DEVELOPMENT REVIEW BOARD PANEL A AGENDA

June 12, 2023 at 6:30 PM

Wilsonville City Hall & Remote Video Conferencing

PARTICIPANTS MAY ATTEND THE MEETING AT:
City Hall, 29799 SW Town Center Loop East, Wilsonville, Oregon
Zoom: *https://us02web.zoom.us/j/85843043229*

TO PROVIDE PUBLIC TESTIMONY:
Individuals must submit a testimony card online:
https://www.ci.wilsonville.or.us/DRB-SpeakerCard
and email testimony regarding Resolution No. 416
to Cindy Luxhoj AICP, Associate Planner at
luxhoj@ci.wilsonville.or.us
by 2:00 PM on June 12, 2023.

CALL TO ORDER

CHAIR'S REMARKS

ROLL CALL

Yara Alatawy Rob Candrian
Jordan Herron Clark Hildum
Jean Svadlenka

CITIZEN INPUT

CONSENT AGENDA

1. Approval of minutes of the May 8, 2023 DRB Panel A meeting

PUBLIC HEARINGS

2. **Resolution No. 416. SW Boeckman Road Building W-5.** The applicant is requesting approval of a Stage 1 Preliminary Plan Modification, Stage 2 Final Plan Modification, Site Design Review, Type C Tree Removal Plan, Standard SROZ Map Verification, and Standard SRIR Review for development of an 80,446 square foot industrial building and associated improvements on property located at 9600 SW Boeckman Road.

Case Files:

DB22-0004 SW Boeckman Road Building W-5
- Stage 1 Preliminary Plan Modification (STG122-0004)
- Stage 2 Final Plan Modification (STG222-0004)
- Site Design Review (SDR22-0004)
- Type C Tree Removal Plan (TPLN22-0003)
- Standard SROZ Map Verification (SROZ22-0003)
- Standard SRIR Review (SRIR22-0001)

BOARD MEMBER COMMUNICATIONS

3. Recent City Council Action Minutes

STAFF COMMUNICATIONS

ADJOURN

The City will endeavor to provide the following services, without cost, if requested at least 48 hours prior to the meeting by contacting Shelley White, Administrative Assistant at 503-682-4960: assistive listening devices (ALD), sign language interpreter, and/or bilingual interpreter. Those who need accessibility assistance can contact the City by phone through the Federal Information Relay Service at 1-800-877-8339 for TTY/Voice communication.

Habrá intérpretes disponibles para aquéllas personas que no hablan Inglés, previo acuerdo. Comuníquese al 503-682-4960.

DEVELOPMENT REVIEW BOARD MEETING
JUNE 12, 2023
6:30 PM

Consent Agenda:

1. Approval of minutes of May 8, 2023 DRB Panel A meeting

DEVELOPMENT REVIEW BOARD PANEL A
MEETING MINUTES
May 8, 2023 at 6:30 PM
Wilsonville City Hall & Remote Video Conferencing

CALL TO ORDER
A regular meeting of the Development Review Board Panel A was held at City Hall beginning at 6:30 p.m. on Monday, May 8, 2023. Chair Jean Svadlenka called the meeting to order at 6:30 p.m.

CHAIR'S REMARKS
The Conduct of Hearing and Statement of Public Notice were read into the record.

ROLL CALL
Present for roll call were: Jean Svadlenka, Clark Hildum, Yara Alatawy, and Jordan Herron. Rob Candrian was absent.

Staff present: Daniel Pauly, Amanda Guile-Hinman, Miranda Bateschell, Kimberly Rybold, Cindy Luxhoj, Amy Pepper, Kerry Rappold, and Shelley White

CITIZENS INPUT – This is an opportunity for visitors to address the Development Review Board on items not on the agenda. There were no comments.

CONSENT AGENDA
1. Approval of Minutes of the April 10, 2023 DRB Panel A meeting

Jean Svadlenka moved to approve the April 10, 2023 DRB Panel A meeting minutes as presented. Clark Hildum seconded the motion, which passed unanimously.

PUBLIC HEARINGS
2. **Resolution No. 411. Delta Logistics Site Expansion.** The Applicant is requesting approval of a Stage 1 Preliminary Plan, Stage 2 Final Plan, Site Design Review, Waivers, Class 3 Sign Permit, Type C Tree Removal Plan, Standard SROZ Map Verification, Standard SRIR Review and Variance for Development of a 58,116 square foot warehouse / manufacturing building with accessory office space at 9710 SW Day Road, and minor site modifications at 9835 SW Commerce Circle.
   Case Files:
   DB22-0007 Delta Logistics Site Expansion

- Stage 1 Preliminary Plan (STG122-0005)
- Stage 2 Final Plan (STG222-0006)
- Site Design Review (SDR22-0006)
- Waivers (WAIV22-0001)
- Class 3 Sign Permit (SIGN22-0004)
- Type C Tree Removal Plan (TPLN22-0005)
- Standard SROZ Map Verification (SROZ22-0006)
- Standard SRIR Review (SRIR22-0004)
- Variance (VAR22-0001)

Chair Svadlenka called the public hearing to order at 6:36 p.m. and read the conduct of hearing format into the record. Jean Svadlenka, Clark Hildum, and Jordan Herron declared for the record that they had visited the site. No board member, however, declared a conflict of interest, ex parte contact, bias, or conclusion from a site visit. No board member participation was challenged by any member of the audience.

Cindy Luxhoj, Associate Planner, announced that the criteria applicable to the application were stated starting on Page 2 of the Staff report, which was entered into the record. Copies of the report were made available at the side of the room and on the City's website.

The following exhibits were entered into the record:

- Exhibit A7: Staff memorandum to DRB dated May 5, 2023
- Exhibit B15: Letter from the Applicant's legal counsel dated May 4, 2023, regarding conditions of approval in the Staff report.

Ms. Luxhoj presented the Staff report via PowerPoint, briefly reviewing the site's and expansion area's location, key features, and surrounding land uses, and presenting the project as follows:

- The project had been reviewed using all applicable standards in the Coffee Creek Form Based Code and Pattern Book and complied with Coffee Creek review procedures. City Council had reviewed the Annexation and Zone Map Amendment and approved both ordinances unanimously. The appeal period for both ordinances ended on February 18, 2023. (Slide 4)
  - If the Stage 2 Final Plan application was not approved, the Annexation and Zone Map Amendment would expire on June 18, 2023, 120 days from the effective date of the Ordinances.
- Proper noticing was followed for this application with notice mailed to all property owners within 250 ft of the subject property and notice published in the newspaper. An additional posting was placed on the site and the City's website. Due to the nature of the revised review process for projects within Coffee Creek, public notice was mailed and posted on December 15, 2022, January 3, March 7, and April 18, 2023. No public comments regarding the project were received during the comment period.

- The first seven requests before the DRB tonight were objective in nature, as they involved verifying compliance with the standards. The waivers and variance involved discretionary review. (Slide 6)
- The Applicant had proposed three design options for the site expansion area. All options included the same improvements in the central and eastern parts of the site but differed in their interaction with the Significant Resource Overlay Zone (SROZ) in the western portion of the property.
  - The Applicant's preferred Option 1 requested a variance to cross the SROZ with a drive aisle to access trailer cab parking on the west part of the site.
  - Option 2 was the Applicant's preferred alternate option and also included trailer cab parking west of the SROZ but access was via an interim driveway on SW Day Road. That driveway would be replaced in the future by a connection to a Supporting Street offsite to the west and did not include a variance request.
  - Option 3 did not include any crossing of or development west of the SROZ nor a variance request. It did note, however, the potential for future development west of the SROZ under a separate future application.

15:25

  - The discussion and findings in the DRB Staff report focused on Site Design Option 3, which was Staff's recommended option because it was the only one that did not intrude into the SROZ or require a variance. Additionally, it minimized impacts on natural resources while still achieving the majority of the Applicant's development objectives for the site.
- The Stage 1 Preliminary Plan proposed expansion of the Applicant's operation northward from their current location at 9835 SW Commerce Circle. The proposed project included a new warehouse/manufacturing building on the eastern part of the site and semi-tractor trailer and cab parking in the center. A driveway would provide access to SW Day Road.
  - The Applicant proposed minor improvements to the north part of their existing site to provide a connection between the two sites and to facilitate semi-tractor trailer circulation. The SROZ and upland area on the western part of the site were proposed to remain in their natural state with potential future development under separate application.
- The Stage 2 Final Plan reviewed the function and design of the project and assured the proposal met all performance design standards of the PDI-RSIA Zone and the Coffee Creek Industrial Design Overlay District and Pattern Book.
  - The 58,125 sq ft structure had the potential for a future internal addition of two storage mezzanines for a total potential floor area of 62,107 sq ft. The structure was designed as a warehouse and manufacturing facility with accessory office use. (Slide 9)
  - The project provided 41 parking spaces, which was the minimum required based on the proposed use. The 15 spaces at the front of the building faced SW Day Road, and 26 spaces were located on the building's south side. Loading, utility, and service areas were located at the west side of the building. Roughly 34.9% of the project site, and 15.9% of the parking area was landscaped, which exceeded the standards. Proposed site improvements met, or would meet with conditions of approval, City standards.

- The Coffee Creek Design Overlay District included a Regulating Plan Map and Connectivity Standards. Land within the Overlay District was subject to additional Connectivity Standards as detailed in Figures CC-4 and Table CC-1. Within Coffee Creek, connectivity was to be provided through existing and planned Addressing Streets, required Supporting Streets, and Through Connections. Planned Intersections were locations where Addressing Streets intersect with required Supporting Streets and Through Connections. (Figure CC-1, Slide 10)
  - The exact location, alignment, and cross-section of required streets or paths complying with spacing and minimum cross-section standards was determined at the time of development review. Table CC-1 specified a 600-ft maximum centerline to centerline connection spacing for Supporting Streets, except for intersections with Addressing Streets SW Garden Acres Road and SW Day Road. If the Addressing Street was SW Day Road, connection spacing was to be no less than 1,000 ft centerline to centerline.
- Specific to the current application, the Applicant proposed frontage improvements and right-of-way dedications on SW Day Road consistent with City design sections for this major arterial and identified Addressing Street, thus meeting the standards.
  - The subject site was intended to obtain access to SW Day Road via the required Supporting Street on its west boundary and the Planned Intersection at its northwest corner. However, if the Supporting Street was the only access for the property, a drive aisle that crossed the SROZ would be necessary to access the eastern part of the site.
  - To minimize impacts on the SROZ and enable the Applicant to access the eastern part of their property, the City Engineer evaluated whether a driveway access on SW Day Road, east of the SROZ would function while continuing to meet safety and Level of Service (LOS) standards. As a result, the City approved the location of a driveway east of the SROZ to enable development of the largest unencumbered portion of the site. The City also specified that development of the western portion of the site would require construction of the required Supporting Street. (Slide 11)
  - Because none of the Applicant's site design options proposed dedication or construction of the required Supporting Street along the west site boundary, Engineering Condition of Approval PFA 14 required the Applicant to dedicate a 31-ft wide public access and utility easement along the western property line to ensure the future required Supporting Street could provide a vital connection for properties in Coffee Creek to the west and south.
- The Traffic Study evaluated five intersections, all of which would remain at LOS C or better, which exceeded the minimum LOS D standard ~~of~~. Staff noted that sight distance for trucks exiting the proposed driveway on SW Day Road was identified as a concern in the Transportation Impact Analysis (TIA) for the project. Site distances were evaluated and determined to be met for passenger cars, not trucks making a left turn from the driveway onto SW Day Road. As a result, Condition PFA 10 prohibited trucks from making left turns onto SW Day Road from the site and must use the existing site access on SW Commerce Circle. (Slide 12)

- Site Design Review. The Applicant used appropriate professional services to design structures and landscaped areas on the site and used quality materials. The proposed tilt-up concrete building with colors including light, medium and dark gray, and white was consistent with the design standards in the Overlay District. The building will also contain perforated metal panels, a steel canopy and metal top cap, and glass. The colors and materials chosen were appropriate for the development.
  - The Applicant had used the General Landscape Standard for the site's frontage on Addressing Street SW Day Road while adding varied plantings to provide the naturalistic landscape character required by the Coffee Creek Design District Standards. Three areas were landscaped to the High Screen standard, including on the south side of the industrial wayside, north of the loading area on the west side of the building, and surrounding the trash recycling enclosure on the south side of the site. The sides and rear of the site, which are adjacent to other industrial-designated properties, were landscaped to the Low Screen standard. (Slide 14)
  - The proposed industrial wayside was located west of the driveway on the south side of SW Day Road frontage in the general area outlined in red. The wayside was designed as a looping detour path with two seating areas. (Slide 15)
    - The paved surface of the wayside path and plaza area were approximately 700 sq ft, exceeding the minimum requirement. Perimeter landscaping would not obscure visual access to the wayside from SW Day Road. Dense landscaping behind the wayside, on the north side, visually separated it from the semi-tractor trailer parking at the interior of the site.
    - Benches and trash bins were provided, and bollard fixtures provided illumination.
- Class 3 Sign Permit. The Applicant had proposed one building sign on the north front façade and one monument sign east of the driveway on the SW Day Road frontage. The proposed signs were typical of, proportional to, and compatible with development in the PDI-RSIA Zone.
  - Conditions of approval would ensure the proposed signs would not exceed the maximum allowed size and that the details of design, color, texture, lighting, and materials were provided at the time of application for Class 1 Sign Permits.
- Type C Tree Removal Plan. A total of 257 trees were inventoried, including 221 onsite and 36 offsite. Trees proposed to be retained were shown circled in green and included 46 onsite trees, primarily in the SROZ and the upland portion of the site to the west, and a few along the east and south property boundaries. The 36 offsite trees along the east and south boundaries would also be preserved and protected during construction.
  - The remaining 175 onsite trees, including trees in the SW Day Road right-of-way adjacent to the site, were proposed for removal. The Applicant would plant 175 trees in landscaping throughout the site and as street trees to meet the one-for-one mitigation requirement. (Slide 17)
- Discretionary Review-Waivers. Per the Development Code Section 4.118 (.03), a waiver must implement, or better implement, the purpose and objectives of the planned development regulations. In cases where the Applicant elected to apply for the waiver track instead of the clear and objective track within Coffee Creek, the Design Guidelines would guide approval of the project. Both requested waivers related to the development

standards in Table CC-3 Site Design in Section 4.134 (.11) of the Coffee Creek Industrial Design Overlay District, and were specific to the proposed development, intended to improve design, and also met the intent of the standards.

The first waiver requested that the vehicle parking area design standards be waived in Table CC-3 of Subsection 4.134 (.11). While the number of proposed parking spaces were within the maximum 16 spaces allowed without an adjustment, the Applicant proposed designating 9 of the 15 total parking spaces for employees, which was not allowed by the standard; therefore, a waiver was requested. (Slide 19)

- The second waiver also regarded Table CC-3 and requested that the maximum retaining wall height standard of 4 ft, or 4.8 ft with an allowed adjustment of 20%, be waived to allow for the varying grades of the proposed retaining wall which was 18.7 ft-high at the northeast corner and along the entire eastern segment to the southeast corner where it descended to grade at the west extent of the south wall. (Slide 20)
  - The north section of the retaining wall, highlighted in red, on the north side of the parking area drive aisle would not be visible from the SW Day Road right-of-way, except at its northeast corner and along the eastern portion not obscured by the building. The retaining wall would be visible from within the north parking area and from the walkway to the office endcap at the northwest part of the building.
  - Soil nails and a finished surface of scored shotcrete that resembled basalt bedrock would be used to construct the wall. The eastern wall section would include a benched landscape area and landscape seating wall at its base, providing the minimum 5-ft horizontal offset required by the design standard. Landscaping was proposed along the entire extent of the wall and was located in a way to avoid the critical root zone of retained offsite trees along the east and south property boundaries.
- Staff recommended approval of the requested waivers. The Applicant would address the waiver criteria and explain how the requested waivers met the purpose of the standards.

- Discretionary Review-Variance. Per the Code, Uses exempt from SROZ regulations included the construction of new public, not private, roads and paths into the SROZ to provide access to or across the sensitive area, provided the location of the crossing was consistent with the intent of the Comprehension Plan and construction impacts were minimized. Therefore, the exemption did not apply to the private drive aisle crossing proposed by the Applicant. None of the other exempt uses or activities listed in the Code applied to the proposed private crossing of the SROZ. (Slide 21)
  - Although two of three Site Design options did not include a drive aisle crossing of the SROZ, the Applicant had not withdrawn the variance request and proposed Option 1 as their preference. Because there was no exemption in the regulations for a private crossing of the SROZ, and the Applicant had failed to demonstrate that the proposed crossing involved the minimum necessary to relieve the alleged hardship, Staff recommended denial of the variance request.
- The Applicant requested that the DRB not impose Engineering Conditions PFA 3 and PFA 11.
  - Condition PFA 3 addressed the looping of the water line serving the site. Looping was necessary to avoid long, dead-end water lines. The proposed main to serve the hydrant

on the south side of the building was approximately 750 ft long, which was considered a long line. The City's Water Master Plan had identified an existing deficiency in the fire system on the Applicant's existing site. The proposed fire system would need to be looped to ensure there were no performance or reliability issues in the future.
    - Although looping the water line through the Applicant's existing site on SW Commerce Circle would improve performance and liability, it was not essential to serve the development. Therefore, deleting the second sentence in the condition was acceptable to the City. (Slide 22)
  - Condition PFA 11 addressed water line easements, but not the looping of water lines specifically. Dedication of all necessary water line easements was a standard requirement of development when public utilities were located on private property. As such, no modification of this condition was warranted.
- The Applicant also requested that the DRB not impose Condition PFA 14, which addressed the dedication of an easement to enable construction of the required Supporting Street along the site's west boundary, shown in the Coffee Creek Regulating Plan Figure CC-1, either with the current application or at some point in the future.
  - Compliance with the Coffee Creek Code and Regulating Plan occurs during the Stage 2 Final Plan application and approval. In Stage 2, the Applicant showed future development on that portion of the property, which would take access from the Supporting Street. Since development was anticipated in the future, striking that condition was not acceptable, and no modification to the condition was warranted.
  - Staff had communicated to the Applicant that the City would consider a modification proposed by them provided it achieved the City's objective of providing that vital connection to SW Day Road for properties in Coffee Creek, but the Applicant had not proposed such a modification.

Chair Svadlenka confirmed there were no questions for Staff and called for the Applicant's presentation.

Garrett Stephenson, Attorney, Schwabe Williamson & Wyatt, 1211 SW Fifth Ave, Suite 1900, Portland, OR, 97204, stated he represented the Applicant and appreciated the Staff report and the recommendation for approval. Both the Applicant and Staff had worked hard on the project, and he believed the Applicant was 99% in lockstep with Staff regarding the project.

- Regarding Condition PFA 14 requiring the 31-ft easement, he noted of the three options, Option 2 would involve development of the west side parking lot and Staff would not support the proposed access out to the street. Although there was a possibility of accessing the other street in the Coffee Creek Plan in the future, the Applicant determined that plan would not be feasible with a 31-ft easement.
- He encouraged the DRB to focus on Options 1 and 3, noting the main divider between those options was the variance request. He did not believe there was a scenario in which Option 2, even if approved, would work from a development standpoint if the 31-ft easement was required.

Lee Leighton, Lead Planner, Mackenzie, 1515 SE Water Ave, Suite 100, Portland, OR, 97214, stated the project had begun in late 2020, noting the design work had been very intensive to figure out how to make the sloping site work for industrial development and for the owner, Delta Logistics, located to the south. Staff had provided a lot of guidance, and while they had not agreed on everything, Staff had been very professional in representing the City, and they had been good dialogue back and forth. The property presented a number of challenges, and the Applicant had worked hard to address them. He presented the Applicant's proposal via PowerPoint with these comments: He highlighted the success story of Delta Logistics, which began as a two-employee start-up over 20 years ago and had since grown into a multi-state, multimodal logistics service company. Delta moved to its current Wilsonville site in 2016 with 57 employees, and now had 113 full-time employees serving more than 2,500 customers, with other locations in Washington and Illinois. In the Northwest, the company served customers within an approximate 270-mile radius of Wilsonville. The Applicant was a great success story for Wilsonville and a regional employer that was growing and doing well. Delta's acquisition of the subject site and its development proposal reflected their success.

- He commended Ms. Luxhoj for her excellent Staff report which covered most of what the Applicant would have covered in their presentation.
- Anyone visiting the site would have seen how steep Day Road was in front of the property and how it transitioned along the frontage. East of the site was an apex vertical curve where a high point in the road prevented seeing oncoming traffic when trying to exit the driveway. Therefore, a driveway any farther to the east was impractical due to unsatisfactory sight distance. As a result, the Applicant had to identify an appropriate driveway location that was operationally safe and would also allow grading within the site to allow for the connection to the south where the existing headquarters operation was located.
    - The result was the initial plan shown by Ms. Luxhoj. He indicated where the connection could be made to the existing Delta Logistics site and come through the site and back out to SW Day Road. The grades could be made to work, but only with substantial excavation of the building's site so the finished floor's elevation would be low enough to allow practical access and circulation for trucks. The grade had to be less than a 3% cross slope through the site to allow safe maneuvering for trucks and trailers. It had been a very difficult design exercise.
- Additionally, the Applicant proposed to protect Tapman Creek, which was in the SROZ and flowed north to south through the site. Option 1 included some impacts to the creek with mitigation of those impacts. Option 3 did not include any impacts on the protected buffers around the creek.
    - Due to a downstream flow constraint in Tapman Creek about a half mile south of the site, the City required the site to have over-and-above stormwater retention, and the proposed raingarden facility was designed to detain more than the standard 25-year storm design. In Option 3, stormwater retention was only designed for the development as seen on the east side of Tapman Creek.
    - The Applicant's 100-year storm rain garden facility would enable the site to outflow water to Tapman Creek at the same rate it did now. The water would be detained in the ponds and slowly released to mimic the downstream flow, which would reduce the

amount of water at the pinch point farther south to help mitigate or at least not contribute to that constraint, even in very high storm events.

- The building's main entrance was located on the northwest corner of the building and was immediately visible when entering the site from the driveway and the visitor parking was clearly visible by the front door to the left. Visitor traffic and trucks comingling was dangerous for everyone, but with only one driveway, the design layout split truck traffic off as soon as they enter the site and gave trucks leaving the site plenty of opportunity to see vehicles entering the site and hold back until it was safe to proceed.
- The crosswalk was located away from the driveway because it was the only place an ADA accessible path from the street could go due to the grades and topography. It also allowed the Applicant to move the pedestrian path and crosswalk of the passenger vehicular drive aisle away from the throat of the driveway which was safer for pedestrians walking to and from the building because they would not cross a truck path to access the main building entrance.
    - There was also room for an incoming vehicle to move aside and wait for a pedestrian to cross without being backed up into the drive aisle. The concentration of bringing things close together was functionally very attractive and important.
- The wayside was located just to the west of the driveway and adjacent to the sidewalk along SW Day Road, presented itself nicely to the street, and would likely be used as an outdoor break area for employees as well as a refuge for pedestrians.

Adam Goldberg, Project Architect, Mackenzie, said the Applicant believed the proposed building was a step above the normative, tilt concrete warehouse. They had paid close attention to the Coffee Creek Design Guidelines in a few key ways, paying special attention to the prescriptions of the base, middle, and top elements of the building. The lower 10 ft of the building was accentuated with a darker contrasting paint scheme and a series of perforated corrugated metal panels that stood off the building that met or exceeded the minimum standoff requirements.

- In the main body of the building, some horizontal banding was accentuated and punched openings and glazing were also included. Some of the horizontal bands continued across the building to the bumped-out corner that was the main office and building entrance. The entry was celebrated with a large, wraparound steel canopy that protected the pedestrian access to the building. That datum also carried across to a perforated metal screen wall that screened the visual perspective from the streets to the truck apron. Plantings in front of the screen also beautified the area. The top of the building was met with an 18-in tall painted metal coping which stepped off at least an inch and a half as well.
- At the north and front of the building, the metal panels would run horizontally in the medium/dark gray bands with a 16-ft datum that carried across the entire middle of the building from the top band to the canopy to the top of the screen wall. The color scheme included a series of grays and a callback to the site's natural basaltic rock features, which would also be celebrated in the large retaining wall adjacent to the building. (Slide 9)

Nicole Ferreira, Landscape Architect, Mackenzie, stated the Applicant wanted to ensure the site's entrance provided a multi-tiered and naturalized experience. The front tiered landscape

strip included both meadow and stormwater facilities, depending on one's location along the frontage, and separated bicyclists from the street; then another landscape strip with street trees separated bicyclists from pedestrians, and adjacent to that was a generous, 20-ft landscape buffer that also incorporated the wayside, which had a sight-obscuring buffer behind it. The elevation change of the sidewalk helped screen the building from the street. A pedestrian sitting in the wayside would not know they were seated next to a truck court. (Slides 10-11)

- Staff asked the Applicant to consider views of the retaining wall from both offsite into the site and from inside the site outward which challenged the design team to ensure the wall was aesthetically pleasing and that there was sufficient screening at the start and close to full screening of the wall when the plantings matured.
    - Smaller, new trees would be planted at the north side of the building along the property line. The south side of the building had existing trees both to the east and to the south that would be protected. The wall was outside the dripline of all of the existing trees. The Applicant worked with their geotech and the City to come to a solution that helped protect the neighbors' trees for their ability to develop their property in the future. She indicated where the Applicant bumped a portion of the wall out to accommodate the dripline of an existing tree. She noted the soil nail wall technology did not require the Applicant to over excavate to construct the retaining wall.
- Three different wall options were considered. (Slide 17) The Applicant preferred Option 1 which had a 10-ft offset so the soil nails would not cross over the property line. The wall in Option 2 would be compliant with the current standards, but the tiers would start 6 ft to 10 ft away from the wall and could not be done in a way to allow both trees and fire access behind the building. The compromised reached with Staff was to have a lower pedestrian-scale wall to create a space for people to enjoy. (Option 3) However, her concern was that trees were needed to prevent a wind tunnel.
- During construction, an arborist would be on site to assess the situation and ensure the trees were substantially preserved. Soil nails would be positioned to minimize the risk of affecting significant roots of existing trees. The arborist had been an integral part of the development plan for the wall, as well as the Applicant's geotech.

Janet Jones, Traffic Engineer, Mackenzie, reiterated there were several challenges related to site design and the offsite impacts of visibility along SW Day Road. To provide an adequate driveway that was both safe and efficient for the site, the Applicant had to address site grading, circulation, separating trucks from passenger vehicles, and ensuring safe mobility onto SW Day Road with respect to the vertical crest on Day Road to the east. Various site access points were reviewed for sight distance, which had been verified both in person at the site and by utilizing AutoCAD modeling with Metro-provided topographical data to ensure the proposed driveway location was, in fact, safe and allowed for clear visibility through the roadway surface. (Slide 18-19)

Mr. Stephenson noted Chair Svadlenka's opening remarks stated that it was incumbent upon the Applicant to raise any potential constitutional issues before the end of the hearing process,

adding he would briefly touch on those items now and referenced Exhibit B15, which discussed Conditions PFA 3, 11, and 14 that Staff had already mentioned.

- Regarding Conditions PFA 3 and 11, he appreciated that Staff had stated the Applicant did not have to connect the waterline down to Commerce Circle. However, he would maintain their objection to those two conditions, because he did not know what a looped waterline would require of the Applicant at this point. The objection to Condition PFA 11 was not because they did not think stormwater lines needed to be in easements, but mainly because Condition PFA 11 lived with the condition for a loop down to the Commerce Circle waterline, so it made sense to address both conditions together. He believed they could potentially work through those two conditions, but it was not yet apparent to the Applicant since they had just seen the revised condition today and did not yet know how it would work.
- Condition PFA 14 regarding the 31-ft public easement had a number of problems and was the key condition. First and foremost, it would effectively prohibit doing anything from a practical matter to the west side, which was why he had asked the DRB not to consider Option 2. The constitutional issue was that under no scenario would the Applicant be able to access the new street that the Coffee Creek Plan may or may not locate directly adjacent to the Applicant's property. (Slide 20)
  - Oregon case law stated if a developer was not proposing to access a street and would not be using it in any way, they did not have to dedicate right-of-way or build that street. There could be a future scenario where the City wanted to build the street and the Applicant could be a partner in that, but at this point, the constitutional problem was that the Applicant did not need the street connection to make Option 3 work.
  - If the street was not needed by the Applicant nor impacted by the Applicant, the City could ask that it be built but had to pay for it. Unlike a condition that required design alterations or to meet a code, this condition asked for an interest in property for a goal that was unrelated to the application before the DRB, which was why the Applicant objected as explained in his letter. (Exhibit B15)
- He believed the Applicant had a good application, and they agreed with Staff on the vast majority of the elements. If the DRB imposed Condition PFA 14, the Applicant had the option to appeal and then seek damages in circuit court or go to the Land Use Board of Appeals, as set out under Oregon law.
- He had racked his brain about how the Applicant could use the site with that condition but based on the image on the Alternative Site/Access Plan – Option II (Slide 20), he could not envision the Applicant coming back for a Phase 2, which Staff had alluded to that, but a completely different accommodation on the location of that street was needed for the Applicant to be in a position to come back with a future development plan.
- Unless the DRB approved the requested variance, there was no potential for any development on the west side of the site in the near future. The Applicant had some ideas about the street's location, but they were not before the DRB tonight. The Applicant requested that the DRB approve the application, and if the Board did not find that the variance was warranted, that Option 3 be approved.

Mr. Leighton noted the parking spaces were special; they were not for cars or trailers, but rather for the tractors and were a special size and shape; however, they still required a 24-ft drive aisle behind them for two-way circulation to maneuver in and out of the parking spaces. With a 31-ft wide easement for the future right-of-way dedication plus the required 10-ft landscaping setback from the street, it was not possible to achieve a single-loaded parking area for any type of vehicle because the corridor would be too narrow to make the two-way circulation and parking spaces work. Consequently, there was no scenario in which the western part of the property would be usable.

Clark Hildum asked if the western parking lot was necessary for part of the subject project.

Mr. Leighton explained it was part of Option 1, the Applicant's preferred plan, because it would add overall capacity so the site could better accommodate the Applicant's growth and the equipment required to meet those needs. Option 1, which required the variance for the crossing, would allow the Applicant to internalize all the truck and unit movements, allowing a tractor to drop off a trailer at the dock door and park without going back out to the street, which would add trips on the arterials of the street network. Achieving that internal circulation would enable the Applicant to do a better job of reducing trip generation and friction on the streets, which was why Option 1 was preferred.

- Because the Applicant wanted to find a path forward and avoid a dispute, they decided to take the western development piece off the table for now and move forward with what could be approved now and take up that issue later, in a separate application, which would also have to come before the DRB, especially if it needed a variance, waiver, or approval.
- Consequently, the City would get another opportunity to determine whether this was the appropriate alignment for the Supporting Street. There was correspondence in the record about whether that was the case, but Applicant believed that would sort itself out as more development happened to the west of this site in Coffee Creek where 100 or more acres were available for future development. He believed it made more sense to determine the correct alignment for the Supporting Street during future development.
- The Applicant's driveway needed to be located as proposed for proper operation and safety, as far as sight distances, etc. Staff's location for the Supporting Street was 500 ft away, even though the Staff report noted the desired spacing for Supporting Streets, broadly speaking, was 1,000 ft. There was a lot of room to achieve that 1,000 ft west of the subject property, and 1,000 ft beyond that to Garden Acres Road. Therefore, the situation would likely resolve itself favorably as more development projects came forward in the future.
- Not having the tractor parking in the western part of the site was disappointing, but it was tolerable and better than the project not moving forward. He asked that the DRB make a decision to enable the project to keep moving forward.
- He confirmed the Applicant had no ownership, interest, or control of the property west of the subject site.

Chair Svadlenka understood the public easement and Supporting Street would be located at the very westernmost section of the Applicant's property. Some diagrams seemed to show a

potential supporting road going through the property but still some available space to the west of it near the existing residence.

Mr. Leighton explained that the Portland General Electric power lines corridor came up through the property, and the Applicant could cross under that easement as long as a building was not built. With subject property line and the Bonneville Power Administration (BPA) corridor, which pivoted and formed a funny angle in the southwestern part of the property, there was only a small triangle on the neighboring property immediately to the west between SW Day Road, the subject property line, and the BPA corridor. No industrial building could occur anywhere close to that alignment for a Supporting Street and vehicles would either be driving underneath the BPA lines or a long way to get to the parking lot and building. Any building would have to be built on the far west side, so from a design standpoint, that area to the west was not a good opportunity to achieve the kind of street-facing, street relationships desired in Coffee Creek. That concept would work well farther west with the BPA corridor in the back.

- Similarly, if the Supporting Street was back up against the BPA corridor, he questioned whether a developer would build the east side of a Supporting Street that was right against the BPA powerlines corridor where no industrial development would occur.
- The Applicant believed time was likely to work the situation out. He reminded that if Delta decided to develop the western property in the future, another review procedure would be required. There might be an impact that warranted a dedication, construction, etc., but the Applicant was not proposing to make that access happen as part of Option 3, so there was no impact on that corridor that made it appropriate to ask the Applicant to commit to a dedication at this time.

Mr. Stephenson stated if the Applicant were to provide right-of-way in the City's preferred location, he believed the alignment of the street would be too close to one of BPA's current or future supporting towers. A tower was needed where a transmission line turned, and those towers required substantial easements on both sides so they could be accessed regardless of traffic. While there could be a situation in which a street could go perpendicular under some lines, if a line turned, it could be a problem based on how the easement was laid out.

- He agreed this was not the process through which to plan the road. The Applicant's proposed Options 1 and 3 neither required nor accessed the future Supporting Street. While the Applicant believed Option 1 was warranted, they would not stand between the City realizing its street program and the Applicant doing their development. The difference was if the City wanted a street built there, it would have to pay for the street, which was how the Constitution worked in this case.
    - The Supporting Street was very much in contrast with the frontage improvements the Applicant was making along SW Day Road, which Delta currently accessed and used. Staff's position had been that the Applicant could not cross the SROZ to access it and could not have a direct access on the west side from SW Day Road. The Applicant would have to build the street, but as a practical matter, aside from Constitutional matters, the Applicant could not make that work.
- He asked the DRB to carefully consider Options 1 and 3, adding the City did not need to require Condition PFA 14 at this point. If the Applicant came back with a plan to somehow

develop the area, the City and Applicant could discuss how that street could be built, and how the Applicant could participate, but now was not the time.
- He did not believe the condition was constitutionally permissible, adding a lot more planning and design work should go into clarifying where the alignment needed to be based upon the potential or lack of development as mentioned.

Chair Svadlenka confirmed the Applicant's design included a separate bike lane and pedestrian lane, as required by the City, and that the bike lane was completely separate from the street with a curb as opposed to a typical bike lane. She understood the Applicant would construct the separated bike lane along Delta's section of Day Road and asked how the transition between the new separated bike lane and the existing sidewalk would work.

Amy Pepper, Engineering Development Manager, confirmed the separate bike lane would extend the entire length of SW Day Road. Some interim transitions would be used until the properties to the west and east were developed, but the Applicant would construct their portion and then as development occurred, the entire section of SW Day Road would be improved. The Applicant would also construct the transition from what currently existed to their new improvements.

Chair Svadlenka asked if there was currently a bike lane, and if not, how a transition from no bike lane to a bike lane and back to no bike lane would occur.

Mr. Hildum noted there was about a 3-ft wide space between the road and the curb that would support the transitions.

Chair Svadlenka asked if the trees on the south property line were new plantings because it looked like all the trees on the south property line were being removed. (Slide 16)

Ms. Ferreira replied there were trees on the adjacent property that would be retained. Some trees on the Applicant's side of the property could not be protected so they would be removed and replaced with new trees.
- She clarified the trees with the green overlay were the existing trees to remain. The displayed Tree Protection and Mitigation Plan did not show the trees to be removed. The larger black symbols showed trees proposed for planting and the smaller symbols surrounded by green were trees to remain and be protected. The green represented the dripline, the root protection zone. (Slide 16)

Chair Svadlenka asked if Condition PFA 3 was acceptable with the second line removed.

Mr. Stephenson replied the modifications to the conditions had only been received today, so the Applicant had not yet had a chance to see if they could make them work. The Applicant had to preserve their objections to them because they did not know if they were workable or not. He suspected they might be, which was why he preserved his objection to Conditions PFA 3 and 11 together. The Applicant understood the conditions required a new waterline connection.

The waterline the Applicant would use for the project came off SW Day Road, and the original condition stated it needed to be looped in with Commerce Circle to the south, which was a much longer line than ever anticipated, making it a pretty expensive improvement that did nothing to serve the property, but did appear to fix a deficiency in SW Day Road.

- The Applicant had preserved their objection to the easement because they believed they would not only have to build the waterline, but also determine how get an easement for the City to preserve that line. He understood the condition now allowed the Applicant to loop within the boundaries of the property. If that was feasible from an engineering standpoint and they could provide an easement, it should be fine, except for a water easement that ran through the building.
- He reiterated the need to maintain their objections as they had not had time to review the modifications.

Daniel Pauly, Planning Manager, added Staff had received the letter Thursday, noting there was time to continue the hearing, if more time was needed to iron out the modifications.

- He confirmed the only change was striking the second sentence in Condition PFA 3. Condition PFA 11 remained the same and was essentially tied to PFA 3. Though the words were the same, it was a substantially smaller ask with the change in PFA 3.

Mr. Stephenson reiterated the change might be entirely acceptable, the Applicant just did not know yet. He stated he did not want to continue hearing because June 18th was the deadline for getting the initial approval of the zoning and annexation. He asked the DRB to make its decision tonight to keep the project moving forward. If the conditions were retained, the Applicant could consider whether to appeal to City Council. He did not believe Conditions PFA 3 and PFA 11 would likely be appealed as they could be figured out; however, he did not see how PFA 14 was a sustainable condition under the Constitution. He was concerned about pushing out any further in case the Applicant still needed to appeal. He asked that the DRB approve either Option 1 or 3, regardless of the conditions.

Amanda Guile-Hinman, City Attorney, stated that Legal's recommendation was to continue the hearing, particularly for PFA 14, because Option 3 was listed as potential future development whereas other developers in Coffee Creek did phases for their Stage 2 plan; for example, presenting a Stage 2 plan just for Phase 1 that was not connected to a Supporting Street; therefore, a dedication or building a right-of-way was not discussed because that was not a consideration for Phase 1. Whereas the Applicant's materials state there is potential future development, so there probably was some proportionality, which was the Constitutional analysis mentioned by Mr. Stephenson that could be applied. City Staff had not conducted a proportionality analysis due to only receiving the letter on Thursday. If that condition was going to stand as is, and it was likely the Applicant would continue to raise that objection, the proportionality analysis needed to be in the record. Without that, she was not comfortable advising the Board to make a decision today if there was going to be an objection to it. The hearing should be continued so Staff could conduct that analysis and put it in the record. Alternatively, the application could be modified to not show that possibility of future development, although she was unsure if that could be accomplished tonight.

Mr. Stephenson responded with all due respect to Staff's legal counsel, he had two problems with that. If there was a continuance, the Applicant might not be able to get the project to work. He did not want the City to put the Applicant in the position to either accept the condition or it would not be approved, and the zoning would go away. He doubted Ms. Guile-Hinman was suggesting that, but he did not want to get to that point, practically speaking. He had made it clear earlier in the hearing that there was no way the Applicant could do an option where they access the new street. Therefore, unless the DRB was prepared to approve Option 1, there was no scenario in which the City would be able to make a case for a nexus in proportionality because the Applicant would never be able to get over that SROZ to access that street. He disagreed that potential future development was an adequate basis to make a case for the City. The Applicant did not have a future development to show anyone, and as a practical matter, there was no way to develop the project and meet Condition PFA 14 on the little parking lot to the east.

- He noted it was the City's burden to establish the nexus and proportionality, and if Condition PFA 14 was imposed and the Applicant appealed, the City would have the opportunity to do that in preparation for the appeal to City Council. He did not want to get to that point, but he did not think a continuance was the right decision for the City. He did not believe it was required by Delta's application. If the DRB approved only Option 3, as Staff requested, there was no opportunity, from a practical standpoint with Condition PFA 14 in place, for the Applicant to develop the additional parking area. He did not think that Staff having the additional opportunity to prepare findings to try to make a case for this was warranted unless the Applicant could actually develop something there and could access it, but the Applicant could not; it was just not possible.

Chair Svadlenka asked if Staff had a preference for a continuance of Condition PFA 14 versus keeping it in the application and going to appeal.

Ms. Guile-Hinman replied she was worried about the timeframe to accomplish that as she believed the appeal timeframe to Council was 14 days. She. The main question was the Applicant stating there was no possibility of future development while the application materials showed potential future development. She understood that Ms. Luxhoj had done a mockup that included the 31-ft easement and that there was a possibility for future development, which was why this had become an issue.

Mr. **Stephenson** noted, as a procedural point, that the record was open and the fact that the application materials showed three options did not mean the Applicant could not state tonight that the options for that western development were not on the table, which had been stated. The Applicant was unaware this condition was going to come down until they saw the Staff report, so they were not in a position to design around it. Had they known about the condition earlier, they likely would have withdrawn the other options.
He suspected he knew the answer to approving Option 1, but unless the DRB approved a crossing of the SROZ, the Applicant was not representing to the DRB that there would be a future development that looked anything like what they had for the parking unless something

changed in a future application. At this point, it was not practical to withdraw options, but after seeing Staff's proposed condition, they had to walk away from that.

Ms. Guile-Hinman recommended taking a short recess so Staff could attempt to work out some language to codify the representations being made.

Chair Svadlenka called for a brief recess at 8:14 pm and reconvened the meeting at 8:50 pm.

Ms. Guile-Hinman stated Staff was typing up the agreed-upon modified condition of approval for the DRB, but essentially City Staff and the Applicant had recommended changing Condition PFA 14 to essentially state that any future development west of the SROZ would include the Applicant providing the appropriate right-of-way, dedication, easement, or improvements reflective of their proportionate share of the impact of their development. If the DRB moved to approve, it would be with the amendments to both Conditions PFA 3 and PFA 14 with Option 3. She asked the Applicant's representative to comment on the record about the agreement.

Mr. Stephenson stated this was a much better option for both the DRB and the Applicant, which was under a huge time pressure, and it was substantially risky for both sides to perpetuate the original version of Condition PFA 14. He and City Attorney Guile-Hinman had discussed the change, cleared it with their respective clients, and he supported the proposed amendment. He reiterated that the Applicant really wanted a decision tonight, and he believed the DRB now had everything it needed to resolve the matter and issue a decision.

Chair Svadlenka confirmed the Board had no questions of the Applicant.

Mr. Hildum stated the building was a beautiful project and would be a nice asset to the community. [inaudible] He continued noting that SW Day Road was rapidly becoming very busy, and the City would likely want to limit ingress and egress from that road in the future. Consequently, he did not think the mythical road west of the subject development would ever be built. Additionally, he could not see how the road would be required for future development, so he did not believe Condition PFA 14 was necessary.

- Regarding Condition PFA 3, he would be very hesitant as a property owner to give anyone a water right-of-way through his property, so he did not think that was necessary for the City.
- In terms of Option 3, as a property owner, he would object strongly to giving up that much property to a wetlands or undeveloped area. Option 2 had been eliminated, which left Option 1, which he believed was very good, and the preferred choice. It would allow trucks to use either SW Day Road or cut through the Applicant's other property to Commerce Circle.

Jordan Herron understood Option 1 involved going over the creek noting plans were in place, such as the raingarden, to minimize impact to the creek. He asked if that was the only potential impact being minimized or were there additional impacts to the creek the DRB had not yet heard about.

Mr. Stephenson stated the Applicant decided to use a bridge to cross the wetland as the objective was to avoid damage to the wetland itself. There were likely some mitigation elements to the riparian area around the wetland as well.

Mr. Leighton stated the Applicant's initial application included a wetland delineation and a biological assessment by Kim Biafora, now Kim Carpenter, of Shott & Associates, who conducted a thorough inventory, and the Applicant had calculated the impact. Although they were using a bridge to cross the actual wetlands, pavement was needed on either side to access the bridge, which would cause impacts on the buffer areas around the wetlands, so they calculated the area needed for those as well as the appropriate mitigation ratios, and the proposed Option 1 exceeded the required mitigation ratios. If there was an impact in one area, in another area adjacent to the wetland, plantings could be installed or improved conditions established to mitigate those impacts. The Applicant had accomplished all of that entirely with onsite mitigation, as opposed to paying a fee into a mitigation bank that would enact changes elsewhere in the watershed. As part of the application for Option 1, that mitigation plan was integral to the proposal and achieved ratios in excess of the minimum requirements.

Mr. Pauly explained that the bar was set higher for variances as opposed to waivers. Due to the specificity of variance criteria, an argument that worked for a waiver would not always work for a variance such that it was unique to the site and was the minimum necessary to relieve the hardship. For the subject application, Staff had looked at it seriously and believed the variance criteria themselves were not met and those positive findings could not be made, which was why Staff had recommended denial. Had this been a waiver situation, Staff would have looked at it differently.

Kerry Rappold, Natural Resources Manager, stated that he administered the SROZ. He noted a variance had never been approved in regard to the SROZ. The City had a fairly restrictive Code that protected three categories of resources. The buffer seen on the subject property was the buffer from Tapman Creek. The wetlands identified within the project area were not locally significant wetlands so did not receive the same 50-ft buffer which was a requirement the City implemented as part of Metro's requirements for Title III.

- Doing something that spanned the area more completely was the only way to significantly minimize the crossing. Extensive retaining walls were being used to construct the bridge, so it had a fairly significant footprint within the buffer area as it crossed the creek. Impacts to the downstream system had to be offset based on having the larger stormwater management facility, so this was probably the most constrained drainage system within the city. It had been an ongoing problem for years. So, the denial was not really a consideration in terms of the variance, but any type of crossing in the area would create constraints in terms of how the stormwater conveyance system was addressed in the future. It was not an ideal location for a crossing either. The proper function of this drainage system in terms of conveyance would also be an ongoing issue as Basalt Creek developed in the future.

Chair Svadlenka called for public testimony regarding the application and confirmed with Staff that no one was present at City Hall to testify and no one on Zoom indicated they wanted to testify.

Yara Alatawy understood Option 3 with no future potential development was the only option on the table.

Mr. Pauly confirmed Option 1 with a variance was also still available but would require specific language from the Board to change the variance findings to make findings that the variance criteria were met. The variance criteria were used when codes were not meant to have a waiver available or be easily changed. The bar was high, so the Board would have to look carefully at the findings if they wanted to go in that direction. [2:34:18]

Ms. Alatawy understood Option 1 might be considered if—

Mr. Pauly interjected yes, adding in Staff's opinion, those l findings could not be—

Mr. Stephenson interjected the Applicant had an application that had detailed sets of an explanation of why this variance was justified. The issue here was that the Applicant applied and told Staff why they met the criteria for a variance, and Staff did not agree. If the DRB approved the variance, the Board could simply approve the language in the application, and he believed there was a supplement as well. He did not want it to sound like there was no explanation of why they believed the variance was met; it was part of their application. The issue was Staff would not provide the DRB with that because Staff did not think it was needed. If the DRB wanted to approve the variance, the Board would essentially be agreeing with the application as written by the Applicant.

Mr. Pauly noted the Applicant did not have Goal 5 findings, because a Goal 5 resource was being impacted, Goal 5 findings were still needed.

Mr. Stephenson replied specific Goal 5 findings were not needed because both the SROZ program and the variance process were acknowledged to comport with Goal 5. The only time a Goal 5 finding was needed was if there was not an approved Goal 5 program, and Wilsonville had one.

Mr. Pauly responded that essentially the variance would be ignoring the Goal 5 program, and he did not think the City's Goal 5 approval directly addressed the use of a variance to go away from the Goal 5 program.

Ms. Alatawy asked for further clarification about Goal 5 in relation to the variance requested for Option 1.

Mr. Rappold explained Goal 5 came in to play because the SROZ program was adopted by the City to be in compliance with that statewide planning goal. The City put together its own Code

and allowed for the variance process to be entertained in regard to a situation such as this where there was no other way to approve it. That said, the City had never had an application before that sought a variance in regard to something like this.

Kimberly Rybold, Senior Planner added that she believed Ms. Luxhoj had researched the application of the adopted State standard relative to the Safe Harbor. She did not know if Ms. Luxhoj or Mr. Rappold had anything further to add on that topic and how it related to the SROZ.

Mr. Rappold replied there were a number of ways to comply with Goal 5 in terms of procedures to follow or the means by which to comply, and Safe Harbor was one of those approaches an applicant could apply to protect the resources of a protected area. However, with this application, they were complying with Metro's Title III requirements in terms of the buffer that the City added. The City protected every single stream in the city, whether it was manmade or natural, with a minimum 50-ft buffer, and the Code was constructed such that impacts were allowed only to a very small portion of the SROZ, which had to be within an area called the Area of Limited Conflicted Use and that did not include waterways, which only left the option of having some an exempt use or activity, or request a variance; however, the variance criteria still had to be met in terms of compliance.

Chari Svadlenka noted Conditions PFA 3 and 14 were being changed. Because she was not in favor of approving the variance, she was in favor of Option 3.

Mr. Herron stated he was also in favor of Option 3.

Mr. Hildum replied that he was still in favor of Option 1.

Ms. Alatawy supported Option 3.

Mr. Herron added he did not like any impact to the wetlands that could be avoided. They were a huge part of why he had moved to Wilsonville, and that highly shaped his decision.

Mr. Hildum agreed that impacts on wetland areas should be minimized, but the City had taken an agricultural area and converted it to an industrial zone and some of that was just going to have to be impacted if they were going to continue with the Canyon Creek Industrial Zone. He believed the building a bridge like the one proposed was minimal, and the impact was minimal.

Chair Svadlenka noted that Mr. Rappold had spoken about the impacts related to the retaining wall and all the concrete that would go in, which resulted in a significant impact overall.

Mr. Hildum replied overall, the impact would be relatively insignificant to the size of the area.

Chair Svadlenka disagreed, adding she believed the impact was significant because the SROZ there was not huge.

Mr. Hildum agreed, but believed it was large enough to withstand that, although he did not know the importance of that SROZ.

Mr. Herron stated he had not heard a strong enough case for approving a variance when Wilsonville had a history of not doing so in that area. He did not think any impact was worth it and protecting the land was more important in this case.

Ms. Guile-Hinman confirmed Option 3 included the possibility of future development.

Ms. Alatawy suggested that with potential future development there might be other workarounds and solutions for the area for potential growth or development as long as the Applicant had the developed area.

Ms. Guile-Hinman replied that the Applicant's point about the agreement regarding the easement right-of-way dedication discussion on the western portion was the City did not have a clear idea yet of what the street alignment should be and that ultimately, the alignment could result in more potential opportunities for future development farther to the west. The fact that the development agreement included that this issue would be addressed in the event future development occurred, showed that additional discussion could occur about that right-of-way to the west and what that orientation would look like.

Mr. Hildum stated future development would increase traffic on SW Day Road, and he did not know how much traffic SW Day Road could accommodate. Consequently, he did not believe that westside street would ever be necessary or built.

Mr. Pauly replied Staff had those conversations and the street was essential in some connections and not just a line on a map. The City was very serious about it as part of the Transportation System Plan. There were long properties located on Garden Acres Road, so to enable development behind them, some there would be another street; otherwise the block would be too big. Although the exact alignment was currently unknown, there would definitely be another street there likely sooner rather than later, due to development pressure.

Chair Svadlenka confirmed there were no further questions or discussion and closed the public hearing at 9:16 pm.

Mr. Pauly stated he wanted to put on record that the exhibits contained plans that had the different options, so when stamped approved, the City would only stamp approved the drawings and plans that reflected the option that was adopted. He clarified that typically when a Staff report was adopted, all the exhibits reflected what was being adopted but in this case, the exhibits had other drawings based on options that were not being adopted.

Ms. Guile-Hinman added that the language regarding Condition PFA 14 was in the email Board members received, and that email had also been provided to the Applicant.

Chair Svadlenka stated that the modified Staff report included the Option 3 design and proposed changes to Conditions PFA 3 and PFA 14.

Chair Svadlenka moved to approve the amended Staff report, including the modifications of Design Option 3, adding Exhibits A7 and B15 and the amendments to Conditions PFA3 and PF14 as provided by Staff. Jordan Herron seconded the motion.
(Note: the following changes were made to the record with additional language in bold, italic text and deleted language struck through.)

- **PFA 3. With the Public Works Permit:** The construction drawings shall show all necessary temporary water line looping to avoid long dead-end water lines. ~~Water line looping to the existing water line across the SW Commerce Circle site is required to improve system performance and reliability.~~
- ***Revised*** **PFA 14. Prior to ~~Final Building Certificate of Occupancy~~** ***Prior to issuance of Public Works Permit:*** ~~The Applicant shall dedicate a 31-foot wide public access and utility easement along the western property line for the purposes of a future Supporting Street.~~ ***Applicant agrees that if Applicant applies to do development west of the SROZ, the Applicant will provide adequate right-of-way/easement/improvements reflective of its proportionate share of its impact, which agreement will be reflected in a development agreement.***

The motion passed unanimously.

Chair Svadlenka moved to adopt Resolution No. 411 including the amended Staff report. The motion was seconded by Jordan Herron and passed unanimously.

Chair Svadlenka read the rules of appeal into the record.

BOARD MEMBER COMMUNICATIONS:

3. Results of the April 24, 2023 DRB Panel B meeting
4. Recent City Council Action Minutes

There were no comments.

STAFF COMMUNICATIONS

Daniel Pauly, Planning Manager, announced that DRB Panel B was undergoing the Transportation Training that Panel A had already done.

ADJOURN

The meeting adjourned at 9:23 p.m.

Respectfully submitted,

Paula Pinyerd, ABC Transcription Services, LLC. for
Shelley White, Planning Administrative Assistant

DEVELOPMENT REVIEW BOARD MEETING
JUNE 12, 2023
6:30 PM

Public Hearing:

2. **Resolution No. 416. SW Boeckman Road Building W-5.** The applicant is requesting approval of a Stage 1 Preliminary Plan Modification, Stage 2 Final Plan Modification, Site Design Review, Type C Tree Removal Plan, Standard SROZ Map Verification, and Standard SRIR Review for development of an 80,446 square foot industrial building and associated improvements on property located at 9600 SW Boeckman Road.

Case Files:

DB22-0004 SW Boeckman Road Building W-5

- Stage 1 Preliminary Plan Modification (STG122-0004)
- Stage 2 Final Plan Modification (STG222-0004)
- Site Design Review (SDR22-0004)
- Type C Tree Removal Plan (TPLN22-0003)
- Standard SROZ Map Verification (SROZ22-0003)
- Standard SRIR Review (SRIR22-0001)

DEVELOPMENT REVIEW BOARD
RESOLUTION NO. 416

A RESOLUTION ADOPTING FINDINGS AND CONDITIONS OF APPROVAL, APPROVING A STAGE 1 PRELIMINARY PLAN MODIFICATION, STAGE 2 FINAL PLAN MODIFICATION, SITE DESIGN REVIEW, TYPE C TREE REMOVAL PLAN, STANDARD SROZ MAP VERIFICATION, AND STANDARD SRIR REVIEW FOR DEVELOPMENT OF AN 80,446 SQUARE FOOT INDUSTRIAL BUILDING AND ASSOCIATED IMPROVEMENTS ON PROPERTY LOCATED AT 9600 SW BOECKMAN ROAD.

WHEREAS, an application, together with planning exhibits for the above-captioned development, has been submitted by authorized representative Lance Mueller & Associates on behalf of the owner/applicant, W-5 LLC, in accordance with the procedures set forth in Section 4.008 of the Wilsonville Code, and

WHEREAS, the subject site is located at 9600 SW Boeckman Road on Tax Lots 204 and 204, Section 14B, Township 3 South, Range 1 West, Willamette Meridian, City of Wilsonville, Clackamas County, Oregon, and

WHEREAS, the Planning Staff has prepared the staff report on the above-captioned subject dated June 5, 2023, and

WHEREAS, said planning exhibits and staff report were duly considered by the Development Review Board Panel A at a scheduled meeting conducted on June 12, 2023, at which time exhibits, together with findings and public testimony were entered into the public record, and

WHEREAS, the Development Review Board considered the subject and the recommendations contained in the staff report, and

WHEREAS, interested parties, if any, have had an opportunity to be heard on the subject.

NOW, THEREFORE, BE IT RESOLVED that the Development Review Board of the City of Wilsonville does hereby adopt the staff report dated June 5, 2023, attached hereto as Exhibit A1, with findings and recommendations contained therein, and authorizes the Planning Director to issue permits consistent with said recommendations for:

DB22-0004 SW Boeckman Road Building W5: Stage 1 Preliminary Plan Modification (STG122-0004), Stage 2 Final Plan Modification (STG222-0004), Site Design Review (SDR22-0004), Type C Tree Removal Plan (TPLN22-0003), Standard SROZ Map Verification (SROZ22-0003), and Standard SRIR Review (SRIR22-0001).

ADOPTED by the Development Review Board of the City of Wilsonville at a regular meeting thereof this 12th day of June, 2023, and filed with the Planning Administrative Assistant on _____. This resolution is final on the 15th calendar day after the postmarked date of the written notice of decision per *WC Sec 4.022(.09)* unless appealed per *WC Sec 4.022(.02)* or called up for review by the Council in accordance with *WC Sec 4.022(.03).*

_____

Jean Svadlenka, Chair - Panel A
Wilsonville Development Review Board

Attest:

_____

Shelley White, Planning Administrative Assistant

WILSONVILLE
OREGON

Exhibit A1
Staff Report
Wilsonville Planning Division
SW Boeckman Road Building W5

Development Review Board Panel 'A'
Quasi-Judicial Public Hearing

Hearing Date:	June 12, 2023
Date of Report:	June 5, 2023
Application No.:	DB22-0004 SW Boeckman Road Building W5
Request/Summary:	The requests before the Development Review Board include a Stage 1 Preliminary Plan Modification, Stage 2 Final Plan Modification, Site Design Review, Type C Tree Plan, Standard SROZ Map Verification, and Standard SRIR Review.
Location:	9600 SW Boeckman Road. The property is specifically known as Tax Lots 202 and 204, Section 14B, Township 3 South, Range 1 West, Willamette Meridian, City of Wilsonville, Clackamas County, Oregon
Owner/Applicant:	W-5 LLC (Contact: Mac Martin)
Authorized Representative:	Lance Mueller & Associates (Contact: Bob Wells)
Comprehensive Plan Designation:	Industrial
Zone Map Classification:	PDI (Planned Development Industrial)
Staff Reviewers:	Cindy Luxhoj AICP, Associate Planner Amy Pepper, Development Engineering Manager Kerry Rappold, Natural Resources Program Manager

Staff Recommendation: **Approve with conditions** the requested Stage 1 Preliminary Plan Modification, Stage 2 Final Plan Modification, Site Design Review, Type C Tree Plan, Standard SROZ Map Verification, and Standard SRIR Review.

Applicable Review Criteria:

Development Code:	
Section 4.001	Definitions
Section 4.008	Application Procedures-In General
Section 4.009	Who May Initiate Application
Section 4.010	How to Apply
Section 4.011	How Applications are Processed
Section 4.014	Burden of Proof
Section 4.031	Authority of the Development Review Board
Subsection 4.035 (.04)	Site Development Permit Application
Subsection 4.035 (.05)	Complete Submittal Requirement
Section 4.110	Zones
Section 4.117	Standards Applying to Industrial Development in All Zones
Section 4.118	Standards Applying to Planned Development Zones
Section 4.135	Planned Development Industrial (PDI) Zone
Section 4.140	Planned Development Regulations
Section 4.154	On-site Pedestrian Access and Circulation
Section 4.155	Parking, Loading, and Bicycle Parking
Section 4.156.01 through 4.156.11	Signs
Section 4.167	Access, Ingress, and Egress
Section 4.171	Protection of Natural Features and Other Resources
Section 4.175	Public Safety and Crime Prevention
Section 4.176	Landscaping, Screening, and Buffering
Section 4.177	Street Improvement Standards
Section 4.179	Mixed Solid Waste and Recycling
Sections 4.199.20 through 4.199.60	Outdoor Lighting
Sections 4.300 through 4.320	Underground Utilities
Sections 4.400 through 4.440 as applicable	Site Design Review
Sections 4.600 through 4.640.20	Tree Preservation and Protection
Other Planning Documents:	
Wilsonville Comprehensive Plan	
Previous Land Use Approvals	

Vicinity Map:

Background:

Initial development of the subject property occurred in the 1970s with construction of an industrial building – Building W4 – and associated improvements on the eastern part of the subject site. It is unclear in the City record whether a Stage 1 Preliminary Plan was prepared at the time anticipating that a second building would be constructed on the treeless western part of the site in a future development phase.

Since its construction, Building W4 has served a number of industrial users including a publishing plant (RFD Publications), a warehouse for doors and other building materials (OrePac), and, currently, DWFritz Automation. Substantial custom architectural renovations to the existing Building W4 occurred in 2016-2017 to consolidate DWFritz's local operations in one building for their world headquarters. The renovation included many structural and architectural enhancements, as well as a change of use from warehouse to industrial office/manufacturing, and additional parking to serve the building The Transportation Impact Analysis (TIA) prepared in August 2017 (Exhibit A3) as part of the DWFritz site modifications analyzed traffic associated with renovation of the existing 155,000-square-foot building and addition of a second building sometime in the future (future building) that was anticipated to include 70,000 square feet of high-

tech manufacturing and 4,000 square feet in a sit-down restaurant. While included in the TIA, no land use applications for the future building as described in the TIA was ever submitted. The current application proposes to construct the second building anticipated in the 2017 TIA; however, rather than including the mix of uses evaluated in that analysis, the new building is proposed to be an 80,446-square-foot office/manufacturing building without the previously anticipated restaurant space. The new Building W5 is proposed to be located west of the existing Building W4 on the northern vacant portion of the subject site. As described by the applicant, the new Building W5 provides manufacturing space for hi-tech industrial operations. Substantial portions of the Building W5 site will remain as treed natural area, including SROZ and wetland designated areas.

Staff notes that Tax Lot 202, on which Building W4 is located, was partitioned in 2021 to create Tax Lot 204, where Building W5 is proposed to be constructed. While the new Building W5, associated improvements, and some parking will be located on Tax Lot 204, the majority of parking that serves the new building is proposed to be located between it and Building W4. Staff also notes that 11 parking spaces serving Building W4 will be relocated and two (2) new spaces added to accommodate development of the southeast parking area serving Building W5 (see Sheet A1.0 in Exhibit B2). The two buildings will share access to SW Boeckman Road and internal circulation within the centrally located parking area, however, the Code standards related to parking and loading, landscaping, mixed solid waste/recycling storage, etc., are addressed individually for Building W5 to demonstrate compliance as a stand-alone development.

Summary:

Stage 1 Preliminary Plan Modification

Prior Stage I Preliminary Plan approvals covering the property show the site of the proposed building (building site) as undeveloped. No prior phasing or potential use of the building site has been approved. The Stage 1 Preliminary Plan is thus modified to identify the site of the proposed new industrial building containing office and manufacturing space and associated improvements. The proposed use of the building site is consistent with the Planned Development Industrial (PDI) zone.

Stage 2 Final Plan Modification

The Stage 2 Final Plan Modification builds on the Stage 1 Preliminary Plan modification and reviews the function and design of the proposed new office/manufacturing building and related site improvements. In addition to laying out the function and design of the previously undeveloped portions of the site, the Stage 2 Final Plan modification includes reconfiguring a portion of the Building W4 parking area to accommodate one (1) of the parking areas serving the new building (see Sheet A1.0 in Exhibit B2). The Stage 2 review assures the proposal meets all the performance standards of the PDI zone. The overall site is conceived as a heavily treed campus where, for efficiency, the two (2) buildings share the existing driveways on SW Boeckman Road, vehicle circulation drives, and some of the centrally located parking area, while the building lobbies have a pedestrian and visual connection, but separate service areas.

Site Design Review

The applicant used appropriate professional services and quality materials to design the proposed Building W5 and associated improvements. The configuration of the development allows for preservation and enhancement of existing natural features, such as the SROZ west and south of the proposed building, and preservation of valuable trees.

Type C Tree Removal Plan

Trees are located in the SROZ west and south of the proposed Building W5 and in the new parking areas to the southeast. Proposed tree removal and replacement/mitigation is discussed in the Discussion Points – Verifying Compliance with the Standards section, below.

Public Comments and Responses:

One public comment, from DWFritz Automation, was received during the comment period for the project (Exhibit D1). DWFritz Automation is the tenant of Building W4 on the subject site. The comment raises concerns about the location of the new building and associated parking and loading in relation to existing parking and internal circulation, and employee safety, for Building W4. Concern also is expressed about the number of parking spaces proposed for Building W5 and that there may not be sufficient parking for the size of the proposed building.

Discussion Points – Verifying Compliance with Standards:

This section provides a discussion of key clear and objective development standards that apply to the proposed applications. The Development Review Board will verify compliance of the proposed applications with these standards. The ability of the proposed applications to meet these standards may be impacted by the Development Review Board's consideration of discretionary review items as noted in the next section of this report.

Traffic Impacts and Concurrency

Prior Stage 2 Final Plan approvals did not approve any trips for the western portion of the subject site where Building W5 is proposed. However, the Transportation Impact Analysis prepared in August 2017 (2017 TIA; see Exhibit A3) as part of the DWFritz site modifications analyzed traffic associated with addition of a potential future 74,000-square-foot building on the building site of the currently proposed Building W5. This potential future building referenced in the 2017 TIA was never applied for or approved. Discussion of the building in the Trip Generation Memo (see Exhibit B1) is just for the purpose of connecting back to the 2017 TIA. All trips connected with the current proposal, referred to as "Current Proposed Land Use" in the Trip Generation Memo are new trips and do not represent any reduction of traffic from prior land use approvals. The current proposal is estimated to generate 54 PM Peak Hour trips and 414 Weekday trips. This is less trips than the 2017 TIA assumed and all intersections impacted by the proposed development are expected to operate above the City's acceptable level of service (LOS) D.

LAND USE (ITE CODE)	SIZE [a]	TRIP TYPE	PM PEAK HOUR			WEEKDAY
			IN	OUT	TOTAL	
CURRENT PROPOSED LAND USE						
MANUFACTURING (140)	80 KSF	Vehicle	17	37	54	414

Industrial Performance Standards

The PDI-RSIA zone prohibits development not meeting an extensive list of performance standards including wholly enclosed operations, no off-site vibrations, no off-site odors, screened outdoor storage, no heat or glare, no dangerous substances, no waste storage attracting pests, sewer conveyance meeting City standards, no noise violating the City's noise ordinance, no electrical disturbances, limits on air pollution, and no open burning. The proposed project can meet all the performance standards.

Pedestrian Access and Circulation

Pedestrian access is provided from the public sidewalk in SW Boeckman Road on both the west and east sides of the entry driveway to the main entrance at the northeast corner of Building W5. Internal pedestrian circulation is located on the north, east, and south sides, and at the southwest corner of the building, as well as throughout parking areas serving the building.

Vehicular and Bicycle Parking

The proposed Building W5 requires a minimum of 151 vehicle parking spaces and, as it contains a manufacturing component, there is no maximum limit on the number of spaces. The applicant proposes 297 stalls, substantially exceeding the minimum amount required. Parking is located along the north and east sides and at the southwest corner, as well as in two (2) lots southeast of the building.

As the commercial office space occupies more than 20% of the building, required bicycle parking is calculated as the sum of the requirements for the individual primary uses, resulting in a minimum of 10 required spaces. The applicant proposes 11 bicycle parking spaces, two (2) in a rack outside the main building entrance and nine (9) interior to the building at its southwest corner.

Tree Removal and Retention/Protection

Building W5 is proposed on the undeveloped northern portion of the site, which is treeless and vegetated with grasses. Existing trees on the site are located in the SROZ west and south of the proposed building and in the new parking areas to the southeast. Of 173 trees inventoried for the current application, 72 trees are proposed for removal and 101 trees will be preserved and protected, including 21 "situational" trees that may need to be removed in the future if their health declines as a result of fill placement despite installation of an aeration system over their root systems. The applicant has taken tree preservation into consideration, and has limited tree

removal to what is necessary for development. The applicant proposes planting 65 trees in parking areas and on the building perimeter and 328 trees in the SROZ as mitigation, thus substantially exceeding the replacement requirements, including for "situational" trees.

Standard SROZ Map Verification and SRIR Review

The applicant conducted a detailed site analysis consistent with the requirements of the SROZ ordinance, which the City's Natural Resources Manager reviewed and recommends approval of by the Development Review Board. The applicant's standard Significant Resource Impact Report (SRIR) delineated specific resource boundaries and analyzed the impacts of exempt development within the SROZ. The applicant's SRIR contained the required information, including an analysis and development recommendations for mitigating impacts.

Discussion Points – Discretionary Review:

This section provides a discussion of discretionary review requests that are included as part of the proposed applications. The most typical type of discretionary review is waiver requests. The application proposes no waivers or other requests subject to discretionary review.

Conclusion and Conditions of Approval:

Staff reviewed the applicant's analysis of compliance with the applicable criteria. The Staff report adopts the applicant's responses as Findings of Fact except as noted in the Findings. Based on the Findings of Fact and information included in this Staff Report, and information received from a duly advertised public hearing, staff recommends that the Development Review Board approve, with the conditions below, the proposed application (DB22-0004) for Stage 1 Preliminary Plan Modification, Stage 2 Final Plan Modification, Site Design Review, Type C Tree Removal Plan, Standard SROZ Map Verification, and Standard SRIR Review.

Planning Division Conditions:

Request A: Stage 1 Preliminary Plan Modification (STG122-0004)

PDA 1.	**General:** Minor changes in an approved Stage 1 Preliminary Plan may be approved by the Planning Director through the Class 1 Administrative Review Process if such changes are consistent with the purposes and general character of the development plan. All other modifications, including extension or revision of the staged development schedule, shall be processed in the same manner as the original application and shall be subject to the same procedural requirements.

Request B: Stage 2 Final Plan Modification (STG222-0004)

PDB 1.	**General:** The approved Stage 2 Final Plan, as modified by Conditions of Approval, shall control the issuance of all building permits and shall restrict the nature, location and design of all uses. Minor changes in an approved preliminary or final development plan may be approved by the Planning Director through the Class 1 Administrative Review Process if such changes are consistent with the purposes and general character of the development plan. All other modifications shall be processed in the same manner as the original application and shall be subject to the same procedural requirements.
PDB 2.	**Prior to Temporary Occupancy and Ongoing:** The applicant proposes standard parking spaces that are at least nine 9 feet long and compact spaces that are at least 7.5 feet long. However, the dimension of some parking spaces adjacent to landscape areas includes one (1) to two (2) feet of landscape area in the length calculation. To ensure adequate clearance in the affected spaces, landscaping shall be limited to groundcover within the bumper overhang area. See Finding B30.
PDB 3.	**Prior to Temporary Occupany:** A parking easement shall be provided over the parking area located on Tax Lot 202 that serves the new building on Tax Lot 204. See Finding B33.
PDB 4.	**Prior to Non-Grading Building Permit Issuance:** Applicant shall provide a detail of the proposed interior long-term bicycle parking/storage spaces. See Finding B52.
PDB 5.	**Prior to Final Occupancy:** All exterior, roof and ground mounted, mechanical and utility equipment shall be screened from ground level off-site view from adjacent streets or properties. See Finding B67.

Request C: Site Design Review (SDR22-0004)

PDC 1.	**General:** Construction, site development, and landscaping shall be carried out in substantial accord with the Development Review Board approved plans, drawings, sketches, and other documents as modified by Conditions of Approval. Minor revisions may be approved by the Planning Director through administrative review pursuant to Section 4.030. See Finding C14.
PDC 2.	**Prior to Temporary Occupancy:** All landscaping required and approved by the Board shall be installed prior to issuance of any occupancy permits, unless security equal to one hundred and ten percent (110%) of the cost of the landscaping as determined by the Planning Director is filed with the City assuring such installation within six (6) months of occupancy. "Security" is cash, certified check, time certificates of deposit, assignment of a savings account or such other assurance of completion as shall meet with the approval of the City Attorney. In such cases the developer shall also provide written authorization, to the satisfaction of the City Attorney, for the City or its designees to enter the property and complete the landscaping as approved. If the installation of the landscaping is not completed within the six-month period, or within an extension of time authorized by the Board, the security may be used by the City to complete the installation. Upon completion of the installation, any portion of the remaining security deposited with the City will be returned to the applicant. See Finding C32.
PDC 3.	**Ongoing:** The approved landscape plan is binding upon the applicant/owner. Substitution of plant materials, irrigation systems, or other aspects of an approved landscape plan shall not be made without official action of the Planning Director or Development Review Board, pursuant to the applicable sections of Wilsonville's Development Code. See Finding C33.
PDC 4.	**Ongoing:** All landscaping shall be continually maintained, including necessary watering, weeding, pruning, and replacing, in a substantially similar manner as originally approved by the Board, unless altered as allowed by Wilsonville's Development Code. See Findings C34 and C35.
PDC 5.	**Prior to Temporary Occupancy:** The following requirements for planting of shrubs and ground cover shall be met: • Non-horticultural plastic sheeting or other impermeable surface shall not be placed under landscaping mulch. • Native topsoil shall be preserved and reused to the extent feasible. • Surface mulch or bark dust shall be fully raked into soil of appropriate depth, sufficient to control erosion, and shall be confined to areas around plantings. • All shrubs shall be well branched and typical of their type as described in current AAN Standards and shall be equal to or better than 2-gallon containers and 10" to 12" spread. • Shrubs shall reach their designed size for screening within three (3) years of planting. • Ground cover shall be equal to or better than the following depending on the type of plant materials used: gallon containers spaced at 4 feet on center

	minimum, 4" pot spaced 2 feet on center minimum, 2-1/4" pots spaced at 18 inch on center minimum. • No bare root planting shall be permitted. • Ground cover shall be sufficient to cover at least 80% of the bare soil in required landscape areas within three (3) years of planting. • Appropriate plant materials shall be installed beneath the canopies of trees and large shrubs to avoid the appearance of bare ground in those locations. • Compost-amended topsoil shall be integrated in all areas to be landscaped, including lawns. See Finding C41.
PDC 6.	**Prior to Temporary Occupancy:** All trees shall be balled and burlapped and conform in grade to "American Standards for Nursery Stock" current edition. Tree size shall be a minimum of 2-inch caliper. See Finding C42.
PDC 7.	**Prior to Temporary Occupancy:** Plant materials shall be installed to current industry standards and be properly staked to ensure survival. Plants that die shall be replaced in kind, within one growing season, unless appropriate substitute species are approved by the City. See Finding C47.
PDC 8.	**Prior to Building Permit Issuance:** Final review of the proposed building lighting's conformance with the Outdoor Lighting Ordinance will be determined at the time of Building Permit issuance. See Findings C50 through C58.

Request D: Type C Tree Plan (TPLN22-0003)

PDD 1.	**General:** This approval for removal applies only to the 72 trees identified in the applicant's submitted materials. All other trees on the property shall be maintained unless removal is approved through separate application.
PDD 2.	**General:** Of 101 preserved trees on the subject property, 21 have been identified as "situational", which are likely to be retained with planned installation of an aeration system over their roots before fill is placed to assist with long-term survival. These trees will be re-evaluated at the time of site clearing to assess suitability for preservation and will be monitored during construction to minimize root zone impacts. If, as a result of construction, one (1) or more of the trees is determined to be no longer sustainable, the applicant may seek written authorization from the City for removal and appropriate mitigation. See Finding D6.
PDD 3.	**Prior to Grading Permit Issuance:** The applicant shall submit an application for a Type 'C' Tree Removal Permit on the Planning Division's Development Permit Application form, together with the applicable fee. In addition to the application form and fee, the applicant shall provide the City's Planning Division an accounting of trees to be removed within the project site, corresponding to the approval of the Development Review Board. The applicant shall not remove any trees from the project site until the tree removal permit, including the final tree removal plan, have been approved by the Planning Division staff.
PDD 4.	**Prior to Temporary Occupancy/Ongoing:** The permit grantee or the grantee's successors-in-interest shall cause the replacement trees to be staked, fertilized and mulched, and shall guarantee the trees for two (2) years after the planting date. A

	"guaranteed" tree that dies or becomes diseased during the two (2) years after planting shall be replaced. See Finding D10 and D11.
PDD 5.	**Prior to Commencing Site Grading:** Prior to site grading or other site work that could damage trees, the applicant/owner shall install 6-foot-tall chain-link fencing around the drip line of preserved trees. Removal of the fencing around the identified trees shall only occur if it is determined the trees are not feasible to retain. The fencing shall comply with Wilsonville Public Works Standards Detail Drawing RD-1230. Protective fencing shall not be moved or access granted within the protected zone without arborist supervision and notice of the City of the purpose of proposed movement of fencing or access. See Finding D13.

Request E: Standard SROZ Map Verification (SROZ22-0003)

No conditions for this request.

Request F: Standard SRIR Review (SRIR22-0001)

No conditions for this request.

The following Conditions of Approval are provided by the Engineering, Natural Resources, or Building Divisions of the City's Community Development Department or Tualatin Valley Fire and Rescue, all of which have authority over development approval. A number of these Conditions of Approval are not related to land use regulations under the authority of the Development Review Board or Planning Director. Only those Conditions of Approval related to criteria in Chapter 4 of Wilsonville Code and the Comprehensive Plan, including but not limited to those related to traffic level of service, site vision clearance, recording of plats, and concurrency, are subject to the Land Use review and appeal process defined in Wilsonville Code and Oregon Revised Statutes and Administrative Rules. Other Conditions of Approval are based on City Code chapters other than Chapter 4, state law, federal law, or other agency rules and regulations. Questions or requests about the applicability, appeal, exemption or non-compliance related to these other Conditions of Approval should be directed to the City Department, Division, or non-City agency with authority over the relevant portion of the development approval.

Engineering Division Conditions:

PF 1.	**Ongoing:** Public Works Plans and Public Improvements shall conform to the "Public Works Plan Submittal Requirements and Other Engineering Requirements" in Exhibit C1.
PF 2.	**Prior to Issuance of Public Works Permit**: Submit site plans to Engineering showing all stormwater quality facilities, sewer, water, and storm connections, driveway approach reconstruction, defective sidewalk repairs, and pavement restoration associated with utility connection disturbances. All existing defective sidewalks along the project frontage shall be repaired as part of the Public Works Permit.
PF 3.	**With Public Works Permit:** The construction drawings shall show all necessary temporary water line looping to avoid long dead-end water lines. All water meters shall be located in the public right-of-way and not on private property. All new public water mains shall be located in an exclusive 15-foot easement.

PF 4.	**Prior to the Issuance of Public Works Permit:** A final stormwater report shall be submitted for review and approval. The stormwater report shall include information and calculations to demonstrate how the proposed development meets the treatment, flow control, and source control requirements.
PF 5.	**Prior to the Issuance of Public Works Permit:** Applicant shall obtain an NPDES 1200C permit from the Oregon Department of Environmental Quality and a Local Erosion Control Permit from the City of Wilsonville. All erosion control measures shall be in place prior to starting any construction work, including any demolition work. Permits shall remain active until all construction work is complete and the site has been stabilized.
PF 6.	The site is impacted by a Significant Resource Overlay Zone (SROZ). **Prior to Final Building Certificate of Occupancy**: The applicant shall dedicate a conservation easement over all SROZ areas on the site.
PF 7.	**Prior to Issuance of Any Occupancy Permits:** All public infrastructure improvements including but not limited to street, stormwater drainage, water quality and flow control, sanitary sewer, and water facilities shall be substantially complete with approval from the Community Development Director pursuant to Section 4.220 of the Development Code.
PF 8.	**Prior to Issuance of Any Occupancy Permits:** All necessary easements shall be recorded with the County, including any necessary public water line, private stormwater access and maintenance easements, and conservation easements.
PF 9.	**Prior to Any Paving:** Onsite stormwater facilities must be constructed and vegetated facilities planted. **Prior Issuance of Final Building Certificate of Occupancy:** The applicant must execute and record with the County a Stormwater Maintenance and Access Easement Agreement with the City.

Natural Resources Division Conditions:

NR1.	Natural Resource Division Requirements and Advisories listed in Exhibit C2 apply to the proposed development.

Master Exhibit List:

The entry of the following exhibits into the public record by the Development Review Board confirms its consideration of the application as submitted. The exhibit list below includes exhibits for Planning Case File DB22-0004. The exhibit list below reflects the electronic record posted on the City's website and retained as part of the City's permanent electronic record. Any inconsistencies between printed or other electronic versions of the same Exhibits are inadvertent and the version on the City's website and retained as part of the City's permanent electronic record shall be controlling for all purposes.

Planning Staff Materials

A1. Staff Report and Findings (this document)
A2. Staff's Presentation Slides for Public Hearing (to be presented at Public Hearing)
A3. DWFritz Transportation Impact Analysis, Dated August 14, 2017 – *Available Under Separate Cover*

Materials from Applicant

B1. **Applicant's Narrative and Materials** – *Available Under Separate Cover*
Part 1 Application and Narrative
Part 2 Applicant's Reports and Exhibits
B2. **Applicant's Drawing Package** – *Available Under Separate Cover*
B3. **Applicant's Supplemental Information and Plan Corrections** – *Available Under Separate Cover – Note: Plan Sheets A1.0, A1.2, C1.30, TR-1 and TR-2 supersede corresponding Plan Sheets in Exhibit B2; Storm Drainage Report supersedes corresponding Report in Exhibit B1. Part 2.*
B4. Response to Incomplete Notice, Dated July 8, 2022
B5. Response to Complete Notice, Dated March 15, 2023
B6. Applicant's 120-day Waiver Request 1
B7. Applicant's 120-day Waiver Request 2
B8. Applicant's 120-day Waiver Request 3

Development Review Team Correspondence

C1. Public Works Plan Submittal and Other Engineering Requirements
C2. Natural Resources Findings & Requirements

Other Correspondence

D1. K. Bryant, DWFritz, Comment, Dated June 2, 2023

Procedural Statements and Background Information:

1. The statutory 120-day time limit applies to this application. The application was received on February 9, 2022. Staff conducted a completeness review within the statutorily allowed 30-day review period and found the application to be incomplete on March 11, 2022. The applicant submitted additional materials on July 11, 2022. Staff conducted a second completeness review within the statutorily allowed 30-day review period and found the application to be complete on August 8, 2022. Based on the August 8, 2022 completeness date, the City was required to render a final decision for all requests, including any appeals, by December 6, 2022. However, the applicant requested that the 120-day review period be extended, first to April 5, 2023, then to August 8, 2023, to allow time to process their application. Therefore, the City must render a final decision for all requests, including any appeals, by August 8, 2023.

2. Surrounding land uses are as follows:

Compass Direction	Zone:	Existing Use:
North:	PDI	Industrial
East:	PDI / FDAH-I	Industrial
South:	PDI	Industrial
West:	FDAH-I	Natural Area/SROZ

3. Previous Planning Approvals:

   74RZ09 – Zone Change from RA-1 to Industrial91PC13 – Stage 1 Modification, Stage 2 - Parking Addition
   91DR06 – Landscape, Parking Addition
   AR05-0104 – Class 1 Review – Tree removal from approved landscape plan
   AR06-0028 – Class 1 Review – New truck/warehouse door and driveway
   AR14-0006 – Class 2 Review – Exterior canopy less than 1,250 square feet
   AR16-0015 – Class 2 Review – Tentative Partition Plat and SROZ Map Verification
   AR16-0032 – Class 1 Review – Final Partition Plat
   AR16-0063 – Class 2 Review – Architectural changes and minor grading
   AR17-0041 – Class 2 Review – Building entry modification
   AR17-0053 – Class 1 Review – Addition of awnings
   DB17-0008–DB17-0010 – Stage 2 Final Plan Modification, Site Design Review, Type C Tree Plan for Site Modifications
   AR18-0020 – Class 1 Review – Landscape plan revision
   AR20-0044 – Class 2 Review – Tentative Partition Plat
   AR21-0039 – Class 1 Review – Final Partition Plat

4. The applicant has complied with Sections 4.013-4.031 of the Wilsonville Code, said sections pertaining to review procedures and submittal requirements. The required public notices have been sent and all proper notification procedures have been satisfied.

Findings of Fact:

NOTE: Pursuant to Section 4.014 the burden of proving that the necessary findings of fact can be made for approval of any land use or development application rests with the applicant in the case.

General Information

Application Procedures-In General
Section 4.008

The processing of the application is in accordance with the applicable general procedures of this Section.

Initiating Application
Section 4.009

The application has the signature of Mac Martin, an authorized signer for the property owner, W-5 LLC.

Pre-Application Conference
Subsection 4.010 (.02)

The City held a pre-application conference on May 13, 2021 (PA21-0010) in accordance with this subsection.

Lien Payment before Approval
Subsection 4.011 (.02) B.

No applicable liens exist for the subject property. The application can thus move forward.

General Submission Requirements
Subsection 4.035 (.04) A.

The applicant has provided all of the applicable general submission requirements.

Zoning-Generally
Section 4.110

The proposed development is in conformity with the applicable zoning district and City review uses the general development regulations listed in Sections 4.150 through 4.199.

Request A: Stage 1 Preliminary Plan Modification (STG122-0004)

As described in the Findings below, the request meets the applicable criteria or will by conditions of approval.

Planned Development Regulations

Planned Development Purpose & Lot Qualifications
Subsections 4.140 (.01) and (.02)

A1. The property is of sufficient size to be developed in a manner consistent the purposes and objectives of Section 4.140. The subject property is greater than two (2) acres and is designated for industrial development in the Comprehensive Plan. The property will be developed as a planned development in accordance with this subsection.

Ownership Requirements
Subsection 4.140 (.03)

A2. All the land subject to change under the proposal is under a single ownership.

Professional Design Team
Subsection 4.140 (.04)

A3. As can be found in the applicant's submitted materials, appropriate professionals have been involved in the planning and permitting process. Bob Wells with Lance Mueller & Associates is the applicant's representative.

Planned Development Permit Process
Subsection 4.140 (.05)

A4. The subject property is greater than two (2) acres, is designated for industrial development in the Comprehensive Plan, and is zoned Planned Development Industrial (PDI). The property will be developed as a planned development in accordance with this subsection.

Comprehensive Plan Consistency
Subsection 4.140 (.06)

A5. The proposed project, as described elsewhere in this report, complies with the Planned Development Industrial (PDI) zoning designation, which implements the Comprehensive Plan designation of Industrial for this property.

Application Requirements
Subsection 4.140 (.07)

A6. Review of the proposed Stage 1 Preliminary Plan Modification has been scheduled for a public hearing before the Development Review Board, in accordance with this subsection, and the applicant has met all the applicable submission requirements as follows:

- The property affected by the Stage 1 Preliminary Plan Modification is under the sole ownership of W-5 LLC and the application has been signed by Mac Martin who is

authorized to sign on behalf of the owner.

- The application for a Stage 1 Preliminary Plan Modification has been submitted on a form prescribed by the City.
- The professional design team and coordinator have been identified. See Findings A3 and B3.
- The applicant has stated the various uses involved in the Stage 1 Preliminary Plan Modification and their locations.
- The boundary affected by the Stage 1 Preliminary Plan Modification has been clearly identified and legally described.
- Sufficient topographic information has been submitted.
- Information on the land area to be devoted to various uses has been provided.
- Any necessary performance bonds will be required.

Planned Development Industrial (PDI) Zone

Purpose of PDI Zone
Subsection 4.135 (.01)

A7. The uses proposed within the PDI zone are limited to industrial uses, supporting the purpose stated in this subsection.

Uses Typically Permitted
Subsection 4.135 (.03)

A8. The proposed development consists of an industrial building where the intended uses are expected to include commercial office, manufacturing/processing, research and development and similar uses, to be further defined when a tenant is secured. These uses are consistent with the uses typically permitted and are allowed outright within the PDI zone.

Prohibited Uses
Subsection 4.135 (.04)

A9. No prohibited uses are proposed by the applicant. Performance standards will be required to be met as part of the Stage 2 Final Plan Modification review.

Block and Access Standards
Subsections 4.135 (.04) and 4.131 (.03)

A10. The drawings submitted by the applicant show development on the subject property providing adequate pedestrian and vehicle connectivity along SW Boeckman Road. No changes to blocks or access spacing are proposed.

PDI Performance Standards

Industrial Performance Standards
Subsections 4.135 (.06) A. through N.

A11. The Stage 1 Preliminary Plan Modification enables conformance with the Industrial Performance Standards. Final compliance will be reviewed with the Stage 2 Final Plan Modification. See Finding B23.

Other Standards for PDI Zone

Lot Size
Subsections 4.135 (.07) A.

A12. Nothing in the Stage 1 Preliminary Plan Modification would prevent lot size requirements from being met.

Setbacks
Subsections 4.135 (.07) C. through E.

A13. Nothing in the Stage 1 Preliminary Plan Modification would prevent setback requirements from being met.

Request B: Stage 2 Final Plan Modification (STG222-0004)

As described in the Findings below, the request meets the applicable criteria or will by conditions of approval.

Planned Development Regulations-Generally

Planned Development Purpose & Lot Qualifications
Subsection 4.140 (.01) and (.02)

B1. The proposed Stage 2 Final Plan Modification for development of the subject property is consistent with the Planned Development Regulations purpose statement.

Ownership Requirements
Subsection 4.140 (.03)

B2. The subject parcels are under the ownership of W-5 LLC, for whom an authorized signer, Mac Martin, signed the application.

Professional Design Team
Subsection 4.140 (.04)

B3. As can be found in the applicant's submitted materials, appropriate professionals have been involved in the planning and permitting process. Bob Wells with Lance Mueller & Associates is the applicant's representative.

Stage 2 Final Plan Submission Requirements and Process

Stage 2 Submission Within 2 Years of Stage 1
Subsection 4.140 (.09) A.

B4. The applicant is requesting approval of both Stage 1 Preliminary Plan Modification and Stage 2 Final Plan Modification, together with Site Design Review, as part of this application. The Stage 2 Final Plan Modification provides sufficient information regarding conformance with both the Stage 1 Preliminary Plan Modification and Site Design Review.

Development Review Board Role
Subsection 4.140 (.09) B.

B5. The Development Review Board review considers all applicable permit criteria set forth in the Planning and Land Development Code and staff recommends the Development Review Board approve the application with conditions of approval.

Stage 1 Conformance, Submission Requirements
Subsection 4.140 (.09) C.

B6. The Stage 2 Final Plan Modification conforms to the proposed Stage 1 Preliminary Plan Modification. The applicant's submitted drawings and other documents show all the additional information required by this subsection.

Stage 2 Final Plan Detail
Subsection 4.140 (.09) D.

B7. The applicant's submitted materials provide sufficiently detailed information to indicate fully the ultimate operation and appearance of the development, including a detailed site plan, landscape plans, and elevation drawings.

Submission of Legal Documents
Subsection 4.140 (.09) E.

B8. The Development Review Board does not require any additional legal documentation for dedication or reservation of public facilities.

Expiration of Approval
Subsection 4.140 (.09) I. and Section 4.023

B9. The Stage 2 Final Plan Modification approval, along with other associated applications, will expire two (2) years after approval, absent the granting of an extension in accordance with these subsections.

Consistency with Plans
Subsection 4.140 (.09) J. 1.

B10. The site's zoning, Planned Development Industrial (PDI), is consistent with the Industrial designation in the Comprehensive Plan. The Transportation System Plan calls for no additional frontage or road improvements.

Traffic Concurrency
Subsection 4.140 (.09) J. 2.

B11. The City's traffic consultant, DKS Associates, calculates that the proposed 80,446-square-foot office/manufacturing building will generate 54 PM peak hour trips and 414 weekday trips. All intersections impacted by the proposed development are expected to operate above the City's acceptable level of service (LOS) D.

Facilities and Services Concurrency
Subsection 4.140 (.09) J. 3.

B12. Facilities and services, including utilities in SW Boeckman Road, are available and sufficient to serve the proposed development.

Adherence to Approved Plans
Subsection 4.140 (.10) A.

B13. A condition of approval ensures adherence to approved plans except for minor revisions approved by the Planning Director.

Standards Applying in All Planned Development Zones

Underground Utilities
Subsection 4.118 (.02)

B14. The applicant's plans show all utilities underground.

Waivers
Subsection 4.118 (.03)

B15. The applicant does not request any waivers.

Other Requirements or Restrictions
Subsection 4.118 (.03) E.

B16. Staff does not recommend any additional requirements or restrictions pursuant to this subsection.

Impact on Development Cost
Subsection 4.118 (.04)

B17. In staff's professional opinion, the determination of compliance or attached conditions do not unnecessarily increase the cost of development, and no evidence has been submitted to the contrary.

Requiring Tract Dedications
Subsection 4.118 (.05)

B18. Staff does not recommend any additional tract dedication for recreational facilities, open space, or easements for orderly extension of public utilities consistent with this subsection.

Habitat Friendly Development Practices
Subsection 4.118 (.09)

B19. The applicant will implement habitat-friendly development practices to the extent practicable. Grading will be limited to that needed for the proposed improvements, no significant native vegetation would be retained by an alternative site design, the City's stormwater standards will be met, thus limiting adverse hydrological impacts on water resources, and no impacts on wildlife corridors or fish passages have been identified.

Planned Development Industrial (PDI) Zone

Purpose of PDI Zone
Subsection 4.135 (.01)

B20. The stated purpose of the PDI zone is to provide opportunities for a variety of industrial operations and associated uses. The proposed development includes an industrial building and associated site improvements consistent with the purpose stated in this subsection.

Typically Permitted Uses
Subsection 4.135 (.03)

B21. The uses proposed in the Stage 2 Final Plan Modification are consistent with the Stage 1 Preliminary Plan. The proposed development consists of an industrial building where the intended uses are expected to include commercial office, manufacturing/processing, research and development and similar uses, to be further defined when a tenant is secured. These uses are consistent with the uses typically permitted and are allowed outright within the PDI zone.

Block and Access Standards
Subsections 4.131.05 (.07) and 4.131 (.03)

B22. The proposal requests no changes to blocks or access spacing.

Industrial Performance Standards

Industrial Performance Standards
Subsection 4.135 (.05)

B23. The proposed project meets the performance standards of this subsection as follows:

- **Pursuant to Standard A** (enclosure of uses and activities), all non-parking activities and uses will be completely enclosed, and no outdoor storage is proposed.
- **Pursuant to Standard B** (vibrations), there is no indication that the proposed development will produce vibrations detectable off site without instruments.
- **Pursuant to Standard C** (emissions), there is no indication the proposed use would produce odorous gas or other odorous matter.
- **Pursuant to Standard D** (open storage), outdoor storage of mixed solid waste and recycling will be screened from off-site view.

- **Pursuant to Standard E** (night operations and residential areas), no openings in the proposed building are within 100 feet of a residential area and the proposed use is not expected to conduct night operations.
- **Pursuant to Standard F** (heat and glare), the applicant proposes no exterior operations creating heat and glare.
- **Pursuant to Standard G** (dangerous substances), there are no prohibited dangerous substances expected on the development site.
- **Pursuant to Standard H** (liquid and solid wastes), staff has no evidence that the operations would violate standards defined for liquid and solid waste.
- **Pursuant to Standard I** (noise), staff has no evidence that noise generated from the proposed operations would violate the City's Noise Ordinance and noises produced in violation of the Noise Ordinance would be subject to the enforcement procedures established in WC Chapter 6 for such violations.
- **Pursuant to Standard J** (electrical disturbances), staff has no evidence that the proposed use would have any prohibited electrical disturbances.
- **Pursuant to Standard K** (discharge of air pollutants), staff has no evidence that the proposed use would produce any prohibited discharge.
- **Pursuant to Standard L** (open burning), the applicant proposes no open burning.
- **Pursuant to Standard M** (outdoor storage), no outdoor storage is proposed and storage of the mixed solid waste and recycling area will be screened consistent with City standards.
- **Pursuant to Standard N** (unused area landscaping), no unused areas will be bare.

On-site Pedestrian Access and Circulation

Continuous Pathway System
Subsection 4.154 (.01) B. 1.

B24. As shown on the applicant's site plan in Exhibit B2, the proposed pathway system will provide pedestrian access between the existing public sidewalk along SW Boeckman Road and the main entrance at the northeast corner of the building. The pathway system extends throughout the development site, on the north, east, and south sides and at the southwest corner of the building, providing internal connections to parking and service/utility areas, as well as to Building W4 to the east.

Safe, Direct, Convenient Pathways
Subsection 4.154 (.01) B. 2.

B25. Proposed pedestrian pathways are safe, direct and convenient. Most are concrete or asphalt surface; however, soft paths are used in a few locations where a pathway weaves among established existing trees in the parking area. The park-like setting bordering the SROZ and natural area includes meandering driveways that are safe for bicyclists and pedestrians.

Vehicle/Pathway Separation-Vertical or Horizontal
Subsection 4.154 (.01) B. 3.

B26. The proposed design of pedestrian pathways provide for vertical separation from vehicle circulation areas.

Crosswalks Clearly Marked
Subsection 4.154 (.01) B. 4.

B27. As shown on the applicant's site plan in Exhibit B2, the primary circulation system pathways are at least five (5) feet wide and marked using crosswalk striping at drive aisles crossings and internally in parking areas.

Pathways Width and Surface-5 Foot Wide, Durable Surface
Subsection 4.154 (.01) B. 5.

B28. The applicant proposes pathways at least five (5) feet wide in a combination of concrete surface and contrasting paint on asphalt throughout the site. As noted earlier, some pathways are proposed to be soft surface; however, these are supplementary to the hard surface circulation system proposed throughout the site.

Parking Area Design Standards

Minimum and Maximum Number of Parking Spaces
Subsections 4.155 (.03) G., Table 5

B29. The proposed Building W5 requires a minimum of 151 passenger vehicle parking spaces and, as manufacturing use is included, there is no limit on the number of spaces allowed. The applicant proposes 297 parking spaces, which substantially exceeds the minimum off-street parking requirements. Calculation of parking spaces is as follows:

Use and Parking Standard	Square Feet	Minimum Off-street Spaces Required	Maximum Off-street Spaces Allowed	Proposed Off-street Spaces	Minimum Bicycle Parking Spaces	Proposed Bicycle Parking Spaces
Office or flex space (except medical and dental)	20,000 sf	2.7 per 1,000 = 54	4.1 per 1,000 = 82	--	1.0 per 5,000 (min 2) = 4	--
Manufacturing	60,446 sf	1.6 per 1,000 = 97	No limit		1.0 per 10,000 (min 6) = 6	
Total	**80,446 sf**	**151**	**No limit**	**297**	**10**	**11**

Other Parking Area Design Standards
Section 4.155 (.02) and (.03)

B30. The applicable parking designs standards are met as follows:

Standard	Met	Explanation
Subsection 4.155 (.02) General Standards		
B. All spaces accessible and usable for parking	☒	The applicant proposes standard parking spaces that are at least nine 9 feet by 18 feet and compact spaces that are at least 7.5 feet by 15 feet, and 24-foot-wide drive aisles, meeting the Development Code standards. Staff notes that the dimension of some standard and compact spaces adjacent to landscape areas includes one (1) to two (2) feet of landscape area in the length calculation; this is acceptable so long as landscaping in these areas is limited to groundcover that will not interfere with bumper overhang. A condition of approval ensures the standard is met.
J. Sturdy bumper guards of at least 6 inches to prevent parked vehicles crossing property line or interfering with screening or sidewalks.	☒	The applicant's plans show walkways dimensioned to accommodate bumper overhang; therefore, bumper guards are not necessary.
K. Surfaced with asphalt, concrete or other approved material.	☒	Surfaced with asphalt.
Drainage meeting City standards	☒	Drainage is professionally designed and being reviewed to meet City standards
L. Lighting does not shine into adjoining structures or into the eyes of passer-bys.	☒	Lighting is proposed to be shielded and meet the City's Outdoor Lighting Standard.
N. No more than 40% of parking compact spaces.	☒	Ninety-four (94) of the 297 parking spaces, or 31.6%, are compact, which is below the maximum of 40%.
O. Where vehicles overhang curb, planting areas at least 7 feet in depth.	☒	The narrowest planting area adjacent to parking spaces meets or exceeds the 7-foot depth requirement.
Subsection 4.155 (.03) General Standards		
A. Access and maneuvering areas adequate.	☒	Access drive and drive aisle are 24 feet or more, providing an adequate 12-foot travel lane each direction.
A.1. Loading and delivery areas and circulation separate from customer/employee parking and pedestrian areas.	☒	The proposal includes two (2) dock-high and one (1) on-grade drive-in loading berths, which exceeds the requirement.
Circulation patterns clearly marked.	☒	The proposed design is typical of industrial/commercial parking lots with circulation patterns clearly delineated.

A.2. To the greatest extent possible, vehicle and pedestrian traffic separated.	☒	The plans clearly delineate and separate vehicle and pedestrian traffic areas, except for crosswalks.
C. Safe and Convenient Access, meet ADA and ODOT Standards.	☒	The proposed parking and access enable the meeting of ADA and ODOT standards.
For parking areas with more than 10 spaces, 1 ADA space for every 50 spaces.	☒	The proposal provides eight (8) ADA parking spaces for 297 parking spaces, meeting the standard. The ADA spaces are located in the parking area on the east side of the building nearest to the main entrance.
D. Where possible, parking areas connect to adjacent sites.	☒	The southeast parking area is proposed to be shared between Building W4 (existing) and W5 (new) and is centrally located to serve both buildings. There is not an opportunity to connect to parking on adjacent properties.
Efficient on-site parking and circulation	☒	The careful and professional design of the parking provides for safety and efficiency and is a typical design with standard parking space and drive aisle size and orientation.

Other Parking Standards and Policies and Procedures

Parking Variances and Waivers
Subsection 4.155 (.02) A. 1.-2.

B31. The applicant has not requested variances or waivers pursuant to this subsection.

Multiple Use Parking Calculations
Subsection 4.155 (.02) D.

B32. The review considers all proposed uses including commercial office and manufacturing for the purpose of parking calculations.

Shared Parking
Subsection 4.155 (.02) E.

B33. Although the parking requirements for Building W4 (existing on Parcel 1, Tax Lot 202) and Building W5 (new on Parcel 2, Tax Lot 204) are individually met, the majority of parking designed to serve Building W5 is located on Parcel 1 between the buildings. Because the site is intended to function as a campus, the centrally located parking can be shared by users of both buildings; however, because the parking requirements for each use are individually met, no shared parking as described by this subsection is proposed with the current application. However, a future parking easement for the portion of the parking area located on the Tax Lot 202 is shown on the applicant's plan Sheet A1.0 (Exhibit B2) and this would

be required if, in the future, Tax Lot 204 is sold to another owner; a condition of approval ensures an easement is provided.

Off-Site Parking Allowance
Subsection 4.155 (.02) G.

B34. No off-site parking was used for calculating the parking spaces provided.

Non-Parking Use of Parking Areas
Subsection 4.155 (.02) H.

B35. All parking areas are expected to be maintained and kept clear for parking unless a temporary use permit is granted or the Stage 2 Final Plan Modification approval is revised. Particularly no container or other storage is permitted in the parking areas.

Parking for Uses Not Listed
Subsection 4.155 (.02) M.

B36. The parking calculation is based on the listed uses of commercial office and manufacturing.

On-Street Parking for Parking Calculations
Subsection 4.155 (.03) F.

B37. The parking calculations do not include any on-street parking.

Electrical Vehicle Charging Stations
Subsection 4.155 (.03) H.

B38. The applicant does not propose electrical charging stations. However, as required by the Building Code under Oregon Administrative Rules (OAR) 918-460-0200, the applicant has included electric vehicle charging infrastructure adjacent to 13 parking spaces in the North Lot and 37 spaces in Southeast 1 Lot for this purpose (see Sheet CS-2 in Exhibit B2). Compliance with applicable Building Code will be verified during Building plan review.

Substituting Motorcycle Parking for Vehicle Parking
Subsection 4.155 (.03) I.

B39. The applicant does not propose motorcycle parking.

Parking Area Landscaping

Minimizing Visual Dominance of Parking
Subsection 4.155 (.03) B.

B40. The applicant proposes landscaping throughout the parking area helping to minimize the visual dominance of the paved parking area.

10% Parking Area Landscape Requirement
Subsection 4.155 (.03) B. 1.

B41. The applicant's plan Sheets L1.1 and L1.2 (Exhibit B2) identify five (5) parking areas within the site, including North (15,150 square feet (sf)), West (1,654 sf), East (1,925 sf), Southeast 1 (24,451 sf) and Southeast 2 (37,913 sf). As shown on the plans, these parking areas include a total of 81,093 sf of paved area, which requires 8,109 sf (10%) of landscaped area. The applicant proposes 16,077 square feet (19.8%) of landscaped area in the five (5) areas combined, exceeding the overall requirement. The minimum is exceeded in each distinct parking area within the site as well, as follows: North (3,013 sf; 19.9%), West (470 sf; 28.4%), East (284 sf; 14.8%), Southeast 1 (8,489 sf; 34.7%) and Southeast 2 (3,821 sf; 10.1%).

Landscape Screening of Parking
Subsection 4.155 (.03) B. 1.

B42. The proposed design screens the parking area from adjacent properties, adjacent rights-of-way, and the SROZ on the north and south sides of proposed Building W5 by landscaping as required by the standards. There is no parking on the south side of the building. The east parking area is contiguous with the parking area for Building W4 and parking further south is not visible from the right-of-way or adjacent properties; therefore, landscape screening is not necessary. The design does not warrant additional screening meeting a specific City screening standard.

Tree Planting Area Dimensions
Subsection 4.155 (.03) B. 2.

B43. Landscape tree planting areas meet or exceed the minimum dimensional standards of eight (8) feet by eight (8) feet, and are spaced every six (6) spaces or an equivalent aggregated amount throughout the parking areas as required for parking areas with more than 200 spaces.

Parking Area Tree Requirement
Subsection 4.155 (.03) B. 2. and 2. a.

B44. The proposed site plan includes 297 surface parking spaces, requiring 50 parking area trees at ratio of one (1) tree for every six (6) spaces or an equivalent aggregated amount. The applicant proposes to plant 37 trees in landscape tree planting areas and at the perimeter of the parking areas and to use 49 tree credits for mature trees preserved within the parking areas (see Finding C45), for a total of 86 trees, thus exceeding the minimum requirement.

Parking Area Landscape Plan
Subsection 4.155 (.03) B. 2. a.

B45. The applicant's landscape plan Sheets L1.1 and L1.2 (Exhibit B2) include the proposed parking areas and required landscape area calculations.

Parking Area Tree Clearance
Subsection 4.155 (.03) B. 2. b.

B46. The applicant will maintain all trees listed for planting in the parking area and expected to overhang the parking areas to provide a seven (7)-foot vertical clearance.

Parking Area of More Than 200 Spaces

Required Trees
Subsection 4.155 (.03) B. 3. a. and b.

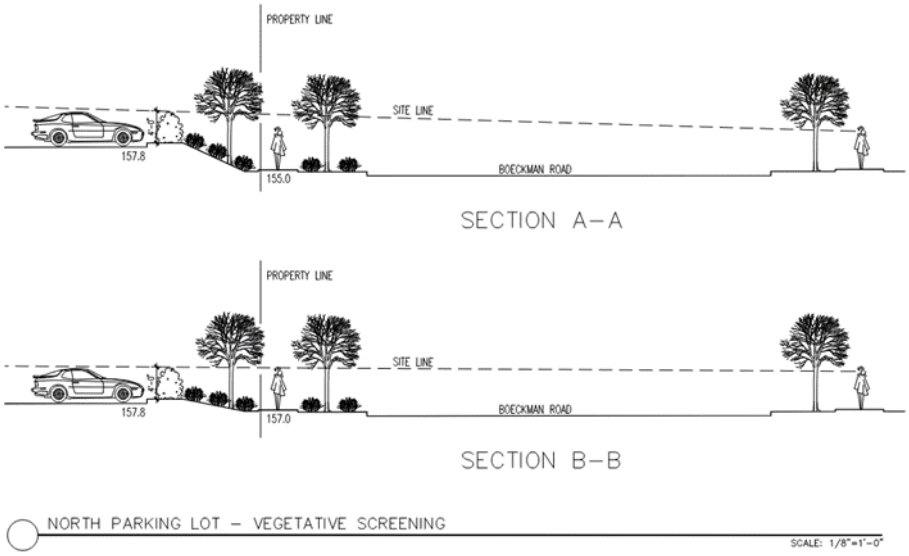
B47. The current application proposes a total of 297 parking spaces to serve new Building W5, therefore, the standards of this section apply. As shown on the applicant's plan Sheets L1.1 and L1.2, one tree is proposed to be planted for every six parking spaces or fraction thereof with at least 25% of the required trees planted in the interior of the parking areas. The applicant has elected to apply 49 eligible tree credits for mature trees preserved within the Southeast 1 and Southeast 2 parking areas to satisfy part of the requirement (see Findings B44 and C45). Existing mature trees are located both within the parking areas and along the perimeter and these will be supplemented with newly planted trees that, in combination, will provide a minimum of 40% of the canopy dripline expected to shade or ovelap the parking area.

Internal Pedestrian Walkway for Every Six Aisles
Subsection 4.155 (.03) B. 3. c.

B48. None of the new parking areas serving Building W5 have six (6) parking aisles, as the parking is dispersed in five (5) distinct area. However, parking areas are designed with an internal pedestrian walkway with minimum five (5)-foot clearance to provide pedestrian access to parking areas, minimize travel among vehicles, and channel pedestrians to the front entrance of the building.

Minimum 12-foot Landscaped Buffer at Right-of-Way
Subsection 4.155 (.03) B. 3. e.

B49. A minimum 12-foot landscaped buffer extends from the edge of the property lines at the SW Boeckman Road right-of-way to the edge of spaces in the North parking area. Because the parking area is at a higher elevation than the adjacent right-of-way, landscaping to the low screen standard is provided along the north side of this parking area, as illustrated below. Landscaping is designed to buffer and soften the view of vehicles to the extent possible. Other parking areas are located at a distance, are not visible from the right-of-way, and are landscaped to the General Landscape standard.



Landscape Buffer to Include Stormwater Treatment Where Feasible
Subsection 4.155 (.03) B. 3. f.

B50. Stormwater treatment is provided in rain gardens at the perimeter of parking areas and will be constructed to Public Works Standards as required.

Bicycle Parking

Required Bicycle Parking
Section 4.155 (.04) A. 1. and 3.

B51. As shown in the table in Finding B29, Building W5 is proposed to include 20,000 square feet of commercial office use and 60,446 square feet of manufacturing use. Commercial office uses require one (1) bicycle parking space per 5,000 square feet or a minimum of two (2) bicycle parking spaces. Manufacturing uses require one (1) bicycle parking space per 10,000 square feet or a minimum of six (6) bicycle parking spaces. Therefore, the requirement for the commercial office portion of the site is four (4) bicycle spaces, and for the manufacturing portion of the site is six (6) bicycle spaces, for a total of 10 spaces. The applicant proposes one (1) bicycle rack that accommodates two (2) bicycle spaces outside the main entrance of the building and indoor storage for an additional nine (9) bicycles for a total of 11 bicycle parking spaces, thus meeting the requirement.

Bicycle Parking Standards
Section 4.155 (.04) B.

B52. The applicant's plans show one (1) short-term bicycle parking rack that can accommodate two (2) bicycles within 30 feet of the main entrance to the building. The applicant's plan Sheet A1.1 Detail A (Exhibit B2) shows that clearance for the bicycle parking spaces will comply with the two (2)-foot width and six (6)-foot length requirement. The applicant's plan Sheet A1.0 indicates the proposed general location for nine (9) long-term bicycle parking/storage spaces within the building at the southwest corner. A detail of the short-

term bicycle parking rack is included in the applicant's materials (Exhibit B1). However, no detail is provided of the proposed long-term parking/storage spaces, and a condition of approval ensures the standard is met.

Other Parking Standards

Minimum Off-Street Loading Requirements
Section 4.155 (.05)

B53. The proposed building is 80,446 square feet in floor area, requiring two (2) loading/unloading berths. The proposal includes two (2) dock-high loading berths at the southwest corner of the building and one (1) on-grade drive-in loading berth with a drive-in door at the southeast corner of the building, which exceeds the requirement.

Carpool and Vanpool Parking Requirements
Section 4.155 (.06)

B54. The proposed development includes over 75 parking spaces; therefore, at least five percent (5%), but no fewer than two (2), spaces must be designated for exclusive carpool/vanpool parking. Of the 297 proposed spaces, at least 15 carpool/vanpool spaces are required. The applicant's plan Sheet CS-2 (Exhibit B2) identifies 15 carpool/vanpool spaces in the North parking area near the main building entrance, meeting the requirement.

Other Development Standards

Access, Ingress, and Egress
Section 4.167

B55. Site access is via an existing private access drive located between Buildings W4 and W5 with a driveway on SW Boeckman Road. An additional existing access point, also with driveway access to SW Boeckman Road, is located roughly 400 feet to the east at the eastern end of the Building W4 parking area.

Natural Features and Other Resources
Section 4.171

B56. The Building W5 location (Tax Lot 204) is currently undeveloped and includes substantial area within the SROZ in its west and south portions. The new Building W5 is proposed on the northern part of the property in an open fill area vegetated with field grass. The Building W5 parking area is mostly located in a heavily treed portion of the Building W4 property (Tax Lot 202) between the buildings. The applicant's narrative recognizes that the site contains natural features worthy of preservation, and minimizes disturbance and strives to protect these features to the extent practicable.

Access Drives and Travel Lanes
Subsection 4.177 (.01) E.

B57. The design of the access drives provides clear travel lanes, free from obstructions. The design shows all drive aisles as asphalt, and a condition of approval will ensure they are capable of carrying a 23-ton load. Emergency access lanes are improved to a minimum of 12 feet and the development is being reviewed and approved by Tualatin Valley Fire and Rescue.

Outdoor Lighting
Sections 4.199.20 through 4.199.60

B58. The outdoor lighting standards apply to the proposal. See Request C, Findings C50 through C58.

Underground Installation of Utilities
Sections 4.300-4.320

B59. All existing utilities in the SW Boeckman Road right-of-way are undergrounded and new utilities on site will be installed underground.

Public Safety and Crime Prevention

Design for Public Safety, Surveillance and Access
Subsections 4.175 (.01) and (.03)

B60. The proposed development is designed to a reasonable extent to deter crime and ensure public safety. It includes security cameras, separated staff and visitor parking areas, and, as security fence and/or gates are not proposed, will be easily accessible by law enforcement.

Addressing and Directional Signing
Subsection 4.175 (.02)

B61. Addressing will meet public safety standards. The building permit process will ensure conformance.

Lighting to Discourage Crime
Subsection 4.175 (.04)

B62. Lighting design is in accordance with the City's outdoor lighting standards, which will provide sufficient lighting to discourage crime.

Landscaping Standards

Landscaping Standards Purpose
Subsection 4.176 (.01)

B63. In complying with the various landscape standards in Section 4.176 the applicant has demonstrated the Stage 2 Final Plan Modification is in compliance with the landscape purpose statement.

Landscape Code Compliance
Subsection 4.176 (.02) A.

B64. The applicant requests no waivers or variances to landscape standards. All landscaping and screening must comply with standards of this section.

Intent and Required Materials
Subsections 4.176 (.02) C. through I.

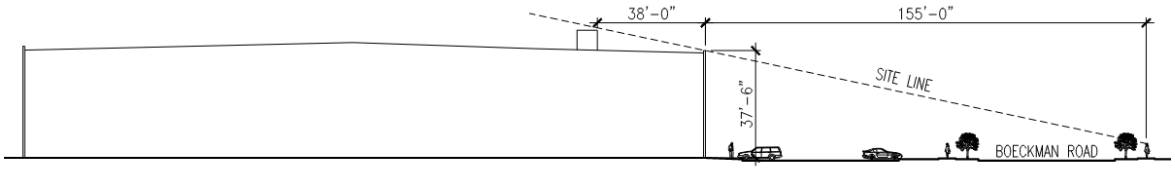
B65. The applicant's planting plan implements the landscaping standards and integrates general and low screen landscaping throughout the site, consistent with professional landscaping and design best practices. Plantings meeting the low screen standard will be utilized along the periphery of the parking area visible from the SW Boeckman Road right-of-way. The applicant's narrative notes that a 30-foot wide utility easement for the Willamette Water Supply Project (WWSP) is located along the north part of the site. This area includes parking spaces and landscaping, of which the latter is subject to plant materials limitations compatible with the WWSP pipeline. Therefore, plant materials shown on the applicant's plan Sheet L1.1 (Exhibit B2) may need be modified based on ongoing discussions with WWSP after approval of the current application. Such modification is subject to additional review as defined in the conditions of approval.

Landscape Area and Locations
Subsection 4.176 (.03)

B66. The proposed development will exceed the 15% landscaping requirement. As shown in the table on the applicant's plan Sheet A0 (Exhibit B2), the subject property is 437,610 square feet in size. Of this area, 315,925 square feet (72.1%) is either SROZ or formal landscaped area, substantially exceeding the requirements. Plantings are proposed along the entire frontage of SW Boeckman Road to soften the appearance of the new building, as well as in the parking areas. The landscaping will include trees, shrubs, ground cover and grasses planted in parking areas, general landscape areas, stormwater facilities, and within the SROZ.

Buffering and Screening
Subsection 4.176 (.04)

B67. The subject property is zoned PDI and borders PDI zoning to the north, east, and south. To the west, the property is bordered by FDAH-I zoned property, on the west side of SW Kinsman Road, which contains natural area/open space uses. This lower intensity use is screened from development on the subject property by trees and vegetation in the SROZ along the western part of the site. There are no residential areas adjacent to the subject property, no outdoor storage areas are proposed, and all exterior, roof and ground mounted, mechanical and utility equipment will be screened from ground level off-site view from adjacent streets or properties as shown in the detail drawing on the applicant's plan Sheet A2.2 (Exhibit B2) and included below. A condition of approval ensures that the utility equipment screening requirement is met.



A SITE SECTION
1" = 60'-0"

Landscape Plan Requirements
Subsection 4.176 (.09)

B68. The applicant's submitted landscape plans are drawn to scale and show the type, installation size, number and placement of materials. Plans include a plant material list identifying plants by both their scientific and common names. A note on the applicant's plan Sheet L1.0 (Exhibit B2) indicates that the project will be irrigated by an automatic underground system, and the plant schedule on Sheet L1.1 indicates water usage for all proposed plantings.

Mixed Solid Waste and Recyclables Storage

DRB Review of Adequate Storage Area, Minimum Storage Area
Subsections 4.179 (.01), (.03) and (.07)

B69. The storage area calculation is based on the predominant use(s) of the building. If a building has more than one (1) use and that use occupies more than 20% of the floor area of the building, then the storage area requirement for the whole building is the sum of the requirement for the area of each use. As described by the applicant and shown in the table below, Building W5 is proposed to include 20,000 square feet (sf) of commercial office use (24.9% of total area) and 60,446 sf of manufacturing use (75.1% of total area), for a total of 80,446 sf. Therefore, the building requires provision 453 sf of mixed solid waste and recycling storage area. As shown in the table on the applicant's plan Sheet A0 (Exhibit B2) and the detail on Sheet A1.2, the applicant proposes an exterior enclosure in the parking/utility area at the building's southwest corner with dimensions of 20 feet by 12 feet containing two (2) 6.9-foot tall containers, providing 415 sf of storage area. In addition 85 sf in interior containers near the loading dock area is proposed for cardboard recycling. Thus, a total of 500 sf of storage area is proposed, which exceeds the minimum requirement.

Building	Use	Area of Use (% of Total)	Minimum Storage Area
W5	Commercial Office	20,000 sf (24.9%)	10 sf + 4 sf/1,000 sf = 90 sf
W5	Manufacturing	60,446 sf (75.1%)	6 sf/1,000 sf = 363 sf
Total		**80,446 sf**	**453 sf**

Review by Franchise Garbage Hauler
Subsection 4.179 (.07).

B70. A letter from Republic Services, the franchise hauler, is included in the applicant's materials (Exhibit B1) indicating coordination with the franchised hauler and that the proposed storage area and site plan meets Republic Services requirements.

Request C: Site Design Review (SDR22-0004)

As described in the Findings below, the request meets the applicable criteria or will by conditions of approval.

Site Design Review

Excessive Uniformity, Inappropriateness Design
Subsection 4.400 (.01) and Subsection 4.421 (.03)

C1. Staff summarizes compliance with this subsection as follows:

- **Excessive Uniformity:** The proposed development is unique to the particular development context and does not create excessive uniformity.
- **Inappropriate or Poor Design of the Exterior Appearance of Structures:** The applicant used appropriate professional services to design structures on the site using quality materials and design. The new Building W5 as proposed is attractively designed utilizing precast concrete walls with a neutral stain finish, vegetated green walls, insulated glass, metal finishes, and clear anodized storefront to add visual interest.
- **Inappropriate or Poor Design of Signs:** The current application does not include a sign plan and the applicant indicates that this will be a separate application once a tenant is secured for the building. It is expected that appropriate professionals will be engaged to design signs meeting City sign standards compatible with the architecture of the building.
- **Lack of Proper Attention to Site Development:** The applicant employed the skills of the appropriate professional services to design the site, demonstrating attention to site development.
- **Lack of Proper Attention to Landscaping:** The applicant proposes landscaping exceeding the area requirements that is professionally designed by a landscape architect, incorporating a variety of plant materials, demonstrating attention to landscaping.

Objectives of Site Design Review

Proper Functioning of the Site
Subsection 4.400 (.02) A. and Subsection 4.421 (.03)

C2. The applicant's plans are designed in a manner that insures proper functioning of the site.

High Quality Visual Environment
Subsection 4.400 (.02) A. and Subsection 4.421 (.03)

C3. A professionally designed building, landscaping, and a professional, site specific layout supports a quality visual environment.

Encourage Originality, Flexibility, and Innovation
Subsection 4.400 (.02) B. and Subsection 4.421 (.03)

C4. The applicant proposes a building, landscaping, and other site elements that are professionally designed specifically for the site, demonstrating originality, flexibility, and innovation.

Discourage Inharmonious Development
Subsection 4.400 (.02) C. and Subsection 4.421 (.03)

C5. The professional unique design of the proposed Building W5 and other site elements harmonize with the existing Building W4 and support a high quality visual environment, thus preventing monotonous, drab, unsightly, dreary development.

Proper Relationships with Site and Surroundings
Subsection 4.400 (.02) D. and Subsection 4.421 (.03)

C6. The applicant prepared a professional site-specific design that carefully considers the relationship of the building, landscaping, and other improvements with the SROZ and existing Building W4, demonstrating proper relationships with the site and its surroundings.

Attention to Exterior Appearances
Subsection 4.400 (.02) D. and Subsection 4.421 (.03)

C7. The applicant used appropriate professional services to design the exterior of the building, demonstrating attention to exterior appearances.

Protect and Enhance City's Appeal
Subsection 4.400 (.02) E. and Subsection 4.421 (.03)

C8. The proposal adds future jobs to the City and enhances the appeal of SW Boeckman Road with an attractive, professionally design hi-tech industrial building.

Stabilize Property Values/Prevent Blight
Subsection 4.400 (.02) F. and Subsection 4.421 (.03)

C9. Development of this site on SW Boeckman Road will add services and amenities with a quality design, which adds value to this street and prevents blight on the property.

Adequate Public Facilities
Subsection 4.400 (.02) G. and Subsection 4.421 (.03)

C10. As found in the Stage 2 Final Plan Modification review (see Request B), adequate public facilities serve the site.

Pleasing Environments and Behavior
Subsection 4.400 (.02) H. and Subsection 4.421 (.03)

C11. The proposed development provides a clearly defined layout and is designed in a configuration that meets defensible space guidelines such as the inclusion of clear sightlines that allow for surveillance and clearly identified structures. See Finding B56 for additional information.

Civic Pride and Community Spirit
Subsection 4.400 (.02) I. and Subsection 4.421 (.03)

C12. Adding a new development with a high quality design and creating additional jobs in the community will contribute to civic pride and community spirit.

Favorable Environment for Residents
Subsection 4.400 (.02) J. and Subsection 4.421 (.03)

C13. Constructing a new, high-quality building on an undeveloped parcel in a predominantly industrial area of the City will provide a favorable environment to residents and potential employees.

Jurisdiction and Power of the DRB for Site Design Review

Development Must Follow DRB Approved Plans
Section 4.420

C14. A condition of approval ensures construction, site development, and landscaping are carried out in substantial accord with the Development Review Board approved plans, drawings, sketches, and other documents.

Design Standards

Preservation of Landscaping
Subsection 4.421 (.01) A.

C15. Overall, a substantial portion of the subject property will be preserved in a natural state, with disturbance limited to those areas necessary to construct the proposed building and other site improvements. The development area for the proposed building is vegetated in grasses, which will be removed and replaced with landscaping and other site improvements. Existing plantings in the public right-of-way of SW Boeckman Road north of the building will be retained, as will trees and native vegetation in the SROZ west and south of the building. Trees are proposed to be removed for parking area improvements; however, the applicant proposes to preserve and protect several mature trees, including

Oregon white oak and Ponderosa pine, in parking areas by carefully locating the improvements to avoid the critical root zones of the trees.

Harmony of Proposed Buildings to Environment
Subsection 4.421 (.01) B.

C16. The applicant used appropriate professional services to design the exterior of the building to ensure harmony with the environment and to blend with the natural features of the site. The campus appearance is of two large buildings (W5 and existing W4) placed in the clearing that fronts SW Boeckman Road and intertwined with a significant established treed natural area to the south and west. Landscaping is used to enhance the appearance of the building and associated improvements while also softening and blending them with the natural setting of the site and its industrial surroundings.

Drives, Parking, and Circulation
Subsection 4.421 (.01) C.

C17. All access points are existing and meet City standards. The applicant does not propose changes to the existing circulation areas, but proposes to extend circulation around the new Building W5 and parking areas between it and Building W4. The interior circulation is at least 24 feet wide and the design separates pedestrian and vehicle circulation except at necessary cross walks. The new parking areas are safe, conveniently located for access to the building, provide adequate area for safe maneuvering, and are designed to be screened from off-site view either with landscaping or by distance from the public right-of-way.

Special Attention to Surface Water Drainage
Subsection 4.421 (.01) D.

C18. The proposed development provides parking areas which will contain water quality features consistent with City standards. These features are dispersed throughout the developed area, will help improve water quality throughout the property, and will not adversely affect neighboring properties.

Harmonious Above Ground Utility Installations, Indication of Sewage Disposal
Subsection 4.421 (.01) E.

C19. No above ground utility installations are proposed. All sewage disposal will be through standard sewer connections to City sewer lines found to be adequate to serve the site as part of the Stage 2 Final Plan Modification.

Advertising Features Do Not Detract
Subsection 4.421 (.01) F.

C20. Advertising features will be reviewed separately from the current application, once a tenant is secured for the space, and to ensure they are sized and located appropriately to not detract from the design of the existing structure and surrounding properties.

Screening and Buffering of Special Features
Subsection 4.421 (.01) G.

C21. The applicant does not propose any special features requiring additional screening or buffering.

Design Standards Apply to All Buildings, Structures, Signs, and Features
Subsection 4.421 (.02)

C22. The applicant's design considers the design standards for all buildings, structures, and other features.

Conditions of Approval to Ensure Proper and Efficient Function
Subsection 4.421 (.05)

C23. Staff does not recommend any additional conditions of approval to ensure the proper and efficient functioning of the development.

Color or Materials Requirements
Subsection 4.421 (.06)

C24. As shown in the applicant's plan Sheet A3.0 (Exhibit B2) and described in the narrative and materials (Exhibit B1), a range of materials, such as cast concrete, metal and glass, in neutral colors of silver, bronze, and semi-transparent stain, are proposed for Building W5. These colors and materials are appropriate for the industrial setting. Staff does not recommend any additional requirements or conditions related to colors and materials.

Standards for Mixed Solid Waste and Recycling Areas

Mixed Solid Waste and Recycling Areas Colocation
Subsection 4.430 (.02) A.

C25. The proposal provides an exterior storage area for solid waste and recyclables located at the southwest corner of the proposed building, combined with interior space for cardboard recycling.

Exterior vs Interior Storage, Fire Code, Number of Locations
Subsections 4.430 (.02) C.-F.

C26. The applicant proposes a single, visible, exterior location southwest of the building. The enclosure is appropriately screened. Review of the Building Permit will ensure that the building and fire code standards are met.

Collection Vehicle Access, Not Obstruct Traffic or Pedestrians
Subsections 4.430 (.02) G.

C27. The letter from Republic Services included in the applicant's materials (Exhibit B1) indicates the location and arrangement is accessible to collection vehicles. The location of the storage area does not impede sidewalks, parking area aisles, or public street right-of-way.

Dimensions Adequate to Accommodate Planned Containers
Subsections 4.430 (.03) A.

C28. Pursuant to the letter from Republic Services, the dimensions are adequate to accommodate the planned containers.

6-Foot Screen, 10-Foot Wide Gate
Subsections 4.430 (.03) C.

C29. The solid waste and recyclables storage area is enclosed by an eight (8)-foot concrete tilt wall with two (2) 10-foot-wide gates, which meets the minimum standards.

Site Design Review Submission Requirements

Submission Requirements
Section 4.440

C30. The applicant submitted a site plan drawn to scale and a detailed landscape plan.

Time Limit on Site Design Review Approvals

Void after 2 Years
Section 4.442

C31. The applicant acknowledges that Site Design Review approval is void after two (2) years unless a building permit has been issued and substantial development pursuant thereto has taken place or the City grants an extension.

Installation of Landscaping

Landscape Installation or Bonding
Subsection 4.450 (.01)

C32. A condition of approval will assure installation or that appropriate security equal to one hundred and ten percent (110%) of the cost of the landscaping as determined by the Planning Director is filed with the City assuring such installation within six (6) months of occupancy.

Approved Landscape Plan Binding
Subsection 4.450 (.02)

C33. A condition of approval will ensure that substitution of plant materials, irrigation systems, or other aspects of an approved landscape plan will not be made without official action of the Planning Director or Development Review Board and provide ongoing assurance the criterion is met.

Landscape Maintenance and Watering
Subsection 4.450 (.03)

C34. A condition of approval will ensure landscaping is continually maintained in accordance with this subsection.

Limitation to Modifications of Landscaping
Subsection 4.450 (.04)

C35. A condition of approval will provide ongoing assurance that this criterion is met by preventing modification or removal of landscaping without appropriate City review.

Natural Features and Other Resources

Protection
Section 4.171

C36. The proposed design of the site provides for protection of natural features and other resources, specifically the SROZ areas on the west and south parts of the site, and trees in the new parking areas southeast of the new building, consistent with the proposed Stage 2 Final Plan Modification and the purpose and objectives of Site Design Review.

Landscaping

Landscape Standards Code Compliance
Subsection 4.176 (.02) B.

C37. No waivers or variances to landscape standards have been requested; thus all landscaping and screening must comply with the standards of this section.

Intent and Required Materials
Subsections 4.176 (.02) C. through I.

C38. The minimum or higher standard has been applied throughout different landscape areas of the site and landscape materials are proposed to meet each standard in the different areas. Site Design Review is being reviewed concurrently with the Stage 2 Final Plan Modification, which includes a thorough analysis of the functional application of the landscaping standards.

Landscape Area and Locations
Subsection 4.176 (.03)

C39. As indicated in the applicant's narrative and plan set the site contains 72.1% landscaped area, exceeding the 15% requirement. Additionally, 19.8% of the overall parking area is dedicated to landscaping, exceeding the 10% requirement.

Buffering and Screening
Subsection 4.176 (.04)

C40. Consistent with the proposed Stage 2 Final Plan Modification, adequate screening is proposed.

Shrubs and Groundcover Materials
Subsection 4.176 (.06) A.

C41. All of the proposed shrubs in the applicant's landscape plans (Exhibit B2) meet or exceed the required two (2)-gallon minimum. A condition of approval will require that the detailed requirements of this subsection are met.

Plant Materials-Trees
Subsection 4.176 (.06) B.

C42. All trees in the applicant's landscape plans are proposed to be two (2)-inch caliper (deciduous) or six (6) feet in height (coniferous) consistent with the requirements of this subsection. A condition of approval will require all trees to be balled and burlapped (B&B), well-branched and typical of their type as described in current American Association of Nurserymen (AAN) Standards.

Plant Materials-Buildings Larger than 24 Feet in Height or Greater than 50,000 Square Feet in Footprint Area
Subsection 4.176 (.06) C.

C43. The proposed building is 39 feet tall to the top of the roof parapet and exceeds 50,000 square feet in footprint area, which meets the threshold for requiring larger or more mature plant materials as defined by this subsection. However, the design provides architectural interest by using a variety of materials in landscape areas surrounding the building, as well as vine covered green walls on the north, east, and south sides of the building to soften the façade and give it a natural appearance that blends with the surrounding environment. Numerous preserved trees, as well as newly planted trees in the parking areas and preservation of large areas of SROZ will also soften views of the building from surrounding areas. It is staff's professional opinion that larger or more mature plant materials are not needed to achieve the intent of this subsection.

Types of Plant Species
Subsection 4.176 (.06) E.

C44. The applicant's landscape plan provides sufficient information showing the proposed landscape design meets the standards of this subsection related to use of native vegetation and prohibited plant materials.

Tree Credit
Subsection 4.176 (.06) F.

C45. As shown in the table below and in the calculations on the applicant's plan Sheet L1.1 (Exhibit B2), the current application requires 50 trees in landscape islands and on the perimeter of parking areas. The applicant proposes to plant 37 new trees in parking areas throughout the site and to apply 49 eligible tree credits for mature trees preserved within the Southeast 1 and Southeast 2 parking areas. The total of 86 trees exceeds the minimum requirement.

Existing Trunk Diameter	Number of Tree Credits	Southeast 1 Lot	Southeast 2 Lot
18 to 24 inches	3	--	2 trees x 3 cr/tree = 6 cr
25 to 31 inches	4	--	2 trees x 4 cr/tree = 8 cr
32 inches or greater	5	6 trees x 5 cr/tree = 30 cr	1 tree x 5 cr/tree = 5 cr
Total		**30 cr**	**19 cr**

Exceeding Plant Standards
Subsection 4.176 (.06) G.

C46. The selected landscape materials do not violate any height or vision clearance requirements.

Landscape Installation and Maintenance
Subsection 4.176 (.07)

C47. The installation and maintenance standards are or will be met by conditions of approval as follows:

- Plant materials are required to be installed to current industry standards and be properly staked to ensure survival
- Within one (1) growing season, the applicant must replace in kind plants that die, unless the City approves appropriate substitute species.
- Notes on the applicant's landscape plans provide for an irrigation system.

Landscape Plans
Subsection 4.176 (.09)

C48. The applicant's submitted plans provide the required information.

Completion of Landscaping
Subsection 4.176 (.10)

C49. The applicant has not requested to defer installation and, thus, must install landscaping prior to occupancy.

Outdoor Lighting

Applicability of Outdoor Lighting Standards
Sections 4.199.20 and 4.199.60

C50. An outdoor lighting system is being installed for the proposed new development. The Outdoor Lighting standards thus apply.

Outdoor Lighting Zones
Section 4.199.30

C51. The subject property is within LZ2 and the proposed outdoor lighting systems will be reviewed under the standards of this lighting zone.

Optional Lighting Compliance Methods
Subsection 4.199.40 (.01) A.

C52. The applicant has elected to comply with the prescriptive method.

Wattage and Shielding
Subsection 4.199.40 (.01) B. 1. and Table 7

C53. The applicant's narrative states that the proposed luminaires comply with the maximum luminaire lamp wattage and shielding requirements within Table 7. The luminaire cutsheets are included in Exhibit B1.

Table 7: Maximum Wattage And Required Shielding

Lighting Zone	Fully Shielded	Shielded	Partly Shielded	Unshielded
LZ 2	100	35	39	Low voltage landscape lighting 50 watts or less

Oregon Energy Efficiency Specialty Code Compliance
Subsection 4.199.40 (.01) B. 2.

C54. The applicant will demonstrate compliance with the Oregon Energy Efficiency Code, Exterior Lighting prior to construction.

Mounting Height
Subsection 4.199.40 (.01) B. 3.

C55. All exterior mounted lighting on the building and pole-mounted lighting is less than 40 feet high, and thus complies with Table 8. A condition of approval will ensure the requirements of the Outdoor Lighting Ordinance are met at the time of building permit issuance.

Table 8: Maximum Lighting Mounting Height In Feet			
Lighting Zone	Lighting for private drives, driveways, parking, bus stops and other transit facilities	Lighting for walkways, bikeways, plazas and other pedestrian areas	All other lighting
LZ 2	40	18	8

Luminaire Setback
Subsection 4.199.40 (.01) B. 4.

C56. The subject property is bordered by the same base zoning and the same lighting zone on all sides. Staff understands the three (3) times mounting height setback to only apply where the property abuts a lower lighting district. A condition of approval will ensure the requirements of the Outdoor Lighting Ordinance are met at the time of building permit issuance.

Lighting Curfew
Subsection 4.199.40 (.01) D.

C57. The applicant proposes the standard LZ 2 curfew of 10 PM.

Standards and Submittal Requirements
Sections 4.199.40 and 4.199.50

C58. All required materials have been submitted.

Request D: Type C Tree Removal Plan (TPLN22-0003)

As described in the Findings below, the request meets the applicable criteria or will by conditions of approval.

Type C Tree Removal-General

Tree Related Site Access
Subsection 4.600.50 (.03) A.

D1. It is understood the City has access to the property to verify information regarding trees.

Review Authority
Subsection 4.610.00 (.03) B.

D2. The requested removal is connected to Site Design Review by the Development Review Board for new development. The tree removal is thus being reviewed by the Development Review Board.

Conditions of Approval
Subsection 4.610.00 (.06) A.

D3. No additional conditions are recommended pursuant to this subsection.

Completion of Operation
Subsection 4.610.00 (.06) B.

D4. It is understood the tree removal will be completed prior to construction of the proposed building, which is a reasonable time frame for tree removal.

Security for Permit Compliance
Subsection 4.610.00 (.06) C.

D5. No bond is anticipated to be required to ensure compliance with the tree removal plan as a bond is required for overall landscaping.

Tree Removal Standards
Subsection 4.610.10 (.01)

D6. The standards of this subsection are met as follows:

- Standard for the Significant Resource Overlay Zone: Ten (10) trees in poor condition within the SROZ are proposed for removal (see applicant's plan Sheet TR-1 in Exhibit B2). These trees meet the criteria for removal within the SROZ due to their condition and mitigation plantings are proposed.
- Preservation and Conservation. The applicant has taken tree preservation into consideration, and has limited tree removal to trees that are necessary to remove for development. Of the 173 trees inventoried on the site, 101 trees are proposed for retention/preservation and 72 are proposed to be removed. Of the 101 preserved trees, 21 have been identified as "situational", which are likely to be retained with planned installation of an aeration system over their roots before fill is placed to assist with long-term survival. These trees will be re-evaluated at the time of site clearing to assess suitability for preservation and will be monitored during construction to minimize root zone impacts. If, as a result of construction, one (1) or more of the trees is determined to be no longer sustainable, the applicant may seek written authorization from the City for removal and appropriate mitigation. A condition of approval is included specific to the 21 "situational" trees to ensure the evaluation and approval process is followed. Trees within the SROZ, except as noted above, will be preserved.
- Development Alternatives: Proposed tree removal has been minimized to the extent possible in order to develop the proposed building and associated improvements. The applicant has preserved several mature trees and provided a pedestrian path through a grove of preserved trees in the southeast parking area, redesigned a rain garden at the perimeter of this parking area to preserve an Oregon white oak previously proposed for removal, and proposes to install an aeration system over the roots of 21 mature trees that could be impacted by fill placement during construction to increase the likelihood of long-term survival.

- Land Clearing: Land clearing and grading is proposed and will be limited to areas necessary for construction of the proposed building, structures, and other site improvements.
- Compliance with Statutes and Ordinances: The necessary tree replacement and protection is planned according to the requirements of the tree preservation and protection ordinance.
- Limitation: Tree removal is limited to where it is necessary for construction or to address nuisances or where the health of the trees warrants removal.
- Additional Standards: A tree survey has been provided, and no utilities are proposed to be located where they would cause adverse environmental consequences.

Review Process
Subsection 4.610.40 (.01)

D7. The plan is being reviewed concurrently with the Stage 2 Final Plan Modification.

Tree Maintenance and Protection Plan
Section 4.610.40 (.02)

D8. The applicant has provided information on tree maintenance and protection in plan Sheets TR-1 and TR-2 (Exhibit B2). Tree protection fencing is shown on Sheets C1.01, C1.20, and C1.21 (Exhibit B2) around preserved trees.

Replacement and Mitigation

Tree Replacement Requirement
Subsection 4.620.00 (.01)

D9. As shown in the table below, 173 trees were inventoried for the current application. Of these, 101 trees are proposed for retention/preservation and 72 are proposed to be removed. It also is possible that one (1) or more of the 21 "situational" trees, as noted above, may need to be removed in the future (see Finding D6). Trees within the SROZ, except as noted above, will be preserved. The applicant proposes planting 65 trees in parking areas and on the building perimeter, as well as 328 trees in the SROZ as mitigation (see Exhibit B1), thus substantially exceeding the replacement requirements, including for "situational" trees.

Basis for Determining Replacement and Replacement
Subsection 4.620.00 (.02) and (.03)

D10. Replacement trees will meet the minimum caliper and other replacement requirements.

Replacement Tree Stock Requirements
Subsection 4.620.00 (.04)

D11. The planting notes on the applicant's plan Sheet L2.1 (Exhibit B2) indicate the appropriate quality.

Replacement Trees Locations
Subsection 4.620.00 (.05) A.

D12. The applicant proposes to mitigate for all removed trees on site and in the appropriate locations for the proposed development.

Protection of Preserved Trees

Tree Protection During Construction
Section 4.620.10

D13. Tree protection is required. All trees required to be protected must be clearly labeled as such, and suitable barriers to protect remaining trees must be erected, maintained, and remain in place until the City authorizes their removal or issues a final certificate of occupancy. Any adjustments to tree protection fencing, work within the tree protection fencing within the root protection zone of protected trees, or pruning of the roots or overstory (canopy and branches) of protected trees must be supervised by the project arborist. A condition of approval will ensure the applicable requirements of this section are met.

Request E: Standard SROZ Map Verification (SROZ22-0003)

As described in the Findings below, the request meets the applicable criteria or will by conditions of approval.

SROZ Map Verification

Requirements and Process
Section 4.139.05

E1. Consistent with the requirements of this section, a verification of the SROZ boundary is required as the applicant requests a land use decision. The applicant conducted a detailed site analysis consistent with the requirements of this section, which the City's Natural Resources Manager reviewed and recommends approval of.

Request F: Standard SRIR Review (SRIR22-0001)

As described in the Findings below, the request meets the applicable criteria or will by conditions of approval.

Findings of Fact:

1. Pursuant to Section 4.139.05 (Significant Resource Overlay Zone Map Verification), the map verification requirements shall be met at the time an applicant requests a land use decision. The applicant conducted a detailed site analysis consistent with code requirements, which the Natural Resources Manager reviewed and approved.

2. The property is comprised of mixed conifer and broadleaf forest (Site ID Number 4.01), grass/lawn areas, and three delineated wetlands (i.e., Wetlands A, B and C). The wetlands are associated with an old stormwater facility and a drainage ditch near the western boundary.

3. Vegetation within the forests and wetlands consists of native plant species such as Oregon ash, bigleaf maple, Douglas fir, Oregon white oak, red alder, red osier dogwood, wild rose, snowberry, trailing blackberry, Pacific ninebark, and common camas. In addition, there are invasive plant species, such as sweet cherry, reed canarygrass, Himalayan blackberry, poison hemlock, and English ivy.

4. The Significant Resource Overlay Zone ordinance prescribes regulations for development within the SROZ and its associated 25-foot Impact Area. Setbacks from significant natural resources implement the requirements of Metro Title 3 Water Quality Resource Areas, Metro Title 13 Nature in Neighborhoods, and Statewide Planning Goal 5. All significant natural resources have an Impact Area. Development or other alteration activities may be permitted within the SROZ and its associated Impact Area through the review of a Significant Resource Impact Report (SRIR). The primary purpose of the Impact Area is to insure that development does not encroach into the SROZ.

5. Pursuant to the City's SROZ ordinance, development is only allowed within the Area of Limited Conflicting Use (ALCU). The ALCU is located between the riparian corridor boundary, riparian impact area or the Metro Title 3 Water Quality Resource Area boundary, whichever is furthest from the wetland or stream, and the outside edge of the SROZ, or an isolated significant wildlife habitat (upland forest) resource site.

6. The applicant's standard Significant Resource Impact Report (SRIR) delineated specific resource boundaries and analyzed the impacts of non-exempt and exempt development within the SROZ. The applicant's SRIR contained the required information, including an analysis and development recommendations for mitigating impacts.

Background / Discussion

The SRIR assessed three (3) wetlands (Figure 4, Existing Conditions, in Attachment A of the applicant's SRIR; see Exhibit B1): Wetland A (shallow basin and forested wetland), Wetlands B and C (drainage ditch along the western boundary of property). Within the SRIR, a significance determination, based on the approved wetland delineation and updated Oregon Freshwater Wetland Assessment Methodology (OFWAM), was completed for the wetlands.

Wetland A (1.46 acres) is located in a large, fairly shallow basin that was excavated decades ago as a stormwater facility. The hydrology of the wetland is dependent on direct precipitation and runoff from adjacent impermeable surfaces. A seasonally high water table may also be present. The dominant vegetation includes Oregon ash, English hawthorn, sweet briar rose, common camas, reed canarygrass, and spreading rush.

Wetlands B and C (0.09 acre and 0.09 acre) are located in a drainage ditch oriented north to south and located near the western boundary of the property. These wetlands mainly receive runoff from upslope areas as well as groundwater. Vegetation consists of Oregon ash, salmonberry, velvet grass, reed canarygrass, bird's-foot trefoil, yellow glandweed, lemon balm, and spreading rush.

In regards to the City's Natural Resources Inventory (circa 1992-93), a wetland determination, based on OFWAM, provided preliminary boundaries of wetlands in Wilsonville. The mapped boundaries for the wetland determinations relied on aerial photographs, topographic maps, Clackamas County soil survey, and limited field reconnaissance. In contrast to the wetland determination, the state approved wetland delineation, submitted by the applicant, identifies the precise boundaries, location and current condition of the wetlands on the property. The wetland delineation incorporated observations of on-site hydrology, soils and vegetation. In accordance with the Corps of Engineers Wetlands Delineation Manual, Pacific Habitat Services delineated the wetland locations and boundaries.

To be deemed a locally significant wetland (and included in the SROZ), as specified in the City of Wilsonville Natural Resource Inventory, a wetland must satisfy the Oregon Freshwater Wetland Assessment Methodology (OFWAM). As documented in the applicant's report, Wetlands A and C satisfy the OFWAM criteria, but Wetland B does not. Staff concurs with the applicant's wetland delineation and determination of local significance. Pursuant to Section 4.139.09(.01) (D), the applicant has demonstrated compliance with the provisions of the SROZ map refinement process for the wetland area.

Description of Request

The applicant is requesting approval of a standard Significant Resource Impact Report (SRIR) for proposed development that is located within the Significant Resource Overlay Zone (SROZ) and its associated Impact Area.

Summary of Issues

Within the SROZ, the applicant's proposed (non-exempt) development includes a portion of the new building and access road. Pursuant to Section 4.139.00 and Section 4.139.06(.03), no development is allowed within the SROZ unless it is located within an ALCU. Within the designated ALCU on the property, approximately 340 square feet (0.01 acre) will be developed.

Proposed exempt development in the SROZ and its associated Impact Area include the following:

1. Fire access road;
2. Two stormwater facilities (i.e., rain gardens);
3. Sewer line extension; and
4. Stormwater outfalls – installation of pipe and outfall structure.

Exempt Uses in the SROZ

Use and Activities Exempt from These Regulations
Subsection 4.118 (.03) A. and 4.130.04

F1. Proposed exempt development in the SROZ and its associated Impact Area complies with the following exemptions.

1. Fire access road

Subsection 4.139.04 (.08) exempts the following use/activity: The construction of new roads, pedestrian or bike paths into the SROZ in order to provide access to the sensitive area or across the sensitive area, provided the location of the crossing is consistent with the intent of the Wilsonville Comprehensive Plan. Roads and paths shall be constructed so as to minimize and repair disturbance to existing vegetation and slope stability.

Finding: The proposed fire access road is a requirement of the fire district.

2. Two stormwater facilities (i.e., rain gardens)

Subsection 4.139.04 (.13) exempts the following use/activity: Enhancement of the riparian corridor or wetlands for water quality or quantity benefits, fish, or wildlife habitat as approved by the City and appropriate regulatory agencies

Finding: Due to the current condition of the open space area, the placement and operation of the proposed stormwater facilities will provide a water quality and habitat benefit through the planting of stormwater facility vegetation and the installation of soil media.

3. Sewer line extension, and 4. Stormwater outfalls - installation of pipe and outfall structure:

Subsection 4.139.04 (.18) exempts the following use/activity: Private or public service connection laterals and service utility extensions.

Finding: The stormwater pipes and outfalls are necessary for conveying treated and controlled runoff to the wetlands. The sewer line extension is necessary for serving the new building.

Standard SRIR Requirements

Site Development Permit Application Requirement
Subsection 4.139.06 (.01) A.

F2. The applicant has submitted a land use application in conformance with the Planning and Land Development Ordinance.

Outline of Existing Features
Subsection 4.139.06 (.01) B.

F3. Preliminary plans have been submitted which include all of the proposed development.

Location of Wetlands or Water Bodies
Subsection 4.139.06 (.01) C.

F4. Staff concurs with the applicant's wetland delineation and determination of local significance.

Tree Inventory Requirement
Subsection 4.139.06 (.01) D.

F5. The preliminary plans include a tree inventory.

Location of SROZ and Impact Area Boundaries
Subsection 4.139.06(.01) E.

F6. The SROZ and Impact Area boundaries have been identified on the preliminary plans.

Slope Cross-Section Measurements
Subsection 4.139(.01) F.

F7. A slope analysis was included in the SRIR.

Metro Title 3 Boundary Delineation
Subsection 4.139(.01) G.

F8. The SRIR includes a delineation of the Metro Title 3 Water Quality Resource Area boundary.

Photos of Site Conditions
Subsection 4.139(.01) H.

F9. The SRIR includes representative site photographs.

Narrative Describing Impacts
Subsection 4.139(.01) I.

F10. The proposed development impacts have been documented in the SRIR, and the SRIR includes a mitigation plan.

Standard SRIR Review Criteria
Section 4.139.06 (.03)

F11. In addition to the normal Site Development Permit Application requirements as stated in the Planning and Land Development Ordinance, the following standards shall apply to the issuance of permits requiring an SRIR. The SRIR must demonstrate how these standards are met in a manner that meets the purposes of this Section.

A. Except as specifically authorized by this code, development shall be permitted only within the Area of Limited Conflicting Use (see definition) found within the SROZ;

Finding: Only non-exempt development is proposed within the Area of Limited Conflicting Use.

B. Except as specifically authorized by this code, no development is permitted within Metro's Urban Growth Management Functional Plan Title 3 Water Quality Resource Areas boundary;

Finding: The proposed exempt development is allowed within Metro's Title 3 Water Quality Resource Areas boundary, and the non-exempt development is not within the Title 3 Water Quality Resource Areas boundary.

C. No more than five (5) percent of the Area of Limited Conflicting Use (see definition) located on a property may be impacted by a development proposal. On properties that are large enough to include Areas of Limited Conflicting Use on both sides of a waterway, no more than five (5) percent of the Area of Limited Conflicting Use on each side of the riparian corridor may be impacted by a development proposal. This condition is cumulative to any successive development proposals on the subject property such that the total impact on the property shall not exceed five (5) percent;

Finding: The applicant has identified the proposed non-exempt development within the Area of Limited Conflicting Use, and calculated the percentage for this development. The following information has been provided for the Area of Limited Conflicting Use (ALCU):

Total ALCU	=	140,301 square feet
Allowed Impact (5%)	=	7,015 square feet
Proposed Impact	=	340 square feet (0.24%)

D. Mitigation of the area to be impacted shall be consistent with Section 4.139.06 of this code and shall occur in accordance with the provisions of this Section;

Finding: The proposed mitigation is consistent with the development code provisions. The mitigation will provide an enhancement to the upland forest through the planting of native trees and shrubs.

E. The impact on the Significant Resource is minimized by limiting the degree or magnitude of the action, by using appropriate technology or by taking affirmative steps to avoid, reduce or mitigate impacts;

Finding: The impacts to the SROZ are the minimum necessary for addressing Public Works Standards and development code requirements.

F. The impacts to the Significant Resources will be rectified by restoring, rehabilitating, or creating enhanced resource values within the "replacement area" (see definitions) on the site or, where mitigation is not practical on-site, mitigation may occur in another location approved by the City;

Finding: Impacts to the SROZ will be mitigated for on-site.

G. Non-structural fill used within the SROZ area shall primarily consist of natural materials similar to the soil types found on the site;

Finding: Non-structural fill will consist of natural materials similar to the soil types found on the site.

H. The amount of fill used shall be the minimum required to practically achieve the project purpose;

Finding: The amount of fill has been minimized to the extent practicable.

I. Other than measures taken to minimize turbidity during construction, stream turbidity shall not be significantly increased by any proposed development or alteration of the site;

Finding: All proposed grading activities on-site will be managed pursuant to guidelines established and identified in the applicant's approved erosion control plan and a 1200-CN Erosion Control Permit. Stream turbidity is regulated under the City's Grading and Erosion Control Permit.

J. Appropriate federal and state permits shall be obtained prior to the initiation of any activities regulated by the U.S. Army Corps of Engineers and the Oregon Division of State Lands in any jurisdictional wetlands or water of the United States or State of Oregon, respectively.

Finding: The applicant has not proposed impacts to Wetlands A, B and C, which are regulated by the Oregon Department of State Lands and the U.S. Army Corps of Engineers.

July 8, 2022

Re: Submittal #2 - DB22-0004 Boeckman Road Building W5

To: **City of Wilsonville**
Planning Division - Philip Bradford
29799 SW Town Center Loop East
Wilsonville, OR 97070

From: Bob Wells
Lance Mueller & Associates / Architects
130 Lakeside Ave. S., #250
Seattle, WA 98122

Dear Philip,

Thank you for your screening comments of 3/11/22, which are attached at the end of this response letter for reference. On behalf of ownership attached is our resubmittal for DB22-0004 in hopes of passing screening for Site Design Review and the related approvals.

The following are our item-by-item responses to items 1-8 from your screening comments of 3/11/22. Your comments are in blue and italics followed by our responses:

Item 1. Incomplete written responses to applicable review criteria. The applicable review criteria include the following:

Industrial Development Standards and Industrial Zoning

- *Planned Development Industrial (PDI) Zones and Industrial Standards: Section 4.117, 4.135 through 4.135.5*

Planned Development Standards and Regulations for all Planned Development (PD) Zones

- *Standards applying to all Planned Development (PD) Zones: Section 4.118*
- *Planned Development Regulations: Section 4.140*

General Development Regulations and Standards

- *On-Site Pedestrian Access and Circulation: Section 4.154*
- *Parking, Loading, and Bicycle Parking: Section 4.155*
- *Street Improvement Standards: Section 4.177*
- *Landscaping, Screening, and Buffering: Section 4.176*
- *Mixed Solid Waste and Recycling: Section 4.179*
- *Outdoor Lighting: Sections 4.199 through 4.199.60*
- *Underground Utilities: Sections 4.300 through 4.320*
- *Protection of Natural and Other Features: Section 4.171*
- *Public Safety and Crime Prevention: Section 4.175*

Overlay Zones

- *Significant Resource Overlay Zone (SROZ) Ordinance: Sections 4.139 through 4.139.11*

Site Design Review (Detailed Review of Architecture, Landscaping, Signs, and other Design Elements)

- *Site Design Review: Sections 4.400 through 4.450*

Trees

- *Tree Preservation and Protection: Sections 4.600 through 4.640.20*

Item 1 response: Philip, Item 1 is so comprehensive yet non-specific it is impossible to provide an item-by-item response, other than to say I've reviewed all your listed code sections above and updated my narrative where appropriate. See the revised narrative that I call Submittal #2.

For the record, it would be more helpful in the future if you comment specifically on an issue, and more professional if the relevant code section is included for reference. To say incomplete response then just list the many section titles in the narrative is comparable to my looking for a needle in the haystack, except I don't know what needle you want me to address.

Item 2. Insufficient detail in submitted plans and drawings. While some information is provided, the following is specific information still missing:

General Site Plan o Location of private drives, and driveways on adjacent properties o Calculation of off-street parking requirements and total provided for both W-4 and W-5

Breakdown between standard size parking spaces and compact parking spaces

Dimensions for loading berths

Setbacks required by existing zoning requirements

Landscape Plans o Indication of water consumption categories (high, moderate, low, and interim or unique) See WC Subsections 4.176(.09)A.-D.

Color Board: In addition to the submitted elevations and material information, provide the following: o Color board displaying specifications as to type, color, and texture of the exterior surfaces of the proposed structures

Item 2 responses:

General Site Plan - adjacent properties – We had an earlier email exchange where we agreed the drives are all established in our vicinity of Boeckman Road and W5 proposes no change. You agreed it is not necessary at this time to further survey existing drives on the north side of Boeckman Road.

General Site Plan – off-street parking calculations of W4 & W5 - we have refocused our W5 site plan sheet A1.0 to include the proposed partition plat that separates W5 property from existing W4 building, and we list the W5 tabulations for the proposed W5 lot only on Cover Sheet A0. We have also added Supplemental Plan Sheet CS-2 that covers tabulations for W4 & W5 separately and combined. The narrative refers to the plan set for tabulations. This includes the compact and standard stall breakdown.

Landscape Plans have included water consumption categories on the landscape plan material lists. Thank you for listing the relevant section.

Color board is already provided in the Narrative, Section 6 – Reports, and it is expanded on Submittal #2 to include the discussion below with pictures of the existing examples. As we previously discussed, the color board clearly defines the simple color palette proposed, which is similar to the existing example buildings. They show a similar neutral wall color range to verify the quality of the concrete color and sheen as well as how the other materials work with the concept proposed as a whole.

The precast walls finish in the examples all feature a field applied semi-transparent stain finish installed in two layers with pigment change between the layers

for added color depth. The stain pigment is applied in a clear penetrating sealer. This is a premium finish compared to paint, and we believe that it is a richer and more natural aesthetic (with the subtle mottled neutral colors) compared to a flat paint finish. Importantly, stain is proven tough enough to hold up to vine covered green walls, which is questionable with paint finish. Besides the initial aesthetic preference, long-term the stain maintains its subtle patina and waterproofing capabilities longer than paint, so the precast facade holds its quality appearance longer. This is important on its own merits, but it is more important when vines are attached to the walls as we propose. Imagine the time and expense involved to repaint a vine covered building. First the vine removal, then the painting process with surface prep, and then waiting a few years for the vines to grow back on the wall. We consider the stain finish linked to the green walls proposed aesthetically and practically.

The stain is custom field applied for each of the owner's buildings, who uses his own long-term subcontractor to control the application. The final colors are selected by the owner, who takes a personal interest, from field samples on the precast walls. For accuracy we place the field samples on the actual concrete walls because concrete color varies from batch to batch, which influences how the semi-transparent stain color is perceived.

The color board presentation issue is how do we present a field sample that is not created yet? Unfinished concrete walls colors vary from cool (bluish) to warm (off-white) hues, which significantly influences the semi-transparent stain color perceived. This makes it impossible to present an accurate precast color sample at a DRB hearing. Instead, the owners do have three (3) Wilsonville examples of their stained precast buildings of similar scale and materials that have received Wilsonville approval in the past. At the DRB hearing we will present pictures of these representing the stain color range with their addresses for field visits to verify the color. We will also offer three (3) Tualatin building examples (also with addresses) by the owner showing a slightly darker semi-transparent color range. We think these aged examples provide a good sense for how the concrete finish will ultimately appear, and the exact hue is less important. City approval could be conditioned on the city approving the field samples at the end of construction. In the owner's previous Wilsonville buildings (i.e. the stained precast examples permitted as W1, W2 and W3) planning approval was given based upon the building examples by the owner. I don't recall if planning approved the field samples, although I think they did on the first one.

Item 3. Service Provider Permit from TVF&R indicating feasibility of providing services. Please visit the TVF&R's online portal to obtain this permit: https://www.tvfr.com/399/ServiceProvider-Permit. Show fire hydrant locations and servicing water lines on plans.

Item 3 response:

The TVFR Service Provider Permit is added to Narrative6 – Reports.

Item 4. Exterior lighting plan and other information demonstrating compliance with either the prescriptive or performance method in the City's outdoor lighting standards. The fixture wattage provided conflicts with the wattage maximum in the standards. Additionally, the narrative does not adequately address standards for lighting adjacent to SROZ areas and Major Additions or Modifications to Pre-existing Sites.

Item 4 responses:

Exterior Lighting Compliance: We have added the ComCheck exterior lighting compliance report in Narrative, Section 6 – Reports. With all LED exterior lighting

luminaires, it is no surprise that our proposal dramatically passes on a watts/SF energy use basis.

Wattage Maximum Standards: We have revised our luminaire heads to meet the 100w max limitation with shields per Table 7, and less lumen output required adding some lighting fixtures for full coverage. See our revised exterior lighting drawings.

Lighting adjacent to SROZ areas: See our updated narrative comments in Sections 4.199.40, (01),B., 4., e. The discussion includes two existing LED light poles next to the SROZ that remain from W4 permit approvals, and the owners intend for those to remain.

Major Additions or Mods to Pre-existing Sites: (Section 4.199.59) We consider W5 a new project that will be on a separate parcel from existing W4. Aesthetically we want the two-building campus to be integrated aesthetically as well as share pedestrian and vehicular circulation routes. We want the existing W4 lighting to integrate with the new W5 lighting too, so the new lighting is the same style, height and size as the existing lighting fixtures for a unified campus functionally and aesthetically.

Item 5. Tabulation of land area to be devoted to various uses such as building area, parking and paving coverage, and landscaped area coverage are not shown on the plans and should be included in the narrative responses for code sections that set such requirements. These requirements are applied to the subject property as a whole rather than applying them to various areas of the site.

Item 5 response:

We have refocused our W5 Architectural Plans A0/A1.0 to include the proposed partition plat that separates W5 property from existing W4 building, and we list the W5 tabulations as a stand-alone or combined with existing W4. We have also added a Supplemental Site Plan CS-2 goes in further depth on parking tabulations for W4 & W5 separately and combined. The narrative refers to both plans for the appropriate tabulations.

Item 6. Include a circulation plan showing the direction of traffic flow into and out of off-street parking and loading areas

Item 6 response:

A circulation plan is added to our Supplemental Plan sheet CS-3.

Item 7. Include a tree removal plan showing the locations of all trees 6-inch DBH or greater proposed for removal.

Item 7 response:

Tree Removal Plan sheet TR-1 is added to our Supplemental Plan drawing set. We also have added sheet TR-2, which is the SRIR Tree Report Table. This is a handy plan-size reference when viewing the Tree Removal Plan.

Item 8. Provide copies of easements located on the subject property.

Item 8 responses:

The proposed partition plat is added to our Supplemental Architectural plan set. This graphically defines all the existing easements on the W4 and W5 properties, as well as the location of the proposed lot line separating W4 and W5. The easements themselves are that included in our Title Report in the Narrative

In addition to the incompleteness items listed above, the following questions and comments regarding compliance came to City staff's attention while reviewing the materials for completeness. Please respond and/or incorporate into updated materials as appropriate.

A. *Landscaping shown in renderings does not appear to correspond to proposed landscaping shown screening the parking lot along SW Boeckman Road. Please provide further detail on the landscaping plans and narrative responses to demonstrate compliance with the Low Screen Landscaping Standard.*

Renderings: After further discussions we agreed the building renderings are useful for the DRB and others to understand the building design, and we do not need to revise the rendering plant material to exactly match the landscape drawings. We can explain to the DRB the plant materials in the rendering are representational and are not the exact plants on the landscape drawings.

W5 parking frontage (N of W5) needs more design work to meet the screening standard and the W5 team share's the goal to have this parking screened from Boeckman Road. Before we finalize our design, we need to learn more about the 30' utility easement limitations in place. We have received plant material limitations for this easement and a prelim drawing for a new 68" diameter water main proposed under our parking stalls – this is graphically shown on Civil Sheet C1.30. This area will be resolved in the course of continued design and plan development as part of the Site Design Review process.

B. *The subject property has an approved land use application AR21-0039 to partition the property into two lots to allow for the development of Building W-5. Information within the narrative and plan set conflict with the approved partition. Please clarify whether a new partition application will be submitted or the previously approved partition will be recorded with Clackamas County. Staff have concerns that the proposed site plan conflicts with the new parcel lines of the previously approved partition application.*

The owners intend to complete the Partition Plat after the W5 Site Design Review entitlement process is resolved. See Architectural Sheet CS-2 that shows the proposed AR21-0039 lot line separating W4 and W5. It also shows (shaded in blue) a W5 easement on W4 property allowing the new Lot 1 and 2 parking areas for W5 use.

C. *Additional information is needed regarding the existing DW Fritz parking lot. Improvements are being shown that impact parking spaces that are associated with that development. Please provide an inventory of all parking spaces and a parking calculation for the entire site to ensure requirements are met. In reviewing this project, it appears that there have been various changes to the existing parking lot that are not shown on the submitted plans. In addition to those modifications, it appears that numerous parking spaces are being utilized for outdoor storage in a manner that is not consistent with the Industrial Performance Standards.*

Parking calculations for the entire site: We have added Architectural Sheet CS-2 to show the parking for existing W4 and W5 both as separate lots and combined. We have also added W4 (only) Architectural Sheet A1.1 to show W4 as approved in 2014 (pre-W5).

W4 Outdoor Storage: Regarding W4's tenant, DWFRITZ Precision Engineering, adding outside storage to their south parking lot, we understand the tenant's facility manager, John Burkhart, is currently addressing permitting this with the city. The owners would like to leave this as a matter between the city and the tenant.

D. *Additional exterior bicycle parking spaces are required for the proposed use, please revise plans to include the required bicycle parking and demonstrate compliance with the size and maneuvering requirements.*

Bicycle parking calculations are listed on the Architectural Sheet A.0 as well as the location for the exterior bike racks near the Lobby that meet the size and maneuvering requirements. W5 is a building shell that requires a tenant improvement prior to occupancy, but the tenant is not identified as yet. The interior bike storage rooms are as TI when the tenant is known, although we suggested a likely location on Architectural Sheet A1.1. Note, the owners have learned from previous projects over the years that industrial hi-tech employees are picky about bike security, and they want their expensive bikes stored inside securely. Industrial hi-tech employers often respond with this as a perk with showers adjacent – the adjacent TI for DWFRITZ in W4 is just one example.

E. *The narrative responses and area shown on the plan dedicated to solid waste and recycling storage areas do not meet the code requirements. Show calculations.*

Solid waste/recycling calculations are listed on the Architectural Sheet A.0 and located with callouts on Sheet A1.0. Further enclosure plans and details are on Sheet A1.2. Note, recycled cardboard is proposed to be stored inside near the docks, and this is identified on Site Plan A1.0 and Floor Plan A2.0. We believe the design and calculations meet code and are appropriate for this project.

F. *Staff have concerns regarding the interpretation of various code requirements, while these concerns are more broadly covered as an incompleteness item noting insufficient narrative findings, several specific concerns are noted below:*

a. *The narrative notes that the criteria for parking lots in excess of 200 spaces does not apply, staff have counted more than 200 new parking spaces are proposed, therefore this criteria does apply.*

Section 4.155, (03), B, 3.: After discussions with Planning, we acknowledge the criteria for parking lots in excess of 200 spaces does apply to W5. For the record, we based our initial narrative comments on a literal reading of Section 4.155, (03), B, 3., which had two criteria: (1) more than 200 spaces plus (2) can be viewed from the public ROW. Since 85% of the stalls cannot be viewed from the ROW, we thought this section did not apply. Planning later explained their policy on viewed stalls is, "if you can see one stall you can see all 200". With that clarification we bow to the staff policy.

b. *Several code standards such as the Industrial Performance Standards are deferred to the building permit review process in the narrative responses. These criteria need to be addressed during the land use review process.*

After discussions with Planning, we have expanded the narrative to explain why future tenants will meet the performance standards.

c. *While internal bicycle parking is permitted, the location of those spaces should be shown during the land use review process to determine compliance and ensure they were provided in accordance with the approved plan during final occupancy.*

Internal Bicycle Parking: We have added a general location for nine internal bicycle parking on the A1.0 Site Plan. Because our proposal is for building shell only, this will have to be completed as a separate TI permit prior to any occupancy.

Engineering Comments (in addition to incomplete items included above)

A. *Provide revised plans that show the existing street improvements located adjacent to the property.*

B. *Revise the utility plan to show one separate service line for domestic water, irrigation, and fire.*

C. *Review the storm water basin delineation calculations (some basins show more impervious area than the entire basin drainage area). Storm water lines and drainage is shown crossing the proposed property lines shown on the approved preliminary plat. Show easements for these areas.*

D. *Show how fire service is provided on the existing improvements. Fire services lines shall be separate from domestic and irrigation lines and shall be publically owned and provided in an easement to the City. All meter boxes shall be installed in the right-of-way.*

E. *Show and label all easements impacting this site. If the previously approved partition plat is moving forward, additional easements may be required for utilities (storm water) crossing property lines.*

F. *Prior to any site work, the applicant will be required to obtain a NPDES 1200C permit from DEQ. For work encroaching into the wetland buffer, additional analysis will be required for erosion control purposes.*

Engineering Comments: We acknowledge the A-F Engineering Comments items listed are important. They will all flesh themselves out in the course of continued design and plan development as part of the Site Design Review process. The submitted Civil drawings define our intent thoroughly enough to start dialogue with Public Works and none of the listed items are needed at SDR submittal screening.

Philip, we look forward to your review responses. Hopefully this submittal passes your screening so we can get on with the SDR review process.

Sincerely,

Bob Wells
Lance Mueller & Associates / Architects
130 Lakeside Ave. S., #250
Seattle, WA 98122

Encl: Incomplete Application Letter, dated March 11, 2022

March 11, 2022

Mac Martin
W-5 LLC
PO Box 15523
Seattle, WA 98115

Application Number: DB22-0004 Boeckman Road Building W5

Proposal: Stage I Preliminary Plan Modification, Stage II Final Plan Modification, Site Design Review, Type C Tree Plan, SROZ Map Verification, Abbreviated SRIR Review

Location: 9600 SW Boeckman Road

Legal Description: Tax Lot 202, Section 14B, Township 3 South, Range 1 West, Willamette Meridian, Clackamas County, Oregon

Status: Notice that Your APPLICATION IS NOT COMPLETE

Mac Martin:

City of Wilsonville Site Development application forms submitted regarding the property described above list you as the applicant. The City received your applications on February 9, 2022, for a Stage I Preliminary Plan Modification, Stage II Final Plan Modification, Site Design Review, Type C Tree Plan, SROZ Map Verification, and Abbreviated SRIR Review.

The application submitted is incomplete, based on the applicable provisions of ORS 227.178 (2) and Subsection 4.035(.05) Wilsonville Code ("WC"), due to the following missing items:

1. Incomplete written responses to applicable review criteria. The applicable review criteria include the following:

   Industrial Development Standards and Industrial Zoning

- Planned Development Industrial (PDI) Zones and Industrial Standards: Section 4.117, 4.135 through 4.135.5

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Planned Development Standards and Regulations for all Planned Development (PD) Zones

- Standards applying to all Planned Development (PD) Zones: Section 4.118
- Planned Development Regulations: Section 4.140

General Development Regulations and Standards

- On-Site Pedestrian Access and Circulation: Section 4.154
- Parking, Loading, and Bicycle Parking: Section 4.155
- Street Improvement Standards: Section 4.177
- Landscaping, Screening, and Buffering: Section 4.176
- Mixed Solid Waste and Recycling: Section 4.179
- Outdoor Lighting: Sections 4.199 through 4.199.60
- Underground Utilities: Sections 4.300 through 4.320
- Protection of Natural and Other Features: Section 4.171
- Public Safety and Crime Prevention: Section 4.175

Overlay Zones

- Significant Resource Overlay Zone (SROZ) Ordinance: Sections 4.139 through 4.139.11

Site Design Review (Detailed Review of Architecture, Landscaping, Signs, and other Design Elements)

- Site Design Review: Sections 4.400 through 4.450

Trees

- Tree Preservation and Protection: Sections 4.600 through 4.640.20

2. Insufficient detail in submitted plans and drawings. While some information is provided, the following is specific information still missing:
   - General Site Plan o Location of private drives, and driveways on adjacent properties o Calculation of off-street parking requirements and total provided for both W-4 and W-5
     - Breakdown between standard size parking spaces and compact parking spaces
     - Dimensions for loading berths
     - Setbacks required by existing zoning requirements
   - Landscape Plans o Indication of water consumption categories (high, moderate, low, and interim or unique) See WC Subsections 4.176(.09)A.-D.
   - Architectural drawings and sketches. In addition to the submitted elevations and material information, provide the following: o Color board displaying specifications as to type, color, and texture of the exterior surfaces of the proposed structures

3. Service Provider Permit from TVF&R indicating feasibility of providing services. Please visit the TVF&R's online portal to obtain this permit: https://www.tvfr.com/399/ServiceProvider-Permit. Show fire hydrant locations and servicing water lines on plans.

4. Exterior lighting plan and other information demonstrating compliance with either the prescriptive or performance method in the City's outdoor lighting standards. The fixture wattage provided conflicts with the wattage maximum in the standards. Additionally, the narrative does not adequately address standards for lighting adjacent to SROZ areas and Major Additions or Modifications to Pre-existing Sites.

5. Tabulation of land area to be devoted to various uses such as building area, parking and paving coverage, and landscaped area coverage are not shown on the plans and should be included in the narrative responses for code sections that set such requirements. These requirements are applied to the subject property as a whole rather than applying them to various areas of the site.

6. Include a circulation plan showing the direction of traffic flow into and out of off-street parking and loading areas.

7. Include a tree removal plan showing the locations of all trees 6-inch DBH or greater proposed for removal.

8. Provide copies of easements located on the subject property.

In addition to the incompleteness items listed above, the following questions and comments regarding compliance came to City staff's attention while reviewing the materials for completeness. Please respond and/or incorporate into updated materials as appropriate.

G. Landscaping shown in renderings does not appear to correspond to proposed landscaping shown screening the parking lot along SW Boeckman Road. Please provide further detail on the landscaping plans and narrative responses to demonstrate compliance with the Low Screen Landscaping Standard.

H. The subject property has an approved land use application AR21-0039 to partition the property into two lots to allow for the development of Building W-5. Information within the narrative and plan set conflict with the approved partition. Please clarify whether a new partition application will be submitted or the previously approved partition will be recorded with Clackamas County. Staff have concerns that the proposed site plan conflicts with the new parcel lines of the previously approved partition application.

I. Additional information is needed regarding the existing DW Fritz parking lot. Improvements are being shown that impact parking spaces that are associated with that development. Please provide an inventory of all parking spaces and a parking calculation for the entire site to ensure requirements are met. In reviewing this project, it appears that there have been various changes to the existing parking lot that are not shown on the submitted plans. In addition to those modifications, it appears that numerous parking spaces are being utilized for outdoor storage in a manner that is not consistent with the Industrial Performance Standards.

J. Additional exterior bicycle parking spaces are required for the proposed use, please revise plans to include the required bicycle parking and demonstrate compliance with the size and maneuvering requirements.

K. The narrative responses and area shown on the plan dedicated to solid waste and recycling storage areas do not meet the code requirements. Show calculations.

L. Staff have concerns regarding the interpretation of various code requirements, while these concerns are more broadly covered as an incompleteness item noting insufficient narrative findings, several specific concerns are noted below:

a. The narrative notes that the criteria for parking lots in excess of 200 spaces does not apply, staff have counted more than 200 new parking spaces are proposed, therefore this criteria does apply.
b. Several code standards such as the Industrial Performance Standards are deferred to the building permit review process in the narrative responses. These criteria need to be addressed during the land use review process.
c. While internal bicycle parking is permitted, the location of those spaces should be shown during the land use review process to determine compliance and ensure they were provided in accordance with the approved plan during final occupancy.

Engineering Comments (in addition to incomplete items included above)

G. Provide revised plans that show the existing street improvements located adjacent to the property.

H. Revise the utility plan to show one separate service line for domestic water, irrigation, and fire.

I. Review the storm water basin delineation calculations (some basins show more impervious area than the entire basin drainage area). Storm water lines and drainage is shown crossing the proposed property lines shown on the approved preliminary plat. Show easements for these areas.

J. Show how fire service is provided on the existing improvements. Fire services lines shall be separate from domestic and irrigation lines and shall be publically owned and provided in an easement to the City. All meter boxes shall be installed in the right-of-way.

K. Show and label all easements impacting this site. If the previously approved partition plat is moving forward, additional easements may be required for utilities (storm water) crossing property lines.

L. Prior to any site work, the applicant will be required to obtain a NPDES 1200C permit from DEQ. For work encroaching into the wetland buffer, additional analysis will be required for erosion control purposes.

Incompleteness items 1-8 need to be addressed in order to complete the applications. Please provide 3 copies of the revised project narrative, findings, and reduced 11" by 17" plans, full sheet plans drawn to scale and **folded** plus an electronic copy of the project narrative, findings, and plans. When you have resubmitted the application materials, staff will have up to 30 days to determine whether the application is complete. ORS 227.178. Upon determination the application is complete please provide 7 additional copies of the materials listed above. If there are revisions please provide 10 copies of the final set of plans and other materials, both paper and electronic copies.

If you have any questions or require additional information, please contact me at 503-570-1623 or pbradford@ci.wilsonville.or.us.

Sincerely,

Philip Bradford
Associate Planner

Cc via email: Bob Wells, LMA BWells@lmueller.com

March 11, 2022

Application Number: **DB22-0004** Boeckman Road Building W5

As indicated in the attached correspondence, your application (Planning Case File No. DB220004) has been deemed INCOMPLETE.

You must acknowledge, in writing, your intent to provide the material required to complete the application, as identified in the attached correspondence, dated March 11, 2022. To do this, please sign below and return this acknowledgment by March 25, 2022, to:

Planning Division – Attention: Philip Bradford
Community Development Division
City of Wilsonville
29799 SW Town Center Loop Drive E
Wilsonville, OR 97070

If you indicate your intent to complete the application, you will have 180 days from the date of the initial submittal (February 9, 2022) to provide the required material. If you fail to submit the required material within 180 days (August 8, 2022) of the date the application was submitted your application will be deemed void. The case files regarding the application will then be closed.

If you do not return this acknowledgment, such action will be considered to be a refusal under the meaning accorded in ORS 227.178(2). Your application will then be processed based upon the information you have previously submitted. Note that failure to submit sufficient evidence or material to demonstrate compliance with the applicable criteria is grounds for denial of the application.

A C K N O W L E D G E M E N T

I (☐ intend / ☐ refuse) to provide the additional material identified in correspondence from the Planning Division, Community Development Department, dated March 11, 2022.

_____ _____

Signed and Acknowledged Date
(Mac Martin)

CITY OF WILSONVILLE • COMMUNITY DEVELOPMENT

Phone 503-682-4960
Fax 503-682-7025

29799 SW Town Center Loop East
Wilsonville, OR 97070

www.ci.wilsonville.or.us
info@ci.wilsonville.or.us

March 15, 2023

Re: Submittal #3 - DB22-0004 Boeckman Road Building W5

To: **City of Wilsonville**
Planning Division – Cindy Luxhoj AICP
29799 SW Town Center Loop East
Wilsonville, OR 97070

From: Bob Wells
Lance Mueller & Associates / Architects
130 Lakeside Ave. S., #250
Seattle, WA 98122

Dear Cindy,

Thank you for the Complete Application Notice and your additional screening comments of 8/8/22, which are attached at the end of this response letter for reference. On behalf of ownership attached is our resubmittal for DB22-0004 that addresses the additional screening comments for the final application materials.

Below find are our item-by-item responses to your screening comments of 8/8/22. Your comments are in blue and italics followed by our responses.

Sincerely,

Bob Wells
Lance Mueller & Associates / Architects
130 Lakeside Ave. S., #250
Seattle, WA 98122

Encl: Application is Complete Letter with comments, dated August 8, 2022

Planning Comments

1. *Correct inconsistencies in off-street passenger vehicle and bicycle parking calculations, including discrepancies in mix of uses, multipliers used, number of spaces proposed, etc., among the narrative (e.g., page 4) and plan sheets (e.g., A0, A1.0, CS-2, etc.).*
   Apologies for having the same information repeated in so many different places, which leads to inadvertent errors. The coordination in parking calculations has been done, including updating the Narrative Sections 1-4, page 4.
2. *Reflect site plan revisions shown on sheet A1.0 on all other plans in the review set. For example, changes to the parking area configuration north of Building W5 shown on the second submittal A1.0 have not been revised on other plans (e.g., C1.01, C1.20, C1.30, etc.).*
   This base plan coordination is complete for all the drawings, including civil, landscape, and site lighting in Narrative Section 5 - Drawings.
3. *IncludeaspartoftheTVF&RServiceProviderLettertheapprovedandstampedsiteplan referenced in the letter (see page 353 of the Section 6 Reports submittal).*

The TVF&R Service provider letter is paired with the service provider approved drawings in Section 6 of Reports, pages D357 – D361.

4. *IncludeaspartoftheRepublicServicesServiceProviderLetterthesiteplanreferencedin the letter (see page 337 of the Section 6 Reports submittal).*
   The Service provider letter is paired with the service provider approved drawings in Section 6 of Reports, pages D338 – D341.
5. *Include the recorded Partition Plat No. 2022-054 (recorded June 28, 2022), rather than the pending documents, in the supplemental drawings (pages 29-31 of the plan set)*
   The recorded Partition Plat is added and replaces the pending plat in the Supplemental Drawings in Narrative Section 5 – Plan Set, pages 34 – 37.
6. *Explore parking area and stormwater facility design alternatives that will allow retention/preservation of the following native trees that are in Good condition (per the arborist's report):*
   1. *#835, Ponderosa Pine, 41"*
   2. *#869, Pacific Madrone, 13"*
   3. *#5000, Oregon White Oak, 15" -* Saved by rain garden redesign.
   4. *#5042, Oregon White Oak, 27" and 18"*
   5. *#50395, Ponderosa Pine, 36"*
   6. *#50399, Oregon White Oak, 21"*
   7. *#50400, Oregon White Oak, 42"*
   8. *#50404, Oregon White Oak, 17"*
   9. *#50409, Ponderosa Pine, 32"*

   As requested, we looked at the parking and stormwater areas for opportunities to save trees listed as removed and have had some success. We saved oak tree #5000 on your list by reducing/changing the rain garden configuration. We also saved #50403 (not on your list) by reducing/changing the rain garden configuration at the new south parking lot. The issue with the nearby #50404 is it is in a fill area, which you can see on the grading plans. This is best verified on Supplemental Drawings TR-1 and TR-2, where these tree revisions are bubbled and noted in plan and on the tree report schedule. We have not noted the revision on the Tree Assessment in the Narrative Section 6 – Reports, because that does not define which are saved or removed. The assessment does not need to be revised.
7. *Demonstrate how proposed landscaping of the parking area along SW Boeckman Road complies with the Low Screen Landscaping standard and the requirements of the Willamette Water Supply Program within the 30-foot water pipeline easement.*
   We have added a hedge (trees/shrubs were already included in frontage) at our parking curb to meet the standard, which is shown on the L1.1 Plan. To show how this meets the standard two (2) new frontage cross-sections (with ROW line-of-site) are added on L2.0 Landscape Detail sheet. Fortunately, our level parking is elevated compared to the ROW, which slopes down to the west, and this creates a berm that varies in height with ROW grades.

   Our frontage landscaping materials build on the existing established ROW landscaping between sidewalk and street curb. For continuity we repeat the existing Kelsey Dogwood shrub in (3) rows on the W5 side of the sidewalk and then add the Pink Princess Escallonia hedge at the curb with Kinnikinnick ground cover at the car overhang portion. The Drawings are found in in Narrative Section 5.

   Plant selection in this frontage is limited by a 2016 water facilities permanent easement that limits ground disturbance/excavation to max 24" for trees and plants (among other

things). The easement is found in our Property Information report as recorded item 9 on page 2 of 6, and there is a link on the recording number to download the easement. To comply with the easement restrictions, we also moved our parking pole lights from the frontage to be building mounted. The single pole light at the drive entry was relocated slightly to stay out of this easement and is still effective lighting of the entry drive.

8. *Provide cut sheet/details of bicycle racks and demonstrate compliance with size and maneuvering requirements.*

   The exterior bike rack is drawn in scale with dimensioned added to prove it meets code on Sheet A1.1 in Narrative Section 5 - Drawings. The exterior bike rack cut sheets are added to Narrative Section 6 – Reports, pages D363-D364 (located immediately after the Exterior Colors and Materials).

   Regarding interior bike racks, W5 is a building shell that requires building and tenant improvement permits prior to occupancy. The tenant is not identified as yet, but we propose a location for the interior bike storage rooms on A1.0. Note, the owners have learned from previous similar tenants over the years that industrial hi-tech employees are picky about bike security, and they want their expensive bikes stored inside securely. Industrial hi-tech employers often respond with this as a perk with showers adjacent. The TI for DWFRITZ in adjacent W4 is an example of secure interior bike parking with showers as a perk (which was permitted as a TI after the building shell was approved separately).

9. *Locate tree protection fencing outside the root protection zone/drip line of all retained trees on the Tree Protection Plan C1.01.*

   Tree protection fencing is shown on C1.01, and this now includes the two (2) additional saved trees described in item 6. (above).

10. *Show location of tree protection fencing on Grading Plans (e.g., C1.20, C1.21).*

    Tree protection fencing is shown on the Grading Plans C2.0 and C2.1, and this now includes the two (2) additional saved trees described in item 6. (above).

Engineering and Natural Resources Comments

K. Revise the site plan and other plans, as appropriate, to remove parking spaces from the wetland buffer area and relocate a retaining wall to outside of the wetland buffer along SW Kinsman Road at the southwest corner of the proposed building.

We have revised all our plans to remove new parking from the Wetland B buffer. In addition, we have an update memo by Pacific Habitat Services, dated 1/16/23, that acknowledges this 2,624sf removed from the SR Impact Area; see Narrative Section 6 – Reports, page 106.

It was a simple matter to remove our parking from the wetland buffer and relocate the retaining wall. With so few parking stalls remaining in this rear service are, we moved the pedestrian path to the building to the closest door on the west side. We did this because this non-public parking does not need to access the lobby. Service truck dock access was affected by this revision, and to resolve we reconfigured the dock recess to blend with the adjacent drive lane to allow the truck maneuvering necessary to access the dock.

L. Address Engineering and Natural Resources Comments contained in the Incompleteness Notice dated March 11, 2022, which were acknowledged but not responded to in the applicant's response of July 8, 2022, as follows:

1. *Provide revised plans that show the existing street improvements located adjacent to the property.*

   Existing street improvements are added to the architectural and civil drawings.

2. *Revise the utility plan to show one separate service line for domestic water, irrigation, and fire.*

This is clarified on the civil drawing C1.30.

3. *Review the storm water basin delineation calculations (some basins show more impervious area than the entire basin drainage area). Storm water lines and drainage is shown crossing the proposed property lines shown on the approved preliminary plat. Show easements for these areas.*
   We revised the storm water delineation calculations in this submittal (as the entire WESBMP Sizing Report was errant in the previous submittals). Easements are shown on the Utility Plans C1.31 and C1.32.
4. *Show how fire service is provided on the existing improvements. Fire services lines shall be separate from domestic and irrigation lines and shall be publically owned and provided in an easement to the City. All meter boxes shall be installed in the right-of-way.*
   See attached civil engineer as-built plans for the W4 project, which are added to Narrative Section 6 – Reports, pages D36 – 38. As-built sheet C0.1 is the cover sheet that lists the people involved, and sheets C3.1-C3.2 trace the fire service from Boeckman Road to the connection to the existing W4 building service. Fire service for existing W4 is separate from the proposed W5, including separate ROW connections over 500' apart.
5. *Show and label all easements impacting this site. If the previously approved partition plat is moving forward, additional easements may be required for utilities (storm water) crossing property lines.*
   The partition plat is now approved, and the recorded partition plat drawings are in our Supplemental Drawings in Narrative Section 5 – Drawings; pages 30 – 33.
6. *Prior to any site work, the applicant will be required to obtain a NPDES 1200C permit from DEQ. For work encroaching into the wetland buffer, additional analysis will be required for erosion control purposes.*
   We acknowledge this permit requirement from DEQ and additional analysis will be required for work in the wetland buffer.

Building Comments

M. Effective July 1, 2022, new commercial buildings are required to comply with electric vehicle charging infrastructure requirements for parking areas in accordance with OAR 918-460-0200: https://www.oregon.gov/bcd/laws-rules/Documents/20220701-hb2180- evcharging-pr.pdf

We show our design intent for electric vehicle charging station infrastructure on Site Plan sheet CS-2 in our Supplemental Drawings in Narrative Section 5 - Drawings. The notes list the calculation on number of EV charge stations, and they are located on this plan. The infrastructure is the electrical capacity and conduits to the proposed EV charge stations shown. Per ordinance, we indicate 20% of the proposed W5 parking stalls as receiving this infrastructure.
EV Charging Station infrastructure is also referenced in statistics on both drawing sheet A0 (Narrative Section 5) and Narrative Section 1, page 4.

End

WILSONVILLE
OREGON

APPLICANT REQUEST FOR WAIVER OF 120-DAY RULE (ORS 227.178(5))

9600 SW Boeckman Road - Building W5, a new 80,000sf building on undeveloped land.
Project Name, Description

W-5 LLC
Applicant's Name

DB22-0004
City of Wilsonville File Number

I have a pending land use application with the City for the file number identified above. I request a waiver of the 120-day rule to allow additional time for the City to process my land use application, as allowed by ORS 227.178. As a result, I am giving the City the period of time through and including the date of April 5, 2023 [1] to make a final decision on my land use application. Unless, an additional waiver is given by me, I understand the City will make a final decision on my land use application on or before the date specified in this letter.

_____ Applicant's Signature

Date October 20th, 2022

[1] In no event may the total amount of time, including all extensions, exceed 365 days from the date the application is deemed complete. Example: an application deemed complete on March 1, 2020, cannot be extended beyond March 1, 2021, and the City must make a final decision on or before March 1, 2021. (Note, W5 was deemed complete for Site Design Review on July 11, 2021.)

WILSONVILLE
OREGON

APPLICANT REQUEST FOR WAIVER OF 120-DAY RULE (ORS 227.178(5))

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_____

Applicant's Signature Date: October 25th, 2022

[1] In no event may the total amount of time, including all extensions, exceed 365 days from the date the application is deemed complete. Example: an application deemed complete on March 1, 2020, cannot be extended beyond March 1, 2021, and the City must make a final decision on or before March 1, 2021. (Note, W5 was deemed complete for Site Design Review on ~~July 11, 2021~~ August 8, 2022.) mcm

WILSONVILLE
OREGON

APPLICANT REQUEST FOR WAIVER OF 120-DAY RULE (ORS 227.178(5))

9600 SW Boeckman Road - Building W5, a new 80,000sf building on undeveloped land.
Project Name, Description

W-5 LLC
Applicant's Name

DB22-0004
City of Wilsonville File Number

I have a pending land use application with the City for the file number identified above. I request a waiver of the 120-day rule to allow additional time for the City to process my land use application, as allowed by ORS 227.178. As a result, I am giving the City the period of time through and including the date of August 8, 2023 [1] to make a final decision on my land use application. Unless, an additional waiver is given by me, I understand the City will make a final decision on my land use application on or before the date specified in this letter.

_____

Applicant's Signature Date: March 23rd, 2023

[1] In no event may the total amount of time, including all extensions, exceed 365 days from the date the application is deemed complete. Example: an application deemed complete on March 1, 2020, cannot be extended beyond March 1, 2021, and the City must make a final decision on or before March 1, 2021. (Note, W5 was deemed complete for Site Design Review on ~~July 11, 2021~~ (August 8, 2023.)

CITY OF WILSONVILLE • COMMUNITY DEVELOPMENT DEPT. • PLANNING DIV.
Phone 503-682-4960
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Exhibit C1
Public Works Plan Submittal Requirements and Other Engineering Requirements

1. All construction or improvements to public works facilities shall be in conformance to the City of Wilsonville Public Works Standards - 2017.

2. Applicant shall submit insurance requirements to the City of Wilsonville in the following amounts:

Coverage *(Aggregate, accept where noted)*	**Limit**
Commercial General Liability:	
▪ General Aggregate (per project)	$3,000,000
▪ General Aggregate (per occurrence)	$2,000,000
▪ Fire Damage (any one fire)	$50,000
▪ Medical Expense (any one person)	$10,000
Business Automobile Liability Insurance:	
▪ Each Occurrence	$1,000,000
▪ Aggregate	$2,000,000
Workers Compensation Insurance	$500,000

3. No construction of, or connection to, any existing or proposed public utility/improvements will be permitted until all plans are approved by Staff, all fees have been paid, all necessary permits, right-of-way and easements have been obtained and Staff is notified a minimum of 24 hours in advance.

4. All public utility/improvement plans submitted for review shall be based upon a 22"x 34" format and shall be prepared in accordance with the City of Wilsonville Public Work's Standards.

5. Plans submitted for review shall meet the following general criteria:

   a. Utility improvements that shall be maintained by the public and are not contained within a public right-of-way shall be provided a maintenance access acceptable to the City. The public utility improvements shall be centered in a minimum 15-ft. wide public easement for single utilities and a minimum 20-ft wide public easement for two parallel utilities and shall be conveyed to the City on its dedication forms.
   b. Design of any public utility improvements shall be approved at the time of the issuance of a Public Works Permit. Private utility improvements are subject to review and approval by the City Building Department.
   c. In the plan set for the PW Permit, existing utilities and features, and proposed new private utilities shall be shown in a lighter, grey print. Proposed public improvements shall be shown in bolder, black print.

d. All elevations on design plans and record drawings shall be based on NAVD 88 Datum.
e. All proposed on and off-site public/private utility improvements shall comply with the State of Oregon and the City of Wilsonville requirements and any other applicable codes.
f. Design plans shall identify locations for street lighting, gas service, power lines, telephone poles, cable television, mailboxes and any other public or private utility within the general construction area.
g. As per City of Wilsonville Ordinance No. 615, all new gas, telephone, cable, fiber-optic and electric improvements etc. shall be installed underground. Existing overhead utilities shall be undergrounded wherever reasonably possible.
h. Any final site landscaping and signing shall not impede any proposed or existing driveway or interior maneuvering sight distance.
i. Erosion Control Plan that conforms to City of Wilsonville Ordinance No. 482.
j. Existing/proposed right-of-way, easements and adjacent driveways shall be identified.
k. All engineering plans shall be printed to PDF, combined to a single file, stamped and digitally signed by a Professional Engineer registered in the State of Oregon.
l. All plans submitted for review shall be in sets of a digitally signed PDF and three printed sets.

6. Submit plans in the following general format and order for all public works construction to be maintained by the City:

a. Cover sheet
b. City of Wilsonville construction note sheet
c. Land Use Conditions of Approval sheet
d. General construction note sheet
e. Existing conditions plan.
f. Erosion control and tree protection plan.
g. Site plan. Include property line boundaries, water quality pond boundaries, sidewalk improvements, right-of-way (existing/proposed), easements (existing/proposed), and sidewalk and road connections to adjoining properties.
h. Grading plan, with 1-foot contours.
i. Composite utility plan; identify storm, sanitary, and water lines; identify storm and sanitary manholes.
j. Detailed plans; show plan view and either profile view or provide i.e.'s at all utility crossings; include laterals in profile view or provide table with i.e.'s at crossings; vertical scale 1"= 5', horizontal scale 1"= 20' or 1"= 30'.
k. Street plans.
l. Storm sewer/drainage plans; number all lines, manholes, catch basins, and cleanouts for easier reference.
m. Stormwater LIDA facilities (Low Impact Development): provide plan and profile views of all LIDA facilities.
n. Water and sanitary sewer plans; plan; number all lines, manholes, and cleanouts for easier reference.

o. Where depth of water mains are designed deeper than the 3-foot minimum (to clear other pipe lines or obstructions), the design engineer shall add the required depth information to the plan sheets.
p. Detailed plan for storm water detention facility (both plan and profile views), including water quality orifice diameter and manhole rim elevations. Provide detail of inlet structure and energy dissipation device. Provide details of drain inlets, structures, and piping for outfall structure. Note that although storm water detention facilities are typically privately maintained they will be inspected by engineering, and the plans must be part of the Public Works Permit set.
q. Detailed plan for water quality facility (both plan and profile views). Note that although storm water quality facilities are typically privately maintained they will be inspected by Natural Resources, and the plans must be part of the Public Works Permit set.
r. Composite franchise utility plan.
s. City of Wilsonville detail drawings.
t. Illumination plan.
u. Striping and signage plan.
v. Landscape plan.

7. Design engineer shall coordinate with the City in numbering the sanitary and stormwater sewer systems to reflect the City's numbering system. Video testing and sanitary manhole testing will refer to City's numbering system.

8. The applicant shall install, operate and maintain adequate erosion control measures in conformance with the standards adopted by the City of Wilsonville Ordinance No. 482 during the construction of any public/private utility and building improvements until such time as approved permanent vegetative materials have been installed.

9. Applicant shall work with City Engineering before disturbing any soil on the respective site. If 5 or more acres of the site will be disturbed applicant shall obtain a 1200-C permit from the Oregon Department of Environmental Quality. If 1 to less than 5 acres of the site will be disturbed a 1200-CN permit from the City of Wilsonville is required.

10. The applicant shall be in conformance with all stormwater and flow control requirements for the proposed development per the Public Works Standards.

11. A storm water analysis prepared by a Professional Engineer registered in the State of Oregon shall be submitted for review and approval by the City.

12. The applicant shall be in conformance with all water quality requirements for the proposed development per the Public Works Standards. If a mechanical water quality system is used, prior to City acceptance of the project the applicant shall provide a letter from the system manufacturer stating that the system was installed per specifications and is functioning as designed.

13. Storm water quality facilities shall have approved landscape planted and/or some other erosion control method installed and approved by the City of Wilsonville prior to paving.

14. The applicant shall contact the Oregon Water Resources Department and inform them of any existing wells located on the subject site. Any existing well shall be limited to irrigation purposes only. Proper separation, in conformance with applicable State standards, shall be maintained between irrigation systems, public water systems, and public sanitary systems. Should the project abandon any existing wells, they shall be properly abandoned in conformance with State standards.

15. All survey monuments on the subject site, or that may be subject to disturbance within the construction area, or the construction of any off-site improvements shall be adequately referenced and protected prior to commencement of any construction activity. If the survey monuments are disturbed, moved, relocated or destroyed as a result of any construction, the project shall, at its cost, retain the services of a registered professional land surveyor in the State of Oregon to restore the monument to its original condition and file the necessary surveys as required by Oregon State law. A copy of any recorded survey shall be submitted to Staff.

16. Streetlights shall be in compliance with City dark sky, LED, and PGE Option C requirements.

17. Sidewalks, crosswalks and pedestrian linkages in the public right-of-way shall be in compliance with the requirements of the U.S. Access Board.

18. No surcharging of sanitary or storm water manholes is allowed.

19. The project shall connect to an existing manhole or install a manhole at each connection point to the public storm system and sanitary sewer system.

20. A City approved energy dissipation device shall be installed at all proposed storm system outfalls. Storm outfall facilities shall be designed and constructed in conformance with the Public Works Standards.

21. The applicant shall provide a 'stamped' engineering plan and supporting information that shows the proposed street light locations meet the appropriate AASHTO lighting standards for all proposed streets and pedestrian alleyways.

22. All required pavement markings, in conformance with the Transportation Systems Plan and the Bike and Pedestrian Master Plan, shall be completed in conjunction with any conditioned street improvements.

23. Street and traffic signs shall have a hi-intensity prismatic finish meeting ASTM 4956 Spec Type 4 standards.

24. The applicant shall provide adequate sight distance at all project driveways by driveway placement or vegetation control. Specific designs to be submitted and approved by the City Engineer. Coordinate and align proposed driveways with driveways on the opposite side of the proposed project site.

25. The applicant shall provide adequate sight distance at all project street intersections, alley intersections and commercial driveways by properly designing intersection alignments, establishing set-backs, driveway placement and/or vegetation control. Coordinate and align proposed streets, alleys and commercial driveways with existing streets, alleys and commercial driveways located on the opposite side of the proposed project site existing roadways. Specific designs shall be approved by a Professional Engineer registered in the State of Oregon. As part of project acceptance by the City the Applicant shall have the sight distance at all project intersections, alley intersections and commercial driveways verified and approved by a Professional Engineer registered in the State of Oregon, with the approval(s) submitted to the City (on City approved forms).

26. Access requirements, including sight distance, shall conform to the City's Transportation Systems Plan (TSP) or as approved by the City Engineer. Landscaping plantings shall be low enough to provide adequate sight distance at all street intersections and alley/street intersections.

27. Applicant shall design interior streets and alleys to meet specifications of Tualatin Valley Fire & Rescue and Allied Waste Management (United Disposal) for access and use of their vehicles.

28. The applicant shall provide the City with a Stormwater Maintenance and Access Easement Agreement (on City approved forms) for City inspection of those portions of the storm system to be privately maintained. Applicant shall provide City with a map exhibit showing the location of all stormwater facilities which will be maintained by the Applicant or designee. Stormwater or rainwater LID facilities may be located within the public right-of-way upon approval of the City Engineer. Applicant shall maintain all LID storm water components and private conventional storm water facilities; maintenance shall transfer to the respective homeowners association when it is formed.

29. The applicant shall "loop" proposed waterlines by connecting to the existing City waterlines where applicable.

30. Applicant shall provide a minimum 6-foot Public Utility Easement on lot frontages to all public right-of-ways. An 8-foot PUE shall be provided along Collectors. A 10-ft PUE shall be provided along Minor and Major Arterials.

31. For any new public easements created with the project the Applicant shall be required to produce the specific survey exhibits establishing the easement and shall provide the City with the appropriate Easement document (on City approved forms).

32. Mylar Record Drawings:

At the completion of the installation of any required public improvements, and before a 'punch list' inspection is scheduled, the Engineer shall perform a record survey. Said survey shall be the basis for the preparation of 'record drawings' which will serve as the physical record of those changes made to the plans and/or specifications, originally approved by Staff, that occurred during construction. Using the record survey as a guide, the appropriate changes will be made to the construction plans and/or specifications and a complete revised 'set' shall be submitted. The 'set' shall consist of drawings on 3 mil. Mylar and an electronic copy in AutoCAD, current version, and a digitally signed PDF.

Exhibit C2
Natural Resources Findings & Requirements

Findings for SRIR22-0001

(if SRIR include related findings here)

Significant Resource Overlay Zone

1. The applicant shall submit the SROZ mapping as ARCGIS shape files or a compatible format.
2. All landscaping, including herbicides used to eradicate invasive plant species and existing vegetation, in the SROZ shall be reviewed and approved by the Natural Resources Manager. Native plants are required for landscaping in the SROZ.
3. Prior to any site grading or ground disturbance, the applicant is required to delineate the boundary of the SROZ. Six-foot (6') tall cyclone fences with metal posts pounded into the ground at 6'-8' centers shall be used to protect the significant natural resource area where development encroaches into the 25-foot Impact Area.
4. The applicant shall minimize the impact of the proposed sewer line extension in the SROZ (e.g., boring of sewer line).
5. Mitigation actions shall be implemented prior to or at the same time as the impact activity is conducted.
6. The Significant Resource Overlay Zone (SROZ) shall be identified in a conservation easement. The applicant shall record the conservation easement with Clackamas County Clerk's office. The conservation easement shall include language prohibiting any disturbance of native vegetation without first obtaining approval from the Planning Division and the Natural Resources Manager. The conservation easement shall be reviewed by the City Attorney prior to recording.
7. The applicant shall submit a monitoring and maintenance plan to be conducted for a period of five years following mitigation implementation. The applicant shall be responsible for ongoing maintenance and management activities, and shall submit an annual report to the Natural Resources Manager documenting such activities, and reporting progress towards the mitigation goals. The report shall contain, at a minimum, photographs from established photo points, quantitative measure of success criteria, including plant survival and vigor if these are appropriate data. The Year 1 annual report shall be submitted one year following mitigation action implementation. The final annual report (Year 5 report) shall document successful satisfaction of mitigation goals, as per the stated performance standards.

Exhibit C2
DB22-0004

From: Karen Bryant
To: Luxhoj, Cindy
Cc: Alex Murta; Chris T. Frisiras; Atul Shah
Subject: Written Comments: Public Hearing on June 12, 2023 for DB22-0004 SW Boeckman Road Building W-5
Date: Friday, June 2, 2023 11:35:02 AM
Attachments: image002.png
image003.png

[This email originated outside of the City of Wilsonville]

DW FRITZ®
PRECISION AUTOMATION

To the Development Review Board Members,

We are writing you to share our concerns on the developmental plans on the property west of our building. Our business is located at 9600 SW Boeckman Rd.

Our first safety concern is that the overall building is too close to the main access road to both buildings on Plot 202 & 204. We want to ensure that our employees and visitors have shoulders and walkways (and or the space to use for these purposes) so that they remain safe.

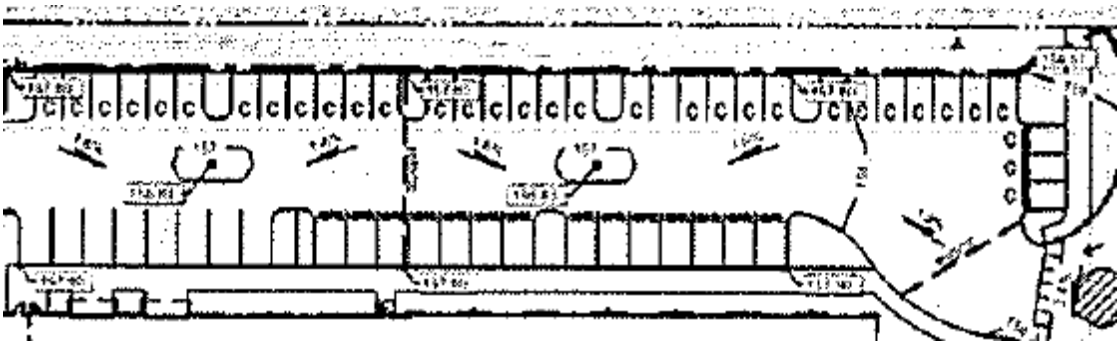
The second safety concern is that the entrance to the parking lot for the building on lot 204 is too close to Boeckman Road. Our concern lies in making a turn in or out of the parking lot and then immediately onto Boeckman Road. As this will be an industrial building, it is expected that semi-trucks will be using the driveways frequently.

The third concern is related to what seem to be two loading docks on the east side of the building plan. There seems to be too little space for trucks to navigate safely to those loading docks without blocking the driveways.

The plan drawings also seem to omit the fact that there are parking spaces all along the west side of the drainage ditch on tax lot 202 nearest to the driveway. The drawing shows the driveway covering what is now pedestrian walkways and current parking spaces for the existing building at this address.

Lastly, we believe that the number of parking spaces in general may be an issue. We counted 57 spaces in the front of the building but that seems low for the occupancy limit and the size of the building (see below). There may be additional 17 spots in the back of the building but it is unclear from the picture.

We'd suggest or request a traffic study to address the specific issues above during peak times.



Kind regards,
Karen Bryant

Karen Bryant
VP, Talent & Organizational Development
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Prepared for

WILSONVILLE
OREGON

Wilsonville DW Fritz

Transportation Impact Analysis

Prepared by

DKS

August 2017

DKS

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dksassociates.com

August 14, 2017

Steve Adams
City of Wilsonville
29799 Town Center Loop East
Wilsonville, OR 97070

Subject: Wilsonville DW Fritz Transportation Impact Study P17021-003

Dear Steve,

DKS Associates is pleased to submit this transportation impact study for the proposed DW Fritz renovation and addition located at 9600 SW Boeckman Road in Wilsonville. Please feel free to call if you have any questions or comments regarding this study.

Sincerely,
DKS Associates

Scott Mansur, P.E., PTOE
Transportation Engineer

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CHAPTER 1: INTRODUCTION AND SUMMARY

This study evaluates the transportation impacts associated with the renovation of the currently vacant 155,000 square foot building located at 9600 SW Boeckman Road and the addition of a 70,000 square foot high tech building and 4,000 square foot sit-down restaurant. The proposed additions are located on the south side of Boeckman Road, just west of the Portland & Western Railroad tracks in Wilsonville, Oregon.

The purpose of this transportation impact analysis is to identify potential mitigation measures needed to offset transportation impacts that the proposed development may have on the nearby transportation network. The analysis evaluated the traffic associated with the existing building and the proposed buildings (since there is no current traffic on the City transportation system). The impact analysis is focused on the study intersections, which were selected for evaluation in coordination with City staff[1]. The intersections are shown in Figure 1 and listed below:

- SW Boones Ferry Road/SW 95th Avenue
- SW Elligsen Road/ I-5 Southbound Ramp
- Boeckman Road/95th Avenue
- Boeckman Road/SW Parkway Avenue
- SW Wilsonville Road/SW Boones Ferry Road
- SW Wilsonville Road/I-5 Southbound Ramp

Figure 1: Study Area

This chapter provides an introduction to the proposed development and the steps taken to analyze the associated impacts on the transportation network. It highlights important elements of the remaining chapters, including a description of the project and the findings of the transportation analysis.

Table 1 lists important characteristics of the study area and proposed project.

[1] Phone conversation with Steve Adams, City of Wilsonville, March 29th, 2017.

Table 1: Key Study Area and Proposed Development Characteristics

Characteristics	Information
Study Area	
Number of Study Intersections	6
Analysis Period	Weekday PM Peak Hour (Peak hour between 4-6 PM)
Project Site	
Existing Land Use	155,000 sq. ft. manufacturing building (currently vacant)
Proposed Development	**Phase 1:** 155,000 sq. ft. manufacturing building renovation **Phase 2:** 70,000 sq. ft. high tech building and 4,000 sq. ft. restaurant
Project Access	Two existing driveways along Boeckman Road

Existing Intersection Operations

Existing traffic operations at the study intersection were determined for the PM peak hour based on the 2000 Highway Capacity Manual methodology for signalized intersections.[2] Table 2 lists the estimated delay, LOS , and v/c ratio of each study intersection. The existing study intersections currently meet mobility targers/operating standards.

Table 2: Existing PM Peak Study Intersection Operations

Intersection	Mobility Targets/ Operating Standard	Existing PM Peak		
		Delay	*LOS*	*v/c*
SW Boones Ferry Road/SW 95th Avenue	LOS D	25.5	C	0.77
SW Elligsen Road/I-5 Southbound Ramp	LOS D and 0.90 v/c[a]	17.7	B	0.79
Boeckman Road/SW 95th Avenue	LOS D	17.2	B	0.44
Boeckman Road/SW Parkway Avenue	LOS D	37.0	D	0.85
SW Wilsonville Road/SW Boones Ferry Road	LOS D	38.3	D	0.78
SW Wilsonville Road/I-5 Southbound Ramp	LOS D and 0.90 v/c[a]	23.6	C	0.52
I-5 Southbound On-Ramp Meter	N/A	-	-	0.91

Delay = Average Intersection Delay (sec.) LOS = Level of Service v/c = Volume-to-Capacity Ratio

[a] The typical ODOT mobility target for interchange ramps is a 0.85 v/c ratio. However, when the interchange vicinity is fully developed and adequate storage is available on the interchange ramp to prevent queues from backing up on the main line, then the target can be increased to a 0.90 v/c ratio. This is the case for the both I-5 interchange areas in Wilsonville.

It is important to note that the intersection operations at the study intersections shown in Table 2 represent typical operations. What this analysis does not include is incurred delay from incidents on the I-5 mainline and the ramp meter on the I-5 southbound ramp at Wilsonville Road that regulates the flow of traffic onto I-5.

[2] *2000 Highway Capacity Manual*, Transportation Research Board, Washington DC, 2000.

The existing capacity of this ramp meter is 1,260 vehicles per hour. If the peak hour demand of the southbound on-ramp exceeds 1,260 vehicles, additional storage would be necessary to prevent spillback and associated impacts on SW Wilsonville Road.

Currently, approximately 1,144 vehicles are entering the southbound on-ramp during the peak hour which results in a volume to capacity (v/c) ratio of 0.91 which is nearing the ramp's full capacity. When traffic incidents occur on I-5 and I-205 such that the additional traffic exceeds the 1,260 vehicles or the I-5 mainline cannot deliver the existing traffic flow, the I-5/SW Wilsonville Road interchange is significantly impacted and vehicles experience traffic delays similar to level of service "F" (greater than 80 seconds of delay).

Proposed Development

The proposed development project will be completed in two phases. The first phase involves renovating the currently vacant 155,000 square-foot building into combined office and warehouse space. The second phase will add a new 70,000 square-foot high tech building and a new 4,000 square-foot sit-down restaurant to the project site. This development will have two existing driveways along Boeckman Road.

Trip Generation

Trip generation is the method used to estimate the number of vehicles added to site driveways and the adjacent roadway network by a development during a specified period (i.e., such as the PM peak hour). For this study, the trip generation was based on the ITE Trip Generation Manual. Table 3 provides the primary trip generation for the proposed renovation (Phase 1) and occupancy of the existing 155,000 square foot building. The development in Phase 1 is expected to generate approximately 105 total (38 in, 67 out) PM peak hour trips.

Table 3: PM Peak Hour Primary Trip Generation Phase 1

Phase	Land Use (ITE Code)	Building area (square feet)	Trip Rate per 1,000 square feet	In	Out	Total
1	Manufacturing (140)	155,000	0.68[a]	38	67	**105**
			Phase 1 Total Primary Trips	38	67	**105**

[a]Rate back-calculated from ITE equation

Table 4 provides the primary trip generation for both the renovated building and the additions of the high tech building and restaurant (Phase 2). It should be noted that the Phase 2 ITE equation trip generation associated with the manufacturing land use is lower than what was assumed in Phase 1. The ITE data has a trip rate that decreases as the total square footage

increases. The proposed Phase 1 and Phase 2 development is expected to generate approximately 183 (75 in, 108 out) PM peak hour primary trips.

Table 4: PM Peak Hour Primary Trip Generation Phases 1 and 2

Phase	Land Use (ITE Code)	Building area (square feet)	Trip Rate per 1,000 square feet	In	Out	Total
1 and 2	Manufacturing (140)	155,000 + 70,000	0.64[a]	52	92	**144**
2	Restaurant (932)	4,000	9.85	23	16	**39**
		Phases 1 and 2 Total Primary Trips		75	108	**183**

[a]Rate back-calculated from ITE equation

As per ITE Trip Generation Handbook guidance,[3] two reductions in primary trips were included in the trip generation analysis; internal trips and pass-by trips. The following paragraphs discuss these reductions and Table 5 displays the total net new trips after accounting for the internal and pass-by trip reductions.

Internal Trips. A reduction of internal trips was evaluated to reduce the total number of driveway trips to account for trips between uses (for example employees from the industrial uses staying to eat at the restaurant). An internal capture rate of 10% was applied to the PM peak hour primary trips of the restaurant.

Pass-By Trips. A reduction of pass-by trips was evaluated to account for traffic that currently exists on the adjacent roadways that the proposed project will have primary access. Pass-by trips are subtracted out after the internal trips are applied and for this project and were only applied to the restaurant trip generation. Pass-by rate of 43% was taken from the ITE Trip Generation Handbook. Pass-by trips result in new driveway trips only and will not increase traffic to the adjacent roadways.

[3] Institute of Transportation Engineers, Trip Generation Handbook, October 1998.

Table 5: PM Peak Hour Net New Trips

	In	Out	Total
Total Primary Trips (Phases 1 and 2)	75	108	**183**
Internal Trip Reduction (10% of restaurant trips)	-2	-2	**-4**
Pass-By Trip Reduction (43% of restaurant trips)	-9	-6	**-15**
Net New Trips (Phase 1 and Phase 2)	64	100	**164**

After reducing the primary project site trips for the restaurant by the internal trip reduction of 10% and then the pass-by trip rate of 43%, the net new total trips to the project site is 164 (64 in/100 out) during the PM peak hour.

Project Trips Through City of Wilsonville Interchange Areas

The project trips through the two City of Wilsonville I-5 interchange areas were estimated based on the trip generation and distribution assumptions. The proposed DW Fritz development is expected to generate 32 PM peak hour trips for Phase 1 and a total of 49 PM peak hour trips for Phases 1 and 2 through the I-5/SW Elligsen Road interchange area. The development is expected to generate 21 PM peak hour trips for Phase 1 and 33 PM peak hour trips for Phases 1 and 2 through the I-5/Wilsonville Road interchange area.

Project Traffic Impact

The impact analysis includes trip generation, trip distribution, and PM peak hour project trips for Phase 1 and Phase 2 of the project. The analysis also includes scenarios that account for Stage II approved developments in the area, including those under construction or built but not yet occupied. The scenarios include:

- Existing + Stage II (includes traffic from other developments with Stage II approval or are under construction)
- Existing + Project (Phase 1)
- Existing + Project (Phase 1) + Stage II
- Existing + Project (Phase 1 and Phase 2)
- Existing + Project (Phase 1 and Phase 2) + Stage II

The study intersection operating conditions for the project trips during Phase 1 development and future Stage II developments are listed in Table 6. All the study intersections meet operating standards for “Existing plus Phase 1,” “Existing plus Stage II,” and “Existing plus Phase 1 plus Stage II” scenarios.

Table 6: Future Phase 1 Project and Stage II Intersection Operations Comparison

Intersection	Mobility Target/ Operating Standard	Existing + Phase 1			Existing + Stage II			Existing + Phase 1 + Stage II		
		Delay	*LOS*	*v/c*	*Delay*	*LOS*	*v/c*	*Delay*	*LOS*	*v/c*
SW Boones Ferry Road/SW 95th Avenue	LOS D	25.7	C	0.77	26.6	C	0.80	26.9	C	0.80
SW Elligsen Road/I-5 Southbound Ramp	LOS D and 0.90 v/c[a]	17.8	B	0.80	20.1	C	0.87	21.0	C	0.88
Boeckman Road/SW 95th Avenue	LOS D	18.7	B	0.45	19.3	B	0.49	20.5	C	0.51
Boeckman Road/SW Parkway Avenue	LOS D	38.9	D	0.87	46.6	D	0.91	49.3	D	0.93
SW Wilsonville Road/SW Boones Ferry Road	LOS D	38.4	D	0.79	51.3	D	0.91	52.7	D	0.92
SW Wilsonville Road/I-5 Southbound Ramp	LOS D and 0.90 v/c[a]	23.5	C	0.52	23.7	C	0.56	23.8	C	0.56
I-5 Southbound On-Ramp Meter	N/A	-	-	0.92	-	-	0.98	-	-	0.99

Delay = Average Intersection Delay (sec.) v/c = Volume-to-Capacity Ratio LOS = Level of Service

[a]The typical ODOT mobility target for interchange ramps is a 0.85 v/c ratio. However, when the interchange vicinity is fully developed and adequate storage is available on the interchange ramp to prevent queues from backing up on the main line, then the target can be increased to a 0.90 v/c ratio. This is the case for the both I-5 interchange areas in Wilsonville.

The study intersection operating conditions for the project trips during both Phase 1 and Phase 2 development and future Stage II developments are listed in Table 7. Again, all the study intersections meet operating standards for “Existing plus Phases 1 and 2,” “Existing plus Stage II,” and “Existing plus Phases 1 and 2 plus Stage II” scenarios.

Table 7: Future Phases 1 and 2 Project and Stage II Intersection Operations Comparison

Intersection	Mobility Target/ Operating Standard	Existing + Phases 1 and 2			Existing + Stage II			Existing + Phases 1 and 2 + Stage II		
		Delay	*LOS*	*v/c*	*Delay*	*LOS*	*v/c*	*Delay*	*LOS*	*v/c*
SW Boones Ferry Road/SW 95th Avenue	LOS D	26.0	C	0.78	26.6	C	0.80	27.1	C	0.81
SW Elligsen Road/I-5 Southbound Ramp	LOS D and 0.90 v/c[a]	17.9	B	0.81	20.1	C	0.87	21.6	C	0.89
Boeckman Road/SW 95th Avenue	LOS D	18.9	B	0.46	19.3	B	0.49	20.7	C	0.50
Boeckman Road/SW Parkway Avenue	LOS D	39.6	D	0.87	46.6	D	0.91	50.3	D	0.93
SW Wilsonville Road/SW Boones Ferry Road	LOS D	38.5	D	0.79	51.3	D	0.91	53.4	D	0.92
SW Wilsonville Road/I-5 Southbound Ramp	LOS D and 0.90 v/c[a]	23.4	C	0.52	23.7	C	0.56	23.9	C	0.57
I-5 Southbound On-Ramp Meter	N/A	-	-	0.92	-	-	0.98	-	-	0.99

Delay = Average Intersection Delay (sec.) v/c = Volume-to-Capacity Ratio LOS = Level of Service

[a]The typical ODOT mobility target for interchange ramps is a 0.85 v/c ratio. However, when the interchange vicinity is fully developed and adequate storage is available on the interchange ramp to prevent queues from backing up on the main line, then the target can be increased to a 0.90 v/c ratio. This is the case for the both I-5 interchange areas in Wilsonville.

Even though the SW Wilsonville Road/Southbound I-5 intersection does meet the 0.90 v/c mobility target for both Phase 1 and Phase 2, the southbound on-ramp signal meter is expected to experience an increase in future demand volumes during the peak hour. The on-ramp meter has a capacity of 1,260 vehicles per hour. These future demand projections would result in the ramp meter experiencing volume-to-capacity ratio of 0.99 by the completion of Phase 2.

Site Plan Evaluation

A site plan showing the proposed development can be found in the appendix. The site plan shows sufficient space for two way motor vehicle circulation except for trucks attempting to reach the proposed loading dock at the south side of the high tech building. Turn radius does not appear to be sufficient for trucks to arrive and depart from the loading dock based on a preliminary evaluation of the site plan provided. It is recommended that the project sponsor provide turn templates showing safe circulation to the loading dock or the project site should be reconfigured to accommodate truck turning movements.

The existing site accesses to the proposed DW Fritz site include two driveways along Boeckman Road. The east driveway provides access to the parking lots on the east side of the existing building. The west driveway connects to parking lots on the west side of the existing building and provides access to the proposed high tech building and restaurant.

City Code Requirement

The proposed 70,000 square-foot manufacturing building and 4,000 square-foot restaurant is required to comply with the City of Wilsonville Planning and Land Development code for the number of vehicular parking stalls and bicycle parking spaces that are provided on site.[4] Table 8 lists the vehicular and bicycle parking requirements for both the proposed building and the entire site, which are based on the types and square footage of the various building uses. The table also lists the peak parking demand, which is estimated based on parking data published by the Institute of Transportation Engineers (ITE).[5]

Table 8: Vehicular and Bicycle Parking Summary

Land Use (ITE Code)	Size (KSF[a])	Estimated Peak Demand[b]	Spaces Required by City Code[c]		
			Vehicle Minimum	*Vehicle Maximum*	*Bicycle Minimum*
New Building					
Manufacturing (Land Use 140)	70	83	112	No limit	7
Restaurant (Land Use 932)	4	65	61	92	4
Total New Building	**74**	**148**	**173**	**No limit**	**11**
Existing Building					
Manufacturing (Land Use 140)	155	183	248	No limit	16
Total Existing Building	**155**	**183**	**248**	**No limit**	**16**
TOTAL SITE	**229**	**331**	**421**	**No limit**	**27**

[a] KSF = 1,000 square feet

[b] Estimated demand based on 85th percentile identified in the *Parking Generation, 4th Edition*, Institute of Transportation Engineers, 2010.

[c] City of Wilsonville, Planning and Land Development Ordinance, Section 4.155, Table 5, Updated June 2013.

As shown in Table 8, 173 vehicular stalls are needed to meet the minimum City Code requirements for the new building and 148 stalls are needed to satisfy the estimated peak parking demand. For the entire site, 421 vehicular stalls are needed to meet the minimum City Code requirements and 331 stalls are needed to satisfy the estimated peak parking demand. Because the site is expected to have 529 parking stalls, the site is expected to have sufficient available parking. The table above also indicates that 27 bicycle parking spaces are needed at the project site to meet the minimum City Code requirements. Currently, the site plan does not show any bicycle parking spaces. At minimum, 27 bicycle parking spaces will need to be built on the project site and should be located near building entrances in order to provide convenient access.

Access Spacing and Sight Distance

The two existing driveways along Boeckman Road are spaced at approximately 460 feet from 95th Avenue, approximately 400 feet apart from each other, and approximately 560 feet from Kinsman and do not conform with the City's minimum access spacing standards (600 feet) in

[4] City of Wilsonville, Planning and Land Development Ordinance, Sections 4.154-4.198, Updated Feb. 2004.

[5] *Parking Generation*, 4rd Edition, Institute of Transportation Engineers, 2010.

the TSP[6] for a minor arterial. The existing accesses will require a variance to the City's access spacing standards.

Preliminary sight distance was evaluated at the existing site driveways on Boeckman Road and there were no concerns. Prior to occupancy, sight distance at any existing access points will need to be verified, documented, and stamped by a registered professional Civil or Traffic Engineer licensed in the State of Oregon to assure that buildings, signs or landscaping does not restrict sight distance.

Project Impact Summary

The DW Fritz development is anticipated to result in the following impacts:

Trip Generation

- The development is expected to be completed in two phases; Phase 1 includes a 155,000 square foot renovation to a currently vacant warehouse. Phase 2 includes the addition of a 70,000 square foot high tech building and a 4,000 square foot restaurant.
- Phase 1 of the development is expected to generate an additional 105 (38 in, 67 out) PM peak hour trips and Phases 1 and Phase 2 of the development is expected to generate an additional 164 (64 in, 100 out) net new PM peak hour trips.
- Of the 105 total Phase 1 project trips, 32 new PM peak hour trips are estimated to pass through the I-5/SW Elligsen Road interchange area and 21 PM peak hour trips through the I-5/Wilsonville Road interchange area.
- Of the 164 total Phase 1 and Phase 2 project trips, 49 new PM peak hour trips are estimated to pass through the I-5/SW Elligsen Road interchange area and 33 PM peak hour trips through the I-5/Wilsonville Road interchange area.

Intersection Operations

- All the study intersections meet the City's operating standard and ODOT mobility targets for all scenarios.

Site Plan Evaluation

- Turn radius does not appear to be sufficient for trucks to arrive and depart from the loading dock based on a preliminary evaluation of the site plan provided. It is recommended that the project sponsor provide turn templates showing safe circulation to the loading dock or the project site should be reconfigured to accommodate truck turning movements.

[6] City of Wilsonville Transportation System Plan, Table 3-2, Amended June 2016.

- The City Code requirement for vehicular parking is 421 parking stalls at the project site and the parking demand is estimated at 331 parking stalls. The site plan proposes 529 stalls, meeting the city code requirement and parking demand. The minimum bicycle parking stall requirement per City Code is 27 stalls. The site plan does not currently show any bicycle parking stalls.

Access Spacing and Sight Distance

- The driveways along Boeckman Road do not conform with the current minimum access spacing standards (600 feet) in the TSP for a minor arterial. The existing accesses will require a variance to the City's access spacing standards.
- Prior to occupancy, sight distance at any existing access points will need to be verified, documented, and stamped by a registered professional Civil or Traffic Engineer licensed in the State of Oregon to assure that buildings, signs or landscaping does not restrict sight distance.

CHAPTER 2: EXISTING CONDITIONS

This chapter provides documentation of existing study area conditions, including the study area roadway network, pedestrian and bicycle facilities, and existing traffic volumes and operations. Supporting details are provided in the appendix.

Project Site

The project sponsor plans to renovate the currently vacant manufacturing building (155,000 square feet) as part of Phase 1. A new high tech building (70,000 square feet) and restaurant (4,000 square feet) will be completed in Phase 2. The renovated manufacturing building and high tech building both include a combination of office space and warehouse space.

Study Area Roadway Network

Key roadways in the study area are summarized in Table 9 along with their existing (or proposed) roadway characteristics. The functional classifications for City of Wilsonville streets are provided in the *City of Wilsonville Transportation System Plan* (TSP).[7]

Table 9: Study Area Roadway Characteristics (within the Study Area)

Roadway	Classification	No. of Lanes	Posted Speed	Sidewalks	Bike Lanes	On-Street Parking
SW Elligsen Road	Major Arterial	4	35 mph	Yes	Yes	No
Boeckman Road	Minor Arterial	2	40 mph	Yes/No[a]	Yes	No
SW Parkway Avenue	Minor Arterial	3	45 mph	Yes/No[b]	Yes/No[b]	No
SW 95th Avenue	Minor Arterial	3	35 mph	Yes/No[c]	Yes	No
SW Wilsonville Road	Major Arterial	4	25 - 35 mph	Yes	Yes	No
SW Boones Ferry Road (Day Rd to I-5 SB Ramp)	Major Arterial	3-5	35 mph	Yes/No[d]	Yes	No
SW Boones Ferry Road (south of Ridder Rd)	Collector	2-3	35 mph	Partial	Partial	No

[a] No sidewalk between Parkway Ave and Boberg Rd
[b] Sidewalk and bike lane missing along segments of SW Parkway Ave
[c] No sidewalk on the west side between Boeckman Road and SW Hillman Ct
[d] No sidewalk on the west side

[7] *Wilsonville Transportation System Plan*, Adopted by Council, June 2013.

Pedestrian and Bicycle Facilities

Near the project site, Boeckman Road meets the City's standards for minor arterial and is improved with curbs, gutters, sidewalks and bike lanes on both sides of the street. The Kinsman Road extension that is currently under construction will run along the west side of the project site and is expected to have standard bike lanes and sidewalks once completed.

Public Transit Service

South Metro Area Regional Transit (SMART) operates several fixed routes that serve Wilsonville and the surrounding area.[8] Route 5 travels on Boeckman Road, SW 95th Avenue, and SW Boones Ferry Road and provides service between the SMART Central station in Wilsonville to SW Pioneer Court in Wilsonville. There are two stops along Route 5 that are located on SW 95th Avenue. Route 2X provides service from the SMART Central station in Wilsonville to Barbur Station in Portland. This route travels on SW Boones Ferry Road, SW Wilsonville Road, Parkway Avenue, and SW Elligsen Road. There are two stops located near SW Parkway Avenue/Boeckman Road intersection on Route 2X. At the SW Wilsonville Road/SW Boones Ferry Road intersection, many SMART transit stops are located as the SMART transit station is located half a mile north of the intersection.

The Kinsman Road extension will include transit route and stop improvements when it is complete (it is currently under construction).

Future Planned Projects

Funded Projects

The following is a list of planned and funded projects included in the Wilsonville TSP[9]. Both of these projects are currently under design. A map of these improvements can be seen in the appendix.

- **RW-P2 Additional Queuing Lane on Southbound I-5 Ramp:** Construct a third queuing lane on the southbound I-5 ramp at the I-5/Wilsonville Road interchange.
- **RE-08 Kinsman Road Extension (South):** Construct 2-lane roadway with bike lanes, sidewalks, and transit stop improvements from Barber Street to Boeckman Road; project also includes a roundabout at Kinsman Road/Boeckman Road intersection

[8] South Metro Area Regional Transit (SMART) operates several fixed routes that serve Wilsonville and make connections to TriMet in Portland, Cherriots in Salem, and Canby Area Transit. The City's transit center, "SMART Central at Wilsonville Station," provides connections to all SMART routes and to TriMet's Westside Express Service (WES) commuter rail station.

[9] *Wilsonville Transportation System Plan*, Adopted by Council, June 2013.

Unfunded Projects

The following is a list of planned but unfunded projects included in the Wilsonville TSP. A map of these improvements can be seen in the appendix.

- **BW-02 95th Avenue Sidewalk Infill:** Fill in the sidewalk network on the east side of 95th Avenue from Boeckman Road to Hillman Court, and construct transit stop improvements.
- **RW-01 Boeckman Road Bridge and Corridor Improvements:** Widen Boeckman Road from Boberg Road to 500 feet east of Parkway Avenue to include additional travel lanes in both directions along with bike lanes and sidewalks; project includes reconstruction of the bridge over I-5 and improvements at Boeckman Road/Boberg Road and Boeckman Road/Parkway Avenue intersections and adjacent transit stops.

Existing Traffic Volumes and Operations

Existing PM peak hour traffic operations were analyzed at the following study intersections based on coordination with city staff[10]:

- SW Boones Ferry Road/SW 95th Avenue
- SW Elligsen Road/ I-5 Southbound Ramp
- Boeckman Road/95th Avenue
- Boeckman Road/SW Parkway Avenue
- SW Wilsonville Road/SW Boones Ferry Road
- SW Wilsonville Road/I-5 Southbound Ramp

The counted volumes at these intersections were collected[11] during the PM peak hour when schools were in session. The volumes are shown in Figure 2. The following sections describe intersection performance measures, required operating standards, existing operating conditions, and field observations.

Intersection Performance Measures

Level of service (LOS) ratings and volume-to-capacity (v/c) ratios are two commonly used performance measures that provide a good picture of intersection operations.

- **Level of service (LOS):** A "report card" rating (A through F) based on the average delay experienced by vehicles at the intersection.[12] LOS A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. LOS D

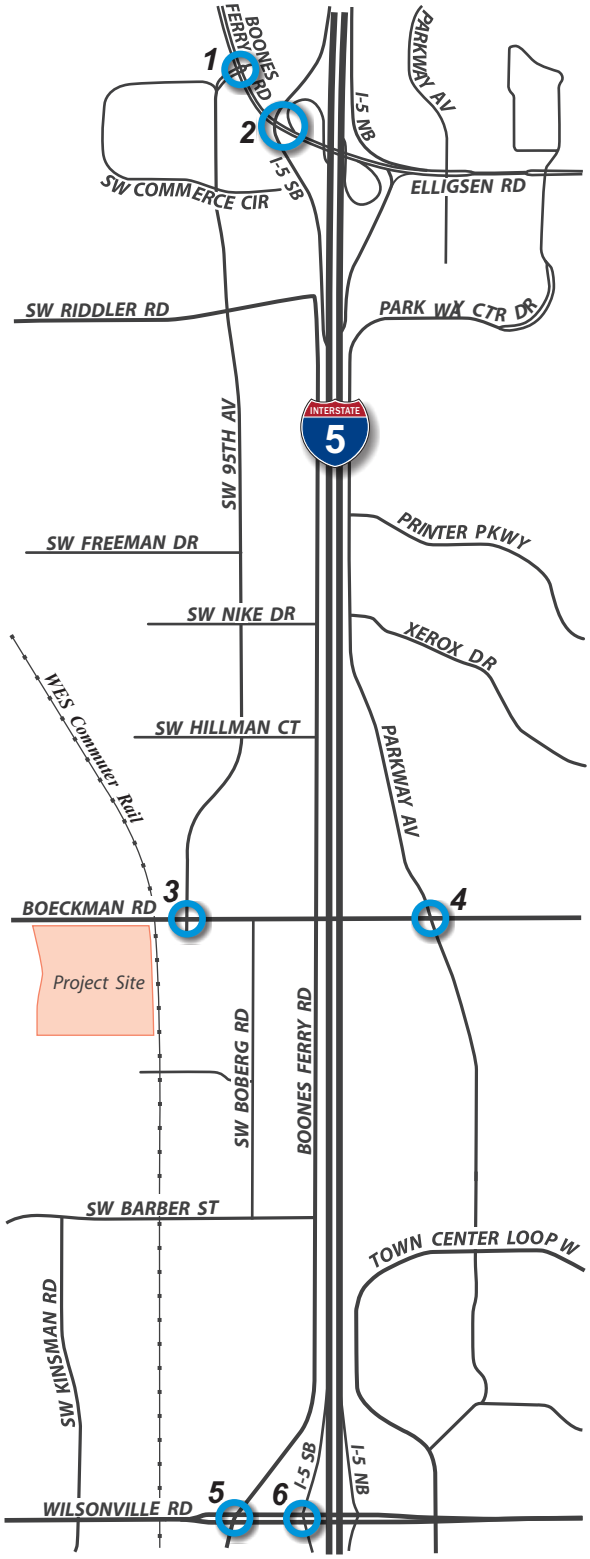
[10] Phone conversation with Steve Adams, City of Wilsonville, March 29th, 2017.

[11] Traffic data was collected on June 7th, 2017 by All Traffic Data.

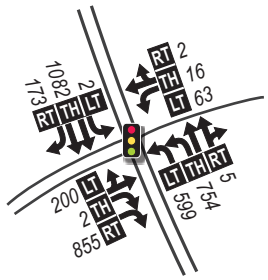
[12] A description of Level of Service (LOS) is provided in the appendix and includes a list of the delay values (in seconds) that correspond to each LOS designation.

and E are progressively worse operating conditions. LOS F represents conditions where average vehicle delay has become excessive and demand has exceeded capacity.

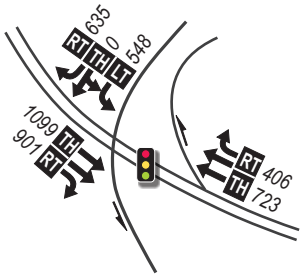
- **Volume-to-capacity (v/c) ratio:** A decimal representation (typically between 0.00 and 1.00) of the proportion of capacity that is being used at a turn movement, approach leg, or intersection. It is determined by dividing the peak hour traffic volume by the hourly capacity of a given intersection or movement. A lower ratio indicates smooth operations and minimal delays. As the ratio approaches 1.00, congestion increases and performance is reduced. If the ratio is greater than 1.00, the turn movement, approach leg, or intersection is oversaturated and usually results in excessive queues and long delays.



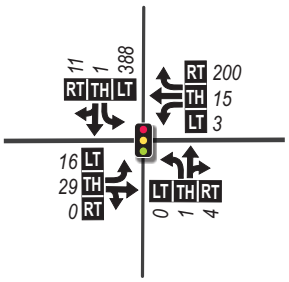
1. SW Boones Ferry Rd. @ SW 95th Ave.



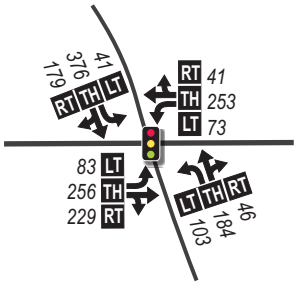
2. I-5 SB @ Elligsen R Boones Ferry Rd.



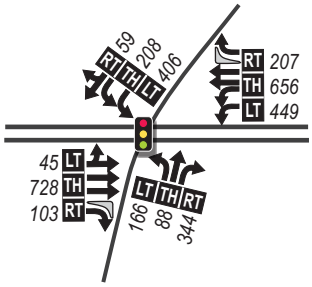
3. Boeckman Rd. @ SW 95th Ave.



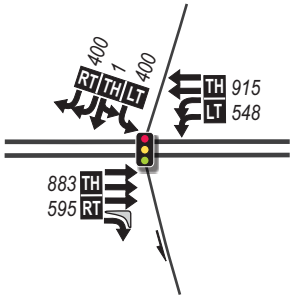
4. Boeckman Rd. @ SW Parkway Ave.



5. SW Boones Ferry Rd. @ SW Wilsonville Rd.



6. SW Wilsonville Rd. @ I-5 Southbound Ramp



LEGEND

- # - Study Intersection
- Traffic Signal
- STOP - Stop Sign
- Lane Configuration
- *000* - PM Peak Hour Traffic Volumes
- LT TH RT - Volume Turn Movement (Left•Thru•Right)

DKS

No Scale

Figure **2**

2017 Existing Conditions PM Peak Hour Traffic Volum

Required Operating Standards

The City of Wilsonville requires the study intersection of public streets to meet its minimum acceptable level of service (LOS) standard, which is LOS D for peak periods.[13] The typical ODOT mobility target for interchange ramps is a 0.85 v/c ratio.[14]

However, when the interchange vicinity is fully developed and adequate storage is available on the interchange ramp to prevent queues from backing up on the main line, then the target can be increased to a 0.90 v/c ratio. This is the case for the both I-5 interchange areas in Wilsonville. While private driveway approaches are not required by City code to meet the City's LOS standard, the safety and operations of these driveways are still considered.

Existing Operating Conditions

Existing traffic operations at the study intersection were determined for the PM peak hour based on the 2000 Highway Capacity Manual methodology for signalized intersection.[15] The results were then compared with the City of Wilsonville's minimum acceptable level of service (LOS) operating standard of LOS D or better and the ODOT Mobility Target of v/c ratio of 0.90 or better. Table 10 lists the estimated delay, LOS, and v/c ratio of each study intersection. The existing study intersections currently meet mobility targets and operating standards.

Table 10: Existing PM Peak Study Intersection Operations

Intersection	Mobility Targets/ Operating Standard	Existing PM Peak		
		Delay	*LOS*	*v/c*
SW Boones Ferry Road/SW 95th Avenue	LOS D	25.5	C	0.77
SW Elligsen Road/I-5 Southbound Ramp	LOS D and 0.90 v/c[a]	17.7	B	0.79
Boeckman Road/SW 95th Avenue	LOS D	17.2	B	0.44
Boeckman Road/SW Parkway Avenue	LOS D	37.0	D	0.85
SW Wilsonville Road/SW Boones Ferry Road	LOS D	38.3	D	0.78
SW Wilsonville Road/I-5 Southbound Ramp	LOS D and 0.90 v/c[a]	23.6	C	0.52
I-5 Southbound On-Ramp Meter	N/A	-	-	0.91

Delay = Average Intersection Delay (sec.) LOS = Level of Service v/c = Volume-to-Capacity Ratio

[a]The typical ODOT mobility target for interchange ramps is a 0.85 v/c ratio. However, when the interchange vicinity is fully developed and adequate storage is available on the interchange ramp to prevent queues from backing up on the main line, then the target can be increased to a 0.90 v/c ratio. This is the case for the both I-5 interchange areas in Wilsonville.

It is important to note that the intersection operations at the study intersections shown in Table 2 represent typical operations. What this analysis does not include is incurred delay from incidents

[13] *City of Wilsonville Code*, City of Wilsonville Section 4.140, p.163.

[14] Table 6, Page 84, 1999 Oregon Highway Plan, Oregon Department of Transportation, Amended May 2015.

[15] *2000 & 2010 Highway Capacity Manual*, Transportation Research Board, Washington DC, 2000/2010.

on the I-5 mainline and the ramp meter on the I-5 southbound ramp at Wilsonville Road that regulates the flow of traffic onto I-5.

The existing capacity of this ramp meter is 1,260 vehicles per hour. If the peak hour demand of the southbound on-ramp exceeds 1,260 vehicles, additional storage would be necessary to prevent spillback and associated impacts on SW Wilsonville Road.

Currently, approximately 1,144 vehicles are entering the southbound on-ramp during the peak hour which results in a volume to capacity (v/c) ratio of 0.91 which is nearing the ramp's full capacity. When traffic incidents occur on I-5 and I-205 such that the additional traffic exceeds the 1,260 vehicles or the I-5 mainline cannot deliver the existing traffic flow, the I-5/SW Wilsonville Road interchange is significantly impacted and vehicles experience traffic delays similar to level of service "F" (greater than 80 seconds of delay).

Field Observations

DKS observed the DW Fritz Renovation project area and the study intersections during the PM peak hour on a typical weekday to identify unique aspect of the project area and the study intersection operations. Observations were also taken to verify that actual intersection operations were consistent with the analysis results.[16] Notable observations included:

Project Site and Driveways

- No sight distance issues were observed at either of the existing project site driveways.
- Boeckman Road in front of the project site was temporarily closed to through traffic due to construction on the Kinsman Road extension (see photo below, left).

Boeckman Road closed in front of project site due to construction (left) and queues on the southbound approach at Boeckman Road/SW Parkway Avenue

[16] Field visit conducted on Thursday, July 13, 2017.

SW Boones Ferry Road/SW 95th Avenue

- Queues on the southbound approach reached as far back as the Day Rd intersection (see photo below, left) and queues on the northbound approach spilled back to the I-5 southbound off-ramp intersection (see photo below, right)

Queues at SW Boones Ferry Road/SW 95th Avenue southbound approach (left) and queues on the northbound approach (right)

Boeckman Road/SW Parkway Avenue

Approximately eleven vehicles were observed to be queuing during PM peak hour (see photo above, right) in both the southbound and eastbound directions.

- Eastbound vehicles were seen taking short gaps on right-turns-on-red.

SW ElligsenRoad/I-5 Southbound Ramp

- Queues on the I-5 southbound on-ramp backed up onto Elligsen Road just past the ramp intersection. There is currently no ramp meter at this location.

Queues at SW Elligsen Road/I-5 Southbound Ramp

SW Wilsonville Road/I-5 Southbound Ramp and SW Wilsonville Road/SW Boones Ferry Road

- Queues on the I-5 southbound on-ramp reached capacity during the PM peak hour and backed up to Wilsonville Road (see two photos below)
- Queues on Wilsonville Road from the I-5 southbound ramp prevent northbound right turns and southbound left turns at SW Wilsonville Road/SW Boones Ferry Road intersection from entering the intersection during peak hours.

Looking east at the SW Wilsonville Road/I-5 southbound on-ramp intersection. Vehicle can be seen in intersection when cross traffic has green light.

CHAPTER 3: PROJECT IMPACTS

This chapter reviews the impacts that the proposed DW Fritz development may have on the study area transportation system. This analysis includes site plan evaluation, trip generation, trip distribution, and future year traffic volumes and operating conditions. The focus of the impact analysis is on the following study intersection identified by City of Wilsonville staff:

- SW Boones Ferry Road/SW 95th Avenue
- SW Elligsen Road/ I-5 Southbound Ramp
- Boeckman Road/95th Avenue
- Boeckman Road/SW Parkway Avenue
- SW Wilsonville Road/SW Boones Ferry Road
- SW Wilsonville Road/I-5 Southbound Ramp

Proposed Development

The proposed development involves renovating and occupying the existing 155,000 square foot industrial building. In addition, there will be a new 70,000 square foot high tech building and a 4,000 square foot sit-down restaurant. This development will have two existing driveways along Boeckman Road.

Trip Generation

Trip generation is the method used to estimate the number of vehicles added to site driveways and the adjacent roadway network by a development during a specified period (i.e., such as the PM peak hour). For this study, typical ITE trip generation data was used which is based on national land use data.[17]

Table 11 provides the trip generation for the proposed office and warehousing space renovation (Phase 1). The Phase 1 development is expected to generate approximately 105 total (38 in, 67 out) PM peak hour trips.

Table 11: PM Peak Hour Primary Trip Generation Phase 1

Phase	Land Use (ITE Code)	Building area (square feet)	Trip Rate per 1,000 square feet	In	Out	Total
1	Manufacturing (140)	155,000	0.68[a]	38	67	**105**
			Phase 1 Total Primary Trips	38	67	**105**

[a]Rate back-calculated from ITE equation

[17] Intersection turning movements counts were collected on Tuesday, January 24, 2017. Additionally 24-hour bi-directional counts were collected on Tuesday thru Thursday, February 21, 22, and 23, 2017. Data was collected by All Traffic Data.

Table 12 provides the trip generation for both the renovated building and the additions of the high tech building and restaurant (Phase 2). It should be noted that the Phase 2 ITE equation trip generation associated with the manufacturing land use is lower than what was assumed in Phase 1. The ITE data has a trip rate that decreases as the total square footage increases. The proposed Phase 1 and Phase 2 development is expected to generate approximately 183 (75 in, 108 out) PM peak hour primary trips.

Table 12: PM Peak Hour Primary Trip Generation Phases 1 & 2

Phase	Land Use (ITE Code)	Building area (square feet)	Trip Rate per 1,000 square feet	In	Out	Total
1 and 2	Manufacturing (140)	155,000 + 70,000	0.64[a]	52	44	**144**
2	Restaurant (932)	4,000	9.85	23	16	**39**
		Phases 1 & 2 Total Primary Trips		75	108	**183**

[a]Rate back-calculated from ITE equation

As per ITE guidance,[18] two reductions in primary trips were included in the trip generation analysis; internal trips and pass-by trips. The following paragraphs discuss these reductions and Table 13 displays the total net new trips after accounting for the internal and pass-by trip reductions.

Internal Trips. A reduction of internal trips was evaluated to reduce the total number of driveway trips to account for trips between uses (for example employees from the industrial uses staying to eat at the restaurant). An internal capture rate of 10% was applied to the PM peak hour primary trips of the restaurant. Internal trip reductions are shown in Table 13.

Pass-By Trips. A reduction of pass-by trips was evaluated for the proposed sit down restaurant to account for traffic that currently exists on the adjacent roadways that the proposed project will have primary access. Pass-by trips are subtracted out after the internal trips are applied and for this project, were only applied to the restaurant trip generation. Pass-by rate of 43% was taken from the ITE Trip Generation Handbook.[19] Pass-by trips result in new driveway trips only and will not increase traffic to the adjacent roadways. Table 13 shows the reduction in primary trips due to pass-by trips for the sit down restaurant.

[18] Institute of Transportation Engineers, Trip Generation Handbook, October 1998.
[19] Institute of Transportation Engineers, Trip Generation Handbook, October 1998. Table F.30, Land Use Code 932.

Table 13: PM Peak Hour Net New Trips

	In	Out	Total
Total Primary Trips (Phases 1 and 2)	75	108	**183**
Internal Trip Reduction (10% of restaurant trips)	-2	-2	**-4**
Pass-By Trip Reduction (43% of restaurant trips)	-9	-6	**-15**
Net New Trips (Phase 1 and Phase 2)	64	100	**164**

After reducing the primary project restaurant trips in Phase 2 by the internal trip reduction of 10% and then the pass-by trips for the restaurant (43%), the net new total trips to the project site is 164 (64 in/ 100 out) during the PM peak hour.

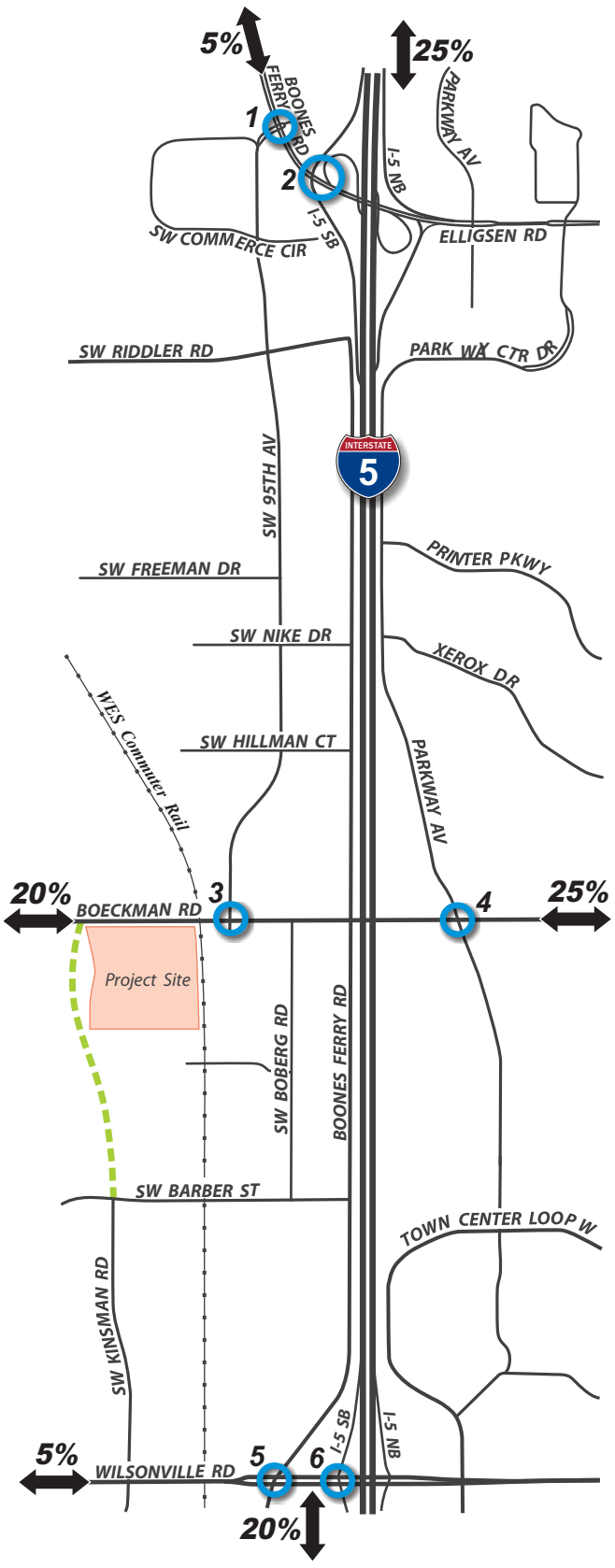
Trip Distribution

Trip distribution provides an estimate of where project-related trips would be coming from and going to. It is given as percentages at key gateways to the study area and is used to route project trips through the study intersections. Figure 3 shows the expected trip distribution and project trip routing for the additional traffic generated by the DW Fritz project. The trip distribution was estimated using the City of Wilsonville travel demand model.[20] The RE-08 Kinsman Road Extension (South) project is expected to be completed prior to the completion of the DW Fritz project. Therefore, project trips are shown to use this route in the trip distribution applied.

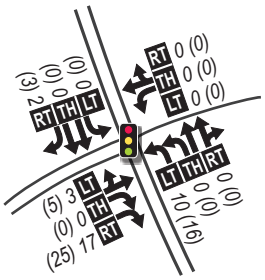
Project Trips Through City of Wilsonville Interchange Areas

The project trips through the two City of Wilsonville I-5 interchange areas were estimated based on the trip generation and distribution assumptions. The proposed DW Fritz development is expected to generate 32 PM peak hour trips for Phase 1 and a total of 49 PM peak hour trips for Phases 1& 2 through the I-5/SW Elligsen Road interchange area. The development is expected to generated 21 PM peak hour trips for Phase 1 and 33 PM peak hour trips for Phases 1 & 2 through the I-5/Wilsonville Road interchange area.

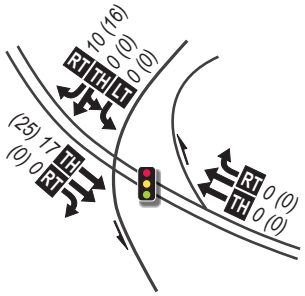
[20] *Wilsonville Travel Forecast Model, Select zone model run for DW Fritz Traffic Analysis Zone.*



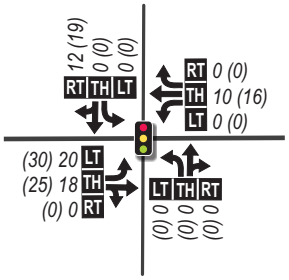
1. SW Boones Ferry Rd. @ SW 95th Ave.



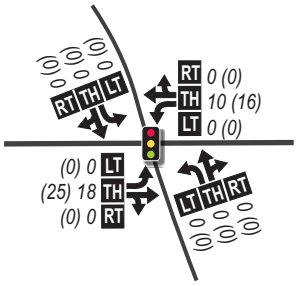
2. I-5 SB @ Elligsen R Boones Ferry Rd.



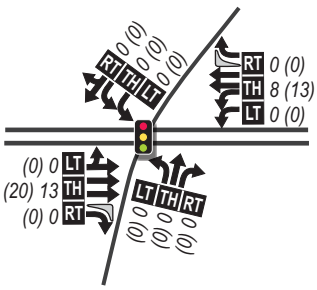
3. Boeckman Rd. @ SW 95th Ave.



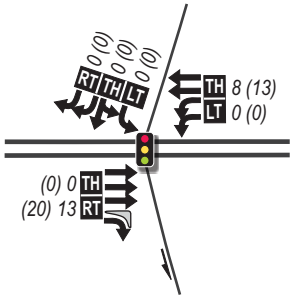
4. Boeckman Rd. @ SW Parkway Ave.



5. SW Boones Ferry Rd. @ SW Wilsonville Rd.



6. SW Wilsonville Rd. @ I-5 Southbound Ramp



LEGEND

- # - Study Intersection
- Traffic Signal
- Planned Connection
- STOP - Stop Sign
- Lane Configuration
- 000 (000) - Phase 1 (Phases 1 & 2) PM Peak Hour Traffic Volumes
- LT TH RT (Left•Thru•Right) - Volume Turn Movement
- 00% - Trip Distribution Percentage

DKS

No Scale

Figure 3

Trip Distribution & Project Trips PM Peak Hour Traffic Volum

Future Traffic Volumes and Operating Conditions

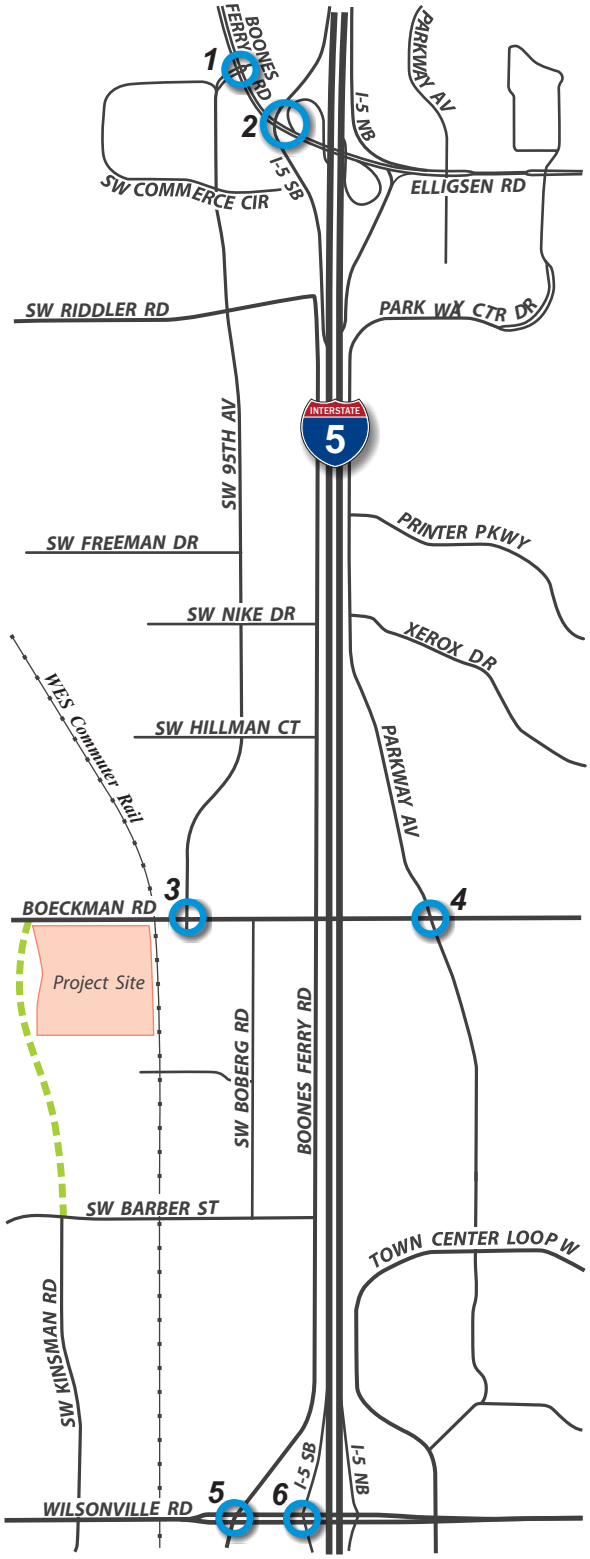
The proposed DW Fritz renovation includes a combination of office, manufacturing, and restaurant space which will be completed in two phases. The first phase involves renovating the existing 155,000 square foot office and warehouse building. The second phase will add a new 70,000 square foot high tech building and a new 4,000 square foot sit-down restaurant to the project site. Future operating conditions were analyzed at the study intersections for the following future traffic scenarios. The comparison of the following scenarios enables the assessment of project impacts:

- Existing + Stage II (includes traffic from other developments with Stage II approval or are under construction)
- Existing + Project Phase 1
- Existing + Project Phase 1 + Stage II
- Existing + Project (Phase 1 and Phase 2)
- Existing + Project (Phase 1 and Phase 2) + Stage II

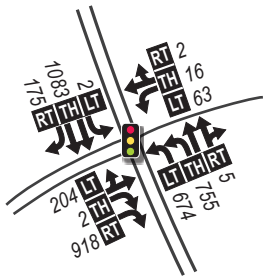
Future traffic volumes were estimated at the study intersection for each scenario. The future operating scenarios include various combinations of three types of traffic: existing, project, and Stage II. Stage II development trips are estimated based on the list of currently approved Stage II developments provided by City staff.[21] The Stage II list and the corresponding PM peak hour trip generation estimates for these developments are included in the appendix.

Figure 4 show the PM peak hour traffic volumes used to analyze the “Existing plus Stage II” scenario. Figure 5 and Figure 6 show the PM peak hour traffic volumes used to analyze the “Existing plus Project” and “Existing plus Project plus Stage II” scenarios for each project phase.

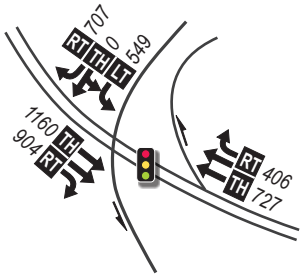
[21] Email from Daniel Pauly, City of Wilsonville, June 16, 2017 (see appendix for Stage II list).



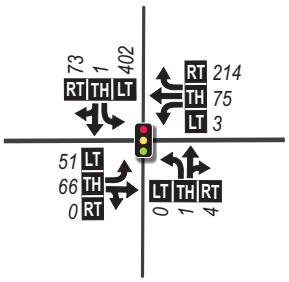
1. SW Boones Ferry Rd. @ SW 95th Ave.



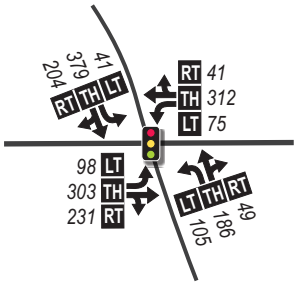
2. I-5 SB @ Elligsen R Boones Ferry Rd.



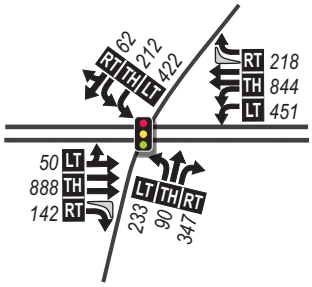
3. Boeckman Rd. @ SW 95th Ave.



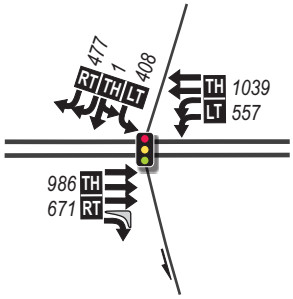
4. Boeckman Rd. @ SW Parkway Ave.



5. SW Boones Ferry Rd. @ SW Wilsonville Rd.



6. SW Wilsonville Rd. @ I-5 Southbound Ramp



LEGEND

- # - Study Intersection
- Traffic Signal
- Planned Connection
- STOP - Stop Sign
- Lane Configuration
- 000 - PM Peak Hour Traffic Volumes
- LT TH RT - Volume Turn Movement (Left•Thru•Right)

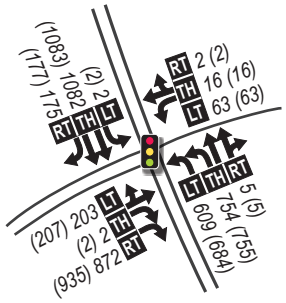
DKS

No Scale

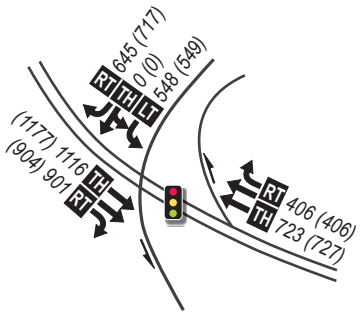
Figure 4

2017 Existing Conditions + Stage II PM Peak Hour Traffic Volum

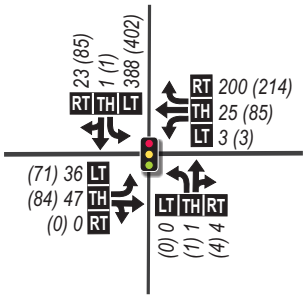
1. SW Boones Ferry Rd. @ SW 95th Ave.



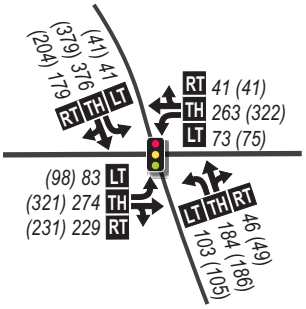
2. I-5 SB @ Elligsen Rd. Boones Ferry Rd.



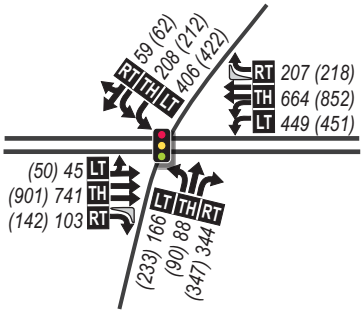
3. Boeckman Rd. @ SW 95th Ave.



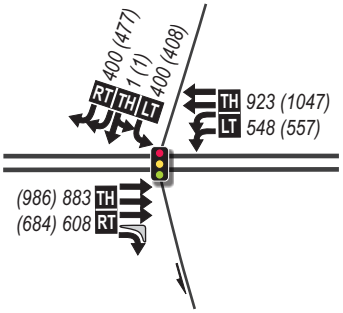
4. Boeckman Rd. @ SW Parkway Ave.



5. SW Boones Ferry Rd. @ SW Wilsonville Rd.



6. SW Wilsonville Rd. @ I-5 Southbound Ramp



LEGEND

- # - Study Intersection
- Traffic Signal
- Planned Connection
- STOP - Stop Sign
- Lane Configuration
- 000 (000) - Existing + Phase 1 (Existing + Phase 1 + Stage II) PM Peak Hour Traffic Volumes
- LT TH RT - Volume Turn Movement (Left•Thru•Right)

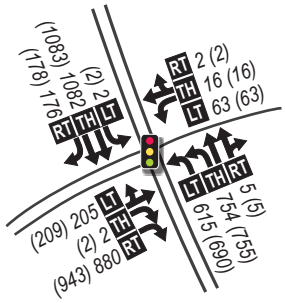
DKS

No Scale

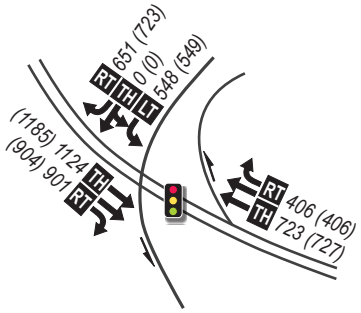
Figure 5

Existing + Project Phase 1 PM Peak Hour Traffic Volum

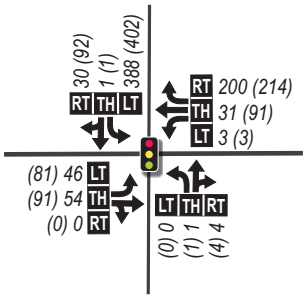
1. SW Boones Ferry Rd. @ SW 95th Ave.



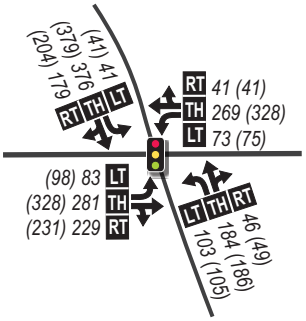
2. I-5 SB @ Elligsen Rd. Boones Ferry Rd.



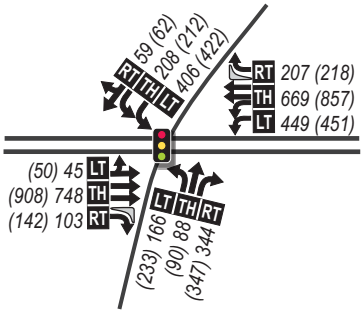
3. Boeckman Rd. @ SW 95th Ave.



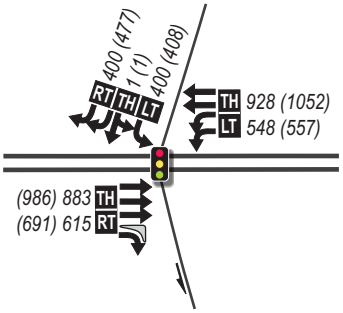
4. Boeckman Rd. @ SW Parkway Ave.



5. SW Boones Ferry Rd. @ SW Wilsonville Rd.



6. SW Wilsonville Rd. @ I-5 Southbound Ramp



LEGEND

- # - Study Intersection
- Traffic Signal
- Planned Connection
- STOP - Stop Sign
- Lane Configuration
- 000 (000) - Existing + Phases 1 & 2 (Existing + Phases 1 & 2 + Stage II) PM Peak Hour Traffic Volumes
- LT TH RT (Left•Thru•Right) - Volume Turn Movement

DKS

No Scale

Figure 6

Existing + Project Phases 1 & 2 PM Peak Hour Traffic Volum

Intersection Operations

The study intersection operating conditions for the project trips during Phase 1 development and future Stage II developments are listed in Table 14. All the study intersections meet operating standards for "Existing plus Phase 1," "Existing plus Stage II," and "Existing plus Project (Phase 1) plus Stage II" scenarios.

Table 14: Future Project (Phase 1) and Stage II Intersection Operations Comparison

Intersection	Mobility Target/ Operating Standard	Existing + Phase 1			Existing + Stage II			Existing + Phase 1 + Stage II		
		Delay	*LOS*	*v/c*	*Delay*	*LOS*	*v/c*	*Delay*	*LOS*	*v/c*
SW Boones Ferry Road/SW 95th Avenue	LOS D	25.7	C	0.77	26.6	C	0.80	26.9	C	0.80
SW Elligsen Road/I-5 Southbound Ramp	LOS D and 0.90 v/c[a]	17.8	B	0.80	20.1	C	0.87	21.0	C	0.88
Boeckman Road/SW 95th Avenue	LOS D	18.7	B	0.45	19.3	B	0.49	20.5	C	0.51
Boeckman Road/SW Parkway Avenue	LOS D	38.9	D	0.87	46.6	D	0.91	49.3	D	0.93
SW Wilsonville Road/SW Boones Ferry Road	LOS D	38.4	D	0.79	51.3	D	0.91	52.7	D	0.92
SW Wilsonville Road/I-5 Southbound Ramp	LOS D and 0.90 v/c[a]	23.5	C	0.52	23.7	C	0.56	23.8	C	0.56
I-5 Southbound On-Ramp Meter	N/A	-	-	0.92	-	-	0.98	-	-	0.99

Delay = Average Intersection Delay (sec.) v/c = Volume-to-Capacity Ratio LOS = Level of Service

[a]The typical ODOT mobility target for interchange ramps is a 0.85 v/c ratio. However, when the interchange vicinity is fully developed and adequate storage is available on the interchange ramp to prevent queues from backing up on the main line, then the target can be increased to a 0.90 v/c ratio. This is the case for the both I-5 interchange areas in Wilsonville.

The study intersection operating conditions for the project trips during Phases 1 and 2 development and future Stage II developments are listed in Table 15. Again, all the study intersections meet operating standards for "Existing plus Phases 1 & 2," "Existing plus Stage II," and "Existing plus Phases 1 and 2 plus Stage II" scenarios.

