MEMORANDUM

To: Dr. Charles Andrews
S. S. Papadopulos & Associates, Inc.
7944 Wisconsin Avenue
Bethesda, MD 20814

Sarah Prowell, R.G.
Prowell Environmental, Inc.
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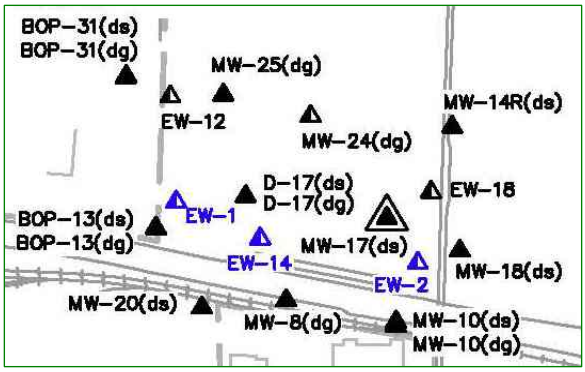
Date: July 13, 2012

RE: Work Plan for EW-1 Well Liner Installation
Cascade Corporation, TSA Remedy

Scope, Objective, and Rationale

This memorandum summarizes plans to install a permanent well liner in TSA remedy extraction well EW-1 on July 18, 2012. The liner is being installed to improve well durability with respect to well cleaning and maintenance activities that are planned during the upcoming years.



As shown in Figure 1, EW-1 has required three well cleaning events during the last six years to maintain an extraction rate of approximately 30 gallons per minute or greater. Similar cleanings will likely be needed in the future. The original well screen is constructed of stainless steel, which is fully compatible with long term well maintenance plans; however the screen is joined to Schedule 40 PVC blank casing which extends from the top of screen to the top of well. As for other similarly constructed TSA extraction wells, the PVC blank casing is more susceptible to wear than the steel screen. A May 2012 downhole video scan of EW-1 showed increased PVC casing wear, relative to February 2011 pre- and post-sonar cleaning videos. The increased PVC wear primarily occurred at two depths:

- 109 feet (ft) below ground surface (bgs) at mid-section of a PVC casing length, where a 6 inch long arcuate "tear" was previously observed before and after well cleaning in February 2011, but was of greater length with additional splays as of May 2012
- 150 ft bgs at the joint between the stainless steel well screen and PVC blank casing, where it appeared equipment may have caught on the PVC end pipe and fractured short segments of the PVC upon installation or removal.

Consistent with well liner installation methods used in TSA extraction well EW-14 in 2010, a well liner will be installed in EW-1 as a protective measure before further cleaning is performed in this well.

Well Liner Design

This will be accomplished by installing a 4 inch diameter stainless steel liner assembly inside the original 6 inch diameter EW-1 well screen and blank casing assembly. The liner assembly will consist of a flush-threaded bottom sump, well screen, blank casing, and centralizers and will extend across the full length of the original well assembly. The liner bottom sump, screen, and blank will be set at depths approximately replicating those of the original well and the liner screen slot size will replicate the 0.04 size of the original well screen. Clean silica sand filter pack will be placed between the 6 inch well and 4 inch liner assemblies to form a sand pack extending from total well depth to approximately 30 ft above top of screen. The sand pack will consist of two sizes, including 6 X 9 sand which will extend from the well bottom to within a few ft of the top of screen. It will be overlain by 8 X 12 sand which will extend to approximately 30 ft above the top of screen. The 6 X 9 size is larger than that used for the original well screen filter pack (8 X 12) and is selected to minimize potential restriction of groundwater flowing through both the original and liner sand packs into the well. Design plans are summarized in Table 1 and are shown in Figure 2. The original EW-1 well log is included in Attachment A.

The liner installation will be performed by Westerberg Drilling (Molalla, OR), an Oregon-licensed driller, and will be conducted under Oregon Water Resource Department start card authorization and in accordance with applicable Oregon Administrative Rules of Chapter 690, Division 240.

After shutdown and removal of the EW-1 pump, transducer, and piezometer assemblies, the following liner installation procedures will be implemented:

- Measure total well depth to confirm whether sediment accumulation is present and bail sediment from the well, if needed
- Decontaminate liner assembly materials that are not delivered in clean plastic containment, using either hot water pressure, steam clean, or liquinox-water washing and clean rinse methods
- Carefully thread and lower the liner assembly into the well and measure total installation depth with a clean weighted tape

Slowly pour clean silica sand filter pack into the annular space between the 6 inch well and 4 inch liner assemblies, measuring frequently to ensure bridging does not occur and to confirm fill depth. The lined well will be surged with a surge block at multiple intervals throughout the screen length during sand placement to verify settlement of sand pack.

