DEVELOPMENT REVIEW BOARD MEETING
JANUARY 9, 2023
6:30 PM

Public Hearing:

2. **Resolution No. 410. ESS Parking Lot Expansion Project.** The applicant is requesting approval of a Stage 2 Final Plan Modification and Site Design Review for a parking lot expansion for the ESS building located at 26440 SW Parkway Avenue.

   Case Files:

   DB22-0008 ESS Parking Lot Expansion Project
   - Stage 2 Final Plan Modification (STG222-0008)
   - Site Design Review (SDR22-0008)

DEVELOPMENT REVIEW BOARD
RESOLUTION NO. 410

A RESOLUTION ADOPTING FINDINGS AND CONDITIONS OF APPROVAL, APPROVING A STAGE 2 FINAL PLAN MODIFICATION AND SITE DESIGN REVIEW FOR A PARKING LOT EXPANSION FOR THE ESS BUILDING LOCATED AT 26440 SW PARKWAY AVENUE

WHEREAS, an application, together with planning exhibits for the above-captioned development, has been submitted by authorized representative Desmond Amper LRS Architects, on behalf of the owner, Parkway Woods, LLC, in accordance with the procedures set forth in Section 4.008 of the Wilsonville Code, and

WHEREAS, the subject site is located at 26440 SW Parkway Ave on Tax Lot 0512, Section 12, Township 3 South, Range 1 West, Willamette Meridian, Clackamas County, Oregon, and

WHEREAS, the Planning Staff has prepared the staff report on the above-captioned subject dated December 29, 2022, and

WHEREAS, said planning exhibits and staff report were duly considered by the Development Review Board Panel A at a scheduled meeting conducted on January 9, 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 December 29, 2022, attached hereto as Exhibit A1, with findings and recommendations contained therein, and authorizes the Planning Director to issue permits consistent with said recommendations for:

DB22-0008 ESS Parking Lot Expansion: Stage 2 Final Plan Modification (STG222-0008) and Site Design Review (SDR22-0008).

ADOPTED by the Development Review Board of the City of Wilsonville at a regular meeting thereof this 9th day of January, 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, Acting Chair - Panel A
Wilsonville Development Review Board

Attest:

_____
Shelley White, Planning Administrative Assistant

Exhibit A1
Staff Report
Wilsonville Planning Division
ESS Parking Lot Expansion

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

Hearing Date:	January 9, 2023
Date of Report:	December 29, 2022
Application Nos.:	DB22-0008 Wilsonville Industrial Yard - Stage 2 Final Plan Modification (STG222-0008) - Site Design Review (SDR22-0008)
Request/Summary:	The requests before the Development Review Board include a Stage 2 Final Plan Modification, and Site Design Review for an 83 space parking lot expansion, minor modifications to the loading dock area, and associated site improvements.
Location:	26440 SW Parkway Ave. The property is specifically known as Tax Lot 0512, Section 12, Township 3 South, Range 1 West, Willamette Meridian, Clackamas County, Oregon.
Owner/Applicant:	Parkway Woods, LLC (Bill Naito Company)
Applicant's Representative:	LRS Architects (Contact: Desmond Amper)
Comprehensive Plan Designation:	Industrial
Zone Map Classification:	Planned Development Industrial (PDI)
Staff Reviewers:	Georgia McAlister, Associate Planner Amy Pepper, Development Engineering Manager Kerry Rappold, Natural Resources Program Manager

Staff Recommendation: **Approve with conditions** the requested Stage 2 Final Plan Modification and Site Design Review.

Applicable Review Criteria:

Development Code:	
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
Section 4.034	Application Requirements
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 4.167	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 Recyclables Storage
Section 4.199	Outdoor Lighting
Sections 4.300 through 4.320	Underground Utilities
Sections 4.400 through 4.450 as applicable	Site Design Review
Sections 4.600 through 4.640 as applicable	Tree Preservation and Protection
Other Planning Documents:	
Wilsonville Comprehensive Plan Previous Land Use Approvals	

Vicinity Map

Background:

The subject property comprises Tax Lot 0512 and is located at 26440 SW Parkway Ave. The business located at the property, ESS, is a rapidly growing manufacturing and warehousing operation. Since the construction of the warehouse in 1980 (80DR22) the needs of the business have changed. Due to the growth in employment the current parking is not sufficient to meet the needs of ESS. The property was once a part of the larger industrial park to the south, Parkway Woods, before a partition in 2018 (AR18-0008). Prior to the partition the parking area to the south was shared between the buildings within the industrial park. With the partition the parking lot expansion is necessary to accommodate employee parking, as the shared parking is no longer utilized. The parking lot expansion will allow the site to meet current minimum parking requirements.

Summary:

Modification to Stage 2 Final Plan (STG222-0008)

The Stage 2 Final Plan Modification reviews the addition of 83 parking spaces and the resulting changes to landscaping and site function, including a minor loading dock modification. This review ensures the modifications meet or exceed all applicable City standards.

Site Design Review (SDR22-0008)

The existing warehouse building on the northwest corner of the property is proposed to remain without improvements. Therefore, Site Design Review focuses on parking, pedestrian access, and landscaping throughout the site. The landscaping includes the installation of 11 trees and planted storm water swales to the north of the parking area. Existing vegetation along the northern property line helps screen the parking from offsite visibility. The proposed 83 parking spaces are designed to meet the City's parking standards. A crosswalk has been provided from the parking area to the north building entrance. A condition of approval will ensure a safe path is provided along the parking area to the crosswalk.

Neighborhood and Public Comments:

No public comments have been received.

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.

Review Process

More than 10 parking spaces are proposed for installation therefore requiring DRB review per Development Code Section 4.130 (.01) B. 1.

Parking

The applicant proposes 83 parking spaces for this project to meet minimum parking standards and provide adequate spaces for the employees at ESS. The site was developed as part of the larger Parkway Woods industrial campus to the south and currently has 162 parking spaces; however, the parking minimum for the site based on the approved manufacturing and warehouse uses is 251 parking spaces. The addition of 83 parking spaces as well as the restoration of 18 spaces will increase the total parking spaces to 263, exceeding the parking minimum for the site. No additional bicycle parking spaces are proposed.

Pedestrian Access and Circulation

The addition of 83 parking spaces necessitates review of the pedestrian access and circulation on site, as these spaces will be located to the north of the existing building where there is not currently parking or pedestrian access. Safe and direct pedestrian connections must be provided from the parking area to the entrance of the building. A crosswalk from the parking area is proposed for safe pedestrian access. A condition of approval will ensure that a sidewalk is provided along the parking area for a safe pathway to the proposed crosswalk.

Conclusion and Conditions of Approval:

Staff has 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 recommend approval to City County or approve, as relevant, the proposed application (DB22-0008) with the following conditions:

Planning Division Conditions:

Request A: Stage 2 Final Plan Modification (STG222-0008)

PDA 1.	**General:** The approved final plan shall control the issuance of all building permits and shall restrict the nature, location and design of all uses. Minor changes in an approved 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, including extension or revision of a staged development schedule, shall be processed in the same manner as the original application and shall be subject to the same procedural requirements.
PDA 2.	**Prior to Issuance of Building Permits:** A pedestrian pathway demonstrating compliance with the requirements of Section 4.154 shall be provided, allowing safe and convenient pedestrian access from all 83 parking spaces to the north entrance of the building. See Finding A21.
PDA 3.	**Prior to Issuance of the Public Works Permit:** A list of all proposed plant species for the landscaping and storm water swales must be provided to and approved by the City. See Finding A32 and A35.
PDA 4.	**Prior to Issuance of BuildingPermits**: A Circulation Plan showing the path of the trucks to the loading docks and pedestrians to the entrance of the building must be submitted to the City. See Finding A27.

Request B: Site Design Review (SDR22-0001)

PDB 1.	**Ongoing:** Construction, site development, and landscaping shall be carried out in substantial accord with the Development Review Board approved plans, drawings, sketches, and other documents. Minor revisions may be approved by the Planning Director through administrative review pursuant to Section 4.030. See Finding B3.
PDB 2.	**Prior to Parking Lot Use:** All landscaping required and approved by the Development Review Board shall be installed prior to use of the proposed parking area 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 Development Review 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 B10.
PDB 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 Findings B11 and B13.
PDB 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 Development Review Board, unless altered as allowed by the Wilsonville Development Code. See Finding B12.

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, performance standards, 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 Findings and Conditions:

PFA 1.	Public Works Plans and Public Improvements shall conform to the "Public Works Plan Submittal Requirements and Other Engineering Requirements" in Exhibit C1.
PFA 2.	**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. The applicant shall submit complete construction drawings showing how site improvements will comply with the treatment, flow control and source control requirements, including necessary signage for interior transfer areas.
PFA 3.	**Prior to Issuance of the Public Works Permit:** Applicant shall obtain 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. Tree

	protection fencing shall be installed, inspected and approved prior to the installation of erosion control measures. Permits shall remain active until all construction work is complete and the site has been stabilized.
PFA 4.	**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.

Master Exhibit List:

Entry of the following exhibits into the public record by the Development Review Board confirms its consideration of the application as submitted. The list below includes exhibits for Planning Case File No. DB22-0008 and 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)

Materials from Applicant

B1. **Applicant's Narrative and Materials**
Application Form
Narrative
Ownership Information

B2. **Applicant's Drawings and Plans**
C0.00 General Notes
C0.01 Site Plan
C1.00 Existing Conditions and Demolition Plan
C1.01 Existing Conditions and Demolition Plan
C2.00 Site Layout and Stormwater Plan
C2.01 Site Layout and Stormwater Plan
C3.00 Grading Plan
C3.01 Grading Plan
C4.00 Swale Sections

B3. **Stormwater Report**
B4. **Infiltration Report**

Development Review Team Correspondence

C1. Public Works Plan Submittal Requirements and Other Engineering Requirements

Procedural Statements and Background Information:

1. The statutory 120-day time limit applies to this application. The application was received on August 1, 2022. Staff conducted a completeness review within the statutorily allowed 30-day review period and found the application incomplete on August 26, 2022. The applicant submitted additional materials on September 15, 2022, and Planning staff deemed the application complete on October 13, 2022. The City must render a final decision for the request, including any appeals, by January 28, 2022.

2. Surrounding land uses are as follows:

Compass Direction	Zone	Existing Use
North	FDA-H/PDI	Undeveloped/Sysco
East	PDI	Open Space
South	PDI	Parkway Works Industrial
West	N/A	I-5 Freeway

3. Previous Planning Approvals:

74RZ03 Zone Change
79DR35 Site Plan Approval
80DR22 Stage II Final Plan
88AR40 Partition
91AR59 Architectural Modification to Building 83
97AR14 Architectural Modification to Building 83
97AR13 Architectural Modification to Building 83
97AR56 Architectural Modification to Building 83
97AR73 Architectural Modification to Building 83
97DB18 Stage II Final Plans and Site Design
97DB35 Stage II Final Plan, Site Design Plans for Parking Lot
97TR37 Type C Tree Removal
AR15-0031 Tentative Partition Plat
AR15-0049 Final Partition Plat
AR16-0037 Tentative Partition Plat
AR18-0008 Final Partition Plat

4. The applicant has complied with Sections 4.008 through 4.011, 4.013-4.031, 4.034 and 4.035 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:

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 application is being processed in accordance with the applicable general procedures of this Section.

Initiating Application
Section 4.009

The application has been submitted on behalf of the property owner Parkway Woods LLC, and is signed by Diane McMahon, an authorized representative.

Pre-Application Conference
Subsection 4.010 (.02)

A pre-application conference was held on June 9, 2022 (PRE22-0005) 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
Subsections 4.035 (.04) A. and 4.035 (.05)

The applicant has provided all of the applicable general submission requirements contained in this subsection.

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 4.140 through 4.199.

Request A: Modification to Stage 2 Final Plan (STG222-0008)

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

Planned Development Regulations

Planned Development Purpose
Subsection 4.140 (.01)

A1. The proposed Stage 2 Final Plan Modification for development of the site is consistent with the Planned Development Regulations purpose statement.

Planned Development Lot Qualifications
Subsection 4.140 (.02)

A2. The subject property is of sufficient size (24.8 acres) to be developed in a manner consistent with the purposes and objectives of Section 4.140. It allows for development of the proposed uses while meeting applicable landscaping and other site requirements indicating it is of sufficient size.

Ownership Requirements
Subsection 4.140 (.03)

A3. The subject property is in a single ownership by Parkway Woods, LLC (Bill Naito Company) and is signed by an authorized representative Diane McMahon of Bill Naito Company.

Professional Design Team
Subsection 4.140 (.04)

A4. As can be found in the applicant's submitted materials the design team is composed of appropriate professionals, including survey, geotechnical engineering, civil and landscape, architectural, and a commercial general contractor.

Planned Development Permit Process
Subsection 4.140 (.05)

A5. The subject property is greater than 2 acres, is zoned Planned Development Industrial and, is designated Industrial in the Comprehensive Plan.

Consistency with Comprehensive Plan and Other Applicable Plans
Subsections 4.140 (.06) and 4.140 (.09) J. 1.

A6. The proposal to expand the parking area for an existing industrial development and is consistent with the comprehensive plan as well as the prior plan approvals.

Modification to Stage 2 Final Plan Submission Requirements and Process

Stage 2 Final Plan

Subsection 4.140 (.09) A-K

A7. The Stage 2 Final Plan was approved in the appropriate manner and timeline. The proposed project is a modification to the Stage 2 Final plan.

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

A8. The Development Review Board is considering all applicable permit criteria set forth in the Wilsonville Development Code and staff is recommending the Development Review Board approve the application with Conditions of Approval.

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

A9. The proposed modifications to the Stage 2 Final Plan are to be reviewed by the Development Review Board according to this standard.

Standards Applying to All Planned Development Zones

Additional Height Guidelines
Subsection 4.118 (.01)

A10. No new buildings are proposed as part of the current application; therefore, this standard does not apply.

Underground Utilities
Subsection 4.118 (.02)

A11. No changes to utilities are proposed for this project.

Waivers
Subsection 4.118 (.03) A. through D.

A12. The applicant has not requested any waivers to the standards applying to all planned development zones.

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

A13. No additional requirements or restrictions are recommended pursuant to this subsection. Performance standards and requirements of the PDI zone address potential impacts from noise, odor, glare, etc.

Habitat Friendly Development Practices
Subsection 4.118 (.09)

A14. 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 Planned Development Industrial (PDI) Zone
Subsection 4.135 (.01)

A15. The proposed parking lot supports the existing industrial operation consistent with the purpose stated in this subsection.

Typically Permitted Uses
Subsection 4.135 (.03)

A16. The existing uses are consistent with the permitted uses in the PDI zone, including industrial manufacturing and production.

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

A17. No changes to blocks or access are proposed.

PDI Performance Standards

Industrial Performance Standards
Subsections 4.135 (.05) A. through N.

A18. The proposed project meets the performance standards of this subsection as follows:

- **Pursuant to Standard A** (enclosure of uses and activities), the parking will be used to accommodate the existing industrial manufacturing use.
- **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 that odorous gas or other odorous matter will be produced by the proposed use.
- **Pursuant to Standard D** (open storage), there is no storage proposed.
- **Pursuant to Standard E** (operations and residential areas), the site is not adjacent to any residential areas.
- **Pursuant to Standard F** (heat and glare, exterior lighting), no exterior operations are proposed creating heat and glare, and no exterior lighting is proposed that would produce light on adjacent residential uses.
- **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), there is no evidence that the standards for liquid and solid waste will be violated.
- **Pursuant to Standard I** (noise), there is no evidence that noise generated from the proposed operations will violate the City's Noise Ordinance.

- **Pursuant to Standard J** (electrical disturbances), no functions or construction methods are proposed that would interfere with electrical systems, and any construction activity that may require temporary electrical disruption for safety or connection reasons will be limited to the project site and coordinated with appropriate utilities.
- **Pursuant to Standard K** (discharge of air pollutants), there is no evidence that any prohibited discharge will be produced by the proposed project.
- **Pursuant to Standard L** (open burning), no open burning is proposed on the development site.
- **Pursuant to Standard M** (outdoor storage), no outdoor storage is proposed.
- **Pursuant to Standard N** (unused area landscaping), the subject site will be completely developed with landscaping, and other site improvements.

Other Standards for PDI Zone

Lot Size and Maximum Lot Coverage
Subsections 4.135 (.06) A. and B.

A19. The subject site is of sufficient size to accommodate the proposed parking lot expansion, stormwater facility, landscaping, and other improvements.

Setbacks
Subsections 4.135 (.06) C. through E.

A20. The existing building on the property meets the applicable setback standards of the PDI zone.

On-site Pedestrian Access and Circulation

Continuous Pathway System, Vehicle Pathway Separation, Width and Surface, Pathway Signs
Subsection 4.154 (.01) B.1. through B.6.

A21. A clearly marked crosswalk from the parking area to the existing building will provide access to the existing building for pedestrians. However, sidewalks are not proposed to allow safe and direct access from all parking spaces to the crosswalk. A condition of approval will require the applicant to provide a pedestrian pathway serving the 83 parking spaces that provides safe and direct access for pedestrians using the parking area. New striping near the ADA spaces will also improve access for those using the spaces. Compliance with all adopted pedestrian access and circulation standards for the existing parking area has been reviewed through previous land use decisions.

Parking Standards

Parking, Loading and Bicycle Parking Purpose
Section 4.155 (.01) A-C.

A22. The addition of the 83 parking spaces is to be located to the north of the existing building. The expansion will service the needs of the existing development. Safe access will be

provided from the parking area to the building. A landscape buffer along the front of the new parking stalls will be provided. The existing vegetation along the north property line will provide adequate screening, protecting the parking from offsite visibility. Stormwater treatment and detention swales are to be installed to address stormwater pollution and detention standards.

Parking, Loading and Bicycle Parking General Regulations
Section 4.155 (.02)

A23. All new proposed parking stalls are designed to meet Development Code standards. The parking area is to be surfaced with asphalt and accessible via the existing driveways and drive aisle. The addition of the 83 parking spaces and restoration of 18 previously approved spaces will meet minimum parking standards for the site. No variances or waivers have been requested as a part of this application.

Parking Landscaping – 10% of Area Landscaped
Section 4.155 (.03) B.1

A24. The proposed parking area is approximately 18,900 SF. For parking areas greater than 650 SF 10% of the area is required to be landscaped. The proposed parking area will have 3,600 SF of landscaped space which is 19% of the proposed parking area.

Parking Landscaping – Trees
Section 4.155 (.03) B.2

A25. One landscape tree is required every eight spaces for parking areas greater than 650 SF and less than 200 spaces. The proposed parking area is 83 spaces, requiring 11 trees to be planted. The applicant has proposed plating 11 trees along the parking area, spaced greater than 8 ft apart.

ADA Parking
Section 4.155 (.03) C.

A26. 83 parking spaces, with 79 standard spaces and 4 ADA spaces, are provided, meeting the one ADA space per 50 space standard.

Minimum and Maximum Parking
Section 4.155 (.03) G.

A27. As the subject property has been partitioned from the rest of the Parkway Woods industrial campus, the existing parking at the ESS site is not in compliance with current minimum parking standards with 162 parking spaces for employees. The intent of this project is to provide more parking for employees and meet minimum parking standards. The 205,100 sf building is divided into two uses with 145,694 sf functioning as a manufacturing warehouse and the remaining 59,406 sf as a storage warehouse. According to the Development Code a manufacturing warehouse requires 1.6 parking spaces per 1000 sf while a storage warehouse use requires .3 parking spaces per 1000 sf. The parking

minimum for the site based on the uses is 251 parking spaces. The addition of 83 parking spaces as well as the restoration of 18 spaces will increase the total parking spaces to 263, exceeding the parking minimum for the site.

Other Parking Design Standards
Subsections 4.155 (.02) and (.03)

A28. The applicable standards are met as follows:

Standard	Met	Explanation
Subsection 4.155 (.02) General Standards		
K. Surfaced with asphalt, concrete or other approved material.	☒	All parking and driving areas are surfaced in asphalt, the loading dock area is surfaced with concrete.
Drainage meeting City standards	☒	Drainage of the parking area and at grade door is professionally designed and being reviewed to meet City standards.
L. Lighting that does not shine into adjoining structures or into the eyes of passersby.	☒	No lighting is proposed. Existing lighting will be used for parking area.
Subsection 4.155 (.03) Minimum and Maximum Off-Street Parking Requirements		
A. Access and maneuvering areas adequate.	☒	Access and maneuvering area is adequate to serve functional needs of site.
A.1. Circulation patterns clearly marked.	☒	Truck circulation will occur near the parking area and is not clearly marked on the plans. A condition of approval will requires the submission of a Circulation Plan prior to issuance of construction permits

Other Development Standards

Access, Ingress, and Egress
Section 4.167

A29. No changes to access are proposed.

Natural Features and Other Resources
Section 4.171

A30. A small portion of the property is protected by the City's Significant Resource Overlay Zone (SROZ). The portions located within the SROZ are on north and east side of the property. The proposed 83 parking spaces are located to the south of the SROZ. No changes to the SROZ or construction within the SROZ are proposed and no impact to the SROZ is expected. Tree protection fencing will separate the construction activity from the SROZ protecting the vegetation and slope.

An overhead powerline runs along the northern portion of the property and caution will need to be taken when construction activities occur in this area. There are no high voltage powerline easements or rights of way or petroleum pipeline easements on the site.

Public Safety and Crime Prevention

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

A31. Parking and loading has been designed to allow access for emergency services.

Lighting to Discourage Crime
Subsection 4.175 (.04)

A32. Lighting will be provided to illuminate the new parking.

Landscaping Standards

Landscaping Standards Purpose
Subsection 4.176 (.01)

A33. Through complying with the various landscape standards in Section 4.176 the applicant has demonstrated the improvements are in compliance with the landscaping and screening purpose statement.

Landscape Code Compliance
Subsection 4.176 (.02) B.

A34. 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.

A35. As shown on Sheets C4.00 (Exhibit B2), materials required to meet landscaping standards are provided. The screening and buffering of the parking area from the Public Right of Way will be accomplished through a combination of the proposed landscaping and dense existing vegetation along the northern property line. A condition of approval will require the applicant to provide a complete list of shrub and groundcover species to be planted in the storm water swales prior to issuance of construction permits.

Landscape Area and Locations
Subsection 4.176 (.03)

A36. Eleven trees will be planted along the parking area meeting the requirement of providing one tree for every eight parking spaces. At least 10% of the parking area will be landscaped meeting the requirements of this standard. Proposed materials achieve a balance between various plant forms, textures, and heights, and native plant materials are used where practicable.

Buffering and Screening
Subsection 4.176 (.04) A. through F.

