Exhibit “D”

From: Terry Keyes
To: Brian Lee
Cc: Tim Franz; Zulema Longoria; Dan Flatten; Barbara Fryer; Yvette Hamilton
Subject: Re: Cornelius : U-Haul - Engineering Comments
Date: Saturday, February 10, 2024 1:14:45 PM
Attachments: image001.png
23836 UHaul Cornelius_Civil Set Revision.zip

Brian,

You addressed my main issue regarding discharge from the pond. I'll do a more thorough review when we are at the final engineering plan stage, but for land use, you are good to go from an engineering standpoint.

One thing I will be looking for in the final engineering plans is a structure (manholes or 24x24 area drains) at both ends of the discharge line between the pond and Baseline. I know this is a private line that Yvette has jurisdiction over, but I am worried if the line ever gets plugged and causes the pond to overflow. That would be very bad. With a structure at both ends that we can get a camera and sewer cleaner into the line if we need to so we can ensure the pond never overflows.

But again, we should address this on the final engineering plans, not at this land use stage.

Terry W. Keyes, PE
City Engineer
City of Cornelius
1355 N. Barlow Street
Cornelius, OR 97113
503-357-3011 office phone
503-449-3631 cell phone
terry.keyes@corneliusor.gov

> On Feb 9, 2024, at 11:20 AM, Brian Lee <brianl@paceengrs.com> wrote:
>
> Tim/Terry,
>
> I had a very good conversation with Yvette, she confirmed that there is no code required building offset for the storm sewer line.
>
> See attached updated Civil Plans and Preliminary Hydro report. Geotech report included just for reference.
>
> Let us know if you need anything else,
>
> **Brian Lee, PE, LEED AP**
> **Principal Engineer**
> p. 503.597.3222 | d. 971.329.4186
>
> PACE
>
> LAND | WATER | INFRASTRUCTURE | FACILITIES
>
> ---
>
> **From:** Tim Franz <Tim.Franz@corneliusor.gov>
> **Sent:** Wednesday, February 7, 2024 2:58 PM
> **To:** Terry Keyes <terry.keyes@corneliusor.gov>; Brian Lee <brianl@paceengrs.com>
> **Cc:** Zulema Longoria <zulema_longoria@uhaul.com>; Dan Flatten <dan_flatten@uhaul.com>; Barbara Fryer <Barbara.Fryer@corneliusor.gov>; Yvette Hamilton <yhamilton@forestgrove-or.gov>
> **Subject:** RE: Cornelius : U-Haul - Engineering Comments

Hello Brian,

When you talk with Yvette, you may also want to inquire if there is adequate room for the line. It will be in the 10' area between the property line and foundation/footing of the building. If the footprint of the building needs to be shifted slightly to the west, now would be the time to make/show that minor adjustment.

Tim Franz, Senior Planner
City of Cornelius
Community Development
1300 S. Kodiak Circle
Mailing: 1355 N. Barlow Street
Cornelius, OR 97113

Phone: (503) 357-3011

From: Terry Keyes <terry.keyes@corneliusor.gov>
Sent: Wednesday, February 7, 2024 2:49 PM
To: Brian Lee <brianl@paceengrs.com>
Cc: Zulema Longoria <zulema_longoria@uhaul.com>; Tim Franz <Tim.Franz@corneliusor.gov>; Dan Flatten <dan_flatten@uhaul.com>; Barbara Fryer <Barbara.Fryer@corneliusor.gov>; Yvette Hamilton <yhamilton@forestgrove-or.gov>
Subject: Re: Cornelius : U-Haul - Engineering Comments

Brian,

You might check with Yvette Hamilton, our Building Official to verify that the storm drain location works and can be approved for a plumbing permit. I copied Yvette on this email.

The connection to the mainline should be with an insert-tee. Attached is the detail to use for this connection.

Terry W. Keyes, PE
City Engineer
City of Cornelius
1355 N. Barlow Street
Cornelius, OR 97113
503-357-3011 office phone
503-449-3631 cell phone
terry.keyes@corneliusor.gov

> On Feb 7, 2024, at 2:27 PM, Brian Lee <brianl@paceengrs.com> wrote:
>
>
>
> Terry,
>
> Thanks for the reply, see attached sketch of what we are working on.
>
> Does the City have a preference as to how to tie into the exiting storm? Use a cut in tee, inserta-tee, a wye or ??

Brian Lee, PE, LEED AP
Principal Engineer
p. 503.597.3222 | d. 971.329.4186

LAND | WATER | INFRASTRUCTURE | FACILITIES

From: Terry Keyes <terry.keyes@corneliusor.gov>
Sent: Wednesday, February 7, 2024 2:21 PM
To: Brian Lee <brianl@paceengrs.com>
Cc: Zulema Longoria <zulema_longoria@uhaul.com>; Tim Franz <Tim.Franz@corneliusor.gov>; Dan Flatten <dan_flatten@uhaul.com>; Barbara Fryer <Barbara.Fryer@corneliusor.gov>
Subject: Re: Cornelius : U-Haul - Engineering Comments

Brian,

That sounds perfect.

Terry W. Keyes, PE
City Engineer
City of Cornelius
1355 N. Barlow Street
Cornelius, OR 97113
503-357-3011 office phone
503-449-3631 cell phone
terry.keyes@corneliusor.gov

On Feb 7, 2024, at 11:52 AM, Brian Lee <brianl@paceengrs.com> wrote:

Terry,

The current plan is to run the storm outfall to the south, between the building and the property line and tie into the storm line in Baseline.

Brian Lee, PE, LEED AP
Principal Engineer
p. 503.597.3222 | d. 971.329.4186

LAND | WATER | INFRASTRUCTURE | FACILITIES

<image001.png>

From: Terry Keyes <terry.keyes@corneliusor.gov>

Sent: Wednesday, February 7, 2024 11:30 AM
To: Brian Lee <brianl@paceengrs.com>
Cc: Zulema Longoria <zulema_longoria@uhaul.com>; Tim Franz <Tim.Franz@corneliusor.gov>; Dan Flatten <dan_flatten@uhaul.com>; Barbara Fryer <Barbara.Fryer@corneliusor.gov>
Subject: Re: Cornelius : U-Haul - Engineering Comments

> You don't often get email from terry.keyes@corneliusor.gov. Learn why this is important

Brian,

If you have questions about whether something is feasible in our system, please ask before putting the final design together.

Terry W. Keyes, PE
City Engineer
City of Cornelius
1355 N. Barlow Street
Cornelius, OR 97113
503-357-3011 office phone
503-449-3631 cell phone
terry.keyes@corneliusor.gov

On Feb 7, 2024, at 9:44 AM, Brian Lee <brianl@paceengrs.com> wrote:

Zulema,

My team is working on the stormwater updates per our conversation last week. I expect the update to be done this week.

Brian Lee, PE, LEED AP
Principal Engineer
p. 503.597.3222 | d. 971.329.4186

<image001.png>

LAND | WATER | INFRASTRUCTURE | FACILITIES

From: Zulema Longoria <zulema_longoria@uhaul.com>
Sent: Wednesday, February 7, 2024 9:15 AM
To: Tim Franz <Tim.Franz@corneliusor.gov>; Dan Flatten <dan_flatten@uhaul.com>; Brian Lee <brianl@paceengrs.com>
Cc: Barbara Fryer <Barbara.Fryer@corneliusor.gov>; Terry Keyes <terry.keyes@corneliusor.gov>
Subject: Cornelius : U-Haul - Engineering Comments

Hello Brian: Good morning.
Can you please send Tim Franz the revised stormwater designs for Cornelius, OR so he can complete the staff report for the PZ hearing scheduled on 02-27-24?

He will need it as soon as possible.

Thank you,

Zulema Longoria, Planner
AMERCO Real Estate Co/U-Haul Int
2727 N Central Ave

Phoenix, AZ 85004
602-263-6502 ext 515306

From: Tim Franz <Tim.Franz@corneliusor.gov>
Sent: Thursday, February 1, 2024 9:52 AM
To: Shannon Marvin-Christopherson <shannon_marvin@uhaul.com>; Zulema Longoria <zulema_longoria@uhaul.com>
Cc: Barbara Fryer <Barbara.Fryer@corneliusor.gov>; Terry Keyes <terry.keyes@corneliusor.gov>; Brian Lee <brianl@paceengrs.com>
Subject: U-Haul - Engineering Comments

Good morning,

Yesterday afternoon we received Engineering Comments from Terry Keyes, the City Engineer, regarding your project in Cornelius. Based upon his comments, there are major concerns regarding the proposed Stormwater facility. Please review the comments, which are attached.

We are in the process of working on the staff report and we wanted to give you an opportunity to review and address these concerns, before the staff report to the Planning Commission is finalized. If you would like to address these issues for the staff report, please let us know by the EOB on February 6. Any plans (cutsheets) would need to be provided no later than February 14th.

The final staff report will be completed and available for review on February 20th.

Please feel free to reach out to Terry Keyes, City Engineer or us at (503) 357-3011 to discuss or answer and any questions you may have.

Sincerely,

Tim Franz, Senior Planner
City of Cornelius
Community Development
1300 S. Kodiak Circle
Mailing: 1355 N. Barlow Street
Cornelius, OR 97113

Phone: (503) 357-3011

U-HAUL MOVING & STORAGE - STORE 704072
CORNELIUS, OREGON

PROJECT NO. 23836.00
DECEMBER 2023

PROJECT INFORMATION

OWNER: AMERCO REAL ESTATE COMPANY
2727 N. CENTRAL AVENUE
PHOENIX, AZ 85004
PH: (360) 524-1789
CONTACT: DAN FLATTEN

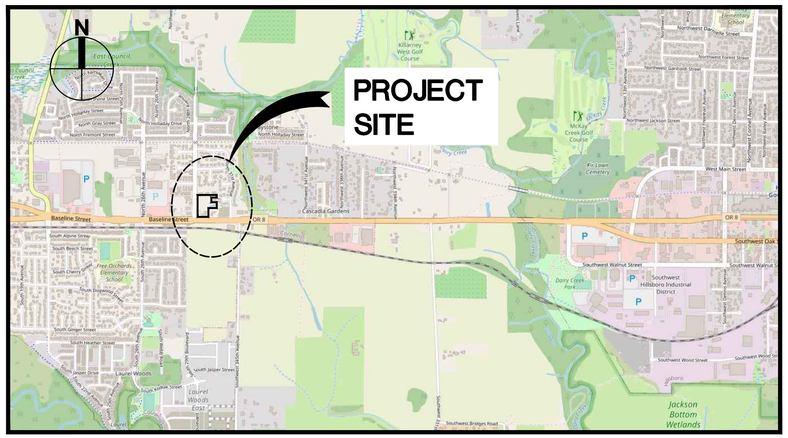
PROJECT ENGINEER: PACE ENGINEERS, INC
4500 KRUSE WAY, SUITE 250
LAKE OSWEGO, OR 97035
(503) 597-3222
CONTACT: BRIAN D. LEE, P.E.

UTILITIES: CORNELIUS WATER / SEWER DISTRICT
1300 S. KODIAK CIRCLE
CORNELIUS, OR 97113
(503) 357-3011

NORWEST NATURAL
(800)-422-4012

PORTLAND GENERAL ELECTRIC
(800) 542-8818

VICINITY MAP



SHEET LIST TABLE

Sheet List Table

SHEET NUMBER	SHEET TITLE
C1	COVER SHEET
C2	EXISTING CONDITIONS
C3	DEMOLITION PLAN
C4	SITE PLAN
C5	UTILITY PLAN
C6	EROSION CONTROL PLAN
C7	PRELIMINARY LANDSCAPE PLAN
C8	DETAILS
C8.1	DETAILS
C9	EROSION CONTROL DETAILS
C10	LANDSCAPE DETAILS

PERMIT INFORMATION

LAND USE CASE FILE:

PROPERTY INFORMATION

ADDRESS:	2962 E. BASELINE, CORNELIUS, OR 97113
PROPERTY AREA:	2.96 ACRES (128,937 SQUARE FEET)
TAX LOT:	7700, 7900
MAP:	1N334DD
ZONING:	C-2 HIGHWAY COMMERCIAL
PROPOSED IMPERVIOUS AREA:	97,295 SQUARE FEET (75.4%)
PROPOSED PERVIOUS AREA:	31,642 SQUARE FEET (24.6%)

ATTENTION: OREGON LAW REQUIRES YOU TO FOLLOW RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER. THOSE RULES ARE SET FORTH IN OAR 952-001-0001 THROUGH 952-001-0090. YOU MAY OBTAIN COPIES OF THE RULES BY CALLING THE CENTER. NOTE: THE TELEPHONE NUMBER FOR OREGON UTILITY NOTIFICATION CENTER IS (503) 232-1987).

QA/QC APPROVAL
THESE DOCUMENTS HAVE BEEN REVIEWED BY:
NAME: _____ DATE: _____

DATE | REVISION | SYM

PACE Engineers
4500 Kruse Way, Suite 250
Lake Oswego, OR 97035
p. 503.597.3222
www.paceengrs.com

REGISTERED PROFESSIONAL ENGINEER
18558
PRELIMINARY
OREGON
JULY 8, 1986
BRIAN D. LEE
RENEWS: 12/31/2024

U-HAUL INTERNATIONAL, INC.
2727 N. CENTRAL AVE.
PHOENIX, AZ 85004
(541) 520-5479

U-HAUL MOVING & STORAGE - CORNELIUS
STORE 704072

COVER SHEET

SCALE:	DATE:
AS SHOWN	DEC 2023
DESIGNED BY:	CHECKED BY:
MAA	BDL

JOB NUMBER 23836.00
DWG NAME: P23836 COVER
SHEET C1 OF 11

FILE NAME: P:\UKO\P23\23836_AMERCO_UHAUL CORNELIUS LU\CAD\ENGINEERING\SHEETS\P23836 COVER.DWG
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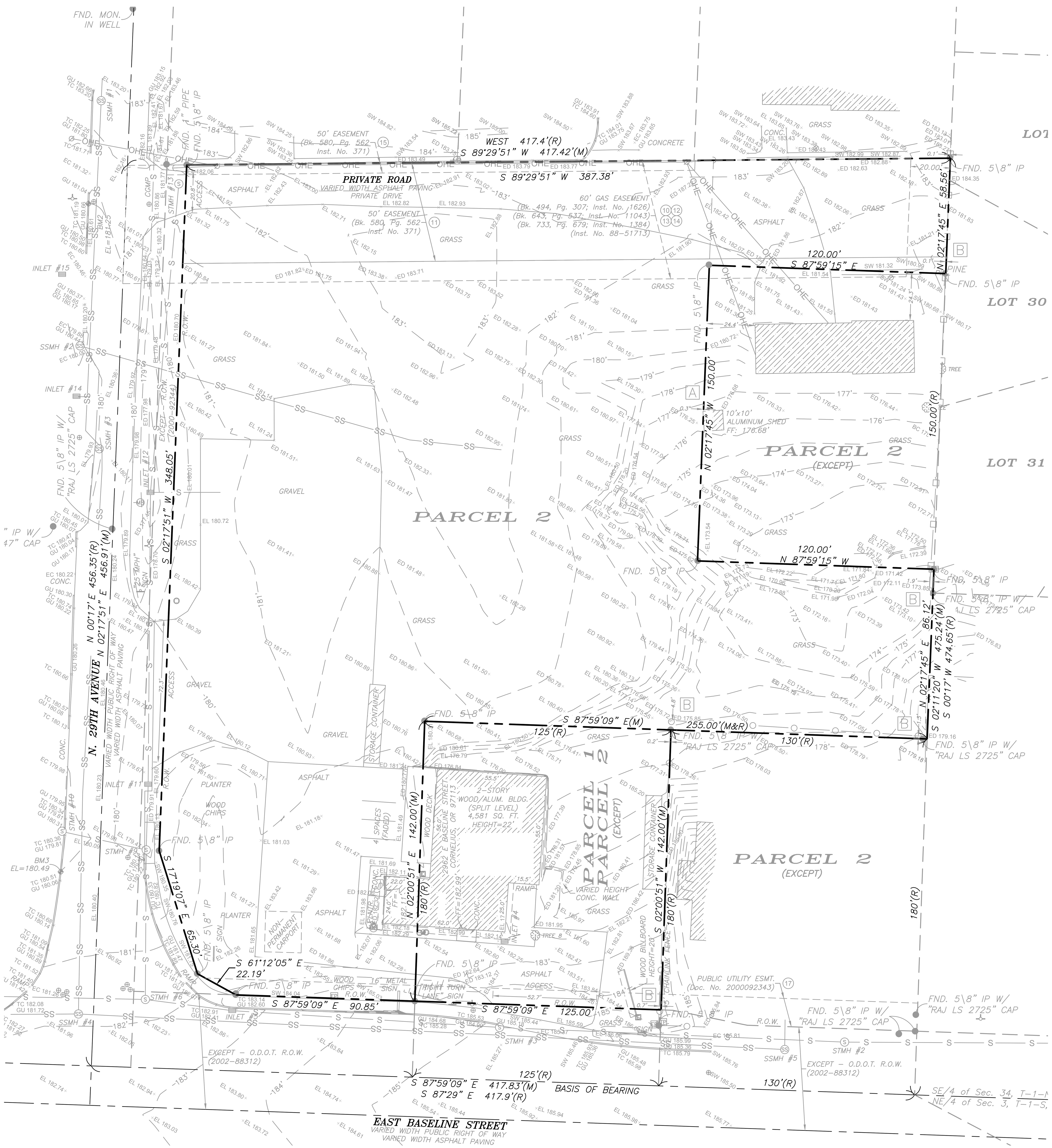

STATE PLANE ZONE:
3601 OREGON NORTH ZONE
HORIZONTAL DATUM: NAD 83
VERTICAL DATUM: NAVD 88
OPUS CORRECTED

BM1: BENCHMARK #1
ELEVATION=183.29
FND. "G98 1934 4" BRASS DISK SET IN TOP OF CONCRETE MONUMENT THE BENCH MARK IS 2.5 MILES WEST OF HILLSBORO, 1.6 MILES EAST OF CORNELIUS, AT RAILROAD CROSSING NO. 762.9 200 YARDS WEST OF RAILROAD MILEPOST NO 763, 200 FEET SOUTH OF THE CENTER OF STATE HIGHWAY NO 8, 27 FEET NORTH OF THE NORTH RAIL OF THE RAILROAD TRACKS, 22 FEET EAST OF THE CENTER OF SOUTHWEST 345TH AVENUE, AND 6 FEET SOUTHEAST OF A POWER POLE SET IN AN 8-INCH SQUARE CONCRETE POST THAT PROJECTS 1-INCH. ALSO BEING S 62°13'14" E A DISTANCE OF 512.64' FROM THE SE PROPERTY CORNER OF PARCEL 2.
N=685,643.7310
E=7,553,090.1350

