PINNACLE
ENGINEERING, INC.
GEOTECHNICAL · STRUCTURAL · CIVIL
QUALITY DESIGNS - ENGINEERED TO LAST

STORMWATER CALCULATION

1190 BEACH LOOP DRIVE
BANDON, OREGON

Pinnacle Engineering, Inc.

Matt Keller, P.E.,G.E., CSI
Principal Engineer

Project #30630
12 February 2024

STORMWATER DRAINAGE CALCULATIONS
1190 BEACH LOOP DRIVE
BANDON, OREGON

OVERVIEW

This report has been prepared in support of the construction of a new residential structure. The proposed structure is to replace the existing residential structure currently located at the site. The proposed structure will be composed of typical light wood framing and finished in a typical residential manner. Site development will generally consist of demolition of the existing building, light grading, stormwater improvements, landscaping wall construction, as well as residential utility improvements. The following calculations have been prepared to summarize the hydrologic analysis performed by Pinnacle Engineering, Inc. (PEI) for the above referenced property.

SITE DESCRIPTION

A.1. Existing Conditions

A.1.a. Soil Conditions

PEI utilized the United States Department of Agriculture (USDA) Web Soil Survey to determine soil condition at the site. Per the survey, the majority of the project area consists of Bullards sandy loam derived from a mixture of eolian and marine deposits. This material is classified as hydrologic soil group B, see attached calculations. This matches what was observed during the geotechnical exploration.

A.1.b. Surface Conditions

The project site is zoned for residential use and has been developed as such. Existing surface conditions were delineated to be a mixture of structure, compacted gravel, pavement, and residential landscaping. Adjacent properties have been developed in a comparable manner and are also zoned the same.

A.2. Proposed Development

A.2.a. Soil Conditions

Site soil conditions will remain largely unchanged. Associated construction will be minimal and associated grading will result in minimal changes to surface conditions. Imported fill will general consist of imported aggregate base course.

A.2.b. Surface Conditions

The proposed development will result in surface conditions consistent with residential developments. Due to the similarities in surface conditions, PEI has elected to analyze all semi-pervious surface conditions as if it was non-pervious.

HYDROLOGIC ANALYSIS

A hydrologic analysis was performed for the site utilizing the guidance provided in the 2014 Oregon Department of Transportation (ODOT), Hydraulics Design Manual (ODOT Manual). The results are as follows:

Coos County, Oregon

8B—Bullards sandy loam, 0 to 7 percent slopes

Map Unit Setting

National map unit symbol: 21rc
Elevation: 30 to 600 feet
Mean annual precipitation: 55 to 75 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 200 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Bullards and similar soils: 75 percent
Minor components: 9 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bullards

Setting

Landform: Marine terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed eolian and marine deposits

Typical profile

Oi - 0 to 3 inches: slightly decomposed plant material
H1 - 3 to 10 inches: sandy loam
H2 - 10 to 44 inches: gravelly sandy loam
H3 - 44 to 63 inches: sand

Properties and qualities

Slope: 0 to 7 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F004AC410OR - Coastal Upland Warm Forest
Forage suitability group: Well Drained <15% Slopes (G004AY014OR)

Other vegetative classification: Well Drained <15% Slopes (G004AY014OR)
Hydric soil rating: No

Minor Components

Blacklock
Percent of map unit: 9 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Coos County, Oregon
Survey Area Data: Version 20, Aug 29, 2024

COMPUTATION WORKSHEET

PINNACLE ENGINEERING, INC.