A37. Buffering and screening is provided as follows:

- **Pursuant to Standard A** (screening between intensive and less intensive developments), the proposed development is not adjacent to less intensive developments.
- **Pursuant to Standard B** (buffering and screening of activity areas on commercial and industrial sites from adjacent residential areas), the proposed development is not adjacent to residential developments.
- **Pursuant to Standard C** (mechanical and utility equipment screening), all exterior, roof and ground mounted, mechanical and utility equipment must be screened from ground level off-site view from adjacent streets or properties. No roof or ground-mounted mechanical equipment is shown on the submitted plans.
- **Pursuant to Standard D** (screening of outdoor storage areas) no outdoor storage is proposed.
- **Pursuant to Standard E** (screening of loading areas and truck parking not in industrial zones), the proposed development is an industrial use in the PDI zone and, therefore, is not required to screen loading areas and docks, and truck parking.
- **Pursuant to Standard F** (fences over six (6) feet high), no fence over six (6) feet high is proposed on the project site.

Landscape Plan Requirements
Subsection 4.176 (.09)

A38. The Landscape Plans provide the required information including proposed landscape areas, type, installation size, number and placement of materials, plant material list, and proposed method of irrigation. A condition of approval will require the applicant to provide a complete list of shrub and groundcover species to be planted in the storm water swales prior to issuance of construction permits.

Other Development Standards

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

A39. No changes to the access drives and travel lanes are proposed.

Outdoor Lighting
Sections 4.199.20 through 4.199.60

A40. The proposed parking lot is designed around the existing outdoor lighting; therefore the requirements of this section do not apply.

Underground Installation
Sections 4.300 through 4.320

A41. No changes to utilities are proposed.

Request B: Site Design Review (SDR22-0008)

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

Site Design Review

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

B1. 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:** This standard does not apply as no new buildings or structures are proposed on the site.
- **Inappropriate or Poor Design of Signs:** This standard does not apply as no signs are proposed on the site.
- **Lack of Proper Attention to Site Development:** The appropriate professional services have been used to design the site, demonstrating attention being given to site development.
- **Lack of Proper Attention to Landscaping:** Landscaping is provided, has been professionally designed by a landscape designer, and includes a variety of plant materials, all demonstrating appropriate attention being given to landscaping.

Purposes and Objectives
Subsection 4.400 (.02) and Subsection 4.421 (.03)

B2. The applicant has provided sufficient information demonstrating compliance with the objectives of this subsection as follows:

- **Pursuant to Objective A** (assure proper functioning of the site and high quality visual environment), the proposed site layout allows for landscaping requirements to be met on the site and creates a visual environment that is compatible with other surrounding industrial uses. The additional parking and modifications to the loading dock will ensure the site continues to function for the existing use and improve current deficiencies.
- **Pursuant to Objective B** (encourage originality, flexibility, and innovation), landscaping is designed according to parking standards and incorporates the storm water facilities in the design.
- **Pursuant to Objective C** (discourage inharmonious development), professional design of the proposed landscaping supports a quality visual environment and thus prevents monotonous, drab, unsightly, and dreary development.
- **Pursuant to Objective D** (conserve natural beauty and visual character), design of the proposed site layout addresses the public at the street. The natural area within the

SROZ will not be impacted, preserving the vegetation and natural resources. Landscaping improves the general aesthetic of the site and harmonizes with the visual character of the PDI zone.

- **Pursuant to Objective E** (protect and enhance City's appeal), development of the site with well-designed landscaping will enhance this industrial area, which could attract additional investment in surrounding properties.
- **Pursuant to Objective F** (stabilize property values/prevent blight), improving the parking will allow the site to continue to function as the current business expands.
- **Pursuant to Objective G** (insure adequate public facilities), the proposal does not impact the availability of orderly, efficient and economic provision of public services and facilities, which are available and adequate for the subject property.
- **Pursuant to Objective H** (achieve pleasing environments and behavior), landscaping and the existing vegetation on the northern property line provide separation and screening to the areas adjacent to the project.
- **Pursuant to Objective I** (foster civic pride and community spirit), the project will foster civic pride by improving the parking allowing for a larger workforce bringing economic opportunity to the City.
- **Pursuant to Objective J** (sustain favorable environment for residents), the project has been designed to protect the peace, health and welfare of the City.

Development Review Board Jurisdiction
Section 4.420

B3. A Condition of Approval will ensure construction, site development, and landscaping are carried out in substantial accordance with the DRB-approved plans, drawings, sketches, and other documents. No building permits will be granted prior to Development Review Board approval. No variances are requested from site development requirements.

Design Standards
Subsection 4.421 (.01)

B4. The applicant has provided sufficient information demonstrating compliance with the standards of this subsection as follows:

- **Pursuant to Standard A** (Preservation of Landscape), there are minimal changes or impact to natural features on the site. No trees are proposed for removal and the SROZ will remain protected. Attention will be paid to grade and soil changes during construction.
- **Pursuant to Standard B** (Relation of Proposed Buildings to Environment),no buildings or structures are proposed for this project.
- **Pursuant to Standard C** (Drives, Parking, and Circulation), vehicle traffic and pedestrian traffic from the parking area will be kept separate using crosswalks creating access to the northern entrance of the building. No changes to drives or circulation are proposed.
- **Pursuant to Standard D** (Surface Water Drainage), required stormwater facilities are proposed and no adverse impacts to surface water drainage are expected to result from

the proposal. Special attention has been paid to the loading dock area in regards to storm water. Conditions of approval will ensure that changes to the loading dock will adequately address stormwater on site.

- **Pursuant to Standard E** (Utility Service), no above ground utility installations are proposed. Stormwater and sanitary sewage disposal facilities are indicated on the applicant's plan set.
- **Pursuant to Standard F** (Advertising Features), no signs are proposed as part of the current application; therefore, this standard does not apply.
- **Pursuant to Standard G** (Special Features), no special features are proposed for this project.

Applicability of Design Standards
Subsection 4.421 (.02)

B5. Design standards have been applied to all buildings, structures, and other site features.

Conditions of Approval
Subsection 4.421 (.05)

B6. Planning and Engineering have recommended conditions of approval to ensure the proper and efficient functioning of the development.

Color or Materials Requirements
Subsection 4.421 (.06)

B7. No new buildings or structures are proposed; therefore, this standard does not apply.

Site Design Review Submission Requirements

Submission Requirements
Section 4.440

B8. The applicant has submitted materials in addition to requirements of Section 4.035, as applicable.

Time Limit on Site Design Review Approvals

Time Limit on Approval
Section 4.442

B9. The applicant has indicated that they will pursue development within two (2) years of receiving approval. It is understood that the approval will expire after two (2) years if a building permit has not been issued, unless an extension has been granted by the Development Review Board.

Installation of Landscaping

Landscape Installation or Bonding
Subsection 4.450 (.01)

B10. A Condition of Approval will assure installation or 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
Subsection 4.450 (.02)

B11. Action by the City approving a proposed landscape plan is binding on the applicant. 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)

B12. A Condition of Approval will ensure landscaping is continually maintained in accordance with this subsection.

Modifications of Landscaping
Subsection 4.450 (.04)

B13. 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

B14. The proposed design provides for protection of natural features and other resources consistent with the purpose and objectives of site design review.

Landscaping Standards

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

B15. 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.

B16. 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 occurring concurrently with Modifications to the Stage 2 Final

Plan, which includes a thorough analysis of the functional application of the landscaping standards.

Landscape Area and Locations
Subsection 4.176 (.03)

B17. Landscaping is proposed throughout the parking area. Materials achieve a balance between various plant forms, textures, and heights, and native plant materials are used where practicable.

Buffering and Screening
Subsection 4.176 (.04)

B18. Consistent with the Modification to the Stage 2 Final Plan, adequate screening is proposed.

Sight-Obscuring Fence or Planting
Subsection 4.176 (.05)

B19. Site obscuring fencing and plantings are not proposed.

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

B20. A Condition of Approval will require that the detailed requirements of this subsection are met.

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

B21. A Condition of Approval will require all trees to be a minimum of 2-inch caliper, balled and burlapped (B&B), well-branched, and typical of their type as described in Current American Association of Nurserymen (AAN) Standards.

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

B22. The applicant has provided sufficient information in their Landscape Plans showing the proposed landscape design meets the standards of this subsection.

Exceeding Plant Standards
Subsection 4.176 (.06) G.

B23. The selected landscape materials do not violate any height or vision clearance requirements.

Landscape Installation and Maintenance
Subsection 4.176 (.07)

B24. Conditions of Approval ensure that installation and maintenance standards are or will be met including that plant materials be installed to current industry standards and properly

staked to ensure survival, and that plants that die are required to be replaced in kind, within one growing season, unless appropriate substitute species are approved by the City. Notes on the applicant's Landscape Plan provide for an irrigation system.

Landscape Plans
Subsection 4.176 (.09)

B25. The applicant's submitted plans provide the required information identifies water usage area for site landscaping.

Completion of Landscaping
Subsection 4.176 (.10)

B26. The applicant has not requested to defer installation of plant materials.

Outdoor Lighting

Applicability
Sections 4.199.20 and 4.199.60

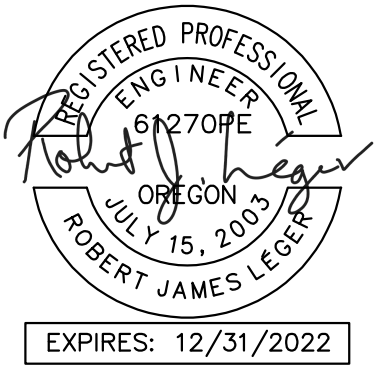
B27. Per the applicant's code response narrative, no outdoor lighting is proposed with the current application.

Stormwater Calculations

ESS, Inc. - Site Updates

26440 SW Parkway Avenue

Wilsonville, OR 97070



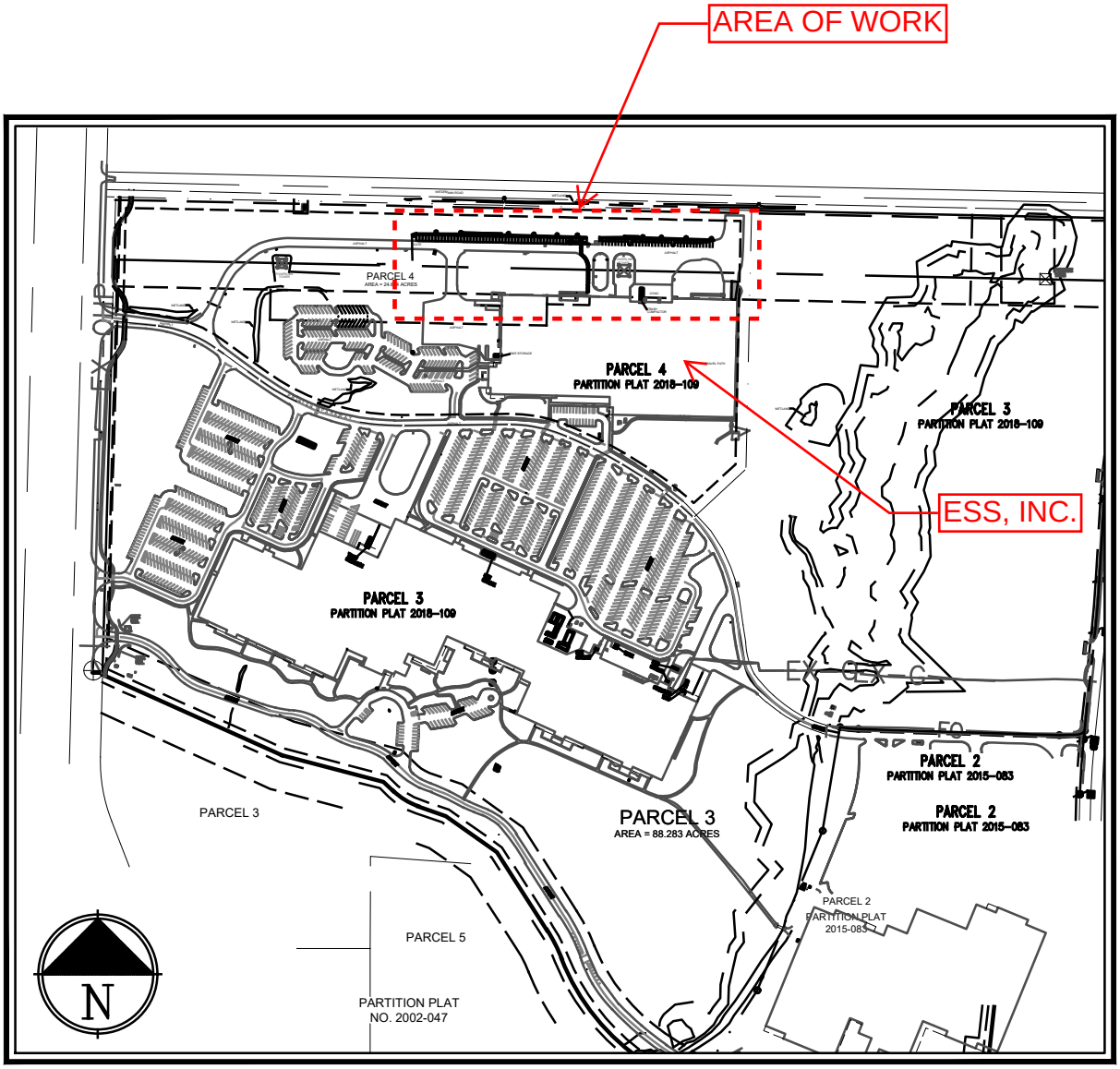
DCI Job Number 21032-0041

December 15, 2022

City of Wilsonville
Exhibit B3 DB22-0008

Table of Contents

Section I: Site Background Information



VICINITY MAP

Section I-2: Project Information

The ESS, Inc. site is located at 26440 SW Parkway Avenue in Wilsonville, Oregon and borders Printer Parkway to the south, SW Parkway Avenue to the west, undeveloped land to the east, and private development and undeveloped land to the north. This stormwater report contains information for the addition of a private onsite stormwater quality and quantity control system to support the new improvements.

The existing site conditions contain one large concrete tilt wall warehouse building with loading docks, parking areas, a stormwater conveyance system, and scattered trees. The new work includes the conversion of a dock-high loading dock to a drive-up ramp door, the addition of 80+ parking spaces, new asphalt paving, and stormwater swales for treatment and detention. Most of the onsite conditions will remain as-is.

Internal tenant improvement work is also planned, but the building footprint will remain the same.

The existing stormwater discharge for the site is to private underground onsite stormwater conveyance pipes. The new stormwater swales are located in the vicinity of two existing catch basins, which will be replaced and used as overflow structures for the stormwater swale after treatment and detention.

Impervious areas on site will be increased by approximately 10,755 sf. The loading dock will also be replaced with a ramp and the replacement area totals an additional 855 sf of impacted area. The swales are designed to treat and detain approximately 11,610 sf, which is a combination of both new and replaced impervious areas from the both the parking field and loading ramp. In addition, the proposed swales are designed to capture the surrounding existing pavement area that was historically draining to this grassed area prior to any construction.

All of the new impervious parking stall area will be directed north to be captured and treated in the proposed stormwater facilities (vegetated swales with underdrains and overflow catch basins) in the northeast corner of the property. The stormwater facilities for the new impervious area are designed to meet City of Wilsonville stormwater requirements. Since high groundwater and poor infiltration rates are expected, the sizing of the swales will exceed the BMP Sizing Tool results to meet the 10% recommendation in the Manual.

Section I-3: Stormwater Narrative

The proposed site improvements are designed to provide stormwater swales for stormwater water quality and quantity compliance. The WES BMP Sizing Tool was used for minimum swale sizing for the new and replaced impervious areas. No analysis or upgrades have been proposed to other existing areas of the site.

Site Area

Stormwater runoff from the proposed site improvements is designed to be captured and conveyed to the existing stormwater conveyance system. New stormwater swales have been sized to treat at least the new and replaced impervious areas of 11,610 sf. Areas included in the 11,610 sf total are the new parking area and the new ramp area.

The new ramp area does not connect to the treatment/detention swales north of the site due to historic flow directions and distance constraints. To offset the new ramp area, which is replacing existing concrete at a 1:1 ratio and adding 105 sf of new impervious area, the northern swales are designed to capture, treat, and meet source control requirements for an equivalent portion of existing asphalt area closer to the swale that was previously untreated or detained. The new ramp area is approximately 960 sf of replaced and new concrete area and the swale is proposing to capture an additional 960 sf of existing asphalt pavement area to account for the new ramp area being unable to reach the swale. The eastern swale is sized to capture, treat, and meet source control requirements for the new asphalt area being constructed, as well as an additional 960 sf of impervious area from the surrounding existing pavement.

The swales are located at the head of the new parking stalls at the northeast corer of the site. The swales will be a minimum of 8’ wide to provide 1’ of depth and a minimum 2’ wide bottom area, with 3:1 side slopes. High groundwater and poor infiltration rates are present, and each swale is designed with an overflow catch basin and underdrain lines with a 1” orifice for required water quality and detention standards.

The WES BMP Sizing Tool was used for each swale to compute the minimum required square footage of each swale based on contributing impervious area. The western swale is receiving approximately 8,330 sf of new asphalt area for parking and the swale is providing 880 sf of treatment area, which is more than the required amount of 500 sf from the WES BMP Sizing Tool. The eastern swale is receiving approximately 3,280 sf of new asphalt area and existing asphalt area to offset the replaced loading dock area.

The eastern swale provides 328 sf of area, which is higher than the minimum required 196.8 sf from the WES BMP Sizing Tool. Both printouts of calculations can be found in section II-1 of this report. An area summary tabulation is in section II-2 of this report.

This site has high groundwater and low infiltration rates, so in addition to the WES BMP Sizing Tool, the swale has been designed to be sized per the manual to have at least 10% of the contributing impervious area, or 1,161 sf minimum. The design of the swale provides 1,208 sf, which exceeds the 10% threshold, and exceeds the WES BMP Sizing Tool required area.

Small conveyance swales on each side of the treatment swales will direct runoff from the new parking stalls to the treatment swales. These conveyance swales have not been designed to be considered as treatment or detention, but will provide benefits for both treatment and detention after growth has been established.

The annual storm events are anticipated to be contained within the swale. Higher level storm events, such as the 100-year event, are designed to be conveyed to the new oversized vegetated swale facility and connected conveyance swales. Runoff from higher level storm events are able to be detained in the volume of the swale.

The stormwater facilities are designed to be unlined with drainage rock to allow infiltration into the native soils. The hydrologic soil group is rated as C/D by the USGS Soil Survey, and infiltration rates are low. Group C was used as the area would be considered a “drained” area. The observed infiltration rate determined by the geotechnical investigation report is 0.9 in/hr at 2’ below grade and 2.5 in/hr at 4’ below grade.

Conveyance

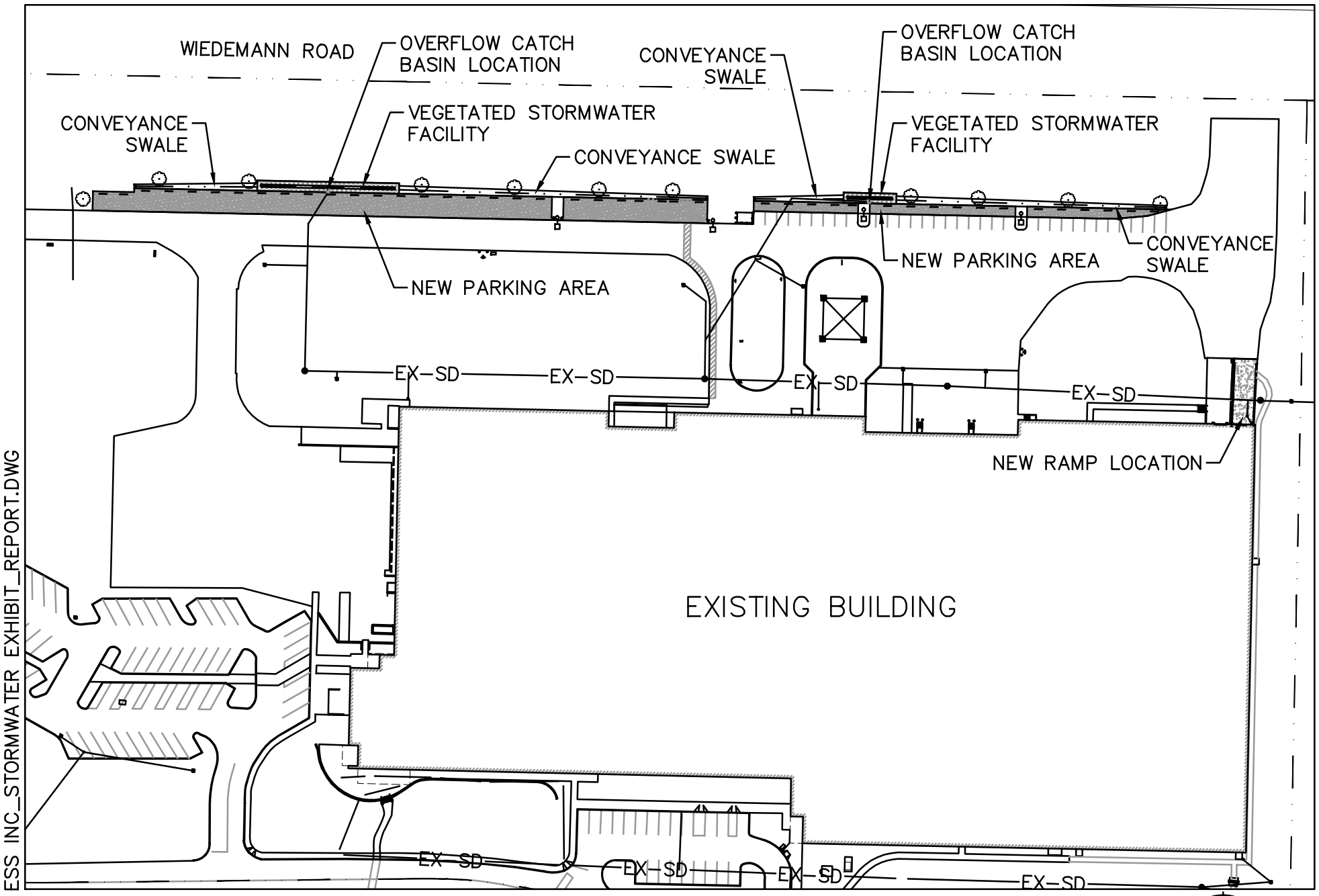
The site has existing stormwater pipe laterals to the swale areas, which will be disconnected from the existing catch basins and re-connected to the overflow inlets. No new storm lines are anticipated to be created with this design. The existing site did not have a detention or treatment facility, so existing flows would generally be discharged quickly through catch basins. The proposed site provides volume through oversized detention and conveyance swales to help detain and treat the water prior to entering the existing stormwater system. The new ramp is maintaining historic flow rates to the adjacent catch basin.

Stormwater Quality Control

The area provided for stormwater quality control was initially based on the BMP Sizing Tool, which was then increased to a higher value of 10% of the affected impervious area, per the Manual due to soil and groundwater conditions. This larger swale size will provide over 60% more square footage than the facility is required per the BMP method, as well as provide additional storage volume that will allow more stormwater to be treated and infiltrated, as opposed to leaving the area without treatment.