Well Downhole Videos and Cleaning

A downhole video scan will be performed after liner installation is complete. The well will then be sonar cleaned by Waterwell Developing & Surveys (Umatilla, OR), consistent with prior well cleaning plans approved by DEQ on May 16, 2012. Following sonar cleaning, EW-1 will be downhole video scanned to confirm liner integrity and will be sand pumped and developed using surge block methods, by

Westerberg Drilling. The EW-1 pump, transducer, and piezometer assemblies will then be reinstalled and pump operation will resume.

EW-1 Pump Schedule

A planned shutdown of approximately 48 to 72 hours is currently scheduled for Wednesday, July 18 through Friday July 20, pending receipt of DEQ approval to proceed.

Reporting

Liner installation and well cleaning records will be presented in the next TSA semiannual report, which will cover the reporting period of April 1 through September 31, 2012.

cc: John Cushing, Cascade Corporation

Enclosures:

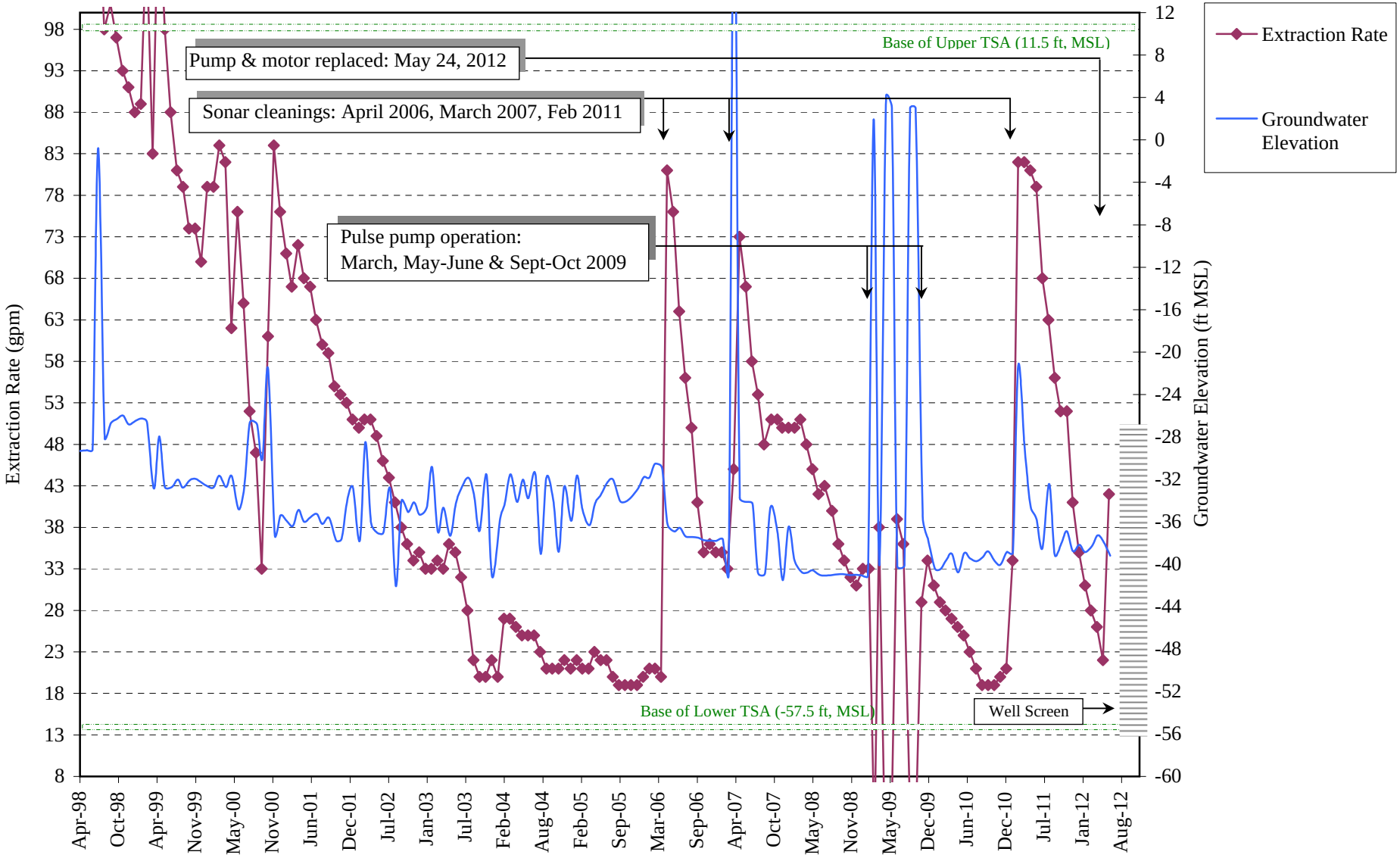
Figure 1. EW-1 Extraction Rate and Water Level Profile

