CITY OF MONROE
RESOLUTION NO. 008/2019

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF MONROE, WASHINGTON, GRANTING THE RIVER'S EDGE SHORELINE VARIANCE (SLVR2018-01); ADOPTING THE HEARING EXAMINER'S FINDINGS OF FACT, CONCLUSIONS OF LAW, RECOMMENDATIONS, AND CONDITIONS OF APPROVAL; AND ESTABLISHING AN EFFECTIVE DATE

WHEREAS, Rebecca Ralston, on behalf of River's Edge, LLLP, submitted an application for a Shoreline Substantial Development Permit (SLDP2018-03) and Shoreline Variance (SLVR2018-01) for a 166-unit Affordable Housing Multi-Family Development in the DC (Downtown Commercial) Zoning District on approximately 9.6 acres located at 147 South Ann Street; and

WHEREAS, the property in question is within the City of Monroe Shoreline Jurisdiction and must comply with the policies and regulations established by the state Shoreline Management Act as expressed through the City of Monroe Shoreline Master Program (SMP); and

WHEREAS, per the City of Monroe Shoreline Master Plan Chapter 2(D), Site Development Standards, a setback/buffer reduction of the applicable two-hundred foot setback/buffer from the Ordinary High Water Mark (OHWM) requires approval of a shoreline variance; and

WHEREAS, Pursuant to MMC Section 19.01.120(B), the hearing examiner shall have the authority to hear and make findings, conclusions, and recommendations on shoreline variances. The City Council shall have authority to grant variances from the substantive requirements of this Shoreline Master Program. The City shall submit all issued variances to the Department of Ecology for final approval or disapproval; and

WHEREAS, the Hearing Examiner for the City of Monroe did hold a consolidated public hearing on March 21, 2019, regarding the River's Edge Shoreline Substantial Development Permit (SLDP2018-03) and Shoreline Variance (SLVR2018-01); and

WHEREAS, the Hearing Examiner, upon due consideration and through the development of Findings of Fact, Conclusions of Law, and Conditions of Approval ("Hearing Examiner's Recommendation"), recommended to the City Council on April 5, 2019, that the River's Edge Shoreline Variance (SLVR2018-01) be granted; and

WHEREAS, following a closed-record review proceeding on April 9, 2019, the City Council has considered the Hearing Examiner's Recommendation and has determined to adopt by reference the Findings of Fact, Conclusions of Law, and Conditions of Approval set forth therein, and on the basis of such findings and conclusions to grant the River's Edge Shoreline Variance (SLVR2018-01).

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF MONROE, WASHINGTON, HEREBY RESOLVES AS FOLLOWS:

Section 1. Findings and Conclusions. As its findings and conclusions in support of its approval decision herein, the City Council hereby adopts and incorporates by reference the above recitals, the content of Agenda Bill No. 19-080, together with the findings and conclusions set forth in the Hearing Examiner's Recommendation dated April 5, 2019, attached hereto as Exhibit A. Anything contained in the above-referenced recitals, agenda bill and Hearing Examiner's Recommendation that could be construed as a finding is expressly adopted as such. Anything contained in the above-referenced recitals, agenda bill and Hearing Examiner's Recommendation that could be construed as a conclusion is expressly adopted as such.

Section 2. Variance Granted; Final Approval by Department of Ecology Required. Based upon the findings and conclusions adopted in Section 1, the City Council hereby GRANTS the River's Edge Shoreline Variance (SLVR2018) subject to the conditions of approval set forth in the Hearing Examiner's Recommendation. Provided, that in accordance with WAC 173-27-200 and MMC 19.01.120(B), this resolution shall be forwarded to the Department of Ecology for a final decision approving, approving with conditions or disapproving the variance granted herein.

Section 3. Limitation on Construction. In accordance with WAC 173-27-190(1), construction pursuant to the variance granted by this resolution shall not begin and is not authorized until 21 days from the date of filing as defined in RCW 90.58.140(6) and WAC 173-27-130, or until all review proceedings initiated within 21 days from the date of such filing have been terminated; except as provided in RCW 90.58.140(5)(a) and (b).

Section 4. Effective Date. This resolution shall take effect immediately upon passage.

ADOPTED by the City Council of the City of Monroe, at its regular meeting thereof, and APPROVED by the Mayor this 9th day of April, 2019.

CITY OF MONROE, WASHINGTON

(SEAL)

Geoffrey Thomas, Mayor

ATTEST:

Elizabeth M. Adkisson, MMC, City Clerk

BEFORE THE HEARING EXAMINER FOR THE CITY OF MONROE

Phil Olbrechts, Hearing Examiner

RE: River's Edge WA, LLLP Shoreline Substantial Development Permit and Shoreline Variance SLDP2018-03, SLVR2018-01	**FINDINGS OF FACT, CONCLUSIONS OF LAW AND FINAL DECISION ON SHORELINE SUBSTANTIAL DEVELOPMENT PERMIT AND RECOMMENDATION FOR CITY COUNCIL APPROVAL OF SHORELINE VARIANCE**

SUMMARY

The Applicant requests approval of a shoreline substantial development permit and shoreline variance to build a 166 unit affordable housing complex at 147 S Ann Street, adjacent to Al Borlin Park. The purpose of the shoreline variance is to build a significant portion of the project within the 200 foot shoreline buffer of Woods Creek. The shoreline variance is forwarded to the City Council with a recommendation for approval by the hearing examiner. The shoreline substantial development permit is approved by the examiner in this decision.

The hearings on the shoreline variance and shoreline substantial development permits was consolidated, but the decision making process was not otherwise consolidated. The staff report and the notice of application identified that the hearing examiner was making a final decision on the shoreline substantial development permit and the City Council was making the final decision on the shoreline variance. For this reason, the City Council only has jurisdiction over the shoreline variance application.

As outlined in the summary of testimony below, the proposal drew the concern of a couple residents, specifically, Mike and Dick Neuharth. Unfortunately, there concerns mostly beyond the scope of shoreline review. Shoreline permit review is focused upon impacts to the shoreline environment, such as fish habitat, shoreline aesthetics and access, and water quality. The Neuharth's concerns were focused upon homelessness in Al Borlin park and traffic. Traffic will be addressed by a traffic study during site plan review. Homelessness also is beyond the scope of shoreline review, at least to the extent of impacts disclosed by the Neuharths.

Judy Heydrick submitted a letter admitted as Ex. 24 that expressed skepticism that

ORAL TESTIMONY

Anita Marrero, City of Monroe, Senior Planner, summarized the staff report.

Rebecca Ralstron, Applicant representative, noted that the property has been used as an industrial site for decades and that there are known contaminants in the ground. There are historical disturbances to the project site already. The Applicant has been making a strong effort over the years to clean up the top of the site. The site was used for trucks, storage and other types of industrial uses. The site wasn't cleared in anticipation of development but rather cleaned up. There's no feasible development that could work within the shoreline setback because of the unusual shape of the property. Ms. Ralstron noted that some of the segregated areas outside the buffer could not be accessed under the City's access standards and also that the areas would at most accommodate one single family home. There also isn't enough critical mass to make any development outside the buffers feasible given the costs of clean up for the site.

Mike Neuharth, who owns Town and Country Tractor in Monroe, noted that Monroe has a serious homeless problem. People are camping at his building. The Al Borlin park has a lot of homeless people in it. The low income housing project is going to be built right next to it. Low income housing typically draws people who can't pay their bills. Poor people have poor ways and poor ways is drugs. The police department is stretched. He knows they are because when he called the police department to report a theft of a chainsaw, it took the police 45 minutes to respond after he said it wasn't an emergency but it could be. The police often come in to look at the video cam footage. 160 units is going to bring in kids with nothing to do using Al Borlin Park. The project site is also adding about 200 cars to Railroad Avenue. A stop light is going to have to be placed at the Fremont intersection if people start using that, which will cause a traffic jam. His company avoids scheduling any pick ups into Duvall after 3:00 pm because it can take an hour to get from Duvall to Monroe. The back up is 2.5 to 3.0 miles. As for tax revenue, industrial businesses will bring in far more than the affordable housing project at significantly less public expense for policing and traffic. There are ten camps in Al Borlin park. City employees go in every morning to pick up trash at the park.

Dick Neuharth, who owns Dick's Tire House, 320, started his business 50 years ago as a one man deal. He put his business by saw mills and other industrial uses because his business made noise. Now 50 years later he's being pushed off the map because of changes in leadership. Many things have changed over the years with changes in expertise and agenda of the city council. He concurs with what Mike Neuharth said. Traffic and homelessness are big issues. He owns half of Railroad Avenue. Railroad traffic impacts the vehicular traffic and that's not going to change. He spoke to someone who's daughter went to the park because of a flat tire and four guys started heading towards her. She rolled up her windows, locked her doors and called her dad to come and protect her. The Neuharths aren't up to leaving town and they're paying big taxes.

He can't fault the police department. He's had batteries stolen a few times. If each family has two cars in the project, there will be access and traffic problems.

Lauren Wibbelman, resident and owner of the project site, agrees there's a homeless problem. He feels the project will make it tougher for the homeless. The residents of the project will not be welfare people. It will be a high quality project for people that aren't drug users. This will clean up the park. He is always working on cleaning up the neighborhood and the City needs to get the homeless pushed out. Monroe doesn't fight or jail the homeless because the homeless don't have any money. The City does nothing about it. The City needs to be blamed. The City is not tough enough and people in the area are sick and tired of the problem. The project will help clear up the situation with people calling the police more.

In rebuttal, Ms. Marrero noted that traffic review will be done as part of site plan review of the project. Police response will increase as a result of the project. The City will require traffic mitigation as part of site plan review that will ensure that adopted levels of service are maintained.

In rebuttal, Ms.Ralstron noted that there are numerous studies that establish that having eyes on property is the single most effective way to deter homelessness and trespassing. Having the project with its families and individuals will eradicate the homelessness problem. Low income is not synonymous with affordable housing. Low income is attainable housing. The affordable housing is targeted at family incomes of approximately $68,000. There are heavy compliance rules applicable to the project that require the residents to have jobs and this is monitored yearly, unlike most other multi-housing projects in Monroe. About 85% of the residential population in Monroe would qualify for the income levels of the project. So, the people of the project will be the people of Monroe. They will be people who will have an opportunity to live in high quality housing. A traffic study is currently being done. The master plan for the area contemplates a vibrant mixed use environment. The affordable housing project will generate far less traffic than most of the other uses envisioned in the master plan.

EXHIBITS

Exhibits 1-21 identified in the "Hearing Examiner Exhibit List" was entered into the record during the hearing. The staff PowerPoint was admitted as Exhibit 22. A March 19, 2019 letter from PUD was admitted as Ex. 23. A letter from Judy Heydrick was admitted as Ex. 24. The Applicant's PowerPoint was admitted as Ex. 25.

FINDINGS OF FACT

Procedural:

1. Applicant. The Applicant is River's Edge WA, LLLP, c/o Rebecca Ralston, 909 5th Avenue #2401. Seattle, WA 98164

2. Hearing. The examiner held a hearing on March 21, 2019 at the Monroe City Hall in the Council Chambers.

Substantive:

3. Site Proposal/Description. The Applicant requests approval of a shoreline substantial development permit and shoreline variance to build a 166 unit affordable housing complex at 147 S Ann Street, adjacent to Al Borlin Park. The purpose of the shoreline variance is to build a significant portion of the project within the 200 foot shoreline buffer of Woods Creek.

River's Edge is a proposed 166-unit multi-family affordable housing development. The project will be income restricted to residents earning no more than 60 percent of the area medium income for Snohomish County. The development will consist of 1, 2, and 3-bedroom units. The development is consistent with the City of Monroe's Downtown Master Plan's objective to revitalize the downtown core with private capital investment to support the development of new, residential and mixed-use projects. River's Edge will use high-quality exterior materials, including cementitious siding, and other sustainable building products. There is a great demand for new, clean, safe, environmentally friendly housing options in Monroe where 85% of the population will income qualify to live at River's Edge. The new development will have energy efficient features throughout, keeping utility bills very low for residents.

The Applicant proposes to demolish existing structures, identify and remove contaminants related to the legacy of industrial use, grade/prepare the site, and construct several multi-family buildings. The proposal includes five (5) new residential structures, access, parking, connection to existing utilities, and a stormwater plan. A compensatory mitigation plan has been designed to offset impacts to shorelines/critical areas resulting from the project.

A significant portion of the proposed development occurs within 200 feet of the OHWM of Woods Creek, which is the required setback for Woods Creek, pursuant to SMP Chapter 2, subsection D. Site Development Standards. The project requires a shoreline substantial development permit due to proposed development in the shoreline (200 feet from the OHWM of Woods Creek). The project requires a variance because development is proposed within the buffer/setback of Woods Creek.

The property consists of six (6) parcels totaling approximately 9.6 acres. The site is located adjacent to Woods Creek and contains several out-buildings. Historically, the property has been used as an industrial site with the current use being used for heavy machinery and commercial vehicle storage. (Exhibits 2, 4)

Wildlife habitat does not occur on the developed portion of the subject parcels. Moderate quality wildlife habitat occurs in the vegetated riparian corridor along the west bank of Woods Creek on the subject parcels. This riparian corridor contains

deciduous forest (big-leaf maple and black cottonwood) with an understory of Himalayan blackberry, sword fern, and sparse occurrences of native upland shrubs. This riparian corridor provides habitat for an assemblage of wildlife species.

Woods Creek is documented to contain many salmonid species. Bull trout, winter steelhead, and Fall Chinook are all federally ESA listed salmonid species with Designated Critical Habitat that are documented to be present or spawning in Woods Creek.

4. Characteristics of the Area. The subject parcels are surrounded by residential and undeveloped open space tracts. To the north and west are a mixture of commercial/industrial and residential parcels. No critical areas features were observed on neighboring parcels to the north and west that would affect the subject parcels with overlapping buffers. To the south and east of the subject parcels are Woods Creek and the City of Monroe's Al Borlin Park with direct connection to the Skykomish River.

Several of the nearby lots located in the shoreline jurisdiction are developed with single-family and multi-family residences. Approval of the variance would allow the Applicant to build a residential development which would not be a special privilege compared with other nearby lots.

5. Adverse Impacts. As conditioned, there are no significant adverse shoreline environmental impacts associated with the proposal. Pertinent impacts are addressed as follows:

A. Critical Areas. With the exception of Woods Creek, there are no critical areas or buffers that will be encroached upon by the project.

B. Ecological Function. The project will not result in a net loss of ecological function and will in fact result in a significant improvement to ecological function. The proposed project will be constructed within the previously disturbed area of the subject property. No further disturbance into the shoreline setback is proposed. As noted by the Applicant, the site is currently used as a parking and storage area for commercial vehicles and equipment, which introduce a variety of toxicants to the ground surface (i.e. diesel, lubricants, hydraulic fluids, coolant, brake dust, metal shavings, and rubber). Stormwater generally flows east across the site as sheet flow, entering one of several natural low points and draining down a steep slope through approximately 30 to 50 feet of native vegetation before meeting Woods Creek. This means that untreated stormwater draining from pollution-generating surfaces flows directly (without detention) to a highly ecologically productive reach of Woods Creek.

The proposed residential use will result in the removal of industrial waste and contaminants from the site, the control of invasive species on the hillslope, and will restore a portion of the historically disturbed gravel area. Significantly, it will also provide a stormwater plan that complies with the current Ecology stormwater manual. The plan routes stormwater from pollution-generating surfaces (parking areas) to an infiltration vault, where it will be tied into the existing stormwater drainage system.

Extensive shoreline mitigation will be imposed as a result of the proposal. The proposal includes removal of approximately 1,900 cubic yards (~19,600 square feet in area) of contaminated soil, removal of invasive species along the hillslope located between the historically disturbed area and the OHWM of Woods Creek, restoration of 14,737 square feet of gravel within the historically disturbed area, installation of a split-rail fence, and a stormwater plan that significantly improves water quality relative to the existing condition.

Enhancement of the hillslope includes removal of industrial waste, control of invasive species, and re-planting with native vegetation throughout an approximately 55,388 square-foot area. Restoration of the historically disturbed area includes gravel removal, decompaction, and installation of native plants within a 14,737 square-foot area at the top of the hillslope. The proposed split-rail fence will be installed along the entire perimeter of the hillslope, and will also encompass the 14,737 square-foot restoration area located at the top of the hillslope. Clean-up of contaminants in the historically disturbed portion of the site will be based on recommendations made in the Excavated Materials Management Plan (EMMP) prepared for this project by Landau Associates.

Ms. Heydrick raised concerns about water quality in her letter, Ex. 24. She is skeptical that the remediation of the project site will successfully remove all contaminants and apparently that inadequate remediation would adversely affect water quality and human habitation. However, remediation is subject to Department of Ecology review and approval and has already been subject to a detailed Phase II Environmental Site Assessment. Given that the Department of Ecology will assure conformance to state remediation standards, it is determined that water quality will no be adversely affected by the Applicant's remediation efforts.

Due to the fact that the proposal will not create newly disturbed areas, that it will significantly improve upon the water quality impacts of existing disturbed areas and that it will involve an extensive amount of shoreline restoration, the project clearly will improve upon existing ecological function and will not result in a net loss of ecological function and values.

C. Aesthetics/Views. According to the application materials, no alterations to visual access are proposed on shoreline street ends, public utilities, or rights-of-way. There is no evidence to the contrary. The proposed apartments will enable more people to enjoy shoreline views over the current industrial use of the property. As to shoreline aesthetics, the project elevations show a high quality residential development that would generally be considered to have much better aesthetics than the historical industrial use and storage of the site.

D. Public Access/Navigation. The proposal is on private property and does not block or hinder public access to the shorelines.

E. Compatibility. The proposed development is consistent with the Downtown Master Plan and is compatible with current residential and mixed-use development in the surrounding East Downtown Neighborhood. The project will also be compatible with future re-development projects. The location of the proposed residential development is within an existing residential area.

6. Necessity to build within shoreline buffer/Minimum Use. The subject properties total 7.17 acres, with 5.07 acres located within 200 feet of Woods Creek. This leaves an irregularly-shaped 2.1 developable acres outside of the setback. According to uncontested assertions made by the Applicant, there is no feasible re-development of the property that would be consistent with the City of Monroe Downtown Master Plan if the 200' setback were strictly enforced. The Applicant further asserts that there is a certain critical mass of development that must be established in order to support the high-cost of cleaning up the site, which simply could not be borne by a developer if the buffer were fully enforced, and thus any future project would be rendered infeasible. In the absence of any disagreement from staff on this issue or any other countervailing evidence, given the past industrial use of the property that necessitates clean up and the properties irregular shape, it is concluded that the Applicant's proposal is a minimum feasible use for the property and that the variance is necessary to achieve that minimum use.

CONCLUSIONS OF LAW

Procedural:

1. Authority of Hearing Examiner. Monroe Municipal Code (MMC) Section 21.50.120 authorizes the hearing examiner to make final decisions on shoreline substantial development permits and to make recommendations to the city council on shoreline variance applications.

Substantive:

2. Shoreline Designation. The project site is located within the City of Monroe's "High Intensity" and "Urban Conservancy" shoreline environmental designations.

3. Review Criteria and Application. Shoreline substantial development criteria are governed by MMC 19.01.110A and shoreline variance criteria are governed by MMC 19.01.120B. Applicable criteria are quoted below and applied via associated conclusions of law.

Shoreline Substantial Development Permit

MMC 19.01.110B: *A substantial development permit shall be granted only when the development proposed is consistent with:*

1. The policies and procedures of the Shoreline Management Act;

2. The provisions of this regulation; and

3. The approved Master Program.

4. SMA Policies/Procedures Met. The proposal is consistent with the policies of the SMA as it doesn't adversely affect public access or navigation, results in no net loss of shoreline ecological functions and values, doesn't adversely affect views or the natural character of the shoreline and overall significantly improves upon existing environmental impacts. The proposal is consistent with SMA procedures as staff has appropriately provided public notice of the project and the decision making process follows that required by the SMA for variances and shoreline substantial development permits.

5."this regulation" met. The term "this regulation" in the criterion quoted above is taken from WAC 173-27-150, which is the regulation that constitutes the review criteria of MMC 19.01.110B quoted above. The City's SMP has been approved as consistent with the requirements of Chapter 173-27 WAC and the proposal is consistent with all requirements of the SMP, therefore, the proposal is consistent with "this regulation."

6. SMP Met. The proposal is consistent with the City's SMP for the reasons identified in Finding of Fact 11(3) of the staff report, adopted by this reference as if set forth in full.

Shoreline Variance

MMC 19.01.120B1: *Variances should be granted in a circumstance where denial of the permit will not thwart the policy enumerated in the Shoreline Management Act or the Master Program. In all instances, extraordinary circumstances shall be shown, and the public interest shall suffer no substantial detrimental effect.*

7. As determined in COL No. 4, the proposal is consistent with the policies of the SMA.

MMC 19.01.120B2: *Variances for development that will be located landward of the ordinary high-water mark may be authorized, provided the Applicant can demonstrate all of the following:*

a. That the strict application of the bulk, dimensional, or performance standards as set forth in the Master Program precludes or significantly interferes with a reasonable permitted use of the property.

8. As determined in FOF No. 6, strict application of the buffer requirements would render development of any reasonable use of the property authorized by the applicable master plan infeasible.

MMC 19.01.120B2b: *That the hardship is specifically related to the property and is the result of unique conditions, such as irregular lot shape, size, or natural features, in the application of the Master Program and not, for example, from deed restrictions or the Applicant's own actions.*

9. The hardship is entirely caused by the Woods Creek shoreline buffer and the irregular shape of the property as identified in FOF No. 6.

MMC 19.01.120B2c: *That the design of the project will be compatible with other permitted activities in the area and not cause adverse effects to adjacent properties or the shoreline environment designation.*

10. As determined in FOF No. 5, the proposal will be compatible with surrounding development.

MMC 19.01.120B2d: *That the variance does not constitute a grant of special privilege not enjoyed by other properties in the area, and will be the minimum necessary to afford relief.*

11. As determined in FOF No. 4, the variance will enable the Applicant to building residential development in a manner similar to surrounding development and thus approval would not constitute a special privilege.

MMC 19.01.120B2e: *That the public interest will suffer no substantial detrimental effect.*

12. As determined in Finding of Fact No. 5, there are no significant adverse shoreline impacts associated with the proposal so the public will suffer no substantial detrimental effect. Traffic will increase, but as noted during the hearing traffic impacts will be addressed during site plan review. Although concerns were raised about homeless problems in nearby Al Borlin park, the evidence does not reasonably suggest that any public detriment would result from building the project near the park.

MMC 19.01.120B3: *Variances for development that will be located waterward of the ordinary high-water mark may be authorized, provided the Applicant can demonstrate all of the criteria specified above; and provided, that the Applicant can demonstrate that the public rights of navigation and use of the shorelines will not be adversely affected by the granting of the variance.*

13. The proposal is waterward of the ordinary high water mark and will have no impact on navigation or public use of the shoreline.

MMC 19.01.120B4: *In granting of all variances, consideration shall be given to the cumulative impact of additional requests or like actions in the area.*

14. Given the highly beneficial environmental impacts of the proposal, the cumulative impact of similar projects would not be significantly adverse.

DECISION

The shoreline substantial development application is approved subject to the conditions below because it complies with all applicable permitting criteria for the reasons identified in the COLs above. The shoreline variance application complies with all applicable shoreline variance criteria for the reasons identified above. It is recommended that the City Council approve the variance subject to the conditions below:

1. All improvements shall be constructed in accordance with the approved site plan with the date stamp of January 23, 2019. Minor modifications of the plans submitted, as described in MMC 18.84.210 (e.g. BLA or reduction in total number of lots), may be approved by the Community Development Director or his/her designee if the modifications do not change the Findings of Fact or the Conditions of Approval.

2. Final engineering drawings depicting the street improvements, water and sewer improvements, and drainage design shall be submitted to the City's Public Works Director for final review and approval before issuance of any grading permits. The street, water and sewer, and drainage improvements shall be designed in accordance with the City's most current Public Works Design and Construction Standards.

3. The project shall implement all of the applicable recommendations contained in the following technical reports submitted to the City:

a) Storm Drainage Report, prepared by Core Design, Inc., dated January 16, 2019.
b) Geotechnical Report, prepared by Associated Earth Sciences, Inc., dated December 6, 2018.

CLEARING AND GRADING

4.A comprehensive erosion and sedimentation control plan to ensure appropriate on-site and off-site water quality control shall be developed and implemented for all construction activities. The Best Management Practices outlined in the 2014 DOE Stormwater Management Manual for Western Washington shall be incorporated into the design. At a minimum, the plan shall include the following elements:

a) Exposed soils shall be stabilized and protected with straw, hydro-seeding or other appropriate materials to limit the extent and duration of exposure;

b) Disturbed areas shall be protected from storm water runoff impacts through the use of silt fence. Other means of filtration of storm water runoff and for limiting erosion/sedimentation such as check dams, and sediment traps may be required and are recommended.

c) Clearing and grading activities shall not be performed in the winter-wet season when soils are unstable.

STORM DRAINAGE IMPROVEMENTS

5.The stormwater system design and stormwater discharge shall utilize the Best Management Practices of the 2014 DOE Stormwater Management Manual for Western Washington.

6.Stormwater pollution prevention measures shall be employed per the approved Stormwater Pollution Prevention Plan and as necessary to ensure appropriate on-site and off-site water quality control. Site runoff during construction shall be handled and treated as to quantity and quality impacts by utilizing Best Management Practices, as defined in the 2014 DOE Stormwater Management Manual for Western Washington.

7.The developer shall obtain a General Construction Stormwater NPDES Permit from the WA Department of Ecology (DOE) prior to beginning construction.

ENVIRONMENTAL

All development shall proceed in accordance with the mitigation conditions listed in the Mitigated Determination of Non-Significance (SEPA2018-11) issued February 25, 2019:

1. In the event that any ground-disturbing or other construction activities result in the unanticipated discovery of archeological resources, work should be halted in the immediate area, and contact made with city officials, the technical staff at DAHP, and tribal representatives. Work should be stopped until further investigation and

appropriate consultation have concluded. In the unlikely event of the inadvertent discovery of human remains, work should be immediately halted in the area, the discovery covered and secured against further disturbance, and contact effected with law enforcement personnel, consistent with provisions set forth in RCW 27.44.055 and RCW 68.60.055.

2. Restoration of the site shall follow the Buffer Restoration Plan prepared by Wetland Resources, Inc. dated January 23, 2019. Monitoring shall be conducted annually for five (5) years and shall include site inspections and annual reports.
3. A split-rail fence shall be installed along the perimeter of the restored/naturally vegetated areas.
4. All development shall proceed in accordance with the recommendations of the Supplemental Phase II Environmental Site Assessment prepared by Landau Associates dated November 12, 2018, including the following:

- Follow the guidance provided in the Excavated Material Management Plan (EMMP; LAI 2018) during construction. The EMMP provides information on areas requiring further remedial excavation and/or confirmation sampling that will need to be conducted during construction.
- Conduct additional explorations to evaluate the extent of the petroleum hydrocarbon contamination detected in P4-MW and to monitor plume conditions. This would likely include direct-push explorations to screen for the extent of contamination with follow-up installation of wells for long-term monitoring of groundwater contaminant conditions. A program of monitored natural attenuation (MNA) may be a feasible remedial alternative for the site if it is found that the plume is stable or shrinking. However, if the plume is found to be expanding or increasing in contaminant concentrations, a more active remedial alternative such as enhanced bioremediation through injection of a terminal electron acceptor solution (oxygen, nitrate, or sulfate depending on plume conditions and local geochemistry) may be necessary.
- Semiannual monitoring of Woods Creek surface water shall be conducted to evaluate the potential long-term impacts associated with the arsenic and zinc contamination detected in the groundwater samples collected at the site.

8. A Special Flood Hazard Area Permit is required before building permit issuance.
9. Any project where demolition of structure(s), earth moving and material handling, heavy equipment operations, and/or disposing of vegetative matter is to occur, is subject to Puget Sound Clean Air Agency regulations. The requirements may include, but are not limited to the following:

- Agency Regulation I: Article 8 – Outdoor Burning, Article 9 – Emission Control Standards, Section(s) 9.03, 9.11, and 9.15
- Agency Regulation III: Article 4 – Asbestos Control Standards

10. Snohomish Health District:

- If there are existing septic systems from any of the buildings, they need to be decommissioned according to WAC 246-272A.

- Contaminated soil needs proper testing, treatment and disposal. Disposal or recycling of contaminated soil may require treatment, testing and confirmation sampling. Soils being disposed or recycled by a facility with a solid waste handling permit issued by the
- Snohomish Health District must meet the permit requirements set for the facility.

ROAD IMPROVEMENTS

11. Frontage improvements, including curb, gutter, sidewalk, street trees, and traffic control devices shall be constructed in accordance with the City's most current Public Works Design and Construction Standards; and are to be installed by the developer to the satisfaction of the City Engineer prior to building permit issuance.

FIRE

12. The following requirements shall be adhered to during construction and completed before occupancy of any structure in accordance with the 2015 International Fire Code:

- Fire hydrants shall be provided in accordance with city standards and the direction of the Fire Marshal
- Fire Hydrants shall be installed as per fire flow and spacing requirements specified for the type of development with regards to distances to structures;
- Fire hydrants shall be equipped four- (4) inch quarter-turn Storz adapters;
- An access route, for fire fighting apparatus, must be provided at the start of construction. Minimum access route requirements include a 20' width, 13'6" vertical height clearance, and the ability to support a load up to 75,000 pounds;
- All buildings must be addressed visibly and legibly from the road. When buildings are not visible from the street, appropriate provisions must be made to identify clearly which road or drive serves the appropriate address including private roads.
- Fire protection systems including, but not limited to the following: sprinkler systems, standpipe systems, fire extinguisher systems, fire hydrants, and fire detection or alarm systems shall be installed in accordance with the 2015 IFC.

LANDSCAPING

13. A final landscape and irrigation plan shall be submitted and approved prior to building permit issuance.

FEES

14. All landscaping associated with the project shall require the submittal of an acceptable warranty surety to warrant all required landscaping improvements against defects in labor materials for a period of 24 months after acceptance of those improvements by the City. The warranty amount shall be equal to fifteen (15) percent of the costs of the improvements, as determined by the Community Development Director.

15. The developer shall submit an acceptable warranty surety to warrant all required public improvements, installed, against defects in labor and materials for a period of 24 months after acceptance of those improvements by the City. The warranty amount shall be equal to ten (10) percent of the costs of the improvements, as determined by the Public Works Director. The surety shall be submitted to and approved by the City of Monroe and executed prior to final occupancy.

16. Park, Traffic and School impact fees assessed in accordance with MMC Chapters 20.07, 20.10 and 20.12 shall be required and paid at the rate in effect at the time of building permit issuance.

17. The water system capital improvement charge, in accordance with MMC Section 13.04.025, shall be required and paid prior to building permit issuance.

18. The wastewater system capital improvement charge, in accordance with MMC Section 13.08.270, shall be required and paid prior to building permit issuance.

MISCELLANEOUS

19. Construction shall not begin and is not authorized to commence construction until twenty-one (21) days have elapsed from the date that the permit is filed with the Washington State Department of Ecology for substantial development permits. For shoreline variances, construction shall not commence until twenty-one (21) days after the Department of Ecology has made its decision regarding the permit or until all review proceedings are terminated, if such proceedings were initiated within said twenty-one-day period.

20. Authorization to conduct construction activities, pursuant to the approved shoreline permit, shall terminate five years after the effective date of a shoreline permit. The hearing examiner may authorize a single extension for a period not to exceed one year, based on reasonable factors, if a request for extension has been filed before the expiration date and notice of the proposed extension is given to parties of record and to the Department of Ecology.

21. The effective date of a shoreline permit shall be the date of filing with the Department of Ecology or the date of decision by the Department of Ecology for conditional use permits and variances. This excludes time for which a use or activity was not actually pursued due to appeals, legal actions or the need to obtain other permits and approvals for the development.

22. All development shall comply with The East Downtown Neighborhood Design Guidelines, dated February 2009, and subject to the requirements of MMC 18.10.132.

23. Mail routes, including mailbox types and locations, shall be approved by the Postmaster prior to construction.

24. All construction equipment, building materials, and debris shall be stored on the Applicant's property, out of the public right-of-way. In no case shall the access to any private or public property be blocked or impinged upon without prior consent from the affected property owners and the City of Monroe.

25. If at any time during clearing, grading and construction the streets are not kept clean and clear, all work will stop until the streets are cleaned and maintained in a manner acceptable to the Public Works Director.

26. Construction noise is not allowed between the hours of eight p.m. and seven a.m., Monday through Friday, and between the hours of eight p.m. and nine a.m., Saturday, Sunday, and legal holidays.

27. The developer and contractor shall attend a pre-construction meeting with City staff to discuss expectations and limitations of the project permit before starting construction.

Dated this 5th Day of April 2019.

Phil A. Olbrechts

City of Monroe Hearing Examiner

Appeal Right and Valuation Notices

The shoreline substantial development permit approval is subject to appeal to the Washington State Shoreline Hearings Board as governed by Chapter 90.58 RCW.

Affected property owners may request a change in valuation for property tax purposes notwithstanding any program of revaluation.

HEARING EXAMINER EXHIBIT LIST

PROJECT:	Public Hearing for Preliminary Plat for River's Edge Shoreline Substantial Development Permit and Shoreline Variance
FILE NUMBER(S):	SLDP2018-03, SLVR2018-01
APPLICANT:	Rebecca Ralston
HEARING DATE AND LOCATION:	**March 21, 2019 at 1:30 PM** Monroe City Hall Council Chambers 806 West Main Street, Monroe, WA 98272

EXHIBITS

1. Staff Report
2. Vicinity Map
3. Shoreline Map
4. Aerial Map
5. Letter of Completeness
6. Application
7. Notice of Application
    - 7- A Affidavit of Publication NOA
    - 7- B Affidavit of Posting (On Site)
    - 7- C Affidavit of Posting (CH_Library)
    - 7- D Affidavit of Mailing
    - 7- E Email to Public Agencies NOA
8. Public Comments
    - A. DAHP
    - B. Snohomish Health District
    - C. Puget Sound Clean Air Agency
    - D. Tulalip Tribes
    - E. Jennifer Carroll
    - F. Judy Hedrick
    - G. Dick Neuharth
    - H. Mike Neuharth
    - I. Phyllis Woods
9. Notice of Public Hearing
    - 9- A Affidavit of Publication NOPH
    - 9- B Affidavit of Mailing

- 9- C Affidavit of Posting (On Site)
- 9- D Affidavit of Posting (CH_Library)
- 9- E Email to Public Agenices and Parties of Interest NOPH

10. SEPA – Mitigated Determination of Non Significance
    - 10- A Affidavit of Publication MDNS
    - 10- B Affidavit of Mailing
    - 10- C Affidavit of Posting (CH_Library)
    - 10- D Affidavit of Posting (On Site)
    - 10- E Email to Public Agencies MDNS
11. Site Plan
12. Narrative
13. Civil Plans
14. Building Elevations
15. Stormwater Drainage Report
16. Geotechnical Report
17. Environmental Site Assessment
18. SEPA Checklist
19. Archeological Survey
20. Critical Areas Study and Restoration Plan
21. Conceptual Landscape Plans

MONROE WASHINGTON	**STAFF REPORT AND RECOMMENDATION** Public Hearing for River's Edge Shoreline Substantial Development Permit and Shoreline Variance
HEARING EXAMINER:	Mr. Phil Olbrechts, City of Monroe Hearing Examiner
FILE NUMBER:	SLDP2018-03, SLVR2018-01
DESCRIPTION:	Public Hearing for River's Edge Shoreline Substantial Development Permit and Shoreline Variance for a 166-unit Affordable Housing Multi-Family Development in the DC (Downtown Commercial) Zoning District.
APPLICANT:	Rebecca Ralston River's Edge WA, LLLP 909 5th Avenue #2401 Seattle, WA 98164
PROJECT LOCATION:	147 S. Ann Street, Monroe, Washington 98272. Identified by Snohomish County Tax Parcel Numbers 27070600300500, 27070600302300, 27070600303300, 27070600300600, 27070600300700, 00465000001100.
HEARING DATE:	March 21, 2019 at 1:30 PM
HEARING LOCATION:	Monroe City Hall Council Chambers 806 West Main Street Monroe, WA 98272
STAFF CONTACT:	Anita Marrero, Senior Planner

SITE DESCRIPTION

The property consists of six (6) parcels totaling approximately 9.6 acres. The site is located adjacent to Woods Creek and contains several out-buildings. Historically, the property has been used as an industrial site with the current use being used for heavy machinery and commercial vehicle storage. (Exhibits 2, 4)

The subject parcels are surrounded by residential and undeveloped open space tracts. To the north and west are a mixture of commercial/industrial and residential parcels. No critical areas features were observed on neighboring parcels to the north and west that would affect the subject parcels with overlapping buffers. To the south and east of the subject parcels are Woods Creek and the City of Monroe's Al Borlin Park with direct connection to the Skykomish River. Woods Creek is a shoreline of the state with a 200-foot critical areas buffer that extends west across most of the subject parcels. No wetlands were observed on the subject parcel. One feature containing wetland parameters was observed on the flood terrace sandbar in Woods Creek.

Wildlife habitat does not occur on the developed portion of the subject parcels. Moderate quality wildlife habitat occurs in the vegetated riparian corridor along the west bank of Woods Creek on

the subject parcels. This riparian corridor contains deciduous forest (big-leaf maple and black cottonwood) with an understory of Himalayan blackberry, sword fern, and sparse occurrences of native upland shrubs. This riparian corridor provides habitat for an assemblage of wildlife species.

Woods Creek is documented to contain many salmonid species. Bull trout, winter steelhead, and Fall Chinook are all federally ESA listed salmonid species with Designated Critical Habitat that are documented to be present or spawning in Woods Creek.

BACKGROUND

River's Edge is a proposed 166-unit multi-family affordable housing development. The project will be income restricted to residents earning no more than 60 percent of the area medium income for Snohomish County. The development will consist of 1, 2, and 3-bedroom units. The development is consistent with the City of Monroe's Downtown Master Plan's objective to revitalize the downtown core with private capital investment to support the development of new, residential and mixed-use projects. River's Edge will use high-quality exterior materials, including cementitious siding, and other sustainable building products. There is a great demand for new, clean, safe, environmentally friendly housing options in Monroe where 85% of the population will income qualify to live at River's Edge. The new development will have energy efficient features throughout, keeping utility bills very low for residents.

The applicant proposes to demolish existing structures, identify and remove contaminants related to the legacy of industrial use, grade/prepare the site, and construct several multi-family buildings. The proposal includes five (5) new residential structures, access, parking, connection to existing utilities, and a stormwater plan. A compensatory mitigation plan has been designed to offset impacts to shorelines/critical areas resulting from the project.

A significant portion of the proposed development occurs within 200 feet of the OHWM of Woods Creek, which is the required setback for Woods Creek, pursuant to SMP Chapter 2, subsection D. Site Development Standards. The project requires a shoreline substantial development permit due to proposed development in the shoreline (200 feet from the OHWM of Woods Creek). The project requires a variance because development is proposed within the buffer/setback of Woods Creek.

Although development is proposed within the buffer/setback of Woods Creek, it will only occur in the historically disturbed gravel area of the site. The proposal includes removal of approximately 1,900 cubic yards (~19,600 square feet in area) of contaminated soil, removal of invasive species along the hillslope located between the historically disturbed area and the OHWM of Woods Creek, restoration of 14,737 square feet of gravel within the historically disturbed area, installation of a split-rail fence, and a stormwater plan that significantly improves water quality relative to the existing condition.

Enhancement of the hillslope includes removal of industrial waste, control of invasive species, and re-planting with native vegetation throughout an approximately 55,388 square-foot area. Restoration of the historically disturbed area includes gravel removal, decompaction, and installation of native plants within a 14,737 square-foot area at the top of the hillslope. The proposed split-rail fence will be installed along the entire perimeter of the hillslope, and will also encompass the 14,737 square-foot restoration area located at the top of the hillslope. Clean-up of contaminants in the historically disturbed portion of the site will be based on recommendations made in the Excavated Materials

Management Plan (EMMP) prepared for this project by Landau Associates.

River's Edge will be the first major redevelopment activity and it will have a far-reaching effect as it will be a catalyst encouraging more economic investment in this historically light-industrial area. Although the proposed development sits within the shoreline setback of 200' it must be noted that none of the development impacts property that has not already been heavily impacted. The proposed development will introduce lighter land-uses that will have far less detrimental effect on existing native vegetation and wildlife. There will be no future risk of contaminants leaching into soils or groundwater, there will be no more refuse and scrap material laid to rest on the site. The property will be kept clean and maintained into perpetuity. The developer will be a long-term owner and will remain vested in the future of the project and the community at large.

FACTS AND FINDINGS

1. On November 2, 2018, Rebecca Ralston on the behalf of River's Edge WA, LLLP, applied for a Shoreline Substantial Development Permit and Shoreline Variance for a 166-unit multi-family residential affordable housing development at 147 S. Ann Street, Monroe, WA 98272. (Exhibit 6)
2. The application was deemed complete on November 5, 2018. The project was circulated for review and comment on November 7, 2018. (Exhibit 5,7)
3. The subject property is approximately 9.6 acres and located adjacent to Woods Creek. Access to the property is from South Ann Street.
4. The following public utilities and services are available to this property:

Water:	City of Monroe	Gas:	Puget Sound Energy
Sewer:	City of Monroe	Cable TV:	Comcast
Garbage:	Republic Services	Police:	City of Monroe
Storm Water:	City of Monroe	Fire:	Monroe Fire District No. 3
Telephone:	Verizon	School:	Monroe Public Schools
Electricity:	Snohomish County PUD No. 1	Hospital:	Evergreen Health

5. A portion of the property is located within the City of Monroe's "High Intensity" and "Urban Conservancy" shoreline environmental designations. The disturbed area is located within the two hundred feet of the Ordinary High Water Mark (OMHW). The proposed development will be constructed in the previously disturbed area which is located in the High Intensity shoreline environmental designation. (Exhibit 3)
6. The subject property is designated "Downtown Commercial" in the City of Monroe Comprehensive Plan and is zoned Downtown Commercial (DC). The following Comprehensive Plan Policies apply to this project:
    - P.096, P.111: Encourage the provision of higher density housing in close proximity to retail, health-care services, parks and transportation routes.
    - P.103: Promote resource and energy-efficient building design and construction methods.
    - P.112: Coordinate with non-profit agencies and other groups providing low to moderate-income housing.
    - P.116, P.224: Allow increased building heights and density within the Downtown and Al Borlin neighborhoods.

- P.211: Maintain and enhance access to shorelines particularly the Skykomish River, Woods Creek and Lake Tye.
- P.215: Encourage new development and redevelopment in the downtown area, including related investment in streetscape improvements, transportation infrastructure and public facilities.

7. The property is located in the East Downtown Neighborhood and is subject to the East Downtown Neighborhood Design Guidelines, dated February 2009.
8. The Downtown Master Plan was adopted in 2008 and was created to set forth a vision for downtown that describes what the community wants to be and how it will appear at some point in the future. The goal for the East Downtown Neighborhood is to promote a concentration of high-quality housing and amenities that will make this area attractive for residents and that serve a full range of markets and provide for affordable housing.
9. In accordance with the consistency test outlined in the Growth Management Act (RCW 36.70B.040), prior to making a decision or recommendation on an application, the city must consider whether a project meets the adopted development regulations and/or Comprehensive Plan policies. The subject property is located in the DC (Downtown Commercial) Zoning District and the following standards apply:

DC Zoning District
East Downtown Neighborhood (ED)

Regulation	**Requirement**	**Submitted**
Density: MMC 18.12.160	Up to twenty residential units per gross acre Total = 192 units	166 units
Land Use: MMC 18.12.170	"Dwelling, multifamily"	Apartment homes
Setbacks: MMC 18.12.200	Front: none Rear: IBC/IFC Side: 5'	Front: 15' Rear: 10' Side: 5'
Building Height: MMC 18.12.200	35'	34'
Lot Coverage: MMC 18.12.200	85%	19%
Parking off-street: MMC 18.86.050	Multifamily dwellings = 2 parking spaces for each unit Total = 332 parking stalls Per MMC 18.74.030(D)(4), The proponent may reduce on-site parking to 1.2 stalls per affordable unit in a multifamily development. Total = 199 parking stalls	205 parking stalls
Park and Recreation Usable Open Space:	Studio and one bedroom = 90 square feet per unit (71 units)	65,834 square feet

MMC 18.78.080	Two bedrooms = 130 square feet per unit (77 units) Three or more bedrooms = 170 square feet per unit (18 units) Total required = 19,460 square feet	
Setback/buffer from the OHWM: SMP, Chapter 2, D. Site Development Standards	200'	75' (average) Shoreline Variance is required

10. Land uses, comprehensive plan designation and zoning districts on surrounding properties include the following:

	Land Use	**Comprehensive Plan Designation**	**Zoning District**
North:	Single-Family Residential/ Industrial	Downtown Commercial	Downtown Commercial (DC)
South:	Woods Creek/ Al Borlin Park	Parks	Public Open Space (PS)
East:	Woods Creek/ Al Borlin Park	Parks	Public Open Space (PS)
West:	Single-Family Residential/ Commercial	Downtown Commercial	Downtown Commercial (DC)

Shoreline Substantial Development Permit

11. MMC 19.01.110(B) identifies the review criteria for shoreline substantial development permits and states, "A substantial development permit shall be granted only when the development proposed is consistent with:
    1. The policies and procedures of the Shoreline Management Act;
        - Per RCW 90.58.020, it is the policy of the state to provide for the management of the shorelines of the state by planning for and fostering all reasonable and appropriate uses. This policy is designed to ensure the development of these shorelines in a manner that, while allowing for limited reduction of rights of the public navigable water, will promote and enhance the public interest. This policy is intended to protect against adverse effects to the public health, the land and its vegetation and wildlife, and the waters of the state and their aquatic life, while generally protecting public rights of navigation and its associated activities.
        - The proposal is consistent with state shoreline policy because it is protective of the public health and the natural character of the shoreline. A compensatory mitigation

plan will be implemented to improve the function of the shoreline and to create a natural barrier that will protect habitat. The proposal will be constructed within the previously disturbed area and the use of residential is a relatively less intensive use than industrial. Environmental clean-up of the property is also proposed.

2. The provisions of this regulation; and
   - Chapter 173-27 of the Washington Administrative Code (WAC) is entitled "Shoreline management permit and enforcement procedures" and sets forth permitting procedures and permit criteria.
   - This proposal is being reviewed under the criteria set forth in WAC 173-27-150, "Review criteria for substantial development permits."
3. The approved Master Program.

Compliance with the City of Monroe Shoreline Master Program (SMP), dated August 2008

Findings:

- The city's Shoreline Master Program (SMP) identifies the location of the site as High Intensity and Urban Conservancy.
- Per SMP Chapter 2 Section C, Shoreline Use and Modification Matrix, multifamily residential is a permitted use in the High Intensity Environment.
- The project retains ecological functions of the associated critical areas outside of the area of work and is limited to previously developed areas.
- The proposal is consistent with the following Management Policies of the High Intensity Environment:
-
  I. Policies and regulations shall assure no net loss of shoreline ecological functions as a result of new development. Where applicable, new development shall include environmental cleanup and restoration of the shoreline to comply with any relevant state and federal law.
  II. The City will encourage conservation and/or restoration projects, such as conserving and enhancing riparian forest and vegetation or recreating off-channel habitat for salmonids.
- Per SMP Chapter 2 Section D, Site Development Standards, the setback/buffer from the OHWM is 200 ft. Setback/buffer reduction shall require approval of a shoreline variance. The applicant has applied for a Shoreline Variance.
- Per SMP Chapter 5 Section G, Shoreline Use Provisions, Residential development means one or more buildings, structures, lots, parcels or portions thereof which are designed for and used or intended to be used to provide a place of abode for human beings, including single-family residences, duplexes, other detached dwellings, floating homes, multi-family residences, apartments, townhouses, mobile home parks, other similar group housing, condominiums, subdivisions and short subdivisions, together with accessory uses and structures normally applicable to residential uses including but not limited to garages, sheds, tennis courts, swimming pools, parking areas, fences, cabanas, saunas and guest cottages. In Monroe, residential development is allowed in the High Intensity and Shoreline Residential Environments. The proposal is consistent with the following Policies of Residential Development:
  I. Residential development should be permitted only where there are adequate provisions for utilities, circulation, and access.
  II. The overall density of development, lot coverage, and height of structures should be appropriate to the physical capabilities of the site and consistent with the comprehensive plan. New residential development

should be designed so as not to cause significant ecological impacts or significant adverse impacts to shoreline aesthetic characteristics, views, and public use of the shoreline and the water.

III. Adequate provisions should be made for protection of groundwater supplies, erosion control, drainage systems, aquatic and wildlife habitat, geohydraulic processes, and open space.

IV. New residential development should be located and designed so as to minimize conflicts or incompatibilities with water-oriented uses. Residential development should not be allowed where occupants would be exposed to noise, bright lights, or other necessary impacts of water development uses, such as industrial activities.

V. When demonstrated to be necessary, shoreline stabilization measures should be designed and located to avoid or minimize adverse impacts. Replacement shoreline stabilization structures should be designed to minimize ecological impacts.

Analysis: The proposal will not negatively affect ecological functions. With the conditions of approval, the proposed application is consistent with the Shoreline Master Program by preserving the character of the shoreline, protecting existing ecological functions and restoring ecological functions in areas that have been previously degraded.

Shoreline Variance

12. MMC 19.01.120(B) identifies the review criteria for shoreline variances and states, "The purpose of a variance is strictly limited to granting relief to specific bulk, dimensional, or performance standards set forth in this Master Program, where there are extraordinary or unique circumstances relating to the properties, such that the strict implementation of the Master Program would impose unnecessary hardships on the applicant or thwart the policies set forth in the Shoreline Management Act." The criteria for granting variances shall be consistent with the Shoreline Management Act and include the following:

Shoreline Variance Criteria

Criteria	Applicant's Response	Analysis	Meets Criteria
1. Variances should be granted in a circumstance where denial of the permit will not thwart the policy enumerated in the Shoreline Management Act or the Master Program. In all instances, extraordinary circumstances shall be shown,	*As previously stated, the project requires a shoreline variance due to proposed development occurring within the 200-foot setback from Woods Creek. In recognizing that the SMP is intended to preserve the resources and ecology of shorelines, and to provide long-term benefits, it is relevant to discuss the merits of this project relative to the existing condition, and also relative to the probable future use of the site (if a variance is denied).* *The site is currently used as a parking and storage area for commercial vehicles and equipment, which introduce a variety of toxicants to the ground surface (i.e. diesel,*	RCW 90.58.020 includes language that encourages uses that provide for public use and enjoyment of shorelines consistent with an overall policy of protecting the public interest in the shorelines. Shoreline rules also allow for residential development. Development of the subject property is limited due to the 200' Shoreline setback/buffer. Applying the 200' setback/buffer would render a majority of the	**YES**

and the public interest shall suffer no substantial detrimental effect.	*lubricants, hydraulic fluids, coolant, brake dust, metal shavings, and rubber). Stormwater generally flows east across the site as sheetflow, entering one of several natural low points and draining down a steep slope through approximately 30 to 50 feet of native vegetation before meeting Woods Creek. This means that untreated stormwater draining from pollution-generating surfaces flows directly (without detention) to a highly ecologically productive reach of Woods Creek.* *The proposed residential use will result in the removal of industrial waste and contaminants from the site, the control of invasive species on the hillslope, and will restore a portion of the historically disturbed gravel area. Significantly, it will also provide a stormwater plan that complies with the current Ecology stormwater manual. The plan routes stormwater from pollution-generating surfaces (parking areas) to an infiltration vault, where it will be tied into the existing stormwater drainage system.* *The existing condition impairs resources and functions, and provides no long-term benefits. The proposed project will result in functional ecological improvements and better protection of resources than the existing condition. If a variance is not issued for this property, (and alternate uses would only be allowed within the irregularly-shaped 2 acres located outside of the 200-foot setback), it is expected that the current use of the site would likely continue without improvements.* *For these reasons, strict implementation of the SMP (a required 200-foot setback in this case) would thwart the policies of the Shoreline Management Act (SMA) by providing a strong incentive to maintain the existing use of the site. The applicant asserts that the variance request for this project is consistent with the goals of the SMP, and should be allowed.* *With regard to site design: the 200' setback would render the property undevelopable in compliance with the City*	property undevelopable. Because of the restrictions of the property, if this project is not granted a variance the existing nonconforming use would continue thus the environmental clean-up would not commence and restoration of the shoreline buffer which includes buffer restoration within a 14,737 square foot portion of the historically disturbed area and 55,388 square foot hillslope restoration would not occur. Two critical actions needed to protect habitat. The Downtown Master Plan labels this property as an "Opportunity Site". The objective is to activate the underutilized lands near Al Borlin Park, with expanded office, housing and public facilities. The third option for Borlin Site 2 (proposed project location) is 3-5 story multifamily buildings with associated parking and open space. The Downtown Master Plan initiated a zoning change of the subject property from General Industrial to Downtown Commercial to allow for residential use. The zoning change was consistent with the City's Comprehensive Plan Goals and Policies for the Downtown that encouraged a wide variety of development types and densities while maintaining the character and vitality of existing residential neighborhoods. The Housing Strategy of the Downtown Master Plan recommends development of	

	of Monroe's Downtown Master Plan because there would not be the ability to achieve necessary parking or open-space for any of the identified residential commercial land uses the City has identified. There is a certain critical mass of development that must be established in order to support the high-cost of cleaning up the site, which simply could not be borne by a developer if the setback were in play, and thus any future project would be rendered infeasible. Please note, this is an irregular shaped property and a 200' setback is simply not feasible, it negates any feasible development that is consistent with the City of Monroe Downtown Master Plan, which would leave the existing lay-down, recycling, construction-staging yard, the only viable activity on the site. This would be a very unfortunate outcome for the community. This project will be a great economic generator for the City and community.	housing in a range of product types and products, including market rate and affordable categories. This project will provide affordable housing which is greatly needed in Monroe and Snohomish County. This project shows extraordinary circumstances and the public interest shall suffer no substantial detrimental effect. Therefore, approval of the variance from minimum shoreline setbacks would not thwart policy RCW 90.58.020	
2. Variances for development that will be located landward of the ordinary high-water mark may be authorized, provided the applicant can demonstrate all of the following: a. That the strict application of the bulk, dimensional, or performance standards as set forth in the Master Program precludes or significantly interferes with a reasonable permitted use of the property. b. That the hardship is specifically related	*a. Strict application of the bulk standards would require proposed development to occur outside of 200 feet from the OHWM of Woods Creek. The subject properties total 7.17 acres, with 5.07 acres located within 200 feet of Woods Creek. This leaves an irregularly-shaped 2.1 developable acres outside of the setback. The subject property will not be developed if strict application of the standards is enforced. There is no feasible re-development of the property that would be consistent with the City of Monroe Downtown Master Plan if the 200' setback were strictly enforced. Furthermore, it would be a blatant disregard of the good that would come as a result of the proposed development. Again, the development will not impact any land that is not already impacted. In addition, the proposed development will shoulder the cost of clean-up of identified toxins and invasive species. If denied, toxins will continue to leach into soils and groundwater could be at risk. River's Edge will be a catalyst for economic investment and redevelopment of this area of Monroe*	a. The Shoreline Master Program allows multi-family development in the High Intensity Shoreline Environmental Designation but requires a 200' setback/buffer from the OHWM. Strict application of the bulk regulations as set out in the SMP precludes or significantly interferes with a reasonable permitted use of the property. b. The subject parcel is irregular in shape and the bulk of the property lies within the Shoreline Jurisdiction. Development is restricted to the area located outside of the 200' setback and limits the potential development of the property. The hardship related to his parcel is unique in that the current development encroaches into the shoreline setback and has since 1973. The proposed project will be	**YES**

to the property and is the result of unique conditions, such as irregular lot shape, size, or natural features, in the application of the Master Program and not, for example, from deed restrictions or the applicant's own actions. c. That the design of the project will be compatible with other permitted activities in the area and not cause adverse effects to adjacent properties or the shoreline environment designation. d. That the variance does not constitute a grant of special privilege not enjoyed by other properties in the area, and will be the minimum necessary to afford relief. e. That the public interest will suffer no substantial detrimental effect.	*that is known to have widespread soil contamination from historic industrial uses.* *b. The difficulty in redeveloping the subject property is related to the encumbrance by Woods Creek relative to the shape and size of the assemblage. No deed restrictions are known, and the applicant's own actions have not created this hardship. The River's Edge Development has been thoughtfully and intentionally designed in a way that keeps nuisance lighting from vehicles away from Woods Creek. Parking areas are designated at the center of the site so that buildings can protect Woods Creek from loud noises and excessive light levels. There will be windows and ground-level patios that take advantage of the beautiful setting provided by Woods Creek. There will be a split-rail fence that spans the entire on-site length of the Woods Creek corridor. This will limit human disturbance on the steep slope and will further preserve the natural environment. Furthermore, statistical evidence shows that having windows, and thus eyes, on property, prevents crime, deters trespassing, and keeps property safer. The capital costs associated with development of the subject property assemblage would prohibit any lesser development than that which is proposed. Therefore, the Variance is the minimum necessary to afford relief. There is a certain critical mass of development that must be established in order to support the high-cost of cleaning up the site, which simply could not be borne by a developer if the setback were in play, and thus any future project would be rendered infeasible. Please note, this is an irregular shaped property and a 200' setback is simply not feasible, it negates any feasible development that is consistent with the City of Monroe Downtown Master Plan.* *c. The proposed River's Edge development is consistent with the City of Monroe Downtown Master Plan which encourages redevelopment of this light-*	constructed within the previously disturbed area of the subject property. No further disturbance into the shoreline setback is proposed. The applicant did not create the lot or the conditions of the property. There are no known deed restrictions affecting the proposal. c. The proposed development is consistent with the Downtown Master Plan and is compatible with current residential and mixed-use development in the East Downtown Neighborhood. The project will also be compatible with future re-development projects. The location of the proposed residential development is within an existing residential area. There should not be any degradation of shoreline qualities and the use is appropriate for the East Downtown Neighborhood. There are some poor quality conditions which will be addressed as part of the project mitigation. Invasive species have taken over the shoreline hillslope and will be removed as part of the mitigation plan to improve the shoreline buffer. Additional native plants are also proposed as part of the mitigation to improve shoreline buffer function. A mitigation and planting plan have been submitted. d. Several of the nearby lots located in the shoreline jurisdiction are developed with single-family and multi-family residences. Approval of the variance would allow the	

	industrial area with Residential and Mixed-Use land uses. Multi-family development is a permitted use in the shoreline environment designation (High Intensity). Redevelopment of the site is not expected to cause adverse effects to adjacent properties. River's Edge will be an improvement in the community introducing new, high-quality housing where a recycling and construction-staging yard previously existed. *d. Several properties in the area are developed with residential structures within 200 feet of Woods Creek. This project does not constitute a grant of special privilege. The project has been sited within the footprint of historic disturbance and is the minimum necessary to afford relief. Furthermore, the proposed development is consistent with the City of Monroe Downtown Master Plan. The existing use and neighboring uses are considered legal, though non-conforming with the City's Downtown Master Plan which encourages the redevelopment and economic investment in the existing light-industrial area. The project will help the City achieve its goals to clean up the area from known contamination.* *The capital costs associated with development of the subject property assemblage would prohibit any lesser development than that which is proposed. Therefore, the Variance is the minimum necessary to afford relief. There is a certain critical mass of development that must be established in order to support the high-cost of cleaning up the site, which simply could not be borne by a developer if the setback were in play, and thus any future project would be rendered infeasible. Please note, this is an irregular shaped property and a 200' setback is simply not feasible, it negates any feasible development that is consistent with the City of Monroe Downtown Master Plan.*	applicant to build a residential development which would not be a special privilege compared with other nearby lots. e. Locating the project within the existing developed area of the current development results in no impact to the public or the public's interest. Per the Critical Areas Study submitted by the applicant, the overall goal of the restoration plan is to improve ecological functions along the onsite portion of Woods Creek riparian corridor.	

	e. The public interest will benefit directly from the addition of affordable residential units, and indirectly by improving ecological functions along a high-value stream system. Statistical evidence supports that having windows, and thus eyes, on property, prevents crime, deters trespassing, and keeps property safer. The community will benefit greatly from the redevelopment of the property. It will be cleaner, safer, and more sustainable.		
3. Variances for development that will be located waterward of the ordinary high-water mark may be authorized, provided the applicant can demonstrate all of the criteria specified above; and provided, that the applicant can demonstrate that the public rights of navigation and use of the shorelines will not be adversely affected by the granting of the variance.	*Not applicable. No development is proposed waterward of the OHWM of Woods Creek.*	N/A - All development will occur landward of Woods Creek.	**YES**
4. In granting of all variances, consideration shall be given to the cumulative impact of additional requests or like actions in the area.	*South of E McDougall Street, the residential neighborhood is built-out. Several townhouses were built adjacent to the west of the subject property. It is unlikely that additional requests or like actions will be made, based on the level of development in surrounding areas.*	This development is anticipated to spark new development and re-development in the East Downtown Neighborhood. A majority of the re-developable parcels are located outside of the shoreline jurisdiction. A majority of the remaining parcels that are located in the shoreline jurisdiction are significantly smaller and contain single-family residences. It is not anticipated that similar projects would occur in the shoreline jurisdiction.	**YES**
5. Variances from	*Residential development is a permitted*	The applicant is not asking for a	**YES**

the use regulations of this Master Program are prohibited.	*use in the High Intensity shoreline environment designation (SMP Chapter 2, subsection C). This proposal complies with the use regulations of the SMP.*	variance from the use regulations of the SMP. Multi-family residential is a permitted use in the High Intensity Shoreline Environment Designation. A variance is required because the proposed development is within 200' of the OHWM.	

13. Land uses, comprehensive plan designation and zoning districts on surrounding properties include the following:

	Land Use	**Comprehensive Plan Designation**	**Zoning District**
North:	Single-Family Residential	Medium Density SFR	Urban Residential (UR6000)
South:	Single-Family Residential	Medium Density SFR	Urban Residential (UR6000)
East:	Al Borlin Park	Parks	PS
West:	Single-Family Residential	Medium Density SFR	Urban Residential (UR6000)

14. Pursuant to Monroe Municipal Code (MMC) Section 19.01.110(A)(D), the hearing examiner shall hold a public hearing on the proposed substantial development permit and approve, approve with conditions, or deny the application. The hearing examiner's decision shall become final and the permit shall be issued upon the terms and conditions prescribed by the hearing examiner, if no appeal is filed. The hearing examiner's decision shall be filed with the Department of Ecology.
15. Pursuant to MMC Section 19.01.120(B), the hearing examiner shall have the authority to hear and make findings, conclusions, and recommendations on shoreline variances. The city council shall have authority to grant variances from the substantive requirements of this Shoreline Master Program. The purpose of a variance is strictly limited to granting relief to specific bulk, dimensional, or performance standards set forth in this Master Program, where there are extraordinary or unique circumstances relating to the properties, such that the strict implementation of the Master Program would impose unnecessary hardships on the applicant or thwart the policies set forth in the Shoreline Management Act. The city shall submit all issued variances to the Department of Ecology for final approval or disapproval.
16. Public notice for the application was provided in accordance with the requirements of MMC section 21.40.010. A Notice of Application was published, mailed, and posted on November 7, 2018. A public comment period was provided from November 7, 2018 through 5:00 PM on December 10, 2018. (Exhibit 7)
17. The City received public and agency comments from the following:
    - Department of Archaeology & Historic Preservation (Exhibit 8A)

- Snohomish Health District (Exhibit 8B)
- Puget Sound Clean Air Agency (Exhibit 8C)
- Tulalip Tribes (comments were received after the comment period) (Exhibit 8D)
- Five (5) public comments (Exhibits 8E-8I)

18. A SEPA Mitigated Determination of Non-Significance (MDNS) was issued on February 25, 2019. No comments or appeals on the SEPA threshold determination were received. (Exhibit 10)
19. A Notice of Public Hearing was published, mailed, and posted on March 9, 2019. The date of the open record public hearing with the Hearing Examiner is set for March 21, 2019 at 1:30 PM. Public testimony may be provided during the public hearing pursuant to MMC 21.50.060(C). (Exhibit 9)

CONCLUSIONS

1. The proposed project was found to be consistent with the City of Monroe Comprehensive Plan, Downtown Master Plan, applicable zoning regulations, environmental regulations, shoreline provisions, and development regulations.
2. With conditions of approval, the project complies with the performance regulations for substantial development permits and shoreline variances.
3. The project will have no adverse impacts to the surrounding properties, and, more generally it will not adversely affect the public health, safety and general welfare as conditioned. According to the laws governing these type of applications, if the criteria contained within the code are met, thus demonstrating compatibility, then the application must be approved.
4. SEPA review has been conducted and as mitigated does not have probable significant adverse environmental impacts.

STAFF RECOMMENDATION

Based on the application and facts and findings of the staff report, staff recommends that the Hearing Examiner **APPROVE** the Shoreline Substantial Development Permit and Shoreline Variance Permit No. SLDP2018-03, SLVR2018-01 to allow the development of a 166-unit affordable housing development at the property located at 147 S. Ann Street in the DC zoning district and shoreline jurisdiction subject to the following conditions:

1. All improvements shall be constructed in accordance with the approved site plan with the date stamp of January 23, 2019. Minor modifications of the plans submitted, as described in MMC 18.84.210 (e.g. BLA or reduction in total number of lots), may be approved by the Community Development Director or his/her designee if the modifications do not change the Findings of Fact or the Conditions of Approval.

2. Final engineering drawings depicting the street improvements, water and sewer improvements, and drainage design shall be submitted to the City's Public Works Director for final review and approval before issuance of any grading permits. The street, water and sewer, and drainage improvements shall be designed in accordance with the City's most current Public Works Design and Construction Standards.

3. The project shall implement all of the applicable recommendations contained in the following technical reports submitted to the City:

   a) Storm Drainage Report, prepared by Core Design, Inc., dated January 16, 2019.
   b) Geotechnical Report, prepared by Associated Earth Sciences, Inc., dated December 6, 2018.

CLEARING AND GRADING

4. A comprehensive erosion and sedimentation control plan to ensure appropriate on-site and off-site water quality control shall be developed and implemented for all construction activities. The Best Management Practices outlined in the 2014 DOE Stormwater Management Manual for Western Washington shall be incorporated into the design. At a minimum, the plan shall include the following elements:

   a) Exposed soils shall be stabilized and protected with straw, hydro-seeding or other appropriate materials to limit the extent and duration of exposure;

   b) Disturbed areas shall be protected from storm water runoff impacts through the use of silt fence. Other means of filtration of storm water runoff and for limiting erosion/sedimentation such as check dams, and sediment traps may be required and are recommended.

   c) Clearing and grading activities shall not be performed in the winter-wet season when soils are unstable.

STORM DRAINAGE IMPROVEMENTS

5. The stormwater system design and stormwater discharge shall utilize the Best Management Practices of the 2014 DOE Stormwater Management Manual for Western Washington.

6. Stormwater pollution prevention measures shall be employed per the approved Stormwater Pollution Prevention Plan and as necessary to ensure appropriate on-site and off-site water quality control. Site runoff during construction shall be handled and treated as to quantity and quality impacts by utilizing Best Management Practices, as defined in the 2014 DOE Stormwater Management Manual for Western Washington.

7. The developer shall obtain a General Construction Stormwater NPDES Permit from the WA Department of Ecology (DOE) prior to beginning construction.

ENVIRONMENTAL

8. All development shall proceed in accordance with the mitigation conditions listed in the Mitigated Determination of Non-Significance (SEPA2018-11) issued February 25, 2019:

   1. In the event that any ground-disturbing or other construction activities result in the unanticipated discovery of archeological resources, work should be halted in the immediate area, and contact made with city officials, the technical staff at DAHP, and tribal representatives. Work should be stopped until further investigation and appropriate consultation have concluded. In the unlikely event of the inadvertent discovery of human remains, work should be immediately halted in the area, the discovery covered and secured against further disturbance, and contact effected with law enforcement personnel, consistent with provisions set forth in RCW 27.44.055 and RCW 68.60.055.

2. Restoration of the site shall follow the Buffer Restoration Plan prepared by Wetland Resources, Inc. dated January 23, 2019. Monitoring shall be conducted annually for five (5) years and shall include site inspections and annual reports.
3. A split-rail fence shall be installed along the perimeter of the restored/naturally vegetated areas.
4. All development shall proceed in accordance with the recommendations of the Supplemental Phase II Environmental Site Assessment prepared by Landau Associates dated November 12, 2018, including the following:
    - Follow the guidance provided in the Excavated Material Management Plan (EMMP; LAI 2018) during construction. The EMMP provides information on areas requiring further remedial excavation and/or confirmation sampling that will need to be conducted during construction.
    - Conduct additional explorations to evaluate the extent of the petroleum hydrocarbon contamination detected in P4-MW and to monitor plume conditions. This would likely include direct-push explorations to screen for the extent of contamination with follow-up installation of wells for long-term monitoring of groundwater contaminant conditions. A program of monitored natural attenuation (MNA) may be a feasible remedial alternative for the site if it is found that the plume is stable or shrinking. However, if the plume is found to be expanding or increasing in contaminant concentrations, a more active remedial alternative such as enhanced bioremediation through injection of a terminal electron acceptor solution (oxygen, nitrate, or sulfate depending on plume conditions and local geochemistry) may be necessary.
    - Semiannual monitoring of Woods Creek surface water shall be conducted to evaluate the potential long-term impacts associated with the arsenic and zinc contamination detected in the groundwater samples collected at the site.

9. A Special Flood Hazard Area Permit is required before building permit issuance.

10. Any project where demolition of structure(s), earth moving and material handling, heavy equipment operations, and/or disposing of vegetative matter is to occur, is subject to Puget Sound Clean Air Agency regulations. The requirements may include, but are not limited to the following:

    - Agency Regulation I: Article 8 – Outdoor Burning, Article 9 – Emission Control Standards, Section(s) 9.03, 9.11, and 9.15
    - Agency Regulation III: Article 4 – Asbestos Control Standards

11. Snohomish Health District:

    - If there are existing septic systems from any of the buildings, they need to be decommissioned according to WAC 246-272A.
    - Contaminated soil needs proper testing, treatment and disposal. Disposal or recycling of contaminated soil may require treatment, testing and confirmation sampling. Soils being disposed or recycled by a facility with a solid waste handling permit issued by the
    - Snohomish Health District must meet the permit requirements set for the facility.

ROAD IMPROVEMENTS

12. Frontage improvements, including curb, gutter, sidewalk, street trees, and traffic control devices shall be constructed in accordance with the City's most current Public Works

Design and Construction Standards; and are to be installed by the developer to the satisfaction of the City Engineer prior to building permit issuance.

FIRE

13. The following requirements shall be adhered to during construction and completed before occupancy of any structure in accordance with the 2015 International Fire Code:

    - Fire hydrants shall be provided in accordance with city standards and the direction of the Fire Marshal
    - Fire Hydrants shall be installed as per fire flow and spacing requirements specified for the type of development with regards to distances to structures;
    - Fire hydrants shall be equipped four- (4) inch quarter-turn Storz adapters;
    - An access route, for fire fighting apparatus, must be provided at the start of construction. Minimum access route requirements include a 20' width, 13'6" vertical height clearance, and the ability to support a load up to 75,000 pounds;
    - All buildings must be addressed visibly and legibly from the road. When buildings are not visible from the street, appropriate provisions must be made to identify clearly which road or drive serves the appropriate address including private roads.
    - Fire protection systems including, but not limited to the following: sprinkler systems, standpipe systems, fire extinguisher systems, fire hydrants, and fire detection or alarm systems shall be installed in accordance with the 2015 IFC.

LANDSCAPING

14. A final landscape and irrigation plan shall be submitted and approved prior to building permit issuance.

FEES

15. All landscaping associated with the project shall require the submittal of an acceptable warranty surety to warrant all required landscaping improvements against defects in labor materials for a period of 24 months after acceptance of those improvements by the City. The warranty amount shall be equal to fifteen (15) percent of the costs of the improvements, as determined by the Community Development Director.
16. The developer shall submit an acceptable warranty surety to warrant all required public improvements, installed, against defects in labor and materials for a period of 24 months after acceptance of those improvements by the City. The warranty amount shall be equal to ten (10) percent of the costs of the improvements, as determined by the Public Works Director. The surety shall be submitted to and approved by the City of Monroe and executed prior to final occupancy.
17. Park, Traffic and School impact fees assessed in accordance with MMC Chapters 20.07, 20.10 and 20.12 shall be required and paid at the rate in effect at the time of building permit issuance.
18. The water system capital improvement charge, in accordance with MMC Section 13.04.025, shall be required and paid prior to building permit issuance.
19. The wastewater system capital improvement charge, in accordance with MMC Section 13.08.270, shall be required and paid prior to building permit issuance.

MISCELLANEOUS

20. Construction shall not begin and is not authorized to commence construction until twenty-one (21) days have elapsed from the date that the permit is filed with the Washington State Department of Ecology for substantial development permits. For shoreline variances, construction shall not commence until twenty-one (21) days after the Department of Ecology has made its decision regarding the permit or until all review proceedings are terminated, if such proceedings were initiated within said twenty-one-day period.

21. Authorization to conduct construction activities, pursuant to the approved shoreline permit, shall terminate five years after the effective date of a shoreline permit. The hearing examiner may authorize a single extension for a period not to exceed one year, based on reasonable factors, if a request for extension has been filed before the expiration date and notice of the proposed extension is given to parties of record and to the Department of Ecology.

22. The effective date of a shoreline permit shall be the date of filing with the Department of Ecology or the date of decision by the Department of Ecology for conditional use permits and variances. This excludes time for which a use or activity was not actually pursued due to appeals, legal actions or the need to obtain other permits and approvals for the development.

23. All development shall comply with The East Downtown Neighborhood Design Guidelines, dated February 2009, and subject to the requirements of MMC 18.10.132.

24. Mail routes, including mailbox types and locations, shall be approved by the Postmaster prior to construction.

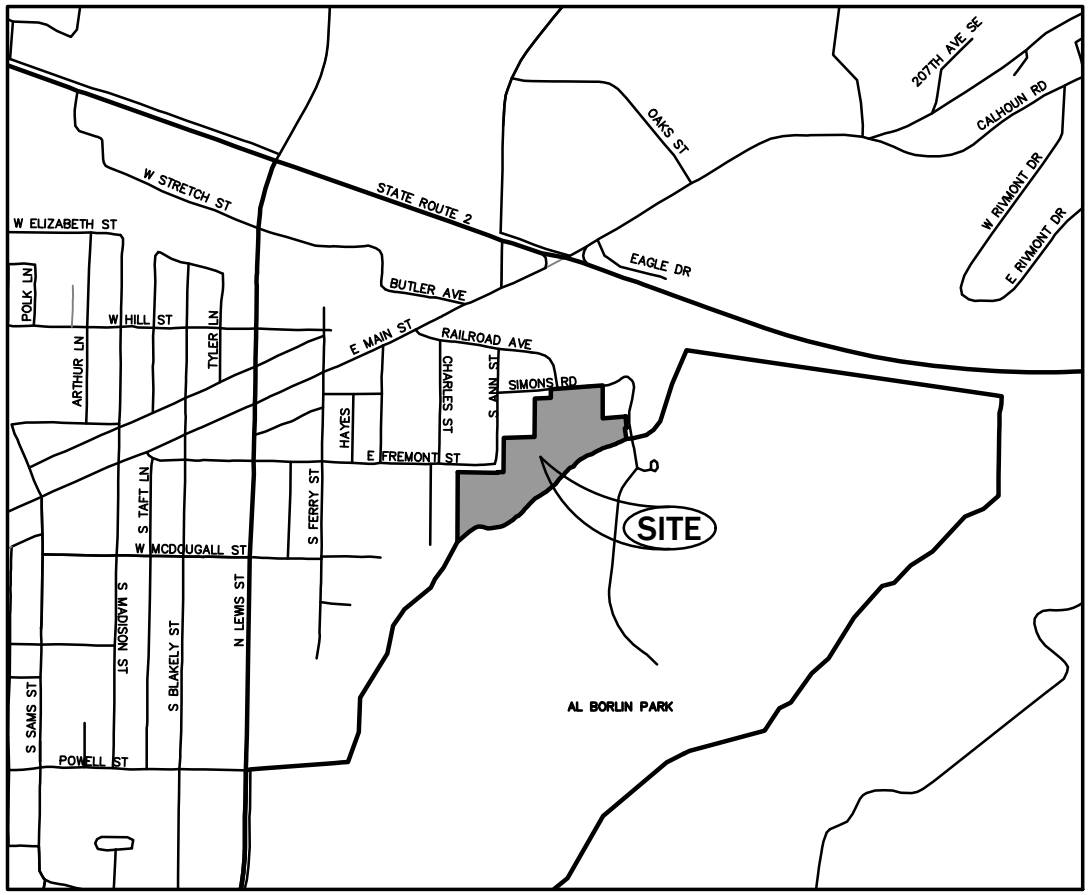
25. All construction equipment, building materials, and debris shall be stored on the applicant's property, out of the public right-of-way. In no case shall the access to any private or public property be blocked or impinged upon without prior consent from the affected property owners and the City of Monroe.

26. If at any time during clearing, grading and construction the streets are not kept clean and clear, all work will stop until the streets are cleaned and maintained in a manner acceptable to the Public Works Director.

27. Construction noise is not allowed between the hours of eight p.m. and seven a.m., Monday through Friday, and between the hours of eight p.m. and nine a.m., Saturday, Sunday, and legal holidays.

28. The developer and contractor shall attend a pre-construction meeting with City staff to discuss expectations and limitations of the project permit before starting construction.

EXHIBIT 2



VICINITY MAP

N.T.S.

EXHIBIT 3

City of Monroe
Shoreline Environment Designations

Boundaries

- Monroe City Limits
- Shoreline Boundary

Shoreline Designations

- (A) - Aquatic
- (HI) - High Intensity
- (N) - Natural
- (SR) - Shoreline Residential
- (TSW) - Tye Stormwater Facility
- (UC) - Urban Conservancy
- (UCM) - Urban Conservancy Mining

Shoreline jurisdiction boundaries depicted on this map are approximate. They have not been formally delineated or surveyed and are intended for planning purposes only. Additional site-specific evaluation may be needed to confirm/verify information shown on this map.

Map data shown is the property of the City of Monroe. Inaccuracies may exist. The City of Monroe implies no warranties or guaranties regarding any aspect of data depiction. No real estate decisions are to be made using this map. Please contact the City of Monroe Community Development Department to verify the designation(s).

Project: Shoreline Environment Designations
Y:\GIS\Departments\CD\Shorelines\Shoreline Environment Designations (4-07-08).mxd
Source: City of Monroe 2008; Snohomish County 2008, Watershed Company 2002; FEMA 2006
Revised: 04-30-08
Author: R. Wright

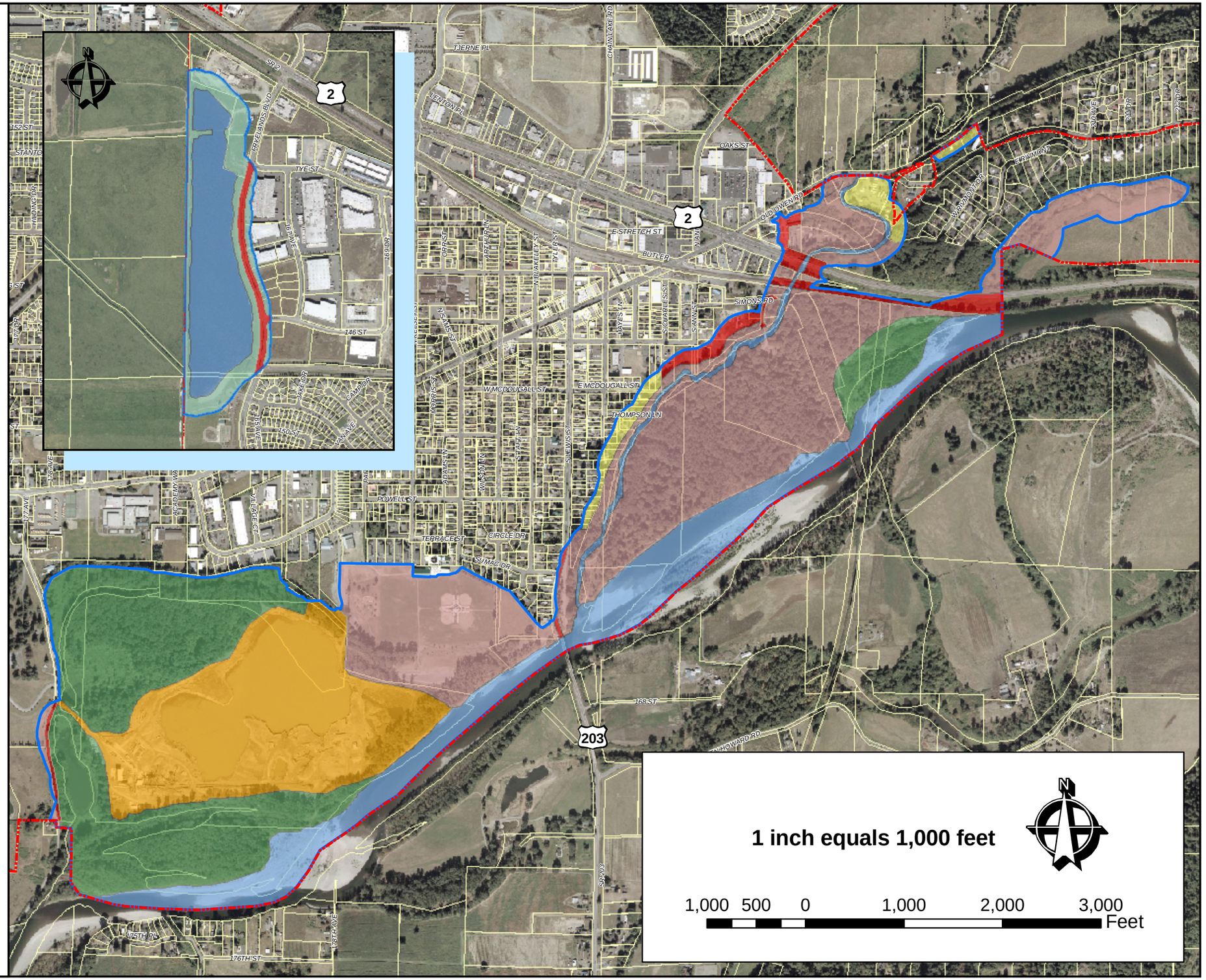
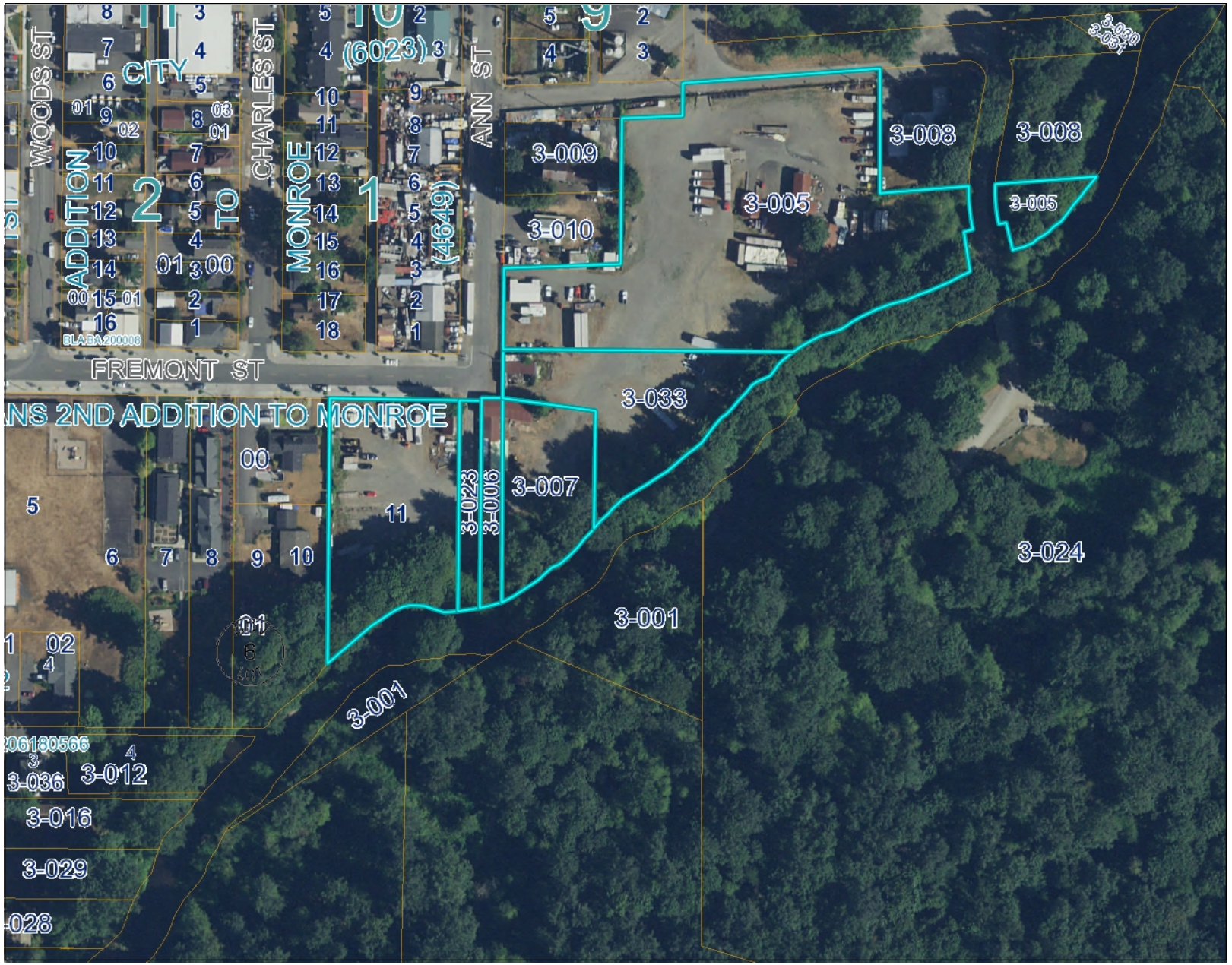


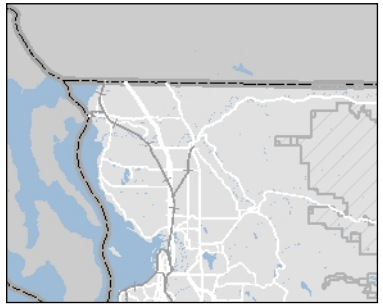
EXHIBIT 4

Snohomish County, Washington
PDS MAP PORTAL

River's Edge

3/12/2019





Legend

- Snohomish County Tax Parcels

1: 2,400

400.0 0 200.00 400.0 Feet

Projection: NAD_1983_StatePlane_Washington_North_FIPS_4601_Feet
Planning and Development Services, Snohomish County

All maps, data, and information set forth herein ("Data"), are for illustrative purposes only and are not to be considered an official citation to, or representation of, the Snohomish County Code. Amendments and updates to the Data, together with other applicable County Code provisions, may apply which are not depicted herein. Snohomish County makes no representation or warranty concerning the content, accuracy, currency, completeness or quality of the Data contained herein and expressly disclaims any warranty of merchantability or fitness for any particular purpose. All persons accessing or otherwise using this Data assume all responsibility for use thereof and agree to hold Snohomish County harmless from and against any damages, loss, claim or liability arising out of any error, defect or omission contained within said Data. Washington State Law, Ch. 42.56 RCW, prohibits state and local agencies from providing access to lists of individuals intended for use for commercial purposes and, thus, no commercial use may be made of any Data comprising lists of individuals contained herein.

Notes

This map was automatically generated using Geocortex Essentials.

EXHIBIT 5

MONROE
WASHINGTON

November 5, 2018

Wetland Resources, Inc.
Niels Pedersen
9505 19th Avenue SE, Suite 106
Everett, WA 98208

RE: Notice of Complete Application for River's Edge Shoreline Substantial Development Permit and Shoreline Variance

File No. SLDP2018-03, SLVR2018-01, SEPA2018-11

Dear Mr. Pedersen,

Your land use permit application which was submitted to the City of Monroe on November 2, 2018 for a Shoreline Substantial Development Permit and Shoreline Variance has been determined **COMPLETE** as of **November 5, 2018**. A complete application is not an approved application. A permit application is complete when it meets the submission requirements outlined in the Monroe Municipal Code. The City's determination of completeness does not preclude the City from requesting revisions, additional information or studies if new information is required, corrections are needed, or where there are substantial changes in the proposed action.

A decision will be made within 120 days of the date of the letter of completeness excluding time periods as described in MMC 21.50.110. If you have any questions and/or wish to discuss any portion of the enclosure of your application, please feel free to contact me at (360) 863-4513 or amarrero@monroewa.gov.

Sincerely,

Anita Marrero
Senior Planner

Cc: File
Rebecca Ralston

City of Monroe
806 West Main Street, Monroe, WA 98272
Phone (360) 794-7400 Fax (360) 794-4007
www.monroewa.gov

EXHIBIT 6

MONROE
WASHINGTON

COMMUNITY DEVELOPMENT

806 West Main Street, Monroe, WA 98272
Phone (360) 794-7400 Fax (360) 794-4007
www.monroewa.gov

FOR OFFICE USE ONLY
PERMIT #(s)
SLDP-2018-03 (5380)
SLVR-2018-01 (5381)
SEPA-2018-11 (5382)

RECEIVED
NOV 02 2018
COMMUNITY DEVELOPMENT

COMBINED PERMIT APPLICATION

PERMIT SUBMITTAL HOURS
MONDAY – FRIDAY 8:00 – 12:00 / 1:00 – 5:00

Building
- ☐ Commercial T/I
- ☐ Demolition
- ☐ Garage/Carport
- ☐ Mechanical
- ☐ New Construction (Commercial/Residential)
- ☐ Plumbing
- ☐ Racking
- ☐ Residential Remodel
- ☐ Sign
- ☐ Other _____

Operations
- ☐ Engineering Review
- ☐ Fencing
- ☐ Grading
- ☐ Retaining wall
- ☐ Rockery
- ☐ Right-of-Way Disturbance
- ☐ Special Flood Hazard Area
- ☐ Utility Service
- ☐ Other _____

Fire
- ☐ Fire Alarm
- ☐ Fire Sprinkler
- ☐ High Piled Storage
- ☐ Hood Suppression
- ☐ Operational
- ☐ Spray Booth
- ☐ Tents & Canopies
- ☐ Other _____

Land Use
- ☐ Accessory Dwelling Unit
- ☐ Boundary Line Adjustment /Lot Consolidation
- ☐ Conditional/Special Use
- ☐ Land Clearing/Forest Practices
- ☐ Planned Residential Development
- ☒ Shoreline Permit (Variance & Dev. Permit)
- ☐ Short Plat
- ☐ Subdivision/Plat
- ☐ Variance
- ☒ Other SEPA

NOTE: All required Electrical Permits will be issued by the Dept. of Labor & Industries.

THIS APPLICATION WILL NOT BE ACCEPTED WITHOUT COMPLETED SUBMITTAL REQUIREMENTS

Site Address or Property Location: 147 S. ANN STREET

Size of site (acre/square feet): APPROX 9.8 AC

Assessor's Tax Parcel Number (14 digits): SEE CIVIL

Applicant: RIVERS RIDGE WA LLLP Phone # (206) 351-9941

*Signature: _____ Printed Name: REBECCA RALSTON

Mailing Address: 909 SIXTH AVE #2401 Fax # (____) _____

City SEATTLE State WA Zip 98101 E-mail REBECCA.RALSTON@OUTLOOK.COM

Property Owner: Lawrence Wibbelman Phone # (425-308-4408

**Signature: _____ Printed Name: Lawrence Wibbelman

Mailing Address: 147 So Ann St. Fax # (____) N/A

City Monroe State WA Zip 98272 E-mail WibbelmanLawrence@gmail.com

Attach a separate sheet for additional property owners/additional addresses

***Applicant: By your signature above, you hereby certify that the information submitted is true and correct and that you are authorized by the property owner(s) to act on their behalf.**

****Property Owners: by your signature above, you hereby certify that you have authorized the above applicant to make application on your behalf for this application.**

City of Monroe
Land Use Permit Application- Page 2

Give a detailed description below of the proposal / work. Provide details specific to your application e.g., current and proposed lot sizes, number of lots, description of driveway, description of proposed business including hours of operation, number of employees, existing and proposed parking spaces.

Forest Tax Reporting Account Number (if harvesting timber call the Department of Revenue at (800) 548-8829 for tax reporting information or to receive a tax number):

Detailed Description of work:

A PROPOSED 116-UNIT MULTI-FAMILY DEVELOPMENT. INCOME RESTRICTED FOR HOUSE HOLDS EARNING NO MORE THAN 60% AMI FOR SNOHOMISH COUNTY. CONSTRUCTION IS ANTICIPATED TO BEGIN ON OR AROUND MARCH/APRIL 2019.

FOR OFFICE USE ONLY

Planning Application Fee: 1650.00 X2 — Publication Fee: _____
Fire Plan Check Fee: _____ — Mailing Fee: _____
SEPA Fee: _____ — Technology Fee: _____
TOTAL FEES: _____

EXHIBIT 7

City of Monroe
806 West Main Street, Monroe, WA 98272
Phone (360) 794-7400 Fax (360) 794-4007
www.monroewa.gov

NOTICE OF LAND USE APPLICATION

NOTICE IS HEREBY GIVEN that the City of Monroe has received an application for a Shoreline Substantial Development Permit and Shoreline Variance as described below:

PROJECT NAME: River's Edge Shoreline Substantial Development Permit and Shoreline Variance

PROJECT FILE#: SLDP2018-03, SLVR2018-01, SEPA2018-11

APPLICANT: Rebecca Ralston on the behalf of River's Edge WA, LLLP

OWNER: Lauren Wibbelman

PROJECT LOCATION: The site is located in the SW quarter of Township 27, Section 06, and Range 07. The site encompasses six (6) parcels and is adjacent to Woods Creek; otherwise known as 147 S. Ann Street, Monroe, Washington, 98272. Snohomish County Tax Parcel Numbers: 27070600300500, 27070600302300, 27070600303300, 27070600300600, 27070600300700, 00465000001100.

PROJECT DESCRIPTION: Demolition of the existing structures, identifying and removing contaminants related to the legacy of industrial use, grade/prepare the site to construct a 166-unit multi-family residential affordable housing development on approximately 9.6 acres. The proposal includes access, parking, connection to existing utilities, a stormwater plan, and pedestrian access trail. A compensatory mitigation plan had been designed to offset impacts to the shorelines/critical areas resulting from this project.

PERMITS/APPROVALS REQUIRED: Shoreline Substantial Development Permit, Shoreline Variance, Grading/Engineering Permit, Building Permit, and any State and Federal Permits if applicable.

STUDIES REQUIRED: SEPA Checklist, Critical Areas Study, Geotechnical Report, Environmental Assessment.

APPLICATION PROCESS: Requests for a shoreline substantial development permit, variance, or a conditional use permit require review by the City of Monroe hearing examiner. The hearing examiner's decision on substantial development permits is final. The hearing examiner shall have the authority to hear and make findings, conclusions, and recommendations on shoreline variances. The city council shall have the authority to grant shoreline variances. The City will submit the shoreline variance to the Department of Ecology for its approval or disapproval.

APPLICATION DATE: November 2, 2018

NOTICE OF COMPLETE APPLICATION: November 5, 2018

DATE OF NOTICE OF APPLICATION: November 7, 2018

PUBLIC COMMENT PROCEDURE: Submit written comments on or before **5 p.m., December 10, 2018.** The City will not act on this application until the end of the 30-day shoreline permit public comment period. Upon completion of project review the proposed application will be scheduled for a public hearing with the Monroe Hearing Examiner where the project will be approved, approved with conditions, or denied. You may request a copy of the final decision on the project by making a written request to the staff contact listed below.

PUBLIC HEARING: There will be a public hearing conducted on this project. You have the right to request notice of and to participate in the public hearing. If you want to receive notice of the hearing, you may make a written request to the staff contact named below.

APPEALS: Any person aggrieved by the granting, denying, or rescinding of a permit on shorelines of the state pursuant to RCW 90.58.140 may seek review from the shorelines hearings board by filing a petition for review within twenty-one days of the date of filing as defined in Chapter 90.58 RCW. Only persons who file written comments on the project in response to the Notice of Application are considered parties of record who may appeal the decision. If you do not file written comments within the comment period, you may not appeal the final decision.

STAFF CONTACT: Anita Marrero, Senior Planner @ (360) 863-4513 or amarrero@monroewa.gov

All documents are available for review Monday-Friday, 8:00-5:00 p.m., excluding holidays, at Monroe City Hall, 806 West Main St Monroe, WA 98272 and online at www.monroewa.gov.

A decision on the application will be made within one hundred twenty (120) days of the date of the letter of completeness.

EXHIBIT 7-A

Everett Daily Herald

Affidavit of Publication

State of Washington }
County of Snohomish } ss

Dicy Sheppard being first duly sworn, upon oath deposes and says: that he/she is the legal representative of the Everett Daily Herald a daily newspaper. The said newspaper is a legal newspaper by order of the superior court in the county in which it is published and is now and has been for more than six months prior to the date of the first publication of the Notice hereinafter referred to, published in the English language continually as a daily newspaper in Snohomish County, Washington and is and always has been printed in whole or part in the Everett Daily Herald and is of general circulation in said County, and is a legal newspaper, in accordance with the Chapter 99 of the Laws of 1921, as amended by Chapter 213, Laws of 1941, and approved as a legal newspaper by order of the Superior Court of Snohomish County, State of Washington, by order dated June 16, 1941, and that the annexed is a true copy of EDH833445 SLVR2018 SEPA2018-11 as it was published in the regular and entire issue of said paper and not as a supplement form thereof for a period of 1 issue(s), such publication commencing on 11/07/2018 and ending on 11/07/2018 and that said newspaper was regularly distributed to its subscribers during all of said period.

The amount of the fee for such publication is $100.05.

Dicy Sheppard

Subscribed and sworn before me on this 7 day of November, 2018.

Aubrey Knapp

Notary Public in and for the State of Washington.

City Of Monroe | 14103247
LEIGH ANNE BARR

AUBREY KNAPP
Notary Public
State of Washington
My Commission Expires
July 30, 2022

Classified Proof

CITY OF MONROE, WASHINGTON
NOTICE OF LAND USE APPLICATION

NOTICE is hereby given that the City of Monroe has received an application for a Shoreline Substantial Development Permit and Shoreline Variance as described below: PROJECT NAME: River's Edge Shoreline Substantial Development Permit and Shoreline Variance. PROJECT FILE#: SLDP2018-03, SLVR2018-01, SEPA2018-11 APPLICANT: Rebecca Ralston on the behalf of River's Edge WA, LLLP OWNER: Lauren Wibbelman PROJECT LOCATION: The site is located in the SW quarter of Township 27, Section 06, and Range 07. The site encompasses six (6) parcels and is adjacent to Woods Creek; otherwise known as 147 S. Ann Street, Monroe, Washington, 98272. Snohomish County Tax Parcel Numbers: 27070600300500, 27070600302300, 27070600303300, 27070600300600, 27070600300700, 00465000001100. PROJECT DESCRIPTION: Demolition of the existing structures, identifying and removing contaminants related to the legacy of industrial use, grade/prepare the site to construct a 166-unit multi-family residential affordable housing development on approximately 9.6 acres. The proposal includes access, parking, connection to existing utilities, a stormwater plan, and pedestrian access trail. A compensatory mitigation plan had been designed to offset impacts to the shorelines/critical areas resulting from this project. PERMITS/APPROVALS REQUIRED: Shoreline Substantial Development Permit, Shoreline Variance, Grading/Engineering Permit, Building Permit, and any State and Federal Permits if applicable. STUDIES REQUIRED: SEPA Checklist, Critical Areas Study, Geotechnical Report, Environmental Assessment. APPLICATION PROCESS: Requests for a shoreline substantial development permit, variance, or a conditional use permit require review by the City of Monroe hearing examiner. The hearing examiner's decision on substantial development permits is final. The hearing examiner shall have the authority to hear and make findings, conclusions, and recommendations on shoreline variances. The city council shall has the authority to grant shoreline variances. The City will submit the shoreline variance to the Department of Ecology for its approval or disapproval. APPLICATION DATE: November 2, 2018 NOTICE OF COMPLETE APPLICATION: November 5, 2018 DATE OF NOTICE OF APPLICATION: November 7, 2018 PUBLIC COMMENT PROCEDURE: Submit written comments on or before 5 p.m., December 10, 2018. The City will not act on this application until the end of the 30-day shoreline permit public comment period. Upon completion of project review the proposed application will be scheduled for a public hearing with the Monroe Hearing Examiner where the project will be approved, approved with conditions, or denied. You may request a copy of the final decision on the project by making a written request to the City contact person named below. PUBLIC HEARING: There will be a public hearing conducted on this project. You have the right to request notice of and to participate in the public hearing. If you want to receive notice of the hearing, you may make a written request to the City contact person named below. APPEALS: Any person aggrieved by the granting, denying, or rescinding of a permit on shorelines of the state pursuant to RCW 90.58.140 may seek review from the shorelines hearings board by filing a petition for review within twenty-one days of the date of filing as defined in Chapter 90.58 RCW. Only persons who file written comments on the project in response to the Notice of Application are considered parties of record who may appeal the decision. If you do not file written comments within the comment period, you may not appeal the final decision. STAFF CONTACT: Anita Marrero, Senior Planner @ (360) 863-4513 or amarrero@monroewa.gov. All documents are available for review Monday-Friday, 8:00-5:00 p.m., excluding holidays, at Monroe City Hall, 806 West Main St Monroe, WA 98272 and online at www.monroewa.gov.

A decision on the application will be made within one hundred twenty (120) days of the date of the letter of completeness.

Published: November 7, 2018. EDH833445

Everett Daily Herald

Affidavit of Publication

State of Washington }
County of Snohomish } ss

Dicy Sheppard being first duly sworn, upon oath deposes and says: that he/she is the legal representative of the Everett Daily Herald a daily newspaper. The said newspaper is a legal newspaper by order of the superior court in the county in which it is published and is now and has been for more than six months prior to the date of the first publication of the Notice hereinafter referred to, published in the English language continually as a daily newspaper in Snohomish County, Washington and is and always has been printed in whole or part in the Everett Daily Herald and is of general circulation in said County, and is a legal newspaper, in accordance with the Chapter 99 of the Laws of 1921, as amended by Chapter 213, Laws of 1941, and approved as a legal newspaper by order of the Superior Court of Snohomish County, State of Washington, by order dated June 16, 1941, and that the annexed is a true copy of EDH834294 SLVR2018-01 as it was published in the regular and entire issue of said paper and not as a supplement form thereof for a period of 1 issue(s), such publication commencing on 11/14/2018 and ending on 11/14/2018 and that said newspaper was regularly distributed to its subscribers during all of said period.

The amount of the fee for such publication is $100.05.

Dicy Sheppard

Subscribed and sworn before me on this 14 day of November, 2018.

Aubrey Knapp

Notary Public in and for the State of Washington.

City Of Monroe | 14103247
KIM SHAW

AUBREY KNAPP
Notary Public
State of Washington
My Commission Expires
July 30, 2022

Classified Proof

CITY OF MONROE, WASHINGTON
NOTICE OF LAND USE APPLICATION

NOTICE is hereby given that the City of Monroe has received an application for a Shoreline Substantial Development Permit and Shoreline Variance as described below: PROJECT NAME: River's Edge Shoreline Substantial Development Permit and Shoreline Variance. PROJECT FILE#: SLDP2018-03, SLVR2018-01, SEPA2018-11 APPLICANT: Rebecca Ralston on the behalf of River's Edge WA, LLLP OWNER: Lauren Wibbelman PROJECT LOCATION: The site is located in the SW quarter of Township 27, Section 06, and Range 07. The site encompasses six (6) parcels and is adjacent to Woods Creek; otherwise known as 147 S. Ann Street, Monroe, Washington, 98272. Snohomish County Tax Parcel Numbers: 27070600300500, 27070600302300, 27070600303300, 27070600300600, 27070600300700, 00465000001100. PROJECT DESCRIPTION: Demolition of the existing structures, identifying and removing contaminants related to the legacy of industrial use, grade/prepare the site to construct a 166-unit multi-family residential affordable housing development on approximately 9.6 acres. The proposal includes access, parking, connection to existing utilities, a stormwater plan, and pedestrian access trail. A compensatory mitigation plan had been designed to offset impacts to the shorelines/critical areas resulting from this project. PERMITS/APPROVALS REQUIRED: Shoreline Substantial Development Permit, Shoreline Variance, Grading/Engineering Permit, Building Permit, and any State and Federal Permits if applicable. STUDIES REQUIRED: SEPA Checklist, Critical Areas Study, Geotechnical Report, Environmental Assessment. APPLICATION PROCESS: Requests for a shoreline substantial development permit, variance, or a conditional use permit require review by the City of Monroe hearing examiner. The hearing examiner's decision on substantial development permits is final. The hearing examiner shall have the authority to hear and make findings, conclusions, and recommendations on shoreline variances. The city council shall have the authority to grant shoreline variances. The City will submit the shoreline variance to the Department of Ecology for its approval or disapproval. APPLICATION DATE: November 2, 2018 NOTICE OF COMPLETE APPLICATION: November 5, 2018 DATE OF NOTICE OF APPLICATION: November 7, 2018 PUBLIC COMMENT PROCEDURE: Submit written comments on or before 5 p.m., December 10, 2018. The City will not act on this application until the end of the 30-day shoreline permit public comment period. Upon completion of project review the proposed application will be scheduled for a public hearing with the Monroe Hearing Examiner where the project will be approved, approved with conditions, or denied. You may request a copy of the final decision on the project by making a written request to the City contact person named below. PUBLIC HEARING: There will be a public hearing conducted on this project. You have the right to request notice of and to participate in the public hearing. If you want to receive notice of the hearing, you may make a written request to the staff contact named below. APPEALS: Any person aggrieved by the granting, denying, or rescinding of a permit on shorelines of the state pursuant to RCW 90.58.140 may seek review from the shorelines hearings board by filing a petition for review within twenty-one days of the date of filing as defined in Chapter 90.58 RCW. Only persons who file written comments on the project in response to the Notice of Application are considered parties of record who may appeal the decision. If you do not file written comments within the comment period, you may not appeal the final decision. STAFF CONTACT: Anita Marrero, Senior Planner @ (360) 863-4613 or amarrero@monroewa.gov. All documents are available for review Monday-Friday, 8:00-5:00 p.m., excluding holidays, at Monroe City Hall, 806 West Main St Monroe, WA 98272 and online at www.monroewa.gov. A decision on the application will be made within one hundred twenty (120) days of the date of the letter of completeness.

Published: November 14, 2018. EDH834294

EXHIBIT 7-B

AFFIDAVIT OF POSTING
NOTICE OF LAND USE APPLICATION

STATE OF WASHINGTON)

COUNTY OF SNOHOMISH)

147 S Ann St.
Project location

River's Edge Shoreline - SLDP2018-03/ SLVR2018-01/SEPA2018-11
Application Name and File Number

I, Jamie Woolwork (print name) being first duly sworn on oath, depose and say: That I am a citizen of the United States of America; That I am competent to be witness herein; That on the 7th day of November, 2018, that I posted two signs for the **Shoreline at River's Edge (SlDP2018-03/SLVR2018-01/SEPA2018-11)** on or near the property concerned, in a conspicuous place; and the correct date of posting of said notice, to wit:

147 S Anne St. / XXX Simons Rd.
Location of notice

Jamie Woolwork
Signed

Subscribed and sworn to me this 7th day of November, 2018

NOTARY SEAL

KIM M SHAW
COMMISSION EXPIRES
NOTARY
PUBLIC
06-03-20
STATE OF WASHINGTON

Kim M. Shaw
NOTARY PUBLIC in and for the State of Washington, residing at:

Snohomish County

Printed Name: Kim Shaw

My commission expires: 6/3/2020

EXHIBIT 7-C

AFFIDAVIT OF POSTING
NOTICE OF LAND USE APPLICATION

STATE OF WASHINGTON)

COUNTY OF SNOHOMISH)

Rebecca Ralston / River's Edge LLLP
Applicant

SLDP2018-03/SLVR2018-01, SEPA2018-11
Application File and Name

I, Kim Shaw (print name) being first duly sworn on oath, depose and say: That I am a citizen of the United States of America; That I am competent to be witness herein; That on the 7th day of November, 2018, I posted (1) notice in the City Hall lobby and Emailed (1) notice to the Monroe Public Library; and on the correct date of posting of said notice, to wit:

806 W Main St., 1070 Village Way, Monroe WA
Location of Notice

Kim Shaw
Signed

Subscribed and sworn to me this 11th day of November, 2018

NOTARY SEAL

VICKI L. THAYER
NOTARY PUBLIC
STATE OF WASHINGTON
COMMISSION EXPIRES
5-09-20

Vicki L Thayer
NOTARY PUBLIC in and for the State of Washington, residing at:

Snohomish County

Printed Name: Vicki Thayer

My commission expires: 5/9/2020

EXHIBIT 7-D

AFFIDAVIT OF MAILING
NOTICE OF LAND USE APPLICATION

STATE OF WASHINGTON)

COUNTY OF SNOHOMISH)

River's Edge Shoreline Variance & Shoreline Development permit #SLDP2018-03/ SLVR2018-01
Application Name & File #

Rebecca Ralston with River's Edge WA LLLP
Applicant

I, **Leigh Anne Barr**, being first duly sworn on oath depose and say that on the **5th** day of **November, 2018**, made application with Click 2 Mail to mail on **November 7th, 2018**, a copy with prepaid postage of the **Notice of Land Use Application for Shoreline Variance & Shoreline Development Permit of River's Edge.** Attached is a list of names and addresses to whom this information was mailed.

L. Barr
Signed

Subscribed and sworn to me this 15th day of Nov., 2018

NOTARY SEAL

KIM M SHAW
COMMISSION EXPIRES
NOTARY
PUBLIC
06-03-20
STATE OF WASHINGTON

Kim M. Shaw
NOTARY PUBLIC in and for the State of Washington, residing at:

Snohomish County

Printed Name: Kim M. Shaw

My commission expires: 6/3/2020

OWNER NAME	OWNER ADDRESS	OWNER CITY	OWNER STATE	OWNER ZIP
140 WOODS STREET LLC	1166 VILLAGE WY STE B	MONROE	WA	98272
143 ST ANN LLC	307 N MADISON ST	MONROE	WA	98272
320 EAST MAIN LLC	320 E MAIN ST	MONROE	WA	98272-1540
449 RAILROAD LLC	449 RAILROAD AVE	MONROE	WA	98272-2330
AMSBERRY 500 MAIN LLC	500 MAIN ST	MONROE	WA	98272
ANDERSEN KATHLEEN S	6316 188TH ST SE	SNOHOMISH	WA	98290
BENTZ PROPERTIES LLC	2081 CLIFFSIDE TERRACE	CAMANO ISLAND	WA	98282
BERGER DEBORAH	105 RIVMONT DR E	MONROE	WA	98272
BIDERBOST KURT	127 CHARLES ST	MONROE	WA	98272
BLANCHARD ROBERT & MARY	334 THOMPSON LN	MONROE	WA	98272-2360
BROWN MATSON	4203 81ST PL NE	MARYSVILLE	WA	98270-3436
BURLINGTON NORTHERN RR	PO BOX 961089	FORT WORTH	TX	76161-0089
CARROLL JENNIFER L	129 CHARLES ST	MONROE	WA	98272-2302
CRESWELL LAWRENCE S JR ET AL	P O BOX 291	MONROE	WA	98272
DANGER CONNIE N	17043 156TH AVE SE	MONROE	WA	98272
EATON DONALD & JEANETTE L	19912 STATE ROUTE 2	MONROE	WA	98272
EPPIG VICKI K	322 THOMPSON LN	MONROE	WA	98272
FAULDS KATHLEEN	313 THOMPSON LN	MONROE	WA	98272-2360
FIFIELD WILL & STEPHANIE	145 WOODS ST	MONROE	WA	98272
FISHER SETH STEVEN	15104 178TH AVE SE	MONROE	WA	98272
FONTES CONNIE KAREN	131 CHARLES ST	MONROE	WA	98272-2302
G & L 2	205 WEST CASINO RD	EVERETT	WA	98204
GLOBAL SIGNAL ACQUISITIONS IV LLC	2000 CORPORATE DR	CANONSBURG	PA	15317
GOODWIN KENNETH R & NONA A	404 E FREMONT ST	MONROE	WA	98272-2315
HALLERT BRIGITTE	151 CHARLES ST	MONROE	WA	98272
HARRIS DERIK R	153 WOOD ST	MONROE	WA	98272
HAUER STEPHEN & PALMER AMANDA	22500 SE 56TH ST UNIT 22-306	ISSAQUAH	WA	98029
HOUGARDY PATRICK A & KAILEE D	315 THOMPSON LN	MONROE	WA	98272-2360
HOUSING HOPE	5830 EVERGREEN WAY	EVERETT	WA	98203
JENSEN RETA	151 CHARLES ST	MONROE	WA	98272
JOHNSON JEREMY D & ADELEINEA	139 WOODS ST	MONROE	WA	98272-2327
JOHNSTON CAMERON	158 CHARLES ST	MONROE	WA	98272-2303
KELLEHER DINA	136 CHARLES ST	MONROE	WA	98272-2303
LOPEZ CESAR JULIAN R/CORTES MAYRA A R	544 SIMONS RD	MONROE	WA	98272
LUNDSTROM TOMAS & EDITH	12517 182ND AVE SE	SNOHOMISH	WA	98290
MASSINE DENNIS	11418 215TH AVE SE	SNOHOMISH	WA	98290
MILLENIUM MOTORS INC	25555 NE 80TH ST	REDMOND	WA	98053
MONROE CITY OF	806 W MAIN	MONROE	WA	98272
MONROE SCHOOL DIST #103	200 E FREMONT ST	MONROE	WA	98272

MOORE GARY B	424 LAKE VIEW RD	LYNNWOOD	WA	98037
NELSON ODIN O JR & JULIE A	15691 LAKEVIEW AVE SE	MONROE	WA	98272
NEUHARTH DICK D & LUCILLE	320 E MAIN	MONROE	WA	98272
OLNEY AUSTIN	162 CHARLES ST	MONROE	WA	98272
PAYNE DON & DELLA	P O BOX 628	DUVALL	WA	98019
PEASE LOIS M	152 CHARLES ST	MONROE	WA	98272-2303
POPA COSMIN & REBECCA P	412 166TH AVE NE	BELLEVUE	WA	98008
POPA EMANUEL	307 N MADISON ST	MONROE	WA	98272
RAILROAD PROPERTIES LLC	PO BOX 119	CENTRALIA	WA	98531
REASONER ERNESTINE L	22506 SE HIGHLAND CIRCLE	ISSAQUAH	WA	98029
ROBERTSON DONALD & KIM	21312 132ND ST SE	MONROE	WA	98272
ROBERTSON DONALD E	20014 HWY 2 UNIT A	MONROE	WA	98272
ROOT RAWLIN	10820 22ND DR SE	EVERETT	WA	98208
RULE REAL ESTATE I LLC	124 WOODS ST	MONROE	WA	98272-2328
RUMAR LLC	103 RIVMONT DR E	MONROE	WA	98272
SANDERSON WILLIAM S	129 WOODS STREET	MONROE	WA	98272
SNOHOMISH COUNTY	3000 ROCKEFELLER AVE M/S 404	EVERETT	WA	98201
VERIZON NORTHWEST INC	PO BOX 152206	IRVING	TX	75015
WAH INVESTMENTS INC	101 LAKE ST S	KIRKLAND	WA	98033
WALTERS ERNEST D & JENNIFER J	144 CHARLES ST	MONROE	WA	98272-2303
WATERMAN SCOTT	3115 NE 84TH ST	SEATTLE	WA	98115
WEAVER AARON P & JULIE A	149 CHARLES ST	MONROE	WA	98272-2302
WIBBELMAN LAUREN E	147 S ANN ST	MONROE	WA	98272

EXHIBIT 7-E

From:	Kim Shaw
To:	Kim Shaw
Cc:	Anita Marrero; Ben Swanson
Bcc:	"separegister@ecy.wa.gov"; "pspirito@sno-isle.org"; "lanthony@sno-isle.org"; "Justin.fontes@ftr.com"; "david.matulich@pse.com"; "john_warrick@cable.comcast.com"; "crenderlein@snopud.com"; "Kate.Tourtellot@commtrans.org"; "Neilwheeler@comcast.net"; "Eileen.lefebvre@providence.org"; "piplicd@monroe.wednet.edu"; "Gretchen.Kaehler@DAHP.wa.gov"; "sharon.swan@snoco.org"; "Diane.Rolph@co.snohomish.wa.us"; "mfitzgerald@snofire7.org"; "k.kerwin@snoco.org"; "SEPA@pscleanair.org"; "stevev@pscleanair.org"; "eip@parks.wa.gov"; "sposner@utc.wa.gov"; "kmclain@agr.wa.gov"; "ike.nwankwo@commerce.wa.gov"; "reviewteam@commerce.wa.gov"; "sepadesk@dfw.wa.gov"; "efheinitz@doc1.wa.gov"; "sepacenter@dnr.wa.gov"; "ramin.pazooki@wsdot.wa.gov"; "randy.kline@parks.wa.gov"; "somers.elaine@epa.gov"; "epa-seattle@epa.gov"; "Stan.Allison@faa.gov"; "Karen.Wood-McGuiness@fema.dhs.gov"; "kjoseph@sauk-suiattle.com"; "njoseph@sauk-suiattle.com"; "jjoseph@sauk-suiattle.com"; "ryoung@tulaliptribes-nsn.gov"; "klyste@stillaguamish.com"; "pstevenson@stillaguamish.com"; "newstips@heraldnet.com"; "mmuscari@esassoc.com"; "info@PPTValley.org"; "tom.laufmann@sno.wednet.edu"; "lpelly@tu.org"; "rooseveltwater@frontier.com"; "staff@highlandwaterdistrict.com"; "bewood@snopud.com"; "faye.ryan@pse.com"; "dan.o.olson@williams.com"; "shannon.fleming@snoco.org"; "zlamebull@tulaliptribes-nsn.gov"; "wrightp@wsdot.wa.gov"; "mrobenland@doc1.wa.gov"; "mannixj@monroe.wednet.edu"; "hansenh@monroe.wednet.edu"; "JPrichard@republicservices.com"; "rodrijr@dshs.wa.gov"; "EHquestions@snohd.org"
Subject:	City of Monroe Notice of Land Use Application
Date:	Wednesday, November 7, 2018 3:38:00 PM
Attachments:	Agency Notice NOA.pdf

Good Afternoon!

Please see the attached Notice of Application for a Shoreline Development and Shoreline Variance permit within the City of Monroe. For questions on this proposal, you can contact Anita Marrero, Senior Planner, at 360-863-4513 or amarrero@monroewa.gov.

Thank you,
Kim

Kim Shaw, CPT | Land Use Permit Supervisor
806 West Main Street | Monroe, WA 98272
360-863-4532 | kshaw@monroewa.gov

NOTE: This email is considered a public record and may be subject to public disclosure.

EXHIBIT 8-A

From: Ben Swanson
To: Kim Shaw; Anita Marrero
Subject: RE: City of Monroe Notice of Land Use Application
Date: Wednesday, November 21, 2018 11:27:23 AM

Please notify the applicant.

From: SEPA (DAHP) [mailto:sepa@dahp.wa.gov]
Sent: Tuesday, November 20, 2018 2:58 PM
To: Kim Shaw <KShaw@monroewa.gov>
Cc: Anita Marrero <AMarrero@monroewa.gov>; Ben Swanson <BSwanson@monroewa.gov>
Subject: RE: City of Monroe Notice of Land Use Application

Hello Kim,

Please see the attached letter from the DAHP recommending an archaeological and historic property survey for the River's Edge development project. Feel free to contact me with any questions or concerns. I understand that this project may include contaminated soils and thus archaeological monitoring may be a preferred method in some portions of the project area, if there is a perceived threat to the health of the survey teams. Feel free to contact me as this project progresses to discuss any specific recommendations.

Regards,
Stephanie

Stephanie Jolivette | Local Government Archaeologist
360.586.3088 | stephanie.jolivette@dahp.wa.gov

Department of Archaeology & Historic Preservation | www.dahp.wa.gov
1110 Capitol Way S, Suite 30 | Olympia WA 98501
PO Box 48343 | Olympia WA 98504-8343

From: Kim Shaw <KShaw@monroewa.gov>
Sent: Wednesday, November 7, 2018 3:39 PM
To: Kim Shaw <KShaw@monroewa.gov>
Cc: Anita Marrero <AMarrero@monroewa.gov>; Ben Swanson <BSwanson@monroewa.gov>
Subject: City of Monroe Notice of Land Use Application

Good Afternoon!

Please see the attached Notice of Application for a Shoreline Development and Shoreline Variance permit within the City of Monroe. For questions on this proposal, you can contact Anita Marrero, Senior Planner, at 360-863-4513 or amarrero@monroewa.gov.

Thank you,

Kim

Kim Shaw, CPT | Land Use Permit Supervisor
806 West Main Street | Monroe, WA 98272
360-863-4532 | kshaw@monroewa.gov

NOTE: This email is considered a public record and may be subject to public disclosure.

EXHIBIT 8-B

Kim Shaw

From: Anne Alfred <aalfred@snohd.org>
Sent: Wednesday, February 27, 2019 2:36 PM
To: Anita Marrero
Subject: FW: Notice of Mitigated Determination of Non-Significance (City of Monroe)
Attachments: River's Edge SEPA 02252019.pdf; Vicinity Map.pdf; REVISED Rivers Edge SEPA 01_23_2019.pdf

Hi Anita—I met you when you worked in Mukilteo☺

I am unclear how to comment—I see that they need to be in by March 11, 2019. You and Ben Swanson are listed…..I hope you can help me?

The Snohomish Health District offers just these comments

- If existing septic systems from any of the buildings, they need to be decommissioned according to WAC 246-272A
- Contaminated soil needs proper testing, treatment and disposal. Disposal or recycling of contaminated soil may require treatment, testing and confirmation sampling. Soils being disposed or recycled by a facility with a solid waste handling permit issued by the Snohomish Health District must meet the permit requirements set for the facility.

Please give a call or reply so that I know the proper steps to take.

Thanks!

Anne

SNOHOMISH HEALTH DISTRICT
WWW.SNOHD.ORG
3020 Rucker Ave, Ste
425.339.8789 (d)
aalfred@snohd.org
WEBSITE

Anne Alfred
Environmental Health
Snohomish Health District
104, Everett, WA 98201
425.512.6349 (c)

Notice: All emails and attachments sent to and from the Snohomish Health District are public records and may be subject to disclosure pursuant to the Public Records Act (RCW 42.56).

From: Anne Alfred
Sent: Wednesday, February 27, 2019 9:14 AM
To: Anne Alfred <aalfred@snohd.org>
Subject: FW: Notice of Mitigated Determination of Non-Significance (City of Monroe)

From: Environmental Health Questions
Sent: Monday, February 25, 2019 8:21 AM
To: Andrea Pellham <apellham@snohd.org>; Steve Rice <srice@snohd.org>; Jeff Hutchison <jhutchison@snohd.org>; Anne Alfred <aalfred@snohd.org>
Subject: FW: Notice of Mitigated Determination of Non-Significance (City of Monroe)

EXHIBIT 8-C

From:	SEPA Review Notices
To:	Anita Marrero
Subject:	RE: Notice of Mitigated Determination of Non-Significance (City of Monroe)
Date:	Friday, March 1, 2019 9:13:16 AM
Attachments:	image001.jpg image002.jpg

The Puget Sound Clean Air Agency is submitting the following public comment to this project:

Any project where demolition of structure(s), earth moving and material handling, heavy equipment operations, and/or disposing of vegetative matter is to occur, is subject to Puget Sound Clean Air Agency regulations. The requirements may include, but are not limited to the following:

Agency Regulation I:
Article 8 – Outdoor Burning
Article 9 – Emission Control Standards, Section(s) 9.03, 9.11, and 9.15

Agency Regulation III:
Article 4 – Asbestos Control Standards

Agency Regulations can be viewed in full on our website:
http://www.pscleanair.org/219/PSCAA-Regulations

From: Kim Shaw [mailto:KShaw@monroewa.gov]
Sent: Saturday, February 23, 2019 2:49 PM
To: Kim Shaw
Cc: Kim Shaw
Subject: Notice of Mitigated Determination of Non-Significance (City of Monroe)

Good Afternoon,

Please see the attached Mitigated Determination of Non-Significance for the River's Edge Shoreline Substantial Development and Shoreline Variance permit. For specific questions, please contact Anita Marrero, Senior Planner, at (360) 863-4513 or amarrero@monroewa.gov.

You can also find the project documents on the city's web site at:
http://www.monroewa.gov/791/Rivers-Edge-Shoreline-Permits

Thank you,
Kim Shaw

Kim Shaw, CPT | Land Use Permit Supervisor
806 West Main Street | Monroe, WA 98272
360-863-4532 | kshaw@monroewa.gov

NOTE: This email is considered a public record and may be subject to public disclosure.

EXHIBIT 8-D

6406 Marine DR NW
Tulalip, WA 98271
360-716-4214

March 13, 2019

Kim Shaw, CPT
Land Use Permit Supervisor
806 West Main Street
Monroe WA 98272

Subject: River's Edge Shoreline Substantial Development Permit and Shoreline Variance

Ms. Shaw,

On behalf of The Tulalip Tribes we thank you for the opportunity to provide comments on the referenced project. We look forward to future correspondence and communication.

After review of the site plans and the Critical Area Study and Restoration Plan for the referenced project the Tulalip Tribes have the following comments. The Tulalip Tribes are the successors in interest to the Snohomish, Snoqualmie, and Skykomish Tribes and other tribes and bands signatory to the Treaty of Point Elliot of 1855. The Shoreline Management Act specifies that it shall not "affect any rights established by treaty to which the United States is a party." RCW 90.58.350. Recent federal court decisions have recognized that treaty fishing rights include protection against certain state actions that negatively impact fish habitat. The Tribes interest in responding to this proposal is two-fold, concerns regarding salmon resources and their habitat and impacts to potential cultural resources. Generally speaking, the development proposal changes the use of the property from commercial industrial to residential. With this change come different future impacts to salmon resources, which include impacts like garbage dumping, encroachment on the buffers, future stormwater impacts from lack of maintenance. We agree that the current condition of the site is unacceptable and the proposed project presents an opportunity to remove environmental damage and improve conditions. However, viewing the new use of the property from a long term perspective, the proposal continues an existing condition that

6406 Marine DR NW
Tulalip, WA 98271
360-716-4214

compromises fish habitat in Woods Creek and the reduced ecological functions of a much reduced buffer width.

Critical Area Study and Restoration Plan

We do not consider the split rail fence mitigation, it does not provide any ecological function. The restoration plan focuses on vegetative enhancements that will occur in several locations. Buffer widths are never mentioned in the Critical Areas Study, nor are the ecological benefits of buffers to aquatic species, including ESA listed species such as Chinook, Bull trout and Steelhead. The proposed buffer appears to vary from approximately 35 to 110 feet. The narrow portions of the buffer on the site compromise the ecological functions of buffers (e.g. large wood debris recruitment, litter fall, temperature moderation). It appears the Critical Areas Determination and restoration planning was largely performed remotely (i.e. from the office). From what we can determine, site conditions were verified during one site visit where data from a single collection point was recorded. The level of effort to establish vegetative conditions, site topography, and delineation of boundaries leave us with significant uncertainty that conditions depicted in the plans are accurate and what the buffer will look like when the project is finished.

Grading and Utility Plan

It appears that stormwater runoff will be treated through infiltration trenches and an infiltration vault. It is critical that the infiltration vault has the capacity and is designed to provide treatment of metals and petroleum products. Infiltration vault specifications were not included in the plans, so it is difficult to determine if the vault meets those requirements. Since the new vault is tying into the existing system does this redevelopment provide an opportunity to provide additional treatment to the existing stormwater system, if the existing system provides sub-standard treatment?

Cultural Resources

It appears contamination cleanup will require material to be excavated from the site. If it has not happened, a cultural resources survey should be performed and monitoring of any excavation should occur. The Tulalip Tribes should be notified, when a site survey is performed and if digging recovers cultural resources.

Redevelopment provides the opportunity to correct environmental damages and recover lost ecological functions and improve aquatic habitats. The proposal

6406 Marine DR NW
Tulalip, WA 98271
360-716-4214

addresses contamination, removes debris from the riparian area and revegetates buffer areas, but it continues a narrow buffer condition and the reduced function that come with narrow buffers, a condition that will be present for years to come. The Tulalip Tribes would strongly recommend the buffer be enlarged in the narrow sections to a width of 100 feet or greater, which is half the width of what should be present. Given the buffer enhancements proposed a 100 foot buffer should provide adequate functions into the future. It is also critical that stormwater is adequately treated, the infiltration vault needs to have the capacity and be designed to provide treatment for metals and petroleum products. In addition, does this redevelopment provide an opportunity to improve treatment of the existing system if needed? Finally, the Tulalip Tribes should be notified of any future cultural resource investigations performed on the site.

Sincerely,

Kur Nelson
Environmental Division Manager
The Tulalip Tribes Natural Resources Department
(360) 716-4617

EXHIBIT 8-E

From: Jennifer Carroll
To: Anita Marrero
Subject: Rivers Edge File #SLVR2018-01
Date: Monday, December 10, 2018 4:37:48 PM

Hi Anita,

I would like to be kept in the loop in regards to any and ALL hearings regarding this plan. I am very concerned for this area having 166 affordable housing units for many reasons. I did find the Downtown Master Plan and I am still looking for the map I had mentioned to you.

Thank you,

Jennifer Carroll

EXHIBIT 8-F

From:	Judy Heydrick
To:	Anita Marrero
Subject:	Land Use Application, River"s Edge Shoreline Substantial Development Permit and Shoreline Variance
Date:	Monday, December 3, 2018 8:26:57 PM

Anita Marrero, Sr. Planner, City of Monroe

I strongly oppose the proposal to permit the construction of a 166 unit residential complex on the shores of Woods Creek. This project appears to thwart the Woods Creek conservation district's effort to restore a salmon run by degrading water quality and injuring ESA listed species habitat. Citing from the group's website "Woods Creek flows from the Lake Roesiger area south toward the City of Monroe, where it empties into the Skykomish River. **This creek is one of the best salmon-producing streams in Snohomish County**, **but salmon runs have been decreasing** in past years because high water temperatures, lots of fine sediment, and a lack of large pieces of wood in the creek are threatening their existence."

Several years ago a WDFW Area Biologist shared his concerns regarding the location of a similar development adjacent to a salmon bearing stream/creek. "Our many years of experience with moderate density home sites that abut streams is what remnant trees are left are often cut at some point because they are deemed hazard trees; unsupervised children and pets often harass or kill spawning fish; people unknowingly remove woody debris from the channel; and garbage or litter in the streams are the rule rather than the exception."

Under RCW 36A.70.172(1) counties and cities shall give special consideration to conservation or protection measures necessary to preserve or enhance anadromous fisheries. For the sake of our area's rapidly diminishing and endangered salmon and orca populations please deny this shoreline building application.

I would like to become a person of record and notified by e-mail of the upcoming public hearing date.

Thank you for your consideration,

Judy Heydrick

P.O. Box 352

Sultan, WA 98294

EXHIBIT 8-G

RECEIVED
DEC 10 2018
CITY OF MONROE

December 10, 2019

City of Monroe
Planning & Permitting
806 West Main Street
Monroe, WA 98272

Re: River's Edge File #SLVR2018-01 – Notice of Land Use

To Whom it May Concern:

I have a few concerns about this proposed building project and some of the concerns that this project will add to the East end of Monroe (ie, more cars, more children and the safety hazards, other traffic concerns). I would like to discuss these concerns with the city council and the project committee.

Thank you

Dick Neuharth
Dick's Tire Haus
360.794.7103

EXHIBIT 8-H

RECEIVED
DEC 10 2018
CITY OF MONROE

December 10, 2019

City of Monroe
Planning & Permitting
806 West Main Street
Monroe, WA 98272

Re: River's Edge File #SLVR2018-01 – Notice of Land Use

To Whom it May Concern:

I have a few concerns about this proposed building project and some of the concerns that this project will add to the East end of Monroe (ie, more cars, more children and the safety hazards, other traffic concerns). I would like to discuss these concerns with the city council and the project committee.

Thank you

Mike Neuharth
Town & Country Tractors, Inc.
360.794.5426

EXHIBIT 8-I

From: P E. Woods
To: Anita Marrero
Subject: Proposed housing site beside Woods Creek
Date: Thursday, December 20, 2018 1:28:07 PM

I would like to be informed as to the progress on this project. I am concerned about soil contamination as,well as Woods Creek. Thank you. Phyllis Woods

Sent via the Samsung Galaxy Note5, an AT&T 4G LTE smartphone

EXHIBIT 9

COMMUNITY DEVELOPMENT

NOTICE OF LAND USE PUBLIC HEARING

NOTICE is hereby given that a **PUBLIC HEARING** is scheduled to be held on the proposed **SHORELINE DEVELOPMENT PERMIT AND SHORELINE VARIANCE FOR RIVER'S EDGE** on **THURSDAY, MARCH 21, 2019 AT 1:30 P.M.** by the City of Monroe Hearing Examiner in the Council Chambers at City Hall, located at 806 West Main Street, Monroe, WA**.**

PROJECT NAME: **River's Edge Shoreline Substantial Development Permit and Shoreline Variance**

PROJECT FILE #: SLDP2018-03/SLVR2018-01/SEPA2018-11

APPLICANT CONTACT: Rebecca Ralston on behalf of River's Edge WA, LLLP

PROJECT DESCRIPTION*:* Demolition of the existing structures, identifying and removing contaminants related to the legacy of industrial use, grade/prepare the site to construct a 166-unit multi-family residential affordable housing development on approximately 9.6 acres. The proposal includes access, parking, connection to existing utilities, and a stormwater plan. A compensatory mitigation plan had been designed to offset impacts to the shorelines/critical areas resulting from this project.

PROJECT LOCATION: The site is located in the SW quarter of Township 27, Section 06, and Range 07. The site encompasses six (6) parcels and is adjacent to Woods Creek; otherwise known as 147 S. Ann Street, Monroe, Washington, 98272. Snohomish County Tax Parcel Numbers: 27070600300500, 27070600302300, 27070600303300, 27070600300600, 27070600300700, 00465000001100.

PUBLIC COMMENTS/ APPROVAL PROCESS: Anyone wishing to comment on the above items or to provide other relevant information may do so in writing or appear in person before the Hearing Examiner at the time and place of said public hearing. The Hearing Examiner is required to issue a final decision on this project pursuant to MMC 21.50.030(D). Per MMC 19.01.110(D), the hearing examiner's decision shall become final and the shoreline substantial development permit shall be issued upon the terms and conditions prescribed by the hearing examiner, if no appeal is filed. The hearing examiner's decision shall be filed with the Department of Ecology. Per MMC 19.01.120(B), the hearing examiner shall have the authority to hear and make findings, conclusions, and recommendations on shoreline variances. The city council shall have authority to grant variances from the substantive requirements of this Shoreline Master Program. The city shall submit all issued variances to the Department of Ecology for final approval or disapproval.

PUBLIC REVIEW OF DOCUMENTS: The file is available for review during regular business hours, 8:00 a.m. – 5:00 p.m., Monday - Friday at Monroe City Hall, 806 West Main Street, Monroe WA. For more information, please contact Kim Shaw at (360) 863-4532 or kshaw@monroewa.gov. Project information is also available on the city's website at: www.monroewa.gov/791/RiversEdgeShorelinePermits.

STAFF CONTACT: Anita Marrero, Senior Planner, at (360) 863-4513 or amarrero@monroewa.gov.

Accommodations for people with disabilities will be provided upon request.
Please contact City Hall at (360) 794-7400 and allow one-week advance notice.

EXHIBIT 9-B

AFFIDAVIT OF MAILING
NOTICE OF LAND USE PUBLIC HEARING

STATE OF WASHINGTON)

COUNTY OF SNOHOMISH)

River's Edge Shoreline Variance & Shoreline Development permit #SLDP2018-03/ SLVR2018-01
Application Name & File #

Rebecca Ralston with River's Edge WA LLLP
Applicant

I, **Kim Shaw**, being first duly sworn on oath depose and say that on the **7th** day of **March, 2019**, made application with Click 2 Mail to mail on **March 8th, 2019**, a copy with prepaid postage of the **Notice of Land Use Application Public Hearing for Shoreline Variance & Shoreline Development Permit of River's Edge.** Attached is a list of names and addresses to whom this information was mailed.

Kim Shaw
Signed

Subscribed and sworn to me this 14th day of March, 2019

NOTARY SEAL

STATE OF WASHINGTON
VICKI L. THAYER
NOTARY PUBLIC
COMMISSION EXPIRES
5-09-20

Vicki L Thayer
NOTARY PUBLIC in and for the State of Washington, residing at:

Snohomish County

Printed Name: Vicki L Thayer

My commission expires: May 9, 2020

FIRST	LAST	ADDRESS	CITY	STATE	ZIP
140 WOODS STREET LLC		1166 VILLAGE WAY STE B	MONROE	WA	98272
320 EAST MAIN LLC		320 E MAIN STREET	MONROE	WA	98272
449 RAILROAD LLC		449 RAILROAD AVENUE	MONROE	WA	98272
AARON AND JULIE	WEAVER	149 CHARLES STREET	MONROE	WA	98272
ARTHUR AND MARY	SCHULTZ	143 CHARLES STREET	MONROE	WA	98272
AUSTIN	OLNEY	162 CHARLES STREET	MONROE	WA	98272
BENTZ PROPERTIES LLC		2081 CLIFFSIDE TERRACE	CAMANO ISLAND	WA	98282
BRIGITTE	HALLERT	151 CHARLES STREET	MONROE	WA	98272
BURLINGTON NORTHERN RAILROAD		PO BOX 961089	FORT WORTH	TX	76161
CAMERON	JOHNSTON	158 CHARLES STREET	MONROE	WA	98272
CIRILO AND MATILDE	HERNANDEZ	125 S ANN STREET	MONROE	WA	98272
CIRILO AND MATILDE	HERNANDEZ	135 ANN STREET	MONROE	WA	98272
CITY OF MONROE		806 W MAIN STREET	MONROE	WA	98272
CONNIE	FONTES	131 CHARLES STREET	MONROE	WA	98272
CONNIE	DANGER	17043 156TH AVENUE SE	MONROE	WA	98272
CURRENT	RESIDENT	100 RAILROAD AVENUE	MONROE	WA	98272
CURRENT	RESIDENT	111 S ANN STREET	MONROE	WA	98272
CURRENT	RESIDENT	117 S ANN STREET	MONROE	WA	98272
CURRENT	RESIDENT	120 WOODS STREET	MONROE	WA	98272
CURRENT	RESIDENT	130 CHARLES STREET	MONROE	WA	98272
CURRENT	RESIDENT	131 WOODS STREET	MONROE	WA	98272
CURRENT	RESIDENT	133 WOODS STREET	MONROE	WA	98272
CURRENT	RESIDENT	135 CHARLES STREET	MONROE	WA	98272
CURRENT	RESIDENT	139 WOODS STREET	MONROE	WA	98272
CURRENT	RESIDENT	140 CHARLES STREET	MONROE	WA	98272
CURRENT	RESIDENT	140 WOODS STREET	MONROE	WA	98272
CURRENT	RESIDENT	143 S ANN STREET	MONROE	WA	98272
CURRENT	RESIDENT	145 WOODS STREET	MONROE	WA	98272
CURRENT	RESIDENT	147 WOODS STREET	MONROE	WA	98272
CURRENT	RESIDENT	148 CHARLES STREET	MONROE	WA	98272
CURRENT	RESIDENT	148 WOODS STREET	MONROE	WA	98272
CURRENT	RESIDENT	150 ANN STREET	MONROE	WA	98272
CURRENT	RESIDENT	19922 STATE ROUTE 2	MONROE	WA	98272
CURRENT	RESIDENT	20012 STATE ROUTE 2	MONROE	WA	98272
CURRENT	RESIDENT	245 E MCDOUGALL STREET	MONROE	WA	98272
CURRENT	RESIDENT	264 E MCDOUGALL STREET	MONROE	WA	98272
CURRENT	RESIDENT	276 E MCDOUGALL STREET	MONROE	WA	98272
CURRENT	RESIDENT	307 FREMONT STREET	MONROE	WA	98272
CURRENT	RESIDENT	315 THOMPSON LANE	MONROE	WA	98272
CURRENT	RESIDENT	316 E FREMONT STREET	MONROE	WA	98272
CURRENT	RESIDENT	320 E FREMONT STREET	MONROE	WA	98272
CURRENT	RESIDENT	400 E FREMONT STREET	MONROE	WA	98272
CURRENT	RESIDENT	404 RAILROAD AVENUE	MONROE	WA	98272
CURRENT	RESIDENT	440 MAIN STREET	MONROE	WA	98272
CURRENT	RESIDENT	450 RAILROAD AVENUE	MONROE	WA	98272
CURRENT	RESIDENT	500 MAIN STREET	MONROE	WA	98272
CURRENT	RESIDENT	506 E MAIN STREET	MONROE	WA	98272
CURRENT	RESIDENT	510 E MAIN STREET	MONROE	WA	98272
DEBORAH	BERGER	105 RIVMONT DRIVE E	MONROE	WA	98272
DENNIS	MASSINE	11418 215TH AVENUE SE	SNOHOMISH	WA	98290
DERIK	HARRIS	153 WOODS STREET	MONROE	WA	98272
DICK AND LUCILLE	NEUHARTH	320 E MAIN STREET	MONROE	WA	98272
DINA	KELLEHER	136 CHARLES STREET	MONROE	WA	98272
DON AND DELLA	PAYNE	P O BOX 628	DUVALL	WA	98019
DONALD	ROBERTSON	20014 STATE ROUTE 2 UNIT A	MONROE	WA	98272

DONALD	ROBERTSON	21312 132ND STREET SE	MONROE	WA	98272
DONALD AND JEANETTE	EATON	19912 STATE ROUTE 2	MONROE	WA	98272
ERNEST AND JENNIFER	WALTERS	144 CHARLES STREET	MONROE	WA	98272
G AND L 2		205 WEST CASINO ROAD	EVERETT	WA	98204
GARSAN LLC		5122 220TH STREET NW	STANWOOD	WA	98292
GARY	MOORE	424 LAKE VIEW ROAD	LYNNWOOD	WA	98037
HOUSING HOPE		5830 EVERGREEN WAY	EVERETT	WA	98203
JENNIFER L	CARROLL	129 CHARLES STREET	MONROE	WA	98272
JIM AND CAROLYN	DENT	19114 YEW WAY	SNOHOMISH	WA	98290
JULIAN LOPEZ AND	MAYRA CORTES	544 SIMONS ROAD	MONROE	WA	98272
KATHLEEN	FAULDS	313 THOMPSON LANE	MONROE	WA	98272
KATHLEEN	ANDERSEN	6316 188TH STREET SE	SNOHOMISH	WA	98290
KENNETH AND NONA	GOODWIN	404 E FREMONT STREET	MONROE	WA	98272
KEVIN	PEASE	6211 205TH STREET SE	SNOHOMISH	WA	98290
KURT	BIDERBOST	127 CHARLES STREET	MONROE	WA	98272
LAUREN	WIBBELMAN	147 S ANN STREET	MONROE	WA	98272
LAWRENCE CRESWELL JR, ET AL		P O BOX 291	MONROE	WA	98272
LOIS	PEASE	152 CHARLES STREET	MONROE	WA	98272
MATSON	BROWN	4203 81ST PLACE NE	MARYSVILLE	WA	98270
MILLENIUM MOTORS INC		25555 NE 80TH STREET	REDMOND	WA	98053
MONROE PROPERTY INVESTMENTS LLC		95 KIRKLAND AVENUE	KIRKLAND	WA	98033
MONROE SCHOOL DISTRICT #103		200 E FREMONT STREET	MONROE	WA	98272
ODIN AND JULIE	NELSON	15691 LAKEVIEW AVENUE SE	MONROE	WA	98272
PAUL	REASONER	9202 W MEADOW LAKE DRIVE	SNOHOMISH	WA	98290
RAILROAD PROPERTIES LLC		420 E 18TH STREET	TACOMA	WA	98421
RAWLIN	ROOT	10820 22ND DRIVE SE	EVERETT	WA	98208
RETA	JENSEN	151 CHARLES STREET	MONROE	WA	98272
ROBERT AND MARY	BLANCHARD	334 THOMPSON LANE	MONROE	WA	98272
RULE REAL ESTATE I LLC		124 WOODS STREET	MONROE	WA	98272
RULE REAL ESTATE II LLC		17132 267TH DRIVE SE	MONROE	WA	98272
RUMAR LLC		103 RIVMONT DRIVE E	MONROE	WA	98272
SAMUEL NAHOOPII TRUST		54-056 KUKUNA ROAD	HAUULA	HI	96717
SCOTT	WATERMAN	3115 NE 84TH STREET	SEATTLE	WA	98115
SETH	FISHER	15104 178TH AVENUE SE	MONROE	WA	98272
SNOHOMISH COUNTY		3000 ROCKEFELLER AVENUE M/S 404	EVERETT	WA	98201
STEPHEN HAUER AND	AMANDA PALMER	22500 SE 56TH STREET UNIT 22-306	ISSAQUAH	WA	98029
TOMAS AND EDITH	LUNDSTROM	12517 182ND AVENUE SE	SNOHOMISH	WA	98290
VERIZON NORTHWEST INC		PO BOX 152206	IRVING	TX	75015
VICKI	EPPIG	322 THOMPSON LANE	MONROE	WA	98272
WAYNE AND JOAN	WHISNANT	302 SOUTH BLAKELY STREET	MONROE	WA	98272
WILLIAM	SANDERSON	129 WOODS STREET	MONROE	WA	98272

EXHIBIT 9-C

AFFIDAVIT OF POSTING
NOTICE OF PUBLIC HEARING

STATE OF WASHINGTON)

COUNTY OF SNOHOMISH)

147 S Ann St., Monroe WA 98272
Address

River's Edge Shoreline Variance and Shoreline Development SLVR2018-01/SLDP2018-03
Application File and Name

I, Ron Paynter (print name) being first duly sworn on oath, depose and say: That I am a citizen of the United States of America; That I am competent to be witness herein; That on **the 8th day of March, 2019,** and at least ten days prior to the hearing of the above named proposed application, I posted two (2) signs for the **Notice of Public Hearing for the River's Edge Shoreline Variance and Shoreline Development Permit** on or near the property concerned, in a conspicuous place; and the correct date of posting of said notice, to wit:

147 S Ann St. / XXX Simons Rd, Monroe WA98272
Location of Notice

Signed

Subscribed and sworn to me this 8th day of March, 2019

NOTARY SEAL

KIM M SHAW
NOTARY PUBLIC
STATE OF WASHINGTON
COMMISSION EXPIRES
06-03-20

Kim Shaw
NOTARY PUBLIC in and for the State of Washington, residing at:

Snohomish County

Printed Name: Kim Shaw

My commission expires: 6/3/2020

EXHIBIT 9-D

AFFIDAVIT OF POSTING
NOTICE OF LAND USE PUBLIC HEARING

STATE OF WASHINGTON)

COUNTY OF SNOHOMISH)

Rebecca Ralston / River's Edge LLLP
Applicant

SLDP2018-03/SLVR2018-01, SEPA2018-11
Application File and Name

I, Kim Shaw (print name) being first duly sworn on oath, depose and say: That I am a citizen of the United States of America; That I am competent to be witness herein; That on the 8th day of March, 2019, I posted (1) notice in the City Hall lobby and Emailed (1) notice to the Monroe Public Library; for **Notice of Public Hearing for River's Edge Shoreline Variance and Shoreline Development Permit** and on the correct date of posting of said notice, to wit:

806 W Main St., 1070 Village Way, Monroe WA
Location of Notice

Kim Shaw
Signed

Subscribed and sworn to me this 14th day of March, 2019

NOTARY SEAL

VICKI L. THAYER NOTARY PUBLIC STATE OF WASHINGTON COMMISSION EXPIRES 5-09-20

Vicki L Thayer
NOTARY PUBLIC in and for the State of Washington, residing at:

Snohomish County

Printed Name: Vicki Thayer

My commission expires: 5/9/2020

COMMUNITY DEVELOPMENT
NOTICE OF LAND USE PUBLIC HEARING

NOTICE is hereby given that a **PUBLIC HEARING** is scheduled to be held on the proposed **SHORELINE DEVELOPMENT PERMIT AND SHORELINE VARIANCE FOR RIVER'S EDGE** on **THURSDAY, MARCH 21, 2019 AT 1:30 P.M.** by the City of Monroe Hearing Examiner in the Council Chambers at City Hall, located at 806 West Main Street, Monroe, WA.

PROJECT NAME: **River's Edge Shoreline Substantial Development Permit and Shoreline Variance**

PROJECT FILE #: SLDP2018-03/SLVR2018-01/SEPA2018-11

APPLICANT CONTACT: Rebecca Ralston on behalf of River's Edge WA, LLLP

PROJECT DESCRIPTION: Demolition of the existing structures, identifying and removing contaminants related to the legacy of industrial use, grade/prepare the site to construct a 166-unit multi-family residential affordable housing development on approximately 9.6 acres. The proposal includes access, parking, connection to existing utilities, and a stormwater plan. A compensatory mitigation plan had been designed to offset impacts to the shorelines/critical areas resulting from this project.

PROJECT LOCATION: The site is located in the SW quarter of Township 27, Section 06, and Range 07. The site encompasses six (6) parcels and is adjacent to Woods Creek; otherwise known as 147 S. Ann Street, Monroe, Washington, 98272. Snohomish County Tax Parcel Numbers: 27070600300500, 27070600302300, 27070600303300, 27070600300600, 27070600300700, 00465000001100.

PUBLIC COMMENTS/ APPROVAL PROCESS: Anyone wishing to comment on the above items or to provide other relevant information may do so in writing or appear in person before the Hearing Examiner at the time and place of said public hearing. The Hearing Examiner is required to issue a final decision on this project pursuant to MMC 21.50.030(D). Per MMC 19.01.110(D), the hearing examiner's decision shall become final and the shoreline substantial development permit shall be issued upon the terms and conditions prescribed by the hearing examiner, if no appeal is filed. The hearing examiner's decision shall be filed with the Department of Ecology. Per MMC 19.01.120(B), the hearing examiner shall have the authority to hear and make findings, conclusions, and recommendations on shoreline variances. The city council shall have authority to grant variances from the substantive requirements of this Shoreline Master Program. The city shall submit all issued variances to the Department of Ecology for final approval or disapproval.

PUBLIC REVIEW OF DOCUMENTS: The file is available for review during regular business hours, 8:00 a.m. - 5:00 p.m., Monday - Friday at Monroe City Hall, 806 West Main Street, Monroe WA. For more information, please contact Kim Shaw at (360) 863-4532 or kshaw@monroewa.gov. Project information is also available on the city's website at: www.monroewa.gov/791/RiversEdgeShorelinePermits.

STAFF CONTACT: Anita Marrero, Senior Planner, at (360) 863-4513 or amarrero@monroewa.gov.

Accommodations for people with disabilities will be provided upon request.
Please contact City Hall at (360) 794-7400 and allow one-week advance notice.

EXHIBIT 9-E

From:	Kim Shaw
To:	Kim Shaw
Cc:	Anita Marrero
Bcc:	"separegister@ecy.wa.gov"; "pspirito@sno-isle.org"; "lanthony@sno-isle.org"; "Justin.fontes@ftr.com"; "david.matulich@pse.com"; "john_warrick@cable.comcast.com"; "crenderlein@snopud.com"; "Kate.Tourtellot@commtrans.org"; "Neilwheeler@comcast.net"; "Eileen.lefebvre@providence.org"; "piplicd@monroe.wednet.edu"; "Gretchen.Kaehler@DAHP.wa.gov"; "sharon.swan@snoco.org"; "Diane.Rolph@co.snohomish.wa.us"; "mfitzgerald@snofire7.org"; "k.kerwin@snoco.org"; "SEPA@pscleanair.org"; "stevev@pscleanair.org"; "eip@parks.wa.gov"; "sposner@utc.wa.gov"; "kmclain@agr.wa.gov"; "ike.nwankwo@commerce.wa.gov"; "reviewteam@commerce.wa.gov"; "sepadesk@dfw.wa.gov"; "efheinitz@doc1.wa.gov"; "sepacenter@dnr.wa.gov"; "ramin.pazooki@wsdot.wa.gov"; "randy.kline@parks.wa.gov"; "somers.elaine@epa.gov"; "epa-seattle@epa.gov"; "Stan.Allison@faa.gov"; "Karen.Wood-McGuiness@fema.dhs.gov"; "kjoseph@sauk-suiattle.com"; "njoseph@sauk-suiattle.com"; "jjoseph@sauk-suiattle.com"; "ryoung@tulaliptribes-nsn.gov"; "klyste@stillaguamish.com"; "pstevenson@stillaguamish.com"; "newstips@heraldnet.com"; "mmuscari@esassoc.com"; "info@PPTValley.org"; "tom.laufmann@sno.wednet.edu"; "rooseveltwater@frontier.com"; "staff@highlandwaterdistrict.com"; "bewood@snopud.com"; "faye.ryan@pse.com"; "dan.o.olson@williams.com"; "shannon.fleming@snoco.org"; "zlamebull@tulaliptribes-nsn.gov"; "wrightp@wsdot.wa.gov"; "mrobenland@doc1.wa.gov"; "mannixj@monroe.wednet.edu"; "hansenh@monroe.wednet.edu"; "JPrichard@republicservices.com"; "rodrijr@dshs.wa.gov"; "ehquestions@snohd.org"; "serviceaddresscorrec@pse.com"; "Jennifer.lee@psp.wa.gov"; "wcr.nepa@noaa.gov"
Subject:	Notice of Public Hearing for River"s Edge Shoreline Development Permit and Shoreline Variance
Date:	Friday, March 8, 2019 3:07:00 PM
Attachments:	NOPH Rivers Edge.pdf

Good Afternoon,

Good Afternoon,
Please see the attached Notice of Public Hearing for the River's Edge Shoreline Development Permit and Shoreline Variance - City of Monroe File #'s SLDP2018-03/SLVR2018-01. For specific questions regarding this project, please contact Anita Marrero, Senior Planner, at (360) 863-4513 or at amarrero@monroewa.gov.
You can also access this information on the City's website at:
http://www.monroewa.gov/791/RiversEdgeShorelinePermits

Thank you,

Kim Shaw

Kim Shaw, CPT | Land Use Permit Supervisor
806 West Main Street | Monroe, WA 98272
360-863-4532 | kshaw@monroewa.gov

NOTE: This email is considered a public record and may be subject to public disclosure.

From:	Kim Shaw
To:	Kim Shaw
Cc:	Anita Marrero
Bcc:	"mooremason@aol.com"; "judystan01@gmail.com"; "carrolljl@aol.com"; "Stephanie.Jolivette@dahp.wa.gov"; "aalfred@snohd.org"; "pe_woods@hotmail.com"; "SEPA@pscleanair.org"; "klyste@stillaguamish.com"
Subject:	Notice of Public Hearing for River"s Edge Shoreline Development Permit and Shoreline Variance
Date:	Tuesday, March 12, 2019 7:48:29 AM
Attachments:	NOPH Rivers Edge.pdf

Good Morning,

As an interested party of record, please see the attached Notice of Public Hearing for the River's Edge Shoreline Development Permit and Shoreline Variance - City of Monroe File #'s SLDP2018-03/SLVR2018-01. For specific questions regarding this project, please contact Anita Marrero, Senior Planner, at (360) 863-4513 or at amarrero@monroewa.gov.