Stormwater Quantity Control (Detention)

The BMP Sizing Tool sized the facility for detention, and the swale area will be increased per the Manual due to the soil and groundwater conditions. This extra sizing factor will provide additional storage volume and lower outflow rates. The sizing factor used is 10% of the total new and disturbed impervious areas, which exceeds the design requirement from the WES BMP Sizing Tool.



ESS INC_STORMWATER EXHIBIT_REPORT.DWG

STORMWATER FACILITIES MAP

SECTION 1-4

SCALE: 1"=100'

Section II: Onsite Stormwater Design Information

WEST SWALE

WES BMP Sizing Software Version 1.6.0.2, May 2018

WES BMP Sizing Report

Project Information

Project Name	ESS, Inc. - Wilsonville
Project Type	Addition
Location	26440 SW Parkway Ave.
Stormwater Management Area	8330
Project Applicant	LRS Architects
Jurisdiction	OutofDistrict

Drainage Management Area

Name	Area (sq-ft)	Pre-Project Cover	Post-Project Cover	DMA Soil Type	BMP
DMA-Added Parking	8,330	Grass	ConventionalConcrete	C	Vegetated Swale

LID Facility Sizing Details

LID ID	Design Criteria	BMP Type	Facility Soil Type	Minimum Area (sq-ft)	Planned Areas (sq-ft)	Orifice Diameter (in)
Vegetated Swale	FlowControlAndTreatment	Vegetated Swale - Filtration	C3	499.8	880.0	0.9

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.

Due to groundwater and poor infiltration rates, the swale is sized per the manual to be at least 10% of the contributing area (1,161 sf total).

The swale will be split into two separate facilities, sized appropriately for their contributing area.

EAST SWALE

WES BMP Sizing Software Version 1.6.0.2, May 2018

WES BMP Sizing Report

Project Information

Project Name	ESS, Inc. - Wilsonville
Project Type	Addition
Location	26440 SW Parkway Ave.
Stormwater Management Area	3280
Project Applicant	LRS Architects
Jurisdiction	OutofDistrict

Drainage Management Area

Name	Area (sq-ft)	Pre-Project Cover	Post-Project Cover	DMA Soil Type	BMP
DMA-Added Parking	3,280	Grass	ConventionalConcrete	C	Vegetated Swale

LID Facility Sizing Details

LID ID	Design Criteria	BMP Type	Facility Soil Type	Minimum Area (sq-ft)	Planned Areas (sq-ft)	Orifice Diameter (in)
Vegetated Swale	FlowControlAndTreatment	Vegetated Swale - Filtration	C3	196.8	328.0	0.5

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.

Due to groundwater and poor infiltration rates, the swale is sized per the manual to be at least 10% of the contributing area (1,161 sf total).

The swale will be split into two separate facilities, sized appropriately for their contributing area.

Section II-2: Impervious Area Summary

Impervious Area Table:

Basin	Area (sf)
New Pavement Area (West Parking)	8,330
New Pavement Area (East Parking)	2,320
New and Replaced Pavement Area (Dock)	960
Total Disturbed Impervious Area	11,610

There are two swales on site: a west swale and an east swale. The west swale captures, treats, and provides runoff control for the new pavement area for the west parking. The east swale captures, treats, and provides runoff control for the new pavement area for the east parking, as well as additional existing asphalt area to offset the replaced dock area.

Swale Summary Table:

Basin	Contributing Imp. Area (sf)	Swale Area Provided (sf)	Swale Area Required (sf)
West Swale	8,330	880	499.8
East Swale	3,280	328	196.8

For this site, the soils are low draining and there is high groundwater present. Due to this, the swales are designed to be at least 10% of the disturbed impervious area.

10% x Total Disturbed Impervious Area = Minimum swale size

0.10 x 11,610 sf = 1,161 sf minimum

The total design area of the swale is 1,208 sf, therefore it satisfies the 10% impervious area requirement.

In addition, the proposed 1,208 sf swale exceeds the WES BMP Sizing Tool estimate of minimum area for both the western and eastern swales. The proposed swales provide approximately 2x the amount of required area from the WES BMP sizing tool.

Appendix

Appendix A

Soil Survey and Hydrologic Classification

Hydrologic Soil Group—Clackamas County Area, Oregon
(ESS, Inc.)

Map Scale: 1:1,880 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

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: Apr 16, 2021—Apr 18, 2021

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	8.6	77.4%
2225A	Huberly silt loam, 0 to 3 percent slopes	C/D	2.5	22.6%
Totals for Area of Interest			**11.1**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

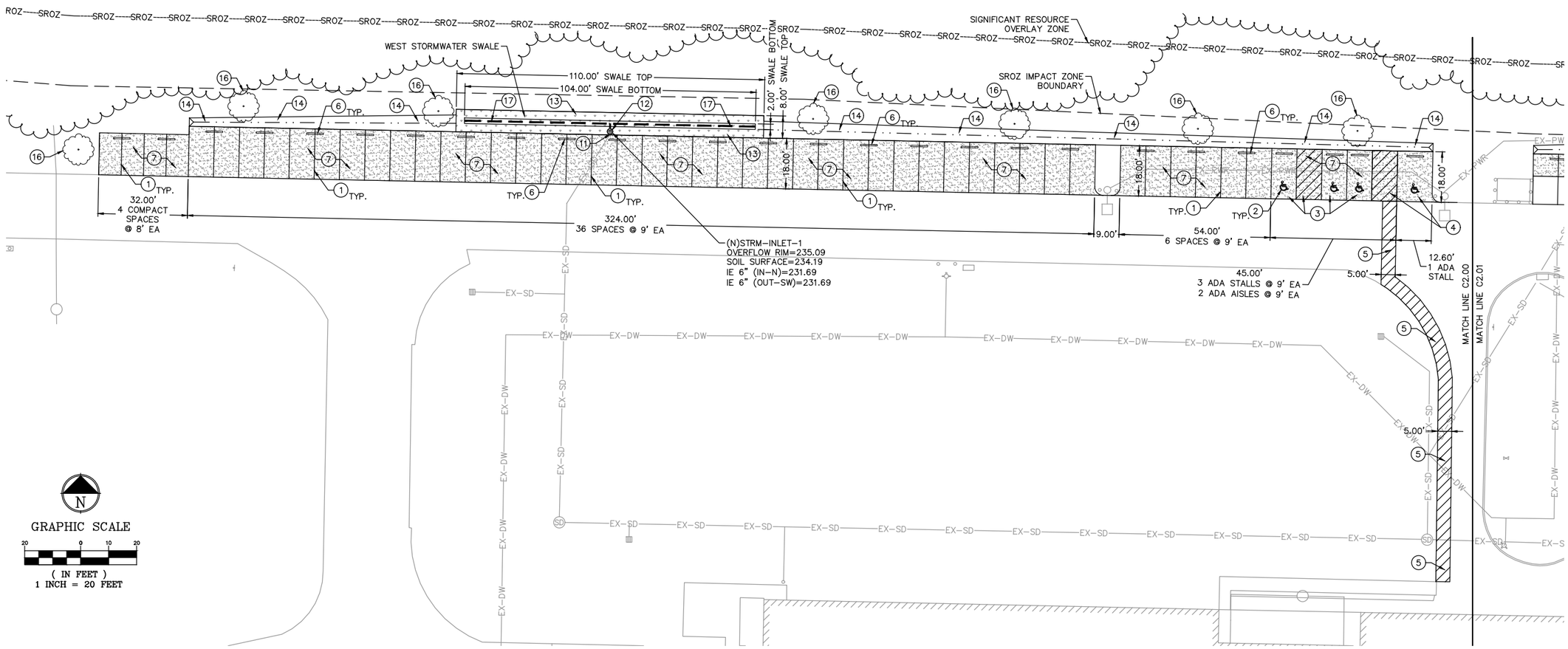
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Appendix B

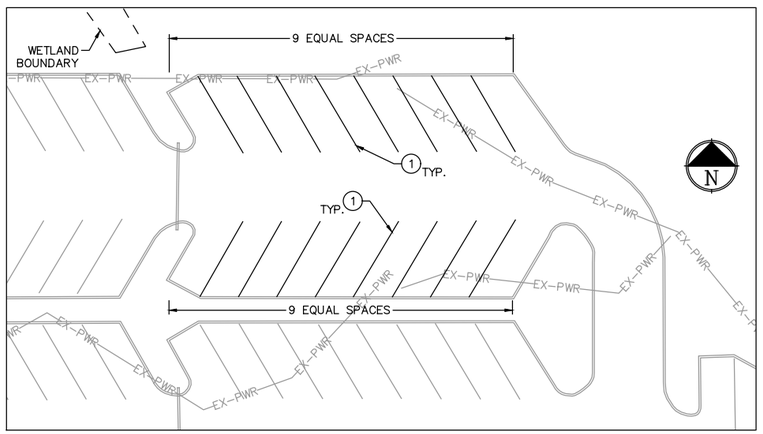
Reference Stormwater Plan Sheets



GRAPHIC SCALE

20 0 10 20

(IN FEET)
1 INCH = 20 FEET



GRAPHIC SCALE

20 0 10 20

(IN FEET)
1 INCH = 20 FEET

SOUTHWEST PARKING AREA

SITE LAYOUT AND STORMWATER GENERAL NOTES:

1. TRAFFIC CONTROL FOR THE SITE SHALL FOLLOW THE PROVISIONS IN THE LATEST VERSION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
2. SIDEWALK CROSS SLOPES SHALL BE 1.5% MAXIMUM TOWARDS THE PARKING FIELD, WHERE APPLICABLE.
3. REFER TO LANDSCAPING NOTES ON SHEET C4.00 FOR LANDSCAPE REQUIREMENTS.
4. ALL DRAINAGE AND UTILITY STRUCTURES SHALL BE INSTALLED SO THAT RIM ELEVATIONS CAN BE ADJUSTED TO MATCH FINISHED GRADE.
5. SWALE DIMENSIONS SHOWN ARE TO BOTTOM OF SWALE, UNLESS INDICATED OTHERWISE.
6. IN AREAS WHERE STORMWATER LINES ARE LESS THAN 36", THE STORMWATER LINE SHALL BE COMPRISED OF DUCTILE IRON, CLASS-51 CEMENT LINED PIPE (DI CL-51).

LEGEND

- NEW ASPHALT CONCRETE PAVEMENT AREA
- NEW PORTLAND CEMENT CONCRETE AREA
- NEW VEGETATED SWALE AREA

(X) SITE LAYOUT AND STORMWATER KEYNOTES:

1. PAINT NEW 4" WIDE, WHITE STRIPE.
2. PAINT NEW ADA WHEELCHAIR SYMBOL. SEE DETAIL 1/C5.00.
3. CONSTRUCT NEW ACCESSIBLE PARKING AREA AND LANDING ZONE. AREA SHALL NOT EXCEED 1.8% IN ANY DIRECTION. SEE DETAIL 1/C5.00.
4. CONSTRUCT NEW VAN-ACCESSIBLE PARKING AREA AND LANDING ZONE. AREA SHALL NOT EXCEED 1.8% IN ANY DIRECTION. SEE DETAIL 1/C5.00.
5. PAINT NEW ACCESSIBLE PATH. STRIPING SHALL BE COMPRISED OF 4" WIDE, WHITE STRIPES AT A 45° ANGLE, SPACED 2' ON CENTER, WITH 4" WIDE, WHITE CONTINUOUS STRIPING ALONG EDGES. PATH SHALL BE 5' WIDE.
6. INSTALL CONCRETE WHEELSTOP, 5' LONG, 8" WIDE. CENTER BETWEEN SPACES AND SECURE TO PAVEMENT.
7. CONSTRUCT ASPHALT CONCRETE PAVEMENT SECTION. SEE DETAIL 3/C5.00 AND CITY OF WILSONVILLE DRAWING NUMBER RD-1170/C5.00.
8. CONSTRUCT NEW THICKENED PORTLAND CEMENT CONCRETE PAVEMENT SECTION. SEE DETAIL 2/C5.00.
9. CONSTRUCT NEW RAMP PER GRADING DETAILS ON SHEET C3.10.
10. CONSTRUCT NEW STRUCTURAL WALL AND GUARDRAIL ALONG RAMP PER DETAIL 1/C5.01.
11. CONNECT EXISTING STORMWATER LINES TO THE NEW CATCH BASIN USING APPROVED PREMANUFACTURED FITTINGS.
12. CONSTRUCT NEW 24" DIAMETER NYLOPLAST OVERFLOW INLET WITH GRATE PER CITY OF WILSONVILLE DRAWING NUMBER S-2112/C5.00. 6" UNDERDRAIN PIPES SHALL CONNECT TO THE NEW BASIN WITH REMOVABLE CAPS WITH 1" DRILLED ORIFICES.
13. CONSTRUCT UNLINED STORMWATER SWALE PER CITY OF WILSONVILLE DRAWING NUMBER ST-6045/C5.01. SIDE SLOPES SHALL BE 3H:1V, MAXIMUM. AREAS WITHIN SWALE BASINS SHALL BE PROTECTED FROM USE AS CONSTRUCTION STORAGE AREAS AND OVER-COMPACTION BY EQUIPMENT THROUGHOUT THE CONSTRUCTION PERIOD.
14. CONSTRUCT STORMWATER CHANNEL FOR RUNOFF PER GRADING PLANS C3.00 AND C3.01. SEE CROSS SECTION DETAIL, SHEET C3.10.
15. ADJUST EXISTING STORMWATER CLEANOUT RIM IN NEW RAMP TO FINISH GRADE.
16. INSTALL NEW TREE PER CITY OF WILSONVILLE DRAWING NUMBER P-5000/C5.01. TREE SHALL BE 1" CALIPER MINIMUM TILIA CORDATA, LITTLELEAF LINDEN.
17. CONSTRUCT NEW 6" PERFORATED PVC UNDERDRAIN LINE BENEATH STORMWATER SWALE. CONNECT TO OVERFLOW INLET USING APPROVED FITTINGS. UNDERDRAIN SHALL BE EMBEDDED IN DRAIN ROCK SECTION, WITH INVERT ELEVATION BEING APPROXIMATELY 2.50' BELOW SOIL SURFACE.
18. EXTERIOR DOWNSPOUT LINE TO REMAIN. INSTALL CONCRETE FILLED BOLLARD OR OTHER PROTECTION.

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PROJECT LEAD: KYLE LABHART, P.E.

SIGNATURE:
REGISTERED PROFESSIONAL ENGINEER
OREGON JULY 15, 2014
ROBERT JAMES LABHART
61270PE
EXPIRES: 12/31/2022

REVISIONS:

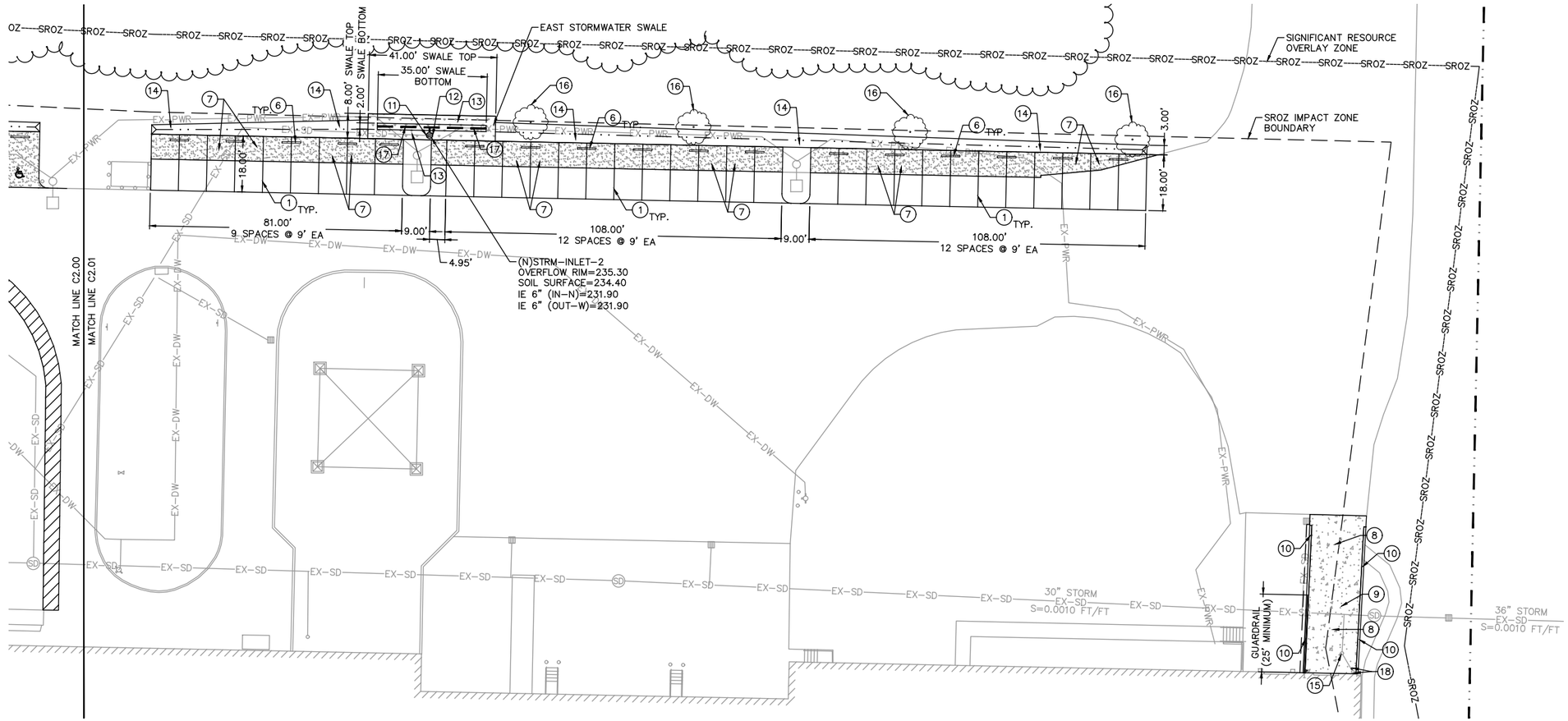
APPROVALS:
Job No.: 21032-0041
Proj. Manager: RJL
Designed: KLE
Reviewed: RJL
Drawn: KLE
Dwg. Checked: RJL
Scale: AS SHOWN

PROJECT TITLE:
ESS INC. SITE IMPROVEMENTS

SHEET TITLE:
SITE LAYOUT AND STORMWATER PLAN - WEST

SHEET NO.
C2.00

Plot Date: 2022-12-14 File Location: O:\0320-Portland\DCI-Civil\2021\21032-0041 ESS Inc\0-DRAWINGS\SHEETS\21032-0041_LAYOUT-STRM-PLAN.dwg



GRAPHIC SCALE

20 0 10 20

(IN FEET)

1 INCH = 20 FEET

SITE LAYOUT AND STORMWATER GENERAL NOTES:

1. TRAFFIC CONTROL FOR THE SITE SHALL FOLLOW THE PROVISIONS IN THE LATEST VERSION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
2. SIDEWALK CROSS SLOPES SHALL BE 1.5% MAXIMUM TOWARDS THE PARKING FIELD, WHERE APPLICABLE.
3. REFER TO LANDSCAPING NOTES ON SHEET C4.00 FOR LANDSCAPE REQUIREMENTS.
4. ALL DRAINAGE AND UTILITY STRUCTURES SHALL BE INSTALLED SO THAT RIM ELEVATIONS CAN BE ADJUSTED TO MATCH FINISHED GRADE.
5. SWALE DIMENSIONS SHOWN ARE TO BOTTOM OF SWALE, UNLESS INDICATED OTHERWISE.
6. IN AREAS WHERE STORMWATER LINES ARE LESS THAN 36", THE STORMWATER LINE SHALL BE COMPRISED OF DUCTILE IRON, CLASS-51 CEMENT LINED PIPE (DI CL-51).

LEGEND

NEW ASPHALT CONCRETE PAVEMENT AREA

NEW PORTLAND CEMENT CONCRETE AREA

NEW VEGETATED SWALE AREA

(X) SITE LAYOUT AND STORMWATER KEYNOTES:

1. PAINT NEW 4" WIDE, WHITE STRIPE.
2. PAINT NEW ADA WHEELCHAIR SYMBOL. SEE DETAIL 1/C5.00.
3. CONSTRUCT NEW ACCESSIBLE PARKING AREA AND LANDING ZONE. AREA SHALL NOT EXCEED 1.8% IN ANY DIRECTION. SEE DETAIL 1/C5.00.
4. CONSTRUCT NEW VAN-ACCESSIBLE PARKING AREA AND LANDING ZONE. AREA SHALL NOT EXCEED 1.8% IN ANY DIRECTION. SEE DETAIL 1/C5.00.
5. PAINT NEW ACCESSIBLE PATH. STRIPING SHALL BE COMPRISED OF 4" WIDE, WHITE STRIPES AT A 45° ANGLE, SPACED 2' ON CENTER, WITH 4" WIDE, WHITE CONTINUOUS STRIPING ALONG EDGES. PATH SHALL BE 5' WIDE.
6. INSTALL CONCRETE WHEELSTOP, 5' LONG, 8" WIDE. CENTER BETWEEN SPACES AND SECURE TO PAVEMENT.
7. CONSTRUCT ASPHALT CONCRETE PAVEMENT SECTION. SEE DETAIL 3/C5.00 AND CITY OF WILSONVILLE DRAWING NUMBER RD-1170/C5.00.
8. CONSTRUCT NEW THICKENED PORTLAND CEMENT CONCRETE PAVEMENT SECTION. SEE DETAIL 2/C5.00.
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15. ADJUST EXISTING STORMWATER CLEANOUT RIM IN NEW RAMP TO FINISH GRADE.
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17. CONSTRUCT NEW 6" PERFORATED PVC UNDERDRAIN LINE BENEATH STORMWATER SWALE. CONNECT TO OVERFLOW INLET USING APPROVED FITTINGS. UNDERDRAIN SHALL BE EMBEDDED IN DRAIN ROCK SECTION, WITH INVERT ELEVATION BEING APPROXIMATELY 2.50' BELOW SOIL SURFACE.
18. EXTERIOR DOWNSPOUT LINE TO REMAIN. INSTALL CONCRETE FILLED BOLLARD OR OTHER PROTECTION.