BM2: BENCHMARK #2
ELEVATION=181.25
FND. CUT "X" ON TOP OF CURB. LOCATED OFF-SITE ON THE WEST SIDE OF NORTH 29TH AVENUE, BEING 49.85' WEST AND 19.69' SOUTH OF THE NW PROPERTY CORNER OF PARCEL 1.
N = 686,334.4590
E = 7,552,217.5050

BM3: BENCHMARK #3
ELEVATION=180.49
FND. CUT "X" ON TOP OF CURB. LOCATED OFF-SITE ON THE WEST SIDE OF NORTH 29TH AVENUE, BEING 49.98' WEST AND 10.67' SOUTH OF THE WESTERN MOST SW PROPERTY CORNER OF PARCEL 1.
N = 685,995.7110
E = 7,552,203.4230

INLET #1
TR 184.06

STMH #2
TR 185.65
FL E&W 167.65 36" RCP

STMH #3
RIM 185.17
FL E&W 168.30 36" RCP

INLET #4
TG 182.05
FULL OF WATER

INLET #5
TR 182.50
FL E&W 169.50 36" RCP

STMH #6
TR 181.60
FL N,E&W 173.10 36" RCP

STMH #7
TR 182.32
FL E&S 176.02

INLET #8
TR 181.57
FL N 176.77 12" RCP

STMH #9
RIM 180.1
FL N 177.9 12" PVC
FL W 176.8 12" PVC
FL S 173.5 12" PVC

STMH #10
RIM 180.32
FL E 177.5 12" PVC

INLET #11
TG 179.61
FL N&S 174.11

INLET #12
TG 177.45
FL N,S&E 174.45 12" PVC

STMH #13
TR 181.96
FL S 177.05 12" PVC

INLET #14
TR 179.38
FL E 176.18 12" PVC

INLET #15
TG 180.42
FULL OF WATER

SSMH #1
FL 169.79
TR 182.69
FL S 169.79 12" STEEL
FL N 169.80 12" STEEL

SSMH #2
TR 177.45
FL 174.55 12" PVC

SSMH #3
TR=180.06
FL N 170.76 12" STEEL
FL S 170.66 12" STEEL

SSMH #4
TR 182.69
FL N,E&W 172.79 12" STEEL

SSMH #5
TR 185.72
FL N 175.12 12" STEEL

SURVEY PROVIDED BY OTHERS:
THE BOUNDARY, TOPOGRAPHIC INFORMATION AND MAP FEATURES SHOWN HEREON WERE PREPARED BY S&F LAND SERVICES AND PROVIDED BY THE CLIENT. PACE CLAIMS NO RESPONSIBILITY FOR ITS ACCURACY OR COMPLETENESS NOR ASSUMES ANY LIABILITY FOR ITS USE.

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PLOT TIME: 2/9/2024 7:55 AM
USER NAME: ASHLEY TELLIN
XREF FILES: ####

SYM	REVISION	DATE

PACE Engineers
4500 Kruse Way, Suite 250
Lake Oswego, OR 97035
p. 503.597.3222
www.paceengrs.com

REGISTERED PROFESSIONAL ENGINEER
18558
PRELIMINARY
OREGON
JULY 6, 1996
BRIAN D. LEE
RENEWS: 12/31/2024

U-HAUL INTERNATIONAL, INC.
2727 N. CENTRAL AVE.
PHOENIX, AZ 85004
(541) 520-5479

U-HAUL MOVING & STORAGE - CORNELIUS STORE 704072

EXISTING CONDITIONS

SCALE:	DATE:
AS SHOWN	DEC 2023
DESIGNED BY:	CHECKED BY:
MAA	BDL

JOB NUMBER
23836.00

DWG NAME:
P23836 EC

SHEET C2 OF 11

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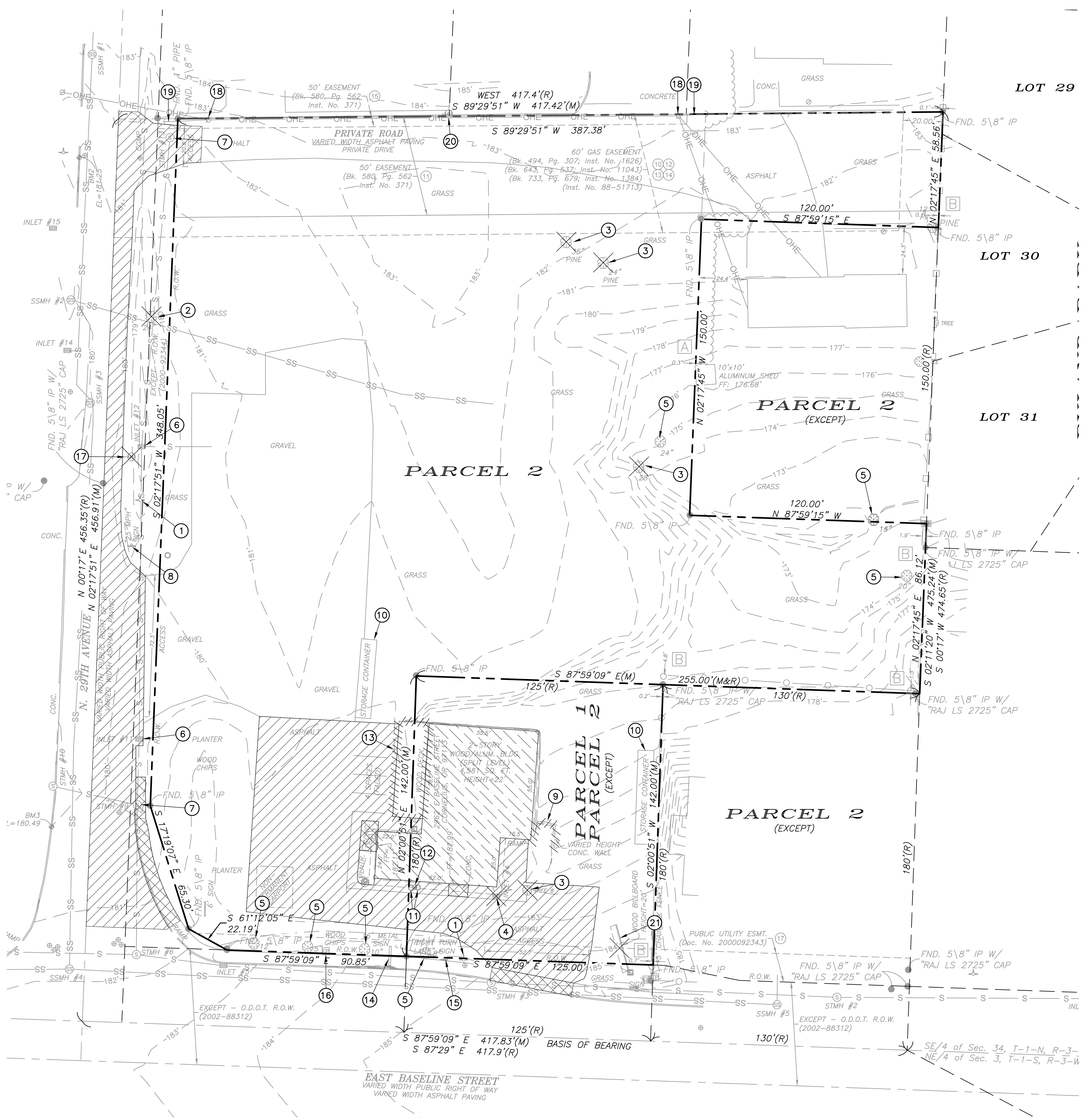
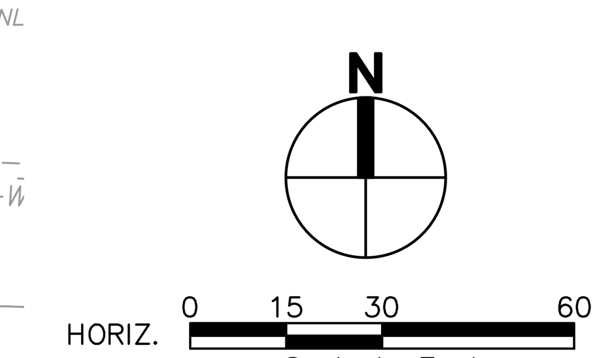




GENERAL NOTES

1.

CONSTRUCTION NOTES

1. PROTECT FIRE HYDRANT
2. REMOVE DECIDUOUS TREE.
3. REMOVE EVERGREEN TREE.
4. REMOVE STORM INLET.
5. PROTECT TREE.
6. PROTECT STORM INLET.
7. PROTECT STORM MANHOLE.
8. REMOVE AND REINSTALL SPEED LIMIT SIGN.
9. REMOVE CONCRETE WALL.
10. REMOVE STORAGE CONTAINER.
11. REMOVE BOLLARD.
12. REMOVE GAS METER.
13. REMOVE WOOD DECK.
14. REMOVE 16' SIGN.
15. PROTECT SIGN.
16. PROTECT UTILITY CABINET.
17. REMOVE MAILBOX.
18. PROTECT POWER POLE.
19. PROTECT DOWN GUY WIRE.
20. PROTECT MAILBOX.
21. OWNER WILL REMOVE BILLBOARD.

LEGEND

- SAWCUT
- REMOVE FEATURE
- DEMOLISH FEATURE
- PAVEMENT REMOVAL
- CONCRETE REMOVAL
- BUILDING REMOVAL

DEMOLITION NOTES:

1. PROTECT ALL ABOVE AND BELOW GRADE FEATURES UNLESS OTHERWISE SPECIFIED WITHIN THIS PLAN SET OR AS DIRECTED BY THE OWNER AND/OR OWNER'S REPRESENTATIVE.

SYM	REVISION	DATE

PACE Engineers
4500 Kruse Way, Suite 250
Lake Oswego, OR 97035
p. 503.597.3222
www.paceengrs.com

REGISTERED PROFESSIONAL ENGINEER
18558
PRELIMINARY
OREGON
JULY 6, 1996
BRIAN D. LEE
RENEWS: 12/31/2024

U-HAUL INTERNATIONAL, INC.
2727 N. CENTRAL AVE.
PHOENIX, AZ 85004
(541) 520-5479

U-HAUL MOVING & STORAGE - CORNELIUS STORE 704072

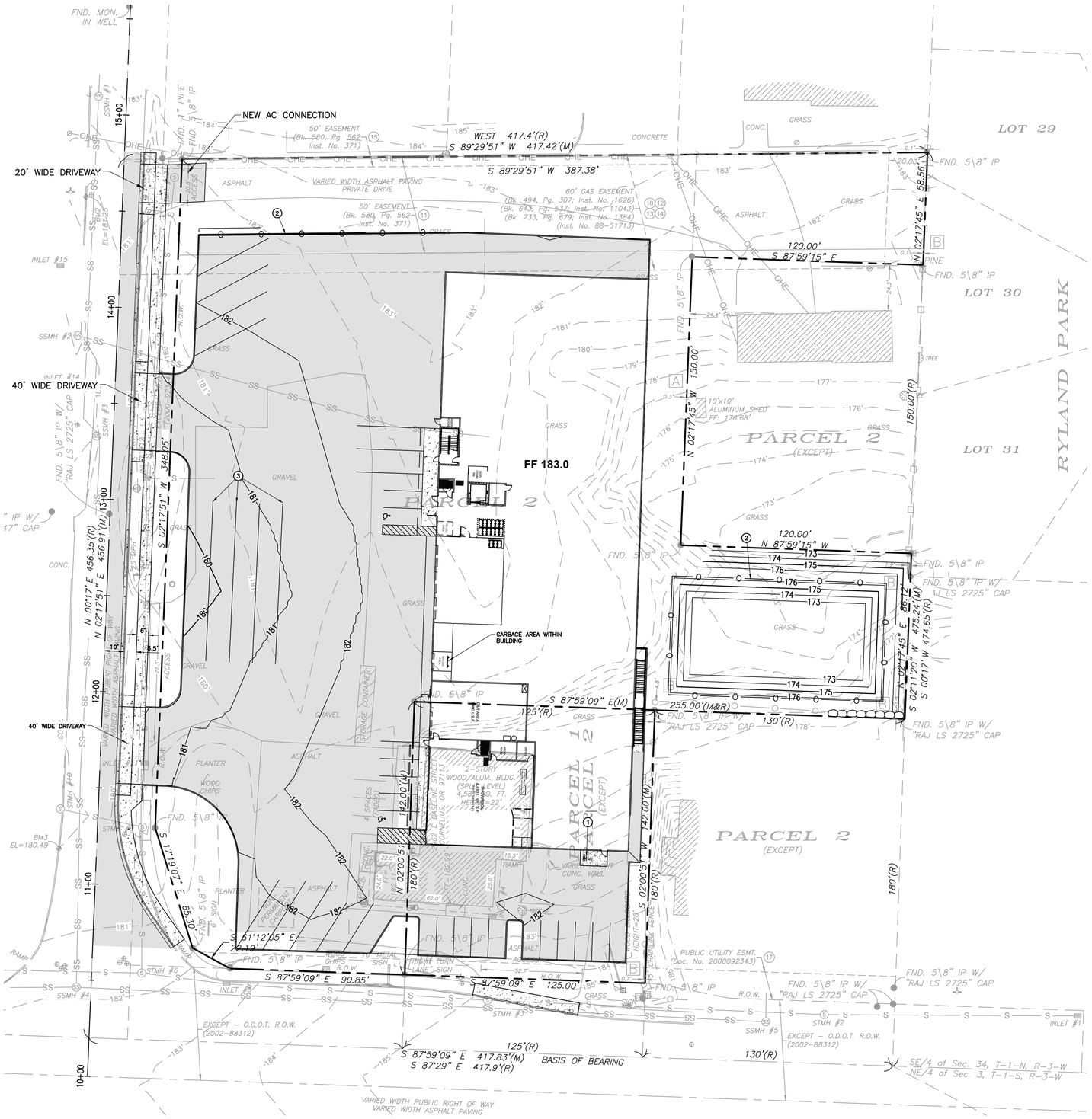
DEMOLITION PLAN

SCALE:	DATE:
AS SHOWN	DEC 2023
DESIGNED BY:	CHECKED BY:
MAA	BDL

JOB NUMBER: **23836.00**

DWG NAME: P23836 DEMO

SHEET C3 OF 11



#CONSTRUCTION NOTES

1. ON-SITE BICYCLE PARKING PER FAIRWEATHER SITE FURNISHINGS DETAIL BR-1.5 (SURFACE MOUNT, POWDERCOAT BLACK) AND CMC 18.145.030 TABLE 1.
2. 6' TALL VINYL COATED CHAIN LINK FENCE PER CLEAN WATER SERVICES DETAIL 792.
3. SHUNTING AREA.

ZONING INFORMATION

PROJECT NAME:	U-HAUL OF CORNELIUS
MUNICIPALITY:	CITY OF CORNELIUS
PROJECT ADDRESS:	2962 E. BASELINE STREET CORNELIUS, OR 97113
SITE ACRE / LAND USE AREA	2.96 ACRES

ABUTTING ZONING DISTRICT:

N - R-7
S - C-2
E - C-2
W - C-2

USES:

VEHICLE RENTAL - PERMITTED
EQUIPMENT RENTAL - PERMITTED
SELF-STORAGE - CUP
MINI STORAGE - CUP
WAREHOUSING - CUP
RETAIL - PERMITTED
RV / VEHICLE STORAGE - NOT LISTED

BULK REQUIREMENTS:

SETBACKS

FRONT YARD:	10 FT (MINIMUM)
SIDE YARD:	ABUTTING RESIDENTIAL - 5 FT ABUTTING PUBLIC STREET - 10 FT
REAR YARD:	ABUTTING RESIDENTIAL - 5 FT ABUTTING PUBLIC STREET - 10 FT

FAR: NONE

LOT COVERAGE: NONE

HEIGHT LIMIT: 35 FT - UNLESS APPROVED BY PLANNING COMMISSION

PARKING:

GENERAL RETAIL - 3.7 SP/1,000 SF (MIN) AND 5.1 SP/1,000 SF (MAX)
SELF STORAGE - 1 SP/5,000 SF FOR UP TO 20,000 SF, THEN 1 SP/20,000 SF
REQUIRED = 18 SPACES/PROVIDED = 29 SPACES

LANDSCAPING:

SETBACK: 5 FT (MIN)

DATE	REVISION	SYM

PACE Engineers
4500 Kruse Way, Suite 250
Lake Oswego, OR 97035
p. 503.597.3222
www.paceengrs.com

REGISTERED PROFESSIONAL ENGINEER
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JULY 6, 1986
BRIAN D. LEE
RENEWS: 12/31/2024

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2727 N. CENTRAL AVE.
PHOENIX, AZ 85004
(541) 520-5479

