOD	0
☐	ROADS/STEEP	0
☑	ROOF TOPS/FLAT	0
☑	DRIVEWAYS/FLAT	0
☐	DRIVEWAYS/MOD	0
☐	DRIVEWAYS/STEEP	0
☐	SIDEWALKS/FLAT	0
☐	SIDEWALKS/MOD	0
☐	SIDEWALKS/STEEP	0
☐	PARKING/FLAT	0
☐	PARKING/MOD	0
☐	PARKING/STEEP	0
☐	POND	0
☐	Porous Pavement	0

Pervious Total	11.75	Acres
Impervious Total	0	Acres
Basin Total	11.75	Acres

Select By:



☐ Predeveloped

☑ Mitigated

X 50

Y 12

Thu 2:49p - 19.12.5.004 - Finish Mitigated

PostDev Mitigated

Subbasin Name: PostDev ☐ Designate as Bypass for POC:

	Surface	Interflow	Groundwater
Flows To :	Vault 1	Vault 1	

Area in Basin ☐ Show Only Selected

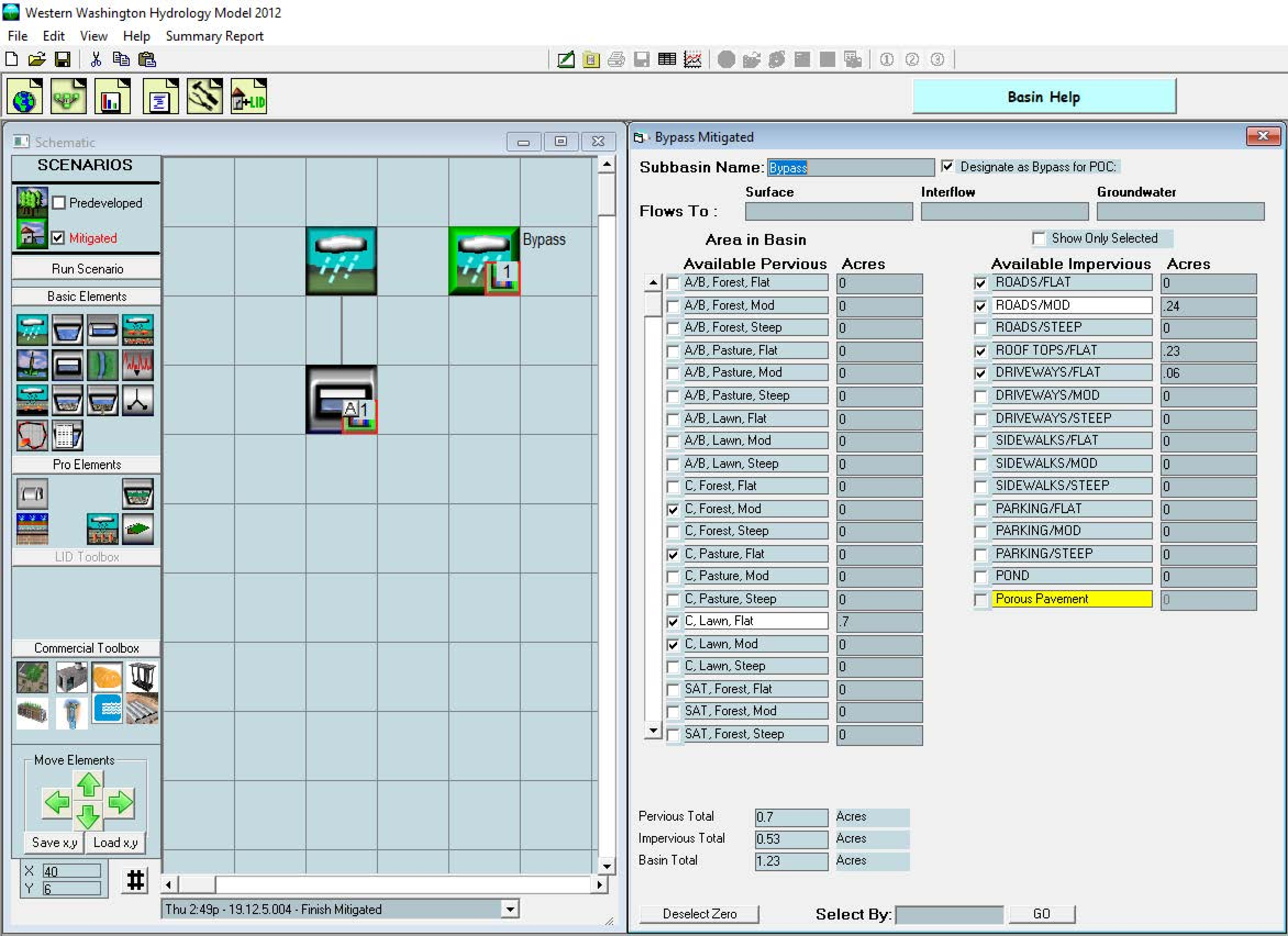
	Available Pervious	Acres
☐	A/B, Forest, Flat	0
☐	A/B, Forest, Mod	0
☐	A/B, Forest, Steep	0
☐	A/B, Pasture, Flat	0
☐	A/B, Pasture, Mod	0
☐	A/B, Pasture, Steep	0
☐	A/B, Lawn, Flat	0
☐	A/B, Lawn, Mod	0
☐	A/B, Lawn, Steep	0
☐	C, Forest, Flat	0
☑	C, Forest, Mod	.25
☐	C, Forest, Steep	0
☑	C, Pasture, Flat	2.53
☐	C, Pasture, Mod	0
☐	C, Pasture, Steep	0
☑	C, Lawn, Flat	4.02
☑	C, Lawn, Mod	0
☐	C, Lawn, Steep	0
☐	SAT, Forest, Flat	0
☐	SAT, Forest, Mod	0
☐	SAT, Forest, Steep	0

	Available Impervious	Acres
☑	ROADS/FLAT	.15
☑	ROADS/MOD	1.4
☐	ROADS/STEEP	0
☑	ROOF TOPS/FLAT	1.74
☑	DRIVEWAYS/FLAT	.44
☐	DRIVEWAYS/MOD	0
☐	DRIVEWAYS/STEEP	0
☐	SIDEWALKS/FLAT	0
☐	SIDEWALKS/MOD	0
☐	SIDEWALKS/STEEP	0
☐	PARKING/FLAT	0
☐	PARKING/MOD	0
☐	PARKING/STEEP	0
☐	POND	0
☐	Porous Pavement	0

Pervious Total	6.8	Acres
Impervious Total	3.73	Acres
Basin Total	10.53	Acres

Precipitation Gage 2 - <UNK> | seatac 15 minute

Select By:



X 40
Y 6

Thu 2:49p - 19.12.5.004 - Finish Mitigated

Bypass Mitigated

Subbasin Name: Bypass ☑ Designate as Bypass for POC:

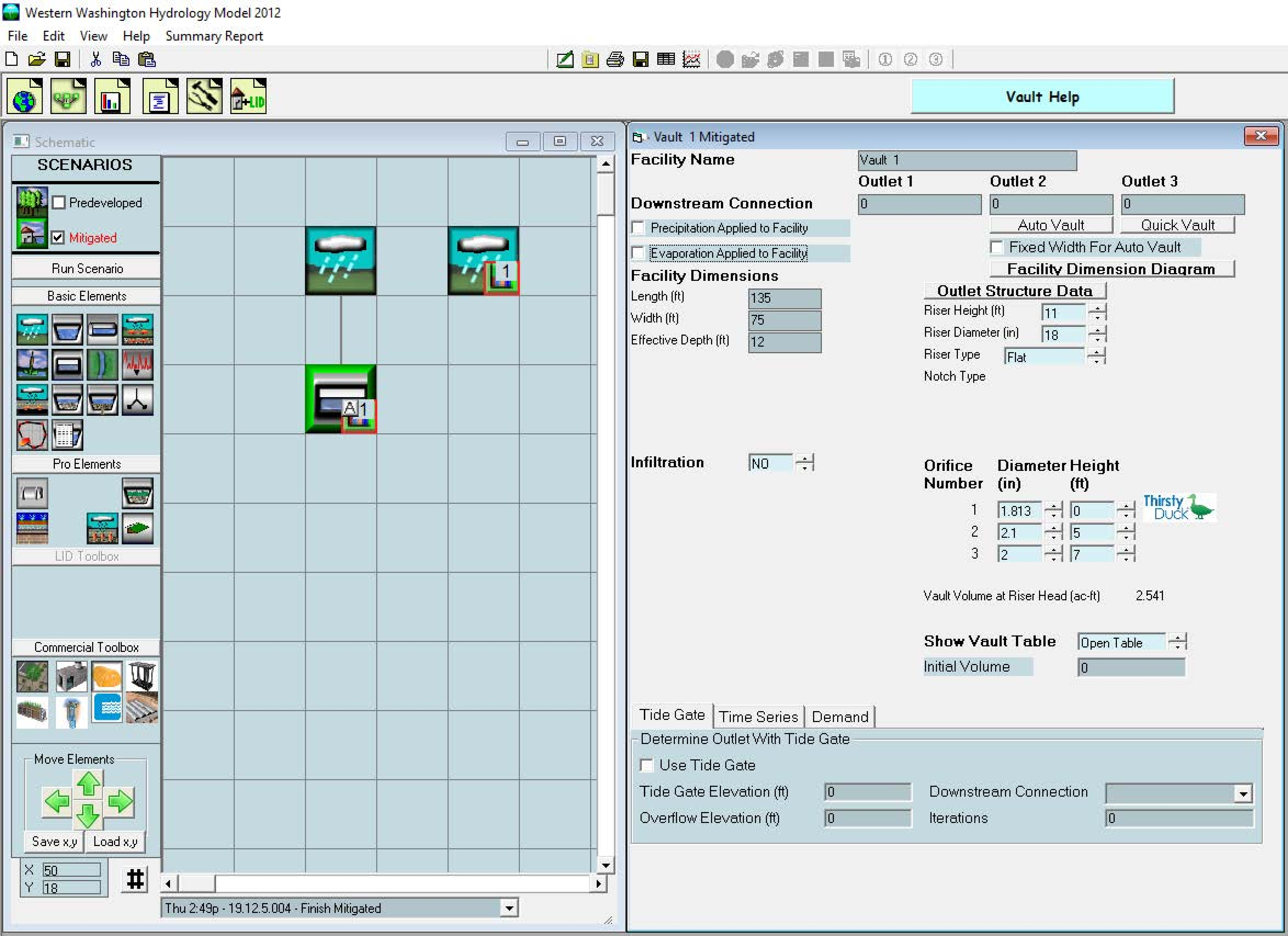
Flows To : Surface: , Interflow: , Groundwater:

Area in Basin ☐ Show Only Selected

Available Pervious	Acres	Available Impervious	Acres
☐ A/B, Forest, Flat	0	☑ ROADS/FLAT	0
☐ A/B, Forest, Mod	0	☑ ROADS/MOD	.24
☐ A/B, Forest, Steep	0	☐ ROADS/STEEP	0
☐ A/B, Pasture, Flat	0	☑ ROOF TOPS/FLAT	.23
☐ A/B, Pasture, Mod	0	☑ DRIVEWAYS/FLAT	.06
☐ A/B, Pasture, Steep	0	☐ DRIVEWAYS/MOD	0
☐ A/B, Lawn, Flat	0	☐ DRIVEWAYS/STEEP	0
☐ A/B, Lawn, Mod	0	☐ SIDEWALKS/FLAT	0
☐ A/B, Lawn, Steep	0	☐ SIDEWALKS/MOD	0
☐ C, Forest, Flat	0	☐ SIDEWALKS/STEEP	0
☑ C, Forest, Mod	0	☐ PARKING/FLAT	0
☐ C, Forest, Steep	0	☐ PARKING/MOD	0
☑ C, Pasture, Flat	0	☐ PARKING/STEEP	0
☐ C, Pasture, Mod	0	☐ POND	0
☐ C, Pasture, Steep	0	☐ Porous Pavement	0
☑ C, Lawn, Flat	.7		
☑ C, Lawn, Mod	0		
☐ C, Lawn, Steep	0		
☐ SAT, Forest, Flat	0		
☐ SAT, Forest, Mod	0		
☐ SAT, Forest, Steep	0		

Pervious Total	0.7	Acres
Impervious Total	0.53	Acres
Basin Total	1.23	Acres

Select By:



☐ Predeveloped

☑ Mitigated

X 50

Y 18

Thu 2:49p - 19.12.5.004 - Finish Mitigated

Vault 1 Mitigated

Facility Name	Vault 1		
	Outlet 1	Outlet 2	Outlet 3
Downstream Connection	0	0	0

☐ Precipitation Applied to Facility

☐ Evaporation Applied to Facility

☐ Fixed Width For Auto Vault

Facility Dimensions

Length (ft) 135

Width (ft) 75

Effective Depth (ft) 12

Outlet Structure Data

Riser Height (ft) 11

Riser Diameter (in) 18

Riser Type Flat

Notch Type

Infiltration NO

Orifice Number	Diameter (in)	Height (ft)
1	1.813	0
2	2.1	5
3	2	7

Vault Volume at Riser Head (ac-ft) 2.541

Show Vault Table Open Table

Initial Volume 0

Determine Outlet With Tide Gate

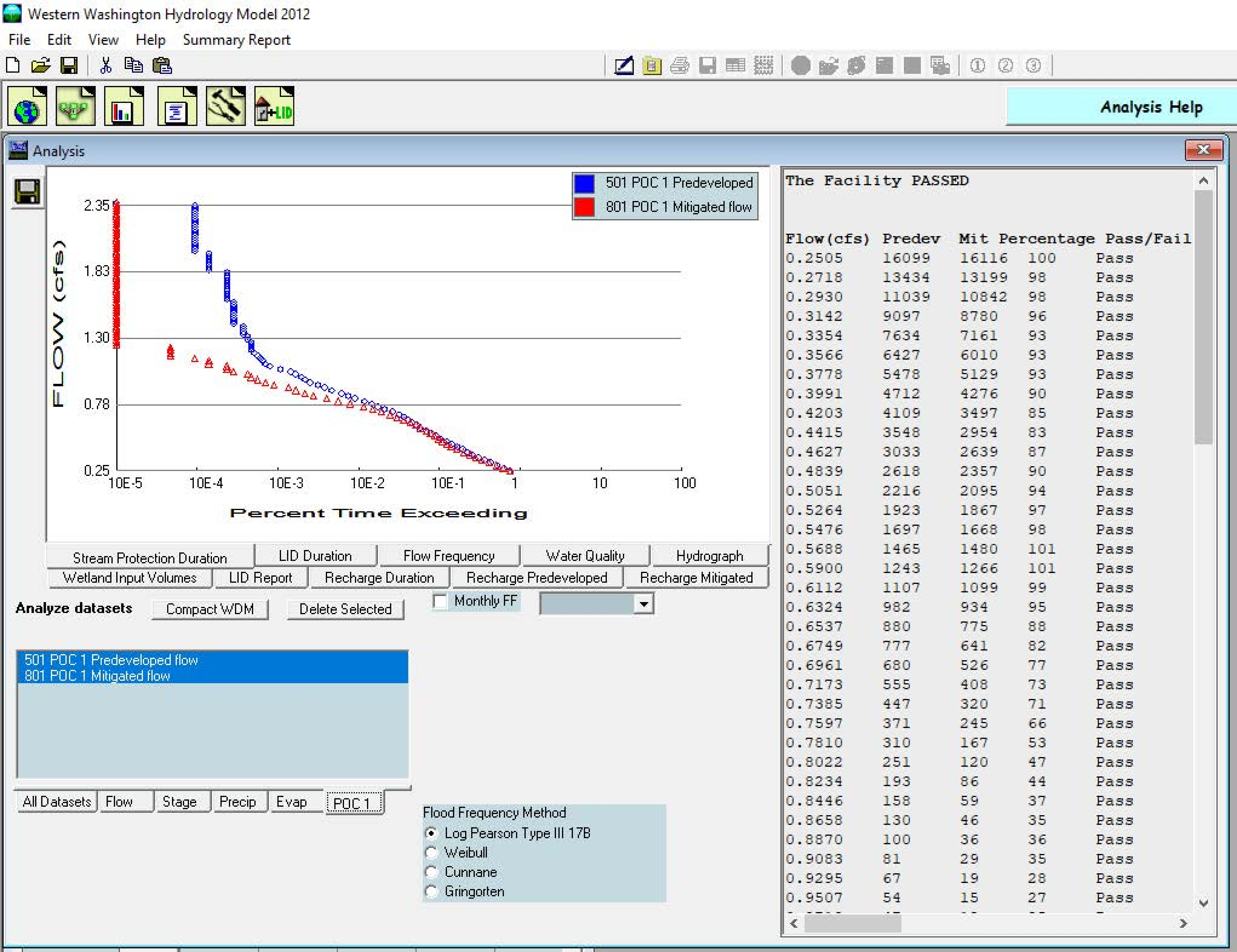
☐ Use Tide Gate

Tide Gate Elevation (ft) 0

Downstream Connection

Overflow Elevation (ft) 0

Iterations 0



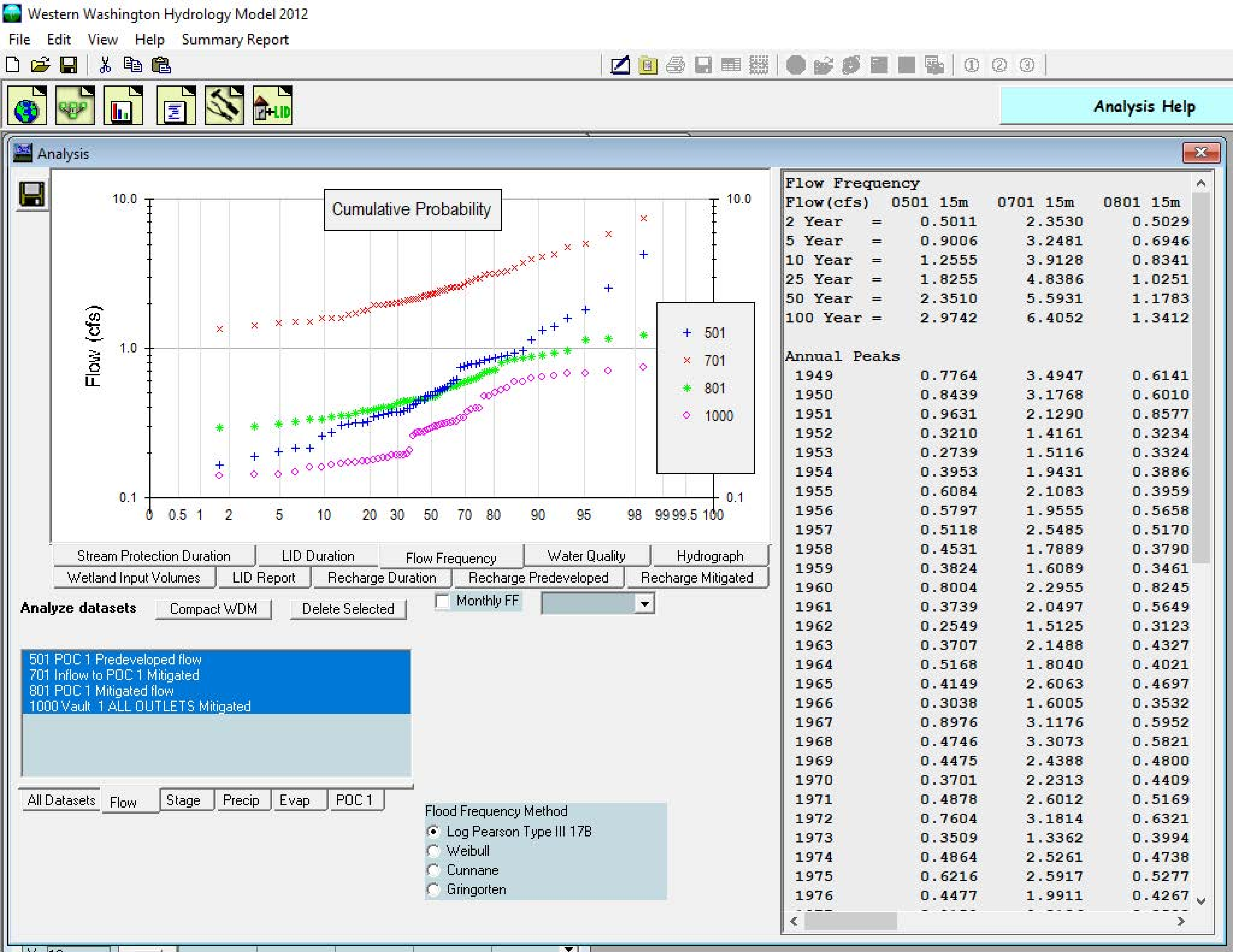
☐ Monthly FF

501 POC 1 Predeveloped flow
801 POC 1 Mitigated flow

Flood Frequency Method
● Log Pearson Type III 17B
○ Weibull
○ Cunnane
○ Gringorten

```
The Facility PASSED

Flow(cfs)  Predev  Mit Percentage Pass/Fail
0.2505     16099   16116  100      Pass
0.2718     13434   13199  98       Pass
0.2930     11039   10842  98       Pass
0.3142     9097    8780   96       Pass
0.3354     7634    7161   93       Pass
0.3566     6427    6010   93       Pass
0.3778     5478    5129   93       Pass
0.3991     4712    4276   90       Pass
0.4203     4109    3497   85       Pass
0.4415     3548    2954   83       Pass
0.4627     3033    2639   87       Pass
0.4839     2618    2357   90       Pass
0.5051     2216    2095   94       Pass
0.5264     1923    1867   97       Pass
0.5476     1697    1668   98       Pass
0.5688     1465    1480   101      Pass
0.5900     1243    1266   101      Pass
0.6112     1107    1099   99       Pass
0.6324     982     934    95       Pass
0.6537     880     775    88       Pass
0.6749     777     641    82       Pass
0.6961     680     526    77       Pass
0.7173     555     408    73       Pass
0.7385     447     320    71       Pass
0.7597     371     245    66       Pass
0.7810     310     167    53       Pass
0.8022     251     120    47       Pass
0.8234     193     86     44       Pass
0.8446     158     59     37       Pass
0.8658     130     46     35       Pass
0.8870     100     36     36       Pass
0.9083     81      29     35       Pass
0.9295     67      19     28       Pass
0.9507     54      15     27       Pass
```

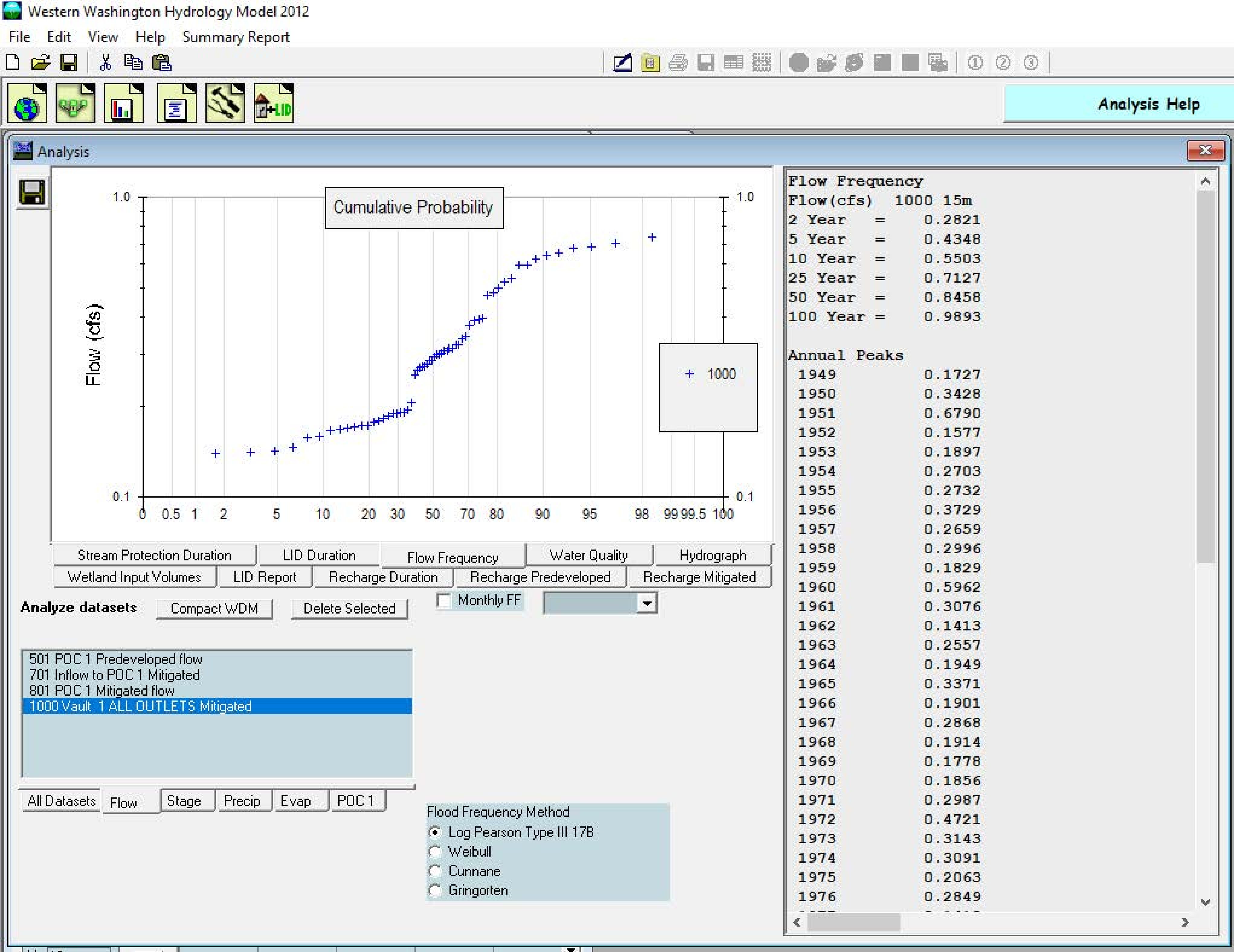


501 POC 1 Predeveloped flow
701 Inflow to POC 1 Mitigated
801 POC 1 Mitigated flow
1000 Vault 1 ALL OUTLETS Mitigated

Flood Frequency Method
● Log Pearson Type III 17B
○ Weibull
○ Cunnane
○ Gringorten

```
Flow Frequency
Flow(cfs)   0501 15m   0701 15m   0801 15m
2 Year   =    0.5011     2.3530     0.5029
5 Year   =    0.9006     3.2481     0.6946
10 Year  =    1.2555     3.9128     0.8341
25 Year  =    1.8255     4.8386     1.0251
50 Year  =    2.3510     5.5931     1.1783
100 Year =    2.9742     6.4052     1.3412

Annual Peaks
 1949         0.7764     3.4947     0.6141
 1950         0.8439     3.1768     0.6010
 1951         0.9631     2.1290     0.8577
 1952         0.3210     1.4161     0.3234
 1953         0.2739     1.5116     0.3324
 1954         0.3953     1.9431     0.3886
 1955         0.6084     2.1083     0.3959
 1956         0.5797     1.9555     0.5658
 1957         0.5118     2.5485     0.5170
 1958         0.4531     1.7889     0.3790
 1959         0.3824     1.6089     0.3461
 1960         0.8004     2.2955     0.8245
 1961         0.3739     2.0497     0.5649
 1962         0.2549     1.5125     0.3123
 1963         0.3707     2.1488     0.4327
 1964         0.5168     1.8040     0.4021
 1965         0.4149     2.6063     0.4697
 1966         0.3038     1.6005     0.3532
 1967         0.8976     3.1176     0.5952
 1968         0.4746     3.3073     0.5821
 1969         0.4475     2.4388     0.4800
 1970         0.3701     2.2313     0.4409
 1971         0.4878     2.6012     0.5169
 1972         0.7604     3.1814     0.6321
 1973         0.3509     1.3362     0.3994
 1974         0.4864     2.5261     0.4738
 1975         0.6216     2.5917     0.5277
 1976         0.4477     1.9911     0.4267
```



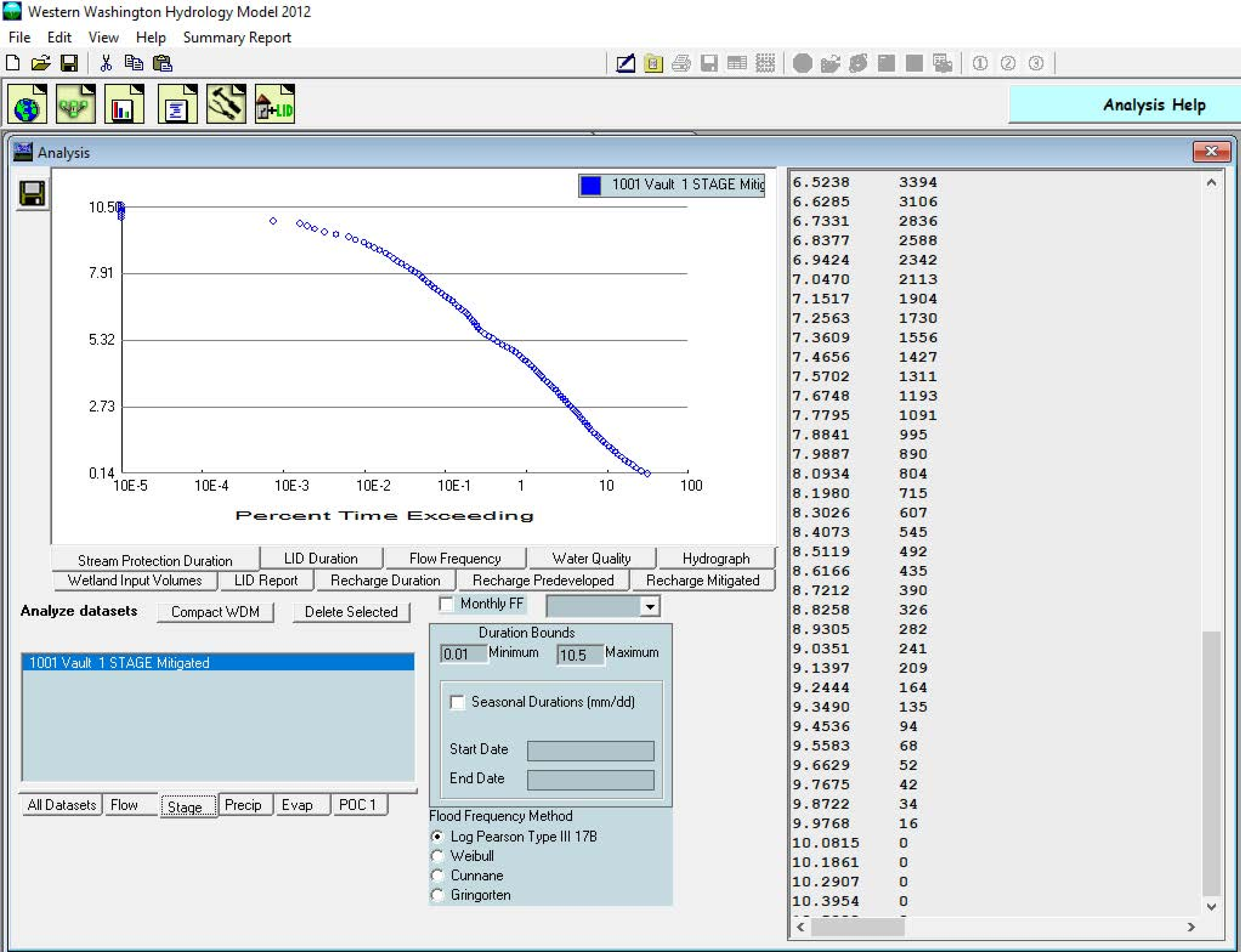
☐ Monthly FF

501 POC 1 Predeveloped flow
701 Inflow to POC 1 Mitigated
801 POC 1 Mitigated flow
1000 Vault 1 ALL OUTLETS Mitigated

Flood Frequency Method
● Log Pearson Type III 17B
○ Weibull
○ Cunnane
○ Gringorten

```
Flow Frequency
Flow(cfs)   1000 15m
2 Year   =      0.2821
5 Year   =      0.4348
10 Year  =      0.5503
25 Year  =      0.7127
50 Year  =      0.8458
100 Year =      0.9893

Annual Peaks
 1949           0.1727
 1950           0.3428
 1951           0.6790
 1952           0.1577
 1953           0.1897
 1954           0.2703
 1955           0.2732
 1956           0.3729
 1957           0.2659
 1958           0.2996
 1959           0.1829
 1960           0.5962
 1961           0.3076
 1962           0.1413
 1963           0.2557
 1964           0.1949
 1965           0.3371
 1966           0.1901
 1967           0.2868
 1968           0.1914
 1969           0.1778
 1970           0.1856
 1971           0.2987
 1972           0.4721
 1973           0.3143
 1974           0.3091
 1975           0.2063
 1976           0.2849
```



1001 Vault 1 STAGE Mitigated

☐ Monthly FF

Duration Bounds

0.01 Minimum

10.5 Maximum

☐ Seasonal Durations (mm/dd)

Start Date

End Date

Flood Frequency Method

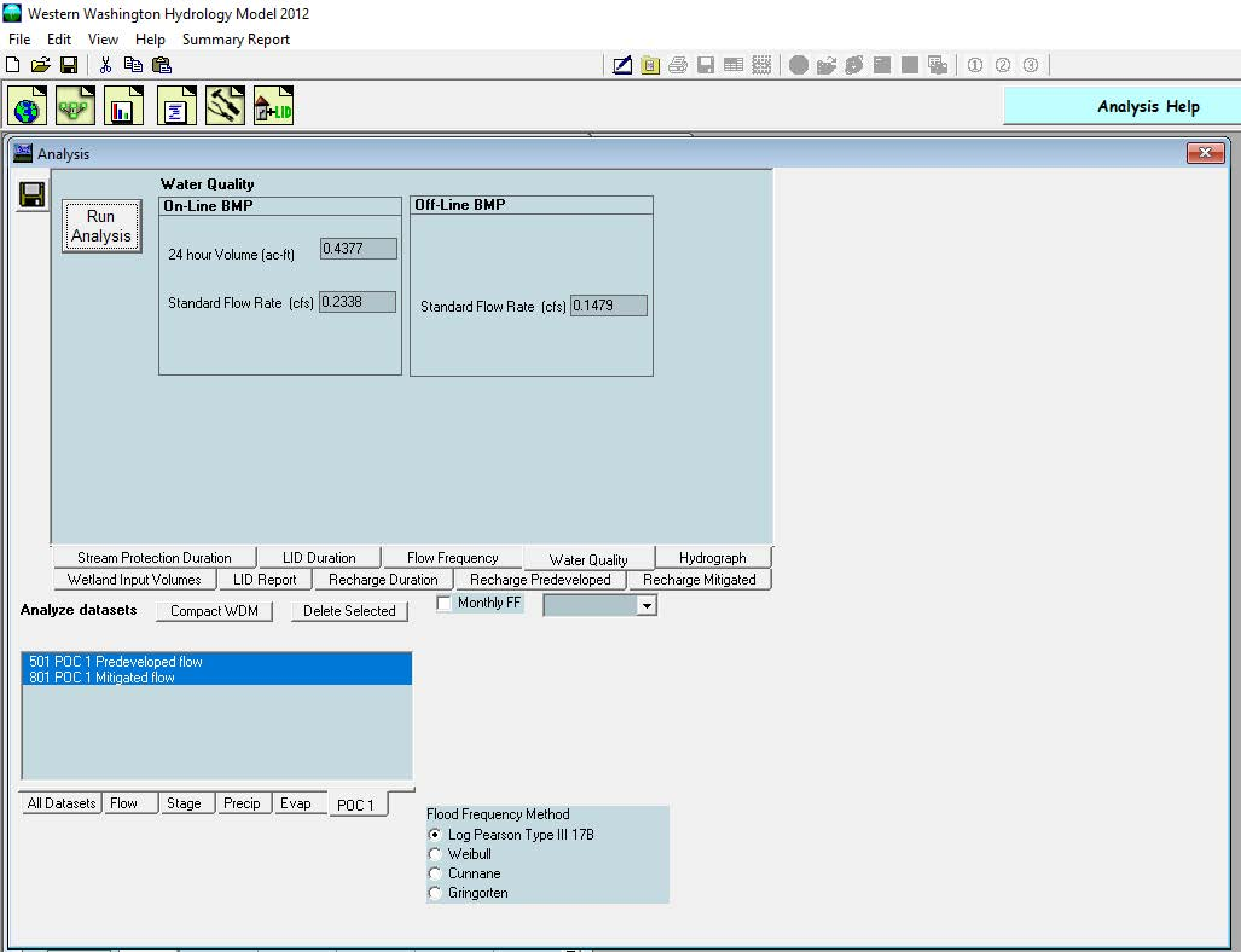
● Log Pearson Type III 17B

○ Weibull

○ Cunnane

○ Gringorten

```
6.5238      3394
6.6285      3106
6.7331      2836
6.8377      2588
6.9424      2342
7.0470      2113
7.1517      1904
7.2563      1730
7.3609      1556
7.4656      1427
7.5702      1311
7.6748      1193
7.7795      1091
7.8841      995
7.9887      890
8.0934      804
8.1980      715
8.3026      607
8.4073      545
8.5119      492
8.6166      435
8.7212      390
8.8258      326
8.9305      282
9.0351      241
9.1397      209
9.2444      164
9.3490      135
9.4536      94
9.5583      68
9.6629      52
9.7675      42
9.8722      34
9.9768      16
10.0815     0
10.1861     0
10.2907     0
10.3954     0
```



Water Quality

On-Line BMP

24 hour Volume (ac-ft) 0.4377

Standard Flow Rate (cfs) 0.2338

Off-Line BMP

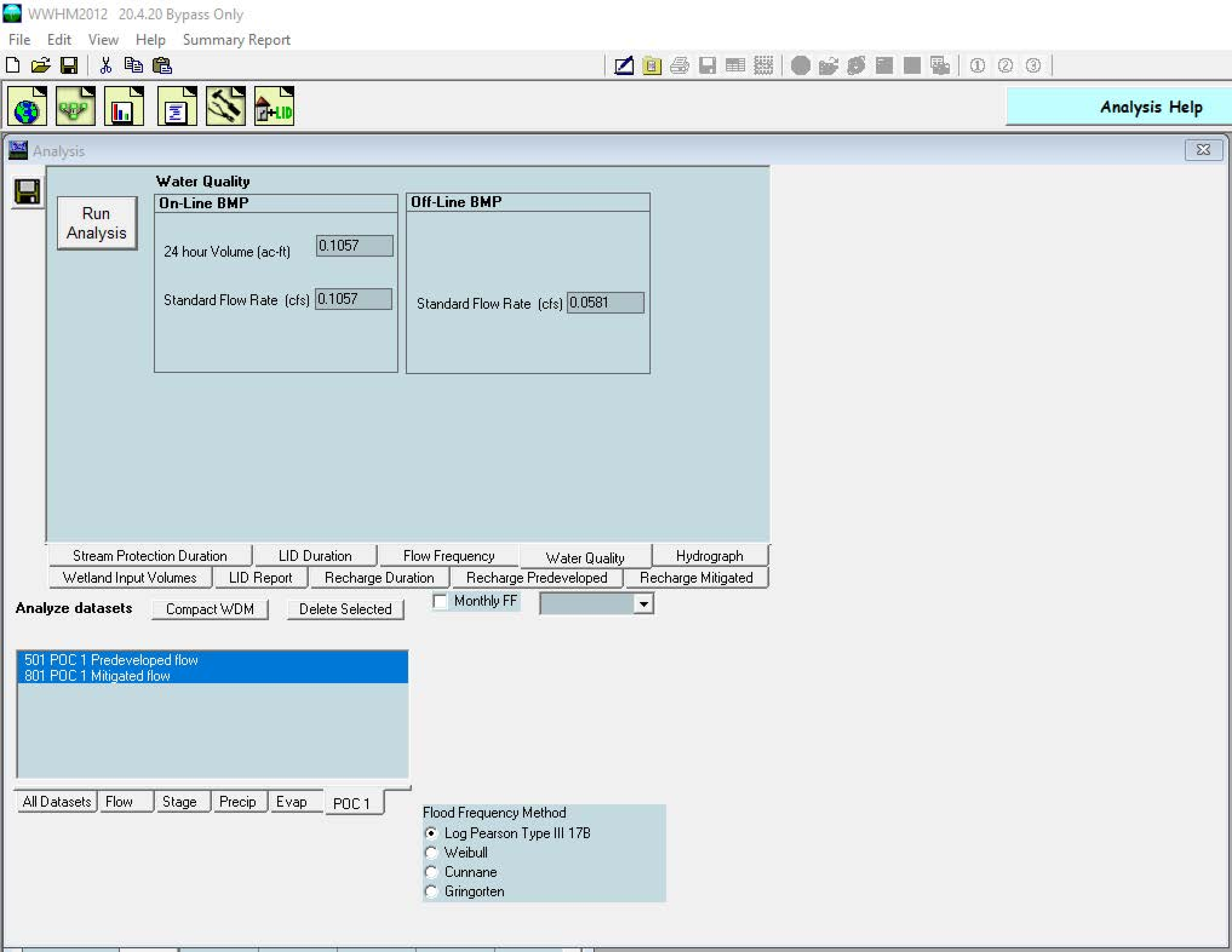
Standard Flow Rate (cfs) 0.1479

Analyze datasets

☐ Monthly FF

501 POC 1 Predeveloped flow
801 POC 1 Mitigated flow

Flood Frequency Method
● Log Pearson Type III 17B
○ Weibull
○ Cunnane
○ Gringorten



Water Quality

On-Line BMP

24 hour Volume (ac-ft) 0.1057

Standard Flow Rate (cfs) 0.1057

Off-Line BMP

Standard Flow Rate (cfs) 0.0581

Analyze datasets

☐ Monthly FF

501 POC 1 Predeveloped flow
801 POC 1 Mitigated flow

Flood Frequency Method
● Log Pearson Type III 17B
○ Weibull
○ Cunnane
○ Gringorten

APPENDIX C - CONVEYANCE WORKSHEET

Job # 1222

Calavista PRD

11-Apr-19

WWHM2012
19.4.11.1222

701 Inflow to POC 1 Mitigated
(See Appendix C - WWHM 2012 Report)

Flows	(cfs)
2 Year	2.35
5 Year	3.25
10 Year	3.91
25 Year	4.84
50 Year	5.59
100 Year	**6.41**

Mannings Flow Calculator

(Q = 1.486/n * A * R^.6667 * s^.5)

Mannings n	0.012			
Pipe Diam (Ft)	1.00	0.7854		
Hyd Rad	☒	0.2500	Q (cfs) =	**2.73**
Slope (Ft/Ft)	0.005		V (fps)	**3.47**

Mannings Flow Calculator

(Q = 1.486/n * A * R^.6667 * s^.5)

Mannings n	0.012			
Pipe Diam (Ft)	1.00	0.7854		
Hyd Rad	☒	0.2500	Q (cfs) =	**3.86**
Slope (Ft/Ft)	0.01		V (fps)	**4.91**

Mannings Flow Calculator

(Q = 1.486/n * A * R^.6667 * s^.5)

Mannings n	0.012			
Pipe Diam (Ft)	1.00	0.7854		
Hyd Rad	☒	0.2500	Q (cfs) =	**5.46**
Slope (Ft/Ft)	0.02		V (fps)	**6.95**

Mannings Flow Calculator

(Q = 1.486/n * A * R^.6667 * s^.5)

Mannings n	0.012			
Pipe Diam (Ft)	1.00	0.7854		
Hyd Rad	☒	0.2500	Q (cfs) =	**6.68**
Slope (Ft/Ft)	0.03		V (fps)	**8.51**

Mannings Flow Calculator

(Q = 1.486/n * A * R^.6667 * s^.5)

Mannings n	0.012			
Pipe Diam (Ft)	1.25	1.2272		
Hyd Rad	☒	0.3125	Q (cfs) =	**7.00**
Slope (Ft/Ft)	0.01		V (fps)	**5.70**

Mannings Flow Calculator

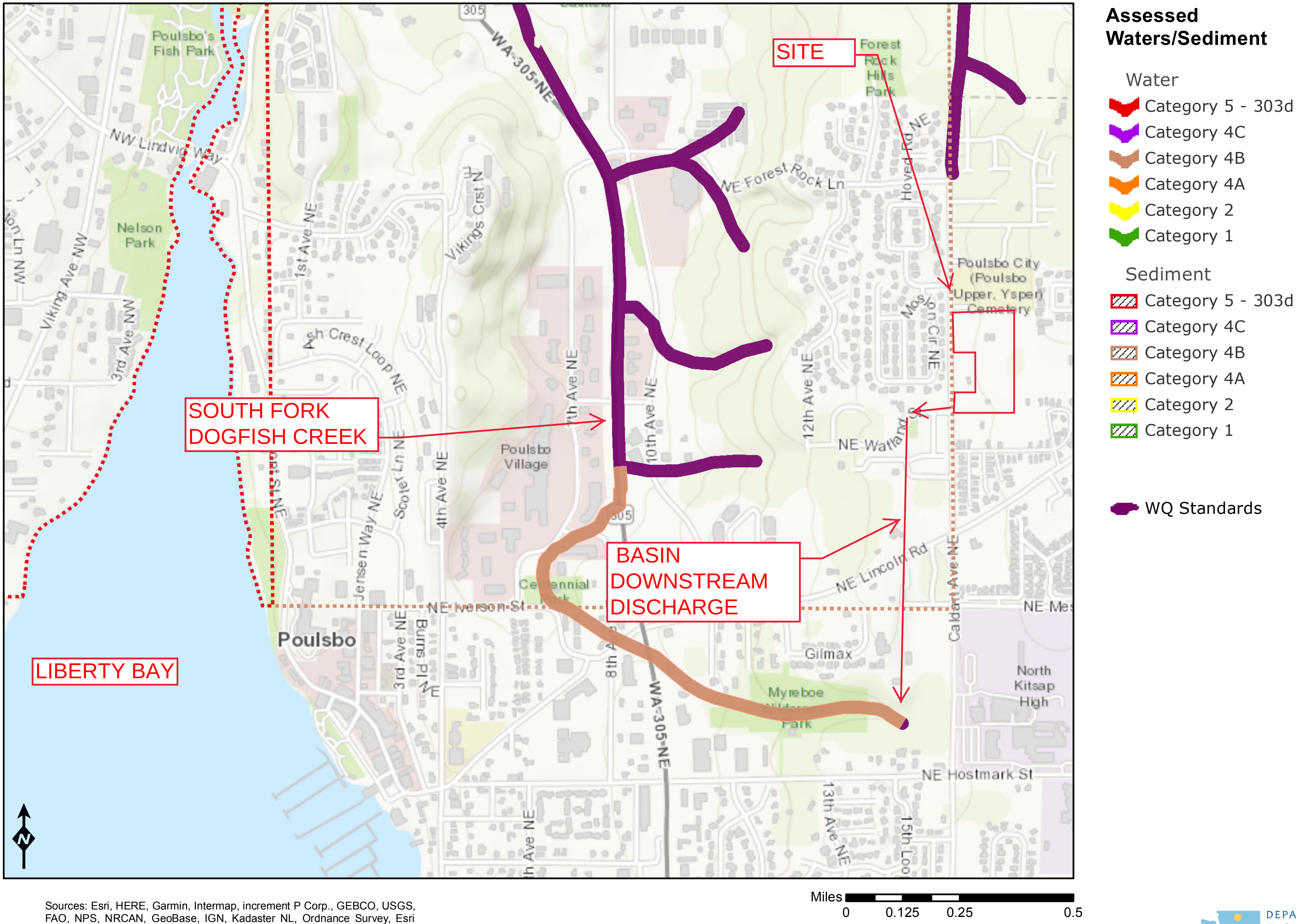
(Q = 1.486/n * A * R^.6667 * s^.5)

Mannings n	0.012			
Pipe Diam (Ft)	1.50	1.7671		
Hyd Rad	☒	0.3750	Q (cfs) =	**8.05**
Slope (Ft/Ft)	0.005		V (fps)	**4.55**

APPENDIX D - DOE 303d LISTING FOR DOGFISH CREEK

December 7, 2018

Water Quality Atlas Map



SITE

SOUTH FORK DOGFISH CREEK

BASIN DOWNSTREAM DISCHARGE

LIBERTY BAY

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap

DEPARTMENT OF ECOLOGY State of Washington

Listing ID: 8729

Main Listing Information

Listing ID:	8729	**2014 Category:**	2
Waterbody Name:	DOGFISH CREEK	**2012 Category:**	2
Medium:	Water	**2008 Category:**	2
Parameter:	Turbidity	**2004 Category:**	2
WQI Project:	None Assigned	**On 1998 303(d) List?:**	Y
Designated Use:	None Assigned	**On 1996 303(d) List?:**	Y

Assessment Unit

Assessment Unit ID: 17110019002769

Location Identification

Counties:	Kitsap	**WRIA:**	15 - Kitsap
Waterbody ID (WBID):	WA-15-2030	**Waterbody Class:**	RAA
Town/Range/Section (Legacy):	26N-1E-14		

Basis

Forsyth, 1995. 2 excursions beyond the criterion out of 4 samples collected at the mouth during 1994-1995.

Remarks

Remark	Modified By	Modified On	Visibility
This waterbody segment was listed on the 1998 303(d) list based on two exceedances. This information is insufficient to determine impairment for purposes of the 303(d) list and does not meet Category 5 listing requirements in WQ Policy 1-11. This waterbody segment will be placed in Category 2 as a priority for monitoring so that adequate information can be obtained to determine if the waterbody is impaired.	Imported	6/11/2007	Public

EIM

No EIM Records Entered

Listing ID: 23529

Main Listing Information

Listing ID:	23529	**2014 Category:**	5
Waterbody Name:	DOGFISH CREEK	**2012 Category:**	5
Medium:	Water	**2008 Category:**	5
Parameter:	Dissolved Oxygen	**2004 Category:**	1
WQI Project:	None Assigned	**On 1998 303(d) List?:**	N
Designated Use:	None Assigned	**On 1996 303(d) List?:**	N

Assessment Unit

Assessment Unit ID: 17110019002769

Location Identification

Counties:	Kitsap	**WRIA:**	15 - Kitsap
Waterbody ID (WBID):	None Assigned	**Waterbody Class:**	RAA
Town/Range/Section (Legacy):	26N-1E-14		

Basis

Location ID: [12070000] -- In 2007, 0 of 4 sample values (0%) showed an excursion of the criterion (9.5 mg/L) for this waterbody; (External Data Source: [USGS NWIS database)

Location ID:KCHD-SF01], [KCHD-DF01] -- In 2006, 1 of 9 sample values (11%) showed an excursion of the criterion (9.5 mg/L) for this waterbody;

Location ID: [KCHD-SF01], [KCHD-DF01] -- In 2005, 6 of 12 sample values (50%) showed an excursion of the criterion (9.5 mg/L) for this waterbody;

Location ID: [KCHD-SF01], [KCHD-DF01] -- In 2004, 2 of 7 sample values (29%) showed an excursion of the criterion (9.5 mg/L) for this waterbody;

Location ID: [KCHD-SF01], [KCHD-DF01] -- In 2003, 1 of 11 sample values (9%) showed an excursion of the criterion (9.5 mg/L) for this waterbody;

Location ID [KCHD-SF01] -- In 2002, 1 of 3 sample values (33.3%) showed an excursion of the criterion for this waterbody, (criterion = 9.5 mg/L).
Location ID [KCHD-DF01] -- In 2002, none of the 3 sample values (0.0%) showed an excursion of the criterion for this waterbody, (criterion = 9.5 mg/L).

Liberty Bay Foundation unpublished data (submitted by Luis Barrantes on 12 Decemeber 2002) from station LBNS-1 (Mouth of Dogfish Creek behind Liberty Bay Auto Center (@ culvert outlet)) show no excursions beyond the criterion from measurements collected in 2001-2002 .

Remarks

Remark	Modified By	Modified On	Visibility
Ten percent or more of the samples collected in a single year were excursions of the criterion, and at least 3 excursions exist from all data considered.	Jessica Archer	10/3/2014	Public

EIM

User Study ID:	User Location ID:
KITSAPWQ	KCHD-SF01
KITSAPWQ	KCHD-DF01

Listing ID: 23695

Main Listing Information

Listing ID:	23695	**2014 Category:**	4B
Waterbody Name:	DOGFISH CREEK	**2012 Category:**	4B
Medium:	Water	**2008 Category:**	4B
Parameter:	Bacteria	**2004 Category:**	4B
WQI Project:	Dogfish Creek 4b Project	**On 1998 303(d) List?:**	N
Designated Use:	None Assigned	**On 1996 303(d) List?:**	N

Assessment Unit

Assessment Unit ID: 17110019002769

Location Identification

Counties:	Kitsap	**WRIA:**	15 - Kitsap
Waterbody ID (WBID):	None Assigned	**Waterbody Class:**	RAA
Town/Range/Section (Legacy):	26N-1E-14		

Basis

Location ID: [15-DOG-0.6], [KCHD-DF01], [KCHD-SF01] -- In water year 2009, 6 of 22 sample values (27%) showed an excursion of the % criterion for this waterbody (100 cfu/100mL). The geometric mean of 53.4 exceeds the geometric mean criterion (50 cfu/100mL).

Location ID: [15-DOG-0.6], [KCHD-DF01], [KCHD-SF01] -- In water year 2008, 1 of 4 sample values (25%) showed an excursion of the % criterion for this waterbody (100 cfu/100mL). Fewer than five samples were available, therefore a geometric mean was not calculated for this period.

Location ID: [15-DOG-0.6], [KCHD-DF01], [KCHD-SF01] -- In water year 2006, 6 of 12 sample values (50%) showed an excursion of the % criterion for this waterbody (100 cfu/100mL). The geometric mean of 70.8 exceeds the geometric mean criterion (50 cfu/100mL).

Location ID: [15-DOG-0.6], [KCHD-DF01], [KCHD-SF01] -- In water year 2005, 4 of 12 sample values (33%) showed an excursion of the % criterion for this waterbody (100 cfu/100mL). The geometric mean of 47.6 does not exceed the geometric mean criterion (50 cfu/100mL).

Location ID: [15-DOG-0.6], [KCHD-DF01], [KCHD-SF01] -- In water year 2004, 4 of 11 sample values (36%) showed an excursion of the % criterion for this waterbody (100 cfu/100mL). The geometric mean of 114.2 exceeds the geometric mean criterion (50 cfu/100mL).

Location ID: [15-DOG-0.6], [KCHD-DF01], [KCHD-SF01] -- In water year 2003, 5 of 12 sample values (42%) showed an excursion of the % criterion for this waterbody (100 cfu/100mL). The geometric mean of 69.2 exceeds the geometric mean criterion (50 cfu/100mL).

Location ID [KCHD-SF01] -- Fewer than five samples were available in 2002, therefore a geometric mean was not calculated for this period.
Location ID [KCHD-SF01] -- 1 of 3 samples (33.3%) collected in 2002 exceed the percent criterion (100 col/100mL).
Location ID [KCHD-DF01] -- Fewer than five samples were available in 2002, therefore a geometric mean was not calculated for this period.
Location ID [KCHD-DF01] -- 2 of 3 samples (66.7%) collected in 2002 exceed the percent criterion (100 col/100mL).

Liberty Bay Foundation unpublished data (submitted by Luis Barrantes on 12 Decemeber 2002) from station LBNS-1 (Mouth of Dogfish Creek behind Liberty Bay Auto Center (@ culvert outlet)) show a geometric mean of 128 cfu/100mL from samples collected in 2001-2002.

Remarks

Remark	Modified By	Modified On	Visibility
Combined Listing: Listing ID 53092 was rolled into this listing	Chad Brown	9/24/2015	Public
This listing is part of one of four Kitsap County Health's Pollution Identification and Control (PIC) projects that meet Category 4B requirements. The four plans, although issued at separate times, show on-the ground improvements to addressing fecal coliform problems. The PIC plans are closely tied to the county's annual Water Quality Monitoring Report. Changed from Cat 5 to 4B 04/25/05.	Susan Braley	10/27/2014	Public
Policy 1-11 was revised in July 2012 to specify that bacteria is assessed according to water year (Oct 1-Sept 30) from the previous assessment period of calendar year. The water year assessment is only applied to newly assessed data. Therefore, this listing contains data assessed by both water year and calendar year.	Jessica Archer	10/2/2014	Public
Impairment was determined by exceedance of the geometric mean criterion in water year(s) 2009, 2006, 2004 and 2003 and the percent criterion in water year(s) 2009, 2008, 2006, 2005, 2004, 2003 and calendar year 2002.	Jessica Archer	10/2/2014	Public

EIM

User Study ID:	User Location ID:
KITSAPWQ	KCHD-SF01
KITSAPWQ	KCHD-DF01
TSWA0002	15-DOG-0.6

Listing ID: 73436

Main Listing Information

Listing ID:	73436	**2014 Category:**	2
Waterbody Name:	UNNAMED CREEK (TRIB TO DOGFISH CREEK)	**2012 Category:**	3
Medium:	Water	**2008 Category:**	3
Parameter:	Temperature	**2004 Category:**	3
WQI Project:	None Assigned	**On 1998 303(d) List?:**	N
Designated Use:	None Assigned	**On 1996 303(d) List?:**	N

Assessment Unit

Assessment Unit ID: Unmappable - UNNAMED CREEK (TRIB TO DOGFISH CREEK)-26N-1E-14

Location Identification

Counties:	Kitsap	**WRIA:**	15 - Kitsap
Waterbody ID (WBID):	None Assigned	**Waterbody Class:**	None Assigned
Town/Range/Section (Legacy):	26N-1E-14		

Basis

Location ID: 15-SFD-0.0 -- In 2009, 1 of 16 sample values (6%) showed an excursion of the criteria (16°C) for this waterbody;

Location ID: 15-SFD-0.0 -- In 2008, 0 of 10 sample values (0%) showed an excursion of the criteria (16°C) for this waterbody;

Remarks

No Remarks Entered

EIM

User Study ID:	User Location ID:
TSWA0002	15-SFD-0.0

Listing ID: 74656

Main Listing Information

Listing ID: 74656
Waterbody Name: DOGFISH CREEK, S.F.
Medium: Water
Parameter: Bacteria
WQI Project: Kitsap County Bacteria 4B
Designated Use: None Assigned

2014 Category: 4B
2012 Category: 3
2008 Category: 3
2004 Category: 3
On 1998 303(d) List?: N
On 1996 303(d) List?: N

Assessment Unit

Assessment Unit ID: 17110019002844

Location Identification

Counties: Kitsap
WRIA: 15 - Kitsap
Waterbody ID (WBID): None Assigned
Waterbody Class: None Assigned
Town/Range/Section (Legacy): 26N-1E-23

Basis

Location ID: [15-SFD-1.3] -- In water year 2009, 11 of 22 sample values (50%) showed an excursion of the % criterion for this waterbody (100 cfu/100mL). The geometric mean of 64.9 exceeds the geometric mean criterion (50 cfu/100mL).

Location ID: [15-SFD-1.3] -- In water year 2008, 1 of 4 sample values (25%) showed an excursion of the % criterion for this waterbody (100 cfu/100mL). Fewer than five samples were available, therefore a geometric mean was not calculated for this period.

Remarks

Remark	Modified By	Modified On	Visibility
Impairment is being addressed by the Kitsap County Pollution Identification and Correction Program	Patrick Lizon	2/10/2015	Public
Impairment was determined by exceedance of the geometric mean criterion in water year(s) 2009 and the percent criterion in water year(s) 2009, and 2008.	Jessica Archer	10/2/2014	Public

EIM

User Study ID:	User Location ID:
TSWA0002	15-SFD-1.3

Listing ID: 74746

Main Listing Information

Listing ID: 74746

Waterbody Name: UNNAMED CREEK (TRIB TO DOGFISH CREEK)

Medium: Water

Parameter: Bacteria

WQI Project: Kitsap County Bacteria 4B

Designated Use: None Assigned

2014 Category: 4B

2012 Category: 3

2008 Category: 3

2004 Category: 3

On 1998 303(d) List?: N

On 1996 303(d) List?: N

Assessment Unit

Assessment Unit ID: Unmappable - UNNAMED CREEK (TRIB TO DOGFISH CREEK)-26N-1E-14

Location Identification

Counties: Kitsap

WRIA: 15 - Kitsap

Waterbody ID (WBID): None Assigned

Waterbody Class: None Assigned

Town/Range/Section (Legacy): 26N-1E-14

Basis

Location ID: [15-SFD-0.0] -- In water year 2009, 10 of 22 sample values (45%) showed an excursion of the % criterion for this waterbody (100 cfu/100mL). The geometric mean of 86.6 exceeds the geometric mean criterion (50 cfu/100mL).

Location ID: [15-SFD-0.0] -- In water year 2008, 2 of 4 sample values (50%) showed an excursion of the % criterion for this waterbody (100 cfu/100mL). Fewer than five samples were available, therefore a geometric mean was not calculated for this period.

Remarks

Remark	Modified By	Modified On	Visibility
Impairment is being addressed by the Kitsap County Pollution Identification and Correction Program	Patrick Lizon	2/10/2015	Public
Impairment was determined by exceedance of the geometric mean criterion in water year(s) 2009 and the percent criterion in water year(s) 2009, and 2008.	Jessica Archer	10/2/2014	Public

EIM

User Study ID:	User Location ID:
TSWA0002	15-SFD-0.0

APPENDIX 7 – Determining Construction Site Sediment Damage Potential

The following rating system allows objective evaluation of a particular development site's potential to discharge sediment. Permittees may use the rating system below or develop alternative process designed to identify site-specific features which indicate that the site must be inspected prior to clearing and construction. Any alternative evaluation process must be documented and provide for equivalent environmental review.

Step one is to determine if there is a sediment/erosion sensitive feature downstream of the development site. If there is such a site downstream complete step two, assessment of hydraulic nearness. If there is a sediment/erosion sensitive feature and it is hydraulically near the site then go to step three to determine the construction site sediment transport potential.

STEP 1 – Sediment/Erosion Sensitive Feature Identification

Sediment/erosion sensitive features are areas subject to significant degradation due to the effect of sediment deposition or erosion. Special protection must be provided to protect them. Sediment/erosion sensitive features include but are not limited to:

i. Salmonid bearing fresh water streams and their tributaries or freshwater streams that would be Salmonid bearing if not for anthropogenic barriers;
ii. Lakes;
iii. Category I, II, and III wetlands;
iv. Marine near-shore habitat;
v. Sites containing contaminated soils where erosion could cause dispersal of contaminants; and
vi. Steep slopes (25% or greater) associated with one of the above features.

Identify any sediment/erosion sensitive features, and proceed to step two. If there are none the assessment is complete.

STEP 2 – Hydraulic Nearness Assessment

Sites are hydraulically near a feature if the pollutant load and peak quantity of runoff from the site will not be naturally attenuated before entering the feature. The conditions that render a site hydraulically near to a feature include, but are not limited to, the following:

i. The feature or a buffer to protect the feature is within 200 feed downstream of the site.
ii. Runoff from the site is tight-lined to the feature or flows to the feature through a channel or ditch.

A site is not hydraulically near a feature if one of the following takes place to provide attenuation before runoff from the site enters the feature:

i. Sheet flow through a vegetated area with dense ground cover
ii. Flow through a wetland not included as a sensitive feature
iii. Flow through a significant shallow or adverse slope, not in a conveyance channel, between the site and the sensitive feature.

Identify any of the sediment/erosion sensitive features from step one that are hydraulically near the site, and proceed to step three. If none of the sediment/erosion sensitive features are hydraulically near the site the assessment is complete.

STEP 3 – Construction Site Sediment Transport Potential

Using the worksheet below, determine the total points for each development site. Assign points based on the most critical condition that affects 10% or more of the site.

If soil testing has been performed on site, the results should be used to determine the predominant soil type on the site. Otherwise, soil information should be obtained from the county soil survey to determine Hydrologic Soil Group (Table of Engineering Index Properties for step 1.D) and Erosion Potential (Table of Water Features for step 1.E)

When using the county soil survey, the dominant soil type may be in question, particularly when the site falls on a boundary between two soil types or when one of two soil types may be present on a site. In this case, the soil type resulting in the most points on the rating system will be assumed unless site soil tests indicate that another soil type dominates the site.

Use the point score from Step 3 to determine whether the development site has a high potential for sediment transport off of the site.

Total Score	Transport Rating
<100	Low
≥100	High

A high transport rating indicates a higher risk that the site will generate sediment contaminated runoff.

Construction Site Sediment Transport Potential Worksheet

A. Existing slope of site (average, weighted by aerial extent): Points
- 2% or less 0
- >2-5% 5
- >5-10% 15
- >10-15% .... [✓ 30]
- >15% 50

B. Site Area to be cleared and/or graded:
- <5,000 sq. ft. 0
- 5,000 sq. ft. – 1 acre .... [✓ 30]
- >1 acres 50

C. Quantity of cut and/or fill on site:
- <500 cubic yards 0
- 500 – 5,000 cubic yards .... [✓ 5]
- >5,000 – 10,000 cubic yards 10
- >10,000 – 20,000 cubic yards 25
- >20,000 cubic yards 40

D. Runoff potential of predominant soils (Natural Resources Conservation Service):
- Hydrologic soil group A 0
- Hydrologic soil group B 10
- Hydrologic soil group C .... [✓ 20]
- Hydrologic soil group D 40

E. Erosion Potential of predominant soils (Unified Classification System):
- GW, GP, SW, SP soils 0
- Dual classifications (GW-GM, GP-GM, GW-GC, GP-GC, SW-SM, SW-SC, SP-SM, SP-SC) 10
- GM, GC, SM, SC soils .... [✓ 20]
- ML, CL, MH, CH soils 40

F. Surface or Groundwater entering site identified and intercepted[1]:
- Yes .... [✓ 0]
- No 25

G. Depth of cut or height of fill >10 feet:
- Yes .... [✓ 25]
- No 0

H. Clearing and grading will occur in the wet season (October 1 – May 1):
- Yes 50
- No .... [✓ 0]

TOTAL POINTS.. 130

---

[1] If no surface or groundwater enters site, give 0 points.