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SIGNATURE:

REGISTERED PROFESSIONAL ENGINEER 61270PE OREGON JULY 15, 2014 ROBERT JAMES LEE

EXPIRES: 12/31/2022

REVISIONS:

APPROVALS:

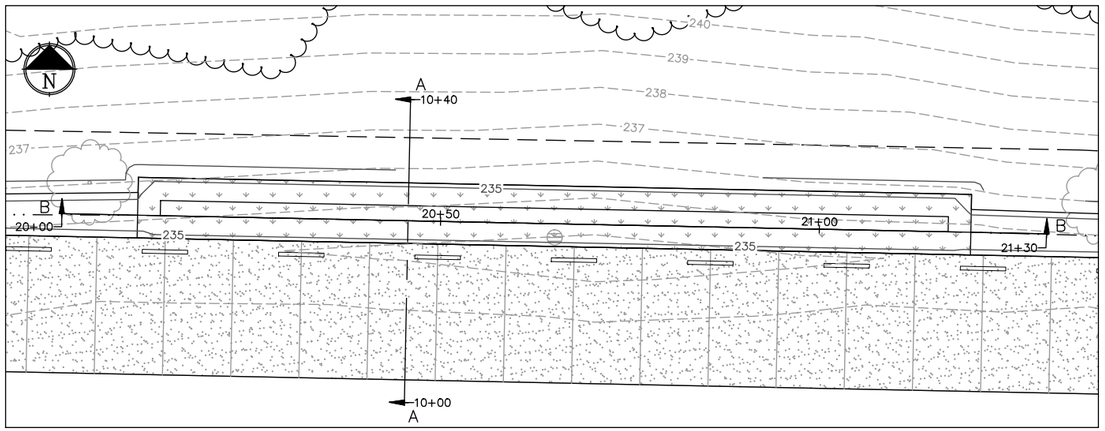
Job No.: 21032-0041
Proj. Manager: RJL
Designed: KLE
Reviewed: RJL
Drawn: KLE
Dwg. Checked: RJL
Scale: AS SHOWN

PROJECT TITLE:
ESS INC. SITE IMPROVEMENTS

SHEET TITLE:
SITE LAYOUT AND STORMWATER PLAN - EAST

SHEET NO.
C2.01

Plot Date: 2022-12-15 File Location: O:\0320-Portland\DCI\Civil\2021\21032-0041 ESS Inc\0-DRAWINGS\SHEETS\21032-0041_LAYOUT-STRM-PLAN.dwg



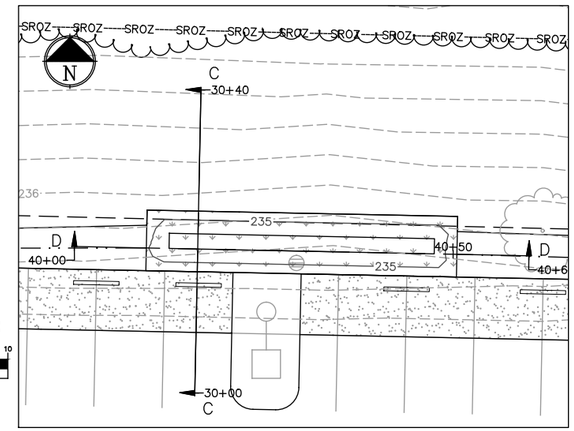
WEST SWALE – PLAN VIEW

SCALE: 1"=10'

GRAPHIC SCALE

10 0 5 10

(IN FEET)
1 INCH = 10 FEET



EAST SWALE – PLAN VIEW

SCALE: 1"=10'

LANDSCAPING NOTES:

1. LANDSCAPING REQUIREMENTS PER CITY OF WILSONVILLE SECTION 3 – PUBLIC WORKS STANDARDS: STORMWATER & SURFACE WATER DESIGN & CONSTRUCTION STANDARDS, 2015 ED.

2. THE WEST AND EAST SWALES ARE DESIGNATED "VEGETATED SWALE – FILTRATION" FACILITY TYPE, PER APPENDIX A OF THE STORMWATER & SURFACE WATER DESIGN & CONSTRUCTION STANDARDS, SECTION A.2.06.
   2.1. PLANTING ZONES WITHIN THE WEST AND EAST SWALES ARE MOISTURE ZONE (A) ONLY.

3. SECTION A.3.00 PLANTING METHODS: PER PART B.3. (b), PLANT QUANTITIES FOR MOISTURE ZONE (A) ARE AS FOLLOWS, PER 100 SF OF FACILITY AREA:
   3.1. 3 LARGE SHRUBS/SMALL TREES
   3.2. 4 SMALL SHRUBS
   3.3. 115 GROUNDCOVER PLANTS

4. PLANTING QUANTIES FOR WEST SWALE (SEE SWALE AREAS BELOW FOR REFERENCE):
   4.1. 27 LARGE SHRUBS
   4.2. 36 SMALL SHRUBS
   4.3. 1,012 GROUNDCOVER PLANTS

5. PLANTING QUANTIES FOR EAST SWALE (SEE SWALE AREAS BELOW FOR REFERENCE):
   5.1. 10 LARGE SHRUBS
   5.2. 14 SMALL SHRUBS
   5.3. 378 GROUNDCOVER PLANTS

6. PLANT SPECIES:
   6.1. LARGE SHRUBS SHALL BE SPIREA DOUGLASII, DOUGLAS SPIRAEA.
   6.2. SMALL SHRUBS SHALL BE PHYSOCARPUS CAPITATUS, PACIFIC NINEBARK.
   6.3. GROUNDCOVER PLANTS SHALL BE CORNUS SERICEA 'KELSEYI', KELSEY DOGWOOD.

7. NOTE: SPECIES SUBSTITUTIONS ARE ALLOWED AND MUST BE SELECTED FROM APPENDIX A, TABLE A–2, OF THE STORMWATER & SURFACE WATER DESIGN & CONSTRUCTION STANDARDS.

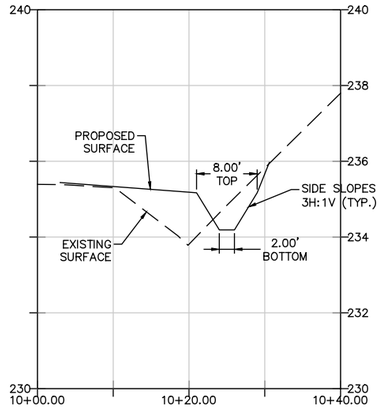
8. MINIMUM PLANT SIZES:
   8.1. LARGE SHRUBS: 30" HEIGHT
   8.2. SMALL SHRUBS/GROUNDCOVER: #1 CONTAINER
   8.3. HERBACEOUS PLANTS: SP #4 CONTAINER

9. CONVEYANCE SWALE LANDSCAPING SHALL BE GRASS (SEE OR SOD).

SWALE AREAS:

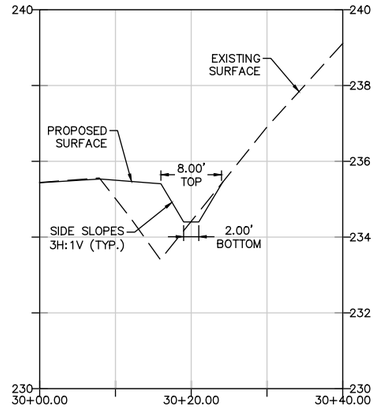
WEST SWALE: 880 SF

EAST SWALE: 328 SF



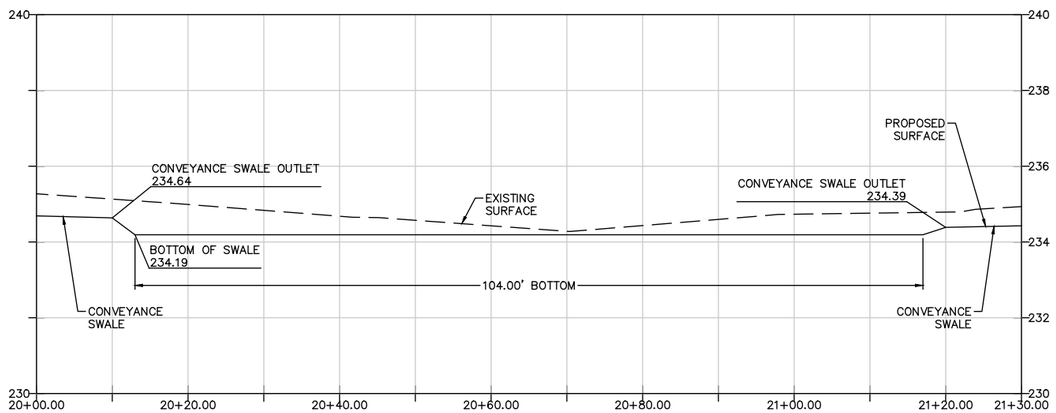
WEST SWALE – SECTION A–A

SCALE: 1"=10' H
1"=2' V



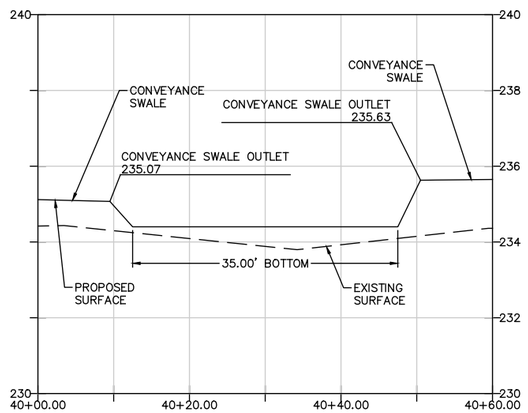
EAST SWALE – SECTION C–C

SCALE: 1"=10' H
1"=2' V



WEST SWALE – SECTION B–B

SCALE: 1"=10' H
1"=2' V



EAST SWALE – SECTION D–D

SCALE: 1"=10' H
1"=2' V

Plot Date: 2022-12-15 File Location: O:\0320-Portland\DCA-civil\2021\2103-2-0041 ESS Inc\0-DRAWINGS\SHEETS\21032-0041_GRAD-SECT-PLAN.dwg

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OREGON JULY 15, 2014 ROBERT JAMES LEVER
EXPIRES: 12/31/2022

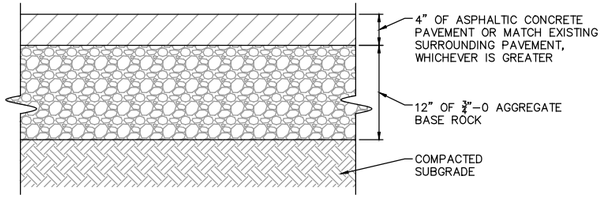
REVISIONS:

APPROVALS:
Job No.: 21032-0041
Proj. Manager: RJL
Designed: KLE
Reviewed: RJL
Drawn: KLE
Dwg. Checked: RJL
Scale: AS SHOWN

PROJECT TITLE:
ESS INC. SITE IMPROVEMENTS

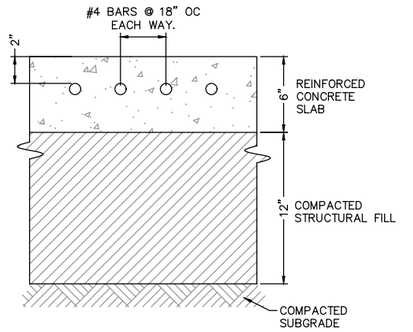
SHEET TITLE:
SWALE SECTIONS

SHEET NO.
C4.00

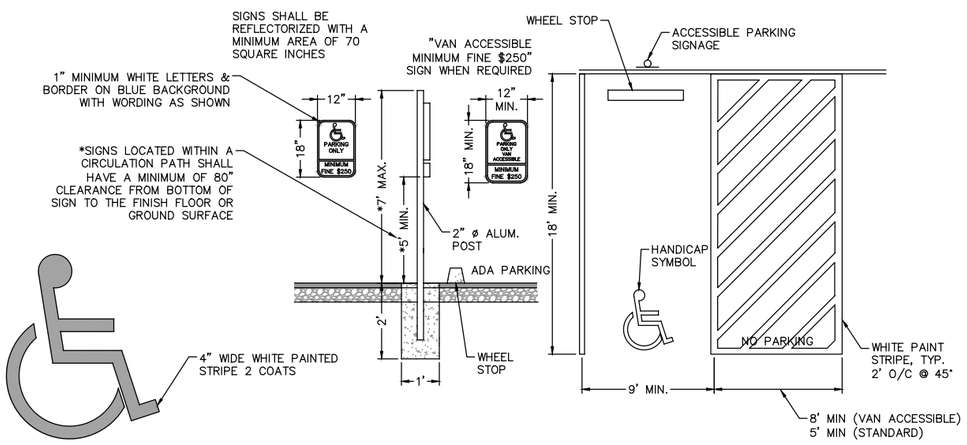


1. ASPHALT CONCRETE SHALL BE ½" LEVEL 2 WITH PG-64-22 ASPHALT BINDER. THE 6" ASPHALT CONCRETE SECTION SHALL BE PLACED IN (3) 2" LIFTS. THE ASPHALTIC CONCRETE PAVING MATERIAL SHALL BE COMPACTED TO A MINIMUM OF 92% OF THE THEORETICAL MAXIMUM DENSITY AS DETERMINED IN ACCORDANCE WITH ASTM D2041 (RICE GRAVITY TEST).
2. PAVEMENT BASE COURSE MATERIALS SHOULD CONSIST OF WELL-GRADED ¾"-0 CRUSHED BASE ROCK HAVING LESS THAN 5% FINE MATERIALS PASSING THE NO. 200 SIEVE. THE BASE COURSE AND ASPHALT CONCRETE MATERIALS SHOULD CONFORM TO THE REQUIREMENTS SET FORTH IN THE LATEST EDITION OF THE OREGON DEPARTMENT OF TRANSPORTATION, STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION. THE BASE COURSE MATERIALS SHALL BE COMPACTED TO A MINIMUM OF 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D1557 (MODIFIED PROCTOR TEST).
3. IF CONSTRUCTION OF THE IMPROVEMENTS IS PERFORMED DURING WET AND/OR INCLEMENT WEATHER CONDITIONS, THE AGGREGATE BASE ROCK SECTION SHALL BE INCREASED BY AT LEAST 6 INCHES.

ASPHALT PAVEMENT SECTION DETAIL — 3 / C5.00
SCALE: NTS

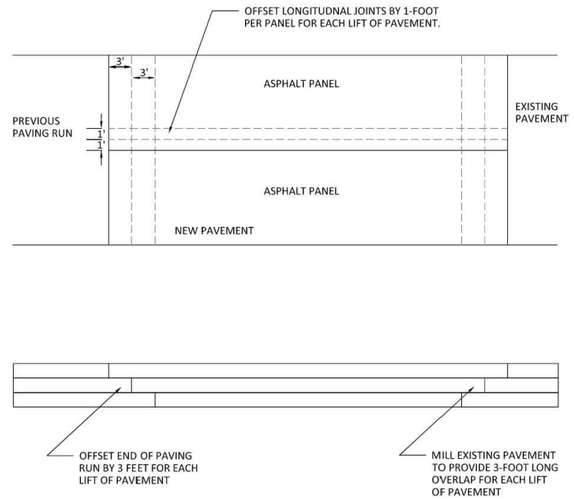


PCC CONCRETE PAVEMENT DETAIL — 2 / C5.00
SCALE: N.T.S.



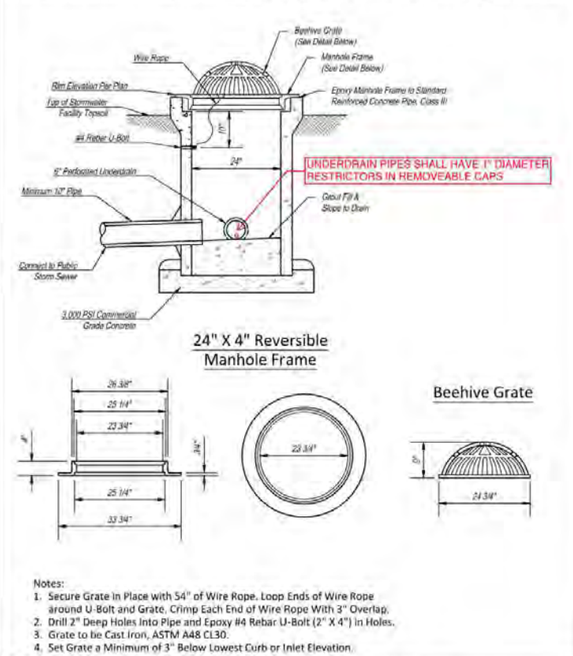
ACCESSIBLE PARKING SPACE — 1 / C5.00
SCALE: NTS

Plot Date: 2022-12-14 File Location: O:\0320-Portland\DCI-Civil\2021\21032-0041 ESS Inc\0-DRAWINGS\SHEETS\21032-0041_DETAILS.dwg



NOTES:
PRIOR TO PLACING NEW PAVEMENT, ASPHALT COLD JOINTS SHALL BE SAWCUT TO A STRAIGHT LINE, CREATING A SMOOTH, SOUND EDGE FOR JOINING NEW PAVEMENT.

Asphalt Concrete Pavement Placement Detail			CITY OF WILSONVILLE
DRAWING NUMBER: RD-1170	DRAWN BY: SR	SCALE: N.T.S.	
FILE NAME: RD-1170.DWG	APPROVED BY: NK	DATE: 4/2/14	PUBLIC WORKS STANDARDS



Notes:
1. Secure Grate in Place with 54" of Wire Rope. Loop Ends of Wire Rope around U-Bolt and Grate. Crimp Each End of Wire Rope With 3" Overlap.
2. Drill 2" Deep Holes Into Pipe and Epoxy #4 Rebar U-Bolt (2" X 4") in Holes.
3. Grate to be Cast Iron, ASTM A48 CL30.
4. Set Grate a Minimum of 3" Below Lowest Curb or Inlet Elevation.

Bee Hive Inlet and Grate			CITY OF WILSONVILLE
DRAWING NUMBER: S-2112	DRAWN BY: SR	SCALE: N.T.S.	
FILE NAME: S-2112.dwg	APPROVED BY: NK	DATE: 06/08/2017	PUBLIC WORKS STANDARDS

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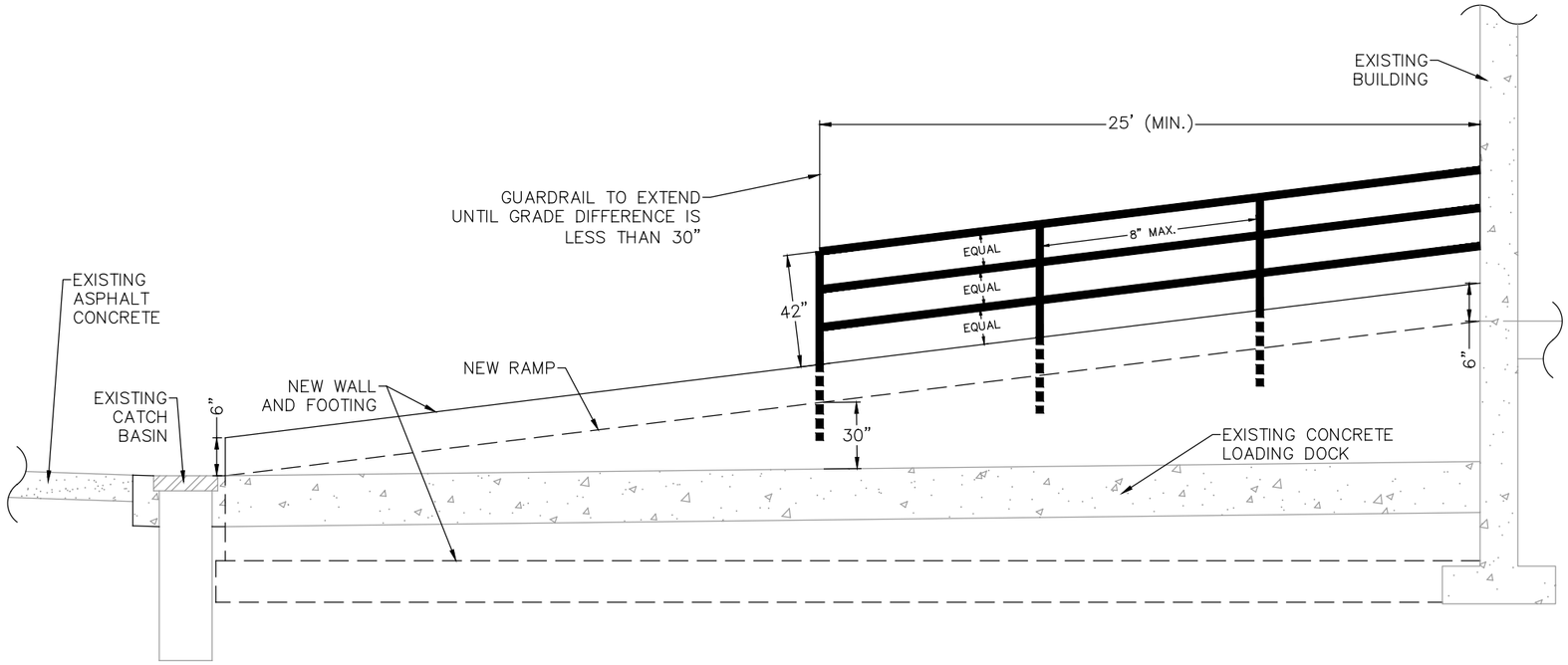
Scale: AS SHOWN

PROJECT TITLE:
ESS INC. SITE IMPROVEMENTS

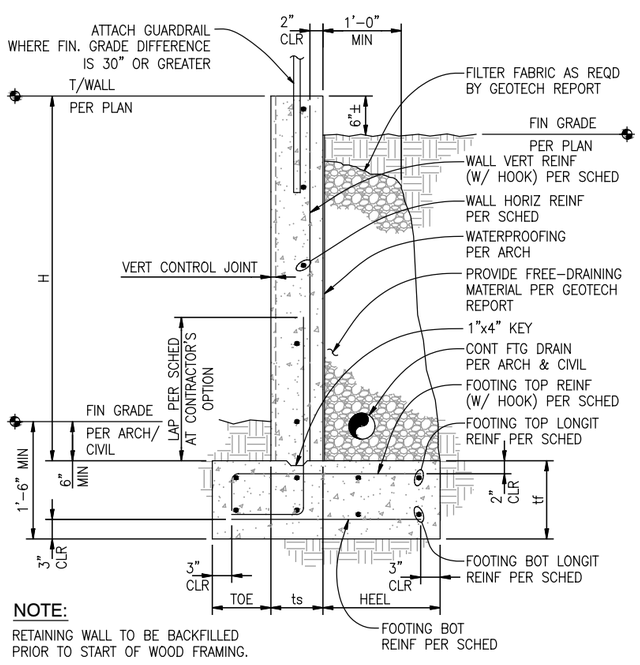
SHEET TITLE:
CIVIL DETAILS

SHEET NO.
C5.00



GUARDRAIL DETAIL
SCALE: N.T.S.

2
C5.01



NOTE:
RETAINING WALL TO BE BACKFILLED PRIOR TO START OF WOOD FRAMING.

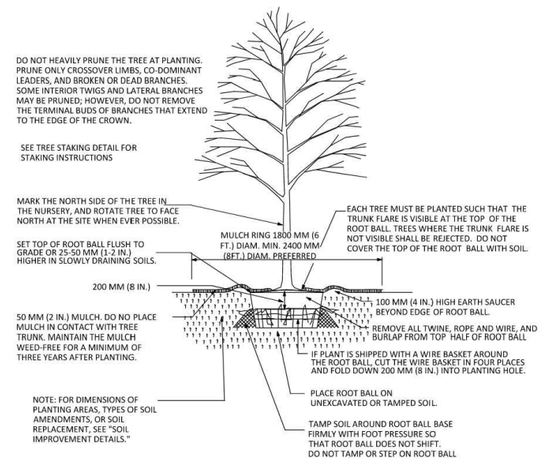
CANTILEVERED SITE RETAINING WALL AND SCHEDULE
SCALE: N.T.S.