U-HAUL MOVING & STORAGE - CORNELIUS
STORE 704072

SITE PLAN

SCALE:	DATE:
AS SHOWN	DEC 2023
DESIGNED BY:	CHECKED BY:
MAA	BDL

JOB NUMBER
23836.00

DWG NAME:
P23836 SITE

SHEET C4 OF 11

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PLOT TIME: 2/9/2024 7:56 AM
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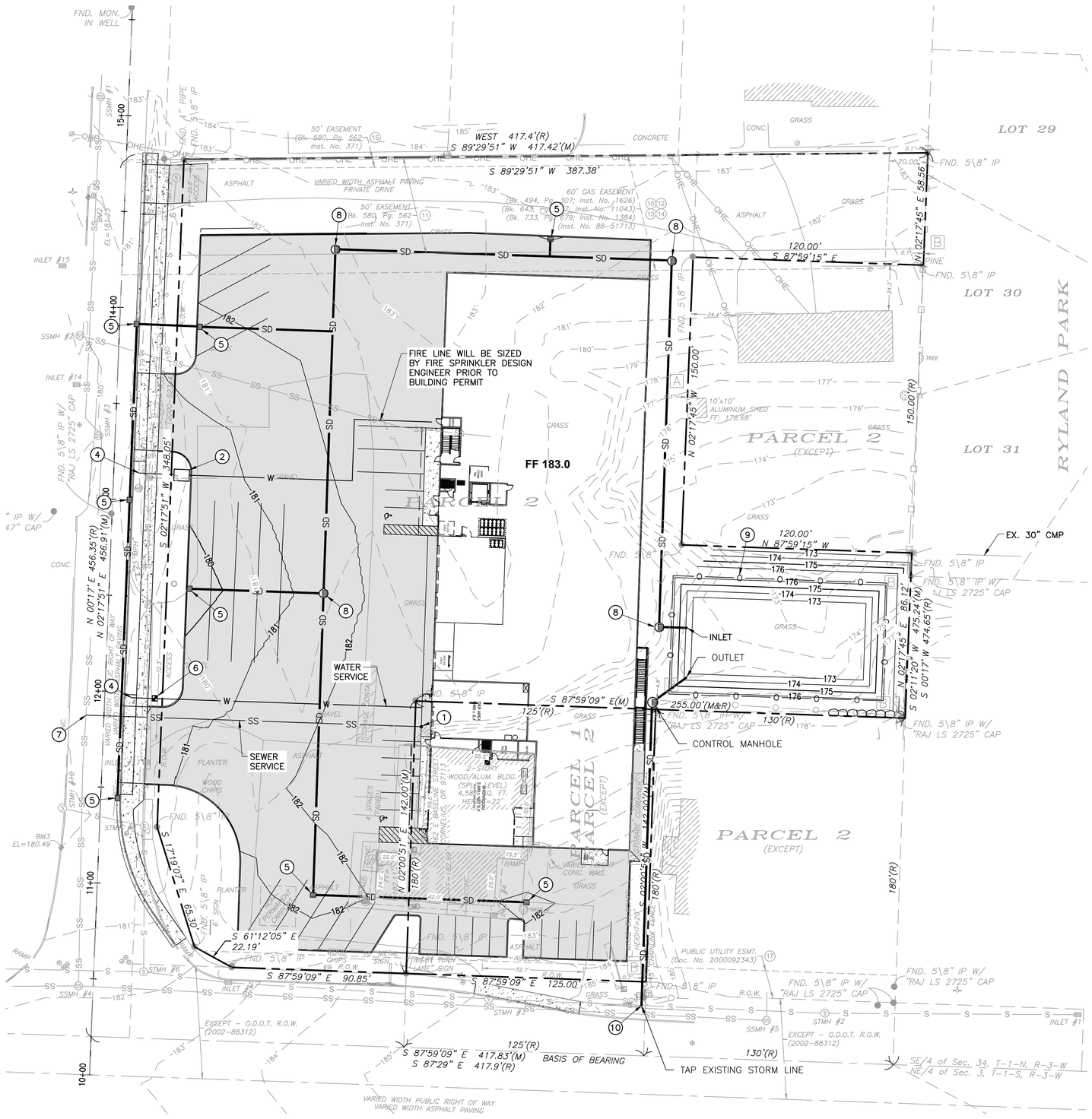

GENERAL NOTES

1. CONTRACTOR TO INSTALL PIPE PER CITY OF CORNELIUS STANDARDS

CONSTRUCTION NOTES

1. INSTALL SANITARY CLEANOUT PER CITY OF CORNELIUS DETAIL
2. INSTALL DOUBLE CHECK DETECTOR ASSEMBLY PER CITY OF CORNELIUS DETAIL
3. CONNECT STORM LINE TO EXISTING MANHOLE
4. CONNECT WATER LINE TO EXISTING WATER MAIN
5. INSTALL CATCH BASIN PER CITY OF CORNELIUS DETAIL
6. WATER METER PER CITY OF CORNELIUS DETAIL
7. CONNECT SEWER SERVICE TO EXISTING SEWER LINE
8. INSTALL STORM MANHOLE PER CITY OF CORNELIUS DETAIL
9. INSTALL CHAIN LINK FENCE PER CLEAN WATER SERVICES DETAIL 792
10. INSTALL INSERTA TEE PER CWS DETAIL 530

LEGEND

- W — PROPOSED WATER LINE
- W — PROPOSED FIRE PROTECTION LINE
- SS — PROPOSED SANITARY SEWER LINE
- SD — PROPOSED STORMWATER LINE

DATE	REVISION	SYM

PACE Engineers
4500 Kruse Way, Suite 250
Lake Oswego, OR 97035
p. 503.597.3222
www.paceengrs.com

REGISTERED PROFESSIONAL ENGINEER
18558
PRELIMINARY
OREGON
JULY 6, 1986
BRIAN D. LEE
RENEWS: 12/31/2024

U-HAUL INTERNATIONAL, INC.
2727 N. CENTRAL AVE.
PHOENIX, AZ 85004
(541) 520-5479

U-HAUL MOVING & STORAGE - CORNELIUS
STORE 704072

UTILITY PLAN

SCALE:	DATE:
AS SHOWN	DEC 2023
DESIGNED BY:	CHECKED BY:
MAA	BDL

JOB NUMBER **23836.00**

DWG NAME: P23836 UTL

SHEET C5 OF 11

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PLOT TIME: 2/9/2024 7:56 AM
USER NAME: ASHLEY TELLIN
XREF FILES: ####

LEGEND

- CG — CLEARING & GRADING LIMITS
- SILT FENCE
- CONSTRUCTION ENTRANCE
- CONCRETE WASH AREA
- FLOW DIRECTION
- HAZARDOUS MATERIAL STORAGE

N

HORIZ. 0 15 30 60
Scale In Feet

DATE
REVISION
SYM

PACE Engineers
4500 Kruse Way, Suite 250
Lake Oswego, OR 97035
p. 503.597.3222
www.paceengrs.com

REGISTERED PROFESSIONAL ENGINEER
18558
PRELIMINARY
OREGON
JULY 6, 1986
BRIAN D. LEE
RENEWS: 12/31/2024

U-HAUL INTERNATIONAL, INC.
2727 N. CENTRAL AVE.
PHOENIX, AZ 85004
(541) 520-5479

U-HAUL MOVING & STORAGE - CORNELIUS STORE 704072

EROSION CONTROL PLAN

SCALE:	DATE:
AS SHOWN	DEC 2023
DESIGNED BY:	CHECKED BY:
MAA	BDL

JOB NUMBER **23836.00**

DWG NAME: P23836 EROS

SHEET C6 OF 11

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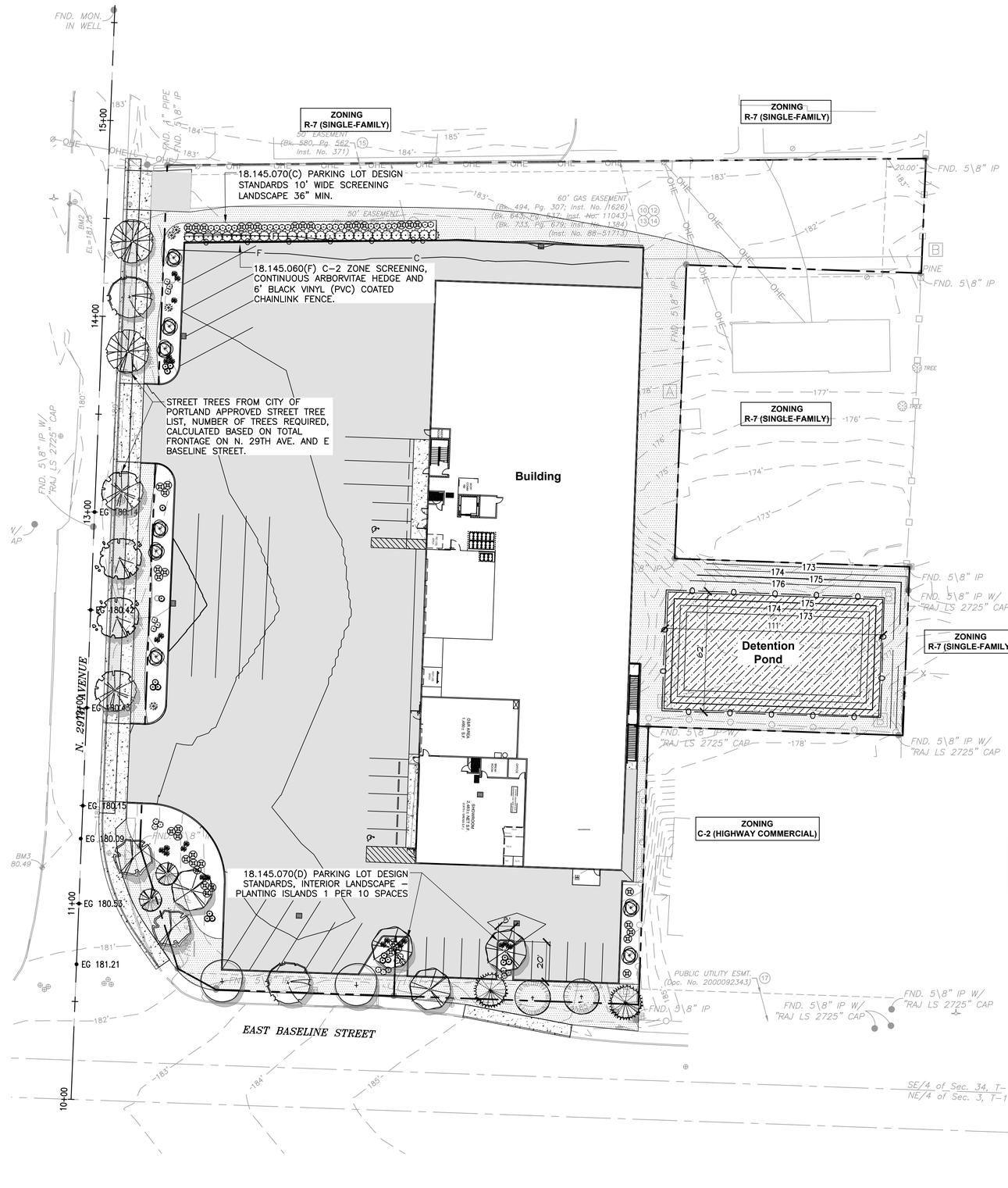


PLANT SCHEDULE

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE	QTY	REMARKS
CONIFEROUS TREES					
	Chamaecyparis obtusa `Gracilis`	Slender Hinoki Cypress	6` HT. MIN	8	
STREET TREES					
	Calocedrus decurrens	Incense Cedar	5` HT. MIN.	2	Family: Cupressaceae (10%)
	Cercidiphyllum japonicum	Katsura Tree	2" CAL. MIN. B&B	2	Family: Cercidiphyllaceae (5%)
	Davidia involucrata	Handkerchief Tree	2" CAL. MIN. B&B	2	Family: Nyssaceae (5%)
	Fagus sylvatica 'Atropunicea'	Purple European Beech	2" CAL. MIN. B&B	4	Family: Fagaceae (30%)
	Liriodendron tulipifera	Tulip Tree	2" CAL. MIN. B&B	2	Family: Magnoliaceae (5%)
	Pseudotsuga menziesii	Douglas Fir	5` HT. MIN.	2	Family: Pinaceae (5%)
	Quercus coccinea	Scarlet Oak	2" CAL. MIN. B&B	2	Family: Fagaceae (30%)
	Quercus rubra	Red Oak	2" CAL. MIN. B&B	2	Family: Fagaceae (30%)
	Thuja plicata	Western Red Cedar	5` HT. MIN.	2	Family: Cupressaceae (10%)
	Ulmus americana 'Princeton'	Princeton American Elm	2" CAL. MIN. B&B	2	Family: Ulmaceae (5%)
SHRUBS					
	Berberis thunbergii `Crimson Pygmy`	Crimson Pygmy Barberry	2 GAL	17	
	Cistus x hybridus	White Rockrose	2 GAL	40	
	Nandina domestica `Burgandy Wine	Burgandy Wine Heavenly Bamboo	2 GAL	22	
	Pinus mugo mugo	Dwarf Mugo Pine	2 GAL	4	
	Potentilla fruticosa	Bush Cinquefoil	2 GAL	6	
	Rhododendron x `Hino-crimson`	Hino-crimson Kurume Azalea	2 GAL	12	
	Thuja occidentalis 'Smaragd'	Emerald Green Arborvitae	6` HT. MIN.	27	
GRASSES					
	Helictotrichon sempervirens	Blue Oat Grass	2 GAL	22	

SYMBOL	CODE	BOTANICAL NAME	COMMON NAME	SIZE	SPACING	QTY	REMARKS
GROUND COVERS							
	LAWN	Lawn Hydroseed	Drought Tolerant Fescue Blend	---		26,108 sf	

STREET TREES & PUBLIC WORKS TREE DIVERSITY REQUIREMENTS

N. 29th Avenue 360 LF Frontage / 30' Tree = 12 Street Trees
E. Baseline Street 217 LF Frontage / 30' Tree = 8 Street Trees
20 Total Street Trees Required

10 different tree species, 9 different tree genera, & 7 different tree families proposed.

CWS STORMWATER FACILITY PLANTING STANDARDS (4.09.2 Detention Pond)
6,551 SF TOTAL AREA

Plant Species per CWS standards, Appendix A "Storm Water Facility (swf)"
3 or more evergreen species, pond bottom side slopes and freeboard to be fully vegetated

DATE
REVISION
SYM

PACE Engineers
4500 Kruse Way, Suite 250
Lake Oswego, OR 97035
p. 503.597.3222
www.paceengrs.com

REGISTERED 1151 PRELIMINARY V. BRIAN WAY OREGON 08/31/2024 LANDSCAPE ARCHITECT

U-HAUL INTERNATIONAL, INC.
2727 N. CENTRAL AVE.
PHOENIX, AZ 85004
(541) 520-5479

U-HAUL MOVING & STORAGE - CORNELIUS
STORE 704072

PRELIMINARY LANDSCAPE PLAN

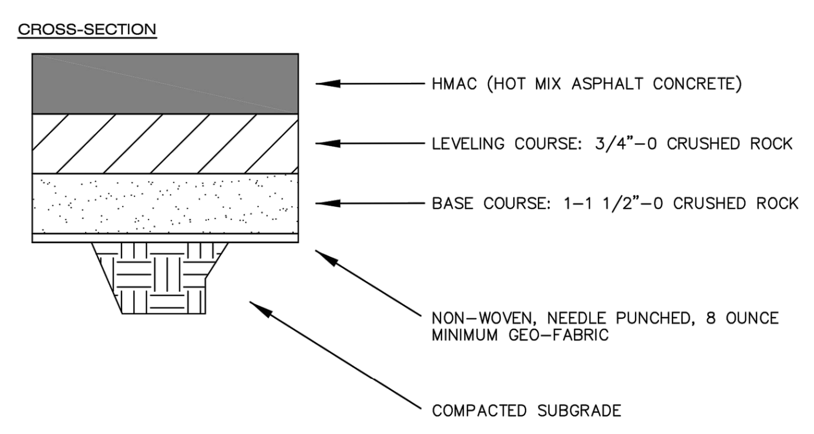
SCALE:	DATE:
AS SHOWN	DEC 2023
DESIGNED BY:	CHECKED BY:
MAA	BDL

JOB NUMBER
23836.00
DWG NAME:
P23836 LP
SHEET C7 OF 11

FILE NAME: P:\UKO\P23\23836_AMERCO_UHAUL CORNELIUS LU\CAD\ENGINEERING\SHEETS\P23836 LP.DWG
SAVE TIME: 1/3/2024 3:51:14 PM
PLOT TIME: 2/9/2024 7:58 AM
USER NAME: ASHLEY TELLIN
XREF FILES: ###

ASPHALT PAVEMENT THICKNESS

CROSS-SECTION



THICKNESS

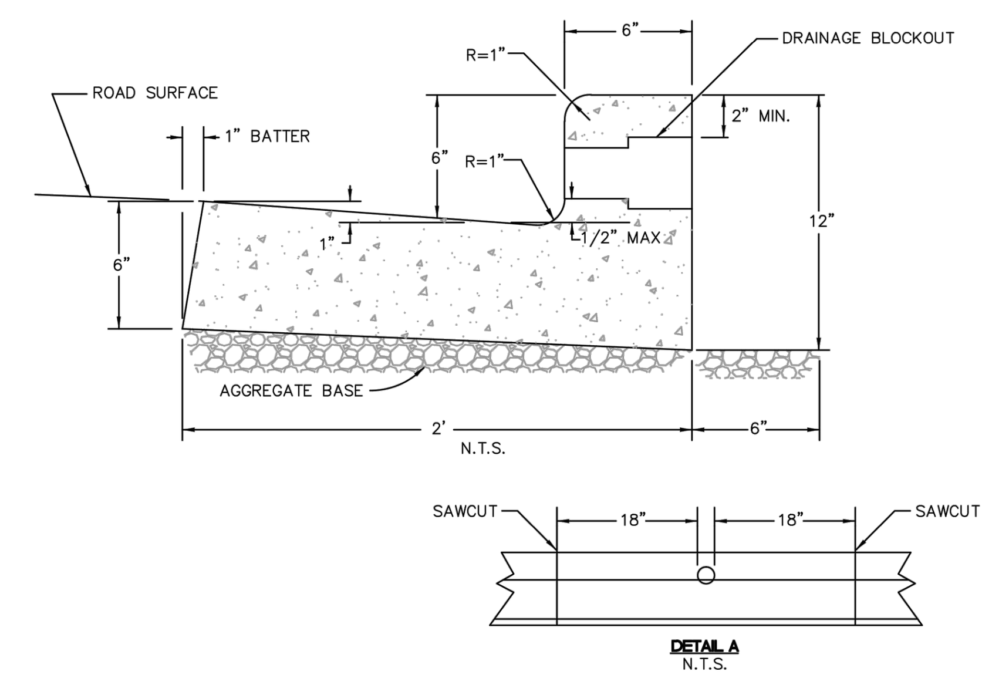
	ARTERIALS AND INDUSTRIAL STREETS	COLLECTORS	LOCAL STREETS	ALLEYS	MAINTENANCE ACCESS ROADS
HMAC	LEVEL 3 6"	LEVEL 2 6"	LEVEL 2 4"	LEVEL 2 3"	LEVEL 2 3"
LEVELING COURSE	2"	2"	2"	2"	2"
BASE COURSE	14"	14"	10"	10"	6"

NOTE:

1. THE MAXIMUM LIFT THICKNESS FOR HMAC SHALL BE 2 INCHES.
2. SUBGRADE COMPACTED TO 95% AASHTO T-99
3. ALLEYS ARE GENERALLY PAVED WITH CONCRETE. THE ALLEY COLUMN IN THE TABLE ABOVE IS FOR SITUATIONS WHERE ONLY A PORTION OF AN EXISTING ALLEY IS PAVED.