APPENDIX F - CONVEYANCE CAPACITY WORKSHEET (OVERALL DISCHARGE BASIN)

Poulsbo Gardens CB#7 - Outlet Culvert Conveyance Check

Job #1222

Calavista

Emergency Overflow Basin Calculation Using Rational Method

Q= CiA

		4 DU/AC	Cemetery	
(Roof, paved areas)	C=	0.48	0.15	
(100-Yr, Bremerton)	I=	3.5	3.5	(100-Year Bremerton)
(Input area-acres)	A=	19.0	3.5	(Area, Acres)
	Q=CIA	**31.92**	**1.84**	

Total Q **33.76** CFS

Existing Capacity Mannings Flow Calculator

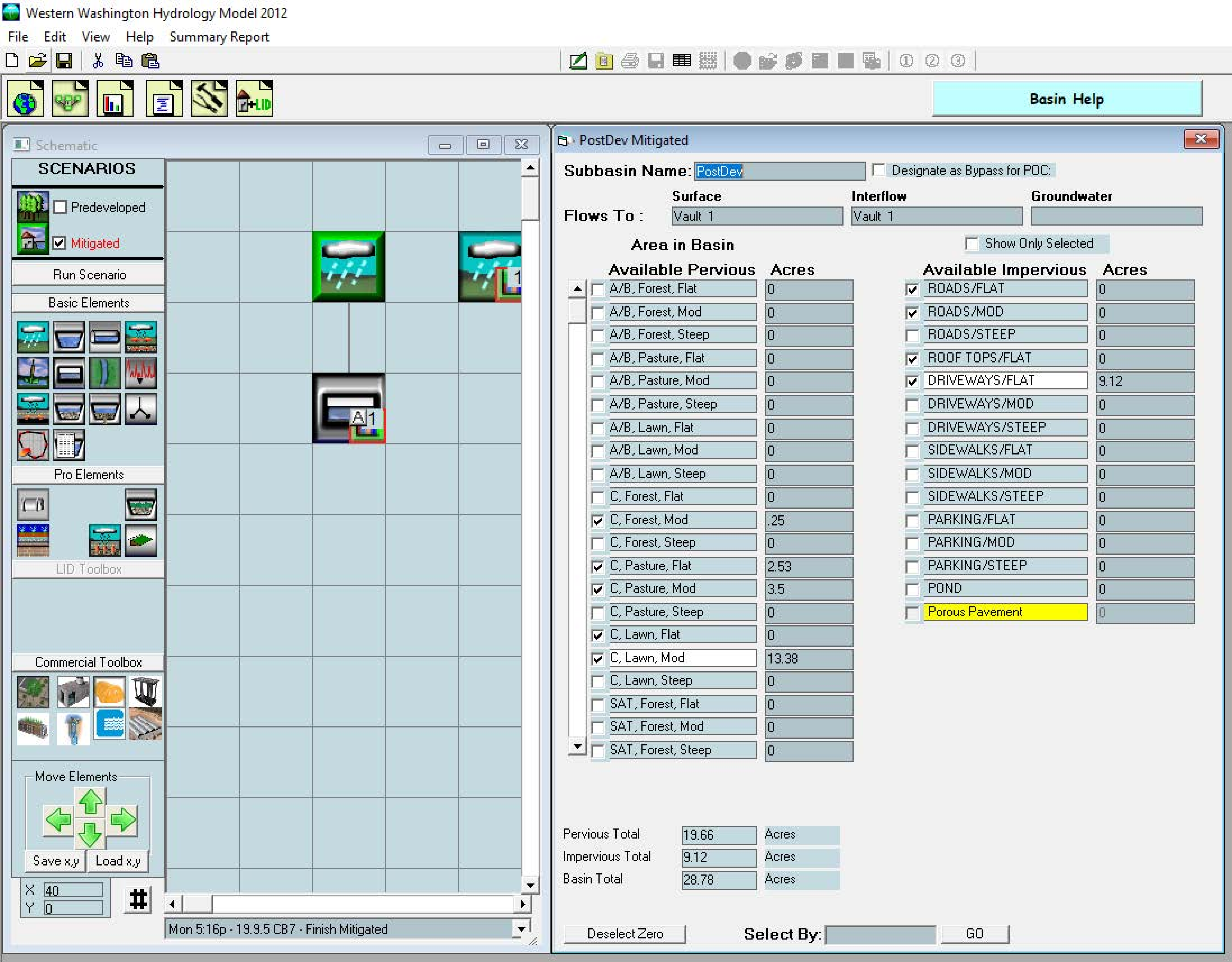
(Q = 1.486/n * A * R^.6667 * s^.5)

Mannings n	0.024			
Pipe Diam (Ft)	1.50	1.7671		
Hyd Rad		0.3750	Q (cfs) =	**4.02**
Slope (Ft/Ft)	0.005		V (fps)	**2.28**

Proposed Capacity Mannings Flow Calculator

(Q = 1.486/n * A * R^.6667 * s^.5)

Mannings n	0.012			
Pipe Diam (Ft)	2.00	3.1416		
Hyd Rad		0.5000	Q (cfs) =	**34.66**
Slope (Ft/Ft)	0.02		V (fps)	**11.03**



☐ Predeveloped
☑ Mitigated

X 40
Y 0

Mon 5:16p - 19.9.5 CB7 - Finish Mitigated

Subbasin Name: PostDev ☐ Designate as Bypass for POC:

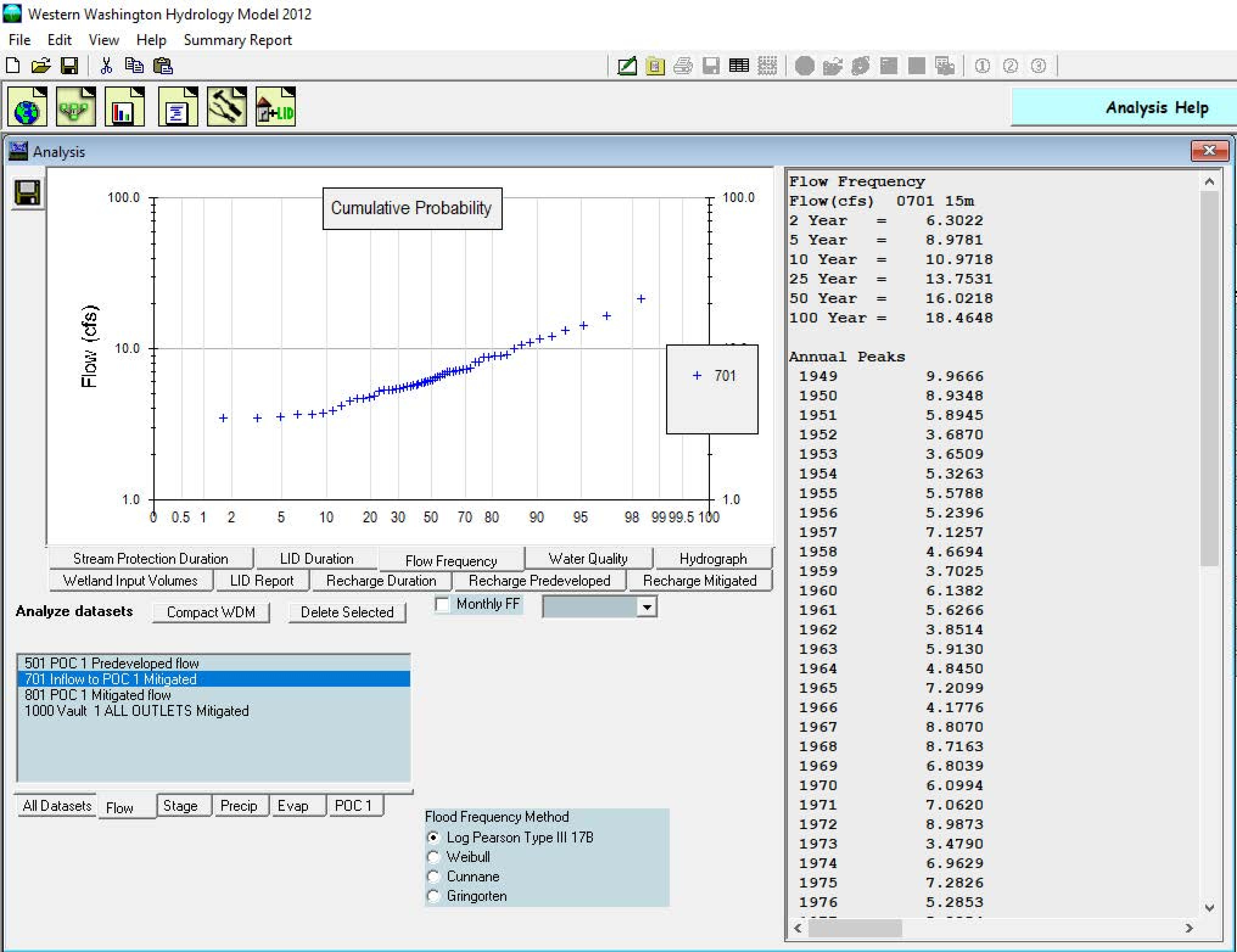
	Surface	Interflow	Groundwater
Flows To :	Vault 1	Vault 1	

Area in Basin ☐ Show Only Selected

	Available Pervious	Acres
☐	A/B, Forest, Flat	0
☐	A/B, Forest, Mod	0
☐	A/B, Forest, Steep	0
☐	A/B, Pasture, Flat	0
☐	A/B, Pasture, Mod	0
☐	A/B, Pasture, Steep	0
☐	A/B, Lawn, Flat	0
☐	A/B, Lawn, Mod	0
☐	A/B, Lawn, Steep	0
☐	C, Forest, Flat	0
☑	C, Forest, Mod	.25
☐	C, Forest, Steep	0
☑	C, Pasture, Flat	2.53
☑	C, Pasture, Mod	3.5
☐	C, Pasture, Steep	0
☑	C, Lawn, Flat	0
☑	C, Lawn, Mod	13.38
☐	C, Lawn, Steep	0
☐	SAT, Forest, Flat	0
☐	SAT, Forest, Mod	0
☐	SAT, Forest, Steep	0

	Available Impervious	Acres
☑	ROADS/FLAT	0
☑	ROADS/MOD	0
☐	ROADS/STEEP	0
☑	ROOF TOPS/FLAT	0
☑	DRIVEWAYS/FLAT	9.12
☐	DRIVEWAYS/MOD	0
☐	DRIVEWAYS/STEEP	0
☐	SIDEWALKS/FLAT	0
☐	SIDEWALKS/MOD	0
☐	SIDEWALKS/STEEP	0
☐	PARKING/FLAT	0
☐	PARKING/MOD	0
☐	PARKING/STEEP	0
☐	POND	0
☐	Porous Pavement	0

Pervious Total	19.66	Acres
Impervious Total	9.12	Acres
Basin Total	28.78	Acres



☐ Monthly FF

501 POC 1 Predeveloped flow
701 Inflow to POC 1 Mitigated
801 POC 1 Mitigated flow
1000 Vault 1 ALL OUTLETS Mitigated

Flood Frequency Method
● Log Pearson Type III 17B
○ Weibull
○ Cunnane
○ Gringorten

```
Flow Frequency
Flow(cfs)   0701 15m
2 Year    =     6.3022
5 Year    =     8.9781
10 Year   =     10.9718
25 Year   =     13.7531
50 Year   =     16.0218
100 Year =      18.4648

Annual Peaks
 1949           9.9666
 1950           8.9348
 1951           5.8945
 1952           3.6870
 1953           3.6509
 1954           5.3263
 1955           5.5788
 1956           5.2396
 1957           7.1257
 1958           4.6694
 1959           3.7025
 1960           6.1382
 1961           5.6266
 1962           3.8514
 1963           5.9130
 1964           4.8450
 1965           7.2099
 1966           4.1776
 1967           8.8070
 1968           8.7163
 1969           6.8039
 1970           6.0994
 1971           7.0620
 1972           8.9873
 1973           3.4790
 1974           6.9629
 1975           7.2826
 1976           5.2853
```

Provided for comparison only.
WWHM2012
1222.19.9.5 CB7

701 Inflow to POC 1 Mitigated

Flows	(cfs)
2 Year	6.3
25 Year	13.75
100 Year	**18.5**

RATIONAL METHOD RUNOFF CALCULATOR

	1-5% c "flat"	>5% c"rolling"
Undeveloped		
Wood and Forest	0.05	0.10
Sparse Trees and Ground Cover	0.10	0.15
Light grass to Bare Gorund	0.15	0.20
Developed Areas		
Pavement and Roofs	0.90	0.90
Gravel Roads and Parking Lots	0.75	0.80
City Business	0.85	0.90
Apartment Dwelling Areas	0.80	0.85
Industrial Areas (heavy)	0.70	0.80
Industrial Areas (light)	0.60	0.70
Earth Shoulder	0.50	0.50
Playgrounds	0.25	0.30
Lawns, Meadows, Pasture	0.20	0.25
Parks and Cemetary	0.15	0.20
Single Family Residential Areas		
1 DU/GA		0.30
2 DU/GA		0.36
3 DU/GA		0.42
4 DU/GA		0.48
6 DU/GA		0.60
9-15 DU/GA		0.70

ESC1

EnviroSound Consulting Inc.

Geotechnical &
Environmental
Consulting

Revised Limited Geotechnical Engineering Report

Project Information

Project Name: Calavista Development
Location: Poulsbo, Washington
Client: Caldart Poulsbo, LLC
Project #: ESC19-G010.1
Date: December 19, 2019

Company Information

P.O. Box 776
Tracyton, Washington 98393
Phone: 360-698-5950
Fax: 360-698-5929

REVISED LIMITED GEOTECHNICAL ENGINEERING REPORT

CALAVISTA DEVELOPMENT
19700 AND 19840 CALDART AVENUE NE
POULSBO, WASHINGTON 98370

Prepared for:
CALDART POULSBO LLC
105 S. MAIN STREET, STE 230
SEATTLE, WASHINGTON 98104

Prepared by:
ENVIROSOUND CONSULTING, INC.
P.O. BOX 776
TRACYTON, WASHINGTON 98393

Project No. ESC19-G010.1
December 19, 2019

EnviroSound Consulting Geotechnical & Environmental Consulting

December 19, 2019

Project: ESC19-G010.1

Caldart Poulsbo LLC
105 S. Main Street, Ste 230
Seattle, Washington 98104

Attention: Mr. Barry Margolese

Revised Limited Geotechnical Engineering Report
Proposed Calavista Residential Development
19700 and 19840 Caldart Ave NE
Poulsbo, Washington
Tax Parcels #132601-3-003-2001 and 132601-3-065-2006

Dear Mr. Margolese

Submitted herewith is our revised report for EnviroSound Consulting's original geotechnical engineering investigation for the subject project. The original report was dated April 25, 2019 and was conducted in accordance with our proposal (Proposal Number ESC19-PG004, dated January 16, 2019. This revised report incorporates comments from the City of Poulsbo dated June 24, 2019 and comments from a peer review completed by Aspect Consulting, LLC dated December 12, 2019. The report presents findings from our geotechnical engineering investigation and provides recommendations for geotechnical engineering aspects of project design.

We appreciate the opportunity to work with you on this project. If we can be of further assistance, or if you have any questions regarding this project, please contact our office.

Sincerely,

Shawn E. Williams, L.E.G.
Senior Engineering Geologist

Engineering Geologist
2203

12-19-19

Michael J. Wolczko, P.E.
Senior Geotechnical Engineer

MICHAEL JOHN WOLCZKO
31276

12/19/19

Enclosures

TABLE OF CONTENTS

LIST OF FIGURES

1.0 INTRODUCTION

EnviroSound Consulting (EnviroSound) was retained by Caldart Poulsbo LLC to conduct a geotechnical engineering investigation for the proposed Calavista residential development in Poulsbo, Washington. The geotechnical report was done in general compliance with our proposal ESC19-PG004 dated January 16, 2019.

1.1 Scope of Work

The purpose of this investigation was to evaluate the subsurface soils and groundwater conditions at the site in order to assess the suitability of stormwater infiltration at the site, and to provide preliminary geotechnical engineering recommendations suitable for project design. The scope of work consisted of a site investigation, excavating geotechnical test pits, and the preparation of a limited geotechnical engineering report. This report provides recommendations for foundations, earthwork, pavements, temporary excavations and shoring that are based on preliminary plans provided by RDCJR Civil Engineering. EnviroSound recommended in the original report that we review final plans, once these details were established, so that we could provide additional recommendations for finalizing earthwork and foundation construction specifications. In addition, we recommended that EnviroSound be involved in the process of developing the plan details, so that we could assist with developing the most suitable and cost-effective building configurations.

1.2 Project Description

EnviroSound has been provided with electronic copies of Sheets 1 through 21 of the Calavista – PRD plans prepared by RDCJR Civil Engineering, dated October 21, 2019. Based on our discussions and review of the provided plans, we understand that the proposed development will consist of the construction of 43 lots for residential housing. Site development work will include site grading to establish roadways and building pads, utility installation, constructing a stormwater detention facility, and constructing retaining walls. Site grading work will consist of excavations up to about 8.0 feet and placing up to approximately 16 feet of fill. Retaining walls up to 8.0 feet high will be used at the site to establish grades. A stormwater detention facility is proposed in a low-lying area in the northwestern part of the site. Based on our review of these documents, it is our opinion that the information presented in these documents is in concurrence with the recommendations presented in our original report.

1.3 Site Description

The subject property consists of two parcels, a northern lot located at 19840 Caldart Avenue NE, and a southern lot located at 19700 Caldart Avenue NE, in Poulsbo Washington (see Figure 1, Site Vicinity). The northern lot consists of a rectangular-shaped, approximately 4.74 acre parcel, and the southern lot consists of a “C”-shaped, approximately 4.29 acre parcel. According to data provided by the Kitsap County Parcel Viewer, the properties are located in Section 13, Township 26 North, Range 1 East, W.M. The northern parcel is located at Longitude -122.62664291 degrees and Latitude 47.74310681 degrees, and the southern parcel is located at Longitude -122.62650317 degrees and Latitude 47.74201540 degrees.

The subject properties are bordered along the west side by Caldart Avenue NE, with residential housing beyond. The Poulsbo City Cemetery is located north of the northern lot. Open fields and residential housing is present along the east side of the properties. NE Halden Glen Court with residential housing beyond is located south of the southern lot.

At the time of our visit, a double-wide mobile home and out buildings were located on the northern lot, and a two-story, single family residence was located on the southern lot. Access to the northern parcel was by a gravel road that extended east from Caldart Avenue NE. Access to the southern parcel was by a gravel road that extended northeast from NE Halden Glen Court.

Vegetation on the northern parcel consisted of generally grass lawns and open areas covered with blackberry bushes and scotch broom, with scattered larger coniferous and deciduous trees. The majority of the eastern portion of the southern parcel was covered with a young forest of alder trees and a thick underbrush of blackberry bushes. Large coniferous and deciduous trees were located in the south-central and southwestern portions of the southern parcel. A review of historical aerial photographs indicates that logging occurred on the northern parcel in 1994, and logging occurred on the southern lot prior to 2001.

A review of a topographic site plan provided by Team 4 Engineering indicates that the subject property consists of a generally west-facing slope. The northern lot descends from a high point of approximately elevation 370 feet along the east property line to about elevation 306 feet along the west property line. The southern lot descends from a high point of approximately elevation 365 feet along the east property line to about elevation 300 at the southwestern corner of the lot.

The subject property generally consists of relatively flat-lying to gently sloping ground in the western portion of the site that slopes up to a generally flatter upland area along the east side of the site. The flat-lying area in the western portion of the site had inclinations measured at less than 3 degrees (5 percent slope). The slope across the site had inclinations measured at between about 8 and 20 degrees (14 to 36 percent slope). Local man-made slopes were at between about 25 degrees and near-vertical.

At the time of our visit, we did not observe any groundwater springs or standing surface water on the site. The native slopes at the site appeared to be relatively stable with no significant sloughing noted at the time of the site visit.

2.0 SITE INVESTIGATION

2.1 Geologic Setting

The subject site lies within the central Puget Lowland. The lowland is part of a regional north-south trending trough that extends from southwestern British Columbia to near Eugene, Oregon. North of Olympia, Washington, this lowland is glacially carved with a depositional and erosional history including at least four separate glacial advance/retreats. The Puget Lowland is bounded on the west by the Olympic Mountains and on the east by the Cascade Range. The lowland is filled with glacial and nonglacial sediments consisting of interbedded gravel, sand, silt, till, and peat lenses.

A review of the available geologic mapping indicates that the site is located in an area mapped at the contact between Vashon age glacial till (Qvt) and Vashon age glacial advance outwash (Qva).

Glacial till typically consists of an unsorted heterogeneous mixture of clay, silt, sand, and gravel with occasional boulders and cobbles deposited directly by glacial ice. Till that is deposited in front of and is overridden by an advancing glacial ice sheet is referred to as lodgment till and is compacted to a very dense or hard state because of the weight of the overriding ice. Till that was deposited as the ice sheet receded is normally consolidated and is referred to as ablation till.

Locally, till can contain lenses of stratified material. Glacial till has relatively low permeability and is often responsible for a perched water table in gentle-to flat-lying topography.

Glacial outwash typically consists of moderately sorted sand, gravel and cobbles that was deposited by glacial meltwater streams and rivers either ahead of and overridden by the advancing ice sheet (advance outwash), or during ablation and retreat of the glacier (recessional outwash).

The United States Department of Agriculture (USDA) Soil Survey of Kitsap County Area, Washington, information indicates the following soil type exists on the project site:

- 22 – Kapowsin gravelly ashy loam, 0 to 6 percent slopes
- 39 – Poulsbo gravelly sandy loam, 0 to 6 percent slopes
- 40 – Poulsbo gravelly sandy loam, 6 to 15 percent slopes

The soil survey descriptions of these soil types are summarized in the following table.

USDA Soil Survey Name	**22- Kapowsin gravelly ashy loam, 0 to 6 percent slopes**	**39 – Poulsbo gravelly sandy loam, 0 to 6 percent slopes**	**40 – Poulsbo gravelly sandy loam, 6 to 15 percent slopes**
Typical Profile	0-15 inches, gravelly ashy loam 15-29 inches, loam 29-59 inches, gravelly loam	0 to 24 inches: gravelly ashy sandy loam 24 to 60 inches: very gravelly sandy loam	0 to 24 inches: gravelly ashy sandy loam 24 to 60 inches: very gravelly sandy loam
Origination	Volcanic ash mixed with glacial drift over dense glaciomarine deposits	Glacial till with volcanic ash in the upper part	Glacial till with volcanic ash in the upper part
Drainage	Moderately well drained.	Moderately well drained	Moderately well drained
Permeability	Moderately rapid above the hardpan and very slow in the pan.	Moderately rapid above the hardpan and very slow in the pan	Moderately rapid above the hardpan and very slow in the pan
Surface Runoff	Slow	Slow	Slow
Erosion Hazard	Slight	Slight	Slight

2.2 Subsurface Exploration

Six (6) test pits, identified as test pits TP-1 through TP-6, were excavated at the site on February 27, 2019. The test pits were excavated with a John Deere 50G track-mounted mini-excavator, provided and operated by Bulls Eye Excavation, under subcontract to EnviroSound. The test pits were excavated to depths of between about 8 and 11 feet deep below the existing ground surface (bgs). We estimated the locations of the test pits by pacing and measuring relative to landmarks at the site. These locations are shown in Figure 2, Site Plan, and should be considered approximate.

A senior geologist with our firm observed the test pit excavations and visually identified the exposed soils, estimated the relative density of the soils, obtained representative soil samples, and compiled a field log of each exploration. The relative density of the exposed soils in the upper 4 feet of the pit was estimated based on probing the sides and bottoms of the pits with a ½-inch-diameter steel bar and by observing the ease or difficulty of the excavation. The relative density of the exposed soils below 4 feet was estimated based on the ease or difficulty of the excavation. Representative soil samples were collected in bags and returned to our laboratory. Where observed, groundwater was noted during excavation. The groundwater-level observations are noted in the test pit logs. The groundwater levels noted on the logs may not be representative of the highest potential groundwater levels at the site. Summary logs of the explorations are presented in Appendix A.

2.3 **Laboratory Testing**

To aid in classifying the soils and to evaluate the strength characteristics, laboratory tests were performed on selected samples. Test method references are shown in the following table. Phoenix Soil Research of Kingston, Washington was retained to provide geotechnical laboratory analysis.

Parameter	*Testing Method Reference*
Moisture Content	ASTM D2216
Gradation Analysis	ASTM D422

The results of the laboratory testing are provided in Appendix B.

2.4 **Soil Conditions**

The subsurface conditions encountered in the explorations generally consisted of topsoil and forest duff overlying glacial till or till-like deposits and advance outwash deposits. The till and outwash deposits were generally interlayered in all of the explorations except test pit TP-3. Outwash deposits were more prevalent in the western portion of the subject property. Topsoil and forest duff at the site was between about 0.5 and 0.8 feet thick.

The till and till-like deposits consisted of loose to very dense, slightly gravelly to gravelly, silty sand. The till-like deposits were interlayered with sand seams.

The outwash deposits consisted of medium dense to dense, trace to slightly silty sand, slightly gravelly to gravelly sand and sandy gravel, with scattered seams of dense silty sand. Test pit TP-1 was terminated in the outwash deposits and the remainder of the test pits terminated in till or till-like deposits.

Underlying the topsoil/forest duff in test pit TP-3 was weathered and unweathered glacial till consisting of medium dense to very dense, slightly gravelly to gravelly, silty sand. Test pit TP-3 was terminated in glacial till.

2.4.1 Groundwater

Groundwater seepage was encountered in test pit TP-2 at a depth of about 7.5 bgs. The groundwater appeared to be perched on an underlying dense to very dense till layer. Groundwater seepage was not encountered in any of the other explorations. Water table elevations can fluctuate with time. Groundwater levels are typically influenced by seasonal precipitation, irrigation, land use, and climatic conditions, as well as other factors. Groundwater level observations at the time of the field investigation may vary from those encountered during the construction phase of the project.

2.5 **Geologic Hazards**

<u>General</u>

A review of “Slope Stability, Kitsap County, Washington”, Jerry Deeter, 1979 and current geologic hazard and critical aquifer mapping presented by the City of Poulsbo were performed in conjunction with the preparation of this report.

The maps provided by the City of Poulsbo indicate that the subject property is mapped in an area as having no potential geologic hazards. A more detailed review of potential geologic hazards is provided below.

Critical Aquifers

Critical aquifer mapping provided by City of Poulsbo maps the subject property in an area of Aquifer Recharge Area of Concern (Shallow Aquifer). Development standards provided in the City of Poulsbo Critical Areas Ordinance, Section 16.20.515-B explains that a hydrogeological report is required for operations proposed in aquifer recharge areas of concern that pose a potential threat to groundwater according to Table 16.20.515 – Activities with Potential Threat to Groundwater. The proposed development is not listed in this table and therefore does not require a hydrogeological report. In addition, areas mapped as an aquifer recharge area of concern require stormwater treatment and infiltration where soils permit and are determined feasible. However, due to the presence of glacial till on the subject property, stormwater infiltration is not feasible.

Erosion Hazard

The United States Department of Agriculture (USDA) Soil Survey of Kitsap County Area, Washington, mapping indicates that the native glacial till soil at the site has a slight erosion hazard. In our opinion, if the soils are disturbed in the sloping areas, there will be a serious erosion hazard and erosion control measures should be implemented immediately.

It has been our experience that soil erosion potential can be minimized through landscaping and surface water runoff control. Typically, erosion of exposed soils will be most noticeable during periods of rainfall and may be controlled by the use of normal temporary erosion control measures, such as silt fences, hay bales, mulching, control ditches or diversion trenching, and contour furrowing. Erosion control measures should be in place before the onset of wet weather. Erosion hazard mitigation is presented in the Conclusions and Recommendation section of this report.

Seismic Hazard

A review of Kitsap County Critical Areas mapping shows the site as having a small area through the middle of the site of moderate seismic hazard. However, this should not have significant impact on the development and overall stability of the slopes due to the dense nature of the soils encountered in our test pits.

The 2015 International Building Code (IBC), Section 1613.3.2, refers to Chapter 20 of ASCE-7 for Site Class Definitions. The seismic site class rating is based on the average Standard Penetration Resistance or N-value of a soil profile extending to a depth of 100 feet. The soil explorations on this site extended to a maximum depth of approximately 11 feet bgs. Since the majority of the native site soils at the site are glacially consolidated and are estimated to be dense to very dense, we estimate that the average Standard Penetration Resistance for the top 100 feet of site soils is greater than 50. Therefore, for seismic design of structures the site should be considered class C, “very dense soil and soft rock”, as defined by Table 20.3-1 “Site Class Definitions,” according to the 2010 ASCE-7 Standard.

We referred to the U.S. Seismic Design Maps Website and 2012/2015 IBC to obtain values for S_S, S_{MS}, S_{DS}, S_1, S_{M1}, S_{D1}, F_a, and F_v. The U.S. Seismic Design Maps Website includes the most updated published data on seismic conditions. The latitude/longitude method was used to obtain the ground motions with a Latitude of 47.74237075 degrees and a Longitude of -122.62666687 degrees. The seismic design parameters for this site are as follows:

Table 1: Seismic Design Parameters
(Reference: 2015 IBC Section 1613.3.2, and ASCE)

Seismic Item	Value
Site Class	C
Site Coefficient F_a	1.000
S_s	1.305 g
S_{MS}	1.305 g
S_{DS}	0.87 g
Site Coefficient F_v	1.500
S_1	0.522 g
S_{M1}	0.679 g
S_{D1}	0.452 g

The damage from fault surface rupture to a site can include displacement damage to structures and offset of roads and underground utilities. Based on our review of the U.S. Geological Survey and Washington State Department of Natural Resources fault mapping, the subject property lies within the delineated area of the Seattle Fault Zone. Although fault surface ruptures have not been mapped or observed in the Poulsbo area, surface ruptures of Seattle Fault strands have been observed and mapped on south Bainbridge Island approximately 10.0 miles away.

Additional seismic considerations include liquefaction potential and amplification of ground motions by soft soil deposits. The liquefaction potential is highest for loose sand with a high groundwater table. The native soils on the subject property, primarily consisting of medium dense to very dense sand and silty sand interpreted to underlie the site are considered to have a low potential for liquefaction and amplification of ground motion. Loose and/or saturated materials on the slopes have the potential for sloughing failures during seismic events.

Landslide Hazard

The subject property is located on a west-facing slope with no known history of landsliding. A review of the “Slope Stability, Kitsap County, Washington”, Jerry Deeter, 1979 indicates that the subject property has been mapped as Stable slopes (S). Stable slopes generally rise less than 15 percent in grade, except in local areas of low groundwater concentration or competent bedrock. Stable slopes include rolling uplands and lowlands underlain by stable material such as unweathered till and/or peat deposits which, although inherently weak, have no significant slope. It should be noted that the mapping was performed in the 1970’s and does not reflect more recent activity.

3.0 CONCLUSIONS AND PRELIMINARY RECOMMENDATIONS

3.1 General

The subject property is shown in an area mapped as having no potential geologic hazards by the City of Poulsbo and native slopes at the site do not exceed 40 percent. The native slopes at the site appeared to be relatively stable with no significant sloughing noted at the time of the site visit. Medium dense to dense soils were encountered at the site at depths of between about 2 and 4 feet bgs. It is our opinion that the minimum required buffer of 25 feet from geologically hazardous areas established in the City of Poulsbo Critical Area Ordinance section 16.20.420 Development standards can be waived due to the presence of dense soils at shallow depth and the relatively stable nature of the slopes. Based on the findings of this investigation, it is our opinion that the proposed site development is feasible provided that recommendations in this report are incorporated in final design plans.

Critical elements of the site development should be observed and tested by a qualified representative of EnviroSound. These include but are not limited to installation of any retaining wall construction, structural fill placement, foundation subgrade verification, slab on grade verification and subsurface drainage. We recommend that EnviroSound be involved in the process of planning the construction, configurations and elevations for the proposed structures. We also recommend that EnviroSound review updated plans, as these documents become available; to verify that geotechnical recommendations are being incorporated.

3.2 Site Drainage

The control of surface and near-surface water is very important for the long-term stability of slopes. An effective drainage mitigation plan must address several aspects of the project. These include areas of slope protection, vegetation management, erosion control, and drainage control. We recommend that temporary and final site grading be designed to direct surface water away from slopes.

3.3 Foundations

We recommend that building foundation loads be supported on spread footings bearing on undisturbed, medium dense to dense native soils or on compacted structural fill established on the suitable native soils. We recommend that the structural fill be placed in accordance with the structural fill recommendations presented in this report.

Foundation elements located near existing slopes, rockery walls, or retaining walls should be embedded to a depth in order to create a 2H:1V (horizontal to vertical) envelope from the outside face of the footing down to the toe of any slope or wall. These footings should also be supported as recommended above.

Footings founded on the medium dense or denser native soil or properly placed structural fill could be designed for an allowable bearing load pressure of 2,500 pounds per square foot (psf). The allowable bearing capacities may be increased by one-third when used with alternative basic load combinations that include wind or earthquake loads. This recommendation is in accordance with the International Building Code (IBC) 2012 Section 1806.

The allowable bearing pressures require that the footings bear at least 18 inches bgs and have a minimum width of 24 inches for isolated footings and 18 inches for continuous wall footings. The elevation difference of adjacent footing should not be greater than one-half the clear distance between them. Where adjoining continuous wall footings are designed at different elevations, the upper footing should be stepped down to the lower footing.

Footings should have adequate embedment for local frost penetration requirements. In the area of this project, the minimum depths are typically 18 inches for exterior footings and 12 inches for interior footings. If footings are supported by structural fill, the fill should extend beyond the outer edges of footings a minimum distance equal to the thickness of the fill beneath the footing.

Lateral footing displacement can be resisted by friction along the base of the foundation and passive pressure acting against the appropriate footing faces. We recommend an allowable friction factor of 0.35 and an allowable equivalent fluid passive pressure of 275 psf/ft of depth.

Footing excavations should be cleaned of all loose soil, leveled, and protected from water. Footing excavations should be kept free of water at all times. If the soils in the footing become wet it is recommended that the wet/soft soils be excavated to suitable soil and replaced with crushed rock.

A representative with our firm should evaluate all foundation subgrades prior to installation of formwork or reinforcing steel. If unsuitable soils are detected at the footing subgrade, further excavation to suitable soils should take place. EnviroSound should be provided with the final grading and structural plans to verify the intent of these recommendations have been implemented.

3.4 **Foundation Drainage**

We recommend that continuous footing drains with cleanouts be installed at the base of the footings along the outside perimeter of the proposed SFR’s constructed at the site to prevent pooling of water underneath the SFR’s. These drains should consist of a minimum 4-inch diameter perforated rigid pipe (with perforations placed at 4 and 8 o’clock) with a minimum thickness of 6 inches of washed pea gravel around the pipe. Drainage socks should not be used around the pipe. The backfill soils within 1 foot of the foundation walls should consist of free-draining sand and gravel material. This drainage system should be designed to transport water away from the structure and discharge into an appropriate area.

Roof drains should not be connected to the footing subdrains. The discharge from footing drains, roof drains, or other drains should be routed by means of a tightline to a suitable discharge point that assume excessive stormwater flows do not back-up into the footing drain system assuming the suitable discharge point is a storm sewer.

3.5 **Floor Slabs**

Based on our explorations, we anticipate that building floor slabs can be supported on densely compacted structural fill placed over native bearing soil subgrades, or supported on undisturbed, medium dense to dense native soil. A modulus of subgrade reaction of 200 pounds per cubic inch should be used to design the slab.

As a capillary break between native soil and the floor slab, we recommend that a minimum 4-inch-thick layer of washed rounded or angular gravel be placed beneath floor slabs. The gravel should have a maximum size of ¾ inch and less than 3 percent fines passing the No. 200 sieve. The gravel should be compacted with at least two passes of a vibrating plate compactor or smooth-drum roller. Angular gravel can provide a firmer working surface than rounded gravel on which to place the slab reinforcement and concrete. The floor slab subgrade should be evaluated by proof rolling and/or probing to confirm that it is in a firm and unyielding condition. Prior to placing the gravel, the exposed subgrade surface should be compacted as needed to achieve a dense, unyielding condition and should be evaluated by a representative of our firm to confirm that it is suitable for floor slab support. Any loose soil encountered beneath slab areas should be removed and replaced with structural fill.

A vapor retarder consisting of plastic sheeting should be placed on top of the capillary break materials to help prevent migration of moisture through the concrete slab, especially in areas with moisture sensitive floor coverings. The moisture barrier system should be installed in accordance with ASTM guidelines. A layer of sand may be placed above the vapor barrier as an option to aid in curing the concrete.

3.6 **Lateral Earth Pressures & Retaining Walls**

Lateral pressures will be exerted on below grade (basement) and retaining walls by backfill soils, surcharge loads, and hydrostatic pressures caused by groundwater. Lateral earth pressures on walls depend upon the type of wall, type of backfill material and allowable wall movements. For walls that are restrained at the top, lateral earth pressures should be estimated for an “at rest” condition. For walls that are free to rotate away from the retained soil, lateral earth pressures should be estimated for an “active” earth pressure. For walls that are compressing the retained soil, lateral earth pressures should be estimated for a “passive” earth pressure. Recommended lateral earth pressures coefficients are provided in the following table along with equivalent fluid pressures. These pressures are calculated assuming a moist unit weight for the backfill soil of 125 pounds per cubic foot (pcf) and an angle of internal friction of 35 degrees. These values are representative of the onsite materials behind retaining walls backfilled using structural fill.

Lateral Earth Pressures, no slope above or below the wall					
“Active” Condition		“At Rest” Condition		“Passive” Condition	
Coefficient (Ka)	Equivalent Fluid Unit Weight (pcf)	Coefficient (Ko)	Equivalent Fluid Unit Weight (pcf)	Coefficient (Kp)	Equivalent Fluid Unit Weight (pcf)
0.27	34	0.43	54	1.77	231

The recommended equivalent fluid unit weights do not include hydrostatic pressure due to groundwater accumulated behind walls. The recommended fluid pressures assume a horizontal ground surface above and below the wall and do not include seismic loading, or any surcharge due to nearby loading from structures, equipment or traffic. The passive pressure has been reduced by a factor of 2 to limit wall translation. Traffic loading of 250 psf should be included in all calculations on walls adjacent to roadways or parking areas.

The potential seismic force on the wall can be modeled as a uniform pressure on the back of the wall equal to 7H (H is the height of the wall (in feet)), for active conditions, with no slope above the wall. For walls designed for at rest conditions, with no slope above the wall, the uniform pressure for the seismic increase should be increased to 23H. The units for this pressure are pounds per square foot (psf).

Continuous drains with cleanouts should be installed at the base of retaining walls to prevent the buildup of hydrostatic pressure behind the structure as discussed in Foundation Drainage of this report.

3.7 Asphalt Pavement

Asphalt Pavement Preliminary recommendations for asphalt pavement thicknesses are based on the AASHTO Guide for Design of Pavement Structures. We presume that the primary traffic on the site will be passenger cars. We used the section on Low-Volume Road Design for Flexible Pavement with a 50 percent inherent reliability level, as recommended in the Guide for local roads. We further assumed that the traffic level would be low, corresponding to 50,000 to 100,000 Equivalent Single Axle Load (ESAL) applications over the lifetime of the pavement. Note that one ESAL is for an 18-kip axle load. One passenger car is approximately 0.008 ESALs. Therefore, the low traffic level corresponds to at least 6,250,000 passenger car trips over the pavement. In the borings, we encountered loose to medium dense, gravelly Sand and Silt. We assigned these soils a relative quality of “Fair”.

Based on the previous assumptions, we preliminarily recommend 2 inches of surface course Asphaltic Concrete (AC) over 6 inches of granular base course. Surface course AC can be substituted for base course and vice versa at a rate of 1 inch of AC per 3 inches of base course. We recommend that the AC thickness not be reduced below 2 inches. The final pavement section can be adjusted based on estimated vehicle loading and desired design life. In consideration of heavier traffic such as garbage trucks or maintenance trucks 3 inches of AC over 8 inches of base course should be considered.

In preparing the preceding recommendations, we assumed that the Elastic Modulus of the Asphaltic Concrete would be at least 400,000 psi, and that the Base Course would be a well graded crushed rock with a California Bearing Ratio (CBR) of 100. If materials with different strengths than presented will be used, we should be contacted to adjust the pavement section recommendations accordingly.

Concrete pavement design recommendations are based on methods provided by the American Concrete Pavement Association for residential-type streets on fine grained soils. A minimum concrete thickness of 6.0 inches is recommended for the parking areas with a base course of 2.0 inches. Pervious concrete typically achieves similar strength characteristics as standard concrete, by increasing the cement ratio; therefore no increase in the depth of concrete pavement is required for porous concrete.

Prior to the placement of standard pavements we recommend that the subgrade be proof rolled with heavy construction equipment such as a loaded dump truck or water truck to ensure that the subgrade is relatively dense and unyielding. Subgrade conditions for porous pavement shall be per the design engineers recommendations and details.

3.8 Earthwork Considerations

During wet weather conditions, which are typically present from October through April, subgrade stability problems and grading difficulties may develop due to high moisture content in the soil, disturbance of sensitive soils and/or the presence of perched groundwater. Therefore, we recommend that earthwork activity be performed during the dry season. If work must proceed in wet weather, we recommend following the guidelines presented in the wet weather section of this report.

3.8.1 Site Preparation

General site clearing should include removal of vegetation, topsoil and debris. Site stripping should extend to a minimum depth of 6 inches, or until all organics in excess of 3 percent by volume or other unsuitable soils are removed. These materials will not be suitable for use as fill for parking or building areas. However, stripped topsoil may be stockpiled and reused in landscape or non-structural areas.

Any buried structures encountered during construction should be properly removed and backfilled. Excavation, depressions, or soft and pliant areas extending below planned finish subgrade level should be cleaned to firm, undisturbed soil and backfilled with structural fill to planned finish subgrade.

3.8.2 Groundwater Concerns

Groundwater seepage was observed in test pit TP-2 at a depth of about 7.5 feet bgs. Groundwater is not expected to impact foundation excavations of the building. However, water table elevations fluctuate with time, being dependent upon seasonal precipitation, irrigation, land use, and climatic conditions, as well as other factors.

3.8.3 Excavations

Excavations at the project site can be accomplished with conventional excavating equipment, such as a dozer or backhoe. We recommend a flat-bladed bucket be used for foundation excavation to minimize the disturbance of the native, silty soils.

It is our opinion that the soils encountered in the explorations are a Type C material as defined by the Washington Industrial Safety and Health Act’s (WISHA) regulations on excavation, trenching and shoring. In the absence of water, temporary slopes excavated in Type C material should be inclined no steeper than 1.5H:1V (horizontal: vertical).

Note that these recommended slopes are for temporary slopes excavated under dry conditions. Flatter slopes should be used as necessary to maintain stability. For example, if water flows or seeps into the excavation, it could cause an unstable local condition on the side slopes. The slopes should be protected with a waterproof covering such as plastic sheeting during periods of wet weather to reduce sloughing and erosion. A representative of our firm should evaluate temporary and permanent slopes to ensure that they are appropriate for the soils encountered during construction. Recommendations to reduce temporary slopes to 2H:1V or flatter may be provided, depending on the observed conditions during construction.

In areas where it is not possible to maintain the recommended slopes due to space constraints, temporary shoring would be required. Such shoring would need to be properly designed by an engineer.

Consistent with conventional construction practice, temporary excavation slopes should not be shown on the plans but should instead be made the responsibility of the Contractor. The Contractor is continually at the site and is able to observe the nature and conditions of the subsurface materials encountered, including groundwater, and also has responsibility for methods, sequence, and schedule of construction. If instability is detected, slopes should be flattened or shored. The Contractor should be familiar with applicable local, state, and federal safety regulations, including the current WISHA regulations on excavation, trenching and shoring. Regardless of the construction method used, all excavation work (and all project work) should be accomplished in compliance with applicable local, state, and federal safety codes.

Construction site safety is the sole responsibility of the Contractor, who shall also be solely responsible for the means, methods, and sequencing of construction operations. EnviroSound is providing this information solely as a service to our client. Under no circumstances should the information provided above be interpreted to mean that EnviroSound is assuming responsibility for construction site safety or the Contractor's activities; such responsibility is not being implied and should not be inferred.

The soils to be penetrated by the proposed excavations may vary significantly across the site. EnviroSound's preliminary soil classification is based solely on the materials encountered in the borings. The Contractor should continually classify the soils that are encountered as excavation progresses with respect to the WISHA system.

Stockpiles of materials or heavy equipment should not be placed closer to the top of the excavation slope than the depth of the excavation. In addition, the Contractor shall be made responsible for controlling any ground or surface water wherever encountered on the project. In this regard, sloping, slope protection, ditching, sumps, dewatering, and other measures should be employed as necessary to permit proper completion of the work. Discharges from de-watering systems must be included in the project Surface Water Pollution Prevention Plan (SWPPP).

3.8.4 Permanent Slopes

We recommend that permanent cut-and-fill slopes be no steeper than 2H:1V for stability purposes and maintenance considerations. We recommend that all slopes be covered with 6 inches of topsoil and seeded and/or planted with relatively fast-growing vegetation to limit surface sloughing and erosion. Additionally, low growth, shrubs can be planted to enhance the stability of the slopes and limit surface sloughing and erosion. Unless vegetation is well established or slopes are covered with plastic, some erosion can be expected.

3.8.5 Structural Fill

The glacial till soils present at the site are moisture sensitive due to their high fines content and will not likely be suitable for use as structural fill during wet weather conditions. Soils with a high fines content may be difficult to compact if the moisture content is not at or below the optimum moisture content. The onsite granular outwash soils may be suitable for use as structural fill, provided they are free of organic or deleterious material, and are placed in accordance with the recommendations presented in this report.

If the earthwork is to take place during the normally wet period of the year, provisions should be in place for export of wet, moisture sensitive soil and import of granular structural fill material. Imported structural fill should consist of well-graded gravel and/or sand with a maximum grain size of 3 inches and less than 5 percent fines (material passing the U.S. Standard No. 200 Sieve). If construction occurs during dry periods the fines content can be increased to 10 percent. All material proposed for use as structural fill should be approved by a representative of the geotechnical engineer.

Structural fill should be placed in loose lifts no more than 12 inches thick, moisture conditioned as necessary (moisture content of soil should be within 2 percent of optimum moisture) and compacted to at least 95 percent of the maximum dry density as determined by ASTM Test Method D-1557. Additional lifts should not be placed if the previous lift did not meet the required dry density or if soil conditions are not stable. Note that, although in place density testing of fill is frequently used as the primary criterion for acceptance of fill, it should not be the only criterion. If, in the judgment of the geotechnical engineer or his representative, placed fill is not suitable it should be rejected regardless of in place density test results. As an example, fill that is compacted wet of the optimum moisture content may exhibit “pumping” behavior even if in place density test results indicate greater than 95 percent compaction has been achieved. In such a situation, the fill should be removed and replaced with drier material.

3.8.6 Utility Trench Fill

Excavations for utilities should be completed and maintained during utility installation and backfilling, in accordance with Occupational Safety and Health Administration (OSHA) requirements. The utility contractor should be responsible for maintaining safety within open trenches. Care should be taken to reduce surcharge loads and vibrations adjacent to utility excavations. Groundwater seepage and sloughing of the test pit sidewalls was encountered at about 7.5 feet bgs during excavation of test pit TP-2. Due to groundwater seepage being encountered during excavation, the contractor should allow for shoring in the event that the groundwater destabilizes the trench sidewalls.

The subsurface soils in the upper 4 feet at this site generally included loose to medium dense silty sand with varying amounts of gravel. We expect that the potential for significant caving within open excavations will be moderate in the loose to medium dense soil so the utility contractor should exercise caution and be prepared to slope excavation sidewalls at gentler angles or install temporary shoring, if conditions indicate that caving may occur. We expect that the potential for significant caving within open excavations will be relatively low in areas of medium dense or denser soil. The factors that may influence the potential for caving could include the depth and length of trench that is opened at any one time, along with the length of time the trench is to remain open and surface and groundwater conditions. The utility contractor should be aware of these factors and observe the excavation for signs of possible caving, such as heavy seepage and tension cracks within and above the excavation sidewalls.

Backfill for utility trenches should consist of suitable material, as described in the **Structural Fill** section of this report. Utility trench backfill placed beneath building and pavement areas should be compacted to at least 95 percent of the maximum dry density based on ASTM Test Method D-1557. The utility trench backfill placed beneath pavement areas, at depths greater than 2 feet below the final grade may be compacted to a minimum of 90 percent of the maximum dry density, as defined by ASTM Test Method D-1557. The bedding material for utility pipes should be in accordance with the manufacturer’s specifications. The utility contractor should use equipment and backfill placement methods, which will reduce the possibility of damage to utilities or structures during placement and compaction.

3.8.7 Wet Weather Earthwork

The soils encountered during explorations that are likely to be encountered during grading activities are granular but contain sufficient amounts of silt and fine sand to make them moisture sensitive. The soils would likely provide a suitable working surface under dry conditions; however, after exposure to rain and continual vehicle traffic, the native soils will degrade rapidly and require overexcavation.

Wet weather generally begins about October and continues through about May, although rainy periods may occur at any time of the year. Therefore, we recommend scheduling earthwork during the normal dry weather months of June through September. In our opinion, earthwork performed during the dry weather months would be less costly than wet weather earthwork.

The following recommendations are applicable if earthwork is to be accomplished in wet weather or in wet conditions:

- Fill material should consist of clean, well-graded sand, or sand and gravel, with not more than 5 percent passing the No. 200 sieve, based on wet-sieving the minus-¾-inch fraction. Any fines should be nonplastic.
- A geotextile separator should be placed between native soils and structural fill.

- The ground surface in and surrounding the construction area should be sloped as much as possible to promote runoff of precipitation away from work areas and to prevent ponding of water.
- Covering work areas or slopes with plastic, sloping, ditching, use of sumps, dewatering, and other measures should be employed as necessary to permit proper completion of the work. Bales of straw and/or geotextile silt fences should be used to control surface soil movement and erosion.
- Earthwork should be accomplished in small sections to reduce exposure to wet conditions. Excavation or the removal of unsuitable soil should be followed immediately by the placement of concrete or a layer of compacted, clean, structural fill or lean-mix concrete.
- No soil should be left uncompacted and exposed to moisture. A smooth drum vibratory roller, or equivalent, should be used to seal the surface if wet weather is anticipated. Wet surface soils should be removed prior to filling each day. Stockpiles of structural fill should be protected from wet weather with waterproof sheeting.
- In-place soils or fill soils that become wet and unstable, and/or too wet to suitably compact, should be removed and replaced with clean granular soil (see above).
- Excavation and fill placement activities should be observed on a full-time basis by an experienced geotechnical engineer if these activities are to be completed during wet weather or under wet conditions.

The above recommendations for wet weather earthwork should be incorporated into the contract specifications.

3.8.8 Erosion Control

A Storm Water Pollution Prevention Plan (SWPPP) is required for all projects that disturb greater than 7,000 square feet. The SWPPP will be prepared by RDCJR Civil Engineering. The native glacial till soils at the site contain a moderate amount of silt. Basic erosion control measures should be adequate to trap sediments within the project limits.

We recommend that exposed soils be covered and protected from erosion. The soils on the slopes may erode in the disturbed state or under conditions of channelized water flow. Therefore, best management practices for erosion control including silt fences, hay bales, etc. should be used to prevent sediment from leaving the site and entering storm water sewer systems or surface waters. Water should not be allowed to free flow over the slopes. Stripping of vegetation on steep slopes should not be performed and stripping in other areas should be limited to the greatest extent possible for proposed future construction. We further recommend that vegetation be replanted on the slopes as soon as practical following completion of any grading. Stripped slope areas should be protected from weather with a plastic visqueen cover when construction will not be occurring on them for more than one to two days.

The Washington State Department of Ecology (DOE) has three publications, which may be helpful in developing long-term slope vegetation maintenance/protection and landscape plans:

- “Slope Stabilization and Erosion Control Using Vegetation: A Manual of Practice for Coastal Property Owners", May 1993, Publication 93-30.
- "Vegetation Management: A Guide for Puget Sound Bluff Property Owners", May 1993, Publication 93-31.
- "Surface Water and Ground Water on Coastal Bluffs: A Guide for Puget Sound Property Owners", June 1995, Publication 95-107.

3.8.9 Stormwater

Runoff from building and impervious surfaces should be directed into a stormwater disposal system designed by a State of Washington registered engineer experienced with stormwater system design. Stormwater infiltration as required by City of Poulsbo Critical Areas Ordinance 16.20.515 – Development Standards for Critical Aquifer Recharge Areas is not feasible on the site due to the presence of glacial till. Ground surfaces should be sloped a minimum of 5 percent for a minimum distance of 10 feet away from structures and paved surfaces 2 percent for 10 feet in accordance with Section 1804.3 in the 2012 International Building Code (IBC). Stormwater drainage and/or mitigation shall be in accordance with local codes and regulations.

4.0 LIMITATIONS

This report has been prepared for Caldart Poulsbo LLC regarding the subject project. Information presented in this report has been collected and interpreted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions, and in accordance with sound and generally accepted principles consistent with normal consulting practice. No other warranty, expressed or implied, including (but not limited to) any warranty or merchantability or fitness for a particular use has been made.

Caldart Poulsbo LLC and EnviroSound discussed the risks and rewards associated with this project, as well as EnviroSound's fee for services. Caldart Poulsbo LLC and EnviroSound agreed to allocate certain of the risks so that, to the fullest extent permitted by law, EnviroSound's total aggregate liability to Caldart Poulsbo LLC is limited to $50,000 or the fee, whichever is greater, for any and all injuries, claims (including any claims for costs of defense or other incurred costs), losses, expenses, or damages whatsoever arising out of or in any way related to EnviroSound's services for this project, from any cause or causes whatsoever, including but not limited to, negligence, errors, omissions, strict liability, breach of contract, breach of warranty, negligent misrepresentation, or other acts giving rise to liability based upon contract tort, or statute.

In the event that change in the nature, design, or location of the proposed construction is made, or any physical changes to the site occur, recommendations are not to be considered valid unless the changes are reviewed by EnviroSound and conclusions of this report are modified or verified in writing.

The subsurface exploration logs and related information depicts conditions only at the specific locations and at the particular time designated on the logs. The passage of time may result in a change of subsurface conditions at these exploration locations. Subsurface conditions at other locations may differ from conditions occurring at the exploration locations. The nature and extent of variations of subsurface conditions between explorations are not known. If variations appear during additional explorations or construction, reevaluation of recommendations in this report may be necessary.

Stratification lines designating the interface between soil types in subsurface exploration logs represent approximate boundaries. The transition between materials may be gradual.

Analyses and recommendations provided in this report are based in part upon the data obtained from the subsurface explorations.

The scope of EnviroSound services did not include an environmental assessment for the presence or absence of hazardous and/or toxic materials, in the soil, groundwater, surface water, or atmosphere. Any statements or absence of statements in this report on any subsurface exploration log regarding staining or odor of soil, groundwater, or surface water, unusual or suspicious items, or conditions observed are strictly descriptive information for Caldart Poulsbo LLC.

REFERENCES

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- USDA Online Web Soil Survey – http://websoilsurvey.nrcs.usda.gov/app/.
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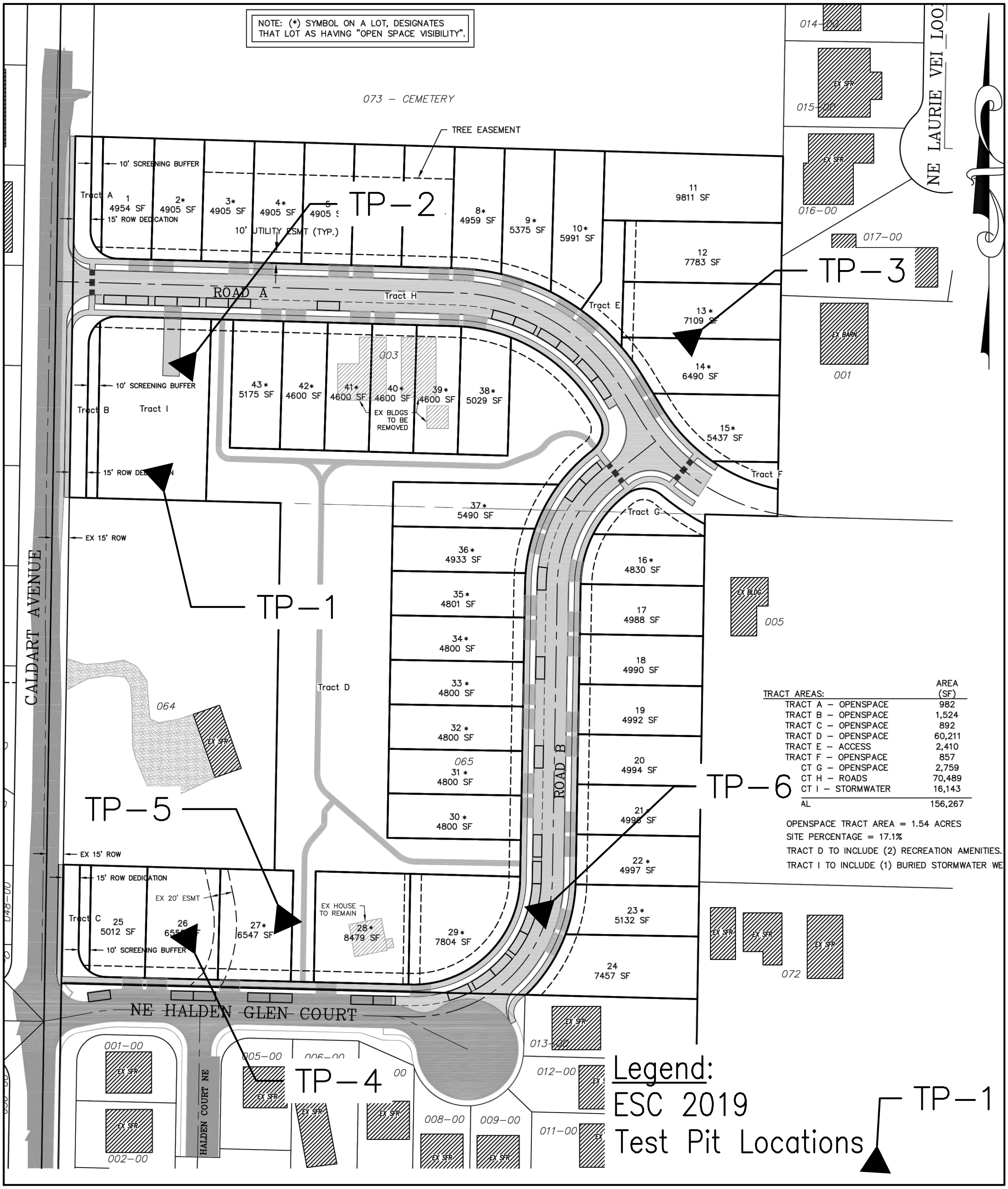
- U.S.G.S. 7.5-minute series topographic maps “Suquamish and Poulsbo, Washington Quadrangles”, 2017.
- "Geologic Map of Surficial Deposits in the Seattle 30’ x 60’ Quadrangle Washington," Young and others, 1993.
- “Geologic Map of the Lofall 7.5-minute Quadrangle, Kitsap and Jefferson Counties, Washington”, Washington State Division of Geology and Earth Resources, Map Series 2013-03, Contreras, et al., October 2013.
- “Geologic Map of the Suquamish 7.5-minute Quadrangle and part of the Seattle North 7.5-minute x 15-minute Quadrangle, Kitsap County, Washington”, U.S. Geological Survey, Scientific Investigations Map 3181, Haugerud and Troost, 2011.
- “Geologic Map of the Seabeck and Poulsbo 7.5-minute Quadrangles, Kitsap and Jefferson Counties, Washington”, Washington State Division of Geology and Earth Resources, Map Series 2013-02, Polenz, et al., October 2013.
- Washington State Department of Ecology Water Well Logs – https://fortress.wa.gov/ecy/waterresources/map/WCLSWebMap/default.aspx.
- Kitsap County Online Parcel Information – https://psearch.kitsapgov.com/psearch/index.html.
- City of Poulsbo Critical Areas Ordinance – https://www.codepublishing.com/WA/Poulsbo/#!/Poulsbo16/Poulsbo1620.html#16.20.420.
- “Geological Hazard Areas Map,” City of Poulsbo Kitsap County, Washington, dated June 14, 2017.
- “Aquifer Critical Area Map,” City of Poulsbo Kitsap County, Washington, dated December 2, 2009.
- Aerial photographs provided by Google Earth and Kitsap County.
- 2015 International Building Code (IBC)
- U.S. Seismic Design Maps – https://seismicmaps.org/

Figure generated from Google Earth Pro, accessed 3-20-19.

EnviroSound Consulting

FIGURE 1. Site Vicinity
Project Name: Calavista Development
Location: Poulsbo, WA
Project: ESC19-G010
Client: Caldart Poulsbo, LLC.
Date: October, 2019



TRACT AREAS:	AREA (SF)
TRACT A – OPENSPACE	982
TRACT B – OPENSPACE	1,524
TRACT C – OPENSPACE	892
TRACT D – OPENSPACE	60,211
TRACT E – ACCESS	2,410
TRACT F – OPENSPACE	857
CT G – OPENSPACE	2,759
CT H – ROADS	70,489
CT I – STORMWATER	16,143
AL	156,267

OPENSPACE TRACT AREA = 1.54 ACRES

SITE PERCENTAGE = 17.1%

TRACT D TO INCLUDE (2) RECREATION AMENITIES.

TRACT I TO INCLUDE (1) BURIED STORMWATER WE

Figure generated from drawing provided by RDCJR Civil Engineering.

EnviroSound Consulting

FIGURE 2. Site Plan

Project Name: Calavista Development
Location: Poulsbo, WA
Project: ESC19-G010
Client: Caldart Poulsbo, LLC.
Date: October, 2019

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N.T.S.