Figure 2. EW-1 Well Construction Details and Liner Design

Table 1. EW-1 Well Construction Details and Liner Design

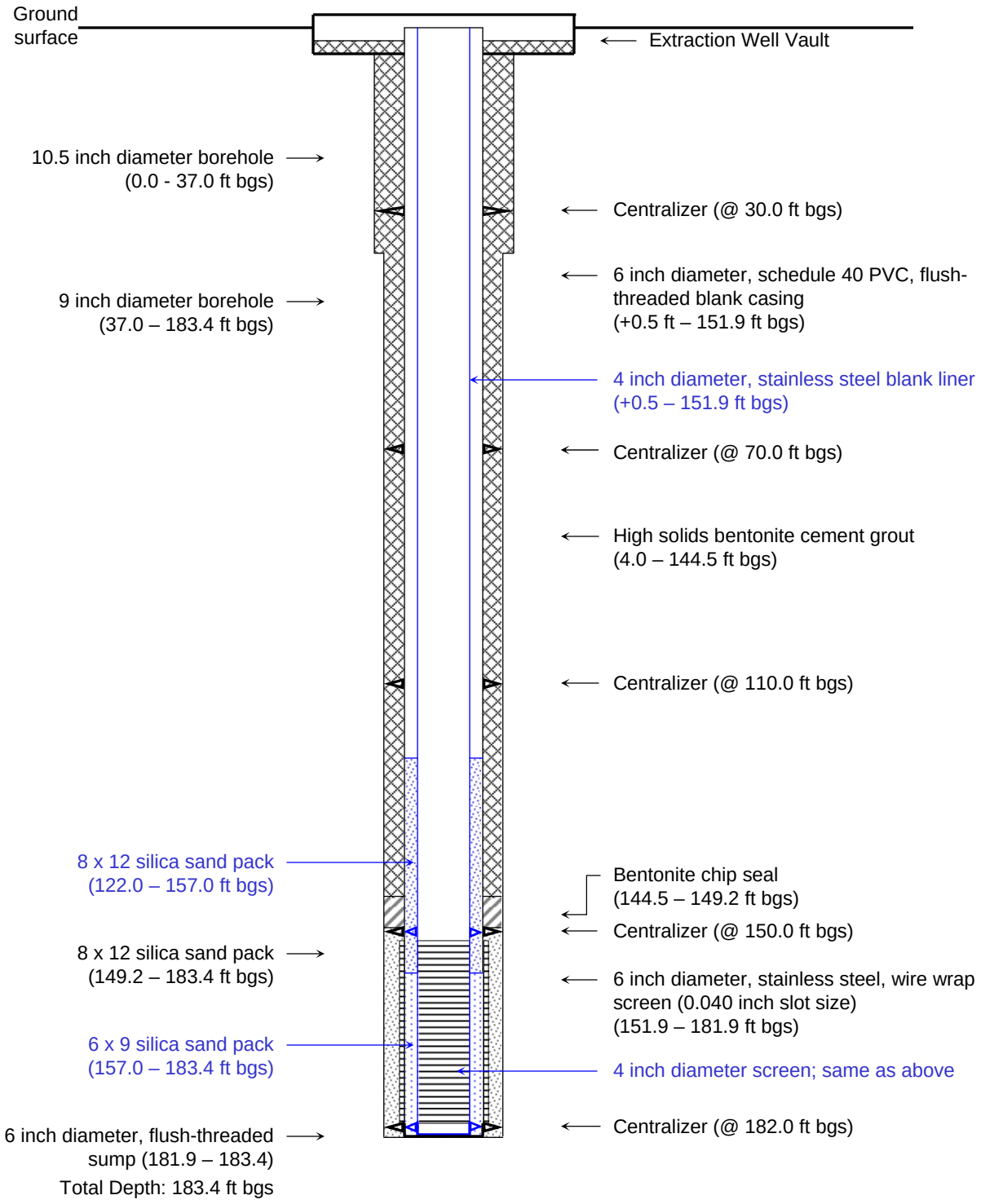
Attachment A. Original EW-1 Well Log

Figure 1
EW-1 Extraction Rate and Water Level Profile
TSA Remedy - East Multnomah County



NOTES: Extraction rates are monthly averages; top of well screen = -28.4 ft, MSL (screen length = 30 ft); water level set point = -40.96 ft, MSL

Fig 1_EW-1 Extrac Rate and WL Profile.xls



Original Well Installation

Well Completion Date:	EMCON, Dec. 6, 1996
Drilling Contractor/Method:	Cascade Drilling / Air Rotary
Ground Surface Elevation:	123.50 ft MSL
Top of Casing Elevation:	124.04 ft MSL

Prowell Environmental, Inc., Portland, Oregon

Figure 2
EW-1 Well Construction Details and Liner Design
TSA Remedy – East Multnomah County

Table 1
EW-1 Well Construction Details and Liner Design
TSA Remedy - East Multnomah County