Cornelius - Oregon's Family Town | ASPHALT PAVEMENT THICKNESS | STREETS | S - 1 | 2/6/17

CURB & GUTTER

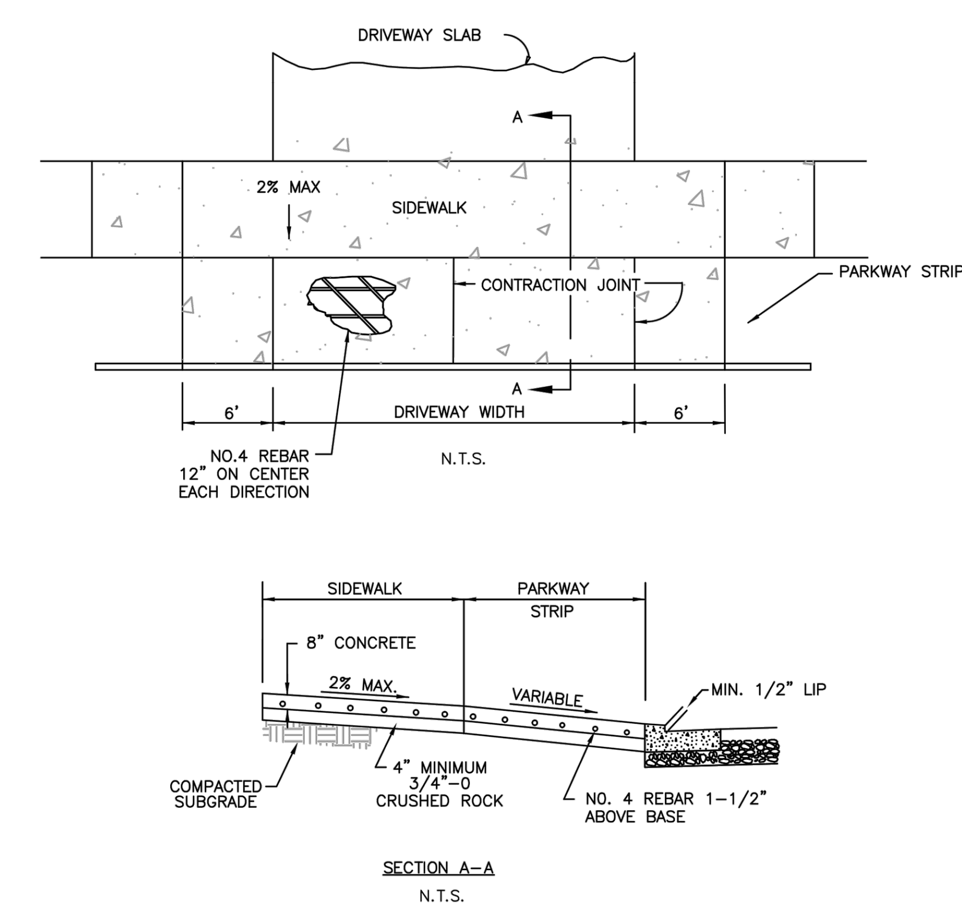


NOTES:

1. CONCRETE TO HAVE A COMPRESSIVE STRENGTH (fc) OF 3300 P.S.I. AFTER 28 DAYS.
2. CONTRACTION JOINTS.
   A. SPACE NOT MORE THAN 10 FEET
   B. DEPTH OF JOINT SHALL BE AT LEAST 1/3 DEPTH OF CONCRETE
   C. CENTER WEEPHOLES WITH CONTRACTION JOINTS
3. USE 1-1/2"-0" OR 3/4"-0" AGGREGATE BASE COMPACTED TO 100% OF AASHTO T-99. PLACE TO SUBGRADE, STREET STRUCTURE, OR 10" DEPTH, WHICHEVER IS GREATER. EXTEND AT LEAST 6" BEHIND CURB.
4. DRAINAGE BLOCKOUT (REQUIRE CITY ENGINEER APPROVAL)
   A. 3" DIAMETER ABS PLASTIC PIPE WITH COUPLING
   B. 2 PER LOT, 5' IN FROM PROPERTY LINES OR LOCATE TO EXISTING ROOF DOWNSPOUTS
   C. CORE DRILL DRAINAGE ACCESS THROUGH EXISTING CURBS OR VERTICALLY SAWCUT CURB AND GUTTER 18" ON EACH SIDE OF DRAIN AND REPOUR TO FULL DEPTH OF CURB AS SHOWN IN DETAIL A.

Cornelius - Oregon's Family Town | CURB & GUTTER | STREETS | S - 11 | 7/18/16

COMMERCIAL DRIVEWAY WITH PARKWAY STRIP



NOTES:

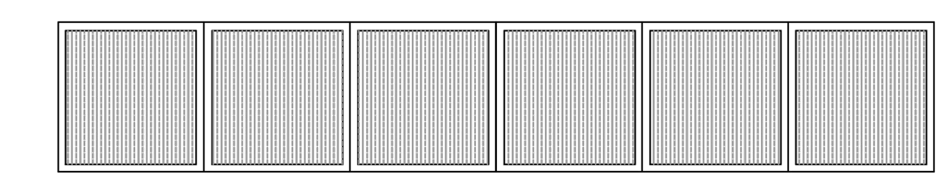
1. CALL PUBLIC WORKS (503) 357-3011 FOR FORM INSPECTION AT LEAST 24 HRS. PRIOR TO PLACEMENT.
2. DRIVEWAY APPROACH MUST EXTEND TO BACK OF RIGHT-OF-WAY (R/W).
3. CONCRETE SHALL HAVE A MINIMUM BEARING STRENGTH OF 4000 PSI AFTER 28 DAYS.
4. REBAR TO BE SUPPORTED ON 1-1/2" BLOCKS.

Cornelius - Oregon's Family Town | COMMERCIAL DRIVEWAY WITH PARKWAY STRIP | STREETS | S - 22 | 7/18/16

SIDEWALK FINISHING

FINISHING NOTES:

1. ALL SIDEWALKS SHALL HAVE A BROOMED SURFACE UNLESS OTHERWISE SPECIFIED.
2. FINISHED SURFACES SHALL BE FREE FROM HUMPS, SAGS, OR OTHER IRREGULARITIES.
3. ALL SURFACES SHALL BE BROOMED TRANSVERSE TO THE DIRECTION OF TRAFFIC.
4. THE EDGES SHALL BE FINISHED WITH A 3" SHINE ON ALL SIDES AS SHOWN BELOW.

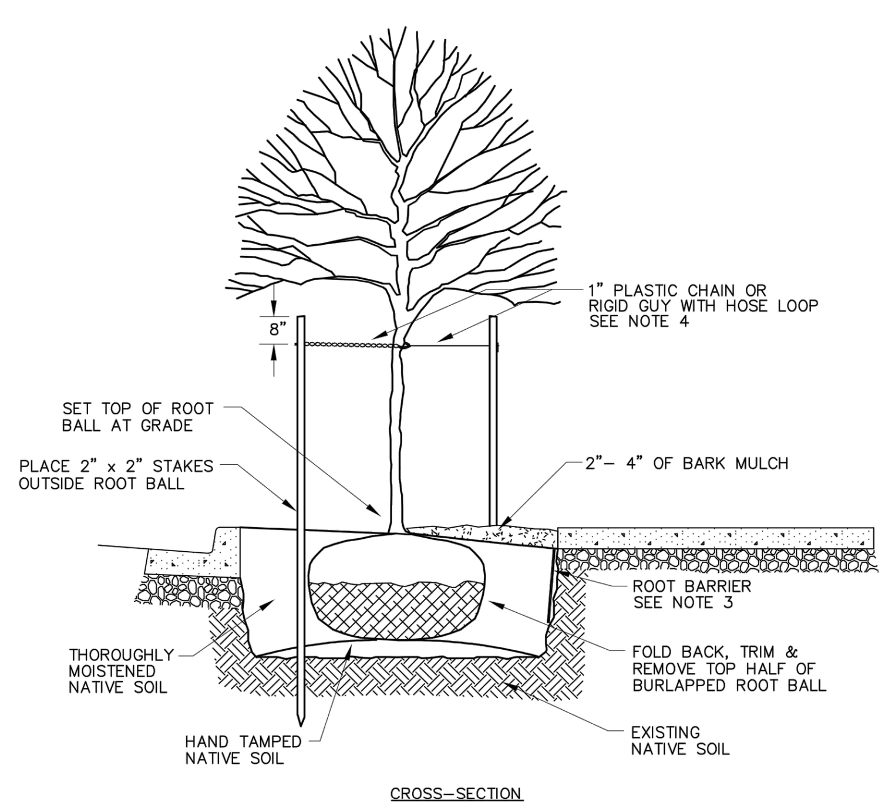


INSPECTION NOTES:

1. ALL SIDEWALK FORMS ARE TO BE INSPECTED BY THE PUBLIC WORKS INSPECTOR TWICE. ONCE PRIOR TO PLACING, TO CHECK FORMS, AND AGAIN AFTER POURING TO ENSURE CONFORMANCE TO FINISHING SPECIFICATIONS.
2. INSPECTION REQUESTS MUST BE MADE AT LEAST 24 HOURS IN ADVANCE BY CONTACTING PUBLIC WORKS.
3. IF FORMS ARE NOT INSPECTED AND APPROVED OR FINISH WORK IS SUBSTANDARD, THE INSPECTOR SHALL REQUIRE THE CONCRETE BE REMOVED AND REPLACED.

Cornelius - Oregon's Family Town | SIDEWALK FINISHING | STREETS | S - 25 | 7/18/16

STANDARD SIDEWALK TREEWELL

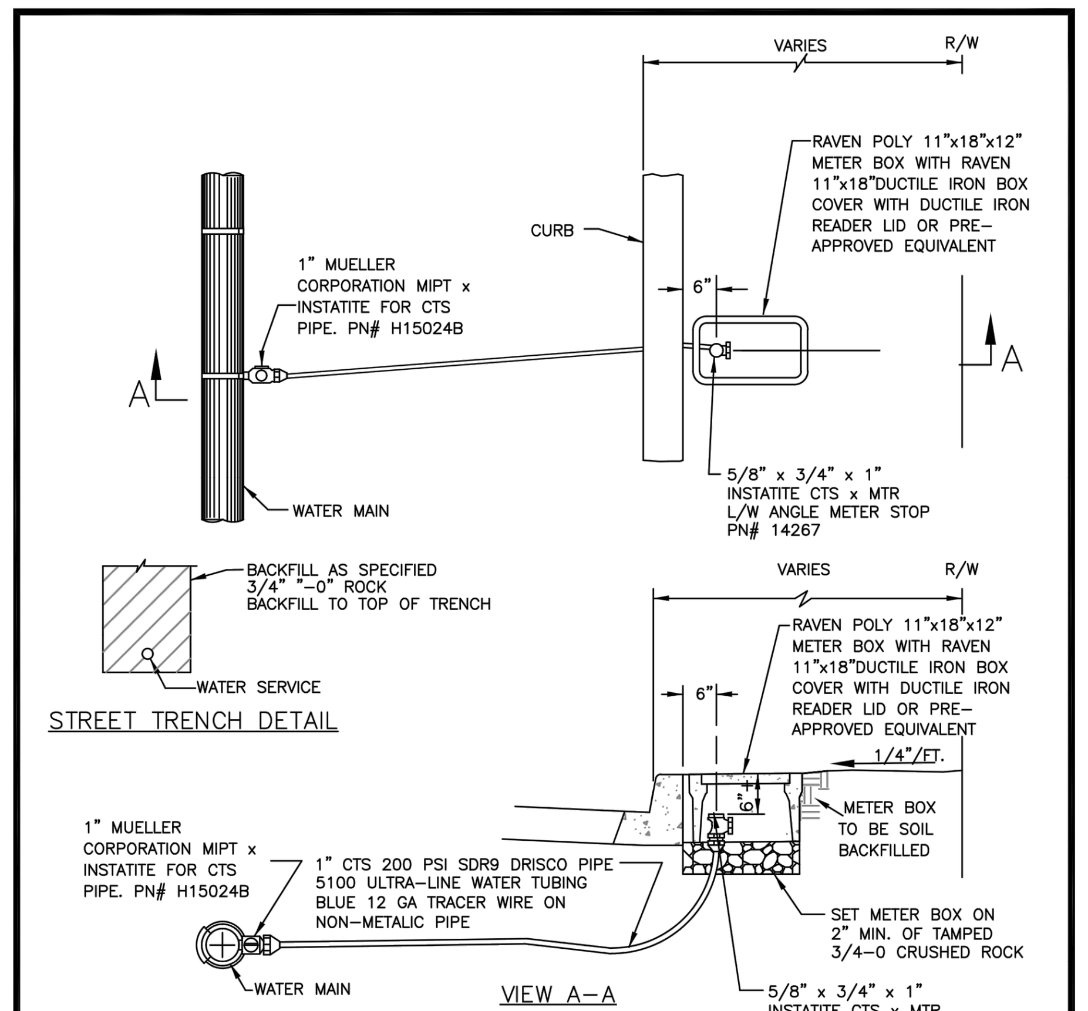


NOTES:

1. ADJUST PLANTING LOCATIONS SO THE TREE CROWN OR ROOT BALL DOES NOT CONFLICT WITH ABOVE OR BELOW-GROUND UTILITIES.
2. DO NOT UNDERMINE CURB OR SIDEWALK WHEN EXCAVATING.
3. AN 18 INCH DEEP ROOT BARRIER SHALL BE REQUIRED WHEN A TREE IS PLANTED IN A PARKWAY STRIP.
4. PROVIDE A LOOP IN CHAIN LOCK OR GUY HOSE LARGE ENOUGH TO ALLOW FOR TRUNK GROWTH.
5. TREE STAKES ARE TO BE REMOVED AT THE END OF THE WARRANTY PERIOD UNLESS THE CITY ENGINEER DETERMINES THE STAKES SHALL REMAIN IN PLACE.

Cornelius - Oregon's Family Town | STANDARD SIDEWALK TREEWELL | STREETS | S - 41 | 7/18/16

DOMESTIC WATER SERVICE



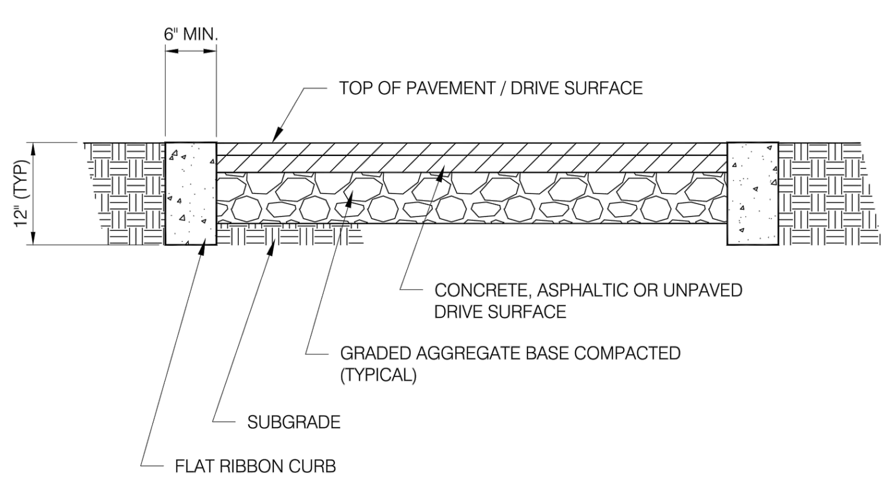
NOTES:

1. FOR CLASS 52 DUCTILE IRON PIPE USE ANODIZED STEEL BAND TAPPING SADDLE.
2. FOR C-900 PIPE USE WIDE STAINLESS STEEL BAND TAPPING SADDLE. APPROVED FOR PVC PIPE.
3. ALL BRASS FITTINGS TO BE MUELLER UNLESS PREVIOUSLY APPROVED BY THE CITY ENGINEER.
4. IF SIDEWALK IS CURB TIGHT, WATER METER SHALL BE LOCATED IMMEDIATELY BEHIND THE SIDEWALK.
5. SERVICE LINE TAPS TO MAIN LINE SHALL BE A MINIMUM OF 24 INCHES APART.
6. IF MULTIPLE LATERALS SHARE A COMMON TRENCH, THE LATERALS SHALL BE A MINIMUM OF 12 INCHES APART.

Cornelius - Oregon's Family Town | DOMESTIC WATER SERVICE | WATER | W - 7 | 7/18/16

RIBBON CURB DETAIL

USE AT ALL INTERIOR LOT LOCATIONS



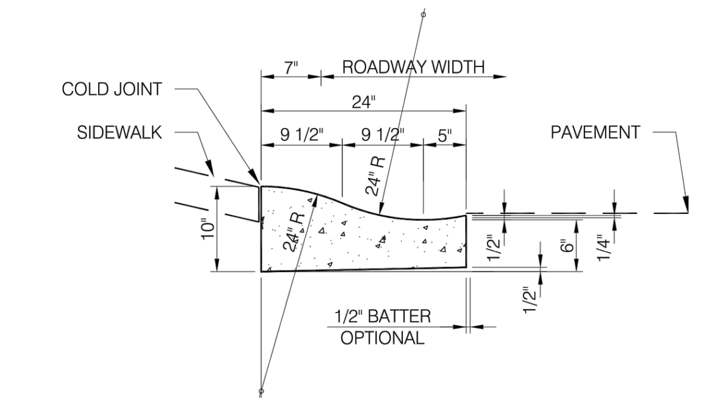
RIBBON CURB NOTES:

1. RIBBON CURB MUST BE A FLAT CURB TOP FLUSH WITH PAVED OR UNPAVED DRIVE SURFACES.
2. RIBBON CURB SHALL BE A MINIMUM OF 3000 PSI CONCRETE AT 28 DAYS.
3. ALONG RIBBON CURB:
   - 1/2-INCH EXPANSION JOINTS OR PREMOLDED BITUMINOUS EXPANSION JOINT MATERIAL SHALL BE PROVIDED AT ALL STRUCTURES, RADIUS POINTS, AND AT INTERVALS NOT TO EXCEED 50 FEET.
   - CONSTRUCTION JOINT SHALL BE INSTALLED 1/2-INCH AT 10-FT INTERVALS.