APPENDIX A

EnviroSound Exploration Logs

TEST PIT LOG – TP-1

Project Name: Calavista
Client: Caldart Poulsbo, LLC.
Project Number: ESC19-G010

Test Pit Elevation: 307 feet
Test Pit Location: See Figure 2
Depth to Groundwater: None Encountered

DEPTH (FT.)	USGS Classification	VISUAL PHYSICAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DEPTH (FT.)	LABORATORY TESTING RESULTS FOR SAMPLE
0		0-0.5’ Grass, topsoil.				
	SM	0.5’-4.0’ Loose to medium dense, orange-brown to brown-gray, slightly gravelly, silty SAND; moist, roots.	S-1 S-2	Grab Grab	1.0’ 2.0’	Gravel: 6.2% Sand: 76.7% Fines: 17.1% M.C.: 11%
5	SP	4.0’-4.5’ Medium dense to dense, gray, slightly gravelly, fine to medium SAND; moist.	S-3	Grab	4.0’	Gravel: 18.4% Sand: 62.3% Fines: 19.3% M.C.: 12%
	SP-SM	4.5’-6.5’ Dense, gray, slightly gravelly, slightly silty SAND; moist. -Scattered dense silty sand seams at 5.0’	S-4 S-5	Grab Grab	5.0’ 6.0’	
	SP	6.5’-8.0’ Dense, gray, SAND; moist, trace silt.	S-6	Grab	7.0’	
10	SP	8.0’-11.0’ Dense, gray, gravelly SAND; moist, trace silt.	S-7	Grab	11.0’	Gravel: 0.8% Sand: 94.3% Fines: 4.9% M.C.: 14%
15		Total Depth: 11.0’ Groundwater: None Encountered				

Excavation Contractor: Bullseye Excavation
Excavation Equipment: Mini-Trackhoe
Operator: Todd

Excavation Date: 2-27-19
ESC Representative: DPO
Page 1 of 1

TEST PIT LOG – TP-2

Project Name: Calavista
Client: Caldart Poulsbo, LLC.
Project Number: ESC19-G010

Test Pit Elevation: 307 feet
Test Pit Location: See Figure 2
Depth to Groundwater: Seepage at ~7.5’

DEPTH (FT.)	USGS Classification	VISUAL PHYSICAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DEPTH (FT.)	LABORATORY TESTING RESULTS FOR SAMPLE
0		0-0.5’ Topsoil, forest duff.				
	SM	0.5’-2.0’ Loose to medium dense, orange-brown, slightly gravelly, silty SAND; moist, roots, charcoal.	S-1	Grab	1.0’	
	SM	2.0’-4.0’ Medium dense to dense, brown-gray, slightly gravelly, silty SAND; moist.	S-2	Grab	2.5’	Gravel: 1.1% Sand: 78.6% Fines: 20.3% M.C.: 14%
5	SW	4.0’-5.5’ Dense, gray, gravelly SAND; moist, trace silt.	S-3	Grab	4.5’	
	SP	5.5’-7.0’ Dense, gray, fine to medium SAND; moist, trace silt and gravel.	S-4	Grab	6.0’	Gravel: 0% Sand: 92.9% Fines: 7.1% M.C.: 17%
	SW	7.0’-9.0’ Dense to very dense, gray, gravelly SAND; moist to wet, trace silt.	S-5	Grab	8.5’	Gravel: 27.1% Sand: 64.8% Silt/Clay: 8.1% M.C.: 10%
10	SM	9.0’-11.0’ Dense to very dense, brown-gray, gravelly, silty SAND; moist, iron oxide staining.	S-6	Grab	10.0’	
		Total Depth: 11.0’ Groundwater: Seepage at ~8.0’				
15						

Excavation Contractor: Bullseye Excavation
Excavation Equipment: Mini-Trackhoe
Operator: Todd

Excavation Date: 2-27-19
ESC Representative: DPO
Page 1 of 1

TEST PIT LOG – TP-3

Project Name: Calavista
Client: Caldart Poulsbo, LLC.
Project Number: ESC19-G010

Test Pit Elevation: 356 feet
Test Pit Location: See Figure 2
Depth to Groundwater: None Encountered

DEPTH (FT.)	USGS Classification	VISUAL PHYSICAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DEPTH (FT.)	LABORATORY TESTING RESULTS FOR SAMPLE
0		0-0.5’ Topsoil				
	SM	0.5’-3.0’ Medium dense to dense,orange-brown to brown gray, slightly gravelly, silty SAND; moist, iron-oxide staining, roots.	S-1 S-2	Grab Grab	1.5’ 3.0’	M.C.: 15% Gravel: 9.2% Sand: 63.2% Silt/Clay: 27.6% M.C.: 12%
5	SM	3.0’-8.0’ Dense to very dense, brown-gray to gray, slightly gravelly, silty SAND; moist, scattered cobbles, iron-oxide staining.	S-3	Grab	5.0’	
			S-4	Grab	8.0’	
10		Total Depth: 8.0’ Groundwater: None Encountered				
15						

Excavation Contractor: Bullseye Excavation
Excavation Equipment: Mini-Trackhoe
Operator: Todd

Excavation Date: 2-27-19
ESC Representative: DPO
Page 1 of 1

TEST PIT LOG – TP-4

Project Name: Calavista
Client: Caldart Poulsbo, LLC.
Project Number: ESC19-G010

Test Pit Elevation: 302 feet
Test Pit Location: See Figure 2
Depth to Groundwater: None Encountered

DEPTH (FT.)	USGS Classification	VISUAL PHYSICAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DEPTH (FT.)	LABORATORY TESTING RESULTS FOR SAMPLE
0		0-0.5’ Topsoil, forest duff.				
	SM	0.5’-2.5’ Loose to medium dense, orange-brown to brown-gray, slightly gravelly, silty SAND; moist, roots.	S-1	Grab	1.0’	
5	SP-SM	2.5’-9.0’ Dense, gray, slightly silty, fine to medium SAND; moist.	S-2	Grab	3.0’	Gravel: 0% Sand: 88.1% Fines: 11.9% M.C.: 9%
			S-3	Grab	6.0’	
			S-4	Grab	6.5’	Gravel: 0.3% Sand: 79.6% Fines: 20.1% M.C.: 16%
10	SP	9.0’-9.5’ Dense, gray, gravelly SAND; moist, trace silt.	S-5	Grab	9.0’	
	SM	9.5’-11.0’ Dense, brown-gray, gravelly, silty SAND; moist.	S-6	Grab	10.5’	Gravel: 37.9% Sand: 43.1% Silt/Clay: 19.0% M.C.: 9%
15		Total Depth: 11.0’ Groundwater: None Encountered				

Excavation Contractor: Bullseye Excavation
Excavation Equipment: Mini-Trackhoe
Operator: Todd

Excavation Date: 2-27-19
ESC Representative: DPO
Page 1 of 1

TEST PIT LOG – TP-5

Project Name: Calavista
Client: Caldart Poulsbo, LLC.
Project Number: ESC19-G010

Test Pit Elevation: 305 feet
Test Pit Location: See Figure 2
Depth to Groundwater: None Encountered

DEPTH (FT.)	USGS Classification	VISUAL PHYSICAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DEPTH (FT.)	LABORATORY TESTING RESULTS FOR SAMPLE
0		0-0.5’ Topsoil, forest duff.				
	SM	0.5’-2.5’ Loose to medium dense, orange-brown to light brown, silty, gravelly SAND; moist, scattered cobbles, roots.	S-1	Grab	1.0’	
	SM	2.5’-5.0’ Medium dense to dense, brown-gray to gray, silty, slightly gravelly SAND; moist, roots, sand seams.	S-2 S-3	Grab Grab	3.0’ 4.5’	Gravel: 12.3% Sand: 68.5 Fines: 19.2% M.C.: 9%
5	SP	5.0’-6.5’ Dense, gray, SAND; moist, trace silt.	S-4	Grab	6.0’	Gravel: 1.4% Sand: 96.0% Fines: 2.6% M.C.: 5%
	SM	6.5’-9.5’ Dense to very dense, gray, slightly gravelly, silty SAND; moist, sand seams.	S-5	Grab	9.0’	Gravel: 9.5% Sand: 71.1% Silt/Clay: 19.4% M.C.: 10%
10		Total Depth: 9.5’ Groundwater: None Encountered				
15						

Excavation Contractor: Bullseye Excavation
Excavation Equipment: Mini-Trackhoe
Operator: Todd

Excavation Date: 2-27-19
ESC Representative: DPO
Page 1 of 1

TEST PIT LOG – TP-6

Project Name: Calavista
Client: Caldart Poulsbo, LLC.
Project Number: ESC19-G010

Test Pit Elevation: 328 feet
Test Pit Location: See Figure 2
Depth to Groundwater: None Encountered

DEPTH (FT.)	USGS Classification	VISUAL PHYSICAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DEPTH (FT.)	LABORATORY TESTING RESULTS FOR SAMPLE
0		0-0.5’ Topsoil				
	SM	0.5’-2.5’ Loose to medium dense, orange-brown, gravelly, silty SAND; moist, scattered cobbles, roots.	S-1	Grab	1.0’	
	GP	2.5’-4.0’ Medium dense to dense, orange-brown, slightly silty, sandy GRAVEL; moist, trace silt, iron-oxide staining.	S-2	Grab	3.0’	Gravel: 56.9% Sand: 38.9% Silt/Clay: 42.2% M.C.: 5%
5	SP	4.0’-6.0’ Dense, gray, fine to medium SAND; moist, trace silt.	S-3	Grab	5.0’	
	SM	6.0’-9.5’ Dense to very dense, brown-gray to gray, slightly gravelly, silty SAND; moist, scattered iron-oxide staining.	S-4 S-5 S-6	Grab Grab Grab	6.5’ 7.5’ 8.0’	Gravel: 0.8% Sand: 57.0% Silt/Clay: 42.2% M.C.: 17%
10 15		Total Depth: 9.5’ Groundwater: None Encountered				

Excavation Contractor: Bullseye Excavation
Excavation Equipment: Mini-Trackhoe
Operator: Todd

Excavation Date: 2-27-19
ESC Representative: DPO
Page 1 of 1

APPENDIX B

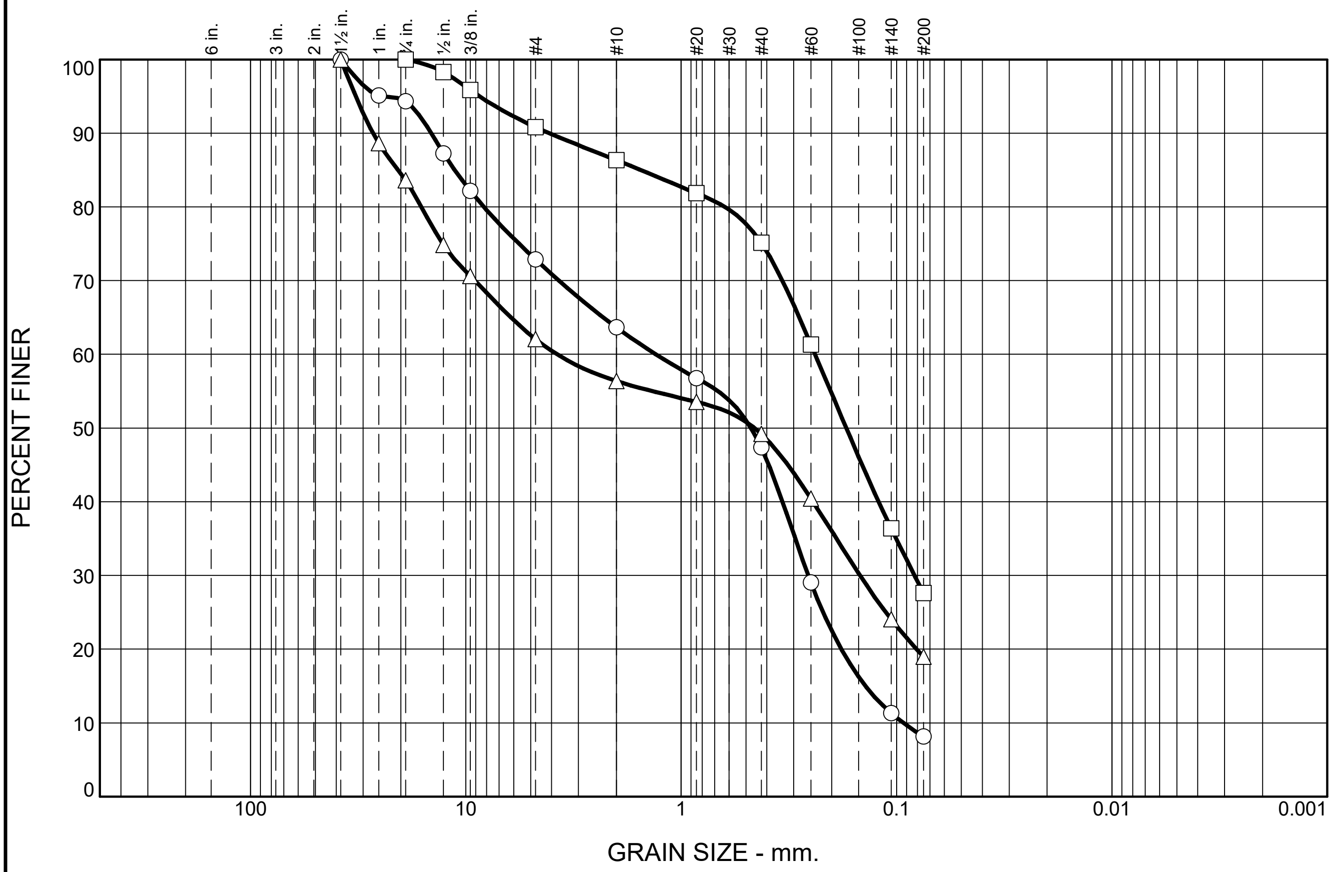
Laboratory Test Results

EnviroSound Consulting
ESC19-G010
CalaVista

Moisture Contents
ASTM D-2216
Table 1

Exploration Number	Sample Number	Depth(ft)	Moisture Content %
TP-1	S-2	2.0	11
TP-1	S-4	5.0	12
TP-1	S-6	7.0	14
TP-2	S-2	2.8	14
TP-2	S-4	6.0	17
TP-2	S-5	8.5	10
TP-3	S-1	1.5	15
TP-3	S-3	5.0	12
TP-4	S-2	3.0	9
TP-4	S-4	6.5	16
TP-4	S-6	10.5	9
TP-5	S-2	3.0	9
TP-5	S-4	6.0	5
TP-5	S-5	9.0	10
TP-6	S-2	3.0	5
TP-6	S-5	7.5	17

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	27.1	64.8	8.1		SP-SM	A-1-b	NP	NV
□	0.0	9.2	63.2	27.6		SM	A-2-4(0)	NP	NV
△	0.0	37.9	43.1	19.0		SM	A-1-b	NP	NV

SIEVE inches size	PERCENT FINER ○	□	△
1.5	100.0		100.0
1	95.1		88.6
0.75	94.3	100.0	83.6
0.5	87.3	98.3	74.8
0.375	82.2	95.8	70.6
	GRAIN SIZE		
D_{60}	1.3108	0.2391	3.7720
D_{30}	0.2571	0.0826	0.1477
D_{10}	0.0930		
	COEFFICIENTS		
C_c	0.54		
C_u	14.09		

SIEVE number size	PERCENT FINER ○	□	△
#4	72.9	90.8	62.1
#10	63.6	86.4	56.4
#20	56.8	81.8	53.5
#40	47.4	75.1	49.2
#60	29.1	61.3	40.4
#140	11.3	36.4	24.1
#200	8.1	27.6	19.0

Material Description

○ poorly graded sand with silt and gravel

□ silty sand

△ silty sand with gravel

REMARKS:

○

□

△

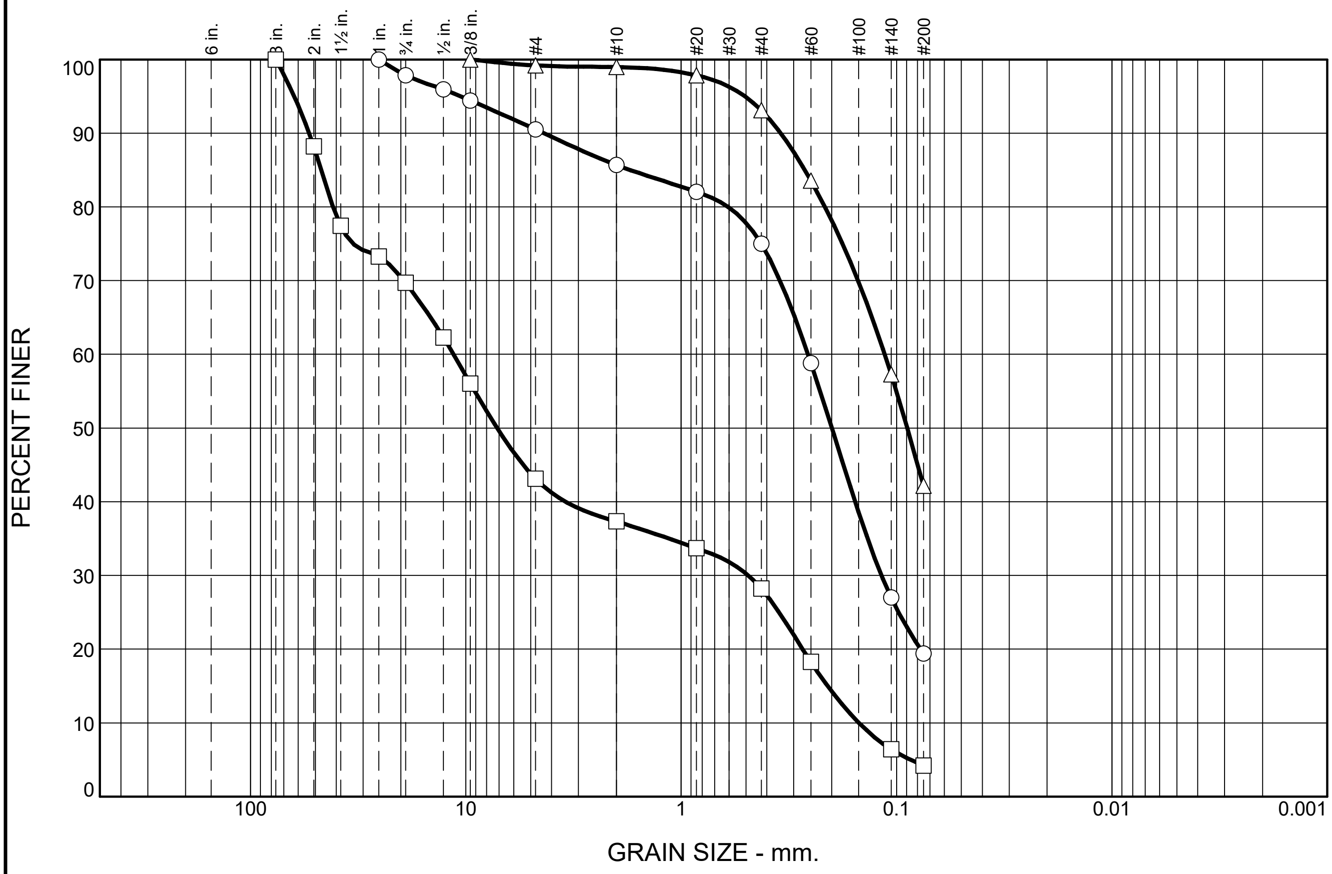
○ Depth: 8.5 Sample Number: TP2 S5
□ Depth: 5 Sample Number: TP3 S3
△ Depth: 10.5 Sample Number: TP4 S6

Phoenix Soil Research

Kingston, WA

Client: EnviroSound Consulting
Project: CalaVista ESC19-G010
Project No.: PSR19-9-0305 Figure 1

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	9.5	71.1	19.4		SM	A-2-4(0)	NP	NV
□	0.0	56.9	38.9	4.2		GP	A-1-a	NP	NV
△	0.0	0.8	57.0	42.2		SM	A-4(0)	NP	NV

SIEVE inches size	PERCENT FINER ○	□	△
3		100.0	
2		88.2	
1.5		77.4	
1	100.0	73.3	
0.75	97.9	69.7	
0.5	95.9	62.3	
0.375	94.4	56.0	100.0
	GRAIN SIZE		
D_{60}	0.2580	11.4164	0.1135
D_{30}	0.1174	0.4883	
D_{10}		0.1495	
	COEFFICIENTS		
C_c		0.14	
C_u		76.38	

SIEVE number size	PERCENT FINER ○	□	△
#4	90.5	43.1	99.2
#10	85.7	37.3	99.0
#20	82.0	33.7	97.8
#40	75.0	28.2	93.1
#60	58.8	18.3	83.5
#140	27.0	6.4	57.3
#200	19.4	4.2	42.2

Material Description

○ silty sand

□ poorly graded gravel with sand

△ silty sand

REMARKS:

○

□

△

○ Depth: 9 Sample Number: TP5 S5

□ Depth: 3.0 Sample Number: TP6 S2

△ Depth: 7.5 Sample Number: TP6 S5

Phoenix Soil Research

Kingston, WA

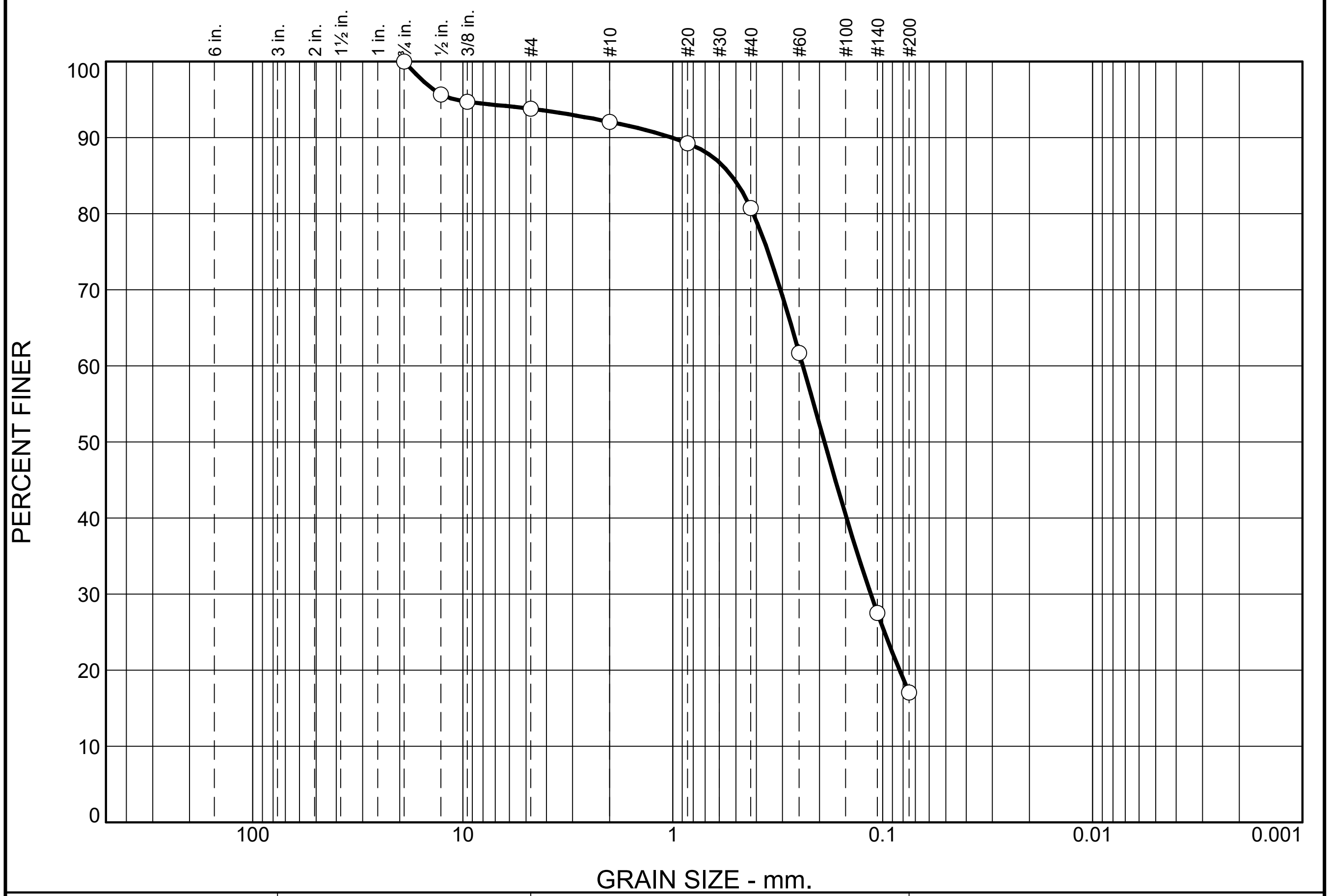
Client: EnviroSound Consulting

Project: CalaVista ESC19-G010

Project No.: PSR19-9-0305

Figure 2

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	
0.0	0.0	6.2	1.7	11.4	63.6	17.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.75	100.0		
0.5	95.7		
0.375	94.7		
#4	93.8		
#10	92.1		
#20	89.2		
#40	80.7		
#60	61.7		
#140	27.5		
#200	17.1		

* (no specification provided)

Material Description

silty sand

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 1.0133 D_{85}= 0.5251 D_{60}= 0.2400
D_{50}= 0.1894 D_{30}= 0.1140 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Sample Number: TP1 S2 **Depth:** 2

Date:

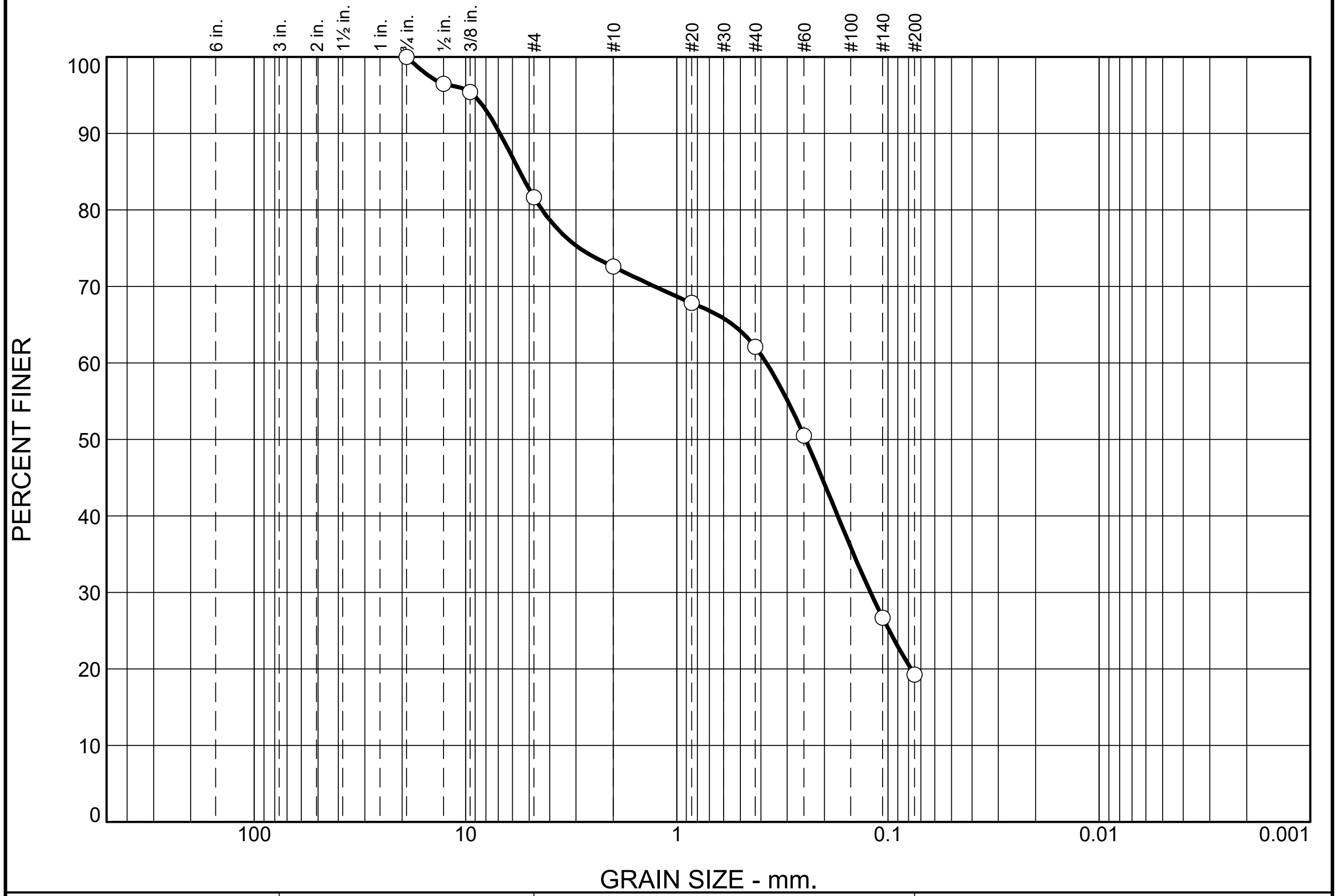
Phoenix Soil Research

Kingston, WA

Client: EnviroSound Consulting
Project: CalaVista ESC19-G010

Project No: PSR19-9-0305 **Figure** 3

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	
0.0	0.0	18.4	9.0	10.5	42.8	19.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.75	100.0		
0.5	96.5		
0.375	95.4		
#4	81.6		
#10	72.6		
#20	67.8		
#40	62.1		
#60	50.5		
#140	26.7		
#200	19.3		

* (no specification provided)

Material Description

silty sand with gravel

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D_{90}= 6.8754 D_{85}= 5.5424 D_{60}= 0.3762
D_{50}= 0.2457 D_{30}= 0.1210 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Sample Number: TP1 S4 **Depth:** 5.0

Date:

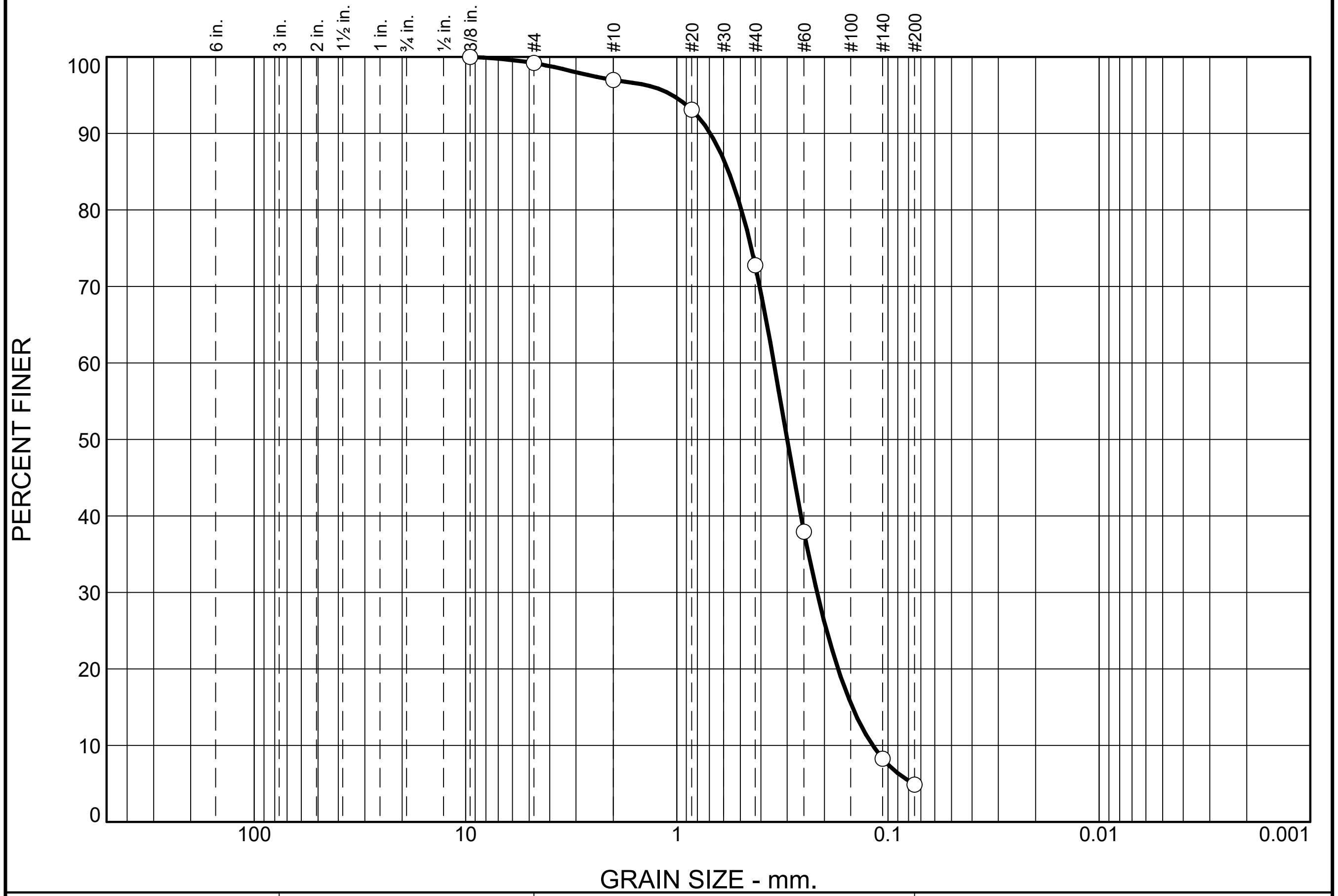
Phoenix Soil Research

Kingston, WA

Client: EnviroSound Consulting
Project: CalaVista ESC19-G010

Project No: PSR19-9-0305 **Figure** 4

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	
0.0	0.0	0.8	2.2	24.3	67.8	4.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375	100.0		
#4	99.2		
#10	97.0		
#20	93.1		
#40	72.7		
#60	37.9		
#140	8.3		
#200	4.9		

* (no specification provided)

Material Description

poorly graded sand

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D_{90}= 0.6946	D_{85}= 0.5679	D_{60}= 0.3468
D_{50}= 0.3001	D_{30}= 0.2169	D_{15}= 0.1473
D_{10}= 0.1182	C_u= 2.93	C_c= 1.15

Classification

USCS= SP AASHTO= A-3

Remarks

Sample Number: TP1 S6 **Depth:** 7

Date:

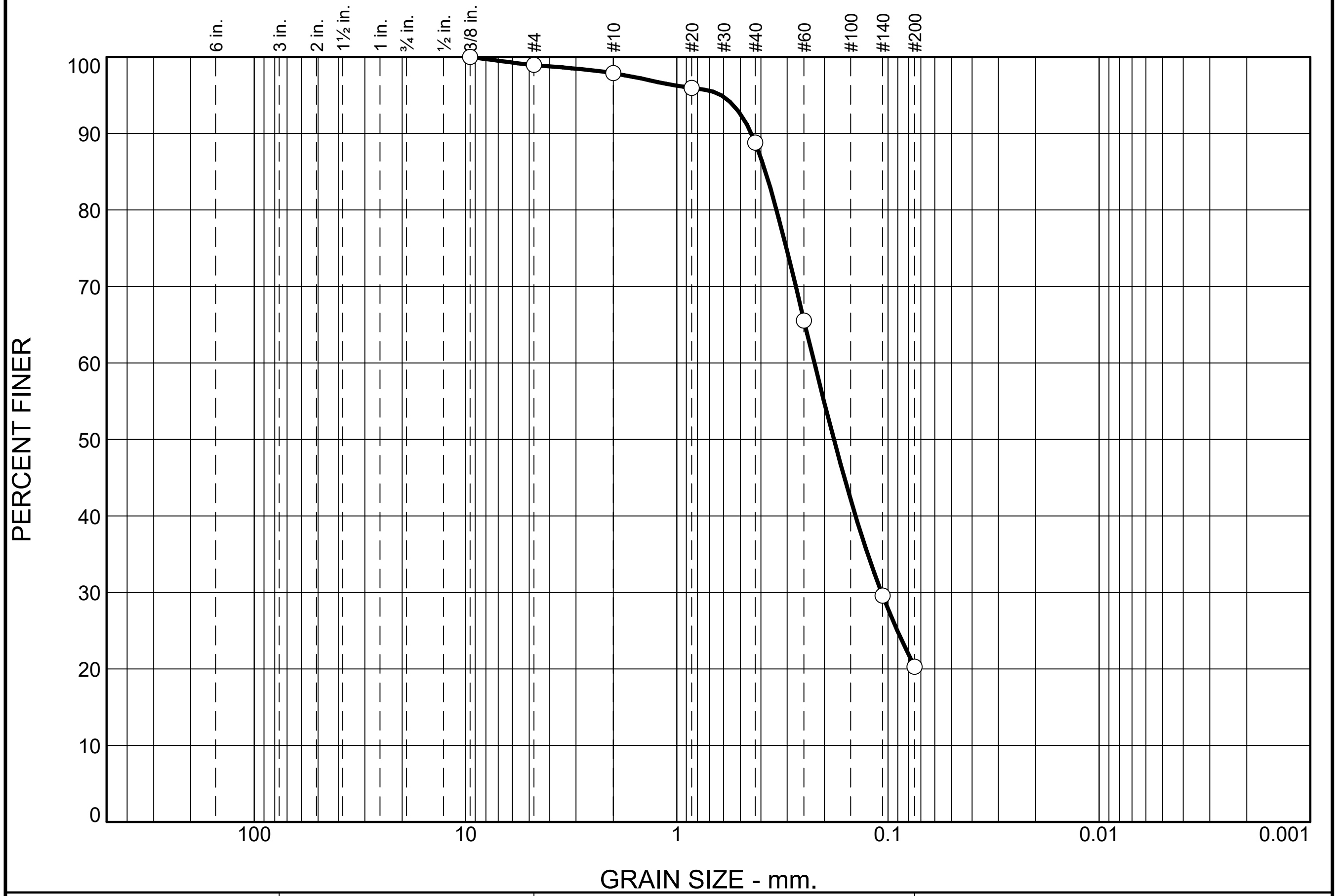
Phoenix Soil Research

Kingston, WA

Client: EnviroSound Consulting
Project: CalaVista ESC19-G010

Project No: PSR19-9-0305 **Figure** 5

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	
0.0	0.0	1.1	1.0	9.1	68.5	20.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375	100.0		
#4	98.9		
#10	97.9		
#20	95.9		
#40	88.8		
#60	65.5		
#140	29.6		
#200	20.3		

* (no specification provided)

Material Description

silty sand

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D_{90}= 0.4443 D_{85}= 0.3803 D_{60}= 0.2233
D_{50}= 0.1802 D_{30}= 0.1074 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Sample Number: TP2 S2 **Depth:** 2.8

Date:

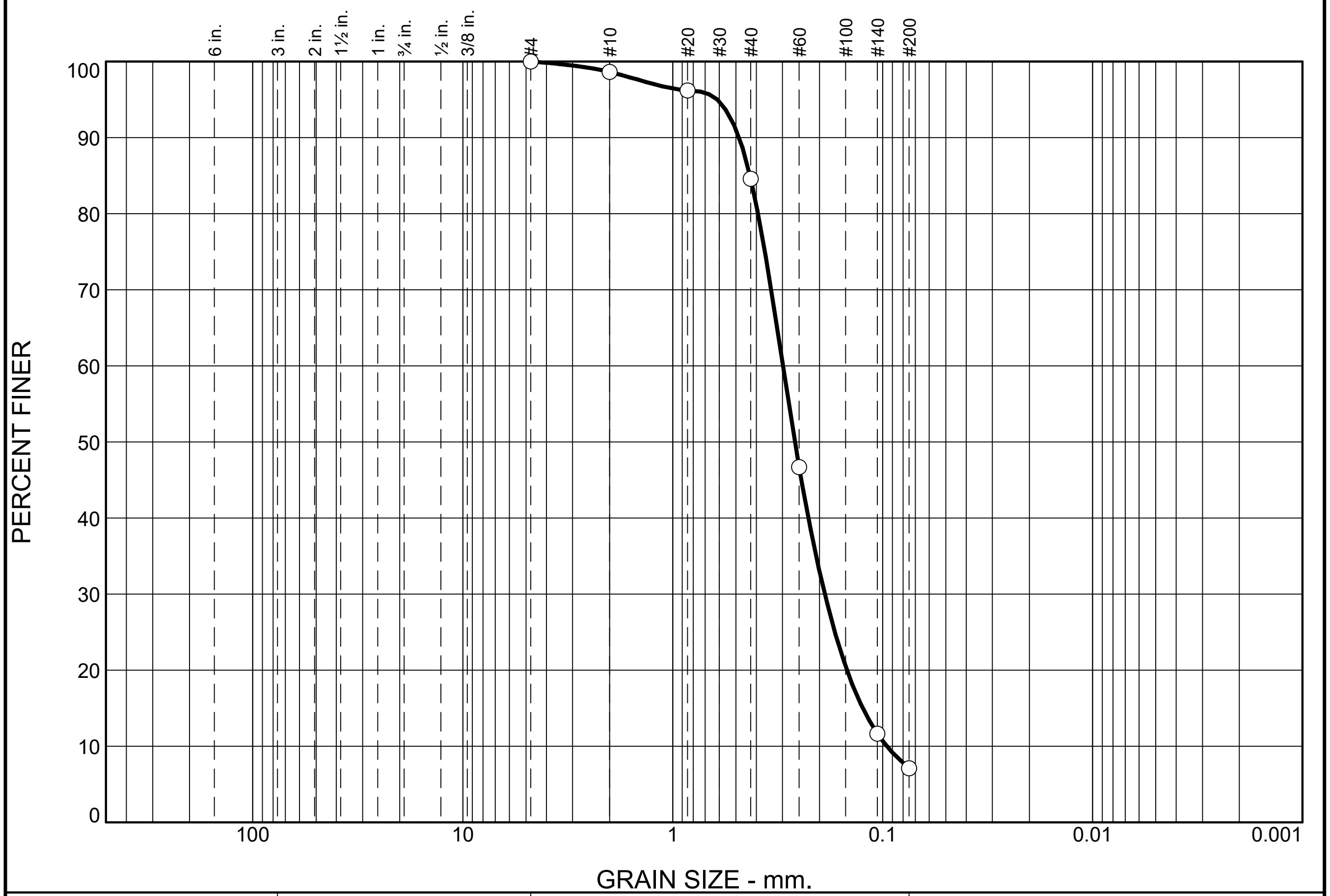
Phoenix Soil Research

Kingston, WA

Client: EnviroSound Consulting
Project: CalaVista ESC19-G010

Project No: PSR19-9-0305 **Figure** 6

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	
0.0	0.0	0.0	1.4	14.0	77.5	7.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	98.6		
#20	96.2		
#40	84.6		
#60	46.7		
#140	11.7		
#200	7.1		

* (no specification provided)

Material Description

poorly graded sand with silt

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D_{90}= 0.4836 D_{85}= 0.4287 D_{60}= 0.2984
D_{50}= 0.2618 D_{30}= 0.1887 D_{15}= 0.1243
D_{10}= 0.0955 C_u= 3.13 C_c= 1.25

Classification

USCS= SP-SM AASHTO= A-3

Remarks

Sample Number: TP2 S4 **Depth:** 6

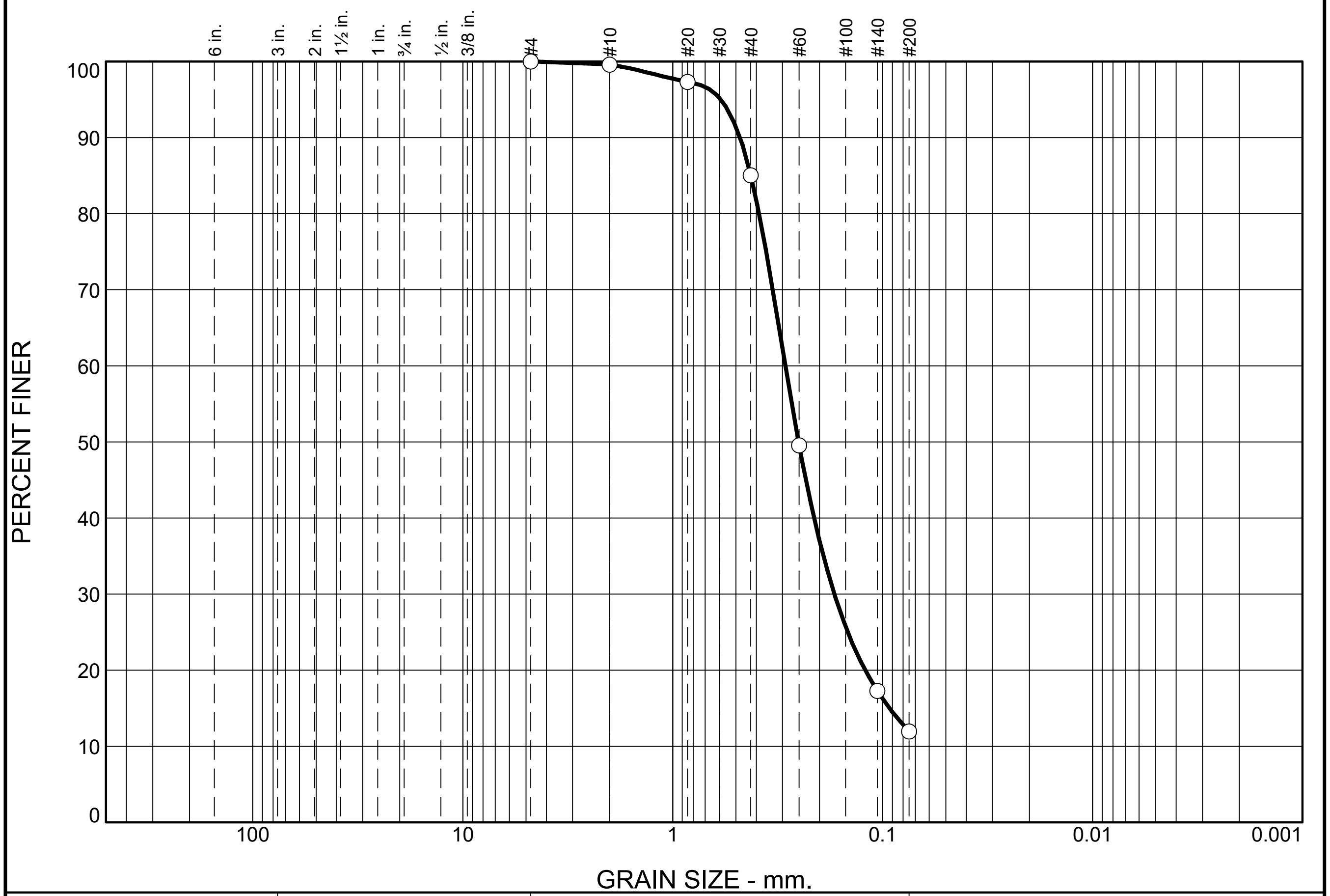
Date:

Phoenix Soil Research

Kingston, WA

Client: EnviroSound Consulting
Project: CalaVista ESC19-G010
Project No: PSR19-9-0305 **Figure** 7

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	
0.0	0.0	0.0	0.4	14.5	73.2	11.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.6		
#20	97.3		
#40	85.1		
#60	49.5		
#140	17.3		
#200	11.9		

* (no specification provided)

Material Description

poorly graded sand with silt

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D_{90}= 0.4785 D_{85}= 0.4246 D_{60}= 0.2907
D_{50}= 0.2518 D_{30}= 0.1698 D_{15}= 0.0927
D_{10}= C_u= C_c=

Classification

USCS= SP-SM AASHTO= A-2-4(0)

Remarks

Sample Number: TP4 S2 **Depth:** 3

Date:

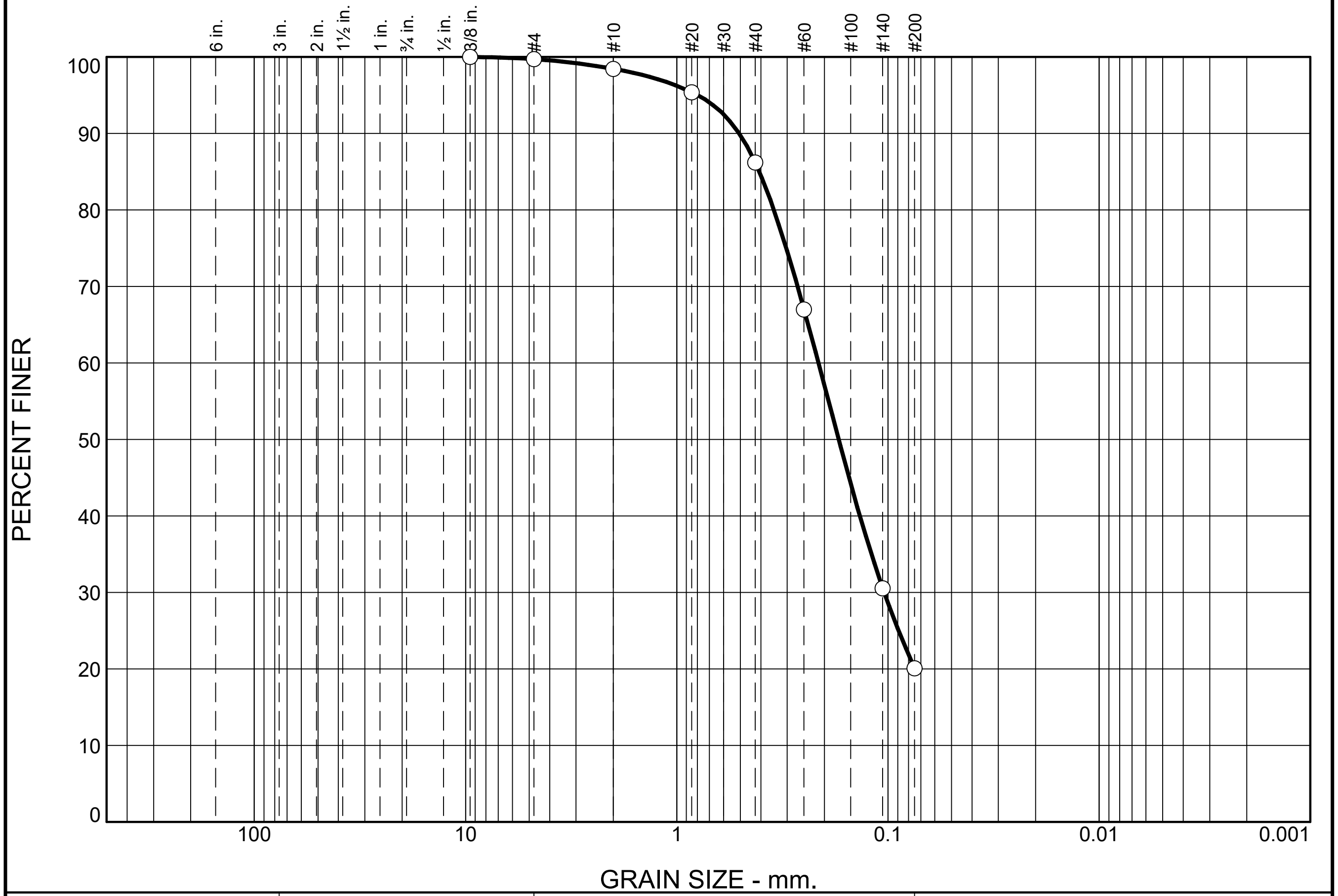
Phoenix Soil Research

Kingston, WA

Client: EnviroSound Consulting
Project: CalaVista ESC19-G010

Project No: PSR19-9-0305 **Figure** 8

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	
0.0	0.0	0.3	1.3	12.2	66.1	20.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375	100.0		
#4	99.7		
#10	98.4		
#20	95.4		
#40	86.2		
#60	67.0		
#140	30.5		
#200	20.1		

* (no specification provided)

Material Description

silty sand

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D_{90}= 0.5070 D_{85}= 0.4068 D_{60}= 0.2135
D_{50}= 0.1710 D_{30}= 0.1043 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Sample Number: TP4 S4 **Depth:** 6.5

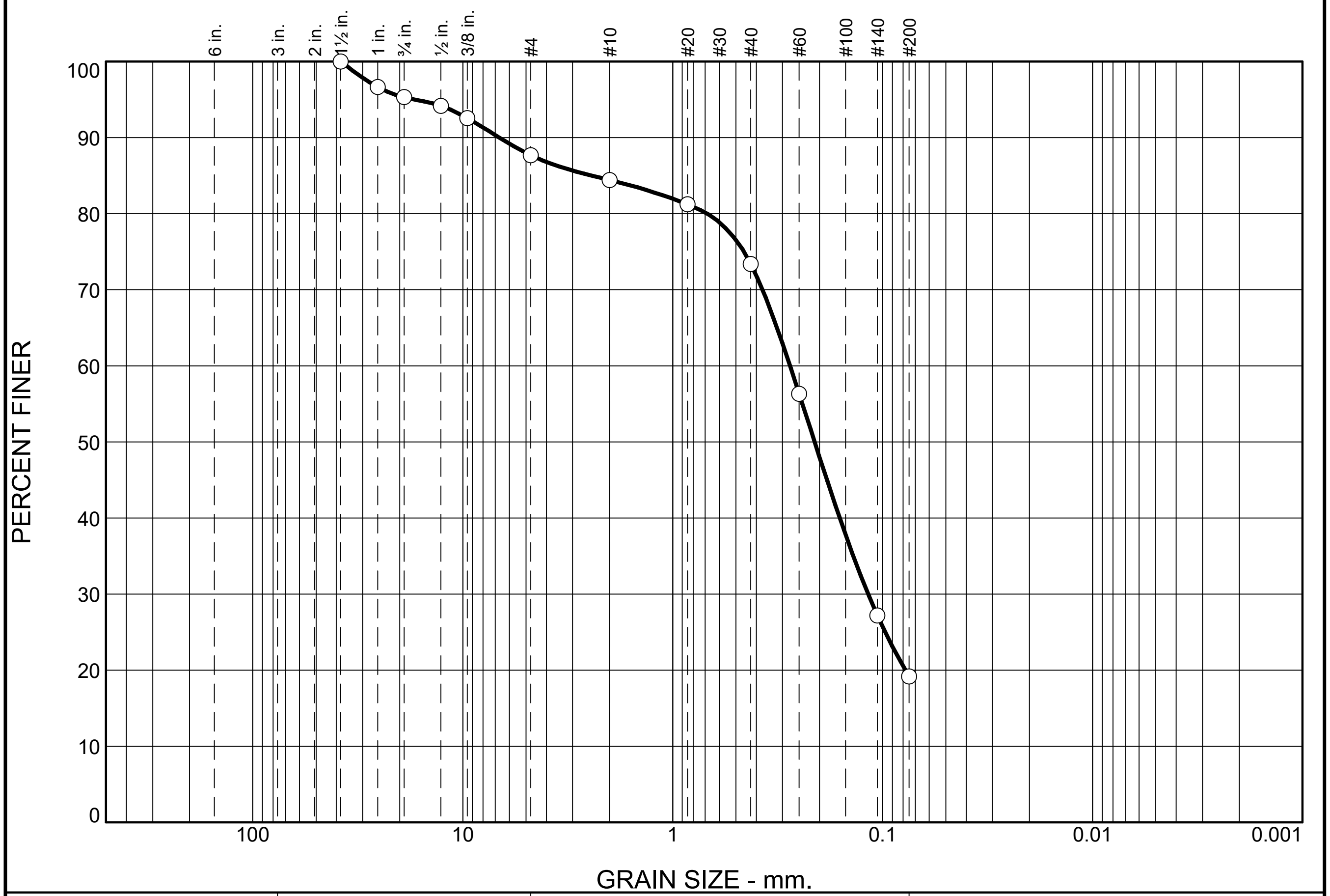
Date:

Phoenix Soil Research

Kingston, WA

Client: EnviroSound Consulting
Project: CalaVista ESC19-G010
Project No: PSR19-9-0305 **Figure** 9

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	
0.0	4.7	7.6	3.3	11.0	54.2	19.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1	96.6		
0.75	95.3		
0.5	94.2		
0.375	92.5		
#4	87.7		
#10	84.4		
#20	81.2		
#40	73.4		
#60	56.3		
#140	27.2		
#200	19.2		

* (no specification provided)

Material Description

silty sand

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D_{90}= 6.7029 D_{85}= 2.4314 D_{60}= 0.2764
D_{50}= 0.2110 D_{30}= 0.1173 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Sample Number: TP5 S2 **Depth:** 3.0

Date:

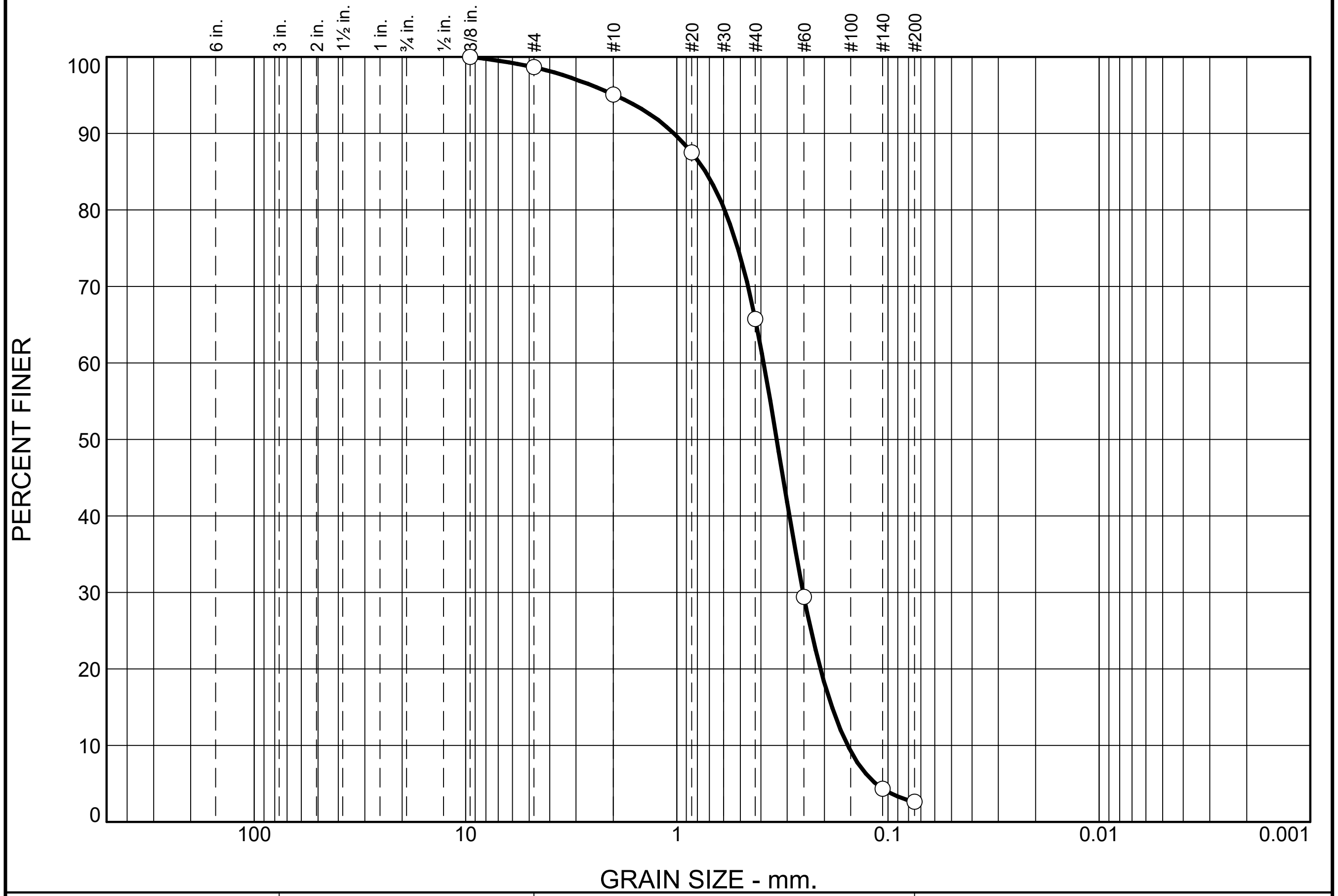
Phoenix Soil Research

Kingston, WA

Client: EnviroSound Consulting
Project: CalaVista ESC19-G010

Project No: PSR19-9-0305 **Figure** 10

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	
0.0	0.0	1.4	3.5	29.4	63.1	2.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375	100.0		
#4	98.6		
#10	95.1		
#20	87.5		
#40	65.7		
#60	29.4		
#140	4.3		
#200	2.6		

* (no specification provided)

Material Description

poorly graded sand

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D_{90}= 1.0312 D_{85}= 0.7316 D_{60}= 0.3878

D_{50}= 0.3363 D_{30}= 0.2524 D_{15}= 0.1841

D_{10}= 0.1551 C_u= 2.50 C_c= 1.06

Classification

USCS= SP AASHTO= A-3

Remarks

Sample Number: TP5 S4 **Depth:** 6.0

Date:

Phoenix Soil Research

Kingston, WA

Client: EnviroSound Consulting

Project: CalaVista ESC19-G010

Project No: PSR19-9-0305 **Figure** 11

SVC1

Soundview Consultants LLC
Environmental Assessment • Planning • Land Use Solutions

2907 Harborview Dr., Suite D, Gig Harbor, WA 98335
Phone: (253) 514-8952 Fax: (253) 514-8954

Technical Memorandum

To: **Barry Margolese** **File Number: 1001.0027**

From: **Don Babineau, Soundview Consultants LLC** **Date: September 24, 2019**

Re: **Stream Assessment for Stormwater Outfall – 19700 and 19840 Caldart Ave NE, Poulsbo, WA (File No. 18-152 229 PSD & 18152235 SPA)**

Dear Mr. Margolese,

This technical memorandum documents the downstream assessment of the South Fork of Dogfish Creek that Soundview Consultants LLC (SVC) conducted to determine potential impacts to the drainage associated with an offsite stormwater outfall for the Calavista PRD project. In July 2019, Soundview Consultants LLC (SVC) conducted an assessment of one-mile segment of the South Fork of Dogfish Creek from its intersection with Highway 305 to the proposed outfall location immediately south of Mosjon Circle. The South Fork of Dogfish Creek is located in the City of Poulsbo within Kitsap County, Washington (Figure 1). The drainage starts in the Southeast ¼ of Section 14, Township 26 North, Range 01 East, W.M. It continues on to Section 23, Township 26 North, Range 1 East, W.M. before turning back into the Western ½ of the previous section (Section 14).

Figure 1. South Fork Dogfish Creek Location

Background Data

Prior to the site investigation, SVC staff conducted background research using the Kitsap County Geographic Information System (GIS) data, Washington Department of Fish and Wildlife (WDFW) Priority Habitat and Species (PHS) and SalmonScape mapping tools, U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI), and Washington Department of Natural Resources (DNR) water typing system. SVC also reviewed stormwater and drainage as-built drawings (Attachment D).

The South-Fork of Dogfish Creek is located in a urban/residential setting and is bordered by residential development, single family residences, and Wilderness Park. Topography throughout headwaters consists of a flat hilltop that drains toward the moderately incised ravine in the lower reaches (Attachment C6).

The DNR stream typing map (Attachment C2) and the Kitsap County stream inventory (Attachment C4) identify this drainage as a fish bearing stream (Type F) up to the upper reaches within Myroeboe Wilderness Park. Upstream of the Wilderness Park, the DNR and Kitsap County designate this stream as non-fish-bearing (Type N) from the north boundary of the park to NE Odessa Way. WDFW's SalmonScape and PHS maps (Attachments C1 & C3) designate the end of fish far downstream of the endpoint marked by the DNR or Kitsap County. WDFW (PHS & Salmonscape) has the end of fish use located south of SR-305.

In 2003, the City of Poulsbo contracted Fishman Environmental Services, LLC to conduct stream habitat studies on multiple streams within the city. The associated report (Attachment D) is titled the "*Report on Best Available Science and Recommended Protection Measures for Fish and Wildlife Habitat*" (Fishman, 2003). This report identified the origin of these stream in a similar location as the DNR and Kitsap county. This report documented the end of anadromous fish use in the same location that the DNR and Kitsap County documented the end of all fish use. Based on the Fishman study, the City of Poulsbo contracted IFC International to draft the *South Fork Dogfish Creek Restoration Master Plan.*

In 2017, the City of Poulsbo adopted a new Critical Areas Ordinance (CAO) that outlined a conservation status and area for Dogfish Creek. The associated map of the South Fork of Dogfish Creek identifies the end of fish use in the same location as the DNR, Kitsap County; however, the origin of South Fork of Dogfish Creek is identified ~1 km north of any of the aforementioned data sources.

Precipitation

Precipitation data was obtained from the National Oceanic and Atmospheric Administration (NOAA) weather station at the Seattle-Tacoma International Airport Station in order to acquire percent of normal precipitation during and preceding the site investigation. A summary of data collected is provided in Table 1.

Table 1. Precipitation Summary[1].

Site Visit Date	Day Of	Day Before	1 Week Prior	2 Weeks Prior	30 Days Prior (Observed/Normal)	Year to Date (Observed/Normal)[2]	Percent of Normal[3]
7/31/2019	0.00	0.00	0.23	0.00	1.15/0.67	16.02/19.71	172/81

1. Precipitation volume provided in inches. Data obtained from NOAA (http://w2.weather.gov/climate/xmacis.php?wfo=sew) for Sea-Tac Airport.
2. Year-to-date precipitation is for the calendar year (beginning January 1) to the onsite date.
3. Percent of normal is shown for the 2019 calendar year to date.

Methods

In addition to the background research, SVC conducted a site investigation to collect data and assess portions of the South Fork of Dogfish Creek for 1 mile downstream of a proposed stormwater outfall. The drainage was assessed by investigating the upper reaches of each segment at culvert crossings and in between culverts where accessible. Bankfull widths and Ordinary High Water (OHW) widths were taken at between each culvert crossings in areas that are outside of influence of the culverts. Photographs were taken at these locations within the reach to document findings (Attachment B).

This investigation was conducted on July 31, 2019 by Don Babineau, Project Manager and Environmental Planner, and Jacob Layman, Environmental Scientist with Soundview Consultants LLC. A summary of staff qualifications are presented in Appendix D.

Results

Consistent with Figure 1 (Attachment D) of the stream reach assessment conducted for the City of Poulsbo by Fishman Environmental Services LLC (Fishman, 2003), SVC assessed the seasonal portion of headwater reach of the South Fork of Dogfish Creek as originating south of NE Watland Street adjacent to the neighborhood park/open space Tract D of the Caldart Heights Division 1 plat. SVC observations of this area indicate this as the beginning of a Type Ns water per PMC 16.20.310 and WAC 222-16-030 based on the first evidence of sorting of substrate observed and an area of scour (26 inches wide) with an average approximate OHWM and BFW of 30 inches. These channel characteristics indicate regular enough flow to be a seasonal system and not an ephemeral, stormwater driven system.

Upslope of the seasonal portion of the drainage, the stream is fed by a 24-inch culvert to the north which crosses under NE Watland Street. This culvert drains what appears to be a narrow constructed drainage between Lots 3 and 4 of the Caldart Heights plat. This segment of the drainage appears to be ephemeral based on the density of vegetation and lack of a continuous, defined channel. Within this area, the drainage has some segments of unsorted substrate on the bottom of the channel and the vegetation is dominated by Quaking Aspen (Populus tremuloides) Himalayan blackberry (Rubus armeniacus), horsetail (Equisetum sp) and creeping buttercup (Ranunculus repens). Upslope of this is a constructed ditch/swale as documented in the attached as-built Road and Drainage Plan for the Poulsbo Gardens Division I plat and noted as a "sculptured drainage swale" within a "play area" between Lots 10 and 22. Based on the swale profile figure in the as-built drawing, the existing grade was lowered by approximately 2 feet to create the swale within the play area. The as-built drawings are consistent with observations made by SVC staff. The drainage in this area currently exhibits characteristics indicative of an ephemeral stormwater conveyance. The channel gradually loses any horizontal relief on each bank and is totally devoid of sorting of the substrate within ~30 feet south of the culvert under Mosjon Circle which drains to the swale at its north end. This part of the drainage is completely vegetated within the swale and is dominated by creeping buttercup (Ranunculus repens), spotted ladysthumb (Persicaria maculosa), common plantain (Plantago major), and soft rush (Juncus effuesus). In the play area immediately adjacent to the Caldart heights plat, the drainage flattens out into a lawn. In this area, the transition from upland lawn to drainage course is indistinct and drainage appears to have been mowed along with the adjacent lawn prior the July 2019 site visit. The approximate average width of the constructed ditch upslope of the lawn is approximately 50 inches. Further upslope north of Mosjon Circle, consistent with observations made by SVC staff, the as-built Road and Drainage Plan shows the drainage as a stormwater detention swale which was lowered from existing grade by approximately 4 to 6 feet to create the detention area.

A Restoration Master Plan for the South Fork of Dogfish Creek prepared for the City of Poulsbo by IFC International (IFC, 2010) depicts the drainage in Figure 2 (Attachment D) of the report noting it as South Fork Dogfish Creek Stream Alignment. Figure 2 of the IFC report shows the stream alignment extending through the play area depicted on the as-built storm drainage plans and continuing north of Mosjon Circle within the detention swale for the Poulsbo Gardens Division I plat. In Section 3.2 of the IFC report, the drainage is generally described upstream of Wilderness park and west of Caldart Avenue NE as a seasonal channel and bioswale. Based on SVC's observations and as-built documentation, the portion of the drainage within the Poulsbo Garden plat where the proposed outfall is located would be consistent with IFC's reference to a bioswale as this drainage segment appears to be an ephemeral manmade stormwater detention and conveyance system discharging into the origin of the seasonal channel starting south of NE Watland Street.

Downstream from the point of origin of the season portion of the drainage, the substrate returns to a silty, unsorted profile within a short distance and the channel begins to widen and lose incision. Approximate average OHWM in this lower section is 54 inches and the BFW is approximately 100 inches. Dominant vegetation includes and Himalayan blackberry (Rubus armeniacus). Although this section of reach was dry during the site visit and appears to lack viable fish habitat, this reach of the drainage is the location cited within the 2003 Fishman study as having stream/riparian function to protect for resident fish use.

Once this drainage passes under NE Odessa Street, it once again exhibits scour below the culvert, but quickly returns to a silty, unsorted substrate profile. Within this area is the stream begins to display a more defined incision to the channel. BFW in this area is 65 inches with an OHWM of ~ 20 inches. Below the reach located between NE Odessa Way and NE Fontaine Way the stream becomes heavily forested. However, access is not allowed in this area by the property owner.

The next accessible portion of this stream is located between NE Lincoln Rd and NE Mesford Street. The substrate profile remains silty, but incision continues throughout the channel in this reach. BFW is ~55 inches and OHWM is ~29 inches. Dominant vegetation includes red alder (Alnus rubra) and salmonberry (Rubus spectabilis).

Between NE Mesford Street and Poulsbo Wilderness Trail park the stream incises even more with the change in local elevation. The substrate profile in this area is still quite silty, but areas of sorting start to appear. OHWM in this area is ~29 inches and the BFW is ~34 inches. Dominant vegetation in this reach includes red alder (Alnus rubra), redosier dogwood (Cornus alba), and coastal hedgenettle (Stachys chamissonis).Inside of the upper reaches of Dogfish creek within Poulsbo Wilderness Trail park, the stream begins to take on the more common riparian characteristics of a stream in a northwest coastal forest. Although there are still areas of unsorted silty substrate, more consistent areas of scour occur in this reach. Sections of the stream flow over areas of bedrock and gravel. In much of this section the substrate is covered in moss indicating a seasonality to the flows within this section and above. There are areas of very deep incision above the confluence with a tributary ~ 385 feet west of Caldart Ave NE that indicate some heavy flashy flows during the winter and spring. However, this section of stream was still lacking any visible flow. Dominant overstory vegetation in this area includes Western red cedar (Thuja plicata), broadleaf maple (Acer macrophyllum) with Swordfern (Polystichum munitum) trailing blackberry (rubus ursinus), and salmonberry (rubus spectabalis) in the understory. The Department of Natural Resources marks the end of fish use in the area of this confluence. This determination is supported by the lack of structure upstream of this area, the beginning of perennial flows below this location, and the beginning of fully defined incision and sorted substrate within this area.

Below the confluence of dogfish creek and the aforementioned unnamed tributary, the stream displays a perennial flow and displays a habitat profile much more indicative of consistent fish use. A more sorted substrate profile starts appearing with gravel the dominant substrate. The stream becomes more deeply incised and the undercutting of banks occurs much more frequently. Pool, riffle structuring is much more evident and woody materials are much more evident within reach structure. The vegetation profile is the same as the upper reaches of Dogfish creek. Stream width measurements were taken above the culvert under SR 305 and they are an OHWM of 72 inches and a BFW of 89 inches.

Discussion

The contributing basin associated with the South Fork of Dogfish Creek contains areas of relatively undisturbed forest interspersed within urban land use of varying intensity ranging from high intensity commercial development to single-family residential subdivisions. As is typical with the historic conversion of forested land cover to urban land use, the drainage has experienced increased flow rates with the reduction in pervious surface over time. This increased flow has resulted in undercutting of the streambanks located within Wilderness Park where the contributing basin begins to be large enough to result higher flow volumes for such erosional features to occur. These erosional features appear to be well established. The headwater reach of the drainage contains low energy stream characteristics with no undercutting far less channel definition. SVC staff observed no recent signs of significant streambank erosion anywhere within the one mile assessment.

The storm system proposed for the project will use the most current design criteria adopted by the City of Poulsbo. To meet stormwater mitigation requirements, stormwater generated onsite with be treated for water quality, and the system will be designed to detain runoff to match flow rates consistent with a forested condition onsite. The metered stormwater discharge to the outfall location from the proposed project will not result in increased flow rates or erosion. In addition, the existing outfall to which the proposed storm system will connect will be upgraded with a 24-inch diameter pipe (Attachment A) to meet conveyance requirements to handle emergency overflow capacity in excess of the 100-year stormwater design event. Under normal conditions up to the 100-year event, discharge velocity at the outfall will be lower than with the current stormwater outfall which should reduce erosion potential over the current condition.

Temporary impacts within the vicinity of the stormwater outfall will be limited to outside the ordinary high water of the existing bioswale south of Mosjon Circle. These impacts will consist of ground disturbance associated with the excavation and backfill required to upgrade the existing outfall pipe. Temporary sedimentation and erosion control best management practices (TESC BMPs) will be used to prevent temporary impacts to the drainage during construction, and the disturbed area will be stabilized using a native seed mix to prevent sediment delivery following pipe installation activities.

Conclusion

The proposed stormwater outfall is located within a portion of the drainage consistent with a grass-lined stormwater bioswale. With the use of TESC BMPs and stabilization of disturbed areas with the application of a native seed mix, temporary impacts associated with the upgrade of the existing outfall pipe will be fully addressed upon completion of the outfall pipe installation. Using current stormwater design for the proposed onsite improvements and outfall pipe, there should be no long term impacts to the drainage from the project, and there could potentially be a reduction in the impacts with the reduced discharge velocity associated with the upgraded outfall pipe.