PROJECT INFORMATION
TITLE: 1190 BEACH LOOP
JOB#: 30725 BY: AJH
DATE: 3/3/25 SHT ____ OF ____

PLANNING • STRUCTURAL • GEOTECHNICAL • FORENSIC • ENVIRONMENTAL • GENERAL CIVIL

STORMWATER AREAS

TOTAL AREA → 0.695 acres

PRE-CONSTRUCTION

BUILDING - 2103.31 ft² → 0.048 acres
PAVEMENT - 495.98 ft² → 0.012 acres
GRAVEL - 4736.98 ft² → 0.109 acres
LANDSCAPING - 22221.72 ft² → 0.510 acres
CONCRETE - 709.18 ft² → 0.016 acres

IMPERVIOUS = 0.076 (11%) SEMI PERVIOUS = 0.109 (16%) PERVIOUS = 0.51 (73%)

CN = 68.8

POST CONSTRUCTION

BUILDING - 3958 → 0.090 acres
PAVEMENT - 2834.20 → 0.065 acres
LANDSCAPING - 22694.76 → 0.521 acres
CONCRETE - 811.38 → 0.019 acres

IMPERVIOUS = 0.166 (24%) PERVIOUS = 0.528 (76%)

CN = 70.2

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Pre - Development Runoff Calculations Worksheet

PINNACLE ENGINEERING, INC.

TITLE: 1190 Beach Loop Drive
PROJECT NO: 30725
DATE: 2/12/2025
SHEET: 1 OF 1

Location: 1190 Beach Loop Drive, Bandon, OR, 97411

Area: 0.695 acres NRCS Distribution: Type IA

Tc: 0.17 hours Design Storm: 24 hour

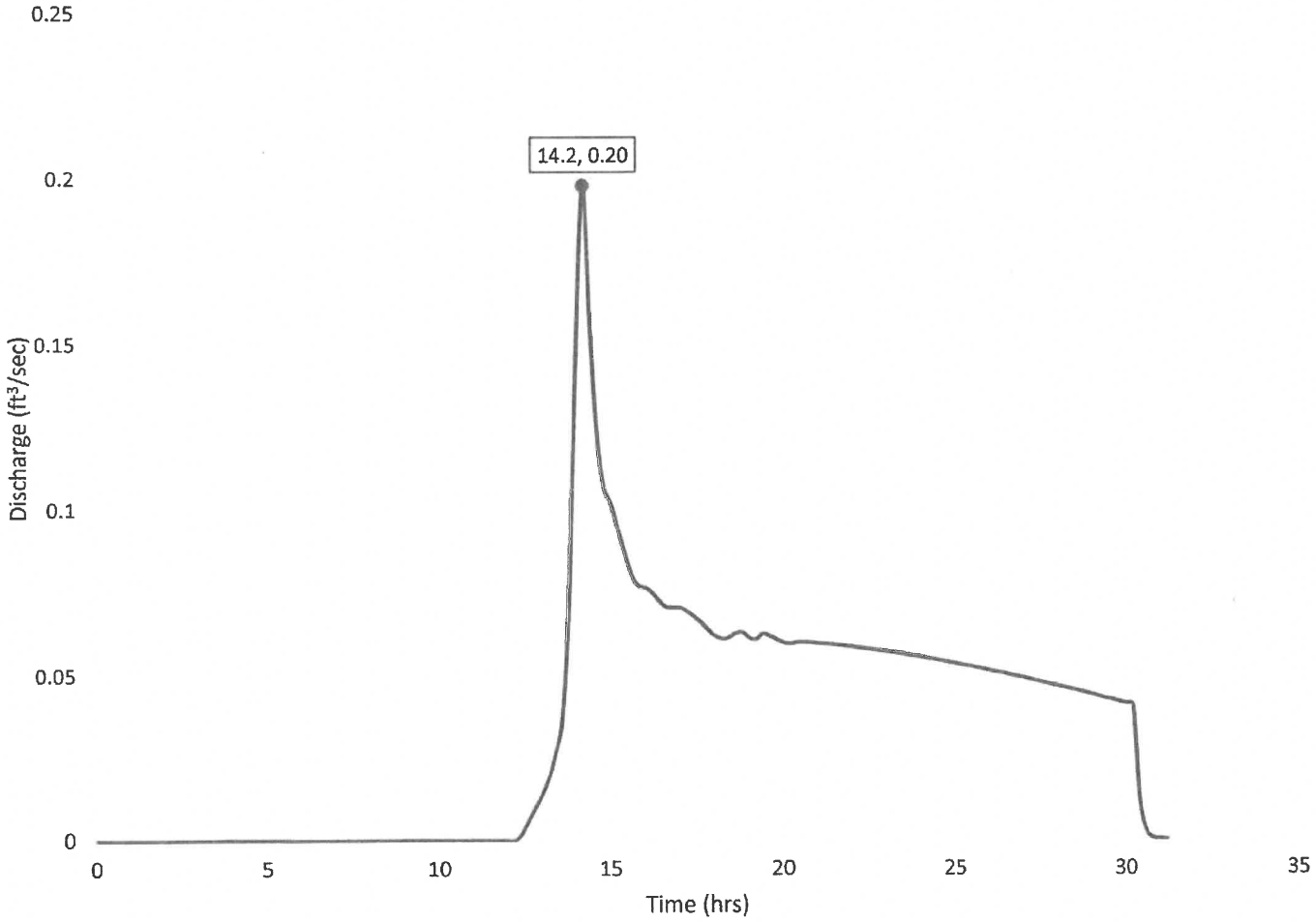
(See Tc Calculations)