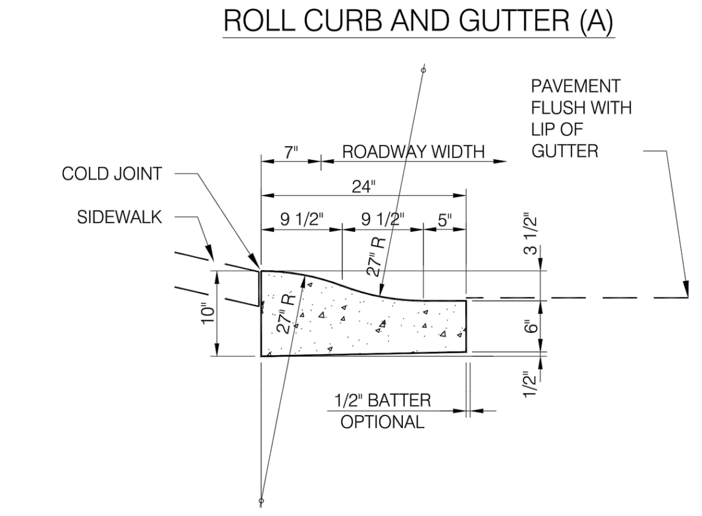
AMERCO REAL ESTATE COMPANY | RIBBON CURB DETAIL | FILE NAME: CURB PROFILES.dwg | SECTION #: Division-3 (3300) | REVISED: 04.08.2020 | SCALE: NOT TO SCALE | SHEET: CP-1 DETAIL

CONSTRUCTION & RENOVATION - 2727 NORTH CENTRAL AVENUE, 9-NORTH - PHOENIX, ARIZONA 85004 PH: (602) 263-6502

MOUNTABLE ROLLED CURB DETAIL



ROLL CURB AND GUTTER (A)



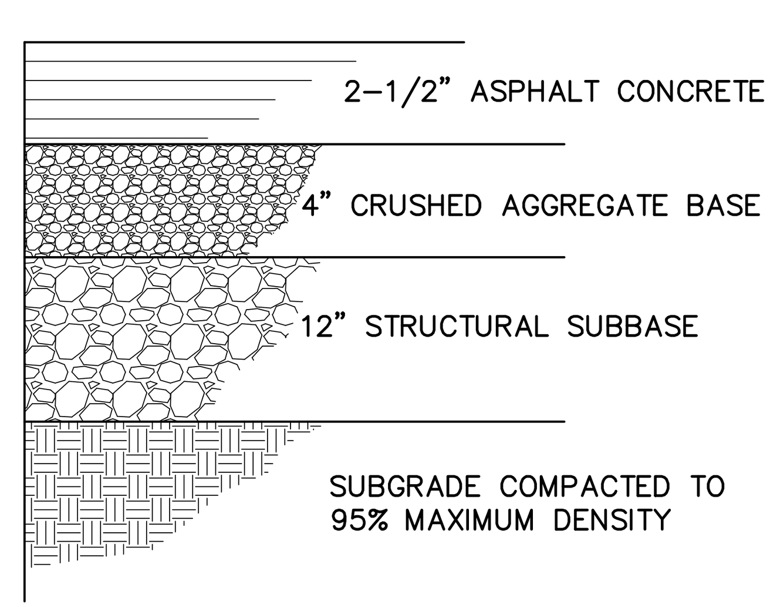
ROLL CURB AND GUTTER (B)

ROLL CURB NOTES (A & B)

1. ONLY USE WHEN RIBBON CURB IS NOT ALLOWED OR WHEN REQUIRED FOR DRAINAGE.
2. CONTRACTION JOINT SPACING 10' MAXIMUM.
3. MINIMUM OF 3000 PSI CONCRETE AT 28 DAYS.

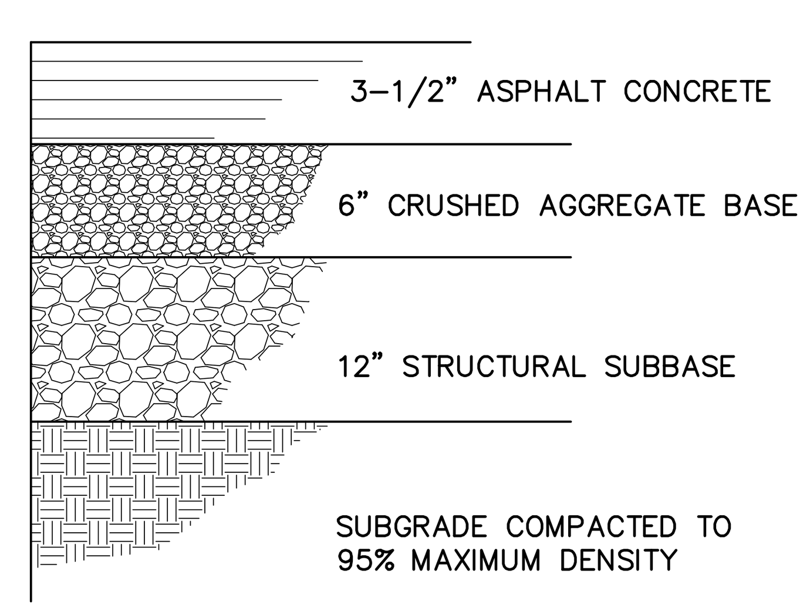
AMERCO REAL ESTATE COMPANY | ROLL CURB DETAILS | FILE NAME: CURB PROFILES.dwg | SECTION #: Division-3 (3300) | REVISED: 04.08.2020 | SCALE: NOT TO SCALE | SHEET: CP-2 DETAIL

CONSTRUCTION & RENOVATION - 2727 NORTH CENTRAL AVENUE, 9-NORTH - PHOENIX, ARIZONA 85004 PH: (602) 263-6502



1 / C8 **LIGHT DUTY FLEXIBLE PAVEMENT SECTION**

NTS



2 / C8 **HEAVY DUTY FLEXIBLE PAVEMENT SECTION**

NTS

ASPHALT MIX DESIGN SHALL MEET THE REQUIREMENTS OF ODOT STANDARD SPECIFICATIONS FOR CONSTRUCTION, SECTION 00744.13.

AGGREGATE BASE SHALL COMPLY WITH ODOT STANDARD SPECIFICATIONS FOR CONSTRUCTION, SECTION 00640.10.

STRUCTURAL SUBBASE SHALL BE DENSE-GRADED AGGREGATES PER ODOT STANDARD SPECIFICATIONS FOR CONSTRUCTION, SECTION 02630.10 AND SHOULDER AGGREGATES PER ODOT STANDARD SPECIFICATIONS FOR CONSTRUCTION, SECTION 02640.00.

SYM	REVISION	DATE

PACE Engineers
4500 Kruse Way, Suite 250
Lake Oswego, OR 97035
p. 503.597.3222
www.paceengrs.com

REGISTERED PROFESSIONAL ENGINEER 18558 PRELIMINARY OREGON JULY 6, 1996 BRIAN D. LEE

RENEWS: 12/31/2024

U-HAUL INTERNATIONAL, INC.
2727 N. CENTRAL AVE.
PHOENIX, AZ 85004
(541) 520-5479

U-HAUL MOVING & STORAGE - COOS BAY STORE 700077

DETAILS

SCALE:	DATE:
AS SHOWN	DEC 2023
DESIGNED BY:	CHECKED BY:
MAA	BDL

JOB NUMBER **22833.00**

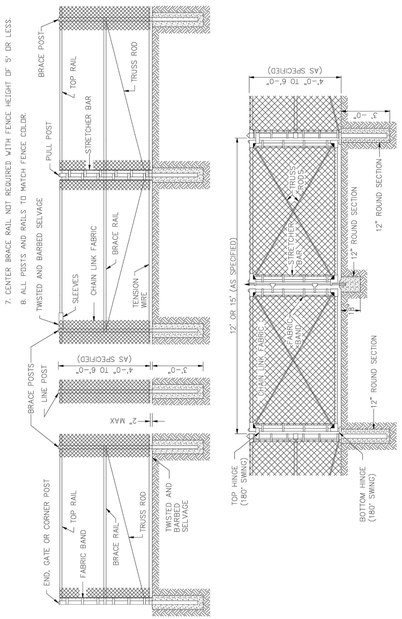
DWG NAME: P23836 DET

SHEET C8 OF 11

FILE NAME: P:\LKO\P23\23836_AMERCO_UHAUL CORNELIUS LU\CAD\ENGINEERING\SHEETS\P23836 DET.DWG
SAVE TIME: 2/8/2024 2:08:17 PM
PLOT TIME: 2/9/2024 7:58 AM
USER NAME: ASHLEY TELLIN
XREF FILES: ####

NOTES:
1. ALL FITTINGS, FASTENERS, & AND FABRIC TIES SHALL BE HOT DIP GALV.
2. CONC SHALL BE MIN 2500 PSI @ 28 DAYS.
3. PROVIDE BRACE RAIL BETWEEN END POSTS AND LINE POSTS. LENGTHS AS REQ'D.
4. PROVIDE GATE STOPS AND DROP RECEIVERS SET IN CONCRETE, EACH GATE.
5. PROVIDE EXTENSION ARMS ON LINE, END AND CORNER POSTS & GATE POSTS AS REQ'D.
6. PROVIDE SIGHT OBSCURING SLATS WITH ALL WASTEWATER PUMP STATIONS.
7. CENTER BRACE RAIL NOT REQUIRED WITH FENCE HEIGHT OF 5' OR LESS.
8. ALL POSTS AND RAILS TO MATCH FENCE COLOR.

MEMBER	NOMINAL DIA (IN)	MATERIAL
BRACE RAIL	1.660	GALV TUBULAR STL
GATE FRAME	2.00	GALV TUBULAR STL
LINE POST	2.375	GALV TUBULAR STL
END & CORNER POST	2.875	GALV TUBULAR STL
CHAIN LINK FABRIC		9 GA., W/GREEN OR BLACK PVC COATING
GATE OPENING (CLEAR)	NOMINAL DIA (IN)	MATERIAL
GATE POST 12' OR 15'	4	GALV TUBULAR STL



CHAIN LINK FENCE AND GATE

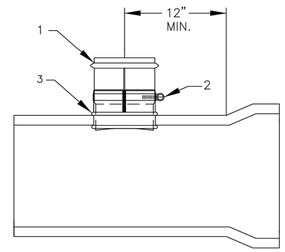
DRAWING NO. 792 REVISED 10-31-19

CleanWater Services

1. PVC HUB SHALL CONFORM TO ASTM 3034, SDR 35 DRIVE INTO CENTER OF RUBBER SLEEVE AFTER SLEEVE IS PLACED IN HOLE.

2. STAINLESS STEEL BAND SECURES UPPER HALF OF RUBBER SLEEVE TO THE PVC HUB. STAINLESS STEEL BAND SHALL BE 300 SERIES, 3/4" BAND WIDTH, CADMIUM PLATED CARBON STEEL, AND ATTACHED WITH HEX HEAD SLOTTED SCREW.

3. COMPLETE RUBBER SLEEVE INCLUDES A MOLDED SEGMENT THAT HOLDS IT IN PLACE.



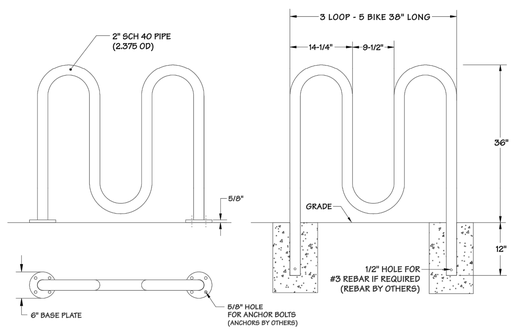
NOTES:

1. ALL INSERTA TEE HOLES SHALL BE MACHINE DRILLED AND CORED.
2. INSERTA TEES ARE NOT ALLOWED IN NEWLY CONSTRUCTED MAINLINES WITH AN INSIDE DIAMETER (I.D.) OF 10 INCHES OR SMALLER.
3. MAINLINE SHALL BE TWO SIZES (NOMINAL I.D.) LARGER THAN THE INSERTA TEE.
4. INSTALLATION SHALL BE PER MANUFACTURER'S INSTRUCTIONS.

INSERTA TEE

DRAWING NO. 530 REVISED 10-31-19

CleanWater Services



SPECIFICATIONS

MATERIAL
The BR-1.5, bike rack shall be fabricated with 2" sch. 40 steel pipe (2.375" OD), .154 wall. Pipe shall conform to ASTM A53. Bends shall be produced by mandril style rotary drawn bending procedure.

PROTECTIVE COATINGS
Powder Coating: Following fabrication bike racks shall be cleaned and treated with an iron phosphate process prior to the coating application. This process shall include a non-chromated alkaline cleaner, and an iron phosphate treatment followed with an acidic sealer for maximum adhesion. The protective coatings shall be either polyester or polyester TGIC powder. Following application the parts shall be baked until properly cured. The coating shall be a minimum of 4 mils thick on all surfaces.
Options for finish: Corrosion resistant undercoat, strongly recommended
Note: Unless otherwise specified, bike racks shall be powder coated a standard FairWeather color.
Hot Dip Galvanizing, instead of powder coating: Following fabrication, the bike rack shall be hot dip galvanized to standard ASTM A123, 3 to 4 mils thick.

Options
Mounting: Embed, surface mount
Cast aluminum base covers

Please Note: For permanent embed, depth and diameter of installation hole may vary with soil conditions. Consult project engineer for correct dimensions.

REV 08-22-12

Bike Rack, Model BR-1.5

NTS **FairWeather Site Furnishings**
360-895-2626 or Toll Free 800-323-1798
Port Orchard, Washington

SYM	REVISION	DATE

PACE Engineers
4500 Kruse Way, Suite 250
Lake Oswego, OR 97035
p. 503.597.3222
www.paceengrs.com

REGISTERED PROFESSIONAL ENGINEER
18558
PRELIMINARY
OREGON
JULY 6, 1986
BRIAN D. LEE
RENEWS: 12/31/2024

U-HAUL INTERNATIONAL, INC.
2727 N. CENTRAL AVE.
PHOENIX, AZ 85004
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U-HAUL MOVING & STORAGE OF SOUTH BAY
STORE 700077

DETAILS

SCALE:	DATE:
AS SHOWN	DEC 2023
DESIGNED BY:	CHECKED BY:
MAA	BDL

JOB NUMBER
22833.00
DWG NAME:
P23836 DET
SHEET C8.1 OF 11

FILE NAME: P:\LKO\P23\23836_AMERCO_UHAUL CORNELIUS LU\CAD\ENGINEERING\SHEETS\P23836 DET.DWG
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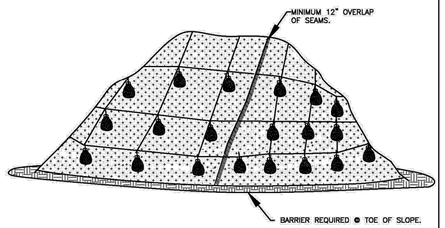
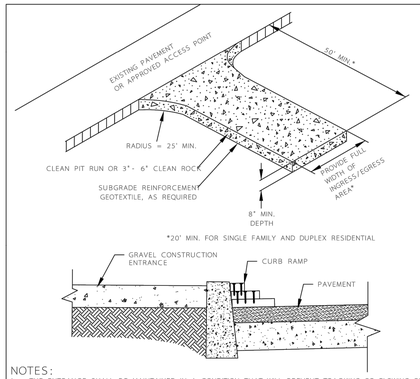


PLASTIC SHEETING

NOTES:
1. MINIMUM 12" OVERLAP OF ALL SEAMS REQUIRED.
2. BARRIER REQUIRED @ TOE OF STOCK PILE.
3. COVERING MAINTAINED TIGHTLY IN PLACE BY USING SANDBAGS OR TIRES ON ROPES WITH A MAXIMUM 10' GRID SPACING IN ALL DIRECTIONS.

PLASTIC SHEETING

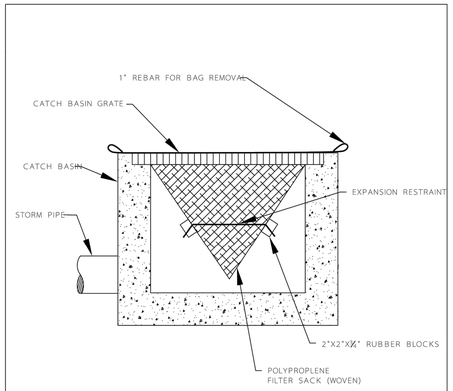
DETAIL DRAWING 4-3 REVISED 01-09



NOTES:
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.
4. WHERE RUNOFF CONTAINING SEDIMENT-LADEN WATER IS LEAVING THE SITE VIA THE CONSTRUCTION ENTRANCE, OTHER MEASURES SHALL BE IMPLEMENTED TO DIVERT RUNOFF THROUGH AN APPROVED FILTERING SYSTEM.
5. DIMENSIONS
   SINGLE FAMILY
   20' LONG BY 20' WIDE 8" DEEP OF ¾" MINUS CLEAN ROCK.
   COMMERCIAL
   50' LONG BY 20' WIDE 3-6" CLEAN ROCK, GOVERNING AUTHORITY MAY REQUIRE GEOTEXTILE FABRIC TO PREVENT SUB-SOIL PUMPING.

CONSTRUCTION ENTRANCE

DETAIL DRAWING 4-13 REVISED 01-09

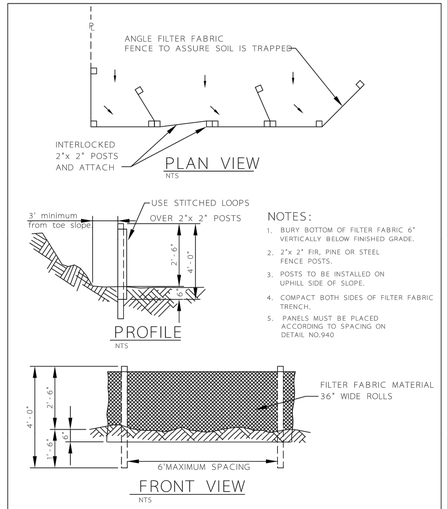


WOVEN POLYPROPLENE SACK

NOTE:
1. RECESSED CURB INLET CATCH BASINS MUST BE BLOCKED WHEN USING FILTER FABRIC INLET SACKS. SIZE OF FILTER FABRIC INLET SACKS TO BE DETERMINED BY MANUFACTURER.