Please do not hesitate to contact our office with any question or concerns you may have.

Sincerely,

Don Babineau
Environmental Planner/Forester
Office 253.514.8952x017
Fax: 253.514.8954
don@soundviewconsultants.com

References

Fishman Environmental, 2003. *City of Poulsbo, Washington: Report on Best Available Science and Recommended Protection Measures for Fish and Wildlife Habitat*. Fishman Environmental Services, LLC with Buell and Associates, INC.

IFC International, 2010. *South Fork Dogfish Creek Restoration Master Plan.*

Poulsbo Municipal Code, Title 16.20 - Critical Areas, 2019.

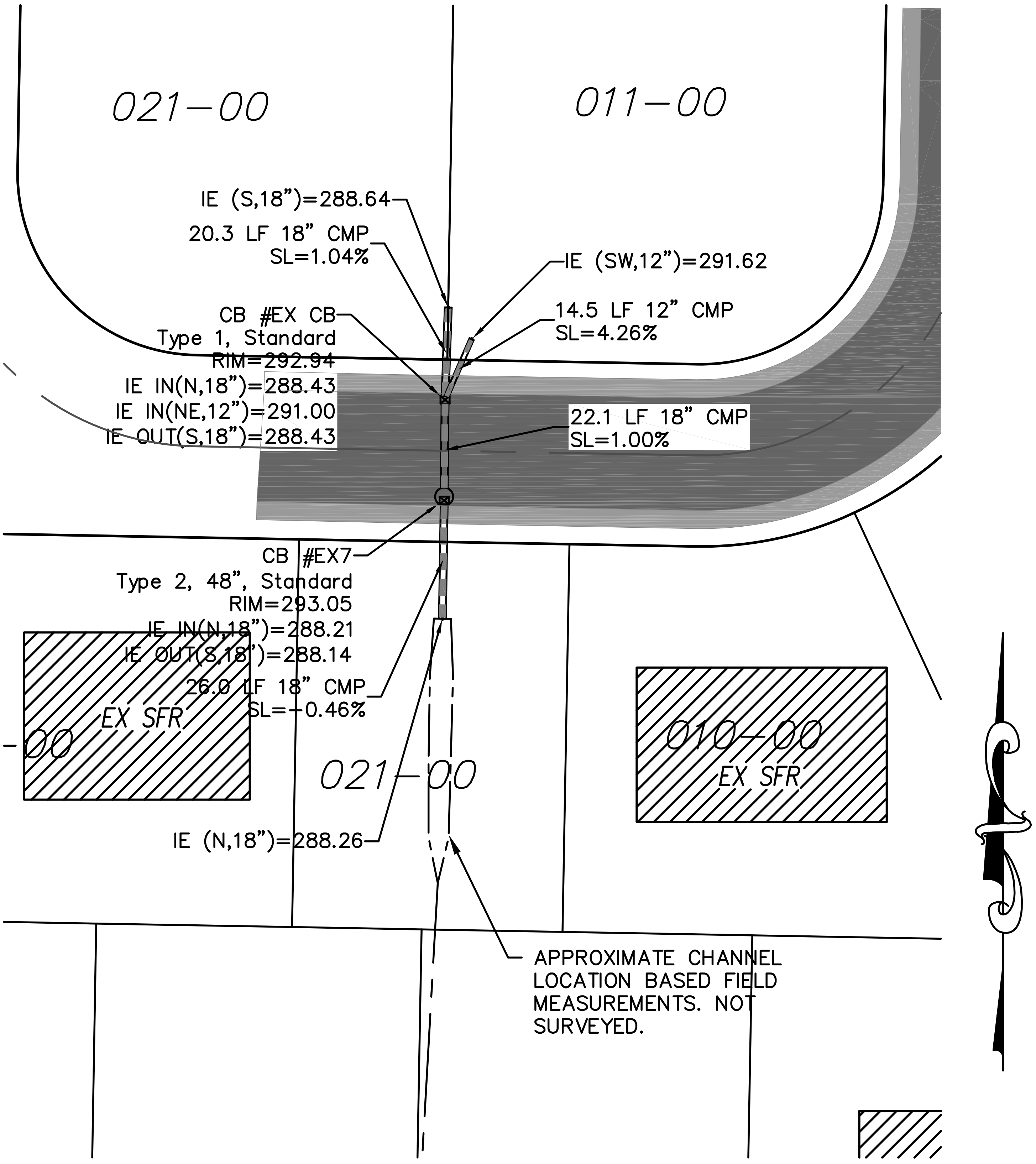
Washington State Department of Ecology, 2010, revised 2016. Publication #16-06-029. *Determining the Ordinary High Water Mark for Shoreline Management Act Compliance in Washington State.*

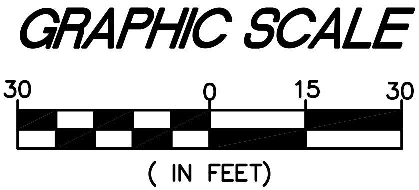
Washington State Department of Natural Resources, 2004. *Forest Practices Board Manual, Section 2 - Standard Methods for Identifying Bankfull Channel Features and Channel Migration Zones.*

Attachment A – Existing Conditions Map and Conceptual Outfall Plan

This attachment includes conceptual drawings from Team 4 Engineering

CALAVISTA – PRD





PREDEVELOPED CONDITIONS MAP

THIS MAP SHOWS DISCHARGE LOCATION IN THE "POULSBO GARDENS" RECREATION TRACT 021–00.

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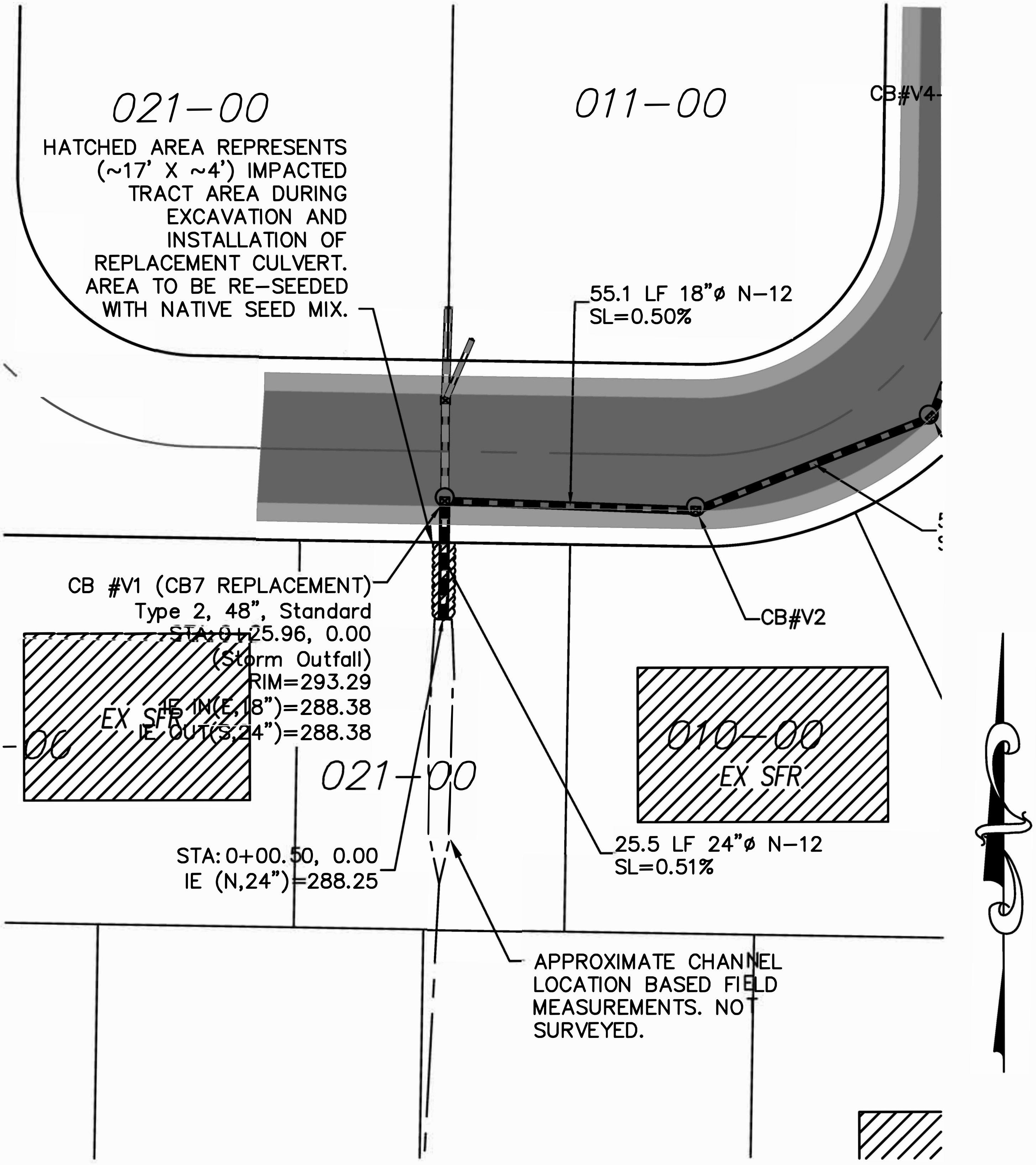
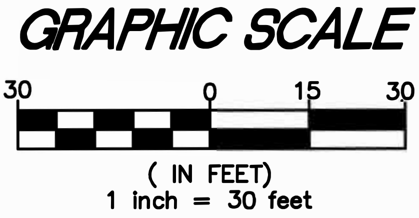
CALAVISTA – PRD





POSTDEVELOPED CONDITIONS MAP

THIS MAP SHOWS DISCHARGE LOCATION IN THE "POULSBO GARDENS" RECREATION TRACT 021–00.

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Attachment B – Site Photographs

Detention swale above Mosjon Circle NE

Bioswale above NE Watland St

North end of culvert above NE Watland St

Drainage downstream of NE Watland St

Drainage upstream NE Fontaine Way

Drainage downstream of NE Lincoln Rd

Drainage upstream NE Mesford Rd

Drainage upstream of Wilderness Park

Drainage in the upper reach of Wilderness Park

Drainage below confluence with unnamed tributary

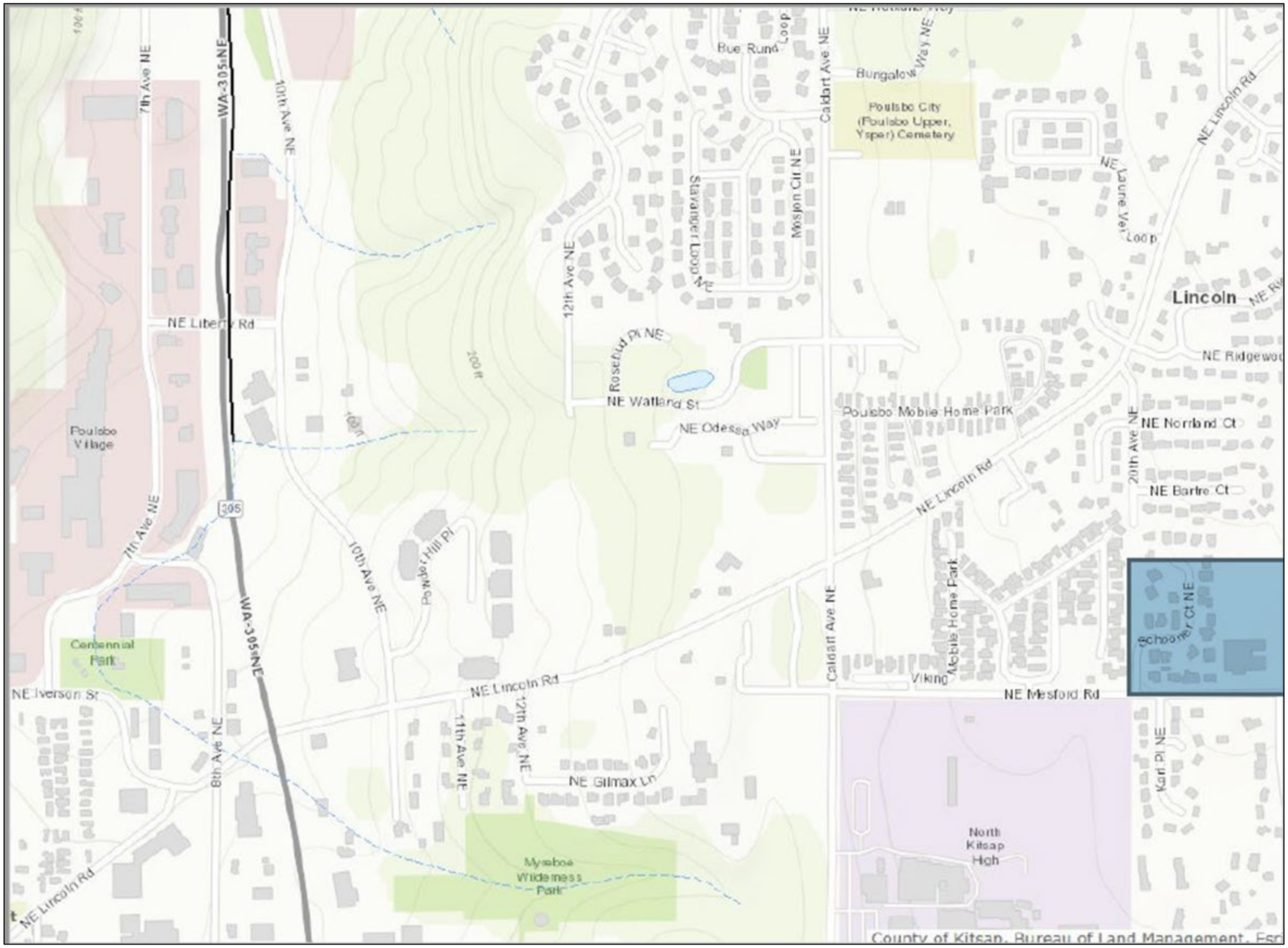
Drainage upstream of SR-305

Drainage and culvert under SR-305

Attachment C – Background Exhibits

This attachment includes WDFW Salmonscape map (C1); DNR Stream Typing Map (C2); WDFW PHS Map (C3); Kitsap County Streams map (C4); WDFW Stream Catalog 1975 (C5). City of Poulsbo Figure CAO-4 (C6)

Attachment C1 – WDFW SalmonScape map



Attachment C2 – DNR Stream Typing

Attachment C3 – WDFW PHS Map

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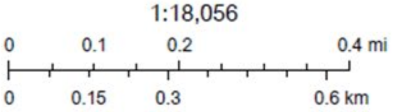
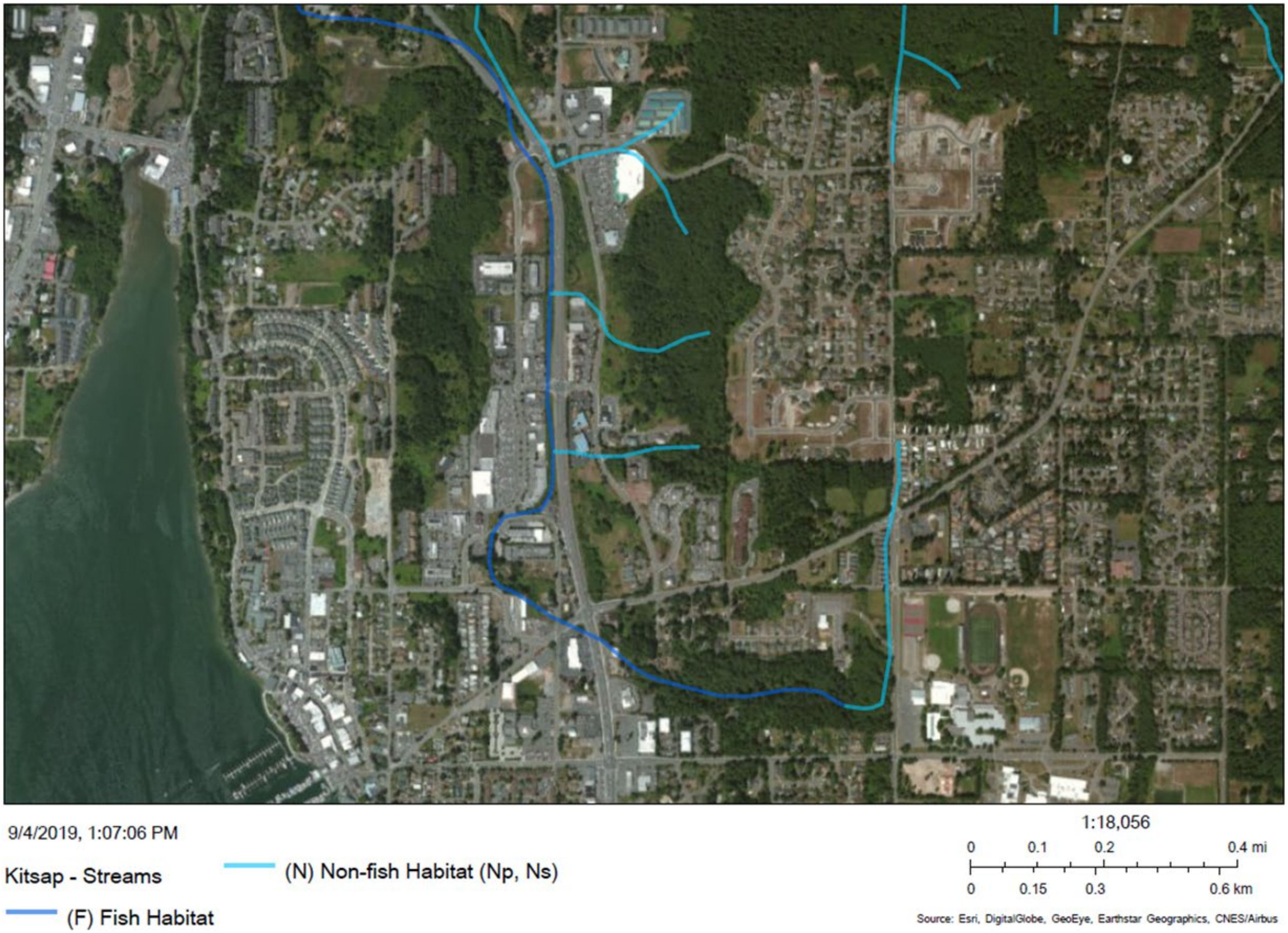
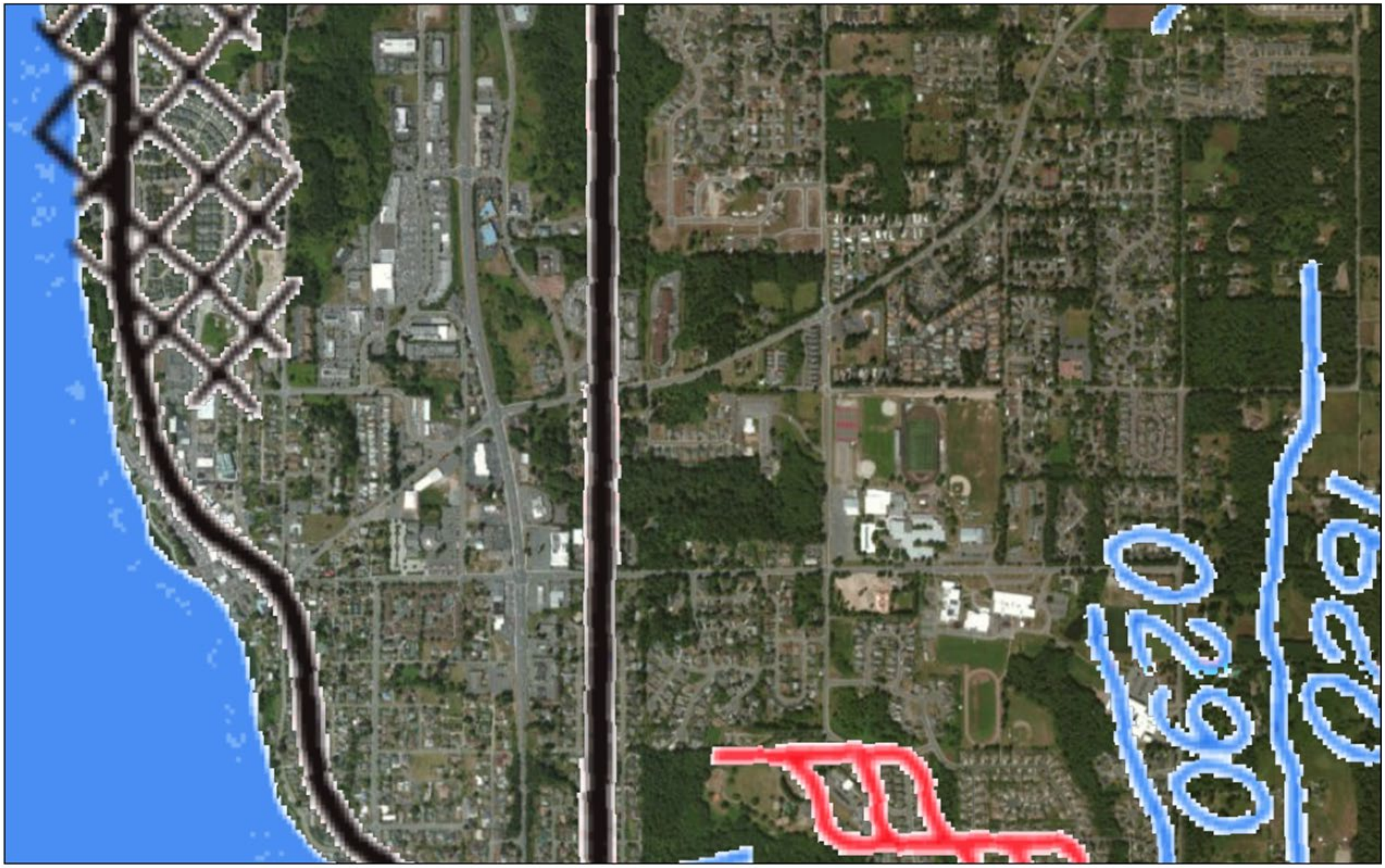


Attachment C4 – Kitsap County Streams Map



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus

Attachment C5 – WDFW Stream Catalog (1975)



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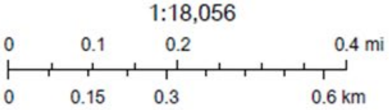
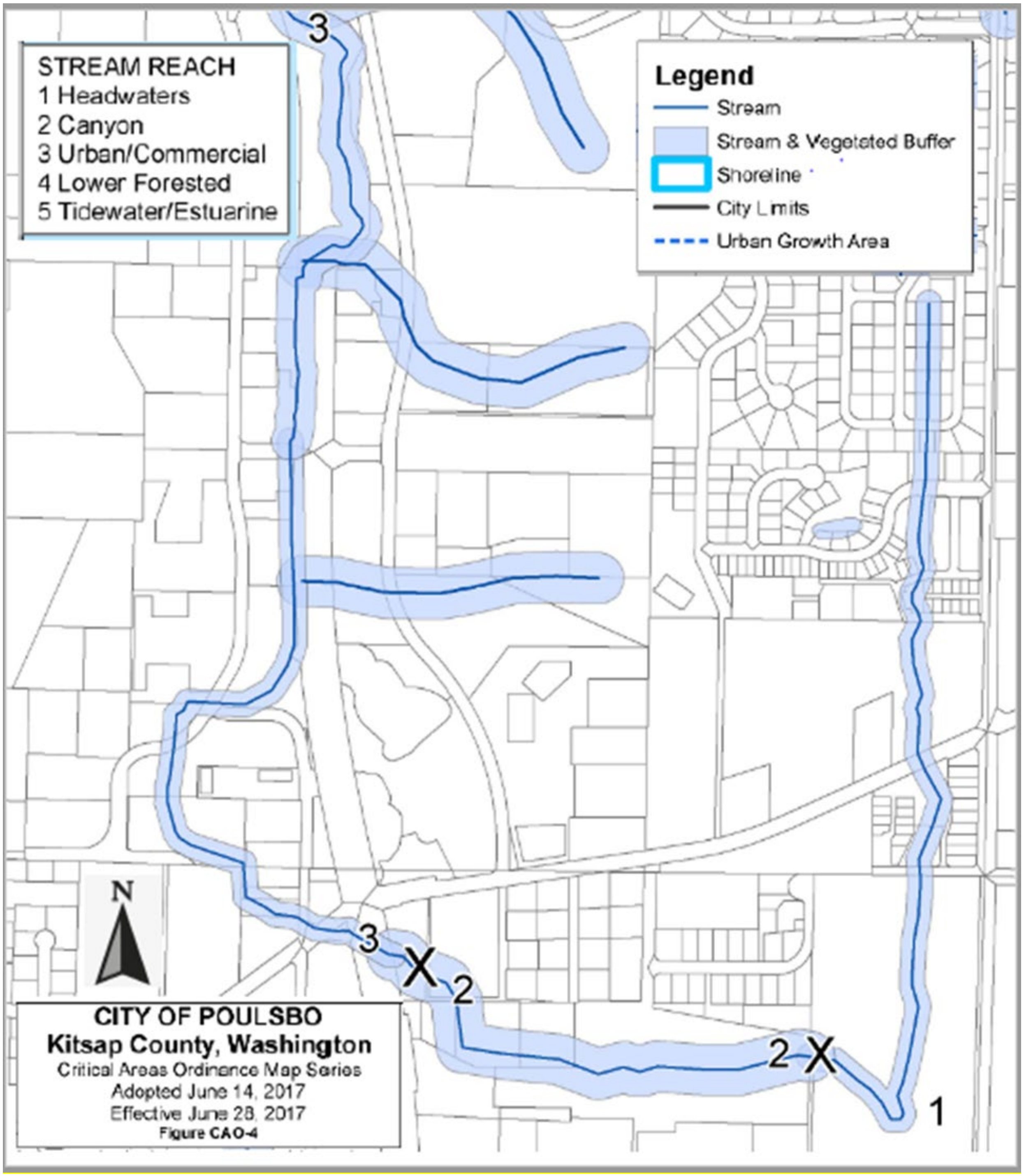


Attachment C6 – City of Poulsbo Southfork Dogfish Creek Reach Map



Attachment D – Previous Report Figures and As-built Plan

This attachment includes Figure 1 from the 2003 Fishman study, Figure 2 from the 2010 IFC study, and the as-built Road and Drainage Plan for the Poulsbo Gardens Division I plat

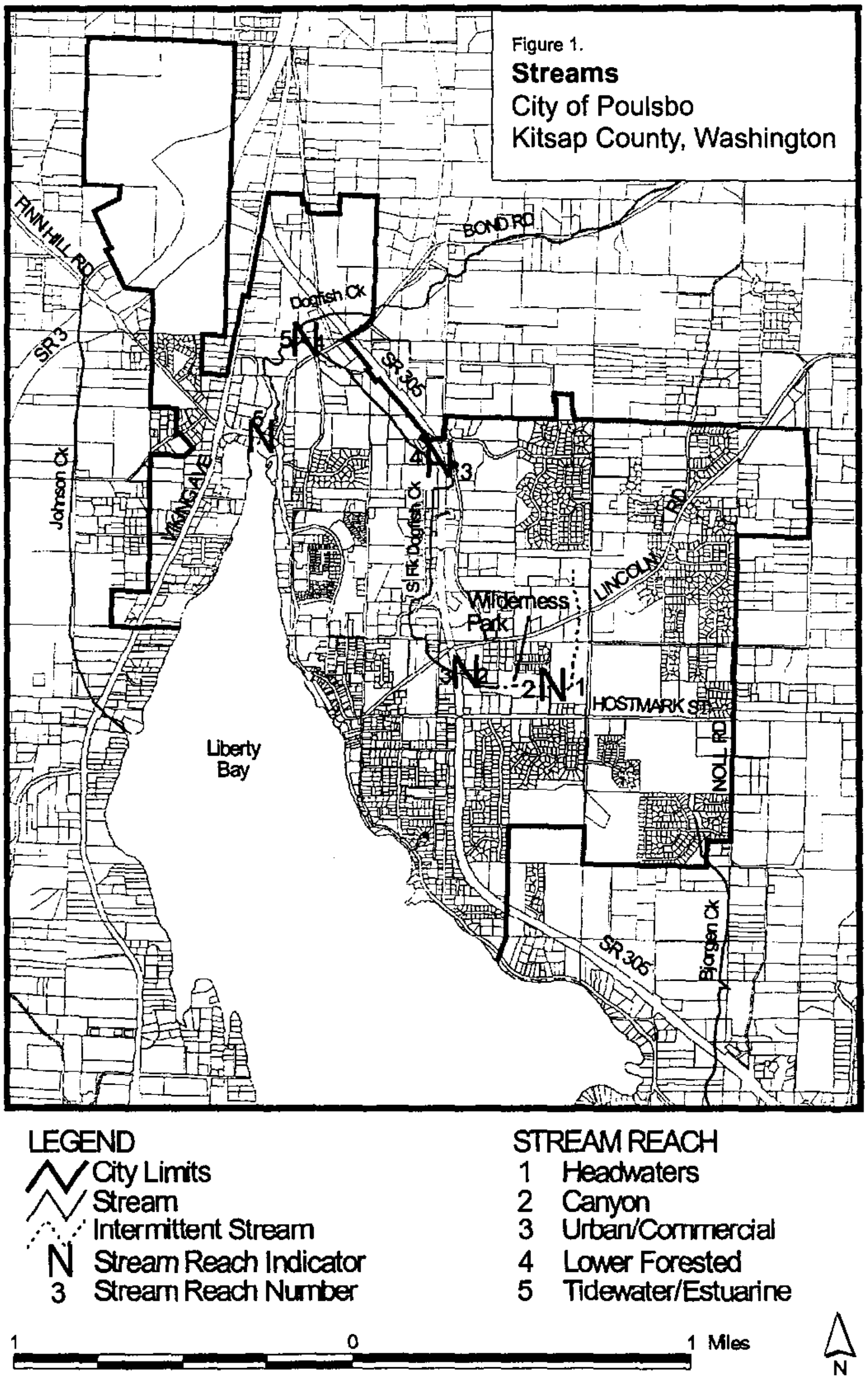
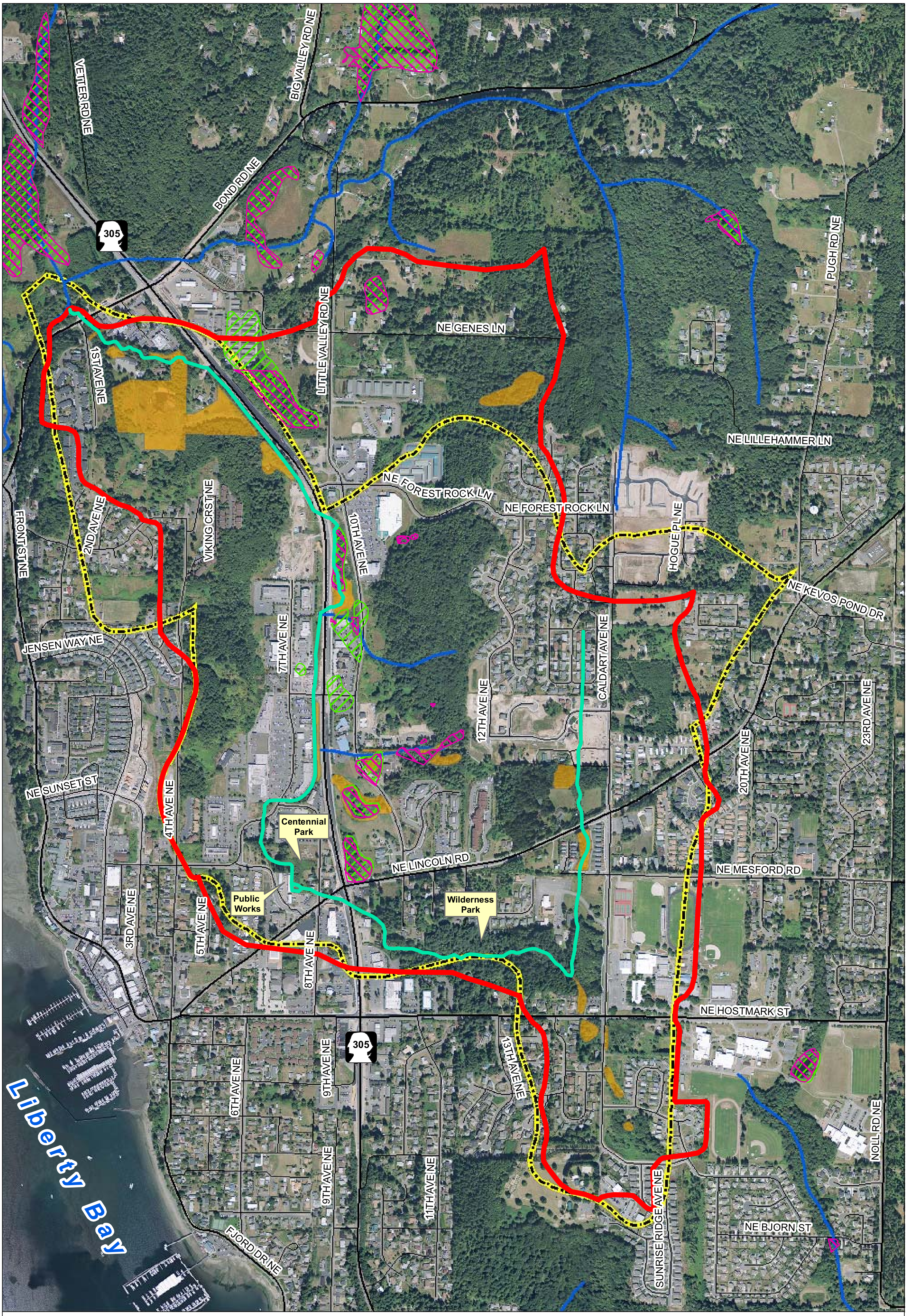


Figure 1.
Streams
City of Poulsbo
Kitsap County, Washington

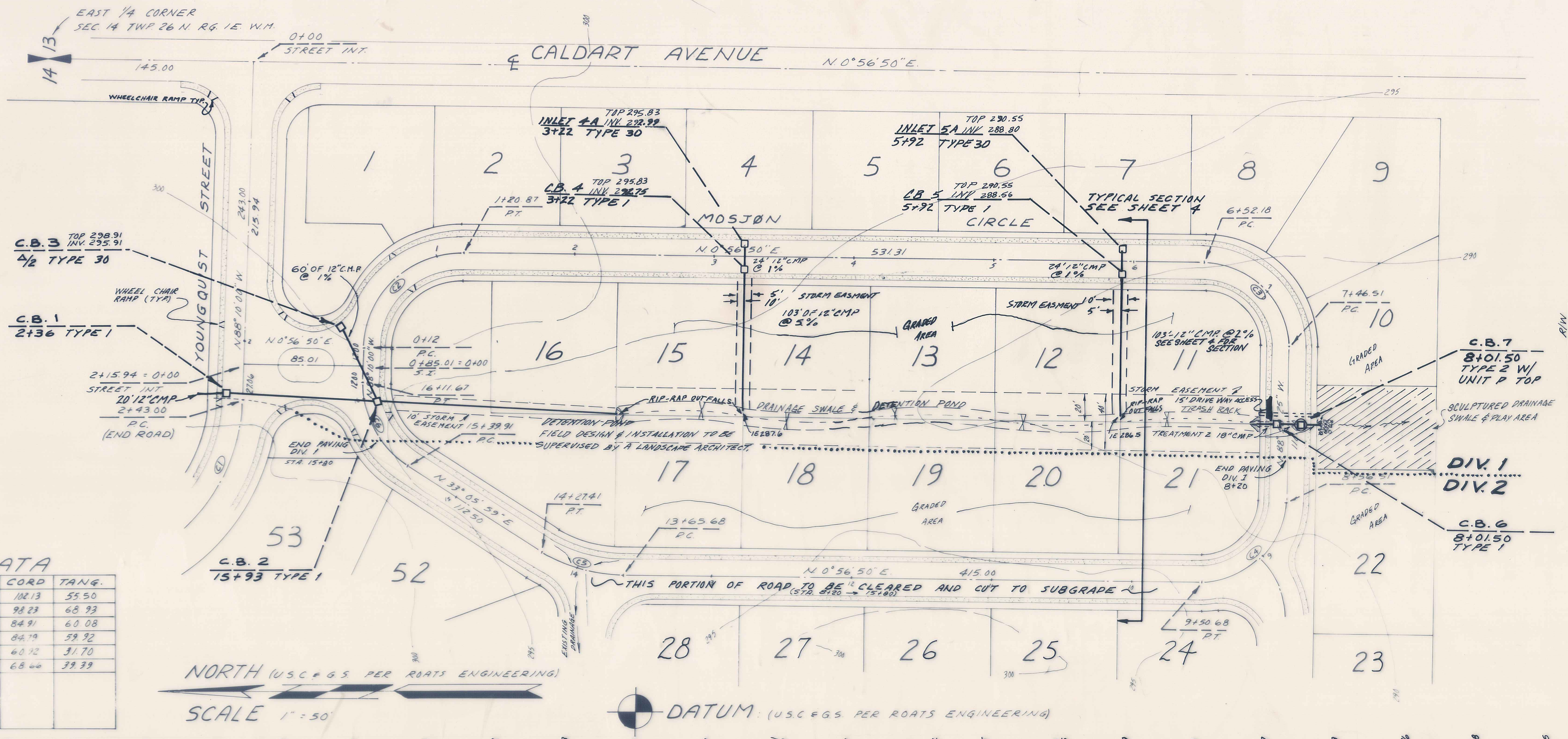


ICF INTERNATIONAL

Figure 2.
Existing Conditions
South Fork Dogfish Creek
Restoration Master Plan

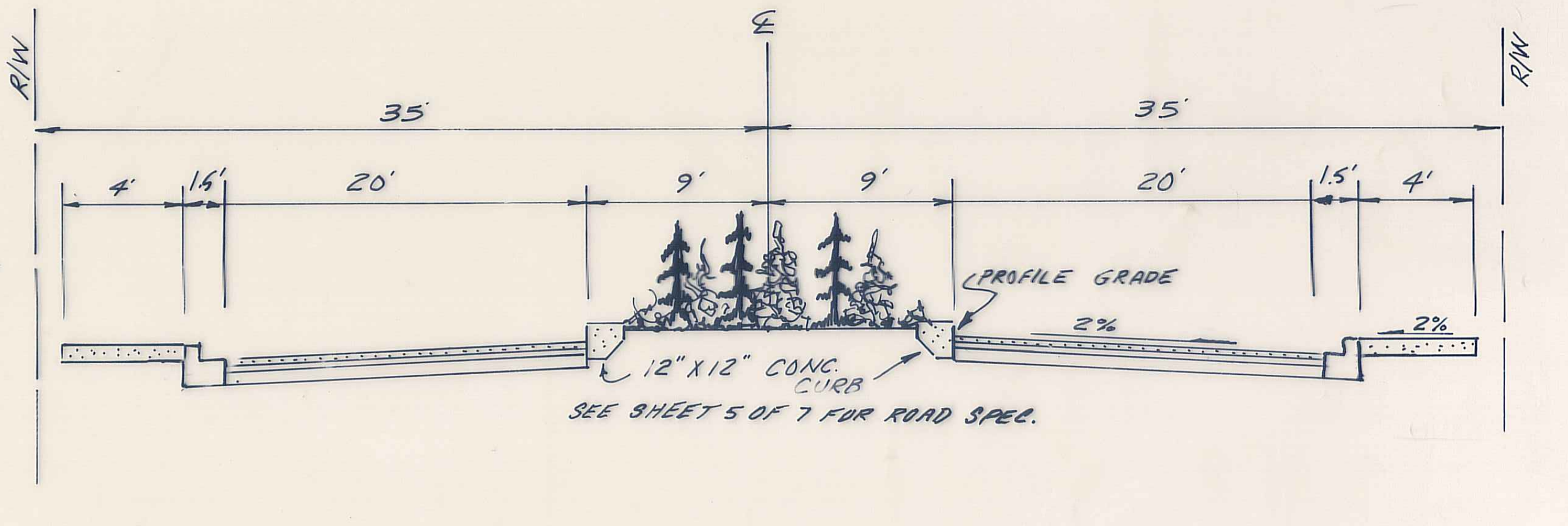
July 2010

N.E. 1/4 S.E. 1/4 SEC. 14, TWP. 26 N., RG. 1 E., W.M.

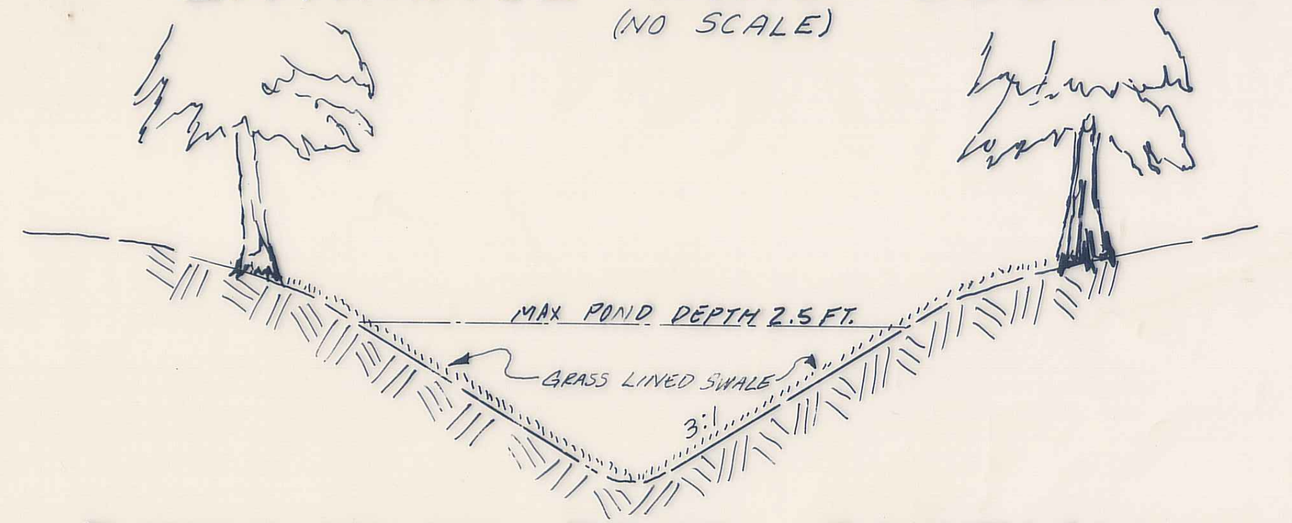


CURVE DATA

NO.	DELTA	RADIUS	ARC	CORD	TANG.
1	46°06'42"	130.386	104.94	102.13	55.50
2	89° 06'50"	70.00	108.87	98.23	68.93
3	90° 04' 45"	60.00	94.33	84.91	60.08
4	89° 55' 15"	60.00	94.17	84.79	59.92
5	32° 09' 09"	110.00	61.73	60.92	31.70
6	58° 44' 01"	70.00	71.76	68.66	39.39

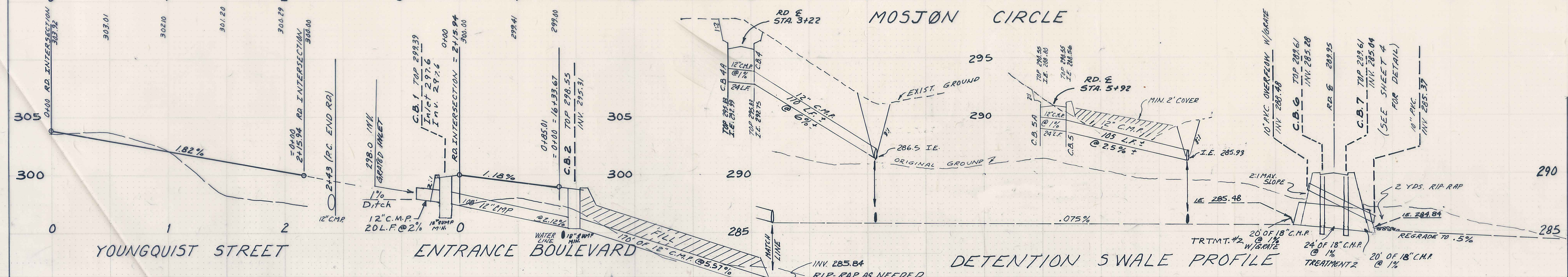


ENTRANCE ROAD SECTION
(NO SCALE)



DETENTION POND SECTION
(NO SCALE)

MOSJØN CIRCLE



SCALE: HORZ. 1" = 50'
VERT. 1" = 5'

REVISED 5-6-86
Revised 4-17-86
REVISED 4-8-86

ROAD & DRAINAGE PLAN
POULSBO GARDENS DIV. I

FOR: STARKE INDUSTRIES
6535 SEAVIEW N.W.
SEATTLE WA. 98117

AS BUILT

JAMES D. EVANS
11757

TRITEC ASSOCIATES INC.
ENGINEERS • SURVEYORS • PLANNERS
P.O. BOX 906 • SILVERDALE, WASHINGTON 98383 • 692-6400
3472 N.W. LOWELL "OLD SILVERDALE"

Attachment E – Author Qualifications

Don Babineau

Environmental Planner/Project Manager
Professional Experience: >15 years

Don Babineau is an Environmental Planner and Project Manager with a diverse background in urban and commercial forestry, land planning, landscape architecture, stormwater monitoring and civil engineering. Don has experience as a Forester with Washington State Department of Natural Resources stream typing and delineating stream protection zones, as well as implementing Washington State's Habitat Conservation Plan to foster the creation of old-growth forest characteristics on state trust lands. Don currently provides permitting and regulatory compliance assistance for land use projects from their planning stages through review, approval, and construction. Don performs wetland and Ordinary High Water delineations; provides land use planning assistance for residential, commercial, and industrial projects; conducts code and regulation analysis; prepares reports and permit applications; and prepares restoration and mitigation plans. Don earned a Bachelor of Science degree in Forest Ecosystems Management and a Bachelor of Landscape Architecture degree, both from the University of Idaho.

Don has received 40-hour wetland delineation training (Western Mtns, Valleys, & Coast and Arid West Regional Supplement) and has been formally trained by the Washington State Department of Ecology in the use of the Washington State Wetland Rating System and How to Determine the Ordinary High Water Mark. In addition, he has experience as certified erosion and sediment control lead (CESCL). He is also a Pierce County qualified Professional Forester.

Jake Layman

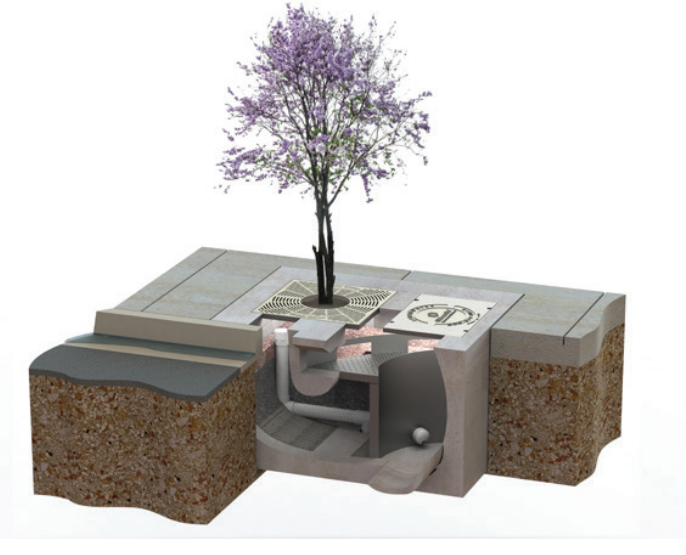
Environmental Scientist
Professional Experience: 10+ years

Jake Layman is an Environmental Scientist with a varied background in fisheries, wildlife, and aquatic invertebrate biology and stream and lake ecology. Jakes's expertise includes endangered species monitoring, lake limnology assessments, water chemistry profiles, off-channel habitat characterization, laboratory management, and terrestrial and aquatic amphibian identification with associated habitat assessments. Jake also has experience in fish population assessments, stream typing, spawning escapement, environmental disaster recovery, and amphibian toxicology research. Jake has over 10 years of experience at the federal and state level conducting ecological monitoring surveys throughout eastern and western Washington. He worked with the National Park Service to conduct environmental compliance monitoring on park construction projects, infrastructure maintenance projects, and federal highways projects. This position also included environmental spill response, fish exclusion surveys in support of construction, and effectiveness monitoring on Engineered Log Jam (ELJ) projects. Jake has worked with the Washington State Department of Fish and Wildlife (WDFW) to assess and inventory fish passage barriers and monitor culvert removal projects throughout Western Washington. Also while working for WDFW, Jake managed the daily operation for the intensive habitat study, on off-channel wetlands, for the Chehalis Aquatic Resources Protection Plan (ASRP).

Jake earned Bachelor's degrees in both Biology, with an Ecology specialization, and Geography, with a Natural Resource Management specialization, from Central Washington University. In addition, Jake also has a Minor in Environmental Studies and a Certificate in Geographic Information Systems (GIS) and Cartography form Central Washington University. Jake has received training from the Washington State Department of Ecology in *Environmental Negotiations*; *Navigating SEPA*, *Puget Sound Coastal Processes, Shoreline Modifications, and Beach Restoration*, and *Using the Marine Shoreline Design Guidelines for Marine Shoreline Stabilization*. Jake has electro-fisher operation and safety training from Smith-Root INC and Department of the Interior. (DOI). Jake also has *Operational Leadership Training* from DOI and *Leading with Integrity* training from WDFW.

BIOPOD™

SUBMITTAL PACKAGE



Oldcastle Infrastructure
(800) 579-8819
OldcastleStormwater.com

Oldcastle Infrastructure
A CRH COMPANY

TABLE OF CONTENTS

SECTION 1

FEATURES & BENEFITS

Oldcastle Infrastructure™
A CRH COMPANY

Stormwater Treatment, NATURALLY

BIOPOD™ SYSTEM WITH STORMMIX™ MEDIA

Sustainable Green Infrastructure for Stormwater Management

BioPod systems utilize an advanced biofiltration design for filtration, sorption and biological uptake to remove Total Suspended Solids (TSS), dissolved metals, nutrients, gross solids, trash and debris as well as petroleum hydrocarbons from stormwater runoff. Environmentally friendly and aesthetically pleasing, BioPod systems are a proven, Low-Impact Development (LID) solution for stormwater treatment. BioPod systems integrate seamlessly into standard site drainage and can accommodate a wide variety of vegetation to meet green infrastructure requirements.

STANDARD SIZES

BioPod units are available in many standard and custom sizes to meet most site-specific requirements. Contact your local Oldcastle Infrastructure representative for additional sizes.

4′ x 4′
4′ x 6′
4′ x 8′
4′ x 10′
6′ x 6′
6′ x 8′
6′ x 12′
8′ x 16′

Oldcastle Infrastructure™
A CRH COMPANY

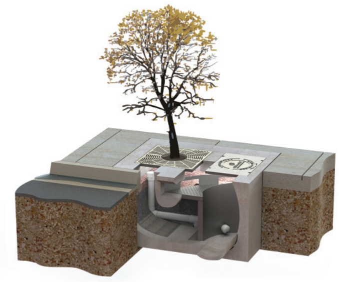
Stormwater Treatment,
NATURALLY

BIOPOD™ SYSTEM WITH STORMMIX™ MEDIA

BioPod systems use StormMix media, an engineered high-flow rate media (153 in/hr) to remove stormwater pollutants. The BioPod system has received a General Use Level Designation (GULD) approval from the Washington State Department of Ecology for Basic (TSS), Phosphorus, and Enhanced (dissolved metals) treatment.

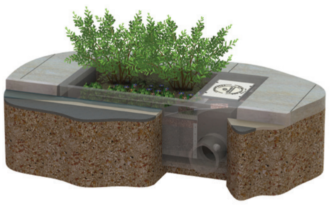
State of Washington
TAPE
GULD
Basic
Enhanced/Metals
Phosphorus

Offering flexibility of design and construction for your storm drain system, the BioPod system comes as an all-in-one, single-piece unit composed of durable precast concrete for ease of installation and a long service life. The BioPod system is offered in four configurations:



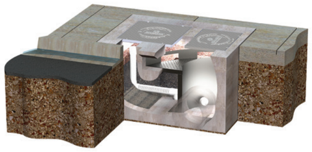
BIOPOD TREE

Vault with media and tree(s).



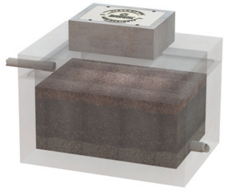
BIOPOD PLANTER

Vault with media and vegetation.



BIOPOD SURFACE

At-grade vault with media only, no vegetation.



BIOPOD UNDERGROUND

Below-grade vault with media only, no vegetation.

High-Flow Bypass

BioPod system offers an optional internal high-flow bypass that eliminates the need for a separate bypass structure, reducing costs and simplifying design so unit can be placed in a "sag" condition.

Hydromodification

BioPod system can be used in conjunction with other Oldcastle detention systems to address hydromodification and water treatment requirements. Collected flows may be utilized to supplement irrigation of the unit or surrounding vegetated areas by integrating a harvesting system, reducing consumption of local potable water.

LEED WITH BIOPOD

Can assist in earning LEED credits for:

- Sustainable Sites (6.1, 6.2)
- Water Efficiency (1.1, 1.2, 3.1, 3.2)
- Materials & Resources (4.1, 4.2; 5.1, 5.2 in AZ, CA, NV, UT)

SECTION 2

WA ECOLOGY GULD APPROVAL

WASHINGTON STATE
DEPARTMENT OF
ECOLOGY

May 2019

GENERAL USE LEVEL DESIGNATION FOR BASIC (TSS), DISSOLVED METALS (ENHANCED), AND PHOSPHORUS TREATMENT

For

Oldcastle Infrastructure, Inc.’s
The BioPod™ Biofilter
(Formerly the TreePod Biofilter)

Ecology’s Decision:

Based on Oldcastle Infrastructure, Inc. application submissions for the The BioPod™ Biofilter (BioPod), Ecology hereby issues the following use level designation:

1. **General Use Level Designation (GULD) for Basic, Enhanced, and Phosphorus Treatment:**
   - **Sized at a hydraulic loading rate of 1.6 gallons per minute (gpm) per square foot (sq ft) of media surface area.**
   - **Constructed with a minimum media thickness of 18-inches (1.5-feet).**

2. **Ecology approves the BioPod at the hydraulic loading rate listed above, to achieve the maximum water quality design flow rate. The water quality design flow rates are calculated using the following procedures:**
   - **Western Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using the latest version of the Western Washington Hydrology Model or other Ecology-approved continuous runoff model.**
   - **Eastern Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using one of the three methods described in Chapter 2.2.5 of the Stormwater Management Manual for Eastern Washington (SWMMEW) or local manual.**
   - **Entire State: For treatment installed downstream of detention, the water quality design flow rate is the full 2-year release rate of the detention facility.**

3. **The GULD has no expiration date, but may be amended or revoked by Ecology.**

<u>Ecology's Conditions of Use:</u>

The BioPod shall comply with these conditions:

1) **Applicants shall design, assemble, install, operate, and maintain the BioPod installations in accordance with Oldcastle Infrastructure, Inc.'s applicable manuals and the Ecology Decision.**

2) **BioPod media shall conform to the specifications submitted to and approved by Ecology**

3) **Maintenance: The required inspection/maintenance interval for stormwater treatment devices is often dependent on the efficiency of the device and the degree of pollutant loading from a particular drainage basin. Therefore, Ecology does not endorse or recommend a "one size fits all" maintenance cycle for a particular model/size of manufactured filter treatment device.**

    - **The BioPod is designed for a target maintenance interval of 1 year. Maintenance includes replacing the mulch, assessing plant health, removal of trash, and raking the top few inches of engineered media.**
    - **A BioPod system tested at the Lake Union Ship Canal Test Facility in Seattle, WA required maintenance after 1.5 months, or 6.3% of a water year. Monitoring personnel observed similar maintenance issues with other systems evaluated at the Test Facility. The runoff from the Test Facility may be unusual and maintenance requirements of systems installed at the Test Facility may not be indicative of maintenance requirements for all sites.**
    - **Test results provided to Ecology from a BioPod System evaluated in a lab following New Jersey Department of Environmental Protection Laboratory Protocol for Filtration MTDs have indicated the BioPod System is capable of longer maintenance intervals.**
    - **Owners/operators must inspect BioPod systems for a minimum of twelve months from the start of post-construction operation to determine site-specific inspection/maintenance schedules and requirements. Owners/operators must conduct inspections monthly during the wet season, and every other month during the dry season. (According to the SWMMWW, the wet season in western Washington is October 1 to April 30. According to the SWMMEW, the wet season in eastern Washington is October 1 to June 30.) After the first year of operation, owners/operators must conduct inspections based on the findings during the first year of inspections.**
    - **Conduct inspections by qualified personnel, follow manufacturer's guidelines, and use methods capable of determining either a decrease in treated effluent flow rate and/or a decrease in pollutant removal ability.**

4) Install the BioPod in such a manner that you bypass flows exceeding the maximum operating rate and you will not resuspend captured sediment.

5) Discharges from the BioPod shall not cause or contribute to water quality standards violations in receiving waters.

Applicant: Oldcastle Infrastructure, Inc.

Applicant's Address: 7100 Longe St, Suite 100
Stockton, CA 95206

Application Documents:

Technical Evaluation Report TreePod™ BioFilter System Performance Certification Project, Prepared for Oldcastle, Inc., Prepared by Herrera Environmental Consultants, Inc. February 2018

Technical Memorandum: Response to Board of External Reviewers' Comments on the Technical Evaluation Report for the TreePod™ Biofilter System Performance Certification Project, Oldcastle, Inc. and Herrera Environmental Consultants, Inc., February 2018

Technical Memorandum: Response to Board of External Reviewers' Comments on the Technical Evaluation Report for the TreePod™ Biofilter System Performance Certification Project, Oldcastle, Inc. and Herrera Environmental Consultants, Inc., January 2018

Application for Pilot Use Level Designation, TreePod™ Biofilter – Stormwater Treatment System, Oldcastle Stormwater Solutions, May 2016

Emerging Stormwater Treatment Technologies Application for Certification: The TreePod™ Biofilter, Oldcastle Stormwater Solutions, April 2016

Applicant's Use Level Request:

- General Use Level Designation as a Basic, Enhanced, and Phosphorus Treatment device in accordance with Ecology's *Stormwater Management Manual for Western Washington*

Applicant's Performance Claims:

Based on results from laboratory and field-testing, the applicant claims the BioPod™ Biofilter operating at a hydraulic loading rate of 153 inches per hour is able to remove:

- 80% of Total Suspended Solids (TSS) for influent concentrations greater than 100 mg/L and achieve a 20 mg/L effluent for influent concentrations less than 100 mg/L.
- 60% dissolved zinc for influent concentrations 0.02 to 0.3 mg/L.
- 30% dissolved copper for influent concentrations 0.005 to 0.02 mg/L.

- 50% or greater total phosphorus for influent concentrations 0.1 to 0.5 mg/L.

Ecology's Recommendations:

Ecology finds that:

- Oldcastle Infrastructure, Inc. has shown Ecology, through laboratory and field testing, that the BioPod™ Biofilter is capable of attaining Ecology's Basic, Total Phosphorus, and Enhanced treatment goals.

Findings of Fact:

Field Testing

1. Herrera Environmental Consultants, Inc. conducted monitoring of the BioPod™ Biofilter at the Lake Union Ship Canal Test Facility in Seattle Washington between November 2016 and April 2018. Herrera collected flow-weight composite samples during 14 separate storm events and peak flow grab samples during 3 separate storm events. The system was sized at an infiltration rate of 153 inches per hour or a hydraulic loading rate of 1.6 gpm/ft^2.
2. The D_{50} of the influent PSD ranged from 3 to 292 microns, with an average D_{50} of 28 microns.
3. Influent TSS concentrations ranged from 17 mg/L to 666 mg/L, with a mean concentration of 98 mg/L. For all samples (influent concentrations above and below 100 mg/L) the bootstrap estimate of the lower 95 percent confidence limit (LCL 95) of the mean TSS reduction was 84% and the bootstrap estimate of the upper 95 percent confidence limit (UCL95) of the mean TSS effluent concentration was 8.2 mg/L.
4. Dissolved copper influent concentrations from the 17 events ranged from 9.0 µg/L to 21.1 µg/L. The 21.1 µg/L data point was reduced to 20.0 µg/L, the upper limit to the TAPE allowed influent concentration range, prior to calculating the pollutant removal. A bootstrap estimate of the LCL95 of the mean dissolved copper reduction was 35%.
5. Dissolved zinc influent concentrations from the 17 events ranged from 26.1 µg/L to 43.3 µg/L. A bootstrap estimate of the LCL95 of the mean dissolved zinc reduction was 71%.
6. Total phosphorus influent concentrations from the 17 events ranged from 0.064 mg/L to 1.56 mg/L. All influent data greater than 0.5 mg/L were reduced to 0.5 mg/L, the upper limit to the TAPE allowed influent concentration range, prior to calculating the pollutant removal. A bootstrap estimate of the LCL95 of the mean total phosphorus reduction was 64%.
7. The system experienced rapid sediment loading and needed to be maintained after 1.5 months. Monitoring personnel observed similar sediment loading issues with other systems evaluated at the Test Facility. The runoff from the Test Facility may not be indicative of maintenance requirements for all sites.

Laboratory Testing

1. Good Harbour Laboratories (GHL) conducted laboratory testing at their site in Mississauga, Ontario in October 2017 following the New Jersey Department of Environmental Protection Laboratory Protocol for Filtration MTDs. The testing evaluated a 4-foot by 6-foot standard biofiltration chamber and inlet contour rack with bypass weir. The test sediment used during

the testing was custom blended by GHL using various commercially available silica sands, which had an average d_{50} of 69 µm. Based on the lab test results:

  a. GHL evaluated removal efficiency over 15 events at a Maximum Treatment Flow Rate (MTFR) of 37.6 gpm, which corresponds to a MTFR to effective filtration treatment area ratio of 1.80 gpm/ft^2. The system, operating at 100% of the MTFR with an average influent concentration of 201.3 mg/L, had an average removal efficiency of 99 percent.
  b. GHL evaluated sediment mass loading capacity over an additional 16 events using an influent SSC concentration of 400 mg/L. The first 11 runs were evaluated at 100% of the MTFR. The BioPod began to bypass, so the remaining 5 runs were evaluated at 90% of the MTFR. The total mass of the sediment captured was 245.0 lbs and the cumulative mass removal efficiency was 96.3%.

2. Herrera Environmental Consultants Inc. conducted laboratory testing in September 2014 at the Seattle University Engineering Laboratory. The testing evaluated the flushing characteristics, hydraulic conductivity, and pollutant removal ability of twelve different media blends. Based on this testing, Oldcastle Infrastructure, Inc. selected one media blend, Mix 8, for inclusion in their TAPE evaluation of the BioPod™ Biofilter.
   a. Herrera evaluated Mix 8 in an 8-inch diameter by 36-inch tall polyvinyl chloride (PVC) column. The column contained 18-inches of Mix 8 on top of 6-inches of pea gravel. The BioPod will normally include a 3-inch mulch layer on top of the media layer; however, this was not included in the laboratory testing.
   b. Mix 8 has a hydraulic conductivity of 218 inches per hour; however, evaluation of the pollutant removal ability of the media was based on an infiltration rate of 115 inches per hour. The media was tested at 75%, 100%, and 125% of the infiltration rate. Based on the lab test results:
      - The system was evaluated using natural stormwater. The dissolved copper and dissolved zinc concentrations in the natural stormwater were lower than the TAPE influent standards; therefore, the stormwater was spiked with 66.4 mL of 100 mg/L Cu solution and 113.6 mL of 1,000 mg/L Zn solution.
      - The BioPod removed an average of 81% of TSS, with a mean influent concentration of 48.4 mg/L and a mean effluent concentration of 9.8 mg/L.
      - The BioPod removed an average of 94% of dissolved copper, with a mean influent concentration of 10.6 µg/L and a mean effluent concentration of 0.6 µg/L.
      - The BioPod removed an average of 97% of dissolved zinc, with a mean influent concentration of 117 µg/L and a mean effluent concentration of 4 µg/L.
      - The BioPod removed an average of 97% of total phosphorus, with a mean influent concentration of 2.52 mg/L and a mean effluent concentration of 0.066 mg/L. When total phosphorus influent concentrations were capped at the TAPE upper limit of 0.5 mg/L, calculations showed an average removal of 87%.

Other BioPod Related Issues to be Addressed By the Company:

1. Conduct hydraulic testing to obtain information about maintenance requirements on a site with runoff that is more typical of the Pacific Northwest.

Technology Description: Download at https://oldcastleprecast.com/stormwater/bioretention-biofiltration-applications/bioretention-biofiltration-solutions/

Contact Information:

Applicant:

Chris Demarest
Oldcastle Infrastructure, Inc.
(925) 667-7100
Chris.demarest@oldcastle.com

Applicant website: https://oldcastleprecast.com/stormwater/

Ecology web link: https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Stormwater-permittee-guidance-resources/Emerging-stormwater-treatment-technologies

Ecology:

Douglas C. Howie, P.E.
Department of Ecology
Water Quality Program
(360) 407-6444
douglas.howie@ecy.wa.gov

Revision History

Date	**Revision**
March 2018	GULD granted for Basic Treatment
March 2018	Provisional GULD granted for Enhanced and Phosphorus Treatment
June 2016	PULD Granted
April 2018	GULD for Basic and Provisional GULD for Enhanced and Phosphorus granted, changed name to BioPod from TreePod
July 2018	GULD for Enhanced and Phosphorus granted
September 2018	Changed Address for Oldcastle
December 2018	Added minimum media thickness requirement
May 2019	Changed language on who must Install and maintain the device from Oldcastle to Applicants

SECTION 3

INSPECTION & MAINTENANCE

Oldcastle Infrastructure™
A CRH COMPANY

BIOMOD®

MODULAR BIORETENTION SYSTEM

Maintenance Specifications

DRAINAGE PROTECTION SYSTEMS
DPS

A division of
Oldcastle Infrastructure

Water

Scope

Federal, State and Local Clean Water Act regulations and those of insurance carriers require that post-construction stormwater Best Management Practices (BMPs) be performed on a recurring basis. The intent of the regulations is to ensure that the BMPs, on a continuing basis, efficiently remove pollutants from stormwater runoff, thereby preventing pollution of the nation's water resources. These requirements apply to the BioMod Modular Bioretention System.

Recommended Frequency of Service

Properly designed and installed bioretention cells require some regular maintenance, most frequently during the first year or two of establishment. Oldcastle Infrastructure recommends that installed BioMod units be inspected and serviced on a recurring basis for sediment buildup, trash removal, erosion, and to evaluate the health of the vegetation. Ultimately, the frequency depends on the amount of runoff, pollutant loading and interference from debris and litter; however, it is recommended that each installation be serviced at least two times per year. Drainage Protection Systems (DPS), a division of Oldcastle Infrastructure, is available to do an onsite evaluation upon request.

Recommended Timing of Service

Guidelines for the timing of service are as follows:

1. For areas with a definitive rainy season: Prior to and following the rainy season.
2. For areas subject to year-round rainfall: On a recurring basis (at least two times per year).
3. For areas with winter snow and summer rain: Prior to and after the snow season.
4. For installed devices not subject to the elements (wash racks, parking garages, etc.): On a recurring basis (no less than two times per year).