Well	Date Completed	Ground Elevation	MPE Elevation	Boring Depth	Boring Diameter	Well Depth[a]	Well Diameter	Well Screen Interval	Screen Slot Size	Casing / Screen Material	Sand Pack Interval	Sand Pack Size
		(ft, MSL)	(ft, MSL)	(ft, bgs)	(inches)	(ft, bgs)	(inches)	(ft, bgs)	(inches)		(ft, bgs)	
EW-1 Original	2/7/96	123.50	124.04	182.5	10.5 / 9	183.4	6	151.9 - 181.9	0.040	Sch 40 PVC / Stainless Steel	149.2 - 183.4	8 x 12
EW-1 Liner	Pending	123.50	*124*	-	-	*183.4*	*4*	*151.9 - 181.9*	*0.040*	*Stainless Steel / Stainless Steel*	*122 - 157* *157 - 183.4*	*8 x 12* *6 x 9*

NOTES:

[a] Bottom threaded sump from 181.9 ft bgs to 183.4 ft bgs.

ft, MSL = feet mean sea level; ft, bgs = feet below ground surface.

MPE = Water level reference measuring point elevation (i.e. piezometer stickup within well vault).

Items shown in *italics* are design plans

ATTACHMENT A. Original EW-1 Well Log

LOG OF EXPLORATORY BORING

PROJECT NAME	Cascade	BORING NO.	EW- 1
LOCATION	Troutdale, Oregon	PAGE	1 OF 10
DRILLED BY	Cascade Drilling, Inc.	GROUND ELEV.	123.5
DRILL METHOD	Air Rotary	TOTAL DEPTH	183.40'
LOGGED BY	Bob Williams	DATE COMPLETED	12/07/96

6/98: 124.11 —

SAMPLE NUMBER (SAMPLE TYPE)	PID (in ppm) (RECOVERY PERCENT)	BLOWS PER 6 INCHES (N COMP)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	WELL DETAILS	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
								0 to 6.5 feet: SILTY GRAVEL (GM), brown, rounded, fine-grained, sandstone and basalt gravel with brown silt, moist. (TOPSOIL/ALLUVIUM)
EW1-5 (C)	0			5				
								6.5 to 25.0 feet: GRAVEL (GW), brown, rounded, fine- to medium-grained, cemented basalt gravel with minor quartz and minor sand and silt; cement of olive, fine, micaceous sandstone, moist. (TROUTDALE GRAVEL AQUIFER)
EW1-10 (C)	0			10				@ 10.0 feet: began adding water for drilling.
EW1-15 (C)	0			15				
				20				

REMARKS

(1) C = cutting sample. (2) SS = split-spoon sampler (2-inch diameter brass tube). (3) Reference elevation is ground level. (4) Water samples were collected at 35, 120, 140, 160 and 180 feet. (5) White triangle = approximate depth at which water was encountered during drilling. Black triangle = water level in completed well. (6) Borehole diameter = 10.5-inch from 0 to 37 feet, 9-inch from 37 to 183.4 feet.

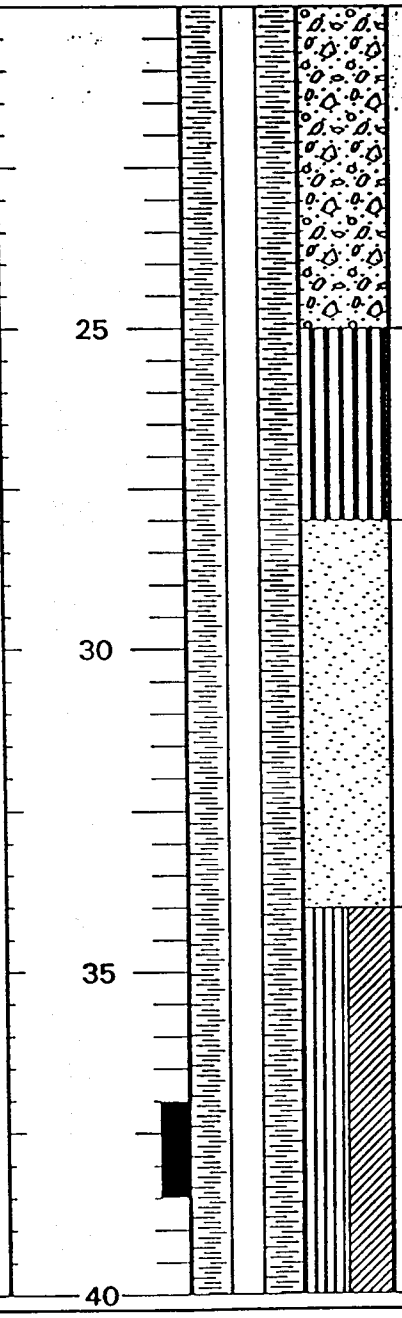
EMCON

LOG OF EXPLORATORY BORING

PROJECT NAME	Cascade	BORING NO.	EW- 1
LOCATION	Troutdale, Oregon	PAGE	2 OF 10
DRILLED BY	Cascade Drilling, Inc.	GROUND ELEV.	
DRILL METHOD	Air Rotary	TOTAL DEPTH	183.40'
LOGGED BY	Bob Williams	DATE COMPLETED	12/07/96

