

7108

**PRELIMINARY DRAINAGE REPORT
FOR**

**1141 Chemawa Road
Keizer, Oregon**

**Prepared For:
Backus Investments, LLC
2415 Perkins Street
Salem, Oregon 97302**

June 30, 2023



1155 13th Street SE
Salem OR 97302
www.mtengineering.net

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PROJECT DESCRIPTION

The applicant is applying to partition a parcel into two lots and rezone one of the lots to develop into a multi-family development. The applicant intends to construct a 20-unit apartment complex that will disturb approximately 0.93-acres. The location of the site is 1141 Chemawa Road. The parcel of land to be developed is a portion of Tax Lot 2100 of Marion County Assessor's Map 07 3W 03BA. Supporting maps for the site are in Appendix A of this report.



Project Site

The development will consist of two apartment buildings containing 20 units and will provide driveway access and a parking lot. The proposed development will be connected to public water and public sewer. Stormwater conveyance and detention will be designed per the current City of Keizer's Public Works Design Standards. The on-site storm facility will be a Combination/Infiltration facility. Runoff from newly created impervious surfaces will be conveyed to the system that has been designed to infiltrate all runoff generated from the site.

EXISTING CONDITIONS

The 0.93-acre site is rectangular in shape. Surface vegetation consists of grass, minimal trees, and accessory buildings. There are no identified wetlands, sensitive areas or waterways located on the property. The topographical high point is located along the southerly property line. Drainage from this high point flows northerly. The relief is approximately 2-feet, and the property does appear to be hydrologically isolated. Appendix A contains a map of existing and proposed conditions.

The abutting properties are zoned residential single family and commercial general with public improvements. Appendix A contains a map of existing and proposed conditions.

The Soil Conservation Service Soil Survey of Marion County identifies the predominate soils on the site as a Cloquato silt loam (map unit Cm). The soil is in the hydrologic soil group B. Appendix B contains the NRCS soil survey for the site.

DEVELOPED CONDITIONS

Stormwater runoff from the site will be conveyed and disposed of via a combination facility. A site map is in Appendix A showing the developed areas. Infiltration testing was performed at the site by Branch Engineering Inc. to determine percolation rates for the development. Testing results at the facility location indicate average percolation rates of 8.9 inches per hour. Using a safety factor of two, a percolation rate of 4.5 inches per hour will be used for design purposes. Appendix B contains the testing analysis and results.

Stormwater runoff from the apartment development will be conveyed to the combination facility designed using the current City of Keizer design standards and the 2020 Portland Stormwater Management Manual for guidance. The facility will have a capacity to infiltrate and detain all runoff generated by all storm events up to the 100-year event for the newly created impervious surfaces.

STORMWATER ANALYSIS

Stormwater quantity within the site is proposed to be handled via a 40' X 40' X 3' combinations facility. Runoff will be routed to the facility that stores and infiltrates runoff for all storm events that includes the 100-year event. An infiltration rate of 4.5 inches per hour was used in the analysis.

Post developed flow and infiltration rates were calculated using HydroCAD 10.20. Since complete infiltration is being used for the site, Table 1 below only lists the 24-hour rainfall depth for the 100-year storm event. Because of the proximity to the City of Keizer, City of Salem rainfall depths were used in the analysis.

Table 1

Storm Event	24-hour Rainfall Depth (in)
100	4.40

For the post-developed conditions, a time of concentration of 5 minutes was assumed. The on-site post-developed area was classified as "Impervious Area", HSG B with a curve number (CN) of 98 and ">75% Grass cover", Good, HSG B with a CN of 61. The weighted CN is 84. A basin map is in Appendix A. A Type 1A rainfall distribution was used with the above rainfall depth. The Santa Barbara Unit Hydrograph method was used to generate the hydrographs.

Table 2 below identifies the pertinent data for the 100-year storm event on the system. The calculations are incorporated in the HydroCAD output located in Appendix C.

Table 2

Storm Event	Required Storage (cu.-ft.)	Storage Provided (cu.-ft.)	Infiltration Rate (inches/hrs)	Release Rate (cfs)
100-year	1,068	3,900	4.5	0.00

(Apartment Site)


In summary, as noted above, the systems as designed will retain and dispose of the runoff from the project and exceeds the City of Keizer design standards. The systems are compliant with the City's WPCF permit with Oregon DEQ by maintaining a separation distance of 2.5 feet from the average water table depth. The average water depth is approximately 25-feet and was obtained from the City of Keizer's Groundwater Protection Model. Attached in Appendix D is the City's correspondence email.

OPERATION & MAINTENANCE

The drainage system for the site is a unique and critical system. It is a complete infiltration system, which allows the water to collect and percolate into the subsurface. The only connection to a City of Keizer storm drainage system is the emergency overflow. All the stormwater generated onsite is to be disposed of through this infiltration system and released directly into the ground.

Since this facility works as a closed system, all dirt and sediment that enters onto the site (by way of wind, car tires, etc.) will remain within the stormwater system, unless it is maintained, and the sediment material is physically removed from the site.

A system as unique as this one must be properly maintained. As sediment and fine particles fill the system, the native soil will develop a sediment "cap" which will limit or completely stop the stormwater runoff from infiltrating into the native soil. This type of system failure can create conditions that require the entire system to be completely removed and replaced.




This manual describes the maintenance activities required to prolong the life of the facility and reduce the occurrence of a system failure that requires replacement.

Operation and maintenance of the stormwater facility will be the responsibility of the property owner. O&M specifications with a checklist can be seen in Appendix D.

CONCLUSION

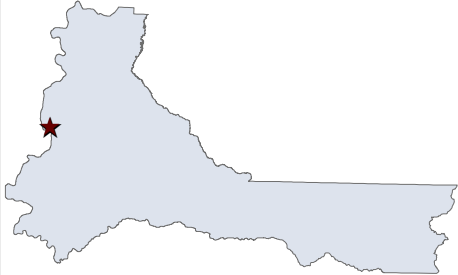
Based on the presented information, the proposed design meets the water quantity standards. If there are any questions regarding this analysis or the design, please contact Matthew Hendrick at Multi/Tech Engineering by phone at (503) 363-9227 or via e-mail at mhendrick@mtengineering.net.



Appendix A

07 3W 03BA

07 3W 03BA
KEIZER



MARION COUNTY, OREGON
NE1/4 NW1/4 SEC3 T7S R3W W.M.
SCALE 1" = 100'

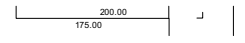
LEGEND

- LINE TYPES
- Taxlot Boundary
 - Road Right-of-Way
 - Railroad Right-of-Way
 - Private Road ROW
 - Subdivision/Plat Bndry
 - Waterline - Taxlot Bndry
 - Historical Boundary
 - Easement
 - Railroad Centerline
 - Taxcode Line
 - Map Boundary
 - Waterline - Non Bndry

- CORNER TYPES
- + 1/16TH Section Cor.
 - ⊙ DLC Corner
 - ⊕ 1/4 Section Cor.
 - 16 15 Section Corner
 - 21 22

- NUMBERS
- Tax Code Number
00 00 0
- Acreage
0.25 AC
- All acres listed are Net Acres, excluding any portions of the taxlot within public ROWs

NOTES
Tick Marks: A tick mark in the road indicates that the labeled dimension extends into the public ROW