Service Procedures

1. Bioretention cells will require supplemental irrigation during the first 2-3 years after planting. Drought tolerant species may need little additional water after this period, except during prolonged drought, when supplemental irrigation may become necessary for plant survival. Verify that the maintenance plan includes a watering schedule for the establishment period and in times of extreme drought after plants have been established.
2. Inspect the inlet surface adjacent to the BioMod unit and the inlet opening for trash and debris accumulation. Remove and dispose as required.
3. For units with pre-filtration, open the access cover of the pre-filtration chamber and inspect for collected pollutants. Remove and dispose of all materials. (Pre-filtration chamber allows for the use of industrial vacuum equipment if available). Close pre-filter access cover.
4. For units with internal bypass overflow screens, check for any blockage or obstructions to the flow path and remove as necessary. Check for any potential future blockage or obstruction beneath and around the overflow screens. Remove and dispose of all materials.
5. Inspect the area beneath the tree grate (when applicable), and if necessary, remove the tree grate and dispose of any collected trash or debris.
6. For units without pre-filtration, remove and replace the mulch layer as necessary, taking care to disturb the plant's roots as little as possible. Units without pre-filtration may see more sediment enter the system. If sediment buildup reaches 25% of the ponding depth, it should be removed, taking care to minimize soil disturbance.

7. Inspect for standing water. If present, or if soil media is appreciably moist more than 72 hours following a rain event, carefully remove and replace the top 4-6 inches of soil media (as well as the mulch layer) taking care to disturb the plant's roots as little as possible. Mulch should be re-applied when erosion is evident. In areas expected to have low metal loads in the runoff, mulch is needed to maintain a 2-3 inch depth. In areas with relatively high metal loads, replace the mulch once per year.
8. While vegetation is being established, remove weeds by hand (weeding frequency should decrease over time, as the vegetation grows). Inspect and prune the plants as needed to maintain adequate shape and health. If vegetation appears to be in poor health with no obvious cause, a landscape specialist should be consulted. Although occasional pruning or trimming might be needed, bioretention cells should generally not be mowed on a regular basis. In some instances where it is desired to maintain fast-growing, annual herbaceous plant cover, annual mowing may be appropriate.
9. Replace dead plants. If a particular species proves to be prone to mortality, it may need to be replaced with a different species that is more likely to succeed on the particular site.

Disposal of Collected Debris, Hydrocarbons and Sediment

The collected debris, hydrocarbons and sediment shall be disposed of in accordance with local, state and federal agency requirements. Where hazardous materials are encountered, these standard maintenance procedures will be ceased immediately and the property owner notified for further work authorization.

DPS also has the capability of servicing all manner of catch basin inserts and catch basins with or without inserts, underground oil/water separators, stormwater interceptors and other such devices. All DPS personnel are highly qualified technicians and are confined-space trained and certified. Call us at (888) 950-8826 for further information and assistance.

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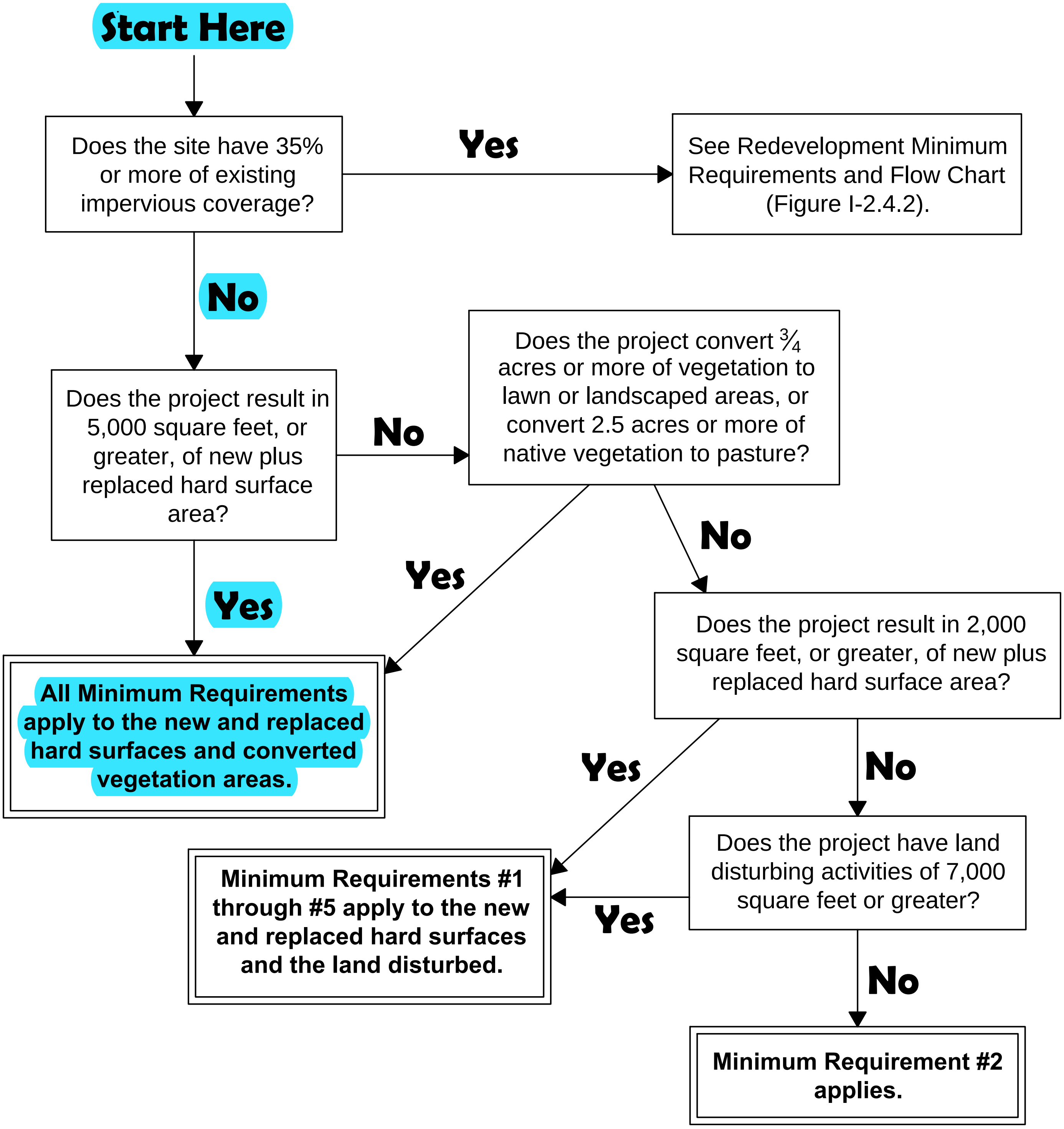
Water
December 2018 v.1

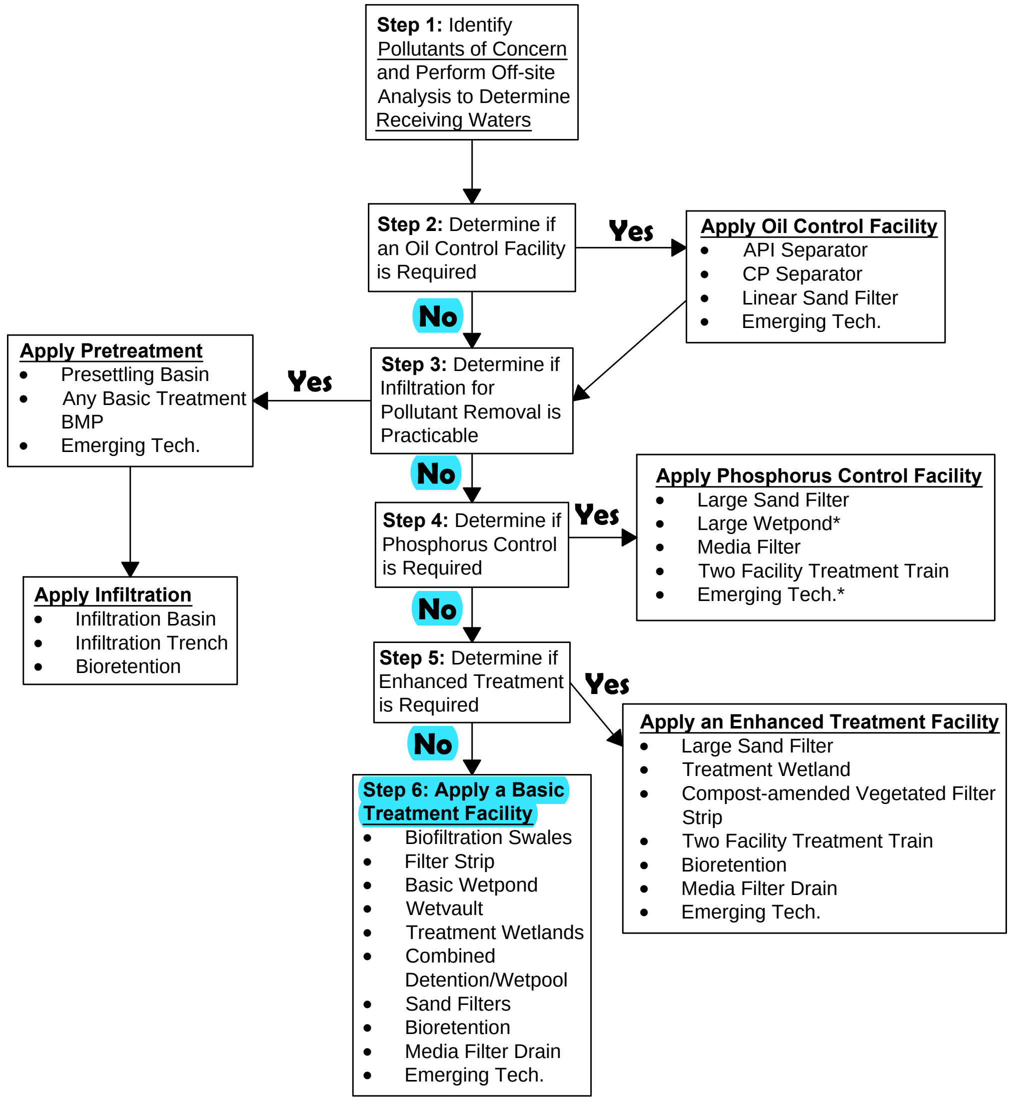


DEPARTMENT OF
ECOLOGY
State of Washington

Figure I-2.4.1
Flow Chart for Determining Requirements for New Development

Revised June 2015

Figure V-2.1.1 Treatment Facility Selection Flow Chart



*When **Phosphorus Control and Enhanced** treatment are required, the Large Wetpond and certain types of emerging technologies will not meet both types of treatment requirements. A different or an additional treatment facility will be required to meet Enhanced treatment.

DEPARTMENT OF
ECOLOGY
State of Washington

Figure V-2.1.1
Treatment Facility Selection Flow Chart

Revised December 2015

From: Becca Ochiltree
To: Anthony W. Burgess; Michael J. Bateman; Peter Wurden-Foster; Kranti Maturi
Cc: Edie Berghoff
Subject: Re: Calavista Peer Review - Storm
Date: Monday, April 27, 2020 2:09:09 PM

CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.

That sounds great. Thanks, Anthony.

Becca

Becca Ochiltree, P.E.
Project Engineer
BHC Consultants, LLC
206-355-8953 cell
becca.ochiltree@bhcconsultants.com

Sent from my iPhone

From: Anthony W. Burgess <aburgess@cityofpoulsbo.com>
Sent: Monday, April 27, 2020 12:42:40 PM
To: Becca Ochiltree <Becca.Ochiltree@bhcconsultants.com>; Michael J. Bateman <mbateman@cityofpoulsbo.com>; Peter Wurden-Foster <peter.wurden-foster@bhcconsultants.com>; Kranti Maturi <Kranti.Maturi@bhcconsultants.com>
Cc: Edie Berghoff <eberghoff@cityofpoulsbo.com>
Subject: RE: Calavista Peer Review - Storm

Becca,

Thank you for getting back to us so quickly.
Based on your response, it sounds like the storm report is in good standing for a preliminary plat approval. We will move forward as such. However, we will require at least one additional review once grading plans and Final Drainage Report are submitted. Once we receive final billing, we can determine if an additional scope of work nees to be submitted and additional escrow collected.

Anthony Burgess | Engineer 1
City of Poulsbo Engineering Department
200 NE Moe St. Pouslbo, WA, 98370
Phone: 360.394.9739
aburgess@cityofpoulsbo.com
https://cityofpoulsbo.com/engineering/

From: Becca Ochiltree <Becca.Ochiltree@bhcconsultants.com>
Sent: Monday, April 27, 2020 9:03 AM
To: Michael J. Bateman <mbateman@cityofpoulsbo.com>; Peter Wurden-Foster <peter.wurden-foster@bhcconsultants.com>; Kranti Maturi <Kranti.Maturi@bhcconsultants.com>
Cc: Anthony W. Burgess <aburgess@cityofpoulsbo.com>; Edie Berghoff <eberghoff@cityofpoulsbo.com>

Subject: RE: Calavista Peer Review - Storm

Hi Michael,

We reviewed the response letter, and it appears to address all of our comments. If you would like us to thoroughly review the revised Drainage Report and drawings, please let us know. Thank you!

Becca

Becca Ochiltree, P.E.
Project Engineer

BHC Consultants, LLC

1601 Fifth Avenue, Suite 500
Seattle, WA 98101

Office: 206-505-3400 x107
Direct: 206-357-9907
Cell: 206-355-8953
Fax: 206-505-3406
becca.ochiltree@bhcconsultants.com
www.bhcconsultants.com

Locations in Seattle, Tacoma and Bellingham.

From: Michael J. Bateman <mbateman@cityofpoulsbo.com>
Sent: Friday, April 24, 2020 10:03 AM
To: Becca Ochiltree <Becca.Ochiltree@bhcconsultants.com>; Peter Wurden-Foster <peter.wurden-foster@bhcconsultants.com>
Cc: Anthony W. Burgess <aburgess@cityofpoulsbo.com>; Edie Berghoff <eberghoff@cityofpoulsbo.com>
Subject: FW: Calavista Peer Review - Storm

Hi Becca/Peter –

Take a look at Ron's response letter and let us know if you think he's responded adequately to all comments. If he has, we will keep moving the project through the process. If not, let us know that too and we will sort through how much of a re-review is warranted.

Thanks!

Michael Bateman, PE
City of Poulsbo Engineering Department

200 NE Moe St, Poulsbo, WA 98370
Ph: 360-394-9744 Fax: 360-697-8269

From: Ron Cleaver Jr <ron@rdcjrengineering.com>
Sent: Tuesday, April 21, 2020 9:31 AM
To: Edie Berghoff <eberghoff@cityofpoulsbo.com>
Cc: Barry Margolese (barry@amalani.com) <barry@amalani.com>; Michael J. Bateman <mbateman@cityofpoulsbo.com>
Subject: RE: Calavista Peer Review - Storm

Hi Edie,

Attached is a response letter for the BHC third-party review of the "Preliminary Storm Drainage Report".

Below is a link to access the revised "Preliminary Storm Drainage Report".
https://rdcjrengineeringcom-my.sharepoint.com/:b:/g/personal/ron_rdcjrengineering_com/EfRb1Yc1oZRKhMlX8l9oeA8BuqicJ_gfWC0eGHsfJe-aQA?e=udfY4W

Looking forward to the issued SEPA Determination, etc.

Thanks,

Ron Cleaver Jr
Principal
RDCJR Engineering LLC
3231 NE Totten Road, Suite 103
Poulsbo, WA 98370
(360) 265-1037

From: Edie Berghoff <eberghoff@cityofpoulsbo.com>
Sent: Friday, April 17, 2020 6:11 PM
To: Ron Cleaver Jr <ron@rdcjrengineering.com>
Cc: Barry Margolese (barry@amalani.com) <barry@amalani.com>; Michael J. Bateman <mbateman@cityofpoulsbo.com>
Subject: RE: Calavista Peer Review - Storm

Hi Ron,

The storm Drainage Report will be sent to the Engineering Consultant by the Engineering Department. Michael will be able to tell you what the anticipated time frame will be on that. This response is copied to Michael.

Planning will review the report as well, since prior indication has been that you were including all necessary creek information in that report. Once the Engineering Consultant has completed review and recommended to City Engineering the report be accepted, Planning will determine the need for review by Grette.

The only other item hanging out is completion of Geotech review by Aspect Consulting. We spoke about their comments and possible resolution a couple months ago.

Once that is complete, I believe we will be working on issuing SEPA for the project.
Edie Berghoff
Associate Planner
City of Poulsbo - Planning and Economic Development
200 NE Moe Street
360-394-9748

FYI - Planning Department Updated Counter Hours:
Walk-in customers: 8:30 am - 12 pm Monday-Friday
Appointments: 8:30 am - 3:30 pm Monday-Friday
https://cityofpoulsbo.com/communitydevelopmentappointment/

From: Ron Cleaver Jr <ron@rdcjrengineering.com>
Sent: Friday, April 17, 2020 2:18 PM
To: Edie Berghoff <eberghoff@cityofpoulsbo.com>
Cc: Barry Margolese (barry@amalani.com) <barry@amalani.com>
Subject: RE: Calavista Peer Review - Storm

Hi Edie,

I plan on responding to the final third-party storm report review next week.

Can you inform us on what the next steps in the approval process will be once that is in and accepted?

Thanks,

Ron Cleaver Jr
Principal
RDCJR Engineering LLC
3231 NE Totten Road, Suite 103
Poulsbo, WA 98370
(360) 265-1037

From: Edie Berghoff <eberghoff@cityofpoulsbo.com>
Sent: Wednesday, April 1, 2020 5:13 PM
To: Ron Cleaver Jr <ron@rdcjrengineering.com>
Cc: Barry Margolese (barry@amalani.com) <barry@amalani.com>
Subject: FW: Calavista Peer Review - Storm

Good Afternoon Ron,

Attached please find the complete engineering review, including information provided March 27, and your summary of the meeting with engineering today.

Please let us know if there are questions.

Edie Berghoff
Associate Planner
City of Poulsbo - Planning and Economic Development
200 NE Moe Street
360-394-9748

FYI - Planning Department Updated Counter Hours:
Walk-in customers: 8:30 am - 12 pm Monday-Friday
Appointments: 8:30 am - 3:30 pm Monday-Friday
https://cityofpoulsbo.com/communitydevelopmentappointment/

From: Michael J. Bateman <mbateman@cityofpoulsbo.com>
Sent: Wednesday, April 01, 2020 3:53 PM
To: Edie Berghoff <eberghoff@cityofpoulsbo.com>
Cc: Anthony W. Burgess <aburgess@cityofpoulsbo.com>; Diane K. Lenius <dlenius@cityofpoulsbo.com>
Subject: Calavista Peer Review - Storm

Hi Edie –

The Engineering Department has received the consultant peer review of the Calavista preliminary storm drainage report from our peer review consultant Their review is attached.

Also attached are the Engineering and Public Works Department's review comments previously forwarded, and a summary of a telecon we had with the applicant's engineer regarding options for compliance with these comments.

Please forward them to the applicant as a complete package.

Best regards -

Michael Bateman, PE
City of Poulsbo Engineering Department
200 NE Moe St, Poulsbo, WA 98370
Ph: 360-394-9744 Fax: 360-697-8269

ESC2

EnviroSound Consulting Geotechnical & Environmental Consulting

December 13, 2019 ESC19-G010

Caldart Poulsbo, LLC.
Mr. Barry Margolese
105 S. Main Street Ste 230
Seattle, Washington 98014

CALAVISTA DEVELOPMENT
POULSBO, WASHINGTON
PERMIT# P-05-08-19-01

Dear Mr. Margolese,

EnviroSound Consulting, Inc. (EnviroSound) is presenting this letter in response to an email from the City of Poulsbo dated December 9, 2019 regarding our Geotechnical Engineering Report for the Calavista Development dated April 25, 2019. Our responses are as follows:

Item 5: Infiltration testing.....

As stated in Section 3.8.9 of the referenced report "Stormwater infiltration.....is not feasible due to the presence of glacial till at shallow depth."

Item 10: "the geotechnical report indicates that the onsite soil may not be suitable for use as fill..."

Our report did not say that the on site soil was unsuitable for fill. It stated that the soil would be moisture sensitive due to a high amount of fines. Similar wording for similar types of soils was provided in an EnviroSound Geotechnical Report dated February 2, 2016, for the Viking Avenue Apartment Complex (Arendahl). The project was successfully completed using similar on-site soils for fill and no issues arouse. Two larger EnviroSound's projects recently completed in Kitsap County had similar soils with the same recommendation. The projects were successfully completed using on site soils.

The wording is a common recommendation for these types of soil. It is included to make the owner/developer aware of the potential that some of the site soils may not be usable as fill or difficult to use, particularly during the wet season or during wet periods of time. Also, that the earthwork contractor needs to proceed with caution and be prepared to incorporate the recommendations provided in the wet weather earthwork section of the report.

We have prepared this letter based on standard practices, currently used in this area at the time of preparation. Although a previous geotechnical report was reviewed no specific subsurface investigation was performed by EnviroSound as part of this letter. The information presented in this letter was collected and interpreted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions. Should you have any questions or concerns, which have not been addressed, or if we may be of additional assistance, please call our office at (360) 698-5950.

Sincerely,

Shawn E. Williams, L.E.G.
Senior Engineering Geologist

Engineering Geologist
2208
Shawn E. Williams

12-16-19

Michael F. Wolczko, P.E.
Senior Geotechnical Engineer

MICHAEL JOHN WOLCZKO
31276

12/16/19

ESC3

EnviroSound Consulting Geotechnical & Environmental Consulting

February 13, 2020 ESC19-G010

Caldart Poulsbo LLC
105 S. Main Street, Ste 230
Seattle, Washington 98104

Attn: Mr. Barry Margolese

PROPOSED CALAVISTA RESIDENTIAL DEVELOPMENT
19700 AND 19840 CALDART AVENUE NE
POULSBO, WASHINGTON
TAX PARCELS #132601-3-003-2001 AND 132601-3-065-2006

Dear Mr. Margolese,

EnviroSound Consulting, Inc. (EnviroSound) is presenting this letter in response to a January 26, 2020 memo from the City of Poulsbo. The two items EnviroSound was requested to address are shown below with our responses.

1. EnviroSound was provided and reviewed the most recent copy of the site plan labeled "Comprehensive Grading Plan" dated 2/24/20. The plan shows the location for the north and east retaining walls. This information does not impact the recommendations provided in our geotechnical report.

2. The geotechnical report indicates that the subject property lies within the delineated area of the Dabob Bay Fault Zone; however, no fault surface ruptures have not been mapped or observed in the Poulsbo area. The nearest mapped surface ruptures are from the Seattle Fault strands located south Bainbridge Island approximately 10.0 miles away. In our opinion, this fault should not adversely impact the proposed project.

We have prepared this letter based on standard practices, currently used in this area at the time of preparation. Although a previous geotechnical report was reviewed no specific subsurface investigation was performed by EnviroSound as part of this letter. The information presented in this letter was collected and interpreted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions. Should you have any questions or concerns, which have not been addressed, or if we may be of additional assistance, please call our office at (360) 698-5950.

Sincerely,

Shawn E. Williams, L.E.G.
Senior Engineering Geologist

State of Washington
Engineering Geologist
2208
Licensed Geologist

2-14-2020

Michael J. Wolczko, P.E.
Senior Geotechnical Engineer

MICHAEL JOHN WOLCZKO
STATE OF WASHINGTON
Michael John Wolczko
31276
REGISTERED
PROFESSIONAL ENGINEER

2/14/20

AC1

From: Alison Dennison
To: Edie Berghoff
Cc: Carly Schaeffer; Erik O. Andersen; Jess Matrazzo
Subject: RE: Peer Review - Calavista PRD - Geotechnical Report
Date: Tuesday, May 12, 2020 11:24:57 PM

CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.

Hi Edie,

We reviewed the additional items and our comments have been suitably addressed. Please let me know if you need anything more.

Thank you,
~Ali

Alison J. Dennison, LEG | Senior Engineering Geologist | Direct: 206-780-7717

From: Edie Berghoff <eberghoff@cityofpoulsbo.com>
Sent: Wednesday, May 06, 2020 1:29 PM
To: Alison Dennison <adennison@aspectconsulting.com>
Cc: Carly Schaeffer <cschaeffer@aspectconsulting.com>; Erik O. Andersen <eandersen@aspectconsulting.com>; Jess Matrazzo <jmatrazzo@cityofpoulsbo.com>
Subject: RE: Peer Review - Calavista PRD - Geotechnical Report

Hello Ali,

Attached is the response from the applicant's consultant to the Aspect review provided February 6. (see this email string). A current project drawing revised 2/24/20 identifying permanent walls on sheet 12 is available at this link https://ci-poulsbo-wa.smartgovcommunity.com/PermittingPublic/PermitDetailPublic/Index/1c2149fd-e391-4226-aac6-aa47014e63e3?_conv=1 under public notices. In addition, the first response letter from ESC, dated December 13, 2019, is attached

Please let me know if this information is adequate for the geotechnical aspects of the Critical Areas Ordinance peer review to be completed for this project. Any recommendations or suggested conditions in that regard are appreciated.

I believe there will need to be an addendum to the scope of work, and consultant task order. Please let me know what the amount will be, and I will get the addendum to you asap. If we could have the final review by May 15, that would be great; however, please let me know if a 10-day timeframe is too soon.

Thank you,
Edie Berghoff
Associate Planner
City of Poulsbo - Planning and Economic Development

200 NE Moe Street
360-394-9748

FYI - Planning Department Updated Counter Hours:
Walk-in customers: 8:30 am - 12 pm Monday-Friday
Appointments: 8:30 am - 3:30 pm Monday-Friday
https://cityofpoulsbo.com/communitydevelopmentappointment/

From: Alison Dennison <adennison@aspectconsulting.com>
Sent: Thursday, April 02, 2020 9:58 PM
To: Edie Berghoff <eberghoff@cityofpoulsbo.com>
Cc: Carly Schaeffer <cschaeffer@aspectconsulting.com>; Erik O. Andersen <eandersen@aspectconsulting.com>; Jess Matrazzo <jmatrazzo@cityofpoulsbo.com>
Subject: RE: Peer Review - Calavista PRD - Geotechnical Report

Hi Edie,

Our initial contract was for a review of the geotechnical report with the results presented in a technical memorandum. Our budget for that task was $2,500 and our invoice was about $2,400. The second response was the second invoice for about $445, which exceeded the contract by about $345.

I will send a Consultant Task Order for the services provided, along with the services for the final review tomorrow.

Thanks,
~Ali

Alison J. Dennison, LEG | Senior Engineering Geologist | Direct: 206-780-7717

From: Edie Berghoff <eberghoff@cityofpoulsbo.com>
Sent: Thursday, April 02, 2020 2:52 PM
To: Alison Dennison <adennison@aspectconsulting.com>
Cc: Carly Schaeffer <cschaeffer@aspectconsulting.com>; Erik O. Andersen <eandersen@aspectconsulting.com>; Jess Matrazzo <jmatrazzo@cityofpoulsbo.com>
Subject: RE: Peer Review - Calavista PRD - Geotechnical Report

Greetings,

The conclusion of this peer review has been hanging out for some time and hoping for some clarification.

The city received a second bill recently for review. Our records indicate that this second bill is $400 in excess of the initial scope of work and consultant task order. We anticipate there will be at least one additional round of review as indicated by the email string below.

For now if you could clarify if the current bill is in excess of the initial scope of work. If this is the case, please provide a scope addendum for the excess and additional review.

Thank you for your assistance,
Edie Berghoff
Associate Planner
City of Poulsbo - Planning and Economic Development
200 NE Moe Street
360-394-9748

FYI - Planning Department Updated Counter Hours:
Walk-in customers: 8:30 am - 12 pm Monday-Friday
Appointments: 8:30 am - 3:30 pm Monday-Friday
https://cityofpoulsbo.com/communitydevelopmentappointment/

From: Edie Berghoff
Sent: Thursday, February 06, 2020 3:40 PM
To: Alison Dennison <adennison@aspectconsulting.com>
Cc: Carly Schaeffer <cschaeffer@aspectconsulting.com>; Erik O. Andersen <eandersen@aspectconsulting.com>
Subject: RE: Peer Review - Calavista PRD - Geotechnical Report

Ali,

Thank you. I will provide your comments to the applicant.

Please let me know if we need additional funds for this or future reviews.
Edie Berghoff
Associate Planner
City of Poulsbo - Planning and Economic Development
200 NE Moe Street
360-394-9748

From: Alison Dennison <adennison@aspectconsulting.com>

Sent: Thursday, February 06, 2020 9:56 AM
To: Edie Berghoff <eberghoff@cityofpoulsbo.com>
Cc: Carly Schaeffer <cschaeffer@aspectconsulting.com>; Erik O. Andersen <eandersen@aspectconsulting.com>
Subject: RE: Peer Review - Calavista PRD - Geotechnical Report

Hi Eddie,

We have two comments regarding the updated report and plan set you provided:

- Per Comment 1 on our original letter, the plans to do not show the retaining walls. It seems as though the steeper slopes indicated on the Grading Plan (Sheet 12) are temporary slopes, however, the plans are not clear. If this is the case, this sheet should be referenced as a temporary grading plan, and a permanent plan sheet should also be provided, with appropriate call-outs to the proposed retaining walls.
- In the seismic hazard section of the report, fault surface rupture is acknowledged as a risk, however conclusions regarding its impact on the project are not discussed. Please include a brief description of whether surface fault rupture is critical for the project.

Please let me know if you have any questions.

Thank you,
~Ali

Alison J. Dennison, LEG | Senior Engineering Geologist | Direct: 206-780-7717

From: Edie Berghoff <eberghoff@cityofpoulsbo.com>
Sent: Tuesday, January 28, 2020 1:41 PM
To: Alison Dennison <adennison@aspectconsulting.com>
Subject: RE: Peer Review - Calavista PRD - Geotechnical Report

Hi Ali,
Thank you for the update.

Edie Berghoff
Associate Planner
City of Poulsbo - Planning and Economic Development
200 NE Moe Street
360-394-9748

From: Alison Dennison <adennison@aspectconsulting.com>
Sent: Tuesday, January 28, 2020 1:30 PM
To: Edie Berghoff <eberghoff@cityofpoulsbo.com>
Subject: RE: Peer Review - Calavista PRD - Geotechnical Report

Hi Edie,

I will have a response by the end of this week.

Thanks,
~Ali

Alison J. Dennison, LEG | Senior Engineering Geologist | Direct: 206-780-7717

From: Edie Berghoff <eberghoff@cityofpoulsbo.com>
Sent: Tuesday, January 21, 2020 11:17 AM
To: Alison Dennison <adennison@aspectconsulting.com>
Subject: RE: Peer Review - Calavista PRD - Geotechnical Report

Hello Allison,

The applicant provided revised critical area report information for the Calavista PRD. Attached please find the Revised Limited Geotechnical Engineering Report. Please let me know if the revision meets the concerns identified in the December 12, 2019 review by Aspect Consulting.

Please let me know if there are questions,
Edie Berghoff
Associate Planner
City of Poulsbo - Planning and Economic Development
200 NE Moe Street
360-394-9748

From: Alison Dennison <adennison@aspectconsulting.com>
Sent: Thursday, December 12, 2019 2:01 PM
To: Edie Berghoff <eberghoff@cityofpoulsbo.com>
Cc: Carly Schaeffer <cschaeffer@aspectconsulting.com>; Erik O. Andersen

<eandersen@aspectconsulting.com>
Subject: RE: Peer Review - Calavista PRD - Geotechnical Report

Good Afternoon Edie,

Our third party review of the Calavista PRD is attached. Please let me know if you have any questions.

Thank you,
~Ali

Alison J. Dennison, LEG | Senior Engineering Geologist | Direct: 206-780-7717

From: Edie Berghoff <eberghoff@cityofpoulsbo.com>
Sent: Thursday, November 14, 2019 12:07 PM
To: Alison Dennison <adennison@aspectconsulting.com>
Subject: Peer Review - Calavista PRD - Geotechnical Report

Hello Allison,

A geotechnical report review is required for a new subdivision proposal. In particular review for consistency with the Poulsbo Critical Areas Ordinance (PMC 16.20) is requested. I have attached a draft task order for you to complete and the project site plan and Geotech report. We can provide paper copies of the plan if needed.

Properties are shown below, located at 19700 CALDART AVE NE and 19840 CALDART AVE NE

I am hoping you are the correct contact on this. If not, please let me know!

Thank you and please let me know if you have any questions.

Edie Berghoff
Associate Planner
City of Poulsbo - Planning and Economic Development
200 NE Moe Street
360-394-9748

SVC2

Soundview Consultants LLC
Environmental Assessment • Planning • Land Use Solutions

2907 Harborview Dr., Suite D, Gig Harbor, WA 98335
Phone: (253) 514-8952 Fax: (253) 514-8954

Technical Memorandum Addendum

To: **Edie Bergoff, Associate Planner, City of Poulsbo** **File Number: 1001.0027**

From: **Don Babineau, Soundview Consultants LLC** **Date: December 20, 2019**

Re: **Response to City of Poulsbo technical review comments: P-05-08-19-01**

Dear Ms. Bergoff,

Thank you for your review and attention to this project. This technical memorandum addendum addresses Comment 1 contained in the memo from your office dated November 20, 2019 regarding the technical memorandum prepared by Soundview Consultants LLC (SVC) dated September 24, 2019 documenting the stream assessment and impact analysis of a one-mile segment of the South Fork of Dogfish Creek from its intersection with Highway 305 to the previously proposed outfall location immediately south of Mosjon Circle. Below is Comment 1 of the City's memo in italics followed by SVC's response.

June 24, Items 1 and 2 identified stream (South Fork Dogfish Creek) and stormwater discharge to the stream. Significant work to update stream information was provided in resubmittal documents. Due to DFW new information a letter responding to fish and wildlife conservation section of the CAO or revision of the Soundview Consultants September 24, 2019 Technical Memorandum is needed prior to city consultant review of the storm drainage report. Please remember the South Fork Dogfish Creek is a salmon stream when addressing Critical Area Ordinance requirements.

As you are aware, the Soundview Consultants September 24, 2019 Technical Memorandum provides stream characterization beginning south of Mosjon Circle in the Poulsbo Gardens (PG) plat Homeowners Association (HOA) property. The memorandum indicates the PG plat HOA property is a bioswale, and the stream does not begin until south of Watland Street in the Caldart Heights plat open space. Further, the memorandum was provided to DFW and Tribe for use at the October 7, 2019 site meeting discussing storm outfall. At that meeting, and in subsequent October 18, 2019 email, DFW determined the HOA property includes a Type Ns stream, not a bioswale.

Review under the CAO Fish & Wildlife Habitat Conservation critical area (CAO Section 300) is warranted based on the PG plat HOA property south of Mosjon Circle containing the Type Ns segment of the South Fork Dogfish Creek. Please remember the South Fork Dogfish Creek is a salmon stream when addressing Critical Area Ordinance requirements. A letter or a revision of the September memorandum is needed prior to city consultant review of the storm drainage report.

The September memorandum and additional CAO review will be provided with the storm drainage report for consultant review. Once the storm water consultant review is finalized, the same documents will be provided to city consultant for CAO review.

While WDFW has determined that the segment of drainage within the Poulsbo Gardens plat Homeowners Association (HOA) property is a type Ns stream, SVC maintains our assessment of this segment of drainage as a bioswale based on its physical characteristics and detailed as-built documentation; however, in an effort to expedite project approval, the applicant agrees to treat this segment of the drainage as a stream as shown on the attached City of Poulsbo map and as regulated under Poulsbo Municipal Code 16.20.315.

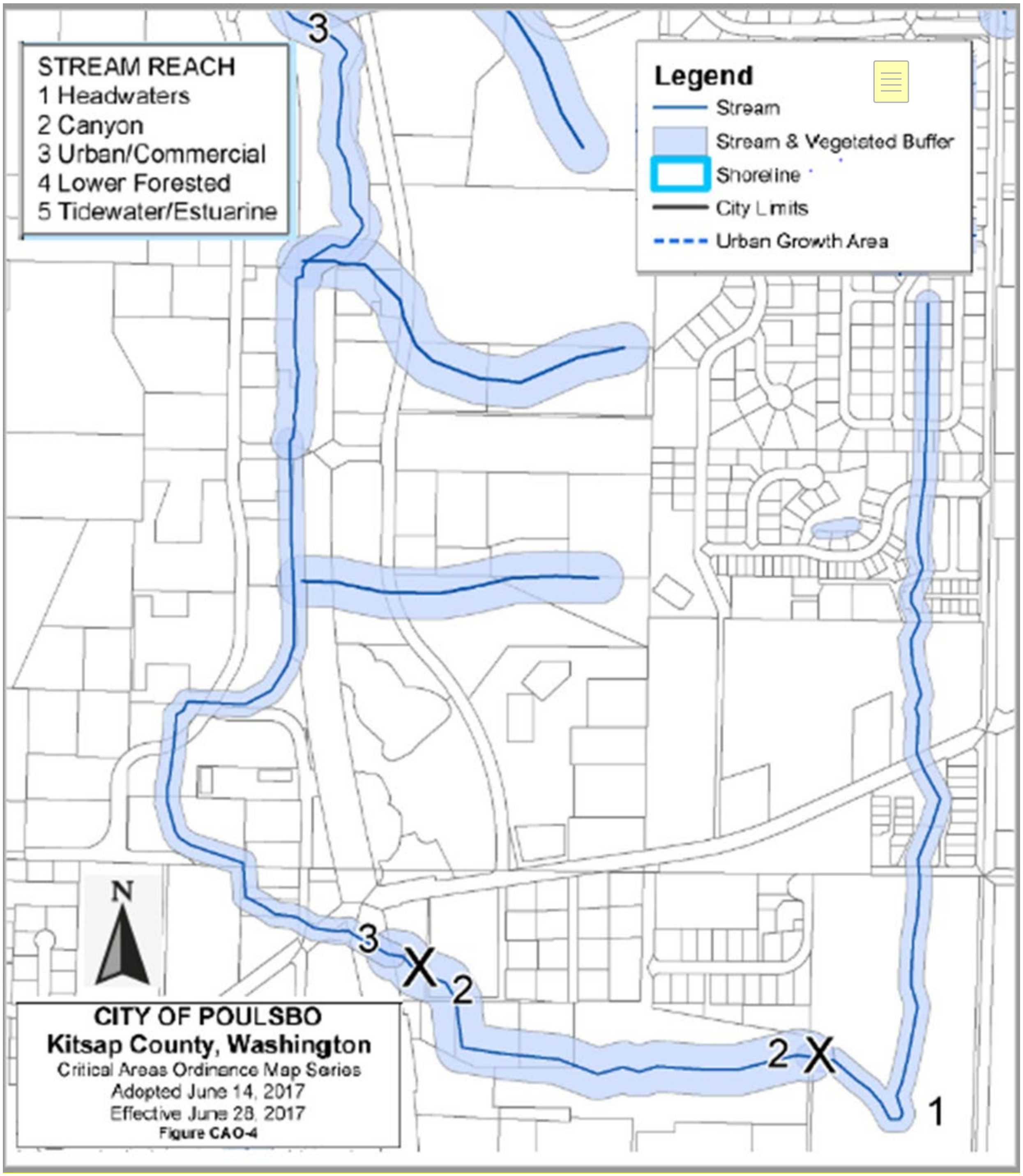
We trust that this addendum fully addresses the City's concerns regarding this matter.

Please do not hesitate to contact me with any question or concerns you may have.

Sincerely,

Don Babineau
Environmental Planner/Forester
Office 253.514.8952x017
Fax: 253.514.8954
don@soundviewconsultants.com

Attachment A – City of Poulsbo Figure CAO-4



February 20, 2020
Calavista, Poulsbo, LLC
105 S. Main St, Suite 230
Seattle, WA 98104
Attn: Barry Margolese

Site: 19700 & 19840 Caldart Ave NE
Poulsbo, WA 98370
TPN: 132601-30652006 & 132601-30032001
Site of assemblage: Approximately 9.05 acres

Re: RFI Dated December 19,2019 by Kevin M. McFarland, ISA (changes highlighted in yellow when practical)

1. Updated to remove ROW trees
2. Updated to consider all trees regardless of current health
3. Updated to add 27 smaller diameter trees and native vegetation to equal the number of trees required for retention.

Re: RFI dated July 14th, 2019 Tree comments by Kevin M. McFarland, ISA

1. Existing trees identified by field tags and corresponding assessment via spreadsheet, tree species are updated and corrected. There were several recent failures within the past year, that no doubt contributes to the discrepancy in number of site trees.
2. Applicant is retaining 25% of the existing viable trees. In addition, the site map for the original submittal shows many smaller diameter trees that will be retained in the tree tracts thou they are not specifically assessed or counted.
3. The 15’ wide maintenance road is no longer being considered, there will be a native walk through tract “D”.
4. Site survey has been updated to more clearly show retained significant trees as well as the tree protection fencing for the LSM.

Dear Barry:

Thank you for requesting my services. Between July 31 – August 3rd, 2019, we performed a Level 2 Visual Tree Assessment (VTA) for all significant trees growing on the Poulsbo site noted above. The proposed project is a 43-lot subdivision of the two parcels totaling 9.05 acres. The information gathered and included in this report is a necessary part of the City of Poulsbo’s requirement for a Tree Preservation Plan to be included in the submittal for proposed site development. (PMC 18.180.030) The preparation of the report was also focused on providing information that the Peer Review Arborist noted was missing from the original submittal.

In summary:

Tree Density Calculation	
Total number of significant trees	194
Total number of onsite viable trees	137
Total number of tree credits	194
Total healthy tree credits	137
Total unhealthy tree credits	57
Required tree density 194 trees *25%	49
Number of retained tree <10"	38
Number of retained tree >10" (122"equivelant/ 10"= 12 tree credits)	27
Total number of retained tree credits (38 + 12)	50
Required mitigation	0

I have included a detailed report of my findings, if you have any questions please contact me. I can be reached on my cell phone: 425.890.3808 or by email: sprince202@aol.com.

Warm regards,

Susan P

Susan Prince
Creative Landscape Solutions
ISA Certified Arborist #1481
TRAQ Certified Arborist #481
Landscape Designer
425.890.3808

*Significant tree is any tree with a DBH 10” or greater (PMC 18.180.030 B.1.)

Table of Contents

Personal qualifications, scope of work and methodology:
To evaluate the trees and prepare the report, I drew on my formal college education in botany and the preparation and training used to obtain my ISA certification. In addition to my education and certification, I relied heavily on my training to obtain my certification as a Tree Risk Assessor. I have worked in the field of arboriculture since 1995, have been ISA Certified since 1999, and have been TRACE/TRAQ certified since 2009.

I followed protocol delineated by the International Society of Arboriculture (ISA) for Visual Risk Assessment (VRA). By doing so, I am examining each tree independently as well as collectively as groups or stands of trees provide stability and can lower risk of independent tree failure. This scientific process examines tree health (e.g. size, vigor, and insect and disease process) as well as site conditions (soil moisture and composition, quantity of impervious surfaces surrounding the tree etc.)

Introduction:
Identifying and managing the risks associated with trees is still largely a subjective process. Since the exact nature of tree failures remains largely unknown, our ability as scientists and arborists to predict which trees will fail and in what fashion remains limited. As currently practiced, the science of hazard tree evaluation involves examining a tree for structural defects, including genetic problems, those caused by the local environmental that the tree grows in and those attributed to man (pruning etc.).

The assessment process involves evaluating three components: 1) a tree with the potential to fail, 2) an environment that may contribute to that failure, and 3) a person or object that would be injured or damaged (the target). A defective tree cannot be considered hazardous without the presence of a target.

All trees have a finite lifespan though it is not pre-programmed internally in the same manner as annual plantings. As trees age, they are less able to compartmentalize structural damage following injury from insects, disease or pruning. Trees in urban settings have a shorter life span than trees grown in an undisturbed habitat.

Different species of trees grow differently. Evergreen trees have a “reputation” of growing slowly and defensively. These trees allocate a high proportion of their resources to defending themselves from pathogens, parasites and wounds. As a rule, trees with this type of growth tend to be long lived. Though like all other living things, they have a predictable life span. Examples of this type of tree include the northwest Pseudotsuga menziesii - Douglas fir, and Thuja plicata - Western red cedar.

Deciduous trees are trees that annually shed leaves or needles. These trees tend to grow quickly and try to “outgrow” problems associated with insects, disease and wounds. They allocate a relatively small portion of their internal resources to defense and rely instead upon an ability to grow more quickly than the pathogens which infect them. However, as these trees age, their growth rate declines, and the normal problems associated with decay begins to catch up and compromise the tree’s structural integrity. Examples of this type of tree include Salix, Populus and Alnus.

Knowledge of the growth and failure patterns of individual tree species is critical to effective hazard analysis. Species vary widely in their rates of failure. The current tree risk evaluation rating system accepted as the standard by the ISA was developed by the ISA in conjunction with Julian Dunster[3] and recognizes this variation in species failure and includes a species component as part of the overall risk evaluation.

Site Observations:
The two-parcel assemblage is located south of the Poulsbo Municipal Cemetery in an area of increasing urbanization. The site currently has two homes and several outbuildings on it, although it remains primarily undeveloped. In areas that have been previously cleared and

not maintained (NE side of the site) the vegetation consists primarily of invasive species (Himalayan blackberries) and pioneer species of trees.

Method's used to determine tree location and tree health:

Trees were identified previously by numbered aluminum tags attached to the western side of the tree. All the trees on site were examined using the Matheny and Clark[1] criteria for determining the potential hazard of trees in an urban environment as well as the Tree Risk Assessment in Urban Areas and The Urban/Rural Interface by Julian Dunster[2]. Tree diameters were measured using a logger's tape, and tree driplines were measured by a Nikon Forestry PRO Laser Rangefinder™.

ABBREVIATED LEGEND- SEE REPORT FOR GREATER DETAIL

1. Numerical ordering
2. Tree tag #: numbered aluminum tags attached to the trees in the field
3. Tree species ID: common and botanical names
    - Apple: *Malus sp.*
    - American sycamore: *Plantanus occidentalis*
    - Austrian pine: *Pinus nigra*
    - Bigleaf maple: *Acer macrophyllum*
    - Birch: *Betula nigra*
    - Bitter Cherry: *Prunus emarginata*
    - Blue atlas cedar: *Cedrus atlantica 'Glauca'*
    - Cedar: *Thuja plicata*
    - Cherry: *Prunus sp.*
    - Dawn redwood: *Chamaecyparis nootkatensis*
    - Deodora cedar: *Cedrus deodara*
    - Colorado blue spruce: *Picea pungens*
    - Cottonwood*: Populus deltoides*
    - Dogwood*: Cornus nuttallii*
    - Douglas fir: *Pseudotsuga menziesii*
    - English laurel: *Prunus laurocerasus*
    - Filbert: *Corylus avellana var.*
    - Grand fir: *Abies grandis*
    - Hemlock: *Tsuga hetrophylla*
    - Holly: *Ilex aquifolium*
    - Japanese maple: *Acer palmatum*
    - Leylandii cypress: *Cupressocyparis leylandii*
    - Lodgepole pine*: Pinus contorta*
    - Mountain ash: *Sorbus americana*
    - Mountain hemlock: *Tsuga mertensiana*
    - Pear: *Pyrus sp.*
    - Plum: *Prunus*
    - Red Alder: *Alnus rubra*
    - Red maple: *Acer rubrum*
    - Walnut: *Juglans sp.*
    - Western red cedar: *Thuja plicata*
    - Weeping Alaska cedar*: Metasequoia glyptostrobides*
    - White pine*: Pinus strobus*
4. DBH: diameter of the tree measured in inches at 4' above grade
5. Adj. DBH: multiple trunk tree DBH in inches calculated per municipality directives
6. Dripline Radius: measurement in feet of the tree canopy from tree trunk to outermost branch tip via laser rangefinder
7. Windfirm/OK in grove: if a viable tree is determined to be in unstable or wet soil, it is presumed to be susceptible to windthrow. If there is no comment in the column the tree is presumed to be windfirm. If a standalone tree is structurally too weak to be retained, it can sometimes be retained, if its location is within a grove
8. Health: a measurement of overall tree vigor and vitality rated as excellent, good, OK, fair or poor based on an assessment of crown density, leaf color and size, active callusing, shoot growth rate, extent of crown dieback, cambium layer health, and tree age

- Excellent: Tree is an ideal specimen for the species with no obvious flaws
- Good: Tree may have some minimal structural or situational defects
- OK: The tree may have an average amount of structural issues, and/or some insect or disease issues, and/or some environmental issues, however, considering the species, the trees will withstand the stress of construction and/or the change in environmental conditions without an increased risk of failure
- Fair: Tree has structural or health issues that predispose it to failure if further stressed, this tree may be unsuitable for retention as a single tree, however depending on the species, it may be suitable for retention if it is retained within a grove
- Poor: Tree has significant structural and/or health issues. It is dead or dying and is generally exempt from total tree count

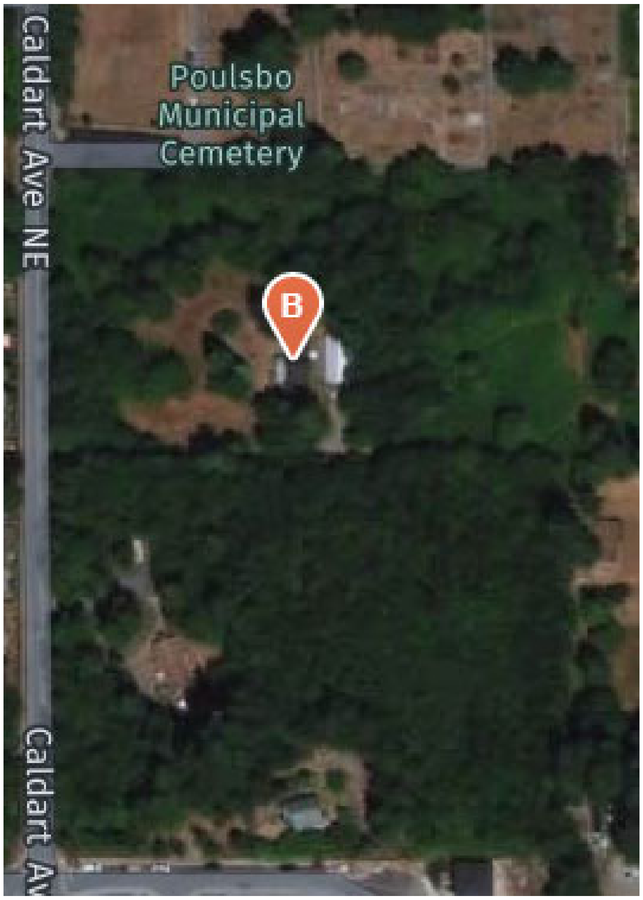
9. Defects/Concerns: a measure of the tree's structural stability and failure potential based on assessment of specific structural features, e.g., decay, conks, co-dominant trunks, included bark, abnormal lean, one-sided canopy, history of failure, prior construction impact, pruning history, etc.
10. Proposed action:
    - Retain
    - Remove due to viability
    - Remove due to planned development (tree is otherwise healthy)
    - Column for retained ROW trees
11. Limits of disturbance/Tree protection zone: the area surrounding the tree that defines the area that surrounds the trunk that cannot be encroached upon during construction. This may be a multiple of the trunk diameter (1 -1.5 times the trunk diameter converted to feet) or it may be related to the width of the canopy. It is always determined by tree species and environment and is up to the discretion of the ISA Certified Arborist to determine.
12. Measure of tree "value" may be determined by municipality formula or a direct measure of the trunk diameter to determine its relative significance. In the Poulsbo tree units are counted and 25% of those are to be retained

[1] Matheny, N., and Clark, J. 1994. *Evaluation of Hazard Trees in Urban Areas*. 2nd Edition. Champaign, Illinois: International Society of Arboriculture.

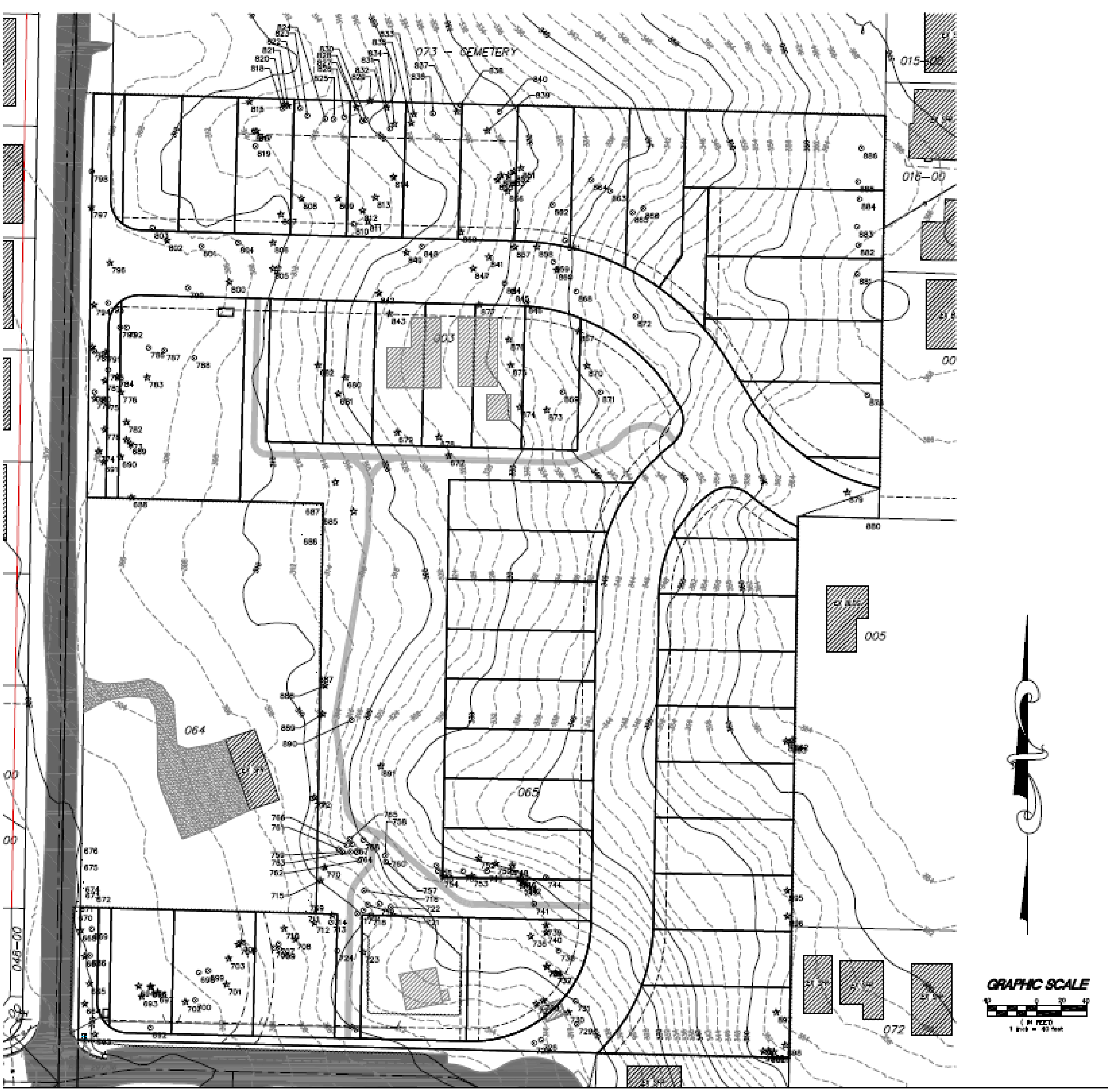
[2] Dunster, J.A. 2009. *Tree Risk Assessment in Urban Areas and the Urban/Rural Interface*: Course Manual. Silverton, Oregon: Pacific Northwest Chapter, International Society of Arboriculture.

[3] Dunster, Julian A., E. Thomas Smiley, Nelda Matheny and Sharon Lilly. Tree Risk Assessment Manual. Champaign, Illinois: International Society of Arboriculture, 2013.

Site GIS Map:



Proposed Site Improvements:



Onsite Tree Observations:

1	2	3	4	5	6	7		8	9	10			11				12		
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD Radius in feet				Tree credits	Viable tree credits	Retained tree credits
										Ret	Remove		N	W	E	S			
										Viable	Non-viable	For site improve-ments							
1	677	Western red cedar	42	42	16			OK	Dead spur @ root crown, carpenter ants bark only, thin canopy, typical of species			1	16	16	16	16	1	1	
2	678	Colorado blue spruce	19	19	13			OK	Torque crack @ root crown up to 15' towards south, free flowing sap, spruce adelgid, dead wood, broken branches, typical of species			1	13	13	13	13	1	1	
3	679	Colorado blue spruce	22	22	16			OK	Vertical crack @ root crown up to 15' towards east, thin canopy, spruce adelgid, typical of species			1	16	16	16	16	1	1	
4	680	Colorado blue spruce	13	13	12			OK	Spruce adelgid, moss and lichen, typical of species, thin canopy			1	12	12	12	12	1	1	
5	681	Douglas fir	14	14	12			Poor	Exposed roots, co-dominant leaders with included bark x2 @ 20' up to 30', fused trunks		1		12	12	12	12	1		
6	682	Douglas fir	28	28	20			OK	Carpenter ants, thin canopy, typical of species			1	20	20	20	20	1	1	
7	683	Western red cedar	18	18	13			OK	Strong lateral, thin canopy, typical of species			1	13	13	13	13	1	1	
8	684	Western red cedar	18	18	16			OK	Tag on fence, dominant canopy, typical of species			1	16	16	16	16	1	1	
9	688	Hemlock	10	10	16			Poor	Girdling barbed wire, previous top loss, thin canopy		1		16	16	16	16	1		
10	689	Douglas fir	10	10	10			OK	Low live crown ratio < 30%, dead wood, broken branches, co-dominant canopy, typical of species			1	10	10	10	10	1	1	

1	2	3	4	5	6	7		8	9	10			11				12		
										Proposed Action			CRZ/TPZ/LOD						
													Radius in feet						
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#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Viable	Non-viable	For site improvements	N	W	E	S	Tree credits	Viable tree credits	Retained tree credits
11	690	Douglas fir	10	10	13			OK	Low live crown ratio < 30%, asymmetric canopy towards west, co-dominant canopy, nurse tree			1	13	13	13	13	1	1	
12	693	Douglas fir	11	11	10			Fair	No taper, abnormal bark, shedding bark, low live crown ratio < 30%		1		10	10	10	10	1		
13	694	Douglas fir	12	12	8			Fair	No taper, abnormal bark, shedding bark, popping bark, low live crown ratio < 10%		1		8	8	8	8	1		
14	695	Douglas fir	13	13	12			OK	Low live crown ratio < 20%, exposed roots, typical of species			1	12	12	12	12	1	1	
15	696	Douglas fir	14	14	10			Fair	Low live crown ratio < 10%, no taper, abnormal bark, shedding bark, popping bark, typical of species, carpenter ants bark only, woodpecker activity		1		10	10	10	10	1		
16	697	Douglas fir	11	11	16			Fair	Previous top loss, elongated branches, low live crown ratio < 10%		1		16	16	16	16	1		
17	698	Madrona	16, 14	21.5	20 south only			OK	Co-dominant leaders with included bark x2 @ root crown, lean towards south, dead wood, broken branches, typical of species, leaning on utility line			1	20 south only	20 south only	20 south only	20 south only	1	1	
18	699	Red alder	10	10	16			Poor	Failing towards east		1		16	16	16	16	1		
19	700	Madrona	14	14	18			OK	Lean towards east, blight, typical of species			1	18	18	18	18	1	1	

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#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD				Tree credits	Viable tree credits	Retained tree credits
													Radius in feet						
										Ret	Remove		N	W	E	S			
										Viable	Non-viable	For site improvements							
20	701	70	22	22	16			OK	Previous top loss, elongated branches, dominant canopy, dead wood, broken branches, typical of species			1	16	16	16	16	1	1	
21	702	Douglas fir	14	14	13			OK	Previous top loss, elongated branch, typical of species, abnormal bark, shedding bark			1	13	13	13	13	1	1	
22	703	Grand fir	16	16	14			OK	Free flowing sap, asymmetric canopy towards south, thin canopy			1	14	14	14	14	1	1	
23	704	Douglas fir	26	26	16			OK	Dead wood, broken branches, asymmetric canopy towards south, co-dominant canopy, typical of species			1	16	16	16	16	1	1	
24	705	Douglas fir	13	13	12			Fair	Co-dominant canopy, previous top loss, lean towards east, low live crown ratio < 20%		1		12	12	12	12	1		
25	706	Madrona	15, 18	23.5	26 south only			OK	Lean towards south, dead wood, broken branches, moss and lichen, blight, typical of species, co-dominant leaders with included bark x2 @ root crown, vertical crack @ root crown up to 8' towards west			1	26 south only	26 south only	26 south only	26 south only	1	1	
26	707	Bigleaf maple	10, 8, 12, 8	19.5	26 north only			OK	Co-dominant leaders with included bark x4 @ root crown, typical of species			1	26 north only	26 north only	26 north only	26 north only	1	1	

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#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD Radius in feet				Tree credits	Viable tree credits	Retained tree credits
										Ret	Remove								
										Viable	Non-viable	For site improve-ments	N	W	E	S			
27	708	Douglas fir	37	37	18			OK	Abnormal bark, shedding bark, popping bark, carpenter ants bark only, asymmetric canopy towards south, dead wood, broken branches, co-dominant canopy			1	18	18	18	18	1	1	
28	709	Madrona	14,4	14.5	28 south only			Fair	Co-dominant leaders with included bark x2 @ root crown, dead scaffold, vertical crack @ root crown up to 4' towards east		1		28 south only	28 south only	28 south only	28 south only	1		
29	710	Douglas fir	31	31	16 west only			OK	Co-dominant canopy, abnormal bark, shedding bark, popping bark, carpenter ants bark only, asymmetric canopy towards west, typical of species			1	16 west only	16 west only	16 west only	16 west only	1	1	
30	712	Douglas fir	14	14	14			Fair	Abnormal bark, shedding bark, suppressed canopy, previous top loss, low live crown ratio < 10%, dead wood, broken branches, carpenter ants		1		14	14	14	14	1		
31	713	Bigleaf maple	19	19	30 south only			Fair	Co-dominant leaders with included bark x2 @ 6', previous top loss, dead wood, broken branches, dead scaffold, asymmetric canopy towards south		1		30 south only	30 south only	30 south only	30 south only	1		

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#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD Radius in feet				Tree credits	Viable tree credits	Retained tree credits
										Ret	Remove								
										Viable	Non-viable	For site improve-ments	N	W	E	S			
32	714	Douglas fir	23	23	14			Fair	Exposed roots, previous top loss, elongated branch, dead wood, broken branches, suppressed canopy, asymmetric canopy towards south, carpenter ants, woodpecker activity		1		14	14	14	14	1		
33	715	Douglas fir	28	28	16			OK	Asymmetric canopy towards south, dead wood, broken branches, elongated branches, previous top loss, typical of species	1			16	16	16	16	1	1	1
34	716	Bitter cherry	12, 13	17.5	16		Y	Fair	Co-dominant leaders with included bark x2 @ root crown, moss and lichen, previous top loss, asymmetric canopy towards south, failing @ root crown	1			16	16	16	16	1	1	1
35	721	Bitter cherry	12, 4	12.5	20 south only		Y	Fair	Co-dominant leaders with included bark x2 @ 1', gummosis, lean towards south, typical of species, large calloused wound @ root crown up to 6' towards north	1			20 south only	20 south only	20 south only	20 south only	1	1	1
36	722	Bitter cherry	12, 8	14.5	19		Y	Fair	Co-dominant leaders with included bark x2 @ 4', gummosis, lean towards south, dead wood, broken branches, typical of species	1			19	19	19	19	1	1	1
37	723	Douglas fir	18	18	16			OK	Asymmetric canopy towards south, exposed roots, carpenter ants bark only, dead wood, broken branches, dominant canopy, typical of species			1	16	16	16	16	1	1	

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#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD Radius in feet				Tree credits	Viable tree credits	Retained tree credits
										Ret	Remove								
										Viable	Non-viable	For site improvements	N	W	E	S			
38	724	Madrona	18	18	24 south only			OK	Lean towards south, typical of species			1	24 south only	24 south only	24 south only	24 south only	1	1	
39	725	Silver maple	10, 10	14	24			Poor	Dead scaffold, co-dominant leaders with included bark x2 @ 1', dying		1		24	24	24	24	1		
40	726	Silver maple	10	10	15			Poor	Vertical crack @ root crown up to 30', dying		1		15	15	15	15	1		
41	727	Douglas fir	19	19	21 west only			Fair	Asymmetric canopy towards west, dead wood, broken branches, self-corrected lean, free flowing sap		1		21 west only	21 west only	21 west only	21 west only	1		
42	728	Douglas fir	14	14	12			OK	Co-dominant canopy, low live crown ratio < 20%, dead wood, broken branches, typical of species			1	12	12	12	12	1	1	
43	729	Silver maple	16	16	18			Poor	Lean towards west, serpentine trunk, previous top loss, dead wood, broken branches		1		18	18	18	18	1		
44	730	Douglas fir	21	21	16			OK	Abnormal bark, shedding bark, carpenter ants bark only, typical of species			1	16	16	16	16	1	1	
45	731	Silver maple	15	15	17			Poor	Previous top loss @ 40', weak laterals, vertical crack @ root crown up to 10' towards south		1		17	17	17	17	1		
46	732	Western red cedar	41	41	16			Fair	Racoon poop, cavity @ root crown up to 3' towards south, co-dominant leaders with included bark x2 @ 6', cavity @ root crown up to 6' towards south, woodpecker activity, carpenter ants		1		16	16	16	16	1		

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#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD Radius in feet				Tree credits	Viable tree credits	Retained tree credits
										Ret	Remove		N	W	E	S			
										Viable	Non-viable	For site improvements							
47	733	Western red cedar	14	14	15			OK	Self-corrected lean, asymmetric canopy towards west, suppressed canopy, typical of species			1	15	15	15	15	1	1	
48	734	Western red cedar	10	10	16			OK	Self-corrected lean towards west, typical of species			1	16	16	16	16	1	1	
49	735	Western red cedar	12	12	16			OK	Self-corrected lean, co-dominant canopy, asymmetric canopy towards west, typical of species			1	16	16	16	16	1	1	
50	736	Western red cedar	11	11	14			OK	Co-dominant canopy, asymmetric canopy towards south, typical of species			1	14	14	14	14	1	1	
51	737	Bigleaf maple	6, 10	11.5	16			Fair	Co-dominant leaders with included bark x2 @ root crown, suppressed canopy, low live crown ratio < 10%, self-corrected lean towards west		1		16	16	16	16	1		
52	738	Madrona	12, 13, 9	20	36			Fair	Co-dominant leaders with included bark x3 @ 1', suppressed canopy, dead scaffold, blight, typical of species		1		36	36	36	36	1		
53	739	Western red cedar	18, 13, 18, 10, 19, 17	39.5	14			OK	Co-dominant leaders with included bark x6 @ root crown, typical of species, racoon poop			1	14	14	14	14	1	1	
54	740	Douglas fir	17	17	14			OK	Dominant canopy, asymmetric canopy towards west, carpenter ants bark only, typical of species			1	14	14	14	14	1	1	

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#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD Radius in feet				Tree credits	Viable tree credits	Retained tree credits
										Ret	Remove								
										Viable	Non-viable	For site improvements	N	W	E	S			
55	743	Douglas fir	14	14	14			Fair	Self-corrected lean, previous top loss @ 50', asymmetric canopy towards west		1		14	14	14	14	1		
56	744	Madrona	11	11	28 west only			OK	Lean towards west, typical of species, dead wood, broken branches, suppressed canopy			1	28 west only	28 west only	28 west only	28 west only	1	1	
57	745	Douglas fir	16	16	14			OK	Exposed roots, girdled root? Low live crown ratio? Asymmetric canopy towards west, co-dominant canopy			1	14	14	14	14	1	1	
58	746	Douglas fir	13	13	10			OK	Suppressed canopy, asymmetric canopy towards west, exposed roots, girdled by Western red cedar roots			1	10	10	10	10	1	1	
59	747	Western red cedar	15	15	12			OK	Typical of species, dominant canopy, woodpecker activity, carpenter ants bark only			1	12	12	12	12	1	1	
60	748	Western red cedar	14, 14, 6, 12	24	14			OK	Co-dominant leaders with included bark x4 @ 2', suppressed canopy, dead spurs, typical of species			1	14	14	14	14	1	1	
61	749	Bigleaf maple	4, 8, 11, 9, 10, 8, 4	21.5	20			Poor	Co-dominant leaders with included bark x7 @ root crown, decay @ root crown, multiple cavities @ root crown		1		20	20	20	20	1		
62	750	Douglas fir	21	21	18			Fair	Dominant canopy, asymmetric canopy towards west, previous top loss, dead wood, broken branches, low live crown ratio < 30%		1		18	18	18	18	1		