You can also access this information on the City's website at:

http://www.monroewa.gov/791/RiversEdgeShorelinePermits

Thank you,

Kim Shaw

Kim Shaw, CPT | Land Use Permit Supervisor
806 West Main Street | Monroe, WA 98272
360-863-4532 | kshaw@monroewa.gov

NOTE: This email is considered a public record and may be subject to public disclosure.

EXHIBIT 10

MITIGATED DETERMINATION OF NON-SIGNIFICANCE (MDNS)

LOCAL FILE NUMBER: SEPA2018-11

NAME OF PROPOSAL: River's Edge Shoreline Substantial Development Permit and Shoreline Variance

DESCRIPTION OF PROPOSAL: Demolition of the existing structures, identifying and removing contaminants related to the legacy of industrial use, grade/prepare the site to construct a 166-unit multi-family residential affordable housing development on approximately 9.6 acres. The proposal includes access, parking, connection to existing utilities, and a stormwater plan. A compensatory mitigation plan had been designed to offset impacts to the shorelines/critical areas resulting from this project.

LOCATION OF PROPOSAL: The site is located in the SW quarter of Township 27, Section 06, and Range 07. The site encompasses six (6) parcels and is adjacent to Woods Creek; otherwise known as 147 S. Ann Street, Monroe, Washington, 98272. Snohomish County Tax Parcel Numbers: 27070600300500, 27070600302300, 27070600303300, 27070600300600, 27070600300700, 00465000001100.

PROPONENT: Rebecca Ralston on the behalf of River's Edge WA, LLLP

LEAD AGENCY: City of Monroe

THRESHOLD DETERMINATION:
The lead agency for this proposal has determined that this proposal as mitigated 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 for review upon request at Monroe City Hall, 806 West Main Street, Monroe, WA 98272 between the hours of 8:00 a.m. and 5:00 p.m. Monday through Friday, excluding holidays.

MITIGATION MEASURES:

1. In the event that any ground-disturbing or other construction activities result in the unanticipated discovery of archeological resources, work should be halted in the immediate area, and contact made with city officials, the technical staff at DAHP, and

tribal representatives. Work should be stopped until further investigation and appropriate consultation have concluded. In the unlikely event of the inadvertent discovery of human remains, work should be immediately halted in the area, the discovery covered and secured against further disturbance, and contact effected with law enforcement personnel, consistent with provisions set forth in RCW 27.44.055 and RCW 68.60.055.

2. Restoration of the site shall follow the Buffer Restoration Plan prepared by Wetland Resources, Inc. dated January 23, 2019. Monitoring shall be conducted annually for five (5) years and shall include site inspections and annual reports.
3. A split-rail fence shall be installed along the perimeter of the restored/naturally vegetated areas.
4. All development shall proceed in accordance with the recommendations of the Supplemental Phase II Environmental Site Assessment prepared by Landau Associates dated November 12, 2018, including the following:
    - Follow the guidance provided in the Excavated Material Management Plan (EMMP; LAI 2018) during construction. The EMMP provides information on areas requiring further remedial excavation and/or confirmation sampling that will need to be conducted during construction.
    - Conduct additional explorations to evaluate the extent of the petroleum hydrocarbon contamination detected in P4-MW and to monitor plume conditions. This would likely include direct-push explorations to screen for the extent of contamination with follow-up installation of wells for long-term monitoring of groundwater contaminant conditions. A program of monitored natural attenuation (MNA) may be a feasible remedial alternative for the site if it is found that the plume is stable or shrinking. However, if the plume is found to be expanding or increasing in contaminant concentrations, a more active remedial alternative such as enhanced bioremediation through injection of a terminal electron acceptor solution (oxygen, nitrate, or sulfate depending on plume conditions and local geochemistry) may be necessary.
    - Semiannual monitoring of Woods Creek surface water shall be conducted to evaluate the potential long-term impacts associated with the arsenic and zinc contamination detected in the groundwater samples collected at the site.

☐ There is no comment period for this MDNS.
☐ This MDNS is issued after using the optional DNS process in WAC 197-11-355. There is no further comment period on the DNS.
☒ This MDNS is issued under WAC 197-11-340(2); the lead agency will not act on this proposal for 14 days from the date below. Comments must be submitted by **March 11, 2019.**

Responsible Official:

Ben Swanson, Community Development Director
SEPA Responsible Official
(360) 863-4554
Monroe City Hall
806 West Main Street
Monroe, WA 98272
bswanson@monroewa.gov

Date: 2/21/19 **Signature:**

Date of Issuance: February 25, 2019

Deadline for Submitting Comments: 5:00 p.m. on March 11, 2019

Appeals: Appeals to the above Mitigated Determination of Non-significance must be filed with the City of Monroe within fourteen working days of the date of issuance above (**Appeal deadline is 5:00 p.m., March 11, 2019**). Appeals must be made on appeal forms available at Monroe City Hall, 806 West Main Street, Monroe, WA 98272. Appeals must be filed in original form in accordance with MMC Chapter 21.60. Appeals shall set forth the specific reason, rationale, and/or basis for the appeal.

Staff Contact

Questions about the proposal may be directed to Anita Marrero, Senior Planner, at amarrero@monroewa.gov or (360) 863-4513.

EXHIBIT 10-A

Everett Daily Herald

Affidavit of Publication

State of Washington }
County of Snohomish } ss

Dicy Sheppard being first duly sworn, upon oath deposes and says: that he/she is the legal representative of the Everett Daily Herald a daily newspaper. The said newspaper is a legal newspaper by order of the superior court in the county in which it is published and is now and has been for more than six months prior to the date of the first publication of the Notice hereinafter referred to, published in the English language continually as a daily newspaper in Snohomish County, Washington and is and always has been printed in whole or part in the Everett Daily Herald and is of general circulation in said County, and is a legal newspaper, in accordance with the Chapter 99 of the Laws of 1921, as amended by Chapter 213, Laws of 1941, and approved as a legal newspaper by order of the Superior Court of Snohomish County, State of Washington, by order dated June 16, 1941, and that the annexed is a true copy of EDH846040 SEPA2018-11 MDNS as it was published in the regular and entire issue of said paper and not as a supplement form thereof for a period of 1 issue(s), such publication commencing on 02/25/2019 and ending on 02/25/2019 and that said newspaper was regularly distributed to its subscribers during all of said period.

The amount of the fee for such publication is $131.95.

Dicy Sheppard

Subscribed and sworn before me on this 25th day of February, 2019.

Diana L Beaver

Notary Public in and for the State of Washington.

City Of Monroe | 14103247
KIM SHAW

DIANA L BEAVER
NOTARY PUBLIC
COMMISSION EXPIRES
4-29-21
STATE OF WASHINGTON

CITY OF MONROE, WASHINGTON
NOTICE OF MITIGATED DETERMINATION OF
NON-SIGNIFICANCE (MDNS)

LOCAL FILE NUMBER: SEPA2018-11 NAME OF PROPOSAL: River's Edge Shoreline Substantial Development Permit and Shoreline Variance DESCRIPTION OF PROPOSAL: Demolition of the existing structures, identifying and removing contaminants related to the legacy of industrial use, grade/prepare the site to construct a 166-unit multi-family residential affordable housing development on approximately 9.6 acres. The proposal includes access, parking, connection to existing utilities, and a stormwater plan. A compensatory mitigation plan had been designed to offset impacts to the shorelines/critical areas resulting from this project. LOCATION OF PROPOSAL: The site is located in the SW quarter of Township 27, Section 06, and Range 07. The site encompasses six (6) parcels and is adjacent to Woods Creek; otherwise known as 147 S. Ann Street, Monroe, Washington, 98272. Snohomish County Tax Parcel Numbers: 27070600300500, 27070600302300, 27070600303300, 27070600300600, 27070600300700, 00465000001100. PROPONENT: Rebecca Ralston on the behalf of River's Edge WA, LLLP LEAD AGENCY: City of Monroe THRESHOLD DETERMINATION: The lead agency for this proposal has determined that this proposal as mitigated 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 for review upon request at Monroe City Hall, 806 West Main Street, Monroe, WA 98272 between the hours of 8:00 a.m. and 5:00 p.m. Monday through Friday, excluding holidays. MITIGATION MEASURES: 1.) In the event that any ground-disturbing or other construction activities result in the unanticipated discovery of archeological resources, work should be halted in the immediate area, and contact made with city officials, the technical staff at DAHP, and tribal representatives. Work should be stopped until further investigation and appropriate consultation have concluded. In the unlikely event of the inadvertent discovery of human remains, work should be immediately halted in the area, the discovery covered and secured against further disturbance, and contact effected with law enforcement personnel, consistent with provisions set forth in RCW 27.44.055 and RCW 68.60.055. 2.) Restoration of the site shall follow the Buffer Restoration Plan prepared by Welland Resources, Inc. dated January 23, 2019. Monitoring shall be conducted annually for five (5) years and shall include site inspections and annual reports. 3.) A split-rail fence shall be installed along the perimeter of the restored/naturally vegetated areas. 4.) All development shall proceed in accordance with the recommendations of the Supplemental Phase II Environmental Site Assessment prepared by Landau Associates dated November 12, 2018, including the following: A.) Follow the guidance provided in the Excavated Material Management Plan (EMMP; LAI 2018) during construction. The EMMP provides information on areas requiring further remedial excavation and/or confirmation sampling that will need to be conducted during construction. B.) Conduct additional explorations to evaluate the extent of the petroleum hydrocarbon contamination detected in P4-MW and to monitor plume conditions. This would likely include direct-push explorations to screen for the extent of contamination with follow-up installation of wells for long-term monitoring of groundwater contaminant conditions. A program of monitored natural attenuation (MNA) may be a feasible remedial alternative for the site if it is found that the plume is stable or shrinking. However, if the plume is found to be expanding or increasing in contaminant concentrations, a more active remedial alternative such as enhanced bioremediation through injection of a terminal electron acceptor solution (oxygen, nitrate, or sulfate depending on plume conditions and local geochemistry) may be necessary. C.) Semiannual monitoring of Woods Creek surface water shall be conducted to evaluate the potential long-term impacts associated with the arsenic and zinc contamination detected in the

groundwater samples collected at the site. ✗ This MDNS is issued under WAC 197-11-340(2); the lead agency will not act on this proposal for 14 days from the date below. Comments must be submitted by March 11, 2019. Responsible Official: Ben Swanson, Community Development Director, SEPA Responsible Official, (360) 863-4554, Monroe City Hall, 806 West Main Street Monroe, WA 98272 bswanson@monroewa.gov. Date of Issuance: February 25, 2019 Deadline for Submitting Comments: 5:00 p.m. on March 11, 2019 Appeals: Appeals to the above Mitigated Determination of Non-significance must be filed with the City of Monroe within fourteen working days of the date of issuance above (Appeal deadline is 5:00 p.m., March 11, 2019). Appeals must be made on appeal forms available at Monroe City Hall, 806 West Main Street, Monroe, WA 98272. Appeals must be filed in original form in accordance with MMC Chapter 21.60. Appeals shall set forth the specific reason, rationale, and/or basis for the appeal. Staff Contact: Questions about the proposal may be directed to Anita Marrero, Senior Planner, at amarrero@monroewa.gov or (360) 863-4513.
Published: February 25, 2019. EDH846040

EXHIBIT 10-B

AFFIDAVIT OF MAILING
NOTICE OF SEPA DETERMINATION (MDNS)

STATE OF WASHINGTON)

COUNTY OF SNOHOMISH)

Rivers Edge Shoreline Variance/SD - SLSD2018-01/SLVR2018-01
Application Name & File #

Rebecca Ralston
Applicant

I, **Kim Shaw**, being first duly sworn on oath depose and say that on the **22nd** day of **February 2019**, made application with Click 2 Mail to mail on **February 23, 2019,** a copy with prepaid postage of the **Notice of Mitigated Determination of Non-Significance for Rivers Edge Shoreline Permits.** Attached is a list of names and addresses to whom this information was mailed.

Kim Shaw
Signed

Subscribed and sworn to me this 25th day of February, 2019

NOTARY SEAL

VICKI L. THAYER NOTARY PUBLIC STATE OF WASHINGTON COMMISSION EXPIRES 5-09-20

Vicki L Thayer
NOTARY PUBLIC in and for the State of Washington, residing at:

Snohomish County

Printed Name: Vicki L. Thayer

My commission expires: 5/9/2020

OWNER NAME	OWNER ADDRESS	OWNER CITY	OWNER STATE	OWNER ZIP
140 WOODS STREET LLC	1166 VILLAGE WY STE B	MONROE	WA	98272
143 ST ANN LLC	307 N MADISON ST	MONROE	WA	98272
320 EAST MAIN LLC	320 E MAIN ST	MONROE	WA	98272-1540
449 RAILROAD LLC	449 RAILROAD AVE	MONROE	WA	98272-2330
AMSBERRY 500 MAIN LLC	500 MAIN ST	MONROE	WA	98272
ANDERSEN KATHLEEN S	6316 188TH ST SE	SNOHOMISH	WA	98290
BENTZ PROPERTIES LLC	2081 CLIFFSIDE TERRACE	CAMANO ISLAND	WA	98282
BERGER DEBORAH	105 RIVMONT DR E	MONROE	WA	98272
BIDERBOST KURT	127 CHARLES ST	MONROE	WA	98272
BLANCHARD ROBERT & MARY	334 THOMPSON LN	MONROE	WA	98272-2360
BROWN MATSON	4203 81ST PL NE	MARYSVILLE	WA	98270-3436
BURLINGTON NORTHERN RR	PO BOX 961089	FORT WORTH	TX	76161-0089
CARROLL JENNIFER L	129 CHARLES ST	MONROE	WA	98272-2302
CRESWELL LAWRENCE S JR ET AL	P O BOX 291	MONROE	WA	98272
DANGER CONNIE N	17043 156TH AVE SE	MONROE	WA	98272
EATON DONALD & JEANETTE L	19912 STATE ROUTE 2	MONROE	WA	98272
EPPIG VICKI K	322 THOMPSON LN	MONROE	WA	98272
FAULDS KATHLEEN	313 THOMPSON LN	MONROE	WA	98272-2360
FIFIELD WILL & STEPHANIE	145 WOODS ST	MONROE	WA	98272
FISHER SETH STEVEN	15104 178TH AVE SE	MONROE	WA	98272
FONTES CONNIE KAREN	131 CHARLES ST	MONROE	WA	98272-2302
G & L 2	205 WEST CASINO RD	EVERETT	WA	98204
GLOBAL SIGNAL ACQUISITIONS IV LLC	2000 CORPORATE DR	CANONSBURG	PA	15317
GOODWIN KENNETH R & NONA A	404 E FREMONT ST	MONROE	WA	98272-2315
HALLERT BRIGITTE	151 CHARLES ST	MONROE	WA	98272
HARRIS DERIK R	153 WOOD ST	MONROE	WA	98272
HAUER STEPHEN & PALMER AMANDA	22500 SE 56TH ST UNIT 22-306	ISSAQUAH	WA	98029
HOUGARDY PATRICK A & KAILEE D	315 THOMPSON LN	MONROE	WA	98272-2360
HOUSING HOPE	5830 EVERGREEN WAY	EVERETT	WA	98203
JENSEN RETA	151 CHARLES ST	MONROE	WA	98272
JOHNSON JEREMY D & ADELEINEA	139 WOODS ST	MONROE	WA	98272-2327
JOHNSTON CAMERON	158 CHARLES ST	MONROE	WA	98272-2303
KELLEHER DINA	136 CHARLES ST	MONROE	WA	98272-2303
LOPEZ CESAR JULIAN R/CORTES MAYRA A R	544 SIMONS RD	MONROE	WA	98272
LUNDSTROM TOMAS & EDITH	12517 182ND AVE SE	SNOHOMISH	WA	98290
MASSINE DENNIS	11418 215TH AVE SE	SNOHOMISH	WA	98290
MILLENIUM MOTORS INC	25555 NE 80TH ST	REDMOND	WA	98053
MONROE CITY OF	806 W MAIN	MONROE	WA	98272

MONROE SCHOOL DIST #103	200 E FREMONT ST	MONROE	WA	98272
MOORE GARY B	424 LAKE VIEW RD	LYNNWOOD	WA	98037
NELSON ODIN O JR & JULIE A	15691 LAKEVIEW AVE SE	MONROE	WA	98272
NEUHARTH DICK D & LUCILLE	320 E MAIN	MONROE	WA	98272
OLNEY AUSTIN	162 CHARLES ST	MONROE	WA	98272
PAYNE DON & DELLA	P O BOX 628	DUVALL	WA	98019
PEASE LOIS M	152 CHARLES ST	MONROE	WA	98272-2303
POPA COSMIN & REBECCA P	412 166TH AVE NE	BELLEVUE	WA	98008
POPA EMANUEL	307 N MADISON ST	MONROE	WA	98272
RAILROAD PROPERTIES LLC	PO BOX 119	CENTRALIA	WA	98531
REASONER ERNESTINE L	22506 SE HIGHLAND CIRCLE	ISSAQUAH	WA	98029
ROBERTSON DONALD & KIM	21312 132ND ST SE	MONROE	WA	98272
ROBERTSON DONALD E	20014 HWY 2 UNIT A	MONROE	WA	98272
ROOT RAWLIN	10820 22ND DR SE	EVERETT	WA	98208
RULE REAL ESTATE I LLC	124 WOODS ST	MONROE	WA	98272-2328
RUMAR LLC	103 RIVMONT DR E	MONROE	WA	98272
SANDERSON WILLIAM S	129 WOODS STREET	MONROE	WA	98272
SNOHOMISH COUNTY	3000 ROCKEFELLER AVE M/S 404	EVERETT	WA	98201
VERIZON NORTHWEST INC	PO BOX 152206	IRVING	TX	75015
WAH INVESTMENTS INC	101 LAKE ST S	KIRKLAND	WA	98033
WALTERS ERNEST D & JENNIFER J	144 CHARLES ST	MONROE	WA	98272-2303
WATERMAN SCOTT	3115 NE 84TH ST	SEATTLE	WA	98115
WEAVER AARON P & JULIE A	149 CHARLES ST	MONROE	WA	98272-2302
WIBBELMAN LAUREN E	147 S ANN ST	MONROE	WA	98272

EXHIBIT 10-C

AFFIDAVIT OF POSTING
NOTICE OF MITIGATED DETERMINATION OF NON-SIGNIFICANCE

STATE OF WASHINGTON)

COUNTY OF SNOHOMISH)

Rebecca Ralston / River's Edge LLLP
Applicant

SLDP2018-03/SLVR2018-01, SEPA2018-11
Application File and Name

I, Kim Shaw (print name) being first duly sworn on oath, depose and say: That I am a citizen of the United States of America; That I am competent to be witness herein; That on the 24th day of February, 2019, I posted (1) notice in the City Hall lobby and Emailed (1) notice to the Monroe Public Library; and on the correct date of posting of said notice, to wit:

806 W Main St., 1070 Village Way, Monroe WA
Location of Notice

Kim Shaw
Signed

Subscribed and sworn to me this 25th day of February, 2019

NOTARY SEAL

VICKI L. THAYER
NOTARY PUBLIC
STATE OF WASHINGTON
COMMISSION EXPIRES
5-09-20

Vicki L Thayer
NOTARY PUBLIC in and for the State of Washington, residing at:

Snohomish County

Printed Name: Vicki Thayer

My commission expires: 5/9/2020

City of Monroe
806 West Main Street, Monroe, WA 98272
Phone (360) 794-7400 Fax (360) 794-4007
www.monroewa.gov

NOTICE OF MITIGATED DETERMINATION OF NON-SIGNIFICANCE (MDNS)

NOTICE is hereby given that a **MITIGATED DETERMINATION OF NON-SIGNIFICANCE (MDNS)** has been issued by the City of Monroe SEPA Official for **River's Edge Shoreline Substantial Development Permit and Shoreline Variance**

LOCAL FILE NUMBER: SEPA2018-11

NAME OF PROPOSAL: River's Edge Shoreline Substantial Development Permit and Shoreline Variance

DESCRIPTION OF PROPOSAL: Demolition of the existing structures, identifying and removing contaminants related to the legacy of industrial use, grade/prepare the site to construct a 166-unit multi-family residential affordable housing development on approximately 9.6 acres. The proposal includes access, parking, connection to existing utilities, and a stormwater plan. A compensatory mitigation plan had been designed to offset impacts to the shorelines/critical areas resulting from this project.

LOCATION OF PROPOSAL: The site is located in the SW quarter of Township 27, Section 06, and Range 07. The site encompasses six (6) parcels and is adjacent to Woods Creek; otherwise known as 147 S. Ann Street, Monroe, Washington, 98272. Snohomish County Tax Parcel Numbers: 27070600300500, 27070600302300, 27070600303300, 27070600300600, 27070600300700, 00465000001100.

PROPONENT: Rebecca Ralston on the behalf of River's Edge WA, LLLP **LEAD AGENCY:** City of Monroe

THRESHOLD DETERMINATION:
The lead agency for this proposal has determined that this proposal as mitigated 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 for review upon request at Monroe City Hall, 806 West Main Street, Monroe, WA 98272 between the hours of 8:00 a.m. and 5:00 p.m. Monday through Friday, excluding holidays.

MITIGATION MEASURES:

1. In the event that any ground-disturbing or other construction activities result in the unanticipated discovery of archeological resources, work should be halted in the immediate area, and contact made with city officials, the technical staff at DAHP, and tribal representatives. Work should be stopped until further investigation and appropriate consultation have concluded. In the unlikely event of the inadvertent discovery of human remains, work should be immediately halted in the area, the discovery covered and secured against further disturbance, and contact effected with law enforcement personnel, consistent with provisions set forth in RCW 27.44.055 and RCW 68.60.055.
2. Restoration of the site shall follow the Buffer Restoration Plan prepared by Wetland Resources, Inc. dated January 23, 2019. Monitoring shall be conducted annually for five (5) years and shall include site inspections and annual reports.

3. A split-rail fence shall be installed along the perimeter of the restored/naturally vegetated areas.
4. All development shall proceed in accordance with the recommendations of the Supplemental Phase II Environmental Site Assessment prepared by Landau Associates dated November 12, 2018, including the following:
    - Follow the guidance provided in the Excavated Material Management Plan (EMMP; LAI 2018) during construction. The EMMP provides information on areas requiring further remedial excavation and/or confirmation sampling that will need to be conducted during construction.
    - Conduct additional explorations to evaluate the extent of the petroleum hydrocarbon contamination detected in P4-MW and to monitor plume conditions. This would likely include direct-push explorations to screen for the extent of contamination with follow-up installation of wells for long-term monitoring of groundwater contaminant conditions. A program of monitored natural attenuation (MNA) may be a feasible remedial alternative for the site if it is found that the plume is stable or shrinking. However, if the plume is found to be expanding or increasing in contaminant concentrations, a more active remedial alternative such as enhanced bioremediation through injection of a terminal electron acceptor solution (oxygen, nitrate, or sulfate depending on plume conditions and local geochemistry) may be necessary.
    - Semiannual monitoring of Woods Creek surface water shall be conducted to evaluate the potential long-term impacts associated with the arsenic and zinc contamination detected in the groundwater samples collected at the site.

☐ There is no comment period for this MDNS.

☐ This MDNS is issued after using the optional DNS process in WAC 197-11-355. There is no further comment period on the DNS.

☒ This MDNS is issued under WAC 197-11-340(2); the lead agency will not act on this proposal for 14 days from the date below. Comments must be submitted by **March 11, 2019.**

Responsible Official:

Ben Swanson, Community Development Director
SEPA Responsible Official
(360) 863-4554
Monroe City Hall
806 West Main Street
Monroe, WA 98272
bswanson@monroewa.gov

Date of Issuance: February 25, 2019

Deadline for Submitting Comments: 5:00 p.m. on March 11, 2019

Appeals: Appeals to the above Mitigated Determination of Non-significance must be filed with the City of Monroe within fourteen working days of the date of issuance above (**Appeal deadline is 5:00 p.m., March 11, 2019**). Appeals must be made on appeal forms available at Monroe City Hall, 806 West Main Street, Monroe, WA 98272. Appeals must be filed in original form in accordance with MMC Chapter 21.60. Appeals shall set forth the specific reason, rationale, and/or basis for the appeal.

Staff Contact
Questions about the proposal may be directed to Anita Marrero, Senior Planner, at amarrero@monroewa.gov or (360) 863-4513.

EXHIBIT 10-D

AFFIDAVIT OF POSTING
NOTICE OF MITIGATED DETERMINATION OF NON-SIGNIFICANCE

STATE OF WASHINGTON)

COUNTY OF SNOHOMISH)

147 S Ann St., Monroe WA. 98272
Applicant

SLDP2018-03/SLVR2018-01, SEPA2018-11
Application File and Name

I, Jamie Woolwork (print name) being first duly sworn on oath, depose and say: That I am a citizen of the United States of America; That I am competent to be witness herein; That on the 25th day of February, 2019, I posted two signs for the **Shoreline at Rivers Edge (SD2018-03/SLVR2018-01/SEPA2018-11)** on or near the property concerned, in a conspicuous place; and the correct date of posting of said notice, to wit:

147 S Ann St. / XXX Simons Rd.
Location of Notice

Jamie Woolwork
Signed

Subscribed and sworn to me this 25th day of February, 2019

NOTARY SEAL

AMY L BRIGHT
COMMISSION EXPIRES
NOTARY
PUBLIC
07-17-21
STATE OF WASHINGTON

C B Sutt
NOTARY PUBLIC in and for the State of Washington, residing at:

Snohomish County

Printed Name: Amy L. Bright

My commission expires: 7/17/21

EXHIBIT 10-E

From:	Kim Shaw
To:	Kim Shaw
Cc:	Kim Shaw
Bcc:	"separegister@ecy.wa.gov"; "pspirito@sno-isle.org"; "lanthony@sno-isle.org"; "Justin.fontes@ftr.com"; "david.matulich@pse.com"; "john_warrick@cable.comcast.com"; "crenderlein@snopud.com"; "Kate.Tourtellot@commtrans.org"; "Neilwheeler@comcast.net"; "Eileen.lefebvre@providence.org"; "piplicd@monroe.wednet.edu"; "Gretchen.Kaehler@DAHP.wa.gov"; "sharon.swan@snoco.org"; "Diane.Rolph@co.snohomish.wa.us"; "mfitzgerald@snofire7.org"; "k.kerwin@snoco.org"; "SEPA@pscleanair.org"; "stevev@pscleanair.org"; "eip@parks.wa.gov"; "sposner@utc.wa.gov"; "kmclain@agr.wa.gov"; "ike.nwankwo@commerce.wa.gov"; "reviewteam@commerce.wa.gov"; "sepadesk@dfw.wa.gov"; "efheinitz@doc1.wa.gov"; "sepacenter@dnr.wa.gov"; "ramin.pazooki@wsdot.wa.gov"; "randy.kline@parks.wa.gov"; "somers.elaine@epa.gov"; "epa-seattle@epa.gov"; "Stan.Allison@faa.gov"; "Karen.Wood-McGuiness@fema.dhs.gov"; "kjoseph@sauk-suiattle.com"; "njoseph@sauk-suiattle.com"; "jjoseph@sauk-suiattle.com"; "ryoung@tulaliptribes-nsn.gov"; "klyste@stillaguamish.com"; "pstevenson@stillaguamish.com"; "newstips@heraldnet.com"; "mmuscari@esassoc.com"; "info@PPTValley.org"; "tom.laufmann@sno.wednet.edu"; "rooseveltwater@frontier.com"; "staff@highlandwaterdistrict.com"; "bewood@snopud.com"; "faye.ryan@pse.com"; "dan.o.olson@williams.com"; "shannon.fleming@snoco.org"; "zlamebull@tulaliptribes-nsn.gov"; "wrightp@wsdot.wa.gov"; "mrobenland@doc1.wa.gov"; "mannixj@monroe.wednet.edu"; "hansenh@monroe.wednet.edu"; "JPrichard@republicservices.com"; "rodrijr@dshs.wa.gov"; "EHquestions@snohd.org"; "serviceaddresscorrec@pse.com"; "Rebecca Ralston"; Anita Marrero; Ben Swanson
Subject:	Notice of Mitigated Determination of Non-Significance (City of Monroe)
Date:	Saturday, February 23, 2019 2:49:00 PM
Attachments:	River"s Edge SEPA 02252019.pdf Vicinity Map.pdf REVISED Rivers Edge SEPA 01_23_2019.pdf

---

Good Afternoon,

Please see the attached Mitigated Determination of Non-Significance for the River's Edge Shoreline Substantial Development and Shoreline Variance permit. For specific questions, please contact Anita Marrero, Senior Planner, at (360) 863-4513 or amarrero@monroewa.gov.

You can also find the project documents on the city's web site at:
http://www.monroewa.gov/791/Rivers-Edge-Shoreline-Permits

Thank you,
Kim Shaw

MONROE WASHINGTON
THE ADVENTURE STARTS HERE!

Kim Shaw, CPT | Land Use Permit Supervisor
806 West Main Street | Monroe, WA 98272
360-863-4532 | kshaw@monroewa.gov

NOTE: This email is considered a public record and may be subject to public disclosure.

EXHIBIT 11

NORTH

SITE PLAN
1" = 40' - 0"

SHEET NOTES

A. ARCHITECTURAL FINISHED FLOOR ELEVATIONS ASSUMED TO BE 100'-0". REFER TO APPROVED CIVIL DRAWINGS FOR FINISH FLOOR ELEVATIONS

B. SITE PLAN INCLUDED FOR REFERENCE ONLY. SEE CIVIL DRAWINGS FOR ALL GRADING, PAVING, HORIZONTAL CONTROL AND SITE UTILITY INFORMATION. THE CONTRACTOR SHALL COORDINATE AND VERIFY ALL GRADE ELEVATIONS AND DIMENSIONS PRIOR TO CONSTRUCTION.

C. REFER TO CIVIL DOCUMENTS FOR GRADING AND PAVING REQUIREMENTS, AND SITE UTILITY LOCATIONS.

SITE DATA

SITE INFORMATION

ZONING CLASSIFICATION

RESIDENTIAL ZONE	C / GRB

SITE PARCELS

Parcel A 270706-003-006-00	0.19 ACRES
Parcel A 270706-003-007-00	0.66 ACRES
Parcel A 270706-003-033-00	1.00 ACRES
Parcel B 270706-003-023-00	0.20 ACRES
Parcel C 004650-000-011-00	1.25 ACRES
Parcel D 270706-003-005-00	3.87 ACRES

BUILDING HEIGHT

ALLOWED	PROVIDED
35 FEET	34 FEET

SITE COVERAGE

MAXIMUM	PROVIDED
40%	19%

SETBACKS - 4.120 (4)

FRONT	15 FEET
SIDE	5 FEET, 10 FEET FOR SIDE ST..
REAR	20 FEET

RECREATION SPACE - MMC 18.78.080

REQUIRED	SQUARE FOOTAGE
71 (1) BEDROOM UNITS @ 90 S.F.	6,390
77 (2) BEDROOM UNITS @ 130	10,010
18 (3) BEDROOM UNITS @ 170	3,060
TOTAL REQUIRED	19,460
MIN. REQ. OPEN SPACE FOR CHILDREN = 25%	4,865

PROVIDED	SQUARE FOOTAGE
COVERED	0%
UNCOVERED	65,834
CHILDREN	65,834
TOTAL PROVIDED	65,834

PARKING REQUIREMENTS

REQUIRED	
71 (1) BEDROOM UNITS @ 1.5	106
77 (2) BEDROOM UNITS @ 2	154
18 (3) BEDROOM UNITS @ 1 / UNIT	36
	296
REDUCTION = 20%	-59
TOTAL REQUIRED	237
VARIANCE REQUESTED (13.5%)	-32
TOTAL PROVIDED	205
COMPACT STALLS - MMC 18.86.090	
30% OF STALLS MAY BE COMPACT	61

ACCESSIBLE PARKING

REQUIRED	PROVIDED
2% OF PARKING PROVIDED X 205 = 4	5
ACCESSIBLE VAN = 1 / 6 SPACE = 1	1

BICYCLE STORAGE

REQUIRED	PROVIDED
2% OF PARKING PROVIDED X 205 = 4	5

SH ARCHITECTURE
16771 NE 80th Street Suite 110, Redmond, WA 98052
ph 425.595.3456 fax 702.363.6060 www.sh-architecture.com

ISSUE DATE 01.16.19

REV	DATE	COMMENT

THESE DOCUMENTS HAVE BEEN PRODUCED AS AN INSTRUMENT OF SERVICE AND ARE INTENDED SOLELY FOR THE PURPOSE OF CONSTRUCTING, USING AND MAINTAINING THE PROJECT. SH ARCHITECTURE AS THE ARCHITECT OF RECORD FOR THE PROJECT RETAINS OWNERSHIP OF THESE DOCUMENTS.

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35471 REGISTERED ARCHITECT DARREN FREEMAN LONG STATE OF WASHINGTON

TITLE: SITE PLAN
PROJECT: RIVERS EDGE APARTMENT COMMUNITY
FREEMONT AND ANN ST., MONROE, WA 98272
CLIENT: RIVERS EDGE WA LLLP

JOB NO: 180042

AS1.1

MICHAEL JUENKE 1/16/2019 6:22 PM

RECEIVED 1/23/2019

EXHIBIT 12

Wetland Resources, Inc.

Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance

9505 19th Avenue S.E.
Suite 106
Everett, Washington 98208
(425) 337-3174
Fax (425) 337-3045

January 23, 2019

City of Monroe
Department of Community Development
806 West Main St
Monroe, WA 98272

Re: Shoreline Compliance Narrative for River's Edge

The following narrative is intended to accompany the Shoreline Permit Application for the River's Edge project. It outlines the reasons why this project requires a shoreline substantial development permit and shoreline variance permit, and describes how the proposed project is consistent with the policies and regulations of the City of Monroe Shoreline Master Program (SMP).

Site Description

River's Edge WA LLP, hereafter referred to as 'the applicant' is proposing to construct new apartment buildings within an industrial site consisting of six tax parcels, in the city limits of Monroe, Washington. The development will end a legacy of industrial use in the vicinity of Woods Creek, a regulated shoreline of the state. At present, the subject parcels (Snohomish County tax parcels 00465000001100, 27070600302300, 27070600303300, 27070600300500, 27070600300600, and 27070600300700) are used as heavy machinery and commercial vehicle storage.

Woods Creek and the steep slopes that form the river's banks are the only critical areas observed on or in the vicinity of the property. No wetlands or other aquatic features were observed. Woods Creek is a shoreline of the state and provides documented spawning habitat for several sensitive aquatic species. All development within 200 feet of the ordinary high water mark (OHWM) of Woods Creek must comply with the SMP.

Project Description

River's Edge is a to-be-built 166-unit affordable housing development proposed within the City of Monroe's designated "Downtown Master Plan," which renders existing light-industrial uses legally existing non-conforming status. The development is consistent with the City of Monroe's objective to revitalize the downtown core with private capital investment to support the development of new, residential and mixed-use projects. River's Edge will use high-quality exterior materials, including cementitious siding, and other sustainable building products. The residential units will be income restricted to individuals and families earning no more than 60% of the Snohomish County Area Median Income, which is $103,500. There is a great demand for new, clean, safe, environmentally friendly housing options in Monroe where 85% of the population will income qualify to live at

River's Edge. The new development will have energy efficient features throughout, keeping utility bills very low for residents.

The applicant proposes to demolish existing structures, identify and remove contaminants related to the legacy of industrial use, grade/prepare the site, and construct several multi-family buildings. The proposal includes new residential structures, access, parking, connection to existing utilities, and a stormwater plan A compensatory mitigation plan has been designed to offset impacts to shorelines/critical areas resulting from the project.

A significant portion of the proposed development occurs within 200 feet of the OHWM of Woods Creek, which is the required setback for Woods Creek, pursuant to SMP Chapter 2, subsection D. *Site Development Standards.* The project requires a shoreline substantial development permit due to proposed development in the shoreline (200 feet from the OHWM of Woods Creek). The project requires a variance because development is proposed within the buffer/setback of Woods Creek.

Please note, although development is proposed within the buffer/setback of Woods Creek, it will only occur in the historically disturbed gravel area of the site. The applicant asserts that this project meets shoreline variance criteria due to the significant ecological benefits that are expected to occur relative to the existing condition of the site, and also relative to the likely future use of the site if the variance is denied. The proposal includes removal of approximately 1,900 cubic yards (~19,600 square feet in area) of contaminated soil, removal of invasive species along the hillslope located between the historically disturbed area and the OHWM of Woods Creek, restoration of 15,513 square feet of gravel within the historically disturbed area, installation of a split-rail fence, and a stormwater plan that significantly improves water quality relative to the existing condition.

Enhancement of the hillslope includes removal of industrial waste, control of invasive species, and re-planting with native vegetation throughout an approximately 51,000 square-foot area. Restoration of the historically disturbed area includes gravel removal, decompaction, and installation of native plants within a 15,513 square-foot area at the top of the hillslope. The proposed split-rail fence will be installed along the entire perimeter of the hillslope, and will also encompass the 15,513 square-foot restoration area located at the top of the hillslope. Clean-up of contaminants in the historically disturbed portion of the site will be based on recommendations made in the Excavated Materials Management Plan (EMMP) prepared for this project by Landau Associates.

As stated earlier, the City of Monroe has identified the subject site as part of the Downtown Master Plan with the aim of encouraging redevelopment of the existing light-industrial uses. River's Edge will be the first major redevelopment activity and it will have a far-reaching effect as it will be a catalyst encouraging more economic investment in this light-industrial area. Although the proposed development sits within the shoreline setback of 200' it must be noted that none of the development impacts property that has not already been heavily impacted. The proposed development will introduce lighter land-uses that will have far less detrimental effect on existing native vegetation and wild-life. There will be no future risk of contaminants leaching into soils or groundwater, there will be no more refuse and scrap material laid to rest on the site. The property will be kept clean and maintained into perpetuity. The developer will be a long-term owner and will remain vested in the future of the project and the community at large.

With regard to site design: the 200' setback would render the property undevelopable in compliance with the City of Monroe's Downtown Master Plan because there would not be the ability to achieve necessary parking or open-space for any of the identified residential commercial land uses the City has identified. There is a certain critical mass of development that must be established in order to support the high-cost of cleaning up the site, which simply could not be borne by a developer if the setback were in play, and thus any future project would be rendered infeasible. Please note, this is an irregular shaped property and a 200' setback is simply not feasible, it negates any feasible development that is consistent with the City of Monroe Downtown Master Plan, which would leave the existing lay-down, recycling, construction-staging yard, the only viable activity on the site. This would be a very unfortunate outcome for the community. This project will be a great economic generator for the City and community.

Shoreline Variance Compliance

The City of Monroe shoreline permit application process specifically requires compliance with Monroe Municipal Code (MMC) section 19.01.120(B). The proposed project meets all MMC criteria. The following narrative re-states relevant code citations (italicized, indented text), which are immediately followed by the applicant's response (normal font, justified).

> *1. Variances should be granted in a circumstance where denial of the permit will not thwart the policy enumerated in the Shoreline Management Act or the Master Program. In all instances, extraordinary circumstances shall be shown, and the public interest shall suffer no substantial detrimental effect.*

As previously stated, the project requires a shoreline variance due to proposed development occurring within the 200-foot setback from Woods Creek. In recognizing that the SMP is intended to preserve the resources and ecology of shorelines, and to provide long-term benefits, it is relevant to discuss the merits of this project relative to the existing condition, and also relative to the probable future use of the site (if a variance is denied).

The site is currently used as a parking and storage area for commercial vehicles and equipment, which introduce a variety of toxicants to the ground surface (i.e. diesel, lubricants, hydraulic fluids, coolant, brake dust, metal shavings, and rubber). Stormwater generally flows east across the site as sheetflow, entering one of several natural low points and draining down a steep slope through approximately 30 to 50 feet of native vegetation before meeting Woods Creek. This means that untreated stormwater draining from pollution-generating surfaces flows directly (without detention) to a highly ecologically productive reach of Woods Creek.

The proposed residential use will result in the removal of industrial waste and contaminants from the site, the control of invasive species on the hillslope, and will restore a portion of the historically disturbed gravel area. Significantly, it will also provide a stormwater plan that complies with the current Ecology stormwater manual. The plan routes stormwater from pollution-generating surfaces (parking areas) to an infiltration vault, where it will be tied into the existing stormwater drainage system.

The existing condition impairs resources and functions, and provides no long-term benefits.The proposed project will result in functional ecological improvements and better protection of resources than the existing condition. If a variance is not issued for this property, (and alternate uses would only be allowed within the irregularly-shaped 2 acres located outside of the 200-foot setback), it is expected that the current use of the site would likely continue without improvements.

For these reasons, strict implementation of the SMP (a required 200-foot setback in this case) would thwart the policies of the Shoreline Management Act (SMA) by providing a strong incentive to maintain the existing use of the site. The applicant asserts that the variance request for this project is consistent with the goals of the SMP, and should be allowed.

With regard to site design: the 200' setback would render the property undevelopable in compliance with the City of Monroe's Downtown Master Plan because there would not be the ability to achieve necessary parking or open-space for any of the identified residential commercial land uses the City has identified. There is a certain critical mass of development that must be established in order to support the high-cost of cleaning up the site, which simply could not be borne by a developer if the setback were in play, and thus any future project would be rendered infeasible. Please note, this is an irregular shaped property and a 200' setback is simply not feasible, it negates any feasible development that is consistent with the City of Monroe Downtown Master Plan, which would leave the existing lay-down, recycling, construction-staging yard, the only viable activity on the site. This would be a very unfortunate outcome for the community. This project will be a great economic generator for the City and community.

2. Variances for development that will be located landward of the ordinary high water mark may be authorized, provided the applicant can demonstrate all of the following:

a. That the strict application of the bulk, dimensional, or performance standards as set forth in the Master Program precludes or significantly interferes with a reasonable permitted use of the property.

Strict application of the bulk standards would require proposed development to occur outside of 200 feet from the OHWM of Woods Creek. The subject properties total 7.17 acres, with 5.07 acres located within 200 feet of Woods Creek. This leaves an irregularly-shaped 2.1 developable acres outside of the setback. The subject property will not be developed if strict application of the standards is enforced. There is no feasible re-development of the property that would be consistent with the City of Monroe Downtown Master Plan if the 200' setback were strictly enforced. Furthermore, it would be a blatant disregard of the good that would come as a result of the proposed development. Again, the development will not impact any land that is not already impacted. In addition, the proposed development will shoulder the cost of clean-up of identified toxins and invasive species. If denied, toxins will continue to leach into soils and groundwater could be at risk. River's Edge will be a catalyst for economic investment and redevelopment of this area of Monroe that is known to have widespread soil contamination from historic industrial uses.

b. That the hardship is specifically related to the property and is the result of unique conditions, such as irregular lot shape, size, or natural features, in the application of the Master Program and not, for example, from deed restrictions or the applicant's own actions.

The difficulty in redeveloping the subject property is related to the encumbrance by Woods Creek relative to the shape and size of the assemblage. No deed restrictions are known, and the applicant's own actions have not created this hardship. The River's Edge Development has been thoughtfully and intentionally designed in a way that keeps nuisance lighting from vehicles away from Woods Creek. Parking areas are designated at the center of the site so that buildings can protect Woods Creek from loud noises and excessive light levels. There will be windows and ground-level patios that take advantage of the beautiful setting provided by Woods Creek. There will be a split-rail fence that spans the entire on-site length of the Woods Creek corridor. This will limit human

disturbance on the steep slope and will further preserve the natural environment. Furthermore, statistical evidence shows that having windows, and thus eyes, on property, prevents crime, deters trespassing, and keeps property safer.

c. That the design of the project will be compatible with other permitted activities in the area and not cause adverse effects to adjacent properties or the shoreline environment designation.

The proposed River's Edge development is consistent with the City of Monroe Downtown Master Plan which encourages redevelopment of this light-industrial area with Residential and Mixed-Use land uses. Multi-family development is a permitted use in the shoreline environment designation (High Intensity). Redevelopment of the site is not expected to cause adverse effects to adjacent properties. River's Edge will be an improvement in the community introducing new, high-quality housing where a recycling and construction-staging yard previously existed.

d. That the Variance will not constitute a grant of special privilege not enjoyed by other properties in the area.

The Variance is sought to redevelop a site for residential use. Several properties in the area are developed with residential structures within 200 feet of Woods Creek. This project does not constitute a grant of special privilege. The project has been sited within the footprint of historic disturbance and is the minimum necessary to afford relief. Furthermore, the proposed development is consistent with the City of Monroe Downtown Master Plan. The existing use and neighboring uses are considered legal, though non-conforming with the City's Downtown Master Plan which encourages the redevelopment and economic investment in the existing light-industrial area. The project will help the City achieve its goals to clean up the area from known contamination.

e. That the Variance requested is the minimum necessary to afford relief; and

The capital costs associated with development of the subject property assemblage would prohibit any lesser development than that which is proposed. Therefore, the Variance is the minimum necessary to afford relief. There is a certain critical mass of development that must be established in order to support the high-cost of cleaning up the site, which simply could not be borne by a developer if the setback were in play, and thus any future project would be rendered infeasible. Please note, this is an irregular shaped property and a 200' setback is simply not feasible, it negates any feasible development that is consistent with the City of Monroe Downtown Master Plan.

f. That the public interest will suffer no substantial detrimental effect.

The public interest will benefit directly from the addition of affordable residential units, and indirectly by improving ecological functions along a high-value stream system. Statistical evidence supports that having windows, and thus eyes, on property, prevents crime, deters trespassing, and keeps property safer. The community will benefit greatly from the redevelopment of the property. It will be cleaner, safer, and more sustainable.

3. Variances for development that will be located waterward of the ordinary high water mark may be authorized, provided the applicant can demonstrate all of the criteria specified above; and provided, that the applicant can demonstrate that the public rights of navigation and use of the shorelines will not be adversely affected by the granting of the variance.

Not applicable. No development is proposed waterward of the OHWM of Woods Creek.

4. In granting of all variances, consideration shall be given to the cumulative impact of additional requests or like actions in the area.

South of E McDougall Street, the residential neighborhood is built-out. Several townhouses were built adjacent to the west of the subject property. It is unlikely that additional requests or like actions will be made, based on the level of development in surrounding areas.

5. Variances from the use regulations of this Master Program are prohibited.

Residential development is a permitted use in the High Intensity shoreline environment designation (SMP Chapter 2, subsection C). This proposal complies with the use regulations of the SMP.

Shoreline Use Activity Policies and Regulations Compliance

The SMP describes general policies and specific regulations for the range of allowed uses/activities in shoreline jurisdiction. The following narrative describes SMP compliance for all policies and regulations that relate to the proposed project. The Residential Development subsection of the SMP applies because the primary use is multi-family residential. The Utilities and Parking subsections apply because the proposal includes utility connections and parking space. Due to the proximity to Woods Creek and the potential for impacts, the Vegetation Conservation, Water Quality, and Environmental Impacts subsections apply to this project. Due to access requirements for multi-family development, the Public Access subsection applies to this project.

The following Policies and Regulations subsections of the SMP will be addressed in this narrative:

- Environmental Impacts (Chapter 3, Section E)
- Parking (Chapter 3, Section G)
- Public Access (Chapter 3, Section H)
- Utilities (Chapter 3, Section K)
- Vegetation Conservation (Chapter 3, Section L)
- Water Quality (Chapter 3, Section M)
- Residential Development (Chapter 5, Section G)

Environmental Impacts

The following policies and regulations are requirements of the City of Monroe SMP. They exist for the purpose of assessing potential environmental impacts related to the proposed development. All SMP policies and regulations are provided in indented, italicized font. The applicant's response immediately follows (normal font, justified).

Policies

1. In implementing this Shoreline Master Program, the City will take necessary steps to ensure compliance with Chapter 43.21 RCW, the Washington State Environmental Policy Act of 1971, and its implementing guidelines.

A SEPA checklist has been prepared that demonstrates compliance with Chapter 43.21 RCW of the Washington State Environmental Policy Act of 1971.

2. All significant adverse impacts to the shoreline should be avoided or, if that is not possible, minimized to the extent feasible, according to the sequence described under regulation number 4 of this section.

The site is currently used for commercial vehicle and equipment storage, and is covered with 5/8" gravel. Runoff drains directly to Woods Creek via sheet flow through natural drainage corridors. The proposed development will reduce the intensity of land use, the total area of impervious surfaces, erosion on the bank of Woods Creek, will provide appropriate stormwater drainage, and will improve the quality of naturally vegetated areas in the vicinity of Woods Creek. Overall, the proposed project will improve the ecological function of the site.

3. It is the policy of the City of Monroe to achieve "no net loss" of ecological functions consistent with WAC 173-26-201(2)(c).

The proposed project will achieve no net loss of ecological functions by removing contaminants from the soil (based on the Excavated Materials Management Plan prepared by Landau Associates), and through restoration of a portion of the existing gravel surface, construction of an appropriate stormwater system, removal of invasive species from the hillslope adjacent to Woods Creek, and replanting with native vegetation.

Regulations

1. All project proposals within shoreline jurisdiction, including those for which a shoreline permit is not required, shall comply with Chapter 43.21c RCW, the Washington State Environmental Policy Act.

A SEPA checklist has been prepared that demonstrates compliance with Chapter 43.21 RCW of the Washington State Environmental Policy Act of 1971.

2. Projects that cause significant ecological impacts, as defined in Chapter 8 (Definitions), are not allowed unless mitigated according to the sequence in Item 4 below to avoid reduction or damage to ecosystem-wide processes and ecological functions.

The proposed action will not create a significant ecological impact; all development is proposed in disturbed areas. Additionally, proposed mitigation will improve overall ecological functions as demonstrated in the *Critical Area Study and Restoration Plan* prepared for this project.

3. Projects that cause significant adverse impacts, other than significant ecological impacts, shall be mitigated according to the sequence in Item 4 below.

The proposed project will not cause significant adverse impacts relative to the existing condition.

4. When applying mitigation to avoid or minimize significant adverse effects and significant ecological impacts, the City will apply the following sequence of steps in order of priority, with (a) being top priority:
a. Avoiding the impact altogether by not taking a certain action or parts of an action;
b. Minimizing impacts by limiting the degree or magnitude of the action and its implementation by using appropriate technology or by taking affirmative steps to avoid or reduce impacts;
c. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
d. Reducing or eliminating the impact over time by preservation and maintenance operations;
e. Compensating for the impact by replacing, enhancing, or providing substitute resources or environments; and
f. Monitoring the impact and the compensation projects and taking appropriate corrective measures.

Not applicable. No significant adverse impacts or significant ecological impacts are proposed.

5. The City will set mitigation requirements or permit conditions based on impacts identified. In determining appropriate mitigation measures, avoidance of impacts by means such as relocating or redesigning the proposed development will be applied first. Lower priority measures will be applied only after higher priority measures

are demonstrated to be not feasible or not applicable. When critical areas are impacted, mitigation will be designed consistent with the Critical Areas Regulations, MMC 20.05, as adapted as part of this Shoreline Master Program and included in Appendix A.

Avoidance has been achieved by placing new development in the footprint of the historically disturbed area. Proposed mitigation is intended to improve ecological function beyond what is impacted through redevelopment.

6. All shoreline development shall be located and constructed to avoid significant adverse impacts to human health and safety.

The proposed development footprint occurs in a historically disturbed area, and will have no significant adverse impacts on human health and safety.

7. Application of the mitigation sequence shall achieve no net loss of ecological functions for each new development and will not result in required mitigation in excess of that necessary to assure that development will result in no net loss of shoreline ecological functions and not have a significant adverse impact on other shoreline functions fostered by the policy of the act.

The proposed project will achieve no net loss through mitigation sequencing primarily by siting development within a historically disturbed area. To ensure no net loss, contaminated materials will be removed from the site, a portion of the gravel surface will be restored to native plants, industrial waste will be removed, stormwater will be managed according to current standards, a split-rail fence will be installed along the edge of vegetation, and aggressive non-native species will be removed in the vicinity of Woods Creek.

8. When compensatory measures are appropriate pursuant to the mitigation priority sequence above, preferential consideration shall be given to measures that replace the impacted functions directly and in the immediate vicinity of the impact. However, alternative compensatory mitigation within the watershed that addresses limiting factors or identified critical needs for shoreline resource conservation based on watershed or comprehensive resource management plans applicable to the area of impact may be authorized. Authorization of compensatory mitigation measures may require appropriate safeguards, terms or conditions as necessary to ensure no net loss of ecological functions.

Mitigation will be located in the immediate vicinity of impacted functions. Shoreline restoration and enhancement are proposed as mitigation for this development.

Parking

The following policies and regulations are requirements of the City of Monroe SMP. They exist for the purpose of assessing potential impacts related to parking (that is accessory to residential development). All SMP policies and regulations are provided in indented, italicized font. The applicant's response immediately follows (normal font, justified).

Policies

1. Parking in shoreline areas should be allowed only if it directly serves a permitted shoreline use.

Parking is proposed in shoreline areas. It is provided to serve multi-family residential development, which is a permitted shoreline use.

2. Parking facilities should be located and designed to minimize adverse impacts including those related to stormwater runoff, water quality, visual qualities, public access and vegetation and habitat maintenance.

Parking will be located in areas currently covered by compacted gravel that are used for vehicle storage. Parking will result in removal of eight trees, which are located in the historically disturbed area. No other impacts to vegetation, habitat, visual qualities, or public access are expected to occur. Stormwater will be routed to an infiltration vault, which ties into an existing City storm pipe. The vault will allow pollutants to filter out of the water, and will control the rate at which water flows to Woods Creek.

3. Parking should be planned to achieve optimum use. Where possible, parking should serve more than one use (e.g. serving recreational use on weekends, commercial uses on weekdays).

Parking will serve multi-family residential use, which is needed at all times, every day. No other uses will be served.

4. Where feasible, parking for shoreline uses should be provided in areas outside shoreline jurisdiction.

Parking is located outside of shoreline jurisdiction where possible for this project. Encroachment into shoreline areas is unavoidable, but will be located over existing compacted gravel.

Regulations

1. Parking as a primary use shall be prohibited within the shoreline jurisdiction.

Residential use is the primary use. Parking is incidental to the primary use.

2. Parking in shoreline jurisdiction shall directly serve a permitted shoreline use.

Paring will directly serve the multi-family residential development on the site, which is a permitted use.

3. Parking facilities shall be designed and landscaped to minimize adverse impacts upon adjacent shoreline and abutting properties. Landscaping shall consist of native vegetation and plant materials approved by the City and be planted before completion of the parking area in such a manner that plantings provide effective screening within three years of project completion.

Proposed mitigation includes native planting that will perform a screening function. Furthermore, proposed structures are located between Woods Creek and proposed parking areas, which will provide additional screening. Mitigation planting will occur concurrently with construction.

4. Parking facilities serving individual buildings located on parcels that are contiguous with shoreline waterbodies shall be located landward from the principal building being served, EXCEPT when the parking facility is within or beneath the structure and adequately screened, or in cases when an alternate location would have less environmental impact on the shoreline.

All parking facilities are located landward of the principal buildings being served.

5. Parking facilities for shoreline activities shall provide safe and convenient pedestrian circulation within the parking area and to the shorelines.

Not applicable. Parking facilities do not directly support shoreline activities.

6. Parking facilities shall provide adequate facilities to prevent surface water runoff from contaminating water bodies, using best available technologies and include a maintenance program that will assure proper functioning of such facilities over time.

The proposed stormwater plan has been designed using the currently adopted Ecology Stormwater Manual. This approach is expected to provide adequate facilities to prevent surface water runoff

from contaminating Woods Creek. Stormwater will be directed to an infiltration vault, which ties into City storm infrastructure and outlets directly to Woods Creek. The aforementioned facilities will include a maintenance program that will assure proper function of the facilities over time.

Public Access

The following policies and regulations are requirements of the City of Monroe SMP. They exist for the purpose of defining public access requirements related to the proposed development. All SMP policies and regulations are provided in indented, italicized font. The applicant's response immediately follows (normal font, justified).

Policies

1. Development, uses, and activities on or near the shoreline should not impair or detract from the public's visual access to the water.

No public access or visual access to the water currently exists within the subject properties. Redevelopment will not impair or detract from the public's visual access relative to the existing condition.

2. Public views from the shoreline and upland areas should be enhanced and preserved. Enhancement of views should not be construed to mean excessive removal of vegetation that partially impairs views.

In the vicinity of the project, public views are limited to the Simons Road bridge that provides access to Al Borlin Park. No changes are proposed.

3. Visual access should be maintained, enhanced, and preserved on shoreline street ends, public utilities, and rights-of-way.

No alterations to visual access are proposed on shoreline street ends, public utilities, or rights-of-way.

4. Public access should be provided as indicated in the City of Monroe Parks, Recreation and Open Space Plan (as amended) as long as those public access and park development measures are consistent with the provisions of this Shoreline Master Program.

The City of Monroe Parks, Recreation and Open Space Plan generally describes policies to guide land use decisions for publicly owned properties. The subject property is privately owned, and will not provide explicit public access.

5. Through capital improvements and other measures, the City will continue to enhance opportunities for the public to enjoy the shorelines within Shoreline Management Act jurisdiction.

Not applicable. No capital improvements are proposed.

6. The City will take measures to preserve and enhance the public access to the Skykomish River, Woods Creek, and the Tye Stormwater Facility and provide public access to all Monroe shorelines, where appropriate.

Not applicable. The proposed project is privately funded, and does not propose new limitations on Monroe shorelines.

7. The City will encourage inclusion on Monroe shoreline public access points in the City's non-motorized transportation plan.

Noted.

8. The City will require that new public areas have adequate parking, located outside shoreline jurisdiction, where feasible.

No new public areas are proposed.

9. Public access should be considered in the review of all private and public developments (including land division) with the exception of single lot development and short plats.

No improvements specifically designed for use by the public are proposed.

10. Public access should be provided as close as possible to the water's edge without causing significant ecological impacts and should be designed in accordance with the Americans with Disabilities Act.

No new public access is proposed.

11. The public's opportunities to enjoy the physical and aesthetic qualities of the shorelines should be enhanced on public properties.

Not applicable. The subject property is privately owned.

12. Public informational and educational displays to enhance the public's appreciation and enjoyment of the shorelines are encouraged.

No informational or educational displays are proposed.

Regulations

1. Development, uses and activities on public lands shall be designed and operated to avoid blocking, reducing or adversely interfering with the public's physical access to the water and shorelines, unless such access would cause ecological impacts.

Not applicable. The proposed is privately owned.

2. Public access provided by shoreline street ends, public utilities, rights-of-way, and other public lands shall not be diminished. RCW 35.79.035 and RCW 36.87.130 restrict the City from vacating right-of-way which abuts on a body of fresh water unless the purpose of the vacation is to enable the public authority to acquire the vacated property for boat launching sites, or for park, viewpoint, recreational, and educational or other public purposes.

Not applicable. This project does not affect existing public access; no changes to shoreline street ends, public utilities, rights-of-way, or other public lands are proposed.

3. Shoreline development, uses, and activities shall be designed and operated to avoid blocking, reducing, or adversely interfering with the public's visual access to the water and shorelines, except that vegetation conservation and shoreline restoration activities may intrude into view corridors where necessary to protect or restore ecological functions. The City may require the development proposal to be relocated or reconfigured to reduce view blockage.

The proposed development does not block, reduce, or interfere with existing public visual access to the water or shorelines.

4. Public lands, such as street ends, rights-of-way, and utilities, shall provide, maintain, enhance, and preserve visual access to the water and shoreline in accordance with RCW 35.79.035 and RCW 36.87.130.

Not applicable. The project occurs entirely within privately owned land.

5. Development on the water shall be constructed of non-reflective materials that are compatible in terms of color and texture with the surrounding area.

Not applicable. No development is proposed on the water.

6. The dedication and improvement of public access shall be required as part of developments for water-enjoyment, water-related, and nonwater-dependent uses and for the subdivision of land into more than four parcels. In these cases, public access is required, except:

a. Where the City determines that more effective public access can be provided through other means.

No new public access is proposed. Al Borlin Park, located adjacent to the subject property, provides effective public access to Woods Creek; the park has a beach area, parking lot, picnic tables, river frontage, and signs.

b. Where it is demonstrated to be infeasible due to reasons of incompatible uses, safety, security, or impact to the shoreline environment or due to constitutional or other legal limitations that may be applicable.
In determining the infeasibility, undesirability, or incompatibility of public access in a given situation, the City will consider alternate methods of providing public access, such as off-site improvements, viewing platforms, separation of uses through site planning and design, and restricting hours of public access.

No new public access is proposed. As previously stated, Al Borlin Park is a more suitable site for improved shoreline access.

c. For individual single-family residences not part of a development planned for more than four parcels.

The proposed development is part of a development planned for more than four parcels.

7. The City will work with project proponents to ensure that public access policies and priorities are implemented, especially in ensuring that the opportunities for continuous trails, linear parks and reclamation areas are not lost.

Noted.

8. Shoreline development by public entities, including local governments, state agencies, and public utility districts, shall include public access measures as part of each development project, unless such access is shown to be incompatible due to reasons of safety, security, or impact to the shoreline environment or where the City determines that a more effective public access system can be achieved through alternate means, such as focusing public access at the most desirable locations.

Not applicable. The project proponent is a private company.

Utilities

The following policies and regulations are requirements of the City of Monroe SMP. They exist for the purpose of assessing potential environmental impacts related to utility service for the proposed development. All SMP policies and regulations are provided in indented, italicized font. The applicant's response immediately follows (normal font, justified).

Policies

1. Accessory utilities should be properly installed so as to protect the shoreline and water from contamination and degradation.

Utilities will be installed according to the International Building Code, in compliance with all City of Monroe development standards. Water contamination and degradation are not expected to occur.

2. Accessory utility facilities and rights-of-way should be located outside of the shoreline area to the maximum extent possible. When utility lines require a shoreline location, they should be placed underground.

Utility facilities and rights of way will be located outside of the shoreline area where possible. Utility lines in the shoreline location will be placed underground.

3. Accessory utility facilities should be designed and located in a manner which preserves the natural landscape and shoreline ecological processes and functions and minimizes conflicts with present and planned land uses.

No development is proposed in the natural landscape; the development area is historically disturbed.

Regulations

1. In shoreline areas, accessory utility transmission lines, pipelines and cables shall be placed underground unless demonstrated to be infeasible. Further, such lines shall utilize existing rights-of-way, corridors and/or bridge crossings whenever possible. Proposals for new corridors in shoreline areas involving water crossings must fully substantiate the infeasibility of existing routes.

Pipelines and cables will be placed underground within the shoreline area, except where it is not feasible. No water crossings are necessary.

2. Accessory utility development shall, through coordination with government agencies, provide for compatible multiple use of sites and rights-of-way. Such uses include shoreline access points, trails and other forms of recreation and transportation systems, providing such uses will not unduly interfere with utility operations or endanger public health and safety.

Not applicable. No accessory utility development will require clearing in the shoreline area.

3. Accessory utility facilities should be located so as to avoid the need for bank stabilization structures, whenever feasible.

Accessory utility structures are located away from the steep banks at the southern end of the site and will therefore not require bank stabilization structures.

4. Sites disturbed for utility installation shall be stabilized during and following construction to avoid adverse impacts from erosion and to assure no net loss of ecological functions.

Utility areas will be stabilized during and following construction. As previously mentioned, the implementation of stormwater facilities will improve the ecological function of the site.

Vegetation Conservation

The following policies and regulations are requirements of the City of Monroe SMP. They exist for the purpose of assessing potential impacts related to vegetation removal. All SMP policies and regulations are provided in indented, italicized font. The applicant's response immediately follows (normal font, justified).

Policies

1. It is the policy of this Shoreline Master Program that vegetation within the City shoreline areas be enhanced over time to provide a greater level of ecological functions, human safety and property protection. To this end, shoreline management activities, including the provisions and implementation of this Shoreline Master Program, are based on a comprehensive approach that considers the ecological functions currently and potentially provided by vegetation on different sections of the shoreline.

Much of the shoreline vegetation within the subject property is dominated by invasive species. As part of the proposed mitigation for this site, invasive species will be removed and replaced with desirable native species. Additionally, gravel removal, decompaction, and native planting is proposed in historically disturbed areas. This plan is expected to significantly improve ecological functions relative to the existing condition.

2. This Shoreline Master Program in conjunction with other City development regulations should establish a coordinated and effective set of provisions and programs to protect and restore those functions provided by shoreline vegetation.

Vegetation within the shoreline will be restored, as previously mentioned, by the removal and replacement of invasive species in the buffer area. The buffer will be protected by split-rail fencing and demarcated with critical area signage.

3. The restoration of vegetation should be a condition of all development that causes significant vegetation removal and nonwater dependent development within shoreline areas where vegetation has been degraded from a natural state.

All development will occur within a historically disturbed area. Vegetation removal is limited to eight existing trees within the historically disturbed area. Proposed restoration will more than offset this necessary vegetation removal.

4. Restoration of degraded shorelines due to natural or manmade causes should, wherever feasible, use soil bioengineering techniques to arrest the processes of erosion, sedimentation and flooding.

The proposed development will result in contaminated soil removal, industrial debris removal, and an improved stormwater system. This project will further restore degraded shorelines through installation of native plants. This proposal will limit erosion, sedimentation and flooding by design.

5. Aquatic weed management should stress prevention first. Where active removal or destruction is necessary, it should be the minimum to allow water-dependent activities to continue, minimize negative impacts to native plant communities, and include appropriate handling or disposal of weed materials. Proposals to apply aquatic herbicides must meet all state requirements.

Aquatic weeds were not observed in the vicinity of the subject parcel.

Regulations

1. The creation of new land parcels or lots that would require significant vegetation removal in order to develop is not allowed. In order to create a new lot partially or wholly within shoreline jurisdiction, the applicant must demonstrate that development can be accomplished without significant vegetation removal. The City may make exceptions to this standard for water dependent development and for development in the High Intensity and Tye Stormwater Facility Environments only.

The proposed development does not involve the creation of new land parcels or lots.

2. For activities conducted under the Washington State Forest Practices Act, conform to the provision of that Act and this Shoreline Master Program.

Not applicable. Timber harvest is limited to several trees in the historically disturbed area, and does not trigger Forest Practices permit requirements.

3. All development, including clearing and grading, shall minimize significant vegetation removal to the extent feasible. In order to implement this regulation, applicants proposing development that includes significant vegetation removal, clearing or grading, must provide, as a part of a shoreline permit or a letter of exemption application, a site plan, drawn to scale, indicating extent of the proposed clearing and/or grading. The City may require that the proposed development or extent of clearing and grading be modified to mitigate the impacts to ecological functions.

Development within the shoreline will be confined to an area of historic disturbance that is almost entirely devoid of vegetation. Eight trees will be removed from the historically disturbed area as part of clearing associated with site development. These trees are disparately located throughout the historically disturbed portion of the site. This project is not expected to result in significant vegetation removal.

4. Restoration of any shoreline that has been disturbed or degraded shall use native plant materials with a diversity and type similar to that which naturally occurs on-site unless the City finds that native plant materials are inappropriate or not hardy in the particular situation.

Several buffer restoration areas within the shoreline are proposed. The proposed planting plans are intended to match plant diversity and type to that which naturally occurs.

Water Quality

The following policies and regulations are requirements of the City of Monroe SMP. They exist for the purpose of assessing potential impacts related to water quality. All SMP policies and regulations are provided in indented, italicized font. The applicant's response immediately follows (normal font, justified).

Policies

1. All shoreline uses and activities should be located, designed, constructed, and maintained to avoid significant ecological impacts by altering water quality, quantity, or flow characteristics.

The redevelopment of this site includes a stormwater management system that complies with the current Ecology Stormwater Manual. Currently, stormwater sheetflows across the site and drains down a steep, vegetated slope towards Woods Creek. The proposed plan utilizes an infiltration vault, which will improve water quality, and will deattenuate peak flows from entering Woods Creek. The proposed plan avoids significant ecological impacts.

2. The City should require reasonable setbacks, buffers, and storm water storage basins to achieve the objective of lessening negative impacts on water quality.

Noted.

3. All measures for controlling erosion, stream flow rates, or flood waters through the use of stream control works should be located, designed, constructed, and maintained so that net off-site impacts related to water do not degrade the existing water quality.

Stream control works are not a part of the proposed project.

4. As a general policy, the City will seek to improve water quality, quantity, and flow characteristics in order to protect and restore ecological functions and ecosystem-wide processes of shorelines within Shoreline Management Act jurisdiction. The City will implement this policy through the regulation of development and activities, through the design of new public works, such as roads, drainage, and water treatment facilities, and through coordination with other local, state, and federal water quality regulations and programs. The

City of Monroe has a policy of adopting the latest version of the Department of Ecology Stormwater Management Manual for Western Washington to regulate stormwater discharge and management. The City will encourage practices that further minimize impervious surfaces and stormwater runoff, including use of best available technologies.

The proposed stormwater system adheres to the latest version of the Department of Ecology Stormwater Management Manual for Western Washington. Presently, stormwater generally runs east across the site as sheetflow, follows natural drainage corridors, and flows into Woods Creek (without detention). The proposed plan routes stormwater from pollution-generating surfaces to an infiltration vault, and roof drainage to infiltration trenches. The infiltration vault directs metered flow to the City's existing stormwater infrastructure, which outlets directly to Woods Creek. By regulating flow and increasing the residence time of stormwater, the infiltration vault will allow pollutants to drop out of stormwater before flowing into Woods Creek.

5. All measures for the treatment of runoff for the purpose of maintaining and/or enhancing water quality should be conducted on-site before shoreline development impacts waters offsite.

Stormwater treatment (detention) occurs within the subject property.

6. The above policies apply to the Tye Stormwater Facility environment and its associated Aquatic environment only as they are consistent with maintaining the primary purpose of the human-made Tye Stormwater Facility, collecting and treating stormwater runoff from existing and future developments within its catchment area. Any loss of ecological functions should be mitigated.

Noted.

Regulations

1. All shoreline development, both during and after construction, shall avoid or minimize ecological impacts, including any increase in surface runoff, through control, treatment, and release of surface water runoff so that the receiving water quality and shore properties and features are not adversely affected. Control measures include, but are not limited to, catch basins or settling ponds, oil interceptor drains, grassy swales, planted buffers, fugitive dust controls, or best available technologies as directed by the City.

The proposed stormwater plan will reduce surface runoff by routing stormwater to an infiltration vault or trench. The infiltration vault will control, treat, and release surface water back to Woods Creek more slowly than the existing condition. Water quality and shore properties and features will not be adversely affected.

2. All development shall adhere to all required setbacks, buffers, and standard in this Shoreline Master Program. (Refer to Shoreline Use Provisions, Environment Designation Provisions, and the Critical Areas Regulations in Appendix A for specific limits.)

Development must occur within the required setback and buffer of Woods Creek. Multi-family residential development is an allowed use in the Shoreline Environment Designation, and can be approved if a shoreline variance is issued for the project. The project proponent is applying for a shoreline variance permit.

3. All development shall conform to local, state, and federal water quality regulations, provided the regulations do not conflict with this Shoreline Master Program. Where there is a conflict, provisions most protective of the natural ecology shall apply. The City of Monroe adopts the latest version of the Department of Ecology Stormwater Management Manual for Western Washington to regulate stormwater discharge and management.

The proposed development conforms to all applicable water quality regulations.

4. The above regulations apply to the Tye Stormwater Facility environment and its associated Aquatic environment only as they are consistent with maintaining the primary purpose of the human-made Tye Stormwater Facility, collecting and treating stormwater runoff from existing and future developments within its catchment area. Any loss of ecological functions must be mitigated.

Not Applicable.

Residential Development

The following policies and regulations are requirements of the City of Monroe SMP. They exist for the purpose of assessing potential impacts related to residential development. All SMP policies and regulations are provided in indented, italicized font. The applicant's response immediately follows (normal font, justified).

Policies

1. Residential development should be permitted only where there are adequate provisions for utilities, circulation, and access.

Access to the site is already available via S Ann Street and E Fremont Street. Utilities constructed as part of the proposed development will be connected to existing utilities. The project meets circulation and access requirements set forth in the MMC.

2. Single-family residences are the most common form of shoreline development and are identified as a priority use when developed in a manner consistent with control of pollution and prevention of damage to the natural environment (WAC 173-26-241(3)(j).

Noted. The planned use of the site is multi-family residential. Site design, contaminant removal, and ecological restoration are consistent with pollution prevention of damage to the natural environment.

3. Residential development should be prohibited in environmentally sensitive areas, including, but not limited to, wetlands, geohazardous areas, floodways, and critical habitats.

All development is proposed outside of environmentally sensitive areas. Impacts within the 200-foot buffer of Woods Creek are mostly limited to development within an existing footprint.

4. The overall density of development, lot coverage, and height of structures should be appropriate to the physical capabilities of the site and consistent with the comprehensive plan. New residential development should be designed so as not to cause significant ecological impacts or significant adverse impacts to shoreline aesthetic characteristics, views, and public use of the shoreline and the water.

The proposed development will be reviewed for consistency with MMC density, lot coverage, and height requirements by City of Monroe staff upon formal submittal. As previously stated, the project will not cause significant ecological impacts or significant adverse impacts to shoreline aesthetic characteristics. No alterations to views, or public use of the shoreline or water are proposed.

5. Recognizing the single-purpose, irreversible, and space-consumptive nature of shoreline residential development, new development should provide adequate setbacks and natural buffers from the water and ample open space between structures to provide space for outdoor recreation, to protect and restore ecological functions and ecosystem-wide processes, to preserve views, and to minimize use conflicts.

Proposed development occurs within a historically disturbed area. A portion of this space will remain as open space. Natural buffers will increase in total area and width, and will be restored by decompaction, waste removal, invasive species control, and replanting with native species. No impacts to views or use conflicts are anticipated.

6. Adequate provisions should be made for protection of groundwater supplies, erosion control, drainage systems, aquatic and wildlife habitat, geohydraulic processes, and open space.

Protection of groundwater, geohydraulic processes, drainage systems, and erosion control will be achieved by the proposed stormwater plan, which complies with the currently adopted Ecology Stormwater Manual. Protection of aquatic and wildlife habitat will be achieved by the proposed mitigation measures (contaminant removal, restoration/decompaction of gravel surfaces, removal of industrial waste, control of invasive species, and replanting with native vegetation). Open space is proposed in accordance with MMC requirements.

7. New multiunit residential development, including duplexes, fourplexes, and the subdivision of land for more than four parcels, should provide community and/or public access in conformance with Chapter 3, Section H of this Shoreline Master Program.

Based on comments from the City's contracted consultant (Perteet), no public access elements are proposed.

8. New residential development should be located and designed so as to not cause significant adverse impacts to or result in the displacement of other nearby shoreline uses, including recreational uses.

The subject property is used for vehicle storage, and is covered in gravel. The proposal will not result in the displacement of any shoreline uses.

9. New residential development should be located and designed so as to minimize conflicts or incompatibilities with water-oriented uses. Residential development should not be allowed where occupants would be exposed to noise, bright lights, or other necessary impacts of water development uses, such as industrial activities.

There are currently no water-oriented uses within the vicinity of the project parcel. As such, the planned residential development will not conflict with water-oriented uses of Woods Creek. Residents will not be exposed to noise, bright lights, or other adverse impacts of water development uses.

10. Appurtenances should be located landward of the principal residence.

The primary residential structures are located along the edge of historic disturbance. All appurtenances are located between Woods Creek and proposed residences.

11. New residences should be designed and located so that shoreline armoring or structural erosion control measures will not be necessary to protect the structure.

The planned development is set back far enough from the shoreline on compacted level ground so as to prevent any erosion or degradation of the shoreline.

12. When demonstrated to be necessary, shoreline stabilization measures should be designed and located to avoid or minimize adverse impacts. Replacement shoreline stabilization structures should be designed to minimize ecological impacts.

Shoreline stabilization measures are not proposed for this development.

13. The creation of new residential lots should not be allowed unless it is demonstrated that the lots can be developed with no net loss to ecological functions.

Proposed development occurs almost exclusively in historically disturbed areas. Proposed mitigation (contaminated soil removal, industrial debris removal, invasive species control, restoration of gravel areas, native vegetation planting, and an exclusionary split-rail fence) will significantly improve ecological functions within the site. No net loss of ecological functions is expected to occur related to this proposal.

14. The application of non-organic chemicals, including fertilizers, herbicides and pesticides, within shoreline jurisdiction is discouraged.

Fertilizers and herbicides will be used to control the aggressive non-native species Japanese knotweed. Herbicides will be applied directly to the stem of the knotweed by a licensed applicator, to prevent runoff into Woods Creek and the surrounding vegetation. Fertilizers must be added where gravel surfaces are removed and replaced with native plants.

Regulations

1. Applications for residential development shall include the following information:

a. Size, location, dimensions, predominant materials, and method of construction (e.g., wood frame, poured-in-place concrete, driven short piles) for all structures:

b. Existing trees over 6-inch caliper proposed for removal.

c. Expected amount of earthwork, clearing, and grading.

d. Location and extent of paved or gravel surfaces.

e. Character and extent of existing vegetation and proposed vegetation restoration/landscaping plans.

f. If shoreline stabilization measures are involved, a geotechnical report consistent with Section C, Chapter 4 of this Shoreline Master Program.

The site plan and geotechnical report depict and describe all of the above required elements.

2. All residential development shall meet the provisions of this Shoreline Master Program. In order to implement the objectives of the Shoreline Management Act, RCW 90.58.020, the City shall review development proposals for such actions. Persons intending to carry out the types of single-family development described above shall apply for a "letter of exemption," as described in the administrative provisions of Chapter 19.01 of the Monroe Municipal Code. The application for the letter of exemption shall describe the information required in Regulation 1 of this section.

Not applicable. This project does not include single-family residential development.

3. Residential development is prohibited within floodways, channel migration zones, wetlands, critical wildlife habitats, and other hazardous areas, such as steep slopes and areas with unstable soils or geologic conditions.

Residential development is not proposed within floodways, channel migration zones, wetlands, critical wildlife habitat, or other hazardous areas.

4. New residential development shall comply with the standards for building height, lot coverage, setbacks, and buffers as outlined in Chapter 2.D, Site Development Standards, and the Critical Areas Regulations (Appendix A). The City of Monroe has a policy of adopting the latest version of the Department of Ecology Stormwater Management Manual for Western Washington to regulate stormwater discharge and management. The City will encourage practices that further minimize impervious surfaces and stormwater runoff, including use of best available technologies.

Proposed development complies with all bulk and dimensional standards. Development is proposed within 200 feet of Woods Creek, which triggers the variance requirement.

5. Appurtenances, as defined in this Shoreline Master Program consistent with Chapter 173-27 WAC, shall be subject to the same conditions as primary residences, except that for the protection of human health and safety and ecological functions further restrictions may apply.

All appurtenances comply with SMP policies and regulations.

6. Accessory uses that are not appurtenant structures shall be reasonable in size and purpose and compatible with on-site and adjacent structures, uses, and natural features. Accessory structures that are not water-dependent are not permitted waterward of the principal residence unless there is a compelling reason to the contrary. Accessory and appurtenant structures should not be located within shoreline buffers to assure that buffer integrity is maintained.

Accessory uses are limited to parking and a stream overlook. These uses are the minimum necessary to accommodate the proposed development.

7. Subdivisions and planned unit developments of five or more waterfront lots/units shall dedicate, improve, and provide maintenance provisions for a pedestrian easement that provides area sufficient to ensure usable access to and along the shoreline for all residents of the development and the general public. When required, public access easements shall be a minimum of 25 feet in width and shall be in compliance with public access standards contained herein.

Not applicable. The proposed development does not create five or more waterfront lots.

8. Residences, appurtenances, and accessory structures shall not be located in required view corridors.

No required view corridors are known. This project does not impact existing view corridors.

9. The creation of new lots shall be prohibited unless all of the following can be demonstrated.

a. A primary residence can be built on each new lot without any of the following being necessary:

i. New structural shoreline stabilization.

ii. New development or clearing and grading that does not meet vegetation conservation standards in Section C, Chapter 3.

iii. New structures in the required shoreline setback, geohazardous areas, wetland, required wetland buffer, critical habitat, or critical habitat buffer (see Appendix A for Critical Areas Regulations).

iv. Causing significant erosion or reduction in slope stability.

v. Causing increased flood or geological hazard in the new development or to other properties.

b. Adequate sewer, water, access, and utilities can be provided.

c. The intensity and type of development is consistent with the City comprehensive plan and development regulations.

d. Potential adverse environmental impacts (including ecological impacts) can be avoided or mitigated to achieve no net loss of ecological functions, taking into consideration temporal loss due to development and potential cumulative impacts to the environment.

e. The proposed development is consistent with other development standards outlined in Chapter 2, Section D (Site Development Standards).

Not applicable. The proposed development does not create new lots.

Conclusion

As discussed throughout this memo, this project will redevelop a historically disturbed site for multi-family residential use. The project requires a shoreline variance due to encroachment into the 200-foot buffer/setback from Woods Creek. In exchange for granting the variance, the applicant proposes to remove contaminants from the soil in the historically disturbed portion of the site, industrial waste and aggressive non-native vegetation from the hillslope, and to restore a portion of the historically disturbed area to native species. A split-rail fence will be installed to limit human intrusion into the vegetated buffer of Woods Creek. BMPs will be used throughout all phases of development to protect water quality and natural resources. Impacts to native vegetation will be limited to the construction and maintenance of a pedestrian trail to access and view Woods Creek. No modifications to public access are proposed.

QTR. SW., SEC. 6, TWP. 27 N., RGE. 7 E., W.M.

RECEIVED 1/23/2019

EXHIBIT 13

FINAL ENGINEERING PLANS

OF

RIVERS EDGE APARTMENT COMMUNITY

FOR

RIVERS EDGE WA LLLP

IN

CITY OF MONROE, WA

LEGAL DESCRIPTION

PARCEL A:
ALL THAT PORTION OF GOVERNMENT LOTS 6 AND 8, SECTION 6, TOWNSHIP 27 NORTH, RANGE 7 EAST OF THE WILLAMETTE MERIDIAN, RECORDS OF SNOHOMISH COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS: BEGINNING AT THE INTERSECTION OF THE SOUTH LINE OF FREMONT STREET WITH THE EAST LINE OF ANN STREET; THENCE WEST 30 FEET, ALONG THE SOUTH LINE OF FREMONT STREET; THENCE SOUTH 150 FEET, MORE OR LESS, TO THE SKYKOMISH RIVER; THENCE NORTHEASTERLY ALONG RIVER AND WOODS CREEK TO THE EASTERLY EXTENSION OF THE NORTH MARGIN OF FREMONT STREET; THENCE WEST, ALONG SAID EASTERLY EXTENSION OF THE NORTH MARGIN OF FREMONT STREET, TO A POINT 160 FEET EAST OF THE EAST MARGIN OF ANN STREET; THENCE NORTH 110 FEET; THENCE WEST 160 FEET TO THE EAST MARGIN OF ANN STREET;
THENCE SOUTH ALONG SAID EAST MARGIN, TO THE POINT OF BEGINNING;

(ALSO KNOWN AS JENSON LEGAL DESCRIPTION OF CITY OF MONROE SHORT PLAT NO. 87-01, RECORDED UNDER RECORDING NO. 8802250257, AS CORRECTED UNDER RECORDING NO. 8803080132).

PARCEL B:
ALL THAT PORTION OF GOVERNMENT LOT 6, SECTION 6, TOWNSHIP 27 NORTH, RANGE 7 EAST OF THE WILLAMETTE MERIDIAN, RECORDS OF SNOHOMISH COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS: BEGINNING AT THE INTERSECTION OF THE SOUTH BOUNDARY OF FREMONT AVENUE WITH THE WEST BOUNDARY OF ANN STREET, EXTENDING SOUTHERLY; THENCE EAST 30 FEET; THENCE SOUTH TO THE NORTH MARGIN OF SKYKOMISH RIVER;
THENCE DOWN STREAM TO POINT DUE SOUTH OF POINT OF BEGINNING;
THENCE NORTH ALONG EAST LINE OF LOT 11, HARRIMAN'S SECOND ADDITION TO THE POINT OF BEGINNING; EXCEPT THAT PORTION THEREOF CONVEYED TO THE CITY OF MONROE BY DEED RECORDED UNDER RECORDING NO. 201303210541.

PARCEL C:
LOT 11, HARRIMAN'S 2ND ADDITION TO THE TOWN OF MONROE, ACCORDING TO THE PLAT THEREOF RECORDED IN VOLUME 4 OF PLATS, PAGE 20, RECORDS OF SNOHOMISH COUNTY, WASHINGTON;

EXCEPT THAT PORTION THEREOF CONVEYED TO THE CITY OF MONROE BY DEED RECORDED UNDER RECORDING NO. 201303210541.

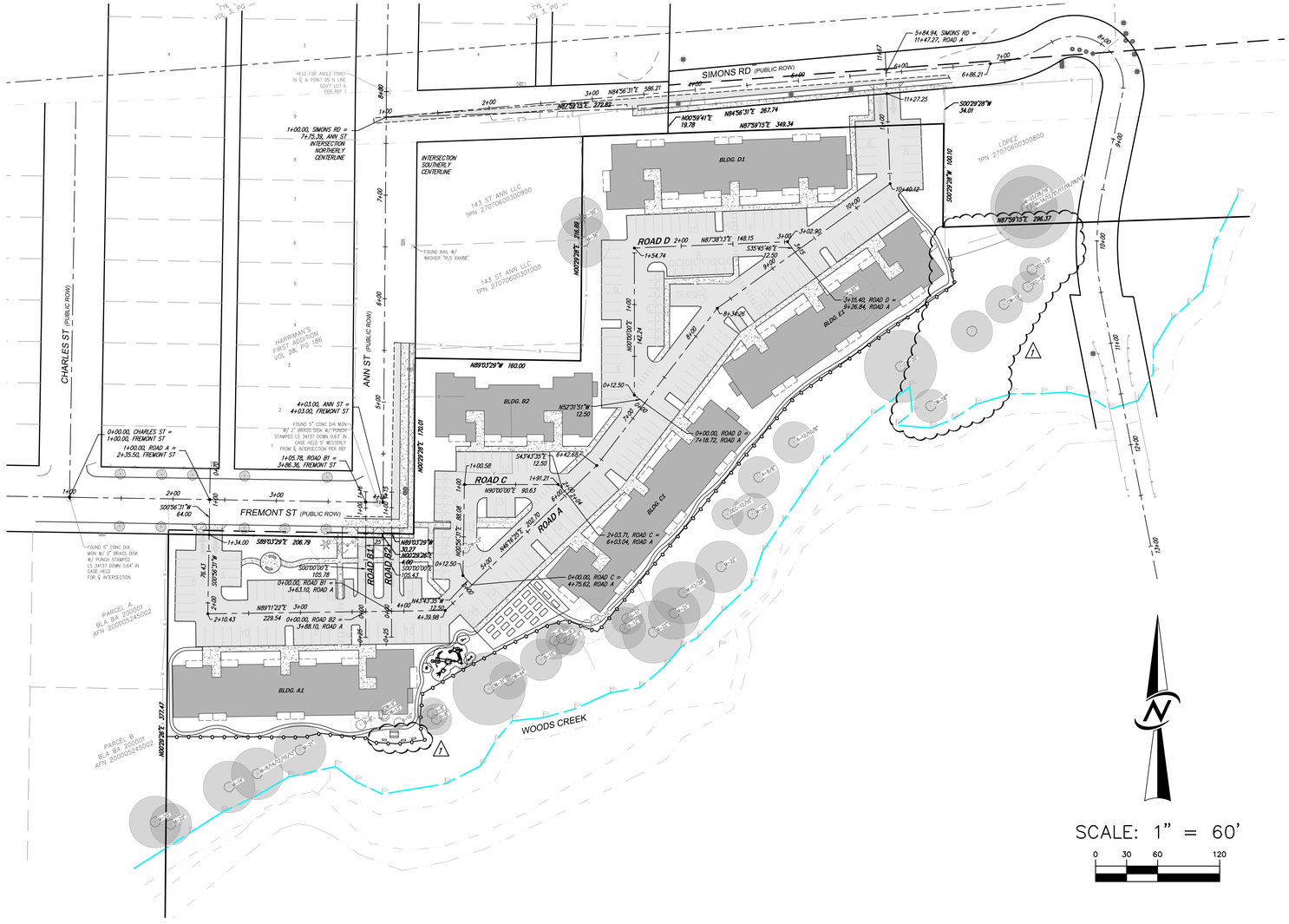
PARCEL D:
THAT PORTION OF GOVERNMENT LOTS 6 AND 8, SECTION 6, TOWNSHIP 27 NORTH, RANGE 7 EAST OF THE WILLAMETTE MERIDIAN, RECORDSOF SNOHOMISH COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:
BEGINNING AT THE SOUTHWEST CORNER OF BLOCK 9, MAP OF TYE CITY, SNOHOMISH COUNTY, WASHINGTON, ACCORDING TO THE PLAT THEREOF RECORDED IN VOLUME 3 OF PLATS, PAGE 36; THENCE SOUTH 50 FEET ALONG THE EAST LINE OF ANN STREET;
THENCE EAST 160 FEET; THENCE SOUTH 310 FEET TO THE EASTERLY EXTENSION OF THE NORTH MARGIN OF FREMONT STREET;
THENCE EAST, ALONG SAID EXTENSION OF THE NORTH MARGIN OF FREMONT STREET, TO THE CENTER OF WOODS CREEK;
THENCE NORTHERLY, ALONG SAID CREEK CENTERLINE, TO THE NORTH LINE OF GOVERNMENT LOT 8;
THENCE WESTERLY 843 FEET, MORE OR LESS, TO THE POINT OF BEGINNING;

EXCEPT THAT PORTION THEREOF CONVEYED TO THE TOWN OF MONROE BY DEED RECORDED UNDER RECORDING NO. 510185; AND

EXCEPT THAT PORTION CONVEYED TO WARREN AND JEANNE SIMON BY DEED RECORDED UNDER RECORDING NO. 913562, DESCRIBED AS FOLLOWS: BEGINNING AT THE SOUTHEAST CORNER OF LOT 9, BLOCK 1, HARRIMAN'S FIRST ADDITION TO MONROE; THENCE EAST 570 FEET TO THE TRUE POINT OF BEGINNING; THENCE NORTH 60 FEET TO 50 FOOT EASEMENT OF CITY OF MONROE; THENCE EASTERLY 320 FEET FOLLOWING SAID EASEMENT TO WEST BANK OF WOODS CREEK; THENCE SOUTHWESTERLY FOLLOWING SAID BANK OF WOODS CREEK TO A POINT SET 100 FEET SOUTH AND 300 FEET EAST OF THE TRUE POINT OF BEGINNING; THENCE WEST 300 FEET; THENCE NORTH 100 FEET TO THE TRUE POINT OF BEGINNING;
(ALSO KNOWN AS SIMON LEGAL DESCRIPTION CONTAINED IN CITY OF MONROE SHORT PLAT RECORDED UNDER RECORDING NO. 8802250257, AS CORRECTED BY RECORDING NO. 8803080132);

AND EXCEPT THAT PORTION CONVEYED TO THE CITY OF MONROE BY DEED RECORDED UNDER RECORDING NO. 9006130180.

ALL SITUATE IN THE COUNTY OF SNOHOMISH, STATE OF WASHINGTON.



PROPERTY OWNER

RIVERS EDGE WA LLLP
909 5TH AVENUE #2401
SEATTLE, WA 98164
PHONE: (206) 351-9941
CONTACT: REBECCA RALSTON

ENGINEER/SURVEYOR/PLANNER

CORE DESIGN INC.
12100 NE 195TH STREET, SUITE 300
BOTHELL, WASHINGTON 98011
PHONE: (425) 885-7877
CONTACTS: GARY SHARNBROICH, P.E. – ENGINEER
KEN SHIPLEY, P.L.S.– SURVEYOR

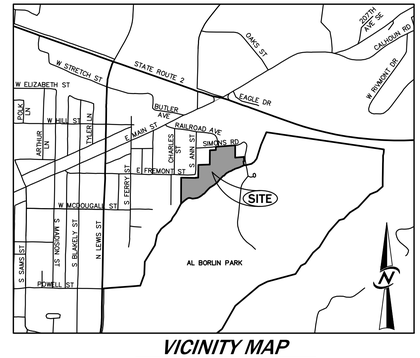
SITE STATISTICS

SITE STREET ADDRESS:	FREMONT AND ANN STREET MONROE, WA 98272
PARCEL NUMBERS:	27070600300500 27070600303300 27070600300700 27070600300600 27070600302300 00465000001100
TOTAL GROSS SITE AREA:	9.644 AC
ZONING DESIGNATION:	DOWNTOWN COMMERCIAL
COMPREHENSIVE PLAN DESIGNATION:	DOWNTOWN COMMERCIAL

SHEET INDEX

1	C1.01	COVER SHEET
2	C1.02	EXISTING CONDITIONS
3	C1.03	SITE PLAN
4	C1.04	SITE PLAN
5	C2.01	TESC PLAN
6	C2.31	TESC NOTES AND DETAILS
7	C3.01	GRADING PLAN
8	C3.02	GRADING PLAN
9	C3.31	GRADING NOTES AND DETAILS
10	C4.01	ROAD AND STORM DRAINAGE PLAN
11	C4.02	ROAD AND STORM DRAINAGE PLAN
12	C4.21	ROAD AND STORM DRAINAGE PROFILES
13	C4.31	ROAD AND STORM DRAINAGE NOTES AND DETAILS
14	C4.32	ROAD AND STORM DRAINAGE NOTES AND DETAILS
15	C4.33	ROAD AND STORM DRAINAGE NOTES AND DETAILS
16	C4.34	ROAD AND STORM DRAINAGE NOTES AND DETAILS
17	C5.01	SANITARY SEWER AND WATER PLAN
18	C5.02	SANITARY SEWER AND WATER PLAN
19	C5.21	SANITARY SEWER AND WATER PROFILES
20	C5.31	SANITARY SEWER AND WATER NOTES AND DETAILS

1 REMOVED NORTH AND SOUTH TRAILS, ADDED AN OVERLOOK/COMMUNITY GATHERING AREA, AND ADDED SILT FENCE FOR SLOPE RESTORATION



VICINITY MAP
N.T.S.

FILE NO. XXXXXX

NO.	DATE	REVISION	BY	CK
1	01/18/2019	REVISED PER LETTER FROM PERTEET DATED 12/27/2018		

01-16-2019

CORE DESIGN
CIVIL ENGINEERING
LANDSCAPE ARCHITECTURE
PLANNING
SURVEYING
12100 NE 195th St., Suite 300 Bothell, Washington 98011 425.885.7877

SCALE:
DESIGNED
DRAWN
CHECKED
DATE 01/16/19
VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING 0" 1"

COVER SHEET
RIVERS EDGE APARTMENT COMMUNITY

RIVERS EDGE WA LLLP
909 5TH AVENUE #2401
SEATTLE, WASHINGTON 98164

PROJECT NUMBER
18038

DRAWING
C1.01

SHEET 1 OF 20

QTR. SW., SEC. 6, TWP. 27 N., RGE. 7 E., W.M.

SIMONS RD (PUBLIC ROW)

FREMONT ST (PUBLIC ROW)

CHARL ST

ANN ST (PUBLIC ROW)

WOODS CREEK

PARCEL A

PARCEL B

PARCEL C

PARCEL D

N87°59'15"E 349.34
50' CONVEYED TO CITY OF MONROE AS TRACT B BY W.D., RECORDED 11/9/31, AFN 510185
POSSIBLE ALTERNATE LOCATION 50' EASEMENT

N00°29'28"E 100.10

N87°59'15"E 296.37

N00°29'28"E 216.89

N89°03'29"W 160.00

N00°29'28"E 170.01

N89°03'29"W 206.79

N89°03'29"W 30.27

N00°29'26"E 4.00

N00°29'26"E 377.47

4' CONVEYED TO THE CITY OF MONROE FOR ROAD BY DEED UNDER AFN 201303210541

143 ST ANN LLC TPN 270706003009000

143 ST ANN LLC TPN 270706003010000

LOPEZ TPN 270706003008000

HARRIMAN'S FIRST ADDITION VOL 28, PG 186

BLOCK 10 TYE CITY VOL 3, PG 36

BLOCK 9 TYE CITY VOL 3, PG 36

PARCEL A BLA BA 200001 AFN 200005245002

PARCEL B BLA BA 200001 AFN 200005245002

"AL BORLIN PARK"

PARK SIGN

"10 MPH"

GATE

"STOP" "SIMONS GRAVEL AREA" RD/RAILROAD AVE"

50' RIGHT-OF-WAY DEPICTED ON ASSESSOR'S MAP
POSSIBLE LOCATION OF EASEMENT TO MONROE AS DESCRIBED IN DEED, AFN 913562

CELL TOWER/FACILITIES

FUEL PUMPS/FACILITIES

SSMH #8150
RIM EL=76.09
6"DI(NW)E=69.49(2 PIPES)
8"CONC(S)E=68.62
8"CONC(E)E=68.60

SSMH #8149
RIM EL=78.35
6"CLAY(E)E=74.30
24"CMP(N)E=57.68
24"CMP(S)E=57.60
7" VERT PVC TOP=76.14

SSMH #8148
RIM EL=78.59
8"PVC(S)E=67.28
8"PVC(N)E=66.92
8"PVC(E)E=66.91
8"PVC(W)E=66.88

SSMH #8143
RIM EL=76.66
8"PVC(S)E=66.42
8"PVC(E)E=66.39
8"PVC(N)E=66.29
8"PVC(W)E=66.21

SSMH #8702
RIM EL=76.08
8"CONC(N)E=69.08
8"CONC(W)E=69.02

FOUND NAIL W/ WASHER "PLS XXX88"

FOUND 5" CONC DIA MON W/ 2" BRASS DISK W/ PUNCH STAMPED LS 34137 DOWN 0.63' IN CASE HELD 5' WESTERLY FROM ℄ INTERSECTION PER REF ASPHALT RAMP

FOUND 5" CONC DIA MON W/ 2" BRASS DISK W/ PUNCH STAMPED LS 34137 DOWN 0.64' IN CASE HELD FOR ℄ INTERSECTION

N85°43'29"E 5178.25 MEAS
N LINE GOV'T LOT 6, SEC. 6-27-4 PER EXISTING MONUMENTS HELD FOR ANGLE POINT IN ℄ & POINT ON N LINE GOV'T LOT 6
N LINE GOV'T LOT 6, SEC. 6-27-4, PER REF 1 — PER REF 1

N89°03'29"W 2633.00 BASIS OF BEARINGS

FENCE CROSSES ℄

DRIPLINE (TYP)

SOUTH LINE TPN 270706003010000 PER ASSESSOR DESCRIPTION

FENCE 7.4' N & 0.7' E PROP COR

HELD TO BE 110' NORTHERLY FROM AND PARALLEL TO NORTH MARGIN FREMONT STREET PER CITY OF MONROE SHORT PLAT NO. 87-01

EXISTING STRCTURE

APPROXIMATE ℄ WATERLINE EASEMENT AFN 201878

20' PUD NO. 1 EASEMENT AFN 7711220230

STORAGE CONTAINER BETWEEN BLDG & FENCE

NW BLDG COR 0.5' W OF ℄

SW BLDG COR 0.8' W OF ℄

EXISTING DILAPIDATED STRUCTURE

END 8' SHEET METAL FENCE 0.9' S & 0.6' W OF PROP COR

PORTION OF CONC PAD IN ROW

EXISTING STRUCTURE

8' SHEET METAL FENCE

GATED ACCESS

20' GATED ACCESS

12' DRIVE GATED ACCESS

6' SMF

4' HWF

6' VBF

WV CASE FULL OF DIRT

WV TON EL=75.85 FH BF EL=76.59

FH BF EL=77.90

LEFT ARROW

SHIPPING DOCK

CARPORT/STORAGE STRUCTURES

EXISTING STRUCTURE

CB #8550, TYPE I
RIM EL=78.42
8"CPEP(S)E=77.34

SMASHED CPEP, CONNECTION UNKNOWN

PROPERTY LINE HELD TO ℄ WOODS CREEK ACCORDING TO PARCEL D DESCRIPTION. ASSESSOR MAPS INDICATE OWNERSHIP AT BANK OF CREEK. HOWEVER, BASED ON AVAILABLE EVIDENCE, CREEK IS NOT NAVIGABLE WATER OF THE US AND OWNERSHIP WOULD CARRY TO ℄

OHWM

M-23/28/16
M-14/15/20/17/16/18/16

"LEAVE NO TRACE"

ORDINARY HIGH WATER FLAGS SURVEYED JULY 2018

OHWM A1 – OHWM A35

BRIDGE

CB #8213, TYPE I
RIM EL=58.87
8"CPEP(NW)E=56.11

EDGE OF CREEK JULY 2018

APPROXIMATE ℄ WOODS CREEK

APPROXIMATE TOP OF SLOPE

YELLOW FLAG, ILLEGIBLE GREEN & BLUE LOCATE PAINT

DRAINAGE CHANNEL

POSSIBLE LOCATION STORM DRAIN EASEMENT AFN 1431656 (DESCRIBED ONLY AS BURDENING PARCEL B)

ORDINARY HIGH WATER

24"CMP IE=56.09

18"CMP IE=53.34 (DAMAGED - CONNECTION UNKNOWN)

N35°51'50"W 193.40

N43°08'10"E 72.50

POB

N67°52'30"W 303.24

N72°23'00"W 492.65

N17°36'40"E 50.00

SCALE: 1" = 40'
0 20 40 80

FILE NO. XXXXXX

NO.	DATE	REVISION	BY	CK

01-16-2019

CIVIL ENGINEERING
LANDSCAPE ARCHITECTURE
PLANNING
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SCALE:	
DESIGNED	
DRAWN	
CHECKED	
DATE	01/16/19

VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING
0" 1"

EXISTING CONDITIONS
RIVERS EDGE APARTMENT COMMUNITY

RIVERS EDGE WA LLLP
909 5TH AVENUE #2401
SEATTLE, WASHINGTON 98164

PROJECT NUMBER
18038

DRAWING
C1.02

SHEET 2 OF 20

QTR. SW., SEC. 6, TWP. 27 N., RGE. 7 E., W.M.

SEE SHEET C1.04

SCALE: 1" = 20'

0 10 20 40

FILE NO. XXXXXX

NO.	DATE	REVISION	BY	CK
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SITE PLAN

RIVERS EDGE APARTMENT COMMUNITY

RIVERS EDGE WA LLLP
909 5TH AVENUE #2401
SEATTLE, WASHINGTON 98164

PROJECT NUMBER 18038

DRAWING C1.03

SHEET 3 OF 20

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QTR. SW., SEC. 6, TWP. 27 N., RGE. 7 E., W.M.

SIMONS RD (PUBLIC ROW)

SEE SHEET C3.31 P

SEE SHEET C3.31 Q

PROP. TRENCH AND PAVEMENT PATCHING PER CITY OF MONROE STD. PLANS 312 & 611

PROP. 25' DRIVEWAY PER CITY OF MONROE STD. PLAN 307B

MARKS WASH

SEE SHEET C3.31 M

SEE SHEET C3.31 L

BLDG. D1

226.58'

50.25'

34.84'

SEE SHEET C3.31 K

ROAD D

ROAD A

BLDG. E1

226.58'

BLDG. B2

151.26'

SEE SHEET C3.31 J

SEE SHEET C3.31 I

143 ST ANN LLC
TPN 27070600300900

143 ST ANN LLC
TPN 27070600301000

LOPEZ
TPN 27070600300800

FOUND NAIL W/ WASHER "PLS XXX88"

20' PUD NO. 1 EASEMENT AFN 7711220230

APPROXIMATE C WATERLINE EASEMENT AFN 7711220230

ANN ST (PUBLIC ROW)

10' CRITICAL AREA BUILDING SETBACK

EDGE OF HISTORIC DISTURBANCE

ORDINARY HIGH WATER

WOODS CREEK

SEE SHEET C1.03

SCALE: 1" = 20'

FILE NO. XXXXXX

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01-16-2019

CIVIL ENGINEERING
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DATE 01/16/19
VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING 1"
0"

SITE PLAN

RIVERS EDGE APARTMENT COMMUNITY

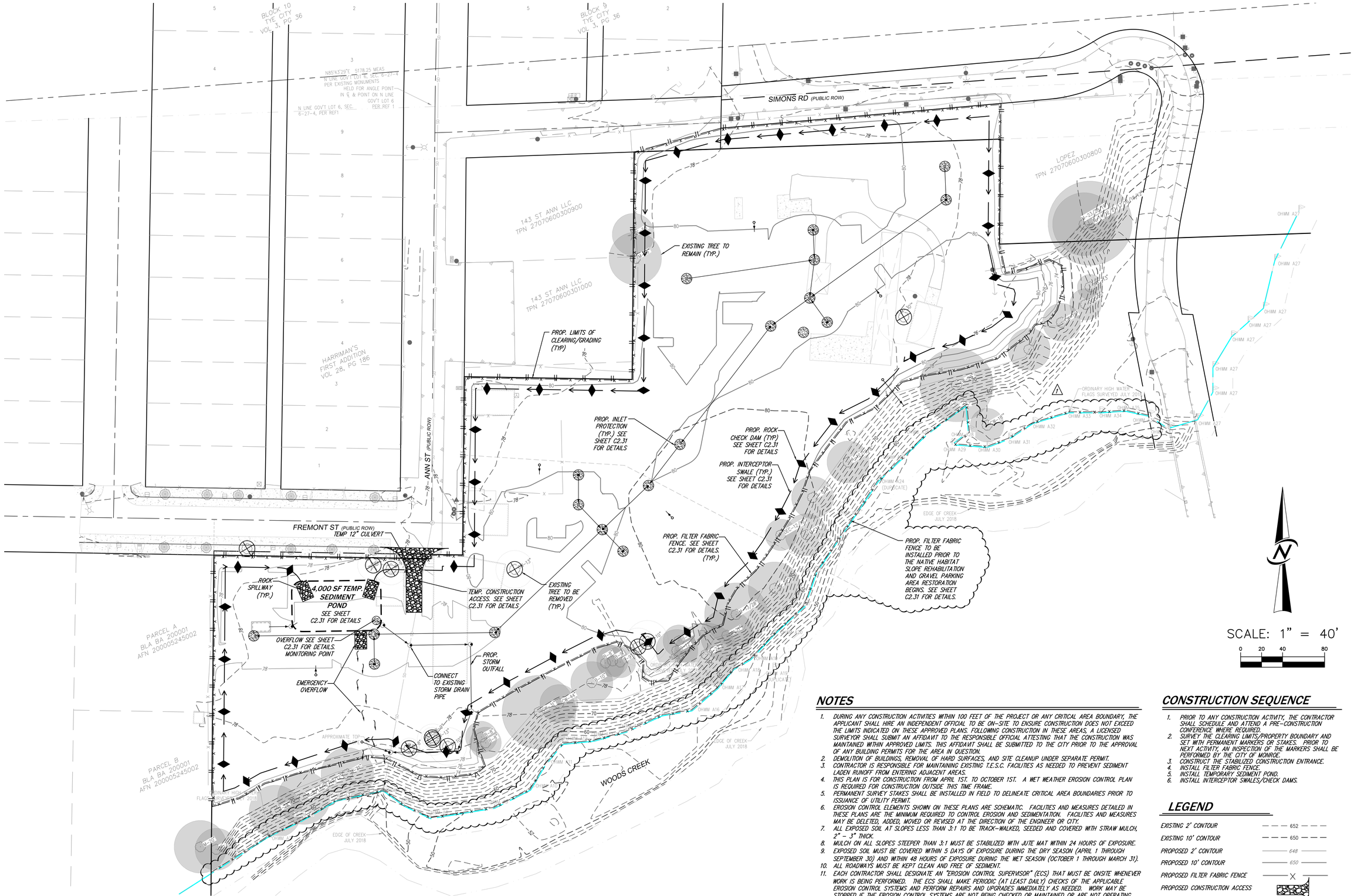
RIVERS EDGE WA LLLP
909 5TH AVENUE #2401
SEATTLE, WASHINGTON 98164

PROJECT NUMBER 18038

DRAWING C1.04

SHEET 4 OF 20

QTR. SW., SEC. 6, TWP. 27 N., RGE. 7 E., W.M.



SCALE: 1" = 40'

0 20 40 80

NOTES

1. DURING ANY CONSTRUCTION ACTIVITIES WITHIN 100 FEET OF THE PROJECT OR ANY CRITICAL AREA BOUNDARY, THE APPLICANT SHALL HIRE AN INDEPENDENT OFFICIAL TO BE ON-SITE TO ENSURE CONSTRUCTION DOES NOT EXCEED THE LIMITS INDICATED ON THESE APPROVED PLANS. FOLLOWING CONSTRUCTION IN THESE AREAS, A LICENSED SURVEYOR SHALL SUBMIT AN AFFIDAVIT TO THE RESPONSIBLE OFFICIAL ATTESTING THAT THE CONSTRUCTION WAS MAINTAINED WITHIN APPROVED LIMITS. THIS AFFIDAVIT SHALL BE SUBMITTED TO THE CITY PRIOR TO THE APPROVAL OF ANY BUILDING PERMITS FOR THE AREA IN QUESTION.
2. DEMOLITION OF BUILDINGS, REMOVAL OF HARD SURFACES, AND SITE CLEANUP UNDER SEPARATE PERMIT.
3. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING EXISTING T.E.S.C. FACILITIES AS NEEDED TO PREVENT SEDIMENT LADEN RUNOFF FROM ENTERING ADJACENT AREAS.
4. THIS PLAN IS FOR CONSTRUCTION FROM APRIL 1ST. TO OCTOBER 1ST. A WET WEATHER EROSION CONTROL PLAN IS REQUIRED FOR CONSTRUCTION OUTSIDE THIS TIME FRAME.
5. PERMANENT SURVEY STAKES SHALL BE INSTALLED IN FIELD TO DELINEATE CRITICAL AREA BOUNDARIES PRIOR TO ISSUANCE OF UTILITY PERMIT.
6. EROSION CONTROL ELEMENTS SHOWN ON THESE PLANS ARE SCHEMATIC. FACILITIES AND MEASURES DETAILED IN THESE PLANS ARE THE MINIMUM REQUIRED TO CONTROL EROSION AND SEDIMENTATION. FACILITIES AND MEASURES MAY BE DELETED, ADDED, MOVED OR REVISED AT THE DIRECTION OF THE ENGINEER OR CITY.
7. ALL EXPOSED SOIL AT SLOPES LESS THAN 3:1 TO BE TRACK-WALKED, SEEDED AND COVERED WITH STRAW MULCH, 2" – 3" THICK.
8. MULCH ON ALL SLOPES STEEPER THAN 3:1 MUST BE STABILIZED WITH JUTE MAT WITHIN 24 HOURS OF EXPOSURE.
9. EXPOSED SOIL MUST BE COVERED WITHIN 5 DAYS OF EXPOSURE DURING THE DRY SEASON (APRIL 1 THROUGH SEPTEMBER 30) AND WITHIN 48 HOURS OF EXPOSURE DURING THE WET SEASON (OCTOBER 1 THROUGH MARCH 31).
10. ALL ROADWAYS MUST BE KEPT CLEAN AND FREE OF SEDIMENT.
11. EACH CONTRACTOR SHALL DESIGNATE AN "EROSION CONTROL SUPERVISOR" (ECS) THAT MUST BE ONSITE WHENEVER WORK IS BEING PERFORMED. THE ECS SHALL MAKE PERIODIC (AT LEAST DAILY) CHECKS OF THE APPLICABLE EROSION CONTROL SYSTEMS AND PERFORM REPAIRS AND UPGRADES IMMEDIATELY AS NEEDED. WORK MAY BE STOPPED IF THE EROSION CONTROL SYSTEMS ARE NOT BEING CHECKED OR MAINTAINED OR ARE NOT OPERATING EFFECTIVELY.

CONSTRUCTION SEQUENCE

1. PRIOR TO ANY CONSTRUCTION ACTIVITY, THE CONTRACTOR SHALL SCHEDULE AND ATTEND A PRE-CONSTRUCTION CONFERENCE WHERE REQUIRED.
2. SURVEY THE CLEARING LIMITS/PROPERTY BOUNDARY AND SET WITH PERMANENT MARKERS OR STAKES. PRIOR TO NEXT ACTIVITY, AN INSPECTION OF THE MARKERS SHALL BE PERFORMED BY THE CITY OF MONROE.
3. CONSTRUCT THE STABILIZED CONSTRUCTION ENTRANCE.
4. INSTALL FILTER FABRIC FENCE.
5. INSTALL TEMPORARY SEDIMENT POND.
6. INSTALL INTERCEPTOR SWALES/CHECK DAMS.

LEGEND

EXISTING 2' CONTOUR — — — 652 — — —
EXISTING 10' CONTOUR — — — 650 — — —
PROPOSED 2' CONTOUR 648
PROPOSED 10' CONTOUR 650
PROPOSED FILTER FABRIC FENCE X
PROPOSED CONSTRUCTION ACCESS

FILE NO. XXXXXX

NO.	DATE	REVISION	BY	CK

01-16-2019

CIVIL ENGINEERING
LANDSCAPE ARCHITECTURE
PLANNING
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CORE DESIGN
12100 NE 195th St, Suite 300 Bothell, Washington 98011 425.885.7877

SCALE:
DESIGNED
DRAWN
CHECKED
DATE 01/16/19

VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING. 0" 1"

TESC PLAN
RIVERS EDGE APARTMENT COMMUNITY

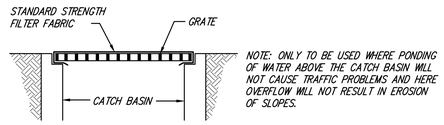
RIVERS EDGE WA LLLP
909 5TH AVENUE #2401
SEATTLE, WASHINGTON 98164

PROJECT NUMBER
18038

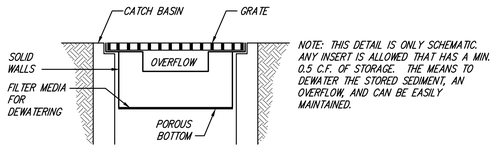
DRAWING
C2.01

SHEET 5 OF 20

THIS PLAN, AS AN INSTRUMENT OF SERVICE, IS AND SHALL REMAIN THE PROPERTY OF CORE DESIGN, INC. THE REPRODUCTION OF THIS PLAN FOR OTHER PROJECTS OR EXTENSIONS OF THIS PROJECT WITHOUT THE WRITTEN PERMISSION OF CORE DESIGN, INC. IS PROHIBITED.



FILTER FABRIC PROTECTION



CATCH BASIN INSERT

MAINTENANCE STANDARDS

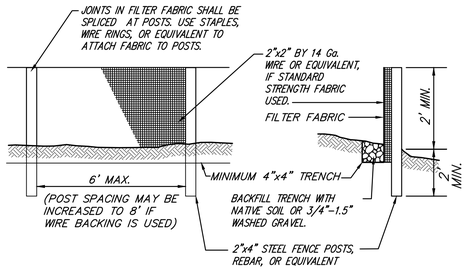
1. ANY ACCUMULATED SEDIMENT ON OR AROUND THE FILTER FABRIC PROTECTION SHALL BE REMOVED IMMEDIATELY. SEDIMENT SHALL NOT BE REMOVED WITH WATER, AND ALL SEDIMENT MUST BE DISPOSED OF AS FILL ON-SITE OR HAULED OFF-SITE.

2. ANY SEDIMENT IN THE CATCH BASIN INSERT SHALL BE REMOVED WHEN THE SEDIMENT HAS FILLED ONE-THIRD OF THE AVAILABLE STORAGE. THE FILTER MEDIA FOR THE INSERT SHALL BE CLEANED OR REPLACED AT LEAST MONTHLY.

3. REGULAR MAINTENANCE IS CRITICAL FOR BOTH FORMS OF CATCH BASIN PROTECTION. UNLIKE MANY FORMS OF PROTECTION THAT FAIL GRADUALLY, CATCH BASIN PROTECTION WILL FAIL SUDDENLY AND COMPLETELY IF NOT MAINTAINED PROPERLY.

FILTER FABRIC PROTECTION FOR CBs

NO SCALE



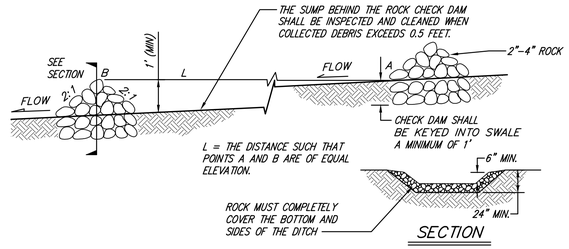
NOTE: FILTER FABRIC FENCES SHALL BE INSTALLED ALONG CONTOUR WHENEVER POSSIBLE

NOTES:

1. THE GEOTEXTILE USED MUST MEET THE STANDARDS LISTED BELOW. A COPY OF THE MANUFACTURER'S FABRIC SPECIFICATIONS MUST BE AVAILABLE ON-SITE.
   AOS (ASTM D-4751) = 30-100 SIEVE SIZE (0.60-0.15 MM) FOR SLIT FILM
   50-100 SIEVE SIZE (0.30-0.15 MM) FOR OTHER FABRICS
   WATER PERMITTIVITY (ASTM D-4491) = 0.02 SEC MIN.
   GRAB TENSILE STRENGTH (ASTM D-4632) = 180 LBS MIN. FOR EXTRA STRENGTH FABRIC
   100 LBS MIN. FOR STANDARD STRENGTH FABRIC
   GRAB TENSILE ELONGATION (ASTM D-4632) = 30% MAX.
   ULTRAVIOLET RESISTANCE (ASTM D-4355) = 70% MIN.
2. STANDARD STRENGTH FABRIC REQUIRES WIRE BACKING TO INCREASE THE STRENGTH OF THE FENCE. WIRE BACKING OR CLOSER POST SPACING MAY BE REQUIRED FOR EXTRA STRENGTH FABRIC IF FIELD PERFORMANCE WARRANTS A STRONGER FENCE.
3. WHERE THE FENCE IS INSTALLED, THE SLOPE SHALL BE NO STEEPER THAN 2H:1V.

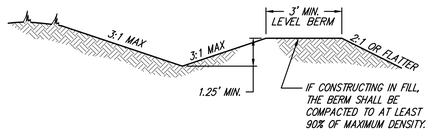
SILT FENCE DETAIL

NO SCALE



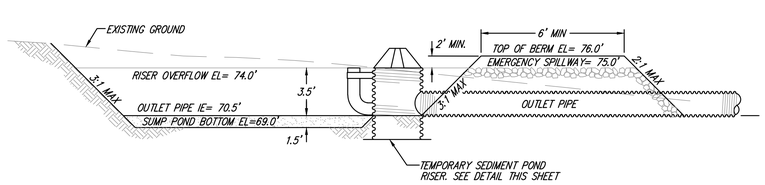
ROCK CHECK DAM

NO SCALE



INTERCEPTOR SWALE DETAIL

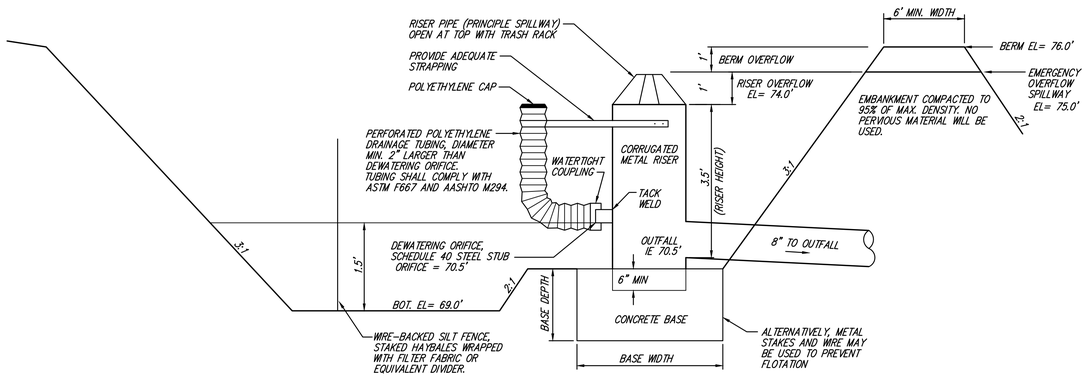
NO SCALE



NOTE: SEE PLAN FOR POND DIMENSIONS & ELEVATIONS

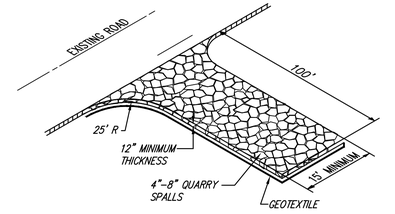
SEDIMENTATION POND DETAIL

NO SCALE



TEMPORARY SEDIMENT POND RISER

NO SCALE



NOTE: GRADE THE ENTRANCE AREA 12" LOWER THAN SUBGRADE PRIOR TO PLACING QUARRY SPALLS

TEMPORARY CONSTRUCTION ACCESS

NO SCALE

FILE NO. XXXXXX

NO.	DATE	REVISION	BY	CK

01-16-2019

CIVIL ENGINEERING
LANDSCAPE ARCHITECTURE
PLANNING
SURVEYING

CORE DESIGN
12100 NE 195th St, Suite 300 Bothell, Washington 98011 425.885.7877

SCALE:	
DESIGNED	
DRAWN	
CHECKED	
DATE	01/16/19

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING
0" 1"

TESC NOTES AND DETAILS
RIVERS EDGE APARTMENT COMMUNITY

RIVERS EDGE WA LLLP
909 5TH AVENUE #2401
SEATTLE, WASHINGTON 98164

PROJECT NUMBER
18038

DRAWING
C2.31

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QTR. SW., SEC. 6, TWP. 27 N., RGE. 7 E., W.M.

SEE SHEET C3.02

DETAIL A
SCALE: 1" = 10'

SEE DETAIL A THIS SHEET

FREMONT ST (PUBLIC ROW)

ANN ST (PUBLIC ROW)

ROAD A

ROAD B1

ROAD B2

ROAD C

BLDG. B2
FF
81.00

BLDG. C1
FF
81.25

BLDG. A1
FF
78.50

PARCEL A
BLA BA 200001
AFN 200005245002

PARCEL B
BLA BA 200001
AFN 200005245002

LIMITS OF CLEARING & GRADING (TYP.)

10' CRITICAL AREA BUILDING SETBACK

EDGE OF HISTORIC DISTURBANCE

ORDINARY HIGH WATER

STREAM OVERLOOK AND GATHERING SPACE

WOODS CREEK

EDGE OF CREEK JULY 2018

APPROXIMATE TOP OF SLOPE

APPROXIMATE WATERLINE BASEMENT

NOTE
TOP OF CURB IS 6" ABOVE FLOW LINE UNLESS OTHERWISE NOTED.

SCALE: 1" = 20'
0 10 20 40

FILE NO. XXXXXX

NO.	DATE	REVISION	BY	CK

01-16-2019

CIVIL ENGINEERING
LANDSCAPE ARCHITECTURE
PLANNING
SURVEYING
CORE DESIGN
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SCALE:
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DATE 01/16/19
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0" 1"

GRADING PLAN
RIVERS EDGE APARTMENT COMMUNITY

RIVERS EDGE WA LLLP
909 5TH AVENUE #2401
SEATTLE, WASHINGTON 98164

PROJECT NUMBER
18038

DRAWING
C3.01

SHEET 7 OF 20

QTR. SW., SEC. 6, TWP. 27 N., RGE. 7 E., W.M.

SIMONS RD (PUBLIC ROW)

ANN ST (PUBLIC ROW)

BLDG. D1
FF
80.25

BLDG. E1
FF
80.50

BLDG. B2
FF
81.00

FF
81.25

ROAD D

ROAD A

143 ST ANN LLC
TPN 2707060300900

143 ST ANN LLC
TPN 2707060301000

LOPEZ
TPN 2707060300800

10' CRITICAL AREA BUILDING/SETBACK

EDGE OF HISTORIC DISTURBANCE

ORDINARY HIGH WATER

WOODS CREEK

APPROXIMATE E WATERLINE EASEMENT

SEE SHEET C3.01

NOTE
TOP OF CURB IS 6" ABOVE FLOW LINE UNLESS OTHERWISE NOTED.

SCALE: 1" = 20'
0 10 20 40

FILE NO. XXXXXX

NO.	DATE	REVISION	BY	CK

01-16-2019

CIVIL ENGINEERING
LANDSCAPE ARCHITECTURE
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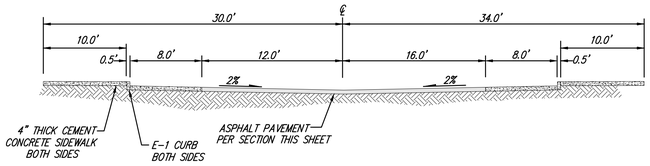
GRADING PLAN
RIVERS EDGE APARTMENT COMMUNITY

RIVERS EDGE WA LLLP
909 5TH AVENUE #2401
SEATTLE, WASHINGTON 98164

PROJECT NUMBER
18038

DRAWING
C3.02

SHEET 8 OF 20



SECTION A - A

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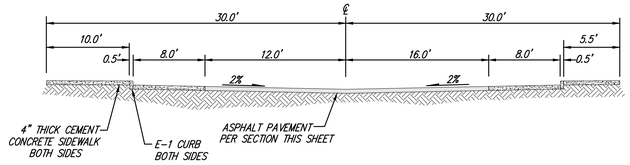

SECTION B - B

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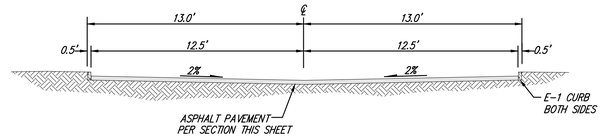

SECTION C - C

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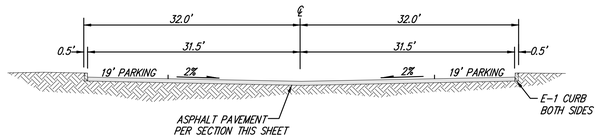

SECTION D - D

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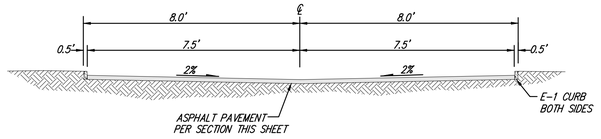

SECTION E - E

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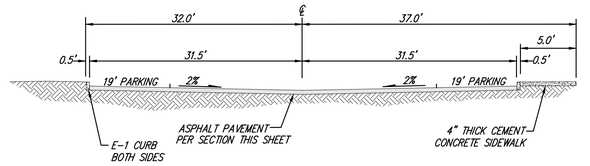

SECTION F - F

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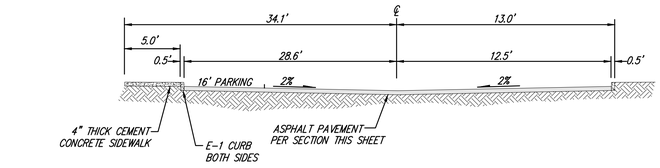

SECTION G - G

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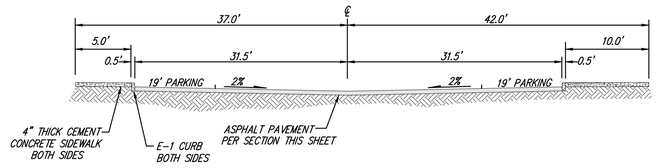

SECTION H - H

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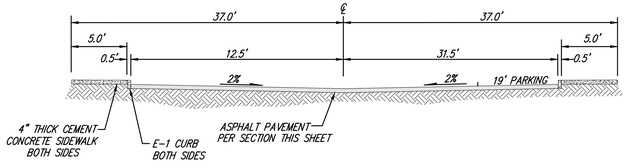

SECTION I - I

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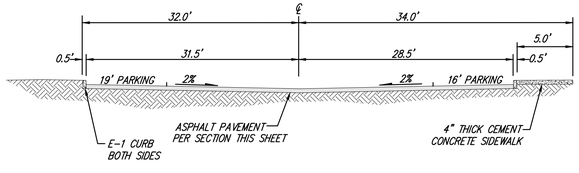

SECTION J - J

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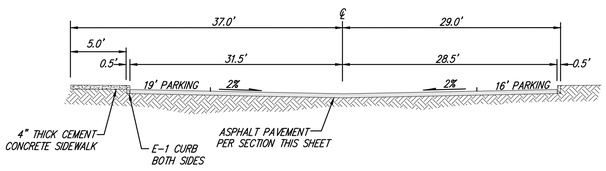
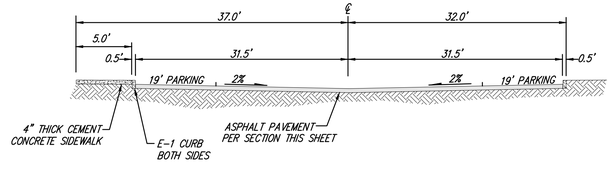


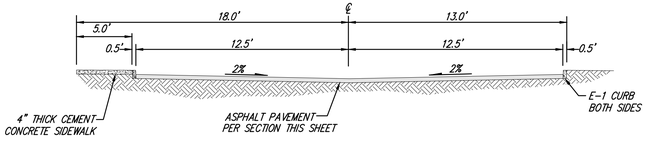
SECTION K - K

NO SCALE



SECTION L - L

NO SCALE



SECTION M - M

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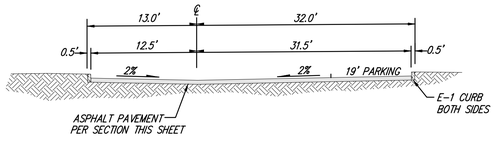
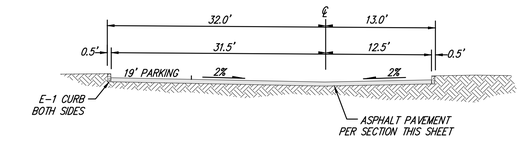


SECTION N - N

NO SCALE



SECTION O - O

NO SCALE

FILE NO. XXXXXX

NO.	DATE	REVISION	BY	CK

01-16-2019

CIVIL ENGINEERING
LANDSCAPE ARCHITECTURE
PLANNING
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CORE DESIGN
12100 NE 195th St, Suite 300 Bothell, Washington 98011 425.885.7877

SCALE:
DESIGNED
DRAWN
CHECKED
DATE 01/16/19

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING
0" 1"

GRADING NOTES AND DETAILS
RIVERS EDGE APARTMENT COMMUNITY

RIVERS EDGE WA LLLP
909 5TH AVENUE, #2401
SEATTLE, WASHINGTON 98164

PROJECT NUMBER
18038

DRAWING
C3.31

I:\18038\CAD\SHEETS\C3.31 GRADING NOTES AND DETAILS.DWG

QTR. SW., SEC. 6, TWP. 27 N., RGE. 7 E., W.M.

SEE SHEET C4.02

FREMONT ST (PUBLIC ROW)

ANN ST (PUBLIC ROW)

ROAD B1

ROAD B2

ROAD C

ROAD A

WQ VAULT
PROP. 8'X16' UNDERGROUND BIOPOD BIOFILTER VAULT W/ INTERNAL BYPASS. MODEL # BPU-16-816. SEE SHEET C4.34 FOR DETAILS.

CB 1
STA. 2+46.00, 8.50 LT
TYPE 2-48", MANHOLE
RIM 77.40

CB 20
STA. 3+33.33, 8.50 LT
TYPE 2-64", SOLID LOCKING LID
RIM 76.88

INFILT. VAULT
PROP. R-TANK INFILTRATION SYSTEM. SEE SHEETS C4.31 AND C4.32 FOR DETAILS

12" IE 68.67
12" IE 70.84
12" IE 66.00
21LF 12" PVC
5LF 12" PVC
7LF 12" PVC
115LF 12" PVC
12" IE 66.00
8LF 12" PVC
30LF 12" PVC
115LF 12" PVC
58LF 24" PVC

CB 2
STA. 2+10.43, 0.00
TYPE 2-48", VANED GRATE
RIM 76.93

INFILT. TRENCH
PROP. R-TANK INFILTRATION TRENCH - BLDG A. SEE SHEETS C4.33 AND C4.34 FOR DETAILS.

6" IE 73.90
9LF 6" PVC
28LF 6" PVC
6" IE 73.90
3LF 6" PVC

8" CLEANOUT
RIM 78.42
6" IE 75.00

CONNECT ROOF DRAINS AND PORTION OF FOOTING DRAIN TO CLEANOUT

CB 3
STA. 3+25.00, 0.00 LT
TYPE 2-48", VANED GRATE
RIM 76.67

BLDG. A1
ROOF AREA
11,014 SF
FF
78.50

CONNECT DEEPENED FOOTING DRAIN TO CLEANOUT

8" CLEANOUT
RIM 78.35
4" IE 70.00

CB 21
STA. 3+59.01, 11.00 RT
TYPE 2-48", MANHOLE
RIM 77.18

CB 12
STA. 3+25.00, 28.50 RT
TYPE 1, SOLID LOCKING LID
RIM 77.24

28LF 6" PVC
PERF. PIPE
64LF 24" PVC
44LF 24" PVC

INFILT. TRENCH
PROP. R-TANK INFILTRATION TRENCH - BLDG B. SEE SHEETS C4.33 AND C4.34 FOR DETAILS.

BLDG. B2
ROOF AREA
7,519 SF
FF
81.00

CB 15
STA. 1+61.88, 28.50 LT
TYPE 1, SOLID LOCKING LID
RIM 79.78

CONNECT ROOF AND FOOTING DRAINS TO CLEANOUT

8" CLEANOUT
RIM 80.81
6" IE 77.50
9LF 6" PVC
6" IE 76.40
6" IE 76.90
3LF 6" PVC
28LF 6" PVC

CB 14
STA. 1+61.88, 0.00
TYPE 1, VANED GRATE
RIM 79.21

3LF 6" PVC
61LF 12" PVC
14LF 12" PVC

CB 7
STA. 6+92.00, 0.00
TYPE 2-48", VANED GRATE
RIM 79.60

49LF 12" PVC

CB 6
STA. 6+42.68, 0.00
TYPE 2-48", MANHOLE
RIM 80.05

CONNECT ROOF AND FOOTING DRAINS TO CLEANOUT

6" IE 76.65
9LF 6" PVC

8" CLEANOUT
RIM 81.30
6" IE 77.15

BLDG. C1
ROOF AREA
11,014 SF
FF
81.25

INFILT. TRENCH
PROP. R-TANK INFILTRATION TRENCH - BLDG C. SEE SHEETS C4.33 AND C4.34 FOR DETAILS.

CB 5
STA. 5+81.84, 0.00
TYPE 2-48", MANHOLE
RIM 79.69

6" IE 77.15
3LF 6" PVC

CB 13
STA. 5+81.84, 28.50 RT
TYPE 1, SOLID LOCKING LID
RIM 80.26

CB 4
STA. 4+39.98, 0.00
TYPE 2-48", MANHOLE
RIM 77.87

10' CRITICAL AREA BUILDING SETBACK

EDGE OF HISTORIC DISTURBANCE

ORDINARY HIGH WATER

CB 22
STA. 4+16.73, 11.00 RT
TYPE 2-48", MANHOLE
RIM 77.77

CB 23
STA. 4+16.73, 74.62 RT
TYPE 2-48", MANHOLE
RIM 78.30

CB 24
STA. 4+02.99, 112.90 RT
TYPE 2-48", MANHOLE
RIM 78.17

CB 25
STA. 3+39.03, 112.90 RT
TYPE 2-48", MANHOLE
RIM 77.34

WOODS CREEK

EDGE OF CREEK JULY 2018

ORDINARY HIGH WATER FLAGS SURVEYED JULY 2018

APPROXIMATE TOP OF SLOPE

APPROXIMATE WATERLINE EASEMENT

PARCEL A
BLA BA 200001
AFN 200005245002

PARCEL B
BLA BA 200001
AFN 200005245002

SDMH #8149
RIM EL=78.35
6"CLAY(E)IE=74.30
24"CMP(N)IE=57.68
24"CMP(S)IE=57.60
2" VERT. PVC TOP=76.14

24"CMP IE=56.09

18"CMP IE=53.34
(DAMAGED, CONNECTION UNKNOWN)

SCALE: 1" = 20'
0 10 20 40

FILE NO. XXXXXX

NO.	DATE	REVISION	BY	CK

01-16-2019

CIVIL ENGINEERING
LANDSCAPE ARCHITECTURE
PLANNING
SURVEYING

CORE DESIGN
12100 NE 195th St, Suite 300 Bothell, Washington 98011 425.885.7877

SCALE:	VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING
DESIGNED	
DRAWN	
CHECKED	
DATE 01/16/19	0" 1"

ROAD AND STORM DRAINAGE PLAN
RIVERS EDGE APARTMENT COMMUNITY

RIVERS EDGE WA LLLP
909 5TH AVENUE #2401
SEATTLE, WASHINGTON 98164

PROJECT NUMBER
18038

DRAWING
C4.01

SHEET 10 OF 20

QTR. SW., SEC. 6, TWP. 27 N., RGE. 7 E., W.M.

SIMONS RD (PUBLIC ROW)

ROAD D

ROAD A

ANN ST (PUBLIC ROW)

BLDG. D1
ROOF AREA 11,014 SF
FF 80.25

BLDG. E1
ROOF AREA 11,014 SF
FF 80.50

BLDG. B2
ROOF AREA 7,519 SF
FF 81.00

FF 81.25

INFILT. TRENCH
PROP. R-TANK INFILTRATION TRENCH - BLDG D. SEE SHEETS C4.33 AND C4.34 FOR DETAILS.

INFILT. TRENCH
PROP. R-TANK INFILTRATION TRENCH - BLDG E. SEE SHEETS C4.33 AND C4.34 FOR DETAILS.

INFILT. TRENCH
PROP. R-TANK INFILTRATION TRENCH - BLDG B. SEE SHEETS C4.33 AND C4.34 FOR DETAILS.

8" CLEANOUT
RIM 80.24
6" IE 76.75

9LF 6" PVC

6" IE 75.65

3LF 6" PVC
6" IE 76.15

28LF 6" PVC

123LF 8" PVC

37LF 8" PVC

160LF 12" PVC

32LF 12" PVC

46LF 12" PVC

29LF 6" PVC

6" IE 75.90
9LF 6" PVC

8" CLEANOUT
RIM 80.45
6" IE 77.00

CONNECT ROOF DRAINS AND PORTION OF FOOTING DRAIN TO CLEANOUT

6" IE 76.40
3LF 6" PVC

CONNECT DEEPENED FOOTING DRAIN TO CLEANOUT

8" CLEANOUT
RIM 80.33
4" IE 72.00

143LF 12" PVC

49LF 12" PVC

32LF 4" PVC PIPE

4" IE 70.00

10' CRITICAL AREA BUILDING SETBACK

EDGE OF HISTORIC DISTURBANCE

ORDINARY HIGH WATER

WOODS CREEK

8" CLEANOUT
RIM 80.81
6" IE 77.50

9LF 6" PVC

6" IE 76.40

CONNECT ROOF AND FOOTING DRAINS TO CLEANOUT

CB 18
STA. 2+76.67, 28.50 LT
TYPE 1, SOLID LOCKING LID
RIM 79.05

CB 17
STA. 2+76.67, 0.00
TYPE 1, VANED GRATE
RIM 78.48

CB 11
STA. 10+72.00, 0.00
TYPE 1, VANED GRATE
RIM 78.38

CB 10
STA. 10+40.12, 0.00
TYPE 1, SOLID LOCKING LID
RIM 78.65

CB 9
STA. 8+80.00, 0.00
TYPE 1, VANED GRATE
RIM 78.70

CB 19
STA. 1+41.82, 0.00
TYPE 1, VANED GRATE
RIM 78.57

CB 16
STA. 8+80.00, 28.50 RT
TYPE 1, SOLID LOCKING LID
RIM 79.27

CB 8
STA. 8+34.26, 0.00
TYPE 2-48", MANHOLE
RIM 79.12

CB 15
STA. 1+61.88, 28.50 LT
TYPE 1, SOLID LOCKING LID
RIM 79.78

CB 7
STA. 6+92.00, 0.00
TYPE 2-48", VANED GRATE
RIM 79.60

143 ST ANN LLC
TPN 270706003009000

143 ST ANN LLC
TPN 270706003010000

LOPEZ
TPN 270706003008000

FOUND NAIL W/ WASHER "PLS XXX8S"

20' PUD NO. 1 EASEMENT
AFN 7311220230

SCALE: 1" = 20'
0 10 20 40

SEE SHEET 4.01

FILE NO. XXXXXX

NO.	DATE	REVISION	BY	CK

01-16-2019

CIVIL ENGINEERING
LANDSCAPE ARCHITECTURE
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CORE DESIGN
12100 NE 195th St, Suite 300 Bothell, Washington 98011 425.885.7877

SCALE:	
DESIGNED	
DRAWN	
CHECKED	
DATE	01/16/19

VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING 1"

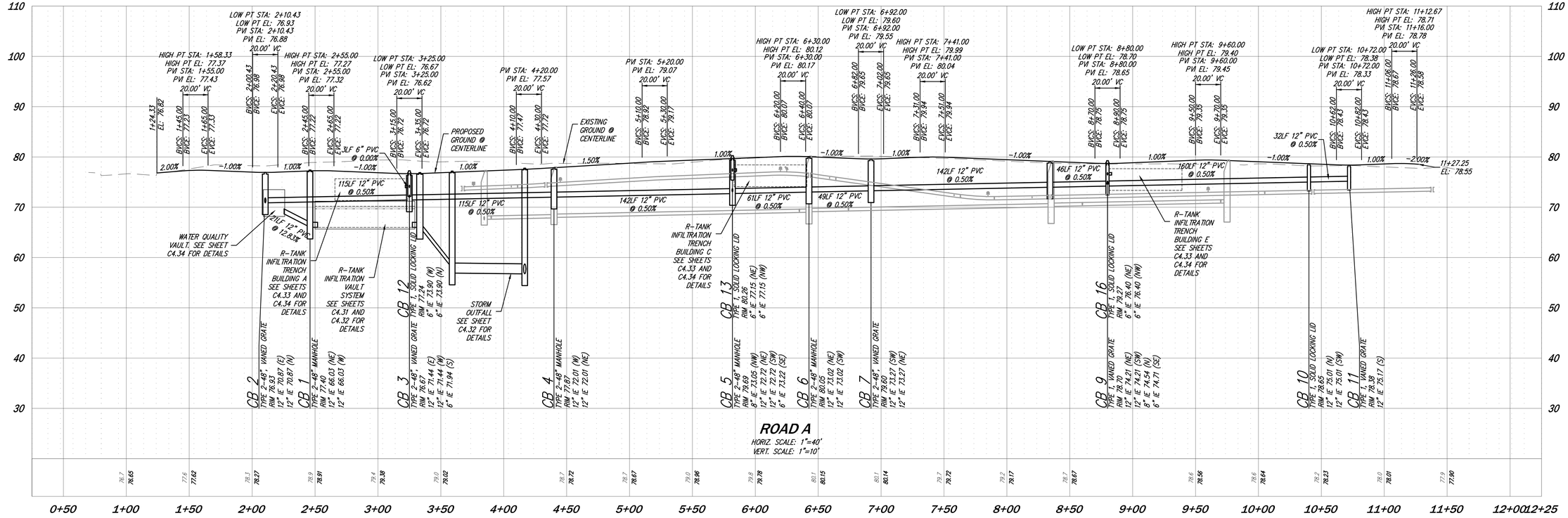
ROAD AND STORM DRAINAGE PLAN
RIVERS EDGE APARTMENT COMMUNITY

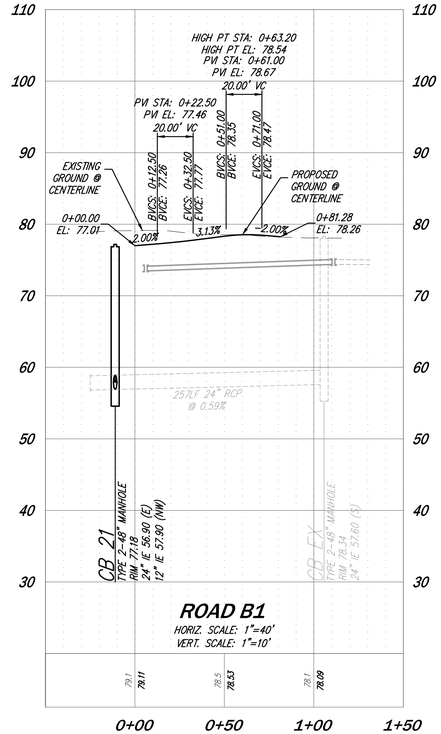
RIVERS EDGE WA LLLP
909 5TH AVENUE #2401
SEATTLE, WASHINGTON 98164

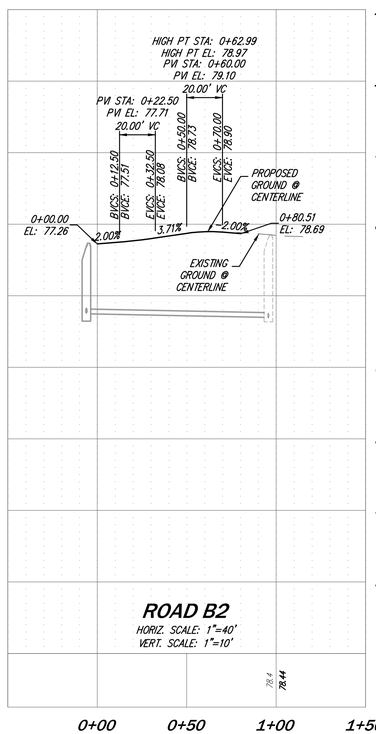
PROJECT NUMBER 18038

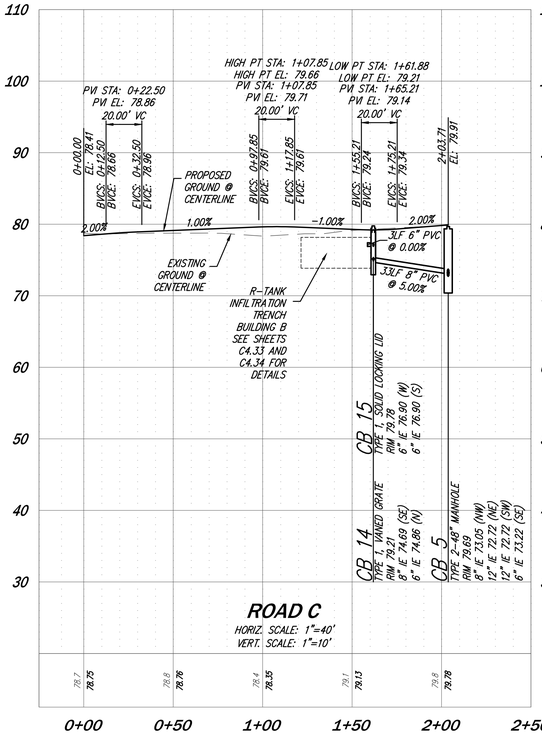
DRAWING C4.02

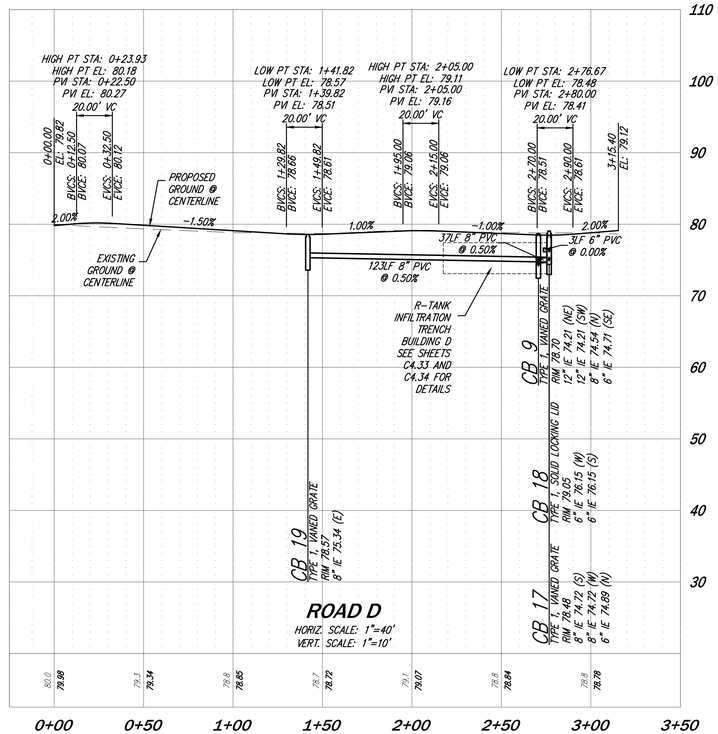
SHEET 11 OF 20











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NO.	DATE	REVISION	BY	CK

01-16-2019

CIVIL ENGINEERING
LANDSCAPE ARCHITECTURE
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SURVEYING

CORE DESIGN
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DESIGNED	
DRAWN	
CHECKED	
DATE	01/16/19

VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING 0" 1"

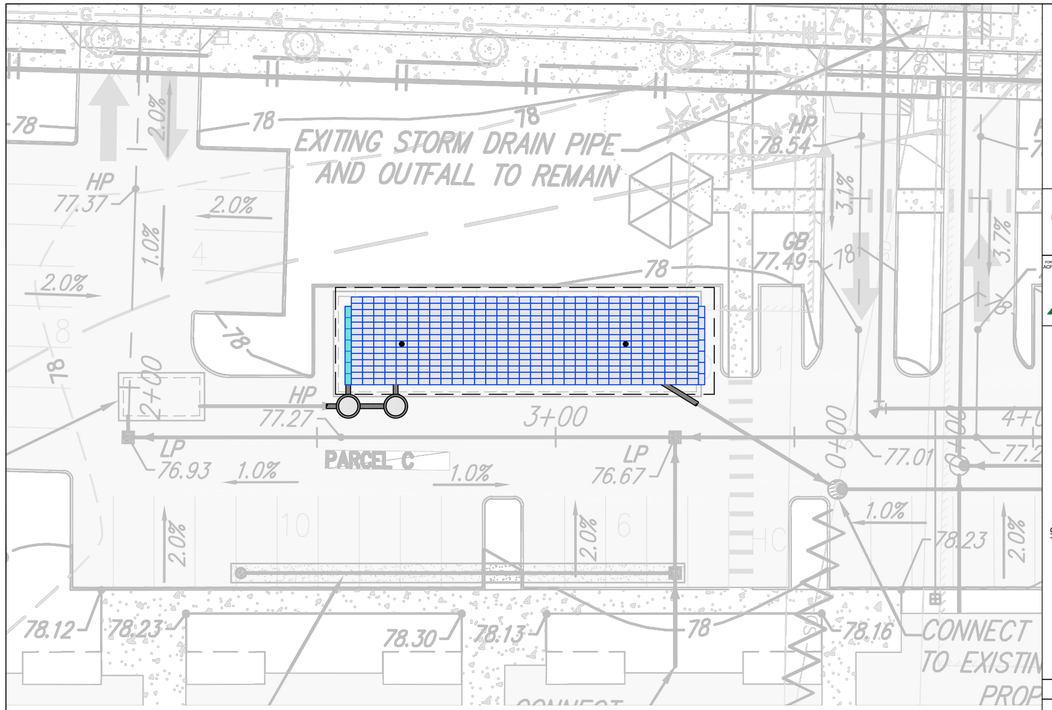
ROAD AND STORM DRAINAGE PROFILES
RIVERS EDGE APARTMENT COMMUNITY

RIVERS EDGE WA LLLP
909 5TH AVENUE #2401
SEATTLE, WASHINGTON 98164

PROJECT NUMBER 18038

DRAWING C4.21

SHEET 12 OF 20



R-TANK^{HD} SYSTEM OVERLAY
SCALE: 1" = 15'

SCALE 1" = 15'

ENGINEER OF RECORD TO REVIEW, APPROVE AND ENDORSE FINAL SITE SPECIFIC DESIGN.

FOR ADDITIONAL INFORMATION PLEASE CONTACT ACF ENVIRONMENTAL 1-800-448-3636 www.acfenvironmental.com

R-TANK^{HD} SYSTEM LAYOUT
RIVERS EDGE
MONROE, WA
SITE DESIGNATION: INFILTRATION GALLERY
ACF ENVIRONMENTAL, 1-800-448-3636, www.acfenvironmental.com

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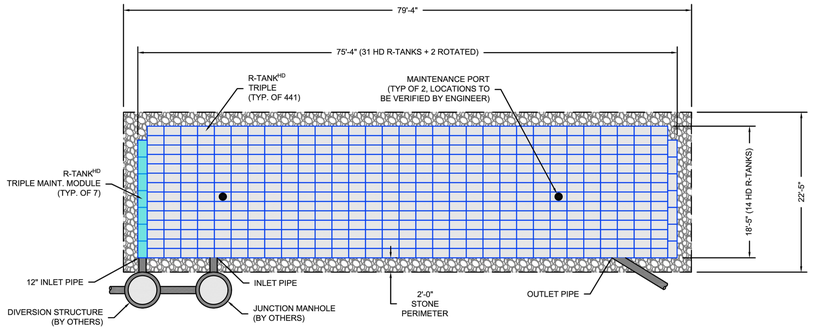
DATE: 11/28/18
SHEET NO.: 1 of 7

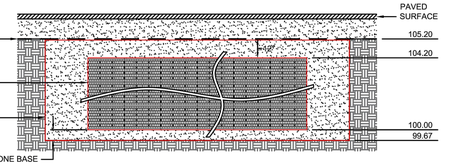


NOTES:
1. STORAGE VOLUME FROM 99.67 TO 103.70 = 5,670 CF
2. FREEBOARD PROVIDED FROM 103.70 TO 104.20
3. ELEVATIONS ARE PROVIDED AS REFERENCE, REFER TO CIVIL PLANS FOR SITE SPECIFIC ELEVATION INFORMATION.

SCALE 1" = 10'

LAYOUT SCALE	1" = 10'
R-TANK^{HD} MODULE TYPE	TRIPLE
TRAFFIC LOAD	HS-20
# OF TRIPLE R-TANKS	441
# OF TRIPLE R-TANK MAINTENANCE MODULES	7
TOTAL SYSTEM STORAGE	7,113 CF
R-TANK STORAGE VOLUME	5,501 CF
STONE STORAGE VOLUME (40% VOID RATIO)	1,612 CF
TOP OF COVER STONE ELEV. (12")	105.20
ACF BX-12 GEOGRID ELEV.	105.20
TOP OF R-TANK ELEV.	104.20
TANK INVERT	100.00
INVERT OF STONE BASE (4")	99.67
MIN. STONE PERIMETER WIDTH	2.0 FT
SEE SHEETS 3 - 7 FOR DETAILS AND ADDITIONAL INFORMATION	

GEOGRID (ACF BX-12) PLACED 12" ABOVE THE R-TANK^{HD} SYSTEM. OVERLAP ADJACENT PANELS BY 18" MIN. GEOGRID SHOULD EXTEND 3' BEYOND THE EXCAVATION FOOTPRINT.



R-TANK^{HD} TANK WRAP & EXCAVATION ENVELOPE DETAIL

ENGINEER OF RECORD TO REVIEW, APPROVE AND ENDORSE FINAL SITE SPECIFIC DESIGN.