CANCELLED NUMBERS

800	8700
900	8800
1600L1	
1601	
7600	
7700	
7800	
7900	
8000	
8100	
8200	
8300	
8400	
8500	
8501	
8600	
8601	

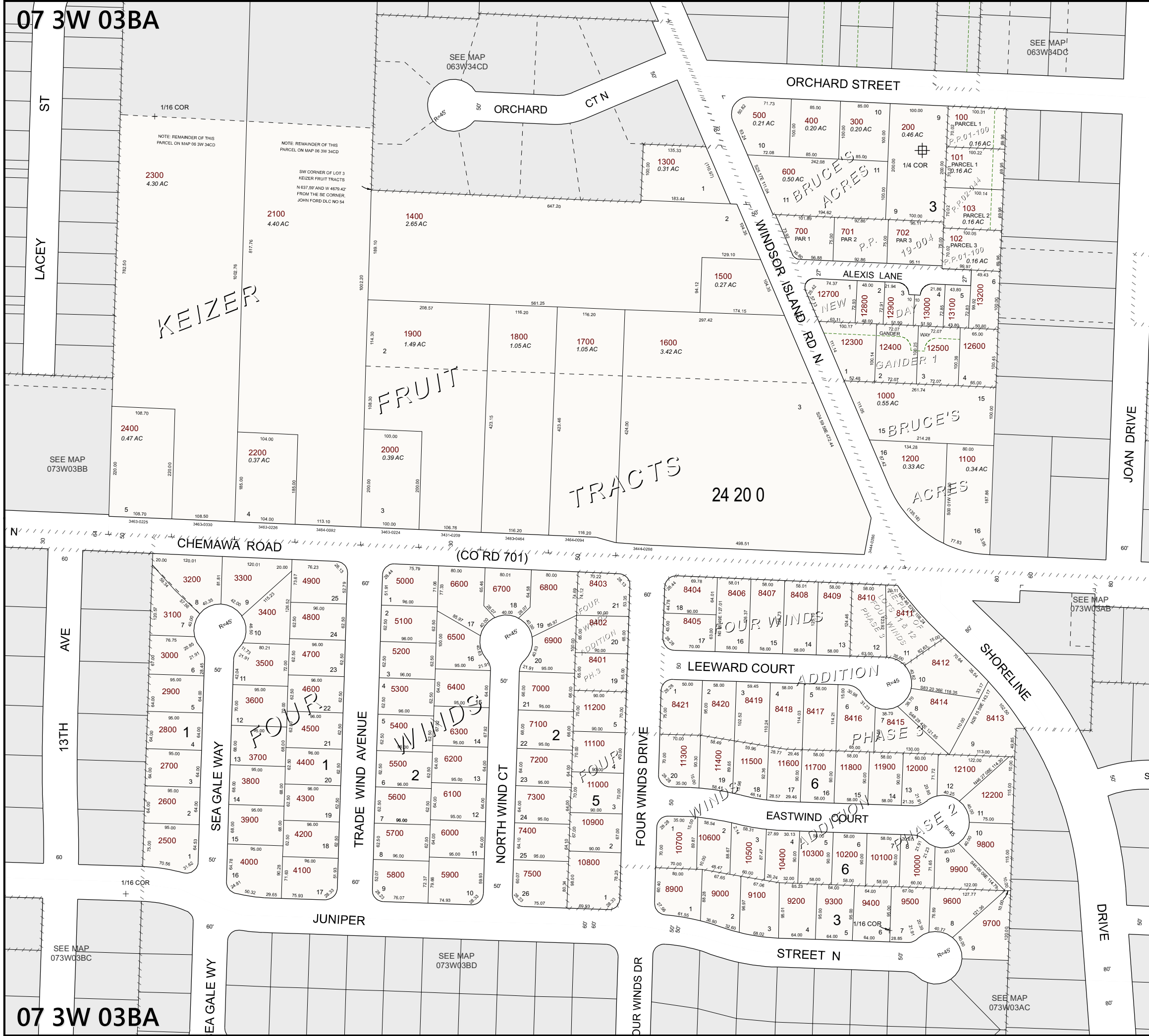
DISCLAIMER: THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSES ONLY



FOR ADDITIONAL MAPS VISIT OUR WEBSITE AT www.co.marion.or.us

PLOT DATE: 10/16/2020

KEIZER
07 3W 03BA





Appendix B



March 31, 2023

Jeremy Grenz
Multi-Tech Engineering Inc
1155 13th Street SE
Salem, Oregon

**RE: SITE INFILTRATION TEST RESULTS
CHEMAWA PARTITION APARTMENTS
TAX MAP 06-3W-34CD TAX LOT 2100
KEIZER, OREGON
BRANCH ENGINEERING INC. PROJECT NO. 23-107**

At the request of the Multi-Tech Engineering Inc., Branch Engineering Inc (BEI). Has conducted site infiltration testing for the design of proposed stormwater systems at the subject site. The purpose of this investigation was to evaluate the infiltration rate of native soils that will be exposed to stormwater runoff from the proposed development. The results presented herein are for initial design and should be verified by the design engineer of record (EOR) at the time of construction. The scope of our services has included a review of the proposed site development, observations, logging, of three test pit excavations which were utilized for performing encased falling head infiltration tests at the approximate locations shown on the attached Figure-1.

Site Soils

The soils observed in the site test pit excavations were visually classified using the American Society of Testing and Materials (ASTM) Method D-2488) and logged by BEI staff (see attached infiltration soil logs). Observed soil conditions consisted of approximately 8- to 12-inches of brown silt topsoil, followed by a maximum of 34-inches of brown silty sand (SM), underlain by brown silt with little sand (ML). The deposition of the coarser grained material over the underlying fine-grained materials is likely a result of a large flood event, or series of flood events as faint lenses of silt were present within the larger silty sand horizon.

Nearby Oregon Water Resources Department (OWRD) well logs have been included with this report to establish the soil and groundwater conditions that are likely present beneath the site. Surficial soil conditions were similar to those observed in our onsite exploration with gravel being encountered at approximately 23-feet BGS in a boring completely a few hundred feet to the south. The NRCS Web Soil Survey of the Marion County Area shows that site soils are mapped as Cloquato silt loam, which forms on flood plains, is composed primarily of silt loam with a parent material of alluvium, and is considered well drained.

Ground Water

BEI staff observed the test pit excavations for the infiltration tests, and the geotechnical test pit excavations which advanced to a maximum depth of 10-feet BGS for deeper soil observations. We did not encounter the regional groundwater table; however, a very slow (<0.25 gal/min estimated) seep was observed at 8-feet BGS in Test Pit-3. The attached well logs indicate that groundwater was measured between 26- and 27-feet BGS at the well's locations. The elevation of the groundwater table

in the vicinity of the subject site is anticipated to be coincident with the Willamette River (approximately 25-feet lower in elevation than the site).

Infiltration Data Analysis

Site infiltration testing was conducted on March 8, 2023 in accordance with the 2014 City of Salem Administrative Rules. The soil is assumed to be laterally homogeneous and sidewall infiltration is negligible as a 6-inch diameter, open-ended, plastic standpipe was used for containment of the water column. Water was added to the pipe to pre-saturate the soil prior to testing. Infiltration testing commenced over three successive trials with water being added and the height of the water column being recorded over time. The measured infiltration rate is shown below in Table 1 (no factor of safety applied), with the field data presented in the attached Infiltration Test Results page. This rate should be considered preliminary and should be confirmed once the facility has been completed.

Table 1:

<i>Test Location</i>	<i>Test Depth (inches) BGS</i>	<i>Infiltration Rate (in/hr)</i>
IT-1	40	17.2
IT-2	48	12.0
IT-3	55	8.9

Conclusion

The above infiltration rates indicate the finer grained soils have a lower rate of infiltration than the surficial coarser grained materials. The site infiltration rates are, in our experience, generally representative of the soil type(s) encountered and it is our opinion that on-site disposal of stormwater at the site is feasible. However, soil type and consistency likely varies throughout the site and soil conditions should be verified by the EOR. The area(s) proposed for infiltration shall not be subjected to compaction of the soil by vehicle traffic, storage of materials, or other means that can influence the rate of infiltration in those areas. The required setback from property lines and structures is 5-feet and 10-feet, respectively. It is the client/design professional’s responsibility to determine that the placement of the infiltration basin meets these requirements.

Limitations

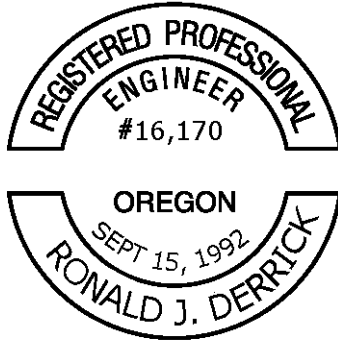
This report has been prepared for the exclusive use of the addressee and their designated representatives for the design of the proposed development. The analysis and recommendations contained herein were prepared in general accordance with the standards of practice for the area at the time of this report’s preparation and may not be suitable for purposes other than those described in this report.