SAMPLE NUMBER (SAMPLE TYPE)	PID (in ppm) (RECOVERY PERCENT)	BLOWS PER 6 INCHES (N COMP)	LITHOLOGIC DESCRIPTION
EW1-20 (C)	0		**6.5 to 25.0 feet: GRAVEL (GW),** continued.
EW1-25 (C)	0.8		**25.0 to 28.0 feet: SILT WITH GRAVEL AND CLAY (MH),** brown, soft, with fine, rounded, basaltic gravel.
EW1-26 (C)	1.5		@ 26.0 feet: became tan in color and indurated; gravel increased to 30 percent.
EW1-28 (C)	1.5		**28.0 to 34.0 feet: SAND (SW),** gray, fine- to medium-grained, cemented, basaltic and quartzitic sand with siltstone fragments and black basalt gravel.
EW1-30 (C)	2		@ 30.0 feet: sand became uncemented.
EW1-35 (C)	1.5		**34.0 to 67.0 feet: SILT AND CLAY (ML/CL),** brown, low to medium plasticity, with fine- to medium-grained basaltic sand, damp. (CONFINING UNIT 1)
EW1-37 (SS)	(100)	7-13-48 (61)	

GROUND WATER LEVELS | DEPTH IN FEET | SAMPLES | WELL DETAILS | LITHOLOGIC COLUMN



REMARKS

(1) C = cutting sample. (2) SS = split-spoon sampler (2-inch diameter brass tube). (3) Reference elevation is ground level. (4) Water samples were collected at 35, 120, 140, 160 and 180 feet. (5) White triangle = approximate depth at which water was encountered during drilling. Black triangle = water level in completed well. (6) Borehole diameter = 10.5-inch from 0 to 37 feet, 9-inch from 37 to 183.4 feet.

LOG OF EXPLORATORY BORING

PROJECT NAME	Cascade	BORING NO.	EW- 1
LOCATION	Troutdale, Oregon	PAGE	3 OF 10
DRILLED BY	Cascade Drilling, Inc.	GROUND ELEV.	
DRILL METHOD	Air Rotary	TOTAL DEPTH	183.40'
LOGGED BY	Bob Williams	DATE COMPLETED	12/07/96

SAMPLE NUMBER (SAMPLE TYPE)	PID (in ppm) (RECOVERY PERCENT)	BLOWS PER 6 INCHES (N COMP)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	WELL DETAILS	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
EW1-40 (C)	0							**34.0 to 67.0 feet: SILT AND CLAY (ML/CL),** continued.
								@ 40.0 feet: dark gray-green silty CLAY.
EW1-45 (C)	0			45				@ 45.0 feet: dark blue-gray clayey SILT.
EW1-50 (C)	0			50				@ 50.0 feet: brown clayey SILT.
EW1-55 (C)	0			55				
				60				

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EMCON

LOG OF EXPLORATORY BORING

PROJECT NAME Cascade
LOCATION Troutdale, Oregon
DRILLED BY Cascade Drilling, Inc.
DRILL METHOD Air Rotary
LOGGED BY Bob Williams

BORING NO. EW- 1
PAGE 4 OF 10
GROUND ELEV.
TOTAL DEPTH 183.40'
DATE COMPLETED 12/07/96

SAMPLE NUMBER (SAMPLE TYPE)	PID (in ppm) (RECOVERY PERCENT)	BLOWS PER 6 INCHES (N COMP)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	WELL DETAILS	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
EW1-60 (C)	0							**34.0 to 67.0 feet: SILT AND CLAY (ML/CL),** continued. @ 60.0 feet: olive with orange and brown mottles, silty CLAY.
EW1-65 (C)	0			65				
EW1-67 (C)	0							@ 67.0 feet: drilling became harder; grades into light brown SANDSTONE. **67.0 to 98.0 feet: SAND (SW),** black, fine- to medium-grained, well graded, well- to poorly-cemented, with minor silt. (TROUTDALE SANDSTONE AQUIFER SANDSTONE)
EW1-70 (C)	0			70				
EW1-75 (C)	0			75				@ 75.0 feet: becomes poorly cemented.
				80				

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EMCON

LOG OF EXPLORATORY BORING

PROJECT NAME	Cascade	BORING NO.	EW- 1
LOCATION	Troutdale, Oregon	PAGE	5 OF 10
DRILLED BY	Cascade Drilling, Inc.	GROUND ELEV.	
DRILL METHOD	Air Rotary	TOTAL DEPTH	183.40'
LOGGED BY	Bob Williams	DATE COMPLETED	12/07/96

SAMPLE NUMBER (SAMPLE TYPE)	PID (in ppm) (RECOVERY PERCENT)	BLOWS PER 6 INCHES (N COMP)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	WELL DETAILS	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
EW1-80 (C)	0			85				67.0 to 98.0 feet: SAND (SW), continued.
EW1-85 (C)	0							
EW1-90 (C)				90				
EW1-95 (C)				95				
				100				98.0 to 112.0 feet: SILT WITH SAND AND GRAVEL (ML), light olive, with significant coarse sand and fine gravel composed of basalt, minor quartz, and siltstone.