FOR ADDITIONAL INFORMATION PLEASE CONTACT ACF ENVIRONMENTAL 1-800-448-3636 www.acfenvironmental.com

R-TANK^{HD} SYSTEM LAYOUT
RIVERS EDGE
MONROE, WA
SITE DESIGNATION: INFILTRATION GALLERY
ACF ENVIRONMENTAL, 1-800-448-3636, www.acfenvironmental.com

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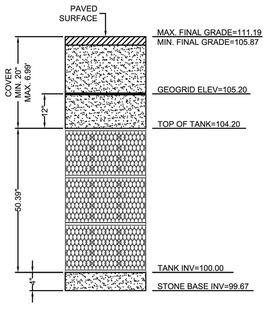
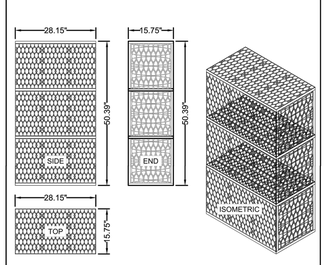
DATE: 11/28/18
SHEET NO.: 2 of 7



NOTE:
ELEVATIONS ARE PROVIDED AS REFERENCE, REFER TO CIVIL PLANS FOR SITE SPECIFIC ELEVATION INFORMATION.

TRIPLE R-TANK^{HD} - ELEVATION



MODULE DATA

GEOMETRY:	LOAD RATING:
LENGTH = 28.15 IN. (715 MM)	33.4 PSI, (MODULE ONLY)
WIDTH = 15.75 IN. (400 MM)	HS20, (WITH ACF COVER SYSTEM)
HEIGHT = 50.39 IN. (1280 MM)	**MATERIAL:**
TANK VOLUME = 12.93 CF	100% RECYCLED POLYPROPYLENE
STORAGE VOLUME = 12.28 CF	**SMALL PLATES PER**
VOID INTERNAL VOLUME: 95%	**SEGMENT/TOTAL:**
VOID SURFACE AREA: 90%	5/15

TRIPLE R-TANK^{HD} - MODULE DETAIL

R-TANK^{HD} QUANTITIES	
R-TANK^{HD} MODULE TYPE	TRIPLE
# OF TRIPLE R-TANKS	441
# OF TRIPLE R-TANK MAINTENANCE MODULES	7
TOTAL SYSTEM STORAGE	7,113 CF
R-TANK STORAGE VOLUME	5,501 CF
STONE STORAGE VOLUME (40% VOID RATIO)	1,612 CF
STONE BED FOOTPRINT	1,775 SF
STONE QUANTITY	149 CY
FW402 WOVEN GEOTEXTILE TANK WRAP	4,080 SF (453 SY)
FW402 WOVEN GEOTEXTILE EXCAVATION WRAP	5,381 SF (598 SY)
8 OZ. NON-WOVEN GEOTEXTILE MAINT. ROW WRAP	199 SF (22 SY)
S300 WOVEN GEOTEXTILE MAINT. ROW BASE FABRIC	93 SF (10 SY)
ACF BX-12 GEOGRID	2,785 SF (309 SY)
12" MAINTENANCE PORTS	2
12" PIPE BOOTS	1
PIPE BOOTS (UNKNOWN SIZE)	2
NOTE: STONE QUANTITY INCLUDES 12" OF COVER AND 4" OF BASE.	
NOTE: GEOTEXTILE / LINER QUANTITIES INCLUDE A 15% WASTE FACTOR.	

NOTES:
1. STORAGE VOLUME FROM 99.67 TO 103.70 = 5,670 CF
2. FREEBOARD PROVIDED FROM 103.70 TO 104.20

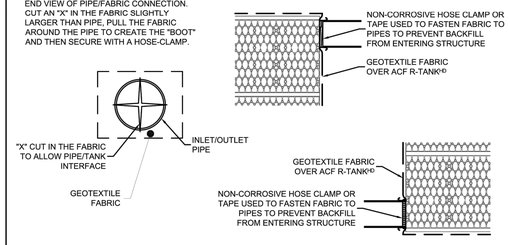
ENGINEER OF RECORD TO REVIEW, APPROVE AND ENDORSE FINAL SITE SPECIFIC DESIGN.

FOR ADDITIONAL INFORMATION PLEASE CONTACT ACF ENVIRONMENTAL 1-800-448-3636 www.acfenvironmental.com

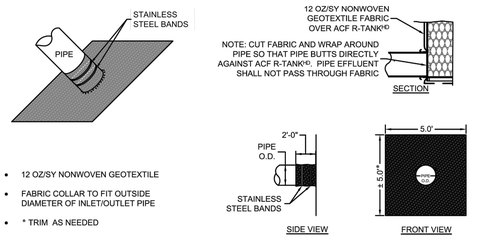
R-TANK^{HD} SYSTEM DETAILS
RIVERS EDGE
MONROE, WA
SITE DESIGNATION: INFILTRATION GALLERY
ACF ENVIRONMENTAL, 1-800-448-3636, www.acfenvironmental.com

DRAWN BY: EDQ
DATE: 11/28/18
SHEET NO.: 3 of 7

END VIEW OF PIPE/FABRIC CONNECTION. CUT AN "X" IN THE FABRIC SLIGHTLY LARGER THAN PIPE, PULL THE FABRIC AROUND THE PIPE TO CREATE THE "BOOT" AND THEN SECURE WITH A HOSE-CLAMP.



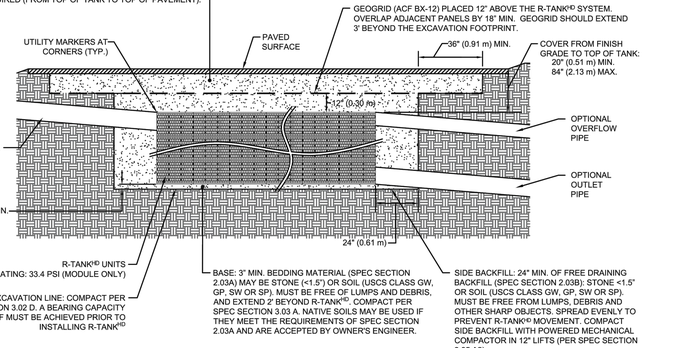
R-TANK^{HD} TYPICAL TANK INLET/OUTLET DETAIL



GEOTEXTILE PIPE BOOT FOR R-TANK^{HD}

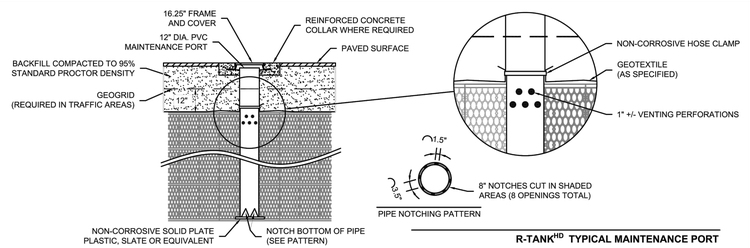
TOTAL COVER: 20" MINIMUM AND 84" MAXIMUM. FIRST 12" MUST BE FREE DRAINING BACKFILL (SPEC SECTION 2.03B): STONE <1.5" OR SOIL (USCS CLASS GW, GP, SW OR SP). ADDITIONAL FILL MAY BE STRUCTURAL FILL (SPEC SECTION 2.03C): STONE OR SOIL (USCS CLASS SM, SP, SW, GM, GP OR GW) WITH MAX CLAY CONTENT<10%, MAX 25% PASSING NO. 200 SIEVE, AND MAX PLASTICITY INDEX OF 4. A MIN. 12" COVER MUST BE MAINTAINED BETWEEN BACKFILL EQUIPMENT AND THE TOP OF THE R-TANK™ SYSTEM AT ALL TIMES. TOTAL HEIGHT OF TOP BACKFILL SHOULD NOT EXCEED 7'. CONTACT ACF ENVIRONMENTAL IF MORE THAN 7' OR LESS THAN 20" OF TOP BACKFILL IS REQUIRED (FROM TOP OF TANK TO TOP OF PAVEMENT).

NOTES:
1. FOR COMPLETE MODULE DATA, SEE APPROPRIATE R-TANK^{HD} MODULE SHEET .
2. INSTALLATIONS PER THIS DETAIL MEET GUIDELINES OF HL-93 LOADING PER THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, CUSTOMARY U.S. UNITS, 7TH EDITION, 2014 WITH 2015 AND 2016 INTERIM REVISIONS.
3. PRE-TREATMENT STRUCTURES NOT SHOWN.
4. FOR INFILTRATION APPLICATIONS, GEOTEXTILE ENVELOPING R-TANK SHALL BE ACF M200 (PER SPEC SECTION 2.02A) AND BASE SHALL BE 4" MIN. UNCOMPACTED FREE DRAINING BACKFILL (SPEC SECTION 2.03A) TO PROVIDE A LEVEL BASE. SURFACE MUST BE SMOOTH, FREE OF LUMPS OR DEBRIS, AND EXTEND 2' BEYOND R-TANK^{HD} FOOTPRINT.



R-TANK^{HD} & H-20 LOADS - SECTION VIEW

NOTES
1. THIS PORT IS USED TO PUMP WATER INTO THE SYSTEM AND RE-SUSPEND ACCUMULATED SEDIMENT SO THAT IT MAY BE PUMPED OUT.
2. MINIMUM REQUIRED MAINTENANCE INCLUDES A QUARTERLY INSPECTION DURING THE FIRST YEAR OF OPERATION AND A YEARLY INSPECTION THEREAFTER. FLUSH AS NEEDED.
3. ONLY R-TANK^{HD} AND R-TANK^{HD} MAY BE USED IN TRAFFIC APPLICATIONS.
4. SEE TRAFFIC LOADING DETAIL FOR MINIMUM & MAXIMUM COVER REQUIREMENTS.



R-TANK^{HD} TYPICAL MAINTENANCE PORT

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FOR ADDITIONAL INFORMATION PLEASE CONTACT ACF ENVIRONMENTAL 1-800-448-3636 www.acfenvironmental.com

R-TANK^{HD} SYSTEM DETAILS
RIVERS EDGE
MONROE, WA
SITE DESIGNATION: INFILTRATION GALLERY
ACF ENVIRONMENTAL, 1-800-448-3636, www.acfenvironmental.com

DRAWN BY: EDQ
DATE: 11/28/18
SHEET NO.: 4 of 7

NO.	DATE	REVISION	BY	CK

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ROAD AND STORM DRAINAGE NOTES AND DETAILS

RIVERS EDGE APARTMENT COMMUNITY

RIVERS EDGE WA LLLP
909 5TH AVENUE #2401
SEATTLE, WASHINGTON 98164

SCALE:
DESIGNED
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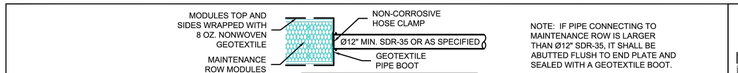
CHECKED
DATE 01/16/19
VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING 1"
0" 1"

PROJECT NUMBER
18038

DRAWING
C4.31

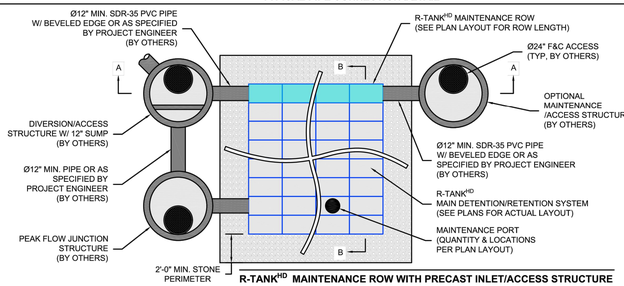
SHEET 13 OF 20

FILE NO. XXXXXX

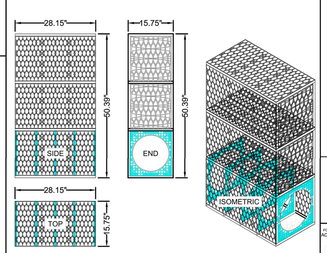


NOTE: IF PIPE CONNECTING TO MAINTENANCE ROW IS LARGER THAN Ø12" SDR-35, IT SHALL BE ABUTTED FLUSH TO END PLATE AND SEALED WITH A GEOTEXTILE BOOT.

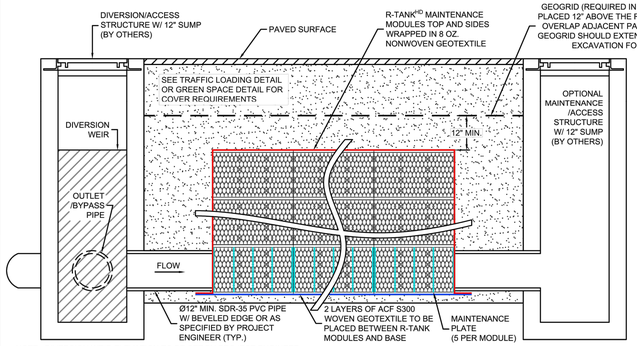
TYPICAL PIPE CONNECTION DETAIL



R-TANK^HD MAINTENANCE ROW WITH PRECAST INLET/ACCESS STRUCTURE

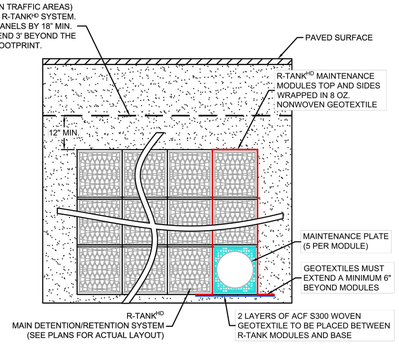


TRIPLE R-TANK^HD - MAINTENANCE MODULE DETAIL
(FOR MODULE DATA, SEE STANDARD MODULE DETAIL)



NOTE: DIVERSION WEIR ELEVATION TO BE SET BY PROJECT ENGINEER BASED ON TREATMENT VOLUME/FLOW RATE REQUIRED.

R-TANK^HD MAINTENANCE ROW SECTION A-A



R-TANK^HD MAINTENANCE ROW SECTION B-B

R-TANK^HD MAINTENANCE ROW DETAILS
RIVERS EDGE
MONROE, WA
SITE DESIGNATION: INFILTRATION GALLERY
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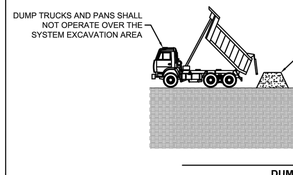
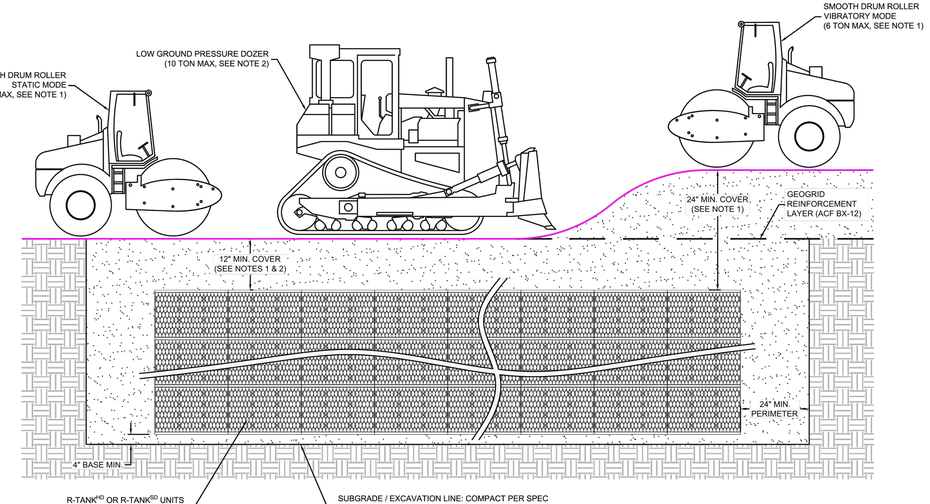
DATE: 11/28/18
SHEET NO.: 5 of 7



DUMP TRUCK DETAIL (SEE NOTE 3)

NOTES:
1. FOLLOWING PLACEMENT OF SIDE BACKFILL, A UNIFORM 12" LIFT OF THE FREELY DRAINING MATERIAL (SPEC SECTION 2.03 B) SHALL BE PLACED OVER THE R-TANK AND LIGHTLY COMPACTED USING A WALK-BEHIND TRENCH ROLLER. ALTERNATELY, A ROLLER (MAXIMUM GROSS VEHICLE WEIGHT OF 6 TONS) MAY BE USED. ROLLER MUST REMAIN IN STATIC MODE UNTIL A MINIMUM OF 24" OF COVER HAS BEEN PLACED OVER THE MODULES. SHEEP FOOT ROLLERS SHOULD NOT BE USED. **SPEC SECTION 3.05 A**
2. ONLY LOW PRESSURE TIRE OR TRACK VEHICLES (LESS THAN 7 PSI AND OPERATING WEIGHT OF LESS THAN 20,000 LBS) SHALL BE OPERATED OVER THE R-TANK SYSTEM DURING CONSTRUCTION. **SPEC SECTION 3.05 B**
3. DUMP TRUCKS AND PANS SHALL NOT BE OPERATED WITHIN THE R-TANK SYSTEM AT ANY TIME. WHERE NECESSARY, THE HEAVY EQUIPMENT SHOULD UNLOAD IN AN AREA ADJACENT TO THE R-TANK SYSTEM AND THE MATERIAL SHOULD BE MOVED OVER THE SYSTEM WITH TRACKED EQUIPMENT. **SPEC SECTION 3.05 B**
4. ENSURE THAT ALL UNRELATED CONSTRUCTION TRAFFIC IS KEPT AWAY FROM THE LIMITS OF EXCAVATION UNTIL THE PROJECT IS COMPLETE AND FINAL SURFACE MATERIALS ARE IN PLACE. NO NON-INSTALLATION RELATED LOADING SHOULD BE ALLOWED OVER THE R-TANK SYSTEM UNTIL THE FINAL DESIGN SECTION HAS BEEN CONSTRUCTED (INCLUDING PAVEMENT). **SPEC SECTION 3.05 C**
5. SEE R-TANK INSTALLATION GUIDE OR CONTACT YOUR LOCAL ACF REPRESENTATIVE FOR ADDITIONAL INFORMATION.



CONSTRUCTION EQUIPMENT COVER DETAIL - VEHICULAR TRAFFIC

R-TANK^HD CONSTRUCTION EQUIPMENT COVER DETAIL
RIVERS EDGE
MONROE, WA
SITE DESIGNATION: INFILTRATION GALLERY
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SHEET NO.: 6 of 7

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ACF ENVIRONMENTAL LET'S GET IT DONE

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CIVIL ENGINEERING
LANDSCAPE ARCHITECTURE
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CORE DESIGN

12100 NE 195th St, Suite 300 Bothell, Washington 98011 425.885.7877

R-TANK SPECIFICATION

PART 1 - GENERAL
1.01 Related Documents
A. Drawings, technical specification and general provisions of the Contract as modified herein apply to this section.

1.02 Description of Work Included
A. Provide excavation and base preparation per geotechnical engineer's recommendations and/or as shown on the design drawings, to provide adequate support for project design loads and safety from excavation sidewall collapse. Excavations shall be in accordance with the owner's and OSHA requirements.
B. Provide and install R-Tank^SD, R-Tank^HD, R-Tank^HD, or R-Tank^HD system (hereafter called R-Tank) and all related products including fill materials, geotextiles, geogrids, inlet and outlet pipe with connections per the manufacturer's installation guidelines provided in this section.
C. Provide and construct the cover of the R-Tank system including; stone backfill, structural fill cover, and pavement section as specified.
D. Protect R-Tank system from construction traffic after installation until completion of all construction activity in the installation area.

1.03 Quality Control
A. All materials shall be manufactured in ISO certified facilities.
B. Installation Contractor shall demonstrate the following experience:
1. A minimum of three R-Tank or equivalent projects completed within 2 years; and,
2. A minimum of 25,000 cubic feet of storage volume completed within 2 years.
3. Contractor experience requirement may be waived if the manufacturer's representative provides on-site training and review during construction.
C. Installation Personnel: Performed only by skilled workers with satisfactory record of performance on bulk earthworks, pipe, chamber, or pond/landfill construction projects of comparable size and quality.
D. Contractor must have manufacturer's representative available for site review if requested by Owner.

1.04 Submittals
A. Submit proposed R-Tank layout drawings. Drawings shall include typical section details as well as the required base elevation of stone and tanks, minimum cover requirements and tank configuration.
B. Submit manufacturer's product data, including compressive strength and unit weight.
C. Submit manufacturer's installation instructions.
D. Submit R-Tank sample for review. Reviewed and accepted samples will be returned to the Contractor.
E. Submit material certificates for geotextile, geogrid, base course and backfill materials.
F. Submit required experience and personnel requirements as specified in Section 1.03.
G. Any proposed equal alternative product substitution to this specification must be submitted for review and approved prior to bid opening. Review package should include third party reviewed performance data that meets or exceeds criteria in Table 2.01 B.

1.05 Delivery, Storage, and Handling
A. Protect R-Tank and other materials from damage during delivery, and store UV sensitive materials under tarp to protect from sunlight when time from delivery to installation exceeds two weeks. Storage of materials should be on smooth surfaces, free from dirt, mud and debris.
B. Handling is to be performed with equipment appropriate to the materials and site conditions, and may include hand, handcart, forklifts, extension lifts, etc.
C. Cold weather:
1. Care must be taken when handling plastics when air temperature is 40 degrees or below as plastic becomes brittle.
2. Do not use frozen materials or materials mixed or coated with ice or frost.
3. Do not build on frozen ground or wet, saturated or muddy subgrade.

1.06 Preinstallation Conference.
A. Prior to the start of the installation, a preinstallation conference shall occur with the representatives from the design team, the general contractor, the excavation contractor, the R-Tank installation contractor, and the manufacturer's representative.

1.07 Project Conditions
A. Coordinate installation for the R-Tank system with other on-site activities to eliminate all non-installation related construction traffic over the completed R-Tank system. No loads heavier than the design loads shall be allowed over the system, and in no case shall loads higher than a standard AASHTO HS20 (or HS25, depending on design criteria) load be allowed on the system at any time.
B. Protect adjacent work from damage during R-Tank system installation.
C. All pre-treatment systems to remove debris and heavy sediments must be in place and functional prior to operation of the R-Tank system. Additional pretreatment measures may be needed if unit is operational during construction due to increased sediment loads.
D. Contractor is responsible for any damage to the system during construction.

PART 2 - PRODUCTS
2.01 R-Tank Units
A. R-Tank - Injection molded plastic tank plates assembled to form a 95% void modular structure of predesigned height (custom for each project).
B. R-Tank units shall meet the following Physical & Chemical Characteristics:

PROPERTY	DESCRIPTION	R-Tank^SD VALUE	R-Tank^HD VALUE	R-Tank^HD VALUE	R-Tank^HD VALUE
Void Area	Volume available for water storage	95%	95%	95%	95%
Surface Void Area	Percentage of exterior available for infiltration	90%	90%	90%	90%
Compressive Strength	ASTM D 2412 / ASTM F 2418	32.0 psi	33.4 psi	42.8 psi	> 134.2 psi
HS-20 Minimum Cover	Cover required to support HS-20 loads	N/A	30"	24"	12" (measured)
HS-25 Minimum Cover	Cover required to support HS-25 loads	N/A	24"	18"	18" (measured)
Maximum Cover	Maximum allowable cover depth	8 feet	8 feet	8 feet	8 feet
Unit Weight	Weight of plastic per cubic foot of tank	3.29 lbs / cf	3.62 lbs/cf	3.98 lbs / cf	4.3 lbs / cf
Rib Thickness	Thickness of plastic at rib bearing members	0.18 inches	0.18 inches	0.18 inches	0.18 inches
Service Temperature	Safe temperature range for use	-14 ~ 167° F	-14 ~ 167° F	-14 ~ 167° F	-14 ~ 167° F

C. Supplier: ACF Environmental 2831 Cardwell Road Richmond, VA 23234
(T): 800-448-3636; (F): 804-743-7779 www.acfenvironmental.com

2.02 Geosynthetics
A. Geotextile. A geotextile envelope is required to prevent backfill material from entering the R-Tank modules.
1. Standard Application: The standard geotextile shall be an 8 oz per square yard nonwoven geotextile (ACF N080 or equivalent).
2. Infiltration Application: When water must infiltrate/filtrate through the geotextile as a function of the system design, a woven monofilament (ACF M200 or equivalent) shall be used.
B. Geogrid: For installations subject to traffic loads and/or when required by project plans, install geogrid (ACF BX12 or equivalent) to reinforce backfill above the R-Tank system. Geogrid is not always required for R-Tank^SD installations, and is often not required for non-traffic load applications.

2.03 Backfill & Cover Materials
A. Bedding Materials: Stone (angular and smaller than 1.5" in diameter) or soil (GW, GP, SW, or SP as classified by the Unified Soil Classification System) shall be used below the R-Tank system (3" minimum). Material must be free from lumps, debris, and any sharp objects that could cut the geotextile. Material shall be within 3 percent of the optimum moisture content as determined by ASTM D698 at the time of installation. For infiltration applications bedding material shall be free draining.
B. Side and Top Backfill: Free draining material shall be used adjacent to (24" minimum) and above (for the first 12") the R-Tank system. Material must be free from lumps, debris and any sharp objects that could cut the geotextile. Material shall be within 3 percent of the optimum moisture content as determined by ASTM D698 at the time of installation.
1. For LD, HD, and SD modules, backfill materials shall be free draining stone (angular and smaller than 1.5" in diameter) or soil (GW, GP, SW, or SP as classified by the Unified Soil Classification System).
2. For UD modules in traffic loaded (HS-20) applications with less than 14' of top cover, side backfill materials shall be free draining stone (angular and smaller than 1.5" in diameter). The use of soil backfill on the sides of the UD module is not permitted unless the modules are installed outside of traffic areas or with cover depths of > 14'. Top backfill material may be stone or soil as noted above (Section 2.03 B 1).
C. Additional Cover Materials: Structural Fill shall consist of granular materials meeting the gradational requirements of SM, SP, SW, GM, GP or GW as classified by the Unified Soil Classification System. Structural fill shall have a maximum of 25 percent passing the No. 200 sieve, shall have a maximum clay content of 10 percent and a maximum Plasticity Index of 4. Material shall be within 3 percent of the optimum moisture content as determined by ASTM D698 at the time of installation.

2.04 Other Materials
Utility Marker: Install metallic tape at corners of R-Tank system to mark the area for future utility detection.

PART 3 - EXECUTION
3.01 Assembly of R-Tank Units
A. Assembly of modules shall be performed in accordance with the R-Tank Installation Manual, Section 2.

3.02 Layout and Excavation
A. Installer shall stake out, excavate, and prepare the subgrade area to the required plan grades and dimensions, ensuring that the excavation is at least 2 feet greater than R-Tank dimensions in each direction allowing for installation. For installation of geotextile filter fabric, R-Tank modules, and free draining backfill materials.
B. All excavations must be prepared with OSHA approved excavated sides and sufficient working space.
C. Protect partially completed installation against damage from other construction traffic by establishing a perimeter with high visibility construction tape, fencing, barricades, or other means until construction is complete.
D. Base of the excavation shall be uniform, level, and free of lumps or debris and soft or yielding subgrade areas. A minimum 2,000 pounds per square foot bearing capacity is required.
1. Standard Applications: Compact subgrade to a minimum of 95% of Standard Proctor (ASTM D698) density or as required by the Owner's engineer.
2. Infiltration Applications: Subgrade shall be prepared in accordance with the contract documents. Compaction of subgrade should not be performed in infiltration applications.
E. Unsuitable Soils or Conditions: All questions about the base of the excavation shall be directed to the owner's engineer, who will approve the subgrade conditions prior to placement of stone. The owner's engineer shall determine the required bearing capacity of the R-Tank subgrade; however in no case shall a bearing capacity of less than 2,000 pounds per square foot be provided.
1. If unsuitable soils are encountered at the subgrade, or if the subgrade is pumping or appears excessively soft, repair the area in accordance with contract documents and/or as directed by the owner's engineer.
2. If indications of the water table are observed during excavation, the engineer shall be contacted to provide recommendations.
3. Do not start installation of the R-Tank system until unsatisfactory subgrade conditions are corrected and the subgrade conditions are accepted by the owner's engineer.

3.03 Preparation of Base
A. Place a thin layer (3" unless otherwise specified) of bedding material (Section 2.03 A), over the subgrade to establish a level working platform for the R-Tank modules. Level to within ½" (+½") or as shown on the plans. Native subgrade soils or other materials may be used if determined to meet the requirements of 2.03 A and are accepted by the owner's engineer.
1. Standard Applications: Static roll or otherwise compact bedding materials until they are firm and unyielding.
2. Infiltration Applications: Bedding materials shall be prepared in accordance with the contract documents.
B. Outline the footprint of the R-Tank system on the excavation floor using spray paint or chalk line to ensure a 2' perimeter is available around the R-Tank system for proper installation and compaction of backfill.

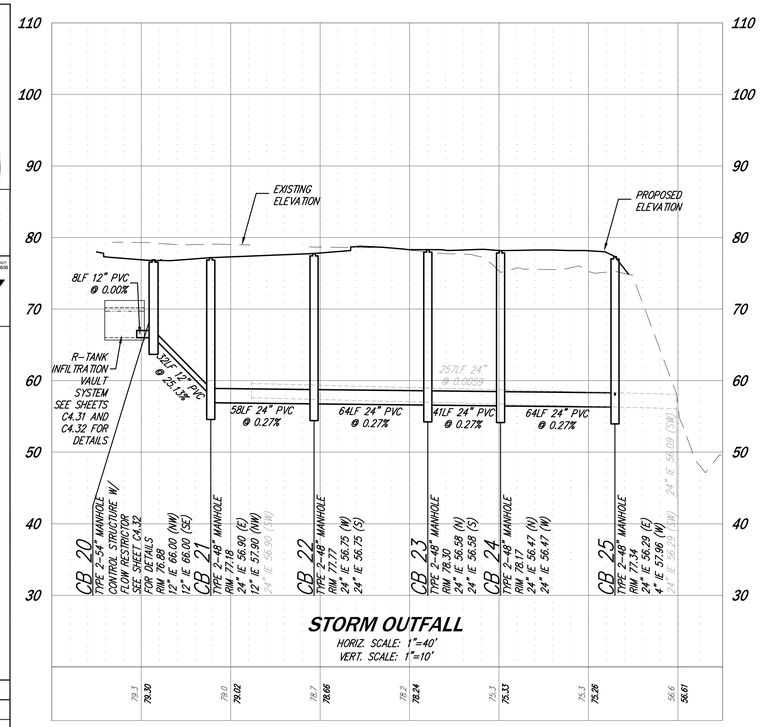
3.04 Installation of the R-Tanks
A. Where a geotextile wrap is specified on the stone base, cut strips to length and install in excavation, removing wrinkles so material lays flat. Overlap geotextile a minimum 12" or as recommended by manufacturer.
B. Where an impervious liner (for containment) is specified, install the liner per manufacturer's recommendations and the contract documents. The R-Tank units shall be separated from impervious liner by a non-woven geotextile fabric installed accordance with Section 3.04A.
C. Install R-Tank modules by placing side by side, in accordance with the design drawings. No lateral connections are required. It is advisable to use a string line to form square corners and straight edges along the perimeter of the R-Tank system. The modules are to be oriented as per the design drawing with required depth as shown on plans..
D. For LD, HD, and SD installations, the large side plate of the tank should be placed on the perimeter of the system. This will typically require that the two ends of the tank area will have a row of tanks placed perpendicular to all other tanks. If this is not shown in the construction drawings, it is a simple field adjustment that will have minimal affect on the overall system footprint. Refer to R-Tank Installation Guide for more details
2. For UD installations, there is no perpendicular end row required.
E. Wrap the R-Tank top and sides in specified geotextile. Cut strips of geotextile so that it will cover the sides and top, encapsulating the entire system to prevent backfill entry into the system. Overlap geotextile 12" or as recommended by manufacturer. Take great care to avoid damage to geotextile (and, if specified, impervious liner) during placement.
F. Identify locations of inlet, outlet and any other penetrations of the geotextile (and optional liner). These connections should be installed flush (butted up to the R-Tank) and the geotextile fabric shall be cut to enable hydraulic continuity between the connections and the R-Tank units. These connections shall be secured using pipe boots with stainless steel pipe clamps. Support pipe in trenches during backfill operations to prevent pipe from settling and damaging the geotextile, impervious liner (if specified) or pipe. Connecting pipes at 90 degree angles facilitates construction, unless otherwise specified. Ensure end of pipe is installed snug against R-Tank system.
G. Install Inspection and Maintenance Ports in locations noted on plans. At a minimum one maintenance port shall be installed within 10' of each inlet & outlet connection, and with a maximum spacing of one maintenance port for every 2,500 square feet. Install all ports as noted in the R-Tank Installation Guide.
H. If required, install ventilation pipes and vents as specified on drawings to provide ventilation for proper hydraulic performance. The number of pipes and vents will depend on the size of the system. Vents are often installed using a 90 degree elbow with PVC pipe into a landscaped area with 12" bend or venting bollard to inhibit the ingress of debris. A ground level concrete or steel cover can be used.

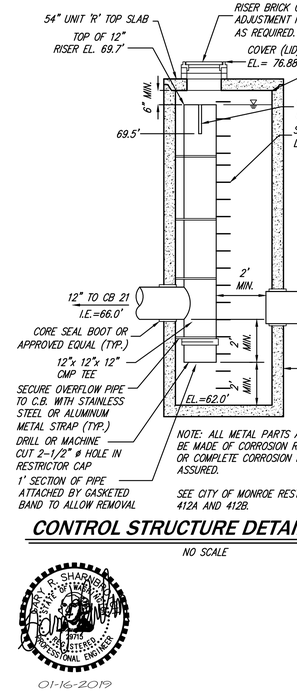
3.05 Backfilling of the R-Tank Units
A. Backfill and fill with recommended materials as follows:
1. Place freely draining backfill materials (Section 2.03 B) around the perimeter in lifts with a maximum thickness of 12". Each lift shall be placed around the entire perimeter such that each lift is no more than 24" higher than the side backfill along any other location on the perimeter of the R-Tank system. No fill shall be placed over top of tanks until the side backfill has been completed.
2. Each lift shall be compacted at the specified moisture content to a minimum of 95% of the Standard Proctor Density until no further densification is observed (for self-compacting stone materials). The side lifts must be compacted with walk behind compaction equipment. Even when "self-compacting" backfill materials are selected, a walk behind vibratory compactor must be used.
3. Take care to ensure that the compaction process does not allow the machinery to come into contact with the modules due to the potential for damage to the geotextile and R-Tank units.
4. Inspection equipment is permissible to operate directly on the R-Tank modules.
5. Top Backfill:
a. Typical Applications: Install a 12" (or as shown on plans) lift of freely draining material (Section 2.03 B) over the R-Tank Units, maintaining 12" between equipment tracks and R-Tank System.
b. Shallow Applications (< 18" total cover): Install top backfill in accordance with plans.
Lightly compacted using a walk-behind trench roller. Alternately, a roller (maximum gross vehicle weight of 6 tons) may be used. Roller must remain in static mode until a minimum of 24" of cover has been placed over the modules. Sheep foot rollers should not be used.
6. If required, install a geogrid as shown on plans. Geogrid shall extend a minimum of 3 feet beyond the limits of the excavation wall.
7. Following placement and compaction of the initial cover, subsequent lifts of structural fill (Section 2.03 C) shall be placed at the specified moisture content and compacted to a minimum of 95% of the Standard Proctor Density and shall cover the entire footprint of the R-Tank system. During placement of fill above the system, unless otherwise specified, a uniform elevation of fill shall be maintained to within 12" across the footprint of the R-Tank system. Do not exceed maximum cover depths listed in Table 2.01 B.
8. Place additional layers of geotextile and/or geogrid at elevations as specified in the design details. Each layer of geosynthetic reinforcement placed above the R-Tank system shall extend a minimum of 3 feet beyond the footprint of the excavation.
B. Only low pressure tire or track vehicles shall be operated over the R-Tank system during construction. No machinery should drive on top of the tank until a minimum of 18" of backfill and compaction is achieved. Dump Trucks and Pans shall not be operated within the R-Tank system footprint at any time. Where necessary the heavy equipment should unload in an area adjacent to the R-Tank system and the material should be moved over the system with tracked equipment.
C. Ensure that all unrelated construction traffic is kept away from the limits of excavation until the project is complete and final surface materials are in place. No non-installation related loading should be allowed over the R-Tank system until the final design section has been constructed (including pavement).
D. Place surfacing materials, such as groundcovers (no large trees), or paving materials over the system with care to avoid displacement of cover fill and damage to surrounding areas.
E. Backfill depth over R-Tank system must be within the limitations shown in the table in Section 2.01 B. If the total backfill depth does not comply with this table, contact engineer or manufacturer's representative for assistance.

PART 4 - USING THE SYSTEM
4.01 Maintenance Requirements
A. A routine maintenance effort is required to ensure proper performance of the R-Tank system. The Maintenance program should be focused on pretreatment systems. Ensuring these structures are clean and functioning properly will reduce the risk of contamination of the R-Tank system and stormwater released from the site. Pre-treatment systems shall be inspected yearly, or as directed by the regulatory agency and by the manufacturer (for proprietary systems). Maintain as needed using acceptable practices or following manufacturer's guidelines (for proprietary systems).
B. Inspection and/or Maintenance Ports in the R-Tank system will need to be inspected for accumulation of sediments at least quarterly through the first year of operation and at least yearly thereafter. This is done by removing the cap of the port and using a measuring device long enough to reach the bottom of the R-Tank system and stiff enough to push through the loose sediments, allowing a depth measurement.
C. If sediment has accumulated to the level noted in the R-Tank Maintenance Guide or beyond a level acceptable to the Owner's engineer, the R-Tank system should be flushed. A flushing event consists of pumping water into the Maintenance Port and/or adjacent structure, allowing the turbulent flows through the R-Tank system to re-suspend the fine sediments. If multiple Maintenance Ports have been installed, water should be pumped into each port to maximize flushing efficiency. Sediment-laden water can be filtered through a Dirtbag or approved equivalent if permitted by the locality.

R-TANK SPECIFICATION
RIVERS EDGE
MONROE, WA
SITE DESIGNATION: INFILTRATION GALLERY
ACF ENVIRONMENTAL, 1-800-448-3636, www.acfenvironmental.com

DRAWN BY: EDQ
DATE: 11/28/18
SHEET NO.: 7 of 7





CONTROL STRUCTURE DETAIL - CB 20
NO SCALE

01-16-2019

SCALE:	
DESIGNED	
DRAWN	
CHECKED	
DATE	01/16/19

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING
0" 1"

RIVERS EDGE APARTMENT COMMUNITY
ROAD AND STORM DRAINAGE NOTES AND DETAILS
RIVERS EDGE WA LLLP
909 5TH AVENUE #2401
SEATTLE, WASHINGTON 98164

PROJECT NUMBER
18038

DRAWING
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SHEET 14 OF 20

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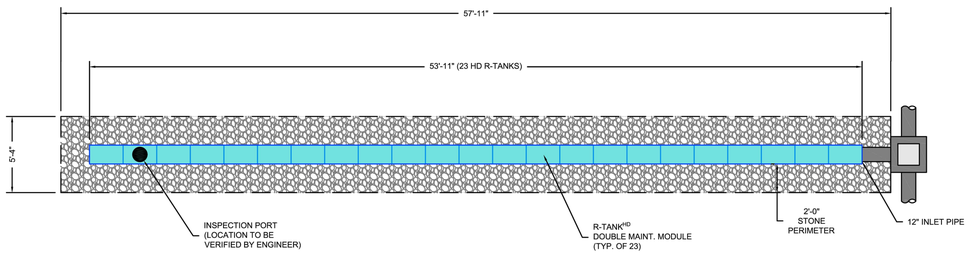
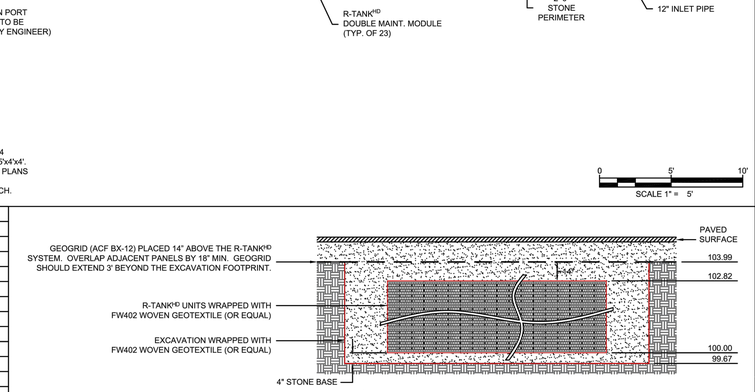


NOTE:
1. THE LAYOUT ABOVE IS PROVIDED AS A TYPICAL DESIGN FOR 4 INDIVIDUAL INFILTRATION TRENCHES SHOWN ON PLANS AS 95'x4'x4'.
2. ELEVATIONS ARE PROVIDED AS REFERENCE, REFER TO CIVIL PLANS FOR SITE SPECIFIC ELEVATION INFORMATION.
3. QUANTITIES LISTED BELOW ARE FOR EACH INDIVIDUAL TRENCH.

0 5' 10'
SCALE 1" = 5'

LAYOUT SCALE	1" = 5'
R-TANK HD MODULE TYPE	DOUBLE
TRAFFIC LOAD	HS-20
# OF DOUBLE R-TANK MAINTENANCE MODULES	23
TOTAL SYSTEM STORAGE	601 CF
R-TANK STORAGE VOLUME	190 CF
STONE STORAGE VOLUME (40% VOID RATIO)	411 CF
TOP OF COVER STONE ELEV. (14")	103.99
ACF BX-12 GEOGRID ELEV.	103.99
TOP OF R-TANK ELEV.	102.82
TANK INVERT	100.00
INVERT OF STONE BASE (4")	99.67
MIN. STONE PERIMETER WIDTH	2.0 FT
SEE SHEETS 3 - 6 FOR DETAILS AND ADDITIONAL INFORMATION	



R-TANK HD TANK WRAP & EXCAVATION ENVELOPE DETAIL

ENGINEER OF RECORD TO REVIEW, APPROVE AND ENDORSE FINAL SITE SPECIFIC DESIGN.

FOR ADDITIONAL INFORMATION PLEASE CONTACT ACF ENVIRONMENTAL 1-800-448-3636 www.acfenvironmental.com

ACF ENVIRONMENTAL LET'S GET IT DONE

R-TANK HD SYSTEM LAYOUT
RIVERS EDGE
MONROE, WA
SITE DESIGNATION: INFILTRATION TRENCHES
ACF ENVIRONMENTAL, 1-800-448-3636, www.acfenvironmental.com

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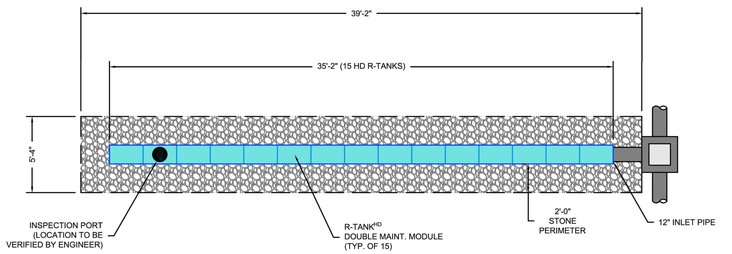
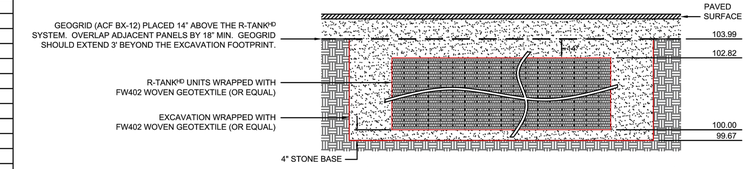
SHEET NO.: 1 of 6



NOTE:
1. THE LAYOUT ABOVE IS PROVIDED AS A DESIGN FOR 1 INFILTRATION TRENCH SHOWN ON PLANS AS 65'x4'x4'.
2. ELEVATIONS ARE PROVIDED AS REFERENCE, REFER TO CIVIL PLANS FOR SITE SPECIFIC ELEVATION INFORMATION.

0 5' 10'
SCALE 1" = 5'

LAYOUT SCALE	1" = 5'
R-TANK HD MODULE TYPE	DOUBLE
TRAFFIC LOAD	HS-20
# OF DOUBLE R-TANK MAINTENANCE MODULES	15
TOTAL SYSTEM STORAGE	404 CF
R-TANK STORAGE VOLUME	124 CF
STONE STORAGE VOLUME (40% VOID RATIO)	280 CF
TOP OF COVER STONE ELEV. (14")	103.99
ACF BX-12 GEOGRID ELEV.	103.99
TOP OF R-TANK ELEV.	102.82
TANK INVERT	100.00
INVERT OF STONE BASE (4")	99.67
MIN. STONE PERIMETER WIDTH	2.0 FT
SEE SHEETS 3 - 6 FOR DETAILS AND ADDITIONAL INFORMATION	



R-TANK HD TANK WRAP & EXCAVATION ENVELOPE DETAIL

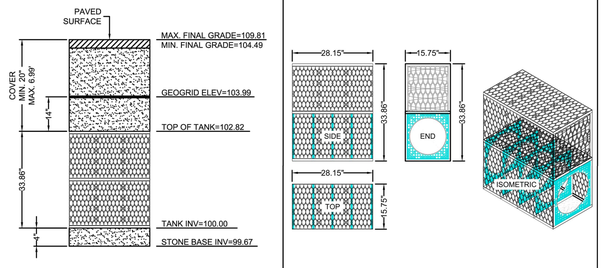
ENGINEER OF RECORD TO REVIEW, APPROVE AND ENDORSE FINAL SITE SPECIFIC DESIGN.

FOR ADDITIONAL INFORMATION PLEASE CONTACT ACF ENVIRONMENTAL 1-800-448-3636 www.acfenvironmental.com

ACF ENVIRONMENTAL LET'S GET IT DONE

R-TANK HD SYSTEM LAYOUT
RIVERS EDGE
MONROE, WA
SITE DESIGNATION: INFILTRATION TRENCHES
ACF ENVIRONMENTAL, 1-800-448-3636, www.acfenvironmental.com

DRAWN BY: EDQ
DATE: 11/28/18
SHEET NO.: 2 of 6



NOTE:
ELEVATIONS ARE PROVIDED AS REFERENCE, REFER TO CIVIL PLANS FOR SITE SPECIFIC ELEVATION INFORMATION.

DOUBLE R-TANK HD - ELEVATION

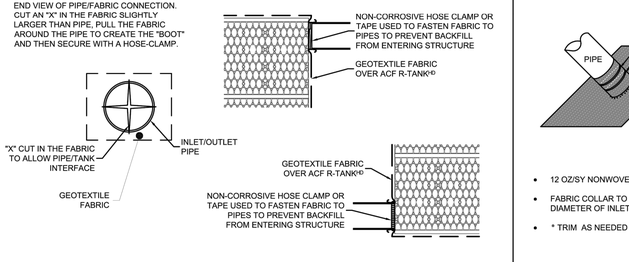
MODULE DATA

GEOMETRY:	LOAD RATING:
LENGTH = 28.15 IN. (715 MM)	33.4 PSI, (MODULE ONLY)
WIDTH = 15.75 IN. (400 MM)	HS20, (WITH ACF COVER SYSTEM)
HEIGHT = 33.86 IN. (860 MM)	**MATERIAL:**
TANK VOLUME = 8.69 CF	100% RECYCLED POLYPROPYLENE
STORAGE VOLUME = 8.25 CF	**SMALL PLATES PER**
VOID INTERNAL VOLUME: 95%	**SEGMENT/TOTAL:**
VOID SURFACE AREA: 90%	5/10

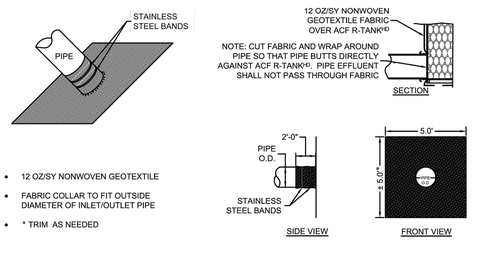
DOUBLE R-TANK HD - MODULE DETAIL

R-TANK HD QUANTITIES

R-TANK HD MODULE TYPE	DOUBLE
# OF DOUBLE R-TANK MAINTENANCE MODULES	107
FW402 WOVEN GEOTEXTILE TANK WRAP	2,435 SF (271 SY)
FW402 WOVEN GEOTEXTILE EXCAVATION WRAP	4,623 SF (514 SY)
ACF BX-12 GEOGRID	3,405 SF (378 SY)
12" INSPECTION PORTS	5
12" PIPE BOOTS	5
NOTE: GEOTEXTILE / LINER QUANTITIES INCLUDE A 15% WASTE FACTOR.	



R-TANK HD TYPICAL TANK INLET/OUTLET DETAIL



- 12 OZ/SY NONWOVEN GEOTEXTILE
- FABRIC COLLAR TO FIT OUTSIDE DIAMETER OF INLET/OUTLET PIPE
- * TRIM AS NEEDED

GEOTEXTILE PIPE BOOT FOR R-TANK HD

ENGINEER OF RECORD TO REVIEW, APPROVE AND ENDORSE FINAL SITE SPECIFIC DESIGN.

FOR ADDITIONAL INFORMATION PLEASE CONTACT ACF ENVIRONMENTAL 1-800-448-3636 www.acfenvironmental.com

ACF ENVIRONMENTAL LET'S GET IT DONE

R-TANK HD SYSTEM DETAILS
RIVERS EDGE
MONROE, WA
SITE DESIGNATION: INFILTRATION TRENCHES
ACF ENVIRONMENTAL, 1-800-448-3636, www.acfenvironmental.com

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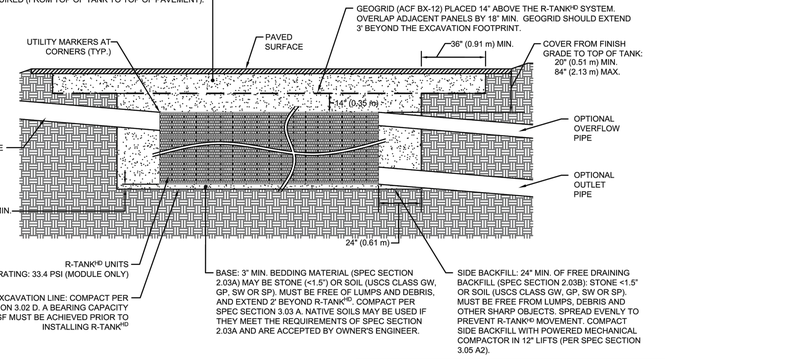
DATE: 11/28/18
SHEET NO.: 3 of 6

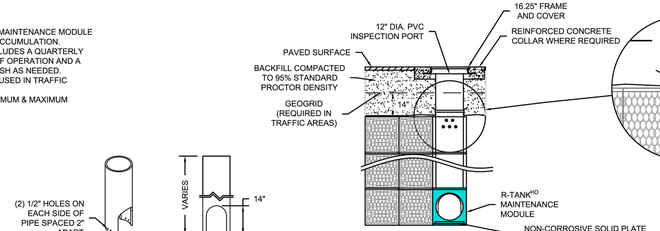
TOTAL COVER: 20" MINIMUM AND 84" MAXIMUM. FIRST 12" MUST BE FREE DRAINING BACKFILL (SPEC SECTION 2.03B): STONE <1.5" OR SOIL (USCS CLASS GW, GP, SW OR SP). ADDITIONAL FILL MAY BE STRUCTURAL FILL (SPEC SECTION 2.03C): STONE OR SOIL (USCS CLASS SM, SP, SW, GM, GP OR GW) WITH MAX CLAY CONTENT<10%, MAX 25% PASSING NO. 200 SIEVE, AND MAX PLASTICITY INDEX OF 4. A MIN. 12" COVER MUST BE MAINTAINED BETWEEN BACKFILL EQUIPMENT AND THE TOP OF THE R-TANK™ SYSTEM AT ALL TIMES. TOTAL HEIGHT OF TOP BACKFILL SHOULD NOT EXCEED 7'. CONTACT ACF ENVIRONMENTAL IF MORE THAN 7' OR LESS THAN 20" OF TOP BACKFILL IS REQUIRED (FROM TOP OF TANK TO TOP OF PAVEMENT).

NOTES:
1. FOR COMPLETE MODULE DATA, SEE APPROPRIATE R-TANK HD MODULE SHEET .
2. INSTALLATIONS PER THIS DETAIL MEET GUIDELINES OF HL-93 LOADING PER THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, CUSTOMARY U.S. UNITS, 7TH EDITION, 2014 WITH 2015 AND 2016 INTERIM REVISIONS.
3. PRE-TREATMENT STRUCTURES NOT SHOWN.
4. FOR INFILTRATION APPLICATIONS, GEOTEXTILE ENVELOPING R-TANK SHALL BE ACF M200 (PER SPEC SECTION 2.02A) AND BASE SHALL BE 4" MIN. UNCOMPACTED FREE DRAINING BACKFILL (SPEC SECTION 2.03A) TO PROVIDE A LEVEL BASE. SURFACE MUST BE SMOOTH, FREE OF LUMPS OR DEBRIS, AND EXTEND 2' BEYOND R-TANK HD FOOTPRINT.



R-TANK HD & H-20 LOADS - SECTION VIEW

NOTES
1. THE INSPECTION PORT IS USED IN THE MAINTENANCE MODULE TO INSPECT THE LEVEL OF SEDIMENT ACCUMULATION.
2. MINIMUM REQUIRED MAINTENANCE INCLUDES A QUARTERLY INSPECTION DURING THE FIRST YEAR OF OPERATION AND A YEARLY INSPECTION THEREAFTER. FLUSH AS NEEDED.
3. ONLY R-TANK HD AND R-TANK HD MAY BE USED IN TRAFFIC APPLICATIONS.
4. SEE TRAFFIC LOADING DETAIL FOR MINIMUM & MAXIMUM COVER REQUIREMENTS.



R-TANK HD TYPICAL INSPECTION PORT

ENGINEER OF RECORD TO REVIEW, APPROVE AND ENDORSE FINAL SITE SPECIFIC DESIGN.

FOR ADDITIONAL INFORMATION PLEASE CONTACT ACF ENVIRONMENTAL 1-800-448-3636 www.acfenvironmental.com

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R-TANK HD SYSTEM DETAILS
RIVERS EDGE
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SHEET NO.: 4 of 6

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ROAD AND STORM DRAINAGE NOTES AND DETAILS
RIVERS EDGE APARTMENT COMMUNITY

RIVERS EDGE WA LLLP
909 5TH AVENUE #2401
SEATTLE, WASHINGTON 98164

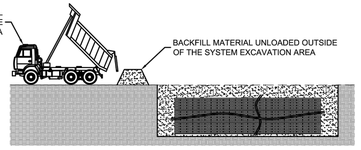
SCALE:
DESIGNED
DRAWN
CHECKED
DATE 01/16/19
VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING
0" 1"

PROJECT NUMBER
18038

DRAWING
C4.33

SHEET 15 OF 20

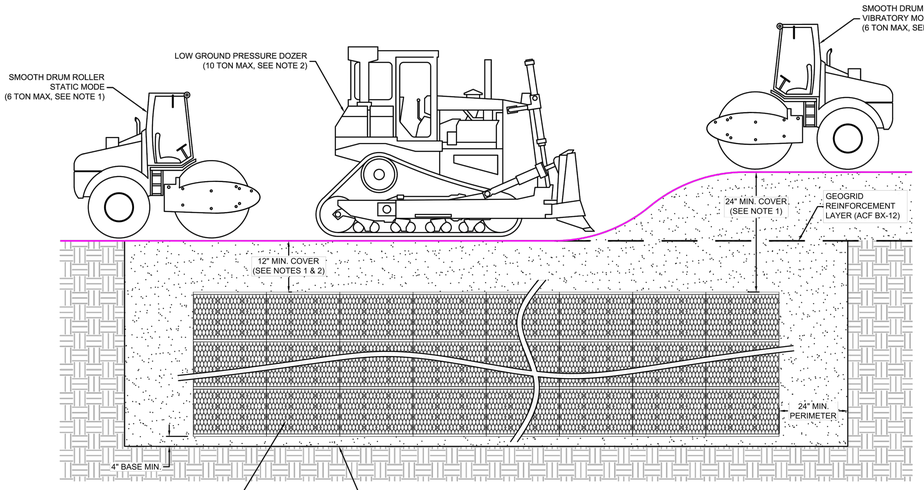
FILE NO. XXXXXX



DUMP TRUCK DETAIL (SEE NOTE 3)

NOTES:

1. FOLLOWING PLACEMENT OF SIDE BACKFILL, A UNIFORM 12" LIFT OF THE FREELY DRAINING MATERIAL (SPEC SECTION 2.03 B) SHALL BE PLACED OVER THE R-TANK AND LIGHTLY COMPACTED USING A WALK-BEHIND TRENCH ROLLER. ALTERNATELY, A ROLLER (MAXIMUM GROSS VEHICLE WEIGHT OF 6 TONS) MAY BE USED. ROLLER MUST REMAIN IN STATIC MODE UNTIL A MINIMUM OF 24" OF COVER HAS BEEN PLACED OVER THE MODULES. SHEEP FOOT ROLLERS SHOULD NOT BE USED. **SPEC SECTION 3.05 A**
2. ONLY LOW PRESSURE TIRE OR TRACK VEHICLES (LESS THAN 7 PSI AND OPERATING WEIGHT OF LESS THAN 20,000 LBS) SHALL BE OPERATED OVER THE R-TANK SYSTEM DURING CONSTRUCTION. **SPEC SECTION 3.05 B**
3. DUMP TRUCKS AND PANS SHALL NOT BE OPERATED WITHIN THE R-TANK SYSTEM AT ANY TIME. WHERE NECESSARY, THE HEAVY EQUIPMENT SHOULD UNLOAD IN AN AREA ADJACENT TO THE R-TANK SYSTEM AND THE MATERIAL SHOULD BE MOVED OVER THE SYSTEM WITH TRACKED EQUIPMENT. **SPEC SECTION 3.05 B**
4. ENSURE THAT ALL UNRELATED CONSTRUCTION TRAFFIC IS KEPT AWAY FROM THE LIMITS OF EXCAVATION UNTIL THE PROJECT IS COMPLETE AND FINAL SURFACE MATERIALS ARE IN PLACE. NO NON-INSTALLATION RELATED LOADING SHOULD BE ALLOWED OVER THE R-TANK SYSTEM UNTIL THE FINAL DESIGN SECTION HAS BEEN CONSTRUCTED (INCLUDING PAVEMENT). **SPEC SECTION 3.05 C**
5. SEE R-TANK INSTALLATION GUIDE OR CONTACT YOUR LOCAL ACF REPRESENTATIVE FOR ADDITIONAL INFORMATION.



CONSTRUCTION EQUIPMENT COVER DETAIL - VEHICULAR TRAFFIC

ENGINEER OF RECORD TO REVIEW, APPROVE AND ENDORSE FINAL SITE SPECIFIC DESIGN.

FOR ADDITIONAL INFORMATION PLEASE CONTACT ACF ENVIRONMENTAL 1-800-448-3636 www.acfenvironmental.com

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R-TANK^HD CONSTRUCTION EQUIPMENT COVER DETAIL
RIVERS EDGE
MONROE, WA
SITE DESIGNATION: INFILTRATION TRENCHES
ACF ENVIRONMENTAL, 1-800-448-3636, www.acfenvironmental.com

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DATE: 11/28/18
SHEET NO: 5 of 6

R-TANK SPECIFICATION

PART 1 - GENERAL

1.01 Related Documents
A. Drawings, technical specification and general provisions of the Contract as modified herein apply to this section.

1.02 Description of Work Included
A. Provide excavation and base preparation per geotechnical engineer's recommendations and/or as shown on the design drawings, to provide adequate support for project design loads and safety from excavation sidewall collapse. Excavations shall be in accordance with the owner's and OSHA requirements.
B. Provide and install R-Tank^ST, R-Tank^HD, R-Tank^HD, or R-Tank^SD system (hereafter called R-Tank) and all related products including fill materials, geotextiles, geogrids, inlet and outlet pipe with connections per the manufacturer's installation guidelines provided in this section.
C. Provide and construct the cover of the R-Tank system including; stone backfill, structural fill cover, and pavement section as specified.
D. Protect R-Tank system from construction traffic after installation until completion of all construction activity in the installation area.

1.03 Quality Control
A. All materials shall be manufactured in ISO certified facilities.
B. Installation Contractor shall demonstrate the following experience:
1. A minimum of three R-Tank projects of equivalent projects completed within 2 years; and,
2. A minimum of 25,000 cubic feet of storage volume completed within 2 years.
3. Contractor experience requirement may be waived if the manufacturer's representative provides on-site training and review during construction.
C. Installation Personnel: Performed only by skilled workers with satisfactory record of performance on bulk earthworks, pipe, chamber, or pond/landfill construction projects of comparable size and quality.
D. Contractor must have manufacturer's representative available for site review if requested by Owner.

1.04 Submittals
A. Submit proposed R-Tank layout drawings. Drawings shall include typical section details as well as the required base elevation of stone and tanks, minimum cover requirements and tank configuration.
B. Submit manufacturer's product data, including compressive strength and unit weight.
C. Submit manufacturer's installation instructions.
D. Submit R-Tank sample for review. Reviewed and accepted samples will be returned to the Contractor.
E. Submit material certificates for geotextile, geogrid, base course and backfill materials.
F. Submit required experience and personnel requirements as specified in Section 1.03.
G. Any proposed equal alternative product substitution to this specification must be submitted for review and approved prior to bid opening. Review package should include third party reviewed performance data that meets or exceeds criteria in Table 2.01 B.

1.05 Delivery, Storage, and Handling
A. Protect R-Tank and other materials from damage during delivery, and store UV sensitive materials under tarp to protect from sunlight when time from delivery to installation exceeds two weeks. Storage of materials should be on smooth surfaces, free from dirt, mud and debris.
B. Handling is to be performed with equipment appropriate to the materials and site conditions, and may include hand, handcart, forklifts, extension lifts, etc.
C. Cold weather:
1. Care must be taken when handling plastics when air temperature is 40 degrees or below as plastic becomes brittle.
2. Do not use frozen materials or materials mixed or coated with ice or frost.
3. Do not build on frozen ground or wet, saturated or muddy subgrade.

1.06 Preinstallation Conference.
A. Prior to the start of the installation, a preinstallation conference shall occur with the representatives from the design team, the general contractor, the excavation contractor, the R-Tank installation contractor, and the manufacturer's representative.

1.07 Project Conditions
A. Coordinate installation for the R-Tank system with other on-site activities to eliminate all non-installation related construction traffic over the completed R-Tank system. No loads heavier than the design loads shall be allowed on the system, and in no case shall loads higher than a standard AASHTO H320 (or HS25, depending on design criteria) load be allowed on the system at any time.
B. Protect adjacent work from damage during R-Tank system installation.
C. All pre-treatment systems to remove debris and heavy sediments must be in place and functional prior to operation of the R-Tank system. Additional pretreatment measures may be needed if unit is operational during construction due to increased sediment loads.
D. Contractor is responsible for any damage to the system during construction.

PART 2 - PRODUCTS

2.01 R-Tank Units
A. R -Tank - Injection molded plastic tank plates assembled to form a 95% void modular structure of predesigned height (custom for each project).
B. R-Tank units shall meet the following Physical & Chemical Characteristics:

PROPERTY	DESCRIPTION	R-Tank^ST VALUE	R-Tank^HD VALUE	R-Tank^HD VALUE	R-Tank^SD VALUE
Void Area	Volume available for water storage	95%	95%	95%	95%
Surface Void Area	Percentage of exterior available for infiltration	60%	60%	60%	60%
Compressive Strength	ASTM D 2412 / ASTM F 2418	30.0 psi	33.4 psi	42.9 psi	134.2 psi
HS-20 Minimum Cover	Cover required to support HS-20 loads	NA	24"	18"	12" (450mm/kN/m)
HS-25 Minimum Cover	Cover required to support HS-25 loads	NA	24"	18"	15" (mm/kN/m)
Maximum Cover	Maximum allowable cover depth	4 feet	< 7 feet	< 13 feet	8 feet
Unit Weight	Weight of plastic per cubic foot of tank	3.29 lbs / cf	3.62 lbs/cf	3.95 lbs / cf	4.93 lbs / cf
Dia. Thickness	Thickness of load-bearing members	0.18 inches	0.18 inches	0.18 inches	N/A
Service Temperature	Safe temperature range for use	-14 – 167° F	-14 – 167° F	-14 – 167° F	-14 – 167° F

C. Supplier: ACF Environmental 2831 Cardwell Road Richmond, VA 23234
(T): 800-448-3636; (F): 804-743-7779 www.acfenvironmental.com

2.02 Geosynthetics
A. Geotextile. A geotextile envelope is required to prevent backfill material from entering the R-Tank modules.
1. Standard Application: The standard geotextile shall be an 8 oz per square yard nonwoven geotextile (ACF N080 or equivalent).
2. Infiltration Applications: When water must infiltrate/filtrate through the geotextile as a function of the system design, a woven monofilament (ACF M200 or equivalent) shall be used.
B. Geogrid. For installations subject to traffic loads and/or when required by project plans, install geogrid (ACF BX12 or equivalent) to reinforce backfill above the R-Tank system. Geogrid is not always required for R-Tank^HD installations, and is often not required for non-traffic load applications.

2.03 Backfill & Cover Materials
A. Bedding Materials: Stone (angular and smaller than 1.5" in diameter) or soil (GW, GP, SW, or SP as classified by the Unified Soil Classification System) shall be used below the R-Tank system (3" minimum). Material must be free from lumps, debris, and any sharp objects that could cut the geotextile. Material shall be within 3 percent of the optimum moisture content as determined by ASTM D698 at the time of installation. For infiltration applications bedding material shall be free draining.
B. Side and Top Backfill: Free draining material shall be used adjacent to (24" minimum) and above (for the first 12") the R-Tank system. Material must be free from lumps, debris and any sharp objects that could cut the geotextile. Material shall be within 3 percent of the optimum moisture content as determined by ASTM D698 at the time of installation.
1. For LD, HO, and SD modules, backfill materials shall be free draining stone (angular and smaller than 1.5" in diameter) or soil (GW, GP, SW, or SP as classified by the Unified Soil Classification System).
2. For UD modules in traffic loaded (HS-20) applications with less than 14" of top cover, side backfill materials shall be free draining stone (angular and smaller than 1.5" in diameter). The use of soil backfill on the sides of the UD module is not permitted unless the modules are installed outside of traffic areas or with cover depths of > 14". Top backfill material may be stone or soil as noted above (Section 2.03 B 1).
C. Additional Cover Materials: Structural Fill shall consist of granular materials meeting the gradational requirements of SM, SP, SW, GM, GP or GW as classified by the Unified Soil Classification System. Structural Fill shall have a maximum of 25 percent passing the No. 200 sieve, shall have a maximum clay content of 10 percent and a maximum Plasticity Index of 4. Material shall be within 3 percent of the optimum moisture content as determined by ASTM D698 at the time of installation.

2.04 Other Materials
Utility Marker: Install metallic tape at corners of R-Tank system to mark the area for future utility detection.

PART 3 - EXECUTION

3.01 Assembly of R-Tank Units
A. Assembly of modules shall be performed in accordance with the R-Tank Installation Manual, Section 2.

3.02 Layout and Excavation
A. Installer shall stake out, excavate, and prepare the subgrade area to the required plan grades and dimensions, ensuring that the excavation is at least 2 feet greater than R-Tank dimensions in each direction allowing for installation of geotextile filter fabric, R-Tank modules, and free draining backfill materials.
B. All excavations must be prepared with OSHA approved excavated sides and sufficient working space.
C. Protect partially completed installation against damage from other construction traffic by establishing a perimeter with high visibility construction tape, fencing, barricades, or other means until construction is complete.
D. Base of the excavation shall be uniform, level, and free of lumps or debris and soft or yielding subgrade areas. A minimum 2,000 pounds per square foot bearing capacity is required.
1. Standard Applications: Compact subgrade to a minimum of 95% of Standard Proctor (ASTM D698) density or as required by the Owner's engineer.
2. Infiltration Applications: Subgrade shall be prepared in accordance with the contract documents. Compaction of subgrade should not be performed in infiltration applications.
E. Unsuitable Soils or Conditions: All questions about the base of the excavation shall be directed to the owner's engineer, who will approve the subgrade conditions prior to placement of stone. The owner's engineer shall determine the required bearing capacity of the R-Tank subgrade; however in no case shall a bearing capacity of less than 2,000 pounds per square foot be provided.
1. If unsuitable soils are encountered at the subgrade, or if the subgrade is pumping or appears excessively soft, repair the area in accordance with contract documents and/or as directed by the owner's engineer.
2. If indications of the water table are observed during excavation, the engineer shall be contacted to provide recommendations.
3. Do not start installation of the R-Tank system until unsatisfactory subgrade conditions are corrected and the subgrade conditions are accepted by the owner's engineer.

3.03 Preparation of Base
A. Place a thin layer (3" unless otherwise specified) of bedding material (Section 2.03 A), over the subgrade to establish a level working platform for the R-Tank modules. Level to within ½" (+/- ½") or as shown on the plans. Native subgrade soils or other materials may be used if determined to meet the requirements of 2.03 A and are accepted by the owner's engineer.
1. Standard Applications: Static roll or otherwise compact bedding materials until they are firm and unyielding.
2. Infiltration Applications: Bedding materials shall be prepared in accordance with the contract documents.
B. Outline the footprint of the R-Tank system on the excavation floor using spray paint or chalk line to ensure a 2' perimeter is available around the R-Tank system for proper installation and compaction of backfill.

3.04 Installation of the R-Tanks
A. Where a geotextile wrap is specified on the stone base, cut strips to length and install in excavation, removing wrinkles so material lays flat. Overlap geotextile a minimum 12" or as recommended by manufacturer.
B. Where an impervious liner (for containment) is specified, install the liner per manufacturer's recommendations and the contract documents. The R-Tank units shall be separated from impervious liner by a non-woven geotextile fabric installed accordance with Section 3.04A.
C. Install R-Tank modules by placing side by side, in accordance with the design drawings. No lateral connections are required. It is advisable to use a string line to form square corners and straight edges along the perimeter of the R-Tank system. The modules are to be oriented as per the design drawing with required depth as shown on plans.
1. For LD, HD, and SD installations, the large side plate of the tank should be placed on the perimeter of the system. This will typically require that the two ends of the tank area will have a row of tanks placed perpendicular to all other tanks. If this is not shown in the construction drawings, it is a simple field adjustment that will have minimal effect on the overall system footprint. Refer to R-Tank Installation Guide for more details
2. For UD installations, there is no perpendicular end row required.
D. Wrap the R-Tank top and sides in specified geotextile. Cut strips of geotextile so that it will cover the sides and top, encapsulating the entire system to prevent backfill entry into the system. Overlap geotextile 12" or as recommended by manufacturer. Use geotextile repair cuts to avoid damage to geotextile (and, if specified, impervious liner) during placement.
E. Identify locations of inlet, outlet and any other penetrations of the geotextile (and optional liner). These connections should be installed flush (butted up to the R-Tank) and the geotextile fabric shall be cut to enable hydraulic continuity between the connections and the R-Tank units. These connections shall be secured using pipe boots with stainless steel pipe clamps. Support pipe in trenches during backfill operations to prevent pipe from settling and damaging the geotextile, impervious liner (if specified) or pipe. Connecting pipes at 90 degree angles facilitates construction, unless otherwise specified. Ensure end of pipe is installed snug against R-Tank system.
F. Install Inspection and Maintenance Ports in locations noted on plans. At a minimum one maintenance port shall be installed within 10' of each inlet & outlet connection, and with a maximum spacing of one maintenance port for every 2,500 square feet. Install all ports as noted in the R-Tank Installation Guide.
G. If required, install ventilation pipes and vents as specified on drawings to provide ventilation for proper hydraulic performance. The number of pipes and vents will depend on the size of the system. Vents are often installed using a 90 degree elbow with PVC pipe into a landscaped area with "U" bend or venting bollard to inhibit the ingress of debris. A ground level concrete or steel cover can be used.

3.05 Backfilling of the R-Tank Units
A. Backfill and fill with recommended materials as follows:
1. Place freely draining backfill materials (Section 2.03 B) around the perimeter in lifts with a maximum thickness of 12". Each lift shall be placed around the entire perimeter such that each lift is no more than 24" higher than the side backfill along any other location on the perimeter of the R-Tank system. No fill shall be placed over top of tanks until the side backfill has been completed.
2. Each lift shall be compacted at the specified moisture content to a minimum of 95% of the Standard Proctor Density until no further densification is observed (for self-compacting stone materials). The side lifts must be compacted with walk behind compaction equipment. Even when "self-compacting" backfill materials are selected, a walk behind vibratory compactor must be used.
3. Take care to ensure that the compaction process does not allow the machinery to come into contact with the modules due to the potential for damage to the geotextile and R-Tank units.
4. No compaction equipment is permissible to operate directly on the R-Tank modules.
5. Top Backfill:
a. Typical Applications: Install a 12" (or as shown on plans) lift of freely draining material (Section 2.03 B) over the R-Tank Units, maintaining 12" between equipment tracks and R-Tank System.
b. Shallow Applications (< 18" total cover): Install top backfill in accordance with plans.
Lightly compacted using a walk-behind trench roller. Alternately, a roller (maximum gross vehicle weight of 6 tons) may be used. Roller must remain in static mode until a minimum of 24" of cover has been placed over the modules. Sheep foot rollers shall not be used.
6. If required, install a geogrid as shown on plans. Geogrid shall extend a minimum of 3 feet beyond the limits of the excavation wall.
7. Following placement and compaction of the initial cover, subsequent lifts of structural fill (Section 2.03 C) per the placed and compacted to a minimum of 95% of the Standard Proctor Density and shall cover the entire footprint of the R-Tank system. During placement of fill above the system, unless otherwise specified, a uniform section of fill shall be maintained to within 12" across the footprint of the R-Tank system. Do not exceed maximum cover depths listed in Table 2.01 B.
8. Place additional layers of geotextile and/or geogrid at elevations as specified in the design details. Each layer of geosynthetic reinforcement placed above the R-Tank system shall extend a minimum of 3 feet beyond the limits of the excavation wall.
B. Only low pressure tire or track vehicles shall be operated over the R-Tank system during construction. No machinery should drive on top of the tank until a minimum of 18" of backfill and compaction is achieved. Dump Trucks and Pans shall not be operated within the R-Tank system footprint at any time. Where necessary the heavy equipment should unload in an area adjacent to the R-Tank system and the material should be moved over the system with tracked equipment.
C. Ensure that all unrelated construction traffic is kept away from the limits of excavation until the project is complete and final surface materials are in place. No non-installation related loading should be allowed over the R-Tank system until the final design section has been constructed (including pavement).
D. Place surfacing materials, such as groundcovers (no large trees), or paving materials over the structure with care to avoid displacement of cover fill and damage to surrounding areas.
E. Backfill depth over R-Tank system must be within the limitations shown in the table in Section 2.01 B. If the total backfill depth does not comply with this table, contact engineer or manufacturer's representative for assistance.

PART 4 - USING THE SYSTEM

4.01 Maintenance Requirements
A. A routine maintenance effort is required to ensure proper performance of the R-Tank system. The Maintenance program should be focused on pretreatment systems. Ensuring these structures are clean and functioning properly will reduce the risk of contamination of the R-Tank system and stormwater released from the site. Pre-treatment systems shall be inspected yearly, or as directed by the regulatory agency and by the manufacturer (for proprietary systems). Maintain as needed using acceptable practices or following manufacturer's guidelines (for proprietary systems).
B. Inspection and/or Maintenance Ports in the R-Tank system will need to be inspected for accumulation of sediments at least quarterly through the first year of operation and at least yearly thereafter. This is done by removing the cap of the port and using a measuring device long enough to reach the bottom of the R-Tank system and stiff enough to push through the loose sediments, allowing a depth measurement.
C. If sediment has accumulated to the level noted in the R-Tank Maintenance Guide or beyond a level acceptable to the Owner's engineer, the R-Tank system should be flushed. A flushing event consists of pumping water into the Maintenance Port and/or adjacent structure, allowing the turbulent flows through the R-Tank system to re-suspend the fine sediments. If multiple Maintenance Ports have been installed, water should be pumped into each port to maximize flushing efficiency. Sediment-laden water can be filtered through a Dirtbag or approved equivalent if permitted by the locality.

ENGINEER OF RECORD TO REVIEW, APPROVE AND ENDORSE FINAL SITE SPECIFIC DESIGN.

FOR ADDITIONAL INFORMATION PLEASE CONTACT ACF ENVIRONMENTAL 1-800-448-3636 www.acfenvironmental.com

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R-TANK SPECIFICATION
RIVERS EDGE
MONROE, WA
SITE DESIGNATION: INFILTRATION TRENCHES
ACF ENVIRONMENTAL, 1-800-448-3636, www.acfenvironmental.com

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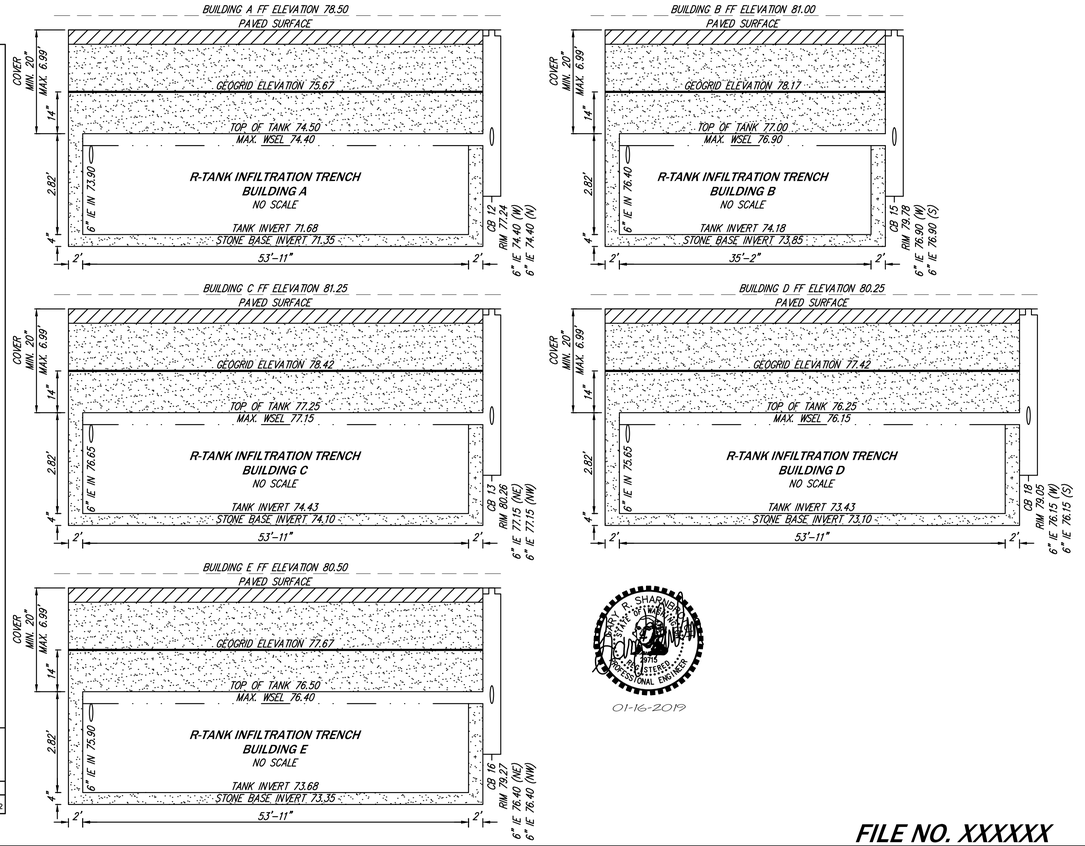
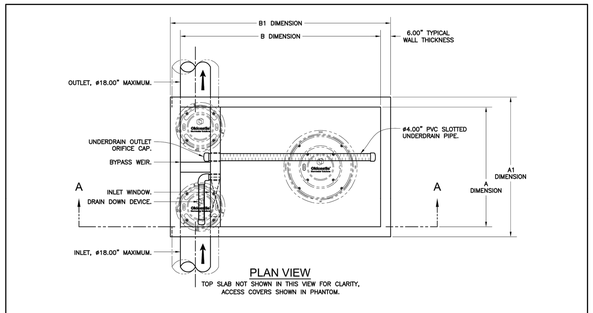
DATE: 11/28/18
SHEET NO: 6 of 6





MODEL	VAULT SIZE [1] (ID)		VAULT FOOTPRINT [1] (OD)		TREATMENT FLOW CAPACITY [2] (GPM/CFS)	TREATMENT FLOW CAPACITY [3] (GPM/CFS)
	A DIM	B DIM	A1 DIM	B1 DIM		
BPU-IB-46	4'	6'	5'	7'	25.6 / 0.057	28.8 / 0.064
BPU-IB-48	4'	8'	5'	9'	38.4 / 0.086	43.2 / 0.096
BPU-IB-412	4'	12'	5'	13'	64.0 / 0.143	72.0 / 0.160
BPU-IB-66	6'	6'	7'	7'	38.4 / 0.086	43.2 / 0.096
BPU-IB-68	6'	8'	7'	9'	57.6 / 0.128	64.8 / 0.144
BPU-IB-612	6'	12'	7'	13'	96.0 / 0.214	108.0 / 0.241
BPU-IB-816	8'	16'	9'	17'	179.2 / 0.399	201.6 / 0.449

[1] All Dimensions Are Nominal
[2] Based on an IWA 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.

US Patents Pending

BioPod™ Biofilter Underground
Vault with Internal Bypass
Bioretention/ Biofiltration

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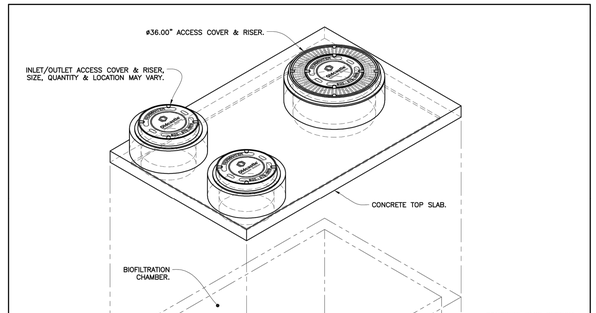

ISOMETRIC VIEW
FILTER MEDIA & DRAIN ROCK NOT SHOWN FOR CLARITY.
SCALE: 1X

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

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0" 1"

ROAD AND STORM DRAINAGE NOTES AND DETAILS
RIVERS EDGE APARTMENT COMMUNITY

RIVERS EDGE WA LLLP
909 5TH AVENUE #2401
SEATTLE, WASHINGTON 98164

PROJECT NUMBER
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SHEET 16 OF 20

QTR. SW., SEC. 6, TWP. 27 N., RGE. 7 E., W.M.

SEE SHEET C5.02

FREMONT ST (PUBLIC ROW)

ANN ST (PUBLIC ROW)

1+10.96, 4.50' RT
1~8" TEE (FL)
1~8" GATE VALVE (FLxMJ)
WITH CONC BLOCKING

CONNECT TO EX. SEWER
SSMH #81415
RIM ELV=78.59
8"PVC(S)E=67.28
8"PVC(N)E=66.92
8"PVC(E)E=66.91
8"PVC(W)E=66.68
8"PVC(S)=66.98

ROAD B1

105LF 8" DI

ROAD B2

102LF 8" PVC

3+67.69, 6.00' LT
1~8" 90° BEND (MJ)
WITH CONC BLOCKING

4+06.00, 6.00' LT
2-½" WATER METER
WITH 2-½" SERVICE

4+11.00, 6.00' LT
4" FIRE SERVICE

ROAD A

208LF 8" PVC

179LF 8" DI

5LF 8" DI

58LF 8" DI

8LF 8" DI

58LF 8" PVC

3+90.00, 6.00' RT
6" IE 67.79

27LF 6"
@ 8.20%

4+45.00, 8.65' LT
1~8"x6" TEE (FLxFL)
1~6" GV (FLxMJ)
1~5-¼" FH ASS'Y
1~8" ADAPTOR (FLxMJ)
WITH CONC BLOCKING

4+33.62, 6.00' LT
1~8" 45° BEND (MJxFL)
WITH CONC. BLOCKING

3+76.00, 6.00' LT
1~2" BLOWOFF ASS'Y
WITH CONC BLOCKING

SSMH 1
STA. 3+84.52, 6.00' RT
TYPE 1–48"

8" CLEANOUT
RIM 78.42
6" IE 70.00

PROPOSED RISER ROOM

STAND PIPE CONNECTED TO FIRE SYSTEM

BLDG. A1
FF
78.50

BLDG. B2
FF
81.00

8" CLEANOUT
RIM 80.89
6" IE 72.50

6+64.00, 6.00' LT
4" FIRE SERVICE

6+59.00, 6.00' LT
2-½" WATER METER
WITH 2-½" SERVICE

6+42.21, 6.00' LT
1~8" 11° BEND (MJ)
WITH CONC BLOCKING

6+25.00, 6.23' LT
1" AIR VAC PER
CITY OF MONROE
STD. PLAN 511

26LF 6"
@ 12.95%

142LF 8" DI

6+74.00, 6.00' RT
6" IE 69.42

32LF 6"
@ 10.90%

8" CLEANOUT
RIM 81.03
6" IE 72.75

6+20.00, 6.30' LT
1~8"x6" TEE (FLxFL)
1~6" GV (FLxMJ)
1~5-¼" FH ASS'Y
WITH CONC BLOCKING

ROAD C

BLDG. C1
FF
81.25

SSMH 3
STA. 6+42.68, 6.02' RT
TYPE 1–48"

STAND PIPE CONNECTED TO FIRE SYSTEM

6+35.00, 6.00' RT
6" IE 69.13

7+58.00, 6.00' LT
2-½" WATER METER
WITH 2-½" SERVICE

10' CRITICAL AREA
BUILDING SETBACK

EDGE OF HISTORIC DISTURBANCE

ORDINARY HIGH WATER

SSMH 2
STA. 4+39.98, 6.45' RT
TYPE 1–48"

EDGE OF CREEK
JULY 2018

WOODS CREEK

PARCEL A
BLA BA 200001
AFN 200005245002

PARCEL B
BLA BA 200001
AFN 200005245002

SCALE: 1" = 20'
0 10 20 40

FILE NO. XXXXXX

NO.	DATE	REVISION	BY	CK

01-16-2019

CIVIL ENGINEERING
LANDSCAPE ARCHITECTURE
PLANNING
SURVEYING

CORE DESIGN
12100 NE 195th St, Suite 300 Bothell, Washington 98011 425.885.7877

SCALE:
DESIGNED:
DRAWN:
CHECKED:
DATE 01/16/19
VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING
0" 1"

SANITARY SEWER AND WATER PLAN
RIVERS EDGE APARTMENT COMMUNITY

RIVERS EDGE WA LLLP
909 5TH AVENUE #2401
SEATTLE, WASHINGTON 98164

PROJECT NUMBER
18038

DRAWING
C5.01

SHEET 17 OF 20

QTR. SW., SEC. 6, TWP. 27 N., RGE. 7 E., W.M.

SIMONS RD (PUBLIC ROW)

REPLACE EXISTING 4" AC WATER MAIN WITH 8" DI WATER MAIN

7+72.19, 9.38' LT
1~8" TEE (FL)
1~8" GV (FLxMJ)
WITH CONC BLOCKING

488LF 8" DI

11+38.01, 6.00' LT
1~8" TEE (FL)
3~8" GV (FLxMJ)
WITH CONC BLOCKING

REPLACE EXISTING 4" AC WATER MAIN WITH 8" DI WATER MAIN

6+18.57, 9.49' RT
1~8"x6" TEE (FL)
1~8" GV (FLxFL)
WITH CONC BLOCKING

40LF 8" DI

EXISTING WATER LINE TO REMAIN

EXISTING FIRE HYDRANT TO REMAIN

LOPEZ
TPN 2707060300800

143 ST ANN LLC
TPN 2707060300900

143 ST ANN LLC
TPN 2707060301000

FOUND NAIL W/ WASHER "PLS XXX88"

BLDG. D1
FF
80.25

10+00.00, 6.00' LT
2-½" WATER METER
WITH 2-½" SERVICE

8" CLEANOUT
RIM 80.11
6" IE 71.75

9+60.00, 6.00' LT
1~8"x6" TEE (FLxFL)
1~6" GV (FLxMJ)
1~5-¼" FH ASS'Y
WITH CONC BLOCKING

PROPOSED RISER ROOM

105LF 8" DI

10+43.33, 6.00' LT
1~8" 11° BEND (MJ)
1~8" 45° BEND (MJ)
WITH CONC BLOCKING

City doesn't provide 2 1/2" water service. Change all building services to 2".

77LF 8" DI

24LF 6" @ 1.25%

Side sewer needs to go directly into manhole and channeled.

9+70.00, 6.00' RT
6" IE 71.00

10+05.00, 6.00' LT
4" FIRE SERVICE

8+34.26, 6.06' LT
1~8" 11° BEND (MJ)
WITH CONC BLOCKING

ROAD D

127LF 8" DI

ROAD A

140LF 8" PVC

8+20.00, 6.00' LT
2-½" WATER METER
WITH 2-½" SERVICE

7+85.00, 6.00' LT
1~8"x6" TEE (FLxFL)
1~6" GV (FLxMJ)
1~5-¼" FH ASS'Y
WITH CONC BLOCKING

8+60.00, 6.00' RT
6" IE 70.45

32LF 6" @ 1.25%

50LF 8" DI

BLDG. E1
FF
80.50

STAND PIPE CONNECTED TO FIRE SYSTEM

8" CLEANOUT
RIM 80.13
6" IE 72.00

SSMH 4
STA. 8+35.14, 6.00' RT
TYPE 1-48"

Fire line services to each building need to have isolation valves at the main.

7+90.00, 6.00' LT
4" FIRE SERVICE

7+63.00, 6.00' LT
4" FIRE SERVICE

7+58.00, 6.00' LT
2-½" WATER METER
WITH 2-½" SERVICE

PROPOSED RISER ROOM

10' CRITICAL AREA BUILDING SETBACK

EDGE OF HISTORIC DISTURBANCE

ORDINARY HIGH WATER

WOODS CREEK

6+64.00, 6.00' LT
4" FIRE SERVICE

6+59.00, 6.00' LT
2-½" WATER METER
WITH 2-½" SERVICE

6+42.21, 6.00' LT
1~8" 11° BEND (MJ)
WITH CONC BLOCKING

26LF 6" @ 12.95%

BLDG. B2
FF
81.00

8" CLEANOUT
RIM 80.89
6" IE 72.50

6+25.00, 6.23' LT
1" AIR VAC PER
CITY OF MONROE
STD. PLAN 511

APPROXIMATE ℄ WATERLINE EASEMENT

191LF 8" PVC

6+74.00, 6.00' RT
6" IE 69.42

32LF 6" @ 10.40%

DCDAs will be required for fire service installation to each building.

FF
81.25

ANN ST (PUBLIC ROW)

SEE SHEET 5.01

SCALE: 1" = 20'

0 10 20 40

FILE NO. XXXXXX

NO.	DATE	REVISION	BY	CK

01-16-2019

CIVIL ENGINEERING
LANDSCAPE ARCHITECTURE
PLANNING
SURVEYING

CORE DESIGN
12100 NE 195th St., Suite 300 Bothell, Washington 98011 425.885.7877

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CHECKED
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0" 1"

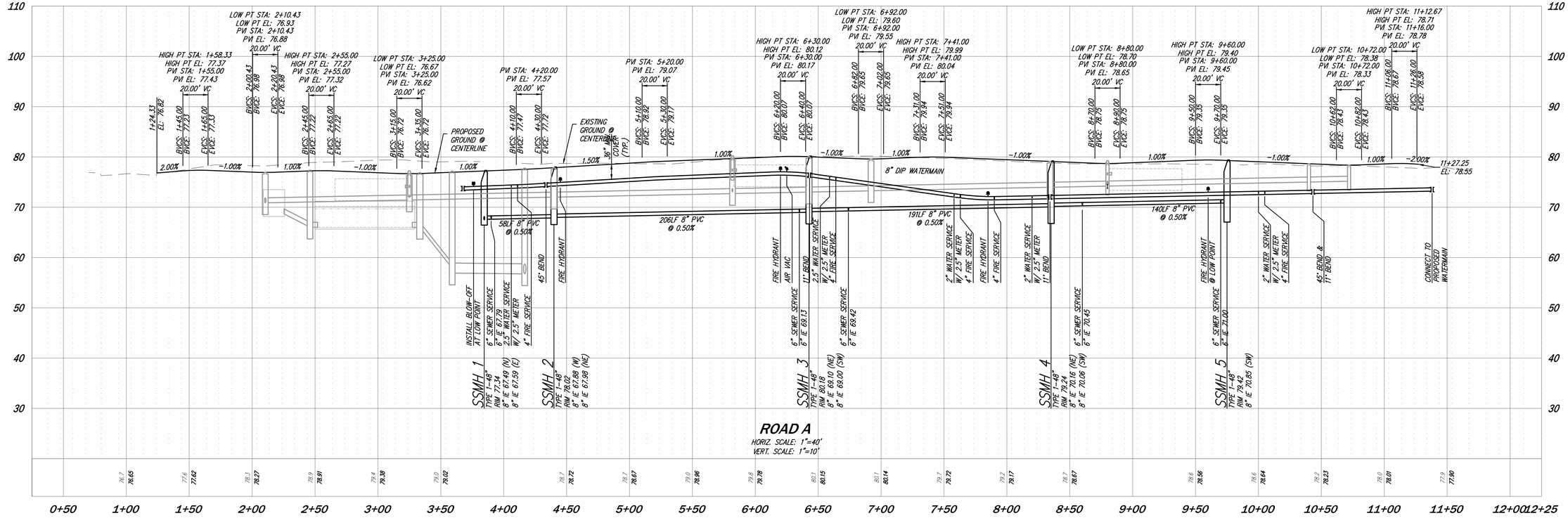
SANITARY SEWER AND WATER PLAN
RIVERS EDGE APARTMENT COMMUNITY

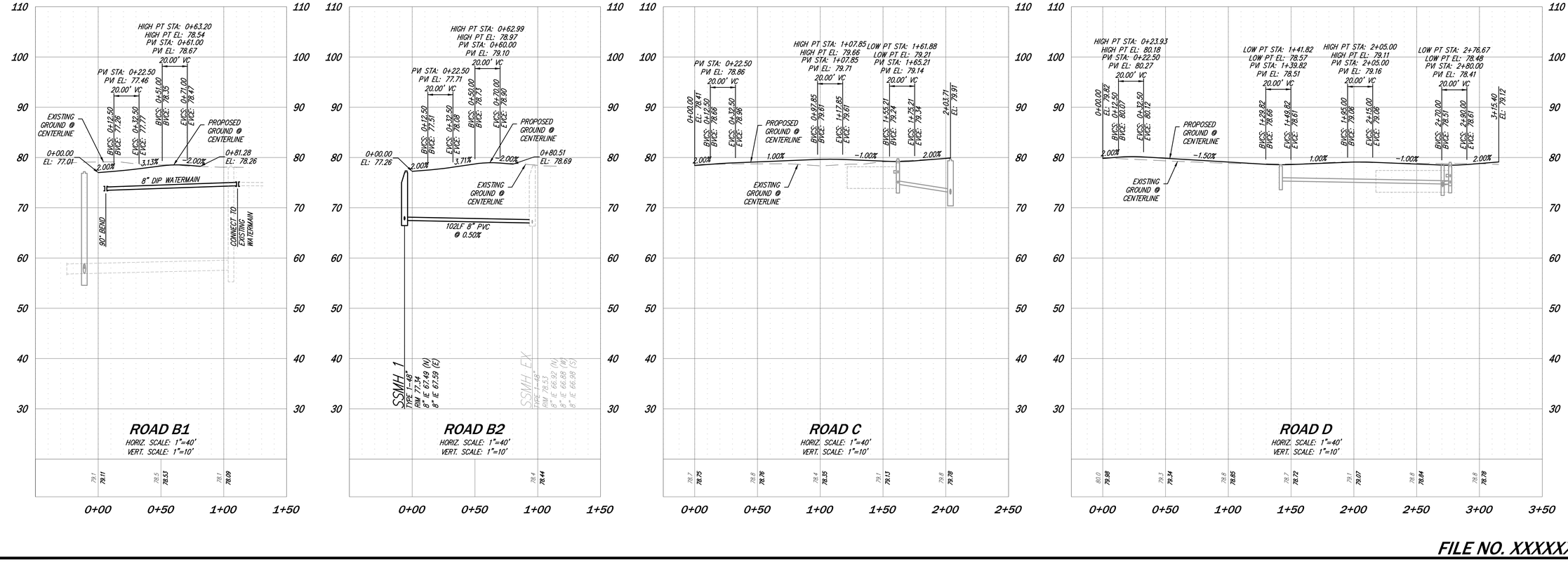
RIVERS EDGE WA LLLP
909 5TH AVENUE #2401
SEATTLE, WASHINGTON 98164

PROJECT NUMBER
18038

DRAWING
C5.02

SHEET 18 OF 20





FILE NO. XXXXXX

NO.	DATE	REVISION	BY	CK

01-16-2019

CIVIL ENGINEERING
LANDSCAPE ARCHITECTURE
PLANNING
SURVEYING

CORE DESIGN
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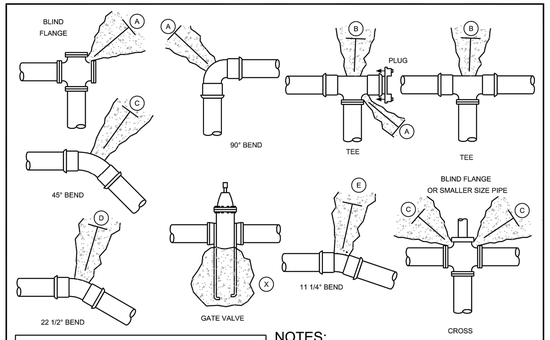
SANITARY SEWER AND WATER PROFILES
RIVERS EDGE APARTMENT COMMUNITY

RIVERS EDGE WA LLLP
909 5TH AVENUE, #2401
SEATTLE, WASHINGTON 98164

PROJECT NUMBER
18038

DRAWING
C5.21

SHEET 19 OF 20



THRUST BLOCK - TABLE

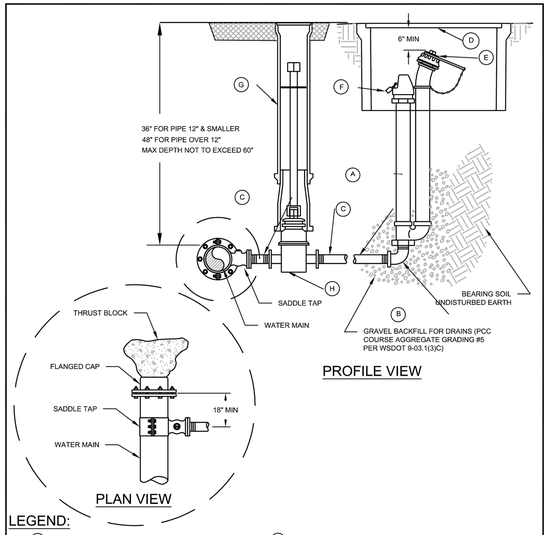
MIN. BEARING AREA AGAINST UNDISTURBED SOIL

PIPE SIZE	A FT 2	B FT 2	C FT 2	D FT 2	E FT 2	X FT 2
	SQUARE FEET					
4"	3	1	1	1	1	NONE
6"	4	4	2	1	1	NONE
8"	7	6	4	2	1	4
10"	11	10	6	3	2	6
12"	16	14	9	5	3	9
14"	22	19	12	6	3	12
16"	29	25	16	8	4	16
18"	36	31	20	10	5	20
20"	45	39	24	13	6	24
22"	54	47	29	15	8	29
24"	64	56	35	18	9	35
28"	87	76	48	24	12	48
30"	101	87	55	28	14	55
36"	175	125	78	40	20	78
42"	197	171	107	55	27	107
48"	257	223	140	71	36	140

NOTES:

1. BEARING AREA OF CONCRETE THRUST-BLOCK BASED ON 200 PSI PRESSURE AND SAFE SOIL-BEARING LOAD OF 2,000 POUNDS PER SQUARE FOOT.
2. AREAS MUST BE ADJUSTED FOR OTHER PIPE SIZES, PRESSURES, AND SOIL CONDITIONS.
3. CONCRETE BLOCKING (CLASS 3000) SHALL BE CAST IN PLACE AND HAVE A MINIMUM OF 1/4 SQUARE FOOT BEARING AGAINST THE FITTING.
4. BLOCK SHALL BEAR AGAINST FITTINGS ONLY AND SHALL BE CLEAR OF JOINTS TO PERMIT TAKING UP OR DISMANTLING OF JOINT.
5. CONTRACTOR SHALL INSTALL BLOCKING ADEQUATE TO WITHSTAND FULL TEST PRESSURE UNDER ALL CONDITIONS OF SERVICE.
6. MINIMUM ROD DIAMETER SHALL BE 3/4" ASTM A-307 WITH 36KSI YIELD STRENGTH.
7. SHEET PLASTIC OVER NUTS AND BOLTS PRIOR TO CONCRETE POUR.

DESCRIPTION	DESIGNATION
HORIZONTAL THRUST BLOCKS	514
SCALE: NOT TO SCALE	REVISED: DEC 17, 2013



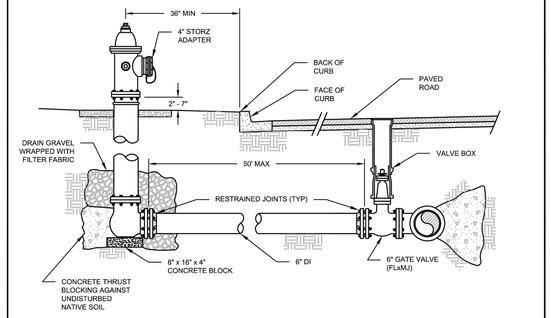
LEGEND:

- A MAINGUARD 2" BLOW-OFF HYDRANT
- B 2" BRASS STREET "L"
- C 2" BRASS NIPPLE
- D CONCRETE METER BOX FOGTITE OR EQUAL, CARSON 1730 IN NON TRAFFIC AREAS AND MID STATES MSBCF 18XL IN TRAFFIC AREAS (DIAMOND PLATE FRAME)
- E 2" CAP NATIONAL STANDARD THREAD
- F LOCK TO BE SUPPLIED BY CITY OF MONROE
- G VALVE BOX AND EXTENSION PER PER STD DWG 512
- H 2" SUPER HEAVY DUTY RESILIENT SEAT GATE VALVE (WATEROUS SERIES 500 OR M&H 3067 OR APPROVED EQUAL

NOTE:

REQUIRES DEVIATION FROM REQUIREMENTS.

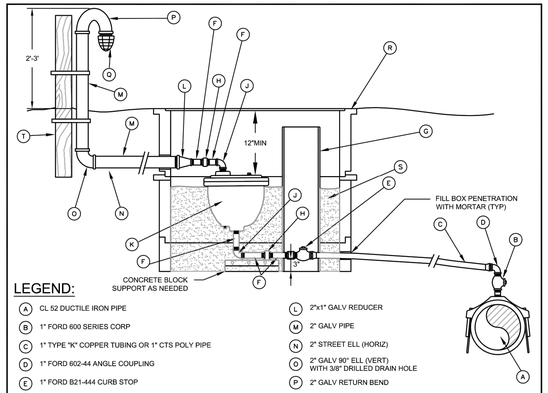
DESCRIPTION	DESIGNATION
BLOW-OFF ASSEMBLY	509
SCALE: NOT TO SCALE	REVISED: DEC 17, 2013



NOTES:

1. HYDRANTS AND ALL MATERIALS TO BE APWA OR AWWA APPROVED.
2. FIRE HYDRANT SHALL BE M&H NO. 929, MUELLER CENTURION, OR WATEROUS WITH 5 1/4" VALVE
   TWO 2 1/2" NST HOSE PORTS, AND ONE NST 4" STORZ FITTING ON 4 1/2" STEAMER PORT FACING STREET, OR AS OTHERWISE DIRECTED.
   1-1/4" OPERATING NUT AND CAP NUT FOR 2-1/2" PORTS. BREAK-OFF HYDRANT BASE FLANGE.
   WHERE MORE THAN ONE BELL JOINT IS USED A FIELD LOCK GASKET SHALL BE INSTALLED.
3. 4 " THICK X 3' X 3' CONCRETE PAD WITH EXPANSION STRIP AROUND HYDRANT.
   HYDRANT SHALL SIT IN THE CENTER OF THE PAD. CONCRETE SHALL BE CLASS 3000.
4. PROVIDE FOR VEHICULAR TRAFFIC PROTECTION WHEN NECESSARY PER STD. PLAN 507
5. BREAK-OFF FLANGE TO BE 2" TO 7" ABOVE GROUND LEVEL.
6. 1/2 CY DRAIN ROCK WRAPPED WITH 6 MIL. POLYETHYLENE SHEETING.
7. FIRE HYDRANT BODY SHALL BE PAINTED WITH TWO COATS OF SAFETY RED SHERWIN WILLIAMS INDUSTRIAL ENAMEL B54R38.
   FIRE HYDRANT BONNET AND CAPS SHALL BE PAINTED WITH SHERWIN WILLIAMS COROTHANE(1) M10-ALUMINUM B65S14.
8. LANDSCAPING SHALL BE PLANTED AND MAINTAINED IN A MANNER SO AS TO PROVIDE 3' CLEARANCE FROM THE CIRCUMFERENCE OF THE HYDRANT.
9. THERE SHALL BE AT LEAST 1' OF CLEARANCE BETWEEN HYDRANT & SIDEWALK.

DESCRIPTION	DESIGNATION
FIRE HYDRANT ASSEMBLY	506
SCALE: NOT TO SCALE	REVISED: JAN 11, 2016



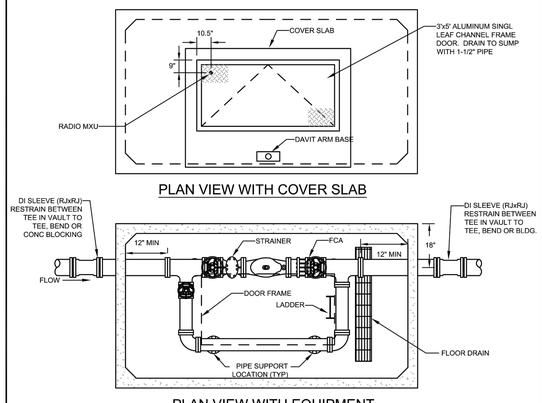
LEGEND:

- A CL 52 DUCTILE IRON PIPE
- B 1" FORD 600 SERIES CORP
- C 1" TYPE "K" COPPER TUBING OR 1" CTS POLY PIPE
- D 1" FORD 602-44 ANGLE COUPLING
- E 1" FORD B21-444 CURB STOP
- F 1" BRASS NIPPLE
- G 6" PVC PIPE WITH NON GASKETED CAP
- H 1" BRASS UNION
- J 1" BRASS 90° ELL
- K 1" COMBINATION AIR AND VACUUM RELIEF VALVE SHALL BE CRISPIN CRVL-10 OR 20 OR APPROVED EQUAL
- L 2"x1" GALV REDUCER
- M 2" GALV PIPE
- N 2" STREET ELL (HORIZ)
- O 2" GALV 90° ELL (VERT) WITH 3/8" DRILLED DRAIN HOLE
- P 2" GALV RETURN BEND
- Q GALV BEEHIVE STRAINER GREENBURG P-24-08, FOR 2" PIPE
- R UTILITY BOX CARSON 1730 SERIES, BROOKS SERIES 65T OR FOGTITE NO 2.
- S BACKFILL WITH SAWDUST TO BONNET.
- T 6" x 6" x 6' PRESSURE TREATED POST, ATTACH PIPE TO POST WITH STAINLESS STEEL STRAPS

NOTES:

1. AIR-VAC UNIT AND BOX TO BE INSTALLED IN NON-TRAFFIC AREA.
2. USE MUELLER DOUBLE STRAP SERVICE CLAMP OR APPROVED EQUAL ON ALL MAINS GREATER THAN 8" IN DIAMETER.
3. ALL PIPE FITTINGS BETWEEN MAIN AND UNION, AFTER AIR/VACUUM RELIEF VALVE, SHALL BE BRASS.
4. INSTALLATIONS FOR OTHER SIZE AIR/VACUUM RELIEF VALVES SHALL BE INDIVIDUALLY DESIGNED AND WILL REQUIRE APPROVAL BY THE UTILITIES DIVISION.
5. PAINT METER BOX LID AND RISER ASSEMBLY (2) COATS SAFETY YELLOW, OIL BASE ENAMEL- HAND BRUSH APPLIED. STENCIL RISER ASSEMBLY WITH "AV" AND SIZE OF AIR/VAC ASSEMBLY ON SIDE FACING ROADWAY IN 2" BLACK LETTERS.
6. AIR/VAC RELEASE VALVE ASSEMBLY SHALL BE INSTALLED AT HIGH POINT ON LINE. IF HIGH POINT FALLS IN LOCATION WHERE ASSEMBLY CANNOT BE INSTALLED, PROVIDE ADDITIONAL DEPTH TO CREATE A NEW HIGH POINT.
7. CONCRETE VAULT PENETRATIONS SHALL BE CORE DRILLED AND GROUTED.

DESCRIPTION	DESIGNATION
1" AIR AND VACUUM REALEASE VALVE	511
SCALE: NOT TO SCALE	REVISED: JUNE 21, 2016

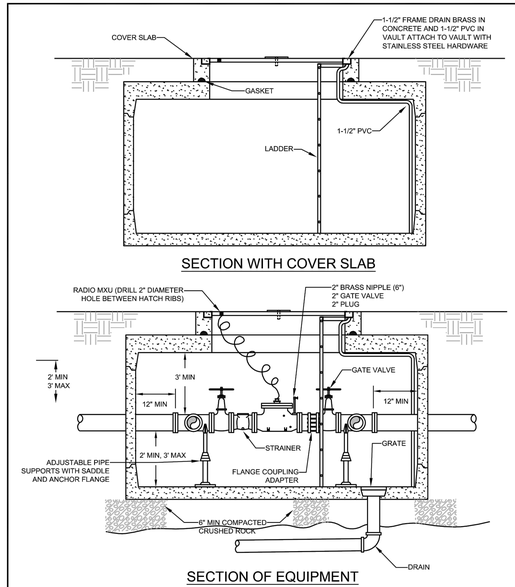


VAULT, FITTINGS AND PIPING SIZING REQUIREMENTS					
METER SIZE	BYPASS VALVE AND PIPING	BYPASS TEE (FLxFL)	MIN. INSIDE VAULT DIM.		
			LENGHT	WIDTH	HEIGHT
3"	3"	3"x3"	6 FT	6 FT	6 FT
4"	4"	4"x4"	10 FT	6 FT	6 FT
6"	4"	6"x4"	12 FT	6 FT	6 FT

NOTES:

1. VAULT ACCESS HATCH SHALL BE DRILLED FOR INSTALLATION OF RADIO MXU. TRPL TOUCH READ HEAD.
2. A GRAVITY VAULT DRAIN SHALL BE CONNECTED TO STORM SEWER AS SHOWN ON DRAWING NUMBER 505-A.
3. PAINT ALL EXPOSED PIPING AND FITTINGS INSIDE VAULT, EXCEPT METER BODY. REFER TO STANDARD TEXT 5-4.19 FOR RECOMMENDED MANUFACTURERS.

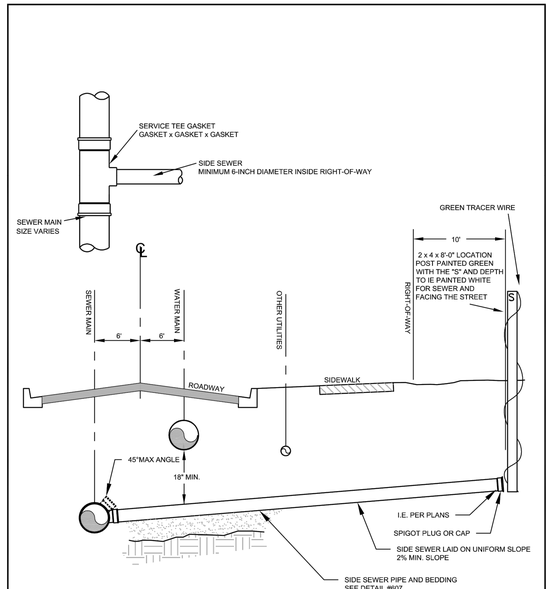
DESCRIPTION	DESIGNATION
3", 4", 6" WATER SERVICE	505
SCALE: NOT TO SCALE	REVISED: DEC 17, 2013



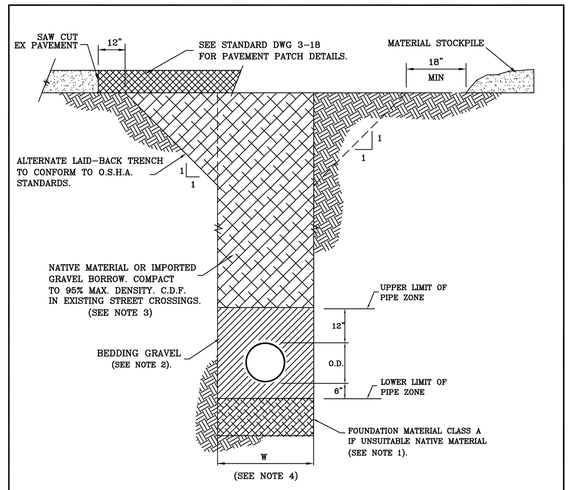
NOTES:

1. SET COVER SLAB FLUSH WITH SIDEWALK OR CURB ELEVATION IF LOCATED IN LAWN AREA. SET COVER SLAB APPROXIMATELY 2" ABOVE FINISHED GRADE IF LOCATED IN LANDSCAPING AREA.

DESCRIPTION	DESIGNATION
3", 4", 6" WATER METER SECTIONS	505-A
SCALE: NOT TO SCALE	REVISED: DEC 17, 2013



DESCRIPTION	DESIGNATION
GRAVITY SEWER SVC CONNECTION	SS4
SCALE: NOT TO SCALE	REVISED: JAN 11, 2016



NOTES

1. FOUNDATION MATERIAL SHALL CONFORM TO SECTION 9-03.17 1996 STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION WSDOT/APWA.
2. BEDDING MATERIAL SHALL CONFORM TO SECTION 9-03.16 1996 STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION WSDOT/APWA.
3. GRAVEL BORROW SHALL CONFORM TO SECTION 9-03.14(1) 1996 STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION WSDOT/APWA.
4. W = MAXIMUM WIDTH OF TRENCH. FOR PIPES 15" OR LESS IN DIA W=40". FOR PIPES 18" OR GREATER W=1-1/2 x I.D. + 18".

TYPICAL TRENCH AND BEDDING SECTION	NUMBER 611
CITY OF MONROE DEPARTMENT OF PUBLIC WORKS	DATE 11-16-05

NO.	DATE	REVISION	BY	CK

01-16-2019

CIVIL ENGINEERING
LANDSCAPE ARCHITECTURE
PLANNING
SURVEYING

CORE DESIGN
12100 NE 195th St, Suite 300 Bothell, Washington 98011 425.885.7877

SCALE: 1"
DESIGNED
DRAWN
CHECKED
DATE 01/16/19
VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING
0"

SANITARY SEWER AND WATER NOTES AND DETAILS
RIVERS EDGE APARTMENT COMMUNITY

RIVERS EDGE WA LLLP
909 5TH AVENUE #2401
SEATTLE, WASHINGTON 98164

PROJECT NUMBER 18038

DRAWING C5.31

SHEET 20 OF 20

FILE NO. XXXXXX

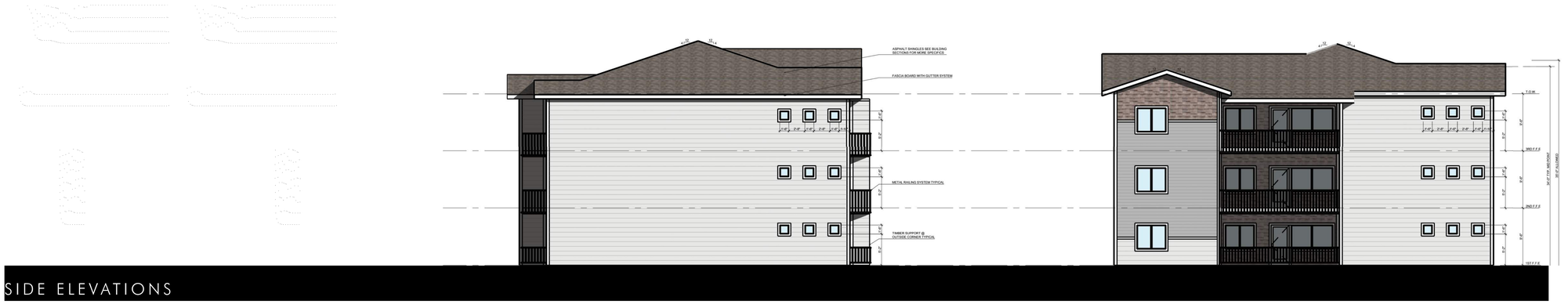
I:\2018\18-038 RIVERS EDGE\PRELIMINARY\CIVIL\18-038 C5.31.DWG

RECEIVED 11/2/2018

EXHIBIT 14

FRONT ELEVATION

REAR ELEVATION



SIDE ELEVATIONS

ELEVATION DATA

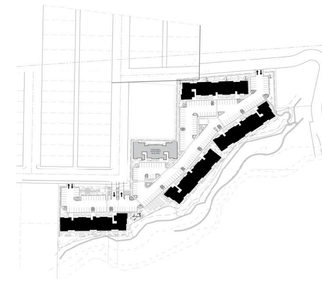
BUILDING HEIGHT:

ALLOWED	35'
PROVIDED	34'

EXTERIOR MATERIALS

- ARCHITECTURAL ASPHALT SHINGLES
- HARDIE BOARD-3 (10" HARDIE PLANK LAP SIDING, LIGHT GREY)
- HARDIE BOARD-3 (10" HARDIE PLANK LAP SIDING, DARK GREY)
- HARDIE BOARD-1 (HARDIE SHINGLE SIDING, STAGERED EDGE PANEL, BROWN)

ALL BUILDING AREAS, LAND COVERAGE AND PARKING TABULATIONS ARE PRELIMINARY AND SUBJECT TO CHANGE. ANY PROPOSED DEVELOPMENT IS SUBJECT TO REVIEW AND APPROVAL OF GOVERNMENTAL AGENCIES.



KEY PLAN NTS NORTH

BUILDING 1 - EXTERIOR ELEVATIONS

8'

RIVER'S EDGE APARTMENTS

MONROE, WASHINGTON

DATE: 10.31.2018 SHEET: 3 OF 4 SH PROJECT NO.: 180042

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FRONT ELEVATION

REAR ELEVATION

SIDE ELEVATIONS

ELEVATION DATA

BUILDING HEIGHT:

ALLOWED	35’
PROVIDED	34’

EXTERIOR MATERIALS

ARCHITECTURAL ASPHALT SHINGLES

HARDIE BOARD-3 (10” HARDIE PLANK LAP SIDING, LIGHT GREY)

HARDIE BOARD-3 (10” HARDIE PLANK LAP SIDING, DARK GREY)

HARDIE BOARD-1 (HARDIE SHINGLE SIDING, STAGERED EDGE PANEL, BROWN)

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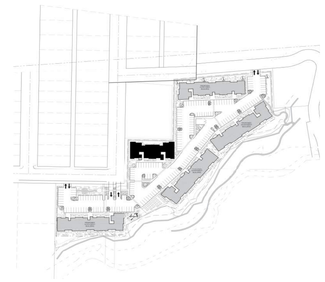

KEY PLAN

NTS NORTH

BUILDING 2 - EXTERIOR ELEVATIONS

8’

RIVER’S EDGE APARTMENTS

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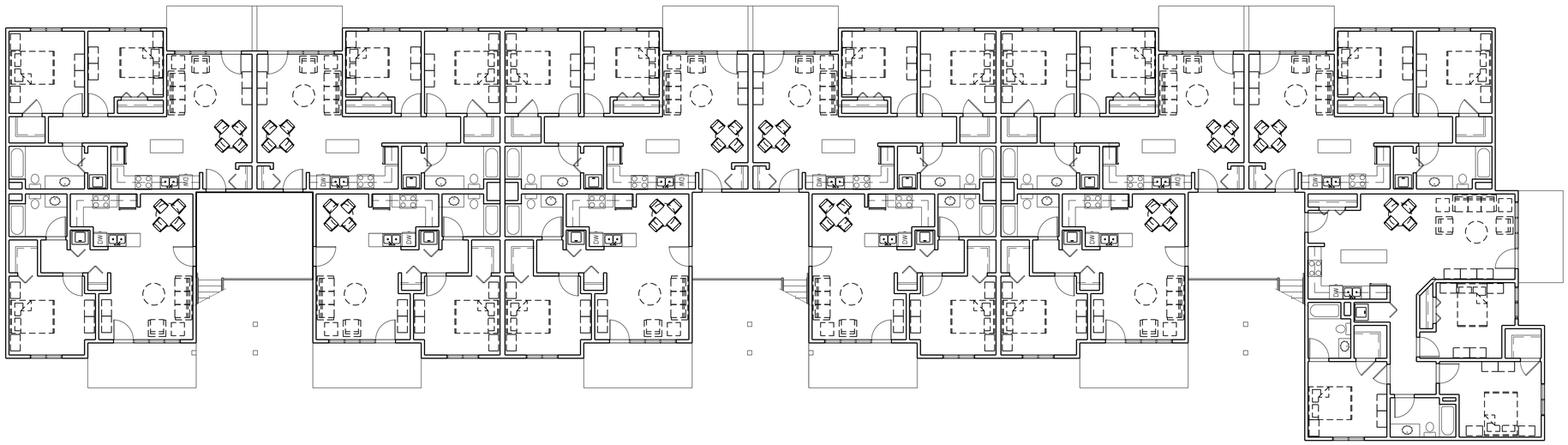
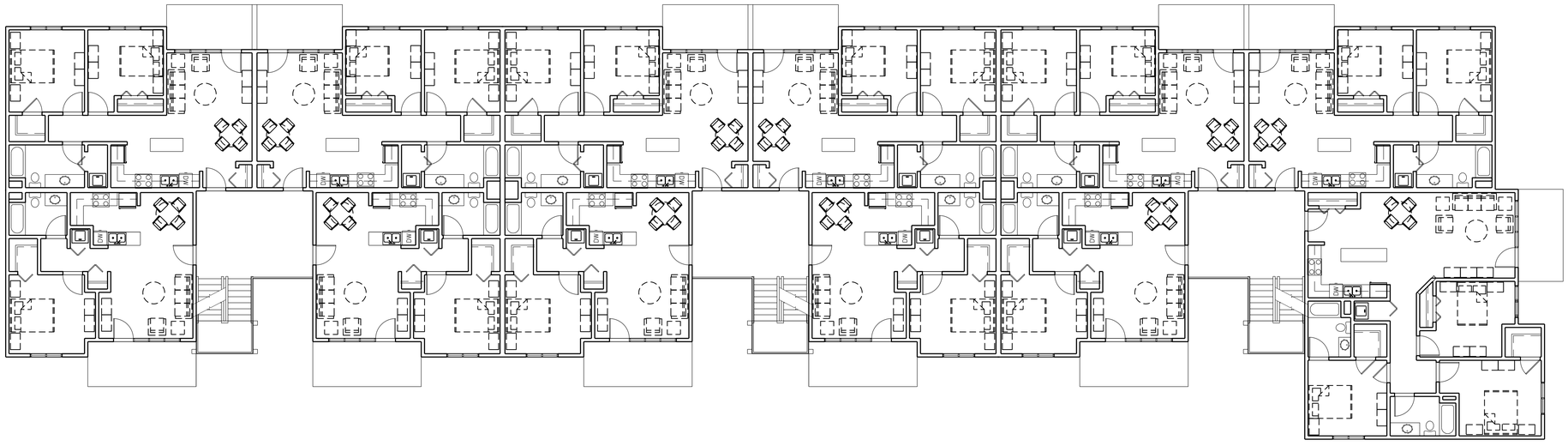


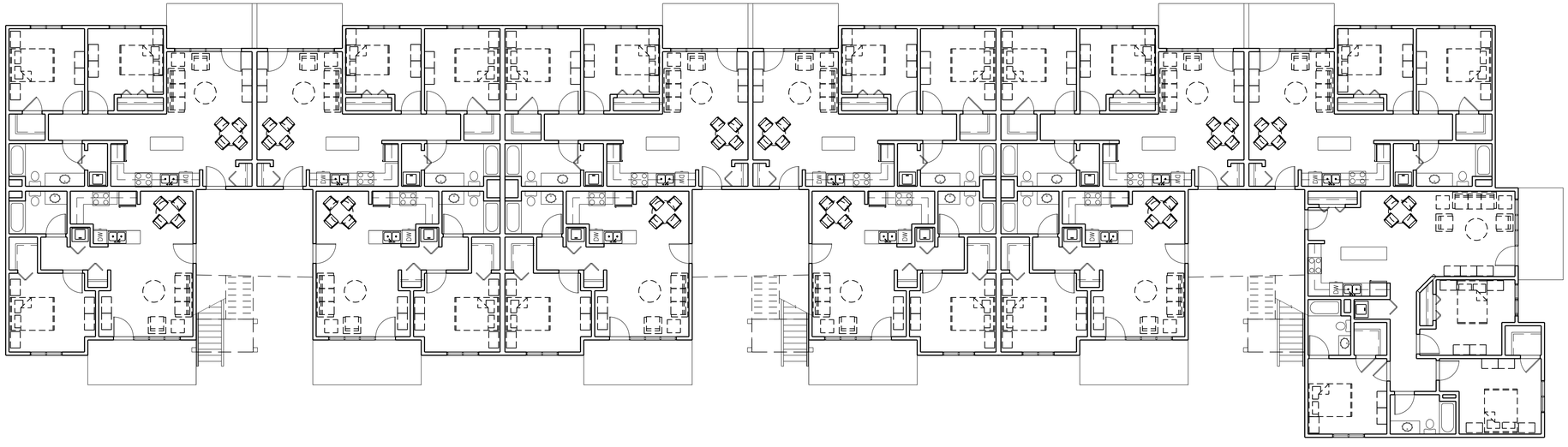
OVERALL FLOOR PLAN - BUILDING 1 - LEVEL 3

1/8" = 1'-0"



OVERALL FLOOR PLAN - BUILDING 1 - LEVEL 2

1/8" = 1'-0"



OVERALL FLOOR PLAN - BUILDING 1 - LEVEL 1

1/8" = 1'-0"

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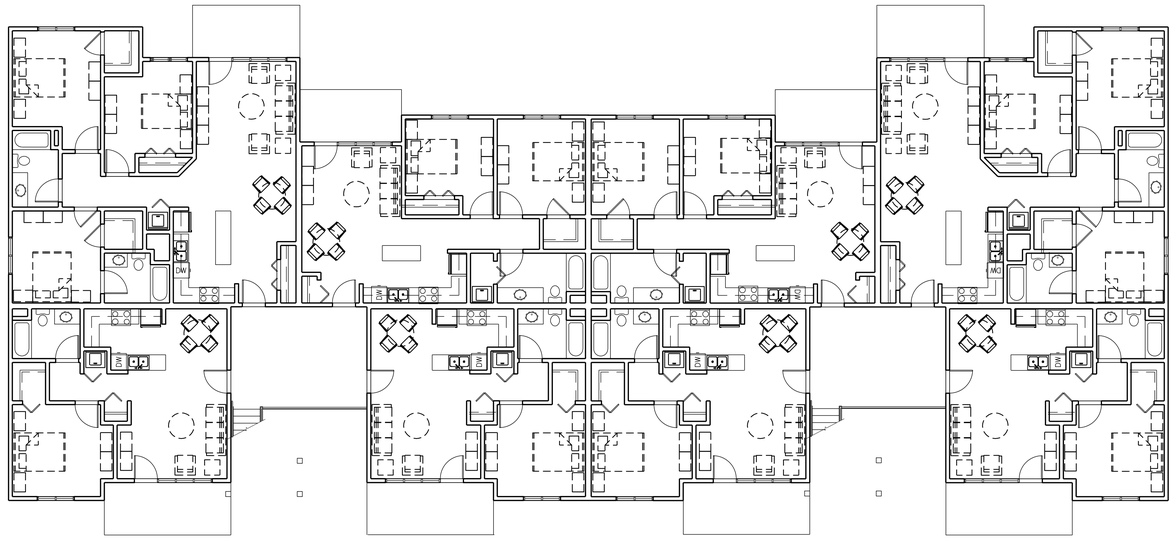
TITLE: BUILDING 1 OVERALL FLOOR PLANS

PROJECT: RIVER'S EDGE APARTMENTS
FREEMONT AND ANN ST., MONROE, WA 98272

CLIENT: Rebecca Ralston

JOB NO: 180042

A2-1



OVERALL FLOOR PLAN - BUILDING 2 - LEVEL 3

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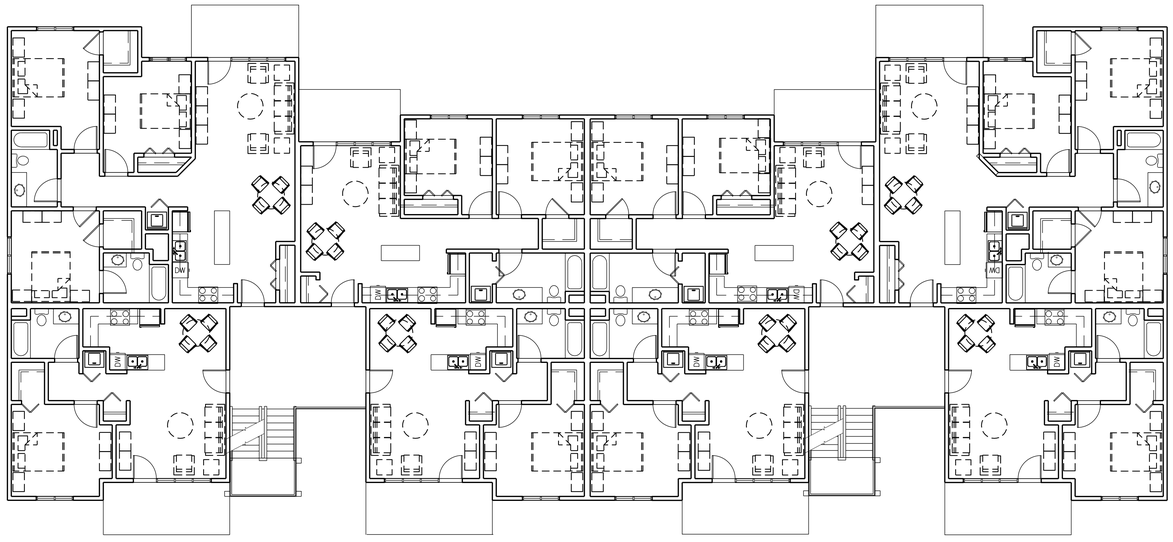
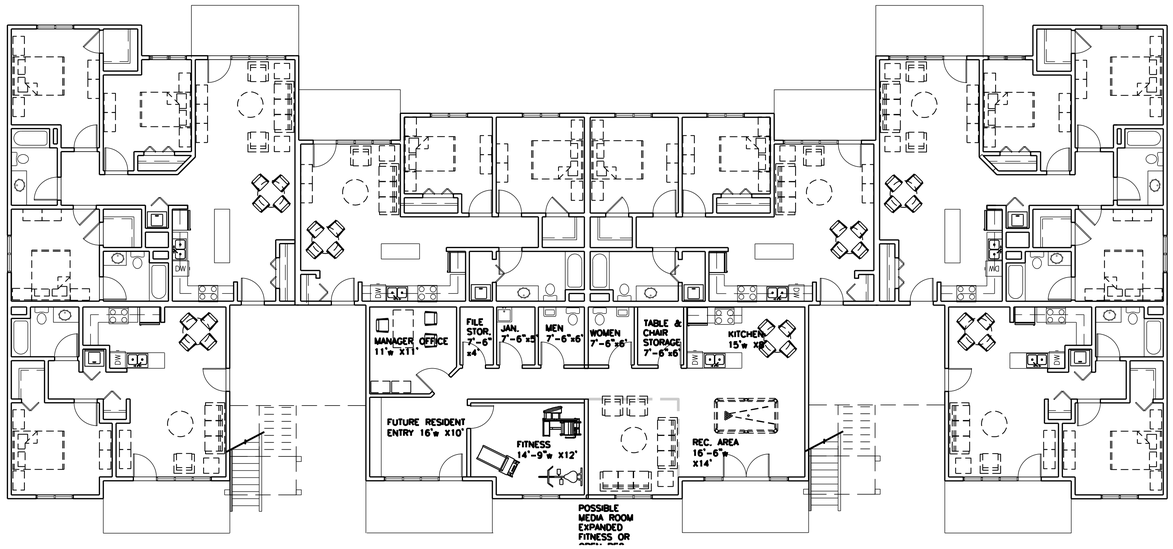


OVERALL FLOOR PLAN - BUILDING 2 - LEVEL 2

1/8" = 1'-0"



OVERALL FLOOR PLAN - BUILDING 2 - LEVEL 1

1/8" = 1'-0"

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CLIENT Rebecca Ralston

JOB NO: 180042

A2-11

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SHEET NOTES

1. ---

KEYNOTES

1 ---

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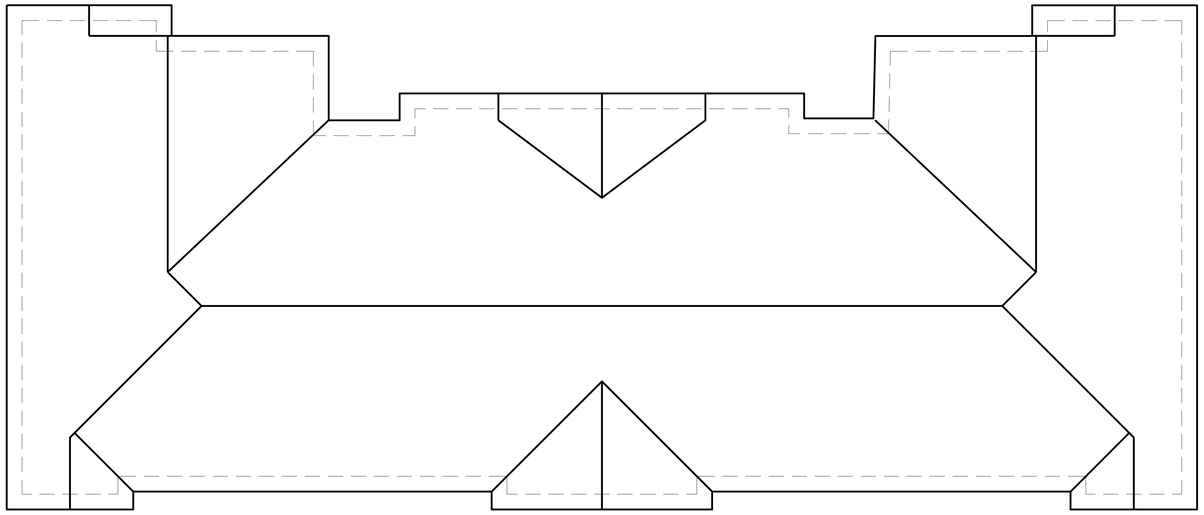

OVERALL ROOF PLAN - BUILDING 2

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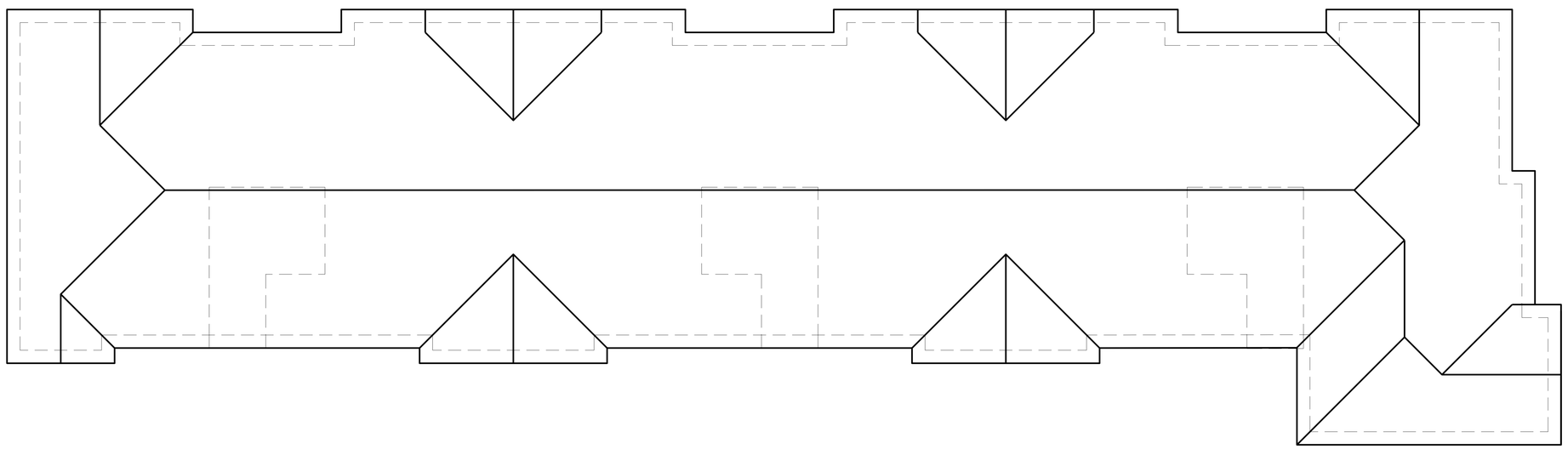

15

OVERALL ROOF PLAN - BUILDING 1

1/8" = 1'-0"

20

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TITLE: BUILDINGS 1 AND 2 ROOF PLAN AND DETAILS

PROJECT: RIVER'S EDGE APARTMENTS
FREEMONT AND ANN ST., MONROE, WA 98272

CLIENT: Rebecca Ralston

JOB NO: 180042

A4-1

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HARDY BOARD 1
HARDY BOARD 2
HARDY BOARD 3
8'x10' TYP.
6'x8' TYP.
6'x10' TYP.
6'-0"
6'-11" TYP.
6'-0"
6'-0"
6'-0"

1 BLDG 2 FRONT ELEVATION
SCALE: 1/8" = 1'-0"

2 BLDG 2 REAR ELEVATION
SCALE: 1/8" = 1'-0"

3 BLDG 2 LEFT ELEVATION
SCALE: 1/8" = 1'-0"

4 BLDG 2 RIGHT ELEVATION
SCALE: 1/8" = 1'-0"

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TITLE BUILDING 2 EXTERIOR ELEVATIONS

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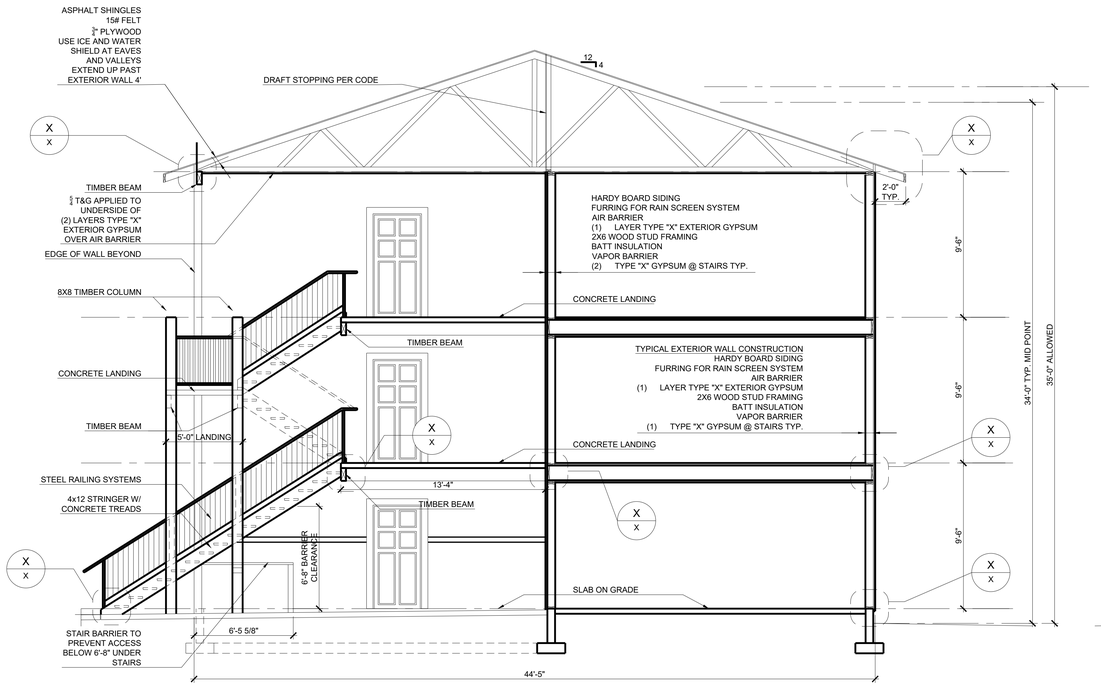
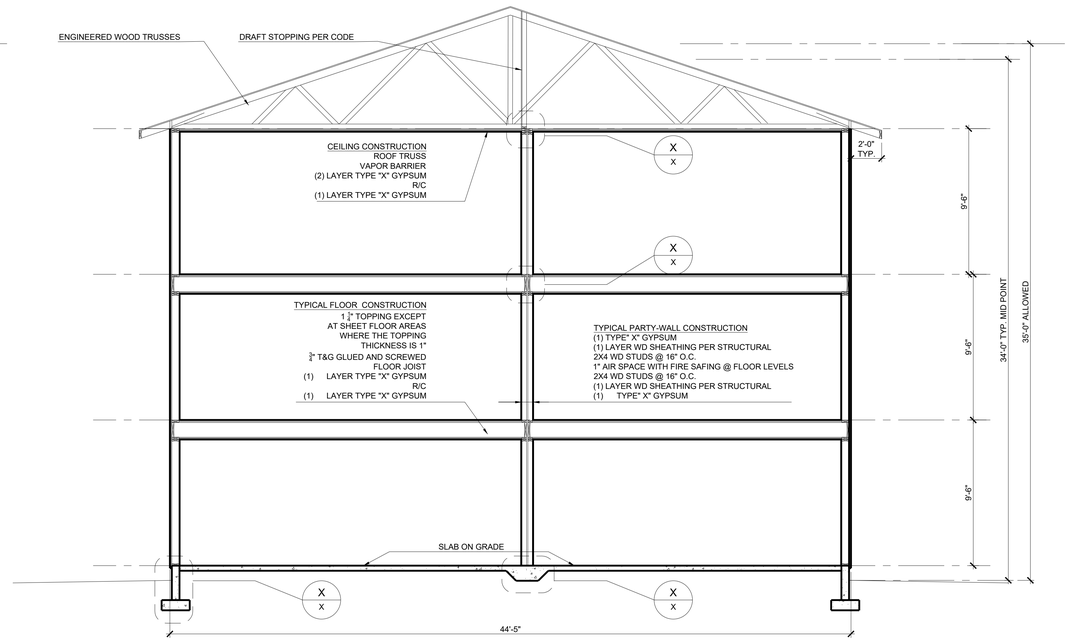


1 BUILDING SECTION @ STAIR TYP.
1/4"



2 TYPICAL BUILDING SECTION
1/4"

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FREEMAN FONG
STATE OF WASHINGTON

TITLE BUILDING SECTIONS

PROJECT RIVER'S EDGE APARTMENTS
FREEMONT AND ANN ST., MONROE, WA 98272

CLIENT Rebecca Ralston

JOB NO: 180042

A6-10

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EXHIBIT 15

RECEIVED 1/23/2019

TECHNICAL INFORMATION REPORT

River's Edge

MONROE, WASHINGTON

FOR

River's Edge WA LLLP
1525 9th Ave, Suite 3505
Seattle, WA 98101

01/16/2019

Prepared by:	**Valerie M. Gooding**
Date:	**January, 2019**
Approved by:	**Gary R. Sharnbroich, P.E.**
Core No.:	**18038**
Revised:	

CORE DESIGN

14711 NE 29Th Place, Suite 101
Bellevue, Washington 98007
Ph 425.885.7877
www.coredesigninc.com

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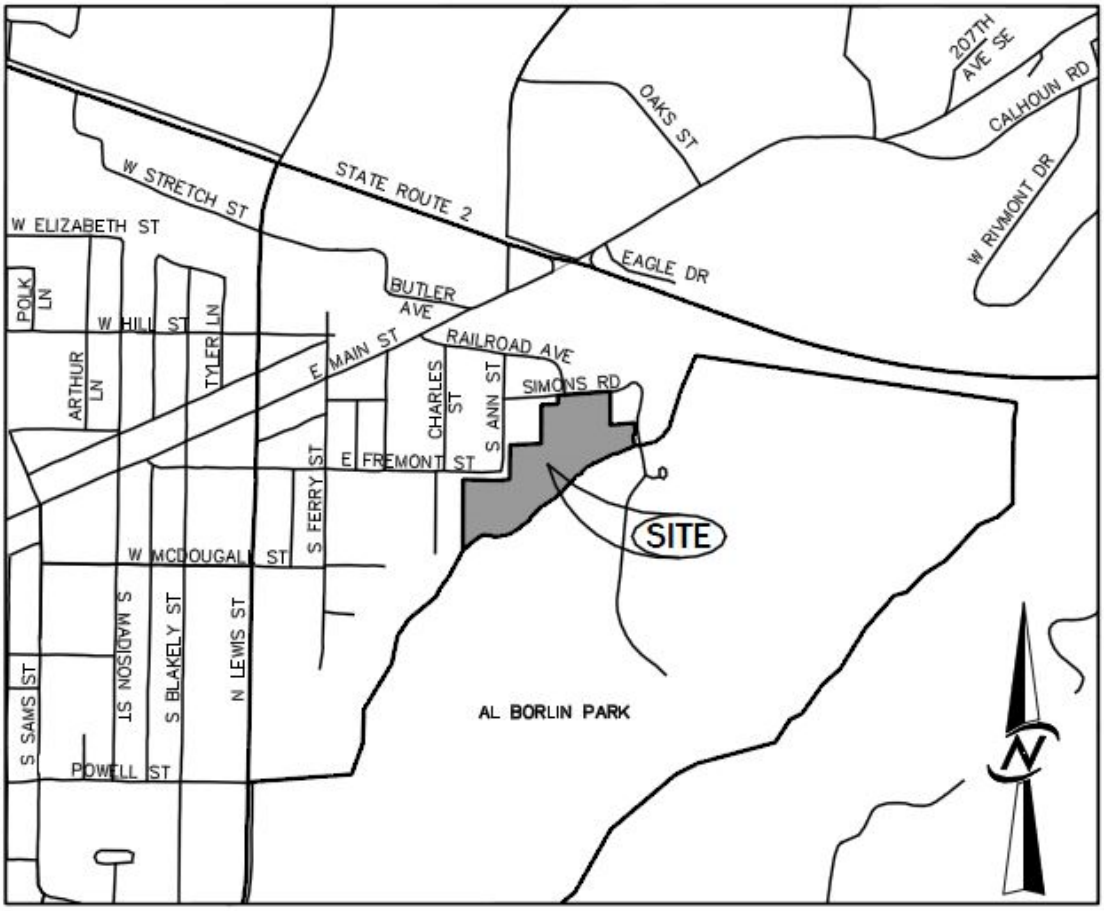
1.0 PROJECT OVERVIEW

The River's Edge project site consists of five parcels in Monroe, Washington, at East Fremont Street and South Ann Street, 98272. See the Vicinity Map on the following page. More specifically the project is in the SW ¼ of Section 6, Township 27 N, Range 7 East, W.M. The Snohomish County tax parcel ID numbers for the parcels are provided below in Table 1.1.

Table 1. 1 Parcel Areas

King County Parcel ID & Area
(1) Parcel A: 270706-003-006-00 (0.19 Acres)
(2) Parcel A: 270706-003-007-00 (0.66 Acres)
(3) Parcel A: 270706-003-033-00 (1.00 Acres)
(4) Parcel B: 270706-003-023-00 (0.20 Acres)
(5) Parcel C: 004650-000-011-00 (1.25 Acres)
(6) Parcel D: 270706-003-005-00 (3.87 Acres)

The project is located within the DC (Downtown Commercial) zoning area. The site is bordered by East Fremont Street, South Ann Street, Simons Road, and Woods Creek/Al Borlin Park. The existing site contains several single-story commercial buildings, outhouses, storage containers, and various equipment, trucks, and materials on a mostly gravel surface, with small areas of concrete and grass. The existing site topography is relatively flat with steep slopes along the southeastern portion of the site adjacent to Woods Creek. The steep slopes range from approximately 12 to 32 feet. The project proposes to demolish all existing structures, and construct five apartment buildings with associated drive aisles, parking, sidewalks, landscape, and underground utilities. The project has been designed using the guidelines and requirements established in the City of Monroe Municipal Code Section 15.01.025, which adopts the 2012 Department of Ecology Stormwater Manual for Western Washington, as amended in December 2014, as amended by Section 1-6 of Appendix 1 of the Western Washington Phase II Municipal Stormwater Permit, also referred to as the "2014 Stormwater Manual." The Snohomish County Parcel Reports are included in the Appendix.



VICINITY MAP

N.T.S.

2.0 CONDITIONS AND REQUIREMENTS SUMMARY

Per the City of Monroe Municipal Code Section 15.01.025 the adopted 2014 Department of Ecology Stormwater Manual will apply to the project. Per Figure I-2.4.1 (included in the Appendix) of the above referenced manual, the proposed project is classified as a new development which adds 5,000 square feet or more of new impervious surfaces. Therefore, all minimum requirements 1 through 9 will be addressed. The applicable minimum requirements, and how the project proposes to addresses each, are listed below.

2.1 Minimum Requirements

2.1.1 Minimum Requirement #1: Preparation of Stormwater Site Plans

See construction plans under separate cover.

2.1.2 Minimum Requirement #2: Construction Stormwater Pollution Prevention Plan

See full DOE SWPPP under separate cover.

2.1.3 Minimum Requirements #3: Source Control of Pollution

Source control of Pollution must be applied to all projects.

CONSTRUCTION STORMWATER BMPs
A Storm Water Pollution Prevention Plan, SWPPP, is part of the construction drawings prepared for the project, and includes the following erosion control Best Management Practices:

Preserve Natural Vegetation (BMP C101)
Do not clear past the designated clearing limits.

High Visibility Fencing (BMP C103)
Use in combination with BMP C233, silt fence along the east boundary as indicated on the plans. High visibility fencing should be installed along the west and south property lines.

Construction Entrance (BMP C105)
Install construction entrance as located on the plans per Std. Detail 206.

Construction Road/Parking Area Stabilization (BMP C107)
Once grading in future paved areas has reached subgrade, the gravel base course of material indicated on the applicable paving section is to be Placed on the subgrade to stabilize exposed surfaces. Surfaces protected this way include sidewalks, and the construction staging area and parking.

Temporary & Permanent Seeding (BMP C120)
Permanent seeding shall be used to stabilize exposed soils and shall be performed under the direction of the landscape plans and specifications.

Mulching (BMP C121)
Stabilize exposed surfaces with 4" sterile straw mulch when surfaces are to be unworked for the seasonal time frames listed in the TESC Notes and SWPPP Narrative. Mulch can be used to temporarily stabilize soils under future pavement; however, all mulch must be removed prior to Placement of base courses. Alternatively, construction road/parking stabilization can be used in future paved areas.

Plastic Covering (BMP C123)
Use plastic sheathing to protect stockpiles. Stabilize with sand bags connected with rope.

Topsoiling (BMP C125)
Strip topsoil under pavement, walks and building. Stockpile separately for use on project landscaping.

Dust Control (BMP C140)
Contractor shall implement measures to prevent wind transport of dust from soil surfaces. Such measures can include but are not limited to the following: mulching areas not used for vehicle access, reducing speeds on haul roads, sprinkle exposed surfaces with water, surface haul roads with gravel.

Grass Lined Swale (BMP C201)
Grass lined Interceptor swales will be installed to intercept site runoff before it leaves the site and to direct site it to the temporary infiltration pond.

Check Dams (BMP C207)
Check dams will be installed in the interceptor swale to slow flow velocities and allow sediment deposition.

Storm Inlet Protection (BMP C220)
West Main Street: Place inserts per plan detail in existing catch basins as indicated on the plan.

Onsite catch basins: as new catch basins are installed, these shall also be protected until the drainage area is stabilized.

Silt Fence (BMP C233)
Install silt fence in locations indicated on the plan per Std. Detail 204.

Temporary Infiltration Pond
As necessary, temporary infiltration ponds will be constructed in the vicinity of grading operations.

PERMANENT SOURCE CONTROL BMPs
The following source controls apply:

- Container storage of wastes;
- Vegetation management;

- Cleaning of paved surfaces;
- Storm drainage maintenance

2.1.4 Minimum Requirement #4: Preservation of Natural Drainage Systems and Outfalls

The project is proposing to connect to the existing 24" CMP pipe on-site, upstream of the discharge location, which will remain undisturbed, and therefore the drainage basin of Lower Woods Creek has been preserved.

2.1.5 Minimum Requirement #5: On-site Stormwater Management

The proposed drainage system consists of collection and conveyance of the runoff from the project. In general, flow will be collected in catch basins or roof drain piping and be connected to the proposed infiltration trenches/facility.

Being required to meet Minimum Requirements #1-9 and being a new development inside the UGA (Urban Growth Area); the site will need to meet the Low Impact Development Performance Standard and BMP T5.13: Post-Construction Soil Quality and Depth; or List #2

The Low Impact Development Performance Standard will be met by matching flow durations between 8% of the 2-year flow through the full 50-year flow calculated using MGS Flood (included in the appendix). Runoff from the different site areas will be managed as follows:

Pavement Areas:
The paved areas that are subject to vehicular traffic will require treatment. Storm water management for these areas will be collected, treated and infiltrated.

Roof Areas:
Storm water management for the roof will be collected and conveyed to the infiltration trenches.

Lawn and Landscaped Areas:
BMP T5.13 Post Construction Soil Quality and Depth will be implemented on disturbed and landscaped areas. Post Construction Soil Quality and Depth will be used on the site to recondition those areas that have been compacted by construction traffic. Stockpiled native topsoil or imported topsoil will be used in the planted areas as needed. The intent of this BMP is to re-establish the natural ability of the soil to infiltrate runoff as in the uncompacted predeveloped condition. Additional information is provided on the construction drawings that are part of the construction permit submittal.

See section 4.0 Flow Control Design for additional information.

2.1.6 Minimum Requirement #6: Runoff Treatment

With more than 5,000 sf of pollution generating impervious surface the site requires runoff treatment.

OIL CONTROL
Oil control is required for "high-use" sites. High-use sites are those that typically generate high

concentrations of oil due to high traffic turnover or the frequent transfer of oil. High-use sites include:

- An area of a commercial or industrial site subject to an expected average daily traffic (ADT) count equal to or greater than 100 vehicles per 1,000 square feet of gross building area.
- An area of a commercial or industrial site subject to petroleum storage and transfer in excess of 1,500 gallons per year, not including routinely delivered heating oil. Some examples are discussed below.
- An area of a commercial or industrial site subject to parking, storage or maintenance of 25 or more vehicles that are over 10 tons gross weight (trucks, buses, trains, heavy equipment, etc.).
- A road intersection with a measured average daily traffic (ADT) count of 25,000 vehicles or more on the main roadway and 15,000 vehicles or more on any intersecting roadway, excluding projects proposing primarily pedestrian or bicycle use improvements.