INLET PROTECTION TYPE 5

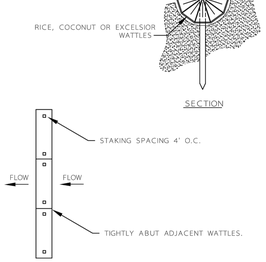
DETAIL DRAWING 4-19 REVISED 01-09



NOTES:
1. BURY BOTTOM OF FILTER FABRIC 6" VERTICALLY BELOW FINISHED GRADE.
2. 2"x 2" FIR, PINE OR STEEL FENCE POSTS.
3. POSTS TO BE INSTALLED ON UPHILL SIDE OF SLOPE.
4. COMPACT BOTH SIDES OF FILTER FABRIC TRENCH.
5. PANELS MUST BE PLACED ACCORDING TO SPACING ON DETAIL NO.940

SEDIMENT FENCE

DETAIL DRAWING 4-23 REVISED 01-09



NOTES:
1. STAKING SPECIFICATIONS:
   a. 1"X2" WOODEN STAKES
   b. ADDITIONAL STAKES MAY BE INSTALLED ON DOWNHILL SIDE OF WATTLES, ON STEEP SLOPE OR HIGHLY EROSIVE SOILS.
2. SPACING IN ACCORDANCE WITH DETAIL 940.

WATTLES

DETAIL DRAWING 4-27 REVISED 01-09

SYM	REVISION	DATE

PACE Engineers
4500 Kruse Way, Suite 250
Lake Oswego, OR 97035
p. 503.597.3222
www.paceengrs.com

REGISTERED PROFESSIONAL ENGINEER
18558
PRELIMINARY
OREGON
JULY 6, 1986
BRIAN D. LEE
RENEWS: 12/31/2024

U-HAUL INTERNATIONAL, INC.
2727 N. CENTRAL AVE.
PHOENIX, AZ 85004
(541) 520-5479

U-HAUL MOVING & STORAGE - CORNELIUS STORE 704072

EROSION CONTROL DETAILS

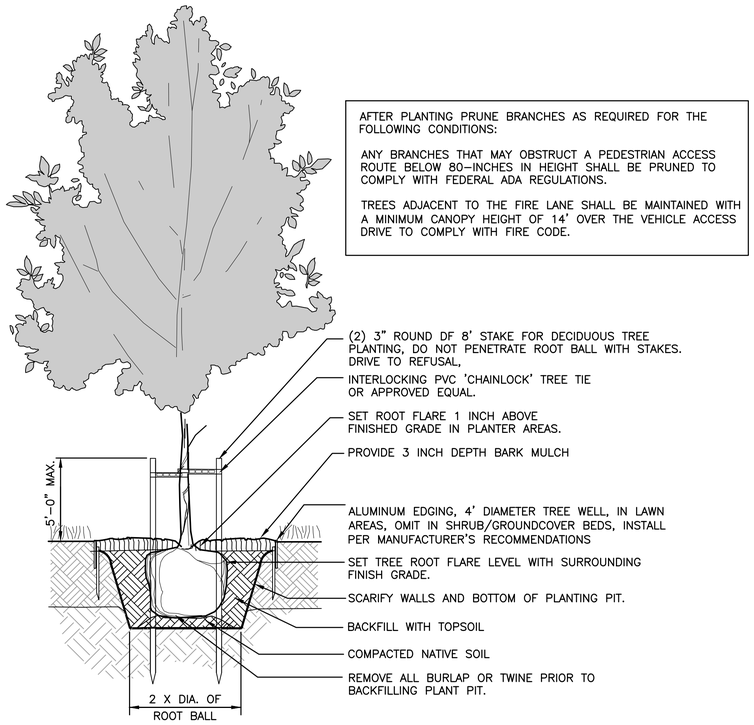
SCALE:	DATE:
AS SHOWN	DEC 2023
DESIGNED BY:	CHECKED BY:
MAA	BDL

JOB NUMBER **23836.00**

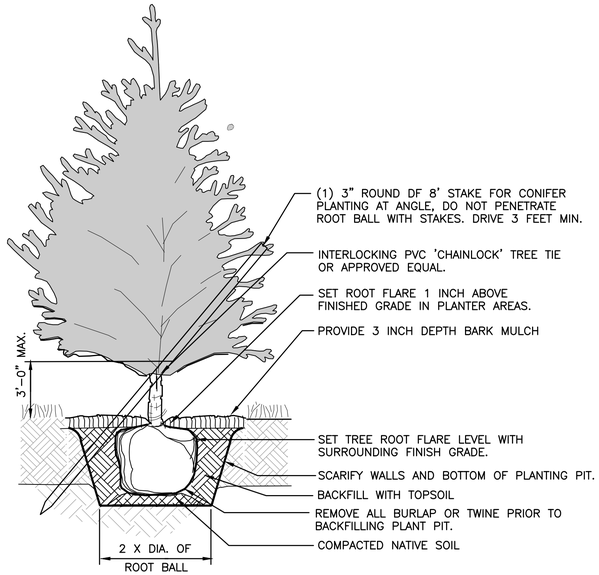
DWG NAME: P23836 EC DET

SHEET C9 OF 11

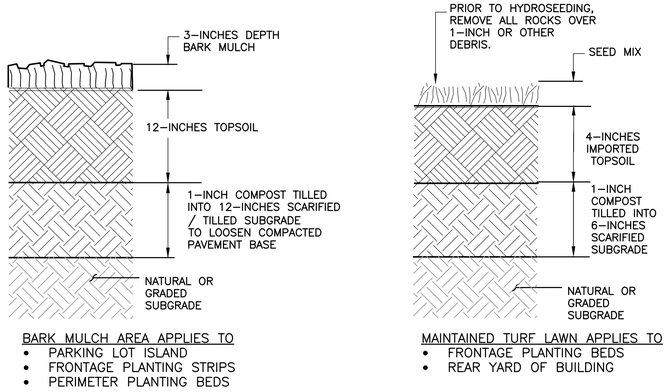
FILE NAME: P:\UKO\P23\23836_AMERCO_UHAUL CORNELIUS LU\CAD\ENGINEERING\SHEETS\P23836 EC DET.DWG
SAVE TIME: 1/3/2024 3:50:56 PM
PLOT TIME: 2/9/2024 7:58 AM
USER NAME: ASHLEY TELLIN
XREF FILES: ###



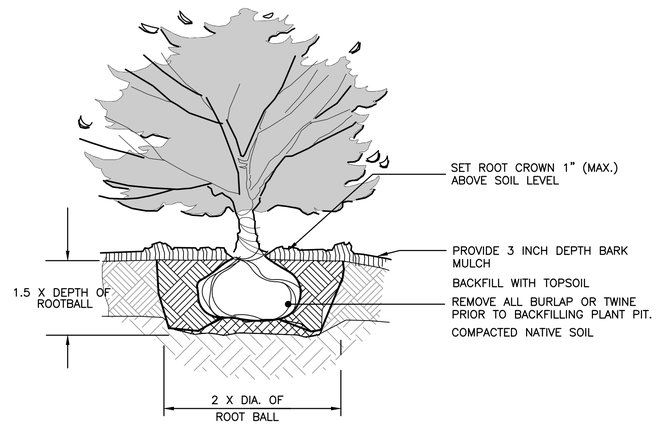
1 DECIDUOUS TREE PLANTING DETAIL
NTS



2 CONIFER / MULTI TRUNK PLANTING DETAIL
NTS



3 PLANTING PREPARATION
NTS



4 SHRUB PLANTING DETAIL
NTS

GENERAL PLANTING NOTES

1. AN AUTOMATIC UNDERGROUND IRRIGATION SYSTEM IS REQUIRED FOR THIS PROJECT.
2. GRADING SHALL BE ACCEPTED PRIOR TO PLANT INSTALLATION. FINISHED GRADE FOR NEW PLANTING AREAS SHALL ALLOW FOR TOPSOIL AND ROCK MULCH AND 1–INCH CLEAR TO TOP OF CURB OR SIDEWALK.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING AND HAULING ALL EXTRA DEBRIS AND EXCESS SOIL GENERATED BY THIS PROJECT.

PLANTING, FERTILIZING AND MAINTENANCE

4. ALL PLANTS SHALL CONFORM TO AMERICAN ASSOCIATION OF NURSERYMAN (AAN) GRADES AND STANDARDS AS PUBLISHED IN THE MOST RECENT Z60.1 "AMERICAN STANDARD FOR NURSERY STOCK" MANUAL. TREE CALIPER SHALL BE MEASURED SIX INCHES ABOVE THE ROOT FLARE.
5. AREAS DISTURBED BY GRADING AND NOT SHOWN AS PLANTING / LAWN AREAS SHALL BE SEEDED.
6. APPLY FERTILIZER TO ALL LAWN, GROUNDCOVER, SHRUB AND TREE PLANTING AREAS. FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR FERTILIZER TYPE (N–P–K RATIO) FOR LAWN, ORNAMENTAL SHRUBS, AND TREES.
7. THE ONGOING MAINTENANCE IS THE RESPONSIBILITY OF THE PROPERTY OWNER.

TOPSOIL, COMPOST AND MULCH

8. REMOVE SUBGRADE MATERIAL TO ACCOMMODATE TOPSOIL, ROCK MULCH, SOD LAWN WITH 1" CLEAR TO TOP OF CURB, SIDEWALK OR OTHER PAVED SURFACES.
9. REFER TO PLANTING PREPARATION DETAIL SHEET THIS SHEET FOR TOPSOIL AND COMPOST REQUIREMENTS.
10. TOPSOIL SHALL BE A TWO–WAY MIX OR APPROVED EQUAL, CONSISTING OF THE FOLLOWING:
    SOIL SHALL BE A MIXTURE OF 50% PURE COMPOST, AND 50% SAND, SANDY LOAM, OR SILTY SAND. THE COMPOST SHALL BE FULLY COMPOSTED AND MATURE ORGANIC MATERIALS. NO FRESH SAWDUST OR OTHER FRESH WOOD BY–PRODUCTS SHALL BE ADDED TO EXTEND THE VOLUME AFTER THE COMPOSTING PROCESS.

    CHEMICAL/PHYSICAL CHARACTERISTICS SHALL COMPLY WITH THE FOLLOWING:
    - SCREEN SIZE (APPROX. PARTICLE SIZE) 7/16" MAXIMUM
    - TOTAL NITROGEN.25% MINIMUM
    - ORGANIC MATTER 50%
    - PH RANGE 5.5–7.5
11. BARK MULCH SHALL BE HEMLOCK / FIR MEDIUM GRIND.

DATE	REVISION	SYM

PACE Engineers
4500 Kruse Way, Suite 250
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p. 503.597.3222
www.paceengrs.com

REGISTERED 1151 PRELIMINARY V. BRIAN WAY OREGON 08/31/2024 LANDSCAPE ARCHITECT

U-HAUL INTERNATIONAL, INC.
2727 N. CENTRAL AVE.
PHOENIX, AZ 85004
(541) 520–5479

U-HAUL MOVING & STORAGE - CORNELIUS STORE 704072

LANDSCAPE DETAILS

SCALE:	DATE:
AS SHOWN	DEC 2023
DESIGNED BY:	CHECKED BY:
MAA	BDL

JOB NUMBER **23836.00**
DWG NAME: P23836 LP DET
SHEET C10 OF 11

FILE NAME: P:\LKO\P23\23836_AMERCO_UHAUL CORNELIUS LU\CAD\ENGINEERING\SHEETS\P23836 LP DET.DWG
SAVE TIME: 1/3/2024 3:50:51 PM
PLOT TIME: 2/9/2024 7:58 AM
USER NAME: ASHLEY TELLIN
XREF FILES: ###

PRELIMINARY DRAINAGE REPORT

Preliminary Drainage Report

U-Haul Moving and Storage
Store 704072

Cornelius, Oregon

Prepared For:

U-Haul Moving and Storage
AMERCO Real Estate Company
2727 N. Central Ave
Phoenix, AZ 85004
Attn: Zulema Longoria

February 2024

PACE
An Engineering Services Company

Preliminary Drainage Report

U-Haul Moving and Storage
Store 704072

Prepared For:

U-Haul Moving and Storage
AMERCO Real Estate Company
2727 N. Central Avenue
Phoenix, AZ 85004
Attn: Zulema Longoria

PACE Engineers, Inc.
4500 Kruse Way, Suite 250
Lake Oswego, Oregon 97035
PACE Project No. 21824

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PROJECT CERTIFICATION

The technical material and data contained in this report was prepared by PACE Engineers, Inc., under the supervision of the listed individuals below. Those responsible staff members who are registered professional engineers are licensed in the State of Oregon.

Brian D. Lee, P.E.
PACE Engineers, Inc.

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TABLE OF CONTENTS

APPENDIX

1. Soils Map
2. Hydraulic Model Reports
3. Storm Drainage Plan
4. Geotech Report – See separate PDF file.

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PRELIMINARY DRAINAGE REPORT

1.0 PURPOSE AND INTRODUCTION

This report represents the drainage analysis that was performed on a 2.96 acre parcel located at 2962 E. Baseline Street (HWY 8) located in Cornelius, Oregon. It is made up of 2 tax lots (1N334DD 7700 and 7900). The proposed project is to redevelop the property into a U-Haul storage facility.

Due to frontage improvements required by the City of Cornelius, the Right of Way (ROW) drainage area on NE 29th Avenue were included in the drainage analysis for the purposes of this report. This project triggers Clean Water Services (CWS) stormwater management for both water quality and quantity. To determine the stormwater quantity control required for the project, CWS uses three criteria. For this site, the RISK is Low, the DEVELOPMENT CLASS is Developed Area and the SIZE is Large. This puts the development into Category 2, requiring peak flow matching detention.

While infiltration of stormwater is an option to meet Category 2 requirements, the predominately clay soils in this area make infiltrating significant volumes of runoff nearly impossible. Meeting these detention requirements is typically accomplished using an open pond or underground detention pipes on the site. The Client has selected an open pond for stormwater management.

This is the documentation of the goals for which the stormwater facility for this site were designed to meet, the sources of information upon which the analysis is based, the design methodology, and the results of the analysis. The analysis was performed using a hydrologic and hydraulic model built in an Excel Spreadsheet using the SBUH method. Water quality and quantity performance goals are based on current Clean Water Services (CWS) and ODOT standards.

2.0 PROJECT LOCATION AND DESCRIPTION

The proposed improvements are in Cornelius, Oregon. The site is bordered by NE 29th Avenue the West and E. Baseline Rd (HWY 8) to the South.

2.1 Project Location

ITEM	DESCRIPTION
Address	2962 E. Baseline Street, Cornelius, OR 97113
Watershed	Council Creek Sub-Watershed of Tualatin River Watershed
County	Washington County
Zoning	Highway Commercial (C-2)

ITEM	DESCRIPTION
Area	Onsite Stormwater Collection Area – 2.96 acres Offsite Stormwater Collection Area – (+/-) 0.31 acres
Existing improvements	The existing site is mostly undeveloped. Currently Murphy's furniture store is located along E. Baseline Road with a few connections (catch basins) to the storm sewer system in the right of way.
Current ground cover	Gravel and asphalt parking areas, a building and undeveloped natural ground cover.
Existing topography	The ground naturally slopes to the East. Two (2) existing drainage ditches run Easterly to a lower area that collects stormwater runoff. No current outlet.
Surrounding Features	Surrounding features consist of roadways, single family residences and a regional natural resource area (Council Creek).
Nearby Water Bodies	The stormwater on the property drains to a natural lower area and pools. In the past it had a connection to the stormwater system that drained to Council Creek natural area. Council Creek drains into the Tualatin River.
Soils	37B – Quatama loam, 3 to 7 percent slopes 2027A - Verboort silty clay loam, 0 to 3 percent slopes 37A - Quatama loam, 0 to 3 percent slopes

2.2 Project Description

The project facility serves the 2.96-acre property and 0.31-acre Right of Way (ROW) frontage improvements on N. 29th Avenue. It does not take in upstream drainage from natural or manmade drainage systems. A Storm Drainage Plan is included in the Appendix.

ITEM	DESCRIPTION
Proposed Improvements	The proposed improvements include: • Earthwork modifications to create a new AC parking, landscaping and building pad. • Installing an open pond detention system. • Installing new flow control structure to meter the discharge into the existing 36" storm sewer pipe on E. Baseline Street.

3.0 HYDRAULIC AND HYDROLOGIC DESIGN

3.1 Hydrologic and Hydraulic Model

Hydrologic and hydraulic calculations to estimate runoff flows were conducted using Excel Spreadsheet based SBUH model for rainfall-runoff-routing simulation model using the following information to develop the model:

- Soil Conservation Service ("SCS") Type 1A hyetograph for rainfall distribution developed from ODOT Isopluvial Maps and published CWS storm depths, see table 3-1.
- Drainage area basin based on local contour maps. This area was assigned a Runoff Curve Number of 79 for pre-industrial conditions, assumed to be undeveloped pasture land and Washington County Soil Survey classifications for pre-industrial conditions. A Runoff Curve Number of 98 for the current proposed conditions was used, where 100% impervious land cover was assumed.
- Existing stormwater system pipe network with hydraulic information provided by City of Cornelius and data collected during ALTA site survey.

Table 3.1 – Study Precipitation Depths

Recurrence Interval (Years)	24-hour Rainfall Depth (inches)
Water Quality – ½ 2-yr per ODOT Isopluvial	1.11
CWS 2-yr	2.5
CWS 10-yr	3.45
CWS 25-yr	3.9
100-yr	4.5

3.2 Water Quality Design Requirements

Clean Water Services (CWS) is the local permitting agency for stormwater discharges from the project.

The following information summarizes these water quality parameters below:

Impervious Area (Onsite + ROW) = 107909 SF
Area * 0.03' = 3237 CF Required

Max Outflow = 0.019 CFS

Water quality treatment in the proposed design is performed by capturing and treating the required water quality volume of each storm event. This is accomplished by sizing the lowest orifice and setting its elevation to retain the 3237 CF of water to release less than the 0.019 CFS rate.

3.3 Water Quantity Design Goals

The current flow control standards of the existing facility are limiting the peak discharge in the developed condition to match the pre-industrial peak discharge or release less than ½ the 2-yr, 10-yr, and 25-yr frequency storm events. The goal of this project is to meet current CWS flow control performance standards.

3.4 Existing Flow Control

The current system has no discharge. Previous construction removed the piping and connections to the discharge pipe running East to the wetland area of Council Creek.

3.5 Proposed Facility Flow Control Design

The proposed storm pond system discharges are designed to meet the peak flow requirements for the ½ of the 2-yr, 10-yr, and 25-yr events. The proposed facility outlets to a flow control manhole that consist of two orifices (0.96-inch and 1.65-inch) and an overflow weir with a crest height of 3-ft. The control manhole will outlet to an existing 36” storm line along East Baseline Street before the runoff eventually outfalls to the wetland area of Council Creek.