CN 68.8 Design Storm: 10 year

(11% -Impervious)(16%-Gravel)(73%-Lawn)

Rainfall Period	24-Hr Rainfall amount
2	3.22
10	4.41
25	5.17
50	5.76
100	6.36
500	7.82
1000	8.48

Unit Hydrograph: Maximum Runoff: 0.20 cfs @ 14.2 hr



Time of Concentration
Pre - Development
Worksheet

PINNACLE ENGINEERING, INC.

TITLE: 1190 Beach Loop Drive
PROJECT NO: 30725
DATE: 2/12/2025
SHEET: 1 OF 1

Time of Concentration: SC: Shallow Concentrated OC: Open Channel

Flow Type	Flow Length (feet)	Slope (ft/ft)	Surface "x"	Manning's "n"	Area (sq.ft.)	WP (feet)	Velocity (ft./sec.)	Travel Time (hours)
Sheet	100	0.0645	f	0.24	n/a	n/a	n/a	0.148
SC	103	0.0451	s	n/a	n/a	n/a	1.48	0.019
SC	26	0.6587	s	n/a	n/a	n/a	5.65	0.001
SC				n/a	n/a	n/a	-------	0.000
OC			n/a				-------	0.000
OC			n/a				-------	0.000
OC			n/a				--------	0.000
OC			n/a				--------	0.000

Time of Concentration (hours): 0.169
Time of Concentration (min): 10.14

2yr - 24h Precipitation: 3.22 in

Storm Event: 10 year

Sheet Flow shall not be greater than 100 LF

Tc shall not be less than 5 min

Manning's Roughness Number		
Code	Surface Type	n
a	Pavement and Roof	0.014
b	Graveled Surface	0.020
c	Industrial Areas	0.050
d	Urban Residential Area	0.080
e	Meadows, Pastures and Range Land	0.150
f	Rural Residential Area	0.240
g	Playgound, Light Turf	0.240
h	Parks and Cemeteries, Heavy Turf	0.400
i	Woodland And Forests	0.400
u	User:	

Shallow Concentrated Surface					
Code	Surface Type	V_1	V_2	V_3	
p	Pavement	4.32	16.50	0.00	
g	Grassed Waterways	3.43	13.10	0.00	
n	Nearly Bare	2.12	8.09	0.00	
c	Cultivated Straight Row Crops	1.86	7.11	0.00	
s	Short-grass Pasture	1.48	5.65	0.00	
t	Tillage Cultivation, strip cropped, Woodlands	1.07	4.08	0.00	
f	Forest, hay meadows	0.53	2.04	0.00	