The site does not meet the definition of a “high-use” site and special Oil Control BMPs are not required.

PHOSPHOROUS CONTROL

The local government can use the following sources of information for pursuing plans and implementing ordinances and/or regulations:

- Those waterbodies reported under section 305(b) of the Clean Water Act, and designated as not supporting beneficial uses due to phosphorous;
- Those listed in Washington State's Nonpoint Source Assessment required under section 319(a) of the Clean Water Act due to nutrients.

The site is not within a watershed that has been determined to be sensitive to phosphorus and Phosphorous Control BMPs are not required.

ENHANCED TREATMENT

Enhanced Treatment for reduction in dissolved metals is required for the following project sites that:

- discharge directly to fresh waters or conveyance systems tributary to fresh waters designated for aquatic life use or that have an existing aquatic life use; or
- use infiltration strictly for flow control – not treatment – and the discharge is within ¼ mile of a fresh water designated for aquatic life use or that has an existing aquatic life use:
- Industrial project sites,
- Commercial project sites,
- Multi-family residential project sites, and
- High AADT roads.

The project is proposing to connect to the existing outfall into Woods Creek, which discharges directly to fresh waters designated for aquatic life use, and therefore Enhanced Treatment BMPs are required.

The Enhanced Treatment requirement is mitigated with the use of an 8' X 16' BioPod™ Biofilter Underground Vault with Internal Bypass (Model # BPU-IB-816). The vault is provided by Oldcastle Infrastructure and performance standards, plans, and details have been included in the appendix. Basin Treatment is addressed as follows:

BASINS 1-5
These basins do not include any areas subject to vehicular use and do not require treatment.

BASIN 6
Runoff from basin 6 includes areas subject to vehicular use and require treatment. Stormwater treatment of the access drive and walkways will be accomplished through the use of an 8' X 16' BioPod™ Biofilter Underground Vault by Oldcastle Infrastructure. The systems are approved for general use for enhanced treatment by the Department of Ecology and is sized to treat the water quality, 15 minute, flow rate as calculated MGS Flood (0.35 cfs). An 8' X 16' BioPod™ Biofilter Underground Vault is capable of treating 0.399 cfs. See MGS Flood report included in the appendix.

2.1.7 Minimum Requirement #7: Flow Control

The project is proposing to discharge to Woods Creek, and therefore Flow Control is required. See Section 4.0 Flow Control Design for additional information.

2.1.8 Minimum Requirement #8: Wetlands Protection

Woods Creek is located on and in the vicinity of the subject property. Woods Creek is a Type S waterbody that requires a 200-foot protective buffer. The FEMA floodplain was identified on and in the vicinity of the subject property. A Critical Area Study and Restoration Plan, by Wetland Resources, Inc., has been prepared as part of the Shoreline Variance currently under review. A copy has been included in the Appendix.

2.1.9 Minimum Requirement #9: Operation and Maintenance

An operation and maintenance manual will be provided upon construction plan approval.

3.0 OFFSITE ANALYSIS

Upstream:

The project is at a local high point and does not receive upstream drainage.

Downstream:

Date of Field Inspection: November 14, 2018

Weather Conditions: 50 degrees Fahrenheit, cloudy, with light rain.

Existing Conditions

The existing topography of the site is relatively flat with moderately steep slopes along the southeastern portion of the site breaking to the ordinary high water mark of Woods Creek. The site currently infiltrates, sheet flows, or is collected in concentrated flows and is conveyed over the slopes into Woods Creek. Flows continue Southwest, discharging to the Skykomish River, and ultimately into the Puget Sound. In addition, there is an existing 24" pipe that conveys upstream stormwater from the intersection of East Fremont Street, and South Ann Street directly into Woods Creek at the bottom of the slope near the southwestern corner of the site. The outfall was inaccessible due to the location and steep slopes during the field investigation.

Proposed Conditions

The project proposes to treat and then infiltrate the majority of runoff which will mimic the existing conditions. The remaining runoff will be collected and tightlined to the existing 24" CMP pipe on-site, which will discharge at the existing outfall location into Woods Creek.

4.0 FLOW CONTROL DESIGN

4.1. Basin Modeling

All stormwater facilities will be designed in accordance with the City of Monroe Municipal Code Section 15.01.025, which adopts the 2012 Department of Ecology Stormwater Manual for Western Washington, as amended in December 2014, as amended by Section 1-6 of Appendix 1 of the Western Washington Phase II Municipal Stormwater Permit. The DOE approved, MGS Flood Continuous Simulation Hydrology Model was used for modeling the project.

4.1.1 Existing Conditions

The site consists of six basins for a total of 4.895 acres. The site is currently being used for various industrial purposes, and is covered with a number of outbuildings, gravel, and small areas of concrete, and grass. Unmanaged stormwater sheet flows towards Woods Creek via one of several low points along the edge of the hillslope, which is naturally vegetated. See below for a breakdown of the existing condition areas, and the Existing Conditions Exhibit as the end of this section.

The drainage analysis consists of 6 basins, modelled as follows:

Basin 1
Till Forest: 0.253 AC

Basin 2
Till Forest: 0.253 AC

Basin 3
Till Forest: 0.253 AC

Basin 4
Till Forest: 0.253 AC

BASIN 5
Till Forest: 0.173 AC

BASIN 6
Till Forest: 3.71 AC

4.1.2 Existing Soils

A geotechnical report provided by Associated Earth Sciences, Inc. has been included in the appendix of this report. The subsurface soils were sampled and documented using twelve test pits excavated throughout the site. The subsurface conditions encountered were labeled as fill, Vashon recessional outwash deposits, and pre-Fraser non-glacial deposits, though not all units were encountered in each test pit. Groundwater was encountered at depths ranging from 26 to

30 feet below existing ground. The onsite glacial till soil is considered hydrologic soil group C for modeling.

Basins 1 – 5 will be routed to individual infiltration trenches, and will infiltrate 100% of the stormwater, and therefore, only Basin 6 has been included in the analysis. See Section 4.1.4 for additional information. The pre-developed conditions were modeled in MGS Flood as historic land cover. Based on the geotechnical report the soils were modeled as till. A summary of the uncontrolled peak runoff flow rates for the pre-developed condition is shown below.

	Predevelopment Runoff
Tr (Years)	Discharge (cfs)
2-Year	0.130
5-Year	0.216
10-Year	0.285
25-Year	0.374
50-Year	0.486
100-Year	0.661
200-Year	0.866

QTR. SW., SEC. 6, TWP. 27 N., RGE. 7 E., W.M.

SIMONS RD (PUBLIC ROW)

FREMONT ST (PUBLIC ROW)

CHARL ST

ANN ST (PUBLIC ROW)

PARCEL A

PARCEL B

PARCEL C

PARCEL D

N87°59'15"E 349.34
50' CONVEYED TO CITY OF MONROE AS TRACT B BY W.D., RECORDED 11/9/31, AFN 510185
POSSIBLE ALTERNATE LOCATION 50' EASEMENT

N00°29'28"E 100.10

N87°59'15"E 296.37

N89°03'29"W 160.00

N00°29'28"E 216.89

N00°29'28"E 170.01

N89°03'29"W 206.79

4' CONVEYED TO THE CITY OF MONROE FOR ROAD BY DEED UNDER AFN 201303210541

N89°03'29"W 30.27

N00°29'26"E 4.00

N00°29'26"E 377.47

N89°03'29"W 43.00 BASIS OF BEARINGS

N85°43'29"E 5178.25 MEAS
N LINE GOV'T LOT 6, SEC. 6-27-4 PER EXISTING MONUMENTS HELD FOR ANGLE POINT IN ℄ & POINT ON N LINE GOV'T LOT 6
N LINE GOV'T LOT 6, SEC. 6-27-4, PER REF1 — PER REF 1

BLOCK 10 TYE CITY VOL 3, PG 36

BLOCK 9 TYE CITY VOL 3, PG 36

HARRIMAN'S FIRST ADDITION VOL 28, PG 186

143 ST ANN LLC TPN 270706003009000

143 ST ANN LLC TPN 270706003010000

LOPEZ TPN 270706003008000

PARCEL A BLA BA 200001 AFN 200005245002

PARCEL B BLA BA 200001 AFN 200005245002

FOUND NAIL W/ WASHER "PLS XXX88"

FOUND 5" CONC DIA MON W/ 2" BRASS DISK W/ PUNCH STAMPED LS 34137 DOWN 0.63' IN CASE HELD FOR ℄ INTERSECTION

FOUND 5" CONC DIA MON W/ 2" BRASS DISK W/ PUNCH STAMPED 1 LS 34137 DOWN 0.63' IN CASE HELD 5' WESTERLY FROM ℄ INTERSECTION PER REF ASPHALT RAMP

6' CLF NORTH OF HERE, SHOWN SOUTH OF HERE IS THE W'LY EXTENTS OF STAGED STORAGE CONTAINERS CONNECTED BY VARYING MATERIALS TO SERVE AS A BARRICADE

SOUTH LINE TPN 270706003010000 PER ASSESSOR DESCRIPTION

FENCE CROSSES ℄

FENCE 7.4' N & 0.7' E PROP COR

EXISTING STRUCTURE PARALLEL TO NORTH MARGIN FREMONT STREET PER CITY OF MONROE SHORT PLAT NO. 87-01 HELD TO BE 110' NORTHERLY FROM AND

50' RIGHT-OF-WAY DEPICTED ON ASSESSOR'S MAP
POSSIBLE LOCATION OF EASEMENT TO MONROE AS DESCRIBED IN DEED, AFN 913562

APPROXIMATE ℄ WATERLINE EASEMENT AFN 201878

20' PUD NO. 1 EASEMENT AFN 7711220230

APPROXIMATE LOCATION 4"AC WATER PIPE PER CITY OF MONROE WATER SYSTEM MAP, ACTUAL LOCATION UNKNOWN

POSSIBLE LOCATION STORM DRAIN EASEMENT AFN 1431656 (DESCRIBED ONLY AS BURDENING PARCEL B)

PROPERTY LINE HELD TO ℄ WOODS CREEK ACCORDING TO PARCEL D DESCRIPTION. ASSESSOR MAPS INDICATE OWNERSHIP AT BANK OF CREEK, HOWEVER, BASED ON AVAILABLE EVIDENCE, CREEK IS NOT NAVIGABLE WATER OF THE US AND OWNERSHIP WOULD CARRY TO ℄

ORDINARY HIGH WATER

ORDINARY HIGH WATER FLAGS SURVEYED JULY 2018

EDGE OF CREEK JULY 2018

APPROXIMATE ℄ WOODS CREEK

WOODS CREEK

"LEAVE NO TRACE"

"AL BORLIN PARK"

PARK SIGN

"10 MPH"

BRIDGE

SCALE: 1" = 40'
0 20 40 80

FILE NO. XXXXXX

NO.	DATE	REVISION	BY	CK

01-16-2019

CIVIL ENGINEERING
LANDSCAPE ARCHITECTURE
PLANNING
SURVEYING

CORE DESIGN
12100 NE 195th St, Suite 300 Bothell, Washington 98011 425.885.7877

SCALE:	VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING
DESIGNED	
DRAWN	
CHECKED	
DATE 01/16/19	0" 1"

EXISTING CONDITIONS
RIVERS EDGE APARTMENT COMMUNITY

RIVERS EDGE WA LLLP
909 5TH AVENUE #2401
SEATTLE, WASHINGTON 98164

PROJECT NUMBER
18038

DRAWING
C1.02

SHEET 2 OF 20

4.1.3 Developed Conditions

The project proposes to construct five apartment buildings with associated drive aisles, parking, sidewalks, and landscape. Stormwater runoff will be collected and conveyed to one of six infiltration facilities. The runoff from each of the five building roofs will be routed to an infiltration trench located along the frontage of each building and will infiltrate 100% of the stormwater. The runoff from paved areas will be collected in a pipe/inlet system and routed to a water quality facility prior to entering an infiltration facility located near the west side of the site. The majority of the stormwater will infiltrate, and the overflow is conveyed to an existing 24" CMP pipe which will connect through a proposed manhole. The 24" pipe will be re-routed around the proposed building and ultimately outfall at the bottom of the slope directly into Woods Creek. See below for a breakdown of the proposed condition areas, and the Developed Conditions Map and the end of this section.

The drainage analysis consists of 6 basins, modelled as follows:

BASINS 1-4

The basins consist of the roof area for Buildings A, C, D, and E, which all have the same roof/surface area. Each contains 0.253 AC or 1.012 AC total for all four buildings and is tributary to Infiltration Trenches A, C, D, and E, respectively. See Minimum Requirements 6 and 7 for additional information on the treatment and infiltration facility sizing. The basins consist of the following land uses:

Basin 1
Rooftops: 0.253 AC

Basin 2
Rooftops: 0.253 AC

Basin 3
Rooftops: 0.253 AC

Basin 4
Rooftops: 0.253 AC

BASIN 5

The basin consists of the roof area for Building B, which contains 0.173 AC and is tributary to Infiltration Trench B. See Minimum Requirements 6 and 7 for additional information on the treatment and infiltration facility sizing. The basins consist of the following land uses:

Rooftops: 0.173 AC

BASIN 6

The basin consists of the remaining areas on site, including the paved roadway, sidewalks, and landscape, which contains 3.71 AC and is tributary to the Infiltration Facility. See Minimum Requirements 6 and 7 for additional information on the treatment and infiltration facility sizing. The basins consist of the following land uses:

Pavement & Walks:	1.97 AC
Landscaping:	1.74 AC
Total:	3.71 AC

See the MGS Flood flow frequency analysis below and refer to the Appendix for the full MGS Flood report. There is a decrease of **0.058 cfs** in the 100 year flow frequency from the pre-developed condition to the developed condition.

Postdevelopment Runoff

Tr (Years)	Discharge (cfs)
2-Year	9.093E-02
5-Year	0.150
10-Year	0.177
25-Year	0.263
50-Year	0.334
100-Year	0.603
200-Year	0.710

INFILTRATION FACILITIES

There are five infiltration trenches that correspond to Basins 1-5. The basin number, facility identification, length, width and depth are listed for each facility. See MGS Flood reports in the Appendix for additional information.

BASIN ID	FACILITY ID	LENGTH	WIDTH	DEPTH	% INFILTRATED
#1	Facility A	60 Feet	5 Feet	4 Feet	100%
#2	Facility C	60 Feet	5 Feet	4 Feet	100%
#3	Facility D	60 Feet	5 Feet	4 Feet	100%
#4	Facility E	60 Feet	5 Feet	4 Feet	100%
#5	Facility B	40 Feet	5 Feet	4 Feet	100%
#6	Facility F	75 Feet	20 Feet	4 Feet	96.80%

Infiltration facilities will be constructed using R-Tank modules provided by ACF Environmental. Performance standards, plans, and details have been included in the appendix.

OUTFALL ANALYSIS

Outfall improvements are not anticipated as the proposed project reduces the pre-developed flow rates for all storm events in the post-developed condition. See MGS Flood report in the Appendix for additional information.

QTR. SW., SEC. 6, TWP. 27 N., RGE. 7 E., W.M.

SEE SHEET C4.02

FREMONT ST (PUBLIC ROW)

ANN ST (PUBLIC ROW)

ROAD A

ROAD B1

ROAD B2

ROAD C

WQ VAULT
PROP. 8'X16' UNDERGROUND BIOPOD BIOFILTER VAULT W/ INTERNAL BYPASS. MODEL # BPU-16-816. SEE SHEET C4.34 FOR DETAILS.

CB 1
STA. 2+46.00, 8.50 LT
TYPE 2-48", MANHOLE
RIM 77.40

CB 2
STA. 2+10.43, 0.00
TYPE 2-48", VANED GRATE
RIM 76.93

CB 3
STA. 3+25.00, 0.00 LT
TYPE 2-48", VANED GRATE
RIM 76.67

CB 4
STA. 4+39.98, 0.00
TYPE 2-48", MANHOLE
RIM 77.87

CB 5
STA. 5+81.84, 0.00
TYPE 2-48", MANHOLE
RIM 79.69

CB 6
STA. 6+42.68, 0.00
TYPE 2-48", MANHOLE
RIM 80.05

CB 7
STA. 6+92.00, 0.00
TYPE 2-48", VANED GRATE
RIM 79.60

CB 12
STA. 3+25.00, 28.50 RT
TYPE 1, SOLID LOCKING LID
RIM 77.24

CB 13
STA. 5+81.84, 28.50 RT
TYPE 1, SOLID LOCKING LID
RIM 80.26

CB 14
STA. 1+61.88, 0.00
TYPE 1, VANED GRATE
RIM 79.21

CB 15
STA. 1+61.88, 28.50 LT
TYPE 1, SOLID LOCKING LID
RIM 79.78

CB 20
STA. 3+33.33, 8.50 LT
TYPE 2-64", SOLID LOCKING LID
RIM 76.88

CB 21
STA. 3+59.01, 11.00 RT
TYPE 2-48", MANHOLE
RIM 77.18

CB 22
STA. 4+16.73, 11.00 RT
TYPE 2-48", MANHOLE
RIM 77.77

CB 23
STA. 4+16.73, 74.62 RT
TYPE 2-48", MANHOLE
RIM 78.30

CB 24
STA. 4+02.99, 112.90 RT
TYPE 2-48", MANHOLE
RIM 78.17

CB 25
STA. 3+39.03, 112.90 RT
TYPE 2-48", MANHOLE
RIM 77.34

INFILT. TRENCH
PROP. R-TANK INFILTRATION TRENCH - BLDG A. SEE SHEETS C4.33 AND C4.34 FOR DETAILS.

INFILT. VAULT
PROP. R-TANK INFILTRATION SYSTEM. SEE SHEETS C4.31 AND C4.32 FOR DETAILS

INFILT. TRENCH
PROP. R-TANK INFILTRATION TRENCH - BLDG B. SEE SHEETS C4.33 AND C4.34 FOR DETAILS.

INFILT. TRENCH
PROP. R-TANK INFILTRATION TRENCH - BLDG C. SEE SHEETS C4.33 AND C4.34 FOR DETAILS.

BLDG. A1
ROOF AREA
11,014 SF
FF
78.50

BLDG. B2
ROOF AREA
7,519 SF
FF
81.00

BLDG. C1
ROOF AREA
11,014 SF
FF
81.25

12" IE 68.67
12" IE 66.00
12" IE 70.84
21LF 12" PVC
5LF 12" PVC
7LF 12" PVC
115LF 12" PVC
12" IE 66.00
8LF 12" PVC
30LF 18" PVC
115LF 12" PVC
58LF 24" PVC
28LF 6" PVC
6" IE 73.90
9LF 6" PVC
3LF 6" PVC
8" CLEANOUT
RIM 78.42
6" IE 75.00
CONNECT ROOF DRAINS AND PORTION OF FOOTING DRAIN TO CLEANOUT
6" IE 73.90
CONNECT DEEPENED FOOTING DRAIN TO CLEANOUT
8" CLEANOUT
RIM 78.35
4" IE 70.00
28LF 6" PVC
PERF. PIPE
64LF 24" PVC
44LF 24" PVC
8" CLEANOUT
RIM 80.81
6" IE 77.50
CONNECT ROOF AND FOOTING DRAINS TO CLEANOUT
9LF 6" PVC
6" IE 76.40
6" IE 76.90
3LF 6" PVC
28LF 6" PVC
30LF 6" PVC
6" IE 76.65
9LF 6" PVC
8" CLEANOUT
RIM 81.30
6" IE 77.15
49LF 12" PVC
61LF 12" PVC
28LF 6" PVC
6" IE 77.15
3LF 6" PVC
14LF 12" PVC
10' CRITICAL AREA BUILDING SETBACK
EDGE OF HISTORIC DISTURBANCE
ORDINARY HIGH WATER
EDGE OF CREEK JULY 2018
WOODS CREEK
18"CMP IE=53.34 (DAMAGED, CONNECTION UNKNOWN)
24"CMP IE=56.09
SDMH #8149
RIM EL=78.35
6"CLAY(E)IE=74.30
24"CMP(N)IE=57.68
24"CMP(S)IE=57.60
2" VERT. PVC TOP=76.14
APPROXIMATE TOP OF SLOPE
APPROXIMATE WATERLINE EASEMENT
PARCEL A
BLA BA 200001
AFN 200005245002
PARCEL B
BLA BA 200001
AFN 200005245002

SCALE: 1" = 20'
0 10 20 40

FILE NO. XXXXXX

NO.	DATE	REVISION	BY	CK

01-16-2019

CIVIL ENGINEERING
LANDSCAPE ARCHITECTURE
PLANNING
SURVEYING

CORE DESIGN
12100 NE 195th St, Suite 300 Bothell, Washington 98011 425.885.7877

SCALE:	VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING
DESIGNED	
DRAWN	
CHECKED	
DATE 01/16/19	0" 1"

ROAD AND STORM DRAINAGE PLAN
RIVERS EDGE APARTMENT COMMUNITY

RIVERS EDGE WA LLLP
909 5TH AVENUE #2401
SEATTLE, WASHINGTON 98164

PROJECT NUMBER
18038

DRAWING
C4.01

SHEET 10 OF 20

SIMONS RD (PUBLIC ROW)

ROAD D

ROAD A

ANN ST (PUBLIC ROW)

BLDG. D1
ROOF AREA 11,014 SF
FF 80.25

BLDG. E1
ROOF AREA 11,014 SF
FF 80.50

BLDG. B2
ROOF AREA 7,519 SF
FF 81.00

FF 81.25

INFILT. TRENCH
PROP. R-TANK INFILTRATION TRENCH - BLDG D. SEE SHEETS C4.33 AND C4.34 FOR DETAILS.

INFILT. TRENCH
PROP. R-TANK INFILTRATION TRENCH - BLDG E. SEE SHEETS C4.33 AND C4.34 FOR DETAILS.

INFILT. TRENCH
PROP. R-TANK INFILTRATION TRENCH - BLDG B. SEE SHEETS C4.33 AND C4.34 FOR DETAILS.

8" CLEANOUT
RIM 80.24
6" IE 76.75

9LF 6" PVC

6" IE 75.65

3LF 6" PVC
6" IE 76.15

CB 18
STA. 2+76.67, 28.50 LT
TYPE 1, SOLID LOCKING LID
RIM 79.05

CB 17
STA. 2+76.67, 0.00
TYPE 1, VANED GRATE
RIM 78.48

32LF 12" PVC

CB 11
STA. 10+72.00, 0.00
TYPE 1, VANED GRATE
RIM 78.38

CB 10
STA. 10+40.12, 0.00
TYPE 1, SOLID LOCKING LID
RIM 78.65

160LF 12" PVC

28LF 6" PVC

123LF 8" PVC

CB 9
STA. 8+80.00, 0.00
TYPE 1, VANED GRATE
RIM 78.70

37LF 8" PVC

6" IE 75.90
9LF 6" PVC

8" CLEANOUT
RIM 80.45
6" IE 77.00

CONNECT ROOF DRAINS AND PORTION OF FOOTING DRAIN TO CLEANOUT

46LF 12" PVC

29LF 6" PVC

6" IE 76.40
3LF 6" PVC

CONNECT DEEPENED FOOTING DRAIN TO CLEANOUT

CB 16
STA. 8+80.00, 28.50 RT
TYPE 1, SOLID LOCKING LID
RIM 79.27

8" CLEANOUT
RIM 80.33
4" IE 72.00

CB 8
STA. 8+34.26, 0.00
TYPE 2-48", MANHOLE
RIM 79.12

143LF 12" PVC

CB 19
STA. 1+41.82, 0.00
TYPE 1, VANED GRATE
RIM 78.57

CB 15
STA. 1+61.88, 28.50 LT
TYPE 1, SOLID LOCKING LID
RIM 79.78

8" CLEANOUT
RIM 80.81
6" IE 77.50

CONNECT ROOF AND FOOTING DRAINS TO CLEANOUT

9LF 6" PVC

6" IE 76.40

CB 7
STA. 6+92.00, 0.00
TYPE 2-48", VANED GRATE
RIM 79.60

49LF 12" PVC

4" IE 70.00

10' CRITICAL AREA BUILDING SETBACK

EDGE OF HISTORIC DISTURBANCE

ORDINARY HIGH WATER

WOODS CREEK

143 ST ANN LLC
TPN 2707060300900

143 ST ANN LLC
TPN 2707060301000

LOPEZ
TPN 2707060300800

FOUND NAIL W/ WASHER "PLS XXX8S"

20' PUD NO. 1 EASEMENT AFN 7311220230

APPROXIMATE E WATERLINE EASEMENT

SCALE: 1" = 20'
0 10 20 40

SEE SHEET 4.01

FILE NO. XXXXXX

NO.	DATE	REVISION	BY	CK

01-16-2019

CIVIL ENGINEERING
LANDSCAPE ARCHITECTURE
PLANNING
SURVEYING

CORE DESIGN
12100 NE 195th St, Suite 300 Bothell, Washington 98011 425.885.7877

SCALE:
DESIGNED
DRAWN
CHECKED
DATE 01/16/19
VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING
0" 1"

ROAD AND STORM DRAINAGE PLAN
RIVERS EDGE APARTMENT COMMUNITY

RIVERS EDGE WA LLLP
909 5TH AVENUE #2401
SEATTLE, WASHINGTON 98164

PROJECT NUMBER
18038

DRAWING
C4.02

SHEET 11 OF 20

THESE PLANS ARE NOT VALID UNLESS ORIGINAL SIGNATURE AND SEAL ARE AFFIXED

5.0 Conveyance System Analysis and Design

The proposed storm drainage conveyance system was designed to have sufficient capacity to convey and contain the runoff from the 25-year storm event using the Rational Method. The calculations show that the proposed conveyance system has adequate capacity. The runoff coefficients ('C' values) that were used for the conveyance capacity spreadsheets to determine the tributary flow rates were calculated based on the maximum developed condition impervious areas.

Rational Method

$$Q = CiA$$

Where:

Q = runoff (cfs)
C = runoff coefficient
I = average rainfall intensity (inches per hour)
A = drainage area (acres)

Composite Runoff Coefficient

$$C_c = (C_1A_1 + C_2A_2)/A_t$$

Where:

C_c = composite runoff coefficient (cfs)
C_1 = runoff coefficient 0.9 (Pavement and Roofs)
C_2 = runoff coefficient 0.25 (Lawns)
A_1, A_2 = Area of land cover(acres)
A_t = Total area (acres)

A composite runoff coefficient was calculated for the tributary drainage basins.
All structures can convey the 25-year and 100-year storms events. Refer to the spreadsheets for the full conveyance capacity calculations in the Appendix.

Appendix

Snohomish County Parcel Assessors Reports

2014 DOE Figure I-2.4.1

MGS Flood Reports (3)

BioPod™ BioFilter Performance Standards, Plans, and Details

R-Tank Performance Standards, Plans, and Details

Critical Area Study and Restoration Plan

Geotechnical Report

Conveyance System Analysis

Planning and Development Services Property Report

About the Property Report

This report contains information regarding the subject property. This information may be useful for land developers, agents, and planners when analyzing potential land use changes.

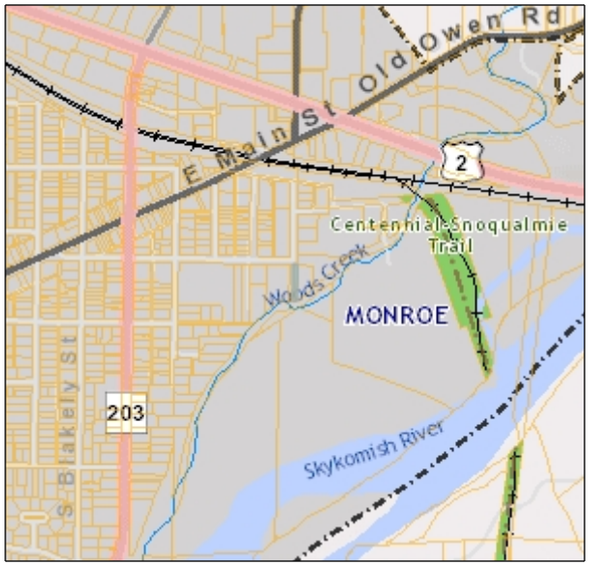
The information in this report was compiled from the Snohomish County geographic information system (GIS). Data sources include several Snohomish County departments as well as federal, state, and local agencies.

Please note that all information contained in this report is subject to the disclaimer as noted at the bottom of each page and the end of the report.

Larger-sized map images are included at the end of this report.

Significant information that can affect permitting are displayed in red text.

Report Generated On: 11/20/2018 6:28:14 PM



General Location Info

Site Address:	UNKNOWN UNKNOWN
City:	UNKNOWN
Zip:	No Data
Tax Parcel Number:	27070600300600
QTR-Sec-Twp-Rng:	SW 6 T27N R 7E
Latitude / Longitude: (NAD83)	Lat=47.854443 Long=-121.965545
WA State Plane North Zone: (NAD83, US Feet)	X=1,362,461.43 Y=313,716.75
County Road Atlas Page:	130

Administrative Info

Land Use Jurisdiction:	City of Monroe
Tribal Lands Status:	Non-tribal land
Tribal Lands Name:	Non-tribal land

Planning Info

Future Land Use (FLU):	CITY
FLU Description:	Incorporated City
Zoning:	CITY
Zoning Description:	City
QTR-Sec-Twp-Rng:	SW 6 T27N R 7E
Tax Parcel Number:	27070600300600
Urban Growth Area (UGA):	Monroe UGA
Municipal UGA:	Not in a Municipal Urban Growth Area
Transportation ILA:	MON ILA-6, Estm. Trip% = 90
TDR Sending Area:	Not in a TDR Sending area
TDR Receiving Area:	Not in a TDR Receiving area
Snow Load Factor:	0.057
Snow Load:	To obtain snow load value, turn on 'Snowload' layer in interactive map and click on the area of interest
No-Shooting Area:	Not in a No-shooting Area (SCC 10.12)
Lot Status:	Unconfirmed
SCC 30.23.040 (22) Applies:	Minimum Lot Size does not apply {per SCC 30.23.040(22)}
Transportation Services Area:	C
Mineral Resource Type:	Not in an Mineral Resource area
Mineral Resource Name:	Not in a mineral resource overlay area
Shoreline Management Area:	Not in a Shoreline Management Area

Planning and Development Services Property Report

Assessor Info

Tax Parcel:	27070600300600
Owner Name:	WIBBELMAN LAUREN E
Taxpayer of Record: (maintained by Treasurer)	WIBBELMAN LAUREN E
Site Address:	UNKNOWN UNKNOWN
City:	UNKNOWN
Zip:	No Data
Use Code:	910 Undeveloped (Vacant) Land
Gross Size (acres):	0.12
Land Value:	$1,700
Improvement Value:	$0
Total Value:	$1,700
Tax Year:	2018
Assessment Date:	01/01/2017
Property Account Summary:	https://www.snoco.org/proptax/search.aspx?parcel_number=27070600300600
Permit Information:	http://www.snoco.org/app/pds/permitstatus/PDS-ParcelList.aspx?PN=27070600300600

District Info

Council District:	County Council District 5
Fire District:	Fire District 07
Fire Authority:	Not in a Fire Authority area
School District:	Monroe School District 103
Sewer District:	Not in a sewer district
Water District:	Not in a water district
Water Provider (CWSP):	City of Monroe Water System
Park District:	East County Park And Recreation
Park Service Area:	Centennial
Drainage District:	Not in a drainage district
Diking District:	Not in a diking district
Flood Control District:	Not in a flood control district

Notification Info

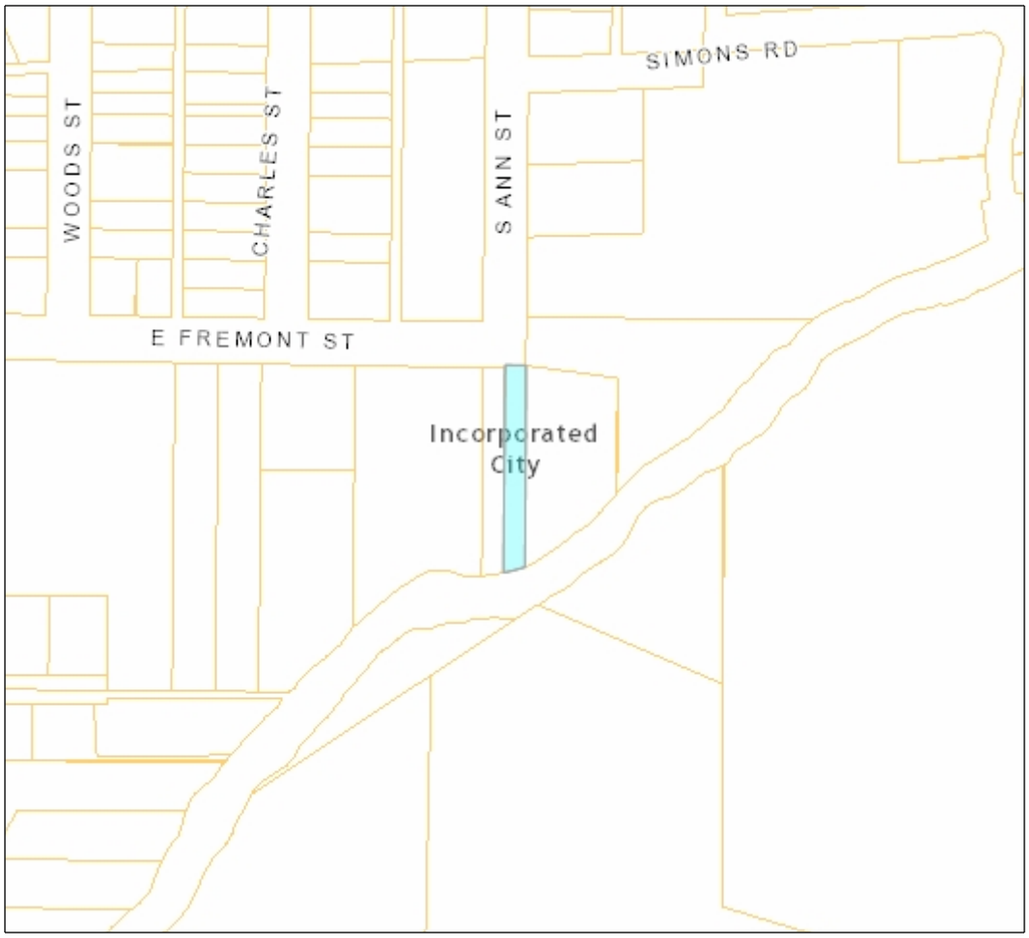
Agriculture Notification Area:	Not within an agriculture notification area
Lahar Volcanic Notice (200 ft):	Not in a lahar hazard area
Commercial Forrest Notice (500 ft):	Not within 500 ft of a commercial forest
Mineral Resource Notice (2000 ft):	Not within 2,000 ft of a Mineral Resource Overlay area
Paine Field Airport:	Not within 20,000 ft of Paine Field
Airpark:	No airparks within 2500 ft
Airport Compatibility Area:	Not within an airport compatibility area
Airport Influence Area:	Not within an airport influence area

Critical and Physical Info

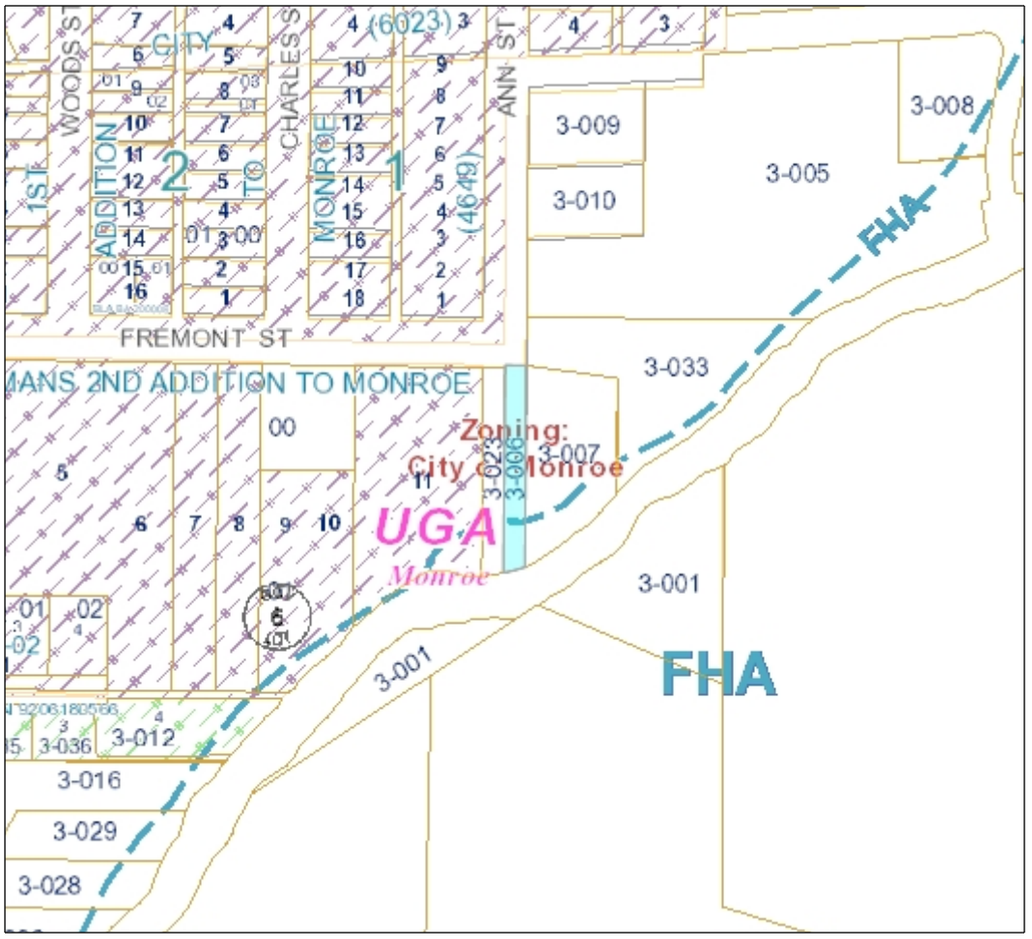
Watershed Name:	Skykomish watershed
Aquifer Sensitivity:	High Aquifer Sensitivity
Elevation: (NAVD88, US Feet)	Approximately 51.6 to 79.0 ft
Sub-basin Name:	Lower Woods Creek sub-basin
Hydric Soils:	No hydric soils Hydric soils present
Basin Name:	Snohomish
Flood Hazard Area:	A portion of the parcel is inside the flood hazard area
Sole Source Aquifer:	Not in a sole source aquifer
Water Resource Inventory Area:	WRIA 7
Flood Plain 100yr:	Floodway Fringe Area
Critical Aquifer Recharge Area:	Not in a critical aquifer recharge area
Geology (erodible surface):	Alluvium
Soil Type:	PILCHUCK LOAMY SAND : SULTAN SILT LOAM
National Wetlands Inventory:	Freshwater Forested/Shrub Wetland
Wetlands (Snoco):	No PDS wetlands present
Wetlands Last Edited:	No PDS wetlands present
Steep Slopes (> 33%):	Steep slopes present
Landslide Hazard Area:	Not within a known landslide and outside the modeled LHA area — More Information: SCC 30.62B.340
Mine Hazard:	No mines within 200 feet
Pipelines:	No petroleum pipelines within 1,000 feet
Levees:	No levees within 1,000 feet
Levees Source:	No levee on the property
Data Compiled On:	11/19/2018

Parks (within 1/2 mile)	Schools (within 1/2 mile)	Bus Stops (within 1/2 mile)
Centennial-Snoqualmie Trail	Sky Valley Education Center Monroe School District #103	Chain Lake Rd & Hwy 2 W Main St & S Madison St E Main St & Woods St Hwy 2 & Main St Hwy 2 & Woods Creek Rd SE Hwy 2 & N Lewis St W Main St & N Blakely St E Main St & Woods St Hwy 2 & Chain Lake Rd Hwy 2 & Woods Creek Rd SE

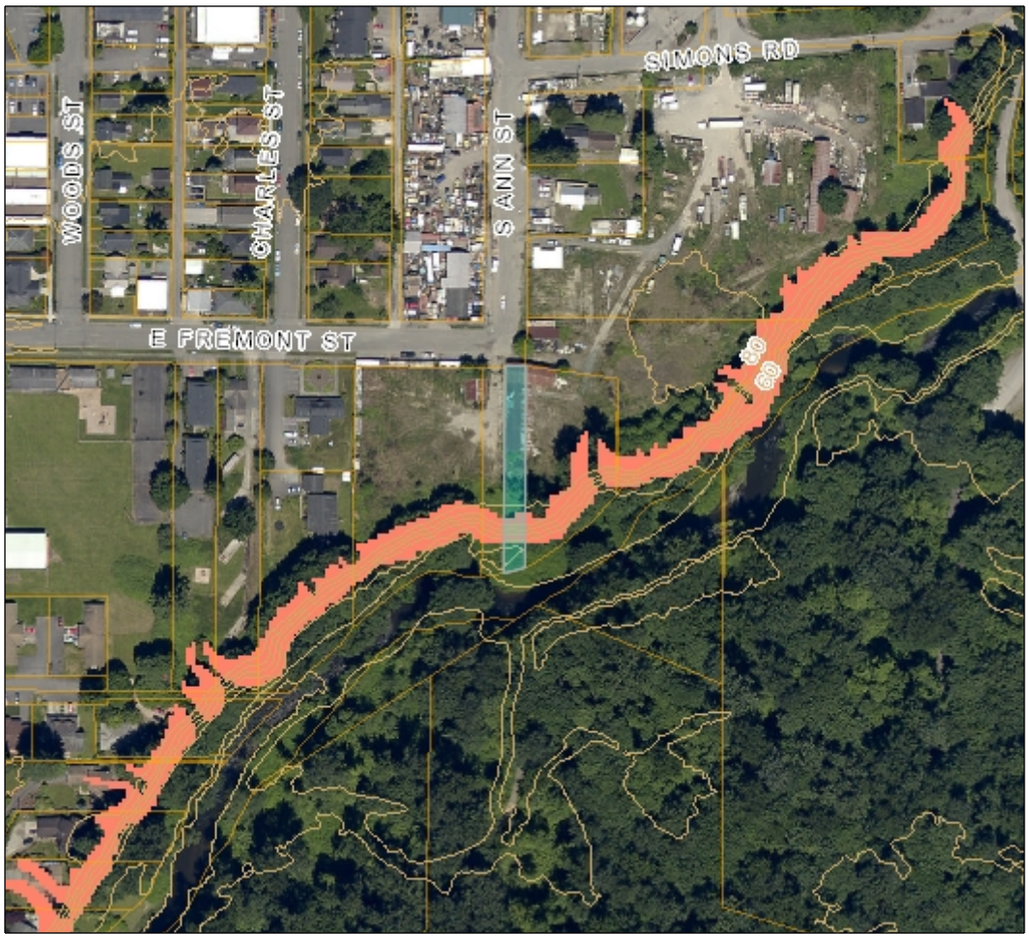
Future Land Use Map



Zoning Map


WOODS ST
1ST
ADDITION
2
TO
CITY
CHARLES ST
MONROE
1
ANN ST
(6023)
(4649)
3-009
3-008
3-005
3-010
FHA
FREMONT ST
MANS 2ND ADDITION TO MONROE
3-033
Zoning:
City of Monroe
3-007
UGA
Monroe
3-001
FHA
3-001
3-036
3-012
3-016
3-029
3-028

2015 Aerial Photo Map



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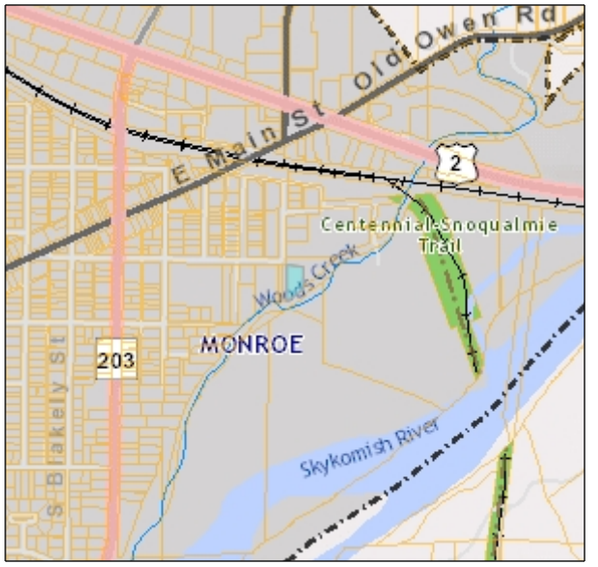
Planning and Development Services Property Report

About the Property Report

Report Generated On: 11/20/2018 6:28:34 PM



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Larger-sized map images are included at the end of this report.

Significant information that can affect permitting are displayed in red text.

General Location Info

Site Address:	FREEMONT & ANN ST
City:	MONROE
Zip:	98272
Tax Parcel Number:	27070600300700
QTR-Sec-Twp-Rng:	SW 6 T27N R 7E
Latitude / Longitude: (NAD83)	Lat=47.854497 Long=-121.965250
WA State Plane North Zone: (NAD83, US Feet)	X=1,362,534.20 Y=313,735.46
County Road Atlas Page:	130

Administrative Info

Land Use Jurisdiction:	City of Monroe
Tribal Lands Status:	Non-tribal land
Tribal Lands Name:	Non-tribal land

Planning Info

Future Land Use (FLU):	CITY
FLU Description:	Incorporated City
Zoning:	CITY
Zoning Description:	City
QTR-Sec-Twp-Rng:	SW 6 T27N R 7E
Tax Parcel Number:	27070600300700
Urban Growth Area (UGA):	Monroe UGA
Municipal UGA:	Not in a Municipal Urban Growth Area
Transportation ILA:	MON ILA-6, Estm. Trip% = 90
TDR Sending Area:	Not in a TDR Sending area
TDR Receiving Area:	Not in a TDR Receiving area
Snow Load Factor:	0.057
Snow Load:	To obtain snow load value, turn on 'Snowload' layer in interactive map and click on the area of interest
No-Shooting Area:	Not in a No-shooting Area (SCC 10.12)
Lot Status:	Unconfirmed
SCC 30.23.040 (22) Applies:	Minimum Lot Size does not apply {per SCC 30.23.040(22)}
Transportation Services Area:	C
Mineral Resource Type:	Not in an Mineral Resource area
Mineral Resource Name:	Not in a mineral resource overlay area
Shoreline Management Area:	Not in a Shoreline Management Area

Assessor Info

Tax Parcel:	27070600300700
Owner Name:	WIBBELMAN LAUREN E
Taxpayer of Record: (maintained by Treasurer)	WIBBELMAN LAUREN E
Site Address:	FREEMONT & ANN ST
City:	MONROE
Zip:	98272
Use Code:	519 Other Wholesale Trade, NEC
Gross Size (acres):	0.48
Land Value:	$1,600
Improvement Value:	$2,300
Total Value:	$3,900
Tax Year:	2018
Assessment Date:	01/01/2017
Property Account Summary:	https://www.snoco.org/proptax/search.aspx?parcel_number=27070600300700
Permit Information:	http://www.snoco.org/app/pds/permitstatus/PDS-ParcelList.aspx?PN=27070600300700

District Info

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Fire Authority:	Not in a Fire Authority area
School District:	Monroe School District 103
Sewer District:	Not in a sewer district
Water District:	Not in a water district
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Park District:	East County Park And Recreation
Park Service Area:	Centennial
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Notification Info

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Lahar Volcanic Notice (200 ft):	Not in a lahar hazard area
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Airport Influence Area:	Not within an airport influence area

Critical and Physical Info

Watershed Name:	Skykomish watershed
Aquifer Sensitivity:	High Aquifer Sensitivity
Elevation: (NAVD88, US Feet)	Approximately 51.7 to 79.7 ft
Sub-basin Name:	Lower Woods Creek sub-basin
Hydric Soils:	No hydric soils Hydric soils present
Basin Name:	Snohomish
Flood Hazard Area:	A portion of the parcel is inside the flood hazard area
Sole Source Aquifer:	Not in a sole source aquifer
Water Resource Inventory Area:	WRIA 7
Flood Plain 100yr:	Floodway Fringe Area
Critical Aquifer Recharge Area:	Not in a critical aquifer recharge area
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Soil Type:	PILCHUCK LOAMY SAND : SULTAN SILT LOAM
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Wetlands Last Edited:	No PDS wetlands present
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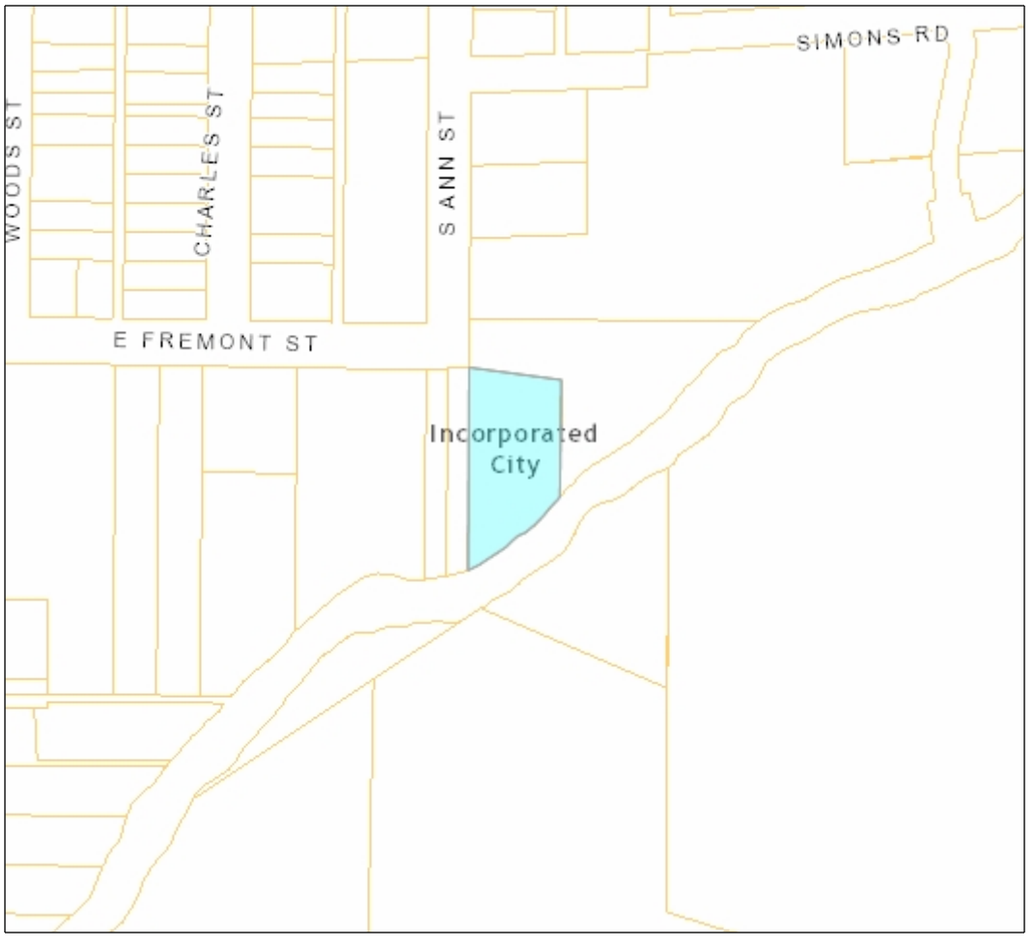
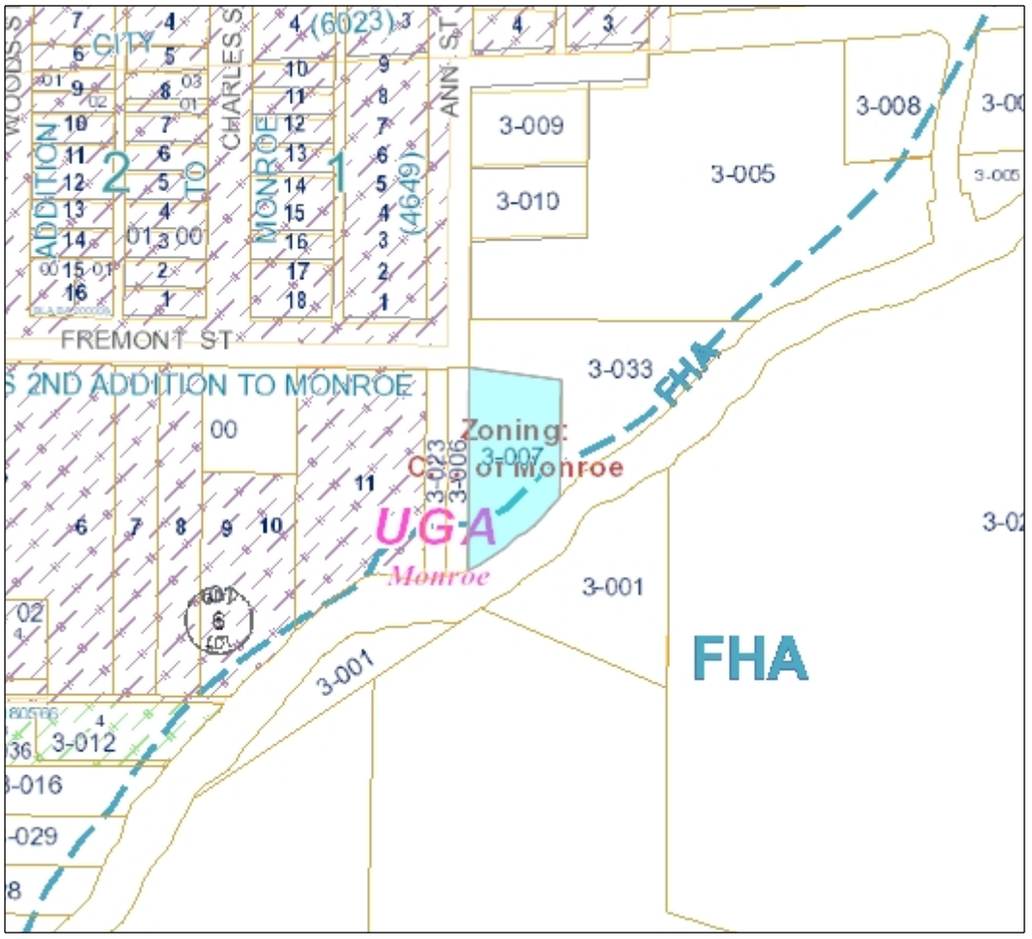
Landslide Hazard Area:	Not within a known landslide and outside the modeled LHA area — More Information: SCC 30.62B.340
Mine Hazard:	No mines within 200 feet
Pipelines:	No petroleum pipelines within 1,000 feet
Levees:	No levees within 1,000 feet
Levees Source:	No levee on the property
Data Compiled On:	11/19/2018

Parks (within 1/2 mile)	Schools (within 1/2 mile)	Bus Stops (within 1/2 mile)
Centennial-Snoqualmie Trail	Monroe School District #103	Chain Lake Rd & Hwy 2
		W Main St & S Madison St
		E Main St & Woods St
		Hwy 2 & Main St
		Hwy 2 & Woods Creek Rd SE
		Hwy 2 & N Lewis St
		W Main St & N Blakely St
		E Main St & Woods St
		Hwy 2 & Chain Lake Rd
		Hwy 2 & Woods Creek Rd SE

Future Land Use Map



Zoning Map


CITY
ADDITION
2
TO
CHARLES S
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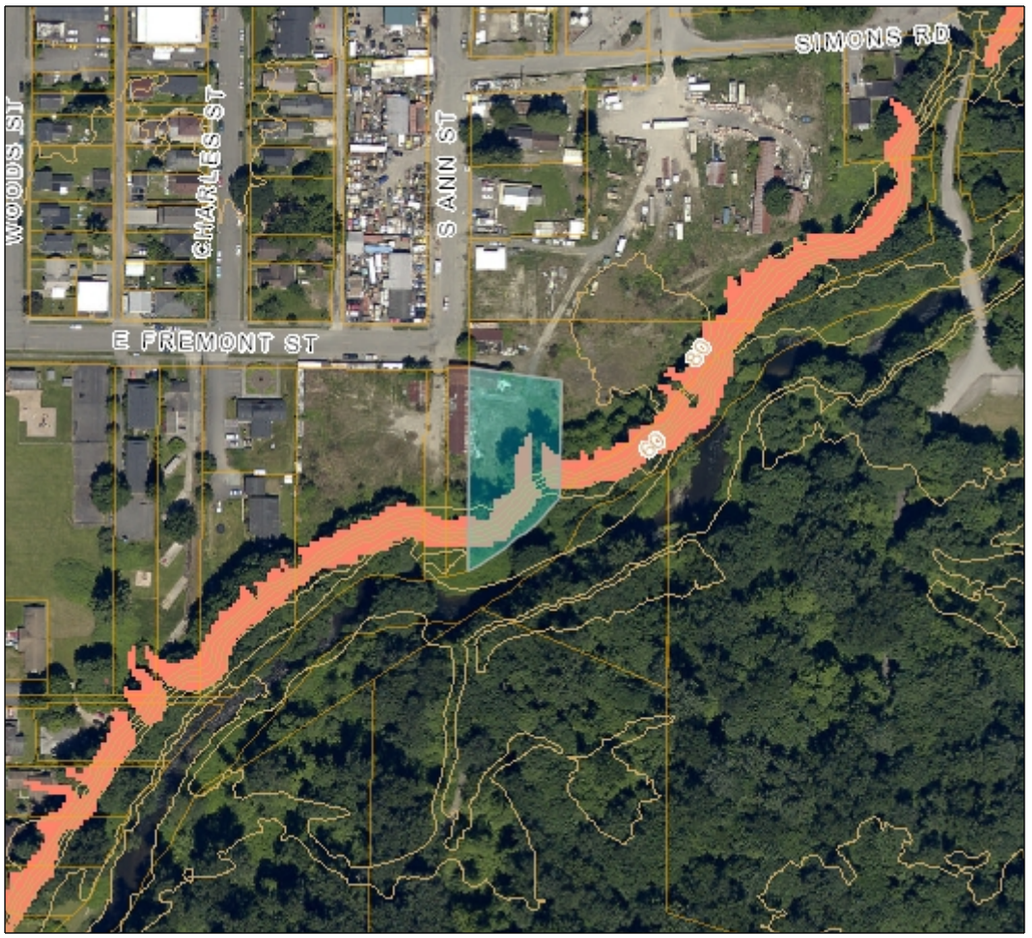
(6023)
(4649)
ANN ST
3-009
3-010
3-005
3-008
FREMONT ST
2ND ADDITION TO MONROE
3-033
FHA
Zoning:
City of Monroe
3-007
3-023
3-006
UGA
Monroe
3-001
FHA
3-012
3-016
3-029

2015 Aerial Photo Map



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Planning and Development Services Property Report

About the Property Report

Report Generated On: 11/20/2018 6:29:54 PM

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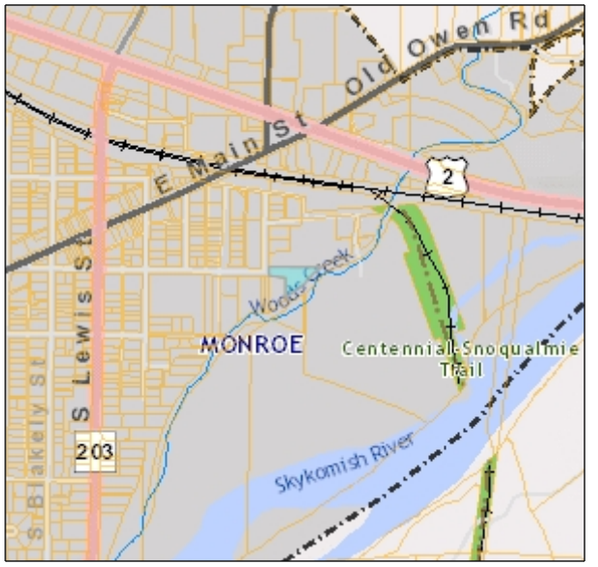

General Location Info

Site Address:	UNKNOWN UNKNOWN
City:	UNKNOWN
Zip:	No Data
Tax Parcel Number:	27070600303300
QTR-Sec-Twp-Rng:	SW 6 T27N R 7E
Latitude / Longitude: (NAD83)	Lat=47.854822 Long=-121.964737
WA State Plane North Zone: (NAD83, US Feet)	X=1,362,661.85 Y=313,852.07
County Road Atlas Page:	130

Administrative Info

Land Use Jurisdiction:	City of Monroe
Tribal Lands Status:	Non-tribal land
Tribal Lands Name:	Non-tribal land

Planning Info

Future Land Use (FLU):	CITY
FLU Description:	Incorporated City
Zoning:	CITY
Zoning Description:	City
QTR-Sec-Twp-Rng:	SW 6 T27N R 7E
Tax Parcel Number:	27070600303300
Urban Growth Area (UGA):	Monroe UGA
Municipal UGA:	Not in a Municipal Urban Growth Area
Transportation ILA:	MON ILA-6, Estm. Trip% = 90
TDR Sending Area:	Not in a TDR Sending area
TDR Receiving Area:	Not in a TDR Receiving area
Snow Load Factor:	0.057
Snow Load:	To obtain snow load value, turn on 'Snowload' layer in interactive map and click on the area of interest
No-Shooting Area:	Not in a No-shooting Area (SCC 10.12)
Lot Status:	Unconfirmed
SCC 30.23.040 (22) Applies:	Minimum Lot Size does not apply {per SCC 30.23.040(22)}
Transportation Services Area:	C
Mineral Resource Type:	Not in an Mineral Resource area
Mineral Resource Name:	Not in a mineral resource overlay area
Shoreline Management Area:	Not in a Shoreline Management Area

Planning and Development Services Property Report

Assessor Info

Tax Parcel:	27070600303300
Owner Name:	WIBBELMAN LAUREN E
Taxpayer of Record: (maintained by Treasurer)	WIBBELMAN LAUREN E
Site Address:	UNKNOWN UNKNOWN
City:	UNKNOWN
Zip:	No Data
Use Code:	910 Undeveloped (Vacant) Land
Gross Size (acres):	1.0
Land Value:	$9,700
Improvement Value:	$0
Total Value:	$9,700
Tax Year:	2018
Assessment Date:	01/01/2017
Property Account Summary:	https://www.snoco.org/proptax/search.aspx?parcel_number=27070600303300
Permit Information:	http://www.snoco.org/app/pds/permitstatus/PDS-ParcelList.aspx?PN=27070600303300

District Info

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Fire Authority:	Not in a Fire Authority area
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Mineral Resource Notice (2000 ft):	Not within 2,000 ft of a Mineral Resource Overlay area
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Critical and Physical Info

Watershed Name:	Skykomish watershed
Aquifer Sensitivity:	High Aquifer Sensitivity
Elevation: (NAVD88, US Feet)	Approximately 55.0 to 81.7 ft
Sub-basin Name:	Lower Woods Creek sub-basin
Hydric Soils:	No hydric soils Hydric soils present
Basin Name:	Snohomish
Flood Hazard Area:	A portion of the parcel is inside the flood hazard area
Sole Source Aquifer:	Not in a sole source aquifer
Water Resource Inventory Area:	WRIA 7
Flood Plain 100yr:	Floodway Fringe Area
Critical Aquifer Recharge Area:	Not in a critical aquifer recharge area
Geology (erodible surface):	Alluvium
Soil Type:	PILCHUCK LOAMY SAND : SULTAN SILT LOAM
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Parks (within 1/2 mile)	Schools (within 1/2 mile)	Bus Stops (within 1/2 mile)
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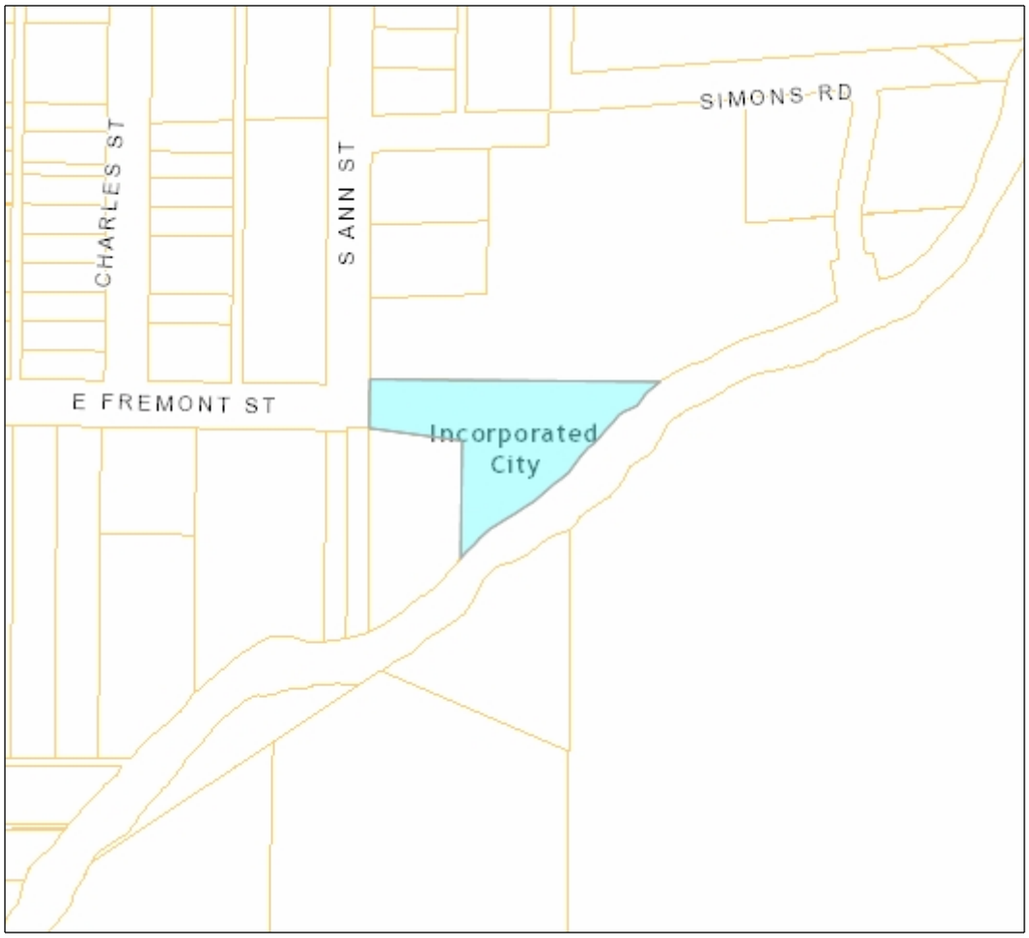
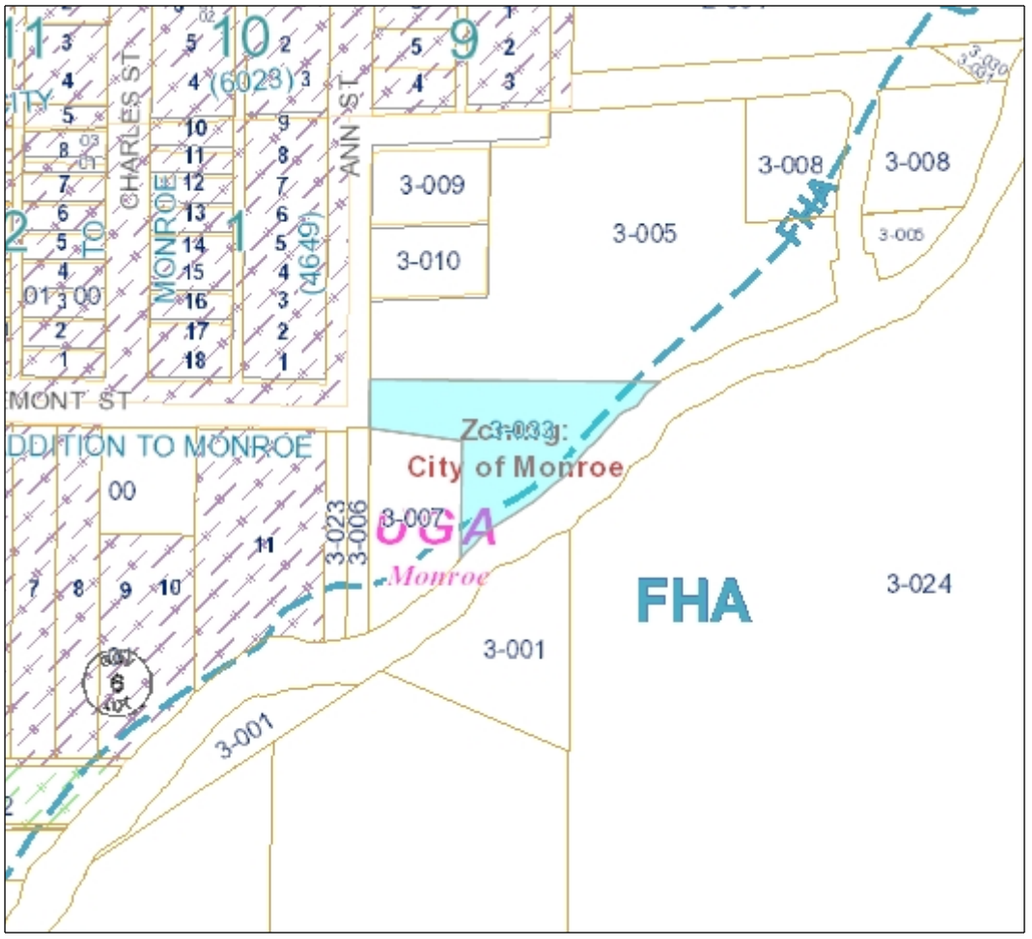
Future Land Use Map



Zoning Map


CHARLES ST
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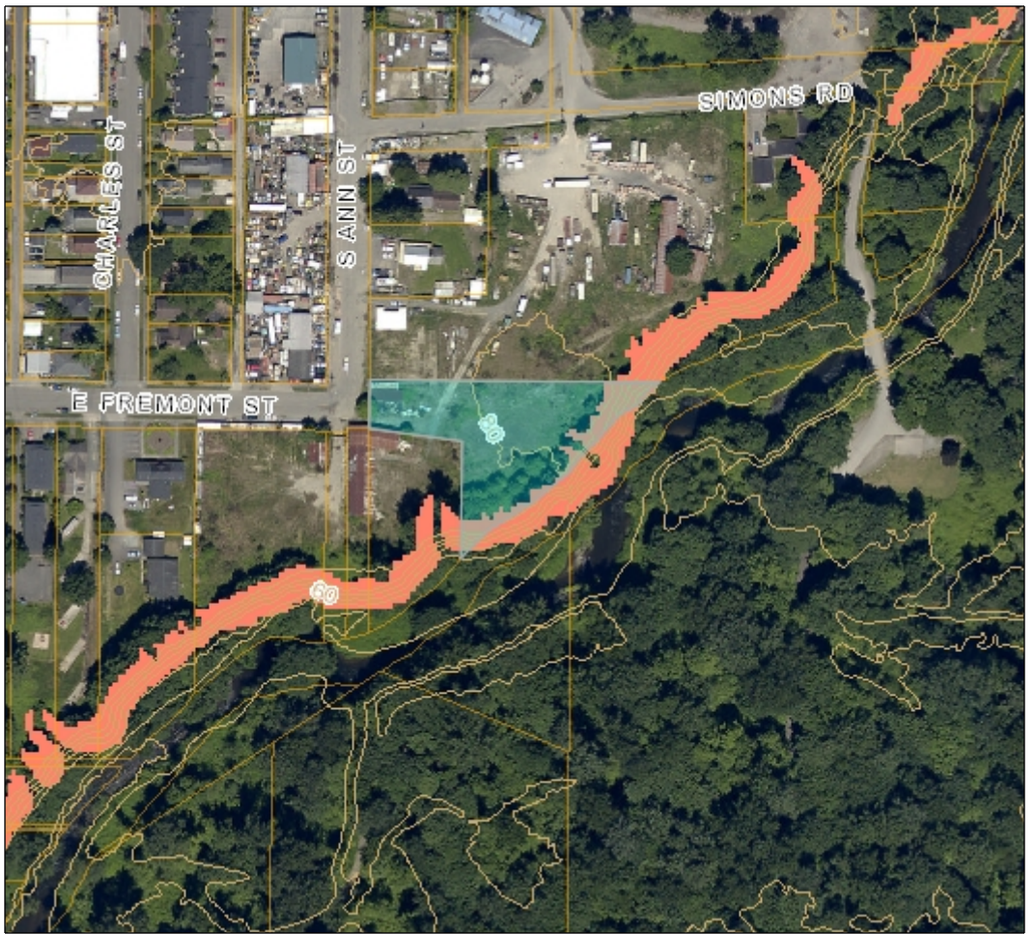

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Planning and Development Services Property Report

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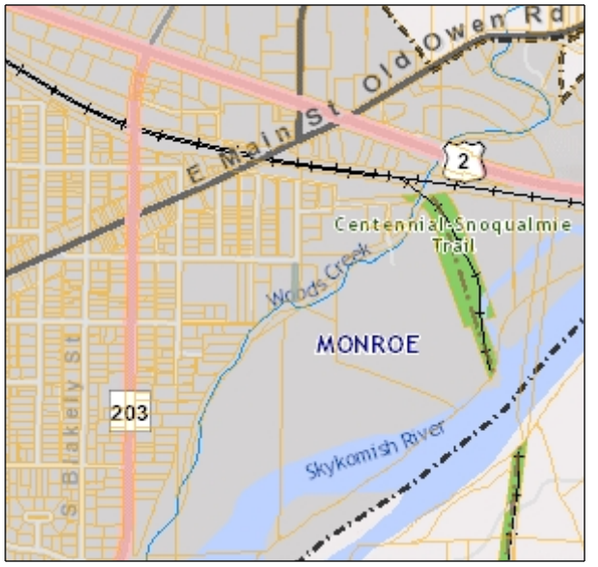
Report Generated On: 11/20/2018 6:27:53 PM



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City:	MONROE
Zip:	98272
Use Code:	910 Undeveloped (Vacant) Land
Gross Size (acres):	0.12
Land Value:	$2,500
Improvement Value:	$0
Total Value:	$2,500
Tax Year:	2018
Assessment Date:	01/01/2017
Property Account Summary:	https://www.snoco.org/proptax/search.aspx?parcel_number=27070600302300
Permit Information:	http://www.snoco.org/app/pds/permitstatus/PDS-ParcelList.aspx?PN=27070600302300

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Sewer District:	Not in a sewer district
Water District:	Not in a water district
Water Provider (CWSP):	City of Monroe Water System
Park District:	East County Park And Recreation
Park Service Area:	Centennial
Drainage District:	Not in a drainage district
Diking District:	Not in a diking district
Flood Control District:	Not in a flood control district

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Agriculture Notification Area:	Not within an agriculture notification area
Lahar Volcanic Notice (200 ft):	Not in a lahar hazard area
Commercial Forrest Notice (500 ft):	Not within 500 ft of a commercial forest
Mineral Resource Notice (2000 ft):	Not within 2,000 ft of a Mineral Resource Overlay area
Paine Field Airport:	Not within 20,000 ft of Paine Field
Airpark:	No airparks within 2500 ft
Airport Compatibility Area:	Not within an airport compatibility area
Airport Influence Area:	Not within an airport influence area

Critical and Physical Info

Watershed Name:	Skykomish watershed
Aquifer Sensitivity:	High Aquifer Sensitivity
Elevation: (NAVD88, US Feet)	Approximately 49.1 to 79.0 ft
Sub-basin Name:	Lower Woods Creek sub-basin
Hydric Soils:	No hydric soils Hydric soils present
Basin Name:	Snohomish
Flood Hazard Area:	A portion of the parcel is inside the flood hazard area
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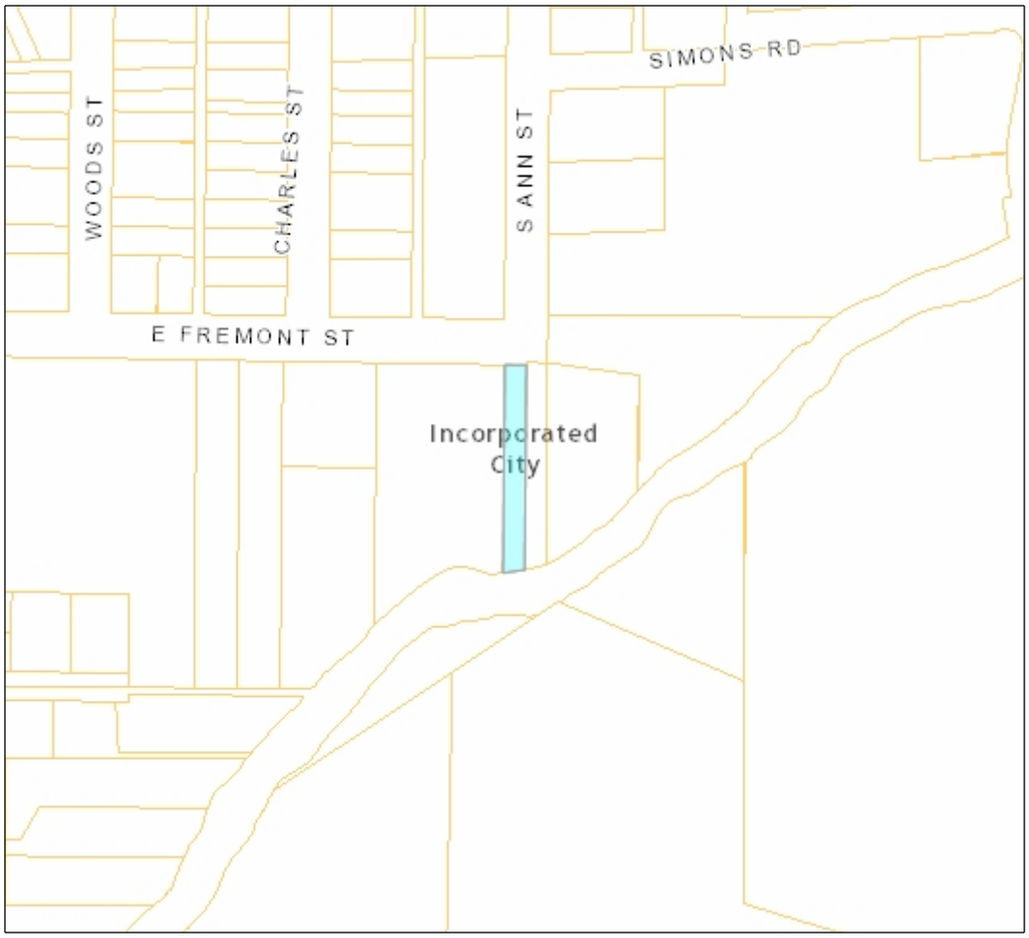
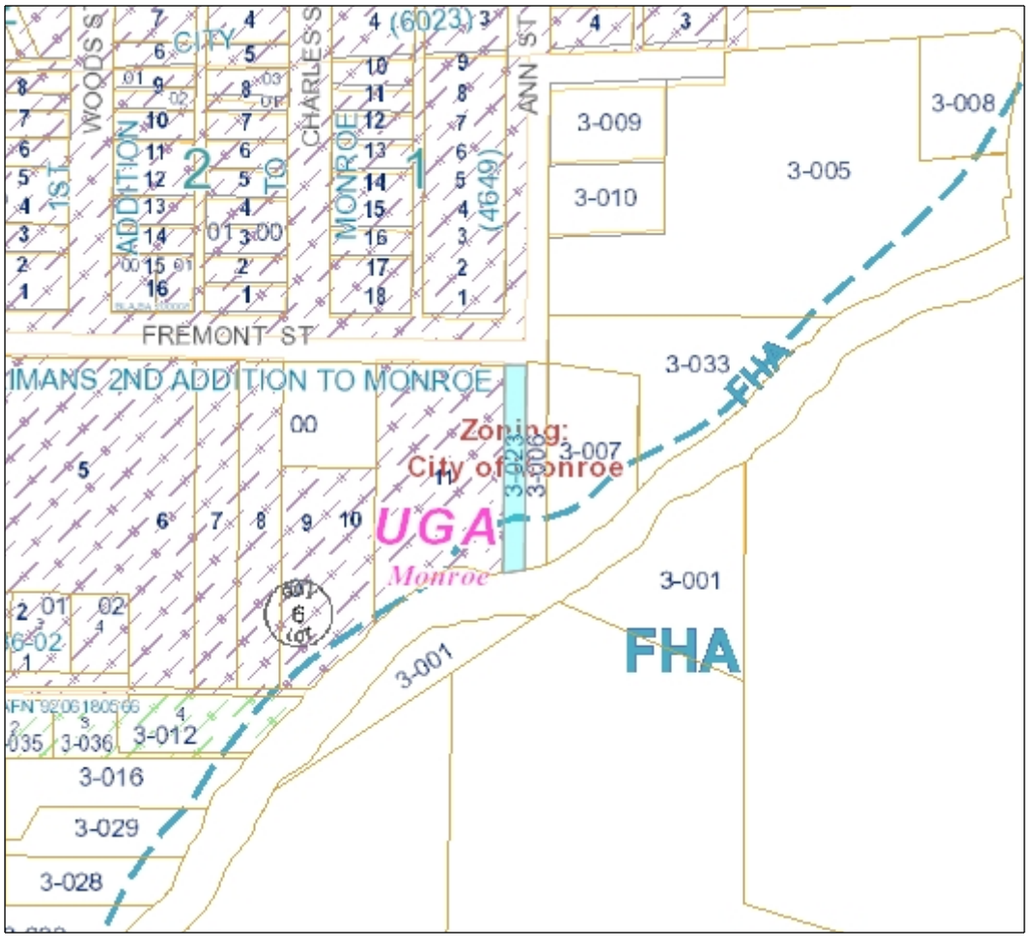
Water Resource Inventory Area:	WRIA 7
Flood Plain 100yr:	Floodway Fringe Area
Critical Aquifer Recharge Area:	Not in a critical aquifer recharge area
Geology (erodible surface):	Alluvium
Soil Type:	PILCHUCK LOAMY SAND : SULTAN SILT LOAM
National Wetlands Inventory:	Freshwater Forested/Shrub Wetland
Wetlands (Snoco):	No PDS wetlands present
Wetlands Last Edited:	No PDS wetlands present
Steep Slopes (> 33%):	Steep slopes present
Landslide Hazard Area:	Not within a known landslide and outside the modeled LHA area — More Information: SCC 30.62B.340
Mine Hazard:	No mines within 200 feet
Pipelines:	No petroleum pipelines within 1,000 feet
Levees:	No levees within 1,000 feet
Levees Source:	No levee on the property
Data Compiled On:	11/19/2018

Parks (within 1/2 mile)	Schools (within 1/2 mile)	Bus Stops (within 1/2 mile)
Centennial-Snoqualmie Trail	Sky Valley Education Center Monroe School District #103	Chain Lake Rd & Hwy 2 W Main St & S Madison St E Main St & Woods St Hwy 2 & Main St Hwy 2 & Woods Creek Rd SE Hwy 2 & N Lewis St W Main St & N Blakely St E Main St & Woods St Hwy 2 & Chain Lake Rd Hwy 2 & Woods Creek Rd SE

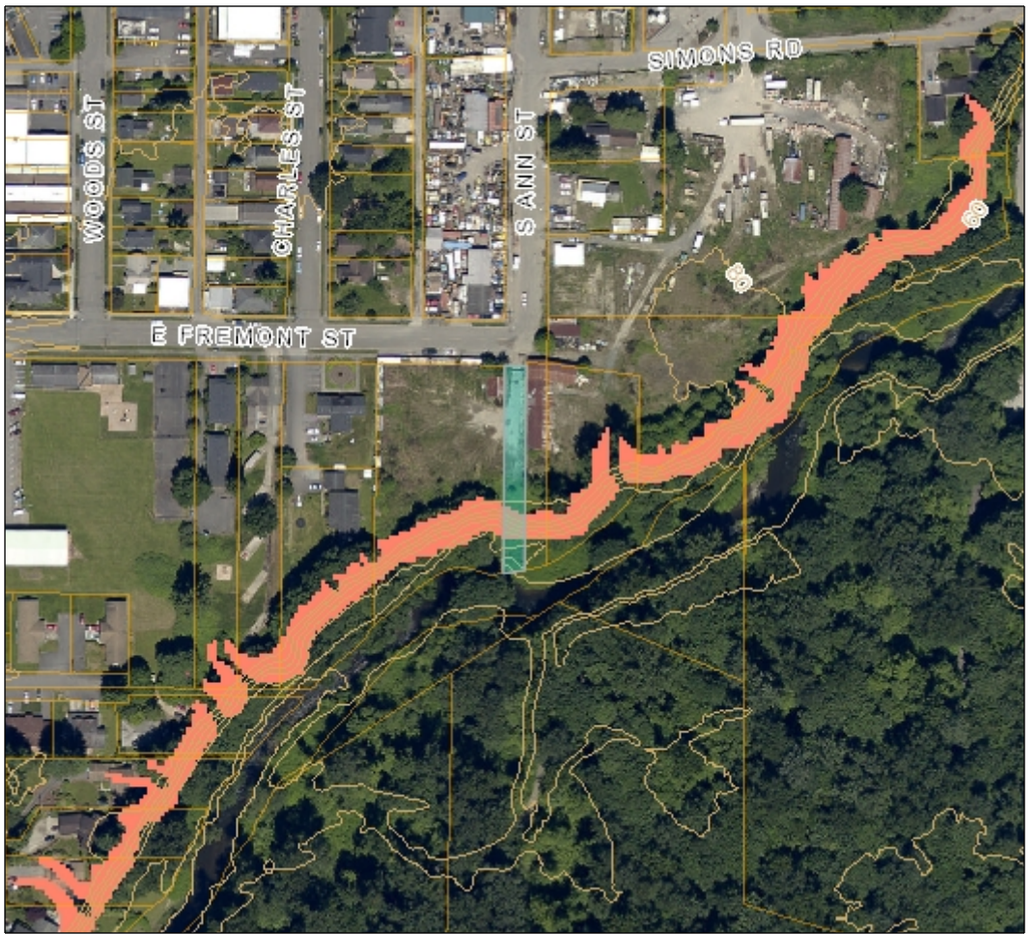
Future Land Use Map



Zoning Map


WOODS ST
1ST
ADDITION
2
TO
CITY
CHARLES ST
MONROE
1
(6023)
(4649)
ANN ST
3-009
3-010
3-005
3-008
FREMONT ST
IMANS 2ND ADDITION TO MONROE
3-033
FHA
Zoning:
City of Monroe
3-007
3-006
3-023
UGA
Monroe
3-001
FHA
3-001
3-012
3-036
3-016
3-029
3-028

2015 Aerial Photo Map



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Planning and Development Services Property Report

About the Property Report

Report Generated On: 11/20/2018 6:25:56 PM

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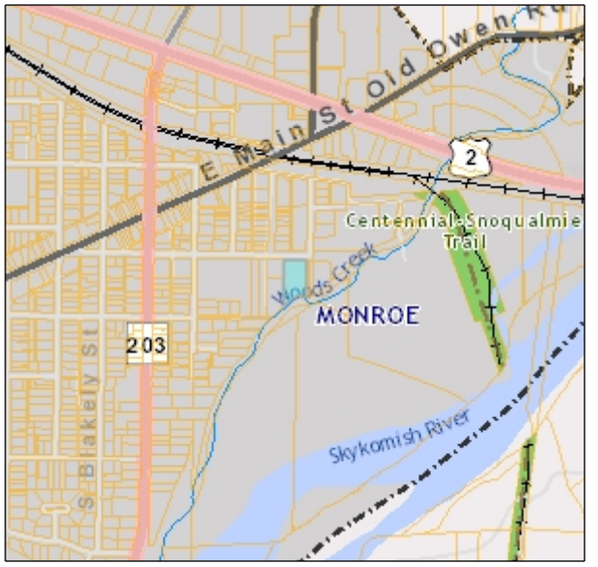

General Location Info

Site Address:	FREMONT ST
City:	MONROE
Zip:	98272
Tax Parcel Number:	00465000001100
QTR-Sec-Twp-Rng:	SW 6 T27N R 7E
Latitude / Longitude: (NAD83)	Lat=47.854402 Long=-121.966104
WA State Plane North Zone: (NAD83, US Feet)	X=1,362,323.93 Y=313,703.99
County Road Atlas Page:	130

Administrative Info

Land Use Jurisdiction:	City of Monroe
Tribal Lands Status:	Non-tribal land
Tribal Lands Name:	Non-tribal land

Planning Info

Future Land Use (FLU):	CITY
FLU Description:	Incorporated City
Zoning:	CITY
Zoning Description:	City
QTR-Sec-Twp-Rng:	SW 6 T27N R 7E
Tax Parcel Number:	00465000001100
Urban Growth Area (UGA):	Monroe UGA
Municipal UGA:	Not in a Municipal Urban Growth Area
Transportation ILA:	MON ILA-6, Estm. Trip% = 90
TDR Sending Area:	Not in a TDR Sending area
TDR Receiving Area:	Not in a TDR Receiving area
Snow Load Factor:	0.057
Snow Load:	To obtain snow load value, turn on 'Snowload' layer in interactive map and click on the area of interest
No-Shooting Area:	Not in a No-shooting Area (SCC 10.12)
Lot Status:	Unconfirmed
SCC 30.23.040 (22) Applies:	Minimum Lot Size does not apply {per SCC 30.23.040(22)}
Transportation Services Area:	C
Mineral Resource Type:	Not in an Mineral Resource area
Mineral Resource Name:	Not in a mineral resource overlay area
Shoreline Management Area:	Not in a Shoreline Management Area

Assessor Info

Tax Parcel:	00465000001100
Owner Name:	WIBBELMAN LAUREN E
Taxpayer of Record: (maintained by Treasurer)	WIBBELMAN LAUREN E
Site Address:	FREMONT ST
City:	MONROE
Zip:	98272
Use Code:	910 Undeveloped (Vacant) Land
Gross Size (acres):	0.96
Land Value:	$11,400
Improvement Value:	$0
Total Value:	$11,400
Tax Year:	2018
Assessment Date:	01/01/2017
Property Account Summary:	https://www.snoco.org/proptax/search.aspx?parcel_number=00465000001100
Permit Information:	http://www.snoco.org/app/pds/permitstatus/PDS-ParcelList.aspx?PN=00465000001100

District Info

Council District:	County Council District 5
Fire District:	Fire District 07
Fire Authority:	Not in a Fire Authority area
School District:	Monroe School District 103
Sewer District:	Not in a sewer district
Water District:	Not in a water district
Water Provider (CWSP):	City of Monroe Water System
Park District:	East County Park And Recreation
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Elevation: (NAVD88, US Feet)	Approximately 47.6 to 79.5 ft
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Hydric Soils:	No hydric soils Hydric soils present
Basin Name:	Snohomish
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Water Resource Inventory Area:	WRIA 7
Flood Plain 100yr:	Floodway Fringe Area
Critical Aquifer Recharge Area:	Not in a critical aquifer recharge area
Geology (erodible surface):	Alluvium
Soil Type:	PILCHUCK LOAMY SAND : SULTAN SILT LOAM
National Wetlands Inventory:	Freshwater Forested/Shrub Wetland
Wetlands (Snoco):	No PDS wetlands present
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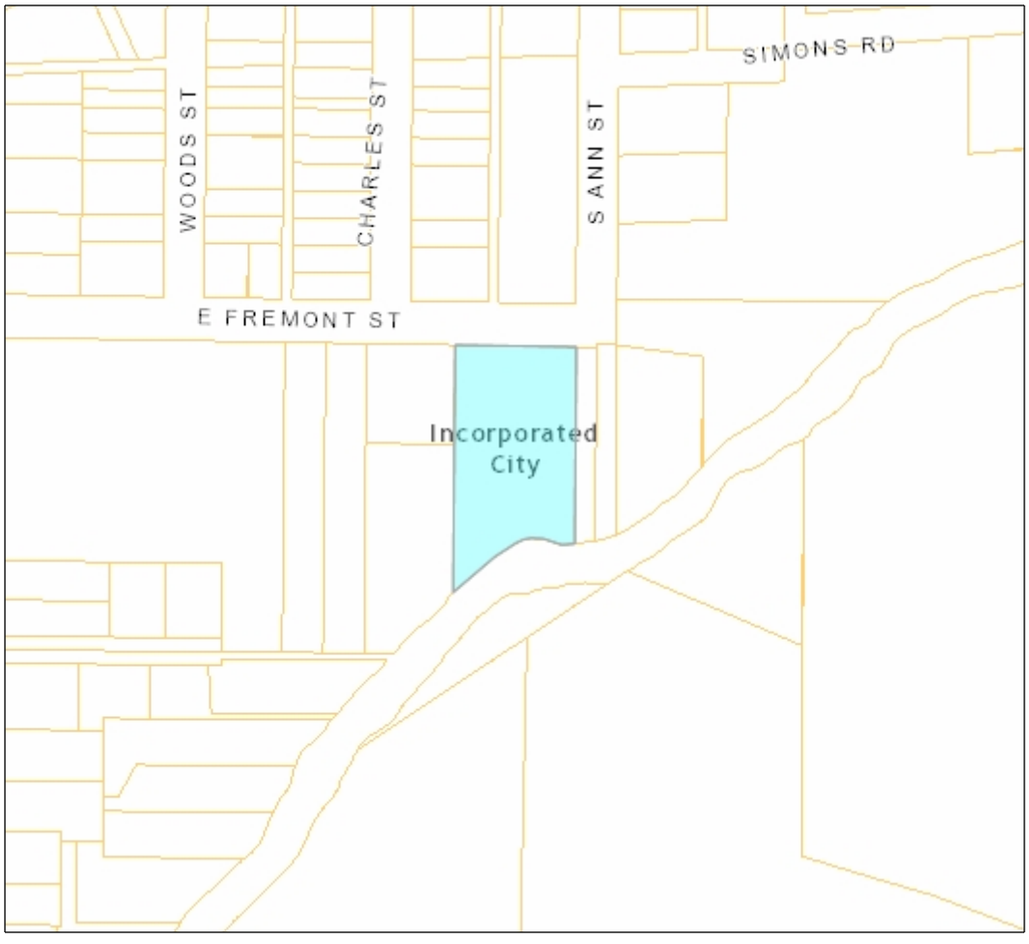
Future Land Use Map



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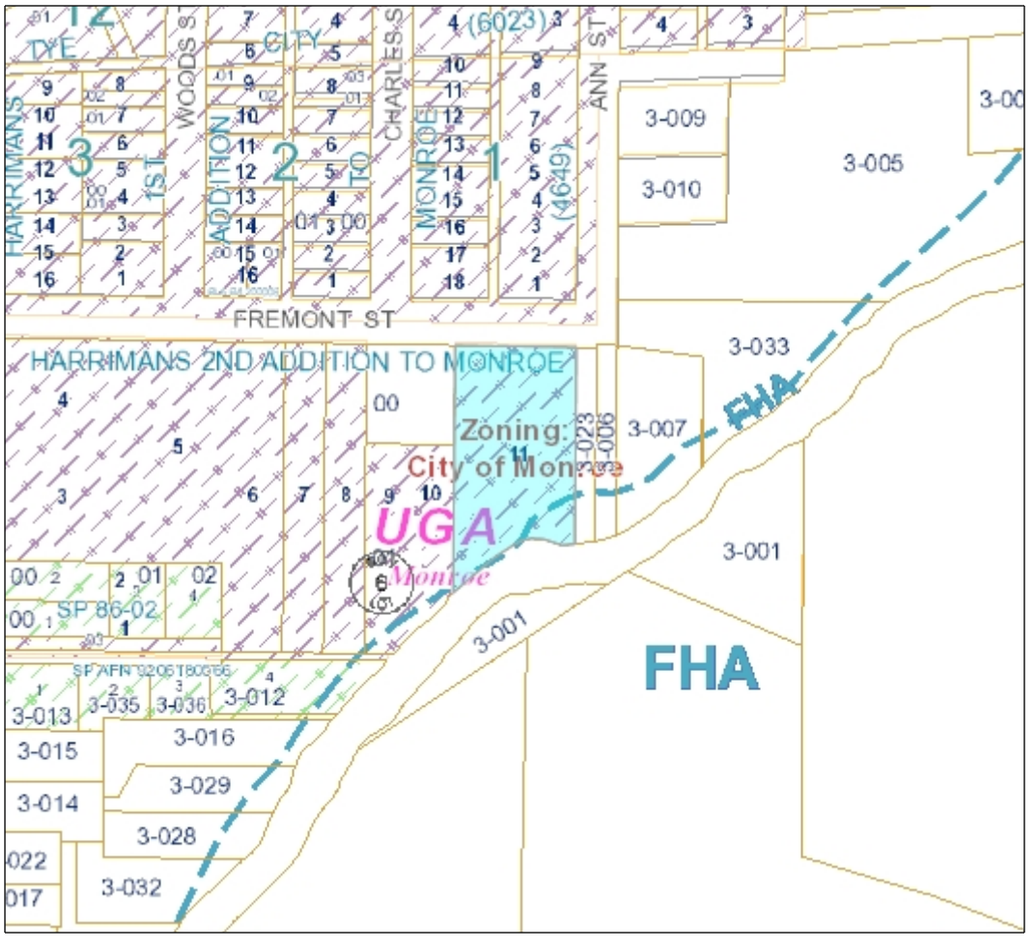
FREMONT ST
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Zoning:
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3-010
3-005
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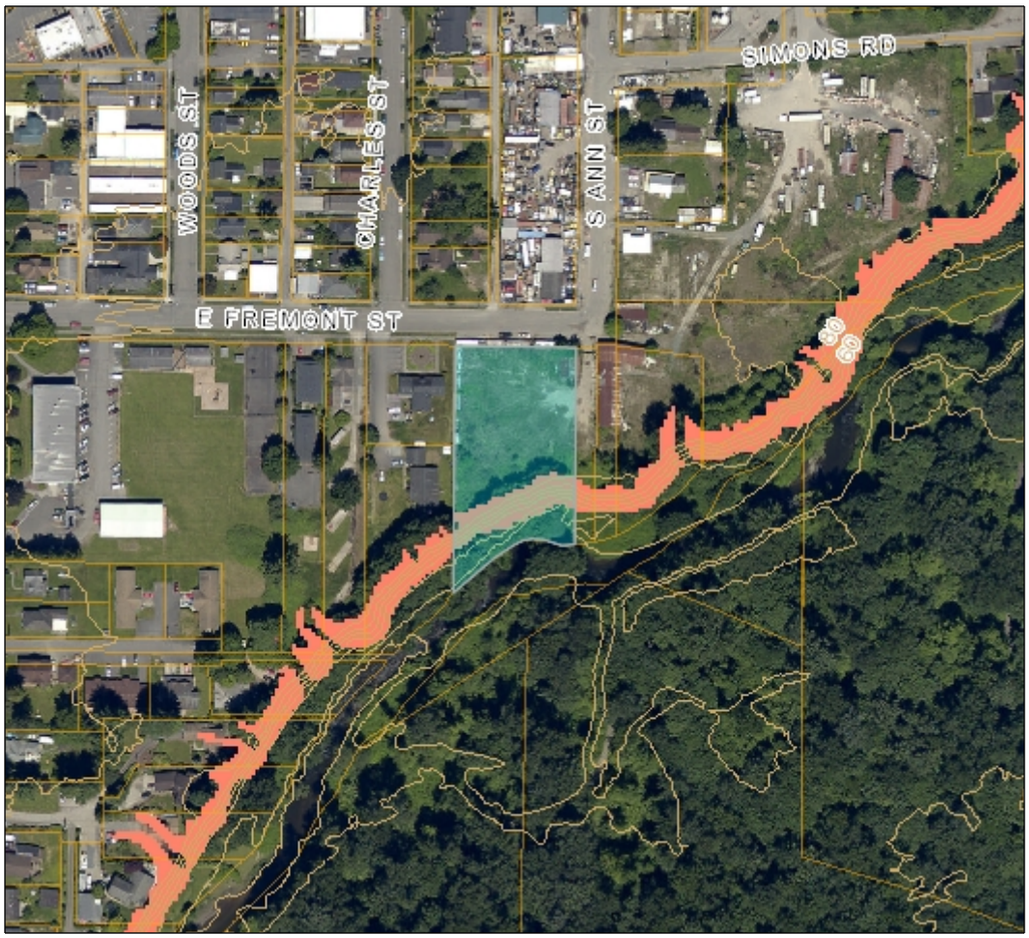
3-013
3-015
3-014
3-016
3-029
3-028
3-032
SP 86-02

2015 Aerial Photo Map



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Report Generated On: 11/20/2018 6:30:19 PM

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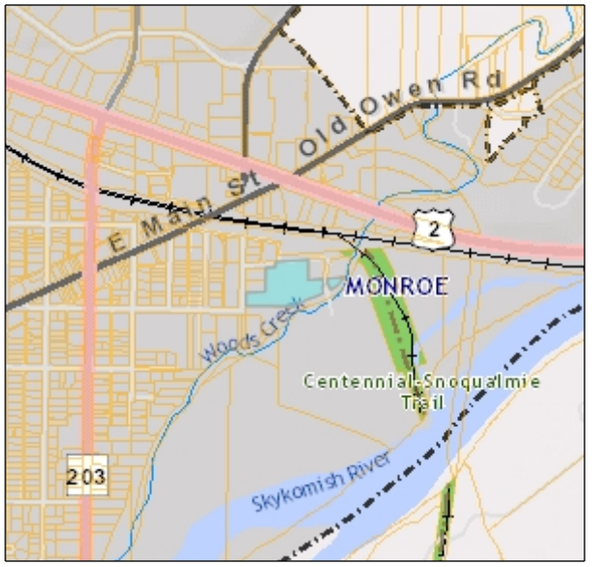

General Location Info

Site Address:	ANN ST
City:	MONROE
Zip:	98272
Tax Parcel Number:	27070600300500
QTR-Sec-Twp-Rng:	SW 6 T27N R 7E
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Zip:	98272
Use Code:	519 Other Wholesale Trade, NEC
Gross Size (acres):	6.96
Land Value:	$44,000
Improvement Value:	$13,100
Total Value:	$57,100
Tax Year:	2018
Assessment Date:	01/01/2017
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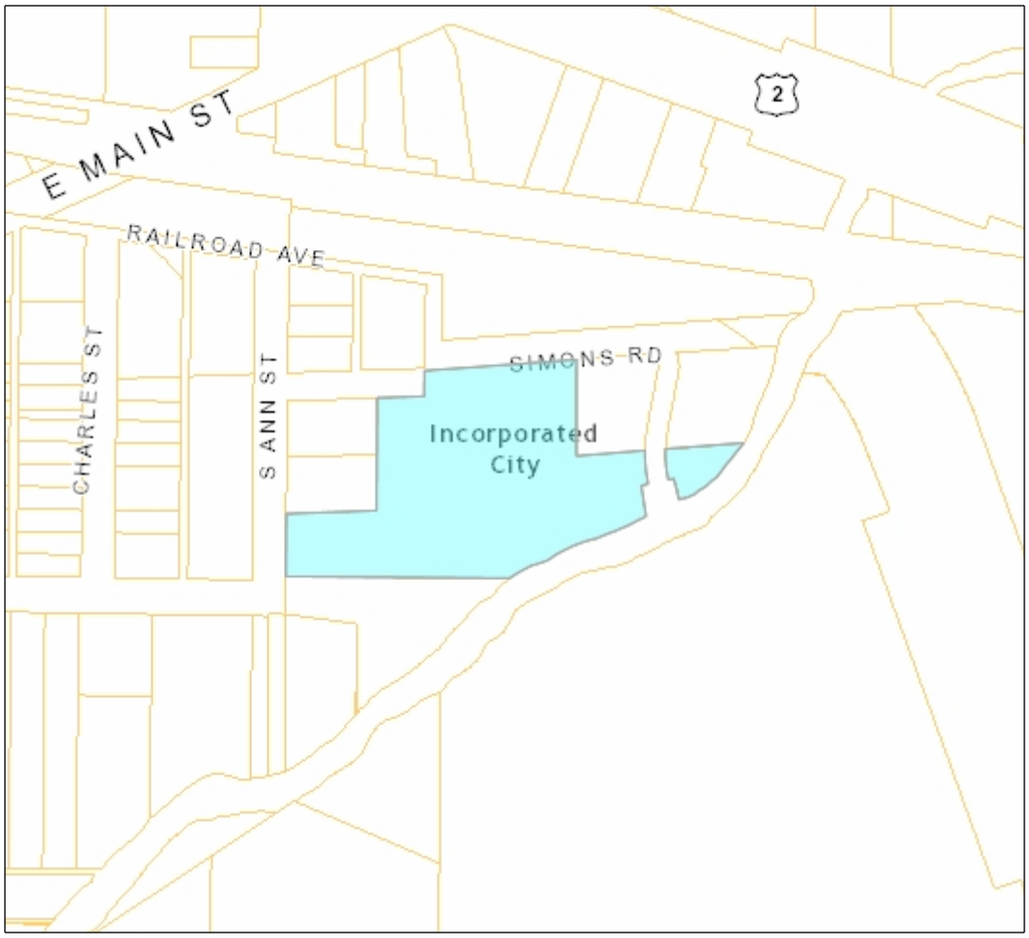
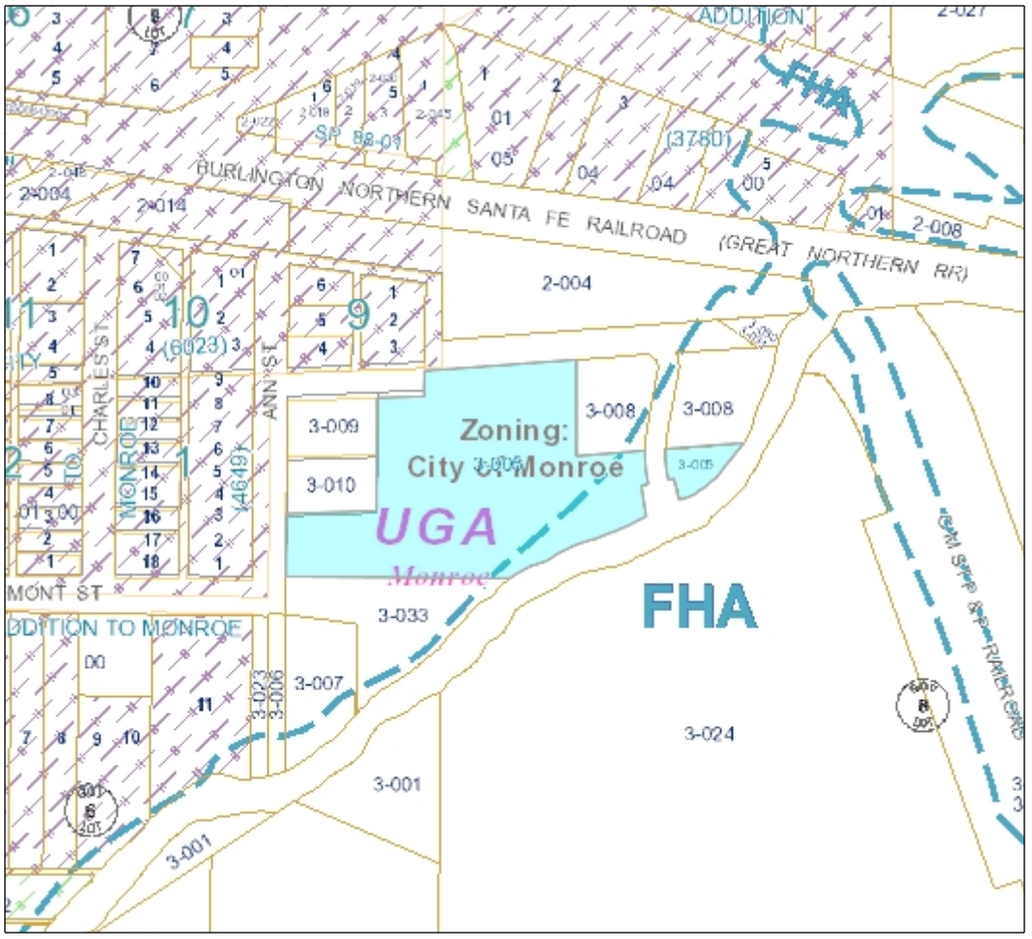


Zoning Map


Zoning:
City of Monroe
UGA
Monroe
FHA
3-009
3-010
3-008
3-033
3-007
3-024
3-001
BURLINGTON NORTHERN SANTA FE RAILROAD (GREAT NORTHERN RR)
2-004
2-008
CHARLES ST
ANN ST
MONROE
MONT ST
ADDITION TO MONROE
SF 88-01
(37801)
(6023)
(4649)

2015 Aerial Photo Map

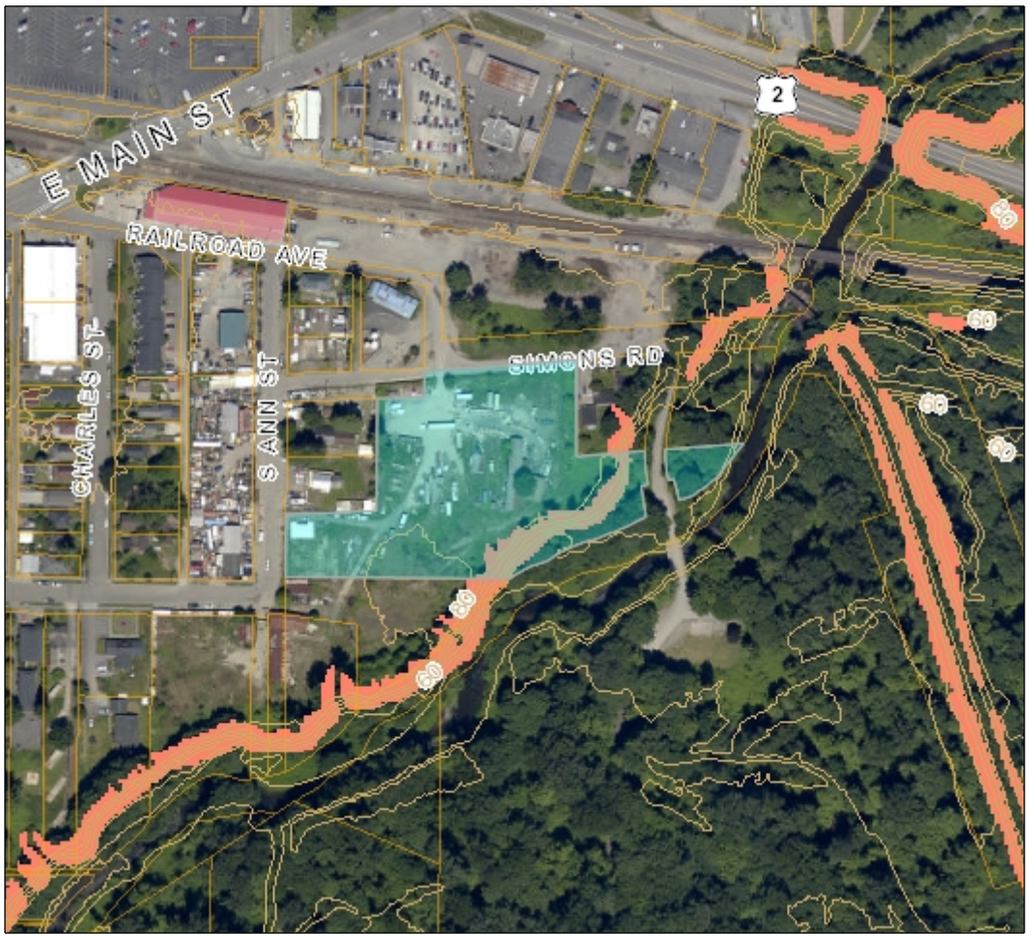


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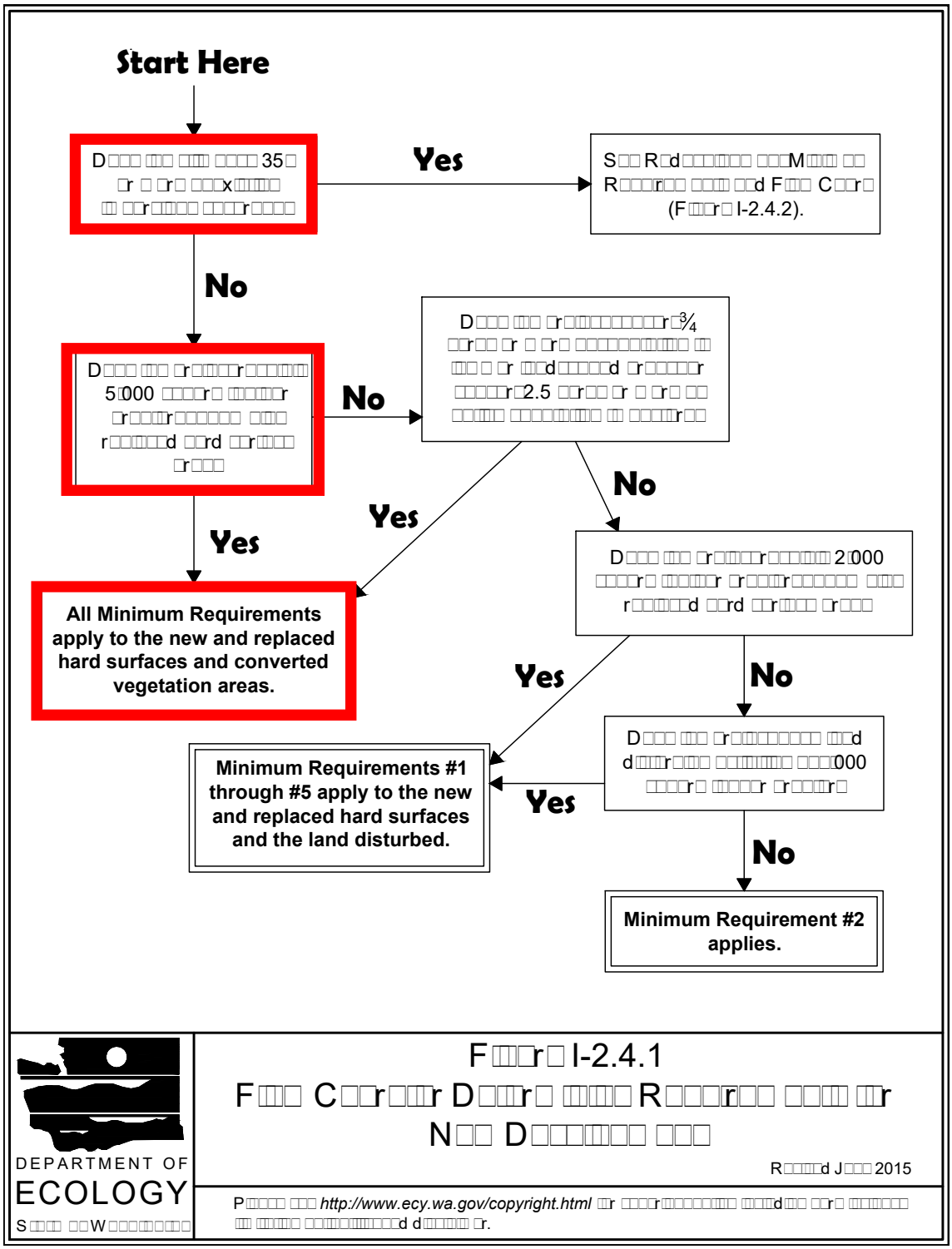
Figure I-2.4.1 Flow Chart for Determining Requirements for New Development



2014 Stormwater Management Manual for Western Washington

Volume I - Chapter 2 - Page 37

MGS FLOOD
PROJECT REPORT

Program Version: MGSFlood 4.46
Program License Number: 200210008
Project Simulation Performed on: 11/16/2018 3:10 PM
Report Generation Date: 11/16/2018 3:11 PM

Input File Name: 18038 MGS Flood.fld
Project Name: Rivers Edge
Analysis Title:
Comments:

PRECIPITATION INPUT

Computational Time Step (Minutes): 15

Extended Precipitation Time Series Selected
Climatic Region Number: 18

Full Period of Record Available used for Routing
Precipitation Station : 96005205 Puget East 52 in_5min 10/01/1939-10/01/2097
Evaporation Station : 961052 Puget East 52 in MAP
Evaporation Scale Factor : 0.750

HSPF Parameter Region Number: 1
HSPF Parameter Region Name : USGS Default

********** Default HSPF Parameters Used (Not Modified by User) **********

********** WATERSHED DEFINITION **********

Predevelopment/Post Development Tributary Area Summary

	Predeveloped	Post Developed
Total Subbasin Area (acres)	3.710	3.710
Area of Links that Include Precip/Evap (acres)	0.000	0.000
Total (acres)	3.710	3.710

----------SCENARIO: PREDEVELOPED
Number of Subbasins: 1

---------- Subbasin : Predev ----------

	-------Area (Acres) --------
Till Forest	3.710
Subbasin Total	3.710

----------SCENARIO: POSTDEVELOPED
Number of Subbasins: 1

---------- Subbasin : Dev ----------

	-------Area (Acres) --------
Till Grass	1.740
Impervious	1.970
Subbasin Total	3.710

********** LINK DATA **********

----------SCENARIO: PREDEVELOPED
Number of Links: 0

********** **LINK DATA** **********

----------SCENARIO: POSTDEVELOPED
Number of Links: 1

Link Name: R-tank
Link Type: Structure
Downstream Link: None

Prismatic Pond Option Used
Pond Floor Elevation (ft) : 100.00
Riser Crest Elevation (ft) : 103.70
Max Pond Elevation (ft) : 104.20
Storage Depth (ft) : 3.70
Pond Bottom Length (ft) : 20.0
Pond Bottom Width (ft) : 75.0
Pond Side Slopes (ft/ft) : L1= 0.00 L2= 0.00 W1= 0.00 W2= 0.00
Bottom Area (sq-ft) : 1500.
Area at Riser Crest El (sq-ft) : 1,500.
(acres) : 0.034
Volume at Riser Crest (cu-ft) : 5,550.
(ac-ft) : 0.127
Area at Max Elevation (sq-ft) : 1500.
(acres) : 0.034
Vol at Max Elevation (cu-ft) : 6,300.
(ac-ft) : 0.145

Constant Infiltration Option Used
Infiltration Rate (in/hr): 20.00

Riser Geometry
Riser Structure Type : Circular
Riser Diameter (in) : 12.00
Common Length (ft) : 0.000
Riser Crest Elevation : 103.70 ft

Hydraulic Structure Geometry

Number of Devices: 2

---Device Number 1 ---
Device Type : Circular Orifice
Control Elevation (ft) : 100.00
Diameter (in) : 2.50
Orientation : Horizontal
Elbow : No

--- Device Number 2 ---
Device Type : Rectangular Weir that Intersects the Riser Top
Invert Elevation (ft) : 103.50
Length (ft) : 0.250

**********FLOOD FREQUENCY AND DURATION STATISTICS**********

----------SCENARIO: PREDEVELOPED
Number of Subbasins: 1
Number of Links: 0

----------SCENARIO: POSTDEVELOPED
Number of Subbasins: 1
Number of Links: 1

********** Link: R-tank ********** Link WSEL Stats

WSEL Frequency Data(ft)
(Recurrence Interval Computed Using Gringorten Plotting Position)

Tr (yrs)	WSEL Peak (ft)
1.05-Year	100.015
1.11-Year	100.016
1.25-Year	100.028
2.00-Year	100.298
3.33-Year	100.563
5-Year	100.808
10-Year	101.124
25-Year	102.481
50-Year	103.495
100-Year	103.770

*************Groundwater Recharge Summary ***************

Recharge is computed as input to Perlnd Groundwater Plus Infiltration in Structures

Total Predeveloped Recharge During Simulation

Model Element	Recharge Amount (ac-ft)
Subbasin: Predev	822.054
Total:	822.054

Total Post Developed Recharge During Simulation

Model Element	Recharge Amount (ac-ft)
Subbasin: Dev	247.456
Link: R-tank	1722.763
Total:	1970.219

Total Predevelopment Recharge is Less than Post Developed
Average Recharge Per Year, (Number of Years= 158)
Predeveloped: 5.203 ac-ft/year, Post Developed: 12.470 ac-ft/year

*************Water Quality Facility Data ***************

----------SCENARIO: PREDEVELOPED

Number of Links: 0

----------SCENARIO: POSTDEVELOPED

Number of Links: 1

********** Link: R-tank **********

Basic Wet Pond Volume (91% Exceedance): 13833. cu-ft
Computed Large Wet Pond Volume, 1.5*Basic Volume: 20750. cu-ft

2-Year Discharge Rate : 0.091 cfs

15-Minute Timestep, Water Quality Treatment Design Discharge
On-line Design Discharge Rate (91% Exceedance): 0.35 cfs
Off-line Design Discharge Rate (91% Exceedance): 0.20 cfs

Infiltration/Filtration Statistics----------
Inflow Volume (ac-ft): 1779.76
Inflow Volume Including PPT-Evap (ac-ft): 1779.76
Total Runoff Infiltrated (ac-ft): 1722.76, 96.80%
Total Runoff Filtered (ac-ft): 0.00, 0.00%
Primary Outflow To Downstream System (ac-ft): 57.26
Secondary Outflow To Downstream System (ac-ft): 0.00

Percent Treated (Infiltrated+Filtered)/Total Volume: 96.80%

************Compliance Point Results **************

Scenario Predeveloped Compliance Subbasin: Predev

Scenario Postdeveloped Compliance Link: R-tank

***** Point of Compliance Flow Frequency Data *****
Recurrence Interval Computed Using Gringorten Plotting Position

Predevelopment Runoff		Postdevelopment Runoff	
Tr (Years)	Discharge (cfs)	Tr (Years)	Discharge (cfs)
2-Year	0.130	2-Year	9.093E-02
5-Year	0.216	5-Year	0.150
10-Year	0.285	10-Year	0.177
25-Year	0.374	25-Year	0.263
50-Year	0.486	50-Year	0.334
100-Year	0.661	100-Year	0.603
200-Year	0.866	200-Year	0.710

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

****** Flow Duration Performance ******

Excursion at Predeveloped 50%Q2 (Must be Less Than or Equal to 0%):	-98.5%	PASS
Maximum Excursion from 50%Q2 to Q2 (Must be Less Than or Equal to 0%):	-95.5%	PASS
Maximum Excursion from Q2 to Q50 (Must be less than 10%):	0.0%	PASS
Percent Excursion from Q2 to Q50 (Must be less than 50%):	0.0%	PASS

MEETS ALL FLOW DURATION DESIGN CRITERIA: PASS

****** LID Duration Performance ******

Excursion at Predeveloped 8%Q2 (Must be Less Than 0%):	-98.0%	PASS
Maximum Excursion from 8%Q2 to 50%Q2 (Must be Less Than 0%):	-98.5%	PASS

MEETS ALL LID DURATION DESIGN CRITERIA: PASS

MGS FLOOD
PROJECT REPORT

Program Version: MGSFlood 4.46
Program License Number: 200210008
Project Simulation Performed on: 12/19/2018 7:30 PM
Report Generation Date: 12/19/2018 7:31 PM

Input File Name: Trench 1.fld
Project Name: River's Edge
Analysis Title: Trench 1
Comments:

PRECIPITATION INPUT

Computational Time Step (Minutes): 15

Extended Precipitation Time Series Selected
Climatic Region Number: 18

Full Period of Record Available used for Routing
Precipitation Station : 96005205 Puget East 52 in_5min 10/01/1939-10/01/2097
Evaporation Station : 961052 Puget East 52 in MAP
Evaporation Scale Factor : 0.750

HSPF Parameter Region Number: 1
HSPF Parameter Region Name : USGS Default

********** Default HSPF Parameters Used (Not Modified by User) **********

********** WATERSHED DEFINITION **********

Predevelopment/Post Development Tributary Area Summary

	Predeveloped	Post Developed
Total Subbasin Area (acres)	0.253	0.253
Area of Links that Include Precip/Evap (acres)	0.000	0.000
Total (acres)	0.253	0.253

----------SCENARIO: PREDEVELOPED
Number of Subbasins: 1

---------- Subbasin : PreDev ----------

	-------Area (Acres) --------
Till Forest	0.253
Subbasin Total	0.253

----------SCENARIO: POSTDEVELOPED
Number of Subbasins: 1

---------- Subbasin : PostDev ----------

	-------Area (Acres) --------
Impervious	0.253
Subbasin Total	0.253

********** LINK DATA **********

----------SCENARIO: PREDEVELOPED
Number of Links: 0

********** **LINK DATA** **********

----------SCENARIO: POSTDEVELOPED
Number of Links: 1

Link Name: Trench1
Link Type: Structure
Downstream Link: None

Prismatic Pond Option Used
Pond Floor Elevation (ft) : 100.00
Riser Crest Elevation (ft) : 102.72
Max Pond Elevation (ft) : 102.82
Storage Depth (ft) : 2.72
Pond Bottom Length (ft) : 58.0
Pond Bottom Width (ft) : 5.3
Pond Side Slopes (ft/ft) : L1= 0.00 L2= 0.00 W1= 0.00 W2= 0.00
Bottom Area (sq-ft) : 308.
Area at Riser Crest El (sq-ft) : 308.
(acres) : 0.007
Volume at Riser Crest (cu-ft) : 838.
(ac-ft) : 0.019
Area at Max Elevation (sq-ft) : 308.
(acres) : 0.007
Vol at Max Elevation (cu-ft) : 869.
(ac-ft) : 0.020

Constant Infiltration Option Used
Infiltration Rate (in/hr): 10.00

Riser Geometry
Riser Structure Type : Circular
Riser Diameter (in) : 6.00
Common Length (ft) : 0.000
Riser Crest Elevation : 102.72 ft

Hydraulic Structure Geometry

Number of Devices: 0

**********FLOOD FREQUENCY AND DURATION STATISTICS**********

----------**SCENARIO: PREDEVELOPED**
Number of Subbasins: 1
Number of Links: 0

----------**SCENARIO: POSTDEVELOPED**
Number of Subbasins: 1
Number of Links: 1

********** **Subbasin: PostDev** **********

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)

Tr (yrs)	Flood Peak (cfs)
2-Year	0.106
5-Year	0.137
10-Year	0.159
25-Year	0.193
50-Year	0.237
100-Year	0.297
200-Year	0.300

********** Link: Trench1 ********** Link Inflow Frequency Stats

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)

Tr (yrs)	Flood Peak (cfs)
2-Year	0.106
5-Year	0.137
10-Year	0.159
25-Year	0.193
50-Year	0.237
100-Year	0.297
200-Year	0.300

********** Link: Trench1 ********** Link WSEL Stats

WSEL Frequency Data(ft)
(Recurrence Interval Computed Using Gringorten Plotting Position)

Tr (yrs)	WSEL Peak (ft)
1.05-Year	100.012
1.11-Year	100.017
1.25-Year	100.045
2.00-Year	100.203
3.33-Year	100.358
5-Year	100.508
10-Year	100.761
25-Year	101.316
50-Year	101.672
100-Year	101.980

*************Groundwater Recharge Summary ***************
Recharge is computed as input to Perlnd Groundwater Plus Infiltration in Structures

Total Predeveloped Recharge During Simulation

Model Element	Recharge Amount (ac-ft)
Subbasin: PreDev	56.059
Total:	56.059

Total Post Developed Recharge During Simulation

Model Element	Recharge Amount (ac-ft)
Subbasin: PostDev	0.000
Link: Trench1	153.703
Total:	153.703

Total Predevelopment Recharge is Less than Post Developed
Average Recharge Per Year, (Number of Years= 158)
Predeveloped: 0.355 ac-ft/year, Post Developed: 0.973 ac-ft/year

*************Water Quality Facility Data ***************

----------SCENARIO: PREDEVELOPED

Number of Links: 0

----------SCENARIO: POSTDEVELOPED

Number of Links: 1

********** Link: Trench1 **********

Basic Wet Pond Volume (91% Exceedance): 1406. cu-ft
Computed Large Wet Pond Volume, 1.5*Basic Volume: 2109. cu-ft

Time to Infiltrate 91% Treatment Volume, (Hours): 5.48

Infiltration/Filtration Statistics----------
Inflow Volume (ac-ft): 153.70
Inflow Volume Including PPT-Evap (ac-ft): 153.70
Total Runoff Infiltrated (ac-ft): 153.70, 100.00%
Total Runoff Filtered (ac-ft): 0.00, 0.00%
Primary Outflow To Downstream System (ac-ft): 0.00
Secondary Outflow To Downstream System (ac-ft): 0.00
Percent Treated (Infiltrated+Filtered)/Total Volume: 100.00%

************Compliance Point Results **************

Scenario Predeveloped Compliance Subbasin: PreDev

Scenario Postdeveloped Compliance Link: Trench1

***** Point of Compliance Flow Frequency Data *****
Recurrence Interval Computed Using Gringorten Plotting Position

Predevelopment Runoff		Postdevelopment Runoff	
Tr (Years)	Discharge (cfs)	Tr (Years)	Discharge (cfs)
2-Year	8.867E-03	2-Year	0.000
5-Year	1.471E-02	5-Year	0.000
10-Year	1.945E-02	10-Year	0.000
25-Year	2.554E-02	25-Year	0.000
50-Year	3.312E-02	50-Year	0.000
100-Year	4.510E-02	100-Year	0.000
200-Year	5.908E-02	200-Year	0.000

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

****** Flow Duration Performance ******

Excursion at Predeveloped 50%Q2 (Must be Less Than or Equal to 0%):	0.0%	PASS
Maximum Excursion from 50%Q2 to Q2 (Must be Less Than or Equal to 0%):	0.0%	PASS
Maximum Excursion from Q2 to Q50 (Must be less than 10%):	0.0%	PASS
Percent Excursion from Q2 to Q50 (Must be less than 50%):	0.0%	PASS

MEETS ALL FLOW DURATION DESIGN CRITERIA: PASS

****** LID Duration Performance ******

Excursion at Predeveloped 8%Q2 (Must be Less Than 0%):	0.0%	PASS
Maximum Excursion from 8%Q2 to 50%Q2 (Must be Less Than 0%):	0.0%	PASS

MEETS ALL LID DURATION DESIGN CRITERIA: PASS

MGS FLOOD
PROJECT REPORT

Program Version: MGSFlood 4.46
Program License Number: 200210008
Project Simulation Performed on: 12/19/2018 7:33 PM
Report Generation Date: 12/19/2018 7:33 PM

Input File Name: Trench 2.fld
Project Name: River's Edge
Analysis Title: Trench 2
Comments:

PRECIPITATION INPUT

Computational Time Step (Minutes): 15

Extended Precipitation Time Series Selected
Climatic Region Number: 18

Full Period of Record Available used for Routing
Precipitation Station : 96005205 Puget East 52 in_5min 10/01/1939-10/01/2097
Evaporation Station : 961052 Puget East 52 in MAP
Evaporation Scale Factor : 0.750

HSPF Parameter Region Number: 1
HSPF Parameter Region Name : USGS Default

********** Default HSPF Parameters Used (Not Modified by User) **********

********** WATERSHED DEFINITION **********

Predevelopment/Post Development Tributary Area Summary

	Predeveloped	Post Developed
Total Subbasin Area (acres)	0.173	0.173
Area of Links that Include Precip/Evap (acres)	0.000	0.000
Total (acres)	0.173	0.173

----------SCENARIO: PREDEVELOPED
Number of Subbasins: 1

---------- Subbasin : PreDev ----------

	-------Area (Acres) --------
Till Forest	0.173
Subbasin Total	0.173

----------SCENARIO: POSTDEVELOPED
Number of Subbasins: 1

---------- Subbasin : PostDev ----------

	-------Area (Acres) --------
Impervious	0.173
Subbasin Total	0.173

********** LINK DATA **********

----------SCENARIO: PREDEVELOPED
Number of Links: 0

********** **LINK DATA** **********

----------SCENARIO: POSTDEVELOPED
Number of Links: 1

Link Name: Trench2
Link Type: Structure
Downstream Link: None

Prismatic Pond Option Used
Pond Floor Elevation (ft) : 100.00
Riser Crest Elevation (ft) : 102.72
Max Pond Elevation (ft) : 102.82
Storage Depth (ft) : 2.72
Pond Bottom Length (ft) : 40.0
Pond Bottom Width (ft) : 5.2
Pond Side Slopes (ft/ft) : L1= 0.00 L2= 0.00 W1= 0.00 W2= 0.00
Bottom Area (sq-ft) : 208.
Area at Riser Crest El (sq-ft) : 208.
(acres) : 0.005
Volume at Riser Crest (cu-ft) : 566.
(ac-ft) : 0.013
Area at Max Elevation (sq-ft) : 208.
(acres) : 0.005
Vol at Max Elevation (cu-ft) : 587.
(ac-ft) : 0.013

Constant Infiltration Option Used
Infiltration Rate (in/hr): 10.00

Riser Geometry
Riser Structure Type : Circular
Riser Diameter (in) : 6.00
Common Length (ft) : 0.000
Riser Crest Elevation : 102.72 ft

Hydraulic Structure Geometry

Number of Devices: 0

**********FLOOD FREQUENCY AND DURATION STATISTICS**********

----------**SCENARIO: PREDEVELOPED**
Number of Subbasins: 1
Number of Links: 0

----------**SCENARIO: POSTDEVELOPED**
Number of Subbasins: 1
Number of Links: 1

********** **Subbasin: PostDev** **********

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)

Tr (yrs)	Flood Peak (cfs)
2-Year	7.276E-02
5-Year	9.349E-02
10-Year	0.109
25-Year	0.132
50-Year	0.162
100-Year	0.203
200-Year	0.205

********** Link: Trench2 ********** Link Inflow Frequency Stats

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)

Tr (yrs)	Flood Peak (cfs)
2-Year	7.276E-02
5-Year	9.349E-02
10-Year	0.109
25-Year	0.132
50-Year	0.162
100-Year	0.203
200-Year	0.205

********** Link: Trench2 ********** Link WSEL Stats

WSEL Frequency Data(ft)
(Recurrence Interval Computed Using Gringorten Plotting Position)

Tr (yrs)	WSEL Peak (ft)
1.05-Year	100.013
1.11-Year	100.020
1.25-Year	100.053
2.00-Year	100.217
3.33-Year	100.370
5-Year	100.526
10-Year	100.784
25-Year	101.353
50-Year	101.709
100-Year	102.025

*************Groundwater Recharge Summary ***************

Recharge is computed as input to Perlnd Groundwater Plus Infiltration in Structures

Total Predeveloped Recharge During Simulation

Model Element	Recharge Amount (ac-ft)
Subbasin: PreDev	38.333
Total:	38.333

Total Post Developed Recharge During Simulation

Model Element	Recharge Amount (ac-ft)
Subbasin: PostDev	0.000
Link: Trench2	105.101
Total:	105.101

Total Predevelopment Recharge is Less than Post Developed
Average Recharge Per Year, (Number of Years= 158)
Predeveloped: 0.243 ac-ft/year, Post Developed: 0.665 ac-ft/year

*************Water Quality Facility Data ***************

----------SCENARIO: PREDEVELOPED

Number of Links: 0

----------SCENARIO: POSTDEVELOPED

Number of Links: 1

********** Link: Trench2 **********

Basic Wet Pond Volume (91% Exceedance): 961. cu-ft
Computed Large Wet Pond Volume, 1.5*Basic Volume: 1442. cu-ft

Time to Infiltrate 91% Treatment Volume, (Hours): 5.55

Infiltration/Filtration Statistics----------
Inflow Volume (ac-ft): 105.10
Inflow Volume Including PPT-Evap (ac-ft): 105.10
Total Runoff Infiltrated (ac-ft): 105.10, 100.00%
Total Runoff Filtered (ac-ft): 0.00, 0.00%
Primary Outflow To Downstream System (ac-ft): 0.00
Secondary Outflow To Downstream System (ac-ft): 0.00
Percent Treated (Infiltrated+Filtered)/Total Volume: 100.00%

************Compliance Point Results **************

Scenario Predeveloped Compliance Subbasin: PreDev

Scenario Postdeveloped Compliance Link: Trench2

***** Point of Compliance Flow Frequency Data *****
Recurrence Interval Computed Using Gringorten Plotting Position

Predevelopment Runoff		Postdevelopment Runoff	
Tr (Years)	Discharge (cfs)	Tr (Years)	Discharge (cfs)
2-Year	6.063E-03	2-Year	0.000
5-Year	1.006E-02	5-Year	0.000
10-Year	1.330E-02	10-Year	0.000
25-Year	1.746E-02	25-Year	0.000
50-Year	2.264E-02	50-Year	0.000
100-Year	3.084E-02	100-Year	0.000
200-Year	4.040E-02	200-Year	0.000

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

****** Flow Duration Performance ******

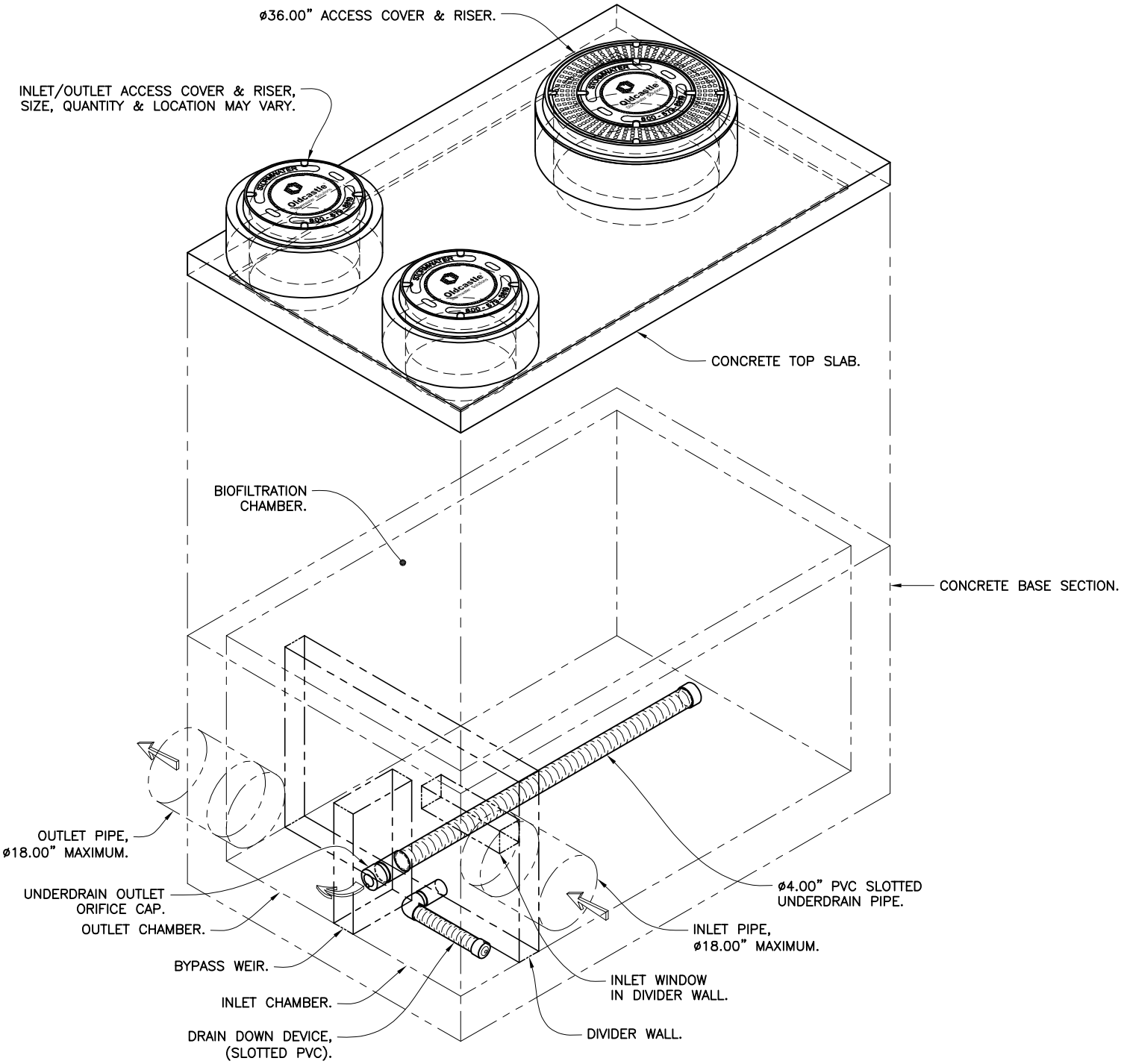
Excursion at Predeveloped 50%Q2 (Must be Less Than or Equal to 0%):	0.0%	PASS
Maximum Excursion from 50%Q2 to Q2 (Must be Less Than or Equal to 0%):	0.0%	PASS
Maximum Excursion from Q2 to Q50 (Must be less than 10%):	0.0%	PASS
Percent Excursion from Q2 to Q50 (Must be less than 50%):	0.0%	PASS

MEETS ALL FLOW DURATION DESIGN CRITERIA: PASS

****** LID Duration Performance ******

Excursion at Predeveloped 8%Q2 (Must be Less Than 0%):	0.0%	PASS
Maximum Excursion from 8%Q2 to 50%Q2 (Must be Less Than 0%):	0.0%	PASS

MEETS ALL LID DURATION DESIGN CRITERIA: PASS



ISOMETRIC VIEW

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

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

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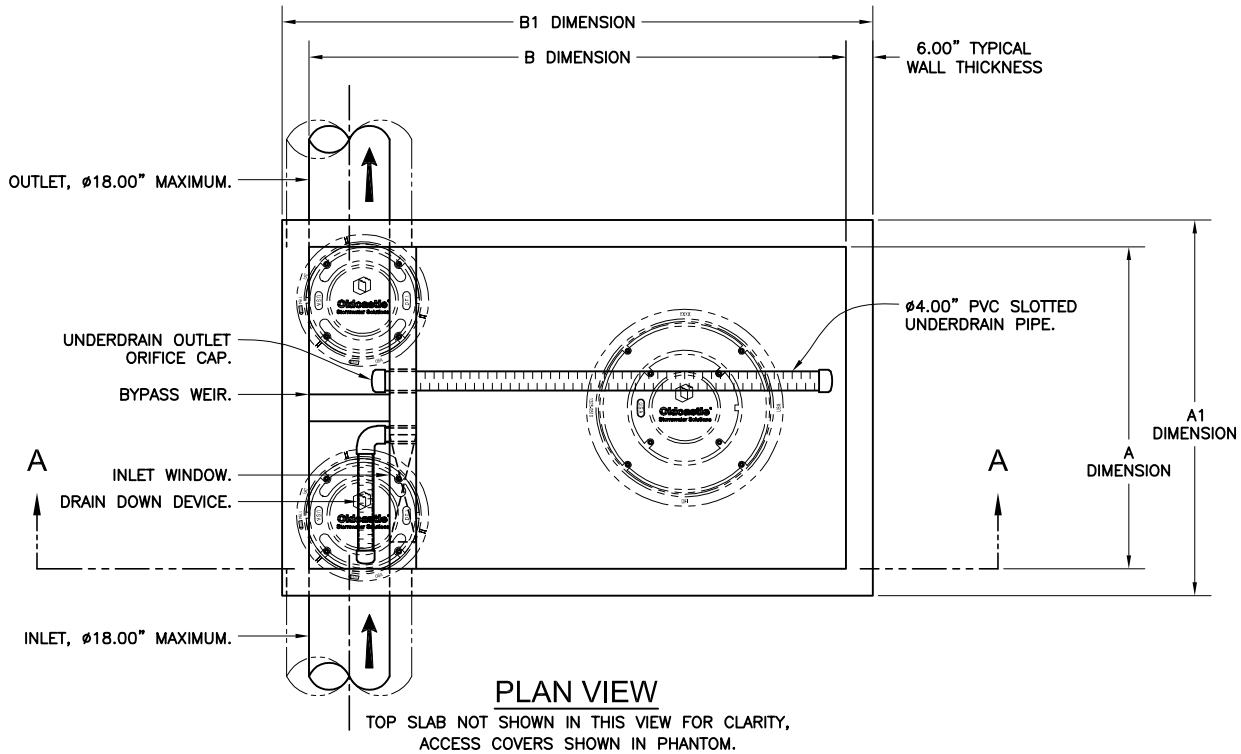
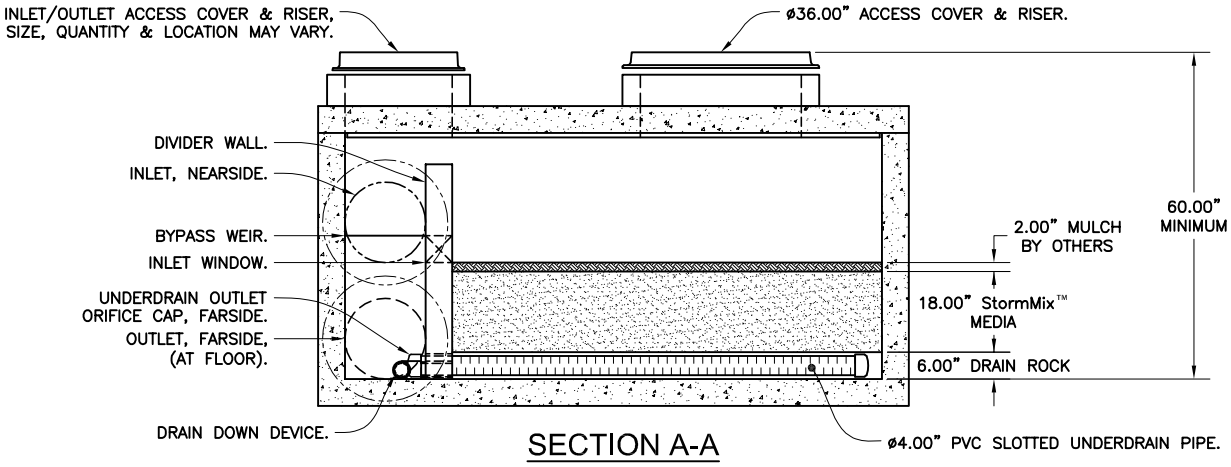
DRAWING NO.	REV	ECO	DATE	
BPU-IB	NA	ECO-0156 NEW 10/4/18	JPR 10/4/18	SHEET 1 OF 2



PLAN VIEW

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



SECTION A-A

MODEL	VAULT SIZE [1] (ID)		VAULT FOOTPRINT [1] (OD)		TREATMENT FLOW CAPACITY [2] (GPM/CFS)	TREATMENT FLOW CAPACITY [3] (GPM/CFS)
	A DIM	B DIM	A1 DIM	B1 DIM		
BPU-IB-46	4'	6'	5'	7'	25.6 / 0.057	28.8 / 0.064
BPU-IB-48	4'	8'	5'	9'	38.4 / 0.086	43.2 / 0.096
BPU-IB-412	4'	12'	5'	13'	64.0 / 0.143	72.0 / 0.160
BPU-IB-66	6'	6'	7'	7'	38.4 / 0.086	43.2 / 0.096
BPU-IB-68	6'	8'	7'	9'	57.6 / 0.128	64.8 / 0.144
BPU-IB-612	6'	12'	7'	13'	96.0 / 0.214	108.0 / 0.241
BPU-IB-816	8'	16'	9'	17'	179.2 / 0.399	201.6 / 0.449

[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.

US Patents Pending

Bioretention/ Biofiltration

BioPod™ Biofilter Underground

Vault with Internal Bypass

Oldcastle® INFRASTRUCTURE

Ph: 800.579.8819 | oldcastlestormwater.com

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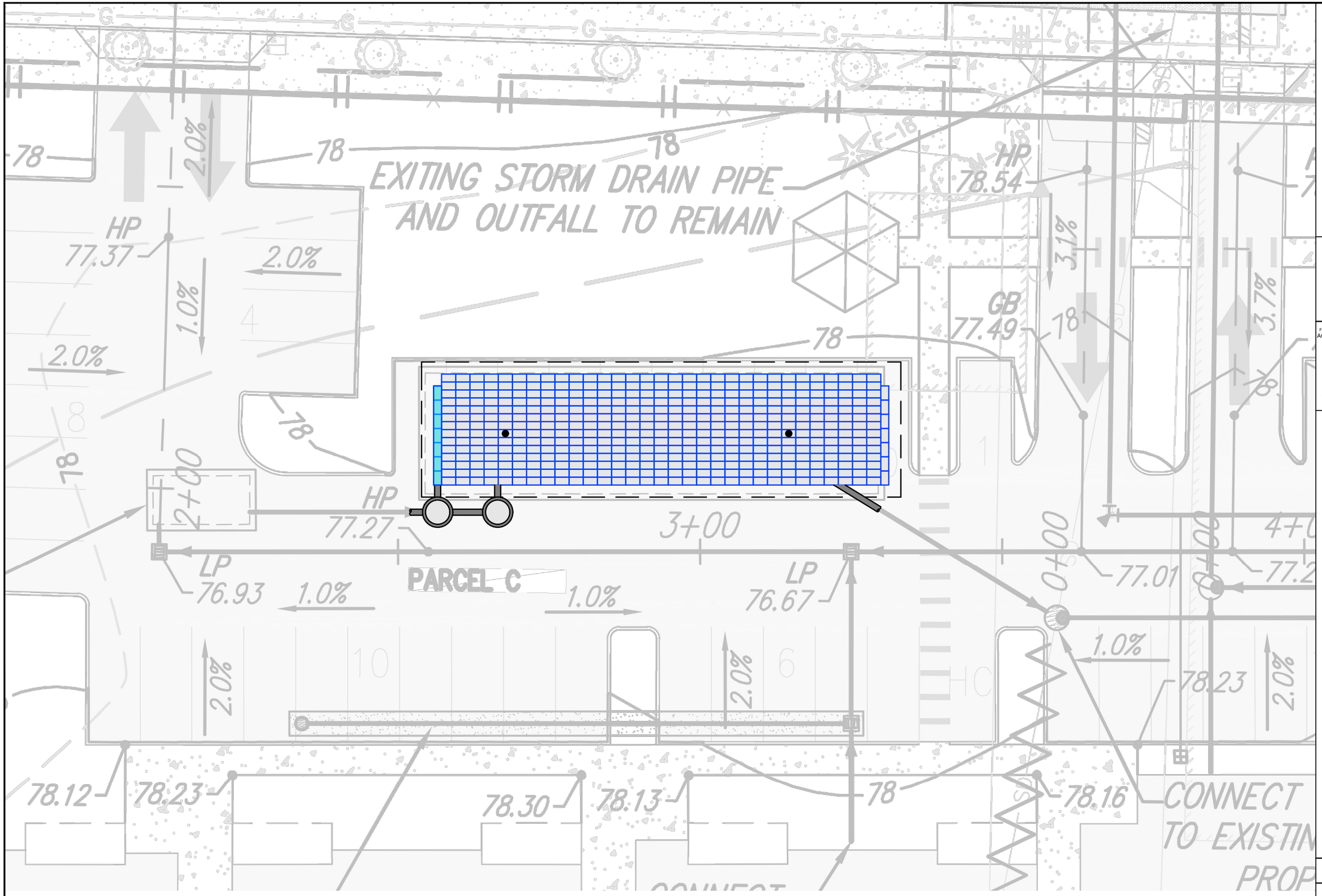
DRAWING NO.	REV	ECO	DATE	
BPU-IB	NR	ECO-0156 NEW 10/4/18	JPR 10/4/18	SHEET 1 OF 2



R-TANK^{HD} SYSTEM OVERLAY
SCALE: 1" = 15'

0 15' 30'
SCALE 1" = 15'

ENGINEER OF RECORD TO REVIEW, APPROVE AND ENDORSE FINAL SITE SPECIFIC DESIGN.

FOR ADDITIONAL INFORMATION PLEASE CONTACT:
ACF ENVIRONMENTAL 1-800-448-3636
www.acfenvironmental.com

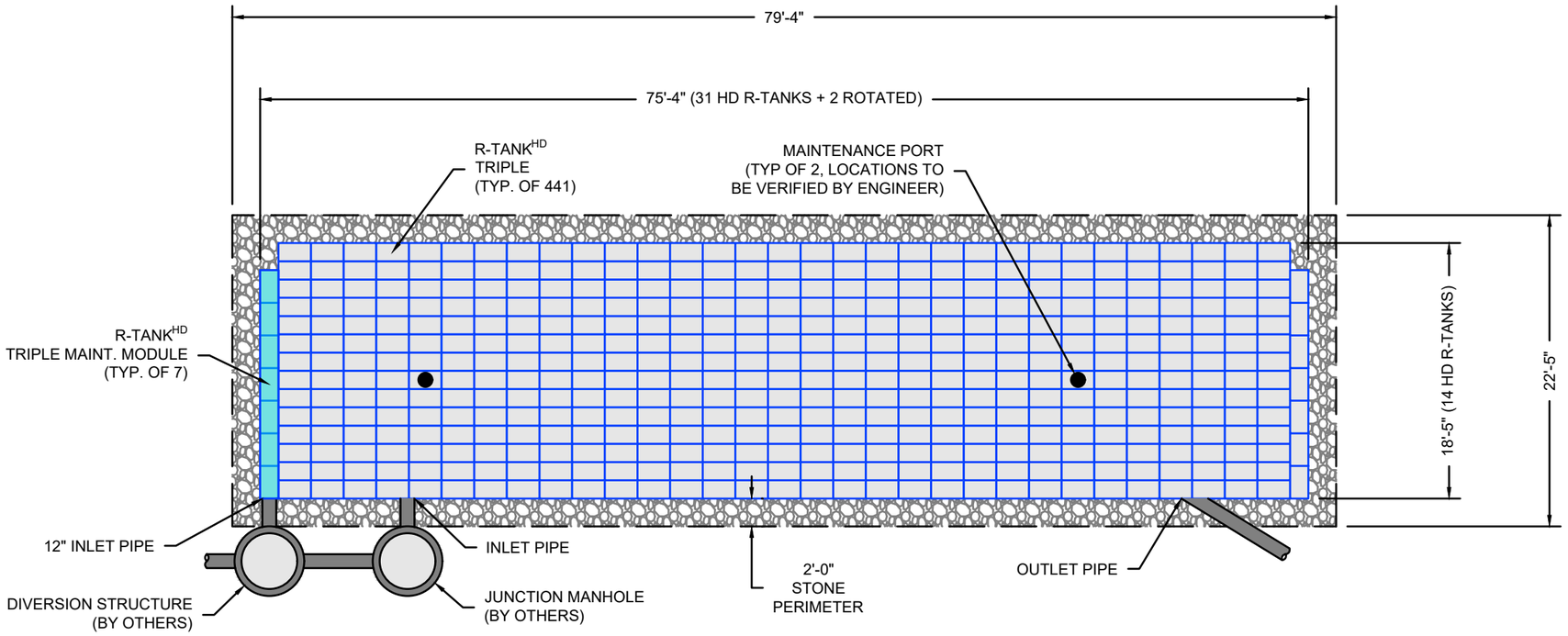
ACF ENVIRONMENTAL
LET'S GET IT DONE

R-TANK^{HD} SYSTEM LAYOUT
RIVERS EDGE
MONROE, WA
SITE DESIGNATION: INFILTRATION GALLERY
ACF ENVIRONMENTAL, 1-800-448-3636, www.acfenvironmental.com

DRAWN BY
EDQ

DATE
11/28/18

SHEET NO.
1 of 7

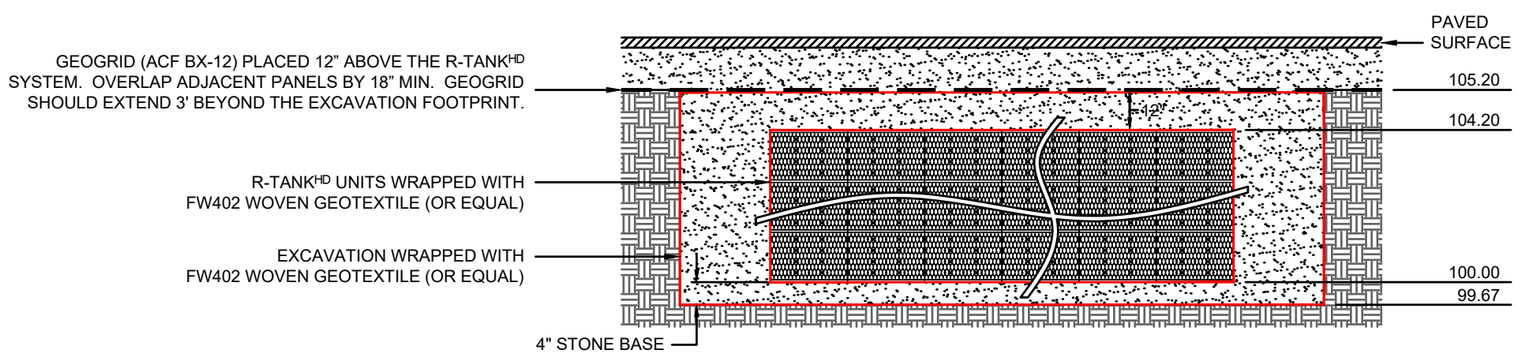


NOTES:
1. STORAGE VOLUME FROM 99.67 TO 103.70 = 5,670 CF
2. FREEBOARD PROVIDED FROM 103.70 TO 104.20
3. ELEVATIONS ARE PROVIDED AS REFERENCE, REFER TO CIVIL PLANS FOR SITE SPECIFIC ELEVATION INFORMATION.