REMARKS

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LOG OF EXPLORATORY BORING

PROJECT NAME	Cascade	BORING NO.	EW- 1
LOCATION	Troutdale, Oregon	PAGE	6 OF 10
DRILLED BY	Cascade Drilling, Inc.	GROUND ELEV.	
DRILL METHOD	Air Rotary	TOTAL DEPTH	183.40'
LOGGED BY	Bob Williams	DATE COMPLETED	12/07/96

SAMPLE NUMBER (SAMPLE TYPE)	PID (in ppm) (RECOVERY PERCENT)	BLOWS PER 6 INCHES (N COMP)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	WELL DETAILS	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
EW1-100 (C)	1.5							**98.0 to 112.0 feet: SILT WITH SAND AND GRAVEL (ML),** continued.
EW1-105 (C)	0.8		▽ 12/6/96 ▼ 12/5/96	105				
EW1-110 (C)	0.5			110				
EW1-115 (C)	0.8			115				**112.0 to 181.0 feet: SANDY GRAVEL (GW),** gray and black, angular to well-rounded, fine- to medium-grained basaltic gravel with minor quartz and fine- to coarse-grained basaltic sand, minor evidence of orange/brown, micaceous, palagonite sandstone cementation. (TROUTDALE SANDSTONE AQUIFER - CONGLOMERATE)
				120				

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LOG OF EXPLORATORY BORING

PROJECT NAME	Cascade	BORING NO.	EW- 1
LOCATION	Troutdale, Oregon	PAGE	7 OF 10
DRILLED BY	Cascade Drilling, Inc.	GROUND ELEV.	
DRILL METHOD	Air Rotary	TOTAL DEPTH	183.40'
LOGGED BY	Bob Williams	DATE COMPLETED	12/07/96

SAMPLE NUMBER (SAMPLE TYPE)	PID (in ppm) (RECOVERY PERCENT)	BLOWS PER 6 INCHES (N COMP)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	WELL DETAILS	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
EW1-120 (C)	1.5							**112.0 to 181.0 feet: SANDY GRAVEL (GW),** continued.
								@ 122.0 feet: increasing cementation; smoother drilling.
EW1-125 (C)	2.1			125				
EW1-130 (C)	0			130				@ 130.0 feet: increasing cementation.
EW1-135 (C)	0			135				@ 137.0 feet: drilling water becomes clear.
				140				

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LOG OF EXPLORATORY BORING

PROJECT NAME	Cascade	BORING NO.	EW- 1
LOCATION	Troutdale, Oregon	PAGE	8 OF 10
DRILLED BY	Cascade Drilling, Inc.	GROUND ELEV.	
DRILL METHOD	Air Rotary	TOTAL DEPTH	183.40'
LOGGED BY	Bob Williams	DATE COMPLETED	12/07/96

SAMPLE NUMBER (SAMPLE TYPE)	PID (in ppm) (RECOVERY PERCENT)	BLOWS PER 6 INCHES (N COMP)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	WELL DETAILS	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
EW1-140 (C)	1.5							**112.0 to 181.0 feet: SANDY GRAVEL (GW),** continued.
EW1-145 (C)	1			145				
EW1-151.5 (C)	0.5			150				@ 152.0 feet: increase in black GRAVELLY SAND.
EW1-155 (C)	1			155				
				160				

REMARKS

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LOG OF EXPLORATORY BORING

PROJECT NAME	Cascade	BORING NO.	EW- 1
LOCATION	Troutdale, Oregon	PAGE	9 OF 10
DRILLED BY	Cascade Drilling, Inc.	GROUND ELEV.	
DRILL METHOD	Air Rotary	TOTAL DEPTH	183.40'
LOGGED BY	Bob Williams	DATE COMPLETED	12/07/96

SAMPLE NUMBER (SAMPLE TYPE)	PID (in ppm) (RECOVERY PERCENT)	BLOWS PER 6 INCHES (N COMP)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	WELL DETAILS	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
EW1-160 (C)	0			165				**112.0 to 181.0 feet: SANDY GRAVEL (GW),** continued. @ 160.0 feet: increase in black GRAVELLY SAND.
EW1-165 (C)	0			170				@ 168.0 feet: water production of 30 to 40 gpm.
EW1-170 (C)	0			175				@ 172.0 feet: change in drilling character-larger gravels.
EW1-175 (C)	0			180				

REMARKS

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LOG OF EXPLORATORY BORING

PROJECT NAME	Cascade	BORING NO.	EW- 1
LOCATION	Troutdale, Oregon	PAGE	10 OF 10
DRILLED BY	Cascade Drilling, Inc.	GROUND ELEV.	
DRILL METHOD	Air Rotary	TOTAL DEPTH	183.40'
LOGGED BY	Bob Williams	DATE COMPLETED	12/07/96