Table 15: Future Project (Phases 1 and 2) and Stage II Intersection Operations Comparison

Intersection	Mobility Target/ Operating Standard	Existing + Phases 1 and 2			Existing + Stage II			Existing + Phases 1 and 2 + Stage II		
		Delay	*LOS*	*v/c*	*Delay*	*LOS*	*v/c*	*Delay*	*LOS*	*v/c*
SW Boones Ferry Road/SW 95th Avenue	LOS D	26.0	C	0.78	26.6	C	0.80	27.1	C	0.81
SW Elligsen Road/I-5 Southbound Ramp	LOS D and 0.90 v/c[a]	17.9	B	0.81	20.1	C	0.87	21.6	C	0.89
Boeckman Road/SW 95th Avenue	LOS D	18.9	B	0.46	19.3	B	0.49	20.7	C	0.50
Boeckman Road/SW Parkway Avenue	LOS D	39.6	D	0.87	46.6	D	0.91	50.3	D	0.93
SW Wilsonville Road/SW Boones Ferry Road	LOS D	38.5	D	0.79	51.3	D	0.91	53.4	D	0.92
SW Wilsonville Road/I-5 Southbound Ramp	LOS D and 0.90 v/c[a]	23.4	C	0.52	23.7	C	0.56	23.9	C	0.57
I-5 Southbound On-Ramp Meter	N/A	-	-	0.92	-	-	0.98	-	-	0.99

Delay = Average Intersection Delay (sec.) v/c = Volume-to-Capacity Ratio LOS = Level of Service

[a]The typical ODOT mobility target for interchange ramps is a 0.85 v/c ratio. However, when the interchange vicinity is fully developed and adequate storage is available on the interchange ramp to prevent queues from backing up on the main line, then the target can be increased to a 0.90 v/c ratio. This is the case for the both I-5 interchange areas in Wilsonville.

Even though the SW Wilsonville Road/Southbound I-5 intersection does meet the 0.90 v/c mobility target for both Phase 1 and Phase 2, the southbound on-ramp signal meter is expected to experience an increase in future demand volumes during the peak hour. The on-ramp meter has a capacity of 1,260 vehicles per hour. These future demand projections would result in the ramp meter experiencing volume-to-capacity ratio of 0.99 by the completion of Phase 2.

Site Plan Evaluation

A site plan showing the proposed development can be found in the appendix. The site plan shows sufficient space for two way motor vehicle circulation except for trucks attempting to reach the proposed loading dock at the south side of the high tech building. Turn radius does not appear to be sufficient for trucks to arrive and depart from the loading dock based on a preliminary evaluation of the site plan provided. It is recommended that the project sponsor provide turn templates showing safe circulation to the loading dock or the project site should be reconfigured to accommodate truck turning movements.

The existing site accesses to the proposed DW Fritz site include two driveways along Boeckman Road. The east driveway provides access to the parking lots on the east side of the

existing building. The west driveway connects to parking lots on the west side of the existing building and provides access to the proposed high tech building and restaurant.

City Code Requirement

The proposed 70,000 square-foot manufacturing building and 4,000 square-foot restaurant is required to comply with the City of Wilsonville Planning and Land Development code for the number of vehicular parking stalls and bicycle parking spaces that are provided on site.[22] Table 16 lists the vehicular and bicycle parking requirements for both the proposed building and the entire site, which are based on the types and square footage of the various building uses. The table also lists the peak parking demand, which is estimated based on parking data published by the Institute of Transportation Engineers (ITE).[23]

Table 16: Vehicular and Bicycle Parking Summary

Land Use (ITE Code)	Size (KSF[a])	Estimated Peak Demand[b]	Spaces Required by City Code[c]		
			Vehicle Minimum	*Vehicle Maximum*	*Bicycle Minimum*
New Building					
Manufacturing (Land Use 140)	70	83	112	No limit	7
Restaurant (Land Use 932)	4	65	61	92	4
Total New Building	**74**	**148**	**173**	**No limit**	**11**
Existing Building					
Manufacturing (Land Use 140)	155	183	248	No limit	16
Total Existing Building	**155**	**183**	**248**	**No limit**	**16**
TOTAL SITE	**229**	**331**	**421**	**No limit**	**27**

[a] KSF = 1,000 square feet

[b] Estimated demand based on 85th percentile identified in the *Parking Generation, 4th Edition*, Institute of Transportation Engineers, 2010.

[c] City of Wilsonville, Planning and Land Development Ordinance, Section 4.155, Table 5, Updated June 2013.

As shown in Table 16, 173 vehicular stalls are needed to meet the minimum City Code requirements for the new building and 148 stalls are needed to satisfy the estimated peak parking demand. For the entire site, 421 vehicular stalls are needed to meet the minimum City Code requirements and 331 stalls are needed to satisfy the estimated peak parking demand. Because the site is expected to have 529 parking stalls, the site is expected to have sufficient available parking. The table above also indicates that 27 bicycle parking spaces are needed at the project site to meet the minimum City Code requirements. Currently, the site plan does not show any bicycle parking spaces. At minimum, 27 bicycle parking spaces will need to be built on the project site and should be located near building entrances in order to provide convenient access.

[22] City of Wilsonville, Planning and Land Development Ordinance, Sections 4.154-4.198, Updated Feb. 2004.

[23] *Parking Generation*, 4rd Edition, Institute of Transportation Engineers, 2010.

Access Spacing and Sight Distance

The two existing driveways along Boeckman Road are spaced at approximately 460 feet from 95th Avenue, approximately 400 feet apart from each other, and approximately 560 feet from Kinsman and do not conform with the City's minimum access spacing standards (600 feet) in the TSP for a minor arterial.[24] The existing accesses will require a variance to the City's access spacing standards.

Preliminary sight distance was evaluated at the existing site driveways on Boeckman Road and there were no concerns. Prior to occupancy, sight distance at any existing access points will need to be verified, documented, and stamped by a registered professional Civil or Traffic Engineer licensed in the State of Oregon to assure that buildings, signs or landscaping does not restrict sight distance.

Project Impact Summary

The DW Fritz development is anticipated to result in the following impacts:

Trip Generation

- The development is expected to be completed in two phases; Phase 1 includes a 155,000 square foot renovation to a currently vacant warehouse. Phase 2 includes the addition of a 70,000 square foot high tech building and a 4,000 square foot restaurant.
- Phase 1 of the development is expected to generate an additional 105 (38 in, 67 out) PM peak hour trips and Phases 1 & 2 of the development is expected to generate an additional 164 (64 in, 100 out) PM peak hour trips.
- Of the 105 total Phase 1 project trips, 32 new PM peak hour trips are estimated to pass through the I-5/SW Elligsen Road interchange area and 21 PM peak hour trips through the I-5/Wilsonville Road interchange area.
- Of the total 164 Phase 1 and Phase 2 project trips, 49 new PM peak hour trips are estimated to pass through the I-5/SW Elligsen Road interchange area and 33 PM peak hour trips through the I-5/Wilsonville Road interchange area.

Intersection Operations

- All the study intersections meet the operating standard/mobility targets for all scenarios.

Site Plan Evaluation

- Turn radius does not appear to be sufficient for trucks to arrive and depart from the loading dock based on a preliminary evaluation of the site plan provided. It is recommended that the project sponsor provide turn templates showing safe circulation

[24] City of Wilsonville Transportation System Plan, Table 3-2, Amended June 2016.

to the loading dock or the project site should be reconfigured to accommodate truck turning movements.

- The City Code requirement for vehicular parking is 421 parking stalls at the project site and the parking demand is estimated at 331 parking stalls. The site plan proposes 529 stalls, meeting the city code requirement and parking demand. The minimum bicycle parking stall requirement per City Code is 27 stalls. The site plan does not currently show any bicycle parking stalls.

Access Spacing and Sight Distance

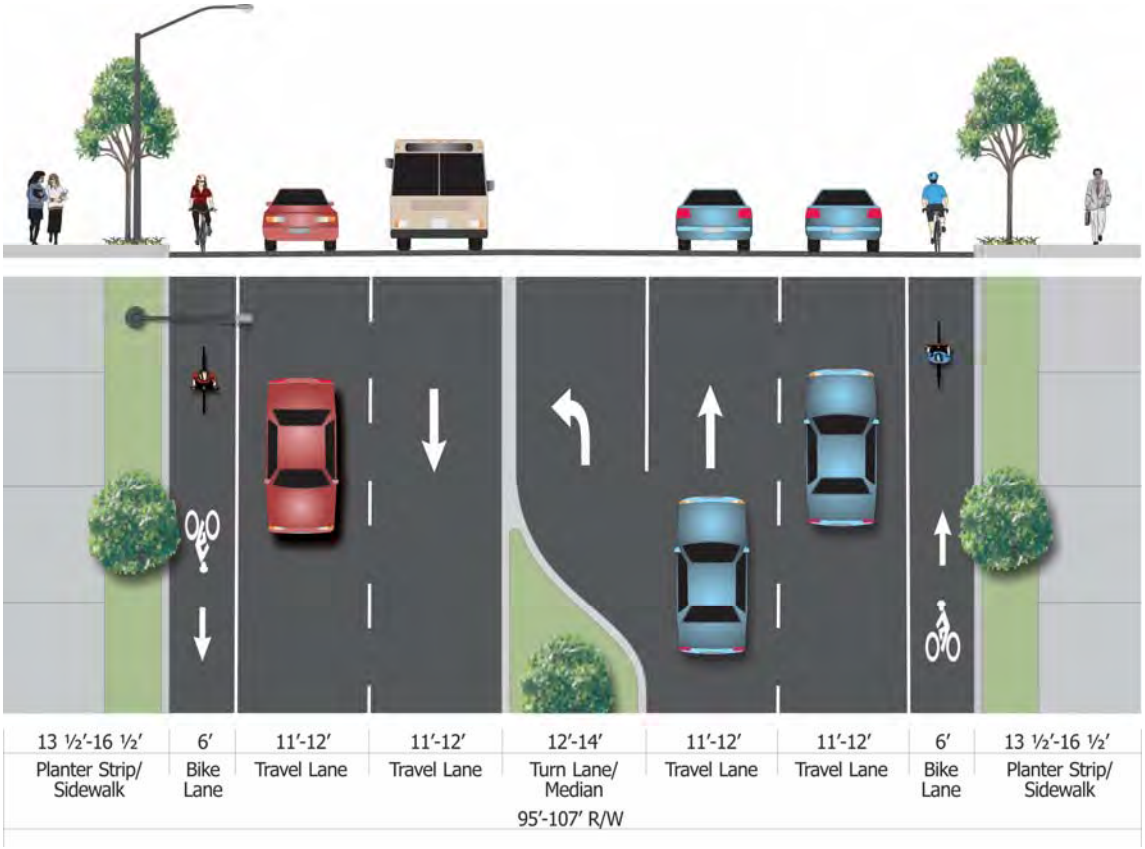
- The driveways along Boeckman Road do not conform with the current minimum access spacing standards (600 feet) in the TSP for a minor arterial. The existing accesses will require a variance to the City's access spacing standards.
- Prior to occupancy, sight distance at any existing access points will need to be verified, documented, and stamped by a registered professional Civil or Traffic Engineer licensed in the State of Oregon to assure that buildings, signs or landscaping does not restrict sight distance.

APPENDIX

City of Wilsonville Cross-section Details
City of Wilsonville TSP Planned Projects
Existing PM Peak Hour Traffic Counts
Level of Service Descriptions
Trip Generation Summary
City of Wilsonville Stage II List
HCM Analysis – Existing
HCM Analysis – Existing + Stage II
HCM Analysis – Existing + Project Phase 1
HCM Analysis – Existing + Project Phase 1 + Stage II
HCM Analysis – Existing + Project Phase 2
HCM Analysis – Existing + Project Phase 2 + Stage II

City of Wilsonville Cross-section Details

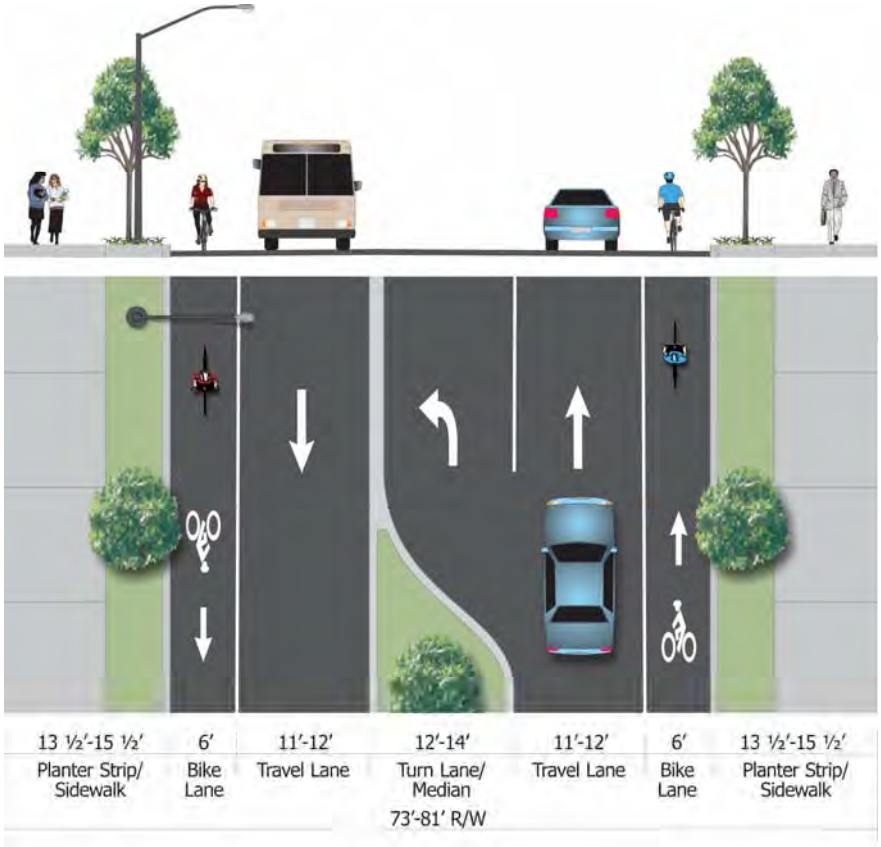
FIGURE 3-6. MAJOR ARTERIAL CROSS-SECTION



Notes:

1. Travel lane and turn lane/median widths as determined by Community Development Director.
2. Minimum sidewalk width is 5 feet; actual sidewalk width as determined by Community Development Director. Width of sidewalk/planting strip may be combined in commercial/retail areas for a total width of 13½ to 16½ feet; street trees shall be located in minimum 4-foot tree wells.
3. Curb width of ½-foot is included in the sidewalk/planter strip width.
4. Street lights shall be located within the planter strip, center landscape median, or sidewalk as determined by Community Development Director.
5. Striping and signage as required in the PW Standards.
6. On-street parking is not allowed.
7. Transit stop locations to be determined by Transit Director.
8. When not needed as a left-turn lane, median may be provided to serve safety, stormwater, or aesthetic objectives.
9. New streets shall incorporate low impact development design as practicable.
10. Allow for separation for bikes on major arterials (especially freight routes).

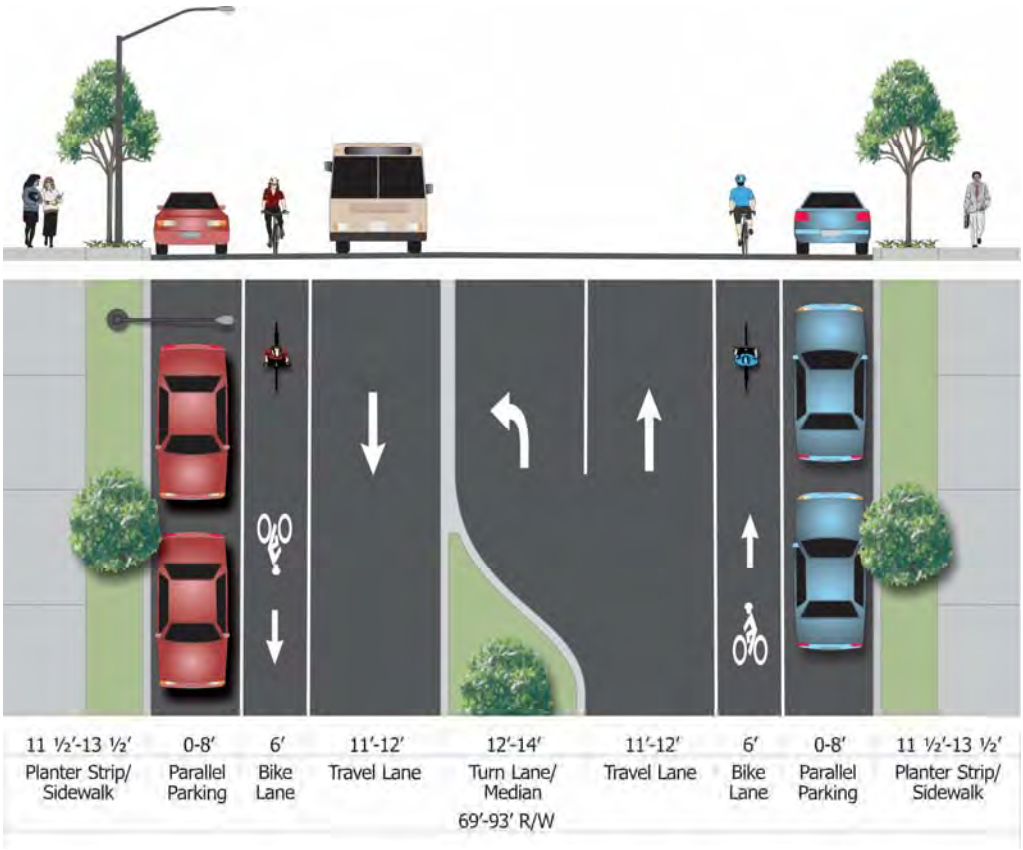
FIGURE 3-7. MINOR ARTERIAL CROSS-SECTION



Notes:

1. Travel lane and turn lane/median widths as determined by Community Development Director.
2. Minimum sidewalk width is 5 feet; actual sidewalk width as determined by Community Development Director. Width of sidewalk/planting strip may be combined in commercial/retail areas for a total width of 13½ to 15½ feet; street trees shall be located in minimum 4-foot tree wells.
3. Curb width of ½ foot is included in the sidewalk/planter strip width.
4. Street lights shall be located within the planter strip, center landscape median, or sidewalk as determined by Community Development Director.
5. Striping and signage as required in the PW Standards.
6. On-street parking is not allowed.
7. Transit stop locations to be determined by Transit Director.
8. When not needed as a left-turn lane, median may be provided to serve safety, stormwater, or aesthetic objectives.
9. New streets shall incorporate low impact development design as practicable.
10. Allow for separation for bikes on minor arterials (especially freight routes).

FIGURE 3-8. COLLECTOR CROSS-SECTION



Notes:

1. Collector right-of-way varies between 59 to 89 feet as determined by Community Development Director based on surrounding planned development of residential, commercial or industrial and need for on-street parking and/or turn lane/median.
2. Minimum sidewalk width is 5 feet; actual sidewalk width as determined by Community Development Director. Width of sidewalk/planting strip may be combined in commercial/retail areas for a total width of 11½ to 13½ feet; street trees shall be located in minimum 4-foot tree wells.
3. Curb and sidewalk bulb-outs at crosswalks or street intersections as determined by Community Development Director.
4. Curb width of ½ foot is included in the sidewalk/planter strip width.
5. Street lights shall be located within the planter strip, center landscape median, or sidewalk as determined by Community Development Director.
6. Travel lane and turn lane/median widths as determined by Community Development Director. Turn lane/median may be eliminated.
7. Striping and signage as required in the PW Standards.
8. On-street parking on one or both sides is allowed.
9. Transit stop locations to be determined by Transit Director.
10. When not needed as a left-turn lane, median may be provided to serve safety, stormwater, or aesthetic objectives.
11. New streets shall incorporate low impact development design as practicable.

City of Wilsonville TSP Planned Projects

Figure 5-2. Higher Priority Projects

This figure provides an overall perspective of the Higher Priority projects throughout the city. Additional details are provided on the pages that follow for each of the City's four quadrants (Northwest, Northeast, Southwest, Southeast), which use I-5 and Boeckman Road as dividing lines.

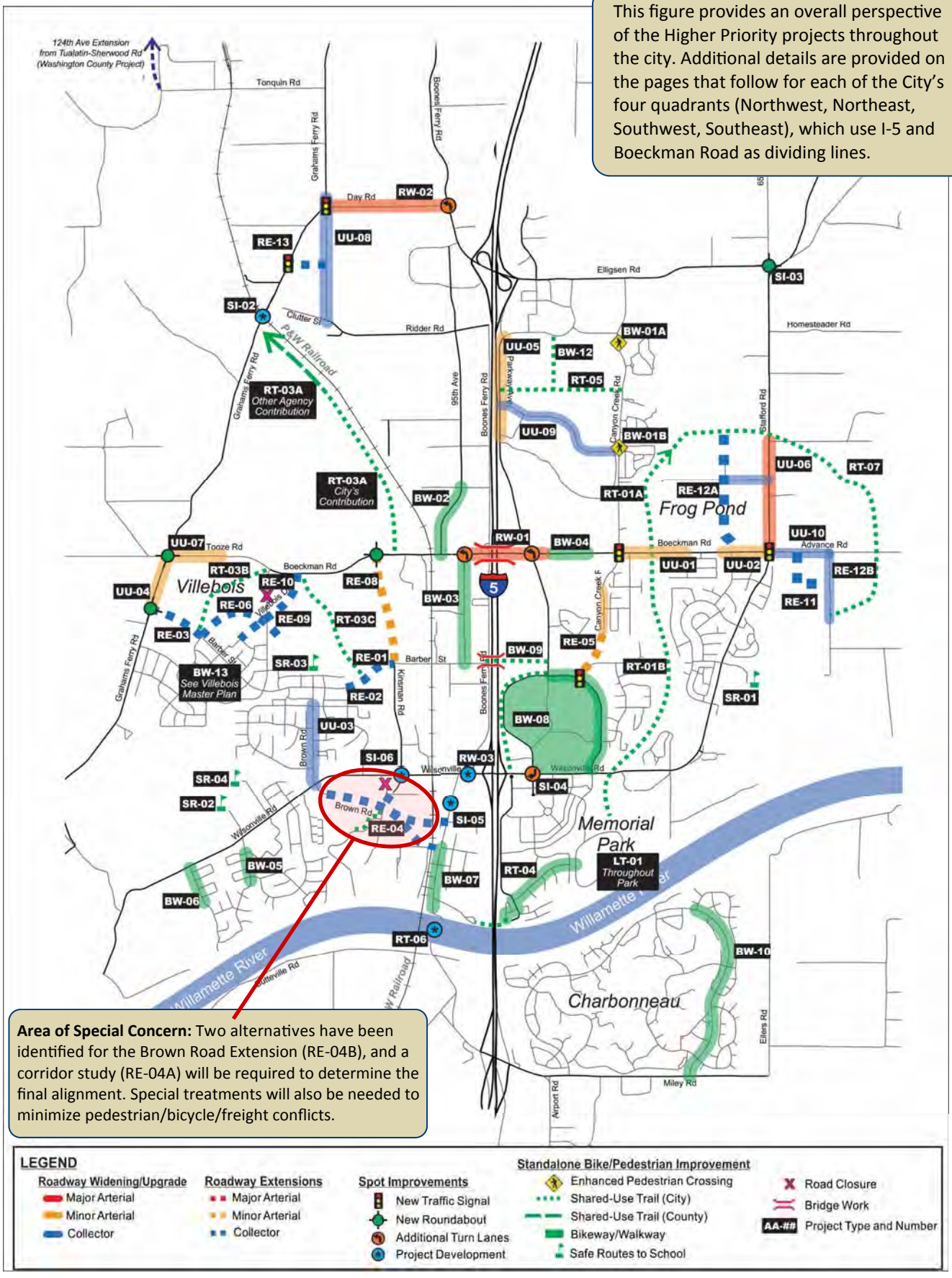
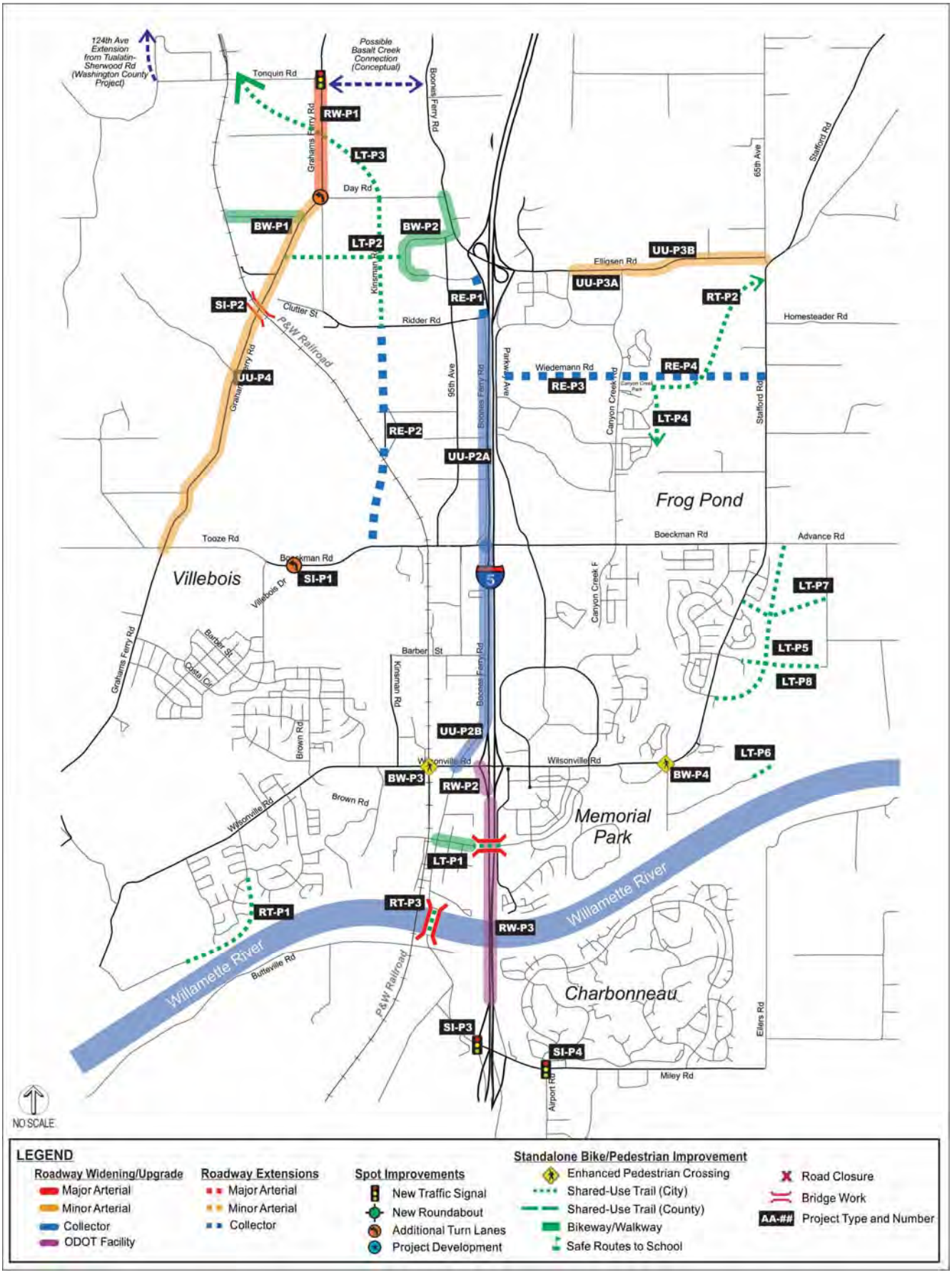


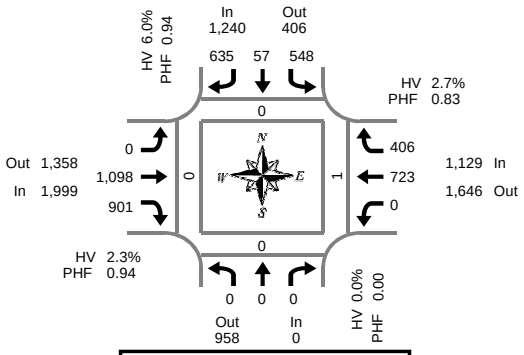
FIGURE 5-7. ADDITIONAL PLANNED PROJECTS



Existing PM Peak Hour Traffic Counts

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:40 PM to 5:40 PM

I-5 SB Ramp & SW Elligsen Rd

Wednesday, June 07, 2017
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound I-5 SB Ramp				Southbound I-5 SB Ramp				Eastbound SW Elligsen Rd				Westbound SW Elligsen Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	0	0	0	0	39	2	49	0	0	87	85	0	0	54	20	0	336	0	0	0	0
4:05 PM	0	0	0	0	50	4	63	0	0	90	79	0	0	56	26	0	368	0	0	0	0
4:10 PM	0	0	0	0	40	3	52	0	0	99	87	0	0	46	25	0	352	0	0	0	0
4:15 PM	0	0	0	0	39	2	58	0	0	75	68	0	0	54	23	0	319	0	0	0	0
4:20 PM	0	0	0	0	39	5	45	0	0	66	74	0	0	52	20	0	301	0	0	0	0
4:25 PM	0	0	0	0	41	6	38	0	0	96	66	0	0	49	30	0	326	0	0	0	0
4:30 PM	0	0	0	0	42	2	60	0	0	106	69	0	0	49	14	1	342	0	0	0	0
4:35 PM	0	0	0	0	45	4	39	0	0	94	78	0	0	57	36	0	353	0	0	0	0
4:40 PM	0	0	0	0	46	1	56	0	0	105	74	0	0	49	36	0	367	0	0	0	0
4:45 PM	0	0	0	0	53	5	58	0	0	90	85	0	0	52	30	1	373	0	0	0	0
4:50 PM	0	0	0	0	46	2	58	0	0	91	66	1	0	48	22	0	333	0	0	0	0
4:55 PM	0	0	0	0	34	3	47	0	0	91	82	0	0	66	29	0	352	0	0	0	0
5:00 PM	0	0	0	0	31	6	33	0	0	112	77	0	0	69	41	0	369	0	0	0	0
5:05 PM	0	0	0	0	54	5	54	0	0	105	64	0	0	61	47	1	390	0	0	0	0
5:10 PM	0	0	0	0	47	4	56	0	0	96	80	0	0	72	52	0	407	0	0	1	0
5:15 PM	0	0	0	0	50	8	48	0	0	82	85	0	0	59	30	0	362	0	0	0	0
5:20 PM	0	0	0	0	44	5	56	0	0	83	75	0	0	64	26	1	353	0	0	0	0
5:25 PM	0	0	0	0	54	7	56	0	0	65	85	0	0	57	28	1	352	0	0	0	0
5:30 PM	0	0	0	0	42	6	54	0	0	79	68	0	0	56	31	1	336	0	0	0	0
5:35 PM	0	0	0	0	47	5	59	0	0	99	60	0	0	70	34	0	374	0	0	0	0
5:40 PM	0	0	0	0	58	9	59	0	0	79	65	0	0	60	35	0	365	0	0	1	0
5:45 PM	0	0	0	0	51	5	68	0	0	69	68	0	0	46	21	0	328	0	0	0	0
5:50 PM	0	0	0	0	54	7	61	0	0	33	73	0	0	44	25	0	297	0	0	0	0
5:55 PM	0	0	0	0	48	5	70	0	0	63	60	0	0	42	18	1	306	0	0	0	0
Total Survey	0	0	0	0	1,094	111	1,297	0	0	2,055	1,773	1	0	1,332	699	7	8,361	0	0	2	0

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound I-5 SB Ramp				Southbound I-5 SB Ramp				Eastbound SW Elligsen Rd				Westbound SW Elligsen Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	0	0	0	0	129	9	164	0	0	276	251	0	0	156	71	0	1,056	0	0	0	0
4:15 PM	0	0	0	0	119	13	141	0	0	237	208	0	0	155	73	0	946	0	0	0	0
4:30 PM	0	0	0	0	133	7	155	0	0	305	221	0	0	155	86	1	1,062	0	0	0	0
4:45 PM	0	0	0	0	133	10	163	0	0	272	233	1	0	166	81	1	1,058	0	0	0	0
5:00 PM	0	0	0	0	132	15	143	0	0	313	221	0	0	202	140	1	1,166	0	0	1	0
5:15 PM	0	0	0	0	148	20	160	0	0	230	245	0	0	180	84	2	1,067	0	0	0	0
5:30 PM	0	0	0	0	147	20	172	0	0	257	193	0	0	186	100	1	1,075	0	0	1	0
5:45 PM	0	0	0	0	153	17	199	0	0	165	201	0	0	132	64	1	931	0	0	0	0
Total Survey	0	0	0	0	1,094	111	1,297	0	0	2,055	1,773	1	0	1,332	699	7	8,361	0	0	2	0

Peak Hour Summary
4:40 PM to 5:40 PM

By Approach	Northbound I-5 SB Ramp				Southbound I-5 SB Ramp				Eastbound SW Elligsen Rd				Westbound SW Elligsen Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	0	958	958	0	1,240	406	1,646	0	1,999	1,358	3,357	1	1,129	1,646	2,775	5	4,368	0	0	1	0
%HV		0.0%				6.0%				2.3%				2.7%			3.5%				
PHF		0.00				0.94				0.94				0.83			0.94				

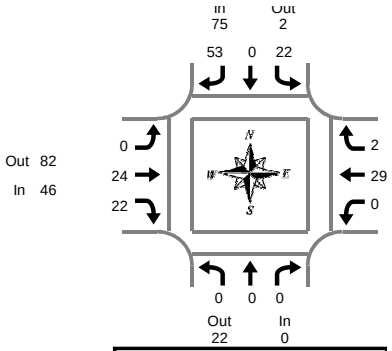
By Movement	Northbound I-5 SB Ramp				Southbound I-5 SB Ramp				Eastbound SW Elligsen Rd				Westbound SW Elligsen Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	0	0	0	548	57	635	1,240	0	1,098	901	1,999	0	723	406	1,129	4,368
%HV	0.0%	0.0%	0.0%	0.0%	4.0%	0.0%	8.3%	6.0%	0.0%	2.2%	2.4%	2.3%	0.0%	4.0%	0.5%	2.7%	3.5%
PHF	0.00	0.00	0.00	0.00	0.91	0.71	0.92	0.94	0.00	0.88	0.92	0.94	0.00	0.89	0.73	0.83	0.94

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound I-5 SB Ramp				Southbound I-5 SB Ramp				Eastbound SW Elligsen Rd				Westbound SW Elligsen Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	0	0	0	0	514	39	623	0	0	1,090	913	1	0	632	311	2	4,122	0	0	0	0
4:15 PM	0	0	0	0	517	45	602	0	0	1,127	883	1	0	678	380	3	4,232	0	0	1	0
4:30 PM	0	0	0	0	546	52	621	0	0	1,120	920	1	0	703	391	5	4,353	0	0	1	0
4:45 PM	0	0	0	0	560	65	638	0	0	1,072	892	1	0	734	405	5	4,366	0	0	2	0
5:00 PM	0	0	0	0	580	72	674	0	0	965	860	0	0	700	388	5	4,239	0	0	2	0

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



I-5 SB Ramp & SW Elligsen Rd

Wednesday, June 07, 2017
4:00 PM to 6:00 PM

Peak Hour Summary
4:40 PM to 5:40 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound I-5 SB Ramp				Southbound I-5 SB Ramp				Eastbound SW Elligsen Rd				Westbound SW Elligsen Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	2	0	5	7	0	4	4	8	0	3	0	3	18
4:05 PM	0	0	0	0	3	0	9	12	0	3	6	9	0	4	0	4	25
4:10 PM	0	0	0	0	2	0	5	7	0	3	1	4	0	2	1	3	14
4:15 PM	0	0	0	0	0	0	10	10	0	5	4	9	0	3	1	4	23
4:20 PM	0	0	0	0	2	0	6	8	0	2	2	4	0	4	1	5	17
4:25 PM	0	0	0	0	2	0	1	3	0	5	1	6	0	6	1	7	16
4:30 PM	0	0	0	0	1	0	12	13	0	4	2	6	0	4	0	4	23
4:35 PM	0	0	0	0	0	0	6	6	0	1	3	4	0	5	0	5	15
4:40 PM	0	0	0	0	1	0	10	11	0	3	3	6	0	4	0	4	21
4:45 PM	0	0	0	0	4	0	8	12	0	2	4	6	0	1	0	1	19
4:50 PM	0	0	0	0	3	0	5	8	0	1	2	3	0	2	0	2	13
4:55 PM	0	0	0	0	1	0	4	5	0	3	3	6	0	1	0	1	12
5:00 PM	0	0	0	0	2	0	1	3	0	2	1	3	0	7	1	8	14
5:05 PM	0	0	0	0	0	0	3	3	0	4	0	4	0	2	1	3	10
5:10 PM	0	0	0	0	1	0	6	7	0	2	1	3	0	0	0	0	10
5:15 PM	0	0	0	0	2	0	4	6	0	4	2	6	0	4	0	4	16
5:20 PM	0	0	0	0	3	0	1	4	0	0	4	4	0	1	0	1	9
5:25 PM	0	0	0	0	4	0	3	7	0	1	0	1	0	2	0	2	10
5:30 PM	0	0	0	0	1	0	6	7	0	0	1	1	0	4	0	4	12
5:35 PM	0	0	0	0	0	0	2	2	0	2	1	3	0	1	0	1	6
5:40 PM	0	0	0	0	3	0	4	7	0	2	0	2	0	2	0	2	11
5:45 PM	0	0	0	0	2	0	2	4	0	3	2	5	0	0	1	1	10
5:50 PM	0	0	0	0	0	0	3	3	0	2	1	3	0	3	0	3	9
5:55 PM	0	0	0	0	2	0	3	5	0	4	2	6	0	1	0	1	12
Total Survey	0	0	0	0	41	0	119	160	0	62	50	112	0	66	7	73	345

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound I-5 SB Ramp				Southbound I-5 SB Ramp				Eastbound SW Elligsen Rd				Westbound SW Elligsen Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	7	0	19	26	0	10	11	21	0	9	1	10	57
4:15 PM	0	0	0	0	4	0	17	21	0	12	7	19	0	13	3	16	56
4:30 PM	0	0	0	0	2	0	28	30	0	8	8	16	0	13	0	13	59
4:45 PM	0	0	0	0	8	0	17	25	0	6	9	15	0	4	0	4	44
5:00 PM	0	0	0	0	3	0	10	13	0	8	2	10	0	9	2	11	34
5:15 PM	0	0	0	0	9	0	8	17	0	5	6	11	0	7	0	7	35
5:30 PM	0	0	0	0	4	0	12	16	0	4	2	6	0	7	0	7	29
5:45 PM	0	0	0	0	4	0	8	12	0	9	5	14	0	4	1	5	31
Total Survey	0	0	0	0	41	0	119	160	0	62	50	112	0	66	7	73	345

Heavy Vehicle Peak Hour Summary
4:40 PM to 5:40 PM

By Approach	Northbound I-5 SB Ramp			Southbound I-5 SB Ramp			Eastbound SW Elligsen Rd			Westbound SW Elligsen Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	22	22	75	2	77	46	82	128	31	46	77	152
PHF	0.00			0.60			0.77			0.65			0.72

By Movement	Northbound I-5 SB Ramp				Southbound I-5 SB Ramp				Eastbound SW Elligsen Rd				Westbound SW Elligsen Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	0	0	0	22	0	53	75	0	24	22	46	0	29	2	31	152
PHF	0.00	0.00	0.00	0.00	0.61	0.00	0.58	0.60	0.00	0.60	0.61	0.77	0.00	0.73	0.25	0.65	0.72

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

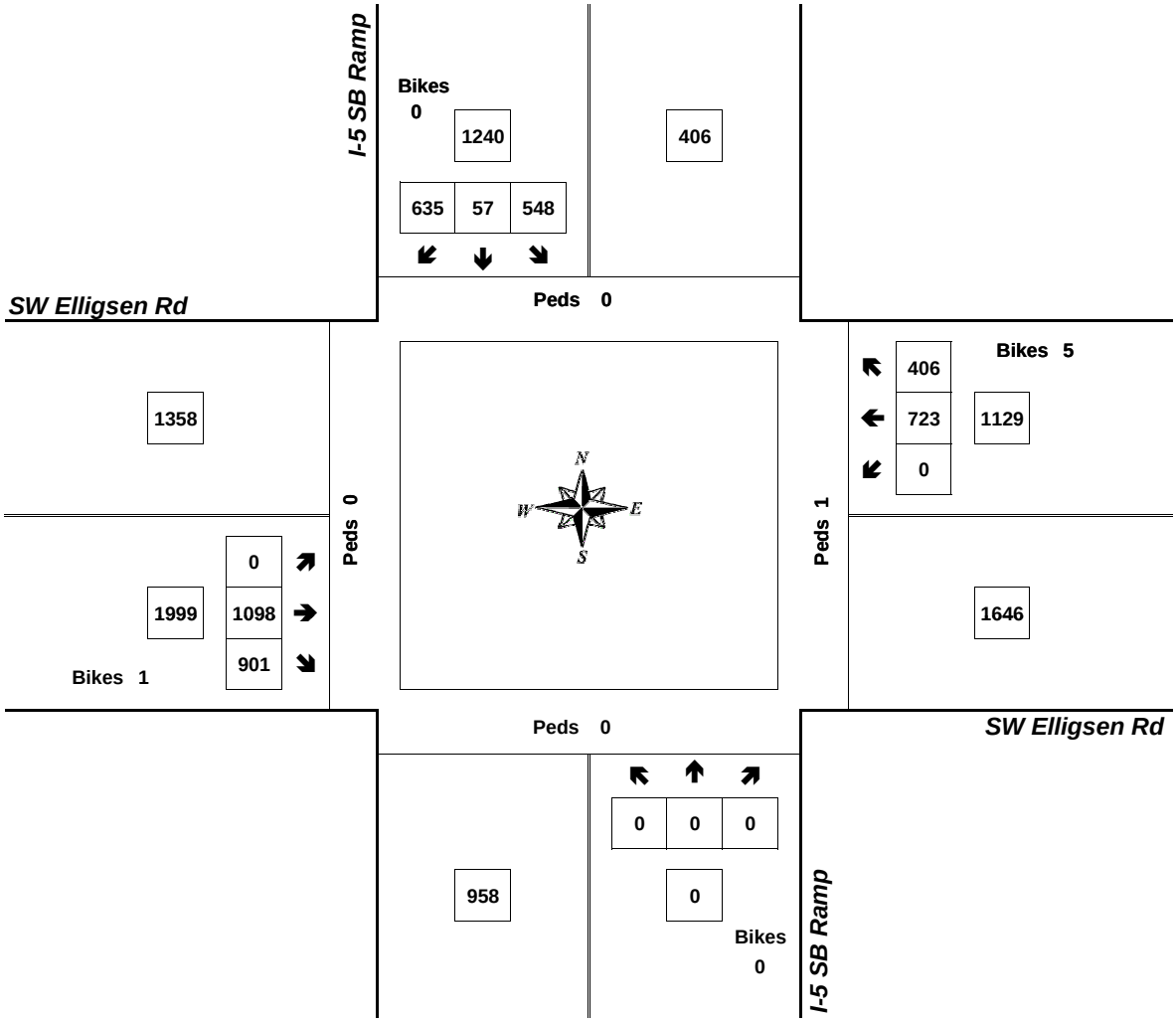
Interval Start Time	Northbound I-5 SB Ramp				Southbound I-5 SB Ramp				Eastbound SW Elligsen Rd				Westbound SW Elligsen Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	21	0	81	102	0	36	35	71	0	39	4	43	216
4:15 PM	0	0	0	0	17	0	72	89	0	34	26	60	0	39	5	44	193
4:30 PM	0	0	0	0	22	0	63	85	0	27	25	52	0	33	2	35	172
4:45 PM	0	0	0	0	24	0	47	71	0	23	19	42	0	27	2	29	142
5:00 PM	0	0	0	0	20	0	38	58	0	26	15	41	0	27	3	30	129

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

I-5 SB Ramp & SW Elligsen Rd

4:40 PM to 5:40 PM
Wednesday, June 07, 2017

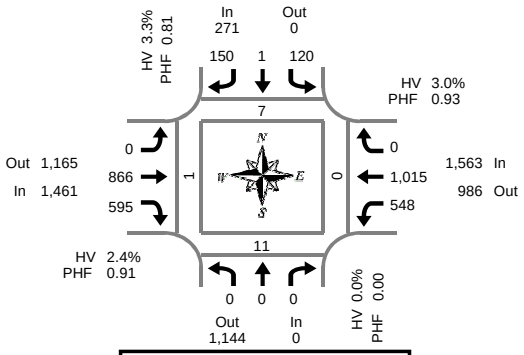


Approach	PHF	HV%	Volume
EB	0.94	2.3%	1,999
WB	0.83	2.7%	1,129
NB	0.00	0.0%	0
SB	0.94	6.0%	1,240
Intersection	0.94	3.5%	4,368

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:45 PM to 5:45 PM

I-5 SB Ramp & SW Wilsonville Rd

Wednesday, June 07, 2017
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound I-5 SB Ramp				Southbound I-5 SB Ramp				Eastbound SW Wilsonville Rd				Westbound SW Wilsonville Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	0	0	0	0	9	0	11	0	0	64	60	0	37	62	0	0	243	0	0	0	0
4:05 PM	0	0	0	0	4	0	13	0	0	96	47	0	31	77	0	0	268	0	1	0	0
4:10 PM	0	0	0	0	6	0	9	0	0	74	41	0	49	80	0	0	259	0	1	0	0
4:15 PM	0	0	0	0	15	0	8	0	0	54	46	0	51	74	0	1	248	3	0	0	0
4:20 PM	0	0	0	0	12	0	10	0	0	65	49	0	41	75	0	0	252	3	2	0	0
4:25 PM	0	0	0	0	9	0	8	0	0	95	44	0	40	70	0	0	266	3	1	0	0
4:30 PM	0	0	0	0	4	0	9	0	0	66	45	0	51	87	0	1	262	0	0	0	0
4:35 PM	0	0	0	0	7	0	12	0	0	58	37	0	47	70	0	1	231	0	0	0	0
4:40 PM	0	0	0	0	11	0	11	0	0	64	48	0	34	93	0	0	261	2	1	0	0
4:45 PM	0	0	0	0	15	0	13	0	0	72	41	0	53	97	0	0	291	0	1	0	0
4:50 PM	0	0	0	0	9	0	17	1	0	62	46	0	52	83	0	0	269	0	0	0	0
4:55 PM	0	0	0	0	9	0	8	0	0	55	56	0	56	80	0	0	264	1	0	0	0
5:00 PM	0	0	0	0	5	0	15	0	0	73	63	0	26	71	0	0	253	1	0	0	0
5:05 PM	0	0	0	0	4	0	11	0	0	77	52	0	55	100	0	0	299	0	1	0	0
5:10 PM	0	0	0	0	16	0	6	0	0	89	46	0	50	75	0	0	282	2	0	0	0
5:15 PM	0	0	0	0	12	1	12	0	0	62	45	0	45	76	0	0	253	0	3	0	0
5:20 PM	0	0	0	0	12	0	8	0	0	83	49	0	42	95	0	0	289	1	0	0	0
5:25 PM	0	0	0	0	3	0	11	0	0	95	46	0	51	90	0	0	296	0	1	0	1
5:30 PM	0	0	0	0	7	0	12	0	0	49	50	0	48	76	0	1	242	1	1	0	0
5:35 PM	0	0	0	0	17	0	19	0	0	74	57	0	36	66	0	2	269	0	0	0	0
5:40 PM	0	0	0	0	11	0	18	0	0	75	44	0	34	106	0	0	288	1	4	0	0
5:45 PM	0	0	0	0	11	0	7	0	0	79	43	0	45	87	0	1	272	2	0	0	2
5:50 PM	0	0	0	0	5	0	10	0	0	60	54	2	51	75	0	0	255	0	0	0	0
5:55 PM	0	0	0	0	10	0	11	0	0	66	42	0	45	86	0	0	260	0	0	0	0
Total Survey	0	0	0	0	223	1	269	1	0	1,707	1,151	2	1,070	1,951	0	7	6,372	20	17	0	3

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound I-5 SB Ramp				Southbound I-5 SB Ramp				Eastbound SW Wilsonville Rd				Westbound SW Wilsonville Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	0	0	0	0	19	0	33	0	0	234	148	0	117	219	0	0	770	0	2	0	0
4:15 PM	0	0	0	0	36	0	26	0	0	214	139	0	132	219	0	1	766	9	3	0	0
4:30 PM	0	0	0	0	22	0	32	0	0	188	130	0	132	250	0	2	754	2	1	0	0
4:45 PM	0	0	0	0	33	0	38	1	0	189	143	0	161	260	0	0	824	1	1	0	0
5:00 PM	0	0	0	0	25	0	32	0	0	239	161	0	131	246	0	0	834	3	1	0	0
5:15 PM	0	0	0	0	27	1	31	0	0	240	140	0	138	261	0	0	838	1	4	0	1
5:30 PM	0	0	0	0	35	0	49	0	0	198	151	0	118	248	0	3	799	2	5	0	0
5:45 PM	0	0	0	0	26	0	28	0	0	205	139	2	141	248	0	1	787	2	0	0	2
Total Survey	0	0	0	0	223	1	269	1	0	1,707	1,151	2	1,070	1,951	0	7	6,372	20	17	0	3

Peak Hour Summary
4:45 PM to 5:45 PM

By Approach	Northbound I-5 SB Ramp				Southbound I-5 SB Ramp				Eastbound SW Wilsonville Rd				Westbound SW Wilsonville Rd				Total
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	
Volume	0	1,144	1,144	0	271	0	271	1	1,461	1,165	2,626	0	1,563	986	2,549	3	3,295
%HV	0.0%				3.3%				2.4%				3.0%				2.8%
PHF	0.00				0.81				0.91				0.93				0.98

Pedestrians Crosswalk			
North	South	East	West
7	11	0	1

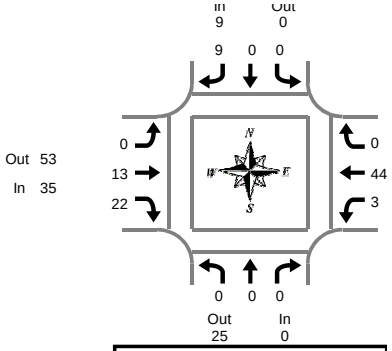
By Movement	Northbound I-5 SB Ramp				Southbound I-5 SB Ramp				Eastbound SW Wilsonville Rd				Westbound SW Wilsonville Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	0	0	0	120	1	150	271	0	866	595	1,461	548	1,015	0	1,563	3,295
%HV	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.0%	3.3%	0.0%	1.5%	3.7%	2.4%	0.5%	4.3%	0.0%	3.0%	2.8%
PHF	0.00	0.00	0.00	0.00	0.75	0.25	0.77	0.81	0.00	0.90	0.87	0.91	0.85	0.97	0.00	0.93	0.98

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound I-5 SB Ramp				Southbound I-5 SB Ramp				Eastbound SW Wilsonville Rd				Westbound SW Wilsonville Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	0	0	0	0	110	0	129	1	0	825	560	0	542	948	0	3	3,114	12	7	0	0
4:15 PM	0	0	0	0	116	0	128	1	0	830	573	0	556	975	0	3	3,178	15	6	0	0
4:30 PM	0	0	0	0	107	1	133	1	0	856	574	0	562	1,017	0	2	3,250	7	7	0	1
4:45 PM	0	0	0	0	120	1	150	1	0	866	595	0	548	1,015	0	3	3,295	7	11	0	1
5:00 PM	0	0	0	0	113	1	140	0	0	882	591	2	528	1,003	0	4	3,258	8	10	0	3

Heavy Vehicle Summary

All Traffic Data
Services Inc.
Clay Carney
(503) 833-2740



I-5 SB Ramp & SW Wilsonville Rd

Wednesday, June 07, 2017
4:00 PM to 6:00 PM

Peak Hour Summary
4:45 PM to 5:45 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound I-5 SB Ramp				Southbound I-5 SB Ramp				Eastbound SW Wilsonville Rd				Westbound SW Wilsonville Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	0	0	0	0	0	5	0	5	0	2	0	2	7
4:05 PM	0	0	0	0	0	0	3	3	0	6	2	8	0	4	0	4	15
4:10 PM	0	0	0	0	0	0	0	0	0	3	3	6	0	2	0	2	8
4:15 PM	0	0	0	0	0	0	1	1	0	5	0	5	4	7	0	11	17
4:20 PM	0	0	0	0	0	0	1	1	0	3	2	5	0	5	0	5	11
4:25 PM	0	0	0	0	0	0	1	1	0	2	0	2	1	5	0	6	9
4:30 PM	0	0	0	0	1	0	1	2	0	1	1	2	1	4	0	5	9
4:35 PM	0	0	0	0	0	0	1	1	0	1	0	1	0	3	0	3	5
4:40 PM	0	0	0	0	1	0	0	1	0	2	3	5	1	6	0	7	13
4:45 PM	0	0	0	0	0	0	0	0	0	3	5	8	0	3	0	3	11
4:50 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	5	0	5	6
4:55 PM	0	0	0	0	0	0	1	1	0	1	1	2	0	2	0	2	5
5:00 PM	0	0	0	0	0	0	0	0	0	0	3	3	0	12	0	12	15
5:05 PM	0	0	0	0	0	0	1	1	0	1	1	2	0	4	0	4	7
5:10 PM	0	0	0	0	0	0	2	2	0	2	1	3	0	0	0	0	5
5:15 PM	0	0	0	0	0	0	1	1	0	1	2	3	1	3	0	4	8
5:20 PM	0	0	0	0	0	0	0	0	0	3	1	4	0	7	0	7	11
5:25 PM	0	0	0	0	0	0	1	1	0	0	1	1	0	3	0	3	5
5:30 PM	0	0	0	0	0	0	0	0	0	0	2	2	0	2	0	2	4
5:35 PM	0	0	0	0	0	0	1	1	0	1	1	2	0	0	0	0	3
5:40 PM	0	0	0	0	0	0	2	2	0	1	3	4	2	3	0	5	11
5:45 PM	0	0	0	0	1	0	0	1	0	4	2	6	2	5	0	7	14
5:50 PM	0	0	0	0	0	0	1	1	0	1	0	1	1	1	0	2	4
5:55 PM	0	0	0	0	2	0	1	3	0	0	1	1	0	2	0	2	6
Total Survey	0	0	0	0	5	0	19	24	0	46	36	82	13	90	0	103	209

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound I-5 SB Ramp				Southbound I-5 SB Ramp				Eastbound SW Wilsonville Rd				Westbound SW Wilsonville Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	0	0	3	3	0	14	5	19	0	8	0	8	30
4:15 PM	0	0	0	0	0	0	3	3	0	10	2	12	5	17	0	22	37
4:30 PM	0	0	0	0	2	0	2	4	0	4	4	8	2	13	0	15	27
4:45 PM	0	0	0	0	0	0	1	1	0	4	7	11	0	10	0	10	22
5:00 PM	0	0	0	0	0	0	3	3	0	3	5	8	0	16	0	16	27
5:15 PM	0	0	0	0	0	0	2	2	0	4	4	8	1	13	0	14	24
5:30 PM	0	0	0	0	0	0	3	3	0	2	6	8	2	5	0	7	18
5:45 PM	0	0	0	0	3	0	2	5	0	5	3	8	3	8	0	11	24
Total Survey	0	0	0	0	5	0	19	24	0	46	36	82	13	90	0	103	209

Heavy Vehicle Peak Hour Summary
4:45 PM to 5:45 PM

By Approach	Northbound I-5 SB Ramp			Southbound I-5 SB Ramp			Eastbound SW Wilsonville Rd			Westbound SW Wilsonville Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	25	25	9	0	9	35	53	88	47	13	60	91
PHF	0.00			0.56			0.80			0.62			0.84

By Movement	Northbound I-5 SB Ramp				Southbound I-5 SB Ramp				Eastbound SW Wilsonville Rd				Westbound SW Wilsonville Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	0	0	0	0	0	9	9	0	13	22	35	3	44	0	47	91
PHF	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.56	0.00	0.54	0.79	0.80	0.38	0.58	0.00	0.62	0.84

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

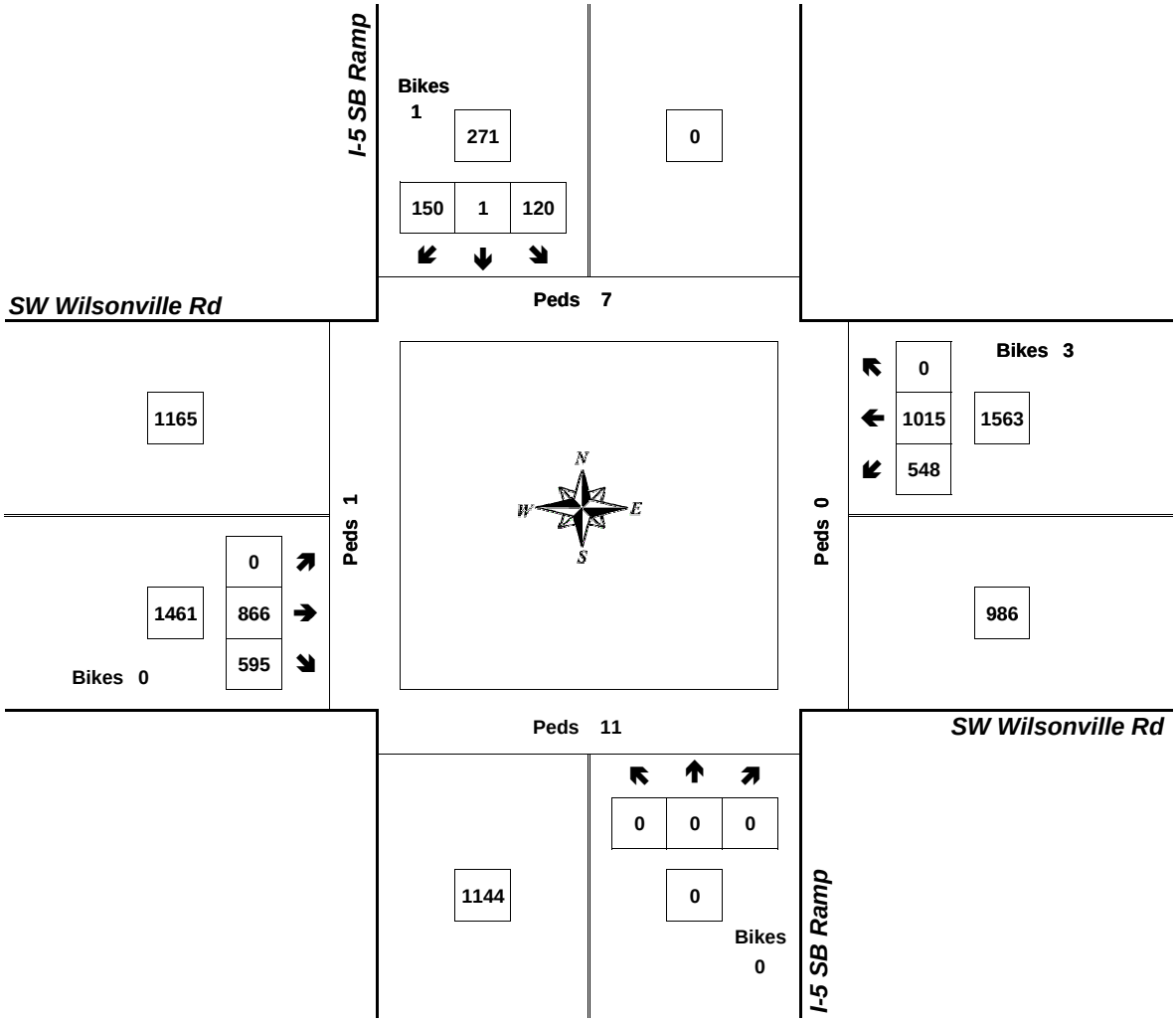
Interval Start Time	Northbound I-5 SB Ramp				Southbound I-5 SB Ramp				Eastbound SW Wilsonville Rd				Westbound SW Wilsonville Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	2	0	9	11	0	32	18	50	7	48	0	55	116
4:15 PM	0	0	0	0	2	0	9	11	0	21	18	39	7	56	0	63	113
4:30 PM	0	0	0	0	2	0	8	10	0	15	20	35	3	52	0	55	100
4:45 PM	0	0	0	0	0	0	9	9	0	13	22	35	3	44	0	47	91
5:00 PM	0	0	0	0	3	0	10	13	0	14	18	32	6	42	0	48	93

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

I-5 SB Ramp & SW Wilsonville Rd

4:45 PM to 5:45 PM
Wednesday, June 07, 2017

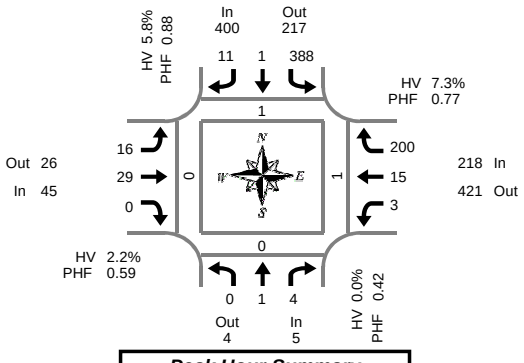


Approach	PHF	HV%	Volume
EB	0.91	2.4%	1,461
WB	0.93	3.0%	1,563
NB	0.00	0.0%	0
SB	0.81	3.3%	271
Intersection	0.98	2.8%	3,295

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:30 PM to 5:30 PM

SW 95th Ave & SW Boeckman Rd

Wednesday, June 07, 2017
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 95th Ave				Southbound SW 95th Ave				Eastbound SW Boeckman Rd				Westbound SW Boeckman Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	0	1	1	0	24	1	2	0	2	2	0	0	0	1	14	0	48	0	0	0	0
4:05 PM	0	1	2	0	39	0	1	0	6	3	0	0	0	0	15	1	67	0	0	0	0
4:10 PM	0	0	1	0	33	0	3	0	2	2	0	0	0	1	19	0	61	0	0	0	0
4:15 PM	0	2	0	0	40	0	1	0	1	4	0	0	0	0	16	0	64	0	0	0	0
4:20 PM	0	0	0	0	24	0	1	0	1	1	0	0	0	0	11	0	38	0	0	0	0
4:25 PM	0	0	0	0	31	1	1	0	1	3	0	0	0	0	14	0	51	0	0	0	0
4:30 PM	0	0	2	0	36	0	0	0	1	4	0	0	1	2	17	0	63	0	0	0	0
4:35 PM	0	1	0	0	35	0	3	5	2	3	0	0	0	1	18	0	63	0	0	0	0
4:40 PM	0	0	0	0	27	0	1	1	1	1	0	1	1	1	13	0	45	1	0	1	0
4:45 PM	0	0	0	0	36	0	0	0	1	0	0	0	0	1	15	1	53	0	0	0	0
4:50 PM	0	0	2	0	23	0	1	1	1	2	0	0	1	1	17	0	48	0	0	0	0
4:55 PM	0	0	0	0	33	1	0	0	2	3	0	0	0	0	8	0	47	0	0	0	0
5:00 PM	0	0	0	0	35	0	0	0	0	1	0	0	0	2	15	0	53	0	0	0	0
5:05 PM	0	0	0	0	35	0	0	0	2	1	0	0	0	2	17	1	57	0	0	0	0
5:10 PM	0	0	0	0	37	0	1	0	1	6	0	0	0	1	13	0	59	0	0	0	0
5:15 PM	0	0	0	0	40	0	1	0	3	2	0	0	0	1	25	0	72	0	0	0	0
5:20 PM	0	0	0	0	27	0	2	0	2	5	0	0	0	3	14	0	53	0	0	0	0
5:25 PM	0	0	0	0	24	0	2	0	0	1	0	0	0	0	28	0	55	0	0	0	0
5:30 PM	0	1	0	0	30	0	1	0	0	1	0	0	0	1	16	0	50	0	0	0	0
5:35 PM	0	0	1	0	33	0	0	0	0	1	0	0	0	2	11	0	48	0	0	0	0
5:40 PM	0	1	0	0	35	0	3	0	0	2	0	0	0	2	18	1	61	0	0	0	0
5:45 PM	0	0	1	0	29	0	1	0	0	2	0	0	0	0	11	1	44	0	0	0	0
5:50 PM	0	0	0	0	30	0	0	0	0	0	0	0	0	0	15	0	45	0	0	0	0
5:55 PM	0	0	0	0	29	0	2	0	0	1	0	0	0	2	16	0	50	0	0	0	0
Total Survey	0	7	10	0	765	3	27	7	29	51	0	1	3	24	376	5	1,295	1	0	1	0

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 95th Ave				Southbound SW 95th Ave				Eastbound SW Boeckman Rd				Westbound SW Boeckman Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	0	2	4	0	96	1	6	0	10	7	0	0	0	2	48	1	176	0	0	0	0
4:15 PM	0	2	0	0	95	1	3	0	3	8	0	0	0	0	41	0	153	0	0	0	0
4:30 PM	0	1	2	0	98	0	4	6	4	8	0	1	2	4	48	0	171	1	0	1	0
4:45 PM	0	0	2	0	92	1	1	1	4	5	0	0	1	2	40	1	148	0	0	0	0
5:00 PM	0	0	0	0	107	0	1	0	3	8	0	0	0	5	45	1	169	0	0	0	0
5:15 PM	0	0	0	0	91	0	5	0	5	8	0	0	0	4	67	0	180	0	0	0	0
5:30 PM	0	2	1	0	98	0	4	0	0	4	0	0	0	5	45	1	159	0	0	0	0
5:45 PM	0	0	1	0	88	0	3	0	0	3	0	0	0	2	42	1	139	0	0	0	0
Total Survey	0	7	10	0	765	3	27	7	29	51	0	1	3	24	376	5	1,295	1	0	1	0

Peak Hour Summary
4:30 PM to 5:30 PM

By Approach	Northbound SW 95th Ave				Southbound SW 95th Ave				Eastbound SW Boeckman Rd				Westbound SW Boeckman Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	5	4	9	0	400	217	617	7	45	26	71	1	218	421	639	2	668	1	0	1	0
%HV	0.0%				5.8%				2.2%				7.3%				6.0%				
PHF	0.42				0.88				0.59				0.77				0.89				

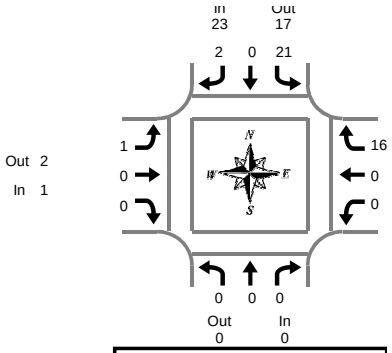
By Movement	Northbound SW 95th Ave				Southbound SW 95th Ave				Eastbound SW Boeckman Rd				Westbound SW Boeckman Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	1	4	5	388	1	11	400	16	29	0	45	3	15	200	218	668
%HV	0.0%	0.0%	0.0%	0.0%	5.4%	0.0%	18.2%	5.8%	6.3%	0.0%	0.0%	2.2%	0.0%	0.0%	8.0%	7.3%	6.0%
PHF	0.00	0.25	0.50	0.42	0.87	0.25	0.55	0.88	0.67	0.56	0.00	0.59	0.38	0.75	0.75	0.77	0.89

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 95th Ave				Southbound SW 95th Ave				Eastbound SW Boeckman Rd				Westbound SW Boeckman Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	0	5	8	0	381	3	14	7	21	28	0	1	3	8	177	2	648	1	0	1	0
4:15 PM	0	3	4	0	392	2	9	7	14	29	0	1	3	11	174	2	641	1	0	1	0
4:30 PM	0	1	4	0	388	1	11	7	16	29	0	1	3	15	200	2	668	1	0	1	0
4:45 PM	0	2	3	0	388	1	11	1	12	25	0	0	1	16	197	3	656	0	0	0	0
5:00 PM	0	2	2	0	384	0	13	0	8	23	0	0	0	16	199	3	647	0	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



SW 95th Ave & SW Boeckman Rd

Wednesday, June 07, 2017
4:00 PM to 6:00 PM

Peak Hour Summary
4:30 PM to 5:30 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 95th Ave				Southbound SW 95th Ave				Eastbound SW Boeckman Rd				Westbound SW Boeckman Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:05 PM	0	0	0	0	3	0	0	3	1	0	0	1	0	0	2	2	6
4:10 PM	0	0	0	0	3	0	1	4	0	0	0	0	0	0	2	2	6
4:15 PM	0	0	0	0	3	0	0	3	0	0	0	0	0	0	3	3	6
4:20 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	1	2
4:25 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
4:30 PM	0	0	0	0	2	0	0	2	0	0	0	0	0	0	3	3	5
4:35 PM	0	0	0	0	4	0	1	5	0	0	0	0	0	0	3	3	8
4:40 PM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	2
4:45 PM	0	0	0	0	5	0	0	5	0	0	0	0	0	0	0	0	5
4:50 PM	0	0	0	0	2	0	0	2	1	0	0	1	0	0	3	3	6
4:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2
5:05 PM	0	0	0	0	2	0	0	2	0	0	0	0	0	0	2	2	4
5:10 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1
5:15 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2	2	3
5:20 PM	0	0	0	0	3	0	0	3	0	0	0	0	0	0	0	0	3
5:25 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:35 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	1	2
5:40 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:50 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1
5:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Total Survey	0	0	0	0	34	0	3	37	3	0	0	3	0	0	26	26	66

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 95th Ave				Southbound SW 95th Ave				Eastbound SW Boeckman Rd				Westbound SW Boeckman Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	6	0	1	7	1	0	0	1	0	0	4	4	12
4:15 PM	0	0	0	0	4	0	0	4	1	0	0	1	0	0	4	4	9
4:30 PM	0	0	0	0	6	0	2	8	0	0	0	0	0	0	7	7	15
4:45 PM	0	0	0	0	7	0	0	7	1	0	0	1	0	0	3	3	11
5:00 PM	0	0	0	0	3	0	0	3	0	0	0	0	0	0	4	4	7
5:15 PM	0	0	0	0	5	0	0	5	0	0	0	0	0	0	2	2	7
5:30 PM	0	0	0	0	2	0	0	2	0	0	0	0	0	0	1	1	3
5:45 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	1	2
Total Survey	0	0	0	0	34	0	3	37	3	0	0	3	0	0	26	26	66

Heavy Vehicle Peak Hour Summary
4:30 PM to 5:30 PM

By Approach	Northbound SW 95th Ave			Southbound SW 95th Ave			Eastbound SW Boeckman Rd			Westbound SW Boeckman Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	0	0	23	17	40	1	2	3	16	21	37	40
PHF	0.00			0.52			0.25			0.57			0.67

By Movement	Northbound SW 95th Ave				Southbound SW 95th Ave				Eastbound SW Boeckman Rd				Westbound SW Boeckman Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	0	0	0	21	0	2	23	1	0	0	1	0	0	16	16	40
PHF	0.00	0.00	0.00	0.00	0.58	0.00	0.25	0.52	0.25	0.00	0.00	0.25	0.00	0.00	0.57	0.57	0.67

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

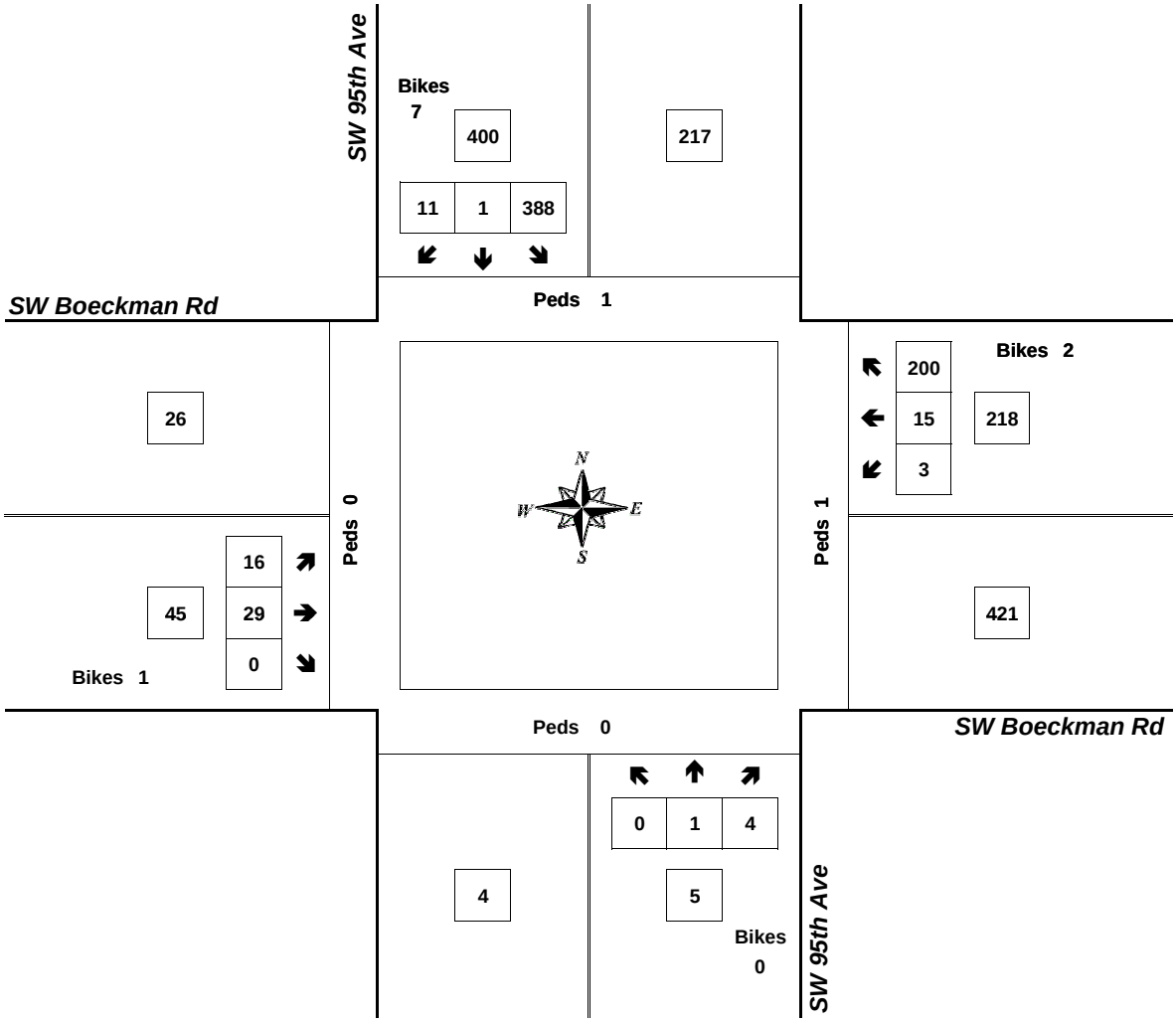
Interval Start Time	Northbound SW 95th Ave				Southbound SW 95th Ave				Eastbound SW Boeckman Rd				Westbound SW Boeckman Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	23	0	3	26	3	0	0	3	0	0	18	18	47
4:15 PM	0	0	0	0	20	0	2	22	2	0	0	2	0	0	18	18	42
4:30 PM	0	0	0	0	21	0	2	23	1	0	0	1	0	0	16	16	40
4:45 PM	0	0	0	0	17	0	0	17	1	0	0	1	0	0	10	10	28
5:00 PM	0	0	0	0	11	0	0	11	0	0	0	0	0	0	8	8	19

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

SW 95th Ave & SW Boeckman Rd

4:30 PM to 5:30 PM
Wednesday, June 07, 2017

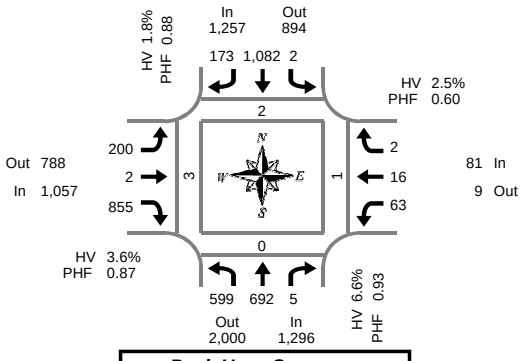


Approach	PHF	HV%	Volume
EB	0.59	2.2%	45
WB	0.77	7.3%	218
NB	0.42	0.0%	5
SB	0.88	5.8%	400
Intersection	0.89	6.0%	668

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:40 PM to 5:40 PM

SW Boones Ferry Rd & SW 95th Ave

Wednesday, June 07, 2017
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW Boones Ferry Rd				Southbound SW Boones Ferry Rd				Eastbound SW 95th Ave				Westbound SW 95th Ave				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	41	46	1	0	0	80	14	0	17	0	77	0	6	3	0	0	285	0	0	0	1
4:05 PM	51	60	0	0	1	72	17	0	18	0	99	0	4	0	0	0	322	0	0	0	0
4:10 PM	52	51	0	0	1	75	9	0	14	0	95	0	2	3	0	0	302	0	0	0	0
4:15 PM	51	57	2	0	0	79	5	1	14	0	66	0	1	1	0	0	276	1	0	0	0
4:20 PM	45	48	1	0	0	86	8	0	16	0	55	0	0	1	0	0	260	0	0	0	0
4:25 PM	43	44	0	0	1	110	16	0	9	0	59	0	4	0	0	0	286	0	0	0	0
4:30 PM	49	46	3	0	0	85	4	0	11	0	93	0	4	1	0	0	296	1	0	1	1
4:35 PM	35	53	0	0	0	77	17	1	15	0	83	0	6	3	0	0	289	0	0	0	0
4:40 PM	47	56	1	0	0	93	10	0	10	0	83	0	4	3	0	0	307	0	0	0	1
4:45 PM	51	57	1	0	0	72	14	0	25	0	74	0	5	1	2	0	302	1	0	1	0
4:50 PM	42	62	0	0	0	95	17	0	16	0	67	0	5	3	0	0	307	0	0	0	0
4:55 PM	42	59	2	0	0	97	22	0	12	0	67	0	3	1	0	0	305	0	0	0	1
5:00 PM	38	60	0	0	0	87	15	0	15	1	84	0	14	3	0	0	317	1	0	0	1
5:05 PM	49	51	0	0	0	82	12	0	17	0	90	0	10	1	0	0	312	0	0	0	0
5:10 PM	52	69	0	0	0	84	15	0	16	0	82	0	4	2	0	0	324	0	0	0	0
5:15 PM	58	54	0	0	0	82	14	0	17	0	79	1	3	0	0	0	307	0	0	0	0
5:20 PM	54	62	1	0	0	81	8	0	13	0	65	0	2	1	0	0	287	0	0	0	0
5:25 PM	52	51	0	1	1	119	14	0	18	1	36	1	5	1	0	0	298	0	0	0	0
5:30 PM	63	50	0	0	0	100	20	0	24	0	60	0	6	0	0	0	323	0	0	0	0
5:35 PM	51	61	0	0	1	90	12	0	17	0	68	0	2	0	0	0	302	0	0	0	0
5:40 PM	53	55	0	0	1	73	14	0	16	0	57	0	3	2	0	0	274	0	0	0	0
5:45 PM	65	54	0	0	0	86	12	0	17	1	51	0	0	2	0	0	288	0	0	0	0
5:50 PM	52	51	0	0	0	46	12	0	13	0	42	0	1	2	0	0	219	0	0	0	0
5:55 PM	56	48	1	0	0	73	14	0	12	0	34	0	2	0	0	0	240	0	0	0	0
Total Survey	1,192	1,305	13	1	6	2,024	315	2	372	3	1,666	2	96	34	2	0	7,028	4	0	2	5

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW Boones Ferry Rd				Southbound SW Boones Ferry Rd				Eastbound SW 95th Ave				Westbound SW 95th Ave				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	144	157	1	0	2	227	40	0	49	0	271	0	12	6	0	0	909	0	0	0	1
4:15 PM	139	149	3	0	1	275	29	1	39	0	180	0	5	2	0	0	822	1	0	0	0
4:30 PM	131	155	4	0	0	255	31	1	36	0	259	0	14	7	0	0	892	1	0	1	2
4:45 PM	135	178	3	0	0	264	53	0	53	0	208	0	13	5	2	0	914	1	0	1	1
5:00 PM	139	180	0	0	0	253	42	0	48	1	256	0	28	6	0	0	953	1	0	0	1
5:15 PM	164	167	1	1	1	282	36	0	48	1	180	2	10	2	0	0	892	0	0	0	0
5:30 PM	167	166	0	0	2	263	46	0	57	0	185	0	11	2	0	0	899	0	0	0	0
5:45 PM	173	153	1	0	0	205	38	0	42	1	127	0	3	4	0	0	747	0	0	0	0
Total Survey	1,192	1,305	13	1	6	2,024	315	2	372	3	1,666	2	96	34	2	0	7,028	4	0	2	5

Peak Hour Summary
4:40 PM to 5:40 PM

By Approach	Northbound SW Boones Ferry Rd				Southbound SW Boones Ferry Rd				Eastbound SW 95th Ave				Westbound SW 95th Ave				Total
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	
Volume	1,296	2,000	3,296	1	1,257	894	2,151	0	1,057	788	1,845	2	81	9	90	0	3,691
%HV	6.6%				1.8%				3.6%				2.5%				4.0%
PHF	0.93				0.88				0.87				0.60				0.97

Pedestrians Crosswalk			
North	South	East	West
2	0	1	3

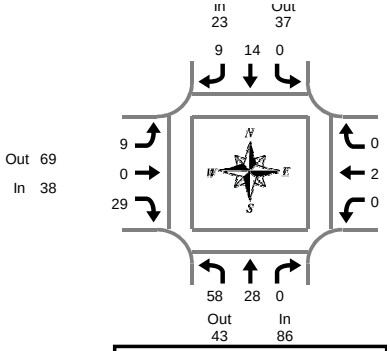
By Movement	Northbound SW Boones Ferry Rd				Southbound SW Boones Ferry Rd				Eastbound SW 95th Ave				Westbound SW 95th Ave				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	599	692	5	1,296	2	1,082	173	1,257	200	2	855	1,057	63	16	2	81	3,691
%HV	9.7%	4.0%	0.0%	6.6%	0.0%	1.3%	5.2%	1.8%	4.5%	0.0%	3.4%	3.6%	0.0%	12.5%	0.0%	2.5%	4.0%
PHF	0.89	0.94	0.42	0.93	0.25	0.88	0.80	0.88	0.85	0.50	0.83	0.87	0.56	0.57	0.25	0.60	0.97

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW Boones Ferry Rd				Southbound SW Boones Ferry Rd				Eastbound SW 95th Ave				Westbound SW 95th Ave				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	549	639	11	0	3	1,021	153	2	177	0	918	0	44	20	2	0	3,537	3	0	2	4
4:15 PM	544	662	10	0	1	1,047	155	2	176	1	903	0	60	20	2	0	3,581	4	0	2	4
4:30 PM	569	680	8	1	1	1,054	162	1	185	2	903	2	65	20	2	0	3,651	3	0	2	4
4:45 PM	605	691	4	1	3	1,062	177	0	206	2	829	2	62	15	2	0	3,658	2	0	1	2
5:00 PM	643	666	2	1	3	1,003	162	0	195	3	748	2	52	14	0	0	3,491	1	0	0	1

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



SW Boones Ferry Rd & SW 95th Ave

Wednesday, June 07, 2017
4:00 PM to 6:00 PM

Peak Hour Summary
4:40 PM to 5:40 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW Boones Ferry Rd				Southbound SW Boones Ferry Rd				Eastbound SW 95th Ave				Westbound SW 95th Ave				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	3	3	0	6	0	3	0	3	3	0	3	6	0	1	0	1	16
4:05 PM	9	3	0	12	0	1	0	1	0	0	4	4	0	0	0	0	17
4:10 PM	12	3	0	15	0	5	0	5	0	0	5	5	0	0	0	0	25
4:15 PM	6	4	0	10	0	5	0	5	1	0	3	4	0	0	0	0	19
4:20 PM	7	2	0	9	0	4	1	5	2	0	0	2	0	0	0	0	16
4:25 PM	3	2	0	5	0	3	2	5	0	0	4	4	0	0	0	0	14
4:30 PM	10	3	0	13	0	3	0	3	1	0	6	7	0	0	0	0	23
4:35 PM	9	4	0	13	0	2	1	3	0	0	1	1	0	0	0	0	17
4:40 PM	7	7	0	14	0	0	1	1	1	0	3	4	0	1	0	1	20
4:45 PM	4	8	0	12	0	3	0	3	1	0	2	3	0	0	0	0	18
4:50 PM	4	2	0	6	0	0	2	2	1	0	3	4	0	0	0	0	12
4:55 PM	5	2	0	7	0	3	2	5	1	0	4	5	0	0	0	0	17
5:00 PM	6	1	0	7	0	0	1	1	0	0	1	1	0	0	0	0	9
5:05 PM	4	1	0	5	0	1	1	2	0	0	4	4	0	0	0	0	11
5:10 PM	4	1	0	5	0	1	0	1	1	0	3	4	0	1	0	1	11
5:15 PM	8	1	0	9	0	4	0	4	1	0	5	6	0	0	0	0	19
5:20 PM	2	1	0	3	0	0	0	0	0	0	1	1	0	0	0	0	4
5:25 PM	2	2	0	4	0	0	1	1	0	0	1	1	0	0	0	0	6
5:30 PM	9	2	0	11	0	1	0	1	3	0	0	3	0	0	0	0	15
5:35 PM	3	0	0	3	0	1	1	2	0	0	2	2	0	0	0	0	7
5:40 PM	2	4	0	6	0	1	0	1	1	0	2	3	0	1	0	1	11
5:45 PM	4	0	0	4	0	2	0	2	0	0	3	3	0	0	0	0	9
5:50 PM	4	3	0	7	0	0	2	2	2	0	2	4	0	0	0	0	13
5:55 PM	0	3	0	3	0	2	0	2	1	0	4	5	0	0	0	0	10
Total Survey	127	62	0	189	0	45	15	60	20	0	66	86	0	4	0	4	339

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW Boones Ferry Rd				Southbound SW Boones Ferry Rd				Eastbound SW 95th Ave				Westbound SW 95th Ave				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	24	9	0	33	0	9	0	9	3	0	12	15	0	1	0	1	58
4:15 PM	16	8	0	24	0	12	3	15	3	0	7	10	0	0	0	0	49
4:30 PM	26	14	0	40	0	5	2	7	2	0	10	12	0	1	0	1	60
4:45 PM	13	12	0	25	0	6	4	10	3	0	9	12	0	0	0	0	47
5:00 PM	14	3	0	17	0	2	2	4	1	0	8	9	0	1	0	1	31
5:15 PM	12	4	0	16	0	4	1	5	1	0	7	8	0	0	0	0	29
5:30 PM	14	6	0	20	0	3	1	4	4	0	4	8	0	1	0	1	33
5:45 PM	8	6	0	14	0	4	2	6	3	0	9	12	0	0	0	0	32
Total Survey	127	62	0	189	0	45	15	60	20	0	66	86	0	4	0	4	339

Heavy Vehicle Peak Hour Summary
4:40 PM to 5:40 PM

By Approach	Northbound SW Boones Ferry Rd			Southbound SW Boones Ferry Rd			Eastbound SW 95th Ave			Westbound SW 95th Ave			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	86	43	129	23	37	60	38	69	107	2	0	2	149
PHF	0.67			0.58			0.68			0.50			0.75

By Movement	Northbound SW Boones Ferry Rd				Southbound SW Boones Ferry Rd				Eastbound SW 95th Ave				Westbound SW 95th Ave				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	58	28	0	86	0	14	9	23	9	0	29	38	0	2	0	2	149
PHF	0.91	0.41	0.00	0.67	0.00	0.58	0.45	0.58	0.75	0.00	0.60	0.68	0.00	0.50	0.00	0.50	0.75

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

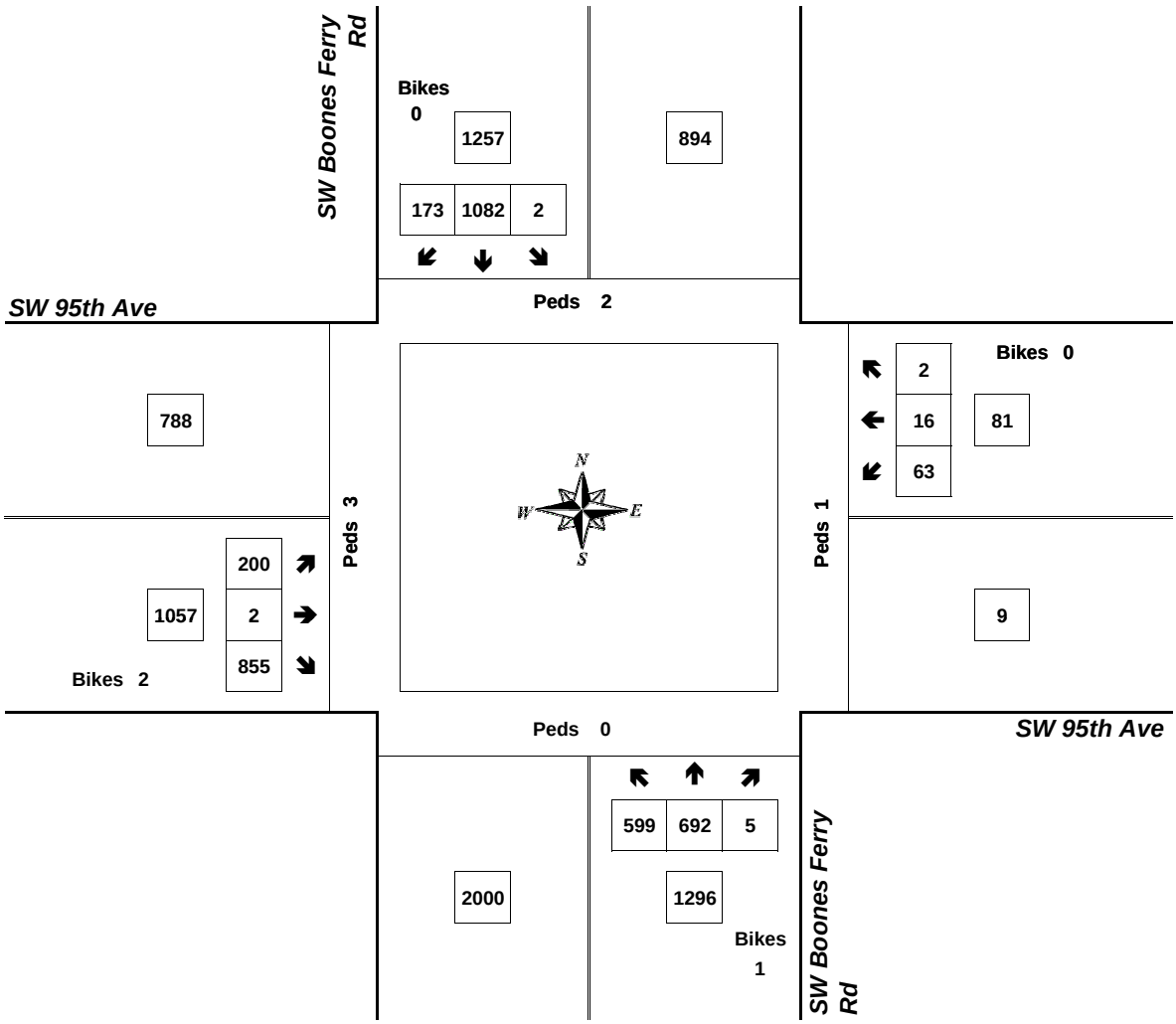
Interval Start Time	Northbound SW Boones Ferry Rd				Southbound SW Boones Ferry Rd				Eastbound SW 95th Ave				Westbound SW 95th Ave				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	79	43	0	122	0	32	9	41	11	0	38	49	0	2	0	2	214
4:15 PM	69	37	0	106	0	25	11	36	9	0	34	43	0	2	0	2	187
4:30 PM	65	33	0	98	0	17	9	26	7	0	34	41	0	2	0	2	167
4:45 PM	53	25	0	78	0	15	8	23	9	0	28	37	0	2	0	2	140
5:00 PM	48	19	0	67	0	13	6	19	9	0	28	37	0	2	0	2	125

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

SW Boones Ferry Rd & SW 95th Ave

4:40 PM to 5:40 PM
Wednesday, June 07, 2017

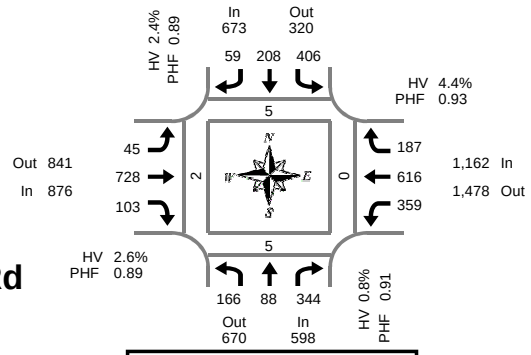


Approach	PHF	HV%	Volume
EB	0.87	3.6%	1,057
WB	0.60	2.5%	81
NB	0.93	6.6%	1,296
SB	0.88	1.8%	1,257
Intersection	0.97	4.0%	3,691

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:50 PM to 5:50 PM

SW Boones Ferry Rd & SW Wilsonville Rd

Wednesday, June 07, 2017
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW Boones Ferry Rd				Southbound SW Boones Ferry Rd				Eastbound SW Wilsonville Rd				Westbound SW Wilsonville Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	18	0	28	0	34	6	0	0	3	71	8	0	35	39	14	0	256	0	1	0	0
4:05 PM	9	7	28	0	52	18	6	0	4	71	7	0	20	40	12	0	274	1	0	0	0
4:10 PM	6	4	23	0	35	17	2	0	1	69	8	0	25	48	14	0	252	0	0	0	0
4:15 PM	12	9	30	0	30	9	8	0	1	60	9	0	38	42	14	1	262	2	0	0	0
4:20 PM	11	13	41	0	46	15	4	0	3	48	3	0	28	35	21	0	268	2	0	1	1
4:25 PM	22	11	31	0	39	14	1	0	3	76	13	0	16	33	14	0	273	3	0	0	0
4:30 PM	5	6	26	0	39	11	4	0	2	55	12	0	30	49	18	1	257	0	0	0	1
4:35 PM	17	11	33	2	31	7	1	0	3	62	8	0	37	42	13	3	265	1	0	0	2
4:40 PM	17	13	24	0	34	13	4	0	5	52	6	0	31	34	10	0	243	0	0	0	0
4:45 PM	11	8	19	0	42	13	5	0	0	58	4	0	28	55	9	0	252	0	0	0	1
4:50 PM	9	5	29	0	32	14	3	0	4	54	11	0	44	57	15	0	277	0	0	0	0
4:55 PM	10	3	42	0	23	14	6	0	3	59	8	0	26	47	15	0	256	0	0	0	0
5:00 PM	13	11	30	0	33	21	4	0	2	53	8	0	30	32	15	0	252	0	0	0	0
5:05 PM	8	7	22	0	48	14	9	0	5	73	10	0	24	62	16	0	298	0	0	0	0
5:10 PM	11	8	39	0	31	14	4	0	2	80	13	0	34	50	12	0	298	1	0	0	0
5:15 PM	19	7	23	0	39	22	5	0	4	43	7	0	32	42	14	0	257	1	0	0	0
5:20 PM	24	14	16	0	30	24	4	0	2	74	2	0	23	61	15	0	289	0	0	0	0
5:25 PM	18	6	34	0	39	13	7	0	6	74	6	0	30	57	18	0	308	0	2	0	0
5:30 PM	12	7	33	0	19	9	2	0	4	52	8	0	33	56	20	1	255	0	2	0	1
5:35 PM	15	11	23	0	47	22	4	0	7	39	12	0	23	42	19	0	264	0	1	0	1
5:40 PM	18	4	20	0	43	25	7	0	2	61	12	0	22	56	16	1	286	1	0	0	0
5:45 PM	9	5	33	0	22	16	4	0	4	66	6	0	38	54	12	0	269	2	0	0	0
5:50 PM	16	7	32	0	31	19	5	0	4	52	8	0	29	43	10	0	256	0	0	0	0
5:55 PM	12	9	27	0	38	12	6	0	1	31	4	0	31	38	12	0	221	2	0	0	1
Total Survey	322	186	686	2	857	362	105	0	75	1,433	193	0	707	1,114	348	7	6,388	16	6	1	8

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW Boones Ferry Rd				Southbound SW Boones Ferry Rd				Eastbound SW Wilsonville Rd				Westbound SW Wilsonville Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	33	11	79	0	121	41	8	0	8	211	23	0	80	127	40	0	782	1	1	0	0
4:15 PM	45	33	102	0	115	38	13	0	7	184	25	0	82	110	49	1	803	7	0	1	1
4:30 PM	39	30	83	2	104	31	9	0	10	169	26	0	98	125	41	4	765	1	0	0	3
4:45 PM	30	16	90	0	97	41	14	0	7	171	23	0	98	159	39	0	785	0	0	0	1
5:00 PM	32	26	91	0	112	49	17	0	9	206	31	0	88	144	43	0	848	1	0	0	0
5:15 PM	61	27	73	0	108	59	16	0	12	191	15	0	85	160	47	0	854	1	2	0	0
5:30 PM	45	22	76	0	109	56	13	0	13	152	32	0	78	154	55	2	805	1	3	0	2
5:45 PM	37	21	92	0	91	47	15	0	9	149	18	0	98	135	34	0	746	4	0	0	1
Total Survey	322	186	686	2	857	362	105	0	75	1,433	193	0	707	1,114	348	7	6,388	16	6	1	8

Peak Hour Summary
4:50 PM to 5:50 PM

By Approach	Northbound SW Boones Ferry Rd				Southbound SW Boones Ferry Rd				Eastbound SW Wilsonville Rd				Westbound SW Wilsonville Rd				Total
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	
Volume	598	670	1,268	0	673	320	993	0	876	841	1,717	0	1,162	1,478	2,640	2	3,309
%HV	0.8%				2.4%				2.6%				4.4%				2.9%
PHF	0.91				0.89				0.89				0.93				0.97

Pedestrians Crosswalk			
North	South	East	West
5	5	0	2

By Movement	Northbound SW Boones Ferry Rd				Southbound SW Boones Ferry Rd				Eastbound SW Wilsonville Rd				Westbound SW Wilsonville Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	166	88	344	598	406	208	59	673	45	728	103	876	359	616	187	1,162	3,309
%HV	0.0%	1.1%	1.2%	0.8%	3.0%	1.4%	1.7%	2.4%	6.7%	2.6%	1.0%	2.6%	0.6%	3.1%	16.0%	4.4%	2.9%
PHF	0.68	0.76	0.85	0.91	0.86	0.83	0.78	0.89	0.66	0.88	0.80	0.89	0.90	0.89	0.82	0.93	0.97

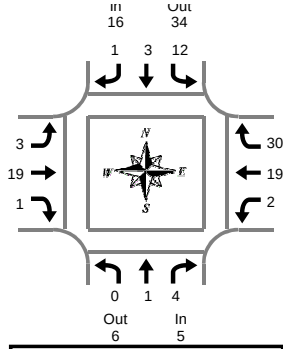
Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW Boones Ferry Rd				Southbound SW Boones Ferry Rd				Eastbound SW Wilsonville Rd				Westbound SW Wilsonville Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	147	90	354	2	437	151	44	0	32	735	97	0	358	521	169	5	3,135	9	1	1	5
4:15 PM	146	105	366	2	428	159	53	0	33	730	105	0	366	538	172	5	3,201	9	0	1	5
4:30 PM	162	99	337	2	421	180	56	0	38	737	95	0	369	588	170	4	3,252	3	2	0	4
4:45 PM	168	91	330	0	426	205	60	0	41	720	101	0	349	617	184	2	3,292	3	5	0	3
5:00 PM	175	96	332	0	420	211	61	0	43	698	96	0	349	593	179	2	3,253	7	5	0	3

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

Out 20
In 23



SW Boones Ferry Rd & SW Wilsonville Rd

Wednesday, June 07, 2017
4:00 PM to 6:00 PM

Peak Hour Summary
4:50 PM to 5:50 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW Boones Ferry Rd				Southbound SW Boones Ferry Rd				Eastbound SW Wilsonville Rd				Westbound SW Wilsonville Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	0	0	0	0	0	5	0	5	0	1	2	3	8
4:05 PM	0	1	1	2	5	1	1	7	0	5	0	5	0	4	1	5	19
4:10 PM	0	0	0	0	1	1	0	2	0	1	1	2	0	2	1	3	7
4:15 PM	0	1	0	1	1	0	0	1	0	2	0	2	1	4	4	9	13
4:20 PM	0	2	0	2	3	1	1	5	0	4	0	4	0	2	3	5	16
4:25 PM	0	0	0	0	1	0	0	1	0	1	1	2	0	2	5	7	10
4:30 PM	0	0	0	0	0	0	0	0	1	1	0	2	1	3	4	8	10
4:35 PM	0	0	1	1	0	0	0	0	0	1	0	1	0	1	3	4	6
4:40 PM	0	0	0	0	5	1	0	6	0	2	0	2	2	0	1	3	11
4:45 PM	0	1	2	3	1	0	0	1	0	1	0	1	0	2	2	4	9
4:50 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	1	4	5	6
4:55 PM	0	0	0	0	2	0	0	2	0	2	0	2	0	2	0	2	6
5:00 PM	0	0	0	0	2	0	0	2	0	0	0	0	1	1	5	7	9
5:05 PM	0	0	0	0	1	0	0	1	0	1	0	1	0	3	4	7	9
5:10 PM	0	0	1	1	2	1	0	3	0	3	0	3	0	2	3	5	12
5:15 PM	0	0	1	1	1	0	0	1	2	0	0	2	1	1	3	5	9
5:20 PM	0	1	0	1	1	0	0	1	0	3	0	3	0	4	2	6	11
5:25 PM	0	0	0	0	1	0	1	2	0	1	0	1	0	1	4	5	8
5:30 PM	0	0	0	0	0	1	0	1	1	3	0	4	0	0	2	2	7
5:35 PM	0	0	0	0	1	0	0	1	0	0	1	1	0	2	0	2	4
5:40 PM	0	0	0	0	0	1	0	1	0	4	0	4	0	0	1	1	6
5:45 PM	0	0	2	2	1	0	0	1	0	1	0	1	0	2	2	4	8
5:50 PM	0	0	0	0	1	0	0	1	0	0	0	0	1	2	1	4	5
5:55 PM	0	1	0	1	1	0	0	1	0	0	0	0	0	1	1	2	4
Total Survey	0	7	8	15	31	7	3	41	4	42	3	49	7	43	58	108	213

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW Boones Ferry Rd				Southbound SW Boones Ferry Rd				Eastbound SW Wilsonville Rd				Westbound SW Wilsonville Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	1	1	2	6	2	1	9	0	11	1	12	0	7	4	11	34
4:15 PM	0	3	0	3	5	1	1	7	0	7	1	8	1	8	12	21	39
4:30 PM	0	0	1	1	5	1	0	6	1	4	0	5	3	4	8	15	27
4:45 PM	0	1	2	3	3	0	0	3	0	4	0	4	0	5	6	11	21
5:00 PM	0	0	1	1	5	1	0	6	0	4	0	4	1	6	12	19	30
5:15 PM	0	1	1	2	3	0	1	4	2	4	0	6	1	6	9	16	28
5:30 PM	0	0	0	0	1	2	0	3	1	7	1	9	0	2	3	5	17
5:45 PM	0	1	2	3	3	0	0	3	0	1	0	1	1	5	4	10	17
Total Survey	0	7	8	15	31	7	3	41	4	42	3	49	7	43	58	108	213

Heavy Vehicle Peak Hour Summary
4:50 PM to 5:50 PM

By Approach	Northbound SW Boones Ferry Rd			Southbound SW Boones Ferry Rd			Eastbound SW Wilsonville Rd			Westbound SW Wilsonville Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	5	6	11	16	34	50	23	20	43	51	35	86	95
PHF	0.42			0.67			0.64			0.67			0.74

By Movement	Northbound SW Boones Ferry Rd				Southbound SW Boones Ferry Rd				Eastbound SW Wilsonville Rd				Westbound SW Wilsonville Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	1	4	5	12	3	1	16	3	19	1	23	2	19	30	51	95
PHF	0.00	0.25	0.50	0.42	0.60	0.38	0.25	0.67	0.38	0.68	0.25	0.64	0.50	0.68	0.63	0.67	0.74

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

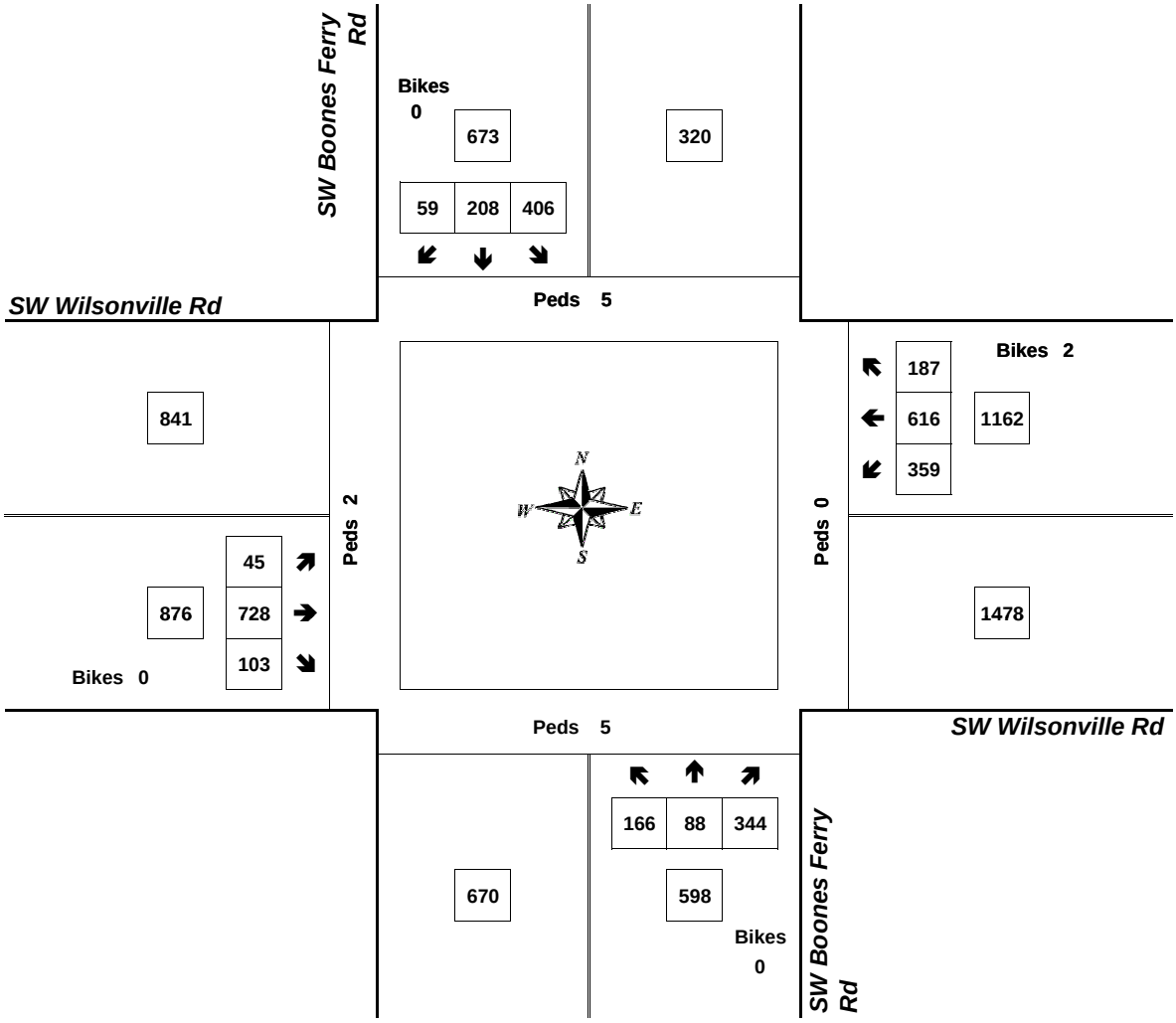
Interval Start Time	Northbound SW Boones Ferry Rd				Southbound SW Boones Ferry Rd				Eastbound SW Wilsonville Rd				Westbound SW Wilsonville Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	5	4	9	19	4	2	25	1	26	2	29	4	24	30	58	121
4:15 PM	0	4	4	8	18	3	1	22	1	19	1	21	5	23	38	66	117
4:30 PM	0	2	5	7	16	2	1	19	3	16	0	19	5	21	35	61	106
4:45 PM	0	2	4	6	12	3	1	16	3	19	1	23	2	19	30	51	96
5:00 PM	0	2	4	6	12	3	1	16	3	16	1	20	3	19	28	50	92

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

SW Boones Ferry Rd & SW Wilsonville Rd

4:50 PM to 5:50 PM
Wednesday, June 07, 2017

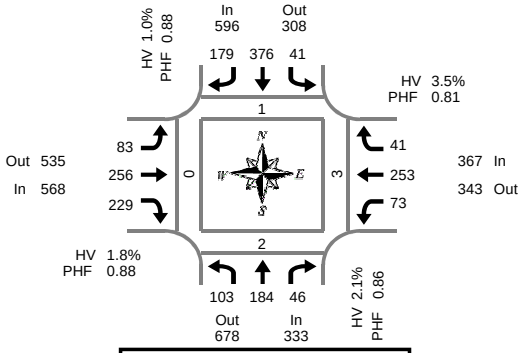


Approach	PHF	HV%	Volume
EB	0.89	2.6%	876
WB	0.93	4.4%	1,162
NB	0.91	0.8%	598
SB	0.89	2.4%	673
Intersection	0.97	2.9%	3,309

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:30 PM to 5:30 PM

SW Parkway Ave & SW Boeckman Rd

Tuesday, January 24, 2017
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW Parkway Ave				Southbound SW Parkway Ave				Eastbound SW Boeckman Rd				Westbound SW Boeckman Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	11	21	3	0	5	40	28	0	4	16	18	0	3	18	0	0	167	0	0	0	0
4:05 PM	10	5	2	0	2	36	10	0	7	22	18	0	4	16	5	0	137	0	0	0	0
4:10 PM	11	15	5	0	3	32	11	0	9	16	14	0	7	12	2	0	137	0	0	1	0
4:15 PM	10	13	5	0	2	30	14	0	7	20	23	0	4	17	3	0	148	0	0	0	0
4:20 PM	10	21	5	0	1	28	13	0	4	19	16	0	4	14	2	0	137	0	0	0	0
4:25 PM	8	12	4	0	3	32	10	0	0	20	17	0	4	12	1	0	123	0	0	0	0
4:30 PM	13	21	5	0	6	27	14	0	8	24	16	0	4	21	2	0	161	0	1	1	0
4:35 PM	7	15	7	0	2	35	15	0	8	22	16	0	4	18	2	0	151	0	0	0	0
4:40 PM	7	18	4	0	0	26	13	0	5	19	29	0	6	21	1	0	149	1	0	1	0
4:45 PM	8	14	4	0	3	28	13	0	3	27	20	0	3	14	5	0	142	0	0	0	0
4:50 PM	6	12	2	0	5	37	13	0	11	16	15	0	7	22	3	0	149	0	0	0	0
4:55 PM	8	12	4	0	3	22	14	0	7	18	19	0	4	15	3	0	129	0	1	1	0
5:00 PM	3	15	3	0	6	34	20	0	3	22	18	0	6	22	1	0	153	0	0	0	0
5:05 PM	8	14	2	0	3	40	15	0	6	17	19	1	12	25	6	0	167	0	0	0	0
5:10 PM	12	11	3	0	4	36	12	0	17	30	21	0	7	19	2	0	174	0	0	0	0
5:15 PM	10	21	3	0	2	32	16	0	2	23	26	0	5	32	5	0	177	0	0	0	0
5:20 PM	10	19	6	0	6	35	16	0	6	19	12	0	5	21	3	0	158	0	0	0	0
5:25 PM	11	12	3	0	1	24	18	0	7	19	18	0	10	23	8	0	154	0	0	0	0
5:30 PM	10	6	4	0	2	25	11	0	2	16	15	0	9	20	4	0	124	0	0	0	0
5:35 PM	6	16	5	0	5	23	14	0	3	10	29	0	5	11	2	0	129	0	0	0	0
5:40 PM	6	13	3	0	0	30	15	0	9	15	12	0	8	12	0	0	123	0	0	0	0
5:45 PM	17	10	4	0	2	17	7	0	4	16	18	0	3	12	1	0	111	0	0	0	0
5:50 PM	7	14	3	0	3	32	22	0	6	5	7	0	6	9	1	0	115	0	0	0	0
5:55 PM	4	12	4	0	3	29	9	0	12	13	11	0	10	15	4	1	126	0	0	1	0
Total Survey	213	342	93	0	72	730	343	0	150	444	427	1	140	421	66	1	3,441	1	2	5	0

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW Parkway Ave				Southbound SW Parkway Ave				Eastbound SW Boeckman Rd				Westbound SW Boeckman Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	32	41	10	0	10	108	49	0	20	54	50	0	14	46	7	0	441	0	0	1	0
4:15 PM	28	46	14	0	6	90	37	0	11	59	56	0	12	43	6	0	408	0	0	0	0
4:30 PM	27	54	16	0	8	88	42	0	21	65	61	0	14	60	5	0	461	1	1	2	0
4:45 PM	22	38	10	0	11	87	40	0	21	61	54	0	14	51	11	0	420	0	1	1	0
5:00 PM	23	40	8	0	13	110	47	0	26	69	58	1	25	66	9	0	494	0	0	0	0
5:15 PM	31	52	12	0	9	91	50	0	15	61	56	0	20	76	16	0	489	0	0	0	0
5:30 PM	22	35	12	0	7	78	40	0	14	41	56	0	22	43	6	0	376	0	0	0	0
5:45 PM	28	36	11	0	8	78	38	0	22	34	36	0	19	36	6	1	352	0	0	1	0
Total Survey	213	342	93	0	72	730	343	0	150	444	427	1	140	421	66	1	3,441	1	2	5	0

Peak Hour Summary
4:30 PM to 5:30 PM

By Approach	Northbound SW Parkway Ave				Southbound SW Parkway Ave				Eastbound SW Boeckman Rd				Westbound SW Boeckman Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	333	678	1,011	0	596	308	904	0	568	535	1,103	1	367	343	710	0	1,864	1	2	3	0
%HV	2.1%				1.0%				1.8%				3.5%				1.9%				
PHF	0.86				0.88				0.88				0.81				0.90				

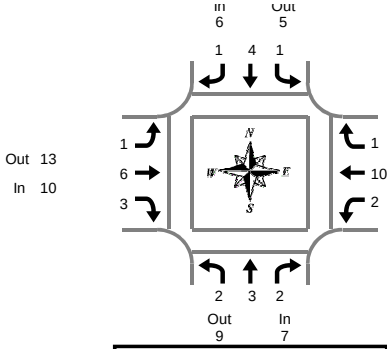
By Movement	Northbound SW Parkway Ave				Southbound SW Parkway Ave				Eastbound SW Boeckman Rd				Westbound SW Boeckman Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	103	184	46	333	41	376	179	596	83	256	229	568	73	253	41	367	1,864
%HV	1.9%	1.6%	4.3%	2.1%	2.4%	1.1%	0.6%	1.0%	1.2%	2.3%	1.3%	1.8%	2.7%	4.0%	2.4%	3.5%	1.9%
PHF	0.80	0.85	0.72	0.86	0.73	0.85	0.90	0.88	0.80	0.89	0.87	0.88	0.73	0.83	0.64	0.81	0.90

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW Parkway Ave				Southbound SW Parkway Ave				Eastbound SW Boeckman Rd				Westbound SW Boeckman Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	109	179	50	0	35	373	168	0	73	239	221	0	54	200	29	0	1,730	1	2	4	0
4:15 PM	100	178	48	0	38	375	166	0	79	254	229	1	65	220	31	0	1,783	1	2	3	0
4:30 PM	103	184	46	0	41	376	179	0	83	256	229	1	73	253	41	0	1,864	1	2	3	0
4:45 PM	98	165	42	0	40	366	177	0	76	232	224	1	81	236	42	0	1,779	0	1	1	0
5:00 PM	104	163	43	0	37	357	175	0	77	205	206	1	86	221	37	1	1,711	0	0	1	0

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



SW Parkway Ave & SW Boeckman Rd

Tuesday, January 24, 2017
4:00 PM to 6:00 PM

Peak Hour Summary
4:30 PM to 5:30 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW Parkway Ave				Southbound SW Parkway Ave				Eastbound SW Boeckman Rd				Westbound SW Boeckman Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	0	0	1	1	2	0	0	2	0	2	0	2	5
4:05 PM	0	0	0	0	0	0	0	0	0	4	1	5	0	0	1	1	6
4:10 PM	0	1	0	1	0	1	0	1	0	0	0	0	1	2	0	3	5
4:15 PM	1	1	0	2	0	0	1	1	0	0	0	0	0	0	0	0	3
4:20 PM	0	2	0	2	0	0	1	1	0	2	0	2	0	2	0	2	7
4:25 PM	0	1	0	1	0	1	0	1	0	0	0	0	0	1	0	1	3
4:30 PM	1	0	0	1	1	0	0	1	0	3	1	4	0	2	0	2	8
4:35 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	4	0	4	5
4:40 PM	0	0	0	0	0	1	0	1	0	0	1	1	1	0	0	1	3
4:45 PM	0	1	0	1	0	0	0	0	0	0	1	1	0	0	0	0	2
4:50 PM	0	0	1	1	0	0	1	1	0	0	0	0	0	1	0	1	3
4:55 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
5:00 PM	0	0	0	0	0	1	0	1	0	1	0	1	0	0	0	0	2
5:05 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	1	1	2	3
5:10 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2
5:15 PM	0	1	0	1	0	1	0	1	0	0	0	0	0	1	0	1	3
5:20 PM	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	2
5:25 PM	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	1	2
5:30 PM	0	0	0	0	0	1	0	1	0	2	0	2	0	0	0	0	3
5:35 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1	2
5:40 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2
5:45 PM	1	1	0	2	0	0	0	0	0	0	0	0	0	1	0	1	3
5:50 PM	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	1	2
5:55 PM	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	1	2
Total Survey	4	9	3	16	1	8	4	13	4	16	4	24	5	18	3	26	79

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW Parkway Ave				Southbound SW Parkway Ave				Eastbound SW Boeckman Rd				Westbound SW Boeckman Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	1	0	1	0	1	1	2	2	4	1	7	1	4	1	6	16
4:15 PM	1	4	0	5	0	1	2	3	0	2	0	2	0	3	0	3	13
4:30 PM	1	1	0	2	1	1	0	2	0	3	2	5	1	6	0	7	16
4:45 PM	0	1	1	2	0	0	1	1	1	0	1	2	0	1	0	1	6
5:00 PM	0	0	0	0	0	2	0	2	0	3	0	3	0	1	1	2	7
5:15 PM	1	1	1	3	0	1	0	1	0	0	0	0	1	2	0	3	7
5:30 PM	0	0	0	0	0	2	0	2	0	4	0	4	0	0	1	1	7
5:45 PM	1	1	1	3	0	0	0	0	1	0	0	1	2	1	0	3	7
Total Survey	4	9	3	16	1	8	4	13	4	16	4	24	5	18	3	26	79

Heavy Vehicle Peak Hour Summary
4:30 PM to 5:30 PM

By Approach	Northbound SW Parkway Ave			Southbound SW Parkway Ave			Eastbound SW Boeckman Rd			Westbound SW Boeckman Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	7	9	16	6	5	11	10	13	23	13	9	22	36
PHF	0.58			0.75			0.50			0.46			0.56

By Movement	Northbound SW Parkway Ave				Southbound SW Parkway Ave				Eastbound SW Boeckman Rd				Westbound SW Boeckman Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	2	3	2	7	1	4	1	6	1	6	3	10	2	10	1	13	36
PHF	0.50	0.38	0.50	0.58	0.25	0.50	0.25	0.75	0.25	0.50	0.38	0.50	0.50	0.42	0.25	0.46	0.56

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

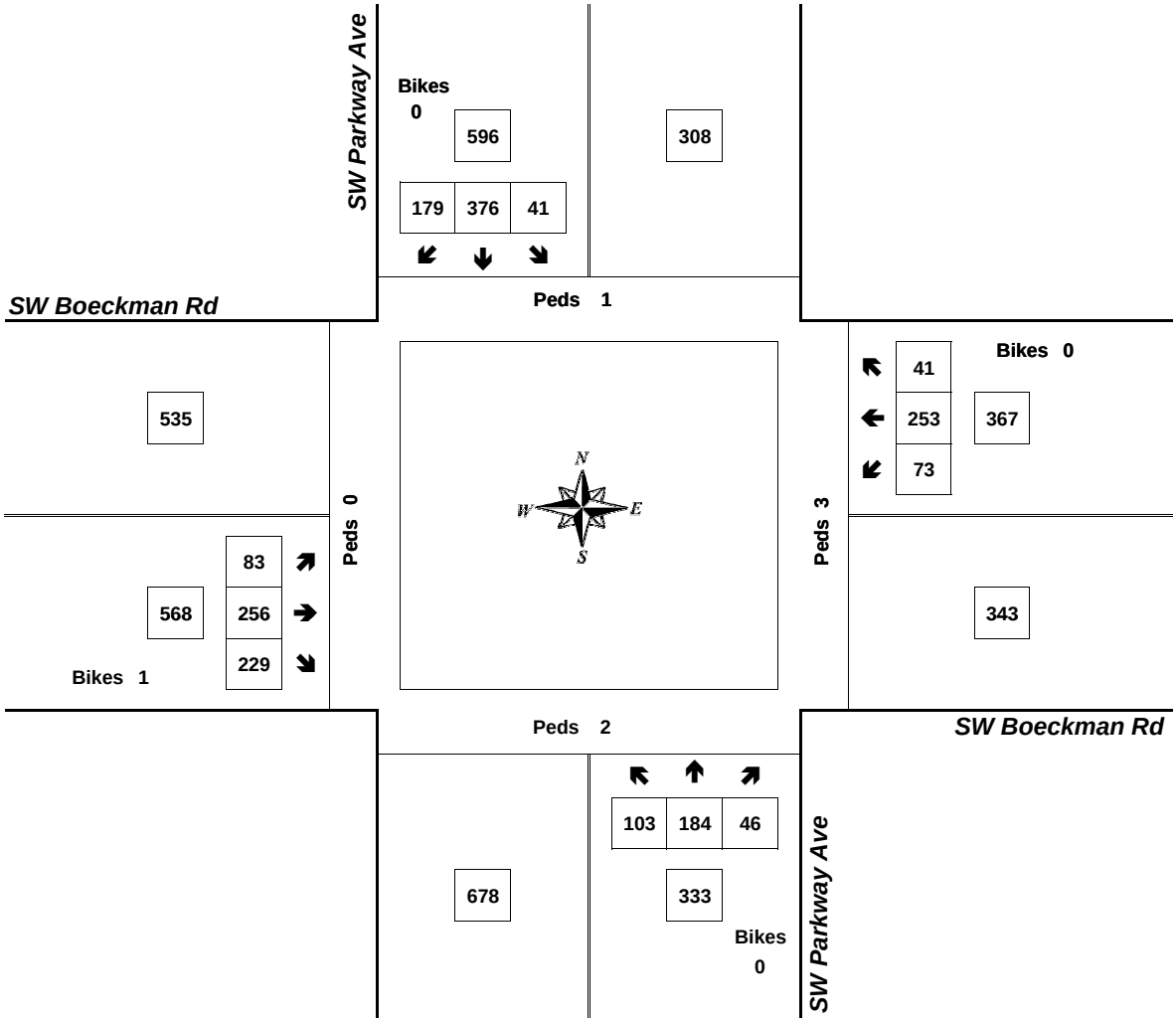
Interval Start Time	Northbound SW Parkway Ave				Southbound SW Parkway Ave				Eastbound SW Boeckman Rd				Westbound SW Boeckman Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	2	7	1	10	1	3	4	8	3	9	4	16	2	14	1	17	51
4:15 PM	2	6	1	9	1	4	3	8	1	8	3	12	1	11	1	13	42
4:30 PM	2	3	2	7	1	4	1	6	1	6	3	10	2	10	1	13	36
4:45 PM	1	2	2	5	0	5	1	6	1	7	1	9	1	4	2	7	27
5:00 PM	2	2	2	6	0	5	0	5	1	7	0	8	3	4	2	9	28

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

SW Parkway Ave & SW Boeckman Rd

4:30 PM to 5:30 PM
Tuesday, January 24, 2017



Approach	PHF	HV%	Volume
EB	0.88	1.8%	568
WB	0.81	3.5%	367
NB	0.86	2.1%	333
SB	0.88	1.0%	596
Intersection	0.90	1.9%	1,864

Count Period: 4:00 PM to 6:00 PM

Level of Service Descriptions

TRAFFIC LEVELS OF SERVICE

Analysis of traffic volumes is useful in understanding the general nature of traffic in an area, but by itself indicates neither the ability of the street network to carry additional traffic nor the quality of service afforded by the street facilities. For this, the concept of level of service has been developed to subjectively describe traffic performance. Level of service can be measured at intersections and along key roadway segments.

Levels of service categories are similar to report card ratings for traffic performance. Intersections are typically the controlling bottlenecks of traffic flow and the ability of a roadway system to carry traffic efficiently is generally diminished in their vicinities. Levels of Service A, B and C indicate conditions where traffic moves without significant delays over periods of peak travel demand. Level of service D and E are progressively worse peak hour operating conditions and F conditions represent where demand exceeds the capacity of an intersection. Most urban communities set level of service D as the minimum acceptable level of service for peak hour operation and plan for level of service C or better for all other times of the day. The Highway Capacity Manual provides level of service calculation methodology for both intersections and arterials[1]. The following two sections provide interpretations of the analysis approaches.

[1] *2000 Highway Capacity Manual*, Transportation Research Board, Washington D.C., 2000, Chapter 16 and 17.

UNSIGNALIZED INTERSECTIONS (Two-Way Stop Controlled)

Unsignalized intersection level of service is reported for the major street and minor street (generally, left turn movements). The method assesses available and critical gaps in the traffic stream which make it possible for side street traffic to enter the main street flow. The 2010 Highway Capacity Manual describes the detailed methodology. It is not unusual for an intersection to experience level of service E or F conditions for the minor street left turn movement. It should be understood that, often, a poor level of service is experienced by only a few vehicles and the intersection as a whole operates acceptably.

Unsignalized intersection levels of service are described in the following table.

Level-of-Service Criteria: Automobile Mode

Control Delay (s/vehicle)	**LOS by Volume-to-Capacity Ratio**	
	***v/c* ≤ 1.0**	***v/c* > 1.0**
0-10	A	F
>10-15	B	F
>15-25	C	F
>25-35	D	F
>35-50	E	F
>50	F	F

Note: The LOS criteria apply to each lane on a given approach and to each approach on the minor street. LOS is not calculated for major-street approaches or for the intersection as a whole

SIGNALIZED INTERSECTIONS

For signalized intersections, level of service is evaluated based upon average vehicle delay experienced by vehicles entering an intersection. Control delay (or signal delay) includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. In previous versions of this chapter of the HCM (1994 and earlier), delay included only stopped delay. As delay increases, the level of service decreases. Calculations for signalized and unsignalized intersections are different due to the variation in traffic control. The 2000 Highway Capacity Manual provides the basis for these calculations.

Level of Service	Delay (secs.)	Description
A	<10.00	**Free Flow/Insignificant Delays:** No approach phase is fully utilized by traffic and no vehicle waits longer than one red indication. Most vehicles do not stop at all. Progression is extremely favorable and most vehicles arrive during the green phase.
B	10.1-20.0	**Stable Operation/Minimal Delays:** An occasional approach phase is fully utilized. Many drivers begin to feel somewhat restricted within platoons of vehicles. This level generally occurs with good progression, short cycle lengths, or both.
C	20.1-35.0	**Stable Operation/Acceptable Delays:** Major approach phases fully utilized. Most drivers feel somewhat restricted. Higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level, and the number of vehicles stopping is significant.
D	35.1-55.0	**Approaching Unstable/Tolerable Delays:** The influence of congestion becomes more noticeable. Drivers may have to wait through more than one red signal indication. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. The proportion of vehicles not stopping declines, and individual cycle failures are noticeable.
E	55.1-80.0	**Unstable Operation/Significant Delays:** Volumes at or near capacity. Vehicles may wait though several signal cycles. Long queues form upstream from intersection. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are a frequent occurrence.
F	>80.0	**Forced Flow/Excessive Delays:** Represents jammed conditions. Queues may block upstream intersections. This level occurs when arrival flow rates exceed intersection capacity, and is considered to be unacceptable to most drivers. Poor progression, long cycle lengths, and v/c ratios approaching 1.0 may contribute to these high delay levels.

Source: *2000 Highway Capacity Manual*, Transportation Research Board, Washington D.C.

Trip Generation Summary

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Report File: S:\...\Project Trips Phase 1.pdf

Scenario 2 Phase 1 Trips
7/20/2017

Turning Movement Volume: Summary

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
1	SW Boones Ferry Road/SW 95th Avenue	10	0	0	0	0	2	3	0	17	0	0	0	32

ID	Intersection Name	Southwestbound			Northwestbound		Southeastbound		Total Volume
		Left	Thru	Right	Thru	Right	Thru	Right	
2	SW Elligsen/I-5 SB Ramp	0	0	10	0	0	17	0	27

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
3	Boeckman Rd/SW 95th Avenue	0	0	0	0	0	12	20	18	0	0	10	0	60

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Boeckman Road/SW Parkway Avenue	0	0	0	0	0	0	0	18	0	0	10	0	28

ID	Intersection Name	Northbound			Eastbound			Westbound			Southwestbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
5	SW Wilsonville Road/SW Boones Ferry Road	0	0	0	0	13	0	0	8	0	0	0	0	21

ID	Intersection Name	Southbound			Eastbound		Westbound		Total Volume
		Left	Thru	Right	Thru	Right	Left	Thru	
6	SW Wilsonville Road/I-5 SB Ramp	0	0	0	0	13	0	8	21

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
12	West Driveway	29	0	0	0	0	0	0	0	18	0	0	0	47

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
13	East Driveway	0	0	38	0	0	0	0	0	0	22	0	0	60

DW Frtiz TIA

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Report File: S:\...\Project Trips Phase 2.pdf

Scenario 3 Phase 2 Trips
7/20/2017

Turning Movement Volume: Summary

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
1	SW Boones Ferry Road/SW 95th Avenue	15	0	0	0	0	3	5	0	23	0	0	0	46

ID	Intersection Name	Southwestbound			Northwestbound		Southeastbound		Total Volume
		Left	Thru	Right	Thru	Right	Thru	Right	
2	SW Elligsen/I-5 SB Ramp	0	0	15	0	0	23	0	38

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
3	Boeckman Rd/SW 95th Avenue	0	0	0	0	0	18	28	21	0	0	15	0	82

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Boeckman Road/SW Parkway Avenue	0	0	0	0	0	0	0	21	0	0	15	0	36

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
5	SW Wilsonville Road/SW Boones Ferry Road	0	0	0	0	0	0	0	18	0	0	12	0	30

ID	Intersection Name	Southbound			Eastbound		Westbound		Total Volume
		Left	Thru	Right	Thru	Right	Left	Thru	
6	SW Wilsonville Road/I-5 SB Ramp	0	0	0	0	18	0	12	30

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
14	West Driveway	41	0	0	0	0	0	0	0	27	0	0	0	68

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
15	East Driveway	0	0	49	0	0	0	0	0	0	33	0	0	82

City of Wilsonville Stage II List

Updated by D. Pauly 3.13.17

Stage II Approved

Project	Land Use	Status	Size	Total PM Peak Trips	Trip Allocation Percentage		Net New (Primary + Diverted) PM Peak Hour Trips not yet active		
					Internal	Pass-By	In	Out	Total
Ash Meadows	MFDU	Built	14 units				9	4	13
Ash Park Subdivision	Residential	Not built	12 units				8	4	12
Hydro-Temp: Recent agreement with the City, the project is vested and so are the traffic trips	Office/Flex-Space	Not built	60.8 KSF				44	46	90
Mercedes Benz (Phase 2)	Auto Dealership	Not built					20	26	46
Renaissance Boat Club (Abele Zone Change TIS)	Residential (Single Family)	25 homes sold and occupied	33 Lots				5	3	8
Shredding Systems (SQFT does not including paint canopy and another canopy)	Industrial/Commercial	Not built	66.8 KSF				20	46	66
Town Center Ph III *and trip dedication to Miller Paint store Uses marked with "*" have not been built and PM peak hr trip sum exceeds remaining vested trip level by 2 trips. It has yet to be determined how to allocate trips between remaining buildings.*	*Fast Food (Pad 2)	Not built	2.5 KSF				18	16	34*
	*High Turnover Restaurant (Pad 1)	Not built	7.5 KSF				24	17	41*
	*Miller Paint store	Not built	5.0 KSF				6	6	12*
	Remaining Approved Total								85
Wilsonville Road Business Park Phase II	Phase 2 - office (2-story building on west parcel)	Partially Built	21.7 KSF				15	71	86
Clackamas Community College Pole Training Yard Expansion	Educational	Not built		0			0	0	0
Universal Health Services	Mental Health Facility	Not built	62K						
Meridian Creek Middle School (formerly Advance Road Middle School)	Educational	Under construction	118K						
14-Lot Single-Family Subdivision at 28500 and 28530 SW Canyon Creek Rd. South	Residential	Under construction	14				9	5	14
SORT Bionergy **Minimal impact, no PM Peak indicated in traffic impact analysis*	Industrial	Not built					*	*	*
Charbonneau Range 40-lot Subdivision	Residential	Approved	40 lots				29	17	46

Stage II Approved – Villebois													
Project	Phase	Status	Land Use					Total PM Peak Trips	Trip Allocation Percentage		Net New (Primary + Diverted) PM Peak Hour Trips not yet active		
			SF	Town.	Apt.	Retail	School		Internal	Pass-By	In	Out	Total
North (Entirety)	Residential	Partially Built, 304 homes sold and occupied	440		10						91	53	143
Grande Pointe (Phase 7 South)	Grande Pointe	Partially Built, 34 homes sold and occupied	100	-	-	-	-	114	4		42	24	66
East	Residential	Partially Built, 394 homes (367 single family and 27 row homes) sold and occupied	576	42							128	89	217
Central	Residential	Partially Built, 490 homes (47 single family, 78 condo/row homes, 365 apartments) occupied	75	459	449	3 KSF					185	94	279

Pending Projects for Which Traffic Analysis has been completed (except Villebois)										
Project	Land Use	Status	Size	Total PM Peak	Trip Allocation Percentage			Net New (Primary) PM Peak Hour Trips		
					Internal	Pass-By	Diverted	In	Out	Total
Mercedes Benz Expansion	Commercial	Land Use Application Not Submitted	53 KSF					18	18	36
Marion Carpet	Industrial	Under Review	30.5 KSF					11	24	35

HCM Analysis – Existing

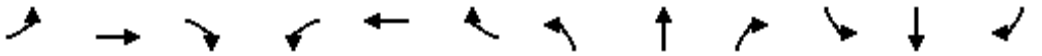
HCM Signalized Intersection Capacity Analysis
1: Boones Ferry Rd & 95th Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	200	2	855	63	16	2	599	754	5	2	1082	173
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00	0.88	1.00	1.00		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes		1.00	0.99	1.00	1.00		1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85	1.00	0.98		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1737	2734	1805	1686		3183	3468		1805	3574	1497
Flt Permitted		0.72	1.00	0.43	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1304	2734	809	1686		3183	3468		1805	3574	1497
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	206	2	881	65	16	2	618	777	5	2	1115	178
RTOR Reduction (vph)	0	0	18	0	2	0	0	0	0	0	0	89
Lane Group Flow (vph)	0	208	863	65	16	0	618	782	0	2	1115	89
Confl. Peds. (#/hr)	2					2	3		1	1		3
Confl. Bikes (#/hr)			2						1			
Heavy Vehicles (%)	4%	0%	3%	0%	12%	0%	10%	4%	0%	0%	1%	5%
Turn Type	Perm	NA	pm+ov	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		8	1		4		1	6		5	2	
Permitted Phases	8		8	4								2
Actuated Green, G (s)		21.5	49.8	21.5	21.5		28.3	70.3		1.2	43.2	43.2
Effective Green, g (s)		21.5	49.8	21.5	21.5		28.3	70.3		1.2	43.2	43.2
Actuated g/C Ratio		0.20	0.47	0.20	0.20		0.27	0.67		0.01	0.41	0.41
Clearance Time (s)		4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		267	1400	165	345		857	2321		20	1470	615
v/s Ratio Prot			c0.17		0.01		c0.19	0.23		0.00	c0.31	
v/s Ratio Perm		c0.16	0.15	0.08								0.06
v/c Ratio		0.78	0.62	0.39	0.05		0.72	0.34		0.10	0.76	0.14
Uniform Delay, d1		39.5	20.5	36.1	33.5		34.8	7.4		51.4	26.4	19.3
Progression Factor		1.00	1.00	1.00	1.00		1.10	0.62		1.00	1.00	1.00
Incremental Delay, d2		13.4	0.8	1.6	0.1		4.0	0.3		2.2	2.3	0.1
Delay (s)		52.9	21.3	37.7	33.6		42.4	4.9		53.6	28.7	19.4
Level of Service		D	C	D	C		D	A		D	C	B
Approach Delay (s)		27.3			36.8			21.4			27.5	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: I-5 SB On Ramp/I-5 SB Off Ramp & Boones Ferry Road/Elligsen Road

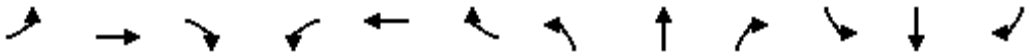


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1099	901	0	723	406	0	0	0	548	0	635
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0				4.5	4.5	4.5
Lane Util. Factor		0.95	1.00		0.95	1.00				0.95	0.95	1.00
Frpb, ped/bikes		1.00	0.99		1.00	0.98				1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00				1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85				1.00	1.00	0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95	0.95	1.00
Satd. Flow (prot)		3539	1564		3471	1580				1649	1649	1495
Flt Permitted		1.00	1.00		1.00	1.00				0.95	0.95	1.00
Satd. Flow (perm)		3539	1564		3471	1580				1649	1649	1495
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	1169	959	0	769	432	0	0	0	583	0	676
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	87
Lane Group Flow (vph)	0	1169	959	0	769	432	0	0	0	291	292	589
Confl. Peds. (#/hr)									1	1		
Confl. Bikes (#/hr)			1			5						
Heavy Vehicles (%)	0%	2%	2%	0%	4%	0%	0%	0%	0%	4%	0%	8%
Turn Type		NA	Free		NA	Free				Split	NA	Prot
Protected Phases		2			6					4	4	4
Permitted Phases			Free			Free						
Actuated Green, G (s)		50.0	105.0		50.0	105.0				45.5	45.5	45.5
Effective Green, g (s)		51.0	105.0		51.0	105.0				45.5	45.5	45.5
Actuated g/C Ratio		0.49	1.00		0.49	1.00				0.43	0.43	0.43
Clearance Time (s)		5.0			5.0					4.5	4.5	4.5
Vehicle Extension (s)		3.0			3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		1718	1564		1685	1580				714	714	647
v/s Ratio Prot		c0.33			0.22					0.18	0.18	c0.39
v/s Ratio Perm			0.61			0.27						
v/c Ratio		0.68	0.61		0.46	0.27				0.41	0.41	0.91
Uniform Delay, d1		20.7	0.0		17.8	0.0				20.5	20.5	27.9
Progression Factor		0.86	1.00		1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2		1.6	1.3		0.9	0.4				0.4	0.4	17.1
Delay (s)		19.4	1.3		18.7	0.4				20.9	20.9	44.9
Level of Service		B	A		B	A				C	C	D
Approach Delay (s)		11.2			12.1			0.0			33.8	
Approach LOS		B			B			A			C	

Intersection Summary			
HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Boeckman Rd & 95th Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	16	29	0	3	15	200	0	1	4	388	1	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98		0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.88		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1700	1900		1805	1900	1459		1655		1719	1369	
Flt Permitted	1.00	1.00		0.74	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (perm)	1789	1900		1398	1900	1459		1655		1719	1369	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	18	33	0	3	17	225	0	1	4	436	1	12
RTOR Reduction (vph)	0	0	0	0	0	167	0	4	0	0	7	0
Lane Group Flow (vph)	18	33	0	3	17	58	0	1	0	436	6	0
Confl. Peds. (#/hr)	1					1			1	1		
Confl. Bikes (#/hr)			1			2						7
Heavy Vehicles (%)	6%	0%	0%	0%	0%	8%	0%	0%	0%	5%	0%	18%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	2			6		6						
Actuated Green, G (s)	3.9	2.5		20.6	14.7	14.7		0.8		22.1	22.1	
Effective Green, g (s)	3.9	2.5		20.6	14.7	14.7		0.8		22.1	22.1	
Actuated g/C Ratio	0.07	0.04		0.36	0.26	0.26		0.01		0.39	0.39	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		4.5		4.5	4.5	
Vehicle Extension (s)	2.5	3.0		2.5	3.0	3.0		2.5		2.5	2.5	
Lane Grp Cap (vph)	120	83		602	490	376		23		666	530	
v/s Ratio Prot	c0.00	c0.02		0.00	0.01			c0.00		c0.25	0.00	
v/s Ratio Perm	0.01			0.00		c0.04						
v/c Ratio	0.15	0.40		0.00	0.03	0.15		0.05		0.65	0.01	
Uniform Delay, d1	23.7	26.5		11.6	15.8	16.3		27.7		14.3	10.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	0.4	3.1		0.0	0.0	0.2		0.6		2.1	0.0	
Delay (s)	24.2	29.6		11.7	15.9	16.5		28.3		16.4	10.7	
Level of Service	C	C		B	B	B		C		B	B	
Approach Delay (s)		27.7			16.4			28.3			16.2	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	57.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
4: Parkway Ave & Boeckman Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	83	256	229	73	253	41	103	184	46	41	376	179
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.98		1.00	0.97		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1717		1752	1788		1770	1791		1766	1790	
Flt Permitted	0.37	1.00		0.14	1.00		0.11	1.00		0.55	1.00	
Satd. Flow (perm)	696	1717		261	1788		213	1791		1020	1790	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	92	284	254	81	281	46	114	204	51	46	418	199
RTOR Reduction (vph)	0	34	0	0	6	0	0	9	0	0	17	0
Lane Group Flow (vph)	92	504	0	81	321	0	114	246	0	46	600	0
Confl. Peds. (#/hr)	1		2	2		1			3	3		
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	1%	2%	1%	3%	4%	2%	2%	2%	4%	2%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)	35.1	28.8		34.1	28.3		40.9	35.0		37.3	33.2	
Effective Green, g (s)	35.1	28.8		34.1	28.3		40.9	35.0		37.3	33.2	
Actuated g/C Ratio	0.39	0.32		0.38	0.31		0.45	0.39		0.41	0.37	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	345	545		193	557		197	691		453	655	
v/s Ratio Prot	0.02	c0.29		c0.03	0.18		c0.04	0.14		0.00	c0.34	
v/s Ratio Perm	0.08			0.13			0.22			0.04		
v/c Ratio	0.27	0.92		0.42	0.58		0.58	0.36		0.10	0.92	
Uniform Delay, d1	18.6	29.9		21.2	26.2		19.3	19.8		16.2	27.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	21.6		1.5	1.4		4.1	0.3		0.1	17.5	
Delay (s)	19.0	51.5		22.7	27.6		23.3	20.1		16.3	44.9	
Level of Service	B	D		C	C		C	C		B	D	
Approach Delay (s)		46.7			26.6			21.1			42.9	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	37.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	90.7	Sum of lost time (s)	17.0
Intersection Capacity Utilization	82.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

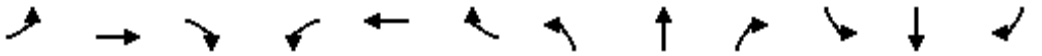
HCM Signalized Intersection Capacity Analysis
5: Boones Ferry Rd & Wilsonville Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	728	103	449	656	207	166	88	344	406	208	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	4.0		5.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.91		0.97	0.95	1.00	1.00	1.00	1.00	0.97	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1687	3100		3467	3600	1348	1805	4600	1599	4000	1809	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1687	3100		3467	3600	1348	1805	4600	1599	4000	1809	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	46	751	106	463	676	213	171	91	355	419	214	61
RTOR Reduction (vph)	0	15	0	0	0	81	0	0	48	0	10	0
Lane Group Flow (vph)	46	842	0	463	676	132	171	91	307	419	265	0
Confl. Peds. (#/hr)	5		5	5		5	2					2
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	7%	3%	1%	1%	3%	16%	0%	1%	1%	3%	1%	2%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	pm+ov	Split	NA	
Protected Phases	5	2		1	6		8	8	1	4	4	
Permitted Phases						6			8			
Actuated Green, G (s)	7.0	36.4		18.6	48.0	48.0	15.2	15.2	33.8	19.8	19.8	
Effective Green, g (s)	7.0	37.4		18.6	49.0	49.0	15.2	15.2	33.8	19.8	19.8	
Actuated g/C Ratio	0.06	0.34		0.17	0.45	0.45	0.14	0.14	0.31	0.18	0.18	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.5	0.5		2.5	4.3	4.3	2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	107	1054		586	1603	600	249	635	564	720	325	
v/s Ratio Prot	0.03	c0.27		c0.13	0.19		c0.09	0.02	0.09	0.10	c0.15	
v/s Ratio Perm						0.10			0.10			
v/c Ratio	0.43	0.80		0.79	0.42	0.22	0.69	0.14	0.54	0.58	0.82	
Uniform Delay, d1	49.6	32.9		43.8	20.8	18.8	45.1	41.7	31.7	41.3	43.3	
Progression Factor	1.00	1.00		1.25	0.81	0.60	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.0	6.4		6.4	0.8	0.8	7.0	0.1	0.9	1.0	14.2	
Delay (s)	51.6	39.3		61.3	17.5	12.1	52.1	41.8	32.5	42.3	57.6	
Level of Service	D	D		E	B	B	D	D	C	D	E	
Approach Delay (s)		39.9			31.7			39.3			48.3	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	38.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: I-5 SB & Wilsonville Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	883	595	548	915	0	0	0	0	400	1	400
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Lane Util. Factor		0.91	1.00	0.97	0.95					0.95	0.95	0.88
Frpb, ped/bikes		1.00	0.97	1.00	1.00					1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		5085	1504	3467	3471					1715	1719	2682
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		5085	1504	3467	3471					1715	1719	2682
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	901	607	559	934	0	0	0	0	408	1	408
RTOR Reduction (vph)	0	0	396	0	0	0	0	0	0	0	0	191
Lane Group Flow (vph)	0	901	211	559	934	0	0	0	0	204	205	217
Confl. Peds. (#/hr)	7		11	11		7	1					1
Confl. Bikes (#/hr)						3						1
Heavy Vehicles (%)	0%	2%	4%	1%	4%	0%	0%	0%	0%	0%	0%	6%
Turn Type		NA	Perm	Prot	NA					Split	NA	custom
Protected Phases		2		1	6					7	7	4
Permitted Phases			2									
Actuated Green, G (s)		37.5	37.5	27.5	69.5					31.5	31.5	31.5
Effective Green, g (s)		37.5	37.5	27.5	69.5					31.5	31.5	31.5
Actuated g/C Ratio		0.34	0.34	0.25	0.63					0.29	0.29	0.29
Clearance Time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Vehicle Extension (s)		4.9	4.9	2.3	4.9					2.3	2.3	2.3
Lane Grp Cap (vph)		1733	512	866	2193					491	492	768
v/s Ratio Prot		c0.18		c0.16	0.27					0.12	c0.12	0.08
v/s Ratio Perm			0.14									
v/c Ratio		0.52	0.41	0.65	0.43					0.42	0.42	0.28
Uniform Delay, d1		29.0	27.8	36.9	10.2					31.8	31.8	30.5
Progression Factor		0.68	0.66	1.00	1.00					1.00	1.00	1.00
Incremental Delay, d2		0.8	1.8	3.7	0.6					2.6	2.6	0.1
Delay (s)		20.5	20.1	40.6	10.8					34.4	34.4	30.6
Level of Service		C	C	D	B					C	C	C
Approach Delay (s)		20.3			22.0			0.0			32.5	
Approach LOS		C			C			A			C	

Intersection Summary			
HCM 2000 Control Delay	23.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Analysis – Existing + Stage II

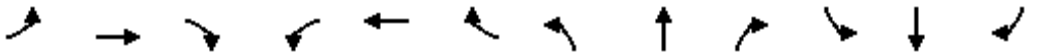
HCM Signalized Intersection Capacity Analysis
1: Boones Ferry Rd & 95th Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	204	2	918	63	16	2	674	755	5	2	1083	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00	0.88	1.00	1.00		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes		1.00	0.99	1.00	1.00		1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85	1.00	0.98		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1737	2734	1805	1686		3183	3468		1805	3574	1497
Flt Permitted		0.72	1.00	0.42	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1304	2734	798	1686		3183	3468		1805	3574	1497
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	210	2	946	65	16	2	695	778	5	2	1116	180
RTOR Reduction (vph)	0	0	18	0	2	0	0	0	0	0	0	90
Lane Group Flow (vph)	0	212	928	65	16	0	695	783	0	2	1116	90
Confl. Peds. (#/hr)	2					2	3		1	1		3
Confl. Bikes (#/hr)			2						1			
Heavy Vehicles (%)	4%	0%	3%	0%	12%	0%	10%	4%	0%	0%	1%	5%
Turn Type	Perm	NA	pm+ov	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		8	1		4		1	6		5	2	
Permitted Phases	8		8	4								2
Actuated Green, G (s)		21.7	49.8	21.7	21.7		28.1	70.1		1.2	43.2	43.2
Effective Green, g (s)		21.7	49.8	21.7	21.7		28.1	70.1		1.2	43.2	43.2
Actuated g/C Ratio		0.21	0.47	0.21	0.21		0.27	0.67		0.01	0.41	0.41
Clearance Time (s)		4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		269	1400	164	348		851	2315		20	1470	615
v/s Ratio Prot			c0.18		0.01		c0.22	0.23		0.00	c0.31	
v/s Ratio Perm		c0.16	0.16	0.08								0.06
v/c Ratio		0.79	0.66	0.40	0.05		0.82	0.34		0.10	0.76	0.15
Uniform Delay, d1		39.5	21.2	36.0	33.4		36.0	7.5		51.4	26.4	19.4
Progression Factor		1.00	1.00	1.00	1.00		1.11	0.56		1.00	1.00	1.00
Incremental Delay, d2		14.1	1.2	1.6	0.1		6.3	0.3		2.2	2.3	0.1
Delay (s)		53.6	22.4	37.6	33.4		46.2	4.5		53.6	28.8	19.5
Level of Service		D	C	D	C		D	A		D	C	B
Approach Delay (s)		28.1			36.7			24.1			27.5	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: I-5 SB On Ramp/I-5 SB Off Ramp & Boones Ferry Road/Elligsen Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1160	904	0	727	406	0	0	0	549	0	707
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0				4.5	4.5	4.5
Lane Util. Factor		0.95	1.00		0.95	1.00				0.95	0.95	1.00
Frpb, ped/bikes		1.00	0.99		1.00	0.98				1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00				1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85				1.00	1.00	0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95	0.95	1.00
Satd. Flow (prot)		3539	1564		3471	1580				1649	1649	1495
Flt Permitted		1.00	1.00		1.00	1.00				0.95	0.95	1.00
Satd. Flow (perm)		3539	1564		3471	1580				1649	1649	1495
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	1234	962	0	773	432	0	0	0	584	0	752
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	78
Lane Group Flow (vph)	0	1234	962	0	773	432	0	0	0	292	292	674
Confl. Peds. (#/hr)									1	1		
Confl. Bikes (#/hr)			1			5						
Heavy Vehicles (%)	0%	2%	2%	0%	4%	0%	0%	0%	0%	4%	0%	8%
Turn Type		NA	Free		NA	Free				Split	NA	Prot
Protected Phases		2			6					4	4	4
Permitted Phases			Free			Free						
Actuated Green, G (s)		44.9	105.0		44.9	105.0				50.6	50.6	50.6
Effective Green, g (s)		45.9	105.0		45.9	105.0				50.6	50.6	50.6
Actuated g/C Ratio		0.44	1.00		0.44	1.00				0.48	0.48	0.48
Clearance Time (s)		5.0			5.0					4.5	4.5	4.5
Vehicle Extension (s)		3.0			3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		1547	1564		1517	1580				794	794	720
v/s Ratio Prot		c0.35			0.22					0.18	0.18	c0.45
v/s Ratio Perm			0.62			0.27						
v/c Ratio		0.80	0.62		0.51	0.27				0.37	0.37	0.94
Uniform Delay, d1		25.5	0.0		21.4	0.0				17.1	17.1	25.7
Progression Factor		0.90	1.00		1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2		3.0	1.2		1.2	0.4				0.3	0.3	19.4
Delay (s)		26.1	1.2		22.6	0.4				17.4	17.4	45.0
Level of Service		C	A		C	A				B	B	D
Approach Delay (s)		15.2			14.7			0.0			33.0	
Approach LOS		B			B			A			C	

Intersection Summary			
HCM 2000 Control Delay	20.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Boeckman Rd & 95th Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	51	66	0	3	75	214	0	1	4	402	1	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97		0.99		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.88		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1700	1900		1805	1900	1457		1655		1719	1338	
Flt Permitted	0.87	1.00		0.71	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (perm)	1556	1900		1347	1900	1457		1655		1719	1338	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	57	74	0	3	84	240	0	1	4	452	1	82
RTOR Reduction (vph)	0	0	0	0	0	195	0	4	0	0	51	0
Lane Group Flow (vph)	57	74	0	3	84	45	0	1	0	452	32	0
Confl. Peds. (#/hr)	1					1			1	1		
Confl. Bikes (#/hr)			1			2						7
Heavy Vehicles (%)	6%	0%	0%	0%	0%	8%	0%	0%	0%	5%	0%	18%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	2			6		6						
Actuated Green, G (s)	11.0	4.6		22.0	11.1	11.1		0.9		22.2	22.2	
Effective Green, g (s)	11.0	4.6		22.0	11.1	11.1		0.9		22.2	22.2	
Actuated g/C Ratio	0.19	0.08		0.38	0.19	0.19		0.02		0.38	0.38	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		4.5		4.5	4.5	
Vehicle Extension (s)	2.5	3.0		2.5	3.0	3.0		2.5		2.5	2.5	
Lane Grp Cap (vph)	307	149		606	359	275		25		651	506	
v/s Ratio Prot	c0.02	c0.04		0.00	c0.04			c0.00		c0.26	0.02	
v/s Ratio Perm	0.01			0.00		0.03						
v/c Ratio	0.19	0.50		0.00	0.23	0.17		0.04		0.69	0.06	
Uniform Delay, d1	20.1	25.9		11.5	20.1	19.9		28.4		15.3	11.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	0.2	2.6		0.0	0.3	0.3		0.5		3.0	0.0	
Delay (s)	20.3	28.5		11.5	20.5	20.2		28.9		18.3	11.6	
Level of Service	C	C		B	C	C		C		B	B	
Approach Delay (s)		24.9			20.2			28.9			17.3	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	58.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
4: Parkway Ave & Boeckman Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	98	303	231	75	312	41	105	186	49	41	379	204
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.98		1.00	0.97		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1729		1752	1794		1770	1788		1766	1782	
Flt Permitted	0.30	1.00		0.13	1.00		0.12	1.00		0.53	1.00	
Satd. Flow (perm)	559	1729		244	1794		216	1788		994	1782	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	109	337	257	83	347	46	117	207	54	46	421	227
RTOR Reduction (vph)	0	29	0	0	5	0	0	9	0	0	20	0
Lane Group Flow (vph)	109	565	0	83	388	0	117	252	0	46	628	0
Confl. Peds. (#/hr)	1		2	2		1			3	3		
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	1%	2%	1%	3%	4%	2%	2%	2%	4%	2%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)	37.6	31.0		36.2	30.3		40.6	34.5		36.8	32.6	
Effective Green, g (s)	37.6	31.0		36.2	30.3		40.6	34.5		36.8	32.6	
Actuated g/C Ratio	0.41	0.33		0.39	0.33		0.44	0.37		0.40	0.35	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	314	578		191	587		197	666		430	627	
v/s Ratio Prot	0.02	c0.33		c0.03	0.22		c0.04	0.14		0.00	c0.35	
v/s Ratio Perm	0.12			0.14			0.22			0.04		
v/c Ratio	0.35	0.98		0.43	0.66		0.59	0.38		0.11	1.00	
Uniform Delay, d1	18.5	30.5		21.7	26.7		21.0	21.2		17.3	30.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	31.6		1.6	2.8		4.7	0.4		0.1	36.3	
Delay (s)	19.2	62.0		23.2	29.5		25.7	21.6		17.4	66.3	
Level of Service	B	E		C	C		C	C		B	E	
Approach Delay (s)		55.4			28.4			22.9			63.1	
Approach LOS		E			C			C			E	

Intersection Summary			
HCM 2000 Control Delay	46.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	92.6	Sum of lost time (s)	17.0
Intersection Capacity Utilization	86.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

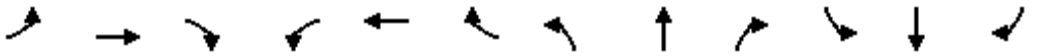
HCM Signalized Intersection Capacity Analysis
5: Boones Ferry Rd & Wilsonville Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	888	142	451	844	218	233	90	347	422	212	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	4.0		5.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.91		0.97	0.95	1.00	1.00	1.00	1.00	0.97	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1687	3100		3467	3600	1347	1805	4600	1599	4000	1808	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1687	3100		3467	3600	1347	1805	4600	1599	4000	1808	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	52	915	146	465	870	225	240	93	358	435	219	64
RTOR Reduction (vph)	0	18	0	0	0	70	0	0	46	0	10	0
Lane Group Flow (vph)	52	1043	0	465	870	155	240	93	312	435	273	0
Confl. Peds. (#/hr)	5		5	5		5	2					2
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	7%	3%	1%	1%	3%	16%	0%	1%	1%	3%	1%	2%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	pm+ov	Split	NA	
Protected Phases	5	2		1	6		8	8	1	4	4	
Permitted Phases						6			8			
Actuated Green, G (s)	7.0	33.6		17.7	44.3	44.3	18.5	18.5	36.2	20.2	20.2	
Effective Green, g (s)	7.0	34.6		17.7	45.3	45.3	18.5	18.5	36.2	20.2	20.2	
Actuated g/C Ratio	0.06	0.31		0.16	0.41	0.41	0.17	0.17	0.33	0.18	0.18	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.5	0.5		2.5	4.3	4.3	2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	107	975		557	1482	554	303	773	598	734	332	
v/s Ratio Prot	0.03	c0.34		c0.13	0.24		c0.13	0.02	0.08	0.11	c0.15	
v/s Ratio Perm						0.12			0.11			
v/c Ratio	0.49	1.07		0.83	0.59	0.28	0.79	0.12	0.52	0.59	0.82	
Uniform Delay, d1	49.8	37.7		44.7	25.1	21.5	43.9	38.8	29.9	41.1	43.2	
Progression Factor	1.00	1.00		1.21	0.79	0.63	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.5	49.4		9.2	1.5	1.1	12.8	0.1	0.6	1.1	14.8	
Delay (s)	52.3	87.1		63.4	21.3	14.7	56.7	38.9	30.5	42.2	58.0	
Level of Service	D	F		E	C	B	E	D	C	D	E	
Approach Delay (s)		85.5			32.9			40.7			48.4	
Approach LOS		F			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	51.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: I-5 SB & Wilsonville Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	986	671	557	1039	0	0	0	0	408	1	477
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Lane Util. Factor		0.91	1.00	0.97	0.95					0.95	0.95	0.88
Frpb, ped/bikes		1.00	0.97	1.00	1.00					1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		5085	1504	3467	3471					1715	1719	2682
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		5085	1504	3467	3471					1715	1719	2682
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	1006	685	568	1060	0	0	0	0	416	1	487
RTOR Reduction (vph)	0	0	395	0	0	0	0	0	0	0	0	145
Lane Group Flow (vph)	0	1006	290	568	1060	0	0	0	0	208	209	342
Confl. Peds. (#/hr)	7		11	11		7	1					1
Confl. Bikes (#/hr)						3						1
Heavy Vehicles (%)	0%	2%	4%	1%	4%	0%	0%	0%	0%	0%	0%	6%
Turn Type		NA	Perm	Prot	NA					Split	NA	custom
Protected Phases		2		1	6					7	7	4
Permitted Phases			2									
Actuated Green, G (s)		37.5	37.5	27.5	69.5					31.5	31.5	31.5
Effective Green, g (s)		37.5	37.5	27.5	69.5					31.5	31.5	31.5
Actuated g/C Ratio		0.34	0.34	0.25	0.63					0.29	0.29	0.29
Clearance Time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Vehicle Extension (s)		4.9	4.9	2.3	4.9					2.3	2.3	2.3
Lane Grp Cap (vph)		1733	512	866	2193					491	492	768
v/s Ratio Prot		c0.20		c0.16	0.31					0.12	0.12	c0.13
v/s Ratio Perm			0.19									
v/c Ratio		0.58	0.57	0.66	0.48					0.42	0.42	0.45
Uniform Delay, d1		29.8	29.6	37.0	10.7					31.9	31.9	32.1
Progression Factor		0.61	0.68	1.00	1.00					1.00	1.00	1.00
Incremental Delay, d2		0.8	2.5	3.9	0.8					2.7	2.7	0.2
Delay (s)		18.8	22.6	40.9	11.5					34.5	34.6	32.3
Level of Service		B	C	D	B					C	C	C
Approach Delay (s)		20.3			21.7			0.0			33.4	
Approach LOS		C			C			A			C	

Intersection Summary			
HCM 2000 Control Delay	23.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	81.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Analysis – Existing + Project Phase 1

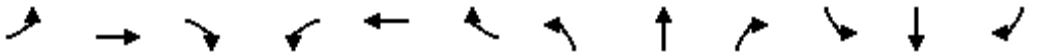
Existing + Phase 1.syn
1: Boones Ferry Rd & 95th Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	203	2	872	63	16	2	609	754	5	2	1082	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00	0.88	1.00	1.00		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes		1.00	0.99	1.00	1.00		1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85	1.00	0.98		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1737	2734	1805	1686		3183	3468		1805	3574	1497
Flt Permitted		0.72	1.00	0.42	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1304	2734	800	1686		3183	3468		1805	3574	1497
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	209	2	899	65	16	2	628	777	5	2	1115	180
RTOR Reduction (vph)	0	0	18	0	2	0	0	0	0	0	0	90
Lane Group Flow (vph)	0	211	881	65	16	0	628	782	0	2	1115	90
Confl. Peds. (#/hr)	2					2	3		1	1		3
Confl. Bikes (#/hr)			2						1			
Heavy Vehicles (%)	4%	0%	3%	0%	12%	0%	10%	4%	0%	0%	1%	5%
Turn Type	Perm	NA	pm+ov	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		8	1		4		1	6		5	2	
Permitted Phases	8		8	4								2
Actuated Green, G (s)		21.6	49.8	21.6	21.6		28.2	70.2		1.2	43.2	43.2
Effective Green, g (s)		21.6	49.8	21.6	21.6		28.2	70.2		1.2	43.2	43.2
Actuated g/C Ratio		0.21	0.47	0.21	0.21		0.27	0.67		0.01	0.41	0.41
Clearance Time (s)		4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		268	1400	164	346		854	2318		20	1470	615
v/s Ratio Prot			c0.17		0.01		c0.20	0.23		0.00	c0.31	
v/s Ratio Perm		c0.16	0.15	0.08								0.06
v/c Ratio		0.79	0.63	0.40	0.05		0.74	0.34		0.10	0.76	0.15
Uniform Delay, d1		39.5	20.7	36.1	33.4		35.0	7.4		51.4	26.4	19.4
Progression Factor		1.00	1.00	1.00	1.00		1.11	0.60		1.00	1.00	1.00
Incremental Delay, d2		14.1	0.9	1.6	0.1		4.2	0.3		2.2	2.3	0.1
Delay (s)		53.6	21.6	37.6	33.5		43.1	4.8		53.6	28.7	19.5
Level of Service		D	C	D	C		D	A		D	C	B
Approach Delay (s)		27.7			36.7			21.8			27.5	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Existing + Phase 1.syn
2: I-5 SB On Ramp/I-5 SB Off Ramp & Boones Ferry Road/Elligsen Road

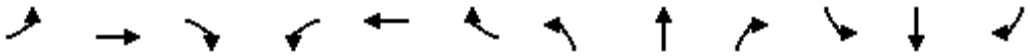


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1116	901	0	723	406	0	0	0	548	0	645
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0				4.5	4.5	4.5
Lane Util. Factor		0.95	1.00		0.95	1.00				0.95	0.95	1.00
Frpb, ped/bikes		1.00	0.99		1.00	0.98				1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00				1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85				1.00	1.00	0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95	0.95	1.00
Satd. Flow (prot)		3539	1564		3471	1580				1649	1649	1495
Flt Permitted		1.00	1.00		1.00	1.00				0.95	0.95	1.00
Satd. Flow (perm)		3539	1564		3471	1580				1649	1649	1495
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	1187	959	0	769	432	0	0	0	583	0	686
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	85
Lane Group Flow (vph)	0	1187	959	0	769	432	0	0	0	291	292	601
Confl. Peds. (#/hr)									1	1		
Confl. Bikes (#/hr)			1			5						
Heavy Vehicles (%)	0%	2%	2%	0%	4%	0%	0%	0%	0%	4%	0%	8%
Turn Type		NA	Free		NA	Free				Split	NA	Prot
Protected Phases		2			6					4	4	4
Permitted Phases			Free			Free						
Actuated Green, G (s)		49.0	105.0		49.0	105.0				46.5	46.5	46.5
Effective Green, g (s)		50.0	105.0		50.0	105.0				46.5	46.5	46.5
Actuated g/C Ratio		0.48	1.00		0.48	1.00				0.44	0.44	0.44
Clearance Time (s)		5.0			5.0					4.5	4.5	4.5
Vehicle Extension (s)		3.0			3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		1685	1564		1652	1580				730	730	662
v/s Ratio Prot		c0.34			0.22					0.18	0.18	c0.40
v/s Ratio Perm			0.61			0.27						
v/c Ratio		0.70	0.61		0.47	0.27				0.40	0.40	0.91
Uniform Delay, d1		21.7	0.0		18.5	0.0				19.8	19.8	27.2
Progression Factor		0.86	1.00		1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2		1.8	1.3		0.9	0.4				0.4	0.4	16.1
Delay (s)		20.4	1.3		19.5	0.4				20.1	20.2	43.4
Level of Service		C	A		B	A				C	C	D
Approach Delay (s)		11.8			12.6			0.0			32.7	
Approach LOS		B			B			A			C	

Intersection Summary			
HCM 2000 Control Delay	17.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Existing + Phase 1.syn
3: Boeckman Rd & 95th Ave

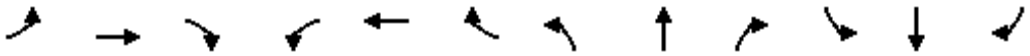


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	36	47	0	3	25	200	0	1	4	388	1	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98		0.99		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.88		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1700	1900		1805	1900	1458		1655		1719	1350	
Flt Permitted	0.95	1.00		0.72	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (perm)	1704	1900		1373	1900	1458		1655		1719	1350	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	40	53	0	3	28	225	0	1	4	436	1	26
RTOR Reduction (vph)	0	0	0	0	0	172	0	4	0	0	16	0
Lane Group Flow (vph)	40	53	0	3	28	53	0	1	0	436	11	0
Confl. Peds. (#/hr)	1					1			1	1		
Confl. Bikes (#/hr)			1			2						7
Heavy Vehicles (%)	6%	0%	0%	0%	0%	8%	0%	0%	0%	5%	0%	18%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	2			6		6						
Actuated Green, G (s)	8.2	4.2		22.4	13.9	13.9		0.9		22.1	22.1	
Effective Green, g (s)	8.2	4.2		22.4	13.9	13.9		0.9		22.1	22.1	
Actuated g/C Ratio	0.14	0.07		0.38	0.24	0.24		0.02		0.38	0.38	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		4.5		4.5	4.5	
Vehicle Extension (s)	2.5	3.0		2.5	3.0	3.0		2.5		2.5	2.5	
Lane Grp Cap (vph)	236	135		622	448	344		25		644	506	
v/s Ratio Prot	c0.01	c0.03		0.00	0.01			c0.00		c0.25	0.01	
v/s Ratio Perm	0.01			0.00		c0.04						
v/c Ratio	0.17	0.39		0.00	0.06	0.15		0.04		0.68	0.02	
Uniform Delay, d1	22.3	26.1		11.3	17.4	17.8		28.6		15.4	11.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.9		0.0	0.1	0.2		0.5		2.6	0.0	
Delay (s)	22.6	28.0		11.3	17.5	18.1		29.1		18.0	11.6	
Level of Service	C	C		B	B	B		C		B	B	
Approach Delay (s)		25.7			17.9			29.1			17.6	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	18.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	58.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Existing + Phase 1.syn
4: Parkway Ave & Boeckman Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	83	274	229	73	263	41	103	184	46	41	376	179
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.98		1.00	0.97		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1723		1752	1789		1770	1791		1766	1790	
Flt Permitted	0.36	1.00		0.14	1.00		0.11	1.00		0.55	1.00	
Satd. Flow (perm)	680	1723		254	1789		214	1791		1015	1790	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	92	304	254	81	292	46	114	204	51	46	418	199
RTOR Reduction (vph)	0	32	0	0	6	0	0	9	0	0	17	0
Lane Group Flow (vph)	92	526	0	81	332	0	114	246	0	46	600	0
Confl. Peds. (#/hr)	1		2	2		1			3	3		
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	1%	2%	1%	3%	4%	2%	2%	2%	4%	2%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)	35.9	29.6		34.9	29.1		40.8	34.8		37.2	33.0	
Effective Green, g (s)	35.9	29.6		34.9	29.1		40.8	34.8		37.2	33.0	
Actuated g/C Ratio	0.39	0.32		0.38	0.32		0.45	0.38		0.41	0.36	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	343	557		192	569		197	681		447	646	
v/s Ratio Prot	0.02	c0.31		c0.03	0.19		c0.04	0.14		0.00	c0.34	
v/s Ratio Perm	0.09			0.13			0.22			0.04		
v/c Ratio	0.27	0.94		0.42	0.58		0.58	0.36		0.10	0.93	
Uniform Delay, d1	18.4	30.1		21.4	26.1		19.7	20.3		16.6	28.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	24.9		1.5	1.5		4.1	0.3		0.1	19.6	
Delay (s)	18.8	55.0		22.9	27.6		23.8	20.7		16.7	47.7	
Level of Service	B	E		C	C		C	C		B	D	
Approach Delay (s)		49.9			26.7			21.6			45.5	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	38.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	91.4	Sum of lost time (s)	17.0
Intersection Capacity Utilization	83.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

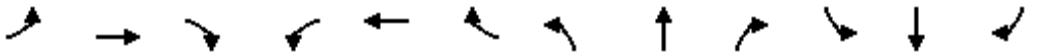
Existing + Phase 1.syn
5: Boones Ferry Rd & Wilsonville Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	741	103	449	664	207	166	88	344	406	208	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	4.0		5.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.91		0.97	0.95	1.00	1.00	1.00	1.00	0.97	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1687	3100		3467	3600	1348	1805	4600	1599	4000	1809	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1687	3100		3467	3600	1348	1805	4600	1599	4000	1809	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	46	764	106	463	685	213	171	91	355	419	214	61
RTOR Reduction (vph)	0	15	0	0	0	80	0	0	48	0	10	0
Lane Group Flow (vph)	46	855	0	463	685	133	171	91	307	419	265	0
Confl. Peds. (#/hr)	5		5	5		5	2					2
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	7%	3%	1%	1%	3%	16%	0%	1%	1%	3%	1%	2%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	pm+ov	Split	NA	
Protected Phases	5	2		1	6		8	8	1	4	4	
Permitted Phases						6			8			
Actuated Green, G (s)	7.0	36.4		18.6	48.0	48.0	15.2	15.2	33.8	19.8	19.8	
Effective Green, g (s)	7.0	37.4		18.6	49.0	49.0	15.2	15.2	33.8	19.8	19.8	
Actuated g/C Ratio	0.06	0.34		0.17	0.45	0.45	0.14	0.14	0.31	0.18	0.18	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.5	0.5		2.5	4.3	4.3	2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	107	1054		586	1603	600	249	635	564	720	325	
v/s Ratio Prot	0.03	c0.28		c0.13	0.19		c0.09	0.02	0.09	0.10	c0.15	
v/s Ratio Perm						0.10			0.10			
v/c Ratio	0.43	0.81		0.79	0.43	0.22	0.69	0.14	0.54	0.58	0.82	
Uniform Delay, d1	49.6	33.1		43.8	20.9	18.8	45.1	41.7	31.7	41.3	43.3	
Progression Factor	1.00	1.00		1.25	0.80	0.61	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.0	6.8		6.4	0.8	0.8	7.0	0.1	0.9	1.0	14.2	
Delay (s)	51.6	39.9		61.2	17.6	12.2	52.1	41.8	32.5	42.3	57.6	
Level of Service	D	D		E	B	B	D	D	C	D	E	
Approach Delay (s)		40.5			31.6			39.3			48.3	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	38.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Existing + Phase 1.syn
6: I-5 SB & Wilsonville Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	883	608	548	923	0	0	0	0	400	1	400
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Lane Util. Factor		0.91	1.00	0.97	0.95					0.95	0.95	0.88
Frpb, ped/bikes		1.00	0.97	1.00	1.00					1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		5085	1504	3467	3471					1715	1719	2682
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		5085	1504	3467	3471					1715	1719	2682
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	901	620	559	942	0	0	0	0	408	1	408
RTOR Reduction (vph)	0	0	396	0	0	0	0	0	0	0	0	187
Lane Group Flow (vph)	0	901	224	559	942	0	0	0	0	204	205	221
Confl. Peds. (#/hr)	7		11	11		7	1					1
Confl. Bikes (#/hr)						3						1
Heavy Vehicles (%)	0%	2%	4%	1%	4%	0%	0%	0%	0%	0%	0%	6%
Turn Type		NA	Perm	Prot	NA					Split	NA	custom
Protected Phases		2		1	6					7	7	4
Permitted Phases			2									
Actuated Green, G (s)		37.5	37.5	27.5	69.5					31.5	31.5	31.5
Effective Green, g (s)		37.5	37.5	27.5	69.5					31.5	31.5	31.5
Actuated g/C Ratio		0.34	0.34	0.25	0.63					0.29	0.29	0.29
Clearance Time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Vehicle Extension (s)		4.9	4.9	2.3	4.9					2.3	2.3	2.3
Lane Grp Cap (vph)		1733	512	866	2193					491	492	768
v/s Ratio Prot		c0.18		c0.16	0.27					0.12	c0.12	0.08
v/s Ratio Perm			0.15									
v/c Ratio		0.52	0.44	0.65	0.43					0.42	0.42	0.29
Uniform Delay, d1		29.0	28.1	36.9	10.2					31.8	31.8	30.5
Progression Factor		0.67	0.64	1.00	1.00					1.00	1.00	1.00
Incremental Delay, d2		0.8	2.0	3.7	0.6					2.6	2.6	0.1
Delay (s)		20.3	19.8	40.6	10.8					34.4	34.4	30.6
Level of Service		C	B	D	B					C	C	C
Approach Delay (s)		20.1			21.9			0.0			32.5	
Approach LOS		C			C			A			C	

Intersection Summary			
HCM 2000 Control Delay	23.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Analysis – Existing + Project Phase 1 + Stage II

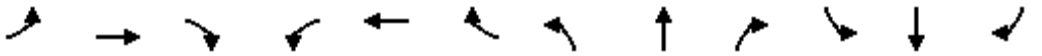
Existing + Phase 1 + Stage II.syn
1: Boones Ferry Rd & 95th Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	207	2	935	63	16	2	684	755	5	2	1083	177
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00	0.88	1.00	1.00		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes		1.00	0.99	1.00	1.00		1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85	1.00	0.98		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1737	2734	1805	1686		3183	3468		1805	3574	1497
Flt Permitted		0.72	1.00	0.42	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1304	2734	789	1686		3183	3468		1805	3574	1497
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	213	2	964	65	16	2	705	778	5	2	1116	182
RTOR Reduction (vph)	0	0	18	0	2	0	0	0	0	0	0	91
Lane Group Flow (vph)	0	215	946	65	16	0	705	783	0	2	1116	91
Confl. Peds. (#/hr)	2					2	3		1	1		3
Confl. Bikes (#/hr)			2						1			
Heavy Vehicles (%)	4%	0%	3%	0%	12%	0%	10%	4%	0%	0%	1%	5%
Turn Type	Perm	NA	pm+ov	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		8	1		4		1	6		5	2	
Permitted Phases	8		8	4								2
Actuated Green, G (s)		21.8	49.9	21.8	21.8		28.1	70.0		1.2	43.1	43.1
Effective Green, g (s)		21.8	49.9	21.8	21.8		28.1	70.0		1.2	43.1	43.1
Actuated g/C Ratio		0.21	0.48	0.21	0.21		0.27	0.67		0.01	0.41	0.41
Clearance Time (s)		4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		270	1403	163	350		851	2312		20	1467	614
v/s Ratio Prot			c0.18		0.01		c0.22	0.23		0.00	c0.31	
v/s Ratio Perm		c0.16	0.17	0.08								0.06
v/c Ratio		0.80	0.67	0.40	0.05		0.83	0.34		0.10	0.76	0.15
Uniform Delay, d1		39.5	21.3	35.9	33.3		36.2	7.5		51.4	26.5	19.4
Progression Factor		1.00	1.00	1.00	1.00		1.10	0.56		1.00	1.00	1.00
Incremental Delay, d2		14.9	1.3	1.6	0.1		6.6	0.3		2.2	2.4	0.1
Delay (s)		54.4	22.6	37.5	33.3		46.6	4.5		53.6	28.9	19.5
Level of Service		D	C	D	C		D	A		D	C	B
Approach Delay (s)		28.4			36.6			24.4			27.6	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Existing + Phase 1 + Stage II.syn
2: I-5 SB On Ramp/I-5 SB Off Ramp & Boones Ferry Road/Elligsen Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1177	904	0	727	406	0	0	0	549	0	717
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0				4.5	4.5	4.5
Lane Util. Factor		0.95	1.00		0.95	1.00				0.95	0.95	1.00
Frpb, ped/bikes		1.00	0.99		1.00	0.98				1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00				1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85				1.00	1.00	0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95	0.95	1.00
Satd. Flow (prot)		3539	1564		3471	1580				1649	1649	1495
Flt Permitted		1.00	1.00		1.00	1.00				0.95	0.95	1.00
Satd. Flow (perm)		3539	1564		3471	1580				1649	1649	1495
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	1252	962	0	773	432	0	0	0	584	0	763
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	79
Lane Group Flow (vph)	0	1252	962	0	773	432	0	0	0	292	292	684
Confl. Peds. (#/hr)									1	1		
Confl. Bikes (#/hr)			1			5						
Heavy Vehicles (%)	0%	2%	2%	0%	4%	0%	0%	0%	0%	4%	0%	8%
Turn Type		NA	Free		NA	Free				Split	NA	Prot
Protected Phases		2			6					4	4	4
Permitted Phases			Free			Free						
Actuated Green, G (s)		45.4	105.0		45.4	105.0				50.1	50.1	50.1
Effective Green, g (s)		46.4	105.0		46.4	105.0				50.1	50.1	50.1
Actuated g/C Ratio		0.44	1.00		0.44	1.00				0.48	0.48	0.48
Clearance Time (s)		5.0			5.0					4.5	4.5	4.5
Vehicle Extension (s)		3.0			3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		1563	1564		1533	1580				786	786	713
v/s Ratio Prot		c0.35			0.22					0.18	0.18	c0.46
v/s Ratio Perm			0.62			0.27						
v/c Ratio		0.80	0.62		0.50	0.27				0.37	0.37	0.96
Uniform Delay, d1		25.3	0.0		21.0	0.0				17.4	17.4	26.5
Progression Factor		0.92	1.00		1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2		3.0	1.2		1.2	0.4				0.3	0.3	23.8
Delay (s)		26.2	1.2		22.2	0.4				17.7	17.7	50.3
Level of Service		C	A		C	A				B	B	D
Approach Delay (s)		15.4			14.4			0.0			36.2	
Approach LOS		B			B			A			D	

Intersection Summary			
HCM 2000 Control Delay	21.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Existing + Phase 1 + Stage II.syn
3: Boeckman Rd & 95th Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	71	84	0	3	85	214	0	1	4	402	1	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97		0.99		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.88		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1701	1900		1805	1900	1458		1655		1719	1336	
Flt Permitted	0.69	1.00		0.70	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (perm)	1244	1900		1323	1900	1458		1655		1719	1336	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	80	94	0	3	96	240	0	1	4	452	1	96
RTOR Reduction (vph)	0	0	0	0	0	187	0	4	0	0	62	0
Lane Group Flow (vph)	80	94	0	3	96	53	0	1	0	452	35	0
Confl. Peds. (#/hr)	1					1			1	1		
Confl. Bikes (#/hr)			1			2						7
Heavy Vehicles (%)	6%	0%	0%	0%	0%	8%	0%	0%	0%	5%	0%	18%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	2			6		6						
Actuated Green, G (s)	13.6	6.7		24.9	13.5	13.5		0.9		22.0	22.0	
Effective Green, g (s)	13.6	6.7		24.9	13.5	13.5		0.9		22.0	22.0	
Actuated g/C Ratio	0.22	0.11		0.41	0.22	0.22		0.01		0.36	0.36	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		4.5		4.5	4.5	
Vehicle Extension (s)	2.5	3.0		2.5	3.0	3.0		2.5		2.5	2.5	
Lane Grp Cap (vph)	327	207		645	418	321		24		616	479	
v/s Ratio Prot	c0.03	c0.05		0.00	c0.05			c0.00		c0.26	0.03	
v/s Ratio Perm	0.03			0.00		0.04						
v/c Ratio	0.24	0.45		0.00	0.23	0.16		0.04		0.73	0.07	
Uniform Delay, d1	19.8	25.6		10.8	19.6	19.3		29.8		17.1	12.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	0.3	1.6		0.0	0.3	0.2		0.6		4.3	0.0	
Delay (s)	20.1	27.2		10.8	19.9	19.6		30.3		21.4	13.0	
Level of Service	C	C		B	B	B		C		C	B	
Approach Delay (s)		23.9			19.6			30.3			19.9	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	20.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	61.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

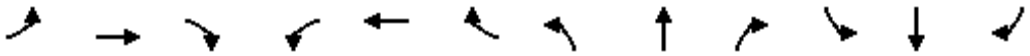
Existing + Phase 1 + Stage II.syn
4: Parkway Ave & Boeckman Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	98	321	231	75	322	41	105	186	49	41	379	204
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.98		1.00	0.97		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1734		1752	1795		1770	1788		1766	1782	
Flt Permitted	0.28	1.00		0.13	1.00		0.12	1.00		0.53	1.00	
Satd. Flow (perm)	534	1734		244	1795		216	1788		994	1782	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	109	357	257	83	358	46	117	207	54	46	421	227
RTOR Reduction (vph)	0	27	0	0	5	0	0	9	0	0	20	0
Lane Group Flow (vph)	109	587	0	83	399	0	117	252	0	46	628	0
Confl. Peds. (#/hr)	1		2	2		1			3	3		
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	1%	2%	1%	3%	4%	2%	2%	2%	4%	2%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)	37.6	31.0		36.2	30.3		40.6	34.5		36.8	32.6	
Effective Green, g (s)	37.6	31.0		36.2	30.3		40.6	34.5		36.8	32.6	
Actuated g/C Ratio	0.41	0.33		0.39	0.33		0.44	0.37		0.40	0.35	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	306	580		191	587		197	666		430	627	
v/s Ratio Prot	0.03	c0.34		c0.03	0.22		c0.04	0.14		0.00	c0.35	
v/s Ratio Perm	0.12			0.14			0.22			0.04		
v/c Ratio	0.36	1.01		0.43	0.68		0.59	0.38		0.11	1.00	
Uniform Delay, d1	18.6	30.8		21.9	27.0		21.0	21.2		17.3	30.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	40.6		1.6	3.2		4.7	0.4		0.1	36.3	
Delay (s)	19.3	71.4		23.5	30.2		25.7	21.6		17.4	66.3	
Level of Service	B	E		C	C		C	C		B	E	
Approach Delay (s)		63.5			29.1			22.9			63.1	
Approach LOS		E			C			C			E	

Intersection Summary			
HCM 2000 Control Delay	49.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	92.6	Sum of lost time (s)	17.0
Intersection Capacity Utilization	87.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Existing + Phase 1 + Stage II.syn
5: Boones Ferry Rd & Wilsonville Rd

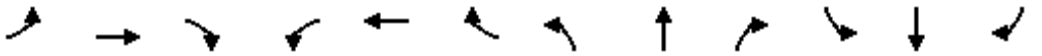


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	901	142	451	852	218	233	90	347	422	212	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	4.0		5.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.91		0.97	0.95	1.00	1.00	1.00	1.00	0.97	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1687	3100		3467	3600	1347	1805	4600	1599	4000	1808	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1687	3100		3467	3600	1347	1805	4600	1599	4000	1808	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	52	929	146	465	878	225	240	93	358	435	219	64
RTOR Reduction (vph)	0	18	0	0	0	70	0	0	46	0	10	0
Lane Group Flow (vph)	52	1057	0	465	878	155	240	93	312	435	273	0
Confl. Peds. (#/hr)	5		5	5		5	2					2
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	7%	3%	1%	1%	3%	16%	0%	1%	1%	3%	1%	2%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	pm+ov	Split	NA	
Protected Phases	5	2		1	6		8	8	1	4	4	
Permitted Phases						6			8			
Actuated Green, G (s)	7.0	33.6		17.7	44.3	44.3	18.5	18.5	36.2	20.2	20.2	
Effective Green, g (s)	7.0	34.6		17.7	45.3	45.3	18.5	18.5	36.2	20.2	20.2	
Actuated g/C Ratio	0.06	0.31		0.16	0.41	0.41	0.17	0.17	0.33	0.18	0.18	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.5	0.5		2.5	4.3	4.3	2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	107	975		557	1482	554	303	773	598	734	332	
v/s Ratio Prot	0.03	c0.34		c0.13	0.24		c0.13	0.02	0.08	0.11	c0.15	
v/s Ratio Perm						0.12			0.11			
v/c Ratio	0.49	1.08		0.83	0.59	0.28	0.79	0.12	0.52	0.59	0.82	
Uniform Delay, d1	49.8	37.7		44.7	25.2	21.5	43.9	38.8	29.9	41.1	43.2	
Progression Factor	1.00	1.00		1.21	0.79	0.63	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.5	54.5		9.1	1.5	1.1	12.8	0.1	0.6	1.1	14.8	
Delay (s)	52.3	92.2		63.3	21.3	14.6	56.7	38.9	30.5	42.2	58.0	
Level of Service	D	F		E	C	B	E	D	C	D	E	
Approach Delay (s)		90.3			32.8			40.7			48.4	
Approach LOS		F			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	52.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Existing + Phase 1 + Stage II.syn
6: I-5 SB & Wilsonville Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	986	684	557	1047	0	0	0	0	408	1	477
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Lane Util. Factor		0.91	1.00	0.97	0.95					0.95	0.95	0.88
Frpb, ped/bikes		1.00	0.97	1.00	1.00					1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		5085	1504	3467	3471					1715	1719	2682
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		5085	1504	3467	3471					1715	1719	2682
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	1006	698	568	1068	0	0	0	0	416	1	487
RTOR Reduction (vph)	0	0	395	0	0	0	0	0	0	0	0	142
Lane Group Flow (vph)	0	1006	303	568	1068	0	0	0	0	208	209	345
Confl. Peds. (#/hr)	7		11	11		7	1					1
Confl. Bikes (#/hr)						3						1
Heavy Vehicles (%)	0%	2%	4%	1%	4%	0%	0%	0%	0%	0%	0%	6%
Turn Type		NA	Perm	Prot	NA					Split	NA	custom
Protected Phases		2		1	6					7	7	4
Permitted Phases			2									
Actuated Green, G (s)		37.5	37.5	27.5	69.5					31.5	31.5	31.5
Effective Green, g (s)		37.5	37.5	27.5	69.5					31.5	31.5	31.5
Actuated g/C Ratio		0.34	0.34	0.25	0.63					0.29	0.29	0.29
Clearance Time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Vehicle Extension (s)		4.9	4.9	2.3	4.9					2.3	2.3	2.3
Lane Grp Cap (vph)		1733	512	866	2193					491	492	768
v/s Ratio Prot		0.20		c0.16	0.31					0.12	0.12	c0.13
v/s Ratio Perm			c0.20									
v/c Ratio		0.58	0.59	0.66	0.49					0.42	0.42	0.45
Uniform Delay, d1		29.8	29.9	37.0	10.8					31.9	31.9	32.1
Progression Factor		0.60	0.71	1.00	1.00					1.00	1.00	1.00
Incremental Delay, d2		0.8	2.6	3.9	0.8					2.7	2.7	0.2
Delay (s)		18.6	23.8	40.9	11.5					34.5	34.6	32.4
Level of Service		B	C	D	B					C	C	C
Approach Delay (s)		20.8			21.7			0.0			33.4	
Approach LOS		C			C			A			C	

Intersection Summary			
HCM 2000 Control Delay	23.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	82.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Analysis – Existing + Project Phase 2

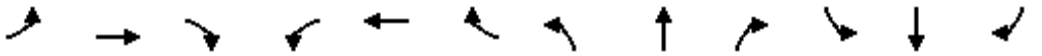
Existing + Phase 2.syn
1: Boones Ferry Rd & 95th Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	205	2	880	63	16	2	615	754	5	2	1082	176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00	0.88	1.00	1.00		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes		1.00	0.99	1.00	1.00		1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85	1.00	0.98		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1737	2734	1805	1686		3183	3468		1805	3574	1497
Flt Permitted		0.72	1.00	0.42	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1304	2734	794	1686		3183	3468		1805	3574	1497
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	211	2	907	65	16	2	634	777	5	2	1115	181
RTOR Reduction (vph)	0	0	18	0	2	0	0	0	0	0	0	91
Lane Group Flow (vph)	0	213	889	65	16	0	634	782	0	2	1115	90
Confl. Peds. (#/hr)	2					2	3		1	1		3
Confl. Bikes (#/hr)			2						1			
Heavy Vehicles (%)	4%	0%	3%	0%	12%	0%	10%	4%	0%	0%	1%	5%
Turn Type	Perm	NA	pm+ov	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		8	1		4		1	6		5	2	
Permitted Phases	8		8	4								2
Actuated Green, G (s)		21.7	49.9	21.7	21.7		28.2	70.1		1.2	43.1	43.1
Effective Green, g (s)		21.7	49.9	21.7	21.7		28.2	70.1		1.2	43.1	43.1
Actuated g/C Ratio		0.21	0.48	0.21	0.21		0.27	0.67		0.01	0.41	0.41
Clearance Time (s)		4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		269	1403	164	348		854	2315		20	1467	614
v/s Ratio Prot			c0.17		0.01		c0.20	0.23		0.00	c0.31	
v/s Ratio Perm		c0.16	0.15	0.08								0.06
v/c Ratio		0.79	0.63	0.40	0.05		0.74	0.34		0.10	0.76	0.15
Uniform Delay, d1		39.5	20.7	36.0	33.4		35.1	7.5		51.4	26.5	19.4
Progression Factor		1.00	1.00	1.00	1.00		1.14	0.60		1.00	1.00	1.00
Incremental Delay, d2		14.7	0.9	1.6	0.1		4.4	0.3		2.2	2.4	0.1
Delay (s)		54.2	21.6	37.6	33.4		44.2	4.8		53.6	28.9	19.5
Level of Service		D	C	D	C		D	A		D	C	B
Approach Delay (s)		27.8			36.7			22.4			27.6	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Existing + Phase 2.syn
2: I-5 SB On Ramp/I-5 SB Off Ramp & Boones Ferry Road/Elligsen Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1124	901	0	723	406	0	0	0	548	0	651
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0				4.5	4.5	4.5
Lane Util. Factor		0.95	1.00		0.95	1.00				0.95	0.95	1.00
Frpb, ped/bikes		1.00	0.99		1.00	0.98				1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00				1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85				1.00	1.00	0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95	0.95	1.00
Satd. Flow (prot)		3539	1564		3471	1580				1649	1649	1495
Flt Permitted		1.00	1.00		1.00	1.00				0.95	0.95	1.00
Satd. Flow (perm)		3539	1564		3471	1580				1649	1649	1495
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	1196	959	0	769	432	0	0	0	583	0	693
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	84
Lane Group Flow (vph)	0	1196	959	0	769	432	0	0	0	291	292	609
Confl. Peds. (#/hr)									1	1		
Confl. Bikes (#/hr)			1			5						
Heavy Vehicles (%)	0%	2%	2%	0%	4%	0%	0%	0%	0%	4%	0%	8%
Turn Type		NA	Free		NA	Free				Split	NA	Prot
Protected Phases		2			6					4	4	4
Permitted Phases			Free			Free						
Actuated Green, G (s)		48.3	105.0		48.3	105.0				47.2	47.2	47.2
Effective Green, g (s)		49.3	105.0		49.3	105.0				47.2	47.2	47.2
Actuated g/C Ratio		0.47	1.00		0.47	1.00				0.45	0.45	0.45
Clearance Time (s)		5.0			5.0					4.5	4.5	4.5
Vehicle Extension (s)		3.0			3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		1661	1564		1629	1580				741	741	672
v/s Ratio Prot		c0.34			0.22					0.18	0.18	c0.41
v/s Ratio Perm			0.61			0.27						
v/c Ratio		0.72	0.61		0.47	0.27				0.39	0.39	0.91
Uniform Delay, d1		22.3	0.0		19.0	0.0				19.3	19.3	26.8
Progression Factor		0.87	1.00		1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2		1.9	1.3		1.0	0.4				0.3	0.3	15.8
Delay (s)		21.2	1.3		20.0	0.4				19.7	19.7	42.6
Level of Service		C	A		B	A				B	B	D
Approach Delay (s)		12.3			12.9			0.0			32.1	
Approach LOS		B			B			A			C	

Intersection Summary			
HCM 2000 Control Delay	17.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

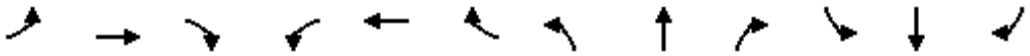
Existing + Phase 2.syn
3: Boeckman Rd & 95th Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	46	54	0	3	31	200	0	1	4	388	1	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98		0.99		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.88		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1700	1900		1805	1900	1458		1655		1719	1345	
Flt Permitted	0.91	1.00		0.72	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (perm)	1627	1900		1363	1900	1458		1655		1719	1345	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	52	61	0	3	35	225	0	1	4	436	1	34
RTOR Reduction (vph)	0	0	0	0	0	172	0	4	0	0	21	0
Lane Group Flow (vph)	52	61	0	3	35	53	0	1	0	436	14	0
Confl. Peds. (#/hr)	1					1			1	1		
Confl. Bikes (#/hr)			1			2						7
Heavy Vehicles (%)	6%	0%	0%	0%	0%	8%	0%	0%	0%	5%	0%	18%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	2			6		6						
Actuated Green, G (s)	8.5	4.4		22.6	14.0	14.0		0.9		22.1	22.1	
Effective Green, g (s)	8.5	4.4		22.6	14.0	14.0		0.9		22.1	22.1	
Actuated g/C Ratio	0.14	0.07		0.38	0.24	0.24		0.02		0.37	0.37	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		4.5		4.5	4.5	
Vehicle Extension (s)	2.5	3.0		2.5	3.0	3.0		2.5		2.5	2.5	
Lane Grp Cap (vph)	239	141		623	450	345		25		642	502	
v/s Ratio Prot	c0.02	c0.03		0.00	0.02			c0.00		c0.25	0.01	
v/s Ratio Perm	0.02			0.00		c0.04						
v/c Ratio	0.22	0.43		0.00	0.08	0.15		0.04		0.68	0.03	
Uniform Delay, d1	22.4	26.2		11.3	17.5	17.9		28.7		15.5	11.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	0.3	2.1		0.0	0.1	0.2		0.5		2.6	0.0	
Delay (s)	22.7	28.3		11.3	17.6	18.1		29.2		18.1	11.7	
Level of Service	C	C		B	B	B		C		B	B	
Approach Delay (s)		25.7			17.9			29.2			17.6	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	59.1	Sum of lost time (s)	18.0
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Existing + Phase 2.syn
4: Parkway Ave & Boeckman Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	83	281	229	73	269	41	103	184	46	41	376	179
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.98		1.00	0.97		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1725		1752	1790		1770	1790		1766	1790	
Flt Permitted	0.36	1.00		0.14	1.00		0.12	1.00		0.54	1.00	
Satd. Flow (perm)	670	1725		249	1790		215	1790		1012	1790	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	92	312	254	81	299	46	114	204	51	46	418	199
RTOR Reduction (vph)	0	30	0	0	5	0	0	9	0	0	17	0
Lane Group Flow (vph)	92	536	0	81	340	0	114	246	0	46	600	0
Confl. Peds. (#/hr)	1		2	2		1			3	3		
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	1%	2%	1%	3%	4%	2%	2%	2%	4%	2%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)	36.4	30.1		35.4	29.6		40.7	34.7		37.1	32.9	
Effective Green, g (s)	36.4	30.1		35.4	29.6		40.7	34.7		37.1	32.9	
Actuated g/C Ratio	0.40	0.33		0.39	0.32		0.44	0.38		0.40	0.36	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	342	565		190	577		196	676		443	641	
v/s Ratio Prot	0.02	c0.31		c0.03	0.19		c0.04	0.14		0.00	c0.33	
v/s Ratio Perm	0.09			0.14			0.22			0.04		
v/c Ratio	0.27	0.95		0.43	0.59		0.58	0.36		0.10	0.94	
Uniform Delay, d1	18.3	30.1		21.3	26.0		20.0	20.6		16.8	28.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	25.3		1.5	1.5		4.3	0.3		0.1	21.0	
Delay (s)	18.7	55.4		22.9	27.5		24.3	20.9		16.9	49.4	
Level of Service	B	E		C	C		C	C		B	D	
Approach Delay (s)		50.3			26.7			22.0			47.2	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	39.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	91.8	Sum of lost time (s)	17.0
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

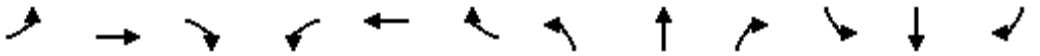
Existing + Phase 2.syn
5: Boones Ferry Rd & Wilsonville Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	748	103	449	669	207	166	88	344	406	208	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	4.0		5.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.91		0.97	0.95	1.00	1.00	1.00	1.00	0.97	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1687	3100		3467	3600	1348	1805	4600	1599	4000	1809	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1687	3100		3467	3600	1348	1805	4600	1599	4000	1809	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	46	771	106	463	690	213	171	91	355	419	214	61
RTOR Reduction (vph)	0	15	0	0	0	79	0	0	48	0	10	0
Lane Group Flow (vph)	46	862	0	463	690	134	171	91	307	419	265	0
Confl. Peds. (#/hr)	5		5	5		5	2					2
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	7%	3%	1%	1%	3%	16%	0%	1%	1%	3%	1%	2%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	pm+ov	Split	NA	
Protected Phases	5	2		1	6		8	8	1	4	4	
Permitted Phases						6			8			
Actuated Green, G (s)	7.0	36.4		18.6	48.0	48.0	15.2	15.2	33.8	19.8	19.8	
Effective Green, g (s)	7.0	37.4		18.6	49.0	49.0	15.2	15.2	33.8	19.8	19.8	
Actuated g/C Ratio	0.06	0.34		0.17	0.45	0.45	0.14	0.14	0.31	0.18	0.18	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.5	0.5		2.5	4.3	4.3	2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	107	1054		586	1603	600	249	635	564	720	325	
v/s Ratio Prot	0.03	c0.28		c0.13	0.19		c0.09	0.02	0.09	0.10	c0.15	
v/s Ratio Perm						0.10			0.10			
v/c Ratio	0.43	0.82		0.79	0.43	0.22	0.69	0.14	0.54	0.58	0.82	
Uniform Delay, d1	49.6	33.2		43.8	20.9	18.8	45.1	41.7	31.7	41.3	43.3	
Progression Factor	1.00	1.00		1.25	0.80	0.61	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.0	7.1		6.4	0.8	0.8	7.0	0.1	0.9	1.0	14.2	
Delay (s)	51.6	40.3		61.2	17.6	12.2	52.1	41.8	32.5	42.3	57.6	
Level of Service	D	D		E	B	B	D	D	C	D	E	
Approach Delay (s)		40.8			31.5			39.3			48.3	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	38.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Existing + Phase 2.syn
6: I-5 SB & Wilsonville Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	883	615	548	928	0	0	0	0	400	1	400
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Lane Util. Factor		0.91	1.00	0.97	0.95					0.95	0.95	0.88
Frpb, ped/bikes		1.00	0.97	1.00	1.00					1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		5085	1504	3467	3471					1715	1719	2682
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		5085	1504	3467	3471					1715	1719	2682
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	901	628	559	947	0	0	0	0	408	1	408
RTOR Reduction (vph)	0	0	396	0	0	0	0	0	0	0	0	185
Lane Group Flow (vph)	0	901	232	559	947	0	0	0	0	204	205	223
Confl. Peds. (#/hr)	7		11	11		7	1					1
Confl. Bikes (#/hr)						3						1
Heavy Vehicles (%)	0%	2%	4%	1%	4%	0%	0%	0%	0%	0%	0%	6%
Turn Type		NA	Perm	Prot	NA					Split	NA	custom
Protected Phases		2		1	6					7	7	4
Permitted Phases			2									
Actuated Green, G (s)		37.5	37.5	27.5	69.5					31.5	31.5	31.5
Effective Green, g (s)		37.5	37.5	27.5	69.5					31.5	31.5	31.5
Actuated g/C Ratio		0.34	0.34	0.25	0.63					0.29	0.29	0.29
Clearance Time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Vehicle Extension (s)		4.9	4.9	2.3	4.9					2.3	2.3	2.3
Lane Grp Cap (vph)		1733	512	866	2193					491	492	768
v/s Ratio Prot		c0.18		c0.16	0.27					0.12	c0.12	0.08
v/s Ratio Perm			0.15									
v/c Ratio		0.52	0.45	0.65	0.43					0.42	0.42	0.29
Uniform Delay, d1		29.0	28.3	36.9	10.3					31.8	31.8	30.6
Progression Factor		0.67	0.63	1.00	1.00					1.00	1.00	1.00
Incremental Delay, d2		0.8	2.1	3.7	0.6					2.6	2.6	0.1
Delay (s)		20.2	19.9	40.6	10.9					34.4	34.4	30.7
Level of Service		C	B	D	B					C	C	C
Approach Delay (s)		20.1			21.9			0.0			32.5	
Approach LOS		C			C			A			C	

Intersection Summary			
HCM 2000 Control Delay	23.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Analysis – Existing + Project Phase 2 + Stage II

Existing + Phase 2 + Stage II.syn
1: Boones Ferry Rd & 95th Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	209	2	943	63	16	2	690	755	5	2	1083	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00	0.88	1.00	1.00		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes		1.00	0.99	1.00	1.00		1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85	1.00	0.98		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1737	2733	1805	1686		3183	3468		1805	3574	1497
Flt Permitted		0.72	1.00	0.41	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1304	2733	786	1686		3183	3468		1805	3574	1497
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	215	2	972	65	16	2	711	778	5	2	1116	184
RTOR Reduction (vph)	0	0	18	0	2	0	0	0	0	0	0	92
Lane Group Flow (vph)	0	217	954	65	16	0	711	783	0	2	1116	92
Confl. Peds. (#/hr)	2					2	3		1	1		3
Confl. Bikes (#/hr)			2						1			
Heavy Vehicles (%)	4%	0%	3%	0%	12%	0%	10%	4%	0%	0%	1%	5%
Turn Type	Perm	NA	pm+ov	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		8	1		4		1	6		5	2	
Permitted Phases	8		8	4								2
Actuated Green, G (s)		22.0	49.8	22.0	22.0		27.8	69.8		1.2	43.2	43.2
Effective Green, g (s)		22.0	49.8	22.0	22.0		27.8	69.8		1.2	43.2	43.2
Actuated g/C Ratio		0.21	0.47	0.21	0.21		0.26	0.66		0.01	0.41	0.41
Clearance Time (s)		4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		273	1400	164	353		842	2305		20	1470	615
v/s Ratio Prot			c0.18		0.01		c0.22	0.23		0.00	c0.31	
v/s Ratio Perm		c0.17	0.17	0.08								0.06
v/c Ratio		0.79	0.68	0.40	0.05		0.84	0.34		0.10	0.76	0.15
Uniform Delay, d1		39.4	21.4	35.8	33.1		36.6	7.6		51.4	26.4	19.4
Progression Factor		1.00	1.00	1.00	1.00		1.10	0.56		1.00	1.00	1.00
Incremental Delay, d2		14.7	1.4	1.6	0.1		7.3	0.3		2.2	2.3	0.1
Delay (s)		54.0	22.8	37.4	33.2		47.6	4.6		53.6	28.8	19.5
Level of Service		D	C	D	C		D	A		D	C	B
Approach Delay (s)		28.5			36.4			25.0			27.5	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

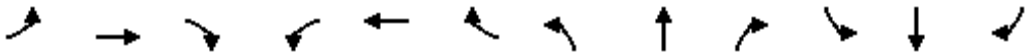
Existing + Phase 2 + Stage II.syn
2: I-5 SB On Ramp/I-5 SB Off Ramp & Boones Ferry Road/Elligsen Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1185	904	0	727	406	0	0	0	549	0	723
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0				4.5	4.5	4.5
Lane Util. Factor		0.95	1.00		0.95	1.00				0.95	0.95	1.00
Frpb, ped/bikes		1.00	0.99		1.00	0.98				1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00				1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85				1.00	1.00	0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95	0.95	1.00
Satd. Flow (prot)		3539	1564		3471	1580				1649	1649	1495
Flt Permitted		1.00	1.00		1.00	1.00				0.95	0.95	1.00
Satd. Flow (perm)		3539	1564		3471	1580				1649	1649	1495
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	1261	962	0	773	432	0	0	0	584	0	769
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	79
Lane Group Flow (vph)	0	1261	962	0	773	432	0	0	0	292	292	690
Confl. Peds. (#/hr)									1	1		
Confl. Bikes (#/hr)			1			5						
Heavy Vehicles (%)	0%	2%	2%	0%	4%	0%	0%	0%	0%	4%	0%	8%
Turn Type		NA	Free		NA	Free				Split	NA	Prot
Protected Phases		2			6					4	4	4
Permitted Phases			Free			Free						
Actuated Green, G (s)		45.6	105.0		45.6	105.0				49.9	49.9	49.9
Effective Green, g (s)		46.6	105.0		46.6	105.0				49.9	49.9	49.9
Actuated g/C Ratio		0.44	1.00		0.44	1.00				0.48	0.48	0.48
Clearance Time (s)		5.0			5.0					4.5	4.5	4.5
Vehicle Extension (s)		3.0			3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		1570	1564		1540	1580				783	783	710
v/s Ratio Prot		c0.36			0.22					0.18	0.18	c0.46
v/s Ratio Perm			0.62			0.27						
v/c Ratio		0.80	0.62		0.50	0.27				0.37	0.37	0.97
Uniform Delay, d1		25.2	0.0		20.9	0.0				17.6	17.6	26.9
Progression Factor		0.92	1.00		1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2		3.0	1.2		1.2	0.4				0.3	0.3	26.7
Delay (s)		26.3	1.2		22.1	0.4				17.9	17.9	53.6
Level of Service		C	A		C	A				B	B	D
Approach Delay (s)		15.5			14.3			0.0			38.2	
Approach LOS		B			B			A			D	

Intersection Summary			
HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Existing + Phase 2 + Stage II.syn
3: Boeckman Rd & 95th Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	81	91	0	3	91	214	0	1	4	402	1	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97		0.99		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.88		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1701	1900		1805	1900	1456		1655		1719	1336	
Flt Permitted	0.69	1.00		0.69	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (perm)	1237	1900		1313	1900	1456		1655		1719	1336	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	91	102	0	3	102	240	0	1	4	452	1	103
RTOR Reduction (vph)	0	0	0	0	0	200	0	4	0	0	66	0
Lane Group Flow (vph)	91	102	0	3	102	40	0	1	0	452	38	0
Confl. Peds. (#/hr)	1					1			1	1		
Confl. Bikes (#/hr)			1			2						7
Heavy Vehicles (%)	6%	0%	0%	0%	0%	8%	0%	0%	0%	5%	0%	18%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	2			6		6						
Actuated Green, G (s)	16.4	6.9		23.0	10.2	10.2		0.9		22.0	22.0	
Effective Green, g (s)	16.4	6.9		23.0	10.2	10.2		0.9		22.0	22.0	
Actuated g/C Ratio	0.27	0.11		0.38	0.17	0.17		0.01		0.36	0.36	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5		4.5		4.5	4.5	
Vehicle Extension (s)	2.5	3.0		2.5	3.0	3.0		2.5		2.5	2.5	
Lane Grp Cap (vph)	407	216		602	319	245		24		624	485	
v/s Ratio Prot	c0.04	c0.05		c0.00	0.05			c0.00		c0.26	0.03	
v/s Ratio Perm	0.03			0.00		0.03						
v/c Ratio	0.22	0.47		0.00	0.32	0.16		0.04		0.72	0.08	
Uniform Delay, d1	17.4	25.1		11.7	22.2	21.6		29.4		16.7	12.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.6		0.0	0.6	0.3		0.6		3.9	0.1	
Delay (s)	17.6	26.8		11.7	22.7	21.9		30.0		20.6	12.7	
Level of Service	B	C		B	C	C		C		C	B	
Approach Delay (s)		22.4			22.0			30.0			19.1	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	20.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	60.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Existing + Phase 2 + Stage II.syn
4: Parkway Ave & Boeckman Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	98	328	231	75	328	41	105	186	49	41	379	204
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.98		1.00	0.97		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1735		1752	1796		1770	1788		1766	1782	
Flt Permitted	0.28	1.00		0.13	1.00		0.12	1.00		0.53	1.00	
Satd. Flow (perm)	520	1735		244	1796		216	1788		994	1782	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	109	364	257	83	364	46	117	207	54	46	421	227
RTOR Reduction (vph)	0	26	0	0	5	0	0	9	0	0	20	0
Lane Group Flow (vph)	109	595	0	83	405	0	117	252	0	46	628	0
Confl. Peds. (#/hr)	1		2	2		1			3	3		
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	1%	2%	1%	3%	4%	2%	2%	2%	4%	2%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)	37.6	31.0		36.2	30.3		40.6	34.5		36.8	32.6	
Effective Green, g (s)	37.6	31.0		36.2	30.3		40.6	34.5		36.8	32.6	
Actuated g/C Ratio	0.41	0.33		0.39	0.33		0.44	0.37		0.40	0.35	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	301	580		191	587		197	666		430	627	
v/s Ratio Prot	0.03	c0.34		c0.03	0.23		c0.04	0.14		0.00	c0.35	
v/s Ratio Perm	0.12			0.14			0.22			0.04		
v/c Ratio	0.36	1.03		0.43	0.69		0.59	0.38		0.11	1.00	
Uniform Delay, d1	18.7	30.8		21.9	27.1		21.0	21.2		17.3	30.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	44.1		1.6	3.5		4.7	0.4		0.1	36.3	
Delay (s)	19.4	74.9		23.5	30.6		25.7	21.6		17.4	66.3	
Level of Service	B	E		C	C		C	C		B	E	
Approach Delay (s)		66.7			29.4			22.9			63.1	
Approach LOS		E			C			C			E	

Intersection Summary			
HCM 2000 Control Delay	50.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	92.6	Sum of lost time (s)	17.0
Intersection Capacity Utilization	88.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

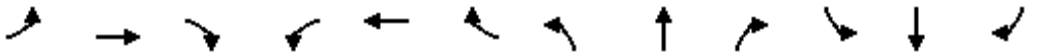
Existing + Phase 2 + Stage II.syn
5: Boones Ferry Rd & Wilsonville Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	908	142	451	857	218	233	90	347	422	212	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	4.0		5.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.91		0.97	0.95	1.00	1.00	1.00	1.00	0.97	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1687	3100		3467	3600	1347	1805	4600	1599	4000	1808	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1687	3100		3467	3600	1347	1805	4600	1599	4000	1808	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	52	936	146	465	884	225	240	93	358	435	219	64
RTOR Reduction (vph)	0	18	0	0	0	70	0	0	46	0	10	0
Lane Group Flow (vph)	52	1064	0	465	884	155	240	93	312	435	273	0
Confl. Peds. (#/hr)	5		5	5		5	2					2
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	7%	3%	1%	1%	3%	16%	0%	1%	1%	3%	1%	2%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	pm+ov	Split	NA	
Protected Phases	5	2		1	6		8	8	1	4	4	
Permitted Phases						6			8			
Actuated Green, G (s)	7.0	33.6		17.7	44.3	44.3	18.5	18.5	36.2	20.2	20.2	
Effective Green, g (s)	7.0	34.6		17.7	45.3	45.3	18.5	18.5	36.2	20.2	20.2	
Actuated g/C Ratio	0.06	0.31		0.16	0.41	0.41	0.17	0.17	0.33	0.18	0.18	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.5	0.5		2.5	4.3	4.3	2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	107	975		557	1482	554	303	773	598	734	332	
v/s Ratio Prot	0.03	c0.34		c0.13	0.25		c0.13	0.02	0.08	0.11	c0.15	
v/s Ratio Perm						0.12			0.11			
v/c Ratio	0.49	1.09		0.83	0.60	0.28	0.79	0.12	0.52	0.59	0.82	
Uniform Delay, d1	49.8	37.7		44.7	25.2	21.5	43.9	38.8	29.9	41.1	43.2	
Progression Factor	1.00	1.00		1.21	0.79	0.63	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.5	57.1		9.1	1.6	1.1	12.8	0.1	0.6	1.1	14.8	
Delay (s)	52.3	94.8		63.3	21.4	14.6	56.7	38.9	30.5	42.2	58.0	
Level of Service	D	F		E	C	B	E	D	C	D	E	
Approach Delay (s)		92.8			32.8			40.7			48.4	
Approach LOS		F			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	53.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Existing + Phase 2 + Stage II.syn
6: I-5 SB & Wilsonville Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	986	691	557	1052	0	0	0	0	408	1	477
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Lane Util. Factor		0.91	1.00	0.97	0.95					0.95	0.95	0.88
Frpb, ped/bikes		1.00	0.97	1.00	1.00					1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		5085	1504	3467	3471					1715	1719	2682
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		5085	1504	3467	3471					1715	1719	2682
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	1006	705	568	1073	0	0	0	0	416	1	487
RTOR Reduction (vph)	0	0	395	0	0	0	0	0	0	0	0	141
Lane Group Flow (vph)	0	1006	310	568	1073	0	0	0	0	208	209	346
Confl. Peds. (#/hr)	7		11	11		7	1					1
Confl. Bikes (#/hr)						3						1
Heavy Vehicles (%)	0%	2%	4%	1%	4%	0%	0%	0%	0%	0%	0%	6%
Turn Type		NA	Perm	Prot	NA					Split	NA	custom
Protected Phases		2		1	6					7	7	4
Permitted Phases			2									
Actuated Green, G (s)		37.5	37.5	27.5	69.5					31.5	31.5	31.5
Effective Green, g (s)		37.5	37.5	27.5	69.5					31.5	31.5	31.5
Actuated g/C Ratio		0.34	0.34	0.25	0.63					0.29	0.29	0.29
Clearance Time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Vehicle Extension (s)		4.9	4.9	2.3	4.9					2.3	2.3	2.3
Lane Grp Cap (vph)		1733	512	866	2193					491	492	768
v/s Ratio Prot		0.20		c0.16	0.31					0.12	0.12	c0.13
v/s Ratio Perm			c0.21									
v/c Ratio		0.58	0.60	0.66	0.49					0.42	0.42	0.45
Uniform Delay, d1		29.8	30.1	37.0	10.8					31.9	31.9	32.2
Progression Factor		0.60	0.73	1.00	1.00					1.00	1.00	1.00
Incremental Delay, d2		0.7	2.8	3.9	0.8					2.7	2.7	0.2
Delay (s)		18.6	24.6	40.9	11.6					34.5	34.6	32.4
Level of Service		B	C	D	B					C	C	C
Approach Delay (s)		21.1			21.7			0.0			33.4	
Approach LOS		C			C			A			C	

Intersection Summary			
HCM 2000 Control Delay	23.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	82.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

WILSONVILLE
OREGON

29799 SW Town Center Loop E, Wilsonville, OR 97070
Phone: 503.682.4960 Fax: 503.682.7025
Web: www.ci.wilsonville.or.us

Planning Division
Development Permit Application

Final action on development application or zone change is required within 120 days in accordance with provisions of ORS 227.175

A pre application conference is normally required prior to submittal of an application. Please visit the City's website for submittal requirements

Pre-Application Meeting Date: Sep 8, 2021

Incomplete applications will not be scheduled for public hearing until all of the required materials are submitted.

Applicant:
Name: Mac Martin
Company: W-5 LLC
Mailing Address: PO Box 15523
City, State, Zip: Seattle, WA 98115
Phone: 206.399.6676 Fax:
E-mail: MartinDevelopment@outlook.com

Authorized Representative:
Name: Bob Wells
Company: LMA
Mailing Address: 130 Lakeside Ave. S. Suit #250
City, State, Zip: Seattle WA 98122
Phone: 206.915.2442 Fax:
E-mail: BWells@lmueller.com

Property Owner:
Name: Same as above
Company:
Mailing Address:
City, State, Zip:
Phone: Fax:
E-mail:

Property Owner's Signature:
Printed Name: Mac Martin, Manager/Member Date: 1/18/2022

Applicant's Signature: (if different from Property Owner)
Printed Name: Date:

Site Location and Description:
Project Address if Available: 9600 Boeckman Road Suite/Unit
Project Location:
Tax Map #(s): 14B Tax Lot #(s): 202 County: ☐ Washington ☒ Clackamas

Request:
Construct a new 80,000SF building and site work for commercials/industrial uses

Project Type: **Class I** ☐ **Class II** ☐ **Class III** ☐

☐ Residential	☒ Commercial	☒ Industrial	☐ Other:

Application Type(s):

☐ Annexation	☐ Appeal	☐ Comp Plan Map Amend	☐ Parks Plan Review
☐ Final Plat	☐ Major Partition	☐ Minor Partition	☐ Request to Modify Conditions
☐ Plan Amendment	☐ Planned Development	☐ Preliminary Plat	
☐ Request for Special Meeting	☐ Request for Time Extension	☐ Signs	☐ Site Design Review
☐ SROZ/SRIR Review	☐ Staff Interpretation	☐ Stage I Master Plan	☐ Stage II Final Plan
☐ Type C Tree Removal Plan	☐ Tree Permit (B or C)	☐ Temporary Use	☐ Variance
☐ Villebois SAP	☐ Villebois PDP	☐ Villebois FDP	☐ Other (describe)
☐ Zone Map Amendment	☐ Waiver(s)	☐ Conditional Use	

Exhibit B1, Part 1
DB22-0004

LANCE MUELLER & ASSOCIATES
ARCHITECTS · AIA

W5	March 2023

96XX SW Boeckman Road, Wilsonville, OR 97070

The proposed W5 hi-tech industrial building **"shell"** in morning light off SW Boeckman Road.

Architectural Review Narrative:

Narrative Index:

	Page	Item
	1-2	Index
	3	Application Form
Section 1.	4-7	Proposal Summary
Section 2.	8-12	Background Information
Section 3.	13	Key Issues (neighborhood outreach)
Section 4.	14-69	Code Criteria List with Proponents Responses
Section 5.	D1-37	Plan Sets

Architectural:
- A0 Cover Sheet
- A1.0 Site Plan
- A1.1 Enlarged Site Plan at Entry & Details
- A1.2 Enlarged Site Plan at Service & Details
- A2.0 First Floor Plan
- A2.2 Roof Plan
- A3.0 Exterior Elevations

Civil
- C1.01 Tree Protection Plan
- C1.20 Grading plan - South
- C1.21 Grading plan - North
- C1.30 Utility plan - South
- C1.31 Utility plan – North
- EC2.0 Clearing & Demolition Erosion & Sediment Control Plan
  - Cut/Fill Map

Landscape

L1.0	Landscape Plan
L1.1	Enlarged Landscape Plan - North
L1.2	Enlarged Landscape Plan – South
L2.0	Landscape Details
L2.1	Landscape Specifications

Site Lighting

1 of 4	Site Lighting Plan & Calculations
2 of 4	Enlarged Site Lighting Plan - North
3 of 4	Enlarged Site Lighting Plan – South
4 of 4	Graphic Site Lighting Plans & Calculations

Supplemental Drawings

CS-2	Site Parking Plan & Calculations
CS-3	Site Circulation Plan & TVFR Service Provider Plan
TR-1	Tree Removal Plan
TR-2	Tree Removal Table
1 of 4	Martin Partition Plan
2 of 4	Martin Partition Plan
3 of 4	Martin Partition Plan
4 of 4	Martin Partition Plan
A1.1	W4 Approved Site Plan (Pre – W5)
C3.0	W4 Approved Utility Plan
C3.1	W4 Approved Utility Plan
C3.2	W4 Approved Utility Plan

Section 6. R1-367 Reports

- Property Information Report by WFG, dated December 9, 2021.
- Assessor Map of property, dated December 9, 2021.
- Traffic: Trip Generation Memo, by DKS Associates, dated November 17, 2021
- Geotechnical Engineering Report by GeoEngineers, dated July 14, 2021
- Preliminary Tree Assessment by The Pacific Resource Group, dated December 9, 2021.
- Significant Resource Impact Report by Pacific Habitat Services, dated January 21, 2022.
- Storm Drainage Report by Mackenzie, dated December 10, 2021.
- Garbage Hauler Preliminary Approval Letter & documentsby Republic Services
- Lighting Fixture Cut Sheets (Exterior)
- Exterior Lighting Compliance certificate – ComCheck
- TVFR Service Provider letter & approved documents.
- Color and Materials Selections (Exterior)

The W5 back side (or SW corner) inside the campus receives the same finishes as the frontage. Manufacturing area windows are smaller and spaced more, and they are elevated so equipment can be placed against the outside wall.

WILSONVILLE
OREGON

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Name: Mac Martin
Company: W-5 LLC
Mailing Address: PO Box 15523
City, State, Zip: Seattle, WA 98115
Phone: 206.399.6676 Fax:
E-mail: MartinDevelopment@outlook.com

Authorized Representative:
Name: Bob Wells
Company: LMA
Mailing Address: 130 Lakeside Ave. S. Suit #250
City, State, Zip: Seattle WA 98122
Phone: 206.915.2442 Fax:
E-mail: BWells@lmueller.com

Property Owner:
Name: Same as above
Company:
Mailing Address:
City, State, Zip:
Phone: Fax:
E-mail:

Property Owner's Signature:
Printed Name: Mac Martin, Manager/Member Date: 1/18/2022

Applicant's Signature: (if different from Property Owner)
Printed Name: Date:

Site Location and Description:
Project Address if Available: 9600 Boeckman Road Suite/Unit
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☐ Villebois SAP	☐ Villebois PDP	☐ Villebois FDP	☐ Other (describe)
☐ Zone Map Amendment	☐ Waiver(s)	☐ Conditional Use	

Section 1: Proposal Summary

The applicant, W5 LLC, requests Site Design Review entitlement approval for an approximately 80,000sf new industrial building east of the existing DWFRITZ Precision Automation building (Permitted as W4). W5 is a new building providing manufacturing space for hi-tech industrial operations that anticipates a DWFRITZ on-site expansion. The W5 building is located on the unbuilt treeless portion of the 24.49-acre lot in the NW corner. Significant portions of the site will remain as treed natural areas, including substantial SROZ and wetland designated areas. The site is conceived as a two-building heavily treed campus, where for efficiency the buildings share the two existing SW Boeckman Road drive entries as well as vehicle circulation drives. The W4 and W5 lobbies have a pedestrian and visual connection, but they have separate service areas not visible from SW Boeckman Road or SW Kinsman Road. New parking surrounds W5 and extends to the southeast between the buildings in new parking areas designated SE Lot 1 and SE Lot 2. This W5 proposal is for the building shell and site work, and a separate tenant improvement permit is required to allow interior work so the building can be occupied.

For background, W5 follows substantial custom architectural renovations to the existing 160,000sf W4 building to consolidate DWFRITZ's local operations in one building for their World Headquarters. The renovation included many structural and architectural enhancements as well as a change of use from warehouse to industrial. The treeless W5 building location has been designated for DWFRITZ expansion since property purchase in 2016, and now timing is right to settle on a design and begin the permit process. No additional building expansion is anticipated for the campus because no treeless buildable areas remain, but there might be some small functional items built such as equipment sheds to support DWFRITZ's operations.

Statistics:

Building Area:

1st Floor SF	64, 988
Mezzanine	15,458
Total	80,446sf

Site Area: 629,112sf (14.442 Acres - Parcel 1 with Bldg. W5)
437,610sf (10.046 Acres - Parcel 2 with existing Bldg. W4)

Parking: (See Sheet CS-2 for a parking plan with statistics that combines the existing W4 with proposed W5)

Required:	Commercial Uses:	2/1,000sf min. & 4/1,000sf max.
	Light Manuf'g R & D:	2/1,000sf min. & 4/1,000sf max.
Minimum Required:	161 stalls (with 20,000sf Commercial Uses & 60,446sf Light Manuf'g R & D)	
Maximum Required:	321 stalls (with 20,000sf Commercial Uses & 60,446sf Light Manuf'g R & D)	

Parking Provided:	297 Stalls (94 Compacts = 31.6%)
Accessible Required:	297 = 8 (including 2 wheelchairs only)
Accessible Proposed:	6 + 2 wheelchair only spaces => 8
Car/Van Pool Required:	297 x .05 => 15 min.
Car/Van Pool Proposed:	15

Electric vehicle charging station infrastructure: (See Sheet CS-2)

Bike Requirements: (See Sheet A0)

Trash Enclosure Requirements: (See Sheet A0)

Loading Berth Requirements:

Required:	Industrial: 30,000sf – 100,000sf => 2 min (12' x 35' min.)
Proposed:	3 (2 dock-high; 1 on-grade drive-in)

Site aerial view after the DWFRITZ Precision Automation (W4) renovation and completion of SW Kinsman Road bordering the east property line. W5 is proposed on the only undeveloped treeless area left on the 24.5-acre lot.

W5 Design Summary:

The owner's goal for W5 is a new 80,000sf flexible hi-tech industrial building to complete their heavily treed 2-building campus. The buildings and campus must be high-quality so the tenant can attract and retain hi-tech employees that are in demand. A quick look at an aerial (above) or the street view (below) shows the obvious W5 building location is the grassy area, the only non-treed undeveloped spot left on the 24.5-acre site. With the building located it was also obvious to:

- Locate the W5 lobby facing the existing W4 and adjacent to the existing entry drive between the buildings. This works well whether the buildings are shared by the same tenant or are separate tenants.
- Locate service areas in the back, where truck operations are not seen from either ROW.
- Surround the building with fire truck access, which helps service truck circulation too. Add parking off the fire lane where we can for efficient land development.

With the building placement basics established the early configurations fell well short of needed building area and parking count. So, the harder work of collaborating with the owners, the arborist, the habitat consultant, the civil engineer, and the city began to understand the limitations in the adjacent existing SROZ, wetlands and treed natural areas. We had to find compromises that allow more site development to go forward. Part of the solution was moving 15,000sf of 1st floor building area to a mezzanine with a stout floor structure to accommodate some industrial activities. This allowed our smaller 65,000sf first floor to better fit the available grassy portion of the site. Another part of the solution was sharing existing drive lanes surrounding the existing W4 and modifying them slightly to add parking in a few areas. The solution included limited encroachments of the SROZ, wetland areas, and the less protected natural areas. These are documented on the drawings and in the Significant Resource Impact Report (SRIR) and the Preliminary Tree Assessment Report. After many iterations, condensed efficient

parking with some tree removal in natural areas (not SROZ or wetland) is added southeast of W5, which we identify as SE lot 1 and SE lot 2. Four (4) raingardens are required for storm water quality, and two (2) are placed in SROZ/wetland areas where their function is helpful to the protected areas. One (1) raingarden is placed in a natural area south of SE lot 2. The last raingarden is in a prominent upland location adjacent to the lobby, where it does its important work for all visitors and employees to see. Retaining walls are used for grade changes west of the building at the SROZ as the least intrusive way to balance a need for building/parking space with preserving SROZ. After many iterations, this submittal is our best compromise.

W5 has a strong architectural street presence facing Boeckman Road with deeply recessed square punched window patterns and the mottled stained precast facade. The architecture is softened by subtle modulation in the parapet heights, the facade step indicating the change from mezzanine to high bay manufacturing, and the vine covered green walls. Green walls extend to three sides of the project but are not possible at some service areas (that are not visible from public ROWs). W5 is also softened by the campus with tall, treed areas to the west and south, so the image is of an especially clean industrial campus in a large established treed natural area. Although a corner lot W5 is barely seen, if seen at all, from Kinsman Road because of screening by the established trees and vegetation that remain.

The owners prefer a simple exterior finish palette, and again they chose precast concrete walls with a neutral stain finish, which ages well to a natural patina. The subtle mottling and color variation of semi-transparent stain is much richer than the more commonly seen flat paint. Stain also accommodates green wall vines naturally attached directly on the surface, which is a key part of facade softening and adding color and richness to the building facades, see the owner's other green wall examples below. In addition to clear insulated glass, silver is the accent color of the metal finishes, which include clear anodized storefronts, painted copings, painted ACM entry wall, and rain collector boxes. Signing is part of the TI permit by others.

We anticipate no additional development on this 24.5-acre lot because the remaining undeveloped land is designated SROZ, wetland, or is a less protected treed natural area. Tenant improvement permits are required for W5 occupancy.

Before and after images from SW Boeckman Road looking SW at the existing drive entry to remain. W5 is located on the natural grass area, and most of the existing trees on this 24.49-acre site remain. Street trees are well established.

W5 marketing image (east elevation) highlighting sustainable and flexible features.

Because the W5 owners are not certain who they are designing this hi-tech industrial building shell for when beginning the permit process, they build in flexibility and sustainability. This is important short-term for the first tenant and for long-term ownership to secure future tenants. W5 examples include:

- The steel roofs are enhanced with extra structural capacity to accommodate roof-mounted HVAC equipment and solar panels as tenant improvements.
- The interiors receive lots of natural light from skylights and large windows. This is a priority for ownership to create a more humane interior and to save lighting energy costs.
- Cool (or light-colored) roofs that reflect sunlight and heat reduce energy costs.
- Green Globes Initiatives building certification ensures this new building is built with sustainability and efficiency features to improve building operations and occupant comfort.
- To support future Electric Vehicle (EV) Charging stations by tenant improvement, W5 provides the infrastructure of power capacity and conduit underground for easy electrical connections. An example of this is on-site at DWFRITZ Precision Automation (W4), which added lots of EV charging stations during their tenant improvement work.
- Native landscaping locally sourced is a best practice used by the owners, who install the landscaping and irrigation systems separately from the GC contract.
- LED lighting is used inside and out to reduce energy costs, maintenance costs, and to improve lighting quality and lighting levels.
- The building structure is enhanced to accommodate many different tenant needs:
    - Such as the roof structure and the mezzanine steel/concrete floor structure have extra load capacity for future flexibility allowing industrial equipment or storage above the ground floor.
    - Wide column spacing allows more tenant flexibility, which is accomplished by adding additional steel in the roof and floor shell structures.
    - High clearance manufacturing allows flexible use of the space, including high-piled storage and/or accommodating extra-large ducts for a quieter professional environment.

Section 2: Background Information

Surrounding Uses: Include other PDI zoned industrial operations and some undeveloped RA-H zoned properties as follows:

North zoning: Planned Development Industrial (PDI)

- Across Boeckman Road is Southern Glazers Wine & Spirits of Oregon, a large distribution and office facility.

West zoning: Residential Agricultural Holding (RA-H)

- Undeveloped – large SROZ overlay area.

East zoning: Planned Development Industrial (PDI) & Residential Agricultural Holding (RA-H)

- (Onsite is DWFRITZ Precision Automation (or W4) sharing the site with the proposed W5)
- Two railroad tracks are immediately east of the property,
- Anderson Pool Works manufacturing and yard storage is east of the RR tracks fronting Boeckman Road,
- South of Anderson Pool Works is the undeveloped Residential Agricultural Holding (RA-H) zone.

South zoning: Planned Development Industrial (PDI)

- Oldcastle Infrastructure, a large existing manufacturing facility of site utility items with extensive yard storage.

Previous Land Use Actions: **The site has been subject to the following previous land use actions:**

- 2017: DB17-0008 Stage II Final Plan Revision and Site Plan Review for Building W4 renovation.
- 2017: DB17-0010 Type C Tree Plan for Building W4 parking lot expansion and associated landscape modifications and trash enclosure modifications.
- 2022: Partition Plat No 2022-054 W-4 LLC; Recorded 6/29/22 in Clackamas County.
- 2022: WD # 022-0034 (Approved - Wetland Delineation Report for W5); Clackamas County; T3S R1W S14B TL202; City of Wilsonville Local Wetlands Inventory, Wetland 4.01D

Anticipated Land Use Applications for Project:

Stage I Master Plan Modification
Stage II Final Plan Modification
Site Design Review
Type C Tree Removal and Protection Plan
Class III Sign Plan (as TI)
Waivers (if any)
SROZ Map Verification
Abbreviated SRIR

Project Schedule:

The proponent's plan is to obtain the relevant entitlement in 2023 and begin the building permit process and construction as soon as a tenant is found.

Previous Wilsonville Projects by the Owners:

W5 is the latest proposed hi-tech industrial building for the development team in Wilsonville, and the 4th building the development team has built to initially serve DWFRITZ Precision Automation. Images of the previous W1- 4 buildings are shown below with captions to show the development team's previous work in Wilsonville.

There is some consistency in the projects beyond quality for hi-tech industrial uses. There is lots of glass and a simple palette on facades that include stained precast concrete. All the projects in Wilsonville are adjacent to and are planned around natural areas designated either SROZ or Wetlands, and this includes the proposed W5.

W1 in Wilsonville from 2009 at the front entry showing the simple palette of stained precast concrete walls, deep facade rustication with deeply set windows and extensive ornamental landscaping in addition to the preserved natural areas. Shell architecture by Lance Mueller & Associates (LMA).

W2 in Wilsonville from 2006 in foreground with W1 beyond on left. The simple palette is stained precast concrete walls with deep facade rustication and deeply set windows. Extensive large ornamental landscaping adds to the significant preserved SROZ natural areas, same as proposed in W5. Shell architecture by LMA.

W3 in Wilsonville from 2012 is part of the complex that includes W1 and W2 and borders the SROZ on right. Originally expansion space for DWFRITZ, it is now occupied by Sig Sauer, Electro-Optics. Shell architect is LMA.

W4 building facade and window pattern from SW Boeckman Road after the 2016 renovation for DWFRITZ Precision Automation, a hi-tech industrial user. Palette is concrete walls painted a dark neutral grey. The large window openings in this north facing facade are clear anodized aluminum as is the coping. Shell architect is LMA.

W4 lobby addition for DWFRITZ Precision Automation faces the proposed W5. Interior & lobby architecture by Hacker.

Previous Green Wall Projects by the Owners:

Since green walls are not common in industrial projects, below are examples by the ownership.

W1 in Wilsonville is a 2009 example that abuts an on-site SROZ natural area. This back-of-building view proves the high-quality materials and architecture extend all around the building. Vines on stained precast concrete walls are part of the architecture that include facade rustication and deeply set windows for visual interest. The big trees on left are part of the SROZ. Scale of this facade is similar to W5. Shell architecture by Lance Mueller & Associates.

Another development by the owners in nearby Tualatin from 2014 that has a similar limited material palette as proposed in W5. In the foreground is Industry Restaurant and the background a 2-story hi-tech industrial building. Both show a strong architectural presence with facades in stained precast concrete, like W5. The restaurant includes vines on the facade and the project preserves protected natural areas (Hedges Creek), also same as W5. Shell architect is LMA.

A 2021 image of another development by the owners in Bellevue, WA from 1998 that has a similar limited exterior material palette same as proposed in W5. This older office building weathers very well with stained precast walls that still repel water intrusion and hold up well to the three-decades-old vines naturally attached. The facade is heavily rusticated with deep-**set windows in 12" concrete walls, bronze metal bands, and deep concrete reveals.** Shell architect is LMA.

A close-up of the previous building better showing the nicely patinaed stained pre-cast concrete vines and rustication.

Section 3: Key Issues (Neighborhood outreach)

Traffic is probably the key issue for the neighborhood, see our attached traffic report. In summary, the W5 proposal is estimated to generate fewer trips than the projected Phase 2 land use for two buildings (future 70,000sf industrial use and a separate 4,000sf restaurant). The W5 (aka Phase 2) proposal is now a single industrial use building of 80,000 square feet, which generates significantly fewer trips than anticipated at the permit approvals of the DWFTITZ Precision Automation building (W4) of about 10 years ago – see our Trip Generation Memo in Narrative Section 6 – Reports. Overall, this is positive traffic news for the neighborhood.

The perimeters of our property are already established and will be essentially unchanged by the W5 proposal. This includes Boeckman Road and our existing two entry driveways off Boeckman. This also includes the W5 property borders where they join the surrounding industrial properties that are all developed and are typically yard storage. Our east border to the substantial off-site SROZ property is also unchanged, and vehicles traveling on Kinsman Road will continue to see the same wall of existing SROZ trees and vegetation on the W5 property. Nothing in this proposal changes our borders other than some frontage landscaping behind the existing sidewalk on SE Boeckman Road north of W5. See an aerial image of our property and adjacent perimeter on page 5 above.

Section 4: Code Criteria List with Proponents Responses

Applicable Criteria: The following Chapters of the Wilsonville Development Code (WDC) are applicable to the subject proposal, and are documented in this narrative in the following sequence:

Industrial Development Standards and Industrial Zoning and Planned Development Zones

- *Section 4.117* *Standards Applying to Industrial Developments in Any Zone.*
- *Section 4.118.(03)* *Waivers to Development Standards by Development Review Board*
- *Section 4.135* *PDI – Planned Industrial Development zone*
- *Section 4.139* *Significant Resource Overlay Zone (SROZ) Ordinance*
- *Section 4.140(.01)* *Planned Development Regulations - Purpose*

General Development regulations and Standards

- *Sections 4.154 - 4.182* *On-Site Pedestrian Access and Circulation*
- *Sections 4.155* *Parking, Loading, and Bicycle Parking*
- *Sections 4.171* *Protection of Natural and Other Features*
- *Sections 4.175* *Public Safety & Crime Prevention*
- *Sections 4.176* *Landscape, Screening, and Buffering*
- *Sections 4.177* *Street Improvement Standards*
- *Sections 4.179* *Mixed Solid Waste & Recycling*
- *Sections 4.199 - 4.199.60* *Outdoor Lighting*
- *Sections 4.300 - 4.32* *Underground Utilities*
- *Sections 4.400 - 4.450* *Site Design Review*
- *Sections 4.600 - 4.640.2* *Tree Preservation & Protection*

(Note, *the code references are in lower-case italics* & **proponents'** responses are non-italic & bold.)

Section 4.117. Standards Applying to Industrial Developments In Any Zone.

(.01) *All industrial developments, uses, or activities are* subject *to performance standards. If not otherwise specified in the Planning and Development Code, industrial developments, uses, and activities shall be subject to the performance standards specified in Section 4. 135 (.05) (PDI Zone).* Acknowledge the performance standards, and note this submittal is for building shell and site work only. A TI permit is required for occupancy, and at that time many of the performance standards can be addressed with the tenant and uses known.

Section 4.118. Standards applying to all Planned Development Zones:

(.03) *Notwithstanding the provisions of Section 4.140 to the contrary, the Development Review Board, in order to implement the purposes and objectives of Section 4.140, and based on findings of fact supported by the record may:*

A. Waive the following typical development standards: We do not request any waivers..

1. *minimum lot area;*
2. *lot width and frontage;*
3. *height and yard requirements;*
4. *lot coverage;*
5. *lot depth;*
6. *street widths;*
7. *sidewalk requirements;*
8. *height of buildings other than signs;*
9. *parking space configuration and drive aisle design;*
10. *minimum number of parking or loading spaces;*
11. *shade tree islands in parking lots, provided that alternative shading is provided;*
12. *fence height;*
13. *architectural design standards;*
14. *transit facilities; and*
15. *On-site pedestrian access and circulation standards; and*

16. *Solar access standards, as provided in section 4.137.*

Section 4.135. PDI- Planned Development Industrial Zone

(.01) *Purpose: The purpose of the PDI zone is to provide opportunities for a variety of industrial operations and associated uses. Our proposal is for expansion of an existing industrial facility.*

(.03) *Uses that are typically permitted: Our proposed uses are listed as typically permitted.* Intended uses at TI are underlined and in bold.

- *A. Warehouses and other buildings for storage of wholesale goods, including cold storage plants.*
- *C. Assembly and packing of products for wholesale shipment*
- *D. Manufacturing and processing*
- *F. Manufacturing and processing of electronics, technical instrumentation components and health care equipment.*
- *G. Fabrication*
- *H. Office complexes - Technology*
- *I. Corporate headquarters*
- *K. Research and development*
- *P. Training facilities whose primary purpose is to provide training to meet industrial needs.*

(.04) *Block and access standards:*
The PDI zone shall be subject to the same block and access standards as the PDC zone, Section 4.131(.02) and (.03). Acknowledge all. No change in existing access drive locations.

(.05) *Performance Standards. The following performance standards apply to all industrial properties and sites within the PDI Zone, and are intended to minimize the potential adverse impacts of industrial activities on the general public and on other land uses or activities. They are not intended to prevent conflicts between different uses or activities that may occur on the same property.* Acknowledge all and note this entitlement permit is for building shell and site work, as the tenant is not identified yet. A TI permit is required prior to occupancy.

- *A. All uses and operations except storage, off-street parking, loading and unloading shall be confined, contained, and conducted wholly within completely enclosed buildings, unless outdoor activities have been approved as part of Stage II, Site Design or Administrative Review.* Acknowledge. No outside storage is proposed.
- *B. Vibration: Every use shall be so operated that the ground vibration inherently and recurrently generated from equipment other than vehicles is not perceptible without instruments at any boundary line of the property on which the use is located.* Acknowledge and note this entitlement permit is for building shell and site work, as the tenant is not identified yet. A TI permit is required prior to occupancy. Further, the owners have experience leasing building shells to hi-tech tenants that occasionally have large precision machines requiring special engineered footings to stabilize the machines, so they operate without vibration. Any vibration ruins the incredible precision required. Vibration emanating from W5 would not be tolerated by these tenants or their highly paid employees.
- *C. Emission of odorous gases or other odorous matter in quantities as detectable at any point on any boundary line of the property on which the use is located shall be prohibited.* Acknowledge and note this entitlement permit is for building shell and site work, as the tenant is not identified yet. A TI permit is required prior to occupancy. The owners have experience leasing building shells to hi-tech tenants, and these tenants work in very clean environments. Odorous emissions or matter would not be tolerated by these tenants or their highly paid employees.
- *D. Any open storage shall comply with the provisions of Section 4.176, and this Section.* Acknowledge. The drawings show that W5 allows for no open storage.
- *E. No building customarily used for night operation, such as a baker or bottling and distribution station, shall have any opening, other than stationary windows or required fire exits, within one hundred (100) feet of any residential district and any space used for loading or unloading commercial vehicles in connection with such an operation shall not be within one hundred (100) feet of any residential district.* Acknowledge. There is no residential in the vicinity of W5, plus no baker or bottling or distribution use could afford the W5 rent.
- *F. Heat and Glare:* Acknowledge all below and note this entitlement permit is for building shell and site work, as the tenant is not identified yet. A TI permit is required prior to occupancy.
  1. *Operations producing heat or glare shall be conducted entirely within an enclosed building.* Acknowledge. W5 is designed so all work is done inside the building.

2. *Exterior lighting on private property shall be screened, baffled, or directed away from adjacent residential properties. This is not intended to apply to street lighting.* There are no adjacent residential areas for the record.

G. *Dangerous Substances: Any use which involves the presence, storage or handling of any explosive, nuclear waste product, or any other substance in a manner which would cause a health or safety hazard for any adjacent land use or site shall be prohibited.* Acknowledge and note this entitlement permit is for building shell and site work, as the tenant is not identified yet. A TI permit is required prior to occupancy.

H. *Liquid and Solid Wastes:* Acknowledge and note this entitlement permit is for building shell and site work, as the tenant is not identified yet. A TI permit is required prior to occupancy.
   1. *Any storage of wastes which would attract insects or rodents or otherwise create a health hazard shall be prohibited.* The owners have experience leasing building shells to hi-tech tenants, and these tenants work in very clean environments. Storing anything that attracts rodents or insects would not be tolerated by these tenants or their highly paid employees.
   2. *Waste products which are stored outside shall be concealed from view from any property line by a sight-obscuring fence or planting as required in Section 4.176.* No outside storage areas are proposed on W5.
   3. *No connection with any public sewer shall be made or maintained in violation of applicable City or State standards.* Acknowledge. Our sewer connections will be designed and approved through the entitlement and building permit process.
   4. *No wastes conveyed shall be allowed to or permitted, caused to enter, or allowed to flow into any public sewer in violation of applicable City or State standards.* Acknowledge. Our sewer connections will be designed and approved through the entitlement and building permit process.
   5. *All drainage permitted to discharge into a street gutter, caused to enter or allowed to flow into any pond, lake, stream, or other natural water course shall be limited to surface waters or waters having similar characteristics as determined by the City, County, and State Department of Environmental Quality.* Acknowledge. Acknowledge. Our storm and sewer connections will be designed and approved through the entitlement and building permit process.
   6. *All operations shall be conducted in conformance with the City's standards and ordinances applying to sanitary and storm sewer discharges.* Acknowledge. Our sewer and storm systems will be designed and approved through the entitlement and building permit process.

I. *Noise: Noise generated by the use, with the exception of traffic noises from automobiles, trucks, and trains, shall not violate any applicable standards adopted by the Oregon Department of Environmental Quality and W.C. 6.204 governing noise control in the same or similar locations. [Amended by Ord. 631, 7/16/07]* Acknowledge and note this entitlement permit is for building shell and site work, as the tenant is not identified yet. A TI permit is required prior to occupancy.

J. *Electrical Disturbances. Except for electrical facilities wherein the City is preempted by other governmental entities, electrical disturbances generated by uses within the PDI zone which interfere with the normal operation of equipment or instruments within the PDI Zone are prohibited. Electrical disturbances which routinely cause interference with normal activity in abutting residential use areas are also prohibited.* Acknowledge and note this entitlement permit is for building shell and site work, as the tenant is not identified yet. A TI permit is required prior to occupancy.

K. *Discharge Standards: There shall be no emission of smoke, fallout, fly ash, dust, vapor, gases, or other forms of air pollution that may cause a nuisance or injury to human, plant, or animal life, or to property. Plans of construction and operation shall be subject to the recommendations and regulations of the State Department of Environmental Quality. All measurements of air pollution shall be by the procedures and with equipment approved by the State Department of Environmental Quality or equivalent and acceptable methods of measurement approved by the City. Persons responsible for a suspected source of air pollution upon the request of the City shall provide quantitative and qualitative information regarding the discharge that will adequately and accurately describe operation conditions.* Acknowledge and note this entitlement permit is for building shell and site work, as the tenant is not identified yet. A TI permit is required prior to occupancy.

L. *Open burning is prohibited.* Of course.

M. *Storage:* Acknowledge and note this entitlement permit is for building shell and site work, as the tenant is not identified yet. A TI permit is required prior to occupancy. No outside storage is envisioned plus no space is allocated for it. The cost of land for new development prohibits it here.
   1. *Outdoor storage must be maintained in an orderly manner at all times.*

2. *Outdoor storage area shall be gravel surface or better and shall be suitable for the materials being ha and stored. If a gravel surface is not sufficient to meet the performance standards for the use, the area shall be suitably paved.*
3. *Any open storage that would otherwise be visible at the property line shall be concealed from view at the abutting property line by a sight obscuring fence or planting not less than six (6) feet in height.*

N. Landscaping:

1. *Unused property, or property designated for expansion or other future use, shall be landscaped and maintained as approved by the Development Review Board. Landscaping for unused property disturbed during construction shall include such things as plantings of ornamental shrubs, lawns, native plants, and mowed, seeded fieldgrass.* No unused property is planned or available for future development. We will have our extensive SROZ and wetland designated properties that have their own stringent regulations to follow.
2. *Contiguous unused areas of undisturbed fieldgrass may be maintained in their existing state. Large stands of invasive weeds such as Himalayan blackberries, English ivy, cherry Laurel, reed canary grass or other identified invasive plants shall be removed and/or mowed at least annually to reduce fire hazard. These unused areas, located within a phased development project or a future expansion cannot be included in the area calculated to meet the landscape requirements for the initial phase(s) of the development.* When W5 is approved there will be no unused buildable property remaining. We will still have extensive SROZ and wetland designated properties that have their own stringent regulations to follow.
3. *Unused property shall not be left with disturbed soils that are subject to siltation and erosion. Any disturbed soil shall be seeded for complete erosion cover germination and shall be subject to applicable erosion control standards.* When W5 is approved there will be no buildable unused property left.

(.06) <u>Other Standards</u>:

A. Minimum Individual Lot Size: No limit save and except as shall be consistent with the other provisions of this Code (e.g., landscaping, parking, etc.). At 24.5 acres in the current configuration or 10.05 acres after the separation of W5 to its own parcel, we greatly exceed minimum lot size requirements. See the Parcel Plat sheets in the Supplemental Plans for site areas. The Parcel Plans are waiting for the completion of this entitlement permit to be executed.

B. Maximum Lot Coverage: No limit save and except as shall be consistent with the other provisions of this Code (e.g., landscaping, parking, etc.). Our W5 lot coverage is 14.9% after separation of W5 into its own parcel, which is way below the **"no limit"** standard because the site is largely treed and we are preserving so much of the SROZ, wetland and the less protected treed natural areas. See sheet A0 for lot coverage statistics for W5 and existing W4 **–** both separately and combined.

C. Front Yard Setback: Thirty (30) feet. Structures on corner or through lots shall observe the minimum front yard setback on both streets. Setbacks shall also be maintained from the planned rights-of-way shown on any adopted City street plan. We easily meet this requirement **with a front setback of 82'**, see drawing A1.0.

D. Rear and Side Yard Setback: Thirty (30) feet. Structures on corner or through lots shall observe the minimum rear and side yard setbacks on both streets. Setbacks shall also be maintained from the planned rights-of-way shown on any adopted City street plan. We greatly exceed this requirement due to our unique circumstances with so much natural SROZ area on site, see drawing A1.0.

E. No setback is required when side or rear yards abut on a railroad siding. NA

F. Corner Vision: Corner lots shall have no sight obstruction to exceed the vision clearance standards of Section 4.177. Our lot corner is an SROZ area, and already improved with the new Kinsman round-about intersection. We are making no changes to this NW corner of our lot that currently has no sight obstruction.

G. Off-Street Parking and Loading: As provided in Section 4.155. Acknowledge, see sheets A0, A1.0, and Supplemental Plan sheet CS-2. CS-2 includes statistics for W5 and existing W4 **–** both separately and combined.

H. Signs: As provided in Sections 4.156.01 through 4.156.11. [Amended by Ord. No. 704, 6/18/12] Acknowledge. The proposal is for a building shell and site work, and the tenant is not yet identified. Building signing is not in this entitlement proposal, and we anticipate it will be a separate signing permit after the tenant is identified.

Section 4.139.00 Significant Resource Overlay Zone (SROZ) Ordinance

Definitions:

Acknowledge all definitions listed below. See our Significant Resource Impact Report (SRIR) **in our Narrative's Section 6 –** Reports.

1. *Area of Limited Conflicting Uses: An Area of Limited Conflicting Uses is either:*

A. *An area located between the riparian corridor boundary, riparian impact area or the Urban Growth Management Functional Plan (UGMFP) Metro Title 3 Water Quality Resource Area boundary, whichever is furthest away from the wetland or stream, and the outside edge of the SROZ; or*

B. *An isolated significant wildlife habitat (upland forest) resource site.*

2. *Bankful Stage: The stage or elevation at which water overflows the natural banks of streams or other waters of the state and begins to inundate upland areas. In the absence of physical evidence, the two-year recurrence interval flood elevation may be used to approximate the bankful stage. [Added by Ord. # 674 11/16/09]*
3. *Emergency: Any human-caused or natural event or circumstances causing or threatening loss of life, injury to person or property, and includes, but is not limited to fire, explosion, flood, severe weather, drought, earthquake, volcanic activity, spills or releases of hazardous material, contamination, utility or transportation disruptions, and disease. [Added by Ord. # 674 11/16/09]*
4. *Encroachment Area: An area within the Area of Limited Conflicting Uses where development may be permitted.*
5. *Impact Area: The area adjacent to the outer boundary of a Significant Resource within which development or other alteration activities may be permitted through the review of a Significant Resource Impact Report (SRIR) or where an SRIR has been waived in accordance with this ordinance. The impact area is 25 feet wide unless otherwise specified in this ordinance or by the decision making body.*
6. *Riparian Corridor: Is a Goal 5 resource that includes the water areas, fish habitat, adjacent riparian areas, and wetlands within the riparian area boundary. The "riparian area" is the area adjacent to a river, lake, stream, consisting of lands that include the area of transition from aquatic ecosystem to a terrestrial ecosystem. The Riparian Corridor is diagrammatically defined in Section 4.139.00.*
7. *Riparian Corridor Cross Sections: Riparian corridor significance for the City of Wilsonville is based on assessment of several factors:*

a. *The presence of habitat used by species listed as threatened or endangered by the Endangered Species Act. The resource is considered significant if ESA-listed salmonid fish species utilize portions of the resource area.*

b. *The protection of ESA listed species habitat both on - or off-site. The resource is considered significant if it provides functions that protect the habitat of ESA-listed species, either on- or off-site. Riparian corridors can protect water quality parameters such as temperature, suspended sediment and contaminants of downstream waters that are ESA-listed species habitat.*

c. *The inclusion of other significant Goal 5 resource areas. Riparian corridor resources that contain significant wetlands and/or wildlife habitat are considered significant.*

d. *The provision of habitat continuity for wildlife. Riparian corridor resources that provide a link or continuity for wildlife movement between significant wildlife habitat areas are considered significant.*

e. *Headwater areas, including intermittent streams, can be important for fish and wildlife resources. These areas can provide good quality water, protection of water quality, insect and organic materials, and other factors for habitat areas downstream.*

8. *Riparian Impact Area: An area within which human activities could have adverse impacts on functions of adjacent riparian corridor resources.*
9. *Significant Resource Impact Report (SRIR): A report that delineates specific resource boundaries and analyzes the impacts of development on significant natural resources. It outlines measures to prevent negative impacts, and also provides mitigation and enhancement plans.*
10. *Significant Resource Overlay Zone (SROZ): The delineated outer boundary of a significant natural resource that includes: a significant Goal 5 natural resource, lands protected under Metro's Urban Growth Management Functional Plan Title 3 (Water Quality Resource Areas), riparian corridors, and significant wildlife habitat.*
11. *Starting Point for Measurement: Is the edge of the defined channel (bankful stage) for streams/rivers, delineated wetland boundary, delineated spring boundary, and/or average high water for lakes or ponds, whichever offers greatest resource protection. Intermittent springs located more than 15 feet from streams/rivers or wetlands shall not serve as a starting point for measurement. [Amended by Ord. # 674 11/16/09]*

Section 4.139.01 SROZ - Purpose

The Significant Resource Overlay Zone (SROZ) is intended to be used with any underlying base zone as sh the City of Wilsonville Zoning Map. The purpose of the Significant Resource Overlay Zone is to implement the goals and policies of the Comprehensive Plan relating to natural resources, open space, environment, flood hazard, and the Willamette River Greenway. In addition, the purposes of these regulations are to achieve compliance with the requirements of the Metro Urban Growth Management Functional Plan (UGMFP) relating to Title 3 Water Quality Resource Areas, and Title 13 Habitat Conservation Areas, and that portion of Statewide Planning Goal 5 relating to significant natural resources. It is not the intent of this ordinance to prevent development where the impacts to significant resources can be minimized or mitigated. [Amended by Ord. # 674 11/16/09] Acknowledge, see our SRIR **in our Narrative's Section 6 –** Reports. We also have added the TR-1 (Tree Removal Plan) and TR-2 (SRIR Tree Report for a handy reference when viewing the Tree Removal Plan), these drawings are found in the Plan Sets under Supplemental Drawings.

Section 4.139.02 Where These Regulations Apply

The regulations of this Section apply to the portion of any lot or development site, which is within a Significant Resource Overlay Zone and its associated "Impact Areas". The text provisions of the Significant Resource Overlay Zone ordinance take precedence over the Significant Resource Overlay Zone maps. The Significant Resource Overlay Zone is described by boundary lines shown on the City of Wilsonville Significant Resource Overlay Zone Map. For the purpose of implementing the provisions of this Section, the Wilsonville Significant Resource Overlay Zone Map is used to determine whether a Significant Resource Impact Report (SRIR) is required. Through the development of an SRIR, a more specific determination can be made of possible impacts on the significant resources.

Unless otherwise exempted by these regulations, any development proposed to be located within the Significant Resource Overlay Zone and/or Impact Area must comply with these regulations. Where the provisions of this Section conflict with other provisions of the City of Wilsonville Planning and Land Development Ordinance, the more restrictive shall apply.

The SROZ represents the area within the outer boundary of all inventoried significant natural resources. The Significant Resource Overlay Zone includes all land identified and protected under Metro's UGMFP Title 3 Water Quality Resource Areas and Title 13 Habitat Conservation Areas, as currently configured, significant wetlands, riparian corridors, and significant wildlife habitat that is inventoried and mapped on the Wilsonville Significant Resource Overlay Zone Map. [Amended by Ord. # 674 11/16/09] We recognize our site has existing SROZ areas with significant man-made wetlands, and that we have a responsibility to mitigate our developments impacts to these areas. See our SRIR **in our Narrative's Section 6 –** Reports.

Section 4.139.03. - Administration.

Acknowledge this section, see our SRIR **in our Narrative's Section 6 –** Reports. We also have added the TR-1 (Tree Removal Plan) and TR-2 (SRIR Tree Report f- a handy reference when viewing the Tree Removal Plan). These drawings are found in the Plan Sets under Supplemental Drawings.

(.01) Resources. The text provisions of this section shall be used to determine whether applications may be approved within the Significant Resource Overlay Zone. The following maps and documents may be used as references for identifying areas subject to the requirements of this Section:

A. Metro's UGMFP Title 3 Water Quality Resource Area maps.
B. The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM).
C. The Wilsonville Local Wetland Inventory (LWI) (1998).
D. The Wilsonville Riparian Corridor Inventory (RCI) (1998).
E. Locally adopted studies or maps.
F. City of Wilsonville slope analysis maps.
G. Clackamas and Washington County soils surveys.
H. Metro's UGMFP Title 13 Habitat Conservation Area Map.

(.02) Impact Area. The "Impact Area" is the area adjacent to the outer boundary of a Significant Resource within which development or other alteration activities may be permitted through the review of an SRIR (Significant Resource Impact Report). Where it can be clearly determined by the Planning Director that development is only in the Impact Area and there is no impact to the Significant Resource, development may be permitted without SRIR review. The impact area is 25 feet wide unless otherwise specified in this ordinance or by the decision making body. Designation of an Impact Area is required by Statewide Planning Goal 5. The primary purpose of the Impact Area is to ensure that development does not encroach into the SROZ.

(.03) Significant Resource Impact Report (SRIR). For proposed non-exempt development within the SROZ, the applicant shall submit a Significant Resource Impact Report (SRIR) as part of any application for a development permit.

(.04) Prohibited Activities. New structures, development and construction activities shall not be permitted within th SROZ if they will negatively impact significant natural resources. Gardens, lawns, application of chemicals, uncontained areas of hazardous materials as defined by DEQ, domestic animal waste, dumping of materials of any kind, or other activities shall not be permitted within the SROZ if they will negatively impact water quality. Unauthorized land clearing or grading of a site to alter site conditions is not allowed, and may result in the maximum requirement of mitigation/enhancement regardless of pre-existing conditions.

(.05) Habitat-Friendly Development Practices. To the extent practicable, development and construction activities that encroach within the Significant Resource Overlay Zone and/or Impact Area shall be designed, located and constructed to: Minimize grading, removal of native vegetation, disturbance and removal of native soils, and impervious area;

B. Minimize adverse hydrological impacts on water resources, such as using the practices described in Part (a) of Table NR-2, unless their use is prohibited by an applicable and required state or federal permit, such as a permit required under the federal Clean Water Act, 33 U.S.C. §§ 1251 et seq., or the federal Safe Drinking Water Act, 42 U.S.C. §§ 300f et seq., and including conditions or plans required by such permit;

C. Minimize impacts on wildlife corridors and fish passage, such as by using the practices described in Part (b) of Table NR-2; and

D. Consider using the practices described in Part (C) of Table NR-2.

Table NR-2: Habitat-Friendly Development Practices
Part (A) Design and Construction Practices to Minimize Hydrologic Impacts
1. Amend disturbed soils to original or higher level of porosity to regain infiltration and stormwater storage capacity.
2. Use pervious paving materials for residential driveways, parking lots and walkways.
3. Incorporate stormwater management in road right-of ways.
4. Landscape with rain gardens to provide on-lot detention, filtering of rainwater and groundwater re-charge.
5. Use green roofs for runoff reduction, energy savings, improved air quality, and enhanced aesthetics.
6. Disconnect downspouts from roofs and direct the flow to vegetated infiltration/filtration areas such as rain gardens.
7. Retain rooftop runoff in a rain barrel for later on-lot use in lawn and garden watering.
8. Use multi-functional open drainage systems in lieu of more conventional curb and gutter systems.
9. Use bioretention cells as rain gardens in landscaped parking lot islands to reduce runoff volume and filter pollutants.
10. Apply a treatment train approach to provide multiple opportunities for storm water treatment and reduce the possibility of system failure.
11. Reduce sidewalk width and grade them such that they drain to the front yard of a residential lot or retention area.

12. Reduce impervious impacts of residential driveways by narrowing widths and moving access to the rear of the site.
13. Use shared driveways.
14. Reduce width of residential streets, depending on traffic and parking needs.
15. Reduce street length, primarily in residential areas, by encouraging clustering and using curvilinear designs.
16. Reduce cul-de-sac radii and use pervious vegetated islands in center to minimize impervious effects, and allow them to be utilized for truck maneuvering/loading to reduce need for wide loading areas on site.
16. Minimize car spaces and stall dimensions, reduce parking ratios, and use shared parking facilities and structured parking.
17. Minimize the number of steam crossings and place crossing perpendicular to stream channel, if possible.
18. Allow narrow street right-of-ways through stream corridors whenever possible to reduce adverse impacts of transportation corridors.
Part (B) Design and Construction Practices to Minimize Impacts on Wildlife Corridors and Fish Passage
1. Carefully integrate fencing into the landscape to guide animals toward animal crossings under, over, or around transportation corridors.
2. Use bridge crossings rather than culverts, wherever possible.
3. If culverts are utilized, install slab, arch or box type culverts, preferably using bottomless designs that more closely mimic stream bottom habitat.
4. Design stream crossings for fish passage with shelves and other design features to facilitate terrestrial wildlife passage.
5. Extend vegetative cover through the wildlife crossing in the migratory route, along with sheltering areas.
Part (C) Miscellaneous Other Habitat Friendly Design and Construction Practices
1. Use native vegetation throughout the development.
2. Locate landscaping adjacent to SROZ.
3. Reduce light spill-off into SROZ areas from development.
4. Preserve and maintain existing trees and tree canopy coverage, and plant trees, where appropriate, to maximize future tree canopy coverage.

Section 4.139.04. - Uses and Activities Exempt from These Regulations.

A request for exemption shall be consistent with the submittal requirements listed under Section 4.139.06 (.01)(B) applicable to the exempt use and activity. Acknowledge these exemptions, see our SRIR **in our Narrative's Section 6 –** Reports. We also have added the TR-1 (Tree Removal Plan) and TR-2 (SRIR Tree Report for a handy reference when viewing the Tree Removal Plan), these drawings are found in the Plan Sets under Supplemental Drawings.

(.01) Emergency procedures or emergency activities undertaken which are necessary for the protection of public health, safety, and welfare. Measures to remove or abate hazards and nuisances. Areas within the SROZ that are disturbed because of emergency procedures or activities should be repaired and mitigated.

(.02) Maintenance and repair of buildings, structures, yards, gardens or other activities or uses that were in existence prior to the effective date of these regulations.

(.03) Alterations of buildings or accessory structures which do not increase building coverage.

(.04) The following agricultural activities lawfully in existence as of the effective date of this ordinance:
A. Mowing of hay, grass or grain crops.
B. Tilling, disking, planting, seeding, harvesting and related activities for pasture, tree crops, commercial woodlots, food crops or business crops, provided that no additional lands within the SROZ are converted to these uses after the effective date of this ordinance.

(.05) Operation, maintenance, and repair of irrigation and drainage ditches, constructed ponds, wastewater facilities, stormwater detention or retention facilities, and water facilities consistent with the Stormwater Master Plan or the Comprehensive Plan.

(.06) Maintenance and repair of streets and utility services within rights-of way, easements, access drives or other previously improved areas.

(.07) Normal and routine maintenance and repair of any public improvement or public recreational area regardless of its location.

(.08) The construction of new roads, pedestrian or bike paths into the SROZ in order to provide access to the sensitive area or across the sensitive area, provided the location of the crossing is consistent with the intent of the Wilsonville Comprehensive Plan. Roads and paths shall be constructed so as to minimize and repair disturbance to existing vegetation and slope stability.

(.09) Maintenance and repair of existing railroad tracks and related improvements.

(.10) The removal of invasive vegetation such as Himalayan Blackberry, English Ivy, Poison Oak, Scots (Scotch) Broom or as defined as invasive in the Metro Native Plant List.

(.11) The planting or propagation of any plant identified as native on the Metro Native Plant List. See Wilsonville Planning Division to obtain a copy of this list.

(.12) Grading for the purpose of enhancing the Significant Resource as approved by the City.

(.13) Enhancement of the riparian corridor or wetlands for water quality or quantity benefits, fish, or wildlife habitat as approved by the City and other appropriate regulatory authorities.

(.14) Flood control activities pursuant to the Stormwater Master Plan, save and except those stormwater facilities subject to Class II Administrative Review, as determined by the Planning Director, to ensure such facilities meet applicable standards under federal, state and local laws, rules and regulations.

(.15) Developments that propose a minor encroachment into the Significant Resource Overlay Zone. The purpose of this adjustment would be to allow for minor encroachments of impervious surfaces such as accessory buildings, eave overhangs, building appurtenances, building access and exiting requirements or other similar feature. The total adjustment shall not exceed 120 square feet in cumulative area.

(.16) The expansion of an existing single family dwelling or duplex not exceeding 600 square feet in area. The expansion of an existing single family dwelling or duplex or structures that are accessory to a single family dwelling or duplex inside the SROZ, provided that the following criteria have been satisfied. An SRIR is not required to evaluate and reach a decision on the issuance of a permit to expand a single-family residence under this paragraph.
A. The expansion of a single family or duplex structure or improvement (including decks and patios) shall not be located any closer to the stream or wetland area than the existing structure or improvement; and
B. The coverage of all structures within the SROZ on the subject parcel shall not be increased by more than 600 square feet, based on the coverage in existence prior to the effective date of this ordinance; and,
C. The applicant must obtain the approval of an erosion and sediment control plan from the City's Building and Environmental Services Divisions; and,
D. No part of the expansion is located within the Metro UGMFP Title 3 Water Quality Area.

(.17) New Single-Family Dwelling or Duplex. The construction of a new single family dwelling or duplex, including a duplex created through conversion of an existing detached single-family dwelling, is exempt unless the building encroaches into the Impact Area and/or the SROZ.

A. If the proposed building encroaches only into the Impact Area then an abbreviated SRIR may be required as specified in Section 4.139.05, unless it can be clearly determined by the Planning Director that the development proposal will have no impact on the Significant Resource. The primary purpose of the Impact Area is to insure that development does not encroach into the SROZ. Development otherwise in compliance with the Planning and Land Development Ordinance may be authorized within the Impact Area.

B. If the proposed building encroaches into the SROZ, then a complete or abbreviated SRIR report is required.

(.18) Private or public service connection laterals and service utility extensions.

(.19) A Stage II development permit or other development permits issued by the City and approved prior to the effective date of this ordinance.

(.20) The installation of public streets and utilities specifically mapped within a municipal utility master plan, the Transportation Systems Plan or a capital improvement plan.

(.21) Structures which are non-conforming to the standards of this Section may be re-built in the event of damage due to fire or other natural hazard subject to Sections 4.189—4.192 of the Planning and Land Development Ordinance, provided that the structure is placed within the same foundation lines (See Figure NR-6.). An SRIR is not required to evaluate and reach a decision on the issuance of a permit to replace a structure subject to this paragraph.

(22) Any impacts to resource functions from the above excepted activities, such as gravel construction pads, erosion/sediment control materials or damaged vegetation, shall be mitigated using appropriate repair or restoration/enhancement techniques.

Section 4.139.05 Significant Resource Overlay Zone Map Verification

The map verification requirements described in this Section shall be met at the time an applicant requests a building permit, grading permit, tree removal permit, land division approval, or other land use decision. Map verification shall not be used to dispute whether the mapped Significant Resource Overlay Zone boundary is a significant natural resource. Map refinements are subject to the requirements of Section 4.139.10(.01)(D). Acknowledge these exemptions, see our SRIR in **our Narrative's Section 6 –** Reports. We also have added the TR-1 (Tree Removal Plan) and TR-2 (SRIR Tree Report for a handy reference when viewing the Tree Removal Plan), these drawings are found in the Plan Sets under Supplemental Drawings.

(.01) In order to confirm the location of the Significant Resource Overlay Zone, map verification shall be required or allowed as follows:

- *A. Development that is proposed to be either in the Significant Resource Overlay Zone or less than 100 feet outside of the boundary of the Significant Resource Overlay Zone, as shown on the Significant Resource Overlay Zone Map.*
- *B. A lot or parcel that:*
  1. *Either contains the Significant Resource Overlay Zone, or any part of which is less than 100 feet outside the boundary of the Significant Resource Overlay Zone, as shown on the Significant Resource Overlay Zone Map; and*
  2. *Is the subject of a land use application for a partition, subdivision, or any land use application that the approval of which would authorize new development on the subject lot or parcel.*

(.02) An application for Significant Resource Overlay Zone Map Verification may be submitted even if one is not required pursuant to Section 4.139.05(.01).