0 10' 20'

SCALE 1" = 10'

LAYOUT SCALE	1" = 10'
R-TANK^{HD} MODULE TYPE	TRIPLE
TRAFFIC LOAD	HS-20
# OF TRIPLE R-TANKS	441
# OF TRIPLE R-TANK MAINTENANCE MODULES	7
TOTAL SYSTEM STORAGE	7,113 CF
R-TANK STORAGE VOLUME	5,501 CF
STONE STORAGE VOLUME (40% VOID RATIO)	1,612 CF
TOP OF COVER STONE ELEV. (12")	105.20
ACF BX-12 GEOGRID ELEV.	105.20
TOP OF R-TANK ELEV.	104.20
TANK INVERT	100.00
INVERT OF STONE BASE (4")	99.67
MIN. STONE PERIMETER WIDTH	2.0 FT
SEE SHEETS 3 - 7 FOR DETAILS AND ADDITIONAL INFORMATION	



R-TANK^{HD} TANK WRAP & EXCAVATION ENVELOPE DETAIL

ENGINEER OF RECORD TO REVIEW, APPROVE AND ENDORSE FINAL SITE SPECIFIC DESIGN.

FOR ADDITIONAL INFORMATION PLEASE CONTACT:
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R-TANK^{HD} SYSTEM LAYOUT
RIVERS EDGE
MONROE, WA
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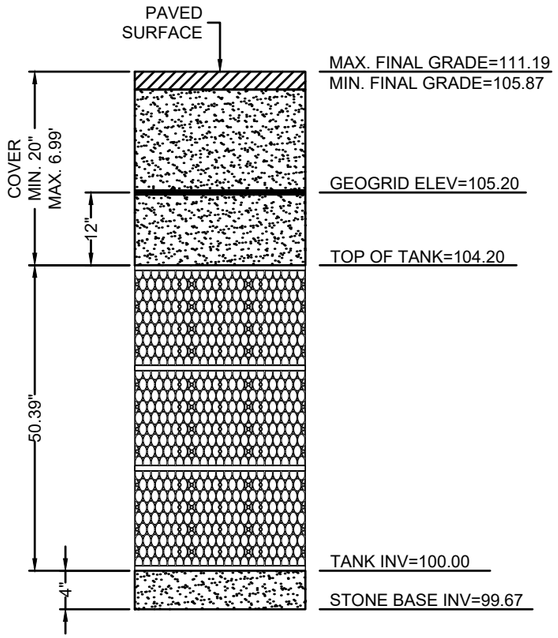
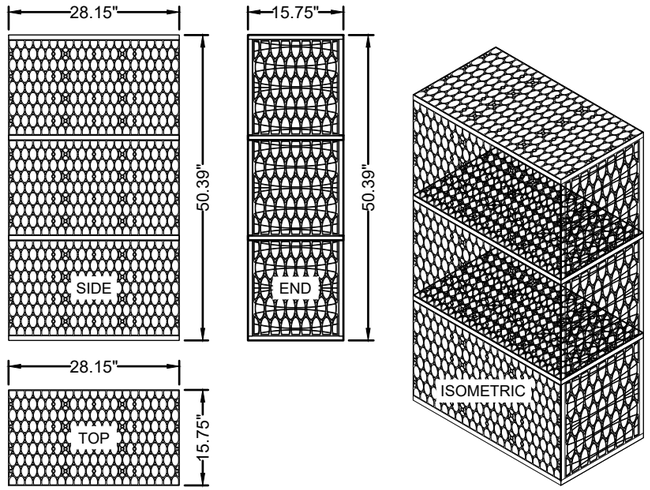


NOTE:
ELEVATIONS ARE PROVIDED AS REFERENCE, REFER TO CIVIL PLANS FOR SITE SPECIFIC ELEVATION INFORMATION.

TRIPLE R-TANK^{HD} - ELEVATION



MODULE DATA

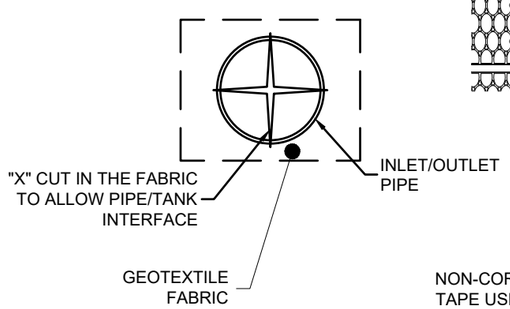
GEOMETRY:	**LOAD RATING:**
LENGTH = 28.15 IN. (715 MM)	33.4 PSI, (MODULE ONLY)
WIDTH = 15.75 IN. (400 MM)	HS20, (WITH ACF COVER SYSTEM)
HEIGHT = 50.39 IN. (1280 MM)	**MATERIAL:**
TANK VOLUME = 12.93 CF	100% RECYCLED POLYPROPYLENE
STORAGE VOLUME = 12.28 CF	**SMALL PLATES PER**
VOID INTERNAL VOLUME: 95%	**SEGMENT/TOTAL:**
VOID SURFACE AREA: 90%	5/15

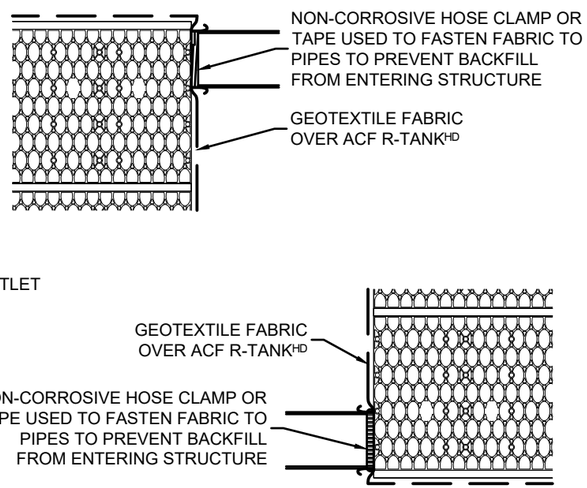
TRIPLE R-TANK^{HD} - MODULE DETAIL

R-TANK^{HD} QUANTITIES	
R-TANK^{HD} MODULE TYPE	TRIPLE
# OF TRIPLE R-TANKS	441
# OF TRIPLE R-TANK MAINTENANCE MODULES	7
TOTAL SYSTEM STORAGE	7,113 CF
R-TANK STORAGE VOLUME	5,501 CF
STONE STORAGE VOLUME (40% VOID RATIO)	1,612 CF
STONE BED FOOTPRINT	1,775 SF
STONE QUANTITY	149 CY
FW402 WOVEN GEOTEXTILE TANK WRAP	4,080 SF (453 SY)
FW402 WOVEN GEOTEXTILE EXCAVATION WRAP	5,381 SF (598 SY)
8 OZ. NON-WOVEN GEOTEXTILE MAINT. ROW WRAP	199 SF (22 SY)
S300 WOVEN GEOTEXTILE MAINT. ROW BASE FABRIC	93 SF (10 SY)
ACF BX-12 GEOGRID	2,785 SF (309 SY)
12" MAINTENANCE PORTS	2
12" PIPE BOOTS	1
PIPE BOOTS (UNKNOWN SIZE)	2
NOTE: STONE QUANTITY INCLUDES 12" OF COVER AND 4" OF BASE.	
NOTE: GEOTEXTILE / LINER QUANTITIES INCLUDE A 15% WASTE FACTOR.	

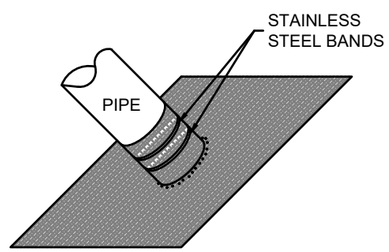
NOTES:
1. STORAGE VOLUME FROM 99.67 TO 103.70 = 5,670 CF
2. FREEBOARD PROVIDED FROM 103.70 TO 104.20

END VIEW OF PIPE/FABRIC CONNECTION.
CUT AN "X" IN THE FABRIC SLIGHTLY LARGER THAN PIPE, PULL THE FABRIC AROUND THE PIPE TO CREATE THE "BOOT" AND THEN SECURE WITH A HOSE-CLAMP.

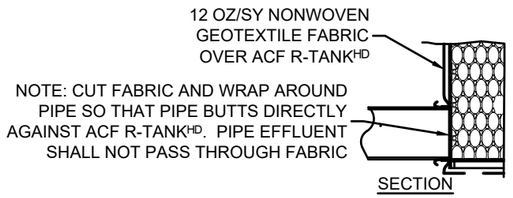


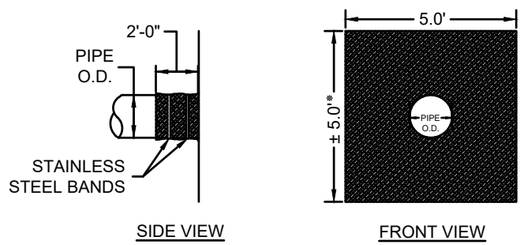


R-TANK^{HD} TYPICAL TANK INLET/OUTLET DETAIL



- 12 OZ/SY NONWOVEN GEOTEXTILE
- FABRIC COLLAR TO FIT OUTSIDE DIAMETER OF INLET/OUTLET PIPE
- * TRIM AS NEEDED





GEOTEXTILE PIPE BOOT FOR R-TANK^{HD}

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R-TANK^{HD} SYSTEM DETAILS
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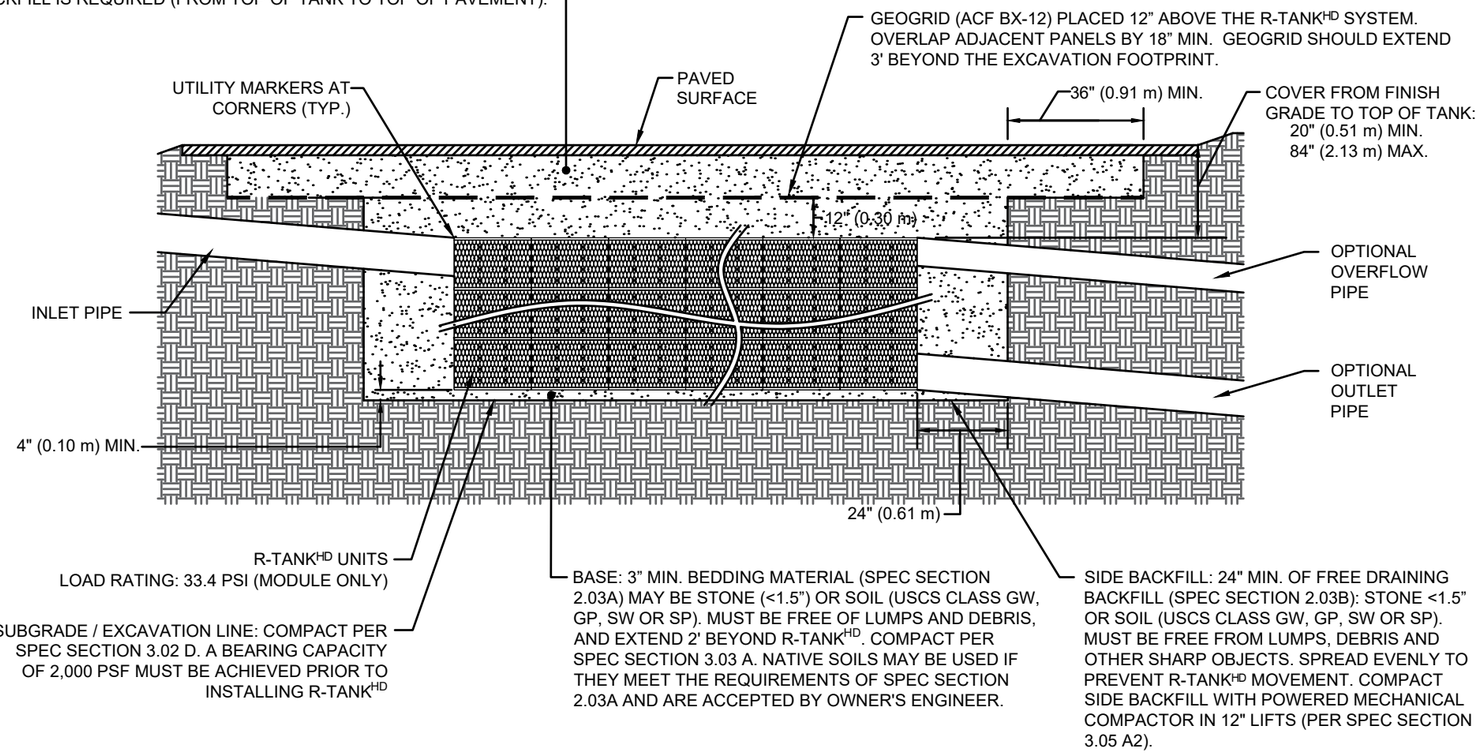
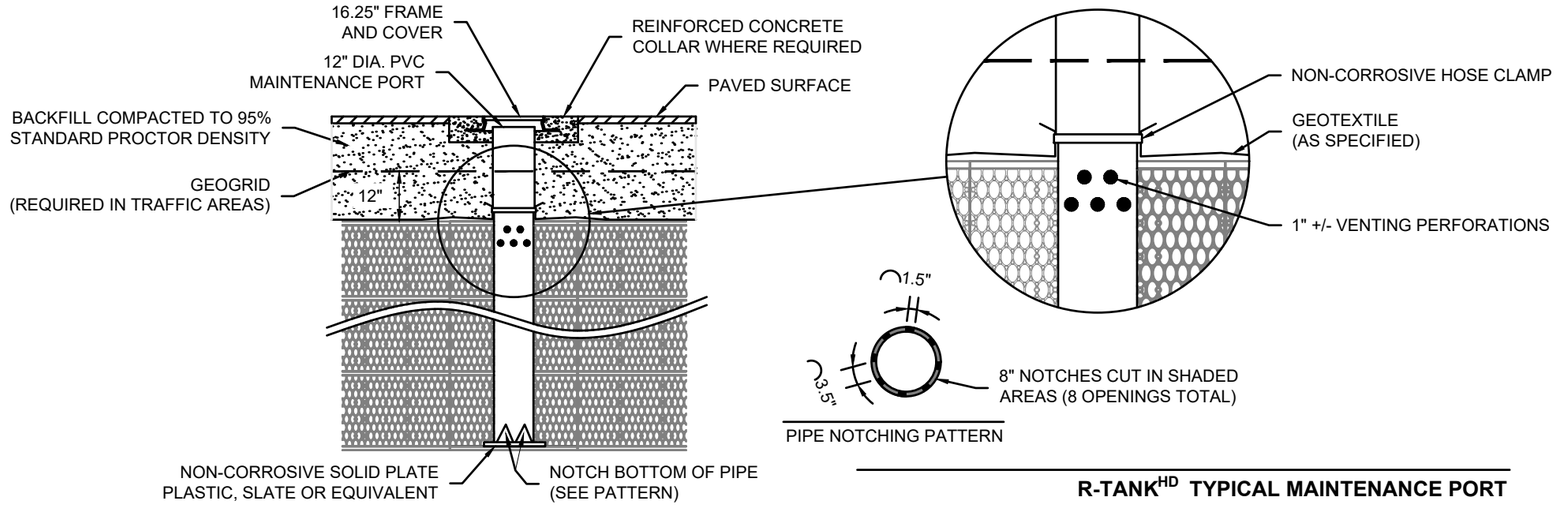
TOTAL COVER: 20” MINIMUM AND 84” MAXIMUM. FIRST 12” MUST BE FREE DRAINING BACKFILL (SPEC SECTION 2.03B): STONE <1.5” OR SOIL (USCS CLASS GW, GP, SW OR SP). ADDITIONAL FILL MAY BE STRUCTURAL FILL (SPEC SECTION 2.03C): STONE OR SOIL (USCS CLASS SM, SP, SW, GM, GP OR GW) WITH MAX CLAY CONTENT<10%, MAX 25% PASSING NO. 200 SIEVE, AND MAX PLASTICITY INDEX OF 4. A MIN. 12” COVER MUST BE MAINTAINED BETWEEN BACKFILL EQUIPMENT AND THE TOP OF THE R-TANK™ SYSTEM AT ALL TIMES. TOTAL HEIGHT OF TOP BACKFILL SHOULD NOT EXCEED 7'. CONTACT ACF ENVIRONMENTAL IF MORE THAN 7' OR LESS THAN 20" OF TOP BACKFILL IS REQUIRED (FROM TOP OF TANK TO TOP OF PAVEMENT).

NOTES:
1. FOR COMPLETE MODULE DATA, SEE APPROPRIATE R-TANK^{HD} MODULE SHEET .
2. INSTALLATIONS PER THIS DETAIL MEET GUIDELINES OF HL-93 LOADING PER THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, CUSTOMARY U.S. UNITS, 7TH EDITION, 2014 WITH 2015 AND 2016 INTERIM REVISIONS.
3. PRE-TREATMENT STRUCTURES NOT SHOWN.
4. FOR INFILTRATION APPLICATIONS, GEOTEXTILE ENVELOPING R-TANK SHALL BE ACF M200 (PER SPEC SECTION 2.02A) AND BASE SHALL BE 4" MIN. UNCOMPACTED FREE DRAINING BACKFILL (SPEC SECTION 2.03A) TO PROVIDE A LEVEL BASE. SURFACE MUST BE SMOOTH, FREE OF LUMPS OR DEBRIS, AND EXTEND 2' BEYOND R-TANK^{HD} FOOTPRINT.



R-TANK^{HD} & H-20 LOADS - SECTION VIEW

NOTES
1. THIS PORT IS USED TO PUMP WATER INTO THE SYSTEM AND RE-SUSPEND ACCUMULATED SEDIMENT SO THAT IT MAY BE PUMPED OUT.
2. MINIMUM REQUIRED MAINTENANCE INCLUDES A QUARTERLY INSPECTION DURING THE FIRST YEAR OF OPERATION AND A YEARLY INSPECTION THEREAFTER. FLUSH AS NEEDED.
3. ONLY R-TANK^{HD} AND R-TANK^{SD} MAY BE USED IN TRAFFIC APPLICATIONS.
4. SEE TRAFFIC LOADING DETAIL FOR MINIMUM & MAXIMUM COVER REQUIREMENTS.



R-TANK^{HD} TYPICAL MAINTENANCE PORT

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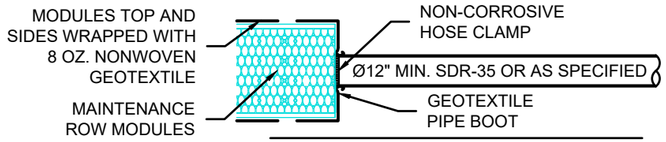
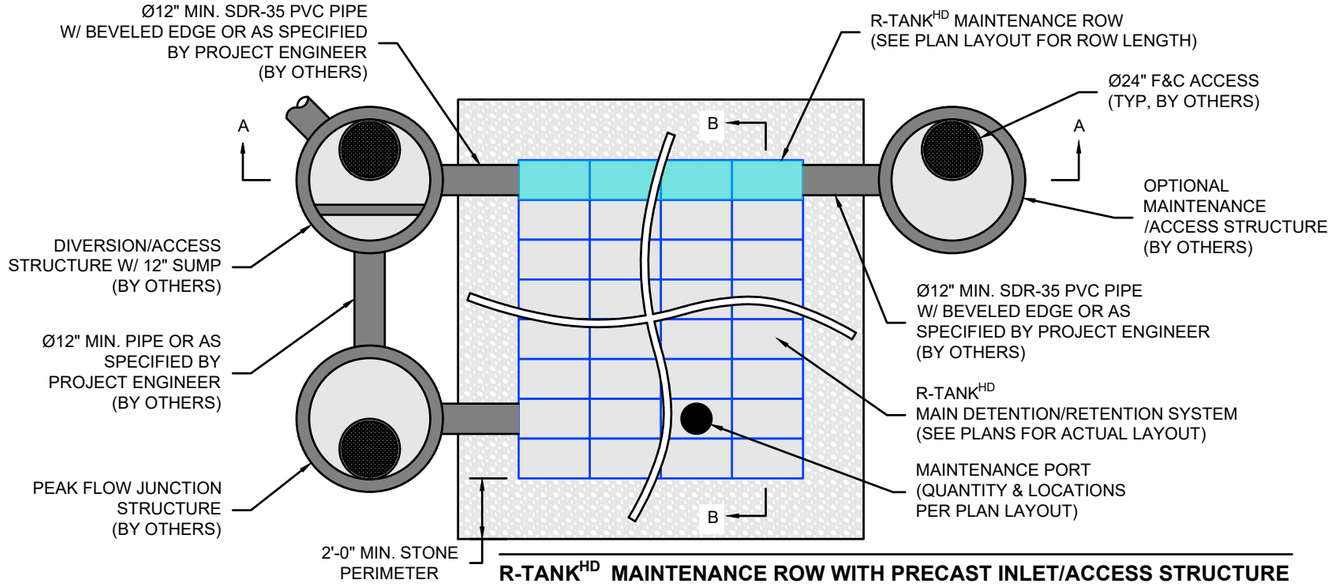
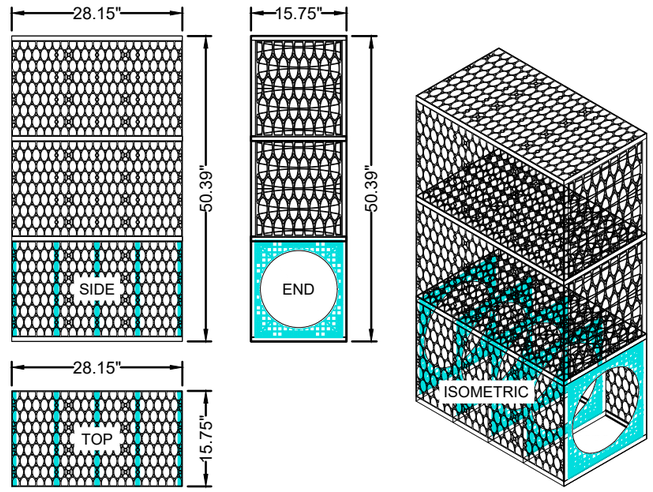


TYPICAL PIPE CONNECTION DETAIL

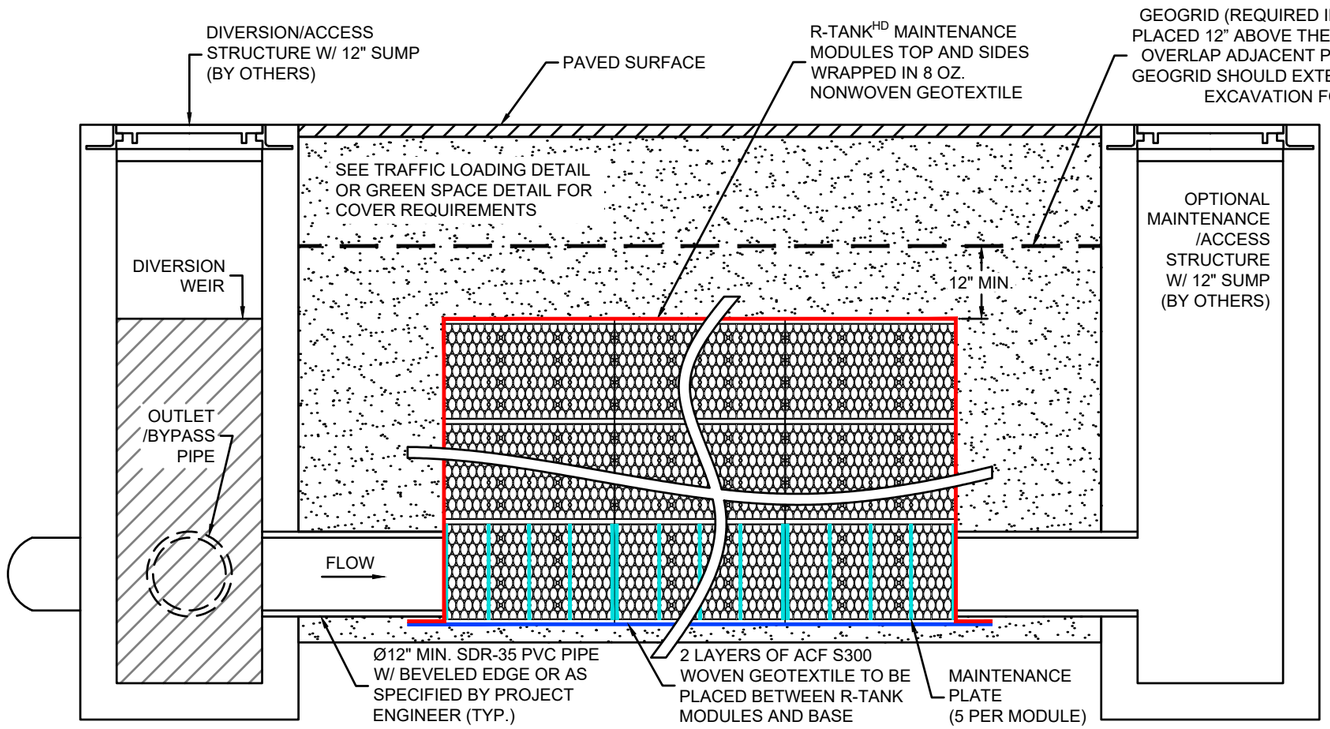
NOTE: IF PIPE CONNECTING TO MAINTENANCE ROW IS LARGER THAN Ø12" SDR-35, IT SHALL BE ABUTTED FLUSH TO END PLATE AND SEALED WITH A GEOTEXTILE BOOT.



R-TANK^HD MAINTENANCE ROW WITH PRECAST INLET/ACCESS STRUCTURE

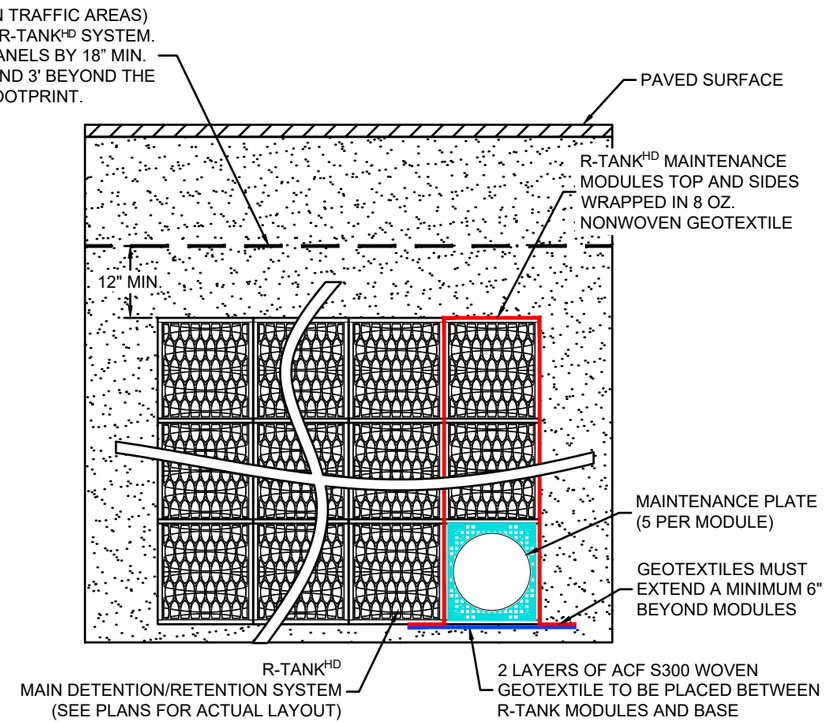


TRIPLE R-TANK^HD - MAINTENANCE MODULE DETAIL
(FOR MODULE DATA, SEE STANDARD MODULE DETAIL)



NOTE: DIVERSION WEIR ELEVATION TO BE SET BY PROJECT ENGINEER BASED ON TREATMENT VOLUME/FLOW RATE REQUIRED.

R-TANK^HD MAINTENANCE ROW SECTION A-A



R-TANK^HD MAINTENANCE ROW SECTION B-B

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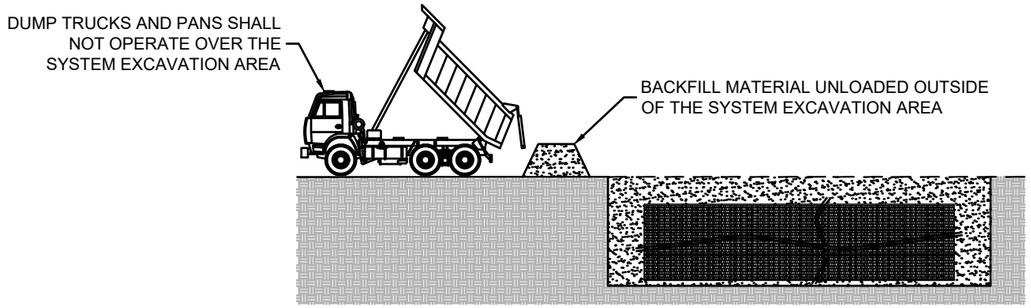
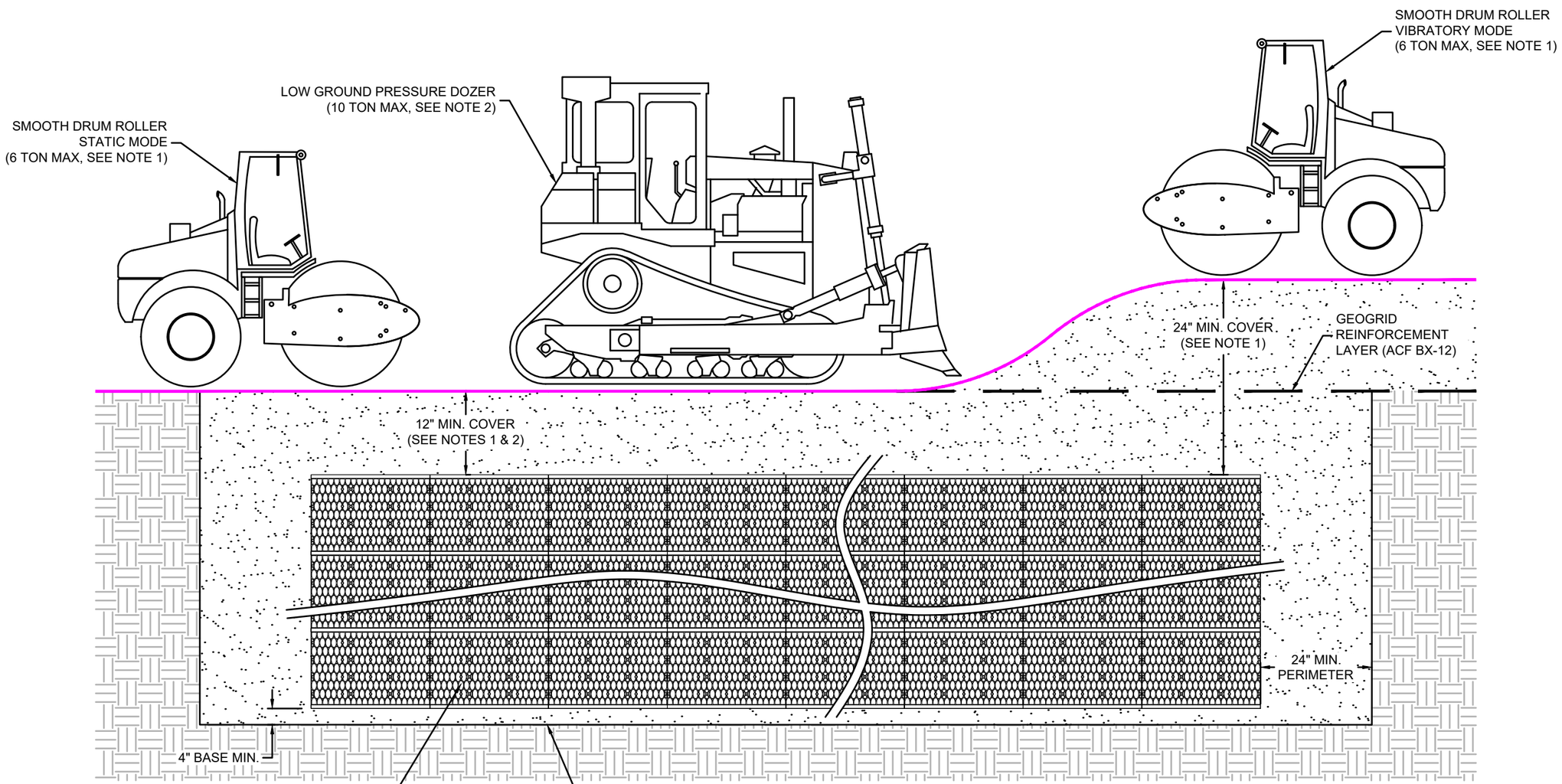


DUMP TRUCK DETAIL (SEE NOTE 3)

NOTES:

1. FOLLOWING PLACEMENT OF SIDE BACKFILL, A UNIFORM 12" LIFT OF THE FREELY DRAINING MATERIAL (SPEC SECTION 2.03 B) SHALL BE PLACED OVER THE R-TANK AND LIGHTLY COMPACTED USING A WALK-BEHIND TRENCH ROLLER. ALTERNATELY, A ROLLER (MAXIMUM GROSS VEHICLE WEIGHT OF 6 TONS) MAY BE USED. ROLLER MUST REMAIN IN STATIC MODE UNTIL A MINIMUM OF 24" OF COVER HAS BEEN PLACED OVER THE MODULES. SHEEP FOOT ROLLERS SHOULD NOT BE USED. **SPEC SECTION 3.05 A**
2. ONLY LOW PRESSURE TIRE OR TRACK VEHICLES (LESS THAN 7 PSI AND OPERATING WEIGHT OF LESS THAN 20,000 LBS) SHALL BE OPERATED OVER THE R-TANK SYSTEM DURING CONSTRUCTION. **SPEC SECTION 3.05 B**
3. DUMP TRUCKS AND PANS SHALL NOT BE OPERATED WITHIN THE R-TANK SYSTEM AT ANY TIME. WHERE NECESSARY, THE HEAVY EQUIPMENT SHOULD UNLOAD IN AN AREA ADJACENT TO THE R-TANK SYSTEM AND THE MATERIAL SHOULD BE MOVED OVER THE SYSTEM WITH TRACKED EQUIPMENT. **SPEC SECTION 3.05 B**
4. ENSURE THAT ALL UNRELATED CONSTRUCTION TRAFFIC IS KEPT AWAY FROM THE LIMITS OF EXCAVATION UNTIL THE PROJECT IS COMPLETE AND FINAL SURFACE MATERIALS ARE IN PLACE. NO NON-INSTALLATION RELATED LOADING SHOULD BE ALLOWED OVER THE R-TANK SYSTEM UNTIL THE FINAL DESIGN SECTION HAS BEEN CONSTRUCTED (INCLUDING PAVEMENT). **SPEC SECTION 3.05 C**
5. SEE R-TANK INSTALLATION GUIDE OR CONTACT YOUR LOCAL ACF REPRESENTATIVE FOR ADDITIONAL INFORMATION.



CONSTRUCTION EQUIPMENT COVER DETAIL - VEHICULAR TRAFFIC

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R-TANK^HD CONSTRUCTION EQUIPMENT COVER DETAIL
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R-TANK SPECIFICATION

PART 1 - GENERAL

1.01 Related Documents

A. Drawings, technical specification and general provisions of the Contract as modified herein apply to this section.

1.02 Description of Work Included

A. Provide excavation and base preparation per geotechnical engineer's recommendations and/or as shown on the design drawings, to provide adequate support for project design loads and safety from excavation sidewall collapse. Excavations shall be in accordance with the owner's and OSHA requirements.

B. Provide and install R-Tank^{LD}, R-Tank^{HD}, R-Tank^{SD}, or R-Tank^{UD} system (hereafter called R-Tank) and all related products including fill materials, geotextiles, geogrids, inlet and outlet pipe with connections per the manufacturer's installation guidelines provided in this section.

C. Provide and construct the cover of the R-Tank system including; stone backfill, structural fill cover, and pavement section as specified.

D. Protect R-Tank system from construction traffic after installation until completion of all construction activity in the installation area.

1.03 Quality Control

A. All materials shall be manufactured in ISO certified facilities.

B. Installation Contractor shall demonstrate the following experience:

1. A minimum of three R-Tank or equivalent projects completed within 2 years; and,
2. A minimum of 25,000 cubic feet of storage volume completed within 2 years.
3. Contractor experience requirement may be waived if the manufacturer's representative provides on-site training and review during construction.

C. Installation Personnel: Performed only by skilled workers with satisfactory record of performance on bulk earthworks, pipe, chamber, or pond/landfill construction projects of comparable size and quality.

D. Contractor must have manufacturer's representative available for site review if requested by Owner.

1.04 Submittals

A. Submit proposed R-Tank layout drawings. Drawings shall include typical section details as well as the required base elevation of stone and tanks, minimum cover requirements and tank configuration.

B. Submit manufacturer's product data, including compressive strength and unit weight.

C. Submit manufacturer's installation instructions.

D. Submit R-Tank sample for review. Reviewed and accepted samples will be returned to the Contractor.

E. Submit material certificates for geotextile, geogrid, base course and backfill materials.

F. Submit required experience and personnel requirements as specified in Section 1.03.

G. Any proposed equal alternative product substitution to this specification must be submitted for review and approved prior to bid opening. Review package should include third party reviewed performance data that meets or exceeds criteria in Table 2.01 B.

1.05 Delivery, Storage, and Handling

A. Protect R-Tank and other materials from damage during delivery, and store UV sensitive materials under tarp to protect from sunlight when time from delivery to installation exceeds two weeks. Storage of materials should be on smooth surfaces, free from dirt, mud and debris.

B. Handling is to be performed with equipment appropriate to the materials and site conditions, and may include hand, handcart, forklifts, extension lifts, etc.

C. Cold weather:

1. Care must be taken when handling plastics when air temperature is 40 degrees or below as plastic becomes brittle.
2. Do not use frozen materials or materials mixed or coated with ice or frost.
3. Do not build on frozen ground or wet, saturated or muddy subgrade.

1.06 Preinstallation Conference.

A. Prior to the start of the installation, a preinstallation conference shall occur with the representatives from the design team, the general contractor, the excavation contractor, the R-Tank installation contractor, and the manufacturer's representative.

1.07 Project Conditions

A. Coordinate installation for the R-Tank system with other on-site activities to eliminate all non-installation related construction traffic over the completed R-Tank system. No loads heavier than the design loads shall be allowed over the system, and in no case shall loads higher than a standard AASHTO HS20 (or HS25, depending on design criteria) load be allowed on the system at any time.

B. Protect adjacent work from damage during R-Tank system installation.

C. All pre-treatment systems to remove debris and heavy sediments must be in place and functional prior to operation of the R-Tank system. Additional pretreatment measures may be needed if unit is operational during construction due to increased sediment loads.

D. Contractor is responsible for any damage to the system during construction.

PART 2 - PRODUCTS

2.01 R-Tank Units

A. R -Tank - Injection molded plastic tank plates assembled to form a 95% void modular structure of predesigned height (custom for each project).

B. R-Tank units shall meet the following Physical & Chemical Characteristics:

PROPERTY	DESCRIPTION	R-Tank^{LD} VALUE	R-Tank^{HD} VALUE	R-Tank^{SD} VALUE	R-Tank^{UD} VALUE
Void Area	Volume available for water storage	95%	95%	95%	95%
Surface Void Area	Percentage of exterior available for infiltration	90%	90%	90%	90%
Compressive Strength	ASTM D 2412 / ASTM F 2418	30.0 psi	33.4 psi	42.9 psi	134.2 psi
HS-20 Minimum Cover	Cover required to support HS-20 loads	N/A	20"	18"	12" (STONE BACKFILL)
HS-25 Minimum Cover	Cover required to support HS-25 loads	N/A	24"	19"	15" (STONE BACKFILL)
Maximum Cover	Maximum allowable cover depth	3 feet	< 7 feet	< 10 feet	5 feet
Unit Weight	Weight of plastic per cubic foot of tank	3.29 lbs / cf	3.62 lbs/cf	3.96 lbs / cf	4.33 lbs / cf
Rib Thickness	Thickness of load-bearing members	0.18 inches	0.18 inches	0.18 inches	N/A
Service Temperature	Safe temperature range for use	-14 – 167° F	-14 – 167° F	-14 – 167° F	-14 – 167° F

C. Supplier: ACF Environmental 2831 Cardwell Road Richmond, VA 23234
(T): 800-448-3636; (F): 804-743-7779 www.acfenvironmental.com

2.02 Geosynthetics

A. Geotextile. A geotextile envelope is required to prevent backfill material from entering the R-Tank modules.

1. Standard Application: The standard geotextile shall be an 8 oz per square yard nonwoven geotextile (ACF N080 or equivalent).
2. Infiltration Applications: When water must infiltrate/exfiltrate through the geotextile as a function of the system design, a woven monofilament (ACF M200 or equivalent) shall be used.

B. Geogrid. For installations subject to traffic loads and/or when required by project plans, install geogrid (ACF BX12 or equivalent) to reinforce backfill above the R-Tank system. Geogrid is not always required for R-Tank^{UD} installations, and is often not required for non-traffic load applications.

2.03 Backfill & Cover Materials

A. Bedding Materials: Stone (angular and smaller than 1.5" in diameter) or soil (GW, GP, SW, or SP as classified by the Unified Soil Classification System) shall be used below the R-Tank system (3" minimum). Material must be free from lumps, debris, and any sharp objects that could cut the geotextile. Material shall be within 3 percent of the optimum moisture content as determined by ASTM D698 at the time of installation. For infiltration applications bedding material shall be free draining.

B. Side and Top Backfill: Free draining material shall be used adjacent to (24" minimum) and above (for the first 12") the R-Tank system. Material must be free from lumps, debris and any sharp objects that could cut the geotextile. Material shall be within 3 percent of the optimum moisture content as determined by ASTM D698 at the time of installation.

1. For LD, HD, and SD modules, backfill materials shall be free draining stone (angular and smaller than 1.5" in diameter) or soil (GW, GP, SW, or SP as classified by the Unified Soil Classification System).
2. For UD modules in traffic loaded (HS-20) applications with less than 14" of top cover, side backfill materials shall be free draining stone (angular and smaller than 1.5" in diameter). The use of soil backfill on the sides of the UD module is not permitted unless the modules are installed outside of traffic areas or with cover depths of > 14". Top backfill material may be stone or soil as noted above (Section 2.03 B 1).

C. Additional Cover Materials: Structural Fill shall consist of granular materials meeting the gradational requirements of SM, SP, SW, GM, GP or GW as classified by the Unified Soil Classification System. Structural fill shall have a maximum of 25 percent passing the No. 200 sieve, shall have a maximum clay content of 10 percent and a maximum Plasticity Index of 4. Material shall be within 3 percent of the optimum moisture content as determined by ASTM D698 at the time of installation.

2.04 Other Materials

Utility Marker: Install metallic tape at corners of R-Tank system to mark the area for future utility detection.

PART 3 - EXECUTION

3.01 Assembly of R-Tank Units

A. Assembly of modules shall be performed in accordance with the R-Tank Installation Manual, Section 2.

3.02 Layout and Excavation

A. Installer shall stake out, excavate, and prepare the subgrade area to the required plan grades and dimensions, ensuring that the excavation is at least 2 feet greater than R-Tank dimensions in each direction allowing for installation of geotextile filter fabric, R-Tank modules, and free draining backfill materials.

B. All excavations must be prepared with OSHA approved excavated sides and sufficient working space.

C. Protect partially completed installation against damage from other construction traffic by establishing a perimeter with high visibility construction tape, fencing, barricades, or other means until construction is complete.

D. Base of the excavation shall be uniform, level, and free of lumps or debris and soft or yielding subgrade areas. A minimum 2,000 pounds per square foot bearing capacity is required.

1. Standard Applications: Compact subgrade to a minimum of 95% of Standard Proctor (ASTM D698) density or as required by the Owner's engineer.
2. Infiltration Applications: Subgrade shall be prepared in accordance with the contract documents. Compaction of subgrade should not be performed in infiltration applications.

E. Unsuitable Soils or Conditions: All questions about the base of the excavation shall be directed to the owner's engineer, who will approve the subgrade conditions prior to placement of stone. The owner's engineer shall determine the required bearing capacity of the R-Tank subgrade; however in no case shall a bearing capacity of less than 2,000 pounds per square foot be provided.

1. If unsuitable soils are encountered at the subgrade, or if the subgrade is pumping or appears excessively soft, repair the area in accordance with contract documents and/or as directed by the owner's engineer.
2. If indications of the water table are observed during excavation, the engineer shall be contacted to provide recommendations.
3. Do not start installation of the R-Tank system until unsatisfactory subgrade conditions are corrected and the subgrade conditions are accepted by the owner's engineer.

3.03 Preparation of Base

A. Place a thin layer (3" unless otherwise specified) of bedding material (Section 2.03 A), over the subgrade to establish a level working platform for the R-Tank modules. Level to within ½" (+/- ¼") or as shown on the plans. Native subgrade soils or other materials may be used if determined to meet the requirements of 2.03 A and are accepted by the owner's engineer.

1. Standard Applications: Static roll or otherwise compact bedding materials until they are firm and unyielding.
2. Infiltration Applications: Bedding materials shall be prepared in accordance with the contract documents.

B. Outline the footprint of the R-Tank system on the excavation floor using spray paint or chalk line to ensure a 2' perimeter is available around the R-Tank system for proper installation and compaction of backfill.

3.04 Installation of the R-Tanks

A. Where a geotextile wrap is specified on the stone base, cut strips to length and install in excavation, removing wrinkles so material lays flat. Overlap geotextile a minimum 12" or as recommended by manufacturer.

B. Where an impervious liner (for containment) is specified, install the liner per manufacturer's recommendations and the contract documents. The R-Tank units shall be separated from impervious liner by a non-woven geotextile fabric installed accordance with Section 3.04A.

C. Install R-Tank modules by placing side by side, in accordance with the design drawings. No lateral connections are required. It is advisable to use a string line to form square corners and straight edges along the perimeter of the R-Tank system. The modules are to be oriented as per the design drawing with required depth as shown on plans..

1. For LD, HD, and SD installations, the large side plate of the tank should be placed on the perimeter of the system. This will typically require that the two ends of the tank area will have a row of tanks placed perpendicular to all other tanks. If this is not shown in the construction drawings, it is a simple field adjustment that will have minimal effect on the overall system footprint. Refer to R-Tank Installation Guide for more details
2. For UD installations, there is no perpendicular end row required.

D. Wrap the R-Tank top and sides in specified geotextile. Cut strips of geotextile so that it will cover the sides and top, encapsulating the entire system to prevent backfill entry into the system. Overlap geotextile 12" or as recommended by manufacturer. Take great care to avoid damage to geotextile (and, if specified, impervious liner) during placement.

E. Identify locations of inlet, outlet and any other penetrations of the geotextile (and optional liner). These connections should be installed flush (butted up to the R-Tank) and the geotextile fabric shall be cut to enable hydraulic continuity between the connections and the R-Tank units. These connections shall be secured using pipe boots with stainless steel pipe clamps. Support pipe in trenches during backfill operations to prevent pipe from settling and damaging the geotextile, impervious liner (if specified) or pipe. Connecting pipes at 90 degree angles facilitates construction, unless otherwise specified. Ensure end of pipe is installed snug against R-Tank system.

F. Install Inspection and Maintenance Ports in locations noted on plans. At a minimum one maintenance port shall be installed within 10' of each inlet & outlet connection, and with a maximum spacing of one maintenance port for every 2,500 square feet. Install all ports as noted in the R-Tank Installation Guide.

G. If required, install ventilation pipes and vents as specified on drawings to provide ventilation for proper hydraulic performance. The number of pipes and vents will depend on the size of the system. Vents are often installed using a 90 degree elbow with PVC pipe into a landscaped area with 'U" bend or venting bollard to inhibit the ingress of debris. A ground level concrete or steel cover can be used.

3.05 Backfilling of the R-Tank Units

A. Backfill and fill with recommended materials as follows:

1. Place freely draining backfill materials (Section 2.03 B) around the perimeter in lifts with a maximum thickness of 12". Each lift shall be placed around the entire perimeter such that each lift is no more than 24" higher than the side backfill along any other location on the perimeter of the R-Tank system. No fill shall be placed over top of tanks until the side backfill has been completed.
2. Each lift shall be compacted at the specified moisture content to a minimum of 95% of the Standard Proctor Density until no further densification is observed (for self-compacting stone materials). The side lifts must be compacted with walk behind compaction equipment. Even when "self-compacting" backfill materials are selected, a walk behind vibratory compactor must be used.
3. Take care to ensure that the compaction process does not allow the machinery to come into contact with the modules due to the potential for damage to the geotextile and R-Tank units.
4. No compaction equipment is permissible to operate directly on the R-Tank modules.
5. Top Backfill:
   a. Typical Applications: Install a 12" (or as shown on plans) lift of freely draining material (Section 2.03 B) over the R-Tank Units, maintaining 12" between equipment tracks and R-Tank System.
   b. Shallow Applications (< 18" total cover): Install top backfill in accordance with plans.
   Lightly compacted using a walk-behind trench roller. Alternately, a roller (maximum gross vehicle weight of 6 tons) may be used. Roller must remain in static mode until a minimum of 24" of cover has been placed over the modules. Sheep foot rollers should not be used.
6. If required, install a geogrid as shown on plans. Geogrid shall extend a minimum of 3 feet beyond the limits of the excavation wall.
7. Following placement and compaction of the initial cover, subsequent lifts of structural fill (Section 2.03 C) shall be placed at the specified moisture content and compacted to a minimum of 95% of the Standard Proctor Density and shall cover the entire footprint of the R-Tank system. During placement of fill above the system, unless otherwise specified, a uniform elevation of fill shall be maintained to within 12" across the footprint of the R-Tank system. Do not exceed maximum cover depths listed in Table 2.01 B.
8. Place additional layers of geotextile and/or geogrid at elevations as specified in the design details. Each layer of geosynthetic reinforcement placed above the R-Tank system shall extend a minimum of 3 feet beyond the limits of the excavation wall.

B. Only low pressure tire or track vehicles shall be operated over the R-Tank system during construction. No machinery should drive on top of the tank until a minimum of 18" of backfill and compaction is achieved. Dump Trucks and Pans shall not be operated within the R-Tank system footprint at any time. Where necessary the heavy equipment should unload in an area adjacent to the R-Tank system and the material should be moved over the system with tracked equipment.

C. Ensure that all unrelated construction traffic is kept away from the limits of excavation until the project is complete and final surface materials are in place. No non-installation related loading should be allowed over the R-Tank system until the final design section has been constructed (including pavement).

D. Place surfacing materials, such as groundcovers (no large trees), or paving materials over the structure with care to avoid displacement of cover fill and damage to surrounding areas.

E. Backfill depth over R-Tank system must be within the limitations shown in the table in Section 2.01 B. If the total backfill depth does not comply with this table, contact engineer or manufacturer's representative for assistance.

PART 4 - USING THE SYSTEM

4.01 Maintenance Requirements

A. A routine maintenance effort is required to ensure proper performance of the R-Tank system. The Maintenance program should be focused on pretreatment systems. Ensuring these structures are clean and functioning properly will reduce the risk of contamination of the R-Tank system and stormwater released from the site. Pre-treatment systems shall be inspected yearly, or as directed by the regulatory agency and by the manufacturer (for proprietary systems). Maintain as needed using acceptable practices or following manufacturer's guidelines (for proprietary systems).

B. Inspection and/or Maintenance Ports in the R-Tank system will need to be inspected for accumulation of sediments at least quarterly through the first year of operation and at least yearly thereafter. This is done by removing the cap of the port and using a measuring device long enough to reach the bottom of the R-Tank system and stiff enough to push through the loose sediments, allowing a depth measurement.

C. If sediment has accumulated to the level noted in the R-Tank Maintenance Guide or beyond a level acceptable to the Owner's engineer, the R-Tank system should be flushed. A flushing event consists of pumping water into the Maintenance Port and/or adjacent structure, allowing the turbulent flows through the R-Tank system to re-suspend the fine sediments. If multiple Maintenance Ports have been installed, water should be pumped into each port to maximize flushing efficiency. Sediment-laden water can be filtered through a Dirtbag or approved equivalent if permitted by the locality.

ENGINEER OF RECORD TO REVIEW, APPROVE AND ENDORSE FINAL SITE SPECIFIC DESIGN.

FOR ADDITIONAL INFORMATION PLEASE CONTACT:
ACF ENVIRONMENTAL 1-800-448-3636
www.acfenvironmental.com

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R-TANK SPECIFICATION
RIVERS EDGE
MONROE, WA
SITE DESIGNATION: INFILTRATION GALLERY
ACF ENVIRONMENTAL, 1-800-448-3636, www.acfenvironmental.com

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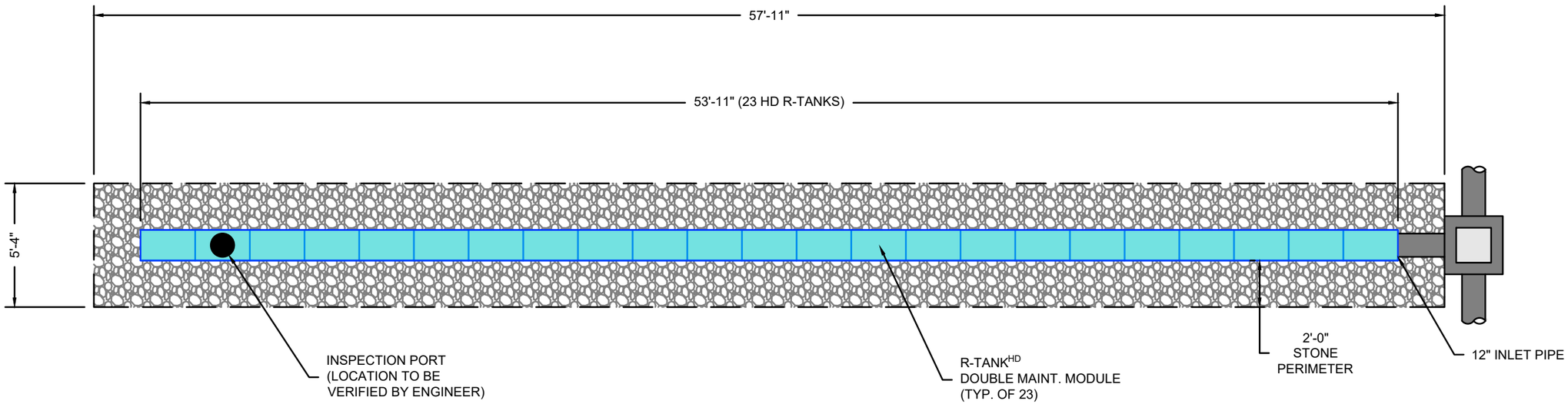
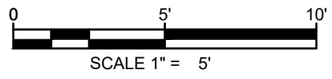
11/28/18

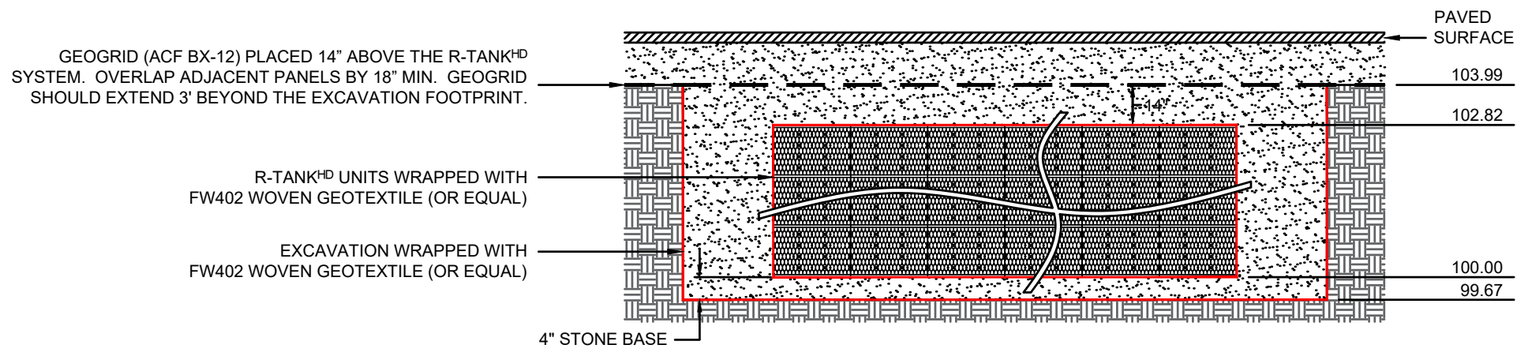
SHEET NO.
7 of 7



NOTE:
1. THE LAYOUT ABOVE IS PROVIDED AS A TYPICAL DESIGN FOR 4 INDIVIDUAL INFILTRATION TRENCHES SHOWN ON PLANS AS 95'x4'x4'.
2. ELEVATIONS ARE PROVIDED AS REFERENCE, REFER TO CIVIL PLANS FOR SITE SPECIFIC ELEVATION INFORMATION.
3. QUANTITIES LISTED BELOW ARE FOR EACH INDIVIDUAL TRENCH.



LAYOUT SCALE	1" = 5'
R-TANK HD MODULE TYPE	DOUBLE
TRAFFIC LOAD	HS-20
# OF DOUBLE R-TANK MAINTENANCE MODULES	23
TOTAL SYSTEM STORAGE	601 CF
R-TANK STORAGE VOLUME	190 CF
STONE STORAGE VOLUME (40% VOID RATIO)	411 CF
TOP OF COVER STONE ELEV. (14")	103.99
ACF BX-12 GEOGRID ELEV.	103.99
TOP OF R-TANK ELEV.	102.82
TANK INVERT	100.00
INVERT OF STONE BASE (4")	99.67
MIN. STONE PERIMETER WIDTH	2.0 FT
SEE SHEETS 3 - 6 FOR DETAILS AND ADDITIONAL INFORMATION	



R-TANK HD TANK WRAP & EXCAVATION ENVELOPE DETAIL

ENGINEER OF RECORD TO REVIEW, APPROVE AND ENDORSE FINAL SITE SPECIFIC DESIGN.

FOR ADDITIONAL INFORMATION PLEASE CONTACT:
ACF ENVIRONMENTAL 1-800-448-3636
www.acfenvironmental.com

R-TANK HD SYSTEM LAYOUT
RIVERS EDGE
MONROE, WA
SITE DESIGNATION: INFILTRATION TRENCHES
ACF ENVIRONMENTAL, 1-800-448-3636, www.acfenvironmental.com

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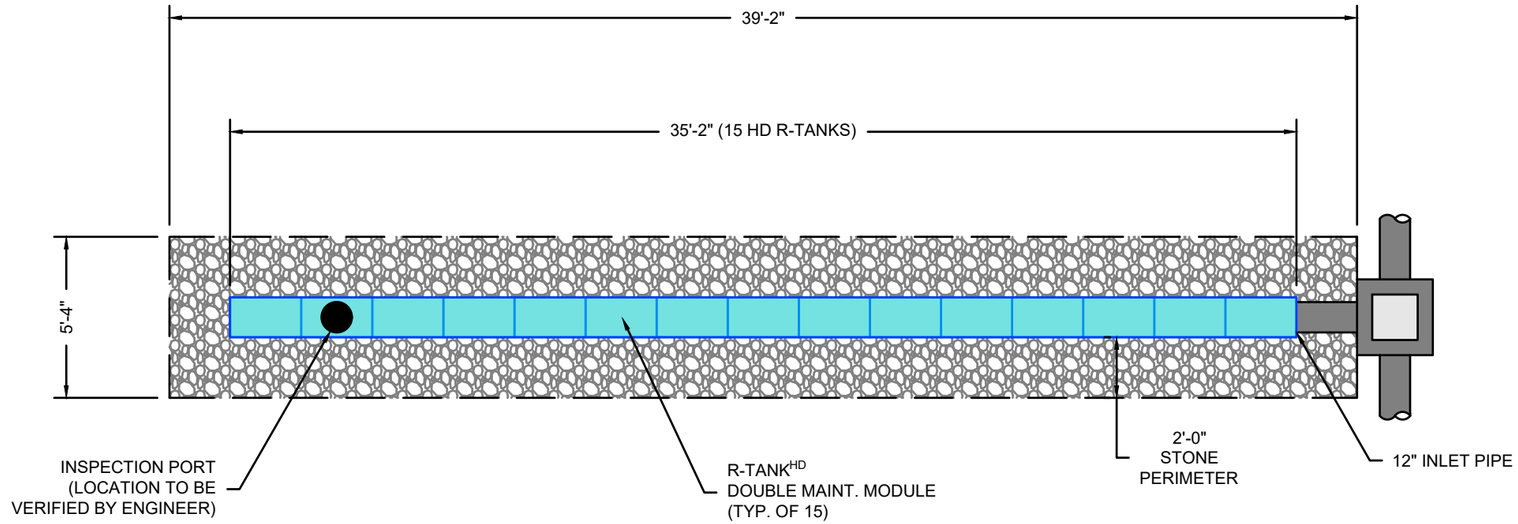
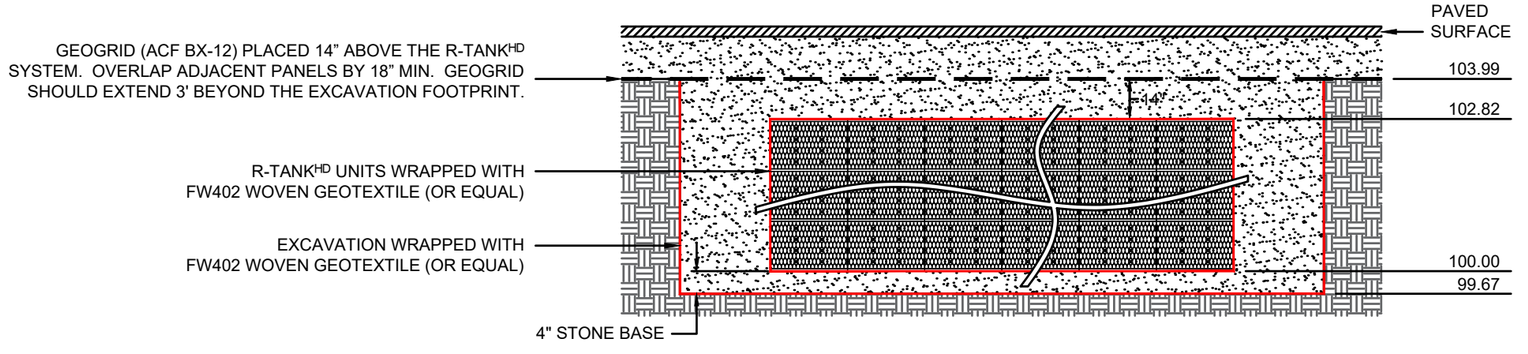
SHEET NO.: 1 of 6



NOTE:

1. THE LAYOUT ABOVE IS PROVIDED AS A DESIGN FOR 1 INFILTRATION TRENCH SHOWN ON PLANS AS 65'x4'x4'.
2. ELEVATIONS ARE PROVIDED AS REFERENCE, REFER TO CIVIL PLANS FOR SITE SPECIFIC ELEVATION INFORMATION.

LAYOUT SCALE	1" = 5'
R-TANK HD MODULE TYPE	DOUBLE
TRAFFIC LOAD	HS-20
# OF DOUBLE R-TANK MAINTENANCE MODULES	15
TOTAL SYSTEM STORAGE	404 CF
R-TANK STORAGE VOLUME	124 CF
STONE STORAGE VOLUME (40% VOID RATIO)	280 CF
TOP OF COVER STONE ELEV. (14")	103.99
ACF BX-12 GEOGRID ELEV.	103.99
TOP OF R-TANK ELEV.	102.82
TANK INVERT	100.00
INVERT OF STONE BASE (4")	99.67
MIN. STONE PERIMETER WIDTH	2.0 FT
SEE SHEETS 3 - 6 FOR DETAILS AND ADDITIONAL INFORMATION	



R-TANK HD TANK WRAP & EXCAVATION ENVELOPE DETAIL

ENGINEER OF RECORD TO REVIEW, APPROVE AND ENDORSE FINAL SITE SPECIFIC DESIGN.

FOR ADDITIONAL INFORMATION PLEASE CONTACT:
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R-TANK HD SYSTEM LAYOUT
RIVERS EDGE
MONROE, WA
SITE DESIGNATION: INFILTRATION TRENCHES
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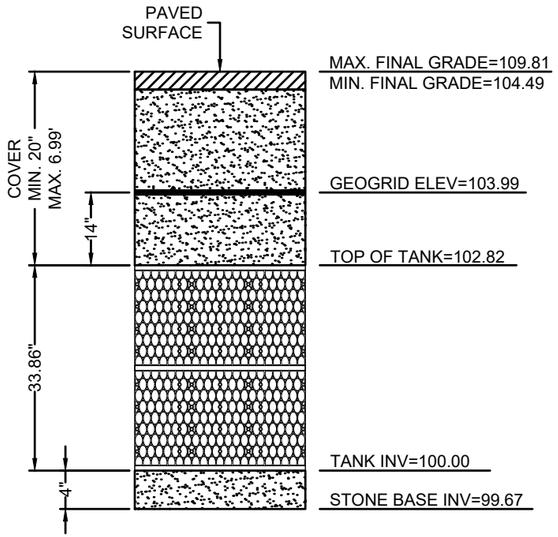
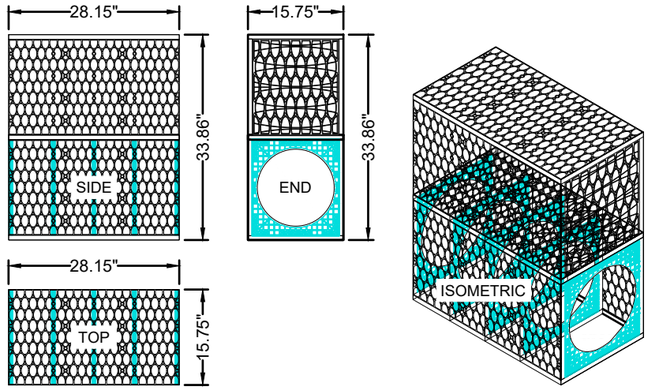
2 of 6



NOTE:
ELEVATIONS ARE PROVIDED AS REFERENCE, REFER TO CIVIL PLANS FOR SITE SPECIFIC ELEVATION INFORMATION.

DOUBLE R-TANK^{HD} - ELEVATION



MODULE DATA

GEOMETRY:	**LOAD RATING:**
LENGTH = 28.15 IN. (715 MM)	33.4 PSI, (MODULE ONLY)
WIDTH = 15.75 IN. (400 MM)	HS20, (WITH ACF COVER SYSTEM)
HEIGHT = 33.86 IN. (860 MM)	**MATERIAL:**
TANK VOLUME = 8.69 CF	100% RECYCLED POLYPROPYLENE
STORAGE VOLUME = 8.25 CF	**SMALL PLATES PER**
VOID INTERNAL VOLUME: 95%	**SEGMENT/TOTAL:**
VOID SURFACE AREA: 90%	5/10

DOUBLE R-TANK^{HD} - MODULE DETAIL

R-TANK^{HD} QUANTITIES	
R-TANK^{HD} MODULE TYPE	DOUBLE
# OF DOUBLE R-TANK MAINTENANCE MODULES	107
FW402 WOVEN GEOTEXTILE TANK WRAP	2,435 SF (271 SY)
FW402 WOVEN GEOTEXTILE EXCAVATION WRAP	4,623 SF (514 SY)
ACF BX-12 GEOGRID	3,405 SF (378 SY)
12" INSPECTION PORTS	5
12" PIPE BOOTS	5
NOTE: GEOTEXTILE / LINER QUANTITIES INCLUDE A 15% WASTE FACTOR.	

ENGINEER OF RECORD TO REVIEW, APPROVE AND ENDORSE FINAL SITE SPECIFIC DESIGN.

FOR ADDITIONAL INFORMATION PLEASE CONTACT:
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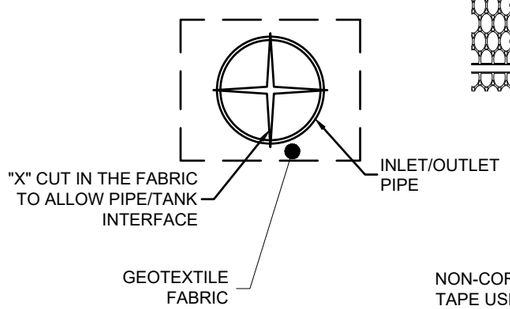
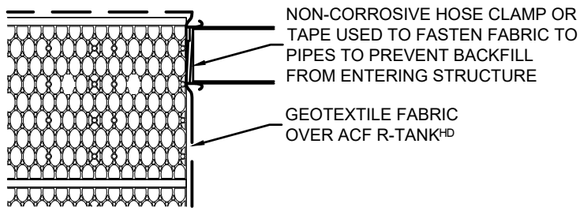
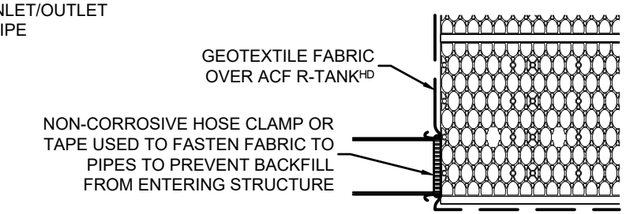
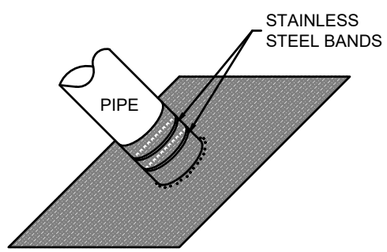
END VIEW OF PIPE/FABRIC CONNECTION. CUT AN "X" IN THE FABRIC SLIGHTLY LARGER THAN PIPE, PULL THE FABRIC AROUND THE PIPE TO CREATE THE "BOOT" AND THEN SECURE WITH A HOSE-CLAMP.



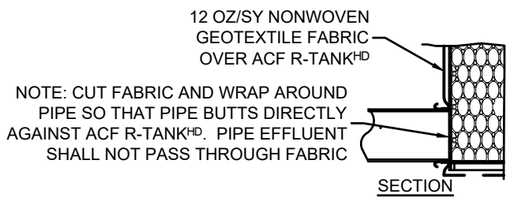


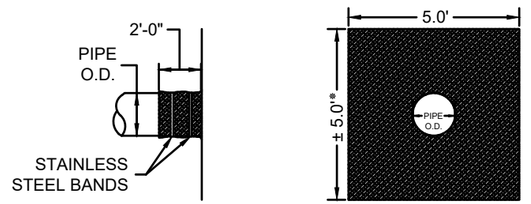


R-TANK^{HD} TYPICAL TANK INLET/OUTLET DETAIL



- 12 OZ/SY NONWOVEN GEOTEXTILE
- FABRIC COLLAR TO FIT OUTSIDE DIAMETER OF INLET/OUTLET PIPE
- * TRIM AS NEEDED





GEOTEXTILE PIPE BOOT FOR R-TANK^{HD}

R-TANK^{HD} SYSTEM DETAILS
RIVERS EDGE
MONROE, WA
SITE DESIGNATION: INFILTRATION TRENCHES
ACF ENVIRONMENTAL, 1-800-448-3636, www.acfenvironmental.com

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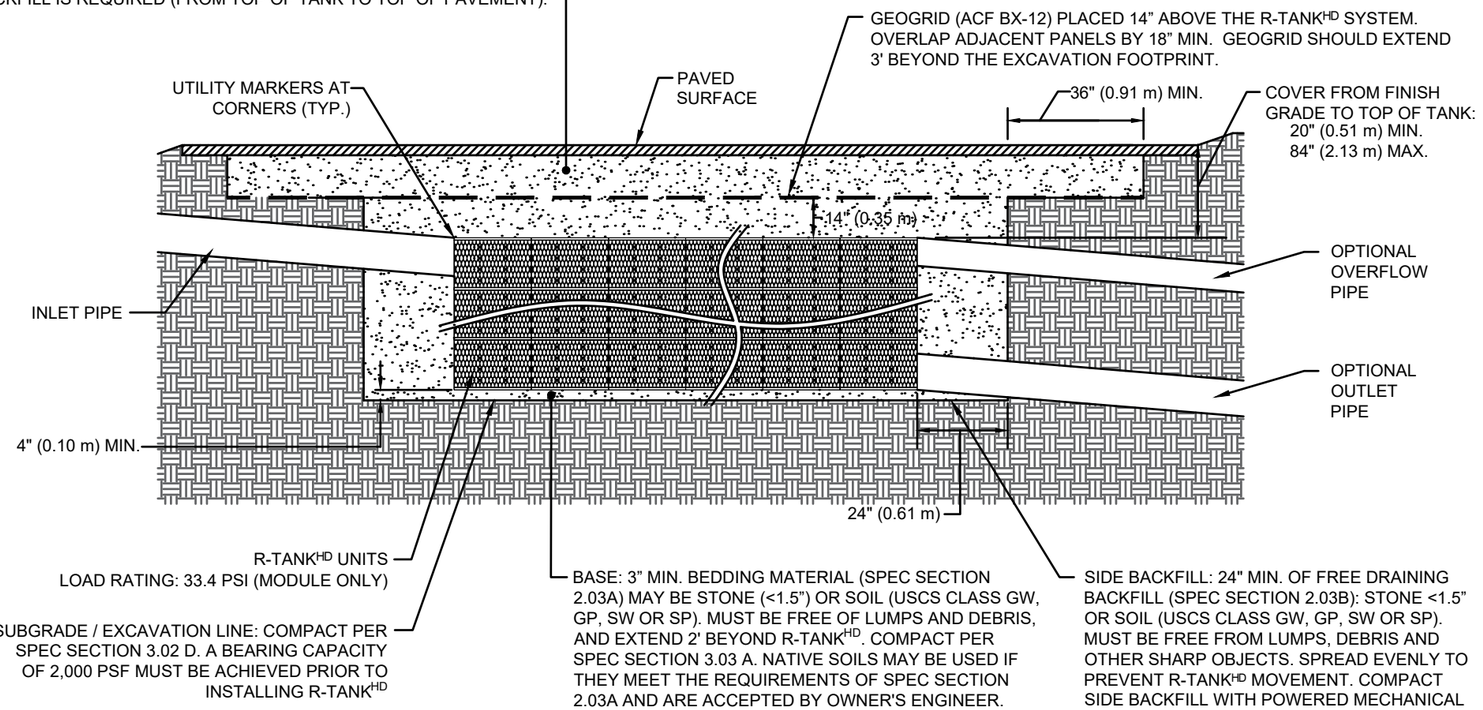
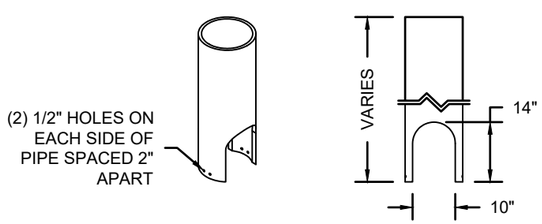
TOTAL COVER: 20” MINIMUM AND 84” MAXIMUM. FIRST 12” MUST BE FREE DRAINING BACKFILL (SPEC SECTION 2.03B): STONE <1.5” OR SOIL (USCS CLASS GW, GP, SW OR SP). ADDITIONAL FILL MAY BE STRUCTURAL FILL (SPEC SECTION 2.03C): STONE OR SOIL (USCS CLASS SM, SP, SW, GM, GP OR GW) WITH MAX CLAY CONTENT<10%, MAX 25% PASSING NO. 200 SIEVE, AND MAX PLASTICITY INDEX OF 4. A MIN. 12” COVER MUST BE MAINTAINED BETWEEN BACKFILL EQUIPMENT AND THE TOP OF THE R-TANK™ SYSTEM AT ALL TIMES. TOTAL HEIGHT OF TOP BACKFILL SHOULD NOT EXCEED 7'. CONTACT ACF ENVIRONMENTAL IF MORE THAN 7' OR LESS THAN 20" OF TOP BACKFILL IS REQUIRED (FROM TOP OF TANK TO TOP OF PAVEMENT).

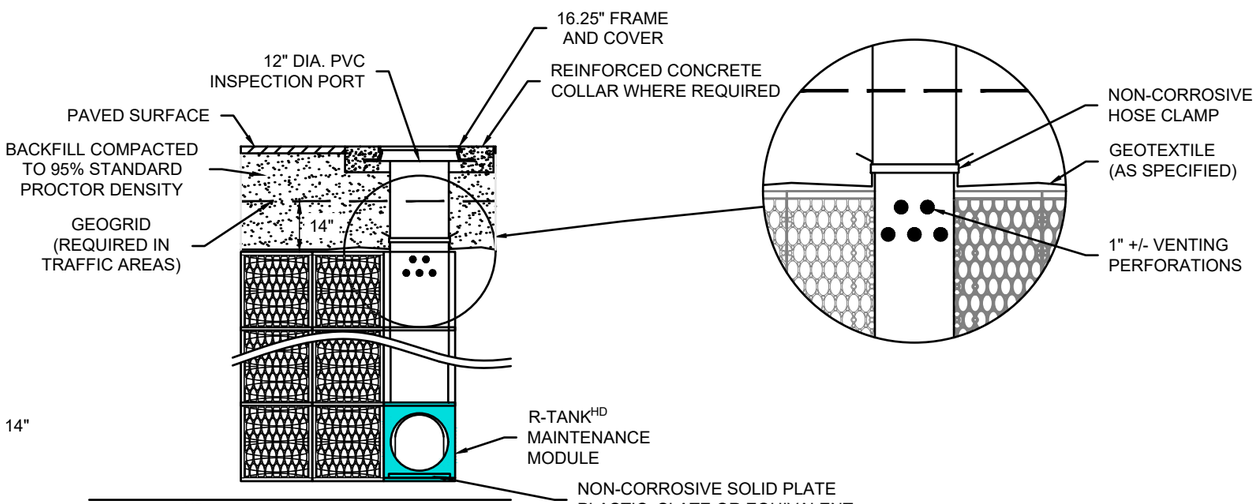
NOTES:
1. FOR COMPLETE MODULE DATA, SEE APPROPRIATE R-TANK^{HD} MODULE SHEET .
2. INSTALLATIONS PER THIS DETAIL MEET GUIDELINES OF HL-93 LOADING PER THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, CUSTOMARY U.S. UNITS, 7TH EDITION, 2014 WITH 2015 AND 2016 INTERIM REVISIONS.
3. PRE-TREATMENT STRUCTURES NOT SHOWN.
4. FOR INFILTRATION APPLICATIONS, GEOTEXTILE ENVELOPING R-TANK SHALL BE ACF M200 (PER SPEC SECTION 2.02A) AND BASE SHALL BE 4" MIN. UNCOMPACTED FREE DRAINING BACKFILL (SPEC SECTION 2.03A) TO PROVIDE A LEVEL BASE. SURFACE MUST BE SMOOTH, FREE OF LUMPS OR DEBRIS, AND EXTEND 2' BEYOND R-TANK^{HD} FOOTPRINT.



R-TANK^{HD} & H-20 LOADS - SECTION VIEW

NOTES
1. THE INSPECTION PORT IS USED IN THE MAINTENANCE MODULE TO INSPECT THE LEVEL OF SEDIMENT ACCUMULATION.
2. MINIMUM REQUIRED MAINTENANCE INCLUDES A QUARTERLY INSPECTION DURING THE FIRST YEAR OF OPERATION AND A YEARLY INSPECTION THEREAFTER. FLUSH AS NEEDED.
3. ONLY R-TANK^{HD} AND R-TANK^{SD} MAY BE USED IN TRAFFIC APPLICATIONS.
4. SEE TRAFFIC LOADING DETAIL FOR MINIMUM & MAXIMUM COVER REQUIREMENTS.





R-TANK^{HD} TYPICAL INSPECTION PORT

ENGINEER OF RECORD TO REVIEW, APPROVE AND ENDORSE FINAL SITE SPECIFIC DESIGN.

FOR ADDITIONAL INFORMATION PLEASE CONTACT:
ACF ENVIRONMENTAL 1-800-448-3636
www.acfenvironmental.com

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R-TANK^{HD} SYSTEM DETAILS
RIVERS EDGE
MONROE, WA
SITE DESIGNATION: INFILTRATION TRENCHES
ACF ENVIRONMENTAL, 1-800-448-3636, www.acfenvironmental.com

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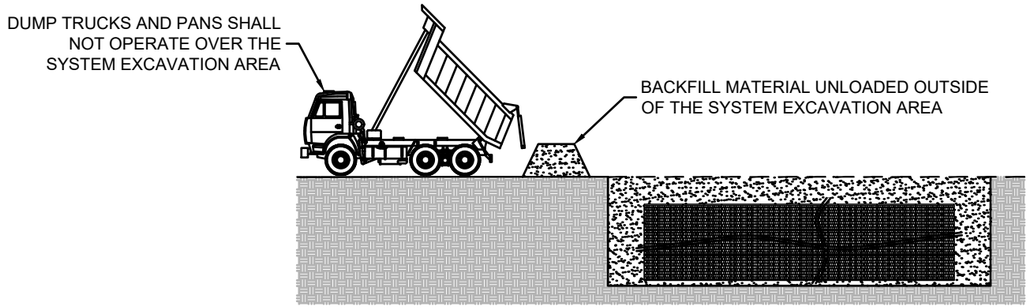
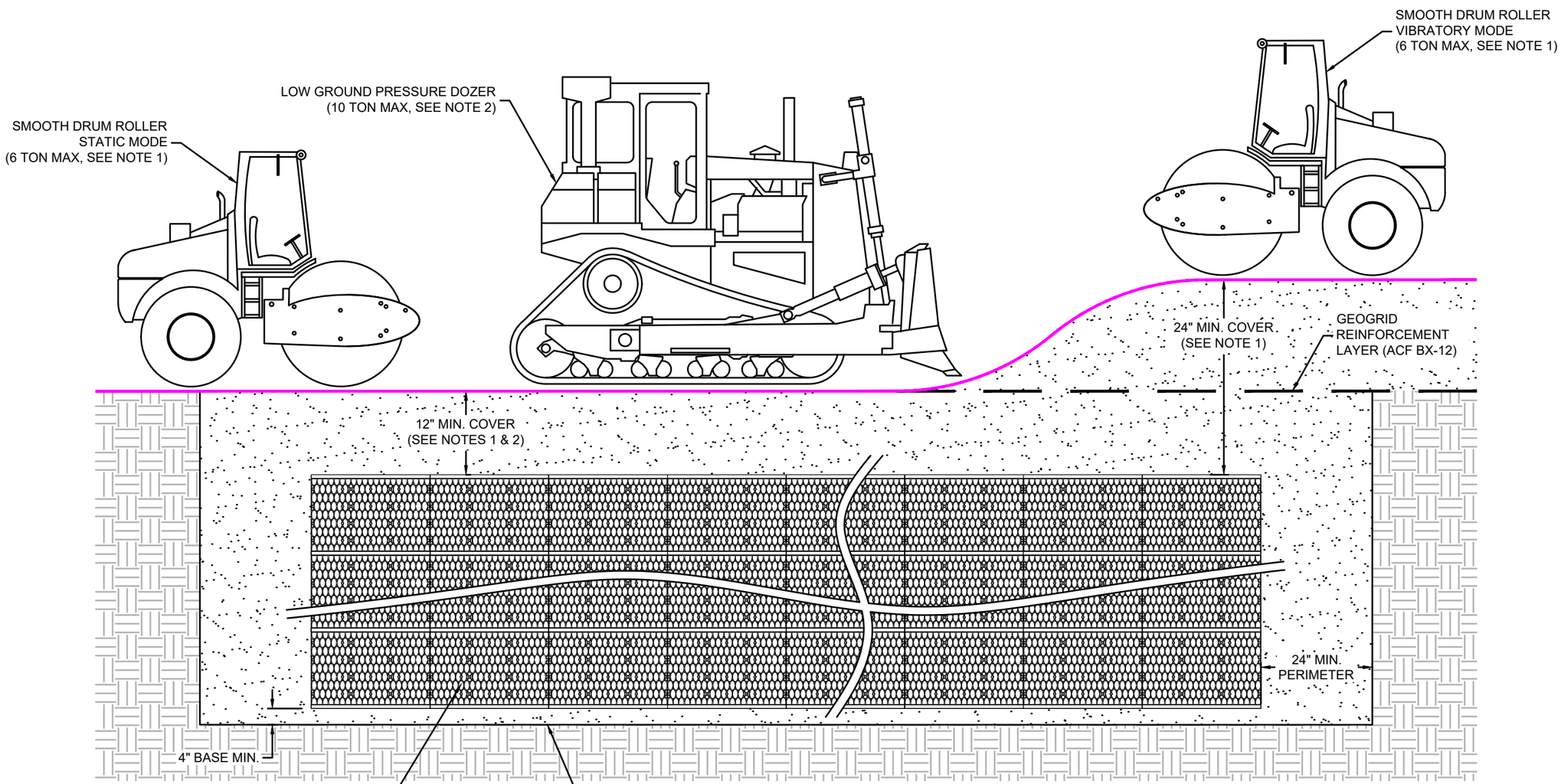


DUMP TRUCK DETAIL (SEE NOTE 3)

NOTES:

1. FOLLOWING PLACEMENT OF SIDE BACKFILL, A UNIFORM 12" LIFT OF THE FREELY DRAINING MATERIAL (SPEC SECTION 2.03 B) SHALL BE PLACED OVER THE R-TANK AND LIGHTLY COMPACTED USING A WALK-BEHIND TRENCH ROLLER. ALTERNATELY, A ROLLER (MAXIMUM GROSS VEHICLE WEIGHT OF 6 TONS) MAY BE USED. ROLLER MUST REMAIN IN STATIC MODE UNTIL A MINIMUM OF 24" OF COVER HAS BEEN PLACED OVER THE MODULES. SHEEP FOOT ROLLERS SHOULD NOT BE USED. **SPEC SECTION 3.05 A**
2. ONLY LOW PRESSURE TIRE OR TRACK VEHICLES (LESS THAN 7 PSI AND OPERATING WEIGHT OF LESS THAN 20,000 LBS) SHALL BE OPERATED OVER THE R-TANK SYSTEM DURING CONSTRUCTION. **SPEC SECTION 3.05 B**
3. DUMP TRUCKS AND PANS SHALL NOT BE OPERATED WITHIN THE R-TANK SYSTEM AT ANY TIME. WHERE NECESSARY, THE HEAVY EQUIPMENT SHOULD UNLOAD IN AN AREA ADJACENT TO THE R-TANK SYSTEM AND THE MATERIAL SHOULD BE MOVED OVER THE SYSTEM WITH TRACKED EQUIPMENT. **SPEC SECTION 3.05 B**
4. ENSURE THAT ALL UNRELATED CONSTRUCTION TRAFFIC IS KEPT AWAY FROM THE LIMITS OF EXCAVATION UNTIL THE PROJECT IS COMPLETE AND FINAL SURFACE MATERIALS ARE IN PLACE. NO NON-INSTALLATION RELATED LOADING SHOULD BE ALLOWED OVER THE R-TANK SYSTEM UNTIL THE FINAL DESIGN SECTION HAS BEEN CONSTRUCTED (INCLUDING PAVEMENT). **SPEC SECTION 3.05 C**
5. SEE R-TANK INSTALLATION GUIDE OR CONTACT YOUR LOCAL ACF REPRESENTATIVE FOR ADDITIONAL INFORMATION.



CONSTRUCTION EQUIPMENT COVER DETAIL - VEHICULAR TRAFFIC

ENGINEER OF RECORD TO REVIEW, APPROVE AND ENDORSE FINAL SITE SPECIFIC DESIGN.

FOR ADDITIONAL INFORMATION PLEASE CONTACT:
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ACF ENVIRONMENTAL
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R-TANK^HD CONSTRUCTION EQUIPMENT COVER DETAIL
RIVERS EDGE
MONROE, WA
SITE DESIGNATION: INFILTRATION TRENCHES
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DATE: 11/28/18
SHEET NO.: 5 of 6

R-TANK SPECIFICATION

PART 1 - GENERAL

1.01 Related Documents

A. Drawings, technical specification and general provisions of the Contract as modified herein apply to this section.

1.02 Description of Work Included

A. Provide excavation and base preparation per geotechnical engineer's recommendations and/or as shown on the design drawings, to provide adequate support for project design loads and safety from excavation sidewall collapse. Excavations shall be in accordance with the owner's and OSHA requirements.

B. Provide and install R-Tank^{LD}, R-Tank^{HD}, R-Tank^{SD}, or R-Tank^{UD} system (hereafter called R-Tank) and all related products including fill materials, geotextiles, geogrids, inlet and outlet pipe with connections per the manufacturer's installation guidelines provided in this section.

C. Provide and construct the cover of the R-Tank system including; stone backfill, structural fill cover, and pavement section as specified.

D. Protect R-Tank system from construction traffic after installation until completion of all construction activity in the installation area.

1.03 Quality Control

A. All materials shall be manufactured in ISO certified facilities.

B. Installation Contractor shall demonstrate the following experience:

1. A minimum of three R-Tank or equivalent projects completed within 2 years; and,
2. A minimum of 25,000 cubic feet of storage volume completed within 2 years.
3. Contractor experience requirement may be waived if the manufacturer's representative provides on-site training and review during construction.

C. Installation Personnel: Performed only by skilled workers with satisfactory record of performance on bulk earthworks, pipe, chamber, or pond/landfill construction projects of comparable size and quality.

D. Contractor must have manufacturer's representative available for site review if requested by Owner.

1.04 Submittals

A. Submit proposed R-Tank layout drawings. Drawings shall include typical section details as well as the required base elevation of stone and tanks, minimum cover requirements and tank configuration.

B. Submit manufacturer's product data, including compressive strength and unit weight.

C. Submit manufacturer's installation instructions.

D. Submit R-Tank sample for review. Reviewed and accepted samples will be returned to the Contractor.

E. Submit material certificates for geotextile, geogrid, base course and backfill materials.

F. Submit required experience and personnel requirements as specified in Section 1.03.

G. Any proposed equal alternative product substitution to this specification must be submitted for review and approved prior to bid opening. Review package should include third party reviewed performance data that meets or exceeds criteria in Table 2.01 B.

1.05 Delivery, Storage, and Handling

A. Protect R-Tank and other materials from damage during delivery, and store UV sensitive materials under tarp to protect from sunlight when time from delivery to installation exceeds two weeks. Storage of materials should be on smooth surfaces, free from dirt, mud and debris.

B. Handling is to be performed with equipment appropriate to the materials and site conditions, and may include hand, handcart, forklifts, extension lifts, etc.

C. Cold weather:

1. Care must be taken when handling plastics when air temperature is 40 degrees or below as plastic becomes brittle.
2. Do not use frozen materials or materials mixed or coated with ice or frost.
3. Do not build on frozen ground or wet, saturated or muddy subgrade.

1.06 Preinstallation Conference.

A. Prior to the start of the installation, a preinstallation conference shall occur with the representatives from the design team, the general contractor, the excavation contractor, the R-Tank installation contractor, and the manufacturer's representative.

1.07 Project Conditions

A. Coordinate installation for the R-Tank system with other on-site activities to eliminate all non-installation related construction traffic over the completed R-Tank system. No loads heavier than the design loads shall be allowed over the system, and in no case shall loads higher than a standard AASHTO HS20 (or HS25, depending on design criteria) load be allowed on the system at any time.

B. Protect adjacent work from damage during R-Tank system installation.

C. All pre-treatment systems to remove debris and heavy sediments must be in place and functional prior to operation of the R-Tank system. Additional pretreatment measures may be needed if unit is operational during construction due to increased sediment loads.

D. Contractor is responsible for any damage to the system during construction.

PART 2 - PRODUCTS

2.01 R-Tank Units

A. R -Tank - Injection molded plastic tank plates assembled to form a 95% void modular structure of predesigned height (custom for each project).

B. R-Tank units shall meet the following Physical & Chemical Characteristics:

PROPERTY	DESCRIPTION	R-Tank^{LD} VALUE	R-Tank^{HD} VALUE	R-Tank^{SD} VALUE	R-Tank^{UD} VALUE
Void Area	Volume available for water storage	95%	95%	95%	95%
Surface Void Area	Percentage of exterior available for infiltration	90%	90%	90%	90%
Compressive Strength	ASTM D 2412 / ASTM F 2418	30.0 psi	33.4 psi	42.9 psi	134.2 psi
HS-20 Minimum Cover	Cover required to support HS-20 loads	N/A	20"	18"	12" (STONE BACKFILL)
HS-25 Minimum Cover	Cover required to support HS-25 loads	N/A	24"	19"	15" (STONE BACKFILL)
Maximum Cover	Maximum allowable cover depth	3 feet	< 7 feet	< 10 feet	5 feet
Unit Weight	Weight of plastic per cubic foot of tank	3.29 lbs / cf	3.62 lbs/cf	3.96 lbs / cf	4.33 lbs / cf
Rib Thickness	Thickness of load-bearing members	0.18 inches	0.18 inches	0.18 inches	N/A
Service Temperature	Safe temperature range for use	-14 – 167° F	-14 – 167° F	-14 – 167° F	-14 – 167° F

C. Supplier: ACF Environmental 2831 Cardwell Road Richmond, VA 23234
(T): 800-448-3636; (F): 804-743-7779 www.acfenvironmental.com

2.02 Geosynthetics

A. Geotextile. A geotextile envelope is required to prevent backfill material from entering the R-Tank modules.

1. Standard Application: The standard geotextile shall be an 8 oz per square yard nonwoven geotextile (ACF N080 or equivalent).
2. Infiltration Applications: When water must infiltrate/exfiltrate through the geotextile as a function of the system design, a woven monofilament (ACF M200 or equivalent) shall be used.

B. Geogrid. For installations subject to traffic loads and/or when required by project plans, install geogrid (ACF BX12 or equivalent) to reinforce backfill above the R-Tank system. Geogrid is not always required for R-Tank^{UD} installations, and is often not required for non-traffic load applications.

2.03 Backfill & Cover Materials

A. Bedding Materials: Stone (angular and smaller than 1.5" in diameter) or soil (GW, GP, SW, or SP as classified by the Unified Soil Classification System) shall be used below the R-Tank system (3" minimum). Material must be free from lumps, debris, and any sharp objects that could cut the geotextile. Material shall be within 3 percent of the optimum moisture content as determined by ASTM D698 at the time of installation. For infiltration applications bedding material shall be free draining.

B. Side and Top Backfill: Free draining material shall be used adjacent to (24" minimum) and above (for the first 12") the R-Tank system. Material must be free from lumps, debris and any sharp objects that could cut the geotextile. Material shall be within 3 percent of the optimum moisture content as determined by ASTM D698 at the time of installation.

1. For LD, HD, and SD modules, backfill materials shall be free draining stone (angular and smaller than 1.5" in diameter) or soil (GW, GP, SW, or SP as classified by the Unified Soil Classification System).
2. For UD modules in traffic loaded (HS-20) applications with less than 14" of top cover, side backfill materials shall be free draining stone (angular and smaller than 1.5" in diameter). The use of soil backfill on the sides of the UD module is not permitted unless the modules are installed outside of traffic areas or with cover depths of > 14". Top backfill material may be stone or soil as noted above (Section 2.03 B 1).

C. Additional Cover Materials: Structural Fill shall consist of granular materials meeting the gradational requirements of SM, SP, SW, GM, GP or GW as classified by the Unified Soil Classification System. Structural fill shall have a maximum of 25 percent passing the No. 200 sieve, shall have a maximum clay content of 10 percent and a maximum Plasticity Index of 4. Material shall be within 3 percent of the optimum moisture content as determined by ASTM D698 at the time of installation.

2.04 Other Materials

Utility Marker: Install metallic tape at corners of R-Tank system to mark the area for future utility detection.

PART 3 - EXECUTION

3.01 Assembly of R-Tank Units

A. Assembly of modules shall be performed in accordance with the R-Tank Installation Manual, Section 2.

3.02 Layout and Excavation

A. Installer shall stake out, excavate, and prepare the subgrade area to the required plan grades and dimensions, ensuring that the excavation is at least 2 feet greater than R-Tank dimensions in each direction allowing for installation of geotextile filter fabric, R-Tank modules, and free draining backfill materials.

B. All excavations must be prepared with OSHA approved excavated sides and sufficient working space.

C. Protect partially completed installation against damage from other construction traffic by establishing a perimeter with high visibility construction tape, fencing, barricades, or other means until construction is complete.

D. Base of the excavation shall be uniform, level, and free of lumps or debris and soft or yielding subgrade areas. A minimum 2,000 pounds per square foot bearing capacity is required.

1. Standard Applications: Compact subgrade to a minimum of 95% of Standard Proctor (ASTM D698) density or as required by the Owner's engineer.
2. Infiltration Applications: Subgrade shall be prepared in accordance with the contract documents. Compaction of subgrade should not be performed in infiltration applications.

E. Unsuitable Soils or Conditions: All questions about the base of the excavation shall be directed to the owner's engineer, who will approve the subgrade conditions prior to placement of stone. The owner's engineer shall determine the required bearing capacity of the R-Tank subgrade; however in no case shall a bearing capacity of less than 2,000 pounds per square foot be provided.

1. If unsuitable soils are encountered at the subgrade, or if the subgrade is pumping or appears excessively soft, repair the area in accordance with contract documents and/or as directed by the owner's engineer.
2. If indications of the water table are observed during excavation, the engineer shall be contacted to provide recommendations.
3. Do not start installation of the R-Tank system until unsatisfactory subgrade conditions are corrected and the subgrade conditions are accepted by the owner's engineer.

3.03 Preparation of Base

A. Place a thin layer (3" unless otherwise specified) of bedding material (Section 2.03 A), over the subgrade to establish a level working platform for the R-Tank modules. Level to within ½" (+/- ¼") or as shown on the plans. Native subgrade soils or other materials may be used if determined to meet the requirements of 2.03 A and are accepted by the owner's engineer.

1. Standard Applications: Static roll or otherwise compact bedding materials until they are firm and unyielding.
2. Infiltration Applications: Bedding materials shall be prepared in accordance with the contract documents.

B. Outline the footprint of the R-Tank system on the excavation floor using spray paint or chalk line to ensure a 2' perimeter is available around the R-Tank system for proper installation and compaction of backfill.

3.04 Installation of the R-Tanks

A. Where a geotextile wrap is specified on the stone base, cut strips to length and install in excavation, removing wrinkles so material lays flat. Overlap geotextile a minimum 12" or as recommended by manufacturer.

B. Where an impervious liner (for containment) is specified, install the liner per manufacturer's recommendations and the contract documents. The R-Tank units shall be separated from impervious liner by a non-woven geotextile fabric installed accordance with Section 3.04A.

C. Install R-Tank modules by placing side by side, in accordance with the design drawings. No lateral connections are required. It is advisable to use a string line to form square corners and straight edges along the perimeter of the R-Tank system. The modules are to be oriented as per the design drawing with required depth as shown on plans..

1. For LD, HD, and SD installations, the large side plate of the tank should be placed on the perimeter of the system. This will typically require that the two ends of the tank area will have a row of tanks placed perpendicular to all other tanks. If this is not shown in the construction drawings, it is a simple field adjustment that will have minimal effect on the overall system footprint. Refer to R-Tank Installation Guide for more details
2. For UD installations, there is no perpendicular end row required.

D. Wrap the R-Tank top and sides in specified geotextile. Cut strips of geotextile so that it will cover the sides and top, encapsulating the entire system to prevent backfill entry into the system. Overlap geotextile 12" or as recommended by manufacturer. Take great care to avoid damage to geotextile (and, if specified, impervious liner) during placement.

E. Identify locations of inlet, outlet and any other penetrations of the geotextile (and optional liner). These connections should be installed flush (butted up to the R-Tank) and the geotextile fabric shall be cut to enable hydraulic continuity between the connections and the R-Tank units. These connections shall be secured using pipe boots with stainless steel pipe clamps. Support pipe in trenches during backfill operations to prevent pipe from settling and damaging the geotextile, impervious liner (if specified) or pipe. Connecting pipes at 90 degree angles facilitates construction, unless otherwise specified. Ensure end of pipe is installed snug against R-Tank system.

F. Install Inspection and Maintenance Ports in locations noted on plans. At a minimum one maintenance port shall be installed within 10' of each inlet & outlet connection, and with a maximum spacing of one maintenance port for every 2,500 square feet. Install all ports as noted in the R-Tank Installation Guide.

G. If required, install ventilation pipes and vents as specified on drawings to provide ventilation for proper hydraulic performance. The number of pipes and vents will depend on the size of the system. Vents are often installed using a 90 degree elbow with PVC pipe into a landscaped area with 'U" bend or venting bollard to inhibit the ingress of debris. A ground level concrete or steel cover can be used.

3.05 Backfilling of the R-Tank Units

A. Backfill and fill with recommended materials as follows:

1. Place freely draining backfill materials (Section 2.03 B) around the perimeter in lifts with a maximum thickness of 12". Each lift shall be placed around the entire perimeter such that each lift is no more than 24" higher than the side backfill along any other location on the perimeter of the R-Tank system. No fill shall be placed over top of tanks until the side backfill has been completed.
2. Each lift shall be compacted at the specified moisture content to a minimum of 95% of the Standard Proctor Density until no further densification is observed (for self-compacting stone materials). The side lifts must be compacted with walk behind compaction equipment. Even when "self-compacting" backfill materials are selected, a walk behind vibratory compactor must be used.
3. Take care to ensure that the compaction process does not allow the machinery to come into contact with the modules due to the potential for damage to the geotextile and R-Tank units.
4. No compaction equipment is permissible to operate directly on the R-Tank modules.
5. Top Backfill:
   a. Typical Applications: Install a 12" (or as shown on plans) lift of freely draining material (Section 2.03 B) over the R-Tank Units, maintaining 12" between equipment tracks and R-Tank System.
   b. Shallow Applications (< 18" total cover): Install top backfill in accordance with plans.
   Lightly compacted using a walk-behind trench roller. Alternately, a roller (maximum gross vehicle weight of 6 tons) may be used. Roller must remain in static mode until a minimum of 24" of cover has been placed over the modules. Sheep foot rollers should not be used.
6. If required, install a geogrid as shown on plans. Geogrid shall extend a minimum of 3 feet beyond the limits of the excavation wall.
7. Following placement and compaction of the initial cover, subsequent lifts of structural fill (Section 2.03 C) shall be placed at the specified moisture content and compacted to a minimum of 95% of the Standard Proctor Density and shall cover the entire footprint of the R-Tank system. During placement of fill above the system, unless otherwise specified, a uniform elevation of fill shall be maintained to within 12" across the footprint of the R-Tank system. Do not exceed maximum cover depths listed in Table 2.01 B.
8. Place additional layers of geotextile and/or geogrid at elevations as specified in the design details. Each layer of geosynthetic reinforcement placed above the R-Tank system shall extend a minimum of 3 feet beyond the limits of the excavation wall.

B. Only low pressure tire or track vehicles shall be operated over the R-Tank system during construction. No machinery should drive on top of the tank until a minimum of 18" of backfill and compaction is achieved. Dump Trucks and Pans shall not be operated within the R-Tank system footprint at any time. Where necessary the heavy equipment should unload in an area adjacent to the R-Tank system and the material should be moved over the system with tracked equipment.

C. Ensure that all unrelated construction traffic is kept away from the limits of excavation until the project is complete and final surface materials are in place. No non-installation related loading should be allowed over the R-Tank system until the final design section has been constructed (including pavement).

D. Place surfacing materials, such as groundcovers (no large trees), or paving materials over the structure with care to avoid displacement of cover fill and damage to surrounding areas.

E. Backfill depth over R-Tank system must be within the limitations shown in the table in Section 2.01 B. If the total backfill depth does not comply with this table, contact engineer or manufacturer's representative for assistance.

PART 4 - USING THE SYSTEM

4.01 Maintenance Requirements

A. A routine maintenance effort is required to ensure proper performance of the R-Tank system. The Maintenance program should be focused on pretreatment systems. Ensuring these structures are clean and functioning properly will reduce the risk of contamination of the R-Tank system and stormwater released from the site. Pre-treatment systems shall be inspected yearly, or as directed by the regulatory agency and by the manufacturer (for proprietary systems). Maintain as needed using acceptable practices or following manufacturer's guidelines (for proprietary systems).

B. Inspection and/or Maintenance Ports in the R-Tank system will need to be inspected for accumulation of sediments at least quarterly through the first year of operation and at least yearly thereafter. This is done by removing the cap of the port and using a measuring device long enough to reach the bottom of the R-Tank system and stiff enough to push through the loose sediments, allowing a depth measurement.

C. If sediment has accumulated to the level noted in the R-Tank Maintenance Guide or beyond a level acceptable to the Owner's engineer, the R-Tank system should be flushed. A flushing event consists of pumping water into the Maintenance Port and/or adjacent structure, allowing the turbulent flows through the R-Tank system to re-suspend the fine sediments. If multiple Maintenance Ports have been installed, water should be pumped into each port to maximize flushing efficiency. Sediment-laden water can be filtered through a Dirtbag or approved equivalent if permitted by the locality.

HD R-TANK

ENGINEER OF RECORD TO REVIEW, APPROVE AND ENDORSE FINAL SITE SPECIFIC DESIGN.

FOR ADDITIONAL INFORMATION PLEASE CONTACT:
ACF ENVIRONMENTAL 1-800-448-3636
www.acfenvironmental.com

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R-TANK SPECIFICATION
RIVERS EDGE
MONROE, WA
SITE DESIGNATION: INFILTRATION TRENCHES
ACF ENVIRONMENTAL, 1-800-448-3636, www.acfenvironmental.com

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DATE
11/28/18

SHEET NO.
6 of 6

EXHIBIT 16

associated
earth sciences
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Subsurface Exploration, Geologic Hazard, Geotechnical Engineering Report, and Infiltration Assessment

RIVER'S EDGE

Monroe, Washington

Prepared For:

RIVER'S EDGE WA, LLLP

Project No. 180411E001
December 6, 2018

Associated Earth Sciences, Inc.
911 5th Avenue
Kirkland, WA 98033
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earth sciences
incorporated

December 6, 2018
Project No. 180411E001

River's Edge WA, LLLP
1525 9th Avenue, Suite 3505
Seattle, Washington 98101

Attention: Ms. Rebecca Ralston

Subject: Subsurface Exploration, Geologic Hazard, Geotechnical Engineering Report, and Infiltration Assessment
River's Edge
Monroe, Washington

Dear Ms. Ralston:

We are pleased to present the enclosed copies of our geotechnical report. This report summarizes the results of our subsurface exploration, geologic hazard, geotechnical engineering studies, infiltration assessment, and offers geotechnical recommendations for the design and development of the proposed project.

We have enjoyed working with you on this study and are confident that the recommendations presented in this report will aid in the successful completion of your project. Please contact me if you have any questions or if we can be of additional help to you.

Sincerely,
ASSOCIATED EARTH SCIENCES, INC.
Kirkland, Washington

Stephen A. Siebert, P.E.
Associate Geotechnical Engineer

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SUBSURFACE EXPLORATION, GEOLOGIC HAZARD, GEOTECHNICAL ENGINEERING REPORT, AND INFILTRATION ASSESSMENT

RIVER'S EDGE

Monroe, Washington

Prepared for:
River's Edge WA, LLLP
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Seattle, Washington 98101

Prepared by:
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December 6, 2018
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I. PROJECT AND SITE CONDITIONS

1.0 INTRODUCTION

This report presents the results of our subsurface exploration, geologic hazard, and preliminary geotechnical engineering study for the proposed River's Edge project in Monroe, Washington. The site location is shown on the "Vicinity Map," Figure 1. The approximate locations of explorations completed for this study are shown on the "Proposed Site and Exploration Plan," Figure 2. Surrounding area and the site are shown on the "Existing Site and Exploration," Figure 3. Interpretive exploration logs of the subsurface explorations completed for this study by Associated Earth Sciences, Inc. (AESI) are included in Appendix A. Previous explorations completed by others at the site are included in Appendix B. Laboratory test results are included in Appendix C. Infiltration test data sheets are included in Appendix D. Slope stability analyses results are included in Appendix E.

1.1 Purpose and Scope

The purpose of this study was to provide subsurface soil and groundwater data to be utilized in the design of the above-referenced project. Our study included reviewing available geologic literature, advancing 17 exploration borings, 12 exploration pits (two completed infiltration testing), and performing a geologic study to assess the type, thickness, distribution, and physical properties of the subsurface sediments and shallow groundwater conditions. Geotechnical engineering studies were completed to determine the type of suitable foundations, allowable foundation soil bearing pressures, ground improvement options anticipated foundation settlements, erosion considerations, infiltration assessment, and drainage considerations. This report summarizes our current fieldwork and offers geotechnical recommendations based on our present understanding of the project.

1.2 Authorization

Written authorization to proceed with this study was granted by Rebecca Ralston with River's Edge WA, LLLP on September 21, 2018. Our study was accomplished in general accordance with our proposal, dated September 20, 2018, and verbal approval to perform subsequent subsurface explorations. This report has been prepared for the exclusive use of River's Edge WA, LLP, and their agents, for specific application to this project. Within the limitations of scope, schedule, and budget, our services have been performed in accordance with generally accepted geotechnical engineering and engineering geology practices in effect in this area at the time our report was prepared. No other warranty, express or implied, is made.

2.0 PROJECT AND SITE DESCRIPTION

The subject site consists of six adjoining parcels, totaling 9.64 acres that form an irregularly shaped parcel located at the southeast corner of Ann Street and Fremont Street in Monroe, Washington (Snohomish County Parcel Numbers 27070600-302300, -300600, -300700, -303300, -300500, and 00465000001100) (Figure 1, "Vicinity Map"). Presently, the property is a gravel-surfaced lot with storage containers, some relatively small areas of concrete paving and loading docks, several single-story commercial buildings, and miscellaneous equipment, trucks, and materials. The topography of the site is relatively flat, except along its southeast margin where it slopes steeply down toward Woods Creek. Based on review of a provided survey, the height of the steep slopes ranges from approximately 12 to 32 feet.

We were provided with copies of previous environmental reports by others in preparation of our current report (Hart Crowser, 1990; Emcon, 1996; Farallon, 1999; and Landau, 2018). Previous subsurface exploration completed at the site by others indicates that much of the site is underlain by fill ranging in thickness from approximately 0.5 feet to in excess of 15 feet. An area in the east-northeast portion of the site is known to be underlain by fill containing wood waste and miscellaneous debris. The area underlain by this fill has been interpreted to extend onto a portion of the steep slope. The natural sediments underlying the fill have been identified by others as glacial outwash and older, potentially pre-Fraser-aged alluvium. Based on the existing exploration data, the depth to groundwater beneath the upper, relatively flat portion of the site is approximately 22 feet. Based on the existing data, key geotechnical considerations associated with site development include the presence of the existing, uncontrolled fill, liquefaction hazards, and landslide hazards associated with the steep slope located along the southeastern site margin.

It is our understanding that current development plans include demolition of the existing structures, and construction of five apartment buildings (designated A, B, C, D, and E) with a total of 160 units as shown on the "Proposed Site and Exploration Plan" (Figure 2). The project will also include paved parking and driveway areas and associated underground utilities. Development plans also include on-site infiltration of stormwater via an infiltration vault in the southwest corner of the site and infiltration trenches at each building.

3.0 SITE EXPLORATION

Our field studies conducted for this project in September and October 2018 included advancing 12 exploration borings and excavating 12 exploration pits. Five additional exploration borings were advanced in late November 2018. Two of the exploration pits were excavated for infiltration testing. The various types of sediments, as well as the depths where the characteristics of the sediments changed, are indicated on the exploration logs presented in Appendices A and B. The depths indicated on the logs where conditions changed may represent

gradational variations between sediment types. If changes occurred between sample intervals in our explorations, they were interpreted. Our explorations were approximately located in the field by measuring from known site features depicted on the preliminary plans referenced earlier. The locations of our explorations and relevant explorations completed by others are shown on Figure 2 relative to existing and proposed site features.

The conclusions and recommendations presented in this report are based, in part, on the explorations completed for this study. The number, locations, and depths of the explorations were completed within site and budgetary constraints. Because of the nature of exploratory work below ground, extrapolation of subsurface conditions between field explorations is necessary. It should be noted that differing subsurface conditions may sometimes be present due to the random nature of deposition and the alteration of topography by past grading and/or filling. The nature and extent of variations between the field explorations may not become fully evident until construction. If variations are observed at that time, it may be necessary to re-evaluate specific recommendations in this report and make appropriate changes.

3.1 Exploration Borings

For this study, exploration borings were completed by advancing an 8-inch, outside-diameter, hollow-stem auger using a truck-mounted drill working under subcontract to AESI. During the drilling process, samples were generally obtained at 5-foot-depth intervals. The borings were continuously observed and logged by a geologist from our firm. The exploration logs presented in Appendix A are based on the field logs, drilling action, and observation of the samples collected.

Disturbed, but representative samples were obtained by using the Standard Penetration Test (SPT) procedure in accordance with *American Society for Testing and Materials* (ASTM) D-1586. This test and sampling method consists of driving a standard 2-inch, outside-diameter, split-barrel sampler a distance of 18 inches into the soil with a 140-pound hammer free-falling a distance of 30 inches. The number of blows for each 6-inch interval is recorded, and the number of blows required to drive the sampler the final 12 inches is known as the Standard Penetration Resistance ("N") or blow count. If a total of 50 is recorded within one 6-inch interval, the blow count is recorded as the number of blows for the corresponding number of inches of penetration. The resistance, or N-value, provides a measure of the relative density of granular soils or the relative consistency of cohesive soils; these values are plotted on the attached exploration boring logs.

The samples obtained from the split-barrel sampler were classified in the field and representative portions placed in watertight containers. The samples were then transported to our laboratory for further visual classification and laboratory testing, as necessary.

3.2 Exploration and Infiltration Pits

The exploration and infiltration pits for this study were excavated using a steel-tracked 312DL CAT track hoe, working under subcontract to AESI. The pits permitted direct, visual observation of subsurface conditions. Materials encountered in the pits were studied and classified in the field by a geologist from AESI. After logging the exposed soils, the exploration and infiltration test pits were backfilled with the excavated soil and lightly tamped with the excavator bucket. The various types of materials and sediments encountered in the explorations, as well as the depths where characteristics of these materials changed, are indicated on the exploration logs included in Appendix A. The depths indicated on the logs where conditions changed may represent gradational variations between sediment types in the field.

Explorations to perform infiltration tests for this study were focused in the proposed infiltration vault area and consisted of two exploration pit/infiltration tests (IT-1 and IT-2).

4.0 SUBSURFACE CONDITIONS

Subsurface conditions on the project site were inferred from the field explorations conducted for this study, previous explorations completed by others, visual reconnaissance of the site, and a review of applicable geologic literature. As shown on the exploration logs, soils encountered at the site consisted of fill, Vashon recessional outwash deposits, and pre-Fraser non-glacial deposits. Not all units were encountered in each exploration. We reviewed J. Dragovich et al., 2011, *Geologic Map of the Monroe 7.5' Quadrangle, King and Snohomish Counties, Washington,* Washington Department of Natural Resources (DNR), scale 1:24,000. The deposits at the site were generally consistent with the regional map. The following section presents more detailed subsurface information on the sediment types encountered at the site.

4.1 Stratigraphy

Fill

Fill soils (those not naturally placed), were encountered in all of our exploration borings to depths ranging from 5 to 24 feet below the existing ground surface. The observed fill depths are deepest in the portion of the site closest to the southeast margin before topography slopes steeply down towards Woods Creek. The existing fill generally consisted of loose to medium dense, fine to medium sand, with variable amounts of silt and gravel. The observed existing fill includes variable amounts of wood debris, construction debris such as bricks, and other organic material. Fill encountered in exploration boring EB-2 to a depth of 24 feet consisted of loose wood waste material, likely associated with the previous timber operation onsite. Existing fill is not considered suitable for foundation support and may require mitigation for pavement, or

slab-on-grade floor support. Excavated existing fill material is suitable for reuse in structural fill applications if such reuse is specifically allowed by project plans and specifications, if excessively organic and any other deleterious materials are removed, and if moisture content is adjusted to allow compaction to the specified level and to a firm and unyielding condition. Based on our explorations completed for this study, we estimate the observed existing fill was above optimum moisture content for compaction purposes, and therefore may require drying during favorable weather prior to compaction in structural fill applications. Existing fill is not considered suitable for infiltration of stormwater runoff due to its high variability.

Vashon Recessional Outwash

Explorations encountered sediments generally consisting of loose to medium dense, light brown to light brownish gray, fine to medium sand with variable amounts of silt and gravel interpreted as Vashon recessional outwash sediments. Recessional outwash was deposited from meltwater streams from a retreating ice sheet and resembles alluvial sediments. Some of the Vashon recessional outwash sediments onsite contain a significant fine-grained fraction and are sensitive to excess moisture during placement in structural fill applications. Reuse of Vashon recessional outwash sediments in structural fill applications may require drying to achieve moisture contents within 1 to 2 percent of optimum for compaction purposes. Where permeable and unsaturated, Vashon recessional outwash sediments can be suitable for stormwater infiltration. Vashon recessional outwash sediments are suitable to support foundation loads when in a medium dense condition or when prepared as recommended in this report.

Pre-Fraser Non-Glacial Deposits

Eight of our exploration borings encountered fine-grained sediments stratigraphically below the existing fill soils and Vashon recessional outwash sediments that are interpreted to represent pre-Fraser sediments. At this site, the observed pre-Fraser sediments typically consisted of dense to very dense, gray to light brown, very silty fine sand and medium stiff to hard sandy silt, or silt with clay. The pre-Fraser sediments observed were faintly to moderately laminated or stratified and contained minor to abundant organic matter. These sediments were encountered at depths ranging from 25 feet to 31 feet below the surface and extended beyond the depths explored where encountered. These sediments were deposited prior to the most recent glaciation of the project region. The most recent glaciation, known as the Fraser Glaciation, occurred approximately 12,500 to 15,000 years ago. We do not expect these sediments to be used for structural support or reuse as fill due to the depth at which they were encountered. Pre-Fraser non-glacial sediments are generally considered unsuitable for infiltration of stormwater runoff due to their high fine-grained content and low permeability.

4.2 Review of Explorations by Others

We also reviewed selected logs presented in the referenced previous reports by others. We focused on recent explorations completed by Landau and Associates for environmental purposes on the southeast margin of the site. The subsurface soils encountered in these explorations are in general agreement with the soils encountered in our geotechnical explorations. Copies of exploration logs from these reports by others are included in Appendix B, and the approximate locations are shown on Figure 2.

4.3 Hydrology

Groundwater was encountered in the exploration borings completed by AESI at depths ranging from 26 to 30 feet below existing ground surface at the time of drilling (September 2018) and 21 feet below existing ground surface (November 2018). Subsurface explorations completed by Landau and Associates during June and August 2018 encountered similar groundwater levels to our explorations completed in September 2018. Groundwater seepage was generally encountered within the Vashon recessional outwash sediments and above the fine-grained pre-Fraser deposits. Observed occurrences of groundwater are noted on the AESI exploration boring logs presented in Appendix A and exploration logs by others in Appendix B. The groundwater encountered in our explorations is interpreted to represent an unconfined aquifer within the Vashon recessional outwash. AESI has conducted seasonal groundwater level monitoring at other sites in downtown Monroe and observed seasonal fluctuations on the order of 6 to 10 feet. A data logger has been installed by Landau Associates in their monitoring well P5-MW to monitor seasonal groundwater levels during the wet season. It should be noted that groundwater levels below the site vary in response to such factors as changes in season, precipitation, and off- and on-site land usage.

4.4 Laboratory Testing

Grain-Size Analysis

AESI performed four grain-size analyses (sieves) on representative samples of Vashon recessional outwash sediments collected from EB-11 at a depth of about 7.5 and 12.5 feet, IT-1 at a depth of about 5 to 5.5 feet, and IT-2 at a depth of about 5 to 5.5 feet. The grain-size analyses test results are included in Appendix C. The grain-size analyses test results are presented below in Table 1 with soil descriptions based on ASTM D-2487 Unified Soil Classification System (USCS). The respective fine-grained content for each sample was measured on the No. 200 sieve and is presented in Table 1.

Table 1
Summary of Grain-Size Analyses

Exploration Number	Depth (feet)	Geologic Unit	USCS Soil Description	Fines Content (%)
EB-11	7.5	Vashon Recessional Outwash	Silty, Gravelly, SAND (SM) Medium Sand is major constituent.	16.0
EB-11	12.5	Vashon Recessional Outwash	Silty, Gravelly, SAND (SM) Medium Sand is major constituent.	16.5
IT-1	5.5	Vashon Recessional Outwash	Very Sandy, GRAVEL (GW) Coarse Gravel is major constituent.	4.6
IT-2	5.5	Vashon Recessional Outwash	Very Sandy, GRAVEL (GW) Coarse Gravel is major constituent.	1.5

USCS - Unified Soil Classification System
% - percent of total weight

Organic Content

AESI performed two organic matter content analyses on representative samples of wood waste fill and fill soils collected from EB-2 at a depth of about 2.5, 7.5, 12.5, and 17.5 feet, and from EB-5 at a depth of about 2.5 feet. The test results are included in Appendix C. The analyses were performed according to ASTM D-2974 and are summarized below in Table 2.

Table 2
Moisture and Organic Matter Testing

Exploration Number	Depth (feet)	Moisture Content (%) (ASTM D2974)	Organic Matter (%) (ASTM D2974)
EB-2	2.5	40.8	23.1
EB-2	7.5	56.3	42.4
EB-2	12.5	31.4	14.0
EB-2	17.5	34.3	9.7
EB-5	2.5	29.9	9.7

% - percent of total weight

5.0 INFILTRATION TESTING AND METHODS

Infiltration testing was conducted to obtain representative infiltration rates for the proposed infiltration system. Infiltration data is included in Appendix D. Results of infiltration testing data are discussed in more detail in Section 16.0 of this report. Testing procedures are described below.

Two low-head Small-Scale Pilot Infiltration Tests (PITs) were completed at the locations noted on Figure 2 as IT-1 and IT-2. The equipment for testing was provided by Northwest Excavating and Trucking, working under subcontract to AESI. Water for the tests was conveyed from an on-site fire hydrant with lay flat hose and through an electronic flow meter assembly with instantaneous flow rate and total flow volume readouts. The flow rates and water levels were measured during testing every 5 to 15 minutes with an electronic water level tape. Infiltration test data sheets are included as Appendix C.

AESI generally conducted infiltration tests as follows: During the initial portion of infiltration testing, water was discharged onto the pit base through a diffuser for a "soaking period" of 6 hours to allow the receptor soils in the immediate vicinity of the pit to become saturated. After completion of the soaking period, the water level in the pit was maintained at a constant low head with constant inflow rates for an additional hour. After 7 hours, the inflow was disconnected, and the falling water level was monitored and recorded at timed intervals for at least 1 hour, or until water level was too low to measure with a water level tape.

The infiltration tests generally followed the procedures described in the 2014 Washington State Department of Ecology *Stormwater Management Manual for Western Washington* (Ecology Manual), and were completed as "in-situ" tests at the approximate locations of selected infiltration facilities based on direction from the project civil/stormwater engineer. Our field-based infiltration rate is considered a "short-term rate" which must be corrected using several factors outlined in the Ecology Manual: site variability and number of locations tested; type of field test method; and potential for long-term clogging due to siltation and bio-buildup.

II. GEOLOGIC HAZARDS AND MITIGATIONS

The following discussion of potential geologic hazards is based on the geologic, slope, and ground and surface water conditions, as observed and discussed herein.

6.0 LANDSLIDE HAZARDS AND MITIGATIONS

Review of a recent topographic survey of the site by CORE Design indicates the southeast slope descends steeply toward Woods Creek at inclinations of 30 to 50 percent over heights ranging from approximately 12 to 32 feet.

This slope classifies as a Landslide Hazard Area under the *Monroe Municipal Code* (MMC) Section 20.05.120.B.2 due to the following characteristics:

- The slope exhibits inclinations of 40 percent or more over a height in excess of 10 feet.
- The inclination of the slope exceeds 15 percent, hillsides intersecting geologic contacts with a relatively permeable sediment overlaying a relatively impermeable sediment, and exhibits emergent seepage

Section 20.05.120.H of the MMC states that for Landslide Hazard Areas, a minimum buffer equal to the height of the slope, or 50 feet, whichever is greater, must be established around all sides of the Landslide Hazard Area.

The buffer may be reduced to a minimum of 10 feet when a qualified professional demonstrates to the director's satisfaction that the reduction will adequately protect the proposed development, adjacent developments and uses, and the subject critical area. Section 20.05.070.C of the MMC also states that unless otherwise specified, a minimum BSBL (Building Setback Line) of 10 feet is required from the edge of any separate tract, buffer or NGPE (Native growth protection easement), whichever is greatest.

6.1 Slope Stability Assessment

We understand that the steep slope that descends toward Woods Creek is regulated under the City of Monroe *Critical Areas Ordinance*, and as such, we have prepared a slope stability analysis for the subject site and the proposed project.

AESI used GeoStudio 2016, Version 8.16, by Geo-Slope International, Ltd. to perform the analysis of slope stability with the proposed development. The Morgenstern-Price method was

used for both static and seismic models evaluating rotational failures. Input parameters for the analysis included slope geometry, geology, and soil strength parameters. The slope geometry was obtained from the topographic contour map depicted in Figure 2 along section lines A-A', B-B', and C-C'. The soil densities and other soil properties in the model were estimated based on SPT blow counts from our explorations, our experience with similar soils, and correlation with published information. The 2015 *International Building Code* (IBC) seismic design parameter for peak ground acceleration (PGA) was determined by the latitude and longitude of the project site using the U.S. Geological Survey (USGS) U.S. Seismic Design Maps website[1]. The USGS website interpolated PGA at the project site to be 0.492g, with a 2 percent chance of exceedance in 50 years. Seismic stability modeling included a horizontal seismic coefficient of 0.25g.

A graphical representation of the cross-sections we used for input is presented in Appendix E. Surcharges used for our analysis included 2,000 pounds per square foot (psf) to represent the proposed development. Our slope stability analysis evaluated the risk of deep-seated landslides extending through the underlying soils and below the approximate location of the proposed foundations. Slope stability is expressed as a factor of safety, which is a ratio between resisting and driving forces for a given slope failure scenario. A factor of safety of 1.0 indicates that resisting and driving forces are equal, and a failure is predicted. Factors of safety greater than 1 indicate that resisting forces exceed driving forces, and a failure is not predicted. Section 20.05.120.I.1 of the MMC states that the proposed development shall not decrease the factor of safety for landslide occurrences below the limits of 1.5 under static conditions and 1.2 under simulated seismic conditions. Our analyses indicate that these factors of safety are met or exceeded at the location of the planned buildings under static conditions. However, under seismic conditions, portions of Buildings A and E that are closer to the steep slope have a factor of safety less than 1.2, and mitigation is required.

6.2 Building Setback and Steep Slope Buffer

The planned building setback and steep slope buffer varies for the Buildings A, C, and E located near the top of the steep slope that descends to Woods Creek due to variations in the slope geometry. According to the MMC, the standard landslide hazard buffer of 50 feet can be reduced to 10 feet as previously mentioned. Based on our analyses, it is our opinion the proposed landslide hazard buffer can be reduced to the minimum of 10 feet where needed for the buildings located next to the slope provided footings are extended to a depth of 7 feet (see Figure 2) and that the combined buffer and standard building setback is suitable for the planned development as shown in the table below.

[1] http://earthquake.usgs.gov/designmaps/

Table 3
Recommended Landslide Hazard Buffers

Building	Landslide Hazard Buffer (feet)	Building Setback (feet)	Combined Landslide Hazard Buffer and Setback (feet)
A	10 to 70	10	20 to 48
C	22 to 38	10	32 to 48
E	10 to 38	10	20 to 80

7.0 SEISMIC HAZARDS AND MITIGATIONS

Earthquakes occur regularly in the Puget Lowland. Most events are small and are usually not felt by people. However, large earthquakes do occur, as evidenced by the 1949, 7.2-magnitude event; the 1965, 6.5-magnitude event; and the 2001, 6.8-magnitude event. The 1949 earthquake appears to have been the largest in this region during recorded history and was centered in the Olympia area. Evaluation of earthquake return rates indicates that an earthquake of the magnitude between 5.5 and 6.0 is likely within a given 20-year period.
Generally, there are four types of potential geologic hazards associated with large seismic events: 1) surficial ground rupture, 2) seismically induced landslides, 3) liquefaction, and 4) ground motion. The potential for each of these hazards to adversely impact the proposed project is discussed below.

7.1 Surficial Ground Rupture

The nearest known fault traces to the project site are the Cherry Creek Fault Zone (CCFZ), the Monroe Fault (MF), and the South Whidbey Island Fault Zone (SWIFZ). Much of the city of Monroe lies within a few miles northeast of inferred fault traces of the SWIFZ, which trends northwest to southeast and just northwest of the MF, which trends generally east-west. The CCFZ, which trends southwest-northeast, and is mapped as extending from east of the city of Duvall through Sultan and extending toward Lake Chaplain to the north of Sultan and crosses within 5 miles to the southwest of the project site.

The Dragovich et al., 2010, *Supplement to the Geologic Map of the Carnation 7.5-Minute Quadrangle, King County, Washington – Geochronologic, Geochemical, Point Count, Geophysical, Earthquake, Fault, and Neotectonic Data*, Open-File Report 2010-2, June 2010, provides a discussion of the CCFZ. A few deep earthquakes may have originated along the CCFZ. Most importantly, the 1996 magnitude 5.3 Duvall earthquake is believed to have occurred along the CCFZ, though no indication of surficial ground rupture was noted. If the 1996 Duvall earthquake did occur along the CCFZ, then the fault is active, at least locally.

Dragovich et al. presented a paper at the 2014 Geological Society of America (GSA) entitled *The Monroe Fault, Anticline, and Synclinal Basin – A Potentially Active Fault and Fold System in the Skykomish River Valley, Snohomish County, Washington* (Paper No. 323-16), which describes the MF. The MF is a potentially active east-west-trending fault. Its recurrence interval is not known.

A 2005 study by the USGS (Sherrod et al., 2005, *Holocene Fault Scarps and Shallow Magnetic Anomalies Along the Southern Whidbey Island Fault Zone Near Woodinville, Washington*, Open-File Report 2005-1136, March 2005) reported that "strong" evidence of prehistoric earthquake activity has been observed along two fault strands thought to be part of the southeastward extension of the SWIFZ. The study suggests as many as nine earthquake events along the SWIFZ may have occurred within the last 16,400 years. The recognition of this fault splay is relatively new, and data pertaining to it are limited with the studies still ongoing. The recurrence interval of movement along this fault system is still unknown, although it is hypothesized to be in excess of 1,000 years.

The recurrence intervals of the potentially active to active CCFZ, SWIFZ, and MF are not well understood; however, the risk of surficial ground rupture as a result of movement of these three fault complexes is relatively low, and no mitigations are recommended.

7.2 Seismically Induced Landslides

As discussed in Section 6.1, "Slope Stability Assessment," it is our opinion that the impact from the project to the stability of the existing slopes is minimal. The risk of damage to the proposed project by landslides under seismic conditions is low.

7.3 Liquefaction

Liquefaction is a process through which unconsolidated soil loses strength as a result of vibrations, such as those which occur during a seismic event. During normal conditions, the weight of the soil is supported by both grain-to-grain contacts and by the fluid pressure within the pore spaces of the soil below the water table. Extreme vibratory shaking can disrupt the grain-to-grain contact, increase the pore pressure, and result in a temporary decrease in soil shear strength. The soil is said to be liquefied when nearly all of the weight of the soil is supported by pore pressure alone. Liquefaction can result in deformation of the sediment and settlement of overlying structures. Areas most susceptible to liquefaction include those areas underlain by non-cohesive silt and sand with low relative densities, accompanied by a shallow water table.

The observed site soils generally consisted of unsaturated loose to medium dense fill and loose to medium dense gravels or medium stiff or hard silts. In our opinion, the risk of significant

damage to the proposed structures due to liquefaction would be generally considered low based on the course consistency of the Vashon recessional outwash and density of the underlying pre-Fraser sediments.

7.4 Ground Motion

It is our opinion that earthquake damage to the proposed structures, when founded on suitable bearing strata in accordance with the recommendations contained herein, will likely be caused by the intensity and acceleration associated with the event. Structural design of the buildings should follow 2015 IBC standards using Site Class "D" as defined in Table 20.3-1 of *American Society of Civil Engineers* (ASCE) *7 – Minimum Design Loads for Buildings and Other Structures.*

8.0 EROSION HAZARD MITIGATION

Section 20.05.B.1 of the MMC states that Erosion Hazard Areas are defined as "those areas identified by the U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service as having "severe" or "very severe" rill and inter-rill erosion hazard." The soils on the site have been classified by the USDA as "Sultan Silt Loam," which has a "slight" erosion potential and thus would not be considered an erosion hazard per the MMC. However, portions of the natural sediments underlying the subject site contain substantial quantities of silt and fine sand and will be sensitive to disturbance when wet.

We recommend the following best management practices (BMPs) to mitigate erosion hazards and potential for off-site sediment transport:

1. Construction activity should be scheduled or phased as much as possible to avoid earthwork activity during the wet season.

2. The winter performance of a site is dependent on a well-conceived plan for control of site erosion and stormwater runoff. The site plan should include ground-cover measures and staging areas. The contractor should be prepared to implement and maintain the required measures to reduce the amount of exposed ground.

3. Temporary erosion and sedimentation control (TESC) elements and perimeter flow control should be established prior to the start of grading.

4. During the wetter months of the year, or when significant storm events are predicted during the summer months, the work area should be stabilized so that if showers occur, it can receive the rainfall without excessive erosion or sediment transport. The required

measures for an area to be "buttoned-up" will depend on the time of year and the duration that the area will be left unworked. During the winter months, areas that are to be left unworked for more than 2 days should be mulched or covered with plastic. During the summer months, stabilization will usually consist of seal-rolling the subgrade. Such measures will aid in the contractor's ability to get back into a work area after a storm event. The stabilization process also includes establishing temporary stormwater conveyance channels through work areas to route runoff to the approved treatment/discharge facilities.

5. All disturbed areas should be revegetated as soon as possible. If it is outside of the growing season, the disturbed areas should be covered with mulch. Straw mulch provides a cost-effective cover measure and can be made wind-resistant with the application of a tackifier after it is placed.

6. Surface runoff and discharge should be controlled during and following development. Uncontrolled discharge may promote erosion and sediment transport.

7. Soils that are to be reused around the site should be stored in such a manner as to reduce erosion from the stockpile. Protective measures may include, but are not limited to, covering stockpiles with plastic sheeting, or the use of silt fences around pile perimeters.

It is our opinion that with the proper implementation of the TESC plans and by field-adjusting appropriate erosion mitigation (BMPs) throughout construction, the potential adverse impacts from erosion hazards on the project may be mitigated.

III. DESIGN RECOMMENDATIONS

9.0 INTRODUCTION

In our opinion, from a geotechnical standpoint, the property is suitable for the proposed development provided the recommendations contained herein are properly followed. Our explorations typically encountered 2 to 15 feet of loose to medium dense granular fill overlying loose to medium dense sands and gravels (Vashon recessional outwash) and stiff to hard silts (pre-Fraser sediments) in the locations of all the planned buildings. Wood waste fill ranging from 10 to 27 feet deep was encountered outside of the footprint of planned Building E along the existing steep slope overlying recessional outwash and pre-Fraser sediments.

In our opinion, shallow foundations can be used for the buildings provided settlement due to uncontrolled fill is mitigated. This can be accomplished by a partial to complete overexcavation and replacement of near-surface fill soils as structural fill. For the eastern portion of Building A that is underlain by up to 15 feet of uncontrolled granular fill, mitigation can be addressed using ground improvement consisting of aggregate piers. Note that site development plans will also include removal and replacement of soils below a portion of Building A to a depth ranging from 3 to 5 feet and below a portion of Building B to a depth of 2 feet to remove contaminated soils. We recommend that earthwork operations consider these environmental activities to reduce subgrade preparation for foundations.

As mentioned in Section 6.1, our stability analyses indicate that a factor of safety less than the City required value of 1.2 is achieved at portions of the perimeter foundations nearest the steep slope for Buildings A and E during a strong seismic event. Consequently, we recommend that perimeter footings nearest the slope as shown on Figure 2 be deepened to create an effective setback that has an adequate factor of safety.

Based on review of infiltration testing results and grain-size analyses performed on soil samples collected from explorations, infiltration facilities are feasible provided they extend beneath existing fill into the underlying recessional outwash and there is adequate separation from the seasonal high water level.

AESI should be allowed to review the final project plans, once they have been developed, to revise our recommendations, as necessary.

10.0 SITE PREPARATION

Site preparation should include removal of all existing pavement, demolition debris from the existing structure, and any other deleterious material. Where any existing loose fill or natural sediments are relatively free of organics and near their optimum moisture content for compaction, they can be segregated and considered for reuse as structural fill. As noted previously, some of the Vashon recessional outwash deposits encountered in our explorations may contain above optimum moisture content and may be difficult to reuse as structural fill. Existing underground utilities should either be removed or relocated if they are located below the planned building areas. Erosion and surface water control should be established around the perimeter of the excavation to satisfy City of Monroe requirements.

10.1 Temporary Cut Slopes

In our opinion, stable construction slopes should be the responsibility of the contractor and should be determined during construction based on the conditions encountered at that time. For estimating purposes, however, we anticipate that temporary, unsupported cut slopes in the loose to medium dense fill and Vashon recessional outwash sediments can be planned at 1.5H:1V. We do not expect pre-Fraser non-glacial deposits will be encountered in temporary cut slopes due to the depth at which they were encountered. Temporary cut slopes may need to be adjusted in the field at the time of construction based on the presence of groundwater. This should be determined in the field by the geotechnical engineer. As is typical with earthwork operations, some sloughing and raveling may occur, and cut slopes may have to be adjusted in the field. In addition, WISHA/OSHA regulations should be followed at all times. If steeper or deeper cuts are required, then temporary shoring may be necessary.

10.2 Site Disturbance

Some of the on-site soils contain a high percentage of fine-grained material, which makes them moisture-sensitive and subject to disturbance when wet. A portion of the soils encountered in our explorations appear to be above their optimum moisture content for compaction at the time of our study. The contractor must use care during site preparation and excavation operations so that the underlying soils are not softened, particularly during wet weather conditions. If disturbance occurs in areas of conventional footings, the softened soils should be removed and the area brought to grade with clean crushed rock fill.

11.0 STRUCTURAL FILL

Structural fill should be placed and compacted according to the recommendations presented in this section. All references to structural fill in this report refer to subgrade preparation, fill type,

placement, and compaction of materials, as discussed in this section. If a percentage of compaction is specified under another section of this report, the value given in that section should be used.

Structural fill is defined as non-organic soil, acceptable to the geotechnical engineer, placed in maximum 8-inch loose lifts, with each lift being compacted to at least 95 percent of the modified Proctor maximum dry density using ASTM D-1557 as the standard. In the case of roadway and utility trench filling, the backfill should be placed and compacted in accordance with City of Monroe standards. For planning purposes, we recommend the use a well-graded sand and gravel for road and utility trench backfill. Controlled density fill (CDF), can also be used for backfill.

The contractor should note that AESI should evaluate any proposed fill soils prior to their use in fills. This would require that we have a sample of the material at least 3 business days in advance of filling activities to perform a Proctor test and determine its field compaction standard. Soils in which the amount of fine-grained material (smaller than the No. 200 sieve) is greater than approximately 5 percent (measured on the minus No. 4 sieve size) should be considered moisture-sensitive. Use of moisture-sensitive soil in structural fills is not recommended. Most of the on-site soils are moisture-sensitive and have natural moisture contents over optimum for compaction and thus should not be considered suitable for use as structural fill. In addition, construction equipment traversing the site when the soils are wet can cause considerable disturbance. For all fills, a select import material consisting of a clean, free-draining gravel and/or sand should be used. Free-draining fill consists of non-organic soil with the amount of fine-grained material limited to 5 percent by weight when measured on the minus No. 4 sieve fraction and at least 30 percent retained on the No. 4 sieve.

A representative from our firm should observe the subgrades and be present during placement of structural fill to observe the work and perform a representative number of in-place density tests. In this way, the adequacy of the earthwork may be evaluated as filling progresses and any problem areas may be corrected at that time. It is important to understand that taking random compaction tests on a part-time basis will not assure uniformity or acceptable performance of a fill. As such, we are available to aid the owner in developing a suitable monitoring and testing frequency.

12.0 FOUNDATIONS

In our opinion, shallow foundations can be used for the proposed buildings provided settlement due to uncontrolled fill is mitigated as summarized in Table 3. This can be accomplished by a partial to complete overexcavation and replacement of near surface fill soils with new structural fill and use of a relatively lower allowable bearing pressure for shallow foundation

design. Alternatively, shallow foundations could be supported using aggregate piers and designed using a relatively higher bearing pressure.

Table 4
Summary of Recommended Foundation Subgrade Improvement Options

Building	Anticipated Foundation Subgrade Conditions	Recommended Subgrade Improvement Options
A	Existing granular fill ranging in depth from 5 to 15 feet deep overlying recessional outwash. Deep fill is located at eastern end of building.	1. Overexcavation and replacement of granular fill to a depth of 5 feet. Existing fill can be reused and recompacted. Use allowable bearing pressure of 2,000 pounds per square foot (psf). 2. Use aggregate piers with allowable bearing pressure of 5,000 psf for the entire building or only deep fill area.
B	Existing granular fill ranging from 2 to 5 feet deep overlying recessional outwash.	Overexcavation and replacement of granular fill where encountered at subgrade level. Existing fill can be reused and recompacted. Use allowable bearing pressure of 2,000 psf.
C	Existing granular fill ranging in depth from 2 to 5 feet overlying recessional outwash. Deep fill about 15 feet thick located at northeastern corner of building.	1. Overexcavation and replacement of granular fill .Existing fill can be reused and recompacted. Use allowable bearing pressure of 2,000 psf. 2. Use aggregate piers with allowable bearing pressure of 5,000 psf for the entire building or only deep fill area.
D	Existing granular fill from 2 to 5 feet deep overlying recessional outwash.	Overexcavation and replacement of granular fill where encountered at subgrade level. Existing fill can be reused and recompacted. Use allowable bearing pressure of 2,000 psf.
E	Existing granular fill from 2 to 5 feet deep overlying recessional outwash. Wood waste fill outside of building footprint along existing steep slope along the southeastern side near the existing steep slope.	1. Overexcavation and replacement of granular fill to a depth of 5 feet. Existing fill can be reused and recompacted. Use allowable bearing pressure of 2,000 pounds per square foot (psf). 2. Use aggregate piers with allowable bearing pressure of 5,000 psf for the entire building.

12.1 Footings Bearing on New Structural Fill

Due to the presence of uncontrolled fill, we recommend overexcavation and replacement of the uncontrolled fill soils as new structural fill. All fill placed beneath spread footing foundations must be compacted to at least 95 percent of ASTM D-1557.

We recommend that an allowable foundation soil bearing pressure of 2,000 psf be used for design purposes, including both dead and live loads. An increase in the allowable bearing pressure of one-third may be used for short-term wind or seismic loading.

Perimeter footings for the proposed buildings should be buried a minimum of 18 inches into the surrounding soil for frost protection except as previously discussed for Buildings A and E where deepened footings are needed to address slope the setback/buffer for seismic stability as shown on Figure 2. No minimum burial depth is required for interior footings; however, all footings must penetrate to the prescribed stratum, and no footings should be founded in or above organic or existing fill soils.

The area bounded by lines extending downward at 1H:1V from any footing must not intersect another footing or intersect a filled area that has not been compacted to at least 95 percent of ASTM D-1557. In addition, a 1.5H:1V line extending down from any footing must not daylight because sloughing or raveling may eventually undermine the footing. Thus, footings should not be placed near the edges of steps or cuts in the bearing soils.

Anticipated settlement of footings founded as described above should be on the order of 1 inch. Differential settlement should be about half of the estimated total settlement. However, disturbed soil not removed from footing excavations prior to footing placement could result in increased settlements. If the above noted, estimated settlement is above the desired level or if a higher allowable bearing pressure is desired, aggregate pier support for all foundations on the proposed development should be considered.

All footing areas should be observed by AESI prior to placing concrete to verify that the exposed soils can support the design foundation bearing pressure, and that construction conforms with the recommendations in this report. Foundation bearing verification will likely also be required by the City of Monroe.

Perimeter footing drains should be provided as discussed under the "Drainage Considerations" section of this report.

12.2 Footings Bearing on Aggregate Piers

The purpose of aggregate piers is to both improve existing fill soils, mitigate settlement from liquefaction, and to transmit loads to more competent bearing materials at depth. We recommend that an allowable bearing pressure of 5,000 psf (including both dead and live loads) be utilized for the structure supported on aggregate piers. An increase of one-third may be used for short-term wind or seismic loading.

Aggregate piers are formed by displacing the existing soil column to a predetermined depth with a vibratory mandrel of a predetermined diameter. Crushed rock is fed down the mandrel from the surface and compacted in thin lifts resulting in a column of compacted aggregate and compaction of soils surrounding the pier.

All aggregate piers are proprietary systems and are designed by the contractor who installs them. The contractor will determine the depth and diameter of the aggregate pier holes and the appropriate spacing. Conventional shallow foundations and floor slabs are then constructed above the subgrade after aggregate piers have been installed. The aggregate pier contractor should review exploration logs contained in this report carefully. Uncontrolled fill and glacial sediments, such as those observed in our explorations, often contain drilling obstacles. Where drilling obstacles are encountered, the contractor should be prepared to relocate aggregate piers, or remove obstacles, as needed, as part of the base bid work.

Perimeter footings for the proposed buildings should be buried a minimum of 18 inches into the surrounding soil for frost protection. No minimum burial depth is required for interior footings. Perimeter footing drains should be provided as discussed under the "Drainage Considerations" section of this report.

AESI should be involved in the early stages of aggregate pier design and installation, which would involve review of the proposed pier design and attendance at a pre-construction conference with the contractor selected. We also recommend full-time construction observation during pier installation to verify that the piers are extending to native bearing soils. Air or water jetting are not acceptable practices during the installation of aggregate piers.

It should be noted that the area bounded by lines extending downward at 1H:1V from any footing must not intersect another footing or intersect a filled area that has not been compacted to at least 95 percent of ASTM D-1557. In addition, a 1.5H:1V line extending down from any footing must not daylight because sloughing or raveling may eventually undermine the footing. Thus, footings should not be placed near the edge of steps or cuts in the bearing soils.

Anticipated settlement of footings founded on the aggregate piers, should be less than 1 inch. However, disturbed soil not removed from footing excavations prior to footing placement could result in increased settlements. All footing areas should be observed by AESI prior to placing concrete to verify that the design bearing capacity of the soils has been attained and that construction conforms to the recommendations contained in this report.

13.0 DRAINAGE CONSIDERATIONS

Traffic across the on-site soils when they are damp or wet may result in disturbance of the otherwise firm stratum. Therefore, during site work and construction, the contractor should provide surface drainage and subgrade protection, as necessary.

Any retaining walls and all perimeter foundation walls should be provided with a drain at the footing elevation. Drains should consist of rigid, perforated, polyvinyl chloride (PVC) pipe surrounded by washed gravel. The level of the perforations in the pipe should be set at the bottom of the footing, and the drains should be constructed with sufficient gradient to allow gravity discharge away from the building. The perforations should be located on the lower portion of the pipe. In addition, any retaining or subgrade walls should be lined with a minimum, 12-inch-thick, washed gravel blanket, backfilled completely with free-draining material, or lined with a drainage mat, such as Mira-Drain 6000, over the full height of the wall (excluding the first 1 foot below the surface). This drainage material should tie into the footing drains and must be installed and backfilled in strict accordance with the manufacturer's specifications. Roof and surface runoff should not discharge into the footing drain system, but should be handled by a separate, rigid, tightline drain.

To minimize erosion, stormwater discharge or concentrated runoff should not be allowed to flow down any steep excavation cuts. In planning, exterior grades adjacent to walls should be sloped downward away from the structures to achieve surface drainage. Runoff water from impervious surfaces should be collected by a storm drain system that discharges into the site stormwater system.

14.0 FLOOR SUPPORT

For all buildings, slab-on-grade floors may be constructed either directly on loose to medium dense existing fill or native soils compacted to a dense condition or new structural fill compacted to at least 95 percent of ASTM D-1557. Floor slabs supported on these subgrade materials may designed assuming a modulus of subgrade reaction equal to 150 pounds per cubic inch (pci).

Floor slabs should be cast atop a minimum of 4 inches of clean, washed, crushed rock or pea gravel to act as a capillary break. Areas of subgrade that are disturbed (loosened) during construction should be compacted to a non-yielding condition prior to placement of capillary break material. Floor slabs should also be protected from dampness by an impervious moisture barrier at least 10 mils thick. The moisture barrier should be placed between the capillary break material and the concrete slab.

15.0 BACKFILLED WALLS

The following preliminary recommendations may be applied to conventional backfilled walls up to 8 feet tall. We should be allowed to offer situation-specific input for taller walls. All backfill behind foundation walls, below grade structures such as the infiltration vault or around foundation units should be placed as per our recommendations for structural fill and as described in this section of the report. Horizontally backfilled walls, which are free to yield laterally at least 0.1 percent of their height, may be designed to resist lateral earth pressure represented by an equivalent fluid equal to 35 pounds per cubic foot (pcf). Fully restrained, horizontally backfilled, rigid walls that cannot yield should be designed for an equivalent fluid of 50 pcf. Walls with sloping backfill up to a maximum gradient of 2H:1V should be designed using an equivalent fluid of 55 pcf for yielding conditions or 75 pcf for fully restrained conditions. If parking areas are adjacent to walls, a surcharge equivalent to 2 feet of soil should be added to the wall height in determining lateral design forces.

As required by the 2015 IBC, retaining wall design should include a seismic surcharge pressure in addition to the equivalent fluid pressures presented above. Considering the site soils and the recommended wall backfill materials, we recommend a seismic surcharge pressure of 10H and 14H psf, where H is the wall height in feet for the "active" and "at-rest" loading conditions, respectively. The seismic surcharge should be modeled as a rectangular distribution with the resultant applied at the midpoint of the walls.

The lateral pressures presented above are based on the conditions of a uniform backfill consisting of excavated on-site soils, or imported structural fill compacted to 90 percent of ASTM D-1557. A higher degree of compaction is not recommended, as this will increase the pressure acting on the walls. A lower compaction may result in settlement of the slab-on-grade or other structures supported above the walls. Thus, the compaction level is critical and must be tested by our firm during placement. Surcharges from adjacent footings or heavy construction equipment must be added to the above values. Perimeter footing drains should be provided for all retaining walls, as discussed under the "Drainage Considerations" section of this report.

It is imperative that proper drainage be provided so that hydrostatic pressures do not develop against the walls. This would involve installation of a minimum 1-foot-wide blanket drain to within 1 foot of finish grade for the full wall height using imported, washed gravel against the walls.

15.1 Passive Resistance and Friction Factors

Lateral loads can be resisted by friction between the foundation and the natural soils or supporting structural fill soils, and by passive earth pressure acting on the buried portions of

the foundations. The foundations must be backfilled with structural fill and compacted to at least 95 percent of the maximum dry density to achieve the passive resistance provided below. We recommend the following allowable design parameters which include a factor of safety of 1.5:

- Passive equivalent fluid = 300 pcf
- Coefficient of friction = 0.35

16.0 STORMWATER INFILTRATION

Based on review of current plans provided by CORE Design dated October 31, 2018, we understand that a stormwater infiltration vault and infiltration trenches are planned (as shown on Figure 2). Our subsurface explorations advanced at the site encountered fill, Vashon recessional outwash and pre-Fraser sediments. Vashon recessional outwash is typically suitable for stormwater infiltration if present in sufficient unsaturated lateral and vertical extent. Due to the unknown lateral extent and potential variation in composition, the undocumented fill soils are not suitable for infiltration.

16.1 Infiltration Considerations

Design Infiltration Rate – Infiltration Vault Facility

An unfactored field infiltration rate of approximately 60 inches per hour (iph) and 120 iph was measured during the constant head infiltration test in IT-1 and IT-2, respectively, within the Vashon recessional outwash. The field-measured infiltration rates must have correction factors applied, according to the 2014 Ecology Manual. The initial field-measured rate must be reduced to account for site variability and number of tests conducted, type of field test method, and the potential for long-term clogging due to siltation and bio-buildup. The correction factors are shown in Table 5.

Table 5
Correction Factors to be Used With In-Situ Infiltration Measurements to Estimate Long-Term Design Infiltration Rates (from Table 3.3.1, Ecology 2014)

Issue	Partial Correction Factor
Site variability and number of locations tested	CF_v = 0.33 to 1.0
Test Method Large-scale PIT Small-scale PIT Other small-scale (e.g., Double ring, falling head) Grain Size Method	 CF_t = 0.75 = 0.5 = 0.4 = 0.4
Degree of influent control to prevent siltation and bio-buildup	CF_m = 0.9*

Total Correction Factor, $CF_T = CF_v \times CF_t \times CF_m$.

K_{sat} design = K_{sat} initial x CF_T.

* A CFv value of 0.9 calls for removal of sediment when the facility is infiltrating at only 90 percent of its design capacity, per the 2012 *Stormwater Management Manual for Western Washington* (Ecology Manual).

Source: Table 3.3.1, page 3-80, 2014 Ecology Manual.

Given the number of explorations and infiltration tests completed across the site and the variability within the recessional outwash in the project area, we recommend a site variability correction factor of **CFv = 0.75** to account for site variability that will occur along the infiltration vault or infiltration trench length; a correction factor for test method of **CFt = 0.5** for the small-scale PIT method; and a maintenance correction factor of **CFm = 0.9**.

Using the Total Correction Factor equation $CF_T = CF_v \times CF_t \times CF_m$, the resulting total correction factor is $CF_T = 0.75 \times 0.5 \times 0.9 = 0.34$.

We recommend a correction factor of 0.34 be applied to the lower field-based infiltration rate. The correction factor of 0.34 is applied as follows:

- Lowest Field Infiltration Rate = 60 inches per hour
- Correction Factor = 0.34
- Recommended Infiltration Vault Design Infiltration Rate = **20 inches per hour, assumes that seasonal groundwater will remain 5 feet below the proposed facility subgrade, to be confirmed by water level monitoring.**

For the design infiltration rate of 20 inches per hour to be achieved for the infiltration vault, the infiltration facility base must be overexcavated through any encountered existing fill soils and that the base of the infiltration facility be embedded a minimum of 2 feet into the Vashon recessional outwash.