Subsurface explorations indicate soil conditions at specific locations and depths and do not necessarily reflect soil and groundwater variations that may exist between other locations at the site. If design changes are made that may affect the results of our testing, or a substantial amount of time passes between our investigation and the site development, we reserve the right to review the changes for applicability.

We assume no responsibility or liability for engineering, inspection, or testing performed by others and no warranty, expressed or implied, is given. Use of this report constitutes an agreement and consent by the addressee and their designated representatives to the limitations listed above.

If you have any questions regarding the test method, data analysis or design, please contact BEI Staff at (503) 779-2577.

Sincerely,
Branch Engineering Inc,

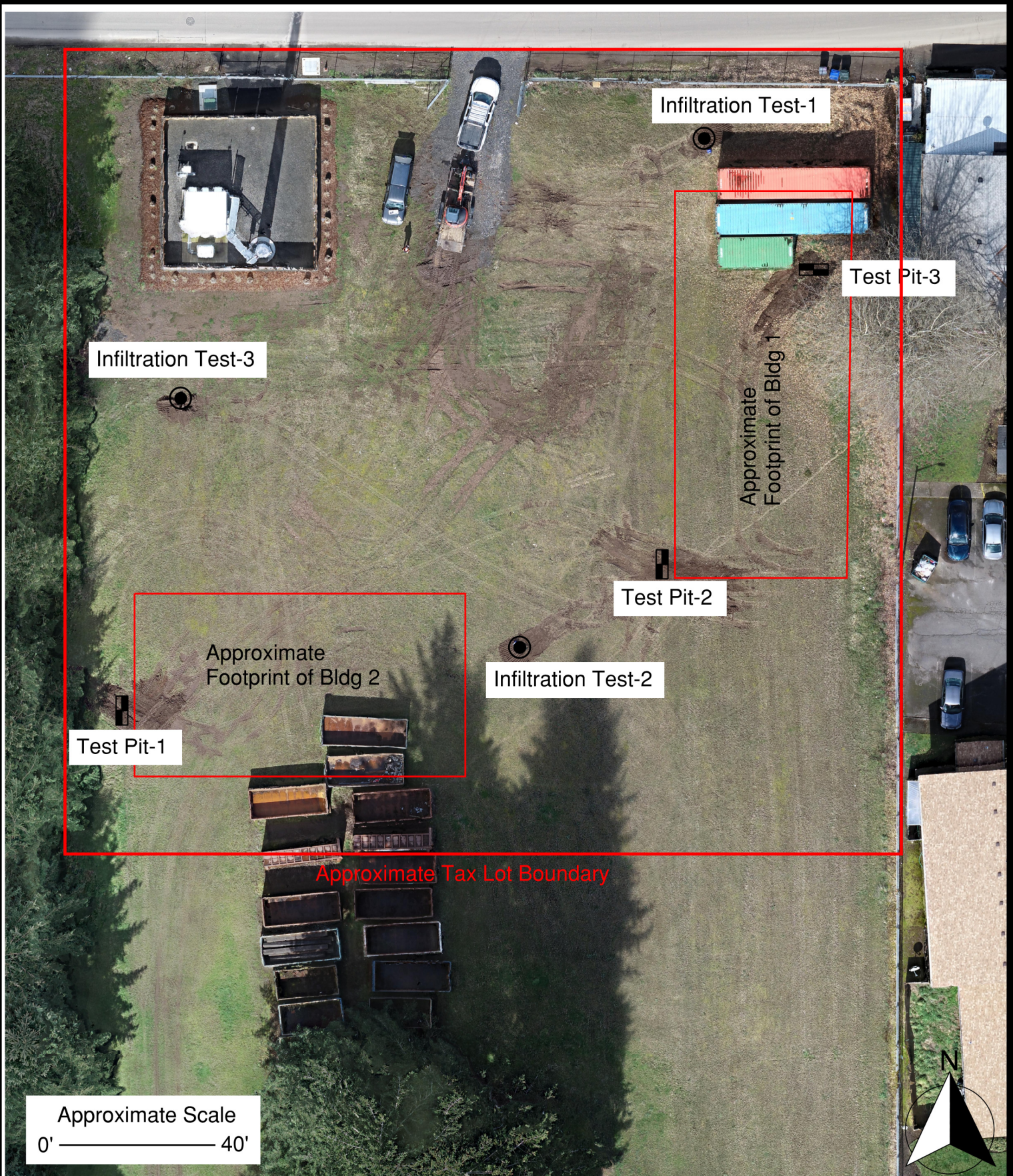


EXPIRES: 12/31/2023

Ronald J. Derrick, P.E., G.E.
Principal Geotechnical Engineer

Attached:

- Figure-1 Site Map
- Infiltration Test Results (1)
- ORWD Well Logs (3)
- NRCS Soils Map



Approximate Scale
 0' ————— 40'

Infiltration Test Results

Project:	Chemawa Partition Apartments
Project No:	23-107
Test Date:	3/8/2023
Test Type:	Encased Falling Head
Pipe Diameter:	6 inches

Test No:	IT-1	Pipe Above Grade:	16 inches	Test Depth:	40 inches
Depth (inches)			Soil Description		
0	12	Brown Silt with fine roots			
12	36	Brown silty sand (SM)			
36	40	Brown silt with little sand (ML)			

Trial 1 Time Start: 14:20

Elapsed Time (min)	Depth to water surface (in)	Depth of Water (in)	Drop in Water Level (in)	Infiltration Rate (in/hr)	Remarks
0	44.0	12			
5	46.0	10	2.0	24.0	
7	46.8	9.3	0.8	22.5	
14	49.3	6.8	2.5	21.4	
19	51.0	5.0	1.8	21.0	
27	53.8	2.3	2.8	20.6	
35	56	0.0	2.3	16.9	

Trial 2 Time Start: 14:56

Elapsed Time (min)	Depth to water surface (in)	Depth of Water (in)	Drop in Water Level (in)	Infiltration Rate (in/hr)	Remarks
0	44.0	12			
5	45.8	10.3	1.8	21.0	
10	47.3	8.7	1.6	18.6	
20	50.3	5.8	3.0	17.7	
30	53.1	2.9	2.9	17.1	
40	56.0	0	2.9	17.4	

Trial 3 Time Start: 15:40

Elapsed Time (min)	Depth to water surface (in)	Depth of Water (in)	Drop in Water Level (in)	Infiltration Rate (in/hr)	Remarks
0	44.5	11.5			
5	46.2	9.8	1.7	20.4	
10	47.8	8.2	1.6	19.2	
20	50.8	5.3	3.0	17.7	
30	53.6	2.4	2.9	17.1	
40	56.0	0	2.4	17.3	

Infiltration Test Results

Project:	Chemawa Partition Apartments
Project No:	23-107
Test Date:	3/8/2023
Test Type:	Encased Falling Head
Pipe Diameter:	6 inches

Test No:	IT-2	Pipe Above Grade:	0 inches	Test Depth:	48 inches
Depth (inches)			Soil Description		
0	12	Brown Silt with fine roots			
12	36	Brown silty sand (SM)			
36	48	Brown silt with little sand (ML)			

Trial 1 Time Start: 14:20

Elapsed Time (min)	Depth to water surface (in)	Depth of Water (in)	Drop in Water Level (in)	Infiltration Rate (in/hr)	Remarks
0	37.0	11			
5	38.5	10	1.5	18.0	
7	39.0	9.0	0.5	15.0	
14	40.6	7.4	1.6	13.7	
19	41.8	6.3	1.2	13.8	
27	43.4	4.6	1.7	12.4	
45	47.0	1.0	3.6	12.0	

Trial 2 Time Start: 15:02

Elapsed Time (min)	Depth to water surface (in)	Depth of Water (in)	Drop in Water Level (in)	Infiltration Rate (in/hr)	Remarks
0	36.5	11.5			
5	37.8	10.3	1.3	15.0	
10	38.9	9.1	1.2	13.8	
20	41.0	7.0	2.1	12.6	
30	43.0	5.0	2.0	12.0	
40	45.0	3.0	2.0	12.0	