See the following table for combined pond flow control performance of the system:

24-Hour Storm Event	Pre-Industrial (Target) Peak Flow (cfs)	Post-Project Peak Release (cfs)
CWS ½ of 2-yr	0.157	0.157
CWS 10-yr	0.723	0.464
CWS 25-yr	0.943	0.701

3.6 Gravity Pipe Conveyance Design

Gravity conveyance pipes for the project have been designed using manning’s equation to pass the 25-year storm event at full or less than full flow.

3.7 Storm System Outfall Design

The proposed facility will outlet to a control structure before it outfalls to an existing 36” storm line located on East Baseline Street. The existing pipe will convey the stormwater before it is eventually discharges into the wetland area of Council Creek.

4.0 OFFSITE CONSIDERATIONS

4.1 Downstream Drainage

This project will reduce peak flows during large storm events to predeveloped conditions. Therefore, it is not anticipated that the downstream path is at risk of damage due to the project.

4.2 Flood Hazard Risk

The project’s hydraulic model evaluated an additional storm using the CWS 100-year storm depth. The orifice sizes for the storm facility system were sized to accommodate the 100-year storm; however, in this event, flow is not limited to the pre-developed conditions. Therefore, flooding of the system is not anticipated.

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Appendix

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 Washington County, Oregon

July 18, 2023

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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Contents

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Map Scale: 1:936 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 10 20 40 60

Feet
0 45 90 180 270

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: Washington County, Oregon
Survey Area Data: Version 22, 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: 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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
37A	Quatama loam, 0 to 3 percent slopes	0.4	12.3%
37B	Quatama loam, 3 to 7 percent slopes	1.4	48.1%
2027A	Verboort silty clay loam, 0 to 3 percent slopes	1.2	39.6%
Totals for Area of Interest		**3.0**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or

landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Washington County, Oregon

37A—Quatama loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 21zl
Elevation: 140 to 250 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Quatama and similar soils: 85 percent
Minor components: 4 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Quatama

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy alluvium

Typical profile

H1 - 0 to 15 inches: loam
H2 - 15 to 30 inches: clay loam
H3 - 30 to 62 inches: loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 24 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Ecological site: R002XC008OR - Valley Terrace Group
Forage suitability group: Moderately Well Drained < 15% Slopes (G002XY004OR)
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

Minor Components

Huberly

Percent of map unit: 4 percent

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

37B—Quatama loam, 3 to 7 percent slopes

Map Unit Setting

National map unit symbol: 21zm
Elevation: 140 to 250 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Quatama and similar soils: 85 percent
Minor components: 4 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Quatama

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy alluvium

Typical profile

H1 - 0 to 15 inches: loam
H2 - 15 to 30 inches: clay loam
H3 - 30 to 62 inches: loam

Properties and qualities

Slope: 3 to 7 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 24 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C

Ecological site: R002XC008OR - Valley Terrace Group
Forage suitability group: Moderately Well Drained < 15% Slopes (G002XY004OR)
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

Minor Components

Huberly
Percent of map unit: 4 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

2027A—Verboort silty clay loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 2mj15
Elevation: 150 to 300 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Verboort and similar soils: 94 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Verboort

Setting
Landform: Flood plains on terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Loamy alluvium over silty and clayey glaciolacustrine deposits

Typical profile
Ap - 0 to 8 inches: silty clay loam
A - 8 to 12 inches: silty clay loam
E - 12 to 19 inches: silty clay loam
2Btg - 19 to 28 inches: clay
2BCtg - 28 to 33 inches: silty clay
2Cg - 33 to 60 inches: silty clay loam

Properties and qualities
Slope: 0 to 3 percent

Depth to restrictive feature: 16 to 26 inches to abrupt textural change
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 to 8 inches
Frequency of flooding: NoneFrequent
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Ecological site: R002XC007OR - Valley Swale Group
Forage suitability group: Poorly Drained (G002XY006OR)
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Minor Components

Waldo

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

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Preliminary Water Quality Calculations

Project: U-Haul Cornelius

Date: 8-Feb

Impervious areas:

Streets & Sidewalks	98000	sf
Offsite ROW	9909	sf
	107909	sf total

Required Water Quality Storage:

Impervious Area * 0.03' = Required Storage

Storage (cf) = 3237 cf

Water Quality Flow:

WQF= WQV/(4 hours * 60min * 60sec)

WQF = 0.225 cfs

= 101 gpm

Extended Dry Detention Drawdown Rate:

WQV/(48 hours * 60min * 60sec)

WQD = 0.019 cfs

Pond Storage Calculations:

Elev	*Surf Area*	*Storage*
(ft)	*(sq ft)*	*(cu ft)*
0	3600	0.00
0.05	3639	180.98
0.10	3678	363.91
0.15	3718	548.82
0.20	3757	735.70
0.25	3797	924.57
0.30	3837	1115.43
0.35	3877	1308.29
0.40	3918	1503.17
0.45	3958	1700.08
0.50	3999	1899.01
0.55	4040	2099.98
0.60	4081	2303.00
0.65	4122	2508.08
0.70	4164	2715.23
0.75	4205	2924.45
0.80	4247	3135.76
0.85	4289	3349.16

Q=CA(2gH)^.5

Orifice Sizing:

Orifice coefficient =		0.62
	Qavg =	0.019
	2/3 WQH =	0.55
	Area (sf) =	0.005
Diameter (in.		**0.96**
	WQVH =	0.83
	2/3 WQH =	0.55

STORAGE ROUTING

Project: *UH Cornelius*
Project Number: *23836*
Date: *2/9/24*
Basin: *Council Creek*
Event: *2 yr*

INFLOW HYDROGRAPH

Hydrograph Data:	***Pre-***	***Post-***	
Onsite Area + ROW Area =	**142553**	**142553**	SF
Onsite Area + ROW Area =	3.27	3.27	acres
Pt =	**2.5**	2.5	inches
dt =	2	2	min
Tc =	**30**	**24**	min
w =	0.032258	0.04	Rout. Con.

Hydrograph Results:

Pre-Developed Peak Runoff:	**0.313**	**cfs**
Pre Developed Total Volume:	9130.6	CF
Post-Developed Peak Runoff:	**1.35**	**cfs**
Post Developed Total Volume:	23738.4	CF

PRE-DEVELOPED		
Pervious Area:		
Area =	3.27	acres
CN =	**78**	
S =	2.82	
0.2S =	0.56	

Impervious Area:		
Area =	**0**	SF
Area =	0.00	acres
CN =	98	
S =	0.20	
0.2S =	0.04	

POST-DEVELOPED		
Pervious Area:		
Area =	0.7953	acres
CN =	**86**	
S =	1.63	
0.2S =	0.33	

Impervious Area:		
Area =	**107909**	SF
Area =	2.4772	acres
CN =	98	
S =	0.20	
0.2S =	0.04	

POND ROUTING

Pond Data:

Bottom Length	**90.0**	FT
Bottom Width	**40.0**	FT
Side Slope	**3**	Horizontal: 1 Vertical
Bottom Area	**3600**	SF
Depth of Effective Side Perc	**0**	FT
Soil Media Depth	**1.5**	FT
Gravel Layer Depth	**0**	FT
Soil Media porosity	**25%**	
Gravel Layer porosity	**40%**	
Infiltration Rate	**0**	in/hr
Infli Safety Factor	**2**	

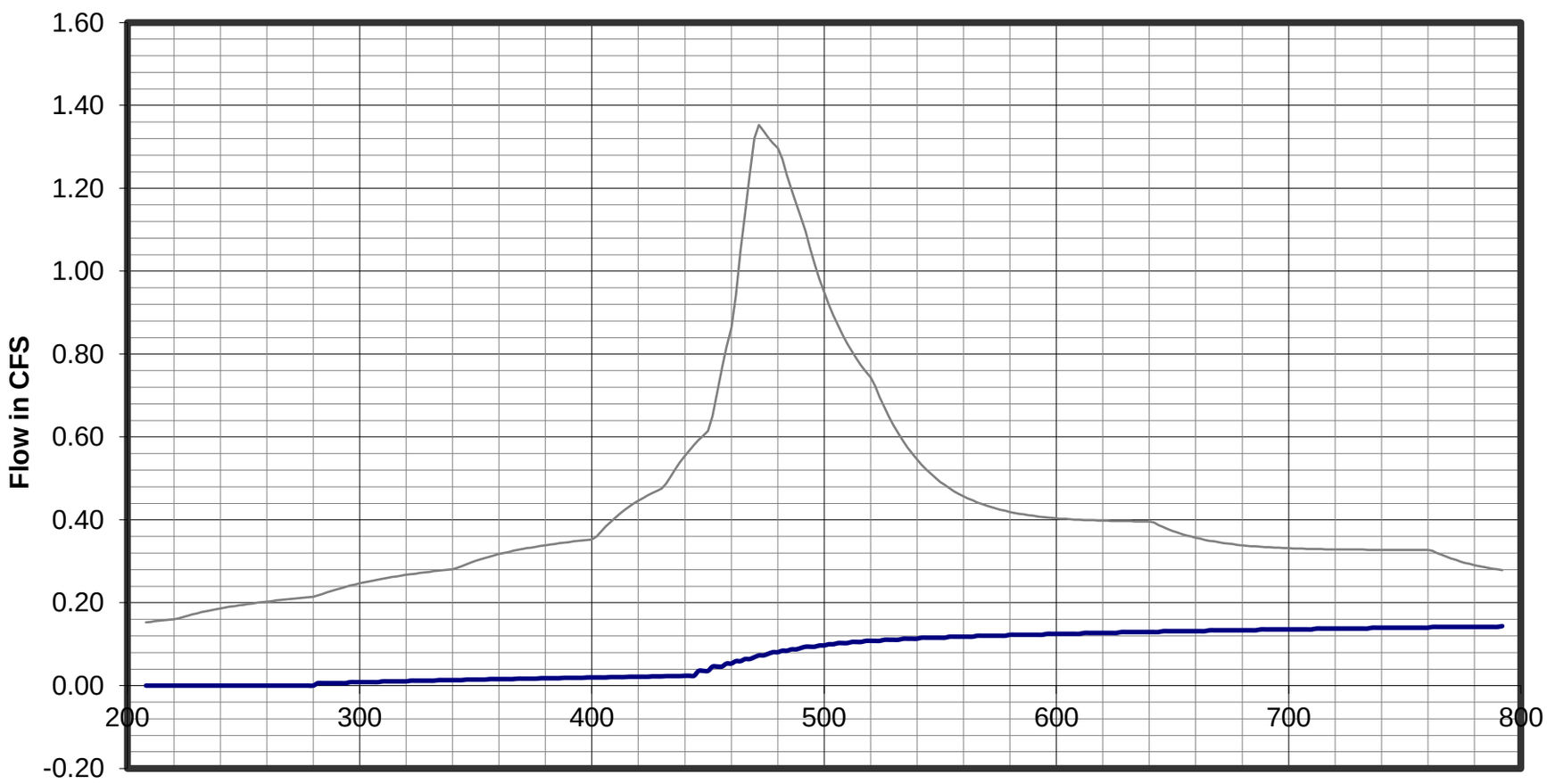
Outlet Data:

Orif1 A =	0.01	sq. ft.	Broad Crested		
Orif1 E =	**0**		Weir1 L =		feet
Dia 1 =	**0.96**	inches	Weir1 E =		
Orif2 A =	0.01	sq. ft.	Rectangular		
Orif2 E =	**0.83**		Weir2 L =	**3**	feet
Dia 2 =	**1.65**	inches	Weir2 E =	**3.5**	
Orif3 A =	0.00	sq. ft.			
Orif3 E =					
Dia 3 =		inches			

Routing Results:

MAX STORAGE =	**15193.4**
MAX OUTLET =	**0.157**
MAX Infiltration =	**0.000**
MAX Bypass =	**0.157**
MAX Depth =	**2.85**

BioCell Inflow/Outflow Hydrograph



STORAGE ROUTING

Project: *UH Cornelius*
Project Number: *23836*
Date: *2/9/24*
Basin: *BASIN*
Event: *10 yr*

INFLOW HYDROGRAPH

Hydrograph Data:	***Pre-***	***Post-***	
Onsite Area + ROW Area =	**142553**	**142553**	SF
Onsite Area + ROW Area =	3.27	3.27	acres
Pt =	**3.45**	3.45	inches
dt =	2	2	min
Tc =	**30**	**24**	min
w =	0.032258	0.04	Rout. Con.

Hydrograph Results:

Pre-Developed Peak Runoff:	**0.723**	**cfs**
Pre Developed Total Volume:	16967.9	CF
Post-Developed Peak Runoff:	**1.97**	**cfs**
Post Developed Total Volume:	34474.5	CF

PRE-DEVELOPED

Pervious Area:		
Area =	3.27	acres
CN =	**78**	
S =	2.82	
0.2S =	0.56	

POST-DEVELOPED

Pervious Area:		
Area =	0.7953	acres
CN =	**86**	
S =	1.63	
0.2S =	0.33	

Impervious Area:		
Area =	**0**	SF
Area =	0.0000	acres
CN =	98	
S =	0.20	
0.2S =	0.04	

Impervious Area:		
Area =	**107909**	SF
Area =	2.4772	acres
CN =	98	
S =	0.20	
0.2S =	0.04	

POND ROUTING

Pond Data:

Bottom Length	**90.0**	FT
Bottom Width	**40.0**	FT
Side Slope	**3**	Horizontal: 1 Vertical
Bottom Area	**3600**	SF
Depth of Effective Side Perc	**0**	FT
Soil Media Depth	**1.5**	FT
Gravel Layer Depth	**0**	FT
Soil Media porosity	**25%**	
Gravel Layer porosity	**40%**	
Infiltration Rate	**0**	in/hr
Infli Safety Factor	**2**	

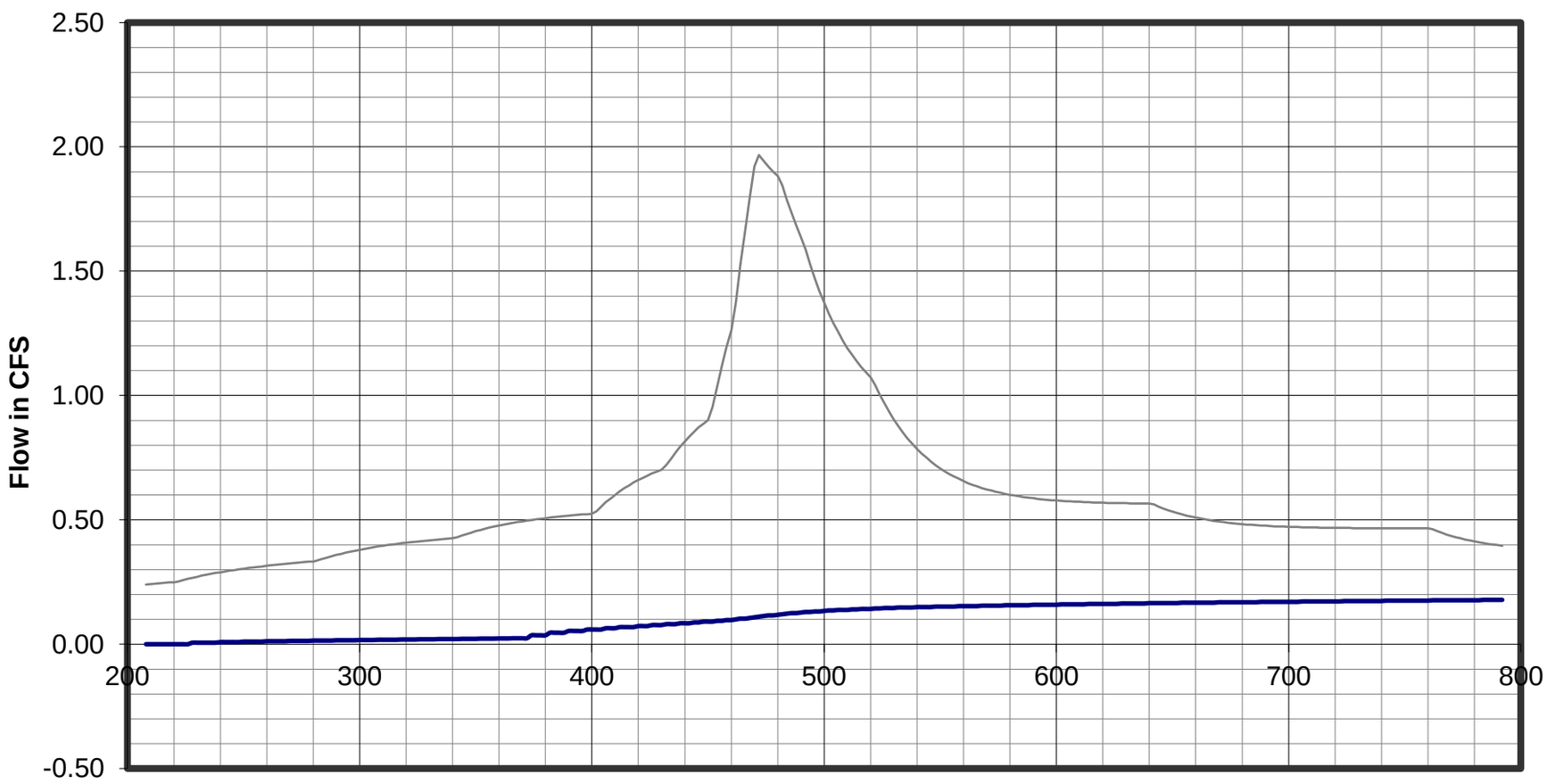
Outlet Data:

Orif1 A =	0.01	sq. ft.	Broad Crested		
Orif1 E =	**0**		Weir1 L =		feet
Dia 1 =	**0.96**	inches	Weir1 E =		
Orif2 A =	0.01	sq. ft.	Rectangular		
Orif2 E =	**0.83**		Weir2 L =	**3**	feet
Dia 2 =	**1.65**	inches	Weir2 E =	**3.5**	
Orif3 A =	0.00	sq. ft.			
Orif3 E =					
Dia 3 =		inches			

Routing Results:

MAX STORAGE =	**19943.7**
MAX OUTLET =	**0.464**
MAX Infiltration =	**0.000**
MAX Bypass =	**0.464**
MAX Depth =	**3.600**

BioCell Inflow/Outflow Hydrograph



STORAGE ROUTING

Project: *UH Cornelius*
Project Number: *23836*
Date: *2/9/24*
Basin: *BASIN*
Event: *25 yr*

INFLOW HYDROGRAPH

Hydrograph Data:	***Pre-***	***Post-***	
Onsite Area + Offsite Area =	**142553**	**142553**	SF
Onsite Area + Offsite Area =	3.27	3.27	acres
Pt =	**3.9**	3.9	inches
dt =	2	2	min
Tc =	**30**	**24**	min
w =	0.032258	0.04	Rout. Con.