SAMPLE NUMBER (SAMPLE TYPE)	PID (in ppm) (RECOVERY PERCENT)	BLOWS PER 6 INCHES (N COMP)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	WELL DETAILS	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
EW1-180 (C)	0			185				**112.0 to 181.0 feet: SANDY GRAVEL (GW),** continued.
EW1-181.5 (SS)	0 (100)	13-27-50 (77)		190				**181.0 to 182.5 feet: SILT (ML),** light, blue-gray, very stiff, low plasticity, damp, minor fine micaceous sand. (CONFINING UNIT 2)
				195				Total depth drilled = 182.5 feet. Total depth sampled = 183.0 feet.
				200				**WELL COMPLETION DETAILS:** 0 to 151.9 feet: 6-inch-diameter, flush-threaded, schedule 40 PVC blank riser pipe. 151.9 to 181.9 feet: 6-inch-diameter, stainless-steel, wire wrap screen with 0.040-inch slots. 181.9 to 183.4 feet: 6-inch-diameter, flush-threaded, end cap. 0 to 4.0 feet: 3/8-inch bentonite chips hydrated with potable water. 4.0 to 144.5 feet: Bentonite grout. 144.5 to 149.2 feet: 3/8-inch bentonite chips. 149.2 to 183.4 feet: 8 - 12 mesh silica sand.

REMARKS

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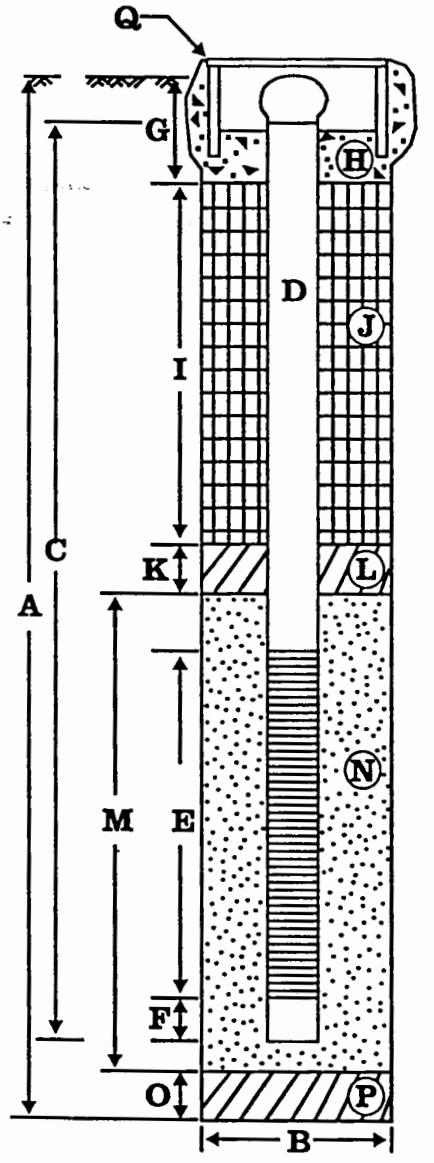
EMCON

WELL DETAILS

Project Number:	40683-008.010/ Task 10	Boring/Well No.:	EW-1
Client Name:	Cascade Corporation	Top of Casing Elev.:	~~123.39~~ 124.04
Project Name:	Cascade	Ground Surface Elev.:	~~123.5~~
Location:	Troutdale, OR	Installation Date:	12-6-96
Driller:	Cascade Drilling Inc.	Permit/Start Card No.:	87611

SP 10/4/10



	Depth (ft, bgs)	Elev. (ft, msl)
Q	0.00	123.5
G	0.11	123.4
H	4.0	119.5
D		
J		
I		
C		
K	144.5	-21.0
L	149.2	-25.7
A	151.9	-28.4
M		
E		
N		
F	181.9	-58.4
	183.4	-59.9
O	183.4	-59.9
P	N/A	N/A
B		

Installed by: Bob Williams

Reviewed by: A. C. Coate

Date: 2-7-97

EXPLORATORY BORING

A. Total depth:	183.4	ft.
B. Diameter:	10.5 inch to 37 ft bgs	
	9 inch to 183.4 bgs	
Drilling method:	Air rotary	

WELL CONSTRUCTION

C. Well casing length:	183.4	ft.
Well casing material:	Schedule 40 PVC	
D. Well casing diameter:	6	in.
E. Well screen length:	30	ft.
Well screen type:	WW SS	
Well screen slot size:	0.040 in.	
F. Well sump/end cap length:	1.5	ft.
G. Surface seal thickness:	4	ft.
H. Surface seal material:	Bentonite chips	
I. Annular seal thickness:	140.5	ft.
J. Annular seal material:	Bentonite grout	
K. Filter pack seal thickness:	4.7	ft.
L. Filter pack seal material:	Bentonite chips	
M. Sand pack thickness:	34.2	ft.
N. Sand pack material:	8-12 silica sand	
O. Bottom material thickness:	N/A	ft.
P. Bottom material:	N/A	
Q. Vault box type:	Flush mount	
Well centralizer depths:	182	ft.
	150	ft.
	110	ft.
	70	ft.
	30	ft.