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#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD Radius in feet				Tree credits	Viable tree credits	Retained tree credits
										Ret	Remove								
										Viable	Non-viable	For site improve-ments	N	W	E	S			
63	751	Madrona	12, 7	14	30 west only			Fair	Co-dominant leaders with included bark x2 @ 8', cavity @ root crown, suppressed canopy, typical of species		1		30 west only	30 west only	30 west only	30 west only	1		
64	752	Douglas fir	10	10	10			Fair	Previous top loss @ 50', supported by #751		1		10	10	10	10	1		
65	753	Douglas fir	15	15	14			OK	Low live crown ratio < 30%, asymmetric canopy towards northwest, co-dominant canopy, dead wood, broken branches, typical of species			1	14	14	14	14	1	1	
66	754	Madrona	17	17	22 west only			OK	Lean towards west, poor pruning with decay, co-dominant leaders with included bark x2 @ 5', typical of species			1	22 west only	22 west only	22 west only	22 west only	1	1	
67	755	Madrona	16	16	18 west only			OK	Lean towards west, typical of species			1	18 west only	18 west only	18 west only	18 west only	1	1	
68	756	Silver maple	15	15	17			Poor	Dying, poor, dead scaffold		1		17	17	17	17	1		
69	757	Bigleaf maple	15, 3, 8	17.5	22 south only		Y	Fair	Co-dominant leaders with included bark x3 @ root crown, asymmetric canopy towards south, moss and lichen, lean towards south	1			22 south only	22 south only	22 south only	22 south only	1	1	1
70	758	Bigleaf maple	9, 11, 6, 7, 9, 12	22.5	16		Y	Fair	Co-dominant leaders with included bark x6 @ root crown, moss and lichen, dead scaffold	1			16	16	16	16	1	1	1
71	759	Madrona	11	11	14		Y	Fair	Low live crown ratio < 5%, lean towards east	1			14	14	14	14	1	1	1

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#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD Radius in feet				Tree credits	Viable tree credits	Retained tree credits
										Ret	Remove								
										Viable	Non-viable	For site improvements	N	W	E	S			
72	760	Bigleaf maple	11	11	14			OK	Suppressed canopy, asymmetric canopy towards west, typical of species	1			14	14	14	14	1	1	1
73	761	Bigleaf maple	14, 9	16.5	17			OK	Co-dominant leaders with included bark x2 @ root crown, vertical crack @ root crown up to 35' towards north, asymmetric canopy towards north, typical of species	1			17	17	17	17	1	1	1
74	762	Madrona	15	15	18		Y	Fair	Co-dominant canopy, low live crown ratio < 10%, moss and lichen, multiple cavities	1			18	18	18	18	1	1	1
75	763	Bigleaf maple	10	10	14			OK	Low live crown ratio < 20%, moss and lichen, typical of species	1			14	14	14	14	1	1	1
76	765	Madrona	14	14	20		Y	Fair	Cavity @ root crown, exposed roots, lean towards south, typical of species	1			20	20	20	20	1	1	1
77	766	Bigleaf maple	9, 9, 15	19.5	15		Y	Fair	Co-dominant leaders with included bark x3 @ root crown, large cavity @ root crown	1			15	15	15	15	1	1	1
78	770	Hemlock	8, 7	10.5	9			Poor	Co-dominant leaders with included bark x2 @ root crown, perennial canker, moss and lichen, exposed roots, mostly dead		1		9	9	9	9	1		
79	771	Bigleaf maple	8, 5, 7	11.5	10		Y	Fair	Co-dominant leaders with included bark x3 @ root crown, cavity @ root crown up to 1'			1	10	10	10	10	1	1	
80	773	Douglas fir	11	11	10			OK	Co-dominant canopy, low live crown ratio < 10%, dead wood, broken branches, typical of species			1	10	10	10	10	1	1	

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#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD Radius in feet				Tree credits	Viable tree credits	Retained tree credits
										Ret	Remove								
										Viable	Non-viable	For site improvements	N	W	E	S			
81	775	Scouler willow	6, 16	17	18			Poor	Co-dominant leaders with included bark x2 @ 2', dead scaffold, dead wood, broken branches moss and lichen, dead top		1		18	18	18	18	1		
82	776	Douglas fir	12	12	12			OK	Moss and lichen, exposed roots, low live crown ratio < 15%, dead wood, broken branches, typical of species			1	12	12	12	12	1	1	
83	780	Red alder	11	11	14			Fair	Lean towards west, asymmetric canopy towards west, previous top loss		1		14	14	14	14	1		
84	782	Douglas fir	16	16	12			OK	Low live crown ratio < 20%, dead wood, broken branches, moss and lichen, typical of species			1	12	12	12	12	1	1	
85	783	Douglas fir	16	16	12			OK	Low live crown ratio < 15%, co-dominant canopy, dead wood, broken branches, moss and lichen, typical of species			1	12	12	12	12	1	1	
86	786	Red alder	9, 10	13.5	16			Fair	Co-dominant leaders with included bark x2 @ root crown, dead top, moss and lichen		1		16	16	16	16	1		
87	787	Scouler willow	5, 14	15	20			Fair	Co-dominant leaders with included bark x2 @ root crown, dead wood, broken branches		1		20	20	20	20	1		
88	788	Scouler willow	14	14	22			Fair	Moss and lichen, dead wood, broken branches, dead top		1		22	22	22	22	1		
89	792	Bigleaf maple	12	12	18			Fair	Co-dominant leaders with included bark x2 @ 5', weak leaders, moss and lichen, dead wood, low live crown ratio < 20%		1		18	18	18	18	1		

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										Proposed Action			CRZ/TPZ/LOD Radius in feet						
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#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Viable	Non-viable	For site improvements	N	W	E	S	Tree credits	Viable tree credits	Retained tree credits
90	793	Bigleaf maple	12	12	16			OK	Moss and lichen, asymmetric canopy towards west, self-corrected lean towards west, typical of species			1	16	16	16	16	1	1	
91	796	Douglas fir	17, 4	17.5	12			OK	Co-dominant leaders with included bark x2 @ 12', dominant canopy, dead wood, broken branches, moss and lichen, typical of species, co-dominant leaders with included bark x2 @ root crown			1	12	12	12	12	1	1	
92	797	Grand fir	14	14	14			OK	Exposed roots, dominant canopy, some free flowing sap @ 3' towards south, typical of species			1	14	14	14	14	1	1	
93	798	Bigleaf maple	13	13	14			OK	Tag on branch towards east, typical of species			1	14	14	14	14	1	1	
94	799	Red alder	6, 20, 10	23	18			Fair	Previous top loss multiple times, moss and lichen, dead top, co-dominant leaders with included bark x3 @ 3', dead scaffold, tag on branch towards east		1		18	18	18	18	1		
95	800	True fir	20	20	17			OK	Typical of species, dead wood, broken branches, moss and lichen, previous top loss, elongated branch			1	17	17	17	17	1	1	
96	801	Bigleaf maple	10	10	12			OK	Typical of species			1	12	12	12	12	1	1	
97	802	Western red cedar	31	31	16			OK	Thin canopy, drought stress, carpenter ants bark only, typical of species			1	16	16	16	16	1	1	
98	803	Red alder	10	10	14			Fair	Lean towards west, dead top		1		14	14	14	14	1		

1	2	3	4	5	6	7		8	9	10			11				12		
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD Radius in feet				Tree credits	Viable tree credits	Retained tree credits
										Ret	Remove								
										Viable	Non-viable	For site improvements	N	W	E	S			
99	804	Red alder	18	18	18			Fair	Dead wood, broken branches, cavity @ 10', moss and lichen, dead top, dead spur, vertical crack @ 4' up to 6' towards west		1		18	18	18	18	1		
100	805	True fir	18	18	19			OK	Girdling from #806, carpenter ants, woodpecker activity, typical of species			1	19	19	19	19	1	1	
101	806	Western red cedar	10	10	14			OK	Suppressed canopy, typical of species			1	14	14	14	14	1	1	
102	807	True fir	20	20	18			OK	Previous top loss, elongated branch, coning, dead wood, broken branches, exposed roots, typical of species			1	18	18	18	18	1	1	
103	808	Western red cedar	20	20	20			OK	Exposed roots, cavity @ root crown towards west, carpenter ants woodpecker activity, thin canopy, typical of species			1	20	20	20	20	1	1	
104	809	True fir	21	21	20			OK	Exposed roots, self-corrected lean towards north, typical of species			1	20	20	20	20	1	1	
105	810	Bigleaf maple	12	12	16			OK	Moss and lichen, typical of species			1	16	16	16	16	1	1	
106	811	Douglas fir	10	10	12			OK	Typical of species, co-dominant canopy, low live crown ratio < 30%, dead wood, broken branches			1	12	12	12	12	1	1	
107	812	Douglas fir	9, 8	12	14			Fair	Moss and lichen, co-dominant leaders with included bark x2 @ 4', low live crown ratio < 5%, dead wood, broken branches		1		14	14	14	14	1		

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#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD Radius in feet				Tree credits	Viable tree credits	Retained tree credits
										Ret	Remove								
										Viable	Non-viable	For site improvements	N	W	E	S			
108	813	Western red cedar	4, 6, 8	11	14			OK	Co-dominant leaders with included bark x3 @ root crown, twisted trunks, dominant canopy, typical of species			1	14	14	14	14	1	1	
109	814	Douglas fir	10	10	12			OK	Dominant canopy, previous top loss, elongated branches, dead wood, broken branches, typical of species			1	12	12	12	12	1	1	
110	815	True fir	11	11	16			Poor	Self-corrected lean towards north, calloused wound @ 4' up to 8', serpentine trunk, asymmetric canopy towards north		1		16	16	16	16	1		
111	816	Madrona	9, 9	12.5	24 north only			OK	Co-dominant leaders with included bark x2 @ root crown, lean towards north, asymmetric canopy towards north, blight, dead wood, broken branches, typical of species			1	24 north only	24 north only	24 north only	24 north only	1	1	
112	817	True fir	18	18	19			Fair	Co-dominant leaders with included bark x2 @ 15', moss and lichen, dominant canopy, dead wood, typical of species		1		19	19	19	19	1		
113	818	Madrona	14	14	16			OK	Self-corrected lean towards west, typical of species	1			16	16	16	16	1	1	1
114	819	Red alder	15	15	20			Poor	Vertical cracks in bark, previous top loss @ 12', weak laterals, dead wood, broken branches, dead scaffold		1		20	20	20	20	1		
115	820	Western red cedar	18	18	18			OK	Thin canopy, typical of species, exposed roots, nurse tree, strong leader, previous	1			18	18	18	18	1	1	1

1	2	3	4	5	6	7		8	9	10			11				12		
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD Radius in feet				Tree credits	Viable tree credits	Retained tree credits
										Ret	Remove		N	W	E	S			
										Viable	Non-viable	For site improve-ments							
									top loss @ 15', elongated branches										
116	821	Douglas fir	20	20	16		Y	Fair	Horizontal crack @ 22', free flowing sap, laminated root rot, calloused wound @ 6'	1			16	16	16	16	1	1	1
117	822	Madrona	13, 8	15.5	17			OK	Co-dominant leaders with included bark x2 @ 1', blight, typical of species	1			17	17	17	17	1	1	1
118	823	Madrona	9, 2	9	16			OK	Co-dominant leaders with included bark x2 @ root crown, typical of species, lean towards south	1			12	12	12	12	1	1	1
119	824	Madrona	9	9	18			OK	Lean towards north, blight, cavity @ 15' up to 18' towards south	1			16	16	16	16	1	1	1
120	825	Madrona	9	9	12			OK	Typical of species	1			16	16	16	16	1	1	1
121	826	Madrona	9	9	14			OK	Asymmetric canopy towards south, typical of species	1			10	10	10	10	1	1	1
122	827	Madrona	12	12	14			OK	Serpentine trunk, typical of species	1			14	14	14	14	1	1	1
123	828	Douglas fir	17	17	14			OK	Dominant canopy, dead wood, broken branches, typical of species	1			14	14	14	14	1	1	1
124	829	Western red cedar	16, 10, 10	21.5	16			OK	Co-dominant leaders with included bark x3 @ 2', spur @ 25', horizontal crack @ 25' towards east	1			16	16	16	16	1	1	1
125	830	Red alder	14	14	18			Poor	Mostly dead		1		18	18	18	18	1		
126	831	Douglas fir	22	22	16			OK	Dominant canopy, dead wood, broken branches, typical of species	1			16	16	16	16	1	1	1

1	2	3	4	5	6	7		8	9	10			11				12		
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD				Tree credits	Viable tree credits	Retained tree credits
													Radius in feet						
										Ret	Remove								
										Viable	Non-viable	For site improve-ments	N	W	E	S			
127	832	Madrona	16, 16	22.5	18			Good	Co-dominant leaders with included bark x2 @ root crown, typical of species, blight	1			18	18	18	18	1	1	1
128	833	Western red cedar	4, 15, 13	20	16			OK	Co-dominant leaders with included bark x3 @ 1', co-dominant canopy, typical of species, cavity @ root crown towards northwest	1			16	16	16	16	1	1	1
129	834	Douglas fir	14	14	14			OK	Hanger, co-dominant canopy, previous top loss, elongated branch, asymmetric canopy towards south, typical of species	1			14	14	14	14	1	1	1
130	835	Douglas fir	14	14	16		Y	Fair	Low live crown ratio < 25%, co-dominant leaders with included bark x2 @ 40	1			16	16	16	16	1	1	1
131	836	Madrona	9	9	16 north only		Y	Fair	Dead wood, broken branches, moss and lichen, blight	1			16 north only	16 north only	16 north only	16 north only	1	1	1
132	837	True fir	24	24	16			OK	Moss and lichen, carpenter ants bark only, woodpecker activity, dominant canopy, hangers	1			16	16	16	16	1	1	1
133	838	Madrona	21	21	26			OK	Serpentine trunk, typical of species	1			26	26	26	26	1	1	1
134	839	Douglas fir	14	14	17			OK	Carpenter ants, dead wood, broken branches, typical of species	1			17	17	17	17	1	1	1
135	840	Bitter cherry	15	15	20		Y	Fair	Gummosis, self-corrected lean towards south, multiple cavities	1			20	20	20	20	1	1	1

1	2	3	4	5	6	7		8	9	10			11				12		
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD Radius in feet				Tree credits	Viable tree credits	Retained tree credits
										Ret	Remove								
										Viable	Non-viable	For site improve-ments	N	W	E	S			
136	841	True fir	14	14	20			OK	Ivy @ root crown up to 10', aphid, typical of species, thin canopy			1	20	20	20	20	1	1	
137	842	True fir	5, 7, 12, 12, 12	22.5	12			OK	Aphid, co-dominant leaders with included bark x5 @ root crown, typical of species, dead wood, broken branches, dominant canopy			1	12	12	12	12	1	1	
138	843	Western red cedar	37	37	16			OK	Co-dominant leaders with included bark x3 @ 25', typical of species, free flowing sap			1	16	16	16	16	1	1	
139	844	Red alder	10	10	12			Fair	Dead top, moss and lichen, typical of species		1		12	12	12	12	1		
140	845	Madrona	12	12	8			Fair	Cavity @ root crown up to 12' towards north, co-dominant leaders with included bark x2 @ 8'		1		8	8	8	8	1		
141	846	Douglas fir	15	15	16			OK	Co-dominant canopy, moss and lichen, typical of species			1	16	16	16	16	1	1	
142	847	Douglas fir	14	14	16			Fair	Co-dominant leaders with included bark x2 @ 20', weak laterals, lean towards south, exposed roots, dead wood, broken branches		1		16	16	16	16	1		
143	848	Red alder	6, 5, 4, 7	11	12			Fair	Co-dominant leaders with included bark x4 @ root crown, dead scaffold, dead wood, dead top		1		12	12	12	12	1		
144	849	Douglas fir	12	12	14			Fair	Asymmetric canopy towards north, co-dominant leaders with included bark x2 @ 50', thin canopy		1		14	14	14	14	1		

1	2	3	4	5	6	7		8	9	10			11				12		
										Proposed Action			CRZ/TPZ/LOD Radius in feet						
										Ret	Remove								
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Viable	Non-viable	For site improve-ments	N	W	E	S	Tree credits	Viable tree credits	Retained tree credits
145	850	Douglas fir	13	13	12			Fair	Torque crack @ 6' up to 10' towards south, dead wood, broken branches, low live crown ratio < 15%, fused spur @ root crown up to 12'		1		12	12	12	12	1		
146	851	Douglas fir	12	12	16			Fair	Co-dominant canopy, exposed roots, moss and lichen, dead wood, broken branches, low live crown ratio < 15%		1		16	16	16	16	1		
147	852	Douglas fir	10	10	16			OK	Low live crown ratio < 20%, dead wood, broken branches, typical of species, co-dominant canopy			1	16	16	16	16	1	1	
148	853	Douglas fir	10	10	10			Fair	Co-dominant leaders with included bark x2 @ 40', dead wood, broken branches, co-dominant canopy		1		10	10	10	10	1		
149	854	Douglas fir	10	10	12			Fair	Serpentine trunk, previous top loss, weak laterals, moss and lichen		1		12	12	12	12	1		
150	855	Douglas fir	13	13	12			OK	Co-dominant canopy, epicormic branch formation @ 10' towards west, typical of species			1	12	12	12	12	1	1	
151	856	Douglas fir	10	10	10 south only			Fair	Asymmetric canopy towards south, lean towards south, low live crown ratio < 10%, previous top loss		1		10 south only	10 south only	10 south only	10 south only	1		
152	857	Douglas fir	16	16	12			OK	Co-dominant canopy, moss and lichen, exposed roots, dominant canopy, previous top loss, elongated branch			1	12	12	12	12	1	1	

1	2	3	4	5	6	7		8	9	10			11				12		
										Proposed Action			CRZ/TPZ/LOD Radius in feet						
										Ret	Remove								
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Viable	Non-viable	For site improvements	N	W	E	S	Tree credits	Viable tree credits	Retained tree credits
153	858	Douglas fir	16	16	17			Fair	Self-corrected lean towards south, serpentine trunk, previous top loss, elongated branch, moss and lichen, dead wood, broken branches, typical of species		1		17	17	17	17	1		
154	859	Madrona	10	10	14			OK	Self-corrected lean towards east, co-dominant leaders with included bark x2 @ 12', blight, asymmetric canopy towards east, moss and lichen, typical of species			1	14	14	14	14	1	1	
155	860	Douglas fir	11	11	12			OK	Asymmetric canopy towards south, low live crown ratio < 25%, dead wood, broken branches, typical of species, exposed roots			1	12	12	12	12	1	1	
156	861	Madrona	12	12	14			OK	Dead wood, broken branches, blight, serpentine trunk, typical of species			1	14	14	14	14	1	1	
157	862	Madrona	11	11	16			OK	Typical of species, co-dominant leaders with included bark x2 @ 22'			1	16	16	16	16	1	1	
158	863	Madrona	11	11	12			OK	Typical of species			1	12	12	12	12	1	1	
159	864	Madrona	10	10	16			Poor	Dead wood, broken branches, dieback		1		16	16	16	16	1		
160	865	Madrona	12, 11	16.5	16			OK	Co-dominant leaders with included bark x2 @ root crown, some drought stress, typical of species			1	16	16	16	16	1	1	
161	866	Red alder	10	10	14			Fair	Top dead, moss and lichen, canker		1		14	14	14	14	1		

1	2	3	4	5	6	7		8	9	10			11				12		
										Proposed Action			CRZ/TPZ/LOD Radius in feet						
										Ret	Remove								
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Viable	Non-viable	For site improvements	N	W	E	S	Tree credits	Viable tree credits	Retained tree credits
162	867	Douglas fir	14	14	14		Y	Fair	Exposed roots, previous top loss, elongated branches, dead wood, broken branches, dominant canopy			1	14	14	14	14	1	1	
163	868	Scouler willow	15	15	16			Fair	Co-dominant leaders with included bark x3 @ 5', dead wood, broken branches, dead top		1		16	16	16	16	1		
164	869	Madrona	16	16	16			OK	Self-corrected lean towards west, dead wood, broken branches, suppressed canopy			1	16	16	16	16	1	1	
165	870	Western red cedar	24	24	18			Poor	Self-corrected lean towards southwest, cavity @ root crown up to 3' towards north, large cavity @ 30' up to 40'		1		18	18	18	18	1		
166	871	Scouler willow	17	17	17		Y	Fair	Exposed roots, moss and lichen, co-dominant leaders with included bark x2 @ 6', dead wood, broken branches			1	17	17	17	17	1	1	
167	872	Sequoia	25	25	16			Poor	Dying, drought stress		1		16	16	16	16	1		
168	873	Douglas fir	16	16	18		Y	Fair	Previous top loss @ 70', weak leaders, low live crown ratio < 20%			1	18	18	18	18	1	1	
169	874	Douglas fir	15	15	15			OK	Previous top loss, elongated branch, dominant canopy, dead wood, broken branches, typical of species			1	15	15	15	15	1	1	
170	875	True fir	12	12	12		Y	Fair	Co-dominant canopy, asymmetric canopy towards west, dead wood, broken branches, low live crown ratio < 20%			1	12	12	12	12	1	1	

1	2	3	4	5	6	7		8	9	10			11				12		
										Proposed Action			CRZ/TPZ/LOD Radius in feet						
										Ret	Remove								
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Viable	Non-viable	For site improvements	N	W	E	S	Tree credits	Viable tree credits	Retained tree credits
171	876	True fir	16	16	16			OK	Girdling root towards west, co-dominant canopy, dead wood, broken branches, typical of species			1	16	16	16	16	1	1	
172	877	Douglas fir	13	13	14			OK	Dominant canopy, dead wood, broken branches, typical of species			1	14	14	14	14	1	1	
173	878	Silver maple	10, 15, 18, 14	29	18		Y	Fair	Co-dominant leaders with included bark x4 @ root crown, large cavity @ 4' up to 12' towards south, dead scaffold, hangers, previous failures			1	18	18	18	18	1	1	
174	879	Western red cedar	28	28	18			OK	Tag tied to Laurel on north side, thin canopy, coning, drought stressed			1	18	18	18	18	1	1	
175	882	River birch	17	17	18			OK	Woodpecker activity, carpenter ants, typical of species			1	18	18	18	18	1	1	
176	883	River birch	12	12	16			OK	Co-dominant canopy, carpenter ants, woodpecker activity, typical of species			1	16	16	16	16	1	1	
177	884	River birch	26	26	21			OK	Co-dominant leaders with included bark x2 @ 30', carpenter ants, woodpecker activity, co-dominant canopy			1	21	21	21	21	1	1	
178	885	River birch	22	22	16			OK	Co-dominant canopy, carpenter ants, woodpecker activity, typical of species			1	16	16	16	16	1	1	
179	886	River birch	25	25	14			OK	Lean towards north, carpenter ants, woodpecker activity, typical of species, #882 through #886 tags ties to raspberry pole			1	14	14	14	14	1	1	

1	2	3	4	5	6	7		8	9	10			11				12		
										Proposed Action			CRZ/TPZ/LOD						
													Radius in feet						
										Ret	Remove								
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Viable	Non-viable	For site improvements	N	W	E	S	Tree credits	Viable tree credits	Retained tree credits
180	888	Western red cedar	15	15	16			OK	Spur @ 15' towards south, previous top loss @ 50', typical of species	1			16	16	16	16	1	1	1
181	889	Douglas fir	24	24	14			OK	Moss and lichen, typical of species	1			14	14	14	14	1	1	1
182	890	Bigleaf maple	17	17	17		Y	Fair	Nurse tree, exposed roots, roots intertwined with Western red cedar, typical of species	1			17	17	17	17	1	1	1
183	891	Western red cedar	20, 17, 14	29.5	17			OK	Co-dominant leaders with included bark x3 @ root crown, carpenter ants, woodpecker activity, nurse tree, twisted girdled trunks	1			17	17	17	17	1	1	1
184	892	Western red cedar	10	10	10			OK	Unable to assess due to blackberries			1	10	10	10	10	1	1	
185	893	Western red cedar	11	11	11			OK	Unable to assess due to blackberries			1	11	11	11	11	1	1	
186	894	Western red cedar	12	12	12			OK	Unable to assess due to blackberries			1	12	12	12	12	1	1	
187	895	Western red cedar	12	12	12			OK	Unable to assess due to blackberries			1	12	12	12	12	1	1	
188	896	Western red cedar	15	15	15			OK	Unable to assess due to blackberries			1	15	15	15	15	1	1	
189	897	Western red cedar	13	13	13			OK	Unable to assess due to blackberries			1	13	13	13	13	1	1	
190	898	Western red cedar	20	20	20			OK	Unable to assess due to blackberries			1	20	20	20	20	1	1	

1	2	3	4	5	6	7		8	9	10			11				12		
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD Radius in feet				Tree credits	Viable tree credits	Retained tree credits
										Ret	Remove		N	W	E	S			
										Viable	Non-viable	For site improvements							
191	899	Western red cedar	11	11	11			OK	Unable to assess due to blackberries			1	11	11	11	11	1	1	
192	900	Douglas fir	13	13	13			OK	Unable to assess due to blackberries			1	13	13	13	13	1	1	
193	901	Western red cedar	12	12	12			OK	Unable to assess due to blackberries			1	12	12	12	12	1	1	
194	902	Douglas fir	12	12	12			OK	Unable to assess due to blackberries			1	12	12	12	12	1	1	
195	16	Douglas fir	5	5	6			OK	Typical of species	1			6	6	6	6	1	1	1
196	17	Douglas fir	6	6	6			OK	Hanger, typical of species	1			6	6	6	6	1	1	1
197	18	Douglas fir	6	6	6			OK	Typical of species	1			6	6	6	6	1	1	1
198	19	Douglas fir	9	9	8			OK	Typical of species	1			8	8	8	8	1	1	1
199	20	Douglas fir	5	5	6			OK	Typical of species, asymmetric canopy towards west	1			6	6	6	6	1	1	1
200	21	Douglas fir	6	6	9			OK	Douglas fir, asymmetric canopy towards west, typical of species	1			9	9	9	9	1	1	1
201	22	Douglas fir	7	7	4			OK	Typical of species	1			4	4	4	4	1	1	1
202	23	Douglas fir	4	4	6			OK	Typical of species	1			6	6	6	6	1	1	1
203	24	Douglas fir	7	7	7			OK	Typical of species	1			7	7	7	7	1	1	1
204	25	Douglas fir	6	6	4			OK	Typical of species	1			4	4	4	4	1	1	1
205	26	Douglas fir	4	4	4			OK	Typical of species	1			4	4	4	4	1	1	1
206	27	Douglas fir	8	8	6			OK	Typical of species	1			6	6	6	6	1	1	1

1	2	3	4	5	6	7		8	9	10			11				12		
#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in grove	Health	Defects/Comments	Proposed Action			CRZ/TPZ/LOD Radius in feet				Tree credits	Viable tree credits	Retained tree credits
										Ret	Remove								
										Viable	Non-viable	For site improve-ments	N	W	E	S			
207	28	Douglas fir	7	7	4			OK	Typical of species	1			4	4	4	4	1	1	1
208	29	Douglas fir	8	8	5			OK	Typical of species	1			5	5	5	5	1	1	1
209	30	Bigleaf maple	9	9	10			OK	Previous top loss @ 25', typical of species	1			10	10	10	10	1	1	1
210	31	Bigleaf maple	8	8	8			OK	Typical of species	1			8	8	8	8	1	1	1
211	32	Douglas fir	7	7	6			OK	Typical of species	1			6	6	6	6	1	1	1
212	33	Bigleaf maple	6	6	6			OK	Typical of species	1			6	6	6	6	1	1	1
213	34	Bigleaf maple	6	6	8			OK	Co-dominant leaders with included bark x2 @ 15', typical of species	1			8	8	8	8	1	1	1
214	35	Bigleaf maple	7	7	9			OK	Typical of species, moss and lichen	1			9	9	9	9	1	1	1
215	36	Western red cedar	7	7	10			OK	Nurse tree, typical of species	1			10	10	10	10	1	1	1
216	37	Douglas fir	6	6	5			OK	Typical of species	1			5	5	5	5	1	1	1
217	38	Douglas fir	5	5	5			OK	Typical of species	1			5	5	5	5	1	1	1
218	39	Douglas fir	6	6	5			OK	Moss and lichen, typical of species	1			5	5	5	5	1	1	1
219	40	Douglas fir	5	5	6			OK	Typical of species, low live crown ratio < 30%	1			6	6	6	6	1	1	1
220	41	Douglas fir	5	5	6			OK	Typical of species	1			6	6	6	6	1	1	1
221	42	Madrona	8	8	15 east only			OK	Typical of species, lean towards east	1			15	15	15	15	1	1	1
										65	57	99					221	164	65

% of Represented Tree species:

% of Represented Tree Species		
Douglas fir	75	35.71
Western red cedar	33	15.71
Madrona	32	15.24
Bigleaf maple	18	8.57
Red alder	12	8.57
True fir	10	4.76
Scouler willow	6	2.86
Bitter cherry	5	2.38
River birch	5	2.38
Silver maple	5	2.38
Colorado blue spruce	3	1.43
Hemlock	3	1.43
Grand fir	2	0.95
Sequoia	1	0.48

Discussion:

Tree Density Calculation	
Total number of significant trees	194
Total number of onsite viable trees	137
Total number of tree credits	194
Total healthy tree credits	137
Total unhealthy tree credits	57
Required tree density 194 trees *25%	49
Number of retained tree <10"	38
Number of retained tree >10" (122"equivelant/ 10"= 12 tree credits)	27
Total number of retained tree credits (38 + 12)	50
Required mitigation	0

The nine (9) acre assemblage site is "C" shaped facing west. There is one home located on the north parcel and one on the south parcel. The remainder of the site is lightly forested with second growth trees; 50% are climax species trees (Douglas fir and Western red cedar); the remainder are short-lived pioneer species trees.

There is a total of 194 significant trees (trees greater than 10" in diameter) and many more trees that are of smaller diameter.

The information gathered and reported is provided to satisfy the City of Poulsbo's requirements for a Tree Retention Plan to be included with the proposed plat submittal.

The trees were surveyed prior to our examination and a report was submitted based on that survey. We were retained to address the comments from the subsequent peer review.

Once onsite we tagged each tree with a numbered aluminum tag and accompanied ribbon. Each tree was measured at approximately four and a half feet above grade. Each trunk of trees whose normal growth habit is characterized by multiple trunks as well as those trees whose structure arose out of co-dominant leaders were also measured at 4.5' above grade and the average of the leaders were taken to be the adjusted DBH sited on the matrix.

Twenty-seven (27) Trees who's adjusted DBH were less than 10" (the diameter necessary to be considered significant) were recorded and their SBH totaled equaling 122". The 10" equivalent of the trees is 122/10= 12.2. These trees will be retained and protected.

Any trees that were dying, but still had living tissue were assessed as being in "poor" condition.

The dripline of each tree was measured using a laser recording device. One measurement was taken on each tree with a "normal" balanced canopy that was approximately equal in radius in all directions. Trees with asymmetric canopies are generally located on the outside edges of groves. The radius of their canopies can vary a great deal. When describing the radius of those canopies, measurements were taken of the canopy in the four directions (NESW) are recorded.

Driplines were sometimes revised to more adequately reflect the location of buttress roots located on the opposite side of an asymmetric canopy – so where there may not be a dripline present, one was prescribed.

The City of Poulsbo municipal code requires that 25% of the significant trees be retained; 194 * .25 = 49 trees. The applicant proposes to remove 99 viable and 57 non-viable trees and proposes to retain 39 trees in two separate areas, an easement located on the north portion of the site, and a tree tract in the center of the site. Both tracts are heavily populated with smaller diameter trees and native vegetation that won't be disturbed. Because the total number of retained trees (39) is less than that required (49); twenty-seven (27) additional smaller diameter trees were tagged. The total DBH of these trees = 122" or twelve (12) tree credits equivalents (122/10=12.2"). The 12 tree credits added to

the retained trees 39+12 = 51 tree credits: meeting the required retention of 49 trees.
PMC: 18.180.030.B.2 and 18.180.040.B

Tract D contains a walking path (construction will be determined under the observation of an ISA certified arborist) that will meander thru the existing trees with minimal disruption. The proposal meets code requirements and retains 100+ smaller diameter trees as well as vegetation.

Tree Protection Fencing:
Tree Protection fencing should be erected prior to any site grading

First, protect roots that lie in the path of construction. Approximately 90 to 95 percent of a tree's root system is in the top three feet of soil, and more than half is in the top one foot. Construction activities should be avoided in this area. Protect as much of the area beyond the tree's dripline as possible. Some healthy trees survive after losing half of their roots. However, other species are extremely sensitive to root damage even outside the dripline.

Do not disturb the Critical Root Zone (CRZ). The CRZ is defined by its "critical root radius." It is more accurate than the dripline for determining the CRZ of trees growing in forests or that have narrow growth habits. To calculate critical root radius, measure the tree's diameter (DBH) in inches, 4.5 feet above the ground. For each inch, allow for 1 to 1.5 feet of critical root radius. If a tree's DBH is ten inches, its critical root radius is 10 to 15 feet.

In addition to the CRZ, it is important to determine the Limits of Disturbance (LOD) for preserved trees. Generally, this approximates the CRZ however in previously excavated areas around the dripline the LOD may be smaller, or in the case of a tree situated on a slope the LOD may be larger. The determination of LOD is also subject to the tree species. Some tree species do better than others after root disturbance.

Tree protection is advised throughout the duration of any construction activities whenever the critical root zone or leaf canopy many be encroached upon by such activities.

The Critical Root Zone (CRZ) or LOD should be protected with fencing adequate to hinder access to people vehicles and equipment. Fencing detail is provided. It should consist of continuous 4 ft. high temporary chain-link fencing with posts sec at 10' on center or polyethylene laminar safety fencing or similar. The fencing must contain fencing signage detailing that the tree protection area cannot be trespassed on.

Soil compaction is one of the most common killers of urban trees. Stockpiled materials, heavy machinery and excessive foot traffic damage soil structure and reduce soil pore space. The effected tree roots suffocate. When construction takes place close to the protected CRZ, cover the site with 4 inches of bark to reduce soil compaction

Tree Protection fencing must be erected prior to soil excavation, boring, grading or fill operations. It is erected at the LOD. If it is necessary to run utilities within the LOD, the utilities should be combined into one cut, as practical. Trenching is not allowed in the LOD. In these areas, boring or tunneling techniques should be used. If roots greater than 1" diameter near the LOD are damaged or torn, it is necessary to hand trim them to a clean cut. Any roots that are exposed during construction should be covered with soil as soon as possible.

During drought conditions, trees must be adequately watered. Site should be visited regularly by a qualified ISA Certified Arborist to ensure the health of the trees. Tree protection fencing is the last item to be removed from the site after construction is completed.

After construction, has been completed, evaluate the remaining trees. Look for signs and symptoms of damage or stress. It may take several years for severe problems to appear.

If fencing around portions of the CRZ of a tree to be retained are not practical to erect due to construction or obstacles, tree protection fencing should be placed three feet laterally from the obstruction (ex. three feet back of a curb, building, or other existing or planned permanent infrastructure.

Glossary:

ANSI A300: American National Standards Institute (ANSI) standards for treecare

Chlorotic: discoloration caused by lack of chlorophyll in the foliage

Conifer: A tree that bears cones and has evergreen needles orscales

Crown: the above ground portion of the tree comprised of branches and their foliage

Crown raise pruning: a pruning technique where the lower branches are removed,thus raising the overall height of the crown from the ground

DBH or DSH: diameter at breast or standard height; the diameter of the trunk measured54 inches (4.5 feet) above grade

Deciduous: tree or other plant that loses its leaves annually and remains leafless generally during the cold season

Epicormic: arising from latent or adventitious buds

Evergreen: tree or plant that keeps its needles or leaves year-round; this means for more than one growing season

Increment: the amount of new wood fiber added to a tree in each period, normally one year.

ISA: International Society of Arboriculture

Landscape function: the environmental, aesthetic, or architectural functions that a plantcan have

Lateral: secondary or subordinate branch

Limits of disturbance: The boundary of minimum protection around a tree, the area that cannot be encroached upon without possible permanent damage to the tree. It is a distance determined by a qualified professional and is based on the age of the tree, its health, the tree species tolerance to disruption and the type of disturbance. It also considers soil and environmental condition and previous impacts. It is uniqueto each tree in its location.

Limited visual assessment: a visual assessment from a specified perspective such as foot, vehicle, or aerial (airborne) patrol of an individual tree or a population of trees near specified targets to identify specified conditions or obvious defects (ISA2013)

Live crown ratio: the percentage of living tissue in the canopy versus the tree’s height. It is a good indicator of overall tree health and the trees growing conditions. Trees with less than a 30% Crown ratio often lack the necessary quantity of photosynthetic material necessary to sustain the roots; consequently, the tree may exhibit low vigor and poor health.

Monitoring: keeping a close watch; performing regular checks or inspections

Owner/manager: the person or entity responsible for tree management or thecontrolling authority that regulates tree management

Pathogen: causal agent of disease

Phototropic growth: growth toward light source or stimulant

ROW: Right-of-way; generally referring to a tree that is located offsite on a city easement

Reaction wood: Specialized secondary xylem which develops in response to a lean or similar mechanical stress, it serves to help restore the stem to a vertical position

Self-corrected lean: a tree whose trunk is at an angle to the grade but whose trunk and canopy changes to become upright/vertical

Senescence: The condition or process of deterioration with age; loss of a cell's power of division and growth

Significant tree: a tree measuring a specific diameter determined by the municipality the tree grows in. Some municipalities deem that only healthy trees can be significant, other municipalities consider both healthy and unhealthy trees of a determined diameter to be significant

Snag: a tree left partially standing for the primary purpose of providing habitat for wildlife

Soil structure: the size of particles and their arrangement; considers the soil, water, and air space

Sounding: process of striking a tree with a mallet or other appropriate tool and listening for tones that indicate dead bark, a thin layer of wood outside a cavity, or cracks in wood

Structural defects: flaws, decay, or other faults in the trunk, branches, or root collar of a tree, which may lead to failure; may be genetic, or environmental

Tree credit: A number assigned to a tree by a municipality that may be equal to the diameter of the tree or a numerical count of the tree, or related to diameter by a factor conveyed in a table of the municipal code

Trunk area: the cross-sectional area of the trunk based upon measurement at 54inches (4.5 ft.) above grade

Visual Tree Assessment (VTA): method of evaluating structural defects and stability in trees by noting the pattern of growth. Developed by Claus Mattheck (Harris, et al 1999) detailed visual inspection of a tree and surrounding site that may include the use of simple tools. It requires that a tree risk assessor walk completely around the tree trunk looking at the site, aboveground roots, trunk, and branches (ISA2013)

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Assumptions and Limiting Conditions

1. Any legal description provided to the consultant/appraiser is assumed to be correct. Any titles and ownerships to any property are assumed to be good and marketable. No responsibility is assumed for matters legal in character. Any and all property is appraised or evaluated as thou free and clear, under responsible ownership and competent management.

2. It is assumed that any property is not in violation of any applicable codes, ordinances, statutes or other governmental regulations.

3. Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible; however, the consultant/appraiser can neither guarantee nor be responsible for the accuracy of information provided by others.

4. The consultant/appraiser shall not be required to give testimony or to attend court by reason of the report unless subsequent contractual arrangements are made including payment of an additional fee for such services as described in the fee schedule and contract of engagement.

5. Loss or alteration of any part of this report invalidates the entire report.

6. Possession of this report or a copy thereof does not imply right of publication or use for any purpose by any other than the person to whom it is addressed, without the prior expressed written or verbal consent of the consultant/appraiser.

7. Neither all nor any part of the contents of the report, nor copy thereof, shall be conveyed by anyone, including the client to the public through advertising, public relations, news, sales or other media, without the prior expressed written or verbal consent of the consultant/appraiser – particularly as to value conclusions, identity of the consultant/appraiser, or any reference to any professional society or instate or to any initialed designation conferred upon the consultant/appraiser as stated in her qualification.

8. The report and any values expressed herein represent the opinion of the consultant/appraiser, and the consultant’s/appraiser’s fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence of subsequent event, nor upon any finding to be reported.

9. Sketches, diagrams, graphs and photographs in this report, being intended as visual aid, are not necessarily to scale and should not be construed as engineering or architectural reports or survey.

10. Unless expressed otherwise: 1) information contained in this report covers only those items that were examined and reflects the condition of those items at the time of inspection; and 2: the inspection is limited to visual examination of accessible items without dissection, excavation, probing or coring. There is not warranty or guarantee, expressed or implied, that problems or deficiencies of the plants or property in question may not arise in the future.

SUF1

SOUND URBAN FORESTRY, LLC **SUF**

Memo

To: Edie Berghoff, City of Poulsbo Associate Planner

From: Kevin M. McFarland, City of Poulsbo Contracted Arborist

Date: 12/19/19

Re: Calavista PRD Revised Tree Retention Review

Upon the request of the City of Poulsbo, I have assessed the revised tree retention plan and submitted arborist report dated October 25, 2109, for the proposed Calavista PRD project at 119700 and 19840 Caldart Ave NE. I have been asked by the City to provide a peer review related to my original comments dated 7/14/19.

Comments

Tree Retention

Overall the arborist report is thorough and addresses my original concerns with the project. A complete assessment of the significant trees within the property has been completed, the correct species listed and the trees marked so that they can easily be found. However, I do have issues with the broad use of the term 'viable' and making use of this term to lower the total number of trees to be counted and therefore the number of trees required for retention. The term is not defined within the City's municipal code, specifically under the definition for significant trees. The code only states that priority shall be given to the retention of healthy trees.

I have been informed by the City that the applicant is not required to count the 22 trees within the 15' ROW dedication. Therefore, if we rely on the strict definition of a significant tree as those measuring 10" and larger in diameter, there are 194 significant trees within the site with a required retention of 49. The applicant is proposing to retain 39 significant trees and therefore a mitigation of 10 trees would be necessary. It may be possible to make up this difference with the retention of smaller diameter trees and native vegetation as outlined in 18.180.030.B.2 and 18.180.040.B but those areas will need to be clearly identified on the plan with tree protection fencing.

Tree Protection

The tree protection as discussed in the report and as shown on the tree retention plan is acceptable and I recommend that page 38 be added as a condition of approval. Additional fencing may be necessary if additional areas with smaller diameter trees and native vegetation are to be retained as mentioned above.

I would also recommend that the wording found on the last paragraph of page 37 regarding the installation of the walking path be added as a condition of approval. It also needs to take into account that according to the comprehensive utility plan, trenching is still taking place within Tract D, following the walking path. A certified arborist should be on site when this trenching is to take place. Fencing should be in place to keep equipment out of all areas to be preserved.

If you should have questions, please feel free to contact me at 360-870-2511 or suf1234@comcast.net

SUF2

SOUND URBAN FORESTRY, LLC **SUF**

Memo

To: Edie Berghoff, City of Poulsbo Associate Planner

From: Kevin McFarland, City of Poulsbo Contracted Arborist

Date: 5/13/2020

Re: Calavista PRD Tree Retention Review

Upon the request of the City of Poulsbo, I have conducted an assessment of the most recently proposed tree retention within the Calavista PRD. I have been provided the Plan Set dated 2/24/20 as well as an amended tree retention report dated 2/20/20 from the applicant's arborist. These updates are in response to my previous comments submitted to the City on 12/19/19.

Comments

I have concluded that all of my earlier concerns regarding numbers of retained trees, trenching through the tree protection area and protection fencing have been addressed. My only remaining request is related to the pervious walking path that meanders through Tract D, including the protection area. As I stated in my earlier memo, I would like to see wording similar to that found on page 36 of the arborist report be added to the Tree Retention Plan (construction will be determined under the observation of an ISA certified arborist). There is no mention of the materials or method to be used in the installation of this path at this time and it needs to be done without impacting the critical root zones of the trees to be retained. No equipment should be allowed within this area without the supervision of an arborist.

If you should have questions, please feel free to contact me at 360-870-2511 or suf1234@comcast.net

GTC1

GTC

Gibson Traffic Consultants, Inc.
2813 Rockefeller Avenue
Suite B
Everett, WA 98201
425.339.8266

CALAVISTA DEVELOPMENT
Update Traffic Impact Analysis

Jurisdiction: City of Poulsbo

February 2020

MATTHEW JOHN PALMER
STATE OF WASHINGTON
42322
REGISTERED PROFESSIONAL ENGINEER
2/11/20

GTC #19-081

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ATTACHMENTS

1. INTRODUCTION

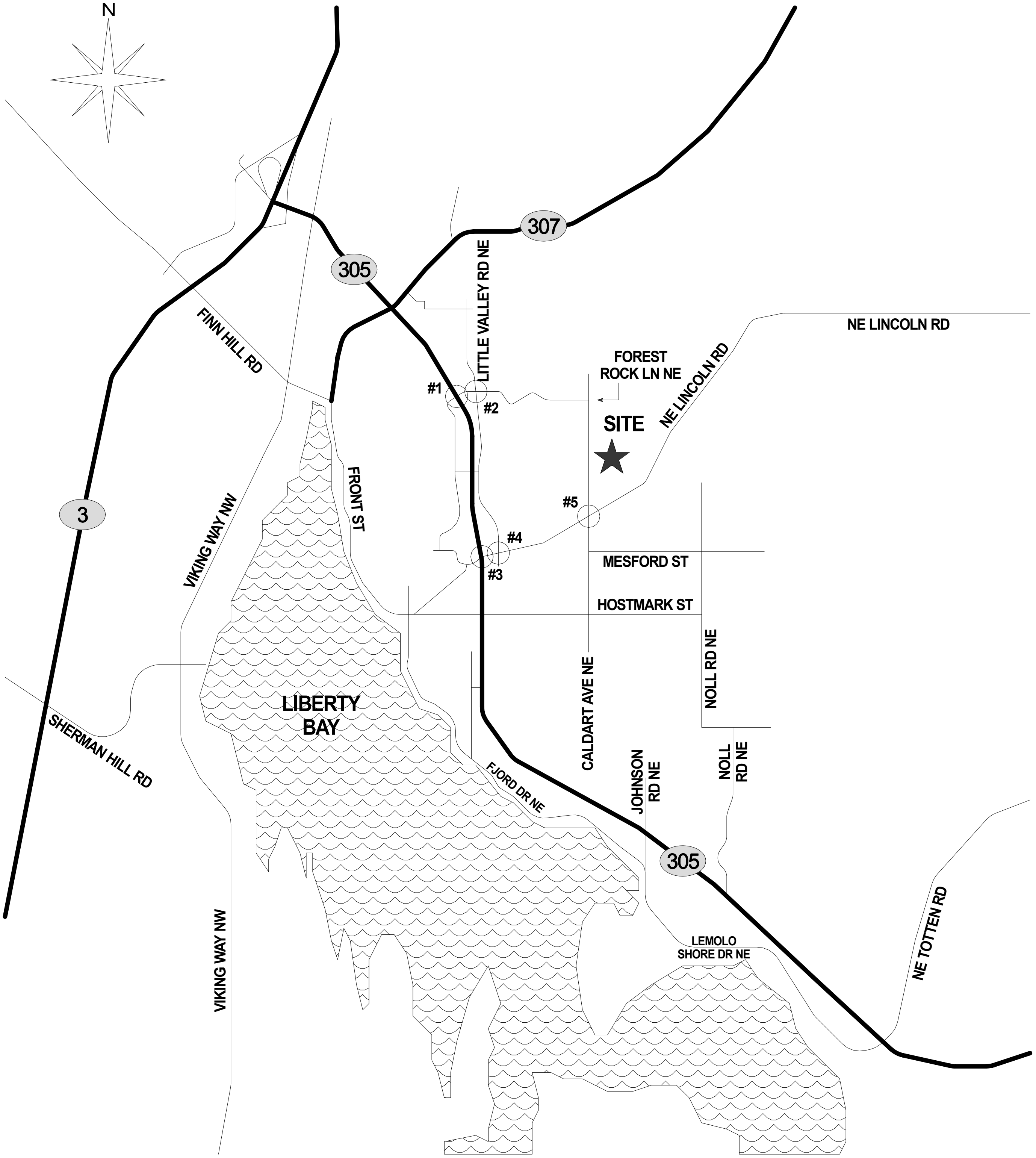
Gibson Traffic Consultants, Inc. (GTC) has been retained to complete a traffic impact analysis (TIA) for the proposed Calavista development. The development is located on the east side of Caldart Avenue NE, north of Halden Glen Court, in City of Poulsbo. The proposed development will consist of 43 total single-family residential units. There are two single-family residential units on site, one of which will be removed with the development and is creditable towards the development's impacts. A site vicinity map is included in **Figure 1**.

The scoping and analysis methodology for the Calavista development follows the City of Poulsbo's TIA Guidelines. This memorandum report summarizes GTC's traffic analysis and findings that include:

1) Proposed site development and access
2) Existing site conditions
3) Trip generation, trip distribution, and trip assignment of the development trips
4) Existing and future without development volumes and LOS
5) Future with development volumes and LOS
6) Collision Analysis
7) Mitigation fee identification

2. PROPOSED SITE DEVELOPMENT & ACCESS

The proposed Calavista development is proposing to construct 43 total single-family detached residential units. One of the two existing single-family detached units on-site will be removed and is creditable to the development; the other will remain on one of the newly created lots. Therefore, the analysis in this report is performed for 41 net new single-family detached units. The development is proposed to be located along the east side of Caldart Avenue NE, north of Halden Glen Court. The development is proposing two accesses, one access to Caldart Avenue NE located approximately 650 feet north of Halden Glen Court and one access that will connect to the existing cul-de-sac at the east end of Halden Glen Court. The development will also create a stub end road on the east side of the development that will allow for future connectivity. The development is scheduled for occupancy in by the end of 2022. The City requires a minimum of 5-years after build-out/occupancy for the horizon year; therefore, the year 2027 has been used as the horizon year in the analysis.



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #19-081

CALAVISTA

CITY OF POULSBO

LEGEND

★ DEVELOPMENT SITE

○# STUDY INTERSECTION

FIGURE 1
SITE VICINITY MAP

3. METHODOLOGY & ANALYSIS SCOPING

A peak-hour level of service (LOS) determination at the site access is determined using the methodology described in the *Highway Capacity Manual*, *6th Edition* (HCM) and *Synchro 10.2* software developed by Trafficware. Site traffic generation estimates for the new use is based on data in the Institute of Transportation Engineers (ITE) *Trip Generation, 10th Edition* (2017). Average trip generation rates were utilized to estimate the weekday daily, AM and PM peak-hour trips.

GTC utilized a 2.5-percent annual compounded growth rate to account for background traffic growth in the site vicinity based on scoping discussions with the City of Poulsbo.

Poulsbo has an analysis horizon year of 5-years after full build-out and occupancy. The Calavista development will start construction in 2020 and is expected to be fully built out and occupied by 2022; therefore, a horizon year of 2027 was used.

Traffic congestion on roadways is generally measured in terms of LOS at critical intersections. In accordance with the *Highway Capacity Manual 6th Edition*, roadway facilities and intersections are rated between LOS A and F, with LOS A being free flow and LOS F being forced flow or over-capacity conditions. The LOS at signalized intersections and all-way stop-controlled intersections are based on the average stopped delay for all entering vehicles. The LOS at two-way stop-controlled intersections is based on stopped delay times for the critical approach or movement(s). Geometric characteristics and conflicting traffic movements are taken into consideration when determining LOS values. A summary of the level of service criteria has been included in Table 1.

Table 1: Level of Service Criteria for Intersections

Level of Service[1]	Expected Delay	Intersection Control Delay (Seconds per Vehicle)	
		Unsignalized Intersections	**Signalized** Intersections
A	Little/No Delay	≤10	≤10
B	Short Delays	>10 and ≤15	>10 and ≤20
C	Average Delays	>15 and ≤25	>20 and ≤35
D	Long Delays	>25 and ≤35	>35 and ≤55
E	Very Long Delays	>35 and ≤50	>55 and ≤80
F	Extreme Delays[2]	>50	>80

Per scoping discussions, five intersections were identified for existing, baseline, and future with development analysis:

1. SR-305 at Forest Rock Lane NE - Signalized
2. 10th Avenue NE at Forest Rock Lane NE - Unsignalized
3. SR-305 at NE Lincoln Road – Signalized
4. 10th Avenue NE at NE Lincoln Road – Unsignalized
5. Caldart Avenue NE at NE Lincoln Road – Signalized

Matthew Palmer, responsible for the traffic analysis and report, is a licensed professional engineer (Civil) in the State of Washington and a current member of the Washington State section of ITE.

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[1] **Source:** *Highway Capacity Manual 6th Edition.*

LOS A: Free-flow traffic conditions, with minimal delay to stopped vehicles (no vehicle is delayed longer than one cycle at signalized intersection).
LOS B: Generally stable traffic flow conditions.
LOS C: Occasional back-ups may develop, but delay to vehicles is short term and still tolerable.
LOS D: During short periods of the peak hour, delays to approaching vehicles may be substantial but are tolerable during times of less demand (i.e. vehicles delayed one cycle or less at signal).
LOS E: Intersections operate at or near capacity, with long queues developing on all approaches and long delays.
LOS F: Jammed conditions on all approaches with excessively long delays and vehicles unable to move at times.

[2] When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing which may cause severe congestion affecting other traffic movements in the intersection.

4. EXISTING CONDITIONS

4.1. Transit Service

Kitsap Transit, route 90, which travels between Poulsbo and Bainbridge with busses arriving hourly from 4 AM until 8 PM services the site vicinity.

4.2. Road Network

The proposed residential development is located north of NE Lincoln Road east of Caldart Avenue NE.

NE Lincoln Road is a 2-lane roadway with an intermittent two-way center-turn lane and a posted speed limit of 25 mph. It is classified as a minor arterial per the City’s Transportation Element. There is curb, gutter, and sidewalk in the site vicinity.

Caldart Avenue NE is a 2-lane roadway with a posted speed limit of 25 mph. Caldart Avenue NE is classified as a collector arterial per the City’s Transportation Element. There is curb, gutter and sidewalk along the west side of the roadway in the site vicinity.

4.3. Collision Analysis

Collision data near the study intersections was requested from WSDOT from January 2016 through December 2018. Table 2 summarizes the data received by WSDOT.

Table 2: 3-Year Collision Data Summary

Intersection	Collision Type							Total Collisions	Collisions Per Year
	Rear-End	Entering at Angle	Opp. Dir.	Sideswipe	Same Dir.	Ped. / Cyclist	Fixed Object/ Other		
SR-305 at Forest Rock Ln NE	13	3	0	3	0	0	1	20	6.7
10th Ave NE at Forest Rock Ln NE	0	5	0	0	0	0	0	5	1.7
SR-305 at NE Lincoln Rd	8	4	0	2	0	1	1	16	5.3
10th Ave NE at NE Lincoln Rd	5	2	0	1	0	0	1	9	3.0
Caldart Ave NE at NE Lincoln Rd	0	1	2	1	0	1	0	5	1.7
SR-305, within 0.1 mi north of NE Forest Rock Ln	0	0	0	1	0	0	1	2	0.7
SR-305, within 0.1 mi north of NE Lincoln Rd	1	0	0	0	0	0	0	1	0.3
SR-305, within 0.1 mi south of NE Lincoln Rd	0	0	0	1	0	0	0	1	0.3
NE Lincoln Rd, between SR-305 and 10th Ave NE	1	0	0	0	1	0	0	2	0.7
NE Lincoln Rd, between 10th Ave NE and 11th Ave NE	2	0	0	0	0	0	0	2	0.7
NE Lincoln Rd, within 0.1 mi east of Caldart Ave NE	1	0	0	0	0	0	0	1	0.3

The 3-year collision rate has been calculated using PM peak-hour volumes and a K-factor of 10 for conversion to average daily traffic. The 3-year collision rates for the intersections are summarized in Table 3.

Table 3: 3-Year Collision Rate Calculation

Intersection	PM Peak-Hour Intersection Vol.	K-Factor	Total Collisions	Collision Rate[3]
SR-305 at Forest Rock Ln NE	3,279	10	20	0.56
10th Ave NE at Forest Rock Ln NE	925	10	5	0.49
SR-305 at NE Lincoln Rd	3,407	10	16	0.43
10th Ave NE at NE Lincoln Rd	1,311	10	9	0.63
Caldart Ave NE at NE Lincoln Rd	1,281	10	5	0.36

The intersection of 10th Avenue NE at NE Lincoln Road had the highest collision rate of the study area and had rear-end collisions as the most common. WSDOT has published collision data for the Olympic Region in the *2011 Annual Collision Summary* (the latest report that provides data for different road types). The average collision rate for State Routes in the Olympic Region is 1.82 collisions per Million Vehicle Miles (equivalent to Million Entering Vehicles at an intersection) for principal arterials. All the intersections have collision rates per million entering vehicles below 1.00, which is below the average rate for the area.

4.4. Existing Volumes and Level of Service

Existing turning movement count at the study intersection was conducted by the independent count firm, Traffic Count Consultants, on April 9, 2019. The existing PM peak-hour turning movement volumes at the study intersections are shown in Figure 2. Based on the existing counts, channelization and intersection control, the study intersections operate at LOS E or better. The existing level of service is summarized in Table 4.

Table 4: Existing Level of Service Summary – Weekday PM Peak-Hour

Intersections		Existing Conditions	
		LOS	Delay
1.	SR-305 at Forest Rock Ln NE	C	31.1 sec
2.	10th Ave NE at Forest Rock Ln NE	E	45.6 sec
3.	SR-305 at NE Lincoln Rd	D	43.8 sec
4.	10th Ave NE at NE Lincoln Rd	C	22.4 sec
5.	Caldart Ave NE at NE Lincoln Rd	C	21.5 sec

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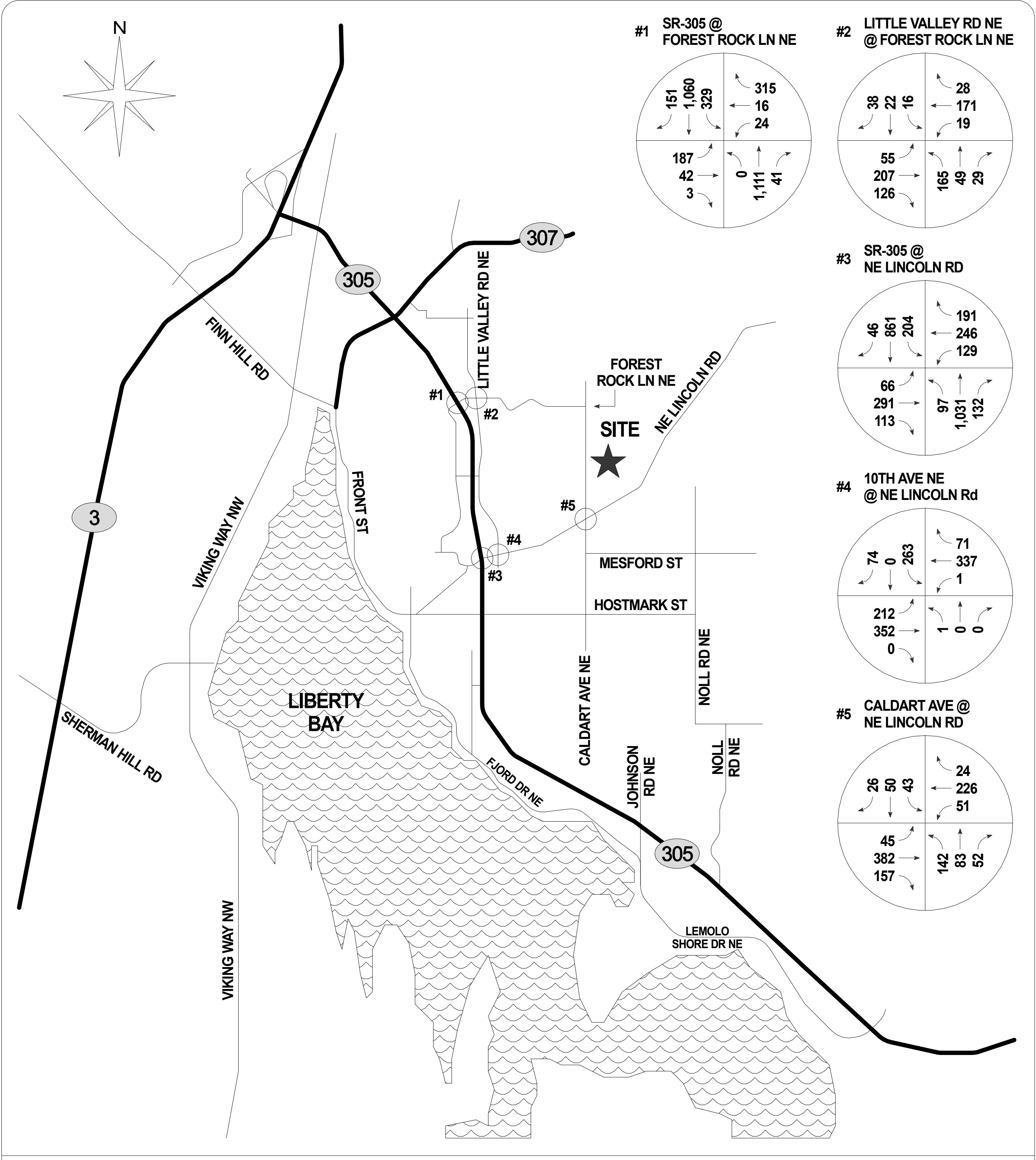
[3] The collision rate is based on Million Entering Vehicles.



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GTC #19-081

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XXX → PM PEAK HOUR
TURNING MOVEMENT VOLUMES

FIGURE 2
EXISTING TURNING MOVEMENTS PM PEAK-HOUR

5. FUTURE CONDITIONS

5.1. Trip Generation

Trip generation calculations for the Calavista development are based on national statistics contained in the Institute of Transportation Engineers' (ITE) *Trip Generation, 10th Edition (2017)*. The average trip generation rates for the ITE Land Use Code (LUC) LUC 210, single-family detached have been used. The Calavista development is proposing to construct a total of 43 single-family detached units. There is one single-family detached unit that will be removed and one that will remain; both are creditable to the development; therefore, the trip generation has been performed for 41 net new single-family detached units. The trip generation is summarized in Table 5.

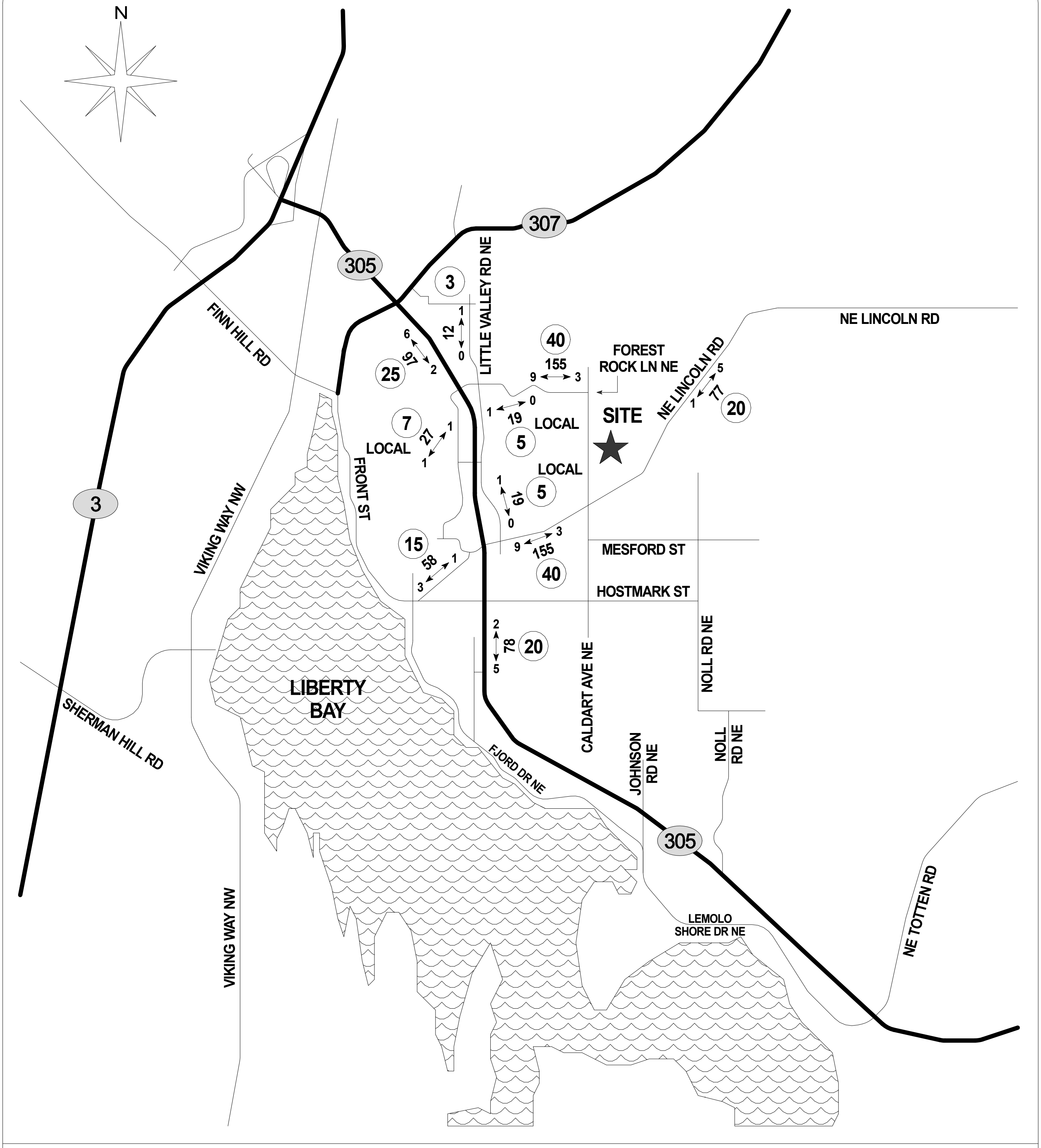
Table 5: Trip Generation Summary

Calavista 41 Net New SFD	**Average Daily Trips**			**AM Peak-Hour Trips**			**PM Peak-Hour Trips**		
	Inbound	Outbound	Total	Inbound	Outbound	Total	Inbound	Outbound	Total
Generation Rate	9.44 Trips per Unit			0.74 Trips per Unit			0.99 Trips per Unit		
Splits	50%	50%	100%	25%	75%	100%	63%	37%	100%
Trips	193.52	193.52	387.04	7.58	22.76	30.34	25.58	15.01	40.59

The 41 net new units in the Calavista development are anticipated to generate 387.04 new daily trips, 30.34 new AM peak-hour trips and 40.59 new PM peak-hour trips. The trip generation calculations are included in the attachments.

5.2. Trip Distribution

Trip distribution is based on existing counts and residential/commercial draw areas by the site. It is anticipated that 28% of the site traffic is expected to travel to and from the north, three percent along Little Valley Road and twenty-five percent on SR-305. Another 15% is expected to travel to and from the west on NE Lincoln Road. Approximately 20% of the site traffic is expected to travel to and from the east along NE Lincoln Road. An estimated 20% of the site traffic is expected to travel to and from the south along SR-305. The final 17% is expected to be local trips. A detailed trip distribution for the AM and PM peak-hours is shown in Figure 3 and Figure 4 respectively.