Design Infiltration Rate – Infiltration Trenches

The site-specific exploration and testing was focused on the infiltration vault area of the site. Due to on site variability, we recommend that the infiltration trenches be sized with an infiltration rate of **10 inches per hour** consistent with generally gravelly nature of the recessional outwash soils. The design infiltration rate could be refined (increased) with additional subsurface exploration and testing. The additional information would reduce potential site variability.

Additional Infiltration Facility Recommendations

We recommend that AESI have an opportunity to review the infiltration facilities layout and details prior to construction.

We recommend that AESI be present during excavation of the infiltration facilities to monitor the subgrade conditions encountered and compare them to the conditions observed during our exploration.

We recommend that excavation equipment should not be allowed on the subgrade of infiltration, and care should be taken to minimize disturbance and compaction of the infiltration surface.

The gravel backfill for infiltration vault and infiltration trenches should be staged onsite prior to excavating the infiltration facilities so that it can be installed immediately following excavation. This timing is required in order to minimize caving. Management of the material stockpiles should include any required provisions for keeping the gravel clean, free of fines, and separated from the site soils.

Protection of Subgrade and Infiltration Facilities During Construction

We recommend that excavation equipment should not be allowed on the infiltration facility subgrade, and care should be taken to minimize disturbance and compaction of the infiltration surface.

Once the facility is excavated and constructed, the contractor must provide temporary protection of the facility to keep turbid water and fine-grained sediments out of the facility. Uncontrolled runoff into the infiltration facility will contaminate the subgrade with fine-grained sediments, constitute failure of the subgrade, requiring removal of all backfill materials and contaminated subgrade, and replacement with clean backfill materials.

The infiltration facility must be kept isolated from influent flows until after the site has been stabilized, so that construction runoff is not introduced into the facility.

Seasonal High Groundwater Level and Groundwater Mounding

Seasonal high water level monitoring is required and should be observed for the site during the next several months. A data logger was installed by Landau and Associates on November 16, 2018, in one of their previously completed groundwater monitoring wells (P5-MW) at the site near the planned infiltration vault.

The Ecology Manual recommends that groundwater mounding analysis be performed for the infiltration facilities where separation from the seasonal high ground water table is less than 5 feet or the drainage area exceeds 1 acre. Groundwater mounding, if required, should be performed to assess whether the infiltration facility has the capacity to manage the design storm event when groundwater is naturally elevated.

17.0 PAVEMENT RECOMMENDATIONS

Pavement areas should be prepared in accordance with the "Site Preparation" section of this report. If the stripped native soil or existing fill subgrade can be compacted to a firm and non-yielding condition, no additional overexcavation is required. Soft or yielding areas should be overexcavated to provide a suitable subgrade and backfilled with structural fill.

The pavement sections included in this report section are for private roads, driveway, and parking areas onsite, and are not applicable to right-of-way improvements. At this time, this report does not address right-of-way improvements; however, if any new paving of public streets is required, we should be allowed to offer situation-specific recommendations.

Upon completing compaction of existing subgrades or compaction of new structural fill, a pavement section consisting of 3½ inches of hot-mix asphalt (HMA) underlain by 4 inches of 1¼-inch crushed surfacing base course is the recommended minimum in areas of planned passenger car lanes and parking. In heavy traffic areas, a minimum pavement section consisting of 3½ inches of HMA underlain by 3 inches of $^{5}/_{8}$-inch crushed surfacing top course and 4 inches of 1¼-inch crushed surfacing base course is recommended. The crushed rock courses must be compacted to 95 percent of the maximum density, as determined by ASTM D-1557. All paving materials should meet gradation criteria contained in the current Washington State Department of Transportation (WSDOT) Standard Specifications.

Depending on construction staging and desired performance, the crushed base course material may be substituted with asphalt treated base (ATB) beneath the final asphalt surfacing. The substitution of ATB should be as follows: 4 inches of crushed rock can be substituted with 3 inches of ATB, and 6 inches of crushed rock may be substituted with 4 inches of ATB. ATB should be placed over a native subgrade compacted to a firm and non-yielding condition or a structural fill subgrade compacted to a minimum of 95 percent relative density, and a 1½- to 2-inch thickness of crushed rock to act as a working surface. If ATB is used for construction access and staging areas, some rutting and disturbance of the ATB surface should be expected. The general contractor should remove affected areas and replace them with properly compacted ATB prior to final surfacing.

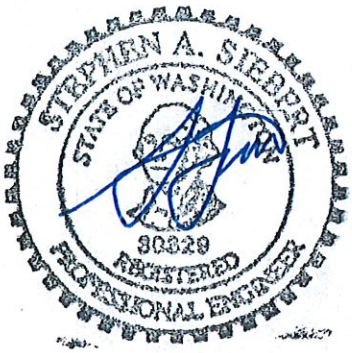
18.0 PROJECT DESIGN AND CONSTRUCTION MONITORING

We recommend that AESI review the seasonal groundwater level monitoring data once collected to compare to the proposed infiltration facility design. We also recommend that AESI perform a geotechnical review of the plans prior to final design completion. In this way, our recommendations may be properly interpreted and implemented in the design. This plan review is not included in the current scope of work and budget.

We are also available to provide geotechnical engineering and monitoring services during construction. The integrity of the earthwork and foundations depends on proper site preparation and construction procedures. In addition, engineering decisions may have to be made in the field in the event that variations in subsurface conditions become apparent. Construction monitoring services are not part of this current scope of work.

We have enjoyed working with you on this study and are confident these recommendations will aid in the successful completion of your project. If you should have any questions or require further assistance, please do not hesitate to call.

Sincerely,
ASSOCIATED EARTH SCIENCES, INC.
Kirkland, Washington



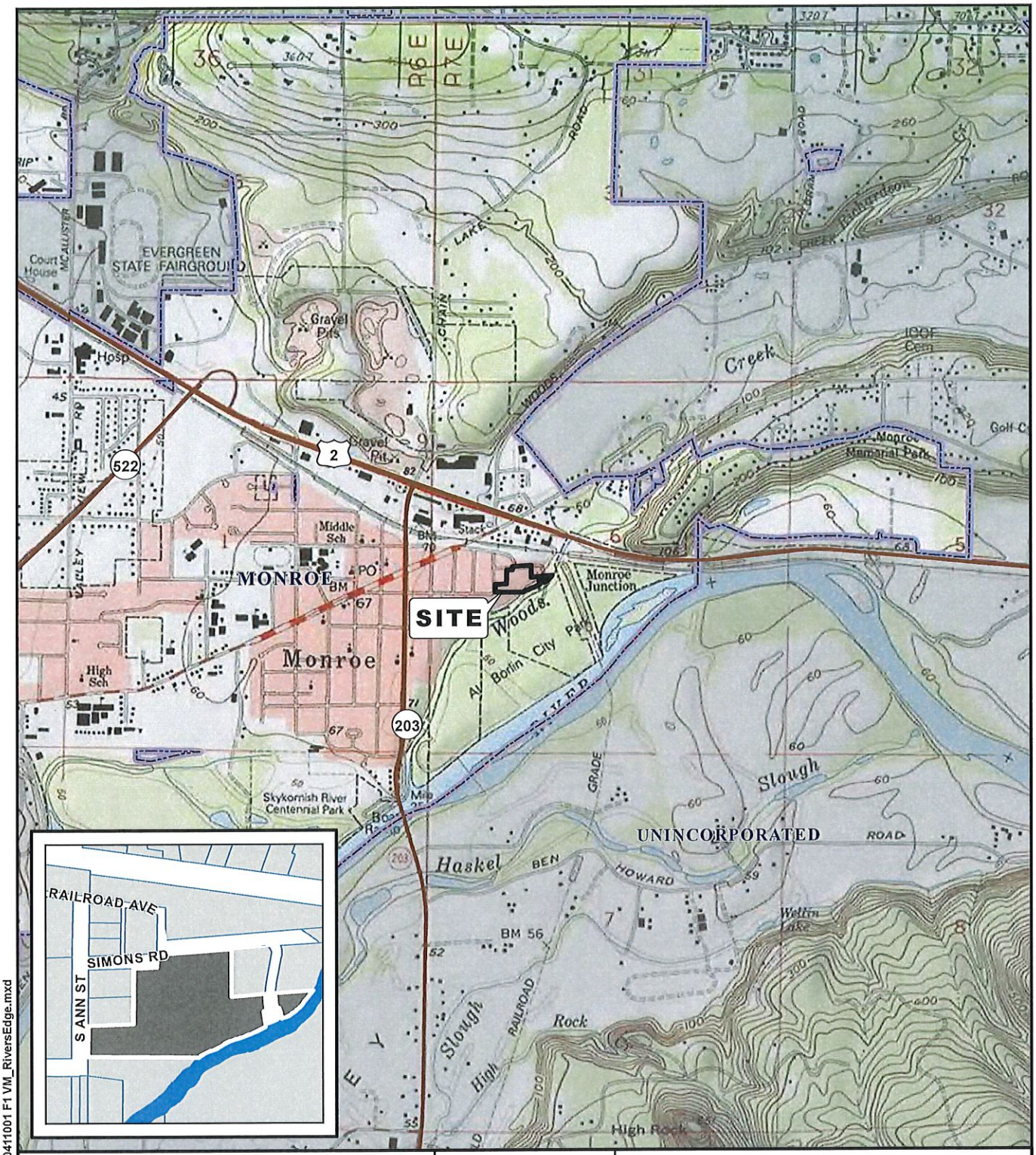
12/6/18

Tyler Gilsdorf, G.I.T.
Senior Staff Geologist

Kurt D. Merriman, P.E.
Senior Principal Engineer

Stephen A. Siebert, P.E.
Associate Geotechnical Engineer

Attachments:
Figure 1: Vicinity Map
Figure 2: Proposed Site and Exploration Plan
Figure 3: Existing Site and Exploration Plan
Appendix A: Exploration Logs by AESI
Appendix B: Exploration Logs by Others
Appendix C: Laboratory Test Results
Appendix D: Infiltration Test Data Sheets
Appendix E: Slope Stability Analyses Results



DATA SOURCES / REFERENCES:
USGS: 7.5' SERIES TOPOGRAPHIC MAPS, ESRI/I-CUBED/NATIONAL GEOGRAPHIC SOCIETY 2013
SNOHOMISH CO: STREETS, CITY LIMITS, PARCELS, 1/18
LOCATIONS AND DISTANCES SHOWN ARE APPROXIMATE

N

0 1000 2000
FEET

NOTE: BLACK AND WHITE REPRODUCTION OF THIS COLOR ORIGINAL MAY REDUCE ITS EFFECTIVENESS AND LEAD TO INCORRECT INTERPRETATION

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VICINITY MAP

RIVER'S EDGE
MONROE, WASHINGTON

PROJ NO.	DATE:	FIGURE:
180411E001	10/18	1

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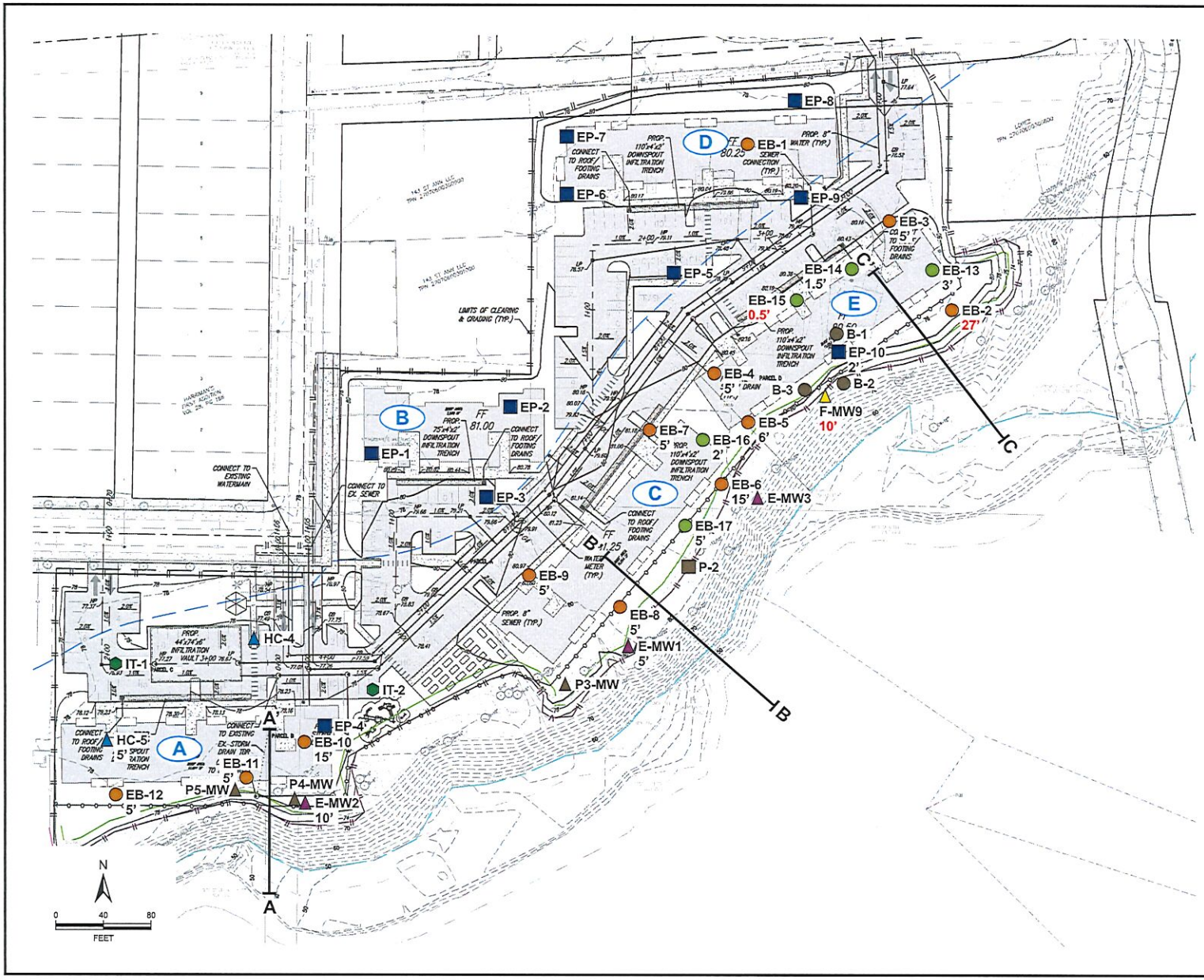

LEGEND:

EB	EXPLORATION BORING - AESI 9/18
EB	EXPLORATION BORING - AESI 11/18
EP	EXPLORATION PIT - AESI 10/18
IT	INFILTRATION TEST - AESI 10/18
HC	MONITORING WELL - HART CROWSER 1990
E-MW	MONITORING WELL - EMCON 1996
F-MW	MONITORING WELL - FARALLON 1999
P-MW	MONITORING WELL - LANDAU 8/18
B	EXPLORATION BORING - LANDAU 6/18
P	EXPLORATION PIT - LANDAU 6/18
XX'	DEPTH (FT) OF EXISTING FILL
XX'	DEPTH (FT) OF EXISTING WOOD WASTE FILL
(X)	BUILDING DESIGNATION

CONTOUR INTERVAL = 2'

NOTE: LOCATION AND DISTANCES SHOWN ARE APPROXIMATE.

NOTES:
1. BASE MAP REFERENCE: CORE DESIGN, RIVERS EDGE, GRADING AND UTILITY PLAN, SHEET 1, 10/31/18.

2. SEE APPENDIX E FOR SLOPE STABILITY CROSS-SECTIONS.

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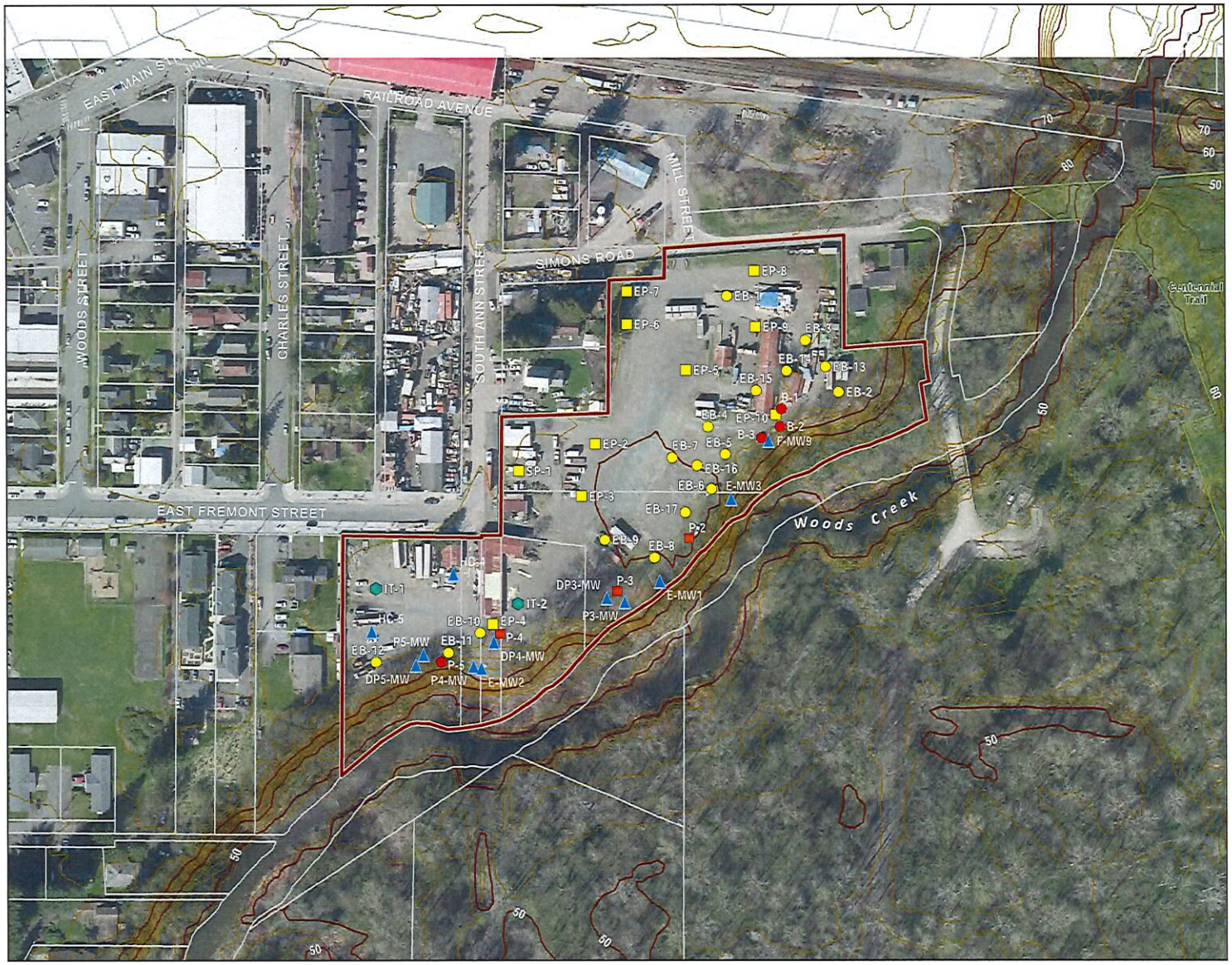
PROPOSED SITE AND EXPLORATION PLAN

RIVERS EDGE
MONROE, WASHINGTON

PROJ NO.	DATE:	FIGURE:
180411E001	12/18	2

180411 Rivers Edge \ 180411E001 F2 S-E Plan.cdr

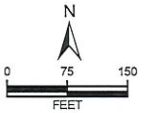


LEGEND

- SITE
- EXPLORATION BORING
- EXPLORATION PIT
- INFILTRATION TEST
- EXPLORATION BORING BY OTHER
- EXPLORATION PIT BY OTHER
- MONITORING WELL BY OTHER
- PARCEL
- CONTOUR 10 FT
- CONTOUR 2 FT

DATA SOURCES / REFERENCES:
PSLC: CEDAR RIVER WATERSHED 2014
DELIVERY1 = EVERETT FLOWN 12/13 AND 2/14
GRID CELL SIZE IS 3'. CONTOURS FROM LIDAR
WA STATE PLANE NORTH (FIPS 4601), NAD83(HARN)
NAVD88 GEOID03, US SURVEY FEET.
SNOHOMISH CO: STREETS, PARCELS 1/18
AERIAL: SNOHOMISH CO., PICTOMETRY INT. 2015
EXPLORATIONS BY OTHERS:
LANDAU, MONROE AUTO WRECKING SUPPLEMENTAL PHASE II ESA, 2018
HART CROWSER: SUBSURFACE EXPLORATION AND TESTING, GLACIER PARK COMPANY PROPERTY 12/90
EMCON: MONROE AUTO SALVAGE, 07/96
FARALLON: REMEDIAL INVESTIGATION AND FEASIBILITY STUDY, 1999

LOCATIONS AND DISTANCES SHOWN ARE APPROXIMATE



BLACK AND WHITE REPRODUCTION OF THIS COLOR ORIGINAL MAY REDUCE ITS EFFECTIVENESS AND LEAD TO INCORRECT INTERPRETATION

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EXISTING SITE AND EXPLORATION PLAN

RIVERS EDGE
MONROE, WASHINGTON

PROJ NO.	DATE:	FIGURE:
180411E001	12/18	3

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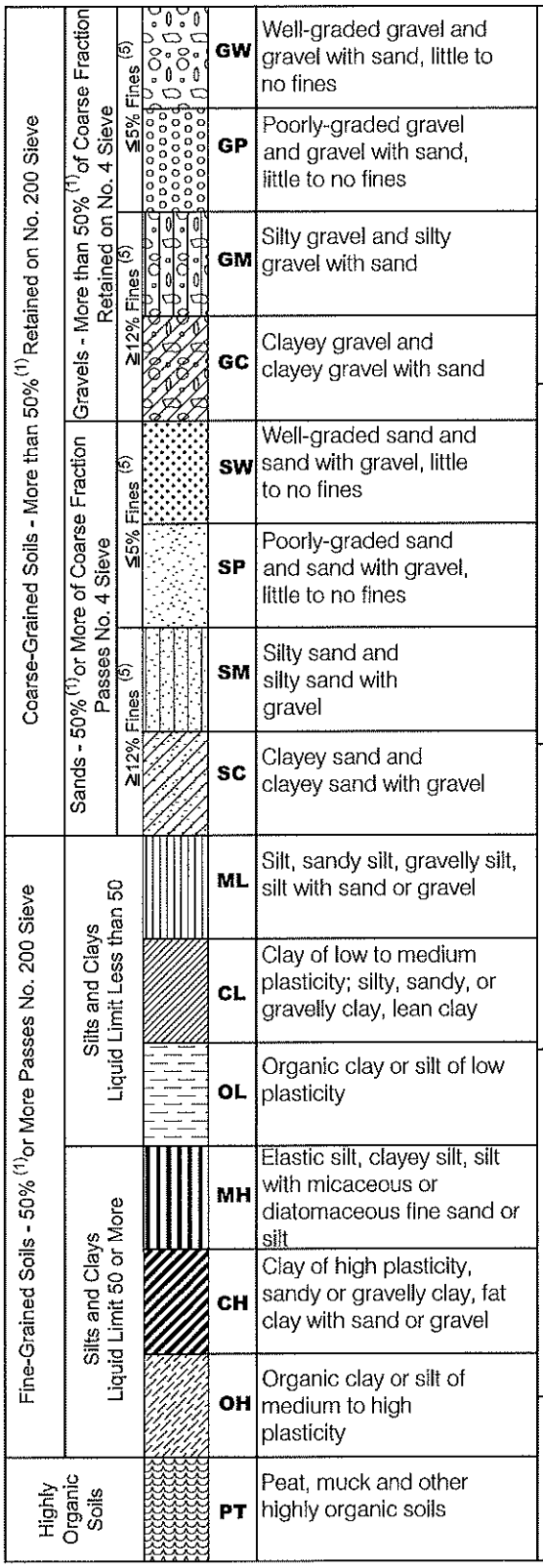
APPENDIX A

Exploration Logs by AESI



Terms Describing Relative Density and Consistency

Coarse-Grained Soils	Density	SPT (2) blows/foot
	Very Loose	0 to 4
	Loose	4 to 10
	Medium Dense	10 to 30
	Dense	30 to 50
	Very Dense	>50

Fine-Grained Soils	Consistency	SPT (2) blows/foot
	Very Soft	0 to 2
	Soft	2 to 4
	Medium Stiff	4 to 8
	Stiff	8 to 15
	Very Stiff	15 to 30
	Hard	>30

Test Symbols

G = Grain Size
M = Moisture Content
A = Atterberg Limits
C = Chemical
DD = Dry Density
K = Permeability

Component Definitions

Descriptive Term	Size Range and Sieve Number
Boulders	Larger than 12"
Cobbles	3" to 12"
Gravel	3" to No. 4 (4.75 mm)
Coarse Gravel	3" to 3/4"
Fine Gravel	3/4" to No. 4 (4.75 mm)
Sand	No. 4 (4.75 mm) to No. 200 (0.075 mm)
Coarse Sand	No. 4 (4.75 mm) to No. 10 (2.00 mm)
Medium Sand	No. 10 (2.00 mm) to No. 40 (0.425 mm)
Fine Sand	No. 40 (0.425 mm) to No. 200 (0.075 mm)
Silt and Clay	Smaller than No. 200 (0.075 mm)

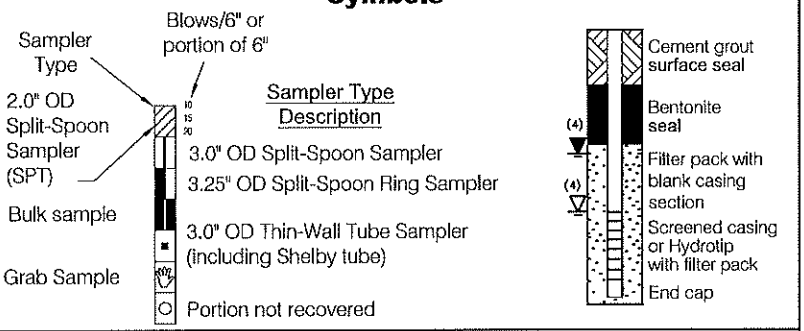
(3) Estimated Percentage

Component	Percentage by Weight
Trace	<5
Some	5 to <12
Modifier (silty, sandy, gravelly)	12 to <30
Very *modifier* (silty, sandy, gravelly)	30 to <50

Moisture Content

Dry - Absence of moisture, dusty, dry to the touch
Slightly Moist - Perceptible moisture
Moist - Damp but no visible water
Very Moist - Water visible but not free draining
Wet - Visible free water, usually from below water table

Symbols



(1) Percentage by dry weight
(2) (SPT) Standard Penetration Test (ASTM D-1586)
(3) In General Accordance with Standard Practice for Description and Identification of Soils (ASTM D-2488)
(4) Depth of ground water
ATD = At time of drilling
Static water level (date)
(5) Combined USCS symbols used for fines between 5% and 12%

Classifications of soils in this report are based on visual field and/or laboratory observations, which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field or laboratory testing unless presented herein. Visual-manual and/or laboratory classification methods of ASTM D-2487 and D-2488 were used as an identification guide for the Unified Soil Classification System.

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Exploration Log

Project Number	Exploration Number	Sheet
180411E001	EB-1	1 of 1

Project Name: Rivers Edge
Location: Monroe, WA
Driller/Equipment: EDI / Truck Rig
Hammer Weight/Drop: 140# / 30"

Ground Surface Elevation (ft): 78
Datum: NAVD 88
Date Start/Finish: 9/24/18,9/24/18
Hole Diameter (in): 8 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Crushed Rock Fill - 12 inches					
				Fill					
		S-1		Moist, brown to dark brown with minor oxidation, silty, fine SAND, some gravel; disturbed texture (SM).			8 5 3	▲8	
5				**Vashon Recessional Outwash**					
		S-2		Moist, light brown to gray, gravelly, fine to medium SAND, some silt; massive (SP-SM).			7 15 14	▲29	
10									
		S-3		Moist, light brown to light reddish brown with moderate oxidation, fine to medium SAND, some gravel, some silt; somewhat stratified (SP-SM).			10 15 14	▲29	
15									
		S-4		Moist, light brown to light grayish brown, fine to medium SAND, trace gravel, trace silt; stratified (SP).			10 15 18	▲33	
20									
		S-5		Wet, brown and gray, sandy, GRAVEL, some silt; low recovery; no apparent structure (SP-SM).			9 9 12	▲21	
25				**Pre-Fraser Nonglacial Deposits**					
				Change in drill action at 26 feet.		▼			
		S-6		Moist, gray to dark gray and dark brown, silty, fine SAND ranging to sandy, SILT; stratified; layered minor organics (SM-ML).			15 22 35	▲57	
30				Bottom of exploration boring at 29 feet Groundwater encountered at 27 feet.					
35									

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture
Water Level ()
Water Level at time of drilling (ATD)

Logged by: TG
Approved by: JHS

AESIBOR 180411.GPJ November 30, 2018

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Exploration Log

Project Number	Exploration Number	Sheet
180411E001	EB-2	1 of 1

Project Name: Rivers Edge
Location: Monroe, WA
Driller/Equipment: EDI / Truck Rig
Hammer Weight/Drop: 140# / 30"

Ground Surface Elevation (ft): 78
Datum: NAVD 88
Date Start/Finish: 9/24/18,9/24/18
Hole Diameter (in): 8 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Crushed Rock Fill - 6 inches					
				Wood Waste Fill					
		S-1					6 2 2	▲4	
5									
		S-2					0 1 0	▲1	
10									
		S-3					0 0 1	▲1	
15									
		S-4					0 1 1	▲2	
20									
		S-5		Upper ~9 inches: Wood waste fill			1 3 3	▲6	
				Fill					
25				Lower 9 inches: Very moist, light brownish gray, fine SAND, trace gravel, trace silt; massive (SP).		▼			
				Pre-Fraser Nonglacial Deposits					
		S-6		Very moist, gray to dark gray and brown, SILT, some sand; minor organics; faint stratification (SM).			0 1 5	▲6	
30									
		S-7		Moist, gray to dark gray and brown, sandy, SILT; stratified; minor organics; minor mica (ML).			13 16 22	▲38	
35				Bottom of exploration boring at 34 feet Groundwater encountered at ~26 feet.					

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture
▽ Water Level ()
▼ Water Level at time of drilling (ATD)

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Exploration Log

Project Number	Exploration Number	Sheet
180411E001	EB-3	1 of 1

Project Name: Rivers Edge
Location: Monroe, WA
Driller/Equipment: EDI / Truck Rig
Hammer Weight/Drop: 140# / 30"

Ground Surface Elevation (ft): 78
Datum: NAVD 88
Date Start/Finish: 9/24/18,9/24/18
Hole Diameter (in): 8 inches

Depth (ft)	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
			Crushed Rock Fill - 9 inches					
			Fill					
	S-1		Moist, light brown to brown, fine SAND, some silt, trace gravel (SP-SM).			3 2 5	▲7	
5			**Vashon Recessional Outwash**					
	S-2		Moist, light brown to light brownish gray, fine to medium SAND, some gravel, trace silt; somewhat stratified (SP).			11 8 10	▲18	
10								
	S-3		Moist, brown to light reddish brown with moderate to heavy oxidation, fine to medium SAND, some gravel, some silt; stratified (SP-SM).			18 15 19	▲34	
15								
	S-4		Moist, light brown to gray, fine SAND, trace gravel, trace silt; stratified (SP).			11 14 14	▲28	
20								
	S-5		Very moist, light brown to light brownish gray, fine to medium SAND, trace gravel, trace silt; massive; broken gravel (SP).			11 19 17	▲36	
25					▼			
			Pre-Fraser Nonglacial Deposits					
	S-6		Moist to very moist, gray to dark gray, silty, fine SAND; minor organics; minor mica; faint stratification (SM).			13 19 28	▲47	
30								
	S-7		Moist, gray to dark gray and dark brown, SILT; abundant organics; minor mica; faintly stratified (OL).			13 20 25	▲45	
35			Bottom of exploration boring at 34 feet Groundwater encountered at 27 feet.					

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture
▽ Water Level ()
▼ Water Level at time of drilling (ATD)

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Exploration Log

Project Number	Exploration Number	Sheet
180411E001	EB-4	1 of 1

Project Name: Rivers Edge
Location: Monroe, WA
Driller/Equipment: EDI / Truck Rig
Hammer Weight/Drop: 140# / 30"

Ground Surface Elevation (ft): 78
Datum: NAVD 88
Date Start/Finish: 9/24/18,9/24/18
Hole Diameter (in): 8 inches

Depth (ft)	Samples	DESCRIPTION	Blows/6"	Blows/Foot (10 20 30 40)
		Crushed Rock - 6 inches		
		Fill		
	S-1	Moist to very moist, light to dark brown, silty, fine SAND, trace gravel; pockets of organics (SM).	2 1 1	▲2
5		**Vashon Recessional Outwash**		
	S-2	Moist, light brownish gray, fine to medium SAND, some gravel, some silt; massive; broken gravel (SP-SM).	20 24 26	▲50
10	S-3	Moist to very moist, red brown to dark brown bands of heavy oxidation, fine to medium SAND, some silt, trace gravel; massive (SP-SM).	17 16 24	▲40
15	S-4	Moist, light brown to tan, fine to medium SAND, some gravel, trace silt; massive; rip up clast of alluvium (SP).	6 14 20	▲34
20	S-5	Very moist, light brown, fine SAND, trace gravel, trace silt; massive (SP).	15 15 18	▲33
25		**Pre-Fraser Nonglacial Deposits**		
	S-6	Very moist to wet, gray to dark gray, silty, fine SAND ranging to sandy, SILT, some silt; minor organics; minor mica (SM-ML).	15 20 26	▲46
30	S-7	Very moist, gray to dark gray, very silty, fine SAND ranging to sandy, SILT; minor organics; faint stratification (SM-ML).	15 20 20	▲40
35		Bottom of exploration boring at 34 feet Groundwater encountered at ~26 feet.		

Well Completion | Water Level | Other Tests

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture
Water Level ()
Water Level at time of drilling (ATD)

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Exploration Log

Project Number	Exploration Number	Sheet
180411E001	EB-5	1 of 1

Project Name: Rivers Edge
Location: Monroe, WA
Driller/Equipment: EDI / Truck Rig
Hammer Weight/Drop: 140# / 30"

Ground Surface Elevation (ft): 78
Datum: NAVD 88
Date Start/Finish: 9/24/18,9/24/18
Hole Diameter (in): 8 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Crushed Rock Fill - ~9 inches					
				Fill					
		S-1		Moist to very moist, silty, fine to medium SAND, trace gravel; abundant wood debris (SM).			5 4 4	▲8	
5				**Vashon Recessional Outwash**					
		S-2		Moist, light brown to light brownish gray, fine to medium SAND, trace gravel, trace silt; massive (SP).			6 10 15	▲25	
10		S-3		Moist, brown to light reddish brown with heavy oxidation, fine to medium SAND, some gravel to gravelly, some silt; massive (SP-SM).			23 22 38	▲60	
15		S-4		Moist, light brown to light brownish gray with bands of oxidation, fine to medium SAND, some silt, trace gravel; stratified (SP-SM).			10 8 14	▲22	
20		S-5		Very moist, light brownish gray with minor oxidation, fine SAND, trace silt; faint stratification (SP).		▼	8 10 12	▲22	
25				**Pre-Fraser Nonglacial Deposits**					
		S-6		Moist, gray to dark gray, sandy, SILT; minor organics and wood debris; massive (ML).			11 12 19	▲31	
30		S-7		As above.			13 22 27	▲49	
35				Bottom of exploration boring at 34 feet Groundwater encountered at 26.5 feet.					

Sampler Type (ST):
- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture
▽ Water Level ()
▼ Water Level at time of drilling (ATD)

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Exploration Log

Project Number	Exploration Number	Sheet
180411E001	EB-6	1 of 1

Project Name	Rivers Edge	Ground Surface Elevation (ft)	80
Location	Monroe, WA	Datum	NAVD 88
Driller/Equipment	EDI / Truck Rig	Date Start/Finish	9/25/18,9/25/18
Hammer Weight/Drop	140# / 30"	Hole Diameter (in)	8 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Crushed Rock Fill - ~6 inches					
				Fill					
		S-1		Moist, light brown to dark brown, very silty, fine SAND, trace gravel; minor wood debris; disturbed texture (SM).			6 6 4	▲10	
5									
		S-2		Construction debris and bricks			4 3 3	▲6	
10									
		S-3		Moist, light brown to light brownish gray, gravelly, fine to medium SAND, some silt; no apparent structure; broken rock in sampler (SP-SM).			18 20 23	▲43	
15				**Vashon Recessional Outwash**					
		S-4		Moist, brown to light reddish brown with bands of heavy oxidation, fine to medium SAND, some gravel, some silt; faint stratification (SP-SM).			10 8 14	▲22	
20									
		S-5		Very moist, light brown to light brownish gray with bands of minor oxidation, fine SAND, trace silt; massive (SP).		▼	12 11 11	▲22	
25									
				Pre-Fraser Nonglacial Deposits					
		S-6		Very moist, gray to dark gray, sandy, SILT to very silty, SAND; zones of abundant organics (ML-SM).			10 12 18	▲30	
30									
		S-7		Moist, gray, sandy, SILT ranging to very silty, SAND; minor organics; minor mica (ML-SM).			12 20 25	▲45	
35				Bottom of exploration boring at 34 feet Groundwater encountered at 26 feet.					

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample
- M - Moisture
- ▽ Water Level ()
- ▼ Water Level at time of drilling (ATD)

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Exploration Log

Project Number	Exploration Number	Sheet
180411E001	EB-7	1 of 1

Project Name	Rivers Edge	Ground Surface Elevation (ft)	80
Location	Monroe, WA	Datum	NAVD 88
Driller/Equipment	EDI / Truck Rig	Date Start/Finish	9/25/18,9/25/18
Hammer Weight/Drop	140# / 30"	Hole Diameter (in)	8 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Crushed Rock Fill - ~9 inches					
				Fill					
		S-1		Moist, light to dark brown, very silty, fine SAND, trace gravel; minor organics; disturbed texture (SM).			3 3 4	▲7	
5				**Vashon Recessional Outwash**					
		S-2		Moist, light brownish gray, gravelly, fine to medium SAND, some silt; massive; broken gravel in sampler (SP-SM).			15 18 22	▲40	
10		S-3		Moist, light brown to light brownish gray, gravelly, fine to medium SAND, some silt; faint stratification; broken gravel in sampler (SP-SM).			19 16 14	▲30	
15		S-4		Moist, light brown to tan with bands of heavy oxidation, fine to medium SAND, some gravel, trace silt; massive (SP).			12 10 8	▲18	
20		S-5		Moist, light brownish gray, fine to medium SAND, trace gravel, trace silt; massive (SP).			5 10 11	▲21	
25				**Pre-Fraser Nonglacial Deposits** Slightly easier drilling ~25 to 26 feet.					
		S-6		Very moist, dark gray, SILT and CLAY, trace gravel, trace sand; lens (~1 inch thick) of medium SAND towards end of sample (ML-CH).		▼	6 9 9	▲18	
30				Harder drilling at 30 feet.					
		S-7		Moist, gray to dark brown, very silty, fine SAND ranging to sandy, SILT; minor organics (SM-ML).			12 20 36	▲56	
35				Bottom of exploration boring at 34 feet Groundwater encountered at ~29 feet.					

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture

- Water Level ()
- Water Level at time of drilling (ATD)

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Exploration Log

Project Number	Exploration Number	Sheet
180411E001	EB-8	1 of 2

Project Name: Rivers Edge
Location: Monroe, WA
Driller/Equipment: EDI / Truck Rig
Hammer Weight/Drop: 140# / 30"

Ground Surface Elevation (ft): 80
Datum: NAVD 88
Date Start/Finish: 9/25/18,9/25/18
Hole Diameter (in): 8 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Crushed Rock Fill - ~9 inches					
				Fill					
		S-1		Moist, dark brown, silty, fine to medium SAND, some gravel; minor construction debris (bricks) (SM).			10 10 8	▲18	
5				**Fill? / Vashon Recessional Outwash**					
		S-2		Moist, light brown to brownish gray, fine to medium SAND, some gravel, some silt; massive (SP-SM).			14 15 18	▲33	
10				**Vashon Recessional Outwash**					
		S-3		Moist, light brown to light brownish gray, fine to medium SAND, some gravel, trace silt; massive (SP).			18 20 19	▲39	
15		S-4		Moist, light brown to light reddish brown with bands of heavy oxidation, fine to coarse SAND, some gravel, some silt; stratified (SP-SM).			13 18 18	▲38	
20		S-5		Very moist, light brown to light gray with minor to moderate oxidation, SILT and CLAY ranging to sandy, SILT, some sand; layer (~1 inch thick) of cleaner, fine SAND (ML-CH).			2 2 6	▲8	
25				Gravelly drill action 25 to 27 feet.		▼			
		S-6		Wet, light reddish brown to red brown with moderate to heavy oxidation throughout sample, gravelly, fine to coarse SAND, trace silt; massive (SP).			10 13 15	▲28	
30				**Pre-Fraser Nonglacial Deposits** Harder drilling 30 to 32.5 feet.					
		S-7		Moist, dark gray to dark brown, sandy, SILT; abundant organics and mica (present as layers) (ML).			17 23 44	▲67	
35		S-8		Very moist to wet, gray to dark gray, fine SAND, some silt; massive (SP-SM); layer (~3 inches thick) of sandy, SILT with minot organics (ML).			18 29 42	▲71	

Sampler Type (ST):
- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture
Water Level ()
Water Level at time of drilling (ATD)

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Exploration Log

Project Number	Exploration Number	Sheet
180411E001	EB-8	2 of 2

Project Name: Rivers Edge
Location: Monroe, WA
Driller/Equipment: EDI / Truck Rig
Hammer Weight/Drop: 140# / 30"

Ground Surface Elevation (ft): 80
Datum: NAVD 88
Date Start/Finish: 9/25/18,9/25/18
Hole Diameter (in): 8 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Bottom of exploration boring at 39 feet Groundwater encountered at 27 feet.					
45									
50									
55									
60									
65									
70									
75									

Sampler Type (ST):
- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture
Water Level ()
Water Level at time of drilling (ATD)

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Exploration Log

Project Number	Exploration Number	Sheet
180411E001	EB-9	1 of 1

Project Name: Rivers Edge
Location: Monroe, WA
Driller/Equipment: EDI / Truck Rig
Hammer Weight/Drop: 140# / 30"

Ground Surface Elevation (ft): 80
Datum: NAVD 88
Date Start/Finish: 9/26/18,9/26/18
Hole Diameter (in): 8 inches

Depth (ft)	Samples	Graphic Symbol	DESCRIPTION	Blows/6"
			Crushed Rock Fill - ~9 inches	
			Fill	
	S-1		Moist, light brown to brown, silty, fine SAND, trace gravel; disturbed texture (SM).	7, 6, 6
5			**Vashon Recessional Outwash**	
	S-2		Moist, light brownish gray, fine to medium SAND, some gravel, trace silt; massive (SP).	10, 11, 13
10				
	S-3		Moist, light brown to light brownish gray, fine to coarse SAND, some gravel, trace silt; massive (SP).	10, 15, 21
15				
	S-4		Moist, light brown to light reddish brown with bands of moderate oxidation, fine to medium SAND, some gravel, trace silt; faint stratification (SP).	26, 25, 24
20				
	S-5		Moist, light brownish gray, fine to medium SAND, some gravel, trace silt; broken rock in sampler; faint stratification (SP).	25, 30, 36
25				
	S-6		**Pre-Fraser Nonglacial Deposits** Very moist, gray to dark gray brown, sandy, SILT; abundant organics; massive (ML).	13, 19, 21
30				
	S-7		Very moist, gray, silty, fine SAND; massive; minor mica; minor organics (SM).	15, 21, 28
35			Bottom of exploration boring at 34 feet Groundwater encountered at 27 feet.	

Blows/Foot: 10 20 30 40

S-1: ▲12
S-2: ▲24
S-3: ▲36
S-4: ▲49
S-5: ▲66
S-6: ▲40
S-7: ▲49

Well Completion | Water Level | Other Tests

Sampler Type (ST):
- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture
Water Level ()
Water Level at time of drilling (ATD)

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Exploration Log

Project Number	Exploration Number	Sheet
180411E001	EB-10	1 of 1

Project Name: Rivers Edge
Location: Monroe, WA
Driller/Equipment: EDI / Truck Rig
Hammer Weight/Drop: 140# / 30"

Ground Surface Elevation (ft): 78
Datum: NAVD 88
Date Start/Finish: 9/26/18,9/26/18
Hole Diameter (in): 8 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Crushed Rock Fill - ~9 inches					
				Fill					
		S-1		Very moist, brown to gray, very silty, fine SAND, trace gravel; low recovery, sampler pushing rock; minor organics (SM).			10 10 10	▲20	
5									
		S-2		Moist, brown to dark brown, fine to medium SAND, some gravel, some silt; minor wood debris (SP-SM).			7 5 6	▲11	
10									
		S-3		Moist, brown, fine to medium SAND, some gravel, some silt; sampler pushing rock, blowcounts overstated (SP-SM).			24 24 42		▲66
15				**Vashon Recessional Outwash**					
		S-4		Moist, light brown to light reddish brown with bands of moderate oxidation, fine to medium SAND, trace gravel, trace silt; layer (~1 inch thick) of silt (SP).			5 7 16	▲23	
20									
		S-5		Moist, light brown to light brownish gray with minor oxidation, silty, fine to medium SAND, trace gravel; contractor noted pounding on rock; massive (SP-SM).			50/3"		▲50/3"
25									
		S-6		Wet, brown to reddish brown with moderate to heavy oxidation throughout the sample, gravelly, fine to coarse SAND, trace silt; massive (SP).		▼	20 19 35		▲54
30				**Pre-Fraser Nonglacial Deposits**					
		S-7		Very moist, gray to dark gray, organic, sandy, SILT; massive (ML).			17 29 50/6"		▲50/6"
35				Bottom of exploration boring at 34 feet Groundwater encountered at ~30 feet.					

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture
▽ Water Level ()
▼ Water Level at time of drilling (ATD)

Logged by: TG
Approved by: JHS

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Exploration Log

Project Number	Exploration Number	Sheet
180411E001	EB-11	1 of 1

Project Name	Rivers Edge	Ground Surface Elevation (ft)	76
Location	Monroe, WA	Datum	NAVD 88
Driller/Equipment	EDI / Truck Rig	Date Start/Finish	9/26/18,9/26/18
Hammer Weight/Drop	140# / 30"	Hole Diameter (in)	8 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Crushed Rock Fill - ~12 inches					
				Fill					
		S-1		Moist, light brown, fine to medium SAND, some gravel, some silt; sampler pushing rock, blowcounts likely overstated (SP-SM).			23 29 45	▲74	
5				**Vashon Recessional Outwash**					
		S-2		Moist, light brownish gray, silty, gravelly, fine to medium SAND; massive (SM).			12 15 10	▲25	
10		S-3		Moist, light brownish gray with minor oxidation, silty, gravelly, fine to medium SAND; massive; clasts of oxidized sandy, silt (SM).			25 27 23	▲50	
15		S-4		Moist, light brown to light brownish gray, fine to medium SAND, trace gravel, trace silt; layer (~1 inch thick) of silt; massive (SP).			25 15 26	▲41	
20		S-5		As above (SP); lens (~2 inches thick) of SILT and CLAY (ML-CH).			8 9 9	▲18	
25		S-6		Upper 12 inches: wet, light brown to light brownish gray with bands of oxidation, fine SAND, some silt, trace gravel; massive (SP-SM).		▼	8 15 15	▲30	
				Pre-Fraser Nonglacial Deposits					
30				Lower ~6 inches: very moist, light brown to gray with moderate oxidation, sandy, SILT; minor organics (ML).					
		S-7		Moist to very moist, gray, sandy, SILT ranging to silty, SAND; abundant organics (present as layers); massive (ML-SM).			19 20 33	▲53	
35				Bottom of exploration boring at 34 feet Groundwater encountered at ~26.5 feet.					

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture

▽ Water Level ()

▼ Water Level at time of drilling (ATD)

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Exploration Log

Project Number	Exploration Number	Sheet
180411E001	EB-12	1 of 1

Project Name: Rivers Edge
Location: Monroe, WA
Driller/Equipment: EDI / Truck Rig
Hammer Weight/Drop: 140# / 30"

Ground Surface Elevation (ft): 76
Datum: NAVD 88
Date Start/Finish: 9/26/18,9/26/18
Hole Diameter (in): 8 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Crushed Rock Fill - ~9 inches					
				Fill					
		S-1		Moist, light to dark brown, silty, fine SAND, some gravel; disturbed texture; minor organics (SM).			6 7 20	▲27	
5				**Vashon Recessional Outwash**					
		S-2		Moist, light brownish gray, fine to medium SAND, some silt, trace gravel; clasts of silt; massive (SP-SM).			18 15 15	▲30	
10				Very gravelly drilling ~9 to 11 feet. Driller called refusal at 11 feet due to inability to advance drill and auger lead breaking.					
				Bottom of exploration boring at 11 feet No groundwater encountered.					
15									
20									
25									
30									
35									

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample
- M - Moisture
- Water Level ()
- Water Level at time of drilling (ATD)

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Exploration Log

Project Number	Exploration Number	Sheet
180411E001	EB-13	1 of 1

Project Name	Rivers Edge	Ground Surface Elevation (ft)	77
Location	Monroe, WA	Datum	NAVD 88
Driller/Equipment	EDI / Truck Rig	Date Start/Finish	11/29/18,11/29/18
Hammer Weight/Drop	140# / 30"	Hole Diameter (in)	8 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
		S-1		**Crushed Rock - ~4 inches**			9		
				Fill			6	▲11	
				Moist, dark brown and gray, gravelly, fine to medium SAND, some silt; disturbed texture (SP-SM).			5		
		S-2		Upper ~4 inches: moist, dark brown, silty, fine to medium SAND, trace gravel; disturbed texture; minor organics (SM).			5		
				Lower ~6 inches: moist, light brown to tan, gravelly, fine to medium SAND, trace silt; massive (SP).			7	▲19	
							12		
5				**Vashon Recessional Outwash**					
				Gravelly drilling at 5 feet.					
		S-3		Moist, light brown and gray, gravelly, fine to coarse SAND, trace to some silt; massive (SP).			10		
							12	▲30	
							18		
10									
		S-4		Moist, light brown to light reddish brown with minor to moderate oxidation, gravelly, fine to coarse SAND, some silt; faint stratification (SP-SM).			8		
							13	▲28	
							15		
15									
		S-5		Very moist, light brownish gray, fine to medium SAND, some gravel, trace silt; moderately stratified (SP).			10		
							18	▲44	
							26		
20				Bottom of exploration boring at 19 feet No groundwater encountered.					
25									
30									
35									

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample
- M - Moisture
- Water Level ()
- Water Level at time of drilling (ATD)

Logged by: TG
Approved by: JHS

AESIBOR 180411.GPJ November 30, 2018

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Exploration Log

Project Number	Exploration Number	Sheet
180411E001	EB-14	1 of 1

Project Name: Rivers Edge
Location: Monroe, WA
Driller/Equipment: EDI / Truck Rig
Hammer Weight/Drop: 140# / 30"

Ground Surface Elevation (ft): 78
Datum: NAVD 88
Date Start/Finish: 11/29/18,11/29/18
Hole Diameter (in): 8 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Crushed Rock - ~4 inches					
				Fill					
				Moist, dark brown and gray, silty, gravelly, fine to medium SAND; minor organics; contains trash (SM).					
				Vashon Recessional Outwash					
		S-1		Moist, light brown to tan, fine to medium SAND, trace to some silt, trace gravel; massive (SP).			3 3 3	▲6	
5				Gravelly drilling ~5 to 6 feet.					
		S-2		Moist, light brown and gray, fine to medium SAND, some silt, some gravel; faint stratification (SP-SM).			12 15 15	▲30	
10									
		S-3		Moist, brown to light reddish brown with minor oxidation, fine to medium SAND some silt, some gravel; faint stratification; low recovery; broken gravel in sampler (SP-SM).			10 12 13	▲25	
15									
		S-4		Moist to very moist, light brownish gray with bands of minor oxidation, fine SAND, trace gravel, trace silt; massive (SP).			10 14 16	▲30	
20				Very gravelly drilling observed 21 to 22 feet.		▼			
		S-5		Wet, light brownish gray to gray, gravelly, fine to coarse SAND, trace to some silt; faint stratification (SP).			8 14 22	▲36	
25				Bottom of exploration boring at 24 feet Groundwater encountered at 21 feet.					
30									
35									

Sampler Type (ST):
- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture
▽ Water Level ()
▼ Water Level at time of drilling (ATD)

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Exploration Log

Project Number	Exploration Number	Sheet
180411E001	EB-15	1 of 1

Project Name: Rivers Edge
Location: Monroe, WA
Driller/Equipment: EDI / Truck Rig
Hammer Weight/Drop: 140# / 30"

Ground Surface Elevation (ft): 78
Datum: NAVD 88
Date Start/Finish: 11/29/18,11/29/18
Hole Diameter (in): 8 inches

Depth (ft)	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
	S-1		**Crushed Rock - ~4 inches**			4	▲5	
			Fill			3		
			Moist, dark brown to reddish brown, very silty, fine SAND, some gravel; disturbed texture (SM).			2		
	S-2		Upper ~6 inches: dark brown to black wood waste			2	▲12	
			Vashon Recessional Outwash			3		
			Lower ~12 inches: moist, light brown to tan and light reddish brown, silty, fine SAND, trace gravel; minor rootlets; massive (SM).			9		
5			Gravelly drilling 4.5 to 5 feet					
	S-3		Moist, light brownish gray, fine to medium SAND, some silt, some gravel; moderately stratified (SP-SM).			11	▲42	
						19		
						23		
10								
	S-4		Moist to very moist, brown to light reddish brown with bands of oxidation, fine SAND, some silt, trace gravel; moderately stratified (SP-SM).			11	▲38	
						23		
						15		
15								
	S-5		Moist, light brownish gray to reddish brown with bands of heavy oxidation, fine SAND, trace silt, trace gravel; faintly stratified (SP).			11	▲32	
						15		
						17		
20			Bottom of exploration boring at 19 feet No groundwater encountered.					
25								
30								
35								

Sampler Type (ST):
- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture
Water Level ()
Water Level at time of drilling (ATD)

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Exploration Log

Project Number	Exploration Number	Sheet
180411E001	EB-16	1 of 1

Project Name: Rivers Edge
Location: Monroe, WA
Driller/Equipment: EDI / Truck Rig
Hammer Weight/Drop: 140# / 30"

Ground Surface Elevation (ft): 80
Datum: NAVD 88
Date Start/Finish: 11/29/18,11/29/18
Hole Diameter (in): 8 inches

Depth (ft)	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
	S-1		**Crushed Rock - ~6 inches**			15		
			Fill			11	▲22	
			Very moist, dark gray and brown, gravelly, fine to medium SAND, some silt; disturbed texture (SP-SM).			11		
	S-2		Black soil in drill cuttings at ~2 feet.			4		
			Vashon Recessional Outwash			4	▲10	
			Moist, reddish brown, silty, fine SAND, trace gravel; massive; low recovery (SM).			6		
5								
	S-3		Moist, light brownish gray, fine to coarse SAND, some gravel, some silt; faint stratification (SP-SM).			15		
						19	▲38	
						19		
10								
	S-4		Moist, light brownish gray, fine to coarse SAND, some silt, some gravel; moderately stratified (SP-SM).			14		
						18	▲32	
						14		
15			Gravelly drilling 15 to 16 feet.					
	S-5		Moist, light brownish gray to light reddish brown with minor to moderate oxidation, fine to coarse SAND, some gravel, trace silt; faintly stratified (SP).			11		
						12	▲25	
						13		
20			Bottom of exploration boring at 19 feet No groundwater encountered.					
25								
30								
35								

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture
Water Level ()
Water Level at time of drilling (ATD)

Logged by: TG
Approved by: JHS

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Exploration Log

Project Number	Exploration Number	Sheet
180411E001	EB-17	1 of 1

Project Name: Rivers Edge
Location: Monroe, WA
Driller/Equipment: EDI / Truck Rig
Hammer Weight/Drop: 140# / 30"

Ground Surface Elevation (ft): 80
Datum: NAVD 88
Date Start/Finish: 11/29/18,11/29/18
Hole Diameter (in): 8 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
		S-1		**Crushed Rock - ~4 inches**			3		
				Fill			11	▲26	
				Moist, light to dark brown, very silty, fine to medium SAND, some gravel; contains brick and wood debris (SM).			15		
		S-2		Moist, light to dark brown, silty, fine SAND, trace gravel; driller noted pushing rock in first 6 inches of sampling; contains wood debris and metal (SM).			21	▲12	
							8		
							4		
5				**Vashon Recessional Outwash**					
				Gravelly drilling at 5 feet.					
		S-3		Moist, light brownish gray, silty, fine to medium SAND, some gravel; broken gravel; faint stratification (SM).			29	▲42	
							22		
							20		
10									
		S-4		Moist, light brown and gray, fine to coarse SAND, some gravel, some silt; moderately stratified (SP-SM).			18	▲31	
							17		
							14		
15									
				Very gravelly drilling 16 to 17 feet.					
		S-5		Moist, brown to dark reddish brown moderately to heavily oxidized, silty, fine to medium SAND, some gravel; broken gravel in sample; moderately stratified (SM).			20	▲40	
							20		
							20		
20				Bottom of exploration boring at 19 feet No groundwater encountered.					
25									
30									
35									

Sampler Type (ST):
- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture
Water Level ()
Water Level at time of drilling (ATD)

Logged by: TG
Approved by: JHS

AESIBOR 180411.GPJ November 30, 2018

LOG OF EXPLORATION PIT NO. EP-1

This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.

Depth (ft)	DESCRIPTION
1	**Grass / Topsoil - 8 inches** medium dense, slightly moist, light brown, silty, fine SAND, some gravel; abundant fine roots; occasional plastic debris (SM).
2	**Fill** Medium dense, slightly moist, dark brown, silty, SAND, some gravel (SM) ranging to silty, sandy, GRAVEL; gravel is primarily angular; unsorted (GM).
3	**Vashon Recessional Outwash**
4	Medium dense, slightly moist, oxidized orangish brown, silty, fine SAND, some gravel; cobbles present; faintly stratified (___).
5	Grades to brownish gray, fine sandy, GRAVEL, some silt (GW-GM). Silt grades to trace.
6	Grades to fine to medium sand, some gravel, some silt.
7	
8	Grades to gravelly (SW).
9	
10	Bottom of exploration pit at depth 9.5 feet No seepage. Minor caving 5 to 6 feet.
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Rivers Edge
Monroe, WA

Logged by: ADY
Approved by: CJK

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Project No. 180411E001
10/22/18

KCTP3 180411.GPJ November 5, 2018

LOG OF EXPLORATION PIT NO. EP-2

This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.

Depth (ft)	DESCRIPTION
	1/4 to 1.5 inch Angular Gravel - ~2 inches
1	**Fill** Gravelly, silty, SAND, ranging to silty, GRAVEL, some sand; unsorted (SM-GM).
2	**Relic Topsoil ?** Medium dense, slightly moist, dark brown, silty, GRAVEL, some sand ranging to silty, SAND, some gravel (SM-GM).
3	**Vashon Recessional Outwash** Medium dense, slightly moist, orangish brown, silty, fine SAND, some gravel; cobbles present; faintly stratified (SM).
4	Grades to brownish gray, fine SAND, some silt, some gravel (SP-SM).
5	Ceramic pipe (~4 inches in diameter) at 4 feet sloping to the east. Fill soils consisting of oxidized orangish brown, silty, fine SAND, trace gravel extending to 4.5 feet in vicinity of pipe.
6	Rotted tree roots (up to 6 inches thick) at ~4 to 4.5 feet.
7	Grades to very gravelly, medium SAND, trace silt (SP). Bottom of exploration pit at depth 6.5 feet No seepage. No caving.
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Rivers Edge
Monroe, WA

Logged by: ADY
Approved by: CJK

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Project No. 180411E001
10/22/18

KCTP3 180411.GPJ November 5, 2018

LOG OF EXPLORATION PIT NO. EP-3

Depth (ft)

This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.

DESCRIPTION

1/4 to 1.5 inch Angular Gravel with Grass - ~2 inches

Fill

1 Medium dense, slightly moist, brown, silty, GRAVEL to gravelly, SAND; occasional bricks and debris; unsorted (SP-GM).

2 Medium dense, slightly moist, dark brown to black, silty, fine SAND, some gravel; contains cobbles and plastic and metal debris (SM).

3 **Vashon Recessional Outwash**

Medium dense, slightly moist, oxidized orangish brown with occasional dark brown to black patches to 3.5 feet, silty, fine SAND, some gravel; contains cobbles; faintly stratified (SM).

4 Grades to brownish gray sand, some gravel, some silt (SP-SM).

5

Grades to very gravelly, fine to medium SAND, trace silt ranging to sandy, GRAVEL, trace silt; contains cobbles (SP-GP).

6

Bottom of exploration pit at depth 6 feet
No seepage. No caving.

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Rivers Edge
Monroe, WA

Logged by: ADY
Approved by: CJK

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Project No. 180411E001

10/22/18

KCTP3 180411.GPJ November 5, 2018

LOG OF EXPLORATION PIT NO. EP-4

This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.

Depth (ft)	DESCRIPTION
1	**Grass and Road Gravel / Topsoil** Loose to medium dense, moist, dark brown, organic-rich, silty, fine SAND; abundant rootlets (SM).
2	**Fill** Medium dense, moist, dark brown to reddish brown, silty, fine SAND, trace rootlets; extends to ~1.5 feet in the north sidewall and 2 feet in the south sidewall (SM).
3	**Vashon Recessional Outwash** Medium dense, moist, brownish gray, fine to medium SAND, some gravel to gravelly, trace silt; few cobbles; stratified (SP).
4	
5	Medium dense, moist, brownish gray, medium to coarse sandy, fine to coarse GRAVEL, trace fine sand, trace silt, trace cobbles; stratified (GW).
6	
7	
8	
9	
10	Bottom of exploration pit at depth 9 feet No seepage. No caving.
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Rivers Edge
Monroe, WA

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Project No. 180411E001

10/22/18

KCTP3 180411.GPJ November 5, 2018

LOG OF EXPLORATION PIT NO. EP-5

This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.

Depth (ft)	DESCRIPTION
	Angular Gravel (~0.5 to 1 inch)
	Fill
1	Medium dense, slightly moist, brown, silty, sandy, GRAVEL (GM).
2	Unsorted, dense, black layer (3 inches thick) at 1.2 feet.
	Vashon Recessional Outwash
3	Medium dense, slightly moist, orangish brown, silty, fine SAND, some gravel; contains cobbles; faintly stratified (SM).
4	Grades to brown, silty, fine SAND below 3.5 feet.
5	Some silt below 5 feet (SP-SM).
6	
7	Grades to very gravelly, fine to medium SAND, trace silt (SP).
8	
9	
10	
11	
12	
13	Grades to fine to medium SAND, trace gravel, trace silt (SP).
14	Becomes oxidized.
15	Bottom of exploration pit at depth 14 feet No seepage. Minor caving 5 to 8 feet.
16	
17	
18	
19	
20	

Rivers Edge
Monroe, WA

Logged by: ADY
Approved by: CJK

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Project No. 180411E001

10/15/18

KCTP3 180411.GPJ November 5, 2018

LOG OF EXPLORATION PIT NO. EP-6

This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.

Depth (ft)	DESCRIPTION
	Gravel
	Fill
1	Medium dense, slightly moist, grayish brown, sandy, angular GRAVEL, ranging to silty; occasional plastic and metal debris; unsorted (GP-GM).
2	**Vashon Recessional Outwash**
3	Medium dense, slightly moist, oxidized orangish brown, silty, fine SAND, some gravel; few roots (up to 1 inch thick); contains cobbles; faintly stratified (SM).
4	Sand grades to fine to medium, trace silt; becomes brown (SP).
5	
6	
7	
8	
9	
10	
11	
12	Layer (6 inches thick) of silty, GRAVEL, with some sand.
13	Oxidized to grayish brown.
14	Medium dense, moist, brown, fine to medium SAND, some gravel, trace silt (SP).
15	Bottom of exploration pit at depth 14 feet No seepage. Minor caving 0 to 2 feet.
16	
17	
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19	
20	

Rivers Edge
Monroe, WA

Logged by: ADY
Approved by: CJK

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Project No. 180411E001
10/15/18

KCTP3 180411.GPJ November 5, 2018

LOG OF EXPLORATION PIT NO. EP-7

This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.

Depth (ft)	DESCRIPTION
	Gravel
1	**Fill**
	Medium dense, brown, slightly moist, very gravelly, SAND, some silt; contains cobbles (up to 8 inches) (SP-SM).
2	**Relic Topsoil ?**
3	Medium dense, dark brown, slightly moist, silty, fine SAND ranging to gravelly (SM).
	Vashon Recessional Outwash
4	Medium dense, slightly moist, oxidized orangish brown, silty, fine SAND, some gravel; contains cobbles; faintly stratified (SM).
5	Grades to brown, gravelly, fine to medium SAND, trace to some silt (SP/SP-SM).
6	
7	Grades to sandy, GRAVEL, trace silt (GP).
8	Grades to gravelly, fine to medium SAND.
9	Grades to very gravelly.
10	
11	
12	Oxidized.
13	Very moist.
14	
15	Medium dense, very moist, brown, gravelly, fine to medium SAND, trace silt (SP).
16	Few fine oxidized layers (~1/4 inch thick) with cobbles.
17	Bottom of exploration pit at depth 16 feet No seepage. Minor caving 0 to 2 feet and 6.5 to 16 feet.
18	
19	
20	

Rivers Edge
Monroe, WA

Logged by: ADY
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Project No. 180411E001
10/15/18

KCTP3 180411.GPJ November 5, 2018

LOG OF EXPLORATION PIT NO. EP-8

This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.

Depth (ft)	DESCRIPTION
	Gravel
1	**Fill**
	Medium dense, slightly moist, brown, silty, sandy, angular GRAVEL (GM).
2	Fill thins to 0.5 feet thick to east.
	Relic Topsoil ?
3	Medium dense, slightly moist, dark brown, silty, fine SAND, trace to some gravel (SP/SP-SM).
	Vashon Recessional Outwash
4	Medium dense, slightly moist, oxidized orangish brown, silty, fine SAND, trace gravel; cobbles present; faintly stratified (SM).
5	Medium dense, slightly moist, brown, fine SAND, some silt, trace to some gravel (SP-SM).
	Sand grades to fine to medium, silt grades to trace.
6	Becomes gravelly to very gravelly below 6 feet.
7	
8	
9	Becomes dark brown to black.
	Becomes oxidized orangish brown.
10	Medium dense, slightly moist, brown, very gravelly, fine to medium SAND, trace silt grading to sandy, GRAVEL (GP).
11	
12	
	Bottom of exploration pit at depth 12 feet
13	No seepage. Minor caving 0 to 2 feet.
14	
15	
16	
17	
18	
19	
20	

Rivers Edge
Monroe, WA

Logged by: ADY
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Project No. 180411E001
10/15/18

KCTP3 180411.GPJ November 5, 2018

LOG OF EXPLORATION PIT NO. EP-9

This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.

Depth (ft)	DESCRIPTION
	Gravel
1	**Fill**
	Medium dense, slightly moist, brown to black, silty, GRAVEL to gravelly, SAND, some silt; unsorted; contains brick, wood and plastic debris (GP/SP-SM).
2	**Vashon Recessional Outwash**
3	Medium dense, slightly moist, oxidized orangish brown, silty, fine SAND, some gravel; cobbles present; faintly stratified (SM).
4	Grades to brown, fine to medium SAND, some gravel, some silt (SP-SM).
5	
6	Grades to very sandy, GRAVEL, trace silt (GW).
7	
8	Bottom of exploration pit at depth 7 feet No seepage. Minor caving 5.5 to 7 feet.
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Rivers Edge
Monroe, WA

Logged by: ADY
Approved by: CJK

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Project No. 180411E001

10/15/18

KCTP3 180411.GPJ November 5, 2018

LOG OF EXPLORATION PIT NO. EP-10

This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplfication of actual conditions encountered.

Depth (ft)	DESCRIPTION
	Gravel
	Fill
1	Medium dense, grayish brown, silty, SAND to sandy, GRAVEL, some silt; unsorted (SM/GP-GM).
2	
	Relic Topsoil - 3 inches
3	Medium dense, dark brown, slightly moist, silty, fine SAND ranging to gravelly (SM).
	Vashon Recessional Outwash
4	Medium dense, slightly moist, oxidized orangish brown, silty, fine SAND, trace gravel (___). Grades to brown, fine SAND, trace to some silt, trace gravel; faintly stratified (SP-SM/SP).
5	Sand grades to fine to medium, becomes gravelly, ranging to sandy, GRAVEL (GW).
6	
7	
8	
9	Layer (~3 inches thick) of silty, GRAVEL (SM).
10	
11	Grades to oxidized dark brown, medium sandy, GRAVEL, trace to some silt (GP-GM). Becomes oxidized orangish brown.
12	
13	Bottom of exploration pit at depth 12 feet No seepage. Minor caving 8 to 12 feet.
14	
15	
16	
17	
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20	

Rivers Edge
Monroe, WA

Logged by: ADY
Approved by: CJK

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Project No. 180411E001

10/15/18

KCTP3 180411.GPJ November 5, 2018

LOG OF EXPLORATION PIT NO. IT-1

This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.

Depth (ft)	DESCRIPTION
	Angular Gravel
1	**Fill**
	Medium dense, slightly moist, gray to brownish gray, gravelly, SAND to fine to medium SAND, some silt; unsorted (SP-SM).
2	**Relic Topsoil ?**
3	Medium dense, slightly moist, dark brown, silty, fine SAND, some gravel; abundant organics; cobbles present (SM).
	Vashon Recessional Outwash
4	Medium dense, slightly moist, oxidized reddish brown, silty, fine SAND, some gravel; cobbles present; faintly stratified (SM).
5	Becomes brown, silt decreases to some (SP-SM).
	Grades to very sandy, GRAVEL, trace silt (GW-GM).
6	Becomes moist below 5 feet.
7	
8	
9	
10	
11	
12	
13	
14	Grades to very sandy, GRAVEL, trace silt (GW).
15	Grades to gravelly, fine to coarse SAND, trace silt (SW).
16	
17	Bottom of exploration pit at depth 16 feet Minor seepage at 12 feet from eastern edge of pit. Moderate caving 3 to 14 feet.
18	
19	
20	

Rivers Edge
Monroe, WA

Logged by: ADY
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Project No. 180411E001
10/22/18

KCTP3 180411.GPJ November 5, 2018

LOG OF EXPLORATION PIT NO. IT-2

This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.

Depth (ft)	DESCRIPTION
1	**Grass and Road Gravel / Topsoil** Loose to medium dense, moist, dark brown, organic-rich, silty, fine SAND; abundant rootlets (SM).
2	**Fill** Medium dense, moist, dark brown to reddish brown, silty, fine SAND, trace rootlets; extends to ~1.5 feet in the north sidewall and 2 feet in the south sidewall (SM).
3	**Vashon Recessional Outwash** Medium dense, moist, brownish gray, fine to medium SAND, some gravel to gravelly, trace silt; stratified (SP).
4	
5	Medium dense, wet, brownish gray, very sandy, GRAVEL, trace silt, trace cobbles; sand is medium to coarse; stratified (GW).
6	
7	
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11	
12	
13	Medium dense, wet, grayish brown, fine to coarse sandy, fine to coarse GRAVEL, some silt, trace cobble; stratified (GW-GM).
14	
15	Medium dense, wet, brownish gray, very gravelly, fine to coarse SAND, trace to some silt, trace cobbles; stratified (SW).
16	
17	Bottom of exploration pit at depth 16 feet Heavy seepage 13 to 16 feet. Moderate caving 6 to 16 feet.
18	
19	
20	

Rivers Edge
Monroe, WA

Logged by: KRB
Approved by: CJK

associated earth sciences incorporated

Project No. 180411E001

10/22/18

KCTP3 180411.GPJ November 5, 2018

APPENDIX B

Exploration Logs by Others

EMCON

LOG OF EXPLORATORY BORING

CLIENT/PROJECT NAME: Monroe Auto Salvage
PROJECT #: 40358-017.001(2)
GEOLOGIST/ENGINEER: Nick Garson
DRILLING CONTRACTOR: CASCADE
DRILLING METHOD: CME 75 Hollow Stem Auger Drill Rig
HOLE DIA.: 4.25" I.D./7" O.D.

BORING NO.: MW-1
DATE BEGAN: 5/1/96
DATE COMPLETED: 5/1/96
TOTAL DEPTH: 21.5 feet
SHEET: 1 OF 2

FIELD LOCATION OF BORING: Next to Orange Shack @ SE site boundary
GROUND ELEVATION:
DATUM:

WATER LEVEL DATA				
DEPTH	~17'			
TIME	0815			
DATE	5/1/96			
BORING DEPTH	21.5'			

OTHER: PID

WELL OR PIEZOMETER DETAILS	SAMPLING METHOD	SAMPLE NUMBER	BLOWS/FT	DEPTH SAMPLED	DEPTH IN FEET	SOIL GROUP SYMBOL (USCS)	LITHOLOGIC DESCRIPTION
					1	SM	0.0 to 5.5 feet: Silty SAND with GRAVEL (SM-GW), dark brown, fine to coarse SAND, ~15-20% low to medium plasticity fines, ~10-15% fine to coarse gravel, scattered roots and glass fragments, dense, damp (FILL)
					2		
					3		
					4		
					5		
2.7	SB	MW-1 -5	30 50/3	X	6		5.5 to 17 feet: SAND (SW), light brown, fine to medium, ~5% coarse SAND to fine gravel, trace fines, very dense, damp to wet (NATIVE)
					7		
					8		
					9	SW	
0.0	SB	MW-1 -10	55	X	10		
					11		
					12		
					13		
					14		
0.0	SB	MW-1 -15	62	X	15		
					16		
					17		17 to 19 feet: SAND (SP), brown, fine, ~5% low plasticity fines, trace medium to coarse SAND, very dense, wet (NATIVE)
					18		
					19		

REMARKS: 1) SB = Soil samples collected using either a 2.5" x 24" Dames and Moore Sampler or a 2.5" x 36" Stainless Steel Split Barrel sampler 2) Blow counts do not represent SPT Results 3) White triangle: field estimate of water level during time of drilling 4) Soil samples screened with PID 5) Reference elevation: Ground Surface

*NOTE: Specify data recorded in undesignated column (e.g. conductance, pH, tip reading, pocket torvane, etc.)

EMCON

LOG OF EXPLORATORY BORING

CLIENT/PROJECT NAME Monroe Auto Salvage
PROJECT # 40358-017.001(2)
GEOLOGIST/ENGINEER N. McGARSON
DRILLING CONTRACTOR CASCADE
DRILLING METHOD CME 75 Hollow Stem Auger Drill Rig
HOLE DIA. 4.25" I.D / 9" O.D

BORING NO. MW-1
DATE BEGAN 5/1/96
DATE COMPLETED 5/1/96
TOTAL DEPTH 21.5 feet
SHEET 2 OF 2

WATER LEVEL DATA

DEPTH				
TIME				
DATE				
BORING DEPTH				

FIELD LOCATION OF BORING:

GROUND ELEVATION
DATUM

OTHER* (PID)	WELL OR PIEZOMETER DETAILS	SAMPLING DATA: SAMPLING METHOD	SAMPLE NUMBER	BLOWS/FT	DEPTH SAMPLED	DEPTH IN FEET	SOIL GROUP SYMBOL (USCS)	LITHOLOGIC DESCRIPTION
0.0		SB	MW-1-19	15 17 12	X	21 22		19 to 21 feet: Silt (ML), brown to gray, laminated, low to medium plasticity, stiff, wet (NATIVE)

Total Depth Drilled: 20 feet bgs
Total Depth Sampled: 21.5 feet bgs

Well Completion Details

0 - 9 feet bgs: 2-inch diameter, flush-threaded Schedule 40 PVC blank riser pipe

9 - 19 feet bgs: 2-inch diameter, flush-threaded Schedule 40 PVC well screen with 0.020 inch machined slots.

0 - 1.5 feet bgs: Flush mount well monument with concrete

1.5 to 6.5 feet bgs: Pure Gold medium bentonite chips hydrated with potable water.

6.5 - 19 feet bgs: RMC Lonestar #6/12 SAND

REMARKS:

*NOTE: Specify data recorded in undesignated column (e.g. conductance, pH, tip reading, pocket torvane, etc.)

EMCON

LOG OF EXPLORATORY BORING

CLIENT/PROJECT NAME: Monroe Auto Salvage
PROJECT #: 40358-017.001(2)
GEOLOGIST/ENGINEER: Nick Garson
DRILLING CONTRACTOR: Cascade
DRILLING METHOD: CME 75 Hollow Stem Auger Drill Rig
HOLE DIA.: 4.25" I.D./9" O.D.

BORING NO.: MW-2
DATE BEGAN: 5/1/96
DATE COMPLETED: 5/1/96
TOTAL DEPTH: 29 feet
SHEET: 1 OF 2

OTHER: PID

WELL OR PIEZOMETER DETAILS

SAMPLING DATA

SAMPLING METHOD	SAMPLE NUMBER	BLOWS/FT	DEPTH SAMPLED
SB	MW-2-5	20 / 27 / 12	
SB	MW-2-10	8 / 7 / 7	
SB	MW-2-15	5 / 7 / 8	

WATER LEVEL DATA

DEPTH	~21.5'			
TIME	1025			
DATE	5/1/96			
BORING DEPTH	29 feet			

FIELD LOCATION OF BORING: South of office

GROUND ELEVATION:
DATUM:

DEPTH IN FEET | SOIL GROUP SYMBOL (USCS)

LITHOLOGIC DESCRIPTION

0.0 to 10 feet: Silty SAND with GRAVEL (SM-GW) dark brown, fine to coarse SAND, ~15-20% low to medium plasticity fines, ~10-15% fine to coarse gravel, loose to medium dense, damp (FILL)

SM-GW

@ 10 feet - Auger Refusal. Moved boring ~3-4 to south.

10 to 15 feet: Silty SAND (SM), dark brown to black, fine, ~10-15% low plasticity fines, trace to ~5% medium to coarse SAND, scattered wood chips and peat, loose, damp (NATIVE)

SM

15 to 21 feet: SAND (SW), brown, fine to medium, ~5-10% coarse sand, trace fines, loose, damp to wet (NATIVE)

SW

REMARKS:

*NOTE: Specify data recorded in undesignated column (e.g. conductance, pH, tip reading, pocket torvane, etc.)

EMCON

LOG OF EXPLORATORY BORING

CLIENT/PROJECT NAME: Monroe Auto Salvage
PROJECT #: 40354-011.001(2)
GEOLOGIST/ENGINEER: Nick Grayson
DRILLING CONTRACTOR: Cascade
DRILLING METHOD: CME 75 H.S.A. Drill Rig
HOLE DIA.: 7.25" I.D. / 9" O.D.

BORING NO.: MW-2
DATE BEGAN: 5/1/96
DATE COMPLETED: 5/1/96
TOTAL DEPTH: 29 feet
SHEET: 2 OF 2

WATER LEVEL DATA

DEPTH				
TIME				
DATE				
BORING DEPTH				

FIELD LOCATION OF BORING:

GROUND ELEVATION:
DATUM:

OTHER*: PID

WELL OR PIEZOMETER DETAILS	SAMPLING METHOD	SAMPLE NUMBER	BLOWS/FT	DEPTH SAMPLED	DEPTH IN FEET	SOIL GROUP SYMBOL (USCS)	LITHOLOGIC DESCRIPTION
2.7	SB	MW-2 -20	15 34 50/5	X	21	SW ML	21 to 27.5 feet: Silt (ML), rust brown, non to low plasticity, trace fine sand, hard, moist to wet (Native)
	SB	MW-2 -21.5	24 17 23	X	22 23 24		21.5 to 27.5 feet: SAND (SW), brown, fine to medium, ~5-10% coarse sand, trace fines, medium to very dense, wet (Native)
	SB	MW-2 -25	80/5	X	25 26 27	SW	@ ~25 feet: fines increase to ~5-15%
	SB	MW-2 -27.5	31 50	X	28	ML	27.5 to 28.5 feet: Silt (ML), gray, low plasticity, hard, wet (Native)
					29 30		Total Depth Drilled: 27.5 feet bgs Total Depth Sampled: 29 feet bgs
							Well Completion Details
							0 - 17 feet bgs: 2-inch diameter, flush-threaded Schedule 40 PVC blank riser pipe
							17 - 27 feet bgs: 2-inch diameter, flush-threaded Schedule 40 PVC well screen with 0.020-inch machined slots
							mount 0 - 1.5 feet: Flush well monument with concrete 1.5 - 15.5 feet: Pure Gold medium bentonite chips hydrated with potable water 15.5 - 27 Feet: Rmc Lonestar #6/12 SAND

REMARKS:

*NOTE: Specify data recorded in undesignated column (e.g. conductance, pH, tip reading, pocket torvane, etc.)

EMCON

LOG OF EXPLORATORY BORING

CLIENT/PROJECT NAME: Monroe Auto Salvage
PROJECT #: 40358-017.001
GEOLOGIST/ENGINEER: Nick Garson
DRILLING CONTRACTOR: Cascade
DRILLING METHOD: CME 75 Hollow Stem Auger, Drill Rig
HOLE DIA.: 4.25" I.D./9" O.D.

BORING NO.: MW-3
DATE BEGAN: 5/1/96
DATE COMPLETED: 5/1/96
TOTAL DEPTH: 25 feet
SHEET: 1 OF 2

FIELD LOCATION OF BORING: South of Focused PCO Sampling Area
GROUND ELEVATION:
DATUM:

WATER LEVEL DATA				
DEPTH	~22'			
TIME	1250			
DATE	5/1/96			
BORING DEPTH	28'			

OTHER* PID	WELL OR PIEZOMETER DETAILS	SAMPLING METHOD	SAMPLE NUMBER	BLOWS/FT	DEPTH SAMPLED	DEPTH IN FEET	SOIL GROUP SYMBOL (USCS)	LITHOLOGIC DESCRIPTION
						0		0.0 to 10 feet: Silty GRAVELLY SAND (SW), light to dark brown, fine to coarse, ~10-15% fine to coarse gravel, ~5-10% low plasticity fines, dense, damp (FILL)
2.7		SB	MW-3 -5	50/4	X	5	SW	
2.7		SB	MW-3 -10	31 50	X	10	SP	10 to 15 feet: SAND (SP), brown, fine, trace to ~5% medium to coarse SAND, trace fines, medium to dense, damp (NATIVE)
2.7		SB	MW-3 -15	54	X	15	SW	15 to 20 feet: GRAVELLY SAND (SW), rust brown, fine to coarse, ~15-20% fine to coarse GRAVEL, trace fines, very dense, damp to moist (NATIVE)

REMARKS:

*NOTE: Specify data recorded in undesignated column (e.g. conductance, pH, tip reading, pocket torvane, etc.)

EMCON

LOG OF EXPLORATORY BORING

CLIENT/PROJECT NAME: Monroe Auto Salvage
PROJECT #: 40255-017.001(2)
GEOLOGIST/ENGINEER: N. Lic. Carson
DRILLING CONTRACTOR: Cascade
DRILLING METHOD: CME 75 HSA Drilling
HOLE DIA.: 4.25" I.D./8" O.D.

BORING NO.: MW-3
DATE BEGAN: 5/1/96
DATE COMPLETED: 5/1/96
TOTAL DEPTH: 28 feet
SHEET: 2 OF 2

FIELD LOCATION OF BORING:

GROUND ELEVATION: _____
DATUM: _____

OTHER* PID	WELL OR PIEZOMETER DETAILS	SAMPLING METHOD	SAMPLE NUMBER	BLOWS/FT	DEPTH SAMPLED	DEPTH IN FEET	SOIL GROUP SYMBOL (USCS)	LITHOLOGIC DESCRIPTION
								WATER LEVEL DATA
								DEPTH:
								TIME:
								DATE:
								BORING DEPTH:
2.7		SB	MW-3-20	50	X	21		20 to 25 feet: SAND (SP), rust to dark brown, fine, ~5% medium to coarse SAND, trace to ~5% fine to coarse gravel, medium to dense, moist to wet (NATIVE)
						22	▽	
2.7		SB	MW-3 -22.5	15 50	X	23	SP	@ ~22 feet: Scattered silt lenses up to 2" thick
						24		
						25		25 to 27 feet: GRAVELLY SAND (SW), brown, fine to coarse, ~10-15% fine to coarse gravel, ~5% low plasticity fines, very dense, wet (NATIVE)
2.7		SB	MW-3 -25	53	X	26	SW	
—		SB	MW-3 -26.5	8 12 20	X	27		27 to 28 feet: Silt (ML), brown to gray, low plasticity, trace to ~5% fine SAND, stiff to very stiff, wet (NATIVE)
						28		

Total Depth Drilled: 27.5 feet bgs
Total Depth Sampled: 28.0 feet bgs

Well Completion Details

0 - 17.5 Feet: 2-inch diameter, flush-threaded Schedule 40 PVC blank riser pipe.

17.5 - 27.5 feet: 2-inch diameter, flush-threaded Schedule 40 PVC well screen with 0.020-inch machined slots

0 - 1.5 Feet: Flush mount well monument with concrete

1.5 - 16 Feet: Pure Gold medium bentonite chips hydrated with potable water

16 - 27.5 Feet: RMC Lonestar #6/12 SAND

REMARKS:

*NOTE: Specify data recorded in undesignated column (e.g. conductance, pH, tip reading, pocket torvane, etc.)

EMCON

LOG OF EXPLORATORY BORING

CLIENT/PROJECT NAME: Monroe Auto Salvage
PROJECT #: 40358-017.001(2)
GEOLOGIST/ENGINEER: Nick Gatson
DRILLING CONTRACTOR: Cascade
DRILLING METHOD: CME 75 Hollow stem Auger Drill Rig
HOLE DIA.: 4.25" ID / 8" OD

BORING NO.: MW-4
DATE BEGAN: 5/1/96
DATE COMPLETED: 5/1/96
TOTAL DEPTH: 28 feet
SHEET: 1 OF 2

FIELD LOCATION OF BORING:
GROUND ELEVATION:
DATUM:

WATER LEVEL DATA				
DEPTH	~22'			
TIME	1430			
DATE	5/1/96			
BORING DEPTH	28'			

OTHER* PID	WELL OR PIEZOMETER DETAILS	SAMPLING DATA: SAMPLING METHOD	SAMPLE NUMBER	BLOWS/FT	DEPTH SAMPLED	DEPTH IN FEET	SOIL GROUP SYMBOL (USCS)	LITHOLOGIC DESCRIPTION
								0.0 to 11 feet: SAND (SP), light to dark brown, fine, ~5% medium to coarse sand, ~5% fines, trace fine to coarse gravel, loose to dense, damp (Fill / Native)
2.7		SB	MW-4-5	5 23 50/2	X	5	SP	@ ~5-6 feet: scattered organic material
2.7		SB	MW-4-10	10 50	X	10		11 to 25 feet: Gravelly SAND (SW), rust brown, fine to coarse, ~15-30% fine to coarse gravel, trace fines, medium to dense, damp to wet (Native)
2.7		SB	MW-4-15	24 50	X	15	SW	@ ~15 feet: fines increase to ~5%

REMARKS:

*NOTE: Specify data recorded in undesignated column (e.g. conductance, pH, tip reading, pocket torvane, etc.)

EMCON

LOG OF EXPLORATORY BORING

CLIENT/PROJECT NAME Monaco Auto Service
PROJECT # 40358-017.001(2)
GEOLOGIST/ENGINEER Nick Gleason
DRILLING CONTRACTOR CASCADE
DRILLING METHOD CME 75 H.S.A. OR.
HOLE DIA. 8.25" ID/12" OD

BORING NO. MW-4
DATE BEGAN 5/1/96
DATE COMPLETED 5/1/96
TOTAL DEPTH 28 feet
SHEET 2 OF 2

WATER LEVEL DATA

DEPTH				
TIME				
DATE				
BORING DEPTH				

FIELD LOCATION OF BORING:

GROUND ELEVATION
DATUM

OTHER: PID

WELL OR PIEZOMETER DETAILS	SAMPLING METHOD	SAMPLE NUMBER	BLOWS/FT	DEPTH SAMPLED	DEPTH IN FEET	SOIL GROUP SYMBOL (USCS)	LITHOLOGIC DESCRIPTION
2.7	SD	MW-4 -20	50	X	21		
					22	▽	@ ~ 23 feet: Scattered silt lenses ~1-2" thick
	SB	MW-4 -22.5	10 10 20	X X	23	SW	
					24		
					25		25 to 28 feet: Silty GRAVELLY SAND (SW) brown, fine to coarse, ~5-15% fines, ~15-20% fine to coarse gravel, very dense, wet (NATIVE)
	SB	MW-4 -25	50	X	26		
	SD	MW-4 -26.5	50	X	27	ML	
					28		26.5 to 28 feet: SILT (ML) gray, non to low plasticity, trace to fine sand, hard, wet (NATIVE)

Total Depth Drilled: 27 feet
Total Depth Sampled: 27 feet

Well Completion Details

0 - 17 feet: 2-inch diameter, flush-threaded Schedule 40 PVC blank riser pipe

17 - 27 feet: 2-inch diameter, flush-threaded Schedule 40 PVC well screen with 0.020-inch machined slots

0 - 1.5 feet: Flushmount well monument w/ concrete

1.5 - 15 feet: Pure Gold Medium Bentonite chips hydrated with potable water

15 - 27 feet: RMC Lonestar #6/12 SAND

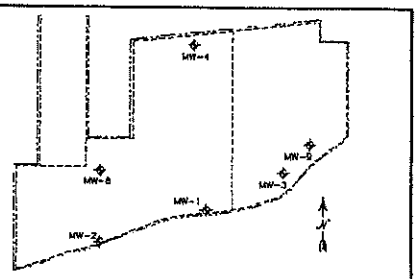
REMARKS:

*NOTE: Specify data recorded in undesignated column (e.g. conductance, pH, tip reading, pocket torvane, etc.)

FARALLON CONSULTING
320 3rd Ave. NE, Suite 200
Issaquah, WA 98027

LOG OF WELL MW-9

(Page 1 of 1)



Monroe Auto Salvage
Remedial Investigation / Feasibilty Study
Monroe, WA

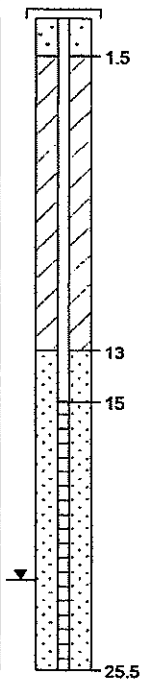
Project # 601-001

Logged by: Matt Essig

Time Started	: 8/6/99	Surface Elev.	: NA
Time Finished	: 8/6/99	Ground Water	: 22 feet
Hole Diameter	: 6 5/8 in.		
Drilling Method	: H.S.A.		
Sampling Method	: CA Mod. Sampler		

Depth in Feet	Sample Interval	% Recovery	Blow Count 6/6/6	USCS	GRAPHIC	DESCRIPTION	Sample ID.	Submitted for Lab Analysis
0		0		FL		FILL, sandy silty topsoil followed by blackish gray wood fiber, no sheen, no odor		
5		38	77-7"	FL		FILL, medium dense, blackish grey to reddish brown, sawdust, organic decay, moist, odor, no sheen.	FLM-SB2@6.0'	
		0						
10		66	32,50-6"	SW		SAND, Well Graded, medium dense to dense, brown, fine grained sand to gravel, becomes coarse sand @ 11.5', moist, no sheen, no odor.	FLM-SB2@11.0'	
		0						
		33	60-6"	GW		GRAVEL, Well Graded, dense, dark brownish gray, sandy gravel, damp, cobble plug, no sheen, no odor.	FLM-SB2@13.0'	
15		0						
		33	100-6"	SP		SAND, Poorly Graded, dense, gray, fine grained sand with gravel, damp, sheen, no odor.	FLM-SB2@16.0'	X
		0						
		66	32,50-6"	SP			FLM-SB2@18.0'	
20		0						
		66	33,50-6"	SP		SAND, Poorly Graded, medium dense, gray, medium sand, damp, no sheen, no odor.	FLM-SB2@21.0'	X
		100	26,38,50	SW			FLM-SB2@22.0'	
		0				SAND, Poorly Graded, medium dense to dense, gray, medium sand, moist light sheen, no odor.		
25		33	60-6"	ML		SAND, Well Graded, dense, gray, gravelly coarse sand, wet to sat- urated no sheen, no odor.	FLM-SB2@25.0'	
						SILT, dense, gray, damp, no sheen, no odor.		
30						Total depth 25.5 feet below ground surface.		

Well: MW-9
Elev.: NA



Well Construction Information

WELL CONSTRUCTION

Date Completed	: 8/6/99
Hole Diameter	: 5 5/8 in.
Drill. Method	: HSA
Company Rep.	: D. Simon

WELL CASING

Material	: PVC
Diameter	: 2 in.
Joints	: threaded

WELL SCREEN

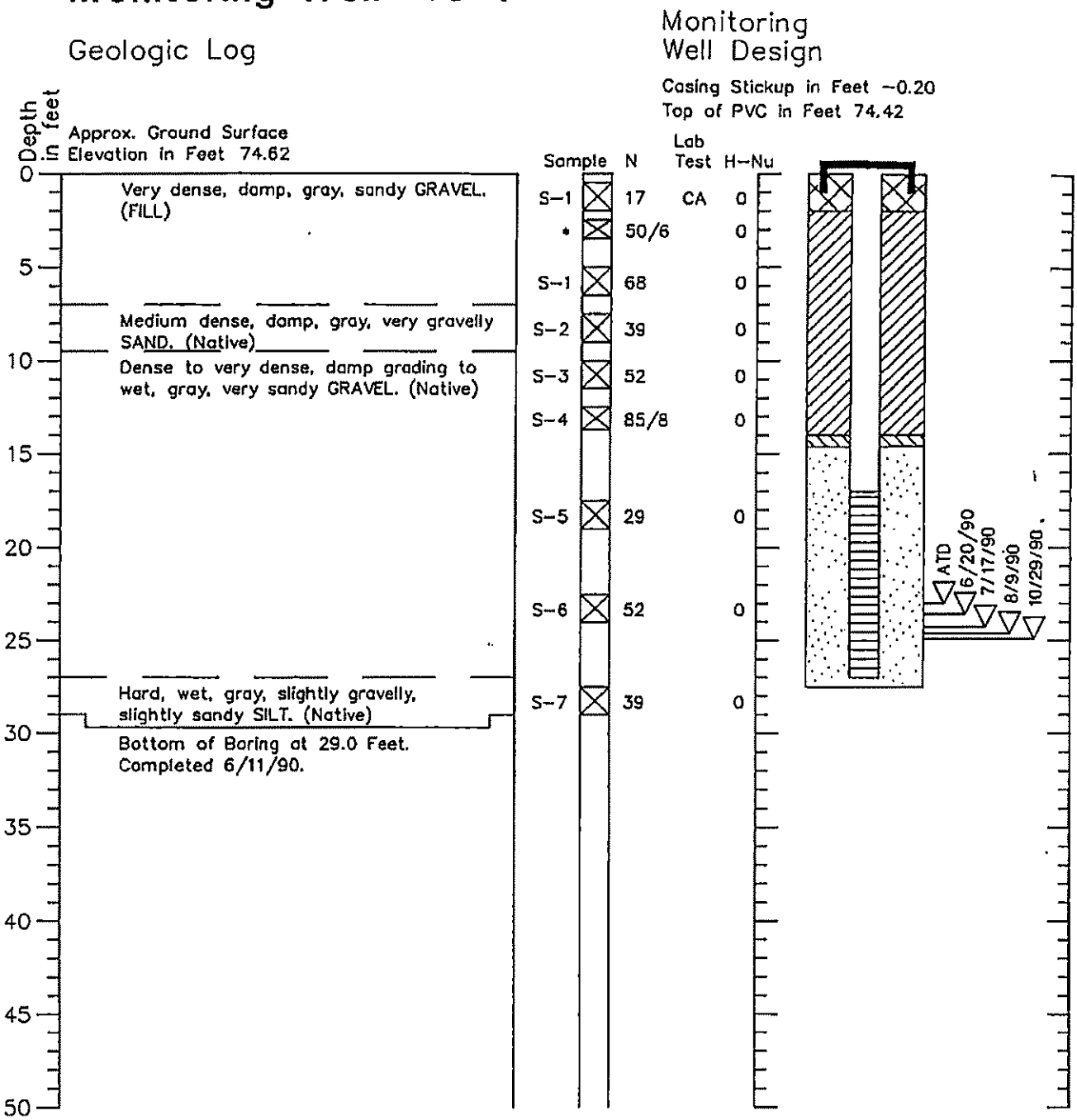
Material	: PVC
Diameter	: 2 in.
Joints	: threaded
Opening	: .010 slot
SAND PACK	: #12-2 Lonestar sand
ANNULUS SEAL	: bentonite pellets : and slurry

WELL SCREEN

Material	: steel
Diameter	: 6 in.
Cap	:

NOTES

Boring Log and Construction Data for Monitoring Well HC-4



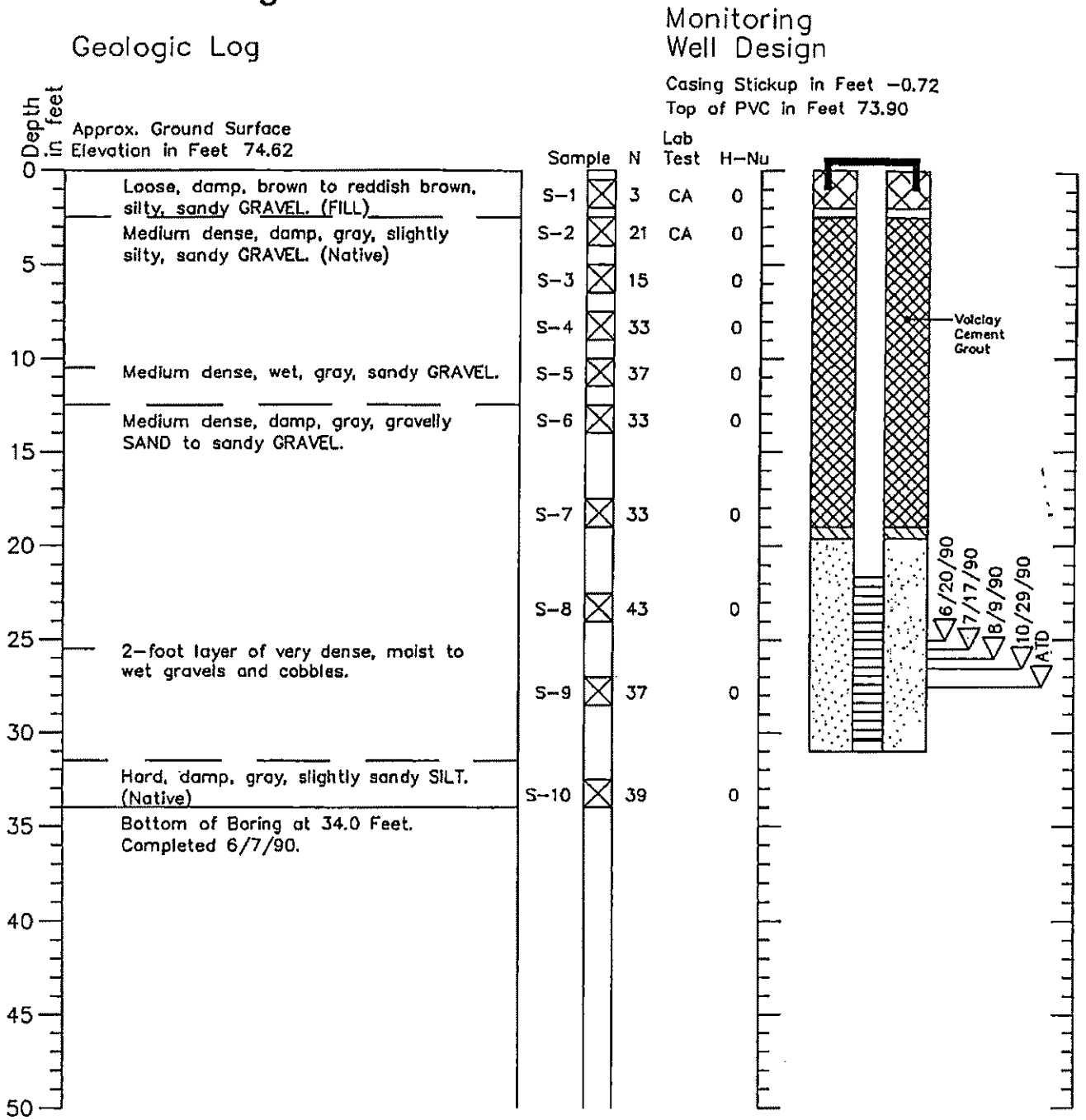
1. Refer to Figure A−1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

HARTCROWSER

J-2915 6/90

Figure A- 5

Boring Log and Construction Data for Monitoring Well HC-5



1. Refer to Figure A−1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

HARTCROWSER

J-2915 6/90

Figure A- 6

Soil Classification System

MAJOR DIVISIONS			GRAPHIC SYMBOL	USCS LETTER SYMBOL[1]	TYPICAL DESCRIPTIONS [2][3]
COARSE-GRAINED SOIL (More than 50% of material is larger than No. 200 sieve size)	GRAVEL AND GRAVELLY SOIL (More than 50% of coarse fraction retained on No. 4 sieve)	CLEAN GRAVEL (Little or no fines)		GW	Well-graded gravel; gravel/sand mixture(s); little or no fines
				GP	Poorly graded gravel; gravel/sand mixture(s); little or no fines
		GRAVEL WITH FINES (Appreciable amount of fines)		GM	Silty gravel; gravel/sand/silt mixture(s)
				GC	Clayey gravel; gravel/sand/clay mixture(s)
	SAND AND SANDY SOIL (More than 50% of coarse fraction passed through No. 4 sieve)	CLEAN SAND (Little or no fines)		SW	Well-graded sand; gravelly sand; little or no fines
				SP	Poorly graded sand; gravelly sand; little or no fines
		SAND WITH FINES (Appreciable amount of fines)		SM	Silty sand; sand/silt mixture(s)
				SC	Clayey sand; sand/clay mixture(s)
FINE-GRAINED SOIL (More than 50% of material is smaller than No. 200 sieve size)	SILT AND CLAY (Liquid limit less than 50)			ML	Inorganic silt and very fine sand; rock flour; silty or clayey fine sand or clayey silt with slight plasticity
				CL	Inorganic clay of low to medium plasticity; gravelly clay; sandy clay; silty clay; lean clay
				OL	Organic silt; organic, silty clay of low plasticity
	SILT AND CLAY (Liquid limit greater than 50)			MH	Inorganic silt; micaceous or diatomaceous fine sand
				CH	Inorganic clay of high plasticity; fat clay
				OH	Organic clay of medium to high plasticity; organic silt
	HIGHLY ORGANIC SOIL			PT	Peat; humus; swamp soil with high organic content

OTHER MATERIALS	GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
PAVEMENT		AC or PC	Asphalt concrete pavement or Portland cement pavement
ROCK		RK	Rock (See Rock Classification)
WOOD		WD	Wood, lumber, wood chips
DEBRIS		DB	Construction debris, garbage

Notes:
1. USCS letter symbols correspond to symbols used by the Unified Soil Classification System and ASTM classification methods. Dual letter symbols (e.g., SP-SM for sand or gravel) indicate soil with an estimated 5-15% fines. Multiple letter symbols (e.g., ML/CL) indicate borderline or multiple soil classifications.
2. Soil descriptions are based on the general approach presented in the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), outlined in ASTM D 2488. Where laboratory index testing has been conducted, soil classifications are based on the Standard Test Method for Classification of Soils for Engineering Purposes, as outlined in ASTM D 2487.
3. Soil description terminology is based on visual estimates (in the absence of laboratory test data) of the percentages of each soil type and is defined as follows:

Primary Constituent:	> 50%	- "GRAVEL," "SAND," "SILT," "CLAY," etc.
Secondary Constituents:	> 30% and ≤ 50%	- "very gravelly," "very sandy," "very silty," etc.
	> 15% and ≤ 30%	- "gravelly," "sandy," "silty," etc.
Additional Constituents:	> 5% and ≤ 15%	- "with gravel," "with sand," "with silt," etc.
	≤ 5%	- "with trace gravel," "with trace sand," "with trace silt," etc., or not noted.

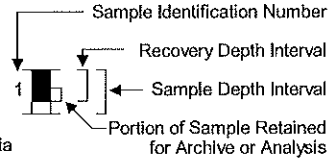
4. Soil density or consistency descriptions are based on judgement using a combination of sampler penetration blow counts, drilling or excavating conditions, field tests, and laboratory tests, as appropriate.

Drilling and Sampling Key

SAMPLER TYPE

Code	Description
a	3.25-inch O.D., 2.42-inch I.D. Split Spoon
b	2.00-inch O.D., 1.50-inch I.D. Split Spoon
c	Shelby Tube
d	Grab Sample
e	Single-Tube Core Barrel
f	Double-Tube Core Barrel
g	2.50-inch O.D., 2.00-inch I.D. WSDOT
h	3.00-inch O.D., 2.375-inch I.D. Mod. California
i	Other - See text if applicable
1	300-lb Hammer, 30-inch Drop
2	140-lb Hammer, 30-inch Drop
3	Pushed
4	Vibrocore (Rotosonic/Geoprobe)
5	Other - See text if applicable

SAMPLE NUMBER & INTERVAL



Field and Lab Test Data

Code	Description
PP = 1.0	Pocket Penetrometer, tsf
TV = 0.5	Torvane, tsf
PID = 100	Photoionization Detector VOC screening, ppm
W = 10	Moisture Content, %
D = 120	Dry Density, pcf
-200 = 60	Material smaller than No. 200 sieve, %
GS	Grain Size - See separate figure for data
AL	Atterberg Limits - See separate figure for data
GT	Other Geotechnical Testing
CA	Chemical Analysis

Groundwater

▽ Approximate water level at time of drilling (ATD)

▼ Approximate water level at time after drilling/excavation/well

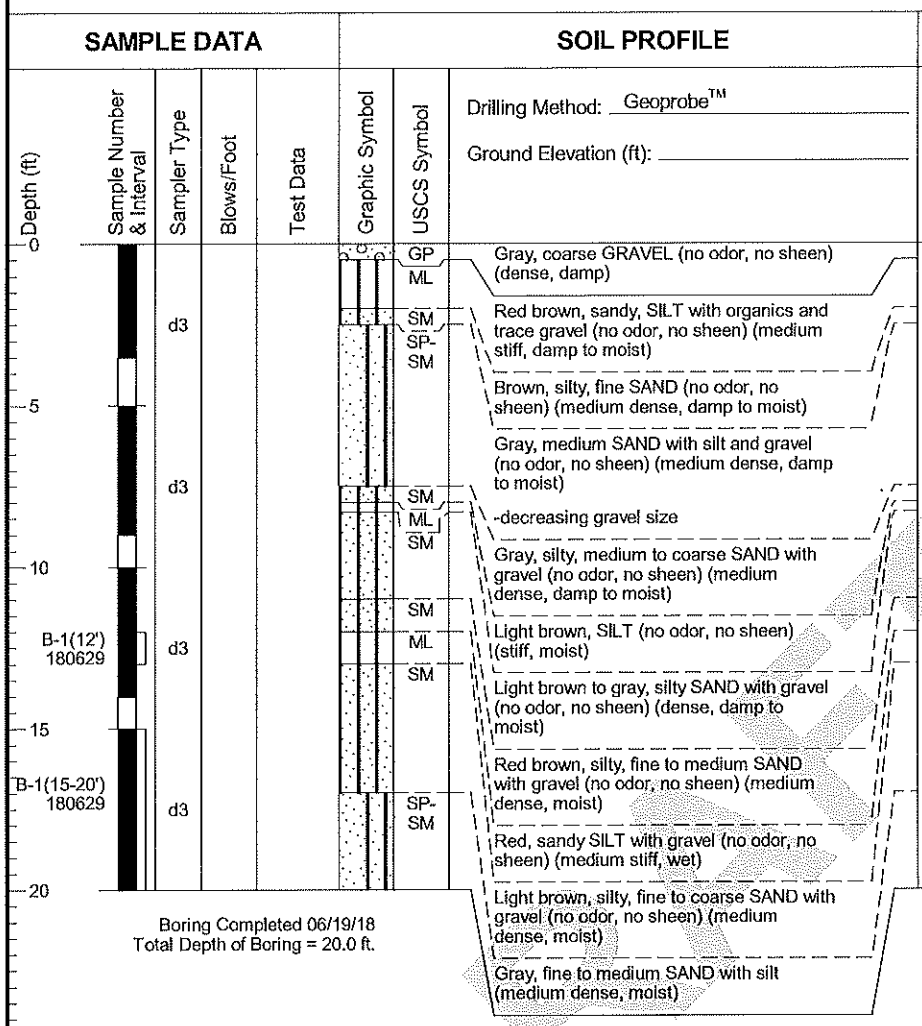
LANDAU ASSOCIATES

Monroe Auto Salvage
Monroe, WA

Soil Classification System and Key

Figure A-1

B-1



DRAFT

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1759001.010.011 8/29/18 N:\PROJECTS\1759001.010.GPJ SOIL BORING LOG

LANDAU ASSOCIATES

Monroe Auto Salvage Monroe, WA	Log of Boring B-1	Figure A-2

B-2

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Drilling Method: Geoprobe™ Ground Elevation (ft):	
0						ML	Brown, SILT with sand, organics and gravel (no odor, no sheen) (soft to medium stiff, moist)	Groundwater not encountered.
		d3				SM	Brown, silty, fine to medium SAND with trace gravel (no odor, no sheen) (medium dense, damp to moist)	
5						SP-SM	Gray, gravelly, fine to medium SAND with silt (no odor, no sheen) (dense, damp to moist)	
		d3					grades to medium SAND	
10						SP-SM	Gray, gravelly, fine to medium SAND with silt (no odor, no sheen) (dense, damp to moist)	
	B-2(12') 180629	d3				SM		
						SM	Dark brown, silty, medium SAND with gravel (no odor, no sheen) (dense, moist)	
15						SM	Red, silty, fine to medium SAND with gravel (no odor, no sheen) (dense, moist)	
	B-2(15-20') 180629	d3				SP-SM	Gray, silty, fine to medium SAND with gravel (no odor, no sheen) (medium dense, damp to moist)	
20							Gray, fine to medium SAND with silt and trace gravel (no odor, no sheen) (dense, moist)	

Boring Completed 06/19/18
Total Depth of Boring = 20.0 ft.

25
30
35
40

DRAFT

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1759001.010.011 8/29/18 N:\PROJECTS\1759001.010.GPJ SOIL BORING LOG

LANDAU ASSOCIATES

Monroe Auto Salvage
Monroe, WA

Log of Boring B-2

Figure
A-3

B-3

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Drilling Method: Geoprobe™ Ground Elevation (ft):	
0						ML	Brown to grey, SILT with sand and trace gravel (no odor, no sheen) (soft to medium stiff, moist)	Groundwater not encountered.
						ML		
		d3				SM	Red, SILT with sand and trace gravel (no odor, no sheen) (soft to medium stiff, moist)	
5						SP-SM	Light brown, silty, fine to medium SAND (no odor, no sheen) (medium dense, damp to moist)	
		d3					Grey, medium SAND with silt and gravel (no odor, no sheen) (dense, moist)	
10						SP-SM	Grey, fine to coarse SAND with silt and trace gravel (no odor, no sheen) (dense, damp to moist)	
	B-3(12') 180629	d3				SM	Brown, silty, Medium SAND with gravel (no odor, no sheen) (dense, damp to moist)	
						SP-SM	grades to fine to coarse SAND	
15						SM	Light brown, fine to medium SAND with silt (no odor, no sheen) (dense, damp to moist)	
	B-3(15-20') 180629	d3				SP-SM	Grey, silty, fine to coarse SAND with gravel (no odor, no sheen) (dense, moist)	
20							Gray, fine to medium SAND with silt and trace gravel (no odor, no sheen) (dense, moist)	
25								
30								
35								
40								

Boring Completed 06/19/18
Total Depth of Boring = 20.0 ft.

DRAFT

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1759001.010.011 8/29/18 N:\PROJECTS\1759001.010.GPJ SOIL BORING LOG

LANDAU ASSOCIATES

Monroe Auto Salvage
Monroe, WA

Log of Boring B-3

Figure
A-4

P-2

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Drilling Method: Geoprobe™ Ground Elevation (ft):	Water Level
0		d3				ML	Gray to light brown, SILT with sand and gravel (no odor, no sheen) (stiff, damp)	
5		d3					-increase in gravel content	
10		d3				ML	Dark brown to black, SILT with wood debris (no odor, no sheen) (stiff, damp to moist)	
15		d3				ML	mottled gray and brown, SILT with sand and gravel (no odor, no sheen) (stiff, damp to moist)	
20		d3				SP-SM	light brown, gravelly, fine to medium SAND with silt (no odor, no sheen) (dense, damp to moist)	
25		d3				ML SM	Mottled grey and dark brown, SILT with sand and gravel (no odor, no sheen) (stiff, moist) Gray to light brown, gravelly, silty, fine to coarse SAND (no odor, no sheen) (dense, wet)	▽ ATD
30		d3				ML	Gray, SILT (no odor, no sheen) (stiff, moist)	
35								
40								

Boring Completed 06/19/18
Total Depth of Boring = 30.0 ft.

DRAFT

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1759001.010.011 8/29/18 N:\PROJECTS\1759001.010.GPJ SOIL BORING LOG

LANDAU ASSOCIATES

Monroe Auto Salvage
Monroe, WA

Log of Boring P-2

Figure
A-5

P-3

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Drilling Method: Geoprobe™ Ground Elevation (ft):	Water Level
0		d3				ML	Brown, sandy SILT with gravel (no odor, no sheen) (soft to medium stiff, damp to moist)	
5		d3					-increase in gravel content	
10		d3				SP-SM / ML	Light brown, gravelly, fine to medium SAND with silt (no odor, no sheen) (medium dense, damp) Dark brown, gravelly SILT with sand (no odor, no sheen) (medium stiff, damp to moist)	
15		d3				SM / SP-SM	Light brown, silty, fine to medium SAND with gravel (no odor, no sheen) (medium dense, moist) Dark brown to black, gravelly, medium to coarse SAND with silt (no odor, no sheen) (dense, moist) -with metal and glass debris	
20		d3				ML	Dark brown, SILT with sand (no odor, no sheen) (stiff, moist)	
25		d3				SM / ML	Dark brown, silty, fine to medium SAND with gravel (no odor, no sheen) (dense, moist to wet) Light brown, SILT (no odor, no sheen) (hard, damp)	▽ ATD
30								
35								
40								

Boring Completed 06/19/18
Total Depth of Boring = 30.0 ft.

Notes:
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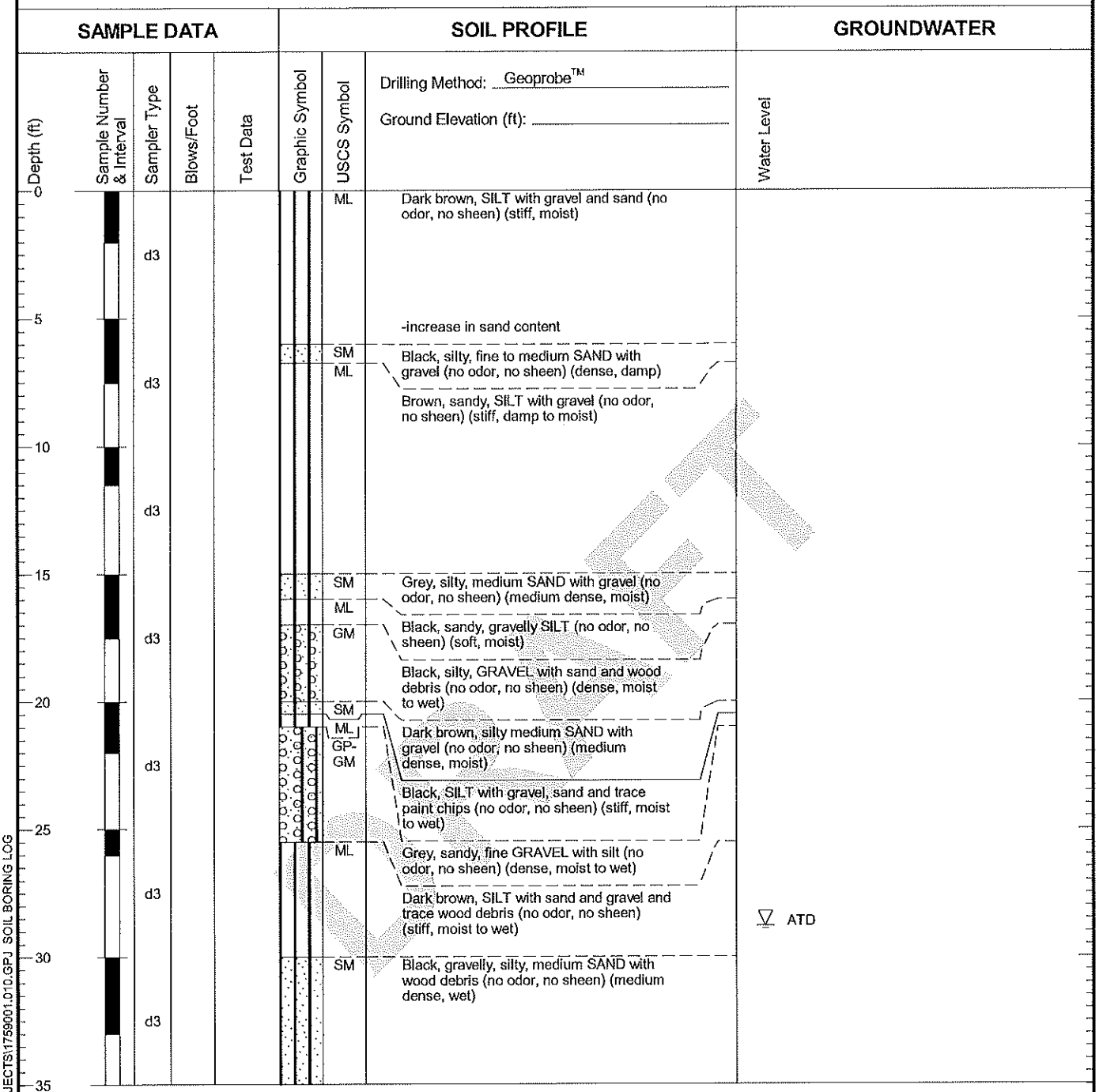
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1759001.010.011 8/29/18 N:\PROJECTS\1759001.010.GPJ SOIL BORING LOG

LANDAU ASSOCIATES

Monroe Auto Salvage Monroe, WA	Log of Boring P-3	Figure A-6

P-4



Boring Completed 06/19/18
Total Depth of Boring = 35.0 ft.

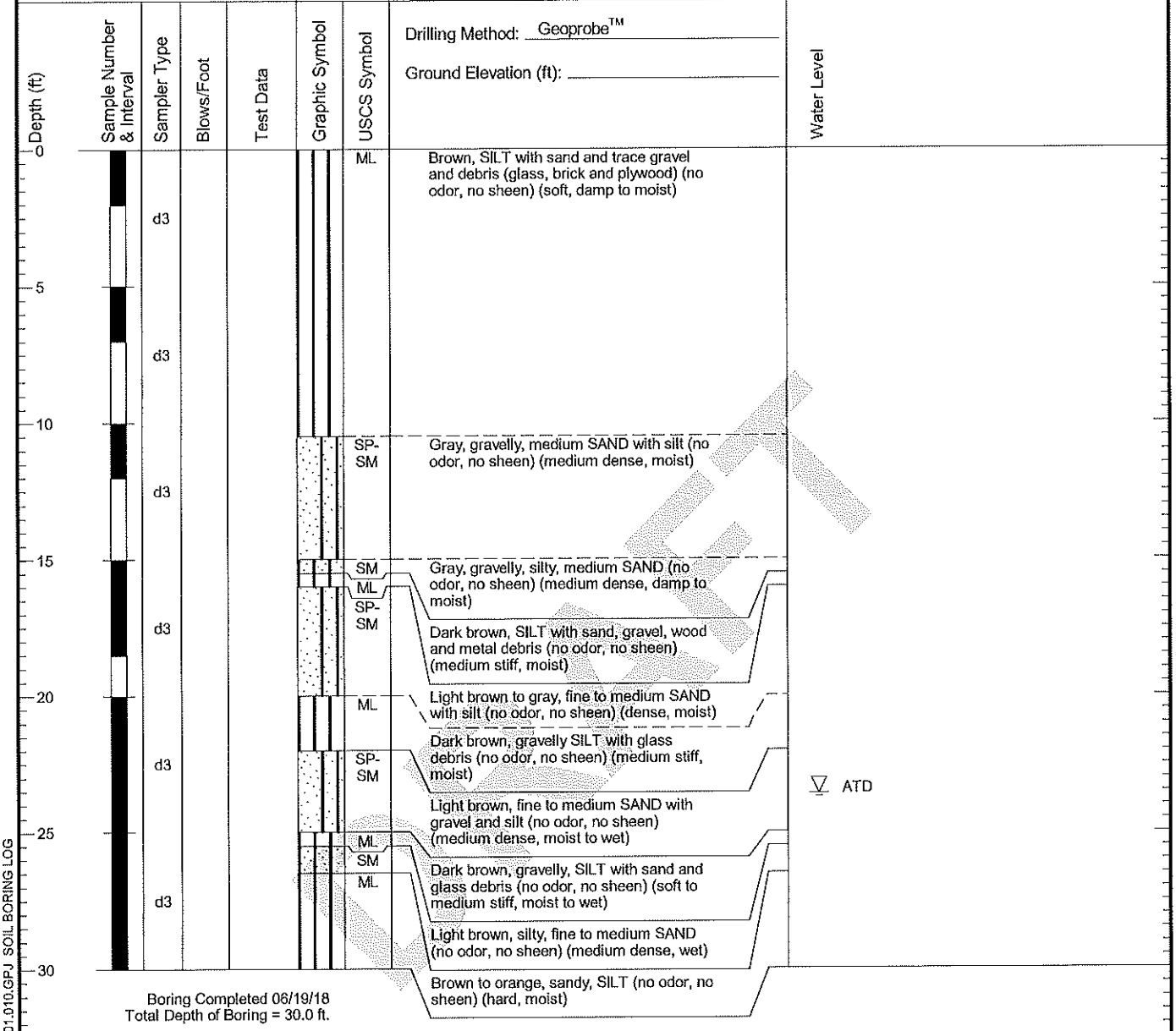
Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1759001.010.011 8/29/18 N:\PROJECTS\1759001.010.GPJ SOIL BORING LOG

LANDAU ASSOCIATES

Monroe Auto Salvage Monroe, WA	Log of Boring P-4	Figure A-7

P-5



Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1759001.010.011 8/29/18 N:\PROJECTS\1759001.010.GPJ SOIL BORING LOG

LANDAU ASSOCIATES

Monroe Auto Salvage Monroe, WA	Log of Boring P-5	Figure A-8

P3-MW

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Depth (ft) | Sample Number & Interval | Sampler Type | Blows/Foot | Test Data | Graphic Symbol | USCS Symbol

Drilling Method: Geoprobe™

Ground Elevation (ft): _____

Water Level

Monitoring Well Detail
(DOE#: BKX 646)

2.25 in

0
5
10
15
20
25
30
35
40

-For approximate lithology see log of P-3

ATD

Flush-mounted monument with locking cap

1-inch diameter, Schedule 80, PVC well casing

Bentonite chips

6/9 Colorado sand pack

1-inch diameter, Schedule 80, PVC screen (0.010-inch slot size)

Threaded end cap

Boring Completed 08/10/18
Total Depth of Boring = 35.0 ft.

Monitoring Well Completed 08/10/18

DRAFT

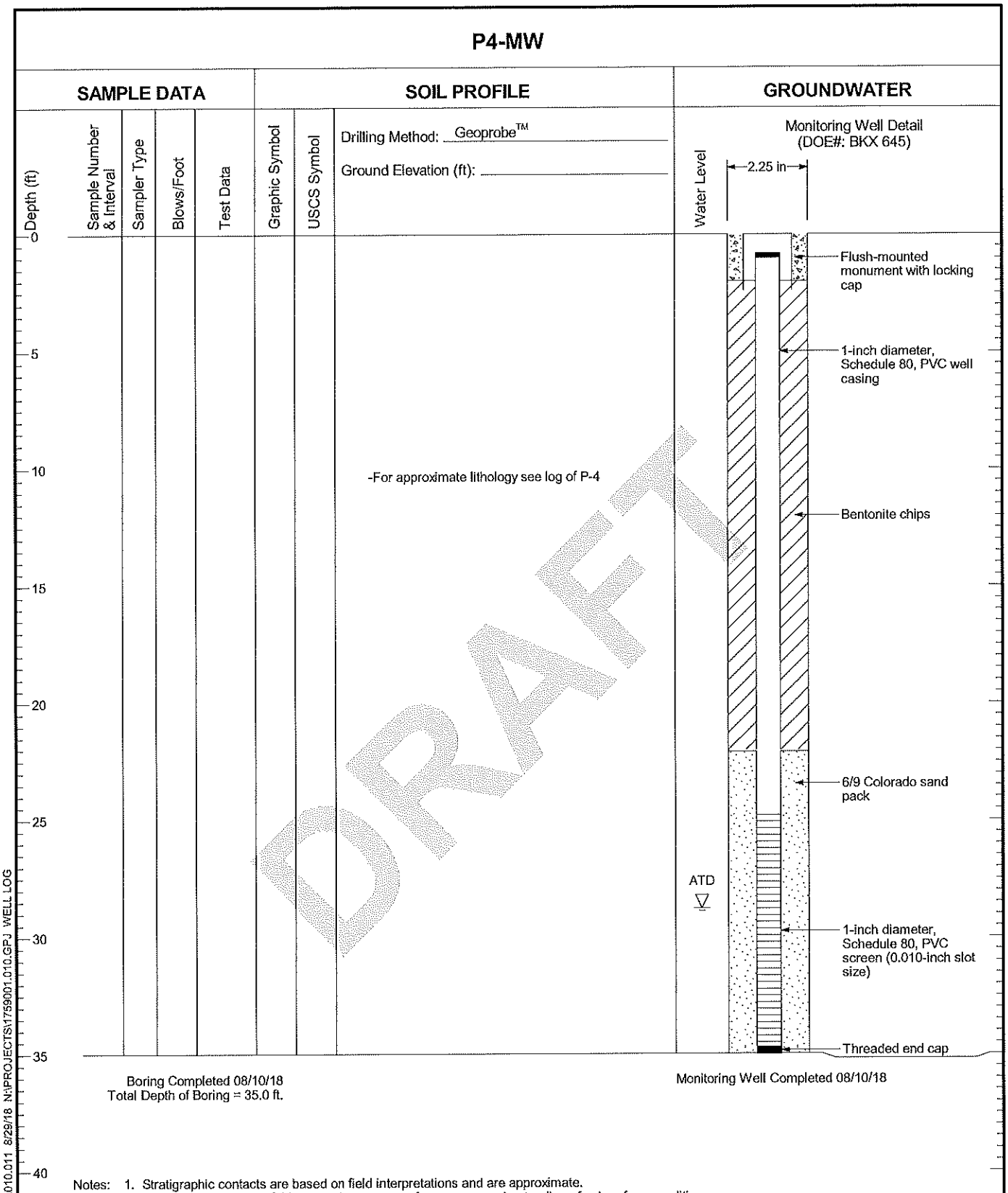
Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

LANDAU ASSOCIATES

Monroe Auto Salvage
Monroe, WA

Log of Monitoring Well P3-MW

Figure
A-9



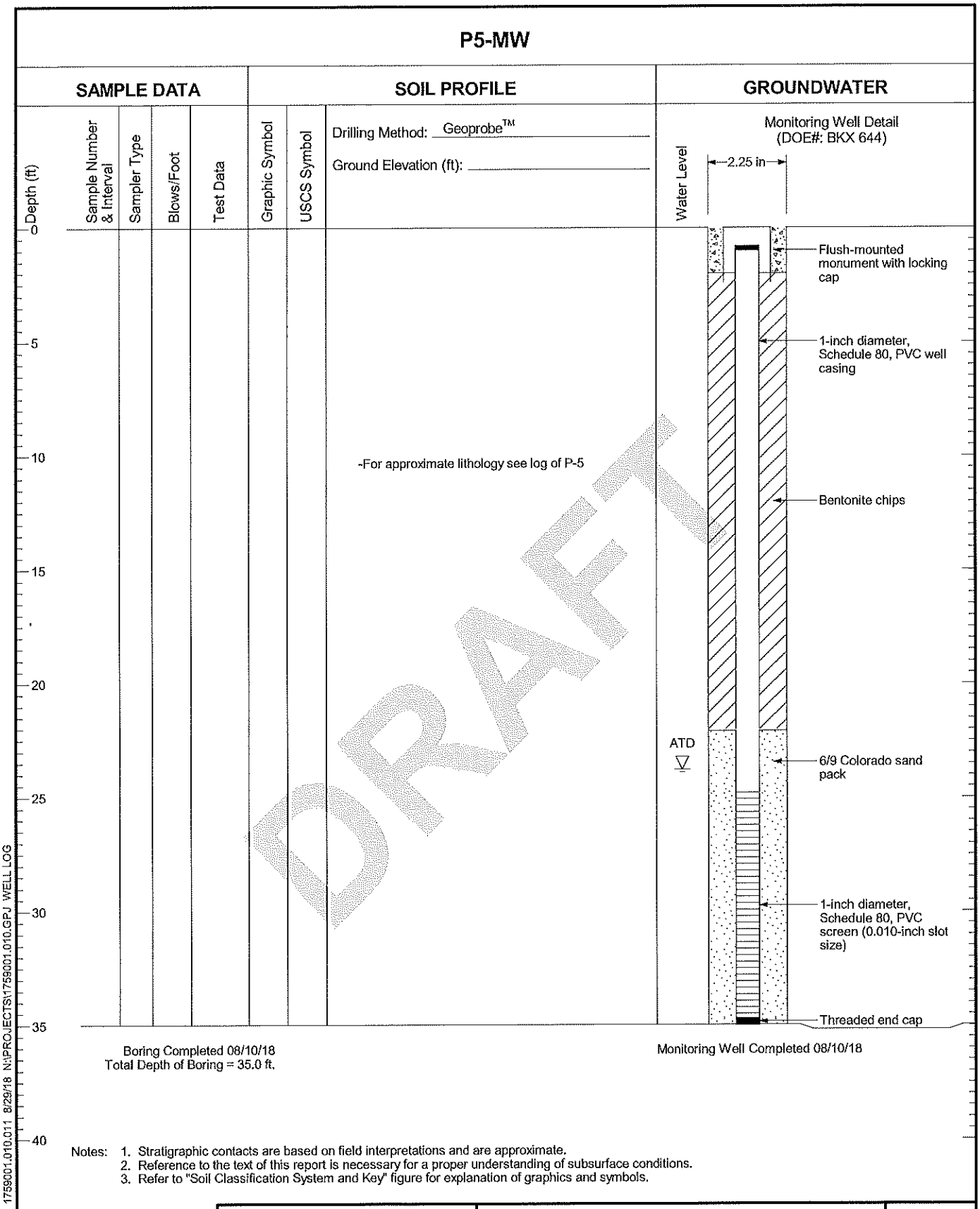
Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1759001.010.011 8/29/18 N:\PROJECTS\1759001.010.GPJ WELL LOG

LANDAU ASSOCIATES

Monroe Auto Salvage Monroe, WA	Log of Monitoring Well P4-MW	Figure A-10

P5-MW



Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1759001.010.011 8/29/18 N:\PROJECTS\1759001.010.GPJ WELL LOG

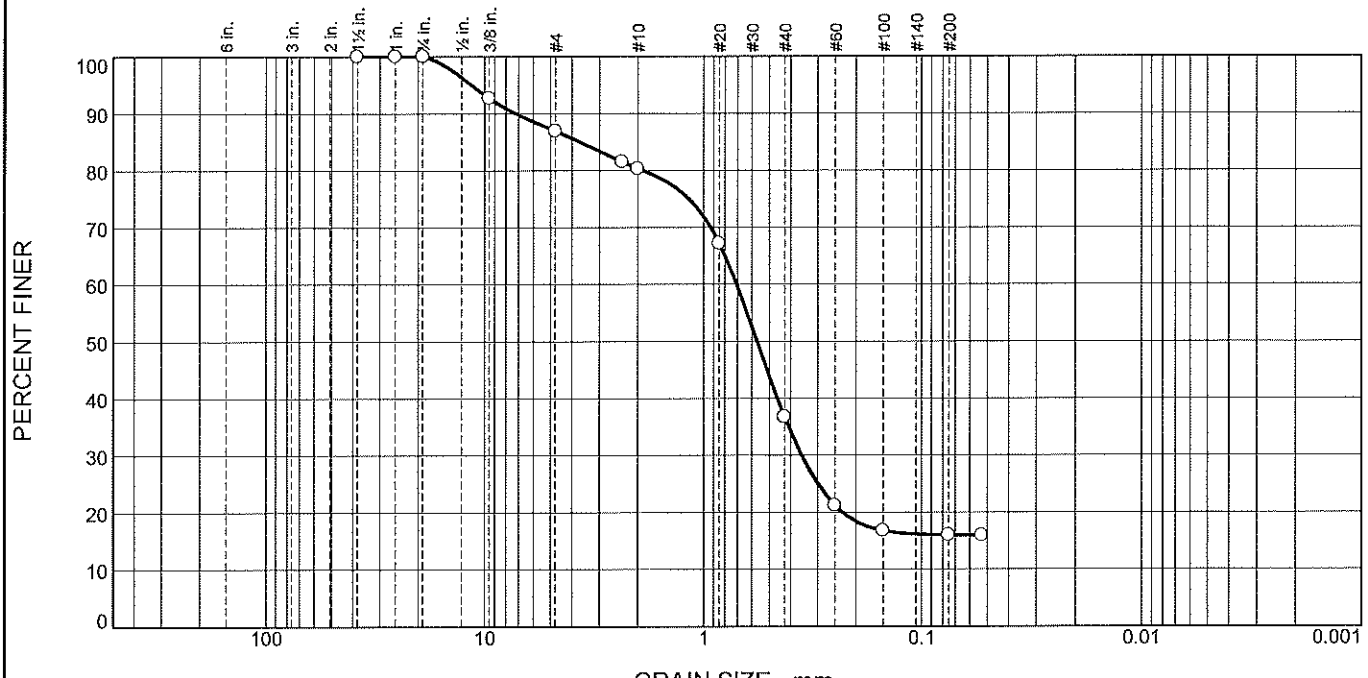
LANDAU ASSOCIATES

Monroe Auto Salvage Monroe, WA	Log of Monitoring Well P5-MW	Figure A-11

APPENDIX C

Laboratory Test Results

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	13.1	6.6	43.6	20.7	16.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5	100.0		
1	100.0		
.75	100.0		
.375	92.7		
#4	86.9		
#8	81.5		
#10	80.3		
#20	67.2		
#40	36.7		
#60	21.2		
#100	16.8		
#200	16.0		
#270	15.9		

* (no specification provided)

Material Description

silty, gravelly SAND

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-1-b

Coefficients

D_{90}= 7.2214 D_{85}= 3.6973 D_{60}= 0.7068
D_{50}= 0.5690 D_{30}= 0.3550 D_{15}=
D_{10}= C_u= C_c=

Remarks

Collected by: TG

Date Received: 10/05/2018 **Date Tested:** 10/09/2018

Tested By: BN

Checked By: SS

Title:

Location: Onsite **Date Sampled:** 09/26/2018

Sample Number: EB-11 **Depth:** 7.5'

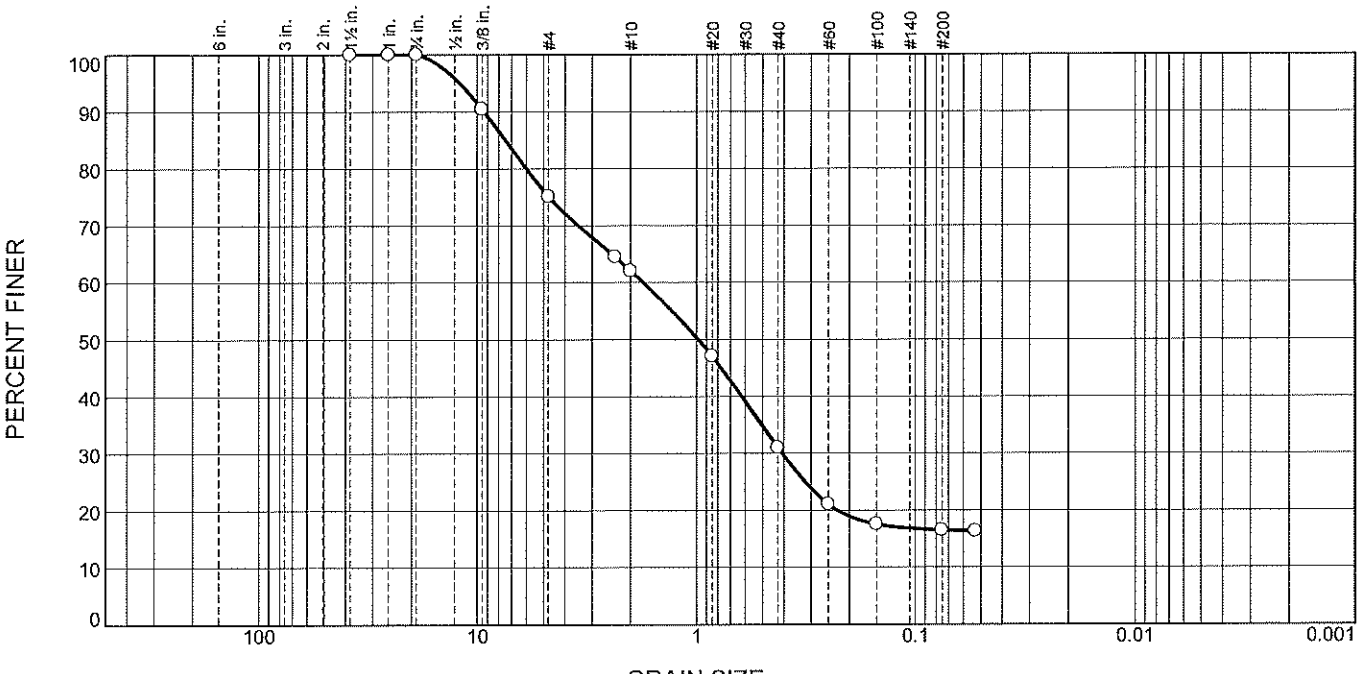
associated earth sciences incorporated

Client: Rivers Edge WA

Project: Rivers Edge

Project No: 180411 E001 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	24.9	13.1	31.0	14.5	16.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5	100.0		
1	100.0		
.75	100.0		
.375	90.4		
#4	75.1		
#8	64.5		
#10	62.0		
#20	47.1		
#40	31.0		
#60	21.0		
#100	17.5		
#200	16.5		
#270	16.3		

* (no specification provided)

Material Description

silty, gravelly SAND

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-1-b

Coefficients

D_{90}= 9.3272 D_{85}= 7.4671 D_{60}= 1.7554
D_{50}= 0.9818 D_{30}= 0.4070 D_{15}=
D_{10}= C_u= C_c=

Remarks

Collected by: TG

Date Received: 10/05/2018 **Date Tested:** 10/09/2018

Tested By: BN

Checked By: SS

Title:

Location: Onsite **Date Sampled:** 09/26/2018

Sample Number: EB-11 **Depth:** 12.5'

associated earth sciences incorporated

Client: Rivers Edge WA

Project: Rivers Edge

Project No: 180411 E001 **Figure**

associated earth sciences incorporated

Moisture, Ash, and Organic Matter of Peat and Other Organic Soils - ASTM 2974

Date Sampled	Project	Project No.		Soil Description
10/17/2018	River's Edge	180411 E001		Fill with wood waste
Tested By	**Location**	**EB/EP No.**	**Depth**	
BN	Onsite	EB-2,5,10		

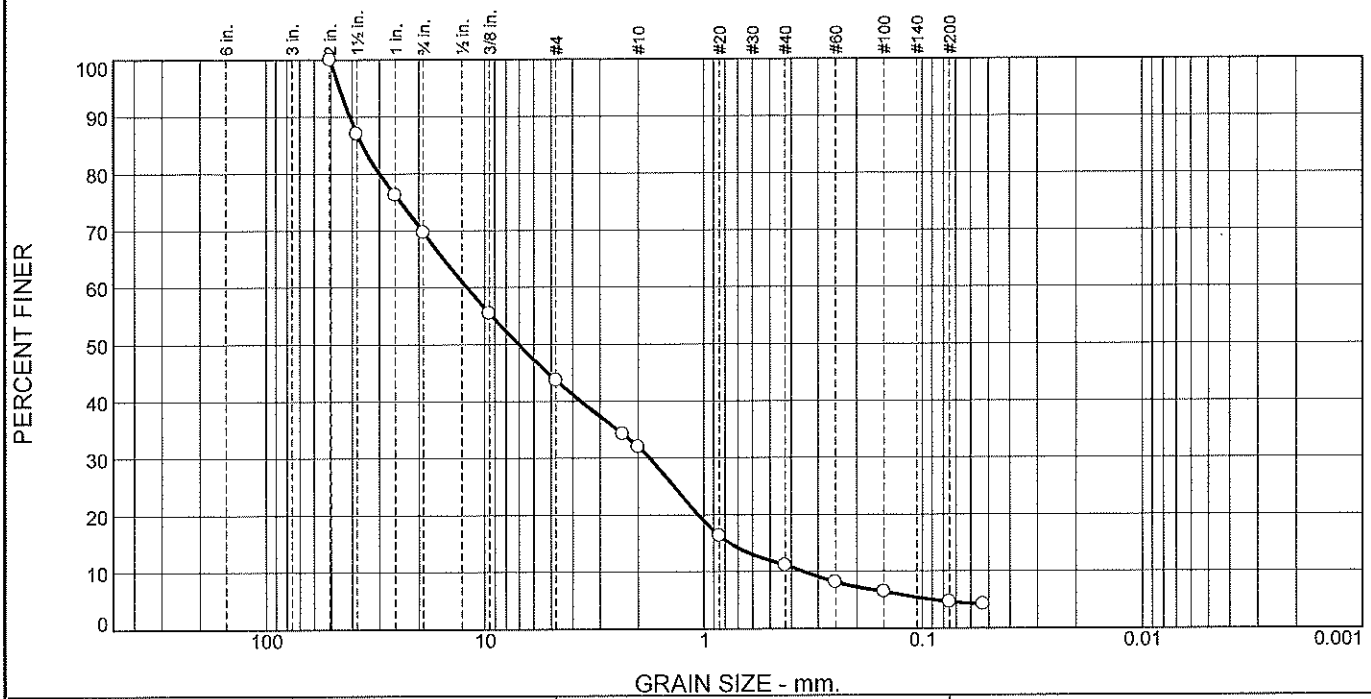
Moisture Content

Sample ID	EB-2_2.5'	EB-2_7.5'	EB-2_12.5'	EB-2_17.5'	EB-5_2.5'
Wet Weight + Pan	206.74	203.24	264.89	256.05	303.35
Dry Weight + Pan	161.42	143.97	213.34	201.68	242.74
Weight of Pan	95.74	97.97	100.62	97.77	101.01
Weight of Moisture	45.32	59.27	51.55	54.37	60.61
Dry Weight of Soil	65.68	46.00	112.72	103.91	141.73
% Moisture	40.83	56.30	31.38	34.35	29.95

Organic Matter and Ash Content

Sample ID	EB-2_2.5'	EB-2_7.5'	EB-2_12.5'	EB-2_17.5'	EB-5_2.5'
Dry Soil Befor Burn + Pan	186.84	131.06	140.07	130.70	206.32
Dry Soil After Burn + Pan	175.19	113.63	132.97	126.06	199.91
Weight of Pan	136.35	89.94	89.22	82.80	140.35
Wt. Loss Due to Ignition	11.65	17.43	7.10	4.64	6.41
Actual Wt. Of Soil After Burr	38.84	23.69	43.75	43.26	59.56
% Organics	23.07	42.39	13.96	9.69	9.72

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	30.3	26.0	11.7	20.9	6.5	4.6	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2	100.0		
1.5	87.0		
1	76.2		
.75	69.7		
.375	55.5		
#4	43.7		
#8	34.2		
#10	32.0		
#20	16.3		
#40	11.1		
#60	8.1		
#100	6.4		
#200	4.6		
#270	4.2		

* (no specification provided)

Material Description

very sandy GRAVEL, trace silt

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI=

Classification

USCS (D 2487)= GP AASHTO (M 145)= A-1-a

Coefficients

D_{90}= 41.0481 D_{85}= 35.9563 D_{60}= 12.0581
D_{50}= 7.0269 D_{30}= 1.7768 D_{15}= 0.7620
D_{10}= 0.3501 C_u= 34.44 C_c= 0.75

Remarks

Collected by: ADY

Date Received: 10/24/2018 **Date Tested:** 10/30/2018

Tested By: BN

Checked By: SS

Title:

Location: Onsite **Date Sampled:** 10/22/2018

Sample Number: IT-1 **Depth:** 5'-5.5'

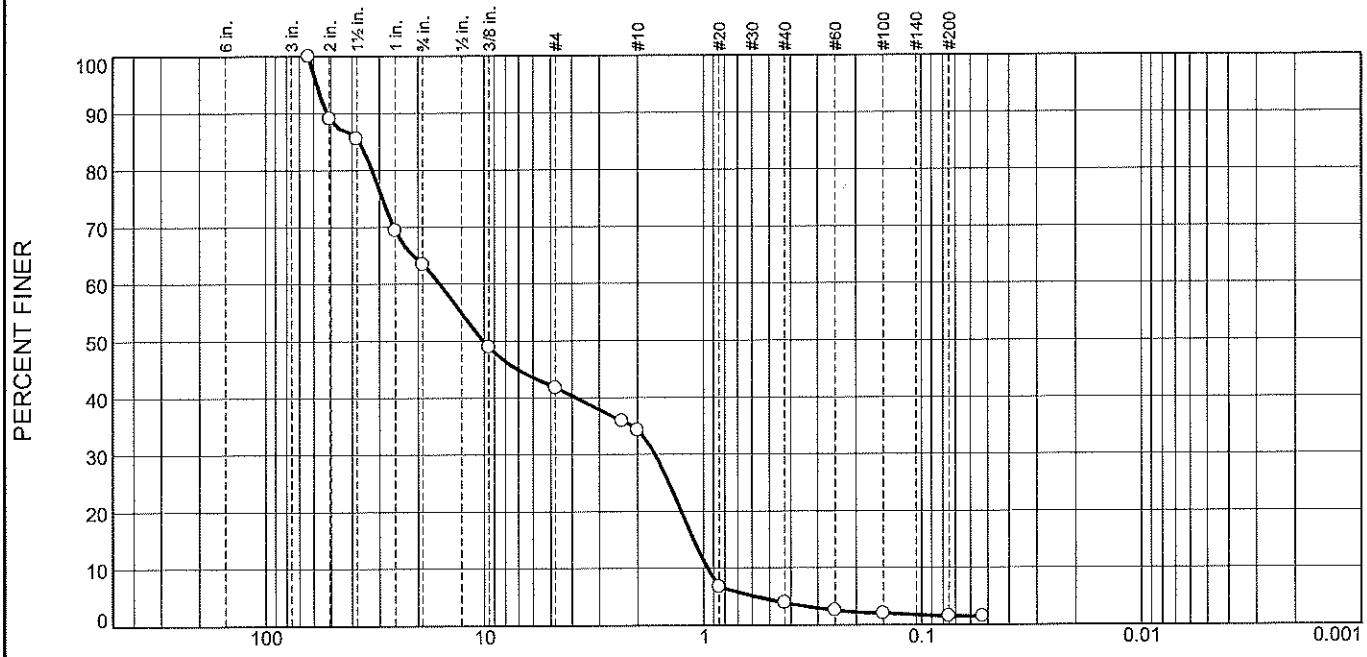
associated earth sciences incorporated

Client: Rivers Edge WA

Project: Rivers Edge

Project No: 180411 E001 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	36.6	21.6	7.6	30.3	2.4	1.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2.5	100.0		
2	89.0		
1.5	85.5		
1	69.4		
.75	63.4		
.375	48.9		
#4	41.8		
#8	35.9		
#10	34.2		
#20	6.7		
#40	3.9		
#60	2.6		
#100	2.0		
#200	1.5		
#270	1.4		

* (no specification provided)

Material Description

very sandy GRAVEL, trace silt

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI=

Classification

USCS (D 2487)= GP AASHTO (M 145)= A-1-a

Coefficients

D_{90}= 52.3704 D_{85}= 37.2119 D_{60}= 15.9449
D_{50}= 10.0958 D_{30}= 1.6695 D_{15}= 1.1122
D_{10}= 0.9623 C_u= 16.57 C_c= 0.18

Remarks

Collected by: ADY

Date Received: 10/24/2018 **Date Tested:** 10/30/2018

Tested By: BN

Checked By: SS

Title:

Location: Onsite **Date Sampled:** 10/22/2018

Sample Number: IT-2 **Depth:** 5'-5.5'

associated earth sciences incorporated

Client: Rivers Edge WA

Project: Rivers Edge

Project No: 180411 E001 **Figure**

APPENDIX D

Infiltration Test Data Sheets

Project Name:	River's Edge	**Water Source:**	Hydrant
Project Number:	180411H001	**Meter:**	AESI FM#3
Date:	10/22/2018	**Pit Area (sq. feet):**	3.2x5.5 ft
Weather:	clear, 60's	**Ring Area (sq. feet):**	NA
Test No.:	IT-1	**Test Depth (feet):**	5
Performed By:	ADY	**Receptor Soils:**	Qvr

Time (24-hr)	Flow Rate (gpm)	Stage (feet)	Totalizer (gallons)	Comments
8:58	5.14	0	0	
9:06	14.42	0.17	52.0	
9:10	14.42	0.41	112	
9:16	12.46	0.52	190	
9:30	12.16	0.51	359	
9:45	12.57	0.5	541	
10:02	12.46	0.54	725	
10:15	12.54	0.54	922	
10:30	12.54	0.54	1106	
10:45	12.36	0.55	1294	
11:00	12.52	0.55	1419	
11:15	12.22	0.56	1663	
11:30	12.11	0.56	1845	
11:45	12.12	0.56	2028	
12:00	12.2	0.55	2212	
12:05	12.1	0.55	2411	Flow fluctuations: splitter for IT-2
12:32	12.3	0.55	2614	
12:47	12.36	0.56	2796	
13:03	12.3	0.55	2982	
13:18	12.26	0.55	3169	
13:30	12.33	0.54	3319	
13:47	12.06	0.55	3523	
14:01	12.04	0.55	3694	
14:17	12.1	0.55	3386	
14:31	12.22	0.55	4058	
14:46	12.14	0.55	4239	
15:02	12.38	0.56	4437	
15:16	12.4	0.56	4607	
15:24	12.36	0.56	4706	Flow fluctuations, water was turned off at Test IT-2
15:33	12.7	0.6	4827	
15:35	12.35	0.6	4850	
15:40	12.48	0.62	4912	
15:45	12.36	0.62	4974	
15:50	12.38	0.62	5037	
15:55	12.32	0.62	5096	
16:00:00	12.42	0.62	5160	Flow off, begin falling head
16:00:40		0.59		
16:01:15		0.51		
16:01:25		0.49		
16:02:00		0.45		
16:02:40		0.4		
16:03:20		0.35		
16:04:00		0.3		
16:04:40		0.25		
16:05:10		0.2		

Project Name:	River's Edge	**Water Source:**	Hydrant
Project Number:	180411H001	**Meter:**	AESI FM#3
Date:	10/22/2018	**Pit Area (sq. feet):**	3.2x5.5 ft
Weather:	clear, 60's	**Ring Area (sq. feet):**	NA
Test No.:	IT-1	**Test Depth (feet):**	5
Performed By:	ADY	**Receptor Soils:**	Qvr

Time (24-hr)	Flow Rate (gpm)	Stage (feet)	Totalizer (gallons)	Comments
16:05:45		0.15		
16:06:15		0.1		

	Average Infiltration Rate (in/hr) during last hour of inflow:	67
	Average Infiltration Rate (in/hr) during falling head:	60

Note:

Project Name:	River's Edge	**Water Source:**	Hydrant
Project Number:	180411H001	**Meter:**	AESI FM#9, KW 3-50
Date:	10/22/2018	**Pit Area (sq. feet):**	6.8x6.2 ft
Weather:	clear, 60's	**Ring Area (sq. feet):**	NA
Test No.:	IT-2	**Test Depth (feet):**	5
Performed By:	KRB	**Receptor Soils:**	Qvr

Time (24-hr)	Flow Rate (gpm)	Stage (feet)	Totalizer (gallons)	Comments
8:30	9.48	0	0	
8:31	9.43		16.3	
8:32	9.33		23.5	
8:33			32.9	
8:35			70.8	
8:37			118	
8:39		0.15	208	
8:41	48.2	0.2	296	
8:43	48.24	0.22	390	
8:44	48.37	0.23	445	
8:45	48.17	0.24	496	
8:48	48.2	0.28	641	
8:50	48	0.28	745	
8:52	48.22	0.28	846	
8:54		0.28	929	Max flow, meter is wide open
8:55	48.54	0.28	990	
8:58	42.79	0.27	1129	
9:00	47.09	0.27	1216	
9:05	47.44	0.27	1444	
9:12	44.99	0.25	1771	
9:15	45.02	0.24	1923	
9:21	45.72	0.24	2175	
9:25	45.82	0.24	2375	
9:35	45.43	0.25	2818	
9:47	45.65	0.25	3368	
9:55	47.83	0.25	3729	
10:10	46.36	0.25	4428	
10:25	46.48	0.24	5124	
10:40	46.19	0.25	5913	
10:55	46.34	0.25	6506	
11:10	45.41	0.24	7196	
11:25	45.67	0.25	7876	
11:40	45.68	0.25	8561	
11:55	45.63	0.24	9249	
12:02			9579	Flow paused to add splitter
12:03	60.26		9607	Flow on with 2 flow meters to increase flow capacity
12:05	58.84	0.35	9686	
12:06	59.4	0.37	9751	
12:07	59.24	0.45	9798	
12:09	58.8	0.48	9822	
12:10	59	0.5	9980	
12:12	59.06	0.52	10093	
12:14	59.16	0.55	10212	
12:16	58.76	0.56	10322	

Project Name:	River's Edge	**Water Source:**	Hydrant
Project Number:	180411H001	**Meter:**	AESI FM#9, KW 3-50
Date:	10/22/2018	**Pit Area (sq. feet):**	6.8x6.2 ft
Weather:	clear, 60's	**Ring Area (sq. feet):**	NA
Test No.:	IT-2	**Test Depth (feet):**	5
Performed By:	KRB	**Receptor Soils:**	Qvr