Trial 3 Time Start: 15:44

Elapsed Time (min)	Depth to water surface (in)	Depth of Water (in)	Drop in Water Level (in)	Infiltration Rate (in/hr)	Remarks
0	36.0	12			
5	37.2	10.8	1.2	14.4	
10	38.3	9.7	1.1	13.2	
20	40.5	7.5	2.2	13.2	
30	42.6	5.4	2.1	12.6	
40	44.6	3.4	2.0	12.0	
50	46.6	1.4	2	12.0	

Infiltration Test Results

Project:	Chemawa Partition Apartments
Project No:	23-107
Test Date:	3/8/2023
Test Type:	Encased Falling Head
Pipe Diameter:	6 inches

Test No:	IT-3	Pipe Above Grade:	0 inches	Test Depth:	55 inches
Depth (inches)			Soil Description		
0	12	Brown Silt with fine roots			
12	46	Brown silty sand (SM)			
46	55	Brown silt with little sand (ML)			

Trial 1 Time Start: 14:25

Elapsed Time (min)	Depth to water surface (in)	Depth of Water (in)	Drop in Water Level (in)	Infiltration Rate (in/hr)	Remarks
0	45.0	10			
5	46.0	9	1.0	12.0	
10	46.9	8.1	0.9	10.8	
14	47.6	7.4	0.7	10.5	
20	48.6	6.4	1.0	10.0	
30	50.2	4.8	1.6	9.6	
55	54.0	1.0	3.8	9.1	

Trial 2 Time Start: 15:26

Elapsed Time (min)	Depth to water surface (in)	Depth of Water (in)	Drop in Water Level (in)	Infiltration Rate (in/hr)	Remarks
0	44.0	11			
5	44.9	10.1	0.9	10.8	
10	45.7	9.3	0.8	9.6	
30	49.0	6.0	3.3	9.9	
40	50.5	4.5	1.5	9.0	
58	53.2	1.8	2.7	9.0	

Trial 3 Time Start: 16:30

Elapsed Time (min)	Depth to water surface (in)	Depth of Water (in)	Drop in Water Level (in)	Infiltration Rate (in/hr)	Remarks
0	45.5	9.5			
10	47.2	7.8	1.7	10.2	
20	48.8	6.2	1.6	9.5	
30	50.3	4.7	1.5	9.1	
40	51.8	3.2	1.5	9.0	
55	54.0	1.0	2.2	8.8	

DLC 06 1989

MARI

536

6S/3W/33da

STATE OF OREGON WATER WELL REPORT (as required by ORS 537.765)

WATER RESOURCES DEPT. SALEM, OREGON

(START CARD) # 16980

(1) OWNER: Name City of Salem Well Number: Address City Salem State OR Zip 97310

(2) TYPE OF WORK: [X] New Well [] Deepen [] Recondition [] Abandon

(3) DRILL METHOD: [] Rotary Air [] Rotary Mud [X] Cable [] Other

(4) PROPOSED USE: [] Domestic [] Community [] Industrial [] Irrigation [] Thermal [] Injection [X] Other test production

(5) BORE HOLE CONSTRUCTION: Special Construction approval Yes No Depth of Completed Well 27 ft. Explosives used [] [X] Type Amount

Table with columns: HOLE Diameter, SEAL Material, Amount sacks or pounds. Includes entries for cement grout and bentonite.

How was seal placed: Method [] A [] B [X] C [] D [] E Backfill placed from 16" 0' to 100' 100' ft. Material bentonite

(6) CASING/LINER: Table with columns: Diameter, From, To, Gauge, Steel, Plastic, Welded, Threaded. Includes entries for Casing and Liner.

(7) PERFORATIONS/SCREENS: [X] Screens Method Type Material stainless

Table with columns: From, To, Slot size, Number, Diameter, Tele/pipe size, Casing, Liner. Includes entries for perforations at 122-128, 128-158, and 158-168.

(8) WELL TESTS: Minimum testing time is 1 hour. Yield gal/min 400 Drawdown 165 Drill stem at 1 hr. Time 1 hr.

Temperature of water Depth Artesian Flow Found Was a water analysis done? [] Yes By whom Did any strata contain water not suitable for intended use? [] Too little [] Salty [] Muddy [] Odor [] Colored [] Other Depth of strata:

(9) LOCATION OF WELL by legal description: County Marion Latitude Longitude Township 6S N or S, Range 3W E or W, WM. Section 33 NE 1/4 SE 1/4 Tax Lot 1500 Lot Block Subdivision Street Address of Well (or nearest address) 5000 block, 17th Ave (in nut orchard)

(10) STATIC WATER LEVEL: 27 ft. below land surface. Date 11-20-89 Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES: Depth at which water was first found 31

Table with columns: From, To, Estimated Flow Rate, SWL. Includes entries for zones at 106-125, 31-42, and 171.

(12) WELL LOG: Table with columns: Material, From, To, SWL. Includes entries for Silty clay brown, Gravels clay brown, etc.

Date started 10-26-89 Completed 11-20-89

(unbonded) Water Well Constructor Certification: I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Signed [Signature] WWC Number 758 Date 11-30-89

(bonded) Water Well Constructor Certification: I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. Signed [Signature] WWC Number 723 Date 12-4-89

GEOTECHNICAL HOLE REPORT

(as required by OAR 690-240-035)

(1) OWNER/PROJECT: Hole Number B-1

Name CITY OF SALEM

Address 555 LIBERTY SE

City SALEM State OREGON Zip 97302

(2) TYPE OF WORK

New Deepening Alteration (repair/recondition) Abandonment

(3) CONSTRUCTION:

Rotary Air Hand Auger Hollow Stem Auger
 Rotary Mud Cable Tool Push Probe Other

(4) TYPE OF HOLE:

Uncased Temporary Cased Permanent
 Uncased Permanent Slope Stability Other

(5) USE OF HOLE: GEOTECHNICAL

(6) BORE HOLE CONSTRUCTION:

Special Construction approval Yes No Depth of Completed Hole 35 ft.

HOLE			SEAL			Sacks or pounds
Diameter	From	To	Material	From	To	
8	35	0	BENT CHIPS	35	1	17
			CONCRETE	1	0	

Backfill placed from _____ ft. to _____ ft. Material _____

Filter Pack placed from _____ ft. to _____ ft. Size of pack _____

(7) CASING/SCREEN:

	Diameter	From	To	Gauge	Steel			
					Plastic	Welded	Threaded	
Casing:	N/A				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Screen:					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Slot size _____

(8) WELL TEST:

Pump Bailer Air Flowing Artesian

Permeability _____ Yield _____ GPM _____

Conductivity _____ PH _____

Temperature of water 58 °F Depth artesian flow found _____ ft.

Was water analysis done? Yes No

By whom? _____

Depth of strata analyzed. From _____ ft. to _____ ft.

Remarks: _____

(9) LOCATION OF HOLE by legal description:

County MARION Latitude _____ Longitude _____

Township 7 S Range 3 W W.M.

Section 3 SE 1/4 NW 1/4

Tax Lot ROW Lot _____ Block _____ Subdivision _____

Street Address of Well (or nearest address) INTERSEC OF SHORELINE AND DEARBORN

Map with location identified must be attached

(10) STATIC WATER LEVEL:

26 ft. below land surface. Date 9/4/02

Artesian pressure _____ lb. per square inch. Date _____

(11) SUBSURFACE LOG:

Ground Elevation _____

Material Description	From	To	SWL
ASPHALT AND BASE ROCK	0	1	
BROWN GRAVELY SILT	1	26	26
GRAY GRAVELY SAND	26	35	

Date Started 9/4/02

Date Completed 9/4/02

(12) ABANDONMENT LOG:

Material Description	From	To	Sacks or Pounds
BENT CHIPS	35	1	17
CONCRETE	1	0	
RECEIVED			
OCT 01 2002			
WATER RESOURCES DEPT. SALEM, OREGON			

Date started 9/4/02

Date Completed 9/4/02

Professional Certification

(to be signed by a licensed water supply or monitoring well constructor, or registered geologist or civil engineer).

I accept responsibility for the construction, alteration, or abandonment work performed on during the construction dates reported above. All work performed during this time is in compliance with Oregon geotechnical hole construction standards. This report is true to the best of my knowledge and belief.