(.03) If a lot or parcel or parcel is subject to Section 4.139.05(.01), an application for Significant Resource Overlay Zone Map Verification shall be filed concurrently with the other land use applications referenced in Section 4.139.05(.01)(B)(2) unless a previously approved Significant Resource Overlay Zone Map Verification for the subject property remains valid.

(.04) An applicant for Significant Resource Overlay Zone Map Verification shall use one or more of the following methods to verify the Significant Resource Overlay Zone boundary:

- *A. The applicant may concur with the accuracy of the Significant Resource Overlay Zone Map of the subject property;*
- *B. The applicant may demonstrate a mapping error was made in the creation of the Significant Resource Overlay Zone Map;*
- *C. The applicant may demonstrate that the subject property was developed lawfully prior to June 7, 2001.*

(.05) The Planning Director shall determine the location of any Significant Resource Overlay Zone on the subject property by considering information submitted by the applicant, information collected during any site visit that may be made to

the subject property, information generated by Significant Resource Overlay Zone Map Verification that has oc on adjacent properties, and any other relevant information that has been provided.

(.06) For applications filed pursuant to Section 4.139.05(.04)(A) and (C), a Significant Resource Overlay Zone Map Verification shall be consistent with the submittal requirements listed under Section 4.139.06(.01)(B-H).

(.07) For applications filed pursuant to Section 4.139.05(.04)(B), a Significant Resource Overlay Zone Map Verification shall be consistent with the submittal requirements listed under Section 4.139.06(.02)(D)(1).

[Section 4.139.05 added by Ord. # 674 11/16/09]

Section 4.139.06 Significant Resource Impact Report (SRIR) and Review Criteria

A Significant Resource Impact Report (SRIR) is a report that delineates specific resource boundaries and analyzes the impacts of development within mapped significant resource areas based upon the requirements of this Section. An SRIR is only required for non-exempt development that is located within the Significant Resource Overlay Zone and/or its associated 25 foot Impact Area.

The Significant Resource Overlay Zone Map identifies areas that have been classified as significant natural resources. The preparation of the Significant Resource Overlay Zone Map did not include specific field observations of every individual property. These maps are designed to be specific enough to determine whether further environmental review of a development proposal is necessary. If any portion of the development or alteration of the land (except those exempted by this Section) is located within the Significant Resource Overlay Zone boundary or the identified Impact Area, then an SRIR is required before any development permit can be issued. Where it can be clearly determined by the Planning Director that development is only in the Impact Area and there is no impact to the Significant Resource, development may be permitted without SRIR review.

The Planning Director may consult with a professional with appropriate expertise to evaluate an applicant's SRIR prepared under this Section or may rely on appropriate staff expertise, in order to properly evaluate the report's conclusions.

(.01) Abbreviated SRIR Requirements. It is the intent of this subsection to provide a user-friendly process for the applicant. Only the materials necessary for the application review are required. At the discretion of the Planning Director, an abbreviated SRIR may be submitted for certain small-scale developments such as single family dwellings, additions to single family dwellings, minor additions and accessory structures. The following requirements shall be prepared and submitted as part of the abbreviated SRIR evaluation:

- *A. A Site Development Permit Application must be submitted in compliance with the Planning and Land Development Ordinance;* The SRIR is part of the Site Development Permit - **see our Narrative's Section 6 –** Reports.
- *B. Outline of any existing features including, but not limited to, structures, decks, areas previously disturbed and existing utility locations*;* Done **–** see drawings and SRIR.
- *C. Location of any wetlands or water bodies on the site and the location of the stream centerline and top-of-bank;* Done **–** see drawings and SRIR **in our Narrative's Section 6 –** Reports.
- *D. Within the area proposed to be disturbed, the location, size and species of all trees that are more than six (6) inches in diameter at breast height (DBH). Trees outside the area proposed to be disturbed may be individually shown or shown as drip line with an indication of species type or types;* See drawings and SRIR on page 6.
- *E. The location of the SROZ and Impact Area boundaries*;* See the drawings and SRIR.
- *F. A minimum of three slope cross-section measurements transecting the site, equally spaced at no more than 100-foot increments. The measurements should be made perpendicular to the stream*;* Included in the SRIR on page 3.
- *G. A map that delineates the Metro UGMFP Title 3 Water Quality Resource Area boundary (using Metro Title 3 field observed standards)*;* Done **–** see the drawings and SRIR.
- *H. Current photos of site conditions shall be provided to supplement the above information*.* Included on the SRIR.
- *I. A narrative describing the possible and probable impacts to natural resources and a plan to mitigate for such impacts*.* Included on the SRIR, also see the drawings.

(.02) Application Requirements for a Standard SRIR. The following requirements must be prepared and submitted as part of the SRIR evaluation for any development not included in paragraph A above:

- *A. A Site Development Permit Application must be submitted in compliance with the Planning and Land Development Ordinance.* The SRIR by Pacific Habitat Services, Inc. is a key part of our Site Development Permit Application.
- *B. The SRIR shall be conducted and prepared by a natural resource professional knowledgeable and qualified to complete such a report.* The attached SRIR was prepared by Pacific Habitat Services, Inc. (PHS). PHS provides a wide range of services to the public and private sector, ranging from natural resource assessments to environmental design and construction. PHS offers professional expertise in the disciplines of wetland

science, wildlife biology, hydrology, soil science, environmental toxicology, botany, and environmental planning.

C. *The qualifications of the person or persons preparing each element of the analysis shall be included with the SRIR.* Included in the SRIR on page 3.

D. *The SRIR shall include the following:*

1. *Physical Analysis. The analysis shall include, at a minimum:*

a. *Soil types;* Our response included in the SRIR on page 4.

b. *Geology;* Our response included in the SRIR on page 4.

c. *Hydrology of the site;* Our response included in the SRIR on pages 4 - 6.

d. *Outline of any existing features including, but not limited to, structures, decks, areas previously disturbed, and existing utility locations;* Our response included in the SRIR on page 6.

e. *Location of any wetlands or water bodies on the site and the location of the stream centerline and top-of-bank.* Our response included in the SRIR on page 6.

f. *Within the area proposed to be disturbed, the location, size and species of all trees that are more than six (6) inches DBH. Trees outside the area proposed to be disturbed may be individually shown or shown as drip line with an indication of species type or types;* Our response included in the Arborist Report and the SRIR on page 6.

g. *A property survey together with topography shown by contour lines prepared at two-foot vertical intervals. Five-foot vertical intervals may be allowed for steep sloped areas. The survey shall be prepared by an Oregon Registered Land Surveyor or Civil Engineer.* Our response included in the SRIR on page 6 - 7.

h. *The location of the SROZ and Impact Area boundaries;* Our response included in the SRIR on page 7.

i. *A minimum of three slope cross-section measurements transecting the site, equally spaced at no more than 100-foot increments. The measurements should be made perpendicular to the stream;* Our response included in the SRIR on page 7.

j. *A map that delineates the Metro UGMFP Title 3 Water Quality Resource Area boundary (using Metro Title 3 field observed standards);* Our response included in the SRIR on page 7.

k. *A map that delineates the Goal 5 safe harbor boundary (using the standards found within the Oregon Administrative Rule OAR 660-23(1996));* Our response included in the SRIR on page 7 - 8.

l. *The existing site significant resource conditions shall be determined and identified by a natural resource professional; and* Our response included in the SRIR on pages 8 & 9.

m. *Current photos of site conditions shall be provided to supplement the above information.* Our response included in the SRIR on Attachment D.

2. *The analysis shall include development recommendations including grading procedures, soil erosion control measures, slope stabilization measures, and methods of mitigating hydrologic impacts. For projects that affect possible wetlands, a copy of the Local Wetland Inventory (LWI) map pertaining to the site shall be provided. Notice of the proposal shall be given to the Oregon Division of State Lands and the Army Corp of Engineers.* Our response included in the SRIR on pages 9 & 10.

3. *Ecological Analysis. The Ecological Analysis shall include a map, using the Physical Analysis map as a base, showing the delineated boundaries and coverage of wetlands, riparian corridors, and wildlife habitat resources identified on the site.* Our response included in the SRIR on page 10.

a. *Wetland boundaries shall be delineated using the method currently accepted by the Oregon Division of State Lands and the US Army Corps of Engineers. Riparian boundaries shall be delineated using the riparian corridor descriptions in this ordinance. Boundaries of mapped Goal 5 wildlife habitat shall be verified by field observation.* Our response included in the SRIR on page 10.

b. *The analysis shall include an inventory that lists and describes the native and ornamental dominant and sub-dominant groundcover, shrub and tree species occurring on the site and wildlife observed during at least one site visit (specify date). The report shall also include recommended measures for minimizing the adverse impacts of the proposed development on unique and/or significant features of the ecosystem. The analysis shall include a report that discusses the ecological functions and values of the SROZ area, discussing each parameter listed below. The discussion shall be based on actual field observations and data obtained by a natural resource professional.* Our response included in the SRIR beginning on page 10.

c. *Wetlands (based on evaluation criteria in the Oregon Freshwater Wetlands Assessment Methodology (OFWAM), Oregon Division of State Lands)* Our response included in the SRIR beginning on page 14.

i. *wildlife habitat diversity*

ii. *fish habitat*

iii. *water quality protection*
iv. *hydrologic control*

d. *Wildlife Habitat (includes riparian corridors and upland forested area)*[1] Our response included in the SRIR beginning on page 14.
   i. *wildlife habitat diversity*
   ii. *water quality protection*
   iii. *ecological integrity*
   iv. *connectivity*
   v. *uniqueness*

e. *Riparian Corridors 1*
   e. *Riparian Corridors 1* Our item-by-item responses included in the SRIR beginning on page 16.
   Stream-riparian ecosystems:
      i. *Presence and abundance of Large Woody Debris (LWD) in and adjacent to stream*
      ii. *Tree/shrub canopy stream shade production (water temperature and aquatic plant growth control)*
      iii. *Erosion and sediment control by riparian vegetation*
      iv. *Water quality protection by riparian vegetation*
      v. *River-floodplain ecosystem (Willamette River)*
      vi. *Presence of functional floodplain (inundated annually)*
      vii. *Type and condition of functional floodplain vegetation*
      viii. *Use of river-floodplain by ESA-listed species*
      ix. *Role as wildlife corridor connecting significant wildlife habitat areas*

4. *Mitigation and Enhancement Proposal. The applicant must propose a Significant Resource mitigation and enhancement plan as part of the SRIR. The mitigation and enhancement shall increase the natural values and quality of the remaining Significant Resource lands located on the site or other location as approved by the City. The mitigation and enhancement proposal shall conform to the mitigation standards identified in this Section.* Our response included in the SRIR beginning on page 17.
5. *Waiver of Documentation: The Planning Director may waive the requirement that an SRIR be prepared where the required information has already been made available to the City, or may waive certain provisions where the Director determines that the information is not necessary to review the application. Such waivers may be appropriate for small-scale developments and shall be processed under Administrative Review. Where such waivers are granted by the Planning Director, the Director shall clearly indicate the reasons for doing so in the record, citing the relevant information relied upon in reaching the decision.* Our response included in the SRIR on page 18.

(.03) SRIR Review Criteria. In addition to the normal Site Development Permit Application requirements as stated in the Planning and Land Development Ordinance, the following standards shall apply to the issuance of permits requiring an SRIR. The SRIR must demonstrate how these standards are met in a manner that meets the purposes of this Section.

A. *Except as specifically authorized by this code, development shall be permitted only within the Area of Limited Conflicting Use (see definition) found within the SROZ;* Our response included in the SRIR on page 18.
B. *Except as specifically authorized by this code, no development is permitted within Metro's Urban Growth Management Functional Plan Title 3 Water Quality Resource Areas boundary;* Our response included in the SRIR on page 18.
C. *No more than five (5) percent of the Area of Limited Conflicting Use (see-definition) located on a property may be impacted by a development proposal. On properties that are large enough to include Areas of Limited Conflicting Use on both sides of a waterway, no more than five (5) percent of the Area of Limited Conflicting Use on each side of the riparian corridor may be impacted by a development proposal. This condition is cumulative to any successive development proposals on the subject property such that the total impact on the property shall not exceed five (5) percent;* Our response included in the SRIR on pages 18 - 19.

D. *Mitigation of the area to be impacted shall be consistent with Section 4.139.06 of this code and shall occur in accordance with the provisions of this Section;* Our response included in the SRIR on page 19.
E. *The impact on the Significant Resource is minimized by limiting the degree or magnitude of the action, by using appropriate technology or by taking affirmative steps to avoid, reduce or mitigate impacts;* Our response included in the SRIR on page 19.
F. *The impacts to the Significant Resources will be rectified by restoring, rehabilitating, or creating enhanced resource values within the "replacement area" (see definitions) on the site or, where mitigation is not practical on-site, mitigation may occur in another location approved by the City;* Our response included in the SRIR on page 19.
G. *Non-structural fill used within the SROZ area shall primarily consist of natural materials similar to the soil types found on the site;* Our response included in the SRIR on page 20.
H. *The amount of fill used shall be the minimum required to practically achieve the project purpose;* Our response included in the SRIR on page 20.
I. *Other than measures taken to minimize turbidity during construction, stream turbidity shall not be significantly increased by any proposed development or alteration of the site* Our response included in the SRIR on page 20.*;*
J. *Appropriate federal and state permits shall be obtained prior to the initiation of any activities regulated by the U.S. Army Corps of Engineers and the Oregon Division of State Lands in any jurisdictional wetlands or water of the United States or State of Oregon, respectively.* Our response included in the SRIR on page 20.

Section 4.139.07 Mitigation Standards

The following mitigation standards apply to significant wildlife habitat resource areas for encroachments within the Area of Limited Conflicting Uses, and shall be followed by those proposing such encroachments. Wetland mitigation shall be conducted as per permit conditions from the US Army Corps of Engineers and Oregon Division of State Lands. While impacts are generally not allowed in the riparian corridor resource area, permitted impacts shall be mitigated by: using these mitigation standards if the impacts are to wildlife habitat values; and using state and federal processes if the impacts are to wetland resources in the riparian corridor. Mitigation is not required for trees lost to a natural event such as wind or floods. Our response included in the SRIR beginning on page 20. Our SRIR is found **in our Narrative's Section 6 –** Reports.

(.01) The applicant shall review the appropriate Goal 5 Inventory Summary Sheets for wildlife habitat (i.e. upland) contained in the City of Wilsonville Natural Resource Inventory and Goal 5/Title 3/ESA Compliance and Protection Plan ("Compliance and Protection Plan"- May 2000) to determine the resource function ratings at the time the inventory was conducted.

(.02) The applicant shall prepare a Mitigation Plan document containing the following elements:

A. *The Mitigation Plan shall contain an assessment of the existing natural resource function ratings at the time of the proposed encroachment for the site compared to the function ratings recorded in the Compliance and Protection Plan.*
B. *The Mitigation Plan shall contain an assessment of the anticipated adverse impacts to significant wildlife habitat resources. The impact assessment shall discuss impacts by resource functions (as listed in the Compliance and Protection Plan, May 2000) for each resource type, and shall map the area of impact (square feet or acres) for each function.*
C. *The Mitigation Plan shall present a proposed mitigation action designed to replace the lost or impacted resource functions described in Subsection B, above. The mitigation plan shall be designed to replace lost or impacted functions by enhancement of existing resources on, or off the impact site, or creation of new resource areas.*
D. *For mitigation projects based on resource function enhancement, the area ratios presented in Table NR - 2 shall be applied. These ratios are based on the resource function ratings at the time of the proposed action, as described in Subsection A, above. The mitigation action shall be conducted on the appropriate size area as determined by the ratios in Table NR - 2.*
E. *The Mitigation Plan shall include a planting plan containing the following elements:*
    1. *Required Plants and Plant Densities. All trees, shrubs and ground cover shall be native vegetation. An applicant shall comply with Section 4.139.06(.02)(E)(1)(a) or (b), whichever results in more tree plantings, except where the disturbance area is one acre or more, the applicant shall comply with Section 4.139.06(.02)(E)(1)(b).*
        a. *The mitigation requirement shall be calculated based on the number and size of trees that are removed from the site. Trees that are removed from the site shall be replaced as shown in Table NR – 3. Conifers shall be replaced with conifers. Bare ground shall be planted or seeded with native grasses or herbs.*

Table NR – 3: Tree Replacement Requirements

Size of Tree to be Removed (inches in diameter at breast height)	Number of Trees and Shrubs to be Planted
6 to 12	2 trees and 3 shrubs
over 12 to 18	3 trees and 6 shrubs
over 18 to 24	5 trees and 12 shrubs
over 24 to 30	7 trees and 18 shrubs
over 30	10 trees and 30 shrubs

b. The mitigation requirement shall be calculated based on the size of the disturbance within the Significant Resource Overlay Zone. Native trees and shrubs shall be planted at a rate of five (5) trees and twenty-five (25) shrubs per every 500 square feet of disturbance area (calculated by dividing the number of square feet of disturbance area by 500, and then multiplying that result times five (5) trees and twenty-five (25) shrubs, and rounding all fractions to the nearest whole number of trees and shrubs; for example, if there will be 330 square feet of disturbance area, then 330 divided by 500 equals 0.66, and 0.66 times five equals 3.3, so three (3) trees shall be planted, and 0.66 times twenty-five (25) equals 16.5, so seventeen (17) shrubs shall be planted). Bare ground shall be planted or seeded with native grasses or herbs.

2. Plant Size. Replacement trees and shrubs shall be at least one-gallon in size and shall be at least twelve (12) inches in height.
3. Plant Spacing. Trees shall be planted between eight (8) and twelve (12) feet on center, and shrubs shall be planted between four (4) and five (5) feet on center, or clustered in single species groups of no more than four (4) plants, with each cluster planted between eight (8) and ten (10) feet on center. When planting near existing trees, the drip line of the existing tree shall be the starting point for plant spacing measurements.
4. Plant Diversity. Shrubs shall consist of at least two (2) different species. If five (5) trees or more are planted, then no more than fifty (50) percent of the trees may be of the same genus.
5. Invasive Vegetation. Invasive non-native or noxious vegetation shall be removed within the mitigation area prior to planting, and shall be removed or controlled for five (5) years following the date that the mitigation planting is completed.
6. Mulching and Browse Protection. Mulch shall be applied around new plantings at a minimum of three inches in depth and eighteen inches in diameter. Browse protection shall be installed on trees and shrubs. Mulching and browse protection shall be maintained during the two-year plant establishment period.
7. Tree and Shrub Survival. Trees and shrubs that die shall be replaced in kind to the extent necessary to ensure that a minimum of eighty (80) percent of the trees and shrubs initially required shall remain alive on the fifth anniversary of the date that the mitigation planting is completed.

[Section 4.139.07(.02)(E.) added by Ord. # 674 11/16/09]

(.03) Proposals for mitigation action where new natural resource functions and values are created (i.e. creating wetland or wildlife habitat where it does not presently exist) will be reviewed and may be approved by the Development Review Board or Planning Director if it is determined that the proposed action will create natural resource functions and values that are equal to or greater than those lost by the proposed impact activity.

(.04) Mitigation actions shall be implemented prior to or at the same time as the impact activity is conducted.

(.05) Mitigation plans shall have clearly stated goals and measurable performance standards.

(.06) All mitigation plans shall contain a monitoring and maintenance plan to be conducted for a period of five years following mitigation implementation. The applicant shall be responsible for ongoing maintenance and management activities, and shall submit an annual report to the Planning Director documenting such activities, and reporting progress towards the mitigation goals. The report shall contain, at a minimum, photographs from established photo points, quantitative measure of success criteria, including plant survival and vigor if these are appropriate data. The Year 1 annual report shall be submitted one year following mitigation action implementation. The final annual report (Year 5 report) shall document successful satisfaction of mitigation goals, as per the stated performance standards. If the ownership of the mitigation site property changes, the new owners will have the continued responsibilities established by this section.

(.07) The Mitigation Plan document shall be prepared by a natural resource professional.

(.08) Prior to any site clearing, grading or construction, the SROZ area shall be staked, and fenced per approved plan. During construction, the SROZ area shall remain fenced and undisturbed except as allowed by an approved development permit.

(.09) For any development which creates multiple parcels intended for separate ownership, the City shall require that the SROZ areas on the site be encumbered with a conservation easement or tract.

(.10) The City may require a conservation easement over the SROZ that would prevent the owner from activities and uses inconsistent with the purpose of this Section and any easements therein. The purpose of the conservation easement is to conserve and protect resources as well as to prohibit certain activities that are inconsistent with the purposes of this section. Such conservation easements do not exclude the installation of utilities.

(.11) At the Planning Directors discretion, mitigation requirements may be modified based on minimization of impacts at the impact activity site. Where such modifications are granted by the Planning Director, the Director shall clearly indicate the reasons for doing so in the record, citing the relevant information relied upon in reaching the decision.

(.12) The Director may study the possibility of a payment-in-lieu-of system for natural resource impact mitigation. This process would involve the public acquisition and management of natural resource properties partially funded by these payments.

TABLE NR – 4: NATURAL RESOURCE ENHANCEMENT MITIGATION RATIOS

Existing Function Rating at Impact Site*	*Existing Function* Rating at Mitigation Site*	*Proposed Function* Rating at Mitigation Site*	*Area Ratio (Mitigation:Impact)*
L	*L*	*M*	*2:1*
L	*L*	*H*	*1 ½ : 1*
L	*M*	*H*	*2 : 1*
M	*L*	*M*	*3 : 1*
M	*L*	*H*	*2 : 1*
M	*M*	*H*	*2 ½ : 1*
H	*L*	*M*	*4 : 1*
H	*L*	*H*	*3 : 1*
H	*M*	*H*	*2 ½ : 1*
H	*H*	*H+*	*5 : 1*

** mitigation function (i.e water quality, ecological integrity) shall be the same as impacted function*
+ improve on a H rating

Section 4.139.08 Activities Requiring a Class I Administrative Review Process

(.01) Class I Procedure for Amending the Significant Resource Overlay Zone Boundary. The Director may authorize an adjustment to the SROZ by a maximum of 2% (two percent) of the Area of Limited Conflicting Use. On properties that are large enough to include Areas of Limited Conflicting Use on both sides of a waterway or wetland, no more than 2% of the Area of Limited Conflicting Use on each side of the riparian corridor may be adjusted, provided the applicant demonstrates that the following standards are met: Acknowledge.

A. The proposed adjustment is located in an Area of Limited Conflicting Use as determined through a site assessment and SRIR;

B. The area within the Significant Resource Overlay Zone is not reduced to less than the requirements of Metro's UGMFP Title 3 Water Quality Resource Areas for the site;

C. The adjustment shall be located in the outermost 10% of the significant resource area as it runs near or parallel to a riparian corridor. Where no riparian corridor exists on the site, the adjustment shall be made in a manner which protects the highest resource values on the site;

D. The conclusions of the SRIR confirm that the area where the project is proposed does not significantly contribute to the protection of the remaining Significant Resource for water quality, storm water control and wildlife habitat;

E. The line to be adjusted has not been previously adjusted from the boundary location originally adopted as part of this Section; and

F. The land proposed to be removed through the use of this adjustment process do not contain more than three l trees, as determined by an arborist, that are greater than 6 inches DBH.

G. Any change to the SROZ boundary authorized through this Section shall be noted on the official zoning map of the City.

(.02) Applications that do not meet all of the above criteria shall be processed as a Class II Administrative Review. Acknowledge.

Section 4.139.09 Activities Requiring a Class II Administrative Review Process

(.01) The review of any action requiring an SRIR except: Acknowledge.

A. Activities and uses exempt under this Section;

B. Adjustments permitted as a Class I Administrative Review.

C. Adjustments permitted as part of a Development Review Board public hearing process.

(.02) Single family dwelling or the expansion of a single family dwelling on lots with limited buildable land. Single family dwelling or the expansion of a single family dwelling which meet all of the following requirements: Acknowledge.

A. The lot was legally created and has less than 5,000 square feet of buildable land located outside the SROZ; and

B. No more than one single family house is permitted on the property and no more than 3,000 square feet of land is to be developed by impervious improvements within the SROZ; and

C. The single-family structure shall be sited in a location, which reduces the impacts to the Significant Resources.

D. An Abbreviated SRIR is required to be submitted.

(.03) The expansion of an existing single family dwelling or structures that are accessory to a single-family dwelling located inside Metro's UGMFP Title 3 Water Quality Resource Areas. Acknowledge.

A. The expansion of a single family structure or improvement is located no closer to the stream or wetland area than the existing structures, roadways, driveways or accessory uses and development; and

B. The coverage of all structures shall not be increased by more than 600 square feet, based on the coverage in existence as of the effective date of this ordinance; and

C. The applicant must obtain the approval of an erosion and sediment control plan from the City's Building and Environmental Services Divisions.

D. In determining appropriate conditions of approval, the applicant shall:

1. Demonstrate that no reasonably feasible alternative design or method of development exists that would have a lesser impact on the Water Quality Resource Area than the one proposed; and

2. If no such reasonably feasible alternative design or method of development exists, the project shall be conditioned to limit its disturbance and impact on the Water Quality Resource to the minimum extent necessary to achieve the proposed addition, alteration, restoration, replacement or rehabilitation; and

3. Provide mitigation consistent with Section 4.139.06 to ensure that impacts to the functions and values of the Water Quality Resource Area will be mitigated or restored to the extent practicable.

Section 4.139.10 Development Review Board (DRB) Process

The following actions require review through a Development Review Board quasi-judicial process. Nothing contained herein shall be deemed to require a hearing body to approve a request for a permit under this Section.

(.01) Exceptions. The following exceptions may be authorized through a Development Review Board quasi-judicial review procedure. Acknowledge, see our SRIR on pages 21 - 22.

D. Map Refinement process. The applicant may propose to amend the SROZ boundary through a Development Review Board quasi-judicial zone change where more detailed information is provided, such as a state approved wetland delineation. The criteria for amending the SROZ are as follows:

1. Any map refinement must be evaluated by considering the riparian corridor types contained in this ordinance.

2. Other supporting documents to be considered in evaluating a proposal to refine a map include, but are not limited to:

a. Natural Resources Inventories (LWI/RCI);

b. The Economic, Social, Environmental and Energy (ESEE) Analysis;

c. Metro Functional Plans;

d. Wilsonville Comprehensive Plan;

e. State approved wetland delineations;

f. Detailed slope analysis

3. An SRIR must be prepared by the applicant in conformance with the provisions of this Section.

4. The Hearing Body (including City Council) may amend the Significant Resource Overlay Zone (in or out) upon making a determination that the land area in question is or is not a significant resource. The criteria for determining

that land is significant shall be based on finding that the site area has at least one rating of "high" using the fun criteria listed in the Natural Resource Function Rating Matrices.

(.02) Adding Wetlands. Except for water quality or storm water detention facilities, the City shall initiate amendments to the Significant Resource Overlay Zone maps to add wetlands when the City receives significant evidence that a wetland meets any one of the following criteria:

A. The wetland is fed by surface flows, sheet flows or precipitation, and has evidence of flooding during the growing season, and has 60 percent or greater vegetated cover, and is over one-half acre in size; or the wetland qualifies as having intact water quality function under the 1996 Oregon Freshwater Wetland Assessment Methodology; or

B. The wetland is in the Metro Title 3 Flood Management Area as corrected by the most current FEMA Flood Insurance Rate Maps, and has evidence of flooding during the growing season, and is five acres or more in size, and has a restricted outlet or no outlet; or the wetland qualifies as having intact hydrologic control function under the 1996 Oregon Freshwater Wetland Assessment Methodology; or

C. The wetland or a portion of the wetland is within a horizontal distance of less than one - fourth mile from a water body which meets the Department of Environmental Quality definition of water quality limited water body in OAR Chapter 340, Division 41 (1996).

D. Created or restored wetlands that meet the requirements of Section 4.139.10(.02) shall be added to the Significant Resource Overlay Zone. [Added by Ord. # 674 11/16/09]

(.03) Development of structures, additions and improvements that relate to uses other than single family residential.

(.04) Variances. A variance may be taken to any of the provisions of this Section per the standards of Section 4.196 of the Planning and Land Development Ordinance.

Section 4.139.11 Special Provisions

(.01) Reduced front, rear and side yard setback. Applications on properties containing the SROZ may reduce the front, rear and side yard setback for developments or additions to protect the significant resource, as approved by the Development Review Board. Reductions not requested, see our SRIR on page 22.

(.03) Alteration of constructed drainageways. Alteration of constructed drainageways may be allowed provided that such alterations do not adversely impact stream flows, flood storage capacity and in stream water quality and provide more efficient use of the land as well as provide improved habitat value through mitigation, enhancement and/or restoration. Such alterations must be evaluated through an SRIR and approved by the City Engineer and Development Review Board. Acknowledge, see our SRIR on page 22. **Our SRIR is found in our Narrative's** Section 6 **–** Reports.

Section 4.140. Planned Development Regulations.

(.01) Purpose .

A. The provisions of Section 4.140 shall be known as the Planned Development Regulations. The purposes of these regulations are to encourage the development of tracts of land sufficiently large to allow for comprehensive master planning, and to provide flexibility in the application of certain regulations in a manner consistent with the intent of the Comprehensive Plan and general provisions of the zoning regulations and to encourage a harmonious variety of uses through mixed use design within specific developments thereby promoting the economy of shared public services and facilities and a variety of complimentary activities consistent with the land use designation on the Comprehensive Plan and the creation of an attractive, healthful, efficient and stable environment for living, shopping or working. Acknowledge. In our proposal we complete the hi-tech industrial campus by integrating one (1) new industrial building that coordinates with the existing large industrial building to share access driveways, on-site circulation driveways, and potentially could share parking if a single tenant occupies both. This completes the development of the 24.5-acre site and preserves significant SROZ and wetland areas.

B. It is the further purpose of the following Section: See our response immediately above for this section.

1. To take advantage of advances in technology, architectural design, and functional land use design:

2. To recognize the problems of population density, distribution and circulation and to allow a deviation from rigid established patterns of land uses, but controlled by defined policies and objectives detailed in the comprehensive plan;

3. To produce a comprehensive development equal to or better than that resulting from traditional lot land use development.

4. To permit flexibility of design in the placement and uses of buildings and open spaces, circulation facilities and off-street parking areas, and to more efficiently utilize potentials of sites characterized by special features of

geography, topography, size or shape or characterized by problems of flood hazard, severe soil limitations or other hazards;

5. *To permit flexibility in the height of buildings while maintaining a ratio of site area to dwelling units that is consistent with the densities established by the Comprehensive Plan and the intent of the Plan to provide open space, outdoor living area and buffering of low-density development.*
6. *To allow development only where necessary and adequate services and facilities are available or provisions have been made to provide these services and facilities.*
7. *To permit mixed uses where it can clearly be demonstrated to be of benefit to the users and can be shown to be consistent with the intent of the Comprehensive Plan.*
8. *To allow flexibility and innovation in adapting to changes in the economic and technological climate.*

Sections 4.154 - 4.182 General Development regulations and Standards

Section 4.154. <u>On-site Pedestrian Access and Circulation</u>.

(.01) <u>On-site Pedestrian Access and Circulation</u>

A. The purpose of this section is to implement the pedestrian access and connectivity policies of the Transportation System Plan. It is intended to provide for safe, reasonably direct, and convenient pedestrian access and circulation. Acknowledge.

B. Standards. Development shall conform to all of the following standards:

1. *Continuous Pathway System. A pedestrian pathway system shall extend throughout the development site and connect to adjacent sidewalks, and to all future phases of the development, as applicable.* Our proposal includes pedestrian circulation through the site connecting pedestrians from parking to the building and SW Boeckman Road, see drawing A1.0. We could not connect pedestrians to SW Kinsman Road because we are blocked by existing wetland and SROZ, but we did unsuccessfully propose this during the early stages of design and at the Pre-App meeting.
2. *Safe, Direct, and Convenient. Pathways within developments shall provide safe, reasonably direct, and convenient connections between primary building entrances and all adjacent parking areas, recreational areas/playgrounds, and public rights-of-way and crosswalks based on all of the following criteria:* Acknowledge, see drawing A1.0. In a few places we use soft paths in natural areas weaving between established existing trees.

a. Pedestrian pathways are designed primarily for pedestrian safety and convenience, meaning they are free from hazards and provide a reasonably smooth and consistent surface. Acknowledge, see drawing A1.0.

b. The pathway is reasonably direct. A pathway is reasonably direct when it follows a route between destinations that does not involve a significant amount of unnecessary out-of-direction travel. Acknowledge, see drawing A1.0.

c. The pathway connects to all primary building entrances and is consistent with the Americans with Disabilities Act (ADA) requirements. Acknowledge and we include a direct ADA path connecting the lobbies for the two industrial building that complete the site development, see drawing A1.0.

d. All parking lots larger than three acres in size shall provide an internal bicycle and pedestrian pathway pursuant to Section 4.155(.03)(B.)(3.)(d.). Our proposal has dispersed parking in a park-like setting that borders significant treed natural SROZ and wetland areas. Here bikes are safe in the meandering driveways where everybody must naturally drive slower. Pedestrian paths are already addressed in previous responses.

3. *Vehicle/Pathway Separation. Except as required for crosswalks, per subsection 4, below, where a pathway abuts a driveway or street it shall be vertically or horizontally separated from the vehicular lane. For example, a pathway may be vertically raised six inches above the abutting travel lane, or horizontally separated by a row of bollards.* Acknowledge, see drawing A1.0.
4. *Crosswalks. Where a pathway crosses a parking area or driveway, it shall be clearly marked with contrasting paint or paving materials (e.g., pavers, light-color concrete inlay between asphalt, or similar* contrast*).*

5. *Pathway Width and Surface. Primary pathways shall be constructed of concrete, asphalt, brick/m pavers, or other durable surface, and not less than five (5) feet wide. Secondary pathways and pedestrian trails may have an alternative surface except as otherwise required by the ADA.* Acknowledge, see drawing A1.0.
6. *All pathways shall be clearly marked with appropriate standard signs.* Acknowledge, see drawing A1.0.

Section 4.155. <u>General Regulations - Parking, Loading and Bicycle Parking</u>.

(.01) Purpose:

A. *The design of parking areas is intended to enhance the use of the parking area as it relates to the site development as a whole, while providing efficient parking, vehicle circulation and attractive, safe pedestrian access.* Our proposal disperses parking in a setting that borders significantly treed SROZ and wetland areas with some new parking installed in less-protected treed natural areas. Here we weave the new parking into existing tree stands with goal of preserving as many established existing trees as possible while preserving a logical vehicle and pedestrian circulation.

B. *As much as possible, site design of impervious surface parking and loading areas shall address the environmental impacts of air and water pollution, as well as climate change from heat islands.* Our site is significantly treed, and a high percentage are retained to naturally resist heat islands. We do add tree islands in our new parking per code as well as other landscaping. See our landscaping drawings that include calculations for Interior Parking Landscaping & Tree Requirements on sheet L1.1.

C. *The view from the public right of way and adjoining properties is critical to meet the aesthetic concerns of the community and to ensure that private property rights are met. Where developments are located in key locations such as near or adjacent to the I-5 interchanges, or involve large expanses of asphalt, they deserve community concern and attention.* W5 has dispersed parking in a treed campus setting with significant treed natural SROZ and wetland areas. In addition, W5 includes green walls from vines on the facade, to further soften the building and enhance the treed campus appearance from Boeckman Road and adjacent neighbors – see the W5 renderings on the first two Narrative pages. W5 is a very green project, and much greener that its neighbors.

(.02) General Provisions:

A. *The provision and maintenance of off-street parking spaces is a continuing obligation of the property owner. The standards set forth herein shall be considered by the Development Review Board as minimum criteria.* Acknowledge.
   1. *The Board shall have the authority to grant variances or planned development waivers to these standards in keeping with the purposes and objectives set forth in the Comprehensive Plan and this Code.* Acknowledge, although none requested.
   2. *Waivers to the parking, loading, or bicycle parking standards shall only be issued upon a findings that the resulting development will have no significant adverse impact on the surrounding neighborhood, and the community, and that the development considered as a whole meets the purposes of this section.* Acknowledge, although none requested.

B. *No area shall be considered a parking space unless it can be shown that the area is accessible and usable for that purpose, and has maneuvering area for the vehicles, as determined by the Planning Director.* Acknowledge.

C. *In cases of enlargement of a building or a change of use from that existing on the effective date of this Code, the number of parking spaces required shall be based on the additional floor area of the enlarged or additional building, or changed use, as set forth in this Section. Current development standards, including parking area landscaping and screening, shall apply only to the additional approved parking area.* NA

D. *In the event several uses occupy a single structure or parcel of land, the total requirement for off-street parking shall be the sum of the requirements of the several uses computed separately, except as modified by subsection "E," below. Within the TC Zone, the cumulative number of parking spaces required by this subsection may be reduced by 25 percent.* Acknowledge.

[Amended by Ord. 835, 6/5/19]

E. *Owners of two (2) or more uses, structures, or parcels of land may utilize jointly the same parking area when the peak hours of operation do not overlap, provided satisfactory legal evidence is presented in the form of deeds, leases, or contracts securing full and permanent access to such parking areas for all the parties jointly using them. [Amended by Ord. # 674 11/16/09]* Acknowledge. This may be implemented when the W5 tenant is known.

F. *Off-street parking spaces existing prior to the effective date of this Code may be included in the amount necessary to meet the requirements in case of subsequent enlargement of the building or use to which such spaces are necessary.* Acknowledge. W5 will share circulation drives with the existing W4, and Supplemental sheet CS-2 shows parking calculations for the buildings, both individually and combined.

G. *Off-Site Parking. Except for single-family dwellings, the vehicle parking spaces required by this Chapter may be located on another parcel of land, provided the parcel is within 500 feet of the use it serves and the DRB has approved the off-site parking through the Land Use Review. The distance from the parking area to the use shall be measured from the nearest parking space to the main building entrance, following a sidewalk or other pedestrian route. Within the TC Zone there is no maximum distance to an off-site location provided the off-site parking is located within the TC Zone. The right to use the off-site parking must be evidenced in the form of recorded deeds, easements, leases, or contracts securing full and permanent access to such parking areas for all the parties jointly using them. Within the TC zone, there is no maximum distance to an off-site location provided the off-site parking is located within the TC Zone. [Amended by Ord. 835, 6/5/19]* Not applicable as no off-site parking proposed.

H. *The conducting of any business activity shall not be permitted on the required parking spaces, unless a temporary use permit is approved pursuant to Section 4.163.* Acknowledge.

I. *Where the boundary of a parking lot adjoins or is within a residential district, such parking lot shall be screened by a sight-obscuring fence or planting. The screening shall be continuous along that boundary and shall be at least six (6) feet in height.* Not applicable.

J. *Parking spaces along the boundaries of a parking lot shall be provided with a sturdy bumper guard or curb at least six (6) inches high and located far enough within the boundary to prevent any portion of a car within the lot from extending over the property line or interfering with required screening or sidewalks.* Acknowledge. Car overhangs are accommodated in our plan dimensioning and there are no conflicts as described in this section.

K. *All areas used for parking and maneuvering of cars shall be surfaced with asphalt, concrete, or other surface, such as pervious materials (i. e. pavers, concrete, asphalt) that is found by the City's authorized representative to be suitable for the purpose. In all cases, suitable drainage, meeting standards set by the City's authorized representative~~,~~ shall be provided. [Amended by Ord. # 674 11/16/09]* Acknowledge. We propose asphalt or concrete paving.

L. *Artificial lighting which may be provided shall be so limited or deflected as not to shine into adjoining structures or into the eyes of passers-by.* Acknowledge, see our lighting plans and lighting fixture cuts that addresses glare.

M. *Off-street parking requirements for types of uses and structures not specifically listed in this Code shall be determined by the Development Review Board if an application is pending before the Board. Otherwise, the requirements shall be specified by the Planning Director, based upon consideration of comparable uses.* Acknowledge.

N. *Up to forty percent (40%) of the off-street spaces may be compact car spaces as identified in Section 4.001 - "Definitions," and shall be appropriately identified.* Acknowledge, see our Site Plan sheet A1.0.

O. *Where off-street parking areas are designed for motor vehicles to overhang beyond curbs, planting areas adjacent to said curbs shall be increased to a minimum of seven (7) feet in depth. This standard shall apply to a double row of parking, the net effect of which shall be to create a planted area that is a minimum of seven (7) feet in depth.* Acknowledge. We meet this standard, see drawing A1.0.

P. *Parklets are permitted within the TC Zone on up to two parking spaces per block and shall be placed in front of the business. Placement of parklet requires a temporary right-of-way use permit and approval by the City Engineer. [Added by Ord. 835, 6/5/19]* Not applicable.

(.03) Minimum and Maximum Off-Street Parking Requirements:

A. *Parking and loading or delivery areas shall be designed with access and maneuvering area adequate to serve the functional needs of the site and shall:*

1. *Separate loading and delivery areas and circulation from customer and/or employee parking and pedestrian areas. Circulation patterns shall be clearly marked.* Acknowledge, see our Site Plan sheet A1.0. This is a building shell proposal where we have anticipated the flex needs of future hi-tech industrial tenants. For flexibility we provide two (2) dock-high spaces and on-grade service access on three sides of the building. In all cases, the service doors are separate from vehicle parking.
2. *To the greatest extent possible, separate vehicle and pedestrian traffic.* Acknowledge, see our Site Plan sheet A1.0. We propose a mix of hard surface pedestrian paths and soft service in natural areas.

B. *Parking and loading or delivery areas shall be landscaped to minimize the visual dominance of the parking or loading area, as follows:* Agree and we have placed our most active loading areas in the rear of the site where not seen from the public ROW, where they are blocked from public view by the building and/or the heavily treed SROZ areas. From Kinsman Road there is current narrow a line-of-sight view of the future truck dock area when looking east. After construction this narrow view between SROZ trees will be blocked by the elevation change and the new retaining wall.

1. *Landscaping of at least ten percent (10%) of the parking area designed to be screened from view from the public right-of-way and adjacent properties. This landscaping shall be considered to be part of the fifteen percent (15%) total landscaping required in Section 4.176.03 for the site development.* Complies. See landscape calcs as reference on Sheet L1.1.
2. *Landscape tree planting areas shall be a minimum of eight (8) feet in width and length and spaced every eight (8) parking spaces or an equivalent aggregated amount.*
   a. *Trees shall be planted in a ratio of one (1) tree per eight (8) parking spaces or fraction thereof, except in parking areas of more than two hundred (200) spaces where a ratio of one (1) tree per six (six) spaces shall be applied as noted in subsection (.03) (B.) (3.). A landscape design that includes trees planted in areas based on an aggregated number of parking spaces must provide all area calculations.* W5 distributes parking across the site but due to us having more than 200 parking stalls the 1:6 tree ratio applies. See our revised Landscape Plan Sheet L1.0. with the Interior Parking Landscape & Tree Calculations that show code compliance. Further specific comments on the softening of our parking areas follows from heat islands:
      - North of W5 the elevated double loaded parking that will be screened from ROW line-of-site-view by additional frontage trees and the bushes and groundcover on the frontage berm. The front-of-building view is further softened by the W5 green wall with vines covering the facade. Heat islands are not an issue here because the building shades this N side much of the day and in the afternoon the existing SROZ tree stand to the west provides the shade.
      - East of W5 the onsite row of mostly accessible parking stalls is softened by the W5 green wall with vines covering the facade. Heat islands are less an issue here because the building shades this small parking area during the hottest time of the day.
      - SW of W5 a small elevated double loaded parking area bracketed by SROZ and wetlands that is not seen from Kinsman Road by the **8' retaining wall (including solid guardrail)** blocking line-of-sight. Heat islands are not an issue in this small space surrounded by established existing protected trees.

- SE Parking Lot 1: This parking area is woven into an existing non-SROZ tree stand seen from off-site, where many existing trees remain. Heat islands are not an issue because of the significant remaining existing trees.
- SE Parking Lot 2: This is our largest parking area in a relatively lightly treed non-SROZ area not visible from off-site. W**e concentrated the parking in a 240' x 180' area** surrounded by existing trees as the best compromise to grow the parking count. Heat islands are less an issue here because of the surrounding established existing trees and the new trees.

- *b. Except for trees planted for screening, all deciduous interior parking lot trees must be suitably sized, located, and maintained to provide a branching minimum of seven (7) feet clearance at maturity.* Complies. See specs as reference on Sheet L2.0.

3. *Due to their large amount of impervious surface, new development with parking areas of more than two hundred (200) spaces that are located in any zone, and that may be viewed from the public right of way, shall be landscaped to the following additional standards:* Acknowledge this section applies. We propose over 200 new parking spaces in our park-like setting with substantial mature treed areas. While 90% cannot be viewed from the public ROW, city policy is if you can see one stall you can see them all. We will follow Planning policy.
   a. *One (1) trees shall be planted per six (6) parking spaces or fraction thereof. At least twenty-five percent (25%) of the required trees must be planted in the interior of the parking area.*
   b. *Required trees may be planted within the parking area or the perimeter, provided that a minimum of forty percent (40%) of the canopy dripline of mature perimeter trees can be expected to shade or overlap the parking area. Shading shall be determined based on shadows cast on the summer solstice.*
   c. *All parking lots in excess of two hundred (200) parking spaces shall provide an internal pedestrian walkway for every six (6) parking aisles. Minimum walkway clearance shall be at least five (5) feet in width. Walkways shall be designed to provide pedestrian access to parking areas in order to minimize pedestrian travel among vehicles. Walkways shall be designed to channel pedestrians to the front entrance of the building.*
   d. *Parking lots more than three acres in size shall provide street-like features along principal drive isles, including curbs, sidewalks, street trees or planting strips, and bicycle routes.*
   e. *All parking lots viewed from the public right of way shall have a minimum twelve (12) foot landscaped buffer extending from the edge of the property line at the right of way to the edge of the parking area. Buffer landscaping shall meet the low screen standard of 4.176(.02)(D) except that trees, groundcovers and shrubs shall be grouped to provide visual interest and to create view openings no more than ten (10) feet in length and provided every forty (40) feet. Notwithstanding this requirement, view of parking area that is unscreened from the right of way due to slope or topography shall require an increased landscaping standard under 4.176(.02) in order to buffer and soften the view of vehicles as much as possible. For purposes of this section, "view from the public right of way" is intended to mean the view from the sidewalk directly across the street from the site, or if no sidewalk, from the opposite side of the adjacent street or road.*
   f. *Where topography and slope condition permit, the landscape buffer shall integrate parking lot storm water treatment in bioswales and related plantings. Use of berms or drainage swales are allowed provided that planting areas with lower grade are constructed so that they are protected from vehicle maneuvers. Drainage swales shall be constructed to Public Works Standards.*
   g. *In addition to the application requirements of section 4.035(.04)(6)(d), where view of signs is pertinent to landscape design, any approved or planned sign plan shall accompany the application for landscape design approval.*

C. *Off Street Parking shall be designed for safe and convenient access that meets ADA and ODOT standards. All parking areas which contain ten (10) or more parking spaces, shall for every fifty (50) standard spaces.,*

provide one ADA-accessible parking space that is constructed to building code standards, Wilsonville 9.000. Acknowledge, sheets A0.0 & A1.0 show how we meet the requirements.

D. *Where possible, parking areas shall be designed to connect with parking areas on adjacent sites so as to eliminate the necessity for any mode of travel of utilizing the public street for multiple accesses or cross movements. In addition, on-site parking shall be designed for efficient on-site circulation and parking.* Existing and proposed on-site parking is integrated to share drives and circulation for an efficient layout for efficient circulation and minimal land disturbance. We meet this requirement.

E. *In all multi-family dwelling developments, there shall be sufficient areas established to provide for parking and storage of motorcycles, mopeds and bicycles. Such areas shall be clearly defined and reserved for the exclusive use of these vehicles.* Not Applicable.

F. *On-street parking spaces, directly adjoining the frontage of and on the same side of the street as the subject property, may be counted towards meeting the minimum off-street parking standards.* Not Applicable because SE Boeckman Road is not designed to allow on-street parking.

G. *Tables 5 shall be used to determine the minimum and maximum parking standards for various land uses. The minimum number of required parking spaces shown on Tables 5 shall be determined by rounding to the nearest whole parking space. For example, a use containing 500 square feet, in an area where the standard is one space for each 400 square feet of floor area, is required to provide one off-street parking space. If the same use contained more than 600 square feet, a second parking space would be required. Structured parking and on-street parking are exempted from the parking maximums in Table 5. [Amended by Ordinance No. 538, 2/21/02.]* Acknowledge, sheets A0.0 & A1.0 show how we meet the required **parking standard for "manufacturing establishment" use on Table 5**. To establishing the number of proposed parking stalls required by the new hi-tech manufacturing tenant for W5, the owners took input from the adjacent DWFRITZ Precision Automation (the most likely future tenant).

H. *Electrical Vehicle Charging Stations:* The decision on electrical charging stations will be made at TI with tenant input. At this shell phase we will provide conduit to economically facilitate power to future charge stations on the northside of the building. Note, the adjacent W4 has 10 EV charge stations for employees.

1. *Parking spaces designed to accommodate and provide one or more electric vehicle charging stations on site may be counted towards meeting the minimum off-street parking standards.*
2. *Modification of existing parking spaces to accommodate electric vehicle charging stations on site is allowed outright.*

I. *Motorcycle parking:* No motorcycle parking is anticipated at this time, but this will be revisited prior to construction, and maybe from input from the new tenant.

1. *Motorcycle parking may substitute for up to 5 spaces or 5 percent of required automobile parking, whichever is less. For every 4 motorcycle parking spaces provided, the automobile parking requirement is reduced by one space.*
2. *Each motorcycle space must be at least 4 feet wide and 8 feet deep. Existing parking may be converted to take advantage of this provision.*

(.04) <u>Bicycle Parking</u>:

A. *Required Bicycle Parking - General Provisions.*

1. *The required minimum number of bicycle parking spaces for each use category is shown in Table 5, Parking Standards.* Our bike parking statistics are on Sheet A0, where we propose to provide the minimum **"manufacturing establishment" use on Table 5**. At shell work we will provide 2 non-required exterior lockable bike racks for deliveries, etc. We will include a note that the required 16 bike stalls will be inside as part of TI. We do this because we have learned that hi-tech employees are particular about their bikes and how they are stored. In the adjacent W4 the TI provided for interior bike storage spaces next to showers and locker rooms, and we anticipate the same at W5.
2. *Bicycle parking spaces are not required for accessory buildings. If a primary use is listed in Table 5, bicycle parking is not required for the accessory use.* NA.

3. *When there are two or more primary uses on a site, the required bicycle parking for the site is the sum of the required bicycle parking for the individual primary uses.* We are proceeding on this basis, see A0.
4. *Bicycle parking space requirements may be waived by the Development Review Board per Section 4.118(.03)(A.)(9.) and (10.).* Acknowledge, although we are not asking for a waiver.

B. *Standards for Required Bicycle Parking*

1. *Each space must be at least 2 feet by 6 feet in area and be accessible without moving another bicycle.*
2. *An aisle at least 5 feet wide shall be maintained behind all required bicycle parking to allow room for bicycle maneuvering. Where the bicycle parking is adjacent to a sidewalk, the maneuvering area may extend into the right-of-way.* Acknowledge.
3. *When bicycle parking is provided in racks, there must be enough space between the rack and any obstructions to use the space properly.* Acknowledge.
4. *Bicycle lockers or racks, when provided, shall be securely anchored.* Acknowledge.
5. *Bicycle parking shall be located within 30 feet of the main entrance to the building or inside a building, in a location that is easily accessible for bicycles. For multi-tenant developments, with multiple business entrances, bicycle parking may be distributed on-site among more than one main entrance.* Acknowledge.
6. *With Planning Director approval, on street vehicle parking can also be used for bicycle parking.*

[Added by Ord. 835, 6/5/19] Acknowledge, although we are not asking for this.

C. *Long-term Bicycle Parking*

1. *Long-term bicycle parking provides employees, students, residents, commuters, and others who generally stay at a site for several hours a weather-protected place to park bicycles.* Our inside bike stalls at TI are for long-term storage.
2. *For a proposed multi-family residential, retail, office, or institutional development, or for a park and ride or transit center, where six (6) or more bicycle parking spaces are required pursuant to Table 5, 50% of the bicycle parking shall be developed as long-term, secure spaces. Required long-term bicycle parking shall meet the following standards:* Acknowledge. Our inside bike stalls at TI are for long-term storage.

a. *All required spaces shall meet the standards in subsection (B.) above, and must be covered in one of the following ways: inside buildings, under roof overhangs or permanent awnings, in bicycle lockers, or within or under other structures.* Acknowledge. The two exterior uncovered bike rack stalls near the lobby are not required stalls. They are placed for the convenience of the occasional visitor.
b. *All spaces must be located in areas that are secure or monitored (e.g., visible to employees, monitored by security guards, or in public view).* Acknowledge. Hi-tech uses place security at a premium so the bikes are anticipated to be well protected inside, although TI permit is required for this and any occupancy.
c. *Spaces are not subject to the locational criterion of (B.)(5.).* Acknowledge.

> *Note: In considering proposed waivers to the following standards, the City will consider the potential uses of the site and not just the uses that are currently proposed. For waivers to exceed the maximum standards, applicants shall bear the burden of proving that Metro, State, and federal clean air standards will not be violated.* No waivers requested at this time.

TABLE 5: PARKING STANDARDS

USE	*PARKING MINIMUMS*	*PARKING MAXIMUMS*	*BICYCLE MINIMUMS*
Manufacturing establishment	*1.6 per 1000 sq. ft.*	*No Limit*	*1 per 10,000 sq. ft. Min. of 6*

(.05) Minimum Off-Street Loading Requirements:

A. *Every building that is erected or structurally altered to increase the floor area, and which will requ receipt or distribution of materials or merchandise by truck or similar vehicle, shall provide off-street loading berths on the basis of minimum requirements as follows:*

1. *Commercial, industrial, and public utility uses which have a gross floor area of 5,000 square feet or more, shall provide truck loading or unloading berths in accordance with the following tables:* W5 proposes 3 loading berths.

Square feet of Floor Area	*Number of Berths Required*
Less than 5,000	*0*
5,000 - 30,000	*1*
30,000 - 100,000	2 **(req'd @ W5)**
100,000 and over	*3*

2. *Restaurants, office buildings, hotels, motels, hospitals and institutions, schools and colleges, public buildings, recreation or entertainment facilities, and any similar use which has a gross floor area of 30,000 square feet or more, shall provide off-street truck loading or unloading berths in accordance with the following table:* Not Applicable.

Square feet of Floor Area	*Number of Berths Required*
Less than 30,000	*0*
30,000 - 100,000	*1*
100,000 and over	*2*

3. *A loading berth shall contain space twelve (12) feet wide, thirty-five (35) feet long, and have a height clearance of fourteen (14) feet. Where the vehicles generally used for loading and unloading exceed these dimensions, the required length of these berths shall be increased to accommodate the larger vehicles.* Acknowledge. We designed to larger trucks for future flexibility.
4. *If loading space has been provided in connection with an existing use or is added to an existing use, the loading space shall not be eliminated if elimination would result in less space than is required to adequately handle the needs of the particular use.* W5 is submitted as a stand-alone building for this requirement.
5. *Off-street parking areas used to fulfill the requirements of this Ordinance shall not be used for loading and unloading operations except during periods of the day when not required to meet parking needs.* Agreed.

B *Exceptions and Adjustments.*

1. *The Planning Director or Development Review Board may approve a loading area adjacent to or within a street right-of-way where it finds that loading and unloading operations:* Not applicable.

a. *Are short in duration (i.e., less than one hour);*
b. *Are infrequent (less than three operations daily);*
c. *Do not obstruct traffic during peak traffic hours;*
d. *Do not interfere with emergency response services or bicycle and pedestrian facilities; and*
e. *Are acceptable to the applicable roadway authority.*

(.06) *Carpool and Vanpool Parking Requirements:*

A. *Carpool and vanpool parking spaces shall be identified for the following uses:*

1. *New commercial and industrial developments with seventy-five (75) or more parking spaces,* Carpool and vanpool parking spaces are required and provided per this regulation.
2. *New institutional or public assembly uses, and* Not Applicable.
3. *Transit park-and-ride facilities with fifty (50) or more parking spaces.* Not Applicable.

B. *Of the total spaces available for employee, student, and commuter parking, at least five percent, not fewer than two, shall be designated for exclusive carpool and vanpool parking.* Acknowledge, sheets A0.0 & A1.0 show how and where we meet the required carpool & vanpool requirements.

C. *Carpool and vanpool parking spaces shall be located closer to the main employee, student or commuter entrance than all other parking spaces with the exception of ADA parking spaces.* Acknowledge, sheets A0.0 & A1.0 show how and where we meet the required carpool & vanpool location requirement on the north side of the building adjacent to the lobby.

D. *Required carpool/vanpool spaces shall be clearly marked "Reserved - Carpool/Vanpool Only."*

(.07) *Parking Area Redevelopment. The number of parking spaces may be reduced by up to 10% of the minimum required parking spaces for that use when a portion of the existing parking area is modified to accommodate or provide transit-related amenities such as transit stops, pull-outs, shelters, and park and ride stations.* Parking space reduction is not requested.

Section 4.171. General Regulations - Protection of Natural Features and Other Resources.

(.01) *Purpose. It is the purpose of this Section to prescribe standards and procedures for the use and development of land to assure the protection of valued natural features and cultural resources. The requirements of this Section are intended to be used in conjunction with those of the Comprehensive Plan and other zoning standards. It is further the purpose of this Section:* **Acknowledge and support the purposes stated here, see our Arborist's and Habitat Consultant's reports and how we protect existing wetlands and SROZ areas.**

A. *To protect the natural environmental and scenic features of the City of Wilsonville.*

B. *To encourage site planning and development practices which protect and enhance natural features such as riparian corridors, streams, wetlands, swales, ridges, rock outcroppings, views, large trees and wooded areas.*

C. *To provide ample open space and to create a constructed environment capable and harmonious with the natural environment.*

(.02) *General Terrain Preparation:* Acknowledge all.

A. *All developments shall be planned, designed, constructed and maintained with maximum regard to natural terrain features and topography, especially hillside areas, floodplains, and other significant landforms.*

B. *All grading, filling and excavating done in connection with any development shall be in accordance with the Uniform Building Code*

C. *In addition to any permits required under the Uniform Building Code, all developments shall be planned, designed, constructed and maintained so as to:*

   l. Limit the extent of disturbance of soils and site by grading, excavation and other land alterations.

   2. Avoid substantial probabilities of: (l) accelerated erosion; (2) pollution, contamination, or siltation of lakes, rivers, streams and wetlands; (3) damage to vegetation; (4) injury to wildlife and fish habitats.

   3. Minimize the removal of trees and other native vegetation that stabilize hillsides, retain moisture, reduce erosion, siltation and nutrient runoff, and preserve the natural scenic character.

(.03) *Hillsides: All developments proposed on slopes greater than 25% shall be limited to the extent that:* No hillsides in our project for the record.

A. *An engineering geologic study approved by the City, establishes that the site is stable for the proposed development, and any conditions and recommendations based on the study are incorporated into the plans and construction of the development. The study shall include items specified under subsection 4.171(.07)(A.)(2.)(a-j):* See

B. *Slope stabilization and re-vegetation plans shall be included as part of the applicant's landscape plans.* See **our Arborist's and Habitat Consultant's reports.**

C. *Buildings shall be clustered to reduce alteration of terrain and provide for preservation of natural features.* W5 is proposed in the only remaining nontree portion of the site, and a relatively flat portion of the rolling site.

D. *Creation of building sites through mass pad grading and successive padding or terracing of building sites shall be avoided where feasible.* Of course.

E. *Roads shall be of minimum width, with grades consistent with the City's Public Works Standards.*
F. *Maintenance, including re-vegetation, of all grading areas is the responsibility of the developer, and shall occur through October 1 of the second growing season following receipt of Certificates of Occupancy unless a longer period is approved by the Development Review Board.*
G. *The applicant shall obtain an erosion and sediment control permit from the City's Building and Environmental Services Division's.*

(.04) *Trees and Wooded Areas.* A significant part of our project is wetland and treed areas to remain largely undisturbed.

A. *All developments shall be planned, designed, constructed and maintained so that:*
   l. Existing vegetation is not disturbed, injured, or removed prior to site development and prior to an approved plan for circulation, parking and structure location. Of course.
   2. Existing wooded areas, significant clumps/groves of trees and vegetation, and all trees with a diameter at breast height of six inches or greater shall be incorporated into the development plan and protected wherever feasible. See our Arborist report in Narrative Section 6.
   3. Existing trees are preserved within any right-of-way when such trees are suitably located, healthy, and when approved grading allows. Not Applicable.
B. *Trees and woodland areas to be retained shall be protected during site preparation and construction according to City Public Works design specifications, by:* **See our Arborist's and Habitat Consultant's** reports in Narrative Section 6.
   l. Avoiding disturbance of the roots by grading and/or compacting activity.
   2. Providing for drainage and water and air filtration to the roots of trees which will be covered with impermeable surfaces. See our Arborist report with those details in certain areas in Narrative Section 6.
   3. Requiring, if necessary, the advisory expertise of a registered arborist/horticulturist both during and after site preparation. See our **Arborist's and Habitat Consultant's reports** in Narrative Section 6.
   4. Requiring, if necessary, a special maintenance, management program to insure survival of specific woodland areas of specimen trees or individual heritage status trees. Acknowledge. **See our Arborist's and Habitat Consultant's reports** in Narrative Section 6.

(.05) *High Voltage Powerline Easements and Rights of Way and Petroleum Pipeline Easements:*

A. *Due to the restrictions placed on these lands, no residential structures shall be allowed within high voltage powerline easements and rights of way and petroleum pipeline easements, and any development, particularly residential, adjacent to high voltage powerline easements and rights of way and petroleum pipeline easements shall be carefully reviewed.* We propose no residential construction.
B. *Any proposed non-residential development within high voltage powerline easements and rights of way and petroleum pipeline easements shall be coordinated with and approved by the Bonneville Power Administration, Portland General Electric Company or other appropriate utility, depending on the easement or right of way ownership.* Acknowledge. We are not working near these hazards.

(.06) *Hazards to Safety: Purpose:* Safety is very important to ownership and the General Contractor, who both work in Wilsonville regularly.

A. *To protect lives and property from natural or human-induced geologic or hydrologic hazards and disasters.*
B. *To protect lives and property from damage due to soil hazards.*
C. *To protect lives and property from forest and brush fires.*
D. *To avoid financial loss resulting from development in hazard areas.*

(.07) *Standards for Earth Movement Hazard Areas:* See our Geotechnical Report for this relatively flat site in Narrative Section 6.

A. *No development or grading shall be allowed in areas of land movement, slump or earth flow, and mud or debris flow, except under one of the following conditions:* Our Geotechnical Report lists none of the conditions listed.

1. *Stabilization of the identified hazardous condition based on established and proven engin techniques which ensure protection of public and private property. Appropriate conditions of approval may be attached by the City.*
2. *An engineering geologic study approved by the City establishing that the site is stable for the proposed use and development. The study shall include the following:* See the recommendations in our Geotechnical Report, which the construction team are required to follow. Note, all of the 10 items listed below are included in our Geotechnical Report.
   a. *Index map.*
   b. *Project description, to include: location; topography, drainage, vegetation; discussion of previous work; and discussion of field exploration methods.*
   c. *Site geology, to include: site geologic map; description of bedrock and superficial materials including artificial fill; location of any faults, folds, etc.; and structural data including bedding, jointing, and shear zones.*
   d. *Discussion and analysis of any slope stability problems.*
   e. *Discussion of any off-site geologic conditions that may pose a potential hazard to the site or that may be affected by on-site development.*
   f. *Suitability of site for proposed development from geologic standpoint.*
   g. *Specific recommendations for cut slope stability, seepage and drainage control, or other design criteria to mitigate geologic hazards.*
   h. *Supportive data, to include: cross sections showing subsurface structure; graphic logs of subsurface explorations; results of laboratory tests; and references.*
   i. *Signature and certification number of engineering geologist registered in the State of Oregon.*
   j. *Additional information or analyses as necessary to evaluate the site.*

B. *Vegetative cover shall be maintained or established for stability and erosion control purposes.* Acknowledge.
C. *Diversion of storm water into these areas shall be prohibited.* Acknowledge.
D. *The principal source of information for determining earth movement hazards is the State Department of Geology and Mineral Industries (DOGAMI) Bulletin 99 and any subsequent bulletins and accompanying maps. Approved site specific engineering geologic studies shall be used to identify the extent and severity of the hazardous conditions on the site, and to update the earth movement hazards database.* Acknowledge.

(.08) *Standards for Soil Hazard Areas:* Acknowledge.

A. *Appropriate siting and design safeguards shall insure structural stability and proper drainage of foundation and crawl space areas for development on land with any of the following soil conditions: wet or high water table; high shrink-swell capability; compressible or organic; and shallow depth-to-bedrock.*
B. *The principal source of information for determining soil hazards is the State DOGAMI Bulletin 99 and any subsequent bulletins and accompanying maps. Approved site-specific soil studies shall be used to identify the extent and severity of the hazardous conditions on the site, and to update the soil hazards database accordingly.* Acknowledge.

(.09) *Historic Protection: Purpose:* Not Applicable, so I removed the rest of this section.

(.10) *Alteration and Development Criteria:* Not Applicable, so I removed the rest of this section.

(.11) *Cultural Resource Designation Criteria: A cultural resource may be designated and placed on the Cultural Resources Inventory if it meets the following criteria:* We are not aware of any Cultural Resources Inventory on this undeveloped natural site.

A. *It exemplifies or reflects special elements of the City's cultural, social, economic, political, aesthetic, engineering or architectural history; or*
B. *It is identified with persons or events significant in local, state, or national history; or*
C. *It embodies distinctive characteristics of a style, type, period, or method of construction, or it is a valuable example of the use of indigenous materials or craftsmanship; or*
D. *It is representative of the notable work of a builder, designer, or architect.*

Section 4.175. Public Safety and Crime Prevention.

(.01) All developments shall be designed to deter crime and insure public safety. Acknowledge. Hi-tech manufacturing uses are proactive about security.
(.02) Addressing and directional signing shall be designed to assure identification of all buildings and structures by emergency response personnel, as well as the general public. Acknowledge. This is also part of the building code.
(.03) Areas vulnerable to crime shall be designed to allow surveillance. Parking and loading areas shall be designed for access by police in the course of routine patrol duties. Acknowledge. Police will have access and there will be many security cameras also.
(.04) Exterior lighting shall be designed and oriented to discourage crime. Acknowledge. See our exterior lighting plans.

Section 4.176. Landscaping, Screening, and Buffering.

(.01) Purpose. This Section consists of landscaping and screening standards and regulations for use throughout the City. The regulations address materials, placement, layout, and timing of installation. The City recognizes the ecological and economic value of landscaping and requires the use of landscaping and other screening or buffering to: Acknowledge the purpose for the 11 items listed below, and our individual responses are in more detail are later in this section.

A. *Promote the re-establishment of vegetation for aesthetic, health, erosion control, flood control and wildlife habitat reasons;*
B. *Restore native plant communities and conserve irrigation water through establishment, or re-establishment, of native, drought-tolerant plants;*
C. *Mitigate for loss of native vegetation;*
D. *Establish and enhance a pleasant visual character which recognizes aesthetics and safety issues;*
E. *Promote compatibility between land uses by reducing the visual, noise, and lighting impacts of specific development on users of the site and abutting sites or uses;*
F. *Unify development and enhance and define public and private spaces;*
G. *Promote the retention and use of existing topsoil and vegetation. Amended soils benefit stormwater retention and promote infiltration;*
H. *Aid in energy conservation by providing shade from the sun and shelter from the wind; and*
I. *Screen from public view the storage of materials that would otherwise be considered unsightly.*
J. *Support crime prevention, create proper sight distance clearance, and establish other safety factors by effective landscaping and screening.*
K. *Provide landscaping materials that minimize the need for excessive use of fertilizers, herbicides and pesticides, irrigation, pruning, and mowing to conserve and protect natural resources, wildlife habitats, and watersheds.*

(.02) Landscaping and Screening Standards. Subsections "C" through "I," below, state the different landscaping and screening standards to be applied throughout the City. The locations where the landscaping and screening are required and the depth of the landscaping and screening is stated in various places in the Code.

A. *All landscaping and screening required by this Code must comply with all of the provisions of this Section, unless specifically waived or granted a Variance as otherwise provided in the Code. The landscaping standards are minimum requirements; higher standards can be substituted as long as fence and vegetation- height limitations are met. Where the standards set a minimum based on square footage or linear footage, they shall be interpreted as applying to each complete or partial increment of area or length (e.g., a landscaped area of between 800 and 1600 square feet shall have two trees if the standard calls for one tree per 800 square feet.* Acknowledge, see our landscape drawings L1.0 – L1.2.
B. *General Landscaping Standard.*
C. *Intent. The General Landscaping Standard is a landscape treatment for areas that are generally open. It is intended to be applied in situations where distance is used as the principal means of separating uses or developments and landscaping is required to enhance the intervening space. Landscaping may include a*

mixture of ground cover, evergreen and deciduous shrubs, and coniferous and deciduous trees. Acknowledge, see our landscape drawings L1.0 **–** L1.2 that include the native mix of plant material described. Except where we place W5 building, much of the existing site remains treed, and much of that is SROZ, wetland, buffers to SROZ or wetland, plus we have some less protected treed natural areas.

1. *Required materials. Shrubs and trees, other than street trees, may be grouped. Ground cover plants must fully cover the remainder of the landscaped area (see Figure 21: General Landscaping). The General Landscaping Standard has two different requirements for trees and shrubs:* Acknowledge this section, see our landscape drawings L1.0 **–** L1.2
    a. *Where the landscaped area is less than 30 feet deep, one tree is required for every 30 linear feet.*
    b. *Where the landscaped area is 30 feet deep or greater, one tree is required for every 800 square feet and two high shrubs or three low shrubs are required for every 400 square feet.*

D. *Low Screen Landscaping Standard.* We propose the low-screen standard to screen our parking on our Boeckman Road frontage north of W5 from the ROW and across the street. Before we finalize this design, we need to learn more about limitations from **the 30' utility easement limitations in place.** We have received allowed **plant material for this easement and a prelim drawing for a new 68"** diameter water main is proposed under our parking stalls, which is graphically shown on Civil Sheet C1.30. This area will be resolved as we continue with discussions with Public Works in the course of continued design and plan development as part of the Site Design Review process. Landscape drawing L1.0 is a placemark that is unresolved regarding the low screen design.

1. *Intent. The Low Screen Landscaping Standard is a landscape treatment that uses a combination of distance and low screening to separate uses or developments. It is intended to be applied in situations where low screening is adequate to soften the impact of one use or development on another, or where visibility between areas is more important than a total visual screen. The Low Screen Landscaping Standard is usually applied along street lot lines or in the area separating parking lots from street rights-of-way.*
2. *Required materials. The Low Screen Landscaping Standard requires sufficient low shrubs to form a continuous screen three (3) feet high and 95% opaque, year-round. In addition, one tree is required for every 30 linear feet of landscaped area, or as otherwise required to provide a tree canopy over the landscaped area. Ground cover plants must fully cover the remainder of the landscaped area. A three (3) foot high masonry wall or a berm may be substituted for the shrubs, but the trees and ground cover plants are still required. When applied along street lot lines, the screen or wall is to be placed along the interior side of the landscaped area. (See Figure 22: Low Screen Landscaping).*

E. *Low Berm Landscaping Standard.* Not used as existing W4 and W5 are compatible uses that share vehicular and pedestrian circulation. The design intent is an integrated two-building hi-tech industrial campus that is heavily treed and landscaped.

1. *Intent. The Low Berm Standard is intended to be applied in situations where moderate screening to reduce both visual and noise impacts is needed to protect abutting uses or developments from one-another, and where it is desirable and practical to provide separation by both distance and sight-obscuring materials. This screening is most important where either, or both, of the abutting uses or developments can be expected to be particularly sensitive to noise or visual impacts.*
2. *Required materials. The Low Berm Standard requires a berm at least two feet six inches (2' 6") high along the interior side of the landscaped area (see Figure 23: Low Berm Landscaping). If the berm is less than three (3) feet high, low shrubs meeting the Low Screen Landscaping Standard, above, are to be planted along the top of the berm, assuring that the screen is at least three (3) feet in height. In addition, one tree is required for every 30 linear feet of berm, or as otherwise required to provide a tree canopy over the landscaped area. Ground cover plants must fully cover the remainder of the landscaped area.* Acknowledge.

F. *High Screen Landscaping Standard.* Not used in our design as our established existing native planting to the east and south are already meet this requirement.
   1. *Intent. The High Screen Landscaping Standard is a landscape treatment that relies primarily on screening to separate uses or developments. It is intended to be applied in situations where visual separation is required.*
   2. *Required materials. The High Screen Landscaping Standard requires sufficient high shrubs to form a continuous screen at least six (6) feet high and 95% opaque, year-round. In addition, one tree is required for every 30 linear feet of landscaped area, or as otherwise required to provide a tree canopy over the landscaped area. Ground cover plants must fully cover the remainder of the landscaped area. A six (6) foot high masonry wall or a berm may be substituted for the shrubs, but the trees and ground cover plants are still required. When applied along street lot lines, the screen or wall is to be placed along the interior side of the landscaped area. (See Figure 24: High Screen Landscaping.*

G. *High Wall Standard.* Not used in our design as our established existing native planting to the east and south are already meet this requirement.
   1. *Intent. The High Wall Standard is intended to be applied in situations where extensive screening to reduce both visual and noise impacts is needed to protect abutting uses or developments from one-another. This screening is most important where either, or both, of the abutting uses or developments can be expected to be particularly sensitive to noise or visual impacts, or where there is little space for physical separation.*
   2. *Required materials. The High Wall Standard requires a masonry wall at least six (6) feet high along the interior side of the landscaped area (see Figure 25: High Wall Landscaping). In addition, one tree is required for every 30 linear feet of wall, or as otherwise required to provide a tree canopy over the landscaped area. Ground cover plants must fully cover the remainder of the landscaped area.*

H. *High Berm Standard.* Not used in our design as our established existing native planting to the east and south are already meet this requirement.
   1. *Intent. The High Berm Standard is intended to be applied in situations where extensive screening to reduce both visual and noise impacts is needed to protect abutting uses or developments from one-another, and where it is desirable and practical to provide separation by both distance and sight-obscuring materials. This screening is most important where either, or both, of the abutting uses or developments can be expected to be particularly sensitive to noise or visual impacts.*
   2. *Required materials. The High Berm Standard requires a berm at least four (4) feet high along the interior side of the landscaped area (see Figure 26: High Berm Landscaping). If the berm is less than six (6) feet high, low shrubs meeting the Low Screen Landscaping Standard, above, are to be planted along the top of the berm, assuring that the screen is at least six (6) feet in height In addition, one tree is required for every 30 linear feet of berm, or as otherwise required to provide a tree canopy over the landscaped area. Ground cover plants must fully cover the remainder of the landscaped area*

I. *Partially Sight-Obscuring Fence Standard.* Not used in our design as our established existing native planting to the east and south are already meet this requirement.
   1. *Intent. The Partially Sight-Obscuring Fence Standard is intended to provide a tall, but not totally blocked, visual separation. The standard is applied where a low level of screening is adequate to soften the impact of one use or development on another, and where some visibility between abutting areas is preferred over a total visual screen. It can be applied in conjunction with landscape plantings or applied in areas where landscape plantings are not necessary and where nonresidential uses are involved.*
   2. *Required materials. Partially Sight-Obscuring Fence Standard are to be at least six (6) feet high and at least 50% sight-obscuring. Fences may be made of wood (other than plywood or particle-board), metal, bricks, masonry or other permanent materials (see Figure 27: Partially Sight-Obscuring Fence).*

J. *Fully Sight-Obscuring Fence Standard.* Not used in our design as our established existing native planting to the east and south are already meet this requirement.
   1. *Intent. The Fully Sight-Obscuring Fence Standard is intended to provide a totally blocked visual separation. The standard is applied where full visual screening is needed to reduce the impact of one*

use or development on another. It can be applied in conjunction with landscape plantings or applie areas where landscape plantings are not necessary.

2. *Required materials. Fully sight-obscuring fences are to be at least six (6) feet high and 100% sight-obscuring. Fences may be made of wood (other than plywood or particle-board), metal, bricks, masonry or other permanent materials (see Figure 28: Totally Sight-Obscuring Fence*

(.03) Landscape Area. Not less than fifteen percent (15%) of the total lot area, shall be landscaped with vegetative plant materials. The ten percent (10%) parking area landscaping required by section 4.155.03(B)(1) is included in the fifteen percent (15%) total lot landscaping requirement. Landscaping shall be located in at least three separate and distinct areas of the lot, one of which must be in the contiguous frontage area. Planting areas shall be encouraged adjacent to structures. Landscaping shall be used to define, soften or screen the appearance of buildings and off-street parking areas. Materials to be installed shall achieve a balance between various plant forms, textures, and heights. The installation of native plant materials shall be used whenever practicable. (For recommendations refer to the Native Plant List maintained by the City of Wilsonville). Acknowledge. Our overall site landscape area for W5 and existing W4 is 47.5 % of the 24.5-acre site in formal landscape or natural area plant materials, including protected SROZ and wetland designated areas. With no current lot line separating the existing W4 building from the proposed W5 building we have added a proposed lot line for purposes of review. The proposed lot line matches DB17-0008 Stage II Final Plan Revision that is currently on hold pending this entitlement permit. The W5 lot (only) overall landscape area is 70.9%, which is well over the 15% minimum. Not in the landscape calculation is the extensive vine coverage of the W5 facades, which will greatly soften the building appearance from Boeckman Road and onsite, see the W5 renderings on pages 1 and 2 of this narrative. See the landscape plans & specifications, plus the Arborist and Habitat Consultant Reports in Narrative Section 4 **–** Reports.

We include landscaping at the base of the building on the north and east side, which are the sides most visible to the public. The south and west sides have a required circulation drive at the base of the building with SROZ or SROZ setback areas near the opposite side of the drive. Our choice is to limit SROZ intrusion by not having planting areas next to the building in these back-of-building areas. We believe this is the best compromise.

(.04) Buffering and Screening. Additional to the standards of this subsection, the requirements of the Section 4.137.5 (Screening and Buffering Overlay Zone) shall also be applied, where applicable.

A. *All intensive or higher density developments shall be screened and buffered from less intense or lower density developments.* **W5's** existing perimeter vegetation at our east lot line is well established and serves to buffer W5 from the large quiet SROZ area across the street from Kinsman Road. This large off-site SROZ area is the only less intensive use on our perimeter.

B. *Activity areas on commercial and industrial sites shall be buffered and screened from adjacent residential areas. Multi-family developments shall be screened and buffered from single-family areas.* Not applicable as there is no residential uses in our area or near our perimeter.

C. *All exterior, roof and ground mounted, mechanical and utility equipment shall be screened from ground level off-site view from adjacent streets or properties.* Acknowledge. Roof mounted equipment is as TI and can only be fully addressed at that time. In anticipation of the TI permit adding roof-mounted equipment, we have created a Site Section A on Architectural Sheet A2.2 showing the line-of-site to roof equipment from the (offsite) N sidewalk on Boeckman Road. This shows that views of even **large roof units are screened by the building parapet when the unit is setback a modest 38' from the** parapet from ground level off-site view from adjacent streets or properties. Screening by the building parapet is the best aesthetic option long-term over roof screens because owners will maintain the building facades, but typically will not maintain roof mounted screens well and they eventually become unsightly.

D. *All outdoor storage areas shall be screened from public view, unless visible storage has been approv the site by the Development Review Board or Planning Director acting on a development permit.* No outdoor storage is proposed.

E. *In all cases other than for industrial uses in industrial zones, landscaping shall be designed to screen loading areas and docks, and truck parking.* Acknowledge. W5 has no designated truck parking areas other than at a loading door. It is anticipated the tenant will be a hi-tech industrial business, in which case this section does not apply. However, in the unlikely event that the building is leased to a non-industrial tenant, the loading docks comply with this section. There is also an on-grade loading door at the SE corner of the building The W5**'s two (2)** loading dock doors at the SW corner of the building are placed to be well screened by significant landscaping and/or the building until you drive to the dock. There is also (1) on-grade drive-in service door discreetly recessed into the SE corner, which is best visualized in the W5 rendering on page 2 of this narrative. See Architectural sheets A0, A1.0, and A1.2.

F. In any zone any fence over six (6) feet high measured from soil surface at the outside of fenceline shall require Development Review Board approval. Acknowledge DRB approval required. No fences proposed at this time.

(.05) Sight-Obscuring Fence or Planting. The use for which a sight-obscuring fence or planting is required shall not begin operation until the fence or planting is erected or in place and approved by the City. A temporary occupancy permit may be issued upon a posting of a bond or other security equal to one hundred ten percent (110%) of the cost of such fence or planting and its installation. (See Sections 4.400 to 4.470 for additional requirements.) Acknowledge.

(.06) Plant Materials.

A. Shrubs and Ground Cover. All required ground cover plants and shrubs must be of sufficient size and number to meet these standards within three (3) years of planting. Non-horticultural plastic sheeting or other impermeable surface shall not be placed under mulch. Native topsoil shall be preserved and reused to the extent feasible. Surface mulch or bark dust are to be fully raked into soil of appropriate depth, sufficient to control erosion, and are confined to areas around plantings. Areas exhibiting only surface mulch, compost or barkdust are not to be used as substitutes for plant areas. Acknowledge, see our landscape drawings L1.1 **–**L1.2

1. *Shrubs. All shrubs shall be well branched and typical of their type as described in current AAN Standards and shall be equal to or better than 2-gallon containers and 10" to 12" spread.*
2. *Ground cover. Shall be equal to or better than the following depending on the type of plant materials used: gallon containers spaced at 4 feet on center minimum, 4" pot spaced 2 feet on center minimum, 2-1/4" pots spaced at 18 inch on center minimum. No bare root planting shall be permitted. Ground cover shall be sufficient to cover at least 80% of the bare soil in required landscape areas within three (3) years of planting. Where wildflower seeds are designated for use as a ground cover, the City may require annual re-seeding as necessary.*
3. *Turf or lawn in non-residential developments. Shall not be used to cover more than ten percent (10%) of the landscaped area, unless specifically approved based on a finding that, due to site conditions and availability of water, a larger percentage of turf or lawn area is appropriate. Use of lawn fertilizer shall be discouraged. Irrigation drainage runoff from lawns shall be retained within lawn areas.*
4. *Plant materials under trees or large shrubs. Appropriate plant materials shall be installed beneath the canopies of trees and large shrubs to avoid the appearance of bare ground in those locations. .*
5. *Integrate compost-amended topsoil in all areas to be landscaped, including lawns, to help detain runoff, reduce irrigation and fertilizer needs, and create a sustainable, low-maintenance landscape.*

B. Trees. All trees shall be well-branched and typical of their type as described in current American Association of Nurserymen (AAN) Standards and shall be balled and burlapped. The trees shall be grouped as follows: Acknowledge, see our landscape drawings L1.1 **–**L1.2.

1. *Primary trees which define, outline or enclose major spaces, such as Oak, Maple, Linden, and Seedless Ash, shall be a minimum of 2" caliper.*
2. *Secondary trees which define, outline or enclose interior areas, such as Columnar Red Maple, Flowering Pear, Flame Ash, and Honeylocust, shall be a minimum of 1-3/4" to 2" caliper.*
3. *Accent trees which, are used to add color, variation and accent to architectural features, such as Flowering Pear and Kousa Dogwood, shall be 1-3/4" minimum caliper.*
4. *Large conifer trees such as Douglas Fir or Deodar Cedar shall be installed at a minimum height of eight (8) feet.*
5. *Medium-sized conifers such as Shore Pine, Western Red Cedar or Mountain Hemlock shall be installed at a minimum height of five to six (5 to 6) feet.*

C. *Where a proposed development includes buildings larger than twenty-four (24) feet in height or greater than 50,000 square feet in footprint area, the Planning Director or the Development Review Board, as applicable, may require larger or more mature plant materials:* Acknowledge this possibility.
   1. *1. At maturity, proposed trees shall be at least one-half the height of the building to which they are closest, and building walls longer than 50 feet shall require tree groups located no more than fifty (50) feet on center, to break up the length and height of the façade.*
   2. *Either fully branched deciduous or evergreen trees may be specified depending upon the desired results. Where solar access is to be preserved, only solar- friendly deciduous trees are to be used. Where year-round sight obscuring is the highest priority, evergreen trees are to be used*
   3. *The following standards are to be applied:*
      a. Deciduous trees:
         i. Minimum height of ten (10) feet; and
         ii. Minimum trunk diameter (caliper) of 2 inches (measured at four and one-half [4 1/2] feet above grade).
      b. Evergreen trees: Minimum height of twelve (12) feet.

D. *Street Trees. In order to provide a diversity of species, the Development Review Board may require a mix of street trees throughout a development. Unless the Board waives the requirement for reasons supported by a finding in the record, different types of street trees shall be required for adjoining blocks in a development.* In this case the street trees on Boeckman Road are existing and established, and they are to remain in our proposal.
   1. *All trees shall be standard base grafted, well branched and typical of their type as described in current AAN Standards and shall be balled and burlapped (b&b). Street trees shall be planted at sizes in accordance with the following standards.*
      a. Arterial streets - 3" minimum caliper
      b. Collector streets - 2" minimum caliper.
      c. Local streets or residential private access drives - 1-3/4" minimum caliper.
      d. Accent or median tree -1-3/4" minimum caliper.
   2. *The following trees and varieties thereof are considered satisfactory street trees in most circumstances; however, other varieties and species are encouraged and will be considered:*
      a. *Trees over 50 feet mature height: Quercus garryana (Native Oregon White Oak), Quercus rubra borealis (Red Oak), Acer Macrophylum (Native Big Leaf Maple), Acer nigrum (Green Column Black Maple), Fraxinus americanus (White Ash), Fraxinus pennsylvannica 'Marshall' (Marshall Seedless Green Ash), Quercus coccinea (Scarlet Oak), Quercus pulustris (Pin Oak), Tilia americana (American Linden:*
      b. *Trees under 50 feet mature height: Acer rubrum (Red Sunset Maple), Cornus nuttallii (NativePacific Dogwood), Gleditsia triacanthos (Honey Locust), Pyrus calleryana 'Bradford' (Bradford Pear), Tilia cordata (Little Leaf Linden), Fraxinus oxycarpa (Flame Ash).*
      c. *Other street tree species. Other species may be specified for use in certain situations. For instance, evergreen species may be specified where year- round color is desirable and no adverse effect on solar access is anticipated. Water-loving species may be specified in low locations where wet soil conditions are anticipated*

E. *Types of Plant Species.* Acknowledge, see our landscape drawings L1.1 –1.2, where significant existing natural area remains. Also see our Arborist and Habitat Consultant reports & drawings.
   1. *Existing landscaping or native vegetation may be used to meet these standards, if protected and maintained during the construction phase of the development and if the plant species do not include any that have been listed by the City as prohibited. The existing native and non-native vegetation to be incorporated into the landscaping shall be identified.*
   2. *Selection of plant materials. Landscape materials shall be selected and sited to produce hardy and drought-tolerant landscaping. Selection shall be based on soil characteristics, maintenance requirements, exposure to sun and wind, slope and contours of the site, and compatibility with other vegetation that will remain on the site. Suggested species lists for street trees, shrubs and groundcovers shall be provided by the City of Wilsonville.*
   3. *Prohibited plant materials. The City may establish a list of plants that are prohibited in landscaped areas. Plants may be prohibited because they are potentially damaging to sidewalks, roads, underground utilities, drainage improvements, or foundations, or because they are known to be invasive to native vegetation.*

F. *Tree Credit.* See our Arborist Report and Landscape drawing L1.1 with tree notes aplus Interior Parking Landscaping and Tree Requirements calculations.
Existing trees that are in good health as certified by an arborist and are not disturbed during construction may count for landscaping tree credit as follows (measured at four and one-half feet above grade and rounded to the nearest inch):

Existing trunk diameter	*Number of Tree Credits*
18 to 24 inches in diameter	*3 tree credits*
25 to 31 inches in diameter	*4 tree credits*
32 inches or greater	*5 tree credits*

   1. *It shall be the responsibility of the owner to use reasonable care to maintain preserved trees. Trees preserved under this section may only be removed if an application for removal permit under Section 4.610.10(01)(H) has been approved. Required mitigation for removal shall be replacement with the number of trees credited to the preserved and removed tree.*
   2. *Within five years of occupancy and upon notice from the City, the property owner shall replace any preserved tree that cannot be maintained due to disease or damage, or hazard or nuisance as defined in Chapter 6 of this code. The notice shall be based on complete information provided by an arborist Replacement with the number of trees credited shall occur within one (1) growing season of notice.*

G. *Exceeding Standards. Landscape materials that exceed the minimum standards of this Section are encouraged, provided that height and vision clearance requirements are met.* Acknowledge. The owners are known to regularly exceed plant material minimum size requirements at installation in Wilsonville.

H. *Compliance with Standards. The burden of proof is on the applicant to show that proposed landscaping materials will comply with the purposes and standards of this Section. (.07)* Acknowledge.

(.07) Installation and Maintenance.

A. *Installation. Plant materials shall be installed to current industry standards and shall be properly staked to assure survival. Support devices (guy wires, etc.) shall not be allowed to interfere with normal pedestrian or vehicular movement.* Acknowledge, see our landscape drawing L2.0, where this is specified.

B. *Maintenance. Maintenance of landscaped areas is the on-going responsibility of the property owner. Any landscaping installed to meet the requirements of this Code, or any condition of approval established by a City decision-making body acting on an application, shall be continuously maintained in a healthy, vital and acceptable manner. Plants that die are to be replaced in kind, within one growing season, unless appropriate substitute species are approved by the City. Failure to maintain landscaping as required in this Section shall constitute a violation of this Code for which appropriate legal remedies, including the revocation of any applicable land development permits, may result.* Acknowledge.

C. *Irrigation. The intent of this standard is to assure that plants will survive the critical establishment period when they are most vulnerable due to a lack of watering and also to assure that water is not wasted through unnecessary or inefficient irrigation. Approved irrigation system plans shall specify one of the following:* Our automatic underground irrigation system is design-build by the landscape contractor, which is noted on sheet L2.0.
   1. *A permanent, built-in, irrigation system with an automatic controller. Either a spray or drip irrigation system, or a combination of the two, may be specified.*
   2. *A permanent or temporary system designed by a landscape architect licensed to practice in the State of Oregon, sufficient to assure that the plants will become established and drought-tolerant.*

3. *Other irrigation system specified by a licensed professional in the field of landscape architecture or irrigation system design.*
4. *A temporary permit issued for a period of one year, after which an inspection shall be conducted to assure that the plants have become established. Any plants that have died, or that appear to the Planning Director to not be thriving, shall be appropriately replaced within one growing season. An inspection fee and a maintenance bond or other security sufficient to cover all costs of replacing the plant materials shall be provided, to the satisfaction of the Community Development Director. Additionally, the applicant shall provide the City with a written license or easement to enter the property and cause any failing plant materials to be replaced.*

D. *Protection. All required landscape areas, including all trees and shrubs, shall be protected from potential damage by conflicting uses or activities including vehicle parking and the storage of materials:* Acknowledge.

(.08) Landscaping on Corner Lots. All landscaping on corner lots shall meet the vision clearance standards of Section 4.177. If high screening would ordinarily be required by this Code, low screening shall be substituted within vision clearance areas. Taller screening may be required outside of the vision clearance area to mitigate for the reduced height within it. The corner of out lot is an SROZ area, so this section does not apply.

(.09) Landscape Plans. Landscape plans shall be submitted showing all existing and proposed landscape areas. Plans must be drawn to scale and show the type, installation size, number and placement of materials. Plans shall include a plant material list. Plants are to be identified by both their scientific and common names. The condition of any existing plants and the proposed method of irrigation are also to be indicated. Landscape plans shall divide all landscape areas into the following categories based on projected water consumption for irrigation: Acknowledge, see our landscape drawings, which note our automatic underground irrigation system is design-build by the landscape contractor. Also see our Arborist and Habitat Consultant Reports in Narrative Section 6 **–** Reports.

A. *High water usage areas (+/- two (2) inches per week): small convoluted lawns, lawns under existing trees, annual and perennial flower beds, and temperamental shrubs;*
B. *Moderate water usage areas (+/- one (1) inch per week): large lawn areas, average water-using shrubs, and trees;*
C. *Low water usage areas (Less than one (1) inch per week, or gallons per hour): seeded fieldgrass, swales, native plantings, drought-tolerant shrubs, and ornamental grasses or drip irrigated areas*
D. *Interim or unique water usage areas: areas with temporary seeding, aquatic plants, erosion control areas, areas with temporary irrigation systems, and areas with special water–saving features or water harvesting irrigation capabilities*

These categories shall be noted in general on the plan and on the plant material list.

(.10) Completion of Landscaping. The installation of plant materials may be deferred for a period of time specified by the Board or Planning Director acting on an application, in order to avoid hot summer or cold winter periods, or in response to water shortages.In these cases, a temporary permit shall be issued, following the same procedures specified in subsection (.07)(C)(3), above, regarding temporary irrigation systems. No final Certificate of Occupancy shall be granted until an adequate bond or other security is posted for the completion of the landscaping, and the City is given written authorization to enter the property and install the required landscaping, in the event that the required landscaping has not been installed. The form of such written authorization shall be submitted to the City Attorney for review. Acknowledge.

(.11) Street Trees Not Typically Part of Site Landscaping. Street trees are not subject to the requirements of this Section and are not counted toward the required standards of this Section. Except, however, that the Development Review Board may, by granting a waiver or variance, allow for special landscaping within the right-of-way to compensate for a lack of appropriate on-site locations for landscaping. See subsection (.06), above, regarding street trees. Acknowledge.
In this case the street trees are existing on Boeckman and well established, and they remain unchanged in our proposal.

(.12) Mitigation and Restoration Plantings. A mitigation plan is to be approved by the City's Development Review Board before the destruction, damage, or removal of any existing native plants. Plantings intended to mitigate the loss of native vegetation are subject to the following standards. Where these standards conflict with other requirements of this Code, the standards of this Section shall take precedence. The desired effect of this section is to preserve existing native vegetation. See our landscape drawings and our Arborist and Habitat Consultant reports & drawings.

A. *Plant Sources. Plant materials are to be native and are subject to approval by the City. They are to be non-clonal in origin; seed source is to be as local as possible, and plants must be nursery propagated or taken from a pre-approved transplantation area. All of these requirements are to be addressed in any proposed mitigation plan.*

B. Plant Materials. The mitigation plan shall specify the types and installation sizes of plant materials to be used f restoration. Practices such as the use of pesticides, fungicides, and fertilizers shall not be employed in mitigation areas unless specifically authorized and approved.

C. Installation. Install native plants in suitable soil conditions. Plant materials are to be supported only when necessary because of extreme winds at the site. Where support is necessary, all stakes, guy wires or other measures are to be removed as soon as the plants can support themselves. Protect from animal and fowl predation and foraging until establishment.

D. Irrigation. Permanent irrigation systems are generally not appropriate in restoration situations, and manual or temporary watering of new plantings is often necessary. The mitigation plan shall specify the method and frequency of manual watering, including any that may be necessary after the first growing season.

E. Monitoring and Reporting. Monitoring of native landscape areas is the on-going responsibility of the property owner. Plants that die are to be replaced in kind and quantity within one year. Written proof of the survival of all plants shall be required to be submitted to the City's Planning Department one year after the planting is completed

Section 4.177. Street Improvement Standards.

This section contains the City's requirements and standards for pedestrian, bicycle, and transit facility improvements to public streets, or within public easements. The purpose of this section is to ensure that development, including redevelopment, provides transportation facilities that are safe, convenient, and adequate in rough proportion to their impacts. Acknowledge this section. No street improvements or new driveways are proposed on SW Boeckman Road in this proposal. The W5 project will share with existing W4 project (DWFRITZ Precision Automation building) the two existing driveways off SW Boeckman Road. The newly built SW Kinsman Road and roundabout remain unchanged by this proposal, where our property abuts them with SROZ and wetland protected natural areas.

Section 4.179. Solid Waste & Recyclables Storage in Non-Residential Buildings.

(.01) All site plans for ~~multi-unit residential and~~ non-residential buildings submitted to the Wilsonville Development Review Board for approval shall include adequate storage space for mixed solid waste and source separated recyclables. Acknowledge.

(.02) The floor area of an interior or exterior storage area shall be excluded from the calculation of building floor area for purposes of determining minimum storage requirements. Acknowledge. No interior storage areas can be identified until TI, so the calculations include full building area.

(.03) The storage area requirement shall be based on the predominant use(s) of the building. If a building has more than one of the uses listed herein and that use occupies 20 percent or less of the floor area of the building, the floor area occupied by that use shall be counted toward the floor area of the predominant use(s). If a building has more than one of the uses listed herein and that use occupies more than 20 percent of the floor area of the building, then the storage area requirement for the whole building shall be the sum of the requirement for the area of each use.

(.04) Storage areas for multiple uses on a single site may be combined and shared. Our calculations on Drawing A0 are for Manufacturing use 100%.

(.05) The specific requirements are based on an assumed storage height of four feet for solid waste/recyclables. Vertical storage higher than four feet but no higher than seven feet may be used to accommodate the same volume of storage in a reduced floor space. Where vertical or stacked storage is proposed, the site plan shall include drawings to illustrate the layout of the storage area and dimensions for the containers. Acknowledge. Our calculations on drawing A0 **propose to use a 6.9' high** containers for trash & recycle. The container was selected from options available to the hauler, and we have attached the taller **container to the hauler's approval letter for reference.**

(.06) The specific requirements for storage area are as follows:

~~A. Multi-unit residential buildings containing five-ten units shall provide a minimum storage area of 50 square feet. Buildings containing more than ten residential units shall provide an additional five square feet per unit for each unit above ten.~~ NA

B. Non-residential buildings shall provide a minimum storage area of ten square feet, plus:

1. ~~Office: Four square feet per 1,000 square feet gross floor area (GFA);~~ NA

2. ~~Retail: Ten square feet per 1,000 square feet GFA;~~ NA

3. Wholesale / Warehouse / Manufacturing: Six square feet per 1,000 square feet GFA; and We use this one.

4. ~~Other: Four square feet per 1,000 square feet GFA.~~ NA

(.07) The applicant shall work with the City's franchised garbage hauler to ensure that site plans provide adequate for the hauler's equipment and that storage area is adequate for the anticipated volumes, level of service and any other special circumstances which may result in the storage area exceeding its capacity. The hauler shall notify the City by letter of their review of site plans and make recommendations for changes in those plans pursuant to the other provisions of this section. **We have included hauler's approval letter with our other reports.**

(.08) Existing multi-unit residential and non-residential developments wishing to retrofit their structures to include storage areas for mixed solid waste and recycling may have their site plans reviewed and approved through the Class I Administrative Review process, according to the provisions of Section 4.035. Site plans for retrofitting existing developments must conform to all requirements of this Section, "Mixed Solid Waste and Recyclables Storage In New Multi-Unit Residential and Non-Residential Buildings," and 4.430, "Location, Design and Access Standards for Mixed Solid Waste and Recycling Areas," of the Wilsonville City Code. Not applicable.

Section 4.199 OUTDOOR LIGHTING

Section 4.199.10. Outdoor Lighting In General.

(.01) Purpose: The purpose of this Code is to provide regulations for outdoor lighting that will: Acknowledge all.

A. Permit reasonable uses of outdoor lighting for nighttime safety, utility, security, productivity, enjoyment and commerce.

B. Conserve energy and resources to the greatest extent possible. The most important choice by owners to conserve exterior lighting energy use is to use all LED lighting fixtures. In Wilsonville it is the only practical choice for reasonable light levels by fixture wattage limitations in Table 7 of Section 4.199.60.

C. Minimize glare, particularly in and around public rights-of-way; and reduce visual discomfort and improve visual acuity over large areas by avoiding "light islands" and "spotlighting" that result in reduced visual perception in areas adjacent to either the source of the glare or the area illuminated by the glare.

D. Minimize light trespass, so that each owner of property does not cause unreasonable light spillover to other property.

E. Curtail the degradation of the nighttime environment and the night sky.

F. Preserve the dark night sky for astronomy and enjoyment.

G. Protect the natural environment, including wildlife, from the damaging effects of night lighting from human sources.

(.02) Purpose Statement as Guidelines: Declaration of purpose statements are guidelines and not approval criteria in the application of WC Section 4.199. Acknowledge.

Section 4.199.20. Applicability.

(.01) This Ordinance is applicable to:

A. Installation of new exterior lighting systems in public facility, commercial, industrial and multi-family housing projects with common areas. Acknowledge this ordinance is applicable to our project.

B. Major additions or modifications (as defined in this Section) to existing exterior lighting systems in public facility, commercial, industrial and multi-family housing projects with common areas. Because drive aisles and pedestrian circulation are shared, we integrate relevant existing W4 lighting fixtures into our W5 lighting plan to show the overall lighting level where the projects join. See our exterior lighting drawings with point-by-**point f'c** levels.

(.02) Exemption. The following luminaires and lighting systems are EXEMPT from these requirements: Acknowledge all exemptions.

A. Interior lighting.

B. Internally illuminated signs.

C. Externally illuminated signs.

D. Temporary lighting for theatrical, television, and performance areas.

E. Lighting in swimming pools and other water features governed by Article 680 of the National Electrical Code.

F. Building Code required exit path lighting.

G. Lighting specifically for stairs and ramps.

H. Temporary and seasonal lighting provided that individual lamps are 10 watts or less.

I. Lighting required and/or regulated by the City (i.e. construction related activities), Federal Aviation Administration, U.S. Coast Guard or other Federal or State agency.

J. Single-family residential lighting.

K. Code Required Signs.

L. American flag.

M. Landscape lighting.

N. Lights approved by the City through an Administrative Review Temporary Use Permit process.

O. *Public street lights.*
P. *ATM security lighting.*
Q. *Those "Exceptions" listed in the "Exterior Lighting Power Allowance" provisions of the Oregon Energy Efficiency Specialty Code.*

Section 4.199.30. *Lighting Overlay Zones.*

(.01) *The designated Lighting Zone as indicated on the Lighting Overlay Zone Map for a commercial, industrial, multi-family or public facility parcel or project shall determine the limitations for lighting systems and fixtures as specified in this Ordinance*. W5 property and surrounding area is in Lighting Overlay Zone 2.

A. *Property may contain more than one lighting zone depending on site conditions and natural resource characteristics.*

(.02) *The Lighting Zones shall be:*

A. *LZ 1. Developed areas in City and State parks, recreation areas, SROZ wetland and wildlife habitat areas; developed areas in natural settings; sensitive night environments; and rural areas. This zone is intended to be the default condition for rural areas within the City.* NA
B. *LZ 2. Low-density suburban neighborhoods and suburban commercial districts, industrial parks and districts. This zone is intended to be the default condition for the majority of the City.* W5 property is in Lighting Overlay Zone 2.
C. *LZ 3. Medium to high-density suburban neighborhoods and districts, major shopping and commercial districts as depicted on the Lighting Overlay Zone Map.* NA
D. *LZ 4. Reserved for limited applications with special lighting requirements. This zone is appropriate for users who have unique site or operating circumstances that warrant additional light. This zone shall not be applied to residential or agricultural areas.* NA

(.03) *Modification of Lighting Zones.*

A. *The City Council may modify the designated Lighting Zones of one or more parcels if the City Council finds that the original Lighting Zone was in error, a change in circumstances has occurred warranting the change since the designation was established or the purposes of this section are better served.* Acknowledge.
B. *The Development Review Board (DRB) may modify the designated Lighting Zones as part of the Stage II, Site Design Review Process if the DRB finds that the original Lighting Zone was in error, or a change in circumstances has occurred warranting the change since the designation was established or the purposes of this section are better served.* Acknowledge.
C. *This ordinance establishes a Lighting Overlay Zone Map. The Planning Division shall maintain the current Lighting Overlay Zone Map.* Acknowledge.

Section 4.199.40. *Lighting Systems Standards for Approval.*

(.01) *Non-Residential Uses and Common Residential Areas.*

A. *All outdoor lighting shall comply with either the Prescriptive Option or the Performance Option below.* Acknowledge.
B. *Prescriptive Option. If the lighting is to comply with this Prescriptive Option, the installed lighting shall meet all of the following requirements according to the designated Lighting Zone.* Prescriptive option is chosen, see our ComCheck compliance report in Narrative Section 6 **–** Reports **–** W5 pass easily.
    1. *The maximum luminaire lamp wattage and shielding shall comply with Table 7.* Acknowledge. While we were unaware of this ordinance on our initial submittal, we have corrected our shielded lighting fixtures to be no more than the 100w maximum per fixture. Low level landscape specific lighting will be less than 50w is unregulated and anticipated to be installed at the end of construction after plant material is placed. This includes some pedestrian paths not illuminated adequately by parking area lighting.
    2. *Except for those exemptions listed in Section 4.199.20(.02), the exterior lighting for the site shall comply with the Oregon Energy Efficiency Specialty Code, Exterior Lighting.* Acknowledge, see our ComCheck compliance report in Narrative Section 6 **–** Reports **–** W5 pass easily.
    3. *The maximum pole or mounting height shall be consistent with Table 8.* Acknowledge. Although LZ2 allows much taller poles, we continue with 26**'** pole height for consistency with the existing W4 building in our park-like setting.
    4. *Each luminaire shall be set back from all property lines at least 3 times the mounting height of the luminaire:*
        a. *Exception 1: If the subject property abuts a property with the same base and lighting zone, no setback from the common lot lines is required.* Adjacent properties where W5 proposes new lighting are all LZ2 also.
        b. *Exception 2: If the subject property abuts a property which is zoned (base and lighting) other than the subject parcel, the luminaire shall be setback three times the mounting height of the luminaire, measured from the*

abutting parcel's setback line. (Any variance or waiver to the abutting property's setback shall considered in the distance calculation). NA

c. *Exception 3: If the luminaire is used for the purpose of street, parking lot or public utility easement illumination and is located less than 3 mounting heights from the property line, the luminaire shall include a house side shield to protect adjoining property.* Acknowledge. Our luminaires are specified with the shield to control off-site spillage, which here is Boeckman Road and our drive entry shared with existing W4. We have two (2) **–** P8 pole mounted fixtures north of W5 lighting our parking lot that are just outside the three mounting height criteria, so this does not apply. Regardless, the optics for this luminaire include the shield. We also have one (1) **–** P3 pole mounted fixture NE of W5 lighting our drive entry also outside the criteria, and the optics for this also include the shield anyway also. Refer to our site lighting plans that locate and specify our luminaires individually.

d. *Exception 4: If the subject property includes an exterior column, wall or abutment within 25 feet of the property line, a luminaire partly shielded or better and not exceeding 60 lamp watts may be mounted onto the exterior column, wall or abutment or under or within an overhang or canopy attached thereto.* NA

e. *Exception 5: Lighting adjacent to SROZ areas shall be set back 3 times the mounting height of the luminaire, or shall employ a house side shield to protect the natural resource area.* Acknowledge that W5 has a number of parking areas and drive lanes near the SROZ. New W5 lighting places all new fixtures away from the SROZ and uses above exception where our luminaires are specified with the shield to limit off-site spillage into the SROZ. Our site lighting plans locate and specify our luminaires individually with point-by-point light levels at ground level. Looking at our lighting plans the spillage of our new W5 lighting fixtures is all under **0.5 f'c**. **Most new W5 lighting spillage varies between 0.0f'c – 0.2f'c at the** SROZ, which is low spillage.

However, there are two existing pole-mounted fixtures from W4 construction labeled SP3 that are located at the edge of the SROZ (on the curving drive west of the Lot 1 parking) that remain. They received new LED fixture heads on the existing poles during W4 construction around 2017, and I am sure it was in the 1970s when the poles were placed (when SROZ ordinances did not exist). Our lighting plans show they **have light spillage into the SROZ in the 3 f'c range**. The owners propose to leave them in place as previously approved building permit elements.

C. <u>Performance Option</u>. *If the lighting is to comply with the Performance Option, the proposed lighting design shall be submitted by the applicant for approval by the City meeting <u>all</u> of the following:* Not Used.

1. *The weighted average percentage of direct uplight lumens shall be less than the allowed amount per Table 9.* NA
2. *The maximum light level at any property line shall be less than the values in Table 9, as evidenced by a complete photometric analysis including horizontal illuminance of the site and vertical illuminance on the plane facing the site up to the mounting height of the luminaire mounted highest above grade. The Building Official or designee may accept a photometric test report, demonstration or sample, or other satisfactory confirmation that the luminaire meets the shielding requirements of Table 7. Luminaires shall not be mounted so as to permit aiming or use in any way other than the manner maintaining the shielding classification required herein:* NA
   a. *Exception 1. If the property line abuts a public right-of-way, including a sidewalk or street, the analysis may be performed across the street at the adjacent property line to the right-of-way.* NA
   b. *Exception 2. If, in the opinion of the Building Official or designee, compliance is impractical due to unique site circumstances such as lot size or shape, topography, or size or shape of building, which are circumstances not typical of the general conditions of the surrounding area. The Building Official may impose conditions of approval to avoid light trespass to the maximum extent possible and minimize any additional negative impacts resulting to abutting and adjacent parcels, as well as public rights-of-way, based on best lighting practices and available lighting technology.* NA
3. *The maximum pole or mounting height shall comply with Table 8.* NA

D. <u>Curfew.</u> *All prescriptive or performance based exterior lighting systems shall be controlled by automatic device(s) or system(s) that:* Acknowledge.

1. *Initiate operation at dusk and either extinguish lighting one hour after close or at the curfew times according to Table 10; or* Acknowledge Table 10,
2. *Reduce lighting intensity one hour after close or at the curfew time to not more than 50% of the requirements set forth in the Oregon Energy Efficiency Specialty Code unless waived by the DRB due to special circumstances; and* Acknowledge reduced lighting levels is an option. The owners will not consider this option for the building shell until a tenant is **identified, and then the tenant's needs can be** accessed, and a plan can be formed on how to proceed

3. *Extinguish or reduce lighting consistent with 1. and 2. above on Holidays.* Acknowledge reduced lighting le holidays is an option. The owners will not consider this option for the building shell until a tenant is identified, **and then the tenant's needs can be accessed, and a plan can be formed on how to proceed**

The following are exceptions to curfew: Acknowledge.

a. *Exception 1: Building Code required lighting.*
b. *Exception 2: Lighting for pedestrian ramps, steps and stairs.*
c. *Exception 3: Businesses that operate continuously or periodically after curfew.*

(.02) Special Permit for Specific Lighting Fixtures and Systems and When Exceeding Lighting Requirements.

A. *This section is intended to apply to situations where more than normal foot candles are required due to a unique circumstance or use or where it is absolutely essential to perform the proposed activities after dark. All special permits shall be reviewed by the DRB.* Acknowledge - no Special Permit is requested.
B. *Upon issuance of a special permit by the Development Review Board (DRB), lighting systems not complying with the technical requirements of this Ordinance may be installed, maintained, and replaced for lighting that exceeds the maximums permitted by this Ordinance. This section is intended to be applied to uses such as sports lighting systems including but not limited to, sport fields and stadiums, such as baseball and football field lighting, tennis court lighting, swimming pool area lighting and prisons; other very intense lighting defined as having a light source exceeding 200,000 lumens or an intensity in any direction of more than 2,000,000 candelas; building façade lighting of portions of buildings over two stories high; and public monuments.* NA
C. *To obtain such a permit, applicants shall demonstrate that the proposed lighting installation:* NA
    1. *Is within Lighting Zone 3 or above.* NA
    2. *Has been designed to minimize obtrusive light and artificial sky glow, supported by a signed statement from a registered civil or electrical engineer describing the mitigation measures. Such statement shall be accompanied by calculations indicating the light trespass levels (horizontal and vertical at ground level) at the property line.*
    3. *Will not create excessive glare, sky glow, or light trespass beyond that which can be reasonably expected by application of best lighting practices, and available technology.*
    4. *Provides appropriate lighting curfew hours based on the use and the surrounding areas.*
D. *The DRB may impose conditions of approval to mitigate any negative impacts resulting to the abutting parcel, based on best lighting practices and available lighting technology.* Acknowledge.
E. *The City may charge a review fee and may, at the Building Official's option, employ the services of a qualified professional civil or electrical engineer to review such submittals and the cost thereof shall be an additional fee charged to the applicant.* Acknowledge.

Section 4.199.50. Submittal Requirements.

(.01) Applicants shall submit the following information as part of DRB review or administrative review of new commercial, industrial, multi-family or public facility projects:

A. *A statement regarding which of the lighting methods will be utilized, prescriptive or performance, and a map depicting the lighting zone(s) for the property.* Acknowledge. We used the Prescriptive approach to lighting compliance and our exterior lighting is 100% LED for lower maintenance costs and energy efficiency **–** see our ComCheck compliance report in Narrative Section 6 **–** Reports, which W5 passed easily. Our lighting plan maps point-by-point lighting levels and distribution on our property.
B. *A site lighting plan that clearly indicates intended lighting by type and location. For adjustable luminaires, the aiming angles or coordinates shall be shown.* Acknowledge.
C. *For each luminaire type, Drawings, cut sheets or other documents containing specifications for the intended lighting including but not limited to, luminaire description, mounting, mounting height, lamp type and manufacturer, lamp watts, ballast, optical system/distribution, and accessories such as shields.* Acknowledge -
D. *Calculations demonstrating compliance with Oregon Energy Efficiency Specialty Code, Exterior Lighting, as modified by Section 4.199.40(.01)(B.)(2.)* See our ComCheck Exterior Lighting compliance report in Narrative Section 6 **–** Reports. The report and lighting drawings confirm that our exterior lighting levels are normal for the use and W5 easily meets code for exterior lighting energy use.
E. *Lighting plans shall be coordinated with landscaping plans so that pole lights and trees are not placed in conflict with one another. The location of lights shall be shown on the landscape plan. Generally, pole lights should not be placed within one pole length of landscape and parking lot trees.* Acknowledge. We have addressed the inevitable conflicts with light poles and trees.

F. *Applicants shall identify the hours of lighting curfew.* Acknowledge the 10P curfew. This submittal is for b shell and site work, and occupancy is not allowed without a separate tenant improvement permit. If the building is built and sitting empty without a tenant, the owners will limit exterior lighting per the curfew. Otherwise, at the TI permit phase the exterior lighting curfew is best addressed by the tenant. W5 tenants only need exterior lighting for the safety and security of the occupants, and no issue with a tenant meeting the curfew is anticipated.

(.02) In addition to the above submittal requirements, Applicants using the Prescriptive Method shall submit the following information as part of the permit set plan review:

A. *A site lighting plan (items 1 A - F, above) which indicates for each luminaire the 3 mounting height line to demonstrate compliance with the setback requirements. For luminaires mounted within 3 mounting heights of the property line the compliance exception or special shielding requirements shall be clearly indicated.* Acknowledge, see exterior lighting drawings with fixture callouts and point-by-point lighting levels in Narrative Section 6 **–** Reports.

(.03) In addition to the above submittal requirements, Applicants using the Performance Method shall submit the following information as part of the permit set plan review: NA

A. *Site plan showing horizontal isocandle lines, or the output of a point-by-point computer calculation of the horizontal illumination of the site, showing property lines and light levels immediately off of the subject property.* NA

B. *For each side of the property, the output of a point-by-point vertical footcandle calculation showing illumination in the vertical plane at the property line from grade to at least 10 feet higher than the height of the tallest pole.* NA

C. *Lighting plans shall be prepared by a qualified licensed engineer.* NA

(.04) In addition to the above applicable submittal requirements, Applicants for Special Permits shall submit the following to the DRB for review: NA **–** no special permit requested.

A. *Tabulation of International Engineering Society of North America (IESNA) lighting recommendations for each task including area illuminated, recommended illumination level, actual maintained illumination level, and luminaires used specifically to achieve the indicated criteria.* NA

B. *Lighting plans shall be prepared by a qualified licensed engineer.* NA

(.05) For all calculations, the following light loss factors shall be used unless an alternative is specifically approved by the City: Acknowledge. All our exterior lighting fixtures are LED.

Metal halide	*0.6*
High pressure sodium	*0.8*
Compact fluorescent	*0.7*
Full size fluorescent	*0.75*
Incandescent	*0.9*
Halogen	*0.95*
Other	*As approved (is underlined as our fixtures are all LED)*

Section 4.199.50. Major Additions or Modifications to Pre-Existing Sites.

(01.) Major Additions. If a major addition occurs on a property, all of the luminaires on the site shall comply with the requirements of this Section. For purposes of this sub-section, the following are considered to be major additions: Acknowledge. We consider W5 a new project that will be on a separate parcel from existing W4. Aesthetically we want the two-building campus to be integrated aesthetically as well as share pedestrian and vehicular circulation routes. We want the existing W4 lighting to integrate with the new W5 lighting too, so the new lighting is the same style, height and size oas the existing lighting fixtures for a unified campus functionally and aesthetically.

A. *Additions of 50 percent or more in terms of additional dwelling units, gross floor area, seating capacity, or parking spaces, either with a single addition or with cumulative additions after July 2, 2008.* Not applicable, W5 is a separate building on a separate lot.

B. *Modification or replacement of 50 percent or more of the outdoor lighting luminaries within a 5-year timeframe existing as of July 2, 2008.* Not applicable, W5 is a separate building on a separate lot.

Table 7: Maximum Wattage And Required Shielding

Lighting Zone	Fully Shielded	Shielded	Partly Shielded	Unshielded
LZ 1	70	20	13	Low voltage landscape lighting 50 watts or less
LZ 2 Acknowledge.	100	35	39	Low voltage landscape lighting 50 watts or less
LZ 3	250	100	70	Landscape and facade lighting 100 watts or less; ornamental lighting on private drives of 39 watts and less
LZ 4	450	150	150	Landscape and facade lighting 250 watts or less; ornamental lights on private drives and lanterns 70 watts or less; marquee lighting not employing medium based lamps

Table 8: Maximum Lighting Mounting Height In Feet

Lighting Zone	Lighting for private drives, driveways, parking, bus stops and other transit facilities	Lighting for walkways, bikeways, plazas and other pedestrian areas	All other lighting
LZ 0	20	8	4
LZ 1	25	12	4
LZ 2	40 Acknowledge **(ours are 26')**.	18 Acknowledge **(ours is 12')**.	8 Acknowledge.
LZ 3	40	18	16
LZ 4	Height limit to be determined by Special Use Permit Only		

Lighting mounted onto buildings or other structures shall not exceed a mounting height greater than 4 feet higher than the tallest part of the building or structure at the place where the lighting is installed, nor higher than 33.33 percent of the horizontal distance of the light from the nearest property line, whichever is less. Acknowledge.

Table 9: Performance Method

Lighting Zone	Maximum percentage of direct uplight lumens	Maximum Light Level at Property Line	
		Horizontal plane at grade (foot candles - fc)	Vertical plane facing the site in question, from grade to mounting height of highest mounted luminaire (foot candles – fc)
LZ 0	0	0.01 fc	0.02 fc
LZ 1	1%	0.05 fc	0.1 fc
LZ 2	5% Acknowledge.	0.2 fc Acknowledge.	0.4 fc Acknowledge.
LZ 3	10%	0.4 fc	0.8 fc
LZ 4	20%	0.8 fc	1.6 fc

Table 10: Curfew

Lighting Zone	Curfew Time
LZ 0	8:00 PM (2000 hours)
LZ 1	
LZ 2	10:00 PM (2200 hours) Acknowledge.
LZ 3	Midnight (2400 hours)
LZ 4	

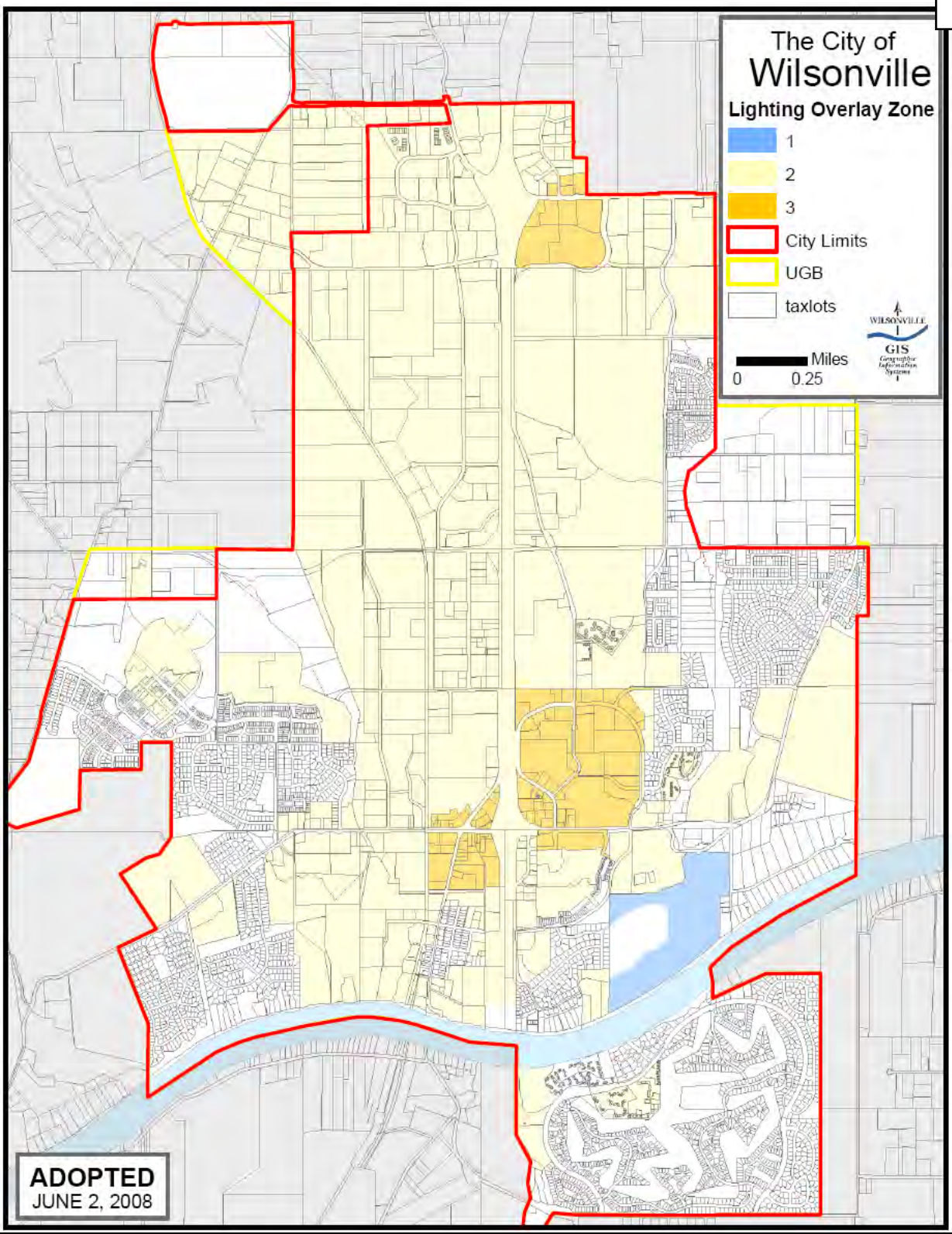


Figure 30: Lighting Overlay Zone Map

Section 4.300 UNDERGROUND UTILITIES

Section 4.300. General.

(.01) *The City Council deems it reasonable and necessary in order to accomplish the orderly and desirable develop land within the corporate limits of the City, to require the underground installation of utilities in all new developments.* Acknowledge.

(.02) *After the effective date of this Code, the approval of any development of land within the City will be upon the express condition that all new utility lines, including but not limited to those required for power, communication, street lighting, gas, cable television services and related facilities, shall be placed underground.* Acknowledge.

(.03) *The construction of underground utilities shall be subject to the City's Public Works Standards and shall meet applicable requirements for erosion control and other environmental protection.* Acknowledge Public Works review, and we are already in contact with Public Works discussing requirements for W5.

Section 4.310 *Exceptions.*

Section 4.300 of this Code shall not apply to surface-mounted transformers, surface-mounted connection boxes, wireless communication facilities, and meter cabinets and other appurtenances which are reasonably necessary to be placed above ground, or to temporary utility service facilities during construction, or to high capacity electric and communication feeder lines, or to utility transmission lines operating at 50,000 volts or more. Acknowledge.

Section 4.320. *Requirements.*

(.01) *The developer or subdivider shall be responsible for and make all necessary arrangements with the serving utility to provide the underground services (including cost of rearranging any existing overhead facilities). All such underground facilities as described shall be constructed in compliance with the rules and regulations of the Public Utility Commission of the State of Oregon relating to the installation and safety of underground lines, plant, system, equipment and apparatus.* Acknowledge.

(.02) *The location of the buried facilities shall conform to standards supplied to the subdivider by the City. The City also reserves the right to approve location of all surface-mounted transformers.* Acknowledge.

(.03) *Interior easements (back lot lines) will only be used for storm or sanitary sewers, and front easements will be used for other utilities unless different locations are approved by the City Engineer. Easements satisfactory to the serving utilities shall be provided by the developer and shall be set forth on the plat.* Acknowledge.

Section 4.400 SITE DESIGN REVIEW.

Section 4.400. *Purpose.*

(.01) *Excessive uniformity, inappropriateness or poor design of the exterior appearance of structures and signs and the lack of proper attention to site development and landscaping in the business, commercial, industrial and certain residential areas of the City hinders the harmonious development of the City, impairs the desirability of residence, investment or occupation in the City, limits the opportunity to attain the optimum use in value and improvements, adversely affects the stability and value of property, produces degeneration of property in such areas and with attendant deterioration of conditions affecting the peace, health and welfare, and destroys a proper relationship between the taxable value of property and the cost of municipal services there for* Acknowledge Site Design Review purpose.

(.02) *The City Council declares that the purposes and objectives of site development requirements and the site design review procedure are to:*

A. *Assure that Site Development Plans are designed in a manner that insures proper functioning of the site and maintains a high quality visual environment.* Acknowledge.

B. *Encourage originality, flexibility and innovation in site planning and development, including the architecture, landscaping and graphic design of said development;* Acknowledge.

C. *Discourage monotonous, drab, unsightly, dreary and inharmonious developments;* Acknowledge.

D. *Conserve the City's natural beauty and visual character and charm by assuring that structures, signs and other improvements are properly related to their sites, and to surrounding sites and structures, with due regard to the aesthetic qualities of the natural terrain and landscaping, and that proper attention is given to exterior appearances of structures, signs and other improvements;* Acknowledge.

E. *Protect and enhance the City's appeal and thus support and stimulate business and industry and promote the desirability of investment and occupancy in business, commercial and industrial purposes;* Acknowledge.

F. *Stabilize and improve property values and prevent blighted areas and, thus, increase tax revenues;* Acknowledge.

G. *Insure that adequate public facilities are available to serve development as it occurs and that proper attention is given*

to site planning and development so as to not adversely impact the orderly, efficient and economic provision o facilities and services. Acknowledge.

H. *Achieve the beneficial influence of pleasant environments for living and working on behavioral patterns and, thus, decrease the cost of governmental services and reduce opportunities for crime through careful consideration of physical design and site layout under defensible space guidelines that clearly define all areas as either public, semi-private, or private, provide clear identity of structures and* Acknowledge.
opportunities for easy surveillance of the site that maximize resident control of behavior -- particularly crime;

I. *Foster civic pride and community spirit so as to improve the quality and quantity of citizen participation in local government and in community growth, change and improvements;* Acknowledge.

J. *Sustain the comfort, health, tranquility and contentment of residents and attract new residents by reason of the City's favorable environment and, thus, to promote and protect the peace, health and welfare of the City.* Acknowledge.

Section 4.420. Jurisdiction and Powers of the Board.

(.01) *Application of Section. Except for single-family or two-family dwellings in any residential zoning district, and in the Village zone, row houses or apartments, and Class II applications in the Coffee Creek Industrial Design Overlay District, no Building Permit shall be issued for a new building or major exterior remodeling of an existing building, and no Sign Permit, except as permitted in Sections 4.156.02 and 4.156.05, shall be issued for the erection or construction of a sign relating to such new building or major remodeling, until the plans, drawings, sketches and other documents required for a Sign Permit application have been reviewed and approved by the Board.* Acknowledge.

(.02) *Development in Accord with Plans. Construction, site development and landscaping shall be carried out in substantial accord with the plans, drawings, sketches and other documents approved by the Board, unless altered with Board approval. Nothing in this subsection shall be construed to prevent ordinary repair, maintenance and replacement of any part of the building or landscaping which does not involve a substantial change from the purpose of Section 4.400. If the Board objects to such proposed changes, they shall be subject to the procedures and requirements of the site design review process applicable to new proposals.* Acknowledge.

(.03) *Variances. The Board may authorize variances from the site development requirements, based upon the procedures, standards and criteria listed in Section* Acknowledge.

Section 4.421. Criteria and Application of Design Standards.

(.01) *The following standards shall be utilized by the Board in reviewing the plans, drawings, sketches and other documents required for Site Design Review. These standards are intended to provide a frame of reference for the applicant in the development of site and building plans as well as a method of review for the Board. These standards shall not be regarded as inflexible requirements. They are not intended to discourage creativity, invention and innovation. The specifications of one or more particular architectural styles is not included in these standards. (Even in the Boones Ferry Overlay Zone, a range of architectural styles will be encouraged.)*

A. *Preservation of Landscape. The landscape shall be preserved in its natural state, insofar as practicable, by minimizing tree and soils removal, and any grade changes shall be in keeping with the general appearance of neighboring developed areas.* 70.9% of the 10.4-acre W5 site is in landscape or natural area plant materials, including protected SROZ and wetland designated areas. Overall, when W4 & W5 are combined on the current 24.5-acre site, 47.5% of the lot remains in landscape or natural area plant materials. No future development area remains on the site after W5 completion. The proposal preserves a significant number of acres of landscaping in a natural state and most of it is SROZ or wetlands designated. See the architectural and landscape drawings, where site coverage data is found on sheet AO.

B. *Relation of Proposed Buildings to Environment. Proposed structures shall be located and designed to assure harmony with the natural environment, including protection of steep slopes, vegetation and other naturally sensitive areas for wildlife habitat and shall provide proper buffering from less intensive uses in accordance with Sections 4.171 and 4.139 and 4.139.5. The achievement of such relationship may include the enclosure of space in conjunction with other existing buildings or other proposed buildings and the creation of focal points with respect to avenues of approach, street access or relationships to natural features such as vegetation or topography.* The proposal places the new W5 industrial building on the only non-treed portion available on the site and otherwise preserves most of the treed natural area, including significant SROZ and wetland

areas plus their buffer areas. The campus appearance is of two large buildings (W5 and existing W4 placed in the clearing that fronts SW Boeckman Road and intertwining with a significant established treed natural area to the south and west, which is mostly on W5 property. See the architectural and landscape drawings and renderings at the front of this narrative.

C. *Drives, Parking and Circulation. With respect to vehicular and pedestrian circulation, including walkways, interior drives and parking, special attention shall be given to location and number of access points, general interior circulation, separation of pedestrian and vehicular traffic, and arrangement of parking areas that are safe and convenient and, insofar as practicable, do not detract from the design of proposed buildings and structures and the neighboring properties.* W5 blends into the site with the existing W4 building (DWFRITZ Precision Automation) and creates a 2-building campus with 49.4% of the 24.5-acre site is in landscape or natural area plant materials. The two building will share the two existing access driveways off SW Boeckman Road and also share on-site vehicle circulation. Nothing in this proposal changes our established borders with industrial users, other than some frontage landscaping behind the existing sidewalk on SE Boeckman Road. See the architectural and landscape drawings.

D. *Surface Water Drainage. Special attention shall be given to proper site surface drainage so that removal of surface waters will not adversely affect neighboring properties of the public storm drainage system.* W5 surface storm water is collected and piped to one of four rain gardens for water quality, and then piped to the large existing on-site wetland and SROZ areas for dispersion in various locations. This does not change the existing W4 storm system that also disperses storm water on-site, but the volume of storm water does increase. See Civil drawings C1.30 – C1.31.

E. *Utility Service. Any utility installations above ground shall be located so as to have a harmonious relation to neighboring properties and site. The proposed method of sanitary and storm sewage disposal from all buildings shall be indicated.* W5 utility installations are underground, except for the electrical transformer in NW building corner, which is screened by landscaping. On-site storm water dispersion is described in D (above). Sanitary sewer runs immediately west from W5 into the public system in SW Kinsman Road, see drawing C1.30.

F. *Advertising Features. In addition to the requirements of the City's sign regulations, the following criteria should be included: the size, location, design, color, texture, lighting and materials of all exterior signs and outdoor advertising structures or features shall not detract from the design of proposed buildings and structures and the surrounding properties.* Acknowledge. No signs are part of the W5 proposal currently because the tenant is not identified.

G. *Special Features. Exposed storage areas, exposed machinery installations, surface areas, truck loading areas, utility buildings and structures and similar accessory areas and structures shall be subject to such setbacks, screen plantings or other screening methods as shall be required to prevent their being incongruous with the existing or contemplated environment and its surrounding properties. Standards for screening and buffering are contained in Section 4.176.* Acknowledge. The W5 design completes the site development with no space allocated for a for exterior storage yards. Truck service is discretely located in the back at the south ends of the building, not seen from either ROW of this corner lot.

(.02) *The standards of review outlined in Sections (a) through (g) above shall also apply to all accessory buildings, structures, exterior signs and other site features, however related to the major buildings or structures.* Acknowledge. The W5 design completes the site development with no space allocated for a future accessory building. Exterior signing is not part of this submittal.

(.03) *The Board shall also be guided by the purpose of Section 4.400, and such objectives shall serve as additional criteria and standards.* Acknowledge.

(.04) *Conditional application. The Planning Director, Planning Commission, Development Review Board or City Council may, as a Condition of Approval for a zone change, subdivision, land partition, variance, conditional use, or other land use action, require conformance to the site development standards set forth in this Section.* Acknowledge.

(.05) *The Board may attach certain development or use conditions in granting an approval that are determined necessary to insure the proper and efficient functioning of the development, consistent with the intent of the Comprehensive Plan, allowed densities and the requirements of this Code. In making this determination of compliance and*

attaching conditions, the Board shall, however, consider the effects of this action on the availability and cost of needed housing. The provisions of this section shall not be used in such a manner that additional conditions either singularly or accumulatively have the effect of unnecessarily increasing the cost of housing or effectively excluding a needed housing type. Acknowledge.

(.06) The Board or Planning Director may require that certain paints or colors of materials be used in approving applications. Such requirements shall only be applied when site development or other land use applications are being reviewed by the City. Where the conditions of approval for a development permit specify that certain paints or colors of materials be used, the use of those paints or colors shall be binding upon the applicant. No Certificate of Occupancy shall be granted until compliance with such conditions has been verified. Acknowledge.

A. Subsequent changes to the color of a structure shall not be subject to City review unless the conditions of approval under which the original colors were set included a condition requiring a subsequent review before the colors could be changed. Acknowledge.

Section 4.430. Location, Design and Access Standards for mixed Solid Waste and Recycling Areas

The following locations, design and access standards for mixed solid waste and recycling storage areas shall be applicable to the requirements of Section 4.179 of the Wilsonville City Code.

(.02) Location Standards:

A. To encourage its use, the storage area for source separated recyclables shall be co-located with the storage area for residual mixed solid waste. The proposal proposes an outside enclosure with mixed solid waste and recycling in a discrete area at the rear SW service area that is screened from ROW views by the building or existing treed SROZ areas. It is also well screened most areas on our site. We also propose an interior cardboard recycle area near the service dock, something the owners have noticed from their other industrial tenants. This would be finalized at the TI permit phase. See architectural drawing AO for size calculations, A1.0 for locations and access, and A.A2 for enclosure details.

B. Indoor and outdoor storage areas shall comply with Uniform Building and Fire Code requirements. Acknowledge.

C. Storage area space requirements can be satisfied with a single location or multiple locations and can combine with both interior and exterior locations. W5 combines both interior and exterior mixed solid waste and recycling locations as described above in A, above.

D. Exterior storage areas can be located within interior side yard or rear yard areas. Minimum setback shall be three (3) feet. Exterior storage areas shall not be located within a required front yard setback, including double frontage lots. No outside storage is proposed beyond the mixed solid waste and recycling enclosure that is outside the building setback.

E. Exterior storage areas shall be located in central and visible locations on a site to enhance security for users. Our mixed solid waste and recycling outside enclosure is in a less visible location described above, but it is seen from the service dock. Also, the building will very likely have extensive security, as hi-tech tenants are very concerned about security.

F. *Exterior storage areas can be located in a parking area if the proposed use provides at least the minimum number of parking spaces required for the use after deducting the area used for storage. Storage areas shall be appropriately screened according to the provisions of Section 4.430 (.03), below.* W5 only has the one outside storage area described above in A that is shared with parking and service areas,.

G. *The storage area shall be accessible for collection vehicles and located so that the storage area will not obstruct pedestrian or vehicle traffic movement on the site or on public streets adjacent to the site.* Our outside storage area is acknowledged as accessible by our hauler. The rear location is out of the way from most of our pedestrian and vehicle circulation, including service trucks.

(.03) Design Standards.

A. *The dimensions of the storage area shall accommodate containers consistent with current methods of local collection.* The enclosure size and placement along with the container size are all approved by our hauler. We designed to their requirements, including garbage truck circulation requirements.

B. Storage containers shall meet Uniform Fire Code standards and be made of or covered with waterproof materials or situated in a covered area. Acknowledge.

C. *Exterior storage areas shall be enclosed by a sight obscuring fence, wall or hedge at least six (6) feet in height.*

Gate openings for haulers shall be a minimum of ten (10) feet wide and shall be capable of being secured closed or open position. In no case shall exterior storage areas be located in conflict with the vision clearance requirements of Section 4.177. **W5 proposes an enclosure with 8' high concrete walls, see** architectural sheet A1.2.

D. Storage area(s) and containers shall be clearly labeled to indicate the type of materials accepted. Acknowledge.

(.04) Access Standards.

A. Access to storage areas can be limited for security reasons. However, the storage area shall be accessible to users at convenient times of the day and to collect service personnel on the day and approximate time they are scheduled to provide collection service. Acknowledge. This proposal is for building shell and site work, and collection times will be coordinated when the tenant is known.

E. *Storage areas shall be designed to be easily accessible to collection trucks and equipment, considering paving, grade and vehicle access. A minimum of ten (10) feet horizontal clearance and eight feet of vertical clearance is required if the storage area is covered.* The enclosure size and placement along with the container size are all approved by our hauler. We designed to their requirements, including garbage truck circulation requirements. We meet the gate horizontal clearance and have unlimited vertical clearance. See architectural sheets A0, A1.0, and A1.2.

B.

C. Storage areas shall be accessible to collection vehicles without requiring backing out of a driveway onto a public street. If only a single access point is available to the storage area, adequate turning radius shall be provided to allow collection vehicles to safely exit the site in a forward motion. W5 garbage truck circulation is approved by the franchise hauler and is not close to a ROW.

Section 4.440. Procedure.

(.01) Submission of Documents.

A prospective applicant for a building or other permit who is subject to site design review shall submit to the Planning Department, in addition to the requirements of Section 4.035, the following:

A. A site plan, drawn to scale, showing the proposed layout of all structures and other improvements including, where appropriate, driveways, pedestrian walks, landscaped areas, fences, walls, off-street parking and loading areas, and railroad tracks. The site plan shall indicate the location of entrances and exits and direction of traffic flow into and out of off-street parking and loading areas, the location of each parking space and each loading berth and areas of turning and maneuvering vehicles. The site plan shall indicate how utility service and drainage are to be provided. Acknowledge.

B. A Landscape Plan, drawn to scale, showing the location and design of landscaped areas, the variety and sizes of trees and plant materials to be planted on the site, the location and design of landscaped areas, the varieties, by scientific and common name, and sizes of trees and plant materials to be retained or planted on the site, other pertinent landscape features, and irrigation systems required to maintain trees and plant materials. An inventory, drawn at the same scale as the Site Plan, of existing trees of 4" caliper or more is required. However, when large areas of trees are proposed to be retained undisturbed, only a survey identifying the location and size of all perimeter trees in the mass in necessary. Acknowledge.

C. Architectural drawings or sketches, drawn to scale, including floor plans, in sufficient detail to permit computation of yard requirements and showing all elevations of the proposed structures and other improvements as they will appear on completion of construction. Floor plans shall also be provided in sufficient detail to permit computation of yard requirements based on the relationship of indoor versus outdoor living area, and to evaluate the floor plan's effect on the exterior design of the building through the placement and configuration of windows and doors. Acknowledge.

D. A Color Board displaying specifications as to type, color, and texture of exterior surfaces of proposed structures. Also, a phased development schedule if the development is constructed in stages. Acknowledge the color board, see the Narrative Section 6 **–** Reports. W5 is the second and last phase of development on the current 24.5 acre site because the remaining site areas are protected natural areas.

E. A sign Plan, drawn to scale, showing the location, size, design, material, color and methods of illumination of all exterior signs. No signing is proposed at this time. W5 is a proposal for building shell and site work, and the tenant is not yet identified. Signing needs the tenant inputs before the permit process can start.

F. The required application fee. Acknowledge.

(.02) As soon as possible after the preparation of a staff report, a public hearing shall be scheduled before the Development Review Board. In accordance with the procedures set forth in Section 4.010(2) and 4.012, the Development Review Board shall review and approve, approve with conditions, or deny the proposed architectural, site development, landscaping or sign plans of the applicant. If the Board finds that additional information or time are necessary to render a decision, the matter may becontinued to a date certain. The applicant shall be immediately notified in writing of any such continuation or delay together with the scheduled date of review. Acknowledge.

Section 4.441. Effective Date of Decisions.
A decision of the Board shall become effective fourteen (14) calendar days after the date of the decision, unless the decision is appealed to, or called up by, the Council. If the decision of the Board is appealed to, or called up by, the City Council, the decision of the Council shall become effective immediately. Acknowledge.

Section 4.442. Time Limit on Approval.
Site design review approval shall be void after two (2) years unless a building permit has been issued and substantial development pursuant thereto has taken place; or an extension is granted by motion of the Board. Acknowledge.

Section 4.443. Preliminary Consideration.
An applicant may request preliminary consideration by the Board of general plans prior to seeking a building permit. When seeking preliminary consideration, the applicant shall submit a site plan showing the proposed structures, improvements and parking, together with a general description of the plans. The Board shall approve or reject all or part of the applicant's general plan within the normal time requirements of a formal application. Preliminary approval shall be deemed to be approval of the final plan to the extent that the final design contains the characteristics of the preliminary design.
Acknowledge.

Section 4.450. Installation of Landscaping.
(.01) All landscaping required by this section and approved by the Board shall be installed prior to issuance of occupancy permits, unless security equal to one hundred and ten percent (110%) of the cost of the landscaping as determined by the Planning Director is filed with the City assuring such installation within six (6) months of occupancy. "Security" is cash, certified check, time certificates of deposit, assignment of a savings account or such other assurance of completion as shall meet with the approval of the City Attorney. In such cases the developer shall also provide written authorization, to the satisfaction of the City Attorney, for the City or its designees to enter the property and complete the landscaping as approved. If the installation of the landscaping is not completed within the six-month period, or within an extension of time authorized by the Board, the security may be used by the City to complete the installation. Upon completion of the installation, any portion of the remaining security deposited with the City shall be returned to the applicant. Acknowledge.

(.02) Action by the City approving a proposed landscape plan shall be binding upon the applicant. Substitution of plant materials, irrigation systems, or other aspects of an approved landscape plan shall not be made without official action of the Planning Director or Development Review Board, as specified in this Code. Acknowledge.

(.03) All landscaping shall be continually maintained, including necessary watering, weeding, pruning, and replacing, in a substantially similar manner as originally approved by the Board, unless altered with Board approval. Acknowledge.

(.04) If a property owner wishes to add landscaping for an existing development, in an effort to beautify the property, the Landscape Standards set forth in Section 4.176 shall not apply and no Plan approval or permit shall be required. If the owner wishes to modify or remove landscaping that has been accepted or approved through the City's development review process, that removal or modification must first be approved through the procedures of Section 4.010. Acknowledge.

Section 4.600 Tree Preservation and Protection

Section 4.600. Purpose and Declaration

(.01) Rapid growth, the spread of development, need for water and increasing demands upon natural resources have the effect of encroaching upon, despoiling, or eliminating many of the trees, other forms of vegetation, and natural

resources and processes associated therewith which, if preserved and maintained in an undisturbed and natural condition, constitute important physical, aesthetic, recreational and economic assets to existing and future residents of the City of Wilsonville. Acknowledge.

(.02) Specifically, the City Council finds that:

A. Woodland growth protects public health through the absorption of air pollutants and contamination, through the reduction of excessive noise and mental and physical damage related to noise pollution, and through its cooling effect in the summer months, and insulating effects in winter; Acknowledge.

B. Woodlands provide for public safety through the prevention of erosion, siltation, and flooding; and Acknowledge.

C. Trees make a positive contribution to water quality and water supply by absorbing rainfall, controlling surface water run-off, and filtering and assisting in ground water recharge; and Acknowledge.

D. Trees and woodland growth are an essential component of the general welfare of the City of Wilsonville by producing play areas for children and natural beauty, recreation for all ages and an irreplaceable heritage for existing and future City residents. Acknowledge.

(.03) Therefore, the purposes of this subchapter are: Acknowledge all. See our **arborist's Prelim Tree Assessment** Report.

A. To preserve Significant Resource Overlay Zone areas, recognizing that development can and will occur.

B. To provide for the protection, preservation, proper maintenance and use of trees and woodlands in order to protect natural habitat and prevent erosion.

C. To protect trees and other wooded areas for their economic contribution to local property values when preserved, and for their natural beauty and ecological or historical significance.

D. To protect water quality, control surface water run-off, and protect ground water recharge.

E. To reflect the public concern for these natural resources in the interest of health, safety and general welfare of Wilsonville residents.

F. To encourage replanting where trees are removed.

Section 4.600.20. Applicability of Subchapter

(.01) The provisions of this subchapter apply to the United States and the State of Oregon, and to their agencies and subdivisions, including the City of Wilsonville, and to the employees and agents thereof. Acknowledge.

(.02) By this subchapter, the City of Wilsonville regulates forest practices on all lands located within its urban growth boundary, as provided by ORS 527.722. Acknowledge.

(.03) The provisions of this subchapter apply to all land within the City limits, including property designated as a Significant Resource Overlay Zone or other areas or trees designated as protected by the Comprehensive Plan, City zoning map, or any other law or ordinance; except that any tree activities in the Willamette River Greenway that are regulated by the provisions of WC 4.500 - 4.514 and requiring a conditional use permit shall be reviewed by the DRB under the application and review procedures set forth for Tree Removal Permits. Acknowledge.

Section 4.600.30. Tree Removal Permit Required

(.01) Requirement Established. No person shall remove any tree without first obtaining a Tree Removal Permit (TRP) as required by this subchapter. Acknowledge.

(.02) Tree Removal Permits will be reviewed according to the standards provided for in this subchapter, in addition to all other applicable requirements of Chapter 4. Acknowledge.

(.03) Although tree activities in the Willamette River Greenway are governed by WC 4.500 - 4.514, the application materials required to apply for a conditional use shall be the same as those required for a Type B or C permit under this subchapter, along with any additional materials that may be required by the Planning Department. An application for a Tree Removal Permit under this section shall be reviewed by the Development Review Board. Acknowledge.

Section 4.600.40. Exceptions

(.01) Exception from requirement. Notwithstanding the requirement of WC 4.600.30(1), the following activities are allowed without a Tree Removal Permit, unless otherwise prohibited:

A. Agriculture, Commercial Tree Farm or Orchard. Tree removal or transplanting occurring during use of land for commercial purposes for agriculture, orchard(s), or tree farm(s), such as Christmas tree production. NA

B. Emergencies. Actions made necessary by an emergency, such as tornado, windstorm, flood, freeze, utility da or other like disasters, in order to prevent imminent injury or damage to persons or property or restore order and it is impractical due to circumstances to apply for a permit. NA

1. *When an emergency has occurred, a Tree Removal Permit must be applied for within thirty (30) days following the emergency tree removal under the application procedures established in this subchapter.* Acknowledge.
2. *In addition to complying with the permit application requirements of this subchapter, an applicant shall provide a photograph of any tree removed and a brief description of the conditions that necessitated emergency removal. Such photograph shall be supplied within seven days of application for a permit. Based on good cause shown arising out of the emergency, the Planning Director may waive any or all requirements of this section.* Acknowledge.
3. *Where a Type A Permit is granted for emergency tree removal, the permitee is encouraged to apply to the City Tree Fund for replanting assistance.* Acknowledge.

C. City utility or road work in utility or road easements, in utility or road right-of-ways, or in public lands. However, any trees removed in the course of utility work shall be mitigated in accordance with the standards of this subchapter. NA

D. Nuisance abatement. The City is not required to apply for a Tree Removal Permit to undertake nuisance abatement as provided in WC 6.200 et seq. However, the owner of the property subject to nuisance abatement is subject to all the provisions of this subchapter in addition to the requirements of WC 6.200 et seq. NA

E. The removal of filbert trees is exempt from the requirements of this subchapter. Acknowledge.

F. The Charbonneau District, including its golf course, is exempt from the requirements of WC 4.600.30(1) on the basis that by and through the current CC&R's of the Charbonneau Country Club, the homeowners' association complies with all requirements of WC 4.610.30(1)(C)(1). This exception has been based upon the Tree Maintenance and Protection Plan that has been submitted by the Charbonneau Country Club and approved by the Planning Director. Tree removal activities remain subject to all applicable standards of this subchapter. Unless authorized by the City, this exception does not include tree removal upon any public easements or public property within the district. In the event that the CC&R's are changed relative to the effect of the Tree Maintenance and Protection Plan, then the Planning Director shall review whether such effect is material, whether it can be mitigated, and if not, may disallow the exemption. NA

Section 4.600.50. Application For Tree Removal Permit

(.01) Application for Permit. A person seeking to remove one or more trees shall apply to the Director for a Tree Removal Permit for a Type A, B, C, or D permit, depending on the applicable standards as provided in this subchapter. Acknowledge, **see our arborist's Prelim Tree Assessm**ent Report.

(A) An application for a tree removal permit that does not meet the requirements of Type A may be submitted as a Type B application. Acknowledge.

(.02) Time of Application. Application for a Tree Removal Permit shall be made before removing or transplanting trees, except in emergency situations as provided in WC 4.600.40 (1)(B) above. Where the site is proposed for development necessitating site plan or plat review, application for a Tree Removal Permit shall be made as part of the site development application as specified in this subchapter. Acknowledge, see **our arborist's Prelim Tree** Assessment Report.

(.03) Fees. A person applying for a Tree Removal Permit shall pay a non-refundable application fee; as established by resolution of the City Council. Acknowledge.

A. By submission of an application, the applicant shall be deemed to have authorized City representatives to have access to applicant's property as may be needed to verify the information provided, to observe site conditions, and if a permit is granted, to verify that terms and conditions of the permit are followed. Acknowledge.

Section 4.610.00. Application Review Procedure

(.01) The permit applicant shall provide complete information as required by this subchapter in order for the City to review the application. Acknowledge. **See our arborist's Prelim Tree Assessment Report.**

(.02) Departmental Review. All applications for Tree Removal Permits must be deemed complete by the City Planning Department before being accepted for review. When all required information has been supplied, the Planning Department will verify whether - the application is complete. Upon request of either the applicant or the City, the City may conduct a field inspection or review meeting. City departments involved in the review shall submit their report and recommendations to the Planning Director who shall forward them to the appropriate reviewing authority. Acknowledge.

(.03) Reviewing Authority. Acknowledge all.

A. *Type A or B. Where site plan review or plat approval by the Development Review Board is not required by City ordinance, the grant or denial of the Tree Removal Permit application shall be the responsibility of the Planning Director. The Planning Director has the authority to refer a Type B permit application to the DRB under the Class II administrative review procedures of this Chapter. The decision to grant or deny a permit shall be governed by the applicable review standards enumerated in WC 4.610.10*

B. *Type C. Where the site is proposed for development necessitating site plan review or plat approval by the Development Review Board, the Development Review Board shall be responsible for granting or denying the application for a Tree Removal Permit, and that decision may be subject to affirmance, reversal or modification by the City Council, if subsequently reviewed by the Council. For site development applications subject to a Class II administrative review process in the Coffee Creek Industrial Design Overlay District, the Planning Director shall be responsible for the granting or denial of the Tree Removal Permit application.*

C. *Type D. Type D permit applications shall be subject to the standards and procedures of Class I administrative review and shall be reviewed for compliance with the Oregon Forest Practice Rules and Statutes. The Planning Director shall make the decision to grant or deny an application for a Type D permit.*

D. *Review period for complete applications. Type A permit applications shall be reviewed within 10 (ten) working days. Type B permit applications shall be reviewed by the Planning Director within thirty (30) calendar days, except that the DRB shall review any referred application within sixty (60) calendar days. Type C permit applications shall be reviewed within the time frame established by this Chapter. Type D permit applications shall be reviewed within 15 calendar days.*

(.04) *Notice. Before the granting of a Type C Tree Removal Permit, notice of the application shall be sent by regular mail to all owners within two hundred fifty feet (250') of the property where the trees are located as provided for in WC 4.010. The notice shall indicate where the application may be inspected and when a public hearing on the application will be held.* Acknowledge.

(.05) *Denial of Tree Removal Permit. Whenever an application for a Tree Removal Permit is denied, the permit applicant shall be notified, in writing, of the reasons for denial.* Acknowledge.

(.06) *Grant of a Tree Removal Permit. Whenever an application for a Type B, C or D Tree Removal Permit is granted, the reviewing authority shall:* Acknowledge all.

A. *Conditions. Attach to the granting of the permit any reasonable conditions considered necessary by the reviewing authority including, but not limited to, the recording of any plan or agreement approved under this subchapter, to ensure that the intent of this Chapter will be fulfilled and to minimize damage to, encroachment on or interference with natural resources and processes within wooded areas;*

B. *Completion of Operations. Fix a reasonable time to complete tree removal operations; and*

C. *Security. Require the Type C permit grantee to file with the City a cash or corporate surety bond or irrevocable bank letter of credit in an amount determined necessary by the City to ensure compliance with Tree Removal Permit conditions and this Chapter.*

1. *This requirement may be waived by the Planning Director if the tree removal must be completed before a plat is recorded, and the applicant has complied with WC 4.264(1) of this Code.*

Section 4.610.10. *Standards For Tree Removal, Relocation Or Replacement*

(.01) *Except where an application is exempt, or where otherwise noted, the following standards shall govern the review of an application for a Type A, B, C or D Tree Removal Permit:*

A. *Standard for the Significant Resource Overlay Zone. The standard for tree removal in the Significant Resource Overlay Zone shall be that removal or transplanting of any tree is not inconsistent with the purposes of this Chapter.* Acknowledge.

B. *Preservation and Conservation. No development application shall be denied solely because trees grow on the site. Nevertheless, tree preservation and conservation as a design principle shall be equal in concern and importance to other design principles.* Acknowledge.

C. *Developmental Alternatives. Preservation and conservation of wooded areas and trees shall be given careful consideration when there are feasible and reasonable location alternatives and design options on-site for proposed buildings, structures or other site improvements.* Acknowledge.

D. *Land Clearing. Where the proposed activity requires land clearing, the clearing shall be limited to designated street rights-of-way and areas necessary for the construction of buildings, structures or other site improvements.* Acknowledge. **See our arborist's Prelim Tree Assessment Report.**

E. *Residential Development. Where the proposed activity involves residential development, residential units shall, to the extent reasonably feasible, be designed and constructed to blend into the natural setting of the landscape.* NA

F. *Compliance With Statutes and Ordinances. The proposed activity shall comply with all applicable statutes and ordinances.* Acknowledge.

G. *Relocation or Replacement. The proposed activity shall include necessary provisions for tree relocation or replacement, in accordance with WC 4.620.00, and the protection of those trees that are not to be removed, in accordance with WC 4.620.10.* Acknowledge. **See our arborist's Prelim Tree Assessment Report.**

H. *Limitation. Tree removal or transplanting shall be limited to instances where the applicant has provided completed information as required by this Chapter and the reviewing authority determines that removal or transplanting is necessary based on the criteria of this subsection.* Acknowledge all. **See our arborist's Prelim Tree Assessment** Report.

1. *Necessary For Construction. Where the applicant has shown to the satisfaction of the reviewing authority that removal or transplanting is necessary for the construction of a building, structure or other site improvement, and that there is no feasible and reasonable location alternative or design option on-site for a proposed building, structure or other site improvement; or a tree is located too close to existing or proposed buildings or structures, or creates unsafe vision clearance.*
2. *Disease, Damage, or Nuisance, or Hazard. Where the tree is diseased, damaged, or in danger of falling, or presents a hazard as defined in WC 6.208, or is a nuisance as defined in WC 6.200 et seq., or creates unsafe vision clearance as defined in this Code.* Acknowledge. **See our arborist's Prelim Tree** Assessment Report.
   (a) *As a condition of approval of Stage II development, filbert trees must be removed if they are no longer commercially grown or maintained.*
3. *Interference. Where the tree interferes with the healthy growth of other trees, existing utility service or drainage, or utility work in a previously dedicated right-of-way, and it is not feasible to preserve the tree on site.* Acknowledge.
4. *Other. Where the applicant shows that tree removal or transplanting is reasonable under the circumstances.* Acknowledge. **See our arborist's Prelim Tree Assessment Report.**

I. *Additional Standards for Type C Permits.* Acknowledge all.

1. *Tree survey. For all site development applications reviewed under the provisions of Chapter 4 Planning and Zoning, the developer shall provide a Tree Survey before site development as required by WC 4.610.40, and provide a Tree Maintenance and Protection plan, unless specifically exempted by the Planning Director or DRB, prior to initiating site development.*
2. *Platted Subdivisions. The recording of a final subdivision plat whose preliminary plat has been reviewed and approved after the effective date of Ordinance 464 by the City and that conforms with this subchapter shall include a Tree Survey and Maintenance and Protection Plan, as required by this subchapter, along with all other conditions of approval.*
3. *Utilities. The City Engineer shall cause utilities to be located and placed wherever reasonably possible to avoid adverse environmental consequences given the circumstances of existing locations, costs of placement and extensions, the public welfare, terrain, and preservation of natural resources. Mitigation and/or replacement of any removed trees shall be in accordance with the standards of this subchapter.*

J. *Exemption. Type D permit applications shall be exempt from review under standards D, E, H and I of this subsection. NA*

Section 4.610.20. *Type A Permit* This Section Not Applicable

Section 4.610.30. *Type B Permit* This Section Not Applicable

Section 4.610.40. *Type C Permit*

(.01) *Approval to remove any trees on property as part of a site development application may be granted in a Type C permit. A Type C permit application shall be reviewed by the standards of this subchapter and all applicable review criteria of Chapter 4. Application of the standards of this section shall not result in a reduction of square footage or loss of density, but may require an applicant to modify plans to allow for buildings of greater height. If an applicant proposes to remove trees and submits a landscaping plan as part of a site development application, an application for a Tree Removal Permit shall be included. The Tree Removal Permit application will be reviewed in the Stage II development review process. The DRB shall review all Type C permits, with the exception of Class II development review applications located within the Coffee Creek Industrial Design Overlay District, where the Planning Director shall have review authority. Any plan changes made that affect trees after Stage II review of a development*

application shall be subject to review by the original approval authority. Where mitigation is required for tree re such mitigation may be considered as part of the landscaping requirements as set forth in this Chapter. Tree removal shall not commence until approval of the required Stage II application and the expiration of the appeal period following that decision. If a decision approving a Type C permit is appealed, no trees shall be removed until the appeal has been settled. Acknowledge.

(.02) The applicant must provide ten copies of a Tree Maintenance and Protection Plan completed by an arborist that contains the following information: Acknowledge.

A. A plan, including a topographical survey bearing the stamp and signature of a qualified, registered professional containing all the following information: Acknowledge all.

1. *Property Dimensions. The shape and dimensions of the property, and the location of any existing and proposed structure or improvement.*
2. *Tree survey. The survey must include:* Acknowledge. **See our arborist's Prelim Tree Assessment Report.**
   a. *An accurate drawing of the site based on accurate survey techniques at a minimum scale of one inch (1") equals one hundred feet (100') and which provides a) the location of all trees having six inches (6") or greater d.b.h. likely to be impacted, b) the spread of canopy of those trees, (c) the common and botanical name of those trees, and d) the approximate location and name of any other trees on the property.*
   b. *A description of the health and condition of all trees likely to be impacted on the site property. In addition, for trees in a present or proposed public street or road right-of-way that are described as unhealthy, the description shall include recommended actions to restore such trees to full health. Trees proposed to remain, to be transplanted or to be removed shall be so designated. All trees to remain on the site are to be designated with metal tags that are to remain in place throughout the development. Those tags shall be numbered, with the numbers keyed to the tree survey map that is provided with the application.*
   c. *Where a stand of twenty (20) or more contiguous trees exist on a site and the applicant does not propose to remove any of those trees, the required tree survey may be simplified to accurately show only the perimeter area of that stand of trees, including its drip line. Only those trees on the perimeter of the stand shall be tagged, as provided in "b," above.*
   d. *All Oregon white oaks, native yews, and any species listed by either the state or federal government as rare or endangered shall be shown in the tree survey.*
3. *Tree Protection. A statement describing how trees intended to remain will be protected during development, and where protective barriers are necessary, that they will be erected before work starts. Barriers shall be sufficiently substantial to withstand nearby construction activities. Plastic tape or similar forms of markers do not constitute "barriers."* Acknowledge. **See our arborist's Prelim Tree Assessment Report.**
4. *Easements and Setbacks. Location and dimension of existing and proposed easements, as well as all setbacks required by existing zoning requirements.* Acknowledge.
5. *Grade Changes. Designation of grade changes proposed for the property that may impact trees.* Acknowledge. Also see our Civil drawings with proposed and existing grades where appropriate.
6. *Cost of Replacement. A cost estimate for the proposed tree replacement program with a detailed explanation including the number, size and species.* Acknowledge.
7. *Tree Identification. A statement that all trees being retained will be identified by numbered metal tags, as specified in subsection "A," above in addition to clear identification on construction documents.* Acknowledge. **See our arborist's Prelim Tree Assessmen**t Report.

Section 4.610.50. *Type D Permit* This Section Not Applicable

Section 4.620.00. *Tree Relocation, Mitigation, Or Replacement*

(.01) Requirement Established. A Type B or C Tree Removal Permit grantee shall replace or relocate each removed tree having six (6) inches or greater d.b.h. within one year of removal. Acknowledge.

(.02) Basis For Determining Replacement. The permit grantee shall replace removed trees on a basis of one (1) tree replanted for each tree removed. All replacement trees must measure two inches (2") or more in diameter. Alternatively, the Planning Director or Development Review Board may require the permit grantee to replace removed trees on a per caliper inch basis, based on a finding that the large size of the trees being removed justifies an increase in the replacement trees required. Except, however, that the Planning Director or Development Review

Board may allow the use of replacement Oregon white oaks and other uniquely valuable trees with a smaller diameter. Acknowledge.

(.03) *Replacement Tree Requirements. A mitigation or replacement tree plan shall be reviewed by the City prior to planting and according to the standards of this subsection.* Acknowledge all.

A. Replacement trees shall have shade potential or other characteristics comparable to the removed trees, shall be appropriately chosen for the site from an approved tree species list supplied by the City, and shall be state Department of Agriculture Nursery Grade No. 1 or better. Acknowledge.

B. Replacement trees must be staked, fertilized and mulched, and shall be guaranteed by the permit grantee or the grantee's successors-in-interest for two (2) years after the planting date. Acknowledge.

C. A "guaranteed" tree that dies or becomes diseased during that time shall be replaced. Acknowledge.

D. Diversity of tree species shall be encouraged where trees will be replaced, and diversity of species shall also be maintained where essential to preserving a wooded area or habitat. Acknowledge.

(.04) *All trees to be planted shall consist of nursery stock that meets requirements of the American Association of Nurserymen (AAN) American Standards for Nursery Stock (ANSI Z60.1) for top grade.* Acknowledge.

(.05) *Replacement Tree Location.*

A. City Review Required. The City shall review tree relocation or replacement plans in order to provide optimum enhancement, preservation and protection of wooded areas. To the extent feasible and desirable, trees shall be relocated or replaced on-site and within the same general area as trees removed. Acknowledge.

B. Relocation or Replacement Off-Site. When it is not feasible or desirable to relocate or replace trees on-site, relocation or replacement may be made at another location approved by the City. Acknowledge.

(.06) *City Tree Fund. Where it is not feasible to relocate or replace trees on site or at another approved location in the City, the Tree Removal Permit grantee shall pay into the City Tree Fund, which fund is hereby created, an amount of money approximately the value as defined by this subchapter, of the replacement trees that would otherwise be required by this subchapter. The City shall use the City Tree Fund for the purpose of producing, maintaining and preserving wooded areas and heritage trees, and for planting trees within the City.* Acknowledge.

A. The City Tree Fund shall be used to offer trees at low cost on a first-come, first-serve basis to any Type A Permit grantee who requests a tree and registers with the City Tree Fund. Acknowledge.

B. In addition, and as funds allow, the City Tree Fund shall provide educational materials to assist with tree planting, mitigation, and relocation. Acknowledge.

(.07) *Exception. Tree replacement may not be required for applicants in circumstances where the Director determines that there is good cause to not so require. Good cause shall be based on a consideration of preservation of natural resources, including preservation of mature trees and diversity of ages of trees. Other criteria shall include consideration of terrain, difficulty of replacement and impact on adjacent property.* Acknowledge.

Section 4.620.10. *Tree Protection During Construction*

(.01) *Where tree protection is required by a condition of development under Chapter 4 or by a Tree Maintenance and Protection Plan approved under this subchapter, the following standards apply:* Acknowledge all. See our **arborist's Prelim Tree Assessment Report that addresses tree protection.**

A. All trees required to be protected must be clearly labeled as such. **See our arborist's Prelim Tree Assessment** Report with trees identified by labels.

B. Placing Construction Materials Near Tree. No person may conduct any construction activity likely to be injurious to a tree designated to remain, including, but not limited to, placing solvents, building material, construction equipment, or depositing soil, or placing irrigated landscaping, within the drip line, unless a plan for such construction activity has been approved by the Planning Director or Development Review Board based upon the recommendations of an arborist. Acknowledge. See our tree protection plan on sheet C1.01 of our Civil drawings. Also see the post construction tree care section of our **arborist's Prelim Tree Assessment Report.**

C. Attachments to Trees During Construction. Notwithstanding the requirement of WC 4.620.10(1)(A), no person shall attach any device or wire to any protected tree unless needed for tree protection. Acknowledge.

D. Protective Barrier. Before development, land clearing, filling or any land alteration for which a Tree Removal Permit is required, the developer shall erect and maintain suitable barriers as identified by an arborist to protect remaining trees. Protective barriers shall remain in place until the City authorizes their removal or issues a final certificate of occupancy, whichever occurs first. Barriers shall be sufficiently substantial to withstand nearby construction activities. Plastic tape or similar forms of markers do not constitute "barriers." The most appropriate and protective barrier shall be utilized. Barriers are required for all trees designated to remain, except in the following cases:

1. *Right-of-Ways and Easements. Street right-of-way and utility easements may be cordoned by placing sta minimum of fifty (50) feet apart and tying ribbon, plastic tape, rope, etc., from stake to stake along the outside perimeters of areas to be cleared.* NA
2. *Any property area separate from the construction or land clearing area onto which no equipment will venture may also be cordoned off as described in paragraph (D) of this subsection, or by other reasonable means as approved by the reviewing authority.* Acknowledge.

Section 4.620.20. *Maintenance And Protection Standards*

(.01) *The following standards apply to all activities affecting trees, including, but not limited to, tree protection as required by a condition of approval on a site development application brought under this Chapter or as required by an approved Tree Maintenance and Protection Plan.* Acknowledge all.

A. *Pruning activities shall be guided by the most recent version of the ANSI 300 Standards for Tree, Shrub, and Other Woody Plant Maintenance. Information on these standards shall be available upon request from the Planning Department.*

B. *Topping is prohibited.*

1. *Exception from this section may be granted under a Tree Removal Permit if necessary for utility work or public safety.* NA

Section 4.630.00. *Appeal*

(.01) *The City shall not issue a Tree Removal Permit until approval has been granted by either the Planning Director or the DRB. Any applicant denied a Type A or B permit may appeal the decision as provided for in review of Class I Development Applications, or Class II Development Applications, whichever is applicable. Decisions by the Planning Director may be appealed to the DRB as provided in WC 4.022. Decisions by the DRB may be appealed to the City Council as provided in WC 4.022.* Acknowledge.

(.02) *The City shall not issue a Tree Removal Permit approved by the Development Review Board until fifteen (15) calendar days have passed following the approval. The grant or denial of a Tree Removal Permit may be appealed to the City Council in the same manner as provided for in WC 4.022. An appeal must be filed in writing, within the fifteen (15) calendar day period following the decision being appealed. The timely filing of an appeal shall have the effect of suspending the issuance of a permit pending the outcome of the appeal. The City Council, upon review, may affirm, reverse or modify the decision rendered by the Development Review Board based upon the same standards of review specified for the DRB in the Wilsonville Code.* Acknowledge.

Section 4.630.10. *Display Of Permit; Inspection*

The Tree Removal Permit grantee shall conspicuously display the permit on-site. The permit grantee shall display the permit continuously while trees are being removed or replaced or while activities authorized under the permit are performed. The permit grantee shall allow City representatives to enter and inspect the premises at any reasonable time, and failure to allow inspection shall constitute a violation of this subchapter. Acknowledge.

Section 4.630.20. *Variance For Hardship*

Any person may apply for a variance of this subchapter as provided for in Section 4.196 of this Chapter. Acknowledge.

Section 4.630.30. *Severability*

If any part of this ordinance is found by a court of competent jurisdiction to be invalid, that part shall be severable and the remainder of this ordinance shall not be affected. Acknowledge.

Section 4.640.00. *Violation; Enforcement* Acknowledge all in this Section.

(.01) *The cutting, damaging, or removal of any individual tree without a permit as required by this ordinance constitutes a violation punishable as a separate infraction under WC 1.013. In addition, each violation of a condition or a violation of any requirement of this Chapter shall constitute a separate infraction.*

(.02) *Retroactive Permit. A person who removes a tree without obtaining a Type A or Type B permit may apply retroactively for a permit. In addition to all application requirements of this Chapter, the person must be able to demonstrate compliance with all requirements of this subchapter, in addition to paying a triple permit fee and a*

penalty per tree in an amount established by resolution of City Council. Mitigation requirements of this subcha
apply to all retroactive permits.

(.03) *Nuisance Abatement. Removal of a tree in violation of this Chapter is a nuisance and may be abated as provided in Sections 6.230 to 6.244, 6.250, and 6.260 of the Wilsonville Code.*

(.04) *Withholding Certificate of Occupancy. The City Building Official has the authority to issue a stop-work order, withhold approval of a final plat, or withhold issuance of a certificate of occupancy, permits or inspections until the provisions of this Chapter, including any conditions attached to a Tree Removal Permit, have been fully met.*

(.05) *Fines. Fines for a violation shall be imposed according to WC 1.012.*

(.06) *Mitigation. The City shall require the property owner to replace illegally removed or damaged trees. The City may also require a combination of payment and tree replacement.*

A. *The City shall notify the property owner in writing that a violation has occurred and mitigation is required. Within thirty (30) days of the date of mailing of the notice, the property owner shall provide a mitigation plan to the City. The plan shall provide for replacement of a tree of similar species and size taking into account the suitability of the site and nursery stock availability.*

B. *Replacement will be on an inch-for-inch basis computed by adding the total diameter measured at d.b.h. in inches of the illegally removed or damaged trees. The City may use any reasonable means to estimate the tree loss if destruction of the illegally removed or damaged trees prevents exact measurement. All replaced trees must be a minimum two-inch (2") caliper. If the mitigation requirements cannot be completed on the property, the City may require completion at another approved location. Alternatively, the City may require payment into the City Tree Fund of the value of the removed tree as established by the Planning Department.*

Section 4.640.10. *Alternative Enforcement*

(.01) *In the event that a person commits more than one violation of WC 4.600.30 to WC 4.630.00, the following alternative sentence may be imposed:* Acknowledge all.

A. *If a person has gained money or property through the commission of an offense under this section, then upon conviction thereof, the court, in lieu of imposing a fine, may sentence the person to pay an amount, fixed by the court, not to exceed double the amount of the gain from the commission of the offense.*

B. *"Gain" is defined as the amount of money or value of property derived from the commission of the violation, less the amount of money or value of property seized by or surrendered to the City. "Value" shall be the greater of the market value or replacement cost as determined by a licensed professional in the tree, nursery, or landscape field.*

C. *Any fines collected by the City under this section shall accrue to the City Tree Fund.*

Section 4.640.20. *Responsibility For Enforcement.*

Compliance with this Chapter shall be enforced by the City Attorney, the City Attorney's designee, and Clackamas County or Washington County law enforcement officers. Acknowledge.

Section 5: Plan Sets

Plan Set Index of Drawings:

Architectural:

A0	Cover Sheet
A1.0	Site Plan
A1.1	Enlarged Site Plan at Entry & Details
A1.2	Enlarged Site Plan at Service & Details
A2.0	First Floor Plan
A2.2	Roof Plan
A3.0	Exterior Elevations

Civil

C1.01	Tree Protection Plan
C1.20	Grading plan - South
C1.21	Grading plan - North
C1.30	Utility plan - South
C1.31	Utility plan – North
EC2.0	Clearing & Demolition Erosion & Sediment Control Plan
-	Cut/Fill Map

Landscape

L1.0	Landscape Plan
L1.1	Enlarged Landscape Plan - North
L1.2	Enlarged Landscape Plan – South
L2.0	Landscape Details
L2.1	Landscape Specifications

Site Lighting

1 of 4	Site Lighting Plan & Calculations
2 of 4	Enlarged Site Lighting Plan - North
3 of 4	Enlarged Site Lighting Plan – South
4 of 4	Graphic Site Lighting Plans & Calculations

Supplemental Drawings

CS-2	Site Parking Plan & Calculations
CS-3	Site Circulation Plan & TVFR Service Provider Plan
TR-1	Tree Removal Plan
TR-2	Tree Removal Table
1 of 4	Martin Partition Plan (Recorded)
2 of 4	Martin Partition Plan
3 of 4	Martin Partition Plan
4 of 4	Martin Partition Plan
A1.1	W4 Approved Site Plan (Pre – W5)
C3.0	W4 Approved Utility Plan
C3.1	W4 Approved Utility Plan
C3.2	W4 Approved Utility Plan

Section 6: Reports and other Documents

Index of Reports and other documents:

1. Property Information Report by WFG National Title Insurance Company, dated Dec 9, 2021.
2. Assessor Map dated December 9, 2021.
3. Traffic: Trip Generation Memo, by DKS Associates, dated Nov 17, 2021
4. Geotechnical Engineering Report by GeoEngineers, dated July 14, 2021
5. Preliminary Tree Assessment by The Pacific Resource Group, dated Dec 9, 2021.
6. Significant Resource Impact Report by Pacific Habitat Services, dated Jan 21, 2022
7. Storm Drainage Report by Mackenzie, dated December 10, 2021.
8. Garbage Hauler Preliminary Approval Letter & documents by Republic Services, dated 11/19/21.
9. Lighting Fixture Schedule (Exterior)
10. Exterior Lighting Compliance certificate – ComCheck
11. TVFR Service Provider letter with approved documents
12. Color and Materials Selections

LANCE MUELLER & ASSOCIATES
ARCHITECTS • AIA

W5	March 2023

96XX SW Boeckman Road, Wilsonville, OR 97070

Architectural Review Narrative:

Narrative Index:

	Page	Item
	1-2	Index
	3	Application Form
Section 1.	4-7	Proposal Summary
Section 2.	8-12	Background Information
Section 3.	13	Key Issues (neighborhood outreach)
Section 4.	14-72	Code Criteria List with Proponents Responses
Section 5.	D1-39	Plan Sets
Section 6.	1-367	Reports (Below)

Section 6: Reports & Documents (Cover Sheet & Index)

Page	Item
Page 1	Section 6 – Cover Sheet & Index
Page 2 - 7	Property Information Report by WFG National Title Insurance Company, Dec 9, 2021.
Page 8	Assessor Map of property, dated December 9, 2021.
Page 9 - 15	Traffic: Trip Generation Memo, by DKS Associates, dated November 17, 2021
Page 16 - 84	Geotechnical Engineering Report by GeoEngineers, dated July 14, 2021
Page 85 - 105	Preliminary Tree Assessment by The Pacific Resource Group, dated December 9, 2021.
Page 106	Update Memo on SRIR Report by Pacific Habitat Services, January 16, 2023.
Page 107 - 219	Significant Resource Impact Report by Pacific Habitat Services, dated January 21, 2022.
Page 220 - 337	Storm Drainage Report by Mackenzie, dated December 10, 2021.
Page 338 - 341	Garbage Hauler Preliminary Approval Letter & documents by Republic Services, dated 11/19/21
Page 342 - 354	Lighting Fixture Schedule (Exterior)
Page 355 - 356	Exterior Lighting Compliance certificate – ComCheck
Page 357 - 361	TVFR Service Provider letter & approved documents
Page 362 - 368	Color and Materials Selections

WFG National Title Insurance Company
a Williston Financial Group company

PROPERTY INFORMATION REPORT

Date: December 9, 2021

File No.: 21-321617
Property: 9600 SW Boeckman Road, Wilsonville, OR 97070

Martin Development NW
P O Box 15523
Seattle, WA 98115

Your Reference: **REPORT FEE:**

The information contained in this report is furnished by WFG National Title Insurance Company (the "Company") as an information service based on the records and the indices maintained by the Company for the county identified below. This report does not constitute title insurance and is not to be construed or used as a commitment for title insurance. The Company assumes and shall have no liability whatsoever for any errors or inaccuracies in this report. In the event any such liability is ever asserted or enforced, such liability shall in no event exceed the paid herein. No examination has been made of the Company's records, other than as specifically set forth in this report.

The effective date of this report is December 3, 2021

REPORT FINDINGS

A. The land referred to in this report is located in the county of Clackamas State of Oregon, and is described as follows:

See Attached Exhibit "A"

B. As of the Effective Date and according to the last deed of record, we find the title to the land to be vested as follows:

W-4 LLC, an Oregon limited liability company

C. As of the Effective Date and according to the Public Records, the Land is subject to the following liens and encumbrances, which are not necessarily shown in the order of priority:

1. Easement, including the terms and provisions thereof:

For	:	Transmission Line and rights to remove danger trees
Granted to	:	the United States of America
Recorded	:	August 28, 1941
Recording No(s)	:	(book) 284 (page) 434
Affects	:	25 foot strip lying West of the Oregon Electric Railway right-of-way along Southerly portion

2. Easement, including the terms and provisions thereof:

For	:	Transmission Line and rights to remove danger trees
Granted to	:	the United States of America
Recorded	:	September 22, 1941
Recording No(s)	:	(book) 285 (page) 301
Affects	:	45 foot strip lying West of the Oregon Electric Railway right-of-way along Northerly portion

3. We find a Notice of Intention of Preserve Interest, including the terms and provisions thereof
   Regarding : Future cost for road construction
   Recorded : November 29, 2000
   Recording No(s) : 2000-077005
   Executed by : RFD Publications, Inc.

4. Easement, including the terms and provisions thereof:
   For : Slope
   Granted to : the City of Wilsonville, a municipal corporation
   Recorded : June 2, 2006
   Recording No(s) : 2006-050622
   Affects : the Northerly lot line - see document for actual location

5. Easement, including the terms and provisions thereof:
   For : Slopes
   Granted to : Tri-County Metropolitan Transportation District of Oregon, a mass transit district
   Recorded : December 5, 2006
   Recording No(s) : 2006-111828
   Affects : the Easterly 14 feet

6. Easement, including the terms and provisions thereof:
   For : Railroad facilities
   Granted to : Tri-County Metropolitan Transportation District of Oregon (Tri-Met), a mass transit district
   Recorded : December 3, 2007
   Recording No(s) : 2007-100710
   Affects : a 8 foot by 8 foot area abutting Oregon Electric Railroad See document for actual location

7. Easement, including the terms and provisions thereof:
   For : Water line
   Granted to : the City of Wilsonville, an Oregon municipal corporation of the State of Oregon
   Recorded : June 28, 2013
   Recording No(s) : 2013-045155
   Affects : Westerly portions of premises - see document for actual location

8. Easement, including the terms and provisions thereof:
   For : Slope
   Granted to : the City of Wilsonville, a municipal corporation
   Recorded : January 29, 2016
   Recording No(s) : 2016-005509
   Affects : the Westerly lot line - see document for actual location

9. Water System Facilities Easement, including the terms and provisions thereof:
   For : Public Utility
   Granted to : Tualatin Valley Water District, a domestic water supply district, organized under ORS Chapter 264 and the City of Hillsboro
   Recorded : April 8, 2016
   Recording No(s) : 2016-22826
   Affects : variable width along the Northerly lot line

10. Water System Facilities Easement, including the terms and provisions thereof:
    For : Utilities
    Granted to : Tualatin Valley Water District, a domestic water supply district, organized under ORS Chapter 264 and the City of Hillsboro
    Recorded : May 24, 2018
    Recording No(s) : 2018-032085
    Affects : A 184 square foot strip along the Westerly portion - see document for actual location

11. Stormwater Maintenance Easement Agreement, including the terms and provisions thereof:
    For : onsite stormwater facilities
    Between : W-4 LLC, an Oregon limited company
    And : the City of Wilsonville, a municipal corporation of the State of Oregon
    Recorded : November 15, 2019
    Recording No(s) : 2019-072356

12. Unpaid Taxes for 2021 -2022:
    Levied Amount : $565,179.31
    Balance Owing : $376,786.21, plus interest and fees, if any
    Property ID No. : 00810331
    Levy Code : 003.023
    Map Tax Lot No. : 31W14B 00202

13. Unpaid Taxes for 2021-2022:
    Levied Amount : $1,839.79, plus interest and fees, if any
    Balance Owing : $1,226.52
    Property ID No. : 05021199
    Levy Code : 003-023
    Map Tax Lot No. : 31W14B 00282

14. Unpaid Taxes for 2021-2022:
    Levied Amount : $656.76, plus interest and fees, if any
    Balance Owing : $437.84
    Property ID No. : 05008927
    Levy Code : 003-023
    Map Tax Lot No. : 31W14B 00292

15. City liens, if any, of the City of Wilsonville.

16. Line of Credit Deed of Trust with Absolute Assignment of Rents and Leases, Security Agreement and Fixture Filing, including the terms and provisions thereof to secure the amount noted below and other amounts secured thereunder, if any:
    Grantor : W-4 LLC, an Oregon limited liability company
    Trustee : Wells Fargo Financial National Bank
    Beneficiary : Wells Fargo Bank, National Association
    Dated : September 23, 2016
    Recorded : September 23, 2016
    Recording No(s) : 2016-065036
    Amount : $17,500,000.00

17. Financing Statement, including the terms and provisions thereof:
    Debtor : W-4 LLC
    Secured Party : Wells Fargo Bank, National Association
    Recorded : September 23, 2016
    Recording No(s) : 2016-065037
    Affecting : Fixtures

The financing statement was Continued by Continuation:
Recorded : March 23, 2021
Recording No. : 2021-029545, of Official Records

The financing statement was Amended:
Recorded : April 12, 2021
Recording No. : 2021-037768, of Official Records

18. Lease, including the terms and provisions thereof, as evidenced by Memorandum:
Lessor : W-4 LLC, an Oregon limited liability company
Lessee : DWFritz Automation, Inc., an Oregon corporation
Dated : July 1, 2016
Recorded : September 23, 2016
Recording No(s) : 2016-065038

Subordination, Non-Disturbance, Attornment and Estoppel Agreement, including the terms and provisions thereof:
Recorded : September 23, 2016
Recording No(s) : 2016-065110

The above Lease was subordinated to the Deed of Trust recorded September 23, 2016 as Recording No(s) 2016-65036.

19. Any unrecorded leases or rights of tenants in possession.

20. No search has been made for Financing Statements filed in the office of the Secretary of State. Exception may be taken to such matters as may be shown thereby. No liability is assumed if a Financing Statement is filed in the office of the County Recorder covering timber, crops, fixtures or contracts on the premises wherein the lands are described other than by metes and bounds or under the rectangular survey system or by recorded lot and block.

END OF EXCEPTIONS

NOTE: We find NO judgments or Federal Tax Liens against the name(s) of W-4 LLC.

NOTE: LINKS FOR ADDITIONAL SUPPORTING DOCUMENTS:
Assessor's map
Taxes 00810331
Taxes 05021199
Taxes 05008927
Vested Deed
Deed Book 383 page 262 ref in legal
Deed 2006-050621 excepted in legal
CMap TL 202
CMap TL 282
CMap TL 292

NOTE: ADJOINING DEEDS FOR TAX LOT 401 AND 491.

NOTE: The following Personal Property Taxes are connected to Tax Lot 202:
P2253193 : DWFritz Automation Inc.
P2255283 : Otto DesignWorks LLC

NOTE: The Oregon Corporation Commission disclosed that W-4 LLC, is an active Oregon limited liability company:
Filed : July 1, 2016
Manager : Mac Martin
Member : Fritz Brothers Investments LLC
Manager : Jack Martin
Manager : Michael Fritz
Registered Agent : Michael Fritz

END OF REPORT

Diane Brokke
WFG National Title Insurance Company
12909 SW 68th Pkwy., Suite 350
Portland, OR 97223
Phone: **(503) 431-8504**
Fax: **(503) 684-2978**
Email: **dbrokke@wfgnationaltitle.com**

EXHIBIT A
LEGAL DESCRIPTION

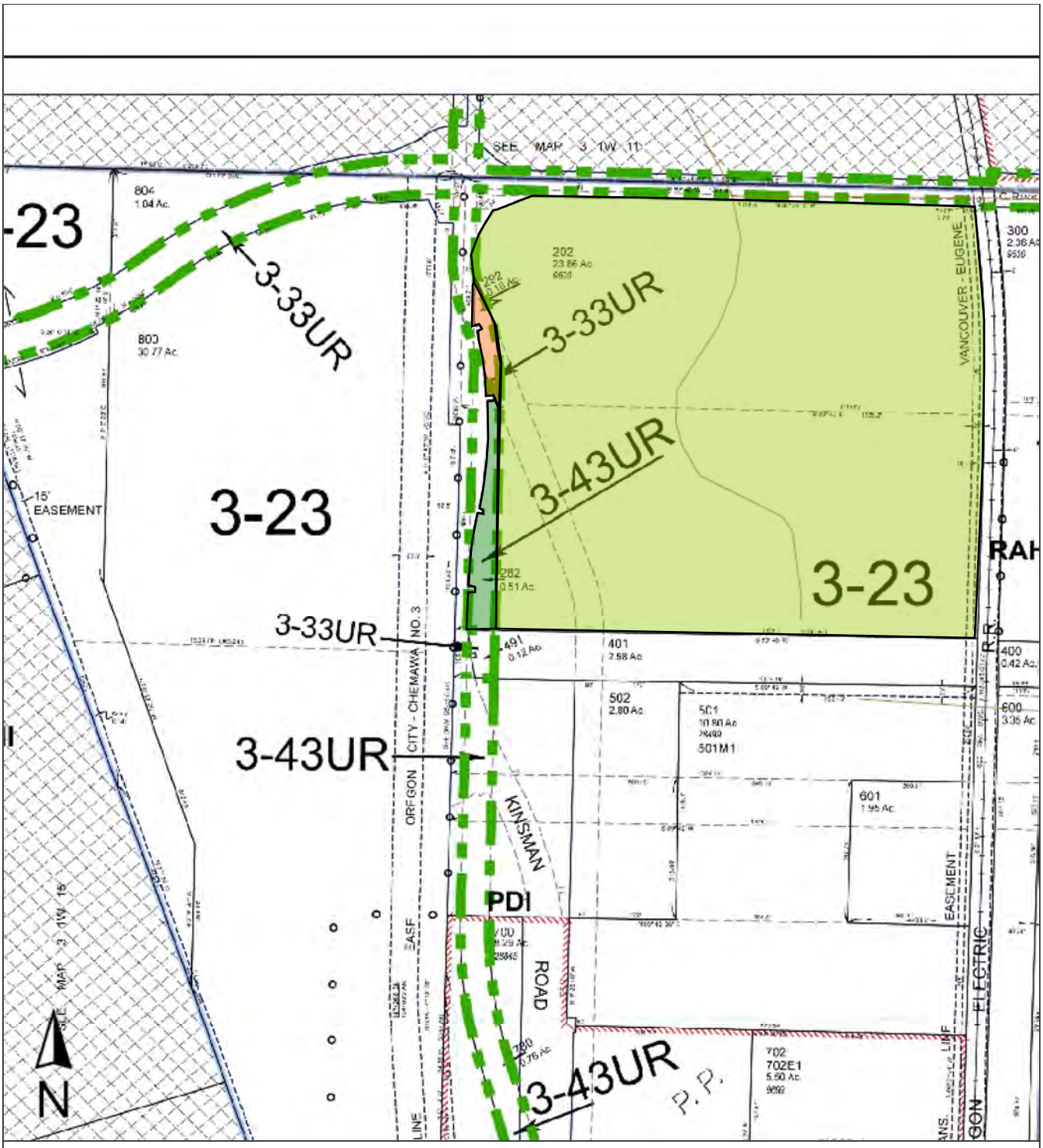
A tract of land in Section 14, Township 3 South, Range 1 West of the Willamette Meridian, in the City of Wilsonville, County of Clackamas and State of Oregon, described as follows:

Beginning at an iron pipe at the Northwest corner of the Northeast one-quarter of the Northwest one-quarter of said Section 14, said point being the Northwest corner of that tract conveyed to Frederic W. Young, et ux, recorded January 13, 1947 in Book 383 page 262, Deed Records; thence South 0º13' East along the West line of said Young tract 499.70 feet to an iron pipe at the Southwest corner thereof and the true point of beginning of the tract herein to be described; thence North 89°43' East along the South line of said Young tract 25.00 feet to a point; thence North 0°13' West parallel with the West line of said Young tract 474.70 feet to a point that is Southerly 25.00 feet measured at right angles from the North line of said Young tract; thence North 89°42' East parallel to the North line of said Young tract 1080.00 feet, more or less, to the West line of the Oregon Electric Railway right of way; thence Southerly along the West line of said Oregon Electric Railway right of way 980.00 feet, more or less, to a point of intersection with the South boundary of the tract conveyed to Sunn Musical Equipment Company, a corporation, by Deed recorded May 5, 1969 as Recorder's Fee No 69 7881, Film Records; thence South 89°44' West along said South boundary 1160.00 feet, more or less, to the Southwest corner thereof, said point being in the Westerly boundary of the Northeast one-quarter of the Northwest one-quarter of said Section 14; thence North 0°13' West along said boundary 499.7 feet to the true point of beginning.

EXCEPTING THEREFROM that portion conveyed to the City of Wilsonville, a municipal corporation by Deed recorded June 2, 2006, Recording No. 2006-050621.

FURTHER EXCEPTING THEREFROM those portions conveyed to the City of Wilsonville, a municipal corporation of the State of Oregon by Deed recorded January 29, 2006, Recording No. 2016-005508.

Item 2.



0502199 31W14B 00282 05008927 31W14B 00292

00810331 31W14B 00202

WFG National Title Insurance Company
a Williston Financial Group company

This map/plat is being furnished as an aid in locating the herein described land in relation to adjoining streets, natural boundaries and other land, and is not a survey of the land depicted. Except to the extent a policy of title insurance is expressly modified by endorsement, if any, the company does not insure dimensions, distances, location of easements, acreage or other matters shown thereon.

DKS 117 COMMERCIAL STREET NE, SUITE 310, SALEM, OR 97301 • 503.391.8773 • DKSASSOCIATES.COM

MEMORANDUM

DATE: November 17, 2021

TO: Matt Palmer, P.E. | City of Wilsonville

FROM: Scott Mansur, P.E., PTOE | DKS Associates
Jenna Bogert, P.E. | DKS Associates

SUBJECT: Wilsonville DW Fritz Phase 2 Trip Generation Memo

Project #19006-014

This memorandum documents the trip generation estimates for the proposed second phase of the DW Fritz Automation site, located at 9600 SW Boeckman Road in Wilsonville, Oregon. The current proposed land use for Phase 2 consists of an industrial use building. Previously, when the original Transportation Impact Study (TIS)[1] was conducted, the proposed land use for Phase 2 included industrial and restaurant land uses. The applicant desires to update the land use for Phase 2 and therefore, the net change in trip generation must be evaluated to determine if any significant impacts are expected.

The purpose of this memorandum is to estimate the weekday and PM peak hour trip generation for the site's original proposed land use (industrial and restaurant) and its current proposed land use for Phase 2 (industrial only). Then, a comparison of the trip generation estimates will be provided to determine the net change in expected vehicle generation. The memorandum will also contain a site plan review which evaluates the site accesses, internal circulation, bicycle and pedestrian needs, and parking.

TRIP GENERATION COMPARISON

Based on the original DW Fritz Phase TIS, the estimated trip generation for the proposed Phase 2 building was 65 PM peak hour trips. An excerpt from the original TIS showing the estimated trip generation is provided as an attachment. The original land use that was evaluated consisted of a single building containing 70,000 square feet of industrial use and a 4,000 square-foot restaurant. The current proposed land use for Phase 2 is an industrial use building of 80,000 square feet.

[1] Wilsonville DW Fritz Traffic Impact Analysis, DKS Associates, August 2017.

The ITE Land Use Code, Manufacturing (140), was selected to estimate the trip generation for the industrial land use, which is consistent with the original TIS.

Table 1 documents the trip generation for both the original and current proposed land uses. The site is estimated to generate fewer overall trips for the PM peak hour and average weekday as compared to the original TIS assumptions. The proposed modified use is estimated to reduce trip generation by 11 PM peak hour trips and 199 weekday trips.

TABLE 1: SITE TRIP GENERATION

LAND USE (ITE CODE)	SIZE [a]	TRIP TYPE	PM PEAK HOUR			WEEKDAY
			IN	OUT	TOTAL	
ORIGINAL PROPOSED LAND USE						
MANUFACTURING (140)	70 KSF	Vehicle	16	29	45	382
RESTAURANT (932)	4 KSF	Vehicle	23	16	39	450
INTERNAL TRIP (10%) AND PASS-BY TRIP (43%) REDUCTIONS (RESTAURANT ONLY)	-	*Vehicle*	*-11*	*-8*	*-19*	*-219*
TOTAL	74 KSF	-	28	37	65	613
CURRENT PROPOSED LAND USE						
MANUFACTURING (140)	80 KSF	Vehicle	17	37	54	414
NET DIFFERENCE (CURRENT – ORIGINAL)		***-***	***-11***	***0***	***-11***	***-199***

[a] KSF = 1,000 square feet.

PROJECT TRIPS THROUGH I-5 INTERCHANGE AREAS

Because the proposed project site is estimated to generate fewer trips than the original land use, the number of project trips enroute to/from the Wilsonville Road and Elligsen Road I-5 Interchanges were not estimated.

SITE PLAN EVALUATION

This section reviews the proposed site plan including site access, internal circulation, bicycle and pedestrian needs, and parking. The project applicant has provided a preliminary site plan, which is provided in the attachments.

SITE ACCESS

The site currently has two existing driveway access points along the south side of Boeckman Road. Based on the site plan provided, there are no additional site accesses proposed or any modifications to the existing site accesses.

INTERNAL CIRCULATION

The site plan for proposed Phase 2 shows the internal circulation for vehicles on-site. The drive aisle widths shown vary between 20 feet and 26 feet, which is sufficient for safe and efficient two-way traffic flow. New parking areas are shown the site plan, two larger lots to the southeast corner of the proposed building and a smaller lots along the north, west, and east sides of the proposed building.

Based on the site plan, the internal roadway network appears to provide adequate turning radii to allow for safe circulation.

BICYCLE AND PEDESTRIAN FACILITIES

There are existing sidewalks along SW Kinsman Road and Boeckman Road surrounding the project site. There are internal sidewalks and marked crosswalks that connect the existing and proposed parking lots to the existing building (W4) and proposed building (W5). Additionally, there are sidewalks shown on the site plan along the north, east, and south face of the proposed building. There is adequate bicycle and pedestrian facilities, therefore, no additional bicycle and pedestrian facilities are recommended.

PARKING

The proposed 80,000 square-foot manufacturing building is required to comply with the City of Wilsonville Development Code for the number of vehicular parking stalls and bicycle parking spaces that are provided on site.[5] Table 2 lists the vehicular and bicycle parking requirements for the proposed Phase 2 building only. The required stall counts are based on the type and size of the building.

TABLE 2: VEHICULAR AND BICYCLE PARKING SUMMARY

LAND USE	SIZE [a]	VEHICLE STALLS		BICYCLE STALL MINIMUM
		MINIMUM	MAXIMUM	
FLEX SPACE	80 KSF	216	328	16
PROPOSED (SITE PLAN)		315		-

[a] KSF = 1,000 square feet

As shown in the table above, 216 new vehicular stalls are needed to meet the minimum City Code requirements for the new building. Because the site is expected to have 315 parking stalls, the site meet's the City Code requirements. The table above also indicates that 16 new bicycle parking spaces are needed at the proposed building (W5) to meet the minimum City Code requirements.

[5] City of Wilsonville, Development Code, Sections 4.155, Table 5, Updated June 2020.

Currently, the site plan shows a bicycle parking rack on the northeast corner of the proposed building. However, it is unknown how many bicycle parking spaces are provided. At minimum, 16 bicycle parking spaces will need to be built and should be located near the W5 building entrances in order to provide convenient access.

SUMMARY

Key findings of the trip generation memo are as follows:

- The current proposed land use is estimated to reduce PM peak hour trips (-11 trips) and weekday trips (-199 trips) compared to the original land use assumptions.
- Because the site will generate fewer trips than the original land use, the number of trips that travel through the I-5/Elligsen Road interchange area and the I-5/Wilsonville Road interchange area were not estimated.
- At minimum, 16 bicycle parking spaces will need to be provided and should be located near the new building entrances in order to provide convenient access.

Attachments:

- Tables 4 and 5, DW Fritz Traffic Impact Study, DKS Associates, August 14, 2017.
- Site Plan

increases. The proposed Phase 1 and Phase 2 development is expected to generate approximately 183 (75 in, 108 out) PM peak hour primary trips.

Table 4: PM Peak Hour Primary Trip Generation Phases 1 and 2

Phase	Land Use (ITE Code)	Building area (square feet)	Trip Rate per 1,000 square feet	In	Out	Total
1 and 2	Manufacturing (140)	155,000 + 70,000	0.64[a]	52	92	**144**
2	Restaurant (932)	4,000	9.85	23	16	**39**
		Phases 1 and 2 Total Primary Trips		75	108	**183**

[a]Rate back-calculated from ITE equation

As per ITE Trip Generation Handbook guidance,[3] two reductions in primary trips were included in the trip generation analysis; internal trips and pass-by trips. The following paragraphs discuss these reductions and Table 5 displays the total net new trips after accounting for the internal and pass-by trip reductions.

Internal Trips. A reduction of internal trips was evaluated to reduce the total number of driveway trips to account for trips between uses (for example employees from the industrial uses staying to eat at the restaurant). An internal capture rate of 10% was applied to the PM peak hour primary trips of the restaurant.

Pass-By Trips. A reduction of pass-by trips was evaluated to account for traffic that currently exists on the adjacent roadways that the proposed project will have primary access. Pass-by trips are subtracted out after the internal trips are applied and for this project and were only applied to the restaurant trip generation. Pass-by rate of 43% was taken from the ITE Trip Generation Handbook. Pass-by trips result in new driveway trips only and will not increase traffic to the adjacent roadways.

[3] Institute of Transportation Engineers, Trip Generation Handbook, October 1998.

Table 5: PM Peak Hour Net New Trips

	In	Out	Total
Total Primary Trips (Phases 1 and 2)	75	108	**183**
Internal Trip Reduction (10% of restaurant trips)	-2	-2	**-4**
Pass-By Trip Reduction (43% of restaurant trips)	-9	-6	**-15**
Net New Trips (Phase 1 and Phase 2)	64	100	**164**

After reducing the primary project site trips for the restaurant by the internal trip reduction of 10% and then the pass-by trip rate of 43%, the net new total trips to the project site is 164 (64 in/100 out) during the PM peak hour.

Project Trips Through City of Wilsonville Interchange Areas

The project trips through the two City of Wilsonville I-5 interchange areas were estimated based on the trip generation and distribution assumptions. The proposed DW Fritz development is expected to generate 32 PM peak hour trips for Phase 1 and a total of 49 PM peak hour trips for Phases 1 and 2 through the I-5/SW Elligsen Road interchange area. The development is expected to generate 21 PM peak hour trips for Phase 1 and 33 PM peak hour trips for Phases 1 and 2 through the I-5/Wilsonville Road interchange area.

Project Traffic Impact

The impact analysis includes trip generation, trip distribution, and PM peak hour project trips for Phase 1 and Phase 2 of the project. The analysis also includes scenarios that account for Stage II approved developments in the area, including those under construction or built but not yet occupied. The scenarios include:

- Existing + Stage II (includes traffic from other developments with Stage II approval or are under construction)
- Existing + Project (Phase 1)
- Existing + Project (Phase 1) + Stage II
- Existing + Project (Phase 1 and Phase 2)
- Existing + Project (Phase 1 and Phase 2) + Stage II

The study intersection operating conditions for the project trips during Phase 1 development and future Stage II developments are listed in Table 6. All the study intersections meet operating standards for “Existing plus Phase 1,” “Existing plus Stage II,” and “Existing plus Phase 1 plus Stage II” scenarios.

Attachment B

Item 2.

"CITY OF WILSONVILLE, BOECKMAN ROAD CL, PLS 53760" HELD

S.W. BOECKMAN ROAD
(COUNTY ROAD NO. 80)

5/8" I.R. NO CAP –DOWN 0.3' S 50°41'07" E, 1.82'

N 68°32'52" E 90.43'
N 32°16'22" E 51.31'
N 20°43'43" E 36.47'
S 01°30'55" W 164.06'
S 14°17'31" E 10.01'
N 76°07'33" E 11.19'
S 76°07'00" W 11.35'
N 85°42'56" E 14.00'
S 85°42'11" W 13.99'
S 04°09'13" E 10.00'
N 77°06'45" W 12.44'
N 77°22'57" W 12.46'
S 12°47'45" W 9.95'
S 88°00'09" E 17.96'
N 01°44'30" E 9.97'
S 88°10'19" E 17.99'
S 88°36'17" E 1126.89'
S 88°38'30" E 959.86'
N 01°34'36" E 537.63'

SROZ ENCROACHMENT
5,381 S.F

FOREST AREA
(NOT SURVEYED)

KINSMAN ROAD
(UNIMPROVED)

PROPOSED
BUILDING W5
65,000 S.F. FOOTPRING
15,000 S.F. MEZZANINE
326 STALLS
315 NEW BLDG. W5 (3.94/1000)
11 RELOCATED BLDG. W4
SROZ AREA – 156,230 +/– S.F.
SROZ ENCROACHMENT – 5,914 S.F. (3.79%)
WETLAND AND BUFFER – 145,157 S.F.

BIKE RACK
DUMPSTER
DOCK HIGH DOORS
DRIVE–IN DOOR
EDGE OF TREES
VARIABLE WIDTH SLOPE EASEMENT PER FEE NO. 2006–050622
6' TALL CHAINLINK FENCE
CONCRETE RETAINING WALL
45' TRANSMISSION LINE EASEMENT PER BOOK 285 PAGE 301

CONSTRUCTED PARKING LOTS AND UTILITIES AS SHOWN ARE PER ENGINEERS DESIGN AND HAS NOT BEEN SURVEYED

EXISTING
BUILDING W4

9600 BOECKMAN RD
EXISTING BUILDING
TAX MAP 3 1W 14B
TAX LOT 202

ASPHALT DRIVEWAY
ASPHALT PARKING LOT
CONCRETE PAD
CONCRETE SIDEWALK
SEE NOTE B

WETLAND
VARIABLE WIDTH SLOPE EASEMENT PER FEE NO. 2016–005509
50' SETBACK
EDGE OF TREES

RAILROAD
ELECTRIC
OREGON
R=28339.93' L=423.47'
5/8" I.R. W STAMPED "DLT & AS DOWN 1.0'
RAILROAD E EASEMENT F FEE NO. 20
14.0' SLOPE EASEMENT PER FEE NO. 2006–1
25' WIDE TRANSMISSION LINE EASEMENT PER BOOK 284 PAGE 434

R=856.50' L=242.79'
L=158.42' R=803.49'
R=803.49' L=87.80'
R=856.50'

SITE PLAN
1" = 50'–0"

18003	job no.
EM	drawn
BW	checked
11–9–21	date

REGISTERED ARCHITECT · LANCE MUELLER · SEATTLE, WA. 1491 · STATE OF OREGON

BUILDING W5
9900 SW Boeckman Rd.
Wilsonville, OR 97070

LANCE MUELLER & ASSOCIATES
ARCHITECTS AIA
130 LAKESIDE • SUITE 250 • SEATTLE, WA 98122 • (206) 325-2553

SITE PLAN

sheet
A1.1

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Geotechnical Engineering Report

Martin Development – Building W5
Wilsonville, Oregon

for
Martin Development

July 14, 2021

GeoEngineers
Earth Science + Technology

Geotechnical Engineering Report

Martin Development – Building W5
Wilsonville, Oregon

for
Martin Development

July 14, 2021

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Geotechnical Engineering Report

Martin Development – Building W5
Wilsonville, Oregon

File No. 0821-016-00

July 14, 2021

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TNG:GAL:cje

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1.0 INTRODUCTION

GeoEngineers, Inc. (GeoEngineers) is pleased to submit this geotechnical engineering report for the proposed Martin Development project located at 9600 SW Boeckman Road in Wilsonville, Oregon. The total project site is approximately 24.5 acres and located south of SW Boeckman Road, east of SW Kinsman Road, west of the existing railroad tracks and north of an existing development. The eastern portion of the site (Parcel 2 ~11.9 acres) is currently developed with Building W4 and associated parking. The western portion of the site (Parcel 1 ~12.6 acres) is proposed to be developed with a single-story Building W5 and associated parking. The location of the site is shown in the Vicinity Map, Figure 1.

Based on correspondence with you and a conceptual site plan (Sheet A1.1) prepared by Lance Mueller & Associates dated March 26, 2021, we understand the project will consist of an approximate 65,000-square-foot, single-story Building W5 within the currently vacant open space west of Building W4. Associated improvements are expected to include underground utilities, asphalt-paved drive aisles, a parking lot and potentially stormwater infiltration facilities.

At the time this report was prepared, VLMK Engineering + Design indicated maximum column and wall loads will be on the order of 600 to 750 kips per column and 12 to 15 kips per lineal foot (klf), respectively. We have assumed that floor loads for slabs-on-grade will be 150 pounds per square foot (psf) or less.

2.0 SCOPE OF SERVICES

Our specific scope of services is detailed in our proposal to you dated April 21, 2021, and authorized April 22, 2021, but in general included: reviewing selected geotechnical information about the site; exploring subsurface soil and groundwater conditions; collecting representative soil samples; completing relevant laboratory testing and geotechnical analyses; and preparing this geotechnical report with our conclusions, findings and design recommendations. Infiltration testing was added to our original scope at the request of Mackenzie.

3.0 SITE CONDITIONS

3.1. Area Geology

Site geology is mapped by the Geology and Geologic Hazards of Northwestern Clackamas County (Schlicker and Finlayson 1979) as underlain by “lacustrine sediments” of Willamette Silt. These sedimentary deposits consist of late-stage “cross-bedded to graded” fine sandy silt and clay deposited across the Willamette Valley by impoundment of the late Pleistocene glacial-outburst floods.

Our subsurface explorations suggest, however, that the shallow subsurface conditions reflect the effects of the so-called "Tonquin Scabland" that traverses the immediate area west of the site. This late-stage Missoula Flood outwash channel incised the earlier Willamette Silt sediment and deposited a layer of coarse lag gravel alluvium in the alluvial channel during the early, high-energy phase of the flood that was capped by silt and sand during the latter, lower-energy phase.

Based on our subsurface explorations we believe that the contact with the Tonquin alluvium is mapped too far to the west, and the surface of the site is mantled by these alluvial materials, typically encountered in our borings as a 10- to 15-foot-thick surficial layer of clayey slack water deposits overlying a 15- to 20-foot-

thick early-stage layer consisting of gravelly alluvium. Where our investigations penetrated the gravels we encountered the Willamette Silt as mapped by Schlicker and Finlayson (1979).

3.2. Surface Conditions

The proposed development consists of an approximate 12.6 acre site that is currently undeveloped with the exception of an access roadway on the east side of the site leading to the south side of Building W4. The undeveloped area within the northern portion of the site (proposed Building W5) is generally covered with rough field grass. Undeveloped area within the southern proposed parking lot consists of rough field grass, an existing asphalt drive aisle, and occasional trees. The site is generally flat with elevations ranging from approximately 157 to 159 feet above mean sea level (MSL) within the proposed building footprint and slopes gradually south of the building footprint to approximately 152 to 154 feet above MSL.

3.3. Subsurface Conditions

We explored subsurface soil and groundwater conditions at the site on May 26 and 27, 2021 by drilling four borings (B-1 through B-4) within the proposed building footprint to depths of 29 to 41½ feet below ground surface (bgs), three borings (B-5 through B-7) within proposed parking areas to a depth of 6½ feet bgs, and three borings (IT-1 through IT-3) for infiltration testing to a depth of 5 feet bgs at the approximate locations shown in the Site Plan, Figure 2.

Representative soil samples from the borings were returned to our laboratory for examination and testing. Detailed descriptions of our site exploration and laboratory-testing programs, along with exploration logs and laboratory test results, are presented in Appendix A.

3.3.1. Soil Conditions

In general, underlying an approximately 2- to 4-inch-thick grass/topsoil zone, we encountered approximately 10 to 15 feet of very soft to very stiff gray-brown clay with varying amounts of sand and gravel. Underlying the upper clay soils, a medium dense to dense brown silty gravel with varying amounts of sand was observed between approximately 10 to 20 feet bgs, where the soil transitioned to a medium dense to very dense brown gravel with varying amounts of silt and sand from approximately 20 to 33 feet bgs. Underlying the gravel, a medium stiff to very stiff gray clay with varying amounts of sand and gravel was observed to the maximum depths explored.

3.3.2. Groundwater

We encountered groundwater at approximately 17¾ feet bgs during drilling at boring B-1, performed using hollow-stem auger. Boring B-1 was left open and allowed to equilibrate overnight. The groundwater at this boring was confined and rose from approximately 17¾ feet bgs to 13 feet bgs approximately 19 hours after drilling. The mud rotary drilling methods did not allow for direct observation of groundwater in our other borings. Sample saturation indicated that groundwater was consistent between the explorations and encountered at approximately 15 feet bgs. We reviewed water well logs on file with the Oregon Water Resources Department to estimate the depth to regional groundwater. Based on our review, regional groundwater is present at approximately 10 to 20 feet bgs and is consistent with water levels observed in our exploration of the site. Groundwater should be expected to rise several feet during periods of extended rainfall as well as from capillary rise. We recommend using a static groundwater of approximately 8 feet bgs at Building W5 for design purposes. Groundwater conditions at the site are expected to vary seasonally due to rainfall events and other factors not observed in our explorations.

4.0 INFILTRATION TESTING

We conducted a total of three infiltration tests at the three requested exploration locations (IT-1, IT-2 and IT-3), at a depth of approximately 5 feet bgs as shown in Figure 2. Testing was conducted using the encased falling head method in general accordance with the procedures outlined in Appendix B of Section 3 Public Works Standards, in the City of Wilsonville 2015 Stormwater & Surface Water Design & Construction Standards (SSWDCS). Test procedure is based on a modified procedure of the U.S. Environmental Protection Agency (EPA) Falling Head Percolation Test (Onsite Wastewater Treatment and Disposal Systems Design Manual, EPA/625/1-80-012, 1980). Our general procedure included drilling to the specified depth with a 6-inch hollow-stem auger, placing a 2-inch-thick layer of washed bagged gravel in the bottom of the hollow-stem auger prior to adding water to reduce disturbance from flowing water at the base of the auger.

Infiltration tests IT-1, IT-2, and IT-3 were pre-soaked over a 4-hour period by repeated addition of water into the pipe when necessary. In our opinion, a good seal was present between the auger and the surrounding soil at the test depth. After the saturation period, the hole was filled with clean water to at least 12 inches above the soil in the bottom of the auger. The drop-in water level was measured over a period of time after the soak period. Field-measured test results are summarized in Table 1. Appropriate correction factors should be applied to the field-measured rates, as discussed below.

TABLE 1. INFILTRATION RESULTS

Infiltration Test No.	Location	Depth (feet)	USCS Material Type	Field Measured Infiltration Rate[1] (inches/hour)
IT-1	NW corner of Building (See Site Plan)	5	CL	0.05-0.1
IT-2	Parking Area SW of Building (See Site Plan)	5	CL	0.1
IT-3	SE corner of Building (See Site Plan)	5	CL	0.1

Notes:

[1] Appropriate factors should be applied to the field-measured infiltration rate, based on the design methodology and specific system used.

USCS = Unified Soil Classification System

The infiltration rates shown in Table 1 and discussed above, are field-measured infiltration rates. These represent the short-term measured rate, and factors of safety have not been applied for the type of infiltration system being considered, variability that may be present in the on-site soil, frequency and type of system maintenance, potential for siltation and bio-fouling, as well as system design correction factors for overflow or redundancy.

Appropriate correction factors should also be applied by the project civil engineer to account for long-term infiltration parameters. From a geotechnical perspective, we recommend a factor of safety (correction factor) of at least 3 be applied to the field-measured infiltration values to account for potential soil variability with depth and location within the area tested. This is the minimum required factor of safety allowed in the SSWDCS for encased falling head tests. In addition, the stormwater system design engineer should determine and apply appropriate remaining correction factor values, or factors of safety, to account for other factors, as identified above.

The actual depths, lateral extent and estimated infiltration rates can vary from the values presented above. We recommend that the design infiltration values be confirmed by field testing completed during installation. Field testing/confirmation during construction is often required in large or long systems or other situations where soil conditions may vary within the area where the system is constructed. The results of this field testing might necessitate that the infiltration locations be modified to achieve the design infiltration rate.

As a result of fine-grained soil conditions and very low measured infiltration rates, we recommend infiltration of stormwater not be used as the sole method of stormwater management at this site unless those design factors can be otherwise accounted for by increasing infiltration area or coupling with other methods of stormwater disposal.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on our explorations, testing and analyses, it is our opinion that the site is generally suitable for the proposed development from a geotechnical engineering standpoint, provided the recommendations in this report are included in design and construction. We offer the following conclusions regarding geotechnical engineering design at the site.

- On-site near surface soils generally consist of clay. The clay soils will become significantly disturbed from earthwork occurring during periods of wet weather, or when the moisture content of the soil is more than a few percentage points above optimum. Wet weather construction practices will be required unless earthwork occurs during the dry summer months (typically mid-July to mid-September).
- Groundwater was encountered between approximately 17¾ feet bgs during drilling and measured at approximately 13 feet bgs approximately 19 hours later in boring B-1. We recommend using a static groundwater of approximately 8 feet bgs at Building W5 for design purposes.
- On-site clay soils are generally not suitable for reuse as structural fill.
- Structures with column loads less than 50 kips and wall loads less than 5 klf can be supported on continuous and isolated spread foundations supported on a minimum 1-foot-thick compacted gravel pad over medium stiff or firmer native silt. Soft/loose or unsuitable soil encountered beneath the foundations should be removed to medium stiff or stiffer material and replaced with compacted structural fill.
- Structures with column loads up to 200 kips and wall loads less than 15 klf can be supported on continuous and isolated spread foundations supported on a minimum 2-foot-thick compacted gravel pad over medium stiff or firmer native clay.
- Structures with column loads up to 750 kips can be supported on isolated spread foundations supported on a minimum 3-foot-thick compacted gravel pad over medium stiff or firmer native clay.
- Floor slabs supporting 150 psf loads or less can be founded on aggregate base placed on native medium stiff or firmer clay.
- Standard concrete and asphalt pavement sections prepared as described in this report will suitably support estimated traffic loads.

6.0 EARTHWORK RECOMMENDATIONS

6.1. Site Preparation

Initial site preparation and earthwork operations will include stripping and grubbing, removing existing pavements within the improvement area, grading the site and excavating for utilities and foundations described below.

6.1.1. Demolition

If present, existing utilities in the construction area should be identified prior to excavation. Live utility lines identified beneath proposed structures should be relocated. Abandoned utility lines beneath structures should be completely removed or filled with grout in order to reduce potential settlement of new structures. Soft or loose soil encountered in utility line excavations should be removed and replaced with structural fill where the soft soil is located within structural areas.

Existing voids and new depressions created during site preparation, and resulting from removal of existing utilities or other subsurface elements, should be cleared of loose soil or debris down to firm soil and backfilled with compacted structural fill. Disturbance to a greater depth should be expected if site preparation and earthwork are conducted during periods of wet weather.

6.1.2. Stripping

Based on our observations, we estimate that the depth of stripping of organics will be on the order of about 3 inches. Greater stripping depths may be required to remove localized zones of loose or organic soil, and in areas where moderate to heavy vegetation may be present, or surface disturbance has occurred. Stripped material should be transported off site for disposal or processed and used as fill in landscaping areas, if approved by the landscape architect. Clearing and grubbing recommendations provided below should be used in areas where moderate to heavy vegetation are present, or where surface disturbance from prior use has occurred.

6.1.3. Clearing and Grubbing

Where thicker vegetation is present, more extensive site clearing will be required to remove site vegetation, including thick grass, shrubs and trees that are designated for removal. Following clearing, grubbing and excavations up to several feet will be required to remove the root zones of thick shrubs and trees. Deeper excavations, up to 4 or 5 feet may be required to remove the root zones of large trees. Roots larger than ½ inch in diameter should be removed. Excavations to remove root zones should be done with a smooth bucket to minimize subgrade disturbance. Portions of the site are heavily vegetated and previously buried roots may be present, even in the current grassy areas of the site. Grubbed materials should be hauled off site and properly disposed unless otherwise allowed by the project specifications for other uses such as landscaping, stockpiling or on-site burning.

Existing voids and new depressions created during demolition, clearing, grubbing or other site preparation activities, should be excavated to firm soil and backfilled with Imported Select Structural Fill. Greater depths of disturbance should be expected if site preparation and earthwork are conducted during periods of wet weather.

6.2. Subgrade Preparation and Evaluation

Upon completion of site preparation activities, the exposed subgrade should be proof-rolled with a fully loaded dump truck or similar heavy rubber-tired construction equipment to identify soft, loose or unsuitable areas. Proof-rolling should be conducted prior to placing fill, and should be observed by a representative of GeoEngineers who will evaluate the suitability of the subgrade and identify areas of yielding that are indicative of soft or loose soil. If soft or loose zones are identified during proof-rolling, these areas should be excavated to the extent indicated by our representative and replaced with Imported Select Structural Fill as defined in this report.

During wet weather, or when the exposed subgrade is wet or unsuitable for proof-rolling, the prepared subgrade should be evaluated by observing excavation activity and probing with a steel foundation probe. Observations, probing and compaction testing should be performed by a member of our staff. Wet soil that has been disturbed due to site preparation activities or soft or loose zones identified during probing, should be removed and replaced with Imported Select Structural Fill as defined in this report.

6.3. Wet Weather Construction

The fine-grained soils at the site are highly susceptible to moisture. Wet weather construction practices will be necessary if work is performed during periods of wet weather. If site grading will occur during wet weather conditions, it will be necessary to use track-mounted equipment, load removed material into trucks supported on existing pavement, use gravel working pads and employ other methods to reduce ground disturbance. The contractor should be responsible to protect the subgrade during construction.

During wet weather we recommend that:

- The ground surface in and around the work area should be sloped so that surface water is directed to a sump or discharge location. The ground surface should be graded such that areas of ponded water do not develop.
- Slopes with exposed soils should be covered with plastic sheeting or similar means.
- The site soils should not be left uncompacted and exposed to moisture. Sealing the surficial soils by rolling with a smooth-drum roller prior to periods of precipitation will reduce the extent to which these soils become wet or unstable.
- Construction activities should be scheduled so that the length of time that soils are left exposed to moisture is reduced to the extent practicable.

In general, if construction activities are planned during periods of wet weather, the contractor should consider the use of granular haul roads and staging area to reduce subgrade disturbance. Based on our experience, between 18 and 24 inches of imported granular material is generally required to provide stable staging areas and haul roads. However, the actual thickness will depend on the contractor's means and methods and accordingly, should be the contractor's responsibility. Additionally, a geotextile fabric, such as Propex Geotex 104F, or approved alternate, should be placed as a barrier between the subgrade and imported granular material in areas of repeated construction traffic.

6.4. Excavation

Based on the material encountered in our subsurface explorations, it is our opinion that conventional earthmoving equipment in proper working condition should be capable of making necessary general excavations.

The earthwork contractor should be responsible for reviewing this report, including the boring logs, providing their own assessments and providing equipment and methods needed to excavate the site soils while protecting subgrades.

6.5. Dewatering

As discussed in the "Groundwater" Section 3.3.2 of this report, groundwater was encountered in our explorations. If groundwater is encountered during construction, saturated/wet soils should be dewatered. Sump pumps are expected to adequately address groundwater encountered in shallow excavations. In addition to groundwater seepage, surface water inflow to the excavations during the wet season can be problematic. Provisions for surface water control during earthwork and excavations should be included in the project plans and should be installed prior to commencing earthwork.

6.6. Shoring

All trench excavations should be made in accordance with applicable Occupational Safety and Health Administration (OSHA) and state regulations. Site soils within expected excavation depths typically range from very soft to stiff clay. Very soft to soft clay soils should be classified as OSHA Soil Type C, while medium stiff to stiff clay soils should be considered OSHA Soil Type B—provided there is no seepage and excavations occur during periods of dry weather. Excavations deeper than 4 feet should be shored or laid back at an inclination of 1H:1V (horizontal to vertical) for Type B soils and 1.5H:1V for Type C soils. Flatter slopes may be necessary if workers are required to enter. Excavations made to construct footings or other structural elements should be laid back or shored at the surface as necessary to prevent soil from falling into excavations.

Shoring for trenches less than 6 feet deep that are above the effects of groundwater should be possible with a conventional box system. Moderate sloughing should be expected outside the box. Shoring deeper than 6 feet or below the groundwater table should be designed by a registered engineer before installation. Further, the shoring design engineer should be provided with a copy of this report.

In our opinion, the contractor will be in the best position to observe subsurface conditions continuously throughout the construction process and to respond to the soil and groundwater conditions. Construction site safety is generally the sole responsibility of the contractor, who also is solely responsible for the means, methods and sequencing of the construction operations and choices regarding excavations and shoring. Under no circumstances should the information provided by GeoEngineers be interpreted to mean that GeoEngineers is assuming responsibility for construction site safety or the contractor's activities; such responsibility is not being implied and should not be inferred.

6.7. Structural Fill and Backfill

6.7.1. General

Materials used to support building foundations, floor slabs, hardscape, pavements and any other areas intended to support structures or within the influence zone of structures are classified as structural fill for the purposes of this report.

All structural fill should be free of debris, clay balls, roots, organic matter, frozen soil, man-made contaminants, particles with greatest dimension exceeding 4 inches and other deleterious materials. The suitability of soil for use as structural fill will depend on the gradation and moisture content of the soil. As the amount of fines in the soil matrix increases, the soil becomes increasingly more sensitive to small changes in moisture content and achieving the required degree of compaction becomes more difficult or impossible. Recommendations for suitable fill material are provided in the following sections.

6.7.2. Use of On-site Soil

As described in the "Subsurface Conditions" Section 3.3, the on-site near surface soil consists of clay. On-site soils are generally not suitable for use as structural fill.

6.7.3. Imported Select Structural Fill

Imported select granular material may be used as structural fill. Imported Select Structural Fill should consist of pit or quarry run rock, crushed rock, or crushed gravel and sand that is fairly well-graded between coarse and fine sizes, with approximately 25 to 65 percent passing the U.S. No. 4 sieve. It should have less than 5 percent passing the U.S. No. 200 sieve and have a minimum of two mechanically fractured faces. During dry weather, the fines content can be increased to a maximum of 12 percent.

6.7.4. Aggregate Base

Aggregate base material located under floor slabs and pavements, and crushed rock used in footing overexcavations should consist of imported clean, durable, crushed angular rock. Such rock should be well-graded, have a maximum particle size of 1 inch and have less than 5 percent passing the U.S. No. 200 sieve (3 percent for retaining walls). In addition, aggregate base shall have a minimum of 75 percent fractured particles according to American Association of State Highway and Transportation Officials (AASHTO) TP-61 and a sand equivalent of not less than 30 percent based on AASHTO T-176.

6.7.5. Retaining Wall Backfill

Fill placed to provide a drainage zone behind retaining walls should meet the general requirements above and consist of free-draining sand and gravel or crushed rock with a maximum particle size of ¾ inch and less than 3 percent passing the U.S. No. 200 sieve.

6.7.6. Trench Backfill

Backfill for pipe bedding and in the pipe zone should consist of well-graded granular material with a maximum particle size of ¾ inch and less than 5 percent passing the U.S. No. 200 sieve. Trench backfill material should be free of organic matter and other deleterious materials. Further, the backfill should meet the pipe manufacturer's recommendations. Above the pipe zone, Imported Select Structural Fill may be used as described above.

6.7.7. Cement Treated Subgrade Design

As an alternative to the use of imported granular material for wet weather structural fill, an experienced contractor may be able to amend the on-site soil with portland concrete cement (PCC), or with limekiln dust and PCC, to obtain suitable support properties. Successful use of soil amendment depends on the use of correct mixing techniques, soil moisture content and amendment quantities. Specific recommendations, based on exposed site conditions, for soil amending can be provided if necessary. However, for preliminary planning purposes, it may be assumed that a minimum of 5 percent cement (by dry weight, assuming a unit weight of 100 pounds per cubic foot [pcf]) will be necessary for subgrade and general fill amendment. Treatment depths of 12 to 16 inches for roadway subgrades are typical (assuming a seven-day unconfined compressive strength of at least 80 pounds per square inch [psi]), though they may be adjusted in the field depending on site conditions. Soil amending should be conducted in accordance with the specifications provided in the 2021 Oregon Department of Transportation (ODOT) Standard Specifications for Construction Section 00344 (Treated Subgrade).

6.7.8. Fill Placement and Compaction

Structural fill should be compacted at moisture contents that are within 3 percent of the optimum moisture content as determined by ASTM International (ASTM) Standard Practices Test Method D 1557 (Modified Proctor). The optimum moisture content varies with gradation and should be evaluated during construction. Fill material that is not near the optimum moisture content should be moisture conditioned prior to compaction.

Fill and backfill material should be placed in uniform, horizontal lifts and compacted with appropriate equipment. The appropriate lift thickness will vary depending on the material and compaction equipment used. Fill material should be compacted in accordance with Table 2, below. It is the contractor's responsibility to select appropriate compaction equipment and place the material in lifts that are thin enough to meet these criteria. However, in no case should the loose lift thickness exceed 18 inches.

TABLE 2. COMPACTION CRITERIA

Fill Type	Compaction Requirements		
	Percent Maximum Dry Density Determined by ASTM Test Method D 1557 at ± 3% of Optimum Moisture		
	0 to 2 Feet Below Subgrade	> 2 Feet Below Subgrade	Pipe Zone
Fine-grained soils (non-expansive)	95	95	-----
Imported Granular, maximum particle size < 1¼ inch	95	95	-----
Imported Granular, maximum particle size 1¼ inch to 4 inches (3-inch maximum under building footprints)	n/a (proof-roll)	n/a (proof-roll)	-----
Retaining Wall Backfill*	92	92	-----
Nonstructural Zones	90	90	90

Fill Type	Compaction Requirements		
	Percent Maximum Dry Density Determined by ASTM Test Method D 1557 at ± 3% of Optimum Moisture		
	0 to 2 Feet Below Subgrade	> 2 Feet Below Subgrade	Pipe Zone
Trench Backfill	95	90	90

Note:

*Measures should be taken to prevent overcompaction of the backfill behind retaining walls. We recommend placing the zone of backfill located within 5 feet of the wall in lifts not exceeding about 6 inches in loose thickness and compacting this zone with hand-operated equipment such as a vibrating plate compactor and a jumping jack.

A representative from GeoEngineers should evaluate compaction of each lift of fill. Compaction should be evaluated by compaction testing, unless other methods are proposed for oversized materials and are approved by GeoEngineers prior to fill placement. These other methods typically involve procedural placement and compaction specifications together with verifying requirements such as proof-rolling.

6.8. Slopes

6.8.1. Permanent Slopes

Permanent cut or fill slopes should not exceed a gradient of 2H:1V. Where access for landscape maintenance is desired, we recommend a maximum gradient of 3H:1V. Fill slopes should be overbuilt by at least 12 inches and trimmed back to the required slope to maintain a firm face.

Slopes should be planted with appropriate vegetation to provide protection against erosion as soon as possible after grading. Surface water runoff should be collected and directed away from slopes to prevent water from running down the face of the slope.

6.8.2. Temporary Slopes

All temporary soil cuts associated with site excavations (greater than 4 feet in depth) should be adequately sloped back to prevent sloughing and collapse, in accordance with applicable OSHA and state guidelines.

Temporary cut slopes should not exceed a gradient appropriate for the soil type being excavated. As noted in the "Shoring" Section 6.6, very soft to soft clay should be considered OSHA Soil Type C and medium stiff to stiff clay soils should be considered OSHA Soil Type B. However, because of the variables involved, actual slope angles required for stability in temporary cut areas can only be estimated before construction.

The stability and safety of cut slopes depend on a number of factors, including:

- The type and density of the soil
- The presence and amount of any seepage
- Depth of cut
- Proximity and magnitude of the cut to any surcharge loads, such as stockpiled material, traffic loads, or structures
- Duration of the open excavation
- Care and methods used by the contractor

We recommend that stability of the temporary slopes used for construction be the responsibility of the contractor, since the contractor is in control of the construction operation and is continuously at the site to observe the nature and condition of the subsurface. If groundwater seepage is encountered within the excavation slopes, the cut slope inclination may have to be flatter than 1.5H:1V. However, appropriate inclinations will ultimately depend on the actual soil and groundwater seepage conditions exposed in the cuts at the time of construction. It is the responsibility of the contractor to ensure that the excavation is properly sloped or braced for worker protection, in accordance with applicable guidelines. To assist with this effort we make the following recommendations regarding temporary excavation slopes:

- Protect the slope from erosion with plastic sheeting for the duration of the excavation to minimize surface erosion and raveling.
- Limit the maximum duration of the open excavation to the shortest time period possible.
- Place no surcharge loads (equipment, materials, etc.) within 10 feet of the top of the slope.

More restrictive requirements may apply depending on specific site conditions, which should be continuously assessed by the contractor.

If temporary sloping is not feasible based on site spatial constraints, excavations could be supported by internally braced shoring systems, such as a trench box or other temporary shoring. There are a variety of options available. We recommend that the contractor be responsible for selecting the type of shoring system to apply.

6.8.3. Slope Drainage

If seepage is encountered at the face of permanent or temporary slopes, it will be necessary to flatten the slopes or install a subdrain to collect the water. We should be contacted to evaluate such conditions on a case-by-case basis.

7.0 STRUCTURAL DESIGN RECOMMENDATIONS

At the time this report was prepared, VLMK Engineering + Design indicated maximum column loads will be 750 kips per column or less and maximum wall loads will be 15 klf or less. We have assumed that floor loads for slabs-on-grade will be 150 psf or less. If design loads exceed these values, our recommendations may need to be revised.

7.1. Foundation Support Recommendations

Depending on the building loads, the structure can be supported on spread footings bearing on thickened granular fill pads over native medium stiff or stiffer clay soils.

We recommend the shallow foundations be founded at least 18 inches below the lowest adjacent grade, or as needed to meet the design loads. The recommended minimum foundation depth is greater than the anticipated frost depth.

7.1.1. Foundation Subgrade Preparation

We recommend that prepared subgrades be observed by a member of our firm, who will evaluate the suitability of the subgrade and identify areas of yielding, which are indicative of soft or loose soil.

Individual spread and continuous wall footings should be supported on a thickened granular fill pad bearing on medium stiff or stiffer clay, as follows:

- Column loads less than 50 kips and wall loads less than 5 klf can be supported on continuous and isolated spread foundations supported on a minimum 1-foot-thick compacted gravel pad over medium stiff or firmer native clay.
- Column loads up to 200 kips and wall loads less than 15 klf can be supported on continuous and isolated spread foundations supported on a minimum 2-foot-thick compacted gravel pad over medium stiff or firmer native clay.
- Column loads up to 750 kips can be supported on isolated spread foundations supported on a minimum 3-foot-thick compacted gravel pad over medium stiff or firmer native clay.

Granular pads should consist of ¾-inch-minus select granular fill placed and compacted as structural fill. Granular pads should extend outward from the edge of the footing 1 foot for every 2 feet of depth.

Any fill material encountered beneath proposed foundation elements should be removed to competent native soils and replaced with structural fill. The width of the overexcavation should extend beyond the edge of the footing a distance equal to the depth of the overexcavation below the base of the footing. The exposed subgrade soil should be probed with a ½-inch-diameter steel rod by GeoEngineers personnel. If soft, yielding or otherwise unsuitable areas are revealed during probing, the unsuitable soils should be removed and replaced with structural fill, as needed.

We recommend loose or disturbed soils be removed before placing reinforcing steel and concrete. Foundation bearing surfaces should not be exposed to standing water. If water infiltrates and pools in the excavation, the water, along with any disturbed soil, should be removed before placing reinforcing steel.

We recommend GeoEngineers observe all foundation excavations before placing concrete forms and reinforcing steel to determine that bearing surfaces have been adequately prepared and the soil conditions are consistent with those observed during site explorations.

7.1.2. Bearing Capacity

We recommend shallow footings be proportioned using a maximum allowable bearing pressure of 3,000 psf if supported on a minimum 1- to 3-foot-thick granular fill pads described above. This bearing pressure applies to the total of dead and long-term live loads and may be increased by one-third when considering earthquake or wind loads. This is a net bearing pressure. The weight of the footing and overlying backfill can be ignored in calculating footing sizes.

7.1.3. Foundation Settlement

Foundations designed and constructed as recommended are expected to experience settlements of less than 1 inch. Differential settlements of up to one-half of the total settlement magnitude can be expected between adjacent footings supporting comparable loads.

7.1.4. Lateral Resistance

Lateral loads on footings can be resisted by passive earth pressures on the sides of footings and by friction on the bearing surface. We recommend that passive earth pressures be calculated using an equivalent fluid unit weight of 240 pcf for foundations confined by native medium stiff or stiffer clay and 350 pcf if confined by a minimum of 2 feet of imported granular fill.

We recommend using a friction coefficient of 0.35 for foundations placed on the native medium stiff or stiffer clay, or 0.50 for foundations placed on a minimum 2-foot-thickness of compacted crushed rock. The passive earth pressure and friction components may be combined provided the passive component does not exceed two-thirds of the total.

The passive earth pressure value is based on the assumptions that the adjacent grade is level and static groundwater remains below the base of the footing throughout the year. The top 1 foot of soil should be neglected when calculating passive lateral earth pressures, unless the adjacent area is covered with pavement. The lateral resistance values include a safety factor of approximately 1.5.

7.2. Drainage Considerations

We recommend the ground surface be sloped away from the buildings at least 2 percent. All downspouts should be tightlined away from the building foundation areas and should also be discharged into a stormwater disposal system. Downspouts should not be connected to footing drains.

Although not required based on expected groundwater depths, if perimeter footing drains are used for below-grade structural elements or crawlspaces, they should be installed at the base of the exterior footings. The perimeter footing drains should be provided with cleanouts and should consist of at least 4-inch-diameter perforated pipe placed on a 3-inch bed of, and surrounded by, 6 inches of drainage material enclosed in a non-woven geotextile such as Mirafi 140N (or approved equivalent) to prevent fine soil from migrating into the drain material. We recommend against using flexible tubing for footing drainpipes. The perimeter drains should be sloped to drain by gravity to a suitable discharge point, preferably a storm drain. We recommend that the cleanouts be covered and placed in flush-mounted utility boxes. Water collected in roof downspout lines must not be routed to the footing drain lines.

7.3. Floor Slabs

Subgrade support for concrete floor slabs supporting up to 150 psf areal loading can be obtained from the medium stiff or firmer native clay or on new structural fill placed on these materials.

A minimum 6-inch-thick layer of crushed rock Aggregate Base material should be placed over the prepared subgrade as a capillary break. Aggregate Base material placed directly below the slab should be ¾-inch maximum particle size or less. We recommend using a subgrade modulus value of 125 pounds per cubic inch (pci) to design slabs on grade, provided the site is prepared as recommended. Concrete slabs constructed as recommended will likely settle less than 1 inch. We recommend that concrete slabs be jointed around columns to allow the individual structural elements to settle differentially.

Due to the presence of fine-grained soils, moisture should be expected at the subgrade surface. Where moisture vapor emission through the slab must be minimized, a vapor retarding membrane or vapor barrier below the slab should be considered.

7.4. Retaining Walls

7.4.1. Concrete Retaining Walls

Retaining structures free to rotate slightly around the base should be designed for active earth pressures using an equivalent fluid unit weight of 40 pcf when the ground surface extends level behind the wall equal to the wall height and 72 pcf for a 2H:1V slope above the wall. For lesser slopes between flat and 2H:1V, the equivalent fluid unit weight can be linearly interpolated between the recommended values.

Retaining walls that are restrained against rotation such as embedded building walls, should be designed for an at-rest equivalent fluid unit weight of 60 pcf for a flat backslope. The at-rest earth pressure should be increased to 90 pcf equivalent fluid unit weight for a backslope of 2H:1V behind the wall and can be linearly interpolated for slopes between the recommended values.

The earth pressure values are based on the following assumptions.

- Walls are adequately designed for the appropriate condition being restrained or not restrained against rotation.
- Walls are 8 feet or less in total wall support height.
- The backfill within 2 feet of the wall consists of free-draining granular materials.
- Grades above the wall heights are no steeper than 2H:1V slope.
- Total wall heights are based on a level front slope from the base of the wall.
- Hydrostatic pressures do not develop, and drainage will be provided behind the wall.

Seismically induced lateral forces on retaining walls can be calculated using a dynamic force equal to 9H psf, where H is the wall height. This seismic force should be applied with the centroid located at 0.6H from the wall base. These values assume that the wall is vertical and unrestrained and the backfill behind the wall is horizontal. Seismic lateral earth pressures were computed using the Mononobe-Okabe equation.

Surcharge loads applied closer than one-half of the wall height should be considered as uniformly distributed horizontal pressures equal to one-third of the distributed vertical surcharge pressure. Footings for retaining walls should be designed as recommended for shallow foundations. Backfill should be placed and compacted as recommended for structural fill.

Re-evaluation of our recommendations will be required if the retaining wall design criteria for the project vary from these assumptions.

We recommend that GeoEngineers be retained to review the retaining wall design to confirm that it meets the requirements in our report.

7.5. Seismic Design

Parameters provided in Table 3 are based on the conditions encountered during our subsurface exploration program and the procedure outlined in the 2018 International Building Code (IBC), which references the 2016 Minimum Design Loads for Buildings and Other Structures (American Society of Civil Engineers [ASCE] 7-16). Per ASCE 7-16 Section 11.4.8, a ground motion hazard analysis or site-specific response analysis is

required to determine the design ground motions for structures on Site Class D sites with S_1 greater than or equal to 0.2g.

For this project, the site is classified as Site Class D with an S_1 value of 0.383g; therefore, the provision of 11.4.8 applies. The parameters listed in Table 3 below may be used to determine the design ground motions if Exception 2 of Section 11.4.8 of ASCE 7-16 is used. Using this exception, the seismic response coefficient (C_s) is determined by Equation (Eq.) (12.8-2) for values of $T \leq 1.5T_S$, and taken as equal to 1.5 times the value computed in accordance with either Eq. (12.8-3) for $T_L \geq T > 1.5T_s$ or Eq. (12.8-4) for $T > T_L$, where T represents the fundamental period of the structure and T_S=0.764 sec. If requested, we can complete a site-specific seismic response analysis, which might provide somewhat reduced seismic demands from the parameters in Table 3 and the requirements for using Exception 2 of Section 11.4.8 in ASCE 7-16. The reduced values will likely not be significant enough to warrant the additional cost of further evaluation if designing to 2018 IBC.

TABLE 3. MAPPED 2018 IBC SEISMIC DESIGN PARAMETERS

Parameter	Recommended Value[1,2]
Site Class	D
Mapped Spectral Response Acceleration at Short Period (S_S)	0.820 g
Mapped Spectral Response Acceleration at 1 Second Period (S_1)	0.383 g
Site Modified Peak Ground Acceleration (PGA_M)	0.458 g
Site Amplification Factor at 0.2 second period (F_a)	1.172
Site Amplification Factor at 1.0 second period (F_v)	1.917
Design Spectral Acceleration at 0.2 second period (S_{DS})	0.641 g
Design Spectral Acceleration at 1.0 second period (S_{D1})	0.489 g

Notes:

[1] Parameters developed based on Latitude 45.316573° and Longitude -122.778908° using the ATC Hazards online tool.

[2] These values are only valid if the structural engineer utilizes Exception 2 of Section 11.4.8 (ASCE 7-16).

8.0 PAVEMENT DESIGN RECOMMENDATIONS

8.1. General

Pavement subgrades should be prepared in accordance with the "Site Preparation" Section 6.1 of this report. The design of the recommended pavement sections are based on an assumed California Bearing Ratio of 3. We do not have specific information on the frequency and type of vehicles that will use the area; however, we have based our design analysis on traffic consisting of 500 cars and up to five, three-axle delivery trucks per day. Light duty pavement areas are considered those accessed only by auto traffic (i.e., parking areas). Heavy-duty pavement areas include those within the drive path of heavy trucks and delivery vehicles.

Heavy construction traffic has not been considered in our pavement design; therefore, we assume that the pavements will be constructed at the end of the project after heavy construction vehicles, such as concrete trucks and construction material delivery trucks, will no longer access the site. Construction traffic should

not be allowed on new pavements. If this is not the case, we will have to re-design the pavements for those heavier loading conditions.

8.2. Drainage

Long-term performance of pavements is influenced significantly by drainage conditions beneath the pavement section. Positive drainage can be accomplished by crowning the subgrade with a minimum 2 percent cross slope and establishing grades to promote drainage.

8.3. Pavement Sections

Based on the estimated traffic data and our analyses, our recommended pavement sections are presented in Table 4.

TABLE 4. RECOMMENDED PAVEMENT SECTIONS

Section	Minimum PCC Thickness (inches)	Minimum Asphalt Thickness (inches)	Minimum Aggregate Base Thickness (inches)
Light Duty (general automobile parking areas)	4	--	6
	--	3.5	6
Heavy Duty (drive aisles and heavy delivery areas supporting up to five three-axle trucks/day)	6	--	6
	--	4	9

The aggregate base course should conform to the "Aggregate Base" Section 6.7.4 of this report and be compacted to at least 95 percent of the maximum dry density determined in accordance with AASHTO T-180/ASTM Test Method D 1557.

The asphalt concrete (AC) pavement should conform to Section 00745 of the most current edition of the ODOT Standard Specifications for Highway Construction. The Job Mix Formula should meet the requirements for a ½-inch Dense Graded Level 2 Mix. The AC binder should be PG 64-22 grade meeting the ODOT Standard Specifications for Asphalt Materials. AC pavement should be compacted to 91.0 percent of the Maximum Theoretical Unit Weight (Rice Gravity) as determined by AASHTO T-209.

PCC pavement sections should be Class 4000 ¾-inch-minus with minimum 28-day flexural strength of 600 psi. Class 4000 indicates a design compressive strength of 4,000 psi.

The recommended pavement sections assume that final improvements surrounding the pavement will be designed and constructed such that stormwater or excess irrigation water from landscape areas does not infiltrate below the pavement section into the crushed base.

9.0 DESIGN REVIEW AND CONSTRUCTION SERVICES

Recommendations provided in this report are based on the assumptions and preliminary design information stated herein. We welcome the opportunity to review and discuss construction plans and specifications for this project as they are being developed. In addition, GeoEngineers should be retained to

review the geotechnical-related portions of the plans and specifications to evaluate whether they are in conformance with the recommendations provided in this report.

Satisfactory foundation and earthwork performance depends to a large degree on quality of construction. Sufficient monitoring of the contractor's activities is a key part of determining that the work is completed in accordance with the construction drawings and specifications. Subsurface conditions observed during construction should be compared with those encountered during the subsurface explorations. Recognition of changed conditions often requires experience; therefore, qualified personnel should visit the site with sufficient frequency to detect whether subsurface conditions change significantly from those anticipated.

We recommend that GeoEngineers be retained to observe construction at the site to confirm that subsurface conditions are consistent with the site explorations, and to confirm that the intent of project plans and specifications relating to earthwork, pavement, and foundation construction are being met.

10.0 LIMITATIONS

We have prepared this report for the exclusive use of Martin Development and their authorized agents and/or regulatory agencies for the proposed W5 building development project in Wilsonville, Oregon.

This report is not intended for use by others and the information contained herein is not applicable to other sites. No other party may rely on the product of our services unless we agree in advance and in writing to such reliance.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

Please refer to Appendix C titled "Report Limitations and Guidelines for Use" for additional information pertaining to use of this report.

11.0 REFERENCES

City of Wilsonville. 2015. Stormwater & Surface Water Design & Construction Standards (SSWDCS).

International Code Council. 2018. 2018 International Building Code.

International Code Council. 2019. 2019 Oregon Structural Specialty Code.

Occupational Safety and Health Administration (OSHA). Technical Manual Section V: Chapter 2, Excavations: Hazard Recognition in Trenching and Shoring: http://www.osha.gov/dts/osta/otm/otm_v/otm_v_2.html.

Oregon Department of Transportation (ODOT). 2021. Oregon Standard Specifications for Construction. Salem, Oregon.

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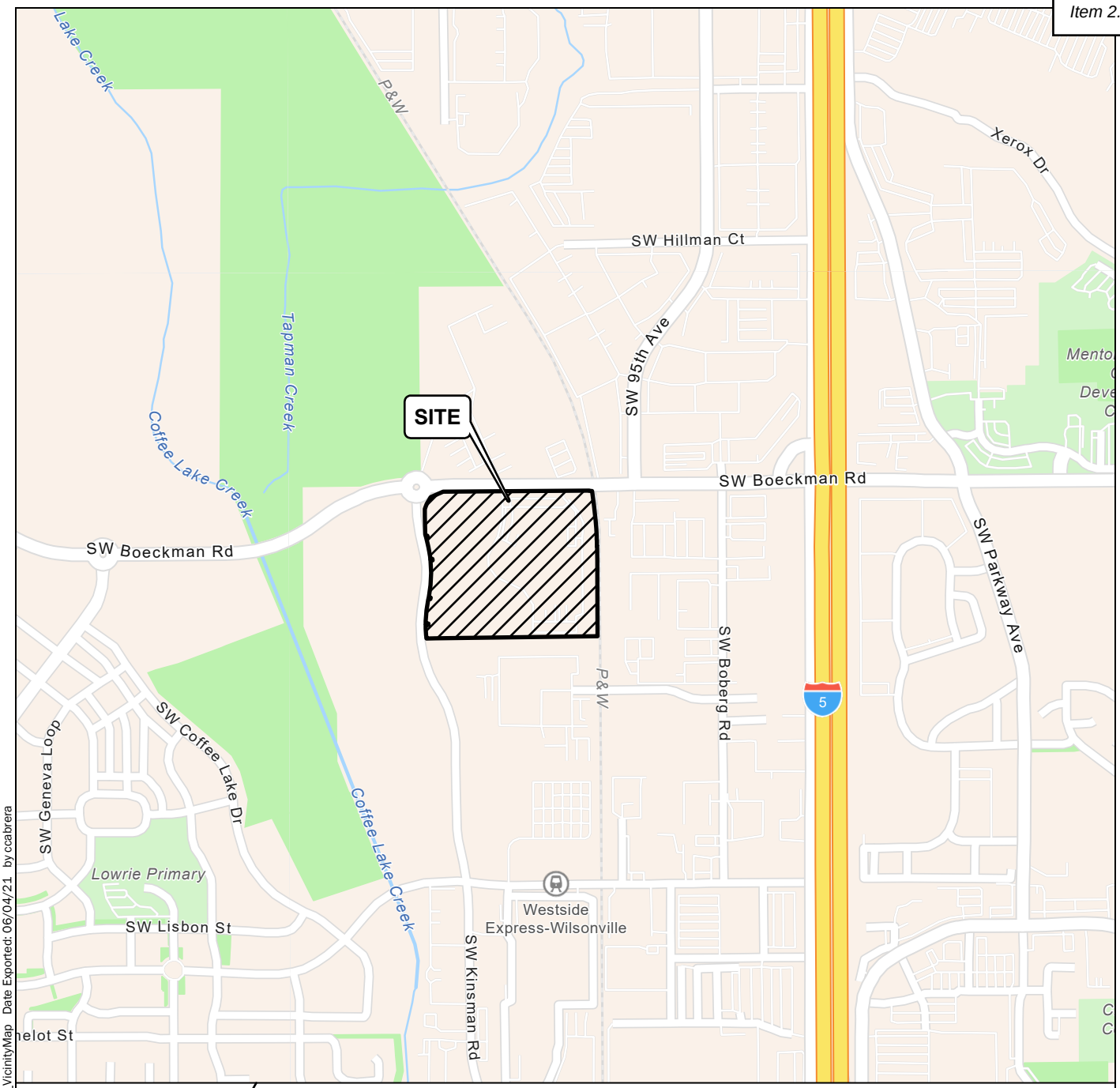

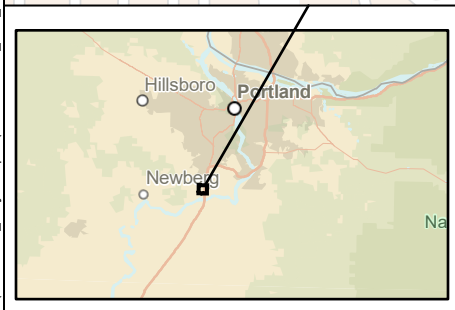

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Vicinity Map

Martin Development – Building W5
Wilsonville, Oregon

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Figure 1

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: ESRI

Projection: NAD 1983 UTM Zone 10N

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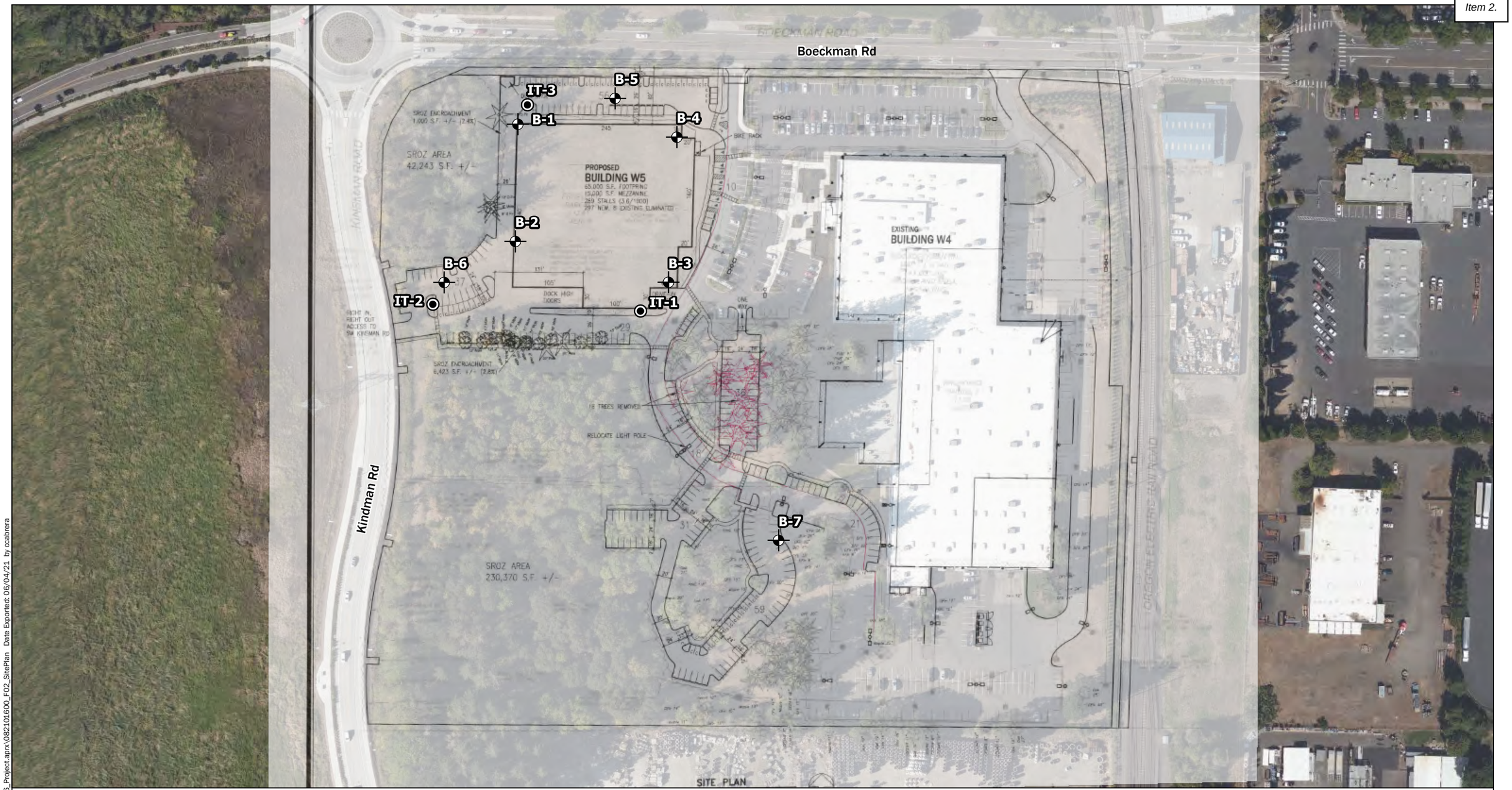

Boring Number and Approximate Location

Infiltration Test Number and Approximate Location

Data Source: Bing Maps.
Site plan overlay from Lance Mueller & Associates.

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Site Plan

Martin Development – Building W5
Wilsonville, Oregon

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Figure 2

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NOTES:

Legend

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APPENDIX A
Field Explorations and Laboratory Testing

APPENDIX A
FIELD EXPLORATIONS AND LABORATORY TESTING

Field Explorations

Soil and groundwater conditions at the site were explored on May 26 and May 27, 2021 by completing seven borings (B-1 through B-7) and three infiltration test borings (IT-1 through IT-3) at the approximate locations shown in the Site Plan, Figure 2. The borings were advanced with mud rotary and hollow-stem auger methods, using a MDI B-58 truck-mounted drill rig owned and operated by PLI Systems, Inc.

The drilling was continuously monitored by a staff engineer from our office who maintained a detailed log of subsurface explorations, visually classified the soil encountered and obtained representative soil samples from the borings. Samples were collected using a 1-inch, inside-diameter, standard split spoon sampler, a 3-inch, inside-diameter, Dames and Moore split spoon sampler, and a 3-inch, outside diameter, thin-wall Shelby Tube sampler. Split spoon samplers were driven into the soil using an automatically driven 140-pound hammer, free-falling 30 inches on each blow. The number of blows required to drive the sampler each of three, 6-inch increments of penetration were recorded in the field. The sum of the blow counts for the last two, 6-inch increments of penetration was reported on the boring logs as the ASTM International (ASTM) Standard Practices Test Method D 1556 standard penetration test (SPT) N-value. The approximate N-values for D&M samples were converted to SPT N-values using the Lacroix-Horn Conversion [N(SPT) = (2*N1*W1*H1)/(175*D1*D1*L1), where N1 is the non-standard blowcount, W1 is the hammer weight in pounds (140), H1 is the hammer drop height in inches (30), D1 is the non-standard sampler outside diameter in inches (3.23), and L1 is the length of penetration in inches (12)].

Recovered soil samples were visually classified in the field in general accordance with ASTM D 2488 and the classification chart listed in Key to Exploration Logs, Figure A-1. The logs of the borings are presented in Figures A-2 through A-11. The logs are based on interpretation of the field and laboratory data, and indicate the depth at which subsurface materials or their characteristics change, although these changes might actually be gradual.

Laboratory Testing

Soil samples obtained from the explorations were visually classified in the field and in our laboratory using the Unified Soil Classification System (USCS) and ASTM classification methods. ASTM Test Method D 2488 was used to visually classify the soil samples, while ASTM D 2487 was used to classify the soils based on laboratory test results. Moisture content tests were performed on selected samples in general accordance with ASTM D 2216 and moisture-density tests in general accordance with ASTM D 7263. One Atterberg limits test was performed in accordance with ASTM D 4318. One consolidation test was performed in general accordance with ASTM D 2435. Results of the laboratory testing are presented in the appropriate exploration logs at the respective sample depths in this appendix. The Atterberg limits and consolidation results are presented in Figures A-12 through A-14 in this appendix.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% RETAINED ON NO. 200 SIEVE	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
				SP	POORLY-GRADED SANDS, GRAVELLY SAND
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

ADDITIONAL MATERIAL SYMBOL

SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
	AC	Asphalt Concrete
	CC	Cement Concrete
	CR	Crushed Rock/ Quarry Spalls
	SOD	Sod/Forest Duff
	TS	Topsoil

Groundwater Contact

Measured groundwater level in exploration, well, or piezometer

Measured free product in well or piezometer

Graphic Log Contact

Distinct contact between soil strata

Approximate contact between soil strata

Material Description Contact

Contact between geologic units

Contact between soil of the same geologic unit

Sampler Symbol Descriptions

2.4-inch I.D. split barrel

Standard Penetration Test (SPT)

Shelby tube

Piston

Direct-Push

Bulk or grab

Continuous Coring

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

"P" indicates sampler pushed using the weight of the drill rig.

"WOH" indicates sampler pushed using the weight of the hammer.

Laboratory / Field Tests

%F	Percent fines
%G	Percent gravel
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DD	Dry density
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
Mohs	Mohs hardness scale
OC	Organic content
PM	Permeability or hydraulic conductivity
PI	Plasticity index
PL	Point load test
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

Key to Exploration Logs

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Figure A-1

Drilled Start 5/26/2021 End 5/26/2021	Total Depth (ft) 29	Logged By IT / Checked By TG	Driller PLI Systems, Inc.	Drilling Method Hollow-stem Auger	
Surface Elevation (ft) / Vertical Datum: Undetermined		Hammer Data: Autohammer 140 (lbs) / 30 (in) Drop		Drilling Equipment: B-58 MDI truck-mounted	
Latitude: 45.31705 / Longitude: -122.778913		System Datum: Decimal Degrees WGS84		See "Remarks" section for groundwater observed	

Notes: D&M N-value reduced using Lacroix-Horn conversion to approximate SPT N-value.

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	0						CL	Gray-brown clay, trace fine sands, orange mottling, trace organic matter (medium stiff, moist)			
		24			1						
	5	16	6		2						Sample at 5 feet is disturbed (re-sampled)
		18	8		3			Becomes gray, medium stiff to stiff			
	10	18	26		4		GM	Gray-brown silty gravel, occasional sand, orange mottling (medium dense, moist)			Groundwater observed at approximately 13 feet below ground surface approximately 19 hours after drilling.
	15	8	33		5			Becomes dense			Rig chatter at 17 feet
											Groundwater observed at approximately 17¾ feet below ground surface during drilling. Slower auger progress
	20	12	40		6			Becomes gray			
	25	14	30		7		GP-GM	Gray gravel with silt and sand (medium dense to dense, wet)			
			40		8			Becomes dense			Auger refusal at 27½ feet

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Google Earth. Vertical approximated based on Google Earth.

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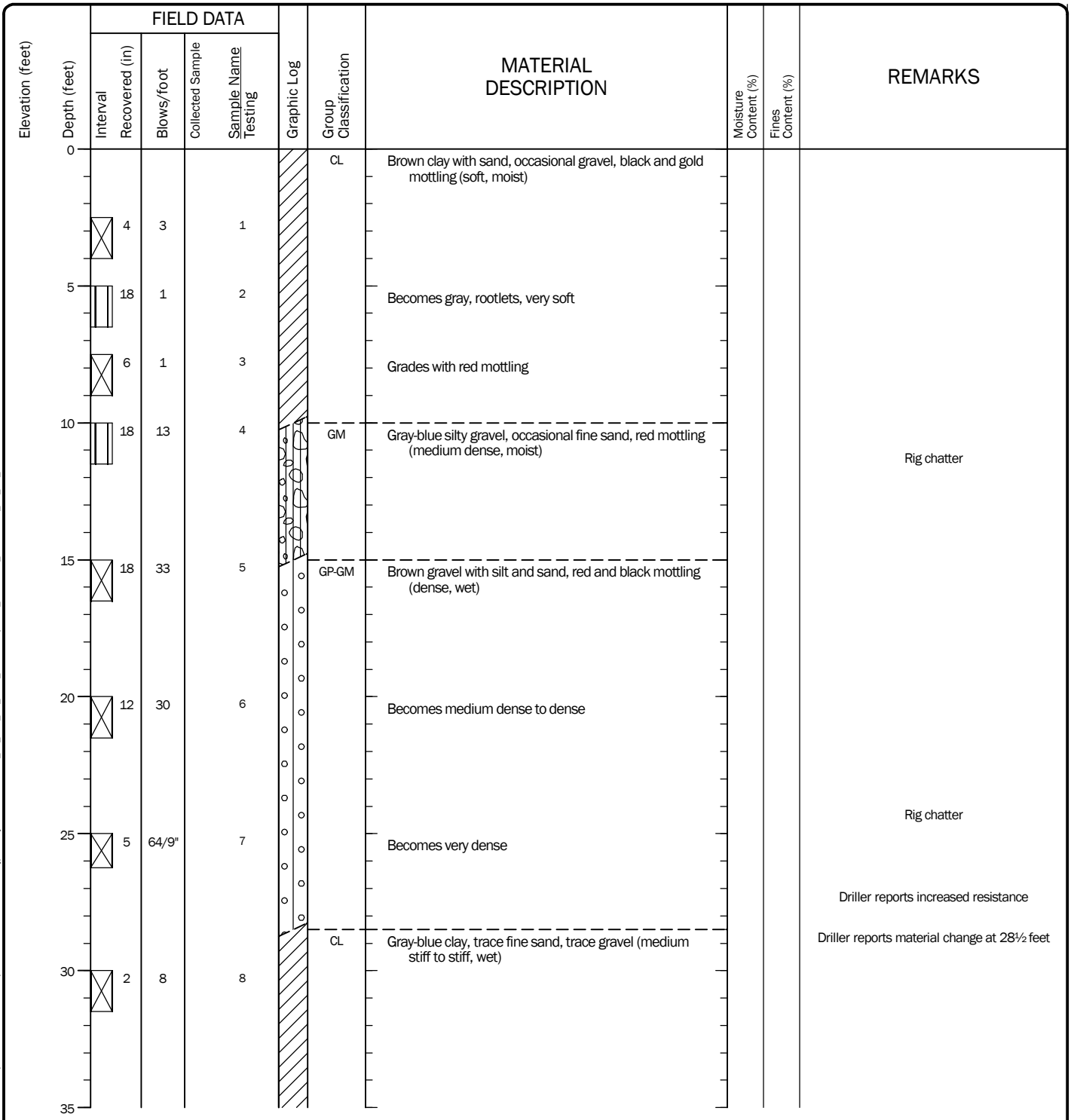
Project: Martin Development - Building W5
Project Location: Wilsonville, Oregon
Project Number: 0821-016-00

Figure
Sheet 1

Date:6/30/21 Path:C:\USERS\CESTES\DOCUMENTS\SHAREPOINT DRAFTS\082101600.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_GEOTECH_STANDARD_%F_NO_GW

Drilled Start 5/27/2021 End 5/27/2021	Total Depth (ft) 36.5	Logged By IT / Checked By TG	Driller PLI Systems, Inc.	Drilling Method Mud Rotary	
Surface Elevation (ft) / Vertical Datum: Undetermined		Hammer Data: Autohammer 140 (lbs) / 30 (in) Drop		Drilling Equipment: B-58 MDI truck-mounted	
Latitude: 45.316573 / Longitude: -122.778908		System Datum: Decimal Degrees WGS84		Groundwater not observed at time of exploration	

Notes: D&M N-value reduced using Lacroix-Horn conversion to approximate SPT N-value.



Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Google Earth. Vertical approximated based on Google Earth.

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Project: Martin Development - Building W5
Project Location: Wilsonville, Oregon
Project Number: 0821-016-00

Figure
Sheet 1

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Elevation (feet) / Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
35	12	12	9A 9B			Becomes with gravel, very stiff			

Date:6/22/21 Path:C:\USERS\CESTES\DOCUMENTS\SHAREPOINT DRAFTS\082101600.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_GEOTECH_STANDARD_%F_NO_GW

Drilled Start 5/26/2021 End 5/26/2021	Total Depth (ft) 41.5	Logged By IT / Checked By TG	Driller PLI Systems, Inc.	Drilling Method Mud Rotary	
Surface Elevation (ft) / Vertical Datum: Undetermined		Hammer Data: Autohammer 140 (lbs) / 30 (in) Drop		Drilling Equipment: B-58 MDI truck-mounted	
Latitude: 45.316438 / Longitude: -122.778013		System Datum: Decimal Degrees WGS84		Groundwater not observed at time of exploration	

Notes: D&M N-value reduced using Lacroix-Horn conversion to approximate SPT N-value.

Elevation (feet)	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	0						CL	Brown clay, trace fine sand, rootlets (stiff, moist)			
		18	14		1 MD				23		DD = 99 pcf
	5	18	6		2			Becomes gray-brown with orange mottling, trace organic matter, medium stiff			
		18	14		3 AL			Becomes with gravel, stiff	42		AL (LL = 42; PI = 18)
	10	16	54		4		GM	Gray-brown silty gravel, occasional fine sand (very dense, moist)			Driller reports gravel at 10 feet
	15	14	28		5			Grades with red mottling, medium dense, wet			Rig chatter Slowed progress
	20	8	31		6			Becomes dense			Rig chatter
	25	5	67/11"		7		GP-GM	Gray gravel with silt and sand (very dense, wet)			Rig chatter
	30	18	6		8		CL	Gray-blue clay, occasional fine sand (medium stiff, wet)			
	35										

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Google Earth. Vertical approximated based on Google Earth.

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Project: Martin Development - Building W5
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Project Number: 0821-016-00

Figure
Sheet 1

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Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample	FIELD DATA: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	35	18	11		9			Becomes light gray with brown and gold mottling, stiff			
	40	18	13		10			Becomes reddish brown mix with light gray			

Date:6/25/21 Path:P:\0\0821016\GINT\082101600.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_GEOTECH_STANDARD_%F_NO_GW

Drilled Start 5/27/2021 End 5/27/2021	Total Depth (ft) 41.5	Logged By IT / Checked By TG	Driller PLI Systems, Inc.	Drilling Method Mud Rotary	
Surface Elevation (ft) / Vertical Datum: Undetermined		Hammer Data: Autohammer 140 (lbs) / 30 (in) Drop		Drilling Equipment: B-58 MDI truck-mounted	
Latitude: 45.317015 / Longitude: -122.777994		System Datum: Decimal Degrees WGS84		Groundwater not observed at time of exploration	

Notes: D&M N-value reduced using Lacroix-Horn conversion to approximate SPT N-value.

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	0						CL	Dark gray and brown clay, occasional fine sand, black mottling (very soft to soft, moist)			
		18	2		1 MD				27		DD = 87 pcf
	5	4			2 CS				30		
		18	7		3			Becomes dark gray, medium stiff			
	10	18	10		4			Becomes gray and brown, red mottling with sand, stiff			Rig chatter
	15	18	26		5		GM	Brown and red silty gravel, occasional sand, orange mottling (medium dense, wet)			
	20	5	22		6		GP-GM	Gray-brown gravel with silt and sand (medium dense, wet)			Rig chatter
	25	8	28		7			Grades with black and orange mottling			Rig chatter
	30	8	48		8			Becomes dark bluish gray, dense			
							CL	Gray sandy clay with gravel (stiff, wet)			Driller reports material change at 33 feet
	35										

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Google Earth. Vertical approximated based on Google Earth.

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Project: Martin Development - Building W5
Project Location: Wilsonville, Oregon
Project Number: 0821-016-00

Figure
Sheet 1

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Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample	FIELD DATA: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	35	0	16		9A						
		18	14		9B						
	40	18	15		10						

Date:7/1/21 Path:P:\0\0821016\GINT\082101600.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_GEOTECH_STANDARD_%F_NO_GW

Drilled: Start 5/26/2021 End 5/26/2021	Total Depth (ft): 6.5	Logged By: IT Checked By: TG	Driller: PLI Systems, Inc.	Drilling Method: Mud Rotary	
Surface Elevation (ft) Vertical Datum: Undetermined		Hammer Data: Autohammer 140 (lbs) / 30 (in) Drop		Drilling Equipment: B-58 MDI truck-mounted	
Latitude: 45.317166 Longitude: -122.778356		System Datum: Decimal Degrees WGS84		Groundwater not observed at time of exploration	
Notes:					

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample	FIELD DATA: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	0						CL	Gray-brown clay with fine sand, orange mottling (very soft, moist)			
		6	0		1						
	5	10	5		2			Becomes medium stiff, rootlets			

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Google Earth. Vertical approximated based on Google Earth.

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Project: Martin Development - Building W5
Project Location: Wilsonville, Oregon
Project Number: 0821-016-00

Figure
Sheet 1

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Drilled Start 5/26/2021 End 5/26/2021	Total Depth (ft) 6.5	Logged By IT Checked By TG	Driller PLI Systems, Inc.	Drilling Method Mud Rotary	
Surface Elevation (ft) Vertical Datum Undetermined		Hammer Data Autohammer 140 (lbs) / 30 (in) Drop		Drilling Equipment B-58 MDI truck-mounted	
Latitude 45.316398 Longitude -122.779312		System Datum Decimal Degrees WGS84		Groundwater not observed at time of exploration	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample	FIELD DATA: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	0	8	5		1 MC		CL	Gray-brown clay with fine sand, rootlets (medium stiff, moist)	27		
	5	14	16		2			Becomes dark gray with orange mottling, stiff to very stiff			

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Google Earth. Vertical approximated based on Google Earth.

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Project: Martin Development - Building W5
Project Location: Wilsonville, Oregon
Project Number: 0821-016-00

Figure
Sheet 1

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Drilled Start 5/27/2021 End 5/27/2021	Total Depth (ft) 6.5	Logged By IT Checked By TG	Driller PLI Systems, Inc.	Drilling Method Hollow-stem Auger	
Surface Elevation (ft) Vertical Datum Undetermined		Hammer Data Autohammer 140 (lbs) / 30 (in) Drop		Drilling Equipment B-58 MDI truck-mounted	
Latitude 45.315387 Longitude -122.777342		System Datum Decimal Degrees WGS84		Groundwater not observed at time of exploration	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample	FIELD DATA: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	0	18	7		1 MC		CL	Brown-gray clay, occasional fine sand (medium stiff, moist)	29		
	5	18	11		2			Becomes brown, stiff			

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Google Earth. Vertical approximated based on Google Earth.