NOTES: WW = Wire wrap
SS = Stainless steel
N/A = not applicable.

STATE OF OREGON

MONITORING WELL REPORT

(as required by ORS 537.765 & OAR 690-240-095)

AMENDED

RECEIVED 2-2-98

EW-1

Start Card # 87611

Instructions for completing this report are on the last page of this form. MULT52475

(1) OWNER/PROJECT:

WELL NO. L04421

Name Cascade Corporation

Address 2201 NE 201st Ave.

City Troutdale State OR Zip 97060

(2) TYPE OF WORK:

- [x] New construction
- [ ] Alteration (Repair/Recondition)
- [ ] Conversion
- [ ] Deepening
- [ ] Abandonment

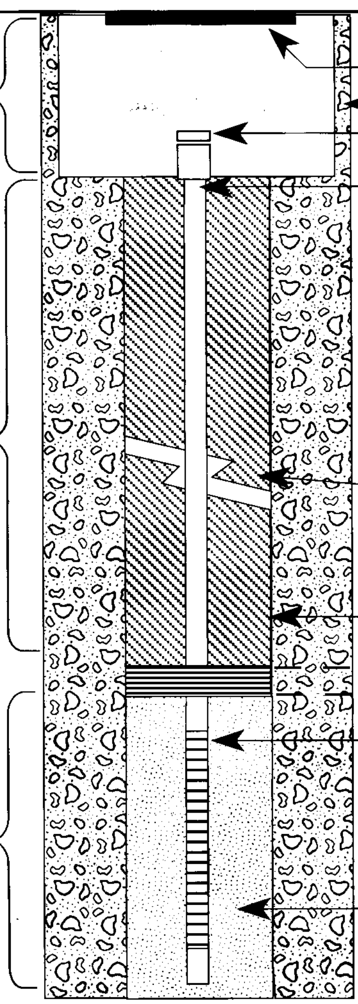
(3) DRILLING METHOD

- [x] Rotary Air
- [ ] Rotary Mud
- [ ] Cable
- [ ] Hollow Stem Auger
- [ ] Other ____

(4) BORE HOLE CONSTRUCTION

Special Standards Yes [ ] No [x]

Depth of completed well 184 ft.



Casing diameter 6 in.
material PVC
Welded [ ] Threaded [x] Glued [ ]

Liner diameter ____ in.
material ____
Welded [ ] Threaded [ ] Glued [ ]

Well seal:
Material Aquaguard Grout
Amount 150
Grout weight 10.11 gal

Borehole diameter 10 in.

Bentonite plug at least 3 ft. thick

Screen material SS
interval(s):
From 152 To 182
From ____ To ____
Slot size .040 in.

Filter pack:
Material CSSI Sand
Size 8/12 in.

(5) WELL TEST:

- [ ] Pump
- [ ] Bailer
- [ ] Air
- [ ] Flowing Artesian

Permeability ____ Yield ____ GPM

Conductivity ____ PH ____

Temperature of water 54 (F)/C Depth artesian flow found ____ ft.

Was water analysis done? [ ] Yes [ ] No

By whom? ____

Depth of strata to be analyzed. From ____ ft. to ____ ft.

Remarks: Emcon / IRC

Name of supervising Geologist/Engineer [illegible]

(6) LOCATION OF WELL By legal description

Well Location: County Multnomah

Township 1N (N or S) Range 3E (E or W) Section 29

1. SE 1/4 of NW 1/4 of above section.

2. **Either** Street address of well location 2201 NE 201st Ave Troutdale, OR

or Tax lot number of well location 2300

3. **ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.**

(7) STATIC WATER LEVEL:

105 Ft. below land surface. Date 12/7/96

Artesian Pressure ____ lb/sq. in. Date ____

(8) WATER BEARING ZONES:

Depth at which water was first found 105'

From	To	Est. Flow Rate	SWL
24	30		

(9) WELL LOG:

Ground elevation ____

Material	From	To	SWL
Gravels Cobbles	0	30	
Siltstone, Sandy	30	34	
Clay silty Brown	34	39	
Clay Bl. Green	39	46	
Siltstone	46	62	
Sandstone	62	99	
Silty	99	113	
Conglomerate	113	182	
Clay Green	182	184	

Date started 12/2/96 Completed 12/5/96

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number 10330

Signed [signature] Date 12/8/96

(bonded) Monitor Well Constructor Certification:

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

MWC Number 10024

Signed [signature] Date 12/8/96

R6084.1

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