License or Registration Number 10400

Signed Warren Cc

Date 9/11/02

WARREN MCCANN

Affiliation **SUBSURFACE TECHNOLOGIES**

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER

1" = 1/4 mile E

3

F

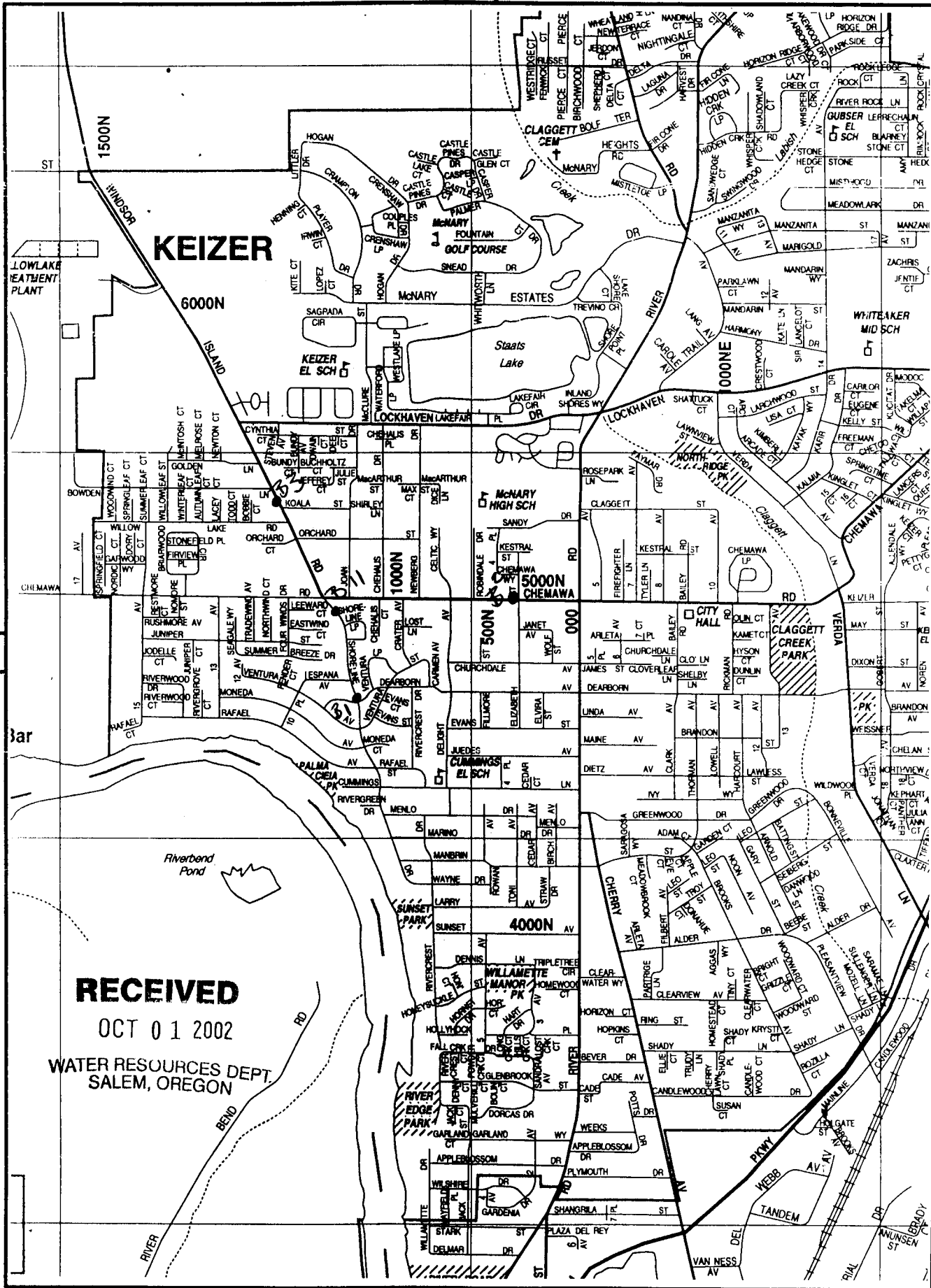
4

5

8

6

10



RECEIVED

OCT 01 2002

WATER RESOURCES DEPT.
SALEM, OREGON

STATE OF OREGON
GEOTECHNICAL HOLE REPORT
(as required by OAR 690-240-0035)

6/15/2021

(1) OWNER/PROJECT Hole Number B1

PROJECT NAME/NBR: LOREN'S SANITATION

First Name Last Name
Company BLACK MOUNTAIN CONSULTING - OWNER'S REP
Address 22566 SW WASHINGTON ST., STE. 206
City SHERWOOD State OR Zip 97140

(2) TYPE OF WORK [X] New [] Deepening [X] Abandonment
[] Alteration (repair/recondition)

(3) CONSTRUCTION
[] Rotary Air [] Hand Auger [X] Hollow stem auger
[] Rotary Mud [] Cable [] Push Probe
[] Other

(4) TYPE OF HOLE:
[] Uncased Temporary [] Cased Permanent
[] Uncased Permanent [] Slope Stability
[] Other
Other:

(5) USE OF HOLE
GEOTECHNICAL SOIL

(6) BORE HOLE CONSTRUCTION Special Standard [] (Attach copy)
Depth of Completed Hole 40.00 ft.

Table with columns: Dia, From, To, Material, SEAL, Amt, lbs. Row 1: 8.25, 0, 40, Bentonite Chips, 0, 40, 21, S

Backfill placed from ft. to ft. Material
Filter pack from ft. to ft. Material Size

(7) CASING/SCREEN
Table with columns: Casing, Screen, Dia, From, To, Gauge, Stl, Plstc, Wld, Thrd

(8) WELL TESTS
[] Pump [] Bailer [] Air [] Flowing Artesian
Yield gal/min Drawdown Drill stem/Pump depth Duration(hr)

Temperature °F Lab analysis [] Yes By
Supervising Geologist/Engineer
Water quality concerns? [] Yes (describe below) TDS amount
Table with columns: From, To, Description, Amount, Units

(9) LOCATION OF HOLE (legal description)
County MARION Twp 6.00 S N/S Range 3.00 W E/W WM
Sec 34 SE 1/4 of the SW 1/4 Tax Lot 2100
Tax Map Number Lot
Lat " or 44.99913056 DMS or DD
Long " or -123.04464167 DMS or DD
[] Street address of hole [X] Nearest address
1141 CHEMAWA RD KEIZER

(10) STATIC WATER LEVEL
Date SWL(psi) + SWL(ft)
Existing Well / Predeepening
Completed Well
Flowing Artesian? []
WATER BEARING ZONES
Depth water was first found
Table with columns: SWL Date, From, To, Est Flow, SWL(psi), + SWL(ft)

(11) SUBSURFACE LOG Ground Elevation
Material From To
Topsoil 0 2
Brown Soft Silt 2 23
Small Gravels/Sands/Cobbles 23 40

Date Started 6/9/2021 Completed 6/9/2021

(12) ABANDONMENT LOG:
Material From To Amt lbs
Bentonite Chips 0 40 21 S

Date Started 6/9/2021 Completed 6/9/2021

Professional Certification (to be signed by an Oregon licensed water or monitoring well constructor, Oregon registered geologist or professional engineer).

I accept responsibility for the construction, deepening, alteration, or abandonment work performed during the construction dates reported above. All work performed during this time is in compliance with Oregon geotechnical hole construction standards. This report is true to the best of my knowledge and belief.

License/Registration Number 1772 Date 6/15/2021

First Name WILLIAM Last Name WRIGHT
Affiliation WESTERN STATES SOIL CONSERVATION, INC.

GEOTECHNICAL HOLE REPORT - Map with location identified must be attached and shall include an approximate scale and north arrow

MARI 69916

6/15/2021

Map of Hole

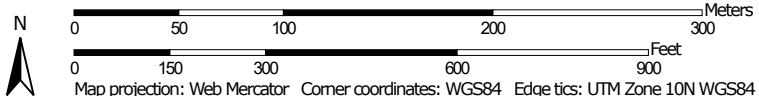


Untitled Map
Write a description for your map.