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GTC #19-081

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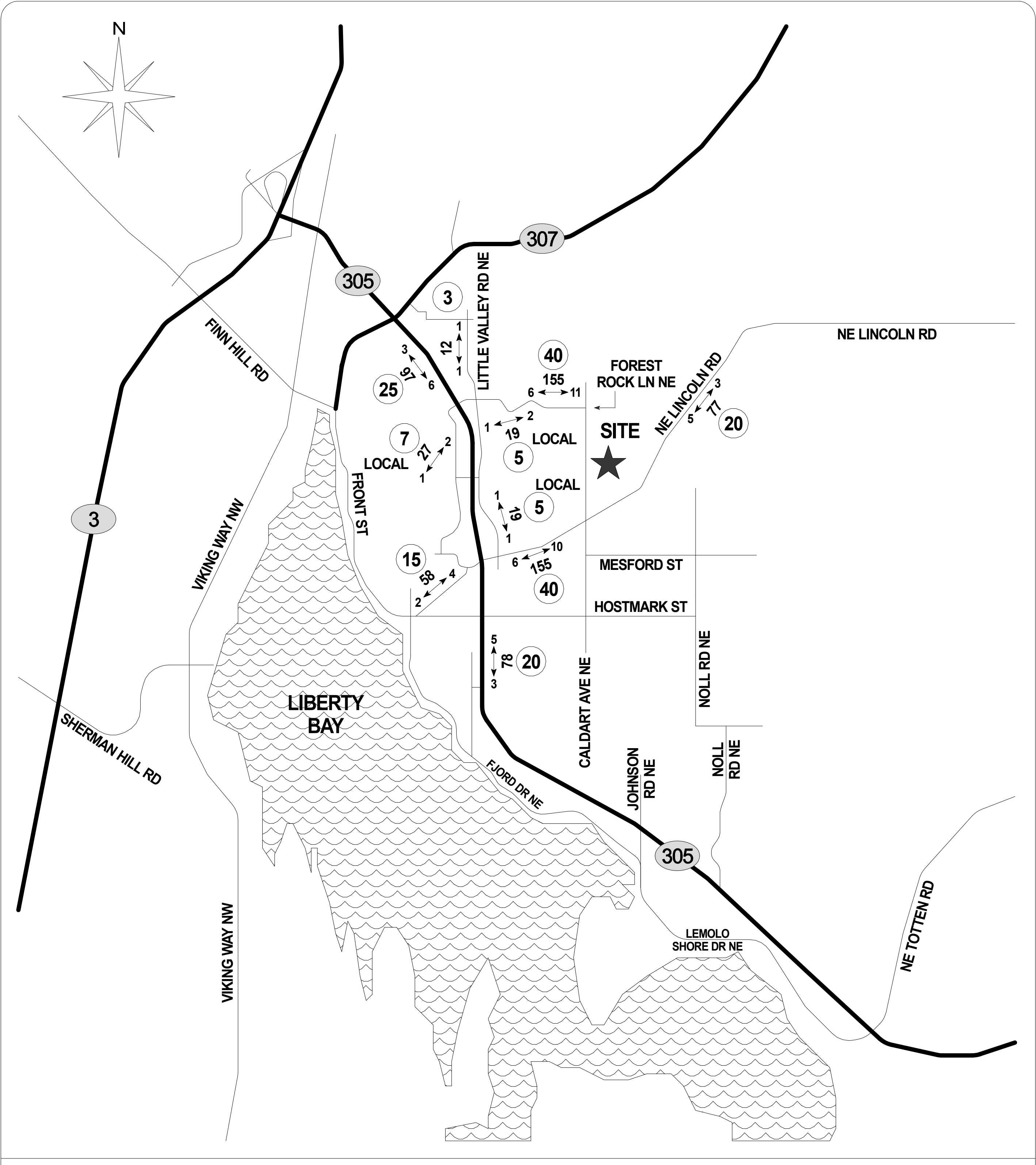
AM ◄——► PEAK	NEW AM PEAK HOUR TRIPS
AWDT	NEW DAILY TRAFFIC
(X X)	TRIP DISTRIBUTION %

FIGURE 3
DEVELOPMENT
TRIP DISTRIBUTION
AM PEAK-HOUR



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TRAFFIC IMPACT STUDY
GTC #19-081

CALAVISTA

CITY OF POULSBO

LEGEND

PM ◄──► PEAK NEW PM PEAK HOUR TRIPS
AWDT NEW DAILY TRAFFIC

XX TRIP DISTRIBUTION %

FIGURE 4

DEVELOPMENT TRIP DISTRIBUTION PM PEAK-HOUR

5.3. 2027 Baseline Volumes and Level of Service

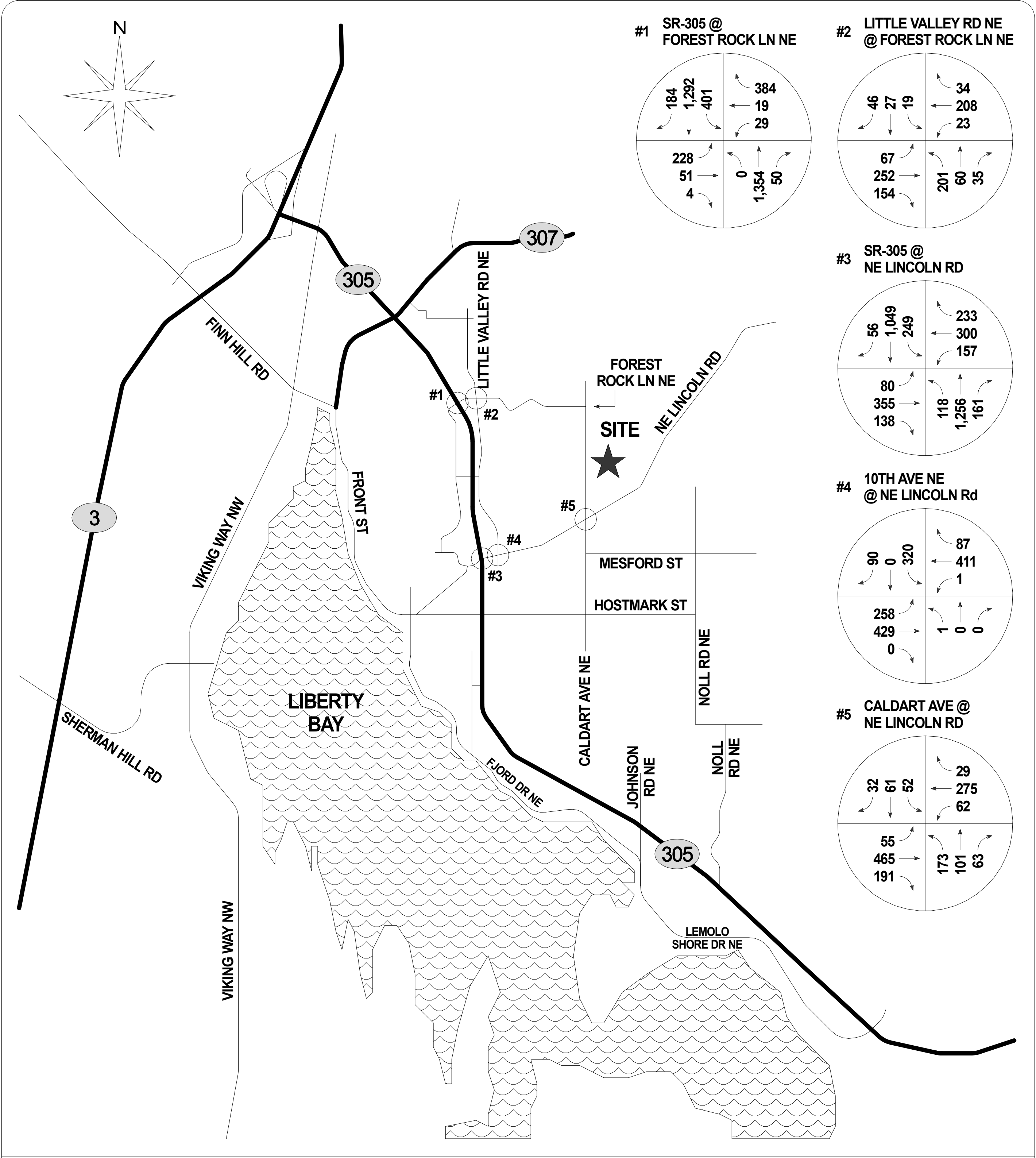
The 2027 baseline (future without development) turning movement volumes are estimated by applying a 2.5% annual compounded growth rate to the existing turning movement volumes per discussions with City Staff. The 2027 future without development PM peak-hour turning movement volumes are shown in Figure 4. Under the 2027 baseline conditions, the study intersections will all continue to operate at LOS E or better with the exception of 10th Avenue NE at Forest Rock Lane NE which will operate at LOS F which is acceptable per the City's Transportation Element. The level of service is summarized in Table 6.

5.4. 2027 Future with Development Volumes and Level of Service

The 2027 future with development turning movement volumes are derived by adding development trips to the 2027 future without development turning movement volumes. The 2027 future with development PM peak-hour turning movement volumes are shown in Figure 5. Under the 2027 future with development conditions, the study intersections will all continue to operate at acceptable LOS E or better with the exception of 10th Avenue NE at Forest Rock Lane NE which will operate at LOS F which will be discussed in section 5.4.2. The level of service is summarized in Table 6.

Table 6: Future Level of Service Summary – Weekday PM Peak-Hour

Intersections		Existing Conditions		2027 Future Conditions			
				without Development		with Development	
		LOS	Delay	LOS	Delay	LOS	Delay
1.	SR-305 at Forest Rock Ln NE	C	31.1 sec	E	60.4 sec	E	61.4 sec
2.	10th Ave NE at Forest Rock Ln NE	E	45.6 sec	F	184.2 sec	F	199.0 sec
3.	SR-305 at NE Lincoln Rd	D	43.8 sec	E	69.0 sec	E	70.2 sec
4.	10th Ave NE at NE Lincoln Rd	C	22.4 sec	C	29.1 sec	C	29.4 sec
5.	Caldart Ave NE at NE Lincoln Rd	C	21.5 sec	C	28.5 sec	C	28.8 sec



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #19-081

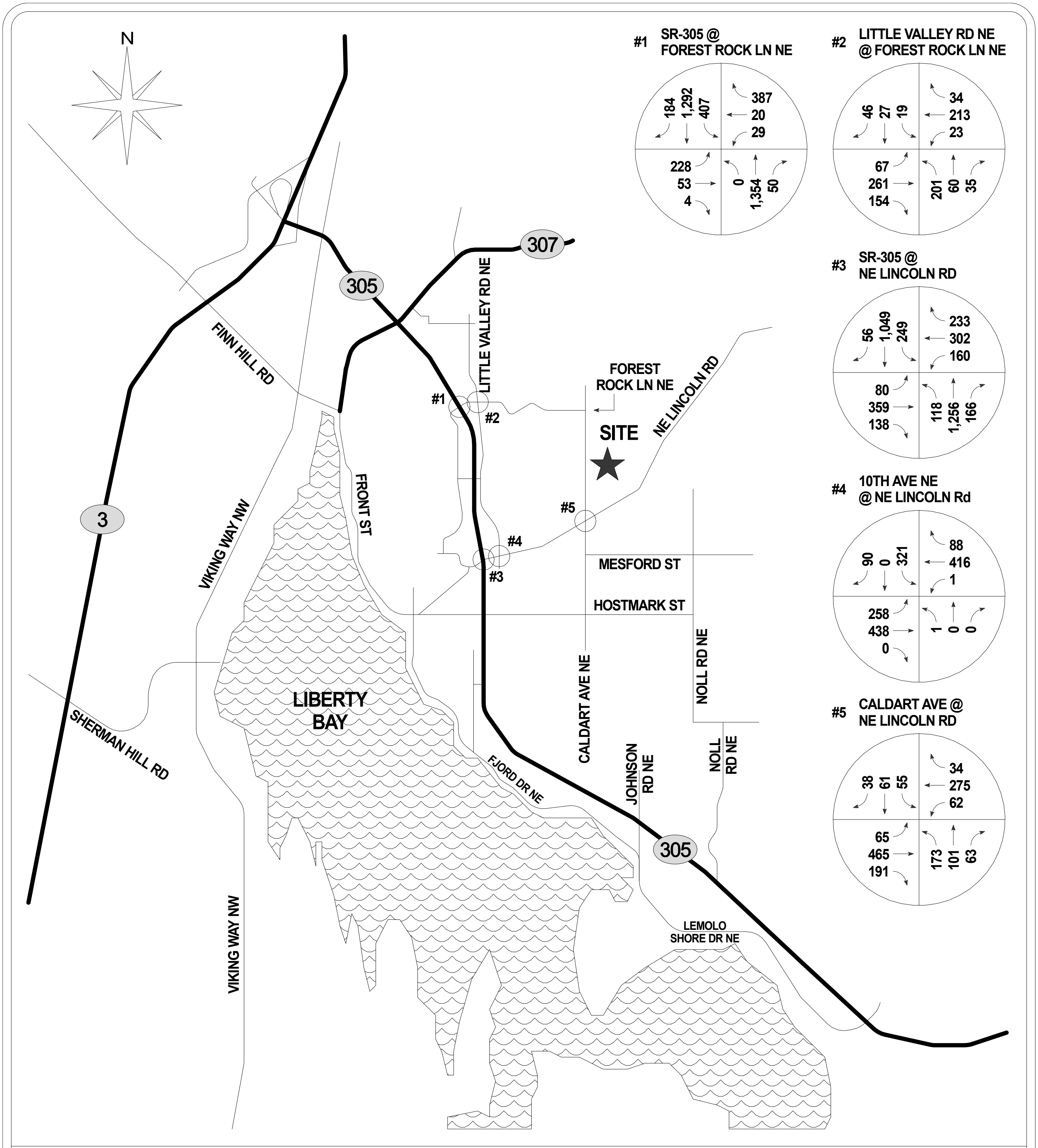
CALAVISTA

CITY OF POULSBO

LEGEND

XXX → PM PEAK HOUR TURNING MOVEMENT VOLUMES

FIGURE 5
2027 BASELINE TURNING MOVEMENTS PM PEAK-HOUR



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #19-081

CALAVISTA

CITY OF POULSBO

LEGEND

XXX → PM PEAK HOUR TURNING MOVEMENT VOLUMES

FIGURE 6

2027 FUTURE WITH DEVELOPMENT TURNING MOVEMENTS PM PEAK-HOUR

5.4.1. Caldart Avenue NE at NE Lincoln Road

The intersection of Caldart Avenue NE at NE Lincoln Road is anticipated to operate at LOS C during the existing, 2027 future without development and 2027 future with development conditions. The development's trips through this intersection are anticipated to add approximately 0.3 seconds of delay. Additionally, if the Laurie Vei roadway connection from the transportation element is completed, the 20% of the development's trip traveling east along NE Lincoln Road are anticipated to utilize this connection. This would further reduce the impact the development would have at the intersection to an increase of only 0.2 seconds of delay compared to the 2027 future without development conditions.

The Calavista development will add an estimated maximum of 13 feet (from 90 feet to 103 for the eastbound left movement) to the 95th percentile queue length for any of the movements at the intersection. All of the other queue lengths are anticipated to increase by less than 4 feet. If the Laurie Vei roadway connection is completed, the development will still add an estimated maximum of 13 feet (from 90 feet to 103 for the eastbound left movement) to the 95th percentile queue length for any of the movements at the intersection. All of the other queue lengths are anticipated to increase by less than 3 feet.

Five collisions occurred at the intersection, four of which occurred due to driver inattention or being distracted. The fifth collision did not provide a reason. As the collision rate for the intersection is 0.36 collisions per million entering vehicles and there are less than 5 correctable collisions per year, the collisions at the intersection are within acceptable standards.

5.4.2. 10th Avenue NE at Forest Rock Lane NE

The intersection of 10th Avenue NE at Forest Rock Lane NE is anticipated to operate at level of service F with 199 seconds of delay; however, per the City of Poulsbo's Transportation Element, LOS F is acceptable at this intersection. Additional alternatives have been analyzed for this intersection based on conversations with the City on possible mitigation. If this intersection is converted to an all-way stop-controlled intersection, it will operate at LOS C with 23.9 seconds of delay during the future analysis year with the development. If the intersection is converted to a signalized intersection, it will operate at LOS B with 14.3 seconds of delay during the future analysis year with the development. The Calavista development will be paying traffic mitigation fees; thus, mitigating their impacts to this intersection.

5.5. Construction Traffic

The development is anticipated to have approximately 2,700 total (in and out) trucks trips during the site grading process which is anticipated to last for approximately 2 months. This equates to 45 truck trips per day. Additionally, between 35 and 40 workers are anticipated to be on-site constructing houses. As the anticipated construction daily trips and PM peak-hour trips are anticipated to be less than the development after full build out, the level of service performed earlier in this report would represent a worst-case scenario of what the study intersections will operate at during the construction phase.

Due to how steep and windy Forest Rock Lane NE is, construction traffic will utilize Caldart Avenue NE via N Lincoln Road to travel to and from the site. This will also reduce the number of small, residential roadways that will be impacted.

5.6. Pedestrian Connectivity

There is currently sidewalk along the south side of Halden Glen Court and both sides of Caldart Avenue NE above and below the development site. There is currently no sidewalks along the site's frontage onto Halden Glen Court or Caldart Avenue NE. The development will be constructing sidewalks along both sides of the internal roadways and along the development's frontage to both Halden Glen Court and Caldart Avenue NE, connecting the houses with the surrounding roadway. It is important to note that there is one parcel in the middle of the development that fronts Caldart Avenue NE will not have sidewalk installed along it. This is due to the development not owning the right-of-way.

6. TRANSPORTATION FINDINGS AND CONCURRENCY

Per Poulsbo Municipal Code 17.60.040, subdivisions may be approved by review authorities if certain criteria are met. The following two criteria related to transportation must be met; the development must have adequate provisions for streets, roads, other public ways and transit stops; provide safe, orderly and efficient circulation for traffic and make adequate provisions for sidewalks and other planning features that provide safe walking conditions for students who walk to and from school. The development will provide a simple internal roadway that provides easy access to the city's transportation system and allows for a future roadway connection to the east of the development. Additionally, there will be sidewalks provided along the internal roadways and along existing public streets that the development has frontage on which will allow pedestrians access to walking paths that lead to school and public transit stops.

Per Poulsbo Municipal Code 14.04, since the development generates more than 300 average daily trips, the impacted existing roadway intersections must be analyzed to determine if they fall below the City's level of service standards. As none of the study intersection fall below the acceptable level of service standard set forth by the city, the development should be deemed concurrent per Poulsbo Municipal Code 14.04.

7. TRAFFIC MITIGATION

The City of Poulsbo has a traffic mitigation fee of $564 per new average daily trip. The development is anticipated to generate 387.04 new average daily trips, which will result in traffic mitigation fees of $218,290.56. The development should not be responsible for off-site improvements due to the study intersections operating at acceptable level of service for the City of Poulsbo threshold for off-site analysis.

Counts and Turning Movement Calculations

Prepared for: **Gibson Traffic Consultants**

Traffic Count Consultants, Inc.

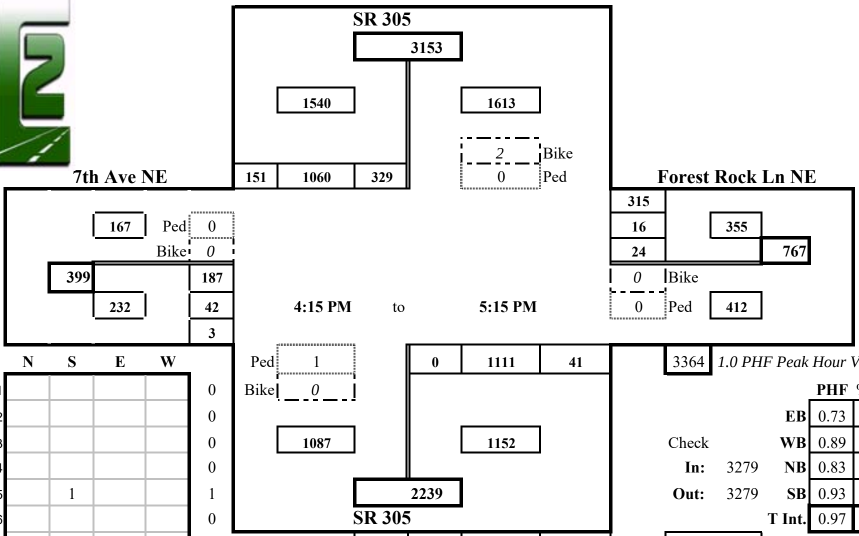
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: SR 305 & Forest Rock Ln NE/7th Ave NE **Date of Count:** Tues 4/09/2019

Location: Poulsbo, Washington **Checked By:** Jess

Time Interval	**From North on (SB)** SR 305				**From South on (NB)** SR 305				**From East on (WB)** Forest Rock Ln NE				**From West on (EB)** 7th Ave NE				**Interval Total**
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	2	83	260	31	8	0	259	10	1	4	6	76	0	54	5	0	788
4:30 P	0	97	267	52	7	0	265	9	0	7	5	88	0	38	12	1	841
4:45 P	3	74	238	32	4	0	331	15	1	5	3	76	0	38	7	1	820
5:00 P	6	81	281	32	4	0	238	6	1	8	4	75	0	46	8	1	780
5:15 P	0	77	274	35	3	0	277	11	0	4	4	76	1	65	15	0	838
5:30 P	4	87	243	33	4	1	293	16	0	4	5	76	0	54	4	0	816
5:45 P	3	76	262	35	1	2	289	7	0	6	6	89	0	56	7	0	835
6:00 P	1	92	263	21	5	1	237	8	0	5	2	80	0	23	3	0	735
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	19	667	2088	271	36	4	2189	82	3	43	35	636	1	374	61	3	6453
	Peak Hour: 4:15 PM to 5:15 PM																
Total	9	329	1060	151	18	0	1111	41	2	24	16	315	1	187	42	3	3279
Approach	1540				1152				355				232				3279
%HV	0.6%				1.6%				0.6%				0.4%				0.9%
PHF	0.93				0.83				0.89				0.73				0.97



3364 *1.0 PHF Peak Hour Volume*

PEDs Across:	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04					0
INT 05		1			1
INT 06					0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	1	0	0	1

Bicycles From:	N	S	E	W	
INT 01					0
INT 02					0
INT 03	1				1
INT 04	1				1
INT 05					0
INT 06					0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	2	0	0	0	2

Check

In: 3279

Out: 3279

	PHF	%HV
EB	0.73	0.4%
WB	0.89	0.6%
NB	0.83	1.6%
SB	0.93	0.6%
T Int.	0.97	0.9%

Conditions:

Special Notes

GTC19054M_01p

Prepared for: **Gibson Traffic Consultants**

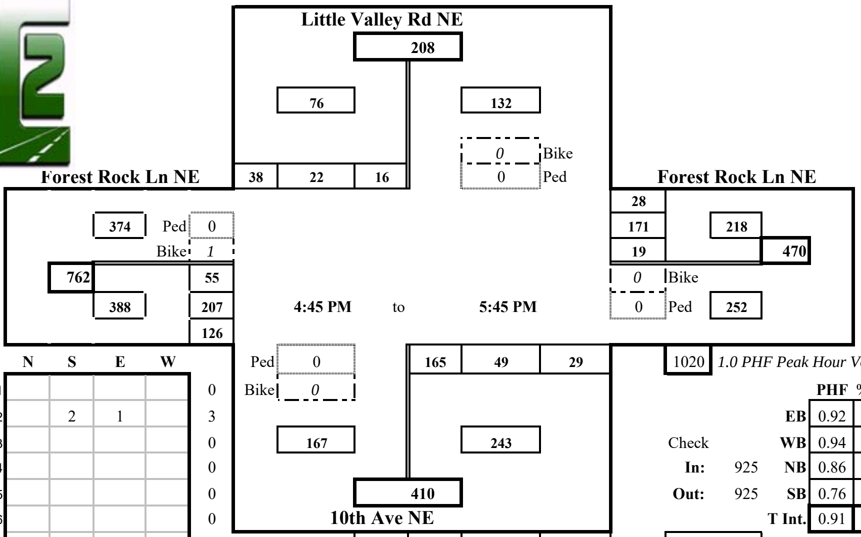
Traffic Count Consultants, Inc.

Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Little Valley Rd NE/10th Ave NE & Forest Rock Ln NE
Date of Count: Tues 4/09/2019
Location: Poulsbo, Washington
Checked By: Jess

Time Interval	**From North on (SB)** Little Valley Rd NE				**From South on (NB)** 10th Ave NE				**From East on (WB)** Forest Rock Ln NE				**From West on (EB)** Forest Rock Ln NE				**Interval Total**
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	1	2	9	9	0	33	7	4	0	5	42	5	1	18	47	30	211
4:30 P	0	1	8	11	0	37	9	7	0	6	49	6	0	20	56	38	248
4:45 P	0	5	3	10	0	38	11	4	1	3	39	5	0	16	52	28	214
5:00 P	0	4	4	8	1	36	9	7	1	1	45	5	1	16	36	38	209
5:15 P	0	1	9	8	0	35	12	6	0	9	43	6	0	12	61	28	230
5:30 P	0	5	5	15	0	42	15	10	0	5	43	9	3	15	58	33	255
5:45 P	0	6	4	7	0	52	13	6	0	4	40	8	0	12	52	27	231
6:00 P	0	3	7	8	0	32	8	7	0	3	45	1	1	4	47	40	205
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	1	27	49	76	1	305	84	51	2	36	346	45	6	113	409	262	1803
	Peak Hour: 4:45 PM to 5:45 PM																
Total	0	16	22	38	1	165	49	29	1	19	171	28	4	55	207	126	925
Approach	76				243				218				388				925
%HV	n/a				0.4%				0.5%				1.0%				0.6%
PHF	0.76				0.86				0.94				0.92				0.91



1020 *1.0 PHF Peak Hour Volume*

PEDs Across:	N	S	E	W	
INT 01					0
INT 02		2	1		3
INT 03					0
INT 04					0
INT 05					0
INT 06					0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	2	1	0	3

Special Notes

Bicycles From:	N	S	E	W	
INT 01					0
INT 02					0
INT 03				1	1
INT 04				1	1
INT 05					0
INT 06					0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	0	2	2

	PHF	%HV
EB	0.92	1.0%
WB	0.94	0.5%
NB	0.86	0.4%
SB	0.76	n/a
T Int.	0.91	0.6%

Check
In: 925
Out: 925

Conditions:

GTC19054M_02p

Prepared for: **Gibson Traffic Consultants**

Traffic Count Consultants, Inc.

Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

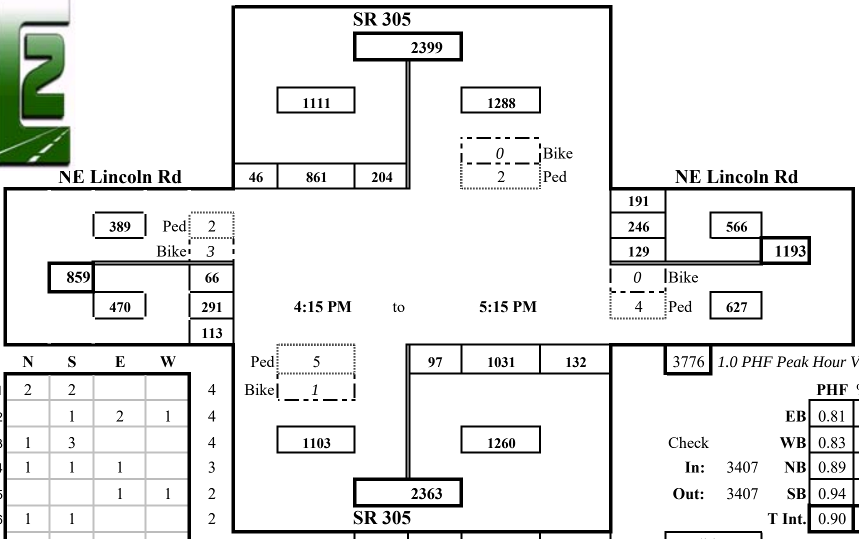
Intersection: SR 305 & NE Lincoln Rd **Date of Count:** Tues 4/09/2019

Location: Poulsbo, Washington **Checked By:** Jess

Time Interval	**From North on (SB)** SR 305				**From South on (NB)** SR 305				**From East on (WB)** NE Lincoln Rd				**From West on (EB)** NE Lincoln Rd				**Interval Total**
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	2	55	191	24	9	15	233	36	0	33	64	31	0	24	83	14	803
4:30 P	0	52	210	16	8	19	261	29	1	29	53	42	1	11	61	29	812
4:45 P	2	44	198	1	4	26	262	29	0	37	72	62	0	19	63	18	831
5:00 P	4	56	220	20	3	27	219	33	0	22	60	39	0	14	82	28	820
5:15 P	1	52	233	9	4	25	289	41	0	41	61	48	0	22	85	38	944
5:30 P	0	42	167	14	2	34	229	25	1	38	54	69	1	19	72	22	785
5:45 P	5	60	192	13	1	23	204	26	0	27	41	49	0	10	59	20	724
6:00 P	1	36	198	13	5	24	194	38	1	25	64	42	1	12	51	26	723
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	15	397	1609	110	36	193	1891	257	3	252	469	382	3	131	556	195	6442

Peak Hour: 4:15 PM to 5:15 PM

Total	7	204	861	46	19	97	1031	132	1	129	246	191	1	66	291	113	3407
Approach	1111				1260				566				470				3407
%HV	0.6%				1.5%				0.2%				0.2%				0.8%
PHF	0.94				0.89				0.83				0.81				0.90



3776 *1.0 PHF Peak Hour Volume*

PEDs Across:	N	S	E	W	
INT 01	2	2			4
INT 02		1	2	1	4
INT 03	1	3			4
INT 04	1	1	1		3
INT 05			1	1	2
INT 06	1	1			2
INT 07		1	1		2
INT 08	1		1		2
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	6	9	6	2	**23**

Special Notes

Bicycles From:	N	S	E	W	
INT 01			2		2
INT 02				1	1
INT 03					0
INT 04		1		2	3
INT 05					0
INT 06				1	1
INT 07					0
INT 08			1		1
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	1	3	4	8

	PHF	%HV
EB	0.81	0.2%
WB	0.83	0.2%
NB	0.89	1.5%
SB	0.94	0.6%
T Int.	0.90	0.8%

Check
In: 3407
Out: 3407

Conditions:

GTC19054M_03p

Prepared for: **Gibson Traffic Consultants**

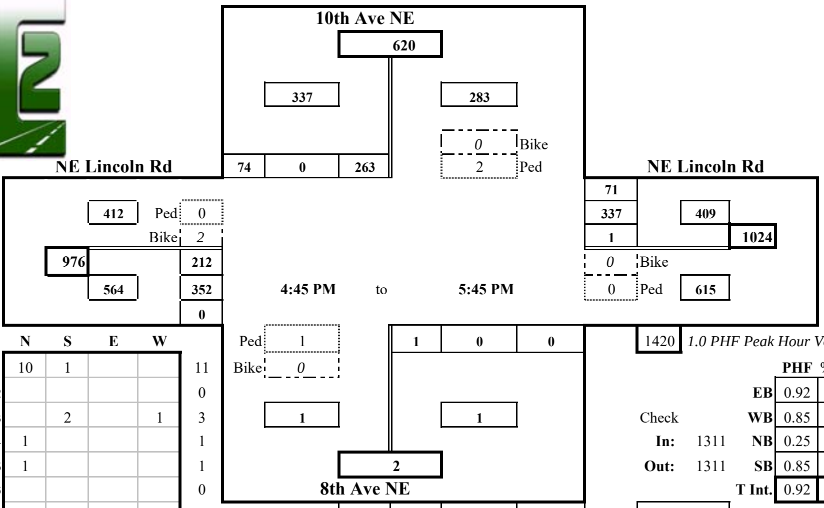
Traffic Count Consultants, Inc.

Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection:	10th Ave NE/8th Ave NE & NE Lincoln Rd	**Date of Count:**	Tues 4/09/2019
Location:	Poulsbo, Washington	**Checked By:**	Jess

Time Interval	**From North on (SB)** 10th Ave NE				**From South on (NB)** 8th Ave NE				**From East on (WB)** NE Lincoln Rd				**From West on (EB)** NE Lincoln Rd				**Interval Total**
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	49	0	23	0	0	0	0	0	0	85	21	2	51	102	0	331
4:30 P	0	49	0	21	0	0	0	0	1	0	72	20	2	42	87	0	291
4:45 P	0	67	0	28	0	0	0	0	0	0	76	22	1	44	74	0	311
5:00 P	0	49	0	20	0	1	0	0	0	0	81	22	0	65	85	0	323
5:15 P	0	62	0	18	0	0	0	0	1	0	101	20	0	54	100	0	355
5:30 P	0	76	0	23	0	0	0	0	0	0	77	14	0	36	83	0	309
5:45 P	0	76	0	13	0	0	0	0	0	1	78	15	1	57	84	0	324
6:00 P	0	47	3	16	0	0	0	0	1	0	79	24	0	46	68	1	284
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	0	475	3	162	0	1	0	0	3	1	649	158	6	395	683	1	2528
	Peak Hour: 4:45 PM to 5:45 PM																
Total	0	263	0	74	0	1	0	0	1	1	337	71	1	212	352	0	1311
Approach	337				1				409				564				1311
%HV	n/a				n/a				0.2%				0.2%				0.2%
PHF	0.85				0.25				0.85				0.92				0.92



1420 *1.0 PHF Peak Hour Volume*

PEDs Across:	N	S	E	W	
INT 01	10	1			11
INT 02					0
INT 03		2		1	3
INT 04	1				1
INT 05	1				1
INT 06					0
INT 07		1			1
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	12	4	0	1	**17**

Special Notes

Bicycles From:	N	S	E	W	
INT 01			2		2
INT 02				1	1
INT 03					0
INT 04				2	2
INT 05					0
INT 06					0
INT 07					0
INT 08			1		1
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	3	3	6

			PHF	%HV
		EB	0.92	0.2%
Check		**WB**	0.85	0.2%
In:	1311	**NB**	0.25	n/a
Out:	1311	**SB**	0.85	n/a
		T Int.	0.92	0.2%

Conditions:

Prepared for: **Gibson Traffic Consultants**

Traffic Count Consultants, Inc.

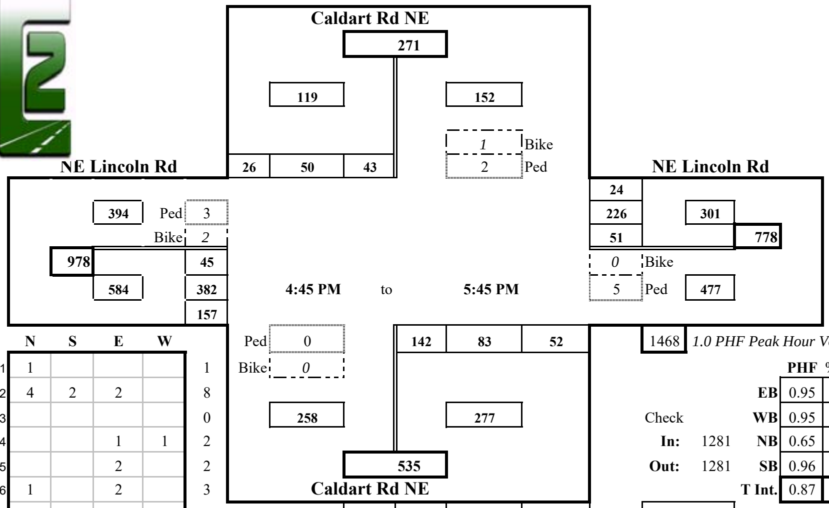
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Caldart Rd NE & NE Lincoln Rd **Date of Count:** Tues 4/09/2019

Location: Poulsbo, Washington **Checked By:** Jess

Time Interval	**From North on (SB)** Caldart Rd NE				**From South on (NB)** Caldart Rd NE				**From East on (WB)** NE Lincoln Rd				**From West on (EB)** NE Lincoln Rd				**Interval Total**
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	10	17	7	0	42	20	16	0	11	57	8	1	11	84	44	327
4:30 P	0	7	13	3	0	31	18	15	3	10	54	11	2	7	91	32	292
4:45 P	0	13	8	7	1	26	7	10	0	8	77	5	1	7	94	32	294
5:00 P	1	9	14	5	0	28	15	18	0	9	62	8	0	15	89	30	302
5:15 P	0	11	14	4	2	56	30	21	0	20	54	4	0	8	99	46	367
5:30 P	0	9	10	12	0	29	21	8	1	11	54	7	0	11	89	49	310
5:45 P	0	14	12	5	0	29	17	5	0	11	56	5	1	11	105	32	302
6:00 P	0	9	10	9	0	35	18	12	0	13	56	3	1	8	77	26	276
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	1	82	98	52	3	276	146	105	4	93	470	51	6	78	728	291	2470
	Peak Hour: 4:45 PM to 5:45 PM																
Total	1	43	50	26	2	142	83	52	1	51	226	24	1	45	382	157	1281
Approach	119				277				301				584				1281
%HV	0.8%				0.7%				0.3%				0.2%				0.4%
PHF	0.96				0.65				0.95				0.95				0.87



1468 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	0.95	0.2%
WB	0.95	0.3%
NB	0.65	0.7%
SB	0.96	0.8%
T Int.	0.87	0.4%

Check
In: 1281
Out: 1281

Conditions:

PEDs Across:	N	S	E	W	
INT 01	1				1
INT 02	4	2	2		8
INT 03					0
INT 04			1	1	2
INT 05			2		2
INT 06	1		2		3
INT 07	1			2	3
INT 08			2	1	3
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	7	2	9	4	**22**

Special Notes

Bicycles From:	N	S	E	W	
INT 01					0
INT 02					0
INT 03				1	1
INT 04	1			2	3
INT 05					0
INT 06					0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	1	0	0	3	4

GTC19054M_05p

1 SR-305 @ Forest Rock Ln

Synchro ID: 1

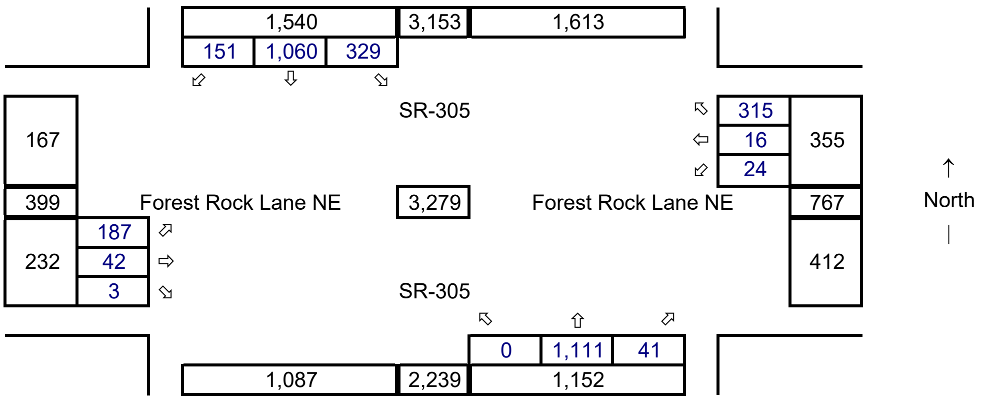
Existing

Average Weekday

PM Peak Hour

Year: **4/9/19**

Data Source: TCC



Future without Project

Average Weekday

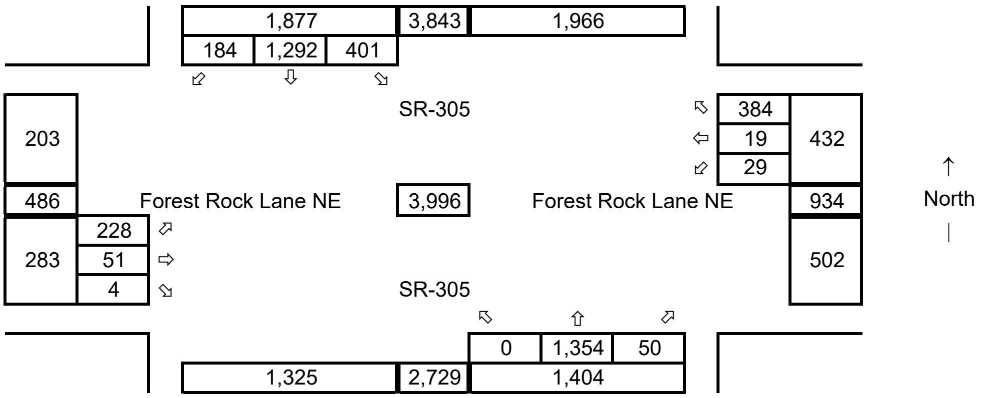
PM Peak Hour

Year: 2027

Growth Rate = 2.5%

Years of Growth = 8

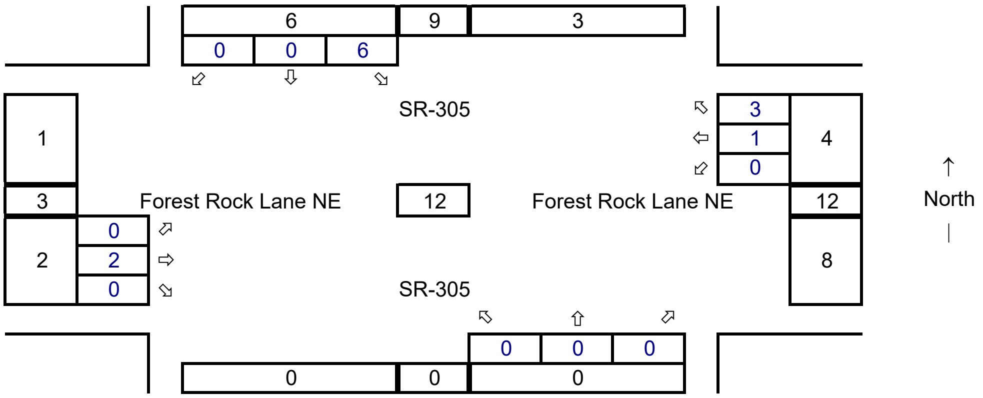
Total Growth = 1.2184



Total Project Trips

Average Weekday

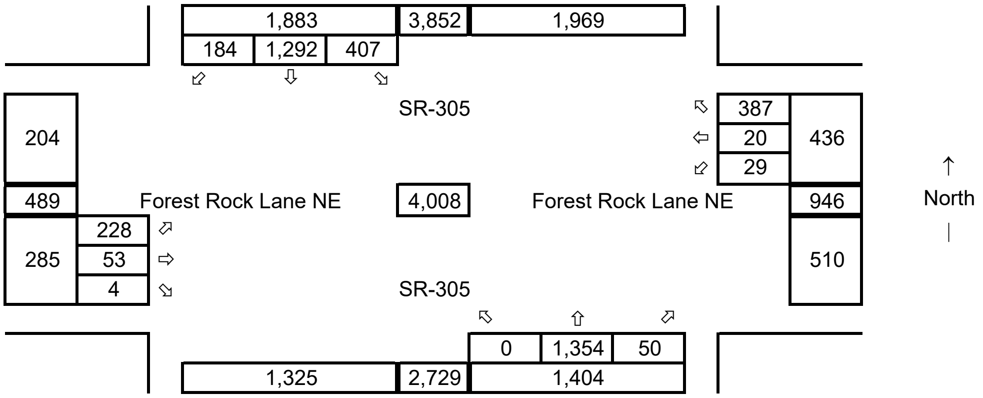
PM Peak Hour



Future with Project

Average Weekday

PM Peak Hour



2 10th Ave @ Forest Rock Ln

Synchro ID: 2

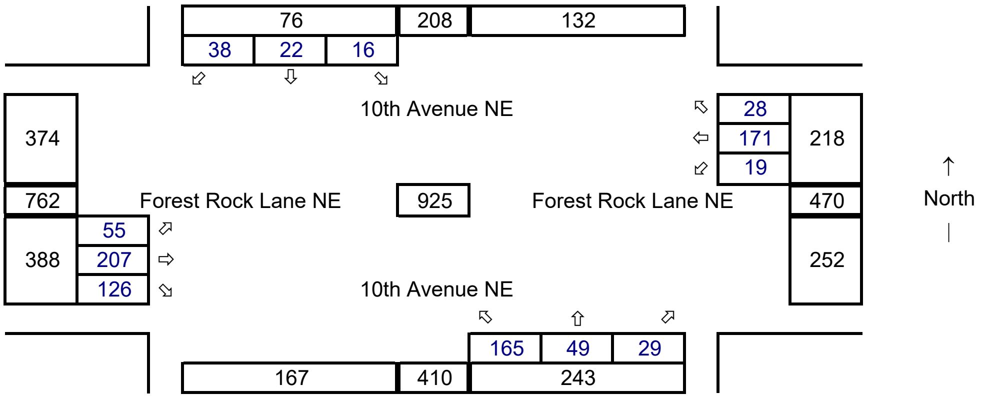
Existing

Average Weekday

PM Peak Hour

Year: **4/9/19**

Data Source: TCC



Future without Project

Average Weekday

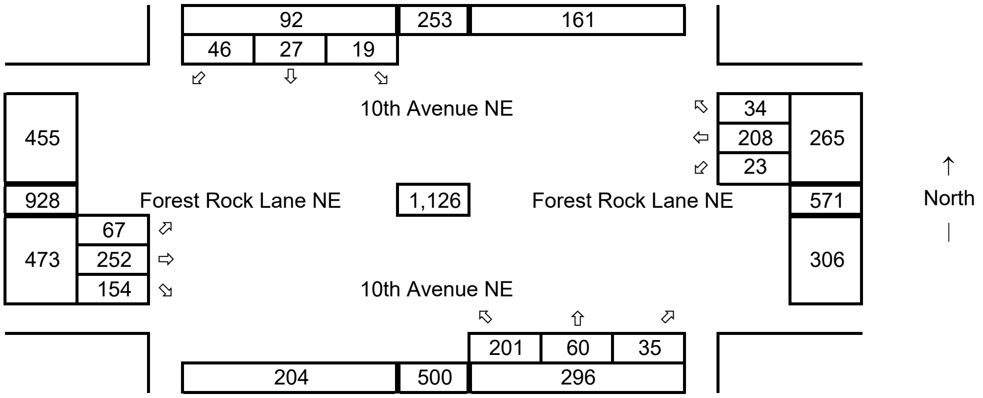
PM Peak Hour

Year: 2027

Growth Rate = 2.5%

Years of Growth = 8

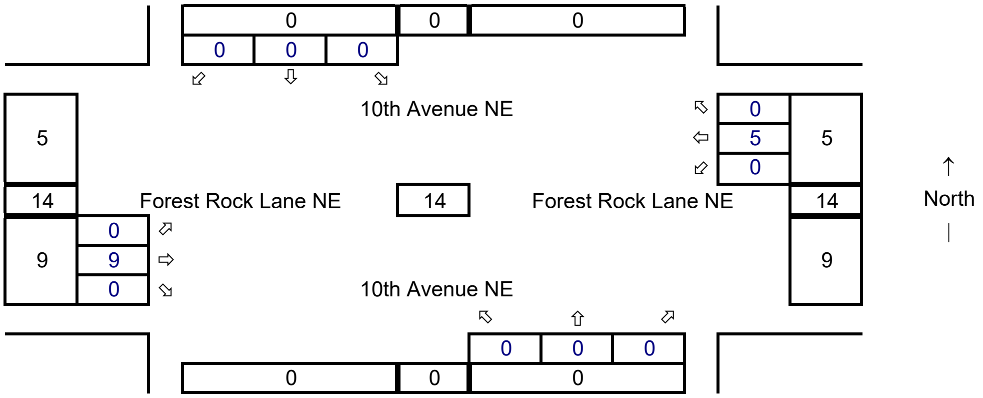
Total Growth = 1.2184



Total Project Trips

Average Weekday

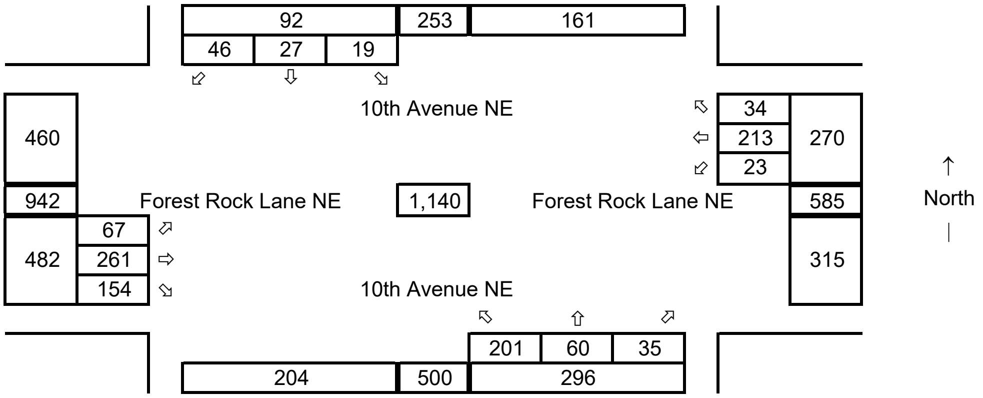
PM Peak Hour



Future with Project

Average Weekday

PM Peak Hour



3 SR-305 @ Lincoln Rd

Synchro ID: 3

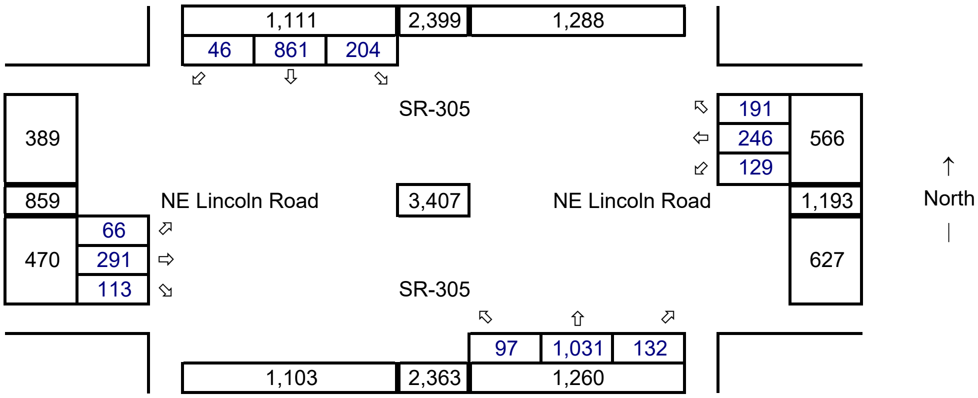
Existing

Average Weekday

PM Peak Hour

Year: **4/9/19**

Data Source: TCC



Future without Project

Average Weekday

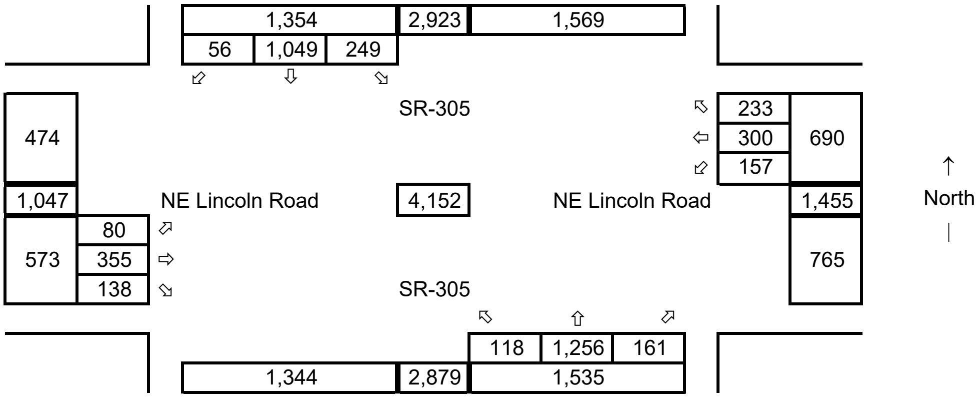
PM Peak Hour

Year: 2027

Growth Rate = 2.5%

Years of Growth = 8

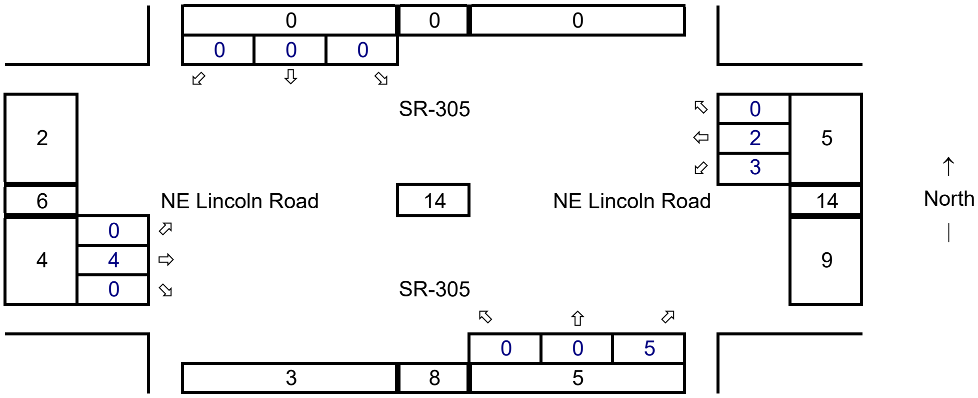
Total Growth = 1.2184



Total Project Trips

Average Weekday

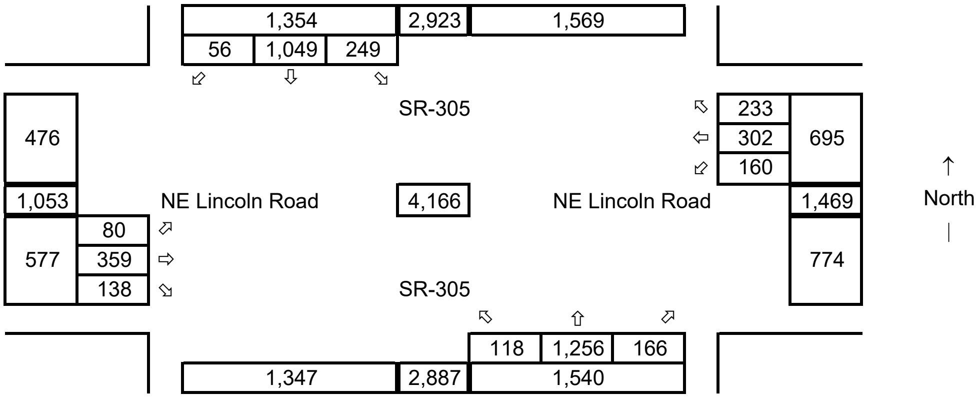
PM Peak Hour



Future with Project

Average Weekday

PM Peak Hour



4 10th Ave @ Lincoln Rd

Synchro ID: 4

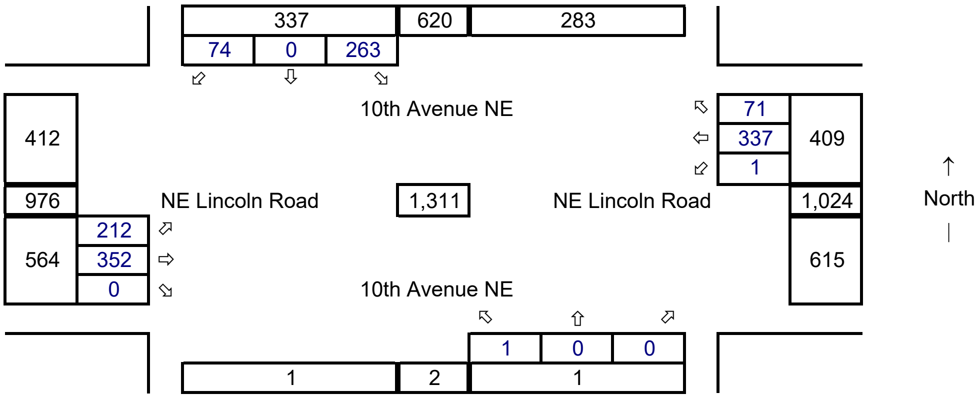
Existing

Average Weekday

PM Peak Hour

Year: **4/9/19**

Data Source: TCC



Future without Project

Average Weekday

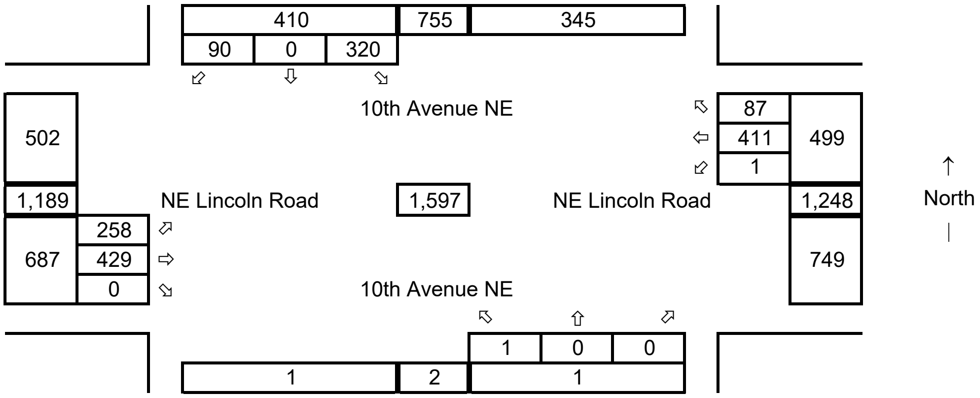
PM Peak Hour

Year: 2027

Growth Rate = 2.5%

Years of Growth = 8

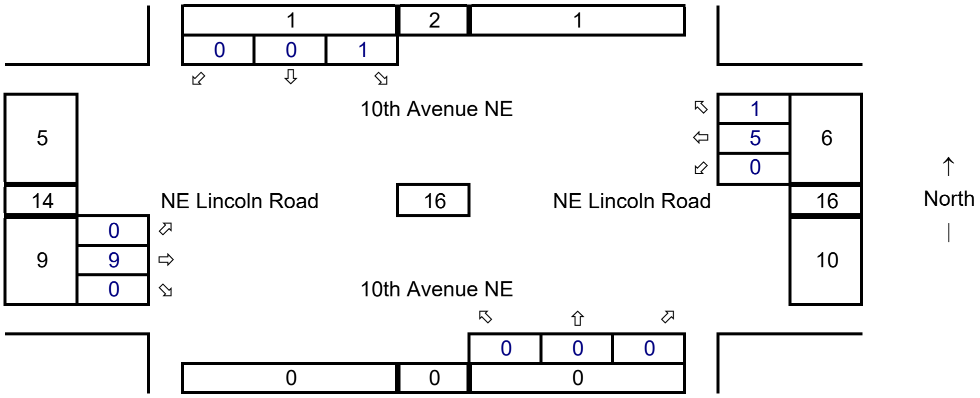
Total Growth = 1.2184



Total Project Trips

Average Weekday

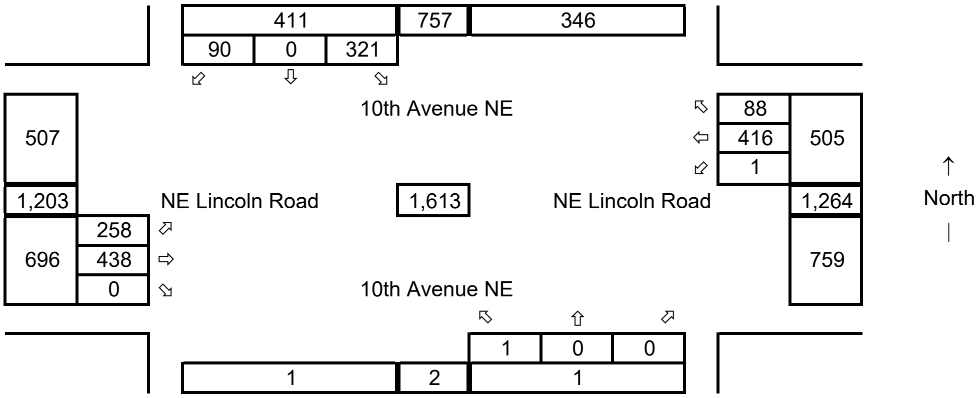
PM Peak Hour



Future with Project

Average Weekday

PM Peak Hour



5 Caldart Ave @ Lincoln Rd

Synchro ID: 5

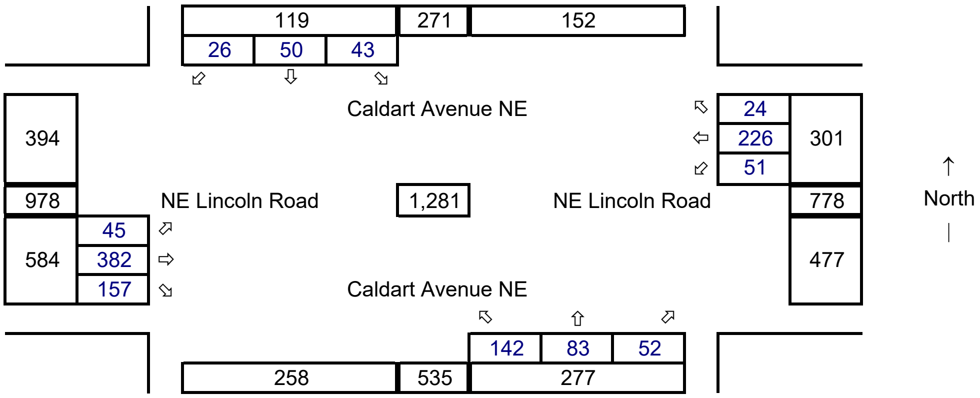
Existing

Average Weekday

PM Peak Hour

Year: **4/9/19**

Data Source: TCC



Future without Project

Average Weekday

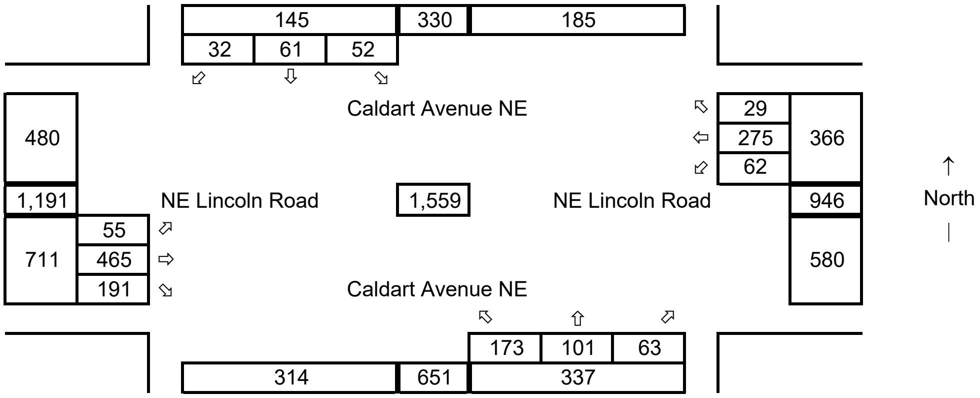
PM Peak Hour

Year: 2027

Growth Rate = 2.5%

Years of Growth = 8

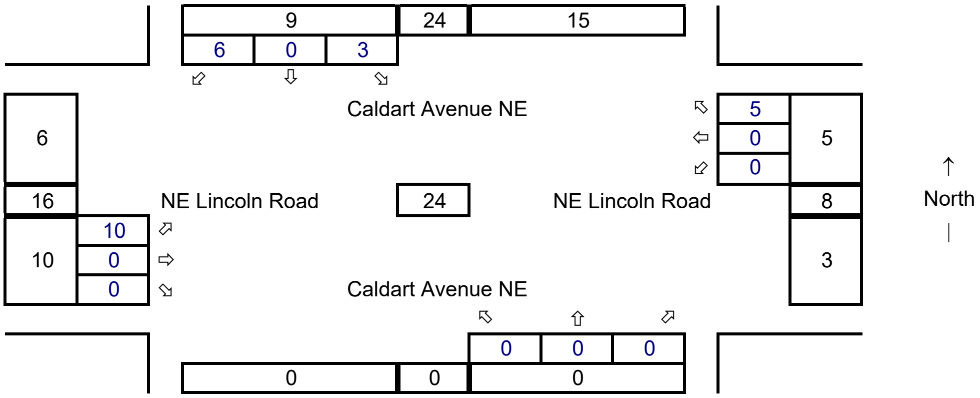
Total Growth = 1.2184



Total Project Trips

Average Weekday

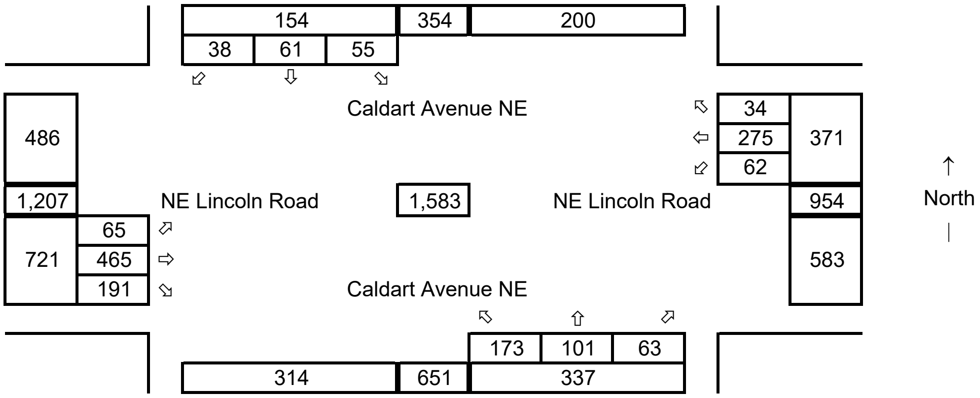
PM Peak Hour



Future with Project

Average Weekday

PM Peak Hour



Level of Service Calculations

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			↰	↱	↰	↑↱		↰	↑↑	↱
Traffic Volume (vph)	187	42	3	24	16	315	0	1111	41	329	1060	151
Future Volume (vph)	187	42	3	24	16	315	0	1111	41	329	1060	151
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	0		40	170		0	500		180
Storage Lanes	1		0	0		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor		1.00			1.00							0.98
Frt		0.990				0.850		0.995				0.850
Flt Protected	0.950				0.970					0.950		
Satd. Flow (prot)	1787	1861	0	0	1825	1599	1881	3556	0	1787	3574	1599
Flt Permitted	0.950				0.970					0.950		
Satd. Flow (perm)	1787	1861	0	0	1823	1599	1881	3556	0	1787	3574	1565
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				325		3				135
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		264			283			3701			1332	
Travel Time (s)		6.0			6.4			84.1			30.3	
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)												2
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	193	46	0	0	41	325	0	1187	0	339	1093	156
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8						6
Detector Phase	4	4		8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	9.5	22.5		9.5	22.5	22.5
Total Split (s)	22.6	22.6		22.6	22.6	22.6	9.5	45.8		29.0	65.3	65.3
Total Split (%)	18.8%	18.8%		18.8%	18.8%	18.8%	7.9%	38.2%		24.2%	54.4%	54.4%
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	Min		None	Min	Min
Act Effct Green (s)	15.7	15.7			9.3	9.3		40.5		23.6	68.7	68.7
Actuated g/C Ratio	0.15	0.15			0.09	0.09		0.38		0.22	0.64	0.64
v/c Ratio	0.74	0.17			0.26	0.75		0.88		0.86	0.48	0.15
Control Delay	62.8	42.2			50.7	16.5		41.3		63.5	11.7	2.7
Queue Delay	0.0	0.0			0.0	0.0		0.0		0.0	0.0	0.0
Total Delay	62.8	42.2			50.7	16.5		41.3		63.5	11.7	2.7
LOS	E	D			D	B		D		E	B	A
Approach Delay		58.8			20.3			41.3			21.8	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			C			D			C	
Queue Length 50th (ft)	129	27			28	0		400		228	187	5
Queue Length 95th (ft)	#243	66			62	85		#623		#439	307	35
Internal Link Dist (ft)		184			203			3621			1252	
Turn Bay Length (ft)	100					40				500		180
Base Capacity (vph)	304	317			310	541		1381		411	2287	1050
Starvation Cap Reductn	0	0			0	0		0		0	0	0
Spillback Cap Reductn	0	0			0	0		0		0	0	0
Storage Cap Reductn	0	0			0	0		0		0	0	0
Reduced v/c Ratio	0.63	0.15			0.13	0.60		0.86		0.82	0.48	0.15