1
C5.01

RETAINING WALL/FOOTING SCHEDULE

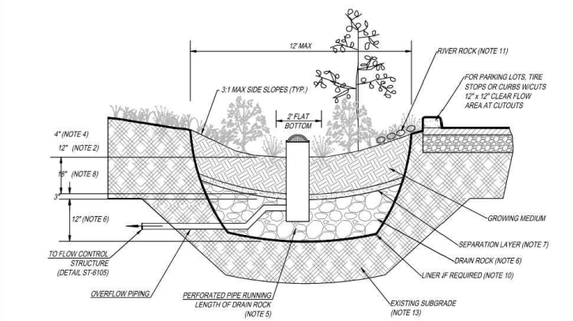
H	WALL/FOOTING SIZES				WALL REINFORCEMENT		FOOTING REINFORCEMENT			
	TOE	ts	HEEL	tf	VERTICAL	HORIZONTAL	TOP	TOP/LONGIT	BOTTOM/LONGIT	BOTTOM
UP TO 5'-0"	9"	8"	1'-3"	12"	#4 @ 16"OC	#5 @ 18"OC	#5 @ 10"OC	(3) #4	(3) #4	#5 @ 10"OC

Plot Date: 2022-12-14 File Location: O:\0320-Portland\DCI-Civil\2021\21032-0041 ESS Inc\0-DRAWINGS\SHEETS\21032-0041_DETAILS.dwg



NOTE: WIDTH OF PLANTING HOLE IS 3 TIMES ROOT BALL DIAMETER IN HIGHLY COMPACTED SOIL; 2 TIMES THE ROOT BALL DIAMETER MINIMUN IN ALL OTHERS.
THIS DETAIL ASSUMES THE PLANTING SPACE IS LARGER THAN 2400 MM (8 FT.) SQUARE, OPEN TO THE SKY, AND NOT COVERED BY ANY PAVING OR GRATING.

Tree Planting Detail - B & B Trees in all Soil Types			CITY OF WILSONVILLE
DRAWING NUMBER: P-5000	DRAWN BY: SJ	SCALE: N.T.S.	
FILE NAME: P-5000.dwg	APPROVED BY: SA	DATE: 3/22/06	PUBLIC WORKS STANDARDS



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 SWALES ARE PREFERRED TO ALLOW MAXIMUM INFILTRATION.
2. **DIMENSIONS:**
   -DEPTH OF SWALE (FROM TOP OF GROWING MEDIUM TO OVERFLOW ELEVATION): 12"
   -LONGITUDINAL SLOPE OF SWALE:6.0% OR LESS
   -FLAT BOTTOM WIDTH: 2' MINIMUM
   -SIDE SLOPES OF SWALE: 3:1 MAXIMUM
3. **LOCATION/SETBACKS:**
   -FILTRATION SWALES SHALL BE 10' FROM FOUNDATIONS AND 5' FROM PROPERTY LINES UNLESS APPROVED BY BUILDING OFFICIAL
4. **OVERFLOW:**
   -INLET ELEVATION SHALL ALLOW FOR 4" OF FREEBOARD, MIMIMUM.
   - PROTECT FROM DEBRIS AND SEDIMENT WITH STRAINER OR GRATE.
5. **PIPING:**
   -PERFORATED UNDER-DRAIN PIPING: SHALL BE ABS SCH. 40, CAST IRON, OR PVC SCH.40. MINIMUM DIAMETER IS 6". PIPING SHALL HAVE 1% GRADE AND 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" - 3/4" WASHED
   -DEPTH: 12"
7. **SEPARATION** BETWEEN DRAIN ROCK AND GROWING MEDIUM: SHALL BE A 3" LAYER OF 3/4" - 1/4" OPEN GRADED AGGREGATE.
8. **GROWING MEDIUM:**
   -18" MINIMUM
   -SEE APPENDIX C 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" TO 3", 4 SQUARE FEET, 6" DEEP.
12. **CHECK DAMS:** SHALL BE PLACED ACCORDING TO FACILITY DESIGN. REFER TO DETAIL ST-6100 FOR PROFILE AND SPACING.
13. **SEASONAL HIGH GROUNDWATER SEPARATION:**
    -SEPARATION DISTANCE AS REQUIRED BY CITY.

Vegetated Swale - Filtration			CITY OF WILSONVILLE
DRAWING NUMBER: ST-6045	DRAWN BY: SR	SCALE: N.T.S.	
FILE NAME: ST-6045.DWG	APPROVED BY: NK	DATE: 4/16/18	PUBLIC WORKS STANDARDS

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SIGNATURE:
REGISTERED PROFESSIONAL ENGINEER
OREGON JULY 15, 2022
ROBERT JAMES LEVEQUE
61270PE
EXPIRES: 12/31/2022

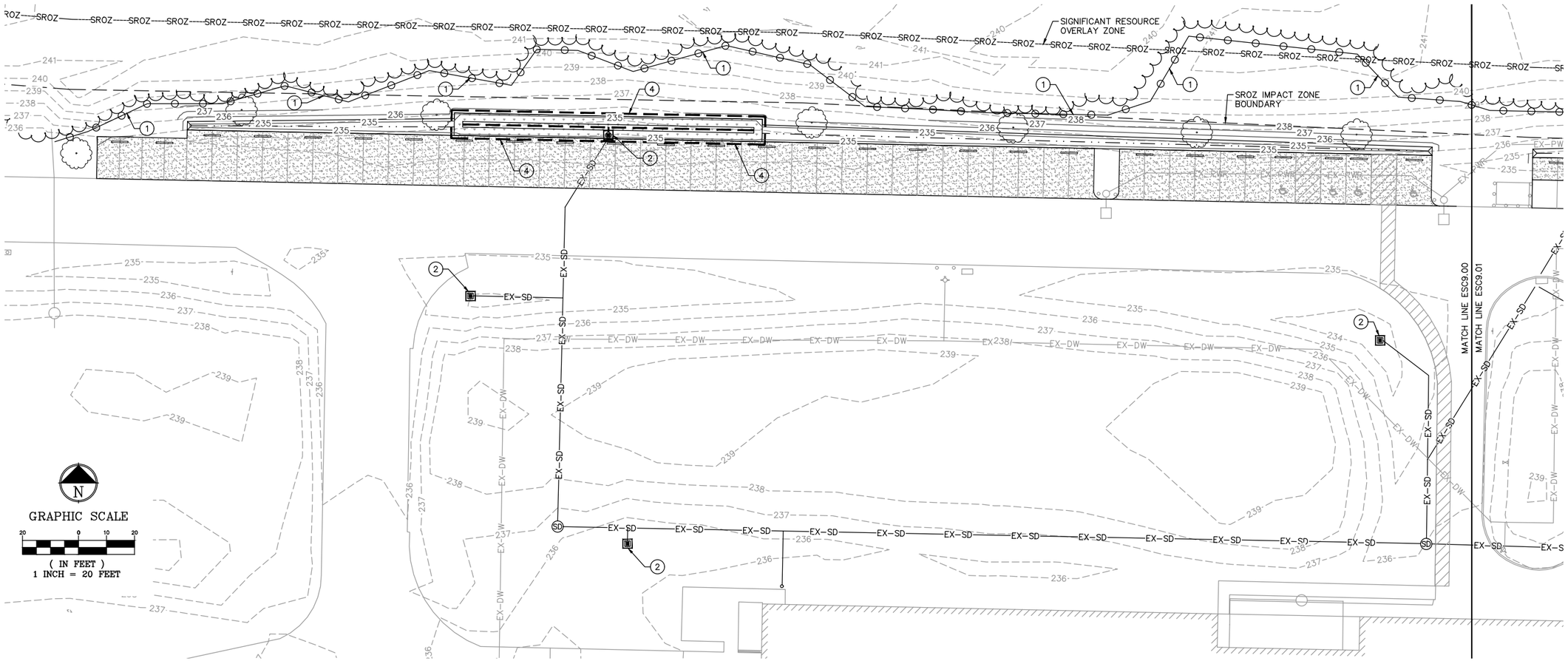
REVISIONS:

APPROVALS:
Job No.: 21032-0041
Proj. Manager: RJL
Designed: KLE
Reviewed: RJL
Drawn: KLE
Dwg. Checked: RJL
Scale: AS SHOWN

PROJECT TITLE:
ESS INC. SITE IMPROVEMENTS

SHEET TITLE:
CIVIL DETAILS

SHEET NO.
C5.01



EROSION AND SEDIMENT CONTROL GENERAL NOTES:

1. ALL BASE EROSION CONTROL MEASURES (INLET PROTECTION, PERIMETER SEDIMENT CONTROL, GRAVEL CONSTRUCTION ENTRANCES, ETC.) MUST BE IN PLACE, FUNCTIONAL, AND APPROVED IN AN INITIAL INSPECTION PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
2. SEDIMENT BARRIERS APPROVED FOR USE INCLUDE SEDIMENT FENCE, BERMS CONSTRUCTED OUT OF MULCH, CHIPPINGS, OR OTHER SUITABLE MATERIAL, STRAW WATTLES, OR OTHER APPROVED MATERIALS.
3. SENSITIVE RESOURCES, INCLUDING BUT NOT LIMITED TO, TREES, WETLANDS, AND RIPARIAN PROTECTION AREAS SHALL BE CLEARLY DELINEATED WITH ORANGE CONSTRUCTION FENCING OR CHAIN LINK FENCING IN A MANNER THAT IS CLEARLY VISIBLE TO ANYONE IN THE AREA. NO ACTIVITIES ARE PERMITTED TO OCCUR BEYOND THE CONSTRUCTION BARRIER.
4. CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING ON CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES INCLUDE, BUT ARE NOT LIMITED TO, STREET SWEEPING AND VACUUMING, MAY BE REQUIRED TO INSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.
5. RUN-ON AND RUN-OFF CONTROLS SHALL BE IN PLACE AND FUNCTIONING PRIOR TO BEGINNING SUBSTANTIAL CONSTRUCTION ACTIVITIES. RUN-ON AND RUNOFF CONTROL MEASURES INCLUDE, BUT ARE NOT LIMITED TO, SLOPE DRAINS (WITH OUTLET PROTECTION), CHECK DAMS, SURFACE ROUGHENING, AND BANK STABILIZATION.
6. THESE EROSION AND SEDIMENT CONTROL PLANS ASSUME "DRY WEATHER" CONSTRUCTION. "WET WEATHER" MEASURES NEED TO BE APPLIED BETWEEN OCTOBER 1ST AND MAY 31ST.

(X) EROSION AND SEDIMENT CONTROL KEYNOTES:

1. INSTALL AND MAINTAIN TEMPORARY 6' TALL CHAIN LINK TREE PROTECTION FENCE PER CITY OF WILSONVILLE DRAWING NUMBER RD-1230, SHEET ESC9.10. LOCATION OF FENCE SHALL BE INSTALLED AT THE TREE DRIP LINE. VERIFY TREE DRIP LINE IN THE FIELD PRIOR TO INSTALLING TREE PROTECTION FENCE. NO CONSTRUCTION ACTIVITIES OR MATERIAL STORAGE SHALL OCCUR WITHIN THE TREE PROTECTION ZONE.
2. INSTALL STORMWATER INLET PROTECTION PER CLACKAMAS COUNTY DETAIL DRAWING 4-18/ESC9.10.
3. INSTALL CONCRETE WASHOUT PER DETAIL 1/ESC9.10.
4. PROTECT STORMWATER SWALE FACILITY AREA. DO NOT COMPACT SOILS WITHIN STORMWATER FACILITY AREAS. STORMWATER AREAS SHALL PRESERVE EXISTING SOIL DENSITY BY LIMITING HEAVY MACHINERY AND VEHICLE TRACKING, AND STORAGE SHALL NOT OCCUR WITHIN THESE AREAS.

EROSION AND SEDIMENT CONTROL LEGEND

- FINISHED GRADE CONTOUR (1 FT INTERVAL) — 102 —
- EXISTING GRADE CONTOUR (1 FT INTERVAL) - - - 102 - - -
- SEDIMENT FENCE
- ORANGE CONSTRUCTION FENCE
- CONSTRUCTION ENTRANCE
- INFILTRATION FACILITY PROTECTION AREA (DO NOT COMPACT NATIVE SOILS AT FACILITY SUBGRADE ELEVATION)
- INLET PROTECTION
- SEEDING & MULCHING
- CONCRETE WASH AREA
- EROSION CONTROL MATTING
- DEVELOPED CONDITIONS DRAINAGE FLOW DIRECTION

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SIGNATURE:
REGISTERED PROFESSIONAL ENGINEER
61270PE
OREGON
JULY 15, 2014
ROBERT JAMES LUNA
EXPIRES: 12/31/2022

REVISIONS:

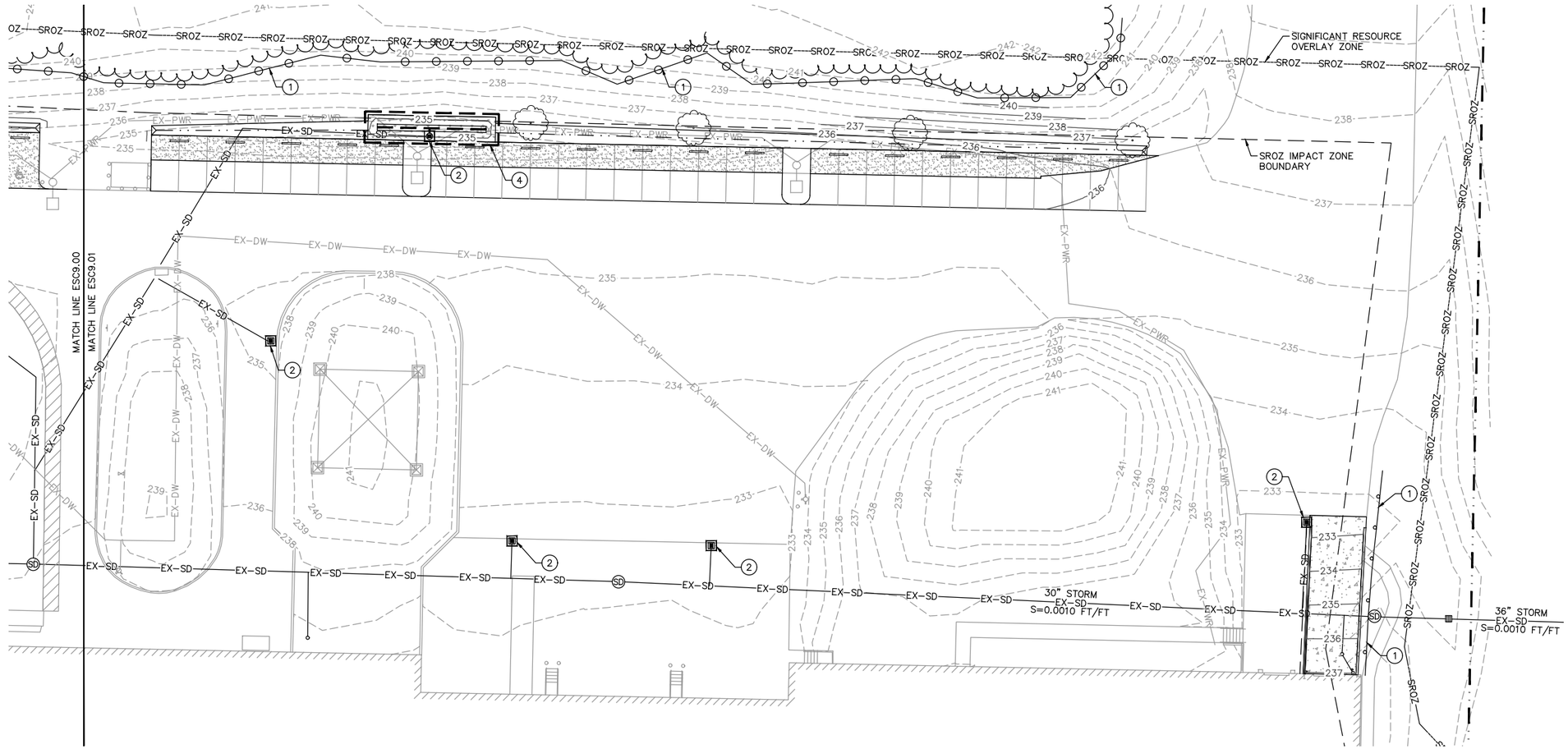
APPROVALS:
Job No.: 21032-0041
Proj. Manager: RJL
Designed: KLE
Reviewed: RJL
Drawn: KLE
Dwg. Checked: RJL
Scale: AS SHOWN

PROJECT TITLE:
ESS INC. SITE IMPROVEMENTS

SHEET TITLE:
EROSION AND SEDIMENT CONTROL PLAN – WEST

SHEET NO.
ESC9.00

Plot Date: 2022-12-14 File Location: O:\0320-Portland\DCI-Civil\2021\21032-0041 ESS Inc\0-DRAWINGS\SHEETS\21032-0041_EROS-CTRL-PLAN.dwg



GRAPHIC SCALE

20 0 10 20

(IN FEET)
1 INCH = 20 FEET

EROSION AND SEDIMENT CONTROL GENERAL NOTES:

1. ALL BASE EROSION CONTROL MEASURES (INLET PROTECTION, PERIMETER SEDIMENT CONTROL, GRAVEL CONSTRUCTION ENTRANCES, ETC.) MUST BE IN PLACE, FUNCTIONAL, AND APPROVED IN AN INITIAL INSPECTION PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
2. SEDIMENT BARRIERS APPROVED FOR USE INCLUDE SEDIMENT FENCE, BERMS CONSTRUCTED OUT OF MULCH, CHIPPINGS, OR OTHER SUITABLE MATERIAL, STRAW WATTLES, OR OTHER APPROVED MATERIALS.
3. SENSITIVE RESOURCES, INCLUDING BUT NOT LIMITED TO, TREES, WETLANDS, AND RIPARIAN PROTECTION AREAS SHALL BE CLEARLY DELINEATED WITH ORANGE CONSTRUCTION FENCING OR CHAIN LINK FENCING IN A MANNER THAT IS CLEARLY VISIBLE TO ANYONE IN THE AREA. NO ACTIVITIES ARE PERMITTED TO OCCUR BEYOND THE CONSTRUCTION BARRIER.
4. CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING ON CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES INCLUDE, BUT ARE NOT LIMITED TO, STREET SWEEPING AND VACUUMING, MAY BE REQUIRED TO INSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.
5. RUN-ON AND RUN-OFF CONTROLS SHALL BE IN PLACE AND FUNCTIONING PRIOR TO BEGINNING SUBSTANTIAL CONSTRUCTION ACTIVITIES. RUN-ON AND RUNOFF CONTROL MEASURES INCLUDE, BUT ARE NOT LIMITED TO, SLOPE DRAINS (WITH OUTLET PROTECTION), CHECK DAMS, SURFACE ROUGHENING, AND BANK STABILIZATION.
6. THESE EROSION AND SEDIMENT CONTROL PLANS ASSUME "DRY WEATHER" CONSTRUCTION. "WET WEATHER" MEASURES NEED TO BE APPLIED BETWEEN OCTOBER 1ST AND MAY 31ST.

(X) EROSION AND SEDIMENT CONTROL KEYNOTES:

1. INSTALL AND MAINTAIN TEMPORARY 6' TALL CHAIN LINK TREE PROTECTION FENCE PER CITY OF WILSONVILLE DRAWING NUMBER RD-1230, SHEET ESC9.10. LOCATION OF FENCE SHALL BE INSTALLED AT THE TREE DRIP LINE. VERIFY TREE DRIP LINE IN THE FIELD PRIOR TO INSTALLING TREE PROTECTION FENCE. NO CONSTRUCTION ACTIVITIES OR MATERIAL STORAGE SHALL OCCUR WITHIN THE TREE PROTECTION ZONE.
2. INSTALL STORMWATER INLET PROTECTION PER CLACKAMAS COUNTY DETAIL DRAWING 4-18/ESC9.10.
3. INSTALL CONCRETE WASHOUT PER DETAIL 1/ESC9.10.
4. PROTECT STORMWATER SWALE FACILITY AREA. DO NOT COMPACT SOILS WITHIN STORMWATER FACILITY AREAS. STORMWATER AREAS SHALL PRESERVE EXISTING SOIL DENSITY BY LIMITING HEAVY MACHINERY AND VEHICLE TRACKING, AND STORAGE SHALL NOT OCCUR WITHIN THESE AREAS.

EROSION AND SEDIMENT CONTROL LEGEND

- FINISHED GRADE CONTOUR (1 FT INTERVAL) — 102 —
- EXISTING GRADE CONTOUR (1 FT INTERVAL) - - - 102 - - -
- SEDIMENT FENCE
- ORANGE CONSTRUCTION FENCE
- CONSTRUCTION ENTRANCE
- INFILTRATION FACILITY PROTECTION AREA (DO NOT COMPACT NATIVE SOILS AT FACILITY SUBGRADE ELEVATION)
- INLET PROTECTION
- SEEDING & MULCHING
- CONCRETE WASH AREA
- EROSION CONTROL MATTING
- DEVELOPED CONDITIONS DRAINAGE FLOW DIRECTION

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61270PE
OREGON
JULY 15, 2014
ROBERT JAMES LEE
EXPIRES: 12/31/2022

REVISIONS:

APPROVALS:
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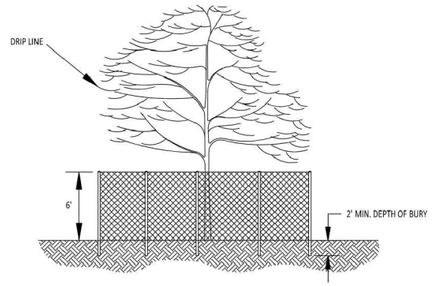
Proj. Manager: RJL
Designed: KLE
Reviewed: RJL
Drawn: KLE
Dwg. Checked: RJL
Scale: AS SHOWN

PROJECT TITLE:
ESS INC. SITE IMPROVEMENTS

SHEET TITLE:
EROSION AND SEDIMENT CONTROL PLAN – EAST

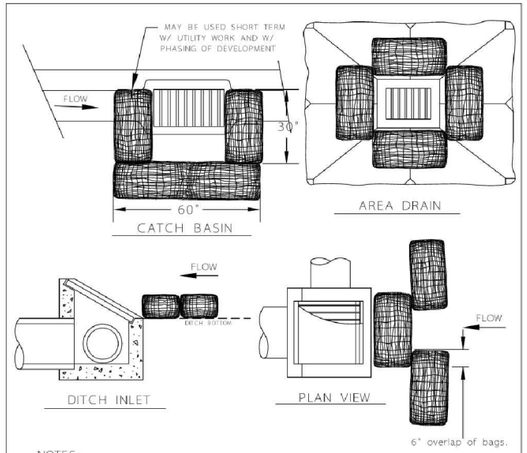
SHEET NO.
ESC9.01

Plot Date: 2022-12-14 File Location: O:\0320-Portland\DCI-Civil\2021\21032-0041 ESS Inc\0-DRAWINGS\SHEETS\21032-0041_EROS-CTRL_PLAN.dwg



NOTES:
1. FENCE SHALL BE 6' IN HEIGHT AND SET AT TREE DRIP LINE.
2. FENCE MATERIALS SHALL CONSIST OF 2" MESH CHAIN LINKS SECURED TO A MINIMUM 1 1/2" DIA. STEEL OR ALUMINUM LINE POSTS.
3. POSTS SHALL BE SET TO A DEPTH OF NO LESS THAN 2 FEET IN NATIVE SOIL.
4. FENCE SHALL REMAIN IN PLACE UNTIL THE COMPLETION OF CONSTRUCTION ACTIVITIES. MOVEMENT OR REMOVAL OF FENCE REQUIRES APPROVAL BY CITY'S AUTHORIZED REPRESENTATIVE.