Soil Map—Marion County Area, Oregon
(Chemawa Partition)



Map Scale: 1:3,610 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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: Marion County Area, Oregon

Survey Area Data: Version 20, Sep 14, 2022

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

Date(s) aerial images were photographed: Aug 1, 2018—Aug 31, 2018

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Cm	Cloquato silt loam	30.4	54.5%
Nu	Newberg fine sandy loam	5.4	9.7%
Nw	Newberg silt loam	20.0	35.9%
Totals for Area of Interest		55.9	100.0%



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

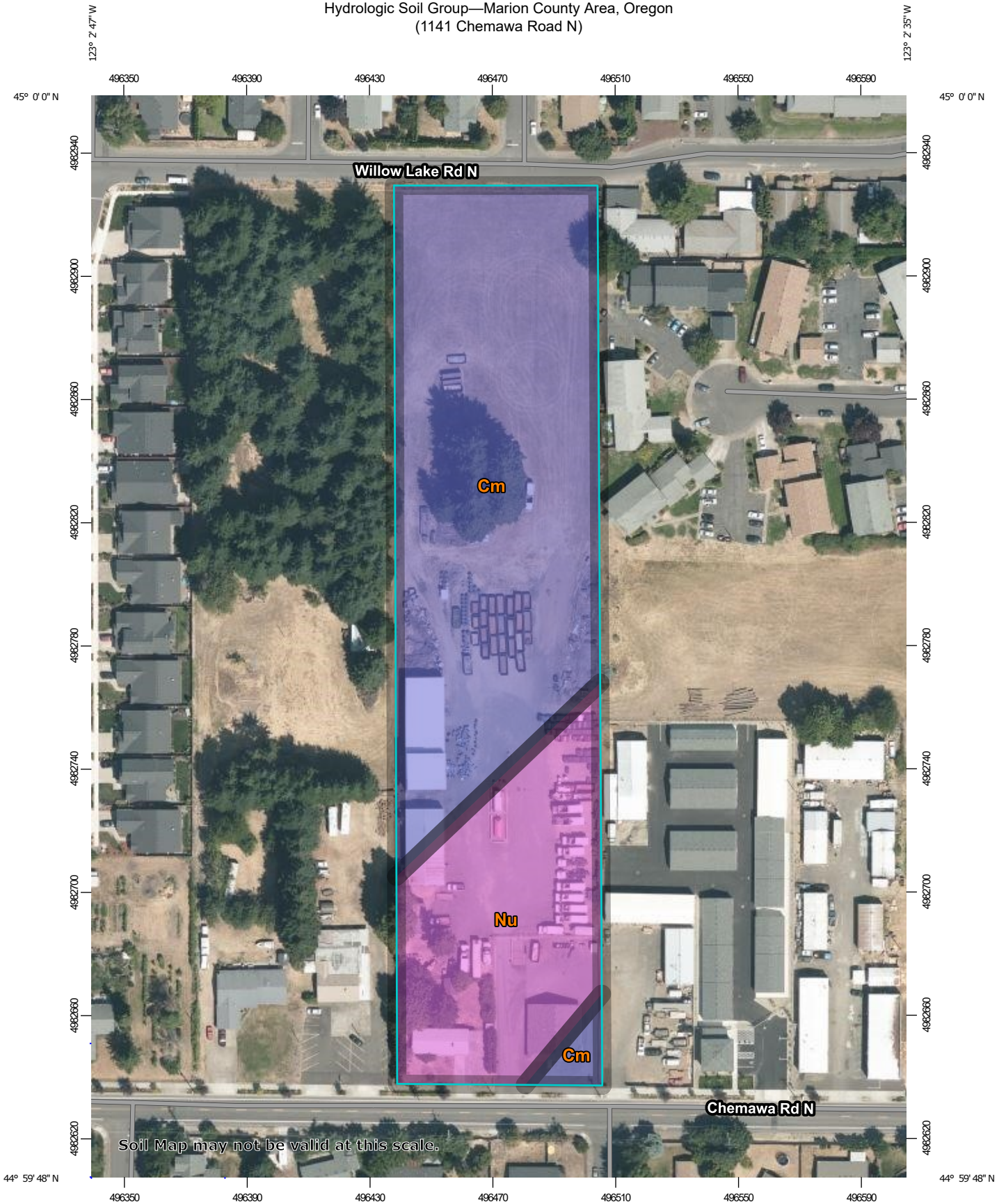
A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for **Marion County Area, Oregon**

1141 Chemawa Road N



Hydrologic Soil Group—Marion County Area, Oregon
(1141 Chemawa Road N)



Map Scale: 1:1,710 if printed on A portrait (8.5" x 11") sheet.




Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84




MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils

Soil 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: Marion County Area, Oregon
 Survey Area Data: Version 20, Sep 14, 2022

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

Date(s) aerial images were photographed: Aug 1, 2018—Aug 31, 2018

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
Cm	Cloquato silt loam	B	3.3	67.9%
Nu	Newberg fine sandy loam	A	1.5	32.1%
Totals for Area of Interest			4.8	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.

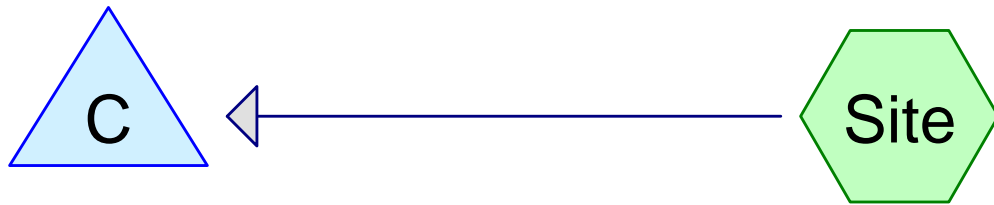
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

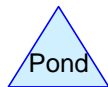
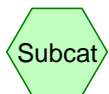


Appendix C



Combination Facility

Apartments



20230630 1141 Chemawa Road Apartments

Type IA 24-hr 100-Year Rainfall=4.40"

Prepared by Multi/Tech Engineering Service

Printed 7/5/2023

HydroCAD® 10.20-3c s/n 00948 © 2023 HydroCAD Software Solutions LLC

Summary for Subcatchment Site: Apartments

Runoff = 0.62 cfs @ 7.91 hrs, Volume= 9,803 cf, Depth= 2.94"

Routed to Pond C : Combination Facility

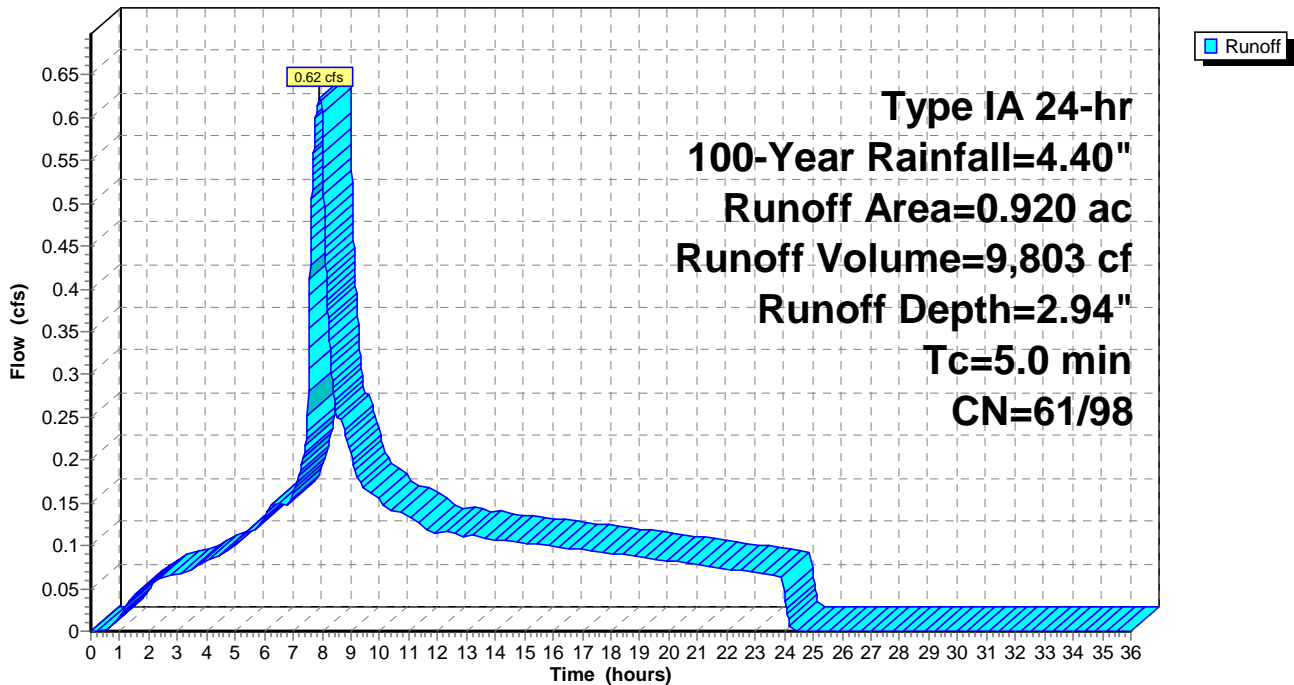
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 100-Year Rainfall=4.40"