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 107.3
Natural Cycle: 110
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 31.1 Intersection LOS: C
Intersection Capacity Utilization 78.5% ICU Level of Service D
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: SR-305 & 7th Avenue NE/Forest Rock Lane NE

2: 10th Avenue NE/Little Valley Road NE & Forest Rock Lane NE

PM Peak-Hour

Intersection	
Int Delay, s/veh	13.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱			✥		↰	↱	
Traffic Vol, veh/h	55	207	126	19	171	28	165	49	29	16	22	38
Future Vol, veh/h	55	207	126	19	171	28	165	49	29	16	22	38
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	50	-	-	-	-	-	60	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	60	227	138	21	188	31	181	54	32	18	24	42

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	219	0	0	365	0	0	695	677	296	705	731	204
Stage 1	-	-	-	-	-	-	416	416	-	246	246	-
Stage 2	-	-	-	-	-	-	279	261	-	459	485	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.11	6.51	6.21	7.11	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.509	4.009	3.309	3.509	4.009	3.309
Pot Cap-1 Maneuver	1356	-	-	1199	-	-	358	376	746	352	350	839
Stage 1	-	-	-	-	-	-	616	594	-	760	704	-
Stage 2	-	-	-	-	-	-	730	694	-	584	553	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1356	-	-	1199	-	-	306	353	746	284	329	839
Mov Cap-2 Maneuver	-	-	-	-	-	-	306	353	-	284	329	-
Stage 1	-	-	-	-	-	-	589	568	-	727	691	-
Stage 2	-	-	-	-	-	-	658	682	-	484	529	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	0.7	45.6	13.9
HCM LOS			E	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	339	1356	-	-	1199	-	-	284	535
HCM Lane V/C Ratio	0.788	0.045	-	-	0.017	-	-	0.062	0.123
HCM Control Delay (s)	45.6	7.8	-	-	8.1	-	-	18.5	12.7
HCM Lane LOS	E	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	6.5	0.1	-	-	0.1	-	-	0.2	0.4

3: SR-305 & NE Iverson Street/NE Lincoln Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↱		↰	↑↱	
Traffic Volume (vph)	66	291	113	129	246	191	97	1031	132	204	861	46
Future Volume (vph)	66	291	113	129	246	191	97	1031	132	204	861	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		75	245		100	300		0	300		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00		0.97	0.99		0.98	1.00	1.00		1.00	1.00	
Frt			0.850			0.850		0.983			0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1881	1599	1787	1881	1599	1787	3500	0	1787	3541	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1782	1881	1559	1776	1881	1574	1784	3500	0	1783	3541	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			95			151		14			6	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1045			560			1707			3701	
Travel Time (s)		23.8			12.7			38.8			84.1	
Confl. Peds. (#/hr)	2		5	5		2	2		4	4		2
Confl. Bikes (#/hr)			3						1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	73	323	126	143	273	212	108	1293	0	227	1008	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5	
Total Split (s)	12.2	28.0	28.0	16.0	31.8	31.8	19.2	54.0		22.0	56.8	
Total Split (%)	10.2%	23.3%	23.3%	13.3%	26.5%	26.5%	16.0%	45.0%		18.3%	47.3%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	
Act Effct Green (s)	7.5	22.5	22.5	11.3	28.7	28.7	11.9	49.6		16.9	54.6	
Actuated g/C Ratio	0.06	0.19	0.19	0.10	0.24	0.24	0.10	0.42		0.14	0.46	
v/c Ratio	0.65	0.90	0.34	0.84	0.60	0.43	0.60	0.88		0.89	0.62	
Control Delay	81.1	75.9	15.8	90.6	47.3	15.5	65.1	39.7		84.4	26.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	81.1	75.9	15.8	90.6	47.3	15.5	65.1	39.7		84.4	26.5	
LOS	F	E	B	F	D	B	E	D		F	C	
Approach Delay		62.1			46.4			41.7			37.2	

3: SR-305 & NE Iverson Street/NE Lincoln Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			D			D			D	
Queue Length 50th (ft)	56	245	20	111	192	38	81	477		174	304	
Queue Length 95th (ft)	#125	#408	74	#226	287	110	140	#584		#317	389	
Internal Link Dist (ft)		965			480			1627			3621	
Turn Bay Length (ft)	75		75	245		100	300			300		
Base Capacity (vph)	116	374	386	174	455	495	222	1474		264	1636	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.63	0.86	0.33	0.82	0.60	0.43	0.49	0.88		0.86	0.62	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 118.3
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 43.8 Intersection LOS: D
Intersection Capacity Utilization 81.5% ICU Level of Service D
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: SR-305 & NE Iverson Street/NE Lincoln Road

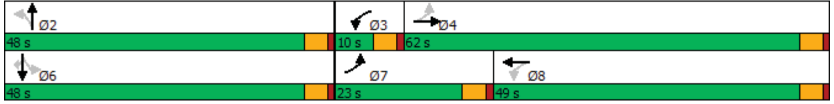
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱			✥			↰	↱
Traffic Volume (vph)	212	352	0	1	337	71	1	0	0	263	0	74
Future Volume (vph)	212	352	0	1	337	71	1	0	0	263	0	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	105		0	105		0	0		0	0		55
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor				1.00	1.00							
Frt					0.974							0.850
Flt Protected	0.950			0.950				0.950			0.950	
Satd. Flow (prot)	1805	1900	0	1805	1842	0	0	1805	0	0	1805	1615
Flt Permitted	0.253			0.535				0.415			0.757	
Satd. Flow (perm)	481	1900	0	1015	1842	0	0	788	0	0	1438	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					10							95
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		560			2052			380			1371	
Travel Time (s)		12.7			46.6			8.6			31.2	
Confl. Peds. (#/hr)	2		1	1		2						
Confl. Bikes (#/hr)			2									
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	230	383	0	1	443	0	0	1	0	0	286	80
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		3	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	22.5		9.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (s)	23.0	62.0		10.0	49.0		48.0	48.0		48.0	48.0	48.0
Total Split (%)	19.2%	51.7%		8.3%	40.8%		40.0%	40.0%		40.0%	40.0%	40.0%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	None		None	None		Min	Min		Min	Min	Min
Act Effct Green (s)	42.4	41.0		28.9	22.9			20.6			20.6	20.6
Actuated g/C Ratio	0.58	0.56		0.40	0.31			0.28			0.28	0.28
v/c Ratio	0.42	0.36		0.00	0.76			0.00			0.70	0.15
Control Delay	10.7	11.7		10.0	32.5			23.0			35.5	4.8
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	10.7	11.7		10.0	32.5			23.0			35.5	4.8
LOS	B	B		A	C			C			D	A
Approach Delay		11.3			32.4			23.0			28.8	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			C			C			C	
Queue Length 50th (ft)	41	75		0	165			0			108	0
Queue Length 95th (ft)	112	238		3	357			5			252	25
Internal Link Dist (ft)		480			1972			300			1291	
Turn Bay Length (ft)	105			105								55
Base Capacity (vph)	645	1537		467	1226			511			933	1081
Starvation Cap Reductn	0	0		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.36	0.25		0.00	0.36			0.00			0.31	0.07

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 72.8
Natural Cycle: 55
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 22.4 Intersection LOS: C
Intersection Capacity Utilization 58.7% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 4: N 8th Avenue/10th Avenue NE & NE Lincoln Road



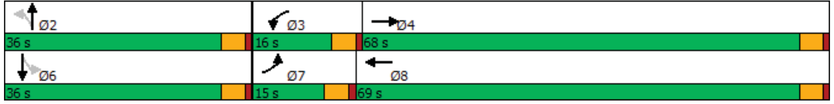
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Traffic Volume (vph)	45	382	157	51	226	24	142	83	52	43	50	26
Future Volume (vph)	45	382	157	51	226	24	142	83	52	43	50	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	90		0	95		0	125		0	105		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99			1.00		0.99	0.99		0.99	0.99	
Frt		0.956			0.985			0.942			0.948	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1805	0	1805	1867	0	1805	1765	0	1805	1782	0
Flt Permitted	0.950			0.950			0.701			0.659		
Satd. Flow (perm)	1801	1805	0	1805	1867	0	1320	1765	0	1237	1782	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			7			26			21	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2052			1092			1255			2391	
Travel Time (s)		46.6			24.8			28.5			54.3	
Confl. Peds. (#/hr)	1					1	3		5	5		3
Confl. Bikes (#/hr)			2									1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	52	619	0	59	288	0	163	155	0	49	87	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Detector Phase	7	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	15.0	68.0		16.0	69.0		36.0	36.0		36.0	36.0	
Total Split (%)	12.5%	56.7%		13.3%	57.5%		30.0%	30.0%		30.0%	30.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)	8.5	29.7		8.9	29.9		15.4	15.4		15.4	15.4	
Actuated g/C Ratio	0.14	0.47		0.14	0.48		0.25	0.25		0.25	0.25	
v/c Ratio	0.21	0.71		0.23	0.32		0.50	0.34		0.16	0.19	
Control Delay	36.0	19.5		35.5	12.4		32.1	23.6		26.5	20.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	36.0	19.5		35.5	12.4		32.1	23.6		26.5	20.9	
LOS	D	B		D	B		C	C		C	C	
Approach Delay		20.8			16.4			27.9			22.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B			C			C	
Queue Length 50th (ft)	19	183		21	67		56	42		15	21	
Queue Length 95th (ft)	67	383		73	149		150	119		54	71	
Internal Link Dist (ft)		1972			1012			1175			2311	
Turn Bay Length (ft)	90			95			125			105		
Base Capacity (vph)	366	1610		401	1672		779	1053		730	1061	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.14	0.38		0.15	0.17		0.21	0.15		0.07	0.08	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 62.6
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 21.5 Intersection LOS: C
Intersection Capacity Utilization 62.0% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 5: Caldart Avenue NE & NE Lincoln Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			↰	↱	↰	↑↱		↰	↑↑	↱
Traffic Volume (vph)	228	51	4	29	19	384	0	1354	50	401	1292	184
Future Volume (vph)	228	51	4	29	19	384	0	1354	50	401	1292	184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	0		40	170		0	500		180
Storage Lanes	1		0	0		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor		1.00			1.00							0.98
Frt		0.989				0.850		0.995				0.850
Flt Protected	0.950				0.971					0.950		
Satd. Flow (prot)	1787	1859	0	0	1827	1599	1881	3556	0	1787	3574	1599
Flt Permitted	0.950				0.971					0.950		
Satd. Flow (perm)	1787	1859	0	0	1825	1599	1881	3556	0	1787	3574	1565
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				309		3				135
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		264			283			3701			1332	
Travel Time (s)		6.0			6.4			84.1			30.3	
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)												2
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	235	57	0	0	50	396	0	1448	0	413	1332	190
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8						6
Detector Phase	4	4		8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	9.5	22.5		9.5	22.5	22.5
Total Split (s)	22.6	22.6		22.6	22.6	22.6	9.5	45.8		29.0	65.3	65.3
Total Split (%)	18.8%	18.8%		18.8%	18.8%	18.8%	7.9%	38.2%		24.2%	54.4%	54.4%
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	Min		None	Min	Min
Act Effct Green (s)	17.4	17.4			12.8	12.8		41.4		24.6	70.5	70.5
Actuated g/C Ratio	0.15	0.15			0.11	0.11		0.36		0.22	0.62	0.62
v/c Ratio	0.86	0.20			0.25	0.87		1.12		1.08	0.60	0.19
Control Delay	77.5	43.9			48.7	32.8		100.4		111.2	15.6	4.0
Queue Delay	0.0	0.0			0.0	0.0		0.0		0.0	0.0	0.0
Total Delay	77.5	43.9			48.7	32.8		100.4		111.2	15.6	4.0
LOS	E	D			D	C		F		F	B	A
Approach Delay		70.9			34.6			100.4			34.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			C			F			C	
Queue Length 50th (ft)	172	35			34	61		~665		~347	305	16
Queue Length 95th (ft)	#324	78			73	#211		#852		#570	410	50
Internal Link Dist (ft)		184			203			3621			1252	
Turn Bay Length (ft)	100					40				500		180
Base Capacity (vph)	284	297			290	514		1291		384	2206	1017
Starvation Cap Reductn	0	0			0	0		0		0	0	0
Spillback Cap Reductn	0	0			0	0		0		0	0	0
Storage Cap Reductn	0	0			0	0		0		0	0	0
Reduced v/c Ratio	0.83	0.19			0.17	0.77		1.12		1.08	0.60	0.19

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 114.2
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.12
Intersection Signal Delay: 60.4 Intersection LOS: E
Intersection Capacity Utilization 91.8% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: SR-305 & 7th Avenue NE/Forest Rock Lane NE

2: 10th Avenue NE/Little Valley Road NE & Forest Rock Lane NE

PM Peak-Hour

Intersection	
Int Delay, s/veh	50.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱			✣		↰	↱	
Traffic Vol, veh/h	67	252	154	23	208	34	201	60	35	19	27	46
Future Vol, veh/h	67	252	154	23	208	34	201	60	35	19	27	46
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	50	-	-	-	-	-	60	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	74	277	169	25	229	37	221	66	38	21	30	51

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	266	0	0	446	0	0	848	826	362	860	892	248
Stage 1	-	-	-	-	-	-	510	510	-	298	298	-
Stage 2	-	-	-	-	-	-	338	316	-	562	594	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.11	6.51	6.21	7.11	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.509	4.009	3.309	3.509	4.009	3.309
Pot Cap-1 Maneuver	1304	-	-	1120	-	-	282	308	685	277	282	793
Stage 1	-	-	-	-	-	-	548	539	-	713	669	-
Stage 2	-	-	-	-	-	-	679	657	-	513	495	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1304	-	-	1120	-	-	227	284	685	202	260	793
Mov Cap-2 Maneuver	-	-	-	-	-	-	227	284	-	202	260	-
Stage 1	-	-	-	-	-	-	517	508	-	672	654	-
Stage 2	-	-	-	-	-	-	593	643	-	397	467	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	0.7	184.2	16.8
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	258	1304	-	-	1120	-	-	202	451
HCM Lane V/C Ratio	1.261	0.056	-	-	0.023	-	-	0.103	0.178
HCM Control Delay (s)	184.2	7.9	-	-	8.3	-	-	24.9	14.7
HCM Lane LOS	F	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	16	0.2	-	-	0.1	-	-	0.3	0.6

3: SR-305 & NE Iverson Street/NE Lincoln Road

PM Peak-Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↱		↰	↑↱	
Traffic Volume (vph)	80	355	138	157	300	233	118	1256	161	249	1049	56
Future Volume (vph)	80	355	138	157	300	233	118	1256	161	249	1049	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		75	245		100	300		0	300		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00		0.97	0.99		0.98	1.00	1.00		1.00	1.00	
Frt			0.850			0.850		0.983			0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1881	1599	1787	1881	1599	1787	3500	0	1787	3541	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1783	1881	1559	1777	1881	1574	1785	3500	0	1784	3541	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			95			151		14			6	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1045			560			1707			3701	
Travel Time (s)		23.8			12.7			38.8			84.1	
Confl. Peds. (#/hr)	2		5	5		2	2		4	4		2
Confl. Bikes (#/hr)			3						1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	394	153	174	333	259	131	1575	0	277	1228	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5	
Total Split (s)	12.2	28.0	28.0	16.0	31.8	31.8	19.2	54.0		22.0	56.8	
Total Split (%)	10.2%	23.3%	23.3%	13.3%	26.5%	26.5%	16.0%	45.0%		18.3%	47.3%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	
Act Effct Green (s)	7.7	23.5	23.5	11.5	27.3	27.3	12.8	49.5		17.5	54.2	
Actuated g/C Ratio	0.06	0.20	0.20	0.10	0.23	0.23	0.11	0.41		0.15	0.45	
v/c Ratio	0.78	1.07	0.40	1.02	0.78	0.55	0.69	1.09		1.07	0.77	
Control Delay	95.9	113.0	20.6	127.2	57.4	21.5	69.9	84.5		123.0	31.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	95.9	113.0	20.6	127.2	57.4	21.5	69.9	84.5		123.0	31.8	
LOS	F	F	C	F	E	C	E	F		F	C	
Approach Delay		88.4			61.1			83.4			48.6	

3: SR-305 & NE Iverson Street/NE Lincoln Road

PM Peak-Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			E			F			D	
Queue Length 50th (ft)	69	~338	38	~140	244	70	98	~718		~237	416	
Queue Length 95th (ft)	#161	#535	101	#288	#376	159	165	#860		#409	513	
Internal Link Dist (ft)		965			480			1627			3621	
Turn Bay Length (ft)	75		75	245		100	300			300		
Base Capacity (vph)	114	368	381	171	427	474	218	1451		260	1602	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.78	1.07	0.40	1.02	0.78	0.55	0.60	1.09		1.07	0.77	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 110
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.09
Intersection Signal Delay: 69.0 Intersection LOS: E
Intersection Capacity Utilization 96.1% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: SR-305 & NE Iverson Street/NE Lincoln Road

4: N 8th Avenue/10th Avenue NE & NE Lincoln Road

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱			✥			↰	↱
Traffic Volume (vph)	258	429	0	1	411	87	1	0	0	320	0	90
Future Volume (vph)	258	429	0	1	411	87	1	0	0	320	0	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	105		0	105		0	0		0	0		55
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor				1.00	1.00							
Frt					0.974							0.850
Flt Protected	0.950			0.950				0.950			0.950	
Satd. Flow (prot)	1805	1900	0	1805	1842	0	0	1805	0	0	1805	1615
Flt Permitted	0.172			0.495				0.328			0.757	
Satd. Flow (perm)	327	1900	0	939	1842	0	0	623	0	0	1438	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					10							95
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		560			2052			380			1371	
Travel Time (s)		12.7			46.6			8.6			31.2	
Confl. Peds. (#/hr)	2		1	1		2						
Confl. Bikes (#/hr)			2									
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	280	466	0	1	542	0	0	1	0	0	348	98
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		3	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	22.5		9.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (s)	23.0	62.0		10.0	49.0		48.0	48.0		48.0	48.0	48.0
Total Split (%)	19.2%	51.7%		8.3%	40.8%		40.0%	40.0%		40.0%	40.0%	40.0%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	None		None	None		Min	Min		Min	Min	Min
Act Effct Green (s)	52.7	51.2		37.0	31.1			27.6			27.6	27.6
Actuated g/C Ratio	0.59	0.57		0.41	0.35			0.31			0.31	0.31
v/c Ratio	0.60	0.43		0.00	0.84			0.01			0.79	0.17
Control Delay	18.3	14.9		12.0	41.4			24.0			43.8	6.7
Queue Delay	0.0	0.2		0.0	0.0			0.0			0.0	0.0
Total Delay	18.3	15.1		12.0	41.4			24.0			43.8	6.7
LOS	B	B		B	D			C			D	A
Approach Delay		16.3			41.4			24.0			35.7	

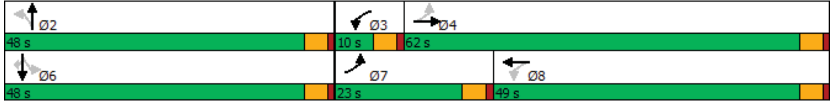
4: N 8th Avenue/10th Avenue NE & NE Lincoln Road

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			D			C			D	
Queue Length 50th (ft)	70	130		0	278			0			183	1
Queue Length 95th (ft)	186	339		3	509			4			336	37
Internal Link Dist (ft)		480			1972			300			1291	
Turn Bay Length (ft)	105			105								55
Base Capacity (vph)	519	1318		443	987			324			750	887
Starvation Cap Reductn	0	271		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.54	0.45		0.00	0.55			0.00			0.46	0.11

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 90
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 29.1
Intersection LOS: C
Intersection Capacity Utilization 69.1%
ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 4: N 8th Avenue/10th Avenue NE & NE Lincoln Road



Calavista (GTC #19-081)
5: Caldart Avenue NE & NE Lincoln Road

2027 Baseline Conditions
PM Peak-Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Traffic Volume (vph)	55	465	191	62	275	29	173	101	63	52	61	32
Future Volume (vph)	55	465	191	62	275	29	173	101	63	52	61	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	90		0	95		0	125		0	105		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99			1.00		0.99	0.99		0.99	0.99	
Frt		0.956			0.986			0.943			0.948	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1805	0	1805	1869	0	1805	1767	0	1805	1782	0
Flt Permitted	0.950			0.950			0.688			0.554		
Satd. Flow (perm)	1801	1805	0	1805	1869	0	1296	1767	0	1041	1782	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			7			25			22	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2052			1092			1255			2391	
Travel Time (s)		46.6			24.8			28.5			54.3	
Confl. Peds. (#/hr)	1					1	3		5	5		3
Confl. Bikes (#/hr)			2									1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	63	754	0	71	349	0	199	188	0	60	107	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Detector Phase	7	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	15.0	68.0		16.0	69.0		36.0	36.0		36.0	36.0	
Total Split (%)	12.5%	56.7%		13.3%	57.5%		30.0%	30.0%		30.0%	30.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)	9.1	41.1		9.6	41.4		20.1	20.1		20.1	20.1	
Actuated g/C Ratio	0.11	0.50		0.12	0.50		0.24	0.24		0.24	0.24	
v/c Ratio	0.32	0.82		0.34	0.37		0.63	0.42		0.24	0.24	
Control Delay	48.1	27.2		47.7	14.6		43.0	30.3		33.6	26.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	48.1	27.2		47.7	14.6		43.0	30.3		33.6	26.6	
LOS	D	C		D	B		D	C		C	C	
Approach Delay		28.8			20.2			36.8			29.1	

Calavista (GTC #19-081)
5: Caldart Avenue NE & NE Lincoln Road

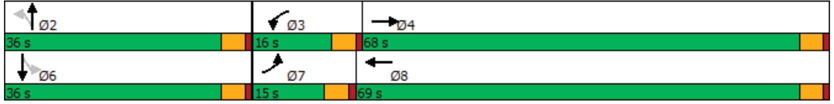
2027 Baseline Conditions
PM Peak-Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			C			D			C	
Queue Length 50th (ft)	31	311		35	104		94	72		25	36	
Queue Length 95th (ft)	90	571		98	200		208	165		73	96	
Internal Link Dist (ft)		1972			1012			1175			2311	
Turn Bay Length (ft)	90			95			125			105		
Base Capacity (vph)	276	1415		302	1452		595	825		478	830	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.23	0.53		0.24	0.24		0.33	0.23		0.13	0.13	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 82.1
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 28.5 Intersection LOS: C
Intersection Capacity Utilization 71.1% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 5: Caldart Avenue NE & NE Lincoln Road



1: SR-305 & 7th Avenue NE/Forest Rock Lane NE

PM Peak-Hour

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			↰	↱	↰	↑↱		↰	↑↑	↱
Traffic Volume (vph)	228	53	4	29	20	387	0	1354	50	407	1292	184
Future Volume (vph)	228	53	4	29	20	387	0	1354	50	407	1292	184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	0		40	170		0	500		180
Storage Lanes	1		0	0		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor		1.00			1.00							0.98
Frt		0.990				0.850		0.995				0.850
Flt Protected	0.950				0.971					0.950		
Satd. Flow (prot)	1787	1861	0	0	1827	1599	1881	3556	0	1787	3574	1599
Flt Permitted	0.950				0.971					0.950		
Satd. Flow (perm)	1787	1861	0	0	1825	1599	1881	3556	0	1787	3574	1565
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				309		3				135
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		264			283			3701			1332	
Travel Time (s)		6.0			6.4			84.1			30.3	
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)												2
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	235	59	0	0	51	399	0	1448	0	420	1332	190
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8						6
Detector Phase	4	4		8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	9.5	22.5		9.5	22.5	22.5
Total Split (s)	22.6	22.6		22.6	22.6	22.6	9.5	45.8		29.0	65.3	65.3
Total Split (%)	18.8%	18.8%		18.8%	18.8%	18.8%	7.9%	38.2%		24.2%	54.4%	54.4%
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	Min		None	Min	Min
Act Effct Green (s)	17.4	17.4			13.0	13.0		41.4		24.6	70.5	70.5
Actuated g/C Ratio	0.15	0.15			0.11	0.11		0.36		0.22	0.62	0.62
v/c Ratio	0.87	0.21			0.25	0.88		1.12		1.10	0.60	0.19
Control Delay	77.8	43.9			48.7	33.3		101.2		117.1	15.7	4.0
Queue Delay	0.0	0.0			0.0	0.0		0.0		0.0	0.0	0.0
Total Delay	77.8	43.9			48.7	33.3		101.2		117.1	15.7	4.0
LOS	E	D			D	C		F		F	B	A
Approach Delay		71.0			35.1			101.2			36.5	

1: SR-305 & 7th Avenue NE/Forest Rock Lane NE

PM Peak-Hour

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			D			F			D	
Queue Length 50th (ft)	173	37			35	64		~669		~361	309	16
Queue Length 95th (ft)	#324	79			73	#216		#852		#584	410	50
Internal Link Dist (ft)		184			203			3621			1252	
Turn Bay Length (ft)	100					40				500		180
Base Capacity (vph)	283	297			289	513		1289		383	2202	1016
Starvation Cap Reductn	0	0			0	0		0		0	0	0
Spillback Cap Reductn	0	0			0	0		0		0	0	0
Storage Cap Reductn	0	0			0	0		0		0	0	0
Reduced v/c Ratio	0.83	0.20			0.18	0.78		1.12		1.10	0.60	0.19

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 114.4
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.12
Intersection Signal Delay: 61.4 Intersection LOS: E
Intersection Capacity Utilization 92.1% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: SR-305 & 7th Avenue NE/Forest Rock Lane NE

Intersection	
Int Delay, s/veh	53.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱			✥		↰	↱	
Traffic Vol, veh/h	67	261	154	23	213	34	201	60	35	19	27	46
Future Vol, veh/h	67	261	154	23	213	34	201	60	35	19	27	46
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	50	-	-	-	-	-	60	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	74	287	169	25	234	37	221	66	38	21	30	51

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	271	0	0	456	0	0	863	841	372	875	907	253
Stage 1	-	-	-	-	-	-	520	520	-	303	303	-
Stage 2	-	-	-	-	-	-	343	321	-	572	604	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.11	6.51	6.21	7.11	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.509	4.009	3.309	3.509	4.009	3.309
Pot Cap-1 Maneuver	1298	-	-	1110	-	-	276	302	676	271	277	788
Stage 1	-	-	-	-	-	-	541	534	-	708	665	-
Stage 2	-	-	-	-	-	-	674	653	-	507	489	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1298	-	-	1110	-	-	221	278	676	197	255	788
Mov Cap-2 Maneuver	-	-	-	-	-	-	221	278	-	197	255	-
Stage 1	-	-	-	-	-	-	510	504	-	668	650	-
Stage 2	-	-	-	-	-	-	588	638	-	392	461	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	0.7	199	17.1
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	251	1298	-	-	1110	-	-	197	444
HCM Lane V/C Ratio	1.296	0.057	-	-	0.023	-	-	0.106	0.181
HCM Control Delay (s)	199	7.9	-	-	8.3	-	-	25.4	14.9
HCM Lane LOS	F	A	-	-	A	-	-	D	B
HCM 95th %tile Q(veh)	16.6	0.2	-	-	0.1	-	-	0.3	0.7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↱		↰	↑↱	
Traffic Volume (vph)	80	359	138	160	302	233	118	1256	166	249	1049	56
Future Volume (vph)	80	359	138	160	302	233	118	1256	166	249	1049	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		75	245		100	300		0	300		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00		0.97	0.99		0.98	1.00	1.00		1.00	1.00	
Frt			0.850			0.850		0.983			0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1881	1599	1787	1881	1599	1787	3500	0	1787	3541	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1783	1881	1559	1777	1881	1574	1785	3500	0	1784	3541	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			95			150		14			6	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1045			560			1707			3701	
Travel Time (s)		23.8			12.7			38.8			84.1	
Confl. Peds. (#/hr)	2		5	5		2	2		4	4		2
Confl. Bikes (#/hr)			3						1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	399	153	178	336	259	131	1580	0	277	1228	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5	
Total Split (s)	12.2	28.0	28.0	16.0	31.8	31.8	19.2	54.0		22.0	56.8	
Total Split (%)	10.2%	23.3%	23.3%	13.3%	26.5%	26.5%	16.0%	45.0%		18.3%	47.3%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	
Act Effct Green (s)	7.7	23.5	23.5	11.5	27.3	27.3	12.8	49.5		17.5	54.2	
Actuated g/C Ratio	0.06	0.20	0.20	0.10	0.23	0.23	0.11	0.41		0.15	0.45	
v/c Ratio	0.78	1.08	0.40	1.04	0.79	0.55	0.69	1.09		1.07	0.77	
Control Delay	95.9	116.9	20.6	132.7	58.0	21.7	69.9	85.7		123.0	31.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	95.9	116.9	20.6	132.7	58.0	21.7	69.9	85.7		123.0	31.8	
LOS	F	F	C	F	E	C	E	F		F	C	
Approach Delay		91.0			63.0			84.5			48.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			E			F			D	
Queue Length 50th (ft)	69	~346	38	~149	246	71	98	~722		~237	416	
Queue Length 95th (ft)	#161	#543	101	#294	#382	159	165	#864		#409	513	
Internal Link Dist (ft)		965			480			1627			3621	
Turn Bay Length (ft)	75		75	245		100	300			300		
Base Capacity (vph)	114	368	381	171	427	473	218	1451		260	1602	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.78	1.08	0.40	1.04	0.79	0.55	0.60	1.09		1.07	0.77	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 120
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.09
Intersection Signal Delay: 70.2 Intersection LOS: E
Intersection Capacity Utilization 96.6% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: SR-305 & NE Iverson Street/NE Lincoln Road

4: N 8th Avenue/10th Avenue NE & NE Lincoln Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱			✥			↰	↱
Traffic Volume (vph)	258	438	0	1	416	88	1	0	0	321	0	90
Future Volume (vph)	258	438	0	1	416	88	1	0	0	321	0	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	105		0	105		0	0		0	0		55
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor				1.00	1.00							
Frt					0.974							0.850
Flt Protected	0.950			0.950				0.950			0.950	
Satd. Flow (prot)	1805	1900	0	1805	1842	0	0	1805	0	0	1805	1615
Flt Permitted	0.169			0.491				0.326			0.757	
Satd. Flow (perm)	321	1900	0	932	1842	0	0	619	0	0	1438	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					10							95
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		560			2052			380			1371	
Travel Time (s)		12.7			46.6			8.6			31.2	
Confl. Peds. (#/hr)	2		1	1		2						
Confl. Bikes (#/hr)			2									
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	280	476	0	1	548	0	0	1	0	0	349	98
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		3	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	22.5		9.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (s)	23.0	62.0		10.0	49.0		48.0	48.0		48.0	48.0	48.0
Total Split (%)	19.2%	51.7%		8.3%	40.8%		40.0%	40.0%		40.0%	40.0%	40.0%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	None		None	None		Min	Min		Min	Min	Min
Act Effct Green (s)	53.3	51.7		37.5	31.6			27.8			27.8	27.8
Actuated g/C Ratio	0.59	0.57		0.41	0.35			0.31			0.31	0.31
v/c Ratio	0.60	0.44		0.00	0.85			0.01			0.79	0.17
Control Delay	18.8	15.0		12.0	41.7			25.0			44.3	6.7
Queue Delay	0.0	0.2		0.0	0.0			0.0			0.0	0.0
Total Delay	18.8	15.2		12.0	41.7			25.0			44.3	6.7
LOS	B	B		B	D			C			D	A
Approach Delay		16.5			41.6			25.0			36.1	

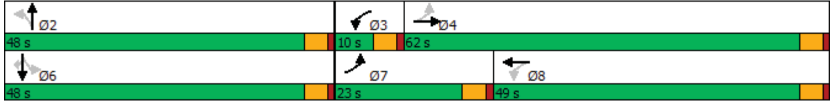
4: N 8th Avenue/10th Avenue NE & NE Lincoln Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			D			C			D	
Queue Length 50th (ft)	71	135		0	285			0			186	1
Queue Length 95th (ft)	189	349		3	516			4			337	37
Internal Link Dist (ft)		480			1972			300			1291	
Turn Bay Length (ft)	105			105								55
Base Capacity (vph)	514	1312		442	977			319			742	880
Starvation Cap Reductn	0	274		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.54	0.46		0.00	0.56			0.00			0.47	0.11

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 90.8
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 29.4 Intersection LOS: C
Intersection Capacity Utilization 69.5% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 4: N 8th Avenue/10th Avenue NE & NE Lincoln Road



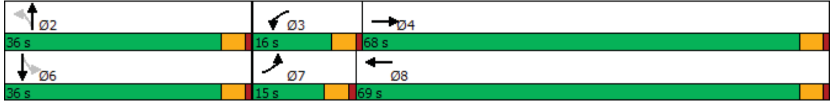
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Traffic Volume (vph)	65	465	191	62	275	34	173	101	63	55	61	38
Future Volume (vph)	65	465	191	62	275	34	173	101	63	55	61	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	90		0	95		0	125		0	105		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99			1.00		0.99	0.99		0.99	0.99	
Frt		0.956			0.984			0.943			0.942	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1805	0	1805	1865	0	1805	1767	0	1805	1768	0
Flt Permitted	0.950			0.950			0.684			0.555		
Satd. Flow (perm)	1801	1805	0	1805	1865	0	1289	1767	0	1043	1768	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			8			25			26	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2052			1092			1255			2391	
Travel Time (s)		46.6			24.8			28.5			54.3	
Confl. Peds. (#/hr)	1					1	3		5	5		3
Confl. Bikes (#/hr)			2									1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	75	754	0	71	355	0	199	188	0	63	114	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Detector Phase	7	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	15.0	68.0		16.0	69.0		36.0	36.0		36.0	36.0	
Total Split (%)	12.5%	56.7%		13.3%	57.5%		30.0%	30.0%		30.0%	30.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)	9.4	41.2		9.6	41.4		20.3	20.3		20.3	20.3	
Actuated g/C Ratio	0.11	0.50		0.12	0.50		0.25	0.25		0.25	0.25	
v/c Ratio	0.36	0.82		0.34	0.38		0.63	0.41		0.25	0.25	
Control Delay	49.2	27.3		48.0	14.8		43.0	30.3		33.8	26.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	49.2	27.3		48.0	14.8		43.0	30.3		33.8	26.1	
LOS	D	C		D	B		D	C		C	C	
Approach Delay		29.3			20.4			36.8			28.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			C			D			C	
Queue Length 50th (ft)	37	313		35	108		95	72		27	37	
Queue Length 95th (ft)	103	571		98	204		209	165		76	99	
Internal Link Dist (ft)		1972			1012			1175			2311	
Turn Bay Length (ft)	90			95			125			105		
Base Capacity (vph)	274	1385		301	1443		589	821		476	822	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.27	0.54		0.24	0.25		0.34	0.23		0.13	0.14	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 82.5
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 28.8 Intersection LOS: C
Intersection Capacity Utilization 71.4% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 5: Caldart Avenue NE & NE Lincoln Road



Calavista (GTC #19-081) 2027 Future with Development Conditions - With Laurie Connection

5: Caldart Avenue NE & NE Lincoln Road

PM Peak-Hour

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Traffic Volume (vph)	65	465	191	62	275	29	173	101	63	52	61	38
Future Volume (vph)	65	465	191	62	275	29	173	101	63	52	61	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	90		0	95		0	125		0	105		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99			1.00		0.99	0.99		0.99	0.99	
Frt		0.956			0.986			0.943			0.942	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1805	0	1805	1869	0	1805	1767	0	1805	1768	0
Flt Permitted	0.950			0.950			0.684			0.554		
Satd. Flow (perm)	1801	1805	0	1805	1869	0	1289	1767	0	1041	1768	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			7			25			26	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2052			1092			1255			2391	
Travel Time (s)		46.6			24.8			28.5			54.3	
Confl. Peds. (#/hr)	1					1	3		5	5		3
Confl. Bikes (#/hr)			2									1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	75	754	0	71	349	0	199	188	0	60	114	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Detector Phase	7	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	15.0	68.0		16.0	69.0		36.0	36.0		36.0	36.0	
Total Split (%)	12.5%	56.7%		13.3%	57.5%		30.0%	30.0%		30.0%	30.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)	9.4	41.1		9.6	41.2		20.1	20.1		20.1	20.1	
Actuated g/C Ratio	0.11	0.50		0.12	0.50		0.24	0.24		0.24	0.24	
v/c Ratio	0.36	0.82		0.34	0.37		0.63	0.42		0.24	0.25	
Control Delay	48.8	27.2		47.7	14.7		43.2	30.3		33.6	26.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	48.8	27.2		47.7	14.7		43.2	30.3		33.6	26.1	
LOS	D	C		D	B		D	C		C	C	
Approach Delay		29.1			20.3			36.9			28.7	

Calavista (GTC #19-081) 2027 Future with Development Conditions - With Laurie Connection

5: Caldart Avenue NE & NE Lincoln Road

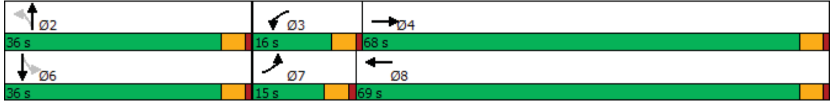
PM Peak-Hour

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			C			D			C	
Queue Length 50th (ft)	37	311		35	105		94	72		25	37	
Queue Length 95th (ft)	103	571		98	200		209	165		73	99	
Internal Link Dist (ft)		1972			1012			1175			2311	
Turn Bay Length (ft)	90			95			125			105		
Base Capacity (vph)	276	1415		302	1452		592	825		478	826	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.27	0.53		0.24	0.24		0.34	0.23		0.13	0.14	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 82.1
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 28.7 Intersection LOS: C
Intersection Capacity Utilization 71.4% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 5: Caldart Avenue NE & NE Lincoln Road



2: 10th Avenue NE/Little Valley Road NE & Forest Rock Lane NE

Intersection	
Intersection Delay, s/veh	23.9
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱			✥		↰	↱	
Traffic Vol, veh/h	67	261	154	23	213	34	201	60	35	19	27	46
Future Vol, veh/h	67	261	154	23	213	34	201	60	35	19	27	46
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	74	287	169	25	234	37	221	66	38	21	30	51
Number of Lanes	1	1	0	1	1	0	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	30	17.1	23.8	11.9
HCM LOS	D	C	C	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	68%	100%	0%	100%	0%	100%	0%
Vol Thru, %	20%	0%	63%	0%	86%	0%	37%
Vol Right, %	12%	0%	37%	0%	14%	0%	63%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	296	67	415	23	247	19	73
LT Vol	201	67	0	23	0	19	0
Through Vol	60	0	261	0	213	0	27
RT Vol	35	0	154	0	34	0	46
Lane Flow Rate	325	74	456	25	271	21	80
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.664	0.149	0.825	0.054	0.533	0.049	0.168
Departure Headway (Hd)	7.351	7.288	6.511	7.68	7.067	8.524	7.553
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	491	492	556	466	510	419	473
Service Time	5.406	5.039	4.262	5.439	4.826	6.301	5.329
HCM Lane V/C Ratio	0.662	0.15	0.82	0.054	0.531	0.05	0.169
HCM Control Delay	23.8	11.3	33	10.9	17.7	11.7	11.9
HCM Lane LOS	C	B	D	B	C	B	B
HCM 95th-tile Q	4.8	0.5	8.3	0.2	3.1	0.2	0.6

Calavista (GTC #19-081) 2027 Future with Development Conditions - Alternatives

2: 10th Avenue NE/Little Valley Road NE & Forest Rock Lane NE PM Peak-Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱			✥		↰	↱	
Traffic Volume (vph)	67	261	154	23	213	34	201	60	35	19	27	46
Future Volume (vph)	67	261	154	23	213	34	201	60	35	19	27	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		0	50		0	0		0	60		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99										
Frt		0.944			0.980			0.984			0.906	
Flt Protected	0.950			0.950				0.967		0.950		
Satd. Flow (prot)	1787	1762	0	1787	1844	0	0	1790	0	1787	1704	0
Flt Permitted	0.582			0.375				0.746		0.606		
Satd. Flow (perm)	1095	1762	0	705	1844	0	0	1381	0	1140	1704	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33			9			7			51	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		283			520			710			627	
Travel Time (s)		6.4			11.8			16.1			14.3	
Confl. Bikes (#/hr)			1									
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	74	456	0	25	271	0	0	325	0	21	81	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	60.0	60.0		60.0	60.0		60.0	60.0		60.0	60.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)	19.1	19.1		19.1	19.1			18.3		18.3	18.3	
Actuated g/C Ratio	0.40	0.40		0.40	0.40			0.39		0.39	0.39	
v/c Ratio	0.17	0.62		0.09	0.36			0.60		0.05	0.12	
Control Delay	11.3	15.4		11.2	11.8			17.8		11.0	6.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay	11.3	15.4		11.2	11.8			17.8		11.0	6.2	
LOS	B	B		B	B			B		B	A	
Approach Delay		14.9			11.8			17.8			7.2	
Approach LOS		B			B			B			A	

Calavista (GTC #19-081) 2027 Future with Development Conditions - Alternatives

2: 10th Avenue NE/Little Valley Road NE & Forest Rock Lane NE PM Peak-Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	11	79		4	43			62		3	5	
Queue Length 95th (ft)	43	217		20	123			176		17	30	
Internal Link Dist (ft)		203			440			630			547	
Turn Bay Length (ft)	50			50						60		
Base Capacity (vph)	1047	1686		674	1763			1320		1090	1631	
Starvation Cap Reductn	0	122		0	0			0		0	0	
Spillback Cap Reductn	0	0		0	0			0		0	0	
Storage Cap Reductn	0	0		0	0			0		0	0	
Reduced v/c Ratio	0.07	0.29		0.04	0.15			0.25		0.02	0.05	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 47.3

Natural Cycle: 45

Control Type: Actuated-Uncoordinated

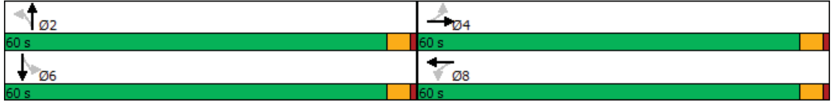
Maximum v/c Ratio: 0.62

Intersection Signal Delay: 14.3 Intersection LOS: B

Intersection Capacity Utilization 61.6% ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 2: 10th Avenue NE/Little Valley Road NE & Forest Rock Lane NE



Collision Data

PRIMARY TRAFFICWAY	INTERSECTING TRAFFICWAY/ REFERENCE POINT NAME	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	MILEPOST	REPORT NUMBER	DATE	TIME	# INJ	# FAT	# VEH	# PEDS	# BIKES	JUNCTION RELATIONSHIP	FIRST COLLISION TYPE / OBJECT STRUCK
10TH AVE NE	NE LINCOLN RD	21	F	N		E875172	2018-12-20	16:55	0	0	2	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - both moving - sideswipe
NE LINCOLN RD	10TH AVE NE	0				E539510	2016-05-02	15:00	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - both moving - rear-end
NE LINCOLN RD	10TH AVE NE	0				E532478	2016-04-08	17:45	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
NE LINCOLN RD	10TH AVE NE	0				E578378	2016-08-25	09:36	1	0	2	0	0	At Intersection and Related	Entering at angle
NE LINCOLN RD	10TH AVE NE	0				E575647	2016-08-19	06:45	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
NE LINCOLN RD	10TH AVE NE	0				E630060	2017-01-09	06:29	1	0	4	0	0	At Intersection and Related	Vehicle overturned
NE LINCOLN RD	10TH AVE NE	0				E637648	2017-01-26	13:56	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
NE LINCOLN RD	10TH AVE NE	0				E870960	2018-12-11	11:10	0	0	2	0	0	At Intersection and Related	Entering at angle
NE LINCOLN RD	10TH AVE NE	61	F	E		E871785	2018-12-13	11:05	0	0	2	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - one stopped - rear-end
NE LINCOLN RD	10TH AVE NE	106	F	E		E527954	2016-03-21	17:30	1	0	2	0	0	Not at Intersection and Not Related	From same direction - both going straight - one stopped - rear-end
NE LINCOLN RD	10TH AVE NE	100	F	W		E593612	2016-09-23	07:01	0	0	2	0	0	At Driveway	From same direction - one right turn - one straight
NE LINCOLN RD	10TH AVE NE	102	F	W		E637304	2017-01-31	15:57	0	0	2	0	0	Not at Intersection and Not Related	From same direction - both going straight - both moving - rear-end
NE LINCOLN RD	CALDART AVE NE	0				E872204	2018-12-14	18:05	1	0	1	1	0	At Intersection and Related	Vehicle going straight hits pedestrian
NE LINCOLN RD	CALDART AVE NE	188	F	NE		E846235	2018-10-05	7:55	0	0	2	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - both moving - sideswipe
NE LINCOLN RD	CALDART AVE NE	148	F	E		E743618	2017-12-05	15:13	0	0	2	0	0	Not at Intersection and Not Related	From same direction - both going straight - one stopped - rear-end
CALDART AVE NE	NE LINCOLN RD	0				E537362	2016-04-25	09:08	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
CALDART AVE NE	NE LINCOLN RD	0				E572439	2016-07-29	11:50	1	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
CALDART AVE NE	NE LINCOLN RD	0				E617383	2016-12-07	14:40	0	0	2	0	0	At Intersection and Related	Entering at angle
NE FOREST ROCK LN	10TH AVE NE	0				E610332	2016-11-16	10:18	0	0	2	0	0	At Intersection and Related	Entering at angle
NE FOREST ROCK LN	10TH AVE NE	0				E580449	2016-09-02	14:05	0	0	2	0	0	At Intersection and Related	Entering at angle
NE FOREST ROCK LN	10TH AVE NE	0				E755910	2017-12-18	17:44	0	0	2	0	0	At Intersection and Related	Entering at angle
NE FOREST ROCK LN	10TH AVE NE	0				E723640	2017-09-22	14:02	1	0	2	0	0	At Intersection and Related	Entering at angle
NE FOREST ROCK LN	10TH AVE NE	0				E778064	2018-02-02	15:03	0	0	2	0	0	At Intersection and Related	Entering at angle
305	NE FOREST ROCK LN	0			12.32	E866808	2018-11-29	17:25	0	0	3	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - one stopped - rear-end
305	NE FOREST ROCK LN	0			12.33	E731110	2017-10-21	16:50	1	0	2	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - one stopped - rear-end
305	NE FOREST ROCK LN	0			12.36	E637650	2017-01-23	15:00	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - both moving - sideswipe
305	NE FOREST ROCK LN	0			12.36	E551037	2016-06-02	17:28	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - sideswipe
305	NE FOREST ROCK LN	0			12.36	E578377	2016-08-14	15:17	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
305	NE FOREST ROCK LN	0			12.36	E514982	2016-02-10	11:02	0	0	2	0	0	At Intersection and Related	Entering at angle
305	NE FOREST ROCK LN	0			12.36	E516307	2016-02-09	14:21	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - sideswipe
305	NE FOREST ROCK LN	0			12.36	E547079	2016-05-24	16:09	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
305	NE FOREST ROCK LN	0			12.36	E613230	2016-11-21	19:12	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
305	NE FOREST ROCK LN	0			12.36	E679180	2017-06-08	07:00	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
305	NE FOREST ROCK LN	0			12.36	E729944	2017-10-31	18:45	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
305	NE FOREST ROCK LN	0			12.36	E831654	2018-08-16	16:59	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - rear-end
305	NE FOREST ROCK LN	0			12.36	E814553	2018-06-25	16:56	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
305	NE FOREST ROCK LN	0			12.36	E843989	2018-09-26	15:10	0	0	2	0	0	At Intersection and Related	Entering at angle
305	NE FOREST ROCK LN	0			12.36	E778067	2018-01-24	19:38	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
305	NE FOREST ROCK LN	0			12.37	E813943	2018-07-01	1:58	0	0	1	0	0	At Intersection and Not Related	Linear Curb
305	NE FOREST ROCK LN	0			12.38	E869151	2018-12-05	13:15	0	0	2	0	0	At Intersection and Related	Entering at angle
305	NE FOREST ROCK LN	0			12.38	E762730	2018-01-21	23:30	0	0	1	0	0	Not at Intersection and Not Related	Concrete Barrier/Jersey Barrier - Face
305	NE FOREST ROCK LN	0			12.4	E805284	2018-06-04	12:27	0	0	2	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - both moving - rear-end
305	NE FOREST ROCK LN	0			12.40	E637649	2017-01-22	14:20	1	0	2	0	0	Not at Intersection and Not Related	From same direction - both going straight - both moving - sideswipe
305	NE FOREST ROCK LN	0			12.42	E723624	2017-10-13	12:09	0	0	2	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - one stopped - rear-end
305	NE FOREST ROCK LN	0			12.43	E655748	2017-03-10	07:19	0	0	2	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - both moving - rear-end
IVERSON RD	305	114	F	SW		E877362	2018-12-20	14:36	0	0	2	0	0	Intersection Related but Not at Intersection	Entering at angle
305	NE LINCOLN RD	0			11.62	E860404	2018-11-13	18:12	2	0	2	0	0	Not at Intersection and Not Related	From same direction - both going straight - both moving - sideswipe
305	NE LINCOLN RD	0			11.63	E648657	2017-03-02	18:18	1	0	3	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - both moving - rear-end
305	NE LINCOLN RD	0			11.64	E677775	2017-05-17	18:02	0	0	2	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - both moving - sideswipe
305	NE LINCOLN RD	0			11.67	E509998	2016-01-27	07:59	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - one stopped - rear-end
305	NE LINCOLN RD	0			11.67	E802552	2018-05-27	22:25	0	0	1	0	0	At Intersection and Not Related	Signal Pole
305	NE LINCOLN RD	0			11.67	E545874	2016-05-18	12:59	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - rear-end

PRIMARY TRAFFICWAY	INTERSECTING TRAFFICWAY/ REFERENCE POINT NAME	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	MILEPOST	REPORT NUMBER	DATE	TIME	# INJ	# FAT	# VEH	# PEDS	# BIKES	JUNCTION RELATIONSHIP	FIRST COLLISION TYPE / OBJECT STRUCK
305	NE LINCOLN RD	0			11.67	E612239	2016-11-19	08:00	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - rear-end
305	NE LINCOLN RD	0			11.67	E574426	2016-08-15	16:05	1	0	4	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
305	NE LINCOLN RD	0			11.67	E505323	2016-01-12	07:35	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - sideswipe
305	NE LINCOLN RD	0			11.67	E559158	2016-06-29	12:54	0	0	2	0	0	At Intersection and Related	Entering at angle
305	NE LINCOLN RD	0			11.67	E609984	2016-11-18	12:58	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
305	NE LINCOLN RD	0			11.67	E572436	2016-08-07	15:49	0	0	2	0	0	At Intersection and Related	Entering at angle
305	NE LINCOLN RD	0			11.67	E738580	2017-11-05	21:09	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
305	NE LINCOLN RD	0			11.67	E778057	2018-03-11	16:48	1	0	1	0	1	At Intersection and Related	Vehicle Strikes Pedalcyclist
305	NE LINCOLN RD	0			11.68	E688272	2017-07-03	23:52	0	0	2	0	0	Not at Intersection and Not Related	From same direction - both going straight - both moving - rear-end
305	NE LINCOLN RD	0			11.69	E644953	2017-02-18	14:38	1	0	2	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - one stopped - rear-end
305	NE LINCOLN RD	0			11.70	E712552	2017-09-17	13:22	0	0	2	0	0	Intersection Related but Not at Intersection	Entering at angle

Note: Not at intersection and not related.

Washington State Department of Transportation

1889

2011 Washington State Collision Data Summary

Olympic Region

2011 AVERAGE COLLISION RATES BY FUNCTIONAL CLASS
Olympic Region (State Routes only)

RURAL AREAS	PRINCIPAL ARTERIAL	MINOR ARTERIAL	COLLECTOR	INTERSTATE	ALL HIGHWAYS
Vehicle Miles of Travel (Millions)	1,140.51	371.66	127.49	399.54	2,039.20
Miles of Highway	414.20	178.47	192.00	16.07	800.74
Total Collisions	1,051	584	194	177	2,006
Collision Rate (1)	**0.92**	**1.57**	**1.52**	**0.44**	**0.98**
Property Damage Only Collisions	670	352	110	130	1,262
Property Damage Only Collision Rate (1)	**0.59**	**0.95**	**0.86**	**0.33**	**0.62**
Injury Collisions	374	223	80	46	723
Injury Collision Rate (1)	**0.33**	**0.60**	**0.63**	**0.12**	**0.35**
Fatal Collisions	7	9	4	1	21
Fatal Collision Rate (2)	**0.61**	**2.42**	**3.14**	**0.25**	**1.03**

URBAN AREAS	PRINCIPAL ARTERIAL	MINOR ARTERIAL	COLLECTOR	INTERSTATE	ALL HIGHWAYS
Vehicle Miles of Travel (Millions)	2,491.59	248.84	0.00	1,761.96	4,502.39
Miles of Highway	204.71	60.66	0.00	39.41	304.78
Total Collisions	4,536	522	0	2,597	7,655
Collision Rate (1)	**1.82**	**2.10**	**0.00**	**1.47**	**1.70**
Property Damage Only Collisions	3,032	320	0	1,794	5,146
Property Damage Only Collision Rate (1)	**1.22**	**1.29**	**0.00**	**1.02**	**1.14**
Injury Collisions	1,493	201	0	796	2,490
Injury Collision Rate (1)	**0.60**	**0.81**	**0.00**	**0.45**	**0.55**
Fatal Collisions	11	1	0	7	19
Fatal Collision Rate (2)	**0.44**	**0.40**	**0.00**	**0.40**	**0.42**

ALL AREAS	PRINCIPAL ARTERIAL	MINOR ARTERIAL	COLLECTOR	INTERSTATE	ALL HIGHWAYS
Vehicle Miles of Travel (Millions)	3,632.10	620.50	127.49	2,161.50	6,541.59
Miles of Highway	618.91	239.13	192.00	55.48	1,105.52
Total Collisions	5,587	1,106	194	2,774	9,661
Collision Rate (1)	**1.54**	**1.78**	**1.52**	**1.28**	**1.48**
Property Damage Only Collisions	3,702	672	110	1,924	6,408
Property Damage Only Collision Rate (1)	**1.02**	**1.08**	**0.86**	**0.89**	**0.98**
Injury Collisions	1,867	424	80	842	3,213
Injury Collision Rate (1)	**0.51**	**0.68**	**0.63**	**0.39**	**0.49**
Fatal Collisions	18	10	4	8	40
Fatal Collision Rate (2)	**0.50**	**1.61**	**3.14**	**0.37**	**0.61**

(1) Per Million Vehicle Miles of Travel
(2) Per 100 Million Vehicle Miles of Travel

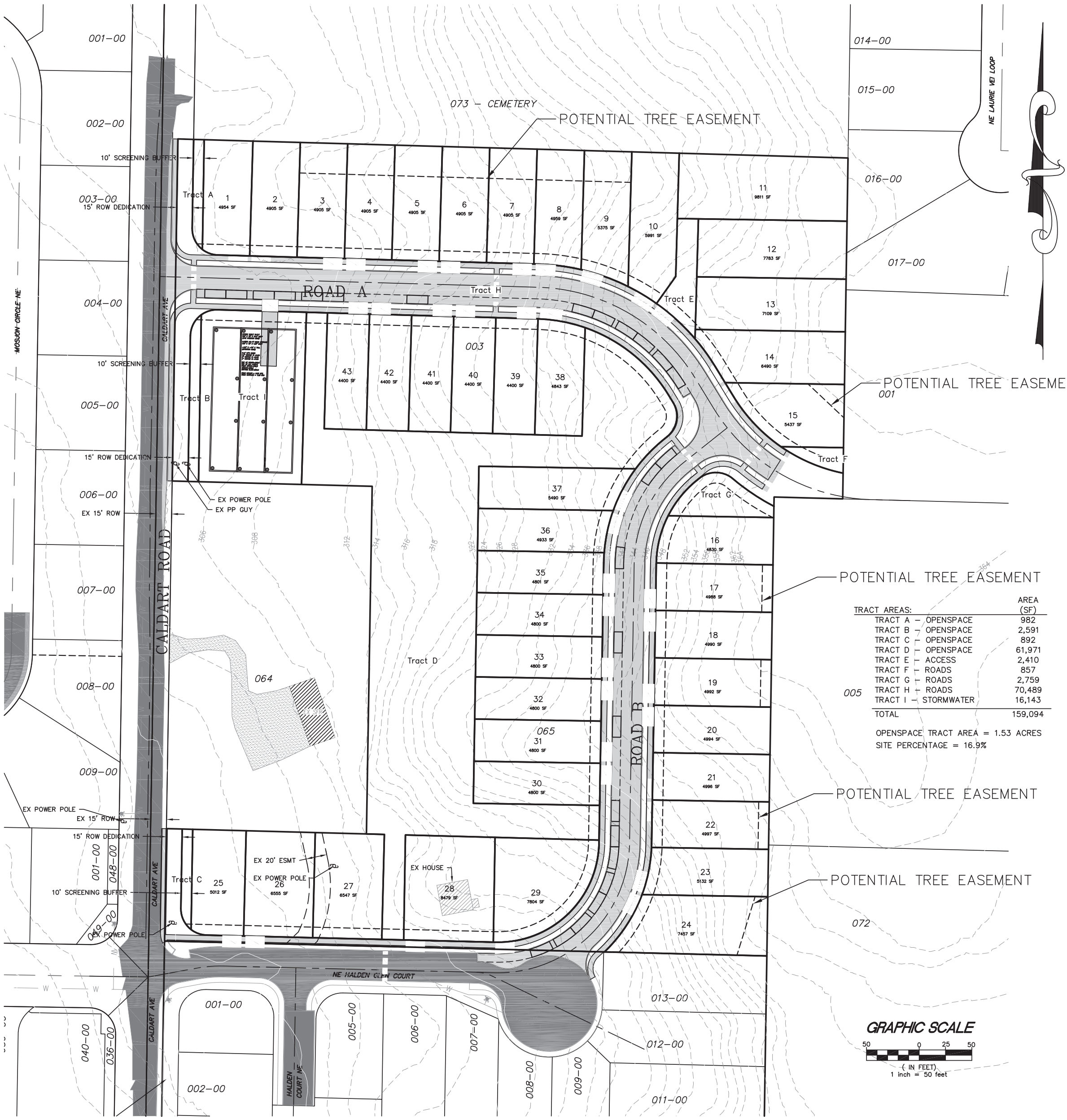
Site Plan

D

D - 1

CALAVISTA – PRD

SITE PLAN



TRACT AREAS:	AREA (SF)
TRACT A – OPENSPACE	982
TRACT B – OPENSPACE	2,591
TRACT C – OPENSPACE	892
TRACT D – OPENSPACE	61,971
TRACT E – ACCESS	2,410
TRACT F – ROADS	857
TRACT G – ROADS	2,759
TRACT H – ROADS	70,489
TRACT I – STORMWATER	16,143
TOTAL	159,094

OPENSPACE TRACT AREA = 1.53 ACRES

SITE PERCENTAGE = 16.9%

ADJACENT PROPERTY OWNERS:

132601–3–073–2006
POULSBO CEMETERY

5191–000–016–0000
SLADE RICHARD A
& JUTHAMAS
1951 NE LAURIE VEI LOOP
POULSBO WA 98370

5191–000–017–0009
FLEMING SANDRA L
1957 NE LAURIE VEI LOOP
POULSBO WA 98370 8580

132601–3–001–2003
SVARDH MICHAEL L
& JOAN Y
PO BOX 350
HANSVILLE WA 98340

132601–3–005–2009
HUNTER BOBBY G
PO BOX 387
POULSBO WA 98370

132601–3–072–2007
TLC INVESTMENTS
PO BOX 986
POULSBO WA 98370

5631–000–013–0001
GREENE MEGAN
1670 NE HALDEN GLEN CT
POULSBO WA 98370

5631–000–012–0002
BREITMAYER ALEX
& SHELBURNE JENNIFER
1664 NE HALDEN GLEN CT
POULSBO WA 98370

5631–000–009–0007
KRENZELOK RICHARD
& SABRINA
1646 HALDEN GLEN CT NE
POULSBO WA 98370

5631–000–008–0008
BARTHA MICHAEL
1640 NE HALDEN GLEN CT
POULSBO WA 98370 5601

5631–000–007–0009
ROESLER NATHANIEL K
& AURORA G
1634 NE HALDEN GLEN CT
POULSBO WA 98370

5631–000–006–0000
BYE TORRE HOWARD D
& JOHN G
1628 NE HALDEN GLEN CT
POULSBO WA 98370

5631–000–005–0001
ANDERSON ROMAN
1622 NE HALDEN GLEN CT
POULSBO WA 98370

5631–000–001–0005
SURLES SCOTT N
& CHELSEA L
19619 HALDEN CT NE
POULSBO WA 98370 5503

4246–000–002–0004
MOSJON MANOR LLC
PO BOX 4508
ROLLING BAY WA 98061

4246–000–003–0003
HERRON STEPHEN M
19880 MOSJON CIRCLE NE
POULSBO WA 98370

4246–000–004–0002
NELSON HENRY K
& MARGARET J TRUSTEES
2402 E INIDAN PINK CIR
PAYSON AZ 85541 4184

4246–000–005–0001
CORRY MICHAEL & NICOLE
19830 MOSJON CIR NE
POULSBO WA 98370 8597

4246–000–006–0000
RICKE MICHAEL
19800 MOSJON CIR NE
POULSBO WA 98370 8597

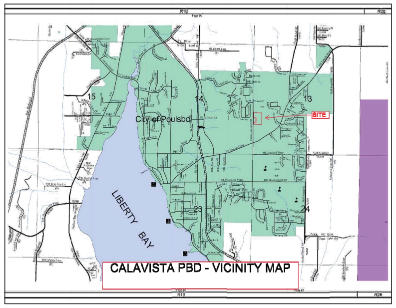
4246–000–007–0009
LAWSON KATHERINE M
19770 MOSJON CIRCLE NE
POULSBO WA 98370

4246–000–008–0008
MURPHY AARON D
& SARAH M
PO BOX 1088
POULSBO WA 98370 0057

4246–000–009–0007
KLEPPE WAYNE K
& SANDRA L
19730 MOSJON CIRCLE NE
POULSBO WA 98370

5498–000–001–0007
KELLN BRENT M
& SHAUNA L
1597 NE WATLAND ST
POULSBO WA 98370

132601–3–064–2007
RAMIREZ JOSE LUIS
& LARIOS SONIA RAMIERZ
23618 DUNBAR PL NW
POULSBO WA 98370



SITE DATA

LOCATION:	19700 & 19840 CALDART AVE NE POULSBO WA 98370
TAX PARCEL NOS.:	132601–3–065–2006 & 132601–3–003–2001
EXISTING ZONING:	URBAN LOW RESIDENTIAL (UL)
INTENDED USE:	42 LOTS – SINGLE FAMILY RESIDENTIAL

SITE AREAS:	AREA (ACRES)	% OF TOTAL
RESIDENTIAL	5.40	59.7
STORMWATER TRACT	0.37	4.1
OPENSPACE TRACTS	1.53	16.9
STREETS	1.76	19.4
TOTAL	9.05	100.0
DEVELOPED AREA		
PERVIOUS SURFACES	4.97	54.9
IMPERVIOUS SURFACES	4.08	45.1

OPEN SPACE NOTE: >10% OF THE SITE WILL BE SPECIFICALLY DEDICATED AND MAINTAINED IN OPEN SPACE TRACTS, AS WILL BE CREATED ON THE FACE OF THE FINAL PLAT.

OWNER OF RECORD & LEGAL DESCRIPTION:
CALDART POULSBO LLC
105 S MAIN ST, STE 230
SEATTLE, WA 98104
132601–3–065–2006
LOT B SHORT PLAT NO. 6570R–1 RECORDED IN VOLUME 13 PAGE 114 OF SHORT PLATS, AUDITOR'S FILE NO. 9603040054 BEING AN AMENDMENT OF VOLUME 11 PAGE 98 OF SHORT PLATS, AUDITOR'S FILE NO. 9409280108/0109. BEING A PORTION OF THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER, SECTION 13, TOWNSHIP 26 NORTH, RANGE 2 EAST, W.M., KITSAP COUNTY, WASHINGTON. TOGETHER WITH EASEMENTS AS DEPICTED ON THE SHORT PLAT.

CURTIS MICHAEL & WENDY FAMILY TRUST
PO BOX 685 KEYPORT WA 98345
132601–3–003–2001
S 323' OF NW 1/4 NW 1/4 SW 1/4 EXC W 15FT FOR CO RD

UTILITIES:
POWER: PUGET SOUND ENERGY SERVICES
WATER: CITY OF POULSBO
SEWER: CITY OF POULSBO
TELEPHONE: CENTURYLINK
REFUSE: CITY OF POULSBO
FIRE PROTECTION: KITSAP COUNTY FIRE DISTRICT #18

Sheet List Table

Sheet Number	Sheet Title
1	PREAPP – SITE PLAN
2	PREAPP – EXISTING TREE PLAN
3	PREAPP – TREE RETENTION PLAN
4	PREAPP – COMPREHENSIVE GRADING PLAN
5	PREAPP – ROAD A PROFILE
6	PREAPP – ROAD B PROFILE
7	PREAPP – ROADS C & D PROFILES
8	PREAPP – COMPREHENSIVE UTILITY PLAN
9	PREAPP – CALDART STORM PLAN & PROFILE
10	PREAPP – ROAD A STORM PROFILE
11	PREAPP – ROAD B STORM PROFILE
12	PREAPP – ROAD D & TRACTS D&E STORM PROFILES
13	PREAPP – STORM NORTH FACILITY
14	PREAPP – STORM SOUTH FACILITY
15	PREAPP – CALDART SEWER PLAN & PROFILE
16	PREAPP – ROAD A SEWER PROFILE
17	PREAPP – ROAD B SEWER PROFILE
18	PREAPP – ROAD D & TRACT D SEWER PROFILES
19	PREAPP – WATER PLAN
20	PREAPP – LOT DIMENSIONS

DESIGN	MAK
DRAWN	RDC
CHECKED	MAK
SEC	13 T 26N R 1E
DISC NO	DATE 8/15/2018
SCALE	AS NOTED

REV NO	REVISION DESCRIPTION	DATE	BY

MARK A. KUHLMAN
STATE OF WASHINGTON
18648
REGISTERED PROFESSIONAL ENGINEER

TITLE CALAVISTA – PRD
SITE PLAN

CLIENT
CALDART POULSBO LLC
C/O BARRY MARGOLESE
105 S. MAIN ST, SUITE 230
SEATTLE, WA 98104
(206) 910–2728

SIGNATURE:

PROJECT MANAGER: RON D CLEAVER JR

TEAM 4 ENGINEERING
5819 NE MINDER RD
POULSBO, WA. 98370
(360) 297–5560
(360) 297–7951 (FAX)

SHEET 1 OF 20

FILE NO 1222