Post - Development Runoff Calculations Worksheet

Option 1

PINNACLE ENGINEERING, INC

TITLE: 1190 Beach Loop Drive
PROJECT NO: 30725
DATE: 2/12/2025
SHEET: 1 OF 1

Location: 1190 Beach Loop Drive, Bandon, OR, 97411

Area: 0.695 acres NRCS Distribution Type IA

Tc: 0.17 hours Design Storm 24 hour

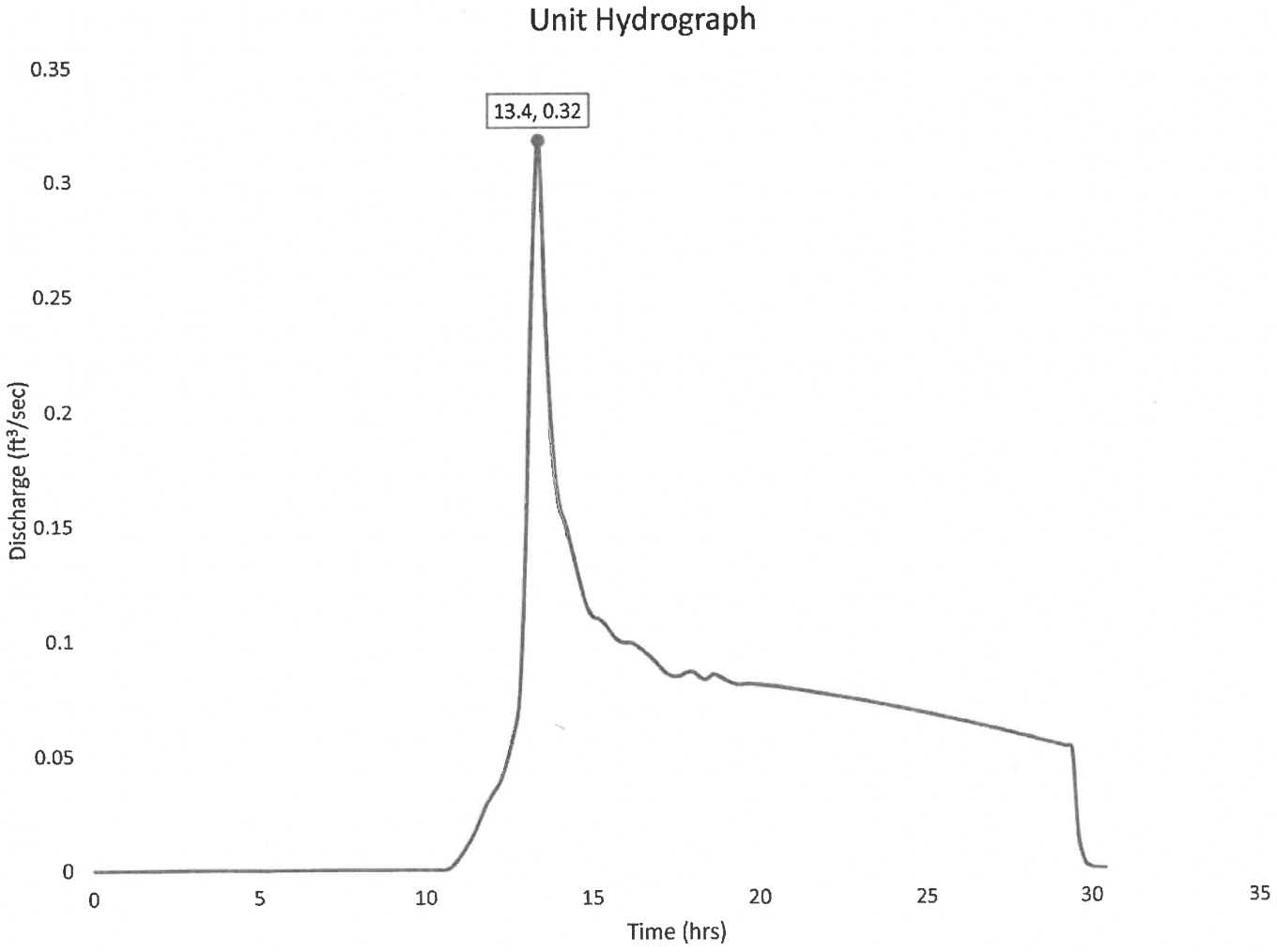
(See Tc Calculations)