Hydrograph Results:

Pre-Developed Peak Runoff:	**0.943**	**cfs**
Pre Developed Total Volume:	21035.6	CF
Post-Developed Peak Runoff:	**2.26**	**cfs**
Post Developed Total Volume:	39617.4	CF

PRE-DEVELOPED

Pervious Area:		
Area =	3.2726	acres
CN =	**78**	
S =	2.82	
0.2S =	0.56	

Impervious Area:

Area =	**0**	SF
Area =	0.0000	acres
CN =	98	
S =	0.20	
0.2S =	0.04	

POST-DEVELOPED

Pervious Area:		
Area =	0.7953	acres
CN =	**86**	
S =	1.63	
0.2S =	0.33	

Impervious Area:

Area =	**107909**	SF
Area =	2.4772	acres
CN =	98	
S =	0.20	
0.2S =	0.04	

POND ROUTING

Pond Data:

Bottom Length	**90.0**	FT
Bottom Width	**40.0**	FT
Side Slope	**3**	Horizontal: 1 Vertical
Bottom Area	**3600**	SF
Depth of Effective Side Perc	**0**	FT
Soil Media Depth	**1.5**	FT
Gravel Layer Depth	**0**	FT
Soil Media porosity	**25%**	
Gravel Layer porosity	**40%**	
Infiltration Rate	**0**	in/hr
Infli Safety Factor	**2**	

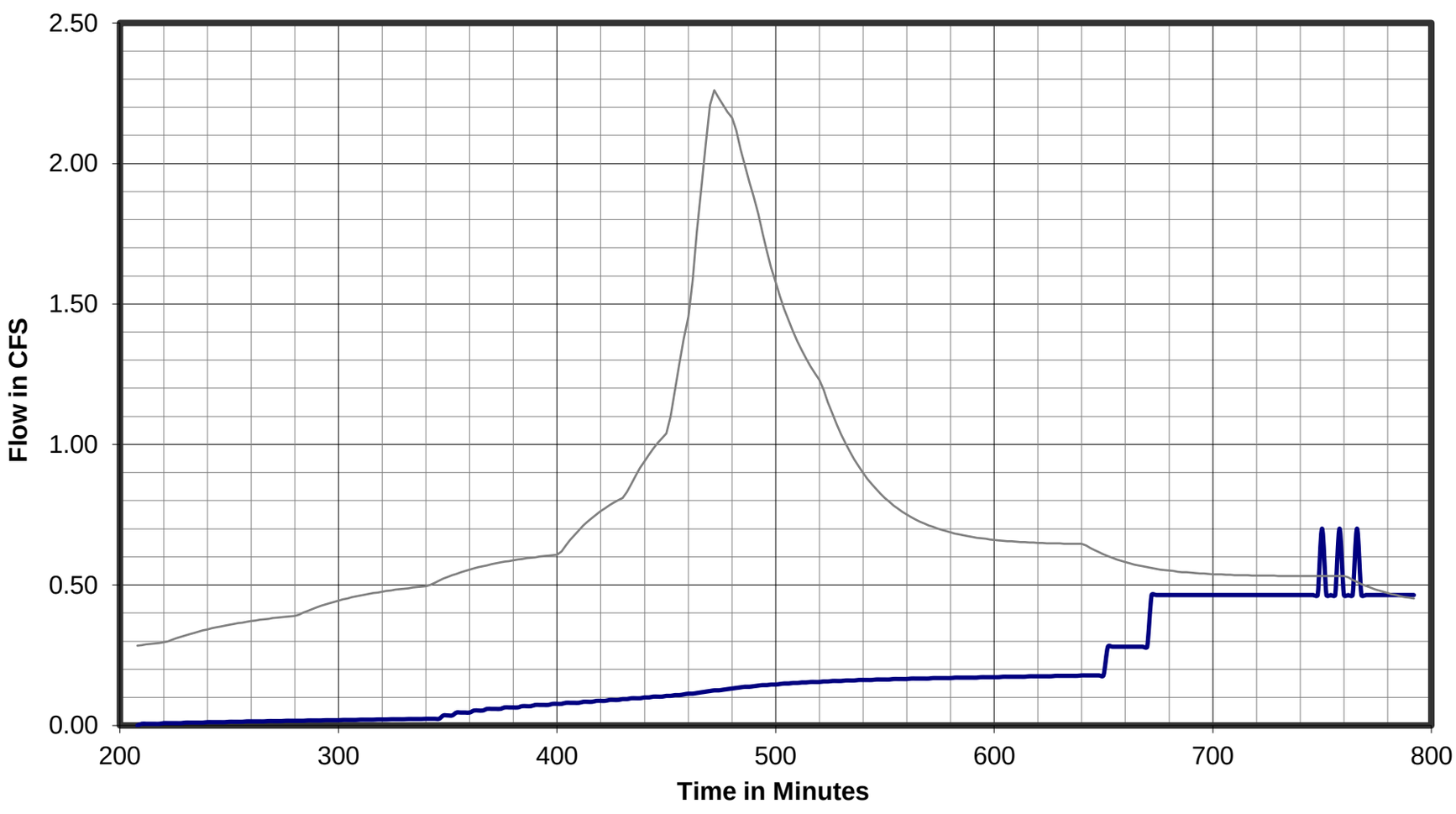
Outlet Data:

Orif1 A =	0.01	sq. ft.	Broad Crested		
Orif1 E =	**0**		Weir1 L =		feet
Dia 1 =	**0.96**	inches	Weir1 E =		
Orif2 A =	0.01	sq. ft.	Rectangular		
Orif2 E =	**0.83**		Weir2 L =	**3**	feet
Dia 2 =	**1.65**	inches	Weir2 E =	**3.5**	
Orif3 A =	0.00	sq. ft.			
Orif3 E =					
Dia 3 =		inches			

Routing Results:

MAX STORAGE =	**20289.2**
MAX OUTLET =	**0.701**
MAX Infiltration =	**0.000**
MAX Bypass =	**0.701**
MAX Depth =	**3.650**

BioCell Inflow/Outflow Hydrograph



STORAGE ROUTING

Project: *UH Cornelius*
Project Number: *23836*
Date: *2/9/24*
Basin: *BASIN*
Event: *100 yr*

INFLOW HYDROGRAPH

Hydrograph Data:	***Pre-***	***Post-***	
Onsite Area + Offsite Area =	**142553**	**142553**	SF
Onsite Area + Offsite Area =	3.27	3.27	acres
Pt =	**4.5**	4.5	inches
dt =	2	2	min
Tc =	**30**	**24**	min
w =	0.032258	0.04	Rout. Con.

Hydrograph Results:

Pre-Developed Peak Runoff:	**1.252**	**cfs**
Pre Developed Total Volume:	26709.6	CF
Post-Developed Peak Runoff:	**2.653**	**cfs**
Post Developed Total Volume:	46511.9	CF

PRE-DEVELOPED

Pervious Area:		
Area =	3.27	acres
CN =	**78**	
S =	2.82	
0.2S =	0.56	

Impervious Area:

Area =	**0**	SF
Area =	0.0000	acres
CN =	98	
S =	0.20	
0.2S =	0.04	

POST-DEVELOPED

Pervious Area:		
Area =	0.7953	acres
CN =	**86**	
S =	1.63	
0.2S =	0.33	

Impervious Area:

Area =	**107909**	SF
Area =	2.4772	acres
CN =	98	
S =	0.20	
0.2S =	0.04	

POND ROUTING

Pond Data:

Bottom Length	**90.0**	FT
Bottom Width	**40.0**	FT
Side Slope	**3**	Horizontal: 1 Vertical
Bottom Area	**3600**	SF
Depth of Effective Side Perc	**0**	FT
Soil Media Depth	**1.5**	FT
Gravel Layer Depth	**0**	FT
Soil Media porosity	**25%**	
Gravel Layer porosity	**40%**	
Infiltration Rate	**0**	in/hr
Infli Safety Factor	**2**	

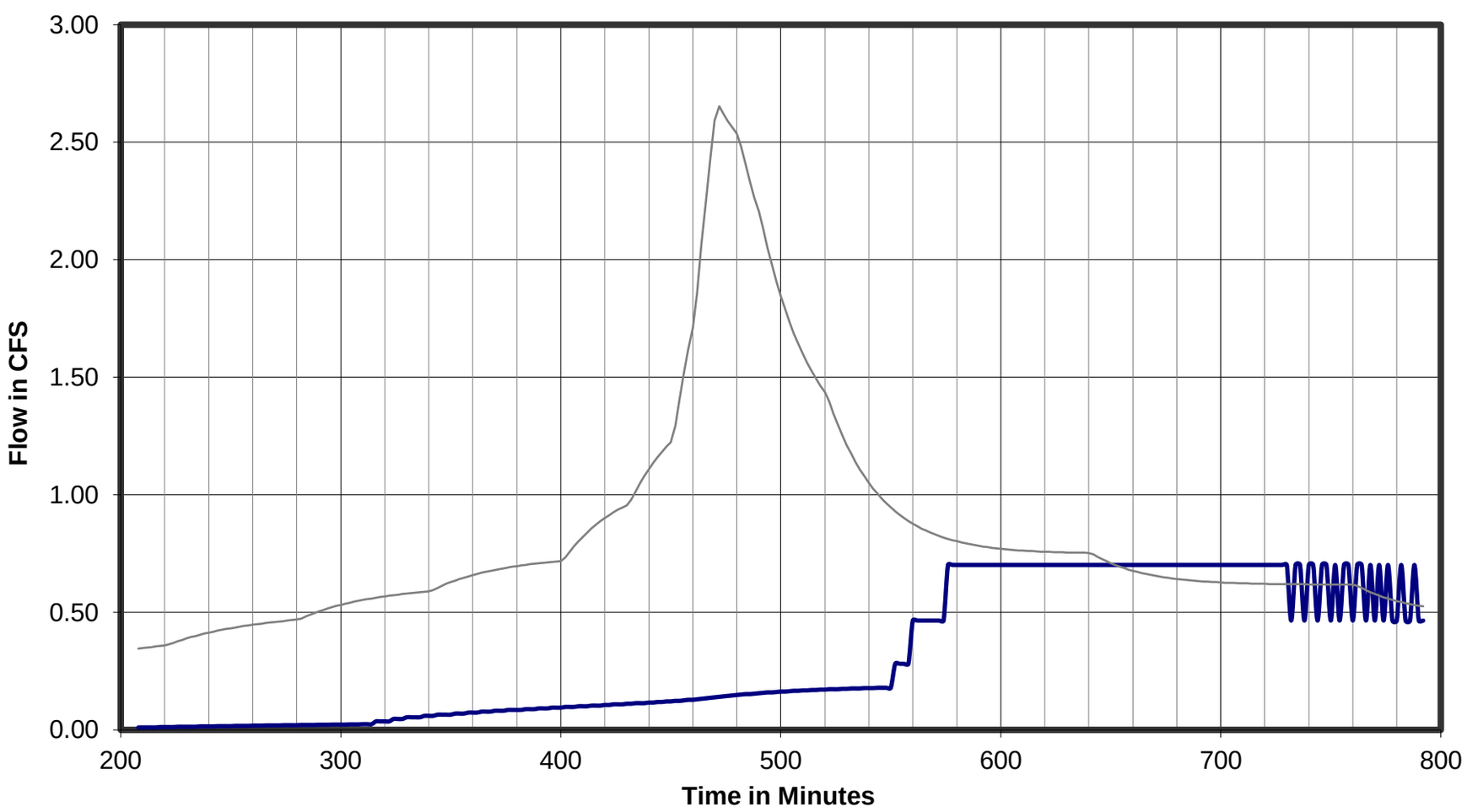
Outlet Data:

Orif1 A =	0.01	sq. ft.	Broad Crested		
Orif1 E =	**0**		Weir1 L =		feet
Dia 1 =	**0.97**	inches	Weir1 E =		
Orif2 A =	0.01	sq. ft.	Rectangular		
Orif2 E =	**0.83**		Weir2 L =	**3**	feet
Dia 2 =	**1.65**	inches	Weir2 E =	**3.5**	
Orif3 A =	0.00	sq. ft.			
Orif3 E =					
Dia 3 =		inches			

Routing Results:

MAX STORAGE =	**20556.7**
MAX OUTLET =	**0.702**
MAX Infiltration =	**0.000**
MAX Bypass =	**0.702**
MAX Depth =	**3.650**

BioCell Inflow/Outflow Hydrograph



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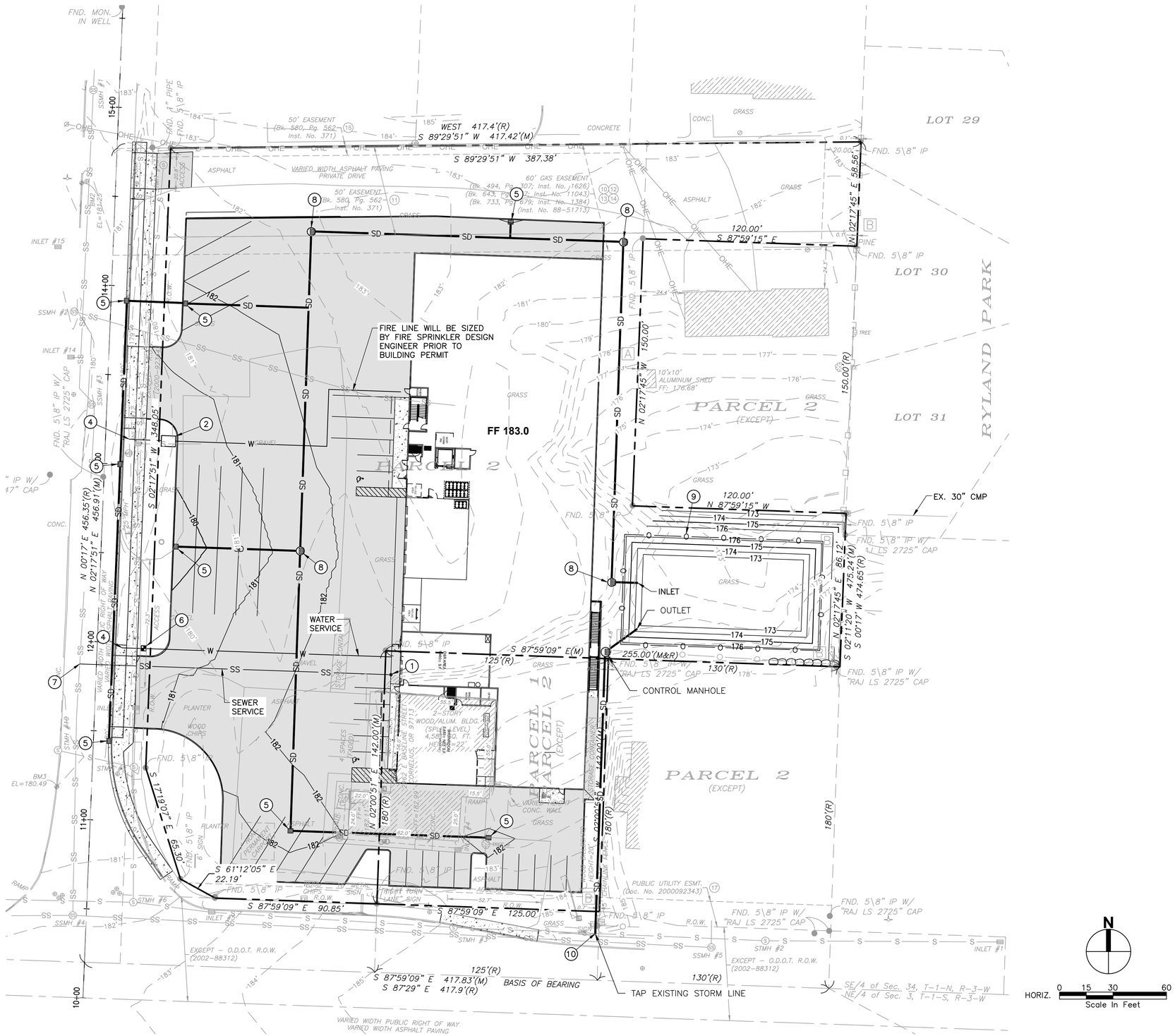

GENERAL NOTES

1. CONTRACTOR TO INSTALL PIPE PER CITY OF CORNELIUS STANDARDS

(#) CONSTRUCTION NOTES

1. INSTALL SANITARY CLEANOUT PER CITY OF CORNELIUS DETAIL
2. INSTALL DOUBLE CHECK DETECTOR ASSEMBLY PER CITY OF CORNELIUS DETAIL
3. CONNECT STORM LINE TO EXISTING MANHOLE
4. CONNECT WATER LINE TO EXISTING WATER MAIN
5. INSTALL CATCH BASIN PER CITY OF CORNELIUS DETAIL
6. WATER METER PER CITY OF CORNELIUS DETAIL
7. CONNECT SEWER SERVICE TO EXISTING SEWER LINE
8. INSTALL STORM MANHOLE PER CITY OF CORNELIUS DETAIL
9. INSTALL CHAIN LINK FENCE PER CLEAN WATER SERVICES DETAIL 792
10. INSTALL INSERTA TEE PER CWS DETAIL 530

LEGEND

W	PROPOSED WATER LINE
W	PROPOSED FIRE PROTECTION LINE
SS	PROPOSED SANITARY SEWER LINE
SD	PROPOSED STORMWATER LINE

DATE	REVISION	SYM

PACE Engineers
4500 Kruse Way, Suite 250
Lake Oswego, OR 97035
p. 503.597.3222
www.paceengrs.com

REGISTERED PROFESSIONAL ENGINEER
18558
PRELIMINARY
OREGON
JULY 6, 1986
BRIAN D. LEE
RENEWS: 12/31/2024

U-HAUL INTERNATIONAL, INC.

2727 N. CENTRAL AVE.
PHOENIX, AZ 85004
(541) 520-5479

U-HAUL MOVING & STORAGE - CORNELIUS STORE 704072

UTILITY PLAN

SCALE:	DATE:
AS SHOWN	DEC 2023
DESIGNED BY:	CHECKED BY:
MAA	BDL

JOB NUMBER **23836.00**

DWG NAME: P23836 UTL

SHEET C5 OF 11

FILE NAME: P:\LKO\P23\23836_AMERCO_UHAUL CORNELIUS LU\CAD\ENGINEERING\SHEETS\P23836 UTL.DWG
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PLOT TIME: 2/8/2024 9:11 AM
USER NAME: ASHLEY TELLIN
XREF FILES: ####