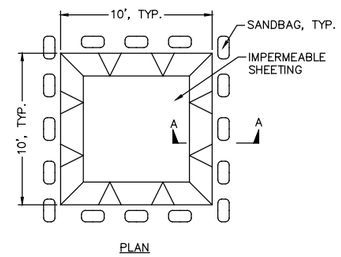
Tree Protection Fencing			CITY OF WILSONVILLE
DRAWING NUMBER: RD-1230	DRAWN BY: SR	SCALE: N.T.S.	PUBLIC WORKS STANDARDS
FILE NAME: RD-1230.DWG	APPROVED BY: NK	DATE: 4/2/14	



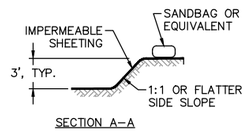
NOTES:
1. ADDITIONAL MEASURES MUST BE CONSIDERED DEPENDING ON SOIL TYPES.
2. BIO-FILTER BAGS SHOULD BE STAKED WHERE APPLICABLE USING (2) 1"x2"WOODEN STAKES OR APPROVED EQUAL PER BAG.
3. WHEN USING 30" BIO-BAGS TO PROTECT A CATCH BASIN YOU MUST HAVE 4 BAGS AND THEY SHALL BE OVERLAPPED BY 6".

INLET PROTECTION TYPE 4

DETAIL DRAWING 4-18 — REVISED 01-09



PLAN



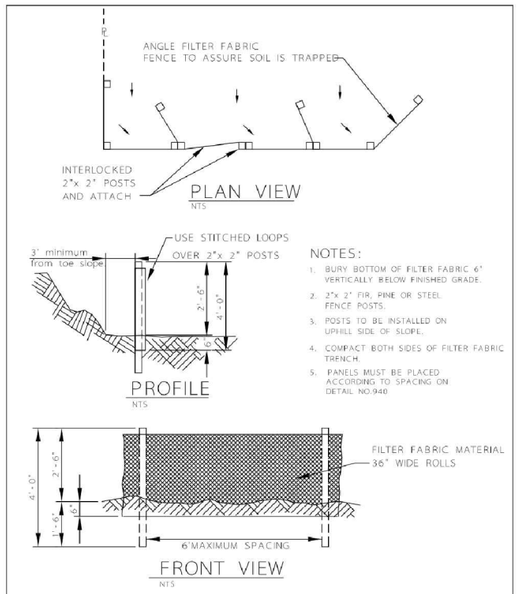
SECTION A–A

CONCRETE WASHOUT NOTES:
1. SIGNS SHALL BE PLACED AT THE CONSTRUCTION ENTRANCE, AT THE WASHOUT AREA, AND ELSEWHERE AS NECESSARY TO CLEARLY INDICATE THE LOCATION OF THE CONCRETE WASHOUT AREA TO OPERATORS OF CONCRETE TRUCKS AND PUMP RIGS.
2. ACTUAL LAYOUT WILL BE DETERMINED IN THE FIELD.
3. REMOVABLE RAIN COVER REQUIRED DURING WET WEATHER SEASON.

CONCRETE WASHOUT DETAIL

SCALE: N.T.S.

1



SEDIMENT FENCE

DETAIL DRAWING 4-23 — REVISED 01-09

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OREGON JULY 15, 2007 ROBERT JAMES LITTLE
EXPIRES: 12/31/2022

REVISIONS:

APPROVALS:
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Proj. Manager: RJL
Designed: KLE
Reviewed: RJL
Drawn: KLE
Dwg. Checked: RJL
Scale: AS SHOWN

PROJECT TITLE:
ESS INC. SITE IMPROVEMENTS

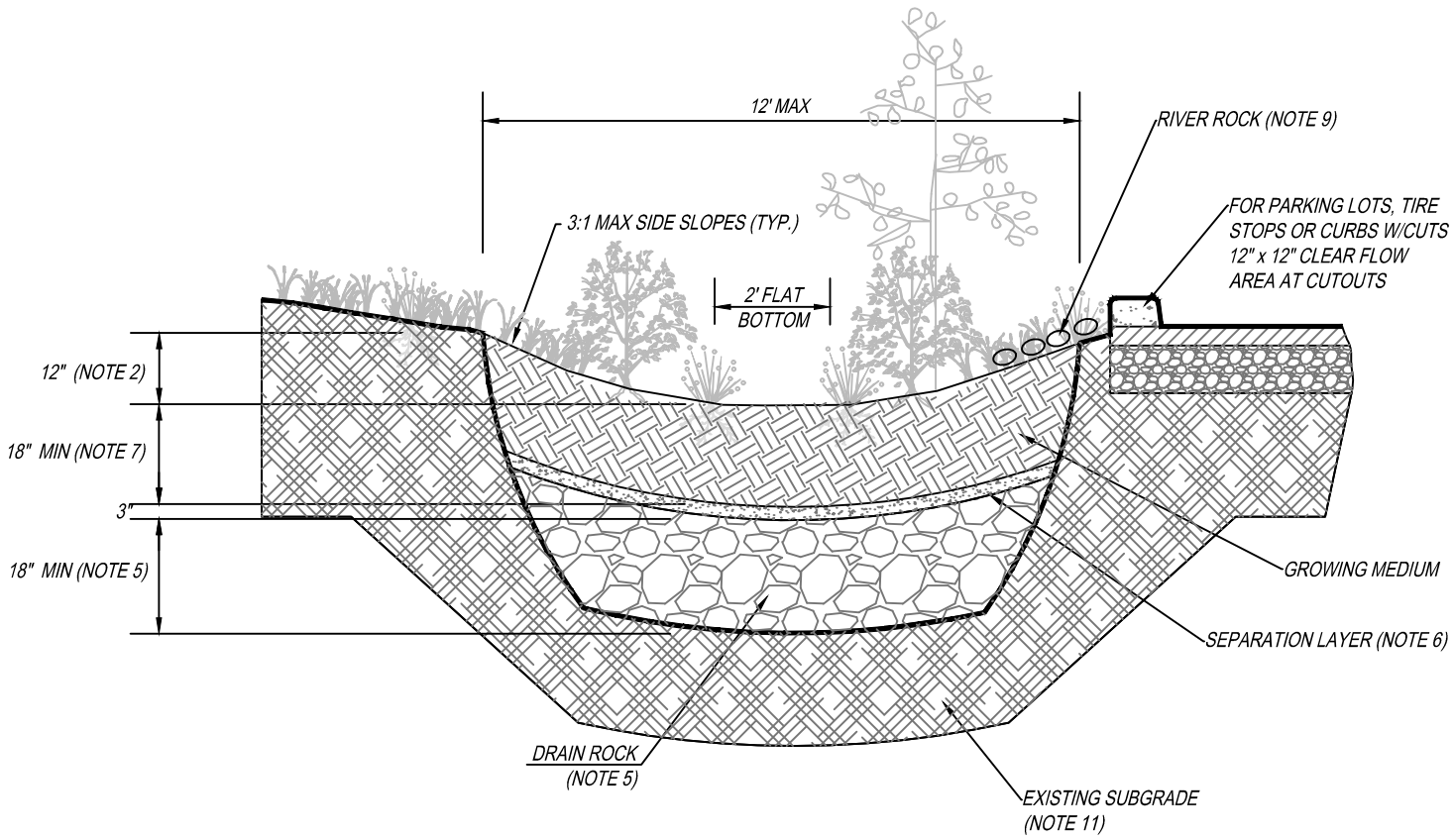
SHEET TITLE:
EROSION AND SEDIMENT CONTROL DETAILS

SHEET NO.
ESC9.10

Plot Date: 2022-12-14 File Location: O:\0320-Portland\DCI-Civil\2021\21032-0041 ESS Inc\0-DRAWINGS\SHEETS\21032-0041_EROS-CTRL-DETAILS.dwg

Appendix C

City of Wilsonville Stormwater Notes



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 SWALES ARE PREFERRED TO ALLOW MAXIMUM INFILTRATION.
2. **DIMENSIONS:**
   -DEPTH OF SWALE (FROM TOP OF GROWING MEDIUM TO OVERFLOW ELEVATION); 12"
   -LONGITUDINAL SLOPE OF SWALE: 6.0% OR LESS
   -FLAT BOTTOM WIDTH: 2'
   -SIDE SLOPES OF SWALE: 3:1 MAXIMUM
3. **SETBACKS (FROM MIDPOINT OF FACILITY):**
   -INFILTRATION VEGETATED SWALES SHALL BE 10' FROM FOUNDATIONS AND 5' FROM PROPERTY LINES.
4. **OVERFLOW:**
   -EMERGENCY OVERFLOW PATH SHALL BE IDENTIFIED ON THE STORMWATER MANAGEMENT PLAN.
5. **DRAIN ROCK:**
   -SIZE: 1 1/2" - 3/4" WASHED
   -DEPTH: 18"
6. **SEPARATION** BETWEEN DRAIN ROCK AND GROWING MEDIUM: SHALL BE A 3" LAYER OF 3/4" - 1/4" OPEN GRADED AGGREGATE.
7. **GROWING MEDIUM:**
   -18" MINIMUM
   -SEE APPENDIX C 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.
8. **VEGETATION:** FOLLOW LANDSCAPE PLANS OR REFER TO PLANTING REQUIREMENTS IN APPENDIX A.
9. **INSTALL RIVER ROCK** SPLASH PAD OVER NON WOVEN GEO TEXTILE FABRIC TO TRANSITION FROM INLETS TO GROWING MEDIUM. SIZE OF ROCK SHALL BE 1" TO 3", 4 SQUARE FEET, 6" DEEP.
10. **CHECK DAMS:** SHALL BE PLACED ACCORDING TO FACILITY DESIGN. REFER TO DETAIL ST-6100 FOR PROFILE AND SPACING.
11. **SEASONAL HIGH GROUNDWATER SEPARATION:**
    -SEPARATION DISTANCE AS REQUIRED BY CITY.

Vegetated Swale - Infiltration			CITY OF WILSONVILLE
DRAWING NUMBER: ST-6050	DRAWN BY: SR	SCALE: N.T.S.	
FILE NAME: ST-6050.DWG	APPROVED BY: NK	DATE: 6/3/16	PUBLIC WORKS STANDARDS

Appendix D

Operations and Maintenance Manual

Operations & Maintenance Manual

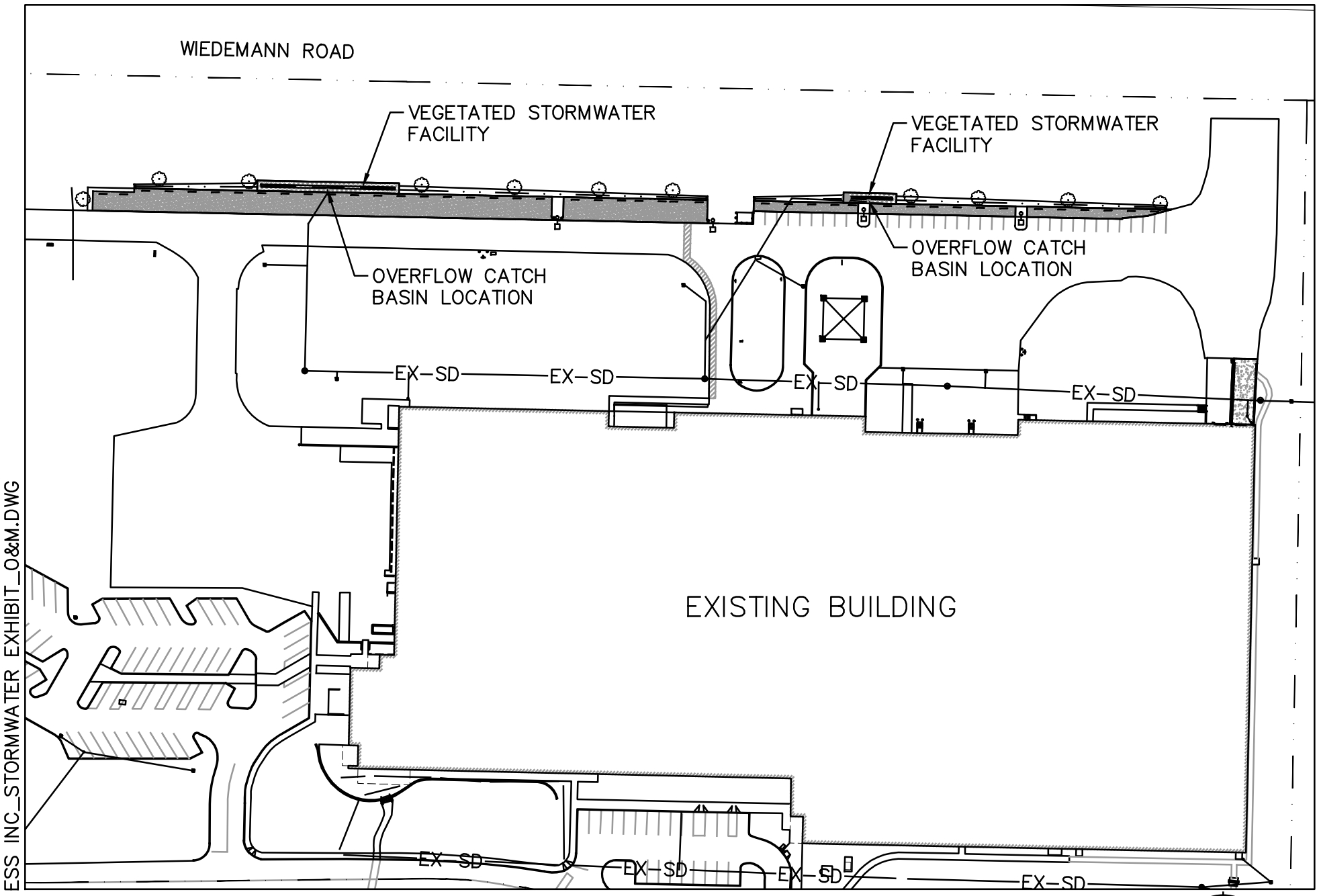
ESS, Inc. Site Updates

26440 SW Parkway Avenue

Wilsonville, OR 97070

DCI Job Number 21032-0041

December 2022



STORMWATER FACILITIES LOCATION

OPERATIONS AND MAINTENANCE MANUAL

SCALE: 1"=100'

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

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**

Vegetated Swales
Operations & Maintenance Plan

What to Look For	What to Do
Structural Components, including inlets and outlets/overflows, shall freely convey stormwater.	
Clogged inlets or outlets	-Remove sediment and debris from catch basins, trench drains, curb inlets and pipes to maintain at least 50% conveyance capacity at all times.
Cracked Drain Pipes	-Replace/seal cracks. Replace when repair is insufficient.
Check Dams	-Maintain 4 - 10 inch deep rock check dams at design intervals.
Vegetation	
Dead or strained vegetation	-Replant per original planting plan, or substitute from Appendix A. -Irrigate as needed. Mulch banks annually. DO NOT apply fertilizers, herbicides, or pesticides.
Tall Grass and Vegetation	-Cut back to 4-6 inches, 1-2 times per year. Remove cuttings
Weeds	-Manually remove weeds. Remove all plant debris.
Growing/Filter Medium, including soil and gravels, shall sustain healthy plant cover and infiltrate within 72 hours.	
Gullies	-Fill, lightly compact, and plant vegetation to disperse flow.
Erosion	-Restore or create outfalls, checkdams, or splash blocks where necessary.
Slope Sippage	-Stabilize Slope.
Ponding	-Rake, till, or amend to restore infiltration rate.

Annual Maintenance Schedule:

Summer. Make any structural repairs. Improve filter medium as needed. Clear drain. Irrigate as needed.
Fall. Replant exposed soil and replace dead plants. Remove sediment and plant debris.
Winter. Monitor infiltration/flow-through rates. Clear inlets and outlets/overflows to maintain conveyance.
Spring. Remove sediment and plant debris. Replant exposed soil and replace dead plants. Mulch.
All seasons. Weed as necessary.
Maintenance Records: Record date, description, and contractor (if applicable) for all structural repairs, landscape maintenance, and facility cleanout activities. Keep work orders and invoices on file and make available upon request of the inspector.
Access: Maintain ingress/egress to design standards.
Infiltration/Flow Control: All facilities shall drain within 72 hours. Record time/date, weather, and site conditions when ponding occurs.
Pollution Prevention: All sites shall implement best management practices to prevent hazardous or solid wastes or excessive oil and sediment from contaminating stormwater. Contact _____ for immediate assistance responding to spills. Record time/date, weather, and site conditions if site activities contaminate stormwater.
Vectors (Mosquitoes & Rodents): Stormwater facilities shall not harbor mosquito larvae or rats that pose a threat to public health or that undermine the facility structure. Monitor standing water for small wiggling sticks perpendicular to the water's surface. Note holes/burrows in and around facilities. Call Clackamas County Vector Control for immediate assistance to eradicate vectors. Record time/date, weather, and site conditions when vector activity observed.

Vegetated Swale O & M Plan			CITY OF WILSONVILLE
DRAWING NUMBER: ST-6055	DRAWN BY: SR	SCALE: N.T.S.	
FILE NAME: ST-6055.DWG	APPROVED BY: NK	DATE: 10/8/14	PUBLIC WORKS STANDARDS

2. An oil/water separator with a coalescing plate shall be installed between the drainage in catchment and the stormwater BMP treatment facility. The purpose of the device is to treat and remove hydrocarbons from entering the stormwater BMP facility. This device shall be maintained per the manufactures specification and the approved maintenance plan.

   (a) Coalescing plate separators shall be designed to achieve 100-ppm non-polar oil and grease in the effluent from the peak flow generated by the washing activity. Testing information must be submitted by the manufacturer of the unit that supports the 100-ppm effluent standard at the calculated flow rate.

   (b) Flow rates will be determined by the drainage area served by the device. The device will be sized to meet the water quality treatment requirements as specified in Section 301.4.04, "Design Criteria".

   (c) Separator details must be shown on the building plans submitted at the time of building permit application and shall match manufacturer specifications and details, including the unit flow rate, effluent water quality, and maximum process flow rate.

   (d) All separators shall be maintained per the manufacture specifications and the applicant shall submit an Operation and Maintenance Plan to be approved by the City.

301.12.16 ODEQ 1200-Z Permit Requirements and Procedures

The requirements in this section apply to facilities identified in Table 1: Sources Covered by the ODEQ New 1200-Z Industrial Stormwater General Permit Document, which can be found in the Water Quality Permit Program section of the ODEQ website.

Facilities identified in Table 1 that may discharge stormwater from a point source to surface waters or to conveyance systems that discharge to surface waters are required to obtain coverage under the 1200-Z permit. To obtain coverage under the permit, facilities must complete the application and registration procedures listed under the *Permit Coverage and Exclusion of Coverage* portion of the New 1200-Z Industrial Stormwater General Permit Document.

301.13.00 OPERATION AND MAINTENANCE REQUIREMENTS

This section describes operation and maintenance requirements that are generally applicable to all private stormwater management facilities. The person designated by the applicant as the responsible party in the Stormwater Maintenance Requirements and Access Easement shall be responsible for operation and maintenance of private stormwater management facilities. An operation and maintenance plan (O&M plan) shall be prepared by the applicant for the stormwater management facility and shall be submitted to the City of Wilsonville Natural Resources Program for review and approval. Maintenance activities shall be documented annually by sending a report of what was completed to the City of Wilsonville Natural Resources Program, by May 1st of each year.

301.13.01 Inspection Program

a. Routine facility inspection will provide three major benefits:

   1. Development of a condition history.

   2. Improved scheduling efficiency.

   3. Preventive maintenance opportunities.

b. Inspection records shall be used to:

   1. Determine where special maintenance conditions exist.

   2. Determine optimal frequencies for future inspection and maintenance.

   3. Generate scheduled and unscheduled (i.e., repair) work orders.

   4. Assure facility operation and aesthetics.

301.13.02 Requirements

a. The applicant shall be responsible for having inspections conducted, maintaining stormwater management facilities, and submitting yearly reports documenting inspection and maintenance activities to the City of Wilsonville Natural Resources Program.

b. Proprietary stormwater management facilities shall be maintained in accordance with the manufacturer specifications and requirements.

c. Inspection and maintenance of the facilities, with the record drawing plans in hand, shall be done in compliance with the Stormwater Maintenance Requirements and Access Easement. If applicable to the stormwater management facility, the design and maintenance specifications shall be used.

d. All required inspections and any maintenance activities performed shall be documented in the annual report as required by the City's Stormwater Maintenance Requirement and Access Easement.

e. Inspection reports shall be in a format and accuracy approved by the City of Wilsonville Natural Resources Program. Inspection reports shall be submitted to the City on a yearly basis.

f. The applicant shall keep inspection records to track the progressive development of the system over time. The inspection records shall include:

   1. General condition of vegetative area(s) and growing medium, predominant plant species, distribution, and success rate (where applicable).

   2. Sediment condition and depth in forebay (or other pretreatment structure), treatment facility, bench planting zones, and other sediment-removal components.

   3. Water elevations and other observations (sheen, smell, etc.).

4. Condition of the inlet, outlet, and overflow structures and devices, diversion structures, trash-removal devices, risers, spillway, embankments, and remaining storage capacity.

5. Unscheduled maintenance needs.

6. Components that do not meet the performance criteria and require immediate maintenance.

7. Common problem areas, solutions, and general observations.

8. Aesthetic conditions.

301.13.03 Structures

Applicant shall be responsible for maintaining all facility structures in good working order. Stormwater management facility structures include, but are not limited to, the following: stormwater pipes, stormwater manholes, sand/oil separators, monitoring manholes, flow control devices, energy dissipaters, headwalls, trash grates, underground detention facilities, catch basins, ditch inlets, area drains, clean-outs, access roads, safety fences, sediment fences, and biofiltration bags. Maintenance may consist of cleaning, repairing, and/or replacing structures or portions of structures as needed to maintain their functional purpose.

301.13.04 Planting Bed Soils

a. In areas where greater than 10% of planting bed vegetation has died, have soil tested as recommended by a Professional Landscape Architect registered in the State of Oregon.

b. Amend soil as per recommendations of a Professional Landscape Architect registered in the State of Oregon; if needed redesign plantings to correct problems, and reestablish soil coverage.

301.13.05 Vegetation Management

a. Vegetated stormwater management facilities may require a number of control practices during their initial 2-year period in order to meet the requirements for establishing healthy vegetation.

b. Requirements

1. Maintain plantings for a period of two years after the date of final construction approval by the City's authorized representative. During the establishment period, remove undesired vegetation with minimal (or preferably no) use of toxic herbicides and pesticides at least three times in year 1, and once or twice in the summer of year 2, unless otherwise approved by the City's authorized representative. Replace plants that die during this period as per recommendations and planting time frame given in Appendix B.2.00, "Landscape Guidelines."

2. At the end of the two-year warranty period, healthy plant establishment shall be achieved for at least 90% of the vegetation (see Section 301.15.02, "Landscape

Inspection for Warranty," for landscape survival criteria). The O&M plan shall specify the long-term maintenance schedule after the warranty period.

3. Selectively irrigate if necessary during the establishment period, during times of drought, or until the vegetation becomes established. It is preferred that the facility be designed to sustain its function without a permanent irrigation system.

4. Replenish mulch at least annually, and specify the mulching schedule in the O&M plan. Mulching shall be done to retain topsoil, heat, and moisture, and to inhibit weed growth. Use temporary fencing to protect seedlings from foraging animals.

5. Schedule maintenance outside sensitive wildlife and vegetation seasons. Minimize plant disturbance during maintenance activities.

6. Do not use fertilizers, herbicides, or pesticides for vegetation maintenance, unless it is specifically called for in the O&M plan.

7. Use replacement plants that conform to the initial planting plan and to Appendix B, "Landscape Requirements."

301.13.06 Sediment Management/Pollutant Control

a. Sediment and other pollutants that degrade water quality will accumulate in stormwater management facilities. The contractor shall remove all accumulated pollutants and sediment to maintain proper facility operation. Periodic testing will help determine appropriate sediment-removal schedules.

b. Requirements:

1. Place a sediment marker (see Detail No. S-2260 of these standards) in the forebay or in an area not likely to be damaged by incoming storm flows and where it can be easily seen by maintenance personnel.

2. Remove sediment when accumulations reach 1 foot in depth, 50% of the designed sediment storage depth, or if sediment accumulation inhibits facility operation. The 50% full capacity shall be identified and marked on sediment marker during facility construction.

3. Test sediment before removing it if the stormwater management facility serves a commercial/industrial site or a multifamily structure or development. Sediment shall be tested according to protocol established in the O&M plan, and any additional information resulting from site-specific conditions and use. Testing could include parameters such as oil and grease, heavy metals (lead, zinc, and cadmium), nutrients (e.g., phosphorus), and organics such as pesticides that may accumulate. Testing must be site specific if a commercial/industrial discharger is being served; City of Wilsonville reserves the right to require testing of specific contaminants. Applicant shall provide the test results to the City of Wilsonville Natural Resources Program prior to excavation and disposal of sediment.

4. Dispose of sediments at the time of excavation in a manner meeting applicable state and federal requirements. If sediment disposal requires special handling,

disposal documentation shall be provided to the City of Wilsonville Natural Resources Program.

5. Investigate and control, or report the pollutant source, if sediment or other pollutants are accumulating more rapidly than assumed when the O&M plan was formulated. Direct pollution-control complaints to the City of Wilsonville Natural Resources Program.

301.13.07 Insect/Vector Control

a. Standing water associated with some types of treatment systems can attract insects.

b. The following measures shall be the primary methods of insect control. The method are not presented in order of implementation, but one or all of these methods shall be used before considering any other measures:

   1. Install predacious bird and bat nesting boxes.

   2. Change the water level of ponds every four days or so to disrupt the larval development cycle of mosquitoes.

   3. Stock ponds and other permanent water facilities with fish or other predatory species.

   4. Use mosquito larvicide, such as Bacillus thurengensis or Altoside® formulations, only if absolutely necessary. Any pesticide or larvicide shall be applied by a licensed individual.

c. Additional assistance with vector monitoring and control may be obtained from the local vector control office.

301.13.08 Access and Safety

O&M programs shall provide for safe and efficient access to a facility and shall be in compliance with Section 101.8.09, “Safety Requirements”. The following are general requirements; specific conditions may require site-specific modifications:

a. Secure easements necessary to provide facility and maintenance access (if applicable).

b. Use only trained and certified personnel to access confined spaces.

c. Maintain ingress/egress routes to design standards, in a manner that allows efficient maintenance of the facility.

d. Ensure that fencing is in good repair.

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 _____

_____

_____

_____

_____

_____

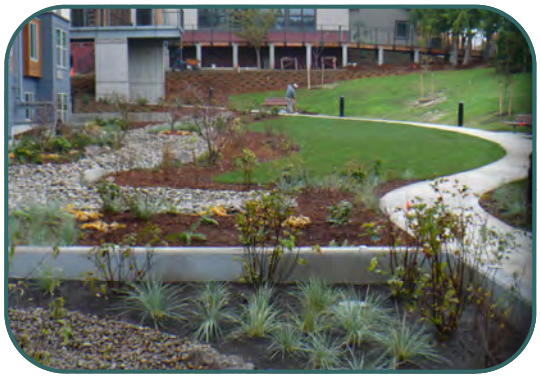
(Attach invoices for work performed) (Continue above on additional sheet if needed)

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

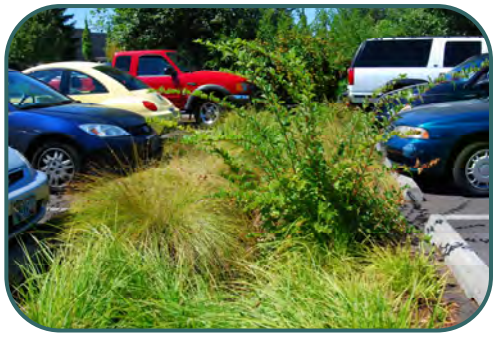
Vegetated Facilities: ecoroofs, infiltration basins, planters, ponds, swales, trees, vegetated filters, and created wetlands.

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.

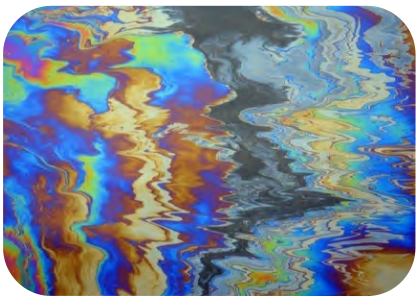
IMPORTANCE TO FACILITY PERFORMANCE

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 E

Geotechnical Infiltration Report

August 16, 2022

DCI Engineers
921 SW Washington Street, Suite 560
Portland, OR 97205

Attention: Robert Léger

Report of Infiltration Testing Services
ESS, Inc. Parking Expansion
26440 SW Parkway Avenue
Wilsonville, Oregon
Project: DCIEng-4-01

INTRODUCTION

This report presents the results of our infiltration testing for the proposed parking expansion for the ESS, Inc. facilities located at 26440 SW Parkway Avenue in Wilsonville, Oregon. Preliminary plans include shallow Low Impact Development Approaches style stormwater planters. Our services for this project were conducted in general accordance with our proposal dated July 20, 2022. Figure 1 shows the site vicinity relative to surrounding features. Figure 2 shows the proposed development area and our approximate exploration location.

PURPOSE AND SCOPE

The purpose of our scope was to perform field infiltration testing to assist in design of on-site stormwater disposal systems. Specifically, we conducted the following tasks:

- Coordinated and managed the field exploration, including utility locates and scheduling of NV5 field staff.
- Conducted a subsurface exploration program consisting of drilling one hand auger boring to a depth of 9.5 feet below ground surface (BGS).
- Performed two infiltration tests using the encased falling head test method in general accordance with the City of Wilsonville *Public Works Standards* with up to two and one-half hours of measurements starting during the saturation period. The tests were performed at depths of 2 and 4 feet BGS.
- Maintained a continuous log of the exploration and collected disturbed soil samples at representative intervals.

- Performed the following laboratory testing on samples collected from the exploration:
  - Three natural moisture content determinations in general accordance with ASTM D2216
  - Two particle-size analyses in general accordance with ASTM D1140
- Prepared this report summarizing the test program, presenting the test results, and providing infiltration design recommendations.

SITE CONDITIONS

SURFACE CONDITIONS

The site is currently occupied by an ESS building with associated parking west of the building. The property is bordered to the north by a commercial building and property, to the east by trees, to the west by SW Parkway Avenue, and to the south by Printer Parkway. Figure 1 shows the site location relative to existing features. Exploration of the site was conducted in the north portion of the site where grass was present at the surface.

SUBSURFACE CONDITIONS

We explored subsurface conditions at the site by drilling one hand auger boring (HA-1). The approximate location of the exploration is shown on Figure 2. A description of the field explorations and laboratory testing program, the boring log, and results of the laboratory testing are presented in the Attachment.

A 6-inch-thick root zone and approximately 1.5 feet of fill were observed at the surface. Clay with varying amounts of sand underlies the fill to the maximum depth explored of 9.5 feet BGS. The moisture content of the samples was determined to range from 28 to 49 percent. Particle-size analysis indicated 83 and 69 percent fines at depths of 2 and 4 feet BGS, respectively.

Groundwater was encountered in the hand auger boring at a depth of 7.5 feet BGS. The depth of groundwater may fluctuate in response to seasonal changes, prolonged rainfall, changes in surface topography, and other factors not observed in this study.

INFILTRATION TESTING

Infiltration testing was performed in boring HA-1 at depths of 2 and 4 feet BGS using the encased falling head method and PVC pipe to evaluate the feasibility of on-site stormwater disposal. A representative soil sample was collected below the infiltration test depths for particle-size analysis.

Table 1 summarizes the results of infiltration testing and particle-size analyses. The exploration log and results of particle-size analyses are presented in the Attachment.

Table 1. Infiltration Testing Results

Exploration	Depth (feet BGS)	Soil Description	Percent Fines	Observed Infiltration Rate (inches per hour)
HA-1	2.0	Clay with sand	83	0.9
HA-1	4.0	Sandy clay	69	2.5

As summarized in Table 1, the shallow soil at the site has very low infiltration capacity.

The infiltration rates presented in Table 1 are short-term field rates and factors of safety have not been applied for the type of infiltration system being considered. Correction factors should be applied to the measured infiltration rate to account for soil variations and the potential for long-term clogging due to siltation and buildup of organic material. Without additional testing, from a geotechnical perspective, we recommend a minimum factor of safety of at least 2 be applied to the field infiltration values presented in Table 1 to account for soil variability with depth.

The infiltration flow rate of infiltration systems will diminish over time as suspended solids and precipitates in the stormwater slowly clog the void spaces between the soil particles. Eventually, systems may fail and will need to be replaced or repaired. We recommend that any infiltration system be designed to overflow to a suitable discharge point such as the storm sewer or an acceptable overland release. Finally, stormwater infiltration systems will cause localized high groundwater levels; therefore, they should not be located near basement walls, retaining walls, or other embedded structures unless these are specifically designed to account for the resulting hydrostatic pressure.

LIMITATIONS

We have prepared this report for use by DCI Engineers and members of the design and construction teams for the proposed project. The data and report can be used for bidding or estimating purposes, but our report, conclusions, and interpretations should not be construed as warranty of the subsurface conditions and are not applicable to other nearby building sites.

Exploration observations indicate soil conditions only at specific locations and only to the depths penetrated. They do not necessarily reflect soil strata or water level variations that may exist between exploration locations. If subsurface conditions differing from those described are noted during the course of excavation and construction, re-evaluation will be necessary.

The site development plans and design details were preliminary at the time this report was prepared. When the design has been finalized and if there are changes in the site grades, location, or configuration; design loads; or type of construction, the conclusions and recommendations presented may not be applicable. If design changes are made, we request that we be retained to review our conclusions and recommendations and to provide a written modification or verification if needed.

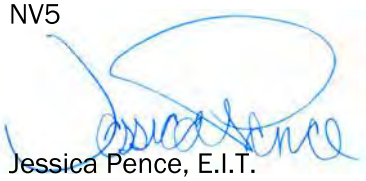
The scope does not include services related to construction safety precautions, and our recommendations are not intended to direct the contractor's methods, techniques, sequences, or procedures, except as specifically described in this report for consideration in design.

Within the limitations of scope, schedule, and budget, our services have been executed in accordance with generally accepted practices in this area at the time this report was prepared. No warranty, expressed or implied, should be understood.

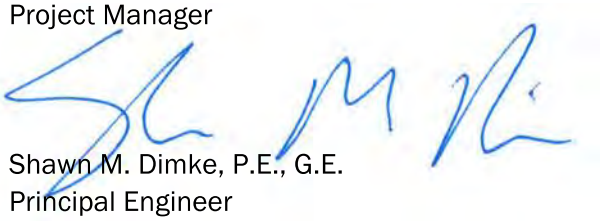
We appreciate the opportunity to be of continued service to you. Please call if you have questions concerning this report or if we can provide additional services.

Sincerely,

NV5



Jessica Pence, E.I.T.
Project Manager



Shawn M. Dimke, P.E., G.E.
Principal Engineer

JJP:SMD:sn
Attachments
One copy submitted
Document ID: DCIEng-4-01-081622-geolr

FIGURES

VICINITY MAP BASED ON AERIAL PHOTOGRAPH OBTAINED FROM GOOGLE EARTH PRO®

NIV5	DCIENG-4-01	**VICINITY MAP**	
	AUGUST 2022	ESS, INC. PARKING EXPANSION WILSONVILLE, OR	**FIGURE 1**

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NV5	DCIENG-4-01	SITE PLAN	
	AUGUST 2022	ESS, INC. PARKING EXPANSION WILSONVILLE, OR	FIGURE 2

ATTACHMENT

ATTACHMENT

FIELD EXPLORATIONS

GENERAL

We explored subsurface conditions at the site by advancing one boring (HA-1) with a hand auger to a maximum depth of 9.5 feet BGS. The exploration was conducted on August 2, 2022. The boring log is presented in this attachment.

SOIL SAMPLING

We collected soil samples for geotechnical laboratory testing. Representative disturbed samples of soil observed in the borings were collected from the auger tip. Sampling methods and intervals are shown on the exploration log.

SOIL CLASSIFICATION

The soil samples were classified in the field in accordance with the "Exploration Key" (Table A-1) and "Soil Classification System" (Table A-2), which are presented in this attachment. The exploration log indicates the depths at which the soil characteristics change, although the change actually could be gradual. If the change occurred between sample locations, the depth was interpreted. Classifications are shown on the exploration log.

LABORATORY TESTING

CLASSIFICATION

The soil samples were classified in the laboratory to confirm field classifications. The laboratory classifications are shown on the exploration log, if those classifications differed from the field classifications.

MOISTURE CONTENT

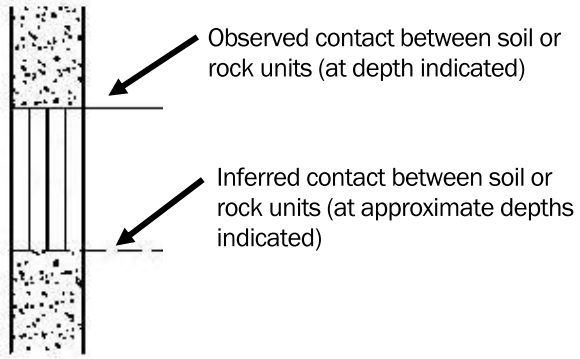
The natural moisture content of select soil samples was determined in general accordance with ASTM D2216. The natural moisture content is a ratio of the weight of the water to dry soil in a test sample and is expressed as a percentage. The test results are presented in this attachment.

PARTICLE-SIZE ANALYSIS

Particle-size analysis was performed on select soil samples in general accordance with ASTM D1140. This test is a quantitative determination of the amount of material finer than the U.S. Standard No. 200 sieve expressed as a percentage of soil weight. The test results are presented in this attachment.

SYMBOL	SAMPLING DESCRIPTION
	Location of sample collected in general accordance with ASTM D1586 using Standard Penetration Test (SPT) with recovery
	Location of sample collected using thin-wall Shelby tube or Geoprobe® sampler in general accordance with ASTM D1587 with recovery
	Location of sample collected using Dames & Moore sampler and 300-pound hammer or pushed with recovery
	Location of sample collected using Dames & Moore sampler and 140-pound hammer or pushed with recovery
	Location of sample collected using 3-inch-outside diameter California split-spoon sampler and 140-pound hammer with recovery
	Location of grab sample
	Rock coring interval
	Water level during drilling
	Water level taken on date shown

Graphic Log of Soil and Rock Types



GEOTECHNICAL TESTING EXPLANATIONS

ATT	Atterberg Limits	P	Pushed Sample
CBR	California Bearing Ratio	PP	Pocket Penetrometer
CON	Consolidation	P200	Percent Passing U.S. Standard No. 200 Sieve
DD	Dry Density		
DS	Direct Shear	RES	Resilient Modulus
HYD	Hydrometer Gradation	SIEV	Sieve Gradation
MC	Moisture Content	TOR	Torvane
MD	Moisture-Density Relationship	UC	Unconfined Compressive Strength
NP	Non-Plastic	VS	Vane Shear
OC	Organic Content	kPa	Kilopascal

ENVIRONMENTAL TESTING EXPLANATIONS

CA	Sample Submitted for Chemical Analysis	ND	Not Detected
P	Pushed Sample	NS	No Visible Sheen
PID	Photoionization Detector Headspace Analysis	SS	Slight Sheen
		MS	Moderate Sheen
ppm	Parts per Million	HS	Heavy Sheen

NV5	**EXPLORATION KEY**	**TABLE A-1**

RELATIVE DENSITY - COARSE-GRAINED SOIL

Relative Density	Standard Penetration Test (SPT) Resistance	Dames & Moore Sampler (140-pound hammer)	Dames & Moore Sampler (300-pound hammer)
Very loose	0 – 4	0 – 11	0 – 4
Loose	4 – 10	11 – 26	4 – 10
Medium dense	10 – 30	26 – 74	10 – 30
Dense	30 – 50	74 – 120	30 – 47
Very dense	More than 50	More than 120	More than 47

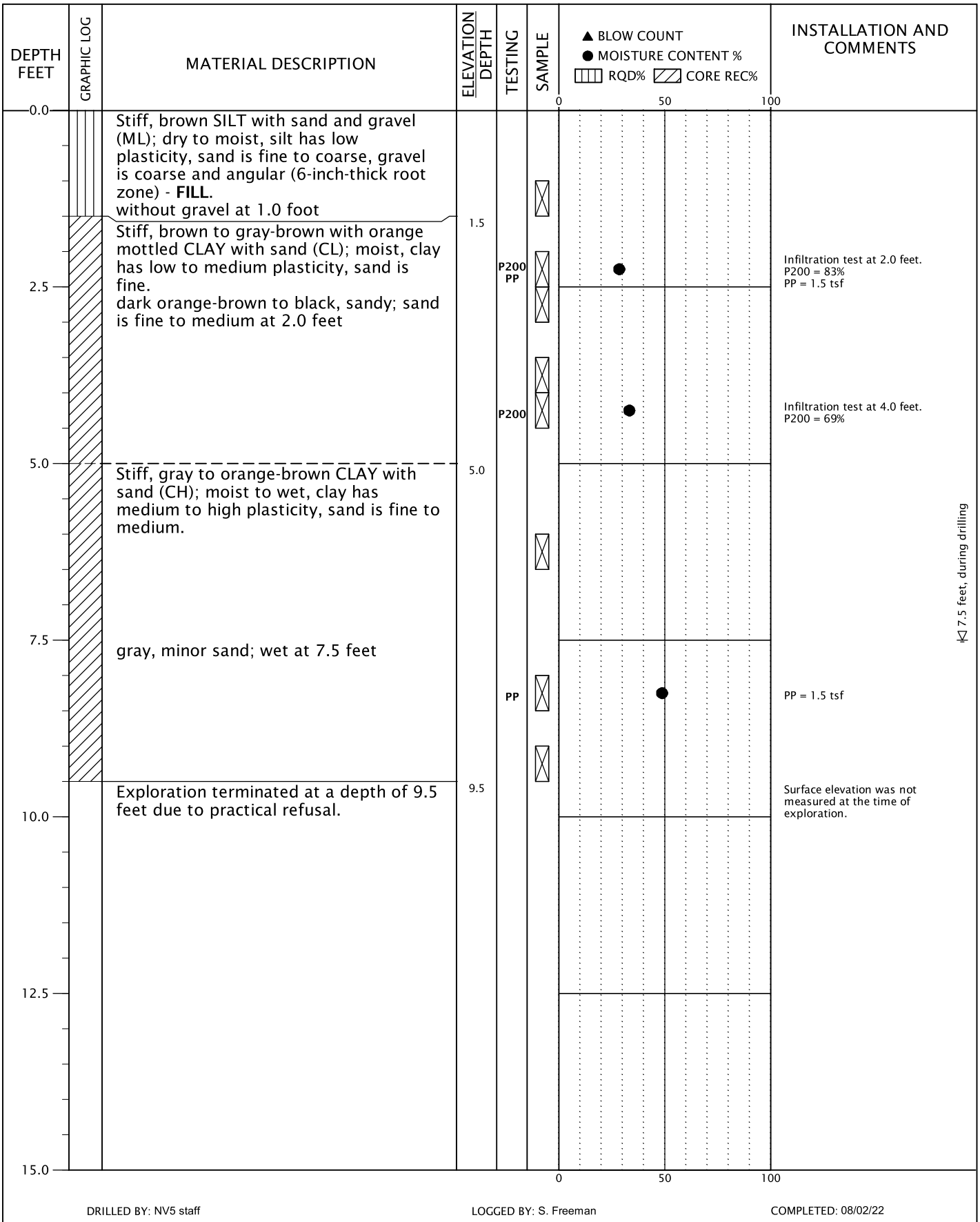
CONSISTENCY - FINE-GRAINED SOIL

Consistency	Standard Penetration Test (SPT) Resistance	Dames & Moore Sampler (140-pound hammer)	Dames & Moore Sampler (300-pound hammer)	Unconfined Compressive Strength (tsf)
Very soft	Less than 2	Less than 3	Less than 2	Less than 0.25
Soft	2 – 4	3 – 6	2 – 5	0.25 – 0.50
Medium stiff	4 – 8	6 – 12	5 – 9	0.50 – 1.0
Stiff	8 – 15	12 – 25	9 – 19	1.0 – 2.0
Very stiff	15 – 30	25 – 65	19 – 31	2.0 – 4.0
Hard	More than 30	More than 65	More than 31	More than 4.0