Time (24-hr)	Flow Rate (gpm)	Stage (feet)	Totalizer (gallons)	Comments
12:20	59.25	0.59	10568	
12:23	59.77	0.59	10741	
12:28	60.18	0.6	10991	
12:30	60.32	0.6	11163	
12:35	60.25	0.62	11463	
12:40	60.1	0.62	11716	
12:47	60.42	0.62	12180	
13:01	60.18	0.63	13030	
13:17	60.36	0.66	14003	
13:29	60.33	0.66	14730	
13:45	59.26	0.66	15684	
14:00	59.28	0.66	16571	
14:15	59.33	0.67	17467	
14:30	58.89	0.67	18356	
14:45	59.54	0.68	19237	
15:00	60.46	0.69	20143	
15:15	60.52	0.7	21037	
15:29	60.26	0.73	21885	
15:30:00		0.73	21948	Flow off, begin falling head
15:31:00		0.57		
15:32:00		0.41		
15:33:00		0.23		last reading used for falling head
15:34:00		0.1		wetted area diminished
15:34:30		0		~2 sq ft wetted area remain
15:35:00		0		dry

	Average Infiltration Rate (in/hr) during last hour of inflow:	136
	Average Infiltration Rate (in/hr) during falling head:	120

Note:

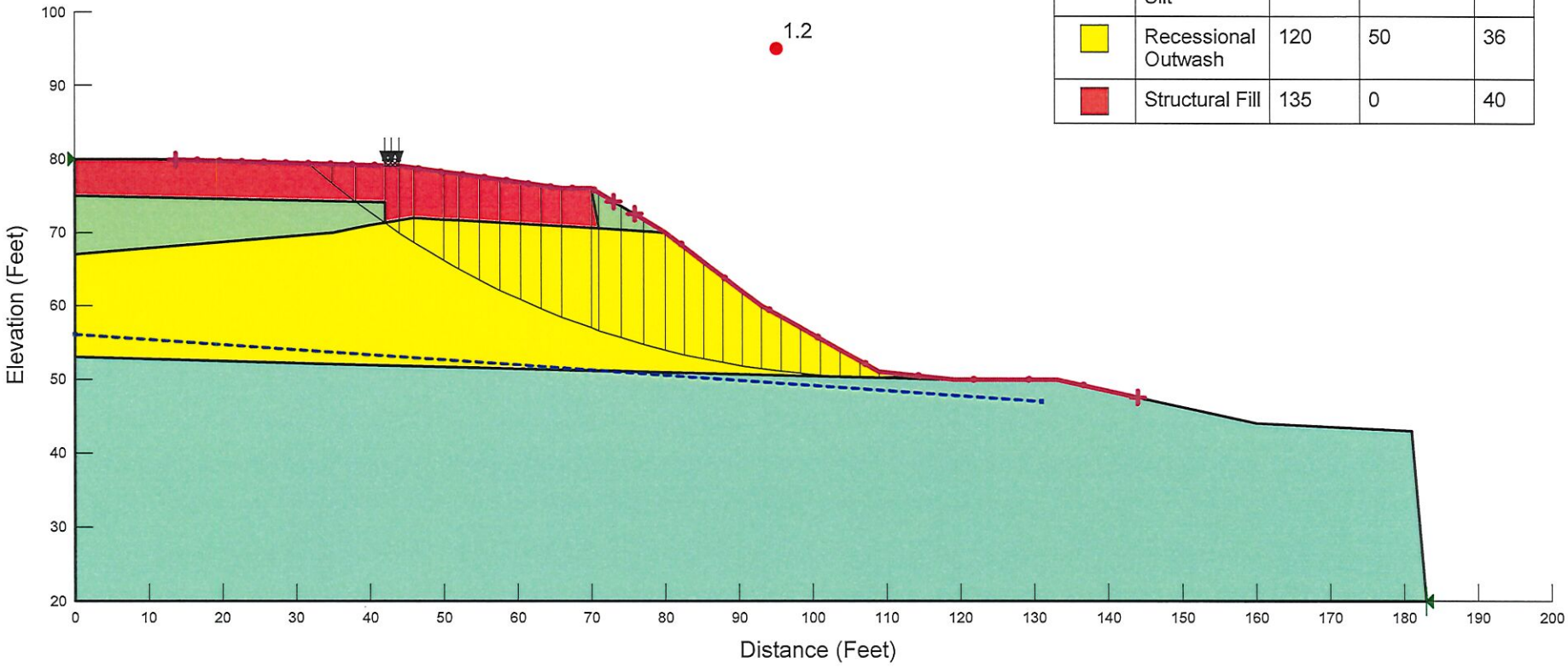
APPENDIX E

Slope Stability Analyses Results

Building A
Proposed Foundations

Rivers Edge
180411E001
A-A'
Seismic

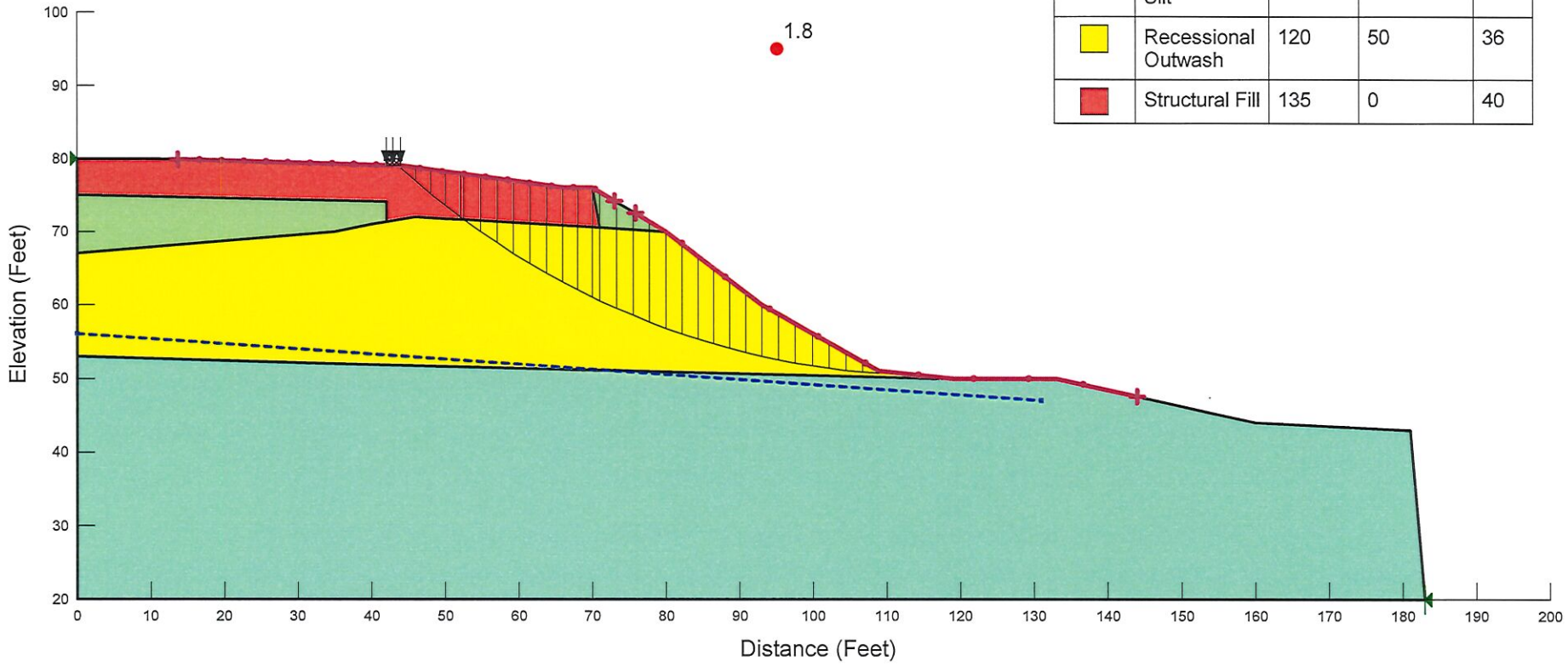
Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	Fill	125	0	36
	pre-Fraser Silt	115	500	28
	Recessional Outwash	120	50	36
	Structural Fill	135	0	40



Building A
Proposed Foundations

Rivers Edge
180411E001
A-A'
Static

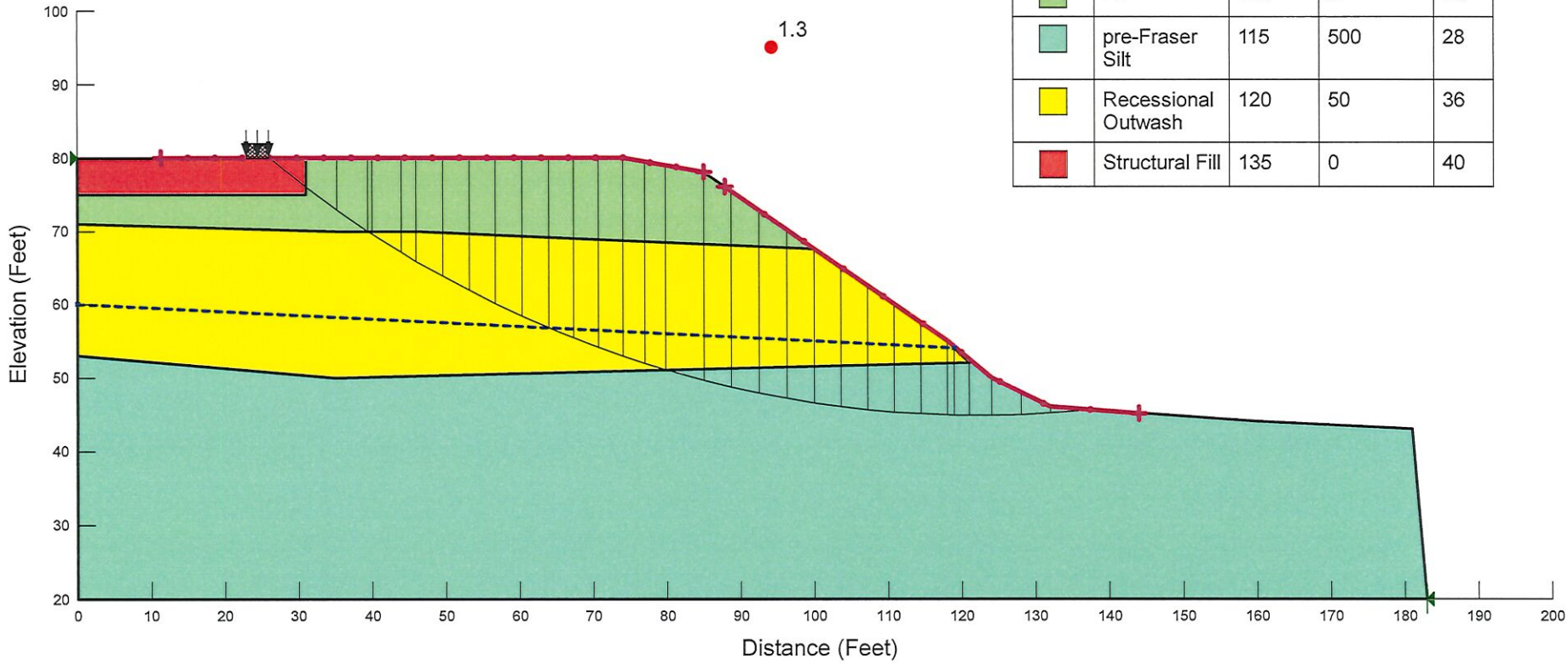
Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	Fill	125	0	36
	pre-Fraser Silt	115	500	28
	Recessional Outwash	120	50	36
	Structural Fill	135	0	40



Building C
Proposed Foundations

Rivers Edge
180411E001
B-B'
Seismic

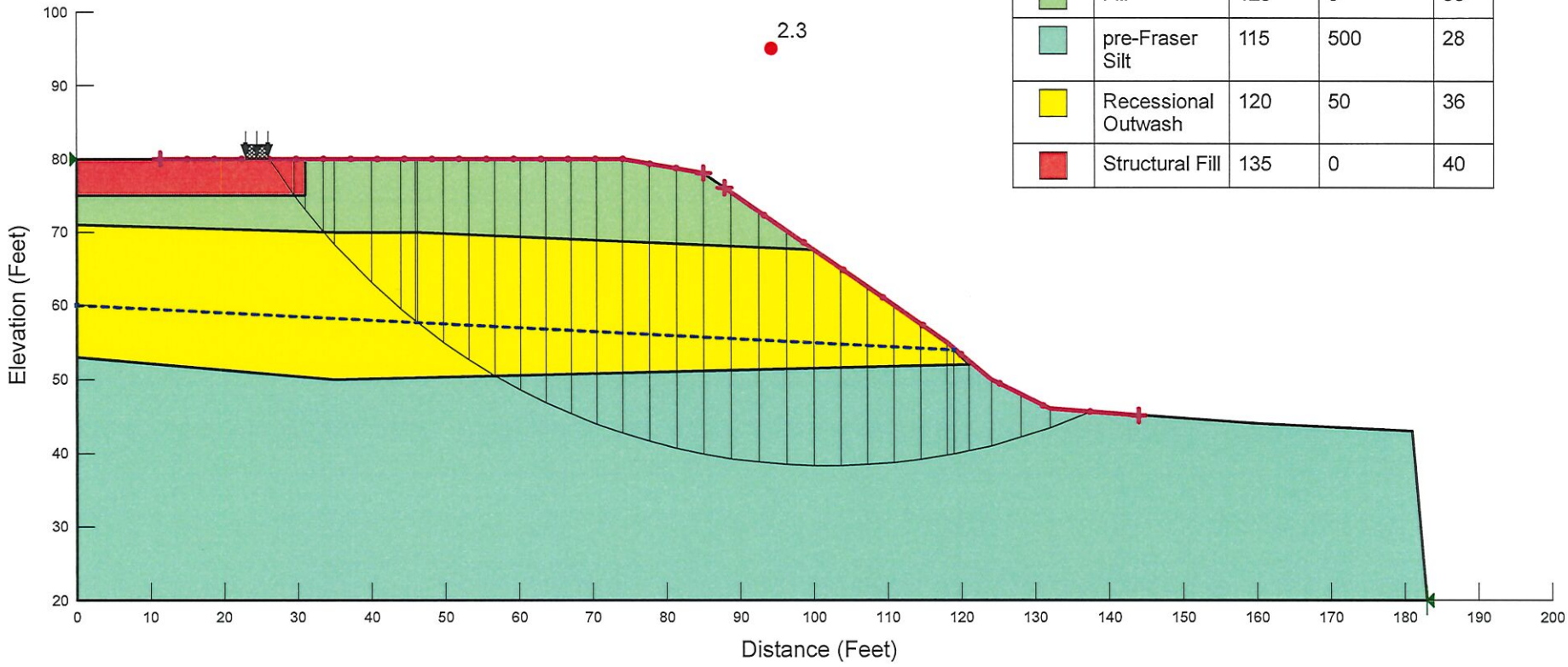
Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	Fill	125	0	36
	pre-Fraser Silt	115	500	28
	Recessional Outwash	120	50	36
	Structural Fill	135	0	40



Building C
Proposed Foundations

Rivers Edge
180411E001
B-B'
Static

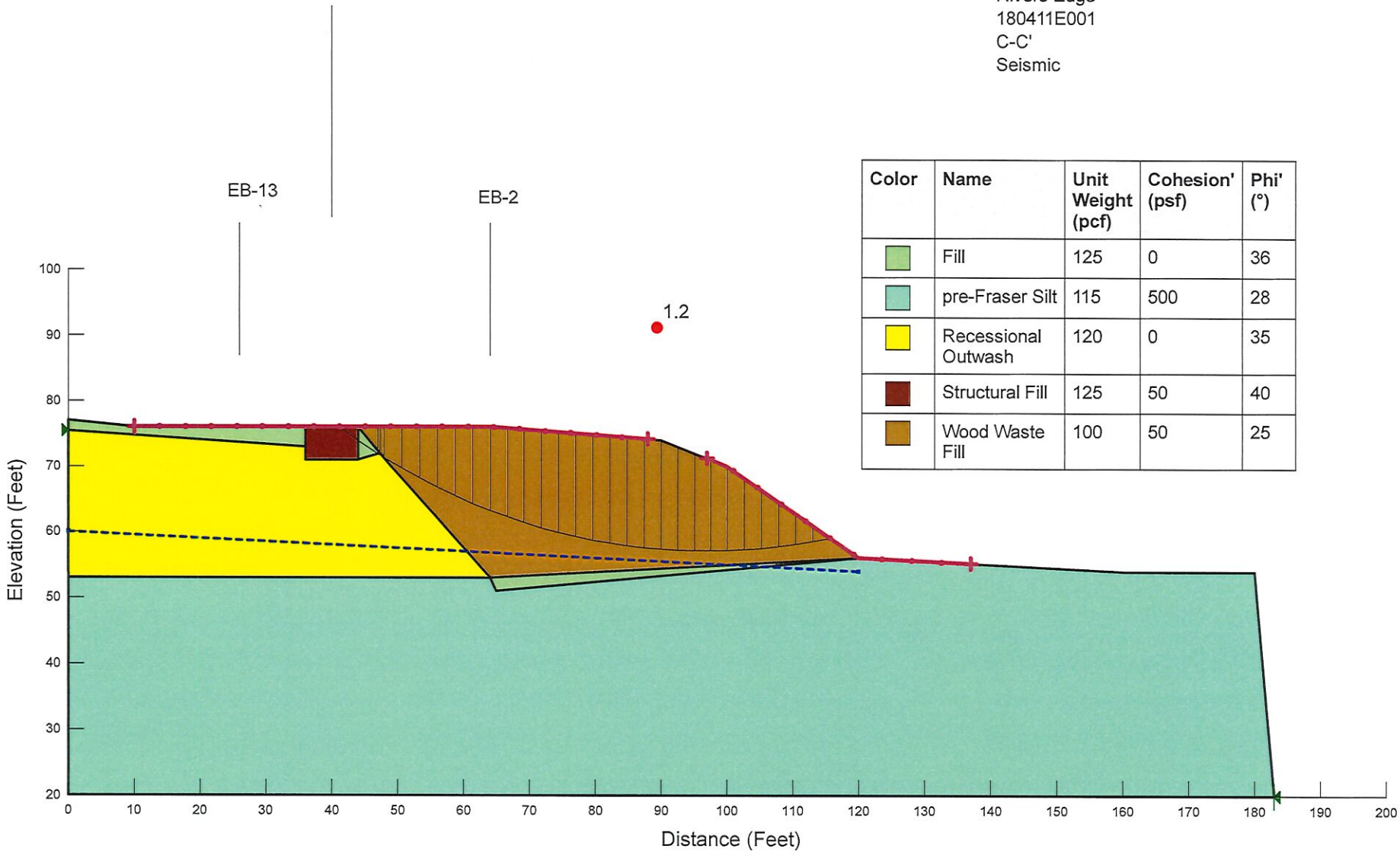
Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	Fill	125	0	36
	pre-Fraser Silt	115	500	28
	Recessional Outwash	120	50	36
	Structural Fill	135	0	40



Building E

Proposed Foundations

Rivers Edge
180411E001
C-C'
Seismic

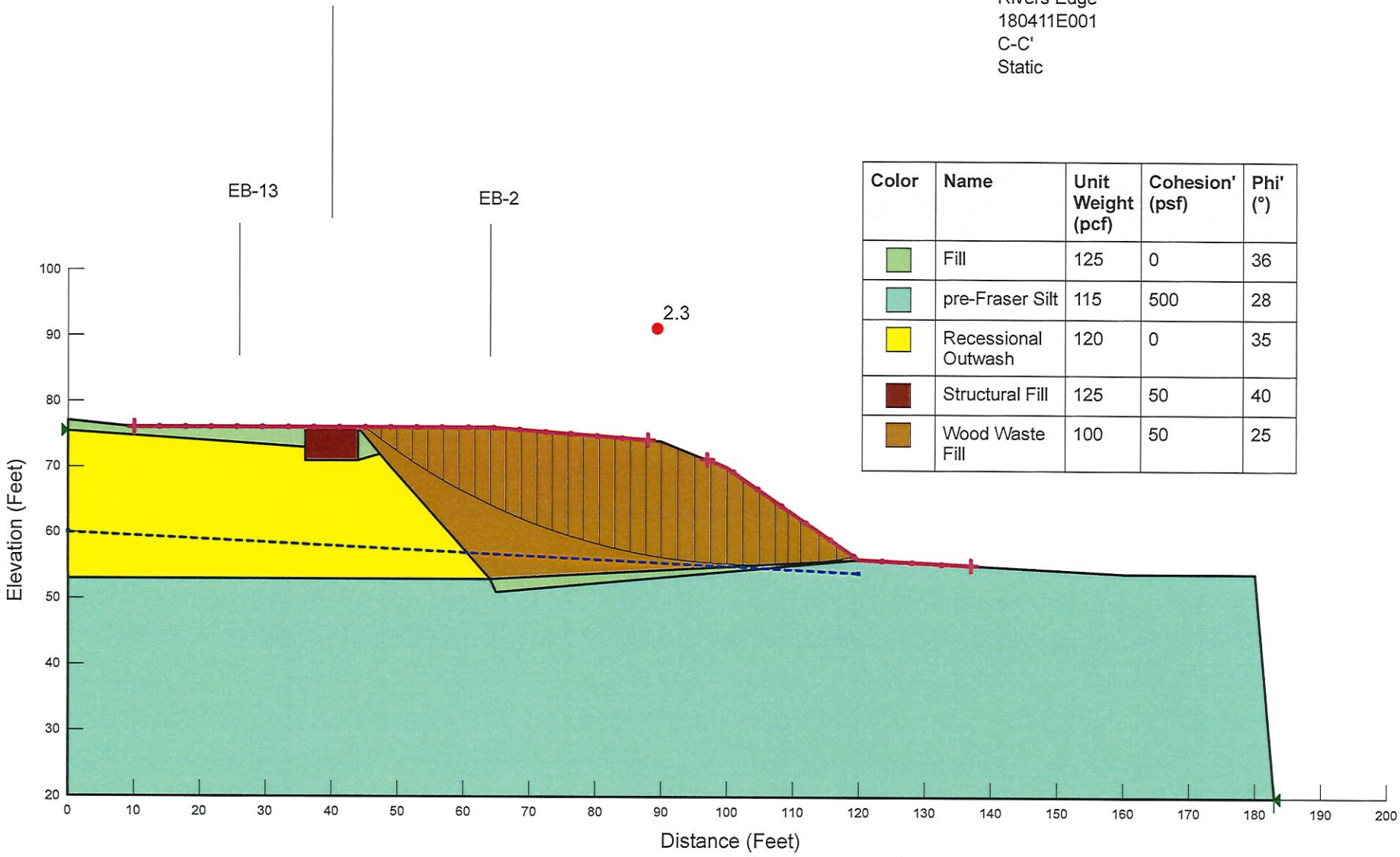


Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	Fill	125	0	36
	pre-Fraser Silt	115	500	28
	Recessional Outwash	120	0	35
	Structural Fill	125	50	40
	Wood Waste Fill	100	50	25

Building E

Proposed Foundations

Rivers Edge
180411E001
C-C'
Static



Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	Fill	125	0	36
	pre-Fraser Silt	115	500	28
	Recessional Outwash	120	0	35
	Structural Fill	125	50	40
	Wood Waste Fill	100	50	25

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EXHIBIT 17

Supplemental Phase II Environmental Site Assessment
Former Monroe Auto Wrecking Site
Monroe, Washington

November 12, 2018

Prepared for

Ms. Rebecca Ralston
On Behalf of River's Edge WA LLLP
River's Edge, Washington

LANDAU ASSOCIATES

Supplemental Phase II Environmental Site Assessment
Former Monroe Auto Wrecking
Monroe, Washington

This document was prepared by, or under the direct supervision of, the technical professionals noted below.

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3	Site and Exploration Plan

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2	Groundwater Analytical Results
3	Surface Water Analytical Results

APPENDICES

Appendix	Title
A	Field Explorations
B	Analytical Laboratory Reports

LIST OF ABBREVIATIONS AND ACRONYMS

AST ..... Aboveground Storage Tank
ASTM ..... American Society for Testing and Materials International
bgs ..... Below Ground Surface
cy ..... Cubic Yard(s)
District ..... Snohomish Public Utility District No. 1
Ecology ..... Washington State Department of Ecology
EMMP ..... Excavated Materials Management Plan
EPA ..... US Environmental Protection Agency
ESA ..... Environmental Site Assessment
ESN ..... ESN Northwest
ft ..... Feet/Foot
Glacier ..... Glacier Environmental Services
LAI ..... Landau Associates, Inc.
µg/L ..... Micrograms per Liter
mg/kg ..... milligrams per kilogram
MNA ..... monitored natural attenuation
MTCA ..... Model Toxics Control Act
NFA ..... No Further Action
PCB ..... Polychlorinated Biphenyl
PAH ..... Polycyclic Aromatic Hydrocarbon
PVC ..... polyvinyl chloride
River's Edge ..... River's Edge WA LLLP
TPH ..... Total Petroleum Hydrocarbon
TPH-D ..... Diesel-Range Total Petroleum Hydrocarbon
TPH-G ..... Gasoline-Range Total Petroleum Hydrocarbon
TPH-O ..... Oil-Range Total Petroleum Hydrocarbon
RI/FS ..... Remedial Investigation/Feasibility Study
VCP ..... Voluntary Cleanup Program

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1.0 INTRODUCTION

Landau Associates, Inc. (LAI) has prepared the following Supplemental Phase II Environmental Site Assessment (ESA) report for Ms. Rebecca Ralston on behalf of River's Edge WA LLLP (River's Edge) to provide the results of soil, groundwater, and surface water sampling and analysis for the Former Monroe Auto Wrecking site located at 426 Fremont Street in Monroe, Washington (Figure 1). It is our understanding that River's Edge is considering acquiring the property, which includes six tax parcels, for construction of low-income housing.

In 2017, LAI prepared a Phase I ESA for the site for the Snohomish County Public Utility District No. 1 (District) (LAI 2017a). The Phase I ESA included all six parcels that make up the site and identified recognized environmental conditions associated with historical site uses (shingle mill, lumber mill, and automobile salvage yard). A Phase II ESA was subsequently conducted on a portion of the site (parcel 27070600300500) that the District was considering purchasing (LAI 2017b). The findings from these and other previous assessments are discussed in Section 2.0 of this report. This Supplemental Phase II ESA was conducted to evaluate *recognized environmental conditions* that were identified in the 2017 Phase I ESA, but were not assessed during the 2017 Phase II ESA due to the more focused scope of that investigation, and to evaluate potential data gaps from previous investigations that could present significant environmental liability for a prospective purchaser. The Phase II ESA was conducted in general accordance with the American Society for Testing and Materials International (ASTM) *Standard Practice for Environmental Site Assessments: Phase II Environmental Site Assessment Process E1903 - 11*, and the scope of work included in our proposal dated May 30, 2018 that was authorized by Ms. Ralston on June 18, 2018.

2.0 PREVIOUS INVESTIGATIONS

A number of previous environmental investigations have been conducted to document soil and groundwater conditions at the Site. This section presents a summary of the findings of the previous investigations. This information was used to develop the scope of work for the Phase II ESA.

1990 Investigation. In 1990, Hart Crowser conducted two investigations on behalf of Glacier Park Company to evaluate whether historical practices associated with a former mill and auto salvage yard had resulted in contamination of the site's soil and groundwater. The Hart Crowser investigations included the portion of the site south of Fremont Street at Ann Street. The investigations also included the area west of the site, and three additional areas to the north of the site. Findings from these areas are not discussed in this report.

Subsurface investigations at the southwest end of the site detected total petroleum hydrocarbons (TPH), lead, and zinc at concentrations above Model Toxics Control Act (MTCA) soil cleanup levels. The contamination covered a surface area of approximately 4,200 square feet to depths of 1 to 2 feet (ft) below ground surface (bgs). Groundwater sampling and analysis conducted in this area of the site found low levels of dissolved cadmium, chromium, and zinc. No TPH, volatile organic compounds, or semivolatile organic compounds, pesticides, or polychlorinated biphenyls (PCBs) were detected in the groundwater samples collected (Hart Crowser 1990).

1996 to 1997 Investigation and Cleanup. Soil and groundwater sampling was conducted at the site by EMCON in 1996 (EMCON 1996a, b) for Ms. Reta Jensen, the owner of the site at the time, found:

- PCBs in soil at concentrations exceeding the MTCA Method A cleanup level near a power pole, east of the mill building in the northeastern portion of the site.
- Cadmium, chromium, and lead in soil samples at concentrations below MTCA Method C (cadmium and chromium) or MTCA Method A (lead) industrial cleanup levels.
- Diesel- and oil-range total petroleum hydrocarbons (TPH-D and TPH-O, respectively) in soil at concentrations exceeding the MTCA Method A cleanup levels in several locations at the site.
- TPH-D in groundwater at a concentration below the MTCA Method A cleanup level in one sample collected from a monitoring well at the southwest end of the site.

In April 1997, Glacier Environmental Services, Inc. (Glacier) reported the results of an independent remedial action at the site involving the removal and disposal of approximately 18 tons of PCB-impacted soil from the area near the power pole identified by EMCON (Figure 2). Glacier concluded that the excavation had removed soil containing PCBs above the MTCA Method A cleanup level (Glacier 1997).

2000 Investigation. In February 2000, Farallon conducted a remedial investigation and feasibility study (RI/FS) for the "East Subareas" (the Former Lumber Mill Subarea and Former Salvage Yard Subarea), which are located within the site boundaries. Farallon excavated 22 test pits (to an average

depth of 15 ft bgs), drilled 3 soil borings (greater than 15 ft bgs), and installed 2 additional groundwater monitoring wells (screened between 15 to 30 ft bgs and 15 to 25 ft bgs). Groundwater samples were also collected from existing monitoring wells installed during previous investigations by EMCON (EMCON 1996a), Hart Crowser (Hart Crowser 1990), and Farallon (Farallon 2000).

Based on the soil and groundwater sampling and analysis conducted for the RI/FS, Farallon identified TPH-D, TPH-O, lead, and PCBs in soil at concentrations above MTCA Method A cleanup levels for unrestricted land uses in areas at the southwest and northeast ends of the Site. No analytes were identified above MTCA Method A cleanup levels in groundwater (Farallon 2000).

In July and August 2000, Farallon conducted remedial excavations at seven areas of the site to remove shallow contaminated soil identified during the RI/FS (Figure 2). Approximately 2,140 tons of soil was excavated and disposed of offsite. Analytical results of confirmation soil samples taken from the sidewalls and floor of the excavations indicated that contamination remained above the MTCA Method B cleanup level for TPH (calculated for the site using the Interim TPH Guidelines based on residential use), and above the MTCA Method A cleanup level for cadmium and lead in two areas in the southwestern portion of the site (identified as Excavation Areas 1 and 2 [Ex-1 and EX-2 on Figure 2]). Further excavation was not conducted to avoid damage to an existing structure and nearby large trees and vegetation. Farallon requested a No Further Action (NFA) determination from the Washington State Department of Ecology (Ecology) based on the results of the cleanup (Farallon 2000).

Ecology (Ecology 2001) granted an NFA determination for the site; however, in 2008, Ecology re-evaluated the site and determined that the remedial action was not sufficient to meet MTCA requirements. The previously issued NFA determination was rescinded due to the presence of TPH, cadmium, and lead left in place at concentrations exceeding cleanup levels (Ecology 2008).

2017 Phase I ESA. LAI's Phase I ESA was completed for all six parcels that comprise the site. The Phase I ESA summarized conditions and identified the following *recognized environmental conditions* for which further evaluation was recommended:

1. Subsurface contamination identified at the site in previous reports as the result of historical site uses (shingle mill, lumber mill, and automobile salvage yard).
2. Cadmium, lead, and petroleum hydrocarbon contamination that exceeds MTCA Method A cleanup levels in the southern portion of the site that was left in place following remedial excavations.
3. Conditions at the reported location of a 500-gallon aboveground storage tank (AST) formerly located at the north end of the site, reportedly removed along with approximately 20 cubic yards (cy) of impacted soil from beneath the AST by the current site owner (Mr. Lauren Wibbleman). Confirmation soil samples were not collected from the excavation to confirm that all impacted soil exceeding cleanup levels was removed.

4. PCB-impacted soil resulting from a release from a burned transformer in an area on the north end of the site that was reportedly excavated and removed from the site in 1997.

Additionally, a bulk fuel terminal with three ASTs located north of and upgradient of the site with no known releases was identified as a potential environmental concern due to its proximity to the site and upgradient location.

2017 Phase II ESA. In June 2017, LAI conducted a Phase II ESA for the eastern-most and largest parcel of the site (Snohomish County tax parcel number 27070600300500) for the District. The purpose of the Phase II ESA was to screen for the presence of soil and groundwater contamination associated with the *recognized environmental conditions* identified in the Phase I ESA for the parcel in question. The focused Phase II ESA investigation included both soil and groundwater samples for specific targeted analytes. Sampling locations were selected to confirm cleanup sample results reported for the locations of earlier cleanup activities on the parcel (Farallon 2000) and to evaluate potential groundwater contamination associated with the adjacent operating offsite petroleum facility located hydraulically upgradient to the north of the Site. The area where contamination was left in place following Farallon's remedial excavations in the southwest portion of the site was not evaluated during the Phase II ESA because it was outside the parcel that was the focus of the investigation.

The Phase II ESA testing results indicated that:

- Previous independent remedial excavations on tax parcel number 27070600300500 (Farallon 2000) appear to have successfully met MTCA Method A cleanup levels for the contaminants of concern at the time of excavation. TPH-D and TPH-O were detected in soil samples collected from that site at concentrations that did not exceed the MTCA Method A cleanup level. Polycyclic aromatic hydrocarbons (PAHs), which were not analyzed for during the previous investigations, were detected in one shallow (i.e. less than 2 ft bgs) Phase II ESA soil sample at concentrations exceeding MTCA Methods A and B cleanup levels.
- No PCBs were detected in the shallow composite soil sample from the area of the earlier PCB cleanup (EMCON 1996c). PAHs, which were not analyzed for during the previous investigations, were detected in the shallow soil below the PCB cleanup area and near previous remedial excavation area EX-7 at concentrations exceeding MTCA Method A and B cleanup levels.
- The groundwater sample from existing well MW-4 located near the north end of the site showed no detections of hazardous substances above detection levels. Based on earlier investigation results, well MW-4 is likely to be downgradient (in the direction of groundwater flow) from the existing operating ASTs north of Simons Road. A groundwater grab sample was collected from a geotechnical boring near the center of the parcel. Results from that sample showed that only low levels of metals (including an exceedance of the MTCA Method A cleanup level for total arsenic) and two semivolatile organic compounds (bis[2-ethylhexyl]-phthalate and naphthalene, including an exceedance of the MTCA Method B cleanup level for bis[2-ethylhexyl]phthalate) were present in the sample. The detections of metals in the grab sample were attributed to high turbidity (suspended solids) in the sample, and the bis[2-ethylhexyl]phthalate from new plastics in the temporary well casing or equipment used for groundwater sampling and, therefore, may not be representative of groundwater.

In summary, PAHs were detected in shallow soil at the site at concentrations that exceed MTCA Method A, and/or Method B (direct contact unrestricted use), cleanup levels. The groundwater samples from the existing well MW-4 show no detections that exceed cleanup screening levels, and no indications of groundwater contamination from the offsite fuel operations. The groundwater grab sample contained arsenic and bis[2-ethylhexyl]phthalate at concentrations exceeding cleanup levels, but these detections should be qualified based on the sampling methodology and are likely not representative of the site groundwater conditions.

Other Actions. Discussions with the property owner identified that indications of a small fuel release prompted limited soil excavation near a former fuel AST and informal soil removal activities were conducted in the vicinity of the AST. Based on discussions, we understand that approximately 18 cy of soil was excavated and disposed of at a solid waste landfill, but no confirmation soil samples were collected. A test pit was excavated and sampled in this area during the 2017 Phase II ESA and no petroleum hydrocarbons, PAHs, or PCBs were detected in the sample collected.

2.1 Data Gaps

In May 2018, LAI contacted Ms. Sonia Fernandez of Ecology's Voluntary Cleanup Program (VCP) to discuss rescission of the 2001 NFA. Ms. Fernandez indicated that, beyond the reasons for the rescission indicated in the letter (i.e. contaminated soil left in place in the southwestern portion of the site following Farallon's remedial excavations), Ecology had concerns that the site soil and groundwater had not been fully characterized and that debris in the slope leading down to Woods Creek associated with dumping during operation of the former auto wrecking yard could impact the creek. Based on our review of the previously prepared environmental reports and the opinion provided by Ecology, LAI identified the following data gaps requiring additional characterization to evaluate whether residual contamination is present that could affect future site residents and/or Woods Creek:

1. TPH-D and TPH-O were detected in soil 15 ft bgs at concentrations of 420 milligrams per kilogram (mg/kg) and 2,050 mg/kg, respectively, in test pit FLM-TP8 to the south of the mill building. The individual detections were at or below the MTCA Method B cleanup level of 2,050 mg/kg calculated by Farallon, but insufficient data were collected to demonstrate that the detections represented two distinct products. Without such data, the analytical results must be summed together, the result of which would exceed the calculated MTCA Method B cleanup level.
2. Cadmium was detected at concentrations above the MTCA Method A cleanup level in the south and east sidewall samples collected from Farallon remedial excavation EX-1 located at the south end of the site, but the extent of contamination was not further evaluated
3. Cadmium, lead, and TPH-D were detected at concentrations above their respective MTCA Method A cleanup levels in the south sidewall and southeast excavation bottom samples collected from Farallon remedial excavation EX-2 at the south end of the site, but the extent of contamination was not further evaluated.

4. Confirmation samples collected from Farallon remedial excavations EX-3, EX-4, and EX-6 were not analyzed for PCBs; however, PCBs were detected in soil samples collected from those areas prior to excavation at concentrations exceeding the MTCA Method A cleanup level.
5. PAHs were detected at concentrations above the MTCA Method A cleanup level in areas adjacent to the mill building during the LAI Phase II ESA, but the extent of contamination was not further evaluated.
6. The extent of the debris in the slope to Woods Creek has not been well characterized.
7. Potential impacts to groundwater and the surface water of Woods Creek have not been well characterized.

Most of the data gaps identified during our review likely represent shallow soil contamination that is unlikely to present a significant additional cost to evaluate and remediate and can be addressed during construction through proper planning, oversight, and documentation. However, the deep diesel contamination (Item 1), the extent of debris in the slope to Woods Creek (Item 6), and the potential for groundwater contamination to be impacting Woods Creek (Item 7) have the potential to significantly impact remediation and redevelopment costs for the site. The purpose of this supplemental Phase II ESA was to further evaluate these issues.

3.0 PHASE II ESA SAMPLING RESULTS AND EVALUATION

Soil, groundwater, and surface water sampling to support the Supplemental Phase II ESA evaluation was conducted at the site on June 19, 2018. Follow-up installation of monitoring wells and subsequent well development and groundwater sampling were conducted between August 10 and 22, 2018.

3.1 Initial Mobilization

On June 29, 2018, ESN Northwest (ESN) of Olympia, Washington, under subcontract to LAI, advanced six direct-push borings with a standard Geoprobe® rig for soil and groundwater sampling, and LAI conducted surface water sampling of Woods Creek. Sampling locations are shown on Figure 3 and are summarized as follows:

- Borings B-1 through B-3 were advanced to approximately 20 ft bgs near the location where TPH soil contamination was detected at concentrations exceeding the MTCA Method A cleanup level at 15 ft bgs to the south of the mill building (former test pit FLM-TP8; Figure 3). Soil samples were collected from two depths at each location: 12 ft bgs and 15-20 ft bgs.
- Borings P-2 through P-5 (boring P-1 was planned, but not conducted due to time constraints) were advanced at least 2 ft past the groundwater interface, which occurred between 24 and 29 ft bgs, at locations along the south property boundary at the top of the slope down to Woods Creek. These borings were advanced to screen for debris associated with the former auto wrecking activities, and to collect groundwater samples to evaluate whether the legacy contamination associated with the auto wrecking activities has impacted groundwater at the site that could discharge into Woods Creek. The borings were advanced to below the depth of the water table so that groundwater samples could be collected at those locations.
- Surface water samples were collected from Woods Creek at a location upstream of the site (SWUP) and downstream (SWD) to screen for potential impacts on the creek associated with the site.

Based on previous investigations, the groundwater flow direction at the site is to the south/southwest toward Wood Creek and along its flow path. Boring locations P-2 through P-5 were selected because of their downgradient position based on the potential groundwater flow direction.

During drilling at each location, continuous soil samples were collected to the maximum depth of the exploration with a 4-ft long, 2-inch-diameter tube sampler with acetate liners. An LAI professional observed the direct-push borings and maintained records of the subsurface soil conditions, obtained representative samples for laboratory analyses, described the soil based on visual and textural examination, and conducted a field assessment for environmental impacts based on visual and olfactory observations. The soil encountered in the borings was screened for contamination using visual and olfactory observations, and described using the Unified Soil Classification System in general accordance with the ASTM D 2488 Standard Recommended Practice for Description of Soil (Visual-Manual Procedures).

Logs of the explorations are provided in Appendix A. These logs represent LAI's interpretation of subsurface conditions identified during the field explorations. The stratigraphic contacts shown on the individual logs represent the approximate boundaries between soil types; actual transitions may be more gradual. Information presented on the summary logs depicts subsurface conditions encountered at the specified location and on the date designated on the log.

Soil samples for laboratory analysis were collected by transferring discreet samples from the acetate liners into laboratory-prepared glassware using disposable stainless-steel spoons. Groundwater samples were collected using a groundwater sampler consisting of a 4-ft long, wire-wrapped, stainless-steel screen (0.010-inch slot size) with a retractable protective steel sheath. The groundwater sampler was advanced to the sample depth and the protective sheath was retracted to expose the stainless-steel screen to the formation. Because the depth to groundwater at each location was outside the suction range of a peristaltic pump, the groundwater samples were collected using a check valve attached to the end of dedicated polyethylene tubing used to collect the samples directly into laboratory-prepared containers. The samples for metals analysis were then filtered at the laboratory using a 0.45-micron filter.

The surface water samples were collected by lowering a decontaminated plastic container into the creek and then filling the laboratory-supplied sample bottles. The samples were collected from as near the approximate centerline of the creek as practical. The sample collection container was decontaminated between samples.

3.1.1 Subsurface Conditions

Subsurface conditions encountered in the soil borings at the site are summarized in the boring logs provided in Appendix A. Observations made during the drilling indicate that subsurface soil at the northeast end of the site in the vicinity of the mill building, as characterized by borings B-1 through B-3, generally consists of silty sand with varying amounts of gravel interbedded with occasional silt layers to 20 ft bgs. The subsurface soil encountered in the explorations along the south property boundary (P-2 through P-5) consists of silts with occasional layers of silty sand. Wood, glass, and metal debris, as well as traces of paint chips, were also observed in samples retrieved from borings P-2 through P-5 as noted below:

- **P-2:** Wood debris was present from approximately 12 to 15 ft bgs.
- **P-3:** Metal and glass debris were present from approximately 15 to 22 ft bgs.
- **P-4**: Metal and glass debris were observed from approximately 17 to 21 ft bgs and wood debris was present from approximately 25 to 35 ft bgs.
- **P-5**: Glass, brick, and plywood debris were present from near the ground surface to approximately 5 ft bgs. Wood and metal debris were noted at approximately 15 to 15.5 ft bgs, and glass debris was observed from approximately 20 to 22 ft bgs and 25 to 25.5 ft bgs.

Groundwater was encountered in P-2 through P-5 at depths of 24 to 29 ft bgs. Groundwater was not observed in B-1 through B-3.

3.1.2 Analytical Results

Samples collected from the Supplemental Phase II ESA explorations were submitted to ALS Environmental (ALS) in Everett, Washington under standard chain-of-custody procedures.

The soil samples collected from borings B-1 through B-2 were analyzed for:

- TPH-D and TPH-O by NWTPH-Dx.

Each groundwater sample collected from borings P-2 through P-5, and both of the surface water samples, were analyzed for the following constituents:

- TPH-D and TPH-O by NWTPH-Dx
- PAHs by US Environmental Protection Agency (EPA) Method 8270
- PCBs by EPA Method 8082
- Dissolved Metals (arsenic, cadmium, chromium, lead, mercury, and zinc) by EPA Method 6010/7470.

The analytical results for the soil, groundwater, and surface water samples are provided in Tables 1 through 3, respectively. The analytical laboratory report is included in Appendix B.

3.1.2.1 Soil Testing Results

Six soil samples from boring B-1, B-2, and B-3 were collected and analyzed for TPH-D and TPH-O Analytical results for soil indicate that TPH-D and TPH-O were not found to be present above the laboratory reporting limit in any of the samples.

3.1.2.2 Groundwater Testing Results

The analytical results for groundwater are summarized below. The sample results were compared against groundwater and surface water regulatory criteria due to the proximity of Woods Creek, as discharge of groundwater to surface water is the most likely exposure pathway.

- **Dissolved Metals.** Dissolved **c**hromium, cadmium, lead, and mercury were not detected in any of the groundwater samples collected above the laboratory detection limit. Arsenic and zinc were detected in multiple samples as follows:
    - Dissolved arsenic was detected in the samples collected from borings P-3, P-4, and P-5 at concentrations of 1.6 micrograms per liter (µg/L), 2.5 µg/L, and 1.1 µg/L, respectively. These concentrations exceed the most restrictive surface water screening criteria of 0.018 µg/L.
    - Zinc was detected in all of the groundwater samples collected at concentrations ranging from 9.3 µg/L to 200 µg/L. The concentrations detected in the samples from P-3 (50 µg/L), P-4 (38 µg/L), and P-5 (200 µg/L) exceeded the most restrictive surface water criteria of 32 µg/L.
- **PAHs.** One or more PAHs including naphthalene; 1-methylnaphthalene; and 2-methylnaphthalene; benzo(g,h,i)perylene; fluoranthene; ideno(1,2,3-cd)pyrene; phenanthrene; and pyrene were detected in each of the groundwater samples analyzed at concentrations well below cleanup levels.

- **PCBs.** PCBs were not detected in any of the groundwater samples analyzed.
- **Petroleum Hydrocarbons.** TPH-D (approximately 230 µg/L) and TPH-O (450 µg/L) were detected in the sample collected from boring P-4. These concentrations are below the MTCA Method A groundwater cleanup level of 500 µg/L for both constituents. A review of the laboratory chromatogram indicates that these detections likely represent two separate petroleum products, so the individual TPH results may be compared against the cleanup criteria rather than summing them together as would be required if only one product was present. There are no surface water criteria for petroleum hydrocarbons.

3.1.2.3 Surface Water Testing Results

The analytical results for the surface water samples are summarized below. The sample results were compared against surface water regulatory criteria.

- **Dissolved Metals.** Dissolved chromium, cadmium, lead, and mercury were not detected in any of the surface water samples collected.
    - Arsenic was detected in both samples at a concentration of 1.8 µg/L. This exceeds the most restrictive surface water criteria of 0.018 µg/L.
    - Zinc was not detected in the upstream sample, but was detected in the downstream sample at a concentration of 2.7 µg/L. This is below the most restrictive surface water criteria of 32 µg/L
- **PAHs.** PAHs were not detected in either of the surface water samples analyzed.
- **PCBs.** PCBs were not detected in either of the surface water samples analyzed.
- **Petroleum Hydrocarbons.** TPH-D and TPH-O were not detected in either of the surface water samples analyzed.

3.1.3 Discussion of Analytical Results

The groundwater sample results indicate that arsenic and zinc are present at concentrations that exceed one or more regulatory screening criteria. The samples were grab samples collected from direct-push explorations and, while they were filtered at the laboratory prior to analysis, were still likely to contain turbidity that could create a high bias in the results due to metals associated with the suspended solids that are not representative of the mobile dissolved fraction. The impact of these contaminants on Woods Creek is difficult to assess based on one sampling event. The surface water results show no detectable increase in the arsenic concentration from upstream to downstream, but did show a slight increase in the zinc concentration from below detection limits to 2.7 µg/L

3.2 Follow-Up Mobilization

The analytical results of the initial mobilization indicated that arsenic and zinc were present in the groundwater samples collected from P-3 through P-5 at concentrations exceeding surface water criteria. Naturally occurring metals are typically found in soil and these reported detections are potentially resulting from the turbidity level associated with samples collected from direct-push explorations rather than permanent, developed monitoring wells. The results may, therefore, not be representative of the actual mobile dissolved fraction in groundwater at the site. Low-turbidity

samples collected from properly developed monitoring wells installed with sand packs will likely result in lower-turbidity samples that are likely more representative of the site's groundwater conditions. A follow-up mobilization was, therefore, conducted to install monitoring wells in the immediate vicinity of P-3 through P-5 in an effort to collect more representative groundwater samples.

3.2.1 Well Installation and Development

On August 10, 2018 ESN, under subcontract to LAI, mobilized to the site to install monitoring wells in the vicinity of direct-push explorations P-3 through P-5 where elevated concentrations of arsenic, zinc, and/or petroleum hydrocarbons were detected during the initial mobilization. The wells were named after the direct-push exploration they were installed near; for example, well P3-MW was installed next to direct-push exploration P-3. Each well was installed using direct-push method with a standard Geoprobe® rig. Each well was installed to 30 ft bgs. Construction details for the wells are as follows.

- Well casings and screens are 1-inch-diameter Schedule 80 polyvinyl chloride (PVC).
- Well screens are 0.010-inch slot size with threaded end cap.
- A 6/9 Colorado sand pack extend from the bottom of the well to 2 ft above the well screen.
- The well seal consists of hydrated bentonite pellets immediately on top of the sand pack with extending to the surface completion.
- The wells are completed in 6-inch-diameter flush-mounted, traffic-rated monuments with gasketed lids and bolts.

Well logs are included in Appendix A.

The wells were developed by LAI personnel on August 13, 2018. Well development was completed to remove fine formation material from the well and sand pack. Developed was conducted using polyethylene tubing fitted with a check-valve and surge block to surge water through the sand pack and purge water from the well to remove the sediment stirred up by surging. This creates a better connection with the surrounding formation and reduces turbidity in the well water.

3.2.2 Groundwater Sampling

Groundwater samples were collected from the three newly installed monitoring wells on August 17 and 22, 2018. The samples were collected using a check valve connected to disposable Teflon tubing because the depth to groundwater was outside the suction limit for the peristaltic pump typically used to sample shallow groundwater. Prior to collecting a sample, three casing volumes were purged from each well to ensure that the sample collected was representative of the surrounding formation water. Following purging, the sample bottles were filled using the check valve and tubing method. The samples for dissolved metals analysis were filtered in the field using disposable 0.45-micron groundwater filters to fill laboratory-supplied sample bottles preserved with nitric acid.

3.2.3 Analytical Results

The groundwater samples were submitted to ALS under standard chain-of-custody procedures. Each sample was analyzed for total and dissolved arsenic and zinc, and the sample from DP4-MW was analyzed for TPH-Dx, to compare against the results from previous samples collected from the direct-push explorations. The sample results for each well are presented below and in Table 2, and the analytical laboratory report is included in Appendix B.

- **P3-MW**: Arsenic was not detected above the detection limit of 1.0 µg/L in either the total or dissolved samples collected from this well. The total and dissolved zinc concentrations were 52 µg/L and 37 µg/L, respectively.
- **P4-MW**: The total and dissolved arsenic concentrations in the sample collected from this well were 15 µg/L and 14 µg/L, respectively. The total and dissolved zinc concentrations were 39 µg/L and 8.2 µg/L, respectively. The total zinc concentration exceeded the screening level of 32 µg/L. TPH-D was not detected in the sample. TPH-O was detected at a concentration of 3,700 µg/L, which exceeds the MTCA Method A cleanup level of 500 µg/L.
- **P5-MW**: The total and dissolved arsenic concentrations in the sample collected from this well were 1.6 µg/L and below the detection limit (1.0 µg/L), respectively. The total and dissolved zinc concentrations were 69 µg/L and 20 µg/L, respectively. The total zinc concentration exceeded the screening level of 32 µg/L

3.2.4 Discussion of Analytical Results

The groundwater sample results indicate that total arsenic was present in two samples and dissolved arsenic in one sample at concentrations exceeding screening levels. Total zinc was present in all three samples at concentrations exceeding screening levels. The dissolved arsenic concentrations were lower than those in the samples collected from the direct-push explorations, except for the sample collected from P4-MW, which, at 14 µg/L, was higher than that collected from P-4 (2.5 µg/L). The small difference in the total and dissolved arsenic concentrations from P4-MW (as well as those collected from the other wells) indicates that arsenic in groundwater at the southern end of the site consists mostly of the dissolved fraction. The higher purge volume from the well sampling activities, as opposed to the direct-push sampling, may have resulted in a more representative sample and the higher concentration in the sample from P4-MW (this is likely the case for the higher TPH result in P4-MW as well). Parameters monitored during sampling indicate a groundwater pH in the wells of approximately 5.5 to 6, and an oxidation/reduction potential around 1,000 millivolts. These conditions are conducive to formation of soluble arsenic species, which may drop out of solution (thus, reducing the dissolved concentration) as the groundwater approaches the more neutral pH conditions of Woods Creek.

The dissolved zinc concentrations were significantly lower in the monitoring well samples compared to the direct-push exploration samples. This likely reflects the added turbidity removal achieved from sampling from wells versus the direct-push explorations.

4.0 CONCLUSIONS

The supplemental Phase 2 ESA explorations were conducted to evaluate the potential for contamination associated with historical site use at the Former Monroe Auto Wrecking site to present significant environmental liability for a prospective purchaser. To that end, LAI evaluated data gaps from previous investigations at the site; conducted subsurface soil and groundwater sampling, as well as surface water sampling, to assess and delineate petroleum hydrocarbon contamination detected near the south end of the mill building on the site, and assessed potential impacts to the adjacent Woods Creek resulting from subsurface contamination at the site and/or debris placed along the slope down to Woods Creek from the site.

Soil sampling conducted at the south end of the mill building found no detectable petroleum hydrocarbons at or near the depths at which it was encountered during the previous explorations conducted by Farallon in 2000. The lack of detections indicates that the previously-detected contamination may have naturally degraded to below-detection limit levels. Further evaluation of this data gap does not appear to be necessary.

Groundwater sampling conducted at the south end of the site indicated that total and dissolved arsenic and zinc are present at concentrations that exceed one or more surface water criteria. In addition, TPH-O was detected in one sample at a concentration exceeding the MTCA Method A cleanup level (surface water cleanup levels to TPH-O have not been published by Ecology). The presence of these contaminants may be associated with the former auto wrecking or mill activities at the site as wood, metal, glass, and paint debris were encountered at depths ranging from within 5 ft of the ground surface to 35 feet bgs in the borings along the south property boundary. This may indicate that wrecking debris or wood debris was dumped at the site, or that fill containing the debris was used to fill the site to its current grade. However, the results of the surface water sampling showed no change in the arsenic concentration, and a slight increase in the zinc concentration, from the upstream to downstream sample locations; petroleum hydrocarbon were not detected. This may indicate that redox conditions between the site and creek are causing the dissolved metals fractions to precipitate out of solution prior to reaching the creek, thus, reducing impacts to surface water. Alternatively, the mass flux of contaminants into the stream may be too low to significantly increase concentrations in the creek. Additional sampling and analysis would be required to confirm these assumptions.

Based on the available data, the contamination detected in the site groundwater appears to be relatively minor and the impact on Woods Creek is uncertain. Due to the cleanup level exceedances, Ecology will likely require additional monitoring of the existing wells and surface water of Woods Creek (in addition to removal and confirmation sampling of the near-surface contamination associated with data gaps 2 through 5 presented in Section 2.1) before granting the site NFA status. Ecology may also require additional explorations to delineate the extent of the petroleum

hydrocarbon contamination detected in the sample collected from P4-MW. LAI recommends that the following steps be taken during site development:

- Follow the guidance provided in the Excavated Materials Management Plan (EMMP; LAI 2018) during construction. The EMMP provides information on areas requiring further remedial excavation and/or confirmation sampling that will need to be conducted during construction.
- Conduct additional explorations to evaluate the extent of the petroleum hydrocarbon contamination detected in P4-MW and to monitor plume conditions. This would likely include direct-push explorations to screen for the extent of contamination with follow-up installation of wells for long-term monitoring of groundwater contaminant conditions. A program of monitored natural attenuation (MNA) may be a feasible remedial alternative for the site if it is found that the plume is stable or shrinking. However, if the plume is found to be expanding or increasing in contaminant concentrations, a more active remedial alternative such as enhanced bioremediation through injection of a terminal electron acceptor solution (oxygen, nitrate, or sulfate depending on plume conditions and local geochemistry) may be necessary.
- Semiannual monitoring of Woods Creek surface water to evaluate the potential long-term impacts associated with the arsenic and zinc contamination detected in the groundwater samples collected at the site.

5.0 LIMITATIONS

This report has been prepared for the exclusive use of River's Edge for specific application to the Former Monroe Auto Wrecking site. No other party is entitled to rely on the information, conclusions, and recommendations included in this document without the express written consent of River's Edge and LAI. Further, the reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by LAI, shall be at the user's sole risk. LAI warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. We make no other warranty, either express or implied.

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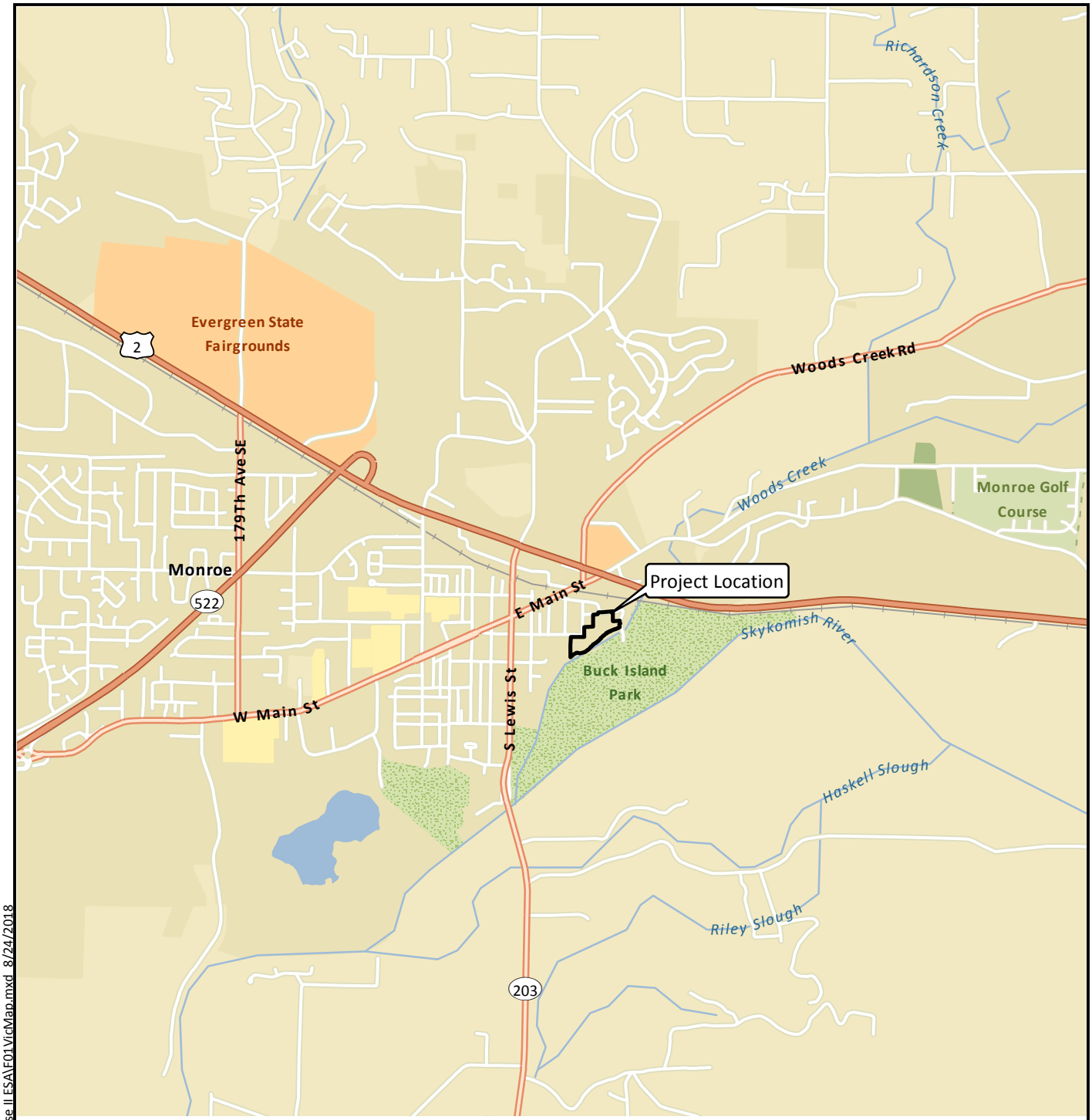

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0 0.5 1

Miles

Data Source: Esri 2012

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Monroe Auto Wrecking Supplemental Phase II ESA Monroe, Washington	**Vicinity Map**	Figure 1

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Legend

- Monitoring Well
- Soil Boring - Only Soil Collected
- Soil Boring - Soil and Groundwater Collected
- Surface Water Sample
- Approximate Location of Test Pit FLM-TP8 Previous Hydrocarbon Soil Detection
- Railroad Tracks
- Woods Creek
- Site Boundary

0 120 240

Scale in Feet

Data Source: Snohomish County GIS; Esri World Imagery.

Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

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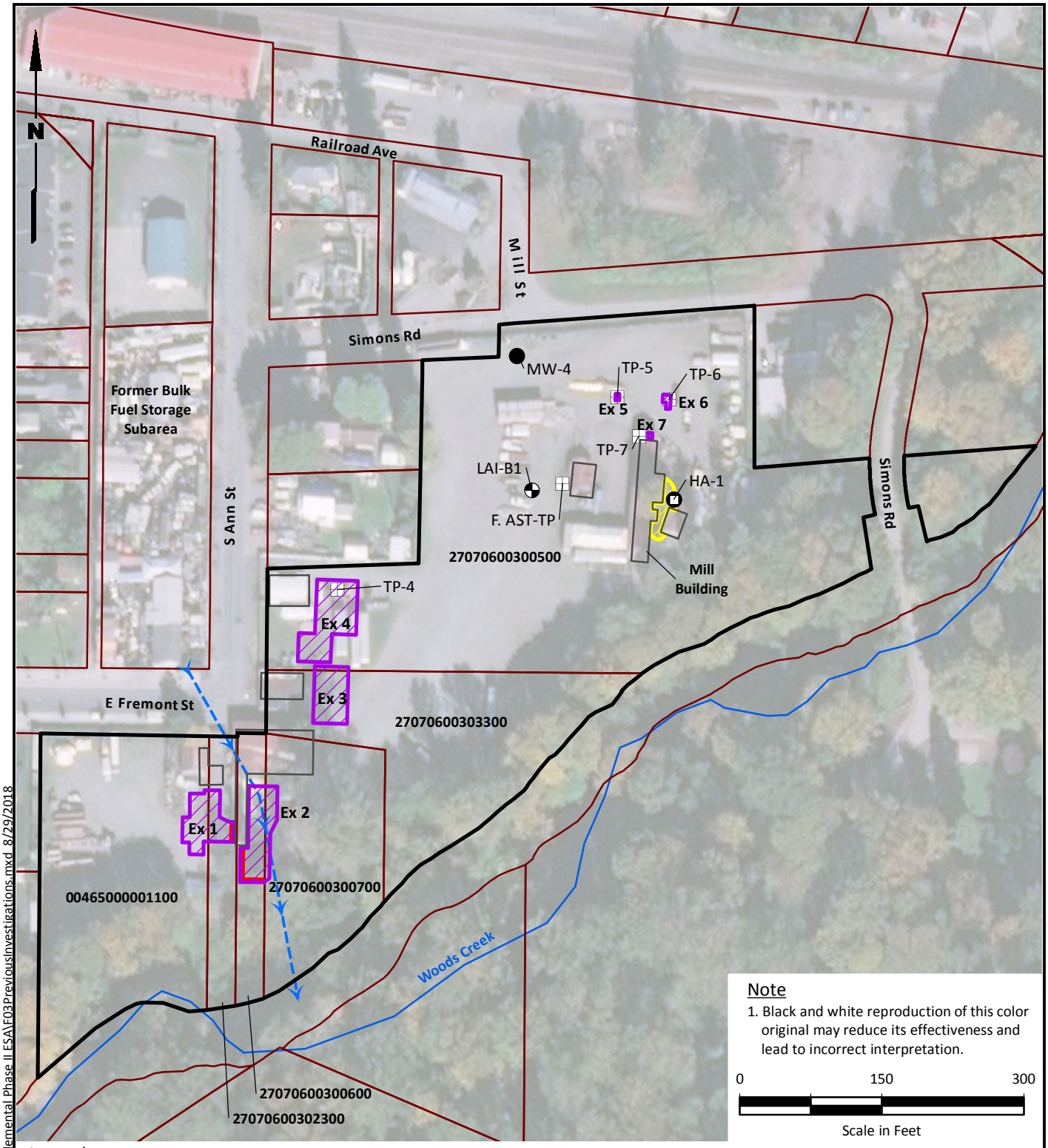
Monroe Auto Wrecking Supplemental Phase II ESA Monroe, Washington	**Site and Exploration Plan**	Figure 2



Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 150 300

Scale in Feet

Legend

- Boring
- Hand Auger
- MW
- Test Pit
- Site
- Tax Parcels
- City Stormwater Outfall
- Woods Creek
- Approximate Building Location
- Excavation Areas of Cadmium, Lead, and TPH-Impacted Soil (Farallon 2000)
- Excavation Area of PCB Impacted Soil (Glacier 1997)
- Total Cadmium, Total Lead, or Total Petroleum Concentration above MTCA Method A or B Cleanup Level After Excavation (Farallon 2000)

Data Sources: Farallon 2000; Glacier 1997; Snohomish County GIS; Esri World Imagery.

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Monroe Auto Wrecking Supplemental Phase II ESA Monroe, Washington	**Previous Investigation and Remediation**	Figure 3

Table 1
Soil Analytical Results
Monroe Auto Salvage

Analyte	MTCA Method A Cleanup Level Unrestricted Uses	Sample Location, Laboratory Sample ID, Sample Date					
		B-1(12') EV18070006-01 6/29/2018	B-1(15-20') EV18070006-02 6/29/2018	B-2(12') EV18070006-03 6/29/2018	B-2(15-20') EV18070006-04 6/29/2018	B-3(12') EV18070006-05 6/29/2018	B-3(15-20') EV18070006-06 6/29/2018
Total Petroleum Hydrocarbons (mg/kg; NWTPH-Dx)							
Petroleum Hydrocarbons C12-C24	2,000	25 U	25 U	25 U	25 U	25 U	25 U
Petroleum Hydrocarbons C24-C40	2,000	50 U	50 U	50 U	50 U	50 U	50 U

Notes:

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

Abbreviations and Acronyms:

ID = identification
mg/kg = milligrams per kilogram
MTCA = Model Toxics Control Act
NWTPH = Northwest Total Petroleum Hydrocarbon

Table 2
Groundwater Analytical Results
Monroe Auto Salvage

Analyte	Groundwater MTCA Method A Cleanup Level	Surface Water MTCA Method B Cleanup Level		Surface Water Aquatic Life Fresh/Acute 173-201A WAC	Surface Water Aquatic Life Fresh/Chronic 173-201A WAC	Sample Location, Laboratory Sample ID, Sample Date						
		Non-Cancer	Cancer			P-2 EV18070006-10 6/29/2018	P-3 EV18070006-09 6/29/2018	P-4 EV18070006-07 6/29/2018	P-5 EV18070006-08 6/29/2018	P3-MW EV18080123-03 8/22/2018	P4-MW EV18080123-02 8/22/2018	P5-MW EV18080123-01 8/17/2018
Total Petroleum Hydrocarbons (µg/L; NWTPH-Dx)												
Diesel-Range Petroleum Hydrocarbons	500	--	--	--	--	130 U	130 U	**230 J**	130 U	--	130 U	--
Oil-Range Petroleum Hydrocarbons	500	--	--	--	--	250 U	250 U	**450**	250 U	--	**3,700**	--
Polycyclic Aromatic Hydrocarbons (µg/L; SW-846 8270D-SIM)												
1-Methylnaphthalene	--	--	--	--	--	**0.039**	**0.035**	**0.041**	**0.035**	--	--	--
2-Methylnaphthalene	--	--	--	--	--	**0.069**	**0.063**	**0.063**	**0.063**	--	--	--
Acenaphthene	--	650	--	--	--	0.020 U	0.020 U	0.020 U	0.020 U	--	--	--
Acenaphthylene	--	--	--	--	--	0.020 U	0.020 U	0.020 U	0.020 U	--	--	--
Anthracene	--	26,000	--	--	--	0.020 U	0.020 U	0.020 U	0.020 U	--	--	--
Benzo(a)anthracene	--	--	0.30	--	--	0.020 U	0.020 U	0.020 U	0.020 U	--	--	--
Benzo(a)pyrene	0.1	--	0.030	--	--	0.020 U	0.020 U	0.020 U	0.020 U	--	--	--
Benzo(b)fluoranthene	--	--	0.30	--	--	0.020 U	0.020 U	0.020 U	0.020 U	--	--	--
Benzo(g,h,i)perylene	--	--	--	--	--	0.020 U	0.020 U	**0.048**	0.020 U	--	--	--
Benzo(k)fluoranthene	--	--	3.0	--	--	0.020 U	0.020 U	0.020 U	0.020 U	--	--	--
Chrysene	--	--	30	--	--	0.020 U	0.020 U	0.020 U	0.020 U	--	--	--
Dibenzo(a,h)anthracene	--	--	0.030	--	--	0.020 U	0.020 U	0.020 U	0.020 U	--	--	--
Fluoranthene	--	86	--	--	--	0.020 U	0.020 U	**0.056**	0.020 U	--	--	--
Fluorene	--	3,500	--	--	--	0.020 U	0.020 U	0.020 U	0.020 U	--	--	--
Indeno(1,2,3-cd)pyrene	--	--	0.30	--	--	0.020 U	0.020 U	**0.028**	0.020 U	--	--	--
Naphthalene	160	4,700	--	--	--	**0.27**	**0.26**	**0.27**	**0.23**	--	--	--
Phenanthrene	--	--	--	--	--	0.020 U	**0.022**	0.020 U	0.020 U	--	--	--
Pyrene	--	2,600	--	--	--	0.020 U	**0.022**	**0.079**	0.020 U	--	--	--
Polychlorinated Biphenyls (µg/L; SW-846 8082A)												
Aroclor 1016	--	0.006	0.003	--	--	0.10 U	0.10 U	0.10 U	0.10 U	--	--	--
Aroclor 1221	--	--	--	--	--	0.10 U	0.10 U	0.10 U	0.10 U	--	--	--
Aroclor 1232	--	--	--	--	--	0.10 U	0.10 U	0.10 U	0.10 U	--	--	--
Aroclor 1242	--	--	--	--	--	0.10 U	0.10 U	0.10 U	0.10 U	--	--	--
Aroclor 1248	--	--	--	--	--	0.10 U	0.10 U	0.10 U	0.10 U	--	--	--
Aroclor 1254	--	0.002	0.0001	--	--	0.10 U	0.10 U	0.10 U	0.10 U	--	--	--
Aroclor 1260	--	--	--	--	--	0.10 U	0.10 U	0.10 U	0.10 U	--	--	--
Aroclor 1268	--	--	--	--	--	0.10 U	0.10 U	0.10 U	0.10 U	--	--	--
Total PCBs	0.1	--	0.0001	2	0.014	0.10 U	0.10 U	0.10 U	0.10 U	--	--	--
Total Metals (µg/L; EPA 200.8/245.1)												
Arsenic	5	18	0.098	360	190	--	--	--	--	1.0 U	**15**	**1.6**
Zinc	--	17,000	--	35	32	--	--	--	--	**52**	**39**	**69**
Dissolved Metals (µg/L; EPA 200.8/245.1)												
Arsenic	5	18	0.098	360	190	1.0 U	**1.6**	**2.5**	**1.1**	1.0 U	**14**	1.0 U
Cadmium	5	41	--	0.82	0.37	1.0 U	1.0 U	1.0 U	1.0 U	--	--	--
Chromium (a)	50	240,000	--	180	57	2.0 U	2.0 U	2.0 U	2.0 U	--	--	--
Lead	15	--	--	14	0.54	1.0 U	1.0 U	1.0 U	1.0 U	--	--	--
Mercury	2	--	--	2.1	0.012	0.20 U	0.20 U	0.20 U	0.20 U	--	--	--
Zinc	--	17,000	--	35	32	**9.3**	**50**	**38**	**200**	**37**	**8.2**	**20**

Notes:
U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
Bold = detected compound
-- = not available
Green Box = detected concentration is greater than one or more cleanup levels

(a) Cleanup levels based on Chromium III.

Abbreviations and Acronyms:
EPA = US Environmental Protection Agency
ID = identification
µg/L = micrograms per liter
MTCA = Model Toxics Control Act
NWTPH = Northwest Total Petroleum Hydrocarbon
PCB = polychlorinated biphenyl
SIM = selected ion monitoring
WAC = Washington Administrative Code

Table 3
Surface Water Analytical Results
Monroe Auto Salvage

Analyte	MTCA Method B Cleanup Level		Surface Water Aquatic Life Fresh/Acute 173-201A WAC	Surface Water Aquatic Life Fresh/Chronic 173-201A WAC	Sample Location, Lab ID, Sample Date	
					SWD EV18070006-11 6/29/2018	SWUP EV18070006-12 6/29/2018
	Non-Cancer	Cancer				
Total Petroleum Hydrocarbons (µg/L; NWTPH-Dx)						
Petroleum Hydrocarbons C12-C24	--	--	--	--	130 U	130 U
Petroleum Hydrocarbons C24-C40	--	--	--	--	250 U	250 U
Polycyclic Aromatic Hydrocarbons (µg/L; SW-846 8270D-SIM)						
1-Methylnaphthalene	--	--	--	--	0.020 U	0.020 U
2-Methylnaphthalene	--	--	--	--	0.020 U	0.020 U
Acenaphthene	650	--	--	--	0.020 U	0.020 U
Acenaphthylene	--	--	--	--	0.020 U	0.020 U
Anthracene	26,000	--	--	--	0.020 U	0.020 U
Benzo(a)anthracene	--	0.30	--	--	0.020 U	0.020 U
Benzo(a)pyrene	--	0.030	--	--	0.020 U	0.020 U
Benzo(b)fluoranthene	--	0.30	--	--	0.020 U	0.020 U
Benzo(g,h,i)perylene	--	--	--	--	0.020 U	0.020 U
Benzo(k)fluoranthene	--	3.0	--	--	0.020 U	0.020 U
Chrysene	--	30	--	--	0.020 U	0.020 U
Dibenzo(a,h)anthracene	--	0.030	--	--	0.020 U	0.020 U
Fluoranthene	86	--	--	--	0.020 U	0.020 U
Fluorene	3,500	--	--	--	0.020 U	0.020 U
Indeno(1,2,3-cd)pyrene	--	0.30	--	--	0.020 U	0.020 U
Naphthalene	4,700	--	--	--	0.020 U	0.020 U
Phenanthrene	--	--	--	--	0.020 U	0.020 U
Pyrene	2,600	--	--	--	0.020 U	0.020 U
Polychlorinated Biphenyls (µg/L; SW-846 8082A)						
Aroclor 1016	0.006	0.003	--	--	0.10 U	0.10 U
Aroclor 1221	--	--	--	--	0.10 U	0.10 U
Aroclor 1232	--	--	--	--	0.10 U	0.10 U
Aroclor 1242	--	--	--	--	0.10 U	0.10 U
Aroclor 1248	--	--	--	--	0.10 U	0.10 U
Aroclor 1254	0.002	0.0001	--	--	0.10 U	0.10 U
Aroclor 1260	--	--	--	--	0.10 U	0.10 U
Aroclor 1268	--	--	--	--	0.10 U	0.10 U
Total PCBs	--	0.0001	2	0.014	0.10 U	0.10 U
Dissolved Metals (µg/L; EPA 200.8)						
Arsenic	18	0.098	360	190	**1.6**	**1.6**
Cadmium	41	--	0.82	0.37	1.0 U	1.0 U
Chromium, Total (a)	240,000	--	180	57	2.0 U	2.0 U
Lead	--	--	14	0.54	1.0 U	1.0 U
Mercury	--	--	2.1	0.012	0.20 U	0.20 U
Zinc	17,000	--	35	32	**2.7**	2.5 U

Notes:

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

Bold = detected compound

-- = not available

Green Box = detected concentration is greater than one or more cleanup levels

(a) Cleanup levels based on Chromium III.

Abbreviations and Acronyms:

EPA = US Environmental Protection Agency
ID = identification
µg/L = micrograms per liter
MTCA = Model Toxics Control Act
NWTPH = Northwest Total Petroleum Hydrocarbon
PCB = polychlorinated biphenyl
SIM = selected ion monitoring
WAC = Washington Administrative Code

APPENDIX A

Field Explorations

Soil Classification System

MAJOR DIVISIONS			GRAPHIC SYMBOL	USCS LETTER SYMBOL[1]	TYPICAL DESCRIPTIONS [2][3]
COARSE-GRAINED SOIL (More than 50% of material is larger than No. 200 sieve size)	GRAVEL AND GRAVELLY SOIL (More than 50% of coarse fraction retained on No. 4 sieve)	CLEAN GRAVEL (Little or no fines)		GW	Well-graded gravel; gravel/sand mixture(s); little or no fines
				GP	Poorly graded gravel; gravel/sand mixture(s); little or no fines
		GRAVEL WITH FINES (Appreciable amount of fines)		GM	Silty gravel; gravel/sand/silt mixture(s)
				GC	Clayey gravel; gravel/sand/clay mixture(s)
	SAND AND SANDY SOIL (More than 50% of coarse fraction passed through No. 4 sieve)	CLEAN SAND (Little or no fines)		SW	Well-graded sand; gravelly sand; little or no fines
				SP	Poorly graded sand; gravelly sand; little or no fines
		SAND WITH FINES (Appreciable amount of fines)		SM	Silty sand; sand/silt mixture(s)
				SC	Clayey sand; sand/clay mixture(s)
FINE-GRAINED SOIL (More than 50% of material is smaller than No. 200 sieve size)	SILT AND CLAY (Liquid limit less than 50)			ML	Inorganic silt and very fine sand; rock flour; silty or clayey fine sand or clayey silt with slight plasticity
				CL	Inorganic clay of low to medium plasticity; gravelly clay; sandy clay; silty clay; lean clay
				OL	Organic silt; organic, silty clay of low plasticity
	SILT AND CLAY (Liquid limit greater than 50)			MH	Inorganic silt; micaceous or diatomaceous fine sand
				CH	Inorganic clay of high plasticity; fat clay
				OH	Organic clay of medium to high plasticity; organic silt
	HIGHLY ORGANIC SOIL			PT	Peat; humus; swamp soil with high organic content

OTHER MATERIALS	GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
PAVEMENT		AC or PC	Asphalt concrete pavement or Portland cement pavement
ROCK		RK	Rock (See Rock Classification)
WOOD		WD	Wood, lumber, wood chips
DEBRIS		DB	Construction debris, garbage

Notes:
1. USCS letter symbols correspond to symbols used by the Unified Soil Classification System and ASTM classification methods. Dual letter symbols (e.g., SP-SM for sand or gravel) indicate soil with an estimated 5-15% fines. Multiple letter symbols (e.g., ML/CL) indicate borderline or multiple soil classifications.
2. Soil descriptions are based on the general approach presented in the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), outlined in ASTM D 2488. Where laboratory index testing has been conducted, soil classifications are based on the Standard Test Method for Classification of Soils for Engineering Purposes, as outlined in ASTM D 2487.
3. Soil description terminology is based on visual estimates (in the absence of laboratory test data) of the percentages of each soil type and is defined as follows:

Primary Constituent:	> 50%	- "GRAVEL," "SAND," "SILT," "CLAY," etc.
Secondary Constituents:	> 30% and ≤ 50%	- "very gravelly," "very sandy," "very silty," etc.
	> 15% and ≤ 30%	- "gravelly," "sandy," "silty," etc.
Additional Constituents:	> 5% and ≤ 15%	- "with gravel," "with sand," "with silt," etc.
	≤ 5%	- "with trace gravel," "with trace sand," "with trace silt," etc., or not noted.

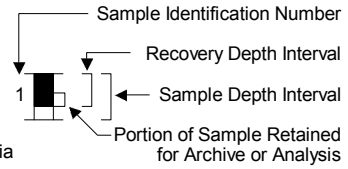
4. Soil density or consistency descriptions are based on judgement using a combination of sampler penetration blow counts, drilling or excavating conditions, field tests, and laboratory tests, as appropriate.

Drilling and Sampling Key

SAMPLER TYPE

Code	Description
a	3.25-inch O.D., 2.42-inch I.D. Split Spoon
b	2.00-inch O.D., 1.50-inch I.D. Split Spoon
c	Shelby Tube
d	Grab Sample
e	Single-Tube Core Barrel
f	Double-Tube Core Barrel
g	2.50-inch O.D., 2.00-inch I.D. WSDOT
h	3.00-inch O.D., 2.375-inch I.D. Mod. California
i	Other - See text if applicable
1	300-lb Hammer, 30-inch Drop
2	140-lb Hammer, 30-inch Drop
3	Pushed
4	Vibrocore (Rotosonic/Geoprobe)
5	Other - See text if applicable

SAMPLE NUMBER & INTERVAL



Field and Lab Test Data

Code	Description
PP = 1.0	Pocket Penetrometer, tsf
TV = 0.5	Torvane, tsf
PID = 100	Photoionization Detector VOC screening, ppm
W = 10	Moisture Content, %
D = 120	Dry Density, pcf
-200 = 60	Material smaller than No. 200 sieve, %
GS	Grain Size - See separate figure for data
AL	Atterberg Limits - See separate figure for data
GT	Other Geotechnical Testing
CA	Chemical Analysis

Groundwater

▽ Approximate water level at time of drilling (ATD)

▼ Approximate water level at time after drilling/excavation/well

LANDAU ASSOCIATES

Monroe Auto Salvage
Monroe, WA

Soil Classification System and Key

Figure
A-1

B-1

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Drilling Method: Geoprobe™ Ground Elevation (ft):	
0						GP	Gray, coarse GRAVEL (no odor, no sheen) (dense, damp)	Groundwater not encountered.
						ML		
		d3				SM	Red brown, sandy, SILT with organics and trace gravel (no odor, no sheen) (medium stiff, damp to moist)	
						SP-SM		
5							Brown, silty, fine SAND (no odor, no sheen) (medium dense, damp to moist)	
							Gray, medium SAND with silt and gravel (no odor, no sheen) (medium dense, damp to moist)	
		d3				SM		
						ML	-decreasing gravel size	
10						SM	Gray, silty, medium to coarse SAND with gravel (no odor, no sheen) (medium dense, damp to moist)	
						SM		
	B-1(12') 180629	d3				ML	Light brown, SILT (no odor, no sheen) (stiff, moist)	
						SM	Light brown to gray, silty SAND with gravel (no odor, no sheen) (dense, damp to moist)	
15							Red brown, silty, fine to medium SAND with gravel (no odor, no sheen) (medium dense, moist)	
	B-1(15-20') 180629	d3				SP-SM		
							Red, sandy SILT with gravel (no odor, no sheen) (medium stiff, wet)	
20							Light brown, silty, fine to coarse SAND with gravel (no odor, no sheen) (medium dense, moist)	
							Gray, fine to medium SAND with silt (medium dense, moist)	
25								
30								
35								
40								

Boring Completed 06/19/18
Total Depth of Boring = 20.0 ft.

DRAFT

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1759001.010.011 8/29/18 N:\PROJECTS\1759001.010.GPJ SOIL BORING LOG

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Monroe Auto Salvage
Monroe, WA

Log of Boring B-1

Figure
A-2

B-2

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Drilling Method: Geoprobe™ Ground Elevation (ft):	
0						ML	Brown, SILT with sand, organics and gravel (no odor, no sheen) (soft to medium stiff, moist)	Groundwater not encountered.
		d3				SM	Brown, silty, fine to medium SAND with trace gravel (no odor, no sheen) (medium dense, damp to moist)	
5		d3				SP-SM	Gray, gravelly, fine to medium SAND with silt (no odor, no sheen) (dense, damp to moist) grades to medium SAND	
10	B-2(12') 180629	d3				SP-SM SM SM	Gray, gravelly, fine to medium SAND with silt (no odor, no sheen) (dense, damp to moist) Dark brown, silty, medium SAND with gravel (no odor, no sheen) (dense, moist)	
15						SM	Red, silty, fine to medium SAND with gravel (no odor, no sheen) (dense, moist)	
	B-2(15-20') 180629	d3				SP-SM	Gray, silty, fine to medium SAND with gravel (no odor, no sheen) (medium dense, damp to moist)	
20							Gray, fine to medium SAND with silt and trace gravel (no odor, no sheen) (dense, moist)	
25								
30								
35								
40								

Boring Completed 06/19/18
Total Depth of Boring = 20.0 ft.

DRAFT

Notes:
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2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
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1759001.010.011 8/29/18 N:\PROJECTS\1759001.010.GPJ SOIL BORING LOG

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Monroe Auto Salvage Monroe, WA	Log of Boring B-2	Figure A-3

B-3

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Drilling Method: Geoprobe™ Ground Elevation (ft):	
0						ML	Brown to grey, SILT with sand and trace gravel (no odor, no sheen) (soft to medium stiff, moist)	Groundwater not encountered.
						ML		
		d3				SM	Red, SILT with sand and trace gravel (no odor, no sheen) (soft to medium stiff, moist)	
5						SP-SM	Light brown, silty, fine to medium SAND (no odor, no sheen) (medium dense, damp to moist)	
		d3					Grey, medium SAND with silt and gravel (no odor, no sheen) (dense, moist)	
10						SP-SM	Grey, fine to coarse SAND with silt and trace gravel (no odor, no sheen) (dense, damp to moist)	
	B-3(12') 180629	d3				SM	Brown, silty, Medium SAND with gravel (no odor, no sheen) (dense, damp to moist)	
						SP-SM	grades to fine to coarse SAND	
15						SM	Light brown, fine to medium SAND with silt (no odor, no sheen) (dense, damp to moist)	
	B-3(15-20') 180629	d3				SP-SM	Grey, silty, fine to coarse SAND with gravel (no odor, no sheen) (dense, moist)	
20							Gray, fine to medium SAND with silt and trace gravel (no odor, no sheen) (dense, moist)	
							Boring Completed 06/19/18 Total Depth of Boring = 20.0 ft.	
25								
30								
35								
40								

DRAFT

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
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1759001.010.011 8/29/18 N:\PROJECTS\1759001.010.GPJ SOIL BORING LOG

LANDAU ASSOCIATES

Monroe Auto Salvage
Monroe, WA

Log of Boring B-3

Figure
A-4

P-2

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Drilling Method: Geoprobe™ Ground Elevation (ft): _____	Water Level
0						ML	Gray to light brown, SILT with sand and gravel (no odor, no sheen) (stiff, damp)	
		d3						
5							-increase in gravel content	
		d3						
10								
		d3				ML	Dark brown to black, SILT with wood debris (no odor, no sheen) (stiff, damp to moist)	
15						ML	mottled gray and brown, SILT with sand and gravel (no odor, no sheen) (stiff, damp to moist)	
		d3				SP-SM	light brown, gravelly, fine to medium SAND with silt (no odor, no sheen) (dense, damp to moist)	
20						ML	Mottled grey and dark brown, SILT with sand and gravel (no odor, no sheen) (stiff, moist)	
		d3				SM	Gray to light brown, gravelly, silty, fine to coarse SAND (no odor, no sheen) (dense, wet)	▽ ATD
25								
		d3				ML	Gray, SILT (no odor, no sheen) (stiff, moist)	
30								
35								
40								

Boring Completed 06/19/18
Total Depth of Boring = 30.0 ft.

DRAFT

Notes:
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3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

LANDAU ASSOCIATES

Monroe Auto Salvage
Monroe, WA

Log of Boring P-2

Figure
A-5

P-3

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Drilling Method: Geoprobe™ Ground Elevation (ft):	Water Level
0		d3				ML	Brown, sandy SILT with gravel (no odor, no sheen) (soft to medium stiff, damp to moist)	
5		d3					-increase in gravel content	
10		d3				SP-SM ML	Light brown, gravelly, fine to medium SAND with silt (no odor, no sheen) (medium dense, damp) Dark brown, gravelly SILT with sand (no odor, no sheen) (medium stiff, damp to moist)	
15		d3				SM SP-SM	Light brown, silty, fine to medium SAND with gravel (no odor, no sheen) (medium dense, moist) Dark brown to black, gravelly, medium to coarse SAND with silt (no odor, no sheen) (dense, moist) -with metal and glass debris	
20		d3				ML	Dark brown, SILT with sand (no odor, no sheen) (stiff, moist)	
25		d3				SM ML	Dark brown, silty, fine to medium SAND with gravel (no odor, no sheen) (dense, moist to wet) Light brown, SILT (no odor, no sheen) (hard, damp)	▽ ATD
30								
35								
40								

Boring Completed 06/19/18
Total Depth of Boring = 30.0 ft.

DRAFT

Notes:
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2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
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LANDAU ASSOCIATES

Monroe Auto Salvage
Monroe, WA

Log of Boring P-3

Figure
A-6

P-4

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Drilling Method: Geoprobe™ Ground Elevation (ft):	Water Level
0						ML	Dark brown, SILT with gravel and sand (no odor, no sheen) (stiff, moist)	
		d3						
5							-increase in sand content	
						SM	Black, silty, fine to medium SAND with gravel (no odor, no sheen) (dense, damp)	
		d3				ML	Brown, sandy, SILT with gravel (no odor, no sheen) (stiff, damp to moist)	
10								
		d3						
15						SM	Grey, silty, medium SAND with gravel (no odor, no sheen) (medium dense, moist)	
						ML		
		d3				GM	Black, sandy, gravelly SILT (no odor, no sheen) (soft, moist)	
							Black, silty, GRAVEL with sand and wood debris (no odor, no sheen) (dense, moist to wet)	
20						SM		
						ML	Dark brown, silty medium SAND with gravel (no odor, no sheen) (medium dense, moist)	
		d3				GP-GM		
							Black, SILT with gravel, sand and trace paint chips (no odor, no sheen) (stiff, moist to wet)	
25						ML	Grey, sandy, fine GRAVEL with silt (no odor, no sheen) (dense, moist to wet)	
		d3					Dark brown, SILT with sand and gravel and trace wood debris (no odor, no sheen) (stiff, moist to wet)	▽ ATD
30						SM	Black, gravelly, silty, medium SAND with wood debris (no odor, no sheen) (medium dense, wet)	
		d3						
35								
40								

Boring Completed 06/19/18
Total Depth of Boring = 35.0 ft.

DRAFT

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1759001.010.011 8/29/18 N:\PROJECTS\1759001.010.GPJ SOIL BORING LOG

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Monroe Auto Salvage
Monroe, WA

Log of Boring P-4

Figure
A-7

P-5

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Drilling Method: Geoprobe™ Ground Elevation (ft):	Water Level
0		d3				ML	Brown, SILT with sand and trace gravel and debris (glass, brick and plywood) (no odor, no sheen) (soft, damp to moist)	
5		d3						
10		d3				SP-SM	Gray, gravelly, medium SAND with silt (no odor, no sheen) (medium dense, moist)	
15		d3				SM ML SP-SM	Gray, gravelly, silty, medium SAND (no odor, no sheen) (medium dense, damp to moist) Dark brown, SILT with sand, gravel, wood and metal debris (no odor, no sheen) (medium stiff, moist)	
20		d3				ML SP-SM	Light brown to gray, fine to medium SAND with silt (no odor, no sheen) (dense, moist) Dark brown, gravelly SILT with glass debris (no odor, no sheen) (medium stiff, moist)	▽ ATD
25		d3				ML SM ML	Light brown, fine to medium SAND with gravel and silt (no odor, no sheen) (medium dense, moist to wet) Dark brown, gravelly, SILT with sand and glass debris (no odor, no sheen) (soft to medium stiff, moist to wet) Light brown, silty, fine to medium SAND (no odor, no sheen) (medium dense, wet)	
30							Brown to orange, sandy, SILT (no odor, no sheen) (hard, moist)	
35								
40								

Boring Completed 06/19/18
Total Depth of Boring = 30.0 ft.

DRAFT

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

LANDAU ASSOCIATES

Monroe Auto Salvage
Monroe, WA

Log of Boring P-5

Figure
A-8

P3-MW

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Depth (ft) | Sample Number & Interval | Sampler Type | Blows/Foot | Test Data | Graphic Symbol | USCS Symbol

Drilling Method: Geoprobe™

Ground Elevation (ft): _____

-For approximate lithology see log of P-3

Water Level

ATD

Monitoring Well Detail
(DOE#: BKX 646)

2.25 in

- Flush-mounted monument with locking cap
- 1-inch diameter, Schedule 80, PVC well casing
- Bentonite chips
- 6/9 Colorado sand pack
- 1-inch diameter, Schedule 80, PVC screen (0.010-inch slot size)
- Threaded end cap

0 5 10 15 20 25 30 35 40

Boring Completed 08/10/18
Total Depth of Boring = 35.0 ft.

Monitoring Well Completed 08/10/18

DRAFT

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1759001.010.011 8/29/18 N:\PROJECTS\1759001.010.GPJ WELL LOG

LANDAU ASSOCIATES

Monroe Auto Salvage
Monroe, WA

Log of Monitoring Well P3-MW

Figure
A-9

P4-MW

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Depth (ft) | Sample Number & Interval | Sampler Type | Blows/Foot | Test Data | Graphic Symbol | USCS Symbol

Drilling Method: Geoprobe™

Ground Elevation (ft): _____

Water Level

Monitoring Well Detail
(DOE#: BKX 645)

2.25 in

0
5
10
15
20
25
30
35
40

-For approximate lithology see log of P-4

Flush-mounted monument with locking cap

1-inch diameter, Schedule 80, PVC well casing

Bentonite chips

6/9 Colorado sand pack

ATD

1-inch diameter, Schedule 80, PVC screen (0.010-inch slot size)

Threaded end cap

DRAFT

Boring Completed 08/10/18
Total Depth of Boring = 35.0 ft.

Monitoring Well Completed 08/10/18

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

LANDAU ASSOCIATES

Monroe Auto Salvage
Monroe, WA

Log of Monitoring Well P4-MW

Figure
A-10

P5-MW

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Depth (ft) | Sample Number & Interval | Sampler Type | Blows/Foot | Test Data | Graphic Symbol | USCS Symbol

Drilling Method: Geoprobe™

Ground Elevation (ft): _____

Water Level

Monitoring Well Detail
(DOE#: BKX 644)

2.25 in

0
5
10
15
20
25
30
35
40

-For approximate lithology see log of P-5

ATD

Flush-mounted monument with locking cap

1-inch diameter, Schedule 80, PVC well casing

Bentonite chips

6/9 Colorado sand pack

1-inch diameter, Schedule 80, PVC screen (0.010-inch slot size)

Threaded end cap

Boring Completed 08/10/18
Total Depth of Boring = 35.0 ft.

Monitoring Well Completed 08/10/18

DRAFT

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

LANDAU ASSOCIATES

Monroe Auto Salvage
Monroe, WA

Log of Monitoring Well P5-MW

Figure
A-11

APPENDIX B

Analytical Laboratory Reports

August 27, 2018

Mr. Cody Johnson
Landau Associates, Inc.
130 - 2nd Ave. S.
Edmonds, WA 98020

Dear Mr. Johnson,

On August 22nd, 3 samples were received by our laboratory and assigned our laboratory project number EV18080123. The project was identified as your Monroe Auto Salvage - 1759001.010.011. The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Rick Bagan
Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

Environmental www.alsglobal.com
RIGHT SOLUTIONS RIGHT PARTNER

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Landau Associates, Inc. 130 - 2nd Ave. S. Edmonds, WA 98020	DATE: ALS JOB#: ALS SAMPLE#:	8/27/2018 EV18080123 EV18080123-01
CLIENT CONTACT:	Cody Johnson	DATE RECEIVED:	08/22/2018
CLIENT PROJECT:	Monroe Auto Salvage - 1759001.010.011	COLLECTION DATE:	8/17/2018 3:30:00 PM
CLIENT SAMPLE ID	P-5-180817	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Arsenic	EPA-200.8	**1.6**	1.0	1	UG/L	08/24/2018	RAL
Zinc	EPA-200.8	**69**	2.5	1	UG/L	08/24/2018	RAL
Arsenic (Dissolved)	EPA-200.8	U	1.0	1	UG/L	08/24/2018	RAL
Zinc (Dissolved)	EPA-200.8	**20**	2.5	1	UG/L	08/24/2018	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

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CERTIFICATE OF ANALYSIS

CLIENT:	Landau Associates, Inc. 130 - 2nd Ave. S. Edmonds, WA 98020	DATE: ALS JOB#: ALS SAMPLE#:	8/27/2018 EV18080123 EV18080123-02
CLIENT CONTACT:	Cody Johnson	DATE RECEIVED:	08/22/2018
CLIENT PROJECT:	Monroe Auto Salvage - 1759001.010.011	COLLECTION DATE:	8/22/2018 11:15:00 AM
CLIENT SAMPLE ID	P-4-180822	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Diesel Range (C12-C24)	NWTPH-DX	U	130	1	UG/L	08/23/2018	EBS
TPH-Oil Range (C24-C40)	NWTPH-DX	**3700**	250	1	UG/L	08/23/2018	EBS
Arsenic	EPA-200.8	**15**	1.0	1	UG/L	08/24/2018	RAL
Zinc	EPA-200.8	**39**	2.5	1	UG/L	08/24/2018	RAL
Arsenic (Dissolved)	EPA-200.8	**14**	1.0	1	UG/L	08/24/2018	RAL
Zinc (Dissolved)	EPA-200.8	**8.2**	2.5	1	UG/L	08/24/2018	RAL

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
C25	NWTPH-DX	**122**	08/23/2018	EBS

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains lube oil.

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CERTIFICATE OF ANALYSIS

CLIENT:	Landau Associates, Inc. 130 - 2nd Ave. S. Edmonds, WA 98020	DATE: ALS JOB#: ALS SAMPLE#:	8/27/2018 EV18080123 EV18080123-03
CLIENT CONTACT:	Cody Johnson	DATE RECEIVED:	08/22/2018
CLIENT PROJECT:	Monroe Auto Salvage - 1759001.010.011	COLLECTION DATE:	8/22/2018 1:25:00 PM
CLIENT SAMPLE ID	P-3-180822	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Arsenic	EPA-200.8	U	1.0	1	UG/L	08/24/2018	RAL
Zinc	EPA-200.8	**52**	2.5	1	UG/L	08/24/2018	RAL
Arsenic (Dissolved)	EPA-200.8	U	1.0	1	UG/L	08/24/2018	RAL
Zinc (Dissolved)	EPA-200.8	**37**	2.5	1	UG/L	08/24/2018	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

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CERTIFICATE OF ANALYSIS

CLIENT:	Landau Associates, Inc. 130 - 2nd Ave. S. Edmonds, WA 98020	DATE: ALS SDG#: WDOE ACCREDITATION:	8/27/2018 EV18080123 C601
CLIENT CONTACT:	Cody Johnson		
CLIENT PROJECT:	Monroe Auto Salvage - 1759001.010.011		

LABORATORY BLANK RESULTS

MB-082218W - Batch 131813 - Water by NWTPH-DX

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
TPH-Diesel Range (C12-C24)	NWTPH-DX	U	UG/L	130	08/23/2018	EBS
TPH-Oil Range (C24-C40)	NWTPH-DX	U	UG/L	250	08/23/2018	EBS

U - Analyte analyzed for but not detected at level above reporting limit.

MB-082318W - Batch 131809 - Water by EPA-200.8

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Arsenic	EPA-200.8	U	UG/L	1.0	08/24/2018	RAL
Zinc	EPA-200.8	U	UG/L	2.5	08/24/2018	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

MB-082318W - Batch 131869 - Water by EPA-200.8

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Arsenic (Dissolved)	EPA-200.8	U	UG/L	1.0	08/24/2018	RAL
Zinc (Dissolved)	EPA-200.8	U	UG/L	2.5	08/24/2018	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

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ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Landau Associates, Inc. 130 - 2nd Ave. S. Edmonds, WA 98020	DATE: ALS SDG#: WDOE ACCREDITATION:	8/27/2018 EV18080123 C601
CLIENT CONTACT:	Cody Johnson		
CLIENT PROJECT:	Monroe Auto Salvage - 1759001.010.011		

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: 131813 - Water by NWTPH-DX

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
TPH-Diesel Range (C12-C24) - BS	NWTPH-DX	**83.7**			67	125.2	08/23/2018	EBS
TPH-Diesel Range (C12-C24) - BSD	NWTPH-DX	**88.3**	**5**		67	125.2	08/23/2018	EBS

ALS Test Batch ID: 131809 - Water by EPA-200.8

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Arsenic - BS	EPA-200.8	**102**			89.1	110	08/24/2018	RAL
Arsenic - BSD	EPA-200.8	**100**	**2**		89.1	110	08/24/2018	RAL
Zinc - BS	EPA-200.8	**105**			88.2	111	08/24/2018	RAL
Zinc - BSD	EPA-200.8	**102**	**3**		88.2	111	08/24/2018	RAL

ALS Test Batch ID: 131869 - Water by EPA-200.8

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Arsenic (Dissolved) - BS	EPA-200.8	**102**			89.1	110	08/24/2018	RAL
Arsenic (Dissolved) - BSD	EPA-200.8	**100**	**2**		89.1	110	08/24/2018	RAL
Zinc (Dissolved) - BS	EPA-200.8	**105**			88.2	111	08/24/2018	RAL
Zinc (Dissolved) - BSD	EPA-200.8	**102**	**3**		88.2	111	08/24/2018	RAL

APPROVED BY

Laboratory Director

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ALS ENVIRONMENTAL

Sample Receiving Checklist

Client: Landau Associates ALS Job #: EV1808012 3

Project: Monroe Auto Salvage

Received Date: 8/22/18 Received Time: 1550 By: RB

Type of shipping container: Cooler X Box ___ Other ___

Shipped via: FedEx Ground ___ UPS ___ Mail ___ Courier ___ Hand Delivered X
FedEx Express ___

	Yes	No	N/A
Were custody seals on outside of shipping container?	___	X	___
If yes, how many? ___ Where? ___			
Custody seal date: ___ Seal name: ___			
Was Chain of Custody properly filled out (ink, signed, dated, etc.)?	X	___	___
Did all bottles have labels?	X	___	___
Did all bottle labels and tags agree with Chain of Custody?	X	___	___
Were samples received within hold time?	X	___	___
Did all bottles arrive in good condition (unbroken, etc.)?	X	___	___
Was sufficient amount of sample sent for the tests indicated?	X	___	___
Was correct preservation added to samples?	X	___	___

If no, Sample Control added preservative to the following:

Sample Number	Reagent	Analyte

Were VOA vials checked for absence of air bubbles?	___	___	X
Bubbles present in sample #: ___			

Temperature of cooler upon receipt: 3.9 °C On Ice (Cold) Cool Ambient N/A

Explain any discrepancies: ___

Was client contacted? ___ Who was called? ___ By whom? ___ Date: ___

Outcome of call: ___

LANDAU ASSOCIATES

- [x] **Seattle/Edmonds** (425) 778-0907
- [ ] **Tacoma** (253) 926-2493
- [ ] **Spokane** (509) 327-9737
- [ ] **Portland** (503) 542-1080
- [ ] _____

Chain-of-Custody Record

Date 8/22/18

Page 1 of 1

EV1808O123

Project Name Monroe Auto Salvage Project No. 175900I.010.011

Project Location/Event Monroe WA / phase 2 2018

Sampler's Name Melissa DiLoreto

Project Contact Cody Johnson

Send Results To Cody Johnson & Dani Jorgensen

Testing Parameters

	Sample I.D.	Date	Time	Matrix	No. of Containers	NWTPH-Dx	dissolved zinc (200.8)*	total zinc (200.5)*	dissolved Arsenic*	total Arsenic*
1	P-5-180817	8/17/18	1530	AQ	2		X	X		
2	P-4-180822	8/22/18	1115	AQ	3	X	X	X		
3	P-3-180822	8/22/18	1325	AQ	2		X	X		

Turnaround Time
- [ ] Standard
- [x] Accelerated — Mon 08/27/18 @ 12:00

Observations/Comments
- [x] Allow water samples to settle, collect aliquot from clear portion
- [ ] NWTPH-Dx - run acid wash silica gel cleanup
- [ ] Analyze for EPH if no specific product identified

VOC/BTEX/VPH (soil):
- [ ] non-preserved
- [ ] preserved w/methanol
- [ ] preserved w/sodium bisulfate
- [ ] Freeze upon receipt
- [ ] Dissolved metal water samples field filtered

Other * dissolved zinc FIELD FILTERED, please centrifuge

Cody added Total + dissolved Arsenic on 8/23/18

Special Shipment/Handling or Storage Requirements: on ice

Method of Shipment: delivered to lab

Relinquished by	Received by	Relinquished by	Received by
Signature: Melissa DiLoreto	Signature: Rick Bgm	Signature:	Signature:
Printed Name: Melissa DiLoreto	Printed Name: Rick Bgm	Printed Name:	Printed Name:
Company: Landau Associates	Company: ALS	Company:	Company:
Date: 8/22/18 Time: 1550	Date: 8/22/18 Time: 15:50	Date: Time:	Date: Time:

WHITE COPY - Project File YELLOW COPY - Laboratory PINK COPY - Client Representative

12/2014

TO BE COMPLETED BY APPLICANT

EVALUATION FOR
AGENCY USE ONLY

City of Monroe
806 West Main Street, Monroe, WA 98272
Phone (360) 794-7400 Fax (360) 794-4007
www.monroewa.gov

SEPA ENVIRONMENTAL CHECKLIST

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for applicants:

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for Lead Agencies:

Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals:

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

A. BACKGROUND

1. Name of proposed project, if applicable:

   River's Edge Apartment Community/Affordable Housing Project

2. Name of applicant:

   Rivers Edge WA, LLLP – Rebecca Ralston

3. Address and phone number of applicant and contact person:

   909 5th Ave, Suite 2401, Seattle WA 98164

   206-351-9941

4. Date checklist prepared:

   01/15/2019

5. Agency requesting checklist:

   City of Monroe, WA

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

   Construction to start summer of 2019

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

   N/A

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

Critical Area Study and Restoration Plan

Geotechnical Report

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

Not Known

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

Shoreline Substantial Development Permit and Shoreline Variance

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

This project proposes to construct a 166 unit affordable housing complex with associated access, parking and management office on 8.6686+/- AC. In addition frontage improvements are proposed along E Fremont St/S Ann St and Simons Road.

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

Located in Snohomish County, Washington and Specifically in the City of Monroe. Parcel No. 00456000001100, 27070600302300, 27070600300600 27070600300700, 27070600303300, 27070600300500. More Generally, the Site is located in the SW quarter of Township 27, Section 06 and Range 07.

B. ENVIRONMENTAL ELEMENTS

1. Earth

A. General description of the site
(Circle one): Flat, rolling, hilly, steep slopes, mountainous,
other:

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

About 50%

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.

Deltaic outwash and kame delta deposits. Outwash consists of loose cobble gravel to pebbly sand, moderately to well sorted and bedded. Outwash is underlain by dense/stiff older pre-Vashon Alluvium, known as the Olympia Beds. This material may consist of sand, silt, clay, gravel, cobbles, organic silts, and minor peat.

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

Signs of slope instability were observed at the southeastern portion of the site. A more in depth analysis will be prepared, and/or any necessary slope stability mitigation.

E. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.

Earthwork activities consist of excavation and removal of deleterious material, subgrade preparation, and utility excavation. Earthwork will be balanced on-site with approx. 6,500 CY of cut and fill.

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

Yes, but with appropriate BMP devices, these will minimize any construction impacts.

G. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt, or buildings)?

Approx. 40%

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

Silt Fence and other BMP's will be used for erosion control.

2. Air

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known:

Temporary exhaust from construction vehicles during onsite construction

Intermittent passenger vehicle exhaust, lawn mower (or similar) exhaust

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

No.

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

None during initial construction

None during or after construction

3. Water

a. Surface Water:

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.

The site is located approx. 1,200 feet NW of the Skykomish River. Woods Creek flows along the east side of the site, meeting the Skykomish River approx. 0.5 miles downstream to the south of the site.

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.

Yes, See site plan.

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

None

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

No.

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

The southeastern portion of the site is within the 100-year floodplain of the Skykomish River Watershed.

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

No.

b. Ground Water:

1) Will ground water 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.

N/A

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.

N/A

c. Water runoff (including stormwater):

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

Stormwater runoff will be collected and routed to infiltration facilities, overflow will discharge to an existing 24" pipe, which flows into Woods Creek, and ultimately into the Skykomish River.

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

Generally, no. Closed pipes carry sanitary sewage into the City sewer lines. Stormwater runoff from the site will pipe to stormwater infiltration facilities to treat stormwater prior to releasing into the existing storm system.

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

Stormwater runoff from the site will be collected and routed to infiltration facilities which will provide the required flow control and water quality mitigation. In an overall sense, existing drainage patterns will be maintained.

4. Plants

a. Check types of vegetation found on the site:

_X_deciduous tree: alder, maple, aspen, other
_X_evergreen tree: fir, cedar, pine, other
_X_shrubs
_X_grass
____pasture
____crop or grain
____ Orchards, vineyards or other permanent crops.
_X_ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
____water plants: water lily, eelgrass, milfoil, other
_X_other types of vegetation

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

Restoration of 16,178 SF of gravel area (area of historic disturbance), debris Removal within the 54,708 SF area between Woods Creek and the area of Historic disturbance, invasive species removal within the same 54,708 SF area.

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

Woods Creek provides habitat for threatened and endangered species (Chinook, Bull trout). Woods Creek is also classified as a fish and wildlife habitat Conservation area.

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

Native planting where invasive species are removed from the 54,708 SF area Between Woods Creek and the area of historic disturbance. Restoration of 16,178 SF of gravel area, debris removal/invasive species removal. Split rail Fence along the perimeter of the restored areas.

e. List all noxious weeds and invasive species known to be on or near the site.

Invasive species within hillslope.

5. Animals

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site. Examples include:

birds: hawk, heron, eagle, songbirds, other:
mammals: deer, bear, elk, beaver, other:
fish: bass, salmon, trout, herring, shellfish, other _____

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

Chinook, bull trout

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

Yes, Woods Creek is a migration route for multiple fish species.

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

Buffer restoration of the historically disturbed area, restoration on the hillslope and installation of a split rail fence along the perimeter of the restored area.

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.

Energy use will be consistent with typical multi-family buildings, and machines used during construction.

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

No

d. 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:

See proposed building plans for specifics.

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.

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:

N/A

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.

Onsite use of fuel trucks providing diesel or gasoline for construction uses. A spill control plan is standard for all building and grading permits.

4) Describe special emergency services that might be required.

Not Known

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

It is assumed that City inspectors will enforce laws that control health hazards during construction.

b. **Noise**

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

None known

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

Short term: Construction vehicles, powered equipment, hand tools

Long term: Car exhaust noise, powered lawn maintenance equipment, garbage Trucks, delivery trucks (similar to other multi-family developments).

4) Proposed measures to reduce or control noise impacts, if any:

Local noise ordinances per City of Monroe municipal code.

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 current site has been used for industrial purposes. The surrounding properties are a mix of commercial, residential, and industrial.

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 as a result 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 nonforest use?

N/A

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:

N/A

c. Describe any structures on the site.

Structures on site include a number outbuildings used for various industrial purposes.

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

All onsite structures will be removed.

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

Downtown Commercial

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

Downtown Commercial

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

N/A

h. Has any part of the site been classified as a critical area by the city or county? If so, specify.

Flooding, Seismic Hazard, and steep slope

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

Assuming 2 persons per unit. 118 units proposed, approx. 250 will reside in the completed project.

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

None.

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

N/A

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

Site Design per local zoning code

m. . Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any:

N/A

9. Housing

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

118 Affordable Housing units

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

None

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

None

10. Aesthetics

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

Max. height allowed by local code, wood, hardplank siding or other material

Allowed by building codes.

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

None.

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

Local review by City to meet local visual standards

11. Light and Glare

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

None

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:

None

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?

Two on-site areas have been proposed for recreational space totaling approx. 6,800 SF. There are two potential areas near the NE corner of the site totaling approx. 11,600 SF. Additionally, 90 acres of open space (Al Borlin Park) is adjacent to the east of the site.

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:

None

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 located on or near the site? If so, specifically describe.

None known

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.

Local knowledge

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.

None

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.

Site access will be off E Fremont St/S Ann Street, and Simons Road.

See Site Plan

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.

There is no public transit stop in the vicinity. However, there is a bus stop approx. a quarter of a mile away at the intersection of Main St and Route 2

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

The project is proposing 202 parking spaces. Currently, there is no on-site parking.

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).

If so, generally describe (indicate whether public or private).

The project proposes public frontage improvements to E Fremont St/S Ann St and Simons Rd along within the ROW adjacent to the site.

e. Will the project or proposal 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 nonpassenger vehicles). What data or transportation models were used to make these estimates?

Not known

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:

None

15. Public Services

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

Yes, there will be an increased need for all public services upon completion of the development

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

None

16. Utilities

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

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

Electricity – Snohomish County PUD

Gas – Puget Sound Energy

Water – City of Monroe

Garbage – Republic Services

Telephone – Comcast

Sewer – City of Monroe

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: _____

Name of signee _____Valerie Gooding_____

Position and Agency/Organization ___Civil Engineer – Core Design, Inc._____

Date Submitted: _____

D. **SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS**

(**IT IS NOT NECESSARY** to use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

Proposed measures to avoid or reduce such increases are:

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

Proposed measures to protect or conserve plants, animals, fish, or marine life are:

3. How would the proposal be likely to deplete energy or natural resources?

Proposed measures to protect or conserve energy and natural resources are:

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

Proposed measures to protect such resources or to avoid or reduce impacts are:

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

Proposed measures to avoid or reduce shoreline and land use impacts are:

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

Proposed measures to reduce or respond to such demand(s) are:

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

EXHIBIT 19

Cultural Resource Consultants

TECHNICAL MEMO 1901H-1

DATE: February 13, 2019

TO: Rebecca Ralston
River's Edge WA LLLP

FROM: Margaret Berger, Principal Investigator

RE: Cultural Resources Assessment for the River's Edge Project, Monroe, Snohomish County, Washington

DAHP PROJECT: 2018-11-09032

The attached short report form constitutes our final report for the above referenced project. Background research and field investigations did not result in the identification of any precontact archaeological resources within the project location. Two historic structures and one historic archaeological site were identified, recorded, and evaluated for listing on historic register. These are recommended not eligible for historic register listing. No further cultural resources investigations are recommended. A detailed inadvertent discovery protocol should be in place for construction efforts. Please contact our office should you have any questions about our findings and/or recommendations.

1416 NW 46th St., STE 105 PMB 346 Seattle, WA 98107
PHONE 206 855-9020 - info@crcwa.com

CULTURAL RESOURCES REPORT COVER SHEET

Author: Jessica Gardner and Sonja Kleinschmidt

Title of Report: Cultural Resources Assessment for the River's Edge Project, Monroe, Snohomish County, Washington

Date of Report: February 13, 2019

County(ies): Snohomish Section: 06 Township: 27N Range: 07E

Quad: Monroe, WA Acres: 9.64

PDF of report submitted (REQUIRED) ☐ Yes

Historic Property Inventory Forms to be Approved Online? ☒ Yes ☐ No

Archaeological Site(s)/Isolate(s) Found or Amended? ☒ Yes ☐ No

TCP(s) found? ☐ Yes ☒ No

Replace a draft? ☐ Yes ☒ No

Satisfy a DAHP Archaeological Excavation Permit requirement? ☐ Yes # ☒ No

Were Human Remains Found? ☐ Yes DAHP Case # ☒ No

DAHP Archaeological Site #:
Temporary #692565

_____
_____
_____
_____
_____
_____
_____

- Submission of PDFs is required.
- Please be sure that any PDF submitted to DAHP has its cover sheet, figures, graphics, appendices, attachments, correspondence, etc., compiled into one single PDF file.
- Please check that the PDF displays correctly when opened.

Cultural Resources Assessment for the River's Edge Project, Monroe, Snohomish County, Washington

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Management Summary

This report describes the cultural resources assessment for the River's Edge Project, Monroe, Snohomish County, Washington. River's Edge WA LLLP requested a cultural resources assessment prior to ground disturbing activities associated with the construction of a multi-family apartment community in Monroe. Anticipated depths of disturbance will be typically be 4 feet below buildings and 7 feet in two 60 foot long segments for slope stability. This assessment was developed to identify any archaeological or historic sites in the project location and to evaluate the potential for the project to affect cultural resources.

Assessment methods conducted by Cultural Resource Consultants, LLC (CRC) included background research, communication with local tribes, and photo-documentation of existing structures and field conditions. No concern regarding the project has been received to date form local tribes. Geotechnical records demonstrate that the project has been filled historically with fill extending up to 24 feet below ground surface with the deepest deposits along the edge of Woods Creek, also indicating that the project was likely historically sloped. Native soils below fill are glacial in origin indicating that intact precontact cultural deposits would be found at or near the natural ground surface. Based on geotechnical findings, it is anticipated that much of the project disturbance will be contained within fill deposits.

Background research did not identify any previously recorded cultural resources in the project location. The project has been subject to river channel migration, logging, and light industrial development historically. Field investigation identified one historic archaeological site, the ruins of an early 1900s garage (Temporary #692565), and two historic structures, built in the early 1900s (#718333 and #718337). These resources were documented and evaluated for listing on historic registers but do not appear eligible for listing. Three additional structures with no listed build dates on the County Assessor website, notations on historic maps, or visibility in aerial imagery were identified in the project and are therefore not considered historic. Much of the historic infrastructure that had been present in the project has been removed over the decades.

Based on archival research, the project appears to have a lower probability to contain as-yet unrecorded, significant archaeological deposits. Excavation is anticipated to be relatively shallow and contained primarily in fill deposits, indicating that historic era material or deposits would be more likely to be found. The significance of these to history would be dependent upon the nature and context of their discovery. CRC recommends that the project proceed as planned and a detailed inadvertent discovery protocol be in place during construction.

1.0 Administrative Data

1.1 Overview

Report Title: Cultural Resources Assessment for the River's Edge Project, Monroe, Snohomish County, Washington

Author (s): Jessica Gardner and Sonja Kleinschmidt

Report Date: February 13, 2019

Location: The project is located at 147 S Ann Street in Monroe, Snohomish County, Washington.

Legal Description: The legal description for the project is Section 6, Township 27 North, Range 07 East, W. M. The project consists of six adjoining parcels, Snohomish County Parcel Numbers 27070600-302300, -300600, -300700, -303300, -300500, and 00465000001100.

USGS 7.5' Topographic Map(s): Monroe, WA (Figure 1).

Total Area Involved: 9.64 acres.

Regulatory Nexus: City of Monroe; Washington State Environmental Policy Act (SEPA).

1.2 Research Design

This assessment was developed as a component of preconstruction environmental review with the goal of preventing cultural resources from being disturbed during construction of the proposed project by identifying the potential for any as-yet unrecorded archaeological or historic sites within the project. CRC's work was intended, in part, to assist in addressing state regulations pertaining to the identification and protection of cultural resources (e.g., RCW 27.44, RCW 27.53, RCW 68.60). The Archaeological Sites and Resources Act (RCW 27.53) prohibits knowingly disturbing archaeological sites without a permit from the Washington State Department of Archaeology and Historic Preservation (DAHP), the Indian Graves and Records Act (RCW 27.44) prohibits knowingly disturbing Native American or historic graves, and the Abandoned and Historic Cemeteries and Historic Graves Act (RCW 68.60) calls for the protection and preservation of historic era cemeteries and graves. This project is seeking permitting from the City of Monroe and is subject to SEPA.

SEPA provides a way to identify possible environmental impacts that may result from governmental decisions. These decisions may be related to issuing permits for private projects, constructing public facilities, or adopting regulations, policies or plans. Information provided during the SEPA review process helps agency decision-makers, applicants, and the public understand how a proposal will affect the environment. This information can be used to change a proposal to reduce likely impacts, or to condition or deny a proposal when adverse environmental impacts are identified. During the review process, DAHP requested a cultural resources survey (Attachment A).

CRC's investigations consisted of review of available project information and correspondence provided by the project proponent, local environmental and cultural information, and historical maps; and field investigations. On January 29, 2019, CRC contacted tribal cultural resource staff members on a technical staff-to-technical staff basis at the Snohomish, Snoqualmie, Stillaguamish, and Tulalip tribes to determine if they had any concerns regarding the project location or information not available in published literature (Attachment B). This correspondence was not intended to be or replace formal government-to-government consultation. The Stillaguamish Tribe responded that they did not have specific concerns at this time and the Snoqualmie Tribe responded that they would like to be on site during field investigations. Site coordination was made with a representative of the Snoqualmie Tribe but they were not able to attend the site visit. Any additional information made available subsequent to the submission of this report will be included in a revision of this report. This assessment utilized a research design that considered previous studies, the magnitude and nature of the undertaking, the nature and extent of potential effects on historic properties, and the likely nature and location of historic

properties within the project, as well as other applicable laws, standards, and guidelines (per 36CFR800.4 (b)(1)) (DAHP 2018).

1.3 Project Description

River's Edge is a proposed 166-unit multi-family apartment community. The project will be income restricted to residents earning no more than 60 percent of the area median income for Snohomish County. The community will consist of 1, 2, and 3-bedroom units. The project will be built to the Evergreen Standard ensuring quality materials and standards, energy efficiency, and water conservation, Project amenities include a nature trail, community garden, children's play area, and community room with kitchen for resident activities. The development will include cleanup of contaminated soils and restoration of critical slope area by eliminating invasive species and partial revegetation with indigenous species.

For the purposes of this assessment, the area of impact for cultural resources (hereafter, "the project location") is understood to be the area described above and depicted in Figures 1 – 2.

2.0 Background Research

2.1 Overview

Background research was conducted in January and February 2019.

Recorded Cultural Resources Present: Yes [ ] No [x]

Context Overview: The context presented here summarizes environmental, ethnographic, historical, and archaeological information presented in local cultural resource reports by reference; archaeological and historic data from DAHP and the Washington Information System for Architectural and Archaeological Records Data (WISAARD) records search; ethnographic resources; geological and soils surveys (e.g., USDA NRCS 2019; WA DNR 2019); and historical maps and documents from Bureau of Land Management United States Surveyor General (USSG) Land Status & Cadastral Survey Records database, HistoryLink, Historic Map Works, HistoricAerials (NETR 2019), University of Washington's Digital Collection, Washington State University's Early Washington Maps Collection, county assessor website, and in CRC's library. The following discussion of project area geology, archaeology, history, and ethnography incorporates context information from prior cultural resource studies conducted in the Monroe area (e.g., Rinck 2013).

2.2 Environmental Context

Overview: The project is an approximately 9.64 acre parcel located on the east edge of the downtown of Monroe, Washington. Monroe is located in a Holocene era river valley (Booth 1990a). It is situated on a slight rise above the north bank of the Skykomish River. The project is within the Tualco Valley and is 3.88 miles (6.24 km) east-northeast of the confluence of the Skykomish and Snoqualmie rivers, which form the Snohomish River. The approximate elevation of the project is 70 feet above sea level. Woods Creek borders the project to the southeast and the Skykomish River is .26 mile (.42 km) southeast of the project. Previous geotechnical testing in the project location shows imported fill above glacial outwash and older alluvium (AESI 2018). The project appears to have been historically used for light industrial purposes.

Recent geotechnical investigations describe the project as follows:

> … the property is a gravel-surfaced lot with storage containers, some relatively small areas of concrete paving and loading docks, several single-story commercial buildings, and miscellaneous equipment, trucks, and materials. The topography of the site is relatively flat, except along its southeast margin where it slopes steeply down toward Woods Creek. Based on review of a provided survey, the height of the steep slopes ranges from approximately 12 to 32 feet. [AESI 2018:2]

Geomorphology: The landscape of northwest Washington is a product of crustal deformation initiated by the Cascadia subduction zone; successive glacial scouring and deposition most recently during the Pleistocene; and landslides, erosion and deposition, and human activity during the Holocene (Troost and Booth 2008). The project is within the Willamette-Puget Lowland physiographic province characterized by the wide "trough" between the Coast and Cascade Ranges formed during the advance and retreat of Pleistocene epoch glaciers (Franklin and Dyrness 1973; McKee 1972). During the Late Pleistocene or last glacial period (110,000 to 12,000 years BP), the Cordilleran ice sheet covered much of the American northwest and scoured the landscape during advance and retreat episodes initiated by localized climate fluctuations.

The most recent glaciation was the Vashon Stade of the Fraser glaciation during which the Puget Lobe entered northwest Washington around 17,000 years BP (Thorson 1980). This final episode scoured the landscape producing moraine features and topographic lows prior to its recession. The Puget Lobe reached the vicinity of present-day Seattle by about 14,500 years BP achieving its maximum extent, approximately 10 to 15 miles south of Olympia, by 14,000 years BP (Booth et al. 2003; Franklin and Dyrness 1973). The onset of climatic warming caused the ice sheets to retreat to the north and began the transition into the Holocene. The Puget Lobe retreated past Seattle by 13,600 years BP (Booth et al. 2003). As the glacier retreated a series of successively lower drainages formed draining the meltwaters until the valley was devoid of ice and the river could establish itself (Bethel 2004).

After the ice sheet retreated and glacial meltwaters subsided, the landscape within the glaciated area was barren, devoid of vegetation, surficial organic soil horizons, and a drainage system that met the needs of the new landscape leaving the landscape highly susceptible to erosion (Bethel 2004). The post-glacial landscape was incised with ravines, alluvial fans formed at the base of steep slopes, which were also undercut by stream incision causing massive landslide in sections that failed. Water, sediment, and organic matter collected in depressions forming lakes, wetlands, and alluvial lowlands.

The project is located within the Tualco Valley, where the Skykomish and Snoqualmie Rivers converge to become the Snohomish River. The Skykomish and Snoqualmie Rivers originate from westward flowing drainage of the Cascade Mountains. The north and south forks of the Skykomish River converge in the vicinity of Index before flowing 20 miles west-ward in a relict trough at the base of steeper uplands to the south (Booth et al. 2003). The three forks of the Snoqualmie River converge in the vicinity of North Bend/Snoqualmie before flowing over the Snoqualmie Falls and entering the north-south trending glacially carved trough that characterizes the lower 40 miles of the river (Bethel 2004). The rivers combine to form the Snohomish River, which flows northwest through a wide trough characterized by wetlands and sloughs before emptying into the Puget Sound. The river valleys are primarily open farmland and wetlands surrounded by forested uplands and farmland plateaus, interspersed by streams and creeks, and punctuated with small lakes.

Mapped Surface Geologic Unit(s): Surface geology within the project is mapped as Qyal, alluvium (Holocene) (Booth 1990a). This unit is described as:

> Moderately sorted deposits of cobble gravel to pebbly sand along rivers and streams. Generally unvegetated surfaces; gradational with both units Qf [alluvial fan deposits (Holocene)] and Qb [bog deposits (Holocene)]. [Booth 1990a]

Alluvium within the Skykomish River channel is generally recently transported sand and gravels with Holocene deposits indicated by the presence of Mazama or Mount St. Helens ash deposits (Booth 1990b; Tabor et al. 1993a, b). The lower Snoqualmie overbank deposits consist of mud, peat, and buried logs.

Mapped Soil Unit(s): The soils mapped in the project location consist primarily of Sultan silt loam with Pilchuck loamy sand present along Woods Creek (USDA NRCS 2019). Sultan silt loam forms on floodplains from a parent material of alluvium in shallow floodplains of the Skykomish River. It consists of ashy silt loam from 0 to 12 inches, silty clay loam from 12 to 42 inches, and stratified sand to silt loam from 42 to 60 inches below surface. This soil is moderately well drained with the water table typically present between 25 to 48 inches below the surface. It is classified as prime farmland.

Pilchuck loamy sand forms in flood plains from a parent material of alluvium in fast moving flood waters along the Skykomish River (USDA NRCS 2019). It consists of loamy sand from 0 to 31 inches, fine sand from 31 to 50 inches, and gravelly sand from 50 to 60 inches below surface. It is considered somewhat excessively drained and is considered prime farmland if it is irrigated and protected from flooding during the growing season.

Geotechnical Investigations: The project locations had previously undergone geotechnical investigations before AESI completed investigations in 2018. As summarized by AESI (2018:2),

> Previous subsurface exploration completed at the site by others indicates that much of the site is underlain by fill ranging in thickness from approximately 0.5 feet to in excess of 15 feet. An area in the east-northeast portion of the site is known to be underlain by fill containing wood waste and miscellaneous debris. The area underlain by this fill has been interpreted to extend onto a portion of the steep slope. The natural sediments underlying the fill have been identified by others as glacial outwash and older, potentially pre-Fraser-aged alluvium. Based on the existing exploration data, the depth to groundwater beneath the upper, relatively flat portion of the site is approximately 22 feet.

Investigations completed by AESI (2018) included 17 exploration borings and 12 exploration pits (Figure 3). Sediments are described as 5 to 24 feet of fill above glacial recessional outwash and pre-glacial alluvial materials. Fill was thickest along the southeastern border adjacent to Woods Creek. Fill is described as:

> …loose to medium dense, fine to medium sand, with variable amounts of silt and gravel. The observed existing fill includes variable amounts of wood debris, construction debris such as bricks, and other organic material. Fill encountered in EB-2 to a depth of 24 feet consisted of loose wood waste material, likely associated with the previous timber operation onsite. [AESI 2018:4]

Vashon recessional outwash was described as "loose to medium dense, light brown to light brownish gray, fine to medium sand with variable amounts of silt and gravel" that had been

deposited by the meltwaters of the retreating ice sheet (AESI 2018:5). Pre-Fraser non-glacial deposits were described as "dense to very dense, gray to light brown, very silty fine sand and medium stiff to hard sandy silt, or silt with clay" that were laminated and contained variable amounts of organic material (AESI 2018:5). These sediments were observed directly below fill and the Vashon recessional outwash deposits between 25 and 31 feet below surface. Groundwater was encountered at depths ranging from 26 to 30 feet below the existing ground surface and seepage was generally observed within the Vashon glacial recessional outwash sediments.

2.3 Paleoclimate and Vegetation

The paleoclimate of the Pacific Northwest during the late Pleistocene and Holocene is defined by four periods, which exhibit general trends based on variations in temperature and moisture (Kopperl et al. 2016:37):

- Between 17,000 and 13,000 cal BP the region was characterized a drier and somewhat warmer climate.
- Between 13,000 and 7000 cal BP the region was characterized by higher temperatures, less precipitation, and more severe and more frequent summer droughts and colder winters than that of present.
- Around 7000 BP the regional climate transitioned to a cooler, moister regime, with temperatures near the range of the contemporary maritime climate found in most of coastal Puget Sound.
- Around 5,000 years ago the maritime climate was fully established. Since this time, smaller scale fluctuations have occurred (e.g., the Little Ice Age 500-100 cal BP).

Local climate fluctuations affected temperature and moisture levels in the region and consequently the adaptation of different plant communities during these episodic periods. Subsequent to glacial recession and the subsidence of meltwaters in the Puget Lowland, landforms stabilized and vegetation began to return (McKee 1972). The following is a synopsis of the localized changes in the plant communities as summarized from Kopperl et al (2016:37-38). Plant species that first emerged during the early Holocene included lodgepole pine, Sitka spruce, and western hemlock with open spruce-pine parkland in higher elevations until approximately 12,000 cal BP. Between 12,000–10,000 cal BP, climatic warming facilitated the establishment of trees at upper elevations in the North Cascades, while lowland forests were occupied by Douglas-fir, red alder, and bracken fern. Evidence of increased charcoal accumulations at this time suggests an increase in fire likely facilitated by the warmer, drier conditions. The period between 10,000 and 6000 cal BP is characterized by the warmest and driest conditions in Western Washington during the Holocene. During this time, subalpine parkland expanded into alpine tundra on the Olympic Peninsula; mixed conifer forests dominated higher elevations in the North Cascade Mountains; an increase in alder, bracken fir, and Douglas-fir pollen in lowland sites suggest an adaptation to warmer, drier conditions than have been observed either prior or subsequent to this time. Approximately 6000 cal BP marks the establishment of modern vegetation communities in Western Washington. During this time, lower elevations were characterized by western red cedar in conjunction with western hemlock in the maritime mixed conifer and alder forest, while Alaska cedar, mountain hemlock, and silver fir became established in the cooler, moister conditions of higher elevations.

2.4 Archaeological Context

Overview: Thousands of years of human occupation of the Puget Sound have been summarized in a number of archaeological, ethnographic, and historical investigations over the past several decades that provide a regional context for evaluating the project (e.g., Greengo 1983; Kopperl 2016; Larson and Lewarch 1995; Morgan 1999; Nelson 1990). Archaeological evidence suggests the presence of nomadic hunter-gatherers not long after glaciers retreated, meltwaters subsided, and landforms stabilized during the late Pleistocene to early Holocene. Following deglaciation, subsequent changes to landforms, climate, and vegetation influenced the available resources and, consequently, the spatial distribution of human activities. Similar to elsewhere, human land use was generally structured around the value of natural resources available in local environments including fresh water, terrestrial and marine food resources, forests, and suitable terrain.

Archaeological Chronologic Sequence: Regional studies have provided an archaeological and historical synthesis of approximately the last 12,000 years of human occupation in Puget Sound (see Carlson 1990; Nelson 1990; Wessen and Stilson 1987). These researchers (and others) have divided the prehistoric record for the Puget Sound region into three broad chronological categories: early (ca. 12,000-5,000 years Before Present [BP]), middle (5,000-1,000 years BP), and late (1,000-250 years BP). Each period is characterized by specific cultural changes in habitation sites, tool development and subsistence practices reflected in the archaeological record. The Puget Lowlands have yielded little evidence of human presence on the landscape dating to the late Pleistocene-early Holocene. The human culture during this period often referred to as Paleoindian, associated more with the Clovis culture, or Paleoarchaic, associated more with the Western Stemmed Tradition along the Pacific Coast of North America, has been complied from relatively few archaeological sites (Ames et al. 2016). Shell middens first appear in the archaeological record in the middle period, as do the first records of seasonal village sites (Carlson 1990; Nelson 1990; Wessen and Stilson 1987). The late period is characterized by an influx of exotic trade goods; bone, shell and antler tools begin to replace (or supersede) the small stone projectile points common in the early period. The first permanent village sites identified in the archaeological record date to this time period (Carlson 1990; Nelson 1990; Wessen and Stilson 1987).

2.5 Ethnographic Context

Traditional Territory: The project location is within the traditional territory of the Snohomish, Skykomish and Snoqualmie, three Southern Coast Salish peoples whose territories each extended to the area of Monroe (Suttles and Lane 1990). Southern Coast Salish settlements were often located on major waterways, river confluences, heads of bays, or inlets. Settlements include the use of permanent winter villages generally comprised of one to three multi-family plank houses made of cedar (Bruseth 1926) and temporary summer camps with access to food and plant resources. Resources ranged from marine based fish, shellfish, and waterfowl, to bulbs, tubers, and grasses available in the prairies, and wild game, berries, and plant life sourced in the uplands (Blukis Onat 1987; Suttles and Lane 1990).

Smith (1941:208-209) identifies three territories or groups associated with tribes in the vicinity of the project location. They are known as the

- Snohomish, *tᵘqwétl'babc* territory of the Snohomish River from Snohomish to Monroe, with a village below Monroe, two miles from the confluence of the Skykomish and Snoqualmie Rivers.
- Snoqualmie, *sàókwalbiuqʷ* territory of the Snoqualmie River.

- Snoqualmie, *stak'táledjabc* territory of the Skykomish River as far up as Sultan.

Ethnographic Place Names: Early ethnographers documented locations of villages and names of resource areas, water bodies, and other cultural or geographic landscape features from local informants. Knowledge of these features contributes to the broader archaeological context of the project location and the nature of the archaeology that may be encountered during this assessment. Named places and village sites tended to be located along major waterways, river confluences, and/or the mouths of streams and creeks.

Waterman (2001:177-181) identifies two place names within the vicinity of the project: *Sts^{3}olûlz*, the name of the Skykomish and Snoqualmie river confluence, and *Q^{w}lotc*, translated to mean a cooked or roasted surface, referencing a creek entering the Snoqualmie near a high rock. Two Snohomish village sites have been documented in the vicinity of Monroe (Tweddell 1974 in Daily 2019). These include *TAH'kw-tuh-tsid* located on the south bank of the Skykomish River approximately 2 miles southwest of Monroe and .5 mile west of Swiss Hall located along Tualco Loop Rd. This was a village location of the *s'doh-doh-HOHBSH* band and was in an area that was historically densely populated. The village included at least four or five longhouses, a potlatch house, and burial sites. The second village was known *as bus-AHDSH* located along the Skykomish River near the present-day bridge south of Monroe. The people here were also of the *s'doh-doh-HOHBSH* band.

2.6 Historical Context

Spanish explorers first visited the Northwest Coast in 1774 followed by British Royal Navy Captain George Vancouver and Lieutenant Peter Puget, who first explored the Puget Sound area, in 1792 (Marino 1990). By 1833, the Hudson's Bay Company established a presence in the Puget Sound region and stimulated development and economic intrigue in the region. After the United States government gained full control of the Puget Sound region in 1846, many settlers claimed land under the Donation Land Claim Act of 1850 which promoted homestead settlement in the Oregon Territory allowing individuals to claim 320 acres of land and married couples to claim 640 acres with the provision that they would cultivate the land for four consecutive years. The Washington Territory was organized in 1853 with Isaac I. Stevens appointed as the governor and ex officio superintendent of Indian affairs (Marino 1990). By the mid-1850s, Euro-American settlement in the region had drastically affected Native American people and their traditions. The United States government and local Tribal groups entered into a series of treaties. These treaties stated that signatory Tribes would cede their traditional lands to the United States government and settle within designated reservations. Signatory Tribes would retain rights of resource gathering in their usual and accustomed territory. The relocation of Native American peoples to reservations opened wide swaths of land for Euro-American settlement throughout the region. This in conjunction with the enactment of the Homestead Act of 1862, which afforded United States citizens the opportunity to claim 160 acres of surveyed government land, helped hasten the settlement of the American west and the Puget Sound region.

The history of Monroe and Snohomish County has been discussed in several sources (e.g., CoM 2015; MHS&M 2013; Rinck 2013; Robertson 2007a) and is summarized as follows. The earliest settlers to the valley arrived in 1860 when Henry McClurg set up a claim along the confluence of the Skykomish and Snoqualmie rivers. Salem Woods arrived the same year, setting up a claim on Woods Creek. By 1864, McClurg had moved his claim to Park Place, at what would become Monroe city center. Travel and trade in the valley typically involved the Snohomish to Monroe

Road, a ferry across the Skykomish, or steamboat travel between Snohomish and Sultan, but with the arrival of the Great Northern Railroad (GNRR) in 1893 came greater access to markets and additional settlers began to arrive. Settlers began harvesting lumber for wholesale or to be sold as shingles. Eventually timber resources shrank and became less lucrative, causing land owners to move to other trades, including lettuce agriculture and dairy herds. These market changes were also affected by the Panic of 1893, which brought the County Farm and Hospital (the Poor Farm) to the west side of Monroe. As societal values and needs changed, the Poor Farm was no longer useful and was converted into a hospital in 1925, for which it is still used today.

The Great Monroe Fire in 1901 destroyed the main city business block, leading to the establishment of a city water system. Monroe was incorporated in 1902, and in 1907 vied and won the rights to build the new reformatory located to the southwest of town. As the population of the region grew, so too did the transportation system. The GNRR established the Cherry Valley line to Tolt in 1911 that was situated along the west side of S Ann Street as it extended south from the city. In the same year, the Chicago, Milwaukee, St. Paul, and Pacific (Milwaukee Road) Railway established their southbound Cedar Falls line, leaving the GNRR mainline ~.3 mile east of the Cherry Valley Line. In 1937, this line was moved further west before being decommissioned in 1973. The new line connected to the GNRR mainline near the crossing of Woods Creek, northeast of the project, in order to accommodate a better approach with the mainline. Vehicular travel expanded in 1949 with the completion of US Highway 2 and in 1967 with the completion of Washington State Route 522.

Several Mills were established by the early 1900s, including at least three mills along Woods Creek. In 1893, a shingle mill, established by the Griffiths brothers, was built at the historical mouth Woods Creek and would later be known as Monroe Mill Company, located in the project (Pearsall 2013). The shingle mill was sold to S. A. Buck within a year (Pearsall 2013). By 1903, Buck was running both the shingle mill and supplying the city with water provided by a well on Buck Island (present-day Al Borlin Park) and pumped into the system through a facility close to the mill (Robertson 2007b). Monroe Mill Company is depicted within the project by 1905 with a GNRR spur line serving the property (Sanborn Map 1905). In 1897, the Stephens brothers built the Stephens Mill on Woods Creek, expanding in 1900 to what is now known as Wagner Lake, and sold to the operation to the Wagners, a father and son partnership, and the Wilsons, two brothers, in 1906 (MHS&M 2017; Robertson and Wojciechowski 2013). August Holmquist built a mill on the east side of Woods Creek, upriver of Monroe Mill Company in 1898, incorporating as the Woods Creek Mill Co in 1908 (Robertson and Boyes 2009). Homesteaders along Woods Creek often used the creek to transport logs and shingles to mills and operations further downstream (Pearsall 2013).

The Monroe Steam Laundry was operated at the southeast corner of S Ann Street and Fremont Street, servicing local logging camps weekly (Monroe Laundry Company 2019; Sanborn 1908). The laundry was established by E. Harris and W. M. Knepp, who leased the property from, and used the steam power provided by, the Monroe Mill Company. The laundry company was sold to R. J. Scott in 1908, who changed to electric engine power in 1920. The laundry company and building were expanded in 1930 when Lon and Earl Heifort purchased the company and added a dry cleaning service. According to the Monroe Laundry Company (2019) “there is no record of a Monroe Laundry in 1953.”

By 1905 the land to the west of the project had been subdivided, with varying residential and commercial uses throughout the early 1900s (Sanborn 1905, 1913b). In 1908, the Pacific Coast Condensed Milk Company built their plant to condense Carnation Milk products, just north of the project location. By 1912 the manufacturer had changed production to the milk protein casein before the facility closed in 1929. The factory was destroyed by fire in 1944.

As summarized by Rinck (2013:17-18),

> Monroe grew slowly, throughout the 1940s, 1950s, and 1960s. In 1941, the first fair was held at the County Poor Farm. The fair resumed after World War II and it remains an important part of the city's culture today (Robertson 2002; Whitfield 1926)...In the early 1970s, Monroe became the terminus for State Route 522 (SR 522). The new highway offered residents a direct connection to Interstate 405 and the larger cities to the south, including Seattle. SR 522 meets up with Highway 2 right in Monroe and many businesses have built up around the intersection…

2.7 Historical Records Search

Review of historical maps and aerial imagery provide an understanding of the historic and modern land use, and ownership of the project and surrounding area. The General Land Office (GLO) conducted early cadastral surveys to define or re-establish the boundaries and subdivisions of Federal Lands of the United States so that land patents could be issued transferring the title of the land from the Federal government to individuals. The GLO produced a survey map of the project location in 1874 (USSG 1874). The GLO provided an updated map in 1896 illustrating land patents that included the project location (USSG 1896). These maps depict the project located at the mouth of Woods Creek as it entered the Skykomish River. The project is listed as within tracts 6 and 8 of Section 6 (Figure 4). Comparison of these maps to present day conditions demonstrate that the Skykomish River channel has migrated over the years and the mouth of Woods Creek is now located further southwest than it had been in the late 1800s. The land to the north of the project had been patented to John Popejoy (USSG 1874). Land patents on file at the Bureau of Land Management (2019) document Charles Harriman claiming tracts 6 and 8 of Section 6 in 1876 (Document Nr: 5245, BLM Serial Nr: WAOAA 063324, Authority: April 24, 1820: Sale-Cash Entry [3 Stat. 566]). The 1898 land classification sheet for Washington depicts the project as located within an area labeled as "area from which timber has been cut" indicating it had been logged by the turn of the century (USGS 1898; Figure 5).

Historic county atlases and Sanborn maps provide a record of landownership and use of the project location during the early 1900s. The 1905 Sanborn Map shows the S Ann Street and E Fremont Street intersection as a three-way crossing, with E Fremont Street continuing east to the railroad spur line associated with Monroe Mill Company. This map depicts several parcels associated with the project. The parcel east of S Ann Street, within the current project location, was owned by the Monroe Mill Company. A railroad spur line was aligned northeast to south-southwest, serving the property and terminating just northwest of the shingle sheds. Mill structures included the main mill structure, shingle sheds, a buggy shed, two steam dry kilns, an Electric Light Plant, the City Pump Station, and several outbuildings east of the railroad spur line.

The 1905 Sanborn Map shows two structures located east of S Ann Street and west of the spur line. The parcels south of Fremont Street were part of the Harriman Addition on the 1910 county atlas (Anderson 1910) and likely residential, each containing a structure. This includes a parcel

immediately south of the intersection of S Ann Street and E Fremont Street with a structure labeled as "Style." The Sanborn maps (1905, 1908, 1913a, 1913b) document two existing 6 inch waterlines, one running along E Fremont Street and another crossing the project southeast to northwest, to the center of S Ann Street west of present day 143 S Ann Street. These lines were fed from the City Pump Station which appears to draw water from Woods Creek.

The 1908 Sanborn map shows E Ann Street continuing east to Woods Creek, where an electric motor is stationed for Pacific Coast Condensing Milk Company. This extension of E Ann Street replaced a residential parcel seen on an earlier map. Additions appear to have been made to the mill including a bridge over Woods Creek. The Monroe Steam Laundry Company is now present in the project as a new building abutting the east edge of E Ann Street, south of E Fremont Street. On this map, the Monroe Steam Laundry is noted as using steam from the shingle mill to create electricity to iron the laundry. According to the 1910 county atlas, the residential parcels are part of the Harriman's 2nd Addition subdivision (Anderson 1910). No further ownership is provided.

The 1913 Sanborn map registers further infrastructure alterations at the intersection of E Ann Street and S Fremont Street. S Fremont Street ends at E Ann Street and the extension to the spur line now shows a garage structure with a cement floor. The Great Northern Railway Cherry Valley Branch runs along the west side of E Ann Street and cuts through the residential parcel west of E Ann Street and south of S Fremont Street. The parcel east of the spur line was still owned by Monroe Mill Company but the water lines were now run by Monroe Light and Water Company. The 1913 Sanborn map was updated in 1926 and 1942. This revised version depicts the Monroe Mill Company's shingle mill as the J. Simon Shingle Company. Much of the mill infrastructure had been removed as had portions of the railroad spur. The mill was contained to a smaller structure where the main structure once stood. Warehouse structures were listed as not in use and two small out buildings remained, but no function was provided. The Monroe Steam Laundry is depicted as having numerous additions resulting in a larger, more irregular floor plan. A 1934 Snohomish County atlas notes the ownership of the mill property to belonging to the Town of Monroe (Kroll 1934). No further ownership changes are documented on available historic maps.

Historic topographical maps are available for the project location beginning in 1921 (USGS 2019). These maps show the Skykomish River channel as migrating through the valley. The Skykomish is a fast-moving braided river and as such changes channels frequently (Anderson 1910; Kroll 1934; USSG 1874; USGS 1921, 1923, 1953). The project was historically situated at the mouth of Woods Creek, which entered the Skykomish River via a relict side channel. Historic maps depict varying sizes and shapes of the island or islands located adjacent to the project between the side channels and main stem of the river. The GLO mapped Woods Creek entering the main channel of the Skykomish River at a north bound curve, with side channels of the Skykomish branching from the south bank (see Figure 4). As time progressed, USGS maps document the main channel shifting to the southern branches with the channel nearest to the project becoming abandoned (Figure 6). As of 1953, the side channel has silted up, connecting the island, historically known as Buck Island and currently within Al Borlin Park, to the mainland of Monroe, and shifting the mouth of Woods Creek to the southwest (USGS 1953; Figure 7). No structures are recorded in the project on the available topographic maps.

Historic aerial imagery is available for the project location beginning in 1938 (NETR 2019). Imagery of the project location is only minimally available and generally lower quality which may not provide adequate detailed information regarding changes at a smaller scale within the project. Imagery of the project location from 1938 shows similar conditions to those described in historical maps but include several differences: the presence of Simon Road running from S Ann Street east along the northern boundary of the project, the partial de-forestation of the north shore of Woods Creek, and the possible absence of the spur line to the eastern parcel of the project. The 1952 aerial imagery depicts increased vegetation at the southeast corner of S Ann Street and E Fremont Street and the and Monroe Steam Laundry is not discernable. By 1969, a larger structure is visible at its location. Aerial imagery from 1990 do not appear to show the mill structures though new structures, not previously visible, are present on the property, the north half of the parcel had been cleared of vegetation, and many vehicles were visible in the project. Subsequent aerial imagery shows the project had been resurfaced completely by 2015.

According to the Snohomish County Assessor (2019), the structure at E Fremont Street and S Ann Street, currently known as Monroe Auto Salvage, is listed as constructed in 1920 and may be an addition to a smaller structure observed in earlier aerial images.

2.8 Cultural Resources Database Review

DAHP WISAARD: A review of the WISAARD database identified previous cultural resource studies, recorded precontact and historic sites, and recorded built environment, which helps gauge the potential and likely nature of cultural resources present within the project vicinity (DAHP 2019). Eleven cultural resource investigations have been completed in a one-mile radius of the project. Cultural resource surveys were conducted in compliance with infrastructure improvements (Hamilton 2005; Lyman 1977; Rinck 2013, Roedel et al. 2005; Stone 2001; Tingwall et al. 2007; Willis and Luttrell 2008), park improvements (Jermann 1982; Rust et al. 2008), housing developments (Elmore and Kennedy 1980; Iversen and Steingraber 2016a; Jermann 1978), and utility installations (BOAS, Inc. 1989; Wessen 1987). These investigations and other studies have identified cultural resources within approximately one mile of the project location. No historic register listed properties or cemeteries are recorded within one-mile radius of the project.

Three archaeological sites have been recorded within one mile of the project. Archaeological sites in proximity to the project include site 45SN704, known as the Milwaukee Road Woods Creek Trestle and Railroad grade; 45SN62, known as the Schuler site lithic scatter; and 45SN15, a lithic scatter site. Site 45SN704 was recorded as part of an investigation to remove the trestle for the Woods Creek restoration and slope stabilization project (Gall and Smith 2018). The proposed creek restoration project is located adjacent to the northeast corner of the project, with the railroad trestle located approximately 410 feet (125 m) northeast of the current project location. The trestle was part of the branch line operated by Chicago, Milwaukee, St. Paul and Pacific Railroad from 1937 to 1973, connecting to the Great Northern mainline in Monroe. It was renovated sometime after 1973 for hauling gravels but was not used and fell into disrepair (Gall and Smith 2018).

Precontact site 45SN62 is an Olcott era lithic scatter spread over 160 acres, approximately .66 mile (1.07 km) west of the project (DAHP 2019). Field investigations completed in 1977 at this site collected more than 680 lithic materials including flakes, large knives and preforms, discoidal and end scrapers, and potential cores or projectiles from a till zone or shallow

deposition (Obermayr 1991). As of 2016, much of the site has been developed and archaeologists posit the site has since been destroyed (Iversen and Steingraber 2016b).

Precontact site 45SN15 is a lithic scatter that does not have a defined boundary, located .78 mile (1.25 km) southwest of the project. The original investigation indicates a large leaf point and detritus were collected, with third party observations of grinding stones or mauls (Miss 1991). Further investigations concluded the materials would have been fairly dispersed and may have been ploughed under or may be located further west (Miss 1991).

Though no site was formally recorded, Jermann (1982) noted the presence of "scanty remains of what appears to be historic pier or bridge supports" being five "badly decayed wooden supports set in concrete…approximately 600-1000 feet upstream from the CMSTP and P [Milwaukee Road Railway] trestle."

There are nearly 750 historic property inventories (HPIs) recorded within an approximately one-mile radius of the project. Of these, only the Dolloff building has been determined eligible for listing on historical registers. It is commercial building constructed in 1903, located .19 mile (.31 km) west of the project at 102 E Main St in Monroe. A further 15 structures have been determined not eligible and 27 structures have not had an eligibility determination made; two of these are located within 330 feet (100 m) of the project. These are a 1910 single-family residence at 149 Charles Street that was determined not eligible and the 1923 Pacific Coast Condensery Stack at N Ann Street, which has not had an eligibility determination made. The remaining inventories were added to the HPI as part of DAHP's 2011 HPI Upload Project, which involved the addition of available information from the County Assessor's building records to WISAARD (ACI et al. 2011). None of the uploaded data was field verified at the time, nor were eligibility assessments conducted. Information provided by the upload lists 15 properties within 330 feet (100 m) of the project. These structures are a mix of single-family residences and commercial warehouses dating between 1900 to 1947 with one 1920 two-story commercial warehouse located on the project.

3.0 Archaeological Expectations

3.1 Archaeological Predictive Model

The DAHP statewide predictive model uses environmental data about the locations of known archaeological sites to identify where previously unknown sites are more likely to be found. The model correlates locations of known archaeological data to environmental data "to determine the probability that, under a particular set of environmental conditions, another location would be expected to contain an archaeological site" (Kauhi and Markert 2009:2-3). Environmental data categories included in the model are elevation, slope, aspect, distance to water, geology, soils, and landforms. According to the model, the projects are ranked primarily as "Survey Highly Advised: Very High Risk."

3.2 Archaeological Expectations

This assessment considers the implications of the predictive model coupled with an understanding of geomorphological context, local settlement patterns, and post-depositional processes to characterize the potential for archaeological deposits to be encountered. Recorded surface geology and soils in the project location consist of thick fill deposits over glacial recessional outwash and pre-Fraser deposits. Geotechnical survey records document an upper fill

zone extending 5 to 24 feet below the surface (AESI 2018). Intended excavation is generally limited to four feet below the surface with two 60 foot long trenches reaching a maximum of seven feet below the current surface (K. Knudson, personal communication, February 6, 2019). Excavation to this depth would likely be primarily within imported fill that may include a mix of modern and historic debris.

According to data, local, precontact archaeology and ethnographically named places appear concentrated along rivers, creeks, and lakes (DAHP 2019; Waterman 2001). Several ethnographically named places and villages, and precontact archaeological sites are located in the vicinity of Monroe. At the time of this survey, no recorded precontact archaeological sites were identified within .5 mile of the project. Ethnographically named places have been recorded within approximately 2 miles of the project. Manifestations of the precontact and ethnohistoric record that may be present within the project location could include evidence of activities such as procurement and processing of plant, animal, and/or mineral resources, overland or waterway travel, or temporary camps, as well as ceremonial or religious activities that may be represented by an array of deposits or materials such as fire-modified rock, lithic or bone tools or implements, basketry, or lithic waste flake scatters that likely resulted from human activity around the periphery of more permanent settlements in the Monroe vicinity.

Review of historical information identified early logging activities with subsequent milling, city water infrastructure, laundry service, and mixed residential and commercial uses within the project location. Historic resources depict the construction and removal of various structures within the project as business ventures were decommissioned and replaced by new ones. Most recently the project has been an auto salvage yard and storage with the landscape filled and resurfaced. Historical topographic and survey maps document the migration of the Skykomish River and the Woods Creek channels. Historically, the confluence was immediately south of the project but has since migrated to the southeast.