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Project: Martin Development - Building W5
Project Location: Wilsonville, Oregon
Project Number: 0821-016-00

Figure
Sheet 1

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Drilled: Start 5/26/2021 End 5/26/2021	Total Depth (ft): 5	Logged By: IT Checked By: TG	Driller: PLI Systems, Inc.	Drilling Method: Hollow-stem Auger	
Surface Elevation (ft) Vertical Datum: Undetermined		Hammer Data: Autohammer 140 (lbs) / 30 (in) Drop		Drilling Equipment: B-58 MDI truck-mounted	
Latitude: 45.316304 Longitude: -122.778176		System Datum: Decimal Degrees WGS84		Groundwater not observed at time of exploration	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample	FIELD DATA: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	0						CL	Dark brown clay, occasional fine sand, rootlets to 4 feet (stiff to very stiff, moist)			
		8	10		1						
	5										Infiltration test performed at 5 feet

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Google Earth. Vertical approximated based on Google Earth.

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Project: Martin Development - Building W5
Project Location: Wilsonville, Oregon
Project Number: 0821-016-00

Figure
Sheet 1

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Drilled Start 5/26/2021 End 5/26/2021	Total Depth (ft) 5	Logged By IT Checked By TG	Driller PLI Systems, Inc.	Drilling Method Hollow-stem Auger	
Surface Elevation (ft) Vertical Datum Undetermined		Hammer Data Autohammer 140 (lbs) / 30 (in) Drop		Drilling Equipment B-58 MDI truck-mounted	
Latitude 45.316307 Longitude -122.779374		System Datum Decimal Degrees WGS84		Groundwater not observed at time of exploration	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample	FIELD DATA: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	0						CL	Dark gray-brown clay, occasional fine sand, rootlets to 5 feet, black mottling (soft to medium stiff, moist)			
		6	4		1						
	5										Infiltration test performed at 5 feet

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Google Earth. Vertical approximated based on Google Earth.

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Project: Martin Development - Building W5
Project Location: Wilsonville, Oregon
Project Number: 0821-016-00

Figure A
Sheet 1

Date:6/22/21 Path:C:\USERS\CESTES\DOCUMENTS\SHAREPOINT DRAFTS\082101600.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_GEOTECH_STANDARD_%F_NO_GW

Drilled Start 5/26/2021 End 5/26/2021	Total Depth (ft) 5	Logged By IT Checked By TG	Driller PLI Systems, Inc.	Drilling Method Hollow-stem Auger	
Surface Elevation (ft) Vertical Datum Undetermined		Hammer Data Autohammer 140 (lbs) / 30 (in) Drop		Drilling Equipment B-58 MDI truck-mounted	
Latitude 45.31713 Longitude -122.778861		System Datum Decimal Degrees WGS84		Groundwater not observed at time of exploration	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	0							CL	Gray-brown clay, occasional fine sand, orange mottling, rootlets to 4 feet (stiff, moist)			
		X	10	9		1						
	5											Infiltration test performed at 5 feet

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Google Earth. Vertical approximated based on Google Earth.

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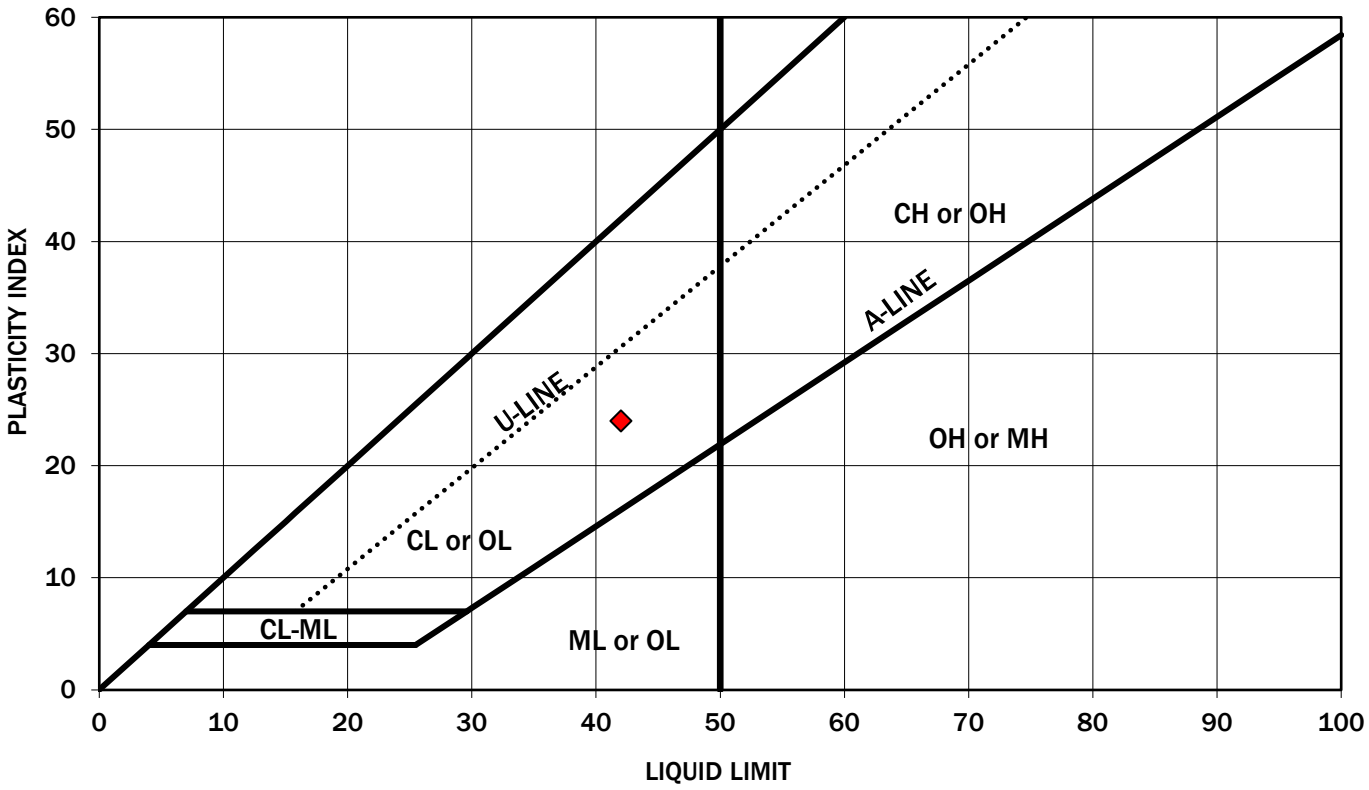
Project: Martin Development - Building W5
Project Location: Wilsonville, Oregon
Project Number: 0821-016-00

Figure A
Sheet 1

Date:6/22/21 Path:C:\USERS\CESTES\DOCUMENTS\SHAREPOINT DRAFTS\082101600.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_GEOTECH_STANDARD_%F_NO_GW

PLASTICITY CHART



Symbol	Boring Number	Depth (feet)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Soil Description
◆	B-3	5	42	42	24	Brown clay w/gravel & occasional sand (CL)

Note: This report may not be reproduced, except in full, without written approval of GeoEngineers, Inc. Test results are applicable only to the specific sample on which they were performed, and should not be interpreted as representative of any other samples obtained at other times, depths or locations, or generated by separate operations or processes.

The liquid limit and plasticity index were obtained in general accordance with ASTM D 4318.

Atterberg Limits Test Results

Martin Development – Building W5
Wilsonville, Oregon

GeoEngineers

Figure A-12

One-Dimensional Consolidation — Test Summary

ASTM D2435 — **B-4, S-2**

Project:	Martin Development W5
Project No.:	0821-016-00
Boring:	B-4
Sample:	S-2
Depth:	5

Trimming Procedure: Turntable/Blade/Ring
Condition of Test: Inundated/Distilled
Test Method: B
Interpretation Procedure: 2 (Taylor)
Approved: Joe Laprade 6/30/21

	Before Inundation	After Final Load
Height (in)	0.7446	0.6530
Diameter (in)	2.4653	2.4653
Volume (in^3)	3.554	3.117
Wet Weight (g)	108.72	105.36
Dry Weight (g)	83.93	83.93
Wet Density (pcf)	116.5	128.8
Dry Density (pcf)	90.0	102.6
Water Content (%)	30%	26%
Void Ratio	0.87	0.64
Saturation (%)	91%	100%

	Load (psf)	d_{100} (in)	d_{50} (in)	t_{90} (min)	C_v (cm^2/s)
Load	100	0.0076	0.0063	0.9	0.826
	200	0.0097	0.0092	1.2	0.634
	400	0.0134	0.0125	0.6	1.205
	800	0.0198	0.0184	0.8	0.891
	1600	0.0282	0.0265	0.6	1.102
	3200	0.0394	0.0374	0.6	1.216
	6400	0.0559	0.0525	0.7	0.907
	12800	0.0765	0.0725	0.6	1.099
	25600	0.1021	0.0966	0.7	0.854
Unload	6400	0.1032	0.1042	0.2	2.770
	1600	0.0989	0.0999	3.2	0.175
	400	0.0952	0.0965	3.2	0.177
	100	0.0921	0.0924	0.4	1.377

Soil Description: fine to coarse sandy silt; numerous fine to coarse organics; ML

Figure A-13

One-Dimensional Consolidation **Consolidation Plot**

ASTM D2435 **B-4, S-2**

Project: Martin Development W5
Project No.: 0821-016-00
Boring: B-4
Sample: S-2
Depth: 5

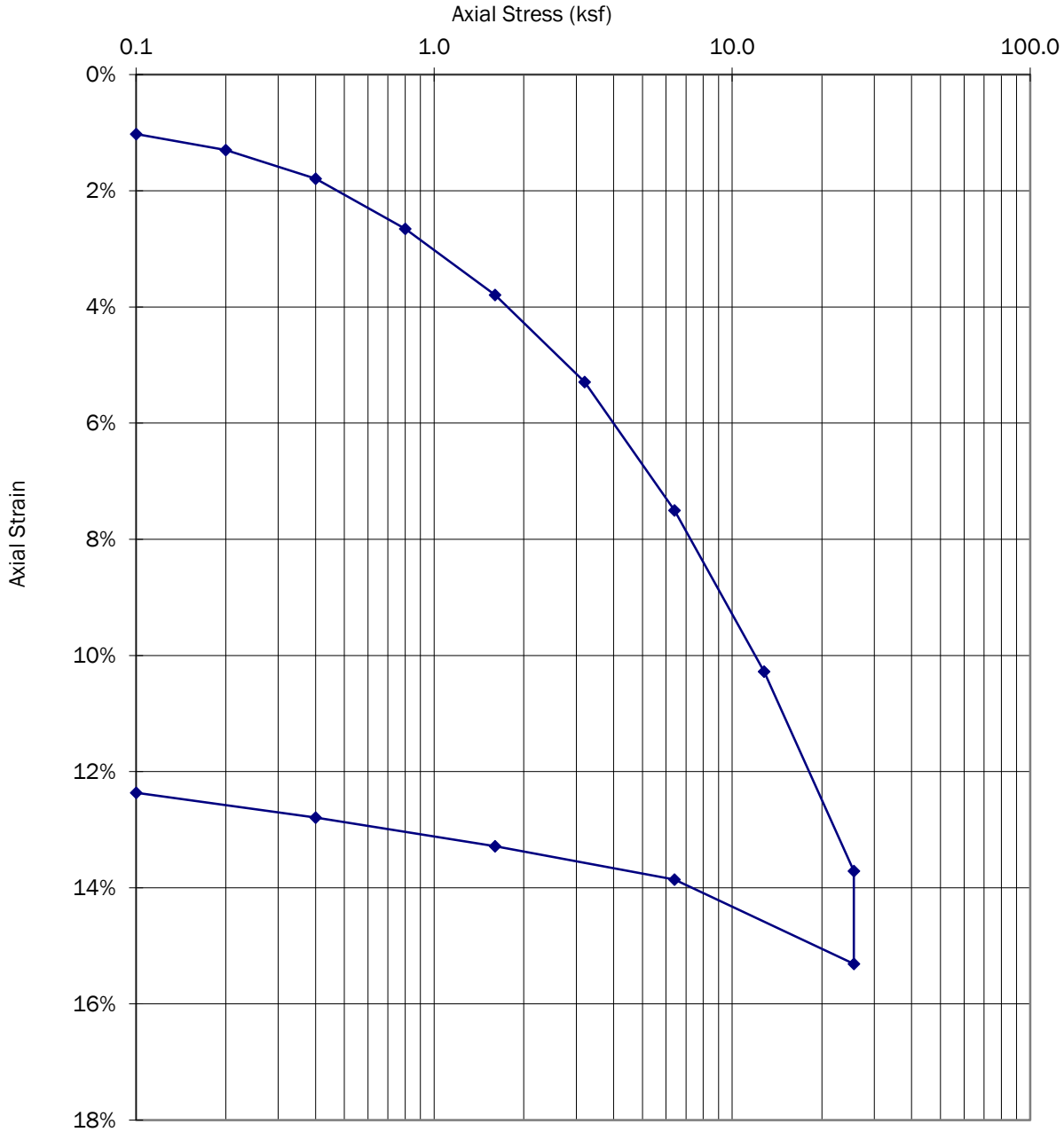


Figure A-14

APPENDIX B
Geotechnical Specifications

SECTION 02510

ASPHALT CONCRETE PAVEMENT

PART I - GENERAL

1.1 DESCRIPTION OF THE WORK

A. Furnish all labor, materials, equipment, and incidentals required for the aggregate base and asphalt concrete paving as shown in the Drawings and specified herein, and as reasonably inferable therefrom.
B. Related Sections:
    1. Section 31 10 00, Site Preparation.
    2. Section 31 20 00, Earthwork.

1.2 REFERENCE STANDARDS AND DOCUMENTS

A. Oregon Standard Specifications for Construction, Oregon Department of Transportation (ODOT), 2021 Edition.
B. ASTM International (ASTM) Standard Practices, 2018 Edition.
    1. ASTM D 1557, Test Methods of Laboratory Compaction Characteristics of Soil Using Modified Effort.
    2. ASTM D 2041, Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures.
C. Geotechnical report prepared by GeoEngineers, Inc. titled “Geotechnical Engineering Report, Martin Development - Building W5, Wilsonville, Oregon” dated July 14, 2021.

1.3 SUBMITTALS

A. Mix Design:
    1. Submit job mix formula with laboratory test results at least 10 working days prior to the anticipated start of paving operations.
B. Reports:
    1. Submit paving vendor’s certified test results for the second truckload and each sixth truckload of asphalt concrete delivered to the site.
    2. Submit calculations on paving area and quantities of each paving material to complete the project.
    3. Submit weigh bills and delivery tickets for materials delivered to the site.
C. Aggregate Materials:
    1. Submit one 50-pound sample of base aggregate to the Geotechnical Engineer at least 10 working days prior to use. No base aggregate materials shall be used until evaluated by the Geotechnical Engineer.
    2. Submit a written statement indicating the source and character of all base aggregate with the sample.
    3. Submit copies of sieve analysis and moisture density test reports indicating conformance of the base aggregate with the Specification.
    4. Confirm that the base aggregate used conforms with the sample supplied to the Geotechnical Engineer.

1.4 QUALITY ASSURANCE

A. Mixing Plant Qualifications:
   1. Asphalt concrete supplier shall have a minimum of 5 years' experience in the production of hot-mix, hot-laid asphalt concrete pavement.

B. Installer's Qualifications:
   1. Installer shall have a minimum of 2 years' experience in the placement of asphalt concrete pavement.
   2. Construction superintendent assigned to the project shall have a minimum of 2 years of documentable experience with successful completion of paving projects of similar size.

C. Quality Control Testing:
   1. Owner will engage Geotechnical Engineer for quality control testing during subgrade preparation and paving operations as specified in Part 1.05 of Section 31 20 00 of these specifications.

D. Temperature and Precipitation Requirements:
   1. Do not apply tack coat when air temperature is below 50 degrees Fahrenheit.
   2. Place asphalt concrete paving only when air temperature is above 40 degrees Fahrenheit.
   3. Place asphalt concrete only when surface of aggregate base is unsaturated, and precipitation is not expected before pavement can be compacted.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Base Aggregate: 1 inch- or ¾-inch- (in)-minus crushed gravel or crushed rock that has less than 5 percent fines passing the U.S. Standard No. 200 Sieve meeting the requirements of Oregon Department of Transportation (ODOT) Section 02630.

B. Asphalt Concrete Materials:
   1. Aggregate Mix: 1-inch or ¾-inch dense graded mix meeting the requirements of ODOT Section 00745.

C. Tack Coat: Use CR-1, CSS-1 or CSS-1h.

2.2 MIXES

A. Job Mix Formula Requirements:
   1. Job mix formula shall be in accordance with ODOT standards, except where modified in this Section.

B. Adjusting the Job Mix Formula:
   1. If physical properties of asphalt concrete paving are not as specified in this Section or if other unsatisfactory conditions as determined by the Geotechnical Engineer results, Geotechnical Engineer will require changes in the job mix formula or materials.
   2. Should the need for a new job mix formula result from Contractor's or his agent's operations, contractor shall develop a new formula to correct deficiencies.
   3. Owner will not be responsible for construction delays caused by changing the job mix formula.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protection:
   1. Protect subgrades from disturbance by paving equipment. Subgrades that are disturbed by the Contractor's activities shall be corrected as directed by the Geotechnical Engineer at the sole expense of the Contractor.
   2. Protect existing site improvements from damage by paving work.

3. Place barricades and traffic cones to keep traffic away from paving work.

B. Subgrade Preparation:
   1. Prepare subgrade in accordance with Sections 31 20 00. Prior to placing base aggregate, notify Geotechnical Engineer.
   2. Proof-roll prepared subgrade with a loaded dump truck or similar heavy, wheeled construction equipment as directed by the Geotechnical Engineer. If construction occurs during the wet season or if the ground surface remains wet, the subgrade should be evaluated by a qualified geotechnical engineer by probing with a steel rod, rather than by proof-rolling.
   3. Overexcavate soft or loose zones as directed by the Geotechnical Engineer. Backfill excavated areas in accordance with Section 31 20 00.

3.2 INSTALLATION

A. Placing Base Aggregate:
   1. Place base aggregate to the lines and grades shown in the Drawings.
   2. Compact base aggregate to 95 percent of maximum dry density within 3 percent of optimum moisture content as determined by ASTM D 1557.

B. Placing Asphalt Concrete:
   1. Place asphalt concrete in accordance with ODOT standards.
   2. Place asphalt concrete only after acceptance of base aggregate by Geotechnical Engineer.
   3. Place asphalt concrete in maximum compacted lift thickness of 2.5 inches.
   4. Place asphalt concrete at temperature between 240 degrees Fahrenheit and 325 degrees Fahrenheit.
   5. Manually shovel to fill in low areas and rake asphalt concrete to obtain required paving level.

C. Compaction of Asphalt Concrete:
   1. Roll asphalt concrete in accordance to minimum density of 91.0 percent of laboratory density as determined by ASTM 2041 (Rice Test Procedure).
   2. Level paving surface to within 1/2 inch in 10 feet.
   3. Finish top of paving to plus or minus 0.17 foot from line and 0.04 foot from grade indicated.

3.3 COMPLETION

A. Adjusting Defective Work:
   1. Fill paving cracks with tack coat asphalt.
   2. Repair variations of more than 0.04 foot from surface grade indicated on Drawings.
   3. Repair variations of more than 0.17 foot from perimeter paving lines indicated on Drawings.

B. Final Cleaning:
   1. Clean asphalt splatters from concrete curbs and walks.
   2. Remove loose aggregate from paving and walks.
   3. Remove excess asphalt materials from the site.

END OF SECTION

SECTION 31 10 00
SITE PREPARATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Removing above- and below-grade site improvements

B. Disconnecting, capping or sealing site utilities

1.02 RELATED REQUIREMENTS

A. Section 31 20 00 – Earth Moving

1.03 REFERENCES

A. Geotechnical report prepared by GeoEngineers, Inc. titled “Geotechnical Engineering Report, Martin Development - Building W5, Wilsonville, Oregon” dated July 14, 2021.

PART 2 - PRODUCTS

2.01 Materials

Not applicable

2.01 Equipment

A. Equipment shall be adequate to accomplish the Work.

PART 3 - EXECUTION

3.01 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance.

B. Protect existing site improvements to remain from damage during construction. Restore damaged improvements to their original condition, as acceptable to Owner.

3.02 UTILITIES

A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place. Arrange for utility companies to shut off indicated utilities.

B. Interrupting Existing Utilities: Do not interrupt utilities serving property except as permitted and coordinated with the utility provider.

3.03 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

3.04 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them off Owner’s property.

END OF SECTION

SECTION 31 20 00
EARTH MOVING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Preparing subgrades

B. Excavating and backfilling for structures

C. Excavating and backfilling for utility trenches

1.02 RELATED REQUIREMENTS

A. Section 31 10 00- Site Preparation

1.03 REFERENCES

A. Oregon Standard Specifications for Construction, Oregon Department of Transportation (ODOT), 2021 Edition.

B. ASTM International (ASTM), 2018 Edition.

1. ASTM D 1557, Test Methods of Laboratory Compaction Characteristics of Soil Using Modified Effort.
2. ASTM C 117, Standard Test Method for Materials Finer than 75 μm (No. 200) sieve in Mineral Aggregates by Washing.
3. ASTM D 6938, Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods.

C. American Association of State Highway and Transportation Officials (AASHTO), 2018 Edition.

1. AASHTO TP-61, Determining the Percentage of Fracture in Coarse Aggregate.
2. AASHTO T-176, Standard Method of Test for Plastic Fines in Graded Aggregates and Soils by use of the Sand Equivalent Test.

D. Geotechnical report prepared by GeoEngineers, Inc. titled “Geotechnical Engineering Report, Martin Development - Building W5, Wilsonville, Oregon” dated July 14, 2021.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Provide the following submittals:

1. Fifty-pound samples of imported materials proposed for use as fill or backfill to the Geotechnical Engineer at least 10 business days prior to use. Do not use materials until approved by the Geotechnical Engineer.
2. A written statement indicating the source, character, and proposed use of all imported materials with the samples.
3. Certification of test results, source, and samples of imported materials.
4. Confirm that the fill material conforms with the material samples supplied to the Geotechnical Engineer throughout its use on the project.

1.05 QUALITY ASSURANCE

A. The Owner will engage a Geotechnical Engineer as the Owner’s on-site representative for quality control and observation of earthwork. The Owner will notify the Contractor of the person or organization that is to serve as the Geotechnical Engineer.

B. The Geotechnical Engineer will evaluate subgrade conditions, materials proposed for use as fill and backfill, make and/or review appropriate tests, evaluate compaction of in-place fill and backfill, and designate for removal of identified unsuitable materials.

C. In-place field density tests will be made by the Geotechnical Engineer to determine the adequacy of compaction of fill and backfill materials. Tests will be performed as deemed necessary to determine the adequacy of compaction. Contractor shall cooperate with such testing by the Geotechnical Engineer.

D. Do not cover site improvements with backfill materials prior to required evaluations, tests and approvals. Backfill materials covering uninspected, untested, and rejected site improvements shall be removed and replaced at the Contractor's sole expense.

PART 2 - PRODUCTS

2.01 Materials

A. Imported Select Structural Fill:

1. Imported structural fill shall be well graded, pit or quarry run rock, crushed rock or crushed gravel and sand that is fairly well-graded between coarse and fine sizes, with approximately 25 to 65 percent passing the U.S. No. 4 sieve. It should be free of clay balls, roots, organic matter and other deleterious materials. Imported structural fill shall have a maximum particle size of 4 inches and shall have less than 5 percent passing the U.S. Standard No. 200 sieve when tested in accordance with ASTM C 117 and have a minimum of two mechanically fractured faces.
2. Imported structural fill placed during periods of dry weather shall have less than 12 percent passing the U.S. Standard No. 200 sieve when tested in accordance with ASTM C 117.

B. Aggregate Base:

1. Crushed rock shall be free of various types of wood or deleterious materials and consist of hard, angular, durable, well-graded 1-inch-minus crushed rock with a minimum of 75 percent fractured particles according to American Association of State Highway and Transportation Officials (AASHTO) TP-61 and a sand equivalent of not less than 30 percent based on AASHTO T-176.
2. The percent passing the U.S. Standard No. 200 sieve shall be less than 5 percent by weight when tested in accordance with ASTM C 117.

C. Retaining Wall Backfill:

1. Fill placed to provide a drainage zone behind retaining walls should consist of free-draining sand and gravel or crushed rock with a maximum particle size of ¾ inch and less than 3 percent passing the U.S. No. 200 sieve when tested in accordance with ASTM C 117.

C. Trench Backfill:

1. Pipe bedding and pipe zone materials shall be as specified for aggregate base, 3/4-inch-minus size, with less than 5 percent by weight passing the U.S. Standard No. 200 sieve when tested in accordance with ASTM C 117, or as specified by the pipe manufacturer.

2.02 Equipment

A. Operate compaction equipment in accordance with the manufacturer's instructions and recommendations. Maintain equipment in such a condition that it will deliver the manufacturer's rated compactive effort. Provide larger and/or different types of equipment if required to obtain adequate compaction. Hand-operated equipment shall be capable of achieving the specified compaction.

PART 3 - EXECUTION

3.01 EXCAVATION

A. Excavation: Excavation consists of removal and disposal of material of any classification and all material encountered when establishing required grades.

1. Excavate to depth, lines and grades as shown on the Drawings or as otherwise specified.
2. Notify the Geotechnical Engineer when excavation has reached required subgrade elevations. Allow Geotechnical Engineer to evaluate finished subgrades.

3. If unsuitable bearing materials are encountered at the required subgrade elevations, carry excavations deeper and replace the excavated material as directed by the Geotechnical Engineer.
4. Excavate as necessary such that all foundations are founded on firm native material, or as directed by the Geotechnical Engineer. The width of overexcavation shall extend at least 6 inches beyond the margins of the footings for every additional foot of excavation.
5. If unsuitable bearing materials are a result of the Contractor's earthwork activities, excavation and backfill shall be completed at the Contractor's sole expense.

B. Unauthorized excavation: Excavation carried below the lines and grades shown on the Drawings or in excess of overexcavation as directed by the Geotechnical Engineer will be considered unauthorized. Unauthorized excavation, as well as remedial work resulting from unauthorized overexcavation, shall be at the Contractor's sole expense.
   1. Unauthorized overexcavation under foundations shall be corrected by replacing the excavated material with Aggregate Base compacted as specified in Part 3.03 of this Section, or as approved by the Geotechnical Engineer.
   2. Unauthorized overexcavation in areas to receive fill shall be corrected by replacing the excavated materials with Imported Select Structural Fill placed and compacted as specified for the overlying materials.
   3. Unauthorized overexcavation in non-structural areas shall be corrected by replacing the excavated materials and compacting to a density not less than the underlying materials.

C. Overexcavation:
   1. Excavation of materials determined by the Geotechnical Engineer to be unsuitable will be considered overexcavation.

D. Temporary Sheeting, Shoring, Bracing or Sloping:
   1. Provide and maintain temporary sheeting, shoring, and bracing necessary to support the sides of excavations.
   2. Prevent any movement that may damage adjacent utilities, or structures, damage or delay the Work, or endanger life and health.
   3. Install, maintain, and remove sheeting, shoring, and bracing as required by Occupational Safety and Health Administration (OSHA) and other applicable governmental regulations.

E. Disposal of Waste Material:
   1. All waste materials and excess topsoil shall be stockpiled or disposed off site as directed by the Owner. Verify off-site disposal with the Owner.
   2. Restrict temporary storage of waste materials and materials to be reused at work areas to locations directed by the Owner.

3.02 SUBGRADE PREPARATION

A. Perform excavation as indicated on Drawings.

B. Notify the Geotechnical Engineer prior to placing fill materials, constructing forms or placing reinforcing steel or concrete.

C. The subgrade should be evaluated by the Geotechnical Engineer by probing with a steel rod.

D. Overexcavate soft or loose zones as directed by the Geotechnical Engineer. Backfill to the specified elevation with Imported Select Structural Fill. Compact as specified in Part 3.03 of this section.

3.03 BACKFILL AND FILL

A. Notification of Geotechnical Engineer: Notify the Geotechnical Engineer 48 hours prior to any fill, backfill, or compaction operations.
   1. Permit Geotechnical Engineer to test all fill and backfill. Do not place additional fill or backfill unless the subgrade and/or previous layer of fill has been tested.
   2. When requested by the Geotechnical Engineer, provide the field elevations of the compacted subgrade or fill layer.

3. If, based on the Geotechnical Engineer's tests and observations, subgrade or fill which has been placed is below specified density for respective construction areas, provide additional moisture conditioning and compaction at no additional expense to Owner.

B. Fill Placement:

1. Place all fill and backfill on a prepared subgrade that consists of firm, inorganic native soils or compacted fill.
2. Place all fill or backfill in uniform horizontal lifts with a thickness appropriate for the material type and compaction equipment.
3. Place imported structural fill, select structural fill, and crushed rock in layers that do not exceed 12 inches prior to compaction.
4. Fill or backfill materials compacted by hand-operated compaction equipment shall be placed in layers not exceeding 6 inches prior to compaction.
5. Compact soils using equipment designed for compacting the type of soil being placed. Utilize operating procedures to attain uniform compaction of the area being filled.
6. Place fill at a moisture content within 3 percent of optimum as determined by ASTM D 1557. Moisture condition to achieve a moisture content within the specified range before compacting.
7. Do not place, spread, or compact fill material during freezing or unfavorable weather conditions. All frozen or disturbed subgrade materials should be removed prior to placement of subsequent lifts of fill materials.
8. Do not place fill and backfill until tests and inspections of the underlying material have been made and the appropriate approvals have been obtained. Do not damage or displace underground utilities during backfilling and compaction.

C. Compaction Requirements: Compact soils to not less than 95 percent of maximum dry density as determined in accordance with ASTM D 1557.

3.04 COMPLETION

A. Remove waste materials, including unacceptable excavated materials, trash, debris, and native materials resulting from excavation and grading. Load, haul, and legally dispose of materials off site, or as otherwise directed in Drawings or Division 1 of these specifications.

END OF SECTION

SECTION 32 13 13
CONCRETE PAVING

PART 1 - GENERAL

1.1 DESCRIPTION OF THE WORK

A. Furnish all labor, materials, equipment, and incidentals required for the aggregate base and Portland cement concrete paving as shown in the Drawings and specified herein, and as reasonably inferable therefrom.

B. Related Sections:
   1. Section 31 10 00, Site Preparation.
   2. Section 31 20 00, Earthwork.

1.2 REFERENCE STANDARDS AND DOCUMENTS

A. Specifications for Structural Concrete, American Concrete Institute (ACI 301 M).

B. Geotechnical Geotechnical report prepared by GeoEngineers, Inc. titled “Geotechnical Engineering Report, Martin Development - Building W5, Wilsonville, Oregon” dated July 14, 2021.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash, slag cement, and other pozzolans.

B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

   1. Review methods and procedures related to concrete paving, including but not limited to, the following:

      a. Concrete mixture design.

      b. Quality control of concrete materials and concrete paving construction practices.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.6 FIELD CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

B. Cold-Weather Concrete Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:

   2. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.

   3. Do not use frozen materials or materials containing ice or snow.

   4. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.

C. Hot-Weather Concrete Placement: Comply with ACI 301 (ACI 301M) and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap, so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301 (ACI 301M) unless otherwise indicated.

2.2 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.

2.3 CONCRETE MATERIALS

A. Cementitious Materials: Use the following cementitious materials, of same type, brand, and source throughout Project:

1. Portland Cement: ASTM C 150/C 150M, gray portland cement Type I.
2. Fly Ash: ASTM C 618, Class F.

B. Normal-Weight Aggregates: ASTM C 33/C 33M, uniformly graded. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: 3/4 inch (19 mm) nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Air-Entraining Admixture: ASTM C 260/C 260M.

D. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain no more than 0.1 percent water-soluble chloride ions by mass of cementitious material.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

E. Water: Potable and complying with ASTM C 94/C 94M.

2.4 CURING MATERIALS

A. White, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 2, Class B, dissipating.

2.5 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301 (ACI 301M), for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.

1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.

2. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that comply with or exceed requirements.

B. Cementitious Materials:

1. Fly Ash or Pozzolan: 25 percent.

C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:

1. Air Content: 6 percent plus or minus 1-1/2 percent for 3/4-inch (19-mm) nominal maximum aggregate size.

D. Concrete Mixtures: Normal-weight concrete.

1. Compressive Strength (28 Days): 4000 psi (27.6 MPa).
2. Maximum W/C Ratio at Point of Placement: 0.45.
3. Slump Limit: 4 inches (100 mm), plus or minus 1 inch (25 mm).

2.6 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.

1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For concrete batches of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For concrete batches larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.

1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.

1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.
2. Provide tie bars at sides of paving strips where indicated.
3. Butt Joints: Use bonding agent at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
4. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys unless otherwise indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
5. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.

1. Locate expansion joints at intervals of 50 feet (15.25 m) unless otherwise indicated.
2. Extend joint fillers full width and depth of joint.
3. Terminate joint filler not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished surface if joint sealant is indicated.
4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch (6-mm) radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate grooving-tool marks on concrete surfaces.
    a. Tolerance: Ensure that grooved joints are within 3 inches (75 mm) either way from centers of dowels.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
    a. Tolerance: Ensure that sawed joints are within 3 inches (75 mm) either way from centers of dowels.

3. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.

E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch (6-mm) radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

3.5 CONCRETE PLACEMENT

A. Before placing concrete, inspect and complete formwork installation and items to be embedded or cast-in.

B. Remove snow, ice, or frost from subbase surface before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with ACI 301 (ACI 301M) requirements for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.

F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

G. Consolidate concrete according to ACI 301 (ACI 301M) by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.

1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating joint devices.

H. Screed paving surface with a straightedge and strike off.

I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleedwater appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

J. Curbs and Gutters: Use design mixture for automatic machine placement. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing.

K. Slip-Form Paving: Use design mixture for automatic machine placement. Produce paving to required thickness, lines, grades, finish, and jointing.

1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of slip-form paving machine during operations.

3.6 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

1. Burlap Finish: Drag a seamless strip of damp burlap across float-finished concrete, perpendicular to line of traffic, to provide a uniform, gritty texture.

2. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface, perpendicular to line of traffic, to provide a uniform, fine-line texture.

3. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1/16 to 1/8 inch (1.6 to 3 mm) deep with a stiff-bristled broom, perpendicular to line of traffic.

3.7 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.

D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound or a combination of these as follows:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

   a. Water.

   b. Continuous water-fog spray.

   c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period, using cover material and waterproof tape.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.

3.8 PAVING TOLERANCES

A. Comply with tolerances in ACI 117 (ACI 117M) and as follows:

1. Elevation: 3/4 inch (19 mm).

2. Thickness: Plus 3/8 inch (10 mm), minus 1/4 inch (6 mm).

3. Surface: Gap below 10-feet- (3-m-) long; unleveled straightedge not to exceed 1/2 inch (13 mm).

4. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: 1/2 inch per 12 inches (13 mm per 300 mm) of tie bar.

5. Lateral Alignment and Spacing of Dowels: 1 inch (25 mm).

6. Vertical Alignment of Dowels: 1/4 inch (6 mm).

7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches (6 mm per 300 mm) of dowel.

8. Joint Spacing: 3 inches (75 mm).

9. Contraction Joint Depth: Plus 1/4 inch (6 mm), no minus.

10. Joint Width: Plus 1/8 inch (3 mm), no minus.

3.9 FIELD QUALITY CONTROL

A. Testing Agency: Contractor to provide a qualified testing agency to perform tests and inspections.

B. Testing Services: Testing and inspecting of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least one composite sample for each 100-cu. yd. (76 cu. m), 5000 sq. ft. (465 sq. m), or fraction thereof of each concrete mixture placed each day.

    a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.

3. Air Content: ASTM C 231/C 231M, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when it is 80 deg F (27 deg C) and above, and one test for each composite sample.

5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.

6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.

    a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).

D. Test results shall be reported in writing to Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Engineer but will not be used as sole basis for approval or rejection of concrete.

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Engineer.

G. Concrete paving will be considered defective if it does not pass tests and inspections.

H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

I. Prepare test and inspection reports.

3.10 REPAIR AND PROTECTION

A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Engineer.

B. Drill test cores, where directed by Engineer, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive.

C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION

APPENDIX C
Report Limitations and Guidelines for Use

APPENDIX C
REPORT LIMITATIONS AND GUIDELINES FOR USE[1]

This appendix provides information to help you manage your risks with respect to the use of this report.

Read These Provisions Closely

It is important to recognize that the geoscience practices (geotechnical engineering, geology and environmental science) rely on professional judgment and opinion to a greater extent than other engineering and natural science disciplines, where more precise and/or readily observable data may exist. To help clients better understand how this difference pertains to our services, GeoEngineers includes the following explanatory "limitations" provisions in its reports. Please confer with GeoEngineers if you need to know more about how these "Report Limitations and Guidelines for Use" apply to your project or site.

Geotechnical Services Are Performed for Specific Purposes, Persons and Projects

This report has been prepared for Martin Development for the Project specifically identified in the report. The information contained herein is not applicable to other sites or projects.

GeoEngineers structures its services to meet the specific needs of its clients. No party other than the party to whom this report is addressed may rely on the product of our services unless we agree to such reliance in advance and in writing. Within the limitations of the agreed scope of services for the Project, and its schedule and budget, our services have been executed in accordance with our Agreement with Martin Development dated April 21, 2021 (authorized April 22, 2021) and generally accepted geotechnical practices in this area at the time this report was prepared. We do not authorize, and will not be responsible for, the use of this report for any purposes or projects other than those identified in the report.

A Geotechnical Engineering or Geologic Report is Based on a Unique Set of Project-Specific Factors

This report has been prepared for the proposed Martin Development W5 Building project at in Wilsonville, Oregon. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, it is important not to rely on this report if it was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

For example, changes that can affect the applicability of this report include those that affect:

- the function of the proposed structure;
- elevation, configuration, location, orientation or weight of the proposed structure;

[1] Developed based on material provided by GBA, Geoprofessional Business Association; www.geoprofessional.org.

- composition of the design team; or
- project ownership.

If changes occur after the date of this report, GeoEngineers cannot be responsible for any consequences of such changes in relation to this report unless we have been given the opportunity to review our interpretations and recommendations. Based on that review, we can provide written modifications or confirmation, as appropriate.

Environmental Concerns Are Not Covered

Unless environmental services were specifically included in our scope of services, this report does not provide any environmental findings, conclusions, or recommendations, including but not limited to, the likelihood of encountering underground storage tanks or regulated contaminants.

Subsurface Conditions Can Change

This geotechnical or geologic report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by man-made events such as construction on or adjacent to the site, new information or technology that becomes available subsequent to the report date, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. If more than a few months have passed since issuance of our report or work product, or if any of the described events may have occurred, please contact GeoEngineers before applying this report for its intended purpose so that we may evaluate whether changed conditions affect the continued reliability or applicability of our conclusions and recommendations.

Geotechnical and Geologic Findings Are Professional Opinions

Our interpretations of subsurface conditions are based on field observations from widely spaced sampling locations at the site. Site exploration identifies the specific subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied its professional judgment to render an informed opinion about subsurface conditions at other locations. Actual subsurface conditions may differ, sometimes significantly, from the opinions presented in this report. Our report, conclusions and interpretations are not a warranty of the actual subsurface conditions.

Geotechnical Engineering Report Recommendations Are Not Final

We have developed the following recommendations based on data gathered from subsurface investigation(s). These investigations sample just a small percentage of a site to create a snapshot of the subsurface conditions elsewhere on the site. Such sampling on its own cannot provide a complete and accurate view of subsurface conditions for the entire site. Therefore, the recommendations included in this report are preliminary and should not be considered final. GeoEngineers' recommendations can be finalized only by observing actual subsurface conditions revealed during construction. GeoEngineers cannot assume responsibility or liability for the recommendations in this report if we do not perform construction observation.

We recommend that you allow sufficient monitoring, testing and consultation during construction by GeoEngineers to confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes if the conditions revealed during the work

differ from those anticipated, and to evaluate whether earthwork activities are completed in accordance with our recommendations. Retaining GeoEngineers for construction observation for this project is the most effective means of managing the risks associated with unanticipated conditions. If another party performs field observation and confirms our expectations, the other party must take full responsibility for both the observations and recommendations. Please note, however, that another party would lack our project-specific knowledge and resources.

A Geotechnical Engineering or Geologic Report Could Be Subject to Misinterpretation

Misinterpretation of this report by members of the design team or by contractors can result in costly problems. GeoEngineers can help reduce the risks of misinterpretation by conferring with appropriate members of the design team after submitting the report, reviewing pertinent elements of the design team's plans and specifications, participating in pre-bid and preconstruction conferences, and providing construction observation.

Do Not Redraw the Exploration Logs

Geotechnical engineers and geologists prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. The logs included in a geotechnical engineering or geologic report should never be redrawn for inclusion in architectural or other design drawings. Photographic or electronic reproduction is acceptable, but separating logs from the report can create a risk of misinterpretation.

Give Contractors a Complete Report and Guidance

To help reduce the risk of problems associated with unanticipated subsurface conditions, GeoEngineers recommends giving contractors the complete geotechnical engineering or geologic report, including these "Report Limitations and Guidelines for Use." When providing the report, you should preface it with a clearly written letter of transmittal that:

- advises contractors that the report was not prepared for purposes of bid development and that its accuracy is limited; and
- encourages contractors to confer with GeoEngineers and/or to conduct additional study to obtain the specific types of information they need or prefer.

Contractors Are Responsible for Site Safety on Their Own Construction Projects

Our geotechnical recommendations are not intended to direct the contractor's procedures, methods, schedule or management of the work site. The contractor is solely responsible for job site safety and for managing construction operations to minimize risks to on-site personnel and adjacent properties.

Biological Pollutants

GeoEngineers' Scope of Work specifically excludes the investigation, detection, prevention or assessment of the presence of Biological Pollutants. Accordingly, this report does not include any interpretations, recommendations, findings or conclusions regarding the detecting, assessing, preventing or abating of Biological Pollutants, and no conclusions or inferences should be drawn regarding Biological Pollutants as they may relate to this project. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria and viruses, and/or any of their byproducts.

A Client that desires these specialized services is advised to obtain them from a consultant who offers services in this specialized field.

GeoEngineers

THE PACIFIC RESOURCES GROUP

December 9, 2021

Mr. Mac Martin
Martin Development
PO Box 15523
Seattle, Washington 98115

Subject: Preliminary Tree Assessment at 9600 Boeckman Road Wilsonville, Oregon

Dear Mr. Martin,
As requested I visited the site on the south east corner of SW Boeckman and Kinsman Roads. You requested a preliminary assessment of the trees that will be affected by the proposed building and parking lot construction. (See the attached 6 diagrams and chart for tree locations and descriptions). The following are my observations, findings and recommendations.

OBSERVATIONS & FINDINGS
The portions of the site that are proposed for development and are shown on the attached tree location diagrams have changes in topography from past placement fill that have disrupted natural surface runoff and results in standing water in several locations during the winter months. The grading of the site to develop it will significantly change this. The predominant tree species, found in this tree assessment, are mainly made up of Douglas Fir and Ponderosa Pine, with a few other species including Oregon White Oak, Oregon Ash, Pacific Madrone, Bird Cherry, Bigleaf Maple and Scouler Willow. Over the years, these trees adapted to the existing drainage conditions, but the serious drought over the last few years has adversely affected a number of them as evidenced by reduced annual growth. Approximately 176 trees were assessed and the description for each tree is listed on the accompanying chart. All the trees assessed were tagged with metal tags with numbers that correspond to those on the assessment chart and on the existing conditions survey performed by Andy Paris and Associates. Several trees that were missed by the surveyors have been added to the tree location diagrams and the tree assessment chart.

The trees included for assessment are those that are within the project's construction limits, in close proximity to areas where construction will disturb the soil surface and affect tree root systems and in an area on the south end of the site that the City requested be included. The assessment includes approximately 176 trees, 93 of which could be retained. Based on the grading plans dated 11/22/21, my preliminary assessment indicates that 73 trees have a variable chance for long term survival if protected during construction depending on their health and condition. These trees will have a very limited amount of disturbance within their root zones and post construction care can mitigate changes in growing conditions that occur during construction. An additional 20 trees may have a significant amount of their root systems covered by fill which can cause root loss, decline in health and death over a number of years. These trees would have a good chance of surviving if an aeration system is constructed over the roots before fill is placed over them.

The suggested aeration system for the 20 trees is comprised of perforated pipe vented outside the fill. Large cobble rock is placed over the pipe so that holes in the pipe and the voids in the rock allow air to continue to circulate and allow roots to continue to exchange air, which is essential for their survival and continued function. Those noted to be retained with and without aeration are indicated in the last column of the assessment chart.

Some of 93 trees are poor specimens, have health issues and have not been evaluated for their value and possible contribution to the landscape on the finished project. They are in locations that offer the possibility for their retention. At this preliminary stage in the design process I have made very preliminary recommendations for their retention. Even though individually they may have health or condition issues due to years of insect, disease and or drought related problems, they could improve with care or changes in growing conditions. More specific recommendations or retention or removal will be made when construction documents are being prepared.

TREE PROTECTION

For those trees planned for retention, some form of tree protection should be provided. For trees that are outside the construction limits and which are outside the erosion control fencing, I do not recommend any tree protection fencing beyond the erosion fencing, unless any construction associated activities (job trailers, parking or material storage, etc.) are allowed outside the construction limits. The City may request that tree protection fencing be placed before demolition begins. I recommend requesting a variance since in some areas where tree removal will take place, the trees are close together and any fencing will be damaged or destroyed during tree removal. If fencing is required, I recommend orange plastic fabric on "T" posts, which can be put back up or replaced easily. Once trees and associated debris are removed tree protection fencing should be placed.

For trees that are within the construction limits and are in an area where they are unlikely to have construction activities within their drip lines, I recommend construction fencing such as chain link panels or orange plastic 4' to 6' tall fence fabric on stakes 8' to 10' apart. The City may require chain link fencing, so check with them before specifying material.

If work is unlikely to be required within the tree protection area, driven posts with light duty chain link fabric could be used. However, if there is any chance that the fencing will have to be relocated temporarily to allow work within the tree protection area, the driven posts and light duty chain link fabric is not recommended as it is typically destroyed when removed. Panels on blocks would be a better option. Single trees needing protection should be fenced at or beyond the drip line. Since there are some trees that will have fill placed over their root systems with side slopes that are not suitable for chain link on panels, I recommend the orange plastic fencing which would be more effective in these situations.

For any trees having work done within their root zone or drip line, the Project Arborist should be present. Any fencing moved to allow work within the protection area should be placed back in it's original position at the end of the work day. Any traffic, storage of materials or other activities that can compact soil or damage roots exposed on the surface should be kept out of the tree protection areas.

POST CONSTRUCTION TREE CARE

Whether plants are established or newly installed in the landscape, making sure that they have access to adequate soil moisture and nutrients is essential. We recommend that composite soil sample(s) be taken and analyzed to get specific recommendations on nutrients and other soil amendments to help

optimize growing conditions. The most reliable local lab is A & L Western Agricultural Laboratory, 10220 SW Nimbus Avenue, Bldg K-9, Tigard, Oregon 97223. Phone 503.968.9225. Website: http://www.al-labs-west.com/. A & L's Agronomists can provide instructions on how to take soil or plant samples for analysis and, depending on your needs, provide soil analysis with recommendations.

Fertilization For Root Replacement

For both existing trees and woody plants, it would be wise to provide these plants with an inexpensive fertilization. This would include new plants the growing season after installation. Trees affected by construction and by transplanting typically suffer root loss and loss of vigor. With new plantings here in the Pacific Northwest, after one season, nitrogen is frequently leached below the root zone by irrigation and winter rain. The adverse effects of construction activities or the general lack of essential nutrients can be mitigated to a great extent by promoting new root growth, which can be accelerated by soil aeration, fertilization and other recommended soil amendments.

Until a soil analysis is obtained, as a general rule here in the Pacific Northwest we recommend that as a first step, the owner or maintenance contractor aerate the soil and fertilize the entire area beneath existing trees using a highly soluble high nitrogen fertilizer applied at a time when surface vegetation is dormant and tree roots are still growing. The best time to do this is in late November and again in late January or early February while plants are still dormant. We suggest using a water soluble fertilizer that is best applied just prior to or during a rain, otherwise it should be watered into the soil. We recommend using Ammonium Sulfate (21-0-0 or 23-0-0) at a rate of 4 lbs. of Nitrogen per 1000 square feet, which is often best made in two applications of 2 lbs. each. This equates to applying 9 lbs. of the Ammonium Sulfate fertilizer to each 1000 square feet of area within the drip line or area to be treated for each tree. If a single application is to be made, we recommend using 4 lbs. of Nitrogen or 18 lbs. of fertilizer in the fall application. The fertilizer can be applied to the surface of the ground with a cyclone or "whirly" type spreader. The fertilization program for woody plants (both trees and woody landscape ornamentals benefit from this) should occur every year for the first 3 years then at a reduced rate every year or two thereafter. The fertilization should be done within the drip line and up to 10 feet outside the drip line of smaller trees and shrubs. For larger trees the area to be treated is within the circle, with the tree at its center, that has a radius equal to one foot for every inch of the tree's diameter at 6" above ground.

NOTE -Once the results of a soil analysis have been obtained the recommended addition of missing nutrients and or soil amendments should take the place of the general fertilization recommendation above.

Soil Compaction Prevention And Reversal

In addition to fertilization, preventing or reversing soil compaction can effectively extend the functional life of trees and woody plants on developed sites. Traffic over the root zone compacts the soil, which cuts off the tree root's ability to get oxygen and expel carbon dioxide. Compaction also provides favorable conditions for disease and soil decay organisms. If traffic occurs within the drip line and soil is compacted, symptoms of decline may appear within a few years. The symptoms to watch for include the appearance of very fine dead wood where small twigs are dying in the outer most portion of the tree's crown or canopy. This dieback typically occurs from the tips of branches, progressing toward the trunk and from the top of the tree down. This pattern can vary with species of tree. To prevent this from occurring or to treat it where it has occurred, the area where the compaction occurred can be aerated using an aerating machine that penetrates at least 4" to 6" into the soil in areas without lawn. Rototilling the affected soil can also accomplish this, however, care should be taken to avoid root damage and loss. In most cases the preferred alternative would be to use a 2" auger and drill holes 12" to 18" in depth spaced about 2' apart throughout the area within the drip line. The holes can be left open or filled with small round rocks with no fines. The voids between rocks will extend the movement of air into the soil. Following tilling, fertilizer can be applied to stimulate root growth. A

durable carbide tipped soil auger can be obtained from A.M. Leonard, at this link - http://www.amleo.com/augers-%26-drills/c/P08A/.

Pre And Post Construction Pruning

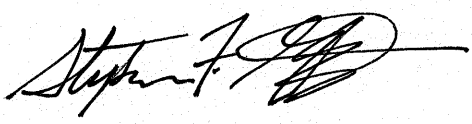
Where appropriate, to reduce liability from falling branches and to better assess subtle changes in tree health, we recommend pruning to remove large to medium size dead wood. In areas where equipment and or workers will be passing beneath trees with large deadwood, its removal should be done during demolition and prior to placing tree protection fencing. Following construction we recommend monitoring tree health for several years after construction is complete. New deadwood appearing after construction is an indicator of declining health, and insect or disease problems that should be addressed. If significant root loss has occurred, we also recommend observing the ground at the base of trees for signs of instability during periods of high winds. Should you have any questions about these recommendations, feel free to contact us.

CONCLUSIONS

This report is based on a preliminary grading plan that will be changed and refined as construction documents are developed. Therefore this report is preliminary and all recommendations are subject to change as the design and review process proceeds. The recommendations contained in this report are both specific and general in nature and will be revised to cover specific situations prior to and during construction.

This completes my report. If any additional information, which would effect my conclusions and recommendations, becomes available I would welcome the opportunity to consider it and revise this report accordingly. If I omitted any information or if you have any questions please do not hesitate to contact me.

Sincerely yours,



Stephen F. Goetz, Principal
American Society of Consulting Arborists Reg #260
American Society of Landscape Architects, OR Lic. #80
Society of American Foresters

SG:mac
Enclosures

ARBORIST DISCLOSURE STATEMENT: Arborists are tree specialists who use their education, knowledge training and experience to examine trees, recommend measures to enhance their health and beauty and to attempt to reduce the risk of living near trees. Clients may choose to accept or disregard the recommendations of the arborist or to seek additional advice. Trees and other plant life are living, changing organisms affected by innumerable factors beyond our control. Trees fail in ways and because of conditions we do not fully understand. Arborists cannot detect or anticipate every condition or event that could possibly lead to the structural failure of a tree. Conditions are often hidden within the trees and below ground. Arborists cannot guarantee that a tree will be healthy or safe under all circumstances, for any specific period or when a tree or its parts may fail. Further, remedial treatments, as with any treatment or therapy, cannot be guaranteed. Treatment, pruning, bracing and removal of trees may involve considerations beyond the scope of the arborist's skills and usual services such as the boundaries of properties, property ownership, site lines, neighbor disputes and agreements and other issues. Therefore, arborists cannot consider such issues unless complete and accurate information is disclosed in a timely fashion. Then, the arborist can be expected, reasonably, to rely upon the completeness and accuracy of the information provided. Trees can be managed but not controlled. To live near trees, regardless of their condition, is to accept some degree of risk. The only way to eliminate all risk associated with trees is to eliminate all trees.
HAZARD/HAZARD POTENTIAL: For the purposes of this evaluation and/report, a tree or tree part that presents a threat to humans, livestock, vehicles, structures, landscape features or other entity of civilization from uprooting, falling, breaking or growth development (e.g., roots). While all large landscape trees in proximity to such targets present some degree of hazard regardless of their condition, such inherent hazard is not intended as within this definition and its usage in this evaluation and report.
INSPECTION LIMITATIONS: The inspection of these trees consisted solely of a visual inspection from the ground. While more thorough techniques are available for inspection and evaluation, they were neither requested nor considered necessary or appropriate at this time. Because trees and other plant life are living, changing organisms effected by innumerable factors beyond our control, The Pacific Resources Group and it's personnel offer no guarantees, stated or implied, as to tree, plant or general landscape safety, health, condition or improvement, beyond that specifically stated in writing in accepted contracts.

9600 Boeckman Rd Tree Assessment

Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
800	48	Ponderosa Pine	100+ x 37	Fair	Moderate & non-correctable defects	Partial lower crown due to crowding with a full upper crown. Co-dominant stems at 70'. Average annual twig growth.	A
801	17	Ponderosa Pine	60 x 30	Poor	Moderate & non-correctable defects	Partial 1/3 very thin crown due to crowding. Below average annual twig growth. May improve with care.	B
802	20	Ponderosa Pine	70 x 25	Fair	Moderate & non-correctable defects	Partial 3/4 crown due to crowding. Co-dominant stems at 50'. Average annual twig growth and moderate amount of large to medium deadwood in crown to remove.	A
803	22	Ponderosa Pine	15 x 0	DEAD	DEAD	Dead 15' tall stump/snag has bark sloughing off and several holes from woodpeckers. DEAD STUMP, REMOVE.	
804	12	Ponderosa Pine	50 x 12	Good	Few & minor or correctable defects	Nearly full asymetric crown with average to above average annual twig growth.	A
805	15	Ponderosa Pine	50 x 15	Fair	Moderate & non-correctable defects	Partial 1/2 crown due to crowding and below average annual twig growth.	B
806	36	Ponderosa Pine	100+ x 42	Good	Moderate & non-correctable defects	Partial 1/3 crown due to crowding and average annual twig growth.	A
807	32	Ponderosa Pine	100+ x 30	Fair	Moderate & non-correctable defects	Partial 3/4 crown due to crowding and average annual twig growth.	A
808	30	Douglas Fir	100+ x 46	Good	Few & minor or correctable defects	Full crown with good annual twig growth.	
809	27	Douglas Fir	100+ x 35	Poor	Moderate & non-correctable defects	Partial 2/3 crown due to crowding. Codominant stems at 30'. Large deadwood in lower crown should be removed if tree is retained. Below average annual twig growth.	
810	19	Douglas Fir	100+ x 25	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with below average annual twig growth.	
811	34	Douglas Fir	100+ x 40	Fair	Moderate & non-correctable defects	Partial 1/2 crown due to crowding and below average annual twig growth.	
812	29	Douglas Fir	90 x 25	Poor	Major defects or problems	Very thin partial crown, top broken out at 90' with very poor annual twig growth.	
813	22	Douglas Fir	80 x 22	Poor	Major defects or problems	Partial 1/2 crown due to crowding and below average annual twig growth. Top broken out at 80'.	B
814	11	Douglas Fir	35 x15	Poor	Major defects or problems	Partial very thin 1/8 crown due to crowding. Top 12' to 15' dead with very poor annual twig growth. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	A
815	24	Ponderosa Pine	100+ x 18	Fair	Moderate & non-correctable defects	Full narrow asymetric crown with broken out top. Below average annual twig growth.	A
816	17	Ponderosa Pine	90 x 10	Poor	Major defects or problems	Very small, 5% to 8% live crown ratio, with below average annual twig growth.	A

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Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
817	34	Ponderosa Pine	100+ x 25	Good	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with good annual twig growth.	A
818	25	Ponderosa Pine	100+ x 18	Good	Moderate & non-correctable defects	Partial 7/8 asymetrical crown due to crowding with good annual twig growth.	A
818 B	20	Douglas Fir	100+ x 30	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average annual twig growth. Light amount of medium deadwood to remove if retaining.	B
819	36	Ponderosa Pine	100+ x 30	Good	Moderate & non-correctable defects	Partial 2/3 crown due to crowding. Good annual twig growth.	A
820	24	Douglas Fir	80 x 20	Fair	Moderate & non-correctable defects	Subdominant tree with partial 1/3 crown due to crowding. Below average annual twig growth.	A
821	36	Ponderosa Pine	100+ x 25	Good	Moderate & non-correctable defects	Partial lower crown and full upper crown due to crowding. Good annual twig growth.	A
822	36	Ponderosa Pine	100+ x 35	Good	Few & minor or correctable defects	Full asymetric crown with good annual twig growth. Nice specimen.	B
823	25	Douglas Fir	90 x 30	Very Poor	Major defects or problems	Very thin partial 1/2 crown due to crowding with very poor annual twig growth indicates declining health. May improve with care.	
826	30	Douglas Fir	100+ x 40	Fair	Moderate & non-correctable defects	Partial 2/3 asymetric crown due to crowding with below average annual twig growth. Large amount of medium to large deadwood in lower crown to be removed if retaining.	
827	15	Douglas Fir	75 x 28	Fair	Moderate & non-correctable defects	Subdominant tree with thin partial 1/3 crown due to crowding. Below average annual twig growth. Some medium to fine deadwood in lower crown.	
828	36	Ponderosa Pine	100+ x 33	Good	Few & minor or correctable defects	Nearly full asymetric crown with average to above average annual twig growth. Large amount of medium to large deadwood in lower crown to remove if retaining.	
829	17	Douglas Fir	90 x 30	Fair	Moderate & non-correctable defects	Subdominant tree with partial 2/3 crown due to crowding and below average annual twig growth. Some medium deadwood in lower crown to remove if retaining.	
830	17	Douglas Fir	90 x 22	Fair	Moderate & non-correctable defects	Top broken out at 90' with partial 2/3 crown due to crowding. Below average annual twig growth.	
831	36	Ponderosa Pine	100+ x 38	Fair	Moderate & non-correctable defects	Below average annual twig growth. Some fine deadwood at branch tips indicates declining health which may improve with care.	
832	30	Douglas Fir	90 x 50	Excellent	Moderate & non-correctable defects	Top broken out at 90' with full symetrical crown and good annual twig growth. Some medium to large deadwood in lower crown to remove if retaining.	
833	30	Douglas Fir	80 x 30	Poor	Major defects or problems	Fungal fruiting bodies (conks) on trunk indicate presence of internal decay. Top splits into crooked top at 45'. Tree leans southwest at 15° to 20° with partial 2/3 crown due to crowding. Below average annual twig growth. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	

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Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
834	30	Douglas Fir	75 x 38	Fair	Moderate & non-correctable defects	Subdominant tree with top broken out. Partial 3/4 crown due to crowding with below average annual twig growth.	
835	41	Ponderosa Pine	100+ x 50	Good	Moderate & non-correctable defects	Partial 2/3 lower crown due to crowding with full asymetric upper crown. Average annual twig growth with some medium to fine deadwood in crown to remove if retaining.	
837	33	Douglas Fir	100+ x 37	Good	Moderate & non-correctable defects	Partial lower crown with full asymetric upper crown due to crowding. Average annual twig growth. Some large, medium and fine deadwood to remove if retaining.	
838	14	Douglas Fir	55 x 25	Very Poor	Major defects or problems	Fungal fruiting bodies (conks) on trunk indicate presence of internal decay. Partial 1/3 crown due to crowding. Below average annual twig growth and trunk has long swoop. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	
839	18	Douglas Fir	90 x 18	Poor	Moderate & non-correctable defects	Subdominant tree with top broken out. Thin partial 1/3 crown due to crowding with very poor annual twig growth. POOR SPECIMEN, MARGINAL FOR RETENTION.	
840	23	Douglas Fir	100+ x 25	Fair	Moderate & non-correctable defects	Thin partial lower and full upper crown with below average annual twig growth.	
841	18	Douglas Fir	90 x 40	Fair	Moderate & non-correctable defects	Thin partial 1/3 crown due to crowding. Below average annual twig growth.	
842	24	Douglas Fir	100+ x 40	Fair	Moderate & non-correctable defects	Partial 1/2 crown due to crowding and average annual twig growth. Large amount of medium to large deadwood in lower crown to remove if retaining.	
843	30	Douglas Fir	100+ x 45	Fair	Moderate & non-correctable defects	Nearly full asymetric crown with below average annual twig growth. Large amount of large deadwood on west side of lower crown to remove if retaining.	
844	16	Douglas Fir	60 x 28	Poor	Major defects or problems	Subdominant tree with top broken out at 60', thin crown and below average annual twig growth.	
845	12	Douglas Fir	80 x 25	Poor	Major defects or problems	Top broken out at 80', partial 3/4 crown due to crowding. Below average annual twig growth.	B
846	21	Douglas Fir	100+ x 30	Fair	Moderate & non-correctable defects	Partial 1/8 & 1/4 crown due to crowding. Below average annual twigh growth with some medium to large deadwood to remove if retaining.	
847	20	Douglas Fir	90 x 30	Fair	Moderate & non-correctable defects	Partial 1/2 crown due to crowding with below average annual twig growth. Some medium to fine deadwood in crown.	
848	24	Douglas Fir	100+ x 40	Fair	Moderate & non-correctable defects	Partial 3/8 crown due to crowding with average annual twig growth. Some medium deadwood on west side of lower crown to remove if retaining.	
849	30	Douglas Fir	100+ x 42	Good	Moderate & non-correctable defects	Partial 1/2 lower and full asymetric upper crown with average annual twig growth. Large amount of large deadwood on northwest side of lower crown to remove if retaining.	
850	30	Douglas Fir	100+ x 40	Good	Moderate & non-correctable defects	Partial 1/2 lower and full asymetric upper crown with average annual twig growth. Large amount of large deadwood on north side of lower crown to remove if retaining.	

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Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
851	45	Douglas Fir	100+ x 42	Good	Few & minor or correctable defects	Full crown with average annual twig growth. Two stems at 55'. Prune to improve structure if retaining.	
853	8	Douglas Fir	65 x 12	Poor	Major defects or problems	Subdominant tree with thin partial 1/4 crown due to crowding. Below average annual twig growth. POOR SPECIMEN MARGINAL FOR PRESERVATION.	
854	16	Douglas Fir	100+ x 16	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with below average annual twig growth.	
855	22	Douglas Fir	100+ x 35	Fair	Moderate & non-correctable defects	Partial 1/8 & 1/8 lower crown with a nearly full upper crown. Below average annual twig growth.	
856	22	Douglas Fir	90 x 18	Poor	Moderate & non-correctable defects	Very thin partial 1/4 crown due to crowding with below average annual twig growth. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	
857	29	Douglas Fir	100+ x 30	Fair	Moderate & non-correctable defects	Partial 1/3 lower and full upper crown with well below average annual twig growth.	
858	35	Ponderosa Pine	100+ x 25	Good	Moderate & non-correctable defects	Partial 1/2 lower with full upper crown. Average annual twig growth with some deadwood in lower crown to be removed if retaining.	A
859	40	Douglas Fir	100+ x 50	Good	Moderate & non-correctable defects	2 stems at 3' with a partial 3/4 crown due to crowding. Below average annual twig growth. Some deadwood in lower crown to remove if retaining.	
860	26	Douglas Fir	100+ x 18	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with below average annual twig growth. Some medium to fine deadwood to remove if retaining.	
861	24	Douglas Fir	100+ x 32	Fair	Moderate & non-correctable defects	Thin partial 1/4 crown due to crowding with below average annual twig growth.	
862	27	Douglas Fir	100+ x 35	Fair	Few & minor or correctable defects	Full asymetric crown due to crowding with below average annual twig growth.	
863	17	Douglas Fir	100+ x 30	Fair	Moderate & non-correctable defects	Partial 1/3 lower and full upper crown. Below average annual twig growth.	B
864	14	Douglas Fir	95 x 14	Fair	Moderate & non-correctable defects	Partial 1/4 lower with full upper crown due to crowding. Below average annual twig growth.	
865	22	Douglas Fir	100+ x 25	Good	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average annual twig growth. Moderate amount of medium to fine deadwood to remove if retaining.	B
866	11	Douglas Fir	100+ x 20	Poor	Moderate & non-correctable defects	Partial 1/8 very narrow crown due to crowding with poor annual twig growth and a light amount of deadwood. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	A
867	11	Douglas Fir	55 x 16	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with average annual twig growth. Some medium deadwood to remove if retaining.	B

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Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
868	26	Douglas Fir	100+ x 45	Fair	Moderate & non-correctable defects	Partial 1/3 lower and nearly full upper crown with average annual twig growth. Moderate amount of medium to large deadwood to remove if retaining.	B
869	13	Pacific Madrone	35 x 30	Good	Moderate & non-correctable defects	Wound on south side at 3'. Asymetrical crown with good leaf size and annual twig growth. Some structural issues could be improved with pruning.	
870	24	Douglas Fir	100+ x 30	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with below average annual twig growth. Some medium deadwood to remove if retaining.	A
871	28	Douglas Fir	100+ x 50	Good	Moderate & non-correctable defects	Partial 1/4 lower and full upper crown due to crowding. Average annual twig growth wth a large amount of medium to large deadwood to remove if retaining.	A
872	12	Douglas Fir	70 x 25	Fair	Moderate & non-correctable defects	Subdominant tree with partial 1/4 crown due to crowding. Average annual twig growth. Light amount of medium to fine deadwood in crown.	A
873	24	Oregon White Oak	85 x 30	Good	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with good annual twig growth and average leaf size. Some fine deadwood in upper crown suggests some insect or health issue that should be further investigated if it is retained.	A
874	17	Oregon White Oak	85 x 30	Good	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average annual twig growth and average leaf size. Some large deadwood to remove if retaining.	A
875	14	Douglas Fir	70 x 25	Fair	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with average annual twig growth. Light amount of medium deadwood to remove if retaining.	A
876	30	Douglas Fir	100+ x 50	Good	Moderate & non-correctable defects	Partial 1/2 lower and full upper crown due to crowding with average annual twig growth. Some light deadwood in crown.	A
877	22	Douglas Fir	100+ x 37	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with poor annual twig growth. Some medium deadwood to remove if retaining.	A
878	10	Douglas Fir	70 x 16	Fair	Moderate & non-correctable defects	Subdominant tree with partial 1/3 crown due to crowding. Below average annual twig growth with some light deadwood in lower crown.	A
879	13	Douglas Fir	85 x 16	Poor	Major defects or problems	Partial 1/2 very thin crown due to crowding with poor annual twig growth. Some light deadwood. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	A
880	24	Douglas Fir	100+ x 28	Fair	Moderate & non-correctable defects	Partial 1/8 lower and 1/2 partial upper crown due to crowding. Average annual twig growth with some medium deadwood to remove if retaining.	A
881	24	Oregon White Oak	85 x 43	Good	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with good annual twig growth and leaf size. 2 stems at 6.5.' Crown is off center and heavy to south. Prune to balance and improve structure.	A
882	13	Douglas Fir	50 x 25	Poor	Moderate & non-correctable defects	Partial 3/4 crown due to crowding with very poor annual twig growth and with a moderate amountd of medium to fine deadwood. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	A
883	23	Douglas Fir	100 x 16	DYING	DYING	Nearly dead. Top 40' is dead. Dying tree is a POTENTIAL HAZARD, DO NOT PRESERVE.	A

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Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
884	23	Oregon White Oak	70 x 38	Fair	Moderate & non-correctable defects	Partial 1/2 crown due to crowding with average leaf size and annual twig growth. 2 stems at 6' and some medium deadwood to remove if retaining. Prune to improve structure.	A
885	17	Douglas Fir	80 x 20	Poor	Major defects or problems	Weak connection at base and partial 1/4 crown due to crowding. Poor annual twig growth and some medium deadwood in crown. POOR SPECIMEN, DO NOT PRESERVE.	A
886	24	Douglas Fir	95 x 25	Poor	Major defects or problems	Thin partial 2/3 crown due to crowding with poor annual twig growth. Clearly declining health with med to large deadwood in mid crown. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	A
887	17	Douglas Fir	85 x 25	Poor	HAZARD REMOVE	Partial 1/2 crown due to crowding with major wound and exposed internal decay on south side from 0' to 6'. HAZARD REMOVE.	A
888	17	Douglas Fir	75 x 25	Poor	Major defects or problems	Thin partial 1/3 crown due to crowding with very poor annual twig growth. Some medium to large deadwood in lower crown. Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
889	17	Douglas Fir	80 x 25	Poor	Major defects or problems	Thin partial 1/4 crown due to crowding with very poor annual twig growth. Moderate amount of medium to fine deadwood throughout crown. Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
890	21	Douglas Fir	100+ x 35	Poor	Major defects or problems	Small thin full crown due to crowding with poor annual twig growth. Large amount of large deadwood. Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
891	21	Douglas Fir	100+ x 18	Poor	Major defects or problems	Small thin crown due to crowding with poor annual twig growth. Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	**A**
892	21	Douglas Fir	85 x 25	Poor	Major defects or problems	Thin partial 1/3 crown due to crowding. Poor annual twig growth. Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
893	22	Douglas Fir	100+ x 25	Poor	Major defects or problems	Narrow thin nearly full crown with poor annual twig growth. Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	
894	24	Douglas Fir	100+ x 35	Poor	Major defects or problems	Thin full crown with poor annual twig growth. Top is dying back and has fine deadwood throughout crown, Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	B
895	22	Douglas Fir	100+ x 32	Fair	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with below average annual twig growth. Moderate amount of medium to large deadwood to remove if retaining.	B
896	22	Douglas Fir	85 x 32	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average annual twig growth. Top is split with a dead side stem attached. Prune to remove deadwood and improve structure if retaining.	A
897	27	Douglas Fir	100+ x 35	Poor	Major defects or problems	Thin full crown with dead top. Dying and serious decline in condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
900	13	Douglas Fir	65 x 20	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding. Below average annual twig growth.	

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Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
901	6	Scouler Willow	23 x 12	Very Poor	DYING HAZARD	Open wound exposes internal decay at 1' to 3'. Dead top and bark is sloughing off from 5' to top. DYING, HAZARD REMOVE.	
902	8	Douglas Fir	35 x 10	Fair	Major defects or problems	Subdominant tree with partial 1/8 crown due to crowding. Below average annual twig growth. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	
903	13	Douglas Fir	55 x 20-	Fair	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with below average annual twig growth.	
904	14	Oregon Ash	45 x 21	Fair	Moderate & non-correctable defects	Nearly full narrow crown due to crowding. Top leans 15° to 25° to north. Average annual leaf size and twig growth. May require inspection and pruning to improve structure if retained.	
905	14	Oregon Ash	60 x 24	Good	Few & minor or correctable defects	Full upper and partial lower crown due to crowding. Good annual leaf size and twig growth.	A
906	12	Oregon Ash	80 x 20	Good	Moderate & non-correctable defects	2 co-dominant stems at 30' with nearly full asymetric crown. Average annual leaf size and twig growth. Some medium size deadwood to be removed if area beneath it is developed.	A
907	10	Oregon Ash	75 x 18	Fair	Moderate & non-correctable defects	2 co-dominant stems at 40' with partial, 2/3 crown due to crowding. Average annual leaf size and twig growth.	A
908	15	Oregon Ash	70 x 30	Good	Moderate & non-correctable defects	Partial 2/3 crown due to crowding is off balance and heavy to north. Good annual leaf size and twig growth.	A
909	11	Oregon Ash	75 x 20	Good	Few & minor or correctable defects	Nearly full narrow crown due to crowding. Good annual leaf size and twig growth.	A
910	8	Oregon Ash	80 x 18	Good	Few & minor or correctable defects	Nearly full narrow crown due to crowding. Good annual leaf size and twig growth.	A
911	8	Oregon Ash	80 x 15	Good	Few & minor or correctable defects	Nearly full narrow crown due to crowding. Good annual leaf size and twig growth.	A
912	8	Oregon Ash	75 x 20	Fair	Moderate & non-correctable defects	Partial crown due to crowding with below average annual twig growth. Top broken out at 60' and may need pruning to improve structure.	A
913	11	Oregon Ash	20 x 5	Poor	Major defects or problems	Top broken out at 20' with a small amount of sucker growth from trunk. TREE DESTROYED, DO NOT PRESERVE.	A
914	7	Oregon Ash	28 x 2	Poor	Major defects or problems	Top broken out at 28' with a small amount of sucker growth from trunk. TREE DESTROYED, DO NOT PRESERVE.	A
915	15	Oregon Ash	80 x 25	Fair	Few & minor or correctable defects	Nearly full asymetric crown with average annual leaf size and twig growth. Some stubs from ice storm broken branches.	A
916	11	Oregon Ash	80 x 25	Good	Moderate & non-correctable defects	Partial crown due to crowding with good annual leaf size and twig growth. Off balance and heavy to north. Some stubs from ice storm broken branches.	A

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Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
917	14	Oregon Ash	80 x 25	Good	Moderate & non-correctable defects	Partial crown due to crowding with good annual leaf size and twig growth. Off balance and heavy to north. Some stubs from ice storm broken branches.	A
918	5, 4	Common Hawthorne	30 x 20	Poor	Major defects or problems	Partial crown due to crowding. Off balance to west. INVASIVE SPECIES & POOR SPECIMEN, DO NOT PRESERVE.	A
5000	15	Oregon White Oak	60 x 45	Good	Few & minor or correctable defects	Full crown with good annual leaf size and twig growth. Some medium to fine deadwood to remove.	
5002	17	Douglas Fir	0 x 0	DEAD	DEAD	Broken off lower trunk. TAKEN DOWN & REMOVED.	B
5003	48	Ponderosa Pine	100+ x 40	Good	Few & minor or correctable defects	Full crown with good annual twig growth. Some medium deadwood to remove.	A
5011	9	Bird Cherry	50 x 15	Very Poor	Moderate & non-correctable defects	Partial very small crown due to crowding. Sapsucker damage has nearly girdled trunk. Large amount of deadwood. VERY POOR SPECIMEN, DO NOT PRESERVE.	A
5012	13	Oregon White Oak	50 x 20	Fair	Moderate & non-correctable defects	Partial asymetric crown with below average annual twig growth and leaf size.	A
5042	27, 18	Oregon White Oak	85 x 75	Good	Moderate & non-correctable defects	2 stems at 30". Crown off balance to east with some medium and large deadwood to remove. Prune to balance and improve structure. Cable two stems together if retaining.	
5043	48	Ponderosa Pine	100+ x 47	Good	Moderate & non-correctable defects	Full asymetric crown due to crowding with average annual twig growth. Some recently dead branches and some large deadwood throughout crown to remove if retaining.	
5044	14	Oregon Ash	90 x 37	Good	Moderate & non-correctable defects	Partial 3/4 crown due to crowding with good leaf size and annual twig growth. Some medium to fine deadwood throughout crown.	
5129	12	Oregon Ash	80 x 23	Fair	Moderate & non-correctable defects	Full asymetric crown with chlorotic leaves, below average leaf size and annual twig growth indicates current health problems. May improve with care.	
5130	14	Oregon Ash	80 x 40	Fair	Moderate & non-correctable defects	Full asymetric crown with below average leaf size and annual twig growth. Tree has some structural problems that can be improved with pruning.	
5132	24	Oregon White Oak	0 X 0	DEAD	DEAD	15' stump lying on ground due to being toppled by winter ice storm.	
5133	23	Oregon White Oak	8 x 0	DEAD	DEAD	Trunk broken off at 8', only stump remains. REMOVE STUMP.	
6604	34	Douglas Fir	100+ x 45	Very Poor	Major defects or problems	Nearly full asymetric very thin crown with very poor annual twig growth. Tree in serious decline, likely due to saturated soil in wetland. Medium to fine deadwood throughout crown. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	
6612		NO TREE			NO TREE	No tree at this location	
6616	12	Oregon Ash	75 x 30	DYING	DYING HAZARD	Wounds extensive internal decay exposed from 0' to 7' across over 50% of circumference. DYING, HAZARD, REMOVE.	

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Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
6587	17	Oregon Ash	80 x 25	Fair	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with average annual leaf size and twig growth. Some large to medium deadwood to remove if area beneath it is improved.	A
6597	11	Oregon White Oak	90 x 20	Fair	Moderate & non-correctable defects	Partial 1/8 & 1/8 crown due to crowding with average annual leaf size and twig growth.	A
50346	32	Douglas Fir	85 x 35	Very Poor	Dying Hazard	Thin partial 3/4 crown due to crowding with very poor annual twig growth. Top was broken out and remaining top is dying with large amount of deadwood throughout crown. Dying tree is a POTENTIAL HAZARD REMOVE.	
50347	26	Douglas Fir	95 x 35	Good	Moderate & non-correctable defects	Partial lower and full upper crown due to crowding. Below average annual twig growth. Leans to northwest at 8° to 10°.	A
50348	9	Douglas Fir	25 x 18	Fair	Moderate & non-correctable defects	Partial crown due to crowding with below average annual twig growth. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
50349	34	Ponderosa Pine	100+ x 40	Good	Moderate & non-correctable defects	Partial lower and full upper crown with average annual twig growth. Top broken out and recently dead branches on north side indicates some potential health problem. May improve with care.	A
50350	24	Douglas Fir	100+ x 40	Good	Moderate & non-correctable defects	Partial crown due to crowding with below average annual twig growth. Some medium to fine deadwood to remove if retaining.	A
50351	35	Douglas Fir	100+ x 35	Fair	Moderate & non-correctable defects	Partial crown due to crowding with below average annual twig growth. Light amount of fine deadwood throughout crown.	A
50361	41	Ponderosa Pine	100+ x 50	Good	Few & minor or correctable defects	Full crown with average annual twig growth. Moderate amount of medium to large deadwood to remove is retaining.	B
50363	No Tree	NO TREE		NO TREE		No tree at this location.	
50364	No Tree	NO TREE		NO TREE		No tree at this location.	
50395	36	Ponderosa Pine	100+ x 35	Good	Few & minor or correctable defects	Full crown with good annual twig growth. Some medium to large deadwood to remove if retaining.	
50396	19	Ponderosa Pine	75 x 20	Fair	Moderate & non-correctable defects	Partial 1/2 crown due to crowding with average annual twig growth. Some recently dead branches in crown.	
50397	19	Douglas Fir	75 x 30	Fair	Moderate & non-correctable defects	Subdominant tree with partial 2/3 crown due to crowding and good annual twig growth.	
50398	19	Douglas Fir	90 x 27	Fair	Few & minor or correctable defects	Full crown with below average annual twig growth.	
50399	21	Oregon White Oak	75 x 30	Good	Moderate & non-correctable defects	Full asymetric crown is off balance and heavy to south. Some large, medium to fine deadwood in crown. Prune to improve structure if retaining.	

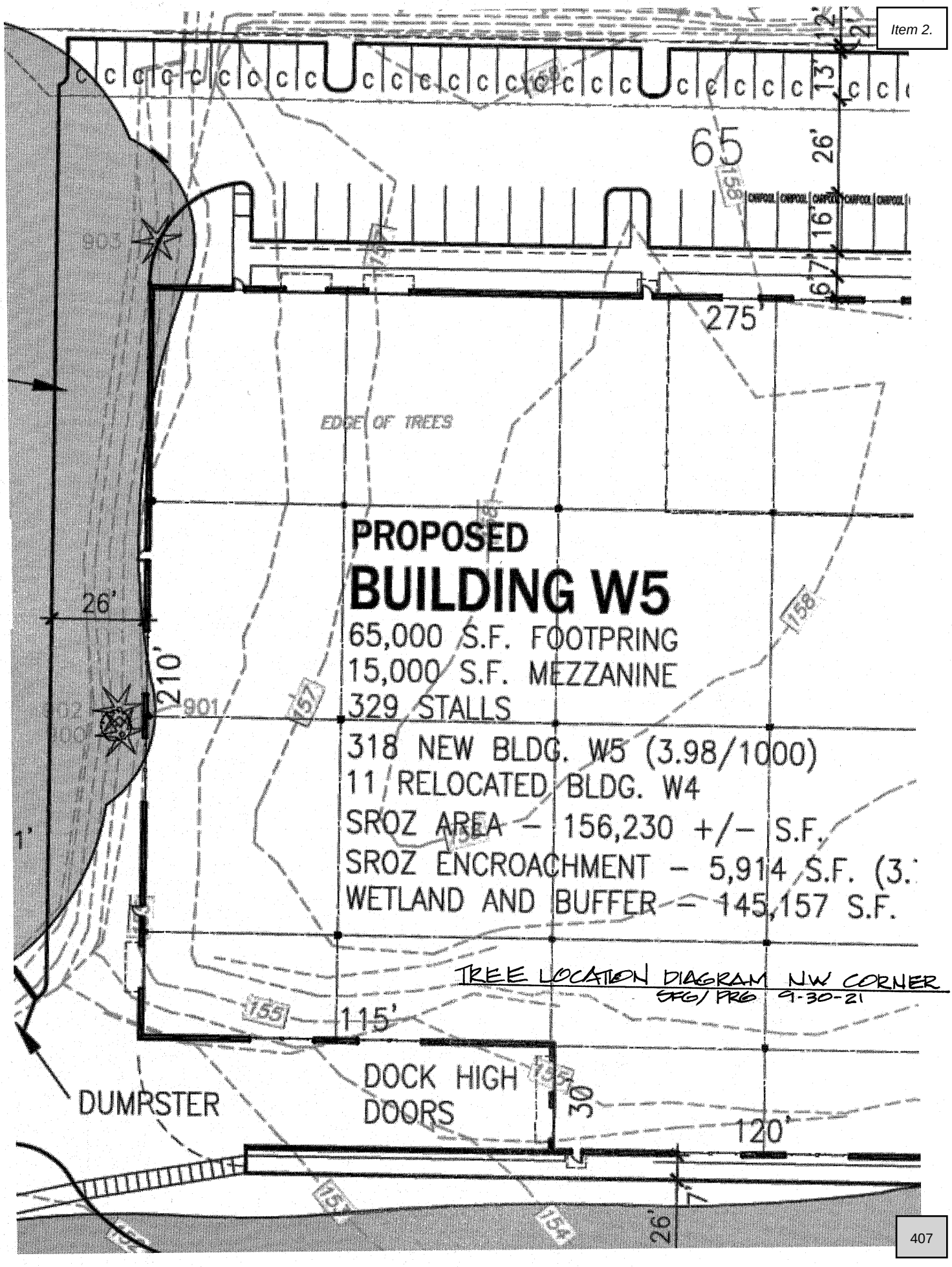
9600 Boeckman Rd Tree Assessment

Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
50400	42	Ponderosa Pine	100+ x 45	Good	Few & minor or correctable defects	Full crown with average annual twig growth. Some medium to large deadwood to remove if retaining.	
50402	15, 13	Oregon Ash	85 x 42	Good	Moderate & non-correctable defects	2 stems at 3', full asymetric crown is off balance to south. Some medium deadwood. Good leaf size and annual twig growth. Prune to improve structure and remove deadwood.	
50403	17	Oregon White Oak	80 x 35	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average leaf size and annual twig growth. Prune to improve structure and balance.	
50404	17	Oregon White Oak	85 x 40	Good	Moderate & non-correctable defects	Full asymetric crown with average leaf size and annual twig growth. Some medium to large deadwood to remove if retaining.	
50405	12	Oregon Ash	70 x 27	Poor	HAZARD REMOVE	Large open wound that exposes internal decay from 0' to 3'. Partial crown due to crowding. Some large deadwood. Poor specimen and not sound due to decay. HAZARD REMOVE.	
50406	12, 9	Bird Cherry	65 x 30	Fair	Moderate & non-correctable defects	Full crown with 2 stems at ground. Thin crown, average size wilted leaves due drought and average annual twig growth. May improve with care.	
50407	24	Douglas Fir	100+ x 40	Fair	Moderate & non-correctable defects	Partial 1/2 lower crown and full upper crown. Average annual twig growth with large, medium and fine deadwood to remove if retaining.	
50408	15	Bigleaf Maple	60 x 40	Fair	Moderate & non-correctable defects	Full crown with dead top. Below average annual twig growth and average leaf size may be due to drought. Prune to remove deadwood.	
50409	32	Ponderosa Pine	100+ x 40	Good	Moderate & non-correctable defects	Partial 3/4 asymetric crown due to crowding with good annual twig growth. Some large, medium and fine deadwood to remove if retaining.	
50410	23	Douglas Fir	100+ x 42	Good	Moderate & non-correctable defects	Partial 7/8 asymetrical crown due to crowding with average annual twig growth. Some medium to fine deadwood.	
50412	15	Douglas Fir	100+ x 23	Fair	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with below average annual twig growth. Medium to fine deadwood to remove if retaining.	
50413	20	Douglas Fir	100+ x 30	Fair	Moderate & non-correctable defects	Partial 2/3 lower and full upper crown due to crowding with average annual twig growth. Some medium to fine deadwood to remove if retaining.	
50474	28	Douglas Fir	100+ x 35	Good	Few & minor or correctable defects	Full crown with below average annual twig growth. Moderate amount of medium to fine deadwood to remove if retaining.	
50476	35	Douglas Fir	100+ x 45	Good	Few & minor or correctable defects	Partial 2/3 lower and nearly full upper crown with good annual twig growth. Moderate amount of large, medium and fine deadwood to remove if retaining.	B
50476 B	16	Douglas Fir	90 x 32	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with below average annual twig growth. Some medium to large deadwood to remove if retaining.	A
50476 C	17	Douglas Fir	100 x 32	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with below average annual twig growth. Some medium to large deadwood to remove if retaining.	A

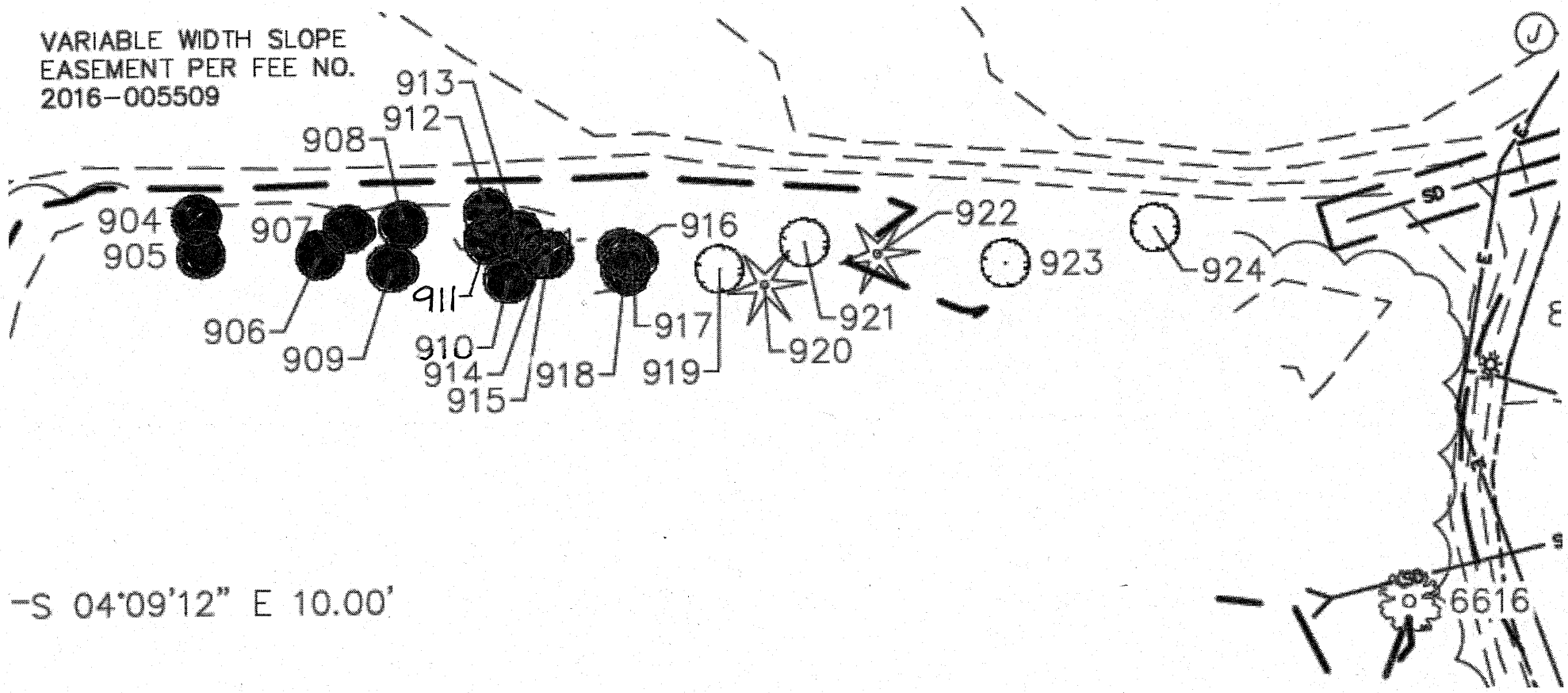
9600 Boeckman Rd Tree Assessment

Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
50479	24	Douglas Fir	100+ x 35	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average annual twig growth. Moderate amount of medium to fine deadwood to remove if retaining.	B
50479 B	11	Douglas Fir	60 x 16	Poor	Moderate & non-correctable defects	Subdomiant tree with partial 1/4 crown due to crowding with below average annual twig growth. Serious declining health with significant deadwood. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	B
50479 C	7	Douglas Fir	50 x 12	Poor	Major defects or problems	Subdominant tree with 1/8 crown due to crowding with very poor annual twig growth. Seriously declining health with significant deadwood. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	A
50479 D	6	Douglas Fir	35 x 0	DEAD	DEAD	DEAD TREE, REMOVE.	
50483	25	Douglas Fir	100+ x 28	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average annual twig growth. Moderate amount of medium to fine deadwood to remove if retaining.	B
50483 B	25	Douglas Fir	100+ x 45	Good	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with below average annual twig growth. Moderate amount of medium to find deadwood to remove if retaining.	B
50483 C	19	Douglas Fir	100+ x 28	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with below average annual twig growth. Some fine deadwood.	B
50487	16	Douglas Fir	100+ x 25	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with below average annual twig growth. Some fine deadwood.	A
50487 B	18	Douglas Fir	100+ x 28	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with below average annual twig growth. Some medium to large deadwood to remove if retaining.	A
50487 C	7	Douglas Fir	25 x 10	Poor	Major defects or problems	Subdominant tree with 1/2 crown due to crowding and below average annual twig growth. Moderate amount of medium deadwood. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
50487 D	22	Douglas Fir	100+ x 32	Fair	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with below average annual twig growth. Moderate amount of medium to find deadwood to remove if retaining.	A
50490	30	Douglas Fir	100+ x 40	Fair	Moderate & non-correctable defects	Full crown with below average annual twig growth. Moderate amount of medium to fine deadwood to remove if retaining.	A
50496	41	Douglas Fir	100+ x 50	Good	Few & minor or correctable defects	Full crown with average annual twig growth. Some medium to large deadwood to remove if retaining.	A
70824	19	Douglas Fir	100+ x 35	Fair	Moderate & non-correctable defects	Partial 1/4 lower and full upper crown due to crowding. Below average annual twig growth with a moderate amount of medium to large deadwood to remove if retaining.	
70824 B	20	Douglas Fir	100+ x 35	Fair	Moderate & non-correctable defects	Partial 1/4 lower and full upper crown due to crowding. Below average annual twig growth with a moderate amount of medium to large deadwood to remove if retaining.	

Notes: Retain A = Retain without aeration, Retain B = Retain with aeration



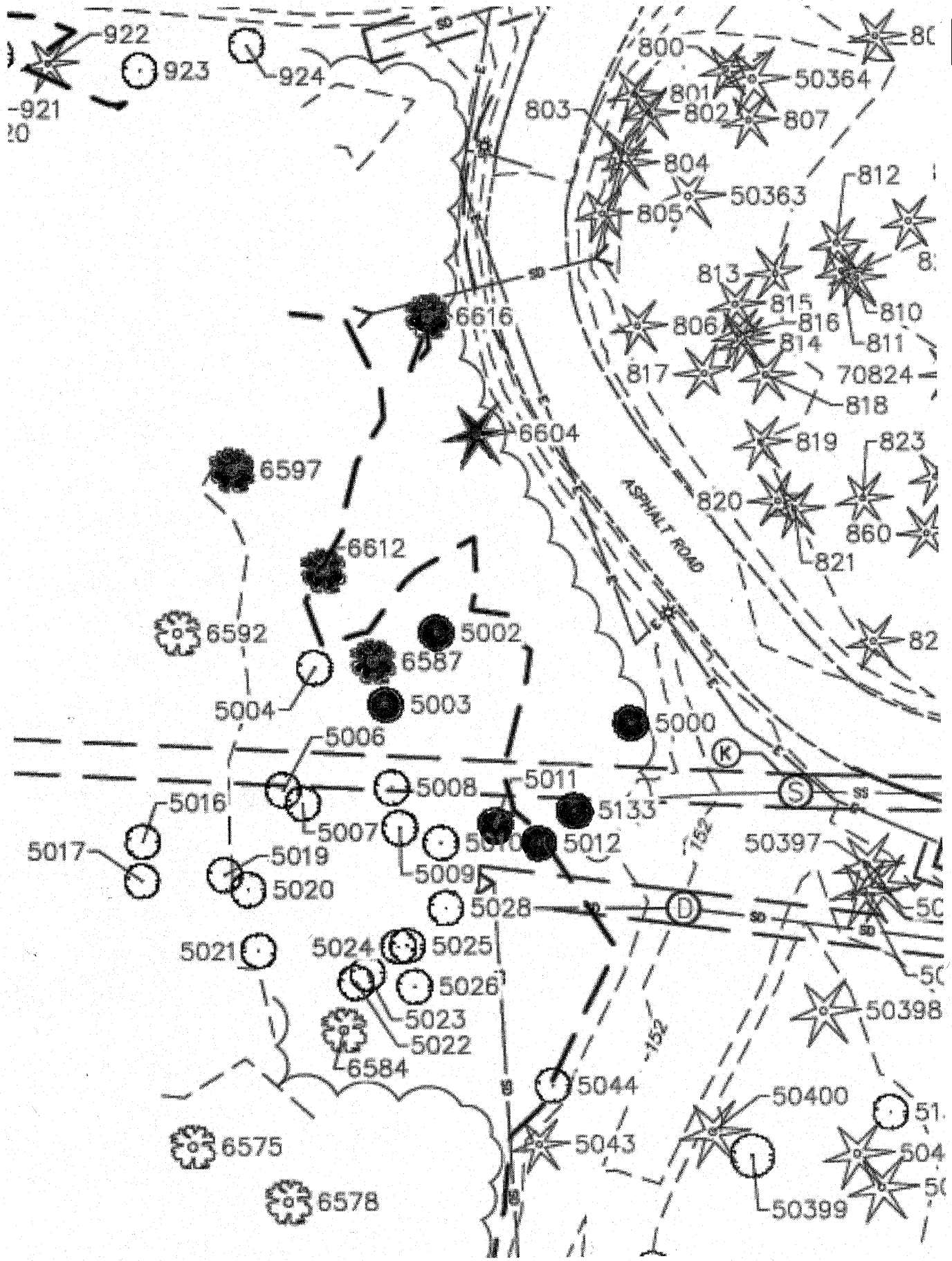
TREE LOCATION DIAGRAM NW CORNER
EFG/PRG 9-30-21



NORTH STORMPOND TREES

EFG/PRG 12-07-21

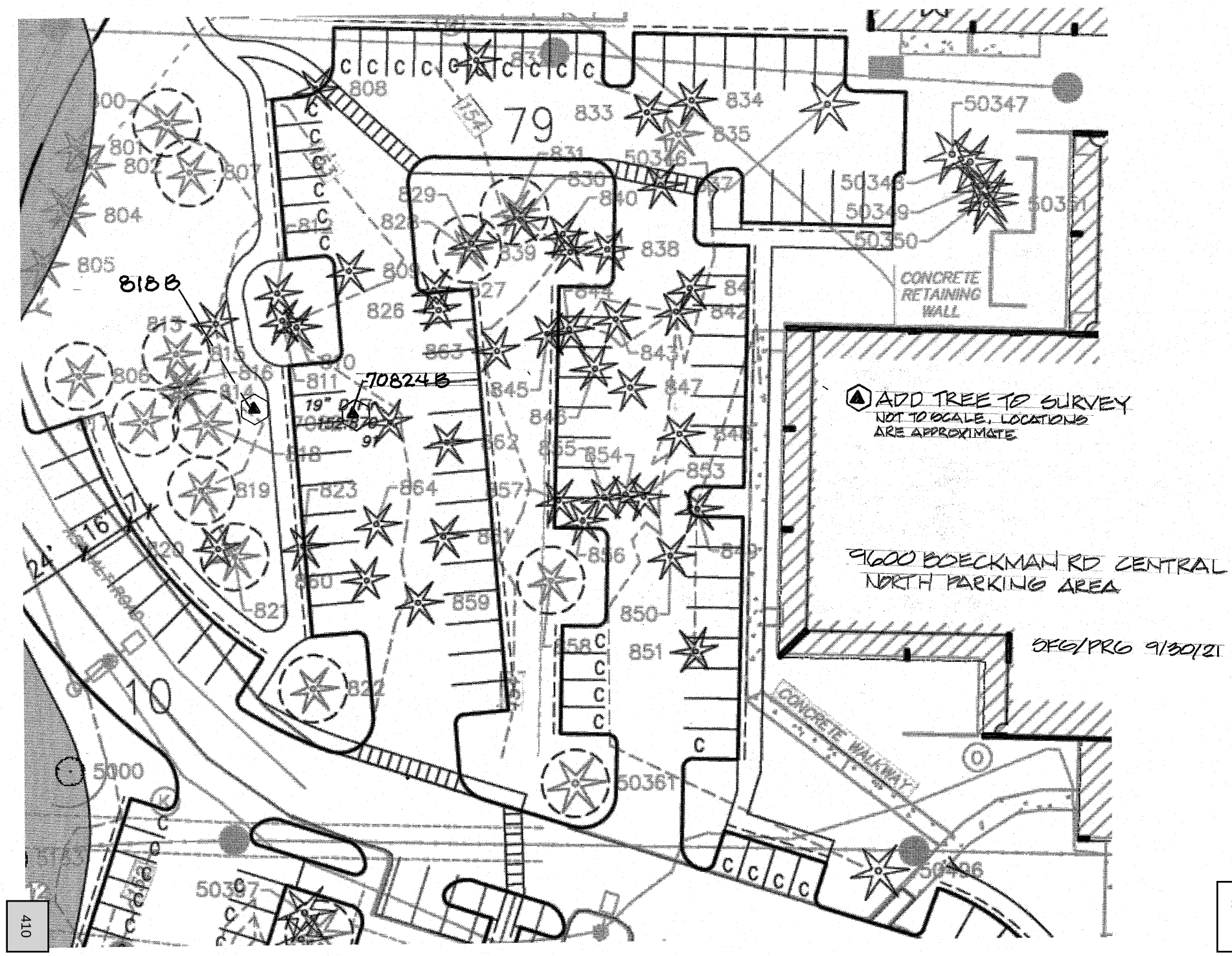
■ EFFECTED TREES - SEE CHART FOR DETAILS



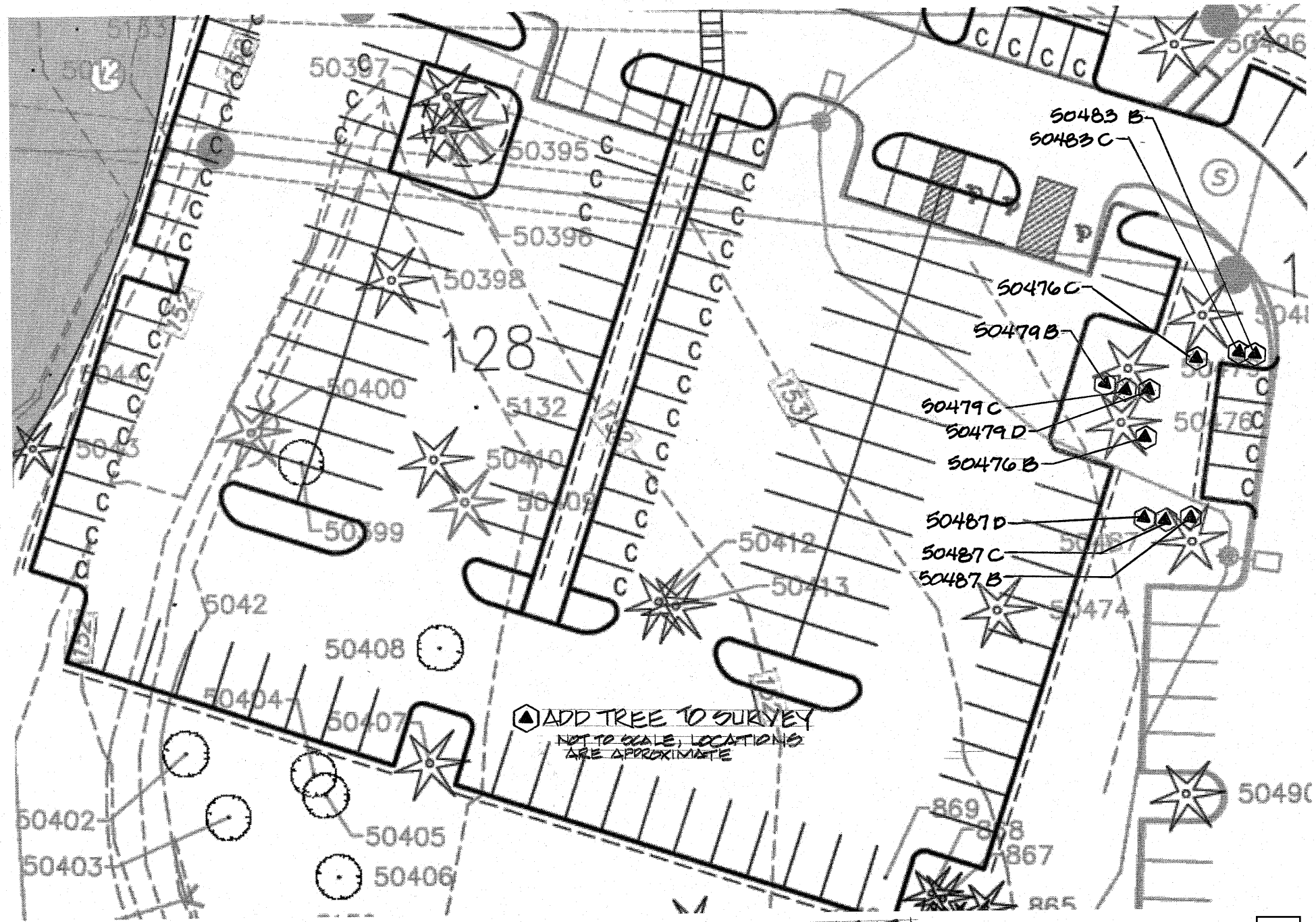
MID SITE STORMPOND TREES

EFFECTED TREES - SEE CHART FOR DETAILS

SEG/PRG - 12-07-21

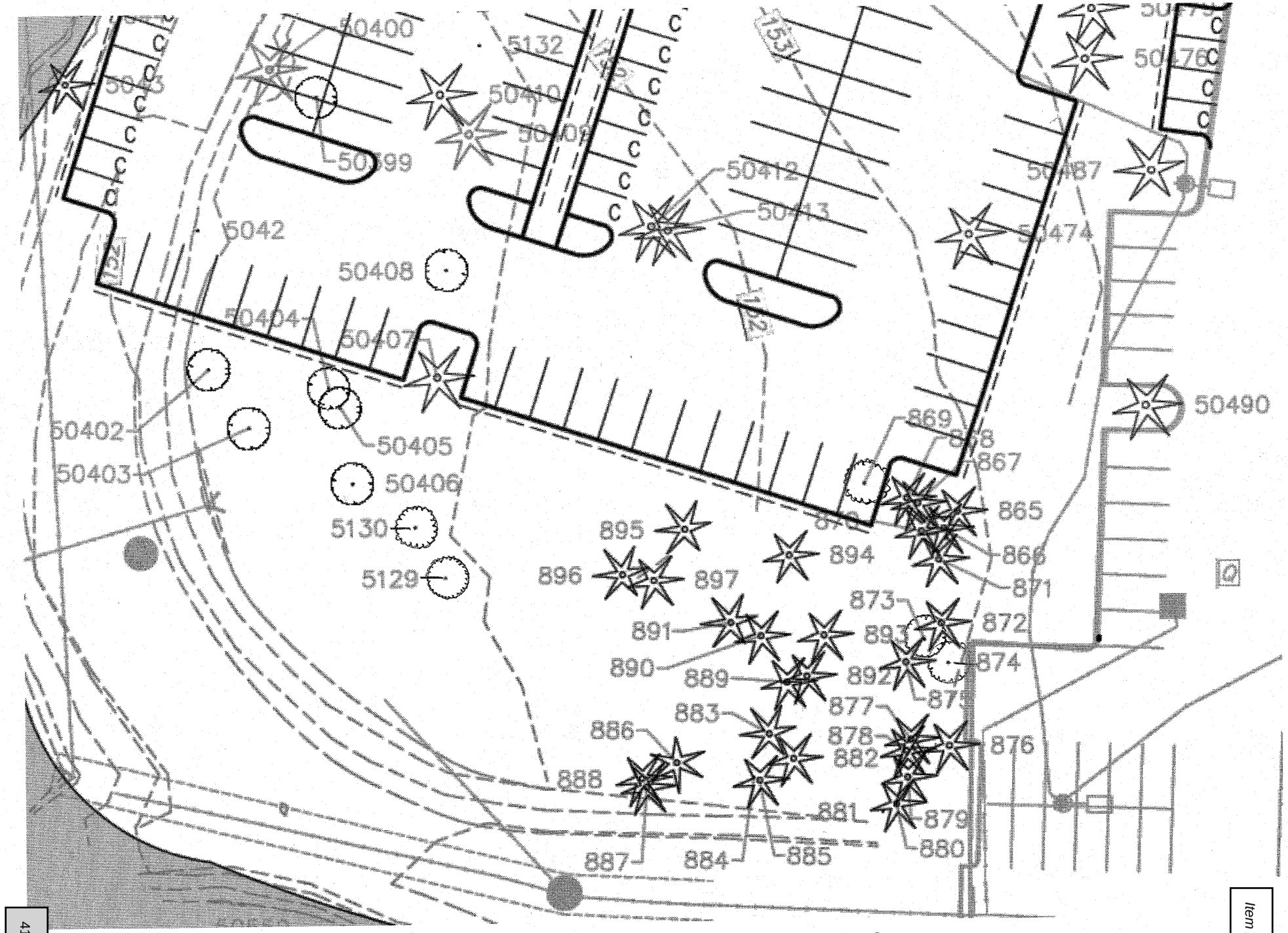


ADD TREE TO SURVEY
NOT TO SCALE, LOCATIONS ARE APPROXIMATE
9600 BOECKMAN RD CENTRAL NORTH PARKING AREA
SFG/PRG 9/30/21
CONCRETE RETAINING WALL
CONCRETE WALKWAY
818B
70824B
79
10



9600 BOECKMAN RD. SOUTH
SOUTH PARKING AREA

SFG/PRG 9/30/21



TREE LOCATION DIAGRAM SE CORNER
SFG/PRG 9-30-21

PACIFIC HABITAT SERVICES, INC
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070
(800) 871-9333 ● (503) 570-0800 ● Fax (503) 570-0855

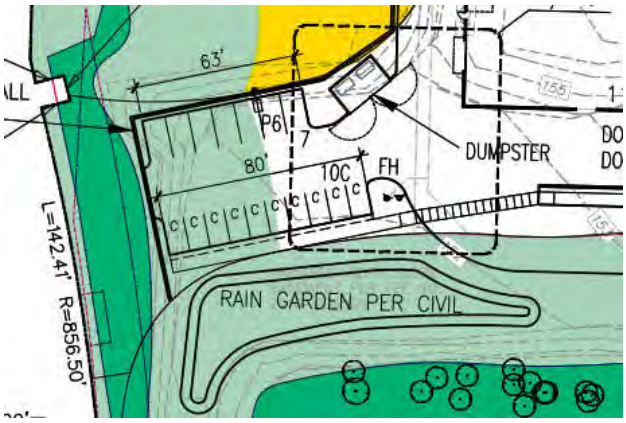
Date: **January 16, 2023**

To: **Mac Martin**
Martin Development

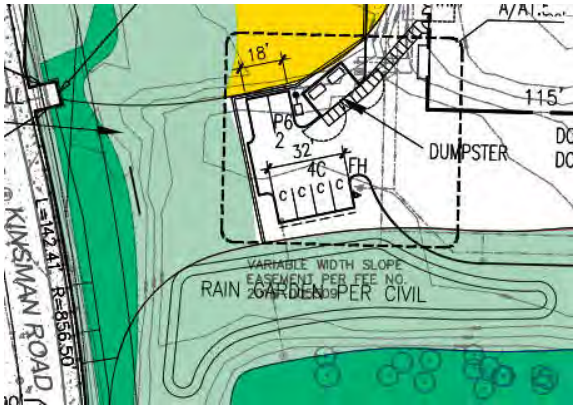
From: **John van Staveren, SPWS**

Re: **Update to the Significant Resource Impact Report for the 9900 SW Boeckman Road Property Wilsonville, Clackamas County, Oregon**
PHS Project Number: 7264

Mac – Pacific Habitat Services prepared the SRIR for the proposed development at 9900 SW Boeckman Road in Wilsonville on January 26, 2022. We have now been informed that the site has been redesigned, so that 2,624 square feet of parking has been removed from the SR Impact Area. The original impact to the SR Impact Area was 22,948 square feet (0.53 acres). The new impact is now 20,324 square feet (0.47 acres). The two graphics below show the original and the proposed design.



Original Parking Lot Design



Proposed Parking Lot Design

There has been no reduction in areas requiring mitigation, as such, the proposed mitigation plan included in the January 26, 2022, report will remain the same.

Please let me know if you have any questions.

Thanks

John

Significant Resource Impact Report for the 9900 SW Boeckman Road Property Wilsonville, Clackamas County, Oregon

(Section 14B, Township 3 South, Range 1 West,
Tax lots 202, 282, and 292)

Prepared for Mac Martin
Martin Development PO Box 15523 Seattle, WA 98115

Prepared by

Joe Thompson PWS John van Staveren SPWS **Pacific Habitat Services, Inc.**
Wilsonville, Oregon 97070 (503) 570-0800
(503) 570-0855 FAX PHS Project Number: 7264

January 27, 2022

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ATTACHMENT A: Figures

Figure 1: Vicinity Map (USGS)
Figure 2: Tax Lot Map
Figure 3: Soil Survey Map
Figure 4: Existing Conditions with SROZ Buffers, SR Impact Area and Wetland Delineation boundaries
Figure 5: Proposed Site plan
Figure 5A: Tree Removal
Figure 6: Mitigation Plan
Figure 7: Aerial Photo with Title 3 Metro boundaries
Figure 8: Local Wetland Inventory Map
Figure 9: Aerial Photo with Title 13 Metro boundaries

ATTACHMENT B: Arborist Tree Inventory
ATTACHMENT C: OFWAM Summary Sheets
ATTACHMENT D: Wetland Delineation Report

1.0 INTRODUCTION

Pacific Habitat Services, Inc. (PHS) has prepared this Significant Resource Impact Report (SRIR) for improvements to the existing property at the 9900 SW Boeckman Road in Wilsonville, Oregon. A resource is mapped on the City of Wilsonville's Significant Resources Overlay Zone (SROZ) in the western portion of the property; therefore, a SRIR is required. The format follows the pertinent sections of the City of Wilsonville's Planning and Land Development Ordinance for a Standard SRIR (Section 4.139.05-06). For ease of review by the City of Wilsonville, key portions of the ordinance language are included (italicized), followed by specific responses to the requirements.

Figures 1, 2, and 3 show the general topography, tax lot map, and soils for the site, respectively. Figure 4 shows the existing site conditions. Figure 5 show the site development plan, 5A shows the tree removal plan, Figure 6 shows the mitigation plan, Figure 7 shows the Metro Title 3 boundaries on the site, Figure 8 is the Local Wetland Inventory Map, and Figure 9 shows the Metro Title 13 boundaries. All Figures are in Attachment A.

2.0 CITY DEVELOPMENT CODE

SECTION 4.139.06 SIGNIFICANT RESOURCE IMPACT REPORT (SRIR) AND REVIEW CRITERIA

(.02) Application Requirements for a Standard SRIR. The following requirements must be prepared and submitted as part of the SRIR evaluation for any development not included in paragraph A above:

A. A Site Development Permit Application must be submitted in compliance with the Planning and Land Development Ordinance.

A Site Development Permit Application is being submitted for this project in compliance with the Planning and Land Development Ordinance.

B. The SRIR shall be conducted and prepared by a natural resource professional knowledgeable and qualified to complete such a report.

The SRIR was prepared by Pacific Habitat Services, Inc. (PHS). PHS provides a wide range of services to the public and private sector, ranging from natural resource assessments to environmental design and construction. PHS offers professional expertise in the disciplines of wetland science, wildlife biology, hydrology, soil science, environmental toxicology, botany, and environmental planning.

C. The qualifications of the person or persons preparing each element of the analysis shall be included with the SRIR.

Joe Thompson is a Professional Wetland Scientist (PWS) with Pacific Habitat Services, Inc.(PHS) and has been a permanent member of the staff since 2016. Joe has over 20 years of experience performing a variety of wildlife, National Environmental Policy Act (NEPA) and wetland related studies, including: biological assessments, special status wildlife and rare plant surveys, wetland delineations, wetland permitting, functional assessments, habitat restoration and compensatory mitigation. John van Staveren is a Senior Professional Wetland Scientist (SPWS) with PHS and has been a permanent member of PHS since 1995. John has over 34

years of experience as a natural resource professional performing a wide-range of wetland, botanical, wildlife, Endangered Species Act and NEPA studies and overseeing the work of PHS' staff.

D. The SRIR shall include the following:

1. Physical Analysis. The analysis shall include, at a minimum:

a. Soil types;

The Natural Resources Conservation Services (NRCS) mapped soils within the tax lot include Aloha silt loam, 0-3% slopes; Amity silt loam; Cove silty clay loam; and Woodburn silt loam, 0-3 percent and 3-8 percent slopes. The Cove silty clay loam soils are considered hydric based on the Clackamas County hydric soils list, and the Aloha and Woodburn soils are considered partially hydric with inclusions. Figure 3 summarizes mapped locations of the soils within the site.

b. Geology;

The site is located approximately 0.35 mile west of Interstate 5 (I-5), and approximately 1.5 miles north of the Willamette River. The USGS DOGAMI[1] Digital Map describes the geology of the site as belonging to the Terrane Group: Quaternary Surficial Deposits, the Formation: Alluvial Deposits, and the Rock Type: Mixed Grain Sediments, which are described as:

> "*Deposits of unconsolidated sediments. Includes alluvium, colluvium, river and coastal terrace, landslide, glacial, eolian, beach, lacustrine, playa and pluvial lake deposits, and outburst flood deposits left by the Missoula and Bonneville floods.*"

Elevations in the site range from approximately 144 feet National Geodetic Vertical Datum (NGVD) in the ditch along the western boundary, to approximately 162 feet NGVD in the northern and eastern portions of the site.

c. Hydrology of the site;

Three wetlands (Wetlands A, B, and C) are present on the site (Figure 4). Wetland Delineation fieldwork was performed by PHS on July 1, 2021. During summer, many seasonal wetlands in the Willamette Valley such as Wetlands A, B, and C do not have surface water or saturation in the upper 12 inches of the soil profile and therefore, hydrology was evaluated using indirect primary and secondary indicators including the FAC-neutral test, geomorphic position, drainage patterns, and oxidized rhizospheres along living roots. Mapped soils in wetland areas include Aloha silt loam, 0 to 3 percent slopes, Amity silt loam, and Cove silty clay loam.

Wetland A

Wetland A is located in a large, fairly shallow basin that was excavated long ago as a stormwater feature. The primary source of hydrology within Wetland A is from direct precipitation, runoff from adjacent impermeable surfaces, and stormwater discharges. A seasonally high water table may also be present. The dominant vegetation includes Oregon ash (*Fraxinus latifolia*), English hawthorn (*Crataegus monogyna*), sweet briar rose (*Rosa rubiginosa*), common camas (*Camasia quamash*), reed canarygrass (*Phalaris arundinacea*), and spreading rush (*Juncus patens*). Wetland

[1] USGS: United State Geological Survey; DOGAMI: Department of Geology and Mineral Industries

hydrology indicators include the FAC-neutral test, geomorphic position, drainage patterns, and oxidized rhizospheres along living roots. Hydric soils meet the requirements for redox dark surface.

Wetlands B and C

Wetlands B and C are located in a drainage ditch oriented north to south and located near the western boundary of the site. These wetland mainly receive runoff from upslope areas as well as groundwater. The dominant vegetation includes Oregon ash, salmonberry (*Rubus spectabilis*), velvet grass (*Holcus lanatus*), reed canarygrass, bird's-foot trefoil (*Lotus corniculatus*), yellow glandweed (*Parentucellia viscosa*), lemon balm (*Melissa officinalis*), and spreading rush.

According to the Oregon Explorer interactive web mapping service, and the local FEMA flood insurance rate mapping (FIRM), no 100-year floodplain is mapped within the site.

d. Outline of any existing features including, but not limited to, structures, decks, areas previously disturbed, and existing utility locations;

The eastern portion of the site is currently developed and houses DW Fritz Precision Automation. The development features a large, modern office building, with parking areas north and south of the building, and west of the northern portion of the building connected by paved access roads. Drainage infrastructure carries runoff to Wetland A, which drains to a ditch containing Wetlands B and C. Industrial development borders the north, east, and south sides of the site and SW Kinsman Road borders the west side. Coffee Lake Creek is located in a large wetland swale west of SW Kinsman Road and residential development is located farther west.

e. Location of any wetlands or water bodies on the site and the location of the stream centerline and top-of-bank.

As stated previously, there are three wetlands within the site; however, no streams exist within the site. Figure 4 depicts the locations of Wetlands A, B, and C within the proposed project area, and the adjacent slopes, which are less than 25%. PHS has prepared a wetland delineation report, and will submit it to the Oregon Department of State Lands (DSL). Once submitted, DSL will have 120 days to review the report and issue a concurrence letter. As the project (Figure 5) will not impact wetlands, a Joint Permit Application (JPA) will not be submitted to the US Army Corps of Engineers (Corps) and DSL.

f. Within the area proposed to be disturbed, the location, size and species of all trees that are more than six (6) inches DBH. Trees outside the area proposed to be disturbed may be individually shown or shown as drip line with an indication of species type or types;

The Pacific Resources Group performed a tree inventory that includes all trees of the site that are in the vicinity of the proposed development. Figure 5 shows the development plan, and Figure 5A shows the existing trees in the vicinity of the development as well as those that will be removed. On Figure 5A, trees are depicted as either conifer or deciduous. Trees that that will be removed (59 in total) are given a reference number and their species, diameter at breast height (DBH), and mitigation criteria are shown in the Arborist Report (Attachment B). A tree removal permit will be prepared as part of the Site Development Permit Application.

g. A property survey together with topography shown by contour lines prepared at two-foot vertical intervals. Five-foot vertical intervals may be allowed for steep sloped areas. An Oregon Registered Land Surveyor or Civil Engineer shall prepare the survey.

Figures 4 and 5 shows the development as surveyed by Andy Paris and Associates, Professional Land Surveying. The two-foot contours were obtained from the National Oceanic and

Atmospheric Administration (NOAA). Slopes measurements were calculated at several areas adjacent to the wetland to display slope variation and gradients below 25% (Figure 4).

h. The location of the SROZ and Impact Area boundaries;

Figure 4 shows the location of the City applied SROZ and Impact Area boundaries within the project area. The refined boundary is based upon a wetland delineation conducted by PHS, which differs somewhat from the City's existing SROZ boundary. While the existing boundaries were based on a wetland determination drawn onto aerial photographs with limited ground truthing in 1998, the new boundaries are based on field documented, flagged and surveyed wetland boundaries conducted in 2021. This is the reason for the submittal of this SRIR and request for map verification.

The delineation methodology followed the 1987 Corps of Engineers *Wetlands Delineation Manual*, *Technical Report Y-87-1,* and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* which is recognized by both the DSL and the Corps.

i. A minimum of three slope cross-section measurements transecting the site, equally spaced at no more than 100-foot increments. The measurements should be made perpendicular to the stream;

Slope measurements calculations adjacent to Wetlands A, B, and C are shown on Figure 4, which includes more than three measurements less than 100-foot increments. The measurements were made perpendicular to the wetland boundaries.

j. A map that delineates the Metro UGMFP Title 3 Water Quality Resource Area boundary (using Metro Title 3 field observed standards);

Figure 7 depicts the UGMFP Title 3 land, which was mapped based on drainage areas upslope and riparian corridors. As described in Section (.02)(h) above, field investigations (including a formal wetland delineation) have refined these boundaries. Title 3 applies to: (1) Development in Water Quality Resource and Flood Management Areas and (2) Development which may cause temporary or permanent erosion on any property within the Metro Boundary. Metro's Water Quality performance standards will be met by: (A) Providing a vegetated corridor to separate Protected Water Features from development; (B) Maintaining or reducing stream temperatures; (C) Maintaining natural stream corridors; (D) Minimizing erosion, nutrient and pollutant loading into water; (E) Filtering, infiltration and natural water purification; and (F) Stabilizing slopes to prevent erosion and contributing to sedimentation of water features.

k. A map that delineates the Goal 5 safe harbor boundary (using the standards found within the Oregon Administrative Rule OAR 660-23(1996));

A Goal 5 safe harbor boundary of 50 feet has been applied to Wetlands A, B, and C (Figures 4, 5, 5A, and 6). This boundary is equal to the SROZ boundary. According to OAR 660-23-0090(5), safe harbor buffers are applied to the following criteria: (a) Along all streams with average annual stream flow greater than 1,000 cubic feet per second (cfs) the riparian corridor boundary shall be 75 feet upland from the top of each bank; (b) Along all lakes, and fish-bearing streams with average annual stream flow less than 1,000 cfs, the riparian corridor boundary shall be 50 feet from the top of bank; (c) Where the riparian corridor includes all or portions of a

significant wetland as set out in OAR 660-023-0100, the standard distance to the riparian corridor boundary shall be measured from, and include, the upland edge of the wetland; (d) In areas where the top of each bank is not clearly defined, or where the predominant terrain consists of steep cliffs, local governments shall apply OAR 660-023-0030 rather than apply the safe harbor provisions of this section.

l. The existing site significant resource conditions shall be determined and identified by a natural resource professional; and

A resource assessment was conducted by Fishman Environmental Services (FES) at the site in 1998 (Local Wetland Inventory (LWI), which confirmed that the project area includes four locally significant wetlands (LSW). Three of these wetlands are designated as 4.01d on the LWI; however, one in the southwest corner of the project area is designated as 4.02d (Figure 8). The wetland in the northern portion adjacent to SW Boeckman Road is no longer present as there is now a sidewalk and planters in that location. The large wetland in the western portion of the project area is in general agreement with the boundaries of Wetland A, while the two small wetlands in the southwest corner are somewhat aligned with Wetlands B and C.

PHS concurs with the previous assessment that Wetlands A and C are locally significant; however, Wetland B is confined to a small portion of the ditch. Due to its small size, lack of a tree canopy, and lack of water quality functions, Wetland B should not be considered significant.

The LWI for Wilsonville assessed these wetland groups for the following significance criteria:

1) Wetlands that score the highest rank for any of the four ecological functions addressed by OFWAM or equivalent: Diverse wildlife habitat, intact fish habitat, intact water quality, or intact hydrologic control.
2) Wetlands that are rated in the second highest functional category for water quality, and that occur within ¼ mile of a water quality-limited stream listed by DEQ.
3) Contain one or more rare/uncommon wetland plant communities in Oregon.
4) Inhabited by any species listed by the federal or state government as a sensitive, threatened, or endangered species in Oregon.
5) Wetland rates in the second highest functional category for fish habitat, and has a surface water connection to a stream segment that is mapped by ODFW as habitat for “indigenous anadromous salmonids”.
6) Optional criterion: Wetland represents a locally unique plant community.
7) Optional criterion: Wetland rates in highest category for education potential and there is documented use for educational purposes by a school or organization.

Summary of overall significance findings by FES in 1998:

Wetland A: (LWI: 4.01d, Unit CL)
“Provides diverse wildlife habitat and has intact water quality functions and hydrologic control functions (fish habitat is degraded). Has educational uses and provides recreational opportunities.” OFWAM sheets are provide in Attachment C

PHS concurs with the previous assessment that Wetland A is a locally significant wetland; however, wetlands within the site are not visible or accessible by the public and therefore would not provide recreational or educational benefits. They do, however, provide foraging and reproductive habitat for resident and migratory birds as well as small to medium sized mammals and a few large mammals including deer and coyotes, amphibians, reptiles, and insects.

Wetlands B and C (Portion): (LWI: 4.02d, Unit CL)
The OFWAM data sheet states "Water quality ponds present in wetland", which likely refers to Wetland A, which appears to have been modified for such use. The OFWAM data sheet also states "Provides rich wildlife habitat and has intact water quality functions and hydrologic control functions (fish habitat is degraded). Has educational uses and provides recreational opportunities." It also states that the wetland is a mitigation site. These descriptions are most likely intended for much larger offsite wetlands that are connected to Wetlands B and C; however, Wetland B and C's proximity to Wetland A serves to create a wetland complex with overall water quality functions and hydrologic control functions. As with Wetlands A, Wetlands B and C are on private property and lack public access or visibility.

m. Current photos of site conditions shall be provided to supplement the above information.

Wetland delineation fieldwork was completed in July, 2021 and the report and figures are provided in Attachment D.

2. The analysis shall include development recommendations including grading procedures, soil erosion control measures, slope stabilization measures, and methods of mitigating hydrologic impacts. For projects that affect possible wetlands, a copy of the Local Wetland Inventory (LWI) map pertaining to the site shall be provided. Notice of the proposal shall be given to the Oregon Division of State Lands and the Army Corps of Engineers.

The development will not result in hydrologic impacts to Wetlands A, B, and C. Grading procedures will follow proper erosion control measures, including the placement of sediment fencing around wetland boundaries, inlet protection around all stormwater inlets, and a construction entrance to reduce dust and tracking within and outside of the work area (See the development plan application for erosion control details). Inlet protection will include a polypropylene filter sack (woven) to reduce the transport of sediment into storm pipes, the construction entrance will include subgrade reinforcement geotextile fabric to prevent infiltration or transport of sediment, and sediment fencing will consist of filter fabric material mounted to 2-foot posts around wetlands to mitigate the potential for sedimentation from the construction areas.

The proposed project will also conform to City of Wilsonville's stormwater standards and will feature two stormwater planters with bioswales that will be planted with native vegetation and will treat runoff from the proposed impervious surfaces before they are permitted to enter wetlands or waters.

Figure 8 displays the LWI map pertaining to the site.

No impacts to state or federally jurisdictional waters are proposed (Figure 5), therefore no notification will be sent to DSL or the Army Corps of Engineers. Wetland delineation fieldwork

has been completed, and a copy of the wetland delineation report will be submitted to DSL for concurrence.

3. Ecological Analysis. The Ecological Analysis shall include a map, using the Physical Analysis map as a base, showing the delineated boundaries and coverage of wetlands, riparian corridors, and wildlife habitat resources identified on the site.

Figure 4 shows the delineated boundaries and coverage of wetland resources within the project area as well as the SROZ boundary, slope measurements calculations adjacent to Wetland A, and the SR Impact Area. Figure 9 shows Metro's map of Regionally Significant Habitat (under Title 13), the site includes the following habitat classifications:

- Upland Wildlife Habitat Class A areas with secondary riparian value that have high value for wildlife habitat
- Riparian Corridors / Wildlife Habitat Class I - Areas support 3 or more riparian functions
- Riparian Corridors / Wildlife Habitat Class II - areas supporting 1 or 2 primary riparian functions

Wetlands A, B, and C are within Riparian Corridors / Wildlife Habitat Class I.

a. Wetland boundaries shall be delineated using the method currently accepted by the Oregon Division of State Lands and the US Army Corps of Engineers. Riparian boundaries shall be delineated using the riparian corridor descriptions in this ordinance. Boundaries of mapped Goal 5 wildlife habitat shall be verified by field observation.

PHS delineated the limits of the wetlands on the site based on the presence of wetland hydrology, hydric soils, and hydrophytic vegetation, in accordance with the Routine On-site Determination, as described in the *Corps of Engineers Wetland Delineation Manual, Wetlands Research Program Technical Report Y-87-1* ("The 1987 Manual") and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region*. As stated previously, wetland delineation fieldwork has been completed, and a wetland delineation report is being prepared for submittal to DSL.

Riparian boundaries were also verified during the delineation field visit, using the descriptions in this ordinance. Please refer to question 3 above for the riparian habitat classification for the site.

b. The analysis shall include an inventory that lists and describes the native and ornamental dominant and sub-dominant groundcover, shrub and tree species occurring on the site and wildlife observed during at least one site visit (specify date). The report shall also include recommended measures for minimizing the adverse impacts of the proposed development on unique and/or significant features of the ecosystem. The analysis shall include a report that discusses the ecological functions and values of the SROZ area, discussing each parameter listed below. The discussion shall be based on actual field observations and data obtained by a natural resource professional.

Vegetation and Wildlife Species

Table 1 summarizes vegetation occurring on the site during the delineation field work completed on July 1, 2021. Table 2 contains wildlife species that are assumed to potentially occupy the site; however, focused or general surveys for wildlife were not conducted. Habitats include the mixed

conifer and broad-leaf forests within the riparian communities mapped in Figure 9 as well as two managed grass/lawn areas east of the Riparian Corridors / Wildlife Habitat Class I area. The larger of these is in the northern part of the site and the other is near the site's southern boundary. The eastern portion of the site is developed.

Table 1. Non-Comprehensive List of Vegetation Observed within the Project Area

Scientific Name	Common Name	Non-Native or Ornamental
TREES		
Acer macrophyllum	bigleaf maple	
Alnus rubra	red alder	
Fraxinus latifolia	Oregon ash	
Pinus ponderosa var. willamettensis	Willamette Valley ponderosa pine	
Populus balsamifera	balsam poplar	
Prunus avium	sweet cherry	X
Pseudotsuga menziesii	Douglas' fir	
Quercus garryana	Oregon white oak	
Salix sp.	willow	
SHRUBS		
Crataegus monogyna	English hawthorn	X
Cornus alba	red osier dogwood	
Corylus cornuta	beaked hazelnut	
Ilex iberica	holly	X
Ranunculus acris	meadow buttercup	
Rosa sp.	wild rose	
Rubus armeniacus	Himalayan blackberry	X
Rubus laciniatus	cutleaf blackberry	X
Rubus ursinus	trailing blackberry	
Symphoricarpos alba	snowberry	
Toxicodendron diversilobum	poison oak	
WOODY VINES		
Hedera helix	English ivy	X
HERBS		
Agrostis capillaris	colonial bentgrass	X
Bromus spp.	brome grasses	X
Camasia quamash	common camas	
Cirsium arvense	Canada thistle	
Conium maculatum	poison hemlock	X
Daucus carota	Queen Anne's lace	X
Epilobium ciliatum	slender willow herb	
Epilobium densiflorum	dense-flower willow-herb	
Gallium aparine	bedstraw	X
Geranium lucidum	shiny geranium	X
Geranium molle	dove's-foot Crane's-bill	X

Scientific Name	Common Name	Non-Native or Ornamental
Geum macrophyllum	long-leaved avens	
Holcus lanatus	common velvet grass	X
Hypericum perforatum	St. Johnswort	X
Hypochaeris radicata	spotted cat's ear	X
Jacobaea vulgaris	stinking willie	X
Juncus balticus	Baltic rush	
Lactuca serriola	prickly lettuce	X
Leucanthemum vulgare	ox-eye daisy	X
Lotus corniculatus	bird's-foot trefoil	X
Melissa officinalis	lemon balm	X
Parentucellia viscosa	yellow glandweed	X
Phalaris arundinacea	reed canarygrass	X
Physocarpus capitatus	Pacific ninebark	
Poa sp.	bluegrass	X
Ranunculus repens	creeping buttercup	X
Ribes sanguineum	Red-flowering currant	
Rumex acetosella	sheep sorrel	X
Schedonorus arundinaceus	tall fescue	
Sonchus spp.	sow thistle	
Torilis arvensis	spreading hedgeparsley	X
Trifolium repens	white clover	X
Tellima grandiflora	fringe cup	
Vicia spp.	vetch	

Table 2. Non-Comprehensive List of Wildlife Species *Potentially* within the Project Area*

Common Name	Scientific Name
MAMMALS	
Black-tailed deer	*Odocoileus hemionus columbianus*
Chickeree	*Tamiasciurus douglasii*
Coyote	*Canis latrans*
Deer mouse	*Peromyscus maniculatus*
Eastern fox squirrel	*Sciurus niger*
Raccoon	*Procyon lotor*
Western gray squirrel	*Sciurus griseus*
BIRDS	
American crow	*Corvus brachyrhynchos*
American kestrel	*Falco sparverius*
American goldfinch	*Carduelis tristis*
American robin	*Turdus migratorius*
Barn swallow	*Hirundo rustica*
Bewick's wren	*Thryomanes bewickii*

Common Name	Scientific Name
Black-capped chickadee	*Parus atricapillus*
Black-headed grosbeak	*Pheucitus melanocephalus*
Brewer's blackbird	*Euphagus cyanocephalus*
Brown creeper	*Certhia americana*
Bushtit	*Psaliparus minimus*
California quail	*Callipepla californica*
Canada goose	*Branta canadensis*
Cedar waxwing	*Bombycilla cedrorum*
Chestnut-backed chickadee	*Parus rufescens*
Cooper's hawk	*Accipiter cooperii*
Dark-eyed junco	*Junco hyemalis*
Downy woodpecker	*Picoides pubescens*
European starling*	*Sturnus vulgaris*
Fox sparrow	*Passerella iliaca*
Golden-crowned kinglet	*Regulus satrapa*
Golden-crowned sparrow	*Zonotrichia atricapilla*
Great-horned owl	*Bubo virginianus*
Hairy woodpecker	*Picoides villosus*
Hermit thrush	*Catharus guttatus*
House finch	*Carpodacus mexicanus*
House sparrow	*Passer domesticus*
House wren	*Troglodytes aedon*
Killdeer	*Charadrius vociferus*
Lesser goldfinch	*Carduelis psaltria*
Mourning dove	*Zenaida macroura*
Northern flicker	*Colaptes auratus*
Orange-crowned warbler	*Vermivora celata*
Pileated woodpecker	*Dryocopus pileatus*
Red-breasted nuthatch	*Sitta canadensis*
Red-breasted sapsucker	*Sphyrapicus ruber*
Red tailed hawk	*Buteo jamaicensis*
Red-winged blackbird	*Agelaius phoeniceus*
Ring-necked pheasant	*Phasianus colchicus*
Ruby-crowned kinglet	*Regulus calendula*
Rufous hummingbird	*Selasphorus rufus*
Savannah sparrow	*Passerculus sandwichensis*
Song sparrow	*Melospiza melodia*
Spotted towhee	*Pipilo erythrophthalmus*
Steller's jay	*Cyanocitta stelleri*
Swainson's thrush	*Catharus ustulatus*
Tree swallow	*Tachycineta bicolor*

Common Name	Scientific Name
Turkey vulture	*Cathartes aura*
Varied thrush	*Ixoreus naevius*
Violet green swallow	*Tachycineta thalassina*
Western screech owl	*Otus kennicottii*
Western scrub jay	*Aphelocoma coerulescens*
Western tanager	*Piranga ludoviciana*
Western wood pewee	*Contopus sordidulus*
White crowned sparrow	*Zonotricha leucophrys*
Winter wren	*Troglodytes*
AMPHIBIANS	
Pacific treefrog	*Hyla regilla*
REPTILES	
Common garter snake	*Thamnophis sirtalis*

*These species are assumed to potentially occupy the habitats of the site due to its suitability for foraging, nesting, or cover. Focused or general surveys for wildlife were not conducted.

Impacts to unique or significant features of the ecosystem

As depicted in the Site Plan (Figure 5), the proposed development would permanently impact 22,948 square feet / 0.53 acres of the City of Wilsonville SR Impact Area and 340 square feet / 0.01 acres of the Area of Limited Conflicting Uses (ALCU) boundary. As stated previously, the development would result in the unavoidable removal of 59 trees, 58 of which are native. Impacts within the ALCU that are exempt include two stormwater ponds and a fire access road around the new building, which is required by the City of Wilsonville. The total permanent impacts for exempt activities within the ALCU are 19,061 square feet / 0.44 acres.

Ecological Functions and Values of the resources are discussed below.

c.W etlands (based on evaluation criteria in the Oregon Freshwater Wetlands Assessment Methodology (OFWAM), Oregon Division of State Lands)

i. wildlife habitat diversity
ii. fish habitat
iii. water quality protection
iv. hydrologic control

Wetlands A and C came in as significant through an OFWAM assessment conducted by FES in 1998. Per that assessment Wetland A is part of LWI Wetland 4.01d and Wetlands B and C are designated as part of the much larger complex of LWI Wetland 4.02d (the letter d means the wetland has been delineated).

Wildlife Habitat

According to the OFWAM summary sheets, the wetlands provide diverse wildlife habitat; however, it should be noted that the forest habitat is relatively small and fragmented so that it does not have the capacity to support large mammals that need extensive cover or have large home ranges, although black-tailed deer (*Odocoileus hemionus columbianus*) and coyotes (*Canis latrans*), which have become adapted to humans are likely common. Fencing, buildings, and

human intrusion also limit the use of the site by large mammals; however, small and medium sized mammals such as raccoons (*Procyon lotor*), striped skunks (*Memphitis memphitis*), and western gray squirrels (*Sciurus griseus*) are likely to use the site. The habitat is also unlikely to provide nesting opportunities for large raptors, although they may on occasion hunt on the site for songbirds and small mammals. Acorn woodpeckers (*Melanerpes formicivorus*), American robins (*Turdus migratorius*), dark-eyed juncos (*Junco hyemalis*), black-capped chickadee (*Poecile atricapillus*), and spotted towhees (*Pipilo maculatus*) are native avian species that are likely to nest in trees and shrubs within the wetland. Northern red-legged frogs (*Rana aurora*), Pacific tree frogs (*Pseudacris regilla*), and rough-skinned newts (*Taricha granulosa*) may forage and breed in ponded areas within the wetland during winter and spring.

Fisheries Habitat

The OFWAM summary sheet described the wetland's fish habitat as degraded, although the description pertains to the larger portion of Wetlands B and C, which extend offsite. Wetlands A, B, and C are seasonal and only have ponded water during winter and spring. The presence of fish on-site is highly unlikely, since water leaves the wetlands via a few small culverts that are not designed for fish passage.

Water Quality Protection

The OFWAM summary sheet states that the water quality (pollutant removal) functions of Wetlands A, B, and C are intact due to vegetation, surface inflow, size, and connectedness. PHS agree in part with this statement. Stormwater entering the wetlands passes over uplands is trapped for long periods in Wetland A, which has dense vegetation that is highly beneficial for pollutant removal, although it appears that most water entering Wetland A as runoff stays and settles in Wetland A rather than flowing into the ditch containing Wetlands B and C; however, some water certainly flows from Wetland A to Wetlands B and C and dense herbaceous vegetation in these wetlands and heavy clay soils are also highly beneficial for pollutant removal .

Hydrologic Control

The OFWAM summary sheet states that the flood control and water supply functions of Wetlands A, B, and C are intact due to floodplain, vegetation and size. It also states that perennial seeps are present, which is likely true for portions of Wetland C that are offsite; however, no perennial wetland seeps are present in the wetlands that are onsite. All three wetlands receive the majority of their hydrology as direct precipitation and runoff, although a seasonally high water table may also provide winter and spring hydrology.

d. Wildlife Habitat (includes riparian corridors and upland forested areas)
- ***i. wildlife habitat diversity***
- ***ii. water quality protection***
- ***iii. ecological integrity***
- ***iv. connectivity***
- ***v. uniqueness***

The wildlife habitat which is present within Wetlands A and C is of high quality, although as stated previously, it is small and fragmented which makes it unlikely to have high value for large mammals and raptors. The plant community is comprised of a mix of native and non-native species, although native species are dominant. Trees within these areas are of mixed age classes

including small, medium and large Douglas' firs, big-leaf maples, western redcedars, Willamette Valley ponderosa pines, madrones (*Arbutus menziesii*), Oregon ash, and Oregon white oaks. These species along with a well-developed understory of native and non-native shrubs, support a variety of resident and migratory avian species, small mammals, reptiles, and amphibians. Wetlands A and C actively treat runoff from the adjacent developed areas to improve downstream water quality.

e. Riparian Corridors

Stream-riparian ecosystems:

i. Presence and abundance of Large Woody Debris (LWD) in and adjacent to stream

ii. Tree/shrub canopy stream shade production (water temperature and aquatic plant growth control)

iii. Erosion and sediment control by riparian vegetation

iv. Water quality protection by riparian vegetation

v. River-floodplain ecosystem (Willamette River)

vi. Presence of functional floodplain (inundated annually)

vii. Type and condition of functional floodplain vegetation

viii. Use of river-floodplain by ESA-listed species

ix. Role as wildlife corridor connecting significant wildlife habitat areas

There are no streams either within or adjacent to the site. Wetlands A, B, and the portion of Wetland C that lies within the site are forested wetlands that have a physical connection via culverts to Seely Ditch, which is west of the site.

Presence and abundance of Large Woody Debris (LWD) in and adjacent to stream

As stated above, there are no streams within the site and therefore, large pieces of woody debris, which are present do not have any effect on stream morphology or aquatic habitats. They do, however, provide cover for terrestrial and some avian wildlife species as well as a source of organic material for soil health.

Tree/shrub canopy stream shade production (water temperature and aquatic plant growth control)

Trees and shrub canopies within the site are well-developed in some areas; however, they bear little to no relationship to water temperature and aquatic plant growth control in offsite waterways including Seely Ditch.

Erosion and sediment control by riparian vegetation

The forest vegetation of the site may have a very slight beneficial effect of limiting the potential for erosion by slowing the velocity of waters and trapping sediments that would otherwise leave the site and end up in offsite Seely Ditch.

Water quality protection by riparian vegetation

The site's dense and healthy vegetation provides treatment of waters collected from unvegetated upslope areas that would otherwise enter offsite Seely Ditch untreated.

River-floodplain ecosystem (Willamette River)

Wetlands A, B, and C as well as adjacent vegetated upland areas within the site provide treatment of upslope runoff, which benefits the Willamette River's floodplain ecosystem.

Presence of functional floodplain (inundated annually)
The wetlands of the study area partially inundated during winter and spring of each year. Wetlands are largely the function of runoff from adjacent impervious surfaces and direct precipitation that accumulated within the confined boundaries of the detention facility. There may also be a seasonally high water table. The site is not located in FEMA's 100 year floodplain.

Type and condition of functional floodplain vegetation
The site lies outside of the floodplain, which is west of SW Kinsman Road. The dominant vegetation of the site is a mix of deciduous and conifer trees with well-developed shrub and herbaceous layers. The wetlands and the adjacent upland vegetation of the site provide ecological uplift to the overall water quality of Seely Ditch and the Willamette River floodplain ecosystem. There are no known listed ESA species at this site, and none were observed at the time of the delineation. This habitat is poorly functioning as a connecting wildlife corridor, due to the existing roadways and other development.

4. Mitigation and Enhancement Proposal. The applicant must propose a Significant Resource mitigation and enhancement plan as part of the SRIR. The mitigation and enhancement shall increase the natural values and quality of the remaining Significant Resource lands located on the site or other location as approved by the City. The mitigation and enhancement proposal shall conform to the mitigation standards identified in this Section.

As depicted on the Proposed Site Development Plan (Figure 5), non-exempt permanent impacts within the ALCU (340 square feet / 0.01 acres) of the 140,301 square feet / 3.22 acre ALCU, which is approximately 0.24 percent of the allowed ALCU impact of five percent. Impacts to the City of Wilsonville SR Impact Area are 22,948 square feet (0.53 acres). Impacts also include 58 native trees. The arborist tree assessment is found in Attachment B.

The requirements for tree replacement are found in Section 4.139.07 of the City of Wilsonville SROZ ordinance, which bases the required number of tree and shrub plantings on the size of removed trees. Table 3 depicts the number of trees in each size category, the required number of trees and shrubs to be replanted per category, and the total number of trees and shrubs to be replanted. Of the 59 trees to be removed, 58 are native and will require mitigation, while one non-native sweet cherry (*Prunus avium*) will not require mitigation. Based on the DBH of the native trees, a total of 328 native trees and 840 native shrubs will need to be planted. Section 4.139 specifies that native trees and shrubs shall be planted at a rate of five (5) trees and twenty-five (25) shrubs per every 500 square feet of disturbance, which will require an area of 33,000 square feet (0.75 acres) based on the required spacing of five trees for every 500 square feet.

Table 3. Mitigation Requirements for Native Tree Removal

Native Trees Proposed for Removal		Replacement Per-Tree		Total Replacement	
Quantity	**DBH (inches)**	**Trees**	**Shrubs**	**Trees**	**Shrubs**
4	6-12	2	3	8	12
14	Over 12-18	3	6	42	84
16	Over 18-24	5	12	80	192

14	Over 24-30	7	18	98	252
10	Over 30	10	30	100	300
TOTAL				**328**	**840**

This activity will improve the function of the remaining SROZ by replacing invasive shrubs with native conifer and deciduous trees, shrubs, and herbaceous plants that will provide greater wildlife benefits and protection for the wetland resources than those that are present.

5. Waiver of Documentation: The Planning Director may waive the requirement that an SRIR be prepared where the required information has already been made available to the City, or may waive certain provisions where the Director determines that the information is not necessary to review the application. Such waivers may be appropriate for small-scale developments and shall be processed under Administrative Review. Where such waivers are granted by the Planning Director, the Director shall clearly indicate the reasons for doing so in the record, citing the relevant information relied upon in reaching the decision.

Not applicable. An SRIR is required by the City.

(.03) SRIR Review Criteria. In addition to the normal Site Development Permit Application requirements as stated in the Planning and Land Development Ordinance, the following standards shall apply to the issuance of permits requiring an SRIR. The SRIR must demonstrate how these standards are met in a manner that meets the purposes of this Section.

A.E xcept as specifically authorized by this code, development shall be permitted only within the Area of Limited Conflicting Use (see definition) found within the SROZ;

Development within the SROZ will take place within the ALCU. The repair and maintenance of existing of water quality detention basins and the construction of fire access roads are considered exempted activities, and therefore do not count toward the five percent of allowed impacts within the ALCU.

The new building construction and a small piece of a new access road are non-exempt impacts to the ALCU and their total impacts are 340 square feet / 0.01 acres and comprise 0.24 percent of the ALCU.

A request for exemption shall be consistent with the submittal requirements listed under Section 4.139.06(.01)(B – I), as applicable to the exempt use and activity. [Added by Ord. # 674 11/16/09].

(.05) Operation, maintenance, and repair of irrigation and drainage ditches, constructed ponds, wastewater facilities, stormwater detention or retention facilities, and water facilities consistent with the Stormwater Master Plan or the Comprehensive Plan.

B.E xcept as specifically authorized by this code, no development is permitted within Metro's Urban Growth Management Functional Plan Title 3 Water Quality Resource Areas boundary;

As stated previously, the repair and maintenance of the existing water quality detention basins are an allowed use within Metro's Urban Growth Management Functional Plan Title 3 Water Quality Resource Areas boundary as specified under 4.139.06(.01) of the SROZ Ordinance.

C.N o more than five (5) percent of the Area of Limited Conflicting Use (see definition) located on a property may be impacted by a development proposal. On properties that are large enough to include Areas of Limited Conflicting Use on both sides of a waterway, no more than five (5) percent of the Area of Limited Conflicting Use on each side of the riparian corridor may be impacted by a development proposal. This condition is cumulative to any successive

development proposals on the subject property such that the total impact on the property shall not exceed five (5) percent;

Approximately 340 square feet / 0.01 acres of the ALCU will be impacted to facilitate the construction of the new building and a small portion of an access road. Reconstruction of two stormwater ponds and fire access roads are exempt and will result in 19,061 square feet / 0.44 acres of exempt activity within the ALCU. Much of this area has been previously impacted by existing parking areas and lawns. Most of this area is dominated by Himalayan blackberry and other invasive shrubs and forbs, although some large native trees are present.

D.M itigation of the area to be impacted shall be consistent with Section 4.139.06 of this code and shall occur in accordance with the provisions of this Section;

As described previously, for impacts of 340 square feet / 0.01 acres to the ALCU and the removal of 58 native trees, the applicant proposes to restore 33,000 square feet (0.75 acres) of degraded habitat within the remaining ALCU (Figure 6). The applicant will remove invasive and non-native species including Himalayan and cut-leaf blackberry, English ivy and holly, and plant 328 native trees and 840 native shrubs, which per the SROZ ordinance will more than offset the loss of riparian function associated with the proposed impacts to the existing habitat. A mitigation plan showing the location of the proposed mitigation and a proposed plant list is included in Figure 6.

The mitigation plan will adhere to the requirements of Section 4.139.06, Section 4.139.07 Mitigation Standards and Section 4.139.07(.02)(E.) of the SROZ ordinance and be designed to replace lost or impacted functions by enhancement of existing resources on site. The existing functions of the impact and mitigation sites are low, based on the predominance of invasive species and in some places an absence of a shrub layer due to mowing as well as low native tree canopy cover. As such, the SROZ ordinance prescribes a ratio of 1.5:1 in order to bring the proposed mitigation area to a functional rating of High; however, in order to compensate for the loss of 58 native trees, based on the diameter at breast height of the trees, the SROZ ordinance prescribes the planting of 328 total native trees and 840 native shrubs. Five trees will be planted for every 500 square feet, which will require 33,000 square feet / 0.75 acres of mitigation area, which in terms of permanent square footage non-exempt impacts is a ratio of approximately 97: 1.

E. The impact on the Significant Resource is minimized by limiting the degree or magnitude of the action, by using appropriate technology or by taking affirmative steps to avoid, reduce or mitigate impacts;

The applicant designed the proposed project to avoid impacts to jurisdictional wetlands and to ensure that only permitted activities (i.e. the water quality control basins) were constructed in the ALCU.

F. The impacts to the Significant Resources will be rectified by restoring, rehabilitating, or creating enhanced resource values within the "replacement area" (see definitions) on the site or, where mitigation is not practical on-site, mitigation may occur in another location approved by the City;

As stated previously, the proposed mitigation plan includes replacement trees and shrubs in accordance with the provisions in the SROZ Ordinance. The proposed replacement area consists of the remaining SROZ in the northwest corner and improves the overall riparian functions.

G.N on-structural fill used within the SROZ area shall primarily consist of natural materials similar to the soil types found on the site;

The water quality control features will be constructed per the City of Wilsonville standards using native soil material and native plants. Fire access roads will be constructed in accordance with City code.

H.T he amount of fill used shall be the minimum required to practically achieve the project purpose;

No fill will be placed in jurisdictional wetlands and fill placed in the SROZ is the minimum amount needed to meet the minimum requirements for construction of the proposed stormwater detention facilities and the fire access roads, which are required by the City.

I.O ther than measures taken to minimize turbidity during construction, stream turbidity shall not be significantly increased by any proposed development or alteration of the site;

Stormwater will be treated prior to leaving the construction site and is not anticipated to increase turbidity during construction due to appropriate erosion and sediment control measures, including silt fencing. Wetlands A, B, and C naturally attenuate turbidity prior to flowing into Seely Ditch downstream; therefore, stream turbidity is not anticipated to increase as a result of the project.

J.A ppropriate federal and state permits shall be obtained prior to the initiation of any activities regulated by the U.S. Army Corps of Engineers and the Oregon Division of State Lands in any jurisdictional wetlands or water of the United States or State of Oregon, respectively.

This section does not apply, as no impacts to wetlands are proposed; however, a wetland delineation report will be submitted to the Oregon Department of State Lands. Concurrence will be received prior to initiation of the project.

SECTION 4.139.07 MITIGATION STANDARDS

The following mitigation standards apply to significant wildlife habitat resource areas for encroachments within the Area of Limited Conflicting uses and shall be followed by those proposing such encroachments. Wetland mitigation shall be conducted as per permit conditions from the U.S. Army Corps of Engineers and the Oregon Division of State Lands [emphasis ours]. While impacts are generally not allowed in the riparian corridor resource area, permitted impacts shall be mitigated by: using these mitigation standards if the impacts are to wildlife habitat values, and using state and federal processes if the impacts are to wetland resources in the riparian corridor…

No fill will be placed within potentially jurisdictional wetlands or waters and no state or federal permits for discharges of fill are required; therefore, wetland mitigation is not required nor proposed.

Although the Title 3 Inventory depicts the forested areas within the ALCU as Riparian Wildlife Habitat Class 1, the areas proposed to be permanently impacted are at the edges of the habitat adjacent to areas that are either lawn or pavement. These habitat edges have high percentages of invasive species and generally low canopy cover. As described previously, for impacts of 340 square feet / 0.01 acres to the ALCU and the removal of 58 native trees, the applicant proposes to restore 33,000 square feet (0.75 acres) of degraded habitat within the remaining ALCU (Figure

6). The applicant will remove invasive and non-native species including Himalayan and cut-leaf blackberry, English ivy and holly, and plant 328 native trees and 840 native shrubs, which per the SROZ ordinance will more than offset the loss of riparian function associated with the proposed impacts to the existing habitat. A mitigation plan showing the location of the proposed mitigation and a proposed plant list is included in Figure 6.

The mitigation plan will adhere to the requirements of Section 4.139.06, Section 4.139.07 Mitigation Standards and Section 4.139.07(.02)(E.) of the SROZ ordinance and be designed to replace lost or impacted functions by enhancement of existing resources on site. The following measures will be applied.

- Mitigation actions shall be implemented prior to or at the same time as the impact activity is conducted.
- Mitigation shall be monitored for a period of five years following implementation
- The applicant shall be responsible for ongoing maintenance and management activities, and shall submit an annual report to the Planning Director documenting such activities, and reporting progress towards the mitigation goals. The report shall contain, at a minimum, photographs from established photo points, quantitative measure of success criteria, including plant survival and vigor if these are appropriate data. The Year 1 annual report shall be submitted one year following mitigation action implementation. The final annual report (Year 5 report) shall document successful satisfaction of mitigation goals, as per the stated performance standards. If the ownership of the mitigation site property changes, the new owners will have the continued responsibilities established by this section.
- Prior to any site clearing, grading or construction, the SROZ area shall be staked, and fenced per approved plan. During construction, the SROZ area shall remain fenced and undisturbed except as allowed by an approved development permit.
- For any development which creates multiple parcels intended for separate ownership, the City shall require that the SROZ areas on the site be encumbered with a conservation easement or tract.
- The City may require a conservation easement over the SROZ that would prevent the owner from activities and uses inconsistent with the purpose of this Section and any easements therein. The purpose of the conservation easement is to conserve and protect resources as well as to prohibit certain activities that are inconsistent with the purposes of this section. Such conservation easements do not exclude the installation of utilities.

SECTION 4.139.10 Development Review Board (DRB) Process

(.01) Exceptions. The following exceptions may be authorized through a Development Review Board quasi-judicial review procedure.

D <u>Map Refinement process.</u> The applicant may propose to amend the SROZ boundary through a Development Review Board quasi-judicial zone change where more detailed information is provided, such as a state approved wetland delineation. The criteria for amending the SROZ are as follows:

Adjustments to the SROZ are proposed based on the locations of delineated wetland, and its associated 50-foot buffer. Verification (concurrence from the DSL) of the onsite wetland is still pending.

(.03) Development of structures, additions and improvements that relate to uses other than single family residential.

This SRIR addresses the development of additions and improvements to a structure other than single family residential and thus requires DRB process.

SECTION 4.139.11 Special Provisions

(.03) Alteration of constructed drainageways. Alteration of constructed drainageways may be allowed provided that such alterations do not adversely impact stream flows, flood storage capacity and in stream water quality and provide more efficient use of the land as well as provide improved habitat value through mitigation, enhancement and/or restoration. Such alterations must be evaluated through an SRIR and approved by the City Engineer and Development Review Board.

As stated previously, Wetland A is located in a shallow excavation that has served for many years as a stormwater detention facility. Several culverts at the west end of Wetland A convey stormwater to a constructed drainageway containing Wetlands B and C within its banks. These improvements are not anticipated to have any noticeable effects on downstream flows, since flows are already muted; however, they will definitely increase flood storage capacity and in stream water quality and provide more efficient use of the land in its current state, particularly since the areas where improvements are proposed contain variable topography that is mostly dominated by invasive Himalayan blackberry, cutleaf blackberry, and holly, although some native trees are present. Proposed mitigation consisting of the planting of native trees, shrubs, and herbaceous species within the SROZ will improved habitat values.

REFERENCES

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Fishman Environmental Services, 1999. *City of Wilsonville Local Wetlands and Riparian Corridor Inventory Southwest*

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U.S. Geological Survey, 2021. 7.5 minute quadrangle topographical map, Sherwood, Oregon.

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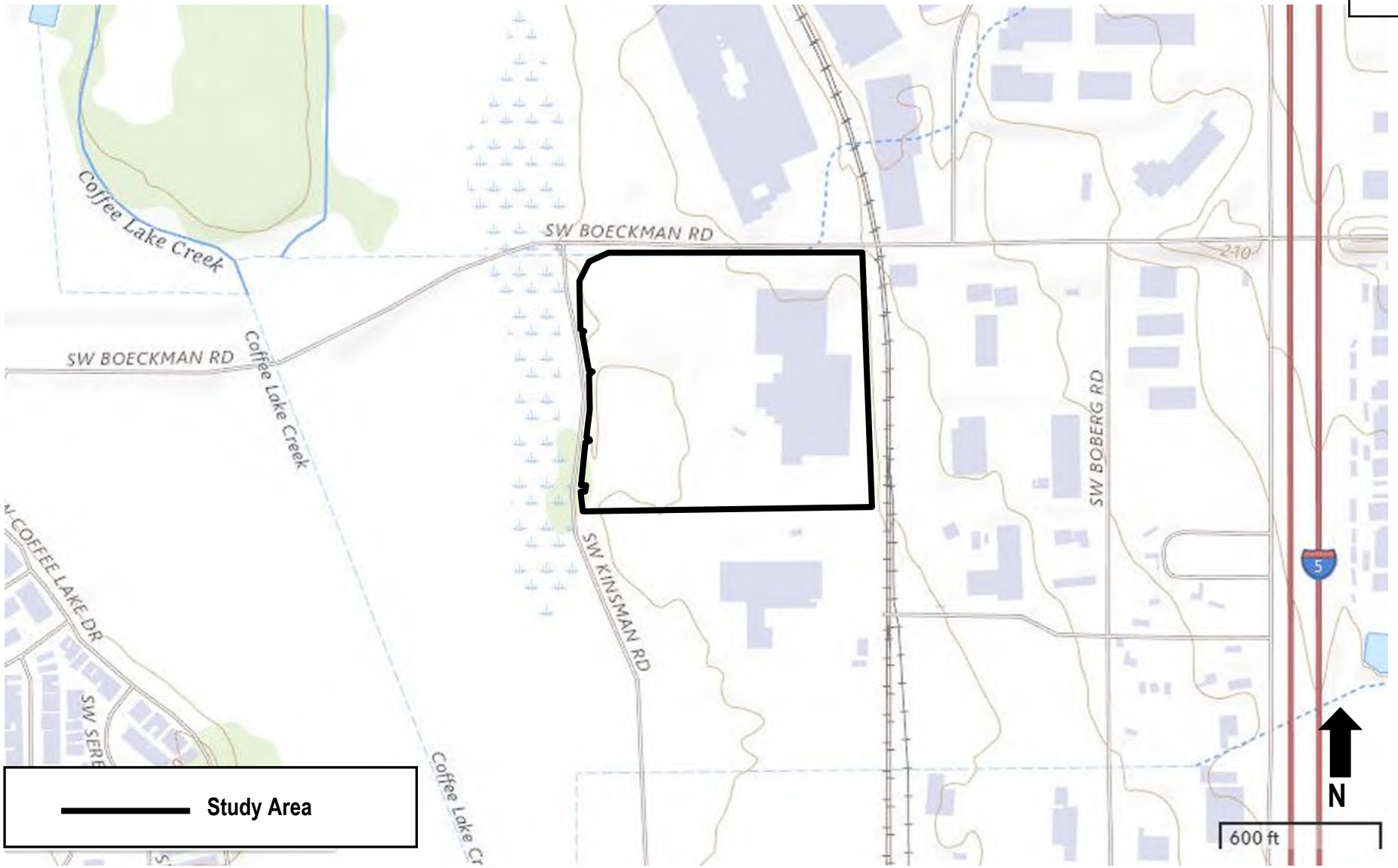
Attachment A

Figures

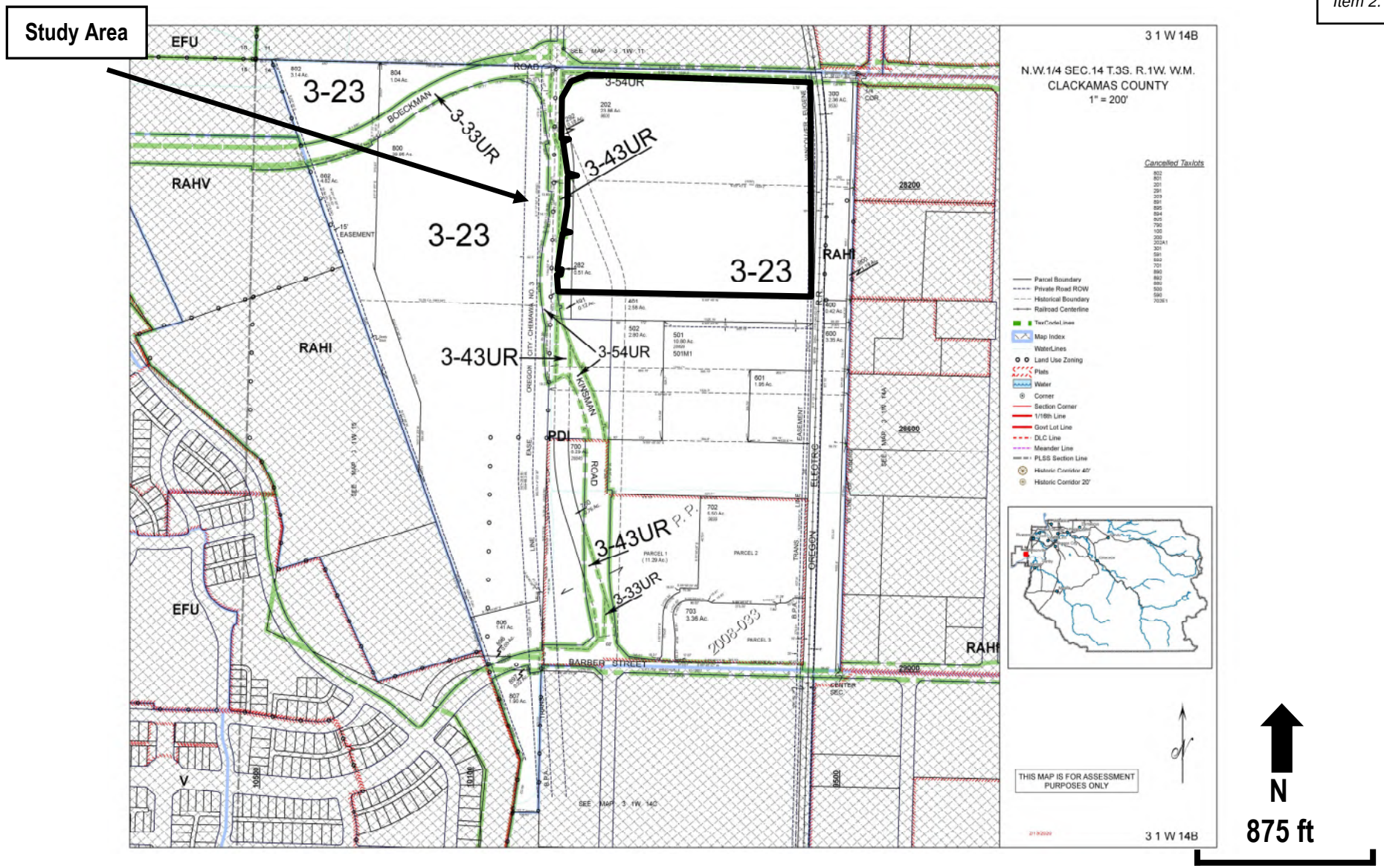


Project #7264
11/24/2021

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

General Location and Topography
9900 SW Boeckman Road Property - Wilsonville, Oregon
United States Geological Survey (USGS) Sherwood, Oregon 7.5 quadrangle, 2020
(viewer.nationalmap.gov/basic)

FIGURE
1

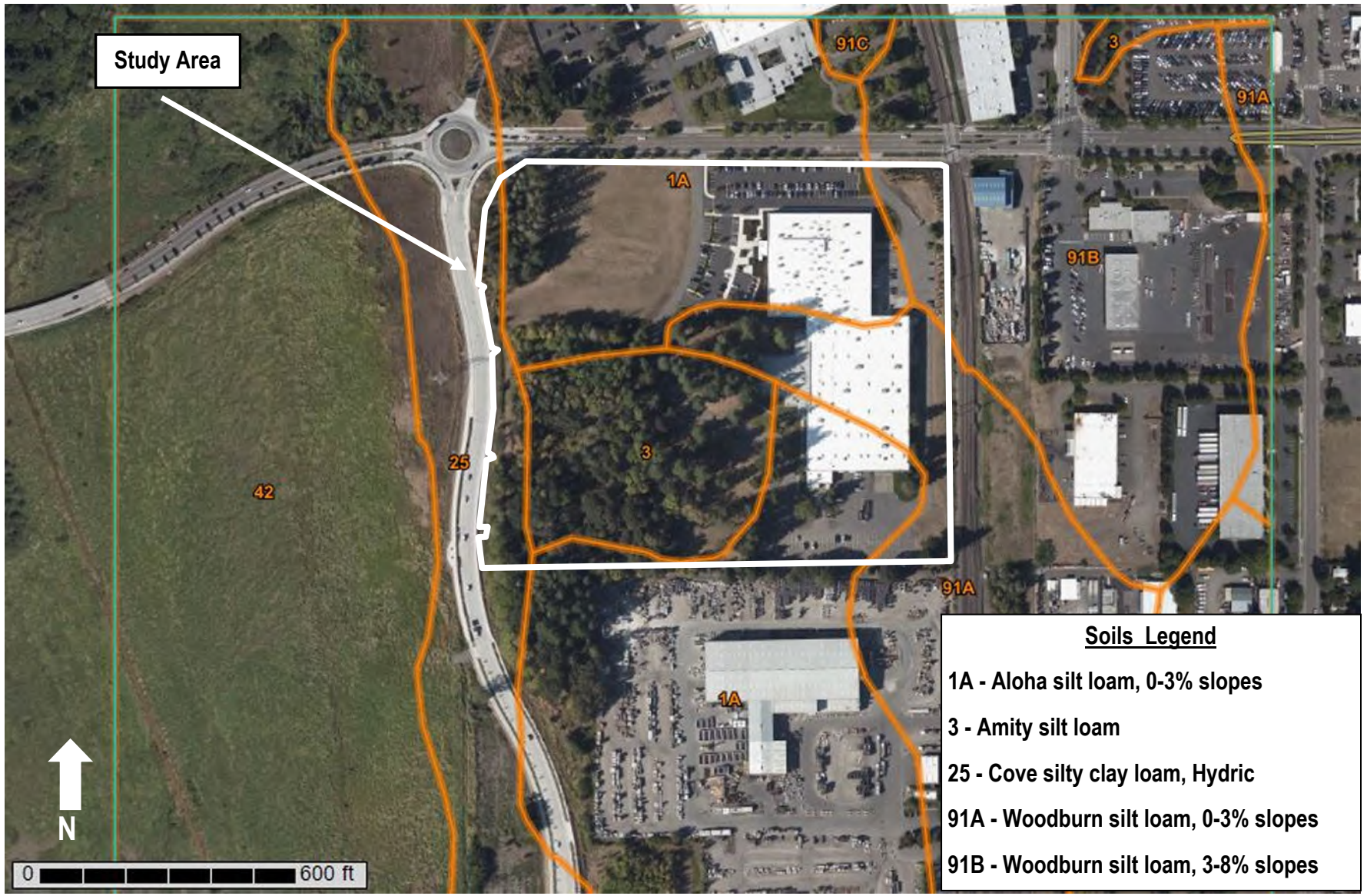


Project #7264
11/24/2021

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Tax Lot Map
9900 SW Boeckman Road Property - Wilsonville, Oregon
The Oregon Map (ormap.net)

FIGURE
2

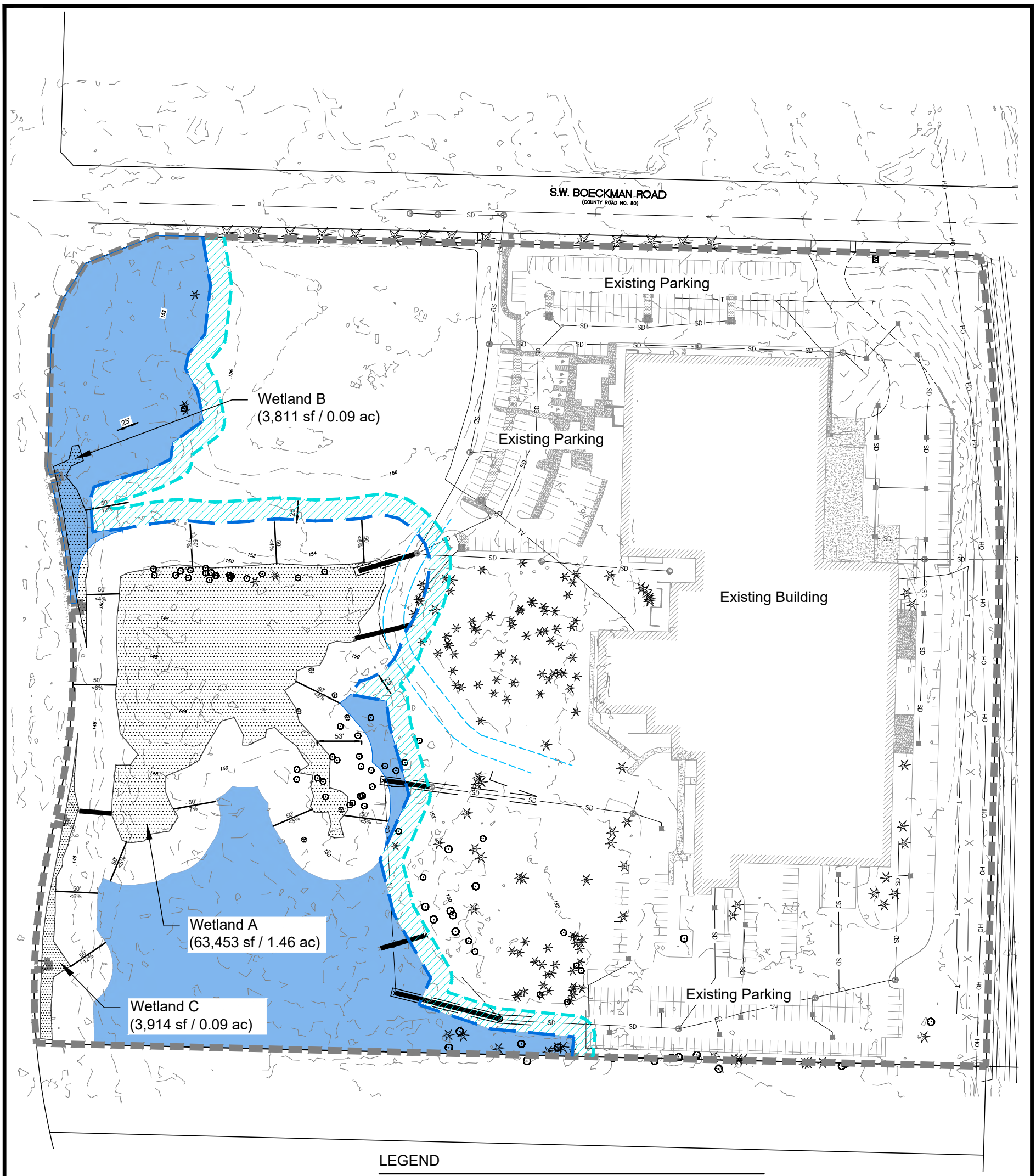


Project #7264
11/24/2021

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Soils
9900 SW Boeckman Road Property - Wilsonville, Oregon
Natural Resources Conservation Services, Web Soil Survey, 2020
(websoilsurvey.sc.egov.usda.gov)

FIGURE
3



LEGEND

- Project Area Boundary (1,066,705 sf / 24.5 ac)
- Wetland (71,178 sf / 1.63 ac)
- 50 ft. Safe Harbor / SROZ Boundary (Area of Conflicting Use) (143,703 sf / 3.3 ac)
- City of Wilsonville SR Impact Area (25' Width) (41,843 sf / 0.96 ac)
- Culvert
- Storm Drain
- LIDAR 2' Contours
- Tree (Deciduous)
- Tree (Conifer)
- SD — Existing Storm Pipe

0 62.5 125 250

SCALE IN FEET

Survey provided by
Andy Paris and Associates, Inc., PLS

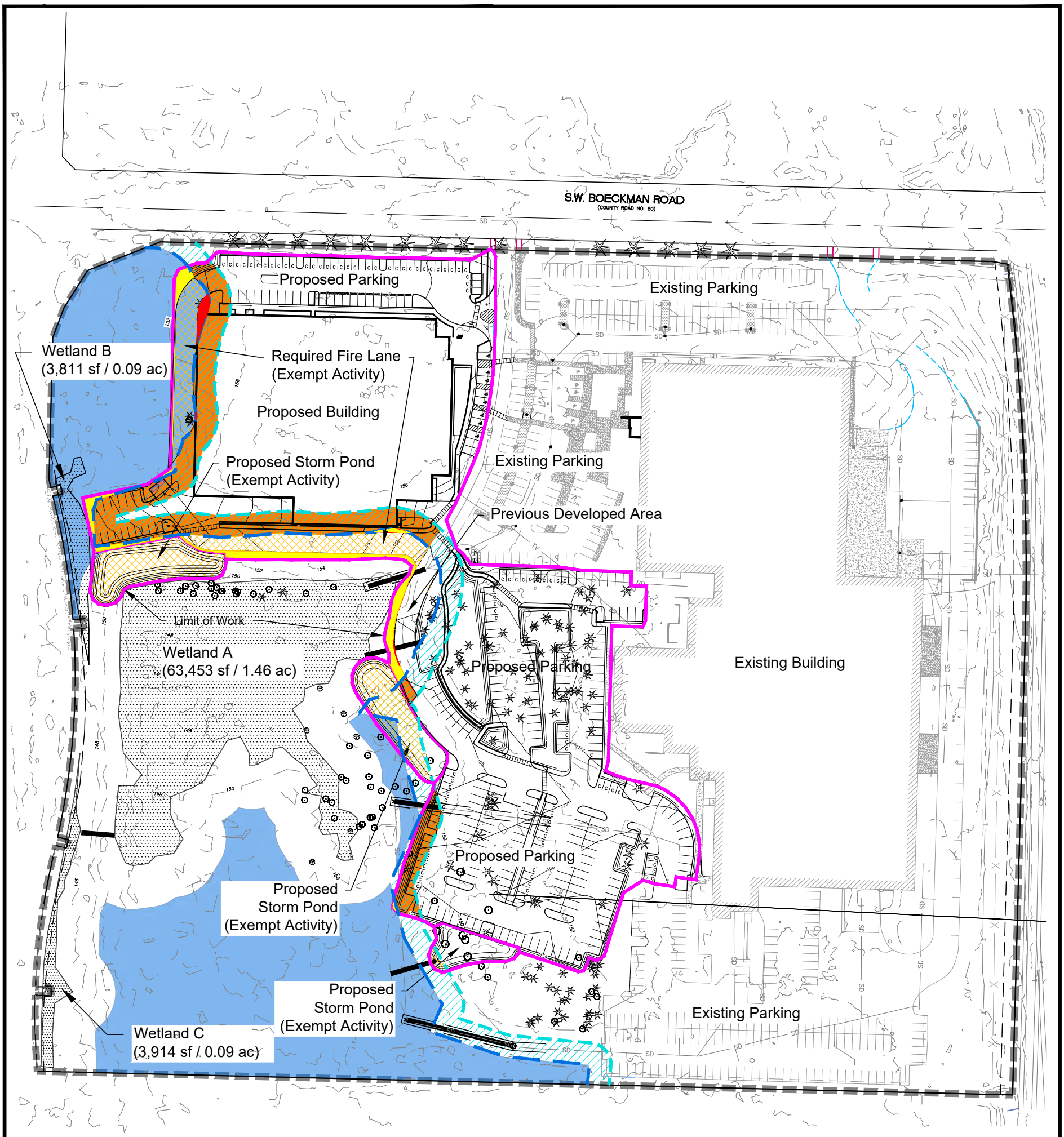
Pacific Habitat Services,Inc.
9450 SW Commerce Circle, Suite 180 Wilsonville, Oregon 97070
Phone: (503) 570-0800 Fax (503) 570-0855

Existing Conditions
9900 SW Boeckman Road Property - Wilsonville, Oregon

FIGURE 4

1-21-2022

X:\Project Directories\7200\7264 Boeckman South Development\AutoCAD\Plot Dwg\Fig4 ExistCond.dwg, 1/21/2022 4:56:21 PM



LEGEND

- Project Area Boundary (1,066,705 sf / 24.5 ac)
- Wetland (71,178 sf / 1.63 ac)
- 50 ft. Safe Harbor / SROZ Boundary (Area of Limted Conflicting Use) (140,301 sf / 3.22 ac)
- City of Wilsonville SR Impact Area (41,907 sf / 0.96 ac)
- Safe Harbor / SROZ Impact (340 sf / 0.01 ac)
- City of Wilsonville SR Area Impact (22,948 sf / 0.53 ac)
- Limit of Work
- Temporary Impact (5,069 sf / 0.12 ac)
- Exempt Activity (19,061 sf / 0.44 ac)
- Culvert
- Storm Drain
- Existing LIDAR 2' Contours
- Manhole
- Tree (Deciduous)
- Tree (Conifer)

0 62.5 125 250

SCALE IN FEET

Survey provided by Andy Paris and Associates, Inc. PLS

Pacific Habitat Services,Inc.
9450 SW Commerce Circle, Suite 180 Wilsonville, Oregon 97070
Phone: (503) 570-0800 Fax (503) 570-0855

Proposed Site Development Plan and SRIR/SROZ Impacts
9900 SW Boeckman Road Property - Wilsonville, Oregon

FIGURE 5

1-26-2022

X:\Project Directories\7200\7264 Boeckman South Development\AutoCAD\Plot Dwg\Fig5 SitePlan.dwg, 1/27/2022 10:43:56 AM

Proposed Parking

Existing Parking

Proposed Building

Proposed
Storm Pond

Existing Parking

Proposed Parking

Limit of Work

Wetland A
(63,453 sf / 1.46 ac)

Existing Building

Proposed
Storm Pond

Proposed Parking

Proposed
Storm Pond

Existing Parking

LEGEND

- Project Area Boundary (1,066,705 sf / 24.5 ac)
- Wetland (71,179 sf / 1.63 ac)
- 50 ft. Safe Harbor / SROZ Boundary
- City of Wilsonville SR Impact Area (41,843 sf / 0.96 ac)
- Existing LIDAR 2' Contours
- 155 Proposed Contours
- Tree To Remain (Deciduous)
- Tree To Remain (Conifer)
- Tree To Be Removed (Deciduous)
- Tree To Be Removed (Conifer)
- Tree Protection Fence
- Limit of Work

0 40 80 160

SCALE IN FEET

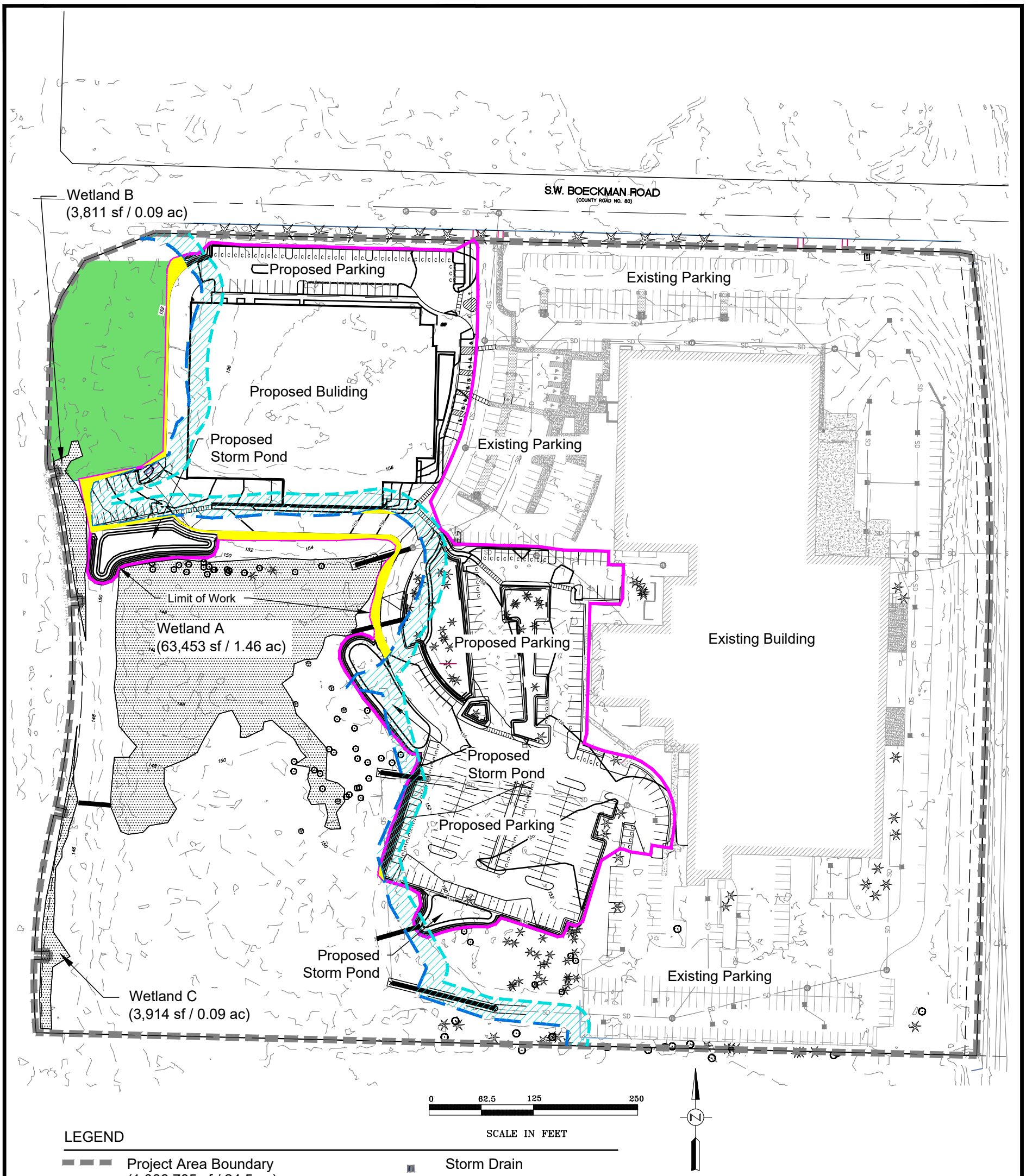
Survey provided by
Andy Paris and Associates, Inc. PLS

Pacific Habitat Services,Inc.
9450 SW Commerce Circle, Suite 180 Wilsonville, Oregon 97070
Phone: (503) 570-0800 Fax (503) 570-0855

Tree Removal Plan
9900 SW Boeckman Road Property - Wilsonville, Oregon

FIGURE
5A

1-20-2022



LEGEND

- Project Area Boundary (1,066,705 sf / 24.5 ac)
- Wetland (71,178 sf / 1.63 ac)
- 50 ft. Safe Harbor / SROZ Boundary
- City of Wilsonville SR Impact Area (41,907 sf / 0.96 ac)
- Mitigation Area (33,053 sf / 0.76 ac)
- Temporary Impact to be Seeded (5,069 sf / 0.12 ac)
- Limit of Work
- Culvert
- Storm Drain
- Existing LIDAR 2' Contours
- Manhole
- Tree (Deciduous)
- Tree (Conifer)

Botanical Name	Wetland Indicator Status	Common Name	Minimum Rooting Size	Minimum Planting Densities
TREES				
Acer macrophyllum	FACU	Big leaf maple	2-gallon	50
Alnus rubra	FACW	Red alder	2-gallon	60
Quercus garryana	UPL	Oregon white oak	2-gallon	60
Pseudotsuga menziesii	FACU	Douglas' Fir	2-gallon	60
Pinus ponderosa var. willamettensis	FACU	Willamette Valley Ponderosa Pine	2- gallon	60
Fraxinus latifolia	FACW	Oregon ash	2-gallon	40
SHRUBS				
Symphoricarpos alba	FACU	Snowberry	1-gallon	140
Rubus ursinus	FACU	Pacific swordfern	1-gallon	140
Mahonia aquifolium	UPL	Tall Oregon grape	1-gallon	140
Rosa nutkana	FACU	Nootka rose	1-gallon	100
Corylus cornuta	FACU	Hazelnut	1-gallon	100
Oemleria cerasiformis	FACU	Indian plum	1-gallon	120
Amelanchier alnifolia	FACU	Service berry	1-gallon	100
Festuca idahoensis	FACU	Idaho fescue	5 pounds	7-10 pounds/acre
			Trees	**328**
			Shrubs	**840**

Survey provided by Andy Paris and Associates, Inc. PLS

Pacific Habitat Services,Inc.
9450 SW Commerce Circle, Suite 180 Wilsonville, Oregon 97070
Phone: (503) 570-0800 Fax (503) 570-0855

Mitigation Plan
9900 SW Boeckman Road Property - Wilsonville, Oregon

FIGURE 6

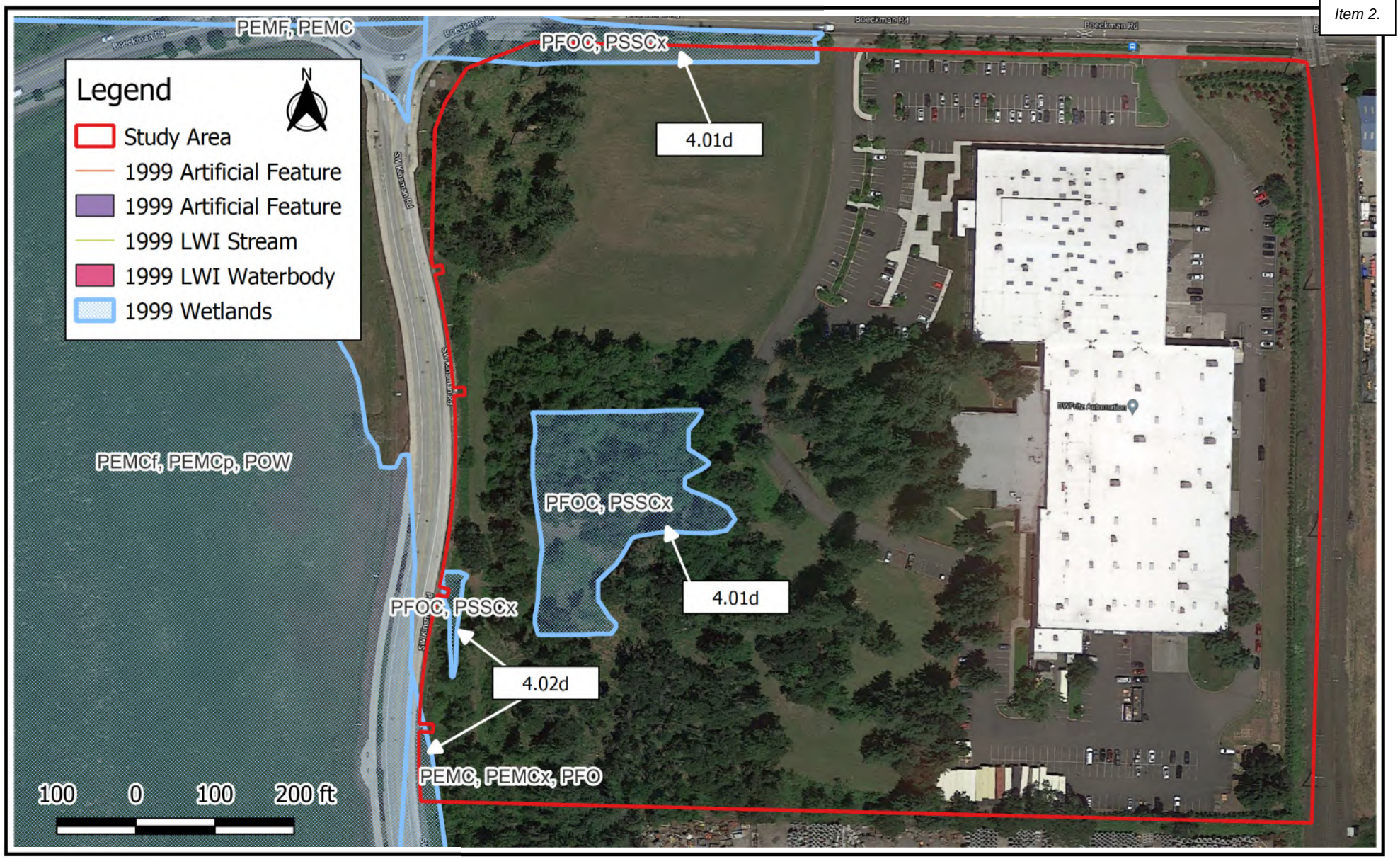
1-26-2022

#7264
1/10/2022

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Title 3 Land in the Portland Metro Region
9900 SW Boeckman Road Property - Wilsonville, Oregon
www.oregonmetro.gov/rlis, 2012

FIGURE
7



#7264
12/29/2021

PHS

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

City of Wilsonville Local Wetlands Inventory
9900 SW Boeckman Road Property - Wilsonville, Oregon
Fishman Associates, 1999

FIGURE
8

#7264
1/10/2022

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Title 13 Land in the Portland Metro Region
9900 SW Boeckman Road Property - Wilsonville, Oregon
www.oregonmetro.gov/rlis, 2012

FIGURE
9

Attachment B

Arborist Tree Inventory

9600 Boeckman Rd Tree Assessment

Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
800	48	Ponderosa Pine	100+ x 37	Fair	Moderate & non-correctable defects	Partial lower crown due to crowding with a full upper crown. Co-dominant stems at 70'. Average annual twig growth.	A
801	17	Ponderosa Pine	60 x 30	Poor	Moderate & non-correctable defects	Partial 1/3 very thin crown due to crowding. Below average annual twig growth. May improve with care.	B
802	20	Ponderosa Pine	70 x 25	Fair	Moderate & non-correctable defects	Partial 3/4 crown due to crowding. Co-dominant stems at 50'. Average annual twig growth and moderate amount of large to medium deadwood in crown to remove.	A
803	22	Ponderosa Pine	15 x 0	DEAD	DEAD	Dead 15' tall stump/snag has bark sloughing off and several holes from woodpeckers. DEAD STUMP, REMOVE.	
804	12	Ponderosa Pine	50 x 12	Good	Few & minor or correctable defects	Nearly full asymetric crown with average to above average annual twig growth.	A
805	15	Ponderosa Pine	50 x 15	Fair	Moderate & non-correctable defects	Partial 1/2 crown due to crowding and below average annual twig growth.	B
806	36	Ponderosa Pine	100+ x 42	Good	Moderate & non-correctable defects	Partial 1/3 crown due to crowding and average annual twig growth.	
807	32	Ponderosa Pine	100+ x 30	Fair	Moderate & non-correctable defects	Partial 3/4 crown due to crowding and average annual twig growth.	A
808	30	Douglas Fir	100+ x 46	Good	Few & minor or correctable defects	Full crown with good annual twig growth.	
809	27	Douglas Fir	100+ x 35	Poor	Moderate & non-correctable defects	Partial 2/3 crown due to crowding. Codominant stems at 30'. Large deadwood in lower crown should be removed if tree is retained. Below average annual twig growth.	
810	19	Douglas Fir	100+ x 25	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with below average annual twig growth.	
811	34	Douglas Fir	100+ x 40	Fair	Moderate & non-correctable defects	Partial 1/2 crown due to crowding and below average annual twig growth.	
812	29	Douglas Fir	90 x 25	Poor	Major defects or problems	Very thin partial crown, top broken out at 90' with very poor annual twig growth.	
813	22	Douglas Fir	80 x 22	Poor	Major defects or problems	Partial 1/2 crown due to crowding and below average annual twig growth. Top broken out at 80'.	
814	11	Douglas Fir	35 x15	Poor	Major defects or problems	Partial very thin 1/8 crown due to crowding. Top 12' to 15' dead with very poor annual twig growth. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	
815	24	Ponderosa Pine	100+ x 18	Fair	Moderate & non-correctable defects	Full narrow asymetric crown with broken out top. Below average annual twig growth.	
816	17	Ponderosa Pine	90 x 10	Poor	Major defects or problems	Very small, 5% to 8% live crown ratio, with below average annual twig growth.	

9600 Boeckman Rd Tree Assessment

Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
817	34	Ponderosa Pine	100+ x 25	Good	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with good annual twig growth.	
818	25	Ponderosa Pine	100+ x 18	Good	Moderate & non-correctable defects	Partial 7/8 asymetrical crown due to crowding with good annual twig growth.	
818 B	20	Douglas Fir	100+ x 30	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average annual twig growth. Light amount of medium deadwood to remove if retaining.	
819	36	Ponderosa Pine	100+ x 30	Good	Moderate & non-correctable defects	Partial 2/3 crown due to crowding. Good annual twig growth.	
820	24	Douglas Fir	80 x 20	Fair	Moderate & non-correctable defects	Subdominant tree with partial 1/3 crown due to crowding. Below average annual twig growth.	
821	36	Ponderosa Pine	100+ x 25	Good	Moderate & non-correctable defects	Partial lower crown and full upper crown due to crowding. Good annual twig growth.	
822	36	Ponderosa Pine	100+ x 35	Good	Few & minor or correctable defects	Full asymetric crown with good annual twig growth. Nice specimen.	B
823	25	Douglas Fir	90 x 30	Very Poor	Major defects or problems	Very thin partial 1/2 crown due to crowding with very poor annual twig growth indicates declining health. May improve with care.	
826	30	Douglas Fir	100+ x 40	Fair	Moderate & non-correctable defects	Partial 2/3 asymetric crown due to crowding with below average annual twig growth. Large amount of medium to large deadwood in lower crown to be removed if retaining.	
827	15	Douglas Fir	75 x 28	Fair	Moderate & non-correctable defects	Subdominant tree with thin partial 1/3 crown due to crowding. Below average annual twig growth. Some medium to fine deadwood in lower crown.	
828	36	Ponderosa Pine	100+ x 33	Good	Few & minor or correctable defects	Nearly full asymetric crown with average to above average annual twig growth. Large amount of medium to large deadwood in lower crown to remove if retaining.	
829	17	Douglas Fir	90 x 30	Fair	Moderate & non-correctable defects	Subdominant tree with partial 2/3 crown due to crowding and below average annual twig growth. Some medium deadwood in lower crown to remove if retaining.	
830	17	Douglas Fir	90 x 22	Fair	Moderate & non-correctable defects	Top broken out at 90' with partial 2/3 crown due to crowding. Below average annual twig growth.	
831	36	Ponderosa Pine	100+ x 38	Fair	Moderate & non-correctable defects	Below average annual twig growth. Some fine deadwood at branch tips indicates declining health which may improve with care.	
832	30	Douglas Fir	90 x 50	Excellent	Moderate & non-correctable defects	Top broken out at 90' with full symetrical crown and good annual twig growth. Some medium to large deadwood in lower crown to remove if retaining.	
833	30	Douglas Fir	80 x 30	Poor	Major defects or problems	crooked top at 45'. Tree leans southwest at 15° to 20° with partial 2/3 crown due to crowding. Below average annual twig growth. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	

9600 Boeckman Rd Tree Assessment

Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
834	30	Douglas Fir	75 x 38	Fair	Moderate & non-correctable defects	Subdominant tree with top broken out. Partial 3/4 crown due to crowding with below average annual twig growth.	
835	41	Ponderosa Pine	100+ x 50	Good	Moderate & non-correctable defects	Partial 2/3 lower crown due to crowding with full asymetric upper crown. Average annual twig growth with some medium to fine deadwood in crown to remove if retaining.	
837	33	Douglas Fir	100+ x 37	Good	Moderate & non-correctable defects	Partial lower crown with full asymetric upper crown due to crowding. Average annual twig growth. Some large, medium and fine deadwood to remove if retaining.	
838	14	Douglas Fir	55 x 25	Very Poor	Major defects or problems	Fungal fruiting bodies (conks) on trunk indicate presence of internal decay. Partial 1/3 crown due to crowding. Below average annual twig growth and trunk has long swoop. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	
839	18	Douglas Fir	90 x 18	Poor	Moderate & non-correctable defects	Subdominant tree with top broken out. Thin partial 1/3 crown due to crowding with very poor annual twig growth. POOR SPECIMEN, MARGINAL FOR RETENTION.	
840	23	Douglas Fir	100+ x 25	Fair	Moderate & non-correctable defects	Thin partial lower and full upper crown with below average annual twig growth.	
841	18	Douglas Fir	90 x 40	Fair	Moderate & non-correctable defects	Thin partial 1/3 crown due to crowding. Below average annual twig growth.	
842	24	Douglas Fir	100+ x 40	Fair	Moderate & non-correctable defects	Partial 1/2 crown due to crowding and average annual twig growth. Large amount of medium to large deadwood in lower crown to remove if retaining.	
843	30	Douglas Fir	100+ x 45	Fair	Moderate & non-correctable defects	Nearly full asymetric crown with below average annual twig growth. Large amount of large deadwood on west side of lower crown to remove if retaining.	
844	16	Douglas Fir	60 x 28	Poor	Major defects or problems	Subdominant tree with top broken out at 60', thin crown and below average annual twig growth.	
845	12	Douglas Fir	80 x 25	Poor	Major defects or problems	Top broken out at 80', partial 3/4 crown due to crowding. Below average annual twig growth.	B
846	21	Douglas Fir	100+ x 30	Fair	Moderate & non-correctable defects	Partial 1/8 & 1/4 crown due to crowding. Below average annual twigh growth with some medium to large deadwood to remove if retaining.	
847	20	Douglas Fir	90 x 30	Fair	Moderate & non-correctable defects	Partial 1/2 crown due to crowding with below average annual twig growth. Some medium to fine deadwood in crown.	
848	24	Douglas Fir	100+ x 40	Fair	Moderate & non-correctable defects	Partial 3/8 crown due to crowding with average annual twig growth. Some medium deadwood on west side of lower crown to remove if retaining.	
849	30	Douglas Fir	100+ x 42	Good	Moderate & non-correctable defects	Partial 1/2 lower and full asymetric upper crown with average annual twig growth. Large amount of large deadwood on northwest side of lower crown to remove if retaining.	
850	30	Douglas Fir	100+ x 40	Good	Moderate & non-correctable defects	Partial 1/2 lower and full asymetric upper crown with average annual twig growth. Large amount of large deadwood on north side of lower crown to remove if retaining.	

9600 Boeckman Rd Tree Assessment

Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
851	45	Douglas Fir	100+ x 42	Good	Few & minor or correctable defects	Full crown with average annual twig growth. Two stems at 55'. Prune to improve structure if retaining.	
853	8	Douglas Fir	65 x 12	Poor	Major defects or problems	Subdominant tree with thin partial 1/4 crown due to crowding. Below average annual twig growth. POOR SPECIMEN MARGINAL FOR PRESERVATION.	
854	16	Douglas Fir	100+ x 16	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with below average annual twig growth.	
855	22	Douglas Fir	100+ x 35	Fair	Moderate & non-correctable defects	Partial 1/8 & 1/8 lower crown with a nearly full upper crown. Below average annual twig growth.	
856	22	Douglas Fir	90 x 18	Poor	Moderate & non-correctable defects	Very thin partial 1/4 crown due to crowding with below average annual twig growth. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	
857	29	Douglas Fir	100+ x 30	Fair	Moderate & non-correctable defects	Partial 1/3 lower and full upper crown with well below average annual twig growth.	
858	35	Ponderosa Pine	100+ x 25	Good	Moderate & non-correctable defects	Partial 1/2 lower with full upper crown. Average annual twig growth with some deadwood in lower crown to be removed if retaining.	A
859	40	Douglas Fir	100+ x 50	Good	Moderate & non-correctable defects	2 stems at 3' with a partial 3/4 crown due to crowding. Below average annual twig growth. Some deadwood in lower crown to remove if retaining.	
860	26	Douglas Fir	100+ x 18	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with below average annual twig growth. Some medium to fine deadwood to remove if retaining.	
861	24	Douglas Fir	100+ x 32	Fair	Moderate & non-correctable defects	Thin partial 1/4 crown due to crowding with below average annual twig growth.	
862	27	Douglas Fir	100+ x 35	Fair	Few & minor or correctable defects	Full asymetric crown due to crowding with below average annual twig growth.	
863	17	Douglas Fir	100+ x 30	Fair	Moderate & non-correctable defects	Partial 1/3 lower and full upper crown. Below average annual twig growth.	B
864	14	Douglas Fir	95 x 14	Fair	Moderate & non-correctable defects	Partial 1/4 lower with full upper crown due to crowding. Below average annual twig growth.	
865	22	Douglas Fir	100+ x 25	Good	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average annual twig growth. Moderate amount of medium to fine deadwood to remove if retaining.	B
866	11	Douglas Fir	100+ x 20	Poor	Moderate & non-correctable defects	Partial 1/8 very narrow crown due to crowding with poor annual twig growth and a light amount of deadwood. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	A
867	11	Douglas Fir	55 x 16	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with average annual twig growth. Some medium deadwood to remove if retaining.	B

9600 Boeckman Rd Tree Assessment

Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
868	26	Douglas Fir	100+ x 45	Fair	Moderate & non-correctable defects	Partial 1/3 lower and nearly full upper crown with average annual twig growth. Moderate amount of medium to large deadwood to remove if retaining.	B
869	13	Pacific Madrone	35 x 30	Good	Moderate & non-correctable defects	Wound on south side at 3'. Asymetrical crown with good leaf size and annual twig growth. Some structural issues could be improved with pruning.	
870	24	Douglas Fir	100+ x 30	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with below average annual twig growth. Some medium deadwood to remove if retaining.	A
871	28	Douglas Fir	100+ x 50	Good	Moderate & non-correctable defects	Partial 1/4 lower and full upper crown due to crowding. Average annual twig growth wth a large amount of medium to large deadwood to remove if retaining.	A
872	12	Douglas Fir	70 x 25	Fair	Moderate & non-correctable defects	Subdominant tree with partial 1/4 crown due to crowding. Average annual twig growth. Light amount of medium to fine deadwood in crown.	A
873	24	Oregon White Oak	85 x 30	Good	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with good annual twig growth and average leaf size. Some fine deadwood in upper crown suggests some insect or health issue that should be further investigated if it is retained.	A
874	17	Oregon White Oak	85 x 30	Good	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average annual twig growth and average leaf size. Some large deadwood to remove if retaining.	A
875	14	Douglas Fir	70 x 25	Fair	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with average annual twig growth. Light amount of medium deadwood to remove if retaining.	A
876	30	Douglas Fir	100+ x 50	Good	Moderate & non-correctable defects	Partial 1/2 lower and full upper crown due to crowding with average annual twig growth. Some light deadwood in crown.	A
877	22	Douglas Fir	100+ x 37	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with poor annual twig growth. Some medium deadwood to remove if retaining.	A
878	10	Douglas Fir	70 x 16	Fair	Moderate & non-correctable defects	Subdominant tree with partial 1/3 crown due to crowding. Below average annual twig growth with some light deadwood in lower crown.	A
879	13	Douglas Fir	85 x 16	Poor	Major defects or problems	Partial 1/2 very thin crown due to crowding with poor annual twig growth. Some light deadwood. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	A
880	24	Douglas Fir	100+ x 28	Fair	Moderate & non-correctable defects	Partial 1/8 lower and 1/2 partial upper crown due to crowding. Average annual twig growth with some medium deadwood to remove if retaining.	A
881	24	Oregon White Oak	85 x 43	Good	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with good annual twig growth and leaf size. 2 stems at 6.5.' Crown is off center and heavy to south. Prune to balance and improve structure.	A
882	13	Douglas Fir	50 x 25	Poor	Moderate & non-correctable defects	Partial 3/4 crown due to crowding with very poor annual twig growth and with a moderate amountd of medium to fine deadwood. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	A
883	23	Douglas Fir	100 x 16	DYING	DYING	Nearly dead. Top 40' is dead. Dying tree is a POTENTIAL HAZARD, DO NOT PRESERVE.	A

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Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
884	23	Oregon White Oak	70 x 38	Fair	Moderate & non-correctable defects	Partial 1/2 crown due to crowding with average leaf size and annual twig growth. 2 stems at 6' and some medium deadwood to remove if retaining. Prune to improve structure.	A
885	17	Douglas Fir	80 x 20	Poor	Major defects or problems	Weak connection at base and partial 1/4 crown due to crowding. Poor annual twig growth and some medium deadwood in crown. POOR SPECIMEN, DO NOT PRESERVE.	A
886	24	Douglas Fir	95 x 25	Poor	Major defects or problems	Thin partial 2/3 crown due to crowding with poor annual twig growth. Clearly declining health with med to large deadwood in mid crown. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	A
887	17	Douglas Fir	85 x 25	Poor	HAZARD REMOVE	Partial 1/2 crown due to crowding with major wound and exposed internal decay on south side from 0' to 6'. HAZARD REMOVE.	A
888	17	Douglas Fir	75 x 25	Poor	Major defects or problems	Thin partial 1/3 crown due to crowding with very poor annual twig growth. Some medium to large deadwood in lower crown. Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
889	17	Douglas Fir	80 x 25	Poor	Major defects or problems	Thin partial 1/4 crown due to crowding with very poor annual twig growth. Moderate amount of medium to fine deadwood throughout crown. Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
890	21	Douglas Fir	100+ x 35	Poor	Major defects or problems	Small thin full crown due to crowding with poor annual twig growth. Large amount of large deadwood. Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
891	21	Douglas Fir	100+ x 18	Poor	Major defects or problems	Small thin crown due to crowding with poor annual twig growth. Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	**A**
892	21	Douglas Fir	85 x 25	Poor	Major defects or problems	Thin partial 1/3 crown due to crowding. Poor annual twig growth. Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
893	22	Douglas Fir	100+ x 25	Poor	Major defects or problems	Narrow thin nearly full crown with poor annual twig growth. Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	
894	24	Douglas Fir	100+ x 35	Poor	Major defects or problems	Thin full crown with poor annual twig growth. Top is dying back and has fine deadwood throughout crown, Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	B
895	22	Douglas Fir	100+ x 32	Fair	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with below average annual twig growth. Moderate amount of medium to large deadwood to remove if retaining.	B
896	22	Douglas Fir	85 x 32	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average annual twig growth. Top is split with a dead side stem attached. Prune to remove deadwood and improve structure if retaining.	A
897	27	Douglas Fir	100+ x 35	Poor	Major defects or problems	Thin full crown with dead top. Dying and serious decline in condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
900	13	Douglas Fir	65 x 20	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding. Below average annual twig growth.	

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Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
901	6	Scouler Willow	23 x 12	Very Poor	DYING HAZARD	Open wound exposes internal decay at 1' to 3'. Dead top and bark is sloughing off from 5' to top. DYING, HAZARD REMOVE.	
902	8	Douglas Fir	35 x 10	Fair	Major defects or problems	Subdominant tree with partial 1/8 crown due to crowding. Below average annual twig growth. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	
903	13	Douglas Fir	55 x 20-	Fair	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with below average annual twig growth.	
904	14	Oregon Ash	45 x 21	Fair	Moderate & non-correctable defects	Nearly full narrow crown due to crowding. Top leans 15° to 25° to north. Average annual leaf size and twig growth. May require inspection and pruning to improve structure if retained.	
905	14	Oregon Ash	60 x 24	Good	Few & minor or correctable defects	Full upper and partial lower crown due to crowding. Good annual leaf size and twig growth.	A
906	12	Oregon Ash	80 x 20	Good	Moderate & non-correctable defects	2 co-dominant stems at 30' with nearly full asymetric crown. Average annual leaf size and twig growth. Some medium size deadwood to be removed if area beneath it is developed.	A
907	10	Oregon Ash	75 x 18	Fair	Moderate & non-correctable defects	2 co-dominant stems at 40' with partial, 2/3 crown due to crowding. Average annual leaf size and twig growth.	A
908	15	Oregon Ash	70 x 30	Good	Moderate & non-correctable defects	Partial 2/3 crown due to crowding is off balance and heavy to north. Good annual leaf size and twig growth.	A
909	11	Oregon Ash	75 x 20	Good	Few & minor or correctable defects	Nearly full narrow crown due to crowding. Good annual leaf size and twig growth.	A
910	8	Oregon Ash	80 x 18	Good	Few & minor or correctable defects	Nearly full narrow crown due to crowding. Good annual leaf size and twig growth.	A
911	8	Oregon Ash	80 x 15	Good	Few & minor or correctable defects	Nearly full narrow crown due to crowding. Good annual leaf size and twig growth.	A
912	8	Oregon Ash	75 x 20	Fair	Moderate & non-correctable defects	Partial crown due to crowding with below average annual twig growth. Top broken out at 60' and may need pruning to improve structure.	A
913	11	Oregon Ash	20 x 5	Poor	Major defects or problems	Top broken out at 20' with a small amount of sucker growth from trunk. TREE DESTROYED, DO NOT PRESERVE.	A
914	7	Oregon Ash	28 x 2	Poor	Major defects or problems	Top broken out at 28' with a small amount of sucker growth from trunk. TREE DESTROYED, DO NOT PRESERVE.	A
915	15	Oregon Ash	80 x 25	Fair	Few & minor or correctable defects	Nearly full asymetric crown with average annual leaf size and twig growth. Some stubs from ice storm broken branches.	A
916	11	Oregon Ash	80 x 25	Good	Moderate & non-correctable defects	Partial crown due to crowding with good annual leaf size and twig growth. Off balance and heavy to north. Some stubs from ice storm broken branches.	A

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Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
917	14	Oregon Ash	80 x 25	Good	Moderate & non-correctable defects	Partial crown due to crowding with good annual leaf size and twig growth. Off balance and heavy to north. Some stubs from ice storm broken branches.	A
918	5, 4	Common Hawthorne	30 x 20	Poor	Major defects or problems	Partial crown due to crowding. Off balance to west. INVASIVE SPECIES & POOR SPECIMEN, DO NOT PRESERVE.	A
5000	15	Oregon White Oak	60 x 45	Good	Few & minor or correctable defects	Full crown with good annual leaf size and twig growth. Some medium to fine deadwood to remove.	
5002	17	Douglas Fir	0 x 0	DEAD	DEAD	Broken off lower trunk. TAKEN DOWN & REMOVED.	B
5003	48	Ponderosa Pine	100+ x 40	Good	Few & minor or correctable defects	Full crown with good annual twig growth. Some medium deadwood to remove.	A
5011	9	Bird Cherry	50 x 15	Very Poor	Moderate & non-correctable defects	Partial very small crown due to crowding. Sapsucker damage has nearly girdled trunk. Large amount of deadwood. VERY POOR SPECIMEN, DO NOT PRESERVE.	A
5012	13	Oregon White Oak	50 x 20	Fair	Moderate & non-correctable defects	Partial asymetric crown with below average annual twig growth and leaf size.	A
5042	27, 18	Oregon White Oak	85 x 75	Good	Moderate & non-correctable defects	2 stems at 30". Crown off balance to east with some medium and large deadwood to remove. Prune to balance and improve structure. Cable two stems together if retaining.	
5043	48	Ponderosa Pine	100+ x 47	Good	Moderate & non-correctable defects	Full asymetric crown due to crowding with average annual twig growth. Some recently dead branches and some large deadwood throughout crown to remove if retaining.	
5044	14	Oregon Ash	90 x 37	Good	Moderate & non-correctable defects	Partial 3/4 crown due to crowding with good leaf size and annual twig growth. Some medium to fine deadwood throughout crown.	
5129	12	Oregon Ash	80 x 23	Fair	Moderate & non-correctable defects	Full asymetric crown with chlorotic leaves, below average leaf size and annual twig growth indicates current health problems. May improve with care.	
5130	14	Oregon Ash	80 x 40	Fair	Moderate & non-correctable defects	Full asymetric crown with below average leaf size and annual twig growth. Tree has some structural problems that can be improved with pruning.	
5132	24	Oregon White Oak	0 X 0	DEAD	DEAD	15' stump lying on ground due to being toppled by winter ice storm.	
5133	23	Oregon White Oak	8 x 0	DEAD	DEAD	Trunk broken off at 8', only stump remains. REMOVE STUMP.	
6604	34	Douglas Fir	100+ x 45	Very Poor	Major defects or problems	Nearly full asymetric very thin crown with very poor annual twig growth. Tree in serious decline, likely due to saturated soil in wetland. Medium to fine deadwood throughout crown. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	
6612		NO TREE			NO TREE	No tree at this location	

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Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
6616	12	Oregon Ash	75 x 30	DYING	DYING HAZARD	Wounds extensive internal decay exposed from 0' to 7' across over 50% of circumference. DYING, HAZARD, REMOVE.	
6587	17	Oregon Ash	80 x 25	Fair	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with average annual leaf size and twig growth. Some large to medium deadwood to remove if area beneath it is improved.	A
6597	11	Oregon White Oak	90 x 20	Fair	Moderate & non-correctable defects	Partial 1/8 & 1/8 crown due to crowding with average annual leaf size and twig growth.	A
50346	32	Douglas Fir	85 x 35	Very Poor	Dying Hazard	Thin partial 3/4 crown due to crowding with very poor annual twig growth. Top was broken out and remaining top is dying with large amount of deadwood throughout crown. Dying tree is a POTENTIAL HAZARD REMOVE.	
50347	26	Douglas Fir	95 x 35	Good	Moderate & non-correctable defects	Partial lower and full upper crown due to crowding. Below average annual twig growth. Leans to northwest at 8° to 10°.	A
50348	9	Douglas Fir	25 x 18	Fair	Moderate & non-correctable defects	Partial crown due to crowding with below average annual twig growth. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
50349	34	Ponderosa Pine	100+ x 40	Good	Moderate & non-correctable defects	Partial lower and full upper crown with average annual twig growth. Top broken out and recently dead branches on north side indicates some potential health problem. May improve with care.	A
50350	24	Douglas Fir	100+ x 40	Good	Moderate & non-correctable defects	Partial crown due to crowding with below average annual twig growth. Some medium to fine deadwood to remove if retaining.	A
50351	35	Douglas Fir	100+ x 35	Fair	Moderate & non-correctable defects	Partial crown due to crowding with below average annual twig growth. Light amount of fine deadwood throughout crown.	A
50361	41	Ponderosa Pine	100+ x 50	Good	Few & minor or correctable defects	Full crown with average annual twig growth. Moderate amount of medium to large deadwood to remove is retaining.	B
50363	No Tree	NO TREE		NO TREE		No tree at this location.	
50364	No Tree	NO TREE		NO TREE		No tree at this location.	
50395	36	Ponderosa Pine	100+ x 35	Good	Few & minor or correctable defects	Full crown with good annual twig growth. Some medium to large deadwood to remove if retaining.	
50396	19	Ponderosa Pine	75 x 20	Fair	Moderate & non-correctable defects	Partial 1/2 crown due to crowding with average annual twig growth. Some recently dead branches in crown.	
50397	19	Douglas Fir	75 x 30	Fair	Moderate & non-correctable defects	Subdominant tree with partial 2/3 crown due to crowding and good annual twig growth.	
50398	19	Douglas Fir	90 x 27	Fair	Few & minor or correctable defects	Full crown with below average annual twig growth.	

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Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
50399	21	Oregon White Oak	75 x 30	Good	Moderate & non-correctable defects	Full asymetric crown is off balance and heavy to south. Some large, medium to fine deadwood in crown. Prune to improve structure if retaining.	
50400	42	Ponderosa Pine	100+ x 45	Good	Few & minor or correctable defects	Full crown with average annual twig growth. Some medium to large deadwood to remove if retaining.	
50402	15, 13	Oregon Ash	85 x 42	Good	Moderate & non-correctable defects	2 stems at 3', full asymetric crown is off balance to south. Some medium deadwood. Good leaf size and annual twig growth. Prune to improve structure and remove deadwood.	
50403	17	Oregon White Oak	80 x 35	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average leaf size and annual twig growth. Prune to improve structure and balance.	
50404	17	Oregon White Oak	85 x 40	Good	Moderate & non-correctable defects	Full asymetric crown with average leaf size and annual twig growth. Some medium to large deadwood to remove if retaining.	
50405	12	Oregon Ash	70 x 27	Poor	HAZARD REMOVE	Large open wound that exposes internal decay from 0' to 3'. Partial crown due to crowding. Some large deadwood. Poor specimen and not sound due to decay. HAZARD REMOVE.	
50406	12, 9	Bird Cherry	65 x 30	Fair	Moderate & non-correctable defects	Full crown with 2 stems at ground. Thin crown, average size wilted leaves due drought and average annual twig growth. May improve with care.	
50407	24	Douglas Fir	100+ x 40	Fair	Moderate & non-correctable defects	Partial 1/2 lower crown and full upper crown. Average annual twig growth with large, medium and fine deadwood to remove if retaining.	
50408	15	Bigleaf Maple	60 x 40	Fair	Moderate & non-correctable defects	Full crown with dead top. Below average annual twig growth and average leaf size may be due to drought. Prune to remove deadwood.	
50409	32	Ponderosa Pine	100+ x 40	Good	Moderate & non-correctable defects	Partial 3/4 asymetric crown due to crowding with good annual twig growth. Some large, medium and fine deadwood to remove if retaining.	
50410	23	Douglas Fir	100+ x 42	Good	Moderate & non-correctable defects	Partial 7/8 asymetrical crown due to crowding with average annual twig growth. Some medium to fine deadwood.	
50412	15	Douglas Fir	100+ x 23	Fair	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with below average annual twig growth. Medium to fine deadwood to remove if retaining.	
50413	20	Douglas Fir	100+ x 30	Fair	Moderate & non-correctable defects	Partial 2/3 lower and full upper crown due to crowding with average annual twig growth. Some medium to fine deadwood to remove if retaining.	
50474	28	Douglas Fir	100+ x 35	Good	Few & minor or correctable defects	Full crown with below average annual twig growth. Moderate amount of medium to fine deadwood to remove if retaining.	
50476	35	Douglas Fir	100+ x 45	Good	Few & minor or correctable defects	Partial 2/3 lower and nearly full upper crown with good annual twig growth. Moderate amount of large, medium and fine deadwood to remove if retaining.	B
50476 B	16	Douglas Fir	90 x 32	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with below average annual twig growth. Some medium to large deadwood to remove if retaining.	A

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Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
50476 C	17	Douglas Fir	100 x 32	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with below average annual twig growth. Some medium to large deadwood to remove if retaining.	A
50479	24	Douglas Fir	100+ x 35	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average annual twig growth. Moderate amount of medium to fine deadwood to remove if retaining.	B
50479 B	11	Douglas Fir	60 x 16	Poor	Moderate & non-correctable defects	Subdomiant tree with partial 1/4 crown due to crowding with below average annual twig growth. Serious declining health with significant deadwood. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	B
50479 C	7	Douglas Fir	50 x 12	Poor	Major defects or problems	Subdominant tree with 1/8 crown due to crowding with very poor annual twig growth. Seriously declining health with significant deadwood. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	A
50479 D	6	Douglas Fir	35 x 0	DEAD	DEAD	DEAD TREE, REMOVE.	
50483	25	Douglas Fir	100+ x 28	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average annual twig growth. Moderate amount of medium to fine deadwood to remove if retaining.	B
50483 B	25	Douglas Fir	100+ x 45	Good	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with below average annual twig growth. Moderate amount of medium to find deadwood to remove if retaining.	B
50483 C	19	Douglas Fir	100+ x 28	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with below average annual twig growth. Some fine deadwood.	B
50487	16	Douglas Fir	100+ x 25	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with below average annual twig growth. Some fine deadwood.	A
50487 B	18	Douglas Fir	100+ x 28	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with below average annual twig growth. Some medium to large deadwood to remove if retaining.	A
50487 C	7	Douglas Fir	25 x 10	Poor	Major defects or problems	Subdominant tree with 1/2 crown due to crowding and below average annual twig growth. Moderate amount of medium deadwood. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
50487 D	22	Douglas Fir	100+ x 32	Fair	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with below average annual twig growth. Moderate amount of medium to find deadwood to remove if retaining.	A
50490	30	Douglas Fir	100+ x 40	Fair	Moderate & non-correctable defects	Full crown with below average annual twig growth. Moderate amount of medium to fine deadwood to remove if retaining.	A
50496	41	Douglas Fir	100+ x 50	Good	Few & minor or correctable defects	Full crown with average annual twig growth. Some medium to large deadwood to remove if retaining.	A
70824	19	Douglas Fir	100+ x 35	Fair	Moderate & non-correctable defects	Partial 1/4 lower and full upper crown due to crowding. Below average annual twig growth with a moderate amount of medium to large deadwood to remove if retaining.	

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Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
70824 B	20	Douglas Fir	100+ x 35	Fair	Moderate & non-correctable defects	Partial 1/4 lower and full upper crown due to crowding. Below average annual twig growth with a moderate amount of medium to large deadwood to remove if retaining.	

Notes: Retain A = Retain without aeration, Retain B = Retain with aeration

Attachment C

OFWAM Summary Sheets

City of Wilsonville

Oregon Freshwater Wetland Assessment Method Summary Sheet

Unit CL Coffee Lake
(3.06. 307, 4.01, 4.02, 4.20)

Function	Evaluation Descriptor	Rationale
Wildlife Habitat	Provides Diverse	Excellent wildlife habitat, very diverse. Red-legged frogs in wet forest. Secretive rails (birds) live in area (and some of the biggest bull frogs I've ever seen)
Fish Habitat	Degraded	Seely Ditch channelized, could use more shade
Water Quality (pollutant removal)	Intact	Vegetation, surface inflow, size, and connectedness
Hydrologic Control (flood control & water supply)	Intact	Flood plain, vegetation, size. Perennial seeps present.
Sensitivity to Future Impacts	Potentially Sensitive	All wetlands in Wilsonville potentially sensitive to future impacts.**
Enhancement Potential*		Enhancement potential on plowed portion owned by The Wetlands Conservancy
Education	Has	Parts owned by Metro and The Wetlands Conservancy. Only area of peat soils in city.
Recreation	Provides	Parts owned by Metro.
Aesthetic Quality	Pleasing	Very large wet area.
Narrative Description of Overall Wetland Functions and Conditions		
Premier wetland-wildlife habitat in the city; provides groundwater discharge and recharge, too wet for development, unique area, corridor to Tonquin Scablands		

Attachment D

Wetland Delineation Report

Wetland Delineation
9900 SW Boeckman Road, Wilsonville, Oregon

Section 14B, Township 3 South, Range 1 West,
Tax lots 202, 282, and 292)

Prepared for

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APPENDIX B: Wetland Delineation Data Sheets
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I. INTRODUCTION

Pacific Habitat Services, Inc. (PHS) conducted a wetland delineation for property at 9900 SW Boeckman Road in Wilsonville, Oregon (Township 3 South, Range 1 West, Section 14B, Tax Lots 202, 282, and 292, and a portion of Right of Way (ROW) for Boeckman Road. This report presents the results of PHS's delineation of the study area. Figures, including a map depicting the location of wetlands within the study area, are in Appendix A. Data sheets documenting on-site conditions are provided in Appendix B. Ground-level photos of the study area are included in Appendix C, and a discussion of the wetland delineation methodology (for the client) is provided in Appendix D.

II. RESULTS AND DISCUSSION

A. Landscape Setting and Land Use

The approximately 24.57-acre study area is located in the western portion of Wilsonville, south of SW Boeckman Road and east of SW Kinsman Road. The eastern portion of the site consists of an existing business (DW Fritz Automation), which includes an industrial building, parking, a pair of very old detention basins, and access roads. The northwestern portion of the site is undeveloped and has a grass field mainly consisting of tall fescue *(Schedonorus arundinacea*, FAC), rough cat's ear (*Hypochaeris radicata*, FACU), hairy hawkbit (*Leontodon saxatilis*, FACU), dandelion (*Taraxacum officinalis*, FACU), self-heal (*Prunella vulgaris*, FACU), and English plantain (*Plantago lanceolata*, FACU). This area has higher topography than the southwestern portion of the site and may be composed of spoils that were used to excavate a detention basin in the southern middle portions of the site.

Detention Basin

A large, very old detention basin occupies the majority of the southwestern portion of the site. The basin does not appear to have been excavated, but is surrounded by large berms at all four sides. The northern portion of the detention basin contains a wetland (Wetland A), and is dominated by Oregon ash (*Fraxinus latifolia*, FACW), Himalayan blackberry (*Rubus armeniacus*, FAC), spreading rush (*Juncus patens*, FACW), and camas (*Camassia quamash*, FACW). The southern portion of the detention basin is upland, and is dominated by Oregon white oak (*Quercus garryana*, FACU), Douglas' fir (*Pseudotsuga menziesii*, FACU), snowberry (*Symphoricarpos alba*, FACU), sweetbrier rose (*Rosa rubiginosa*, UPL), Himalayan blackberry, trailing blackberry (*Rubus ursinus*, FACU), and shiny geranium (*Geranium lucidum*, UPL).

Drainage Ditch

At the western boundary of the site there is a drainage ditch that runs parallel to SW Kinsman Road and contains wetlands (Wetlands B and C). Dominant species in the ditch include Himalayan blackberry, reed canarygrass (*Phalaris arundinacea*, FACW), common rush (*Juncus effusus*, FACW), and spreading rush. Several drainpipes convey stormwater from the westernmost basin into the ditch, which flow south and has a less than one percent gradient.

The Natural Resources Conservation Service (NRCS) depicts six soil map units within the study area: Aloha silt loam, 0 to 3 percent slopes (non-hydric), Amity silt loam (non-hydric), Cove silty clay loam (hydric), Woodburn silt loam, 0 to 3 percent slopes (non-hydric), and Woodburn silt loam, 3 to 8 percent slopes (non-hydric).

B. Site Alterations

As previously discussed, a large stormwater detention basin is located in the western portion of the study area that is surrounded on all sides by berms. Because the site slopes very slightly to the west, several pipes convey stormwater from the eastern part of the study area westward, below the berms and discharge into the detention basin. Several pipes at the western boundary of the detention basin are also used to convey stormwater from the detention basin to the excavated ditch containing Wetlands B and C. It is uncertain whether or not Wetland A would exist if not the for the constructed berms, but they certainly augment the retention of wetland hydrology and the few, small drainpipes exiting the basin to the ditch effectively mute stormwater outflow. For the majority of the basin, mapped soils are also Amity silt loam; however, Cove silty clay loam soils are mapped in the westernmost portion of the wetland, adjacent to the berm.

At the northwestern corner of the study area, a former wetland depicted in the Wilsonville Local Wetland Inventory (LWI) has been filled and replaced by a bioswale for SW Boeckman Road.

C. Precipitation Data and Analysis

PHS performed the wetland delineation and data collection on July 1, 2021, and on January 11, 2022. Recorded precipitation for the water year, beginning on October 1, 2020, and up to the day of the July 1, 2021, fieldwork, was 40.78 inches, which is 100 percent of normal (40.48 inches).

For climate analysis, PHS used the Direct Antecedent Rainfall Analysis Method (DAREM) for both field dates. Using DAREM, if rainfall of prior period was drier than normal (sum is 6-9), normal (sum is 10-14), wetter than normal (sum is 15-18). As shown in Table 1, the weighted average precipitation for the three months preceding the July fieldwork was normal. Recorded rainfall for the water year (October 1, 2020 – June 30, 2021) was 41.07 inches, which is 97 percent of normal (42.29 inches). No precipitation was recorded in the two weeks preceding or on the day of the July fieldwork.

Table 1: Comparison of recorded monthly precipitation at the Oregon City Weather Station to the WETS Tables, prior to July 2021 wetland delineation field work.

Prior Month Name	WETS[1] Rainfall Percentile (inches)		Measured Rainfall[2] (inches)	Condition*:	Condition Value	Month weight	Multiply Previous two columns
	30th	70th		Dry, Wet, Normal	(1=dry, 2=normal, or 3=wet)		
June	1.13	2.18	1.38	Normal	2	3	6
May	1.78	3.24	2.29	Normal	2	2	4
April	2.49	4.08	0.18	Dry	1	1	1
						Sum	**11**

[1] WETS Table for the Oregon City Weather Station; Source: (http://agacis.rcc-acis.org/?fips=41005)

[2] Observed precipitation is the precipitation recorded at the Oregon City Weather Station. Source: (https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/fotg/?fips=41005)

Additional fieldwork was conducted on January 11, 2022. As shown in Table 1, the weighted average precipitation for the three months preceding the January fieldwork was above normal. Recorded precipitation for the two weeks preceding the January fieldwork was 4.99 inches, which is 156 percent of normal (3.2 inches); 0.18 inches fell on the day of this fieldwork.

Table 2: Comparison of recorded monthly precipitation at the Oregon City Weather Station to the WETS Tables, prior to the January 2022 wetland delineation field work.

Prior Month Name	WETS[1] Rainfall Percentile (inches)		Measured Rainfall[2] (inches)	Condition*:	Condition Value	Month weight	Multiply Previous two columns
	30th	70th		Dry, Wet, Normal	(1=dry, 2=normal, or 3=wet)		
December	5.01	8.72	6.64	Normal	2	3	6
November	4.48	8.07	5.92	Normal	2	2	4
October	1.93	4.24	7.26	Wet	3	1	3
						Sum	**13**

[1] WETS Table for the Oregon City Weather Station; Source: (http://agacis.rcc-acis.org/?fips=41005)
[2] Observed precipitation is the precipitation recorded at the Oregon City Weather Station. Source: (https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/fotg/?fips=41005)

D. Methods

PHS delineated the limits of the wetlands in the study area based on the presence of wetland hydrology, hydric soils, and hydrophytic vegetation, in accordance with the routine onsite determination method, as described in the *Corps of Engineers Wetland Delineation Manual, Wetlands Research Program Technical Report Y 87 1* ("The 1987 Manual") and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region*.

Investigations of potential wetlands were performed in all undeveloped areas of the site; however, the majority of the fieldwork took place in areas of low topography. i.e. the two detention basins and ditch.

July 2021 Fieldwork

Although precipitation was considered normal for the early July wetland delineation fieldwork, water tables in the Willamette Valley recede during the summer months, therefore, direct observations of wetland hydrology including surface water, saturation and a high water table were not possible in the seasonal wetlands of the site. Wetland hydrology indicators that were recorded at soils/hydrology pits included geomorphic position, the FAC-neutral test, drainage patterns and oxidized rhizospheres along living roots.

January 2022 Fieldwork

Because hydrological conditions were considered above normal, direct observations of wetland hydrology, including surface water, a high water table, and saturation were utilized when making wetland determinations; however, other indirect indicators, including geomorphic position, the FAC-neutral test, and oxidized rhizospheres along living roots were utilized whenever present.

E. Description of all Wetlands and Other Waters

PHS identified the jurisdictional limits of three wetlands within the study area.

Wetland A

Wetland A (1.46 acre) is located in the western portion of the study area. Its Cowardin classification is palustrine forested broad-leaved deciduous seasonally flooded/saturated (PFO1E) and its Hydrogeomorphic (HGM) classification is Flats. The dominant vegetation is Oregon ash, sweetbrier rose, trailing blackberry, spreading rush, and common camas. Soils meet the requirements for redox dark surface, and wetland hydrology indicators include high oxidized rhizospheres along living roots, geomorphic position, and occasionally the FAC-neutral test. Wetland A does not continue offsite.

The adjacent uplands are on slightly higher topography, and typically do not meet the requirements for hydrophytic vegetation. The dominant vegetation is Oregon white oak, Oregon ash, snowberry, sweetbrier rose, Himalayan blackberry, cutleaf blackberry (*Rubus laciniatus*, FACU), trailing blackberry, and shiny geranium. Owing to the site's history as a detention basin, some areas have hydric soils meeting the requirements for redox dark surface; however, wetland hydrology indicators are absent.

Wetlands B and C

Wetlands B (0.09 acre) and C (0.09 acre) are located in a broad ditch on the site's western boundary. Their Cowardin classification is palustrine emergent seasonally flooded (PEMC) and its HGM classification is Flats. Several culverts convey surface water from Wetland A to the ditch. The dominant vegetation includes velvet grass (*Holcus lanatus*, FAC), reed canarygrass (*Phalaris arundinacea*, FACW), brome grasses (*Bromus* spp.), bluegrass (*Poa* spp.), yellow glandweed (*Parentucellia viscosa*, FAC), and bird's-foot trefoil (*Lotus corniculatus*, FAC). Soils meet the requirements for redox dark surface. Wetland hydrology indicators include oxidized rhizospheres along living roots, geomorphic position, and the FAC-neutral test.

Dominant vegetation in the adjacent uplands includes Oregon white oak, Oregon ash, Himalayan blackberry, Kentucky bluegrass (*Poa pratensis*, FAC), and brome grasses. Wetland hydrology indicators are absent.

F. Deviation from Local or National Wetland Inventories

The 1999 Wilsonville Local Wetlands Inventory (LWI) depicts four wetlands within the site.

The LWI depicts a wetland adjacent to SW Boeckman Road. This wetland no longer exists and appears to have been filled for the construction of a roundabout that was built around the same time as SW Kinsman Road in 2016.

The LWI depicts a wetland in the approximate location of Wetland A. The LWI wetland is somewhat smaller and is farther to the south. These discrepancies are fairly minor and are likely due to the fact that the LWI wetlands were hand-drawn onto a field map, whereas the delineated wetland was flagged, supported with data, and professionally surveyed.

The LWI depicts a wetland in the approximate location of the southern part of Wetland B. The differences between the LWI wetland and Wetland B are also fairly minor, and likely are also the result of the LWI wetland being hand-drawn, whereas the delineated wetland was flagged, supported with data, and professionally surveyed.

The LWI also depicts a wetland in the southwestern portion of the study area that is part of a much larger contiguous wetland and overlaps delineated Wetland C that was partially filled for the construction of SW Kinsman Road in 2016.

G. Mapping Method

The wetland delineation boundaries, sample points 1-9 and 11-15, tax lots, and the study area were surveyed by Andy Paris and Associates, Inc., PLS; however sample points 10, 16, 17, and 18 were surveyed using a Trimble Geo 7X GPS with an accuracy of submeter. The one-foot contour intervals were downloaded from the National Oceanic and Atmospheric Administration (NOAA) website and extracted from a digital elevation model.

H. Additional Information

Wetland A is located in a constructed stormwater basin and is likely the result of water being collected from upslope areas

I. Results and Conclusions

PHS delineated boundaries of three wetlands (Wetlands A, B, and C). The total area of potentially jurisdictional wetlands within the study area is 1.64 acres, as summarized in Table 2.

Table 2: Summary of Wetlands and Water Resources within the Study Area

Wetland	Area (acres)	Cowardin Class	HGM Class
Wetland A	1.46	PFO1E	Flats
Wetland B	0.09	PEMC	Flats
Wetland C	0.09	PEMC	Flats
Wetland Total	**1.64**		

J. Required Disclaimer

This report documents the investigation, best professional judgment and conclusions of the investigators. It is correct and complete to the best of our knowledge. It should be considered a Preliminary Jurisdictional Determination of wetlands and other waters and used at your own risk unless it has been reviewed and approved in writing by the Oregon Department of State Lands in accordance with OAR 141-090-0005 through 141-090-0055.

III. REFERENCES

Adamus, P.R. and D. Field. 2001 *Guidebook for Hydrogeomorphic (HGM)-based Assessment of Oregon Wetland and Riparian Study areas. Willamette Valley Ecoregion, Riverine Impounding and Slopes/Flats Subclasses*. Oregon Division of State Lands, Salem, OR.

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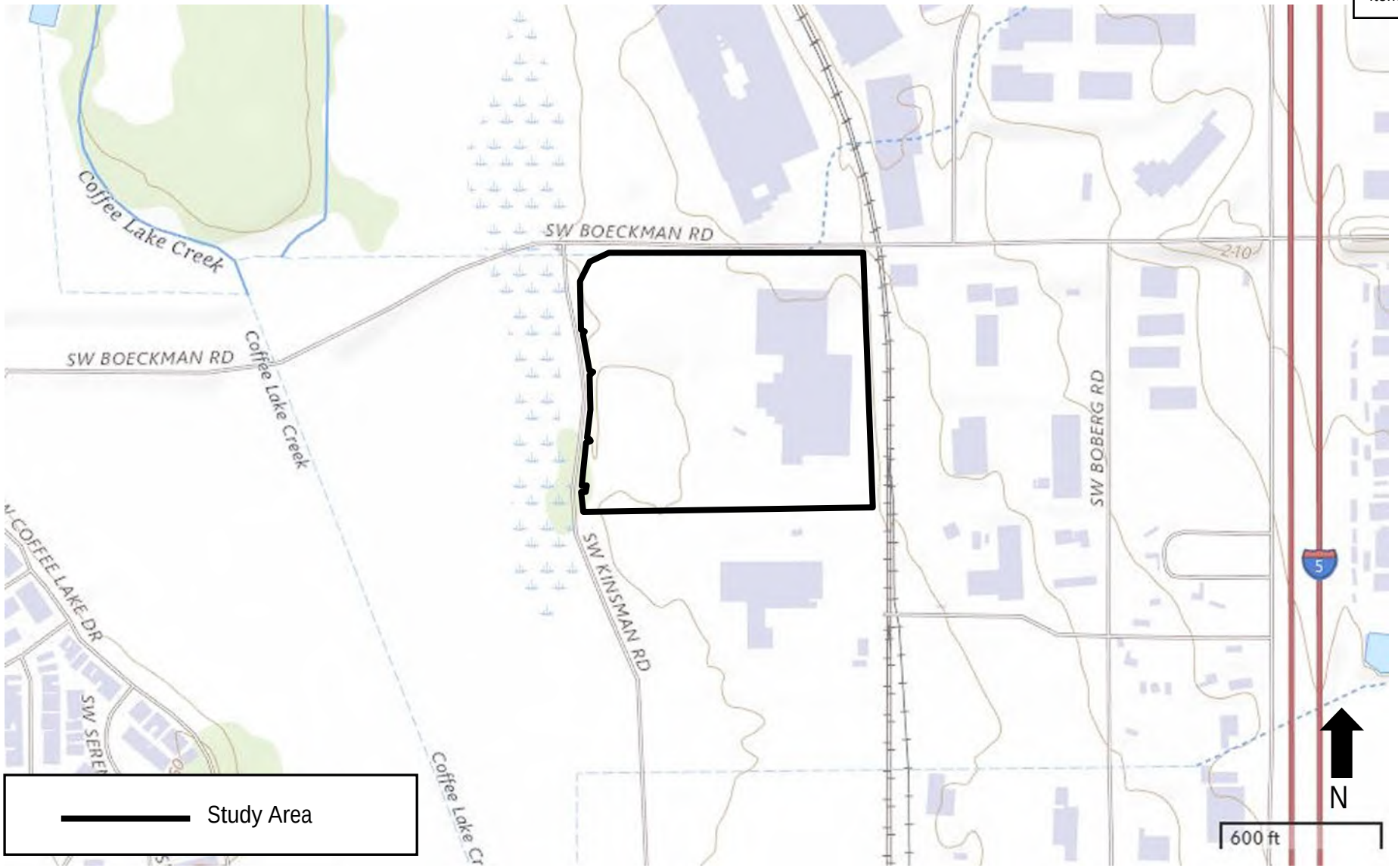
Appendix A

Figures



Project #7264
1/10/2022

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

General Location and Topography
9900 SW Boeckman Road Property - Wilsonville, Oregon
United States Geological Survey (USGS) Sherwood, Oregon 7.5 quadrangle, 2020
(viewer.nationalmap.gov/basic)

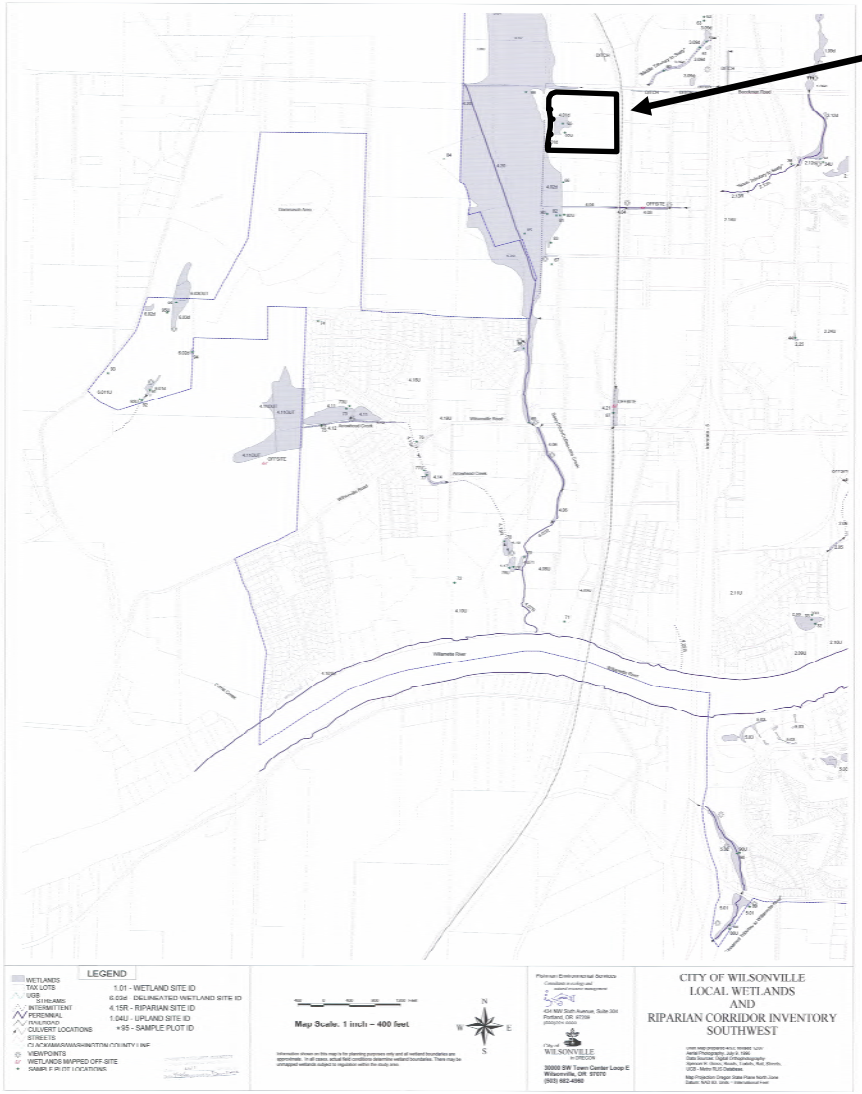
FIGURE
1

Project #7264
1/10/2022

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Tax Lot Map
9900 SW Boeckman Road Property - Wilsonville, Oregon
The Oregon Map (ormap.net)

FIGURE
2



Project #7264
1/10/2022

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Local Wetlands Inventory
9900 SW Boeckman Road Property - Wilsonville, Oregon
Fishman Environmental Services, 1999

FIGURE
3

Project #7264
1/10/2022

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Soils
9900 SW Boeckman Road Property - Wilsonville, Oregon
Natural Resources Conservation Services, Web Soil Survey, 2021
(websoilsurvey.sc.egov.usda.gov)

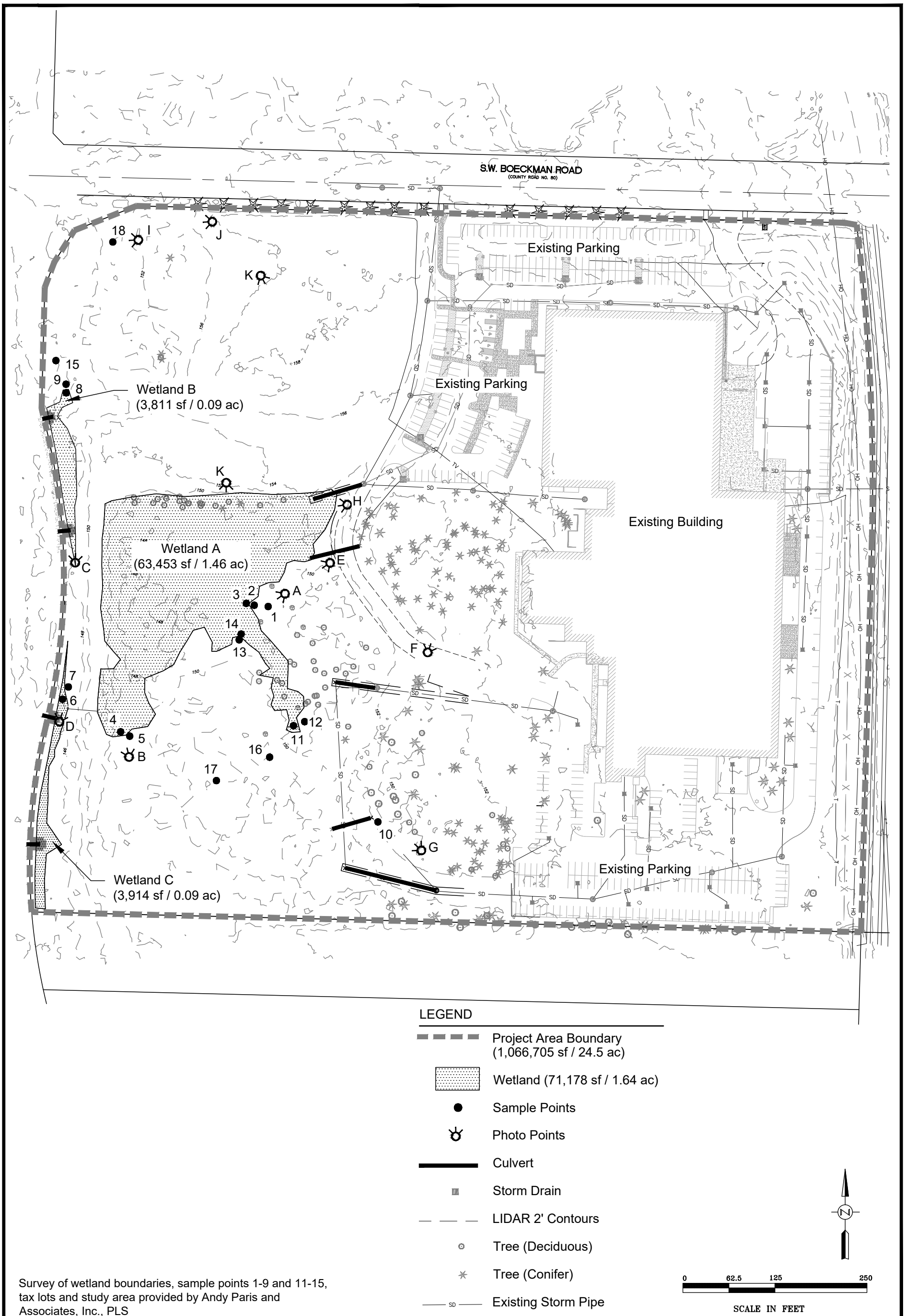
FIGURE
4

Project #7264
1/10/2022

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Aerial Photo
9900 SW Boeckman Road Property - Wilsonville, Oregon
GoogleEarth, 2021

FIGURE
5



Survey of wetland boundaries, sample points 1-9 and 11-15, tax lots and study area provided by Andy Paris and Associates, Inc., PLS
Sample Points 10, 16, 17, and 18 were surveyed using a Trimble Geo7X GPS unit and have submeter accuracy

Pacific Habitat Services,Inc.
9450 SW Commerce Circle, Suite 180 Wilsonville, Oregon 97070
Phone: (503) 570-0800 Fax (503) 570-0855

Wetland Delineation
9900 SW Boeckman Road Property - Wilsonville, Oregon

FIGURE 6

1-13-2022

Appendix B

Wetland Determination Data Sheets

PHS # 7264

Item 2.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: **Boeckman Road** City/County: **Wilsonville/Clackamas** Sampling Date: **7/1/2021**

Applicant/Owner: **Martin Development** State: **OR** Sampling Point: **1**

Investigator(s): **JT/CM** Section, Township, Range: **Section 14B, Township 3 South, Range 1 West**

Landform (hillslope, terrace, etc.:) **Depression** Local relief (concave, convex, none): **None** Slope (%): **~1**

Subregion (LRR): **LRR A** Lat: **45.3158** Long: **-122.7785** Datum: **WGS84**

Soil Map Unit Name: **Amity Silt Loam** NWI Classification: **N/A**

Are climatic/hydrologic conditions on the site typical for this time of year? Yes **X** No ____ (if no, explain in Remarks)

Are vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) **Y**

Are vegetation ____ Soil ____ or Hydrology ____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes		No	X	**Is Sampled Area within a Wetland?** Yes ____ No **X**
Hydric Soil Present?	Yes	X	No		
Wetland Hydrology Present?	Yes		No	X	

Remarks:

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size: 30)			
1 ***Fraxinus latifolia***	80	X	FACW
2 ***Pinus ponderosa***	10		FACU
3 ***Quercus garryana***	5		FACU
4			
	95	= Total Cover	
Sapling/Shrub Stratum (plot size: 15)			
1 ***Symphoricarpos albus***	50	X	FACU
2 ***Rubus ursinus***	30	X	FACU
3			
4			
5			
	80	= Total Cover	
Herb Stratum (plot size: 5)			
1 ***Rumex acetosella***	5		FACU
2 ***Ranunculus acris***	2		FAC
3 ***Vicia sp.***	10		(FAC)
4 ***Geranium lucidum***	50	X	UPL
5			
6			
7			
8			
	67	= Total Cover	
Woody Vine Stratum (plot size:)			
1			
2			
	0	= Total Cover	

% Bare Ground in Herb Stratum **0**

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: **1** (A)

Total Number of Dominant Species Across All Strata: **4** (B)

Percent of Dominant Species That are OBL, FACW, or FAC: **25%** (A/B)

Prevalence Index Worksheet:

Total % Cover of		Multiply by:	
OBL Species		x 1 =	0
FACW species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index =B/A = **#DIV/0!**

Hydrophytic Vegetation Indicators:

____ 1- Rapid Test for Hydrophytic Vegetation

____ 2- Dominance Test is >50%

____ 3-Prevalence Index is ≤ 3.0[1]

____ 4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)

____ 5- Wetland Non-Vascular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No **X**

Remarks:

Quercus garryana <1 percent in the shrub layer (seedling).

SOIL **PHS #** **7264** Sampling Point: 1

Item 2.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	**7.5YR 2.5/2**	**98**	**7.5YR 3/2**	**2**	**C**	**M**	**Silty Clay Loam**	
8-24	**7.5YR 3/2**	**80**	**7.5YR 4/6**	**10**	**C**	**M**	**Silty Clay Loam**	
			7.5YR 4/2	**10**	**D**	**M**	**Silty Clay Loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- **X** Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes **X** **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- **X** Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Fac-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No **X**	Depth (inches):		
Water Table Present?	Yes ___	No **X**	Depth (inches):	**>24**	
Saturation Present? (includes capillary fringe)	Yes ___	No **X**	Depth (inches):	**>24**	

Wetland Hydrology Present?

Yes ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

PHS # 7264

Item 2.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: **Boeckman Road** City/County: **Wilsonville/Clackamas** Sampling Date: **7/1/2021**

Applicant/Owner: **Martin Development** State: **OR** Sampling Point: **2**

Investigator(s): **JT/CM** Section, Township, Range: **Section 14B, Township 3 South, Range 1 West**

Landform (hillslope, terrace, etc.:) **Depression** Local relief (concave, convex, none): **None** Slope (%): **~1**

Subregion (LRR): **LRR A** Lat: **45.3158** Long: **-122.7786** Datum: **WGS84**

Soil Map Unit Name: **Amity Silt Loam** NWI Classification: **N/A**

Are climatic/hydrologic conditions on the site typical for this time of year? Yes **X** No ____ (if no, explain in Remarks)

Are vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) **Y**

Are vegetation ____ Soil ____ or Hydrology ____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes		No	**X**	**Is Sampled Area within a Wetland?** Yes ____ No **X**
Hydric Soil Present?	Yes	**X**	No		
Wetland Hydrology Present?	Yes		No	**X**	

Remarks:

VEGETATION - Use scientific names of plants.

		absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size: **30**)				
1	***Fraxinus latifolia***	**90**	**X**	**FACW**
2	***Quercus garryana***	**10**		**FACU**
3				
4				
		100	= Total Cover	
Sapling/Shrub Stratum (plot size: **15**)				
1	***Rubus laciniatus***	**20**	**X**	**FACU**
2	***Rubus ursinus***	**60**	**X**	**FACU**
3	***Rosa rubiginosa***	**2**		**UPL**
4				
5				
		82	= Total Cover	
Herb Stratum (plot size: **5**)				
1	***Geum macrophyllum***	**20**	**X**	**FAC**
2	***Carex leptopoda***	**10**	**X**	**FAC**
3	***Geranium lucidum***	**20**	**X**	**UPL**
4				
5				
6				
7				
8				
		50	= Total Cover	
Woody Vine Stratum (plot size: ____)				
1				
2				
		0	= Total Cover	

% Bare Ground in Herb Stratum **0**

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: **3** (A)

Total Number of Dominant Species Across All Strata: **6** (B)

Percent of Dominant Species That are OBL, FACW, or FAC: **50%** (A/B)

Prevalence Index Worksheet:

Total % Cover of		Multiply by:	
OBL Species		x 1 =	**0**
FACW species		x 2 =	**0**
FAC Species		x 3 =	**0**
FACU Species		x 4 =	**0**
UPL Species		x 5 =	**0**
Column Totals	**0** (A)		**0** (B)

Prevalence Index =B/A = **#DIV/0!**

Hydrophytic Vegetation Indicators:

____ 1- Rapid Test for Hydrophytic Vegetation

____ 2- Dominance Test is >50%

____ 3-Prevalence Index is ≤ 3.0[1]

____ 4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)

____ 5- Wetland Non-Vascular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No **X**

Remarks:

SOIL **PHS #** **7264** Sampling Point: **2**

Item 2.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	**10YR 3/2**	**99**	**7.5YR 3/4**	**1**	**C**	**M**	**Silty Clay Loam**	
5-12	**10YR 3/2**	**80**	**7.5YR 3/4**	**20**	**C**	**M**	**Silty Clay Loam**	**Coarse**

[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)		Sandy Redox (S5)
	Histic Epipedon (A2)		Stripped Matrix (S6)
	Black Histic (A3)		Loamy Mucky Mineral (F1) **(except MLRA 1)**
	Hydrogen Sulfide (A4)		Loamy Gleyed Matrix (F2)
	Depleted Below Dark Surface (A11)		Depleted Matrix (F3)
	Thick Dark Surface (A12)	**X**	Redox Dark Surface (F6)
	Sandy Mucky Mineral (S1)		Depleted Dark Surface (F7)
	Sandy Gleyed Matrix (S4)		Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

	2 cm Muck (A10)
	Red Parent Material (TF2)
	Very Shallow Dark Surface (TF12)
	Other (explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes **X** **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

	Surface Water (A1)		Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**
	High Water Table (A2)		
	Saturation (A3)		Salt Crust (B11)
	Water Marks (B1)		Aquatic Invertebrates (B13)
	Sediment Deposits (B2)		Hydrogen Sulfide Odor (C1)
	Drift Deposits (B3)		Oxidized Rhizospheres along Living Roots (C3)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)
	Iron Deposits (B5)		Recent Iron Reduction in Plowed Soils (C6)
	Surface Soil Cracks (B6)		Stunted or Stressed Plants (D1) **(LRR A)**
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)
	Sparsely Vegetated Concave Surface (B8)		

Secondary Indicators (2 or more required)

	Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
	Drainage Patterns (B10)
	Dry-Season Water Table (C2)
	Saturation Visible on Aerial Imagery (C9)
	Geomorphic Position (D2)
	Shallow Aquitard (D3)
	Fac-Neutral Test (D5)
	Raised Ant Mounds (D6) **(LRR A)**
	Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No **X**	Depth (inches):	
Water Table Present?	Yes		No **X**	Depth (inches):	**>12**
Saturation Present? (includes capillary fringe)	Yes		No **X**	Depth (inches):	**>12**

Wetland Hydrology Present?

Yes **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

PHS # 7264

Item 2.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: **Boeckman Road** City/County: **Wilsonville/Clackamas** Sampling Date: **7/1/2021**

Applicant/Owner: **Martin Development** State: **OR** Sampling Point: **3**

Investigator(s): **JT/CM** Section, Township, Range: **Section 14B, Township 3 South, Range 1 West**

Landform (hillslope, terrace, etc.:) **Flat** Local relief (concave, convex, none): **Concave** Slope (%): **~1**

Subregion (LRR): **LRR A** Lat: **45.3158** Long: **-122.7786** Datum: **WGS84**

Soil Map Unit Name: **Amity Silt Loam** NWI Classification: **N/A**

Are climatic/hydrologic conditions on the site typical for this time of year? Yes **X** No ____ (if no, explain in Remarks)

Are vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) **Y**

Are vegetation ____ Soil ____ or Hydrology ____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	**X**	No		
Hydric Soil Present?	Yes	**X**	No	**Is Sampled Area within a Wetland?**	Yes **X** No
Wetland Hydrology Present?	Yes	**X**	No		

Remarks:
Sample Point located in a very shallow swale.

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size: **30**)			
1 ***Fraxinus latifolia***	**90**	**X**	**FACW**
2			
3			
4			
	90	= Total Cover	
Sapling/Shrub Stratum (plot size: **15**)			
1 ***Crataegus monogyna***	**10**		**FAC**
2 ***Rosa rubiginosa***	**20**	**X**	**UPL**
3 ***Rubus ursinus***	**20**	**X**	**FACU**
4 ***Fraxinus latifolia***	**5**		**FACW**
5			
	55	= Total Cover	
Herb Stratum (plot size: **5**)			
1 ***Juncus balticus***	**30**	**X**	**FACW**
2 ***Camassia quamash***	**30**	**X**	**FACW**
3 ***Geum macrophyllum***	**10**		**FAC**
4			
5			
6			
7			
8			
	70	= Total Cover	
Woody Vine Stratum (plot size: ____)			
1			
2			
	0	= Total Cover	

% Bare Ground in Herb Stratum **30**

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: **3** (A)

Total Number of Dominant Species Across All Strata: **5** (B)

Percent of Dominant Species That are OBL, FACW, or FAC: **60%** (A/B)

Prevalence Index Worksheet:

Total % Cover of		Multiply by:	
OBL Species		x 1 =	**0**
FACW species		x 2 =	**0**
FAC Species		x 3 =	**0**
FACU Species		x 4 =	**0**
UPL Species		x 5 =	**0**
Column Totals	**0** (A)		**0** (B)

Prevalence Index =B/A = **#DIV/0!**

Hydrophytic Vegetation Indicators:

- ____ 1- Rapid Test for Hydrophytic Vegetation
- **X** 2- Dominance Test is >50%
- ____ 3-Prevalence Index is ≤ 3.0[1]
- ____ 4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
- ____ 5- Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **X** **No** ____

Remarks:

SOIL **PHS #** **7264** Sampling Point: 2

Item 2.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	**10YR 2/2**	**100**					**Silt Loam**	
3-12	**10YR 3/2**	**90**	**7.5YR 2.5/3**	**10**	**C**	**M**	**Silty Clay Loam**	**Fine**

[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)		Sandy Redox (S5)
	Histic Epipedon (A2)		Stripped Matrix (S6)
	Black Histic (A3)		Loamy Mucky Mineral (F1) **(except MLRA 1)**
	Hydrogen Sulfide (A4)		Loamy Gleyed Matrix (F2)
	Depleted Below Dark Surface (A11)		Depleted Matrix (F3)
	Thick Dark Surface (A12)	X	Redox Dark Surface (F6)
	Sandy Mucky Mineral (S1)		Depleted Dark Surface (F7)
	Sandy Gleyed Matrix (S4)		Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

	2 cm Muck (A10)
	Red Parent Material (TF2)
	Very Shallow Dark Surface (TF12)
	Other (explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes X **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

	Surface Water (A1)		Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**		Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
	High Water Table (A2)				
	Saturation (A3)		Salt Crust (B11)	X	Drainage Patterns (B10)
	Water Marks (B1)		Aquatic Invertebrates (B13)		Dry-Season Water Table (C2)
	Sediment Deposits (B2)		Hydrogen Sulfide Odor (C1)		Saturation Visible on Aerial Imagery (C9)
	Drift Deposits (B3)		Oxidized Rhizospheres along Living Roots (C3)	X	Geomorphic Position (D2)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Shallow Aquitard (D3)
	Iron Deposits (B5)		Recent Iron Reduction in Plowed Soils (C6)		Fac-Neutral Test (D5)
	Surface Soil Cracks (B6)		Stunted or Stressed Plants (D1) **(LRR A)**		Raised Ant Mounds (D6) **(LRR A)**
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)		Frost-Heave Hummocks (D7)
	Sparsely Vegetated Concave Surface (B8)				

Field Observations:

Surface Water Present?	Yes		No X	Depth (inches):	
Water Table Present?	Yes		No X	Depth (inches):	>12
Saturation Present? (includes capillary fringe)	Yes		No X	Depth (inches):	>12

Wetland Hydrology Present?

Yes X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

PHS # 7264

Item 2.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: **Boeckman Road** City/County: **Wilsonville/Clackamas** Sampling Date: **7/1/2021**

Applicant/Owner: **Martin Development** State: **OR** Sampling Point: **4**

Investigator(s): **JT/CM** Section, Township, Range: **Section 14B, Township 3 South, Range 1 West**

Landform (hillslope, terrace, etc.:) **Swale** Local relief (concave, convex, none): **Concave** Slope (%): **2**

Subregion (LRR): **LRR A** Lat: **45.3153** Long: **-122.7793** Datum: **WGS84**

Soil Map Unit Name: **Amity Silt Loam** NWI Classification: **N/A**

Are climatic/hydrologic conditions on the site typical for this time of year? Yes **X** No ____ (if no, explain in Remarks)

Are vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) **Y**

Are vegetation ____ Soil ____ or Hydrology ____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	**X**	No		
Hydric Soil Present?	Yes	**X**	No	**Is Sampled Area within a Wetland?**	Yes **X** No
Wetland Hydrology Present?	Yes	**X**	No		

Remarks:
Sample Point located in a very shallow swale.

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size: **30**)			
1 ***Fraxinus latifolia***	**40**	**X**	**FACW**
2			
3			
4			
	40	= Total Cover	
Sapling/Shrub Stratum (plot size: **15**)			
1 ***Rosa sp***	**20**	**X**	**(FAC)**
2 ***Fraxinus latifolia***	**20**	**X**	**FACW**
3 ***Symphoricarpos albus***	**5**		**FACU**
4			
5			
	45	= Total Cover	
Herb Stratum (plot size: **5**)			
1 ***Phalaris arundinacea***	**50**	**X**	**FACW**
2 ***Geranium lucidum***	**20**	**X**	**UPL**
3 ***Epilobium ciliatum***	**5**		**FACW**
4 ***Cirsium arvense***	**5**		**FAC**
5			
6			
7			
8			
	80	= Total Cover	
Woody Vine Stratum (plot size: ____)			
1			
2			
	0	= Total Cover	

% Bare Ground in Herb Stratum **20**

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: **4** (A)

Total Number of Dominant Species Across All Strata: **5** (B)

Percent of Dominant Species That are OBL, FACW, or FAC: **80%** (A/B)

Prevalence Index Worksheet:

Total % Cover of		Multiply by:	
OBL Species		x 1 =	**0**
FACW species		x 2 =	**0**
FAC Species		x 3 =	**0**
FACU Species		x 4 =	**0**
UPL Species		x 5 =	**0**
Column Totals	**0** (A)		**0** (B)

Prevalence Index =B/A = **#DIV/0!**

Hydrophytic Vegetation Indicators:

____ 1- Rapid Test for Hydrophytic Vegetation

X 2- Dominance Test is >50%

____ 3-Prevalence Index is ≤ 3.0[1]

____ 4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)

____ 5- Wetland Non-Vascular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes X** **No** ____

Remarks:

SOIL **PHS #** **7264** Sampling Point: 1

Item 2.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	**10YR 3/1**	**99**	**7.5YR 3/3**	**1**	**C**	**M**	**Silt Loam**	**Fine**
2-7	**10YR 3/1**	**70**	**7.5YR 3/3**	**30**	**C**	**M**	**Silt Loam**	**Coarse**
7-13	**7.5YR 3/1**	**30**	**5YR 3/4**	**70**	**C**	**M**	**Silt Loam**	**Coarse**

[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)		Sandy Redox (S5)
	Histic Epipedon (A2)		Stripped Matrix (S6)
	Black Histic (A3)		Loamy Mucky Mineral (F1) **(except MLRA 1)**
	Hydrogen Sulfide (A4)		Loamy Gleyed Matrix (F2)
	Depleted Below Dark Surface (A11)		Depleted Matrix (F3)
	Thick Dark Surface (A12)	X	Redox Dark Surface (F6)
	Sandy Mucky Mineral (S1)		Depleted Dark Surface (F7)
	Sandy Gleyed Matrix (S4)		Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

	2 cm Muck (A10)
	Red Parent Material (TF2)
	Very Shallow Dark Surface (TF12)
	Other (explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes X **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

	Surface Water (A1)		Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**		Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
	High Water Table (A2)				
	Saturation (A3)		Salt Crust (B11)		Drainage Patterns (B10)
	Water Marks (B1)		Aquatic Invertebrates (B13)		Dry-Season Water Table (C2)
	Sediment Deposits (B2)		Hydrogen Sulfide Odor (C1)		Saturation Visible on Aerial Imagery (C9)
	Drift Deposits (B3)		Oxidized Rhizospheres along Living Roots (C3)	X	Geomorphic Position (D2)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Shallow Aquitard (D3)
	Iron Deposits (B5)		Recent Iron Reduction in Plowed Soils (C6)	X	Fac-Neutral Test (D5)
	Surface Soil Cracks (B6)		Stunted or Stressed Plants (D1) **(LRR A)**		Raised Ant Mounds (D6) **(LRR A)**
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)		Frost-Heave Hummocks (D7)
	Sparsely Vegetated Concave Surface (B8)				

Field Observations:

Surface Water Present?	Yes		No X	Depth (inches):	
Water Table Present?	Yes		No X	Depth (inches):	>13
Saturation Present? (includes capillary fringe)	Yes		No X	Depth (inches):	>13

Wetland Hydrology Present?

Yes X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

PHS # 7264

Item 2.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: **Boeckman Road** City/County: **Wilsonville/Clackamas** Sampling Date: **7/1/2021**

Applicant/Owner: **Martin Development** State: **OR** Sampling Point: **5**

Investigator(s): **JT/CM** Section, Township, Range: **Section 14B, Township 3 South, Range 1 West**

Landform (hillslope, terrace, etc.:) **Flat** Local relief (concave, convex, none): **None** Slope (%): **1**

Subregion (LRR): **LRR A** Lat: **45.3153** Long: **-122.7792** Datum: **WGS84**

Soil Map Unit Name: **Amity Silt Loam** NWI Classification: **N/A**

Are climatic/hydrologic conditions on the site typical for this time of year? Yes **X** No ____ (if no, explain in Remarks)

Are vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) **Y**

Are vegetation ____ Soil ____ or Hydrology ____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes		No	X	**Is Sampled Area within a Wetland?** Yes ____ No **X**
Hydric Soil Present?	Yes	X	No		
Wetland Hydrology Present?	Yes		No	X	

Remarks:
Sample Point located in a very shallow swale.

VEGETATION - Use scientific names of plants.

		absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size: 30)				
1	***Quercus garryana***	40	X	FACU
2				
3				
4				
		40	= Total Cover	
Sapling/Shrub Stratum (plot size: 15)				
1	***Rosa rubiginosa***	70	X	UPL
2	***Symphoricarpos albus***	20	X	FACU
3	***Fraxinus latifolia***	5		FACW
4				
5				
		95	= Total Cover	
Herb Stratum (plot size: 5)				
1	***Geranium lucidum***	20	X	UPL
2	***Vicia sp***	20	X	(FAC)
3	***Phalaris arundinacea***	10	X	FACW
4	***Sonchus sp***	10	X	(FAC)
5	***Galium aparine***	10	X	FACU
6	***Cirsium arvense***	10	X	FAC
7	***Lactuca serriola***	5		FACU
8				
		85	= Total Cover	
Woody Vine Stratum (plot size: ____)				
1				
2				
		0	= Total Cover	

% Bare Ground in Herb Stratum **15**

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: **4** (A)

Total Number of Dominant Species Across All Strata: **9** (B)

Percent of Dominant Species That are OBL, FACW, or FAC: **44%** (A/B)

Prevalence Index Worksheet:

Total % Cover of		Multiply by:	
OBL Species		x 1 =	0
FACW species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index =B/A = **#DIV/0!**

Hydrophytic Vegetation Indicators:

____ 1- Rapid Test for Hydrophytic Vegetation

____ 2- Dominance Test is >50%

____ 3-Prevalence Index is ≤ 3.0[1]

____ 4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)

____ 5- Wetland Non-Vascular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No **X**

Remarks:

SOIL **PHS #** **7264** Sampling Point: **5**

Item 2.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	**10YR 3/1**	**100**					**Silt Loam**	
6-8	**10YR 3/2**	**80**	**7.5YR 4/4**	**20**	**C**	**M**	**Silt Loam**	**Medium**
8-13	**10YR 3/2**	**70**	**7.5YR 3/3**	**30**	**C**	**M**	**Silt Loam**	**Medium**

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- **X** Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes **X** **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Fac-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	___	No **X**	Depth (inches):	___
Water Table Present?	Yes	___	No **X**	Depth (inches):	**>13**
Saturation Present? (includes capillary fringe)	Yes	___	No **X**	Depth (inches):	**>13**

Wetland Hydrology Present?