Area (ac)	CN	Description
* 0.560	98	Impervious surface, HSG B
0.360	61	>75% Grass cover, Good, HSG B
0.920	84	Weighted Average
0.360	61	39.13% Pervious Area
0.560	98	60.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Assumed

Subcatchment Site: Apartments

Hydrograph



20230630 1141 Chemawa Road Apartments

Type IA 24-hr 100-Year Rainfall=4.40"

Prepared by Multi/Tech Engineering Service

Printed 7/5/2023

HydroCAD® 10.20-3c s/n 00948 © 2023 HydroCAD Software Solutions LLC

Summary for Pond C: Combination Facility

Inflow Area = 40,075 sf, 60.87% Impervious, Inflow Depth = 2.94" for 100-Year event
 Inflow = 0.62 cfs @ 7.91 hrs, Volume= 9,803 cf
 Outflow = 0.20 cfs @ 9.06 hrs, Volume= 9,803 cf, Atten= 68%, Lag= 69.0 min
 Discarded = 0.20 cfs @ 9.06 hrs, Volume= 9,803 cf

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 130.22' @ 9.06 hrs Surf.Area= 1,600 sf Storage= 1,068 cf

Plug-Flow detention time= 26.8 min calculated for 9,803 cf (100% of inflow)
 Center-of-Mass det. time= 26.8 min (718.3 - 691.5)

Volume	Invert	Avail.Storage	Storage Description	
#1	127.24'	3,916 cf	Custom Stage Data (Prismatic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
127.24	1,600	0.0	0	0
127.25	1,600	35.0	6	6
128.24	1,600	35.0	554	560
128.25	1,600	5.0	1	561
129.99	1,600	5.0	139	700
130.00	1,600	100.0	16	716
132.00	1,600	100.0	3,200	3,916

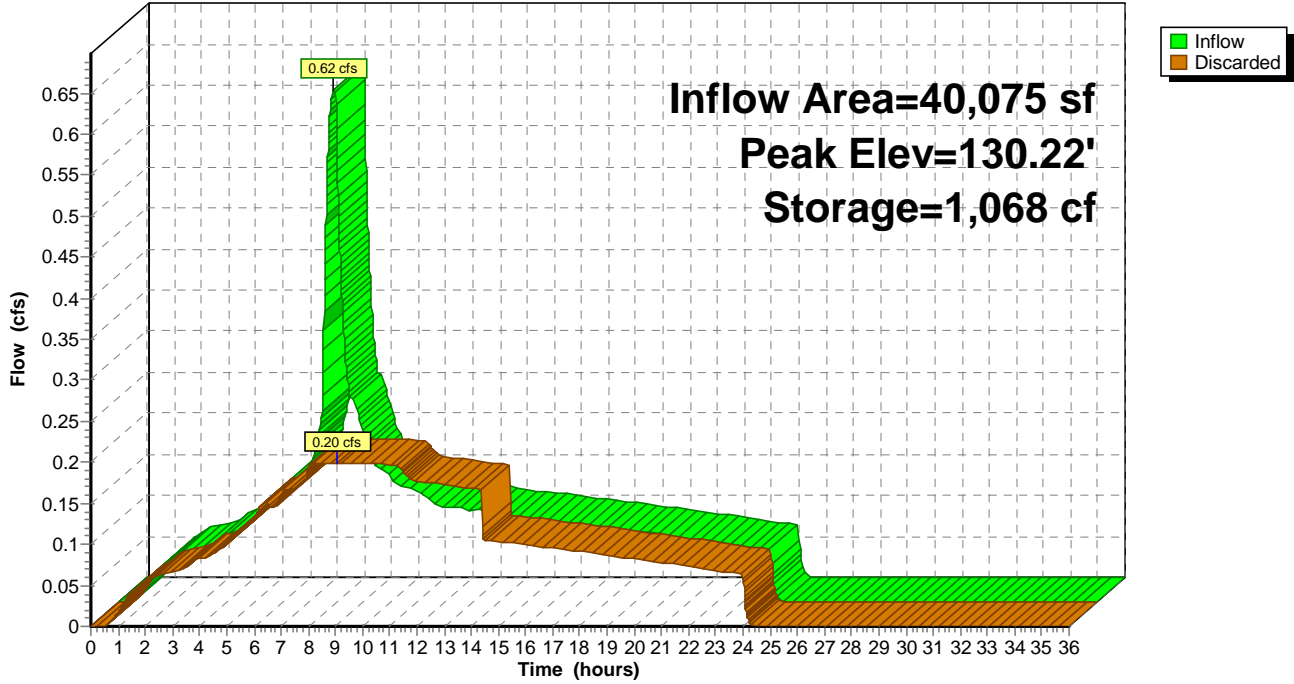
Device	Routing	Invert	Outlet Devices
#1	Discarded	127.24'	4.500 in/hr Exfiltration over Horizontal area Conductivity to Groundwater Elevation = 112.00'

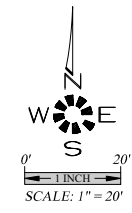
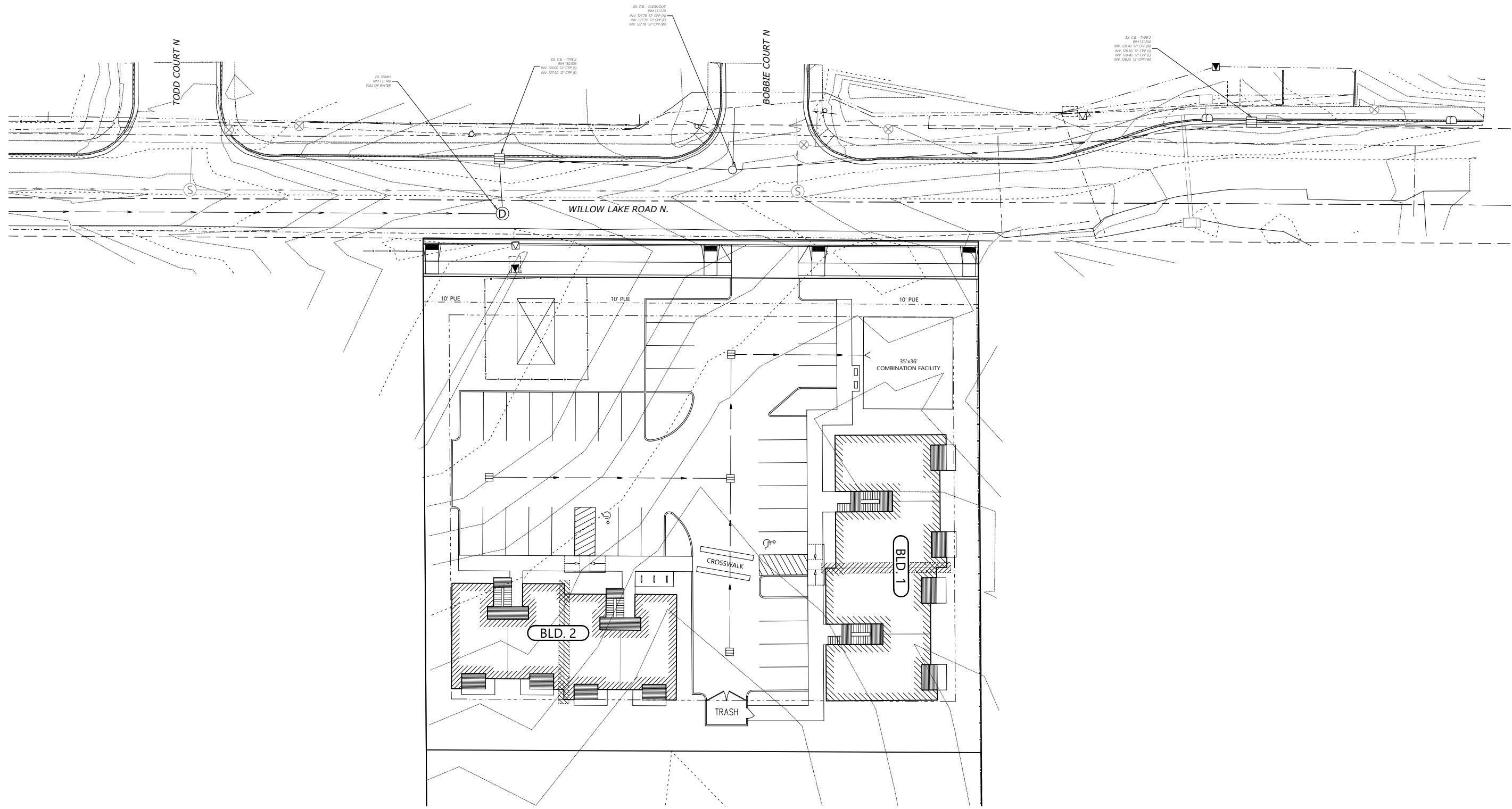
Discarded OutFlow Max=0.20 cfs @ 9.06 hrs HW=130.22' (Free Discharge)