Archaeological deposits within the site, if present, are anticipated to date to the historic period and it is not expected that significant (i.e. intact) historic deposits will be present within the project location. The historic-era archaeological materials most likely to be found in the project location are types that have been previously determined not to meet historic register eligibility criteria. These kinds of resources included:

- railroad track, ties, and grade, unless of clearly unusual construction;
- remains of infrastructure including abandoned utilities and foundations, unless of clearly unusual construction;
- mass deposits of wood, lumber, coal, or cinders;
- loose bricks, mortar, or other architectural materials; and
- historic-period materials within fill that is not associated with a feature or stable surface.

Resources that could be considered to be significant would be those identified within intact strata and may consist of foundations and/or quantities of artifacts that could be linked with individuals or historic companies, such as the laundry service, mill, electric light plant, the city pump station, or railroad.

4.0 Field Investigations

Total Area Examined: The entire project (9.64 acres).

Areas not examined: None.

Date(s) of Survey: February 1, 2019.

Weather and Surface Visibility: Weather was cool with intermittent showers. Mineral soil visibility was non-existent, and the surface was characterized by imported fill in the form of angular gravels.

Fieldwork Conducted By: Sonja Kleinschmidt. Notes are on file with CRC.

Field Methodology: Fieldwork consisted surface survey and photo-documentation of the historic structures and project conditions (Figures 8-17). No subsurface testing was conducted due to thick fill deposits covering the site.

5.0 Archaeological Site Inventory Form and Historic Property Inventory Forms

Two historic structures (#718333 and #718337) one historic archaeological site (Temporary #692565), all commercial structures or their ruins (Attachment C). These resources include a ca. 1920 structure, one early 1900s structure, and the ruins of one early 1900s commercial garage. These resources were identified, recorded, and evaluated for inclusion on historic registers. These resources do not appear to meet the defined criteria to be register eligible other than their age.

6.0 Results and Recommendations

This assessment was conducted to determine potential effects of this project on cultural resources. Geotechnical records demonstrate that the project has been filled historically with fill extending up to 24 feet below ground surface with the deepest deposits along the edge of Woods Creek, also indicating that the project was likely historically sloped. Native soils below fill are glacial in origin indicating that intact precontact cultural deposits would be found at or near the natural ground surface. Based on geotechnical findings, it is anticipated that much of the project disturbance will be contained within fill deposits.

Background research did not identify any previously recorded cultural resources in the project location. The project has been subject to river channel migration, logging, and light industrial development historically. Field investigation identified one historic archaeological site (the ruins of an early 1900s garage) and two historic structures, built in the early 1900s. These resources were documented and evaluated for listing on historic registers but do not appear eligible for listing. Three additional structures with no listed build dates on the County Assessor website, notions on historic maps, or visibility in aerial imagery were identified in the project and are therefore not considered historic. Much of the historic infrastructure that had been present in the project has been removed over the decades.

Based on archival research, the project appears to have a lower probability to contain as-yet unrecorded, significant archaeological deposits. Excavation is anticipated to be relatively shallow and contained primarily in fill deposits, indicating that historic era material or deposits would be more likely to be found. The significance of these to history would be dependent upon the nature and context of their discovery. CRC recommends that the project proceed as planned and a detailed inadvertent discovery protocol be in place during construction.

In the event that any ground-disturbing or other construction activities result in the unanticipated discovery of archaeological resources, work should be halted in the immediate area, and contact made with county officials, the technical staff at DAHP, and tribal representatives. Work should be stopped until further investigation and appropriate consultation have concluded. In the unlikely event of the inadvertent discovery of human remains, work should be immediately halted in the area, the discovery covered and secured against further disturbance, and contact effected with law enforcement personnel, consistent with the provisions set forth in RCW 27.44.055 and RCW 68.60.055.

7.0 Limitations of this Assessment

No cultural resources study can wholly eliminate uncertainty regarding the potential for prehistoric sites, historic properties or traditional cultural properties to be associated with a project. The information presented in this report is based on professional opinions derived from our analysis and interpretation of available documents, records, literature, and information identified in this report, and on our field investigation and observations as described herein. Conclusions and recommendations presented apply to project conditions existing at the time of our study and those reasonably foreseeable. The data, conclusions, and interpretations in this report should not be construed as a warranty of subsurface conditions described in this report. They cannot necessarily apply to site changes of which CRC is not aware and has not had the opportunity to evaluate.

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9.0 Figures and Tables

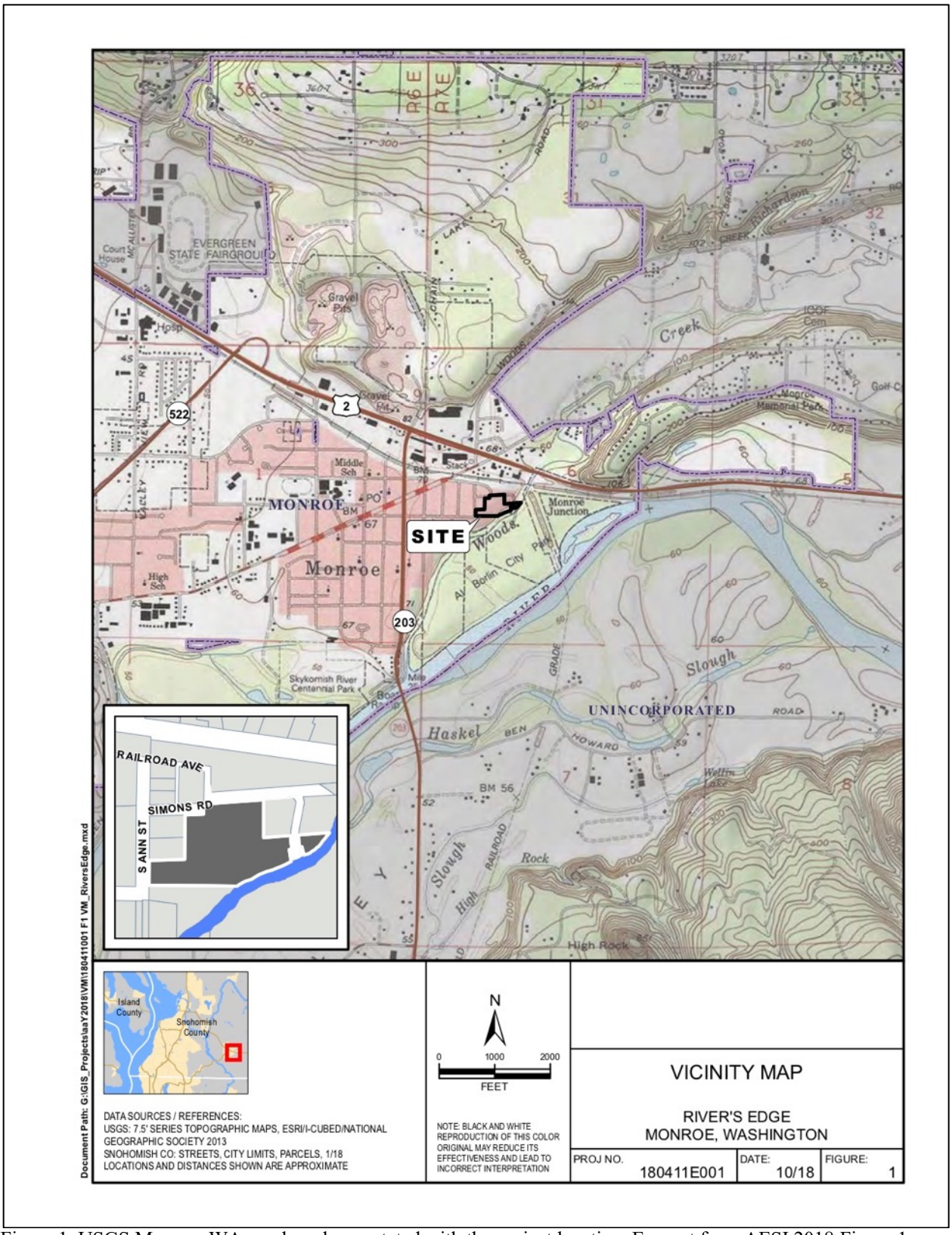

Figure 1. USGS Monroe, WA quadrangle annotated with the project location. Excerpt from AESI 2018:Figure 1.

Figure 2. Satellite imagery annotate with the project location in red.

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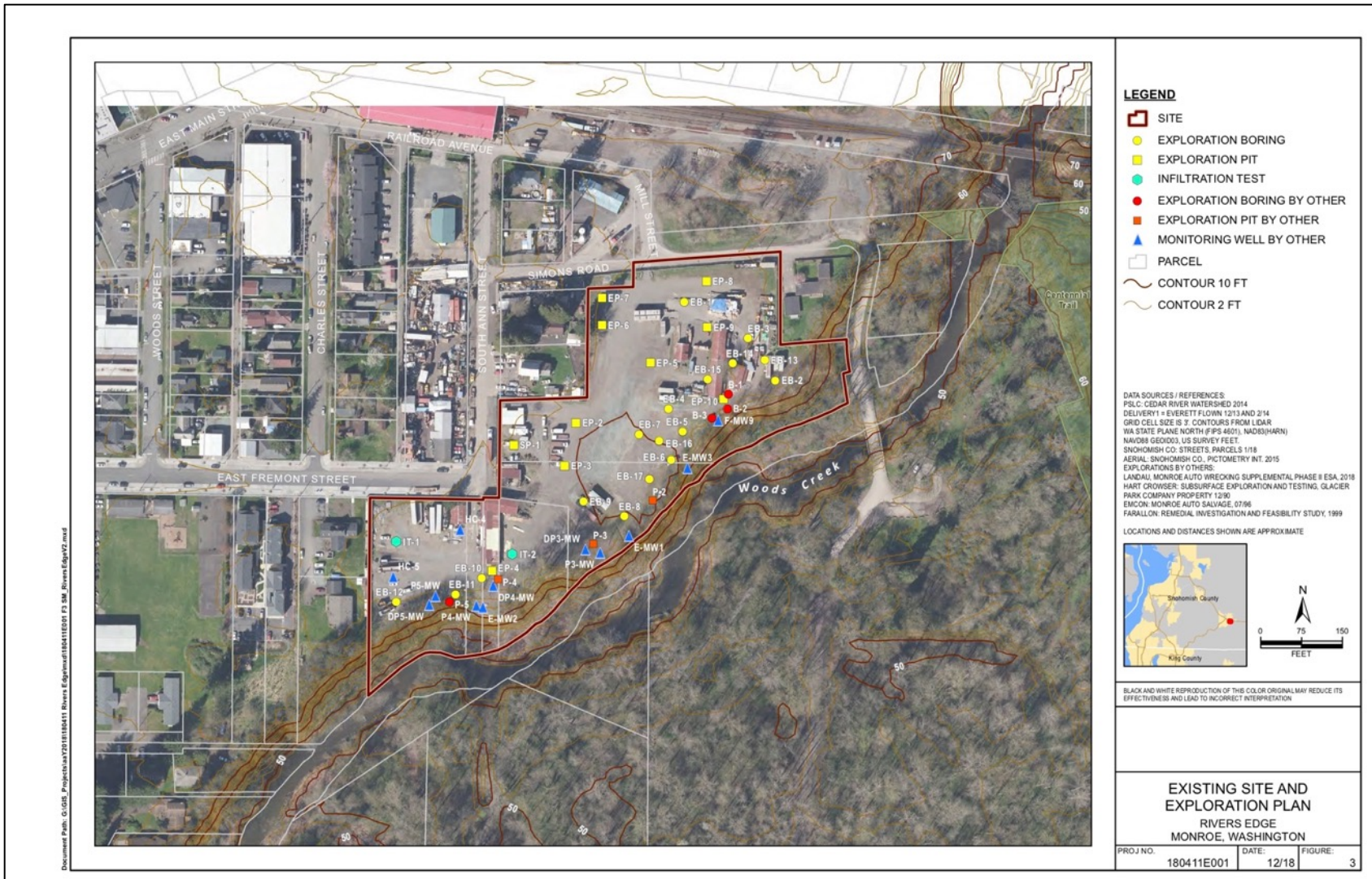

Figure 3. AESI (2018:Figure 3) locations of geotechnical testing completed in the project location

Figure 4. 1874 GLO map of T 27N R 07E Sections 5, 6, 7, and 8, showing the approximate project location and the historic alignment of the Sky-wamish (Skykomish) River.

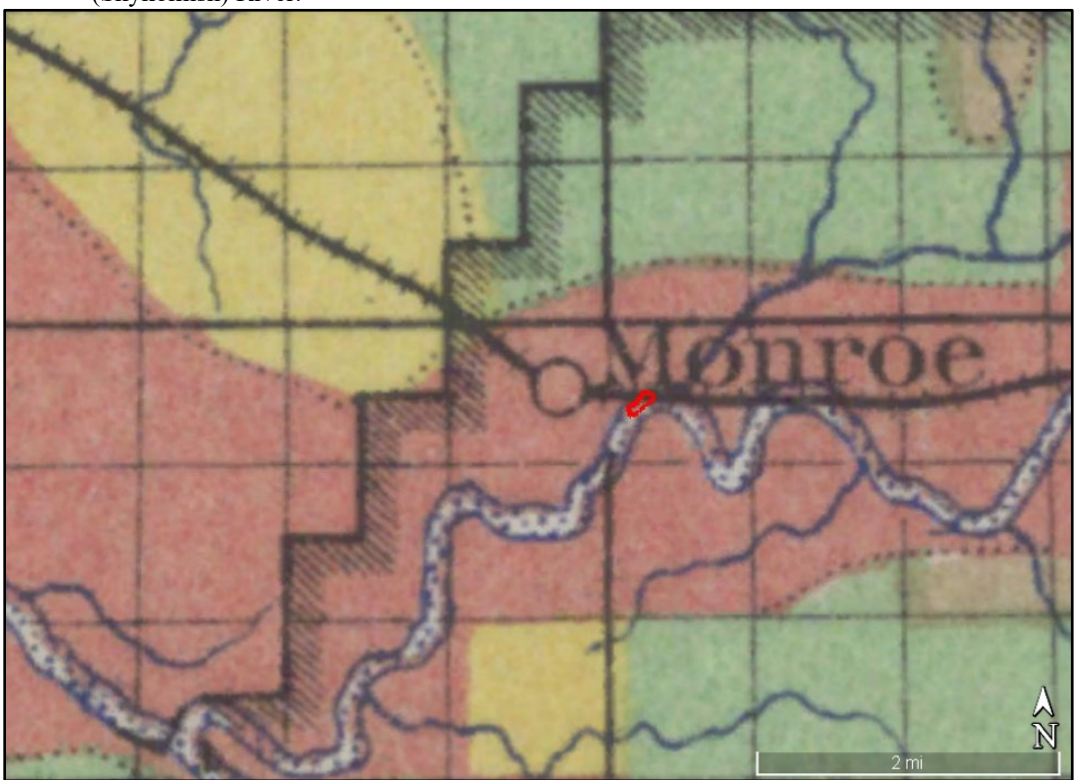

Figure 5. Map of Western Washington, showing land classifications (1898) with the approximate project location.

Figure 6. 1923 Topographic map with approximate project location., showing historic Skykomish River alignment.

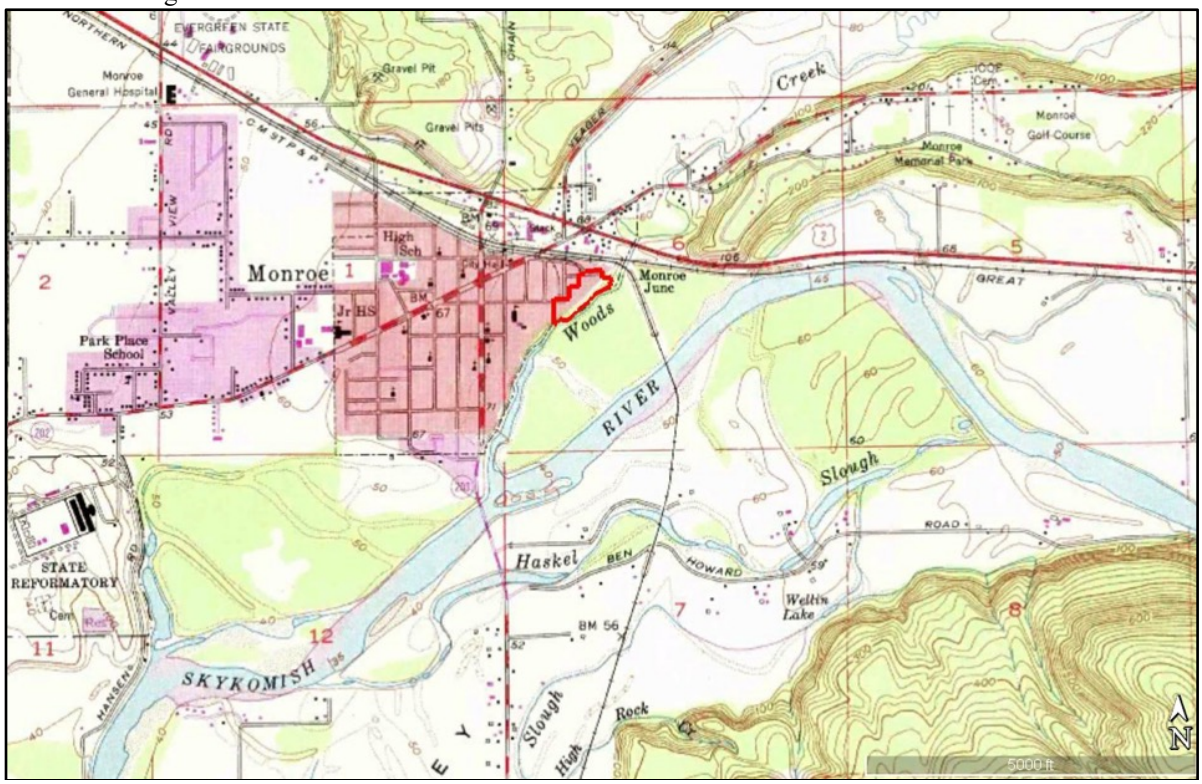

Figure 7. 1953 topographic map with approximate project location, showing changes in the historic flow patterns of the Skykomish River.

Figure 8. Overview of the typical conditions within the project; view is to the southwest.

Figure 9. Overview of the typical conditions within the project; view is to the northeast.

Figure 10. Overview of the typical conditions within the project adjacent to Woods Creek; view is to the southwest. Note the steep slope.

Figure 11. Representative photograph of a warehouse of unknown age in the eastern portion of the project; view is to the northwest.

Figure 12. Representative photograph of a warehouse of unknown age in the eastern portion of the project; view is to the south-southeast.

Figure 13. Representative photograph of a commercial structure dating to the early 1900s in the eastern portion of the project; view is to the northwest.

Figure 14. Representative photograph of a 1973 structure in the western portion of the project; view is to the west.

Figure 14. Representative photograph of the ruins of the early 1900s garage in the western portion of the project; view is to the northwest.

Figure 15. Representative photograph of a warehouse of unknown age in the western portion of the project; view is to the northwest.

Figure 16. Representative photograph of the Monroe Steam Laundry / Monroe Auto Salvage building dating in the western portion of the project; view is to the northeast. Northern portion of west elevation.

Figure 17. Representative photograph of the Monroe Steam Laundry / Monroe Auto Salvage building dating in the western portion of the project; view is to the northeast. Southern portion of west elevation.

Attachment A. DAHP Correspondence.

Allyson Brooks Ph.D., Director
State Historic Preservation Officer

November 20, 2018

Ms. Anita Marrero
Senior Planner
City of Monroe

In future correspondence please refer to:
Project Tracking Code: 2018-11-09032
Property: City of Monroe Wibbelman Ralston River's Edge Shoreline Affordable Housing Project
Re: Archaeology - Survey Requested

Dear Ms. Marrero:

Thank you for contacting the Washington State Historic Preservation Officer (SHPO) and Department of Archaeology and Historic Preservation (DAHP) and providing documentation regarding the above referenced project. As a result of our review, our professional opinion is that the project area has the potential to contain archaeological resources. The entire project area is at very high risk of containing archaeological resources according to the DAHP predictability model. Further, the scale of the proposed ground disturbing actions would destroy any archaeological resources present. Identification during construction is not a recommended detection method because inadvertent discoveries often result in costly construction delays and damage to the resource. Therefore, we recommend a professional archaeological survey of the project area be conducted prior to ground disturbing activities. We also recommend consultation with the concerned Tribes' cultural committees and staff regarding cultural resource issues.

There is also at least one buildings/structure within the project area that is more than 50 years old. The DAHP also requests that the survey include a built environment component and that Historic Property Inventory forms be created or updated for any buildings/structures more than 50 years old.

If any federal funds or permits are associated with this proposal, Section 106 of the National Historic Preservation Act, as amended, and its implementing regulations, 36 CFR 800, must be followed. This is a separate process from both the NEPA and SEPA environmental review processes and requires formal government-to-government consultation with the affected Tribes and the SHPO. Also, we appreciate receiving any correspondence or comments from concerned tribes or other parties concerning cultural resource issues that you receive.

These comments are based on the information available at the time of this review and on behalf of the SHPO in conformance with Washington State law. Should additional information become available, our assessment may be revised.

Thank you for the opportunity to comment on this project and we look forward to receiving the survey report. Please ensure that the DAHP Project Number (a.k.a. Project Tracking Code) is shared with any hired cultural resource consultants and is attached to any communications or submitted reports. Should you have any questions, please feel free to contact me.

Sincerely,

State of Washington • **Department of Archaeology & Historic Preservation**
P.O. Box 48343 • Olympia, Washington 98504-8343 • (360) 586-3065
www.dahp.wa.gov

Stephanie Jolivette
Local Governments Archaeologist
(360) 586-3088
Stephanie.Jolivette@dahp.wa.gov

State of Washington • **Department of Archaeology & Historic Preservation**
P.O. Box 48343 • Olympia, Washington 98504-8343 • (360) 586-3065
www.dahp.wa.gov

Attachment B. Correspondence between CRC and Tribal cultural resources staff.

Cultural Resource Consultants

January 29, 2019

Snohomish Tribe
Michael didahalqid Evans, Chair
9792 Edmonds Way, #267
Edmonds, WA 98020

Re: Cultural Resources Assessment for the River's Edge Project, Monroe, WA

Dear Michael:

I am writing to inform you of a cultural resources assessment for the above referenced project and to seek additional information about the project area the Tribe may have that is not readily available through other written sources. This letter is on a technical staff-to-technical staff basis to inquire about project-related cultural information or concerns. It is not intended as formal government-to-government consultation to be initiated by the appropriate regulatory agency.

The project is located in Section 6, Township 27 North, Range 07 East Willamette Meridian at 147 S Ann Street in Monroe, Snohomish County, Washington. River's Edge is a to-be-built 166 unit multi-family apartment community. The community will consist of 1, 2, and 3 bedroom units. The project will be build to the Evergreen Standard ensuring quality materials and standards, energy efficiency, and water conservation, Project amenities include a nature trail, community garden, children's play area, and community room with kitchen for resident activities. The development will include clean up of contaminated soils and restoration of critical slope area by eliminating invasive species and partial revegetation with indigenous species.

We are in the process of reviewing available information. Background research will include a site files search at the Washington State Department of Archaeology and Historic Preservation, review of previously recorded cultural resource reports, and review of pertinent published literature and ethnographies. Results of our investigations will be presented in a technical memo.

We are aware that not all information is contained within published sources. Should the Tribe have additional information to support our assessment, we would very much like to include it in our study. Please contact me at sonja@crcwa.com or 360-395-8879 should you wish to provide any comments. I appreciate your assistance in this matter and look forward to hearing from you.

Sincerely,

Sonja Kassa Kleinschmidt
Projects Manager

CULTURAL RESOURCE CONSULTANTS, LLC. 1416 NW 46TH ST, STE 105 PMB346, SEATTLE, WA 98107
PHONE 206.855.9020 - sonja@crcwa.com

Cultural Resource Consultants

January 29, 2019

Snoqualmie Indian Tribe
Steven Mullen-Moses
PO Box 969
Snoqualmie, WA 98065

Re: Cultural Resources Assessment for the River's Edge Project, Monroe, WA

Dear Steven:

I am writing to inform you of a cultural resources assessment for the above referenced project and to seek additional information about the project area the Tribe may have that is not readily available through other written sources. This letter is on a technical staff-to-technical staff basis to inquire about project-related cultural information or concerns. It is not intended as formal government-to-government consultation to be initiated by the appropriate regulatory agency.

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Sincerely,

Sonja Kassa Kleinschmidt
Projects Manager

CULTURAL RESOURCE CONSULTANTS, LLC. 1416 NW 46TH ST, STE 105 PMB346, SEATTLE, WA 98107
PHONE 206.855.9020 - sonja@crcwa.com

Cultural Resource Consultants

January 29, 2019

Stillaguamish Tribe
Kerry Lyste, Cultural Resources
3322 236th Street NE
Arlington, WA 98223

Re: Cultural Resources Assessment for the River's Edge Project, Monroe, WA

Dear Kerry:

I am writing to inform you of a cultural resources assessment for the above referenced project and to seek additional information about the project area the Tribe may have that is not readily available through other written sources. This letter is on a technical staff-to-technical staff basis to inquire about project-related cultural information or concerns. It is not intended as formal government-to-government consultation to be initiated by the appropriate regulatory agency.

The project is located in Section 6, Township 27 North, Range 07 East Willamette Meridian at 147 S Ann Street in Monroe, Snohomish County, Washington. River's Edge is a to-be-built 166 unit multi-family apartment community. The community will consist of 1, 2, and 3 bedroom units. The project will be build to the Evergreen Standard ensuring quality materials and standards, energy efficiency, and water conservation, Project amenities include a nature trail, community garden, children's play area, and community room with kitchen for resident activities. The development will include clean up of contaminated soils and restoration of critical slope area by eliminating invasive species and partial revegetation with indigenous species.

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Sincerely,

Sonja Kassa Kleinschmidt
Projects Manager

CULTURAL RESOURCE CONSULTANTS, LLC. 1416 NW 46TH ST, STE 105 PMB346, SEATTLE, WA 98107
PHONE 206.855.9020 - sonja@crcwa.com

January 29, 2019

Tulalip Tribes
Richard Young
6410 23rd Ave NE
Tulalip, WA 98271

Re: Cultural Resources Assessment for the River's Edge Project, Monroe, WA

Dear Richard:

I am writing to inform you of a cultural resources assessment for the above referenced project and to seek additional information about the project area the Tribe may have that is not readily available through other written sources. This letter is on a technical staff-to-technical staff basis to inquire about project-related cultural information or concerns. It is not intended as formal government-to-government consultation to be initiated by the appropriate regulatory agency.

The project is located in Section 6, Township 27 North, Range 07 East Willamette Meridian at 147 S Ann Street in Monroe, Snohomish County, Washington. River's Edge is a to-be-built 166 unit multi-family apartment community. The community will consist of 1, 2, and 3 bedroom units. The project will be build to the Evergreen Standard ensuring quality materials and standards, energy efficiency, and water conservation, Project amenities include a nature trail, community garden, children's play area, and community room with kitchen for resident activities. The development will include clean up of contaminated soils and restoration of critical slope area by eliminating invasive species and partial revegetation with indigenous species.

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We are aware that not all information is contained within published sources. Should the Tribe have additional information to support our assessment, we would very much like to include it in our study. Please contact me at sonja@crcwa.com or 360-395-8879 should you wish to provide any comments. I appreciate your assistance in this matter and look forward to hearing from you.

Sincerely,

Sonja Kassa Kleinschmidt
Projects Manager

CULTURAL RESOURCE CONSULTANTS, LLC. 1416 NW 46TH ST, STE 105 PMB346, SEATTLE, WA 98107
PHONE 206.855.9020 - sonja@crcwa.com

Gmail by Google

Sonja Kleinschmidt <sonja@crcwa.com>

1901H River's Edge letter

Kerry Lyste <klyste@stillaguamish.com> Tue, Jan 29, 2019 at 4:21 PM
To: Teresa Peterson <teresa@crcwa.com>
Cc: Sonja Kassa <sonja@crcwa.com>

Hello Teresa and Sonja,

Thank you for notification on this project. We have no comments or information to add, at this time.

Best, KL

Kerry Lyste
THPO/GIS Database Administrator;

Stillaguamish Tribe of Indians

3322 236th Street NE, Arlington, WA 98223

Mailing Address: PO Box 277, Arlington, WA 98223

Ph:360-572-3072 Fax: 360-659-3113

From: Teresa Peterson [mailto:teresa@crcwa.com]
Sent: Tuesday, January 29, 2019 9:09 AM
To: Kerry Lyste <klyste@stillaguamish.com>
Cc: Sonja Kassa <sonja@crcwa.com>
Subject: 1901H River's Edge letter

Hi Kerry -

[Quoted text hidden]

Gmail by Google

Sonja Kleinschmidt <sonja@crcwa.com>

1901H River's Edge letter

Teresa Peterson <teresa@crcwa.com> Tue, Jan 29, 2019 at 12:06 PM
To: Sonja Kassa <sonja@crcwa.com>

Would you like to reply to Adam?

---------- Forwarded message ---------
From: **Adam Osbekoff** <adam@snoqualmietribe.us>
Date: Tue, Jan 29, 2019 at 11:21 AM
Subject: 1901H River's Edge letter
To: teresa@crcwa.com <teresa@crcwa.com>

Hello Teresa

The Snoqualmie Indian Tribes Department of Archaeology and Historic Preservation request that we have the opportunity to be onsite during any ground disturbing activities. Please keep us informed.

I hope all is well and thank you.

Adam

--

Teresa Peterson
Office Manager
Cultural Resource Consultants
1416 NW 46th Street, Suite 105, PMB 346
Seattle, WA 98107
206 855-9020
web: www.crcwa.com

Attachment C. Archaeological Site Inventory Form and Historic Property Inventory Forms.

Please see associated PDF forms.

RECEIVED 1/23/2019

EXHIBIT 20

Wetland Resources, Inc.

Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance

9505 19th Avenue S.E.
Suite 106
Everett, Washington 98208
(425) 337-3174
Fax (425) 337-3045

CRITICAL AREA STUDY AND RESTORATION PLAN

FOR

River's Edge

Wetland Resources, Inc. Project #18216

Prepared By
Wetland Resources, Inc.
9505 19th Avenue SE, Suite 106
Everett, WA 98208
(425) 337-3174

Prepared For
River's Edge WA LLLP
Attn: Rebecca Ralston
1525 9th Ave, #3505
Seattle, WA 98101

First Submittal: November 1, 2018
Revision 1: November 21, 2018
Revision 2: January 23, 2019

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TABLE 2: SOIL UNITS PRESENT IN THE PROJECT AREA 8

FIGURE 1: AERIAL OVERVIEW OF SUBJECT PROPERTY 1

Appendices

Appendix A: King County Noxious Weed Control Program BMPs
Appendix B: US Army Corps Wetland Determination Data Form (S1)
Appendix C: Critical Area Study and Restoration Plan Maps (1/3 to 3/3)

Executive Summary

Project Name: River's Edge

Location: In the city of Monroe, within six tax parcels located southeast of the intersection of S Ann St and Simons Rd.

Client:
River's Edge WA LLLP
Attn: Rebecca Ralston
1525 9th Ave, #3505
Seattle, WA 98101

Wetland Resources Staff: Scott Brainard (Principal Ecologist), Niels Pedersen (Senior Ecologist)

Critical Areas Determination: One watercourse (Woods Creek) was observed on and in the vicinity of the subject property. Woods Creek is a Type S waterbody that requires a 200-foot protective buffer. The FEMA floodplain was identified on and in the vicinity of the subject property.

Proposed Project: The applicant proposes to construct a 166-unit apartment complex within the subject properties. The proposal includes access, parking, and a management office. All proposed development will occur within a historically disturbed gravel footprint. Eight trees will be removed from within the 200-foot buffer/setback of Woods Creek. No other vegetation impacts are proposed. To offset impacts associated with the project, the applicant proposes the following mitigating measures:

- To remove contaminants in the soil resulting from the industrial legacy of the site,
- To restore and plant a 14,737 square-foot gravel area (area of historic disturbance),
- To remove debris from a 55,388 square-foot area between Woods Creek and the area of historic disturbance,
- To remove invasive species from a 55,388 square-foot area between Woods Creek and the area of historic disturbance,
- To install native plants where invasive species are removed from the 55,388 square-foot area, and
- To install a split-rail fence along the perimeter of the restored areas, to limit human intrusion.

1.0 INTRODUCTION

1.1 PROJECT LOCATION

The proposed project is located southeast of the intersection of Simons Road and S Ann Street. The property is comprised of six Snohomish County tax parcels (27070600300500, 27070600303300, 27070600300700, 27070600300600, 27070600302300, and 00465000001100), and is located within the city limits of Monroe, Washington (Section 6, Township 27N, Range 7E, W.M.).

Figure 1: Aerial Overview of Subject Property

1.2 LANDSCAPE SETTING

Basin: Puget Sound
Sub-Basin: Water Resource Inventory Area (WRIA) 7 – Snohomish
Watershed: Skykomish
Sub-Watershed: Lower Woods Creek

The subject property is located in the southeast corner of downtown Monroe, approximately 1,200 feet northwest of the Skykomish River. Woods Creek flows along the east side of the subject properties, meeting the Skykomish River approximately 0.5 miles downstream to the south of the subject property. Land use in the area consists of a mix of single-family residential development, commercial, and industrial uses. 90 acres of open space (Al Borlin Park) are located adjacent to the east of the subject property.

1.3 SITE DESCRIPTION

The western three-quarters of the subject property is flat, and has been used for various industrial purposes over the last 100+ years. The area is covered with a number of outbuildings, and the remaining level portion of the site is covered with 5/8 gravel. Seven small trees, one large maple, and a small area of maintained lawngrass are present within the historically disturbed area. Unmanaged stormwater sheetflows across the site towards Woods Creek via one of several natural drainage points along the edge of the hillslope.

The eastern one-quarter of the site is a naturally vegetated, moderately steep slope, and breaks to the ordinary high water mark (OHWM) of Woods Creek. A sandy bench extends from the toe of slope towards the active channel of Woods Creek. The active channel was observed to be several feet below the bench. A significant quantity of industrial waste was observed on the hillslope (tires, concrete, metal, empty containers, etc.).

Three distinct vegetation communities exist between the historically disturbed area and the active channel of Woods Creek: bigleaf maple is the dominant tree species, forming a closed canopy over sparse indian plum, salmonberry, and beaked hazelnut, with a sword fern understory. This plant community is prevalent on the hillslope, with the addition of sparse snowberry and red elderberry observed near the break at the toe of the hillslope. In the vicinity of the OHWM (on both the landward and waterward sides), black cottonwood is the dominant tree species, with either 100 percent cover of Japanese knotweed, 100 percent cover of reed canarygrass, or a mix of the aforementioned native shrub assemblage. Patches of Himalayan blackberry were also observed within the site.

As previously stated, the active channel of Woods Creek is several feet lower than the OHWM (which was observed at the edge of the hillslope). The area between slopes towards the active channel, and depressional areas are absent. No wetlands were observed on the hillslope, or between the active channel and the OHWM. Observed soils between the active channel an OHWM were very sandy and brown in color (10YR 3/2+ when compared with Munsell Color Charts), and redoximorphic features were not observed. Observed soils indicate that flood flows quickly drain through the substrate and back to the stream after storm events, and that ponding/flooding does not occur frequently enough to create wetland conditions.

1.4 PROJECT DESCRIPTION

The applicant (River's Edge WA LLP) proposes to demolish existing structures, remove eight trees, identify and address contaminants related to the legacy of industrial use, grade/prepare the site, and to construct several multi-family buildings in the footprint of historic disturbance. The proposal includes access, parking, connection to existing utilities, and a stormwater plan.

All proposed development will occur within the footprint of the historically disturbed area. Seven small trees (between eight and thirteen inches DBH) and one 30" DBH maple will be removed from the historically disturbed area. Proposed mitigation has been designed to offset these impacts.

A significant portion of the proposed development occurs within 200 feet of the OHWM of Woods Creek, which is the required protective buffer width and shoreline setback for Woods Creek. Based on the disturbed nature of the proposed development area, and the proposed ecological benefits that will result from the project, the applicant requests a variance from the 200-foot setback/buffer requirement of the Shoreline Master Program (SMP).

Significant ecological benefits are expected to result from this project relative to the existing condition of the site, which supports the applicant's variance request. The proposal includes enhancement of the hillslope located between the historically disturbed area and the OHWM of Woods Creek, restoration of 14,737 square feet of gravel area within the historically disturbed area, installation of a split-rail fence, voluntary contaminant removal from the flat portion of the site, and a stormwater plan that significantly improves water quality relative to the existing condition.

Enhancement of the hillslope includes removal of industrial waste, control of invasive species, and re-planting with native vegetation throughout an approximately 55,000 square-foot area. Restoration of the historically disturbed area includes gravel removal, decompaction, and installation of native plants within a 14,737 square-foot area at the top of the hillslope. The proposed split-rail fence will be installed along the entire perimeter of the hillslope, and will also encompass the 14,737 square-foot restoration area located at the top of the hillslope. Proposed contaminant clean-up in the historically disturbed portion of the site will be based on recommendations made in the Excavated Materials Management Plan (EMMP) prepared for this project by Landau Associates.

2.0 REGULATORY SETTING

2.1 SHORELINE MANAGEMENT

Woods Creek is regulated as a shoreline of the state because it exceeds mean annual flow 20 cubic feet per second, as defined in 90.58.030 RCW. Development within 200 feet of the OHWM of Woods Creek triggers compliance with the City of Monroe Shoreline Master Program (SMP). General compliance is demonstrated within this section. Consistency with the specific policies and regulations of the SMP is demonstrated within a stand-alone document prepared for this project. That document is provided as part of the Shoreline Permit Application.

2.1.1 Permitted Use Discussion

In the vicinity of the subject property, areas within 200 feet of the OHWM carry either the High Intensity (HI) or Urban Conservancy (UC) shoreline environment designations. The UC designation is limited to the hillslope, and the HI designation includes the flat portion of the site (within 200 feet of the OHWM). All proposed development is limited to the flat portion of the site. The SMP states in Chapter 2, subsection C. *Shoreline Use and Modification Matrix* (page 25), under *Shoreline Use,* that multifamily residential development is a permitted use in the HI environment designation.

2.1.2 Dept. of Ecology Oversight

The proposed project includes removal of contaminated soils from the flat portion of the site, and cleanup of debris from the hillslope. The SMP states in Chapter 2, subsection C. *Shoreline Use and Modification Matrix* (page 27), that "hazardous waste cleanup" is permitted when it is coordinated with approval and oversight by the Department of Ecology. Based on personal communication with Landau Associates staff, the removal of contaminated soil and debris does not meet the definition of "hazardous waste cleanup." The proposed cleanup activities do not require approval and oversight by Ecology because the project does not include hazardous waste cleanup.

2.1.3 Site Development Standards

Proposed development will occur in the HI shoreline environment designation. The subject property is currently zoned as Downtown Commercial (DC). Prior to adoption of this zoning designation, the property was zoned General Industrial (GI). Chapter 2, Subsection D. *Site Development Standards* (page 28 of the SMP), presents a table of bulk standards. This table states that a 200-foot setback/buffer is required from the OHWM, subject to specific conditions. The condition for reducing the 200-foot setback/buffer of Woods Creek requires approval of a shoreline variance. The proposed development appears to meet all other provisions of the aforementioned Site Development Standards Table. This project requires a shoreline variance.

2.1.4 Shoreline Variance Discussion

River's Edge is a to-be-built 166-unit affordable housing development proposed within the City of Monroe's designated "Downtown Master Plan" which renders existing light-industrial uses legal, but non-conforming. The development is consistent with the City of Monroe's objective to revitalize the downtown core with private capital investment to support the development of new, residential and mixed-use projects. River's Edge will use high-quality exterior materials, including cementitious siding, and other sustainable building products. The residential units will be income restricted to individuals and families earning no more than 60% of the Snohomish County Area Median Income, which is $103,500. There is a great demand for new, clean, safe, environmentally friendly housing options in Monroe where 85% of the population will income qualify to live at River's Edge. The new development will have energy efficient features throughout, keeping utility bills very low for residents.

As previously stated, the project requires a shoreline variance due to proposed development occurring within the 200-foot setback from the OHWM of Woods Creek. In recognizing that the SMP is intended to preserve the resources and ecology of shorelines, and to provide long-term benefits, it is relevant to discuss the merits of this project relative to the existing condition, and also relative to the probable future use of the site (if a variance is denied).

The site is currently used as a parking and storage area for commercial vehicles and equipment, which introduce a variety of toxicants to the ground surface (i.e. diesel, lubricants, hydraulic fluids, coolant, brake dust, metal and plastic shavings, and rubber). Stormwater generally flows east across the site as sheetflow, entering one of several natural low points and draining down a steep slope through approximately 30 to 50 feet of native vegetation before meeting Woods Creek. This means that untreated stormwater draining from pollution-generating surfaces flows directly (without detention) to a highly ecologically productive reach of Woods Creek.

The proposed residential use will result in the removal of industrial waste and contaminants from the site, the control of invasive species on the hillslope, and will restore a portion of the historically disturbed gravel area. Significantly, it will also provide a stormwater plan that complies with the current Ecology stormwater manual. The plan routes stormwater from pollution-generating surfaces (parking areas) to an infiltration vault, where it will be tied into the existing stormwater drainage system. The proposed development will introduce lighter land uses that will have far less detrimental effect on existing native vegetation and wildlife. There will be no future risk of contaminants leaching into soils or groundwater, there will be no more refuse and scrap material laid to rest on the site. The property will be kept clean and maintained in perpetuity.

The proposed project will result in functional ecological improvements and better protection of resources than the existing condition. The existing condition impairs resources and functions, and provides no long-term benefits. If a variance is not issued for this property, (and alternate uses would only be allowed within the irregularly-shaped 2 acres located outside of the 200-foot setback), it is expected that the current use of the site would likely continue without improvements. For these reasons, strict implementation of the SMP (a required 200-foot setback in this case) would thwart the policies of the Shoreline Management Act (SMA) by providing a strong incentive to maintain the existing use of the site. The applicant asserts that the variance request for this project is consistent with the goals of the SMP, and should be allowed.

As stated earlier, the City of Monroe has identified the subject site as part of the Downtown Master Plan with the aim of encouraging redevelopment of the existing light-industrial uses. River's Edge will be the first major redevelopment activity and it will have a far-reaching effect as it will be a catalyst encouraging more economic investment in this light-industrial area. Although the proposed development sits within the shoreline setback of 200' it must be noted that none of the development impacts property that has not already been heavily impacted. The proposed development will introduce lighter land uses that will have far less detrimental effect on existing native vegetation and wildlife. There will be no future risk of contaminants leaching into soils or groundwater, there will be no more refuse and scrap material laid to rest on the site. The property will be kept clean and maintained into perpetuity. The developer will be a long-term owner and will remain vested in the future of the project and the community at large.

With regard to site design: the 200' setback would render the property undevelopable in compliance with the City of Monroe's Downtown Master Plan because there would not be the ability to achieve necessary parking or open-space for any of the identified residential or commercial land uses the City has identified. There is a certain critical mass of development that must be established in order to support the high-cost of cleaning up the site, which simply could not be borne by a developer if the setback were in play, and thus any future project would be rendered infeasible. Please note, this is an irregular shaped property and a 200' setback is simply not feasible, it negates any feasible development that is consistent with the City of Monroe Downtown Master Plan, which would leave the existing lay-down, recycling, construction-staging yard, the only viable activity on the site. This would be a very unfortunate outcome for the community. This project will be a great economic generator for the City and community.

2.2 THREATENED AND ENDANGERED SPECIES

Based on review of publicly available resources, Woods Creek provides habitat for threatened and endangered species (Chinook, bull trout). Woods Creek is also classified as a fish and wildlife habitat conservation area (FWHCA). This report meets FWHCA standards, as described in MMC 20.05.100.

2.3 SPECIAL FLOOD HAZARD AREAS

FEMA has delineated special flood hazard areas and risk zones, which are identified on FEMA's Flood Insurance Rate Maps (FIRMs). The City of Monroe participates in the National Flood Insurance Program (NFIP), which requires the adoption of floodplain management ordinances to reduce flood damage.

Special flood hazard areas associated with Woods Creek are located on the hillslope in the eastern portion of the site. No development is proposed within special flood hazard areas.

2.4 CRITICAL AREAS

This report accurately describes wetlands, FWHCAs, state shorelines, and Special Flood Hazard Areas (SFHAs). All other critical areas are outside the scope of this report.

3.0 CRITICAL AREAS DETERMINATION METHODOLOGY

3.1 LIMIT OF STUDY

The proposed project occurs within six tax parcels. Lack of legal access prevents Wetland Resources, Inc. (WRI) staff from performing routine wetland determinations in surrounding areas. Wetland and stream boundaries outside of the subject parcel were estimated using best professional judgment based on visual observation from the edge of legal access, and using elevation contours generated from the Snohomish County Digital Elevation Model (DEM). The limits of surveyed and estimated critical area boundaries are clearly defined on the attached Critical Area Study and Restoration Plan Maps.

3.2 CRITICAL AREAS CLASSIFICATION

Critical areas are typically classified in accordance with the standards set forth in MMC 20.05 for wetlands and FWHCAs. Critical areas located within shoreline jurisdiction are subject to the critical areas regulations in effect when the SMP was adopted (Amended Ordinance 06-061, August 1, 2007).

Wetlands were classified in accordance with Monroe Municipal Code (MMC) section 20.05.030, which requires use of the Washington Department of Ecology Wetland Rating System for Western Washington "as revised." If wetlands were present in the vicinity of the subject property, the Washington Department of Ecology Wetland Rating System for Western Washington 2014 Update (Ecology Publication 14-06-029) would have been used. No wetlands were observed in on or in the vicinity of the subject property.

Streams were classified in accordance with Washington Administrative Code section 222-016-030, as required by MMC 20.05.030. Woods Creek is a Type S stream. FWHCAs were classified in accordance with the definition presented in MMC 20.05.030. Woods Creek is also a FWHCA.

All streams that exceed mean twenty cubic feet per second annual flow, lakes greater than 20 acres in total area, and all marine waters are classified as shorelines of the state. Woods Creek is a shoreline of the state.

SFHAs were classified in accordance with the Flood Insurance Rate Maps (FIRMs) produced by the Federal Emergency Management Agency (FEMA), as required by MMC 20.05.030. Woods Creek has a designated SFHA, which extends onto the eastern portion of the site.

3.3 WETLAND DELINEATION METHODOLOGY

Wetland boundaries were determined using the routine determination approach described in the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0) (U.S. Army Corps of Engineers 2010), as required by MMC 20.05.030. Under the routine methodology, the process for making a wetland determination is based on three steps:

1.) Examination of the site for hydrophytic vegetation (species present and percent cover);
2.) Examination of the site for hydric soils;
3.) Determining the presence of wetland hydrology

The following criteria must be met in order to make a positive wetland determination.

3.3.1 Vegetation Criteria

The Corps Manual and 2010 Regional Supplement define hydrophytic vegetation as "*the assemblage of macrophytes that occurs in areas where inundation or soil saturation is either permanent or of sufficient frequency and duration to influence plant occurrence.*" Field indicators are used to determine whether the hydrophytic vegetation criteria have been met. Examples of these indicators include, but are not limited to, the rapid test for hydrophytic vegetation, a dominance test result of greater than 50%, and/or a prevalence index score less than or equal to 3.0.

3.3.2 Soils Criteria

The 2010 Regional Supplement (per the National Technical Committee for Hydric Soils) defines hydric soils as soils *"that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part."* Field indicators are used to determine whether a given soil meets the definition for hydric soils. Indicators are numerous and include, but are not limited to, presence of a histosol or histic epipedon, a sandy gleyed matrix, depleted matrix, and redoximorphic depressions.

3.3.3 Hydrology Criteria

Wetland hydrology encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface for a sufficient duration during the growing season. Areas with evident characteristics of wetland hydrology are those where the presence of water has an overriding influence on the characteristics of vegetation and soils due to anaerobic and chemically reducing conditions, respectively. The strongest indicators include the presence of surface water, a high water table, and/or soil saturation within at least 12 inches of the soil surface.

3.4 STREAM DELINEATION METHODOLOGY

All watercourses observed within the project area were located in the field and are depicted on the attached maps. Ordinary high water marks (OHWM) were delineated using the methodology described in the Washington State Department of Ecology document Determining the Ordinary High Water Mark for Shoreline Management Act Compliance in Washington State (Anderson et al. 2016).

4.0 CRITICAL AREAS DETERMINATION REPORT

WRI was contracted by the applicant to delineate and catalogue wetlands and watercourses within the project area. Field delineation occurred on July 19, 2018. Woods Creek was observed in the eastern portion of the property. Woods Creek is a Type S waterbody and requires a 200-foot protective buffer and shoreline setback. No wetlands were observed in the vicinity of the site.

Watercourse Name	WAC 222-16-030 Classification	Standard Buffer (feet)
Woods Creek	Type S	200

Table 1: Streams Located in the Project Area

4.1 REVIEW OF EXISTING INFORMATION

Prior to conducting the on-site investigations, public resources information was reviewed to gather background information on the project study area and surrounding areas in regards to wetlands, streams, and other critical areas.

USFWS National Wetlands Inventory

NWI depicts a large freshwater forested/shrub wetland associated with the right bank of Woods Creek, in the vicinity of the subject property. No other features are located in the vicinity of the subject property. This feature was not observed by WRI staff during the July site visit.

Snohomish County Soils

The Natural Resources Conservation Service (NRCS) web soil survey was used to identify soil types in the project area. The subject property consists of Sultan silt loam and Pilchuck loamy sand. The following table describes the hydric component percentages found in this mapped soil type. The likelihood that a given map unit is a hydric soil is partly based on the percentage of hydric components found in the soil type.

Map Unit Name	Hydric Component	Component Percentage
Sultan silt loam	Puget	4
Pilchuck loamy sand	Puget	4

Table 2: Soil Units Present in the Project Area

Fish Presence

The Washington Department of Fish and Wildlife (WDFW), Pacific States Marine Fisheries Commission (PSMFC), and the Washington Dept. of Natural Resources (WADNR) are the primary agencies that provide publicly available information used for making fish presence determinations consistent with the water typing rules set forth in WAC 222-16-030. The following information represents the findings from each source.

WDFW SalmonScape Map Tool

SalmonScape is an online GIS database that contains publicly available resource information for fish population studies and general species distribution (both documented and modeled presence).

The following species are depicted within Woods Creek:

- Chinook,
- Steelhead
- Coho,
- Bull trout
- Chum, and
- Pink

PSMFC StreamNet Map Tool

StreamNet is a fish distribution database maintained by the PSMFC as a regional clearinghouse for fish data. The following species within Woods Creek, in the vicinity of the project:

- Fall Chinook (spawning and rearing),
- Summer Chinook (migration only),
- Coho (rearing and migration),
- Chum (rearing and migration),
- Pink (spawning and rearing),
- Summer steelhead (migration only),
- Winter steelhead (spawning and rearing), and
- Bull trout (migration only)

WDNR Forest Practices Activity Mapping Tool (FPAMT)

FPAMT is an online GIS database that aids the process of submitting a Forest Practices permit application. The tool is useful for the purposes of this study because WADNR models fish presence. FPAMT maps Woods Creek as a Type S stream.

Snohomish County PDS Map Portal

The following features are depicted by PDS Map Portal:

- Woods Creek is depicted as a Type S waterbody, and
- A large freshwater/forested wetland are shown in the southern portion of the site.

WDFW Priority Habitat and Species (PHS) Maps

A large riparian wetland is depicted along the right bank of Woods Creek. This feature was not physically observed during the July site visit.

The following fish species are depicted within Woods Creek, in the vicinity of the project:

- Fall Chinook (breeding area),
- Summer Chinook (occurrence/migration only),
- Coho (occurrence),
- Fall chum (breeding area),
- Pink odd year (breeding area),
- Summer steelhead (occurrence/migration)
- Winter steelhead (breeding area),
- Bull trout (occurrence/migration), and
- Cutthroat (occurrence/migration).

4.2 WATERCOURSE DETERMINATION FINDINGS

Woods Creek
Jurisdiction: WDFW, City of Monroe
WAC 222-16-030 Classification: Type S
Physical Characteristics: Flows to the Skykomish River
City of Monroe Buffer Requirement: 200 feet

Woods Creek is regulated as a shoreline of the state (Type S), and is located along the southeast property line of the subject site. The stream flows southwest for approximately 0.5 miles from the

subject property to the confluence with the Skykomish River. Woods Creek provides documented habitat for Coho, Chinook, Pink, and Chum salmon as well as Bull trout and Cutthroat trout. Type S waters within the city of Monroe require a 200-foot protective buffer.

Woods Creek and its associated edges provide habitat and a potential movement corridor for terrestrial species, which are extremely important as areas become more densely populated. Nearby critical areas and associated buffers provide resources such as food, water, thermal cover, and hiding cover. No mammalian species were detected during the on-site investigation, although several species, including gray squirrels (*Sciurus* spp.), black-tailed deer (*Odocoileus hemionus*), raccoon (*Procyon lotor*), and potentially coyote (*Canis latrans*), are expected to occur within the area. Some avian activity was observed near Woods Creek and, given the habitat available, it is expected that the following avian species use the area: American Crow (*Corvus brachyrhynchos),* Steller's Jay (*Cyanocitta stelleri*), Ruby-crowned Kinglet (*Regulus calendula*), Golden-crowned Kinglet (Regulus satrapa), Black-capped Chickadee (*Poecile atricapilla)*, Dark-eyed Junco (*Junco hyemalis*), Red-winged Blackbird (*Agelaius phoeniceus*), Spotted Towhee (*Pipilo maculatus*), Song Sparrow (*Melospiza melodia*), and Pacific Wren (*Troglodytes pacifica*). This list is not intended to be all-inclusive.

5.0 RESTORATION PLAN

The applicant proposes development within the existing footprint of historic disturbance, which requires removal of eight existing trees. No impacts to native vegetation are proposed. Proposed restoration includes the following measures:

- Buffer restoration within a 14,737 square-foot portion of the historically disturbed area,
- Restoration within a 55,388 square-foot area on the hillslope, which includes debris removal, invasive species removal, and native planting (where invasives are removed), and
- Installation of a split-rail fence along the perimeter of the restored/naturally vegetated areas.

5.1 BUFFER RESTORATION AREAS 1, 2, AND 3

The applicant proposes to restore 14,737 square feet of the historically disturbed area, which is currently covered with 5/8" gravel. The restoration area is located adjacent to the naturally vegetated hillslope. Following the removal of gravel from the restoration areas, underlying soils will be decompacted as necessary (to no less than one foot below existing native soils). Soil amendments shall consist of three inches of premium topsoil (with at least 15 percent organic content) tilled into the top twelve inches of existing soil. Additional soil preparation measures may be necessary, based on recommendations by the contracted biologist. The following plant species and quantities will be installed within the restoration area.

Buffer Restoration Area 1 Planting Plan (2,656 square feet)

Common Name	Latin Name	Size	Spacing	Quantity
Bigleaf maple	*Acer macrophyllum*	1 gallon	9'	9
Douglas fir	*Pseudotsuga menziesii*	1 gallon	9'	12
Western red cedar	*Thuja plicata*	1 gallon	9'	12
Beaked hazelnut	*Corylus cornuta*	1 gallon	5'	5
Salmonberry	*Rubus spectabilis*	1 gallon	5'	24
Snowberry	*Symphoricarpos albus*	1 gallon	5'	14
Osoberry	*Oemleria cerasiformis*	1 gallon	5'	30
Sword fern	*Polystichum munitum*	1 gallon	4'	36
Salal	*Gaultheria shallon*	1 gallon	4'	65
Oregon grape	*Mahonia aquifolium*	1 gallon	4'	65

Buffer Restoration Area 2 Planting Plan (6,225 square feet)

Common Name	Latin Name	Size	Spacing	Quantity
Bigleaf maple	*Acer macrophyllum*	1 gallon	9'	21
Douglas fir	*Pseudotsuga menziesii*	1 gallon	9'	28
Western red cedar	*Thuja plicata*	1 gallon	9'	28
Beaked hazelnut	*Corylus cornuta*	1 gallon	5'	15
Salmonberry	*Rubus spectabilis*	1 gallon	5'	57
Snowberry	*Symphoricarpos albus*	1 gallon	5'	36
Osoberry	*Oemleria cerasiformis*	1 gallon	5'	64
Sword fern	*Polystichum munitum*	1 gallon	4'	80
Salal	*Gaultheria shallon*	1 gallon	4'	154
Oregon grape	*Mahonia aquifolium*	1 gallon	4'	155

Buffer Restoration Area 3 Planting Plan (5,856 square feet)

Common Name	Latin Name	Size	Spacing	Quantity
Bigleaf maple	*Acer macrophyllum*	1 gallon	9'	20
Douglas fir	*Pseudotsuga menziesii*	1 gallon	9'	26
Western red cedar	*Thuja plicata*	1 gallon	9'	26
Beaked hazelnut	*Corylus cornuta*	1 gallon	5'	19
Salmonberry	*Rubus spectabilis*	1 gallon	5'	56
Snowberry	*Symphoricarpos albus*	1 gallon	5'	37
Osoberry	*Oemleria cerasiformis*	1 gallon	5'	50
Sword fern	*Polystichum munitum*	1 gallon	4'	90
Salal	*Gaultheria shallon*	1 gallon	4'	138
Oregon grape	*Mahonia aquifolium*	1 gallon	4'	138

Following installation of the above listed plants, bare areas shall be seeded using the following native buffer seed mix:

Common Name	Latin Name	Lbs./1,000 SF
Tall fescue	*Festuca arundinacea*	0.4
Colonial bentgrass	*Agrostis tenuis*	0.4
Annual ryegrass	*Lolium multiflorum*	0.5
Red clover	*Trifolium repens*	0.2

5.2 BUFFER RESTORATION AREA 4

Intact native vegetation is present in the upper portion of the hillslope. Significant patches of aggressive non-native vegetation (Himalayan blackberry, Japanese knotweed, English ivy, or reed canarygrass) is present on the lower portion of the hillslope, and between the toe of slope and the active channel of Woods Creek. Additionally, the slope and shoreline of Woods Creek have been used as a depository for refuse and debris through the legacy of industrial use. Debris removal and invasive species control shall occur in advance of native plant acquisition/installation. Aggressive control will help ensure the future success of installed native plants. The consulting biologist shall verify that adequate removal of debris and aggressive non-native species has occurred prior to plant installation in Buffer Restoration Area 4.

5.2.1 Invasive Species Removal

As part of the proposed buffer restoration plan, invasive species will be removed and/or treated within the on-site portion of the hillslope. Invasive species to be removed include, but are not limited to, Himalayan blackberry (*Rubus armeniacus*), Japanese knotweed (*Reynoutria japonica*), reed canarygrass (*Phalaris arundinacea*), and English ivy (*Hedera helix*). Removal and control will be conducted in accordance with King County Noxious Weed Control Program Best Management Practices (BMPs). Guidance documents for each of the aforementioned invasive species are provided as Appendix A of this document. Generally, invasive species control will occur in the late summer to early winter, during the dormant period. Ongoing removal and treatment of invasive species will continue throughout the monitoring period.

5.2.2 Buffer Restoration Area 4 Planting Plan

Planting in Restoration Area 4 is predicated on the suppression and removal of invasive species. Prior to the installation of native species, patches of Japanese knotweed, Himalayan blackberry, English ivy, and reed canarygrass will be controlled to prevent the regrowth of aggressive non-native species. As such, the timing of planting in Restoration Area 4 will be based on the success of knotweed removal in the planting area.

Upon successful control, the below planting plan shall be installed in Buffer Restoration Area 4. The exact area of planting shall be determined by the consulting biologist. A conceptual planting plan has been drafted that describes the appropriate number of plants per 1,000 square feet. Some species substitutions may be necessary. Upon installation of these native plants, wood chip mulch (at least 4 inches thick) shall be applied around each new plant. The planting areas shall be re-mulched at least once a year for the remainder of the monitoring period. Plants shall be watered in their first dry season, at least once per week.

Buffer Restoration Area 4 Planting Plan (Plants / 1,000 square feet)

Common Name	Latin Name	Size	Spacing	Quantity
Bigleaf maple	*Acer macrophyllum*	1 gallon	16’	2
Douglas fir	*Pseudotsuga menziesii*	1 gallon	16’	2
Salmonberry	*Rubus spectabilis*	1 gallon	6’	15
Red elderberry	*Sambucus racemosa*	1 gallon	6’	3
Snowberry	*Symphoricarpos albus*	1 gallon	6’	1
Oso berry	*Oemleria cerasiformis*	1 gallon	6’	3
Beaked hazelnut	*Corylus cornuta*	1 gallon	6’	2
Salal	*Gaultheria shallon*	1 gallon	4’	40
Oregon grape	*Mahonia aquifolium*	1 gallon	4	23

5.3 PROJECT NOTES

Pre-construction Meeting

Mitigation projects are typically more complex to install than to describe in plans. Careful monitoring by a wetland professional for all portions of this project is strongly recommended. Construction timing and sequencing is important to the success of this type of project. There will be a pre-construction meeting on this site between the Permittee, the consulting wetland professional, and the contracted landscaper. The objective will be to verify the location of erosion control facilities, verify the location of mitigation areas, and to discuss project sequencing.

Inspections

A wetland professional shall be contracted to periodically inspect the mitigation installation described in this plan. Minor adjustments to the original design may be necessary prior to and during construction due to unusual or hidden site conditions. A City of Monroe representative and/or the consulting professional will make these decisions during construction.

5.4 PLANTING NOTES

Planting shall occur in the early spring or late fall. All plants shall be obtained from a reputable nursery. Care and handling of all plant materials is extremely important to the overall success of the project. The origin of all plant materials specified in this plan shall be native plants, nursery grown in the Puget Sound region of Washington. Some limited species substitution may be allowed, only with the agreement of the landscape designer, wetland biologist, and/or City staff.

Pre-Planting Meeting

Prior to control of invasive species or installation of mitigation plantings, a site meeting between the contracted landscaper and the consulting wetland professional shall occur to resolve any questions that may arise. During this meeting a discussion regarding plant spacing and locations of plant species including wetland verses buffer species shall occur between the landscape contractor and the consulting wetland professional.

Compost/Cultivation

During the pre-planting meeting, the condition of the soils in the enhancement area will be evaluated. If soils appear extremely compacted or of poor quality, a plan for cultivating and/or adding compost will be created. If compost is deemed necessary, all areas denuded of vegetation and soil surface surrounding all planting pit areas shall receive no less than 2 inches of organic compost after planting. Compost shall be kept well away (at least 2 inches) from the trunks and stems of woody plants.

Handling

Plants shall be handled so as to avoid all damage, including: breaking, bruising, root damage, sunburn, drying, freezing or other injury. Plants must be covered during transport. Plants shall not be bound with wire or rope in a manner that could damage branches. Protect plant roots with shade and wet soil in the time period between delivery and installation. Do not lift container stock by trunks, stems, or tops. Do not remove from containers until ready to plant. Water all plants as necessary to keep moisture levels appropriate to the species horticultural requirements. Plants shall not be allowed to dry out. All plants shall be watered thoroughly immediately upon installation. Soak all containerized plants thoroughly prior to installation. Plants whose roots have dried out from exposure will not be accepted at installation inspection.

Storage
Plants stored by the Permittee for longer than one month prior to planting shall be planted in nursery rows and treated in a manner suitable to those species' horticultural requirements. Plants must be re-inspected by the wetland biologist and/or landscape designer prior to installation.

Damaged plants
Damaged, dried out, or otherwise mishandled plants will be rejected at installation inspection. All rejected plants shall be immediately removed from the site.

Plant Names
Plant names shall comply with those generally accepted in the native plant nursery trade. Any question regarding plant species or variety shall be referred to the landscape designer, wetland professional, or City staff. All plant materials shall be true to species and variety and legibly tagged.

Quality and condition
Plants shall be normal in pattern of growth, healthy, well-branched, vigorous, with well-developed root systems, and free of pests and diseases. Damaged, diseased, pest-infested, scraped, bruised, dried out, burned, broken, or defective plants will be rejected. Plants with pruning wounds over 1" in diameter will be rejected.

Roots
All plants shall be balled and burlapped or containerized, unless explicitly authorized by the landscape designer and/or wetland professional. Rootbound plants or B&B plants with damaged, cracked, or loose rootballs (major damage) will be rejected. Immediately before installation, plants with minor root damage (some broken and / or twisted roots) must be root-pruned. Matted or circling roots of containerized plantings must be pruned or straightened and the sides of the root ball must be roughened from top to bottom to a depth of approximately half an inch in two to four places. Bare root plantings of woody material are allowed only with permission from the landscape designer, wetland professional and/or City staff.

Sizes
Plant sizes shall be the size indicated in the plant schedule in approved plans. Larger stock may be acceptable provided that it has not been cut back to the size specified, and that the root ball is proportionate to the size of the plant. Smaller stock may be acceptable, and preferable under some circumstances, based on site-specific conditions. Measurements, caliper, branching, and balling and burlapping shall conform to the American Standard of Nursery Stock by the American Association of Nurserymen (latest edition).

Form
Evergreen trees shall have single trunks and symmetrical, well-developed form. Deciduous trees shall be single trunked unless specified as multi-stem in the plant schedule. Shrubs shall have multiple stems and be well-branched.

Timing of Planting
Unless otherwise approved by City staff, all planting shall occur between November 1 and March 1. Overall, the earlier plants go into the ground during the dormant period, the more time they

have to adapt to the site and extend their root systems before the water demands of spring and summer.

Weeding
Existing and exotic vegetation in the mitigation areas will be hand-weeded from around all newly installed plants at the time of installation and on a routine basis throughout the monitoring period. No chemical control of vegetation on any portion of the site is recommended.

Site conditions
The contractor shall immediately notify the landscape designer and/or wetland professional of drainage or soil conditions likely to be detrimental to the growth or survival of plants. Planting operations shall not be conducted under the following conditions: freezing weather, when the ground is frozen, excessively wet weather, excessively windy weather, or in excessive heat.

Planting Pits
Planting pits shall be circular or square with vertical sides, and shall be 6" deeper and 12" larger in diameter than the root ball of the plant. Break up the sides of the pit in compacted soils. Set plants upright in pits. Burlap shall be removed from the planting pit. Backfill shall be worked back into holes such that air pockets are removed without adversely compacting down soils.

Fertilizer
Slow release fertilizer may be used if pre-approved by City staff. Fertilizers shall be applied only at the base of plantings underneath the required covering of mulch (and shall not make contact with stems of plants). No soil amendment or fertilizers will be placed in planting holes.

Staking
Most shrubs and many trees DO NOT require any staking. If the plant can stand alone without staking in a moderate wind, do not use a stake. If the plant needs support, then strapping or webbing should be used as low as possible on the trunk to loosely brace the tree with two stakes. Do not brace the tree tightly or too high on the trunk. If the tree is unable to sway, it will further lose the ability to support itself. Do not use wire in a rubber hose for strapping as it exerts too much pressure on the bark. As soon as supporting the plant becomes unnecessary, remove the stakes. All stakes must be removed within two (2) years of installation.

Plant Location
Colored surveyors ribbon or other appropriate marking shall be attached to the installed plants to assist in locating the plants while removing the competing non-native vegetation and during the monitoring period.

Arrangement and Spacing
The plants shall be arranged in a pattern with the appropriate numbers, sizes, species, and distribution that are required in accordance with the approved plans. The actual placement of individual plants shall mimic natural, asymmetric vegetation patterns found on similar undisturbed sites in the area. Spacing of the plantings may be adjusted to maintain existing vegetation with the agreement of the landscape designer, wetland biologist, and/or City staff.

Inspection(s)
A wetland biologist shall be present on site to inspect the plants prior to planting. Minor adjustments to the original design may be required prior to and during construction.

Woodchip Mulch
After buffer enhancement plant installation, a 36" circle of no less than 2 to 4 inches of organic/untreated woodchips shall be placed around the base of each plant. Woodchips shall be kept well away (at least 2 inches) from the trunks and stems of woody plants.

6.0 PROJECT MONITORING PROGRAM

Requirements for monitoring project:
1. Initial compliance/as-built report
2. Site inspection (twice per year) for five years
3. Annual reports (one report submitted during each monitored year)

Purpose for Monitoring
The purpose for monitoring this mitigation project shall be to evaluate its success. Success will be determined if monitoring shows at the end of five years that the definitions of success stated below are met. The property owner shall grant access to the mitigation area for inspection and maintenance to the contracted landscaper, wetland specialist, and/or City of Monroe staff during the monitoring period or until the project is evaluated as successful.

Monitoring
Monitoring shall be conducted annually for five years in accordance with the approved Restoration Plan. The monitoring period will begin upon City acceptance of written notification confirming the mitigation plan has been successfully implemented. Final inspection will occur five years after completion of this project. The contracted consultant will prepare a final report documenting the success of the project.

Vegetation Monitoring
Sampling points or transects will be established for vegetation monitoring. Permanent sampling points must be identified on the mitigation site plans in the first monitoring report (they may be drawn on approved plans by hand). Each sampling point shall detail herbaceous, shrub, and tree coverage. Monitoring of vegetation sampling points shall occur once per monitored year.

Photo points
No less than four permanent photo points will be established within the mitigation areas. Photographs will be taken from these points to visually record condition of the enhancement area. Photos shall be taken annually between May 15 and September 30 (prior to leaf drop), unless otherwise specified.

Monitoring Report Contents
Monitoring reports shall be submitted by December 31 of each year during the monitoring period. As applicable, monitoring reports must include descriptions / data for:

1. Site plan and vicinity map
2. Historic description of project, including date of installation, current year of monitoring, restatement of mitigation / restoration goals, and performance standards
3. Plant survival and areal coverage for every plant community (transect or sampling point data), and explanation of monitoring methodology in the context of assessing performance standards
4. Slope condition, site stability, any structures or special features
5. Stream and buffer conditions, e.g., surrounding land use, use by humans, and/or wild and domestic creatures
6. Observed wildlife, including amphibians, avian species, and others
7. Assessment of nuisance / exotic biota and recommendations for management
8. Color photographs taken from permanent photo-points that shall be depicted on the monitoring report map

6.1 GOALS, OBJECTIVES, AND PERFORMANCE STANDARDS

The overall goal of this restoration plan is to provide improve ecological functions along the on-site portion of the Woods Creek riparian corridor. Specific goals, objectives, and performance standards include the following:

Goal 1

Modestly improve forage opportunities in the on-site portion of the Woods Creek corridor.

Objective 1a: Maintain diverse native species that can provide forage for terrestrial mammals and passerine birds in Restoration Areas 1-4

Performance Standard 1a1: Restoration Areas 1-3 shall contain at least four different species of native shrubs, and three different species of native trees, including native pioneer species during each monitoring year.

Performance Standard 1a2: Restoration Area 4 shall contain at least six different species of native shrubs, and four different species of native trees (including existing species and native pioneers) during each monitoring year.

Objective 1b: Control aggressive non-native species within Restoration Areas 1-4

Performance Standard 1b1: Himalayan blackberry, English ivy, and reed canarygrass shall constitute less than 10 percent areal cover in each Restoration Area for all monitoring years.

Goal 2

Improve vegetative screening between proposed development and Woods Creek

Objective 1a: Create soil conditions that can support successional development/screening goals within Restoration Areas 1-3

Performance Standard 1a1: Prior to planting, gravel shall be removed from Restoration Areas 1-3. Soils shall be decompacted to at least twelve inches below existing native soils, and at least three inches of mulch shall be incorporated into the decompacted area.

Objective 1b: Install species that can improve screening in the shrub, sub-canopy, and canopy layers.

Performance Standard 1b1: Installed and native pioneer species in Restoration Areas 1-3 shall constitute 50 percent areal cover in year five. An increase in areal cover shall be observed between monitoring years three and four in Restoration Areas 1-3.

Goal 2 Performance Standard 1b2: There shall be 100 percent survival of all installed species during years one and two in Restoration Areas 1-4. There shall be 80 percent survival of installed species during years three, four, and five in Restoration Area 4.

Goal 3

To discourage human intrusion into the on-site portion of the Woods Creek riparian corridor

Objective 1a: Install split-rail fencing along the perimeter of the Restoration Areas 1-4

Performance Standard 1a1: The split-rail fence shall remain in good condition throughout all monitoring years.

6.2 MAINTENANCE

The mitigation areas will require periodic maintenance to remove aggressive non-native species and replace vegetation mortality. Maintenance shall occur in accordance with the approved plans. Maintenance may include, but will not be limited to: removal of competing grasses (by hand if necessary), irrigation, fertilization (if necessary), replacement of plant mortality, and the replacement of mulch for each maintenance period. Chemical control, only if approved by City staff, shall be applied by a licensed applicator following all label instructions.

Duration and Extent

In order to achieve performance standards, the permittee shall have the mitigation area maintained for the duration of the five-year monitoring period. Maintenance will include: watering, weeding around the base of installed plants, pruning, replacement, re-staking, removal of all classes of noxious weeds (see Washington State Noxious Weeds List, WAC 16-750-005) as well as Himalayan blackberry, and any other measures needed to ensure plant survival. The landscape designer and/or wetland biologist shall direct all maintenance actions.

Survival

The permittee shall be responsible for the health of 100% of all newly installed plants for *two growing seasons* after successful installation. A growing season for these purposes is defined as occurring from spring to spring (March 15 to March 15 of the following year). For fall installation (often required), the growing season will begin the following spring. The permittee shall replace any plants that are: failing, weak, defective in manner of growth, or dead during this growing season, as directed by the landscape designer, wetland biologist, and/or City of Monroe staff.

Installation Timing for Replacement Plants

Replacement plants shall be installed between September 15 and January 15, unless otherwise determined by the landscape designer, wetland professional, and/or City of Monroe staff.

Standards for Replacement Plants
Replacement plants shall meet the same standards for size and type as those specified for the original installation, unless otherwise directed by the landscape designer, wetland professional, and/or City of Monroe staff.

Replanting
Plants that have settled in their planting pits too deep, too shallow, loose, or crooked shall be replanted as directed by the landscape designer, wetland professional, and/or City of Monroe staff.

Herbicides / Pesticides
Chemical controls shall not be used in the mitigation area, sensitive areas, or their buffers. However, limited use of herbicides may be approved depending on site-specific conditions, only if approved by City of Monroe staff.

Irrigation / Watering
Water should be provided during the dry season (July 1 through October 15) for the first two years after installation to ensure plant survival and establishment. A temporary above ground irrigation system and/or water truck should provide water. Water should be applied at a rate of 1" of water twice per week for year one and 1" per week during year two.

General
The permittee shall include in general maintenance activities the replacement of any vandalized or damaged signs, habitat features, fences, or other structural components of this mitigation site.

6.3 CONTINGENCY PLAN
If 20% of the installed plants are severely stressed during any of the inspections, or it appears 20% may not survive, additional plantings of the same species may be added to the planting area. Elements of a contingency plan may include, but will not be limited to: more aggressive weed control, pest control, mulching, replanting with larger plant material, species substitution, fertilization, soil amendments, and/or irrigation.

7.0 USE OF THIS REPORT

This Critical Area Study and Restoration Plan is supplied to River's Edge WA LLLP as a means of determining on-site critical area conditions as required by the City of Monroe during the permitting process. This report is based largely on readily observable conditions and, to a lesser extent, on readily ascertainable conditions. No attempt has been made to determine hidden or concealed conditions.

The laws applicable to wetlands are subject to varying interpretations and may be changed at any time by the courts or legislative bodies. This report is intended to provide information deemed relevant in the applicant's attempt to comply with the laws now in effect.

The work for this report has conformed to the standard of care employed by wetland ecologists. No other representation or warranty is made concerning the work or this report, and any implied representation or warranty is disclaimed.

Wetland Resources, Inc.

Scott Brainard, PWS
Principal Wetland Ecologist

Niels Pedersen
Senior Ecologist

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Appendix A

King County Noxious Weed Control Program BMPs

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King County Noxious Weed Control Program
BEST MANAGEMENT PRACTICES

Invasive Knotweeds

Bohemian Knotweed
Polygonum x *bohemicum* (*Fallopia* x *bohemica*)
Japanese Knotweed
Polygonum cuspidatum (*Fallopia japonica*)
Giant Knotweed
Polygonum sachalinense (*Fallopia sachalinense*)
Himalayan Knotweed
Polygonum polystachyum (*Persicaria wallichii*)
Polygonaceae – Knotweed/Buckwheat Family

Class B Noxious Weeds
Control Recommended
(required in selected areas)

Legal Status in King County: The species of knotweed listed above are classified as Class B noxious weeds (non-native species that can be designated for control based on local priorities) according to Washington State Noxious Weed Law, RCW 17.10. The Washington State Noxious Weed Control Board has not designated these species for required control in King County. The King County Noxious Weed Control Board recommends control of these species wherever feasible, and requires control in selected areas (see current King County Noxious Weed List for details). State quarantine laws prohibit transporting, buying, selling or offering these species for sale or distributing plants, plant parts or seeds.

BACKGROUND INFORMATION

Impacts and History

- Displaces native vegetation due to its fast-growing, dense, aggressive growth.
- Creates bank erosion problems and is considered a potential flood hazard. Despite knotweed's large rhizome mass, it provides poor erosion control.
- Lowers quality of riparian habitat for fish and wildlife. Changes nutrient cycling of rivers and lowers water quality.
- Thickets can completely clog small waterways.
- Forms dense stands that crowd out all other vegetation, degrading native plant and animal

habitat.

- Damages pavement, limits sight visibility along roads, and obscures guard rails and road signs.
- Roots interfere with drainage and septic systems.
- Invades turf and landscaped areas.
- Difficult to control because of extremely vigorous rhizomes and roots that form a deep, dense mat.
- Plants can re-sprout from very small root and rhizome fragments.
- Plant stems and rhizomes that fall into the water can create new infestations downstream.
- Japanese and giant knotweed are native to northeastern Asia. They hybridize to produce Bohemian knotweed. Himalayan knotweed is native to south and central Asia, including the Himalayas.
- All species were introduced into the U.S. and Canada starting in the late 1800s as ornamental plants and for erosion control and have since spreadwidely.

Description

- Large, clump-forming, herbaceous perennial with 4 to 12 feet tall, round canes with thin, papery sheaths and creeping roots. The hollow stems are jointed and swollen at the nodes, giving a bamboo-like appearance.
- Japanese, giant, Bohemian and Himalayan knotweed are members of the buckwheat family (Polygonaceae).
- Rhizomes can spread at least 23 feet (7 meters) from the parent plant and can penetrate more than 7 feet (2 meters) into the soil.
- Forms large, dense clones of either male or female plants.
- Stems are thick and hollow, resembling bamboo, green to reddish in color, often red-speckled. Young shoots look similar to red asparagus.
- Leaves are alternate, bright green with smooth edges. Leaf shape varies. : Himalayan knotweed leaves are like an elongated triangle, Japanese knotweed leaves are rounded with a flat base and short pointed tip Bohemian knotweed leaves vary from a heart-shaped base to a flat base and variable leaf tip shape, and giant knotweed leaves are huge, "elephant ear" type leaves with a distinctly heart-shaped base and elongated pointed tip. Leaf size also varies, however Japanese knotweed leaves are generally 4 to 6 inches long by 3 to 4 inches wide, hybrid Bohemian knotweed leaves are 7 to 9 inches long, and giant knotweed leaves often exceed 12 inches across, twice the size of Japanese knotweed leaves.
- Flowers are small, white/green on Japanese, Bohemian and giant knotweed and light pinkish-white on Himalayan knotweed and grow in showy plume-like branched clusters. Flowers form in July and August and grow in dense clusters

from the leaf joints. Flowers are either all female (form seeds) or all male (don't form seeds) on each plant.
- Flowers in late July, typically start to form seeds by mid-August.

Habitat

- Can grow in partial shade or full sun.
- Knotweed thrives in any moist soil or river cobble, but can also grow in dry areas.
- Most commonly found in the flood zone along rivers and creeks, it also grows in roadside ditches, railroad rights-of-way, unmanaged lands, wetlands, neglected gardens, and other moist areas.

Reproduction and Spread

- Knotweed typically starts growth in April, but can begin as late as June in higher elevations.
- Reproduces by seed and vegetatively from rhizomes and roots. Knotweed can spread rapidly due to its ability to reproduce vegetatively.
- Invasive knotweeds spread mainly by rhizomes. Rhizome and root fragments are dispersed by natural causes (flood, erosion) or man-made dispersal (roadside clearing, fill dirt).
- Root fragments, as small as ½ in (1 cm) can form new plant colonies and can also be spread in contaminated fill material.
- Cut or broken stems will sprout if left on moist soil or put directly into water, or if moved by beavers or earth-moving equipment. Each node on the plant stock is able to produce roots and new plants.
- Seeds can be viable for as long as 15 years. Seeds in the upper 1 inch (2 cm) of soil generally are viable for 4 to 5 years. Below 1 inch (2 cm), the seeds remain dormant longer. However, knotweed seedlings are not often found in the wild and most dispersal is by root and stem fragments.
- Knotweed canes die back with the first hard frost (Pridham and Bing 1975) and go dormant during the winter. The dead, brown stems may remain standing through the winter with new canes developing in the spring from the same rootstock.

Local Distribution

Found throughout King County. The heaviest concentrations of invasive knotweeds are found along riparian corridors and road rights-of-way. Infestations can also be found in residential gardens, wetlands, and upland areas.

CONTROL INFORMATION

Integrated Pest Management

The preferred approach for weed control is Integrated Pest Management (IPM). IPM involves selecting from a range of possible control methods to match the management requirements of each specific site. The goal is to maximize effective control and to minimize negative environmental, economic and social impacts.

Use a multifaceted and adaptive approach. Select control methods that reflect the available time, funding, and labor of the participants, the land use goals, and the values of the community and landowners. Management will require dedication over a number of years, and should allow for flexibility in method as appropriate.

Planning Considerations

The key to controlling knotweed is controlling the rhizomes. What you see on the surface is only a fraction of the problem. "Control measures that fail to address the regenerative capacity of the rhizomes will not control this plant." (Gover et al 2005). Although there are potentially successful mechanical or manual control options for small patches, landscape level projects and large sites will likely require integrating herbicide into the control strategy.

Begin by surveying area for knotweed, setting priorities and selecting the best control method(s) for the site conditions and regulatory compliance issues **(refer to the King County Noxious Weed Regulatory Guidelines)**.

It is possible but not easy to control knotweed, and it is especially difficult on a landscape scale, such as along a river, or when spread over many properties. Because of knotweed's incredibly extensive root system and sprouting ability, landscape level control requires long-term planning and follow-up. Even on a patch-by-patch basis, successful eradication is likely to take several years and multiple treatments.

On rivers and streams, knotweed spreads easily downstream by water, so it is necessary to begin control from the furthest upstream infestation, including all tributaries and other upstream sources of possible re-infestation.

For large, landscape scale projects, outreach to all public and private landowners and the broader community, as well as volunteer recruitment and coordination, will improve the success of the project. Work with volunteers and other organizations in the community to expand the ability to physically get the work done. Landscape

level projects may have a greater chance of success under a coordinated effort such as a Cooperative Weed Management Area (CWMA). Grants are available for invasive vegetation removal, such as knotweed, that benefits public resources, especially for work done through non-profit organizations or government agencies.

Below, each method is first described individually, and then Best Management Method recommendations are provided for different types of infestations.

Early Detection and Prevention

- Monitor for new populations in May and June.
- Dig up isolated or small populations (50 stems or less). If there are more stems than you can remove manually, it may be necessary to treat the area with an appropriate herbicide in the late summer/early fall.
- Prevent plants from spreading away from existing populations by washing vehicles, machinery, and equipment that have been in infested areas.
- Prevent knotweed from entering waterways.
- Do not discard stems or root fragments in waterways or on moist soil.

Manual or Mechanical Control

- **When to use manual methods:** If there is easy access to the site and patches are reasonably small (50 stems or less), commit to following an intensive control regimen.
- **Variations:** Cutting, mowing, pulling, digging, covering.
- Cutting, mowing and pulling stimulates shoot growth and depletes the roots. The more shoots there are per linear foot of root, the more likely it will be to physically pull out the roots, exhaust them by depriving them of energy (i.e. by cutting the shoot off) or eradicating them with an herbicide treatment.
- When controlling knotweed manually, be sure to practice the four T's: timely, tenacious, tough and thorough (Soll 2004).
- Hand pulling and the use of hand mechanical tools to control noxious weeds are generally allowable in critical areas in unincorporated King County (refer to the **King County Noxious Weed Regulatory Guidelines** for details).
- Be aware that repeated cutting tends to produce numerous small stems that may make future treatment with stem injection more difficult.
- **CUT** stems close to the ground TWICE A MONTH OR MORE between at least April and August, and then once a month or more until the first frost, over 3 to 5 consecutive years (Soll 2004). This can vary depending on the growth of the plant. The important thing it to keep the plant from storing any new root energy.
    - Keep plants from growing taller than 6 inches.

    - Using a machete, loppers or pruning shears, cut the stems to the ground surface. If using a mower/weed-eater is necessary, cut as low and as often as possible. Be sure not to scatter stems or root fragments.
    - Rake and pile up the cut stems where they will dry out. Dried stems can be crushed and composted on site or discarded in yard waste.
    - Stems or stem fragments left on moist soil or in water may sprout at the nodes, and the area (or adjacent areas) may become re-infested.
    - Large piles of composting knotweed stems have been known to self-ignite, so take care not to create large piles and monitor regularly.
    - Goats and chickens are reported to eat knotweed and in some circumstances, controlled grazing may be an option similar to intensive mowing. Be aware that goats will eat desirable vegetation as well as knotweed. Grazing should reduce the growth of knotweed, but is unlikely to completely kill the plants. For best results, maintain intense grazing pressure for at least 5 years over the entire knotweed patch or until plants stop growing back.
    - Never allow cut, mowed or pulled knotweed vegetation to enter waterways.
- **DIG** up as much root as possible in August over at least three consecutive years; reported to work for small, isolated patches.
    - Roots of established plants may extend down 7 to 10 feet deep, and rhizomes are often very large and woody and difficult to dig up.
    - Be sure to carefully dispose of the roots in garbage. Do not put them in a compost pile because they remain viable for a very long time. Roots and rhizomes dry out very slowly, so burning isn't usually a feasible disposal option for rhizomes.
    - Each time you see new sprouts (start looking a week after you pull), uproot them as well, trying to pull out as much of the root as you can each time.
    - Be sure to search at least 20 feet away from the original patch center for new sprouts.
- **COVER** with heavy duty geo-textile fabric or black plastic.
    - Works better with isolated and smaller patches on open, undisturbed terrain.
    - Plan to leave the covering material in place throughout at least five growing seasons, longer if the soil is wet or the population large and well-established.
    - First, cut stems down to ground surface. Next, cover the area with geo-textile fabric or heavy duty black plastic extending beyond the plant base and stems at least 7 feet beyond the outside stems. Leave covering material loose and clean of debris, weighted down with heavy rocks or cement blocks. Watch for holes in the fabric and at the perimeters for any new growth. Every two to four weeks during the growing season, stomp down re-growth under covering material and clean debris.

- Install covering at the beginning of the year or after cutting the plant down several times during the growing season which will reduce some of the rapid plant growth.

Chemical Control

- Herbicides should only be applied at the rates and for the site conditions and/or land usage specified on the herbicide label. **Follow all label directions**.
- For your personal safety, at a minimum, wear gloves, long sleeves and pants, closed toe shoes, and appropriate eye protection. Follow label directions for any additional personal protection equipment needed.
- For herbicide use in critical areas and their buffers, certain restrictions apply depending on the site and jurisdiction. In unincorporated King County, refer to the **King County Noxious Weed Regulatory Guidelines** for a summary of current restrictions and regulatory compliance issues. Elsewhere, check with the local jurisdiction.
- Herbicides with the active ingredients glyphosate (e.g. Rodeo, Roundup, Aqua Neat among others), imazapyr (e.g. Habitat, Polaris, Arsenal), triclopyr (e.g. Garlon, Renovate, Element) and aminopyralid (e.g. Milestone) have shown to be variably effective in controlling or suppressing knotweed either separately or in combination. Results vary depending on the timing, rate and method of application. See below for detailed information.
- Aquatic herbicides are Restricted Use Pesticides in Washington and can only be purchased and used for aquatic applications by WSDA licensed pesticide applicators with an aquatic endorsement on their license. Also, state and sometimes local permits are generally required when applying pesticides in water or where herbicides are likely to drift into water.
- Aquatic herbicides that are also labeled for use in terrestrial areas, such as Roundup Custom, can be purchased and used by non-licensed individuals for treating knotweed, as long as the plants being treated are not growing in water and the herbicide is not likely to drift into water, such as with the stem injection method.

Types of Chemical Control Methods

Foliar Application

- Use a backpack sprayer or large volume sprayer.
- Easiest and fastest method, but potentially higher risk of drift onto desirable vegetation and into water and soil.
- Use a systemic herbicide that translocates from leaves to the roots.
- The most effective chemical on knotweed is imazapyr and the second most effective is glyphosate. These products can also be combined to produce

quicker visual signs of treatment, but does not increase the effectiveness of using imazapyr alone.

- The most effective time to spray knotweed with glyphosate or imazapyr is generally July to October, or between bud formation and when the plant dies back after the first frost, with later treatments in that time period generally being more effective than earlier. Early treatments may require a follow-up spray to control re-growth. This will vary with weather and water availability. Usually the most effective time for a single treatment is late August/early September.
- Non-selective herbicides such as glyphosate (e.g. Roundup) and imazapyr (e.g. Habitat, Polaris) kill both grass and broadleaf plants. Selective broadleaf herbicides will not harm most grasses if used according to label. However, there are currently no selective broadleaf herbicides that provide more than one season of knotweed control. Triclopyr and aminopyralid will provide short-term control of knotweed, but generally won't kill the plants. Metsulfuron and dicamba will also control top growth of knotweed although generally don't control the rhizomes. 2,4-D is not effective on knotweed.
- Where it is not possible to spray over the top of the plants due to height and access, spray the stems and the undersides of the leaves and get as much coverage of the plants as possible.
- Avoid spraying knotweed when bees and other pollinators are present on the flowers whenever feasible. When pollinators are present, consider spraying either before full-bloom or after petals begin to drop. You can also spray earlier or later in the day when bees are not as active. If necessary to spray when plants are in full flower, spray the stems and undersides of the leaves and avoid spraying the flowers as much as possible. You may also consider clipping and removing the flowers prior to foliar spray, or using a stem injection method. Alternately, beekeepers can be notified and asked to move bees away from areas being treated if there are concerns about exposure.
- If plants are cut back, allow them to re-grow for at least six weeks, or to about 3 to 6 feet tall, before spraying. If plants are bent over to make them shorter and easier to spray, allow them to recover for one to two weeks before spraying to make sure they are actively growing again. Typically, spraying re-growing or bent knotweed is not as effective as spraying full grown plants, but it is sometimes more efficient and necessary because of land use or visibility issues.
- If it is necessary to keep plants from growing tall for visibility or other reasons, a spring herbicide application or cutting will set back the plant so that it can be sprayed at an effective height and growth stage later in the year.
- Experience in Pennsylvania suggests June 1 as a good cutting date if follow up spraying is planned. They found that regrowth when cut June 1 is

vigorous, but limited in height (6 to 10 ft tall knotweed cut in June resulted in 2 to 4 foot tall re-growth). Cutting too early in the season can result in regrowth that reaches full height and waiting too late in the season can result in almost no regrowth and will limit the ability to spray and control next season's growth (Gover et al 2005).

- Continue to monitor and treat annually in the late summer as long as there is re-growth. Re-growth the following years will be much shorter and sparser, and can be sprayed with considerably less herbicide, although it will take more time to locate all the plants. Re-growing plants can also be dug up once they are very small, although it is still difficult to remove all the roots.
- Regardless of herbicide choice, rate or spray timing, large, established patches (hundreds or thousands of stems) will almost certainly require foliar treatments over at least three years, possibly many more. Similar to treating patches mechanically, be sure to search for new shoots up to 20 feet or more away from the central patch after herbicide treatment begins.

Specific Herbicide Information

Glyphosate: 2% to 5% solution plus surfactant (as recommended on label).

- Apply as coarse spray with complete, uniform coverage.
- Apply when knotweed is actively growing and most have reached the bud to early flowering stage until the first hard frost.
- Roundup Custom/AquaneatRodeo plus surfactant (e.g. Competitor, Agridex) are approved for aquatic sites.
- Roundup ProMax or other products containing glyphosate can be used on terrestrial sites. Add surfactant if advised on label. The concentration of active ingredients can vary by product so make sure to use the rate recommended on the label. The percent rate given here is based on a product such as Roundup ProMax that has 48% active ingredient.

Imazapyr : slow-acting and expensive but highly effective on knotweed.

- 1% solution with 0.25% to 1% surfactant or 0.5 to 1 lb per acre.
- Apply from midsummer after seed set until first killing frost.
- Habitat and Polaris are approved for aquatic sites.
- Arsenal and other imazapyr products are approved for various non-aquatic sites (see label for crop rotation and other restrictions).
- Imazapyr has some soil activity and may impact roots of other plants in the area being sprayed for several months after application. Follow label instructions before planting into treated area and use caution around tree roots and on permeable soils.

Wick Wipe

- Use an applicator wand with a sponge on the end of a reservoir for the herbicide. Wipe the sponge soaked with herbicide on the leaves and stem of the plants.
- Use glyphosate at 33 to 75 % concentration (or as directed on product label).
- Greatly reduces drift.
- Hard to get chemical on leaf surface and seems to increase personal contact with herbicide.
- May be appropriate for small re-growing plants growing near desirable vegetation.

Cut and Pour

- Not very effective and generally not recommended.
- Cut stems between lowest 2 nodes and put 3 ml undiluted (concentrated) glyphosate into stem cavity (can use a large needle with measured reservoir to be precise). Be very careful not to splash herbicide onto the ground.
- Timing best in late summer or early fall.
- Follow label directions on amount applied per acre (i.e. for the 7.5 quart per acre label rate, can only treat 2375 stems per acre at 3 ml per stem).
- Need to remove cut stems away from water where they can dry out and not spread off site.

Hollow Stem-Injection

- Timing is best from late July to end of September (or whenever the stems dry out and start splitting when injected).
- Use a stem injection gun or similar tool that can be calibrated to the required amount.
- Follow directions carefully especially on calibrating and cleaning the equipment.
- Highly effective; usually 95% or more controlled in first year.
- Greatly reduces drift, is highly selective and there are no cut stems to deal with.
- Need to inject every cane in the stand; very time and labor intensive compared with foliar spraying.
- Can only inject stems over ½ inch in diameter so there will always be small stems that can't be injected in a population, especially in the second year of treatment.
- Glyphosate is the only product labeled for hollow stem injection. Aquatic formulations of glyphosate such as Roundup Custom (formerly sold as Aquamaster), Rodeo, or Aqua Neat can be used on or near aquatic sites while Roundup ProMax and other non-aquatic formulations, can be used on non-aquatic sites.

- Inject the concentrated herbicide product into each stem between first and second nodes from the ground, or between second and third node if cane is too woody lower down.
- Most labels recommend 5 ml per cane for knotweed, but our experience and WSU Extension trials have shown that 3ml is just as effective as 5 ml, so we recommend using 3 ml.
- Mark stems immediately after injecting with spray paint or a grease pen to avoid missing stems or doubling up (once stems are injected they won't hold another dose and herbicide will spill out of the stem).
- Make sure to stay within the per acre label rate for the glyphosate product you are using. For example, with a label maximum of 7.5 quarts per acre, at 3ml per cane, you can only inject approximately 2,375 canes per acre.
- For two to three years following stem injection, plan on either spot-spraying or digging up any re-growing plants. Plants will be smaller and sparser, but follow up is essential to long term control.

Combination of Methods

- Using a combination of methods may work better for some site conditions, labor availability or land use needs. However, none of these methods are as effective as spraying full grown knotweed in late summer or using hollow stem injection.
- **Cut/Spray:** Cutting stems, followed by foliar spray 6 weeks later, instead of spraying twice, will reduce overall herbicide input into the watershed and is probably more labor efficient (can use volunteers or unlicensed crews to cut the infestation).
- **Bend/Spray:** Bend stems and then approximately 2 to 4 weeks later, spray plants. Volunteers or unlicensed crews can be used to bend the stems prior to foliar application.
- **Cut/Cover:** This method is moderately effective. Needs constant monitoring and controlling of plants around perimeter and scattered plants that grow through sheet mulch through holes/overlap areas. Every two to four weeks need to stomp down re-growth under covering material and clean off debris.
- **Spray/Spray:** Spring or summer spray followed by fall foliar spray; sets plants back so they can be sprayed at the appropriate growth stage and at the best (easiest) height. This method increases the amount of overall herbicide input into the watershed but takes the least time of the combination methods.

The mention of a specific product brand name in this document is not, and should not be construed as an endorsement or as a recommendation for the use of that product.
Chemical control options may differ for private, commercial and government

agency users. **For questions about herbicide use, contact the King County Noxious Weed Control Program or your local Weed Board or Extension Agent.**

Biological Control

- Biological control is the deliberate introduction of insects, mammals or other organisms which adversely affect the target weed species. Biological control is generally most effective when used in conjunction with other control techniques.
- There are currently no biological control agents approved for managing invasive knotweed in the United States, but it is likely that agents will be approved in the near future. In Washington, contact the WSU Integrated Weed Control Project at http://invasives.wsu.edu/aboutus.htm for current information.

SUMMARY OF BEST MANAGEMENT PRACTICES

Small Infestations in Native and/or Desirable Vegetation

- Dig up plants or apply appropriate herbicide with wick wiper or by spot spray to minimize off target injury (follow directions above for the method used).
- Monitor site throughout growing season and remove any new plants. Remember to search at least 20 feet from the original infestation.
- If using an herbicide in a grassy area, consider using a selective herbicide to avoid injury to the grass or a wick wiper or stem injector.
- Re-vegetate bare areas with appropriate vegetation or cover with mulch while desirable vegetation becomes established. Do not leave large areas of bare soil.

Large Infestations/Monocultures

- Mowing is not effective for controlling invasive knotweed infestations and can spread infestations further.
- Large infestations can be controlled with herbicides or a combination of methods (follow directions in the appropriate sections above).
- Eradication of knotweed with a single herbicide application is difficult. Typically it takes several treatments, over 4 to 6 years to get an infestation under control.
- If using the covering method, be sure to monitor for knotweed growth on the edges of sheet-mulched sites, at overlapped areas in the sheet-mulch, and where sheet-mulch has been staked. For sprayed sites, monitor annually around the edges of chemically treated areas.
- Use erosion control measures in areas subject to erosion, especially on steep slopes or riverbanks.
- Plan on re-vegetating with desirable vegetation after the initial 2-3 years of treatment, especially in areas likely to be re-infested with knotweed or other

invasive vegetation. Mulch bare areas until vegetation is re-established where feasible.
- Consider replanting with vegetation that is beneficial to bees and other pollinators when clearing large areas of knotweed. Use native or non-invasive plants only.

Control in Riparian Areas

- Additional permits may be required for control of infestations in riparian areas. See the **King County Noxious Weed Regulatory Guidelines** for more information or contact your local jurisdiction.
- Whenever large areas of vegetation are removed, the cleared area needs to be replanted with native or non-invasive vegetation and stabilized against erosion. Refer to the King County Surface Water Design Manual for further information about sediment and erosion control practices (call 206-477-4800 or go to http://www.kingcounty.gov/environment/waterandland/stormwater/documents/surface-water-design-manual.aspx for information).
- Survey area and document extent of infestation from the headwaters of waterways down.
- Consider manual removal or stem-injection for small (less than 50 stems) infestations if feasible.
- Target the knotweed, retaining and protecting native and beneficial plants.
- Use aquatic formulations where there is any risk of herbicide entering the water.
- Infested areas should incorporate a management plan lasting at least several years to control plants re-sprouting from the rhizome mass, skipped plants and any regrowth.

Control on Road Rights-of-Way

- Mowing is not an effective means of control and can spread knotweed infestations along road rights-of-way.
- Small plants should be dug up or spot sprayed with an appropriate herbicide. Large patches can be sprayed in late summer/early fall or controlled with a combination of cutting and spraying (see instructions above).
- Where necessary for visibility or other issues, plants can be cut down or sprayed in May or June and then sprayed again in late summer or early fall.

Knotweed Disposal Methods

- Knotweed crowns and rhizomes should be collected and discarded with the trash or taken to a transfer station for disposal. Composting crowns and rhizomes is not recommended.
- Knotweed stems can be composted, but they will root on moist soil so they need to be completely dried out and crushed before composting.

- Stems can be left on site to dry out and decompose if they are in a dry area where they will not move into waterways or onto moist soil. The area should be monitored for re-growth and stems should not be moved to an un-infested area.
- Large piles of composting knotweed stems have been known to self-ignite so monitor piles and avoid creating very large stacks. Knotweed stems burn when dry but the hollow compartments can burst and create small explosions when burned.
- Dried out stems may be broken up or chipped into pieces less than an inch long and then composted on site, disposed of in a city-provided yard waste container or in the green recycling at a transfer station.
- Stems of knotweed with seeds should be collected and put in the trash or taken to a transfer station. If removal is not feasible, these stems can be left on site. However, there is a risk of spread from the seeds, so the area should be monitored for several years for seedlings. Stems should be left well away from waterways, shorelines, roads and un-infested areas.
- Never dispose of knotweed plants or plant parts into waterways, wetlands, or other wet sites where they might take root or infest areas downstream.

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English ivy - *Hedera helix*

English ivy (*Hedera helix)* and Irish ivy (*H. hibernica or H. helix hibernica*) are very similar plants in the Ginseng family (*Araliaceae*), and both are referred to as English ivy in this bulletin.

THE IMPACTS

When English ivy escapes from landscaped plantings it often establishes and spreads in shaded forested lands or natural areas. There it can impact all three zones of a deciduous or conifer plant community – the forest floor, the shrub layer and the canopy.

English ivy climbing a mature tree

- English ivy reaches the tree canopy and shades out deciduous foliage during summer months, suppressing the host tree.
- Dense ivy cover deprives the bark of normal contact with air and microorganisms.
- English ivy adds substantial weight to a tree. The estimated weight of ivy removed from a tree in Olympic National Park was 2100 lbs.
- Mature trees covered with ivy are top-heavy and more likely to blow down.
- Thick ivy mats can accelerate rot and deteriorate structures.

Thick ivy mats smother understory plants and tree seedlings

- English ivy changes the natural succession patterns of forests.
- Ivy limits understory regeneration by blocking sunlight and shading out plants.
- The fast-growing ivy competes for water and nutrients.
- The shallow mat-like root system make it a poor choice for erosion control, and contributes to erosion in some cases.
- Provides hiding areas for rats and other vermin.

IVY CULTIVARS

More than 400 different English ivy cultivars vary in leaf shape, size, color and growth form. While many cultivars are sold as ornamental plants, recent research indicates that several cultivars are invasive and should be avoided as landscape plants in the Pacific Northwest.

Four cultivars of English ivy were added to the 2002 Washington State Noxious Weed List as Class C weeds.

They are: *Hedera helix* 'Baltica';
H. helix 'Pittsburgh';
H. helix 'Star' and
H. hibernica 'Hibernica'

WHAT IS A WEEDY CULTIVAR?

- English ivy is invasive when growing in areas where it was not planted.
- It is invasive when thick mats or vines inadvertently cover plants, trees or structures.
- It is invasive when producing flowers and seeds and rapidly spreading on its own.

King County
Department of Natural Resources and Parks
Water and Land Resources Division
Noxious Weed Control Program

WHAT IS ENGLISH IVY?

This woody, evergreen perennial grows as a vine (climbing or creeping) or as a shrub. English ivy can photosynthesize year-round, and is capable of growth for 9 to 10 months of the year. Older vines can grow over 90 feet long with stems reaching one foot in diameter. English ivy is long-lived with reports of one plant over 400 years old.

Adventitious roots are formed at the leaf nodes of immature plants, and they help ivy climb by adhering or anchoring to surfaces – they do not penetrate the surface. Ivy tolerates a wide range of light conditions but growth is stimulated by light.

The entire plant contains slightly toxic compounds. Berries and leaves are toxic to people or livestock if eaten in a large quantity. The sap can cause dermatitis and blistering.

Hedera is native to Europe and Asia, and was widely introduced into temperate parts of the world. It has a long history as a garden plant. Introductions to the Pacific Northwest date back to at least the 1890's.

There are two distinct forms and growth stages of English ivy – the juvenile and the mature form.

Leaves of juvenile plants

Juvenile form

- Leaves are deeply 3 to 5 lobed, light green and alternately arranged.
- Young shoots and leaves are hairy.
- Stems produce adventitious roots at the nodes.
- Immature plants do not produce flowers.
- This juvenile stage lasts for about 10 years.

Leaves of a mature plant

Mature form

- Leaves are unlobed, or slightly lobed, dark green and leathery and spirally arranged.
- English ivy matures to produce flowers when it begins to grow vertically.
- Mature plants do not produce adventitious roots.

REPRODUCTION AND DISPERSAL

During the juvenile stage ivy only spreads vegetatively. Any stem fragments in contact with the soil can regenerate growth. Mature plants continue with a slower vegetative spread, but they also produce flowers and spread by seed. Clusters of small greenish-white flowers are usually produced in the fall.

The dark colored drupes (berry-like fruits) mature in the spring.

The fruits are high in fat, and they are available in early spring when food is still scarce. Many birds, including blackbirds, European starlings and American robins, disperse the seeds.

CONTROL REQUIREMENTS

English ivy is a Class C Noxious Weed of Concern in King County - control is strongly encouraged although not currently required. The County Weed Board recommends control and containment of existing populations and discourages new plantings of invasive cultivars. For control requirements in other areas, please contact the county noxious weed control program.

Stop buying and stop planting invasive cultivars.

PREVENTION

When planting an area, consider alternative ground covers. The list includes, but is not limited to, the following native plants: wild strawberries, false lily-of-the-valley, bunchberry, fringe cup, wood sorrell, kinnikinnick, low Oregon grape, and sedges. Please contact local nurseries or native plant societies for more suggestions.

PRIORITIZE YOUR CONTROL PLAN

Consider the amount of ivy to be removed and the site you are working on. Also consider the on-site vegetation you want to keep, the time frame for removal and the labor force. Be persistent with your control plan and with follow-up.

- First remove the vertical growing plants to stop flower production and further spread by seed.
- When working in steep areas, the site needs to be considered for slope and any surface erosion.

MANUAL CONTROL

Even though it is labor intensive, the most effective control method is manual removal. Depending on the site, several other manual control options are also effective. NOTE: Remove all cut stems from soil contact.

Wear gloves and protective clothing. The sap can cause a reaction in some people.

- Remove flowers or seed heads you can reach.
- Hand pull or dig out accessible plants.
- Mowing is effective in areas that are mowed regularly. Clippings need to be removed.
- Mulching – apply an 8” thick mulch layer. The plants can be cut or removed and then mulched, or a mulch layer can be directly applied on top of plants. This is not an option in steep areas.

Cut the vines or pry them off of trees with the aid of a tool at a comfortable height. This will kill the upper vines, but the lower, rooted plant needs to be removed.

CHEMICAL CONTROL

Controlling established English ivy with herbicides is not very successful because of the waxy leaves. There is also a risk to non-target plants from run-off of the waxy leaves. English ivy is considered tolerant of many commonly used herbicides. Some success has been achieved by carefully selecting herbicides and focusing applications on young, actively growing plants. If herbicides are used, make sure that their use is allowed at your site. Certain herbicides can not be used in aquatic areas or their buffers. When using an herbicide follow all label directions. Contact your local noxious weed control program for control guidelines in your area.

DISPOSAL - FOR SMALL AMOUNTS

Remove and dispose as yard waste. Backyard composting is only recommended when the rootlets and the cut stems are dead. Otherwise the ivy stems will root in the other material as it decomposes.

English ivy clippings will break down to 1/5 of its size when left to dry out and die.

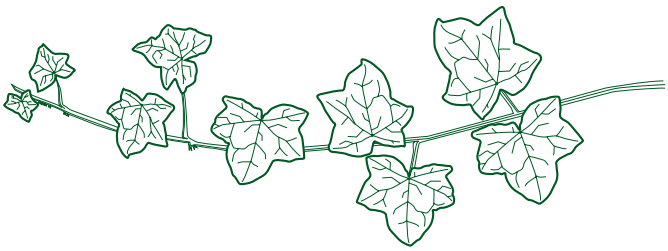
- Expose the stems and rootlets to the air for 6 – 7 days until they desiccate.
- Pile the clippings under a covered area, then cover the clippings with a tarp.
- Pack the ivy in black plastic bags and leave in a sunny spot, rotating to heat all the plants.

English ivy rootlets from a 4" diameter stem

DISPOSAL - FOR LARGER AMOUNTS

For large projects where the removed ivy can remain on site and out of sight, the cut stems can be balled or stacked on top of itself and left on site. Lift the ivy piles to keep the cut stems and rootlets from soil contact, or regularly turn the clippings to keep exposing the rootlets to the air.

- Pile the ivy and let it dry out or decompose. Cover the piles to speed the process.
- Wrap the pulled vines into medium sized bundles, leave them on site to dry up and die.



For more information please contact:

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Department of Natural Resources
Water and Land Resources Division
201 S. Jackson St., Suite 600
Seattle, WA 98104
(206) 296-0290
email: noxious.weeds@metrokc.gov
http://dnr.metrokc.gov/weeds

Or contact your local county noxious weed program.

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Websites:

King County Noxious Weed Control Program:
http://dnr.metrokc.gov/weeds
WA State Noxious Weed Program (with links to counties):
http://www.wa.gov/agr/weedboard
No Ivy League: http://www.noivyleague.com/
Ivy OUT: http://ivyout.org

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Reed Canarygrass

Phalaris arundinacea **Class C Noxious Weed**
Poaceae **Control Recommended**

Legal Status in King County: Reed canarygrass (RCG) is a Class C noxious weed (non-native species that can be designated for control based on local priorities) according to Washington State Noxious Weed Law, RCW 17.10. The State Weed Board has not designated this species for control in King County. The King County Weed Control Board recommends control of this species where feasible, but does not require it.

BACKGROUND INFORMATION

History and Impacts

- Native to Eurasia and possibly North America as well. No reliable way to tell the difference between native and introduced populations. Present on every continent except Antarctica.
- Widespread throughout most of North America including Washington State
- European cultivars widely introduced as hay and forage
- Agricultural use in the Pacific Northwest began at the turn of the 20th century as the first crop following logging for areas being converted to farming
- Used for soil stabilization, although waterways can undermine sod and increase erosion
- Can cause indigestion in livestock
- Forms monospecific stands over time and drastically reduces wetland species diversity
- Can form physical barriers to salmonid migration
- Flooded RCG fields have been known to confuse and strand migrating salmon
- Provides little food for native wildlife species
- Contributes to increased water temperatures
- Dense colonies decrease water flow, increase siltation, contribute to flooding
- Pollen and chaff can aggravate allergies in humans

Reed canarygrass leaf and ligule (*left*); reed canarygrass inflorescence w/seeds formed (*right*)

Description

- Cool-season sod-forming perennial grass 3-9 feet (1-3m) tall
- Rhizomes and dead stems can form sod over 1.5 feet (0.5m) thick that few other species can penetrate
- Stems hairless, hollow, to ½ inch (1.25 cm) in diameter, often reddish near top
- Leaves stick out at a 45 degree angle from the stem
- Leaf blades flat, hairless, ¼ to ¾ inch (0.6-1.9cm) wide, up to 1.5 feet (0.5m) long
- Ligule long and membranous
- Inflorescence is a compact panicle on tall stems high above leaves
- Flowers May to July
- Inflorescence turns from green to purplish in full bloom, then straw colored when seeds form
- Seeds are shiny brown
- Dead stems remain erect and persist throughout the winter, making identification in winter possible

Habitat

- Grows best in wet to damp soil
- Can tolerate prolonged drought in seasonally wet areas
- Can survive in deeper water if recently inundated
- Wet meadows, streambanks, lake margins, ditches, shallow wetlands
- Full sun, does not tolerate shade well

Reproduction and Spread

- Spreads by seed, rhizomes and vegetative fragments
- All plant parts float, facilitating spread in standing or moving water

- Rhizomes:
  - More common form of spread is by rhizomes
  - Rhizomes can extend over 10 feet per year and form a thick mat
- Seeding:
  - Each inflorescence can produce up to 600 seeds;
  - Seeds will not germinate in dense shade
  - Seed germination generally low, seeds viable for less than four years
  - Cold temperatures required for flowering and seed germination
  - Seeds spread on animals, humans (boots, clothing, tools) and cars/machinery
- Vegetative fragments:
  - Detached stems or rhizomes grow into new plants when in contact with bare soil
- Can become established in a disturbed wetland in less than 12 years

Reed canarygrass seeds on muddy boots

Local Distribution

Very widespread in King County in all available habitats

CONTROL INFORMATION

Many of the control techniques discussed below require permits to implement. Refer to the **King County Noxious Weed Control Regulatory Guidelines** for more information on permitting. This document outlines permits and regulations that pertain to physical, cultural, and chemical control methods. The document is available at: www.kingcounty.gov/weeds

Integrated Pest Management

- The preferred approach for weed control is Integrated Pest Management (IPM). IPM involves selecting from a range of possible control methods to match the management requirements of each specific site. The goal is to maximize effective control and to minimize negative environmental, economic and social impacts.
- Use a multifaceted and adaptive approach. Select control methods which reflect the available time, funding, and labor of the participants, the land use goals, and the values of the community and landowners. Management will require dedication over a number of years, and should allow for flexibility in method as appropriate.
- In most cases, a successful reed canarygrass control project will involve at least two different control methods

Early Detection and Prevention

- Reed canarygrass is identifiable year round. Search for it in winter when other grasses are dormant and RCG's persistent, straw-colored stalks are easily seen.
- RCG can be slow to invade intact wetland systems with healthy native plant communities. Any RCG plants found in this situation should be pulled or otherwise carefully controlled as soon as possible.
- Prevent plants from spreading away from existing populations by washing vehicles, boots and animals that have been in infested areas.
- Invasion of any disturbed wetland, including wetland restoration sites, is common since RCG is so widespread. Take measures to prevent establishment such as heavily mulching around new plantings and following a regular maintenance regime to remove new introductions.

Manual Control: using hand tools

- Hand pulling and the use of hand tools are allowable in unincorporated King County critical areas. Check with the local jurisdiction for regulations in other locations.
- Pulling is usually not a viable option because rhizomes will remain in the soil and resprout. It is possible to pull seedlings in wet/mucky soil.
- Dig with hand tools only small clumps in soft soil where you have a reasonable chance of removing all roots and rhizomes.
- Cut small patches with hand clippers or machetes as close to the ground as possible to prevent seeding or as part of an integrated approach. Cutting alone will not kill the plants.
- Clean tools after use to minimize risk of spread.
- Always dispose of removed material properly (see below).

Mechanical Control: using mechanical tools

- Mow or cut using an appropriate tool for the infestation location and size (mowers, brush cutters, line trimmers, tractor-drawn mowers, etc). Follow recommendations below under "Large Infestations/Monocultures" for frequency and timing of mowing.
- Cultivate using discing or tilling machinery as part of an IPM program. Cultivating alone will increase RCG by cutting up and spreading rhizomes unless done frequently through several seasons.
- Burn using a hand-held weed torch. Several varieties are available online. Follow all instructions and safety considerations for the model you use. Do not use a torch in dry or windy conditions. For best results heat small or cut plants slowly to kill all growth.
- Prescribed burning can stimulate growth if done at the wrong time. In the Pacific Northwest that means that burning alone is impractical since fall burns are usually the only timing possible, and fall is the wrong time of year to burn RCG. However, burning can be used as a pre-treatment with other methods such as tilling, shade cloth installation or herbicide application, since it will remove above-ground dead litter.

Burning may require special permits. Check with your local jurisdiction prior to attempting a prescribed burn. For unincorporated King County check with the Department of Permitting and Environmental Review (http://www.kingcounty.gov/property/FireMarshal/BurnBanInfo.aspx)

- Excavating (as with a backhoe) is generally not advised. If a wetland restoration design calls for excavating in reed canarygrass-dominated areas, dispose of all removed plant material properly (see below) and/or bury sod and soil under at least two feet of uncontaminated soil.
- Clean tools and machinery after use to minimize risk of spread.
- Always dispose of removed material properly (see below).

Cultural Control

1) Covering

a) Cover with commercially available shade cloth and secure tightly with stakes, rebar, large garden staples or other appropriate devices. Overlap sections of cloth by at least one foot, and extend the coverage at least two feet beyond the edge of the infestation. Monitor edges and seams for shoots from lateral growth of rhizomes. Shade cloth should be left in place for at least two growing seasons. Shade cloth does not biodegrade and must be removed after use.

b) Sheet mulch using several layers of thick, clean cardboard (no tape or staples). Overlap pieces by at least one foot and extend coverage at least two feet beyond edge of infestation. Cover cardboard with at least four inches of wood mulch or hog fuel.

c) Sheet mulching as described above plus planting densely (2-3 ft. (0.6-0.9 m) apart) with live willow stakes has proven successful in the Puget Sound area, but will not work in areas that get flooded.

2) Flooding

a) If it is possible to manipulate water levels, flood to at least 18 inches (if combined with intensive cultivation) or at least 32 inches if flooding is the only control method.

3) Planting shade

a) Establish desirable trees and shrubs to form shade canopy. Where possible, plan to establish a multi-layered dense canopy, preferably with conifers in the overstory. Dense planting of alders or cottonwoods has also been shown to reduce RCG once a canopy is formed.

b) Install live willow stakes planted at a density of 2-3 ft. (0.6-0.9 m) apart.

c) Any planting effort must include monitoring and spot control of reinvasion for several seasons until trees and shrubs are large enough to compete with RCG. Heavy mulching when plants are small will help.

d) Incomplete shade will allow RCG to recover and/or re-invade.

Chemical Control

Precautions

1) Herbicides should only be applied at the rates and for the site conditions and/or land usage specified on the label of the product being used. **Follow all label directions**.
2) For your personal safety, at a minimum wear gloves, long sleeves, long pants, closed toe shoes, and appropriate eye protection. Follow label directions for any additional personal protection equipment needed.
3) Permits and licenses are required for all chemical control in water and where herbicide is likely to drift into water.
4) Herbicides can only be applied to aquatic systems in Washington State by a licensed pesticide applicator with an aquatic endorsement on their license.
5) A Washington State pesticide license with an aquatic endorsement is also required for the purchase of aquatic herbicides. **NEVER apply non-aquatic herbicide formulations to water since many include ingredients toxic to aquatic organisms**.

Application Methods

1) Small areas can be successfully treated with one application, but larger areas may require several years of treatment to exhaust the seed bank.
2) Spot spray small infestations taking care to avoid damaging surrounding vegetation.
3) Herbicide application prior to covering or sheet mulching can increase efficacy of those methods. Allow for enough time for the herbicide application to take effect so the read canarygrass is dead prior to mulching.
4) Small patches (less than 2 feet in diameter) can be tied in a bunch just before flowering, cut above the tie and then treated with a 33% glyphosate solution applied directly to the stems.
5) Wick-wipe using a wick-wipe tool or hand swiping.
6) Wick-wipers attached to a tractor can treat tall stands without affecting shorter vegetation underneath.

Specific Herbicide Information

1) **Glyphosate** (aquatic labeled trade names include Rodeo ®, AquaMaster ®, Aquaneat ®, Glypro ®). Effective when applied in a 1.5 to 5 percent solution with a nonionic, surfactant (only use surfactants approved for use in aquatic areas by Washington Department of Ecology).

2) **Imazapyr** (aquatic formulations include Habitat ® and Polaris®). Effective when applied at a 1.5 percent solution with a nonionic surfactant (only use Ecology-approved aquatic surfactants). Imazapyr remains active in soil for some time and may cause collateral damage to nearby vegetation, including trees. Recommended only when applied to a RCG monoculture where the site will not be replanted until the following growing season or later. Conducting a soil bioassay prior to planting is recommended to avoid any residual effects from the herbicide in the soil.

The mention of a specific product brand name in this document is not, and should not be construed as an endorsement or as a recommendation for the use of that product.

Chemical control options may differ for private, commercial and government agency users. Additional information and recommendations can be found in the references listed at the end of this document. **For questions about herbicide use, contact the King County Noxious Weed Control Program, Washington State Department of Agriculture or Washington State Department of Ecology.**

Biological Control

- There is no known biocontrol at this time.

BEST MANAGEMENT PRACTICES

Reed canarygrass is widespread in King County, and eradication is unlikely in all but the most isolated locations. Reinfestation is likely unless control, monitoring and maintenance are carefully planned and implemented. Successful long term control will follow these steps:

1. **Prevention**: If you have a wetland dominated by native plants, monitor the edges and immediately remove any reed canarygrass you find. Avoid disturbing the wetland.
2. **Remove existing plants:** Follow the recommendations below that best suit your situation to remove or kill all existing reed canarygrass plants in the infestation. Generally work first in least infested areas, moving towards more heavily infested areas.
3. **Deplete seed bank:** In all but early pioneering infestations the seed bank should be depleted if at all possible before replanting the area (if necessary). Allow seeds to grow and then remove the plants several times over at least two seasons for best results. Seeds can remain viable for up to four years.
4. **Revegetate** with shade-producing or highly-competitive native or other desirable species. Choose plants that will thrive in your location. Best results are obtained with a planting plan that will ultimately establish a multi-layered shade canopy, preferably coniferous, but lighter shade or other plant communities can reduce the impact of reed canarygrass. Consult a restoration specialist for assistance with your area.
5. **Monitoring and maintenance** of any controlled site is imperative until desirable vegetation becomes well established. Any site left unmaintained will revert back to reed canarygrass within a few years.

Permits may be required for some control techniques and some situations. See Control Information section above for more information.

Small Infestations

- **Manual:** Not practical for any but the smallest patches. Hand dig when the ground is soft. Be sure to remove all roots and rhizomes. Any roots or rhizomes left in the soil will resprout. Monitor the site for regrowth. Properly dispose of all removed plant material.
- **Shade:** Cover with shade cloth or sheet mulch with several layers of cardboard and four to six inches of wood mulch. Leave in place for at least one growing season. Monitor the edges for shoots coming up from lateral growth of rhizomes. Efficacy can be increased by pre-treating with herbicide (allow enough time for the herbicide to kill the reed canarygrass before covering), flaming, or removing above ground plant material at or just after flowering, either with hand tools or a line trimmer. Properly dispose of all removed plant material.
- **Burn**: Flaming using hand-held weed torch (many varieties available online) may be possible in some situations. Remove dead stems and thatch as much as possible prior to flaming to reduce threat of smoke and fire. Flame emerging shoots frequently during at least one growing season to weaken and kill roots. Monitor site for regrowth.
- **Chemical:** Spot spray or wick wipe with approved aquatic herbicide just past flowering stage when maximum energy has been depleted from the root system.

Large Infestations / Monocultures

Multiple methods will be required in most situations for large infestations.

1. **Remove or kill established plants.** Depending on feasibility, site conditions and resources, use mowing, cultivation, flooding, burning or herbicide alone or in combination. Research has demonstrated that the following combinations work in many situations:
    - Mow at least 5 times per year for several years.
    - Mow in late spring and again in August, spray in October-November, repeat for at least three growing seasons.
    - Mow or burn in late spring, then cultivate repeatedly (every two weeks). Repeat at least two growing seasons.
    - Spray in late spring and late fall for at least two growing seasons.
    - Cultivate, then flood: Cultivate as soon as possible in spring; be sure to get entire sod layer. Allow sod to dry out, repeating cultivation throughout growing season to ensure thorough drying of the entire infestation. At the end of the growing season, flood to at least 18 inches through late spring the following year.
    - Where manipulation of water levels is possible, flood to at least 32 inches (0.85m) and maintain that depth for at least one growing season. Use other methods to control around the edges of the flooded zone. If using flooding only, additional seasons may be required, or other methods should be used to control regrowth after water levels drop.

- Note: mowing or burning alone fewer than 5 times per growing season has been shown to INCREASE reed canarygrass density.

2. **Eliminate seed bank.** This may not be necessary if long-term goal includes establishment of multi-layered canopy for shade, however it is critical if shade establishment is not planned. Seeds remain viable for up to four years. Allow seeds to germinate and then control the seedlings in one of the following ways:
    - Cultivate repeatedly over at least two growing seasons
    - Flame or apply herbicide to seedlings as they emerge
    - Flood the area where seedlings are present
3. **Establish desirable vegetation.** Shading is the best long-term control strategy. Where possible, establish a multi-layered dense canopy, preferably with conifers in the overstory.
4. **Live willow stakes** installed 2 to 3 feet (0.60-0.91 m) apart in areas of shallow inundation or high soil moisture content can diminish RCG within two growing seasons.
5. **Monitor for regrowth/reinvasion and maintain site.** Control regrowth and re-infestations using techniques for small patches.

Control in Irrigation Ditches

For control of reed canarygrass in the maintenance of agricultural ditches, follow the recommendations in the **Manual of Best Management Practices for Maintenance of Agricultural Waterways in King County**.
http://www.kingcounty.gov/environment/waterandland/stormwater/agricultural-drainage-assistance/waterway-maintenance-bmp-manual.aspx .

Control Along Road Rights-of-Way

- Follow appropriate recommendations as described above for small or large infestations.
- Spot spray infestations in mixed vegetation, taking care not to spray beneficial plants.
- Do NOT mow plants in seed.

Disposal Methods

- Above-ground vegetative plant parts can be composted in a professional composting facility.
- Many plant parts will form roots if left in contact with moist soil. If composting on site, dry thoroughly on a tarp or black plastic before composting.
- Plant parts can be burned where conditions allow. Follow local burn regulations
- Rhizomes, plants in seed, and sod should be disposed of in a landfill.
- All plants parts, including seed, roots and sod, can be buried a minimum of two feet deep in weed-free soil. Buried RCG must remain undisturbed for at least four years.

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Himalayan Blackberry

Rubus armeniacus, syn. Rubus discolor

Evergreen Blackberry

Rubus laciniatus
Roasacae

Class C Noxious Weeds
Control Recommended

Legal Status in King County: Himalayan blackberry and evergreen blackberry are Class C noxious weeds (non-native species that can be designated for control based on local priorities) according to Washington State Noxious Weed Law, RCW 17.10. The State Weed Board has not designated these species for control in King County. The King County Weed Control Board recommends control of these species where feasible, but does not require it.

BACKGROUND INFORMATION

Impacts and History

- Highly invasive and can be found throughout King County.
- Can be very difficult to control.
- Out competes native understory vegetation and prevents the establishment of desirable native shade intolerant trees such as Pacific Madrone, Douglas Fir and Western White Pine.
- Can limit movement of large animals when forming large impenetrable thickets.

Himalayan blackberry

Description

- **Himalayan blackberry** is a robust, sprawling perennial with stems having large stiff thorns.
- Main canes up to 10 feet long with trailing canes reaching up to 40 feet.
- Trailing canes typically take root at the tips.
- Leaves are large, round to oblong and toothed typically come in sets of three (trailing canes) or five (main stems).
- Individual canes can reach a density of 520 canes per square meter.
- Flowers are white to pink, about one inch in diameter and borne in clusters of about 5 to 20 blooms.
- Develops edible black fruit that clings to the center core when picked.

- **Evergreen blackberry** is a robust trailing evergreen shrub that grows into impenetrable thickets.
- Ribbed reddish stems up to 10 feet in length with large curved thorns.
- Young canes arch as they grow longer, eventually reaching the ground and rooting at the nodes.
- Palmately compound leaves with 3 to 5 deeply lacerated leaflets.
- Flowers are white to pink about one inch in diameter borne in clusters.
- Develops edible black fruit that clings to the center core when picked.

© 2005 Virginia Tech
Evergreen blackberry

Habitat

- Blackberry can be found in a myriad of habitats such as vacant lands, pastures, forest plantations, roadsides, creek gullies, river flats, riparian areas, fence lines, and right-of-way corridors.
- Does not grow well in wetland areas, will grow if cane tip roots.

Reproduction and Spread

- Reproduces vegetatively by root and stem fragments and by seed.
- Plants begin flowering in spring with fruit ripening in midsummer to early August.
- Daughter plants can form where canes touch the ground.
- Seeds can remain viable in the soil for several years.

Local Distribution

Found throughout King County.

CONTROL INFORMATION

Integrated Pest Management

- The preferred approach for weed control is Integrated Pest Management (IPM). IPM involves selecting from a range of possible control methods to match the management requirements of each specific site. The goal is to maximize effective control and to minimize negative environmental, economic and social impacts.
- Use a multifaceted and adaptive approach. Select control methods which reflect the available time, funding, and labor of the participants, the land use goals, and the values of the community and landowners. Management will require dedication over a number of years, and should allow for flexibility in method as appropriate.

Planning Considerations

- Plan your control effort including: 1) surveying of the area thoroughly for blackberry, 2) setting priorities for control, 3) selecting the best control method(s) for the site conditions and regulatory compliance issues **(refer to the King County Noxious Weed Regulatory Guidelines)** and 4) monitoring the success of control and implementing follow up control as necessary.
- Control practices in critical areas should be selected to minimize soil disturbance. Any disturbed areas need to be stabilized to control erosion and sediment deposition. Refer to the King County Surface Design Manual (www.kingcounty.gov/environment/waterandland/stormwater/documents/surface-water-design-manual) for further information about sediment and erosion control practices. Minimizing disturbance also avoids creating more opportunities for germination of blackberry and other weeds.
- Generally work first in least infested areas, moving towards more heavily infested areas.
- Ensure habitat protection by targeting only blackberry and preserving all native and beneficial vegetation.
- For sites that provide important bird habitat, it is recommended to remove only one quarter of the blackberry infestation each year especially if there is little alternative habitat nearby. You may also want to consider refraining from large blackberry removal projects during nesting season (mid-March to the end of June).

Early Detection and Prevention

- Blackberry is easily identifiable throughout the year.
- Manually control new infestations as early as possible.
- Monitor the control site and remove any plants returning from root fragments.

Manual

- Hand-pull the stem closest to the ground and uproot the root ball. This method is most effective with first year plants.
- Manual control works best after rain or in loose soils where the canes are suppressed because the blackberries are growing in a forest understory.
- Digging up root crowns and major side roots is slow but will control blackberry and is effective on small infestations.
- Using a claw mattock or pulaski/mattock is also effective.
- Recheck work area because large root fragments left can re-sprout.
- If removing dense patches, area should be replanted with native plants and mulched, or reseeded with a suitable grass.
- Hand pulling and the use of hand mechanical tools are allowable in all critical areas in unincorporated King County.

Mechanical

- Mowing, including the use of riding mowers and tractor mounted mowers, can be very effective in controlling blackberries but also may harm desirable plants present.
- Mowing should not be used where soils are highly susceptible to compaction or erosion, or where soils are very wet.
- Several cuttings a year over several years are necessary to exhaust the roots of their reserve food supply.
- If only one cutting is done per year, cut when the plants begin to flower. If no follow-up is done, the blackberry may re-sprout from the root crown at a greater density, and could overgrow any vegetation planted.
- Cultivation in agricultural areas utilizing cultivation machinery can be effective in controlling blackberry either alone or in conjunction with mowing but is not selective and may require specific sediment and erosion control measures (see Control of Large Infestations/Monocultures).

Biological

Biological control is the deliberate introduction of insects, mammals or other organisms which adversely affect the target weed species. Biological control is generally most effective when used in conjunction with other control techniques. Biological control methods that may assist in blackberry control include the use of goats and chickens as follows:

- Goats and pigs may be effective on clearing or controlling blackberry re-growth from a year to four years old. On mature stands, goats tend to only strip leaves off of the canes. Animals may prefer alternative forage available, so reduce opportunities for selective browsing. Grazing must be continuous or else re-growth will occur. Care needs to be taken to fence off or protect any native or other valuable vegetation. The King Conservation District can provide further information of the use and management of goats for weed control.
- Chickens can potentially decrease the seed bank in blackberry cleared areas by grazing on the seeds.

Chemical

- **Precautions:**
  - Herbicides should only be applied at the rates and for the site conditions and/or land usage specified on the label of the product being used. **Follow all label directions**.
  - For herbicide use in critical areas and their buffers, certain restrictions apply depending on the site and jurisdiction. In unincorporated King County, refer to the **King County Noxious Weed Regulatory Guidelines** for a summary of current restrictions and regulatory compliance issues. Elsewhere, check with the local jurisdiction.

- For your personal safety, at a minimum wear gloves, long sleeves, long pants, closed toe shoes, and appropriate eye protection. Follow label directions for any additional personal protection equipment needed.

- For control of large infestations, herbicide use may be effective, either alone or in combination with mowing. Infested areas should not be mowed until after the herbicide has had a chance to work and weeds are brown and dead.
- For several years following treatment, monitor areas for new plants germinating from the seed bank, or any missed plants.

Specific Herbicide Information

Herbicides are generally described here by the active ingredient. Many commercial formulations are available containing a specific active ingredient. References to product names are as an example only, and other equally, or more effective commercial products may be available.

Glyphosate: can effectively control blackberry. Treatment with glyphosate needs to be combined with effective re-vegetation of the site to prevent re-invasion by undesirable vegetation and to control erosion. Glyphosate is most effective on blackberry in September to October when canes are actively growing and after berries have formed. Fall treatments should be conducted before the first frost.

Selective Broadleaf Herbicides (such as triclopyr, 2,4-D and metsulfuron): most effective when blackberry is growing in a grassy area. Read the label of the product you are using to determine the optimal time to spray. Re-treatment the following year may be necessary to control any returning plants. Continue to monitor for new plants for several years after the initial treatment and following any disturbance to the soil such as tilling or construction. **NOTE: Certain additional restrictions apply for products containing 2,4-D and Triclopyr BEE (e. g. Garlon 4, Crossbow)**. **Refer to the King County Noxious Weed Regulatory Guidelines for more details**.

Selective herbicides that are effective on blackberry include metsulfuron (e.g. Escort, Cimarron, Ally), triclopyr ester (e.g. Garlon 4) or triclopyr amine (e.g. Garlon 3A) and a combination treatment of triclopyr and 2,4-D (e.g. Crossbow).

Metsulfuron should be applied to fully leafed-out blackberry before fall leaf coloration. Good coverage is essential to achieve control.

Triclopyr (amine and ester) and triclopyr + 2,4-D should be applied when actively growing. Foliage must be thoroughly wetted with herbicide.

2,4-D can harm certain grasses, alfalfa, clover and other legumes. The addition of a suitable surfactant may improve the control results.

The mention of a specific product brand name in this document is not, and should not be construed as an endorsement or as a recommendation for the use of that product. Chemical control options may differ for private, commercial and government agency users. **For questions about herbicide use, contact the King County Noxious Weed Control Program at 206-477-9333.**

SUMMARY OF BEST MANAGEMENT PRACTICES

Small Infestations in Native and/or Desirable Vegetation

- Properly identify targeted blackberries.
- Mark all desirable vegetation around control area, ensuring that no native plants are removed.
- Small infestations of less that 200 square feet can be effectively and relatively easily hand-pulled or dug up. Isolated plants should be removed in order to prevent them from infesting a larger area.
- Cut above ground portion of blackberry with loppers or pruners. Dig up or pull the remaining root ball.
- Pull or dig up the plants when the soil is wet.
- Replace any divots created when removing the plants to lessen the amount of disturbed soil.
- Apply appropriate herbicide with wick wiper or by spot spray to the cut stumps to minimize off target injury.
- Monitor site throughout growing season and remove any new plants.
- If using an herbicide in a grassy area, use a selective herbicide to avoid injury to the grass.

Large Infestations/Monocultures

- Properly identify invasive blackberries.
- Mark all native vegetation in and around the control area, ensuring that no native plants are removed.
- Mow down the blackberry with weed-eaters, brush mowers or machetes.
- Following mowing, either dig up the root-ball if labor is available or treat re-sprouting blackberry re-growth with an appropriate herbicide (See the Chemical section of this BMP).
- Mechanical cultivation is also an option for controlling invasive blackberries in agricultural areas. After initially mowing down the above ground vegetation, deep cultivation of the land can control root balls if done multiple times. Yearly spot control of returning seedlings or re-growth will likely be necessary.
- For large areas, it may be more cost-effective to apply herbicide to the mature blackberry plants and then mow the dead canes.
- When large dense areas of blackberry are removed, the bare areas created need to be stabilized and re-vegetated with native or non-invasive vegetation to prevent erosion

and re-invasion of blackberries and other weeds (refer to the King County Surface Water Design Manual or equivalent for incorporated areas). Ensure that a high standard of blackberry control has been achieved prior to re-planting the site.
- If a non-selective herbicide is used in grassy areas, the area needs to be re-seeded to prevent reinvasion by weeds.
- Infested areas will require follow-up management lasting for several years to control plants re-growing from the seed bank and rhizomes.

Riparian and Aquatic Area Control Issues

- Additional permits may be required for control of infestations in riparian areas. See the Noxious Weed Regulatory Guidelines for more information or contact your local jurisdiction.
- In some cases, the cleared area will need to be replanted with native or non-invasive vegetation and stabilized against erosion. See the King County Surface Water Design Manual for further information.
- Focus on manual removal for small infestations if possible. Follow procedures listed above.
- For larger areas where herbicide use is warranted, spray using low pressure and large droplet size to reduce drift. If herbicide could potentially drift into the water or a wetland area, use only approved aquatic herbicides and surfactants.
- Blackberry shrubs can be found growing along wetland margins but are typically daughter plants off of a main cane. Control can be achieved by cutting the canes down to the ground. The roots can not withstand the anaerobic soil conditions without the supporting canes.

Road Rights-of-Way Control Issues

- Manually remove infestations if possible.
- If plants are in grassy areas, use a selective broadleaf herbicide; if controlled with a non-selective herbicide, re-seed after control is completed.
- An effective mowing program can control blackberries along a Right-of-Way. Any blackberries remaining outside the mowed area will quickly re-invade the cleared areas.
- Spot spray blackberries with glyphosate in areas with no desirable vegetation.

Disposal Methods

- Plant crowns and rootballs should be collected and discarded with the trash or yard waste or taken to a transfer station for disposal. Back yard composting of rootballs is not recommended.
- Stems can be composted, but they will root on moist soil so they need to be completely dried out or chipped up before composting.
- Dried out stems may be composted on site, disposed of in a city-provided yard waste container or in the green recycling at a transfer station.

- Stems with berries should be collected and put in the trash, yard waste container, or taken to a transfer station. If removal is not feasible, these stems can be left on site. However, there is a risk of spread from the seeds, so the area should be monitored for
- several years for seedlings. Stems should be left well away from waterways, shorelines, roads and un-infested areas.
- Never dump yard waste in parks or natural areas, as weeds may spread from yard waste piles.

References

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Soll, J. 2004. Controlling Himalayan Blackberry(*Rubus armeniacus* [*R. discolor*, *R. procerus*]) in the Pacific Northwest. The Nature Conservancy. www.invasive.org/gist/moredocs/rubarm01.pdf

VT Forestry I.D. Cards - evergreen blackberry Retrieved January 31, 2005 http://www.cnr.vt.edu/dendro/dendrology/carddetail.cfm?Genus=Rubus&Species=laciniatus

Appendix B

US Army Corps Wetland Determination Data Form (S1)

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WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: River's Edge/SE of S Ann and Simons Rd City/County: Monroe / Snohomish Sampling Date: 7/19/18

Applicant/Owner: River's Edge WA LLP/Lauren Wibbelman State: WA Sampling Point: S1

Investigator(s): NP, EC Section, Township, Range: S6, T27N, R07E, W.M

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): ~5

Subregion (LRR): LRR-A Lat: 47.8541283 Long: -121.9654601 Datum: NAD83

Soil Map Unit Name: Pilchuck Loamy Sand NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☑ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☑ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☐ No ☑ Hydric Soil Present? Yes ☐ No ☑ Wetland Hydrology Present? Yes ☐ No ☑	**Is the Sampled Area within a Wetland?** Yes ☐ No ☑

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m^2)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus balsamifera	50	Y	FAC
2. Alnus rubra	50	Y	FAC
3.			
4.			
	100	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m^2)			
1. Reynoutria japonica	70	Y	FACU
2. Symphoricarpos albus	25	Y	FACU
3. Rubus armeniacus	15	N	FAC
4.			
5.			
	120	= Total Cover	
Herb Stratum (Plot size: 1m^2)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	0	= Total Cover	
Woody Vine Stratum (Plot size: 3m^2)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 100

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species		x 2 =	0
FAC species	115	x 3 =	345
FACU species	95	x 4 =	380
UPL species		x 5 =	0
Column Totals:	210 (A)		725 (B)

Prevalence Index = B/A = 3.45

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☑

Remarks:

SOIL

Sampling Point: S1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 3/2+	100					Silty Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:_____

Depth (inches):_____

Hydric Soil Present? Yes ☐ No ☑

Remarks:

Soil was like powder and dry

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☑ Depth (inches): _____

Water Table Present? Yes ☐ No ☑ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☑ Depth (inches): _____

Wetland Hydrology Present? Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix C

Critical Area Study and Restoration Plan Maps (1/3-3/3)
Existing Conditions, Site Plan and Restoration Plan, Restoration Plan Insets

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CRITICAL AREA STUDY AND RESTORATION PLAN MAPS

RIVER'S EDGE

EXISTING CONDITIONS

SIMONS RD

CHARLES ST

S ANN ST

E FREMONT ST

EXISTING STORM PIPE

ESTIMATED OHWM WOODS CREEK

SURVEYED OHWM WOODS CREEK

WOODS CREEK TYPE S 200' BUFFER/ SHORELINE SETBACK

SHORELINE/ BUFFER LIMITS

200'

S1

AL BORLIN PARK

EDGE OF HISTORIC DISTURBANCE (GPS-BASED)

SUBJECT PROPERTY BOUNDARY

STORM PIPE OUTLET TO WOODS CR.

FEMA FLOODPLAIN

LEGEND

- PROPERTY BOUNDARY
- WOODS CR. (SURVEYED)
- WOODS CR. (ESTIMATED)
- FEMA FLOODPLAIN
- STREAM BUFFER
- SHORELINE LIMITS
- EDGE OF DISTURBANCE
- S1 DATA SITE

Scale 1" = 100'

0 50 100 150 200

Wetland Resources, Inc.
Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance
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Critical Area Study and Restoration Plan Maps
River's Edge
Existing Conditions

River's Edge WA LLLP
Attn: Rebecca Ralston
1525 9th Ave, #3505
Seattle, WA 98101

Sheet 1/3
Project Number: 18216
Drawn by: NP
Revision 2: 1/23/2019

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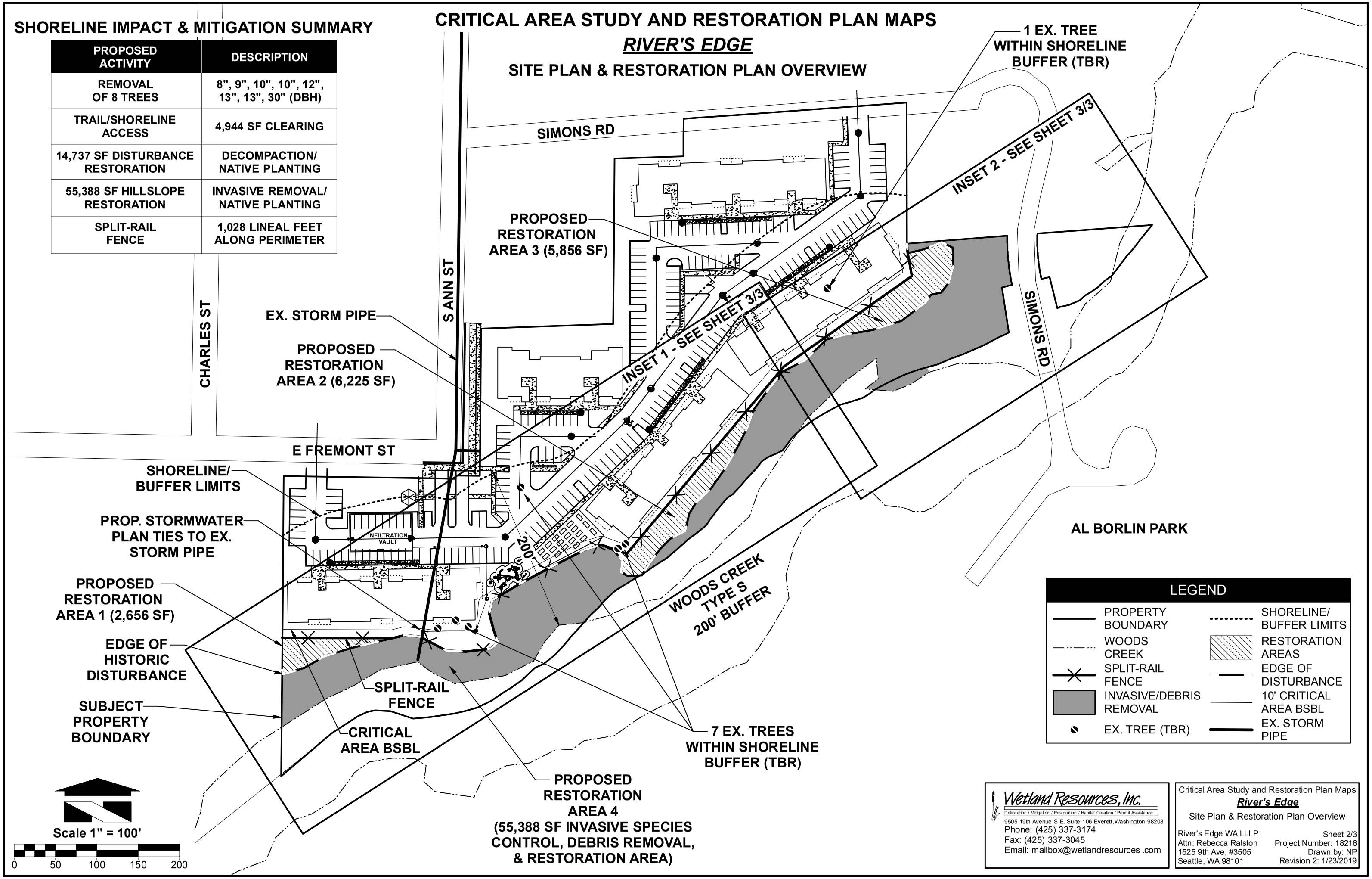
CRITICAL AREA STUDY AND RESTORATION PLAN MAPS

RIVER'S EDGE

SITE PLAN & RESTORATION PLAN OVERVIEW

SHORELINE IMPACT & MITIGATION SUMMARY

PROPOSED ACTIVITY	DESCRIPTION
REMOVAL OF 8 TREES	8", 9", 10", 10", 12", 13", 13", 30" (DBH)
TRAIL/SHORELINE ACCESS	4,944 SF CLEARING
14,737 SF DISTURBANCE RESTORATION	DECOMPACTION/ NATIVE PLANTING
55,388 SF HILLSLOPE RESTORATION	INVASIVE REMOVAL/ NATIVE PLANTING
SPLIT-RAIL FENCE	1,028 LINEAL FEET ALONG PERIMETER



LEGEND

- PROPERTY BOUNDARY
- SHORELINE/ BUFFER LIMITS
- WOODS CREEK
- RESTORATION AREAS
- SPLIT-RAIL FENCE
- EDGE OF DISTURBANCE
- INVASIVE/DEBRIS REMOVAL
- 10' CRITICAL AREA BSBL
- EX. TREE (TBR)
- EX. STORM PIPE

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Critical Area Study and Restoration Plan Maps
River's Edge
Site Plan & Restoration Plan Overview

River's Edge WA LLLP
Attn: Rebecca Ralston
1525 9th Ave, #3505
Seattle, WA 98101

Sheet 2/3
Project Number: 18216
Drawn by: NP
Revision 2: 1/23/2019

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CRITICAL AREA STUDY AND RESTORATION PLAN MAPS

RIVER'S EDGE

RESTORATION PLAN INSETS

INSET 1

PROPOSED RESTORATION AREA 1 (2,656 SF)

PROPOSED BUILDING

PROPOSED PATIO

PROPOSED PARKING

PROPOSED BUILDING

PROPOSED PATIO

PROPOSED BUILDING

SEE BELOW

MATCH LINE

SPLIT-RAIL FENCE

WOODS CREEK OHWM

INVASIVE SPECIES AND DEBRIS REMOVAL AREA

SUBJECT PROPERTY BOUNDARY

PROPOSED RESTORATION AREA 2 (6,225 SF)

INSET 2

PROPOSED PATIO

PROPOSED BUILDING

PROPOSED RESTORATION AREA 3 (5,856 SF)

SUBJECT PROPERTY BOUNDARY

MATCH LINE

SEE ABOVE

INVASIVE SPECIES AND DEBRIS REMOVAL AREA

INVASIVE SPECIES AND DEBRIS REMOVAL AREA

SIMONS RD

WOODS CREEK OHWM

Scale 1" = 50'

0 25 50 75 100

LEGEND

- PROPERTY BOUNDARY
- WOODS CREEK
- BUFFER RESTORATION
- DEBRIS/INVASIVE SPECIES REMOVAL
- SPLIT-RAIL FENCE
- PROPOSED TRAIL
- EDGE OF DISTURBANCE

Wetland Resources, Inc.
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Email: mailbox@wetlandresources .com

Critical Area Study and Restoration Plan Maps

River's Edge

Restoration Plan

River's Edge WA LLLP
Attn: Rebecca Ralston
1525 9th Ave, #3505
Seattle, WA 98101

Sheet 3/3
Project Number: 18216
Drawn by: NP
Revision 2: 1/23/2019

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EXHIBIT 21

PLANT SCHEDULE

	TREES	BOTANICAL NAME COMMON NAME	CONT.	CAL.
STREET		PYRUS CALLERYANA FLOWERING PEAR	24" BOX	2 INCH
STREET		CERCIDIPHYLLUM JAPONICUM KATSURA	24" BOX	2 INCH
STREET		OXYDENDRUM ARBOREUM SOURWOOD	24" BOX	2 INCH
STREET		TILIA CORDATA LITTLE LEAF LINDEN	24" BOX	2 INCH
STREET		FRAXINUS PENNSYLVANICA GREEN ASH 'MARSHALL'	24" BOX	2 INCH
		SCIADOPITYS JAPANESE UMBRELLA PINE 'GREEN STAR'	#10 GAL	6' TALL
		TSUGA HETEROPHYLLA WESTERN HEMLOCK 'IRON SPRINGS'	#10 GAL	6' TALL
	SHRUBS			
		PHYSOCARPUS OPULIFOLIUS 'TINY WINE' NINEBARK	#5 GAL	-
		PIERIS JAPONICA 'BROOKSIDE MINIATURE' BROOKSIDE MINIATURE LILY OF THE VALLEY	#5 GAL	-
		WEIGELA FLORIDA 'ALEXANDRA' WINE & ROSES WEIGELA	#3 GAL	-
		SPIRAEA JAPONICA 'GOLDMOUND' GOLDMOUND SPIREA	#3 GAL	-
		RHODODENDRON IMPEDITUM 'LURSELL' DWARF PURPLE RHODODENDRON	#3 GAL	-
		RHUS AROMATICA 'GRO LOW' FRAGRANT SUMAC	#5 GAL	-
		NANDINA DOMESTICA HEAVENLY BAMBOO 'FIREPOWER'	#5 GAL	-
		TSUGA MERTENSIANA 'ELIZABETH' DWARF MOUNTAIN HEMLOCK	#5 GAL	-
		PINUS MUGO 'JACOBSEN' MUGO PINE	#5 GAL	-
	PERENNIALS/ GRASSES			
		HEMEROCALLIS 'STELLA DE ORO' DAYLILY	#1 GAL	-
		SEDUM X 'BLUE PEARL' SUNSPARKLER BLUE PEARL SEDUM	#1 GAL	-
		HAKONECHLOA MACRA 'AUREOLA' JAPANESE FOREST GRASS	#1 GAL	-
	HEDGES			
		EMERALD GREEN ARBORITAE TREES OR ENGLISH LAUREL	#1 GAL	-

LANDSCAPE PLAN

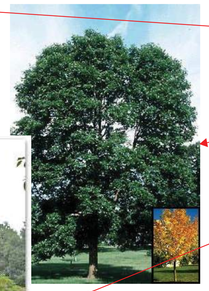
40' NORTH

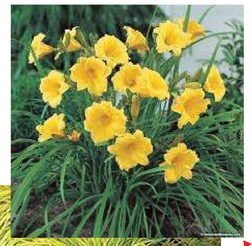
RIVER'S EDGE APARTMENTS

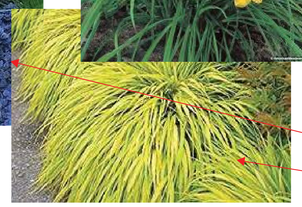
MONROE, WASHINGTON

DATE: 10.31.2018 SHEET: 1 OF 4 SH PROJECT NO.: 180042

SH ARCHITECTURE
7250 Peak Drive Suite 216 Las Vegas Nevada 89128
office 702.363.2222 www.sh-architecture.com







HEDGES: EMERALD GREEN ARBORVITAE TREES (R) AND ENGLISH LAUREL (L)

PLANT SCHEDULE

TREES	BOTANICAL NAME COMMON NAME	CONT.	CAL.	QTY.
	PYRUS CALLERYANA FLOWERING PEAR	24" BOX	2 INCH	7
	CERCIDIPHYLLUM JAPONICUM KATSURA	24" BOX	2 INCH	7
	OXYDENDRUM ARBOREUM SOURWOOD	24" BOX	2 INCH	6
	TILIA CORDATA LITTLE LEAF LINDEN	24" BOX	2 INCH	15
	FRAXINUS PENNSYLVANICA GREEN ASH 'MARSHALL'	24" BOX	2 INCH	12
	SCIADOPITYS JAPANESE UMBRELLA PINE 'GREEN STAR'	#10 GAL.	6' TALL	15
	TSUGA HETEROPHYLLA WESTERN HEMLOCK 'IRON SPRINGS'	#10 GAL.	6' TALL	7
SHRUBS				
	PHYSOCARPUS OPULIFOLIUS TINY WINE NINEBARK	#5 GAL.	-	43
	PIERIS JAPONICA 'BROOKSIDE MINIATURE' BROOKSIDE MINIATURE LILY OF THE VALLEY	#5 GAL.	-	28
	WEIGELA FLORIDA 'ALEXANDRA' WINE & ROSES WEIGELA	#3 GAL.	-	84
	SPIRAEA JAPONICA 'GOLDMOUND' GOLDMOUND SPIREA	#3 GAL.	-	162
	RHODODENDRON IMPEDITUM 'LUISELL' DWARF PURPLE RHODODENDRON	#3 GAL.	-	285
	RHUS AROMATICA 'GRO LOW' FRAGRANT SUMAC	#5 GAL.	-	31
	NANDINA DOMESTICA HEAVENLY BAMBOO 'FIREPOWER'	#5 GAL.	-	148
	TSUGA MERTENSIANA 'ELIZABETH' DWARF MOUNTAIN HEMLOCK	#5 GAL.	-	12
	PINUS MUGO 'JACOBSEN' MUGO PINE	#5 GAL.	-	89
PERENNIALS/ GRASSES				
	HEMEROCALLIS 'STELLA DE ORO' DAYLILY	#1 GAL.	-	133
	SEDUM X 'BLUE PEARL' SUNSPARKLER BLUE PEARL SEDUM	#1 GAL.	-	121
	HAKONECHLOA MACRA 'AUREOLA' JAPANESE FOREST GRASS	#1 GAL.	-	12

HEDGES: EXCELSA CEDAR

LANDSCAPE SCHEDULE

RIVER'S EDGE APARTMENTS
MONROE, WASHINGTON

DATE: 10.31.2018 SHEET: 2 OF 4 SH PROJECT NO.: 180042

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