PRIMARY SOIL DIVISIONS			GROUP SYMBOL	GROUP NAME
COARSE-GRAINED SOIL (more than 50% retained on No. 200 sieve)	GRAVEL (more than 50% of coarse fraction retained on No. 4 sieve)	CLEAN GRAVEL (< 5% fines)	GW or GP	GRAVEL
		GRAVEL WITH FINES (≥ 5% and ≤ 12% fines)	GW-GM or GP-GM	GRAVEL with silt
			GW-GC or GP-GC	GRAVEL with clay
		GRAVEL WITH FINES (> 12% fines)	GM	silty GRAVEL
			GC	clayey GRAVEL
			GC-GM	silty, clayey GRAVEL
	SAND (50% or more of coarse fraction passing No. 4 sieve)	CLEAN SAND (<5% fines)	SW or SP	SAND
		SAND WITH FINES (≥ 5% and ≤ 12% fines)	SW-SM or SP-SM	SAND with silt
			SW-SC or SP-SC	SAND with clay
		SAND WITH FINES (> 12% fines)	SM	silty SAND
			SC	clayey SAND
			SC-SM	silty, clayey SAND
FINE-GRAINED SOIL (50% or more passing No. 200 sieve)	SILT AND CLAY	Liquid limit less than 50	ML	SILT
			CL	CLAY
			CL-ML	silty CLAY
			OL	ORGANIC SILT or ORGANIC CLAY
		Liquid limit 50 or greater	MH	SILT
			CH	CLAY
			OH	ORGANIC SILT or ORGANIC CLAY
HIGHLY ORGANIC SOIL			PT	PEAT

MOISTURE CLASSIFICATION		ADDITIONAL CONSTITUENTS					
		Secondary granular components or other materials such as organics, man-made debris, etc.					
			Silt and Clay In:			Sand and Gravel In:	
Term	Field Test	Percent	Fine-Grained Soil	Coarse-Grained Soil	Percent	Fine-Grained Soil	Coarse-Grained Soil
dry	very low moisture, dry to touch						
moist	damp, without visible moisture	< 5	trace	trace	< 5	trace	trace
		5 – 12	minor	with	5 – 15	minor	minor
wet	visible free water, usually saturated	> 12	some	silty/clayey	15 – 30	with	with
					> 30	sandy/gravelly	Indicate %

NV5	SOIL CLASSIFICATION SYSTEM	TABLE A-2



DRILLED BY: NV5 staff | LOGGED BY: S. Freeman | COMPLETED: 08/02/22

BORING METHOD: hand auger (see document text) | BORING BIT DIAMETER: 6 inches

NV5	DCIENG-4-01	**BORING HA-1**
	AUGUST 2022	ESS, INC. PARKING EXPANSION WILSONVILLE, OR
		FIGURE A-1

BORING LOG - NV5 - 1 PER PAGE DCIENG-4-01-HA1.GPJ GDI_NV5.GDT PRINT DATE: 8/16/22:KT:SN

SAMPLE INFORMATION			MOISTURE CONTENT (PERCENT)	DRY DENSITY (PCF)	SIEVE			ATTERBERG LIMITS		
EXPLORATION NUMBER	SAMPLE DEPTH (FEET)	ELEVATION (FEET)			GRAVEL (PERCENT)	SAND (PERCENT)	P200 (PERCENT)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
HA-1	2.0		28				83			
HA-1	4.0		33				69			
HA-1	8.0		49							

LAB SUMMARY - GDI-NV5 DCIENG-4-01-HA1.GPJ GDI_NV5.GDT PRINT DATE: 8/10/22:SN

NV5	DCIENG-4-01	**SUMMARY OF LABORATORY DATA**	
	AUGUST 2022	ESS, INC. PARKING EXPANSION WILSONVILLE, OR	**FIGURE A-2**

EXHIBIT: E

August 16, 2022

DCI Engineers
921 SW Washington Street, Suite 560
Portland, OR 97205

Attention: Robert Léger

Report of Infiltration Testing Services
ESS, Inc. Parking Expansion
26440 SW Parkway Avenue
Wilsonville, Oregon
Project: DCIEng-4-01

INTRODUCTION

This report presents the results of our infiltration testing for the proposed parking expansion for the ESS, Inc. facilities located at 26440 SW Parkway Avenue in Wilsonville, Oregon. Preliminary plans include shallow Low Impact Development Approaches style stormwater planters. Our services for this project were conducted in general accordance with our proposal dated July 20, 2022. Figure 1 shows the site vicinity relative to surrounding features. Figure 2 shows the proposed development area and our approximate exploration location.

PURPOSE AND SCOPE

The purpose of our scope was to perform field infiltration testing to assist in design of on-site stormwater disposal systems. Specifically, we conducted the following tasks:

- Coordinated and managed the field exploration, including utility locates and scheduling of NV5 field staff.
- Conducted a subsurface exploration program consisting of drilling one hand auger boring to a depth of 9.5 feet below ground surface (BGS).
- Performed two infiltration tests using the encased falling head test method in general accordance with the City of Wilsonville *Public Works Standards* with up to two and one-half hours of measurements starting during the saturation period. The tests were performed at depths of 2 and 4 feet BGS.
- Maintained a continuous log of the exploration and collected disturbed soil samples at representative intervals.

- Performed the following laboratory testing on samples collected from the exploration:
  - Three natural moisture content determinations in general accordance with ASTM D2216
  - Two particle-size analyses in general accordance with ASTM D1140
- Prepared this report summarizing the test program, presenting the test results, and providing infiltration design recommendations.

SITE CONDITIONS

SURFACE CONDITIONS

The site is currently occupied by an ESS building with associated parking west of the building. The property is bordered to the north by a commercial building and property, to the east by trees, to the west by SW Parkway Avenue, and to the south by Printer Parkway. Figure 1 shows the site location relative to existing features. Exploration of the site was conducted in the north portion of the site where grass was present at the surface.

SUBSURFACE CONDITIONS

We explored subsurface conditions at the site by drilling one hand auger boring (HA-1). The approximate location of the exploration is shown on Figure 2. A description of the field explorations and laboratory testing program, the boring log, and results of the laboratory testing are presented in the Attachment.

A 6-inch-thick root zone and approximately 1.5 feet of fill were observed at the surface. Clay with varying amounts of sand underlies the fill to the maximum depth explored of 9.5 feet BGS. The moisture content of the samples was determined to range from 28 to 49 percent. Particle-size analysis indicated 83 and 69 percent fines at depths of 2 and 4 feet BGS, respectively.

Groundwater was encountered in the hand auger boring at a depth of 7.5 feet BGS. The depth of groundwater may fluctuate in response to seasonal changes, prolonged rainfall, changes in surface topography, and other factors not observed in this study.

INFILTRATION TESTING

Infiltration testing was performed in boring HA-1 at depths of 2 and 4 feet BGS using the encased falling head method and PVC pipe to evaluate the feasibility of on-site stormwater disposal. A representative soil sample was collected below the infiltration test depths for particle-size analysis.

Table 1 summarizes the results of infiltration testing and particle-size analyses. The exploration log and results of particle-size analyses are presented in the Attachment.

Table 1. Infiltration Testing Results

Exploration	Depth (feet BGS)	Soil Description	Percent Fines	Observed Infiltration Rate (inches per hour)
HA-1	2.0	Clay with sand	83	0.9
HA-1	4.0	Sandy clay	69	2.5

As summarized in Table 1, the shallow soil at the site has very low infiltration capacity.

The infiltration rates presented in Table 1 are short-term field rates and factors of safety have not been applied for the type of infiltration system being considered. Correction factors should be applied to the measured infiltration rate to account for soil variations and the potential for long-term clogging due to siltation and buildup of organic material. Without additional testing, from a geotechnical perspective, we recommend a minimum factor of safety of at least 2 be applied to the field infiltration values presented in Table 1 to account for soil variability with depth.

The infiltration flow rate of infiltration systems will diminish over time as suspended solids and precipitates in the stormwater slowly clog the void spaces between the soil particles. Eventually, systems may fail and will need to be replaced or repaired. We recommend that any infiltration system be designed to overflow to a suitable discharge point such as the storm sewer or an acceptable overland release. Finally, stormwater infiltration systems will cause localized high groundwater levels; therefore, they should not be located near basement walls, retaining walls, or other embedded structures unless these are specifically designed to account for the resulting hydrostatic pressure.

LIMITATIONS

We have prepared this report for use by DCI Engineers and members of the design and construction teams for the proposed project. The data and report can be used for bidding or estimating purposes, but our report, conclusions, and interpretations should not be construed as warranty of the subsurface conditions and are not applicable to other nearby building sites.

Exploration observations indicate soil conditions only at specific locations and only to the depths penetrated. They do not necessarily reflect soil strata or water level variations that may exist between exploration locations. If subsurface conditions differing from those described are noted during the course of excavation and construction, re-evaluation will be necessary.

The site development plans and design details were preliminary at the time this report was prepared. When the design has been finalized and if there are changes in the site grades, location, or configuration; design loads; or type of construction, the conclusions and recommendations presented may not be applicable. If design changes are made, we request that we be retained to review our conclusions and recommendations and to provide a written modification or verification if needed.

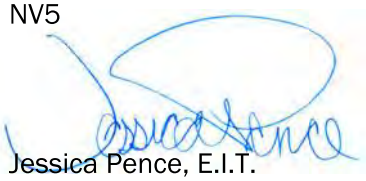
The scope does not include services related to construction safety precautions, and our recommendations are not intended to direct the contractor's methods, techniques, sequences, or procedures, except as specifically described in this report for consideration in design.

Within the limitations of scope, schedule, and budget, our services have been executed in accordance with generally accepted practices in this area at the time this report was prepared. No warranty, expressed or implied, should be understood.

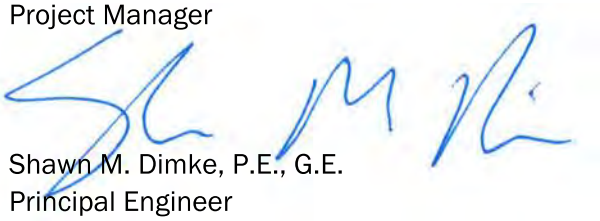
We appreciate the opportunity to be of continued service to you. Please call if you have questions concerning this report or if we can provide additional services.

Sincerely,

NV5



Jessica Pence, E.I.T.
Project Manager



Shawn M. Dimke, P.E., G.E.
Principal Engineer

JJP:SMD:sn
Attachments
One copy submitted
Document ID: DCIEng-4-01-081622-geolr

FIGURES

VICINITY MAP BASED ON AERIAL PHOTOGRAPH OBTAINED FROM GOOGLE EARTH PRO®

NIV5	DCIENG-4-01	**VICINITY MAP**	
	AUGUST 2022	ESS, INC. PARKING EXPANSION WILSONVILLE, OR	**FIGURE 1**

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File Name: J:\A-D\DCIEng\DCIEng-4\DCIEng-4-01\Figures\CAD\DCIEng-4-01-VM01.dwg | Layout: FIGURE 1

NV5	DCIENG-4-01	SITE PLAN	
	AUGUST 2022	ESS, INC. PARKING EXPANSION WILSONVILLE, OR	FIGURE 2

ATTACHMENT

ATTACHMENT

FIELD EXPLORATIONS

GENERAL

We explored subsurface conditions at the site by advancing one boring (HA-1) with a hand auger to a maximum depth of 9.5 feet BGS. The exploration was conducted on August 2, 2022. The boring log is presented in this attachment.

SOIL SAMPLING

We collected soil samples for geotechnical laboratory testing. Representative disturbed samples of soil observed in the borings were collected from the auger tip. Sampling methods and intervals are shown on the exploration log.

SOIL CLASSIFICATION

The soil samples were classified in the field in accordance with the "Exploration Key" (Table A-1) and "Soil Classification System" (Table A-2), which are presented in this attachment. The exploration log indicates the depths at which the soil characteristics change, although the change actually could be gradual. If the change occurred between sample locations, the depth was interpreted. Classifications are shown on the exploration log.

LABORATORY TESTING

CLASSIFICATION

The soil samples were classified in the laboratory to confirm field classifications. The laboratory classifications are shown on the exploration log, if those classifications differed from the field classifications.

MOISTURE CONTENT

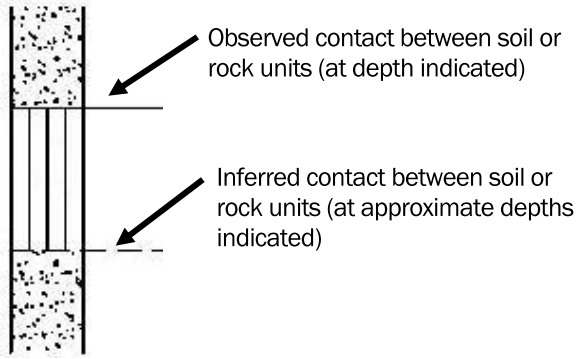
The natural moisture content of select soil samples was determined in general accordance with ASTM D2216. The natural moisture content is a ratio of the weight of the water to dry soil in a test sample and is expressed as a percentage. The test results are presented in this attachment.

PARTICLE-SIZE ANALYSIS

Particle-size analysis was performed on select soil samples in general accordance with ASTM D1140. This test is a quantitative determination of the amount of material finer than the U.S. Standard No. 200 sieve expressed as a percentage of soil weight. The test results are presented in this attachment.

SYMBOL	SAMPLING DESCRIPTION
	Location of sample collected in general accordance with ASTM D1586 using Standard Penetration Test (SPT) with recovery
	Location of sample collected using thin-wall Shelby tube or Geoprobe® sampler in general accordance with ASTM D1587 with recovery
	Location of sample collected using Dames & Moore sampler and 300-pound hammer or pushed with recovery
	Location of sample collected using Dames & Moore sampler and 140-pound hammer or pushed with recovery
	Location of sample collected using 3-inch-outside diameter California split-spoon sampler and 140-pound hammer with recovery
	Location of grab sample
	Rock coring interval
	Water level during drilling
	Water level taken on date shown

Graphic Log of Soil and Rock Types



GEOTECHNICAL TESTING EXPLANATIONS

ATT	Atterberg Limits	P	Pushed Sample
CBR	California Bearing Ratio	PP	Pocket Penetrometer
CON	Consolidation	P200	Percent Passing U.S. Standard No. 200 Sieve
DD	Dry Density		
DS	Direct Shear	RES	Resilient Modulus
HYD	Hydrometer Gradation	SIEV	Sieve Gradation
MC	Moisture Content	TOR	Torvane
MD	Moisture-Density Relationship	UC	Unconfined Compressive Strength
NP	Non-Plastic	VS	Vane Shear
OC	Organic Content	kPa	Kilopascal

ENVIRONMENTAL TESTING EXPLANATIONS

CA	Sample Submitted for Chemical Analysis	ND	Not Detected
P	Pushed Sample	NS	No Visible Sheen
PID	Photoionization Detector Headspace Analysis	SS	Slight Sheen
		MS	Moderate Sheen
ppm	Parts per Million	HS	Heavy Sheen

NV5	**EXPLORATION KEY**	**TABLE A-1**

RELATIVE DENSITY - COARSE-GRAINED SOIL

Relative Density	Standard Penetration Test (SPT) Resistance	Dames & Moore Sampler (140-pound hammer)	Dames & Moore Sampler (300-pound hammer)
Very loose	0 – 4	0 – 11	0 – 4
Loose	4 – 10	11 – 26	4 – 10
Medium dense	10 – 30	26 – 74	10 – 30
Dense	30 – 50	74 – 120	30 – 47
Very dense	More than 50	More than 120	More than 47

CONSISTENCY - FINE-GRAINED SOIL

Consistency	Standard Penetration Test (SPT) Resistance	Dames & Moore Sampler (140-pound hammer)	Dames & Moore Sampler (300-pound hammer)	Unconfined Compressive Strength (tsf)
Very soft	Less than 2	Less than 3	Less than 2	Less than 0.25
Soft	2 – 4	3 – 6	2 – 5	0.25 – 0.50
Medium stiff	4 – 8	6 – 12	5 – 9	0.50 – 1.0
Stiff	8 – 15	12 – 25	9 – 19	1.0 – 2.0
Very stiff	15 – 30	25 – 65	19 – 31	2.0 – 4.0
Hard	More than 30	More than 65	More than 31	More than 4.0

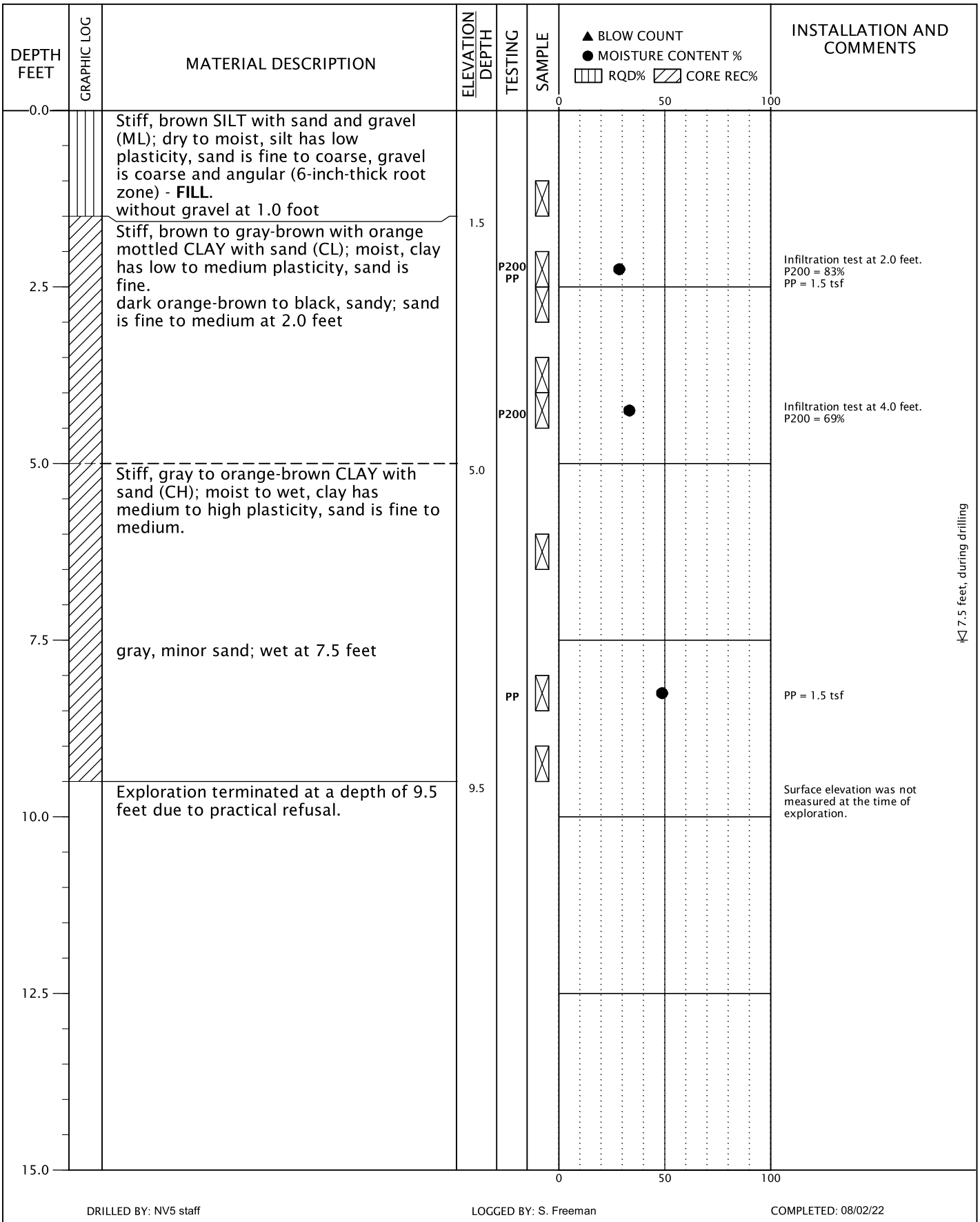
PRIMARY SOIL DIVISIONS			GROUP SYMBOL	GROUP NAME
COARSE-GRAINED SOIL (more than 50% retained on No. 200 sieve)	GRAVEL (more than 50% of coarse fraction retained on No. 4 sieve)	CLEAN GRAVEL (< 5% fines)	GW or GP	GRAVEL
		GRAVEL WITH FINES (≥ 5% and ≤ 12% fines)	GW-GM or GP-GM	GRAVEL with silt
			GW-GC or GP-GC	GRAVEL with clay
		GRAVEL WITH FINES (> 12% fines)	GM	silty GRAVEL
			GC	clayey GRAVEL
			GC-GM	silty, clayey GRAVEL
	SAND (50% or more of coarse fraction passing No. 4 sieve)	CLEAN SAND (<5% fines)	SW or SP	SAND
		SAND WITH FINES (≥ 5% and ≤ 12% fines)	SW-SM or SP-SM	SAND with silt
			SW-SC or SP-SC	SAND with clay
		SAND WITH FINES (> 12% fines)	SM	silty SAND
			SC	clayey SAND
			SC-SM	silty, clayey SAND
FINE-GRAINED SOIL (50% or more passing No. 200 sieve)	SILT AND CLAY	Liquid limit less than 50	ML	SILT
			CL	CLAY
			CL-ML	silty CLAY
			OL	ORGANIC SILT or ORGANIC CLAY
		Liquid limit 50 or greater	MH	SILT
			CH	CLAY
			OH	ORGANIC SILT or ORGANIC CLAY
HIGHLY ORGANIC SOIL			PT	PEAT

MOISTURE CLASSIFICATION		ADDITIONAL CONSTITUENTS					
		Secondary granular components or other materials such as organics, man-made debris, etc.					
			Silt and Clay In:			Sand and Gravel In:	
Term	Field Test	Percent	Fine-Grained Soil	Coarse-Grained Soil	Percent	Fine-Grained Soil	Coarse-Grained Soil
dry	very low moisture, dry to touch						
moist	damp, without visible moisture	< 5	trace	trace	< 5	trace	trace
		5 – 12	minor	with	5 – 15	minor	minor
wet	visible free water, usually saturated	> 12	some	silty/clayey	15 – 30	with	with
					> 30	sandy/gravelly	Indicate %

NV5

SOIL CLASSIFICATION SYSTEM

TABLE A-2



DRILLED BY: NV5 staff

LOGGED BY: S. Freeman

COMPLETED: 08/02/22

BORING METHOD: hand auger (see document text)

BORING BIT DIAMETER: 6 inches

NV5	DCIENG-4-01	**BORING HA-1**
	AUGUST 2022	ESS, INC. PARKING EXPANSION WILSONVILLE, OR
		FIGURE A-1

BORING LOG - NV5 - 1 PER PAGE DCIENG-4-01-HA1.GPJ GDI_NV5.GDT PRINT DATE: 8/16/22:KT:SN

SAMPLE INFORMATION			MOISTURE CONTENT (PERCENT)	DRY DENSITY (PCF)	SIEVE			ATTERBERG LIMITS		
EXPLORATION NUMBER	SAMPLE DEPTH (FEET)	ELEVATION (FEET)			GRAVEL (PERCENT)	SAND (PERCENT)	P200 (PERCENT)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
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HA-1	4.0		33				69			
HA-1	8.0		49							

LAB SUMMARY - GDI-NV5 DCIENG-4-01-HA1.GPJ GDI_NV5.GDT PRINT DATE: 8/10/22:SN

NV5	DCIENG-4-01	**SUMMARY OF LABORATORY DATA**	
	AUGUST 2022	ESS, INC. PARKING EXPANSION WILSONVILLE, OR	**FIGURE A-2**

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.