↑**1=Exfiltration** (Controls 0.20 cfs)

Pond C: Combination Facility

Hydrograph





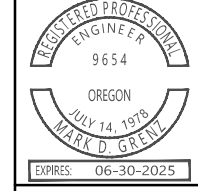
MULTI/TECH
 ENGINEERING SERVICES, INC.
 11515 13TH ST., S.W., SALEM, OR, 97302
 PH: (503) 363 - 9227 FAX: (503) 364-1260
 www.mtengineering.net office@mtengineering.net

PRIVATE STORM DRAIN PLAN

CHEMAWA PARTITION

NO CHANGES, MODIFICATIONS OR REPRODUCTIONS TO BE MADE TO THESE DRAWINGS WITHOUT WRITTEN AUTHORIZATION FROM THE DESIGN ENGINEER.
 DIMENSIONS & NOTES TAKE PRECEDENCE OVER GRAPHICAL REPRESENTATION.

7511P C3.1.8D
 Design: M.D.G.
 Drawn: A.R.B. & M.K.D.
 Checked: J.G.G.
 Date: AS SHOWN
 Scale: AS SHOWN
 As-Built: _____



JOB # 7511

C3.1

Drawing is NOT to scale



Appendix D

Matt Hendrick, P.E.

From: Waldner, Haley <WaldnerH@keizer.org>
Sent: Thursday, June 29, 2023 3:07 PM
To: Matt Hendrick, P.E.
Cc: Jeremy Grenz; Blaylock, Keare
Subject: RE: Water Depth

Matt,

Here is what I found for groundwater depth at 1141 Chemawa road N.

Depth to water: between 25-28ft

This is data collected from a groundwater model and may not be completely accurate

Thank you,

Haley Waldner
Environmental Compliance Coordinator
City Of Keizer, Public Works
Office: (503)856-3424 Mobile: (503)932-5040

From: Matt Hendrick, P.E. <MHendrick@mtengineering.net>
Sent: Thursday, June 29, 2023 2:15 PM
To: Waldner, Haley <WaldnerH@keizer.org>
Cc: Jeremy Grenz <JGrenz@mtengineering.net>
Subject: Water Depth

CAUTION: This email originated from **Outside Your Organization. Exercise caution when opening attachments or on clicking links from unknown senders. Please **contact Information Technology for assistance**.**

Haley,

Could you please give me that water depth at 1141 Chemawa Road N. We are in the process of designing a UIC system for a small apartment complex located at the address. I have attached a couple maps for reference.

Matt

Matthew W. Hendrick, P.E. (OR, WA, ID, AK, AZ, UT)
Civil Engineer

Multi/Tech Engineering Services, Inc.
1155 13th Street S.E.
Salem, OR 97302
Office: (503) 363-9227

STANDARD O&M PLAN FOR THE SIMPLIFIED APPROACH

Rain Gardens

Structural components must be operated and maintained in accordance with the design specifications.	
MAINTENANCE INDICATOR	CORRECTIVE ACTION
Clogged gutters, drains, downspouts, or inlets	Remove sediment, debris, and blockages from downspouts, gutters, pipes, and inlets to maintain at least 50% conveyance at all times. Clean at least twice a year depending on the presence of overhanging trees. Clear any build-up of soil, bark dust, and/or vegetative growth from around downspout extension and/or splash blocks. Verify there is sufficient slope so that water flows away from the foundation.
Damaged or missing pipes, gutters, and downspouts	Repair or replace broken gutters and downspouts as needed. Identify possible leaks and verify that roof flashing directs water into gutters. Look for low spots or sagging areas along the gutter line and repair as needed with new hangers.
Vegetation must cover at least 90% of the facility at maturity.	
MAINTENANCE INDICATOR	CORRECTIVE ACTION
Dead or stressed vegetation	Remove dead material; replant per original planting plan, or substitute from the plant list in Section 3.5.
Dry grass or other plants	Irrigate and mulch as needed. Maintain grass height at 6"-9".
Weeds	Manually remove weeds
Growing medium must sustain healthy plant cover and drain within 48 hours.	
MAINTENANCE INDICATOR	CORRECTIVE ACTION
Gullies, erosion, exposed soils, sediment accumulation	Fill in and lightly compact areas of erosion with City-approved soil mix (see SWMM section 3.2.2.1) and replant according to planting plan or substitute from the plant list in SWMM section 3.8. Any erosion deeper than 2 inches must be addressed. Sediment more than 4 inches deep must be removed.
Scouring at the inlet(s)	Ensure splash blocks or inlet gravel/rock are placed correctly to prevent erosion.
Ponding	Till, amend, or rake soil as needed to ensure ponding water drains within 48 hours.

Annual Maintenance Schedule

Summer	Make structural repairs; clean gutters and downspouts; remove any build-up of weeds or organic debris.
Fall	Replant exposed soil and replace dead plants. Remove sediment and plant debris.
Winter	Clear gutters and downspouts.
Spring	Remove sediment and plant debris. Replant exposed soil and replace dead plants.
All seasons	Weed as necessary.

Maintenance Records: All facility operators are required to keep an inspection and maintenance log. Record date, description, and contractor (if applicable) for all repairs, landscape maintenance, and facility cleanout activities. Keep work orders and invoices on file and make available upon request of the City inspector.

Fertilizers: Their use is strongly discouraged because of the potential for negative environmental impacts. Never apply fertilizer before testing the fertility of the growing medium to determine whether fertilizer is needed and appropriate application rates. Use only organic, slow-release fertilizers. See SWMM Section 3.2.2.1 for more information.

Pesticides/Herbicides: Their use is prohibited.

Pollution Prevention: All sites must implement Best Management Practices to prevent the introduction of pollutants to stormwater and/or facility discharge points. In the event of a spill, call 503-823-7180 to report it immediately and document the circumstances and the corrective action taken; include the date/time, weather and site conditions. Never wash spills into a stormwater facility.

Infiltration/Flow Control: All facilities must drain within 48 hours. Record time/date, weather, and conditions when ponding occurs.

Vectors (Mosquitoes and Rats): Stormwater facilities must not harbor mosquito larvae or rodents that pose a threat to public health or that undermine the facility structure. Record the time/date, weather, and site conditions when vector activity observed. Record when vector abatement started and ended.

Access: Maintain ingress/egress per design standards, maintaining access to the entirety of the facility for inspection & maintenance.

Operations and Maintenance Log

Date	Work Performed By	Type of Work Performed					Notes	Initials
		Clean inlets and Outlets	Sediment and Trash Removal	Plant Replacement type, location	Structural Repairs – type, location	Other		