Yes ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

PHS # 7264

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Item 2.

Project/Site: **Boeckman Road** City/County: **Wilsonville/Clackamas** Sampling Date: **7/1/2021**

Applicant/Owner: **Martin Development** State: **OR** Sampling Point: **6**

Investigator(s): **JT/CM** Section, Township, Range: **Section 14B, Township 3 South, Range 1 West**

Landform (hillslope, terrace, etc.:) **Ditch** Local relief (concave, convex, none): **Concave** Slope (%): **3**

Subregion (LRR): **LRR A** Lat: **45.3154** Long: **-122.7796** Datum: **WGS84**

Soil Map Unit Name: **Amity Silt Loam** NWI Classification: **N/A**

Are climatic/hydrologic conditions on the site typical for this time of year? Yes **X** No ____ (if no, explain in Remarks)

Are vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) **Y**

Are vegetation ____ Soil ____ or Hydrology ____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	**X**	No		
Hydric Soil Present?	Yes	**X**	No	**Is Sampled Area within a Wetland?**	Yes **X** No
Wetland Hydrology Present?	Yes	**X**	No		

Remarks:
Sample Point located in a very shallow swale.

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size: ____)			
1			
2			
3			
4			
	0	= Total Cover	
Sapling/Shrub Stratum (plot size: ____)			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb Stratum (plot size: **5**)			
1 ***Holcus lanatus***	**30**	**X**	**FAC**
2 ***Phalaris arundinacea***	**20**	**X**	**FACW**
3 ***Bromus sp***	**20**	**X**	**(FAC)**
4 ***Poa sp***	**10**		**(FAC)**
5 ***Parentucellia viscosa***	**10**		**FAC**
6 ***Lotus corniculatus***	**5**		**FAC**
7 ***Juncus balticus***	**5**		**FACW**
8			
	100	= Total Cover	
Woody Vine Stratum (plot size: ____)			
1			
2			
	0	= Total Cover	

% Bare Ground in Herb Stratum **0**

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: **3** (A)

Total Number of Dominant Species Across All Strata: **3** (B)

Percent of Dominant Species That are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index Worksheet:

Total % Cover of		Multiply by:	
OBL Species		x 1 =	**0**
FACW species		x 2 =	**0**
FAC Species		x 3 =	**0**
FACU Species		x 4 =	**0**
UPL Species		x 5 =	**0**
Column Totals	**0** (A)		**0** (B)

Prevalence Index =B/A = **#DIV/0!**

Hydrophytic Vegetation Indicators:

____ 1- Rapid Test for Hydrophytic Vegetation

X 2- Dominance Test is >50%

____ 3-Prevalence Index is ≤ 3.0[1]

____ 4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)

____ 5- Wetland Non-Vascular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes X** **No** ____

Remarks:

SOIL **PHS #** **7264** Sampling Point: **6**

Item 2.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	**10YR 2/2**	**97**	**7.5YR 4/6**	**2**	**C**	**PL**	**Sand**	**Fine**
0-5			**7.5YR 4/6**	**1**	**C**	**M**		**Fine**
5-13	**10YR 2/2**	**90**	**7.5YR 4/6**	**5**	**C**	**PL**	**Silt Loam**	**Fine**
5-13			**7.5YR 4/6**	**5**	**C**	**M**		**Fine**

[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)		Sandy Redox (S5)
	Histic Epipedon (A2)		Stripped Matrix (S6)
	Black Histic (A3)		Loamy Mucky Mineral (F1) **(except MLRA 1)**
	Hydrogen Sulfide (A4)		Loamy Gleyed Matrix (F2)
	Depleted Below Dark Surface (A11)		Depleted Matrix (F3)
	Thick Dark Surface (A12)	X	Redox Dark Surface (F6)
	Sandy Mucky Mineral (S1)		Depleted Dark Surface (F7)
	Sandy Gleyed Matrix (S4)		Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

	2 cm Muck (A10)
	Red Parent Material (TF2)
	Very Shallow Dark Surface (TF12)
	Other (explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes X **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

	Surface Water (A1)		Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**		Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
	High Water Table (A2)				
	Saturation (A3)		Salt Crust (B11)		Drainage Patterns (B10)
	Water Marks (B1)		Aquatic Invertebrates (B13)		Dry-Season Water Table (C2)
	Sediment Deposits (B2)		Hydrogen Sulfide Odor (C1)		Saturation Visible on Aerial Imagery (C9)
	Drift Deposits (B3)	X	Oxidized Rhizospheres along Living Roots (C3)	X	Geomorphic Position (D2)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Shallow Aquitard (D3)
	Iron Deposits (B5)		Recent Iron Reduction in Plowed Soils (C6)	X	Fac-Neutral Test (D5)
	Surface Soil Cracks (B6)		Stunted or Stressed Plants (D1) **(LRR A)**		Raised Ant Mounds (D6) **(LRR A)**
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)		Frost-Heave Hummocks (D7)
	Sparsely Vegetated Concave Surface (B8)				

Field Observations:

Surface Water Present?	Yes		No X	Depth (inches):	
Water Table Present?	Yes		No X	Depth (inches):	>13
Saturation Present? (includes capillary fringe)	Yes		No X	Depth (inches):	>13

Wetland Hydrology Present?

Yes X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

PHS # 7264

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Item 2.

Project/Site: **Boeckman Road** City/County: **Wilsonville/Clackamas** Sampling Date: **7/1/2021**

Applicant/Owner: **Martin Development** State: **OR** Sampling Point: **7**

Investigator(s): **JT/CM** Section, Township, Range: **Section 14B, Township 3 South, Range 1 West**

Landform (hillslope, terrace, etc.:) **Ditch** Local relief (concave, convex, none): **Concave** Slope (%): **~1**

Subregion (LRR): **LRR A** Lat: **45.3155** Long: **-122.7796** Datum: **WGS84**

Soil Map Unit Name: **Amity Silt Loam** NWI Classification: **N/A**

Are climatic/hydrologic conditions on the site typical for this time of year? Yes **X** No ____ (if no, explain in Remarks)

Are vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) **Y**

Are vegetation ____ Soil ____ or Hydrology ____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	**X**	No		**Is Sampled Area within a Wetland?** Yes ____ No **X**
Hydric Soil Present?	Yes		No	**X**	
Wetland Hydrology Present?	Yes		No	**X**	

Remarks:
Sample Point located in a very shallow swale.

VEGETATION - Use scientific names of plants.

		absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size: **30**)				
1	***Quercus garryana***	**40**	**X**	**FACU**
2	***Fraxinus latifolia***	**10**	**X**	**FACW**
3				
4				
		50	= Total Cover	
Sapling/Shrub Stratum (plot size: **15**)				
1	***Rubus armeniacus***	**25**	**X**	**FAC**
2				
3				
4				
5				
		25	= Total Cover	
Herb Stratum (plot size: **5**)				
1	***Poa pratensis***	**75**	**X**	**FAC**
2	***Bromus sp***	**20**	**X**	**(FAC)**
3	***Phalaris arundinacea***	**5**		**FACW**
4				
5				
6				
7				
8				
		100	= Total Cover	
Woody Vine Stratum (plot size: ____)				
1				
2				
		0	= Total Cover	

% Bare Ground in Herb Stratum **0**

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: **4** (A)

Total Number of Dominant Species Across All Strata: **5** (B)

Percent of Dominant Species That are OBL, FACW, or FAC: **80%** (A/B)

Prevalence Index Worksheet:

Total % Cover of		Multiply by:	
OBL Species		x 1 =	**0**
FACW species		x 2 =	**0**
FAC Species		x 3 =	**0**
FACU Species		x 4 =	**0**
UPL Species		x 5 =	**0**
Column Totals	**0** (A)		**0** (B)

Prevalence Index =B/A = **#DIV/0!**

Hydrophytic Vegetation Indicators:

- ____ 1- Rapid Test for Hydrophytic Vegetation
- **X** 2- Dominance Test is >50%
- ____ 3-Prevalence Index is ≤ 3.0[1]
- ____ 4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
- ____ 5- Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **X** **No** ____

Remarks:
Daucus carota is less than 1%.

SOIL **PHS #** **7264** Sampling Point: **7**

Item 2.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-13	**10YR 3/2**	**100**					**Loamy 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 X**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Surface Soil Cracks (B6)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres along Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Plowed Soils (C6)
- Stunted or Stressed Plants (D1) **(LRR A)**
- Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Saturation Visible on Aerial Imagery (C9)
- **X** Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Fac-Neutral Test (D5)
- Raised Ant Mounds (D6) **(LRR A)**
- Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No **X**	Depth (inches):	
Water Table Present?	Yes		No **X**	Depth (inches):	**>13**
Saturation Present? (includes capillary fringe)	Yes		No **X**	Depth (inches):	**>13**

Wetland Hydrology Present?

Yes **No X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

PHS # 7264

Item 2.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: **Boeckman Road** City/County: **Wilsonville/Clackamas** Sampling Date: **7/1/2021**

Applicant/Owner: **Martin Development** State: **OR** Sampling Point: **8**

Investigator(s): **JT/CM** Section, Township, Range: **Section 14B, Township 3 South, Range 1 West**

Landform (hillslope, terrace, etc.:) **Swale** Local relief (concave, convex, none): **Concave** Slope (%): **~1**

Subregion (LRR): **LRR A** Lat: **45.3166** Long: **-122.7796** Datum: **WGS84**

Soil Map Unit Name: **Amity Silt Loam** NWI Classification: **N/A**

Are climatic/hydrologic conditions on the site typical for this time of year? Yes **X** No ____ (if no, explain in Remarks)

Are vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) **Y**

Are vegetation ____ Soil ____ or Hydrology ____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	**X**	No		
Hydric Soil Present?	Yes	**X**	No	**Is Sampled Area within a Wetland?**	Yes **X** No
Wetland Hydrology Present?	Yes	**X**	No		

Remarks:
Sample Point located in a very shallow swale.

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size: 30)			
1 ***Fraxinus latifolia***	50	X	FACW
2			
3			
4			
	50	= Total Cover	
Sapling/Shrub Stratum (plot size: 15)			
1 ***Rubus spectabilis***	25	X	FAC
2 ***Symphoricarpos albus***	10	X	FACU
3			
4			
5			
	35	= Total Cover	
Herb Stratum (plot size: 5)			
1 ***Juncus balticus***	30	X	FACW
2 ***Melissa officinalis***	20	X	FACU
3 ***Phalaris arundinacea***	20	X	FACW
4 ***Bromus sp***	20	X	(FAC)
5 ***Torilis arvensis***	10		UPL
6			
7			
8			
	100	= Total Cover	
Woody Vine Stratum (plot size:)			
1			
2			
	0	= Total Cover	

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: **5** (A)

Total Number of Dominant Species Across All Strata: **7** (B)

Percent of Dominant Species That are OBL, FACW, or FAC: **71%** (A/B)

Prevalence Index Worksheet:

Total % Cover of		Multiply by:	
OBL Species		x 1 =	**0**
FACW species		x 2 =	**0**
FAC Species		x 3 =	**0**
FACU Species		x 4 =	**0**
UPL Species		x 5 =	**0**
Column Totals	**0** (A)		**0** (B)

Prevalence Index =B/A = **#DIV/0!**

Hydrophytic Vegetation Indicators:

____ 1- Rapid Test for Hydrophytic Vegetation

X 2- Dominance Test is >50%

____ 3-Prevalence Index is ≤ 3.0[1]

____ 4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)

____ 5- Wetland Non-Vascular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes X** **No** ____

Remarks:

SOIL **PHS #** **7264** Sampling Point: **8**

Item 2.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	**10YR 3/1**	**100**					**Silt Loam**	
5-12	**10YR 3/1**	**90**	**7.5YR 3/4**	**10**			**Silt Loam**	**Blotchy**

[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)		Sandy Redox (S5)
	Histic Epipedon (A2)		Stripped Matrix (S6)
	Black Histic (A3)		Loamy Mucky Mineral (F1) **(except MLRA 1)**
	Hydrogen Sulfide (A4)		Loamy Gleyed Matrix (F2)
	Depleted Below Dark Surface (A11)		Depleted Matrix (F3)
	Thick Dark Surface (A12)	X	Redox Dark Surface (F6)
	Sandy Mucky Mineral (S1)		Depleted Dark Surface (F7)
	Sandy Gleyed Matrix (S4)		Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

	2 cm Muck (A10)
	Red Parent Material (TF2)
	Very Shallow Dark Surface (TF12)
	Other (explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes X **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

	Surface Water (A1)		Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**		Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
	High Water Table (A2)				
	Saturation (A3)		Salt Crust (B11)		Drainage Patterns (B10)
	Water Marks (B1)		Aquatic Invertebrates (B13)		Dry-Season Water Table (C2)
	Sediment Deposits (B2)		Hydrogen Sulfide Odor (C1)		Saturation Visible on Aerial Imagery (C9)
	Drift Deposits (B3)		Oxidized Rhizospheres along Living Roots (C3)	X	Geomorphic Position (D2)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Shallow Aquitard (D3)
	Iron Deposits (B5)		Recent Iron Reduction in Plowed Soils (C6)	X	Fac-Neutral Test (D5)
	Surface Soil Cracks (B6)		Stunted or Stressed Plants (D1) **(LRR A)**		Raised Ant Mounds (D6) **(LRR A)**
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)		Frost-Heave Hummocks (D7)
	Sparsely Vegetated Concave Surface (B8)				

Field Observations:

Surface Water Present?	Yes		No X	Depth (inches):	
Water Table Present?	Yes		No X	Depth (inches):	>12
Saturation Present? (includes capillary fringe)	Yes		No X	Depth (inches):	>12

Wetland Hydrology Present?

Yes X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

PHS # 7264

Item 2.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: **Boeckman Road** City/County: **Wilsonville/Clackamas** Sampling Date: **7/1/2021**

Applicant/Owner: **Martin Development** State: **OR** Sampling Point: **9**

Investigator(s): **JT/CM** Section, Township, Range: **Section 14B, Township 3 South, Range 1 West**

Landform (hillslope, terrace, etc.:) **Flat** Local relief (concave, convex, none): **None** Slope (%): **1**

Subregion (LRR): **LRR A** Lat: **45.3166** Long: **-122.7796** Datum: **WGS84**

Soil Map Unit Name: **Amity Silt Loam** NWI Classification: **N/A**

Are climatic/hydrologic conditions on the site typical for this time of year? Yes **X** No ____ (if no, explain in Remarks)

Are vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) **Y**

Are vegetation ____ Soil ____ or Hydrology ____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes		No	X	**Is Sampled Area within a Wetland?** Yes ____ No **X**
Hydric Soil Present?	Yes	X	No		
Wetland Hydrology Present?	Yes		No	X	

Remarks:
Sample Point located in a very shallow swale.

VEGETATION - Use scientific names of plants.

		absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size: 30)				
1	***Quercus garryana***	60	X	FACU
2	***Fraxinus latifolia***	10		FACW
3	***Pseudotsuga menziesii***	10		FACU
4				
		80	= Total Cover	
Sapling/Shrub Stratum (plot size: 15)				
1	***Rubus armeniacus***	30	X	FAC
2	***Symphoricarpos albus***	30	X	FACU
3	***Rosa rubiginosa***	20		UPL
4	***Toxicodendron diversilobum***	20		FAC
5	***Ribes sanguineum***	5		FACU
		105	= Total Cover	
Herb Stratum (plot size: 5)				
1	***Melissa officinalis***	30	X	FACU
2	***Daucus carota***	20	X	FACU
3	***Poa sp***	20	X	(FAC)
4	***Rosa rubiginosa***	10		UPL
5	***Epilobium densiflorum***	10		(FAC)
6	***Vicia sp***	10		(FAC)
7	***Conium maculatum***	10		FAC
8				
		110	= Total Cover	
Woody Vine Stratum (plot size: ____)				
1				
2				
		0	= Total Cover	

% Bare Ground in Herb Stratum **0**

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: **2** (A)

Total Number of Dominant Species Across All Strata: **6** (B)

Percent of Dominant Species That are OBL, FACW, or FAC: **33%** (A/B)

Prevalence Index Worksheet:

Total % Cover of		Multiply by:	
OBL Species		x 1 =	0
FACW species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index =B/A = **#DIV/0!**

Hydrophytic Vegetation Indicators:

____ 1- Rapid Test for Hydrophytic Vegetation

____ 2- Dominance Test is >50%

____ 3-Prevalence Index is ≤ 3.0[1]

____ 4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)

____ 5- Wetland Non-Vascular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No **X**

Remarks:

SOIL PHS # 7264 Sampling Point: 2

Item 2.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-7	10YR 2/2	100					Silt Loam	
7-16	10YR 3/2	95	10YR 3/3	5	C	M	Silt Loam	Coarse

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1) **(except MLRA 1)**
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- **X** Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- 2 cm Muck (A10)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes X No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Surface Soil Cracks (B6)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres along Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Plowed Soils (C6)
- Stunted or Stressed Plants (D1) **(LRR A)**
- Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Saturation Visible on Aerial Imagery (C9)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Fac-Neutral Test (D5)
- Raised Ant Mounds (D6) **(LRR A)**
- Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No X	Depth (inches):	
Water Table Present?	Yes		No X	Depth (inches):	>16
Saturation Present? (includes capillary fringe)	Yes		No X	Depth (inches):	>16

Wetland Hydrology Present? Yes No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

PHS # 7264

Item 2.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: **Boeckman Road** City/County: **Wilsonville/Clackamas** Sampling Date: **1/11/2022**

Applicant/Owner: **Martin Development** State: **OR** Sampling Point: **10**

Investigator(s): **JT/CM** Section, Township, Range: **Section 14B, Township 3 South, Range 1 West**

Landform (hillslope, terrace, etc.:) **Depression** Local relief (concave, convex, none): **Concave** Slope (%): **0**

Subregion (LRR): **LRR A** Lat: **45.3150** Long: **-122.7779** Datum: **WGS84**

Soil Map Unit Name: **Amity Silt Loam** NWI Classification: **N/A**

Are climatic/hydrologic conditions on the site typical for this time of year? Yes **X** No ____ (if no, explain in Remarks)

Are vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) **Y**

Are vegetation ____ Soil ____ or Hydrology ____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	**X**	No		**Is Sampled Area within a Wetland?** Yes ____ No **X**
Hydric Soil Present?	Yes		No	**X**	
Wetland Hydrology Present?	Yes		No	**X**	

Remarks:
Sample Point located in a very shallow swale.

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size: **30**)			
1 ***Fraxinus latifolia***	**5**		**FACW**
2 ***Alnus rubra***	**20**	**X**	**FAC**
3 ***Quercus garryana***	**25**	**X**	**FACU**
4			
	50	= Total Cover	
Sapling/Shrub Stratum (plot size: ____)			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb Stratum (plot size: **5**)			
1 ***Poa pratensis***	**60**	**X**	**FAC**
2 ***Bellis perennis***	**10**		**(UPL)**
3 ***Geranium lucidum***	**10**		**(UPL)**
4 ***Carex leptopoda***	**5**		**FAC**
5 ***Jacobaea vulgaris***	**5**		**FACU**
6			
7			
8			
	90	= Total Cover	
Woody Vine Stratum (plot size: ____)			
1			
2			
	0	= Total Cover	

% Bare Ground in Herb Stratum **5**

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: **2** (A)

Total Number of Dominant Species Across All Strata: **3** (B)

Percent of Dominant Species That are OBL, FACW, or FAC: **67%** (A/B)

Prevalence Index Worksheet:

Total % Cover of		Multiply by:	
OBL Species		x 1 =	**0**
FACW species		x 2 =	**0**
FAC Species		x 3 =	**0**
FACU Species		x 4 =	**0**
UPL Species		x 5 =	**0**
Column Totals	**0** (A)		**0** (B)

Prevalence Index =B/A = **#DIV/0!**

Hydrophytic Vegetation Indicators:

____ 1- Rapid Test for Hydrophytic Vegetation

X 2- Dominance Test is >50%

____ 3-Prevalence Index is ≤ 3.0[1]

____ 4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)

____ 5- Wetland Non-Vascular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes X** **No** ____

Remarks:

SOIL PHS # 7264 Sampling Point: 19

Item 2.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-9	7.5YR 3/2	100					Silt Loam	
9-13	7.5YR 3/2	98	7.5YR 4/3	2	C	M	Silt Loam	faint/few

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1) **(except MLRA 1)**
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- 2 cm Muck (A10)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes _____ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Surface Soil Cracks (B6)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres along Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Plowed Soils (C6)
- Stunted or Stressed Plants (D1) **(LRR A)**
- Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Fac-Neutral Test (D5)
- Raised Ant Mounds (D6) **(LRR A)**
- Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No X	Depth (inches):	
Water Table Present?	Yes		No X	Depth (inches):	>13
Saturation Present? (includes capillary fringe)	Yes		No X	Depth (inches):	>13

Wetland Hydrology Present?

Yes _____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

PHS # 7264

Item 2.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: **Boeckman Road** City/County: **Wilsonville/Clackamas** Sampling Date: **7/1/2021**

Applicant/Owner: **Martin Development** State: **OR** Sampling Point: **11**

Investigator(s): **JT/CM** Section, Township, Range: **Section 14B, Township 3 South, Range 1 West**

Landform (hillslope, terrace, etc.:) **Flat** Local relief (concave, convex, none): **None** Slope (%): **1**

Subregion (LRR): **LRR A** Lat: **45.3154** Long: **-122.7784** Datum: **WGS84**

Soil Map Unit Name: **Amity Silt Loam** NWI Classification: **N/A**

Are climatic/hydrologic conditions on the site typical for this time of year? Yes **X** No ____ (if no, explain in Remarks)

Are vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) **Y**

Are vegetation ____ Soil ____ or Hydrology ____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	**X**	No		
Hydric Soil Present?	Yes	**X**	No	**Is Sampled Area within a Wetland?**	Yes **X** No
Wetland Hydrology Present?	Yes	**X**	No		

Remarks:
Sample Point located in a very shallow swale.

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size: **30**)			
1 ***Fraxinus latifolia***	**20**	**X**	**FACW**
2			
3			
4			
	20	= Total Cover	
Sapling/Shrub Stratum (plot size: **15**)			
1 ***Symphoricarpos albus***	**10**	**X**	**FACU**
2 ***Rosa rubiginosa***	**5**	**X**	**UPL**
3 ***Crataegus monogyna***	**5**	**X**	**FAC**
4 ***Fraxinus latifolia***	**5**	**X**	**FACW**
5			
	25	= Total Cover	
Herb Stratum (plot size: **5**)			
1 ***Camassia quamash***	**80**	**X**	**FACW**
2 ***Juncus balticus***	**10**		**FACW**
3 ***Hypericum perforatum***	**5**		**FACU**
4 ***Agrostis capillaris***	**5**		**FAC**
5			
6			
7			
8			
	100	= Total Cover	
Woody Vine Stratum (plot size: ____)			
1			
2			
	0	= Total Cover	

% Bare Ground in Herb Stratum **0**

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: **4** (A)

Total Number of Dominant Species Across All Strata: **6** (B)

Percent of Dominant Species That are OBL, FACW, or FAC: **67%** (A/B)

Prevalence Index Worksheet:

Total % Cover of		Multiply by:	
OBL Species		x 1 =	**0**
FACW species		x 2 =	**0**
FAC Species		x 3 =	**0**
FACU Species		x 4 =	**0**
UPL Species		x 5 =	**0**
Column Totals	**0** (A)		**0** (B)

Prevalence Index =B/A = **#DIV/0!**

Hydrophytic Vegetation Indicators:

- ____ 1- Rapid Test for Hydrophytic Vegetation
- **X** 2- Dominance Test is >50%
- ____ 3-Prevalence Index is ≤ 3.0[1]
- ____ 4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
- ____ 5- Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **X** **No** ____

Remarks:

500

SOIL **PHS #** **7264** Sampling Point: **11**

Item 2.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	**10YR 2/2**	**98**	**7.5YR 4/6**	**2**	**C**	**PL**	**Silt Loam**	**Fine**
3-12	**10YR 2/2**	**90**	**7.5YR 4/6**	**10**	**C**	**M**	**Silt Loam**	**Fine**

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- **X** Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- **X** Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- **X** Fac-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No **X**	Depth (inches):	
Water Table Present?	Yes ___	No **X**	Depth (inches):	**>12**
Saturation Present? (includes capillary fringe)	Yes ___	No **X**	Depth (inches):	**>12**

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

PHS # 7264

Item 2.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: **Boeckman Road** City/County: **Wilsonville/Clackamas** Sampling Date: **7/1/2021**

Applicant/Owner: **Martin Development** State: **OR** Sampling Point: **12**

Investigator(s): **JT/CM** Section, Township, Range: **Section 14B, Township 3 South, Range 1 West**

Landform (hillslope, terrace, etc.:) **Flat** Local relief (concave, convex, none): **None** Slope (%): **1**

Subregion (LRR): **LRR A** Lat: **45.3154** Long: **-122.7783** Datum: **WGS84**

Soil Map Unit Name: **Amity Silt Loam** NWI Classification: **N/A**

Are climatic/hydrologic conditions on the site typical for this time of year? Yes **X** No ____ (if no, explain in Remarks)

Are vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) **Y**

Are vegetation ____ Soil ____ or Hydrology ____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes		No	X	**Is Sampled Area within a Wetland?** Yes ____ No **X**
Hydric Soil Present?	Yes		No	X	
Wetland Hydrology Present?	Yes		No	X	

Remarks:
Sample Point located in a very shallow swale.

VEGETATION - Use scientific names of plants.

		absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size: 30)				
1	***Fraxinus latifolia***	30	X	FACW
2	***Quercus garryana***	20	X	FACU
3	***Pinus ponderosa***	10		FACU
4				
		60	= Total Cover	
Sapling/Shrub Stratum (plot size: 15)				
1	***Rosa rubiginosa***	40	X	UPL
2	***Symphoricarpos albus***	40	X	FACU
3	***Rubus ursinus***	30	X	FACU
4	***Toxicodendron diversilobum***	10		FAC
5	***Corylus cornuta***	5		FACU
		127	= Total Cover	
Herb Stratum (plot size: 5)				
1	***Camassia quamash***	80	X	FACW
2	***Juncus balticus***	10		FACW
3	***Hypericum perforatum***	5		FACU
4	***Agrostis capillaris***	5		FAC
5				
6				
7				
8				
		100	= Total Cover	
Woody Vine Stratum (plot size: ____)				
1				
2				
		0	= Total Cover	

% Bare Ground in Herb Stratum **60**

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: **2** (A)

Total Number of Dominant Species Across All Strata: **6** (B)

Percent of Dominant Species That are OBL, FACW, or FAC: **33%** (A/B)

Prevalence Index Worksheet:

Total % Cover of		Multiply by:	
OBL Species		x 1 =	0
FACW species		x 2 =	0
FAC Species		x 3 =	0
FACU Species		x 4 =	0
UPL Species		x 5 =	0
Column Totals	0 (A)		0 (B)

Prevalence Index =B/A = **#DIV/0!**

Hydrophytic Vegetation Indicators:

____ 1- Rapid Test for Hydrophytic Vegetation

____ 2- Dominance Test is >50%

____ 3-Prevalence Index is ≤ 3.0[1]

____ 4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)

____ 5- Wetland Non-Vascular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No **X**

Remarks:
Shrubs continued: Fraxinus latifolia (FACW) 1%, Crataegus monogyna (FAC) 1%.

SOIL **PHS #** **7264** Sampling Point: **12**

Item 2.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-9	**10YR 2/2**	**98**	**7.5YR 4/3**	**2**	**C**	**M**	**Silt Loam**	**Fine**
9-20	**10YR 2/2**	**80**	**7.5YR 4/6**	**20**	**C**	**M**	**Silt Loam**	**Coarse**

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ **No** **X**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Fac-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	___	No **X**	Depth (inches):	
Water Table Present?	Yes	___	No **X**	Depth (inches):	**>20**
Saturation Present? (includes capillary fringe)	Yes	___	No **X**	Depth (inches):	**>20**

Wetland Hydrology Present?

Yes ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

PHS # 7264

Item 2.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: **Boeckman Road** City/County: **Wilsonville/Clackamas** Sampling Date: **7/1/2021**

Applicant/Owner: **Martin Development** State: **OR** Sampling Point: **13**

Investigator(s): **JT/CM** Section, Township, Range: **Section 14B, Township 3 South, Range 1 West**

Landform (hillslope, terrace, etc.:) **Berm** Local relief (concave, convex, none): **Convex** Slope (%): **2**

Subregion (LRR): **LRR A** Lat: **45.3157** Long: **-122.7787** Datum: **WGS84**

Soil Map Unit Name: **Amity Silt Loam** NWI Classification: **N/A**

Are climatic/hydrologic conditions on the site typical for this time of year? Yes **X** No ____ (if no, explain in Remarks)

Are vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) **Y**

Are vegetation ____ Soil ____ or Hydrology ____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes		No	**X**	**Is Sampled Area within a Wetland?** Yes ____ No **X**
Hydric Soil Present?	Yes	**X**	No		
Wetland Hydrology Present?	Yes		No	**X**	

Remarks:
Sample Point located in a very shallow swale.

VEGETATION - Use scientific names of plants.

		absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size: **30**)				
1	***Quercus garryana***	**30**	**X**	**FACU**
2				
3				
4				
		30	= Total Cover	
Sapling/Shrub Stratum (plot size: **15**)				
1	***Rosa rubiginosa***	**50**	**X**	**UPL**
2	***Symphoricarpos albus***	**30**	**X**	**FACU**
3	***Rubus ursinus***	**30**	**X**	**FACU**
4	***Rubus armeniacus***	**20**		**FAC**
5				
		130	= Total Cover	
Herb Stratum (plot size: **5**)				
1	***Geranium lucidum***	**30**	**X**	**UPL**
2	***Geum macrophyllum***	**10**	**X**	**FAC**
3	***Vicia sp***	**10**	**X**	**(FAC)**
4				
5				
6				
7				
8				
		50	= Total Cover	
Woody Vine Stratum (plot size: ____)				
1				
2				
		0	= Total Cover	

% Bare Ground in Herb Stratum **60**

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: **2** (A)

Total Number of Dominant Species Across All Strata: **7** (B)

Percent of Dominant Species That are OBL, FACW, or FAC: **29%** (A/B)

Prevalence Index Worksheet:

Total % Cover of		Multiply by:	
OBL Species		x 1 =	**0**
FACW species		x 2 =	**0**
FAC Species		x 3 =	**0**
FACU Species		x 4 =	**0**
UPL Species		x 5 =	**0**
Column Totals	**0** (A)		**0** (B)

Prevalence Index =B/A = **#DIV/0!**

Hydrophytic Vegetation Indicators:

____ 1- Rapid Test for Hydrophytic Vegetation

____ 2- Dominance Test is >50%

____ 3-Prevalence Index is ≤ 3.0[1]

____ 4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)

____ 5- Wetland Non-Vascular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No **X**

Remarks:

SOIL PHS # 7264 Sampling Point: 13

Item 2.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-8	10YR 2/2	100					Silt Loam	
8-16	10YR 2/2	95	7.5YR 3/3	5	C	M	Silt Loam	Fine

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Fac-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	___	No	X	Depth (inches):	___
Water Table Present?	Yes	___	No	X	Depth (inches):	>16
Saturation Present? (includes capillary fringe)	Yes	___	No	X	Depth (inches):	>16

Wetland Hydrology Present?

Yes ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

PHS # 7264

Item 2.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: **Boeckman Road** City/County: **Wilsonville/Clackamas** Sampling Date: **7/1/2021**

Applicant/Owner: **Martin Development** State: **OR** Sampling Point: **14**

Investigator(s): **JT/CM** Section, Township, Range: **Section 14B, Township 3 South, Range 1 West**

Landform (hillslope, terrace, etc.:) **Old road** Local relief (concave, convex, none): **Concave** Slope (%): **0**

Subregion (LRR): **LRR A** Lat: **45.3157** Long: **-122.7787** Datum: **WGS84**

Soil Map Unit Name: **Amity Silt Loam** NWI Classification: **N/A**

Are climatic/hydrologic conditions on the site typical for this time of year? Yes **X** No ____ (if no, explain in Remarks)

Are vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) **Y**

Are vegetation ____ Soil ____ or Hydrology ____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	**X**	No		
Hydric Soil Present?	Yes	**X**	No	**Is Sampled Area within a Wetland?**	Yes **X** No
Wetland Hydrology Present?	Yes	**X**	No		

Remarks:
Sample Point located in a very shallow swale.

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size: 30)			
1 ***Fraxinus latifolia***	60	X	FACW
2			
3			
4			
	60	= Total Cover	
Sapling/Shrub Stratum (plot size: 15)			
1 ***Rosa rubiginosa***	2		UPL
2 ***Rubus armeniacus***	2		FAC
3			
4			
5			
	4	= Total Cover	
Herb Stratum (plot size: 5)			
1 ***Poa sp***	60	X	(FAC)
2 ***Leucanthemum vulgare***	10		FACU
3 ***Unidentified grass***	10		(FAC)
4 ***Trifolium sp***	10		(FAC)
5			
6			
7			
8			
	90	= Total Cover	
Woody Vine Stratum (plot size:)			
1			
2			
	0	= Total Cover	

% Bare Ground in Herb Stratum **60**

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: **2** (A)

Total Number of Dominant Species Across All Strata: **2** (B)

Percent of Dominant Species That are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index Worksheet:

Total % Cover of		Multiply by:	
OBL Species		x 1 =	**0**
FACW species		x 2 =	**0**
FAC Species		x 3 =	**0**
FACU Species		x 4 =	**0**
UPL Species		x 5 =	**0**
Column Totals	**0** (A)		**0** (B)

Prevalence Index =B/A = **#DIV/0!**

Hydrophytic Vegetation Indicators:

- ____ 1- Rapid Test for Hydrophytic Vegetation
- **X** 2- Dominance Test is >50%
- ____ 3-Prevalence Index is ≤ 3.0[1]
- ____ 4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
- ____ 5- Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **X** **No** ____

Remarks:

SOIL PHS # 7264 Sampling Point: 11

Item 2.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/2	100					Silt Loam	
5-12	10YR 3/4	88	7.5YR 3/4	10	C	M	Silt Loam	Medium
			7.5YR 3/4	2	C	PL		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1) **(except MLRA 1)**
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- 2 cm Muck (A10)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes X No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Surface Soil Cracks (B6)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres along Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Plowed Soils (C6)
- Stunted or Stressed Plants (D1) **(LRR A)**
- Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- Shallow Aquitard (D3)
- X Fac-Neutral Test (D5)
- Raised Ant Mounds (D6) **(LRR A)**
- Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No X	Depth (inches):	
Water Table Present?	Yes		No X	Depth (inches):	>12
Saturation Present? (includes capillary fringe)	Yes		No X	Depth (inches):	>12

Wetland Hydrology Present? Yes X No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

PHS # 7264

Item 2.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: **Boeckman Road** City/County: **Wilsonville/Clackamas** Sampling Date: **7/1/2021**

Applicant/Owner: **Martin Development** State: **OR** Sampling Point: **15**

Investigator(s): **JT/CM** Section, Township, Range: **Section 14B, Township 3 South, Range 1 West**

Landform (hillslope, terrace, etc.:) **Ditch** Local relief (concave, convex, none): **Concave** Slope (%): **2**

Subregion (LRR): **LRR A** Lat: **45.3167** Long: **-122.7797** Datum: **WGS84**

Soil Map Unit Name: **Amity Silt Loam** NWI Classification: **N/A**

Are climatic/hydrologic conditions on the site typical for this time of year? Yes **X** No ____ (if no, explain in Remarks)

Are vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) **Y**

Are vegetation ____ Soil ____ or Hydrology ____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	**X**	No		**Is Sampled Area within a Wetland?** Yes ____ No **X**
Hydric Soil Present?	Yes		No	**X**	
Wetland Hydrology Present?	Yes		No	**X**	

Remarks:
Sample Point located in a very shallow swale.

VEGETATION - Use scientific names of plants.

		absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size: 30)				
1	***Fraxinus latifolia***	**20**	**X**	**FACW**
2				
3				
4				
		20	= Total Cover	
Sapling/Shrub Stratum (plot size: 15)				
1	***Rubus ursinus***	**20**	**X**	**FACU**
2	***Crataegus monogyna***	**20**	**X**	**FAC**
3	***Symphoricarpos albus***	**10**		**FACU**
4	***Toxicodendron diversilobum***	**10**		**FAC**
5				
		60	= Total Cover	
Herb Stratum (plot size: 5)				
1	***Bromus sp***	**40**	**X**	**(FAC)**
2	***Holcus lanatus***	**30**	**X**	**FAC**
3	***Jacobaea vulgaris***	**10**		**FACU**
4	***Unidentified grass***	**10**		**(FAC)**
5				
6				
7				
8				
		90	= Total Cover	
Woody Vine Stratum (plot size:)				
1				
2				
		0	= Total Cover	

% Bare Ground in Herb Stratum **10**

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: **4** (A)

Total Number of Dominant Species Across All Strata: **5** (B)

Percent of Dominant Species That are OBL, FACW, or FAC: **80%** (A/B)

Prevalence Index Worksheet:

Total % Cover of		Multiply by:	
OBL Species		x 1 =	**0**
FACW species		x 2 =	**0**
FAC Species		x 3 =	**0**
FACU Species		x 4 =	**0**
UPL Species		x 5 =	**0**
Column Totals	**0** (A)		**0** (B)

Prevalence Index =B/A = **#DIV/0!**

Hydrophytic Vegetation Indicators:

____ 1- Rapid Test for Hydrophytic Vegetation

X 2- Dominance Test is >50%

____ 3-Prevalence Index is ≤ 3.0[1]

____ 4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)

____ 5- Wetland Non-Vascular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes X** **No** ____

Remarks:

SOIL **PHS #** **7264** Sampling Point: **15**

Item 2.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	**10YR 3/2**	**98**	**10YR 3/4**	**2**	**C**	**M**	**Silt Loam**	**Fine**
10-16	**10YR 3/2**	**90**	**7.5YR 3/4**	**10**	**C**	**M**	**Silt Loam**	**Fine**

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ **No** **X**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- **X** Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Fac-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No **X**	Depth (inches):		
Water Table Present?	Yes ___	No **X**	Depth (inches):	**>16**	**Wetland Hydrology Present?**
Saturation Present? (includes capillary fringe)	Yes ___	No **X**	Depth (inches):	**>16**	**Yes** ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

PHS # 7264

Item 2.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: **Boeckman Road** City/County: **Wilsonville/Clackamas** Sampling Date: **7/1/2021**

Applicant/Owner: **Martin Development** State: **OR** Sampling Point: **16**

Investigator(s): **JT/CM** Section, Township, Range: **Section 14B, Township 3 South, Range 1 West**

Landform (hillslope, terrace, etc.:) **Flat** Local relief (concave, convex, none): **Concave** Slope (%): **0**

Subregion (LRR): **LRR A** Lat: **45.3152** Long: **-122.7785** Datum: **WGS84**

Soil Map Unit Name: **Amity Silt Loam** NWI Classification: **N/A**

Are climatic/hydrologic conditions on the site typical for this time of year? Yes **X** No ____ (if no, explain in Remarks)

Are vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) **Y**

Are vegetation ____ Soil ____ or Hydrology ____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	**X**	No		
Hydric Soil Present?	Yes		No	**X**	**Is Sampled Area within a Wetland?** Yes ____ No **X**
Wetland Hydrology Present?	Yes	**X**	No		

Remarks:
Sample Point located in a very shallow swale.

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size: **30**)			
1 ***Fraxinus latifolia***	**20**	**X**	**FACW**
2			
3			
4			
	20	= Total Cover	
Sapling/Shrub Stratum (plot size: **15**)			
1 ***Symphoricarpos albus***	**40**	**X**	**FACU**
2 ***Rubus armeniacus***	**25**	**X**	**FAC**
3 ***Fraxinus latifolia***	**20**	**X**	**FACW**
4 ***Rosa rubiginosa***	**5**		**UPL**
5 ***Toxicodendron diversilobum***	**5**		**FAC**
	95	= Total Cover	
Herb Stratum (plot size: **5**)			
1 ***Camassia quamash***	**60**	**X**	**FACW**
2			
3			
4			
5			
6			
7			
8			
	60	= Total Cover	
Woody Vine Stratum (plot size: ____)			
1			
2			
	0	= Total Cover	

% Bare Ground in Herb Stratum **40**

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: **4** (A)

Total Number of Dominant Species Across All Strata: **5** (B)

Percent of Dominant Species That are OBL, FACW, or FAC: **80%** (A/B)

Prevalence Index Worksheet:

Total % Cover of		Multiply by:	
OBL Species		x 1 =	**0**
FACW species		x 2 =	**0**
FAC Species		x 3 =	**0**
FACU Species		x 4 =	**0**
UPL Species		x 5 =	**0**
Column Totals	**0** (A)		**0** (B)

Prevalence Index =B/A = **#DIV/0!**

Hydrophytic Vegetation Indicators:

____ 1- Rapid Test for Hydrophytic Vegetation

X 2- Dominance Test is >50%

____ 3-Prevalence Index is ≤ 3.0[1]

____ 4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)

____ 5- Wetland Non-Vascular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes X** **No** ____

Remarks:

510

SOIL **PHS #** **7264** Sampling Point: **16**

Item 2.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-6	**10YR 3/2**						**Silt Loam**	
6-9	**10YR 3/2**	**98**	**7.5YR 3/4**	**2**	**C**	**M**	**Silt Loam**	**Medium**
9-13	**10YR 3/3**	**95**	**7.5YR 4/6**	**5**	**C**	**M**	**Silt Loam**	**Large**

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1) **(except MLRA 1)**
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- 2 cm Muck (A10)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes **No X**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Surface Soil Cracks (B6)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres along Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Plowed Soils (C6)
- Stunted or Stressed Plants (D1) **(LRR A)**
- Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Saturation Visible on Aerial Imagery (C9)
- **X** Geomorphic Position (D2)
- Shallow Aquitard (D3)
- **X** Fac-Neutral Test (D5)
- Raised Ant Mounds (D6) **(LRR A)**
- Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No **X**	Depth (inches):	
Water Table Present?	Yes		No **X**	Depth (inches):	**>13**
Saturation Present? (includes capillary fringe)	Yes		No **X**	Depth (inches):	**>13**

Wetland Hydrology Present? **Yes X** **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

PHS # 7264

Item 2.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: **Boeckman Road** City/County: **Wilsonville/Clackamas** Sampling Date: **1/11/2022**

Applicant/Owner: **Martin Development** State: **OR** Sampling Point: **17**

Investigator(s): **JT** Section, Township, Range: **Section 14B, Township 3 South, Range 1 West**

Landform (hillslope, terrace, etc.:) **Flat** Local relief (concave, convex, none): **Concave** Slope (%): **0**

Subregion (LRR): **LRR A** Lat: **45.3151** Long: **-122.7788** Datum: **WGS84**

Soil Map Unit Name: **Amity Silt Loam** NWI Classification: **N/A**

Are climatic/hydrologic conditions on the site typical for this time of year? Yes **X** No ____ (if no, explain in Remarks)

Are vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) **Y**

Are vegetation ____ Soil ____ or Hydrology ____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No **X**	**Is Sampled Area within a Wetland?**	Yes ____	No **X**
Hydric Soil Present?	Yes ____	No **X**			
Wetland Hydrology Present?	Yes ____	No **X**			

Remarks:

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size: **30**)			
1 ***Quercus garryana***	**10**	**X**	**FACU**
2			
3			
4			
	10	= Total Cover	
Sapling/Shrub Stratum (plot size: **15**)			
1 ***Symphoricarpos albus***	**25**	**X**	**FACU**
2 ***Rubus armeniacus***	**50**	**X**	**FAC**
3			
4			
5			
	75	= Total Cover	
Herb Stratum (plot size: **5**)			
1 ***Juncus patens***	**1**		**FACW**
2			
3			
4			
5			
6			
7			
8			
	1	= Total Cover	
Woody Vine Stratum (plot size: ____)			
1			
2			
	0	= Total Cover	

% Bare Ground in Herb Stratum **0**

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: **1** (A)

Total Number of Dominant Species Across All Strata: **3** (B)

Percent of Dominant Species That are OBL, FACW, or FAC: **33%** (A/B)

Prevalence Index Worksheet:

Total % Cover of		Multiply by:	
OBL Species	____	x 1 =	**0**
FACW species	____	x 2 =	**0**
FAC Species	____	x 3 =	**0**
FACU Species	____	x 4 =	**0**
UPL Species	____	x 5 =	**0**
Column Totals	**0** (A)		**0** (B)

Prevalence Index =B/A = **#DIV/0!**

Hydrophytic Vegetation Indicators:

____ 1- Rapid Test for Hydrophytic Vegetation

____ 2- Dominance Test is >50%

____ 3-Prevalence Index is ≤ 3.0[1]

____ 4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)

____ 5- Wetland Non-Vascular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No **X**

Remarks:

SOIL **PHS #** **7264** Sampling Point: **13**

Item 2.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-5	**7.5YR 3/1**	**100**					**Silt Loam**	
5-12	**7.5YR 3/3**	**100**					**Silt Loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ **No** **X**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- **X** Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Fac-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No **X**	Depth (inches):		
Water Table Present?	Yes ___	No **X**	Depth (inches):	**>12**	
Saturation Present? (includes capillary fringe)	Yes ___	No **X**	Depth (inches):	**>12**	

Wetland Hydrology Present?

Yes ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

PHS # 7264

Item 2.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: **Boeckman Road** City/County: **Wilsonville/Clackamas** Sampling Date: **1/11/2022**

Applicant/Owner: **Martin Development** State: **OR** Sampling Point: **17**

Investigator(s): **JT** Section, Township, Range: **Section 14B, Township 3 South, Range 1 West**

Landform (hillslope, terrace, etc.:) **Flat** Local relief (concave, convex, none): **Concave** Slope (%): **0**

Subregion (LRR): **LRR A** Lat: **45.3171** Long: **-122.7794** Datum: **WGS84**

Soil Map Unit Name: **Aloha Silt Loam, 0-3 Percent Slopes** NWI Classification: **N/A**

Are climatic/hydrologic conditions on the site typical for this time of year? Yes **X** No ____ (if no, explain in Remarks)

Are vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) **Y**

Are vegetation ____ Soil ____ or Hydrology ____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No **X**	**Is Sampled Area within a Wetland?**	Yes ____	No **X**
Hydric Soil Present?	Yes ____	No **X**			
Wetland Hydrology Present?	Yes ____	No **X**			

Remarks:

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size: 30)			
1 ***Pseudotsuga menziesii***	**30**	**X**	**FACU**
2			
3			
4			
	30	= Total Cover	
Sapling/Shrub Stratum (plot size: 15)			
1 ***Symphoricarpos albus***	**10**		**FACU**
2 ***Rubus armeniacus***	**40**	**X**	**FAC**
3 ***Corylus cornuta***	**10**		**FACU**
4			
5			
	60	= Total Cover	
Herb Stratum (plot size: 5)			
1 ***Holcus lanatus***	**60**	**X**	**FAC**
2 ***Stellaria media***	**5**		**FACU**
3 ***Daucus carota***	**5**		**FACU**
4 ***Geranium lucidum***	**20**	**X**	**UPL**
5 ***Geranium robertianum***	**5**		**FACU**
6			
7			
8			
	95	= Total Cover	
Woody Vine Stratum (plot size:)			
1			
2			
	0	= Total Cover	

% Bare Ground in Herb Stratum **0**

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: **2** (A)

Total Number of Dominant Species Across All Strata: **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	____	x 3 =	**0**
FACU Species	____	x 4 =	**0**
UPL Species	____	x 5 =	**0**
Column Totals	**0** (A)		**0** (B)

Prevalence Index =B/A = **#DIV/0!**

Hydrophytic Vegetation Indicators:

____ 1- Rapid Test for Hydrophytic Vegetation

____ 2- Dominance Test is >50%

____ 3-Prevalence Index is ≤ 3.0[1]

____ 4-Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)

____ 5- Wetland Non-Vascular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No **X**

Remarks:

SOIL **PHS #** **7264** Sampling Point: **13**

Item 2.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(Inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	**7.5YR 3/1**	**100**					**Silt Loam**	
5-12	**7.5YR 3/3**	**100**					**Silt Loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ **No** **X**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water stained Leaves (B9) **(Except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water stained Leaves (B9) **(MLRA1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- **X** Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Fac-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No **X**	Depth (inches):		
Water Table Present?	Yes ___	No **X**	Depth (inches):	**>13**	
Saturation Present? (includes capillary fringe)	Yes ___	No **X**	Depth (inches):	**>13**	

Wetland Hydrology Present?

Yes ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix C

Study Area Photos
(ground level)

Photo A:

Looking southwest at upland Sample Point 1, east of Wetland A.

Photo taken on July 1, 2021

Photo B:

Looking northwest at Sample Points 4 (wetland) and 5 (upland).

Photo taken on July 1, 2021

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Photo documentation

9900 SW Boeckman Road - Wilsonville, Oregon

Photo C:

Looking north at Wetland B, which is confined to a ditch at the west end of the site.

Photo taken on July 1, 2021

Photo D:

Looking north at Sample Points 6 (wetland) and 7 (upland) at the north end of Wetland C, which is confined to a ditch.

Photo taken on July 1, 2021

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Photo E:

Looking west at an access road through Wetland A.

Photo taken on January 11, 2022

Photo F:

Looking north / northeast at a grove of Douglas' fir trees east of Wetland A.

Photo taken on January 11, 2022

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Photo G:

Looking northwest at Sample Point 10, located adjacent to a pipe that carries runoff below a constructed berm to the basin in the western portion of the study area.

Photo taken on January 11, 2022

Photo H:

Looking west at the northern portion of Wetland A.

Photo taken on January 11, 2022

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Photo documentation

9900 SW Boeckman Road - Wilsonville, Oregon

Photo I:

Looking west at Sample Point 18.

Photo taken on January 11, 2022

Photo J:

Looking east at the northwestern corner of the site. The Wilsonville LWI depicts a wetland in this area that has since been filled. The planter adjacent to the roadway is a bioswale.

Photo taken on January 11, 2022

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Photo K:

Looking southeast at the lawn area in the northwestern portion of the study area. This area is raised above the natural grade and likely consists of imported soil.

Photo taken on January 11, 2022

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Appendix D

Wetland Definitions, Methodology

WATERS OF THE STATE AND WETLAND DEFINITION AND CRITERIA

Regulatory Jurisdiction

Wetlands and water resources in Oregon are regulated by the Oregon Department of State Lands (DSL) under the Removal-Fill Law (ORS 196.800-196.990) and by the U.S. Army Corps of Engineers (COE) through Section 404 of the Clean Water Act.

The primary source documents for wetland delineations within Oregon is the *Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1* (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), which are required by both DSL and COE.

Waters of This State and Wetland Definition

Waters of This State are defined as "all natural waterways, all tidal and non-tidal bays, intermittent streams, constantly flowing streams, lakes, wetlands, that portion of the Pacific Ocean that is in the boundaries of this state, all other navigable and non-navigable bodies of water in this state and those portions of the ocean shore …" (DSL, 2009).

Wetlands are defined as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (DSL 2009).

Wetland Criteria

Based on the above definition, three major factors characterize a wetland: hydrology, substrate, and biota.

Wetland Hydrology

Wetland hydrology is related to duration of saturation, frequency of saturation, and critical depth of saturation. The 1987 manual defines wetland hydrology as inundation or saturation within a major portion of the root zone (usually above 12 inches), typically for at least 12.5% of the growing season. The wetland hydrology criterion can be met, however, if saturation within the major portion of the root zone is present for only 5% of the growing season, depending on other evidence.

The growing season is defined as the portion of the year when soil temperatures at 12.0 inches below the soil surface are higher than biological zero (41 degrees Fahrenheit, 5 degrees Celsius), but also allows approximation from frost-free days, based on air temperature. The growing season for any given study area or location is determined from US Natural Resources Conservation Service, (formerly Soil Conservation Service) data and information.

Wetland hydrologic indicators include the following: visual observation of inundation or saturation, watermarks, drift lines, sediment deposits, and/or oxidized rhizospheres with living roots. Oxidized rhizospheres are defined as yellowish-red zones around the roots and rhizomes of some plants that grow in frequently saturated soils. Other indicators of hydrology, including algal mats or crust, iron deposits, surface soil cracks, sparsely vegetated concave surface, salt crust, aquatic invertebrates, hydrogen sulfide odor, reduced iron, iron reduction in tilled soils, and stunted or stressed plants can also be used to determine the presence of wetland hydrology.

Wetland Substrate (Soils)

Most wetlands are characterized by hydric soils. Hydric soils are those that are ponded, flooded, or saturated for long enough during the growing season to develop anaerobic conditions. Periodic saturation of soils causes alternation of reduced and oxidized conditions, which leads to the formation of redoximorphic features (gleying and mottling). Mineral hydric soils will be either gleyed or will have bright mottles and/or low matrix chroma. The redoximorphic feature known as gley is a result of greatly reduced soil conditions, which result in a characteristic grayish, bluish or greenish soil color. The term mottling is used to describe areas of contrasting color within a soil matrix. The soil matrix is the portion of the soil layer that has the predominant color. Soils that have brightly colored mottles and a low matrix chroma are indicative of a fluctuating water table.

Hydric soil indicators include organic content of greater than 50% by volume, and/or presence of redoximorphic features and dark soil matrix, as determined by the use of a Munsell Soil Color Chart. This chart establishes the chroma, value and hue of soils based on comparison with color chips. Mineral hydric soil must meet one of the 16 definitions for hydric soil indicators or be classified as a “problem soil” in the Regional Supplement.

Wetland Biota (Vegetation)

Wetland biota is defined as hydrophytic vegetation. A hydrophyte is a plant species that is capable of growing in substrates that are periodically deficient in oxygen as a result of saturated soil conditions. The U.S. Fish and Wildlife Service, in the *National List of Plant Species that Occur in Wetlands*, has established five basic groups of vegetation based on their frequency of occurrence in wetlands. These categories, referred to as the "wetland indicator status”, are as follows: obligate wetland plants (OBL), facultative wetland (FACW), facultative (FAC), facultative upland (FACU), and obligate upland (UPL). Table 1 gives a definition of the plant indicator codes.

Table 1. Description of Wetland Plant Indicator Status Codes

Indicator Code	Status
OBL	Obligate wetland. Plants that always occur in standing water or in saturated soils.
FACW	Facultative wetland. Plants that nearly always occur in areas of prolonged flooding or require standing water or saturated soils but may, on rare occasions, occur in non-wetlands.
FAC	Facultative. Plants that occur in a variety of habitats, including wetland and mesic to xeric non-wetland habitats but commonly occur in standing water or saturated soils.
FACU	Facultative upland. Plants that typically occur in xeric or mesic non-wetland habitats but may frequently occur in standing water or saturated soils.
UPL	Obligate upland. Plants that rarely occur in water or saturated soils.

Observations of hydrology, soils, and vegetation were made using the "Routine On-study area" delineation method as defined in the 1987 manual and the Regional Supplement for areas that were not currently in agricultural production. One-foot diameter soil pits were excavated to 20 inches and soil profiles were examined for hydric soil and wetland hydrology field indicators. In addition, a visual absolute cover estimate of the dominant species of the plant community was performed using soil pit locations as a center of reference. Dominant plant species are based on estimates of absolute cover for herbaceous, and shrub species within a 5-foot radius of the sample point, and basal area cover for tree and woody vine species within a 30-foot radius of the sample point. Plant species in each vegetative layer, which are estimated at less than 20% of the total cover, are not considered dominant. The wetland indicator status is then used to determine if there is an overall dominance (greater than 50%) of wetland or upland plant species. If less than 50% of the dominant species are hydrophytic, then the prevalence index may be used to determine if the subdominant species are hydrophytic. If the prevalence index is less than or equal to three, hydrophytic vegetation criterion is met.

During data collection, the soil profiles were examined for hydric soil and wetland hydrology field indicators. Plant species and cover were recorded. Data was recorded on standard data sheets, which contain the information specified in the 1987 Corps Manual and the Regional Supplement.

MACKENZIE.

STORM DRAINAGE REPORT

Project
W-5
Planning DB No. _____

Applicant
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Attn: Mac Martin
P.O. Box 15523
Seattle, WA 98115

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Submitted
December 10, 2021

Mackenzie Project #
2210115.00

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APPENDIX B – OPERATIONS AND MAINTENANCE MANUAL
APPENDIX C – WEB SOIL SURVEY SOILS MAP

I. PROJECT DESCRIPTION

This report documents the stormwater management calculations and design approach carried out by Mackenzie to manage stormwater runoff for the W-5 project compliant with applicable code(s). The proposed W-5 project is located at the SE corner of the intersection of Boeckman Road and SW Kinsman Road in Wilsonville, Oregon (see Figure 1, Vicinity Map). According to City of Wilsonville GIS, the project site is approximately 23.86 acres when considered along with the existing W-4 development that resides on the easterly half of the property. The applicant is pursuing a subdivision to divide the property into two lots, apportioning the westerly 10.046 acres for this new development (referred to as the "project site" or "site" throughout the report). The overall site is currently addressed as 9600 Boeckman Road as Tax Lot 202 of Tax Map 3 1W 14B, and is zoned as Planned Development Industrial (PDI).

In pursuit of this project, the applicant (or their contractor(s)) is applying for the following permits: Development, Commercial Building, Mechanical, Plumbing, Clackamas County Electrical, Grading, Fire Alarm, Fire Sprinkler, DEQ 1200-C, and Type B/C Tree Removal permits. No right-of-way permits or environmental/regulatory permits are expected to be required at this time.

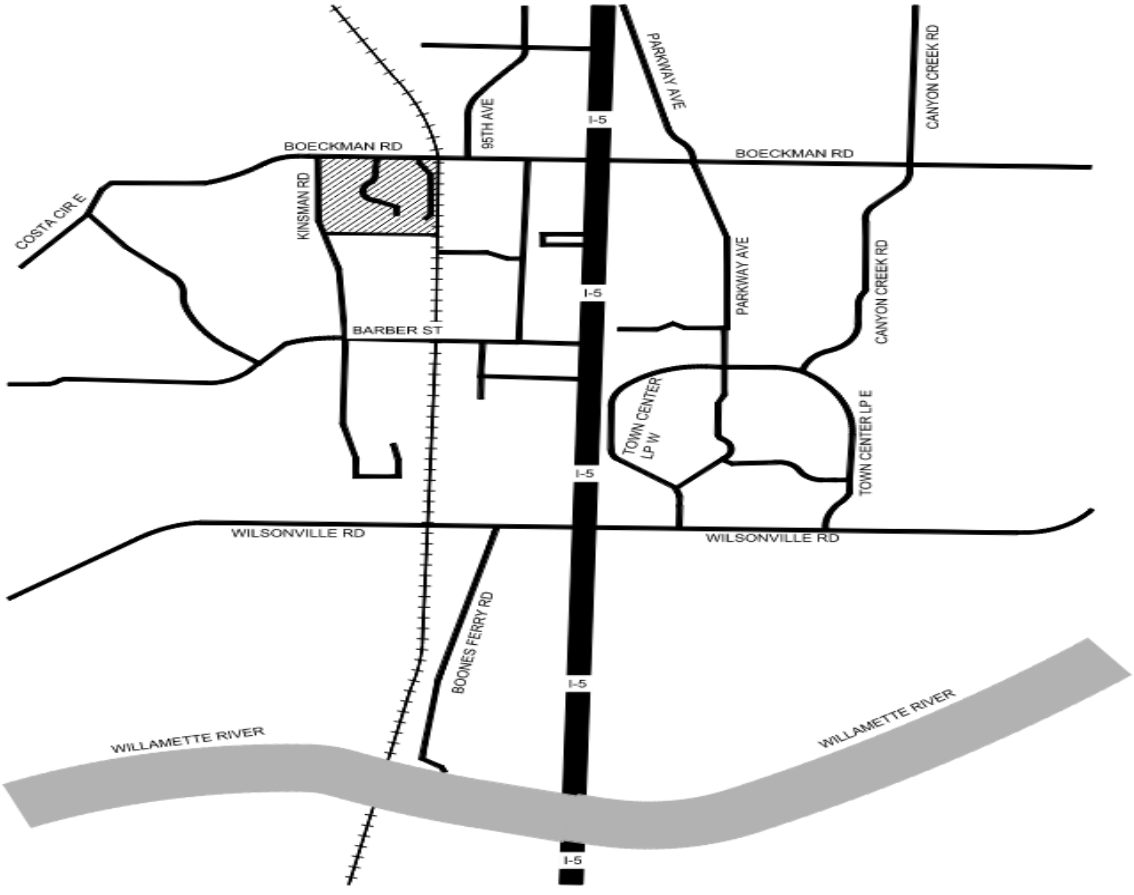


Figure 1: Vicinity Map

Existing Conditions

The existing site consists of a generally open grassy area bounded by the Significant Resource Overlay Zone (SROZ) in the NW corner and southerly portion of the site, Boeckman Road to the north, SW Kinsman Road to the west, and an existing private paved drive aisle to the east. The existing development known as W-4 resides on the easterly portion of the overall property. Figure 2 provides a simplified graphical depiction of the existing conditions.

Stormwater that falls on site generally either infiltrates into the grassy area or drains in a predominantly southerly direction over shallow sloped ground and into the larger SROZ/Wetlands prior to discharge to the public storm drain system. There are no identifiable upstream drainage basins to consider in design. Per City GIS, it appears that rainwater discharge from the project site ultimately outfalls to the Willamette River to the south.

SW Kinsman Road and Boeckman Road are fully improved roads with their own public drainage system.

Soil Conditions

Per the USDA Web Soil Survey, the existing soils on the portion of the site to be developed are almost entirely Aloha silt loam which are identified as Hydrologic Soil Group C/D for the purposes of relating to Technical Release 55 (TR-55) to assign the runoff curve number to be used in the hydrologic analysis of the existing conditions. Referring to Table 2-2a of TR-55 and designating the site as Open Space in Good Condition, the resulting curve number is between 74 and 80 – 76 will be used in the calculations.

Please see the Web Soil Survey Soils Map in Appendix C.

Hydrologic Analysis (Existing)

The hydrologic analysis of the existing conditions was performed using the Water Environment Services (WES) BMP Sizing Tool. For the purposes of hydrologic modeling, the WES BMP Sizing Tool models the historical vegetation which existed onsite prior to development. All subbasins are either defined as grass or forested. Please see the WES BMP Sizing Report, Appendix B, pages 62-63, for details on the hydrologic pre-developed conditions onsite.

Figure 2: Existing Conditions

II. DEVELOPED CONDITIONS

The proposed development consists of the construction of a 65,000 square foot (footprint) manufacturing building with an integral depressed truck dock, associated drive aisles and parking, an exterior trash enclosure, and associated utility services to the building and site. Although the site area (after subdivision) is 10.046 acres, the area to be developed is substantially less due to the SROZ/Wetland areas encumbering more than 50% of the southerly portion and the NW corner of the lot. The total site area being developed is 4.88 acres. Figure 3 provides a simplified graphical depiction of the developed conditions.

See the Drainage Management Area (DMA) Map in Appendix A that provides a breakdown of impervious and pervious areas within each DMA/subbasin.

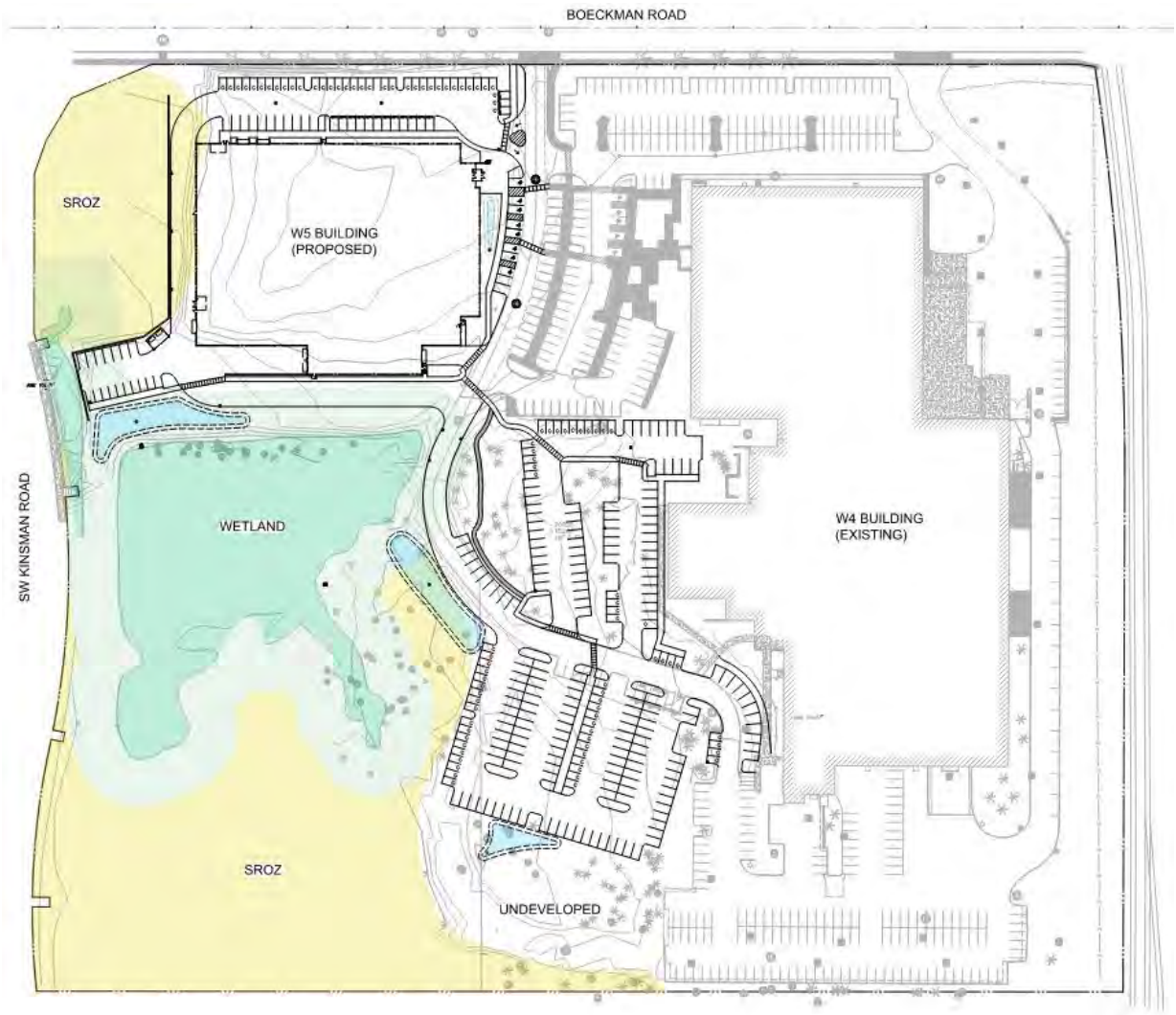


Figure 3: Developed Conditions

Water Quality Standard

Water quality facilities shall be designed to capture and treat 80% of the average annual runoff volume to the Maximum Extent Practicable (MEP) with the goal of 70% total suspended soils (TSS) removal. In this context, MEP means less effective treatment may not be substituted when it is practicable to provide more effective treatment. This treatment volume equates to a design storm of **1.0 inch over 24 hours**.

The BMP Sizing Tool addresses these water quality requirements to size stormwater management facilities.

Hydrodynamic separators, when used as a sole method of stormwater treatment, do not meet the MEP requirement for stormwater treatment effectiveness with regard to these stormwater standards.

Flow Control Standard

The duration of peak flow rates from post-development conditions shall be less than or equal to the duration of peak flow rates from pre-development conditions for all peak flows between **42% of the 2-year storm peak flow rate up to the 10-year peak flow rate**.

Hydrologic Analysis (Proposed)

Water Quality

In order to meet the goals of Low Impact Development, rain gardens have been selected as the proposed BMP to provide water quality treatment for this project. Although the project site has limited infiltration due to relatively high groundwater table (8' bgs) and low infiltration rates (0.1"/hr) , the BMP facilities are not proposed to be lined in order to promote any amount of infiltration that may still occur. The stormwater planters are dispersed throughout the site at strategic locations for capture of runoff, upon which underground piping collects the water and routes it to the SROZ/Wetland area for discharge.

Please refer to the DMA Map and WES BMP Sizing Report (Appendix A, pages 62-63) for facility sizes and impervious areas that are conveyed to each facility. Appendix B contains the Operations & Maintenance Manual for the proposed facilities.

Flow Control

As noted in the Water Quality section, rain gardens have been selected as the proposed BMP which will meet both treatment and flow control requirements.

Please refer to the Drainage Management Area (DMA) Map and WES BMP Sizing Report, Appendix A, pages 62-63, for further detail. Appendix B contains the Operations & Maintenance Manual for the proposed facilities.

Hydraulic Design Computations

The proposed underground storm drainage system for this project has been designed to collect and convey the runoff from a 25-year storm event per the City of Wilsonville 2015 Stormwater & Surface Water Design & Construction Standards. The peak flow has been calculated using the Santa Barbara Urban Hydrograph (SBUH) within the Storm & Sanitary Analysis (SSA) for Autodesk Civil3D software. The peak flow from the 25-year event over the project site has then been prorated on a cfs/sf basis into the various

drainage management areas (DMAs)/subbasins throughout the site. Underground piping has then been sized accordingly using SSA software. Please refer to the DMA Map and Profile Plots, pages 1-7, in Appendix A. In the occurrence of a storm event in excess of the design storm, adequate overland flow has been provided to prevent flooding of habitable structures.

Downstream Analysis

The existing drainage system downstream of the development has been analyzed to verify that it has the capacity to convey the 25-year design storm. The analysis is intended to extend downstream to a point in the drainage system where the proposed development site constitutes 10% or less of the total tributary drainage flow. However, the overall property containing the existing W-4 Building and proposed W-5 Building discharge to a major water body, being Coffee Lake Creek, just across Kinsman Road and as such, the analysis was terminated there.

City of Wilsonville GIS reveals that water is conveyed from the overall property to Coffee Lake Creek through three 18" culverts that run beneath SW Kinsman Road. Figure 4 is a snapshot of City of Wilsonville GIS, and it depicts the conveyance of the stormwater offsite into Coffee Lake Creek. Culverts 1-3 are hydraulically connected such that if stormwater backed up in the furthest downstream culvert (Culvert 3), then stormwater would be conveyed through Culverts 2 and 1 respectively.

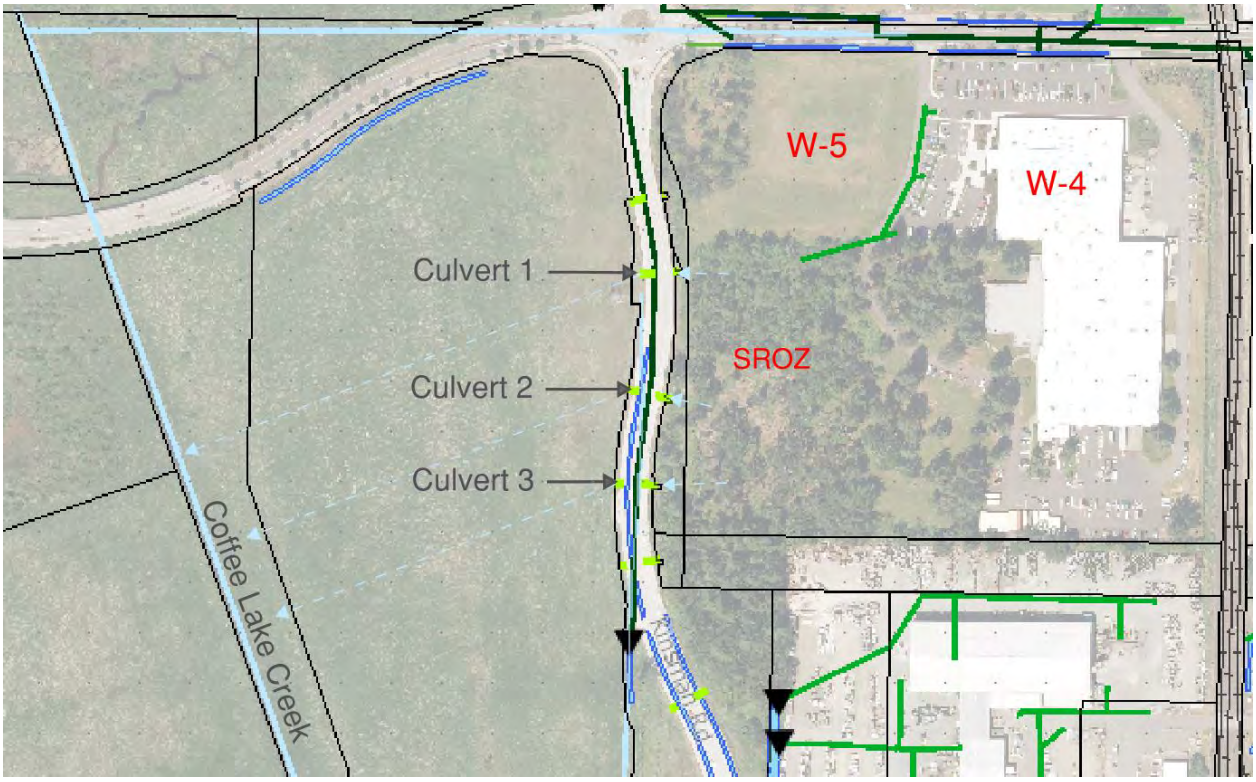


Figure 4: Downstream Analysis Study Area

Hyd. No. 1

Post Developed

Hydrograph type	= SBUH Runoff	Peak discharge	= 13.67 cfs
Storm frequency	= 25 yrs	Time to peak	= 8.00 hrs
Time interval	= 2 min	Hyd. volume	= 236,391 cuft
Drainage area	= 23.860 ac	Curve number	= 89*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.70 min
Total precip.	= 3.90 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= n/a

* Composite (Area/CN) = [(4.280 x 98) + (0.760 x 76) + (6.910 x 76) + (10.120 x 98) + (1.790 x 76)] / 23.860

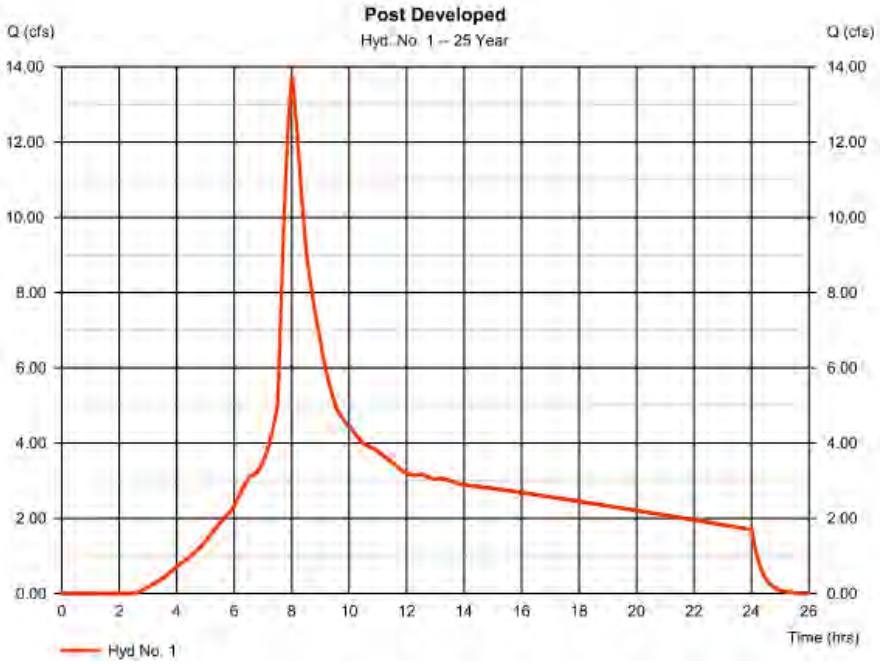


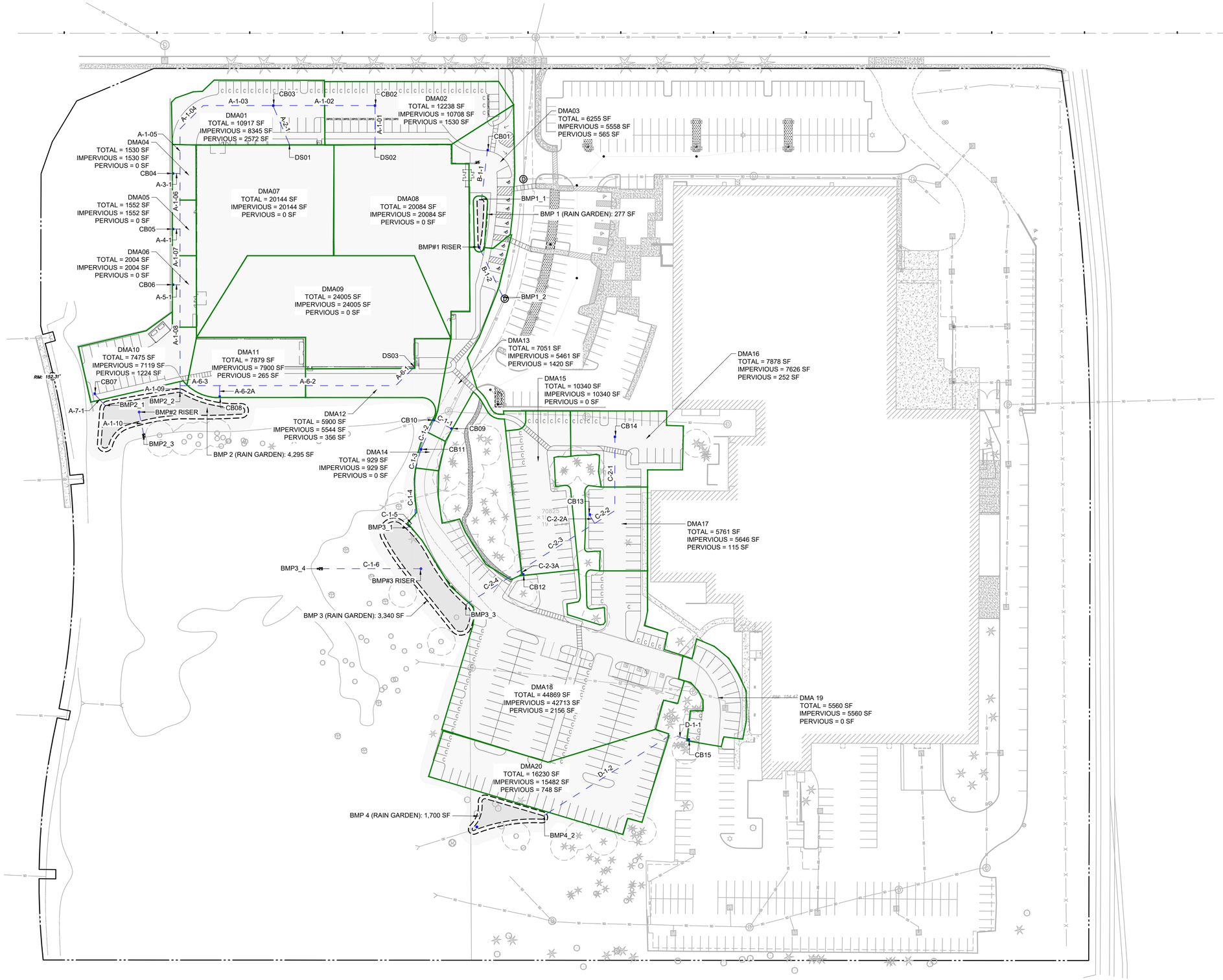
Figure 5: Post Developed Discharge Hydrograph

Runoff (cfs)	Slope(%)	Diameter (in)	Pipe Area (sf)	Hydraulic Radius^2/3	Capacity (cfs)	Velocity at Design Flow (fps)	Runoff/Capacity (ratio)
6.84	0.50	18	1.767	0.520	**7.40**	4.69	0.92
6.84	0.50	18	1.767	0.520	**7.40**	4.69	0.92

Figure 6: Culvert Downstream Conveyance Spreadsheet

Figure 5 illustrates the peak flow (13.67 cfs) for the 25-year storm from the overall property. Figure 6 lists the variables used in a Manning's calculations to determine capacity, and it is conclusive that two 18" culverts are sufficient to adequately convey the 25-year storm peak discharge from the overall property to Coffee Lake Creek.

APPENDIX A –
HYDRAULIC DESIGN
COMPUTATIONS AND
DMA MAP



1 - DRAINAGE MANAGEMENT AREA MAP

50 0 25 50 100 200

(IN FEET)
1 inch = **50** ft.

THE SURVEY INFORMATION SHOWN AS A BACKGROUND SCREEN ON THIS SHEET IS SHOWN FOR REFERENCE ONLY AND IS BASED ON A SURVEY BY: ANDY PARIS & ASSOCIATES, INC. DATE: 08/23/2022

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REVISION SCHEDULE

Delta	Issued As	Issue Date

SHEET TITLE:
DRAINAGE MANAGEMENT AREA MAP

DRAWN BY: BTC

CHECKED BY:GIM

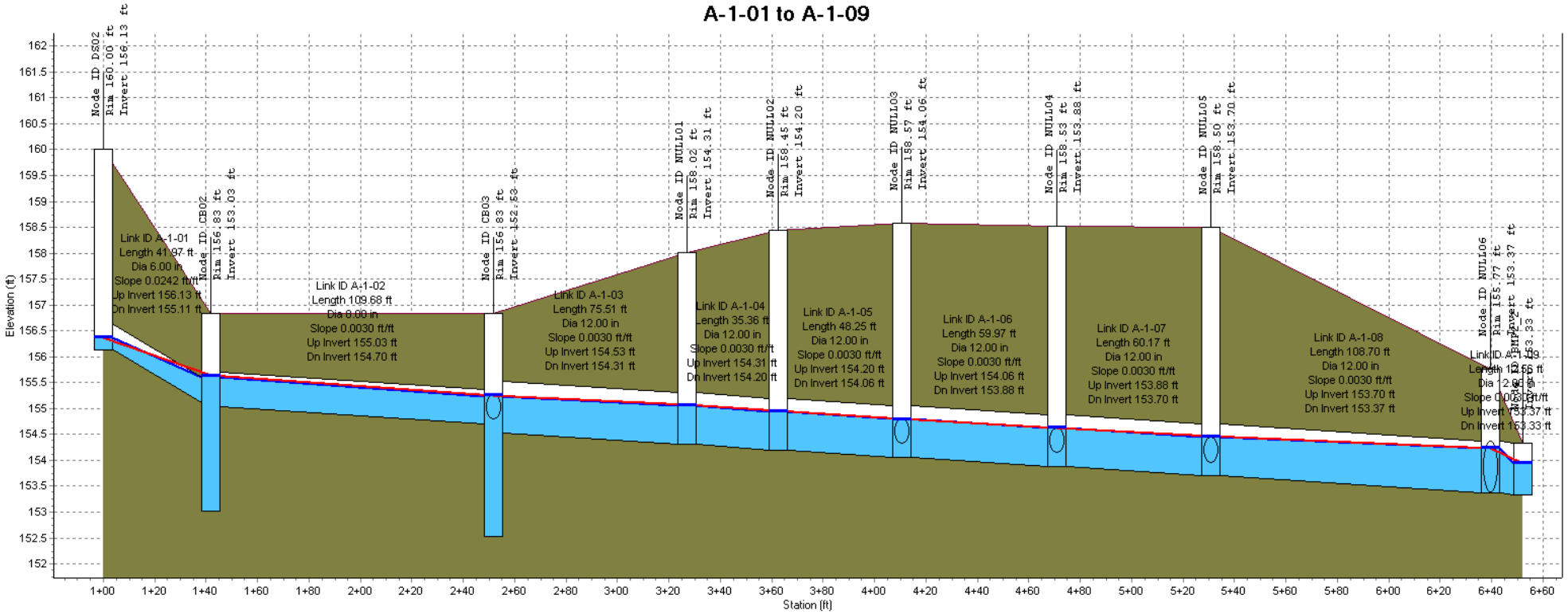
SHEET:

JOB NO. **2210115.00**

LAND USE SUBMITTAL - 12/03/2021

Profile Plot

A-1-01 to A-1-09



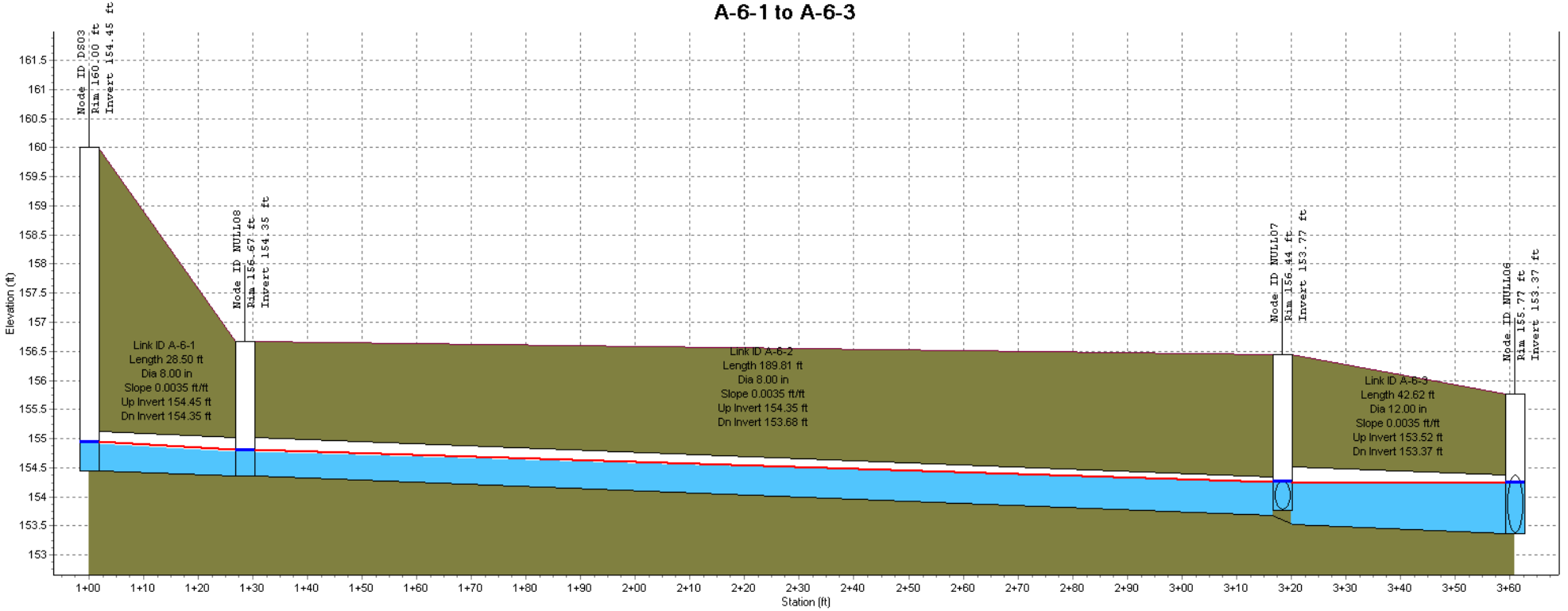
Node ID:	DS02	CB02	CB03	NULL01	NULL02	NULL03	NULL04	NULL05	NULL06	IMP2_2
Rim (ft):	160.00	156.83	156.83	158.02	158.45	158.57	158.53	158.50	155.77	
Invert (ft):	156.13	153.03	152.53	154.31	154.20	154.06	153.88	153.70	153.37	153.33
Min Pipe Cover (ft):				2.71	3.25	3.51	3.65	3.80	1.40	
Max HGL (ft):	156.37	155.64	155.26	155.07	154.95	154.80	154.63	154.46	154.24	153.95

Link ID:	A-1-01	A-1-02	A-1-03	A-1-04	A-1-05	A-1-06	A-1-07	A-1-08	A-1-09
Length (ft):	41.97	109.68	75.51	35.36	48.25	59.97	60.17	108.70	12.56
Dia (in):	6.00	8.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Slope (ft/ft):	0.0242	0.0030	0.0030	0.0030	0.0030	0.0030	0.0030	0.0030	0.0030
Up Invert (ft):	156.13	155.03	154.53	154.31	154.20	154.06	153.88	153.70	153.37
Dn Invert (ft):	155.11	154.70	154.31	154.20	154.06	153.88	153.70	153.37	153.33
Max Q (cfs):	0.43	0.68	1.31	1.31	1.30	1.33	1.36	1.41	2.09
Max Vel (ft/s):	2.75	2.10	2.13	2.08	2.13	2.16	2.19	2.05	3.34
Max Depth (ft):	0.37	0.58	0.74	0.75	0.74	0.75	0.76	0.82	0.74

Autodesk Storm and Sanitary Analysis

Profile Plot

A-6-1 to A-6-3



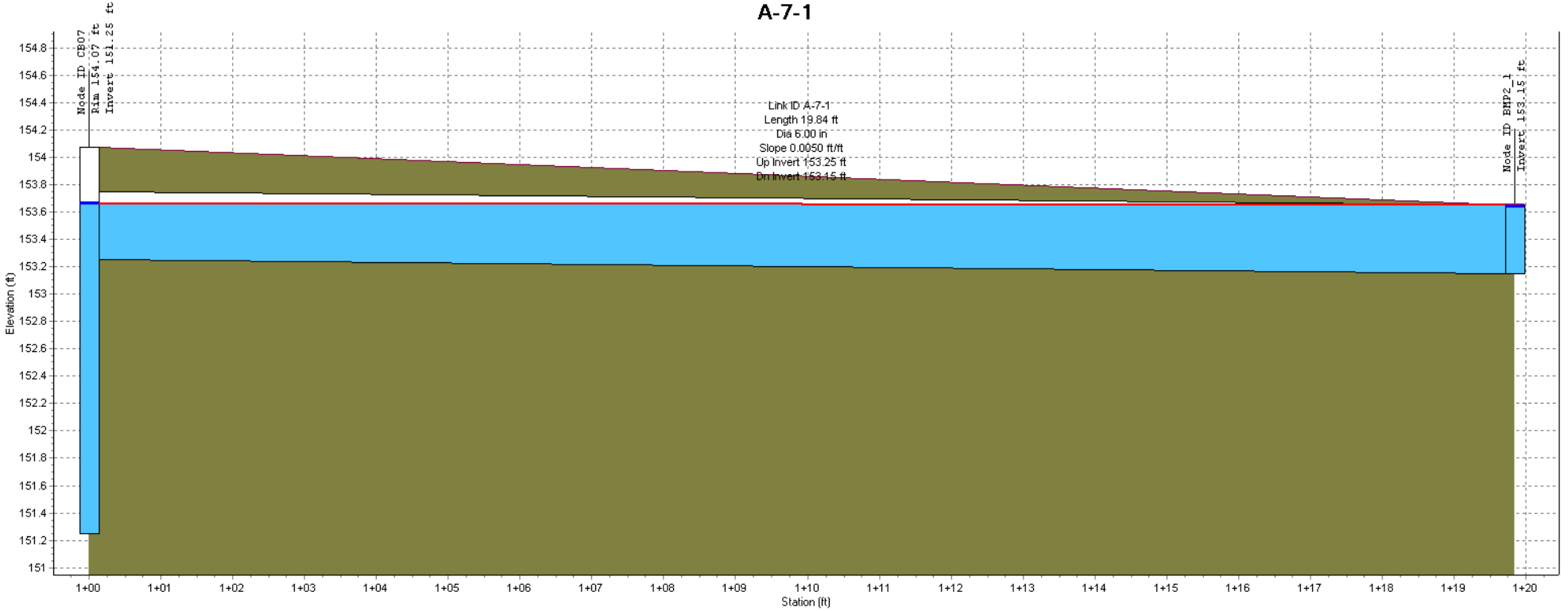
Node ID:	DS03	NULL08	NULL07	NULL06
Rim (ft):	160.00	156.67	156.44	155.77
Invert (ft):	154.45	154.35	153.77	153.37
Min Pipe Cover (ft):		1.65	1.92	1.40
Max HGL (ft):	154.95	154.81	154.26	154.24

Link ID:	A-6-1	A-6-2	A-6-3
Length (ft):	28.50	189.81	42.62
Dia (in):	8.00	8.00	12.00
Slope (ft/ft):	0.0035	0.0035	0.0035
Up Invert (ft):	154.45	154.35	153.52
Dn Invert (ft):	154.35	153.68	153.37
Max Q (cfs):	0.52	0.52	0.68
Max Vel (ft/s):	1.95	2.20	1.45
Max Depth (ft):	0.48	0.47	0.68

Autodesk Storm and Sanitary Analysis

Profile Plot

A-7-1

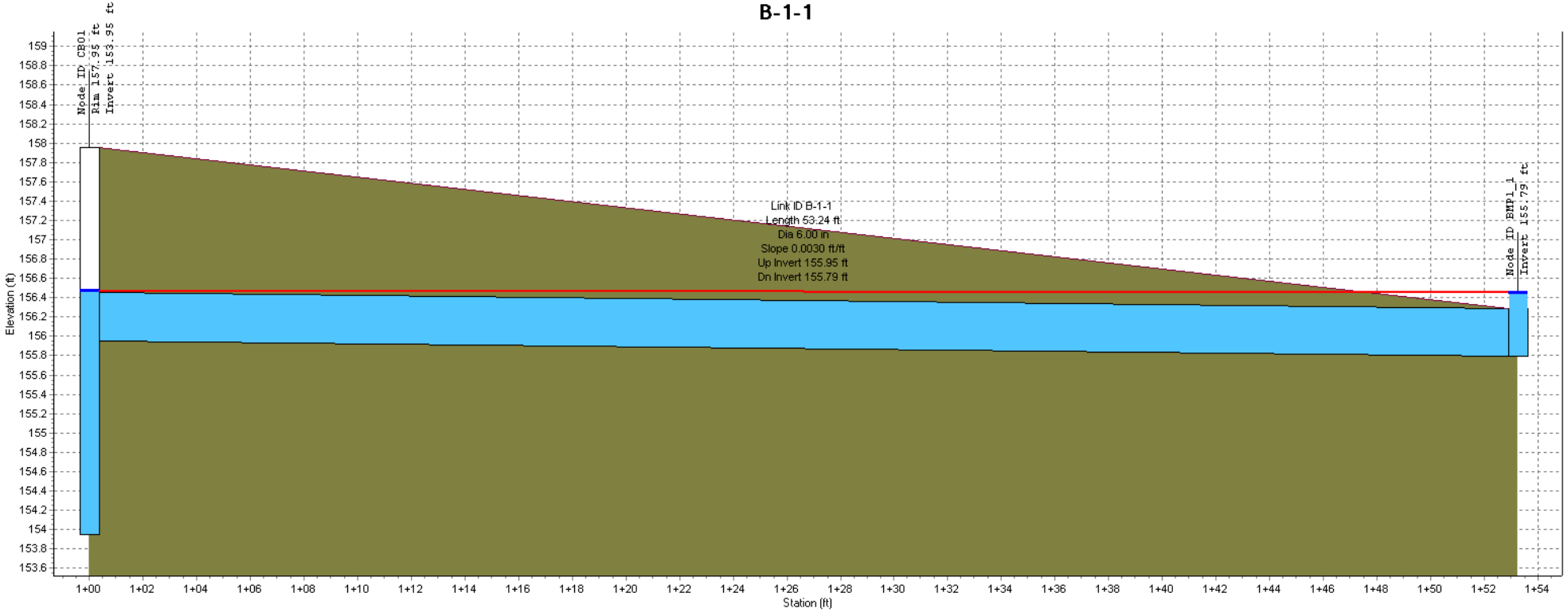


Node ID:	CB07		BMP2_1
Rim (ft):	154.07		
Invert (ft):	151.25		153.15
Min Pipe Cover (ft):			
Max HGL (ft):	153.67		153.65
Link ID:		A-7-1	
Length (ft):		19.84	
Dia (in):		6.00	
Slope (ft/ft):		0.0050	
Up Invert (ft):		153.25	
Dn Invert (ft):		153.15	
Max Q (cfs):		0.15	
Max Vel (ft/s):		0.81	
Max Depth (ft):		0.46	

Autodesk Storm and Sanitary Analysis

Profile Plot

B-1-1



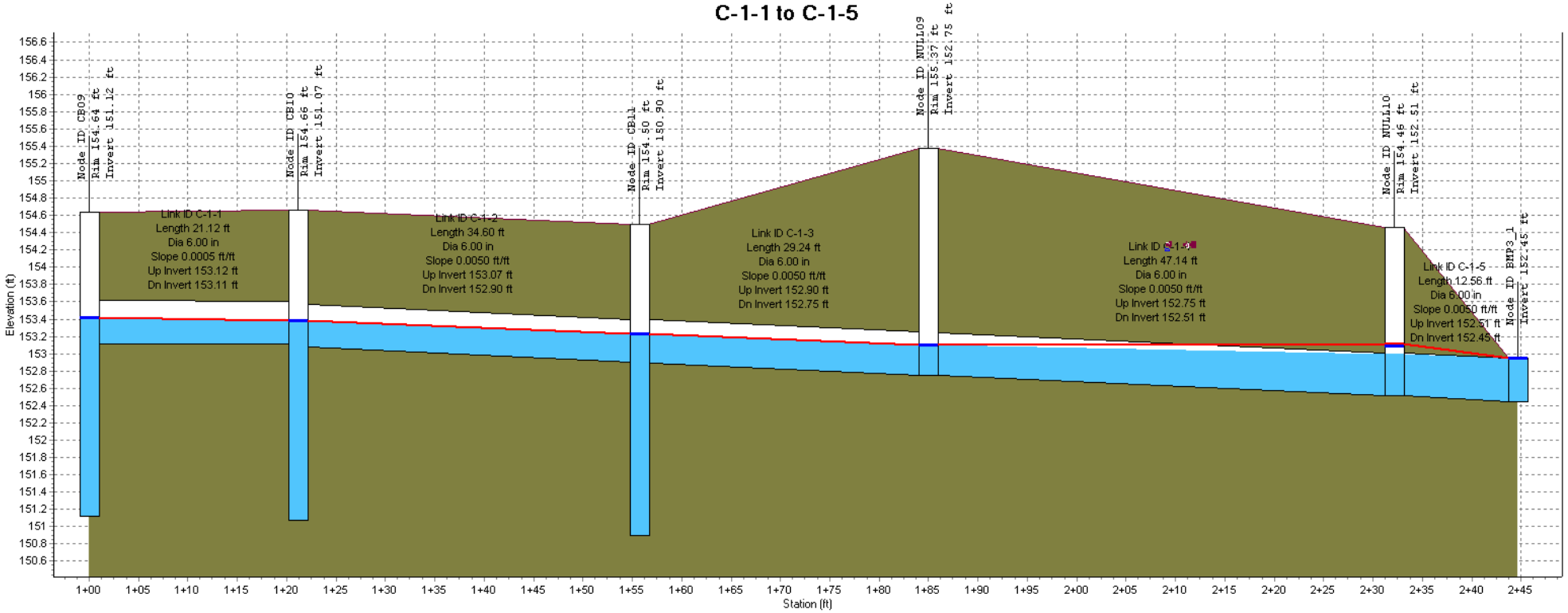
Node ID:	CB01	BMP1_1
Rim (ft):	157.95	
Invert (ft):	153.95	155.79
Min Pipe Cover (ft):		
Max HGL (ft):	156.48	156.45

Link ID:	B-1-1
Length (ft):	53.24
Dia (in):	6.00
Slope (ft/ft):	0.0030
Up Invert (ft):	155.95
Dn Invert (ft):	155.79
Max Q (cfs):	0.13
Max Vel (ft/s):	0.64
Max Depth (ft):	0.50

Autodesk Storm and Sanitary Analysis

Profile Plot

C-1-1 to C-1-5



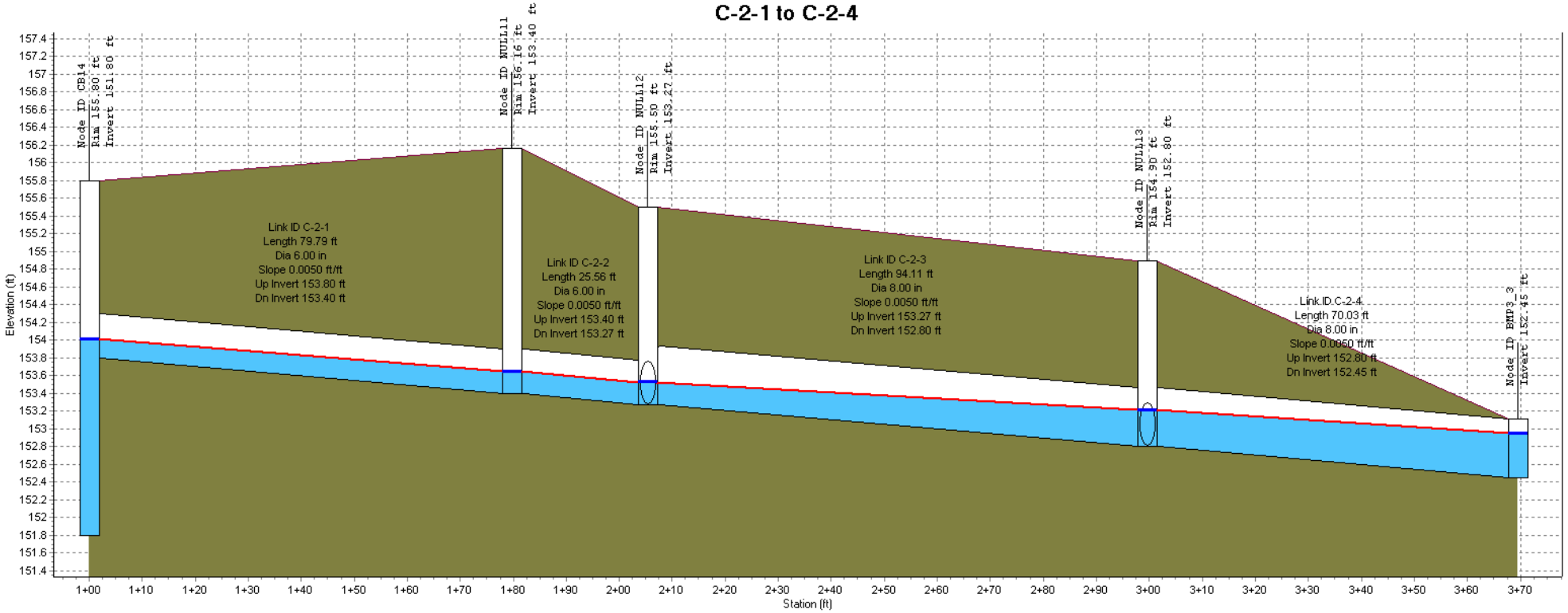
Node ID:	CB09	CB10	CB11	NULL09	NULL10	BMP3_1
Rim (ft):	154.64	154.66	154.50	155.37	154.46	
Invert (ft):	151.12	151.07	150.90	152.75	152.51	152.45
Min Pipe Cover (ft):				2.12	1.45	
Max HGL (ft):	153.42	153.38	153.23	153.10	153.11	152.95

Link ID:	C-1-1	C-1-2	C-1-3	C-1-4	C-1-5
Length (ft):	21.12	34.60	29.24	47.14	12.56
Dia (in):	6.00	6.00	6.00	6.00	6.00
Slope (ft/ft):	0.0005	0.0050	0.0050	0.0050	0.0050
Up Invert (ft):	153.12	153.07	152.90	152.75	152.51
Dn Invert (ft):	153.11	152.90	152.75	152.51	152.45
Max Q (cfs):	0.11	0.23	0.25	0.25	0.33
Max Vel (ft/s):	1.05	1.74	1.73	1.41	2.03
Max Depth (ft):	0.29	0.32	0.34	0.42	0.50

Autodesk Storm and Sanitary Analysis

Profile Plot

C-2-1 to C-2-4



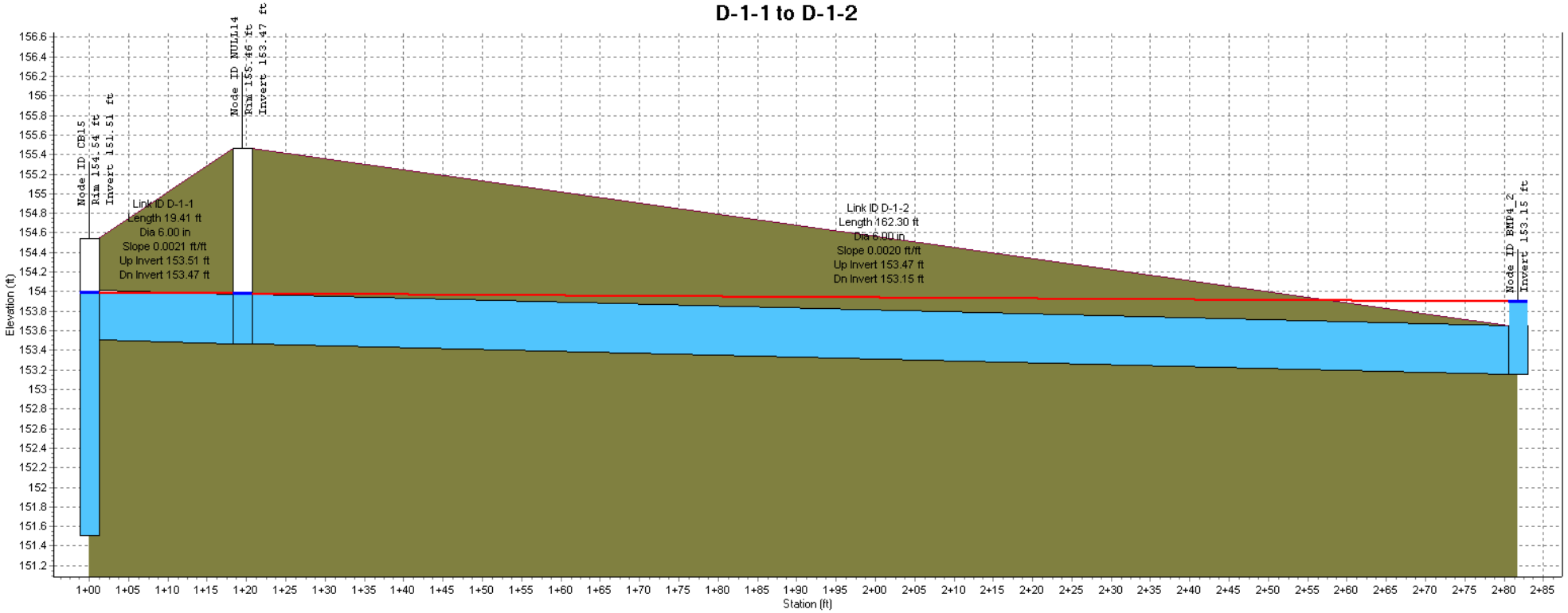
Node ID:	CB14	NULL11	NULL12	NULL13	BMP3_3
Rim (ft):	155.80	156.16	155.50	154.90	
Invert (ft):	151.80	153.40	153.27	152.80	152.45
Min Pipe Cover (ft):		2.26	1.56	1.43	
Max HGL (ft):	154.02	153.65	153.53	153.22	152.95

Link ID:	C-2-1	C-2-2	C-2-3	C-2-4
Length (ft):	79.79	25.56	94.11	70.03
Dia (in):	6.00	6.00	8.00	8.00
Slope (ft/ft):	0.0050	0.0050	0.0050	0.0050
Up Invert (ft):	153.80	153.40	153.27	152.80
Dn Invert (ft):	153.40	153.27	152.80	152.45
Max Q (cfs):	0.16	0.16	0.28	0.50
Max Vel (ft/s):	1.76	1.59	1.55	1.93
Max Depth (ft):	0.24	0.26	0.34	0.46

Autodesk Storm and Sanitary Analysis

Profile Plot

D-1-1 to D-1-2



Node ID:	CB15	NULL14	BMP4_2
Rim (ft):	154.54	155.46	
Invert (ft):	151.51	153.47	153.15
Min Pipe Cover (ft):		1.49	
Max HGL (ft):	153.99	153.98	153.90

Link ID:	D-1-1	D-1-2
Length (ft):	19.41	162.30
Dia (in):	6.00	6.00
Slope (ft/ft):	0.0021	0.0020
Up Invert (ft):	153.51	153.47
Dn Invert (ft):	153.47	153.15
Max Q (cfs):	0.17	0.16
Max Vel (ft/s):	2.75	1.09
Max Depth (ft):	0.49	0.50

Autodesk Storm and Sanitary Analysis

Project Description

File Name 115-SSA.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Santa Barbara UH
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	YES

Analysis Options

Start Analysis On	Nov 23, 2021	00:00:00
End Analysis On	Nov 24, 2021	00:00:00
Start Reporting On	Nov 23, 2021	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins	20
Nodes	48
Junctions	17
Outfalls	11
Flow Diversions	0
Inlets	20
Storage Nodes	0
Links	37
Channels	2
Pipes	35
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	Rain Gage-025yr	Time Series	TS-025YR	Intensity	inches	Oregon	Clackamas	25	4.00	SCS Type IA 24-hr

Subbasin Summary

SN	Subbasin ID	Area	Impervious Area	Impervious Area Curve Number	Pervious Area Curve Number	Total Rainfall	Total Runoff	Total Runoff Volume	Peak Runoff	Time of Concentration
		(ft²)	(%)			(in)	(in)	(ac-in)	(cfs)	(days hh:mm:ss)
1	DMA01	10917.01	76.00	98.00	76.00	3.99	3.27	0.82	0.20	0 00:05:00
2	DMA02	12238.01	87.00	98.00	76.00	3.99	3.49	0.98	0.24	0 00:05:00
3	DMA03	6123.01	91.00	98.00	76.00	3.99	3.57	0.50	0.13	0 00:05:00
4	DMA04	1530.00	100.00	98.00	76.00	3.99	3.76	0.13	0.03	0 00:05:00
5	DMA05	1552.00	100.00	98.00	76.00	3.99	3.76	0.13	0.03	0 00:05:00
6	DMA06	2004.02	100.00	98.00	76.00	3.99	3.76	0.17	0.04	0 00:05:00
7	DMA07	20144.02	100.00	98.00	76.00	3.99	3.76	1.74	0.44	0 00:05:00
8	DMA08	20083.99	100.00	98.00	76.00	3.99	3.76	1.73	0.43	0 00:05:00
9	DMA09	24005.00	100.00	98.00	76.00	3.99	3.76	2.07	0.52	0 00:05:00
10	DMA10	8343.00	85.00	98.00	76.00	3.99	3.44	0.66	0.15	0 00:11:12
11	DMA11	8165.02	97.00	98.00	76.00	3.99	3.70	0.69	0.17	0 00:05:00
12	DMA12	5899.98	94.00	98.00	76.00	3.99	3.63	0.49	0.12	0 00:05:00
13	DMA13	6881.00	79.00	98.00	76.00	3.99	3.32	0.52	0.11	0 00:17:06
14	DMA14	929.00	100.00	98.00	76.00	3.99	3.76	0.08	0.02	0 00:05:00
15	DMA15	10340.01	100.00	98.00	76.00	3.99	3.76	0.89	0.22	0 00:05:00
16	DMA16	7878.00	97.00	98.00	76.00	3.99	3.69	0.67	0.16	0 00:07:46
17	DMA17	5760.98	98.00	98.00	76.00	3.99	3.71	0.49	0.12	0 00:08:01
18	DMA18	44869.02	95.00	98.00	76.00	3.99	3.65	3.76	0.90	0 00:08:53
19	DMA19	5560.00	100.00	98.00	76.00	3.99	3.76	0.48	0.12	0 00:05:00
20	DMA20	16230.02	95.00	98.00	76.00	3.99	3.64	1.36	0.30	0 00:14:24

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	BMP#1 RISER	Junction	152.48	155.73	152.48	155.73	0.00	0.00	152.48	0.00	3.25	0 00:00	0.00	0.00
2	BMP#2 RISER	Junction	149.65	152.90	149.65	152.90	0.00	0.00	149.65	0.00	3.25	0 00:00	0.00	0.00
3	BMP#3 RISER	Junction	148.95	153.20	148.95	152.20	0.00	0.00	148.95	0.00	4.25	0 00:00	0.00	0.00
4	NULL01	Junction	154.31	158.02	154.31	155.38	0.00	1.31	155.07	0.00	2.95	0 00:00	0.00	0.00
5	NULL02	Junction	154.20	158.45	154.20	155.28	0.00	1.31	154.95	0.00	3.50	0 00:00	0.00	0.00
6	NULL03	Junction	154.06	158.57	154.06	155.13	0.00	1.34	154.80	0.00	3.77	0 00:00	0.00	0.00
7	NULL04	Junction	153.88	158.53	153.88	154.95	0.00	1.37	154.63	0.00	3.90	0 00:00	0.00	0.00
8	NULL05	Junction	153.70	158.50	153.70	154.77	0.00	1.41	154.46	0.00	4.04	0 00:00	0.00	0.00
9	NULL06	Junction	153.37	155.77	153.65	154.45	0.00	2.09	154.24	0.00	1.53	0 00:00	0.00	0.00
10	NULL07	Junction	153.77	156.44	153.55	154.91	0.00	0.69	154.26	0.00	2.18	0 00:00	0.00	0.00
11	NULL08	Junction	154.35	156.67	154.33	155.69	0.00	0.52	154.81	0.00	1.86	0 00:00	0.00	0.00
12	NULL09	Junction	152.75	155.37	152.75	153.29	0.00	0.25	153.10	0.00	2.27	0 00:00	0.00	0.00
13	NULL10	Junction	152.51	154.46	152.51	153.06	0.00	0.33	153.11	0.00	1.35	0 00:00	0.00	0.00
14	NULL11	Junction	153.40	156.16	153.40	153.94	0.00	0.16	153.65	0.00	2.51	0 00:00	0.00	0.00
15	NULL12	Junction	153.27	155.50	153.27	154.41	0.00	0.28	153.53	0.00	1.97	0 00:00	0.00	0.00
16	NULL13	Junction	152.80	154.90	152.80	153.93	0.00	0.50	153.22	0.00	1.68	0 00:00	0.00	0.00
17	NULL14	Junction	153.47	155.46	153.47	154.80	0.00	0.30	153.98	0.00	1.48	0 00:00	0.00	0.00
18	BMP1_1	Outfall	155.79					0.13	156.45					
19	BMP1_2	Outfall	151.57					0.00	151.57					
20	BMP2_1	Outfall	153.15					0.15	153.65					
21	BMP2_2	Outfall	153.33					2.09	153.95					
22	BMP2_3	Outfall	149.53					0.00	149.53					
23	BMP3_1	Outfall	152.45					0.33	152.95					
24	BMP3_2	Outfall	152.45					0.00	152.95					
25	BMP3_3	Outfall	152.45					0.50	152.95					
26	BMP3_4	Outfall	148.42					0.00	148.42					
27	BMP4_1	Outfall	153.40					0.01	153.90					
28	BMP4_2	Outfall	153.15					0.16	153.90					

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	A-1-01	Pipe	DS02	CB02	41.97	156.13	154.94	2.8200	6.000	0.0130	0.43	0.94	0.46	2.83	0.37	0.74	0.00	Calculated
2	A-1-02	Pipe	CB02	CB03	109.68	154.86	154.53	0.3000	8.000	0.0130	0.68	0.66	1.02	1.94	0.67	1.00	16.00	SURCHARGED
3	A-1-03	Pipe	CB03	NULL01	75.51	154.53	154.31	0.3000	12.000	0.0130	1.31	1.95	0.67	2.13	0.74	0.74	0.00	Calculated
4	A-1-04	Pipe	NULL01	NULL02	35.36	154.31	154.20	0.3000	12.000	0.0130	1.31	1.95	0.67	2.09	0.75	0.75	0.00	Calculated
5	A-1-05	Pipe	NULL02	NULL03	48.25	154.20	154.06	0.3000	12.000	0.0130	1.30	1.95	0.67	2.12	0.74	0.74	0.00	Calculated
6	A-1-06	Pipe	NULL03	NULL04	59.97	154.06	153.88	0.3000	12.000	0.0130	1.33	1.95	0.68	2.16	0.75	0.75	0.00	Calculated
7	A-1-07	Pipe	NULL04	NULL05	60.17	153.88	153.70	0.3000	12.000	0.0130	1.36	1.95	0.70	2.18	0.76	0.76	0.00	Calculated
8	A-1-08	Pipe	NULL05	NULL06	108.70	153.70	153.37	0.3000	12.000	0.0130	1.41	1.95	0.72	2.05	0.82	0.82	0.00	Calculated
9	A-1-09	Pipe	NULL06	BMP2_2	12.56	153.37	153.33	0.3000	12.000	0.0130	2.09	1.95	1.07	3.34	0.74	0.74	0.00	> CAPACITY
10	A-1-10	Pipe	BMP#2 RISER	BMP2_3	24.86	149.65	149.53	0.5000	6.000	0.0130	0.00	0.40	0.00	0.00	0.00	0.00	0.00	Calculated
11	A-2-1	Pipe	DS01	CB03	45.40	155.39	154.78	1.3400	6.000	0.0130	0.44	0.65	0.67	2.94	0.39	0.78	0.00	Calculated
12	A-3-1	Pipe	CB04	NULL03	7.60	154.35	154.31	0.5000	6.000	0.0130	0.03	0.40	0.08	0.84	0.47	0.94	0.00	Calculated
13	A-4-1	Pipe	CB05	NULL04	7.60	154.17	154.13	0.5000	6.000	0.0130	0.03	0.40	0.08	0.84	0.48	0.96	0.00	Calculated
14	A-5-1	Pipe	CB06	NULL05	7.61	153.99	153.95	0.5000	6.000	0.0130	0.04	0.40	0.11	0.95	0.49	0.97	0.00	Calculated
15	A-6-1	Pipe	DS03	NULL08	28.50	154.45	154.35	0.3500	8.000	0.0130	0.52	0.72	0.72	1.95	0.48	0.71	0.00	Calculated
16	A-6-2	Pipe	NULL08	NULL07	189.81	154.35	153.68	0.3500	8.000	0.0130	0.52	0.67	0.78	2.20	0.47	0.70	0.00	Calculated
17	A-6-2A	Pipe	CB08	NULL07	11.86	154.15	153.77	3.2000	6.000	0.0130	0.17	1.00	0.17	1.97	0.31	0.63	0.00	Calculated
18	A-6-3	Pipe	NULL07	NULL06	42.62	153.52	153.37	0.3500	12.000	0.0130	0.68	3.45	0.20	1.46	0.68	0.68	0.00	Calculated
19	A-7-1	Pipe	CB07	BMP2_1	19.84	153.25	153.15	0.5000	6.000	0.0130	0.15	0.40	0.38	0.81	0.46	0.92	0.00	Calculated
20	B-1-1	Pipe	CB01	BMP1_1	53.24	155.95	155.79	0.3000	6.000	0.0130	0.13	0.31	0.41	0.64	0.50	1.00	1424.00	SURCHARGED
21	B-1-2	Pipe	BMP#1 RISER	BMP1_2	60.16	152.48	151.57	1.5100	8.000	0.0130	0.00	1.48	0.00	0.00	0.00	0.00	0.00	Calculated
22	C-1-1	Pipe	CB09	CB10	21.12	153.12	153.11	0.0500	6.000	0.0130	0.11	0.25	0.44	1.05	0.29	0.57	0.00	Calculated
23	C-1-2	Pipe	CB10	CB11	34.60	153.07	152.90	0.5000	6.000	0.0130	0.23	0.40	0.58	1.74	0.32	0.64	0.00	Calculated
24	C-1-3	Pipe	CB11	NULL09	29.24	152.90	152.75	0.5000	6.000	0.0130	0.25	0.40	0.63	1.73	0.34	0.69	0.00	Calculated
25	C-1-4	Pipe	NULL09	NULL10	47.14	152.75	152.51	0.5000	6.000	0.0130	0.25	0.39	0.63	1.41	0.42	0.84	0.00	Calculated
26	C-1-5	Pipe	NULL10	BMP3_1	12.56	152.51	152.45	0.5000	6.000	0.0130	0.33	0.40	0.84	2.03	0.50	1.00	0.00	SURCHARGED
27	C-1-6	Pipe	BMP#3 RISER	BMP3_4	106.93	148.95	148.42	0.5000	6.000	0.0130	0.00	0.40	0.00	0.00	0.00	0.00	0.00	Calculated
28	C-2-1	Pipe	CB14	NULL11	79.79	153.80	153.40	0.5000	6.000	0.0130	0.16	0.40	0.41	1.76	0.24	0.47	0.00	Calculated
29	C-2-2	Pipe	NULL11	NULL12	25.56	153.40	153.27	0.5000	6.000	0.0130	0.16	0.40	0.41	1.59	0.26	0.51	0.00	Calculated
30	C-2-2A	Pipe	CB13	NULL12	10.96	153.32	153.27	0.5000	6.000	0.0130	0.12	0.39	0.30	1.19	0.25	0.51	0.00	Calculated
31	C-2-3	Pipe	NULL12	NULL13	94.11	153.27	152.80	0.5000	8.000	0.0130	0.28	0.85	0.33	1.55	0.34	0.51	0.00	Calculated
32	C-2-3A	Pipe	CB12	NULL13	5.51	152.83	152.80	0.5000	6.000	0.0130	0.22	0.40	0.56	1.41	0.43	0.85	0.00	Calculated
33	C-2-4	Pipe	NULL13	BMP3_3	70.03	152.80	152.45	0.5000	8.000	0.0150	0.50	0.74	0.67	1.93	0.46	0.69	0.00	Calculated
34	D-1-1	Pipe	CB15	NULL14	19.41	153.51	153.47	0.2100	6.000	0.0130	0.17	0.25	0.67	2.75	0.49	0.98	0.00	Calculated
35	D-1-2	Pipe	NULL14	BMP4_2	162.30	153.47	153.15	0.2000	6.000	0.0130	0.16	0.25	0.65	1.09	0.50	1.00	15.00	SURCHARGED
36	BMP3_CURBBREAK	Channel	BMP3_CURBBREAK	BMP3_2	2.83	153.54	152.45	38.5200	12.000	0.0330	0.00	13.44	0.00	0.00	0.25	0.25	0.00	
37	BMP4_CURBBREAK	Channel	BMP4_CURBBREAK	BMP4_1	6.53	154.50	153.40	16.8500	12.000	0.0330	0.01	8.89	0.00	0.03	0.25	0.25	0.00	

Inlet Summary

SN	Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Initial Water Elevation (ft)	Ponded Area (ft²)	Peak Flow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Allowable Spread (ft)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)
1	BMP3_CURBBREAK	FHWA HEC-22 GENERIC	N/A	On Sag	1	0.00	153.54	0.00	10.00	0.90	N/A	N/A	N/A	7.00	-1.60	153.76
2	BMP4_CURBBREAK	FHWA HEC-22 GENERIC	N/A	On Sag	1	0.00	154.51	0.00	10.00	0.30	N/A	N/A	N/A	7.00	3.67	154.83
3	CB01	FHWA HEC-22 GENERIC	N/A	On Sag	1	153.95	157.95	156.45	0.00	0.13	N/A	N/A	N/A	7.00	1.53	158.09
4	CB02	FHWA HEC-22 GENERIC	N/A	On Sag	1	152.86	156.83	154.64	0.00	0.24	N/A	N/A	N/A	7.00	1.83	156.97
5	CB03	FHWA HEC-22 GENERIC	N/A	On Sag	1	152.53	156.83	154.53	0.00	0.20	N/A	N/A	N/A	7.00	1.73	156.97
6	CB04	FHWA HEC-22 GENERIC	N/A	On Sag	1	152.35	158.57	154.35	0.00	0.03	N/A	N/A	N/A	7.00	1.22	158.70
7	CB05	FHWA HEC-22 GENERIC	N/A	On Sag	1	152.17	158.53	154.17	0.00	0.03	N/A	N/A	N/A	7.00	1.22	158.66
8	CB06	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.99	158.48	153.99	0.00	0.04	N/A	N/A	N/A	7.00	1.26	158.61
9	CB07	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.25	154.07	153.65	0.00	0.15	N/A	N/A	N/A	7.00	1.60	154.21
10	CB08	FHWA HEC-22 GENERIC	N/A	On Sag	1	152.15	156.17	154.15	0.00	0.17	N/A	N/A	N/A	7.00	1.66	156.31
11	CB09	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.12	154.64	153.12	0.00	0.11	N/A	N/A	N/A	7.00	1.49	154.78
12	CB10	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.07	154.66	153.07	0.00	0.12	N/A	N/A	N/A	7.00	1.52	154.80
13	CB11	FHWA HEC-22 GENERIC	N/A	On Sag	1	150.90	154.50	152.95	0.00	0.02	N/A	N/A	N/A	7.00	1.16	154.63
14	CB12	FHWA HEC-22 GENERIC	N/A	On Sag	1	150.83	154.88	152.95	0.00	0.22	N/A	N/A	N/A	7.00	1.78	155.02
15	CB13	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.32	155.44	153.32	0.00	0.12	N/A	N/A	N/A	7.00	1.51	155.58
16	CB14	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.80	155.80	153.80	0.00	0.16	N/A	N/A	N/A	7.00	1.63	155.94
17	CB15	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.51	154.54	153.90	0.00	0.12	N/A	N/A	N/A	7.00	1.52	154.68
18	DS01	FHWA HEC-22 GENERIC	N/A	On Sag	1	155.39	160.00	155.39	0.00	0.44	N/A	N/A	N/A	7.00	2.22	160.15
19	DS02	FHWA HEC-22 GENERIC	N/A	On Sag	1	156.13	160.00	156.13	0.00	0.43	N/A	N/A	N/A	7.00	2.21	160.15
20	DS03	FHWA HEC-22 GENERIC	N/A	On Sag	1	154.45	160.00	154.45	0.00	0.52	N/A	N/A	N/A	7.00	2.37	160.15

Subbasin Hydrology

Subbasin : DMA01

Input Data

Area (ft²)	10917.01
Impervious Area (%)	76.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	10917.01		92.72

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where :

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft²)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

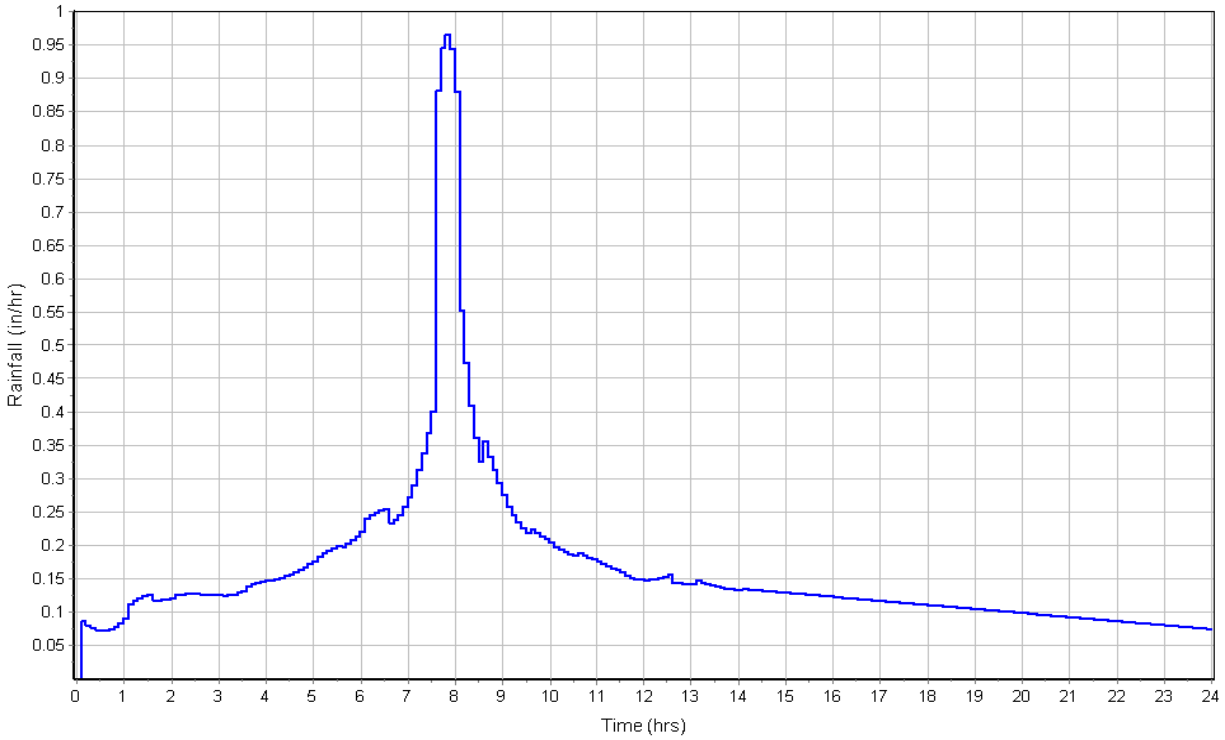
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

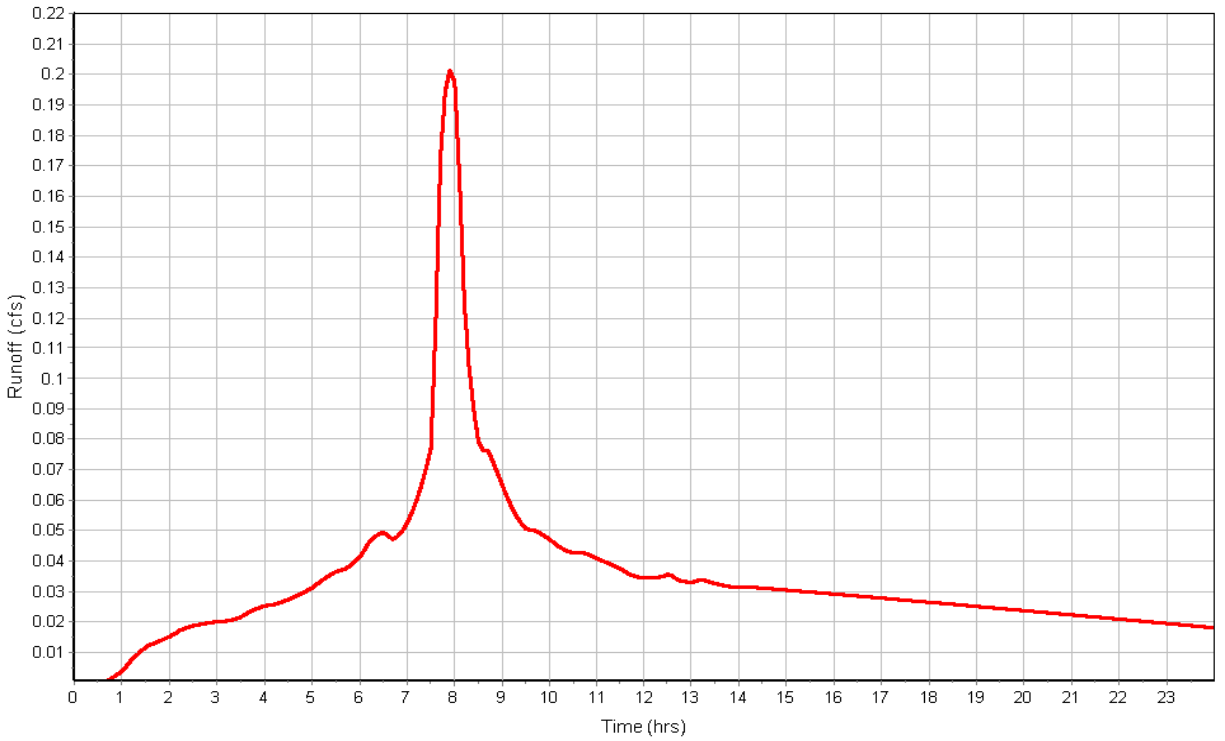
Total Rainfall (in)	3.99
Total Runoff (in)	3.27
Peak Runoff (cfs)	0.20
Weighted Curve Number	92.72
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA01

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA02

Input Data

Area (ft²)	12238.01
Impervious Area (%)	87.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	12238.01		95.14

Time of Concentration

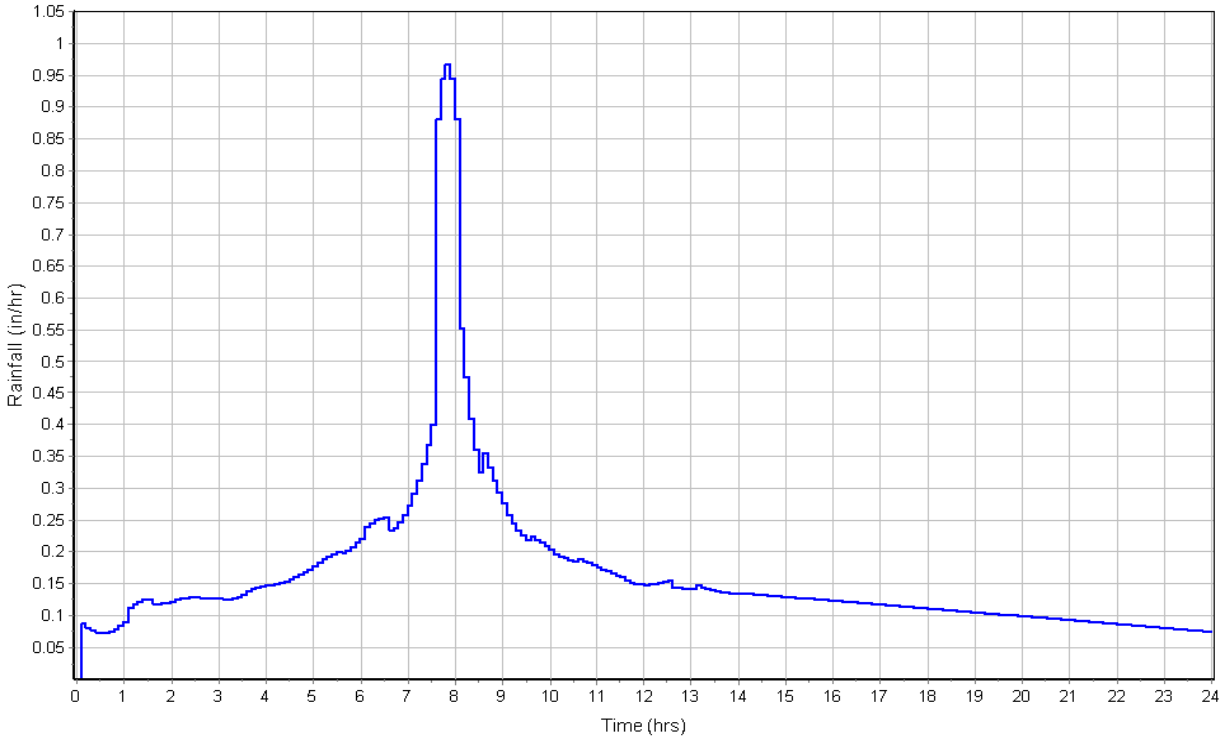
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

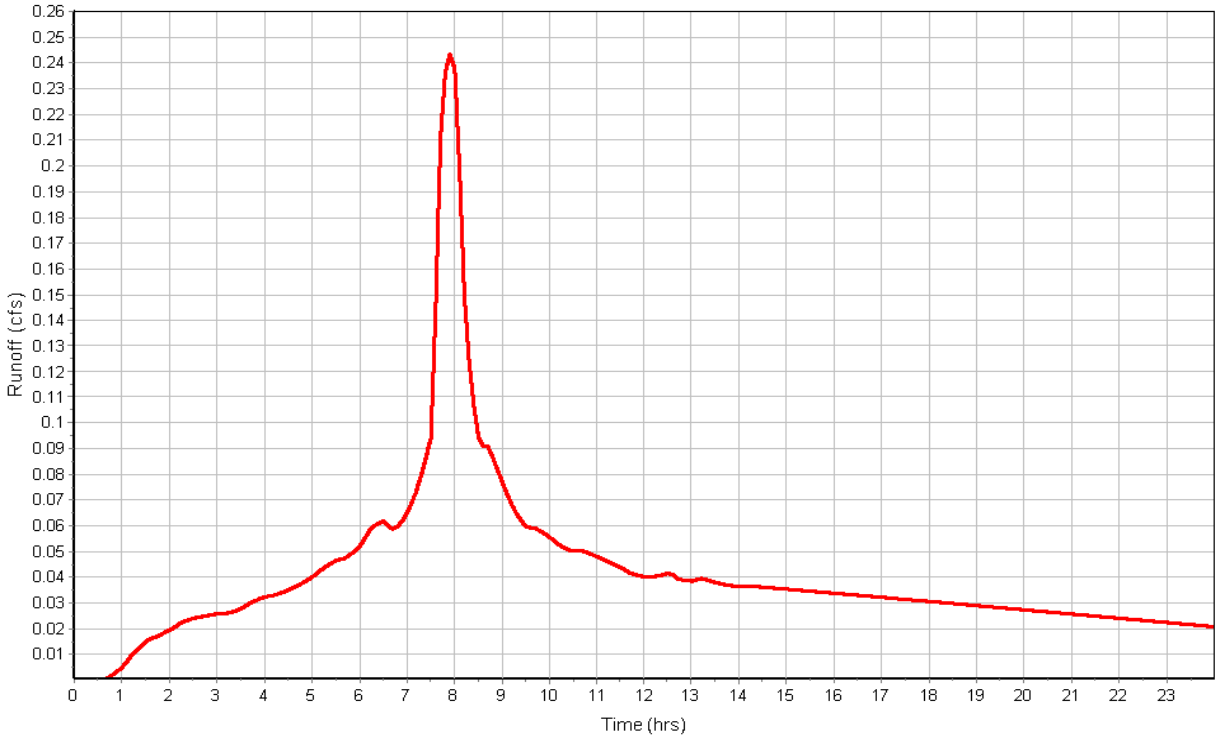
Total Rainfall (in)	3.99
Total Runoff (in)	3.49
Peak Runoff (cfs)	0.24
Weighted Curve Number	95.14
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA02

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA03

Input Data

Area (ft²)	6123.01
Impervious Area (%)	91.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	6123.01		96.02

Time of Concentration

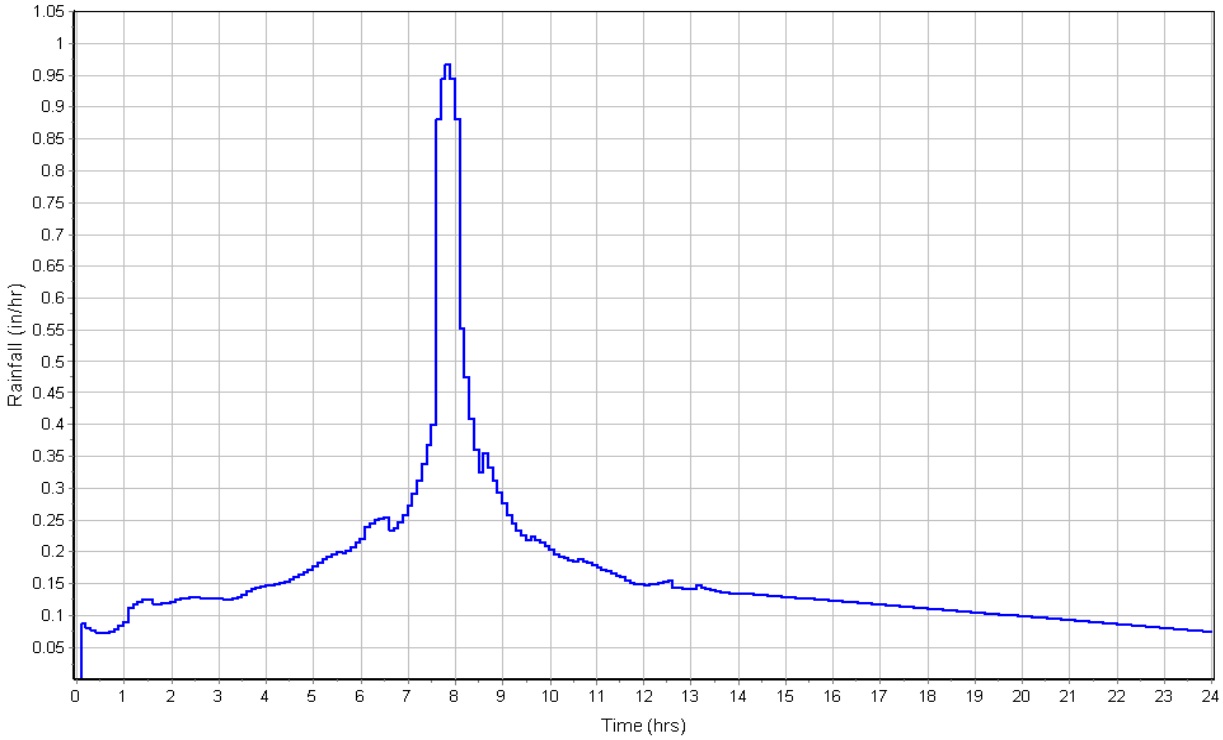
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

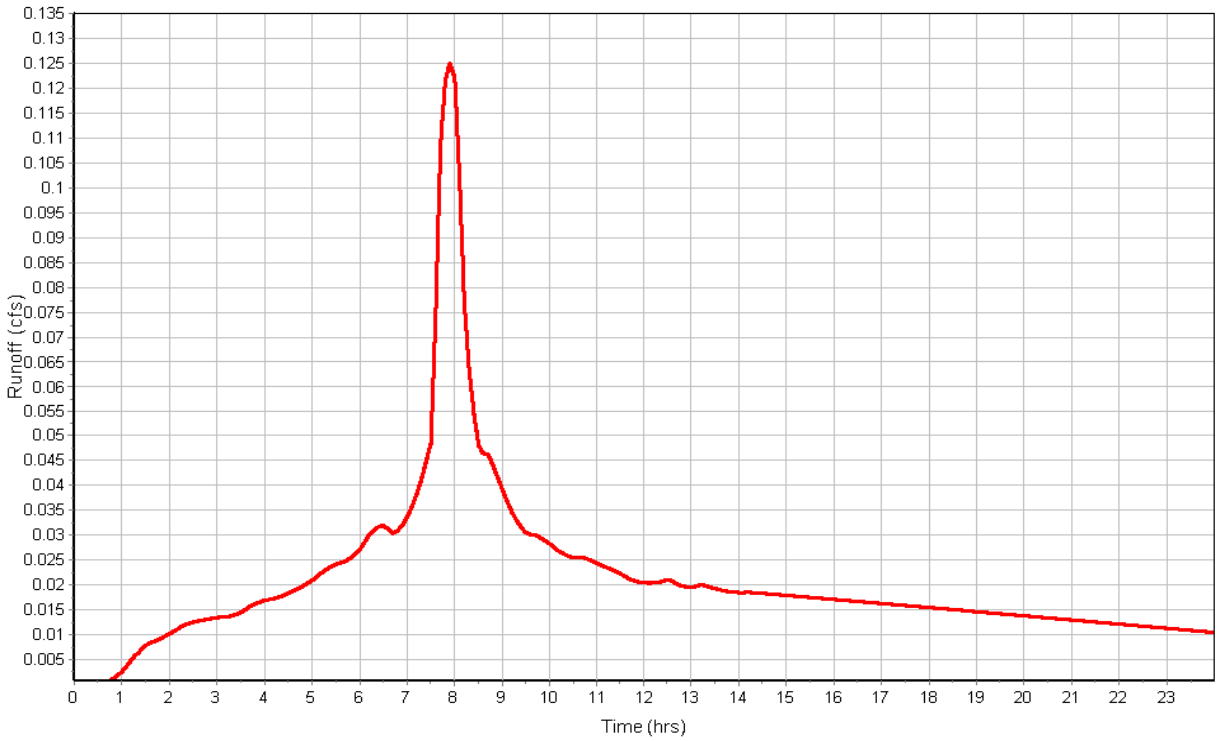
Total Rainfall (in)	3.99
Total Runoff (in)	3.57
Peak Runoff (cfs)	0.13
Weighted Curve Number	96.02
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA03

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA04

Input Data

Area (ft²)	1530.00
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	1530.00		98

Time of Concentration

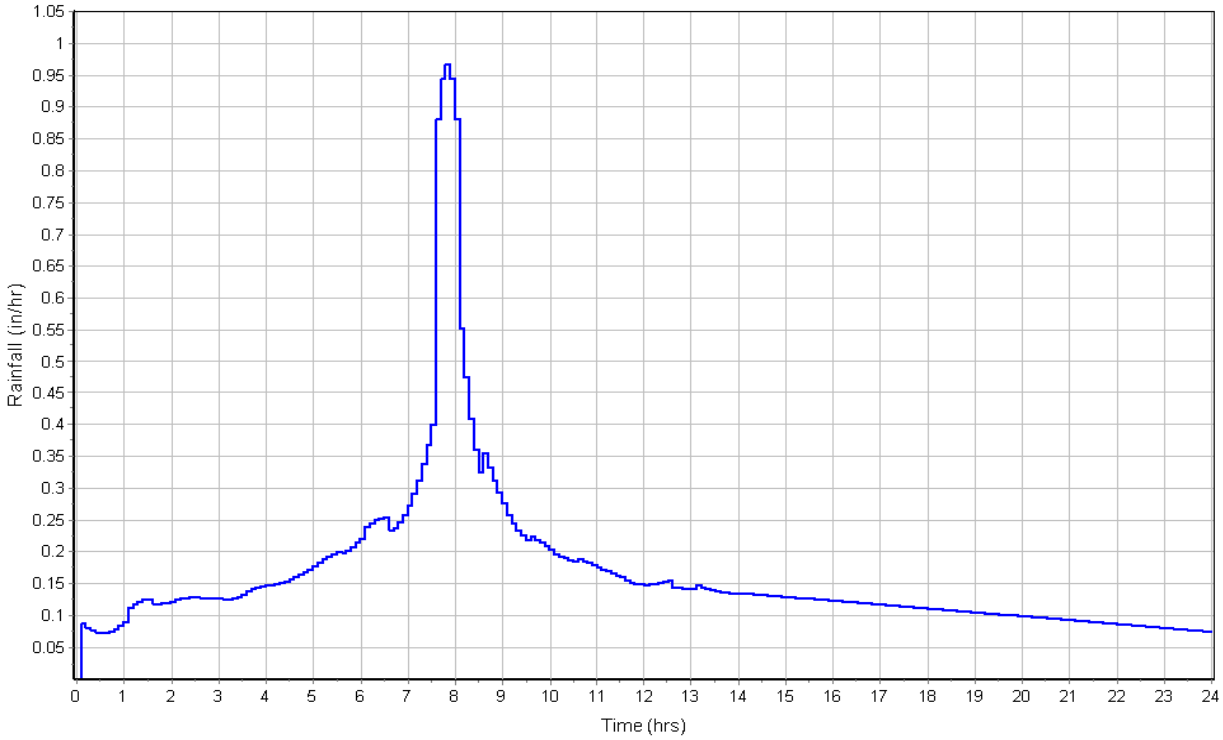
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

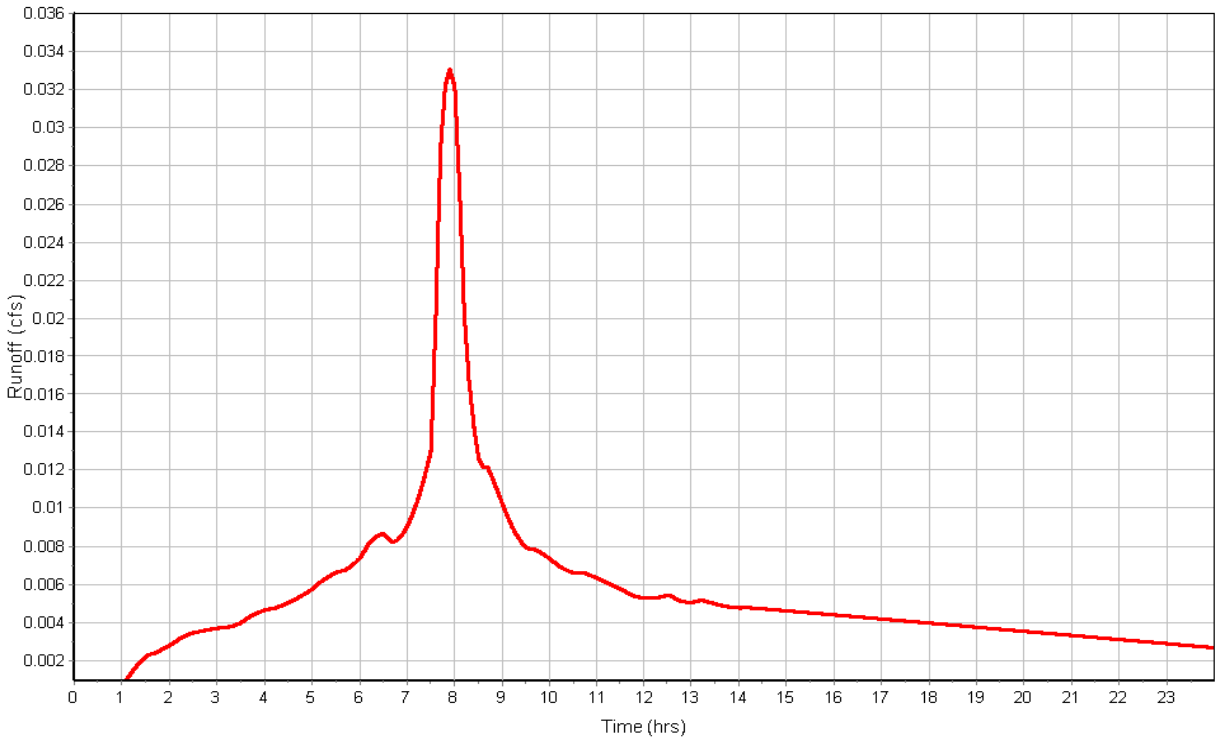
Total Rainfall (in)	3.99
Total Runoff (in)	3.76
Peak Runoff (cfs)	0.03
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA04

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA05

Input Data

Area (ft²)	1552.00
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	1552.00		98

Time of Concentration

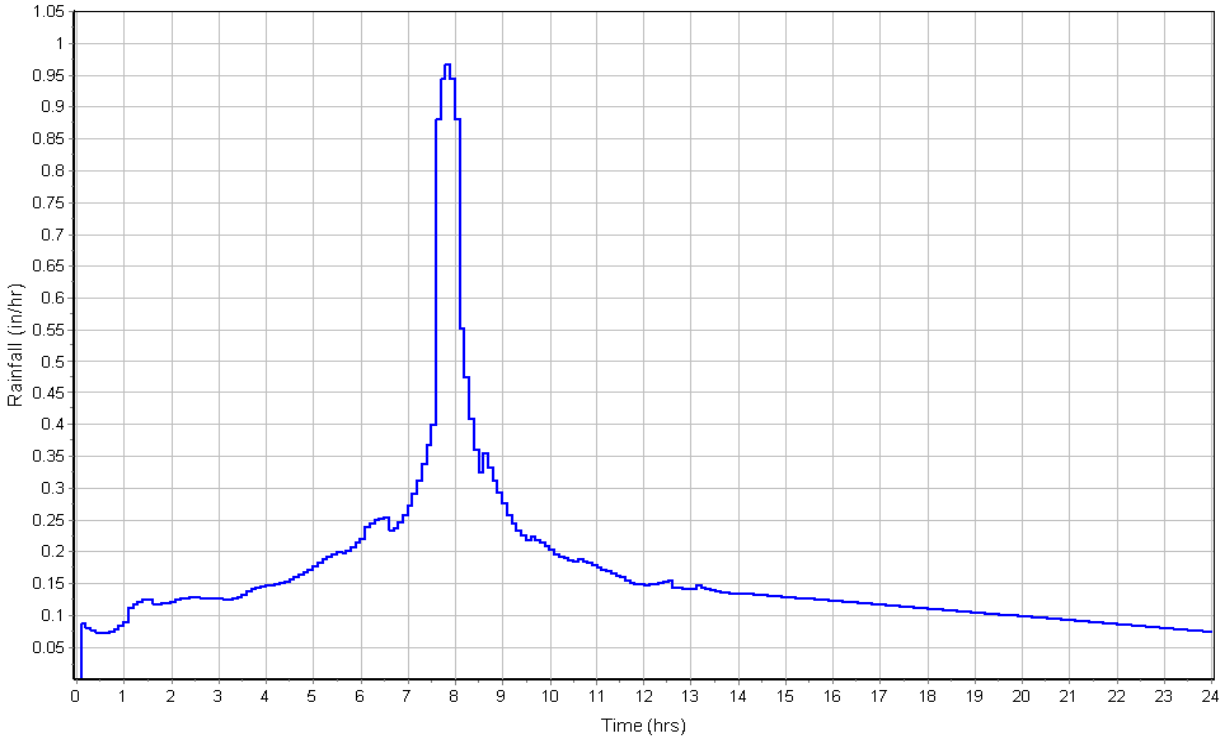
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

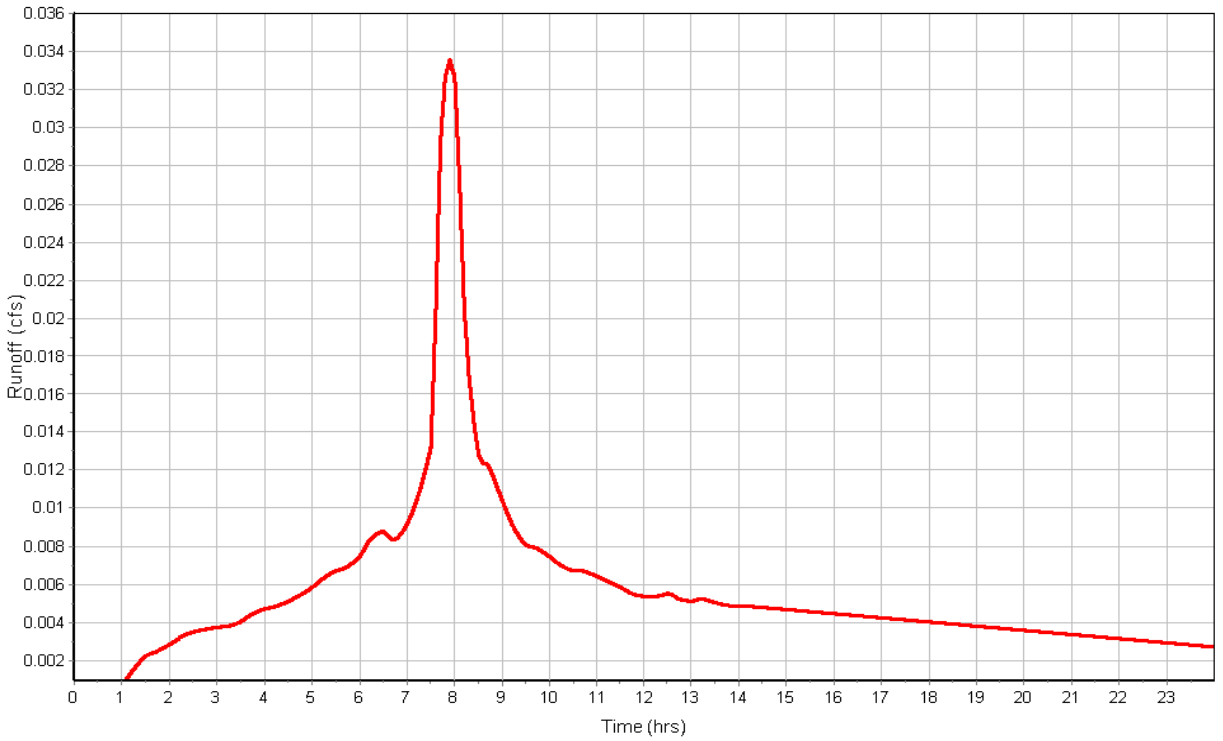
Total Rainfall (in)	3.99
Total Runoff (in)	3.76
Peak Runoff (cfs)	0.03
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA05

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA06

Input Data

Area (ft²)	2004.02
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	2004.02		98

Time of Concentration

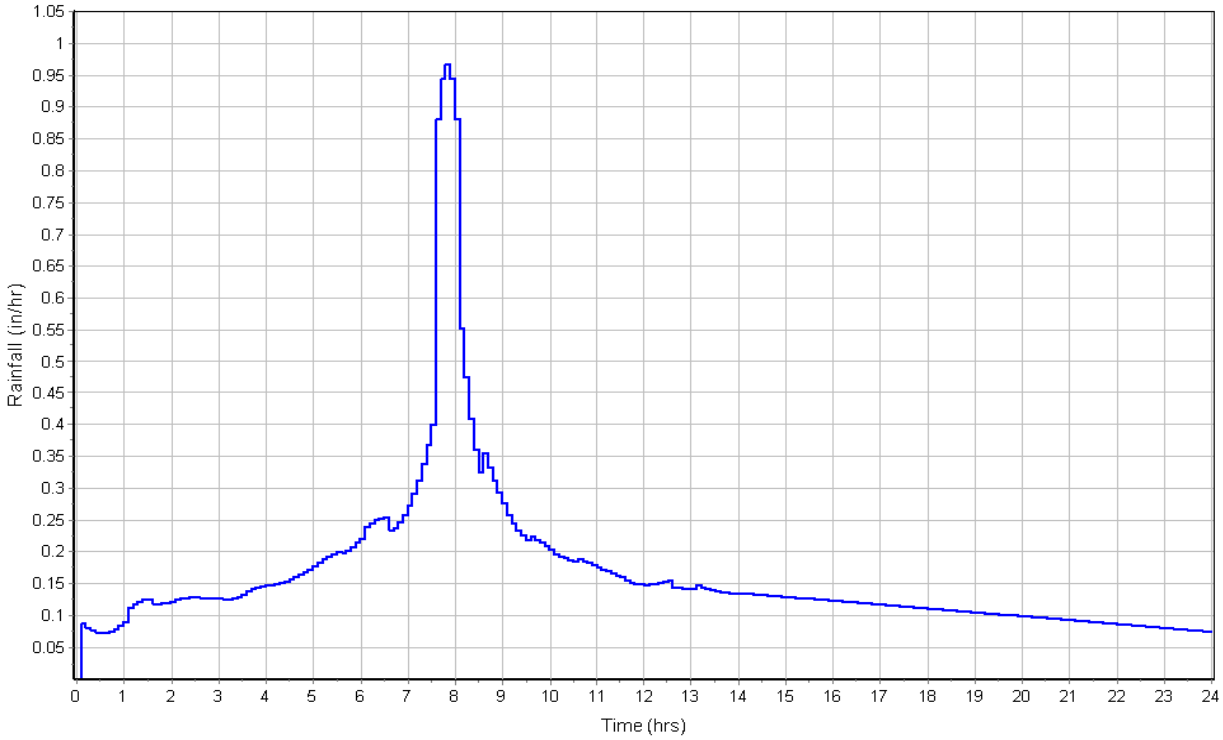
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

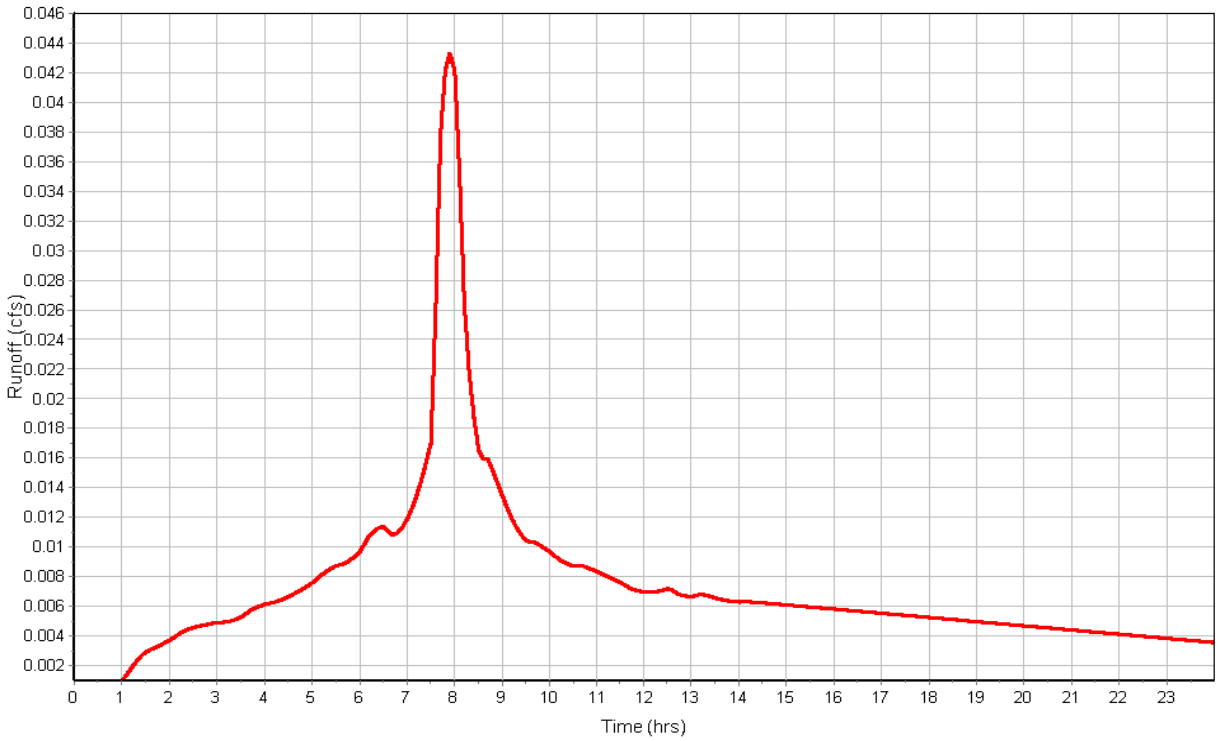
Total Rainfall (in)	3.99
Total Runoff (in)	3.76
Peak Runoff (cfs)	0.04
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA06

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA07

Input Data

Area (ft²)	20144.02
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	20144.02		98

Time of Concentration

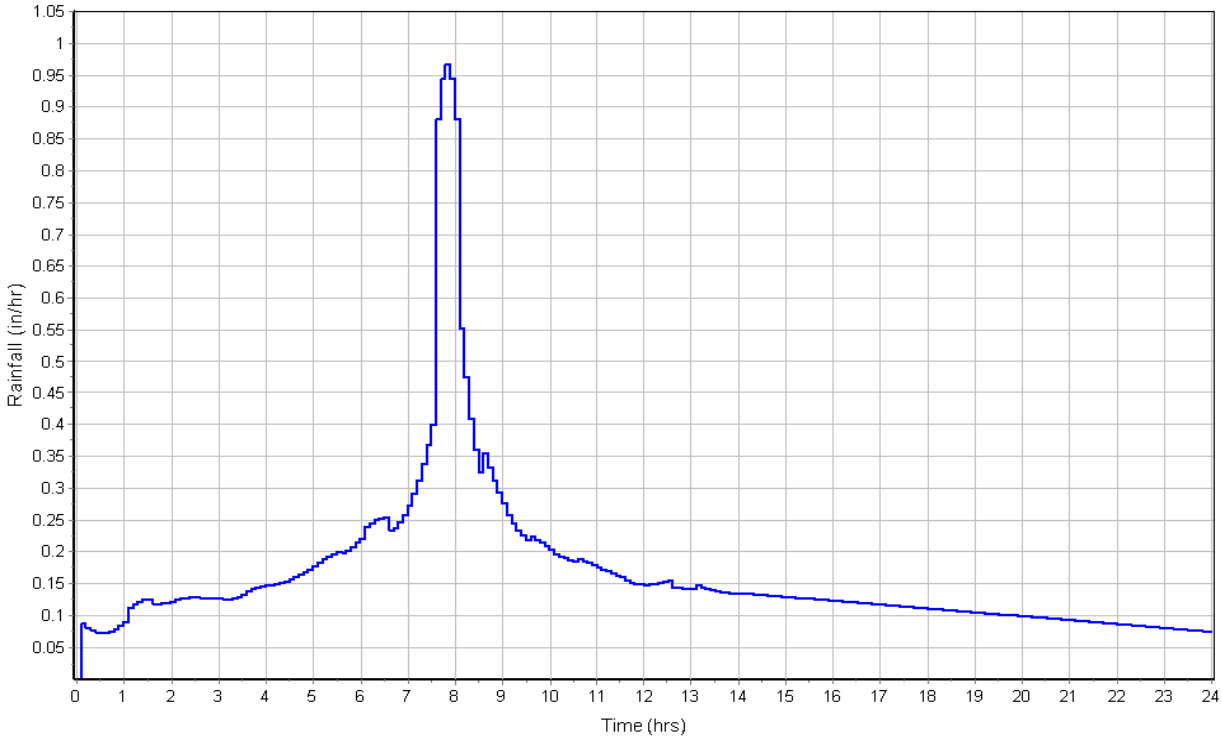
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

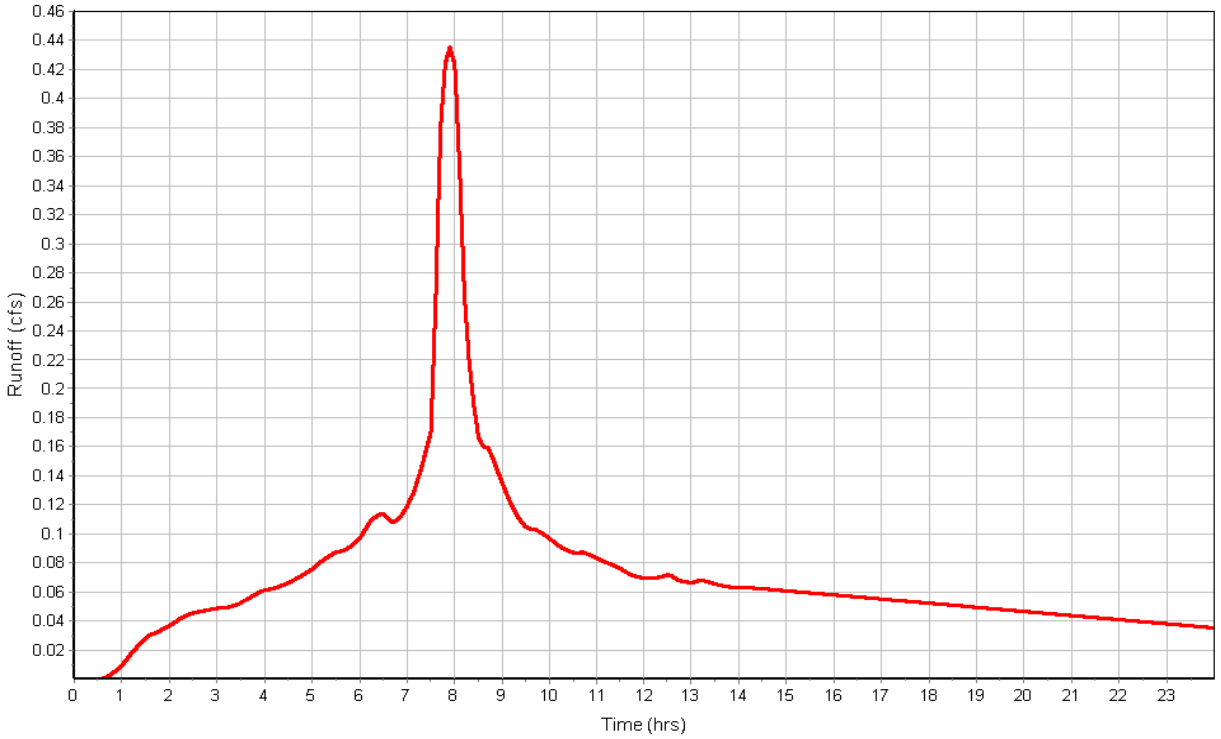
Total Rainfall (in)	3.99
Total Runoff (in)	3.76
Peak Runoff (cfs)	0.44
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA07

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA08

Input Data

Area (ft²)	20083.99
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	20083.99		98

Time of Concentration

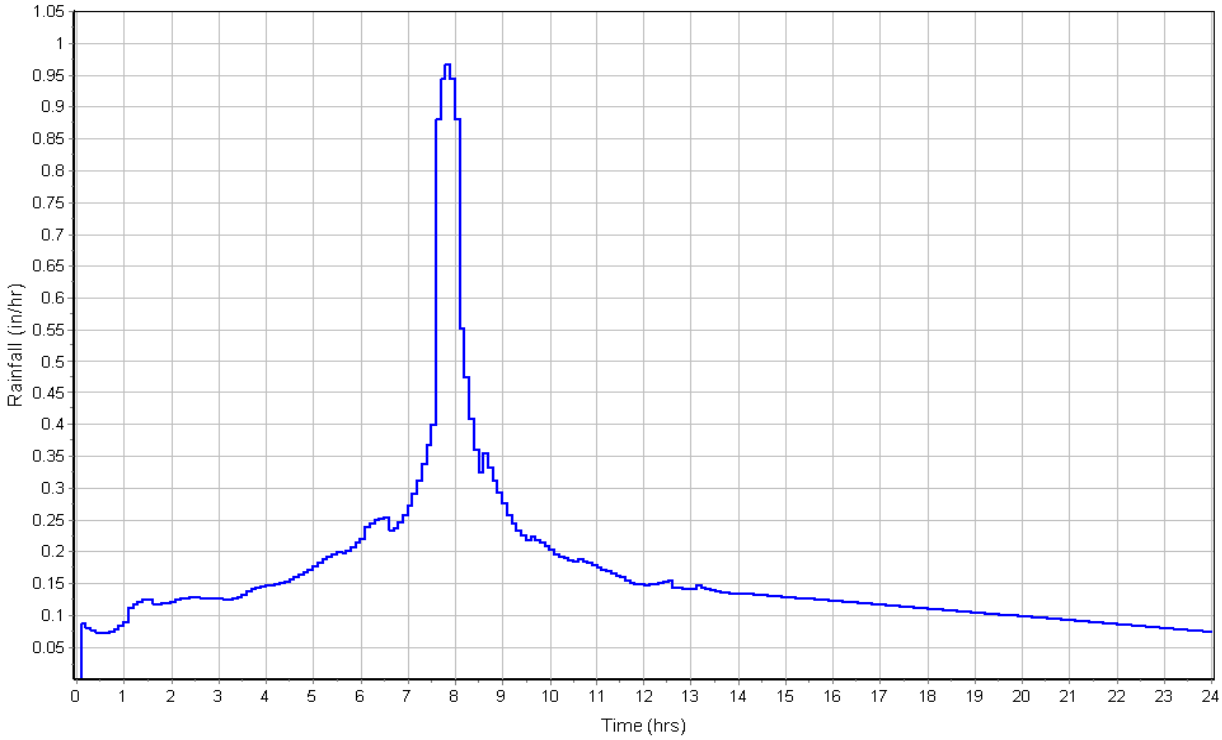
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

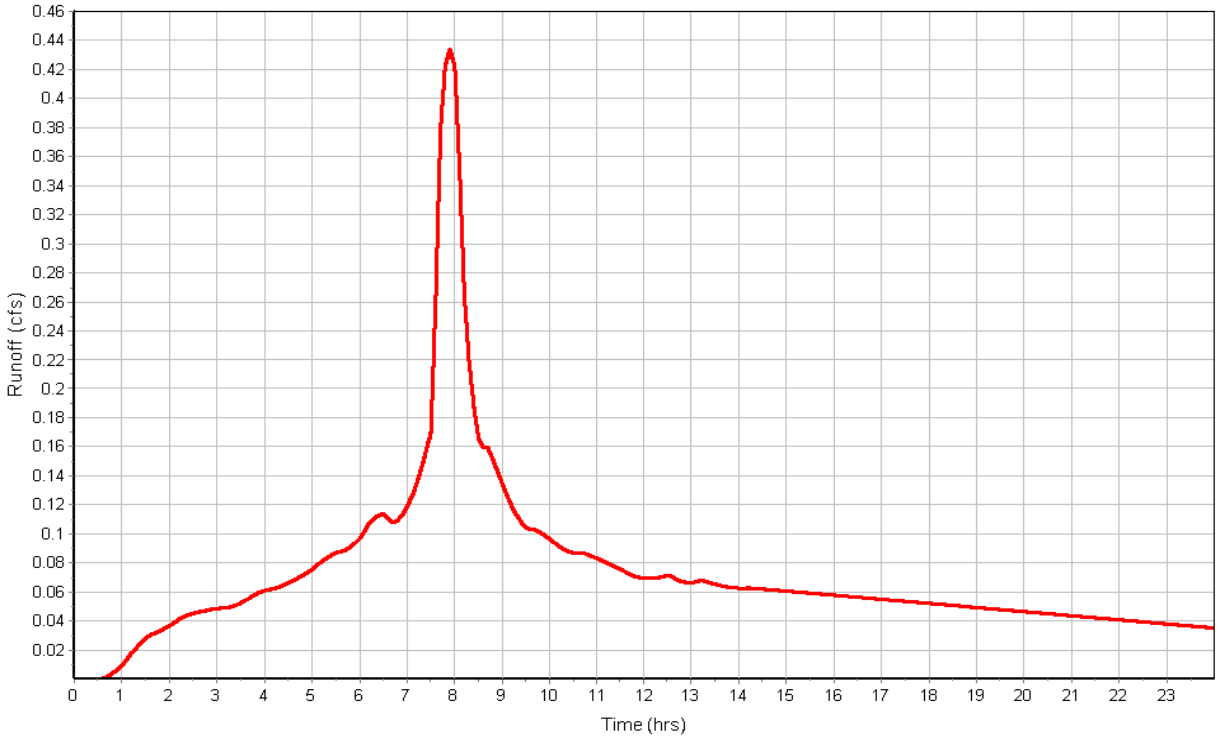
Total Rainfall (in)	3.99
Total Runoff (in)	3.76
Peak Runoff (cfs)	0.43
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA08

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA09

Input Data

Area (ft²)	24005.00
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	24005.00		98

Time of Concentration

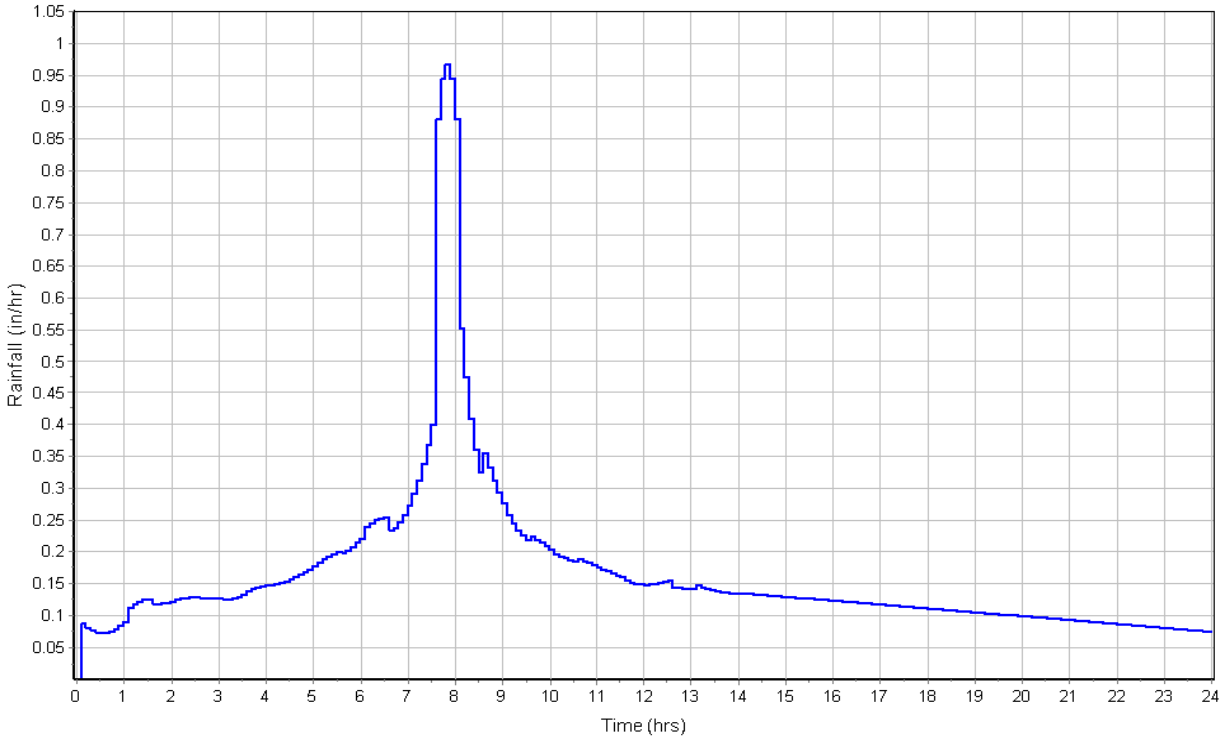
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

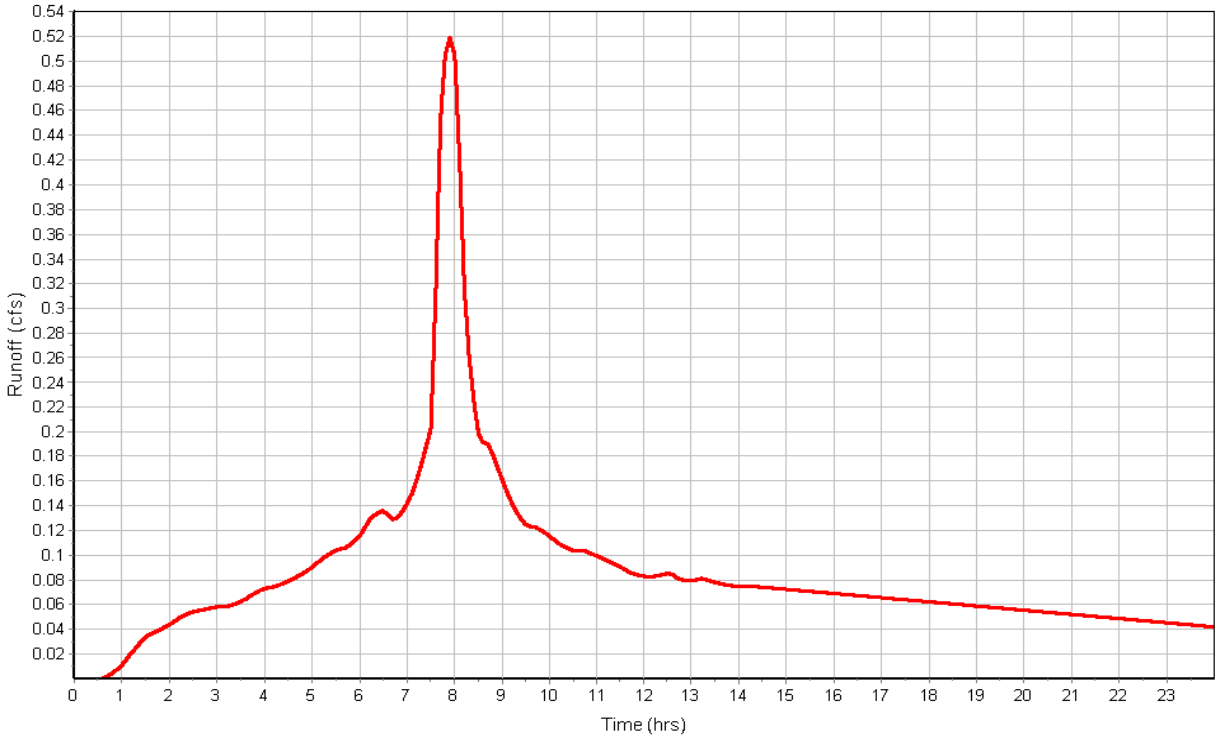
Total Rainfall (in)	3.99
Total Runoff (in)	3.76
Peak Runoff (cfs)	0.52
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA09

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA10

Input Data

Area (ft²) 8343.00
Impervious Area (%) 85.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID ..... Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	8343.00		94.7

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.4	0.01	0.00
Flow Length (ft) :	23.84	107.52	0.00
Slope (%) :	1	2	0.00
2 yr, 24 hr Rainfall (in) :	2.65	2.65	0.00
Velocity (ft/sec) :	0.04	1.37	0.00
Computed Flow Time (min) :	9.89	1.31	0.00

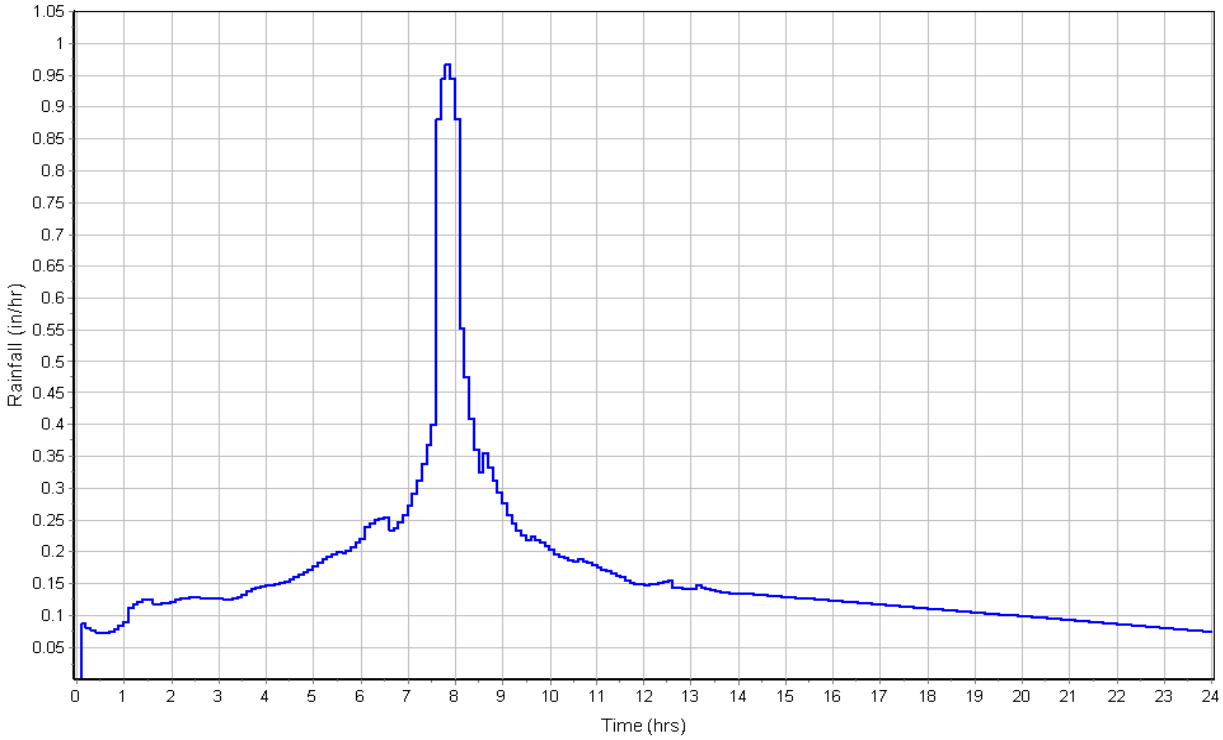
Total TOC (min) 11.20

Subbasin Runoff Results

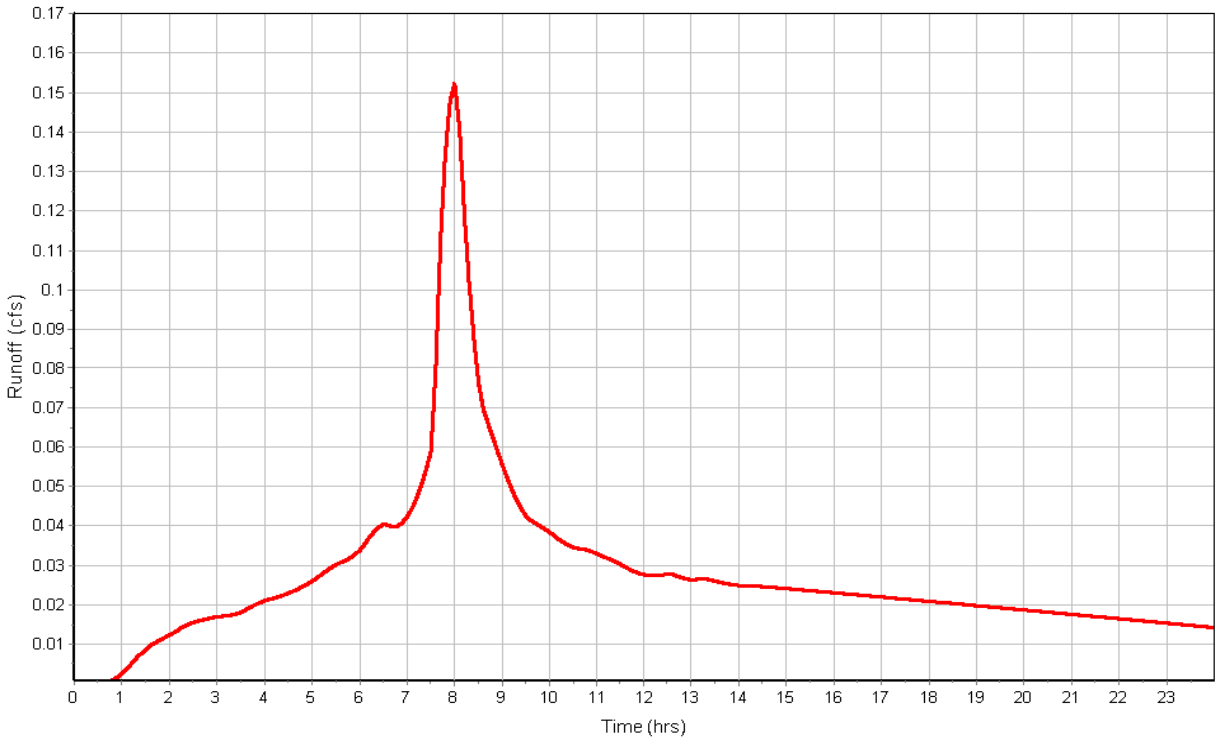
Total Rainfall (in) 3.99
Total Runoff (in) 3.44
Peak Runoff (cfs) 0.15
Weighted Curve Number 94.70
Time of Concentration (days hh:mm:ss) 0 00:11:12

Subbasin : DMA10

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA11

Input Data

Area (ft²)	8165.02
Impervious Area (%)	97.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	8165.02		97.34

Time of Concentration

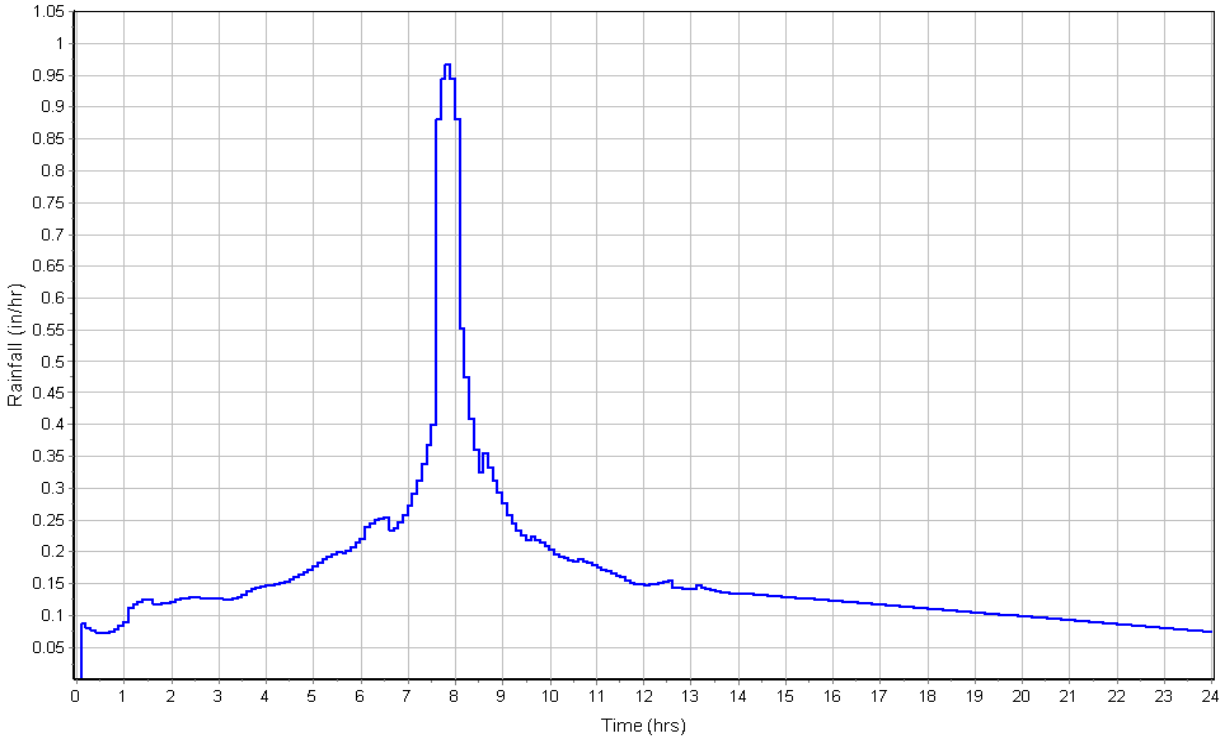
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

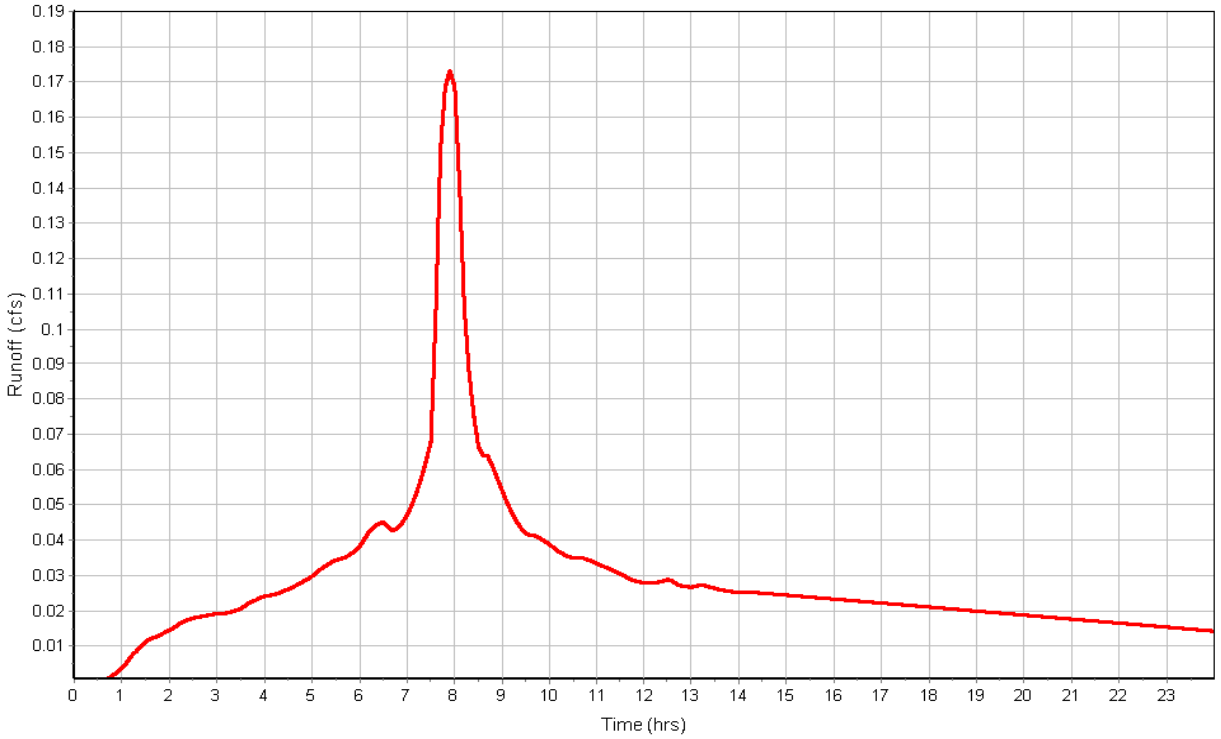
Total Rainfall (in)	3.99
Total Runoff (in)	3.70
Peak Runoff (cfs)	0.17
Weighted Curve Number	97.34
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA11

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA12

Input Data

Area (ft²)	5899.98
Impervious Area (%)	94.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	5899.98		96.68

Time of Concentration

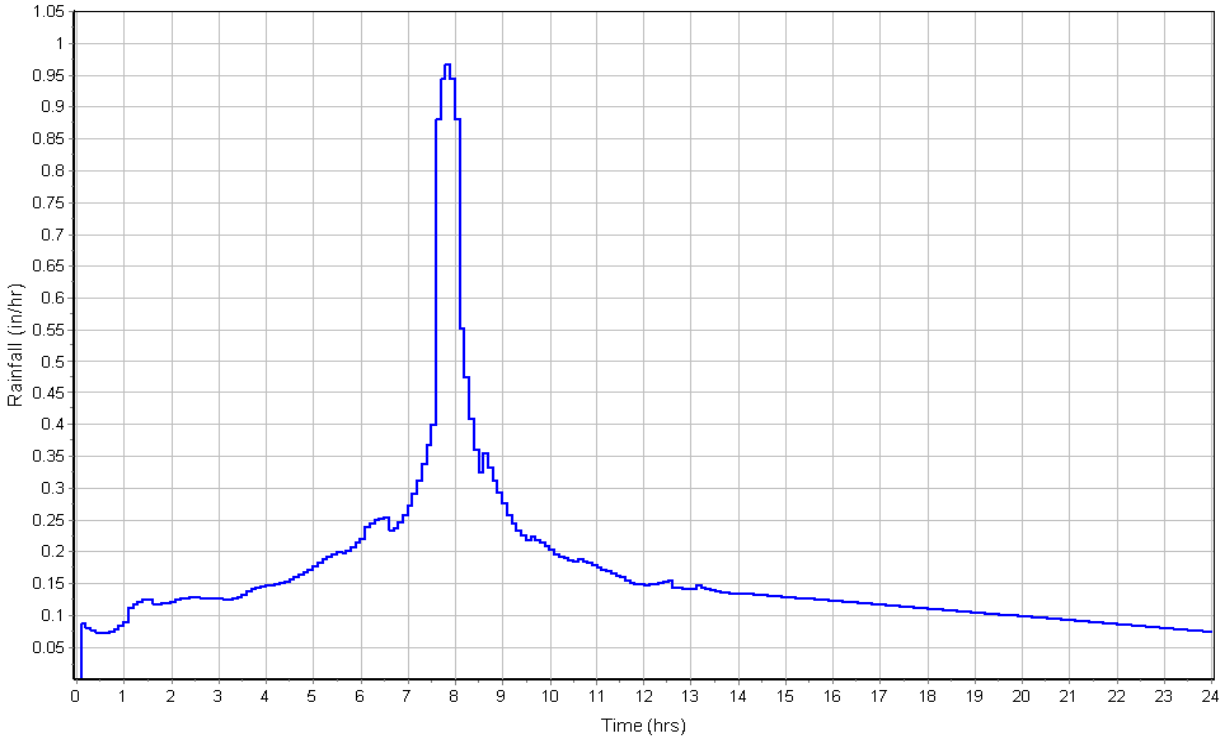
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

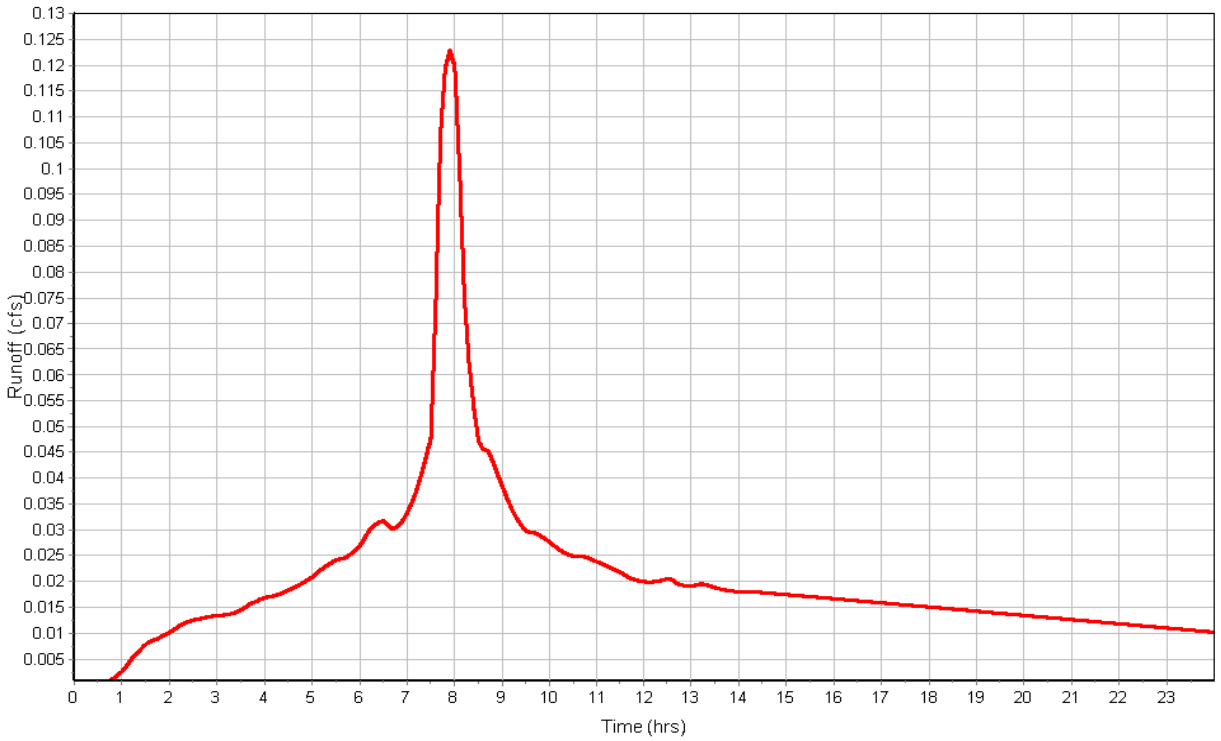
Total Rainfall (in)	3.99
Total Runoff (in)	3.63
Peak Runoff (cfs)	0.12
Weighted Curve Number	96.68
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA12

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA13

Input Data

Area (ft²) 6881.00
Impervious Area (%) 79.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID ..... Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	6881.00		93.38

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.4	0.01	0.00
Flow Length (ft) :	59.68	126.6	0.00
Slope (%) :	2	2	0.00
2 yr, 24 hr Rainfall (in) :	2.65	2.65	0.00
Velocity (ft/sec) :	0.06	1.42	0.00
Computed Flow Time (min) :	15.61	1.49	0.00

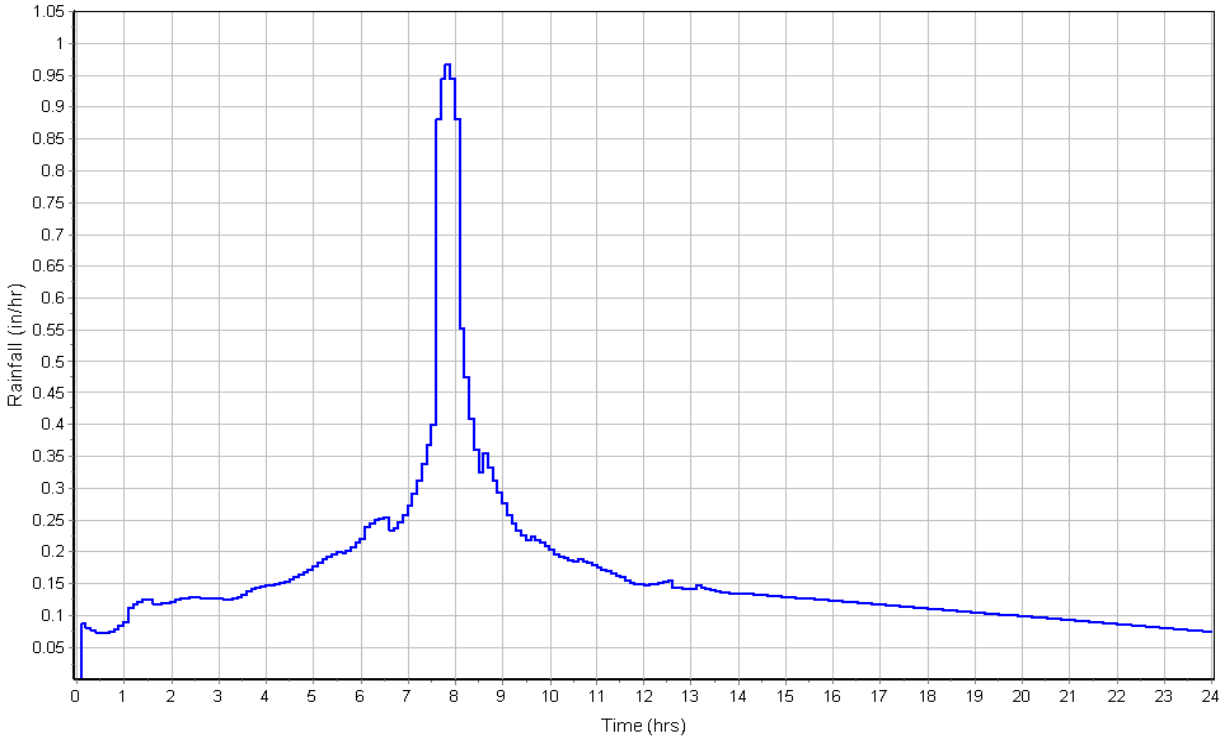
Total TOC (min) 17.10

Subbasin Runoff Results

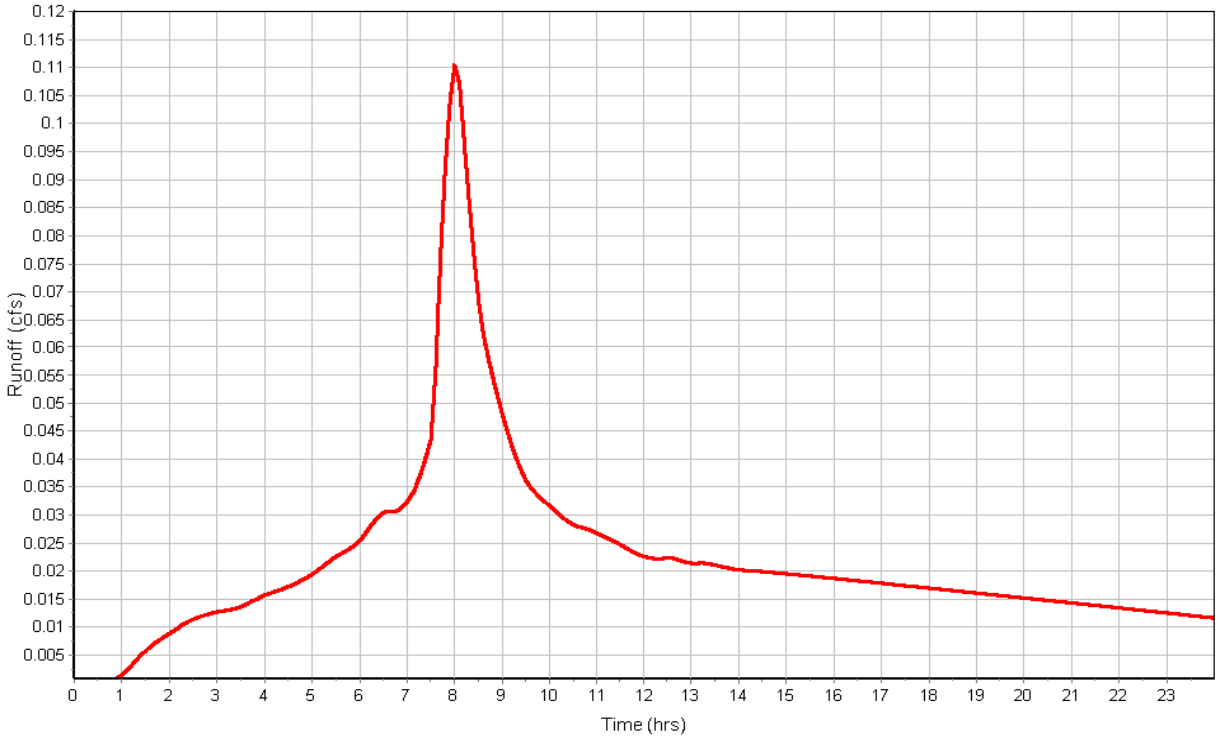
Total Rainfall (in) 3.99
Total Runoff (in) 3.32
Peak Runoff (cfs) 0.11
Weighted Curve Number 93.38
Time of Concentration (days hh:mm:ss) 0 00:17:06

Subbasin : DMA13

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA14

Input Data

Area (ft²)	929.00
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	929.00		98

Time of Concentration

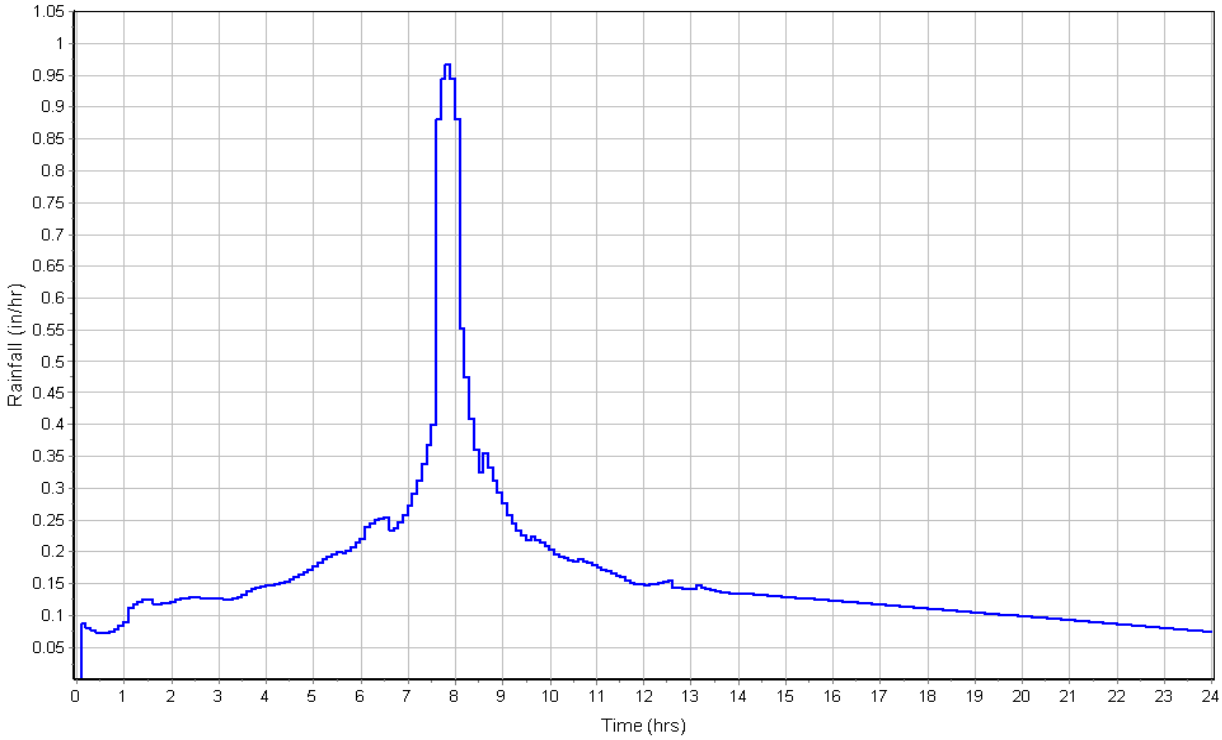
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

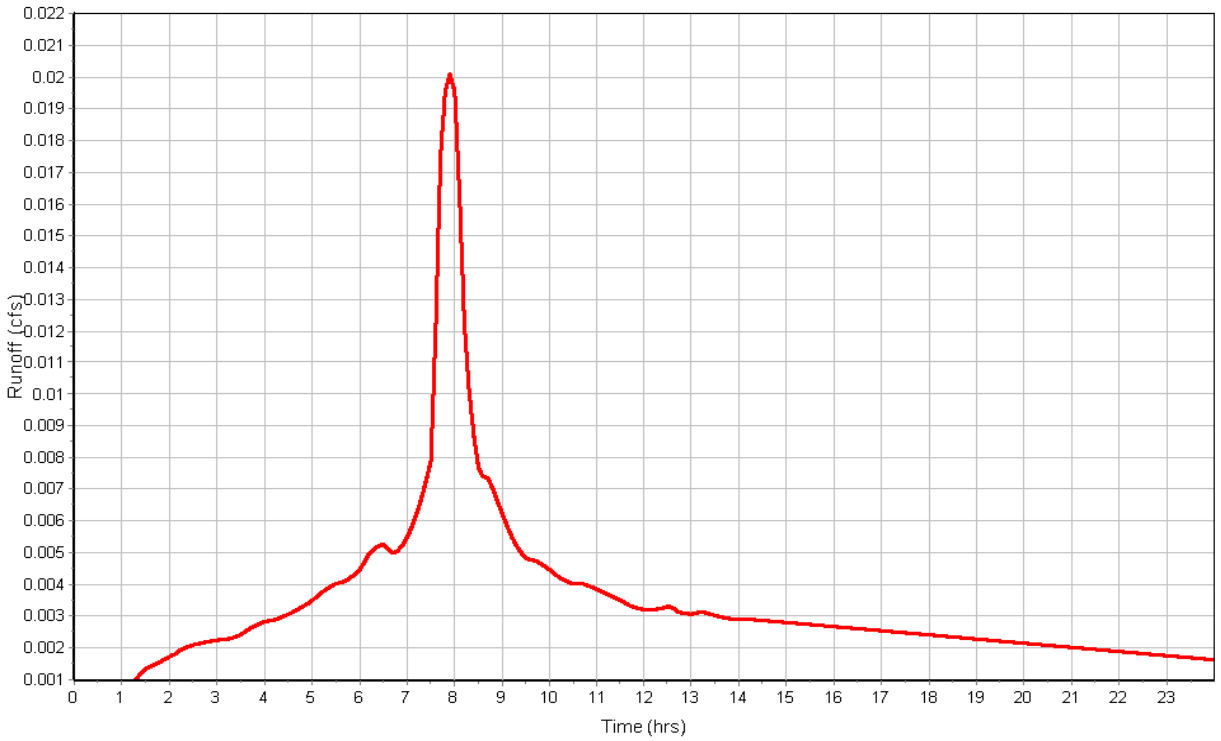
Total Rainfall (in)	3.99
Total Runoff (in)	3.76
Peak Runoff (cfs)	0.02
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA14

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA15

Input Data

Area (ft²)	10340.01
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	10340.01		98

Time of Concentration

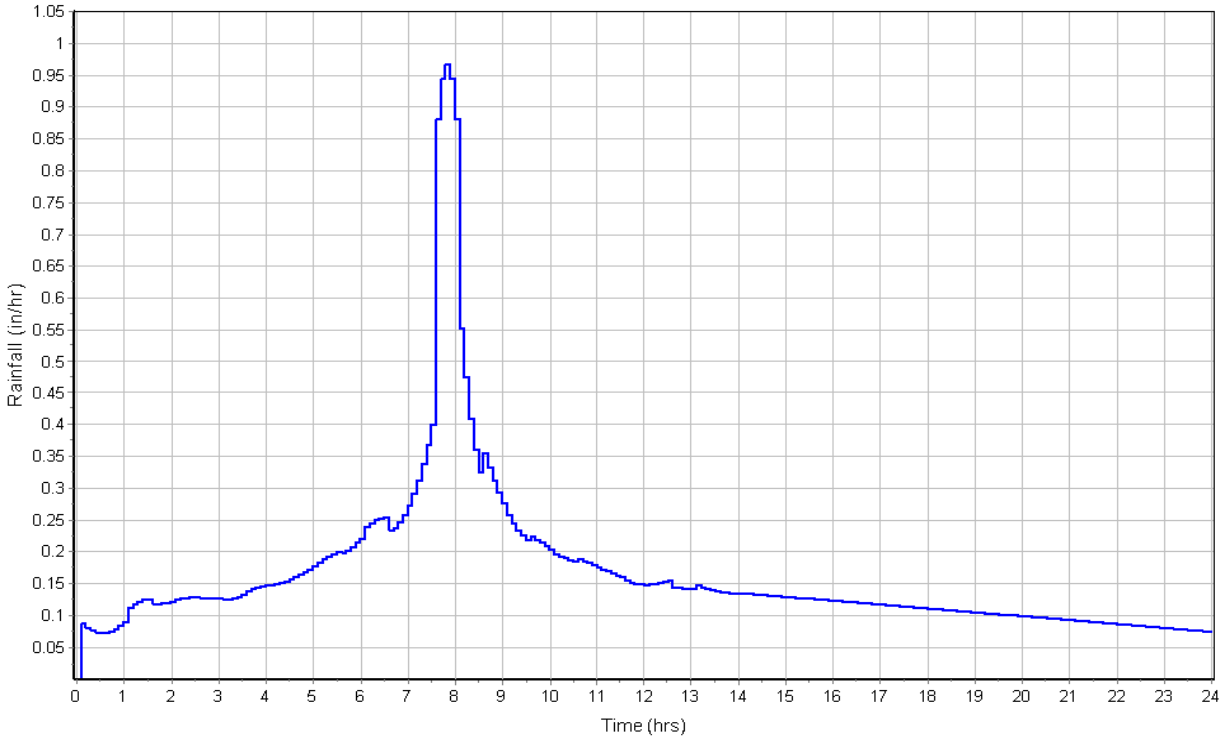
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

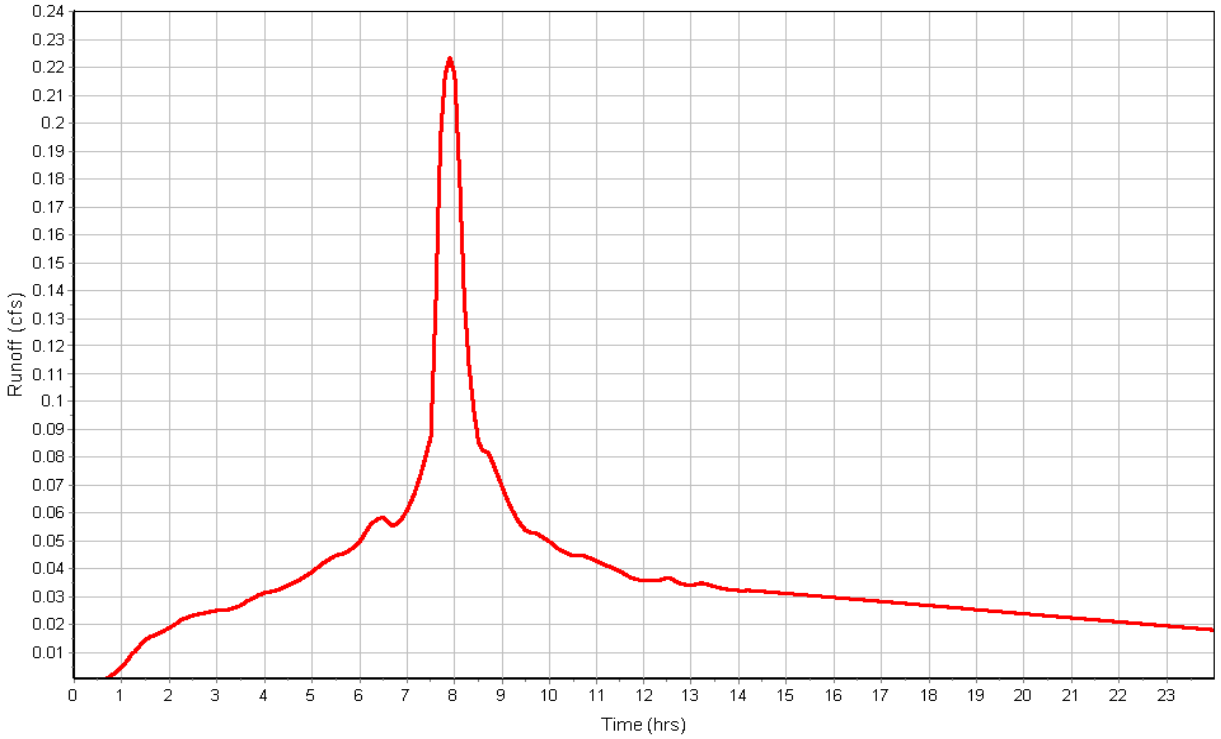
Total Rainfall (in)	3.99
Total Runoff (in)	3.76
Peak Runoff (cfs)	0.22
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA15

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA16

Input Data

Area (ft²)	7878.00
Impervious Area (%)	97.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	7878.00		97.34

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.4	0.01	0.00
Flow Length (ft) :	16.62	21.91	0.00
Slope (%) :	1	2	0.00
2 yr, 24 hr Rainfall (in) :	2.65	2.65	0.00
Velocity (ft/sec) :	0.04	1.00	0.00
Computed Flow Time (min) :	7.41	0.37	0.00

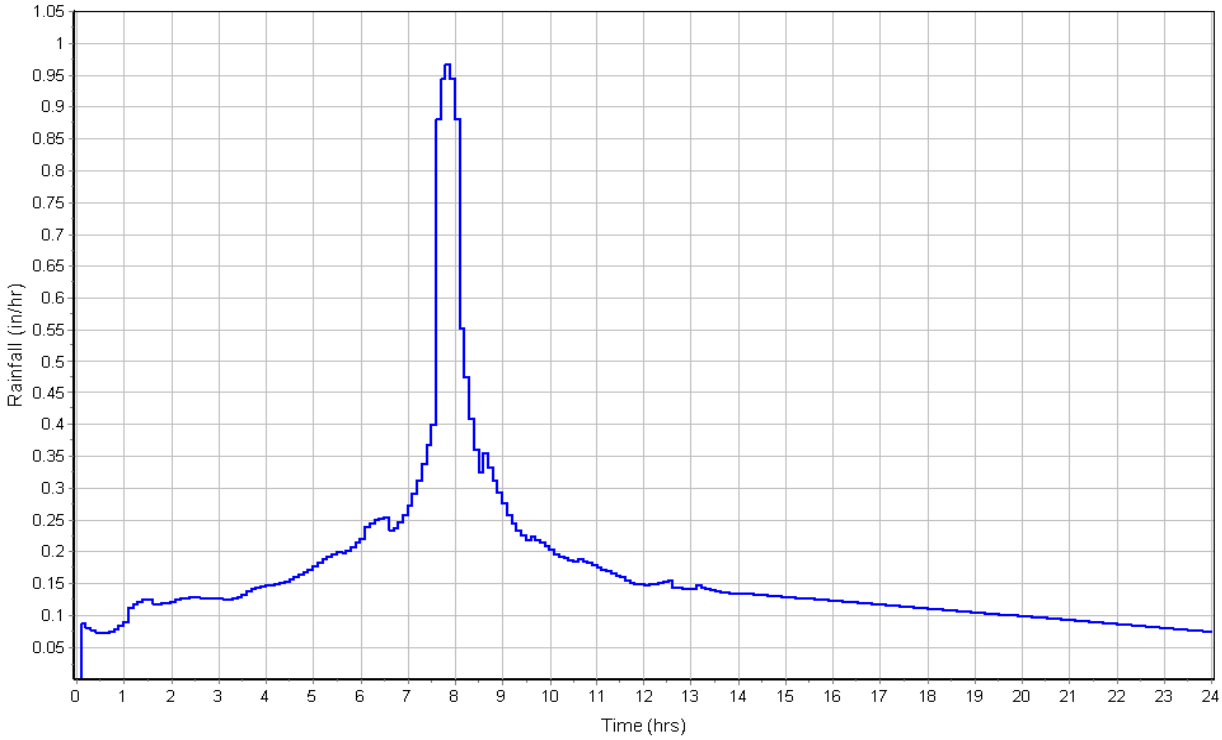
Total TOC (min) 7.78

Subbasin Runoff Results

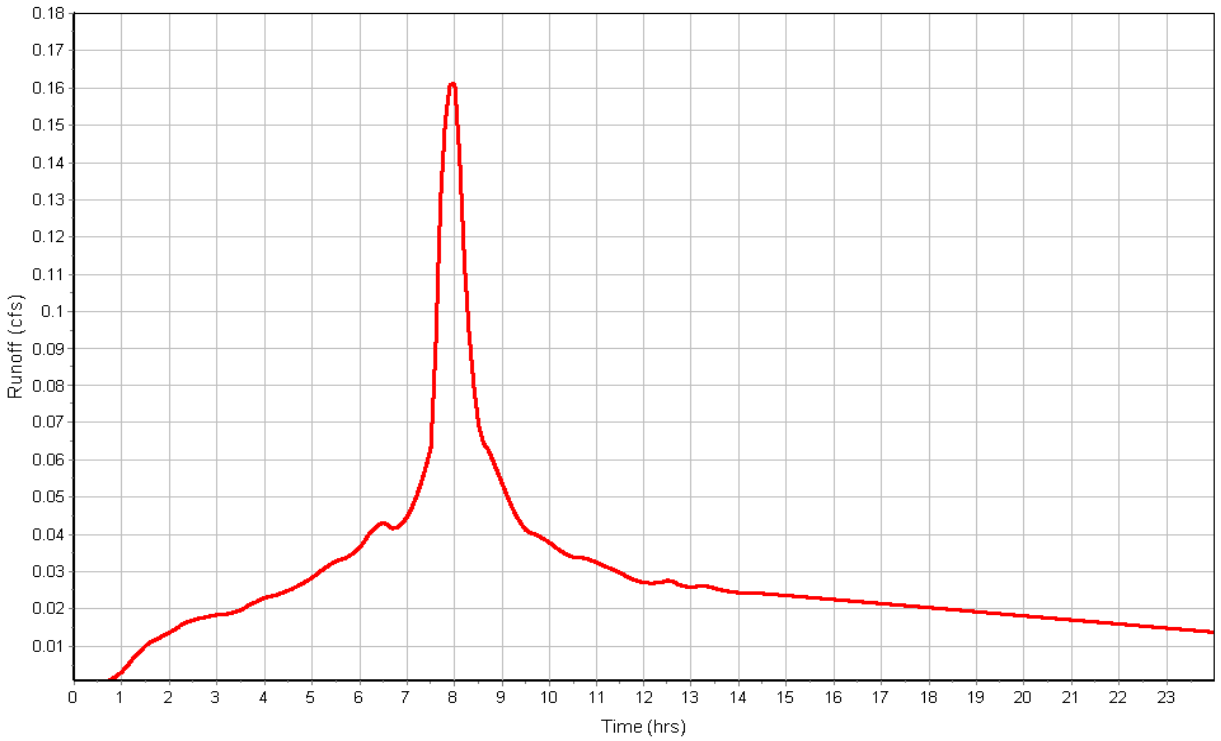
Total Rainfall (in)	3.99
Total Runoff (in)	3.69
Peak Runoff (cfs)	0.16
Weighted Curve Number	97.34
Time of Concentration (days hh:mm:ss)	0 00:07:47

Subbasin : DMA16

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA17

Input Data

Area (ft²) 5760.98
Impervious Area (%) 98.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID ..... Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	5760.98		97.56

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.4	0.01	0.00
Flow Length (ft) :	16.47	45.71	0.00
Slope (%) :	1	2	0.00
2 yr, 24 hr Rainfall (in) :	2.65	2.65	0.00
Velocity (ft/sec) :	0.04	1.16	0.00
Computed Flow Time (min) :	7.36	0.66	0.00

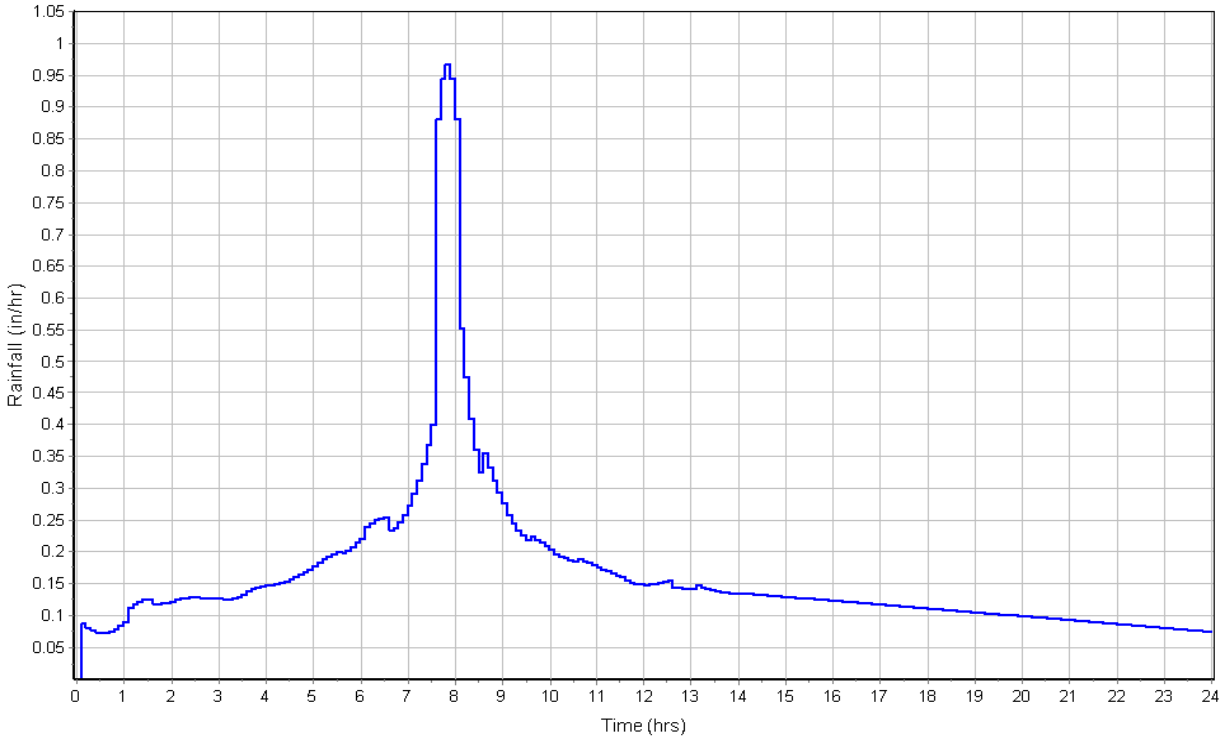
Total TOC (min) 8.02

Subbasin Runoff Results

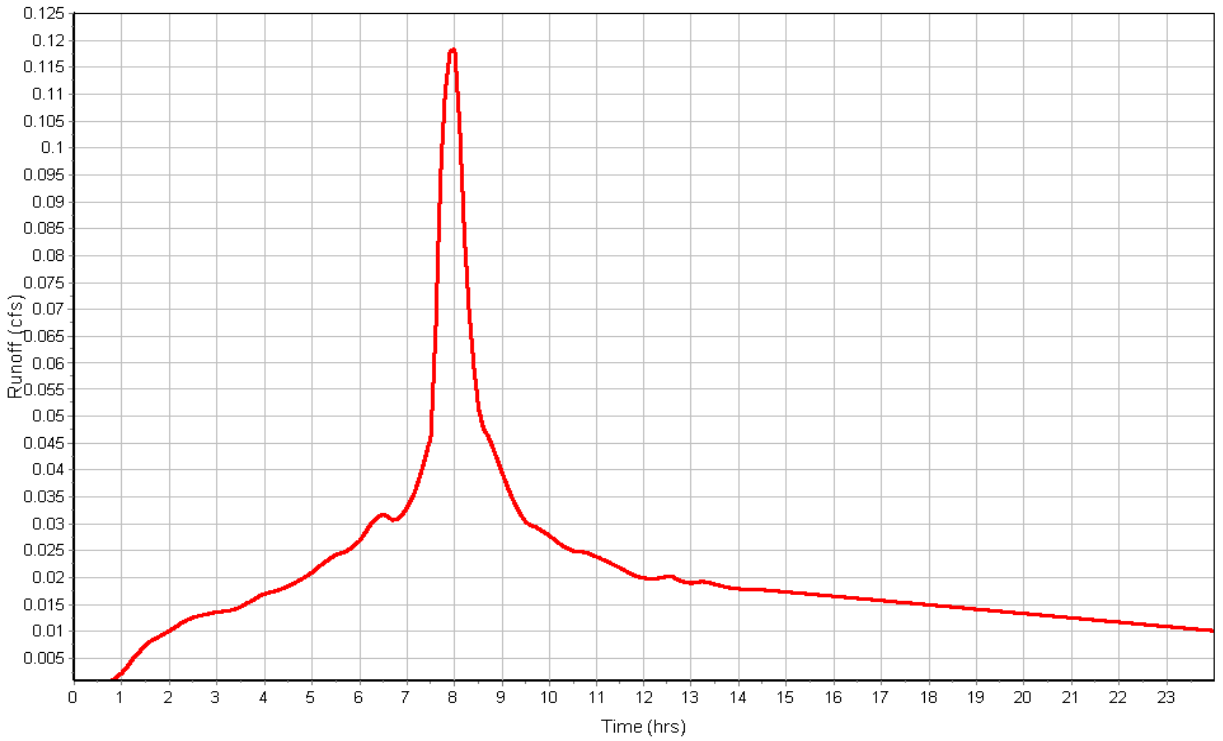
Total Rainfall (in) 3.99
Total Runoff (in) 3.71
Peak Runoff (cfs) 0.12
Weighted Curve Number 97.56
Time of Concentration (days hh:mm:ss) 0 00:08:01

Subbasin : DMA17

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA18

Input Data

Area (ft²)	44869.02
Impervious Area (%)	95.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	44869.02		96.9

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.4	0.01	0.00
Flow Length (ft) :	13.39	261.42	0.00
Slope (%) :	1	2	0.00
2 yr, 24 hr Rainfall (in) :	2.65	2.65	0.00
Velocity (ft/sec) :	0.04	1.64	0.00
Computed Flow Time (min) :	6.23	2.66	0.00

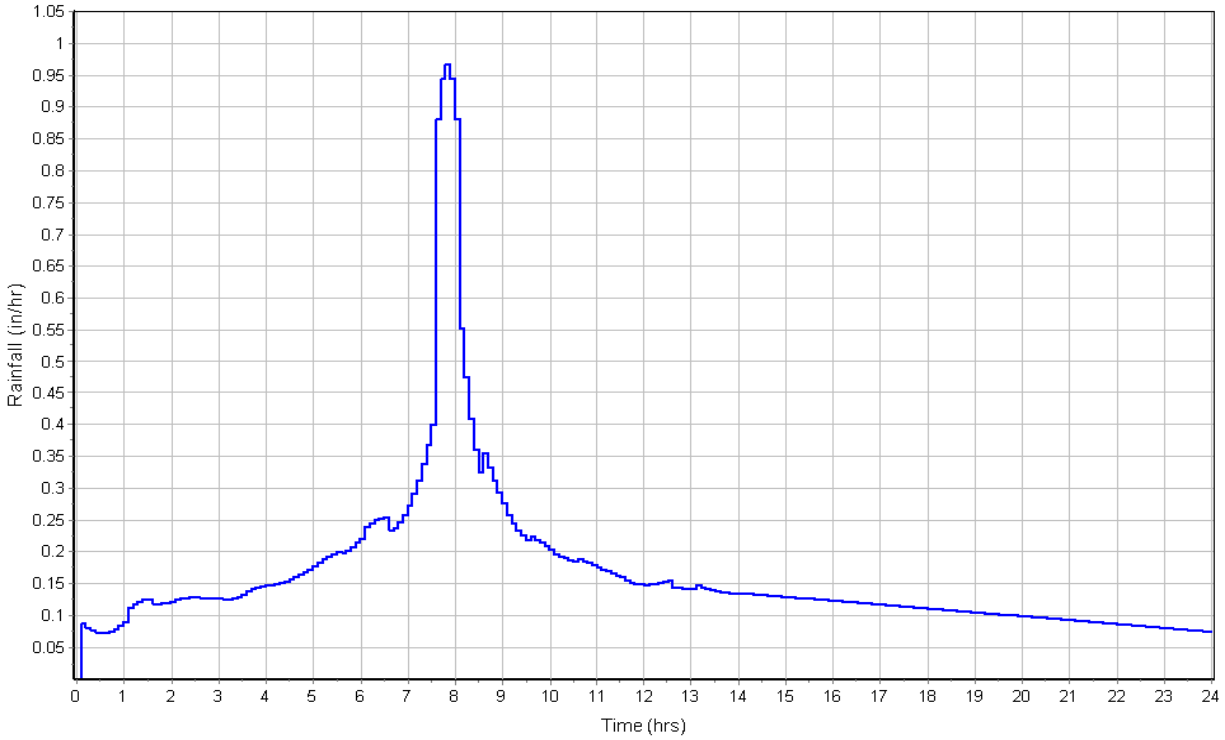
Total TOC (min) 8.89

Subbasin Runoff Results

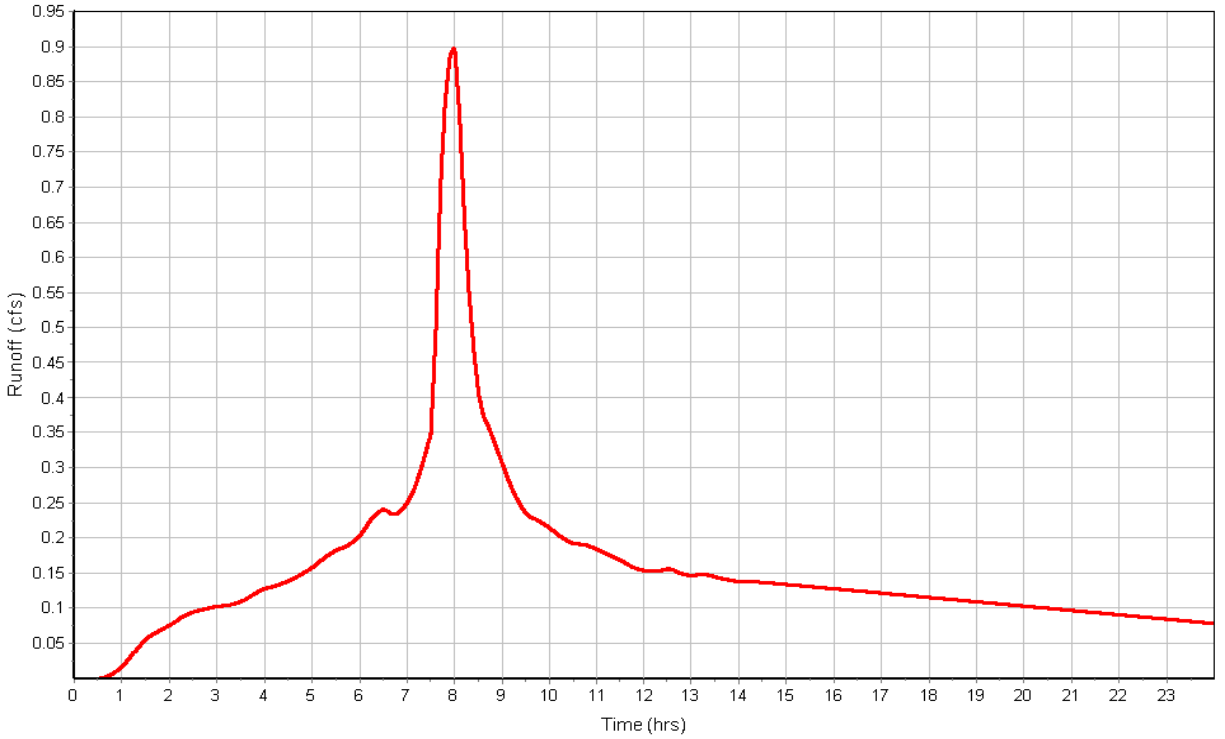
Total Rainfall (in)	3.99
Total Runoff (in)	3.65
Peak Runoff (cfs)	0.90
Weighted Curve Number	96.90
Time of Concentration (days hh:mm:ss)	0 00:08:53

Subbasin : DMA18

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA19

Input Data

Area (ft²)	5560.00
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	5560.00		98

Time of Concentration

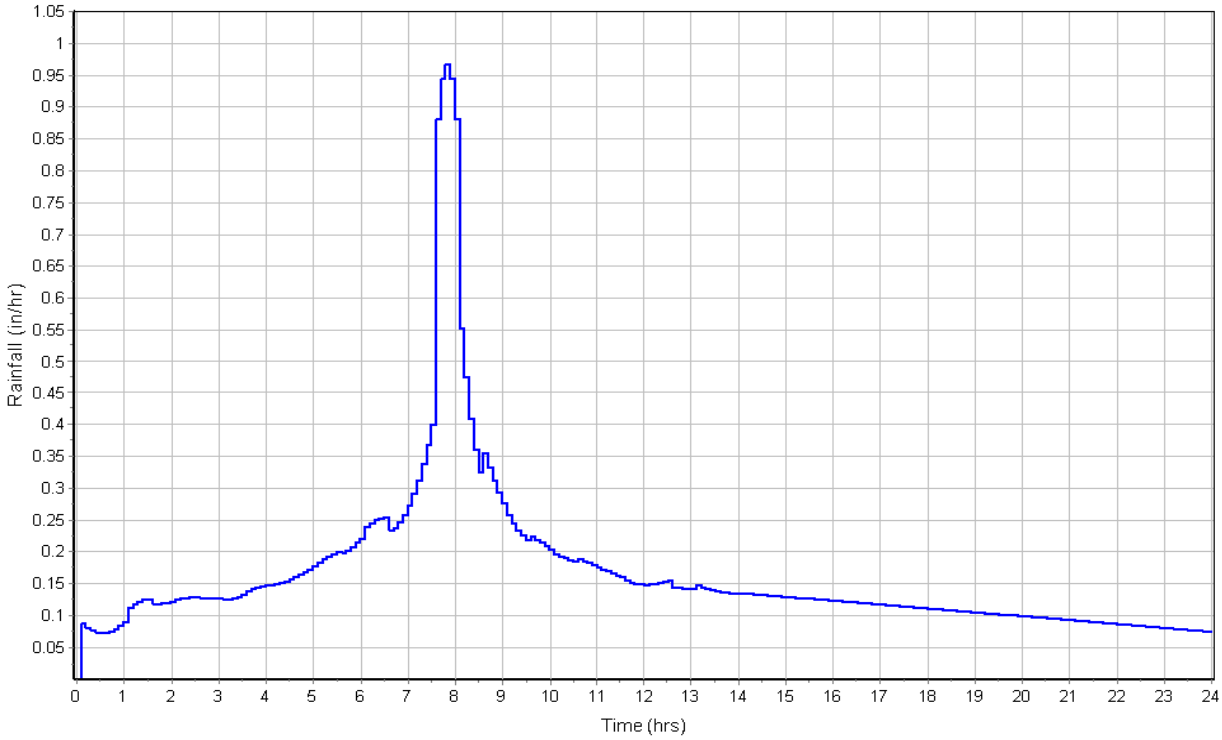
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

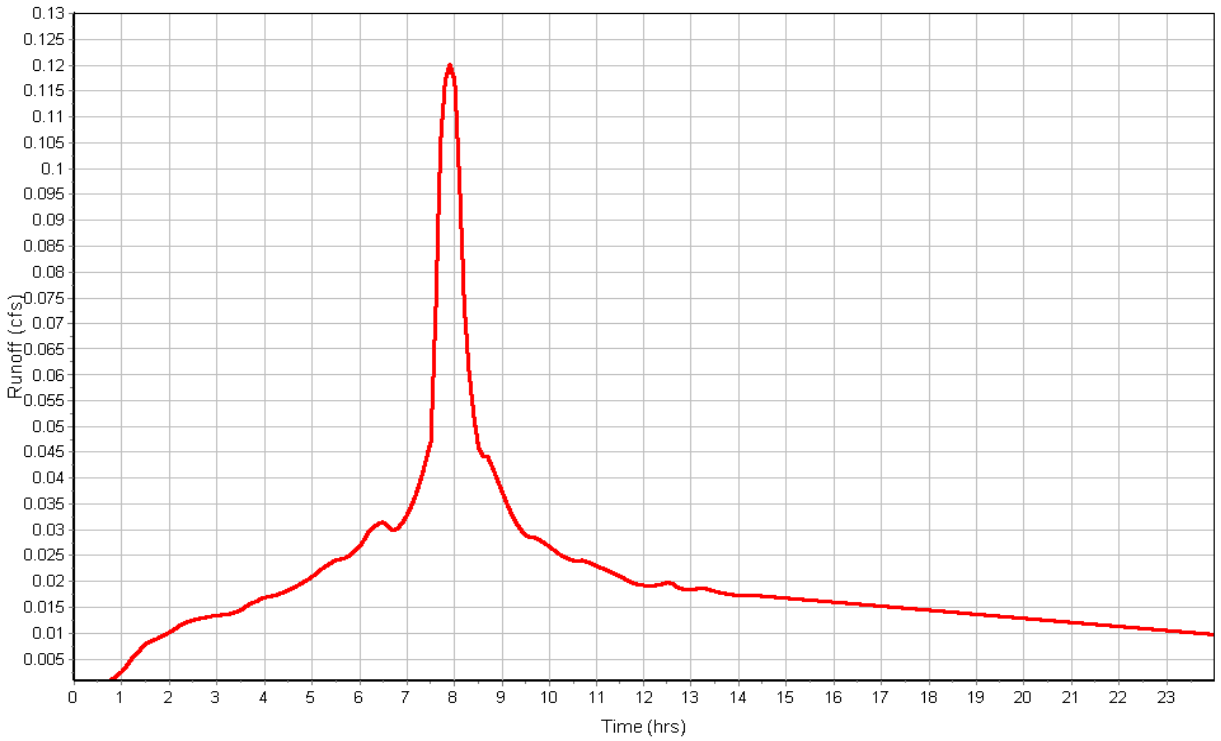
Total Rainfall (in)	3.99
Total Runoff (in)	3.76
Peak Runoff (cfs)	0.12
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA19

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA20

Input Data

Area (ft²)	16230.02
Impervious Area (%)	95.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	16230.02		96.9

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.4	0.01	0.00
Flow Length (ft) :	34.47	88.38	0.00
Slope (%) :	1	2	0.00
2 yr, 24 hr Rainfall (in) :	2.65	2.65	0.00
Velocity (ft/sec) :	0.04	1.32	0.00
Computed Flow Time (min) :	13.28	1.12	0.00

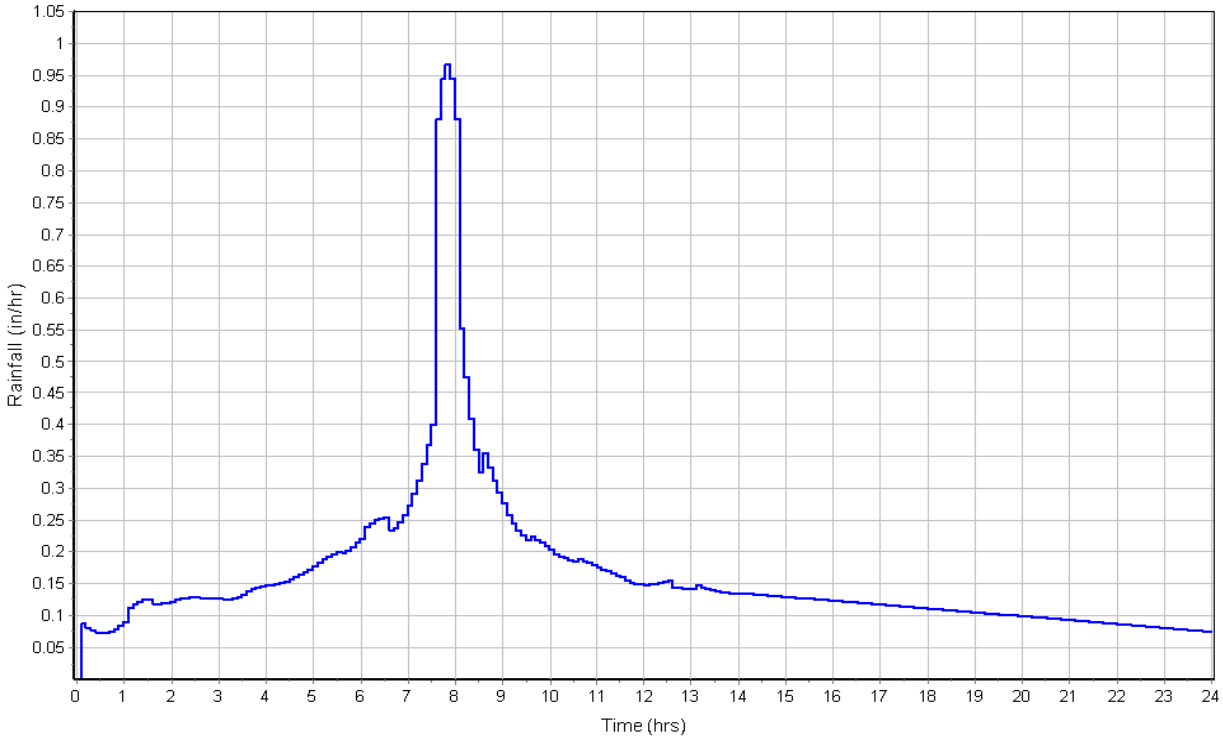
Total TOC (min) 14.40

Subbasin Runoff Results

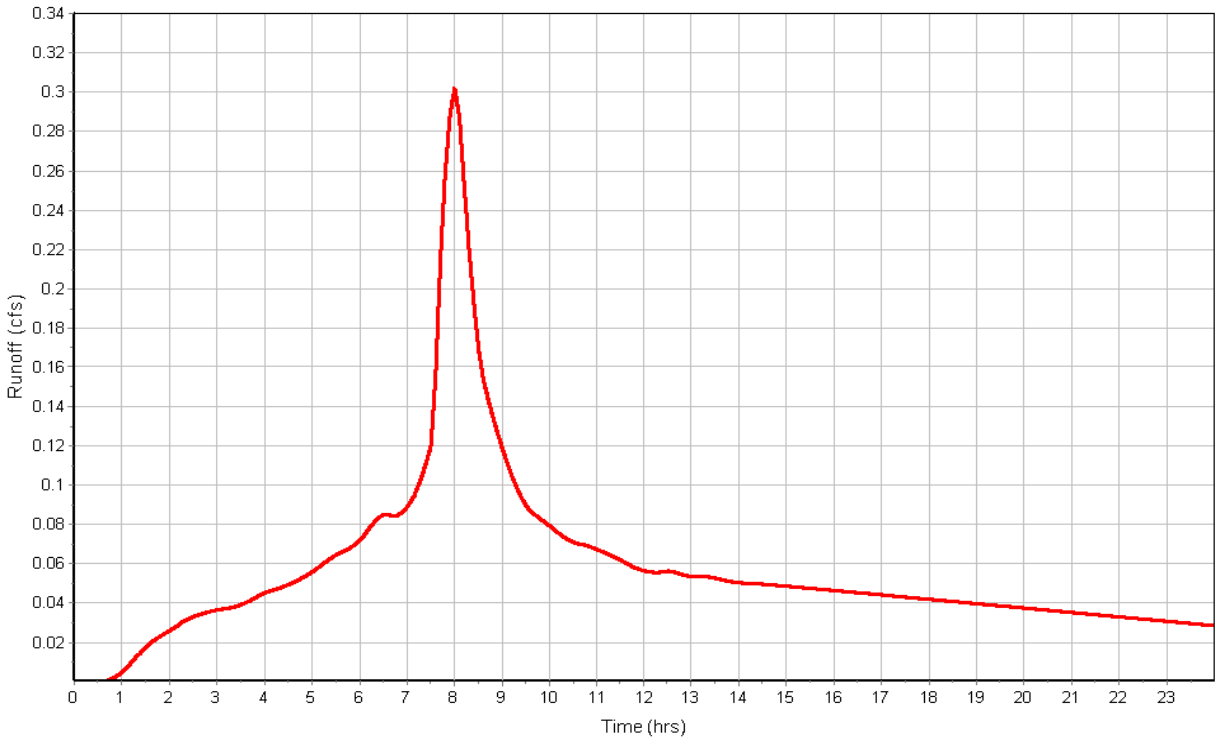
Total Rainfall (in)	3.99
Total Runoff (in)	3.64
Peak Runoff (cfs)	0.30
Weighted Curve Number	96.90
Time of Concentration (days hh:mm:ss)	0 00:14:24

Subbasin : DMA20

Rainfall Intensity Graph



Runoff Hydrograph



Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft^2)	Minimum Pipe Cover (in)
1	BMP#1 RISER	152.48	155.73	3.25	152.48	0.00	155.73	0.00	0.00	31.00
2	BMP#2 RISER	149.65	152.90	3.25	149.65	0.00	152.90	0.00	0.00	33.00
3	BMP#3 RISER	148.95	153.20	4.25	148.95	0.00	152.20	-1.00	0.00	45.00
4	NULL01	154.31	158.02	3.71	154.31	0.00	155.38	-2.64	0.00	32.55
5	NULL02	154.20	158.45	4.25	154.20	0.00	155.28	-3.17	0.00	38.99
6	NULL03	154.06	158.57	4.51	154.06	0.00	155.13	-3.44	0.00	42.16
7	NULL04	153.88	158.53	4.65	153.88	0.00	154.95	-3.58	0.00	43.84
8	NULL05	153.70	158.50	4.80	153.70	0.00	154.77	-3.73	0.00	45.65
9	NULL06	153.37	155.77	2.40	153.65	0.28	154.45	-1.32	0.00	16.80
10	NULL07	153.77	156.44	2.67	153.55	-0.22	154.91	-1.53	0.00	23.04
11	NULL08	154.35	156.67	2.32	154.33	-0.02	155.69	-0.98	0.00	19.84
12	NULL09	152.75	155.37	2.62	152.75	0.00	153.29	-2.08	0.00	25.44
13	NULL10	152.51	154.46	1.95	152.51	0.00	153.06	-1.40	0.00	17.37
14	NULL11	153.40	156.16	2.76	153.40	0.00	153.94	-2.22	0.00	27.12
15	NULL12	153.27	155.50	2.23	153.27	0.00	154.41	-1.09	0.00	18.75
16	NULL13	152.80	154.90	2.10	152.80	0.00	153.93	-0.97	0.00	17.20
17	NULL14	153.47	155.46	1.99	153.47	0.00	154.80	-0.67	0.00	17.88

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	BMP#1 RISER	0.00	0.00	152.48	0.00	0.00	3.25	152.48	0.00	0 00:00	0 00:00	0.00	0.00
2	BMP#2 RISER	0.00	0.00	149.65	0.00	0.00	3.25	149.65	0.00	0 00:00	0 00:00	0.00	0.00
3	BMP#3 RISER	0.00	0.00	148.95	0.00	0.00	4.25	148.95	0.00	0 00:00	0 00:00	0.00	0.00
4	NULL01	1.31	0.00	155.07	0.76	0.00	2.95	154.55	0.24	0 07:56	0 00:00	0.00	0.00
5	NULL02	1.31	0.00	154.95	0.75	0.00	3.50	154.44	0.24	0 07:57	0 00:00	0.00	0.00
6	NULL03	1.34	0.00	154.80	0.74	0.00	3.77	154.30	0.24	0 07:58	0 00:00	0.00	0.00
7	NULL04	1.37	0.00	154.63	0.75	0.00	3.90	154.12	0.24	0 07:58	0 00:00	0.00	0.00
8	NULL05	1.41	0.00	154.46	0.76	0.00	4.04	153.93	0.23	0 07:59	0 00:00	0.00	0.00
9	NULL06	2.09	0.00	154.24	0.87	0.00	1.53	153.73	0.36	0 07:59	0 00:00	0.00	0.00
10	NULL07	0.69	0.00	154.26	0.49	0.00	2.18	153.90	0.13	0 07:59	0 00:00	0.00	0.00
11	NULL08	0.52	0.00	154.81	0.46	0.00	1.86	154.52	0.17	0 07:49	0 00:00	0.00	0.00
12	NULL09	0.25	0.00	153.10	0.35	0.00	2.27	152.96	0.21	0 08:01	0 00:00	0.00	0.00
13	NULL10	0.33	0.00	153.11	0.60	0.00	1.35	152.95	0.44	0 00:01	0 00:00	0.00	0.00
14	NULL11	0.16	0.00	153.65	0.25	0.00	2.51	153.49	0.09	0 08:00	0 00:00	0.00	0.00
15	NULL12	0.28	0.00	153.53	0.26	0.00	1.97	153.38	0.11	0 08:00	0 00:00	0.00	0.00
16	NULL13	0.50	0.00	153.22	0.42	0.00	1.68	152.98	0.18	0 07:57	0 00:00	0.00	0.00
17	NULL14	0.30	0.00	153.98	0.51	0.00	1.48	153.90	0.43	0 07:54	0 00:00	0.00	0.00

Channel Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Shape	Height (ft)	Width (ft)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate
1	BMP3_CURBBREAK	2.83	153.54	153.54	152.45	0.00	1.09	38.5200	Rectangular	1.000	1.000	0.0330	0.5000	0.5000	0.0000	0.00	No
2	BMP4_CURBBREAK	6.53	154.50	154.50	153.40	0.00	1.10	16.8500	Rectangular	1.000	1.000	0.0330	0.5000	0.5000	0.0000	0.00	No

Channel Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	BMP3_CURBBREAK	0.00	0 00:00	13.44	0.00	0.00		0.25	0.25	0.00		
2	BMP4_CURBBREAK	0.01	0 08:21	8.89	0.00	0.03	3.63	0.25	0.25	0.00		

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	A-1-01	41.97	156.13	0.00	154.94	2.08	1.19	2.8200	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
2	A-1-02	109.68	154.86	2.00	154.53	2.00	0.33	0.3000	CIRCULAR	8.040	8.040	0.0130	0.5000	0.5000	0.0000	0.00	No	1
3	A-1-03	75.51	154.53	2.00	154.31	0.00	0.23	0.3000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
4	A-1-04	35.36	154.31	0.00	154.20	0.00	0.11	0.3000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
5	A-1-05	48.25	154.20	0.00	154.06	0.00	0.14	0.3000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
6	A-1-06	59.97	154.06	0.00	153.88	0.00	0.18	0.3000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
7	A-1-07	60.17	153.88	0.00	153.70	0.00	0.18	0.3000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
8	A-1-08	108.70	153.70	0.00	153.37	0.00	0.33	0.3000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
9	A-1-09	12.56	153.37	0.00	153.33	0.00	0.04	0.3000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
10	A-1-10	24.86	149.65	0.00	149.53	0.00	0.12	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
11	A-2-1	45.40	155.39	0.00	154.78	2.25	0.61	1.3400	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
12	A-3-1	7.60	154.35	2.00	154.31	0.25	0.04	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
13	A-4-1	7.60	154.17	2.00	154.13	0.25	0.04	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
14	A-5-1	7.61	153.99	2.00	153.95	0.25	0.04	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
15	A-6-1	28.50	154.45	0.00	154.35	0.00	0.10	0.3500	CIRCULAR	8.040	8.040	0.0130	0.5000	0.5000	0.0000	0.00	No	1
16	A-6-2	189.81	154.35	0.00	153.68	-0.09	0.67	0.3500	CIRCULAR	8.040	8.040	0.0130	0.5000	0.5000	0.0000	0.00	No	1
17	A-6-2A	11.86	154.15	2.00	153.77	0.00	0.38	3.2000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
18	A-6-3	42.62	153.52	-0.25	153.37	0.00	0.15	0.3500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
19	A-7-1	19.84	153.25	2.00	153.15	0.00	0.10	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
20	B-1-1	53.24	155.95	2.00	155.79	0.00	0.16	0.3000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
21	B-1-2	60.16	152.48	0.00	151.57	0.00	0.91	1.5100	CIRCULAR	8.040	8.040	0.0130	0.5000	0.5000	0.0000	0.00	No	1
22	C-1-1	21.12	153.12	2.00	153.11	2.04	0.01	0.0500	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
23	C-1-2	34.60	153.07	2.00	152.90	2.00	0.17	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
24	C-1-3	29.24	152.90	2.00	152.75	0.00	0.15	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
25	C-1-4	47.14	152.75	0.00	152.51	0.00	0.24	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
26	C-1-5	12.56	152.51	0.00	152.45	0.00	0.06	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
27	C-1-6	106.93	148.95	0.00	148.42	0.00	0.53	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
28	C-2-1	79.79	153.80	2.00	153.40	0.00	0.40	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
29	C-2-2	25.56	153.40	0.00	153.27	0.00	0.13	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
30	C-2-2A	10.96	153.32	2.00	153.27	0.00	0.05	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
31	C-2-3	94.11	153.27	0.00	152.80	0.00	0.47	0.5000	CIRCULAR	8.040	8.040	0.0130	0.5000	0.5000	0.0000	0.00	No	1
32	C-2-3A	5.51	152.83	2.00	152.80	0.00	0.03	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
33	C-2-4	70.03	152.80	0.00	152.45	0.00	0.35	0.5000	CIRCULAR	8.040	8.040	0.0150	0.5000	0.5000	0.0000	0.00	No	1
34	D-1-1	19.41	153.51	2.00	153.47	0.00	0.04	0.2100	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
35	D-1-2	162.30	153.47	0.00	153.15	0.00	0.32	0.2000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1

Pipe Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	A-1-01	0.43	0 07:54	0.94	0.46	2.83	0.25	0.37	0.74	0.00		Calculated
2	A-1-02	0.68	0 07:54	0.66	1.02	1.94	0.94	0.67	1.00	16.00		SURCHARGED
3	A-1-03	1.31	0 07:54	1.95	0.67	2.13	0.59	0.74	0.74	0.00		Calculated
4	A-1-04	1.31	0 07:55	1.95	0.67	2.09	0.28	0.75	0.75	0.00		Calculated
5	A-1-05	1.30	0 07:55	1.95	0.67	2.12	0.38	0.74	0.74	0.00		Calculated
6	A-1-06	1.33	0 07:57	1.95	0.68	2.16	0.46	0.75	0.75	0.00		Calculated
7	A-1-07	1.36	0 07:58	1.95	0.70	2.18	0.46	0.76	0.76	0.00		Calculated
8	A-1-08	1.41	0 07:59	1.95	0.72	2.05	0.88	0.82	0.82	0.00		Calculated
9	A-1-09	2.09	0 07:59	1.95	1.07	3.34	0.06	0.74	0.74	0.00		> CAPACITY
10	A-1-10	0.00	0 00:00	0.40	0.00	0.00		0.00	0.00	0.00		Calculated
11	A-2-1	0.44	0 07:54	0.65	0.67	2.94	0.26	0.39	0.78	0.00		Calculated
12	A-3-1	0.03	0 08:03	0.40	0.08	0.84	0.15	0.47	0.94	0.00		Calculated
13	A-4-1	0.03	0 07:59	0.40	0.08	0.84	0.15	0.48	0.96	0.00		Calculated
14	A-5-1	0.04	0 07:59	0.40	0.11	0.95	0.13	0.49	0.97	0.00		Calculated
15	A-6-1	0.52	0 07:54	0.72	0.72	1.95	0.24	0.48	0.71	0.00		Calculated
16	A-6-2	0.52	0 07:55	0.67	0.78	2.20	1.44	0.47	0.70	0.00		Calculated
17	A-6-2A	0.17	0 07:54	1.00	0.17	1.97	0.10	0.31	0.63	0.00		Calculated
18	A-6-3	0.68	0 07:56	3.45	0.20	1.46	0.49	0.68	0.68	0.00		Calculated
19	A-7-1	0.15	0 08:00	0.40	0.38	0.81	0.41	0.46	0.92	0.00		Calculated
20	B-1-1	0.13	0 07:54	0.31	0.41	0.64	1.39	0.50	1.00	1424.00		SURCHARGED
21	B-1-2	0.00	0 00:00	1.48	0.00	0.00		0.00	0.00	0.00		Calculated
22	C-1-1	0.11	0 08:01	0.25	0.44	1.05	0.34	0.29	0.57	0.00		Calculated
23	C-1-2	0.23	0 08:00	0.40	0.58	1.74	0.33	0.32	0.64	0.00		Calculated
24	C-1-3	0.25	0 08:00	0.40	0.63	1.73	0.28	0.34	0.69	0.00		Calculated
25	C-1-4	0.25	0 08:01	0.39	0.63	1.41	0.56	0.42	0.84	0.00		Calculated
26	C-1-5	0.33	0 00:01	0.40	0.84	2.03	0.10	0.50	1.00	0.00		SURCHARGED
27	C-1-6	0.00	0 00:00	0.40	0.00	0.00		0.00	0.00	0.00		Calculated
28	C-2-1	0.16	0 08:00	0.40	0.41	1.76	0.76	0.24	0.47	0.00		Calculated
29	C-2-2	0.16	0 08:00	0.40	0.41	1.59	0.27	0.26	0.51	0.00		Calculated
30	C-2-2A	0.12	0 08:00	0.39	0.30	1.19	0.15	0.25	0.51	0.00		Calculated
31	C-2-3	0.28	0 08:00	0.85	0.33	1.55	1.01	0.34	0.51	0.00		Calculated
32	C-2-3A	0.22	0 07:54	0.40	0.56	1.41	0.07	0.43	0.85	0.00		Calculated
33	C-2-4	0.50	0 07:57	0.74	0.67	1.93	0.60	0.46	0.69	0.00		Calculated
34	D-1-1	0.17	0 00:00	0.25	0.67	2.75	0.12	0.49	0.98	0.00		Calculated
35	D-1-2	0.16	0 00:01	0.25	0.65	1.09	2.48	0.50	1.00	15.00		SURCHARGED

Inlet Input

SN	Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Ponded Area (ft²)	Grate Clogging Factor (%)
1	BMP3_CURBBREAK	FHWA HEC-22 GENERIC	N/A	On Sag	1	0.00	153.54	153.54	0.00	0.00	10.00	0.00
2	BMP4_CURBBREAK	FHWA HEC-22 GENERIC	N/A	On Sag	1	0.00	154.51	154.51	0.00	0.00	10.00	0.00
3	CB01	FHWA HEC-22 GENERIC	N/A	On Sag	1	153.95	157.95	4.00	156.45	2.50	0.00	0.00
4	CB02	FHWA HEC-22 GENERIC	N/A	On Sag	1	152.86	156.83	3.97	154.64	1.78	0.00	0.00
5	CB03	FHWA HEC-22 GENERIC	N/A	On Sag	1	152.53	156.83	4.30	154.53	2.00	0.00	0.00
6	CB04	FHWA HEC-22 GENERIC	N/A	On Sag	1	152.35	158.57	6.22	154.35	2.00	0.00	0.00
7	CB05	FHWA HEC-22 GENERIC	N/A	On Sag	1	152.17	158.53	6.36	154.17	2.00	0.00	0.00
8	CB06	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.99	158.48	6.49	153.99	2.00	0.00	0.00
9	CB07	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.25	154.07	2.82	153.65	2.40	0.00	0.00
10	CB08	FHWA HEC-22 GENERIC	N/A	On Sag	1	152.15	156.17	4.02	154.15	2.00	0.00	0.00
11	CB09	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.12	154.64	3.52	153.12	2.00	0.00	0.00
12	CB10	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.07	154.66	3.59	153.07	2.00	0.00	0.00
13	CB11	FHWA HEC-22 GENERIC	N/A	On Sag	1	150.90	154.50	3.60	152.95	2.05	0.00	0.00
14	CB12	FHWA HEC-22 GENERIC	N/A	On Sag	1	150.83	154.88	4.05	152.95	2.12	0.00	0.00
15	CB13	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.32	155.44	4.12	153.32	2.00	0.00	0.00
16	CB14	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.80	155.80	4.00	153.80	2.00	0.00	0.00
17	CB15	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.51	154.54	3.03	153.90	2.39	0.00	0.00
18	DS01	FHWA HEC-22 GENERIC	N/A	On Sag	1	155.39	160.00	4.61	155.39	0.00	0.00	0.00
19	DS02	FHWA HEC-22 GENERIC	N/A	On Sag	1	156.13	160.00	3.87	156.13	0.00	0.00	0.00
20	DS03	FHWA HEC-22 GENERIC	N/A	On Sag	1	154.45	160.00	5.55	154.45	0.00	0.00	0.00

Roadway & Gutter Input

SN	Element ID	Roadway Longitudinal Slope (ft/ft)	Roadway Cross Slope (ft/ft)	Roadway Manning's Roughness	Gutter Cross Slope (ft/ft)	Gutter Width (ft)	Gutter Depression (in)	Allowable Spread (ft)
1	BMP3_CURBBREAK	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
2	BMP4_CURBBREAK	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
3	CB01	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
4	CB02	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
5	CB03	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
6	CB04	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
7	CB05	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
8	CB06	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
9	CB07	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
10	CB08	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
11	CB09	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
12	CB10	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
13	CB11	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
14	CB12	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
15	CB13	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
16	CB14	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
17	CB15	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
18	DS01	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
19	DS02	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
20	DS03	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00

Inlet Results

SN	Element ID	Peak Flow (cfs)	Peak Lateral Inflow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)	Max Gutter Water Depth during Peak Flow (ft)	Time of Max Depth Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	BMP3_CURBBREAK	0.90	0.90	N/A	N/A	N/A	-1.60	153.76	0.22	0 05:47	3.23	1093.00
2	BMP4_CURBBREAK	0.30	0.30	N/A	N/A	N/A	3.67	154.83	0.32	0 08:21	0.69	939.00
3	CB01	0.13	0.13	N/A	N/A	N/A	1.53	158.09	0.14	0 07:54	0.00	0.00
4	CB02	0.24	0.24	N/A	N/A	N/A	1.83	156.97	0.14	0 07:54	0.00	0.00
5	CB03	0.20	0.20	N/A	N/A	N/A	1.73	156.97	0.14	0 07:55	0.00	0.00
6	CB04	0.03	0.03	N/A	N/A	N/A	1.22	158.70	0.13	0 07:58	0.00	0.00
7	CB05	0.03	0.03	N/A	N/A	N/A	1.22	158.66	0.13	0 07:59	0.00	0.00
8	CB06	0.04	0.04	N/A	N/A	N/A	1.26	158.61	0.13	0 07:59	0.00	0.00
9	CB07	0.15	0.15	N/A	N/A	N/A	1.60	154.21	0.14	0 08:00	0.00	0.00
10	CB08	0.17	0.17	N/A	N/A	N/A	1.66	156.31	0.14	0 07:54	0.00	0.00
11	CB09	0.11	0.11	N/A	N/A	N/A	1.49	154.78	0.14	0 08:00	0.00	0.00
12	CB10	0.12	0.12	N/A	N/A	N/A	1.52	154.80	0.14	0 08:00	0.00	0.00
13	CB11	0.02	0.02	N/A	N/A	N/A	1.16	154.63	0.13	0 08:00	0.00	0.00
14	CB12	0.22	0.22	N/A	N/A	N/A	1.78	155.02	0.14	0 07:57	0.00	0.00
15	CB13	0.12	0.12	N/A	N/A	N/A	1.51	155.58	0.14	0 08:00	0.00	0.00
16	CB14	0.16	0.16	N/A	N/A	N/A	1.63	155.94	0.14	0 07:54	0.00	0.00
17	CB15	0.12	0.12	N/A	N/A	N/A	1.52	154.68	0.14	0 07:54	0.00	0.00
18	DS01	0.44	0.44	N/A	N/A	N/A	2.22	160.15	0.15	0 07:48	0.00	0.00
19	DS02	0.43	0.43	N/A	N/A	N/A	2.21	160.15	0.15	0 07:54	0.00	0.00
20	DS03	0.52	0.52	N/A	N/A	N/A	2.37	160.15	0.15	0 07:54	0.00	0.00

WES BMP Sizing Software Version 1.6.0.2, May 2018

WES BMP Sizing Report

Project Information

Project Name	W5
Project Type	Industrial
Location	9600 Boeckman Road
Stormwater Management Area	9612
Project Applicant	W5, LLC (c/o Mac Martin)
Jurisdiction	OutofDistrict

Drainage Management Area

Name	Area (sq-ft)	Pre-Project Cover	Post-Project Cover	DMA Soil Type	BMP
DMA 01 - Impervious	8,345	Grass	ConventionalConcrete	D	BMP 2
DMA 01 - Pervious	2,572	Grass	LandscapeDsoil	D	BMP 2
DMA 02 - Impervious	10,708	Grass	ConventionalConcrete	D	BMP 2
DMA 02 - Pervious	1,530	Grass	LandscapeDsoil	D	BMP 2
DMA 03 - Impervious	5,558	Forested	ConventionalConcrete	D	BMP 1
DMA 03 - Pervious	565	Forested	LandscapeDsoil	D	BMP 1
DMA 04 - Impervious	1,530	Forested	ConventionalConcrete	D	BMP 2
DMA 05 - Impervious	1,552	Grass	ConventionalConcrete	D	BMP 2
DMA 06 - Impervious	2,004	Grass	ConventionalConcrete	D	BMP 2
DMA 07 - Roof	20,144	Grass	Roofs	D	BMP 2
DMA 08 - Roof	20,084	Grass	Roofs	D	BMP 2
DMA 09 - Roof	24,005	Grass	Roofs	D	BMP 2
DMA 10 - Impervious	7,119	Grass	ConventionalConcrete	D	BMP 2
DMA 10 - Pervious	1,224	Grass	LandscapeDsoil	D	BMP 2
DMA 11 - Impervious	7,900	Grass	ConventionalConcrete	D	BMP 2

DMA 11 - Pervious	265	Grass	LandscapeDsoil	D	BMP 2
DMA 12 - Impervious	5,544	Grass	ConventionalConcrete	D	BMP 3
DMA 12 - Pervious	356	Grass	LandscapeDsoil	D	BMP 3
DMA 13 - Impervious	5,461	Grass	ConventionalConcrete	D	BMP 3
DMA 13 - Pervious	1,420	Grass	LandscapeDsoil	D	BMP 3
DMA 14 - Impervious	929	Grass	ConventionalConcrete	D	BMP 3
DMA 15 - Impervious	10,340	Grass	ConventionalConcrete	D	BMP 3
DMA 16 - Impervious	7,626	Grass	ConventionalConcrete	D	BMP 3
DMA 16 - Pervious	252	Grass	LandscapeDsoil	D	BMP 3
DMA 17 - Impervious	5,646	Grass	ConventionalConcrete	D	BMP 3
DMA 17 - Pervious	115	Grass	LandscapeDsoil	D	BMP 3
DMA 18 - Impervious	42,713	Grass	ConventionalConcrete	D	BMP 3
DMA 18 - Pervious	2,156	Grass	LandscapeDsoil	D	BMP 3
DMA 19 - Impervious	5,560	Grass	ConventionalConcrete	D	BMP 4
DMA 20 - Impervious	15,482	Grass	ConventionalConcrete	D	BMP 4
DMA 20 - Pervious	748	Grass	LandscapeDsoil	D	BMP 4

LID Facility Sizing Details

LID ID	Design Criteria	BMP Type	Facility Soil Type	Minimum Area (sq-ft)	Planned Areas (sq-ft)	Orifice Diameter (in)
BMP 2	FlowControlAndTreatment	Rain Garden - Filtration	D1	4,292.2	4,295.0	3.3
BMP 3	FlowControlAndTreatment	Rain Garden - Filtration	D1	3,250.7	3,340.0	2.9
BMP 4	FlowControlAndTreatment	Rain Garden - Filtration	D1	862.6	1,700.0	1.5
BMP 1	FlowControlAndTreatment	Rain Garden - Filtration	D1	238.1	277.0	0.8

Pond Sizing Details

1. FCWQT = Flow control and water quality treatment, WQT = Water quality treatment only

2. Depth is measured from the bottom of the facility and includes the three feet of media (drain rock, separation layer and growing media).

3. Maximum volume of the facility. Includes the volume occupied by the media at the bottom of the facility.

4. Maximum water storage volume of the facility. Includes water storage in the three feet of soil media assuming a 40 percent porosity.

APPENDIX B – OPERATIONS AND MAINTENANCE MANUAL

Stormwater Operations & Maintenance Manual

For:

Building W-5
Wilsonville, Oregon

December 2021

Prepared by:

Mackenzie
1515 SE Water Avenue
Suite 100
Portland, OR 97214
2210115.00

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ATTACHMENTS

1. O&M Facility Map
2. Sample Maintenance Report
3. City of Wilsonville 2012 Manual for the Operation & Maintenance of Privately Owned Stormwater Facilities

I. GENERAL- SITE DESCRIPTION, ASSUMPTIONS AND GENEREAL SYSTEM DESCRIPTION

This plan was developed to provide a basis for maintenance of stormwater facilities for the W-5 Building project located in Wilsonville, Oregon. The W-5 project includes the construction of a 65,000 square foot (footprint) manufacturing building with an integral depressed truck dock, associated drive aisles and parking, an exterior trash enclosure, and associated utility services to the building and site..

Runoff from the site sheets flows to various standard catch basins and is conveyed to four rain garden stormwater systems onsite.

This Operations and Maintenance Plan generally provides maintenance requirements of the stormwater collection and treatment system. Best Management Practices (BMPs) related to maintenance of the facilities shall include regular maintenance and upkeep of the parking and landscape areas.

II. GENERAL MAINTENANCE AND FACILITY-SPECIFIC MAINTENANCE REQUIREMENTS

The W-5 Facilities Manager shall be responsible for regular inspections and maintenance of the storm drainage system and related facilities. Inspections shall include observations of the landscaping, parking areas, catch basin grates and basins for debris, loose soil or sediment that may enter the system. Inspection of the collection system includes observation of the catch basins, and conveyance lines. General maintenance requirements of those facilities include removal of sediment and debris, repair of damaged components and general maintenance of mechanical systems.

Facility-specific maintenance requirements shall also be the responsibility of the W-5 Facilities Manager. Inspections shall include documentation of observations and maintenance or repairs of each of the drainage system facilities. This would include:

- Landscape areas
- Parking areas
- Catch basins
- Cleanouts
- Conveyance pipes
- Treatment devices
- Detention elements

Operations and Maintenance Contact

W-5 – Facilities Manager

Mac Martin
206.399.6676
macmartinis@gmail.com

III. GENERAL MAINTENANCE ACTIVITIES

Maintenance of stormwater system components is the key to a successful stormwater plan. Most stormwater systems can fail in the first few years due to lack of adequate maintenance. The following guidelines will be used for general maintenance of the stormwater system.

1. Dry sweeping of the parking area to reduce accumulation of sediments and debris in the catch basins will be conducted regularly. Clogging the catch basin with sediments will result in its failure.

2. Quarterly visual inspection of the catch basins for debris and obstructions. All catch basins or other structures shall be kept clear of sediment, debris or other obstructions that may affect the flow or treatment of stormwater.

3. Visually inspect the rain gardens after all major storm events for evidence of system problems. Look for ponded water, debris, erosion, or any other signs of system problems.

4. Annually inspect the spill kit to ensure all supplies are available and have not deteriorated or expired (Note: each tenant shall have a separate spill kit or access to a shared spill kit). Check with city staff to stay aware of newly available products or spill containment procedures. Become familiar with the spill control plan (included with this O&M Plan) and ensure that at least one employee during each work shift is familiar with the plan (always have someone on-site who is aware of the spill containment kit and procedures).

5. Biannually or quarterly inspect the catch basin sumps. Sediments need to be removed along with any oils before the deposits reach one foot in depth and before the outlet is obstructed. Materials removed from the catch basin inlet shall be disposed of in accordance with applicable state law. Records of debris disposal shall be kept on file at the main office in accordance with the state law and shall be available for review by regulating agencies.

IV. SITE PLAN SHOWING LOCATION OF FACILITY COMPONENTS

The attached O&M Facility Map shows the general location of the facility components. The site utility “As-built” drawings should be consulted for further information regarding facility locations, sizes or details.

V. INSPECTION PROGRAM – PERFORMANCE MEASURES FOR MAINTENANCE ACTIVITIES

Objective

The objective of this manual is to help the property owner to maintain the storm sewer system for W-5 so it can continue to operate as designed.

Requirements

Conduct inspections with the as-built plans in hand. Inspect the facility on a quarterly basis for the first 3 years from construction, and a minimum or semi-annually thereafter. Additional inspections will be necessary after long dry periods, large storms or spills. Immediately remove spilled material, taking the appropriate safety and disposal precautions.

Keep inspection records to track the progressive development of the system over time. The inspection records shall include:

1. Sediment condition and depth in sumps
2. Water elevation/observations (sheen, smell, etc.)
3. Conditions of the inlet and outlet pipes, and remaining storage capacity
4. Unscheduled maintenance needs
5. Components that do not meet performance criteria and require immediate maintenance
6. Common problem areas, solutions, and general observations
7. Aesthetic conditions

Collection System

The collection system consists of underground pipes and catch basins.

Catch Basins

The catch basins are metal basins with steel grates. The catch basins have a trapped outlet and sump and need to be inspected and maintained (if necessary) on a quarterly basis and following major storm events. Maintenance includes inspection of the structure itself and removal of any oils, debris or sediment as described in the maintenance table. Check to see if sediment has built up on the bottom of the catch basin by measuring down from the outlet pipe. If it is less than 12-inches then the catch basin needs to be cleaned out.

Storm Sewer Pipes

The storm sewer pipes are plastic with associated fittings. The pipes need to be inspected and cleaned quarterly (if necessary) following major storm events. Cleanouts and manholes are provided for access to the pipe system. The pipes need to be inspected for sediment buildup and cleaned out, if necessary, using a vactor truck so that sediment is removed.

Rain Gardens

Refer to attached City of Wilsonville 2012 Manual for the Operation & Maintenance of Privately Owned Stormwater Facilities.

Maintenance Schedule

Summer: Make structural repairs; clean gutters and downspouts; remove any build-up of weeds or organic debris.

Fall: Replant exposed soil and replace dead plants. Remove sediment and plant debris.

Winter: Clear gutters and downspouts.

Spring: Remove sediment and plant debris. Replant exposed soil and replace dead plants.

All season: Weed as necessary.

Maintenance Record

All facility operators are required to keep an inspection and maintenance log. Record date, description, and contractor (if applicable) for all repairs, landscape maintenance, and facility cleanout activities. Keep work orders and invoices on file and make available upon request of the City inspector.

Access

Maintain ingress/egress per design standards.

Vector (Mosquitoes and Rats)

Facilities must not harbor mosquito larvae or rodents. Record the time/date, weather, and site conditions when vector activity is observed. Record when vector abatement started and ended.

VI. O&M INSPECTION SCHEDULE

- Quarterly inspection of the catch basins and drainage system for accumulation of sediments or oils
- Annual inspection of the emergency spill kit to ensure that all supplies are available and have not deteriorated or expired
- Quarterly inspection of the swale for proper landscape maintenance, removal of trash or sediment and repair of erosion
- Materials removed from the catch basin or pipes shall be disposed of in accordance with state law

Employee and Public Education

Employees will be trained upon hiring and thereafter annually, when new requirements are published or when there are any changes to the system equipment. Employee training will include:

- Reading this Stormwater Management Plan
- Familiarity of all components and locations for materials indicated in the SWMP
- Spill response and Personal Protective Equipment (PPE)
- Documentation requirements

VII. MAINTENANCE EQUIPMENT

Hand tools or other specialized equipment may be necessary to maintain the facilities. Suggested maintenance equipment is listed in the Inspection Checklist. The Facility Manager shall be responsible to maintain on-site, or be able to make available, all required equipment.

Suggested Maintenance Equipment and Materials

- Push broom
- Rake
- Shovel
- Spill kit
- Manhole lid puller
- General landscape tools (weed cutters, pruning clippers, leak rake, etc.)
- Vactor Truck

VIII. SEDIMENT STORAGE, TESTING, AND DISPOSAL

Maintenance of the storm drainage facilities (manholes and catch basins) may include removal of oils, sediments or debris that requires specialized testing or disposal. All removed oils, sediments or other debris shall be disposed of in accordance with applicable regulations. The Facility Manager shall be responsible to retain a qualified company to dispose of this material or otherwise comply with the applicable regulations. The Facility Manager should contact the City of Wilsonville Public Works to verify current regulations or requirements. Local companies providing testing, storage and disposal services:

Clearwater Environmental Services in Wilsonville: (503) 582-1951
River City Environmental in Portland: (503) 252-6144
Bravo Environmental in NW Portland: (503) 261-9800

IX. EMERGENCY CONTACTS

Emergency Contacts

Mac Martin
206.399.6676
macmartinis@gmail.com

Maintenance Responsibilities

The Facility Manager shall be responsible to inspect, maintain or otherwise repair the stormwater facilities. Regular inspections shall occur, and documentation of the inspections, maintenance or repairs kept on-site for a minimum of three years from the date of the activity.

X. SPILL PREVENTION AND CONTROL PLAN

Spill prevention is an important factor in the successful operation of a stormwater management system. All employees will be trained to this plan so that they are certain of the location of materials, who to notify in case of a spill, and how to initially contain the spill of hazardous materials. Employees shall never dump water materials into the stormwater collection/treatment system. Employees shall be observant of other potential contamination occurrences. All employees will review the following page regarding detailed spill response steps.

This data will be posted in an accessible area.

WHAT TO DO IN CASE OF A SPILL

1. The spill kit is located at the stand up shelter near the site entry
2. Get the spill kit (and spill kit instructions when provided)
    a. If possible, determine visually what type of fluids have been spilled
    b. Put on gloves and glasses or any other necessary Personal Protective Equipment (PPE)
    c. Get the absorbent material provided in the kit and drain block cover (pig)
    d. Place the absorbent material in the path of the spill
    e. Remove any debris from the vicinity of the catch basin inlets in the parking lot
    f. Unroll the drain blocker, and place is snugly over the catch basin inlet
    g. Verify the cover has full contact with the rim of the catch basin inlet
    h. Use snakes, pillow or pigs to completely contain the areas
    i. If the spill cannot be contained locally, shut off the storm drain pumps so any spilled material does not leave the site
3. Notify the following personnel immediately:

City of Wilsonville Public Works:	(503) 682-4092
After Hours:	(866) 252-3614
Department of Environmental Quality:	(800) 452-0311
	(800) 452-4011
	(503) 229-5263

Note: Only dry cleanup methods may be employed to clean up spills (i.e. no use of water to wash spilled materials from pavement will be conducted).

XI. ADDITIONAL MAINTENANCE REQUIREMENTS FOR INITIAL ESTABLISHMENT PERIOD

Initial maintenance of landscape vegetation may require additional attention to ensure that landscaping, groundcover and erosion control measures are established or maintained as intended. Proper landscaping and groundcover are an important feature of a successful storm drainage system.

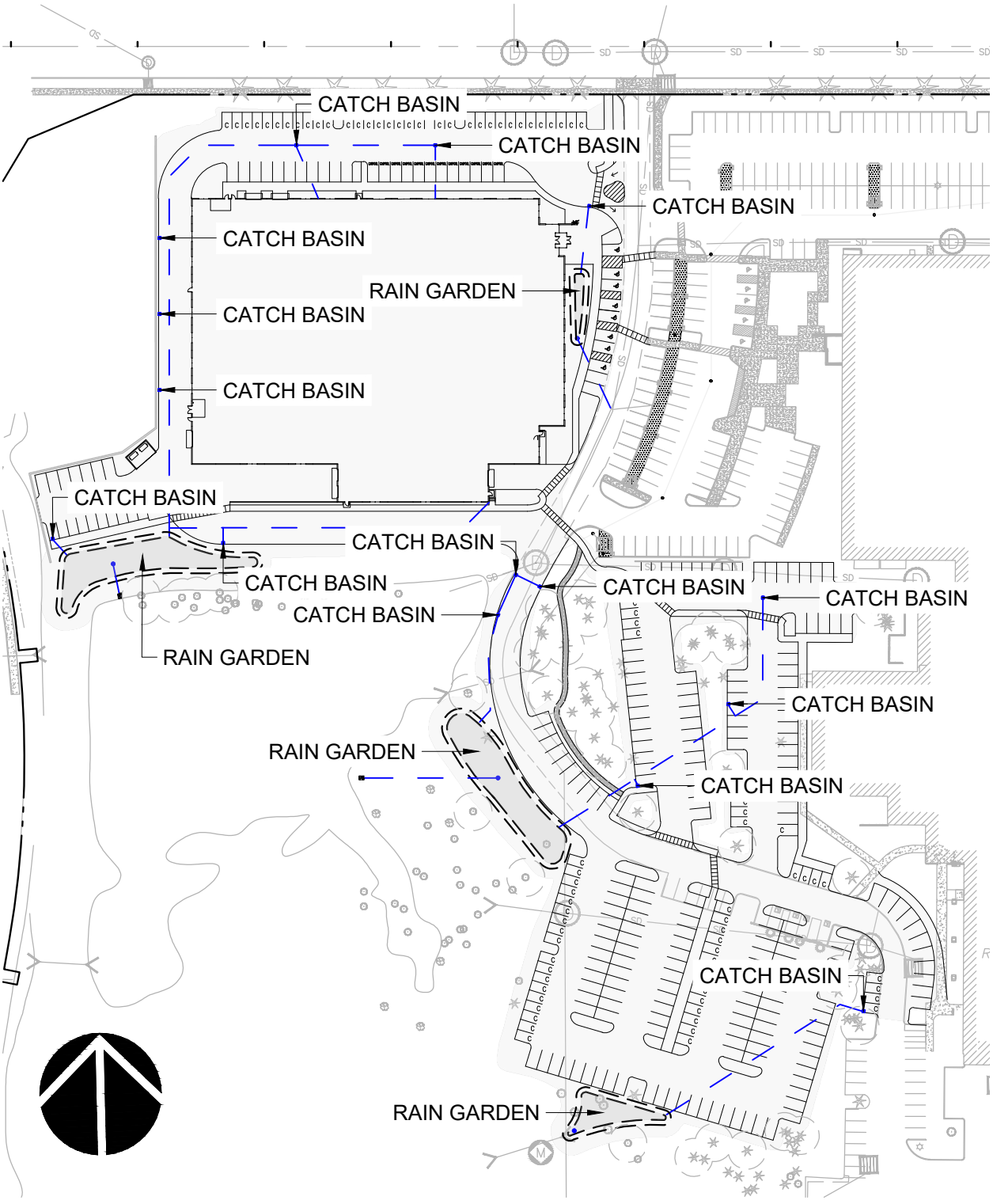
1. During the initial 3-year establishment period, remove undesired vegetation using minimal (or preferably no) use of toxic herbicides and pesticides at least 3 times a year. Replace plants that die during this period.

2. Irrigate as necessary to establish site landscaping

3. Replenish mulch at least annually. Make sure that all exposed soil is covered with mulch or other groundcover

4. Do not use excessive fertilizers, herbicides or pesticides for vegetation maintenance

5. Use replacement plants that conform to the initial planting list



MARTIN DEVELOPMENT
W-5
12/2/2021 © 2021 | Mackenzie |

O&M FACILITY MAP
2210115.00

City of Wilsonville
Annual Stormwater Facility Inspection and Maintenance Report

Name of Development:
Location/Site Address:
Contact Name:
Telephone:
Email:
Mailing Address (if different from Site Address):

Facilities to be Maintained:

	Catch Basin(s)		
	Pretreatment Manhole(s)		
____	Flow Control Manhole(s)		
____	Detention Pond(s)	# of inlets	
____		# of outlets	
____	Rain Garden(s)	# of inlets	
____		#of outlets	____
	Stormwater Planter(s)	# of inlets	____
____		# of outlets	____
	Vegetated Swale(s)	# of inlets	____
____		# of outlets	____
	All Other Facilities as Described on Plans:		____
____			____
			____

Inspection Date:
Describe Inspection, Maintenance, Repair, or Replanting Activities (attach invoices for work performed)**:**

Owner or Representative Signature Date

CITY OF WILSONVILLE • COMMUNITY DEVELOPMENT
Phone 503-682-4960
Fax 503-682-7025
29799 SW Town Center Loop East
Wilsonville, OR 97070
www.ci.wilsonville.or.us
info@ci.wilsonville.or.us

The Owner(s) or Owner's designee shall be responsible for annually conducting inspections and performing maintenance on the above stormwater management facilities annually, in conformance with Section 301.13.00, "Operation and Maintenance Requirements," of the City of Wilsonville Public Works Standards. This requirement pertains to all Stormwater Facilities, including but not limited to: catch basins, pipes, treatment manholes, manholes, trash racks, vegetated swales, and detention ponds.

<u>For vegetated stormwater facilities, particular attention will be given to:</u>

- Examine inlets, outlets, and curb cuts for sediment buildup. Remove sediment as necessary to maintain flow into and out of facility.
- Inspect facility for erosion, gullies, and slope slippage. Repair if present.
- Check for evidence of ponding or slow draining soil media. If necessary, remove and clean or replace the clogged soil media.
- Remove weeds manually.
- Ensure that all plants are healthy. Replace all dead or dying plants with approved plantings.
- Remove trash and excess debris.
- Ensure overflow covers are in place.

<u>For structural facilities and components, particular attention will be given to:</u>

- Remove sediment at least once a year or when basin is half full of sediment.
- Remove trash, oils, and debris.
- Ensure facility is structurally sound by repairing or replacing cracked, loose, askew, or damaged pipes.
- Access covers, trash racks, and metal grates shall be kept free of trash and debris, closed, and in good working order.
- Maintain filter cartridges and other proprietary systems according to manufacturer's recommendations.

Spring	Summer	Fall	Winter
Remove sediment Remove trash Remove weeds Fix erosion **Plant** **Prune grasses** Check irrigation	Remove sediment Remove trash Remove weeds Fix erosion Check irrigation Water plants **Structural repairs**	Remove sediment Remove trash Remove weeds Fix erosion **Plant** Drain irrigation **Structural repairs**	Remove sediment Remove trash Fix erosion **Prune trees & shrubs**

City of Wilsonville

A Manual for the Operation & Maintenance of Privately Owned Stormwater Facilities

March 2012

Working together...

towards a common goal...

clean waters and healthy rivers.

City of Wilsonville
Natural Resources Program
(503) 682-4960
www.ci.wilsonville.or.us

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CARING FOR YOUR STORMWATER FACILITY

THANK YOU

As the owner of a stormwater management facility, you are making a meaningful contribution to the health of Wilsonville's streams, wetlands and the Willamette River. This handbook will help you maintain your facility to make sure it performs the work it is designed to accomplish.

WHAT ARE STORMWATER FACILITIES?

Stormwater facilities are any combination of landscape and structural features that slow, filter, or infiltrate (absorb) runoff on your property after a rainfall. Types of facilities include vegetated systems (planters, swales, ponds, created wetlands, etc.), and structural systems (ecoroofs, porous pavement and manufactured facilities). Piping, inlets and catch basins are also important components that need adequate maintenance to assure facility function. All of these serve a common purpose: controlling the quality and quantity of stormwater runoff from your site to help safeguard our valuable water resources.

PROPERTY OWNER RESPONSIBILITIES

Federal, state and local agencies created management regulations and guidelines so as to improve stormwater quality and protect watersheds, rivers, streams and drinking water resources. The City of Wilsonville has a Stormwater Maintenance and Access Easement that includes the following requirements:

- Annual maintenance on storm drainage facilities in conformance with City of Wilsonville's Public Works Standards. For more information go to: www.ci.wilsonville.or.us/Index.aspx?page=127 Go to Important Links at the bottom of the page and click on Public Works Construction Standards 2006 (section 301.6.00 Operations and Maintenance Req.)
- Removal of debris, leaves and sediment from manholes, detention outlet structures, and catch basins.
- Disposal of all oils, sediment and debris in an approved dumpsite.
- Replacement of all dead or dying plants in ponds and swales. Maintenance of original plantings.
- Removal of trash from ditches, swales, catch basins, or any stormwater conveyance.

The steps we take today will greatly influence Wilsonville's environmental health and quality of life for years to come. Individual actions can make a big difference. Thank you for the significant part you and your stormwater management facility are playing.

* For information or questions about your facility, call the Natural Resources Program at (503) 682-4960

YOUR CONNECTION TO WILSONVILLE'S STREAMS AND THE WILLAMETTE RIVER

THE PROBLEM WITH STORMWATER RUNOFF

When it rains, the stormwater runs off impervious surfaces (such as roofs and paved areas) instead of soaking into the ground.

Conventional stormwater management directs runoff into drains and pipes that carry it offsite and eventually discharge it into a local stream. This approach has a number of harmful effects:

- Impervious areas generate large volumes of runoff relatively quickly. The increased volume and speed of the runoff can cause flooding and erosion and damage natural habitat.
- The runoff picks up a variety of pollutants including oil, pesticides, metals, chemicals, and sediment that negatively impact water quality and fish habitat.
- During warm weather, the runoff absorbs heat from impervious surfaces. This increases the temperature of the receiving waters, with negative impacts on fish and other aquatic life.
- Less water is able to infiltrate into the ground. This reduces groundwater recharge, which reduces summer flows in streams.

For information on the City's stormwater permitting requirements please visit:

www.ci.wilsonville.or.us/Index.aspx?page=693

A BETTER WAY TO FLOW

The City of Wilsonville is actively pursuing a variety of measures to reduce stormwater impacts. One important approach is to manage stormwater on the property where it originates. This is commonly referred to as Low Impact Development. It includes the use of vegetated swales, pervious concrete, rain gardens, eco-roofs, etc. Onsite stormwater management uses processes that mimic nature. Onsite facilities allow runoff to soak into the ground, help filter out pollutants, and slow the flow rate of runoff leaving your site. This significantly reduces the volume and pollution levels in stormwater leaving your property and ending up in local streams and the Willamette River.

WHAT ELSE IS THE CITY DOING?

Onsite management, through the use of Low Impact Development, is just one component of a comprehensive citywide program to limit stormwater runoff impacts. Here are some other steps the City is taking:

- The City requires onsite stormwater management for new construction and redevelopment on public and private property.
- Adhering to and updating the procedures outlined in the Stormwater Master Plan.
- Natural areas, especially riparian areas adjacent to rivers and streams, help filter out pollution, control erosion, and provide shade, food, and habitat for fish and wildlife. The City uses a variety of measures to preserve these critical areas including development and land use zoning requirements and enhancement and restoration efforts.
- In partnership with numerous other organizations, the City provides education and technical assistance aimed at reducing stormwater impacts and promoting watershed health.

INSPECTING AND MAINTAINING YOUR FACILITY

PROTECTING YOUR RESOURCES

It is essential to maintain your facility so it functions as intended and limits off-site environmental impacts. You are required to inspect your facility at a minimum of once a year to determine maintenance needs. Routine inspection and maintenance can help keep overall maintenance costs low by detecting problems early and avoiding large repair or replacement costs. This section identifies general guidelines on what to look for and how to maintain your facility. It also notes non-routine maintenance that may require professional assistance. **If you are unsure of what type of facility you have, call the City of Wilsonville's Natural Resources Program at (503) 682-4960.**

LEGAL REQUIREMENTS: OPERATIONS AND MAINTENANCE PLAN

As a property owner, you are legally required to follow all of the maintenance tasks and schedules outlined in your recorded maintenance and access easement. An Annual Inspection and Maintenance Report must be submitted to the City of Wilsonville no later than May 1 each year (see sample form on page 7). Pictures included with the report are very helpful. Include copies of invoices of work performed by contractors. While inspecting your facility, please keep in mind that it will be necessary for you to refer to your landscape plan in order to maintain your facility as it was originally designed.

INSPECTION SCHEDULE: HOW OFTEN

It is recommended that you inspect your facility at least::

- Quarterly for the first two years
- Once a year there after, and
- Within 48 hours of major rainfall events (more than one inch of rain over a 24-hour period).

SAMPLE REPORTING FORM

Stormwater Annual Inspection and Maintenance Report

- The owner(s) or owner's designee shall be responsible for having inspections conducted and maintenance performed on the above private stormwater facilities annually, in conformance with Section 301.6.00, "Operation and Maintenance," of the City of Wilsonville Public Works Standards. All oils, sediment and debris will be removed and deposited in an approved waste disposal site. Any damaged equipment will be repaired promptly.
- Particular attention will be given to sedimentation and pollution control manholes, and stormwater facility inlet and outlet structures. All debris shall be removed to assure proper functioning.
- The grates of all catch basins shall be kept free of debris and leaves.
- The stormwater facility outlet structure(s) shall be checked to assure that sediment accumulation has not encroached on the required stormwater facility volume. Sediment shall be removed as necessary to maintain that required volume.
- The outlet control manhole shall be inspected to assure that all parts are intact and the orifice is free of any debris that could cause malfunction.
- Inspect all stormwater facilities for survival and viability of plantings. Replace all dead or dying plants with in-kind plantings, and remove sediments and debris. **Maintain all original landscaping in swales, ponds, etc.**
- This includes all stormwater facilities including but not limited to: catch basins, pipes, treatment manholes, manholes, trash racks, and structural controls.

The above inspection and maintenance activities shall be documented annually by sending a signed original letter format report of what was completed to the City of Wilsonville at the mailing address below. **The Annual Inspection and Maintenance Report must be submitted no later than May 1 each year.**

City of Wilsonville
Stormwater Management Coordinator
29799 SW Town Center Loop
Wilsonville, OR 97070
(Stormwater Facilities Maintenance Plan Exhibit B Stormwater Maintenance and Access Easement)

_____
Name of Development

Contact _____
Telephone _____
Mailing Address _____

Location
Tax Lot _____
Street Address _____

Facilities to be maintained
_____ Trapped catch basin(s) (number of each)
_____ Pollution control manhole(s) (number of each)
_____ Outlet control manhole(s) (number of each)
_____ Detention pond(s); ____ tank(s) (number of each)
_____ WQ pond(s) swales; ____ MH(s); ____ vault(s); ____
All other facilities as described on plans _____

Inspection Date _____

Describe inspection, maintenance, repair or replanting _____

_____

_____

_____

_____

_____

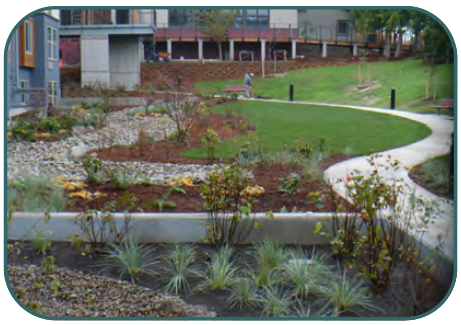
(Attach invoices for work performed) (Continue above on additional sheet if needed)

Owner, Owners or their Representative Signature _____

Date _____

SEDIMENT REMOVAL AND DISPOSAL

FACILITIES AND SYSTEM COMPONENTS THIS APPLIES TO



Vegetated Facilities: ecoroofs, infiltration basins, planters, ponds, swales, trees, vegetated filters, and created wetlands.

Structural Facilities: catch basins, curb cuts, inlets, manufactured facilities, piping, sedimentation manholes, and vaults.

Pervious Pavement: porous concrete or asphalt, permeable pavers.

IMPACT ON FACILITY PERFORMANCE

The purpose of a stormwater treatment facility is to remove pollutants, including suspended solids, by capturing sediment. Sediment can include dirt, leaves, and litter. These materials can restrict or clog the facility. Timely removal of sediment will improve infiltration rates, water quality, and help prevent clogging and flooding.

WHAT TO LOOK FOR

Check the depth of accumulated sediments. Sediment markers can be placed in the facility to help identify depths. Remove sediment when:

Vegetated Facilities:

- Sediment is 4" deep,
- Sediment depth is damaging or killing vegetation, or
- Sediment is preventing the facility from draining within a 24-48 hour period.

Structural Facilities:

- At least once a year, or
- When the basin is half full of sediment.

Pervious Pavement:

- Sediment is preventing the facility from draining in 24 hours.

WHAT TO DO

Often sediment can be removed by hand. Large facilities and underground facilities will need to be cleaned with heavy equipment by trained professionals.

- Remove sediment during dry months when it is easier to remove, weighs less, and creates fewer secondary environmental impacts (such as wet sediment running off the site).

NOTE: It is illegal to hose sediments through your system.

Doing it yourself

Vegetated Facilities:

- Use rakes and shovels to dig out accumulated sediment.
- Avoid damage to existing vegetation.
- If sediment is deep, plants may need to be removed in order to excavate sediment.
- Reseed and mulch disturbed areas to prevent erosion.
- Excavate sand or gravel and clean or replace.

Doing it yourself (continued)

Structural Facilities, Dispersion Trenches and Pervious Pavement:

- Catch Basins: Clean debris off the grate and bars. Lift the grate and use a bucket to remove water and a shovel to dig out sediment.
- Curb cuts, piping and other conveyance facilities: Use a shovel, router, air hose or other dry method to clear sediment and debris.
- Dispersion Trenches: Excavate sand or gravel and clean or replace.
- Pervious Pavement: Remove accumulated sediment from the surface with a dry broom, vacuum system, or other hand tools.

Hiring Professionals

Cleaning certain facilities will require professional assistance.

- Underground facilities such as manholes, and manufactured facilities must be cleaned by a vactor truck. Do not enter these facilities. They are defined by the Oregon Occupational Safety and Health Division as confined spaces and require proper certification to enter.
- Certain components such as collection basins, piping or pervious pavement systems may require vacuuming with a vactor truck or street sweeping equipment.

DISPOSAL

When deciding how to dispose of sediment, you need to consider the types of activities and pollutants on site. Sediment from commercial or industrial sites is usually not considered hazardous waste. However, as the generator of this waste you are responsible for deciding how to properly manage the removed solids.

Contaminated Water and Sediment

Catch basins and stormwater facilities in areas used for chemical or hazardous waste storage, material handling or equipment maintenance may collect the chemicals used in these activities from spills or via stormwater runoff. If you observe an oily sheen, odors, discoloration, or other signs of pollution, hire a professional laboratory or sampling firm to assess whether the material needs specialized hauling, treatment or disposal to comply with Oregon State Department of Environmental Quality (DEQ) rules. If you need assistance deciding whether the solids should be managed as hazardous waste, contact DEQ.

Non-Contaminated Water and Sediment

If the pollutant load is non-hazardous, water may be spread across vegetation onsite. Let the solids dry out, then properly dispose of them. Temporary erosion control measures may be needed to contain the material onsite. Dry materials may be reused elsewhere on your site, may be eligible for reuse by others, or can be disposed of at a designated solid waste facility.

REDUCING SEDIMENT ACCUMULATION AND POLLUTION IN YOUR FACILITY

- Minimize outside sources of sediment, such as eroding soil upstream of your facility.
- Sweep paved areas on your property regularly.
- Make sure chemical and waste storage areas are not exposed to rainfall and stormwater runoff.
- Don't let water from washing vehicles or equipment drain to your stormwater facility.

RESOURCES

City of Wilsonville Public Works Standards: www.ci.wilsonville.or.us/Index.aspx?page=127
Go to *Important Links* at the bottom of the page and click on *Public Works Construction Standards 2006* (section 301.6.00 Operations and Maintenance Req.)

Environmental Protection Agency: www.cfpub.epa.gov/npdes/home.cfm?program_id=6

Department of Environmental Quality: www.oregon.gov/DEQ

Private Maintenance Companies (listed below are just a few examples of companies that provide maintenance services, more companies are available)

- Clearwater Environmental Services in Wilsonville (503) 582-1951
- River City Environmental in Portland (503) 252-6144
- Bravo Environmental NW in Portland (503) 261-9800

Stormwater runoff has substantial impacts on the water quality and habitat that fish depend on. By reducing those impacts, we are taking direct action on behalf of threatened species as well as other fish and wildlife that are under stress.

VEGETATION MANAGEMENT

FACILITIES THIS APPLIES TO

Vegetated Facilities: ecoroofs, infiltration basins, planters, ponds, swales, trees, vegetated filters, and created wetlands.

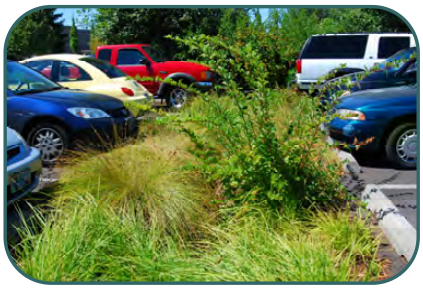
IMPORTANCE TO FACILITY PERFORMANCE

Plants play an important role in stormwater facilities. They absorb water, improve infiltration rates of soil, prevent erosion by stabilizing soil, cool water, and capture pollutants. Plants create habitat for birds and other wildlife and provide aesthetic value to a property. Proper maintenance of vegetation improves the appearance and performance of your facility. Your facility must be kept in accordance with the original landscape design.

WHAT TO LOOK FOR

When identifying maintenance needs it is helpful to have a copy of your landscape plan, this shows the plants you are required to have in your facility. Facilities should be checked for maintenance needs quarterly for the first two years and once a year after that.

Facility needs maintenance when:



- Areas of soil are bare.
- Vegetation is buried by sediment.
- Vegetation appears unhealthy or has died.
- Nuisance and invasive plants are present.
- Vegetation is compromising the facility's structure by blocking inlets or outlets, or roots are intruding into a component of the facility.
- Dropped leaves and other debris are contributing to sediment accumulation or are blocking inlets or outlets.

WHAT TO DO

Maintenance activities can easily be incorporated into existing site landscape maintenance contracts. Vegetation can be maintained with a formal or more natural appearance depending on your preference.

General Maintenance

- Remove dropped leaves, dead plants, and grass and other plant clippings. Plant debris adds nutrient pollution as it breaks down, and can clog facility piping and reduce infiltration.
- Avoid using fertilizers, herbicides, or pesticides in the facility. These products add to the pollution problems the facilities are designed to remedy.
- Use mulch to inhibit weed growth, retain moisture, and add nutrients. Replenish when needed. Ensure mulch does not inhibit water flow.
- Irrigate all new plantings as needed for the first two years.

Caring for wanted vegetation

Facility owners are responsible for maintaining healthy vegetation and must replace any plants that have died or been removed.

- You are required to maintain vegetation to the density approved on your landscape plans or specified in the City's Public Works Standards.
- Replant with vegetation approved for use in the original planting plan or from the recommended plant list in the City's Public Works Standards.

Caring for wanted vegetation (continued)

- Plant in late fall or early spring so plant roots can establish during the cool, rainy seasons, before summer.
- Amend and aerate compacted soils before replanting by adding compost to increase nutrients and enhance soil texture.
- If plants are not surviving, determine the reason for the plant die-off. Survivability may be improved by planting vegetation better suited for the site conditions or by irrigating more. You may need to test planting bed soils for pH, moisture, and other factors such as nutrient levels, soil structure, and organic matter content.

Mowing

- Grassy facilities are designed for routine mowing. Mow at least twice a year.
- Grass should be mowed to keep it 4" to 9" tall. Grass that is at least 4" tall captures more pollutants and is hardier. Do not allow grass to become a fire hazard.

Nuisance and unwanted vegetation

- Remove nuisance and invasive vegetation, such as Himalayan blackberry, English ivy and reed canarygrass, before it goes to seed in the spring. Do additional weeding in the fall. A list of nuisance plants can be found in the Portland Plant List (see below).
- Immediately remove vegetation that is clogging or impeding flow into the facility.
- Remove potentially large and deep-rooted trees or bushes when they might impede the flow path or compromise facility structures.
- Provide ground cover on any dirt exposed by vegetation removal.

Wildlife

Vegetated facilities create habitat, especially for birds. The Migratory Bird Treaty Act protects all native bird species. Birds and other animals will generally adjust to human activity. However, there are simple measures that should be taken to avoid disturbance:

- Avoid maintenance during bird nesting season from early March to late July. Prune and mow during late summer. Many baby birds will spend some time on the ground after leaving a nest.
- Walk the site before you do maintenance. Look for nests, burrows and animals in the facility. Reroute around animal areas by at least a few yards.

RESOURCES

Clackamas County Resources:

Clackamas County Soil and Water Conservation District: www.conservationdistrict.org

Plant Identification:

Native Plant Society: www.npsoregon.org

Master Gardeners: www.extension.oregonstate.edu/mg

Native Plant Nurseries:

Native Plant Nursery: www.plantnative.org

EROSION, BANK FAILURE, CHANNEL FORMATION

FACILITIES THIS APPLIES TO

Vegetated Facilities: ecoroofs, infiltration basins, planters, ponds, swales, trees, vegetated filters, and created wetlands.

IMPORTANCE TO FACILITY PERFORMANCE

Stormwater flowing through a facility can cause erosion. Erosion can increase sediment build up, clog outlets, reduce water quality benefits, add to pollution and cause facility components to fail. Eroded channels create an easy path for water to travel down reducing the ability of the facility to filter pollutants and infiltrate water.

WHAT TO LOOK FOR

Any area with erosion more than two inches deep needs maintenance. Signs of erosion and common locations:

- The formation of flow restricting channels in the bottom of the facility, around inlet pipes and curb cuts, or at overflows.
- Undercutting, scouring, and slumping along banks or berms.
- Channels and undercutting through check dams. (check dams are small berms built across a facility to slow water and create small areas of ponding).

WHAT TO DO

- Fill the eroded area with soil, compact it lightly, and cover with mulch, compost, seed, sod, or other erosion prevention materials.
- Plant banks with deep or heavily rooted plants to permanently stabilize soil.
- Install or repair structures designed to dissipate energy and spread flow, such as splash blocks on downspouts, or riprap around inlet pipes and curb cuts. See the City's Public Works Standards for requirements.
- If erosion continues to be a problem, consult a professional to determine the cause and a solution.
- Replant in accordance with the landscape plan.

STRUCTURAL DEFICIENCIES

FACILITIES THIS APPLIES TO

Most stormwater facilities have some structural components. Some facilities such as vaults, drywells, and sediment manholes are completely structural. In vegetated facilities, structural components often control how water enters, travels through, or exits a facility. Common structural components include:

- Inflow and outflow pipes, curb cuts, and trenches.
- Valves, orifices, trash racks, and pipes.
- Concrete, metal, and plastic structures and components such as curbs, retaining walls, and manholes.
- Manufactured devices such as filter cartridges.
- Earthworks such as embankments, check dams, dikes, berms and side slopes.
- Riprap and other flow spreading elements.
- Access roads, gates and signs.

IMPORTANCE TO FACILITY PERFORMANCE

These elements need to be in good working order to route flows into a facility and for the facility to function properly.

WHAT TO LOOK FOR

Look at the general condition of these elements. Do they need repair or replacement? Are they still properly aligned? Look for:

- cracks, scratches, dents, rust, or other conditions of wear.
- loose fittings, broken or missing components.
- insufficient oil/grease for moving parts.
- appropriate gravel cover or bedding to support the structures.
- misaligned parts or other impediments to the component's ability to still pass flow.

MAINTENANCE

- Immediately repair or replace any major damage to prevent catastrophic failure. This includes any structural component that is cracked, loose or askew. You may need to consult a professional engineer or hire a trained contractor to design and perform any repairs. Refer to page 10 for a list of resources.
- Minor damage such as dents, or rust spots may not need immediate replacement but should be monitored.
- Maintain access to the facility by keeping the access route open and structurally sound, fence gates and vault lids oiled and locks functioning. Access must be available in an emergency.

PONDING WATER

FACILITIES THIS APPLIES TO

Vegetated Facilities: dry ponds, infiltration basins, planters, rain gardens, sand filters, swales, created wetlands, and vegetated filter strips.

Structural Facilities: manufactured facilities and pervious pavement.

NOTE: Some facilities are specifically designed to always hold water such as: wet ponds, spill control manholes, and sedimentation manholes.

IMPORTANCE TO FACILITY PERFORMANCE

Most facilities are designed to drain in a certain amount of time. This varies from 2 to 48 hours depending on the type of facility. This time is stated in the Operations and Maintenance plan for the type of facility. Ponding water is usually a sign that the facility's outlet is clogged or it is not infiltrating properly.

WHAT TO LOOK FOR

- clogging of overflows or outlets with debris, trash or other obstructions.
- fine sediments filtering into the soil or other filtration media (like sand or gravel) that can prevent proper infiltration.
- water that has remained ponded for more than 48 hours.

MAINTENANCE

- For surface facilities, first try raking the top few inches of soil to break up clogged sections and restore water flow.
- Clean out overflows and outlets with hand tools, if possible. Difficult or hard to access blockages may require a professional contractor.
- Identify sources of sediment and debris to prevent them from entering the facility. Simple actions like sweeping a parking lot regularly can keep sediment out of facilities.
- Make sure the facility has enough vegetation. Vegetation absorbs water and roots help keep soil loose so it can infiltrate water.

For more thorough instructions on removing sediment, see the "Sediment Removal and Disposal" section of this handbook. Sediment accumulated in stormwater facilities may be considered hazardous waste and must be handled and disposed of properly.

If ponding still occurs, contact a landscape architect, professional engineer or trained contractor for more assistance.

PESTS

Nutria photo by NDomer

FACILITIES THIS APPLIES TO

All types of stormwater facilities

IMPORTANCE TO FACILITY PERFORMANCE

Mosquitoes can breed in ponded or other stagnant water. Vegetated areas can be attractive habitat for rats, nutria, beaver, and a variety of birds and amphibians. While some species are desirable, others can be public health or nuisance concerns. In particular, mosquitoes and rats can breed quickly and cause a public health hazard if not removed. The presence of pests does not necessarily impact the ability of your facility to treat and manage stormwater but may indicate maintenance needs, such as lack of proper infiltration.

WHAT TO LOOK FOR

- Check for mosquito larvae in any system with open, slow, or non-moving waters - especially during warmer weather. Larvae look like tiny wiggling sticks floating perpendicular to the water's surface.
- Look for nutria, rat, and other animal droppings year round. Also check for structural indicators such as beaver dams and rodent holes and burrows.

WHAT TO DO

Mosquitos

- The best way to avoid breeding mosquitoes is to prevent ponding water. Mosquitoes need standing water to lay their eggs, and for their larvae and pupae to develop. Most stormwater facilities are designed to drain in at least 48 hours. If your facility is not draining properly see the "Ponding Water" and "Sediment Removal and Disposal" sections of this handbook.
- As a temporary control for mosquitoes, the county or other licensed professionals can apply pesticides to kill mosquito larvae in the water or adult insects in the air.

Rats

Rats need shelter, food and water to survive.

- Remove plant debris that may provide shelter for rats from the facility.
- Remove fruits and nuts that fall to the ground.
- Fill in burrows.
- Trap and remove individual animals.

Other Wildlife Other non-native and invasive animal species may take up residence in your facility. Contact the Oregon Department of Fish and Wildlife (ODFW) to help identify these species and suggest removal processes. Permits from ODFW are required to capture and relocate native wildlife. Some common non-native species are:

- Opossum
- Eastern gray squirrel
- Nutria
- Bullfrog
- Fox squirrel
- Eastern cottontail
- Egyptian goose
- Red-eared slider turtle
- Snapping turtle

PEST RESOURCES

Rats and mosquitoes:

Clackamas County Vector Control (includes Washington County)
www.clackamas.us\vector
(503) 655-8394

Other pest issues:
Look in yellow pages or on the internet under "Pest Control"

Other Wildlife:
Oregon Department of Fish and Wildlife
www.dfw.state.or.us/wildlife/
(503) 947-6000 or (800) 720-6339

POLLUTION YOU CAN SEE OR SMELL

FACILITIES THIS APPLIES TO

All types of stormwater facilities.

IMPORTANCE TO FACILITY PERFORMANCE

Stormwater facilities often collect a variety of trash and debris. Trash and debris, especially floating debris, can clog pipes or treatment media. It can also cause odors through decay or by collecting spilled or dumped materials.

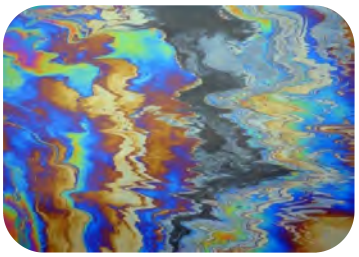
Stormwater facilities are designed to help prevent pollutants from entering rivers and streams. Any visible water quality pollutants may wash out of the facility spreading the pollution problem.

WHAT TO LOOK FOR

- Check monthly for Trash and debris.

Any unusual or unpleasant smells from sources such as:

- Natural plant decay.
- Dying plants trapped under sediment.
- A spill or a leak (e.g., gasoline or sewage).



Visible pollution such as:

- Sheens
- Turbid (cloudy) water
- Discoloration, or
- Other pollutants on the surface of the water.

Pollution You Can See And Smell (continued)

WHAT TO DO

- Regularly remove trash and plant debris.
- Remove accumulated sediment (see "Sediment Removal and Disposal" in this manual).
- Make sure inlets and outlets are not clogged.
- Identify the source of trash, debris or pollutant, such as a spill, leak, or illicit discharge.
- If there is evidence of a spill or leak, contact a professional laboratory or sampling firm to assess whether the material needs specialized removal, treatment, and disposal. Use trained professional staff for any cleanup and remediation.

SAFETY

In addition to keeping the facility in good working order, maintenance should also strive to meet safety and aesthetic goals that benefit the community and protect your site workers. Consider establishing maintenance triggers and practices that respond to the following issues below. Keep in mind the safety of both the employees who maintain your facility and the general public.

WHAT TO LOOK FOR

Site Conditions

Conditions, such as steep slopes, slick surfaces, and vegetation debris, can create a falling hazard to employees and visitors.

Public Safety

Some stormwater facilities, such as ponds and created wetlands, can be "attractive nuisances" attracting undesirable activity, vandalism, or use that could be harmful to public safety. Consider the safety features now in place at your facility.

WHAT TO DO

- Use barrier plantings or fencing to bar entry into the facility area.
- Install road bollards, lighting, and signage to discourage illegal dumping.
- Avoid maintaining facilities in wet weather to reduce the risk of injuries from slipping. Always make sure that appropriate safety gear (e.g., harness, gloves, face shields, safety line) is used.
- For underground facilities, avoid entering anything defined as a confined space. Vaults, deep ponds, manufactured facilities or manholes are examples of confined spaces. These areas require special permits, training and entry techniques. Some can be inspected and cleaned from above without entering. Always use caution when working with underground facilities. You are legally required to meet Oregon Occupational Safety and Health Division (OR-OSHA) requirements for such activities.

RESOURCES

Confined space entry:

OR-OSHA (confined space entry requirements)
www.orosha.org/subjects/confined_spaces.html
(503) 229-5910

PAYING FOR MAINTENANCE

Specific maintenance costs depend on the characteristics of the facility, the site, and the area draining to the facility. The general rule of thumb is that annual maintenance costs will be 5 to 10% of the facility's total capital cost. Routine, scheduled maintenance can help keep overall costs down by addressing problems before they require major attention. Contact your stormwater system manufacturer for information about your system.

FINANCING MAINTENANCE

You need to determine how you will finance your maintenance needs. A facility maintenance fund is recommended for both capital maintenance procedures (e.g., facility replacement and non-routine maintenance, such as sediment removal, facility component repair or replacement, major replanting, or safety structure construction) and operating maintenance procedures (routine activities such as facility inspection, debris removal, and vegetation management). For homeowner associations, this could be a portion of homeowner fees or a specific assessment.

HOW MUCH TO SAVE

- An average 5 to 10% per year of the facility's capital cost for annual routine maintenance.
- A percentage of the non-routine maintenance costs per year (i.e. for sediment removal, vegetation replacement) based on the needed frequency. For example, if the facility is designed to need mechanical sediment removal every five years, 20% of the total cost should be put aside each year.
- An additional 3 to 5% of the facility's capital cost per year for eventual facility replacement (based on the facility's life expectancy). Most of these facilities have a life expectancy of 25 to 50 years.

VEGETATED FACILITIES

- Most required routine maintenance (excluding major repair and replacement) is estimated to have an annual cost of $200 to $600 dollars per acre of facility, above current landscape maintenance costs. Costs can vary depending on the types and level of maintenance practices used.
- The cost and intensity of maintenance activities are usually higher during the two-year plant establishment period. During this time, plants will need additional watering and plants that die will need to be replaced.

WHERE TO GET MORE ASSISTANCE

City of Wilsonville Natural Resources Program
www.ci.wilsonville.or.us/Index.aspx?page=91
(503) 682-4960

City of Wilsonville Public Works Standards:
www.ci.wilsonville.or.us/Index.aspx?page=127 Go to *Important Links* at the bottom of the page and click on *Public Works Construction Standards 2006* (section 301.6.00 Operations and Maintenance Req.)
(503) 682-4092

HIRING CONTRACTORS

Professional maintenance services phone book/internet references:

Vegetation Management:

- "Landscape Contractors"

Sediment Removal and Disposal:

- "Sewage," or
- "Waste Disposal"

Facility Alterations:

- "Landscape Architects" or
- "Engineers - Civil"

Manufactured Facilities:

- Find the specific manufacturer

CONFINED SPACE ENTRY

Oregon Occupational Safety and Health Division (OR-OSHA):
www.orosha.org/subjects/confined_spaces.html
(503) 229-5910

PEST RESOURCES

Rats and mosquitoes:

Clackamas County Vector Control (includes Washington County)
www.clackamas.us\vector
(503) 655-8394

Other pest issues:
Look in yellow pages or on the internet under "Pest Control"

Other Wildlife:
Oregon Department of Fish and Wildlife
www.dfw.state.or.us/wildlife/
(503) 947-6000 or (800) 720-6339

Portland Audubon Wildlife Care Center
Help with injured animals and animal identification questions:
www.audubonportland.org
(503) 292-0304

The Audubon Wildlife Care Center is the oldest and busiest wildlife rehabilitation facility in Oregon. Each year they treat over 3,000 wild animals for release back to the wild and respond to more than 15,000 wildlife related inquiries.

VEGETATION

Clackamas County Resources:

Clackamas County Soil and Water Conservation District:
www.conservationdistrict.org

Plant Identification:

Native Plant Society:
www.npsoregon.org

Master Gardeners:
www.extension.oregonstate.edu/mg

Native Plant Nurseries:

Native Plant Nursery:
www.plantnative.org

City of Wilsonville

29799 SW Town Center Loop E

Phone: 503-682-4960
Fax: 503-682-7025

www.ci.wilsonville.or.us

This brochure was prepared by the City of Wilsonville's Natural Resources Program staff.
March 2012
NOTE: A considerable amount of information was obtained from the City of Portland's Stormwater Management Facilities Operations and Maintenance for Private Property Owners guide.

OTHER WAYS TO PROTECT OUR STREAMS AND THE WILLAMETTE RIVER

In Your Home or Business

- Use nontoxic cleaners.
- Properly dispose of hazardous materials.
- Conserve energy: switch to compact fluorescent bulbs, turn down the heat, do the laundry with cold water, purchase energy-efficient appliances.
- Use water wisely: fix leaks, use low-flow showerheads, use only the water you need.

In Your Yard

- Plant native vegetation.
- Consider planting perennials versus annuals.
- Sweep instead of hose.
- Cover bare soil with mulch or plants.
- Compost yard debris.
- Disconnect downspouts (where appropriate).
- Use drip irrigation.

In and Out of Your Car

- Properly maintain vehicles.
- Wash vehicles where water is recycled.
- Drive less: use transit, bike, walk, or carpool.
- Recycle motor oil.
- Clean up spills or leaks.

In Your Community

- Volunteer for tree planting, cleanup, stream restoration, or invasive plant species removal projects.
- Report spills and illegal dumping (call 503-823-7180).
- Don't litter, and pick up litter when you see it.
- Pick up pet waste and put it in the garbage or toilet.

In Parks and Natural Areas

- Stay on designated hiking trails and biking areas.
- Keep dogs on leashes and away from the streambanks and water. Pick up pet

THANK YOU

for helping keep Wilsonville clean, healthy and sustainable and for stewarding this beautiful place that we all share.

Printed on recycled paper.

APPENDIX C – WEB SOIL SURVEY SOILS MAP

Hydrologic Soil Group—Clackamas County Area, Oregon
(W-5)

Map Scale: 1:2,660 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 35 70 140 210

Feet
0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clackamas County Area, Oregon
Survey Area Data: Version 18, Oct 27, 2021

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

Date(s) aerial images were photographed: Aug 1, 2019—Sep 12, 2019

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1A	Aloha silt loam, 0 to 3 percent slopes	C/D	13.2	48.2%
3	Amity silt loam	C/D	5.7	21.0%
25	Cove silty clay loam	D	2.6	9.4%
91A	Woodburn silt loam, 0 to 3 percent slopes	C	4.3	15.7%
91B	Woodburn silt loam, 3 to 8 percent slopes	C	1.6	5.8%
Totals for Area of Interest			**27.3**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

REPUBLIC SERVICES

November 19, 2021

Bob Wells
Lance Mueller and Associates

Re: Building W5
9600 SW Boeckman Rd.
Wilsonville, OR 97070

Dear Bob,

Thank you, for sending us the preliminary site plans for this proposed development in Wilsonville OR.

My Company: Republic Services of Clackamas and Washington Counties has the franchise agreement to service this area with the City of Wilsonville. We will provide complete commercial waste removal and recycling services as needed on a weekly basis for this location

The planned traffic pattern entering the site from Boeckman Rd. and proceeding in a clockwise circulation of the proposed building, is adequate for our trucks to navigate the site.

The enclosure location at the Southwest corner of the property, and an approach of 75' Ft., will provide our trucks adequate space to approach and access our equipment inside the enclosure.

The proposed enclosures inside dimensions of 20'Ft. wide and 12'Ft. deep, with double gates that open 180 degrees with wind pins to secure the gates in the open and closed positions, and a 20'Ft. clear opening will allow adequate space for housing our trash and recycle receptacles, and space for our trucks to service the equipment.

Thanks Bob, for your help and concerns for our services prior to this project being developed.

Sincerely,

Kelly Herrod
Operations Supervisor
Republic Services Inc.

Kelly Henwood
Republic Services
1/10/2023

SITE PLAN

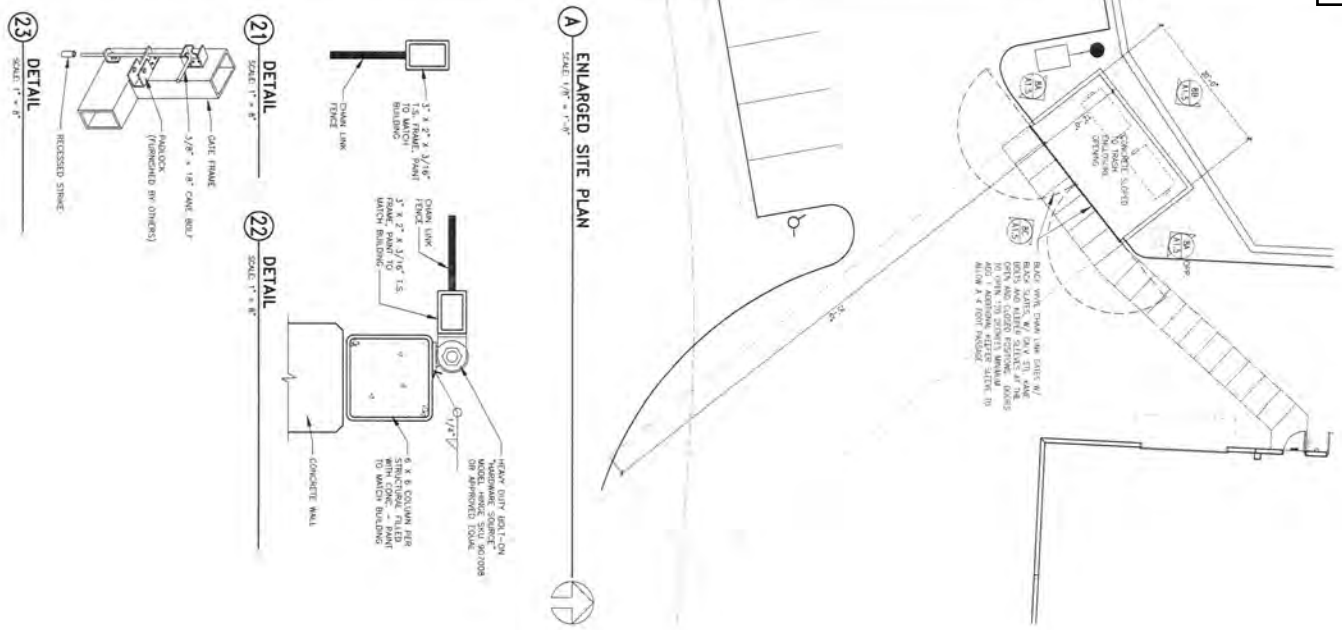
sheet A1.0

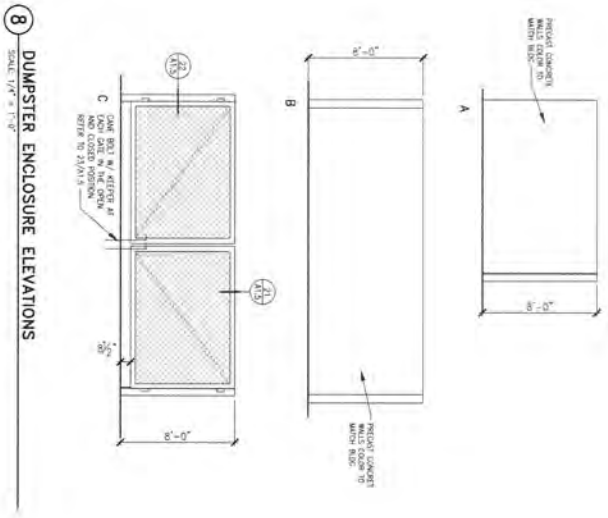
LANCE MUELLER & ASSOCIATES
ARCHITECTS AIA
130 LAKESIDE • SUITE 250 • SEATTLE, WA 98122 • (206) 325-2553

BUILDING W5
99XX SW Boeckman Rd.
Wilsonville, OR 97070

REGISTERED ARCHITECT
LANCE MUELLER
SEATTLE, WA.
1991
STATE OF OREGON

18003 job no			
EM drawn			
BW checked		LAND USE SUBMITTAL #5	11-11-22
		SITE DESIGN REVIEW RESUBMITTAL	1-6-22
11-11-22 date	no.	revision	date





Kelly Hennel
Planning Services
1/10/2023

ENLARGED PLANS AND DETAILS

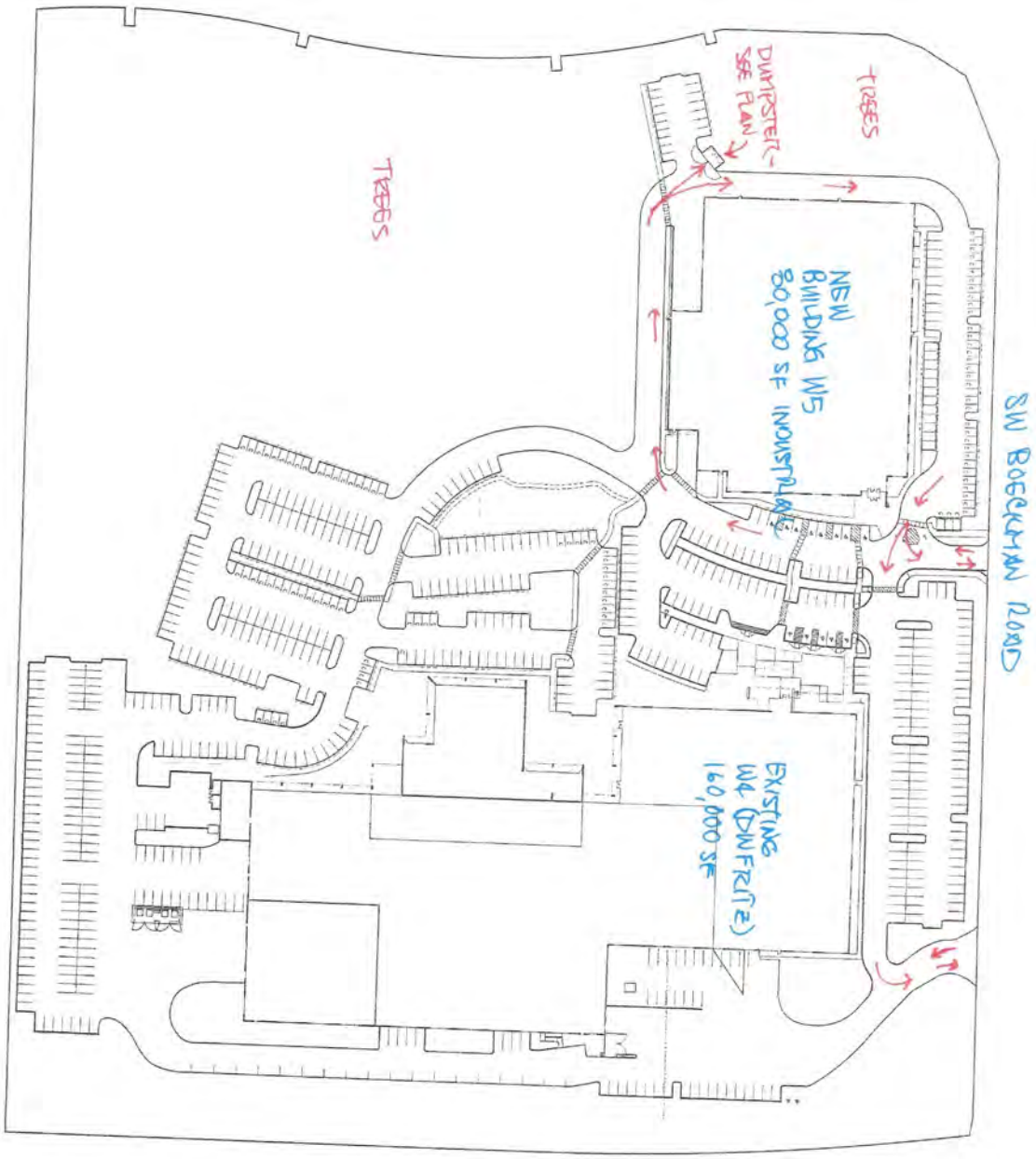
sheet A1.2

LANCE MUELLER & ASSOCIATES
ARCHITECTS AIA
130 LAKESIDE • SUITE 230 • SEATTLE, WA 98122 • (206) 325-2553

BUILDING W5
99XX SW Boeckman Rd.
Wilsonville, OR 97070

REGISTERED ARCHITECT — LANCE MUELLER — SEATTLE, WA 1991 — STATE OF OREGON

18003	job no.		
EW	drawn		
SW	checked	LAND USE SUBMITTAL #2	5-6-22
11-11-22	date	SITE DESIGN RESUBMITTAL	1-6-23
		SITE DESIGN REVIEW	1-24-23
		no. revision	date



SITE PLAN

Kelly Hennod
Republic Services
1/10/2023

SITE PLAN

sheet A1.1

LANCE MUELLER & ASSOCIATES
ARCHITECTS AIA
130 LAKESIDE • SUITE 250 • SEATTLE, WA 98122 • (206) 325-2553

BUILDING W5
9900 SW Boeckman Rd.
Wilsonville, OR 97070

REGISTERED ARCHITECT
LANCE MUELLER
SEATTLE, WA
STATE OF OREGON

11-17-21

LANCE MUELLER & ASSOCIATES
ARCHITECTS • AIA

W5 –Lighting Fixture Schedule & Cut Sheets | January 2022

96XX SW Boeckman Road, Wilsonville, OR 97070

Summary: This proposal is for the second of a two-building industrial campus in a heavily treed site. The new W5 building's lighting fixtures match the existing building's LED fixtures for a unified campus.

Lighting Fixture Schedule

Label	Type	Manufacturer	Part Description	Watts
P3	Pole mounted LED area lighting fixture - 25' height.	Visionaire Lighting	VLX Series - II_T3_64LC_7_4K	(1) = 142W
P6	Pole mounted LED area lighting fixture - 25' height.	Visionaire Lighting	VLX Series - II_T4_64LC_7_4K	(1) = 142W
P6-1	Double-Head Pole mounted LED area lighting fixture - 25' height.	Visionaire Lighting	VLX Series - II_T4_64LC_7_4K	(2) = 284W
P8	Pole mounted LED area lighting fixture - 25' height.	Visionaire Lighting	VLX Series - II_T2_64LC_7_4K	(1) = 142W
PC2	Pedestrian area LED light column – 12' height	Generation Brands	700OCTUR8401220HUNV2S	(1) = 26.8W
S4	LED Downlights in Lobby Vestibule	Cooper Lighting - HALO	SMD4R6940WH	(1) = 9.8W
SP1	Pole mounted LED area lighting fixture - 25' height. (Existing on W4 site)	Visionaire Lighting	Existing – shown on site lighting plan for over-all lighting levels.	(1) = 78W
SP2	Pole mounted LED area lighting fixture - 25' height. (Existing on W4 site)	Visionaire Lighting	Existing – shown on site lighting plan for over-all lighting levels.	(2) = 424W
SP3	Pole mounted LED area lighting fixture - 25' height. (Existing on W4 site)	Visionaire Lighting	Existing – shown on site lighting plan for over-all lighting levels.	(1) = 142W
SP5	Pole mounted LED area lighting fixture - 25' height. (Existing on W4 site)	Visionaire Lighting	Existing – shown on site lighting plan for over-all lighting levels.	(1) = 142W
WM1	Wall mounted LED area lighting fixture - 25' height.	Visionaire Lighting	VMX Series - II_T4_64LC_7_4K-UNV-WM-SL+BAWP	(1) = 142W
WM2	Wall mounted LED loading area lighting fixture – Full cut-off wall pack - 25' height.	Industrial Lighting Products Inc.	WPCS-44WLED-UNIV-40-T3	(1) = 43.6W
WM3	Wall mounted LED Sconce accent fixture – 9.5' top height	Generation Brands	700OWTUR 840 18 C Z UNV S	(1) = 15.3W
WM7	Wall mounted LED area lighting fixture - 25' height.	Visionaire Lighting LLC	VMX Series - II_T2_48LC_5_4K-UNV-WM-SL+BAWP	(1) = 78W

P Pole-Mounted Area Fixtures (P3, P6, P6.1 and P8)

Pole-mounted LED area lighting fixture - 25' height, which match existing.
(SP Fixtures are similar and existing, and shown on the plans for transition lighting levels.)

VLX LED Specifications

Project Name:

Catalog Number:

Type:

The new **VLX LED** Series offers clean, functional styling that is defined by its sleek low profile design and rugged construction. It combines LED performance and advanced LED thermal management technology and provides outdoor lighting that is both energy efficient and aesthetically pleasing.

The LED's performance and the driver's life are maximized by enclosing them in two separate die cast aluminum housings. Easy tool-less access for mounting and maintenance.

The LED light assemblies come with 96 to 192 LEDs. Eight optical distribution patterns are available. Choose between 3000, 4000 or 5000 Kelvin temperature of the LEDs.

A durable polyester powder coat finish is guaranteed for five years; and is available in standard or custom colors.

The **VLX LED** series is an exceptional choice for commercial parking lots, office complexes, architectural projects, and other general lighting projects.

Ordering Information

MODEL	OPTICS	LEDS	CURRENT	KELVIN	VOLTAGE	MOUNTING	FINISH	OPTIONS	OPTIONS
VLX-1	**T1** Type 1 **T2** Type 2 **T3** Type 3 **T4** Type 4 **T4A** Type 4 Automotive **T5** Type 5 **T5W** Type 5 Wide **T5WR** Type 5 Wide Round	**96LC** **128LC** **160LC** **192LC**	**3** 350mA **5** 530mA **7** 700mA	**3K** 3000K **4K** 4000K **5K** 5000K	**UNV** 120-277V **8** 347V **5** 480V	**AM** Arm Mount Round Pole Plate Adaptors (RPP) are to be ordered separately. **WM** Wall Mount *Requires BAWP BAWP to be ordered separately.	**BZ** Bronze **BK** Black **SBK** Smooth Black **WH** White **SWH** Smooth White **GP** Graphite **GY** Grey **SL** Silver Metallic **CC** Custom Color	**PCR-120** **PCR-208** **PCR-240** **PCR-277** **PCR-347** **PCR-480** Photocell & Receptacle **PER** **5PINPER** **7PINPER** 3, 5, or 7 Pin Photo Receptacle w/shorting cap Requires Dimming Driver **DIM** 0-10v Dimming Driver **WSC-8** Motion Sensor 8' Mounting Height **WSC-20** Motion Sensor 9-20' Mounting Height **WSC-40** Motion Sensor 21-40' Mounting Height *The WSC options will require (1) FSIR 100 remote for programing	**RPP** Round Pole Plate Adaptor **UPMA-S** Universal Square Pole Mount Adaptor **UPMA-R** Universal Round Pole Mount Adaptor **BAWP** Cast Wall Plate **ROT-R** Rotated Optics Right Side **ROT-L** Rotated Optics Left Side **CLS** Back Side Cutoff Louver Shield **RCLS** Right Side Cutoff Louver Shield **LCLS** Left Side Cutoff Louver Shield **VWC** Visionaire Wireless Controls *Consult Factory

VISIONAIRE LIGHTING

Features & Specifications

VLX

Heatsink
Die cast aluminum heatsink with integral cooling fins for thermal management.

Mounting Arm/Driver Compartment
·Durable two-piece die cast aluminum driver compartment utilizes a tool-less push button latch for ease of maintenance and sealed with a one-piece silicone gasket.
· Meets ANSI C136.31-2010 1.5G Vibration Standards.

Thermal Management
· The VLX series provides excellent thermal management by mounting the LEDs to the substantial heat sink of the housing. This enables the Luminaire to withstand higher ambient temperatures and driver currents without degrading LED life.
· The L70 test determines the point in an LEDs life when it reaches 70 percent of its initial output. The VLX series LEDs have been determined to last 90,000+ hours in 25° C environments when driven at 350 mA.

Optical System
· The highest lumen output LEDs are utilized in the VLX series. IES distribution Types I, II, III, IV and V are available. The optical system qualifies as IES full cutoff to restrict light trespass, glare and light pollution. The correlated color temperature (CCT) is a specification of the color appearance of the light emitted by a LED, relating its color to the color of light from a reference source when heated to a particular temperature, measured in degrees Kelvin (K).
· CRI values are 70.

Quali-Guard® Finish
· The finish is a Quali-Guard® textured, chemically pretreated through a multiple-stage washer, electrostatically applied, thermoset polyester powder coat finish, with a minimum of 3-5 millimeter thickness. Finish is oven-baked at 400º F to promote maximum adherence and finish hardness. All finishes are available in standard and custom colors.
· Finish is guaranteed for five (5) years.

Electrical Assembly
· The VLX LED series is supplied with a choice of 350, 530 or 700 mA high-performance LED drivers that accept 120v thru 480v, 50 Hz to 60 Hz, input. Power factor of 90%. Rated for -40°C operations.
· 10 kV surge protector supplied as standard.
· Terminal block supplied as standard.

Warranty
Five (5) year Limited Warranty on entire system, including finish. For full warranty information, please visit visionairelighting.com.

Options
· Photocell & receptacle
· Photo receptacle
· Round pole plate adapter
· Cast Wall Plate
· 0-10v Dimming Driver
· Motion Sensor
· Wireless Control
· Universal Pole Mount Adaptor
· Cutoff Louver Shield

Listings
· The VLX is ETL listed
· IP65 Rated
· Powder Coated Tough.
· DLC Listed
· IDA Certification

DesignLights Consortium (DLC) qualified Product. Some configurations of this product family may not be DesignLights Consortium (DLC) listed, please refer to the DLC qualified products list to confirm listed configurations. http://www.designlights.org/
3000K must be selected for IDA certification. Fixed mount must be selected for IDA dark sky certification.

VLX - ELECTRICAL LOAD (A)							
Ordering Nomenclature	**System Watts**	**120**	**208**	**240**	**277**	**347**	**480**
VLX-1-T5-96LC-3	103	0.86	0.50	0.43	0.37	0.30	0.21
VLX-1-T5-96LC-5	159	1.33	0.76	0.66	0.57	0.46	0.33
VLX-1-T5-96LC-7	215	1.79	1.03	0.90	0.78	0.62	0.45
VLX-1-T5-128LC-3	136	1.13	0.65	0.57	0.49	0.39	0.28
VLX-1-T5-128LC-5	215	1.79	1.03	0.90	0.78	0.62	0.45
VLX-1-T5-128LC-7	285	2.38	1.37	1.19	1.03	0.82	0.59
VLX-1-T5-160LC-3	171	1.43	0.82	0.71	0.62	0.49	0.36
VLX-1-T5-160LC-5	266	2.22	1.28	1.11	0.96	0.77	0.55
VLX-1-T5-160LC-7	353	2.94	1.70	1.47	1.27	1.02	0.74
VLX-1-T5-192LC-3	206	1.72	0.99	0.86	0.74	0.59	0.43
VLX-1-T5-192LC-5	317	2.64	1.52	1.32	1.14	0.91	0.66
VLX-1-T5-192LC-7	421	3.51	2.02	1.75	1.52	1.21	0.88

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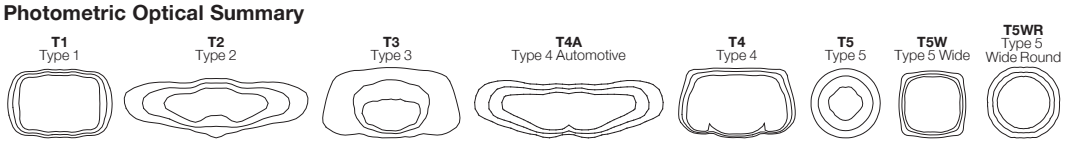
www.visionairelighting.com

VLX LED Specifications

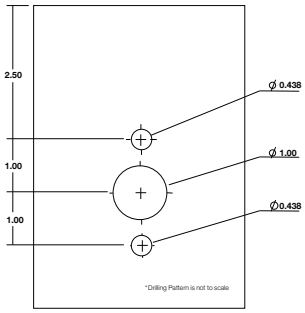
Photometric Optical Summary

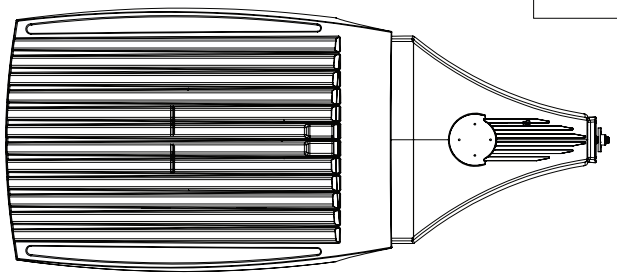


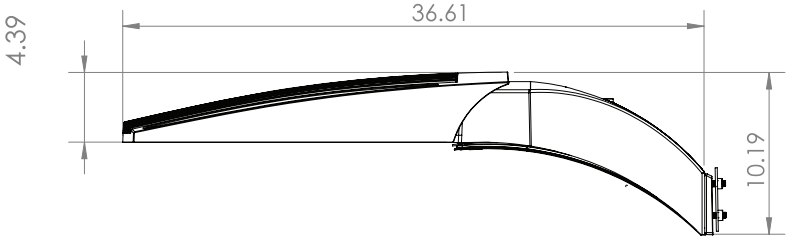
EPA Data	1.0	1.6	2.0	2.5	2.4	2.5

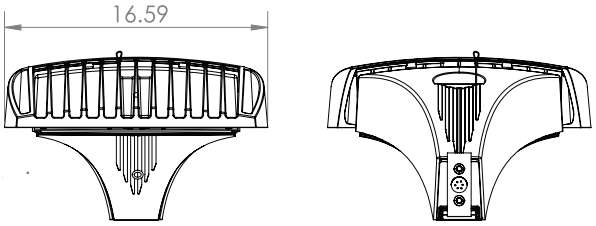
Dimensions

Width:	VLX-1	16.5”
Depth:	VLX-1	36.6”
Height:	VLX-1	4.39”
Overall Height:	VLX-1	10.19”
Weight:		58 LBS









VISIONAIRE LIGHTING

PC2 Pedestrian Pole Fixture

Pedestrian pole LED area lighting fixture

TURBO LIGHT COLUMN

TECH LIGHTING

The distinctively modern Turbo cylindrical light column is a powerful outdoor LED solution for general illumination and area lighting. The Turbo light column has symmetric optics with beam spread options 20° or 40° as well as two different lumen output options.

High quality LM80-tested LEDs
for consistent long-life performance and color

Universal 120-277V driver with integral transient surge protection

Outstanding protection against the elements:

- Marine-grade powder coat finishes
- Stainless Steel mounting hardware
- Impact-resistant, UV stabilized frosted acrylic lensing

Beam spread options, 20 degree and 40 degree

S ECIFICATIONS

DELIVERED LUMENS	2100 or 4517
WATTS	28 or 60
VOLTAGE	Universal 120-277V, with integral transient 2.5kV surge protection (driver)
SECONDARY SURGE PROTECTOR	10kA
DIMMING	0-10
LIGHT DISTRIBUTION	Symmetric
OPTICS	20° or 40°
MOUNTING OPTIONS	Bolt
PERFORMANCE OPTIONS	Photocontrol / In-line Fuse
CCT	3000K or 4000K
CRI	80
COLOR BINING	3 Step
BUG RATING	B1-U2-G0
DARK SKY	Compliant
WET LISTED	IP65
GENERAL LISTING	ETL, Title 24
START TEMP	-30°C
FIELD SERVICEABLE LED	Yes
CONSTRUCTION	Aluminum
HARDWARE	Stainless Steel
FINISH	Marine Grade Powder Coat
LED LIFETIME	L70; 70,000 Hours
WARRANTY*	5 Years

* Visit techlighting.com for specific warranty limitations and details.

TURBO COLUMN
shown in bronze

TURBO COLUMN
shown in charcoal

ORDERING INFORMATION

700OCTUR	CRI/CCT	LENGTH	BEAM SPREAD	FINISH	VOLTAGE	OUTPUT	DISTRIBUTION	OPTIONS
	830 80 CRI, 3000K 840 80 CRI, 4000K	12 12'	20 20° NARROW 40 40° WIDE	Z BRONZE H CHARCOAL	120V–277V	1 55W / 3800 LUMENS 2 25W / 1800 LUMENS	S SYMMETRIC	NONE PC BUTTON PHOTOCONTROL LF IN-LINE FUSE PCLF BUTTON PHOTOCONTROL & IN-LINE FUSE

use 4Use 00k

Use 4000k

techlighting.com

WM Wall-Mounted Area Fixtures (WM1 and WM7)

Wall-mounted LED area lighting fixture - 25' height.

VMX-II LED Specifications

*Universal Arm Mount (UAM) Version Shown.

Project Name:

Catalog Number:

Type:

The **VMX-II LED** Series offers clean, functional styling that is defined by its sleek low profile design and rugged construction. It combines the latest LED technology, advanced LED thermal management and provides outdoor lighting that is both energy efficient and aesthetically pleasing.

The LED's performance and the driver's life are maximized by enclosing them in two separate cast aluminum housings. Easy tool-less access for mounting and maintenance.

The LED light assemblies come with 48 to 96 LEDs. Eight optical distribution patterns are available. Choose between 3000, 4000 or 5000 Kelvin temperature of the LEDs.

A durable polyester powder coat finish is guaranteed for five years; and is available in standard or custom colors.

The **VMX-II LED** series is an exceptional choice for commercial parking lots, office complexes, architectural projects, and other general lighting projects.

Ordering Information

MODEL	OPTICS	LEDs	CURRENT	KELVIN	VOLTAGE	MOUNTING	FINISH	OPTIONS	OPTIONS	OPTIONS
VMX-II	**T1** Type 1	**48LC**	**3** 350mA	**3K** 3000K	**UNV** 120-277V	**AM** Arm Mount	**BZ** Bronze	**PCR-120**	**WSC-8** Motion Sensor 8' Mounting Height	**UPMA-S** Universal Square Pole Mount Adaptor
	T2 Type 2	**64LC**	**5** 530mA	**4K** 4000K	**8** 347V	**SAM** Straight Arm Mount W/ Terminal Block (New Construction)	**BK** Black	**PCR-208**	**WSC-20** Motion Sensor 9-20' Mounting Height	**UPMA-R** Universal Round Pole Mount Adaptor
	T3 Type 3	**80LC**	**7** 700mA	**5K** 5000K	**5** 480V	**UAM** Universal ArmW/ Terminal Block Mount (Retrofit)	**SBK** Smooth Black	**PCR-240**	**WSC-40** Motion Sensor 21-40' Mounting Height *The WSC option will require (1) FSIR 100 remote for programing	**BAWP** Cast Wall Plate
	T4 Type 4	**96LC**	**10** 1050mA *Not available in 96LC			**MAF** Mast Arm Fitter	**WH** White	**PCR-277**		**ROT-R** Rotated Optics Right Side
	T4A Type 4 Automotive					**KM** Knuckle Mount	**SWH** Smooth White	**PCR-347**		**ROT-L** Rotated Optics Left Side
	T5 Type 5					**WM** Wall Mount *Requires BAWP	**GP** Graphite	**PCR-480** Photocell & Receptacle		**CLS** Backside cutoff shield *Not to be used with KM
	T5W Type 5 Wide					**AWM** Adjustable Wall Mount	**GY** Grey	**PER**		**RCLS** Rightside cutoff shield *Not to be used with KM
	T5WR Type 5 Wide Round					*Round Pole Plate Adapters (RPP) are to be ordered separately.	**SL** Silver Metallic	**5PINPER**		**LCLS** Leftside cutoff shield *Not to be used with KM
						*BAWP to be ordered separately	**CC** Custom Color	**7PINPER** 3, 5, or 7 Pin Photo Receptacle w/shorting cap Requires Dimming Driver		**HS** House shield
								DIM 0-10v Dimming Driver	**UMAP** Universal Mast arm fitter	
								RPP-3"	**ECLS** Egg Crate Louver Shield	
								RPP-4"	**ADJLS** Adjustable Louver Light Shield	
								RPP-5" Round Pole Plate Adaptor	**BD** Barn Door Shield	
								VWC Visionaire Wireless Controls *Consult Factory		

VISIONAIRE LIGHTING

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Features & Specifications

VMX-II

Heatsink
Cast aluminum heatsink with integral cooling fins for thermal management.

Mounting Arm/Driver Compartment
Durable two-piece die cast aluminum driver compartment utilizes stainless steel hardware and sealed with a one-piece silicone gasket.

Thermal Management
· The VMX-II series provides excellent thermal management by mounting the LEDs to the substantial heat sink of the housing. This enables the Luminaire to withstand higher ambient temperatures and driver currents without degrading LED life.
· The L70 test determines the point in an LEDs life when it reaches 70 percent of its initial output. The VMX-II series LEDs have been determined to last 100,000+ hours in 25° C environments when driven at 350 mA.

Optical System
· The highest lumen output, LEDs are utilized in the VMX-II series. IES distribution Types I, II, II, III, IV, IV-A, V, V-WR are available. The optical system qualifies as IES full cutoff to restrict light trespass, glare and light pollution.
· CRI values are 70.

Quali-Guard® Finish
· The finish is a Quali-Guard® textured, chemically pretreated through a multiple-stage washer, electrostatically applied, thermoset polyester powder coat finish, with a minimum of 3-5 millimeter thickness. Finish is oven-baked at 400º F to promote maximum adherence and finish hardness. All finishes are available in standard and custom colors.
· Finish is guaranteed for five (5) years.

Electrical Assembly
· The VMX-II LED series is supplied with a choice of 350, 530, 700 or 1050 mA high-performance LED drivers that accept 120v thru 480v, 50 Hz to 60 Hz, input. Power factor of 90%. Rated for -40°C operations.
· 10 kV surge protector supplied as standard.
· Terminal block supplied as standard on AM, SAM and UAM as standard

Warranty
· Five (5) year Limited Warranty on entire system, including finish. For full warranty information, please visit visionairelighting.com.

Options
· Photocell & Receptacle
· Photo Receptacle with Shorting Cap
· 0-10v Dimming Driver
· Motion Sensor
· Wireless Control
· Round pole plate adapter
· Universal Pole Mount Adaptor
· Cast Wall Plate
· Rotated Optics
· Cutoff Louver Shielding (CLS)

Listings
· The VMX-II Series is cUL Listed
· IP65 Rated Housing
· ANSI Certification
· Powder Coated Tough
· IDA Certification
· DLC Listed

DesignLights Consortium (DLC) qualified Product. Some configurations of this product family may not be DesignLights Consortium (DLC) listed, please refer to the DLC qualified products list to confirm listed configurations. http://www.designlights.org/
3000K must be selected with a fixed mount for IDA certification. Fixed mount must be selected for IDA dark sky certification.

VMX-II - ELECTRICAL LOAD (A)							
Ordering Nomenclature	System Watts	120	208	240	277	347	480
VMX-II-T5-48LC-3	52	0.43	0.25	0.22	0.19	0.15	0.11
VMX-II-T5-48LC-5	78	0.65	0.38	0.33	0.28	0.22	0.16
VMX-II-T5-48LC-7	106	0.88	0.51	0.44	0.38	0.31	0.22
VMX-II-T5-48LC-10	161	1.34	0.77	0.67	0.58	0.46	0.34
VMX-II-T5-64LC-3	70	0.58	0.34	0.29	0.25	0.20	0.15
VMX-II-T5-64LC-5	107	0.89	0.51	0.45	0.39	0.31	0.22
VMX-II-T5-64LC-7	142	1.18	0.68	0.59	0.51	0.41	0.30
VMX-II-T5-64LC-10	218	1.82	1.05	0.91	0.79	0.63	0.45
VMX-II-T5-80LC-3	87	0.73	0.42	0.36	0.31	0.25	0.18
VMX-II-T5-80LC-5	132	1.10	0.63	0.55	0.48	0.38	0.28
VMX-II-T5-80LC-7	177	1.48	0.85	0.74	0.64	0.51	0.37
VMX-II-T5-80LC-10	272	2.27	1.31	1.13	0.98	0.78	0.57
VMX-II-T5-96LC-3	104	0.87	0.50	0.43	0.38	0.30	0.22
VMX-II-T5-96LC-5	157	1.31	0.75	0.65	0.57	0.45	0.33
VMX-II-T5-96LC-7	212	1.77	1.02	0.88	0.77	0.61	0.44

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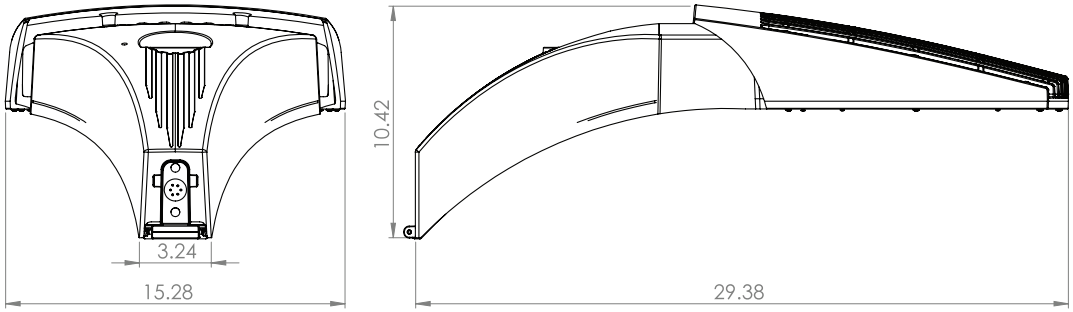
www.visionairelighting.com

VMX-II LED Specifications

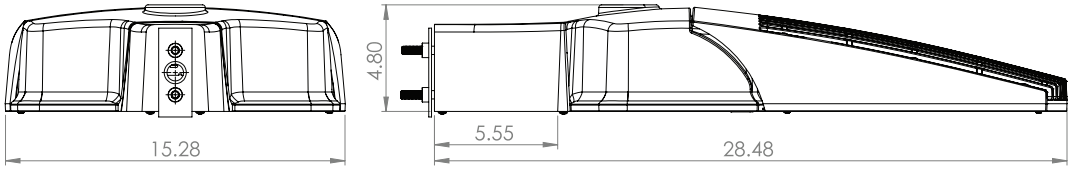
Arm Mount (AM)

The Arm Mount (AM) utilizes a 2 piece cleat system for easy installation, a terminal block is supplied as standard. A Round Pole Plate Adapter (RPP) is required for mounting to round poles.



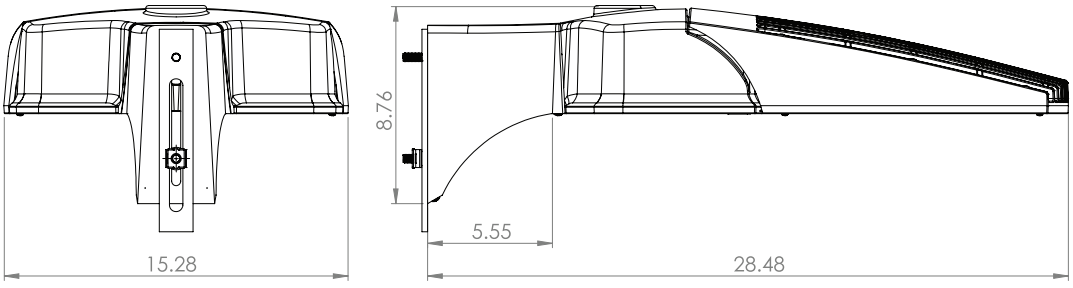
Straight Arm Mount (SAM)

The Straight Arm Mount (SAM) uses a 2 piece mounting system, a terminal block is supplied as standard. A Round Pole Plate Adapter (RPP) is required for mounting to round poles.



Universal Arm Mount (UAM)

The Unviersal Arm Mount (UAM) is meant for retrofit Applications and has a drilling templat raning from 3" to 5.5". A Round Pole Plate Adapter (RPP) is required for mounting to round poles.



VISIONAIRE LIGHTING

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WM2 Wall Pack Fixture

Wall mounted LED loading area lighting fixture – Full cut-off wall pack - 25' height.

Project Name:	Part Number:	Type:

FULL CUTOFF WALL PACK - 44W LED

OUTDOOR

ILP
407-478-3759
www.ilp-inc.com

FEATURES

- Bronze die-cast aluminum housing
- Custom and factory select colors available (Contact factory for pricing)
- Hinged full cutoff front frame
- ½" Coin plugs with o-rings for conduit or optional photocell
- Forward throw optic lens
- Cast-in template for mounting directly over a 4" recessed outlet box
- 3000K, 4000K and 5000K color options
- 0-10V Dimmable Driver
- ETL Listed for wet locations
- Meets Dark Sky Requirements
- 5 Year warranty
- DesignLights Consortium® Premium Qualified Luminaire

SUITABLE APPLICATIONS

- Parking Lots
- Loading Dock Areas
- Exterior Wall Lighting
- Building Entrance Ways

LED SYSTEMS INFO		T2	T3	T4		T2	T3	T4
Calculated L_{70} (TM-21)	4000K	>100K	>100K	>100K	5000K	>100K	>100K	>100K
Delivered Lumens		4,849 lm	4,786 lm	4,618 lm		4,757 lm	4,694 lm	4,530 lm
Total Input Watts		42 W	42 W	42 W		42 W	42 W	42 W
Luminaire Efficacy Rating (LER)		115 lm/W	113 lm/W	109 lm/W		113 lm/W	111 lm/W	107 lm/W
Correlated Color Temperature (CCT)		4000K	4000K	4000K		5000K	5000K	5000K
Color Rendering Index (CRI)		>70	>70	>70		>70	>70	>70
BUG Rating		B2 U0 G2	B1 U0 G1	B1 U0 G2		B2 U0 G2	B1 U0 G1	B1 U0 G2
Maximum Ambient Temperature		125˚F	125˚F	125˚F		125˚F	125˚F	125˚F
Universal Driver		120-277 V	120-277 V	120-277 V		120-277 V	120-277 V	120-277 V

LED System data above based on WPCS-44WLED-UNIV-40 and WPCS-44WLED-UNIV-50
LED Lumen maintenance estimates based on TM-21 projections for the light source at 25˚C ambient.

ORDERING GUIDE:

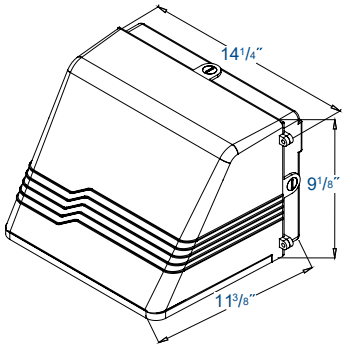
Series	Watts	Driver	Color	Optics	Options	
WPCS Full Cutoff Wall Pack	**44WLED**	**UNIV** 120-277V Driver	**50**	**T2**	**WPC15WG**	Wire Guard,SS Construction
			40	**T3**	**PCxxx***	Photocell (xxx = Voltage)
			30	**T4**	**FI/ILBCP05**	5W LED Factory Installed Battery Backup
					FUSE/SXXX	Single-line Voltage Fuse (120, 277,347)
					FUSE/DXXX	Dual-line Voltage Fuse (208, 240, 480)
					SP1	10kA Max Univolt Surge Protector
					SP2	22kA Max Univolt Surge Protector

* Photocell option available for field install.

FULL CUTOFF WALL PACK - 44W LED

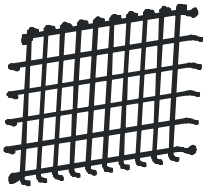
OUTDOOR

LINE DRAWING

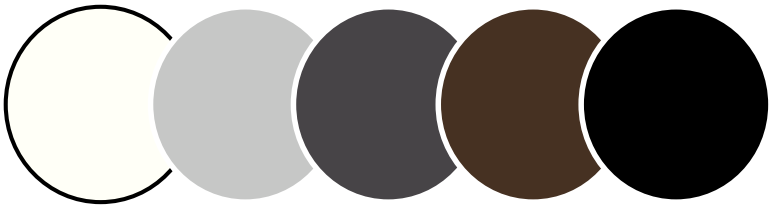


SECURITY OPTIONS

- **WPC15WG** - Wire Guard,SS Construction



FACTORY SELECT COLOR GUIDE



White Silver Bronze Brown Black

COLOR NAME AND DESCRIPTION	SHEEN	PRODUCT	VENDOR	PRICING
WHT - ILP White	SEMI GLOSS	POLANE T	SHERWIN-WILLIAMS	Contact Factory for Pricing
SLV - ILP Silver - Ultrasonic Chrome	GLOSS	POLANE T	SHERWIN-WILLIAMS	Contact Factory for Pricing
BRZ - ILP Bronze - std. & in stock	SEMI GLOSS	POLANE T	SHERWIN-WILLIAMS	Standard
BRN - ILP Brown	SEMI GLOSS	POLANE T	SHERWIN-WILLIAMS	Contact Factory for Pricing
BLK - ILP Black	SEMI GLOSS	POLANE T	SHERWIN-WILLIAMS	Contact Factory for Pricing

COLORS SHOWN ABOVE ARE TO BE USED AS REFERENCE, NOT EXACT MATCH.
PLEASE REQUEST PAINT CHIPS FOR EXACT MATCH.

FULL CUTOFF WALL PACK - 44W LED

OUTDOOR

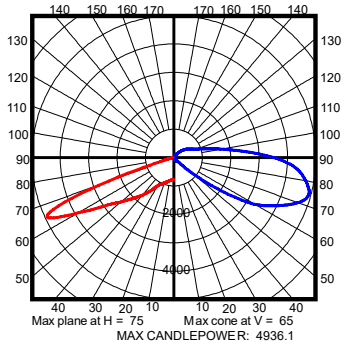
PHOTOMETRIC REPORTS

WPCS-44WLED-UNIV-40-T2

SUMMARY DATA

HEMISPHERES TESTED:	BOTH
EFFICIENCY (Downlight / Uplight):	100.0 % / 0.0 %
EFFICIENCY (Street / House):	66.1 % / 33.9 %
ROADWAY CLASSIFICATION:	TYPE II, SHORT
CUTOFF CLASSIFICATION:	NONCUTOFF
LUMENS:	4,883.41
INPUT WATTS:	43.3

CANDELA PLOT



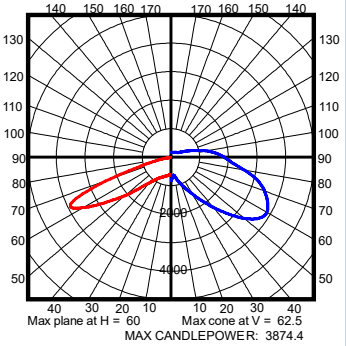
Photometric values based upon tests performed in compliance w/ LM-79.
Download IES files at www.ilp-inc.com

WPCS-44WLED-UNIV-40-T3

SUMMARY DATA

HEMISPHERES TESTED:	BOTH
EFFICIENCY (Downlight / Uplight):	100.0 % / 0.0 %
EFFICIENCY (Street / House):	75.4 % / 24.6 %
ROADWAY CLASSIFICATION:	TYPE III, SHORT
CUTOFF CLASSIFICATION:	CUTOFF
LUMENS:	4,541.77
INPUT WATTS:	43.58

CANDELA PLOT



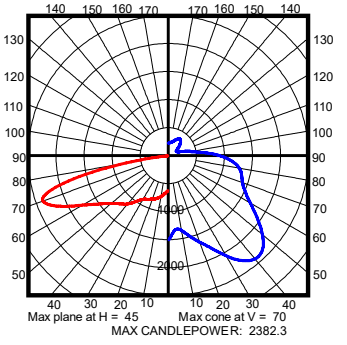
Photometric values based upon tests performed in compliance w/ LM-79.
Download IES files at www.ilp-inc.com

WPCS-44WLED-UNIV-40-T4

SUMMARY DATA

HEMISPHERES TESTED:	BOTH
EFFICIENCY (Downlight / Uplight):	100.0 % / 0.0 %
EFFICIENCY (Street / House):	77.6 % / 22.4 %
ROADWAY CLASSIFICATION:	TYPE IV, SHORT
CUTOFF CLASSIFICATION:	NONCUTOFF
LUMENS:	4,383.33
INPUT WATTS:	43.54

CANDELA PLOT



Photometric values based upon tests performed in compliance w/ LM-79.
Download IES files at www.ilp-inc.com

WM3 Sconce Fixture

Wall mounted LED loading area lighting fixture – Full cut-off wall pack - 25' height.

TURBO WALL SCONCE

TECH LIGHTING

Offering an inviting and open cylindrical silhouette with decorative fins evenly spaced around the circumference, the Turbo LED wall sconce adds a modern aesthetic to any façade. Mounting options enable the fixture to be mounted in three different height positions relative to the back plate position to meet a variety of installation needs and aesthetic preferences.

Outstanding protection against the elements:

- Powder coat finishes
- Stainless Steel mounting hardware
- Impact-resistant, UV stabilized frosted acrylic lensing

Three-position mounting option allows variable height adjustment to back plate

SPECIFICATIONS

DELIVERED LUMENS	597.7
WATTS	15.7
VOLTAGE	Universal 120-277V, with integral transient 2.5kV surge protection (driver)
DIMMING	0-10, ELV
LIGHT DISTRIBUTION	Symmetric
OPTICS	40°
MOUNTING OPTIONS	3-Position Variable Height
PERFORMANCE OPTIONS	Surge Protector
CCT	3000K or 4000K
CRI	80+
COLOR BINNING	3 Step
BUG RATING	B1-U2-G0
DARK SKY	Compliant
WET LISTED	IP65
GENERAL LISTING	ETL
CALIFORNIA TITLE 24	Can be used to comply with CEC 2019 Title 24 Part 6 for outdoor use. Registration with CEC Appliance Database not required.
START TEMP	-30°C
FIELD SERVICEABLE LED	Yes
CONSTRUCTION	Aluminum
HARDWARE	Stainless Steel
FINISH	Powder Coat
LED LIFETIME	L70; >60,000 Hours
WARRANTY*	5 Years
WEIGHT	8.5 lbs.

* Visit techlighting.com for specific warranty limitations and details.

TURBO WALL
shown in bronze

TURBO WALL
shown in charcoal

TURBO WALL
shown in black

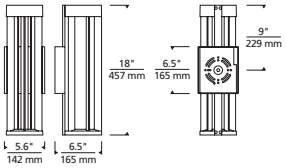
ORDERING INFORMATION

PRODUCT	CRI/CCT	LENGTH	LENS	FINISH	VOLTAGE	DISTRIBUTION	OPTIONS
700OWTUR	830 80 CRI, 3000K 840 80 CRI, 4000K	18 18"	C CLEAR FLAT	B BLACK Z BRONZE H CHARCOAL	UNV 120V–277V	S SYMMETRIC	NONE SP SURGE PROTECTION

techlighting.com

TURBO WALL SCONCE

TECH LIGHTING



Turbo Sconce

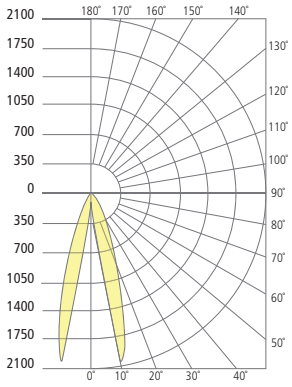
Integrated height adjustment system allows you to customize your fixture position. Low, Mid or High.

PHOTOMETRICS*

*For latest photometrics, please visit www.techlighting.com/OUTDOOR

TURBO WALL

Total Lumen Output:	597.7
Total Power:	15.7
Luminaire Efficacy:	37.8
Color Temp:	3000K
CRI:	80+
BUG Rating:	B1-U2-G0



PROJECT INFO

FIXTURE TYPE & QUANTITY	JOB NAME & INFO	NOTES

TECH LIGHTING

VISUAL COMFORT & CO.

7400 Linder Avenue, Skokie, Illinois 60077
T 847.410.4400

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techlighting.com

COMcheck Software Version COMcheckWeb

Exterior Lighting Compliance Certificate

Project Information

Energy Code:	2021 IECC
Project Title:	W5
Project Type:	New Construction
Permit Date:	March 11, 2022
Permit No.	DB22-0004 (Boeckman W5)
Exterior Lighting Zone	2 (Light industrial area with limited nighttime use (LZ2))

Construction Site:
9600 Boeckman Road
Wilsonville, Oregon 97070

Owner/Agent:
Bob Wells
Lance Mueller & Associates / Architects
130 Lakeside Ave. S.; Suite 250
Seattle, Washington 98122
206-915-2442
BWells@LMueller.com

Designer/Contractor:

Allowed Exterior Lighting Power

A Area/Surface Category	B Quantity	C Allowed Watts /	D Tradable Wattage	E Allowed Watts (B X C)
W5 (area only) (Parking area)	117780 ft2	0.04	Yes	4711
W5 (area only) (Walkway >= 10 feet wide)	1209 ft2	0.1	Yes	121
			Total Tradable Watts (a) =	9924
			Total Allowed Watts =	9924
			Total Allowed Supplemental Watts (b) =	400

(a) Wattage tradeoffs are only allowed between tradable areas/surfaces.
(b) A supplemental allowance equal to 400 watts may be applied toward compliance of both non-tradable and tradable areas/surfaces.

Proposed Exterior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixture	D Fixture Watt.	E (C X D)
W5 (area only) (Walkway < 10 feet wide, 10183 ft of walkway length): Tradable Wattage				
W5 (area only) (Parking area, 117780 ft2): Tradable Wattage				
LED: P3_B, P6_B, P8_B: 26' ht.; pole mtd area light: LED Roadway-Parking Unit 130W:	1	6	87	522
LED: P6_BB: 26' ht.; pole mtd area light: LED Roadway-Parking Unit 130W:	2	6	87	522
LED: WM1_B: 25' ht.; Bldg mtd area light: LED Roadway-Parking Unit 130W:	1	6	87	522
LED: WM2_B: 25' ht.; Bldg mtd area light: LED Roadway-Parking Unit 42W:	1	2	27	53
LED: WM3: 12' ht.; Bldg mtd sconce: LED Other Fixture Unit 16W:	1	10	15	153
LED: WM7_B: 25' ht.; Bldg mtd area light: LED Roadway-Parking Unit 82W:	1	7	78	546
W5 (area only) (Walkway >= 10 feet wide, 1209 ft2): Tradable Wattage				
LED: PC2: 12' high ground mtd pedestrian : LED Other Fixture Unit 6.5W:	2	1	27	27
LED: S4: Soffit downlight mtd 13' ht.: LED Other Fixture Unit 6.5W:	1	4	10	39
			Total Tradable Proposed Watts =	2384

Exterior Lighting PASSES: Design 77% better than code

Exterior Lighting Compliance Statement

Compliance Statement: The proposed exterior lighting design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed exterior lighting systems have been designed to meet the 2021 IECC requirements in COM*check* Version COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Bob Wells — Name - Title

Signature

7/10/22 — Date

LOUDEN MUELLER & ASSOC. / ARCHITECTS

FIRE CODE / LAND USE / BUILDING REVIEW APPLICATION

Tualatin Valley Fire & Rescue

North Operating Center
11945 SW 70th Avenue
Tigard, OR 97223
Phone: 503-649-8577

South Operating Center
8445 SW Elligsen Rd
Wilsonville, OR 97070
Phone: 503-649-8577

REV 6-30-20

Project Information

Applicant Name: W-5 LLC

Address: PO Box 15523, Seattle, WA 98115

Phone: 206-399-6676

Email: MartinDevelopment@outlook.com

Site Address: 9600 Boeckman road

City: Wilsonville, OR

Map & Tax Lot #: 14B, 202 Clackamus Co.

Business Name: (No tenant defined yet)

Land Use/Building Jurisdiction: Wilsonville

Land Use/ Building Permit # DB22-0004 (Boeckman W5)

Choose from: Beaverton, Tigard, Newberg, Tualatin, North Plains, West Linn, **Wilsonville**, Sherwood, Rivergrove, Durham, King City, Washington County, Clackamas County, Multnomah County, Yamhill County

Project Description

Construct a new 80,000sf flex building shell and sitework for a future light industrial tenant. W5 is east of the existing DWFRITZ Precision Automation building (permitted as W4), and anticipates a similar tenant.

Permit/Review Type (check one):

- ☐ **Land Use / Building Review - Service Provider Permit**
- ☐ Emergency Radio Responder Coverage Install/Test
- ☐ LPG Tank (Greater than 2,000 gallons)
- ☐ Flammable or Combustible Liquid Tank Installation (Greater than 1,000 gallons)
  - * Exception: Underground Storage Tanks (UST) are deferred to DEQ for regulation.
- ☐ Explosives Blasting (Blasting plan is required)
- ☐ Exterior Toxic, Pyrophoric or Corrosive Gas Installation (in excess of 810 cu.ft.)
- ☐ Tents or Temporary Membrane Structures (in excess of 10,000 square feet)
- ☐ Temporary Haunted House or similar
- ☐ OLCC Cannabis Extraction License Review
- ☐ Ceremonial Fire or Bonfire (For gathering, ceremony or other assembly)

For Fire Marshal's Office Use Only

TVFR Permit # 2022-0078

Permit Type: SPP - Wilsonville

Submittal Date: 7/1/2022

Assigned To: DFM McGladrey

Due Date: 7/11/2022

Fees Due: 0

Fees Paid: 0

Approval/Inspection Conditions

(For Fire Marshal's Office Use Only)

This section is for application approval only

DFM Alex McGladrey 7/11/2022
Fire Marshal or Designee Date

Conditions:

TVF&R Final Inspection Required

See Attached Conditions: ☐ Yes ☐ No

Site Inspection Required: ☒ Yes ☐ No

This section used when site inspection is required

Inspection Comments:

Final TVFR Approval Signature & Emp ID Date

LSONVILLE,
ROAD CL,

S.W. BOECKMAN ROAD
(COUNTY ROAD NO. 80)

WETLAND

PAINTED FIRE LANE CURB PER 5/CS-2 SHOWN THUS: ----------

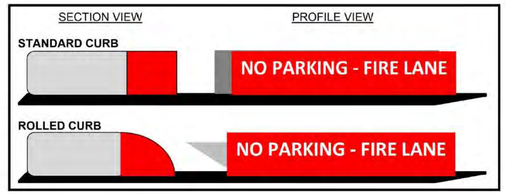
PROVIDE KNOX BOX PER THE FIRE MARSHALL APPROVED LOCATION. BOTTOM OF THE BOX TO BE 6-7 FEET OFF THE GROUND

PAINTED FIRE LANE CURB PER 5/CS-2 SHOWN THUS: ----------

FH

SITE CIRCULATION AND FIRE PLAN
1" = 50'-0"

- Curb paint shall be red for the entire length of the fire lane.
- "NO PARKING FIRE LANE" shall be stenciled with a 3 ½ inch minimum height block in white lettering with a minimum of ½ inch stroke width.
- The markings shall be spaced at 25 foot intervals.



5 PAINTED FIRE LANE CURB
N.T.S.

TVF&R
Tualatin Valley Fire & Rescue
APPROVED PLANS
APPROVAL OF PLANS IS NOT AN APPROVAL OF OMISSIONS OR OVERSIGHTS.
Deputy Fire Marshal II

TVF&R Permit # 2002-0078

FIRE SITE NOTES:
1. FIRE APPARATUS ACCESS ROADS TO BE DESIGNED TO SUPPORT NOT LESS THAN 12,500 POUND POINT LOAD (WHEEL LOAD) AND 75,000 POUND LIVE LOAD (GROSS VEHICLE WEIGHT)
2. FIRE FLOW DEMAND = 1,500 GPM ((FROM 2004 OREGON FIRE CODE, APPENDIX B, TABLE B105.1 – TYPE IIB WITH 75% REDUCTION)
3. FIRE HYDRANT FLOW TEST OR MODELING OF WATER AVAILABILITY AS A DEFERRED SUBMITTAL.
4. EMERGENCY RESPONDER RADIO COVERAGE TO BE MERRC (MOBILE EMERGENCY RESPONDER RADIO COVERAGE) – PROVIDE DOCUMENTATION OF TVF&R PROVIDER PRIOR TO THE ISSUANCE OF THE BUILDING PERMIT.

no.	revision	date
	DESIGN REVIEW RESUBMITTAL	7-8-22

18003 job no.
EM drawn
BW checked
7-8-22 date

REGISTERED ARCHITECT · JANICE MUELLER · SEATTLE, WA. · 1491 · STATE OF OREGON

BUILDING W5
99XX SW Boeckman Rd.
Wilsonville, OR 97070

SITE CIRCULATION AND FIRE PLAN

LANGE MUELLER & ASSOCIATES
ARCHITECTS AIA
130 LAKESIDE • SUITE 250 • SEATTLE, WA 98122 • (206) 325-2553

sheet
CS-3

C:\Users\21006 w5\w5-a1x-v15-areas.dwg
5/17/2022

BUILDING W5

ABBREVIATIONS

AC	ACOUSTICAL CEILING	FA	FIRE ALARM	LAM	LAMINATE/LAMINATED	S	SOUTH/SPANDRAL
ACC	ACCESSIBLE	FCIO	FURNISHED BY CONTRACTOR/INSTALLED BY OWNER	LAV	LAVATORY	SC	SOLID CORE
ACT	ACOUSTICAL CEILING TILE	FCIC	FURNISHED BY CONTRACTOR/INSTALLED BY CONTRACTOR	LT	LIGHT	SCD	SEAT COVER DISPENSER
AD	AREA DRAIN	FD	FLOOR DRAIN	LTG	LIGHTING	SCHED	SCHEDULE
ADDM	ADDENDUM	FDC	FIRE DEPARTMENT CONNECTION			SD	STORM DRAIN
ADJ	ADJUSTABLE	FDTN	FOUNDATION	M	MIRROR	SECT	SECTION
AFF	ABOVE FINISH FLOOR	FE	FIRE EXTINGUISHER	MAS	MASONRY	SF	SQUARE FOOT
AHU	AIR HANDLING UNIT	FEC	FIRE EXTINGUISHER CABINET	MATL	MATERIAL	SGL	SINGLE
ALT	ALTERNATE	FF	FINISH FLOOR	MAX	MAXIMUM	SHT	SHEET
ALUM	ALUMINUM	FH	FIRE HYDRENT	MECH	MECHANICAL	SHTHG	SHEATHING
AMB	AIR/MOISTURE BARRIER	FHC	FIRE HOSE CABINET	MED	MEDIUM	SIM	SIMILAR
ANOD	ANODIZED	FIG	FIGURE	MEMB	MEMBRANE	SPEC	SPECIFICATION
APPROX	APPROXIMATE/APPROXIMATELY	FIN	FINISH/FINISHED	MEZZ	MEZZANINE	SPKLR	SPRINKLER
ARCH	ARCHITECT/ARCHITECTURAL	FIXT	FIXTURE	MGT	MANEGMENT	SQ	SQUARE
AV	AUDIO VISUAL	FLEX	FLEXIBLE	MFR	MANUFACTURE	SS	SERVICE SINK
		FLR	FLOOR	MH	MANHOLE	SST	STAINLESS STEEL
BLDG	BUILDING	FLUOR	FLUORESCENT	MIN	MINIMUM/MINUTE	STL	STEEL
BLKG	BLOCKING	FO	FACE OF/FINISHED OPENING	MISC	MISCELLANEOUS	STOR	STORAGE
BO	BOTTOM OF			MO	MASONRY OPENING	STRUCT	STRUCTURAL/STRUCTURE
BOM	BOTTOM OF MULLION	FOIC	FURNISHED BY OWNER/INSTALLED BY CONTRACTOR	MS	MOP SINK	SUSP	SUSPENDED
BOT	BOTTOM	FOIO	FURNISHED BY OWNER/INSTALLED BY OWNER	MTD	MOUNTED		
BOR	BOTTOM OF REVEAL	FP	FIRE PROTECTION	MTL	METAL	T	TREAD/TEMPERED
BRG	BEARING	FR	FRAME/FIRE RATED			TC	TOP OF CURB
B/S	BUILDING STANDARD	FRMG	FRAMING	N	NORTH	T&G	TONGUE & GROVE
BUR	BUILT UP ROOFING	FRPF	FIRE PROOF/FIREPROOFING	NIC	NOT IN CONTRACT	TEL	TELEPHONE
BW	BOTTOM OF WALL	FRT	FIRE RETARDENT TREATED	NO	NUMBER	TEMP	TEMPERATURE/TEMPORARY
		FS	FLOOR SINK	NOM	NOMINAL	THK	THICK/THICKNESS
CB	CATCH BASIN	FT	FOOT/FEET	NTS	NOT TO SCALE	TO	TOP OF
CEM	CEMENT/CEMENTITIOUS	FTG	FOOTING			TOM	TOP OF MULLION
CFLG	COUNTER FLASHING	FUT	FUTURE	OC	ON CENTER	TOR	TOP OF REVEAL
CI	CAST IRON	FVC	FIRE HOSE VALVE CABINET	OD	OUTSIDE DIAMETER	TOSD	TOP OF STEEL DECK
CIP	CAST IN PLACE			OH	OVERHEAD	TPD	TOILET PAPER DISPENSER
CJ	CONTROL JOINT	G	GRADE/GROUND	OPNG	OPENING	TW	TOP OF WALL
CL	CENTER LINE	GA	GAUGE	OPP	OPPOSITE/OPPOSITE HAND	TYP	TYPICAL
CLR	CLEAR	GALV	GALVANIZED	ORD	OVERFLOW ROOF DRAIN		
CMU	CONCRETE MASONRY UNIT	GB	GRAB BAR	OTS	OPEN TO STRUCTURE ABOVE	U	URINAL
CO	CLEAN OUT	GC	GENERAL CONTRACTOR			UNFIN	UNFINISHED
COL	COLUMN	GI	GALVANIZED IRON			UON	UNLESS OTHERWISE NOTED
COM	CENTER OF MULLION	GL	GLASS	PC	PRECAST		
COMM	COMMUNICATION	GWB	GYPSUM WALL BOARD	PCG	PLASTIC CORNER GUARD	VB	VAPOR BARRIER
CONC	CONCRETE	GYP	GYPSUM	PD	PLANTER DRAIN	VERT	VERTICAL
CONT	CONTINUOUS	GYP BD	GYPSUM BOARD	PERP	PERPENDICULAR	VEST	VESTIBULE
COR	CENTER OF REVEAL			PLAM	PLASTIC LAMINATE	VIF	VERIFY IN FIELD
CORR	CORRIDOR	H	HIGH	PLAS	PLASTER	VNR	VENEER
CPT	CARPET	HB	HOSE BIB	PLYWD	PLYWOOD	VR	VAPOR RETARDER
CS	CEILING SYSTEM	HC	HOLLOW CORE	PNL	PANEL		
CT	CERAMIC TILE	HDW	HARDWARE	PL	PROPERTY LINE	W	WEST/WIDE
CTR	CENTER	HDWD	HARDWOOD	PR	PAIR	W/	WITH
CU	CUBIC	HM	HOLLOW METAL	PRK	PARKING	W/O	WITH OUT
		HO	HOLD OPEN	PROP	PROPERTY	WC	WATER CLOSET/WALL COVERING
DEMO	DEMOLISH/DEMOLITION	HORIZ	HORIZONTAL	PT	PAINT/POINT/PRESSURE TREATED/POST TENSION	WD	WOOD
DET	DETAIL	HR	HOUR	PTD	PAPER TOWEL DISPENSER WASTE RECEPTACLE	WLD	WELD/WELDED
DIA	DIAMETER	HT	HEIGHT	PTN	PARTITION	WP	WEATHER PROOF/WATER PROOF
DIAG	DIAGONAL	HVAC	HEATING, VENTILATING, & AIR CONDITIONING	PTD/WR	PAPER TOWEL DISPENSER WITH WATERPROOFING/WORK POINT		
DIM	DIMENSION					WR	WATER RESISTANT
DIV	DIVIDE/DIVISION	IBC	INTERNATIONAL BUILDING CODE	R	RADIUS/RISER	WT	WEIGHT
DMPF	DAMPPROOF/DAMPPROOFING	ID	INSIDE DIAMETER	RCP	REFLECTED CEILING PLAN	WWF	WELDED WIRE FABRIC
DN	DOWN	INCL	INCLUDE/INCLUDING	RD	ROOF DRAIN/ROAD		
DS	DOWN SPOUT	INFO	INFORMATION	REF	REFER TO/REFERENCE		
DWG	DRAWING	INSUL	INSULATE/INSULATION	REINF	REINFORCED/REINFORCING		
		INT	INTERIOR	REQD	REQUIRED		
E	EAST	INT AL	INTERIOR ALUMINUM	REV	REVISED/REVISION		
EFIS	EXTERIOR INSULATION & FINISH SYSTEM			RFG	ROOFING		
EJ	EXPANSION JOINT	JAN	JANITOR	RM	ROOM		
EL	ELEVATION	JC	JANITOR CLOSET	RO	ROUGH OPENING		
ELEC	ELECTRIC/ELECTRICAL	JS	JANITOR SINK				
ELEV	ELEVATOR	JT	JOINT				
ENCL	ENCLOSE/ENCLOSURE						
ENL	ENLARGE						
EP	ELECTRIC PANEL						
EQ	EQUAL						
EQUIP	EQUIPMENT						
EXH	EXHAUST						
EXP	EXPANSION/EXPOSED						
EXIST	EXSISTING						
EXT	EXTERIOR						

LEGEND

- EARTH
- GRAVEL/ROCK
- CONCRETE
- ASPHALT PAVING
- WOOD FRAMING
- BLOCKING OR SHIM
- FINISH WOOD
- GLASS (ELEVATION)
- GLASS (SECTION)
- GYPSUM WALL BOARD
- CAULKING/SEALANT
- PLYWOOD
- BRICK
- ACOUSTIC TILE
- RIGID INSULATION
- BATT INSULATION
- METAL

GENERAL NOTES

1. MECHANICAL & ELECTRICAL ARE BIDDER DESIGN SYSTEMS. PORTIONS OF THIS WORK ON ARCHITECTURAL, CIVIL & LANDSCAPE ARE FOR DESIGN INTENT.
2. DRAWINGS ARE NOT TO BE SCALED. CONTACT ARCHITECT FOR RESOLUTION OF ANY CONFLICTS OR DISCREPANCY.
3. CONTRACTOR TO VERIFY ALL FIELD DIMENSIONS AND CONDITIONS – ANY DISCREPANCY BETWEEN PLAN AND ACTUAL CONDITION IS TO BE BROUGHT TO THE ATTENTION OF ARCHITECT FOR RESOLUTION.
4. ALL DIMENSION LINES ARE TO FACE OF CONC.. AND METAL STUD WALLS AND CENTERLINE OF COLUMNS AND BEAMS, UNLESS NOTED.
5. THE CONTRACTOR SHALL APPLY AND SECURE ALL OCCUPANCY, SEWER, STORM, WATER, MECHANICAL, ELECTRICAL AND OTHER PERMITS EXCEPT BUILDING PERMITS. CONTRACTOR SHALL PAY ALL NECESSARY FEES AND POST BONDS REQUIRED.
6. GENERAL CONTRACTOR RESPONSIBLE FOR ALL CUTTING AND PATCHING.
7. REPETITIVE FEATURES MAY BE DRAWN ONLY ONCE, BUT SHALL BE PROVIDED AS IF DRAWN FULL.
8. PORTABLE FIRE EXTINGUISHERS PER NFPA 10 AND IN CONSTRUCTION SHACK. PERMANENT FIRE EXTINGUISHERS BY OWNER.
9. ELEVATOR INSTALLER SHALL SUBMIT PERMIT FOR FUTURE T.I. ELEVATOR PER ORS CHAPTER 460 CONTACT THE STATE BUILDING CODES DIVISION, ELEVATOR SAFETY PROGRAM (503) 373-1298
10. ELECTRICAL – PROVIDE TOGGLE ON-OFF SWITCH FOR FUTURE T.I. LIGHTING, PROVIDE IN EACH ROOM PER SECTION 1313.1.1
11. ELECTRICAL – PROVIDE OCCUPANT SENSORS IN FUTURE T.I. RESTROOMS. CONTROLS TO SHUT OFF LIGHTING PER SECTION 1313.3.1.2.2

BUILDING CODE NOTES:

CODES: 2019 OREGON STRUCTURAL & SPECIALTY CODE
2019 OREGON FIRE CODE
2019 OREGON MECHANICAL SPECIALTY CODE (OMSC)
2021 OREGON ELECTRICAL SPECIALTY CODE (OESC)
2021 OREGON PLUMBING SPECIALTY CODE (OPSC)
2011 OREGON ELEVATOR SPECIALTY CODE
2021 OREGON ENERGY EFFICIENCY SPECIALTY CODE (OEESC)

CONSTRUCTION TYPE: II-B SPRINKLERED
OCCUPANCY GROUPS: B, F-1, S-1, A-3 (ACCESSORY USE)
ALLOWABLE AREA: UNLIMITED PER SECTION 507 (60' MIN. YARD ALL SIDES)

OSSC BUILDING HEIGHT (TABLE 503):
TYPE II-B W/ F-1, B OR S-1 OCCUPANCY GROUP ALLOWS TABULAR 2 STORIES.. SECTION 504.2 INCREASES THIS BY ONE STORY W/ THE FIRE SPRINKLER SYSTEM.

OSSC OCCUPANCY SEPARATIONS (SECTION 508.3.1):
NON-SEPARATED USES ARE ALLOWED AS THE MOST RESTRICTIVE OCCUPANCY (F-1) APPLIES TO ENTIRE BUILDING IN CALCULATING ALLOWABLE AREA.

OSSC FIRE RESISTANCE RATINGS FOR BUILDING ELEMENTS (TABLE 601 & 602):

BUILDING ELEMENTS:	RATING:
STRUCTURAL FRAME:	0 HOURS
BEARING WALLS – EXTERIOR:	2 HOURS
BEARING WALLS – INTERIOR:	0 HOURS
NON-BEARING WALLS/PARTITIONS – EXTERIOR:	0 HOURS
NON-BEARING WALLS/PARTITIONS – INTERIOR:	0 HOURS
FLOOR CONSTRUCTION:	0 HOURS
ROOF CONSTRUCTION:	0 HOURS

OSSC EXTERIOR WALL OPENINGS:
AREA OF OPENINGS (TABLE 705.8): TABLE SHOWS 'NO LIMIT' FOR UNPROTECTED OPENINGS GREATER THAN 30 SETBACK, TYPICAL THIS CASE ON ALL SIDES OF THE BUILDING.

OSSC PARAPETS (SECTION 705.11.1):
SHALL HAVE SAME FIRE RESISTANCE AS SUPPORTING WALL, WHICH IT DOES.

SHELL DEFERRED SUBMITTAL LIST

1. FLOOR JOIST LAYOUT. LAYOUT NEEDS TO REFLECT ALL MAJOR POINT LOADING, SUCH AS PIPE SUPPORTS – BY JOIST MFGR.
2. ROOF JOIST LAYOUT. LAYOUT NEEDS TO REFLECT ALL MAJOR POINT LOADING, SUCH AS PIPE SUPPORTS – BY JOIST MFGR.
3. WINDOW WALL PACKAGE – LICENSED OR INSTALLER
4. GLASS & ALUM. PORTIONS OF AWNING SYSTEMS – BY LICENSED STATE ENGINEER
5. STAIR SUPPLIER TO PROVIDE ALL ENGINEERING OF STAIRS (VERIFY WITH STRUCTURAL ENGINEER REGARDING SPECIAL LOADING TO STRUCTURE)

PROJECT TEAM:

OWNER / DEVELOPER
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PERLO CONSTRUCTION
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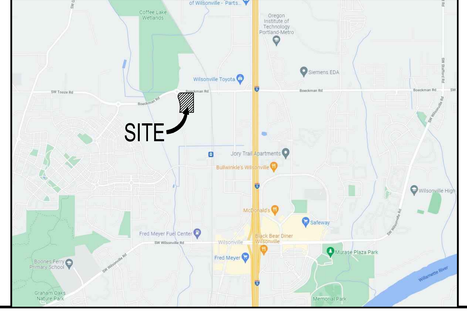
TUALATIN, OR 97062
CONTACT: JORDAN PETERSON
503-624-2090; (FAX) 503-926-9391
JPETERSON@PERLO.BIZ

VICINITY MAP



SCOPE:

CONSTRUCT AN 80,446 SF INDUSTRIAL BUILDING EAST OF THE EXISTING DWFRITZ AUTOMATION BUILDING ON AN UNBUILT TREELESS PORTION OF THE 24.49-ACRE LOT. THE PROJECT LEAVES SIGNIFICANT PORTIONS AS TREED NATURAL AREAS, INCLUDING SUBSTANTIAL SROZ AND WETLAND BUFFER DESIGNATED AREAS. W5 IS INTENDED AS EXPANSION SPACE FOR THE DWFRITZ AUTOMATION OPERATION, WHICH IN THE FUTURE COULD BE SEPARATE INDUSTRIAL TENANTS. W5 WILL SHARE WITH DWFRITZ THEIR TWO EXISTING BOECKMAN ROAD DRIVE ENTRIES AND VEHICLE CIRCULATION. THE LOBBIES WILL HAVE A DEFINED PEDESTRIAN CONNECTION, AND SERVICE AREAS ARE SCREENED FROM SW BOECKMAN ROAD AND SW KINSMAN ROAD.

LEGAL DESCRIPTION:

A TRACT OF LAND SITUATED IN SECTION 14, TOWNSHIP 3 SOUTH, RANGE 1 WEST OF THE WILLIAMETTE MERIDIAN, IN THE CITY OF WILSONVILLE, CLACKAMAS COUNTY, OREGON, MORE PARTICULARLY DESCRIBED AS FOLLOWS: BEGINNING AT AN IRON PIPE AT THE NORTHWEST CORNER OF THE NORTHEAST ONE QUARTER OF THE NORTHWEST ONE QUARTER OF SAID SECTION 14, SAID POINT BEING THE NORTHWEST CORNER OF THAT TRACT CONVEYED TO FREDERIC W. YOUNG, ET UX, RECORDED JANUARY 13, 1947 IN BOOK 383, PAGE 262, DEED RECORDS; THENCE SOUTH 0° 13' EAST ALONG THE WEST LINE OF SAID YOUNG TRACT 499.70 FEET TO AN IRON PIPE AT THE SOUTHWEST CORNER THEREOF; AND THE TRUE POINT OF BEGINNING OF THE TRACT HEREIN TO BE DESCRIBED; THENCE NORTH 89° 43' EAST ALONG THE SOUTH LINE OF SAID YOUNG TRACT 25.00 FEET TO A POINT; THENCE NORTH 0° 13' WEST PARALLEL WITH THE WEST LINE OF SAID YOUNG TRACT 474.70 FEET TO A POINT THAT IS SOUTHERLY 25.00 FEET MEASURED AT RIGHT ANGLES FROM THE NORTH LINE OF SAID YOUNG TRACT; THENCE NORTH 89° 42' EAST PARALLEL WITH THE NORTH LINE OF SAID YOUNG TRACT 1080.00 FEET, MORE OR LESS, TO THE WEST LINE OF THE OREGON ELECTRIC RAILWAY RIGHT OF WAY; THENCE SOUTHERLY ALONG THE WEST LINE OF SAID OREGON ELECTRIC RAILWAY RIGHT OF WAY 980.00 FEET, MORE OR LESS, TO A POINT OF INTERSECTION WITH THE SOUTH BOUNDARY OF THE TRACT CONVEYED TO SUNN MUSICAL EQUIPMENT COMPANY, A CORPORATION, BY DEED FILED MAY 5, 1969 AS RECORDER'S FEE NO. 69-7881, FILM RECORDS; THENCE SOUTH 89° 44' WEST ALONG SAID SOUTH BOUNDARY, 1160.00 FEET, MORE OR LESS, TO THE SOUTHWEST CORNER THEREOF, SAID POINT BEING IN THE WESTERLY BOUNDARY OF THE NORTHEAST ONE QUARTER OF THE NORTHWEST ONE QUARTER OF SAID SECTION 14; THENCE NORTH 0° 13' WEST ALONG SAID BOUNDARY 499.7 FEET TO THE TRUE POINT OF BEGINNING.
EXCEPTING THEREFROM: ALL THAT PORTION DESCRIBED IN DEED TO THE CITY OF WILSONVILLE FOR ROAD PURPOSES, RECORDED JUNE 2, 2006, RECORDERS FEE NO. 2006-050621.
ALSO EXCEPTING THEREFROM: ALL THAT PORTION DESCRIBED IN DEED TO THE CITY OF WILSONVILLE FOR ROAD PURPOSES, RECORDED JANUARY 29, 2016, RECORDERS FEE NO. 2016-005508.

TAX PARCEL NUMBERS:

00810331; 05021199; 05008927

ZONING:

PDI (PLANNED DEVELOPMENT INDUSTRIAL)

STATISTICS:

BUILDING AREA:
1ST FLOOR: 64,988 SF
MEZZANINE: 15,458 SF
TOTAL: 80,446 SF

SITE AREA: 24.50 ACRES

PARKING:
REQUIRED: MANUFACTURING: 1.6/1,000 SF MIN. AND NO MAXIMUM LIMIT
80,446 SF => 50 MIN AND NO MAXIMUM LIMIT
(SECTION 4.155 F INDUSTRIAL 1. MANUFACTURING ESTABLISHMENT)
PROPOSED: 317 STALLS (210 STANDARD/ACCESSIBLE, 107 COMPACTS 32.6%)
ACCESSIBLE REQUIRED: 317 = 8 W/ 2 WHEEL CHAIR ONLY SPACES
(TABLE 1106.1 OSSC)
ACCESSIBLE PROPOSED: 8 W/ 2 WHEEL CHAIR ONLY SPACES
CAR/VAN POOL REQUIRED: 317 X .05 => 16 REQUIRED
(SECTION 4.155.06 B)
CAR/VAN POOL PROPOSED: 16 PROPOSED

BIKE REQUIREMENTS:
REQUIRED: PDI FLEX SPACE: 1 PER 10,000 SF MIN
80,446 SF / 10,000 SF => 9 REQ'D MIN.
(SECTION 4.155 F INDUSTRIAL 1. MANUFACTURING ESTABLISHMENT)
PROPOSED: 11 (2 UNCOVERED OUTSIDE AT LOBBY; 9 INSIDE AS TI)

LOADING REQUIREMENTS:
REQUIRED BERTHS: INDUSTRIAL 30,000 SF -100,000 SF => 2 MIN. (12' X 35' MIN.)
(SECTION 4.155.05 A1)
PROPOSED: 3 (2 DOCK-HIGH; 1 ON-GRADE DRIVE-IN)

TRASH ENCLOSURE REQUIREMENTS:
REQUIRED: 10 SF MINIMUM PLUS
80,000 SF MANUF (6 SF/1,000 SF) = 483 SF MIN.
10 SF + 483 SF = 493 SF MINIMUM TOTAL (4' TALL)
(SECTION 4.178.06 B)
PROPOSED: 415 SF (12' X 20' EXTERIOR ENCLOSURE W/ 6.9' TALL CONTAINERS)
85 SF (INTERIOR CONTAINERS NEAR DOCKS AS TI FOR CARDBOARD)
500 SF TOTAL

SHEET INDEX

ARCHITECTURAL
A0 COVER SHEET
A1.0 SITE PLAN
A1.1 ENLARGED PL
A1.2 ENLARGED PL
A2.0 FLOOR PLAN
A2.2 ROOF PLAN
A3.0 EXTERIOR EL

CIVIL
C1.01 TREE PROTEC
C1.20 GRADING PLA
C1.21 GRADING PLA
C1.30 UTILITY PLAN NORTH
C1.31 UTILITY PLAN SOUTH
EC2.0 CLEARING AND DEMOLISION AND SEDIMENT CONTROL PLAN
– CUT/FILL MAP

LANDSCAPE
L1.0 LANDSCAPE PLAN
L1.1 ENLARGED LANDSCAPE PLAN – NORTH
L1.2 ENLARGED LANDSCAPE PLAN – SOUTH
L2.0 LANDSCAPE SPECIFICATIONS & DETAILS

SITE LIGHTING
1 OF 4 SITE LIGHTING PLAN & CALCULATIONS
2 OF 4 ENLARGED SITE LIGHTING PLAN – NORTH
3 OF 4 ENLARGED SITE LIGHTING PLAN – SOUTH
4 OF 4 GRAPHIC SITE LIGHTING PLANS AND CALCULATIONS

TVF&R
Tualatin Valley Fire & Rescue
APPROVED PLANS
APPROVAL OF PLANS IS NOT AN APPROVAL OF OMISSIONS OR OVERSIGHTS.
Deputy Fire Marshal II

TVF&R Permit # 2002-0078

Item 2.

no.	revision	date
	SITE DESIGN REVIEW	1-21-22

18003 job no.
EM drawn
BW checked
1-21-22 date

REGISTERED ARCHITECT · JANICE MUELLER · SEATTLE, WA. · 1451 · STATE OF OREGON

BUILDING W5
99XX SW Boeckman Rd.
Wilsonville, OR 97070

LANCE MUELLER & ASSOCIATES
ARCHITECTS AIA
130 LAKESIDE • SUITE 250 • SEATTLE, WA 98122 • (206) 325-2553

COVER SHEET

sheet A0

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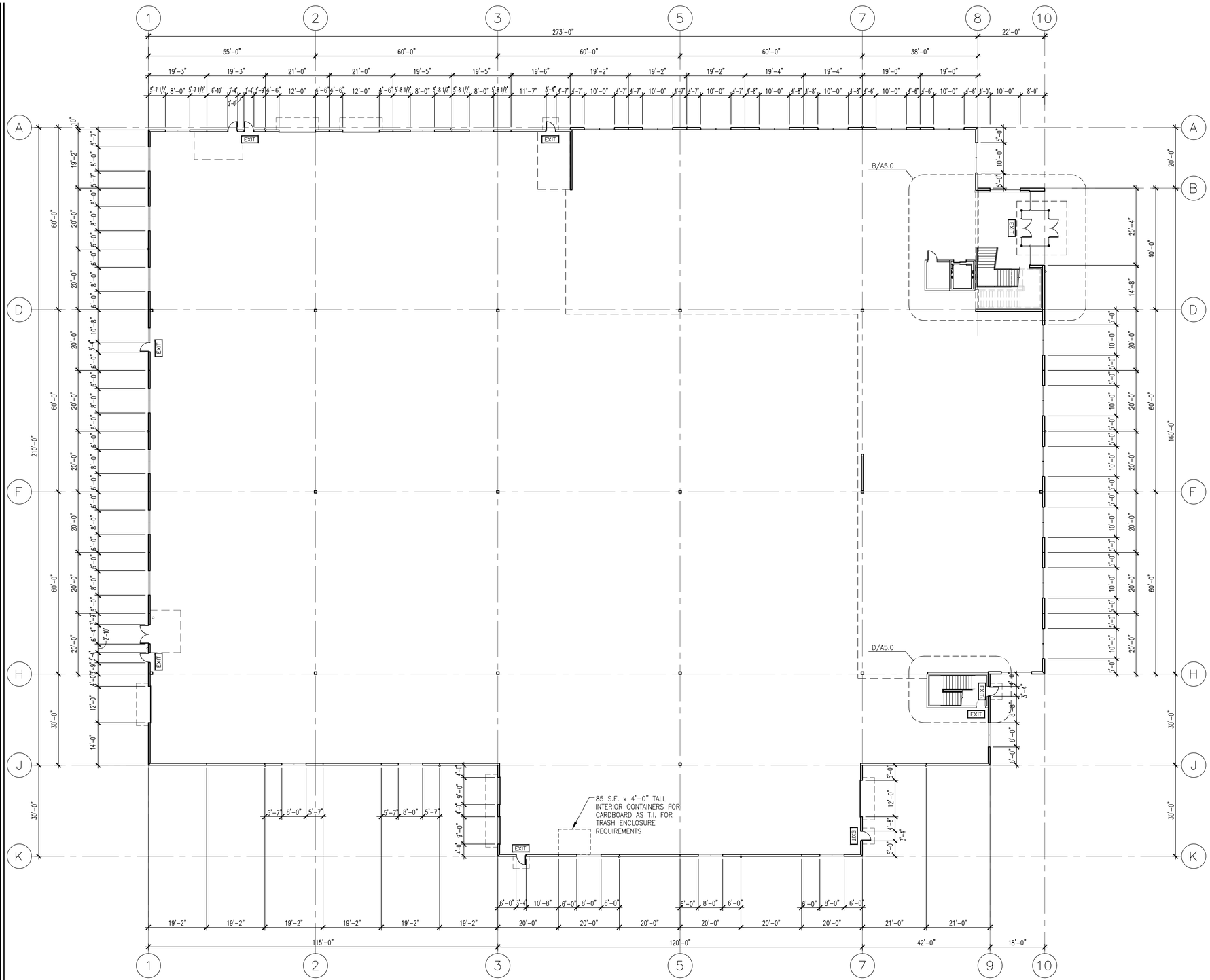
1/21/2022



FLOOR PLAN

1/16" = 1'-0"

TVF&R
Tualatin Valley Fire & Rescue
APPROVED PLANS
APPROVAL OF PLANS IS NOT AN APPROVAL OF OMISSIONS OR OVERSIGHTS.
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Item 2.

no.	revision	date
	SITE DESIGN REVIEW	1-21-22

18003 job no.
EM drawn
BW checked
1-21-22 date

REGISTERED ARCHITECT · LANCE MUELLER · SEATTLE, WA. 1491 · STATE OF OREGON

BUILDING W5
99XX SW Boeckman Rd.
Wilsonville, OR 97070

LANCE MUELLER & ASSOCIATES
ARCHITECTS AIA
130 LAKESIDE • SUITE 250 • SEATTLE, WA 98122 • (206) 325-2553

1ST FLOOR PLAN

sheet
A2.0

667

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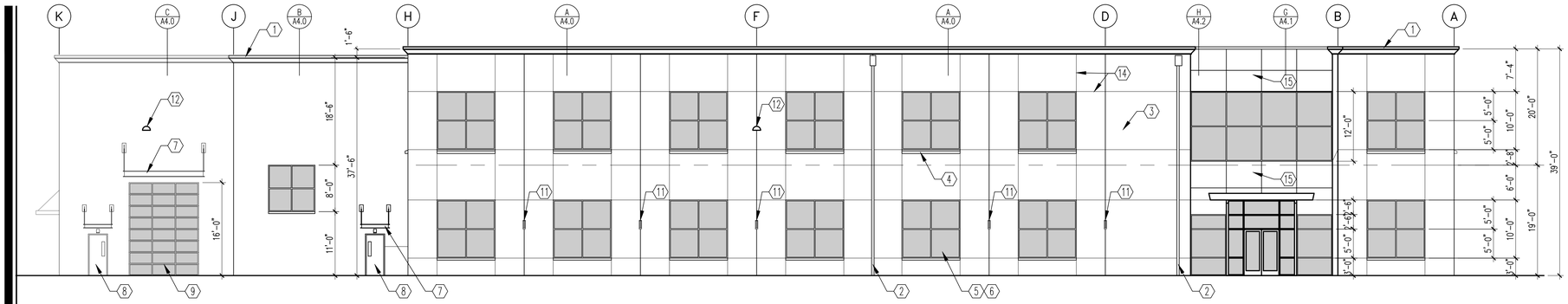
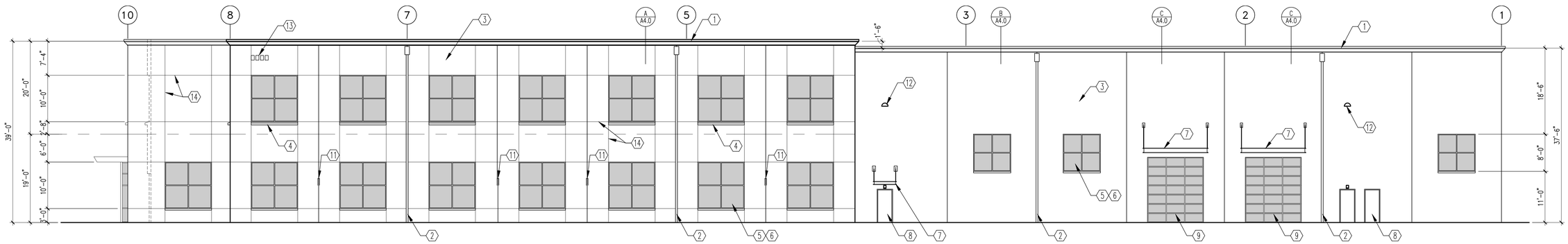
1/21/2022



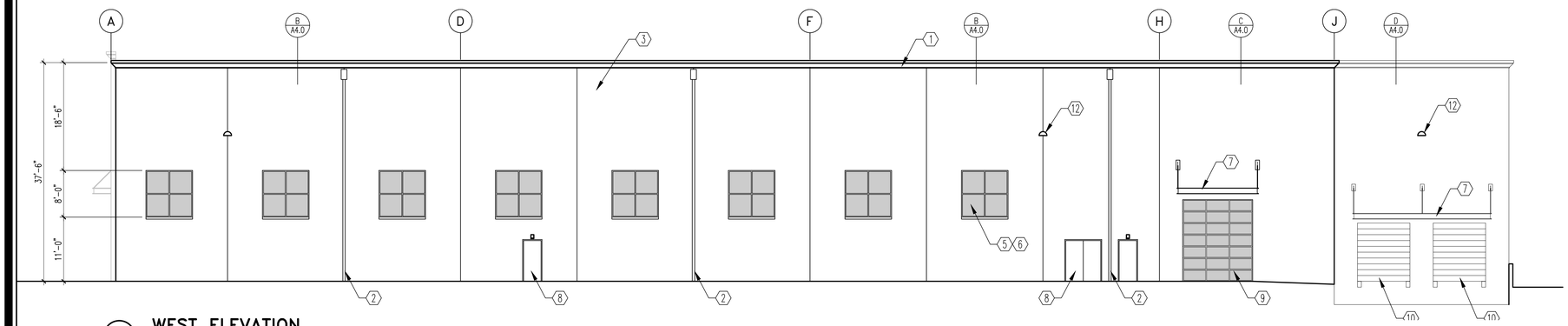
A EAST ELEVATION

3/32" = 1'-0"



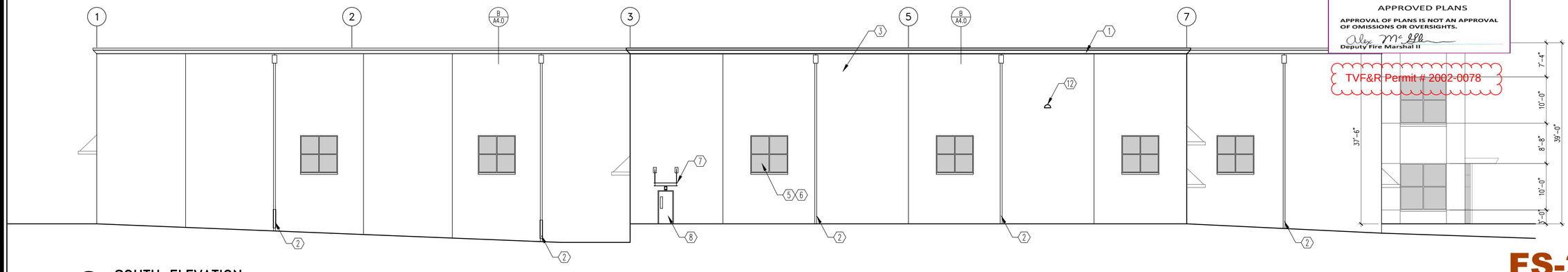
B NORTH ELEVATION

3/32" = 1'-0"



C WEST ELEVATION

3/32" = 1'-0"



C SOUTH ELEVATION

3/32" = 1'-0"

FLAG NOTES

MARK	ITEM	DESCRIPTION	REMARKS
1	COPING & SCUPPER	PRE-FINISHED GALVANIZED IRON	COLOR: SILVER
2	RAIN LEADERS		COLOR: NEUTRAL BRONZE TBD
3	CONCRETE WALL	SITE CAST CONCRETE	STAIN & SEALER TYPICAL. (SEMI-TRANSPARENT STAIN) COLOR: NEUTRAL RANGE TBD
4	PRECAST WINDOW SILL	CAST CONCRETE	COLOR: NEUTRAL RANGE TBD
5	GLASS	LOW-E (SOLARBAN 60) INSULATED GLASS - 1" THICK	COLOR: CLEAR
6	STOREFRONT	FRAMING DESIGN IS BASED UPON ARECADIA AG451 SERIES	THERMAL BREAK STOREFRONT COLOR: CLEAR ANODIZED
7	CANOPIES	STEEL FRAME, PAINTED WITH PRE-FINISHED METAL PANEL INFILL	COLOR: NEUTRAL BRONZE TBD
8	HOLLOW METAL DOORS	INSULATED SOLID CORE H.M., WITH GALVANIZED METAL FRAMES	COLOR: NEUTRAL BRONZE TBD
9	ON-GRADE SERVICE DOORS	ALUMINUM RAIL STILE & INSULATED GLASS SECTIONAL UPWARD ACTING	COLOR: CLEAR ANODIZED & GLASS TBD
10	TRUCK DOCK DOORS	HOLLOW METAL SECTIONAL UPWARD ACTING - PAINT	COLOR: NEUTRAL BRONZE TBD
11	SCONCE	TECH LIGHTING, TURBO WALL	
12	WALL PACK LIGHT		
13	ADDRESS LETTERS	12" HIGH STAINLESS STEEL	
14	CONCRETE REVEAL		
15	ACM METAL PANELS		SILVER TO MATCH CLEAR ANODIZED STOREFRONT

GENERAL NOTES

1. ALL EXTERIOR LIGHTING SHALL BE SHIELDED TO CONFINE LIGHTING TO THE PROJECT SITE
2. PROVIDE RECESSED KNOX EMERGENCY ACCESS KEY BOX. LOCATION TO BE DETERMINED BY THE CITY FIRE DEPARTMENT. BUILDING ACCESS KEYS SHALL BE MARKED AND PLACED IN BOX PRIOR TO FINAL INSPECTION. THE BUILDING OWNER SHALL PROVIDE REPLACEMENT KEYS WHENEVER LOCKS ARE CHANGED.

TVF&R Tualatin Valley Fire & Rescue

APPROVED PLANS

APPROVAL OF PLANS IS NOT AN APPROVAL OF OMISSIONS OR OVERSIGHTS.

Deputy Fire Marshal II

TVF&R Permit # 2002-0078

FS-2

Item 2.

no.	revision	date
	SITE DESIGN REVIEW	1-21-22

18003 job no.
EM drawn
BW checked
1-21-22 date

REGISTERED ARCHITECT · VINCE MUELLER · SEATTLE, WA. 1491 · STATE OF OREGON

BUILDING W5
99XX SW Boeckman Rd.
Wilsonville, OR 97070

EXTERIOR ELEVATIONS

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sheet
A3.0

668

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1/21/2022

LANCE MUELLER & ASSOCIATES
ARCHITECTS • AIA

W5	July 2022

96XX SW Boeckman Road, Wilsonville, OR 97070

Colors and Materials Selections (Prelim)

Coping & Scupper: Prefinished Galvanized Iron, Paint – Color: Silver (to match W4)

Precast Concrete walls & Sill: Sealer & Stain – Color: color range per images below

Glass: Low-e insulated – Color: clear (to match W4)

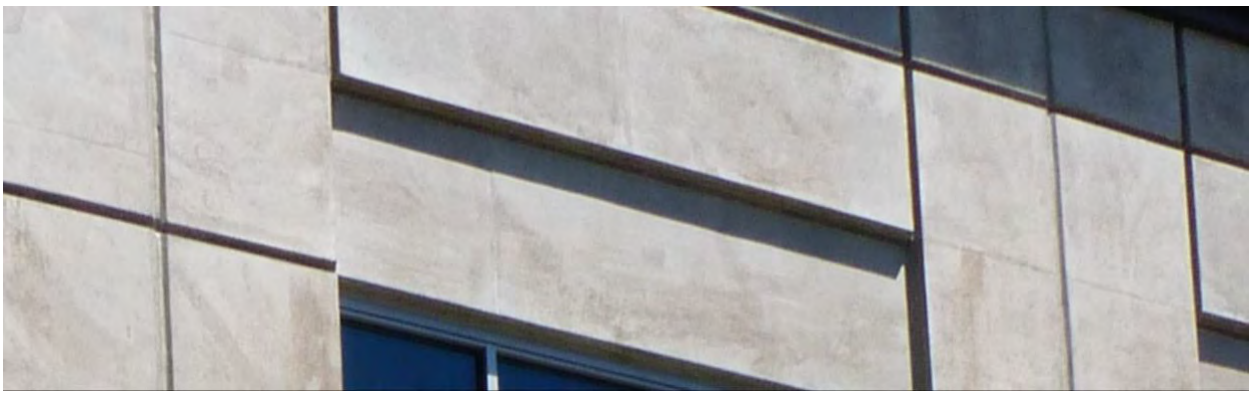
Storefront: – Color: clear anodized (to match W4)

ACM (or other approved metal wall panel system): – Color: Silver (to match W4 coping)

Canopies: – Color: Neutral Bronze (TBD – to blend with wall stain)

Dock Doors & Man Doors: Steel, paint – Color: Neutral Bronze (TBD – to blend with wall stain)

On-Grade Service Doors: Alum stile & rail – Color: clear anodized (to match W4)
Glass, insulated – Color: TBD – to match glass in storefront



Precast Concrete Walls & Sills: The dominant exterior surface is walls, which receive two layers of clear sealer with semi-transparent stain. These images show the range of the warm vs. cool neutral colors from past projects in the area by ownership. W5 will be a neutral color between these two examples. Final selection is by owner from field samples. (Top is Lam Research in Tualatin. Bottom is W1 in Wilsonville. Appearance varies pending underlying concrete color variations, time of day, sunny or cloudy, etc. Color lightens over decades from sun exposure, and we think the patina softens and improves with age.)

We recognize this is an unusual color board. All the selections either match a product on adjacent W4 or are selected after the wall stain sample is approved. Unfortunately, the dominant facade surface, the semi-transparent stained walls, is selected from field samples at the end of construction. To explain why I'll first describe the stain system:

The precast wall finish is a field applied semi-transparent stain installed in two layers with pigment change between the layers for subtle added color depth. The stain pigment is applied in a clear penetrating sealer. This is a premium finish compared to paint, and we believe a richer and more natural aesthetic (with the subtle mottled neutral colors) compared to a flat paint finish. Importantly, this stain is proven tough enough to hold up to vine covered green walls, which is questionable with paint finish. Besides the initial aesthetic preference, long-term the stain maintains its subtle patina and waterproofing capabilities longer than paint, so the precast facade holds its quality appearance longer. This is important on its own merits, but it is more important when vines are attached to the walls as we propose. Imagine the time and expense involved to repaint a vine covered building. First the vine removal, then the painting process with surface prep, and then waiting a few years for the vines to grow back on the wall. We consider the stain finish linked to the green walls proposed aesthetically and practically.

The stain is custom field applied for each of the owner's buildings, who uses his own long-term subcontractor to control the application. The final colors are selected by the owner, who takes a personal interest, from field samples on the precast walls. For accuracy we place the field samples on the actual concrete walls because concrete color varies from batch to batch, which influences how the semi-transparent stain color is perceived.

The color board presentation issue is how do we present a field sample that is not created yet? Unfinished concrete walls colors vary from cool (bluish) to warm (off-white) hues, which significantly influences the semi-transparent stain color perceived. This makes it impossible to present an accurate precast color sample at a DRB hearing. Instead, the owners do have three (3) Wilsonville examples of their stained precast buildings of similar scale and materials that have received Wilsonville approval in the past. At the DRB hearing we will present pictures of these representing the stain color range with their addresses for field visits to verify the color. We will also offer three (3) Tualatin building examples (also with addresses) by the owner showing a slightly darker semi-transparent color range. We think these aged examples provide a good sense for how the concrete finish will ultimately appear, and the exact hue or value is less important. In the owner's previous Wilsonville buildings with stained precast walls (permitted as W1, W2 and W3) DRB and Planning was able to grant approval based upon previous building examples by the owner. It is our hope that DRB and Planning can do this again.

Other comments about the proposed color board: Because many of the other colors and finishes are proposed to match existing W4, the adjacent building provides definitive samples of some well-known building products as follows:

- Coping is silver paint (to match W4).
- Clear glass (to match W4).
- Storefront is clear anodized (to match W4).
- ACM at main entry is silver paint (to match W4 coping).

Other paint colors are chosen to be similar to the wall stain. These selections are delayed until after the wall stain sample is chosen, which is late in construction:

- Painted canopies & hollow metal doors (TBD - to blend with wall stain)

35 Collection

landscapeforms®

Product Data Sheet

Loop

- Loop bike rack is a simple, sweeping circle with a twist.
- Both functional and sculptural.
- Cyclists can loop and lock one or two bikes around its shape-shifting cast aluminum ribbon frame.
- The aluminum casting, finished with Pangard II® powdercoat, is offered in a selection of colors. Must be embedded to a concrete surface.
- Refer to install guide for spacing guidelines.
- Meets APBP guidelines.

	Style	Depth	Length	Height	Product Weight
	bike rack	14"	36"	31"	25 lb

Metal Finishes

- All metal is finished with Pangard II®, offered exclusively by Landscape Forms, a 19-step program of cleaning, priming, and powder coating that resists rusting, chipping, peeling and fading to produce the finest metal finish available for site furniture. In addition, Pangard II® contains no heavy metals and is free of Hazardous Air Pollutants.
- Call for standard color chart.

Recycled Content

- Loop has a recycled content of 97%, and is 100% recyclable.

To Specify

- Specify collection name and product name.

Click here for patent information related to this product.

W1 in Wilsonville from 2009 at the front entry showing the simple palette of stained precast concrete walls, deep facade rustication with deeply set windows and extensive ornamental landscaping in addition to the preserved natural areas. This stain is in the warm range. Originally occupied by DWFRITZ Precision Automation until their expansion. Shell architecture by Lance Mueller & Associates (LMA).

W1 in Wilsonville shown where it abuts an on-site SROZ natural area. This back-of-building view proves the high-quality materials and architecture extend all around the building. Vines on stained precast concrete walls are part of the architecture that include facade rustication and deeply set windows for visual interest. The big trees on left are part of the SROZ. Scale of this facade is similar to W5. Shell architecture by Lance Mueller & Associates. Address: 27200 SW Parkway Ave, Wilsonville, OR 97070

W2 in Wilsonville from 2006 in foreground with W1 beyond on left. W2 wall stain is slightly cooler than W1. Extensive large ornamental landscaping adds to the significant preserved SROZ natural areas, same as proposed in W5. Shell architecture by LMA. Address: 27300 SW Parkway Ave, Wilsonville, OR 97070

Two views of W3 in Wilsonville from 2012, the last part of the complex that includes W1 and W2 and borders the SROZ. Originally expansion space for DWFRITZ, it is now occupied by Sig Sauer, Electro-Optics. This wall stain is another warm example, and the warm afternoon sunlight is an influence. Shell architect is LMA.
Address: 27100 SW Parkway Ave, Wilsonville, OR 97070

Another development by the owners in nearby Tualatin from 2014 that has a similar limited material palette as proposed in W5. In the foreground is Industry Restaurant and the background a 2-story hi-tech industrial building. Both show a strong architectural presence with facades in stained precast concrete, like W5. The restaurant includes vines on the facade and the project preserves protected natural areas (Hedges Creek), also same as W5. This stain is a slightly darker value and grayer hue. Shell architect is LMA. Address: 20185 SW 112th Ave, Tualatin, OR 97062

An office development with stained walls by the owners in Bellevue, WA from 1998 (permitted as I-90 1997). I include this close-up view from 2021 to show the nicely patinaed stained pre-cast concrete after weathering for 34 years. The vines have been cut back a few times to control them and the stain holds up very well. This was the first successful stained project by the owners after previous attempts ended being painted. I check every few years to verify if the sealer is still functioning, and irrigation spray still beads up on the walls! Shell architect is LMA. Address: 15405 SE 37th Street, Bellevue, WA 98006

LANCE MUELLER & ASSOCIATES
ARCHITECTS • AIA

W5 March 2023

96XX SW Boeckman Road, Wilsonville, OR 97070

Architectural Review Narrative:

Narrative Index:

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Section 3.	13	Key Issues (neighborhood outreach)
Section 4.	14-72	Code Criteria List with Proponents Responses
Section 5.	D1-22	Plan Sets
Section 6.	R1-351	Reports

Section 5: Plan Sets (Cover Sheet)

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6	A1.2	Enlarged Site Plan at Service & Details
7	A2.0	First Floor Plan
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11	C1.20	Grading plan - South
12	C1.21	Grading plan - North
13	C1.30	Utility plan - South
14	C1.31	Utility plan – North
15	EC2.0	Clearing & Demolition Erosion & Sediment Control Plan
16	-	Cut/Fill Map
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18	L1.1	Enlarged Landscape Plan - North
19	L1.2	Enlarged Landscape Plan – South
20	L2.0	Landscape Details

21	L2.1	Landscape Specifications

Site Lighting

D 22	1 of 4	Site Lighting Plan & Calculations
23	2 of 4	Enlarged Site Lighting Plan - North
24	3 of 4	Enlarged Site Lighting Plan – South
25	4 of 4	Graphic Site Lighting Plans & Calculations

Supplemental Drawings

D 26	CS-2	Site Parking Plan & Calculations
27	CS-3	Site Circulation Plan & TVFR Service Provider Plan
28	TR-1	Tree Removal Plan
29	TR-2	Tree Removal Table
30	1 of 4	Martin Partition Plan (Recorded)
31	2 of 4	Martin Partition Plan
32	3 of 4	Martin Partition Plan
33	4 of 4	Martin Partition Plan
34	A1.1	W4 Approved Site Plan (Pre – W5)
35	C3.0	W4 Approved Utility Plan
36	C3.1	W4 Approved Utility Plan
37	C3.2	W4 Approved Utility Plan

BUILDING W5

ABBREVIATIONS

AC	ACOUSTICAL CEILING
ACC	ACCESSIBLE
ACT	ACOUSTICAL CEILING TILE
AD	AREA DRAIN
ADDM	ADDENDUM
ADJ	ADJUSTABLE
AFF	ABOVE FINISH FLOOR
AHU	AIR HANDLING UNIT
ALT	ALTERNATE
ALUM	ALUMINUM
AMB	AIR/MOISTURE BARRIER
ANOD	ANODIZED
APPROX	APPROXIMATE/APPROXIMATELY
ARCH	ARCHITECT/ARCHITECTURAL
AV	AUDIO VISUAL
BLDG	BUILDING
BLKG	BLOCKING
BO	BOTTOM OF
BOM	BOTTOM OF MULLION
BOT	BOTTOM
BOR	BOTTOM OF REVEAL
BRG	BEARING
B/S	BUILDING STANDARD
BUR	BUILT UP ROOFING
BW	BOTTOM OF WALL
CB	CATCH BASIN
CEM	CEMENT/CEMENTITIOUS
CFLG	COUNTER FLASHING
CI	CAST IRON
CIP	CAST IN PLACE
CJ	CONTROL JOINT
CL	CENTER LINE
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
CO	CLEAN OUT
COL	COLUMN
COM	CENTER OF MULLION
COMM	COMMUNICATION
CONC	CONCRETE
CONT	CONTINUOUS
COR	CENTER OF REVEAL
CORR	CORRIDOR
CPT	CARPET
CS	CEILING SYSTEM
CT	CERAMIC TILE
CTR	CENTER
CU	CUBIC
DEMO	DEMOLISH/DEMOLITION
DET	DETAIL
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DIV	DIVIDE/DIVISION
DMPF	DAMPPROOF/DAMPPROOFING
DN	DOWN
DS	DOWN SPOUT
DWG	DRAWING
E	EAST
EFIS	EXTERIOR INSULATION & FINISH SYSTEM
EJ	EXPANSION JOINT
EL	ELEVATION
ELEC	ELECTRIC/ELECTRICAL
ELEV	ELEVATOR
ENCL	ENCLOSE/ENCLOSURE
ENL	ENLARGE
EP	ELECTRIC PANEL
EQ	EQUAL
EQUIP	EQUIPMENT
EXH	EXHAUST
EXP	EXPANSION/EXPOSED
EXIST	EXSISTING
EXT	EXTERIOR
FA	FIRE ALARM
FCIO	FURNISHED BY CONTRACTOR/INSTALLED BY OWNER
FCIC	FURNISHED BY CONTRACTOR/INSTALLED BY CONTRACTOR
FD	FLOOR DRAIN
FDC	FIRE DEPARTMENT CONNECTION
FDTN	FOUNDATION
FE	FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
FF	FINISH FLOOR
FH	FIRE HYDRENT
FHC	FIRE HOSE CABINET
FIG	FIGURE
FIN	FINISH/FINISHED
FIXT	FIXTURE
FLEX	FLEXIBLE
FLR	FLOOR
FLUOR	FLUORESCENT
FO	FACE OF/FINISHED OPENING
FOIC	FURNISHED BY OWNER/INSTALLED BY CONTRACTOR
FOIO	FURNISHED BY OWNER/INSTALLED BY OWNER
FP	FIRE PROTECTION
FR	FRAME/FIRE RATED
FRMG	FRAMING
FRPF	FIRE PROOF/FIREPROOFING
FRT	FIRE RETARDENT TREATED
FS	FLOOR SINK
FT	FOOT/FEET
FTG	FOOTING
FUT	FUTURE
FVC	FIRE HOSE VALVE CABINET
G	GRADE/GROUND
GA	GAUGE
GALV	GALVANIZED
GB	GRAB BAR
GC	GENERAL CONTRACTOR
GI	GALVANIZED IRON
GL	GLASS
GWB	GYPSUM WALL BOARD
GYP	GYPSUM
GYP BD	GYPSUM BOARD
H	HIGH
HB	HOSE BIB
HC	HOLLOW CORE
HDW	HARDWARE
HDWD	HARDWOOD
HM	HOLLOW METAL
HO	HOLD OPEN
HORIZ	HORIZONTAL
HR	HOUR
HT	HEIGHT
HVAC	HEATING, VENTILATING, & AIR CONDITIONING
IBC	INTERNATIONAL BUILDING CODE
ID	INSIDE DIAMETER
INCL	INCLUDE/INCLUDING
INFO	INFORMATION
INSUL	INSULATE/INSULATION
INT	INTERIOR
INT AL	INTERIOR ALUMINUM
JAN	JANITOR
JC	JANITOR CLOSET
JS	JANITOR SINK
JT	JOINT
LAM	LAMINATE/LAMINATED
LAV	LAVATORY
LT	LIGHT
LTG	LIGHTING
M	MIRROR
MAS	MASONRY
MATL	MATERIAL
MAX	MAXIMUM
MECH	MECHANICAL
MED	MEDIUM
MEMB	MEMBRANE
MEZZ	MEZZANINE
MGT	MANEGMENT
MFR	MANUFACTURE
MH	MANHOLE
MIN	MINIMUM/MINUTE
MISC	MISCELLANEOUS
MO	MASONRY OPENING
MS	MOP SINK
MTD	MOUNTED
MTL	METAL
N	NORTH
NIC	NOT IN CONTRACT
NO	NUMBER
NOM	NOMINAL
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OH	OVERHEAD
OPNG	OPENING
OPP	OPPOSITE/OPPOSITE HAND
ORD	OVERFLOW ROOF DRAIN
OTS	OPEN TO STRUCTURE ABOVE
PC	PRECAST
PCG	PLASTIC CORNER GUARD
PD	PLANTER DRAIN
PERP	PERPENDICULAR
PLAM	PLASTIC LAMINATE
PLAS	PLASTER
PLYWD	PLYWOOD
PNL	PANEL
PL	PROPERTY LINE
PR	PAIR
PRK	PARKING
PROP	PROPERTY
PT	PAINT/POINT/PRESSURE TREATED/POST TENSION
PTD	PAPER TOWEL DISPENSER WASTE RECEPTACLE
PTN	PARTITION
PTD/WR	PAPER TOWEL DISPENSER WITH
R	RADIUS/RISER
RCP	REFLECTED CEILING PLAN
RD	ROOF DRAIN/ROAD
REF	REFER TO/REFERENCE
REINF	REINFORCED/REINFORCING
REQD	REQUIRED
REV	REVISED/REVISION
RFG	ROOFING
RM	ROOM
RO	ROUGH OPENING
S	SOUTH/SPANDRAL
SC	SOLID CORE
SCD	SEAT COVER DISPENSER
SCHED	SCHEDULE
SD	STORM DRAIN
SECT	SECTION
SF	SQUARE FOOT
SGL	SINGLE
SHT	SHEET
SHTHG	SHEATHING
SIM	SIMILAR
SPEC	SPECIFICATION
SPKLR	SPRINKLER
SQ	SQUARE
SS	SERVICE SINK
SST	STAINLESS STEEL
STL	STEEL
STOR	STORAGE
STRUCT	STRUCTURAL/STRUCTURE
SUSP	SUSPENDED
T	TREAD/TEMPERED
TC	TOP OF CURB
T&G	TONGUE & GROVE
TEL	TELEPHONE
TEMP	TEMPERATURE/TEMPORARY
THK	THICK/THICKNESS
TO	TOP OF
TOM	TOP OF MULLION
TOR	TOP OF REVEAL
TOSD	TOP OF STEEL DECK
TPD	TOILET PAPER DISPENSER
TW	TOP OF WALL
TYP	TYPICAL
U	URINAL
UNFIN	UNFINISHED
UON	UNLESS OTHERWISE NOTED
VB	VAPOR BARRIER
VERT	VERTICAL
VEST	VESTIBULE
VIF	VERIFY IN FIELD
VNR	VENEER
VR	VAPOR RETARDER
W	WEST/WIDE
W/	WITH
W/O	WITH OUT
WC	WATER CLOSET/WALL COVERING
WD	WOOD
WLD	WELD/WELDED
WP	WEATHER PROOF/WATER PROOF WATERPROOFING/WORK POINT
WR	WATER RESISTANT
WT	WEIGHT
WWF	WELDED WIRE FABRIC

LEGEND

EARTH
GRAVEL/ROCK
CONCRETE
ASPHALT PAVING
WOOD FRAMING
BLOCKING OR SHIM
FINISH WOOD
GLASS (ELEVATION)
GLASS (SECTION)
GYPSUM WALL BOARD
CAULKING/SEALANT
PLYWOOD
BRICK
ACOUSTIC TILE
RIGID INSULATION
BATT INSULATION
METAL

GENERAL NOTES

1. MECHANICAL & ELECTRICAL ARE BIDDER DESIGN SYSTEMS. PORTIONS OF THIS WORK ON ARCHITECTURAL, CIVIL & LANDSCAPE ARE FOR DESIGN INTENT.
2. DRAWINGS ARE NOT TO BE SCALED. CONTACT ARCHITECT FOR RESOLUTION OF ANY CONFLICTS OR DISCREPANCY.
3. CONTRACTOR TO VERIFY ALL FIELD DIMENSIONS AND CONDITIONS – ANY DISCREPANCY BETWEEN PLAN AND ACTUAL CONDITION IS TO BE BROUGHT TO THE ATTENTION OF ARCHITECT FOR RESOLUTION.
4. ALL DIMENSION LINES ARE TO FACE OF CONC.. AND METAL STUD WALLS AND CENTERLINE OF COLUMNS AND BEAMS, UNLESS NOTED.
5. THE CONTRACTOR SHALL APPLY AND SECURE ALL OCCUPANCY, SEWER, STORM, WATER, MECHANICAL, ELECTRICAL AND OTHER PERMITS EXCEPT BUILDING PERMITS. CONTRACTOR SHALL PAY ALL NECESSARY FEES AND POST BONDS REQUIRED.
6. GENERAL CONTRACTOR RESPONSIBLE FOR ALL CUTTING AND PATCHING.
7. REPETITIVE FEATURES MAY BE DRAWN ONLY ONCE, BUT SHALL BE PROVIDED AS IF DRAWN FULL.
8. PORTABLE FIRE EXTINGUISHERS PER NFPA 10 AND IN CONSTRUCTION SHACK. PERMANENT FIRE EXTINGUISHERS BY OWNER.
9. ELEVATOR INSTALLER SHALL SUBMIT PERMIT FOR FUTURE T.I. ELEVATOR PER ORS CHAPTER 460 CONTACT THE STATE BUILDING CODES DIVISION, ELEVATOR SAFETY PROGRAM (503) 373–1298
10. ELECTRICAL – PROVIDE TOGGLE ON–OFF SWITCH FOR FUTURE T.I. LIGHTING, PROVIDE IN EACH ROOM PER SECTION 1313.1.1
11. ELECTRICAL – PROVIDE OCCUPANT SENSORS IN FUTURE T.I. RESTROOMS. CONTROLS TO SHUT OFF LIGHTING PER SECTION 1313.3.1.2.2

BUILDING CODE NOTES:

CODES:
2019 OREGON STRUCTURAL & SPECIALTY CODE
2019 OREGON FIRE CODE
2019 OREGON MECHANICAL SPECIALTY CODE (OMSC)
2021 OREGON ELECTRICAL SPECIALTY CODE (OESC)
2021 OREGON PLUMBING SPECIALTY CODE (OPSC)
2011 OREGON ELEVATOR SPECIALTY CODE
2021 OREGON ENERGY EFFICIENCY SPECIALTY CODE (OEESC)

CONSTRUCTION TYPE: II–B SPRINKLERED
OCCUPANCY GROUPS: B, F–1, S–1, A–3 (ACCESSORY USE)
ALLOWABLE AREA: UNLIMITED PER SECTION 507 (60' MIN. YARD ALL SIDES)

OSSC BUILDING HEIGHT (TABLE 503):
TYPE II–B W/ F–1, B OR S–1 OCCUPANCY GROUP ALLOWS TABULAR 2 STORIES. SECTION 504.2 INCREASES THIS BY ONE STORY W/ THE FIRE SPRINKLER SYSTEM.

OSSC OCCUPANCY SEPARATIONS (SECTION 508.3.1):
NON–SEPARATED USES ARE ALLOWED AS THE MOST RESTRICTIVE OCCUPANCY (F–1) APPLIES TO ENTIRE BUILDING IN CALCULATING ALLOWABLE AREA.

OSSC FIRE RESISTANCE RATINGS FOR BUILDING ELEMENTS (TABLE 601 & 602):

BUILDING ELEMENTS:	RATING:
STRUCTURAL FRAME:	0 HOURS
BEARING WALLS – EXTERIOR:	2 HOURS
BEARING WALLS – INTERIOR:	0 HOURS
NON–BEARING WALLS/PARTITIONS – EXTERIOR:	0 HOURS
NON–BEARING WALLS/PARTITIONS – INTERIOR:	0 HOURS
FLOOR CONSTRUCTION:	0 HOURS
ROOF CONSTRUCTION:	0 HOURS

OSSC EXTERIOR WALL OPENINGS:
AREA OF OPENINGS (TABLE 705.8): TABLE SHOWS "NO LIMIT" FOR UNPROTECTED OPENINGS GREATER THAN 30 SETBACK, TYPICAL THIS CASE ON ALL SIDES OF THE BUILDING.

OSSC PARAPETS (SECTION 705.11.1):
SHALL HAVE SAME FIRE RESISTANCE AS SUPPORTING WALL, WHICH IT DOES.

SHELL DEFERRED SUBMITTAL LIST

1. FLOOR JOIST LAYOUT. LAYOUT NEEDS TO REFLECT ALL MAJOR POINT LOADING, SUCH AS PIPE SUPPORTS – BY JOIST MFGR.
2. ROOF JOIST LAYOUT. LAYOUT NEEDS TO REFLECT ALL MAJOR POINT LOADING, SUCH AS PIPE SUPPORTS – BY JOIST MFGR.
3. WINDOW WALL PACKAGE – LICENSED OR INSTALLER
4. GLASS & ALUM. PORTIONS OF AWNING SYSTEMS – BY LICENSED STATE ENGINEER
5. STAIR SUPPLIER TO PROVIDE ALL ENGINEERING OF STAIRS (VERIFY WITH STRUCTURAL ENGINEER REGARDING SPECIAL LOADING TO STRUCTURE)

PROJECT TEAM:

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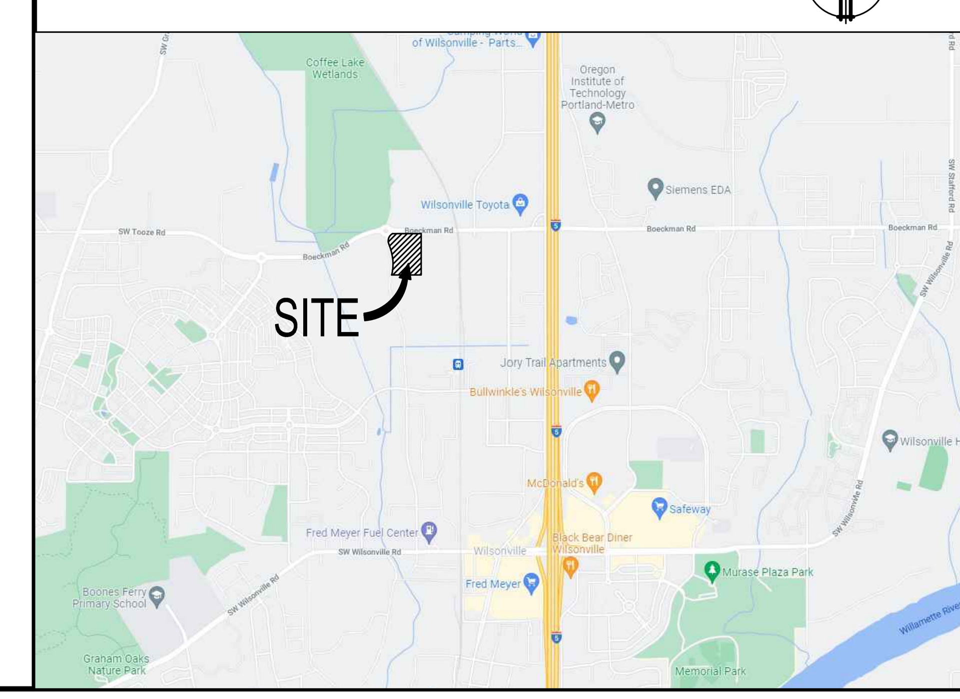
JPETERSON@PERLO.BIZ

VICINITY MAP

north



SCOPE:

CONSTRUCT AN 80,446 SF INDUSTRIAL BUILDING EAST OF THE EXISTING DWFRITZ AUTOMATION BUILDING ON AN UNBUILT TREELESS PORTION OF THE 24.49–ACRE LOT. THE PROJECT LEAVES SIGNIFICANT PORTIONS AS TREED NATURAL AREAS, INCLUDING SUBSTANTIAL SROZ AND WETLAND BUFFER DESIGNATED AREAS. W5 IS INTENDED AS EXPANSION SPACE FOR THE DWFRITZ AUTOMATION OPERATION, WHICH IN THE FUTURE COULD BE SEPARATE INDUSTRIAL TENANTS. W5 WILL SHARE WITH DWFRITZ THEIR TWO EXISTING BOECKMAN ROAD DRIVE ENTRIES AND VEHICLE CIRCULATION. THE LOBBIES WILL HAVE A DEFINED PEDESTRIAN CONNECTION, AND SERVICE AREAS ARE SCREENED FROM SW BOECKMAN ROAD AND SW KINSMAN ROAD.

LEGAL DESCRIPTION:

PARCEL 2 OF PARTITION PLAT NO. 2022–054, RECORDED IN CLACKAMAS COUNTY ON JUNE 29, 2022

TAX PARCEL NUMBERS: 00810331; 05021199; 05008927

ZONING: PDI (PLANNED DEVELOPMENT INDUSTRIAL)

STATISTICS:

BUILDING AREA:
1ST FLOOR: 64,988 SF
MEZZANINE: 15,458 SF
TOTAL 80,446 SF

SITE AREA: PARCEL 1 – 629,112 (14.442 ACRES)
PARCEL 2 – 437.610 (10.046 ACRES)

OCCUPANCY: B OCCUPANCY – 20,000 S.F. ESTIMATE
F OCCUPANCY – 60,446 S.F. ESTIMATE

PARKING: (REFER TO SHEET CS–2 FOR SITE PARKING PLAN)
REQUIRED: COMMERCIAL USES – 2/1000 MIN. 4/1000 MAX
LIGHT MANUFACTURING R & D – 2/1000 MIN. 4/1000 MAX
MINIMUM PARKING
20,000 S.F. COMMERCIAL USES X 2/1,000 => 40 STALLS
60,446 S.F. LIGHT MANUFACTURING R & D X 2/1000 => 121 STALLS
MINIMUM TOTAL PARKING REQUIRED = 40 + 121 = 161 STALLS
MAXIMUM PARKING
20,000 S.F. COMMERCIAL USES X 4/1,000 => 80 STALLS
60,446 S.F. LIGHT MANUFACTURING R & D X 4/1000 => 241 STALLS
MAXIMUM PARKING TOTAL = 80 + 241 = 321 STALLS
PARKING PROVIDED: 297 STALLS (94 COMPACTS 31.6%,)
ACCESSIBLE PROPOSED: 8 W/ 2 WHEEL CHAIR ONLY SPACES
CAR/VAN POOL REQUIRED: 297 X .05 => 15 REQUIRED (SECTION 4.155.06 B)
CAR/VAN POOL PROPOSED: 15 PROPOSED
ELECTRIC VEHICLE (EV) CHARGING INFRASTRUCTURE
297 x .2 = 60 FUTURE SERVICE CAPACITY. REFER TO PLAN FOR LOCATION OF STALLS. PROVIDE CONDUIT FROM THE ELECTRICAL ROOM TO THE PROPOSED EV STALLS FOR LEVEL 2 ELECTRIC CHARGERS.

BIKE REQUIREMENTS:
REQUIRED: PDI FLEX SPACE: 1 PER 10,000 SF MIN
80,446 SF / 10,000 SF => 9 REQ'D MIN.
(SECTION 4.155 F INDUSTRIAL 1. MANUFACTURING ESTABLISHMENT)
PROPOSED: 11 (2 UNCOVERED OUTSIDE AT LOBBY; 9 INSIDE AS TI)

LOADING REQUIREMENTS:
REQUIRED BERTHS: INDUSTRIAL 30,000 SF –100,000 SF => 2 MIN. (12' X 35' MIN.) (SECTION 4.155.05 A1)
PROPOSED: 3 (2 DOCK–HIGH; 1 ON–GRADE DRIVE–IN)

TRASH ENCLOSURE REQUIREMENTS:
REQUIRED: 10 SF MINIMUM PLUS
80,000 SF MANUF (6 SF/1,000 SF) = 483 SF MIN.
10 SF + 483 SF = 493 SF MINIMUM TOTAL (4' TALL)
(SECTION 4.178.06 B)
PROPOSED: 415 SF (12' X 20' EXTERIOR ENCLOSURE W/ 6.9' TALL CONTAINERS)
85 SF (INTERIOR CONTAINERS NEAR DOCKS AS TI FOR CARDBOARD)
500 SF TOTAL

SITE COVERAGE:

W4		W5	
PARCEL 1 SITE AREA –	629,112 S.F.	PARCEL 2 SITE AREA –	437,610 S.F.
BUILDING W4 FOOTPRINT –	161,237 S.F. (25.6%)	BUILDING W5 –	64,988 S.F. (14.9%)
PAVING –	257,589 S.F. (41.0%)	PAVING –	51,019 S.F. (11.7%)
LANDSCAPE –	196,211 S.F. (31.2%)	* LANDSCAPE –	315,925 S.F. (72.1%)
SIDEWALKS –	14,075 S.F. (02.2%)	SIDEWALKS –	5,678 S.F. (01.3%)

COMBINED W4 & W5	
SITE AREA –	1,066,722 S.F.
BUILDINGS –	226,225 S.F. (21.2%)
PAVING –	310,765 S.F. (29.1%)
LANDSCAPE –	509,726 S.F. (47.8%)
SIDEWALKS –	21,006 S.F. (01.9%)

* – REFER TO SHEET L1.1 FOR PARKING LOT LANDSCAPE CALCULATIONS

SHEET INDEX

ARCHITECTURAL
A0 COVER SHEET
A1.0 SITE PLAN
A1.1 ENLARGED PLANS AND DETAILS
A1.2 ENLARGED PLANS AND DETAILS
A2.0 FLOOR PLAN
A2.2 ROOF PLAN AND DETAILS
A3.0 EXTERIOR ELEVATIONS

CIVIL
C1.01 TREE PROTECTION PLAN
C1.20 GRADING PLAN NORTH
C1.21 GRADING PLAN SOUTH
C1.30 UTILITY PLAN NORTH
C1.31 UTILITY PLAN SOUTH
EC2.0 CLEARING AND DEMOLISION AND SEDIMENT CONTROL PLAN
– CUT/FILL MAP

LANDSCAPE
L1.0 LANDSCAPE PLAN
L1.1 ENLARGED LANDSCAPE PLAN – NORTH
L1.2 ENLARGED LANDSCAPE PLAN – SOUTH
L2.0 LANDSCAPE SPECIFICATIONS & DETAILS

SITE LIGHTING
1 OF 4 SITE LIGHTING PLAN & CALCULATIONS
2 OF 4 ENLARGED SITE LIGHTING PLAN – NORTH
3 OF 4 ENLARGED SITE LIGHTING PLAN – SOUTH
4 OF 4 GRAPHIC SITE LIGHTING PLANS AND CALCULATIONS

SUPPLEMENTAL PLAN INDEX
CS–2 SITE PARKING PLAN & CALCULATIONS
CS–3 SITE CIRCULATION AND FIRE PLAN
TR–1 TREE REMOVAL PLAN
TR–2 TREE REMOVAL TABLE
1 OF 3 MARTIN PARTITION PLAN
2 OF 3 MARTIN PARTITION PLAN
3 OF 3 MARTIN PARTITION PLAN
A1.1 W4 APPROVED SITE PLAN (PRE W5)

Item 2.

no.	revision	date
	LAND USE SUBMITTAL #3	11-11-22
	SITE DESIGN REVIEW RESUBMITTAL	7-8-22
	SITE DESIGN REVIEW	1-21-22

18003 job no.
EM drawn
BW checked
11–11–22 date

REGISTERED ARCHITECT · LANCE MUELLER · SEATTLE, WA. 1491 · STATE OF OREGON

BUILDING W5
99XX SW Boeckman Rd.
Wilsonville, OR 97070

LANCE MUELLER & ASSOCIATES
A R C H I T E C T S A I A
130 LAKESIDE • SUITE 250 • SEATTLE, WA 98122 • (206) 325-2553

COVER SHEET
sheet
A0

n:\minshull\21006 w5\w5-alx-v17-areas-v2.dwg
3/16/2023

S.W. BOECKMAN ROAD
(COUNTY ROAD NO. 80)

PROPOSED
BUILDING W5
64,988 S.F. +/- FOOTPRING
15,458 S.F. +/- MEZZANINE
297 STALLS
PARCEL 2

EXISTING
BUILDING W4
DWFRITZ PRECISION AUTOMATION
137,763 S..F. FOOTPRING
23,468 S.F. MEZZANINE
404 TOTAL STALLS
402 EXISTING
11 RELOCATED
2 NEW WITH BLDG. W5
PARCEL 1

9600 BOECKMAN RD
EXISTING BUILDING
TAX MAP 3 1W 14B
TAX LOT 202

FUTURE W5 PARKING EASEMENT SHOWN THUS:

DEMOLISHED PARKING STALLS

11 RELOCATED/2 NEW W4 PARKING STALLS

RETAINING WALL PER CIVIL

SROZ ENCROACHMENT

FOREST AREA (NOT SURVEYED)

WETLAND

PROPOSED 10.00' WIDE PRIVATE SANITARY SEWER EASEMENT FOR THE BENEFIT OF PARCEL 2

VARIABLE WIDTH SLOPE EASEMENT PER FEE NO. 2016-005509

VARIABLE WIDTH SLOPE EASEMENT PER FEE NO. 2006-050622

50' SETBACK

RAIN GARDEN PER CIVIL

PEDESTRIAN PATH PER LANDSCAPE

SE LOT 1

SE LOT 2

LOT LINE

KINSMAN ROAD (UNIMPROVED)

RAILROAD

ELECTRIC

OREGON

45' TRANSMISSION LINE EASEMENT PER BOOK 285 PAGE 301

14.0' SLOPE EASEMENT PER FEE NO. 2

25' WIDE TRANSMISSION LINE EASEMENT PER BOOK 284 PAGE 434

CONSTRUCTED PARKING LOTS AND UTILITIES AS SHOWN ARE PER ENGINEERS DESIGN AND HAS NOT BEEN SURVEYED

EDGE OF TREES

LEGEND
- SROZ
- WETLAND
- WETLAND BUFFER

SITE PLAN
1" = 50'-0"

no.	revision	date
	LAND USE SUBMITTAL #3	11-11-22
	SITE DESIGN REVIEW RESUBMITTAL	7-8-22
	SITE DESIGN REVIEW	1-21-22

18003 job no.
EM drawn
BW checked
11-11-22 date

REGISTERED ARCHITECT · JANICE MUELLER · 1491 · SEATTLE, WA. · STATE OF OREGON

BUILDING W5
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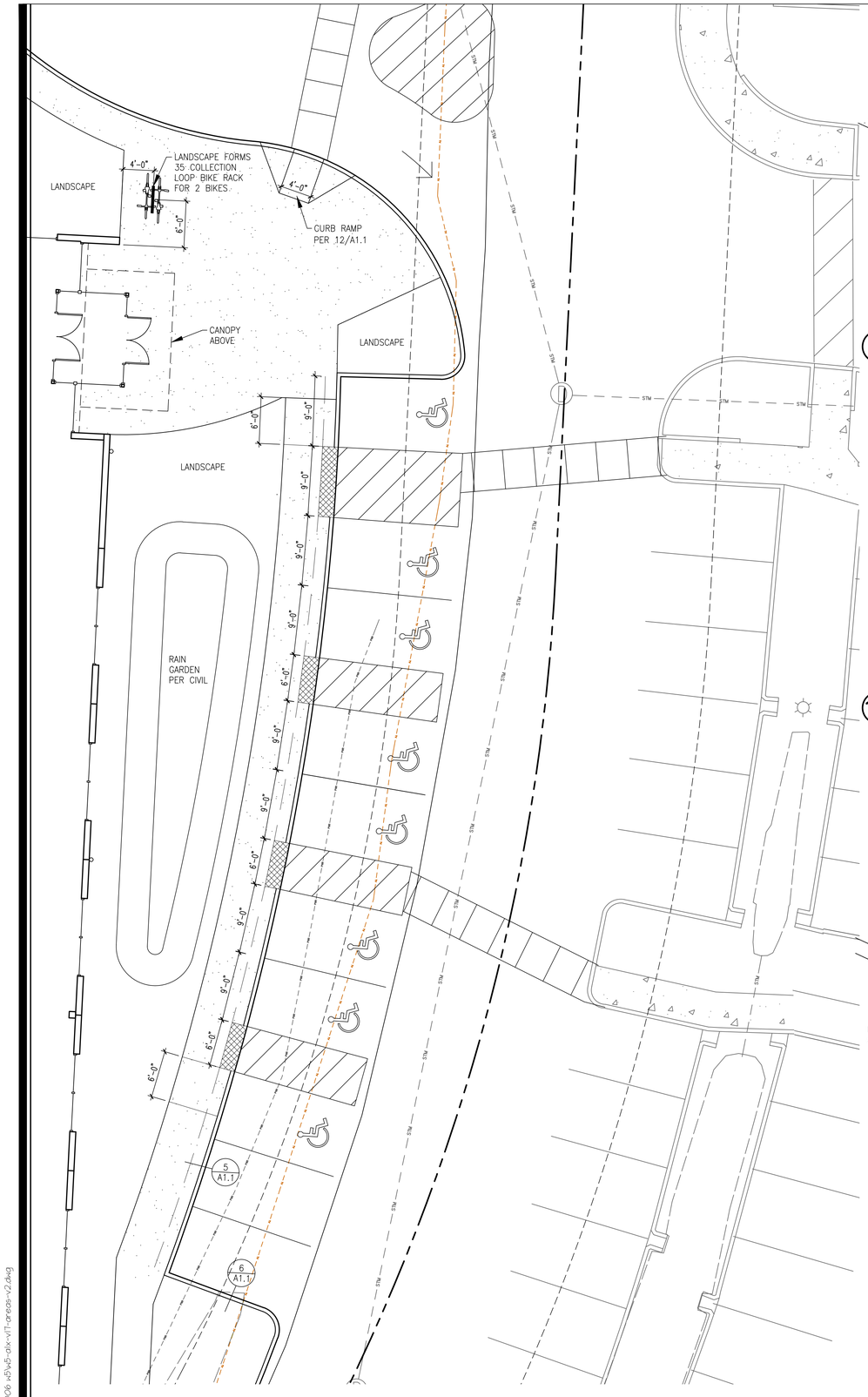
Wilsonville, OR 97070

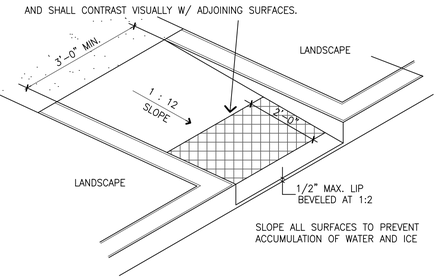
LANGE MUELLER & ASSOCIATES
ARCHITECTS AIA
130 LAKESIDE • SUITE 250 • SEATTLE, WA 98122 • (206) 325-2553

SITE PLAN
sheet
A1.0



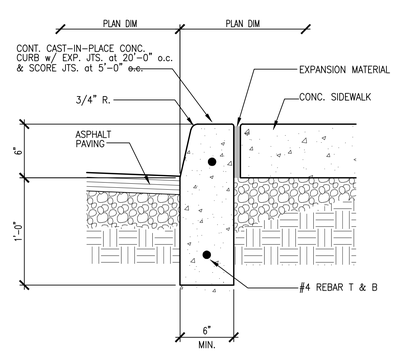
A ENLARGED SITE PLAN

SCALE: 1/8" = 1'-0"



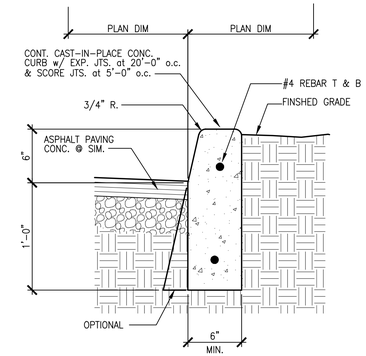
4 ACCESSIBLE CURB RAMP

SCALE: N.T.S.



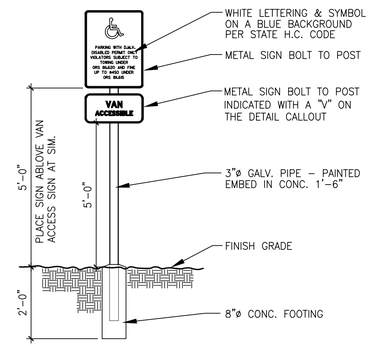
5 CURB DETAIL

SCALE: 1 1/2" = 1'-0"



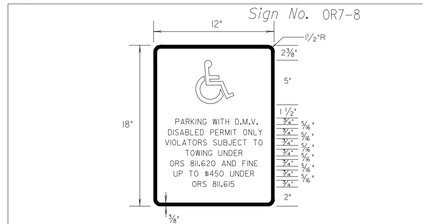
6 CURB DETAIL

SCALE: 1 1/2" = 1'-0"



10 ACCESSIBLE PARKING SIGN

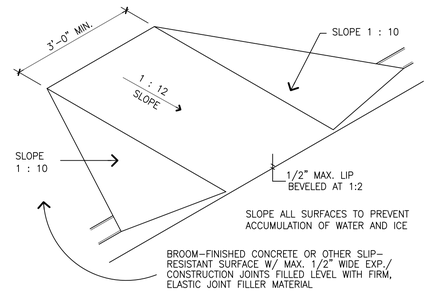
SCALE: 1/2" = 1'-0"



Sign Background: Blue, Retroreflective sheeting
Sign Legend: White, Retroreflective

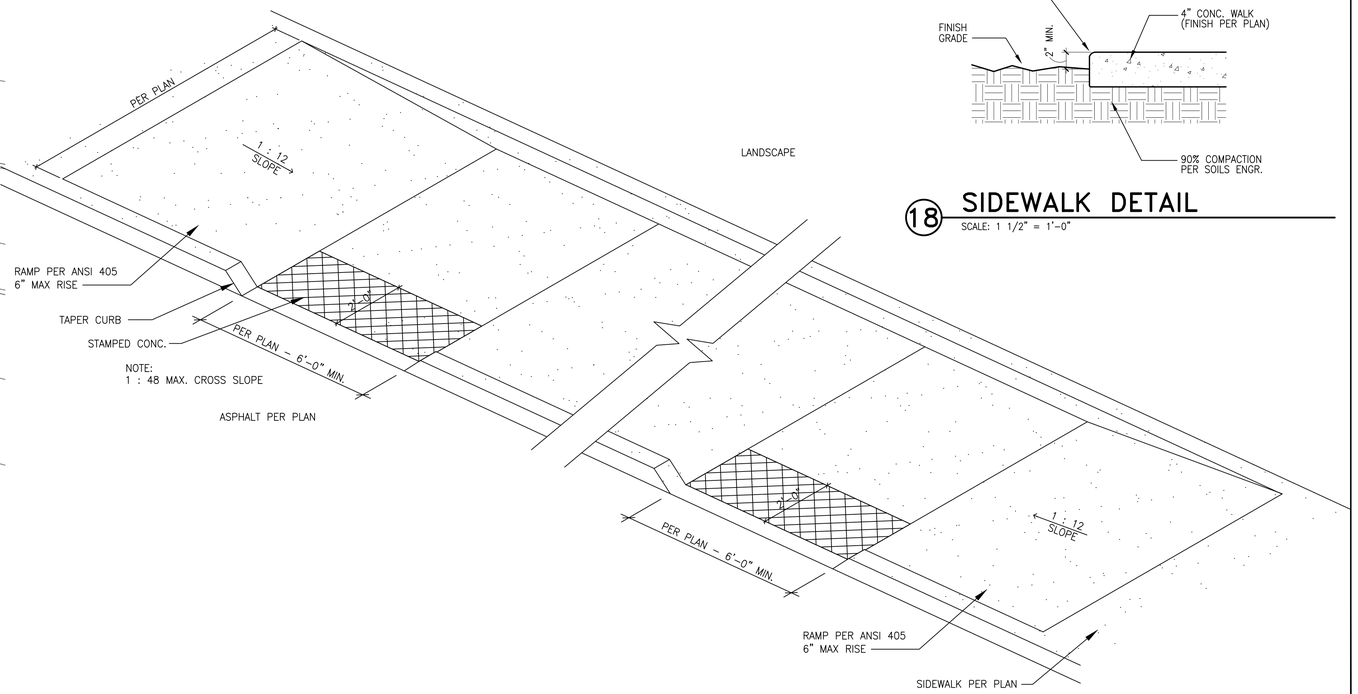
Mount 7'-0" above ground line and no more than 2'-0" inside the oustide stripe of the disabled space.

The Disabled Person parking sign is used to designate a parking space for vehicles with a DMV permit as stated. This is the standard sign for use off the State Highway System.



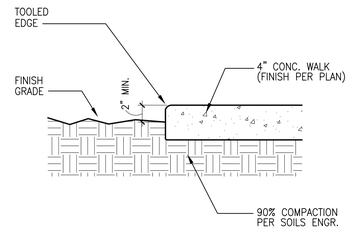
12 ACCESSIBLE CURB RAMP

SCALE: N.T.S.



22 ACCESSIBLE CURB RAMP

N.T.S.



18 SIDEWALK DETAIL

SCALE: 1 1/2" = 1'-0"

no.	revision	date
	LAND USE SUBMITTAL #3	11-1-22
	SITE DESIGN REVIEW RESUBMITTAL	7-8-22
	SITE DESIGN REVIEW	1-21-22

18003 job no.
EM drawn
BW checked
11-11-22 date

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Wilsonville, OR 97070

LANGE MUELLER & ASSOCIATES
ARCHITECTS AIA
130 LAKESIDE • SUITE 250 • SEATTLE, WA 98122 • (206) 325-2553

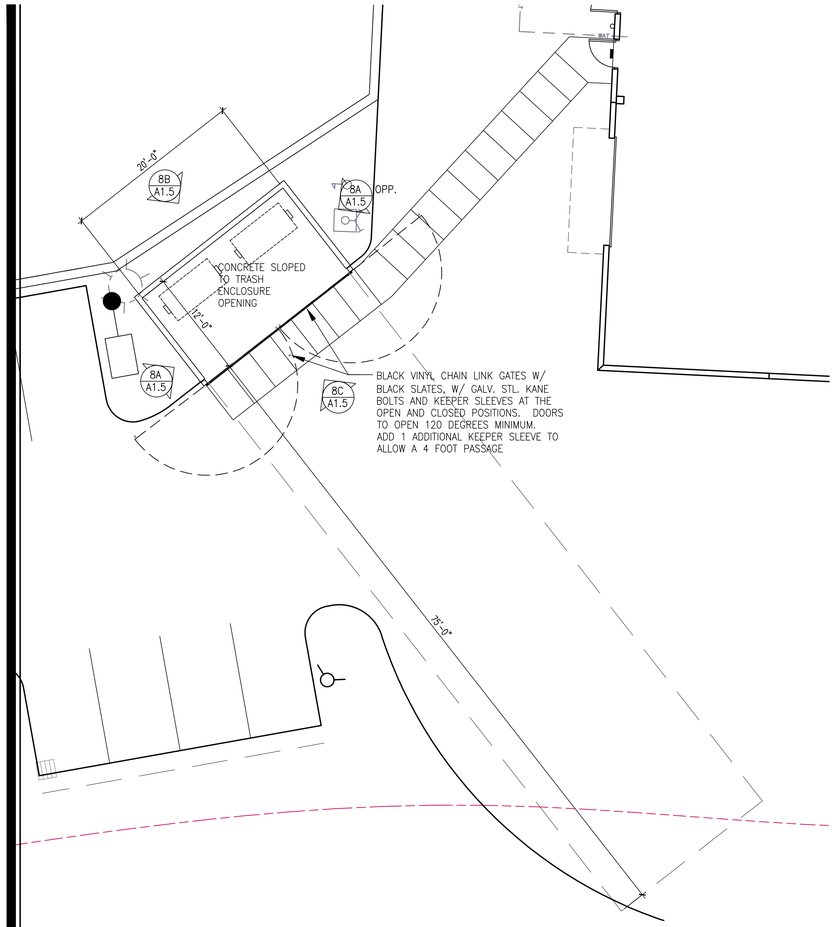
ENLARGED PLAN AND DETAILS

sheet
A1.1

680

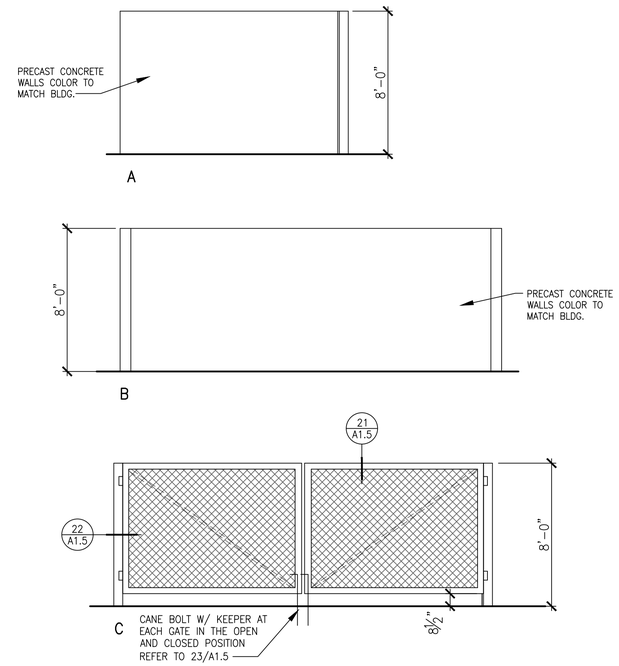
Item 2.

m:\mirabel\2006 w5w5-okr-v17-areas-v2.dwg
11/2022



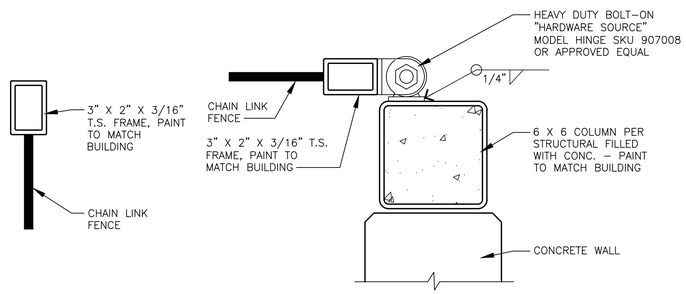
A ENLARGED SITE PLAN

SCALE: 1/8" = 1'-0"



8 DUMPSTER ENCLOSURE ELEVATIONS

SCALE: 1/4" = 1'-0"

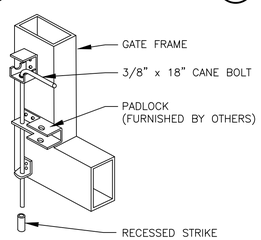


21 DETAIL

SCALE: 1" = 8"

22 DETAIL

SCALE: 1" = 8"



23 DETAIL

SCALE: 1" = 8"

n:\projects\21006 w5\w5-alx-v17-areas-v2.dwg
07/27/2022

Item 2.

no.	revision	date
	LAND USE SUBMITTAL #3	11-1-22
	SITE DESIGN RESUBMITTAL	7-8-22
	SITE DESIGN REVIEW	1-21-22

18003 job no.
EM drawn
BW checked
11-11-22 date

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Wilsonville, OR 97070

ENLARGED PLANS AND DETAILS

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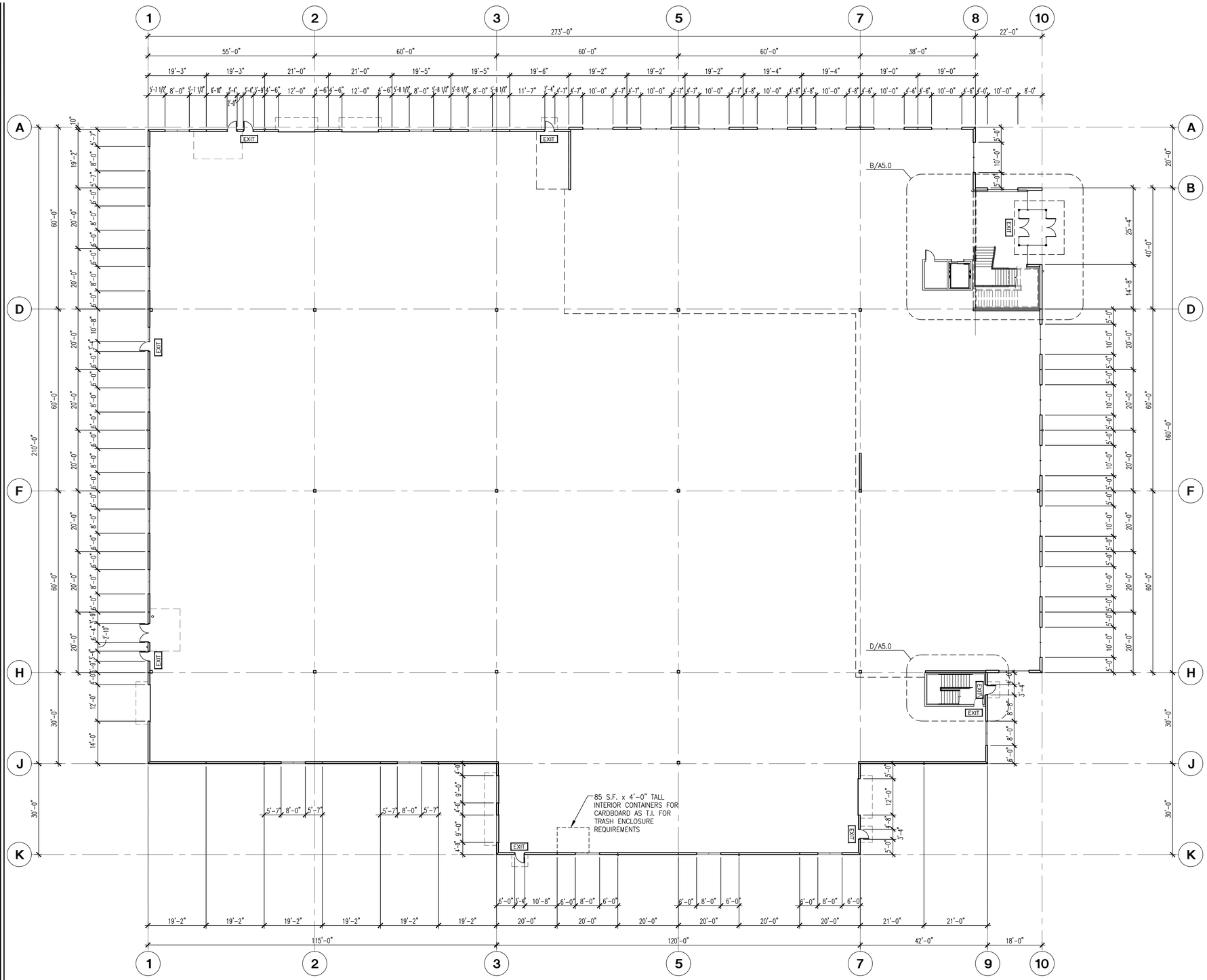
sheet
A1.2



FLOOR PLAN

1/16" = 1'-0"

n:\projects\18003\2006 +52\2006-a02x-v4.dwg
12/5/2022

Item 2.

no.	revision	date
	LAND USE SUBMITTAL #3	11-1-22
	SITE DESIGN REVIEW	1-21-22

18003 job no.
EM drawn
BW checked
11-11-22 date

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BUILDING W5
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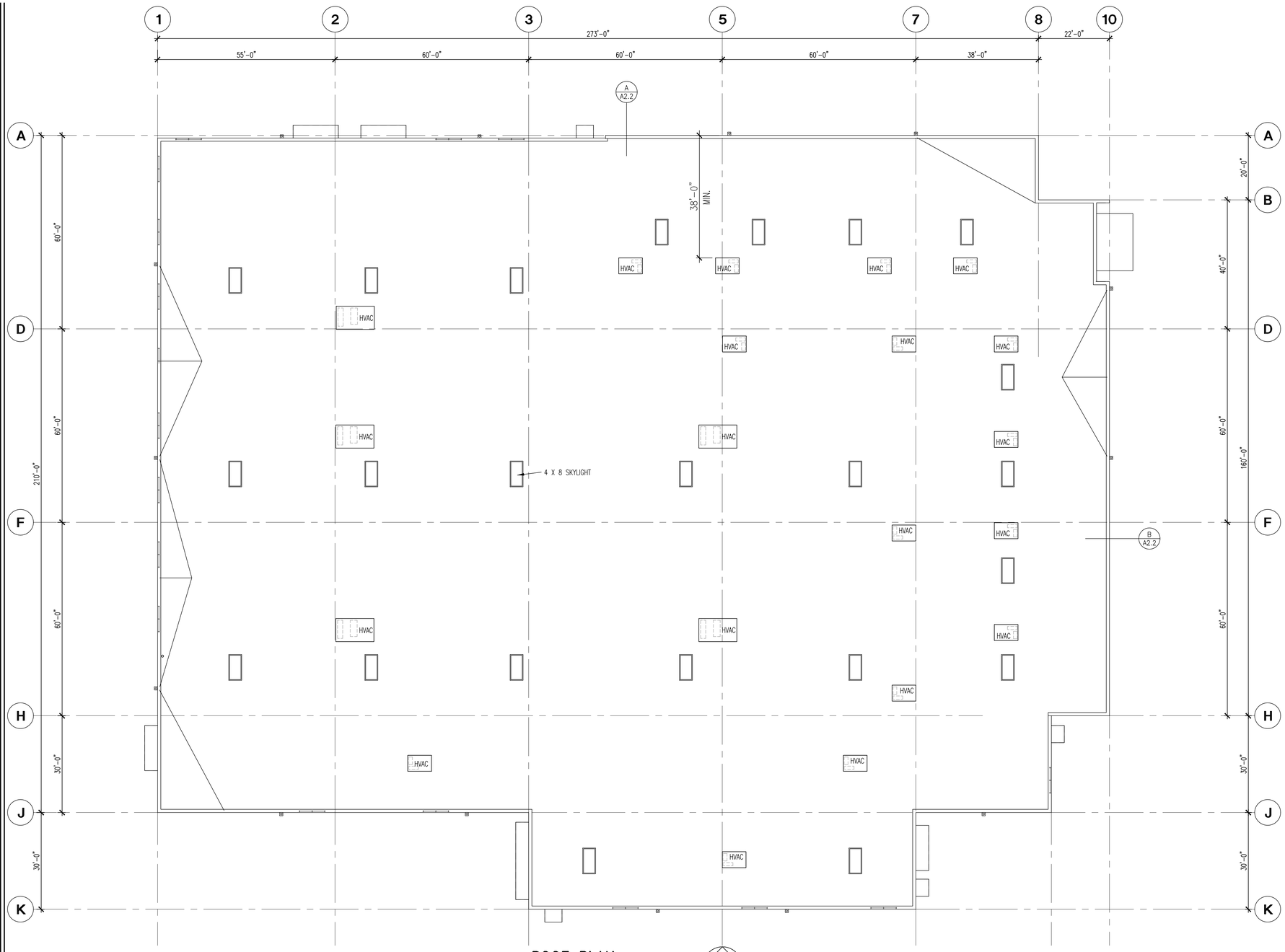
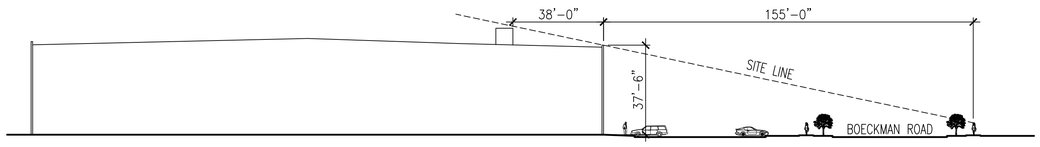
1ST FLOOR PLAN

sheet
A2.0



ROOF PLAN

1/16" = 1'-0"



A SITE SECTION

1" = 60'-0"

no.	revision	date
	LAND USE SUBMITTAL #3	11-1-22
	SITE DESIGN REVIEW	1-21-22

21006 job no.
EM drawn
BW checked
11-11-22 date

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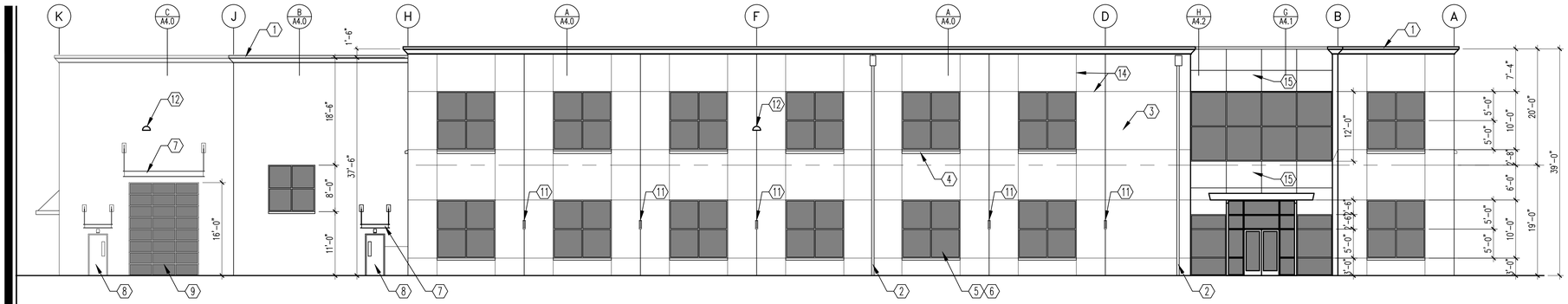
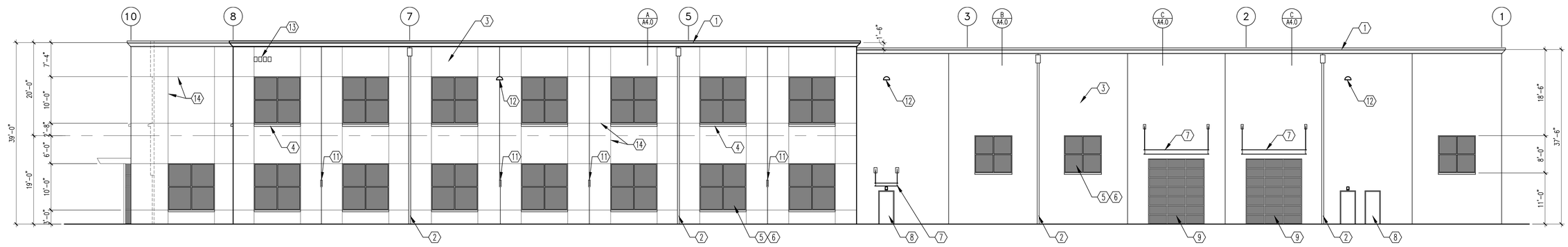
ROOF PLAN

sheet
A2.2

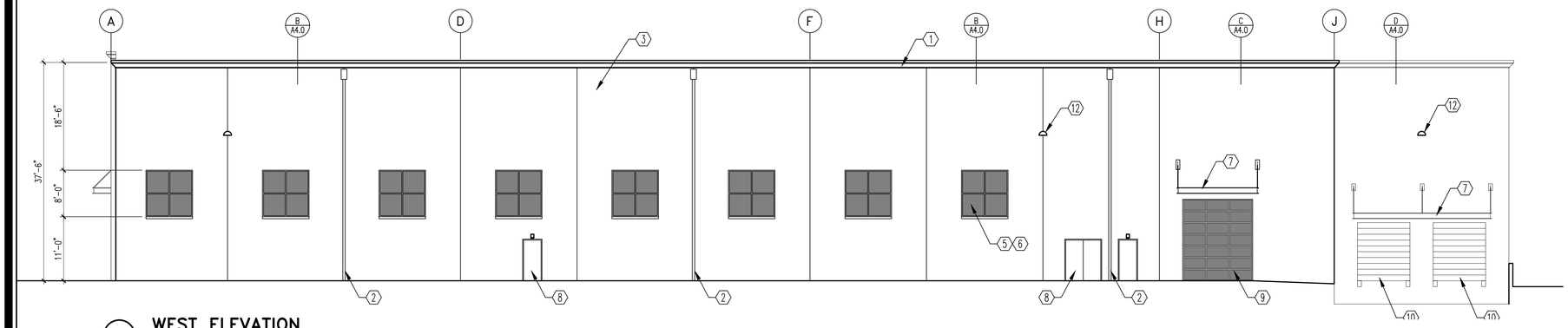
n:\projects\21006 v5\21006-a2x-v4.dwg
12/5/2022



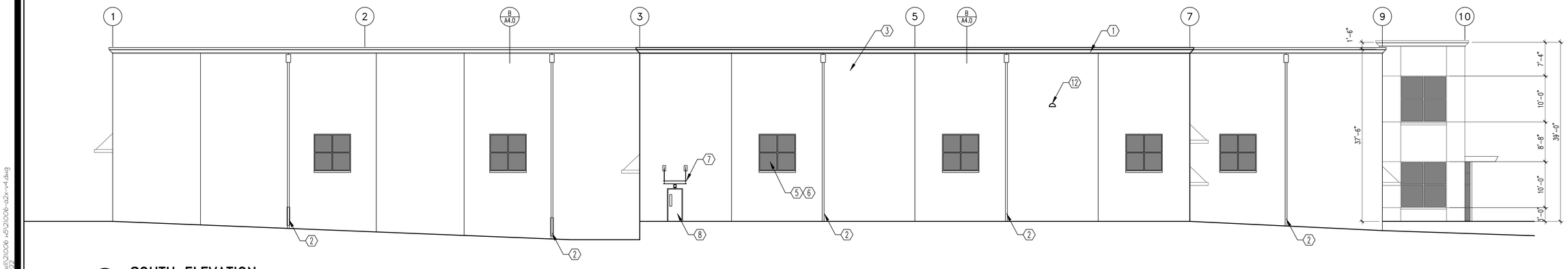
A EAST ELEVATION
3/32" = 1'-0"



B NORTH ELEVATION
3/32" = 1'-0"



C WEST ELEVATION
3/32" = 1'-0"



C SOUTH ELEVATION
3/32" = 1'-0"

FLAG NOTES

MARK	ITEM	DESCRIPTION	REMARKS
1	COPING & SCUPPER	PRE-FINISHED GALVANIZED IRON	COLOR: SILVER
2	RAIN LEADERS		COLOR: NEUTRAL BRONZE TBD
3	CONCRETE WALL	SITE CAST CONCRETE	STAIN & SEALER TYPICAL. (SEMI-TRANSPARENT STAIN) COLOR: NEUTRAL RANGE TBD
4	PRECAST WINDOW SILL	CAST CONCRETE	COLOR: NEUTRAL RANGE TBD
5	GLASS	LOW-E (SOLARBAN 60) INSULATED GLASS - 1" THICK	COLOR: CLEAR
6	STOREFRONT	FRAMING DESIGN IS BASED UPON ARECADIA AG451t SERIES	THERMAL BREAK STOREFRONT COLOR: CLEAR ANODIZED
7	CANOPIES	STEEL FRAME, PAINTED WITH PRE-FINISHED METAL PANEL INFILL	COLOR: NEUTRAL BRONZE TBD
8	HOLLOW METAL DOORS	INSULATED SOLID CORE H.M., WITH GALVANIZED METAL FRAMES	COLOR: NEUTRAL BRONZE TBD
9	ON-GRADE SERVICE DOORS	ALUMINUM RAIL STILE & INSULATED GLASS SECTIONAL UPWARD ACTING	COLOR: CLEAR ANODIZED & GLASS TBD
10	TRUCK DOCK DOORS	HOLLOW METAL SECTIONAL UPWARD ACTING - PAINT	COLOR: NEUTRAL BRONZE TBD
11	SCONCE	TECH LIGHTING, TURBO WALL	
12	WALL PACK LIGHT		
13	ADDRESS LETTERS	12" HIGH STAINLESS STEEL	
14	CONCRETE REVEAL		
15	ACM METAL PANELS		SILVER TO MATCH CLEAR ANODIZED STOREFRONT

GENERAL NOTES

1. ALL EXTERIOR LIGHTING SHALL BE SHIELDED TO CONFINE LIGHTING TO THE PROJECT SITE
2. PROVIDE RECESSED KNOX EMERGENCY ACCESS KEY BOX. LOCATION TO BE DETERMINED BY THE CITY FIRE DEPARTMENT. BUILDING ACCESS KEYS SHALL BE MARKED AND PLACED IN BOX PRIOR TO FINAL INSPECTION. THE BUILDING OWNER SHALL PROVIDE REPLACEMENT KEYS WHENEVER LOCKS ARE CHANGED.

Item 2.

no.	revision	date
	LAND USE SUBMITTAL #3	11-11-22
	SITE DESIGN REVIEW	1-21-22

18003 job no.
EM drawn
BW checked
11-11-22 date

REGISTERED ARCHITECT · LANCE MUELLER · SEATTLE, WA. 1491 · STATE OF OREGON

BUILDING W5
99XX SW Boeckman Rd.
Wilsonville, OR 97070

EXTERIOR ELEVATIONS

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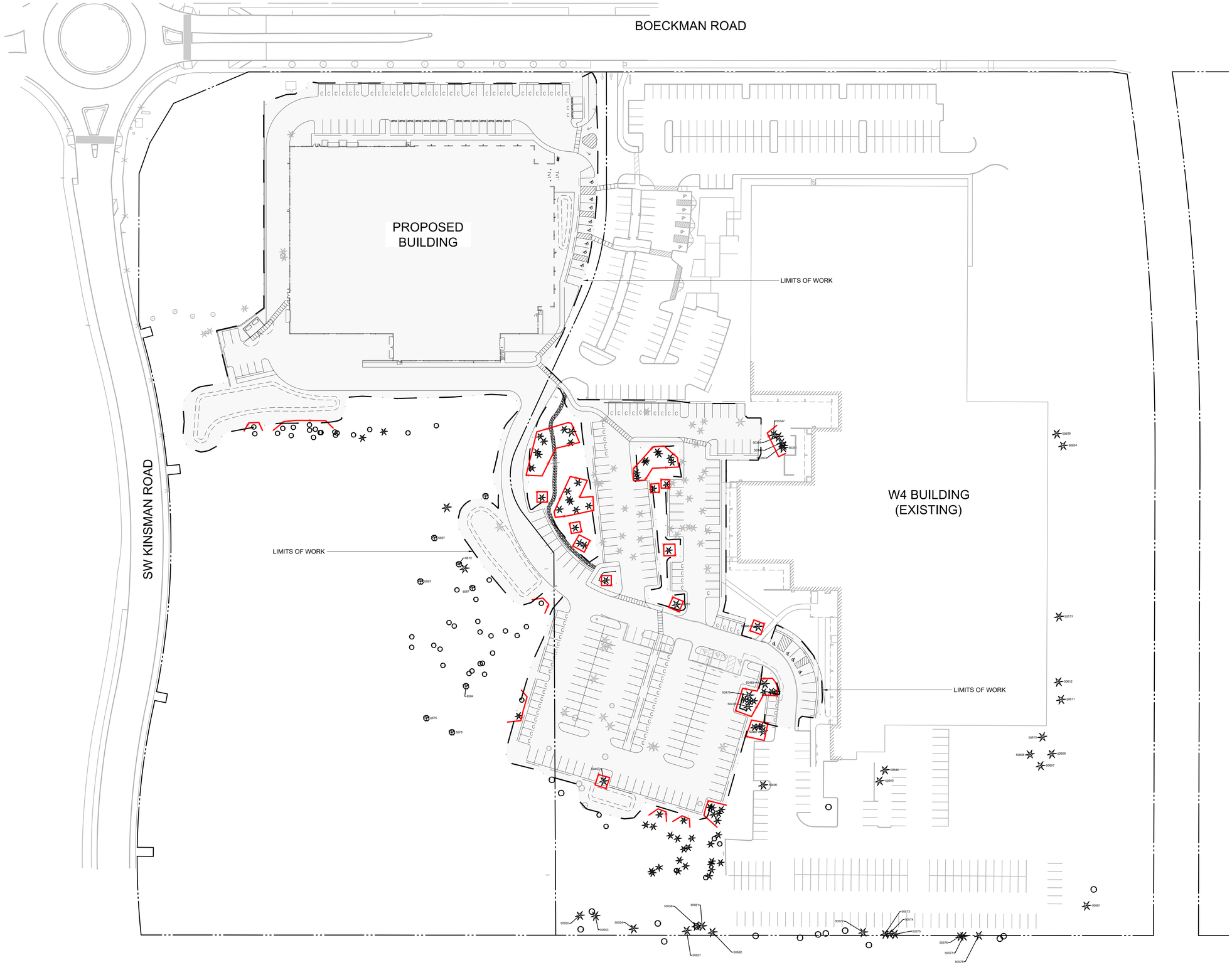
sheet
A3.0



1 C1.01 TREE PROTECTION PLAN

50 0 25 50 100 200

(IN FEET)
1 inch = **50** ft.

TREE PROTECTION FENCING

- TREE FENCING FABRIC SHALL BE ATTACHED TO POSTS 8'-10' ON CENTER PER PROJECT ARBORIST DIRECTION
- WHERE TREES ARE ENCLOSED, LEAVE 3' ACCESS OPEN FOR INSPECTIONS AND MAINTENANCE
- ANY WORK WITHIN DRIPLINE OF TREES OR TREE PROTECTION AREAS SHOULD BE UNDER DIRECTION OF PROJECT ARBORIST
- SEE ARBORIST REPORT FOR FURTHER DIRECTION

THE SURVEY INFORMATION SHOWN AS A BACKGROUND SCREEN ON THIS SHEET IS SHOWN FOR REFERENCE ONLY AND IS BASED ON A SURVEY BY: ANDY PARIS & ASSOCIATES, INC. DATE: 08/23/2022

Architecture ▪ Interiors
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Vancouver, WA
360.695.7879
Seattle, WA
206.749.9993
www.mcknze.com

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Client
MARTIN DEVELOPMENT

P.O. BOX 15523
SEATTLE, WA 98115

Project
W-5

9600 BOECKMAN ROAD
WILSONVILLE, OR 97070

REGISTERED PROFESSIONAL ENGINEER
91697
OREGON
JAN. 10, 2017
GREGORY I. MINO
EXPIRES: 12/31/22

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REVISION SCHEDULE

Delta	Issued As	Issue Date

SHEET TITLE:
TREE PROTECTION PLAN

DRAWN BY: VSN

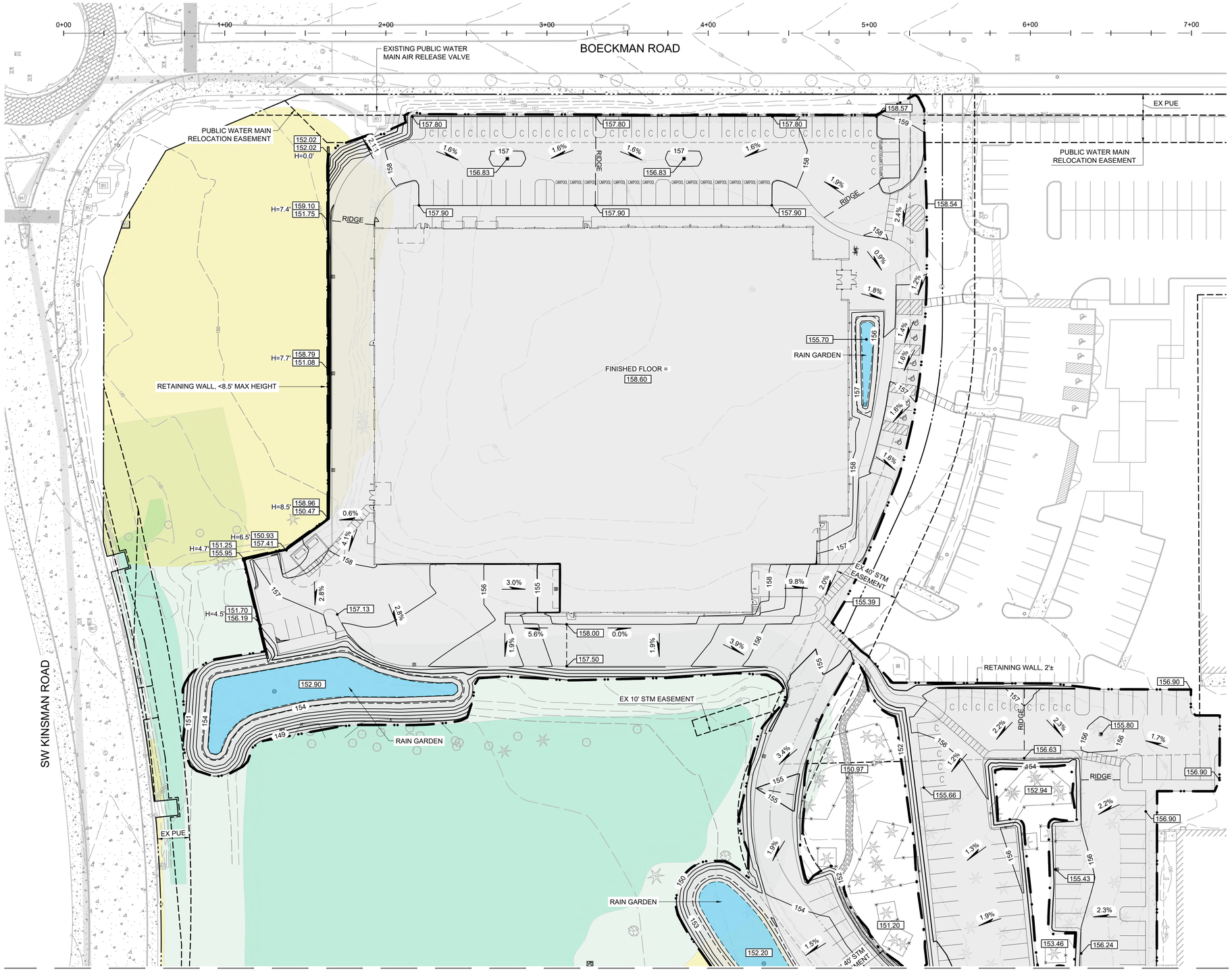
CHECKED BY:GIM

SHEET:
C1.01

JOB NO. **2210115.00**

LAND USE SUBMITTAL #3 - 11/11/2022

221011500\DRAWINGS\CIVIL\115-C1.01.DWG VSN 11/10/22 18:20 1:50



SEE SHEET C1.21

SROZ ENCROACHMENT SUMMARY

TOTAL SROZ AREA (INCL. WETLAND & BUFFERS):	308,000 SF
TOTAL SROZ ENCROACHMENT:	35,500 SF (11.5%)
EXEMPT FIRE LANE ENCROACHMENT (INCL. GRADING):	18,000 SF
EXEMPT STORMWATER ENCROACHMENT (INCL. GRADING):	13,000 SF
NET SROZ ENCROACHMENT:	4,500 SF (1.5%)

LEGEND

	EXISTING	PROPOSED
CATCH BASIN	▤	■
STORM MANHOLE	Ⓘ	
WETLAND		
50' WETLAND BUFFER		
SIGNIFICANT RESOURCE OVERLAY ZONE (SROZ)		
PR STORMWATER AREA		
PROPOSED LIMITS OF DEVELOPMENT		

1 C1.20 GRADING PLAN - NORTH

30 0 15 30 60 120

(IN FEET)
1 inch = **30** ft.

THE SURVEY INFORMATION SHOWN AS A BACKGROUND SCREEN ON THIS SHEET IS SHOWN FOR REFERENCE ONLY AND IS BASED ON A SURVEY BY: ANDY PARIS & ASSOCIATES, INC. DATE: 08/23/2022

M.
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REVISION SCHEDULE

Delta	Issued As	Issue Date

SHEET TITLE:
GRADING PLAN - NORTH

DRAWN BY: BTC

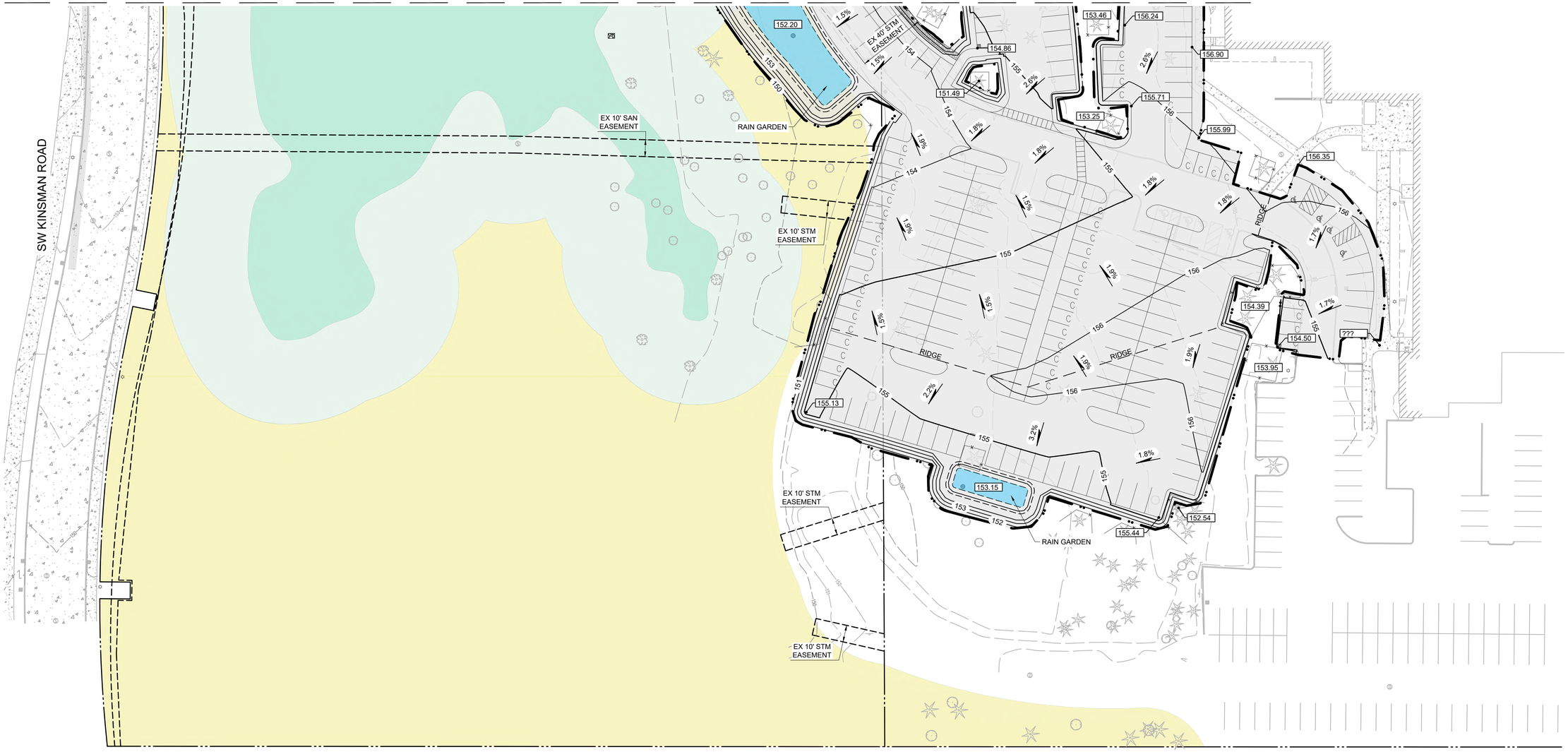
CHECKED BY:GIM

SHEET:
C1.20

JOB NO. **2210115.00**

LAND USE SUBMITTAL #3 - 11/11/2022

SEE SHEET C1.20



1 C1.21 GRADING PLAN - SOUTH

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

LEGEND

	EXISTING	PROPOSED
CATCH BASIN	▤	▪
STORM MANHOLE	Ⓘ	
WETLAND		
50' WETLAND BUFFER		
SIGNIFICANT RESOURCE OVERLAY ZONE (SROZ)		
PR STORMWATER AREA		
PROPOSED LIMITS OF DEVELOPMENT		

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REVISION SCHEDULE

Delta	Issued As	Issue Date

SHEET TITLE:
GRADING PLAN - SOUTH

DRAWN BY: BTC

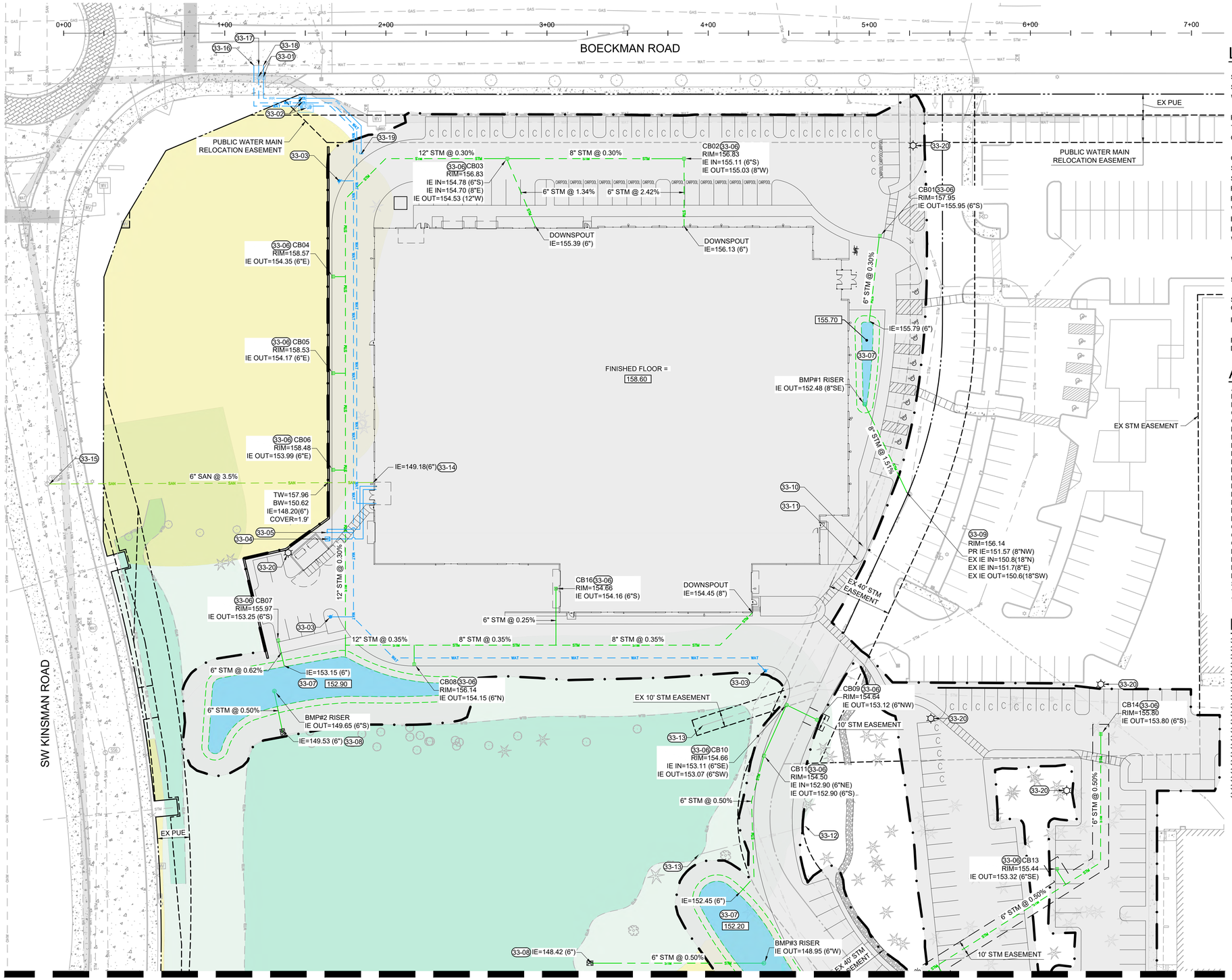
CHECKED BY:GIM

SHEET:
C1.21

JOB NO. **2210115.00**

LAND USE SUBMITTAL #3 - 11/11/2022

2210115\00\DRAWINGS\CIVIL\115-C1.20X.DWG VSN 11/10/22 18:20 1:30



SEE SHEET C1.31

1 C1.30 UTILITY PLAN - NORTH

30 0 15 30 60 120

(IN FEET)
1 inch = **30** ft.

THE SURVEY INFORMATION SHOWN AS A BACKGROUND SCREEN ON THIS SHEET IS SHOWN FOR REFERENCE ONLY AND IS BASED ON A SURVEY BY: ANDY PARIS & ASSOCIATES, INC. DATE: 08/23/2022

LEGEND

	EXISTING	PROPOSED
STORM LINE	STM	STM
SANITARY LINE	SAN	SAN
WATER LINE	WAT	WAT
		WAT
POWER LINE	PWR	
TELECOMMUNICATION LINE	TEL	
CATV LINE	TV	
CATCH BASIN		
STORM MANHOLE		
SANITARY MANHOLE		
FIRE HYDRANT		
FIRE DEPARTMENT CONNECTION	FDC	
WATER METER		
BACKFLOW PREVENTER		RPZ
POST INDICATOR VALVE		
WATER VALVE	WAT	
WETLAND		
50' WETLAND BUFFER		
SIGNIFICANT RESOURCE OVERLAY ZONE (SROZ)		
PR STORMWATER AREA		
PROPOSED LIMITS OF DEVELOPMENT		

ABBREVIATIONS

AC	ASPHALT CONCRETE
BMP	BEST MANAGEMENT PRACTICE
BW	BOTTOM OF WALL
CB	CATCH BASIN
CO	CLEANOUT
DI	DUCTILE IRON
DW	DOMESTIC WATER
EX	EXISTING
FDC	FIRE DEPARTMENT CONNECTION
FF	FINISH FLOOR
FG	FINISHED GRADE ELEVATION
FH	FIRE HYDRANT
FW	FIRE WATER
IE	INVERT ELEVATION
MH	MANHOLE
MJ	MECHANICAL JOINT
NTS	NOT TO SCALE
OC	ON CENTER
ODOT	OREGON DEPARTMENT OF TRANSPORTATION
OSHA	OREGON STATE HEALTH AUTHORITY
PR	PROPOSED
RD	ROOF DRAIN
RIM	RIM ELEVATION
ROW	RIGHT OF WAY
SAN	SANITARY SEWER
TW	TOP OF WALL
TYP	TYPICAL

KEYNOTES

33-01	WATER METER
33-02	BACKFLOW PREVENTER
33-03	FIRE HYDRANT
33-04	FIRE DEPARTMENT CONNECTION
33-05	POST INDICATOR VALVE
33-06	CATCH BASIN
33-07	STORMWATER MANAGEMENT FACILITY, SEE 2/C1.31
33-08	STORM OUTFALL WITH RIP RAP PROTECTION
33-09	CONNECT TO EXISTING STORM MANHOLE
33-10	ADJUST EXISTING UTILITY BOXES TO GRADE AS REQUIRED
33-11	RELOCATE EXISTING SITE LIGHT
33-12	EXISTING STORM CULVERT
33-13	EXISTING STORM OUTFALL
33-14	SANITARY BUILDING CONNECTION
33-15	CONNECT TO EXISTING SANITARY MANHOLE
33-16	FIRE WATER CONNECTION
33-17	DOMESTIC WATER CONNECTION
33-18	IRRIGATION WATER CONNECTION
33-19	IRRIGATION STUB
33-20	SITE LIGHT

Item 2.

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Client
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SEATTLE, WA 98115

Project
W-5

9600 BOECKMAN ROAD
WILSONVILLE, OR 97070

REGISTERED PROFESSIONAL ENGINEER
91897
OREGON
JAN. 10, 2017
GREGORY I. MIMO
EXPIRES: 12/31/22

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REVISION SCHEDULE

Delta	Issued As	Issue Date

SHEET TITLE:
UTILITY PLAN - NORTH

DRAWN BY: BTC

CHECKED BY:GIM

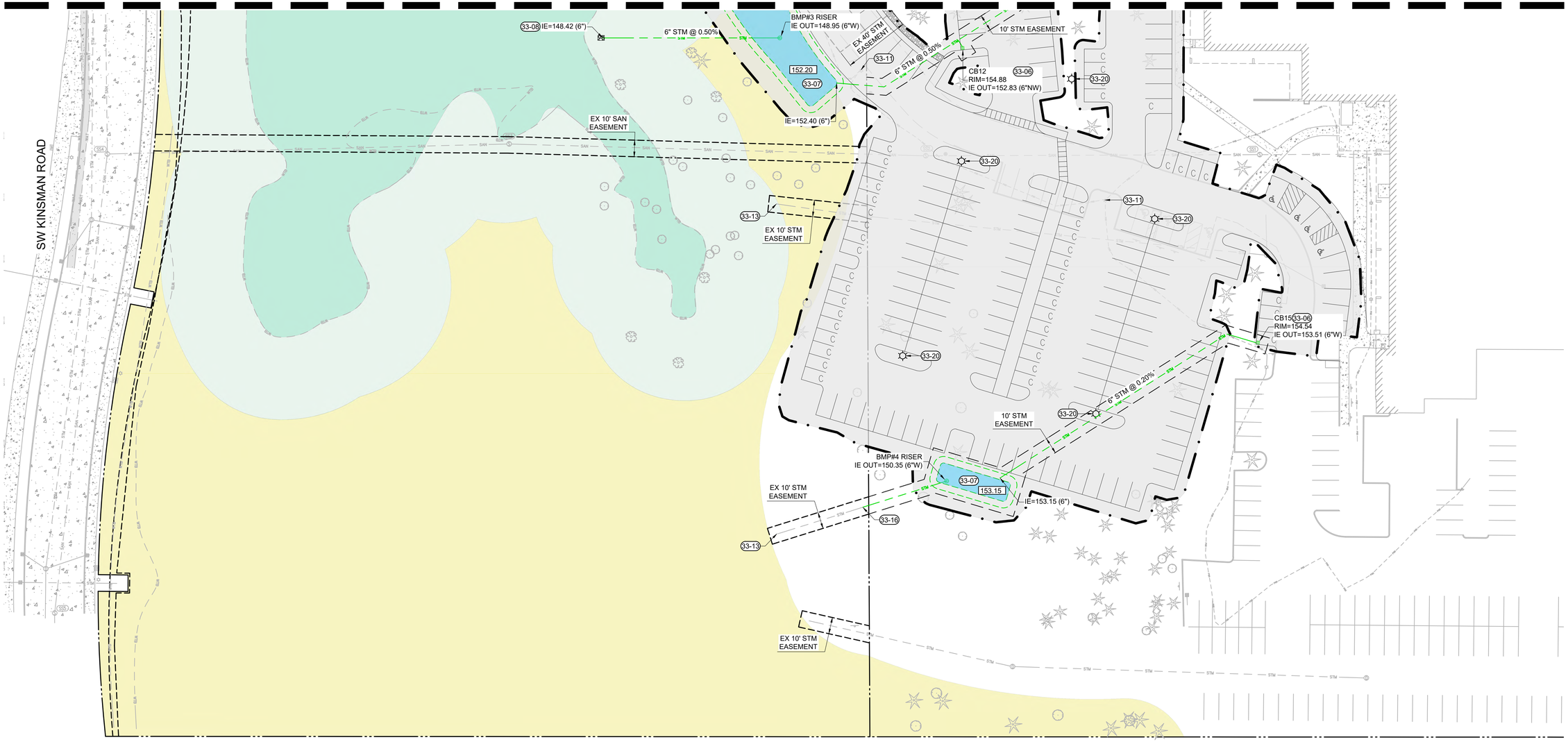
SHEET:
C1.30

JOB NO. **2210115.00**

LAND USE SUBMITTAL #3 - 11/11/2022

2210115.00 C:\TEMP\ACPUBLISH_640\115-C1.30X.DWG VSN 12/07/22 14:02 1:30

SEE SHEET C1.30



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REVISION SCHEDULE

Delta	Issued As	Issue Date

SHEET TITLE:
UTILITY PLAN - SOUTH

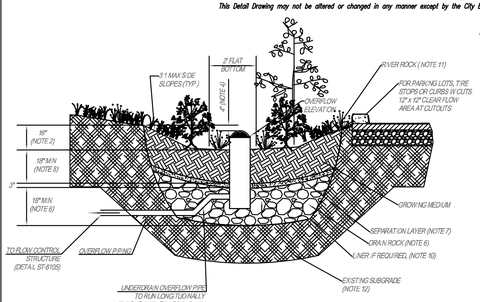
DRAWN BY: BTC

CHECKED BY:GIM

SHEET:
C1.31

JOB NO. **2210115.00**

This Detail Drawing may not be altered or changed in any manner except by the City Engineer. It is the responsibility of the user to acquire the most current version.



GENERAL NOTES:
1. PROVIDE PROTECTION FROM ALL VEHICLE TRAFFIC, EQUIPMENT STAGING, AND FOOT TRAFFIC IN PROPOSED INFILTRATION AREAS PRIOR TO, DURING AND AFTER CONSTRUCTION. UNLESS REQUIRED BY SITE CONDITIONS, UNLINED RAIN GARDENS ARE PREFERRED TO MAXIMIZE ONSITE INFILTRATION.
2. **DIMENSIONS:**
   -DEPTH OF BASIN (FROM TOP OF GROWING MEDIUM TO OVERFLOW ELEVATION); 12"
   -FLAT BOTTOM WIDTH: 2' MINIMUM
   -SIDE SLOPES OF RAIN GARDEN: 3:1 MAXIMUM
   -CENTERLINE SLOPE OF RAIN GARDEN: 0.5% OR LESS
3. **SETBACKS:**
   -FILTRATION RAIN GARDEN SHALL BE 10' FROM FOUNDATIONS AND 5' FROM PROPERTY LINES UNLESS APPROVED BY BUILDING OFFICIAL
4. **OVERFLOW:**
   -OVERFLOW REQUIRED. INLET ELEVATION SHALL ALLOW FOR 4" OF FREEBOARD, MINIMUM.
   - PROTECT FROM DEBRIS AND SEDIMENT WITH STRAINER OR GRATE.
5. **PIPING:**
   -PERFORATED UNDER-DRAIN PIPING: SHALL RUN LONGITUDINALLY THROUGH LENGTH OF FACILITY, SHALL BE ABS SCH. 40, CAST IRON, OR PVC SCH.40. MINIMUM DIAMETER IS 6". PIPING SHALL HAVE 1% GRADE AN FOLLOW THE UNIFORM PLUMBING CODE. PVC NOT ALLOWED ABOVE GROUND. WRAP UNDER-DRAIN IN FILTER FABRIC TO REDUCE TRANSPORT OF FINES. OVERFLOW PIPING: SHALL BE ABS SCH. 40, CAST IRON, OR PVC SCH. 40 AND SHALL NOT BE PERFORATED. MINIMUM DIAMETER IS 6". PIPING SHALL HAVE 1% GRADE AND FOLLOW THE UNIFORM PLUMBING CODE. PVC NOT ALLOWED ABOVE GROUND.
6. **DRAIN ROCK:**
   -SIZE: 1 1/2" TO 3/4" -0 WASHED
   -DEPTH: 18" MINIMUM
7. SEPARATION BETWEEN DRAIN ROCK AND GROWING MEDIUM: SHALL BE A 3" LAYER OF 3/4" - 1/4" OPEN GRADED AGGREGATE.
8. **GROWING MEDIUM:**
   -DEPTH: 18" MINIMUM.
   -SEE APPENDIX A FOR SPECIFICATION OR USE SAND/LOAM/COMPOST 3-WAY MIX.
   -FACILITY SURFACE AREA MAY BE REDUCED BY 25% WHEN GROWING MEDIA DEPTH IS INCREASED TO 30" OR MORE.
9. VEGETATION: FOLLOW LANDSCAPE PLANS OR REFER TO PLANTING REQUIREMENTS IN APPENDIX A.
10. WATERPROOF LINER (IF REQUIRED): SHALL BE 30 MIL PVC OR EQUIVALENT.
11. INSTALL RIVER ROCK SPLASH PAD OVER A NON WOVEN GEO TEXTILE FABRIC TO TRANSITION FROM INLETS TO GROWING MEDIUM. SIZE OF ROCK SHALL BE 1' – 3', 4 SQUARE FEET, 6" DEEP.
12. **SEASONAL HIGH GROUNDWATER SEPARATION:**
   -SEPARATION DISTANCE AS REQUIRED BY CITY.

2 / C1.31

Rain Garden - Filtration			CITY OF WILSONVILLE
DRAWING NUMBER: ST-6020	DRAWN BY: SR	SCALE: N.T.S.	PUBLIC WORKS STANDARDS
FILE NAME: ST-6020.DWG	APPROVED BY: NK	DATE: 4/16/18	

THE SURVEY INFORMATION SHOWN AS A BACKGROUND SCREEN ON THIS SHEET IS SHOWN FOR REFERENCE ONLY AND IS BASED ON A SURVEY BY: ANDY PARIS & ASSOCIATES, INC. DATE: 08/23/2022

1 / C1.31 UTILITY PLAN - SOUTH

30 0 15 30 60 120

(IN FEET)
1 inch = **30** ft.

KEYNOTES

33-01	WATER METER
33-02	BACKFLOW PREVENTER
33-03	FIRE HYDRANT
33-04	FIRE DEPARTMENT CONNECTION
33-05	POST INDICATOR VALVE
33-06	CATCH BASIN
33-07	STORMWATER MANAGEMENT FACILITY, SEE 2/C1.31
33-08	STORM OUTFALL WITH RIP RAP PROTECTION
33-09	CONNECT TO EXISTING STORM MANHOLE
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33-17	DOMESTIC WATER CONNECTION
33-18	IRRIGATION WATER CONNECTION
33-19	IRRIGATION STUB
33-20	SITE LIGHT

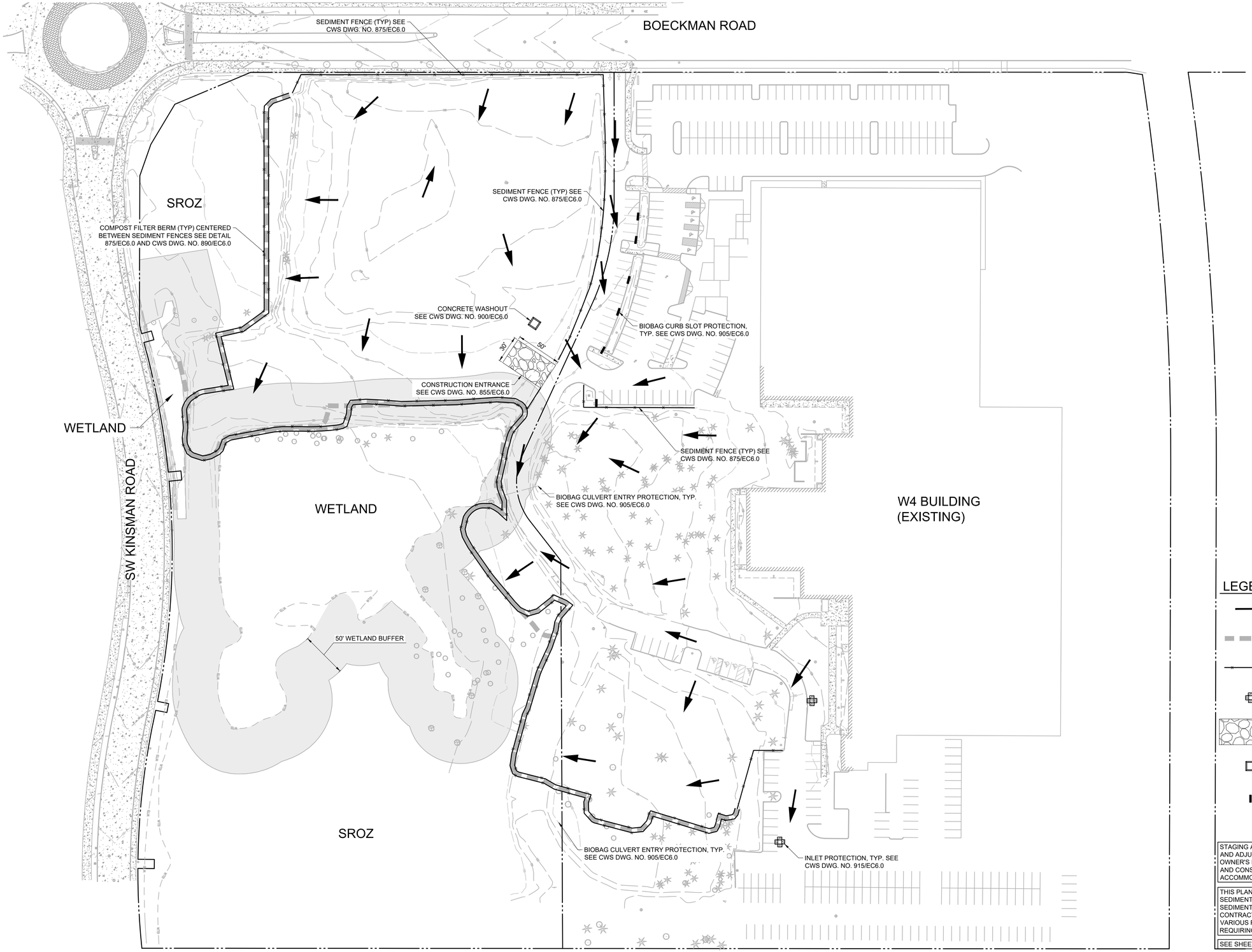
LEGEND

	EXISTING	PROPOSED
STORM LINE	STM	STM
SANITARY LINE	SAN	SAN
WATER LINE	WAT	WAT
POWER LINE	PWR	
TELECOMMUNICATION LINE	TEL	
CATV LINE	TV	
CATCH BASIN		
STORM MANHOLE		
SANITARY MANHOLE		
FIRE HYDRANT		
FIRE DEPARTMENT CONNECTION	FDC	FDC
WATER METER		
BACKFLOW PREVENTER		BUPA
POST INDICATOR VALVE		
WATER VALVE	WAT	
WETLAND	WDC	
50' WETLAND BUFFER		
SIGNIFICANT RESOURCE OVERLAY ZONE (SROZ)		
PR STORMWATER AREA		
PROPOSED LIMITS OF DEVELOPMENT		

ABBREVIATIONS

AC	ASPHALT CONCRETE
BMP	BEST MANAGEMENT PRACTICE
BW	BOTTOM OF WALL
CB	CATCH BASIN
CO	CLEANOUT
DI	DUCTILE IRON
DW	DOMESTIC WATER
EX	EXISTING
FDC	FIRE DEPARTMENT CONNECTION
FF	FINISH FLOOR
FG	FINISHED GRADE ELEVATION
FH	FIRE HYDRANT
FW	FIRE WATER
IE	INVERT ELEVATION
MH	MANHOLE
MJ	MECHANICAL JOINT
NTS	NOT TO SCALE
OC	ON CENTER
ODOT	OREGON DEPARTMENT OF TRANSPORTATION
OSHA	OREGON STATE HEALTH AUTHORITY
PR	PROPOSED
RD	ROOF DRAIN
RIM	RIM ELEVATION
ROW	RIGHT OF WAY
SAN	SANITARY SEWER
TW	TOP OF WALL
TYP	TYPICAL

LAND USE SUBMITTAL #3 - 11/11/2022



1 EC2.0

CLEARING AND DEMOLITION EROSION AND SEDIMENT CONTROL PLAN

50 0 25 50 100 200

(IN FEET)
1 inch = **50** ft.

THE SURVEY INFORMATION SHOWN AS A BACKGROUND SCREEN ON THIS SHEET IS SHOWN FOR REFERENCE ONLY AND IS BASED ON A SURVEY BY: ANDY PARIS & ASSOCIATES, INC. DATE: 08/23/2022

LEGEND

- EXISTING DRAINAGE FLOW DIRECTION
- COMPOST FILTER BERM
- SEDIMENT FENCE/STRAW WATTLE
- INLET PROTECTION
- GRAVEL CONSTRUCTION ENTRANCE
- CONCRETE WASHOUT
- BIOBAG CURB SLOT PROTECTION

STAGING AND STOCKPILE AREAS ARE TO BE DETERMINED BY THE CONTRACTOR AND ADJUSTED TO ACCOMMODATE THE PROGRESS OF CONSTRUCTION. THE OWNER'S EROSION CONTROL INSPECTOR SHALL BE MADE AWARE OF ALL CHANGES AND CONSULTED FOR BMP IMPLEMENTATIONS THAT MAY BE NECESSARY TO ACCOMMODATE THE SELECTED LOCATIONS.

THIS PLAN IS INTENDED TO BE ONLY A BASELINE APPROACH TO EROSION AND SEDIMENT CONTROL FOR THE PROJECT SITE. THE OWNER'S EROSION AND SEDIMENT CONTROL INSPECTOR SHALL BE RESPONSIBLE FOR INSTRUCTING THE CONTRACTOR TO ADJUST BMP'S AS NECESSARY TO PROPERLY MANAGE THE VARIOUS PHASES OF CONSTRUCTION AND ANY UNFORESEEN CONDITIONS REQUIRING DIFFERENT OR ADDITIONAL BMP'S TO MANAGE.

SEE SHEETS EC6.0 FOR EROSION AND SEDIMENT CONTROL DETAILS

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Project
W-5

9600 BOECKMAN ROAD
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REGISTERED PROFESSIONAL ENGINEER
91697
OREGON
JAN. 10, 2017
GREGORY I. MINO
EXPIRES: 12/31/22

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REVISION SCHEDULE

Delta	Issued As	Issue Date

SHEET TITLE:
CLEARING AND DEMOLITION EROSION AND SEDIMENT CONTROL PLAN

DRAWN BY: VSN

CHECKED BY:GIM

SHEET:
EC2.0

JOB NO. **2210115.00**

LAND USE SUBMITTAL #3 - 11/11/2022

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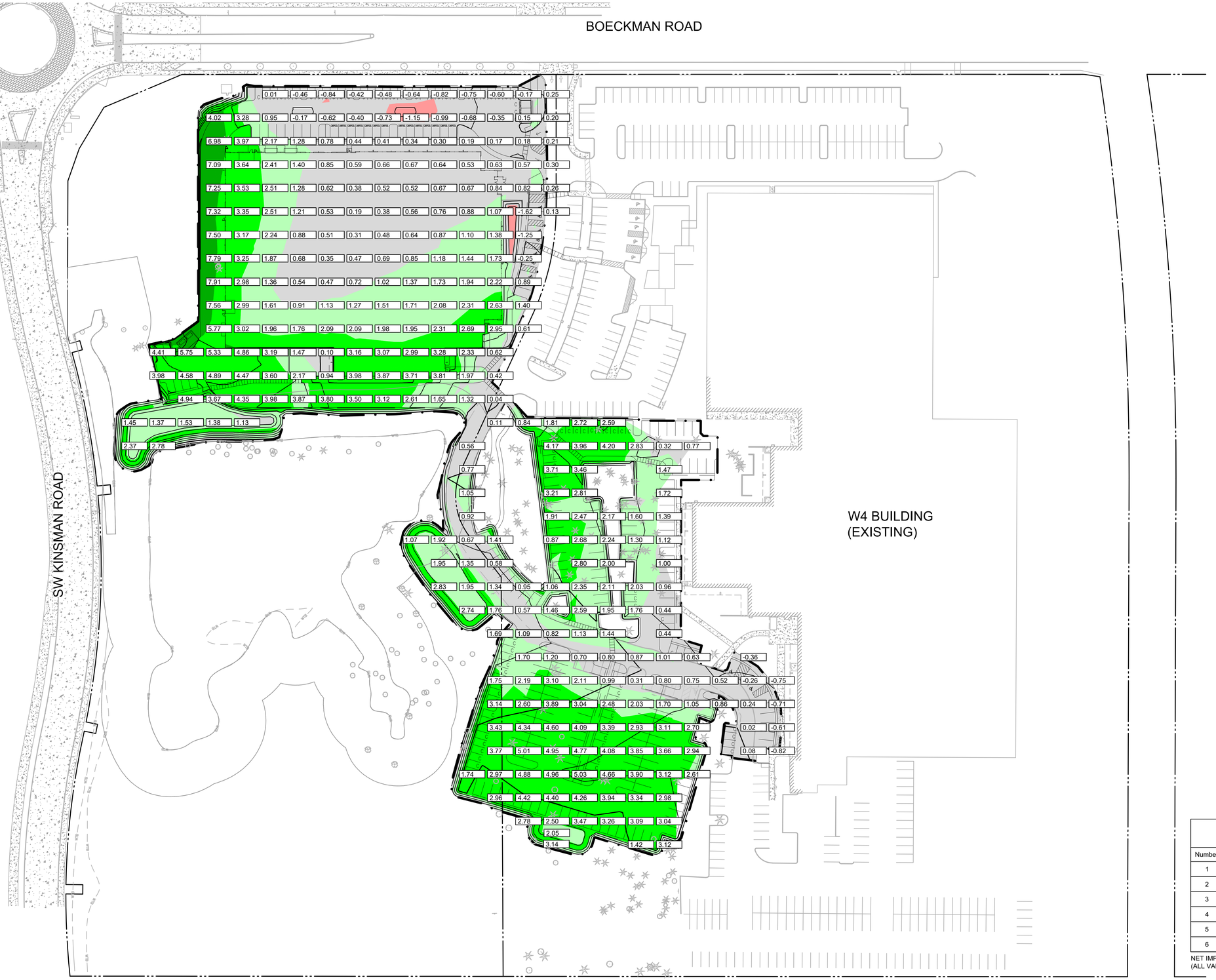

1 CUT/FILL MAP

50 0 25 50 100 200

(IN FEET)
1 inch = **50** ft.

Elevations Table

Number	Minimum Elevation	Maximum Elevation	Area	Color
1	-3.53	-2.00	0.00	
2	-2.00	-1.00	1925.50	
3	-1.00	1.00	85015.20	
4	1.00	2.50	68653.55	
5	2.50	5.50	80403.63	
6	5.50	8.60	5442.91	

NET IMPORT = APPROXIMATELY 17,000 CY
(ALL VALUES LISTED HEREON ARE APPROXIMATE, RAW AND UNADJUSTED)

THE SURVEY INFORMATION SHOWN AS A BACKGROUND SCREEN ON THIS SHEET IS SHOWN FOR REFERENCE ONLY AND IS BASED ON A SURVEY BY: ANDY PARIS & ASSOCIATES, INC. DATE: 08/23/2022

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91697
OREGON
JAN. 10, 2017
GREGORY I. MINO
EXPIRES: 12/31/22

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REVISION SCHEDULE

Delta	Issued As	Issue Date

SHEET TITLE:
CUT/FILL MAP

DRAWN BY: VSN

CHECKED BY: GIM

SHEET:

JOB NO. **2210115.00**

LAND USE SUBMITTAL #3 - 11/11/2022

2210115\00\DRAWINGS\CIVIL\EXHIBITS\115-EARTHWORK.DWG VSN 10/19/22 10:12 1:50

OTTEN + ASSOCIATES
LANDSCAPE ARCHITECTURE

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Portland, OR, 97239
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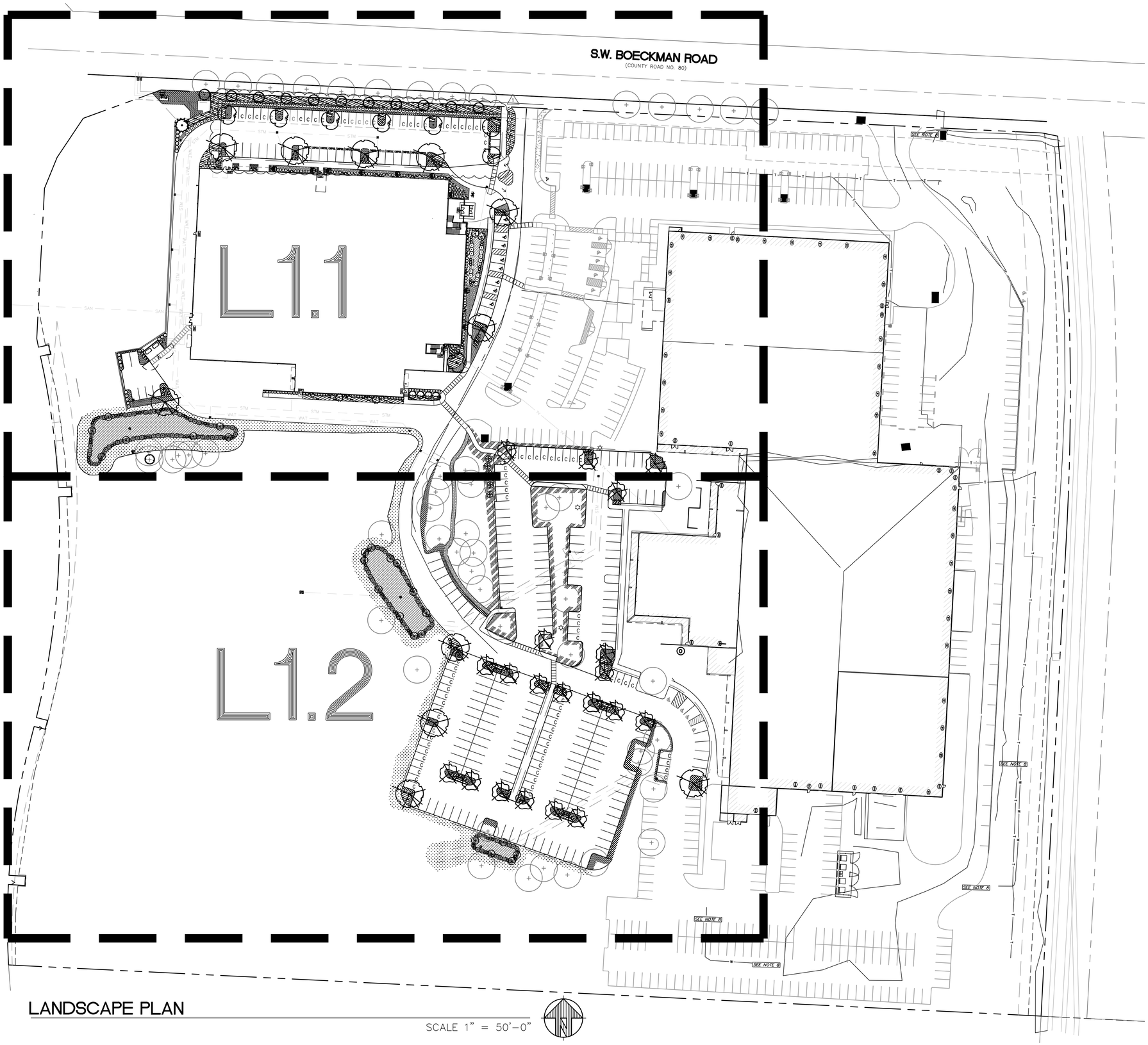
S.W. BOECKMAN ROAD
(COUNTY ROAD NO. 80)



LANDSCAPE PLAN

SCALE 1" = 50'-0"

GENERAL NOTES:
1. Contractor is to verify all plant quantities.
2. Adjust plantings in the field as necessary.
3. Project is to be irrigated by an automatic, underground system, which will provide full coverage for all plant material. System is to be design/ build by Landscape Contractor. Guarantee system for a minimum one year. Show drip systems as alternate bid only.
4. All plants are to be fully foliaged, well branched and true to form.
5. Contractor is to notify Landscape Architect or Owner's Representative of any site changes or unforeseen conditions that may be detrimental to plant health, or cause future problems to any structural elements of the project.

no.	revision	date
1	REVISED PARKING LOT	7-7-2022
2	LAND USE SUBMITTAL #3	11-11-2022

18003 job no.
MPL drawn
EH checked
07-07-22 date

REGISTERED
LA793
ERIN HOLSONBACK
OREGON
5/10/2019
EXP. 5/31/23
LANDSCAPE ARCHITECT

BUILDING W5
9900 SW Boeckman Rd.
Wilsonville, OR 97070

LANDSCAPE PLAN

LANGE MUELLER & ASSOCIATES
ARCHITECTS AIA
130 LAKESIDE • SUITE 250 • SEATTLE, WA 98122 • (206) 325-2553

sheet
L1.0

PLANT LEGEND: GENERAL LANDSCAPING

SYMBOL	QTY.	SUGGESTED PLANT SPECIES	SIZE	SPACING	WATER USAGE
TREES					
	8	ACER PALMATUM 'BLOODGOOD' Japanese Maple	2" cal.	As Shown	MEDIUM
	11	ACER RUBRUM 'RED SUNSET' Red Sunset Red Maple	2" cal.	As Shown	MEDIUM
	6	MAGNOLIA GRANDIFLORA 'TEDDY BEAR' Teddy Bear Southern Magnolia	6' ht.	As Shown	LOW
	20	PARROTIA PERSICA Persian Ironwood	2" cal.	As Shown	LOW
2	11	CORNUS KOUSA 'SATOMI' Satomi Kousa Dogwood	2" cal.	As Shown	LOW
	9	CHAMAECYPARIS OBT. 'GRACILIS' Slender Hinoki Cypress	7–8' ht.	As Shown	MEDIUM
		EXISTING TREE TO REMAIN			
VINES					
A	17	HYDRANGEA PETIOLARIS Climbing Hydrangea	5 gal.	5' o.c.	MEDIUM
B	5	PARTHENOCISSUS TRICUSPIDATA Boston Ivy	5 gal.	5' o.c.	MEDIUM

SYMBOL	QTY.	SUGGESTED PLANT SPECIES	SIZE	SPACING	WATER USAGE
SHRUBS					
2	728	CORNUS SERICEA 'KELSEYI' Kelsey Dogwood	2 gal.	3' o.c.	MEDIUM
	100	ESCALLONIA EXONIENSIS 'FRADESII' Pink Princess Escallonia	5 gal.	4' o.c.	LOW
	116	EUONYMUS 'SILVER QUEEN' Silver Queen Euonymus	5 gal.	3' o.c.	LOW
	19	LIGUSTRUM JAPONICUM 'TEXANUM' Wax Leaf Privet	5 gal.	4' o.c.	LOW
	148	VIBURNUM DAVIDII David Virbunum	5 gal.	3' o.c.	LOW
	5	VIBURNUM PLI. 'SUMMER SNOWFLAKE' Summer Snowflake Viburnum	5 gal.	8' o.c.	MEDIUM
GROUNDCOVER					
	865	ARCTOSTAPHYLOS UVA–URSI "MASS." Massachusetts Kinnikinnick	1 gal.	3' o.c.	LOW
2	570	LIRIOPE SPICATA Creeping Lilyturf	1 gal.	18" o.c.	LOW
	743	MAHONIA REPENS Creeping Mahonia	1 gal.	3' o.c.	LOW
	60	POLYSTICHUM SETIFERUM Soft Shield Fern	1 gal.	2' o.c.	LOW
SEEDED AREAS					
	13,538 SF	ROUGH SEED See Specifications	1 gal.	3' o.c.	MEDIUM

PLANT LIST: STORM WATER PLANTERS

SYMBOL	QTY.	LATIN NAME/ COMMON NAME	SIZE	SPACING	WATER USAGE
2		LARGE SHRUBS			
4	25	ACER CIRCINATUM Vine Maple	30" ht.	As Shown	*LOW
	82	SPIRAEA DOUGLASII Douglas Spirea	30" ht.	As Shown	*LOW
		SMALL SHRUBS			
	95	MAHONIA AQUIFOLIUM Tall Mahonia	1 gal.	As Shown	*LOW
2	46	POLYSTICHUM MUNITUM Sword Fern	1 gal.	As Shown	*LOW
		HERBACEOUS PLANTS (Alternate double rows)			
	2,490	CAREX OBNUPTA Slough Sedge	Plugs	1' o.c.	*LOW
	2,490	JUNCUS PATENS Spreading Rush	Plugs	1' o.c.	*LOW
	2,490	SCIRPUS MICROCARPUS Small Fruit Bulrush	Plugs	1' o.c.	*LOW
		GROUNDCOVER			
	4,066	FRAGARIA CHILOENSIS Beach Strawberry	1 gal.	1' o.c.	*LOW

STORM WATER FACILITY REQUIREMENTS
Per City Of Wilsonville Design & Construction Standards

RAIN GARDEN 01
FACILITY AREA= 774 SF
ZONE 'S' AREA= 276 SF
HERBACEOUS PLANTS REQUIRED= 317
ZONE 'A' AREA= 498 SF
LARGE SHRUBS REQUIRED= 15
SMALL SHRUBS REQUIRED= 20
GROUNDCOVER REQUIRED=572

RAIN GARDEN 02
FACILITY AREA= 4,705 SF
ZONE 'S' AREA= 3,164 SF
HERBACEOUS PLANTS REQUIRED= 3,638
ZONE 'A' AREA= 1,541 SF
LARGE SHRUBS REQUIRED= 46
SMALL SHRUBS REQUIRED= 61
GROUNDCOVER REQUIRED=1,772

RAIN GARDEN 03
FACILITY AREA= 3,542 SF
ZONE 'S' AREA= 2,530 SF
HERBACEOUS PLANTS REQUIRED= 2,910
ZONE 'A' AREA= 1,012 SF
LARGE SHRUBS REQUIRED= 31
SMALL SHRUBS REQUIRED= 41
GROUNDCOVER REQUIRED= 1,164

RAIN GARDEN 04
FACILITY AREA= 1,011 SF
ZONE 'S' AREA= 526 SF
HERBACEOUS PLANTS REQUIRED= 605
ZONE 'A' AREA= 485 SF
LARGE SHRUBS REQUIRED= 15
SMALL SHRUBS REQUIRED= 20
GROUNDCOVER REQUIRED= 558

TREE NOTES
See Tree Plan & Arborist Report for Reference

MITIGATION:

MITIGATION/REPLACEMENT OF ANY TREES 6"OR LARGER REMOVED ON THE ENTIRE SITE ON A 1:1 BASIS.

EXISTING TREE CREDITS:

18 TO 24 INCHES IN DIAMETER: 3 TREE CREDITS
25 TO 31 INCHES IN DIAMETER: 4 TREE CREDITS
32 INCHES OR GREATER: 5 TREE CREDITS

INTERIOR PARKING LANDSCAPE &TREE REQUIREMENTS:

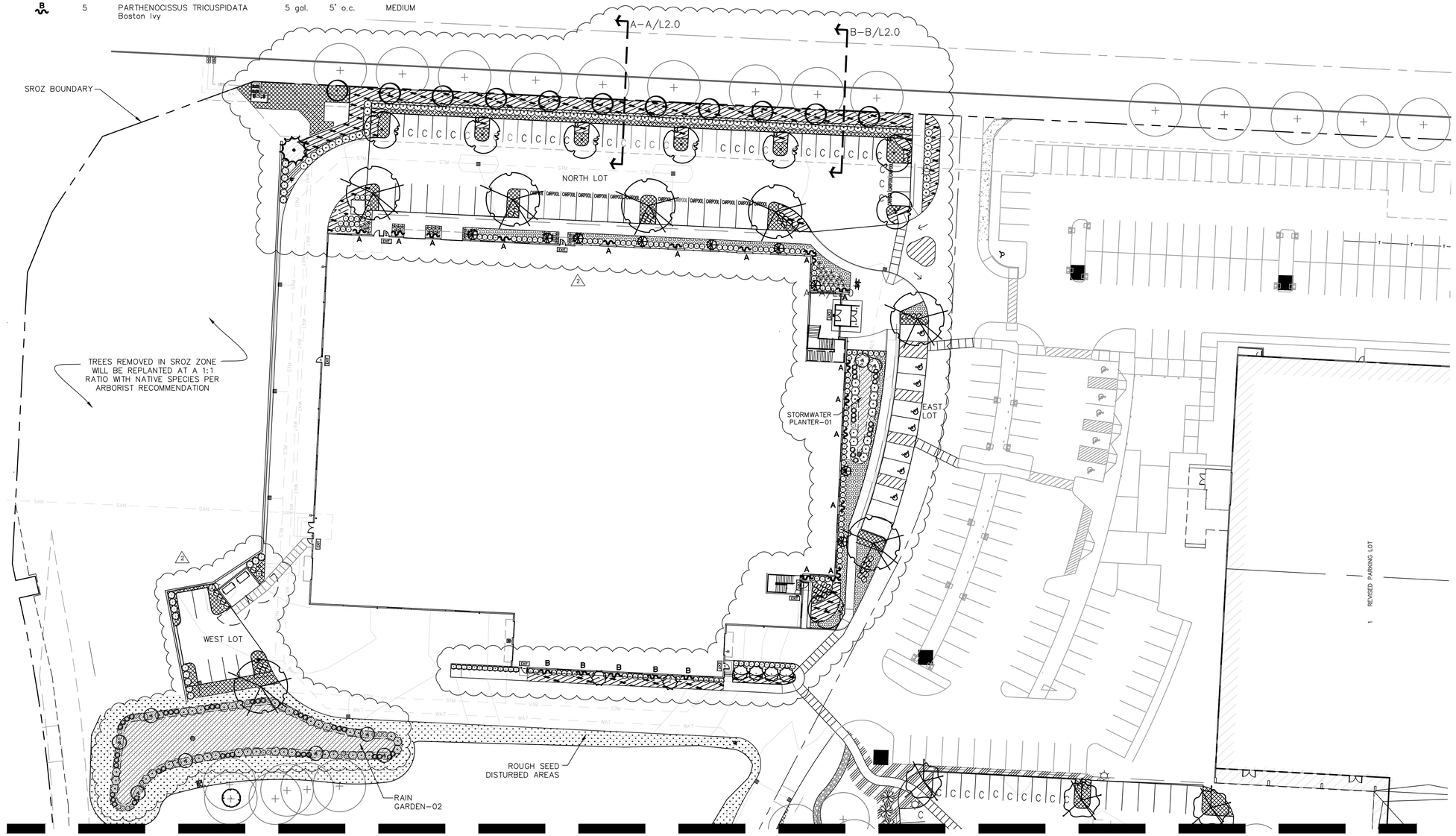
NORTH LOT–
TOTAL PARKING SPACES=56
PAVED AREA=15,150 SF
LANDSCAPE AREA REQUIRED (10%)=1,515 SF
PROPOSED LANDSCAPE AREA=3,013 SF
TREES REQUIRED (1 PER 6 SPACES)=9
EXISTING TREE CREDITS=0
NEW TREES PROPOSED=11

WEST LOT–
TOTAL PARKING SPACES=6
PAVED AREA=1,654 SF
LANDSCAPE AREA REQUIRED (10%)=165 SF
PROPOSED LANDSCAPE AREA=470 SF
TREES REQUIRED (1 PER 6 SPACES)= 1
EXISTING TREE CREDITS=0
NEW TREES PROPOSED=1

EAST LOT–
TOTAL PARKING SPACES= 10
PAVED AREA=1,925 SF
LANDSCAPE AREA REQUIRED (10%)=192 SF
PROPOSED LANDSCAPE AREA=284 SF
TREES REQUIRED (1 PER 6 SPACES)= 2
EXISTING TREE CREDITS= 0
NEW TREES PROPOSED= 2

SOUTH EAST LOT(1)–
TOTAL PARKING SPACES=94
PAVED AREA=24,451 SF
LANDSCAPE AREA REQUIRED (10%)=2,445 SF
PROPOSED LANDSCAPE AREA=8,489 SF
TREES REQUIRED (1 PER 6 SPACES)=16
EXISTING TREE CREDITS=30
–(1)35"DIA.=5 CREDITS
–(3)36"DIA.=15 CREDITS
–(2)41"DIA.=10 CREDITS
NEW TREES PROPOSED=7
TOTAL TREE CREDITS=37

SOUTH EAST LOT(2)–
TOTAL PARKING SPACES=146
PAVED AREA=37,913 SF
LANDSCAPE AREA REQUIRED (10%)=3,791 SF
PROPOSED LANDSCAPE AREA=3,821 SF
TREES REQUIRED (1 PER 6 SPACES)=24
EXISTING TREE CREDITS=15
–(2)24"DIA.=6 CREDITS
–(1)25" DIA.=4 CREDITS
–(1)35" DIA.=5 CREDITS
NEW TREES PROPOSED=16
TOTAL TREE CREDITS=31



MATCHLINE: SEE SHEET L1.2

ENLARGED LANDSCAPE PLAN

SCALE 1" = 30'–0"

OTTEN + ASSOCIATES
LANDSCAPE ARCHITECTURE
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Portland, OR, 97239
(503) 972-0311
www.ottenla.com

no.	revision	date
1	REVISED PARKING LOT	11–11–2022
2	LAND USE SUBMITTAL #3	12–7–2022

18003 job no.
MPL drawn
EH checked
07–07–22 date

REGISTERED LA793 ERIN HOLSONBACK OREGON 5/10/2013 EXP. 5/31/23 LANDSCAPE ARCHITECT

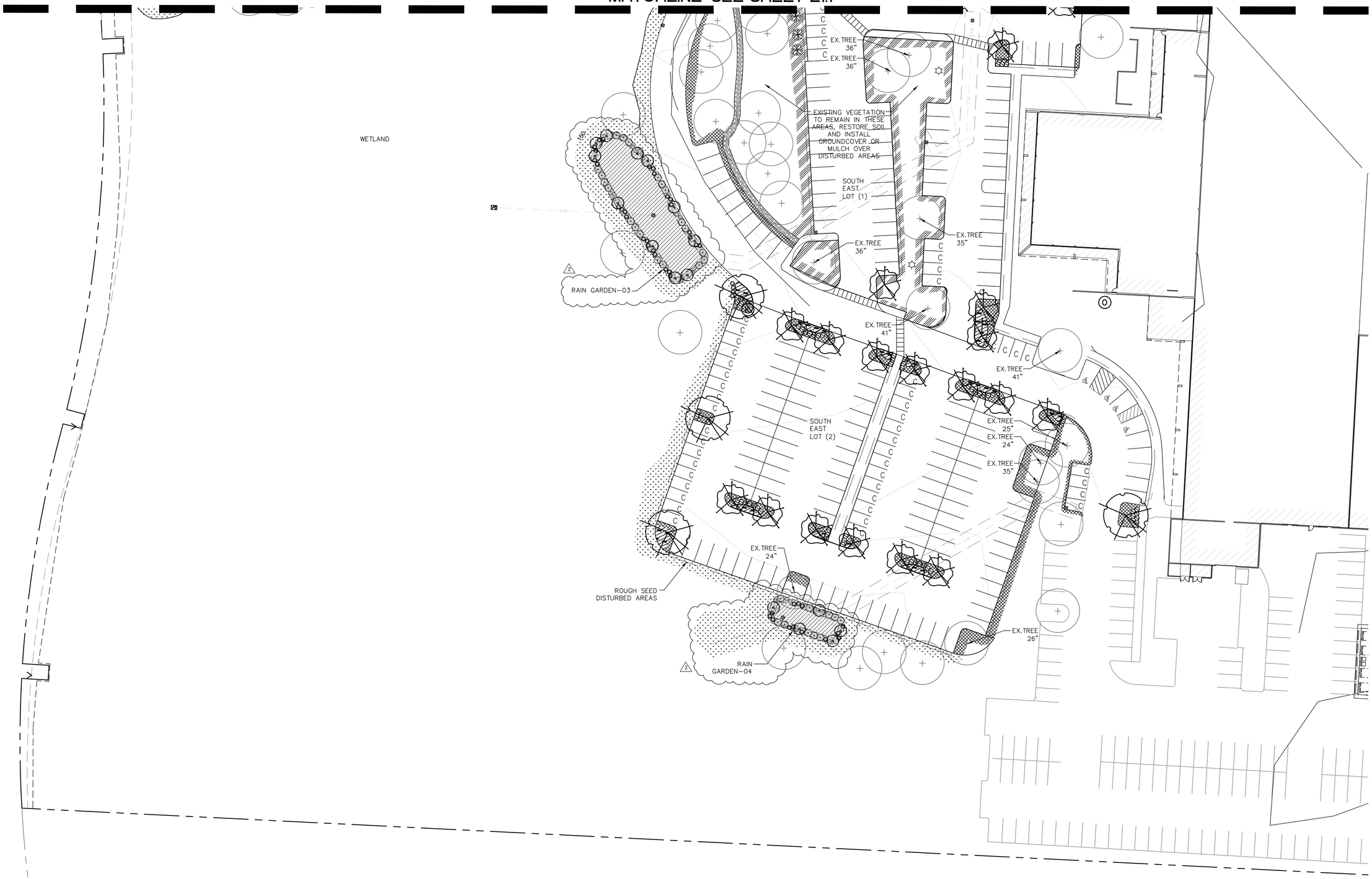
BUILDING W5
9900 SW Boeckman Rd.
Wilsonville, OR 97070

LANGE MUELLER & ASSOCIATES
ARCHITECTS AIA
130 LAKESIDE • SUITE 250 • SEATTLE, WA 98122 • (206) 325-2553

ENLARGED LANDSCAPE PLAN

sheet L1.1

OTTEN + ASSOCIATES
LANDSCAPE ARCHITECTURE
3933 South Kelly Avenue, Suite B
Portland, OR, 97239
(503) 972-0311
www.ottenla.com



ENLARGED LANDSCAPE PLAN

SCALE 1" = 30'-0"

no.	revision	date
2	LAND USE SUBMITTAL #3	11-11-2022
1	REVISED PARKING LOT	7-7-2022

18003 job no.
MPL drawn
EH checked
07-07-22 date

REGISTERED LANDSCAPE ARCHITECT
LA793
ERIN HOLSONBACK
OREGON
5/10/2013
EXP. 5/31/23

BUILDING W5
9900 SW Boeckman Rd.
Wilsonville, OR 97070

ENLARGED LANDSCAPE PLAN

LANCE MUELLER & ASSOCIATES
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sheet
L1.2

Item 2.

694

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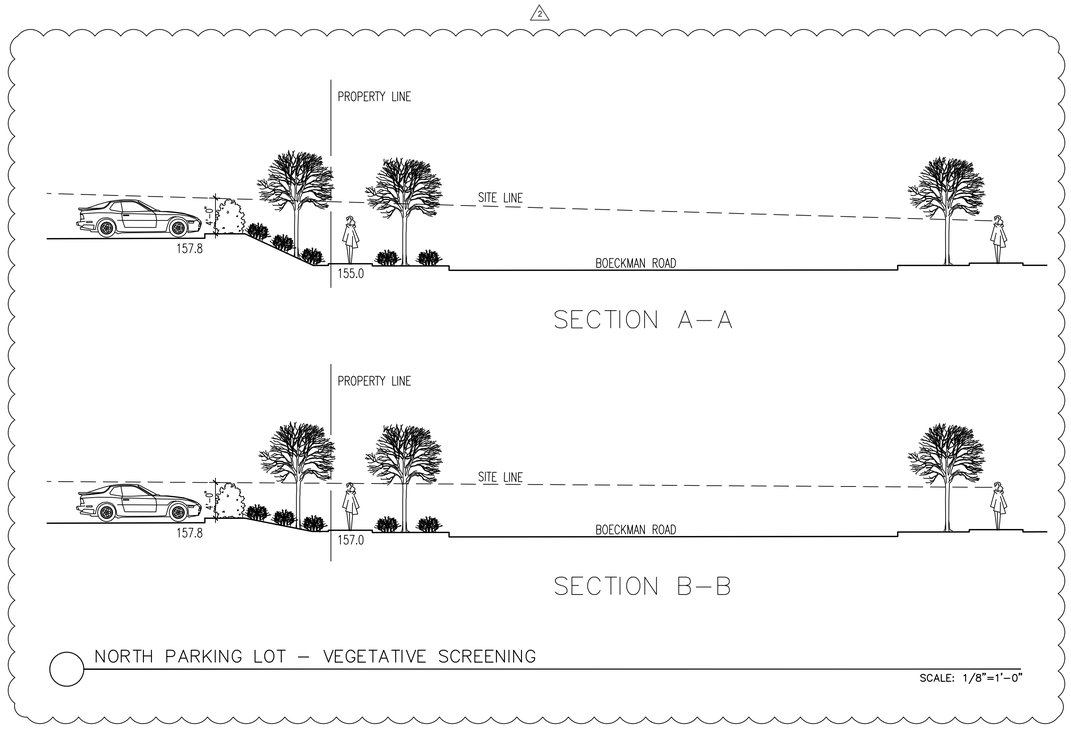
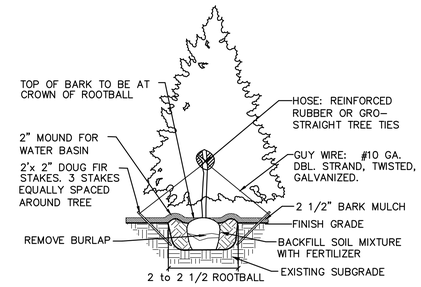


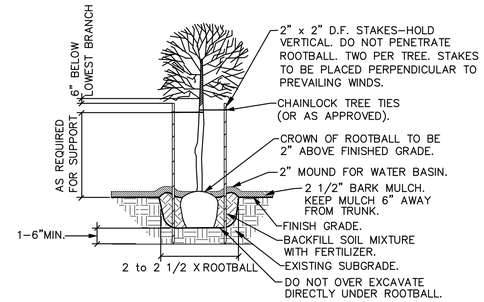
NORTH PARKING LOT – VEGETATIVE SCREENING

SCALE: 1/8"=1'-0"



EVERGREEN TREE STAKING DETAIL

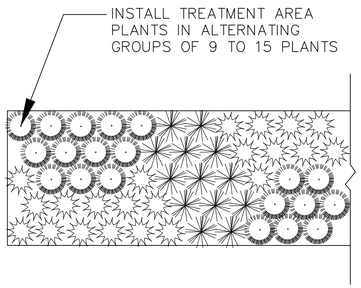
NOT TO SCALE



NOTE: ANY PROPOSED CHANGES TO OUR SPECIFICATION OR DETAIL SHOULD BE APPROVED BY THE LANDSCAPE ARCHITECT. LIKEWISE, IN ACCORDANCE WITH BEST PRACTICES OF LOCAL LANDSCAPE INSTALLATION, SHOULD THE LANDSCAPE CONTRACTOR FIND A PREFERRED ALTERNATE METHOD, THE LANDSCAPE ARCHITECT MAY BE SO ADVISED.

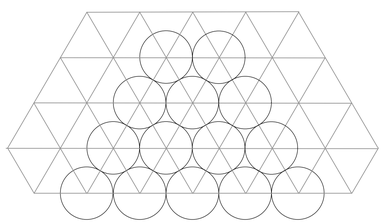
GENERAL DECIDUOUS TREE PLANTING DETAIL

NOT TO SCALE



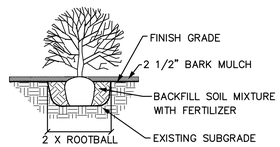
STORMWATER FACILITY PLANTING DETAIL

NOT TO SCALE



GROUNDCOVER PLANTING DETAIL

NOT TO SCALE



SHRUB PLANTING DETAIL

NOT TO SCALE

no.	revision	date
2	LAND USE SUBMITTAL #3	11-11-2022
1	REVISED PARKING LOT	7-7-2022

18003 job no.
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LANDSCAPE DETAILS

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sheet
L2.0

Item 2.

695

OUTLINE SPECIFICATIONS PLANTING AND SEEDING:

GENERAL: All plants shall conform to all applicable standards of the latest edition of the "American Association of Nurserymen Standards", A.N.S.I. Z60.1 – 1973. Meet or exceed the regulations and laws of Federal, State, and County regulations, regarding the inspection of plant materials, certified as free from hazardous insects, disease, and noxious weeds, and certified fit for sale in Oregon.

The apparent silence of the Specifications and Plans as to any detail, or the apparent omission from them of a detailed description concerning any point, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of first quality are to be used. All interpretations of these Specifications shall be made upon the basis above stated.

Landscape contractor shall perform a site visit prior to bidding to view existing conditions.

PERFORMANCE QUALITY ASSURANCE: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary horticultural practices and who are completely familiar with the specified requirements and methods needed for the proper performance of the work of this section.

NOTIFICATION: Give Landscape Architect minimum of 2 days advance notice of times for inspections. Inspections at growing site does not preclude Landscape Architect's right of rejection of deficient materials at project site. Each plant failing to meet the above mentioned "Standards" or otherwise failing to meet the specified requirements as set forth shall be rejected and removed immediately from the premises by the Contractor and at his expense, and replaced with satisfactory plants or trees conforming to the specified requirements.

SUBSTITUTIONS: Only as approved by the Landscape Architect or the Owner's Representative.

GUARANTEE AND REPLACEMENT: All plant material shall be guaranteed from final acceptance for one full growing season or one year, whichever is longer. During this period the Contractor shall replace any plant material that is not in good condition and producing new growth (except that material damaged by severe weather conditions, due to Owner's negligence, normally unforeseen peculiarities of the planting site, or lost due to vandalism). Guarantee to replace, at no cost to Owner, unacceptable plant materials with plants of same variety, age, size and quality as plant originally specified. Conditions of guarantee on replacement plant shall be same as for original plant.

Landscape Contractor shall keep on site for Owner's Representative's inspection, all receipts for soil amendment and topsoil deliveries.

PROTECTION: Protect existing roads, sidewalks, and curbs, landscaping, and other features remaining as final work. Verify location of underground utilities prior to doing work. Repair and make good any damage to service lines, existing features, etc. caused by landscaping installation.

PLANT QUALITY ASSURANCE: Deliver direct from nursery. Maintain and protect roots of plant material from drying or other possible injury. Store plants in shade and protect them from weather immediately upon delivery, if not to be planted within four hours.

Nursery stock shall be healthy, well branched and rooted, formed true to variety and species, full foliaged, free of disease, injury, defects, insects, weeds, and weed roots. Trees shall have straight trunks, symmetrical tips, and have an intact single leader. Any trees with double leaders will be rejected upon inspection. All Plants: True to name, with one of each bundle or lot tagged with the common and botanical name and size of the plants in accordance with standards of practice of the American Association of Nurserymen, and shall conform to the Standardized Plant Names, 1942 Edition.

Container grown stock: Small container–grown plants, furnished in removable containers, shall be well rooted to ensure healthy growth. **Grow container plants in containers a minimum of one year** prior to delivery, with roots filling container but not root bound. Bare root stock: Roots well–branched and fibrous. Balled and burlapped (B&B): Ball shall be of natural size to ensure healthy growth. Ball shall be firm and the burlap sound. No loose or made ball will be acceptable.

TOPSOIL AND FINAL GRADES: Landscape Contractor is to verify with the General Contractor if the on site topsoil is or is not conducive to proper plant growth. Supply alternate bid for imported topsoil.

Landscape Contractor is to supply and place 12" of topsoil in planting beds and 3" in rough seed areas. If topsoil stockpiled on site is not conducive to proper plant growth, the Landscape Contractor shall import the required amount. Landscape Contractor is to submit samples of the imported soil and/or soil amendments to the Landscape Architect. The topsoil shall be a sandy loam, free of all weeds and debris inimical to lawn or plant growth.

Landscaping shall include finished grades and even distribution of topsoil to meet planting requirements. Grades and slopes shall be as indicated. Planting bed grades shall be approximately 3" below adjacent walks, paving, finished grade lines, etc., to allow for bark application. Finish grading shall remove all depressions or low areas to provide positive drainage throughout the area.

PLANTING SPECIFICATIONS:

HERBICIDES: Prior to soil preparation, all areas showing any undesirable weed or grass growth shall be treated with Round–up in strict accordance with the manufacturer's instructions.

SOIL PREPARATION: Work all areas by rototilling to a minimum depth of 8". Remove all stones (over 1½" size), sticks, mortar, large clumps of vegetation, roots, debris, or extraneous matter turned up in working. Soil shall be of a homogeneous fine texture. Level, smooth and lightly compact area to plus or minus .10 of required grades.

In groundcover areas add 2" of compost (or as approved) and till in to the top 6" of soil.

PLANTING HOLE: Lay out all plant locations and excavate all soils from planting holes to 2 1/2 times the root ball or root system width. Loosen soil inside bottom of plant hole. Dispose of any "subsoil" or debris from excavation. Check drainage of planting hole with water, and adjust any area showing drainage problems.

SOIL MIX: Prepare soil mix in each planting hole by mixing:
2 part native topsoil (no subsoil)
1 part compost (as approved)

Thoroughly mix in planting hole and add fertilizers at the following rates:
Small shrubs – 1/8 lb./ plant
Shrubs – 1/3 to 1/2 lb./ plant
Trees – 1/3 to 1 lb./ plant

FERTILIZER: For trees and shrubs use Commercial Fertilizer "A" Inorganic (5–4–3) with micro–nutrients and 50% slow releasing nitrogen. For initial application in fine seed lawn areas use Commercial Fertilizer "B" (8–16–8) with micro–nutrients and 50% slow–releasing nitrogen. For lawn maintenance use Commercial Fertilizer "C" (22–16–8) with micro–nutrients and 50% slow–releasing nitrogen. DO NOT apply fertilizer to Water Quality Swale.

PLANTING TREES AND SHRUBS: Plant upright and face to give best appearance or relationship to adjacent plants and structures. Place 6" minimum, lightly compacted layer of prepared planting soil under root system. Loosen and remove twine binding and burlap from top 1/2 of root balls. Cut off cleanly all broken or frayed roots, and spread roots out. Stagger Plants in rows. Backfill planting hole with soil mix while working each layer to eliminate voids.

When approximately 2/3 full, water thoroughly, then allow water to soak away. Place remaining backfill and dish surface around plant to hold water. Final grade should keep root ball slightly above surrounding grade, not to exceed 1". Water again until no more water is absorbed. Initial watering by irrigation system is not allowed.

STAKING OF TREES: Stake or guy all trees. Stakes shall be 2" X 2" (nom.) quality tree stakes with point. They shall be of Douglas Fir, clear and sturdy. Stake to be minimum 2/3 the height of the tree, not to exceed 8'–0". Drive stake firmly 1'–6" below the planting hole. Tree ties for deciduous trees shall be "Chainlock" (or better). For Evergreen trees use "Gro–Strait" Tree Ties (or a reinforced rubber hose and guy wires) with guy wires of a minimum 2 strand twisted 12 ga. wire. Staking and guying shall be loose enough to allow movement of tree while holding tree upright.

MULCHING OF PLANTINGS: Mulch planting areas with dark, aged, medium grind fir or hemlock bark (aged at least 6 months) to a depth of 2" in ground cover areas and 2½" in shrub beds. Apply evenly, not higher than grade of plant as it came from the nursery, and rake to a smooth finish. Water

ROUGH SEED AREA: In rough seeded area, establish an evenly graded seedbed. Sow seed with a mechanical spreader at the uniform rates as noted below. Rake seed lightly to provide cover.

SEED: Bluetag grass seed conforming to applicable State laws. No noxious weed seeds. Submit Guaranteed analysis.
Rough Seed Mix: To Contain: 60% Perennial Ryegrass, 15% Eureka Hard Fescue, and 20% Herbaceous Plants and Clover (Hobbs and Hopkins Pro–Time 705 PDX, or approved equal). Sow at 2 lbs. Per 1,000 sq.ft.

MAINTENANCE OF SEEDED AREAS:
Rough Seed Areas: Rough seed areas shall be maintained by watering, mowing, reseeding, and weeding for a minimum of 60 days after seeding.

GENERAL MAINTENANCE: Protect and maintain work described in these specifications against all defects of materials and workmanship, through final acceptance. Replace plants not in normal healthy condition at the end of this period. Water, weed, cultivate, mulch, reset plants to proper grade or upright position, remove dead wood and do necessary standard maintenance operations. Irrigate when necessary to avoid drying out of plant materials, and to promote healthy growth.

CLEAN–UP: At completion of each division of work all extra material, supplies, equipment, etc., shall be removed from the site. All walks, paving, or other surfaces shall be swept clean, mulch areas shall have debris removed and any soil cleared from surface. All areas of the project shall be kept clean, orderly and complete.

CITY OF WILSONVILLE WATER QUALITY FACILITY SPECIFICATIONS:

SOIL PREPARATION: Remove all nonnative plant materials, including plants, roots, and seeds prior to adding topsoils. Till the sub–grade in these areas to a depth of at least four inches. Water Quality Swale area shall be over–excavated and filled to final grade with 4 iches of topsoil in areas where topsoil has been removed or not adequate. Topsoil shall be tested for the following characteristics provide a good growing medium:
A) Texture
B) Fertility
C) Microbial

Incorporate 2" garden compost, free of conventional fertilizer, to a depth of 4" on all areas of the water quality facility. DO NOT apply fertilizer to the Water Quality Facility.

TIMING: Plantings should be installed between February 1 and May 1 or between October 1 and November 15. Bare root stock shall be installed only from December 15 through April 15. When plantings must be installed outside these times, additional measures may be needed to assure survival.

EROSION CONTROL: Grading, soil preparation, and seeding shall be performed during optimal weather conditions and at low flow levels to minimize sediment impacts. Site disturbance shall be minimized and desirable vegetation retained, where possible. Slopes shall be graded to support the establishment of vegetation. Where seeding is used for erosion control, an appropriate native grass, Regreen (or its equivalent), or sterile wheat shall be used to stabilize slopes until permanent vegetation is established. Biodegradable fabrics (coir, coconut or approved jute matting (minimum 1/4" square holes) may be used to stabilize slopes and channels. Fabrics such as burlap may be used to secure plant plugs in place and to discourage floating upon inundation.

A biodegradable Erosion Control Matting shall be placed over the topsoil throughout the swale cross section, fabric shall be held in place in accordance with the manufacturer's installation requirements. Use high density jute matting in the treatment area (Geojute Plus or approved equal). In all other areas use low density jute matting (Econojute or approved equal). Landscaping shall include finished grades and even distribution of topsoil to meet planting requirements. Grades and slopes shall be as indicated on civil plans. Finish grading shall remove all depressions or low areas to provide positive drainage throughout the area.

HERBICIDES: Removal of invasive non–native species is required by hand for the entire wetland buffer area. If necessary, excessive weed growth may be treated with Rodeo or Garlon 3–A (or approved equals) in strict accordance with the manufacturer's instructions.

FERTILIZER: Do not apply fertilizer to any plantings within the Wetland Buffer or Water Quality Facilities.

PLANTING TREES AND SHRUBS: Plant upright and face to give best appearance or relationship to adjacent plants and structures. Loosen and remove twine binding and burlap from top one–half of root balls. Cut off cleanly all broken or frayed roots, and spread roots out. Stagger Plants in rows. Backfill planting hole with native soil mix while working each layer to eliminate voids.

MULCHING: Trees, shrubs, and groundcovers planted in upland areas shall be mulched a minimum of 3" in depth and 18" in diameter, to retain moisture and discourage weed growth around newly installed plant material. Appropriate mulches are made from composted bark or leaves that have not been chemically treated. The use of mulch in frequently inundated areas shall be limited, to avoid any possible water quality impacts including the leaching of tannins and nutrients, and the migration of mulch into waterways.

WILDLIFE PROTECTION: Appropriate measures shall be taken to discourage wildlife browsing. Biodegradable plastic mesh tubing, or other substitute approved by the City, shall be placed around individual trees and shrubs to prevent browsing by wildlife, including beaver, nutria, deer, mice and voles.

IRRIGATION: Is to be provided as per a separate plan design/build by Landscape Contractor. Project is to be irrigated by an automatic, underground system, which will provide full coverage for all plant material. Guarantee system for a minimum one year.

MAINTENANCE: The permitee is responsible for the maintenance of this facility for a minimum of two years following the acceptance of the facility by the City of Wilsonville. The City's authorized representative shall inspect the condition of all landscaping located within the water quality facility, at the end of the of the firest year of the post–construction period. The authorized representative shall provide a report describing any deficiencies to the applicant.

If, at any time during the warranty period, the landscaping falls below 90% survival of trees and shrubs or 90% aerial coverage, the Owner shall remove the undesirable vegetation and reinstall all deficient planting at the next appropriate time. Prior to replanting, the cause of the plant loss shall be determined and corrected. The two–year maintenance period shall begin again from the date of replanting.

Water Quality Facility is to be kept free of debris and maintained to insure water flow and proper functioning. Protect and maintain work described in these specifications against all defects of materials and workmanship, through final acceptance.

CLEAN–UP: At completion of each division of work all extra material, supplies, equipment, etc., shall be removed from the site. All walks, paving, or other surfaces shall be swept clean, mulch areas shall have debris removed and any soil cleared from surface. All areas of the project shall be kept clean, orderly and complete.

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no.	revision	date
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sheet
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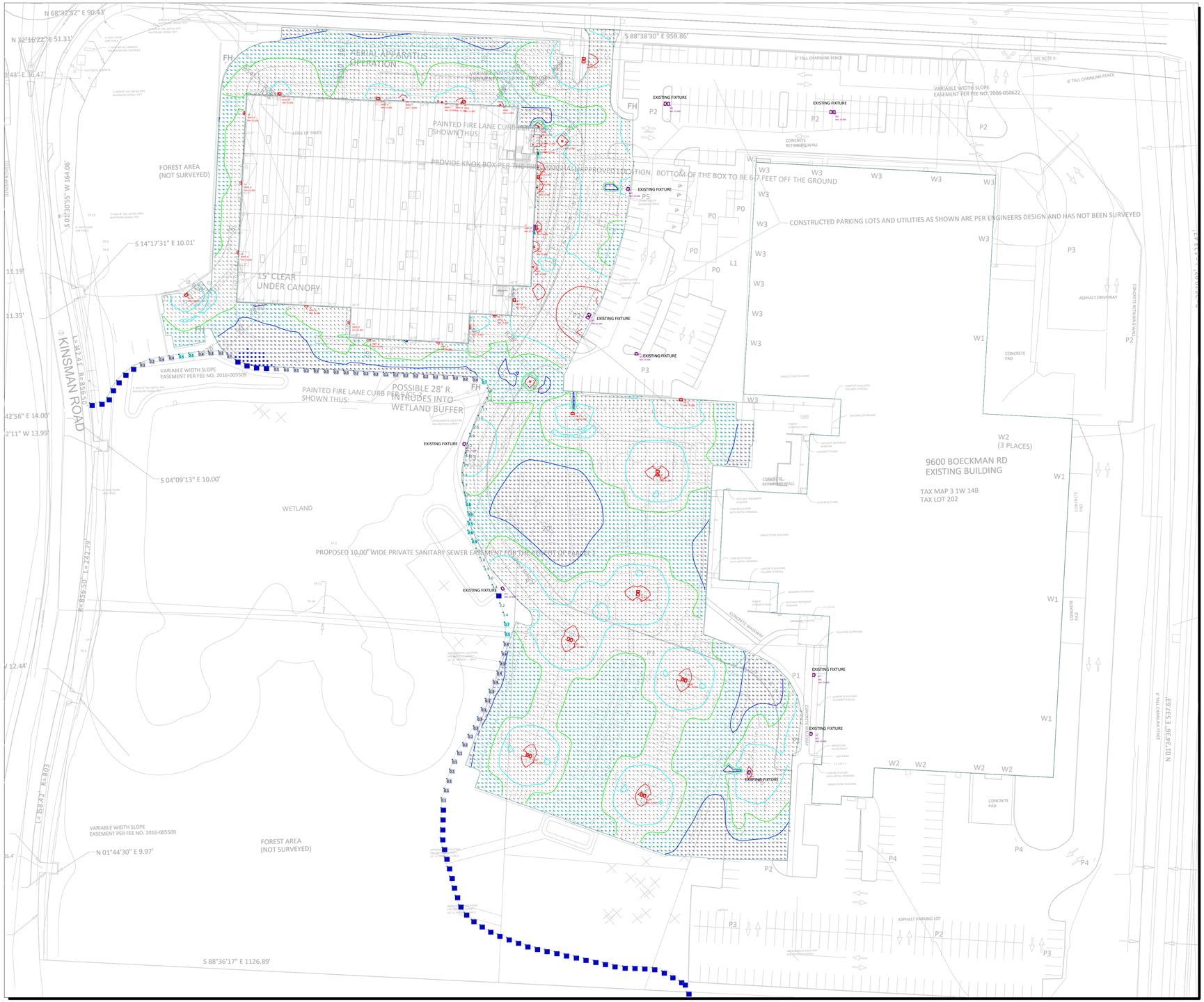
12/19/2022



Scale: 1 inch= 50 Ft.

Standard Luminaire Schedule

Symbol	Qty	Label	[MANUFAC]	Part # Description	Lum. Watts	Lum. Lumens	LLF	Arrangement	Arr. Lum. Lumens	Arr. Watts	Filename
	1	P3_BB	Visionaire Lighting LLC	VMX-II_T3_80LC_3_4K	87	12006	0.900	Back-Back	24012	174	VMX-II_T3_80LC_3_4K.ies
	3	P6_B	Visionaire Lighting LLC	VMX-II_T4_80LC_3_4K	87	11593	0.900	Single	11593	87	VMX-II_T4_80LC_3_4K.ies
	6	P6_BB	Visionaire Lighting LLC	VMX-II_T4_80LC_3_4K_BACK TO BACK	87	11593	0.900	Back-Back	23186	174	VMX-II_T4_80LC_3_4K.ies
	2	PC2	Visual Comfort Group	7000CTUR8401220HUNV2S	26.8	2187	0.900	Single	2187	26.8	103643585CHI-087 VCG 7000CTUR8401220HUNV2S.ies
	4	S4	COOPER LIGHTING SOLUTIONS - HALO (FORMERLY EATON)	SMD4R6940WH	9.8	760	0.900	Single	760	9.8	SMD4R6940WH.ies
	2	SP1	Visionaire Lighting LLC	(EXISTING TO REMAIN W4 SITE) VMX-II_T2_32LC_5_4K	78	9757	0.540	Single	9757	78	VMX-II_T2_48LC_5_4K.ies
	3	SP2	Visionaire Lighting LLC	(EXISTING TO REMAIN W4 SITE) VMX-II_T3_96LC_7_4K	212	25801	0.900	Back-Back	51602	424	VMX-II_T3_96LC_7_4K.ies
	4	SP3	Visionaire Lighting LLC	(EXISTING TO REMAIN W4 SITE) VMX-II_T3_64LC_7_4K	142	17612	0.900	Single	17612	142	VMX-II_T3_64LC_7_4K.ies
	1	SP5	Visionaire Lighting LLC	(EXISTING TO REMAIN W4 SITE) VMX-II_TSW_64LC_7_4K-UNV-AM-SL	142	17831	0.900	Single	17831	142	VMX-II_TSW_64LC_7_4K.ies
	6	WM1_B	Visionaire Lighting LLC	VMX-II_T4_80LC_3_4K_UNV-WM-SL+BAWP	87	11593	0.900	Single	11593	87	VMX-II_T4_80LC_3_4K.ies
	2	WM2_B	Industrial Lighting Products Inc	WPCM-28WLED-UNIV-4D-T4 WALL MOUNT	26.6001	3235	0.900	Single	3235	26.6	WPCM-28WLED-UNIV-4D-T4-IES.ies
	10	WM3	GENERATION BRANDS	7000WTUR 840 18 C Z UNV S	15.3	571	0.900	Single	571	15.3	10217122BCHI-029 GB 700WTUR18SCC8401201.ies
	7	WM7_B	Industrial Lighting Products Inc	WPCM-28WLED-UNIV-40-T2 WALL MOUNT	26.6209	3396	0.900	Single	3396	26.621	WPCM-28WLED-UNIV-40-T2-IES.ies

Calculation Summary

Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
W5 site_Planar	Illuminance	Fc	1.52	88.9	0.0	N.A.	N.A.
wetland	Illuminance	Fc	0.48	5.2	0.0	N.A.	N.A.

Isoline Legend

Illuminance (Fc)	
Color	Value
	0.5
	1
	2
	5

NOTES:
1. LIGHT LOSS FACTOR APPLIED, INITIAL VALUES WILL BE HIGHER
3. FIXTURE HEIGHT: NOTED
3. POLE HEIGHT: 25'
4. STANDARD REFLECTANCE USED: 26% GROUND EQUAL TO ASPHALT
5. CALCULATION POINTS LOCATED ON GROUND

SEATAC LIGHTING & CONTROLS, LLC
15455 53rd Avenue S
Tukwila, WA 98188
FOR ALL DRAWING INQUIRIES PLEASE CONTACT
SEATAC LIGHTING: 206.575.6865

TITLE
LIGHTING CALCULATION

PROJECT NAME
BUILDING W5

LOCATION
WILSONVILLE, OREGON

DATE
12/1/2022

DRAWN BY
JWILLIAMS

SCALE
NOTED

SHEET NO.
Page 1 of 4

Scale: 1 inch= 30 Ft.

Standard Luminaire Schedule

Symbol	Qty	Label	[MANUFAC]	Part # Description	Lum. Watts	Lum. Lumens	LLF	Arrangement	Arr. Lum. Lumens	Arr. Watts	Filename
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	3	P6_B	Visionaire Lighting LLC	VMX-II_T4_80LC_3_4K	87	11593	0.900	Single	11593	87	VMX-II_T4_80LC_3_4K.ies
	6	P6_BB	Visionaire Lighting LLC	VMX-II_T4_80LC_3_4K_BACK TO BACK	87	11593	0.900	Back-Back	23186	174	VMX-II_T4_80LC_3_4K.ies
	2	PC2	Visual Comfort Group	700OCTUR8401220HUNV2S	26.8	2187	0.900	Single	2187	26.8	103643585CHI-087 VCG 700OCTUR8401220HUNV2S.ies
	4	S4	COOPER LIGHTING SOLUTIONS - HALO (FORMERLY EATON)	SMD4R6940WH	9.8	760	0.900	Single	760	9.8	SMD4R6940WH.ies
	2	SP1	Visionaire Lighting LLC	(EXISTING TO REMAIN W4 SITE) VMX-II_T2_32LC_5_4K	78	9757	0.540	Single	9757	78	VMX-II_T2_48LC_5_4K.ies
	3	SP2	Visionaire Lighting LLC	(EXISTING TO REMAIN W4 SITE) VMX-II_T3_96LC_7_4K	212	25801	0.900	Back-Back	51602	424	VMX-II_T3_96LC_7_4K.ies
	4	SP3	Visionaire Lighting LLC	(EXISTING TO REMAIN W4 SITE) VMX-II_T3_64LC_7_4K	142	17612	0.900	Single	17612	142	VMX-II_T3_64LC_7_4K.ies
	1	SP5	Visionaire Lighting LLC	(EXISTING TO REMAIN W4 SITE) VMX-II_T5W_64LC_7_4K-UNV-AM-SL	142	17831	0.900	Single	17831	142	VMX-II_T5W_64LC_7_4K.ies
	6	WM1_B	Visionaire Lighting LLC	VMX-II_T4_80LC_3_4K -UNV-WM-SL+BAWP	87	11593	0.900	Single	11593	87	VMX-II_T4_80LC_3_4K.ies
	2	WM2_B	Industrial Lighting Products Inc	WPCM-28WLED-UNIV-40-T4 WALL MOUNT	26.6001	3235	0.900	Single	3235	26.6	WPCM-28WLED-UNIV-40-T4-IES.ies
	10	WM3	GENERATION BRANDS	700OWTUR 840 18 C Z UNV S	15.3	571	0.900	Single	571	15.3	102171228CHI-029 GB 700WTUR185CC8401201.ies
	7	WM7_B	Industrial Lighting Products Inc	WPCM-28WLED-UNIV-40-T2 WALL MOUNT	26.6209	3396	0.900	Single	3396	26.621	WPCM-28WLED-UNIV-40-T2-IES.ies

Calculation Summary

Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
WS site_Planar	Illuminance	Fc	1.52	88.9	0.0	N.A.	N.A.
wetland	Illuminance	Fc	0.48	5.2	0.0	N.A.	N.A.

Isoline Legend

Illuminance (Fc)
Color	Value
	0.5
	1
	2
	5

NOTES:
1. LIGHT LOSS FACTOR APPLIED, INITIAL VALUES WILL BE HIGHER
3. FIXTURE HEIGHT: NOTED
3. POLE HEIGHT: 25'
4. STANDARD REFLECTANCE USED: 26% GROUND EQUAL TO ASPHALT
5. CALCULATION POINTS LOCATED ON GROUND

SEATAC LIGHTING & CONTROLS, LLC
15455 53rd Avenue S
Tukwila, WA 98188
FOR ALL DRAWING INQUIRIES PLEASE CONTACT
SEATAC LIGHTING: 206.575.6865

TITLE
LIGHTING CALCULATION

PROJECT NAME
BUILDING W5

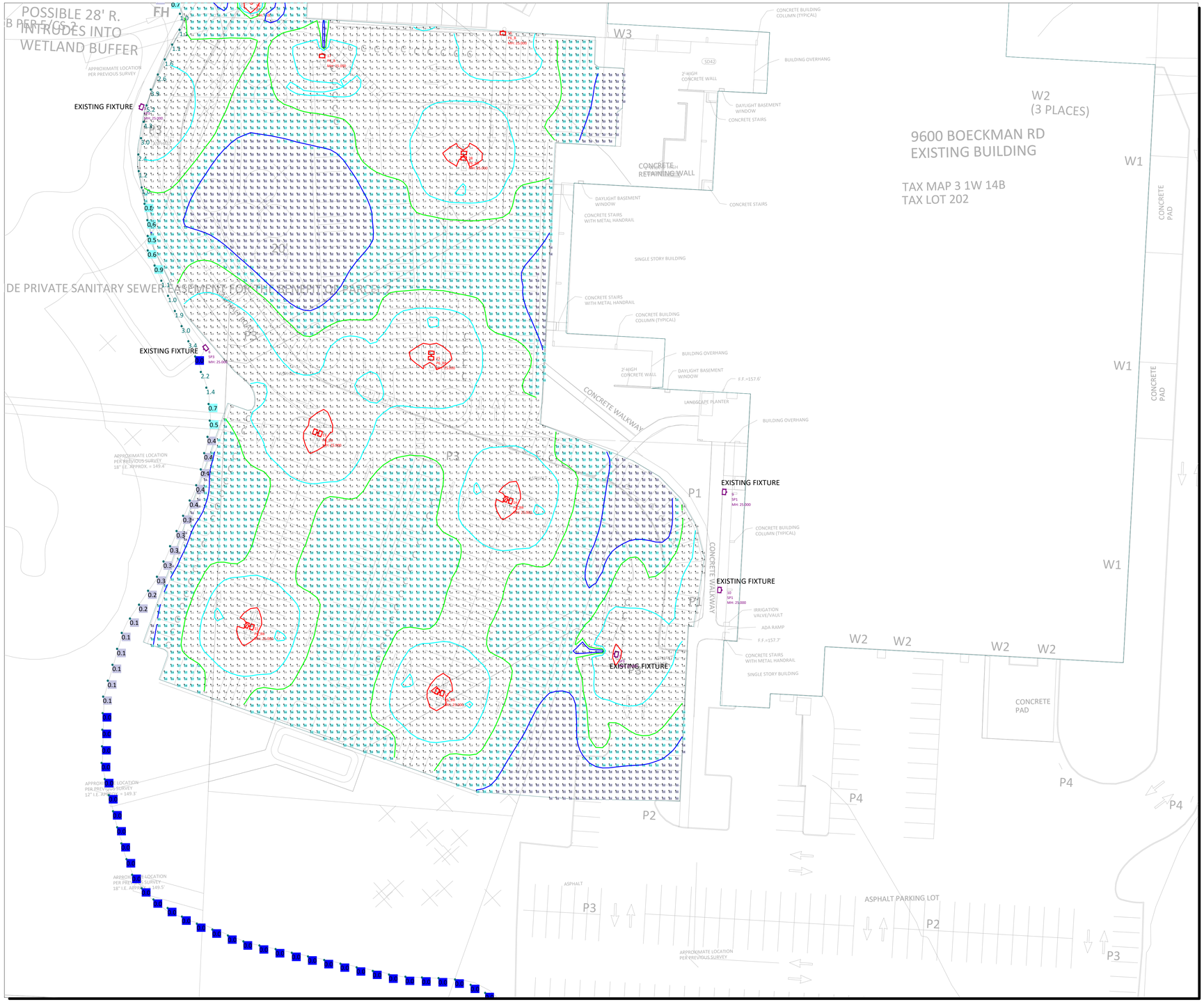
LOCATION
WILSONVILLE, OREGON

DATE
12/1/2022

DRAWN BY
JWILLIAMS

SCALE
NOTED

SHEET NO.
Page 2 of 4



Scale: 1 inch= 30 Ft.

Standard Luminaire Schedule

Symbol	Qty	Label	[MANUFAC]	Part # Description	Lum. Watts	Lum. Lumens	LLF	Arrangement	Arr. Lum. Lumens	Arr. Watts	Filename
	1	P3_BB	Visionaire Lighting LLC	VMX-II_T3_80LC_3_4K	87	12006	0.900	Back-Back	24012	174	VMX-II_T3_80LC_3_4K.ies
	3	P6_B	Visionaire Lighting LLC	VMX-II_T4_80LC_3_4K	87	11593	0.900	Single	11593	87	VMX-II_T4_80LC_3_4K.ies
	6	P6_BB	Visionaire Lighting LLC	VMX-II_T4_80LC_3_4K_BACK TO BACK	87	11593	0.900	Back-Back	23186	174	VMX-II_T4_80LC_3_4K.ies
	2	PC2	Visual Comfort Group	7000CTUR8401220HUNV2S	26.8	2187	0.900	Single	2187	26.8	103643585CHI-087 VCG 7000CTUR8401220HUNV2S.ies
	4	S4	COOPER LIGHTING SOLUTIONS - HALO (FORMERLY EATON)	SMD4R6940WH	9.8	760	0.900	Single	760	9.8	SMD4R6940WH.ies
	2	SP1	Visionaire Lighting LLC	(EXISTING TO REMAIN W4 SITE) VMX-II_T2_32LC_5_4K	78	9757	0.540	Single	9757	78	VMX-II_T2_48LC_5_4K.ies
	3	SP2	Visionaire Lighting LLC	(EXISTING TO REMAIN W4 SITE) VMX-II_T3_96LC_7_4K	212	25801	0.900	Back-Back	51602	424	VMX-II_T3_96LC_7_4K.ies
	4	SP3	Visionaire Lighting LLC	(EXISTING TO REMAIN W4 SITE) VMX-II_T3_64LC_7_4K	142	17612	0.900	Single	17612	142	VMX-II_T3_64LC_7_4K.ies
	1	SP5	Visionaire Lighting LLC	(EXISTING TO REMAIN W4 SITE) VMX-II_TSW_64LC_7_4K-UNV-AM-SL	142	17831	0.900	Single	17831	142	VMX-II_TSW_64LC_7_4K.ies
	6	WM1_B	Visionaire Lighting LLC	VMX-II_T4_80LC_3_4K -UNV-WM-SL+BAWP	87	11593	0.900	Single	11593	87	VMX-II_T4_80LC_3_4K.ies
	2	WM2_B	Industrial Lighting Products Inc	WPCM-28WLED-UNIV-40-T4 WALL MOUNT	26.6001	3235	0.900	Single	3235	26.6	WPCM-28WLED-UNIV-40-T4-IES.ies
	10	WM3	GENERATION BRANDS	7000WTUR 840 18 C Z UNV-S	15.3	571	0.900	Single	571	15.3	10171228CHI-029 GB 700WTUR18SCC8401201.ies
	7	WM7_B	Industrial Lighting Products Inc	WPCM-28WLED-UNIV-40-T2 WALL MOUNT	26.6209	3396	0.900	Single	3396	26.621	WPCM-28WLED-UNIV-40-T2-IES.ies

Calculation Summary

Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
W5 site_Planar	Illuminance	Fc	1.52	88.9	0.0	N.A.	N.A.
wetland	Illuminance	Fc	0.48	5.2	0.0	N.A.	N.A.

Isoline Legend

Illuminance (Fc)	
Color	Value
	0.5
	1
	2
	5

NOTES:
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3. FIXTURE HEIGHT: NOTED
3. POLE HEIGHT: 25'
4. STANDARD REFLECTANCE USED: 26% GROUND EQUAL TO ASPHALT
5. CALCULATION POINTS LOCATED ON GROUND

SEATAC LIGHTING & CONTROLS, LLC
15455 53rd Avenue S
Tukwila, WA 98188
FOR ALL DRAWING INQUIRIES PLEASE CONTACT SEATAC LIGHTING 206.575.6865

TITLE
LIGHTING CALCULATION

PROJECT NAME
BUILDING W5

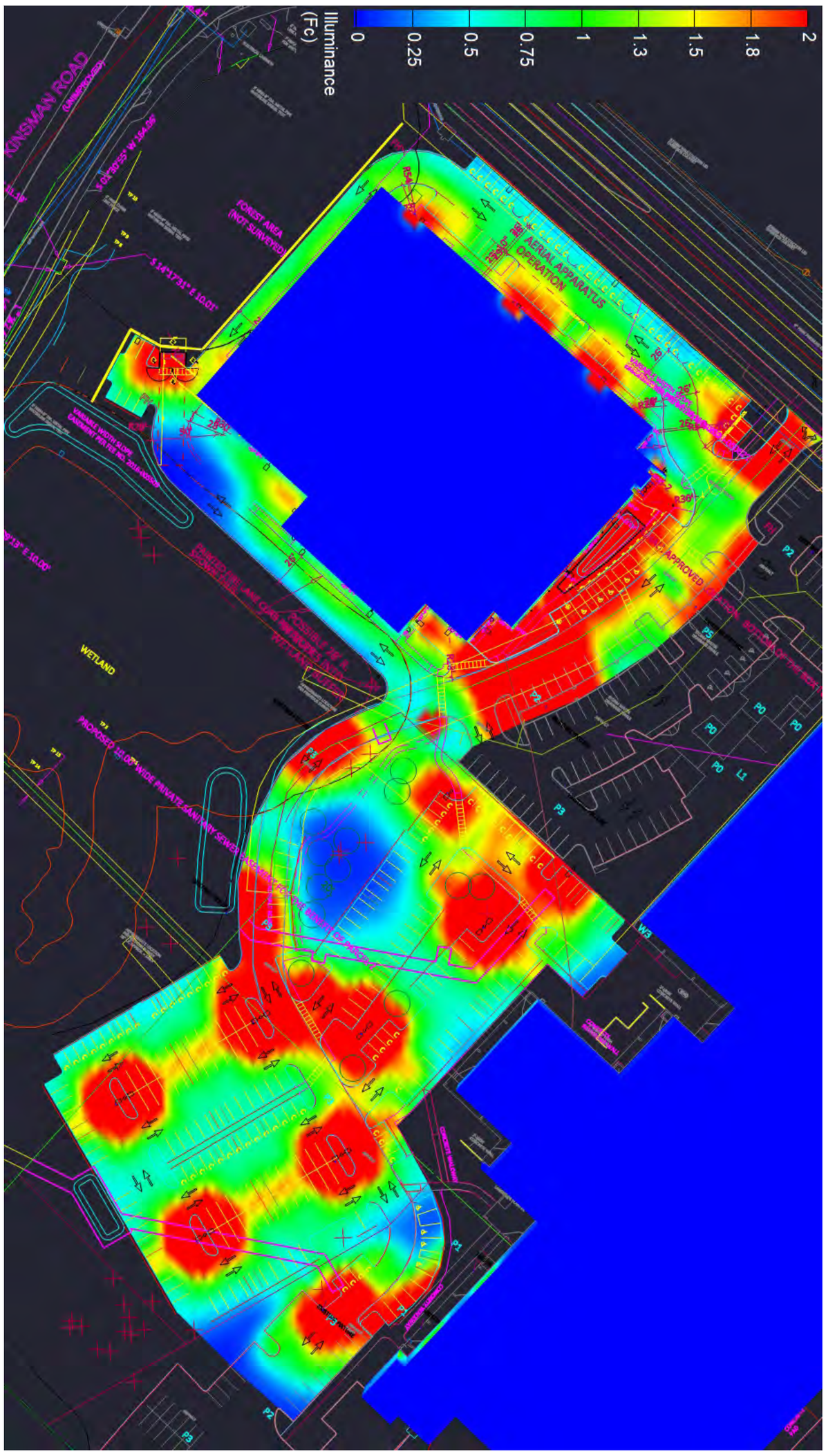
LOCATION
WILSONVILLE, OREGON

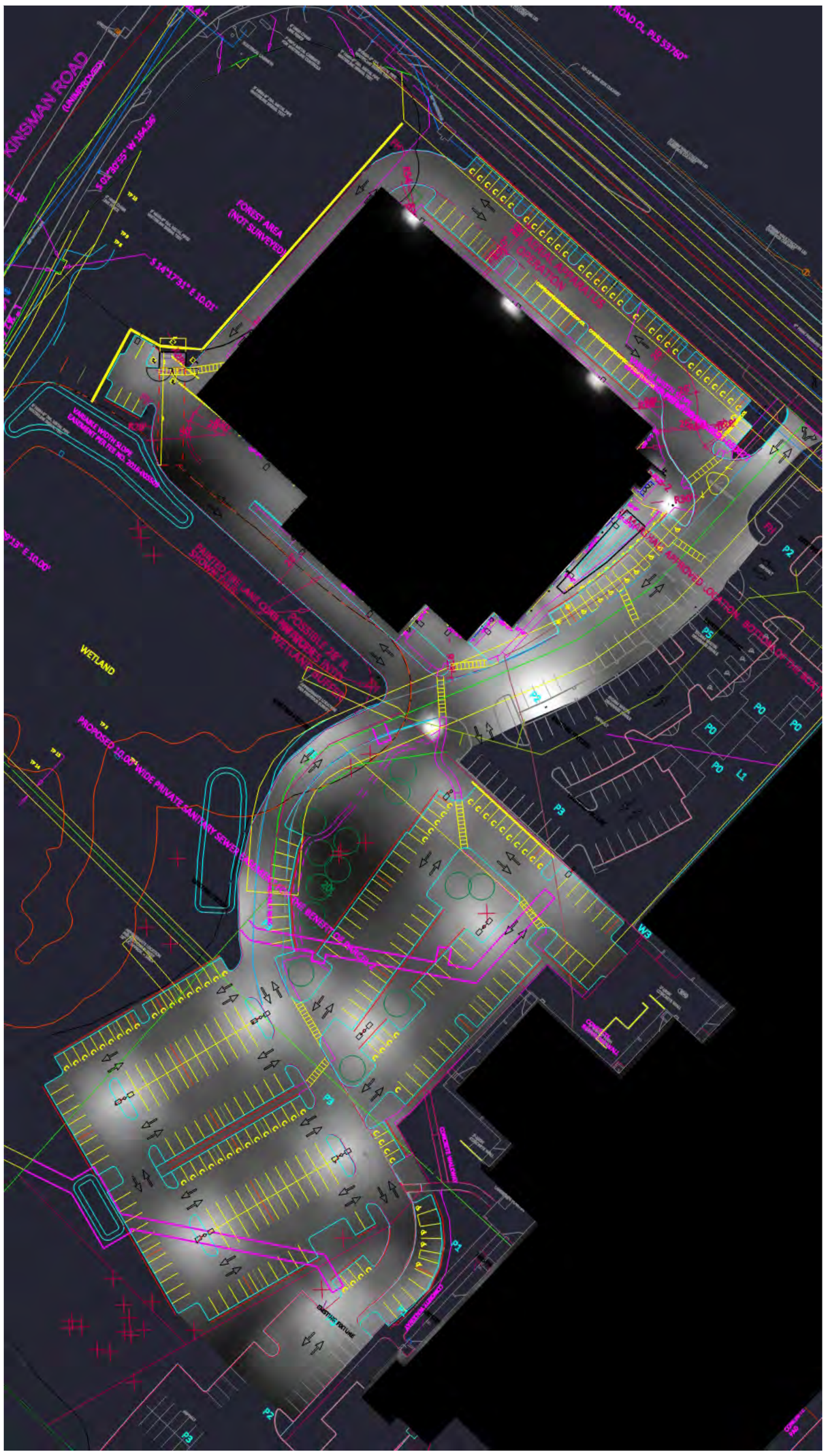
DATE
12/1/2022

DRAWN BY
JWILLIAMS

SCALE
NOTED

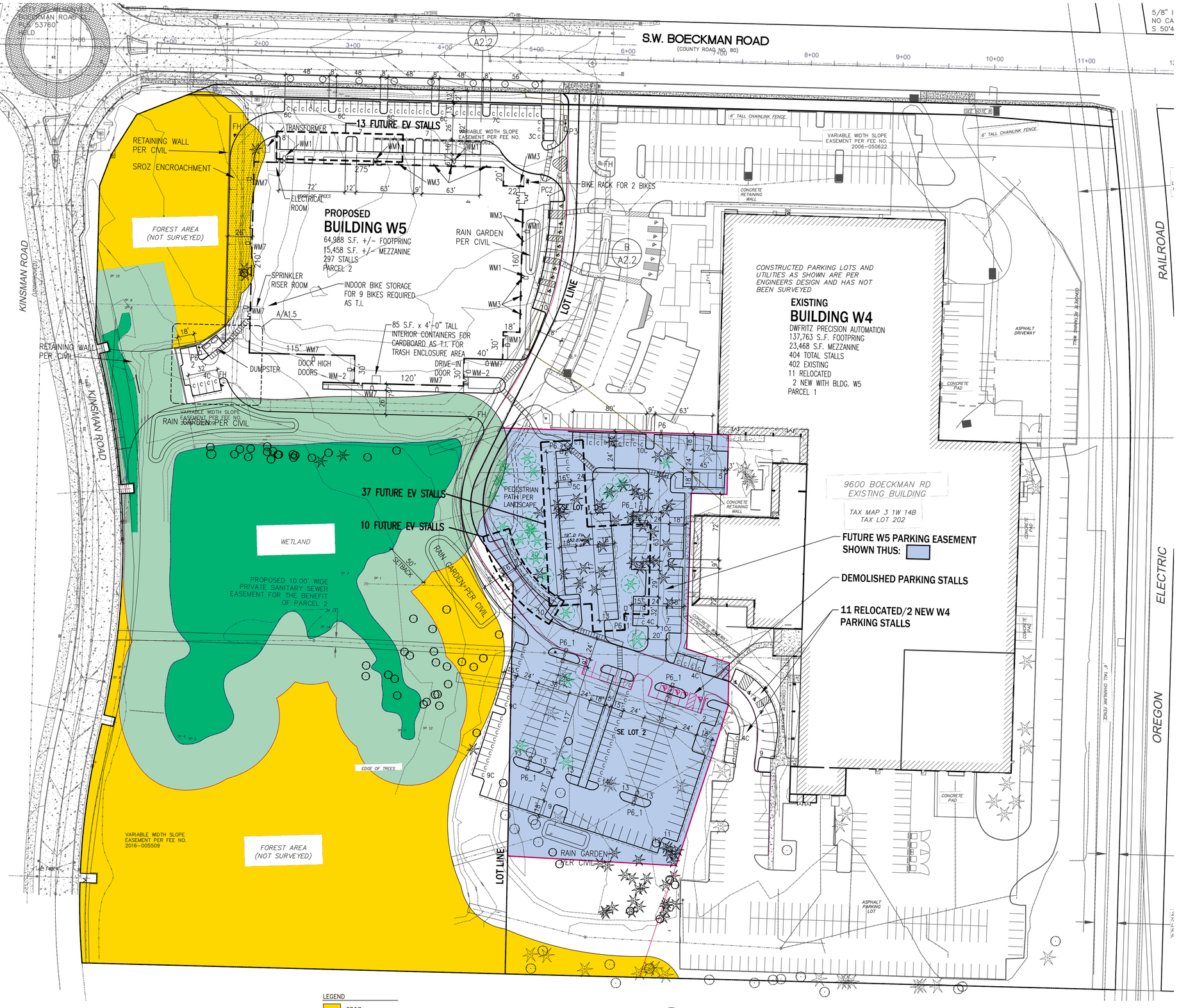
SHEET NO.
Page 3 of 4





PROJECT NAME	BUILDING W5
LOCATION	WILSONVILLE, OREGON
TITLE	LIGHTING CALCULATION
DATE	12/1/2022
DRAWN BY	JWILLIAMS
SCALE	NOTED
SHEET NO.	Page 4 of 4

SEATAC LIGHTING & CONTROLS, LLC
15455 53rd Avenue S
Tukwila, WA 98188
FOR ALL DRAWING INQUIRIES PLEASE CONTACT
SEATAC LIGHTING 206.575.6865



LEGEND

- SROZ
- WETLAND
- WETLAND BUFFER
- FUTURE PARKING EASEMENT

SITE PARKING PLAN

1" = 50'-0"

W4 OCCUPANCIES

B OCCUPANCY – 54,894
F OCCUPANCY – 113,237

W4 EXISTING PARKING

REQUIRED
COMMERCIAL OFFICE – 2.7/1000 MIN. 4.1/1000 MAX
INDUSTRIAL MANUFACTURING – 1.6/1000 MIN. NO LIMIT MAX.
MINIMUM PARKING
54,894 S.F. OFFICE X 2.7 / 1,000 => 149 STALLS
113,237 S.F. MANUFACTURING X 1.6 / 1000 => 182 STALLS
MINIMUM TOTAL PARKING REQUIRED = 149 + 182 = 331 STALLS
MAXIMUM PARKING
54,894 S.F. OFFICE X 4.1 / 1000 = 225 STALLS
113,237 S.F. MANUFACTURING NO LIMIT
MAXIMUM PARKING TOTAL = NO LIMIT

EXISTING PARKING PROVIDED – 402 STALLS

W5 OCCUPANCIES

B OCCUPANCY – 20,000 S.F. ESTIMATE
F OCCUPANCY – 60,446 S.F. ESTIMATE

W5 PARKING

REQUIRED
COMMERCIAL USES – 2/1000 MIN. 4/1000 MAX
LIGHT MANUFACTURING R & D – 2/1000 MIN. 4/1000 MAX
MINIMUM PARKING
20,000 S.F. COMMERCIAL USES X 2/1,000 => 40 STALLS
60,446 S.F. LIGHT MANUFACTURING R & D X 2/1000 => 121 STALLS
MINIMUM TOTAL PARKING REQUIRED = 40 + 121 = 161 STALLS
MAXIMUM PARKING
20,000 S.F. COMMERCIAL USES X 4/1,000 => 80 STALLS
60,446 S.F. LIGHT MANUFACTURING R & D X 4/1000 => 241 STALLS
MAXIMUM PARKING TOTAL = 80 + 241 = 321 STALLS
PARKING PROVIDED – 297 STALLS (15 CARPOOL, 94 C, 8 ACCESSIBLE)
ACCESSIBLE PROPOSED: 8 W/ 2 WHEEL CHAIR ONLY SPACES
CAR/VAN POOL REQUIRED: 297 X .05 => 15 REQUIRED
(SECTION 4.155.06 B)
CAR/VAN POOL PROPOSED: 15 PROPOSED
ELECTRIC VEHICLE (EV) CHARGING INFRASTRUCTURE
297 x .2 = 60 FUTURE SERVICE CAPACITY. REFER TO PLAN FOR LOCATION OF STALLS. PROVIDE CONDUIT FROM THE ELECTRICAL ROOM TO THE PROPOSED EV STALLS FOR LEVEL 2 ELECTRIC CHARGERS.

CURRENT SITE WITH CURRENT CODE W4 & W5

B OCCUPANCY – 74,894 S.F. (54,894 W4 + 20,000 W5)
F OCCUPANCY – 173,683 S.F. (113,237 W4 + 60,446 W5)

PARKING

REQUIRED
COMMERCIAL USES – 2/1000 MIN. 4/1000 MAX
LIGHT MANUFACTURING R & D– 2/1000 MIN. 4/1000 MAX
MINIMUM PARKING
74,894 S.F. COMMERCIAL USES X 2/1,000 => 150 STALLS
173,683 S.F. LIGHT MANUFACTURING R & D X 2/1000 => 348 STALLS
MINIMUM TOTAL PARKING REQUIRED = 150 + 348 = 498 STALLS
MAXIMUM PARKING
74,894 S.F. COMMERCIAL USES X 4/1,000 = 299 STALLS
173,683 S.F. LIGHT MANUFACTURING R & D X 4/1000 = 694 STALLS
MAXIMUM PARKING TOTAL = 299 + 694 = 993 STALLS
PARKING PROVIDED
402 EXISTING W4 STALLS
–11 DEMOLISHED W4 STALLS
13 NEW W4 STALLS
297 NEW W5 STALLS
701 TOTAL STALLS (525 S., 37 CARPOOL, 122 C, 17 ACCESSIBLE)

Item 2.

no.	revision	date
	LAND USE SUBMITTAL #3	11-1-22
	DESIGN REVIEW RESUBMITTAL	7-6-22

18003 job no.
EM drawn
BW checked
11-11-22 date

REGISTERED ARCHITECT · LANCE MUELLER · SEATTLE, WA. 1451 · STATE OF OREGON

BUILDING W5
99XX SW Boeckman Rd.
Wilsonville, OR 97070

SITE PARKING PLAN AND CALCULATIONS

LANGE MUELLER & ASSOCIATES
ARCHITECTS AIA
130 LAKESIDE • SUITE 250 • SEATTLE, WA 98122 • (206) 325-2553

sheet
CS-2

701

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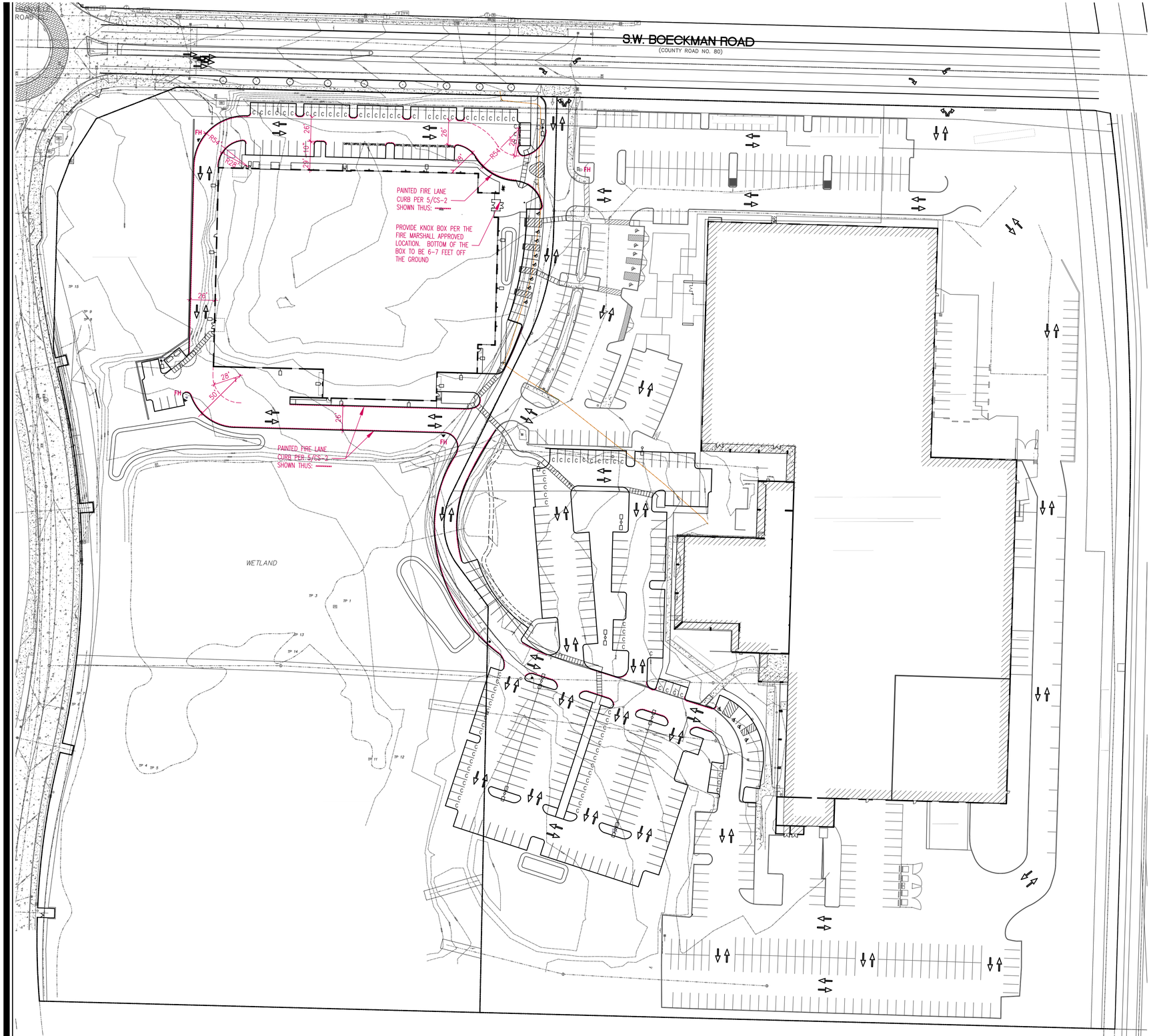
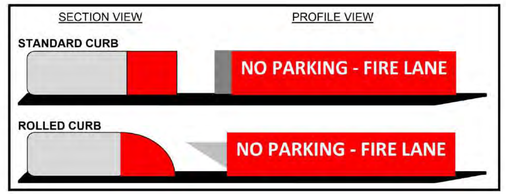
11/9/2022



SITE CIRCULATION AND FIRE PLAN

1" = 50'-0"

- Curb paint shall be red for the entire length of the fire lane.
- "NO PARKING FIRE LANE" shall be stenciled with a 3 ½ inch minimum height block in white lettering with a minimum of ½ inch stroke width.
- The markings shall be spaced at 25 foot intervals.



5 PAINTED FIRE LANE CURB

N.T.S.

FIRE SITE NOTES:

1. FIRE APPARATUS ACCESS ROADS TO BE DESIGNED TO SUPPORT NOT LESS THAN 12,500 POUND POINT LOAD (WHEEL LOAD) AND 75,000 POUND LIVE LOAD (GROSS VEHICLE WEIGHT)
2. FIRE FLOW DEMAND = 1,500 GPM ((FROM 2004 OREGON FIRE CODE, APPENDIX B, TABLE B105.1 – TYPE IIB WITH 75% REDUCTION)
3. FIRE HYDRANT FLOW TEST OR MODELING OF WATER AVAILABILITY AS A DEFERRED SUBMITTAL.
4. EMERGENCY RESPONDER RADIO COVERAGE TO BE MERRC (MOBILE EMERGENCY RESPONDER RADIO COVERAGE) – PROVIDE DOCUMENTATION OF TVF&R PROVIDER PRIOR TO THE ISSUANCE OF THE BUILDING PERMIT.

Item 2.

no.	revision	date
	LAND USE SUBMITTAL #3	11-11-22
	DESIGN REVIEW RESUBMITTAL	7-8-22

18003 job no.
EM drawn
BW checked
11-11-22 date

REGISTERED ARCHITECT · LANCE MUELLER · SEATTLE, WA. 1491 · STATE OF OREGON

BUILDING W5
99XX SW Boeckman Rd.
Wilsonville, OR 97070

SITE CIRCULATION AND FIRE PLAN

LANCE MUELLER & ASSOCIATES
ARCHITECTS AIA
130 LAKESIDE • SUITE 250 • SEATTLE, WA 98122 • (206) 325-2553

sheet
CS-3

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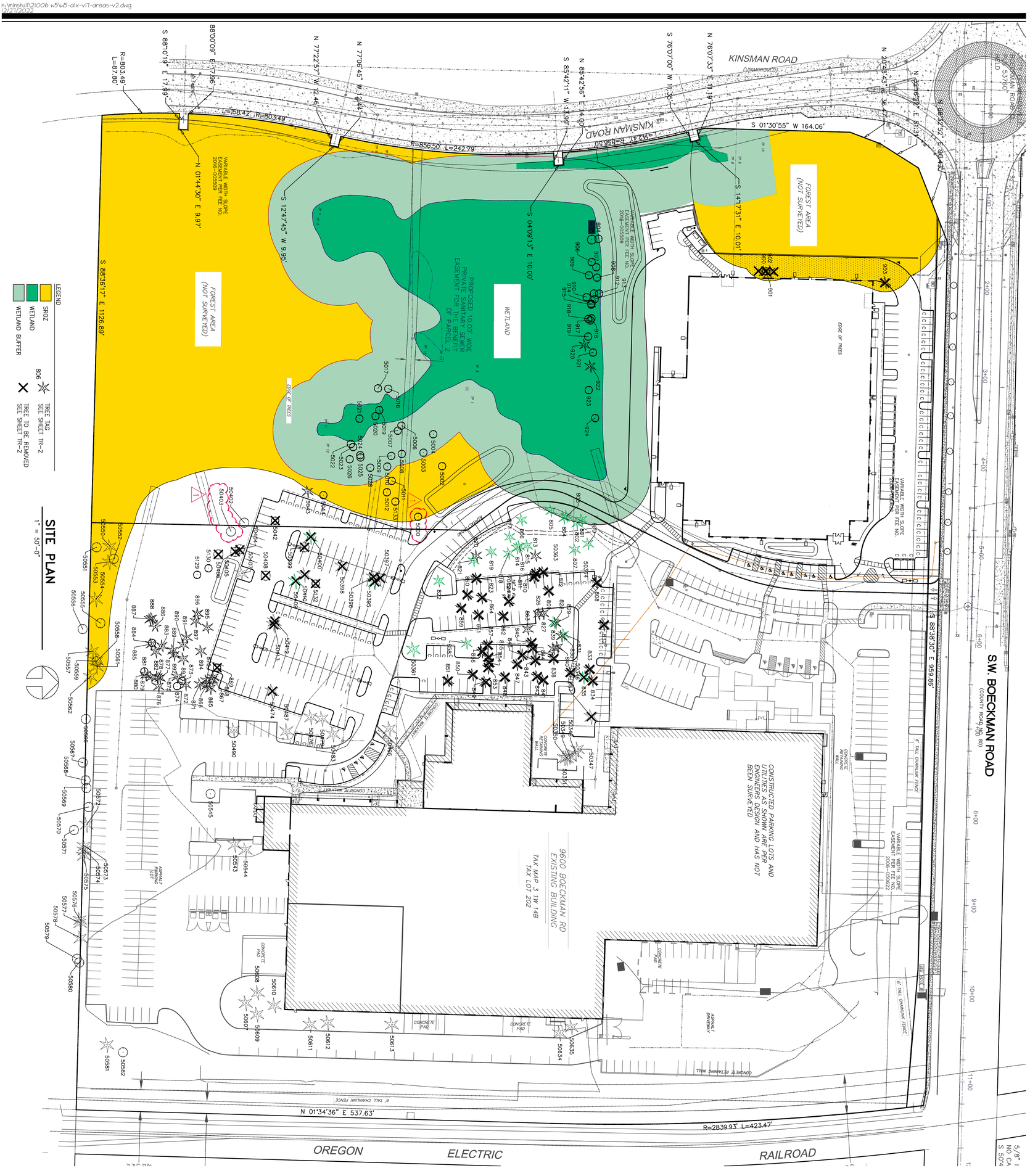
2/21/2022



TREE REMOVAL PLAN

sheet TR-1

LANCE MUELLER & ASSOCIATES
ARCHITECTS AIA
130 LAKESIDE • SUITE 250 • SEATTLE, WA 98122 • (206) 325-2553

BUILDING W5
99XX SW Boeckman Rd.
Wilsonville, OR 97070

REGISTERED ARCHITECT
LANCE MUELLER
SEATTLE, WA.
1491
STATE OF OREGON

18003	job no.		
EM	drawn		
BW	checked		
11-10-22	date		
	no.	revision	date
	1	SAVE TREES 5020 AND 50408	11-11-22
		SITE DESIGN REVIEW RESUBMITTAL	7-8-22

Item 2.

703

9600 Boeckman Rd Tree Assessment

	Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
	800	48	Ponderosa Pine	100+ x 37	Fair	Moderate & non-correctable defects	Partial lower crown due to crowding with a full upper crown. Co-dominant stems at 70'. Average annual twig growth.	A
	801	17	Ponderosa Pine	60 x 30	Poor	Moderate & non-correctable defects	Partial 1/3 very thin crown due to crowding. Below average annual twig growth. May improve with care.	B
	802	20	Ponderosa Pine	70 x 25	Fair	Moderate & non-correctable defects	Partial 3/4 crown due to crowding. Co-dominant stems at 50'. Average annual twig growth and moderate amount of large to medium deadwood in crown to remove.	A
	803	22	Ponderosa Pine	15 x 0	DEAD	DEAD	Dead 15' tall stump/snag has bark sloughing off and several holes from woodpeckers. DEAD STUMP, REMOVE.	
	804	12	Ponderosa Pine	50 x 12	Good	Few & minor or correctable defects	Nearly full asymetric crown with average to above average annual twig growth.	A
	805	15	Ponderosa Pine	50 x 15	Fair	Moderate & non-correctable defects	Partial 1/2 crown due to crowding and below average annual twig growth.	B
	806	36	Ponderosa Pine	100+ x 42	Good	Moderate & non-correctable defects	Partial 1/3 crown due to crowding and average annual twig growth.	A
	807	32	Ponderosa Pine	100+ x 30	Fair	Moderate & non-correctable defects	Partial 3/4 crown due to crowding and average annual twig growth.	A
X	808	30	Douglas Fir	100+ x 46	Good	Few & minor or correctable defects	Full crown with good annual twig growth.	
X	809	27	Douglas Fir	100+ x 35	Poor	Moderate & non-correctable defects	Partial 2/3 crown due to crowding. Codominant stems at 30'. Large deadwood in lower crown should be removed if tree is retained. Below average annual twig growth.	
X	810	19	Douglas Fir	100+ x 25	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with below average annual twig growth.	
X	811	34	Douglas Fir	100+ x 40	Fair	Moderate & non-correctable defects	Partial 1/2 crown due to crowding and below average annual twig growth.	
X	812	29	Douglas Fir	90 x 25	Poor	Major defects or problems	Very thin partial crown, top broken out at 90' with very poor annual twig growth.	
	813	22	Douglas Fir	80 x 22	Poor	Major defects or problems	Partial 1/2 crown due to crowding and below average annual twig growth. Top broken out at 80'.	B
	814	11	Douglas Fir	35 x15	Poor	Major defects or problems	Partial very thin 1/8 crown due to crowding. Top 12' to 15' dead with very poor annual twig growth. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	A
	815	24	Ponderosa Pine	100+ x 18	Fair	Moderate & non-correctable defects	Full narrow asymetric crown with broken out top. Below average annual twig growth.	A
	816	17	Ponderosa Pine	90 x 10	Poor	Major defects or problems	Very small, 5% to 8% live crown ratio, with below average annual twig growth.	A
	817	34	Ponderosa Pine	100+ x 25	Good	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with good annual twig growth.	A
	818	25	Ponderosa Pine	100+ x 18	Good	Moderate & non-correctable defects	Partial 7/8 asymetrical crown due to crowding with good annual twig growth.	A
	818 B	20	Douglas Fir	100+ x 30	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average annual twig growth. Light amount of medium deadwood to remove if retaining.	B
	819	36	Ponderosa Pine	100+ x 30	Good	Moderate & non-correctable defects	Partial 2/3 crown due to crowding. Good annual twig growth.	A
	820	24	Douglas Fir	80 x 20	Fair	Moderate & non-correctable defects	Subdominant tree with partial 1/3 crown due to crowding. Below average annual twig growth.	A
	821	36	Ponderosa Pine	100+ x 25	Good	Moderate & non-correctable defects	Partial lower crown and full upper crown due to crowding. Good annual twig growth.	A
	822	36	Ponderosa Pine	100+ x 35	Good	Few & minor or correctable defects	Full asymetric crown with good annual twig growth. Nice specimen.	B
X	823	25	Douglas Fir	90 x 30	Very Poor	Major defects or problems	Very thin partial 1/2 crown due to crowding with very poor annual twig growth indicates declining health. May improve with care.	
	826	30	Douglas Fir	100+ x 40	Fair	Moderate & non-correctable defects	Partial 2/3 asymetric crown due to crowding with below average annual twig growth. Large amount of medium to large deadwood in lower crown to be removed if retaining.	
	827	15	Douglas Fir	75 x 28	Fair	Moderate & non-correctable defects	Subdominant tree with thin partial 1/3 crown due to crowding. Below average annual twig growth. Some medium to fine deadwood in lower crown.	
	828	36	Ponderosa Pine	100+ x 33	Good	Few & minor or correctable defects	Nearly full asymetric crown with average to above average annual twig growth. Large amount of medium to large deadwood in lower crown to remove if retaining.	
	829	17	Douglas Fir	90 x 30	Fair	Moderate & non-correctable defects	Subdominant tree with partial 2/3 crown due to crowding and below average annual twig growth. Some medium deadwood in lower crown to remove if retaining.	
	830	17	Douglas Fir	90 x 22	Fair	Moderate & non-correctable defects	Top broken out at 90' with partial 2/3 crown due to crowding. Below average annual twig growth.	
	831	36	Ponderosa Pine	100+ x 38	Fair	Moderate & non-correctable defects	Below average annual twig growth. Some fine deadwood at branch tips indicates declining health which may improve with care.	
X	832	30	Douglas Fir	90 x 50	Excellent	Moderate & non-correctable defects	Top broken out at 90' with full symetrical crown and good annual twig growth. Some medium to large deadwood in lower crown to remove if retaining.	
X	833	30	Douglas Fir	80 x 30	Poor	Major defects or problems	Fungal fruiting bodies (conks) on trunk indicate presence of internal decay. Top splits into crooked top at 45'. Tree leans southwest at 15° to 20° with partial 2/3 crown due to crowding. Below average annual twig growth. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	
X	834	30	Douglas Fir	75 x 38	Fair	Moderate & non-correctable defects	Subdominant tree with top broken out. Partial 3/4 crown due to crowding with below average annual twig growth.	
X	835	41	Ponderosa Pine	100+ x 50	Good	Moderate & non-correctable defects	Partial 2/3 lower crown due to crowding with full asymetric upper crown. Average annual twig growth with some medium to fine deadwood in crown to remove if retaining.	
X	837	33	Douglas Fir	100+ x 37	Good	Moderate & non-correctable defects	Partial lower crown with full asymetric upper crown due to crowding. Average annual twig growth. Some large, medium and fine deadwood to remove if retaining.	
X	838	14	Douglas Fir	55 x 25	Very Poor	Major defects or problems	Fungal fruiting bodies (conks) on trunk indicate presence of internal decay. Partial 1/3 crown due to crowding. Below average annual twig growth and trunk has long swoop. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	
	839	18	Douglas Fir	90 x 18	Poor	Moderate & non-correctable defects	Subdominant tree with top broken out. Thin partial 1/3 crown due to crowding with very poor annual twig growth. POOR SPECIMEN, MARGINAL FOR RETENTION.	
	840	23	Douglas Fir	100+ x 25	Fair	Moderate & non-correctable defects	Thin partial lower and full upper crown with below average annual twig growth.	
X	841	18	Douglas Fir	90 x 40	Fair	Moderate & non-correctable defects	Thin partial 1/3 crown due to crowding. Below average annual twig growth.	
X	842	24	Douglas Fir	100+ x 40	Fair	Moderate & non-correctable defects	Partial 1/2 crown due to crowding and average annual twig growth. Large amount of medium to large deadwood in lower crown to remove if retaining.	
X	843	30	Douglas Fir	100+ x 45	Fair	Moderate & non-correctable defects	Nearly full asymetric crown with below average annual twig growth. Large amount of large deadwood on west side of lower crown to remove if retaining.	
X	844	16	Douglas Fir	60 x 28	Poor	Major defects or problems	Subdominant tree with top broken out at 60', thin crown and below average annual twig growth.	
X	845	12	Douglas Fir	80 x 25	Poor	Major defects or problems	Top broken out at 80', partial 3/4 crown due to crowding. Below average annual twig growth.	B
X	846	21	Douglas Fir	100+ x 30	Fair	Moderate & non-correctable defects	Partial 1/8 & 1/4 crown due to crowding. Below average annual twigh growth with some medium to large deadwood to remove if retaining.	
X	847	20	Douglas Fir	90 x 30	Fair	Moderate & non-correctable defects	Partial 1/2 crown due to crowding with below average annual twig growth. Some medium to fine deadwood in crown.	
X	848	24	Douglas Fir	100+ x 40	Fair	Moderate & non-correctable defects	Partial 3/8 crown due to crowding with average annual twig growth. Some medium deadwood on west side of lower crown to remove if retaining.	
X	849	30	Douglas Fir	100+ x 42	Good	Moderate & non-correctable defects	Partial 1/2 lower and full asymetric upper crown with average annual twig growth. Large amount of large deadwood on northwest side of lower crown to remove if retaining.	
X	850	30	Douglas Fir	100+ x 40	Good	Moderate & non-correctable defects	Partial 1/2 lower and full asymetric upper crown with average annual twig growth. Large amount of large deadwood on north side of lower crown to remove if retaining.	
X	851	45	Douglas Fir	100+ x 42	Good	Few & minor or correctable defects	Full crown with average annual twig growth. Two stems at 55'. Prune to improve structure if retaining.	
X	853	8	Douglas Fir	65 x 12	Poor	Major defects or problems	Subdominant tree with thin partial 1/4 crown due to crowding. Below average annual twig growth. POOR SPECIMEN MARGINAL FOR PRESERVATION.	
X	854	16	Douglas Fir	100+ x 16	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with below average annual twig growth.	
X	855	22	Douglas Fir	100+ x 35	Fair	Moderate & non-correctable defects	Partial 1/8 & 1/8 lower crown with a nearly full upper crown. Below average annual twig growth.	
X	856	22	Douglas Fir	90 x 18	Poor	Moderate & non-correctable defects	Very thin partial 1/4 crown due to crowding with below average annual twig growth. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	
X	857	29	Douglas Fir	100+ x 30	Fair	Moderate & non-correctable defects	Partial 1/3 lower and full upper crown with well below average annual twig growth.	
	858	35	Ponderosa Pine	100+ x 25	Good	Moderate & non-correctable defects	Partial 1/2 lower with full upper crown. Average annual twig growth with some deadwood in lower crown to be removed if retaining.	A
X	859	40	Douglas Fir	100+ x 50	Good	Moderate & non-correctable defects	2 stems at 3' with a partial 3/4 crown due to crowding. Below average annual twig growth. Some deadwood in lower crown to remove if retaining.	
X	860	26	Douglas Fir	100+ x 18	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with below average annual twig growth. Some medium to fine deadwood to remove if retaining.	
X	861	24	Douglas Fir	100+ x 32	Fair	Moderate & non-correctable defects	Thin partial 1/4 crown due to crowding with below average annual twig growth.	
X	862	27	Douglas Fir	100+ x 35	Fair	Few & minor or correctable defects	Full asymetric crown due to crowding with below average annual twig growth.	
	863	17	Douglas Fir	100+ x 30	Fair	Moderate & non-correctable defects	Partial 1/3 lower and full upper crown. Below average annual twig growth.	B
X	864	14	Douglas Fir	95 x 14	Fair	Moderate & non-correctable defects	Partial 1/4 lower with full upper crown due to crowding. Below average annual twig growth.	
	865	22	Douglas Fir	100+ x 25	Good	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average annual twig growth. Moderate amount of medium to fine deadwood to remove if retaining.	B
	866	11	Douglas Fir	100+ x 20	Poor	Moderate & non-correctable defects	Partial 1/8 very narrow crown due to crowding with poor annual twig growth and a light amount of deadwood. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	A
	867	11	Douglas Fir	55 x 16	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with average annual twig growth. Some medium deadwood to remove if retaining.	B

9600 Boeckman Rd Tree Assessment

	Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
	868	26	Douglas Fir	100+ x 45	Fair	Moderate & non-correctable defects	Partial 1/3 lower and nearly full upper crown with average annual twig growth. Moderate amount of medium to large deadwood to remove if retaining.	B
X	869	13	Pacific Madrone	35 x 30	Good	Moderate & non-correctable defects	Wound on south side at 3'. Asymetrical crown with good leaf size and annual twig growth. Some structural issues could be improved with pruning.	
	870	24	Douglas Fir	100+ x 30	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with below average annual twig growth. Some medium deadwood to remove if retaining.	A
	871	28	Douglas Fir	100+ x 50	Good	Moderate & non-correctable defects	Partial 1/4 lower and full upper crown due to crowding. Average annual twig growth wth a large amount of medium to large deadwood to remove if retaining.	A
	872	12	Douglas Fir	70 x 25	Fair	Moderate & non-correctable defects	Subdominant tree with partial 1/4 crown due to crowding. Average annual twig growth. Light amount of medium to fine deadwood in crown.	A
	873	24	Oregon White Oak	85 x 30	Good	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with good annual twig growth and average leaf size. Some fine deadwood in upper crown suggests some insect or health issue that should be further investigated if it is retained.	A
	874	17	Oregon White Oak	85 x 30	Good	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average annual twig growth and average leaf size. Some large deadwood to remove if retaining.	A
	875	14	Douglas Fir	70 x 25	Fair	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with average annual twig growth. Light amount of medium deadwood to remove if retaining.	A
	876	30	Douglas Fir	100+ x 50	Good	Moderate & non-correctable defects	Partial 1/2 lower and full upper crown due to crowding with average annual twig growth. Some light deadwood in crown.	A
	877	22	Douglas Fir	100+ x 37	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with poor annual twig growth. Some medium deadwood to remove if retaining.	A
	878	10	Douglas Fir	70 x 16	Fair	Moderate & non-correctable defects	Subdominant tree with partial 1/3 crown due to crowding. Below average annual twig growth with some light deadwood in lower crown.	A
	879	13	Douglas Fir	85 x 16	Poor	Major defects or problems	Partial 1/2 very thin crown due to crowding with poor annual twig growth. Some light deadwood. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	A
	880	24	Douglas Fir	100+ x 28	Fair	Moderate & non-correctable defects	Partial 1/8 lower and 1/2 partial upper crown due to crowding. Average annual twig growth with some medium deadwood to remove if retaining.	A
	881	24	Oregon White Oak	85 x 43	Good	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with good annual twig growth and leaf size. 2 stems at 6.5.' Crown is off center and heavy to south. Prune to balance and improve structure.	A
	882	13	Douglas Fir	50 x 25	Poor	Moderate & non-correctable defects	Partial 3/4 crown due to crowding with very poor annual twig growth and with a moderate amountd of medium to fine deadwood. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	A
	883	23	Douglas Fir	100 x 16	DYING	DYING	Nearly dead. Top 40' is dead. Dying tree is a POTENTIAL HAZARD, DO NOT PRESERVE.	A
	884	23	Oregon White Oak	70 x 38	Fair	Moderate & non-correctable defects	Partial 1/2 crown due to crowding with average leaf size and annual twig growth. 2 stems at 6' and some medium deadwood to remove if retaining. Prune to improve structure.	A
	885	17	Douglas Fir	80 x 20	Poor	Major defects or problems	Weak connection at base and partial 1/4 crown due to crowding. Poor annual twig growth and some medium deadwood in crown. POOR SPECIMEN, DO NOT PRESERVE.	A
	886	24	Douglas Fir	95 x 25	Poor	Major defects or problems	Thin partial 2/3 crown due to crowding with poor annual twig growth. Clearly declining health with med to large deadwood in mid crown. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	A
	887	17	Douglas Fir	85 x 25	Poor	HAZARD REMOVE	Partial 1/2 crown due to crowding with major wound and exposed internal decay on south side from 0' to 6'. HAZARD REMOVE.	A
	888	17	Douglas Fir	75 x 25	Poor	Major defects or problems	Thin partial 1/3 crown due to crowding with very poor annual twig growth. Some medium to large deadwood in lower crown. Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
	889	17	Douglas Fir	80 x 25	Poor	Major defects or problems	Thin partial 1/4 crown due to crowding with very poor annual twig growth. Moderate amount of medium to fine deadwood throughout crown. Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
	890	21	Douglas Fir	100+ x 35	Poor	Major defects or problems	Small thin full crown due to crowding with poor annual twig growth. Large amount of large deadwood. Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
	891	21	Douglas Fir	100+ x 18	Poor	Major defects or problems	Small thin crown due to crowding with poor annual twig growth. Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
	892	21	Douglas Fir	85 x 25	Poor	Major defects or problems	Thin partial 1/3 crown due to crowding. Poor annual twig growth. Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
	893	22	Douglas Fir	100+ x 25	Poor	Major defects or problems	Narrow thin nearly full crown with poor annual twig growth. Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	
	894	24	Douglas Fir	100+ x 35	Poor	Major defects or problems	Thin full crown with poor annual twig growth. Top is dying back and has fine deadwood throughout crown, Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	B
	895	22	Douglas Fir	100+ x 32	Fair	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with below average annual twig growth. Moderate amount of medium to large deadwood to remove if retaining.	B
	896	22	Douglas Fir	85 x 32	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average annual twig growth. Top is split with a dead side stem attached. Prune to remove deadwood and improve structure if retaining.	A
	897	27	Douglas Fir	100+ x 35	Poor	Major defects or problems	Thin full crown with dead top. Dying and serious decline in condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
X	900	13	Douglas Fir	65 x 20	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding. Below average annual twig growth.	
X	901	6	Scouler Willow	23 x 12	Very Poor	DYING HAZARD	Open wound exposes internal decay at 1' to 3'. Dead top and bark is sloughing off from 5' to top. DYING, HAZARD REMOVE.	
X	902	8	Douglas Fir	35 x 10	Fair	Major defects or problems	Subdominant tree with partial 1/8 crown due to crowding. Below average annual twig growth. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	
	903	13	Douglas Fir	55 x 20-	Fair	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with below average annual twig growth.	
	904	14	Oregon Ash	45 x 21	Fair	Moderate & non-correctable defects	Nearly full narrow crown due to crowding. Top leans 15° to 25° to north. Average annual leaf size and twig growth. May require inspection and pruning to improve structure if retained.	
	905	14	Oregon Ash	60 x 24	Good	Few & minor or correctable defects	Full upper and partial lower crown due to crowding. Good annual leaf size and twig growth.	A
	906	12	Oregon Ash	80 x 20	Good	Moderate & non-correctable defects	2 co-dominant stems at 30' with nearly full asymetric crown. Average annual leaf size and twig growth. Some medium size deadwood to be removed if area beneath it is developed.	A
	907	10	Oregon Ash	75 x 18	Fair	Moderate & non-correctable defects	2 co-dominant stems at 40' with partial, 2/3 crown due to crowding. Average annual leaf size and twig growth.	A
	908	15	Oregon Ash	70 x 30	Good	Moderate & non-correctable defects	Partial 2/3 crown due to crowding is off balance and heavy to north. Good annual leaf size and twig growth.	A
	909	11	Oregon Ash	75 x 20	Good	Few & minor or correctable defects	Nearly full narrow crown due to crowding. Good annual leaf size and twig growth.	A
	910	8	Oregon Ash	80 x 18	Good	Few & minor or correctable defects	Nearly full narrow crown due to crowding. Good annual leaf size and twig growth.	A
	911	8	Oregon Ash	80 x 15	Good	Few & minor or correctable defects	Nearly full narrow crown due to crowding. Good annual leaf size and twig growth.	A
	912	8	Oregon Ash	75 x 20	Fair	Moderate & non-correctable defects	Partial crown due to crowding with below average annual twig growth. Top broken out at 60' and may need pruning to improve structure.	A
	913	11	Oregon Ash	20 x 5	Poor	Major defects or problems	Top broken out at 20' with a small amount of sucker growth from trunk. TREE DESTROYED, DO NOT PRESERVE.	A
	914	7	Oregon Ash	28 x 2	Poor	Major defects or problems	Top broken out at 28' with a small amount of sucker growth from trunk. TREE DESTROYED, DO NOT PRESERVE.	A
	915	15	Oregon Ash	80 x 25	Fair	Few & minor or correctable defects	Nearly full asymetric crown with average annual leaf size and twig growth. Some stubs from ice storm broken branches.	A
	916	11	Oregon Ash	80 x 25	Good	Moderate & non-correctable defects	Partial crown due to crowding with good annual leaf size and twig growth. Off balance and heavy to north. Some stubs from ice storm broken branches.	A
	917	14	Oregon Ash	80 x 25	Good	Moderate & non-correctable defects	Partial crown due to crowding with good annual leaf size and twig growth. Off balance and heavy to north. Some stubs from ice storm broken branches.	A
	918	5, 4	Common Hawthorne	30 x 20	Poor	Major defects or problems	Partial crown due to crowding. Off balance to west. INVASIVE SPECIES & POOR SPECIMEN, DO NOT PRESERVE.	A
	5000	15	Oregon White Oak	60 x 45	Good	Few & minor or correctable defects	Full crown with good annual leaf size and twig growth. Some medium to fine deadwood to remove.	
	5002	17	Douglas Fir	0 x 0	DEAD	DEAD	Broken off lower trunk. TAKEN DOWN & REMOVED.	B
	5003	48	Ponderosa Pine	100+ x 40	Good	Few & minor or correctable defects	Full crown with good annual twig growth. Some medium deadwood to remove.	A
	5011	9	Bird Cherry	50 x 15	Very Poor	Moderate & non-correctable defects	Partial very small crown due to crowding. Sapsucker damage has nearly girdled trunk. Large amount of deadwood. VERY POOR SPECIMEN, DO NOT PRESERVE.	A
	5012	13	Oregon White Oak	50 x 20	Fair	Moderate & non-correctable defects	Partial asymetric crown with below average annual twig growth and leaf size.	A
X	5042	27, 18	Oregon White Oak	85 x 75	Good	Moderate & non-correctable defects	2 stems at 30". Crown off balance to east with some medium and large deadwood to remove. Prune to balance and improve structure. Cable two stems together if retaining.	
	5043	48	Ponderosa Pine	100+ x 47	Good	Moderate & non-correctable defects	Full asymetric crown due to crowding with average annual twig growth. Some recently dead branches and some large deadwood throughout crown to remove if retaining.	
	5044	14	Oregon Ash	90 x 37	Good	Moderate & non-correctable defects	Partial 3/4 crown due to crowding with good leaf size and annual twig growth. Some medium to fine deadwood throughout crown.	
	5129	12	Oregon Ash	80 x 23	Fair	Moderate & non-correctable defects	Full asymetric crown with chlorotic leaves, below average leaf size and annual twig growth indicates current health problems. May improve with care.	
	5130	14	Oregon Ash	80 x 40	Fair	Moderate & non-correctable defects	Full asymetric crown with below average leaf size and annual twig growth. Tree has some structural problems that can be improved with pruning.	
X	5132	24	Oregon White Oak	0 X 0	DEAD	DEAD	15' stump lying on ground due to being toppled by winter ice storm.	
	5133	23	Oregon White Oak	8 x 0	DEAD	DEAD	Trunk broken off at 8', only stump remains. REMOVE STUMP.	
	6604	34	Douglas Fir	100+ x 45	Very Poor	Major defects or problems	Nearly full asymetric very thin crown with very poor annual twig growth. Tree in serious decline, likely due to saturated soil in wetland. Medium to fine deadwood throughout crown. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	
	6612		NO TREE			NO TREE	No tree at this location	
	6616	12	Oregon Ash	75 x 30	DYING	DYING HAZARD	Wounds extensive internal decay exposed from 0' to 7' across over 50% of circumference. DYING, HAZARD, REMOVE.	

9600 Boeckman Rd Tree Assessment

	Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
	6587	17	Oregon Ash	80 x 25	Fair	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with average annual leaf size and twig growth. Some large to medium deadwood to remove if area beneath it is improved.	A
	6597	11	Oregon White Oak	90 x 20	Fair	Moderate & non-correctable defects	Partial 1/8 & 1/8 crown due to crowding with average annual leaf size and twig growth.	A
X	50346	32	Douglas Fir	85 x 35	Very Poor	Dying Hazard	Thin partial 3/4 crown due to crowding with very poor annual twig growth. Top was broken out and remaining top is dying with large amount of deadwood throughout crown. Dying tree is a POTENTIAL HAZARD REMOVE.	
	50347	26	Douglas Fir	95 x 35	Good	Moderate & non-correctable defects	Partial lower and full upper crown due to crowding. Below average annual twig growth. Leans to northwest at 8° to 10°.	A
	50348	9	Douglas Fir	25 x 18	Fair	Moderate & non-correctable defects	Partial crown due to crowding with below average annual twig growth. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
	50349	34	Ponderosa Pine	100+ x 40	Good	Moderate & non-correctable defects	Partial lower and full upper crown with average annual twig growth. Top broken out and recently dead branches on north side indicates some potential health problem. May improve with care.	A
	50350	24	Douglas Fir	100+ x 40	Good	Moderate & non-correctable defects	Partial crown due to crowding with below average annual twig growth. Some medium to fine deadwood to remove if retaining.	A
	50351	35	Douglas Fir	100+ x 35	Fair	Moderate & non-correctable defects	Partial crown due to crowding with below average annual twig growth. Light amount of fine deadwood throughout crown.	A
	50361	41	Ponderosa Pine	100+ x 50	Good	Few & minor or correctable defects	Full crown with average annual twig growth. Moderate amount of medium to large deadwood to remove is retaining.	B
	50363	No Tree	NO TREE		NO TREE		No tree at this location.	
	50364	No Tree	NO TREE		NO TREE		No tree at this location.	
X	50395	36	Ponderosa Pine	100+ x 35	Good	Few & minor or correctable defects	Full crown with good annual twig growth. Some medium to large deadwood to remove if retaining.	
X	50396	19	Ponderosa Pine	75 x 20	Fair	Moderate & non-correctable defects	Partial 1/2 crown due to crowding with average annual twig growth. Some recently dead branches in crown.	
X	50397	19	Douglas Fir	75 x 30	Fair	Moderate & non-correctable defects	Subdominant tree with partial 2/3 crown due to crowding and good annual twig growth.	
X	50398	19	Douglas Fir	90 x 27	Fair	Few & minor or correctable defects	Full crown with below average annual twig growth.	
X	50399	21	Oregon White Oak	75 x 30	Good	Moderate & non-correctable defects	Full asymetric crown is off balance and heavy to south. Some large, medium to fine deadwood in crown. Prune to improve structure if retaining.	
X	50400	42	Ponderosa Pine	100+ x 45	Good	Few & minor or correctable defects	Full crown with average annual twig growth. Some medium to large deadwood to remove if retaining.	
	50402	15, 13	Oregon Ash	85 x 42	Good	Moderate & non-correctable defects	2 stems at 3', full asymetric crown is off balance to south. Some medium deadwood. Good leaf size and annual twig growth. Prune to improve structure and remove deadwood.	
	50403	17	Oregon White Oak	80 x 35	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average leaf size and annual twig growth. Prune to improve structure and balance.	
X	50404	17	Oregon White Oak	85 x 40	Good	Moderate & non-correctable defects	Full asymetric crown with average leaf size and annual twig growth. Some medium to large deadwood to remove if retaining.	
X	50405	12	Oregon Ash	70 x 27	Poor	HAZARD REMOVE	Large open wound that exposes internal decay from 0' to 3'. Partial crown due to crowding. Some large deadwood. Poor specimen and not sound due to decay. HAZARD REMOVE.	
X	50406	12, 9	Bird Cherry	65 x 30	Fair	Moderate & non-correctable defects	Full crown with 2 stems at ground. Thin crown, average size wilted leaves due drought and average annual twig growth. May improve with care.	
	50407	24	Douglas Fir	100+ x 40	Fair	Moderate & non-correctable defects	Partial 1/2 lower crown and full upper crown. Average annual twig growth with large, medium and fine deadwood to remove if retaining.	
X	50408	15	Bigleaf Maple	60 x 40	Fair	Moderate & non-correctable defects	Full crown with dead top. Below average annual twig growth and average leaf size may be due to drought. Prune to remove deadwood.	
X	50409	32	Ponderosa Pine	100+ x 40	Good	Moderate & non-correctable defects	Partial 3/4 asymetric crown due to crowding with good annual twig growth. Some large, medium and fine deadwood to remove if retaining.	
X	50410	23	Douglas Fir	100+ x 42	Good	Moderate & non-correctable defects	Partial 7/8 asymetrical crown due to crowding with average annual twig growth. Some medium to fine deadwood.	
X	50412	15	Douglas Fir	100+ x 23	Fair	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with below average annual twig growth. Medium to fine deadwood to remove if retaining.	
X	50413	20	Douglas Fir	100+ x 30	Fair	Moderate & non-correctable defects	Partial 2/3 lower and full upper crown due to crowding with average annual twig growth. Some medium to fine deadwood to remove if retaining.	
X	50474	28	Douglas Fir	100+ x 35	Good	Few & minor or correctable defects	Full crown with below average annual twig growth. Moderate amount of medium to fine deadwood to remove if retaining.	
	50476	35	Douglas Fir	100+ x 45	Good	Few & minor or correctable defects	Partial 2/3 lower and nearly full upper crown with good annual twig growth. Moderate amount of large, medium and fine deadwood to remove if retaining.	B
X	50476 B	16	Douglas Fir	90 x 32	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with below average annual twig growth. Some medium to large deadwood to remove if retaining.	A
	50476 C	17	Douglas Fir	100 x 32	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with below average annual twig growth. Some medium to large deadwood to remove if retaining.	A
	50479	24	Douglas Fir	100+ x 35	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average annual twig growth. Moderate amount of medium to fine deadwood to remove if retaining.	B
	50479 B	11	Douglas Fir	60 x 16	Poor	Moderate & non-correctable defects	Subdomiant tree with partial 1/4 crown due to crowding with below average annual twig growth. Serious declining health with significant deadwood. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	B
	50479 C	7	Douglas Fir	50 x 12	Poor	Major defects or problems	Subdominant tree with 1/8 crown due to crowding with very poor annual twig growth. Seriously declining health with significant deadwood. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	A
	50479 D	6	Douglas Fir	35 x 0	DEAD	DEAD	DEAD TREE, REMOVE.	
	50483	25	Douglas Fir	100+ x 28	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average annual twig growth. Moderate amount of medium to fine deadwood to remove if retaining.	B
	50483 B	25	Douglas Fir	100+ x 45	Good	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with below average annual twig growth. Moderate amount of medium to find deadwood to remove if retaining.	B
	50483 C	19	Douglas Fir	100+ x 28	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with below average annual twig growth. Some fine deadwood.	B
	50487	16	Douglas Fir	100+ x 25	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with below average annual twig growth. Some fine deadwood.	A
	50487 B	18	Douglas Fir	100+ x 28	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with below average annual twig growth. Some medium to large deadwood to remove if retaining.	A
	50487 C	7	Douglas Fir	25 x 10	Poor	Major defects or problems	Subdominant tree with 1/2 crown due to crowding and below average annual twig growth. Moderate amount of medium deadwood. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
	50487 D	22	Douglas Fir	100+ x 32	Fair	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with below average annual twig growth. Moderate amount of medium to find deadwood to remove if retaining.	A
	50490	30	Douglas Fir	100+ x 40	Fair	Moderate & non-correctable defects	Full crown with below average annual twig growth. Moderate amount of medium to fine deadwood to remove if retaining.	A
	50496	41	Douglas Fir	100+ x 50	Good	Few & minor or correctable defects	Full crown with average annual twig growth. Some medium to large deadwood to remove if retaining.	A
	70824	19	Douglas Fir	100+ x 35	Fair	Moderate & non-correctable defects	Partial 1/4 lower and full upper crown due to crowding. Below average annual twig growth with a moderate amount of medium to large deadwood to remove if retaining.	
	70824 B	20	Douglas Fir	100+ x 35	Fair	Moderate & non-correctable defects	Partial 1/4 lower and full upper crown due to crowding. Below average annual twig growth with a moderate amount of medium to large deadwood to remove if retaining.	

Notes: Retain A = Retain without aeration, Retain B = Retain with aeration

no.	revision	date
1	SAVE TREES 5000 AND 50403	11-11-22
	SITE DESIGN REVIEW RESUBMITTAL	7-8-22

18003 job no.
EM drawn
BW checked
11-11-22 date

REGISTERED ARCHITECT · LANCE MUELLER · SEATTLE, WA. · 1491 · STATE OF OREGON

BUILDING W5
99XX SW Boeckman Rd.
Wilsonville, OR 97070

TREE REPORT

LANCE MUELLER & ASSOCIATES
ARCHITECTS AIA
130 LAKESIDE • SUITE 250 • SEATTLE, WA 98122 • (206) 325-2553

sheet
TR-2

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IN THE NW 1/4 SECTION 14, T.3S., R.1W., W.M.
CITY OF WILSONVILLE,
CLACKAMAS COUNTY, OREGON

CITY OF WILSONVILLE PLANNING DIVISION CASE FILE: AR20-0044
JUNE 9, 2021
SURVEY FOR: W-4 LLC

PARTITION PLAT NO. 2022-054

HELD 'B' 2-1/2" BRONZE DISK IN MONUMENT BOX MARKED "CITY OF WILSONVILLE, BOECKMAN ROAD CL, PLS 53760" [S8] (MONUMENT TIED IN 2016). FORMERLY 3/4" IRON PIPE, PER S11. 5/8" IR W/YPC MKD. "OBEC" [S13], SET IN 2018 (NOT HELD FOR N. 1/6TH CORNER)

HELD NW COR. OF THE NE1/4 OF THE NW1/4, SECTION 14, POSITION HELD 1330.01' AS MEASURED ALONG SW BOECKMAN ROAD CENTERLINE FROM MONUMENT 'A' PER S7. MEASURES S88°38'29"E, 0.59' (0.57')S13 FROM MONUMENT 'B'.

HELD 'E' 5/8" IR W/YPC MKD. "LS 1332", DOWN 0.8' [P3]

CLACKAMAS COUNTY SURVEYOR T 3 S R 1 W 1/4 S 11 S 14 2008 UNLAWFUL TO DISTURB

HELD 'A' NORTH 1/4 CORNER, SECTION 14, 3-1/4" BRASS DISK IN MONUMENT BOX PER U.S.B.T. 2008-120

HELD 'C' 5/8" IR DOWN 2.0' [S1]

HELD 'D' 5/8" IR W/YPC MKD. "DLT & ASSOC PLS 1362" DOWN 1.0' [S10]

HELD 'F' FOR W'LY LINE OF NE1/4 OF THE NW1/4, SECTION 14, 5/8" IR W/YPC MKD. "WRG DESIGN, INC.",FLUSH' [S7]

HELD 'G'

SET WITNESS CORNER N 88°36'13" W 7.00'

HELD 'CP1' (TRUE CORNER SET IN RR BALLAST)

INITIAL POINT

DETAIL 'F' ON PAGE 3

SW BOECKMAN ROAD (COUNTY ROAD NO. 80)

SW KINSMAN ROAD

BASIS OF BEARINGS N 88°38'29" W 1330.60' (N 88°38'29" W 1330.53')S9

N01°21'31"E 38.00' (38.00')D2

S 88°38'29" E 24.54'

(C)D2 S88°38'29"E 121.64'

1" BRASS DISK MKD. "OBEC" [S13]

398.61' S 88°38'29" E 959.86' 561.27'

PUE PER D6 S 43°37'20" E 36.76'

SEE DETAIL 1 THIS PAGE

N 68°32'53" E 90.43' (N 68°34'58" E 90.26")D3

N 32°16'22" E 51.31' (N 32°18'48" E 51.32")D3

N 20°43'44" E 36.47' (N 20°42'43" E 36.44')D3

N 01°30'33" E 164.06' (N 01°32'07" E)D3

VARIABLE WIDTH SLOPE EASEMENT PER FEE NO. 2016-005509 BENEFITS CITY OF WILSONVILLE

S 76°07'33" W 11.19' (N 76°02'07" E 11.24')D3

C2 L=9.61' (9.63')D3

N 14°17'30" W 10.01' (S 13°57'53" E 10.00')D3

C3 L=2.58' (2.56')D3

N 76°07'01" E 11.34' (S 76°02'07" W 11.34')D3

C4 L=142.38' (142.39')D3

WATER LINE EASEMENT PER D7 BENEFITS CITY OF WILSONVILLE

WATER SYSTEM FACILITIES EASEMENT PER FEE NO. 2018-032085 BENEFITS TUALATIN VALLEY WATER DISTRICT

(N 85°55'15" E 14.01')D3

S 85°42'57" W 14.00'

N 04°09'12" W 10.00' (S 04°04'45" E 10.00')D3

N 85°42'11" E 14.01' (S 85°55'15" W 14.01')D3

999.40' (999.40')D5

VARIABLE WIDTH SLOPE EASEMENT PER FEE NO. 2016-005509 BENEFITS CITY OF WILSONVILLE

WESTERLY LINE OF THE NE1/4 OF THE NW1/4 OF SECTION 14

26.50' (CENTERLINE & R/W PER S13)

C5 L=242.79' (242.82')D3

C6 L=6.53' (6.53')D3

N 77°06'45" W 12.45' (S 77°10'06" E 12.47')D3

N 12°47'46" E 9.95' (S 12°49'54" W 10.00')D3

S 77°22'56" E 12.46' (N 77°10'06" W 12.47')D3

VARIABLE WIDTH SLOPE EASEMENT PER FEE NO. 2016-005509 BENEFITS CITY OF WILSONVILLE

WATER LINE EASEMENT PER D7 BENEFITS CITY OF WILSONVILLE

C7 L=158.42' (158.44')D3

N 88°00'09" W 17.98' (S 88°02'59" E 17.98')D3

N 01°44'30" E 9.97' (S 01°57'01" W 10.00')D3

S 88°10'18" E 18.01' (N 88°02'59" W 17.98')D3

(S 01°32'07" E)S9 S 01°32'10" W

C8 L=87.80' (87.90')D3

S 88°36'13" E 29.73'

(26.50') TO RE-ALIGNED CENTERLINE

BOUNDARY RADIAL S 85°19'29" W

26.50' (CENTERLINE & R/W PER S13)

461.66'

(30.00' PUE) D6 BENEFITS TVWD AND COH

N 88°38'29" W 856.40' 13.00' WIDE SLOPE EASEMENT PER FEE NO. 2006-050622 BENEFITS CITY OF WILSONVILLE

142.60' S 01°21'31" W

N 88°38'29" W 623.86'

N 01°21'31" E 15.00'

N 88°38'29" W 344.01'

S 01°21'31" W 123.37'

S 89°00'22" E 184.31'

C9 L=116.62'

40' WIDE ACCESS AND UTILITIES SEE PLAT NOTE 2 BENEFITS PARCELS 1 & 2

PARCEL 2
437,610 SQUARE FEET
(10.046 ACRES)

S 26°06'20" W 181.32'

N 89°59'38" E 258.45'

C10 L=76.59'

S 36°34'57" E 54.85'

10' WIDE SDE SEE DETAIL 'A' SEE PLAT NOTE 3

10' WIDE SSE SEE DETAIL 'A' SEE PLAT NOTE 4

10' WIDE SDE SEE DETAIL 'A' SEE PLAT NOTE 3

10' WIDE SDE SEE DETAIL 'A' SEE PLAT NOTE 3

S 01°04'48" W 425.83'

N 01°04'29" E 285.12'

STORM WATER MAINTENANCE EASEMENT AREA PER FEE NO. 2019-072356 BENEFITS PARCELS 2

PARCEL 1
629,112 SQUARE FEET
(14.442 ACRES)

FROM NORTH 1/4 COR. SECTION 14, S. 612.86', W. 189.50' (S. 612.86', W. 189.32')PER FEE NO. 2007-100710

RAILROAD FACILITIES EASEMENT PER FEE NO. 2007-100710 BENEFITS TRI-COUNTY METROPOLITAN TRANSPORTATION DISTRICT OF OREGON

1127.18'
1156.91' (S 89°44' W 1160' M/L)D5 (N 88°34'51" W 1153.51')S3
N 88°36'13" W 1328.88' (S 89°51' W 1325.69')S1
FEE NO. 96-090710

RADIAL: N 70°09'46" E 2889.93'

50.00'

R=2839.93' (2839.93')S5,S3,P3
L=630.48' Δ=12°43'12"
CH.=N 13°28'39" W 629.19'

C1 L=3.79' (3.79")D2

RADIAL: N 82°52'58" E

13.00'

(45.00' PUE)D6 BENEFITS TVWD

38' D2

43'

S01°21'31"W 38.00' (38.00')D2

20.00'(S10)

223.90'(223.90')S8

S 80°11'48" W 209.40'

N 88°38'29" W 157.88' (N 89°47'44" E 156.60')S10

S 79°56'55" E 14.88' (N 79°56'30" W 15.09')D2

N 85°22'01" W 155.94' VARIABLE WIDTH SLOPE EASEMENT PER FEE NO. 2006-050622 BENEFITS CITY OF WILSONVILLE

STORM WATER MAINTENANCE EASEMENT PER FEE NO. 2019-072356 BENEFITS PARCEL 2

45.00'

R=2839.93'(2839.93')S5
L=429.55'(439.12')S5
Δ=8°39'58"(08°51'33")S5
CH.=S 2°47'03" E, 429.14'
(N 02°50'05" W)S8

45' WIDE TRANSMISSION LINE EASEMENT PER BOOK 285, PAGE 301 BENEFITS UNITED STATES OF AMERICA

14' WIDE PERMANENT SLOPE EASEMENT PER FEE NO. 2006-111828 BENEFITS TRI-COUNTY METROPOLITAN TRANSPORTATION DISTRICT OF OREGON

N 88°27'04" W 50.00'

45.00'

25.00'

1.40'

499.94'

S 01°32'56" W 531.61' (537.45')S3

OREGON ELECTRIC RAILWAY CO.

S 01°32'56" W 530.07' (530.12')S5

FEE NO 2010-008592

14' WIDE PERMANENT SLOPE EASEMENT PER FEE NO. 2006-111828 BENEFITS TRI-COUNTY METROPOLITAN TRANSPORTATION DISTRICT OF OREGON

25' WIDE TRANSMISSION LINE EASEMENT PER BOOK 284, PAGE 434 BENEFITS UNITED STATES OF AMERICA

VOLUME 98 PAGE 296

50.00'

(101.85')S5 101.97'

HELD (171.97")S1

50.00'

665.52'

24.97' (25')VOLUME 25, PAGE 256 MEASURED TO CENTERLINE OF MAIN TRACK OF OREGON ELECTRIC RAILWAY.

MAIN TRACK OF OREGON ELECTRIC RAILWAY.

FEE NO. 2008-007901

S 01°36'01" W 1000.28' (1000.26')S5,S10

5/8" IR W/YPC MKD. "S.C.E. INC." DOWN 0.5' [S5]

20.00'

SEE PLAT DETAILS ON PAGES 2 & 3

NORTH

DETAIL 1
SCALE: 1" = 5'

SW KINSMAN ROAD

N 32°16'22" E 51.31'

6.33'

N 20°43'44" E 36.47'

4.19'

N 01°31'24" E 10.35' (S 01°32'07" W)D7

S 88°28'36" E 5.18' (N 88°27'53" E)D7

WATER LINE EASEMENT PER D7

CURVE DATA				
CURVE	LENGTH	RADIUS	DELTA	LONG CHORD
C1	3.79'	25.00'	8°41'34"	S 84°17'42" E 3.79'
C2	9.61'	803.50'	0°41'07"	N 12°42'16" W 9.61'
C3	2.58'	803.50'	0°11'01"	N 13°51'09" W 2.58'
C4	142.38'	856.50'	9°31'28"	N 9°10'56" W 142.21'
C5	242.79'	856.50'	16°14'29"	N 4°22'10" E 241.98'
C6	6.53'	856.50'	0°26'13"	N 13°22'42" E 6.53'
C7	158.42'	803.50'	11°17'48"	N 7°56'55" E 158.16'
C8	87.80'	803.50'	6°15'39"	N 1°32'41" W 87.76'
C9	116.62'	270.00'	24°44'51"	N 13°43'57" E 115.72'
C10	76.59'	70.00'	62°41'17"	S 5°14'19" E 72.82'

RECORD CURVE DATA PER D2				
CURVE	LENGTH	RADIUS	DELTA	LONG CHORD
C1	3.79'	25.00'	8°41'34"	N 84°17'17" W 3.79'

RECORD CURVE DATA PER D3				
CURVE	LENGTH	RADIUS	DELTA	LONG CHORD
C2	9.63'	803.50'	–	S 12°41'58" E 9.63'
C3	2.56'	803.50'	–	S 13°50'50" E 2.56'
C4	142.39'	856.50'	–	S 9°10'34" E 142.22'
C5	242.82'	856.50'	–	S 4°22'38" W 242.01'
C6	6.53'	856.50'	–	S 13°23'11" W 6.53'
C7	158.44'	803.50'	–	S 7°57'20" W 158.18'
C8	87.90'	803.50'	–	S 1°32'26" E 87.86'

REGISTERED PROFESSIONAL LAND SURVEYOR

OREGON
SEPTEMBER 10, 2019
BRIAN LEGGS
77667PLS
RENEWS: DEC. 31, 2022

GRAPHIC SCALE
100 0 50 100
1 INCH = 100 FEET

SHEET 1 OF 4

LEGEND:

- FOUND MONUMENT AS NOTED
- FOUND 5/8" IR W/YPC MKD. "OBEC", SET IN S13
- SET 5/8"x30" IR W/YPC MKD. "ANDY PARIS & ASSOC, INC." ON 10/20/21
- SET 1-5/32" COPPER DISK MKD. "PARIS & ASSOC." ON 10/20/21
- SET 5/8"x30" IR W/ ALUMINUM CAP MKD. "ANDY PARIS & ASSOC. INC" ON 10/20/21

D1 FEE NO. 2006-032934
D2 FEE NO. 2006-050621
D3 FEE NO. 2016-005508
D4 FEE NO. 2016-005509
D5 FEE NO. 2016-065035
D6 FEE NO. 2016-022826
D7 FEE NO. 2013-045155
P1 "BOBERG" (PLAT NO. 174)
P2 PARTITION PLAT NO 1990-083
P3 "WILSONVILLE BUISINESS CENTER PHASE 3" (PLAT NO. 3002)
S1 SN 7751
S2 SN 7635
S3 SN 12979
S4 SN 19309
S5 SN 27256
S6 SN 29679
S7 SN 29387
S8 SN 2008-329
S9 SN 2010-187
S10 SN 19392
S11 SN 11402
S12 SN 23243
S13 SN 2018-034
S14 U.S.B.T. 2008-120

IR IRON ROD
IP IRON PIPE
(C) CALCULATED VALUE
HFL HELD FOR LINE
MKD. MARKED
PUE PUBLIC UTILITY EASEMENT
SDE STORM DRAIN EASEMENT FOR, BENEFITS PARCEL 1
SSE SANITARY SEWER EASEMENT, BENEFITS PARCEL 1
TVWD TUALATIN VALLEY WATER DISTRICT
U.S.B.T. UNITED STATES BEARING TREE
SN SURVEY NUMBER, CLACKAMAS COUNTY SURVEY RECORDS
W/YPC WITH YELLOW PLASTIC CAP
( ) ENCLOSES RECORD DATA
[ ] PROBABLE ORIGIN OF MONUMENT

SINCE 1952
ANDY PARIS AND ASSOCIATES, INC.
PROFESSIONAL LAND SURVEYORS
16057 BOONES FERRY ROAD
LAKE OSWEGO, OREGON 97035
PH: 503-636-3341
www.andyparis.com

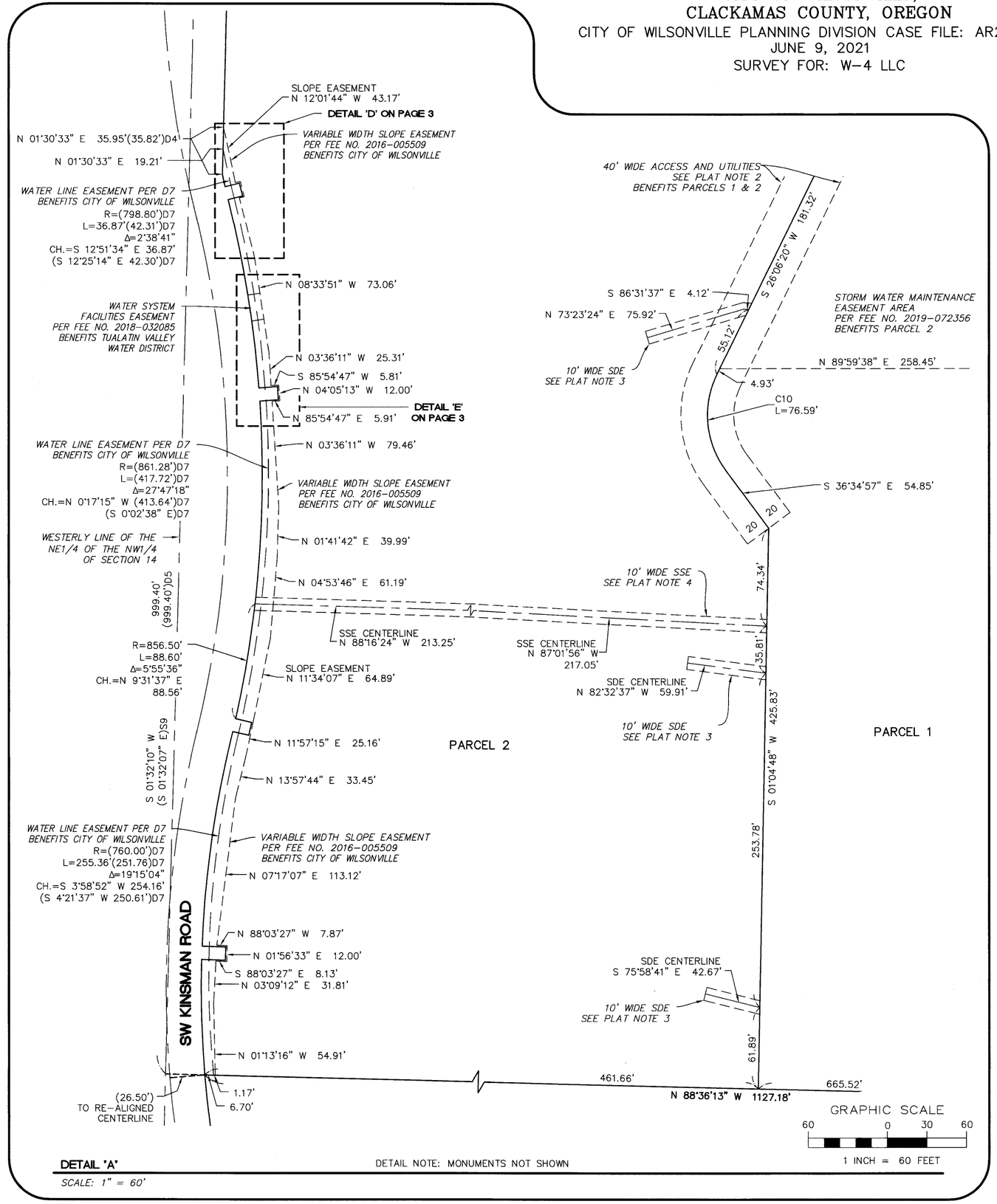
PROJECT: 16168
DRAWING: 16168PP3.DWG
DRAFTED: BL 6/10/21

IN THE NW 1/4 SECTION 14, T.3S., R.1W., W.M.
CITY OF WILSONVILLE,
CLACKAMAS COUNTY, OREGON

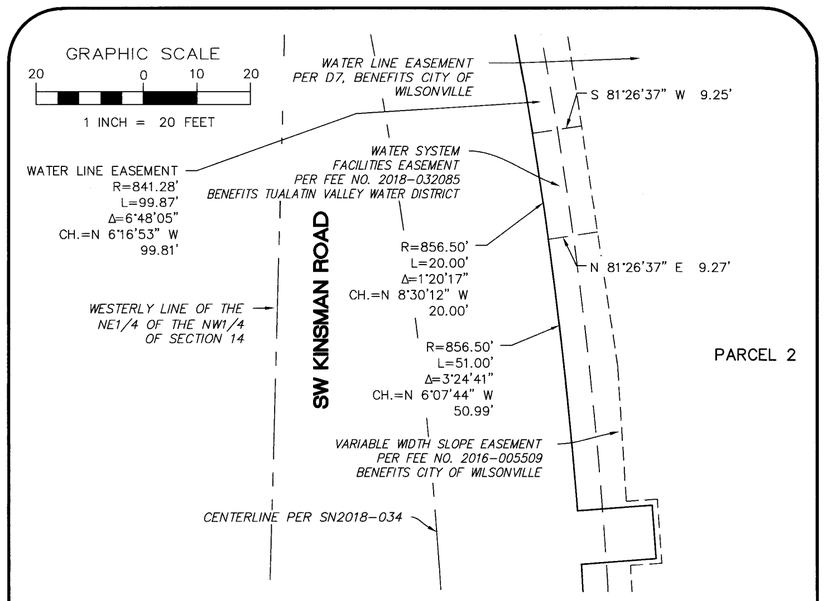
CITY OF WILSONVILLE PLANNING DIVISION CASE FILE: AR20-0044
JUNE 9, 2021
SURVEY FOR: W-4 LLC

PARTITION PLAT NO. 2022-054

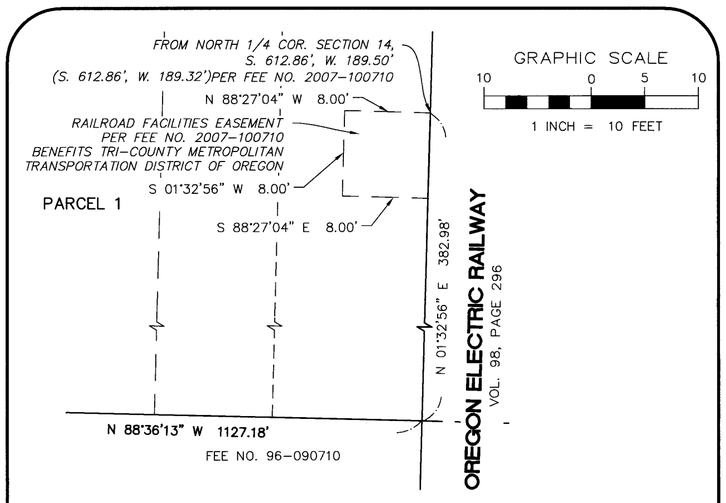
NORTH



DETAIL 'A' DETAIL NOTE: MONUMENTS NOT SHOWN
SCALE: 1" = 60'



DETAIL 'B' DETAIL NOTE: MONUMENTS NOT SHOWN
SCALE: 1" = 20'



DETAIL 'C' DETAIL NOTE: MONUMENTS NOT SHOWN
SCALE: 1" = 10'

SHEET 2 OF 4

REGISTERED
PROFESSIONAL
LAND SURVEYOR
OREGON
SEPTEMBER 10, 2019
BRIAN LEGGS
77667PLS
RENEWS: DEC. 31, 2022

SINCE 1952
ANDY PARIS AND ASSOCIATES, INC.
PROFESSIONAL LAND SURVEYORS
16057 BOONES FERRY ROAD
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PH: 503-636-3341
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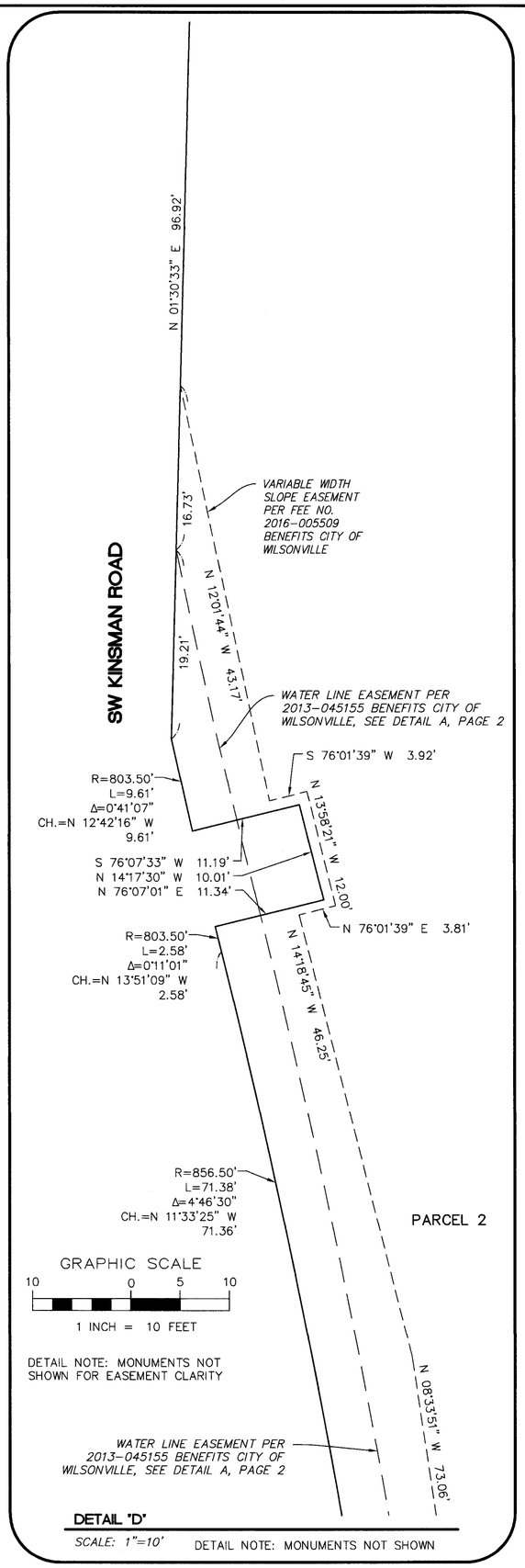
PROJECT: 16168
DRAWING: 16168PP3.DWG
DRAFTED: BL 6/10/21

IN THE NW 1/4 SECTION 14, T.3S., R.1W., W.M.
CITY OF WILSONVILLE,
CLACKAMAS COUNTY, OREGON

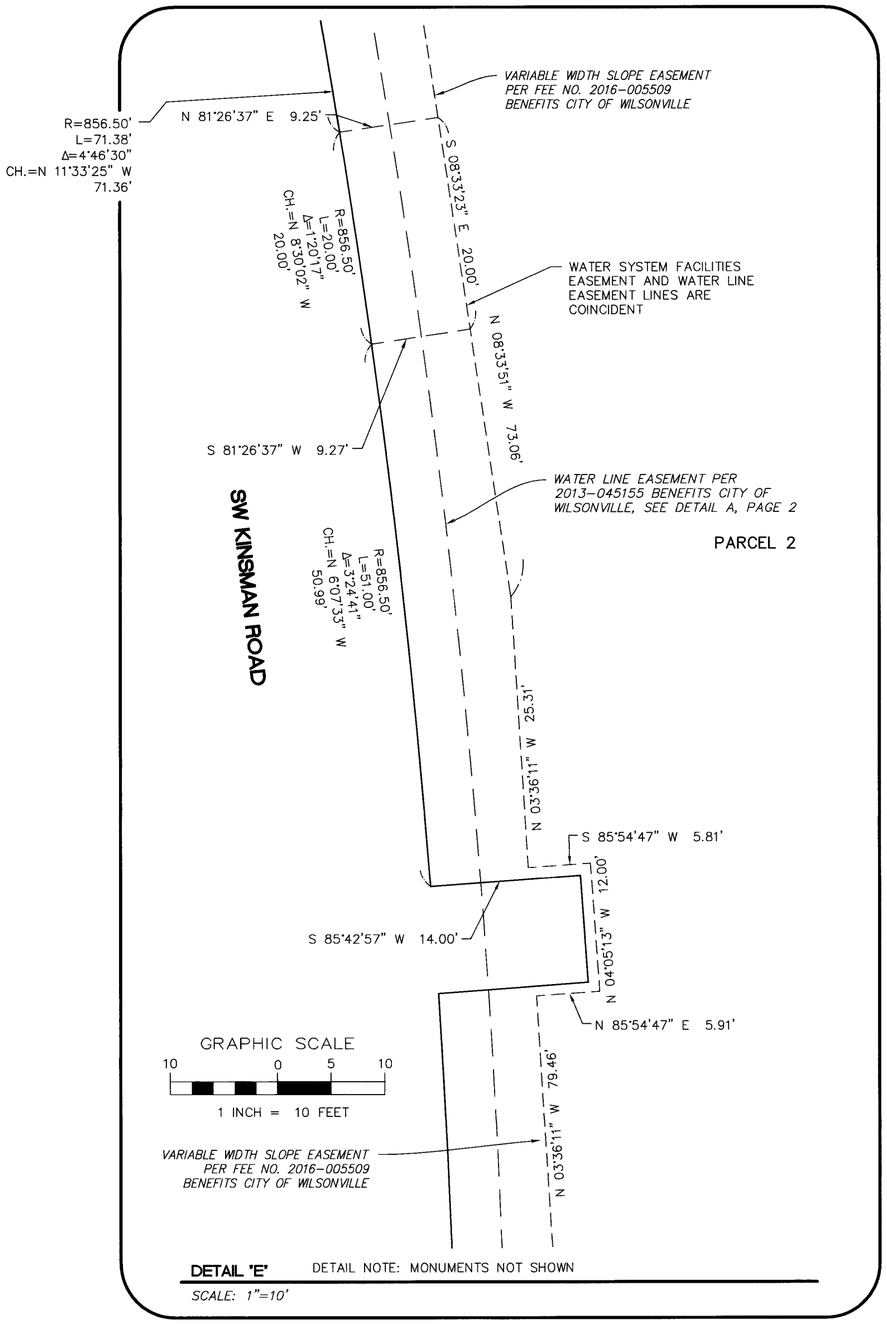
CITY OF WILSONVILLE PLANNING DIVISION CASE FILE: AR20-0044
JUNE 9, 2021
SURVEY FOR: W-4 LLC

PARTITION PLAT NO. 2022-054

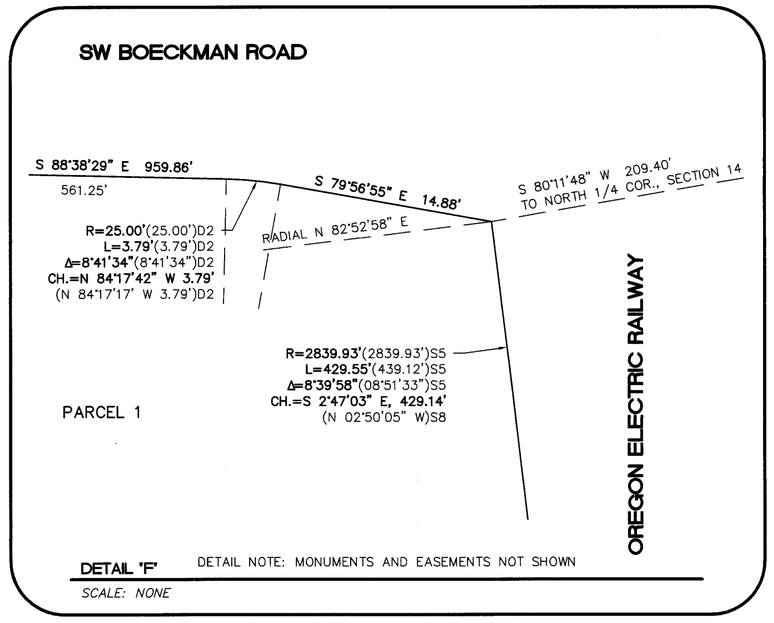
NORTH



DETAIL 'D'
SCALE: 1"=10'
DETAIL NOTE: MONUMENTS NOT SHOWN



DETAIL 'E' DETAIL NOTE: MONUMENTS NOT SHOWN
SCALE: 1"=10'



DETAIL 'F' DETAIL NOTE: MONUMENTS AND EASEMENTS NOT SHOWN
SCALE: NONE

REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON
SEPTEMBER 10, 2019
BRIAN LEGGS
77667PLS
RENEWS: DEC. 31, 2022

SHEET 3 OF 4

SINCE 1952
ANDY PARIS AND ASSOCIATES, INC.
PROFESSIONAL LAND SURVEYORS
16057 BOONES FERRY ROAD
LAKE OSWEGO, OREGON 97035
PH: 503-636-3341
www.andyparis.com

PROJECT: 16168
DRAWING: 16168PP3.DWG
DRAFTED: BL 6/10/21

PARTITION PLAT NO. 2022-054

IN THE NW 1/4 SECTION 14, T.3S., R.1W., W.M.
CITY OF WILSONVILLE,
CLACKAMAS COUNTY, OREGON
CITY OF WILSONVILLE PLANNING DIVISION CASE FILE: AR20-0044
JUNE 9, 2021
SURVEY FOR: W-4 LLC

DECLARATION

KNOW ALL PEOPLE BY THESE PRESENTS THAT W-4 LLC, AN OREGON LIMITED LIABILITY COMPANY, IS THE OWNER OF THE LAND REPRESENTED ON THE ANNEXED MAP AND MORE PARTICULARLY DESCRIBED IN THE ACCOMPANYING SURVEYOR'S CERTIFICATE AND HAVE CAUSED THE SAME TO BE SURVEYED AND PARTITIONED INTO PARCELS, SUBJECT TO EASEMENTS AND RESTRICTIONS AS SHOWN OR NOTED HEREON AND DOES HEREBY GRANT ALL EASEMENTS AS SHOWN OR NOTED HEREON. THIS PLAT CONFORMS TO THE PROVISIONS OF CHAPTER 92 OF THE OREGON REVISED STATUTES.

MAC MARTIN - MEMBER, W-4, LLC

ACKNOWLEDGEMENT

STATE OF OREGON)
COUNTY OF CLACKAMAS) S.S.

KNOW ALL PEOPLE BY THESE PRESENTS, ON THIS 15 DAY OF December, 2021, PERSONALLY APPEARED MAC MARTIN, MEMBER OF W-4 LLC, AND OREGON LIMITED LIABILITY COMPANY, WHO BEING DULY SWORN DID SAY THAT HE IS THE IDENTICAL PERSON NAMED IN THE FOREGOING INSTRUMENT AND THAT HE EXECUTED SAID INSTRUMENT FREELY AND VOLUNTARILY ON BEHALF OF W-4 LLC.

NOTARY SIGNATURE

Keith Adam-Peirce Cata
NOTARY PUBLIC - OREGON

COMMISSION NO. 1010041

MY COMMISSION EXPIRES March 15, 2025

APPROVALS

APPROVED THIS 15th DAY OF December, 2021

BY: _____
CITY OF WILSONVILLE PLANNING DIRECTOR

APPROVED THIS 16TH DAY OF DECEMBER, 2021

BY: _____
CITY OF WILSONVILLE COMMUNITY DEVELOPMENT DIRECTOR

APPROVED THIS 28TH DAY OF June, 2022

_____
CLACKAMAS COUNTY SURVEYOR; AND CLACKAMAS COUNTY BOARD OF COMMISSIONERS DELEGATE PER COUNTY CODE CHAPTER 11.02

ALL TAXES, FEES, ASSESSMENTS AND OTHER CHARGES PROVIDED BY O.R.S. 92.095 HAVE BEEN PAID THRU JUNE 30, 2022.

APPROVED THIS 28 DAY OF June, 2022 ~~2021~~

CLACKAMAS COUNTY ASSESSOR & TAX COLLECTOR

BY: _____
DEPUTY

STATE OF OREGON)
COUNTY OF CLACKAMAS) S.S.

I DO HEREBY CERTIFY THAT THE ATTACHED PARTITION PLAT WAS RECEIVED FOR RECORD ON THE 28 DAY OF June, 2022

AT 11 O'CLOCK A.M.

AS PARTITION PLAT NO. 2022-054

DOCUMENT NO. 2022-037527

SHERRY HALL, CLACKAMAS COUNTY CLERK

BY: _____
DEPUTY

PURPOSE

THE PURPOSE OF THIS SURVEY IS TO PARTITION THAT TRACT OF LAND AS DESCRIBED IN FEE NO. 2016-065035, CLACKAMAS COUNTY DEED RECORDS, PER CITY OF WILSONVILLE CASE FILE NO. AR20-0044.

BASIS OF BEARINGS

HELD NORTH 88°38'29" WEST ALONG THE CENTERLINE OF SW BOECKMAN ROAD, PER SN 2010-187, FROM MONUMENT **'A'** SET IN S8, TO MONUMENT **'B'** SET IN S14.

NARRATIVE

THE SOUTHERLY LINE OF THE SUBJECT TRACT WAS HELD PER S1 FROM MONUMENT **'C'** SET IN S1, TO A POINT ON THE WEST LINE OF THE NE1/4 OF THE NW1/4 OF SECTION 14, PER D1, BEING 999.40 FEET SOUTHERLY FROM THE CALLED NORTHWEST CORNER OF THE NE1/4 OF THE NW1/4 OF SECTION 14, PER S1. SAID WEST LINE OF THE NE1/4 OF THE NW1/4 OF SECTION 14 WAS HELD PER S7 FROM MONUMENT **'H'** SET IN S7, TO A POINT ON THE NORTH LINE OF SAID NE1/4 OF THE NW1/4 OF SECTION 14, BEING S88°38'29"E, 0.59 FEET FROM MONUMENT **'B'**.

THE SOUTHEAST CORNER OF THE SUBJECT TRACT WAS HELD PER EXCEPTION DEED D3 PER S1 ON SAID SOUTHERLY LINE AS DESCRIBED ABOVE, AT CALCULATED POINT **'CP1'**, BEING RECORD 171.97 FEET WESTERLY OF SAID MONUMENT **'C'**.

THE SOUTHWEST CORNER WAS RE-ESTABLISHED ON SAID SOUTHERLY LINE BY INTERSECTING AN ARC WITH A RECORD RADIUS OF 803.50 FEET, CONCAVE EASTERLY, HELD PER S13 FROM MONUMENT **'F'** THROUGH MONUMENT **'G'**, BOTH SET IN S13, AND EXTENDING SAID ARC TO THE SOUTHERLY LINE.

THE WESTERLY BOUNDARIES OF SUBJECT TRACT WERE HELD PER S13 BETWEEN ALL MONUMENTS RECOVERED AS SET IN S13, WITH ALL CURVES BEING HELD WITH RECORD RADII BETWEEN MONUMENTS PER S13.

THE WESTERLY LINE OF THE OREGON ELECTRIC RAILWAY CO. RIGHT-OF-WAY WAS HELD FROM SAID CALCULATED POINT **'CP1'** TO A POINT BEING 50.00 FEET WESTERLY OF MONUMENT **'D'**, PER S5. THE RADIUS POINT FOR THE CURVE IN SAID WESTERLY LINE WAS FIXED AT THE INTERSECTION OF A LINE HELD PARALLEL WITH AND 2839.93 FEET WESTERLY OF THE PREVIOUSLY DESCRIBED LINE, WITH A 2889.93-FOOT RADIUS ARC HELD FROM MONUMENT **'E'**. THIS WAS A LOGICAL AND SIMPLE SOLUTION TO RE-ESTABLISHING THE RAILWAY RIGHT-OF-WAY SOUTH OF SW BOECKMAN ROAD. THE RECORDS FOR THE CURVE RADIUS ARE PER S3, S4, S5, S10, & P3. THERE IS NO ACTUAL RECORD OR EXPLANATION FOR THE SURVEYED POSITION OF THE POINT OF CURVATURE ("PC") FOUND IN MY RESEARCH; BERT MASON JR. APPEARS TO ESTABLISH A POINT OF CURVATURE IN S3, WHICH SUBSEQUENT SURVEYS S4, S5, & S10 RETRACE AND HOLD, HOWEVER NONE EXPLAIN HOW OR WHY THE POSITION WAS ESTABLISHED AS THE POINT OF CURVATURE. HOLDING THE "PC" PER S3 RESULTED IN THE CURVE DRIFTING EASTERLY BY AS MUCH AS 2.0 FEET AT MONUMENT **'E'**. VOLUME 98, PAGE 256, CLACKAMAS COUNTY DEED RECORDS STATES THAT THE OREGON ELECTRIC RAILROAD RIGHT-OF-WAY IS 25-FEET IN WIDTH ON EACH SIDE OF THE CENTERLINE OF THE MAIN LINE TRACK.

THE NORTHERLY LINE OF SUBJECT TRACT WAS HELD PARALLEL WITH AND 38.00 FEET SOUTHERLY OF SW BOECKMAN ROAD CENTERLINE; SAID CENTERLINE WAS HELD PER S8 & EXCEPTION DEED D2 FROM MONUMENT **'A'** TO MONUMENT **'B'** SET IN S13. PER D2, I HELD CURVE NO. 'C1' TANGENT TO SAID NORTH LINE, FIXED WITH RECORD RADIUS OF 25.00-FEET, LENGTH OF 3.79-FEET, AND DELTA OF 8°41'34". PER S8, I HELD THE WESTERLY "PC" OF SAID CURVE ON SAID NORTH LINE, AT A POINT BEING N88°38'29"W, 223.90 FEET, AND S01°21'31"W, 38.00 FEET, FROM MONUMENT **'A'** (WHICH POINT ALSO FIT RECORD D2 BY AS CLOSE AS 0.03 FEET, NOT SHOWN IN THIS SURVEY). PER D2, I HELD A LINE TANGENT TO SAID FIXED CURVE AND RAN EASTERLY TO THE WESTERLY LINE OF THE OREGON ELECTRIC RAILWAY TO RE-ESTABLISH THE NORTHEAST CORNER OF SUBJECT TRACT.

PLAT NOTES

1. THIS PLAT IS SUBJECT TO THE CONDITIONS OF APPROVAL PER CITY OF WILSONVILLE PLANNING DIVISION CASE FILE NO. AR20-0044.
2. A SHARED UTILITY AND ACCESS AGREEMENT FOR THE ACCESS & UTILITY EASEMENT BENEFITING PARCELS 1 AND 2 AS SHOWN HEREON HAS BEEN RECORDED IN DOCUMENT NO. 2022-037528, CLACKAMAS COUNTY DEED RECORDS.
3. A SHARED UTILITY AND ACCESS AGREEMENT FOR THE STORM DRAIN EASEMENTS BENEFITING PARCEL 1 AS SHOWN HEREON HAS BEEN RECORDED IN DOCUMENT NO. 2022-037528, CLACKAMAS COUNTY DEED RECORDS.
4. A SHARED UTILITY AND ACCESS AGREEMENT FOR THE SANITARY SEWER EASEMENT BENEFITING PARCEL 1 AS SHOWN HEREON HAS BEEN RECORDED IN DOCUMENT NO. 2022-037528, CLACKAMAS COUNTY DEED RECORDS.
5. THIS PLAT MAY BE SUBJECT TO TERMS OF INTENT TO PRESERVE INTEREST AS RECORDED IN FEE NO. 2000-077005, CLACKAMAS COUNTY DEED RECORDS. AFFECTS THE NORTHERLY HALF OF PLAT. LOCATION NOT DETERMINED.

SURVEYOR'S CERTIFICIATE

I, BRIAN LEGGS, REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF OREGON, CERTIFY THAT I HAVE CORRECTLY SURVEYED AND MARKED WITH PROPER MONUMENTS THE LAND REPRESENTED ON THE ATTACHED PARTITION PLAT SITUATED IN THE NORTHWEST ONE-QUARTER OF SECTION 14, TOWNSHIP 3 SOUTH, RANGE 1 WEST OF THE WILLAMETTE MERIDIAN, IN THE CITY OF WILSONVILLE, CLACKAMAS COUNTY, OREGON; THAT AT THE INITIAL POINT I SET A COPPER DISK MARKED "PARIS & ASSOC", WHERE THE SOUTH LINE OF SW BOECKMAN ROAD (VARIABLE WIDTH) INTERSECTS THE CURVE IN THE WESTERLY LINE OF THE OREGON ELECTRIC RAILWAY RAILROAD AS DESCRIBED IN VOLUME 96, PAGE 296, CLACKAMAS COUNTY DEED RECORDS, WHICH POINT BEARS S 80°11'48" W, 209.40 FEET FROM THE NORTH ONE-QUARTER CORNER OF SAID SECTION 14, TO WHICH POINT ALSO A RADIAL BEARS N 82°52'58" E TO A POINT ON SAID CURVE OF RAILWAY RIGHT-OF-WAY (BEING NON-TANGENT TO SW BOECKMAN ROAD), SAID CURVE BEING CONCAVE WEST, HAVING A RADIUS OF 2839.93 FEET, AND A LONG CHORD BEARING S 02°47'03" E, 429.14 FEET; THENCE ALONG SAID CURVE, 429.55 FEET SOUTHERLY THROUGH A CENTRAL ANGLE OF 8°39'58" TO A SET 5/8-INCH IRON ROD WITH A YELLOW PLASTIC CAP MARKED "ANDY PARIS & ASSOC. INC"; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY LINE, S 01°32'56" W, 531.61 FEET TO THE NORTHEAST CORNER OF ADJOINING TRACT PER FEE NO. 96-090710; THENCE ALONG THE NORTH LINE OF SAID TRACT, AND LEAVING SAID RIGHT-OF-WAY LINE, N 88°36'13" W, A DISTANCE OF 1127.18 FEET TO A SET 5/8-IRON ROD WITH A YELLOW PLASTIC CAP MARKED "ANDY PARIS & ASSOC. INC"; ON THE EASTERLY LINE OF RE-ALIGNED SW KINSMAN ROAD AS DESCRIBED IN EXCEPTION DEED FEE NO. 2016-005508, BEING A POINT ON A CURVE, NON-TANGENT TO SAID NORTH LINE OF FEE NO. 96-090710, TO WHICH POINT A RADIAL BEARS S 85°19'29" W, SAID CURVE BEING CONCAVE EASTERLY, HAVING A RADIUS OF 803.50 FEET, AND A LONG CHORD BEARING N 01°32'41" W, 87.76 FEET; THENCE NORTHERLY ALONG SAID CURVE, 87.80 FEET THROUGH A CENTRAL ANGLE OF 6°15'39" TO A 5/8-INCH IRON ROD; THENCE CONTINUING ALONG SAID RIGHT-OF-WAY LINE, S 88°10'18" E, 18.01 FEET TO A 5/8-INCH IRON ROD; THENCE N 01°44'30" E, 9.97 FEET TO A 5/8-INCH IRON ROD;
THENCE N 88°00'09" W, 17.98 FEET TO A 5/8-INCH IRON ROD AT THE BEGINNING OF A NON-TANGENT CURVE, CONCAVE EASTERLY, HAVING A RADIUS OF 803.50 FEET, AND A LONG CHORD BEARING N 07°56'55" E, 158.16 FEET; THENCE NORTHERLY ALONG SAID CURVE, 158.42 FEET THROUGH A CENTRAL ANGLE OF 11°17'48" TO A 5/8-INCH IRON ROD AT A POINT OF REVERSING CURVE, CONCAVE WESTERLY, HAVING A RADIUS OF 856.50 FEET, AND A LONG CHORD BEARING N 13°22'42" E, 6.53 FEET; THENCE NORTHERLY ALONG SAID CURVE, 6.53 FEET THROUGH A CENTRAL ANGLE OF 0°26'13" TO A 5/8-INCH IRON ROD;
THENCE S 77°22'56" E, 12.46 FEET TO A 5/8-INCH IRON ROD;
THENCE N 12°47'46" E, 9.95 FEET TO A 5/8-INCH IRON ROD;
THENCE N 77°06'45" W, 12.45 FEET TO A 5/8-INCH IRON ROD AT THE BEGINNING OF A NON-TANGENT CURVE, CONCAVE WESTERLY, HAVING A RADIUS OF 856.50 FEET, AND A LONG CHORD BEARING N 04°22'10" E, 241.98 FEET; THENCE NORTHERLY ALONG SAID CURVE, 242.79 FEET THROUGH A CENTRAL ANGLE OF 16°14'29" TO A 5/8-INCH IRON ROD;
THENCE N 85°42'11" E, 14.01 FEET TO A 5/8-INCH IRON ROD;
THENCE N 04°09'12" W, 10.00 FEET TO A 5/8-INCH IRON ROD;
THENCE S 85°42'57" W, 14.00 FEET TO A 5/8-INCH IRON ROD AT THE BEGINNING OF A NON-TANGENT CURVE, CONCAVE WESTERLY, HAVING A RADIUS OF 856.50 FEET, AND A LONG CHORD BEARING N 09°10'56" W, 142.21 FEET; THENCE NORTHERLY ALONG SAID CURVE, 142.38 FEET THROUGH A CENTRAL ANGLE OF 9°31'28" TO A 5/8-INCH IRON ROD AT A POINT OF REVERSING CURVE, CONCAVE NORTHEASTERLY, HAVING A RADIUS OF 803.50 FEET, AND A LONG CHORD BEARING N 13°51'09" W, 2.58 FEET; THENCE NORTHERLY ALONG SAID CURVE, 2.58 FEET THROUGH A CENTRAL ANGLE OF 0°11'11" TO A 5/8-INCH IRON ROD AND POINT OF NON-TANGENCY;
THENCE N 76°07'01" E, 11.34 FEET TO A 5/8-INCH IRON ROD;
THENCE N 14°17'30" W, 10.01 FEET TO A 5/8-INCH IRON ROD;
THENCE S 76°07'33" W, 11.19 FEET TO A 5/8-INCH IRON ROD AT THE BEGINNING OF A NON-TANGENT CURVE, CONCAVE EASTERLY, HAVING A RADIUS OF 803.50 FEET, AND A LONG CHORD BEARING N 12°42'16" W, 9.61 FEET; THENCE NORTHERLY ALONG SAID CURVE, 9.61 FEET THROUGH A CENTRAL ANGLE OF 0°41'07" TO A 5/8-INCH IRON ROD;
THENCE N 1°30'33" E, 164.06 FEET TO A 5/8-INCH IRON ROD;
THENCE N 20°43'44" E, 36.47 FEET TO A 5/8-INCH IRON ROD;
THENCE N 32°16'22" E, 51.31 FEET TO A 5/8-INCH IRON ROD;
THENCE N 68°32'53" E, 90.43 FEET TO A 1-INCH BRASS DISK ON THE SOUTHERLY LINE OF SW BOECKMAN ROAD AS DESCRIBED IN EXCEPTION DEED FEE NO. 2006-050621; THENCE ALONG SAID RIGHT-OF-WAY LINE, S 88°38'29" E, 959.86 FEET TO A SET COPPER DISK MARKED "PARIS & ASSOC" AT THE BEGINNING OF A CURVE, CONCAVE SOUTHERLY, HAVING A RADIUS OF 25.00 FEET, AND A LONG CHORD BEARING S 84°17'42" W, 3.79 FEET; THENCE EASTERLY ALONG SAID CURVE, 3.79 FEET THROUGH A CENTRAL ANGLE OF 8°41'34" TO A SET COPPER DISK MARKED "PARIS & ASSOC"; THENCE S 79°56'55" E, 14.88 FEET TO THE INITIAL POINT.

CONTAINING 24.489 ACRES, MORE OR LESS.

REGISTERED PROFESSIONAL LAND SURVEYOR

OREGON
SEPTEMBER 10, 2019
BRIAN LEGGS
77667PLS

RENEWS: DEC. 31, 2022

SHEET 4 OF 4

SINCE 1952
ANDY PARIS AND ASSOCIATES, INC.
PROFESSIONAL LAND SURVEYORS
16057 BOONES FERRY ROAD
LAKE OSWEGO, OREGON 97035
PH: 503-636-3341
www.andyparis.com

PROJECT: 16168
DRAWING: 16168PP3.DWG
DRAFTED: BL 6/10/21

PROJECT CONTACTS

Owner / Developer	W4 LLC 1404 Broadmoor Drive E. Seattle, WA 98112 Contact: Jack Martin 206-660-8483 mobile JackMartinis@Outlook.com Alternate Contact: Mac Martin 206-399-6676 mobile MacMartinis@gmail.com
Shell Architect & Design Professional in Responsible Charge:	Lance Mueller & Associates / Architects 130 Lakeside Avenue S., Suite 250 Seattle, WA 98122 Contact: Bob Wells 206-325-2553, Ext 120; (Fax) 206-328-0554 BWells@LMueller.com
Structural Engineer	TM Rippey Consulting Engineers 7650 SW Beveland Street, Suite 100 Tigard, OR 97224 Contact: Tim Rippey 503-443-3900; (Fax) 503-443-3700 trippey@tmrippey.com
Civil Engineer	Alpha Associates, Inc. 4875 SW Griffith Drive, Suite 300 Beaverton, OR 97005 Contact: Chris Harris 503-620.3030; (Fax) 503-620-5539 craigh@aaieng.com
Geotechnical Engineer	Geo Design, Inc. 15575 SW Sequoia Parkway, Suite 100 Portland, OR 97224 Contact: George Saunders 503-968-8787 gsaunders@geodesigninc.com
Landscape Architect	Otten Landscape Architects 3933 SW Kelly Avenue, Suite B Portland, OR 97239 503-972-0311; (Fax) 503-972-0314 Janet@OttenLA.com
Envelope Consultant	Franklin Engineering 625 Fourth Avenue, Suite 202 Kirkland, WA 98033 Contact: Natalie Thrower 425-827-3324; 425-827-6252
General Contractor	Perlo Construction 16101 SW 72nd Avenue, Suite 200 Portland, OR 97224 Contact: Chris McLaughlin 503-624-2090; (Fax) 503-639-4134 cmclaughlin@perlo.biz

PROJECT NOTES

Scope:
Renovate an existing warehouse facility to become DWFRITZ offices and manufacturing. Later permits to include site upgrades for drainage, additional required parking, and a connected addition (new freestanding lobby/conference center). Building permit submittals will be phased to allow a fast-track schedule to serve DWFRITZ's move-in requirements. TI permit work for the DWFRITZ office area is required prior to occupancy under a separate permit by others.

The existing Grace Chapel portion of the building will continue as a separation operation to DM Fritz, and no renovation of this space is planned at this time, other than reroofing and insulation of the high roof portion.

Building Permit Submittal Phase 1: This submittal is limited to architectural, structural, and energy envelope work within the existing high roof area only. The existing Grace Chapel space and site work are not included. Included in this submittal:

- Demolition to cut in new wall openings.
- New roofing and roof insulation system.
- New skylights.
- New and revised existing window openings.
- New energy envelope of roof, walls, and floor; with wall insulation as TI work.

Legal Description:
A tract of land situated in Section 14, Township 3 South, Range 1 West of the Williamette Meridian, in the City of Wilsonville, Clackamas County, Oregon, more particularly described as follows:
Beginning at an iron pipe at the Northwest corner of the Northeast one quarter of the Northwest one quarter of said Section 14, said point being the Northwest corner of that tract conveyed to Frederic W. Young, et ux, recorded January 13, 1947 in Book 383, Page 262, Deed Records; thence South 0° 13' East along the West line of said Young tract 499.70 feet to an iron pipe at the Southwest corner thereof; and the true point of beginning of the tract herein to be described; thence North 89° 43' East along the South line of said Young tract 25.00 feet to a point; thence North 0° 13' West parallel with the West line of said Young tract 474.70 feet to a point that is Southerly 25.00 feet measured at right angles from the North line of said Young tract; thence North 89° 42' East parallel with the North line of said Young tract 1080.00 feet, more or less, to the West line of the Oregon Electric Railway right of way; thence Southerly along the West line of said Oregon Electric Railway right of way 980.00 feet, more or less, to a point of intersection with the South boundary of the tract conveyed to Sunn Musical Equipment Company, a corporation, by deed filed May 5, 1969 as Recorder's Fee No. 69-7881, Film Records; thence South 89° 44' West along said South boundary, 1160.00 feet, more or less, to the Southwest corner thereof, said point being in the Westerly boundary of the Northeast one quarter of the Northwest one quarter of said Section 14; thence North 0° 13' West along said boundary 499.7 feet to the true point of beginning.
EXCEPTING THEREFROM: All that portion described in deed to the City of Wilsonville for road purposes, recorded June 2, 2006, Recorders Fee No. 2006-050621.
ALSO EXCEPTING THEREFROM: All that portion described in deed to the City of Wilsonville for road purposes, recorded January 29, 2016, Recorders Fee No. 2016-005508.

Tax Parcel Numbers: 00810331; 05021199; 05008927

Zoning: PDI (Planned Development Industrial)

Deferred Submittals:
1. Storefront System by manufacturer.
2. Re-Roof Material Information and cut sheets.

General Notes:
1. TI Permit work is required prior to occupancy.

Statistics:

Building Area:		
1st Floor	Upper Levels	
137,398	0	Existing OrePac Distribution Facility
23,468	6,900	Existing Grace Chapel (Mezzanine)
±3,500	0	New Lobby & Conf. Cntr. (by separate permit)
±164,366		Total 1st Floor Area

Site Area: 24.50 Acres

Parking:
Required: PDI Flex Space: 2.7/1,000sf Min. or 4.1/1,000sf Max
Proposed: By separate permit
Accessible Required: By separate permit
Accessible Proposed: By separate permit

Bike Requirements:
Required: PDI Flex Space: 1 per 5,000sf min
Proposed: By separate permit

Trash Enclosure Requirements:
Required: By separate permit
Proposed: By separate permit

Building Code:

2014 Oregon Structural Specialty Code (OSSC)
2014 Oregon Mechanical Specialty Code
2014 Oregon Fire Code
2014 Oregon Plumbing Code
2014 Oregon Residential Specialty Code
2010 Oregon Manufactured Dwelling and Parks Specialty Code
2010 Oregon Solar Specialty Code
2014 Oregon Energy Specialty Code

Const Type: Type III-B, Sprinklered
Occupancy Groups:
B Office
F-1 Factory Indust - Mod Hazard
S-1 Moderate Hazard Storage

Allowable Floor Area: Unlimited per Section 507.3 (for sprinklered 1-story buildings of Group B, F, M, or S occupancy, other than Type V construction.)

Fire Resistive Rating for Building Elements - Table 601:

Building Element:	Rating for III-B(Hours):
Primary Structural Frame	0
Bearing Walls - Exterior	2
Bearing Walls - Interior	0
Non-bearing Walls & Partitions-Ext.	See Table 602 *
Non-bearing Walls & Partitions-Int.	
Floor Construction	0
Roof Construction	0

* Table 602 is non-rated for our fire separation distance of >30'.

Opening Protection: - Unprotected per Table 705.8

DRAWING INDEX

Index of Drawings:

A1.1 - General Notes and Site Plan
A2.0 - Demo Floor Plan
A2.1 - Floor Plan
A2.2 - Roof Plan
A3.1 - Exterior Elevations - New and Existing
A4.1 - Wall Sections and Details
S1.0 - General Notes and Special Inspections
S2.1 - Foundation Plan - North
S2.2 - Foundation Plan - South
S2.3 - Roof Plan - North
S2.4 - Roof Plan - South
S3.1 - Elevations
S3.2 - Elevations
S3.3 - Elevations
S4.1 - Details
S4.2 - Details - Dock and Canopy
S4.3 - Details - Entry Canopy

SITE PLAN

SCALE: 1" = 50'-0"

0 30 60 120 180

no.	revision	date
	PHASE: BUILDING PERMIT SUBMITTAL	10-3-16

16-066 job no.
EM drawn
checked
10-3-16 date

REGISTERED ARCHITECT
LANCE MUELLER
SEATTLE, WA
1491
STATE OF OREGON

DWFRITZ Renovation
9900 SW Boeckman Rd.
Wilsonville, OR 97070

LANCE MUELLER & ASSOCIATES
ARCHITECTS . AIA
130 LAKESIDE . SEATTLE, WA 98122 . 206 325 2553

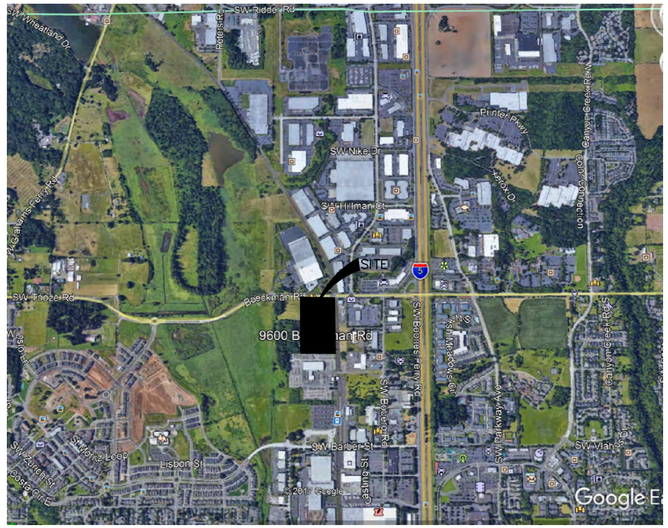
SITE PLAN
sheet
A1.1

DWFRITZ RENOVATION

9600 SW BOECKMAN ROAD
WILSONVILLE, OREGON 97070

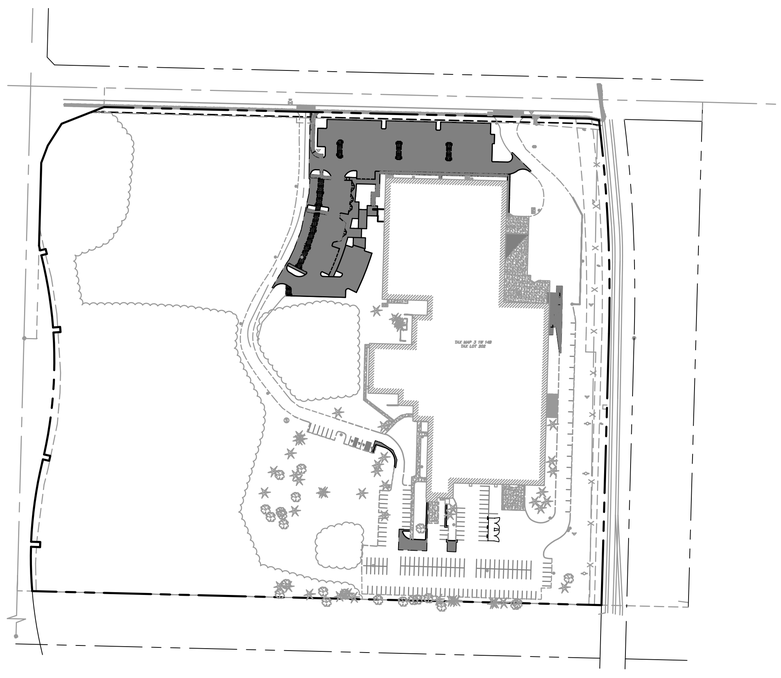
LEGAL DESCRIPTION:

TAX LOT 7000 LOCATED IN THE NORTHWEST 1/4 OF SECTION 11,
TOWNSHIP 1 SOUTH, RANGE 2 EAST, W.M.,
CITY OF PORTLAND, MULTNOMAH COUNTY, OREGON



NORTH

VICINITY MAP
SCALE: NTS



NORTH

SITE PLAN
SCALE: NTS

W-4 LLC — **OWNER/APPLICANT**

CONTACT: MAC MARTIN
PO BOX 15523
SEATTLE, WA 98115
PH: 206-399-6676
EMAIL: MACMARTINIS@GMAIL.COM

AAI ENGINEERING, INC — **CIVIL ENGINEER**

CONTACT: DUSTIN ELMORE
4875 SW GRIFFITH DRIVE, SUITE 300
BEAVERTON, OREGON 97005
PH: 503-620-3030
FAX: 503-620-5539
EMAIL: DUSTINE@AAIENG.COM

LANCE MUELLER & ASSOCIATES — **ARCHITECT**

CONTACT: BOB WELLS
130 LAKESIDE, #250
SEATTLE, WASHINGTON 98122
PH: 206-325-2553

Sheet List Table	
Sheet Number	**Sheet Title**
C0.1	COVER SHEET
C0.2	GENERAL NOTES
C0.3	EXISTING CONDITIONS
C0.4	DEMOLITION PLAN
C1.0	SITE PLAN
C2.0	GRADING PLAN
C2.1	GRADING PLAN ENLARGEMENT
C3.0	STORM PLAN
C3.1	STORM ENLARGEMENT
C3.2	STORMWATER PLAN AND PROFILE
C4.0	DETAILS
C4.1	DETAILS
L1.0	LANDSCAPE PLAN

NOTICE TO EXCAVATORS:
ATTENTION: OREGON LAW REQUIRES YOU TO FOLLOW RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER. THOSE RULES ARE SET FORTH IN OAR 952-001-0010 THROUGH OAR 952-001-0090. YOU MAY OBTAIN COPIES OF THE RULES BY CALLING THE CENTER.
(NOTE: THE TELEPHONE NUMBER FOR THE OREGON UTILITY NOTIFICATION CENTER IS (503)-232-1987).

POTENTIAL UNDERGROUND FACILITY OWNERS

Dig Safely.
Call the Oregon One-Call Center
DIAL 811 or 1-800-332-2344

EMERGENCY TELEPHONE NUMBERS

NW NATURAL GAS	
M-F 7am-6pm	503-226-4211 Ext.4313
AFTER HOURS	503-226-4211
PGE	503-464-7777
QWEST	1-800-573-1311
CITY BUREAU OF MAINTENANCE	503-823-1700
CITY WATER	503-823-4874
VERIZON	1-800-483-1000

ABBREVIATIONS

BOW	BACK OF WALK
℄	CENTERLINE
EG	EXISTING GRADE
EX	EXISTING
ELEV	ELEVATION
FG	FUTURE GRADE
G	GUTTER
GB	GRADE BREAK
IE	INVERT ELEVATION
LT	LEFT
MAX.	MAXIMUM
MIN.	MINIMUM
NO.	NUMBER
NTS	NOT TO SCALE
PC	POINT OF CURVATURE
PT	POINT OF TANGENCY
ROW, R/W	RIGHT-OF-WAY
RT	RIGHT
STA	STATION
STD.	STANDARD
TC	TOP OF CURB
TP	TOP OF PAVEMENT

AS-BUILT
BASED ON INFORMATION PROVIDED BY CONTRACTOR, SURVEYOR AND LIMITED ENGINEER SITE VISITS

ASBUILT SET - 5/9/18

REGISTERED PROFESSIONAL ENGINEER
58412PE
OREGON
CRAIG N. HARRIS
EXPIRES: 6/30/2019

AAI afplan associates, inc.
ENGINEERING
4875 SW Griffith Drive | Suite 300 | Beaverton, OR | 97005
503.620.3030 tel | 503.620.5539 fax | www.aaieng.com

DWFRITZ RENOVATION
PUBLIC WORK PLANS
9600 SW BOECKMAN ROAD
WILSONVILLE, OREGON 97070

COVER SHEET

DATE:	5/9/18
DRAWN:	DSE
CHECKED:	CNH

REVISIONS:

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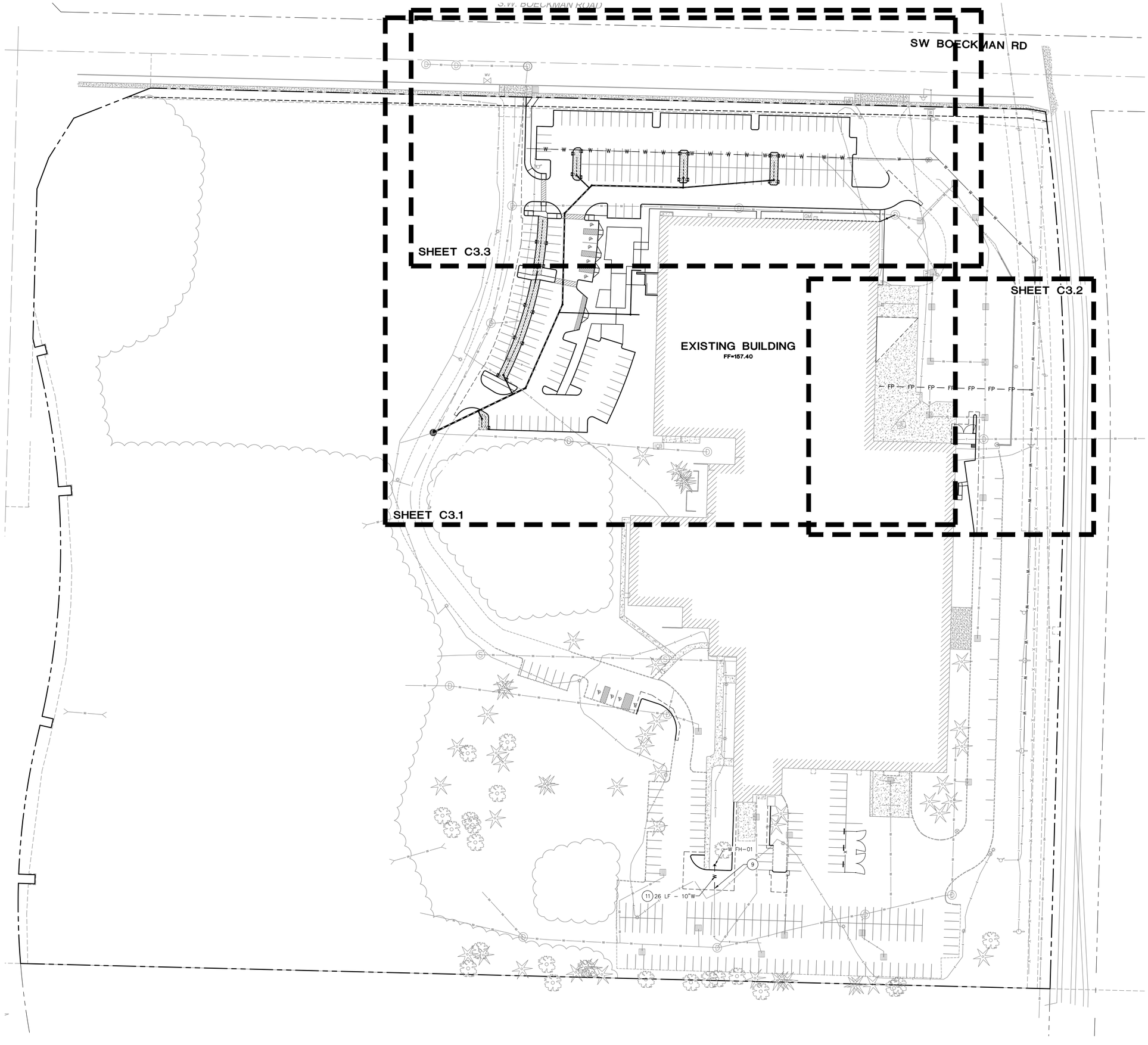
SHEET

C0.1

JOB NUMBER:
A16143.11

I:\2016\A16143.11 - WA Wilsonville\CAD\Cad Sheets\Offsite\A16143.11.C01-COVER SHEET.dwg - May, 11, 18 - 8:33 AM jmeg



SHEET NOTES

1. SEE SHEET C0.1 FOR ADDITIONAL SHEET NOTES.
2. PIPE BEDDING AND BACKFILL UTILITIES SHALL BE DONE PER DETAIL 5/C4.0.
3. INSTALL THRUST BLOCKS AS NEEDED FOR WATER LINES PER DETAIL 6/C4.0. ALL FIRE LINES WILL BE FULLY RESTRAINED C-900 PVC PIPE WITH BELL END RESTRAINTS ON ALL JOINTS AND MEGALUG RESTRAINTS AT ALL DUCTILE IRON FITTINGS.
4. THIS PLAN IS GENERALLY DIAGRAMMATIC. IT DOES NOT SHOW EVERY JOINT, BEND, FITTING, OR ACCESSORY REQUIRED FOR CONSTRUCTION.
5. DOMESTIC WATER AND FIRE LINES AND ACCESSORIES BETWEEN THE WATER METER AND THE BUILDING SHALL BE INSTALLED BY A LICENSED PLUMBER EMPLOYED BY A LICENSED PLUMBING CONTRACTOR.
6. UTILITIES WITHIN FIVE FEET OF A BUILDING SHALL BE CONSTRUCTED OF MATERIALS APPROVED FOR INTERIOR USE AS DESCRIBED IN THE CURRENT EDITION OF THE UPC.
7. THE PROPOSED STORM LAYOUT SHOWN IS FOR INFORMATION ONLY, TO BE COMPLETED UNDER A SEPARATE PERMIT.

(X) UTILITIY NOTES

1 APPROXIMATE LOCATION OF EXISTING 10" CI WATER MAIN. CONTRACTOR TO POTHOLE AND VERIFY LOCATION PRIOR TO ORDERING MATERIALS.

2 CONNECT TO EXISTING WATER MAIN WITH 10"x8" TAPPING SLEEVE.

3 CONNECT TO EXISTING BUILDING SERVICE. SEE PLUMBING PLANS FOR CONTINUATION.

4 INSTALL MJxMJ 8" 45° BEND.

5 CONSTRUCT STORMWATER PLANTER, UNDER A SEPARATE PERMIT.

6 CONSTRUCT STORMWATER SWALE, UNDER A SEPARATE PERMIT.

7 CONSTRUCT STORMWATER RAIN GARDEN, UNDER A SEPARATE PERMIT.

8 NOT USED

9 CONNECT TO EXISTING WATER LINE. CONTRACTOR TO VERIFY PIPE INVERTS PRIOR TO CONSTRUCTION.

10 CONTRACTOR TO VERIFY THAT A HIGH POINT IS NOT CREATED IN THE MAIN AT THE POINT OF CONNECTION. IF A HIGH POINT IS FOUND THE CONTRACTOR SHALL REMOVE AND REINSTALL THE FIRE MAIN TO THE ADJACENT FIRE HYDRANT CONNECTION POINT TO BE USED AS THE BLOW-OFF STRUCTURE.

11 REINSTALL FIRE HYDRANT AND VERIFY EXISTING SHUTOFF GATE VALVE IS OPERATING CORRECTLY OR CONTRACTOR SHALL INSTALL A NEW VALVE, PER DETAIL 9/C4.0.

LABEL LEGEND

PIPE LABELS

UTILITY LENGTH
UTILITY SIZE
UTILITY TYPE

XXLF - XX" XX

S=X.XX%

SLOPE (WHERE APPLICABLE)

STRUCTURE LABELS

UTILITY TYPE (SD=STORM DRAINAGE, FP=FIRE PROTECTION)
STRUCTURE TYPE CALLOUT (SEE BELOW)
ID NUMBER (WHERE APPLICABLE)

XX XX-XX

STRUCTURE TYPES

CALLOUT	DESCRIPTION
FH	INSTALL THE RELOCATED FIRE HYDRANT, PER SHEET C0.3 AND DETAIL 9/C4.0
GV	GATE VALVE, PER DETAIL 7/C4.0
PIV	POST INDICATOR VALVE, PER DETAIL 8/C4.0
RD	ROOF DRAIN CONNECTION

LEGEND

STORM LINE

FIRE LINE — FP — FP — FP — FP —

AS-BUILT
BASED ON INFORMATION PROVIDED BY CONTRACTOR, SURVEYOR AND LIMITED ENGINEER SITE VISITS

NORTH

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 feet

ASBUILT SET - 5/9/18
GRADING PERMIT: #BB170609

no.	revision	date

16-066 job no.
DSE drawn
CNH checked
5-9-18 date

REGISTERED PROFESSIONAL ENGINEER 58412PE OREGON JULY 15, 2015 CRAIG N. HARRIS
EXPIRES: 6/30/2019

AAI alpha associates, inc. ENGINEERING
4875 SW Griffith Drive | Suite 300 | Beaverton, OR | 97005
503.620.3030 tel | 503.620.5039 fax | www.aaiengineering.com
Project No. 16143.11

DWFRITZ Renovation
9600 SW Boeckman Rd.
Wilsonville, OR 97070

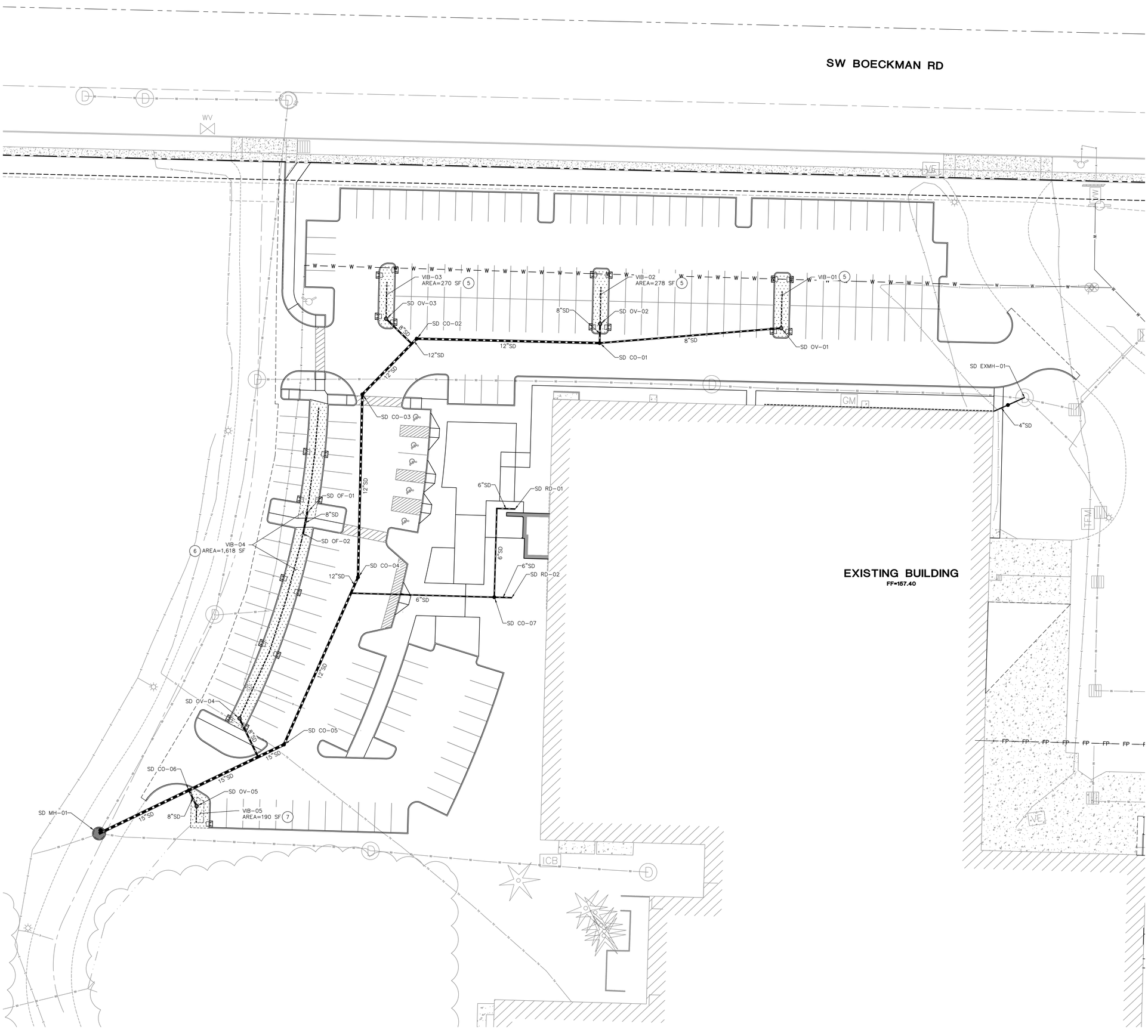
LANCE MUELLER & ASSOCIATES
ARCHITECTS · AIA
130 LAKESIDE · SEATTLE, WA 98122 · 206 325 2553

UTILTY PLAN

sheet
C3.0

Item 2.

711



SHEET NOTES

1. SEE SHEETS C0.1 AND C3.0 FOR SHEET NOTES AND LEGEND.
2. ALL HORIZONTAL AND PIPE INVERT ELEVATIONS ARE BASED ON THE CENTER OF THE STRUCTURE.

(X) UTILITIY NOTES

1 APPROXIMATE LOCATION OF EXISTING 10" CI WATER MAIN. CONTRACTOR TO POTHOLE AND VERIFY LOCATION PRIOR TO ORDERING MATERIALS.

2 CONNECT TO EXISTING WATER MAIN WITH 10"x8" TAPPING SLEEVE.

3 CONNECT TO EXISTING BUILDING SERVICE. SEE PLUMBING PLANS FOR CONTINUATION.

4 INSTALL MJxMJ 8" 45° BEND.

5 CONSTRUCT STORMWATER PLANTER, UNDER A SEPARATE PERMIT.

6 CONSTRUCT STORMWATER SWALE, UNDER A SEPARATE PERMIT.

7 CONSTRUCT STORMWATER RAIN GARDEN, UNDER A SEPARATE PERMIT.

8 NOT USED

9 CONNECT TO EXISTING WATER LINE. CONTRACTOR TO VERIFY PIPE INVERTS PRIOR TO CONSTRUCTION.

10 CONTRACTOR TO VERIFY THAT A HIGH POINT IS NOT CREATED IN THE MAIN AT THE POINT OF CONNECTION. IF A HIGH POINT IS FOUND THE CONTRACTOR SHALL REMOVE AND REINSTALL THE FIRE MAIN TO THE ADJACENT FIRE HYDRANT CONNECTION POINT TO BE USED AS THE BLOW-OFF STRUCTURE.

11 REINSTALL FIRE HYDRANT AND VERIFY EXISTING SHUTOFF GATE VALVE IS OPERATING CORRECTLY OR CONTRACTOR SHALL INSTALL A NEW VALVE, PER DETAIL 9/C4.0.

LABEL LEGEND

PIPE LABELS

UTILITY LENGTH
UTILITY SIZE
UTILITY TYPE
XXLF – XX" XX
S=X.XX%
SLOPE (WHERE APPLICABLE)

STRUCTURE LABELS

UTILITY TYPE (SD=STORM DRAINAGE, FP=FIRE PROTECTION)
STRUCTURE TYPE CALLOUT (SEE BELOW)
ID NUMBER (WHERE APPLICABLE)
XX XX–XX

STRUCTURE TYPES

CALLOUT	DESCRIPTION
FH	INSTALL THE RELOCATED FIRE HYDRANT, PER SHEET C0.3 AND DETAIL 9/C4.0
GV	GATE VALVE, PER DETAIL 7/C4.0
PIV	POST INDICATOR VALVE, PER DETAIL 8/C4.0
RD	ROOF DRAIN CONNECTION

AS-BUILT
BASED ON INFORMATION PROVIDED BY CONTRACTOR, SURVEYOR AND LIMITED ENGINEER SITE VISITS

NORTH

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 feet

ASBUILT SET – 5/9/18
GRADING PERMIT: #BB170609

no.	revision	date

16-066 job no.
DSE drawn
CNH checked
5-9-18 date

REGISTERED PROFESSIONAL ENGINEER 58412PE OREGON JULY 15, 1975 CRAIG N. HARRIS
EXPIRES: 6/30/2019

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503.620.3030 tel | 503.620.5039 fax | www.aaiengineering.com
Project No. 16143.11

DWFRITZ Renovation
9600 SW Boeckman Rd.
Wilsonville, OR 97070

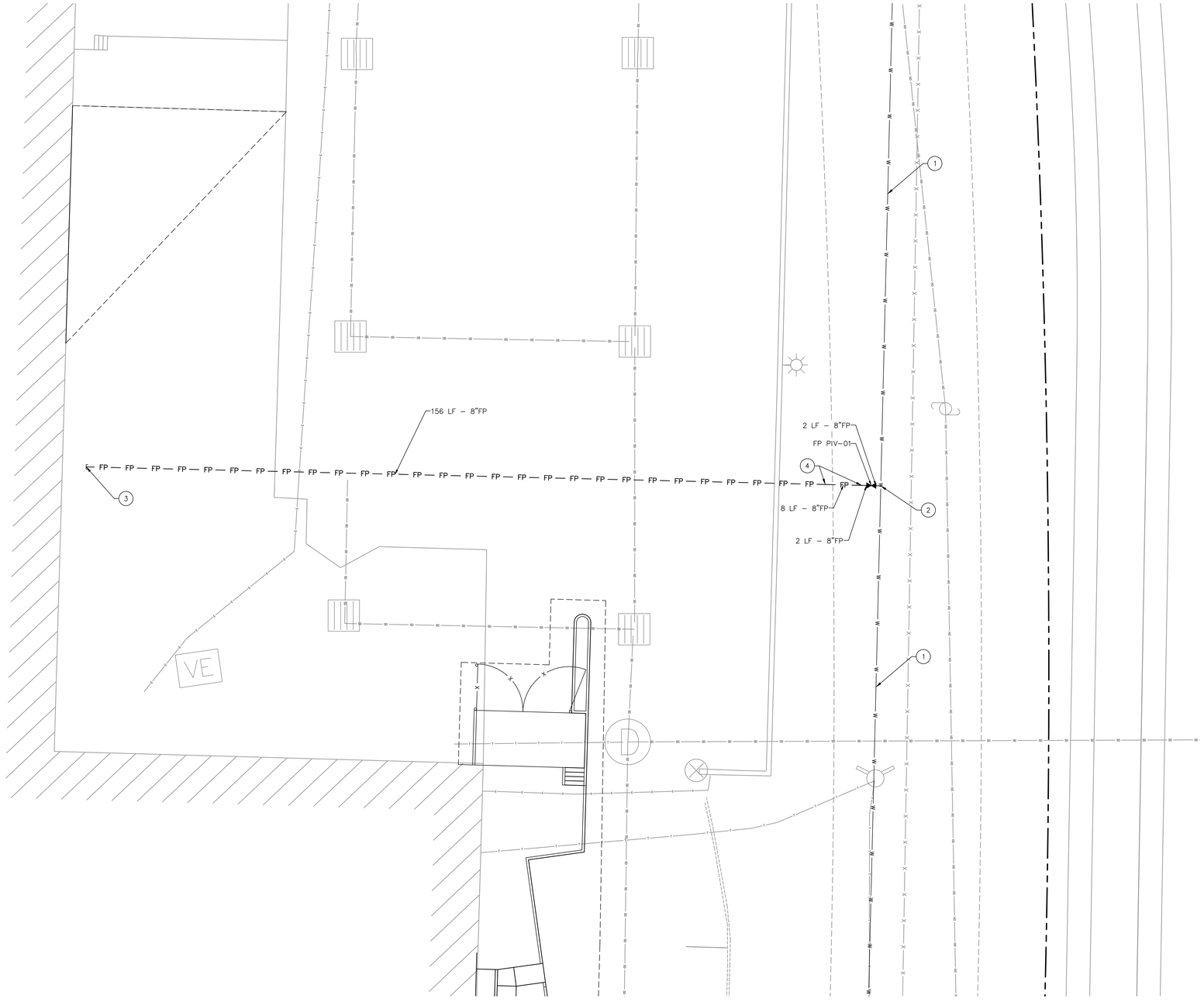
LANCE MUELLER & ASSOCIATES
ARCHITECTS · AIA
130 LAKESIDE · SEATTLE, WA 98122 · 206 325 2553

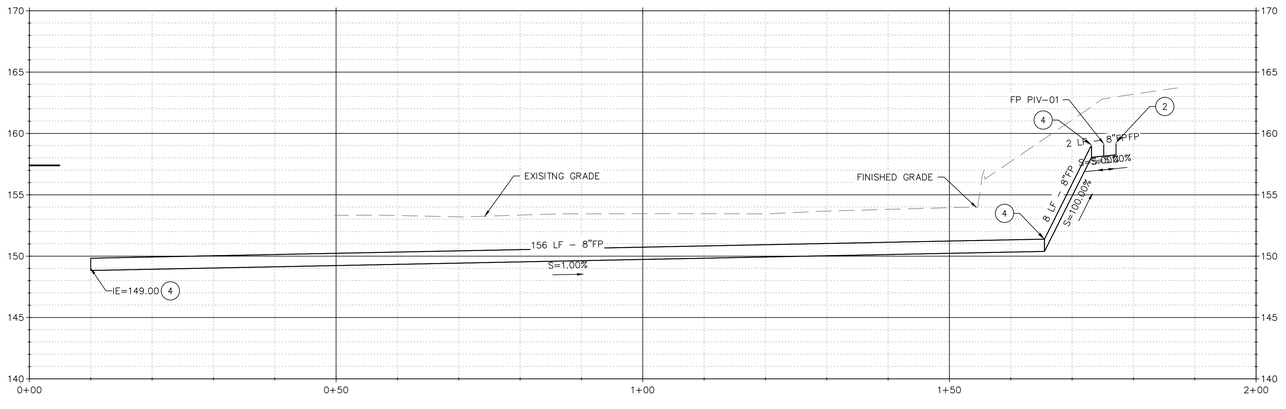
UTILITY ENLARGEMENT

sheet
C3.1

Item 2.

712





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PIPE LABELS

UTILITY LENGTH
UTILITY SIZE
UTILITY TYPE
XXLF – XX" XX

S=X.XX%
SLOPE (WHERE APPLICABLE)

STRUCTURE LABELS

UTILITY TYPE (SD=STORM DRAINAGE, FP=FIRE PROTECTION)
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ID NUMBER (WHERE APPLICABLE)
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AS–BUILT
BASED ON INFORMATION PROVIDED BY CONTRACTOR, SURVEYOR AND LIMITED ENGINEER SITE VISITS

NORTH

GRAPHIC SCALE
10 0 5 10 20 40
(IN FEET)
1 inch = 10 feet

ASBUILT SET – 5/9/18
GRADING PERMIT: #BB170609

date	revision	no.
16-066	job no.	
DSE	drawn	
CNH	checked	
5-9-18	date	

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 10, 1981
CRAIG N. HARRIS
EXPIRES: 6/30/2019

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Wilsonville, OR 97070

LANCE MUELLER & ASSOCIATES
ARCHITECTS · AIA
130 LAKESIDE · SEATTLE, WA 98122 · 206 325 2553

UTILITY ENLARGEMENT

sheet
C3.2

May 16, 2023

Re: **Submittal #3 - Supplement** (Re: Development Engineering comments)
DB22-0004 Boeckman Road Building W5

To: City of Wilsonville
Planning Division – Cindy Luxhoj AICP
29799 SW Town Center Loop East
Wilsonville, OR 97070

From: Bob Wells
Lance Mueller & Associates / Architects
130 Lakeside Ave. S., #250
Seattle, WA 98122

Dear Cindy,

Thank you for sharing Amy Pepper's comments of 5/5/23 as the Development Engineering Manager. Below are our item-by-item responses to the comments. Amy's comments are in blue and italics followed by our responses.

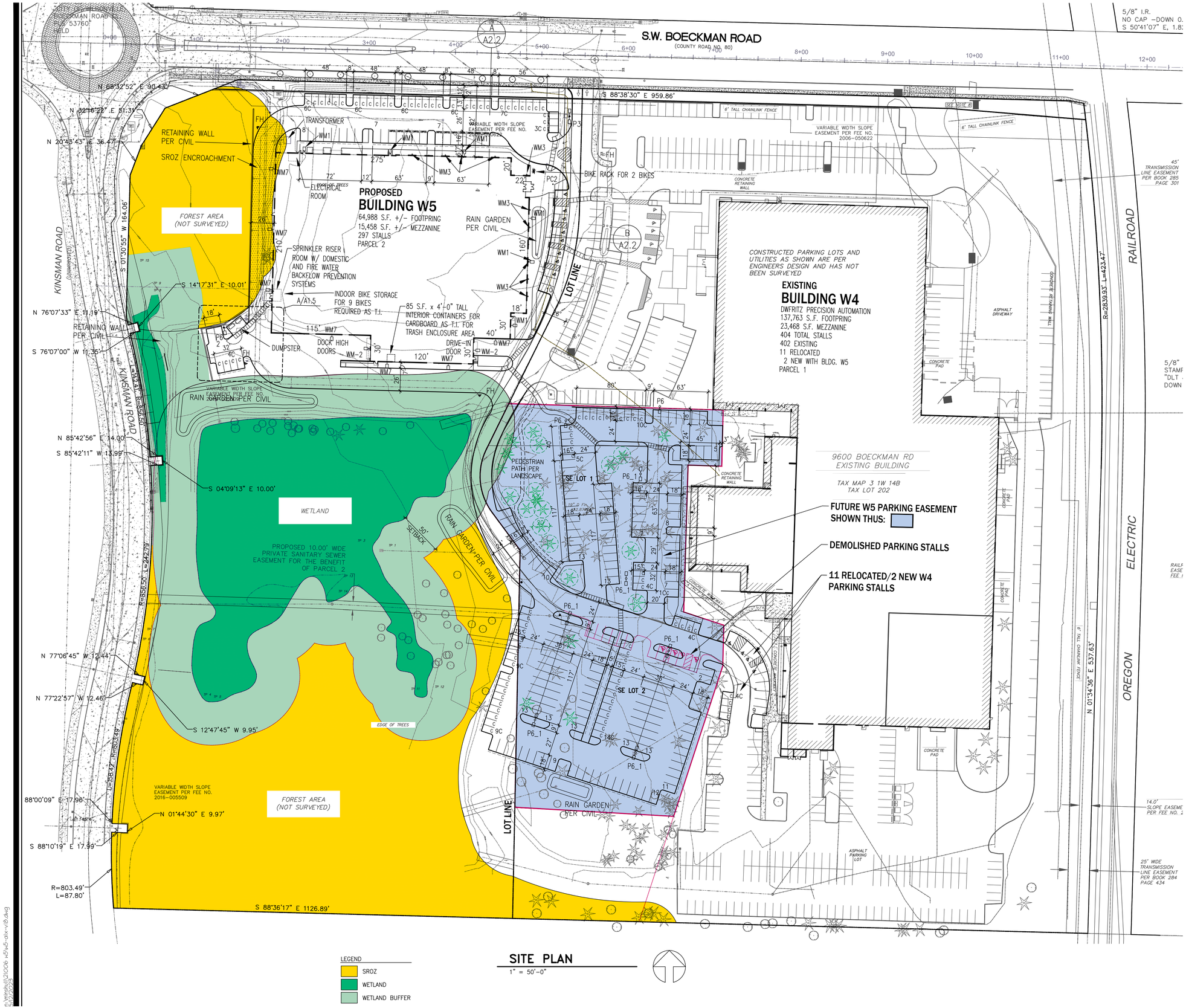
Sincerely,

Bob Wells
Lance Mueller & Associates / Architects
130 Lakeside Ave. S., #250
Seattle, WA 98122

Development Engineering Comments

- *The response letter acknowledges issues with the Stormwater sizing, but no new Storm Report is provided. An updated Stormwater Report is required. Without an updated Stormwater Report its difficult to confirm that the facilities are adequately sized.* See our updated Stormwater Report that addresses the concern, dated 05/15/23.
- *The fire water system is still shown as private. All hydrants must be on a public water main that needs to be located within a 15' exclusive water line easement. The main needs to be looped. It appears from the drawings provided that the looping will need to be separate from the system for W4 as it was constructed as a private system. This can be a condition of approval or they can fix it now, as there are impacts to other utilities.* The attached drawing revises the fire water system to public with a loop and suggests the easement limits, see Civil drawing C1.30, revised 05/15/23. In addition, Architectural Site Plan drawing A1.0 clarifies the domestic & fire water backflow prevention systems are located inside the building at the fire Sprinkler room.
- *The trash enclosure must be hydraulically isolated and covered. It appears from the plans that the enclosure does not have a cover. This can be addressed with a condition of approval as well.* A roof over the trash enclosure is added to the detail drawing, see Architectural drawing A1.2, revised 5/9/23.

End



SITE PLAN
1" = 50'-0"

no.	revision	date
	LAND USE SUBMITTAL #3 - SUPPLEMENT	5-9-23
	LAND USE SUBMITTAL #3	11-11-22
	SITE DESIGN REVIEW RESUBMITTAL	7-8-22
	SITE DESIGN REVIEW	1-21-22

18003 job no.
EM drawn
BW checked
11-11-22 date

REGISTERED ARCHITECT
LANCE MUELLER
SEATTLE, WA.
1491
STATE OF OREGON

BUILDING W5
99XX SW Boeckman Rd.
Wilsonville, OR 97070

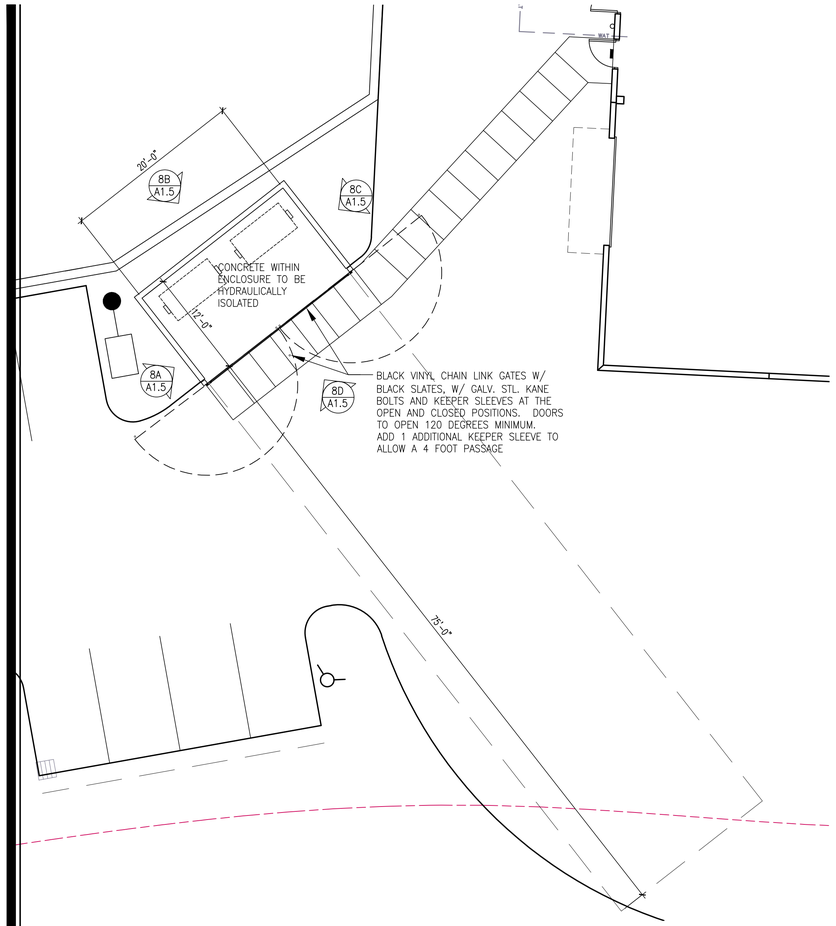
LANCE MUELLER & ASSOCIATES
ARCHITECTS AIA
130 LAKESIDE • SUITE 250 • SEATTLE, WA 98122 • (206) 325-2553

SITE PLAN

sheet
A1.0

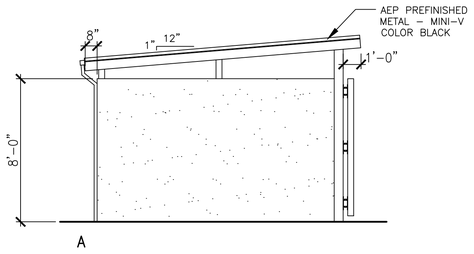
Item 2.

715



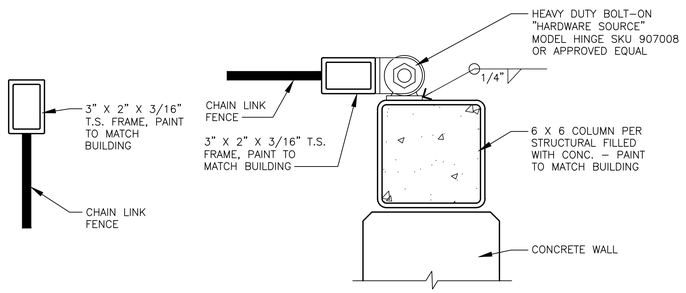
A ENLARGED SITE PLAN

SCALE: 1/8" = 1'-0"



8 DUMPSTER ENCLOSURE ELEVATIONS

SCALE: 1/4" = 1'-0"

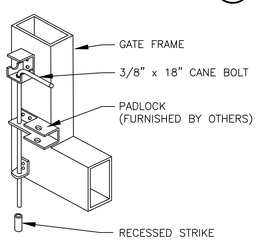


21 DETAIL

SCALE: 1" = 8"

22 DETAIL

SCALE: 1" = 8"



23 DETAIL

SCALE: 1" = 8"

no.	revision	date
	LAND USE SUBMITTAL #3 - SUPPLEMENT	5-6-23
	LAND USE SUBMITTAL #3	1-1-23
	SITE DESIGN RESUBMITTAL	7-8-22
	SITE DESIGN REVIEW	1-21-22

18003 job no.
EM drawn
BW checked
11-11-22 date

REGISTERED ARCHITECT · LANCE MUELLER · SEATTLE WA. 1451 · STATE OF OREGON

BUILDING W5
99XX SW Boeckman Rd.
Wilsonville, OR 97070

LANCE MUELLER & ASSOCIATES
ARCHITECTS AIA
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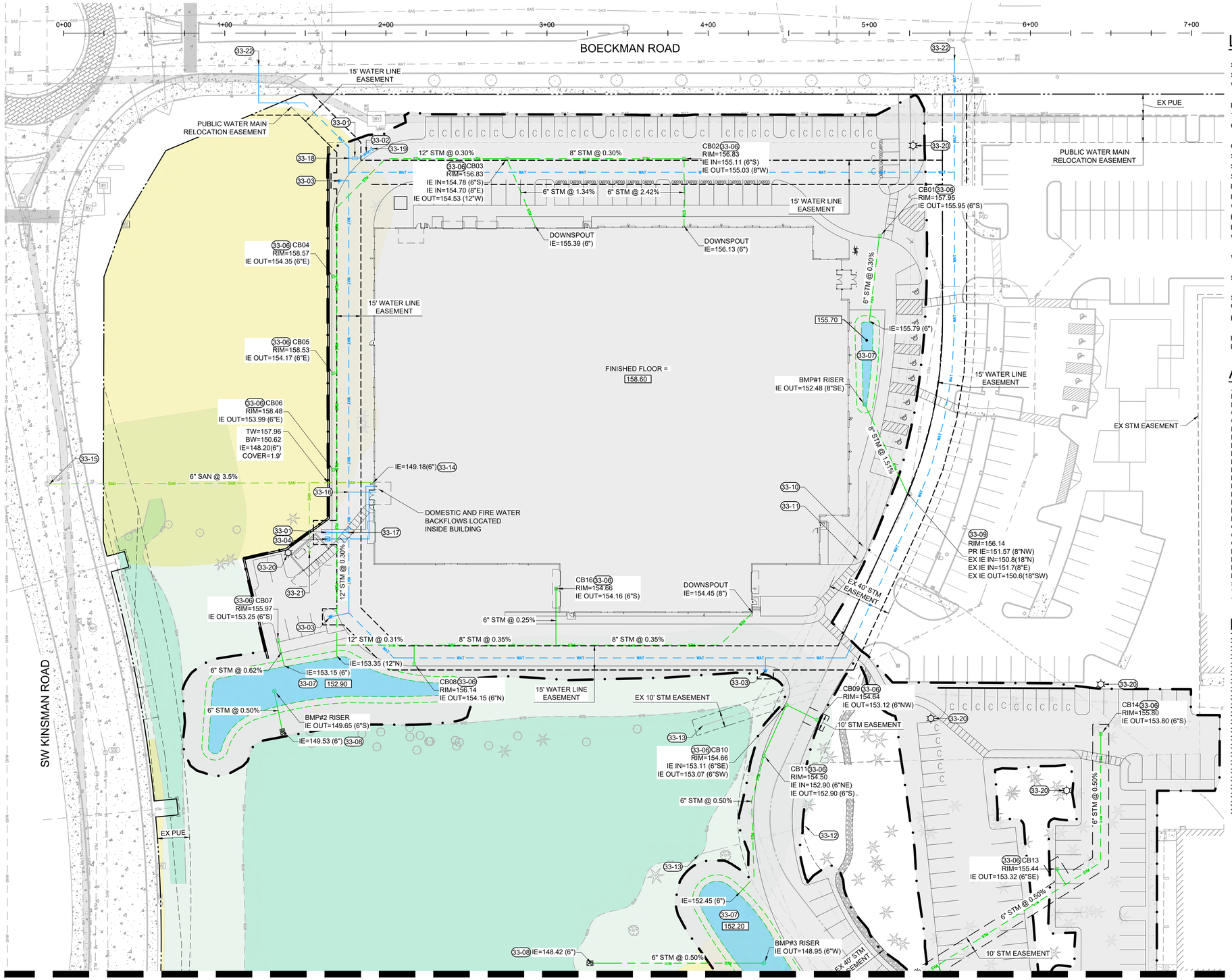
ENLARGED PLANS AND DETAILS

sheet
A1.2

Item 2.



1 C1.30 UTILITY PLAN - NORTH

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

THE SURVEY INFORMATION SHOWN AS A BACKGROUND SCREEN ON THIS SHEET IS SHOWN FOR REFERENCE ONLY AND IS BASED ON A SURVEY BY: ANDY PARIS & ASSOCIATES, INC. DATE: 08/23/2022

LEGEND

	EXISTING	PROPOSED
STORM LINE	STM	STM
SANITARY LINE	SAN	SAN
WATER LINE	WAT	WAT
POWER LINE	PWR	
TELECOMMUNICATION LINE	TEL	
CATV LINE	TV	
CATCH BASIN		
STORM MANHOLE		
SANITARY MANHOLE		
SANITARY AREA DRAIN		
FIRE HYDRANT		
FIRE DEPARTMENT CONNECTION	FDC	
WATER METER		
BACKFLOW PREVENTER		
POST INDICATOR VALVE		
WATER VALVE	WAT	
WETLAND		
50' WETLAND BUFFER		
SIGNIFICANT RESOURCE OVERLAY ZONE (SROZ)		
PR STORMWATER AREA		
PROPOSED LIMITS OF DEVELOPMENT		

ABBREVIATIONS

AC	ASPHALT CONCRETE
BMP	BEST MANAGEMENT PRACTICE
BW	BOTTOM OF WALL
CB	CATCH BASIN
CO	CLEANOUT
DI	DUCTILE IRON
DW	DOMESTIC WATER
EX	EXISTING
FDC	FIRE DEPARTMENT CONNECTION
FF	FINISH FLOOR
FG	FINISHED GRADE ELEVATION
FH	FIRE HYDRANT
FW	FIRE WATER
IE	INVERT ELEVATION
MH	MANHOLE
MJ	MECHANICAL JOINT
NTS	NOT TO SCALE
OC	ON CENTER
ODOT	OREGON DEPARTMENT OF TRANSPORTATION
OSHA	OREGON STATE HEALTH AUTHORITY
PR	PROPOSED
RD	ROOF DRAIN
RIM	RIM ELEVATION
ROW	RIGHT OF WAY
SAN	SANITARY SEWER
TW	TOP OF WALL
TYP	TYPICAL

KEYNOTES

33-01	WATER METER
33-02	BACKFLOW PREVENTER
33-03	FIRE HYDRANT
33-04	FIRE DEPARTMENT CONNECTION
33-05	POST INDICATOR VALVE
33-06	CATCH BASIN
33-07	STORMWATER MANAGEMENT FACILITY, SEE 2/C1.31
33-08	STORM OUTFALL WITH RIP RAP PROTECTION
33-09	CONNECT TO EXISTING STORM MANHOLE
33-10	ADJUST EXISTING UTILITY BOXES TO GRADE AS REQUIRED
33-11	RELOCATE EXISTING SITE LIGHT
33-12	EXISTING STORM CULVERT
33-13	EXISTING STORM OUTFALL
33-14	SANITARY BUILDING CONNECTION
33-15	CONNECT TO EXISTING SANITARY MANHOLE
33-16	FIRE WATER CONNECTION
33-17	DOMESTIC WATER CONNECTION
33-18	IRRIGATION WATER CONNECTION
33-19	IRRIGATION STUB
33-20	SITE LIGHT
33-21	SANITARY AREA DRAIN
33-22	PUBLIC WATER MAIN CONNECTION

Item 2.

Architecture ▪ Interiors
Planning ▪ Engineering

Portland, OR
503.224.9560
Vancouver, WA
360.695.7879
Seattle, WA
206.749.9993
www.mcknze.com

MACKENZIE.
DESIGN DRIVEN | CLIENT FOCUSED

Client
MARTIN DEVELOPMENT

P.O. BOX 15523
SEATTLE, WA 98115

Project
W-5

9600 BOECKMAN ROAD
WILSONVILLE, OR 97070

REGISTERED PROFESSIONAL ENGINEER
91097
OREGON
JAN. 10, 2017
GREGORY I. MINO
EXPIRES: 12/31/24

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REVISION SCHEDULE

Delta	Issued As	Issue Date

SHEET TITLE:
UTILITY PLAN - NORTH

DRAWN BY: BTC

CHECKED BY:GIM

SHEET:
C1.30

JOB NO. **2210115.00**

LAND USE SUBMITTAL #3 - SUPPLEMENT - 05/15/2023

2210115\00\DRAWINGS\CIVIL\115-C1.30X.DWG VSN 05/15/23 16:08 1:30

MACKENZIE.

STORM DRAINAGE REPORT

Project
W-5
Planning DB No. _____

Applicant
Martin Development
Attn: Mac Martin
P.O. Box 15523
Seattle, WA 98115

Design Engineer
Mackenzie
Attn: Greg Mino
1515 SE Water Ave, #100
Portland, OR 97214
503.224.9560

Submitted
May 15, 2023

Mackenzie Project #
2210115.00

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Soil Conditions 2
Hydrologic Analysis (Existing) 2
II. DEVELOPED CONDITIONS 4
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Hydraulic Design Computations 5
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Figure 3: Developed Conditions 4

Figure 4: Downstream Analysis Study Area 6

Figure 5: Post Developed Discharge Hydrograph 7

Figure 6: Culvert Downstream Conveyance Spreadsheet 7

Appendices

APPENDIX A – HYDRAULIC DESIGN COMPUTATIONS AND DMA MAP
APPENDIX B – OPERATIONS AND MAINTENANCE MANUAL
APPENDIX C – WEB SOIL SURVEY SOILS MAP

I. PROJECT DESCRIPTION

This report documents the stormwater management calculations and design approach carried out by Mackenzie to manage stormwater runoff for the W-5 project compliant with applicable code(s). The proposed W-5 project is located at the SE corner of the intersection of Boeckman Road and SW Kinsman Road in Wilsonville, Oregon (see Figure 1, Vicinity Map). According to City of Wilsonville GIS, the project site is approximately 23.86 acres when considered along with the existing W-4 development that resides on the easterly half of the property. The applicant is pursuing a subdivision to divide the property into two lots, apportioning the westerly 10.046 acres for this new development (referred to as the "project site" or "site" throughout the report). The overall site is currently addressed as 9600 Boeckman Road as Tax Lot 202 of Tax Map 3 1W 14B, and is zoned as Planned Development Industrial (PDI).

In pursuit of this project, the applicant (or their contractor(s)) is applying for the following permits: Development, Commercial Building, Mechanical, Plumbing, Clackamas County Electrical, Grading, Fire Alarm, Fire Sprinkler, DEQ 1200-C, and Type B/C Tree Removal permits. No right-of-way permits or environmental/regulatory permits are expected to be required at this time.

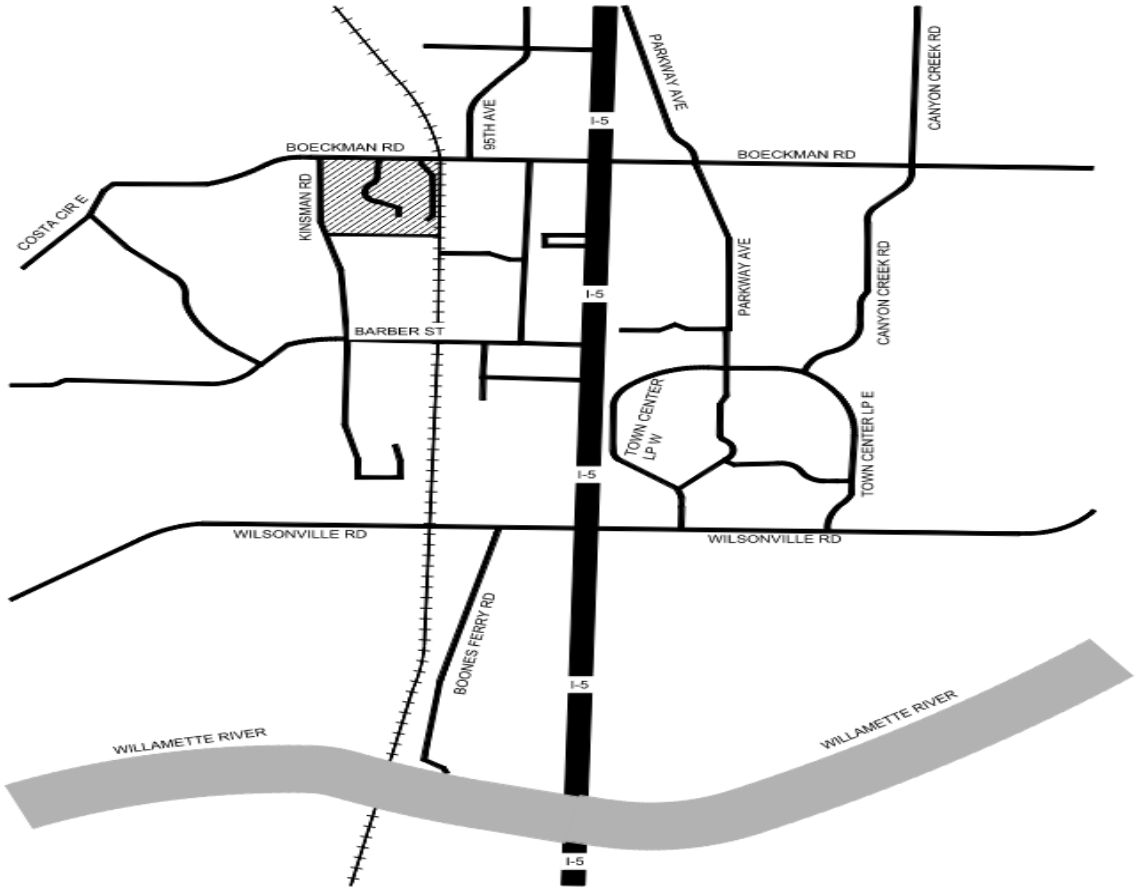


Figure 1: Vicinity Map

Existing Conditions

The existing site consists of a generally open grassy area bounded by the Significant Resource Overlay Zone (SROZ) in the NW corner and southerly portion of the site, Boeckman Road to the north, SW Kinsman Road to the west, and an existing private paved drive aisle to the east. The existing development known as W-4 resides on the easterly portion of the overall property. Figure 2 provides a simplified graphical depiction of the existing conditions.

Stormwater that falls on site generally either infiltrates into the grassy area or drains in a predominantly southerly direction over shallow sloped ground and into the larger SROZ/Wetlands prior to discharge to the public storm drain system. There are no identifiable upstream drainage basins to consider in design. Per City GIS, it appears that rainwater discharge from the project site ultimately outfalls to the Willamette River to the south.

SW Kinsman Road and Boeckman Road are fully improved roads with their own public drainage system.

Soil Conditions

Per the USDA Web Soil Survey, the existing soils on the portion of the site to be developed are almost entirely Aloha silt loam which are identified as Hydrologic Soil Group C/D for the purposes of relating to Technical Release 55 (TR-55) to assign the runoff curve number to be used in the hydrologic analysis of the existing conditions. Referring to Table 2-2a of TR-55 and designating the site as Open Space in Good Condition, the resulting curve number is between 74 and 80 – 76 will be used in the calculations.

Please see the Web Soil Survey Soils Map in Appendix C.

Hydrologic Analysis (Existing)

The hydrologic analysis of the existing conditions was performed using the Water Environment Services (WES) BMP Sizing Tool. For the purposes of hydrologic modeling, the WES BMP Sizing Tool models the historical vegetation which existed onsite prior to development. All subbasins are either defined as grass or forested. Please see the WES BMP Sizing Report, Appendix B, pages 62-63, for details on the hydrologic pre-developed conditions onsite.

Figure 2: Existing Conditions

II. DEVELOPED CONDITIONS

The proposed development consists of the construction of a 65,000 square foot (footprint) manufacturing building with an integral depressed truck dock, associated drive aisles and parking, an exterior trash enclosure, and associated utility services to the building and site. Although the site area (after subdivision) is 10.046 acres, the area to be developed is substantially less due to the SROZ/Wetland areas encumbering more than 50% of the southerly portion and the NW corner of the lot. The total site area being developed is 4.88 acres. Figure 3 provides a simplified graphical depiction of the developed conditions.

See the Drainage Management Area (DMA) Map in Appendix A that provides a breakdown of impervious and pervious areas within each DMA/subbasin.

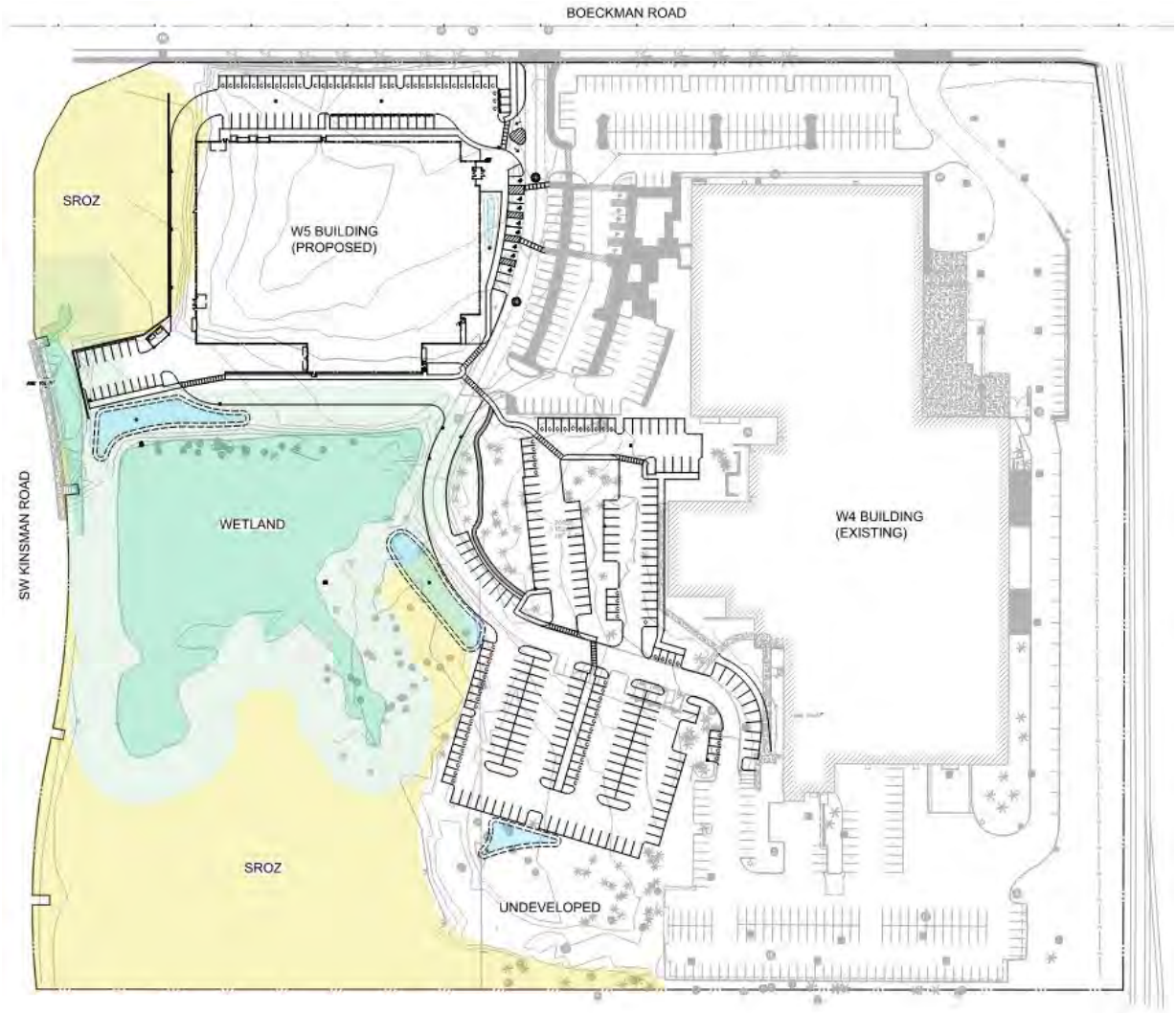


Figure 3: Developed Conditions

Water Quality Standard

Water quality facilities shall be designed to capture and treat 80% of the average annual runoff volume to the Maximum Extent Practicable (MEP) with the goal of 70% total suspended soils (TSS) removal. In this context, MEP means less effective treatment may not be substituted when it is practicable to provide more effective treatment. This treatment volume equates to a design storm of **1.0 inch over 24 hours**.

The BMP Sizing Tool addresses these water quality requirements to size stormwater management facilities.

Hydrodynamic separators, when used as a sole method of stormwater treatment, do not meet the MEP requirement for stormwater treatment effectiveness with regard to these stormwater standards.

Flow Control Standard

The duration of peak flow rates from post-development conditions shall be less than or equal to the duration of peak flow rates from pre-development conditions for all peak flows between **42% of the 2-year storm peak flow rate up to the 10-year peak flow rate**.

Hydrologic Analysis (Proposed)

Water Quality

In order to meet the goals of Low Impact Development, rain gardens have been selected as the proposed BMP to provide water quality treatment for this project. Although the project site has limited infiltration due to relatively high groundwater table (8' bgs) and low infiltration rates (0.1"/hr) , the BMP facilities are not proposed to be lined in order to promote any amount of infiltration that may still occur. The stormwater planters are dispersed throughout the site at strategic locations for capture of runoff, upon which underground piping collects the water and routes it to the SROZ/Wetland area for discharge.

Please refer to the DMA Map and WES BMP Sizing Report (Appendix A, pages 62-63) for facility sizes and impervious areas that are conveyed to each facility. Appendix B contains the Operations & Maintenance Manual for the proposed facilities.

Flow Control

As noted in the Water Quality section, rain gardens have been selected as the proposed BMP which will meet both treatment and flow control requirements.

Please refer to the Drainage Management Area (DMA) Map and WES BMP Sizing Report, Appendix A, pages 62-63, for further detail. Appendix B contains the Operations & Maintenance Manual for the proposed facilities.

Hydraulic Design Computations

The proposed underground storm drainage system for this project has been designed to collect and convey the runoff from a 25-year storm event per the City of Wilsonville 2015 Stormwater & Surface Water Design & Construction Standards. The peak flow has been calculated using the Santa Barbara Urban Hydrograph (SBUH) within the Storm & Sanitary Analysis (SSA) for Autodesk Civil3D software. The peak flow from the 25-year event over the project site has then been prorated on a cfs/sf basis into the various

drainage management areas (DMAs)/subbasins throughout the site. Underground piping has then been sized accordingly using SSA software. Please refer to the DMA Map and Profile Plots, pages 1-7, in Appendix A. In the occurrence of a storm event in excess of the design storm, adequate overland flow has been provided to prevent flooding of habitable structures.

Downstream Analysis

The existing drainage system downstream of the development has been analyzed to verify that it has the capacity to convey the 25-year design storm. The analysis is intended to extend downstream to a point in the drainage system where the proposed development site constitutes 10% or less of the total tributary drainage flow. However, the overall property containing the existing W-4 Building and proposed W-5 Building discharge to a major water body, being Coffee Lake Creek, just across Kinsman Road and as such, the analysis was terminated there.

City of Wilsonville GIS reveals that water is conveyed from the overall property to Coffee Lake Creek through three 18" culverts that run beneath SW Kinsman Road. Figure 4 is a snapshot of City of Wilsonville GIS, and it depicts the conveyance of the stormwater offsite into Coffee Lake Creek. Culverts 1-3 are hydraulically connected such that if stormwater backed up in the furthest downstream culvert (Culvert 3), then stormwater would be conveyed through Culverts 2 and 1 respectively.

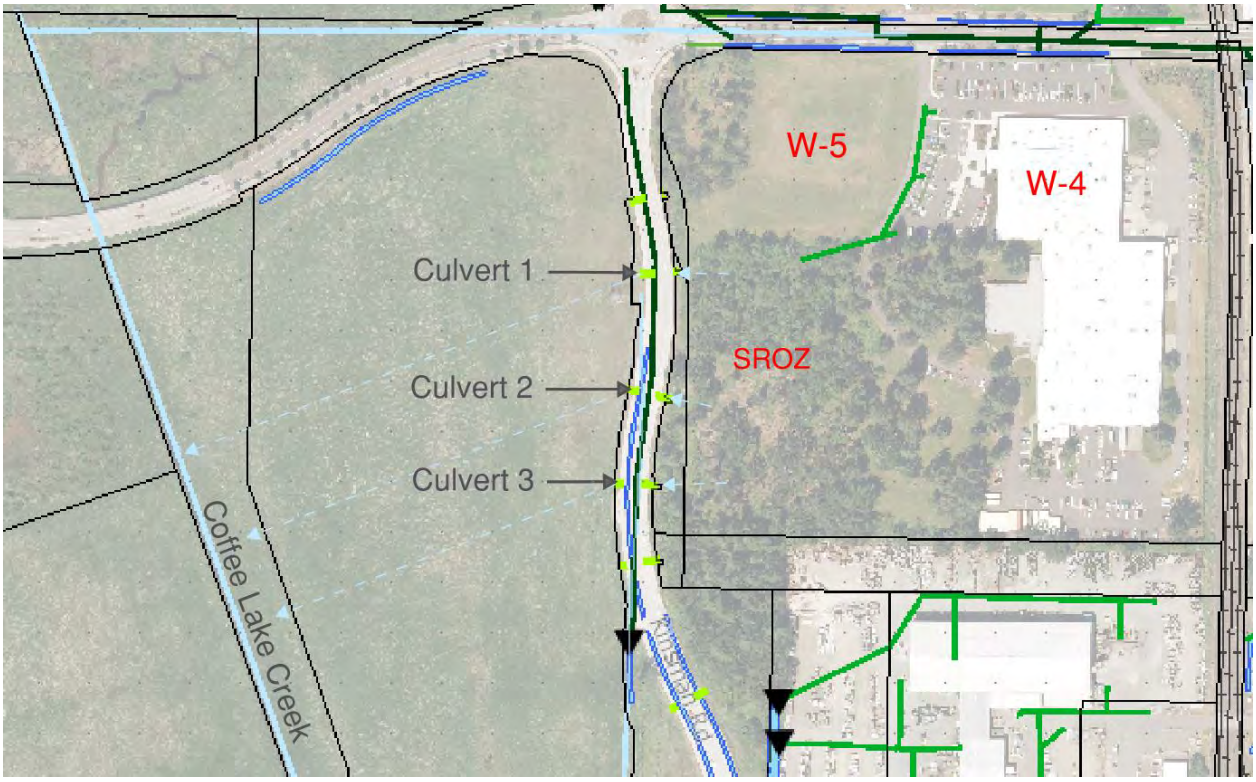


Figure 4: Downstream Analysis Study Area

Hyd. No. 1

Post Developed

Hydrograph type	= SBUH Runoff	Peak discharge	= 13.67 cfs
Storm frequency	= 25 yrs	Time to peak	= 8.00 hrs
Time interval	= 2 min	Hyd. volume	= 236,391 cuft
Drainage area	= 23.860 ac	Curve number	= 89*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.70 min
Total precip.	= 3.90 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= n/a

* Composite (Area/CN) = [(4.280 x 98) + (0.760 x 76) + (6.910 x 76) + (10.120 x 98) + (1.790 x 76)] / 23.860

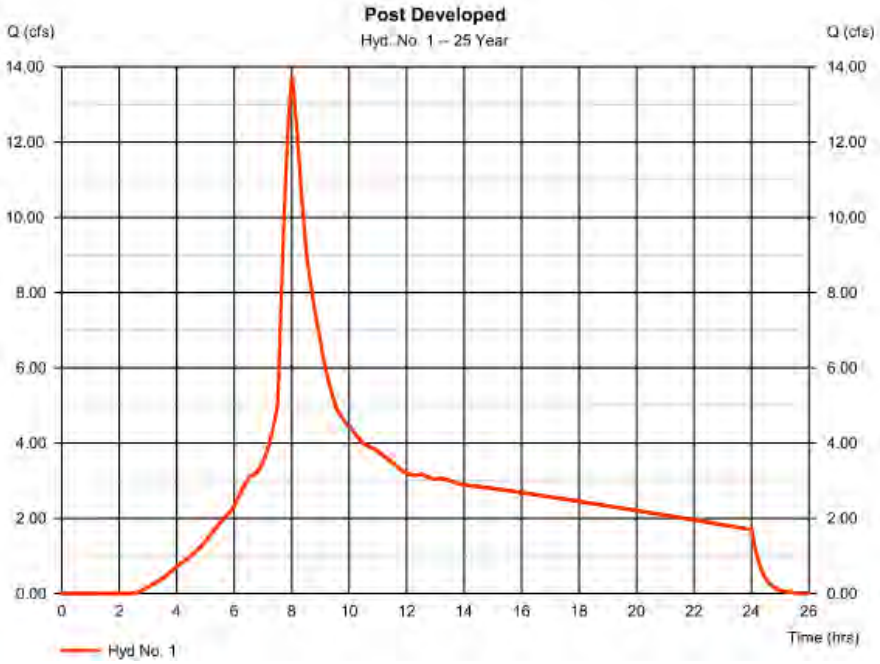


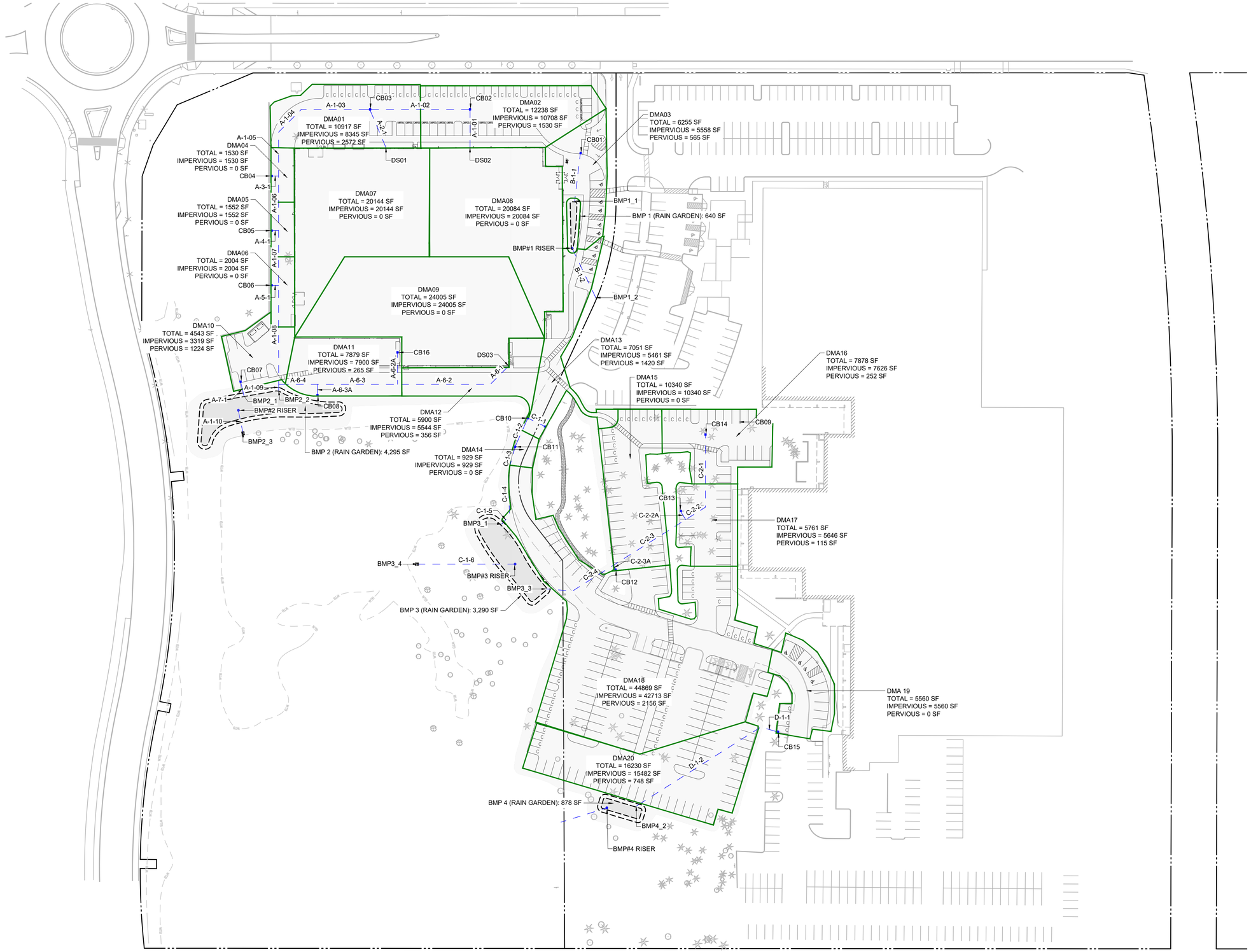
Figure 5: Post Developed Discharge Hydrograph

Runoff (cfs)	Slope(%)	Diameter (in)	Pipe Area (sf)	Hydraulic Radius^2/3	Capacity (cfs)	Velocity at Design Flow (fps)	Runoff/Capacity (ratio)
6.84	0.50	18	1.767	0.520	**7.40**	4.69	0.92
6.84	0.50	18	1.767	0.520	**7.40**	4.69	0.92

Figure 6: Culvert Downstream Conveyance Spreadsheet

Figure 5 illustrates the peak flow (13.67 cfs) for the 25-year storm from the overall property. Figure 6 lists the variables used in a Manning's calculations to determine capacity, and it is conclusive that two 18" culverts are sufficient to adequately convey the 25-year storm peak discharge from the overall property to Coffee Lake Creek.

APPENDIX A – HYDRAULIC DESIGN COMPUTATIONS AND DMA MAP



1 DRAINAGE MANAGEMENT AREA MAP

50 0 25 50 100 200

(IN FEET)
1 inch = **50** ft.

THE SURVEY INFORMATION SHOWN AS A BACKGROUND SCREEN ON THIS SHEET IS SHOWN FOR REFERENCE ONLY AND IS BASED ON A SURVEY BY: ANDY PARIS & ASSOCIATES, INC. DATE: 08/23/2022

Item 2.

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REVISION SCHEDULE

Delta	Issued As	Issue Date

SHEET TITLE:
DRAINAGE MANAGEMENT AREA MAP

DRAWN BY: BTC

CHECKED BY:GIM

SHEET:

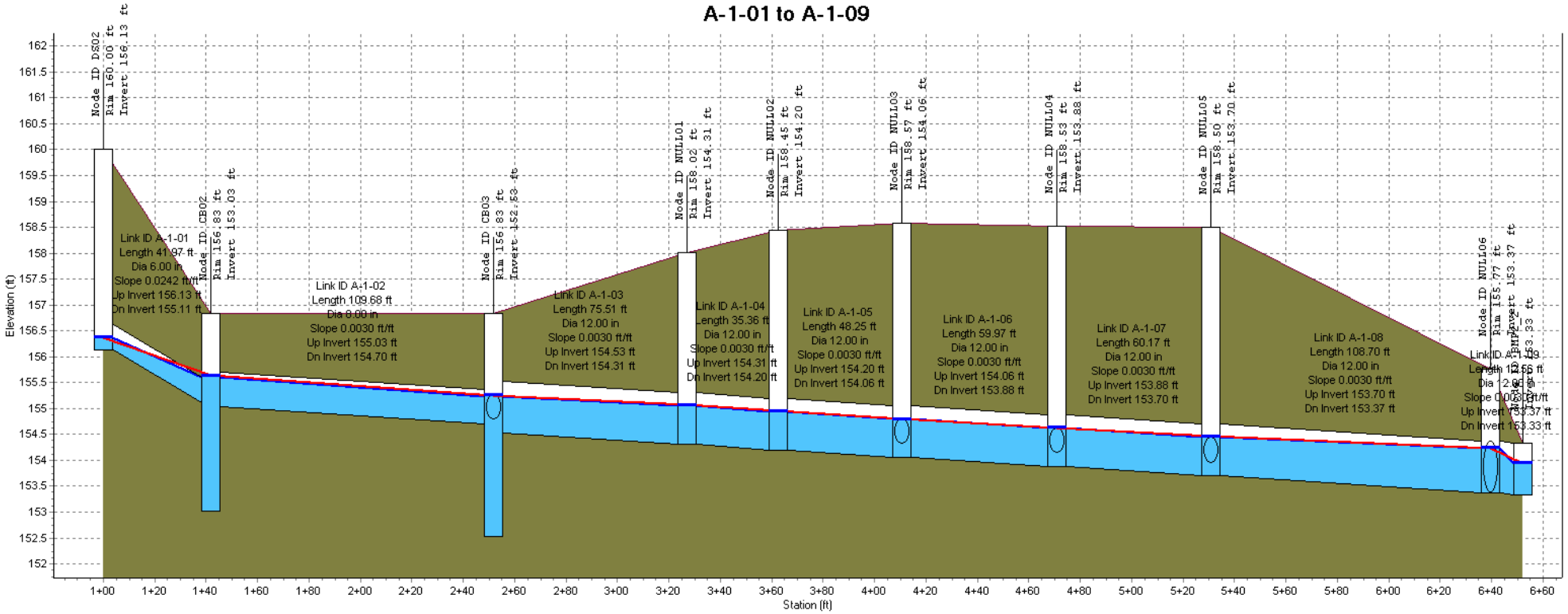
JOB NO. **2210115.00**

LAND USE SUBMITTAL - 10/XX/2022

2210115\00\DRAWINGS\CIVIL\EXHIBITS\115-DMA MAP.DWG VSN 10/18/22 17:28 1:50

Profile Plot

A-1-01 to A-1-09



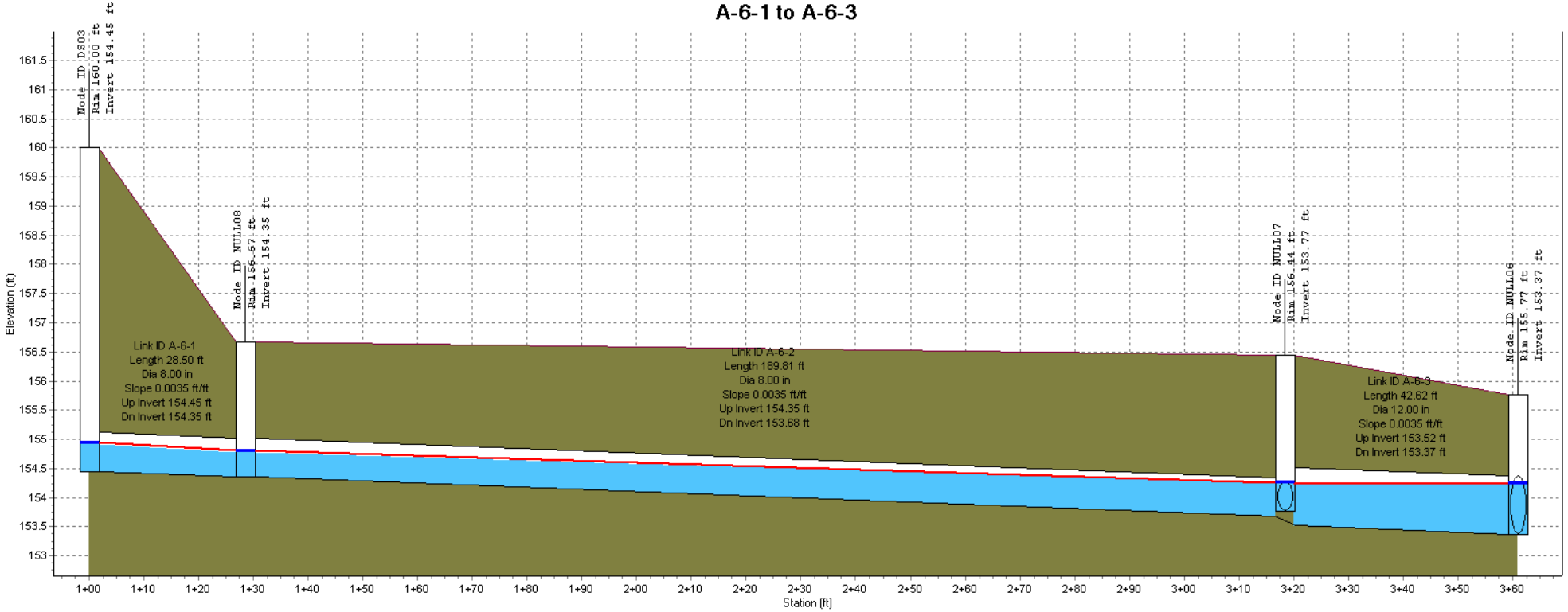
Node ID:	DS02	CB02	CB03	NULL01	NULL02	NULL03	NULL04	NULL05	NULL06	OUTFALL_2
Rim (ft):	160.00	156.83	156.83	158.02	158.45	158.57	158.53	158.50	155.77	
Invert (ft):	156.13	153.03	152.53	154.31	154.20	154.06	153.88	153.70	153.37	153.33
Min Pipe Cover (ft):				2.71	3.25	3.51	3.65	3.80	1.40	
Max HGL (ft):	156.37	155.64	155.26	155.07	154.95	154.80	154.63	154.46	154.24	153.95

Link ID:	A-1-01	A-1-02	A-1-03	A-1-04	A-1-05	A-1-06	A-1-07	A-1-08	A-1-09
Length (ft):	41.97	109.68	75.51	35.36	48.25	59.97	60.17	108.70	12.56
Dia (in):	6.00	8.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Slope (ft/ft):	0.0242	0.0030	0.0030	0.0030	0.0030	0.0030	0.0030	0.0030	0.0030
Up Invert (ft):	156.13	155.03	154.53	154.31	154.20	154.06	153.88	153.70	153.37
Dn Invert (ft):	155.11	154.70	154.31	154.20	154.06	153.88	153.70	153.37	153.33
Max Q (cfs):	0.43	0.68	1.31	1.31	1.30	1.33	1.36	1.41	2.09
Max Vel (ft/s):	2.75	2.10	2.13	2.08	2.13	2.16	2.19	2.05	3.34
Max Depth (ft):	0.37	0.58	0.74	0.75	0.74	0.75	0.76	0.82	0.74

Autodesk Storm and Sanitary Analysis

Profile Plot

A-6-1 to A-6-3



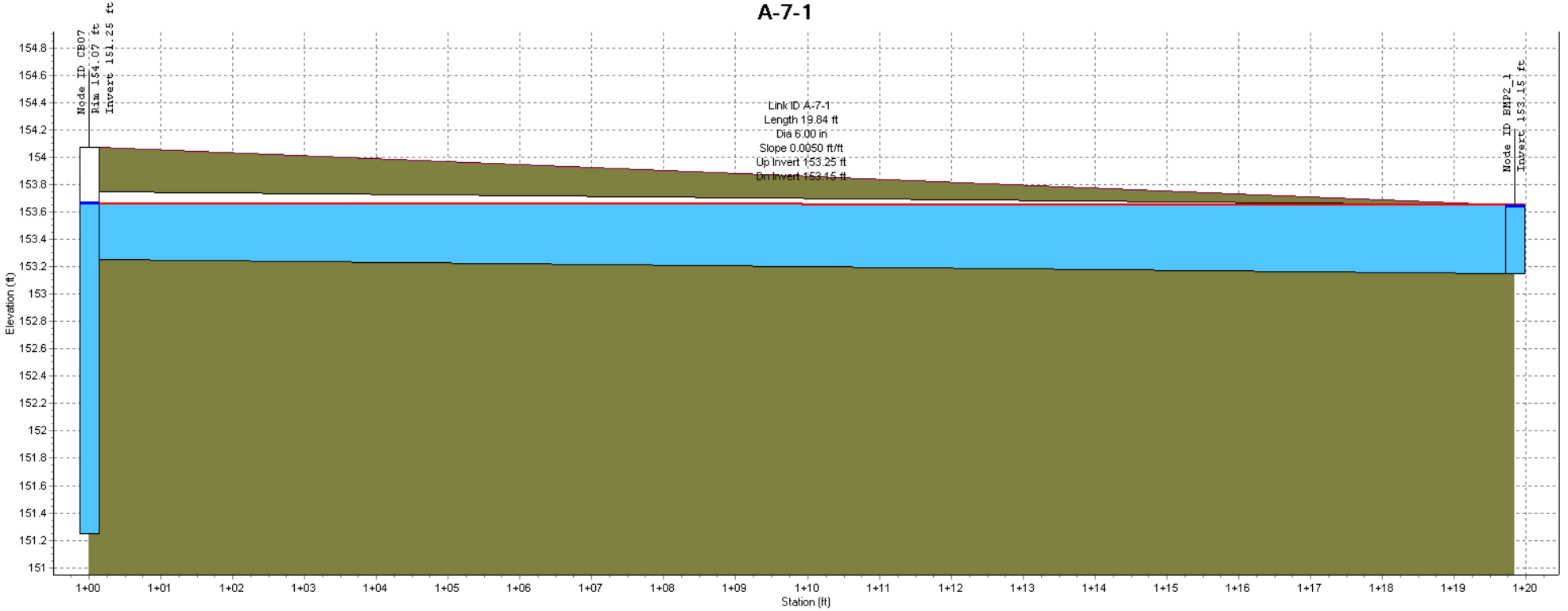
Node ID:	DS03	NULL08	NULL07	NULL06
Rim (ft):	160.00	156.67	156.44	155.77
Invert (ft):	154.45	154.35	153.77	153.37
Min Pipe Cover (ft):		1.65	1.92	1.40
Max HGL (ft):	154.95	154.81	154.26	154.24

Link ID:	A-6-1	A-6-2	A-6-3
Length (ft):	28.50	189.81	42.62
Dia (in):	8.00	8.00	12.00
Slope (ft/ft):	0.0035	0.0035	0.0035
Up Invert (ft):	154.45	154.35	153.52
Dn Invert (ft):	154.35	153.68	153.37
Max Q (cfs):	0.52	0.52	0.68
Max Vel (ft/s):	1.95	2.20	1.45
Max Depth (ft):	0.48	0.47	0.68

Autodesk Storm and Sanitary Analysis

Profile Plot

A-7-1



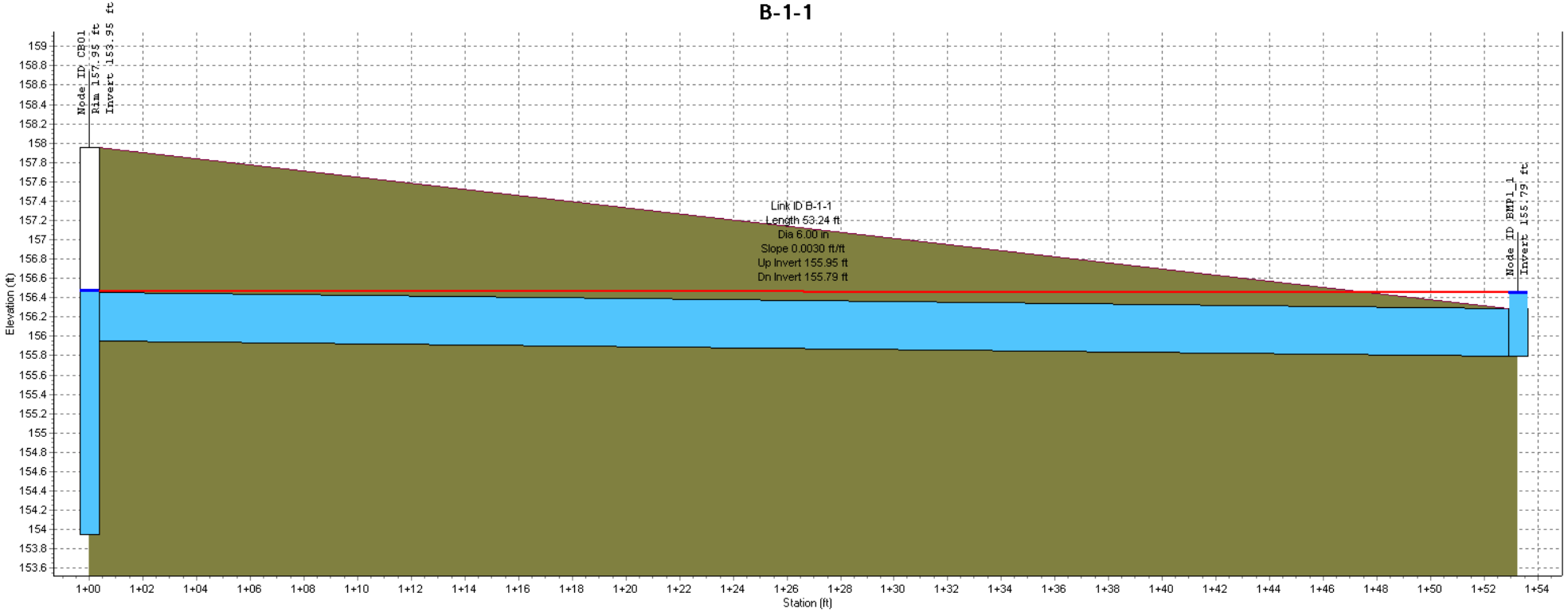
Node ID:	CB07		BMP2_1
Rim (ft):	154.07		
Invert (ft):	151.25		153.15
Min Pipe Cover (ft):			
Max HGL (ft):	153.67		153.65

Link ID:	A-7-1
Length (ft):	19.84
Dia (in):	6.00
Slope (ft/ft):	0.0050
Up Invert (ft):	153.25
Dn Invert (ft):	153.15
Max Q (cfs):	0.15
Max Vel (ft/s):	0.81
Max Depth (ft):	0.46

Autodesk Storm and Sanitary Analysis

Profile Plot

B-1-1



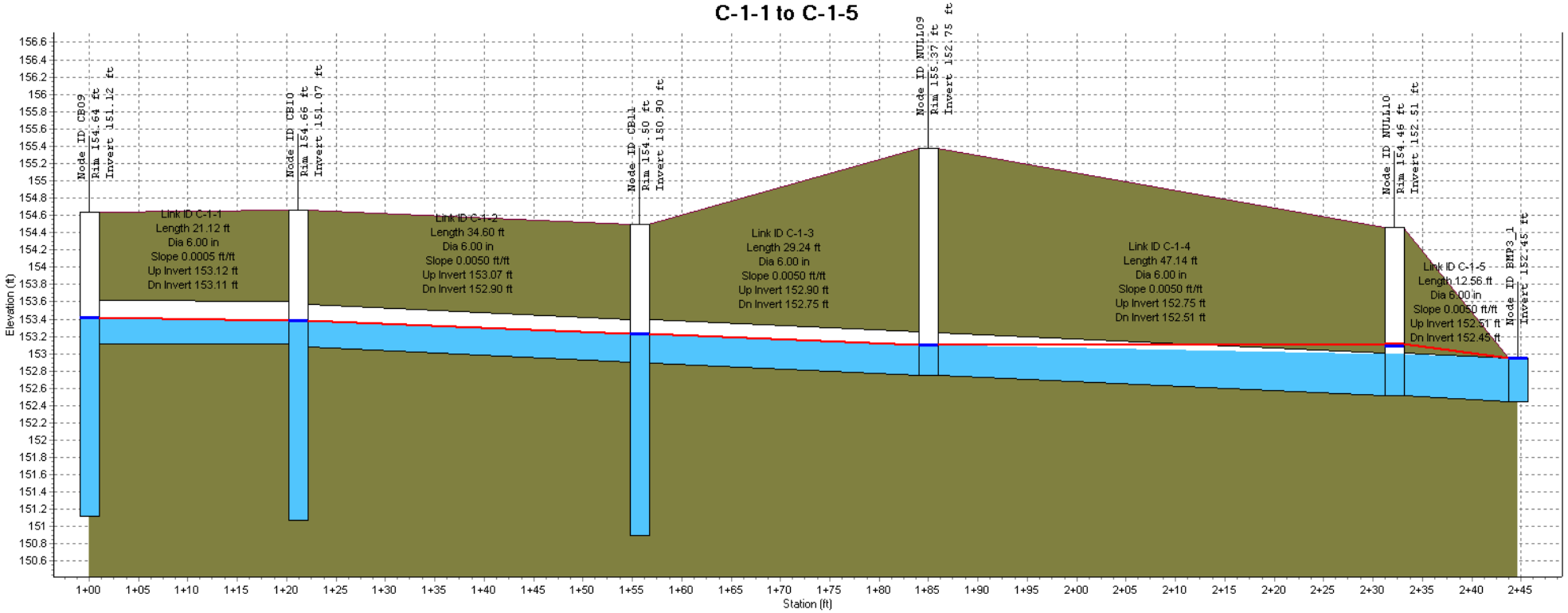
Node ID:	CB01	BMP1_1
Rim (ft):	157.95	
Invert (ft):	153.95	155.79
Min Pipe Cover (ft):		
Max HGL (ft):	156.48	156.45

Link ID:	B-1-1
Length (ft):	53.24
Dia (in):	6.00
Slope (ft/ft):	0.0030
Up Invert (ft):	155.95
Dn Invert (ft):	155.79
Max Q (cfs):	0.13
Max Vel (ft/s):	0.64
Max Depth (ft):	0.50

Autodesk Storm and Sanitary Analysis

Profile Plot

C-1-1 to C-1-5



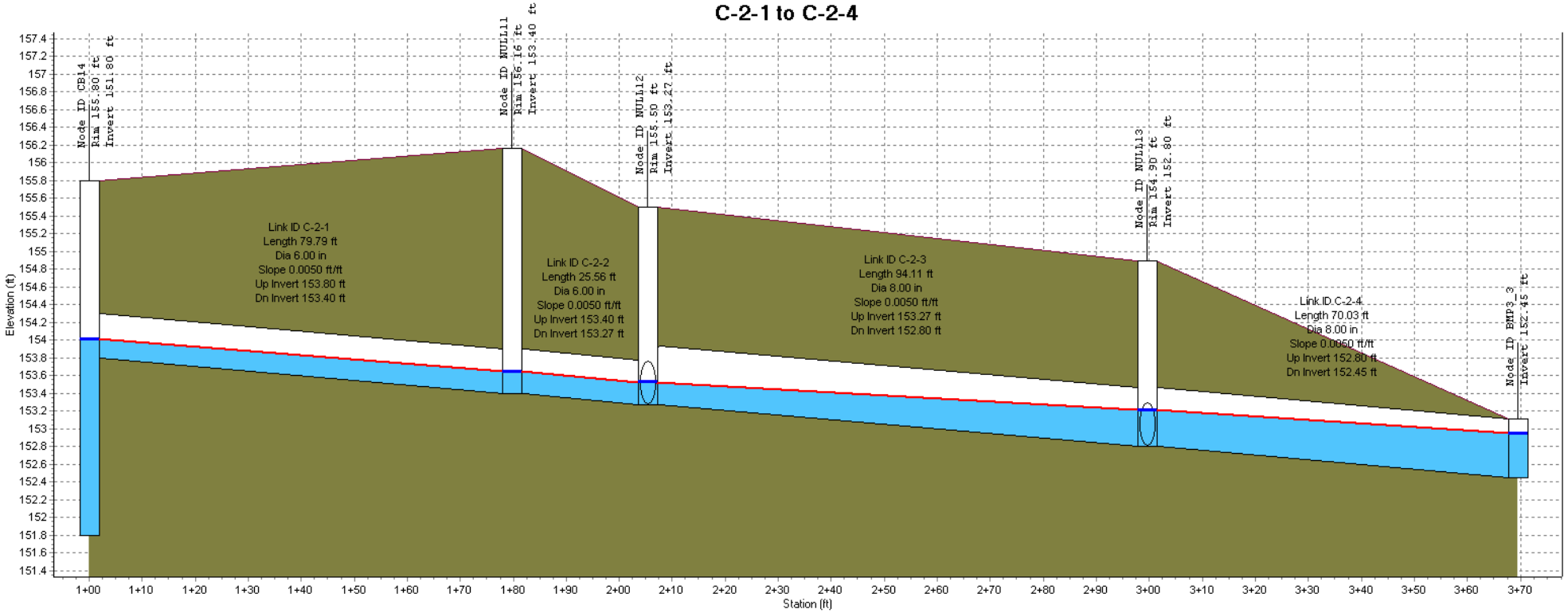
Node ID:	CB09	CB10	CB11	NULL09	NULL10	BMP3_1
Rim (ft):	154.64	154.66	154.50	155.37	154.46	
Invert (ft):	151.12	151.07	150.90	152.75	152.51	152.45
Min Pipe Cover (ft):				2.12	1.45	
Max HGL (ft):	153.42	153.38	153.23	153.10	153.11	152.95

Link ID:	C-1-1	C-1-2	C-1-3	C-1-4	C-1-5
Length (ft):	21.12	34.60	29.24	47.14	12.56
Dia (in):	6.00	6.00	6.00	6.00	6.00
Slope (ft/ft):	0.0005	0.0050	0.0050	0.0050	0.0050
Up Invert (ft):	153.12	153.07	152.90	152.75	152.51
Dn Invert (ft):	153.11	152.90	152.75	152.51	152.45
Max Q (cfs):	0.11	0.23	0.25	0.25	0.33
Max Vel (ft/s):	1.05	1.74	1.73	1.41	2.03
Max Depth (ft):	0.29	0.32	0.34	0.42	0.50

Autodesk Storm and Sanitary Analysis

Profile Plot

C-2-1 to C-2-4



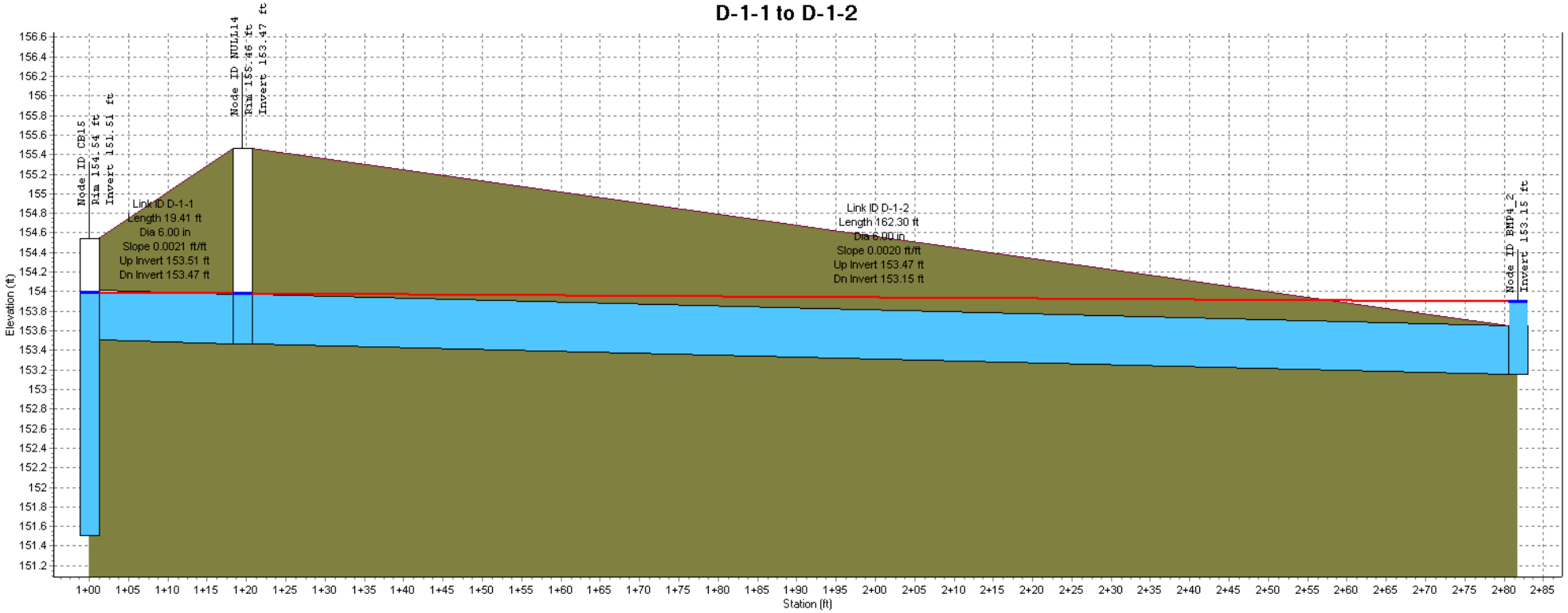
Node ID:	CB14	NULL11	NULL12	NULL13	BMP3_3
Rim (ft):	155.80	156.16	155.50	154.90	
Invert (ft):	151.80	153.40	153.27	152.80	152.45
Min Pipe Cover (ft):		2.26	1.56	1.43	
Max HGL (ft):	154.02	153.65	153.53	153.22	152.95

Link ID:	C-2-1	C-2-2	C-2-3	C-2-4
Length (ft):	79.79	25.56	94.11	70.03
Dia (in):	6.00	6.00	8.00	8.00
Slope (ft/ft):	0.0050	0.0050	0.0050	0.0050
Up Invert (ft):	153.80	153.40	153.27	152.80
Dn Invert (ft):	153.40	153.27	152.80	152.45
Max Q (cfs):	0.16	0.16	0.28	0.50
Max Vel (ft/s):	1.76	1.59	1.55	1.93
Max Depth (ft):	0.24	0.26	0.34	0.46

Autodesk Storm and Sanitary Analysis

Profile Plot

D-1-1 to D-1-2



Node ID:	CB15	NULL14	BMP4_2
Rim (ft):	154.54	155.46	
Invert (ft):	151.51	153.47	153.15
Min Pipe Cover (ft):		1.49	
Max HGL (ft):	153.99	153.98	153.90

Link ID:	D-1-1	D-1-2
Length (ft):	19.41	162.30
Dia (in):	6.00	6.00
Slope (ft/ft):	0.0021	0.0020
Up Invert (ft):	153.51	153.47
Dn Invert (ft):	153.47	153.15
Max Q (cfs):	0.17	0.16
Max Vel (ft/s):	2.75	1.09
Max Depth (ft):	0.49	0.50

Autodesk Storm and Sanitary Analysis

Project Description

File Name 115-SSA.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Santa Barbara UH
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	YES

Analysis Options

Start Analysis On	Nov 23, 2021	00:00:00
End Analysis On	Nov 24, 2021	00:00:00
Start Reporting On	Nov 23, 2021	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins	20
Nodes	48
Junctions	17
Outfalls	11
Flow Diversions	0
Inlets	20
Storage Nodes	0
Links	37
Channels	2
Pipes	35
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	Rain Gage-025yr	Time Series	TS-025YR	Intensity	inches	Oregon	Clackamas	25	4.00	SCS Type IA 24-hr

Subbasin Summary

SN	Subbasin ID	Area	Impervious Area	Impervious Area Curve Number	Pervious Area Curve Number	Total Rainfall	Total Runoff	Total Runoff Volume	Peak Runoff	Time of Concentration
		(ft²)	(%)			(in)	(in)	(ac-in)	(cfs)	(days hh:mm:ss)
1	DMA01	10917.01	76.00	98.00	76.00	3.99	3.27	0.82	0.20	0 00:05:00
2	DMA02	12238.01	87.00	98.00	76.00	3.99	3.49	0.98	0.24	0 00:05:00
3	DMA03	6123.01	91.00	98.00	76.00	3.99	3.57	0.50	0.13	0 00:05:00
4	DMA04	1530.00	100.00	98.00	76.00	3.99	3.76	0.13	0.03	0 00:05:00
5	DMA05	1552.00	100.00	98.00	76.00	3.99	3.76	0.13	0.03	0 00:05:00
6	DMA06	2004.02	100.00	98.00	76.00	3.99	3.76	0.17	0.04	0 00:05:00
7	DMA07	20144.02	100.00	98.00	76.00	3.99	3.76	1.74	0.44	0 00:05:00
8	DMA08	20083.99	100.00	98.00	76.00	3.99	3.76	1.73	0.43	0 00:05:00
9	DMA09	24005.00	100.00	98.00	76.00	3.99	3.76	2.07	0.52	0 00:05:00
10	DMA10	8343.00	85.00	98.00	76.00	3.99	3.44	0.66	0.15	0 00:11:12
11	DMA11	8165.02	97.00	98.00	76.00	3.99	3.70	0.69	0.17	0 00:05:00
12	DMA12	5899.98	94.00	98.00	76.00	3.99	3.63	0.49	0.12	0 00:05:00
13	DMA13	6881.00	79.00	98.00	76.00	3.99	3.32	0.52	0.11	0 00:17:06
14	DMA14	929.00	100.00	98.00	76.00	3.99	3.76	0.08	0.02	0 00:05:00
15	DMA15	10340.01	100.00	98.00	76.00	3.99	3.76	0.89	0.22	0 00:05:00
16	DMA16	7878.00	97.00	98.00	76.00	3.99	3.69	0.67	0.16	0 00:07:46
17	DMA17	5760.98	98.00	98.00	76.00	3.99	3.71	0.49	0.12	0 00:08:01
18	DMA18	44869.02	95.00	98.00	76.00	3.99	3.65	3.76	0.90	0 00:08:53
19	DMA19	5560.00	100.00	98.00	76.00	3.99	3.76	0.48	0.12	0 00:05:00
20	DMA20	16230.02	95.00	98.00	76.00	3.99	3.64	1.36	0.30	0 00:14:24

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	BMP#1 RISER	Junction	152.48	155.73	152.48	155.73	0.00	0.00	152.48	0.00	3.25	0 00:00	0.00	0.00
2	BMP#2 RISER	Junction	149.65	152.90	149.65	152.90	0.00	0.00	149.65	0.00	3.25	0 00:00	0.00	0.00
3	BMP#3 RISER	Junction	148.95	153.20	148.95	152.20	0.00	0.00	148.95	0.00	4.25	0 00:00	0.00	0.00
4	NULL01	Junction	154.31	158.02	154.31	155.38	0.00	1.31	155.07	0.00	2.95	0 00:00	0.00	0.00
5	NULL02	Junction	154.20	158.45	154.20	155.28	0.00	1.31	154.95	0.00	3.50	0 00:00	0.00	0.00
6	NULL03	Junction	154.06	158.57	154.06	155.13	0.00	1.34	154.80	0.00	3.77	0 00:00	0.00	0.00
7	NULL04	Junction	153.88	158.53	153.88	154.95	0.00	1.37	154.63	0.00	3.90	0 00:00	0.00	0.00
8	NULL05	Junction	153.70	158.50	153.70	154.77	0.00	1.41	154.46	0.00	4.04	0 00:00	0.00	0.00
9	NULL06	Junction	153.37	155.77	153.65	154.45	0.00	2.09	154.24	0.00	1.53	0 00:00	0.00	0.00
10	NULL07	Junction	153.77	156.44	153.55	154.91	0.00	0.69	154.26	0.00	2.18	0 00:00	0.00	0.00
11	NULL08	Junction	154.35	156.67	154.33	155.69	0.00	0.52	154.81	0.00	1.86	0 00:00	0.00	0.00
12	NULL09	Junction	152.75	155.37	152.75	153.29	0.00	0.25	153.10	0.00	2.27	0 00:00	0.00	0.00
13	NULL10	Junction	152.51	154.46	152.51	153.06	0.00	0.33	153.11	0.00	1.35	0 00:00	0.00	0.00
14	NULL11	Junction	153.40	156.16	153.40	153.94	0.00	0.16	153.65	0.00	2.51	0 00:00	0.00	0.00
15	NULL12	Junction	153.27	155.50	153.27	154.41	0.00	0.28	153.53	0.00	1.97	0 00:00	0.00	0.00
16	NULL13	Junction	152.80	154.90	152.80	153.93	0.00	0.50	153.22	0.00	1.68	0 00:00	0.00	0.00
17	NULL14	Junction	153.47	155.46	153.47	154.80	0.00	0.30	153.98	0.00	1.48	0 00:00	0.00	0.00
18	BMP1_1	Outfall	155.79					0.13	156.45					
19	BMP1_2	Outfall	151.57					0.00	151.57					
20	BMP2_1	Outfall	153.15					0.15	153.65					
21	BMP2_2	Outfall	153.33					2.09	153.95					
22	BMP2_3	Outfall	149.53					0.00	149.53					
23	BMP3_1	Outfall	152.45					0.33	152.95					
24	BMP3_2	Outfall	152.45					0.00	152.95					
25	BMP3_3	Outfall	152.45					0.50	152.95					
26	BMP3_4	Outfall	148.42					0.00	148.42					
27	BMP4_1	Outfall	153.40					0.01	153.90					
28	BMP4_2	Outfall	153.15					0.16	153.90					

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	A-1-01	Pipe	DS02	CB02	41.97	156.13	154.94	2.8200	6.000	0.0130	0.43	0.94	0.46	2.83	0.37	0.74	0.00	Calculated
2	A-1-02	Pipe	CB02	CB03	109.68	154.86	154.53	0.3000	8.000	0.0130	0.68	0.66	1.02	1.94	0.67	1.00	16.00	SURCHARGED
3	A-1-03	Pipe	CB03	NULL01	75.51	154.53	154.31	0.3000	12.000	0.0130	1.31	1.95	0.67	2.13	0.74	0.74	0.00	Calculated
4	A-1-04	Pipe	NULL01	NULL02	35.36	154.31	154.20	0.3000	12.000	0.0130	1.31	1.95	0.67	2.09	0.75	0.75	0.00	Calculated
5	A-1-05	Pipe	NULL02	NULL03	48.25	154.20	154.06	0.3000	12.000	0.0130	1.30	1.95	0.67	2.12	0.74	0.74	0.00	Calculated
6	A-1-06	Pipe	NULL03	NULL04	59.97	154.06	153.88	0.3000	12.000	0.0130	1.33	1.95	0.68	2.16	0.75	0.75	0.00	Calculated
7	A-1-07	Pipe	NULL04	NULL05	60.17	153.88	153.70	0.3000	12.000	0.0130	1.36	1.95	0.70	2.18	0.76	0.76	0.00	Calculated
8	A-1-08	Pipe	NULL05	NULL06	108.70	153.70	153.37	0.3000	12.000	0.0130	1.41	1.95	0.72	2.05	0.82	0.82	0.00	Calculated
9	A-1-09	Pipe	NULL06	BMP2_2	12.56	153.37	153.33	0.3000	12.000	0.0130	2.09	1.95	1.07	3.34	0.74	0.74	0.00	> CAPACITY
10	A-1-10	Pipe	BMP#2 RISER	BMP2_3	24.86	149.65	149.53	0.5000	6.000	0.0130	0.00	0.40	0.00	0.00	0.00	0.00	0.00	Calculated
11	A-2-1	Pipe	DS01	CB03	45.40	155.39	154.78	1.3400	6.000	0.0130	0.44	0.65	0.67	2.94	0.39	0.78	0.00	Calculated
12	A-3-1	Pipe	CB04	NULL03	7.60	154.35	154.31	0.5000	6.000	0.0130	0.03	0.40	0.08	0.84	0.47	0.94	0.00	Calculated
13	A-4-1	Pipe	CB05	NULL04	7.60	154.17	154.13	0.5000	6.000	0.0130	0.03	0.40	0.08	0.84	0.48	0.96	0.00	Calculated
14	A-5-1	Pipe	CB06	NULL05	7.61	153.99	153.95	0.5000	6.000	0.0130	0.04	0.40	0.11	0.95	0.49	0.97	0.00	Calculated
15	A-6-1	Pipe	DS03	NULL08	28.50	154.45	154.35	0.3500	8.000	0.0130	0.52	0.72	0.72	1.95	0.48	0.71	0.00	Calculated
16	A-6-2	Pipe	NULL08	NULL07	189.81	154.35	153.68	0.3500	8.000	0.0130	0.52	0.67	0.78	2.20	0.47	0.70	0.00	Calculated
17	A-6-2A	Pipe	CB08	NULL07	11.86	154.15	153.77	3.2000	6.000	0.0130	0.17	1.00	0.17	1.97	0.31	0.63	0.00	Calculated
18	A-6-3	Pipe	NULL07	NULL06	42.62	153.52	153.37	0.3500	12.000	0.0130	0.68	3.45	0.20	1.46	0.68	0.68	0.00	Calculated
19	A-7-1	Pipe	CB07	BMP2_1	19.84	153.25	153.15	0.5000	6.000	0.0130	0.15	0.40	0.38	0.81	0.46	0.92	0.00	Calculated
20	B-1-1	Pipe	CB01	BMP1_1	53.24	155.95	155.79	0.3000	6.000	0.0130	0.13	0.31	0.41	0.64	0.50	1.00	1424.00	SURCHARGED
21	B-1-2	Pipe	BMP#1 RISER	BMP1_2	60.16	152.48	151.57	1.5100	8.000	0.0130	0.00	1.48	0.00	0.00	0.00	0.00	0.00	Calculated
22	C-1-1	Pipe	CB09	CB10	21.12	153.12	153.11	0.0500	6.000	0.0130	0.11	0.25	0.44	1.05	0.29	0.57	0.00	Calculated
23	C-1-2	Pipe	CB10	CB11	34.60	153.07	152.90	0.5000	6.000	0.0130	0.23	0.40	0.58	1.74	0.32	0.64	0.00	Calculated
24	C-1-3	Pipe	CB11	NULL09	29.24	152.90	152.75	0.5000	6.000	0.0130	0.25	0.40	0.63	1.73	0.34	0.69	0.00	Calculated
25	C-1-4	Pipe	NULL09	NULL10	47.14	152.75	152.51	0.5000	6.000	0.0130	0.25	0.39	0.63	1.41	0.42	0.84	0.00	Calculated
26	C-1-5	Pipe	NULL10	BMP3_1	12.56	152.51	152.45	0.5000	6.000	0.0130	0.33	0.40	0.84	2.03	0.50	1.00	0.00	SURCHARGED
27	C-1-6	Pipe	BMP#3 RISER	BMP3_4	106.93	148.95	148.42	0.5000	6.000	0.0130	0.00	0.40	0.00	0.00	0.00	0.00	0.00	Calculated
28	C-2-1	Pipe	CB14	NULL11	79.79	153.80	153.40	0.5000	6.000	0.0130	0.16	0.40	0.41	1.76	0.24	0.47	0.00	Calculated
29	C-2-2	Pipe	NULL11	NULL12	25.56	153.40	153.27	0.5000	6.000	0.0130	0.16	0.40	0.41	1.59	0.26	0.51	0.00	Calculated
30	C-2-2A	Pipe	CB13	NULL12	10.96	153.32	153.27	0.5000	6.000	0.0130	0.12	0.39	0.30	1.19	0.25	0.51	0.00	Calculated
31	C-2-3	Pipe	NULL12	NULL13	94.11	153.27	152.80	0.5000	8.000	0.0130	0.28	0.85	0.33	1.55	0.34	0.51	0.00	Calculated
32	C-2-3A	Pipe	CB12	NULL13	5.51	152.83	152.80	0.5000	6.000	0.0130	0.22	0.40	0.56	1.41	0.43	0.85	0.00	Calculated
33	C-2-4	Pipe	NULL13	BMP3_3	70.03	152.80	152.45	0.5000	8.000	0.0150	0.50	0.74	0.67	1.93	0.46	0.69	0.00	Calculated
34	D-1-1	Pipe	CB15	NULL14	19.41	153.51	153.47	0.2100	6.000	0.0130	0.17	0.25	0.67	2.75	0.49	0.98	0.00	Calculated
35	D-1-2	Pipe	NULL14	BMP4_2	162.30	153.47	153.15	0.2000	6.000	0.0130	0.16	0.25	0.65	1.09	0.50	1.00	15.00	SURCHARGED
36	BMP3_CURBBREAK	Channel	BMP3_CURBBREAK	BMP3_2	2.83	153.54	152.45	38.5200	12.000	0.0330	0.00	13.44	0.00	0.00	0.25	0.25	0.00	
37	BMP4_CURBBREAK	Channel	BMP4_CURBBREAK	BMP4_1	6.53	154.50	153.40	16.8500	12.000	0.0330	0.01	8.89	0.00	0.03	0.25	0.25	0.00	

Inlet Summary

SN	Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Initial Water Elevation (ft)	Ponded Area (ft²)	Peak Flow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Allowable Spread (ft)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)
1	BMP3_CURBBREAK	FHWA HEC-22 GENERIC	N/A	On Sag	1	0.00	153.54	0.00	10.00	0.90	N/A	N/A	N/A	7.00	-1.60	153.76
2	BMP4_CURBBREAK	FHWA HEC-22 GENERIC	N/A	On Sag	1	0.00	154.51	0.00	10.00	0.30	N/A	N/A	N/A	7.00	3.67	154.83
3	CB01	FHWA HEC-22 GENERIC	N/A	On Sag	1	153.95	157.95	156.45	0.00	0.13	N/A	N/A	N/A	7.00	1.53	158.09
4	CB02	FHWA HEC-22 GENERIC	N/A	On Sag	1	152.86	156.83	154.64	0.00	0.24	N/A	N/A	N/A	7.00	1.83	156.97
5	CB03	FHWA HEC-22 GENERIC	N/A	On Sag	1	152.53	156.83	154.53	0.00	0.20	N/A	N/A	N/A	7.00	1.73	156.97
6	CB04	FHWA HEC-22 GENERIC	N/A	On Sag	1	152.35	158.57	154.35	0.00	0.03	N/A	N/A	N/A	7.00	1.22	158.70
7	CB05	FHWA HEC-22 GENERIC	N/A	On Sag	1	152.17	158.53	154.17	0.00	0.03	N/A	N/A	N/A	7.00	1.22	158.66
8	CB06	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.99	158.48	153.99	0.00	0.04	N/A	N/A	N/A	7.00	1.26	158.61
9	CB07	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.25	154.07	153.65	0.00	0.15	N/A	N/A	N/A	7.00	1.60	154.21
10	CB08	FHWA HEC-22 GENERIC	N/A	On Sag	1	152.15	156.17	154.15	0.00	0.17	N/A	N/A	N/A	7.00	1.66	156.31
11	CB09	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.12	154.64	153.12	0.00	0.11	N/A	N/A	N/A	7.00	1.49	154.78
12	CB10	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.07	154.66	153.07	0.00	0.12	N/A	N/A	N/A	7.00	1.52	154.80
13	CB11	FHWA HEC-22 GENERIC	N/A	On Sag	1	150.90	154.50	152.95	0.00	0.02	N/A	N/A	N/A	7.00	1.16	154.63
14	CB12	FHWA HEC-22 GENERIC	N/A	On Sag	1	150.83	154.88	152.95	0.00	0.22	N/A	N/A	N/A	7.00	1.78	155.02
15	CB13	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.32	155.44	153.32	0.00	0.12	N/A	N/A	N/A	7.00	1.51	155.58
16	CB14	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.80	155.80	153.80	0.00	0.16	N/A	N/A	N/A	7.00	1.63	155.94
17	CB15	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.51	154.54	153.90	0.00	0.12	N/A	N/A	N/A	7.00	1.52	154.68
18	DS01	FHWA HEC-22 GENERIC	N/A	On Sag	1	155.39	160.00	155.39	0.00	0.44	N/A	N/A	N/A	7.00	2.22	160.15
19	DS02	FHWA HEC-22 GENERIC	N/A	On Sag	1	156.13	160.00	156.13	0.00	0.43	N/A	N/A	N/A	7.00	2.21	160.15
20	DS03	FHWA HEC-22 GENERIC	N/A	On Sag	1	154.45	160.00	154.45	0.00	0.52	N/A	N/A	N/A	7.00	2.37	160.15

Subbasin Hydrology

Subbasin : DMA01

Input Data

Area (ft²)	10917.01
Impervious Area (%)	76.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	10917.01		92.72

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where :

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft²)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

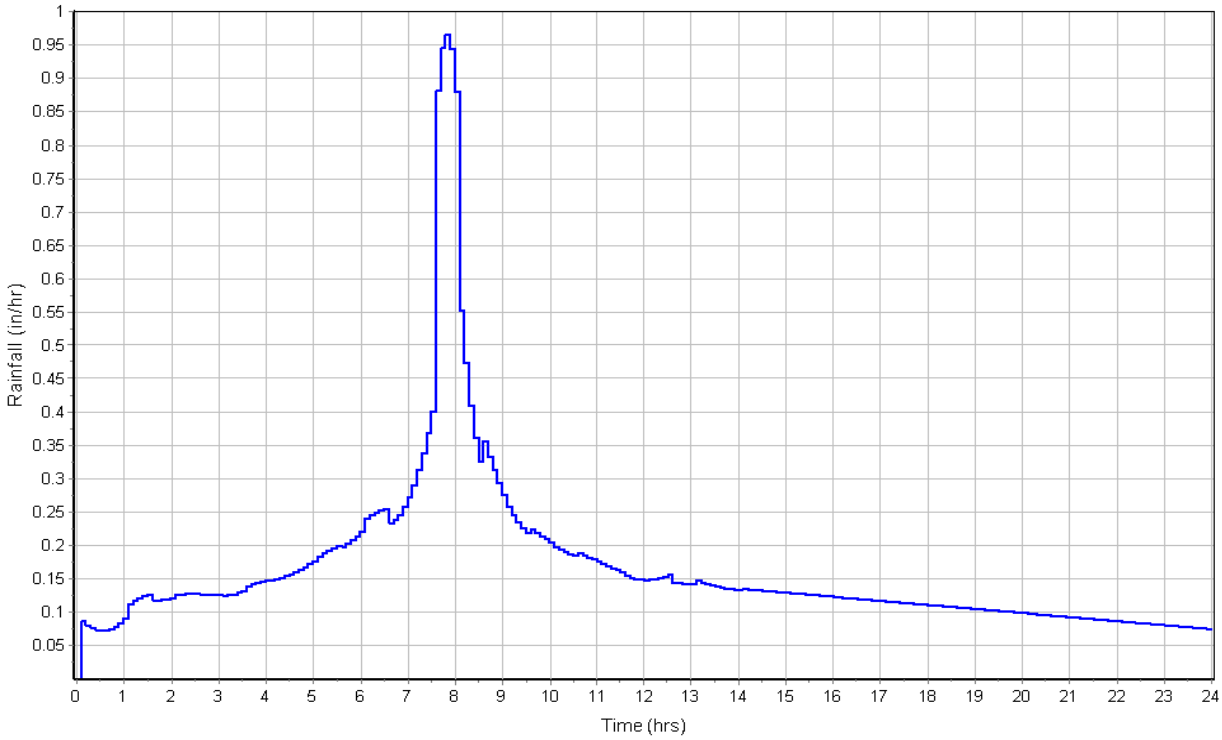
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

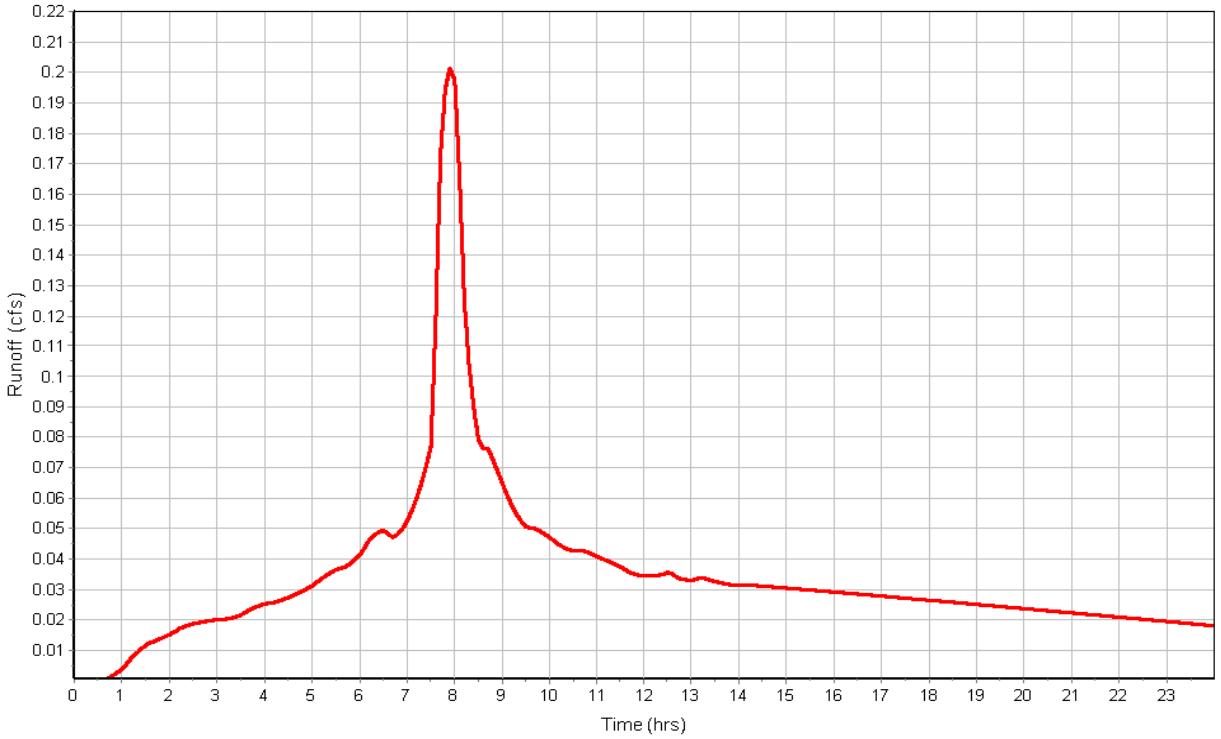
Total Rainfall (in)	3.99
Total Runoff (in)	3.27
Peak Runoff (cfs)	0.20
Weighted Curve Number	92.72
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA01

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA02

Input Data

Area (ft²)	12238.01
Impervious Area (%)	87.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	12238.01		95.14

Time of Concentration

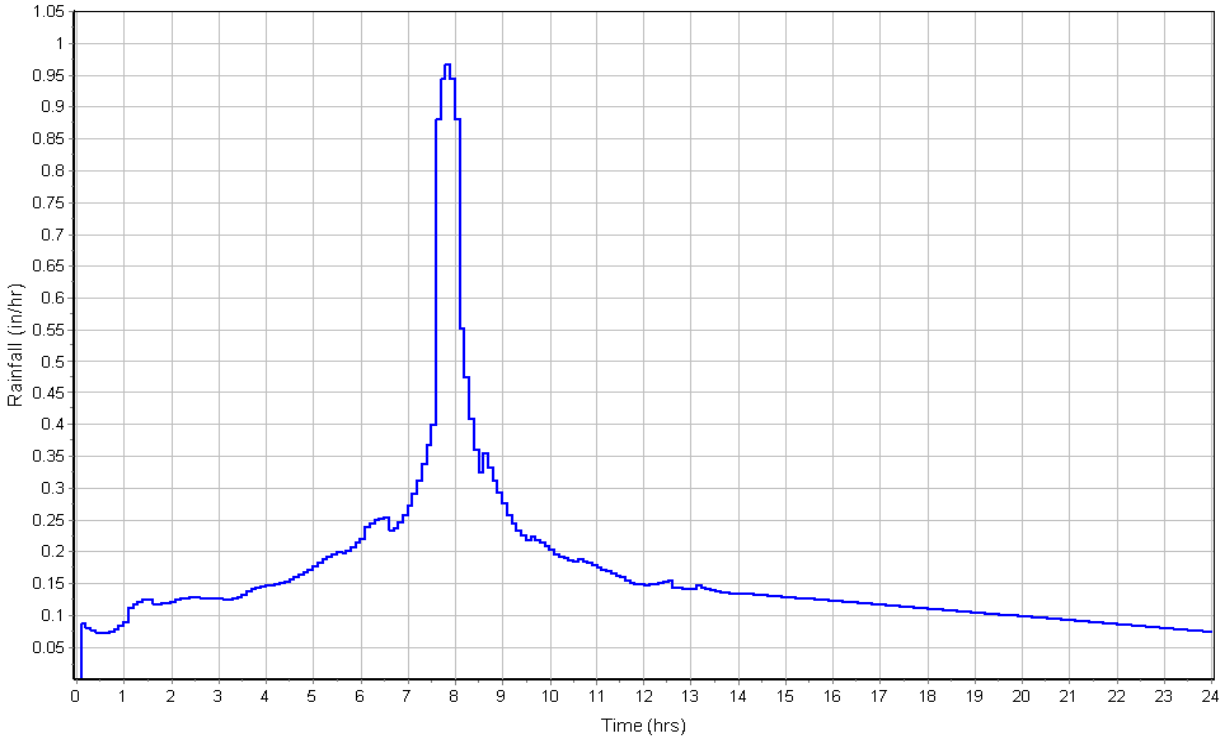
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

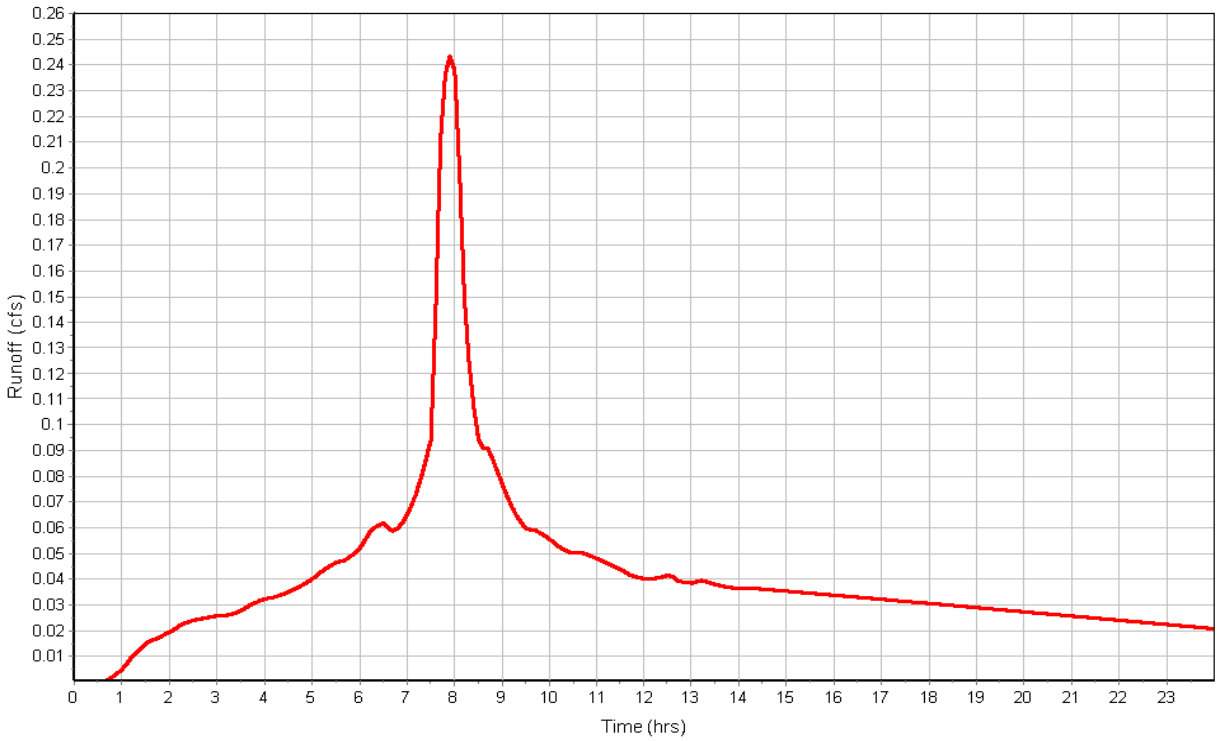
Total Rainfall (in)	3.99
Total Runoff (in)	3.49
Peak Runoff (cfs)	0.24
Weighted Curve Number	95.14
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA02

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA03

Input Data

Area (ft²)	6123.01
Impervious Area (%)	91.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	6123.01		96.02

Time of Concentration

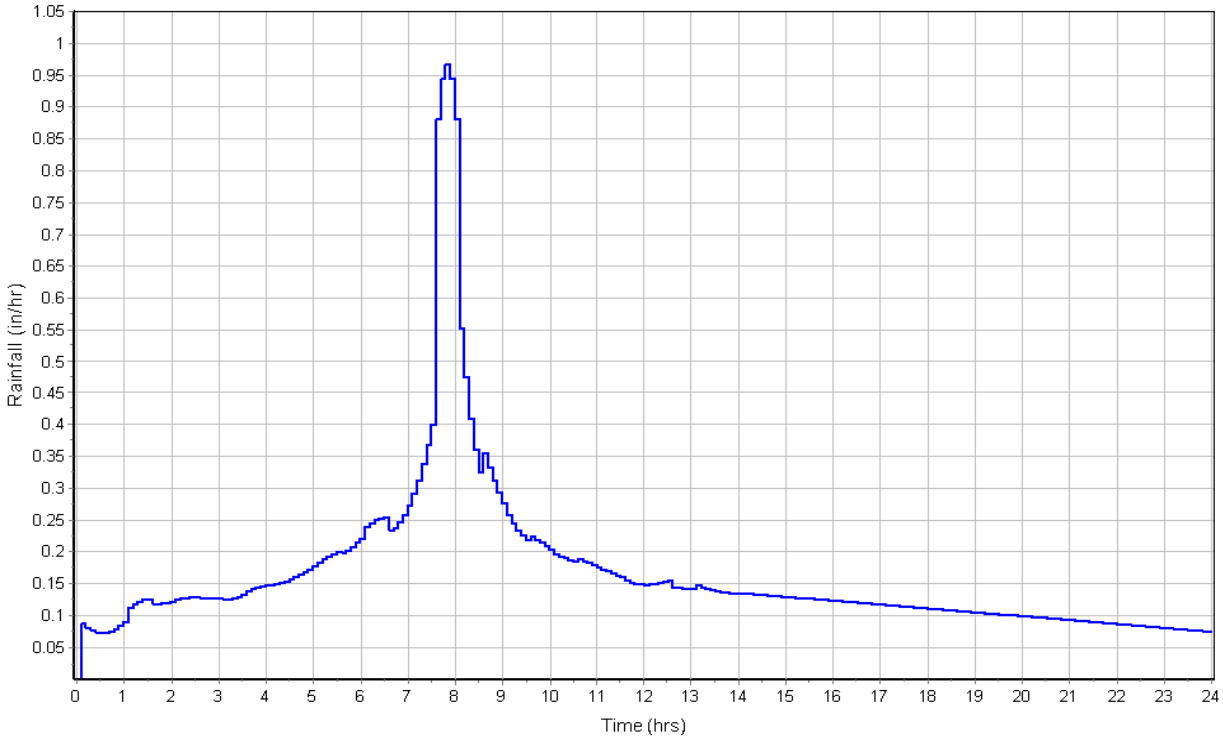
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

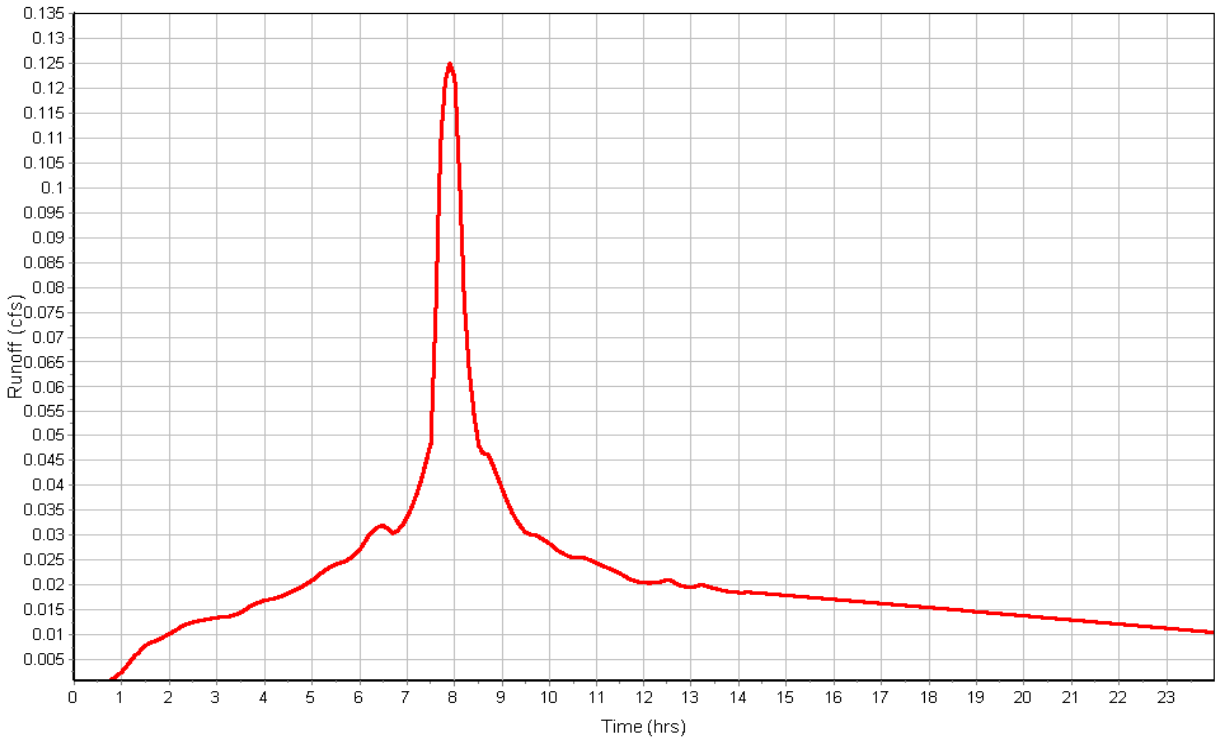
Total Rainfall (in)	3.99
Total Runoff (in)	3.57
Peak Runoff (cfs)	0.13
Weighted Curve Number	96.02
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA03

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA04

Input Data

Area (ft²)	1530.00
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	1530.00		98

Time of Concentration

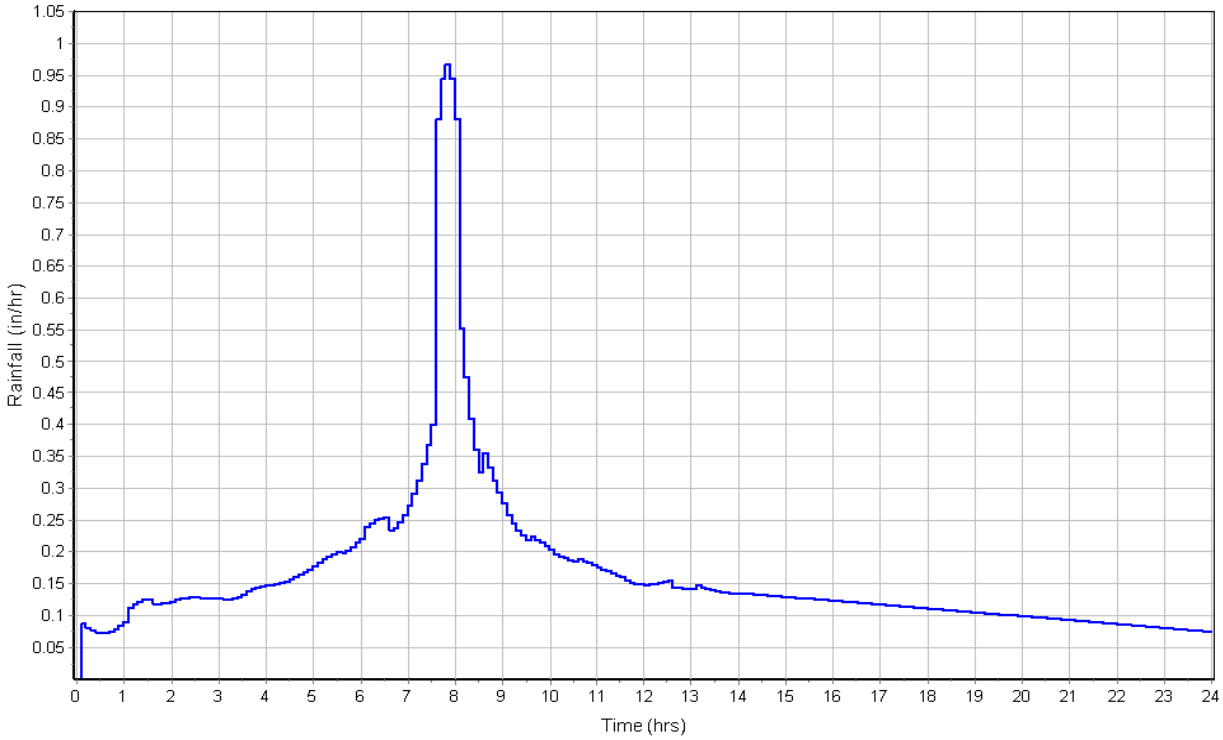
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

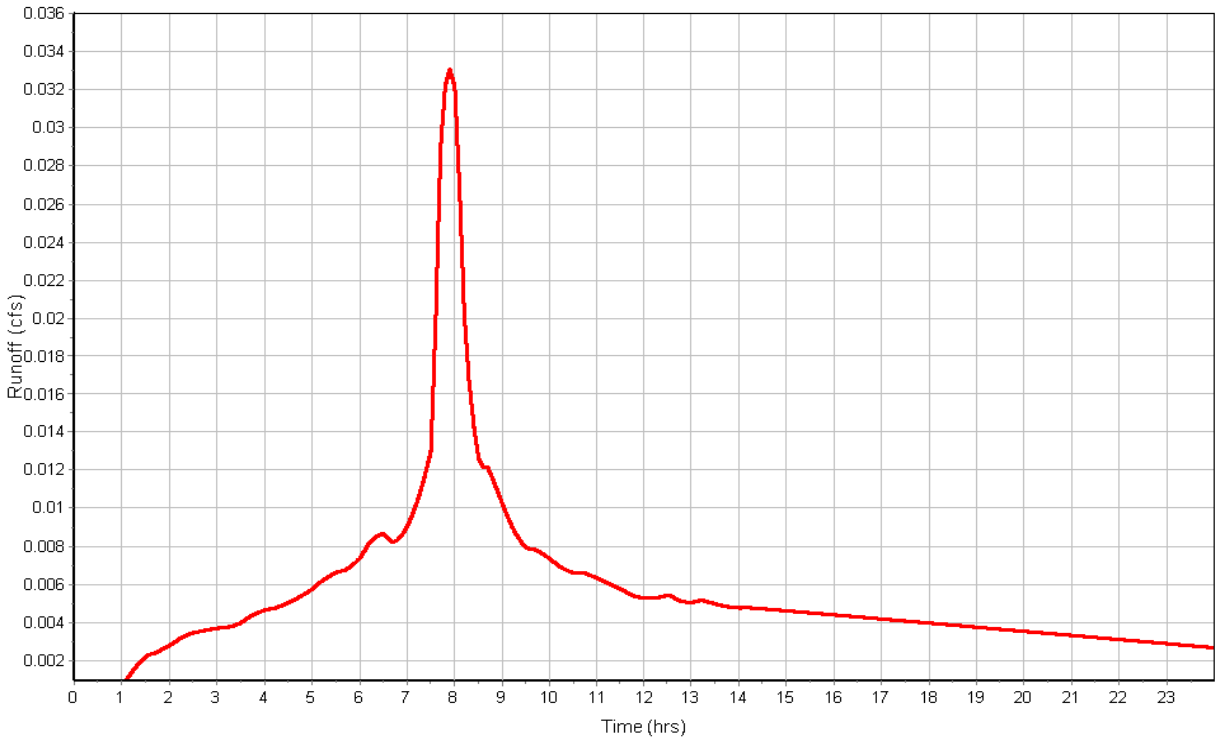
Total Rainfall (in)	3.99
Total Runoff (in)	3.76
Peak Runoff (cfs)	0.03
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA04

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA05

Input Data

Area (ft²)	1552.00
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	1552.00		98

Time of Concentration

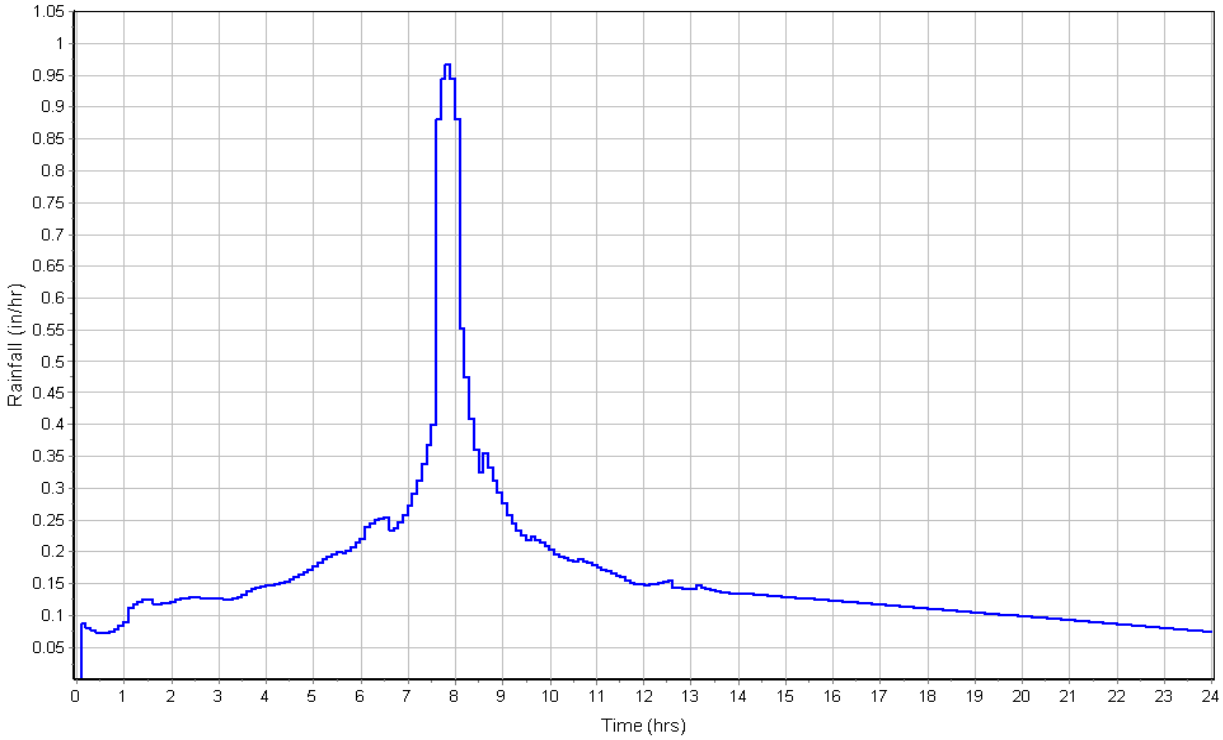
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

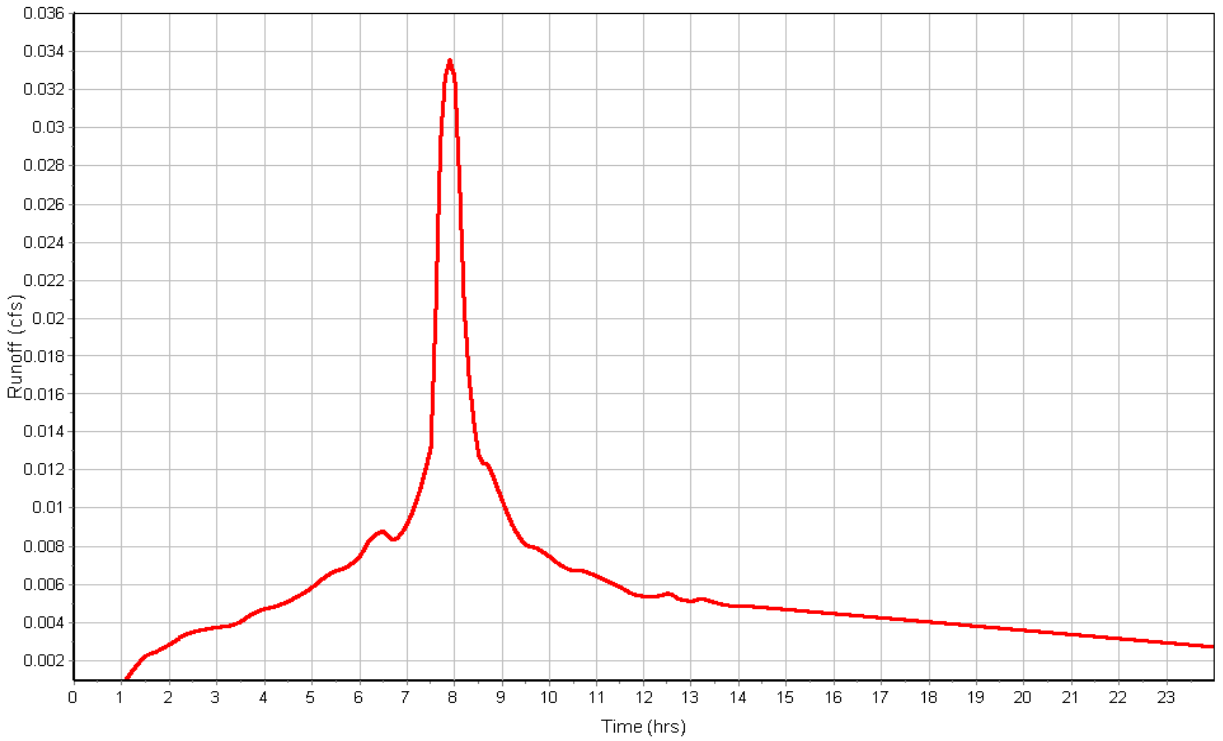
Total Rainfall (in)	3.99
Total Runoff (in)	3.76
Peak Runoff (cfs)	0.03
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA05

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA06

Input Data

Area (ft²)	2004.02
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	2004.02		98

Time of Concentration

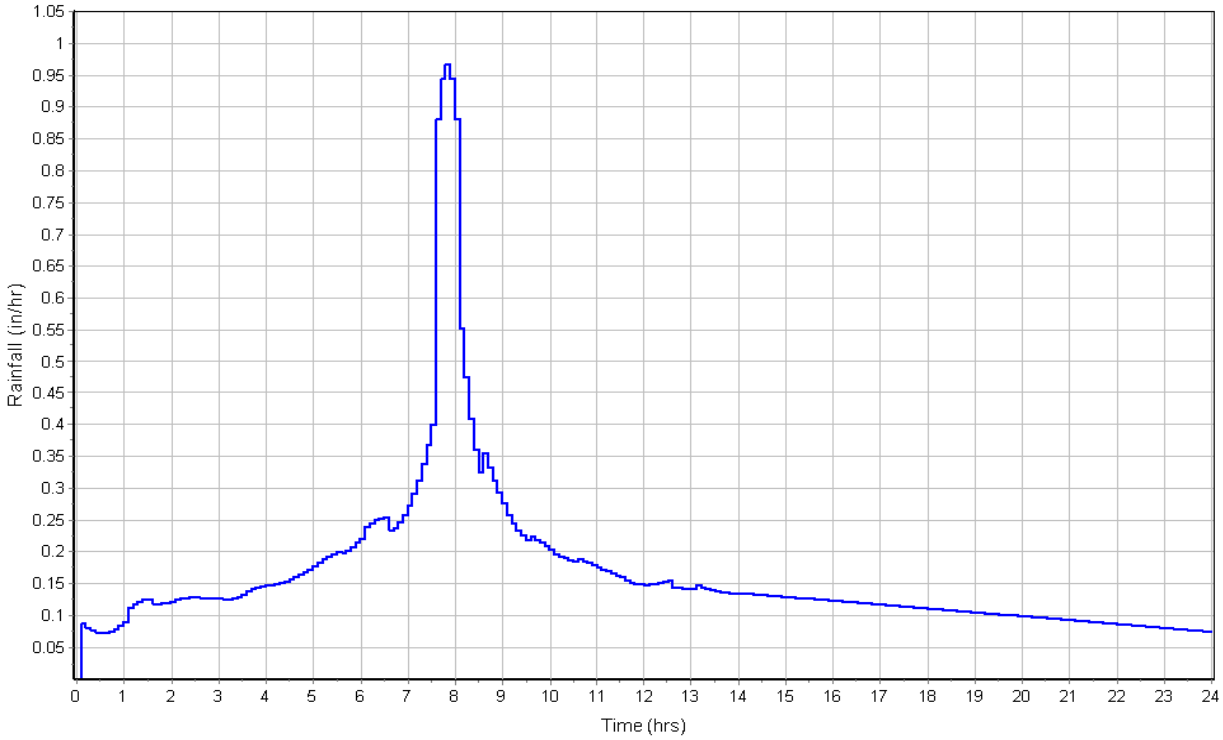
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

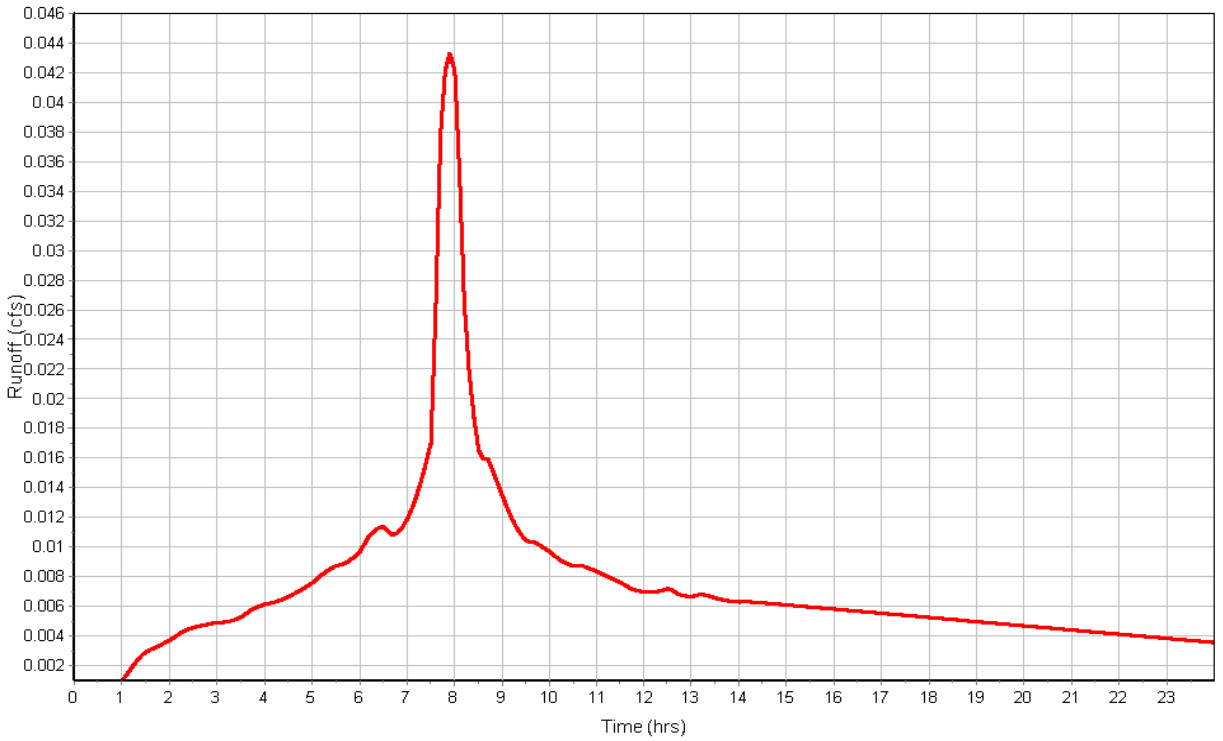
Total Rainfall (in)	3.99
Total Runoff (in)	3.76
Peak Runoff (cfs)	0.04
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA06

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA07

Input Data

Area (ft²)	20144.02
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	20144.02		98

Time of Concentration

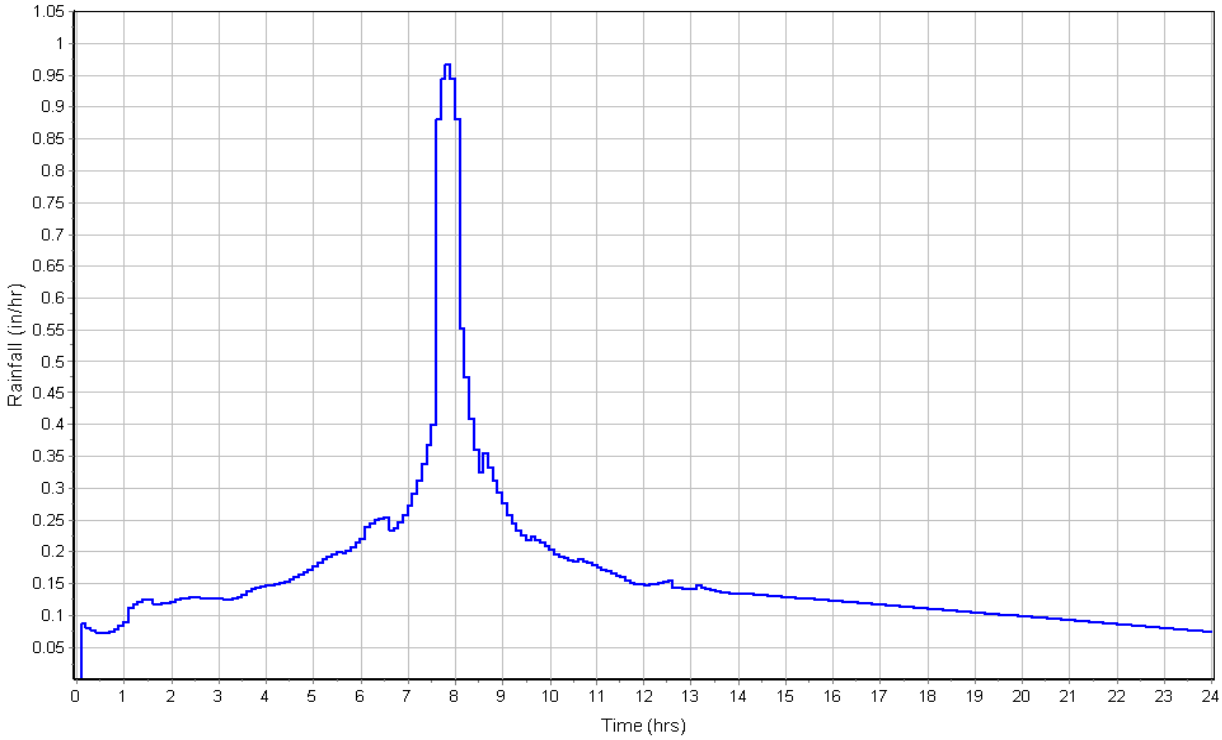
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

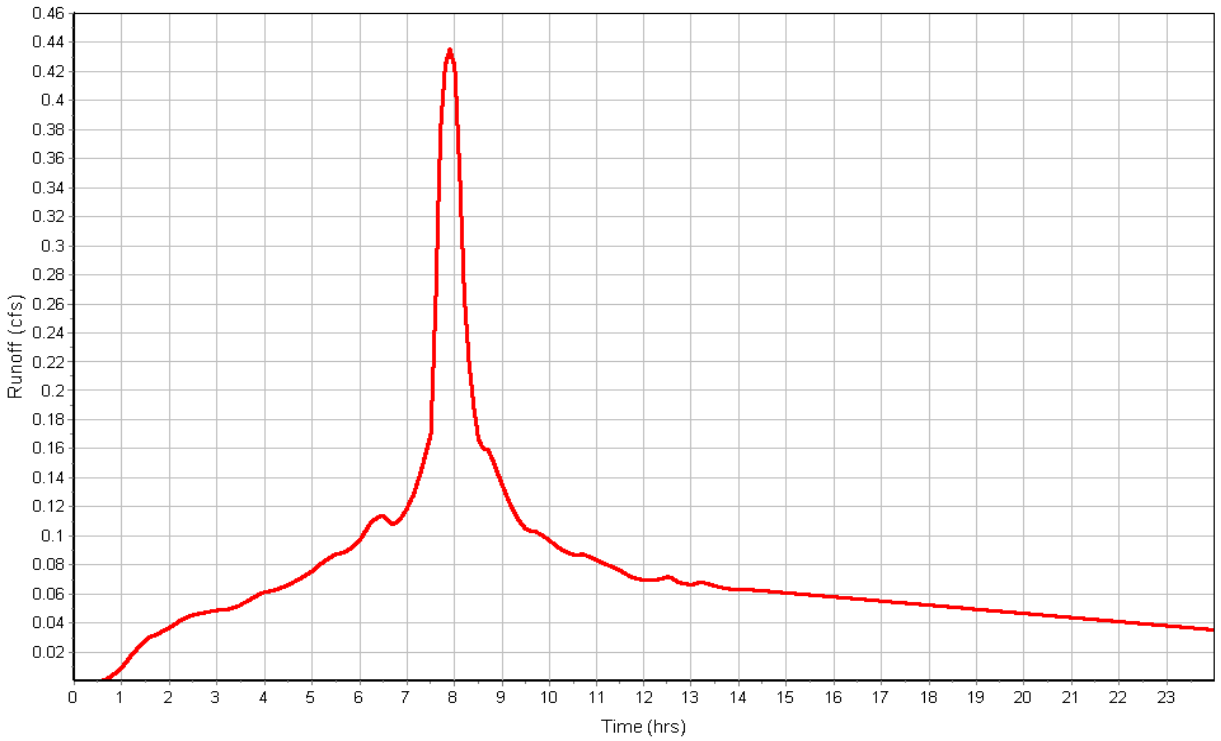
Total Rainfall (in)	3.99
Total Runoff (in)	3.76
Peak Runoff (cfs)	0.44
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA07

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA08

Input Data

Area (ft²)	20083.99
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	20083.99		98

Time of Concentration

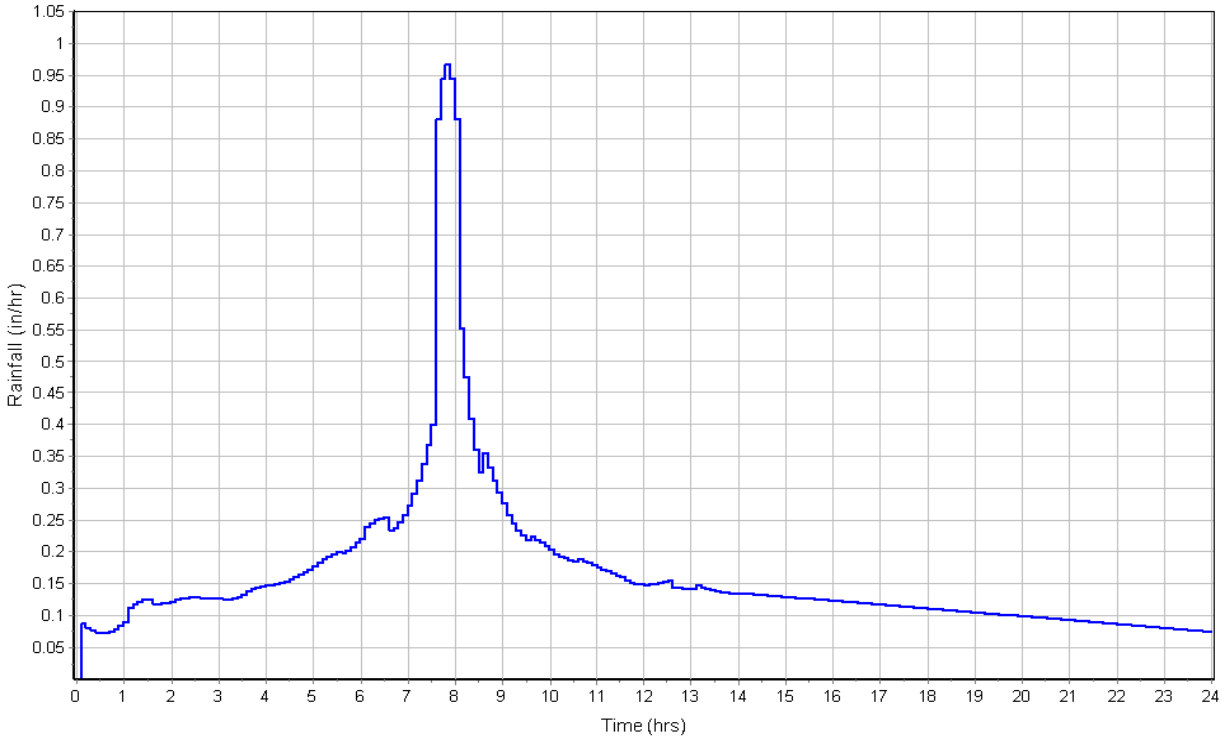
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

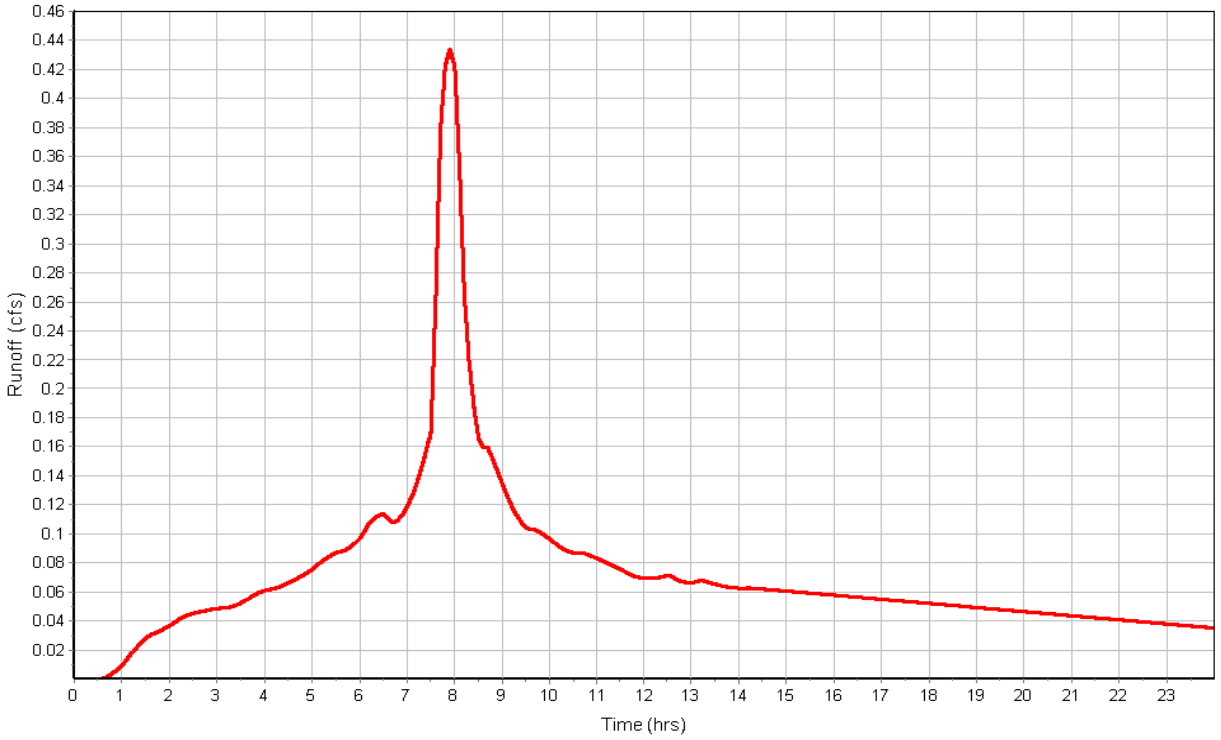
Total Rainfall (in)	3.99
Total Runoff (in)	3.76
Peak Runoff (cfs)	0.43
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA08

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA09

Input Data

Area (ft²)	24005.00
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	24005.00		98

Time of Concentration

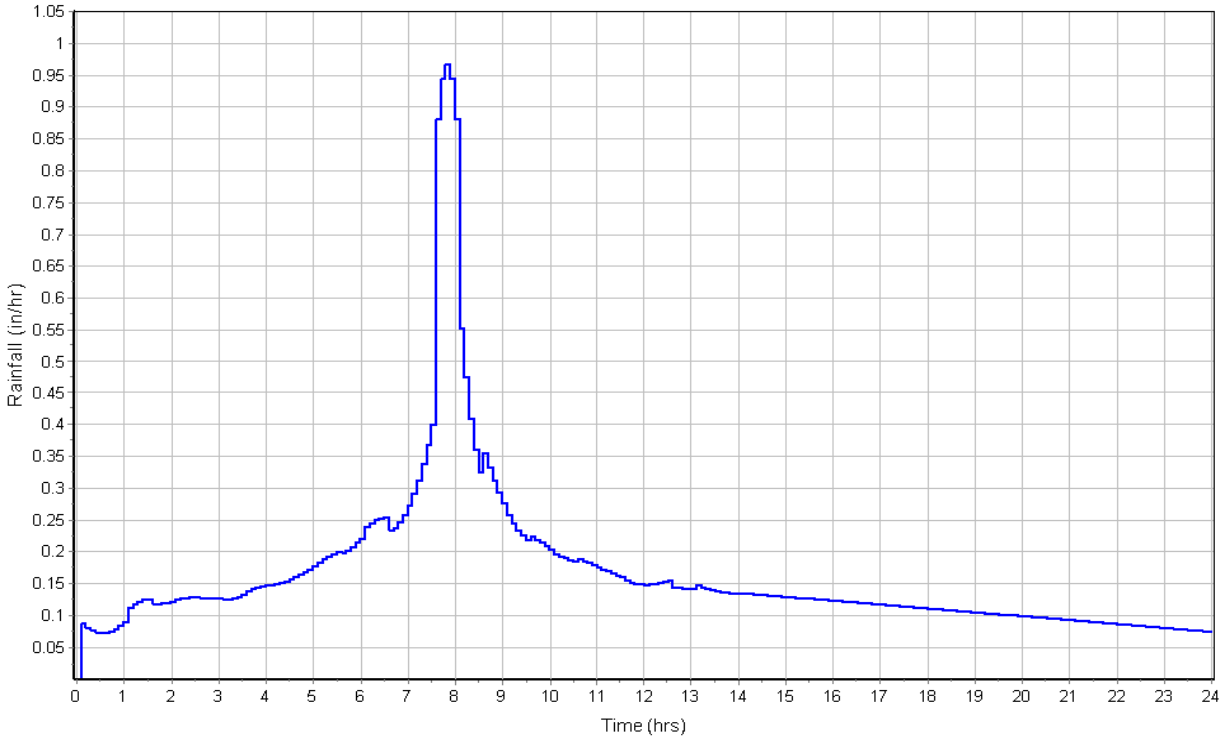
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

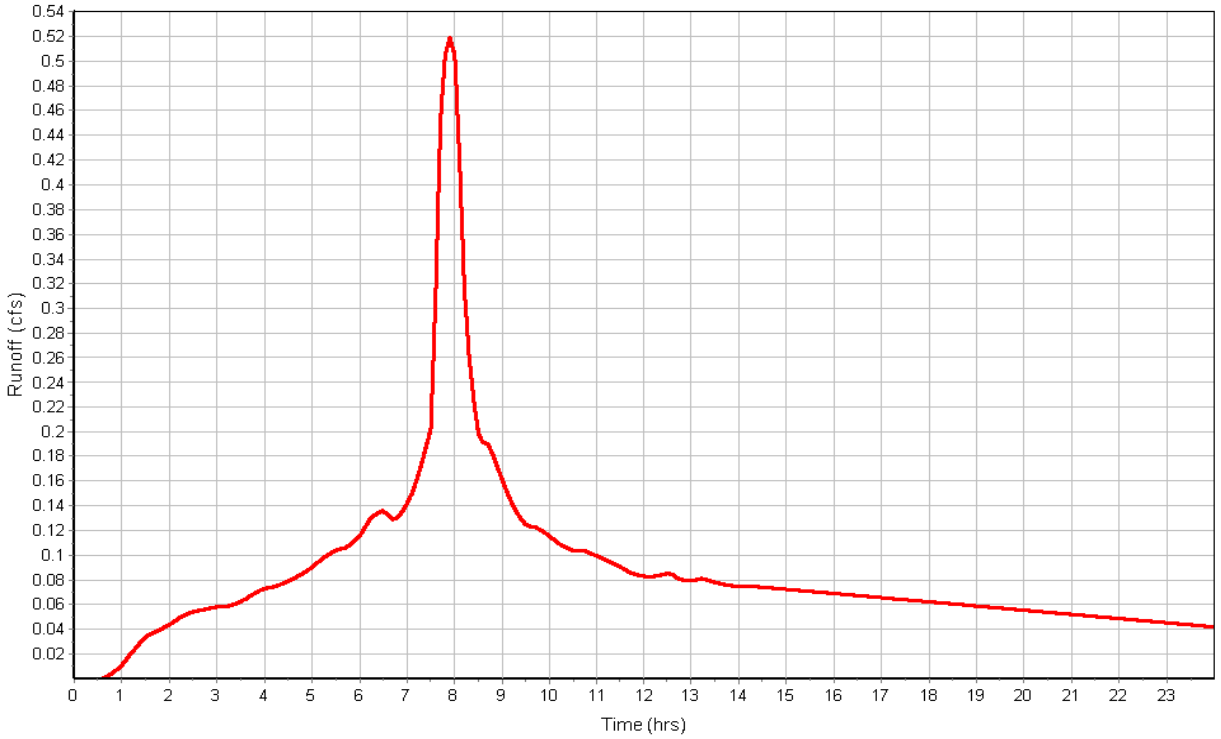
Total Rainfall (in)	3.99
Total Runoff (in)	3.76
Peak Runoff (cfs)	0.52
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA09

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA10

Input Data

Area (ft²)	8343.00
Impervious Area (%)	85.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	8343.00		94.7

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.4	0.01	0.00
Flow Length (ft) :	23.84	107.52	0.00
Slope (%) :	1	2	0.00
2 yr, 24 hr Rainfall (in) :	2.65	2.65	0.00
Velocity (ft/sec) :	0.04	1.37	0.00
Computed Flow Time (min) :	9.89	1.31	0.00

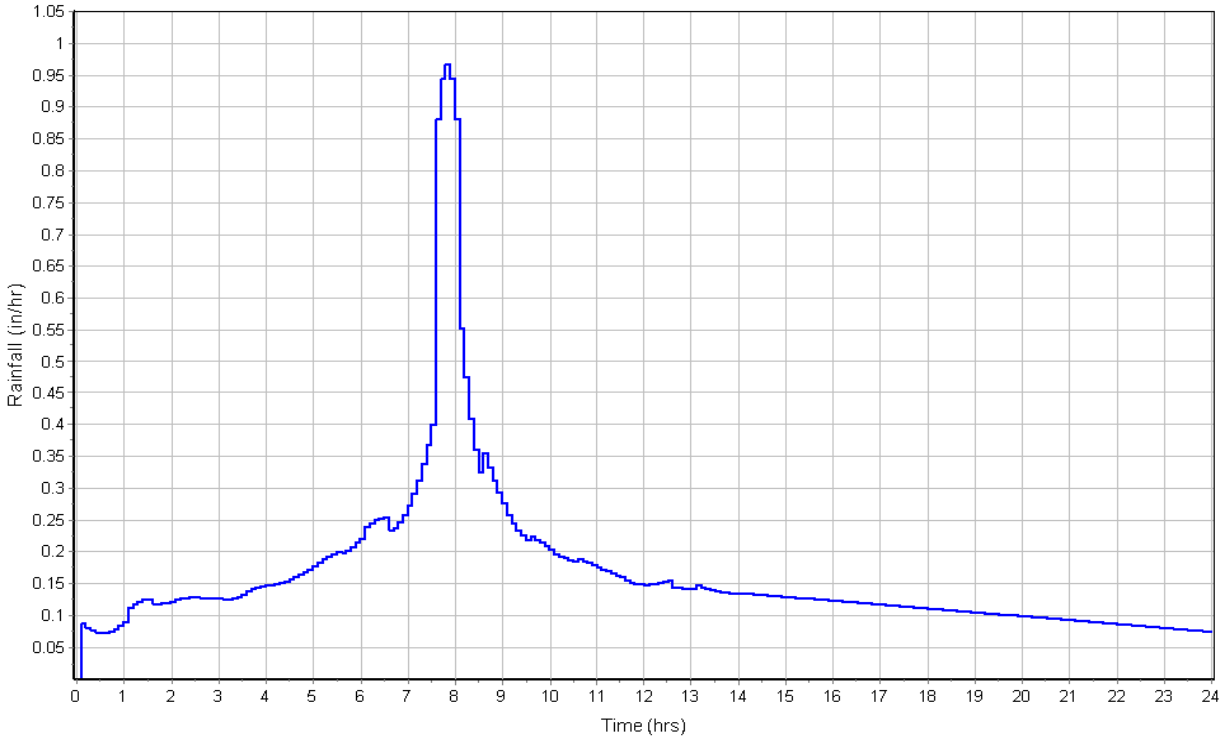
Total TOC (min) 11.20

Subbasin Runoff Results

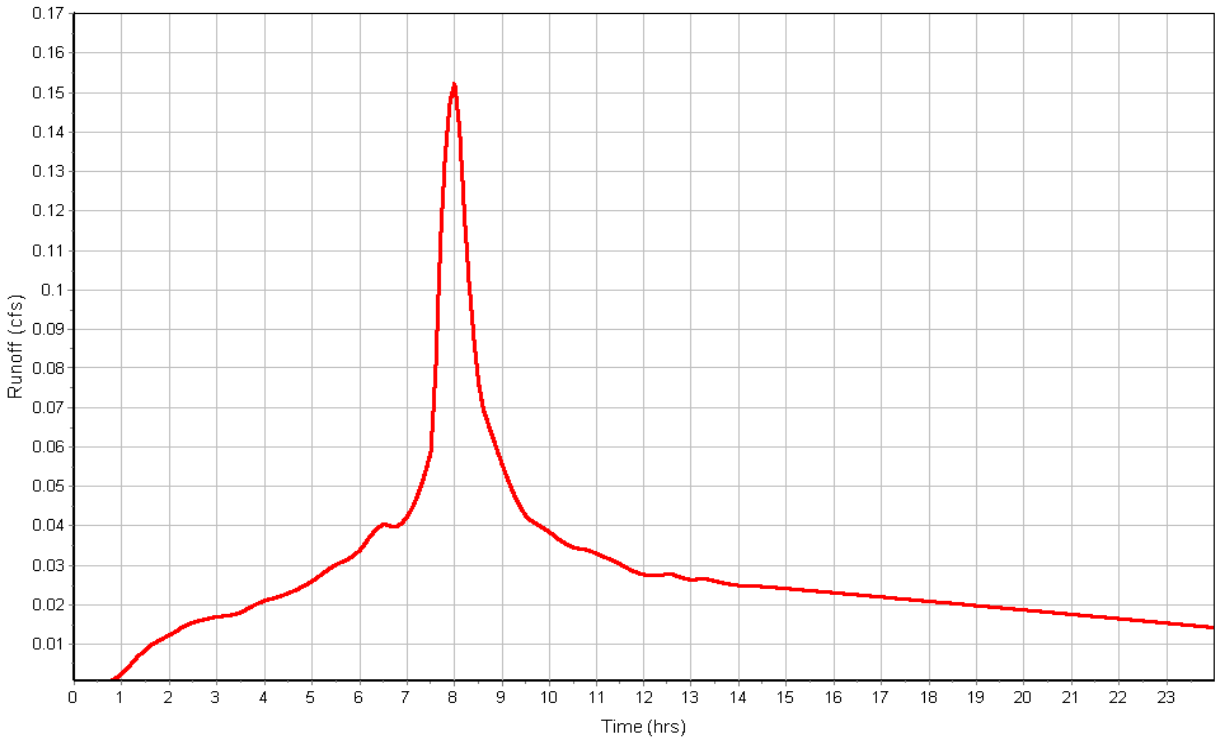
Total Rainfall (in)	3.99
Total Runoff (in)	3.44
Peak Runoff (cfs)	0.15
Weighted Curve Number	94.70
Time of Concentration (days hh:mm:ss)	0 00:11:12

Subbasin : DMA10

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA11

Input Data

Area (ft²)	8165.02
Impervious Area (%)	97.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	8165.02		97.34

Time of Concentration

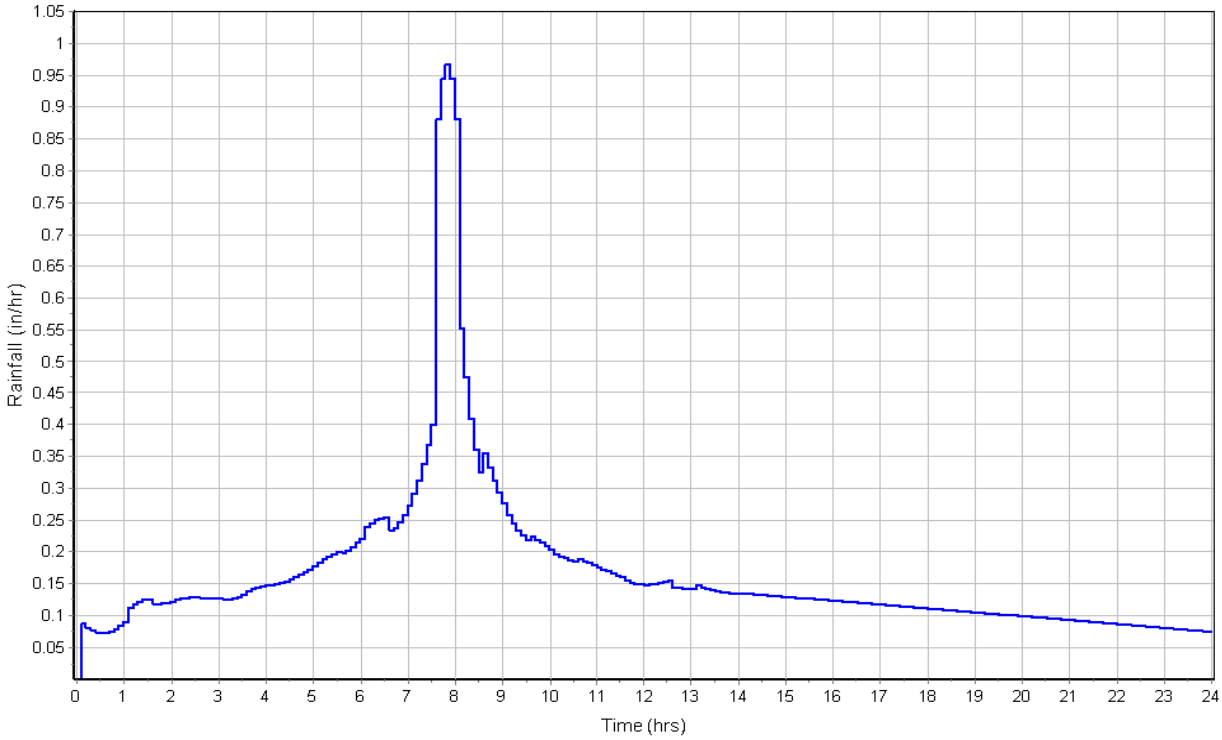
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

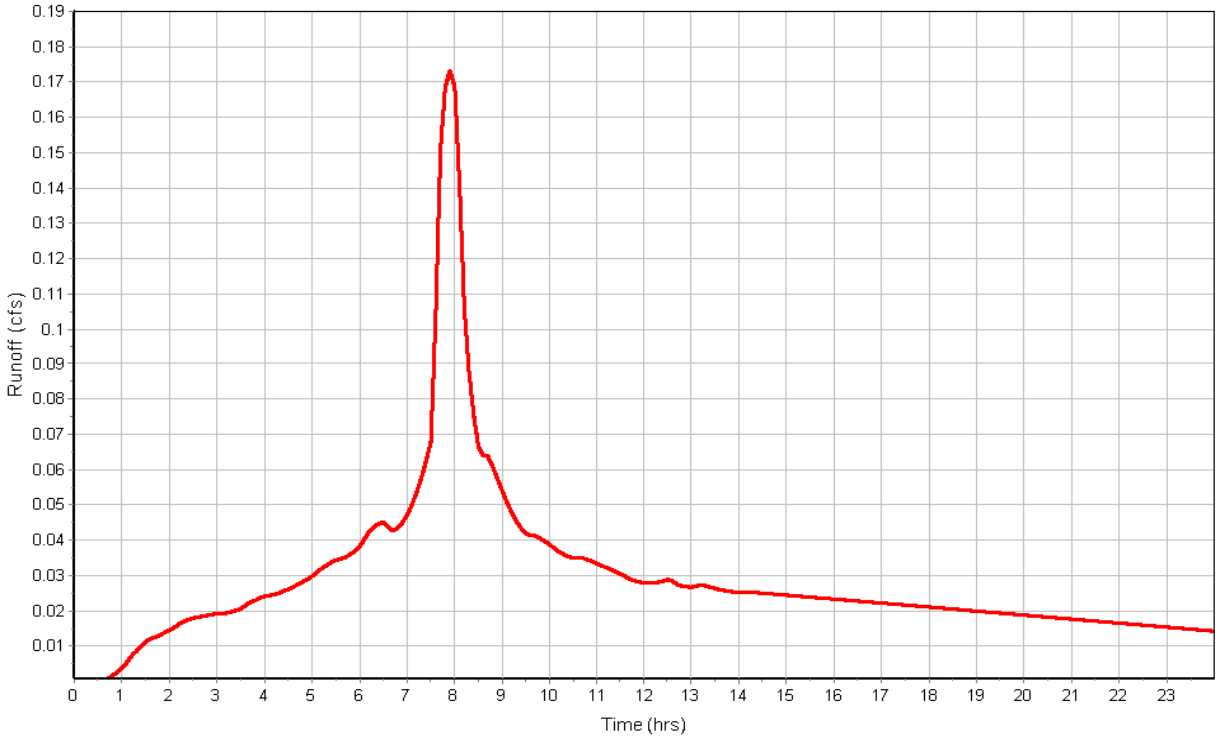
Total Rainfall (in)	3.99
Total Runoff (in)	3.70
Peak Runoff (cfs)	0.17
Weighted Curve Number	97.34
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA11

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA12

Input Data

Area (ft²)	5899.98
Impervious Area (%)	94.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	5899.98		96.68

Time of Concentration

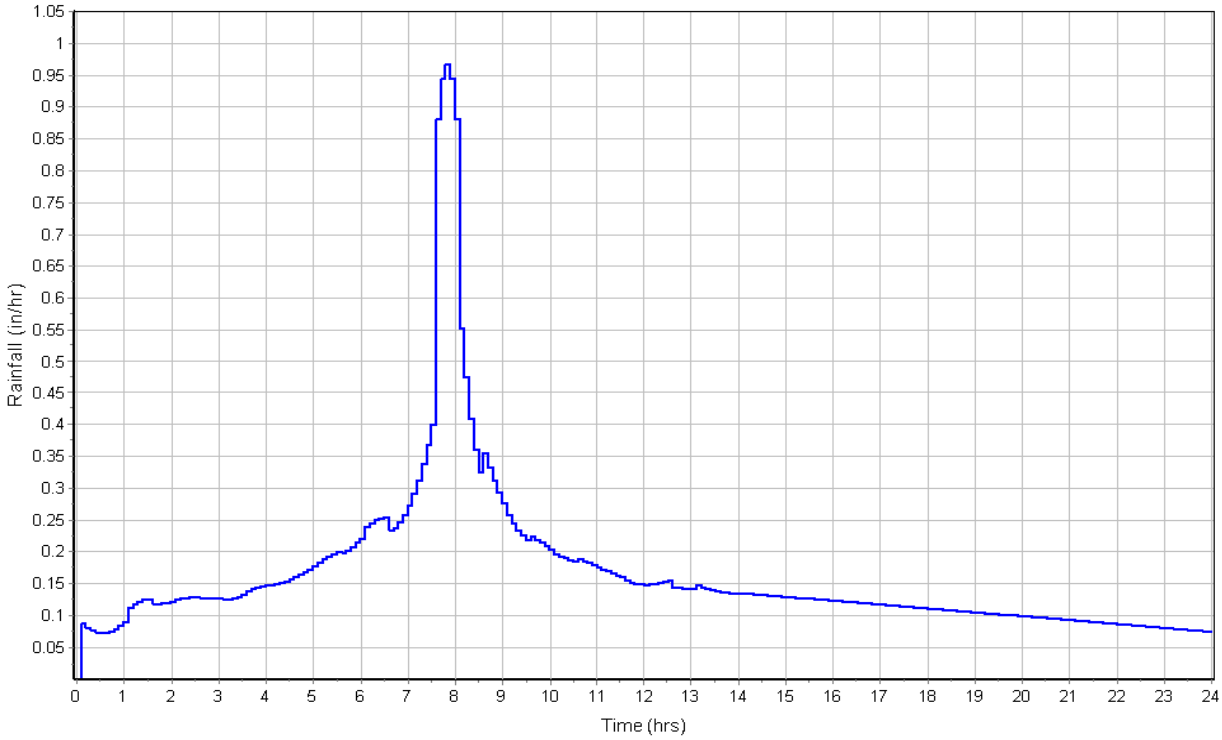
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

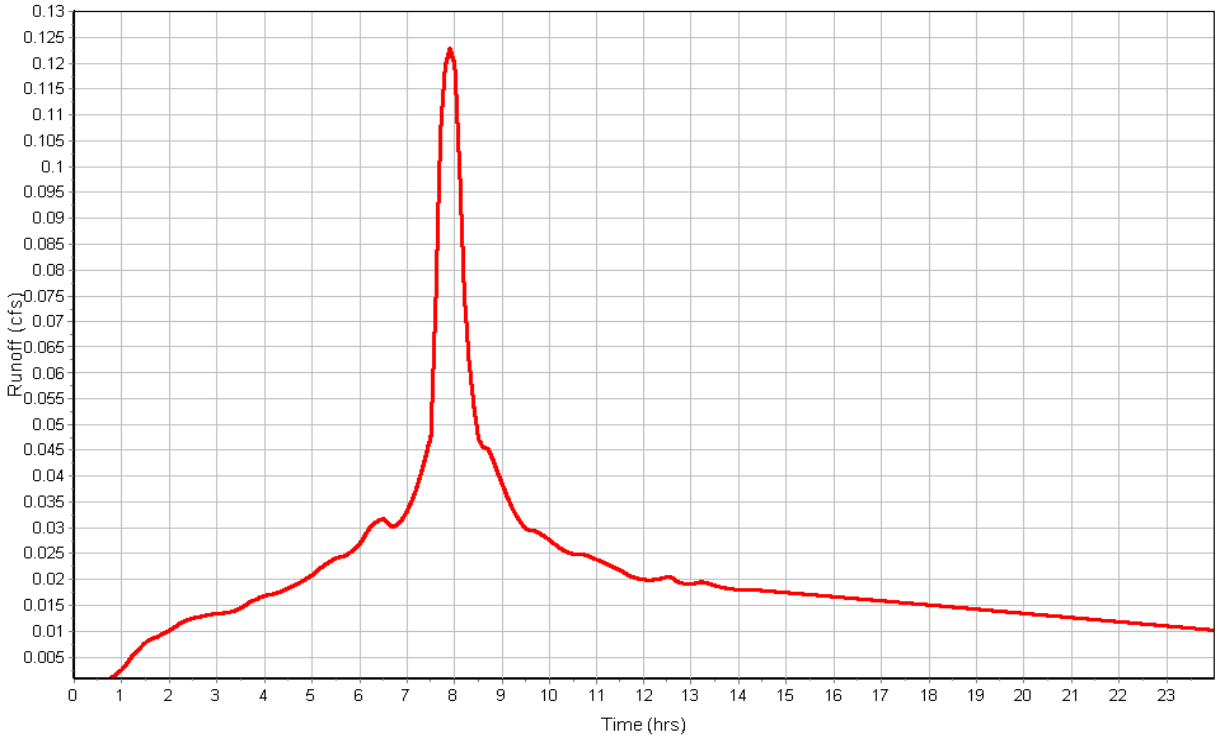
Total Rainfall (in)	3.99
Total Runoff (in)	3.63
Peak Runoff (cfs)	0.12
Weighted Curve Number	96.68
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA12

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA13

Input Data

Area (ft²)	6881.00
Impervious Area (%)	79.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	6881.00		93.38

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.4	0.01	0.00
Flow Length (ft) :	59.68	126.6	0.00
Slope (%) :	2	2	0.00
2 yr, 24 hr Rainfall (in) :	2.65	2.65	0.00
Velocity (ft/sec) :	0.06	1.42	0.00
Computed Flow Time (min) :	15.61	1.49	0.00

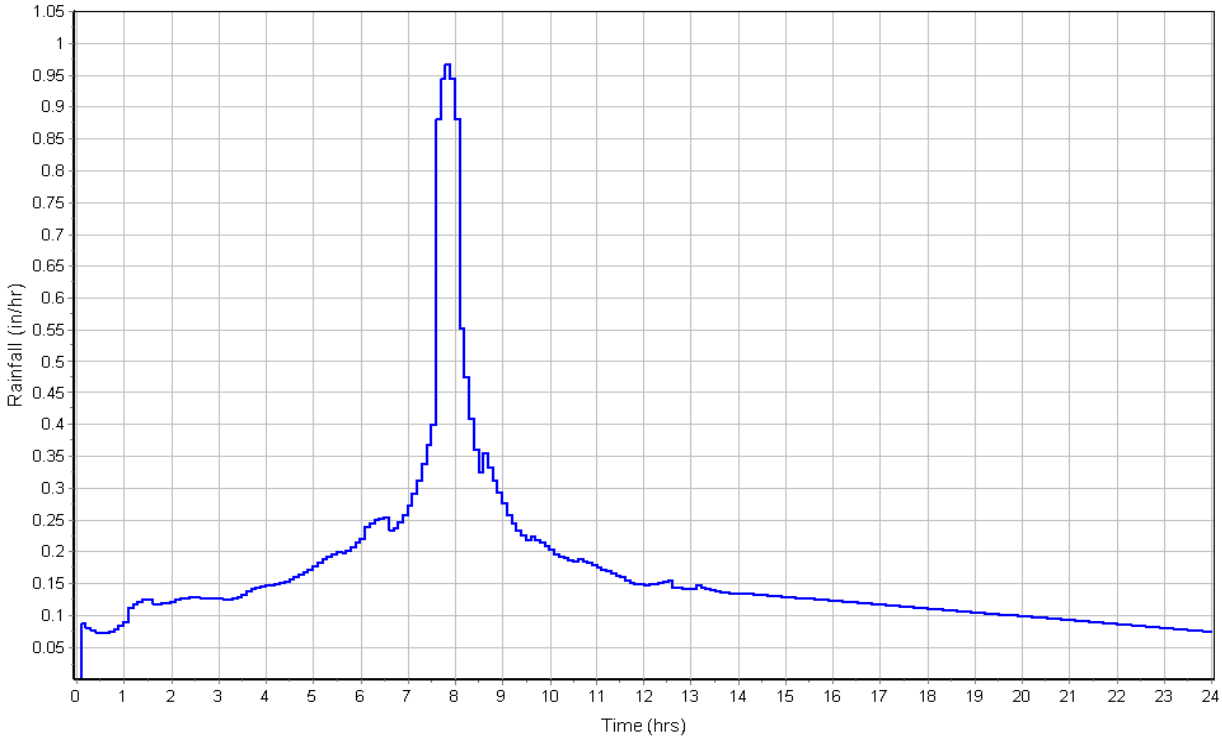
Total TOC (min) 17.10

Subbasin Runoff Results

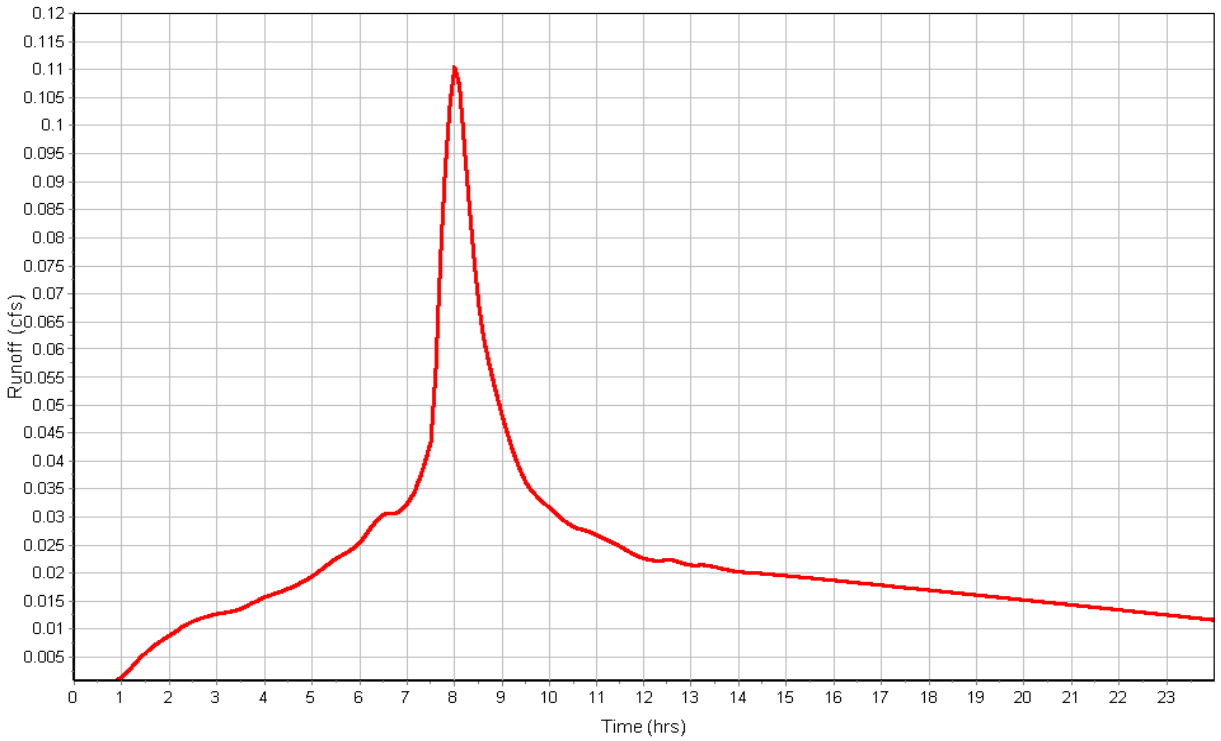
Total Rainfall (in)	3.99
Total Runoff (in)	3.32
Peak Runoff (cfs)	0.11
Weighted Curve Number	93.38
Time of Concentration (days hh:mm:ss)	0 00:17:06

Subbasin : DMA13

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA14

Input Data

Area (ft²)	929.00
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	929.00		98

Time of Concentration

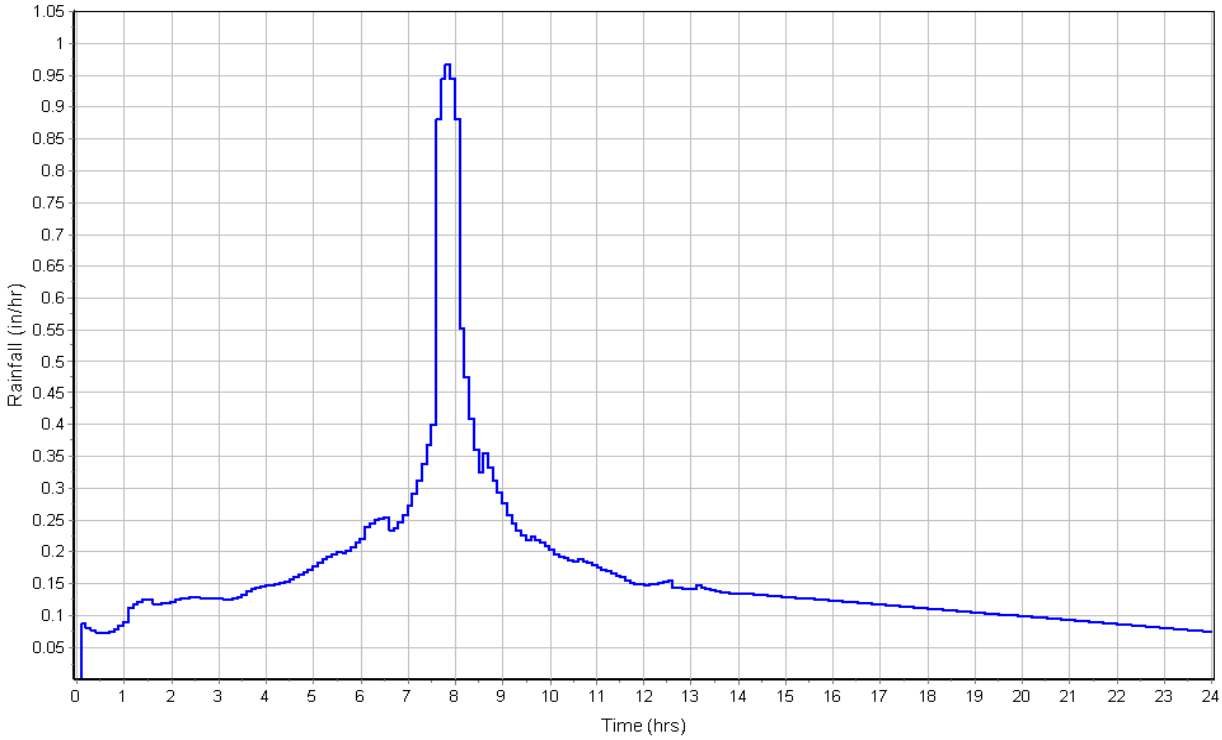
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

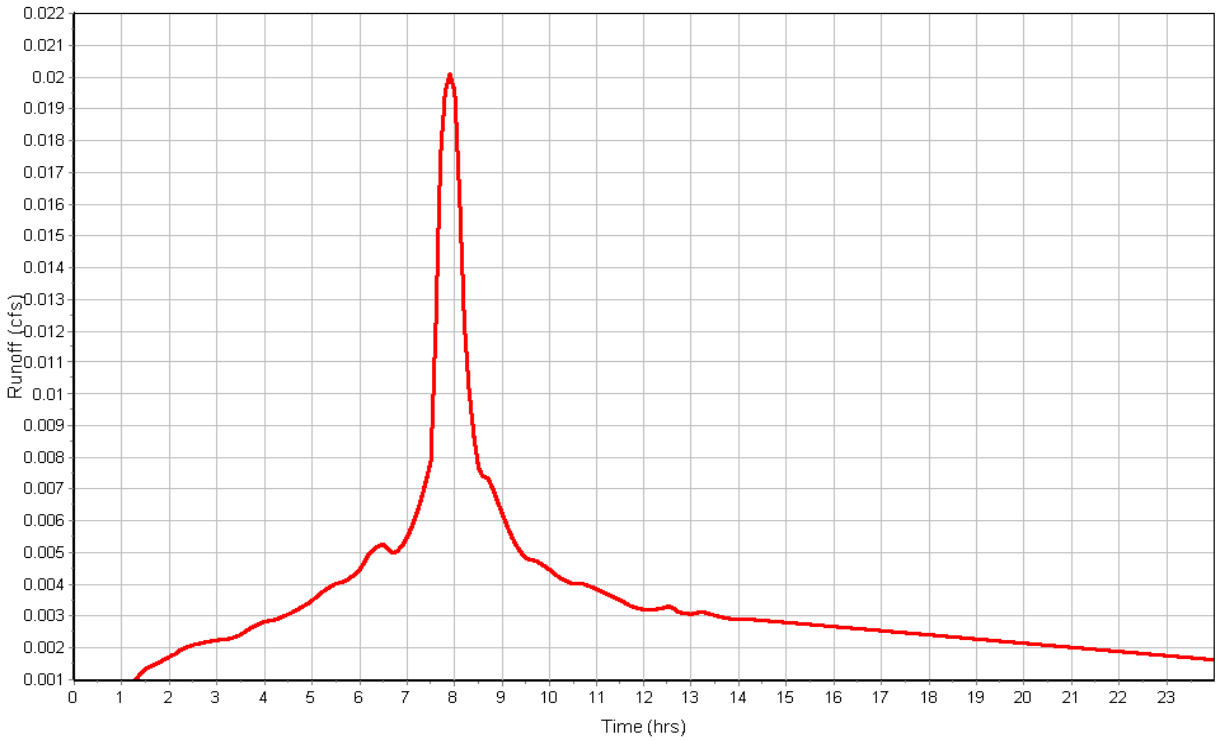
Total Rainfall (in)	3.99
Total Runoff (in)	3.76
Peak Runoff (cfs)	0.02
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA14

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA15

Input Data

Area (ft²)	10340.01
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	10340.01		98

Time of Concentration

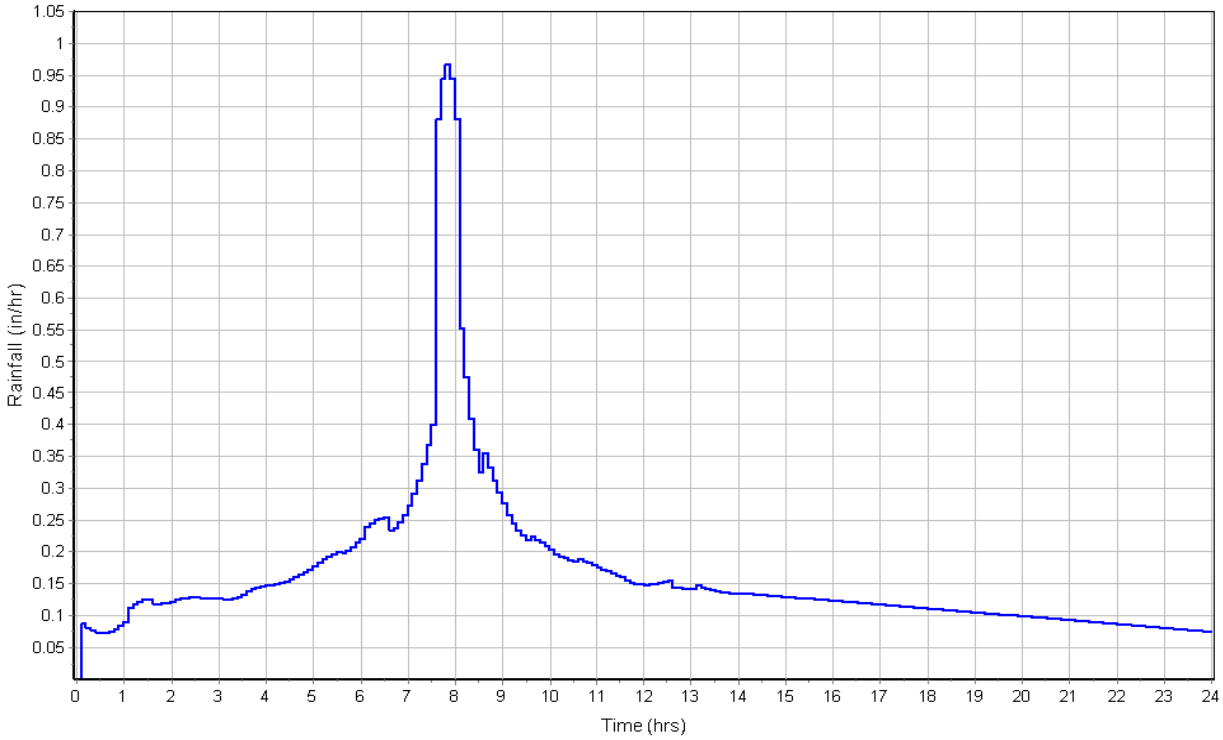
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

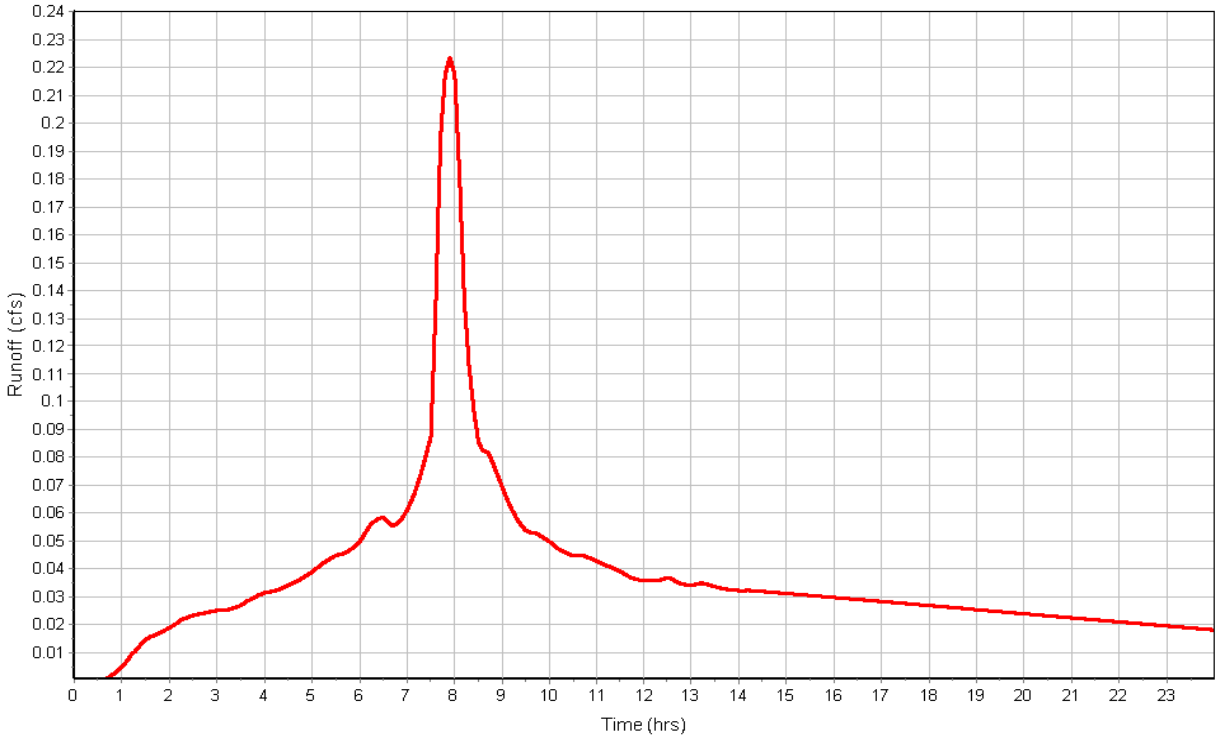
Total Rainfall (in)	3.99
Total Runoff (in)	3.76
Peak Runoff (cfs)	0.22
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA15

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA16

Input Data

Area (ft²)	7878.00
Impervious Area (%)	97.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	7878.00		97.34

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.4	0.01	0.00
Flow Length (ft) :	16.62	21.91	0.00
Slope (%) :	1	2	0.00
2 yr, 24 hr Rainfall (in) :	2.65	2.65	0.00
Velocity (ft/sec) :	0.04	1.00	0.00
Computed Flow Time (min) :	7.41	0.37	0.00

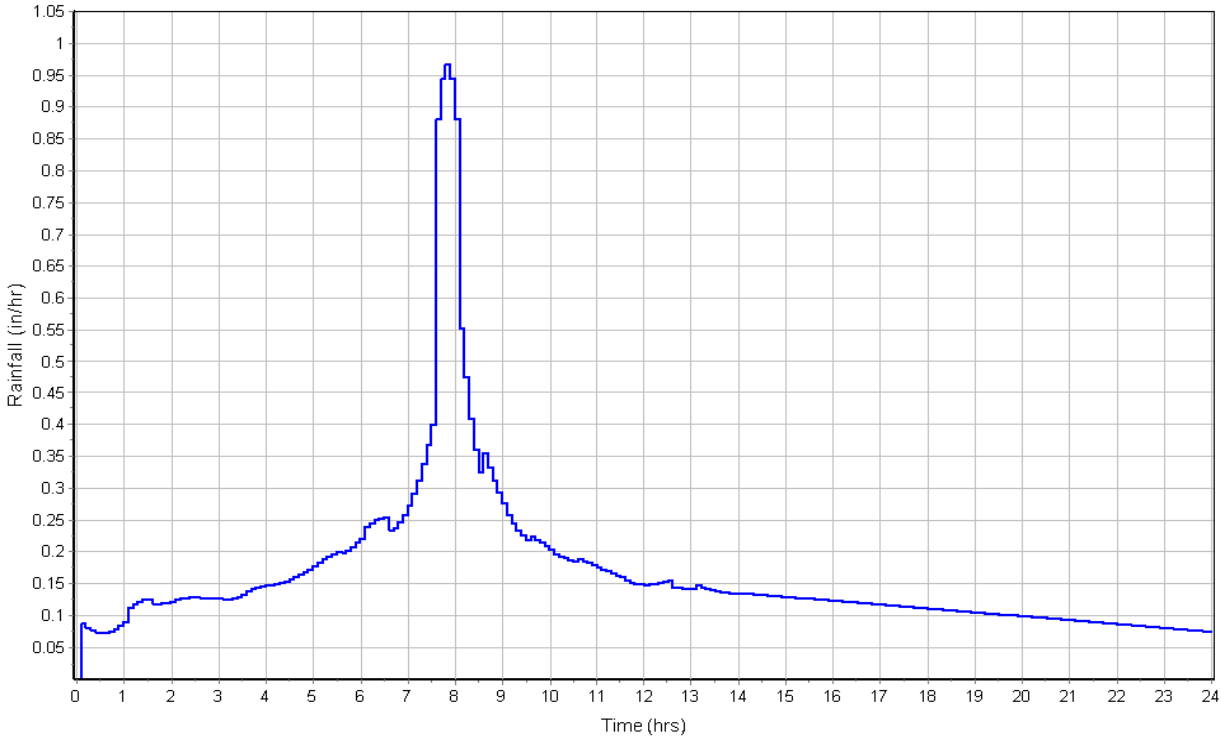
Total TOC (min) 7.78

Subbasin Runoff Results

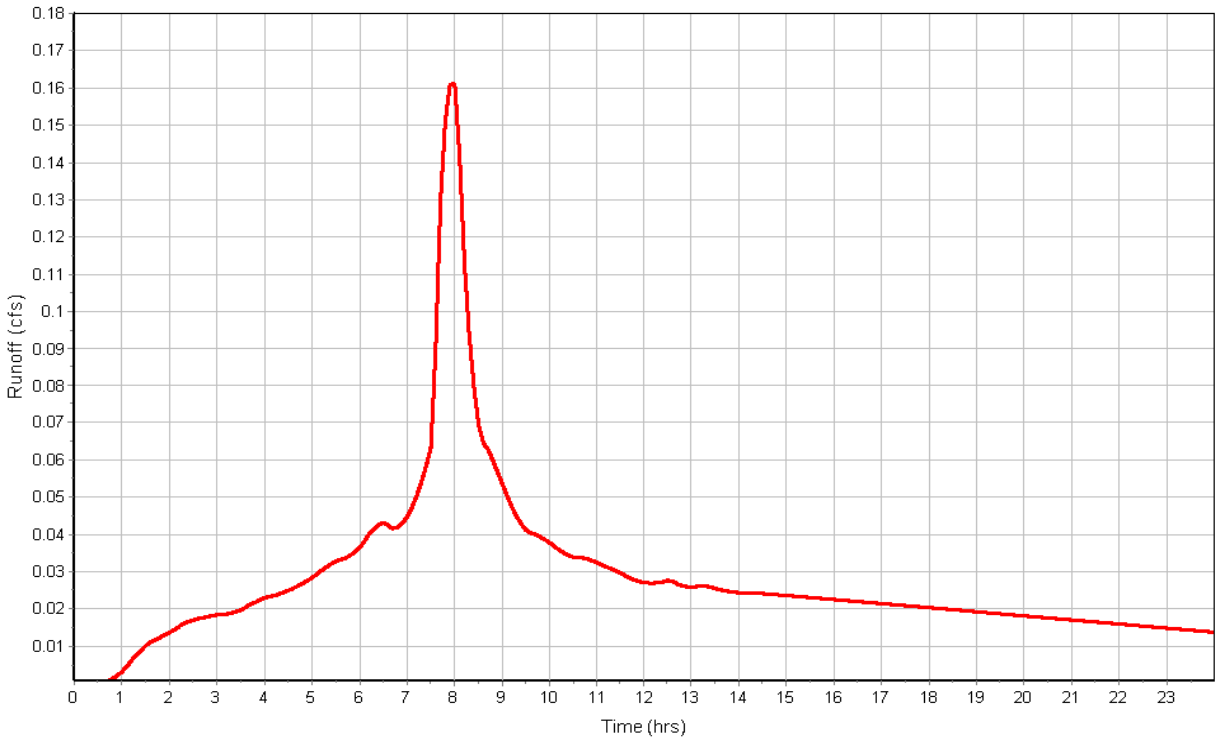
Total Rainfall (in)	3.99
Total Runoff (in)	3.69
Peak Runoff (cfs)	0.16
Weighted Curve Number	97.34
Time of Concentration (days hh:mm:ss)	0 00:07:47

Subbasin : DMA16

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA17

Input Data

Area (ft²) 5760.98
Impervious Area (%) 98.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID ..... Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	5760.98		97.56

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.4	0.01	0.00
Flow Length (ft) :	16.47	45.71	0.00
Slope (%) :	1	2	0.00
2 yr, 24 hr Rainfall (in) :	2.65	2.65	0.00
Velocity (ft/sec) :	0.04	1.16	0.00
Computed Flow Time (min) :	7.36	0.66	0.00

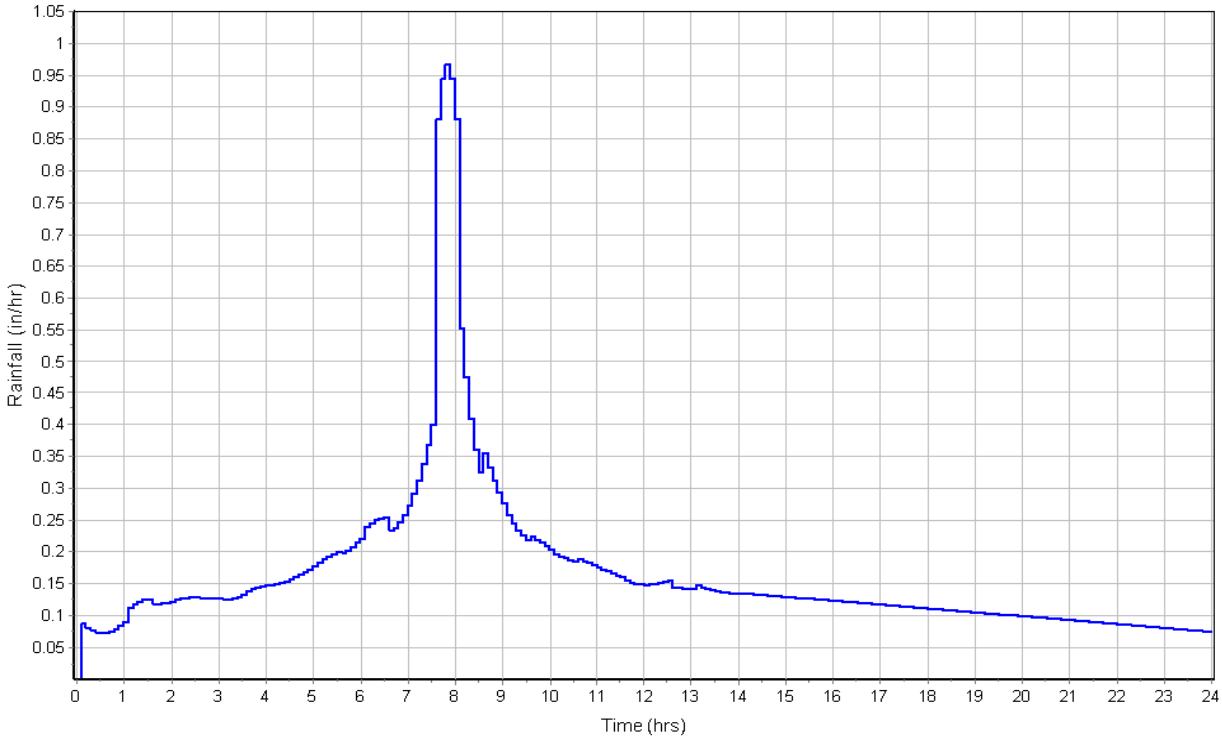
Total TOC (min) 8.02

Subbasin Runoff Results

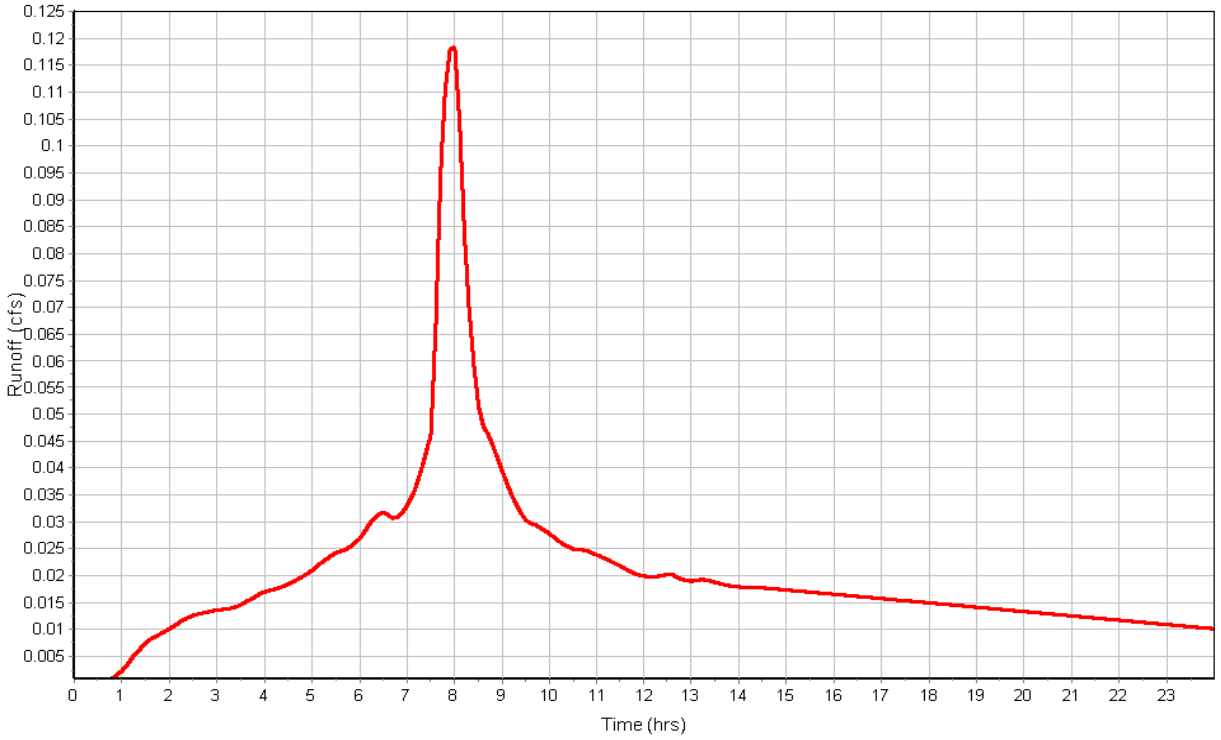
Total Rainfall (in) 3.99
Total Runoff (in) 3.71
Peak Runoff (cfs) 0.12
Weighted Curve Number 97.56
Time of Concentration (days hh:mm:ss) 0 00:08:01

Subbasin : DMA17

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA18

Input Data

Area (ft²) 44869.02
Impervious Area (%) 95.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID ..... Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	44869.02		96.9

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.4	0.01	0.00
Flow Length (ft) :	13.39	261.42	0.00
Slope (%) :	1	2	0.00
2 yr, 24 hr Rainfall (in) :	2.65	2.65	0.00
Velocity (ft/sec) :	0.04	1.64	0.00
Computed Flow Time (min) :	6.23	2.66	0.00

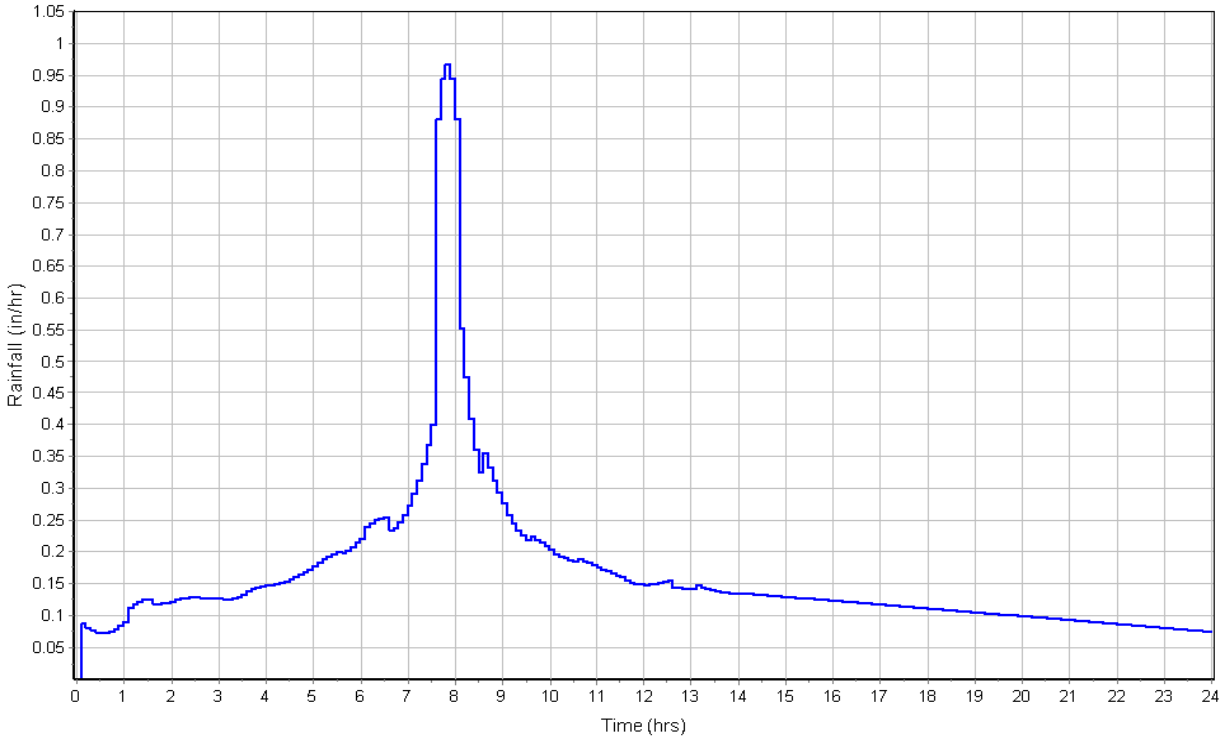
Total TOC (min) 8.89

Subbasin Runoff Results

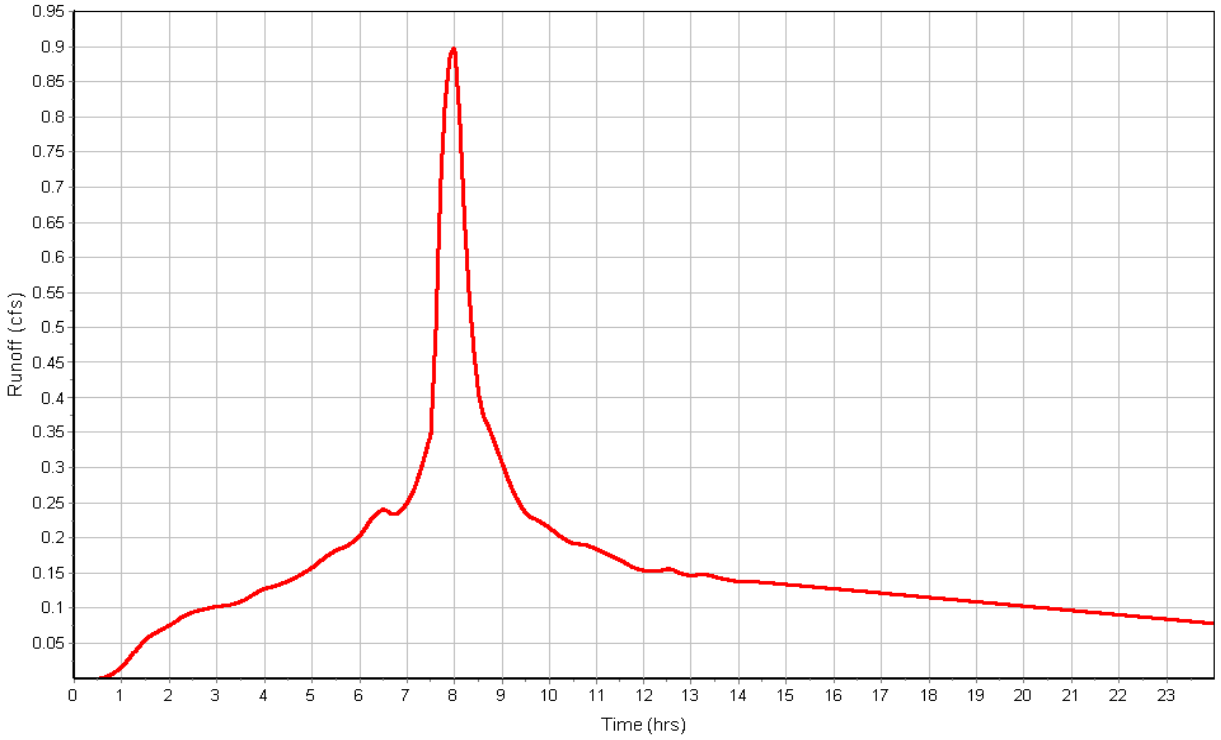
Total Rainfall (in) 3.99
Total Runoff (in) 3.65
Peak Runoff (cfs) 0.90
Weighted Curve Number 96.90
Time of Concentration (days hh:mm:ss) 0 00:08:53

Subbasin : DMA18

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA19

Input Data

Area (ft²)	5560.00
Impervious Area (%)	100.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	5560.00		98

Time of Concentration

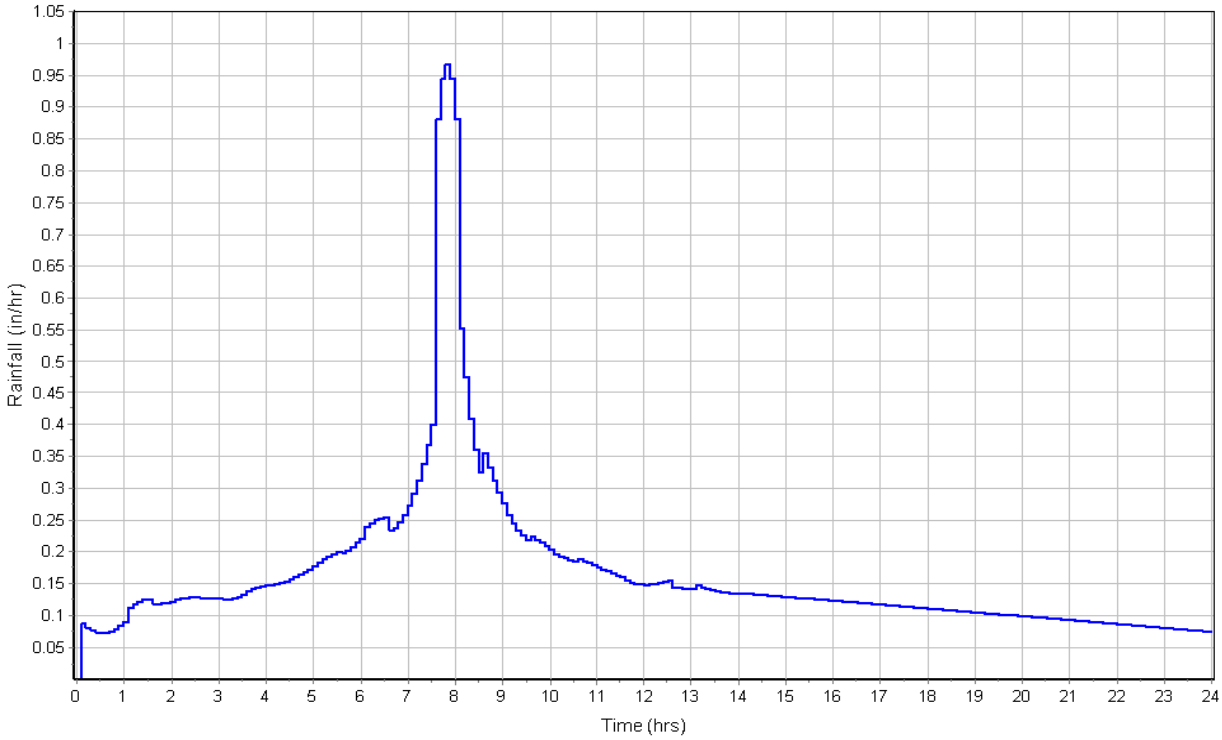
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

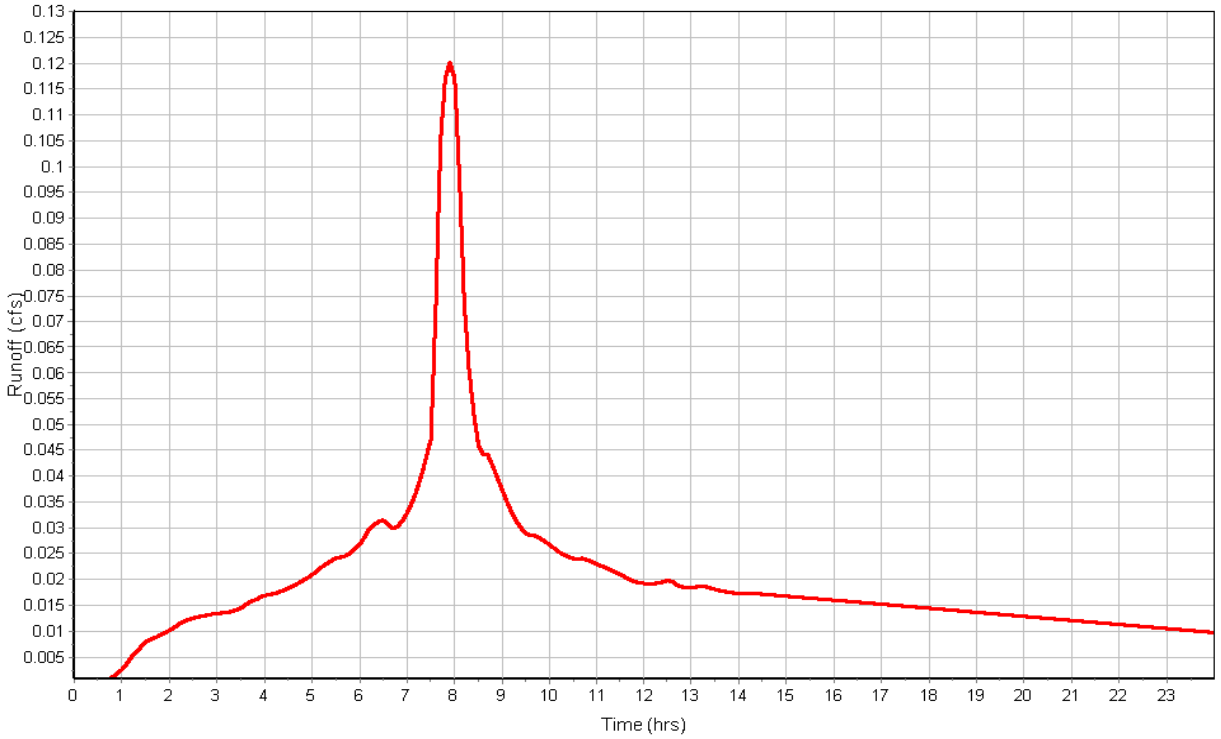
Total Rainfall (in)	3.99
Total Runoff (in)	3.76
Peak Runoff (cfs)	0.12
Weighted Curve Number	98.00
Time of Concentration (days hh:mm:ss)	0 00:05:00

Subbasin : DMA19

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : DMA20

Input Data

Area (ft²)	16230.02
Impervious Area (%)	95.00
Impervious Area Curve Number	98.00
Pervious Area Curve Number	76.00
Rain Gage ID	Rain Gage-025yr

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Composite Area & Weighted CN	16230.02		96.9

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.4	0.01	0.00
Flow Length (ft) :	34.47	88.38	0.00
Slope (%) :	1	2	0.00
2 yr, 24 hr Rainfall (in) :	2.65	2.65	0.00
Velocity (ft/sec) :	0.04	1.32	0.00
Computed Flow Time (min) :	13.28	1.12	0.00

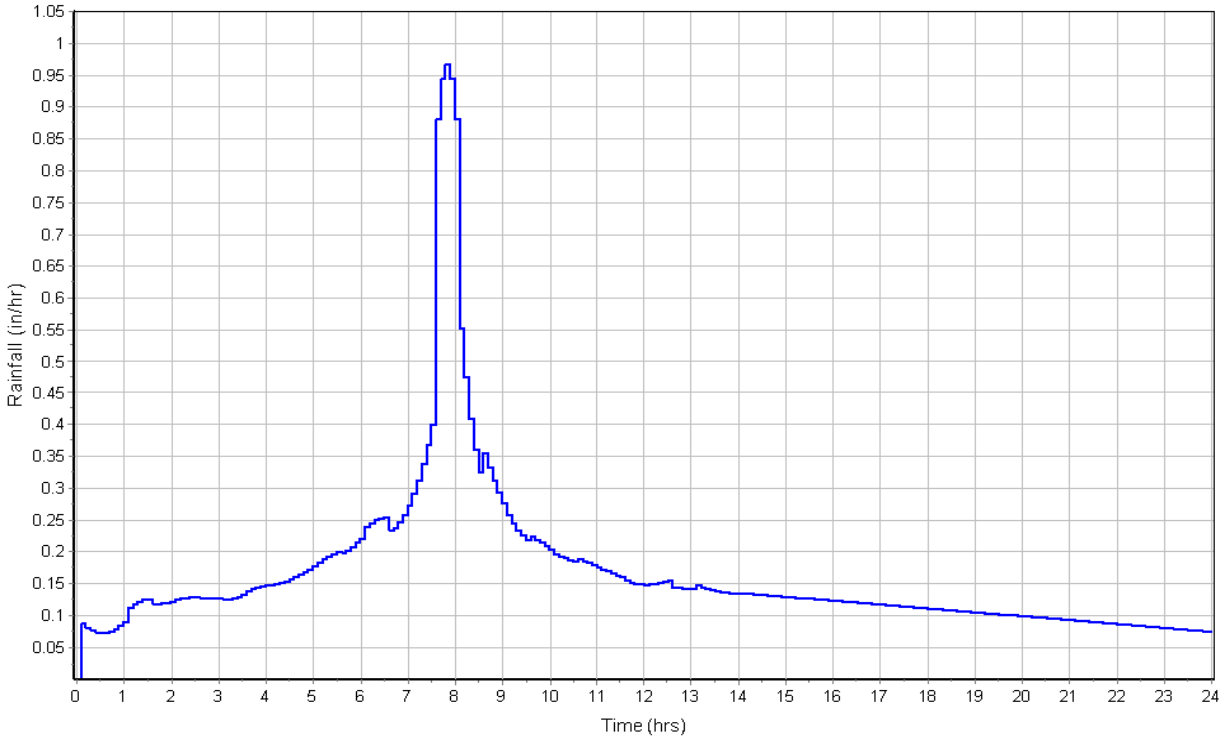
Total TOC (min) 14.40

Subbasin Runoff Results

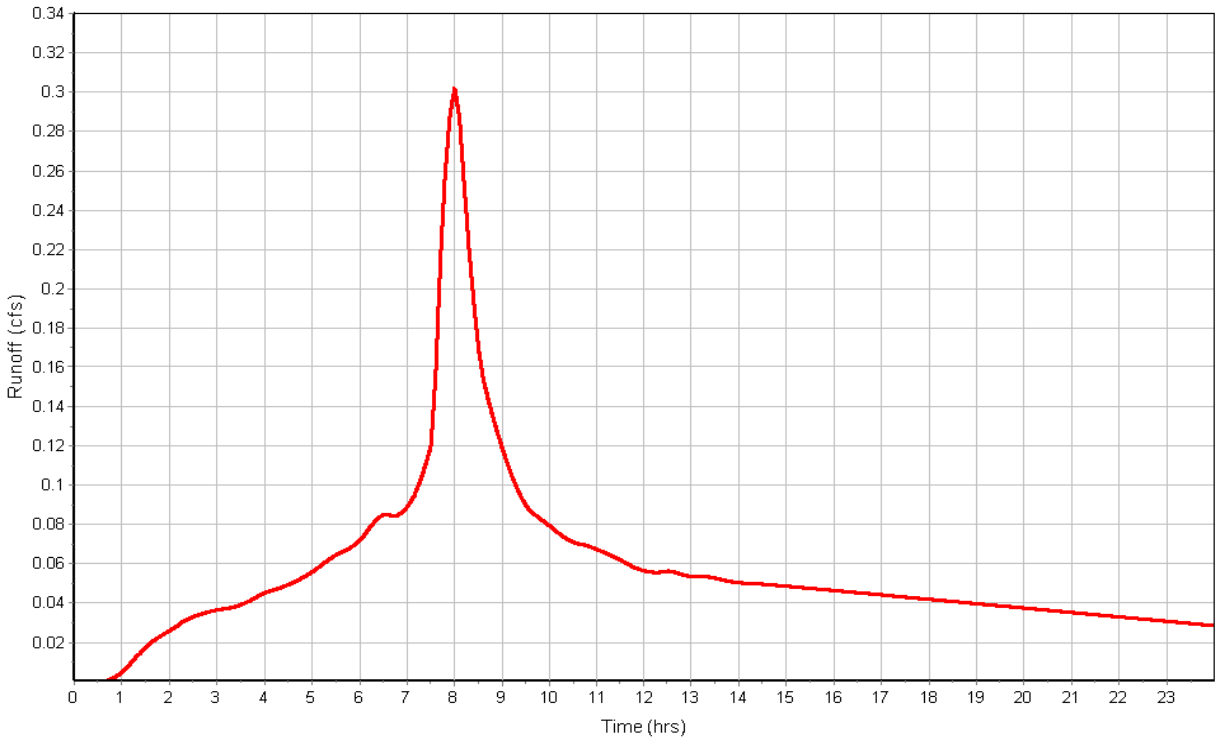
Total Rainfall (in)	3.99
Total Runoff (in)	3.64
Peak Runoff (cfs)	0.30
Weighted Curve Number	96.90
Time of Concentration (days hh:mm:ss)	0 00:14:24

Subbasin : DMA20

Rainfall Intensity Graph



Runoff Hydrograph



Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft^2)	Minimum Pipe Cover (in)
1	BMP#1 RISER	152.48	155.73	3.25	152.48	0.00	155.73	0.00	0.00	31.00
2	BMP#2 RISER	149.65	152.90	3.25	149.65	0.00	152.90	0.00	0.00	33.00
3	BMP#3 RISER	148.95	153.20	4.25	148.95	0.00	152.20	-1.00	0.00	45.00
4	NULL01	154.31	158.02	3.71	154.31	0.00	155.38	-2.64	0.00	32.55
5	NULL02	154.20	158.45	4.25	154.20	0.00	155.28	-3.17	0.00	38.99
6	NULL03	154.06	158.57	4.51	154.06	0.00	155.13	-3.44	0.00	42.16
7	NULL04	153.88	158.53	4.65	153.88	0.00	154.95	-3.58	0.00	43.84
8	NULL05	153.70	158.50	4.80	153.70	0.00	154.77	-3.73	0.00	45.65
9	NULL06	153.37	155.77	2.40	153.65	0.28	154.45	-1.32	0.00	16.80
10	NULL07	153.77	156.44	2.67	153.55	-0.22	154.91	-1.53	0.00	23.04
11	NULL08	154.35	156.67	2.32	154.33	-0.02	155.69	-0.98	0.00	19.84
12	NULL09	152.75	155.37	2.62	152.75	0.00	153.29	-2.08	0.00	25.44
13	NULL10	152.51	154.46	1.95	152.51	0.00	153.06	-1.40	0.00	17.37
14	NULL11	153.40	156.16	2.76	153.40	0.00	153.94	-2.22	0.00	27.12
15	NULL12	153.27	155.50	2.23	153.27	0.00	154.41	-1.09	0.00	18.75
16	NULL13	152.80	154.90	2.10	152.80	0.00	153.93	-0.97	0.00	17.20
17	NULL14	153.47	155.46	1.99	153.47	0.00	154.80	-0.67	0.00	17.88

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	BMP#1 RISER	0.00	0.00	152.48	0.00	0.00	3.25	152.48	0.00	0 00:00	0 00:00	0.00	0.00
2	BMP#2 RISER	0.00	0.00	149.65	0.00	0.00	3.25	149.65	0.00	0 00:00	0 00:00	0.00	0.00
3	BMP#3 RISER	0.00	0.00	148.95	0.00	0.00	4.25	148.95	0.00	0 00:00	0 00:00	0.00	0.00
4	NULL01	1.31	0.00	155.07	0.76	0.00	2.95	154.55	0.24	0 07:56	0 00:00	0.00	0.00
5	NULL02	1.31	0.00	154.95	0.75	0.00	3.50	154.44	0.24	0 07:57	0 00:00	0.00	0.00
6	NULL03	1.34	0.00	154.80	0.74	0.00	3.77	154.30	0.24	0 07:58	0 00:00	0.00	0.00
7	NULL04	1.37	0.00	154.63	0.75	0.00	3.90	154.12	0.24	0 07:58	0 00:00	0.00	0.00
8	NULL05	1.41	0.00	154.46	0.76	0.00	4.04	153.93	0.23	0 07:59	0 00:00	0.00	0.00
9	NULL06	2.09	0.00	154.24	0.87	0.00	1.53	153.73	0.36	0 07:59	0 00:00	0.00	0.00
10	NULL07	0.69	0.00	154.26	0.49	0.00	2.18	153.90	0.13	0 07:59	0 00:00	0.00	0.00
11	NULL08	0.52	0.00	154.81	0.46	0.00	1.86	154.52	0.17	0 07:49	0 00:00	0.00	0.00
12	NULL09	0.25	0.00	153.10	0.35	0.00	2.27	152.96	0.21	0 08:01	0 00:00	0.00	0.00
13	NULL10	0.33	0.00	153.11	0.60	0.00	1.35	152.95	0.44	0 00:01	0 00:00	0.00	0.00
14	NULL11	0.16	0.00	153.65	0.25	0.00	2.51	153.49	0.09	0 08:00	0 00:00	0.00	0.00
15	NULL12	0.28	0.00	153.53	0.26	0.00	1.97	153.38	0.11	0 08:00	0 00:00	0.00	0.00
16	NULL13	0.50	0.00	153.22	0.42	0.00	1.68	152.98	0.18	0 07:57	0 00:00	0.00	0.00
17	NULL14	0.30	0.00	153.98	0.51	0.00	1.48	153.90	0.43	0 07:54	0 00:00	0.00	0.00

Channel Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Shape	Height (ft)	Width (ft)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate
1	BMP3_CURBBREAK	2.83	153.54	153.54	152.45	0.00	1.09	38.5200	Rectangular	1.000	1.000	0.0330	0.5000	0.5000	0.0000	0.00	No
2	BMP4_CURBBREAK	6.53	154.50	154.50	153.40	0.00	1.10	16.8500	Rectangular	1.000	1.000	0.0330	0.5000	0.5000	0.0000	0.00	No

Channel Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	BMP3_CURBBREAK	0.00	0 00:00	13.44	0.00	0.00		0.25	0.25	0.00		
2	BMP4_CURBBREAK	0.01	0 08:21	8.89	0.00	0.03	3.63	0.25	0.25	0.00		

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	A-1-01	41.97	156.13	0.00	154.94	2.08	1.19	2.8200	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
2	A-1-02	109.68	154.86	2.00	154.53	2.00	0.33	0.3000	CIRCULAR	8.040	8.040	0.0130	0.5000	0.5000	0.0000	0.00	No	1
3	A-1-03	75.51	154.53	2.00	154.31	0.00	0.23	0.3000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
4	A-1-04	35.36	154.31	0.00	154.20	0.00	0.11	0.3000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
5	A-1-05	48.25	154.20	0.00	154.06	0.00	0.14	0.3000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
6	A-1-06	59.97	154.06	0.00	153.88	0.00	0.18	0.3000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
7	A-1-07	60.17	153.88	0.00	153.70	0.00	0.18	0.3000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
8	A-1-08	108.70	153.70	0.00	153.37	0.00	0.33	0.3000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
9	A-1-09	12.56	153.37	0.00	153.33	0.00	0.04	0.3000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
10	A-1-10	24.86	149.65	0.00	149.53	0.00	0.12	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
11	A-2-1	45.40	155.39	0.00	154.78	2.25	0.61	1.3400	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
12	A-3-1	7.60	154.35	2.00	154.31	0.25	0.04	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
13	A-4-1	7.60	154.17	2.00	154.13	0.25	0.04	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
14	A-5-1	7.61	153.99	2.00	153.95	0.25	0.04	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
15	A-6-1	28.50	154.45	0.00	154.35	0.00	0.10	0.3500	CIRCULAR	8.040	8.040	0.0130	0.5000	0.5000	0.0000	0.00	No	1
16	A-6-2	189.81	154.35	0.00	153.68	-0.09	0.67	0.3500	CIRCULAR	8.040	8.040	0.0130	0.5000	0.5000	0.0000	0.00	No	1
17	A-6-2A	11.86	154.15	2.00	153.77	0.00	0.38	3.2000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
18	A-6-3	42.62	153.52	-0.25	153.37	0.00	0.15	0.3500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
19	A-7-1	19.84	153.25	2.00	153.15	0.00	0.10	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
20	B-1-1	53.24	155.95	2.00	155.79	0.00	0.16	0.3000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
21	B-1-2	60.16	152.48	0.00	151.57	0.00	0.91	1.5100	CIRCULAR	8.040	8.040	0.0130	0.5000	0.5000	0.0000	0.00	No	1
22	C-1-1	21.12	153.12	2.00	153.11	2.04	0.01	0.0500	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
23	C-1-2	34.60	153.07	2.00	152.90	2.00	0.17	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
24	C-1-3	29.24	152.90	2.00	152.75	0.00	0.15	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
25	C-1-4	47.14	152.75	0.00	152.51	0.00	0.24	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
26	C-1-5	12.56	152.51	0.00	152.45	0.00	0.06	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
27	C-1-6	106.93	148.95	0.00	148.42	0.00	0.53	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
28	C-2-1	79.79	153.80	2.00	153.40	0.00	0.40	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
29	C-2-2	25.56	153.40	0.00	153.27	0.00	0.13	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
30	C-2-2A	10.96	153.32	2.00	153.27	0.00	0.05	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
31	C-2-3	94.11	153.27	0.00	152.80	0.00	0.47	0.5000	CIRCULAR	8.040	8.040	0.0130	0.5000	0.5000	0.0000	0.00	No	1
32	C-2-3A	5.51	152.83	2.00	152.80	0.00	0.03	0.5000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
33	C-2-4	70.03	152.80	0.00	152.45	0.00	0.35	0.5000	CIRCULAR	8.040	8.040	0.0150	0.5000	0.5000	0.0000	0.00	No	1
34	D-1-1	19.41	153.51	2.00	153.47	0.00	0.04	0.2100	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
35	D-1-2	162.30	153.47	0.00	153.15	0.00	0.32	0.2000	CIRCULAR	6.000	6.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1

Pipe Results

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1	A-1-01	0.43	0 07:54	0.94	0.46	2.83	0.25	0.37	0.74	0.00		Calculated
2	A-1-02	0.68	0 07:54	0.66	1.02	1.94	0.94	0.67	1.00	16.00		SURCHARGED
3	A-1-03	1.31	0 07:54	1.95	0.67	2.13	0.59	0.74	0.74	0.00		Calculated
4	A-1-04	1.31	0 07:55	1.95	0.67	2.09	0.28	0.75	0.75	0.00		Calculated
5	A-1-05	1.30	0 07:55	1.95	0.67	2.12	0.38	0.74	0.74	0.00		Calculated
6	A-1-06	1.33	0 07:57	1.95	0.68	2.16	0.46	0.75	0.75	0.00		Calculated
7	A-1-07	1.36	0 07:58	1.95	0.70	2.18	0.46	0.76	0.76	0.00		Calculated
8	A-1-08	1.41	0 07:59	1.95	0.72	2.05	0.88	0.82	0.82	0.00		Calculated
9	A-1-09	2.09	0 07:59	1.95	1.07	3.34	0.06	0.74	0.74	0.00		> CAPACITY
10	A-1-10	0.00	0 00:00	0.40	0.00	0.00		0.00	0.00	0.00		Calculated
11	A-2-1	0.44	0 07:54	0.65	0.67	2.94	0.26	0.39	0.78	0.00		Calculated
12	A-3-1	0.03	0 08:03	0.40	0.08	0.84	0.15	0.47	0.94	0.00		Calculated
13	A-4-1	0.03	0 07:59	0.40	0.08	0.84	0.15	0.48	0.96	0.00		Calculated
14	A-5-1	0.04	0 07:59	0.40	0.11	0.95	0.13	0.49	0.97	0.00		Calculated
15	A-6-1	0.52	0 07:54	0.72	0.72	1.95	0.24	0.48	0.71	0.00		Calculated
16	A-6-2	0.52	0 07:55	0.67	0.78	2.20	1.44	0.47	0.70	0.00		Calculated
17	A-6-2A	0.17	0 07:54	1.00	0.17	1.97	0.10	0.31	0.63	0.00		Calculated
18	A-6-3	0.68	0 07:56	3.45	0.20	1.46	0.49	0.68	0.68	0.00		Calculated
19	A-7-1	0.15	0 08:00	0.40	0.38	0.81	0.41	0.46	0.92	0.00		Calculated
20	B-1-1	0.13	0 07:54	0.31	0.41	0.64	1.39	0.50	1.00	1424.00		SURCHARGED
21	B-1-2	0.00	0 00:00	1.48	0.00	0.00		0.00	0.00	0.00		Calculated
22	C-1-1	0.11	0 08:01	0.25	0.44	1.05	0.34	0.29	0.57	0.00		Calculated
23	C-1-2	0.23	0 08:00	0.40	0.58	1.74	0.33	0.32	0.64	0.00		Calculated
24	C-1-3	0.25	0 08:00	0.40	0.63	1.73	0.28	0.34	0.69	0.00		Calculated
25	C-1-4	0.25	0 08:01	0.39	0.63	1.41	0.56	0.42	0.84	0.00		Calculated
26	C-1-5	0.33	0 00:01	0.40	0.84	2.03	0.10	0.50	1.00	0.00		SURCHARGED
27	C-1-6	0.00	0 00:00	0.40	0.00	0.00		0.00	0.00	0.00		Calculated
28	C-2-1	0.16	0 08:00	0.40	0.41	1.76	0.76	0.24	0.47	0.00		Calculated
29	C-2-2	0.16	0 08:00	0.40	0.41	1.59	0.27	0.26	0.51	0.00		Calculated
30	C-2-2A	0.12	0 08:00	0.39	0.30	1.19	0.15	0.25	0.51	0.00		Calculated
31	C-2-3	0.28	0 08:00	0.85	0.33	1.55	1.01	0.34	0.51	0.00		Calculated
32	C-2-3A	0.22	0 07:54	0.40	0.56	1.41	0.07	0.43	0.85	0.00		Calculated
33	C-2-4	0.50	0 07:57	0.74	0.67	1.93	0.60	0.46	0.69	0.00		Calculated
34	D-1-1	0.17	0 00:00	0.25	0.67	2.75	0.12	0.49	0.98	0.00		Calculated
35	D-1-2	0.16	0 00:01	0.25	0.65	1.09	2.48	0.50	1.00	15.00		SURCHARGED

Inlet Input

SN	Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Ponded Area (ft²)	Grate Clogging Factor (%)
1	BMP3_CURBBREAK	FHWA HEC-22 GENERIC	N/A	On Sag	1	0.00	153.54	153.54	0.00	0.00	10.00	0.00
2	BMP4_CURBBREAK	FHWA HEC-22 GENERIC	N/A	On Sag	1	0.00	154.51	154.51	0.00	0.00	10.00	0.00
3	CB01	FHWA HEC-22 GENERIC	N/A	On Sag	1	153.95	157.95	4.00	156.45	2.50	0.00	0.00
4	CB02	FHWA HEC-22 GENERIC	N/A	On Sag	1	152.86	156.83	3.97	154.64	1.78	0.00	0.00
5	CB03	FHWA HEC-22 GENERIC	N/A	On Sag	1	152.53	156.83	4.30	154.53	2.00	0.00	0.00
6	CB04	FHWA HEC-22 GENERIC	N/A	On Sag	1	152.35	158.57	6.22	154.35	2.00	0.00	0.00
7	CB05	FHWA HEC-22 GENERIC	N/A	On Sag	1	152.17	158.53	6.36	154.17	2.00	0.00	0.00
8	CB06	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.99	158.48	6.49	153.99	2.00	0.00	0.00
9	CB07	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.25	154.07	2.82	153.65	2.40	0.00	0.00
10	CB08	FHWA HEC-22 GENERIC	N/A	On Sag	1	152.15	156.17	4.02	154.15	2.00	0.00	0.00
11	CB09	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.12	154.64	3.52	153.12	2.00	0.00	0.00
12	CB10	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.07	154.66	3.59	153.07	2.00	0.00	0.00
13	CB11	FHWA HEC-22 GENERIC	N/A	On Sag	1	150.90	154.50	3.60	152.95	2.05	0.00	0.00
14	CB12	FHWA HEC-22 GENERIC	N/A	On Sag	1	150.83	154.88	4.05	152.95	2.12	0.00	0.00
15	CB13	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.32	155.44	4.12	153.32	2.00	0.00	0.00
16	CB14	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.80	155.80	4.00	153.80	2.00	0.00	0.00
17	CB15	FHWA HEC-22 GENERIC	N/A	On Sag	1	151.51	154.54	3.03	153.90	2.39	0.00	0.00
18	DS01	FHWA HEC-22 GENERIC	N/A	On Sag	1	155.39	160.00	4.61	155.39	0.00	0.00	0.00
19	DS02	FHWA HEC-22 GENERIC	N/A	On Sag	1	156.13	160.00	3.87	156.13	0.00	0.00	0.00
20	DS03	FHWA HEC-22 GENERIC	N/A	On Sag	1	154.45	160.00	5.55	154.45	0.00	0.00	0.00

Roadway & Gutter Input

SN	Element ID	Roadway Longitudinal Slope (ft/ft)	Roadway Cross Slope (ft/ft)	Roadway Manning's Roughness	Gutter Cross Slope (ft/ft)	Gutter Width (ft)	Gutter Depression (in)	Allowable Spread (ft)
1	BMP3_CURBBREAK	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
2	BMP4_CURBBREAK	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
3	CB01	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
4	CB02	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
5	CB03	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
6	CB04	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
7	CB05	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
8	CB06	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
9	CB07	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
10	CB08	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
11	CB09	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
12	CB10	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
13	CB11	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
14	CB12	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
15	CB13	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
16	CB14	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
17	CB15	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
18	DS01	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
19	DS02	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
20	DS03	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00

Inlet Results

SN	Element ID	Peak Flow (cfs)	Peak Lateral Inflow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)	Max Gutter Water Depth during Peak Flow (ft)	Time of Max Depth Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	BMP3_CURBBREAK	0.90	0.90	N/A	N/A	N/A	-1.60	153.76	0.22	0 05:47	3.23	1093.00
2	BMP4_CURBBREAK	0.30	0.30	N/A	N/A	N/A	3.67	154.83	0.32	0 08:21	0.69	939.00
3	CB01	0.13	0.13	N/A	N/A	N/A	1.53	158.09	0.14	0 07:54	0.00	0.00
4	CB02	0.24	0.24	N/A	N/A	N/A	1.83	156.97	0.14	0 07:54	0.00	0.00
5	CB03	0.20	0.20	N/A	N/A	N/A	1.73	156.97	0.14	0 07:55	0.00	0.00
6	CB04	0.03	0.03	N/A	N/A	N/A	1.22	158.70	0.13	0 07:58	0.00	0.00
7	CB05	0.03	0.03	N/A	N/A	N/A	1.22	158.66	0.13	0 07:59	0.00	0.00
8	CB06	0.04	0.04	N/A	N/A	N/A	1.26	158.61	0.13	0 07:59	0.00	0.00
9	CB07	0.15	0.15	N/A	N/A	N/A	1.60	154.21	0.14	0 08:00	0.00	0.00
10	CB08	0.17	0.17	N/A	N/A	N/A	1.66	156.31	0.14	0 07:54	0.00	0.00
11	CB09	0.11	0.11	N/A	N/A	N/A	1.49	154.78	0.14	0 08:00	0.00	0.00
12	CB10	0.12	0.12	N/A	N/A	N/A	1.52	154.80	0.14	0 08:00	0.00	0.00
13	CB11	0.02	0.02	N/A	N/A	N/A	1.16	154.63	0.13	0 08:00	0.00	0.00
14	CB12	0.22	0.22	N/A	N/A	N/A	1.78	155.02	0.14	0 07:57	0.00	0.00
15	CB13	0.12	0.12	N/A	N/A	N/A	1.51	155.58	0.14	0 08:00	0.00	0.00
16	CB14	0.16	0.16	N/A	N/A	N/A	1.63	155.94	0.14	0 07:54	0.00	0.00
17	CB15	0.12	0.12	N/A	N/A	N/A	1.52	154.68	0.14	0 07:54	0.00	0.00
18	DS01	0.44	0.44	N/A	N/A	N/A	2.22	160.15	0.15	0 07:48	0.00	0.00
19	DS02	0.43	0.43	N/A	N/A	N/A	2.21	160.15	0.15	0 07:54	0.00	0.00
20	DS03	0.52	0.52	N/A	N/A	N/A	2.37	160.15	0.15	0 07:54	0.00	0.00

APPENDIX B – OPERATIONS AND MAINTENANCE MANUAL

WES BMP Sizing Software Version 1.6.0.2, May 2018

WES BMP Sizing Report

Project Information

Project Name	W5
Project Type	Industrial
Location	9600 Boeckman Road
Stormwater Management Area	219453
Project Applicant	W5, LLC (c/o Mac Martin)
Jurisdiction	OutofDistrict

Drainage Management Area

Name	Area (sq-ft)	Pre-Project Cover	Post-Project Cover	DMA Soil Type	BMP
DMA 01 - Impervious	8,345	Grass	ConventionalConcrete	D	BMP 2
DMA 01 - Pervious	2,572	Grass	LandscapeDsoil	D	BMP 2
DMA 02 - Impervious	10,708	Grass	ConventionalConcrete	D	BMP 2
DMA 02 - Pervious	1,530	Grass	LandscapeDsoil	D	BMP 2
DMA 03 - Impervious	5,558	Forested	ConventionalConcrete	D	BMP 1
DMA 03 - Pervious	565	Forested	LandscapeDsoil	D	BMP 1
DMA 04 - Impervious	1,530	Forested	ConventionalConcrete	D	BMP 2
DMA 05 - Impervious	1,552	Grass	ConventionalConcrete	D	BMP 2
DMA 06 - Impervious	2,004	Grass	ConventionalConcrete	D	BMP 2
DMA 07 - Roof	20,144	Grass	Roofs	D	BMP 2
DMA 08 - Roof	20,084	Grass	Roofs	D	BMP 2
DMA 09 - Roof	24,005	Grass	Roofs	D	BMP 2
DMA 10 - Impervious	7,119	Grass	ConventionalConcrete	D	BMP 2
DMA 10 - Pervious	1,224	Grass	LandscapeDsoil	D	BMP 2
DMA 11 - Impervious	7,900	Grass	ConventionalConcrete	D	BMP 2

DMA 11 - Pervious	265	Grass	LandscapeDsoil	D	BMP 2
DMA 12 - Impervious	5,544	Grass	ConventionalConcrete	D	BMP 3
DMA 12 - Pervious	356	Grass	LandscapeDsoil	D	BMP 3
DMA 13 - Impervious	5,461	Grass	ConventionalConcrete	D	BMP 3
DMA 13 - Pervious	1,420	Grass	LandscapeDsoil	D	BMP 3
DMA 14 - Impervious	929	Grass	ConventionalConcrete	D	BMP 3
DMA 15 - Impervious	10,340	Grass	ConventionalConcrete	D	BMP 3
DMA 16 - Impervious	7,626	Grass	ConventionalConcrete	D	BMP 3
DMA 16 - Pervious	252	Grass	LandscapeDsoil	D	BMP 3
DMA 17 - Impervious	5,646	Grass	ConventionalConcrete	D	BMP 3
DMA 17 - Pervious	115	Grass	LandscapeDsoil	D	BMP 3
DMA 18 - Impervious	42,713	Grass	ConventionalConcrete	D	BMP 3
DMA 18 - Pervious	2,156	Grass	LandscapeDsoil	D	BMP 3
DMA 19 - Impervious	5,560	Grass	ConventionalConcrete	D	BMP 4
DMA 20 - Impervious	15,482	Grass	ConventionalConcrete	D	BMP 4
DMA 20 - Pervious	748	Grass	LandscapeDsoil	D	BMP 4

LID Facility Sizing Details

LID ID	Design Criteria	BMP Type	Facility Soil Type	Minimum Area (sq-ft)	Planned Areas (sq-ft)	Orifice Diameter (in)
BMP 2	FlowControlAndTreatment	Rain Garden - Filtration	D1	4,292.2	4,300.0	3.3
BMP 3	FlowControlAndTreatment	Rain Garden - Filtration	D1	3,250.7	3,290.0	2.9
BMP 4	FlowControlAndTreatment	Rain Garden - Filtration	D1	862.6	878.0	1.5
BMP 1	FlowControlAndTreatment	Rain Garden - Filtration	D1	238.1	640.0	0.8

Pond Sizing Details

1. FCWQT = Flow control and water quality treatment, WQT = Water quality treatment only

2. Depth is measured from the bottom of the facility and includes the three feet of media (drain rock, separation layer and growing media).

3. Maximum volume of the facility. Includes the volume occupied by the media at the bottom of the facility.

4. Maximum water storage volume of the facility. Includes water storage in the three feet of soil media assuming a 40 percent porosity.

Stormwater Operations & Maintenance Manual

For:

Building W-5
Wilsonville, Oregon

December 2021

Prepared by:

Mackenzie
1515 SE Water Avenue
Suite 100
Portland, OR 97214
2210115.00

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ATTACHMENTS

1. O&M Facility Map
2. Sample Maintenance Report
3. City of Wilsonville 2012 Manual for the Operation & Maintenance of Privately Owned Stormwater Facilities

I. GENERAL- SITE DESCRIPTION, ASSUMPTIONS AND GENEREAL SYSTEM DESCRIPTION

This plan was developed to provide a basis for maintenance of stormwater facilities for the W-5 Building project located in Wilsonville, Oregon. The W-5 project includes the construction of a 65,000 square foot (footprint) manufacturing building with an integral depressed truck dock, associated drive aisles and parking, an exterior trash enclosure, and associated utility services to the building and site..

Runoff from the site sheets flows to various standard catch basins and is conveyed to four rain garden stormwater systems onsite.

This Operations and Maintenance Plan generally provides maintenance requirements of the stormwater collection and treatment system. Best Management Practices (BMPs) related to maintenance of the facilities shall include regular maintenance and upkeep of the parking and landscape areas.

II. GENERAL MAINTENANCE AND FACILITY-SPECIFIC MAINTENANCE REQUIREMENTS

The W-5 Facilities Manager shall be responsible for regular inspections and maintenance of the storm drainage system and related facilities. Inspections shall include observations of the landscaping, parking areas, catch basin grates and basins for debris, loose soil or sediment that may enter the system. Inspection of the collection system includes observation of the catch basins, and conveyance lines. General maintenance requirements of those facilities include removal of sediment and debris, repair of damaged components and general maintenance of mechanical systems.

Facility-specific maintenance requirements shall also be the responsibility of the W-5 Facilities Manager. Inspections shall include documentation of observations and maintenance or repairs of each of the drainage system facilities. This would include:

- Landscape areas
- Parking areas
- Catch basins
- Cleanouts
- Conveyance pipes
- Treatment devices
- Detention elements

Operations and Maintenance Contact

W-5 – Facilities Manager

Mac Martin
206.399.6676
macmartinis@gmail.com

III. GENERAL MAINTENANCE ACTIVITIES

Maintenance of stormwater system components is the key to a successful stormwater plan. Most stormwater systems can fail in the first few years due to lack of adequate maintenance. The following guidelines will be used for general maintenance of the stormwater system.

1. Dry sweeping of the parking area to reduce accumulation of sediments and debris in the catch basins will be conducted regularly. Clogging the catch basin with sediments will result in its failure.

2. Quarterly visual inspection of the catch basins for debris and obstructions. All catch basins or other structures shall be kept clear of sediment, debris or other obstructions that may affect the flow or treatment of stormwater.

3. Visually inspect the rain gardens after all major storm events for evidence of system problems. Look for ponded water, debris, erosion, or any other signs of system problems.

4. Annually inspect the spill kit to ensure all supplies are available and have not deteriorated or expired (Note: each tenant shall have a separate spill kit or access to a shared spill kit). Check with city staff to stay aware of newly available products or spill containment procedures. Become familiar with the spill control plan (included with this O&M Plan) and ensure that at least one employee during each work shift is familiar with the plan (always have someone on-site who is aware of the spill containment kit and procedures).

5. Biannually or quarterly inspect the catch basin sumps. Sediments need to be removed along with any oils before the deposits reach one foot in depth and before the outlet is obstructed. Materials removed from the catch basin inlet shall be disposed of in accordance with applicable state law. Records of debris disposal shall be kept on file at the main office in accordance with the state law and shall be available for review by regulating agencies.

IV. SITE PLAN SHOWING LOCATION OF FACILITY COMPONENTS

The attached O&M Facility Map shows the general location of the facility components. The site utility “As-built” drawings should be consulted for further information regarding facility locations, sizes or details.

V. INSPECTION PROGRAM – PERFORMANCE MEASURES FOR MAINTENANCE ACTIVITIES

Objective

The objective of this manual is to help the property owner to maintain the storm sewer system for W-5 so it can continue to operate as designed.

Requirements

Conduct inspections with the as-built plans in hand. Inspect the facility on a quarterly basis for the first 3 years from construction, and a minimum or semi-annually thereafter. Additional inspections will be necessary after long dry periods, large storms or spills. Immediately remove spilled material, taking the appropriate safety and disposal precautions.

Keep inspection records to track the progressive development of the system over time. The inspection records shall include:

1. Sediment condition and depth in sumps
2. Water elevation/observations (sheen, smell, etc.)
3. Conditions of the inlet and outlet pipes, and remaining storage capacity
4. Unscheduled maintenance needs
5. Components that do not meet performance criteria and require immediate maintenance
6. Common problem areas, solutions, and general observations
7. Aesthetic conditions

Collection System

The collection system consists of underground pipes and catch basins.

Catch Basins

The catch basins are metal basins with steel grates. The catch basins have a trapped outlet and sump and need to be inspected and maintained (if necessary) on a quarterly basis and following major storm events. Maintenance includes inspection of the structure itself and removal of any oils, debris or sediment as described in the maintenance table. Check to see if sediment has built up on the bottom of the catch basin by measuring down from the outlet pipe. If it is less than 12-inches then the catch basin needs to be cleaned out.

Storm Sewer Pipes

The storm sewer pipes are plastic with associated fittings. The pipes need to be inspected and cleaned quarterly (if necessary) following major storm events. Cleanouts and manholes are provided for access to the pipe system. The pipes need to be inspected for sediment buildup and cleaned out, if necessary, using a vactor truck so that sediment is removed.

Rain Gardens

Refer to attached City of Wilsonville 2012 Manual for the Operation & Maintenance of Privately Owned Stormwater Facilities.

Maintenance Schedule

Summer: Make structural repairs; clean gutters and downspouts; remove any build-up of weeds or organic debris.

Fall: Replant exposed soil and replace dead plants. Remove sediment and plant debris.

Winter: Clear gutters and downspouts.

Spring: Remove sediment and plant debris. Replant exposed soil and replace dead plants.

All season: Weed as necessary.

Maintenance Record

All facility operators are required to keep an inspection and maintenance log. Record date, description, and contractor (if applicable) for all repairs, landscape maintenance, and facility cleanout activities. Keep work orders and invoices on file and make available upon request of the City inspector.

Access

Maintain ingress/egress per design standards.

Vector (Mosquitoes and Rats)

Facilities must not harbor mosquito larvae or rodents. Record the time/date, weather, and site conditions when vector activity is observed. Record when vector abatement started and ended.

VI. O&M INSPECTION SCHEDULE

- Quarterly inspection of the catch basins and drainage system for accumulation of sediments or oils
- Annual inspection of the emergency spill kit to ensure that all supplies are available and have not deteriorated or expired
- Quarterly inspection of the swale for proper landscape maintenance, removal of trash or sediment and repair of erosion
- Materials removed from the catch basin or pipes shall be disposed of in accordance with state law

Employee and Public Education

Employees will be trained upon hiring and thereafter annually, when new requirements are published or when there are any changes to the system equipment. Employee training will include:

- Reading this Stormwater Management Plan
- Familiarity of all components and locations for materials indicated in the SWMP
- Spill response and Personal Protective Equipment (PPE)
- Documentation requirements

VII. MAINTENANCE EQUIPMENT

Hand tools or other specialized equipment may be necessary to maintain the facilities. Suggested maintenance equipment is listed in the Inspection Checklist. The Facility Manager shall be responsible to maintain on-site, or be able to make available, all required equipment.

Suggested Maintenance Equipment and Materials

- Push broom
- Rake
- Shovel
- Spill kit
- Manhole lid puller
- General landscape tools (weed cutters, pruning clippers, leak rake, etc.)
- Vactor Truck

VIII. SEDIMENT STORAGE, TESTING, AND DISPOSAL

Maintenance of the storm drainage facilities (manholes and catch basins) may include removal of oils, sediments or debris that requires specialized testing or disposal. All removed oils, sediments or other debris shall be disposed of in accordance with applicable regulations. The Facility Manager shall be responsible to retain a qualified company to dispose of this material or otherwise comply with the applicable regulations. The Facility Manager should contact the City of Wilsonville Public Works to verify current regulations or requirements. Local companies providing testing, storage and disposal services:

Clearwater Environmental Services in Wilsonville: (503) 582-1951
River City Environmental in Portland: (503) 252-6144
Bravo Environmental in NW Portland: (503) 261-9800

IX. EMERGENCY CONTACTS

Emergency Contacts

Mac Martin
206.399.6676
macmartinis@gmail.com

Maintenance Responsibilities

The Facility Manager shall be responsible to inspect, maintain or otherwise repair the stormwater facilities. Regular inspections shall occur, and documentation of the inspections, maintenance or repairs kept on-site for a minimum of three years from the date of the activity.

X. SPILL PREVENTION AND CONTROL PLAN

Spill prevention is an important factor in the successful operation of a stormwater management system. All employees will be trained to this plan so that they are certain of the location of materials, who to notify in case of a spill, and how to initially contain the spill of hazardous materials. Employees shall never dump water materials into the stormwater collection/treatment system. Employees shall be observant of other potential contamination occurrences. All employees will review the following page regarding detailed spill response steps.

This data will be posted in an accessible area.

WHAT TO DO IN CASE OF A SPILL

1. The spill kit is located at the stand up shelter near the site entry
2. Get the spill kit (and spill kit instructions when provided)
    a. If possible, determine visually what type of fluids have been spilled
    b. Put on gloves and glasses or any other necessary Personal Protective Equipment (PPE)
    c. Get the absorbent material provided in the kit and drain block cover (pig)
    d. Place the absorbent material in the path of the spill
    e. Remove any debris from the vicinity of the catch basin inlets in the parking lot
    f. Unroll the drain blocker, and place is snugly over the catch basin inlet
    g. Verify the cover has full contact with the rim of the catch basin inlet
    h. Use snakes, pillow or pigs to completely contain the areas
    i. If the spill cannot be contained locally, shut off the storm drain pumps so any spilled material does not leave the site
3. Notify the following personnel immediately:

City of Wilsonville Public Works:	(503) 682-4092
After Hours:	(866) 252-3614
Department of Environmental Quality:	(800) 452-0311
	(800) 452-4011
	(503) 229-5263

Note: Only dry cleanup methods may be employed to clean up spills (i.e. no use of water to wash spilled materials from pavement will be conducted).

XI. ADDITIONAL MAINTENANCE REQUIREMENTS FOR INITIAL ESTABLISHMENT PERIOD

Initial maintenance of landscape vegetation may require additional attention to ensure that landscaping, groundcover and erosion control measures are established or maintained as intended. Proper landscaping and groundcover are an important feature of a successful storm drainage system.

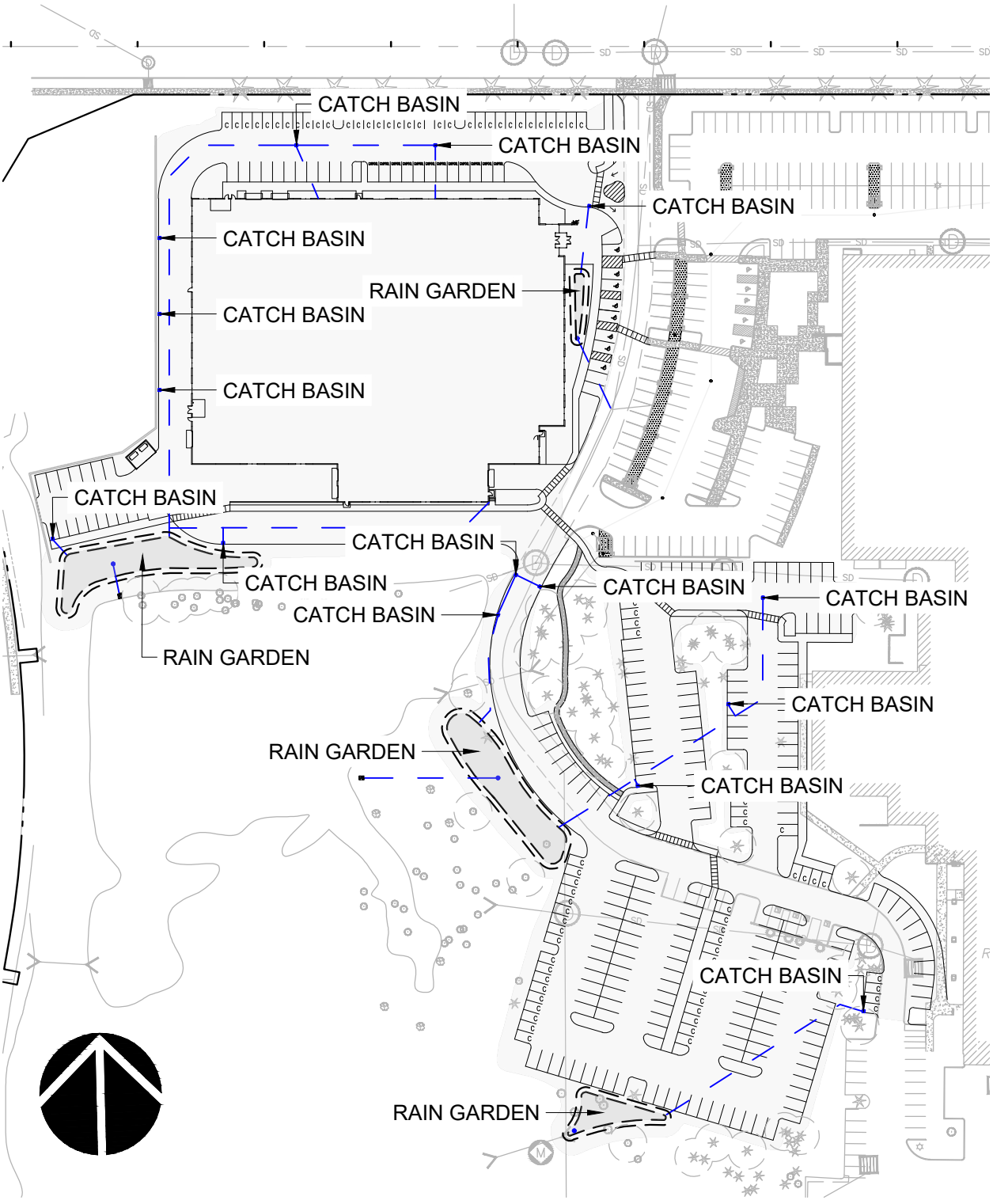
1. During the initial 3-year establishment period, remove undesired vegetation using minimal (or preferably no) use of toxic herbicides and pesticides at least 3 times a year. Replace plants that die during this period.

2. Irrigate as necessary to establish site landscaping

3. Replenish mulch at least annually. Make sure that all exposed soil is covered with mulch or other groundcover

4. Do not use excessive fertilizers, herbicides or pesticides for vegetation maintenance

5. Use replacement plants that conform to the initial planting list



MARTIN DEVELOPMENT
W-5
12/2/2021 © 2021 | Mackenzie |

O&M FACILITY MAP
2210115.00

WILSONVILLE
OREGON

City of Wilsonville
Annual Stormwater Facility Inspection and Maintenance Report

Name of Development:
Location/Site Address:
Contact Name:
Telephone:
Email:
Mailing Address (if different from Site Address):

Facilities to be Maintained:

	Catch Basin(s)		
	Pretreatment Manhole(s)		
____	Flow Control Manhole(s)		
____	Detention Pond(s)	# of inlets	
____		# of outlets	
____	Rain Garden(s)	# of inlets	
____		#of outlets	____
	Stormwater Planter(s)	# of inlets	____
____		# of outlets	____
	Vegetated Swale(s)	# of inlets	____
____		# of outlets	____
	All Other Facilities as Described on Plans:		____
____			____
			____

Inspection Date:
Describe Inspection, Maintenance, Repair, or Replanting Activities (attach invoices for work performed)**:**

Owner or Representative Signature Date

CITY OF WILSONVILLE • COMMUNITY DEVELOPMENT
Phone 503-682-4960
Fax 503-682-7025
29799 SW Town Center Loop East
Wilsonville, OR 97070
www.ci.wilsonville.or.us
info@ci.wilsonville.or.us

The Owner(s) or Owner's designee shall be responsible for annually conducting inspections and performing maintenance on the above stormwater management facilities annually, in conformance with Section 301.13.00, "Operation and Maintenance Requirements," of the City of Wilsonville Public Works Standards. This requirement pertains to all Stormwater Facilities, including but not limited to: catch basins, pipes, treatment manholes, manholes, trash racks, vegetated swales, and detention ponds.

<u>For vegetated stormwater facilities, particular attention will be given to:</u>

- Examine inlets, outlets, and curb cuts for sediment buildup. Remove sediment as necessary to maintain flow into and out of facility.
- Inspect facility for erosion, gullies, and slope slippage. Repair if present.
- Check for evidence of ponding or slow draining soil media. If necessary, remove and clean or replace the clogged soil media.
- Remove weeds manually.
- Ensure that all plants are healthy. Replace all dead or dying plants with approved plantings.
- Remove trash and excess debris.
- Ensure overflow covers are in place.

<u>For structural facilities and components, particular attention will be given to:</u>

- Remove sediment at least once a year or when basin is half full of sediment.
- Remove trash, oils, and debris.
- Ensure facility is structurally sound by repairing or replacing cracked, loose, askew, or damaged pipes.
- Access covers, trash racks, and metal grates shall be kept free of trash and debris, closed, and in good working order.
- Maintain filter cartridges and other proprietary systems according to manufacturer's recommendations.

Spring	Summer	Fall	Winter
Remove sediment Remove trash Remove weeds Fix erosion **Plant** **Prune grasses** Check irrigation	Remove sediment Remove trash Remove weeds Fix erosion Check irrigation Water plants **Structural repairs**	Remove sediment Remove trash Remove weeds Fix erosion **Plant** Drain irrigation **Structural repairs**	Remove sediment Remove trash Fix erosion **Prune trees & shrubs**

City of Wilsonville

A Manual for the Operation & Maintenance of Privately Owned Stormwater Facilities

March 2012

Working together...

towards a common goal...

clean waters and healthy rivers.

City of Wilsonville
Natural Resources Program
(503) 682-4960
www.ci.wilsonville.or.us

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CARING FOR YOUR STORMWATER FACILITY

THANK YOU

As the owner of a stormwater management facility, you are making a meaningful contribution to the health of Wilsonville's streams, wetlands and the Willamette River. This handbook will help you maintain your facility to make sure it performs the work it is designed to accomplish.

WHAT ARE STORMWATER FACILITIES?

Stormwater facilities are any combination of landscape and structural features that slow, filter, or infiltrate (absorb) runoff on your property after a rainfall. Types of facilities include vegetated systems (planters, swales, ponds, created wetlands, etc.), and structural systems (ecoroofs, porous pavement and manufactured facilities). Piping, inlets and catch basins are also important components that need adequate maintenance to assure facility function. All of these serve a common purpose: controlling the quality and quantity of stormwater runoff from your site to help safeguard our valuable water resources.

PROPERTY OWNER RESPONSIBILITIES

Federal, state and local agencies created management regulations and guidelines so as to improve stormwater quality and protect watersheds, rivers, streams and drinking water resources. The City of Wilsonville has a Stormwater Maintenance and Access Easement that includes the following requirements:

- Annual maintenance on storm drainage facilities in conformance with City of Wilsonville's Public Works Standards. For more information go to: www.ci.wilsonville.or.us/Index.aspx?page=127 Go to Important Links at the bottom of the page and click on Public Works Construction Standards 2006 (section 301.6.00 Operations and Maintenance Req.)
- Removal of debris, leaves and sediment from manholes, detention outlet structures, and catch basins.
- Disposal of all oils, sediment and debris in an approved dumpsite.
- Replacement of all dead or dying plants in ponds and swales. Maintenance of original plantings.
- Removal of trash from ditches, swales, catch basins, or any stormwater conveyance.

The steps we take today will greatly influence Wilsonville's environmental health and quality of life for years to come. Individual actions can make a big difference. Thank you for the significant part you and your stormwater management facility are playing.

* For information or questions about your facility, call the Natural Resources Program at (503) 682-4960

YOUR CONNECTION TO WILSONVILLE'S STREAMS AND THE WILLAMETTE RIVER

THE PROBLEM WITH STORMWATER RUNOFF

When it rains, the stormwater runs off impervious surfaces (such as roofs and paved areas) instead of soaking into the ground.

Conventional stormwater management directs runoff into drains and pipes that carry it offsite and eventually discharge it into a local stream. This approach has a number of harmful effects:

- Impervious areas generate large volumes of runoff relatively quickly. The increased volume and speed of the runoff can cause flooding and erosion and damage natural habitat.
- The runoff picks up a variety of pollutants including oil, pesticides, metals, chemicals, and sediment that negatively impact water quality and fish habitat.
- During warm weather, the runoff absorbs heat from impervious surfaces. This increases the temperature of the receiving waters, with negative impacts on fish and other aquatic life.
- Less water is able to infiltrate into the ground. This reduces groundwater recharge, which reduces summer flows in streams.

For information on the City's stormwater permitting requirements please visit:

www.ci.wilsonville.or.us/Index.aspx?page=693

A BETTER WAY TO FLOW

The City of Wilsonville is actively pursuing a variety of measures to reduce stormwater impacts. One important approach is to manage stormwater on the property where it originates. This is commonly referred to as Low Impact Development. It includes the use of vegetated swales, pervious concrete, rain gardens, eco-roofs, etc. Onsite stormwater management uses processes that mimic nature. Onsite facilities allow runoff to soak into the ground, help filter out pollutants, and slow the flow rate of runoff leaving your site. This significantly reduces the volume and pollution levels in stormwater leaving your property and ending up in local streams and the Willamette River.

WHAT ELSE IS THE CITY DOING?

Onsite management, through the use of Low Impact Development, is just one component of a comprehensive citywide program to limit stormwater runoff impacts. Here are some other steps the City is taking:

- The City requires onsite stormwater management for new construction and redevelopment on public and private property.
- Adhering to and updating the procedures outlined in the Stormwater Master Plan.
- Natural areas, especially riparian areas adjacent to rivers and streams, help filter out pollution, control erosion, and provide shade, food, and habitat for fish and wildlife. The City uses a variety of measures to preserve these critical areas including development and land use zoning requirements and enhancement and restoration efforts.
- In partnership with numerous other organizations, the City provides education and technical assistance aimed at reducing stormwater impacts and promoting watershed health.

INSPECTING AND MAINTAINING YOUR FACILITY

PROTECTING YOUR RESOURCES

It is essential to maintain your facility so it functions as intended and limits off-site environmental impacts. You are required to inspect your facility at a minimum of once a year to determine maintenance needs. Routine inspection and maintenance can help keep overall maintenance costs low by detecting problems early and avoiding large repair or replacement costs. This section identifies general guidelines on what to look for and how to maintain your facility. It also notes non-routine maintenance that may require professional assistance. **If you are unsure of what type of facility you have, call the City of Wilsonville's Natural Resources Program at (503) 682-4960.**

LEGAL REQUIREMENTS: OPERATIONS AND MAINTENANCE PLAN

As a property owner, you are legally required to follow all of the maintenance tasks and schedules outlined in your recorded maintenance and access easement. An Annual Inspection and Maintenance Report must be submitted to the City of Wilsonville no later than May 1 each year (see sample form on page 7). Pictures included with the report are very helpful. Include copies of invoices of work performed by contractors. While inspecting your facility, please keep in mind that it will be necessary for you to refer to your landscape plan in order to maintain your facility as it was originally designed.

INSPECTION SCHEDULE: HOW OFTEN

It is recommended that you inspect your facility at least::

- Quarterly for the first two years
- Once a year there after, and
- Within 48 hours of major rainfall events (more than one inch of rain over a 24-hour period).

SAMPLE REPORTING FORM

Stormwater Annual Inspection and Maintenance Report

- The owner(s) or owner's designee shall be responsible for having inspections conducted and maintenance performed on the above private stormwater facilities annually, in conformance with Section 301.6.00, "Operation and Maintenance," of the City of Wilsonville Public Works Standards. All oils, sediment and debris will be removed and deposited in an approved waste disposal site. Any damaged equipment will be repaired promptly.
- Particular attention will be given to sedimentation and pollution control manholes, and stormwater facility inlet and outlet structures. All debris shall be removed to assure proper functioning.
- The grates of all catch basins shall be kept free of debris and leaves.
- The stormwater facility outlet structure(s) shall be checked to assure that sediment accumulation has not encroached on the required stormwater facility volume. Sediment shall be removed as necessary to maintain that required volume.
- The outlet control manhole shall be inspected to assure that all parts are intact and the orifice is free of any debris that could cause malfunction.
- Inspect all stormwater facilities for survival and viability of plantings. Replace all dead or dying plants with in-kind plantings, and remove sediments and debris. **Maintain all original landscaping in swales, ponds, etc.**
- This includes all stormwater facilities including but not limited to: catch basins, pipes, treatment manholes, manholes, trash racks, and structural controls.

The above inspection and maintenance activities shall be documented annually by sending a signed original letter format report of what was completed to the City of Wilsonville at the mailing address below. **The Annual Inspection and Maintenance Report must be submitted no later than May 1 each year.**

City of Wilsonville
Stormwater Management Coordinator
29799 SW Town Center Loop
Wilsonville, OR 97070
(Stormwater Facilities Maintenance Plan Exhibit B Stormwater Maintenance and Access Easement)

_____
Name of Development

Contact _____
Telephone _____
Mailing Address _____

Location
Tax Lot _____
Street Address _____

Facilities to be maintained
_____ Trapped catch basin(s) (number of each)
_____ Pollution control manhole(s) (number of each)
_____ Outlet control manhole(s) (number of each)
_____ Detention pond(s); ____ tank(s) (number of each)
_____ WQ pond(s) swales; ____ MH(s); ____ vault(s); ____
All other facilities as described on plans _____

Inspection Date _____

Describe inspection, maintenance, repair or replanting _____

_____

_____

_____

_____

_____

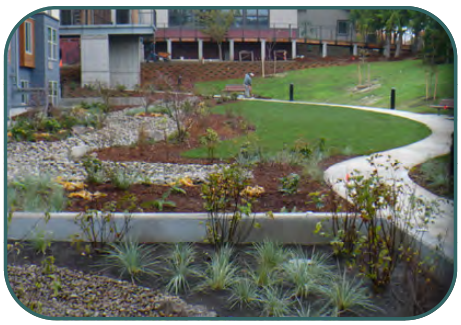
(Attach invoices for work performed) (Continue above on additional sheet if needed)

Owner, Owners or their Representative Signature _____

Date _____

SEDIMENT REMOVAL AND DISPOSAL

FACILITIES AND SYSTEM COMPONENTS THIS APPLIES TO



Vegetated Facilities: ecoroofs, infiltration basins, planters, ponds, swales, trees, vegetated filters, and created wetlands.

Structural Facilities: catch basins, curb cuts, inlets, manufactured facilities, piping, sedimentation manholes, and vaults.

Pervious Pavement: porous concrete or asphalt, permeable pavers.

IMPACT ON FACILITY PERFORMANCE

The purpose of a stormwater treatment facility is to remove pollutants, including suspended solids, by capturing sediment. Sediment can include dirt, leaves, and litter. These materials can restrict or clog the facility. Timely removal of sediment will improve infiltration rates, water quality, and help prevent clogging and flooding.

WHAT TO LOOK FOR

Check the depth of accumulated sediments. Sediment markers can be placed in the facility to help identify depths. Remove sediment when:

Vegetated Facilities:

- Sediment is 4" deep,
- Sediment depth is damaging or killing vegetation, or
- Sediment is preventing the facility from draining within a 24-48 hour period.

Structural Facilities:

- At least once a year, or
- When the basin is half full of sediment.

Pervious Pavement:

- Sediment is preventing the facility from draining in 24 hours.

WHAT TO DO

Often sediment can be removed by hand. Large facilities and underground facilities will need to be cleaned with heavy equipment by trained professionals.

- Remove sediment during dry months when it is easier to remove, weighs less, and creates fewer secondary environmental impacts (such as wet sediment running off the site).

NOTE: It is illegal to hose sediments through your system.

Doing it yourself

Vegetated Facilities:

- Use rakes and shovels to dig out accumulated sediment.
- Avoid damage to existing vegetation.
- If sediment is deep, plants may need to be removed in order to excavate sediment.
- Reseed and mulch disturbed areas to prevent erosion.
- Excavate sand or gravel and clean or replace.

Doing it yourself (continued)

Structural Facilities, Dispersion Trenches and Pervious Pavement:

- Catch Basins: Clean debris off the grate and bars. Lift the grate and use a bucket to remove water and a shovel to dig out sediment.
- Curb cuts, piping and other conveyance facilities: Use a shovel, router, air hose or other dry method to clear sediment and debris.
- Dispersion Trenches: Excavate sand or gravel and clean or replace.
- Pervious Pavement: Remove accumulated sediment from the surface with a dry broom, vacuum system, or other hand tools.

Hiring Professionals

Cleaning certain facilities will require professional assistance.

- Underground facilities such as manholes, and manufactured facilities must be cleaned by a vactor truck. Do not enter these facilities. They are defined by the Oregon Occupational Safety and Health Division as confined spaces and require proper certification to enter.
- Certain components such as collection basins, piping or pervious pavement systems may require vacuuming with a vactor truck or street sweeping equipment.

DISPOSAL

When deciding how to dispose of sediment, you need to consider the types of activities and pollutants on site. Sediment from commercial or industrial sites is usually not considered hazardous waste. However, as the generator of this waste you are responsible for deciding how to properly manage the removed solids.

Contaminated Water and Sediment

Catch basins and stormwater facilities in areas used for chemical or hazardous waste storage, material handling or equipment maintenance may collect the chemicals used in these activities from spills or via stormwater runoff. If you observe an oily sheen, odors, discoloration, or other signs of pollution, hire a professional laboratory or sampling firm to assess whether the material needs specialized hauling, treatment or disposal to comply with Oregon State Department of Environmental Quality (DEQ) rules. If you need assistance deciding whether the solids should be managed as hazardous waste, contact DEQ.

Non-Contaminated Water and Sediment

If the pollutant load is non-hazardous, water may be spread across vegetation onsite. Let the solids dry out, then properly dispose of them. Temporary erosion control measures may be needed to contain the material onsite. Dry materials may be reused elsewhere on your site, may be eligible for reuse by others, or can be disposed of at a designated solid waste facility.

REDUCING SEDIMENT ACCUMULATION AND POLLUTION IN YOUR FACILITY

- Minimize outside sources of sediment, such as eroding soil upstream of your facility.
- Sweep paved areas on your property regularly.
- Make sure chemical and waste storage areas are not exposed to rainfall and stormwater runoff.
- Don't let water from washing vehicles or equipment drain to your stormwater facility.

RESOURCES

City of Wilsonville Public Works Standards: www.ci.wilsonville.or.us/Index.aspx?page=127
Go to *Important Links* at the bottom of the page and click on *Public Works Construction Standards 2006* (section 301.6.00 Operations and Maintenance Req.)

Environmental Protection Agency: www.cfpub.epa.gov/npdes/home.cfm?program_id=6

Department of Environmental Quality: www.oregon.gov/DEQ

Private Maintenance Companies (listed below are just a few examples of companies that provide maintenance services, more companies are available)

- Clearwater Environmental Services in Wilsonville (503) 582-1951
- River City Environmental in Portland (503) 252-6144
- Bravo Environmental NW in Portland (503) 261-9800

Stormwater runoff has substantial impacts on the water quality and habitat that fish depend on. By reducing those impacts, we are taking direct action on behalf of threatened species as well as other fish and wildlife that are under stress.

VEGETATION MANAGEMENT

FACILITIES THIS APPLIES TO

Vegetated Facilities: ecoroofs, infiltration basins, planters, ponds, swales, trees, vegetated filters, and created wetlands.

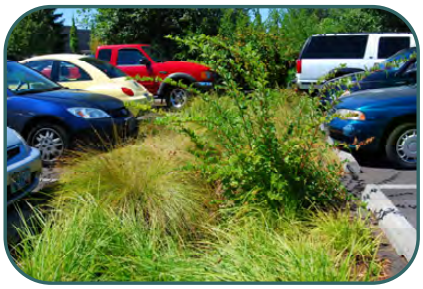
IMPORTANCE TO FACILITY PERFORMANCE

Plants play an important role in stormwater facilities. They absorb water, improve infiltration rates of soil, prevent erosion by stabilizing soil, cool water, and capture pollutants. Plants create habitat for birds and other wildlife and provide aesthetic value to a property. Proper maintenance of vegetation improves the appearance and performance of your facility. Your facility must be kept in accordance with the original landscape design.

WHAT TO LOOK FOR

When identifying maintenance needs it is helpful to have a copy of your landscape plan, this shows the plants you are required to have in your facility. Facilities should be checked for maintenance needs quarterly for the first two years and once a year after that.

Facility needs maintenance when:



- Areas of soil are bare.
- Vegetation is buried by sediment.
- Vegetation appears unhealthy or has died.
- Nuisance and invasive plants are present.
- Vegetation is compromising the facility's structure by blocking inlets or outlets, or roots are intruding into a component of the facility.
- Dropped leaves and other debris are contributing to sediment accumulation or are blocking inlets or outlets.

WHAT TO DO

Maintenance activities can easily be incorporated into existing site landscape maintenance contracts. Vegetation can be maintained with a formal or more natural appearance depending on your preference.

General Maintenance

- Remove dropped leaves, dead plants, and grass and other plant clippings. Plant debris adds nutrient pollution as it breaks down, and can clog facility piping and reduce infiltration.
- Avoid using fertilizers, herbicides, or pesticides in the facility. These products add to the pollution problems the facilities are designed to remedy.
- Use mulch to inhibit weed growth, retain moisture, and add nutrients. Replenish when needed. Ensure mulch does not inhibit water flow.
- Irrigate all new plantings as needed for the first two years.

Caring for wanted vegetation

Facility owners are responsible for maintaining healthy vegetation and must replace any plants that have died or been removed.

- You are required to maintain vegetation to the density approved on your landscape plans or specified in the City's Public Works Standards.
- Replant with vegetation approved for use in the original planting plan or from the recommended plant list in the City's Public Works Standards.

Caring for wanted vegetation (continued)

- Plant in late fall or early spring so plant roots can establish during the cool, rainy seasons, before summer.
- Amend and aerate compacted soils before replanting by adding compost to increase nutrients and enhance soil texture.
- If plants are not surviving, determine the reason for the plant die-off. Survivability may be improved by planting vegetation better suited for the site conditions or by irrigating more. You may need to test planting bed soils for pH, moisture, and other factors such as nutrient levels, soil structure, and organic matter content.

Mowing

- Grassy facilities are designed for routine mowing. Mow at least twice a year.
- Grass should be mowed to keep it 4" to 9" tall. Grass that is at least 4" tall captures more pollutants and is hardier. Do not allow grass to become a fire hazard.

Nuisance and unwanted vegetation

- Remove nuisance and invasive vegetation, such as Himalayan blackberry, English ivy and reed canarygrass, before it goes to seed in the spring. Do additional weeding in the fall. A list of nuisance plants can be found in the Portland Plant List (see below).
- Immediately remove vegetation that is clogging or impeding flow into the facility.
- Remove potentially large and deep-rooted trees or bushes when they might impede the flow path or compromise facility structures.
- Provide ground cover on any dirt exposed by vegetation removal.

Wildlife

Vegetated facilities create habitat, especially for birds. The Migratory Bird Treaty Act protects all native bird species. Birds and other animals will generally adjust to human activity. However, there are simple measures that should be taken to avoid disturbance:

- Avoid maintenance during bird nesting season from early March to late July. Prune and mow during late summer. Many baby birds will spend some time on the ground after leaving a nest.
- Walk the site before you do maintenance. Look for nests, burrows and animals in the facility. Reroute around animal areas by at least a few yards.

RESOURCES

Clackamas County Resources:

Clackamas County Soil and Water Conservation District: www.conservationdistrict.org

Plant Identification:

Native Plant Society: www.npsoregon.org

Master Gardeners: www.extension.oregonstate.edu/mg

Native Plant Nurseries:

Native Plant Nursery: www.plantnative.org

EROSION, BANK FAILURE, CHANNEL FORMATION

FACILITIES THIS APPLIES TO

Vegetated Facilities: ecoroofs, infiltration basins, planters, ponds, swales, trees, vegetated filters, and created wetlands.

IMPORTANCE TO FACILITY PERFORMANCE

Stormwater flowing through a facility can cause erosion. Erosion can increase sediment build up, clog outlets, reduce water quality benefits, add to pollution and cause facility components to fail. Eroded channels create an easy path for water to travel down reducing the ability of the facility to filter pollutants and infiltrate water.

WHAT TO LOOK FOR

Any area with erosion more than two inches deep needs maintenance. Signs of erosion and common locations:

- The formation of flow restricting channels in the bottom of the facility, around inlet pipes and curb cuts, or at overflows.
- Undercutting, scouring, and slumping along banks or berms.
- Channels and undercutting through check dams. (check dams are small berms built across a facility to slow water and create small areas of ponding).

WHAT TO DO

- Fill the eroded area with soil, compact it lightly, and cover with mulch, compost, seed, sod, or other erosion prevention materials.
- Plant banks with deep or heavily rooted plants to permanently stabilize soil.
- Install or repair structures designed to dissipate energy and spread flow, such as splash blocks on downspouts, or riprap around inlet pipes and curb cuts. See the City's Public Works Standards for requirements.
- If erosion continues to be a problem, consult a professional to determine the cause and a solution.
- Replant in accordance with the landscape plan.

STRUCTURAL DEFICIENCIES

FACILITIES THIS APPLIES TO

Most stormwater facilities have some structural components. Some facilities such as vaults, drywells, and sediment manholes are completely structural. In vegetated facilities, structural components often control how water enters, travels through, or exits a facility. Common structural components include:

- Inflow and outflow pipes, curb cuts, and trenches.
- Valves, orifices, trash racks, and pipes.
- Concrete, metal, and plastic structures and components such as curbs, retaining walls, and manholes.
- Manufactured devices such as filter cartridges.
- Earthworks such as embankments, check dams, dikes, berms and side slopes.
- Riprap and other flow spreading elements.
- Access roads, gates and signs.

IMPORTANCE TO FACILITY PERFORMANCE

These elements need to be in good working order to route flows into a facility and for the facility to function properly.

WHAT TO LOOK FOR

Look at the general condition of these elements. Do they need repair or replacement? Are they still properly aligned? Look for:

- cracks, scratches, dents, rust, or other conditions of wear.
- loose fittings, broken or missing components.
- insufficient oil/grease for moving parts.
- appropriate gravel cover or bedding to support the structures.
- misaligned parts or other impediments to the component's ability to still pass flow.

MAINTENANCE

- Immediately repair or replace any major damage to prevent catastrophic failure. This includes any structural component that is cracked, loose or askew. You may need to consult a professional engineer or hire a trained contractor to design and perform any repairs. Refer to page 10 for a list of resources.
- Minor damage such as dents, or rust spots may not need immediate replacement but should be monitored.
- Maintain access to the facility by keeping the access route open and structurally sound, fence gates and vault lids oiled and locks functioning. Access must be available in an emergency.

PONDING WATER

FACILITIES THIS APPLIES TO

Vegetated Facilities: dry ponds, infiltration basins, planters, rain gardens, sand filters, swales, created wetlands, and vegetated filter strips.

Structural Facilities: manufactured facilities and pervious pavement.

NOTE: Some facilities are specifically designed to always hold water such as: wet ponds, spill control manholes, and sedimentation manholes.

IMPORTANCE TO FACILITY PERFORMANCE

Most facilities are designed to drain in a certain amount of time. This varies from 2 to 48 hours depending on the type of facility. This time is stated in the Operations and Maintenance plan for the type of facility. Ponding water is usually a sign that the facility's outlet is clogged or it is not infiltrating properly.

WHAT TO LOOK FOR

- clogging of overflows or outlets with debris, trash or other obstructions.
- fine sediments filtering into the soil or other filtration media (like sand or gravel) that can prevent proper infiltration.
- water that has remained ponded for more than 48 hours.

MAINTENANCE

- For surface facilities, first try raking the top few inches of soil to break up clogged sections and restore water flow.
- Clean out overflows and outlets with hand tools, if possible. Difficult or hard to access blockages may require a professional contractor.
- Identify sources of sediment and debris to prevent them from entering the facility. Simple actions like sweeping a parking lot regularly can keep sediment out of facilities.
- Make sure the facility has enough vegetation. Vegetation absorbs water and roots help keep soil loose so it can infiltrate water.

For more thorough instructions on removing sediment, see the "Sediment Removal and Disposal" section of this handbook. Sediment accumulated in stormwater facilities may be considered hazardous waste and must be handled and disposed of properly.

If ponding still occurs, contact a landscape architect, professional engineer or trained contractor for more assistance.

PESTS

Nutria photo by NDomer

FACILITIES THIS APPLIES TO

All types of stormwater facilities

IMPORTANCE TO FACILITY PERFORMANCE

Mosquitoes can breed in ponded or other stagnant water. Vegetated areas can be attractive habitat for rats, nutria, beaver, and a variety of birds and amphibians. While some species are desirable, others can be public health or nuisance concerns. In particular, mosquitoes and rats can breed quickly and cause a public health hazard if not removed. The presence of pests does not necessarily impact the ability of your facility to treat and manage stormwater but may indicate maintenance needs, such as lack of proper infiltration.

WHAT TO LOOK FOR

- Check for mosquito larvae in any system with open, slow, or non-moving waters - especially during warmer weather. Larvae look like tiny wiggling sticks floating perpendicular to the water's surface.
- Look for nutria, rat, and other animal droppings year round. Also check for structural indicators such as beaver dams and rodent holes and burrows.

WHAT TO DO

Mosquitos

- The best way to avoid breeding mosquitoes is to prevent ponding water. Mosquitoes need standing water to lay their eggs, and for their larvae and pupae to develop. Most stormwater facilities are designed to drain in at least 48 hours. If your facility is not draining properly see the "Ponding Water" and "Sediment Removal and Disposal" sections of this handbook.
- As a temporary control for mosquitoes, the county or other licensed professionals can apply pesticides to kill mosquito larvae in the water or adult insects in the air.

Rats

Rats need shelter, food and water to survive.

- Remove plant debris that may provide shelter for rats from the facility.
- Remove fruits and nuts that fall to the ground.
- Fill in burrows.
- Trap and remove individual animals.

Other Wildlife Other non-native and invasive animal species may take up residence in your facility. Contact the Oregon Department of Fish and Wildlife (ODFW) to help identify these species and suggest removal processes. Permits from ODFW are required to capture and relocate native wildlife. Some common non-native species are:

- Opossum
- Eastern gray squirrel
- Nutria
- Bullfrog
- Fox squirrel
- Eastern cottontail
- Egyptian goose
- Red-eared slider turtle
- Snapping turtle

PEST RESOURCES

Rats and mosquitoes:

Clackamas County Vector Control (includes Washington County)
www.clackamas.us\vector
(503) 655-8394

Other pest issues:
Look in yellow pages or on the internet under "Pest Control"

Other Wildlife:
Oregon Department of Fish and Wildlife
www.dfw.state.or.us/wildlife/
(503) 947-6000 or (800) 720-6339

POLLUTION YOU CAN SEE OR SMELL

FACILITIES THIS APPLIES TO

All types of stormwater facilities.

IMPORTANCE TO FACILITY PERFORMANCE

Stormwater facilities often collect a variety of trash and debris. Trash and debris, especially floating debris, can clog pipes or treatment media. It can also cause odors through decay or by collecting spilled or dumped materials.

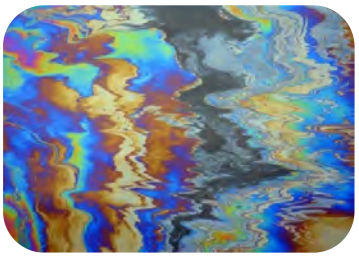
Stormwater facilities are designed to help prevent pollutants from entering rivers and streams. Any visible water quality pollutants may wash out of the facility spreading the pollution problem.

WHAT TO LOOK FOR

- Check monthly for Trash and debris.

Any unusual or unpleasant smells from sources such as:

- Natural plant decay.
- Dying plants trapped under sediment.
- A spill or a leak (e.g., gasoline or sewage).



Visible pollution such as:

- Sheens
- Turbid (cloudy) water
- Discoloration, or
- Other pollutants on the surface of the water.

Pollution You Can See And Smell (continued)

WHAT TO DO

- Regularly remove trash and plant debris.
- Remove accumulated sediment (see "Sediment Removal and Disposal" in this manual).
- Make sure inlets and outlets are not clogged.
- Identify the source of trash, debris or pollutant, such as a spill, leak, or illicit discharge.
- If there is evidence of a spill or leak, contact a professional laboratory or sampling firm to assess whether the material needs specialized removal, treatment, and disposal. Use trained professional staff for any cleanup and remediation.

SAFETY

In addition to keeping the facility in good working order, maintenance should also strive to meet safety and aesthetic goals that benefit the community and protect your site workers. Consider establishing maintenance triggers and practices that respond to the following issues below. Keep in mind the safety of both the employees who maintain your facility and the general public.

WHAT TO LOOK FOR

Site Conditions

Conditions, such as steep slopes, slick surfaces, and vegetation debris, can create a falling hazard to employees and visitors.

Public Safety

Some stormwater facilities, such as ponds and created wetlands, can be "attractive nuisances" attracting undesirable activity, vandalism, or use that could be harmful to public safety. Consider the safety features now in place at your facility.

WHAT TO DO

- Use barrier plantings or fencing to bar entry into the facility area.
- Install road bollards, lighting, and signage to discourage illegal dumping.
- Avoid maintaining facilities in wet weather to reduce the risk of injuries from slipping. Always make sure that appropriate safety gear (e.g., harness, gloves, face shields, safety line) is used.
- For underground facilities, avoid entering anything defined as a confined space. Vaults, deep ponds, manufactured facilities or manholes are examples of confined spaces. These areas require special permits, training and entry techniques. Some can be inspected and cleaned from above without entering. Always use caution when working with underground facilities. You are legally required to meet Oregon Occupational Safety and Health Division (OR-OSHA) requirements for such activities.

RESOURCES

Confined space entry:

OR-OSHA (confined space entry requirements)
www.orosha.org/subjects/confined_spaces.html
(503) 229-5910

PAYING FOR MAINTENANCE

Specific maintenance costs depend on the characteristics of the facility, the site, and the area draining to the facility. The general rule of thumb is that annual maintenance costs will be 5 to 10% of the facility's total capital cost. Routine, scheduled maintenance can help keep overall costs down by addressing problems before they require major attention. Contact your stormwater system manufacturer for information about your system.

FINANCING MAINTENANCE

You need to determine how you will finance your maintenance needs. A facility maintenance fund is recommended for both capital maintenance procedures (e.g., facility replacement and non-routine maintenance, such as sediment removal, facility component repair or replacement, major replanting, or safety structure construction) and operating maintenance procedures (routine activities such as facility inspection, debris removal, and vegetation management). For homeowner associations, this could be a portion of homeowner fees or a specific assessment.

HOW MUCH TO SAVE

- An average 5 to 10% per year of the facility's capital cost for annual routine maintenance.
- A percentage of the non-routine maintenance costs per year (i.e. for sediment removal, vegetation replacement) based on the needed frequency. For example, if the facility is designed to need mechanical sediment removal every five years, 20% of the total cost should be put aside each year.
- An additional 3 to 5% of the facility's capital cost per year for eventual facility replacement (based on the facility's life expectancy). Most of these facilities have a life expectancy of 25 to 50 years.

VEGETATED FACILITIES

- Most required routine maintenance (excluding major repair and replacement) is estimated to have an annual cost of $200 to $600 dollars per acre of facility, above current landscape maintenance costs. Costs can vary depending on the types and level of maintenance practices used.
- The cost and intensity of maintenance activities are usually higher during the two-year plant establishment period. During this time, plants will need additional watering and plants that die will need to be replaced.

WHERE TO GET MORE ASSISTANCE

City of Wilsonville Natural Resources Program
www.ci.wilsonville.or.us/Index.aspx?page=91
(503) 682-4960

City of Wilsonville Public Works Standards:
www.ci.wilsonville.or.us/Index.aspx?page=127 Go to *Important Links* at the bottom of the page and click on *Public Works Construction Standards 2006* (section 301.6.00 Operations and Maintenance Req.)
(503) 682-4092

HIRING CONTRACTORS

Professional maintenance services phone book/internet references:

Vegetation Management:

- "Landscape Contractors"

Sediment Removal and Disposal:

- "Sewage," or
- "Waste Disposal"

Facility Alterations:

- "Landscape Architects" or
- "Engineers - Civil"

Manufactured Facilities:

- Find the specific manufacturer

CONFINED SPACE ENTRY

Oregon Occupational Safety and Health Division (OR-OSHA):
www.orosha.org/subjects/confined_spaces.html
(503) 229-5910

PEST RESOURCES

Rats and mosquitoes:

Clackamas County Vector Control (includes Washington County)
www.clackamas.us\vector
(503) 655-8394

Other pest issues:
Look in yellow pages or on the internet under "Pest Control"

Other Wildlife:
Oregon Department of Fish and Wildlife
www.dfw.state.or.us/wildlife/
(503) 947-6000 or (800) 720-6339

Portland Audubon Wildlife Care Center
Help with injured animals and animal identification questions:
www.audubonportland.org
(503) 292-0304

The Audubon Wildlife Care Center is the oldest and busiest wildlife rehabilitation facility in Oregon. Each year they treat over 3,000 wild animals for release back to the wild and respond to more than 15,000 wildlife related inquiries.

VEGETATION

Clackamas County Resources:

Clackamas County Soil and Water Conservation District:
www.conservationdistrict.org

Plant Identification:

Native Plant Society:
www.npsoregon.org

Master Gardeners:
www.extension.oregonstate.edu/mg

Native Plant Nurseries:

Native Plant Nursery:
www.plantnative.org

City of Wilsonville

29799 SW Town Center Loop E

Phone: 503-682-4960
Fax: 503-682-7025

www.ci.wilsonville.or.us

This brochure was prepared by the City of Wilsonville's Natural Resources Program staff.
March 2012
NOTE: A considerable amount of information was obtained from the City of Portland's Stormwater Management Facilities Operations and Maintenance for Private Property Owners guide.

OTHER WAYS TO PROTECT OUR STREAMS AND THE WILLAMETTE RIVER

In Your Home or Business

- Use nontoxic cleaners.
- Properly dispose of hazardous materials.
- Conserve energy: switch to compact fluorescent bulbs, turn down the heat, do the laundry with cold water, purchase energy-efficient appliances.
- Use water wisely: fix leaks, use low-flow showerheads, use only the water you need.

In Your Yard

- Plant native vegetation.
- Consider planting perennials versus annuals.
- Sweep instead of hose.
- Cover bare soil with mulch or plants.
- Compost yard debris.
- Disconnect downspouts (where appropriate).
- Use drip irrigation.

In and Out of Your Car

- Properly maintain vehicles.
- Wash vehicles where water is recycled.
- Drive less: use transit, bike, walk, or carpool.
- Recycle motor oil.
- Clean up spills or leaks.

In Your Community

- Volunteer for tree planting, cleanup, stream restoration, or invasive plant species removal projects.
- Report spills and illegal dumping (call 503-823-7180).
- Don't litter, and pick up litter when you see it.
- Pick up pet waste and put it in the garbage or toilet.

In Parks and Natural Areas

- Stay on designated hiking trails and biking areas.
- Keep dogs on leashes and away from the streambanks and water. Pick up pet

THANK YOU

for helping keep Wilsonville clean, healthy and sustainable and for stewarding this beautiful place that we all share.

Printed on recycled paper.

APPENDIX C – WEB SOIL SURVEY SOILS MAP

Hydrologic Soil Group—Clackamas County Area, Oregon
(W-5)

Map Scale: 1:2,660 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clackamas County Area, Oregon
Survey Area Data: Version 18, Oct 27, 2021

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

Date(s) aerial images were photographed: Aug 1, 2019—Sep 12, 2019

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1A	Aloha silt loam, 0 to 3 percent slopes	C/D	13.2	48.2%
3	Amity silt loam	C/D	5.7	21.0%
25	Cove silty clay loam	D	2.6	9.4%
91A	Woodburn silt loam, 0 to 3 percent slopes	C	4.3	15.7%
91B	Woodburn silt loam, 3 to 8 percent slopes	C	1.6	5.8%
Totals for Area of Interest			**27.3**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

May 31, 2023

Re: **Submittal #3b - Supplement** (Re: Tree Assessment Updates)
DB22-0004 Boeckman Road Building W5

To: City of Wilsonville
Planning Division – Cindy Luxhoj AICP
29799 SW Town Center Loop East
Wilsonville, OR 97070

From: Bob Wells
Lance Mueller & Associates / Architects
130 Lakeside Ave. S., #250
Seattle, WA 98122

Dear Cindy,

This is in response to your 5/24/23 email request for a table summarizing the existing trees saved versus removed. Attached is revised sheets TR-1 and TR-2, revision 2, dated 5/30/23, which now includes the summary in the lower right of both sheets.

The submitted Tree Assessment Report is specific on condition with recommendations for each individual tree, but lacks a table with the overall summary total. Unfortunately, we could not get guidance in this effort from the arborist, who has closed his office for health reasons and is not available. So, the Architects created the requested summary based upon the arborist's Tree Assessment and the paving/grading plans. We used our judgement to make a few TR-1/TR-2 revisions when appropriate. For example:

1. We removed three trees from the count because the tree table labeled them "no tree". We'll get a more accurate count this way. (This is why the Tree Assessment lists approximately 176 trees, but our TR-1/2 totals list 173).
2. The arborist lists 93 trees retained in his text, but we don't have access to how he arrived at his count. Our TR-1 total lists 101 retained, which is our best estimate based on the arborist's description of the tree and the paving/grading plans.
3. At your request, we identify on the plan the retained "situational" trees that we are hoping to preserve with aeriation (aka, Retain B on table). We add specific language to the table regarding this, which is addition to the Tree Assessment Report.
4. For a few retained trees we revised the designation to receive aeriation when it appeared to have fill over portions of the roots. This seemed prudent for the best outcome.
5. Trees in the wetland or SROZ are not removed, even if they are in very poor condition or labeled "stumps".

The Tree Assessment Report is not revised. Consider the revised drawings TR-1 and TR-2 as updated summaries of the Tree Assessment Report.

Sincerely,

Bob Wells
Lance Mueller & Associates / Architects
130 Lakeside Ave. S., #250
Seattle, WA 98122

S.W. BOECKMAN ROAD
(COUNTY ROAD NO. 80)

S 88°38'30" E 959.86'

N 68°32'52" E 90.43'
N 32°16'22" E 51.31'
N 20°43'43" E 36.47'
S 01°30'55" W 164.06'
S 14°17'31" E 10.01'
N 76°07'33" E 11.19'
S 76°07'00" W 11.35'
N 85°42'56" E 14.00'
S 85°42'11" W 13.99'
S 04°09'13" E 10.00'
N 77°06'45" W 12.44'
N 77°22'57" W 12.46'
S 12°47'45" W 9.95'
88°00'09" E 17.96'
N 01°44'30" E 9.97'
S 88°10'19" E 17.99'
R=803.49'
L=87.80'
S 88°36'17" E 1126.89'

KINSMAN ROAD (UNIMPROVED)
KINSMAN ROAD
L=1342.41', R=858.50'
L=242.79'
R=858.50'
L=582.42', R=803.49'

FOREST AREA (NOT SURVEYED)
WETLAND
PROPOSED 10.00' WIDE PRIVATE SANITARY SEWER EASEMENT FOR THE BENEFIT OF PARCEL 2
VARIABLE WIDTH SLOPE EASEMENT PER FEE NO. 2016-005509
VARIABLE WIDTH SLOPE EASEMENT PER FEE NO. 2006-050622
EDGE OF TREES
6' TALL CHAINLINK FENCE
CONCRETE RETAINING WALL
CONSTRUCTED PARKING LOTS AND UTILITIES AS SHOWN ARE PER ENGINEERS DESIGN AND HAS NOT BEEN SURVEYED
ASPHALT DRIVEWAY
CONCRETE PAD
9600 BOECKMAN RD
EXISTING BUILDING
TAX MAP 3 1W 14B
TAX LOT 202
ASPHALT PARKING LOT
CONCRETE BULKHEAD
RAILROAD
ELECTRIC
OREGON
R=2839.93' L=423.47'
N 01°34'36" E 537.63'

LEGEND
SROZ
WETLAND
WETLAND BUFFER
806 TREE TAG SEE SHEET TR-2
TREE TO BE REMOVED SEE SHEET TR-2

SITE PLAN
1" = 50'-0"

TREE ASSESSMENT TOTALS

	TOTAL TREES – 173 (TREES 6612, 50363 AND 50364 ARE NOT COUNTED, NO TREE ON SITE)
X	TREES TO GET REMOVED – 72 TREES
A	TREES TO BE SAVED WITHOUT AN AERATION SYSTEM – 80
B	TREES TO BE SAVED WITH AN AERATION SYSTEM – 21
	THESE "SITUATIONAL" TREES ARE IDENTIFIED AS LIKELY TO BE RETAINED, AND INSTALLATION OF AN AERATION SYSTEM OVER THE ROOTS, BEFORE FILL IS PLACED, IS PLANNED TO ASSIST WITH LONG-TERM SURVIVAL. THE TREES WILL BE RE-EVALUATED AT THE TIME OF SITE CLEARING TO ASSESS SUITABILITY FOR PRESERVATION AND WILL BE MONITORED DURING CONSTRUCTION TO MINIMIZE ROOT ZONE IMPACTS. IF, AS A RESULT OF CONSTRUCTION, ONE OR MORE OF THE TREES IS DETERMINED TO BE NO LONGER SUSTAINABLE, PER A CONDITION OF APPROVAL, THE APPLICANT MAY SEEK WRITTEN AUTHORIZATION FROM THE CITY FOR REMOVAL AND APPROPRIATE MITIGATION.

no.	revision	date
2	TREE ASSESSMENT SUPPLEMENT	5-30-23
1	SAVE TREES 5000 AND 5043	11-1-22
	SITE DESIGN REVIEW RESUBMITTAL	7-6-22

18003 job no.
EM drawn
BW checked
11-10-22 date

REGISTERED ARCHITECT · JANICE MUELLER · SEATTLE, WA. 1451 · STATE OF OREGON

BUILDING W5
99XX SW Boeckman Rd.
Wilsonville, OR 97070

LANCE MUELLER & ASSOCIATES
ARCHITECTS AIA
130 LAKESIDE • SUITE 250 • SEATTLE, WA 98122 • (206) 325-2553

TREE REMOVAL PLAN

sheet
TR-1

n:\projects\21006 w5\w5-dwg-v19.dwg
5/30/2023

9600 Boeckman Rd Tree Assessment

	Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
	800	48	Ponderosa Pine	100+ x 37	Fair	Moderate & non-correctable defects	Partial lower crown due to crowding with a full upper crown. Co-dominant stems at 70'. Average annual twig growth.	A
	801	17	Ponderosa Pine	60 x 30	Poor	Moderate & non-correctable defects	Partial 1/3 very thin crown due to crowding. Below average annual twig growth. May improve with care.	B
	802	20	Ponderosa Pine	70 x 25	Fair	Moderate & non-correctable defects	Partial 3/4 crown due to crowding. Co-dominant stems at 50'. Average annual twig growth and moderate amount of large to medium deadwood in crown to remove.	A
X	803	22	Ponderosa Pine	15 x 0	DEAD	DEAD	Dead 15' tall stump/snag has bark sloughing off and several holes from woodpeckers. DEAD STUMP, REMOVE.	
	804	12	Ponderosa Pine	50 x 12	Good	Few & minor or correctable defects	Nearly full asymetric crown with average to above average annual twig growth.	A
	805	15	Ponderosa Pine	50 x 15	Fair	Moderate & non-correctable defects	Partial 1/2 crown due to crowding and below average annual twig growth.	B
	806	36	Ponderosa Pine	100+ x 42	Good	Moderate & non-correctable defects	Partial 1/3 crown due to crowding and average annual twig growth.	A
	807	32	Ponderosa Pine	100+ x 30	Fair	Moderate & non-correctable defects	Partial 3/4 crown due to crowding and average annual twig growth.	A
X	808	30	Douglas Fir	100+ x 46	Good	Few & minor or correctable defects	Full crown with good annual twig growth.	
X	809	27	Douglas Fir	100+ x 35	Poor	Moderate & non-correctable defects	Partial 2/3 crown due to crowding. Codominant stems at 30'. Large deadwood in lower crown should be removed if tree is retained. Below average annual twig growth.	
X	810	19	Douglas Fir	100+ x 25	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with below average annual twig growth.	
X	811	34	Douglas Fir	100+ x 40	Fair	Moderate & non-correctable defects	Partial 1/2 crown due to crowding and below average annual twig growth.	
X	812	29	Douglas Fir	90 x 25	Poor	Major defects or problems	Very thin partial crown, top broken out at 90' with very poor annual twig growth.	
	813	22	Douglas Fir	80 x 22	Poor	Major defects or problems	Partial 1/2 crown due to crowding and below average annual twig growth. Top broken out at 80'.	B
	814	11	Douglas Fir	35 x15	Poor	Major defects or problems	Partial very thin 1/8 crown due to crowding. Top 12' to 15' dead with very poor annual twig growth. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	A
	815	24	Ponderosa Pine	100+ x 18	Fair	Moderate & non-correctable defects	Full narrow asymetric crown with broken out top. Below average annual twig growth.	A
	816	17	Ponderosa Pine	90 x 10	Poor	Major defects or problems	Very small, 5% to 8% live crown ratio, with below average annual twig growth.	A
	817	34	Ponderosa Pine	100+ x 25	Good	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with good annual twig growth.	A
	818	25	Ponderosa Pine	100+ x 18	Good	Moderate & non-correctable defects	Partial 7/8 asymetrical crown due to crowding with good annual twig growth.	A
	818 B	20	Douglas Fir	100+ x 30	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average annual twig growth. Light amount of medium deadwood to remove if retaining.	B
	819	36	Ponderosa Pine	100+ x 30	Good	Moderate & non-correctable defects	Partial 2/3 crown due to crowding. Good annual twig growth.	A
	820	24	Douglas Fir	80 x 20	Fair	Moderate & non-correctable defects	Subdominant tree with partial 1/3 crown due to crowding. Below average annual twig growth.	A
	821	36	Ponderosa Pine	100+ x 25	Good	Moderate & non-correctable defects	Partial lower crown and full upper crown due to crowding. Good annual twig growth.	A
	822	36	Ponderosa Pine	100+ x 35	Good	Few & minor or correctable defects	Full asymetric crown with good annual twig growth. Nice specimen.	B
X	823	25	Douglas Fir	90 x 30	Very Poor	Major defects or problems	Very thin partial 1/2 crown due to crowding with very poor annual twig growth indicates declining health. May improve with care.	
X	826	30	Douglas Fir	100+ x 40	Fair	Moderate & non-correctable defects	Partial 2/3 asymetric crown due to crowding with below average annual twig growth. Large amount of medium to large deadwood in lower crown to be removed if retaining.	
X	827	15	Douglas Fir	75 x 28	Fair	Moderate & non-correctable defects	Subdominant tree with thin partial 1/3 crown due to crowding. Below average annual twig growth. Some medium to fine deadwood in lower crown.	
	828	36	Ponderosa Pine	100+ x 33	Good	Few & minor or correctable defects	Nearly full asymetric crown with average to above average annual twig growth. Large amount of medium to large deadwood in lower crown to remove if retaining.	A
	829	17	Douglas Fir	90 x 30	Fair	Moderate & non-correctable defects	Subdominant tree with partial 2/3 crown due to crowding and below average annual twig growth. Some medium deadwood in lower crown to remove if retaining.	A
	830	17	Douglas Fir	90 x 22	Fair	Moderate & non-correctable defects	Top broken out at 90' with partial 2/3 crown due to crowding. Below average annual twig growth.	A
	831	36	Ponderosa Pine	100+ x 38	Fair	Moderate & non-correctable defects	Below average annual twig growth. Some fine deadwood at branch tips indicates declining health which may improve with care.	A
X	832	30	Douglas Fir	90 x 50	Excellent	Moderate & non-correctable defects	Top broken out at 90' with full symetrical crown and good annual twig growth. Some medium to large deadwood in lower crown to remove if retaining.	
X	833	30	Douglas Fir	80 x 30	Poor	Major defects or problems	Fungal fruiting bodies (conks) on trunk indicate presence of internal decay. Top splits into crooked top at 45'. Tree leans southwest at 15° to 20° with partial 2/3 crown due to crowding. Below average annual twig growth. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	
X	834	30	Douglas Fir	75 x 38	Fair	Moderate & non-correctable defects	Subdominant tree with top broken out. Partial 3/4 crown due to crowding with below average annual twig growth.	
X	835	41	Ponderosa Pine	100+ x 50	Good	Moderate & non-correctable defects	Partial 2/3 lower crown due to crowding with full asymetric upper crown. Average annual twig growth with some medium to fine deadwood in crown to remove if retaining.	
X	837	33	Douglas Fir	100+ x 37	Good	Moderate & non-correctable defects	Partial lower crown with full asymetric upper crown due to crowding. Average annual twig growth. Some large, medium and fine deadwood to remove if retaining.	
X	838	14	Douglas Fir	55 x 25	Very Poor	Major defects or problems	Fungal fruiting bodies (conks) on trunk indicate presence of internal decay. Partial 1/3 crown due to crowding. Below average annual twig growth and trunk has long swoop. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	
	839	18	Douglas Fir	90 x 18	Poor	Moderate & non-correctable defects	Subdominant tree with top broken out. Thin partial 1/3 crown due to crowding with very poor annual twig growth. POOR SPECIMEN, MARGINAL FOR RETENTION.	A
	840	23	Douglas Fir	100+ x 25	Fair	Moderate & non-correctable defects	Thin partial lower and full upper crown with below average annual twig growth.	A
X	841	18	Douglas Fir	90 x 40	Fair	Moderate & non-correctable defects	Thin partial 1/3 crown due to crowding. Below average annual twig growth.	
X	842	24	Douglas Fir	100+ x 40	Fair	Moderate & non-correctable defects	Partial 1/2 crown due to crowding and average annual twig growth. Large amount of medium to large deadwood in lower crown to remove if retaining.	
X	843	30	Douglas Fir	100+ x 45	Fair	Moderate & non-correctable defects	Nearly full asymetric crown with below average annual twig growth. Large amount of large deadwood on west side of lower crown to remove if retaining.	
X	844	16	Douglas Fir	60 x 28	Poor	Major defects or problems	Subdominant tree with top broken out at 60', thin crown and below average annual twig growth.	
X	845	12	Douglas Fir	80 x 25	Poor	Major defects or problems	Top broken out at 80', partial 3/4 crown due to crowding. Below average annual twig growth.	B
X	846	21	Douglas Fir	100+ x 30	Fair	Moderate & non-correctable defects	Partial 1/8 & 1/4 crown due to crowding. Below average annual twigh growth with some medium to large deadwood to remove if retaining.	
X	847	20	Douglas Fir	90 x 30	Fair	Moderate & non-correctable defects	Partial 1/2 crown due to crowding with below average annual twig growth. Some medium to fine deadwood in crown.	
X	848	24	Douglas Fir	100+ x 40	Fair	Moderate & non-correctable defects	Partial 3/8 crown due to crowding with average annual twig growth. Some medium deadwood on west side of lower crown to remove if retaining.	
X	849	30	Douglas Fir	100+ x 42	Good	Moderate & non-correctable defects	Partial 1/2 lower and full asymetric upper crown with average annual twig growth. Large amount of large deadwood on northwest side of lower crown to remove if retaining.	
X	850	30	Douglas Fir	100+ x 40	Good	Moderate & non-correctable defects	Partial 1/2 lower and full asymetric upper crown with average annual twig growth. Large amount of large deadwood on north side of lower crown to remove if retaining.	
X	851	45	Douglas Fir	100+ x 42	Good	Few & minor or correctable defects	Full crown with average annual twig growth. Two stems at 55'. Prune to improve structure if retaining.	
X	853	8	Douglas Fir	65 x 12	Poor	Major defects or problems	Subdominant tree with thin partial 1/4 crown due to crowding. Below average annual twig growth. POOR SPECIMEN MARGINAL FOR PRESERVATION.	
X	854	16	Douglas Fir	100+ x 16	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with below average annual twig growth.	
X	855	22	Douglas Fir	100+ x 35	Fair	Moderate & non-correctable defects	Partial 1/8 & 1/8 lower crown with a nearly full upper crown. Below average annual twig growth.	
X	856	22	Douglas Fir	90 x 18	Poor	Moderate & non-correctable defects	Very thin partial 1/4 crown due to crowding with below average annual twig growth. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	
X	857	29	Douglas Fir	100+ x 30	Fair	Moderate & non-correctable defects	Partial 1/3 lower and full upper crown with well below average annual twig growth.	
	858	35	Ponderosa Pine	100+ x 25	Good	Moderate & non-correctable defects	Partial 1/2 lower with full upper crown. Average annual twig growth with some deadwood in lower crown to be removed if retaining.	A
X	859	40	Douglas Fir	100+ x 50	Good	Moderate & non-correctable defects	2 stems at 3' with a partial 3/4 crown due to crowding. Below average annual twig growth. Some deadwood in lower crown to remove if retaining.	
X	860	26	Douglas Fir	100+ x 18	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with below average annual twig growth. Some medium to fine deadwood to remove if retaining.	
X	861	24	Douglas Fir	100+ x 32	Fair	Moderate & non-correctable defects	Thin partial 1/4 crown due to crowding with below average annual twig growth.	
X	862	27	Douglas Fir	100+ x 35	Fair	Few & minor or correctable defects	Full asymetric crown due to crowding with below average annual twig growth.	
	863	17	Douglas Fir	100+ x 30	Fair	Moderate & non-correctable defects	Partial 1/3 lower and full upper crown. Below average annual twig growth.	B
X	864	14	Douglas Fir	95 x 14	Fair	Moderate & non-correctable defects	Partial 1/4 lower with full upper crown due to crowding. Below average annual twig growth.	
	865	22	Douglas Fir	100+ x 25	Good	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average annual twig growth. Moderate amount of medium to fine deadwood to remove if retaining.	A ~~B~~
	866	11	Douglas Fir	100+ x 20	Poor	Moderate & non-correctable defects	Partial 1/8 very narrow crown due to crowding with poor annual twig growth and a light amount of deadwood. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	A
	867	11	Douglas Fir	55 x 16	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with average annual twig growth. Some medium deadwood to remove if retaining.	B

9600 Boeckman Rd Tree Assessment

	Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
	868	26	Douglas Fir	100+ x 45	Fair	Moderate & non-correctable defects	Partial 1/3 lower and nearly full upper crown with average annual twig growth. Moderate amount of medium to large deadwood to remove if retaining.	B
X	869	13	Pacific Madrone	35 x 30	Good	Moderate & non-correctable defects	Wound on south side at 3'. Asymetrical crown with good leaf size and annual twig growth. Some structural issues could be improved with pruning.	
	870	24	Douglas Fir	100+ x 30	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with below average annual twig growth. Some medium deadwood to remove if retaining.	A
	871	28	Douglas Fir	100+ x 50	Good	Moderate & non-correctable defects	Partial 1/4 lower and full upper crown due to crowding. Average annual twig growth wth a large amount of medium to large deadwood to remove if retaining.	A
	872	12	Douglas Fir	70 x 25	Fair	Moderate & non-correctable defects	Subdominant tree with partial 1/4 crown due to crowding. Average annual twig growth. Light amount of medium to fine deadwood in crown.	A
	873	24	Oregon White Oak	85 x 30	Good	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with good annual twig growth and average leaf size. Some fine deadwood in upper crown suggests some insect or health issue that should be further investigated if it is retained.	A
	874	17	Oregon White Oak	85 x 30	Good	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average annual twig growth and average leaf size. Some large deadwood to remove if retaining.	A
	875	14	Douglas Fir	70 x 25	Fair	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with average annual twig growth. Light amount of medium deadwood to remove if retaining.	A
	876	30	Douglas Fir	100+ x 50	Good	Moderate & non-correctable defects	Partial 1/2 lower and full upper crown due to crowding with average annual twig growth. Some light deadwood in crown.	A
	877	22	Douglas Fir	100+ x 37	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with poor annual twig growth. Some medium deadwood to remove if retaining.	A
	878	10	Douglas Fir	70 x 16	Fair	Moderate & non-correctable defects	Subdominant tree with partial 1/3 crown due to crowding. Below average annual twig growth with some light deadwood in lower crown.	A
	879	13	Douglas Fir	85 x 16	Poor	Major defects or problems	Partial 1/2 very thin crown due to crowding with poor annual twig growth. Some light deadwood. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	A
	880	24	Douglas Fir	100+ x 28	Fair	Moderate & non-correctable defects	Partial 1/8 lower and 1/2 partial upper crown due to crowding. Average annual twig growth with some medium deadwood to remove if retaining.	A
	881	24	Oregon White Oak	85 x 43	Good	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with good annual twig growth and leaf size. 2 stems at 6.5.' Crown is off center and heavy to south. Prune to balance and improve structure.	A
	882	13	Douglas Fir	50 x 25	Poor	Moderate & non-correctable defects	Partial 3/4 crown due to crowding with very poor annual twig growth and with a moderate amountd of medium to fine deadwood. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	A
	883	23	Douglas Fir	100 x 16	DYING	DYING	Nearly dead. Top 40' is dead. Dying tree is a POTENTIAL HAZARD, DO NOT PRESERVE.	A
	884	23	Oregon White Oak	70 x 38	Fair	Moderate & non-correctable defects	Partial 1/2 crown due to crowding with average leaf size and annual twig growth. 2 stems at 6' and some medium deadwood to remove if retaining. Prune to improve structure.	A
	885	17	Douglas Fir	80 x 20	Poor	Major defects or problems	Weak connection at base and partial 1/4 crown due to crowding. Poor annual twig growth and some medium deadwood in crown. POOR SPECIMEN, DO NOT PRESERVE.	A
	886	24	Douglas Fir	95 x 25	Poor	Major defects or problems	Thin partial 2/3 crown due to crowding with poor annual twig growth. Clearly declining health with med to large deadwood in mid crown. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	A
	887	17	Douglas Fir	85 x 25	Poor	HAZARD REMOVE	Partial 1/2 crown due to crowding with major wound and exposed internal decay on south side from 0' to 6'. HAZARD REMOVE.	A
	888	17	Douglas Fir	75 x 25	Poor	Major defects or problems	Thin partial 1/3 crown due to crowding with very poor annual twig growth. Some medium to large deadwood in lower crown. Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
	889	17	Douglas Fir	80 x 25	Poor	Major defects or problems	Thin partial 1/4 crown due to crowding with very poor annual twig growth. Moderate amount of medium to fine deadwood throughout crown. Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
	890	21	Douglas Fir	100+ x 35	Poor	Major defects or problems	Small thin full crown due to crowding with poor annual twig growth. Large amount of large deadwood. Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
	891	21	Douglas Fir	100+ x 18	Poor	Major defects or problems	Small thin crown due to crowding with poor annual twig growth. Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
	892	21	Douglas Fir	85 x 25	Poor	Major defects or problems	Thin partial 1/3 crown due to crowding. Poor annual twig growth. Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
X	893	22	Douglas Fir	100+ x 25	Poor	Major defects or problems	Narrow thin nearly full crown with poor annual twig growth. Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	
	894	24	Douglas Fir	100+ x 35	Poor	Major defects or problems	Thin full crown with poor annual twig growth. Top is dying back and has fine deadwood throughout crown, Serious decline in health and condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	B
	895	22	Douglas Fir	100+ x 32	Fair	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with below average annual twig growth. Moderate amount of medium to large deadwood to remove if retaining.	B
	896	22	Douglas Fir	85 x 32	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average annual twig growth. Top is split with a dead side stem attached. Prune to remove deadwood and improve structure if retaining.	A
	897	27	Douglas Fir	100+ x 35	Poor	Major defects or problems	Thin full crown with dead top. Dying and serious decline in condition. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
X	900	13	Douglas Fir	65 x 20	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding. Below average annual twig growth.	
X	901	6	Scouler Willow	23 x 12	Very Poor	DYING HAZARD	Open wound exposes internal decay at 1' to 3'. Dead top and bark is sloughing off from 5' to top. DYING, HAZARD REMOVE.	
X	902	8	Douglas Fir	35 x 10	Fair	Major defects or problems	Subdominant tree with partial 1/8 crown due to crowding. Below average annual twig growth. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	
X	903	13	Douglas Fir	55 x 20-	Fair	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with below average annual twig growth.	
	904	14	Oregon Ash	45 x 21	Fair	Moderate & non-correctable defects	Nearly full narrow crown due to crowding. Top leans 15° to 25° to north. Average annual leaf size and twig growth. May require inspection and pruning to improve structure if retained.	A
	905	14	Oregon Ash	60 x 24	Good	Few & minor or correctable defects	Full upper and partial lower crown due to crowding. Good annual leaf size and twig growth.	A
	906	12	Oregon Ash	80 x 20	Good	Moderate & non-correctable defects	2 co-dominant stems at 30' with nearly full asymetric crown. Average annual leaf size and twig growth. Some medium size deadwood to be removed if area beneath it is developed.	A
	907	10	Oregon Ash	75 x 18	Fair	Moderate & non-correctable defects	2 co-dominant stems at 40' with partial, 2/3 crown due to crowding. Average annual leaf size and twig growth.	A
	908	15	Oregon Ash	70 x 30	Good	Moderate & non-correctable defects	Partial 2/3 crown due to crowding is off balance and heavy to north. Good annual leaf size and twig growth.	A
	909	11	Oregon Ash	75 x 20	Good	Few & minor or correctable defects	Nearly full narrow crown due to crowding. Good annual leaf size and twig growth.	A
	910	8	Oregon Ash	80 x 18	Good	Few & minor or correctable defects	Nearly full narrow crown due to crowding. Good annual leaf size and twig growth.	A
	911	8	Oregon Ash	80 x 15	Good	Few & minor or correctable defects	Nearly full narrow crown due to crowding. Good annual leaf size and twig growth.	A
	912	8	Oregon Ash	75 x 20	Fair	Moderate & non-correctable defects	Partial crown due to crowding with below average annual twig growth. Top broken out at 60' and may need pruning to improve structure.	B X
X	913	11	Oregon Ash	20 x 5	Poor	Major defects or problems	Top broken out at 20' with a small amount of sucker growth from trunk. TREE DESTROYED, DO NOT PRESERVE.	X
X	914	7	Oregon Ash	28 x 2	Poor	Major defects or problems	Top broken out at 28' with a small amount of sucker growth from trunk. TREE DESTROYED, DO NOT PRESERVE.	X
	915	15	Oregon Ash	80 x 25	Fair	Few & minor or correctable defects	Nearly full asymetric crown with average annual leaf size and twig growth. Some stubs from ice storm broken branches.	A
	916	11	Oregon Ash	80 x 25	Good	Moderate & non-correctable defects	Partial crown due to crowding with good annual leaf size and twig growth. Off balance and heavy to north. Some stubs from ice storm broken branches.	A
	917	14	Oregon Ash	80 x 25	Good	Moderate & non-correctable defects	Partial crown due to crowding with good annual leaf size and twig growth. Off balance and heavy to north. Some stubs from ice storm broken branches.	A
X	918	5, 4	Common Hawthorne	30 x 20	Poor	Major defects or problems	Partial crown due to crowding. Off balance to west. INVASIVE SPECIES & POOR SPECIMEN, DO NOT PRESERVE.	X
	5000	15	Oregon White Oak	60 x 45	Good	Few & minor or correctable defects	Full crown with good annual leaf size and twig growth. Some medium to fine deadwood to remove.	A
X	5002	17	Douglas Fir	0 x 0	DEAD	DEAD	Broken off lower trunk. TAKEN DOWN & REMOVED.	~~B~~
	5003	48	Ponderosa Pine	100+ x 40	Good	Few & minor or correctable defects	Full crown with good annual twig growth. Some medium deadwood to remove.	A
	5011	9	Bird Cherry	50 x 15	Very Poor	Moderate & non-correctable defects	Partial very small crown due to crowding. Sapsucker damage has nearly girdled trunk. Large amount of deadwood. VERY POOR SPECIMEN, DO NOT PRESERVE.	A
	5012	13	Oregon White Oak	50 x 20	Fair	Moderate & non-correctable defects	Partial asymetric crown with below average annual twig growth and leaf size.	A
X	5042	27, 18	Oregon White Oak	85 x 75	Good	Moderate & non-correctable defects	2 stems at 30". Crown off balance to east with some medium and large deadwood to remove. Prune to balance and improve structure. Cable two stems together if retaining.	
	5043	48	Ponderosa Pine	100+ x 47	Good	Moderate & non-correctable defects	Full asymetric crown due to crowding with average annual twig growth. Some recently dead branches and some large deadwood throughout crown to remove if retaining.	B
	5044	14	Oregon Ash	90 x 37	Good	Moderate & non-correctable defects	Partial 3/4 crown due to crowding with good leaf size and annual twig growth. Some medium to fine deadwood throughout crown.	B
	5129	12	Oregon Ash	80 x 23	Fair	Moderate & non-correctable defects	Full asymetric crown with chlorotic leaves, below average leaf size and annual twig growth indicates current health problems. May improve with care.	A
	5130	14	Oregon Ash	80 x 40	Fair	Moderate & non-correctable defects	Full asymetric crown with below average leaf size and annual twig growth. Tree has some structural problems that can be improved with pruning.	A
X	5132	24	Oregon White Oak	0 X 0	DEAD	DEAD	15' stump lying on ground due to being toppled by winter ice storm.	
X	5133	23	Oregon White Oak	8 x 0	DEAD	DEAD	Trunk broken off at 8', only stump remains. REMOVE STUMP.	
X	6604	34	Douglas Fir	100+ x 45	Very Poor	Major defects or problems	Nearly full asymetric very thin crown with very poor annual twig growth. Tree in serious decline, likely due to saturated soil in wetland. Medium to fine deadwood throughout crown. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	
	~~6612~~		~~NO TREE~~			~~NO TREE~~	~~No tree at this location~~	
X	6616	12	Oregon Ash	75 x 30	DYING	DYING HAZARD	Wounds extensive internal decay exposed from 0' to 7' across over 50% of circumference. DYING, HAZARD, REMOVE.	

9600 Boeckman Rd Tree Assessment

	Tag No.	Dia. Inches	Species	Est Ht x Crown Width(ft)	Health	Condition	Comments	Retain A or B
	6587	17	Oregon Ash	80 x 25	Fair	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with average annual leaf size and twig growth. Some large to medium deadwood to remove if area beneath it is improved.	A
	6597	11	Oregon White Oak	90 x 20	Fair	Moderate & non-correctable defects	Partial 1/8 & 1/8 crown due to crowding with average annual leaf size and twig growth.	A
X	50346	32	Douglas Fir	85 x 35	Very Poor	Dying Hazard	Thin partial 3/4 crown due to crowding with very poor annual twig growth. Top was broken out and remaining top is dying with large amount of deadwood throughout crown. Dying tree is a POTENTIAL HAZARD REMOVE.	
	50347	26	Douglas Fir	95 x 35	Good	Moderate & non-correctable defects	Partial lower and full upper crown due to crowding. Below average annual twig growth. Leans to northwest at 8° to 10°.	A
	50348	9	Douglas Fir	25 x 18	Fair	Moderate & non-correctable defects	Partial crown due to crowding with below average annual twig growth. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
	50349	34	Ponderosa Pine	100+ x 40	Good	Moderate & non-correctable defects	Partial lower and full upper crown with average annual twig growth. Top broken out and recently dead branches on north side indicates some potential health problem. May improve with care.	A
	50350	24	Douglas Fir	100+ x 40	Good	Moderate & non-correctable defects	Partial crown due to crowding with below average annual twig growth. Some medium to fine deadwood to remove if retaining.	A
	50351	35	Douglas Fir	100+ x 35	Fair	Moderate & non-correctable defects	Partial crown due to crowding with below average annual twig growth. Light amount of fine deadwood throughout crown.	A
	50361	41	Ponderosa Pine	100+ x 50	Good	Few & minor or correctable defects	Full crown with average annual twig growth. Moderate amount of medium to large deadwood to remove is retaining.	B
	~~50363~~	~~No Tree~~	~~NO TREE~~		~~NO TREE~~		~~No tree at this location.~~	
	~~50364~~	~~No Tree~~	~~NO TREE~~		~~NO TREE~~		~~No tree at this location.~~	
X	50395	36	Ponderosa Pine	100+ x 35	Good	Few & minor or correctable defects	Full crown with good annual twig growth. Some medium to large deadwood to remove if retaining.	
X	50396	19	Ponderosa Pine	75 x 20	Fair	Moderate & non-correctable defects	Partial 1/2 crown due to crowding with average annual twig growth. Some recently dead branches in crown.	
X	50397	19	Douglas Fir	75 x 30	Fair	Moderate & non-correctable defects	Subdominant tree with partial 2/3 crown due to crowding and good annual twig growth.	
X	50398	19	Douglas Fir	90 x 27	Fair	Few & minor or correctable defects	Full crown with below average annual twig growth.	
X	50399	21	Oregon White Oak	75 x 30	Good	Moderate & non-correctable defects	Full asymetric crown is off balance and heavy to south. Some large, medium to fine deadwood in crown. Prune to improve structure if retaining.	
X	50400	42	Ponderosa Pine	100+ x 45	Good	Few & minor or correctable defects	Full crown with average annual twig growth. Some medium to large deadwood to remove if retaining.	
	50402	15, 13	Oregon Ash	85 x 42	Good	Moderate & non-correctable defects	2 stems at 3', full asymetric crown is off balance to south. Some medium deadwood. Good leaf size and annual twig growth. Prune to improve structure and remove deadwood.	A
	50403	17	Oregon White Oak	80 x 35	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average leaf size and annual twig growth. Prune to improve structure and balance.	A
X	50404	17	Oregon White Oak	85 x 40	Good	Moderate & non-correctable defects	Full asymetric crown with average leaf size and annual twig growth. Some medium to large deadwood to remove if retaining.	
X	50405	12	Oregon Ash	70 x 27	Poor	HAZARD REMOVE	Large open wound that exposes internal decay from 0' to 3'. Partial crown due to crowding. Some large deadwood. Poor specimen and not sound due to decay. HAZARD REMOVE.	
X	50406	12, 9	Bird Cherry	65 x 30	Fair	Moderate & non-correctable defects	Full crown with 2 stems at ground. Thin crown, average size wilted leaves due drought and average annual twig growth. May improve with care.	
X	50407	24	Douglas Fir	100+ x 40	Fair	Moderate & non-correctable defects	Partial 1/2 lower crown and full upper crown. Average annual twig growth with large, medium and fine deadwood to remove if retaining.	
X	50408	15	Bigleaf Maple	60 x 40	Fair	Moderate & non-correctable defects	Full crown with dead top. Below average annual twig growth and average leaf size may be due to drought. Prune to remove deadwood.	
X	50409	32	Ponderosa Pine	100+ x 40	Good	Moderate & non-correctable defects	Partial 3/4 asymetric crown due to crowding with good annual twig growth. Some large, medium and fine deadwood to remove if retaining.	
X	50410	23	Douglas Fir	100+ x 42	Good	Moderate & non-correctable defects	Partial 7/8 asymetrical crown due to crowding with average annual twig growth. Some medium to fine deadwood.	
X	50412	15	Douglas Fir	100+ x 23	Fair	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with below average annual twig growth. Medium to fine deadwood to remove if retaining.	
X	50413	20	Douglas Fir	100+ x 30	Fair	Moderate & non-correctable defects	Partial 2/3 lower and full upper crown due to crowding with average annual twig growth. Some medium to fine deadwood to remove if retaining.	
X	50474	28	Douglas Fir	100+ x 35	Good	Few & minor or correctable defects	Full crown with below average annual twig growth. Moderate amount of medium to fine deadwood to remove if retaining.	
	50476	35	Douglas Fir	100+ x 45	Good	Few & minor or correctable defects	Partial 2/3 lower and nearly full upper crown with good annual twig growth. Moderate amount of large, medium and fine deadwood to remove if retaining.	B
X	50476 B	16	Douglas Fir	90 x 32	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with below average annual twig growth. Some medium to large deadwood to remove if retaining.	A
	50476 C	17	Douglas Fir	100 x 32	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with below average annual twig growth. Some medium to large deadwood to remove if retaining.	A
	50479	24	Douglas Fir	100+ x 35	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average annual twig growth. Moderate amount of medium to fine deadwood to remove if retaining.	B
	50479 B	11	Douglas Fir	60 x 16	Poor	Moderate & non-correctable defects	Subdomiant tree with partial 1/4 crown due to crowding with below average annual twig growth. Serious declining health with significant deadwood. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	B
	50479 C	7	Douglas Fir	50 x 12	Poor	Major defects or problems	Subdominant tree with 1/8 crown due to crowding with very poor annual twig growth. Seriously declining health with significant deadwood. POOR SPECIMEN, MARGINAL FOR PRESERVATION.	A
X	50479 D	6	Douglas Fir	35 x 0	DEAD	DEAD	DEAD TREE, REMOVE.	
	50483	25	Douglas Fir	100+ x 28	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with average annual twig growth. Moderate amount of medium to fine deadwood to remove if retaining.	B
	50483 B	25	Douglas Fir	100+ x 45	Good	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with below average annual twig growth. Moderate amount of medium to find deadwood to remove if retaining.	B
	50483 C	19	Douglas Fir	100+ x 28	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with below average annual twig growth. Some fine deadwood.	B
	50487	16	Douglas Fir	100+ x 25	Fair	Moderate & non-correctable defects	Partial 1/4 crown due to crowding with below average annual twig growth. Some fine deadwood.	A
	50487 B	18	Douglas Fir	100+ x 28	Fair	Moderate & non-correctable defects	Partial 1/3 crown due to crowding with below average annual twig growth. Some medium to large deadwood to remove if retaining.	A
	50487 C	7	Douglas Fir	25 x 10	Poor	Major defects or problems	Subdominant tree with 1/2 crown due to crowding and below average annual twig growth. Moderate amount of medium deadwood. POOR SPECIMEN MARGINAL FOR PRESERVATION.	A
	50487 D	22	Douglas Fir	100+ x 32	Fair	Moderate & non-correctable defects	Partial 2/3 crown due to crowding with below average annual twig growth. Moderate amount of medium to find deadwood to remove if retaining.	A
	50490	30	Douglas Fir	100+ x 40	Fair	Moderate & non-correctable defects	Full crown with below average annual twig growth. Moderate amount of medium to fine deadwood to remove if retaining.	A
	50496	41	Douglas Fir	100+ x 50	Good	Few & minor or correctable defects	Full crown with average annual twig growth. Some medium to large deadwood to remove if retaining.	A
X	70824	19	Douglas Fir	100+ x 35	Fair	Moderate & non-correctable defects	Partial 1/4 lower and full upper crown due to crowding. Below average annual twig growth with a moderate amount of medium to large deadwood to remove if retaining.	
X	70824 B	20	Douglas Fir	100+ x 35	Fair	Moderate & non-correctable defects	Partial 1/4 lower and full upper crown due to crowding. Below average annual twig growth with a moderate amount of medium to large deadwood to remove if retaining.	

Notes: Retain A = Retain without aeration, Retain B = Retain with aeration

TREE ASSESSMENT TOTALS

	TOTAL TREES – 173 (TREES 6612, 50363 AND 50364 ARE NOT COUNTED, NO TREE ON SITE)
X	TREES TO GET REMOVED – 72 TREES
A	TREES TO BE SAVED WITHOUT AN AERATION SYSTEM – 80
B	TREES TO BE SAVED WITH AN AERATION SYSTEM – 21
	THESE "SITUATIONAL" TREES ARE IDENTIFIED AS LIKELY TO BE RETAINED, AND INSTALLATION OF AN AERATION SYSTEM OVER THE ROOTS, BEFORE FILL IS PLACED, IS PLANNED TO ASSIST WITH LONG-TERM SURVIVAL. THE TREES WILL BE RE-EVALUATED AT THE TIME OF SITE CLEARING TO ASSESS SUITABILITY FOR PRESERVATION AND WILL BE MONITORED DURING CONSTRUCTION TO MINIMIZE ROOT ZONE IMPACTS. IF, AS A RESULT OF CONSTRUCTION, ONE OR MORE OF THE TREES IS DETERMINED TO BE NO LONGER SUSTAINABLE, PER A CONDITION OF APPROVAL, THE APPLICANT MAY SEEK WRITTEN AUTHORIZATION FROM THE CITY FOR REMOVAL AND APPROPRIATE MITIGATION.

Item 2.

no.	revision	date
2	TREE ASSESSMENT SUPPLEMENT	5-30-23
1	SAVE TREES 5000 AND 50403	11-11-22
	SITE DESIGN REVIEW RESUBMITTAL	7-8-22

18003 job no.
EM drawn
BW checked
11-11-22 date

REGISTERED ARCHITECT · LANCE MUELLER · SEATTLE, WA. · 1491 · STATE OF OREGON

BUILDING W5
99XX SW Boeckman Rd.
Wilsonville, OR 97070

LANCE MUELLER & ASSOCIATES
ARCHITECTS AIA
130 LAKESIDE • SUITE 250 • SEATTLE, WA 98122 • (206) 325-2553

TREE REPORT

sheet TR-2

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5/30/2023

DEVELOPMENT REVIEW BOARD MEETING
JUNE 12, 2023
6:30 PM

Board Member Communications:

3. Recent City Council Action Minutes

City Council Meeting Action Minutes
May 1, 2023

COUNCILORS PRESENT
Mayor Fitzgerald
Council President Akervall
Councilor Linville
Councilor Berry
Councilor Dunwell – Arrived at 5:32 p.m.

STAFF PRESENT
Bryan Cosgrove, City Manager
Amanda Guile-Hinman, City Attorney
Kimberly Veliz, City Recorder
Jeanna Troha, Assistant City Manager
Beth Wolf, Senior Systems Analyst
Matt Baker, Facilities Supervisor
Dustin Schull, Parks Supervisor
Brian Stevenson, Program Manager
Dan Pauly, Planning Manager
Zach Weigel, City Engineer
Bill Evans, Communications & Marketing Manager
Zoe Mombert, Assistant to the City Manager
Erika Valentine, Arts & Culture Program Coordinator

AGENDA ITEM	ACTIONS
WORK SESSION	**START:** 5:04 p.m.
A. Community Cultural Events & Program Grant Review	Council was informed of Resolution No. 3032, which allocates Community Cultural Events and Programs Grant Funds for FY 2022/2023.
B. City Charter – Term Limits Discussion	Council and staff discussed actions that could be considered to revise the City Charter's term limit provisions that apply to elected officials.
C. Prohibited Camping Code Update Project – Administrative Rules	Council was given a preview of Ordinance No. 879. The ordinance regulates camping on public property by adding, amending, and repealing sections of the Wilsonville Code.
REGULAR MEETING	
Mayor's Business A. Upcoming Meetings	Upcoming meetings were announced by the Mayor as well as the regional meetings she attended on behalf of the City.
B. Interstate 205 Toll Project EA Comment Letter	The Mayor detailed the City's response to an Environmental Assessment (EA) conducted by the Oregon Department of Transportation (ODOT) to inform the future I-205 tolling project.

Communications A. Metro Report	Metro District 3 Councilor Gerritt Rosenthal provided an update on the priorities being pursued by the Portland-metro area's regional government agency.
B. Oregon Tech Report	Oregon Institute of Technology (OIT) president Dr. Nagi Naganathan detailed the school's programs and highlighted its strong national rankings. In addition, the Mayor acknowledged a proclamation in the City Council packet commemorating OIT's 75th Anniversary.
Consent Agenda A. **Resolution No. 3032** A Resolution To Allocate Community Cultural Events And Programs Grant Funds For Fiscal Year 2022/2023. B. **Resolution No. 3056** A Resolution Of The City Of Wilsonville Authorizing The City Manager To Enter Into And Execute The Intergovernmental Agreement With Clackamas County For Jurisdiction Transfer Of A Portion Of SW Frog Pond Lane And SW Stafford Road.	The Consent Agenda was approved 5-0.
New Business A. None.	
Continuing Business A. **Ordinance No. 877** An Ordinance Of The City Of Wilsonville Adopting Transportation System Plan Amendments To Integrate Transportation Projects From The Frog Pond East And South Master Plan.	Ordinance No. 877 was adopted on second reading by a vote of 5-0.
B. **Ordinance No. 878** An Ordinance Of The City Of Wilsonville Approving A Street Name Change Of SW Columbine Avenue To SW Ponderosa Avenue In The Frog Pond Ridge Subdivision.	Ordinance No. 878 was adopted on second reading by a vote of 5-0.

Public Hearing A. **Ordinance No. 879** An Ordinance of the City of Wilsonville Regarding Regulation of Camping on Public Property by Adding Sections 10.700 through 10.780 to the Wilsonville Code; Amending Wilsonville Code Sections 3.000, 5.200, 5.210, and 10.540; and Repealing Wilsonville Code Sections 6.400 and 10.425.	After a public hearing was conducted, Ordinance No. 879 was approved on first reading by a vote of 5-0.
City Manager's Business	No report.
Legal Business	No report.
ADJOURN	9:56 p.m.

City Council Meeting Action Minutes
May 15, 2023

COUNCILORS PRESENT
Mayor Fitzgerald
Council President Akervall
Councilor Linville - Excused
Councilor Berry
Councilor Dunwell

STAFF PRESENT
Bryan Cosgrove, City Manager
Amanda Guile-Hinman, City Attorney
Dan Pauly, Planning Manager
Delora Kerber, Public Works Director
Kimberly Veliz, City Recorder
Jeanna Troha, Assistant City Manager
Zach Weigel, City Engineer
Zoe Mombert, Assistant to the City Manager

AGENDA ITEM	ACTIONS
WORK SESSION	**START:** 5:15 p.m.
A. Community Service Block Master Plan Contract	Staff informed Council of Resolution No. 3057, which authorizes the City Manager to execute a Professional Services Agreement (PSA) with FFA Architecture and Interiors for the Community Service Block Master Plan.
B. Frog Pond East and South Master Plan Exploring Variable/Scaled Rates for Development Fees for Housing	Staff shared information and sought Council's feedback on variable/scaled development fees gathered as part of Frog Pond East and South Master Plan implementation.
C. Tourism Promotion Committee 1/5 year Plan	Staff reported on Resolution No. 3047, which adopts the FY 2023/24 Five-Year Action Plan and Annual One-Year Implementation Plan for the Tourism Development Strategy.
URBAN RENEWAL AGENCY	
URA Consent Agenda A. **URA Resolution No. 345** A Resolution Of The Urban Renewal Agency Of The City Of Wilsonville Authorizing Acquisition Of The Third Group Of Property And Property Interests Related To Construction Of The Boeckman Road Corridor Project. B. Minutes of the April 17, 2023 URA Meeting.	The URA Consent Agenda was approved 4-0.
New Business A. None.	
URA Public Hearing A. None.	

REGULAR MEETING	
Communications A. Tualatin Valley Fire & Rescue State of the District	Tualatin Valley Fire & Rescue Deputy (TVF&R) Chief Hitt provided an annual 'state of the district' that detailed the agency's operations, and summarized service calls and the district's plans to support future growth.
B. West Linn - Wilsonville School District Achievements	Wilsonville High School student Elijah Siebers detailed the accomplishments of several fellow students during the 2022-2023 school year.
Mayor's Business A. Upcoming Meetings	Upcoming meetings were announced by the Mayor as well as the regional meetings she attended on behalf of the City.
B. Commemorative Flag Request - Pride Flag	The Commemorative Flag Request - Pride Flag was approved 4-0.
C. City Attorney Employment Agreement	The City Attorney Employment Agreement was approved 4-0.
Consent Agenda A. **Resolution No. 3047** A Resolution Of The City Of Wilsonville Adopting The FY 2023/24 Five-Year Action Plan And Annual One-Year Implementation Plan For The Wilsonville Tourism Development Strategy. B. **Resolution No. 3057** A Resolution Of The City Of Wilsonville Authorizing The City Manager To Execute A Professional Services Agreement Contract With FFA Architecture And Interiors For The Community Service Block Master Plan (Capital Improvement Project #8158). C. **Resolution No. 3067** A Resolution Of The City Of Wilsonville Authorizing Acquisition Of The Third Group Of Property And Property Interests Related To Construction Of The Boeckman Road Corridor Project. D. Minutes of the April 17, 2023 City Council Meeting.	The Consent Agenda was approved 4-0.

New Business A. **Resolution No. 3058** A Resolution Of The City Of Wilsonville Adopting Administrative Rules Related To Regulation Of Camping For Survival On Public Property. B. **Resolution No. 3069** A Resolution Of The City Of Wilsonville Repealing Resolution No. 3055 And Authorizing The City Manager To Execute An Intergovernmental Agreement Between The City Of Wilsonville And The Tri-County Metropolitan Transportation District Of Oregon For The Adjustment Of TriMet District Boundaries.	Resolution No. 3058 was adopted 4-0. Resolution No. 3069 was adopted 4-0.
Continuing Business A. **Ordinance No. 879** An Ordinance of the City of Wilsonville Regarding Regulation of Camping on Public Property by Adding Sections 10.700 through 10.780 to the Wilsonville Code; Amending Wilsonville Code Sections 3.000, 5.200, 5.210, and 10.540; and Repealing Wilsonville Code Sections 6.400 and 10.425.	Ordinance No. 879 was adopted on second reading by a vote of 4-0.
Public Hearing A. None.	
City Manager's Business	Reminded Council the City of Wilsonville would host the June 22, 2023 Clackamas Cities Association dinner at McMenamins.
Legal Business	Council was informed the City Attorney would attend and present on camping at the Oregon City Attorney's spring conference held later that week. However, would return for the Budget Committee meetings.
ADJOURN	9:47 p.m.