CN 70.2 Design Storm 25 year

(24% - Impervious)(76% - Lawn)

Rainfall Period	24-Hr Rainfall amount
2	3.22
10	4.41
25	5.17
50	5.76
100	6.36
500	7.82
1000	8.48

Unit Hydrograph: Maximum Runoff: 0.32 cfs @ 13.4 hr



Time of Concentration
Post - Development
Worksheet

PINNACLE ENGINEERING, INC.

TITLE: 1190 Beach Loop Drive
PROJECT NO: 30725
DATE: 2/12/2025
SHEET: 1 OF 1

Time of Concentration: SC: Shallow Concentrated OC: Open Channel

Flow Type	Flow Length (feet)	Slope (ft/ft)	Surface "x"	Manning's "n"	Area (sq.ft.)	WP (feet)	Velocity (ft./sec.)	Travel Time (hours)
Sheet	100	0.0625	f	0.24	n/a	n/a	n/a	0.150
SC	103	0.0451	s	n/a	n/a	n/a	1.48	0.019
SC	26	0.6587	s	n/a	n/a	n/a	5.65	0.001
SC				n/a	n/a	n/a	-------	0.000
OC			n/a				-------	0.000
OC			n/a				--------	0.000
OC			n/a				--------	0.000
OC			n/a				--------	0.000

Time of Concentration (hours): 0.17
Time of Concentration (min): 10.26

2yr - 24h Precipitation: 3.22 in

Storm Event: 25 year

Sheet Flow shall not be greater than 100 LF

Tc shall not be less than 5 min

Manning's Roughness Number		
Code	Surface Type	n
a	Pavement and Roof	0.011
b	Graveled Surface	0.050
c	Industrial Areas	0.060
d	Urban Residential Area	0.170
e	Meadows, Pastures and Range Land	0.150
f	Rural Residential Area	0.240
g	Playgound, Light Turf	0.410
h	Parks and Cemeteries, Heavy Turf	0.400
i	Woodland And Forests	0.800
j	User:	0.130

Shallow Concentrated Surface					
Code	Surface Type	V_1	V_2	V_3	
p	Pavement	4.32	16.50	0.00	
g	Grassed Waterways	3.43	13.10	0.00	
n	Nearly Bare	2.12	8.09	0.00	
c	Cultivated Straight Row Crops	1.86	7.11	0.00	
s	Short-grass Pasture	1.48	5.65	0.00	
t	Tillage Cultivation, strip cropped, Woodlands	1.07	4.08	0.00	
f	Forest, hay meadows	0.53	2.04	0.00	

Detention Volume Calculations Worksheet

PINNACLE ENGINEERING, INC.

TITLE: 1190 Beach Loop Drive
PROJECT NO: 30725
DATE: 2/12/2025
SHEET: 1 OF 1

Required Storage Volume - Option 1

Pre - Construction Inflow	0.20	cfs	Max Water Height	1.25	ft
Post-Construction Inflow	0.32	cfs			
User Defined Outflow	0	cfs	Minimum Orfice Diameter	2.55	in
Total Inflow Volume	5551.0	ft^3	Initial Volume to Detained	135.9	ft^3
Orifice Diameter Used	2.5	in	Orifice Outflow	0.18	cfs
User Defined Diameter	0	in			

Volume To Be Detained: 177.2 ft^3

(Area between the Inflow and Outflow)

Detention Storage: