BIOLOGICAL ASSESSMENT

(continued)

APPENDIX J

Pacific Connector's Access Road Tables

Table J-1
Access Roads and Road Crossing Methods

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
0.12	Private Rd	Gravel	All	Not Crossed	0.26	0	10
0.12	Trans Pacific Hwy (Cnty Rd 218)	Paved	All-Public	Bore	1.51	0	16
0.12	Southern Pacific Service Rd	Gravel	No Ingress / Egress	Bore	0.34	0	10
0.12	Jordan Cove Rd	Paved	All	Not Crossed	0.91	0	0
0.12	Unknown Rd	Paved	All	Not Crossed	0.06	0	0
0.12	Unknown Rd	Dirt	All	Not Crossed	0.47	0	0
0.12	Unknown Rd	Paved	All	Not Crossed	0.33	0	0
0.36	Southern Pacific Railroad	Rails	RR	Bore	2.99	0	0
1.23	US Hwy 101	Paved	All-Public	Under Bay Bridge	3.50	0	0
1.34	Chapelle Pkwy	Paved	All	Open Cut	0.23	0	0
1.34	Ferry Rd	Paved	All	Not Crossed	0.08	0	0
1.34	Plum Loop	Paved	All	Not Crossed	0.36	0	0
3.02	Kentuck Slough Rd (Kentuck Way Ln)	Paved	All-Public	Bore	0.73	0	10
3.02	E Bay Drive (Cnty Rd 45)	Paved	All	HDD	0.21	0	0
6.34R	Country Club Rd	Paved	Light	Not Crossed	0.12	0	0
6.44R	Country Club Rd	Paved	All	Not Crossed	0.54	0	12
6.44R	Country Club Rd	Paved[4]	All	Not Crossed	0.14	0.32	12
6.64R - 7.34R	Logging Spur	Gravel	All	In ROW	0.88	0	10
6.68R	Logging Spur	Gravel	All	In ROW	0.05	0	0
7.34R	Logging Rd	Gravel	All	Not Crossed	1.64	0	10
7.34R - 7.44R	Carlson Heights Rd	Paved/Gravel	Light	In ROW	1.24	0	10
7.77R	Logging Spur	Dirt	All	Not Crossed	0.64	0	10
7.77R	Logging Spur	Dirt	No Ingress / Egress	Open Cut	0.64	0	10
7.88R - 8.12R	Logging Spur	Dirt	All	Open Cut	0.35	0	10
8.17R	Logging Spur	Dirt	All	Open Cut	0.18	0	10
8.44R	Willanch Slough	Paved	All-Public	Open Cut	0.38	0	10
8.91R	Logging Spur	Dirt	All	Open Cut	0.26	0	10
8.93R	Logging Spur	Dirt	All	Open Cut	0.61	0	10
9.11R	Logging Spur	Dirt	All	In ROW	0.18	0	10
9.27R - 9.51R	Unknown Rd	Gravel/Dirt[1,2,3]	All	In ROW	0.25	0	0
9.40R	Noah Butte Rd	Gravel	All	Not Crossed	0.53	0	10
9.40R	Unknown Rd	Gravel	All	Not Crossed	1.57	0	10

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
9.51R - 9.82R	Unknown Rd	Dirt/Gravel [1,2,3]	All	Open Cut	0.35	0	0
9.82R - 10.02R	Unknown Rd	Dirt [1,2,3]	All	In ROW	0.21	0	0
10.20R	Unknown Rd	Dirt [1,2,3]	All	Open Cut	0.68	0	0
10.54R - 10.61R	Unknown Rd	Gravel/Dirt [1,2,3]	No Ingress / Egress	In ROW	0.09	0	0
10.96R	Private Rd	Gravel	All	Not Crossed	0.13	0	0
11.07R	State 241 (Coos River Hwy)	Paved	All-Public	HDD	0.08	0	0
11.18R	Cnty Rd 6 (South Coos River Rd)	Paved	All-Public	HDD	0.66	0	0
11.54BR	Private Rd	Dirt/Gravel [1,2,3]	All	Open Cut	0.37	0	0
11.54BR	Private Rd	Dirt/Gravel [1,2,3]	All	Open Cut	0.48	0	0
12.41BR	Private Logging/Field Rd.	Dirt/Gravel [1,2,3]	All	Open Cut	0.45	0	0
13.15BR 13.66BR	BLM 26-12-4.1	Aggregate	All	In ROW	0.31	0	0
13.15BR-13.66BR	BLM 26-12-4.1	Aggregate [1,2,3]	All	Open Cut	0.66	0	0
13.66BR-13.83BR	Lillian Crk (BLM 26-12-4.3)	Aggregate	All	In ROW	0.18	0	0
13.83BR	Lillian Crk (BLM 26-12-4.3)	Aggregate [1,2,3]	No Ingress / Egress	Not Crossed	0.05	0	0
13.83BR-14.42BR	BLM 26-12-4.4	Aggregate	All	In ROW	0.50	0	0
13.83BR-14.42BR	BLM 26-12-4.4	Aggregate	All	IN ROW	0.13	0	0
15.06BR	Private Field Rd	Unknown	All	Open Cut	0.07	0	0
15.10BR	Cnty Rd 54 (Stock Slough Rd)	Bituminous	All-WTC-Public	Open Cut	1.81	0	0
15.10BR	Stock Slough (BLM 26-12-4.0)	Aggregate [1,2]	All	Not Crossed	0.04	0	0
15.68BR	Unknown Private Rd	Aggregate	All	Not Crossed	0.29	0	0
15.68BR	Unknown Private Rd	Gravel/dirt [1,2,3]	All	Open Cut	0.65	0	0
16.09BR 16.97BR	BLM 26-12-15.2	Aggregate [1,2,3]	All	In ROW	1.32	0	0
16.97BR-18.14BR	Blue Ridge Rd (BLM 26-12-4.2)	Bituminous	All	In ROW	3.16	0	0
18.05BR	Daniels Tie (BLM 26-12-14.0)	Aggregate	All	Not Crossed	0.95	0	0
18.05BR	Daniels Tie (BLM 26-12-14.0)	Aggregate [1,2]	All	Not Crossed	0.23	0	0
18.39BR	BLM 26-12-22.1	Aggregate [1,2,3]	All	Open Cut	0.10	0	0
19.20BR-19.61BR	Blue Ridge Rd (BLM 26-12-4.2)	Bituminous	All	In ROW	2.34	0	0

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
19.88BR-20.05BR	BLM Unknown Logging Spur	Aggregate [1,2]	All	In ROW	0.16	0	0
20.05BR	Blue Ridge Rd (BLM 26-12-4.2) (Blue Ridge Comm Site)	Gravel	All	Not Crossed - Comm *	2.45	0	16
20.05BR	Blue Ridge System Rd (BLM 26-12-35) (Blue Ridge Comm Site)	Gravel	All	Not Crossed - Comm *	0.12	0	16
20.05BR	Blue Ridge System (BLM 26-12-35.0)	Aggregate [1,2]	All	Not Crossed	0.48	0	0
20.42BR	BLM Logging Spur	Aggregate [1,2]	All	Open Cut	0.12	0	0
20.42BR	BLM Logging Spur	Aggregate [1,2]	All	Open Cut	0.02	0	0
20.42BR	BLM Logging Spur	Aggregate [1,2]	All	Open Cut	0.04	0	0
20.64BR	T504 Blue Ridge Trail	Aggregate [1,2]	All	Open Cut	0.44	0	0
20.95BR	Blue Ridge System (BLM 26-12-35.4)	Aggregate [1,2]	All	Open Cut	0.41	0	0
21.15BR	Blue Ridge System Rd (BLM 26-12-35.5) (Blue Ridge Comm Site)	Gravel	All	Not Crossed - Comm *	0.21	0	16
21.50BR-22.16BR	Blue Ridge System (BLM 26-12-35.1)	Aggregate	All	In ROW	0.39	0	0
21.50BR-22.16BR	Blue Ridge System (BLM 26-12-35.1)	Aggregate	All	In ROW	0.83	0	0
22.12BR	Unknown Rd	Unknown	No Ingress / Egress	Open Cut	0.01	0	0
22.19BR	Pac. West Logging Spur	Dirt/Gravel [1,2,3]	All	Open Cut	0.29	0	0
22.46BR	Unknown Rd	Unknown	No Ingress / Egress	Open Cut	0.03	0	0
23.29BR-23.32BR	Unknown Rd	Unknown	All	Open Cut	0.53	0	0
23.32BR	Steinnon Crk Rd (BLM 27-12-15.0)	Aggregate	All	Not Crossed	0.40	0	0
23.42BR-23.53BR	Woodward Crk Spur (BLM 27-12-14.2)	Aggregate [1,2]	All	In ROW	0.63	0	0
24.00BR-24.14BR	Woodward Crk Rd (BLM 27-12-14.0)	Aggregate	All	In ROW	0.03	0	0
24.00BR-24.14BR	Woodward Crk Rd (BLM 27-12-14.0)	Aggregate [1,2]	All	In ROW	0.34	0	0
24.00BR-24.14BR	Woodward Crk Rd (BLM 27-12-14.0)	Aggregate	No Ingress / Egress	In ROW	0.01	0	0
24.37BR	Cnty Rd 59 (Fairview-Sumner Ln / Coos Bay Wagon Rd)	Aggregate	All-WTC-Public	Open Cut	0.33	0	0
24.37BR	Cnty Rd 59 (Fairview-Sumner Ln / Coos Bay Wagon Rd)	Bituminous	All-WTC-Public	Open Cut	4.34	0	0
24.37BR	Private Logging Rd	Gravel [1,2]	All	Not Crossed	0.16	0	0
24.50BR	BLM 27-12-14.1	Natural [1,2,3]	All	Open Cut	0.41	0	0

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
24.72BR	Private Logging Spur	Dirt/Gravel [1,2,3]	All	Open Cut	0.12	0	0
24.72BR	Private Logging Spur	Unknown	All	Open Cut	0.04	0	0
25.12BR	Powerline Access Rd (BLM 27-12-23.0)	Gravel 2	All	Not Crossed	0.50	0	16
25.12BR	Powerline Access Rd (BLM 27-12-23)	Gravel 2	All	Open Cut	0.60	0	16
14.23	Coos City - Sumner Rd	Paved	All-WTC-Public	Not Crossed	0.61	0	16
14.23	Private Rd		All	Not Crossed	0.50	0	10
20	Blue Ridge System Rd (BLM 26-12-35.1) (Blue Ridge Comm Site)	Gravel	All	Not Crossed - Comm *	0.96	0	16
21.98	Powerline Access (BLM 27-12-14.1)	Dirt [2,3]	All	Open Cut	0.33	0	14
21.98	Powerline Access (BLM 27-12-14.1)	Natural [1,2,3]	All	Open Cut	0.49	0	0
22.15	Powerline Access	Gravel/Dirt [2,3]	All	Open Cut	1.13	0	16
22.15	Powerline Access	Gravel [2,3]	All	Open Cut	0.14	0	16
22.39	Powerline Access Rd	Gravel	No Ingress / Egress	Open Cut	0.02	0	16
22.57	Private Rd	Gravel	No Ingress / Egress	Open Cut	0.04	0	0
22.58	Cnty Rd 9C (Fairview-Laverne Park Rd)	Paved	All-WTC-Public	Open Cut	0.17	0	16
23.09	Fisher Rd (Private) (BLM 7-12-25.03)	Gravel [2,3]	All	Not Crossed	0.19	0	16
23.09	Fisher Rd (Private) (Includes BLM 7-12-25)	Gravel [2,3]	All	Open Cut	0.16	0	16
23.22	Unknown Rd	Dirt	No Ingress / Egress	Open Cut	0.02	0	16
23.9	Unknown Rd	Dirt	No Ingress / Egress	Open Cut	0.05	0	0
23.99	Powerline Access Rd	Gravel	No Ingress / Egress	Open Cut	0.03	0	16
24.1	Cnty Rd 60 (Coos Bay Wagon Rd)	Paved	All-WTC-Public	Open Cut	1.06	0	16
24.1	Cnty Rd 60 (Coos Bay Wagon Rd)	Bituminous	All-WTC-Public	Not Crossed	0.53	0	0
24.36	Hudson Rdg Tie (BLM 27-11-17.1)	Gravel	All	Not Crossed	0.36	0	16
24.36	Hudson Ridge Tie (BLM 27-11-17.1)	Gravel	All	Open Cut	0.26	0	16
24.55	Cnty Rd 63 (Coos Bay Wagon Rd)	Paved	All-Public	Open Cut	1.12	0	16
24.55 - 24.81	Private Logging Rd (BLM 27-11-30.1)	Gravel	All	Open Cut	0.74	0	14
24.99 - 25.14	Logging Spur (BLM 27-11-30.03)	Gravel	All	In ROW	0.35	0	16
25.15	Powerline Access Rds (BLM 27-11-30.3)	Dirt	All	Not Crossed	0.52	0	10
25.29	Logging Sp	Dirt	Light	HDD	0.04	0	0
25.31	Logging Sp	Dirt	Light	HDD	0.08	0	0
25.60 - 26.07	Logging Rd Menasha (BLM 27-11-30.1)	Gravel [1,2,3]	All	Open Cut	1.23	0	14
26.08 - 26.65	Menasha Private Logging Spur (BLM NonInv 27-11-32.A)	Dirt/Gravel	All	In ROW	0.66	0	10
26.08 - 26.65	Menasha Private Logging Spur (BLM NonInv 27-11-32.C)	Dirt/Gravel	No Ingress / Egress	Open Cut	0.01	0	10

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
26.65	Powerline Access Rd (BLM 28-11-5.4)	Dirt [2,3]	Light	Open Cut	0.29	0	16
26.65	Powerline Access Rd (BLM NonInv 27-11-32.A)	Dirt [2,3]	Light	Open Cut	0.20	0	16
26.65 - 26.75	Logging Spur	Dirt	No Ingress / Egress	In ROW	0.11	0	10
26.73	Logging Spur	Dirt	No Ingress / Egress	Open Cut	0.03	0	10
26.95	Cnty Rd 13 (Lee McKinley Rd) (Middle Creek Rd)	Gravel 2	All-Public	Open Cut	1.94	0	16
26.95 - 26.99	BLM 28-11-5.2	Aggregate	No Ingress / Egress	In ROW	0.07	0	0
27.07	BLM 28-11-4.1	Pasture/Dirt [2,3]	All	Not Crossed	0.32	0	10
27.53	BLM 28-11-4.1	Dirt [1,2,3]	All	Not Crossed	1.02	0	16
27.53	Logging Rd (BLM NonInv 28-11-4.A)	Dirt [1,2,3]	All	Open Cut	0.27	0	16
27.67 - 28.12	Logging Rd (BLM NonInv 28-11-4.A)	Dirt [1,2,3]	All	In ROW	0.56	0	16
27.68	Logging Rd (BLM NonInv 28-11-4.B)	Dirt [1,2,3]	All	Open Cut	0.03	0	16
27.86 - 27.94	Logging Rd	Dirt	All	In ROW	0.09	0	0
28.06	Yankee Run Mainline (BLM 28-11-20)	Aggregate	All	Not Crossed	0.53	0	20
28.06	BLM 28-11-9.6	Aggregate	All	Open Cut	0.15	0	0
28.06	Yankee Run Mainline (BLM 28-11-20)	Aggregate	All	Not Crossed	2.99	0	0
28.35	Logging Spur (BLM NonInv 28-11-4.C)	Aggregate	All	Open Cut	0.15	0	16
28.5	Dora Ridge Rd (BLM 28-11.3.1)	Gravel [2,3]	All	Open Cut	1.66	0	20
28.5	Dora Ridge Rd (BLM 28-11.3.1)	Gravel [2,3]	All	Not Crossed	0.03	0	20
29.02	BLM 28-11-9.5	Gravel [2,3]	All	Open Cut	0.29	0	16
29.02	BLM 28-11-9	Gravel [2,3]	All	Not Crossed	0.41	0	16
29.25	Lone Rock Logging Rd	Gravel [2,3]	All	Not Crossed	0.15	0	16
29.25	Lone Rock Logging Rd	Dirt	All	Open Cut	0.27	0	0
29.32	Logging Sp	Dirt	All	Open Cut	0.42	0	0
29.59	Cnty Rd 1C (Myrtle Point - Sitkum Rd)	Paved	All-WTC-Public	Open Cut	0.38	0	16
29.59	Laird - Private Rd	Gravel	All	Not Crossed	0.21	0	10
30.38 - 31.19	Logging Spur (BLM NonInv 28-11-14.C)	Gravel/Dirt [1,2,3]	All	In ROW	0.96	0	16
31.3	Logging Spur (BLM NonInv 28-11-14.B)	Gravel/Dirt [1,2,3]	All	Not Crossed	0.14	0	16
31.30 - 31.46	Logging Spur (BLM NonInv 28-11-14.A)	Gravel	All	Open Cut	0.26	0	10
31.51	Dora Spur Rd (BLM 28-11-13.2)	Gravel/Dirt [1,2,3]	All	Not Crossed	0.97	0	14

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
31.69 - 31.81	Back Dora (BLM 28-11-13.6)	Gravel	All	In ROW	0.16	0	12
32.1	Dora Thinning Rd (BLM 28-11-13)	Gravel	All	Not Crossed	1.49	0	14
32.1	GoldBRick Rd	Gravel/Dirt [2,3]	All	Not Crossed	0.33	0	16
32.35	Logging Spur (BLM NonInv 28-11-24.A)	Gravel [1,2,3]	All	Open Cut	0.10	0	16
32.5	GoldBRick Rd (BLM NonInv 28-11-24.B)	Gravel/Dirt [1,2,3]	All	Not Crossed	0.06	0	10
32.54	Logging Rd (BLM NonInv 28-11-24.B)	Gravel/Dirt [1,2,3]	All	Open Cut	0.24	0	10
32.55	GoldBRick Rd	Dirt/Gravel [2,3]	All	Not Crossed	0.27	0	16
32.86	Logging Spur	Dirt	All	Open Cut	0.12	0	0
32.94	Logging Rd (BLM NonInv 28-11-24.B)	Gravel/Dirt [1,2,3]	All	Open Cut	0.33	0	10
33.25	Unknown Rd (BLM NonInv 28-11-24.B)	Dirt	All	Open Cut	0.43	0	10
33.37	Logging Spur (BLM NonInv 28-11-24.C)	Dirt	All	Open Cut	0.31	0	10
33.74 - 33.80	Elk Mountain Loop (BLM 28-11-25)	Paved	All-WTC	In ROW	0.51	0	20
34.02	Elk Creek Rd (BLM 28-11-29)	Paved	All-WTC	Open Cut	7.35	0	20
34.31	GoldBrick Rd	Gravel/Dirt [1,2,3]	All	Open Cut	0.37	0	16
34.37	Logging Spur (BLM NonInv 28-10-19.A)	Gravel [1,2,3]	All	Open Cut	0.10	0	10
34.42	Logging Rd (BLM NonInv 28-10-19.B)	Dirt [2,3]	All	Not Crossed	0.27	0	16
34.42	Logging Rd (BLM NonInv 28-10-19.B)	Dirt [2,3]	All	Open Cut	0.06	0	16
34.44 - 34.52	Logging Spur (BLM NonInv 28-10-19.B)	Dirt	No Ingress / Egress	Open Cut	0.09	0	16
34.69	Logging Rd	Gravel [2,4]	All	Open Cut	1.49	0.11	16
34.71 - 35.04	Logging Spur (BLM NonInv 28-10-30.A)	Gravel	All	In ROW	0.43	0	10
35.33 - 35.80	Elk Creek Rd (BLM 28-11-29)	Paved	All-WTC	In ROW	2.83	0	20
35.34 - 35.80	Cnty Rd 84 (Big Creek Rd) (BLM 28-11-29.0)	Paved	All-WTC-Public	Not Crossed	3.16	0	16
35.34 - 35.80	Big Creek Rd (BLM 29-11-28)	Paved	All-WTC	Not Crossed	1.52	0	16
35.8	Elk Creek Ext. (BLM 28-10-31)	Paved	All-WTC	Not Crossed	3.23	0	14
35.83 - 36.11	Elk Creek Rd (BLM 28-11-29)	Paved	All-WTC	In ROW	0.39	0	20
36.18	Logging Spur (BLM 28-10-29.2)	Gravel	All	Open Cut	0.09	0	20
36.64 - 37.15	Elk Creek Rd (BLM 28-10-29)	Paved	All-WTC	In ROW	0.11	0	20
36.64 - 37.15	Elk Creek Rd (BLM 28-11-29)	Paved	All-WTC	In ROW	1.16	0	20

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
37.15 - 37.22	Unknown Rd BLM Logging Spur	Gravel	All	In ROW	0.07	0	20
38	Private Rd	Gravel [2,3]	All	Not Crossed	0.21	0	10
38.06	BLM 28-10-27	Gravel	No Ingress / Egress	Open Cut	0.03	0	20
38.34 - 38.87	Weaver Sitkum Tie Rd (BLM 28-10-9.4)	Paved	All-WTC	In ROW	4.99	0	20
38.34 - 38.87	Chaney Rd (BLM 28-10-9)	Paved	All-WTC	Not Crossed	0.32	0	20
38.34 - 38.87	Cnty Rd 1C (Weaver Sitkum Tie Rd)	Paved	All-WTC-Public	Not Crossed	1.22	0	16
38.58	BLM 28-10-27.2	Gravel	No Ingress / Egress	Open Cut	0.02	0	20
38.87	Sandy Creek (BLM 29-10-15)	Paved	All-WTC	Not Crossed	1.01	0	20
38.87	Sandy Creek Rd (BLM 29-10-15)	Paved	All-WTC	Not Crossed	4.86	0	14
38.87	Sandy Creek Ext. (BLM 29-10-2.1)	Paved	All-WTC	Not Crossed	0.52	0	16
38.87	Big Creek Rd (BLM 29-11-28)	Paved	All-WTC	Not Crossed	4.51	0	14
38.87	Sandy Creek Rd (BLM 29-10-14.2)	Paved	All-WTC	Not Crossed	0.86	0	14
38.87	Sandy Creek Ext. (BLM 28-10-34.1)	Paved	All-WTC	Not Crossed	1.40	0	16
38.98 - 39.22	Cnty Rd 171 (Plum Creek Logging Spur)	Dirt/Gravel	All	In ROW	0.67	0	16
39.35 - 39.85	Weaver Sitkum Tie Rd (BLM 28-10-9.4)	Paved	All-WTC	In ROW	1.44	0	20
39.60 - 39.72	Tri-W Group Logging Spur (BLM NonInv 28-10-26.C)	Gravel/Dirt	All	In ROW	0.30	0	16
39.94	Tri-W Group Logging Spur	Gravel [2]	All	Not Crossed	0.04	0	16
40.02	Tri-W Group Access Spur	Dirt [1,2,3]	All	Not Crossed	0.10	0	16
40.27 - 40.37	Weaver Sitkum Tie Rd (BLM 28-10-9.4)	Paved	All	In ROW	0.56	0	20
40.61	Tri-W Group Access Spur	Gravel	No Ingress / Egress	Open Cut	0.05	0	16
40.68	Weaver Sitkum Tie Rd (BLM 28-10-9.4)	Paved	All	Not Crossed	0.69	0	20
41.3	Weaver Sitkum Tie Rd (BLM 28-10-9.4)	Paved	All	Not Crossed	0.14	0	20
41.31	Cawrse Rd (BLM 28-10-36)	Gravel	All	Open Cut	0.04	0	16
41.39	BLM 28-9-31	Gravel	No Ingress / Egress	Open Cut	0.03	0	16
41.42	Logging Spur	Gravel	All	Open Cut	0.06	0	16
41.47	Weaver Rd (BLM 28-8-18)	Paved	All	Open Cut	0.38	0	20
41.75	BLM 28-9-31.1	Gravel [1,2,3]	All	Open Cut	0.04	0	16
42.03 - 42.50	Weaver Rd (BLM 28-8-18)	Paved	All	In ROW	1.16	0	14

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
42.03 - 42.50	Weaver Rd (BLM 28-8-18)	Paved	All	Not Crossed	0.67	0	14
42.03 - 42.50	Weaver Rd (BLM 28-8-18)	Paved	All	Not Crossed	8.85	0	14
42.1	Camas Creek (BLM 29-9-6.3)	Gravel	No Ingress / Egress	Not Crossed	0.05	0	16
42.5	Unknown Rd (BLM NonInv 29-9-6.A)	Gravel	All	Not Crossed	0.20	0	16
42.68	Plum Creek Logging Spur	Gravel	All	Open Cut	0.09	0	16
42.74 - 42.86	North Rock Creek (BLM 30-10-3)	Paved	All-WTC	In ROW	0.55	0	16
42.74 - 42.86	Camas Creek Rd (BLM 28-10-12)	Paved	All	Not Crossed	3.94	0	20
42.74 - 42.86	S Fork Camas Crk (BLM 28-9-20)	Aggregate	All	Not Crossed	1.76	0	20
42.74 - 42.86	S Fk Camas Creek Rd (BLM 28-9-32)	Paved	All	Not Crossed	0.18	0	16
42.74 - 42.86	S Fk Camas Creek Rd (BLM 28-9-32.2)	Paved	All	Not Crossed	0.51	0	16
42.74 - 42.86	S Fk Camas Creek Rd (BLM 29-9-5.2)	Paved	All	Not Crossed	0.14	0	16
42.74 - 42.86	S Fk Camas Creek Rd (BLM NonInv 29-9-5.A)	Paved	All	Not Crossed	0.53	0	16
42.94 - 43.05	Logging Spur	Gravel	No Ingress / Egress	Open Cut	0.13	0	16
43.05	BLM 29-9-6.6	Gravel	All	Open Cut	0.04	0	16
43.05 - 43.10	North Rock Creek (BLM 30-10-3)	Paved	All-WTC	In ROW	0.05	0	16
43.29 - 43.45	North Rock Creek (BLM 30-10-3)	Paved	All-WTC	In ROW	2.94	0	16
43.44	North Rock Creek (BLM 30-10-3)	Paved	All-WTC	Not Crossed	7.31	0	16
43.44	Cnty Rd 21	Paved	All-WTC-Public	Not Crossed	0.29	0	0
43.63	BLM 29-9-8	Gravel [2]	All	Not Crossed	0.14	0	14
43.63 - 43.90	Lone Rock Logging Spur (BLM NonInv 29-9-8.B)	Gravel [2,3]	All	In ROW	0.31	0	10
44	Signal Tree Lookout (BLM 29-9-33.4)	Gravel	All	Not Crossed - Comm *	1.19	0	16
44.17	Plum Creek Timber Logging Rd (BLM NonInv 29-9-8.A)	Dirt [1,2,3]	All	Open Cut	0.32	0	16
44.17	Plum Crk Logging Spur Upper Rock	Dirt [4]	All	Not Crossed	0.11	0.06	16

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
44.17	Plum Crk Logging Spur Upper Rock (BLM NonInv 29-9-8.C)	Gravel [2]	All	Not Crossed	0.59	0	20
44.29	Plum Crk Logging Spur Upper Rock	Dirt	No Ingress / Egress	Open Cut	0.05	0	16
44.52 - 44.87	BLM 29-9-9.3	Gravel [2]	All	In ROW	0.42	0	16
44.87 - 45.23	Upper Signal Tree (BLM 28-9-9.1)	Gravel [2]	All	Not Crossed	1.44	0	20
44.87 - 45.23	Upper Signal Tree (BLM 28-9-35)	Gravel [2]	All	In ROW	0.97	0	20
44.87 - 45.23	Upper Signal Tree (BLM 28-9-35)	Gravel [2]	All	In ROW	0.40	0	20
45.24	BLM 29-9-9.2	Gravel	No Ingress / Egress	Open Cut	0.03	0	16
45.50 - 45.70	Unknown Logging Rd	Dirt	No Ingress / Egress	In ROW	0.20	0	16
45.75	Plum Creek Logging Rd	Dirt	No Ingress / Egress	Open Cut	0.03	0	16
45.8	Logging Spur	Gravel [2,3]	All	Open Cut	0.07	0	16
45.80 - 46.30	Plum Creek Logging Spur	Dirt/Gravel [2,3]	All	In ROW	0.52	0	16
45.85 - 45.92	Upper Signal Tree (BLM 28-9-35)	Dirt	All	Not Crossed	3.39	0	20
45.85 - 45.92	Upper Signal Tree (BLM 28-9-35)	Paved	All	In ROW	0.62	0	16
45.92	Plum Creek Logging Spur	Dirt/Gravel [2,3]	All	Open Cut	0.04	0	16
46.30 - 46.53	Plum Creek Logging Spur (BLM NonInv 29-9-10.E)	Dirt/Gravel [2,3]	All	In ROW	0.29	0	16
46.51	Unknown Rd (BLM NonInv 29-9-10.C)	Dirt	All	Not Crossed	0.19	0	16
46.51	Lower Signal Tree (BLM 29-9-36)	Paved [1]	All	Open Cut	11.78	0	14
46.78	Logging Spur (BLM NonInv 29-9-10.A)	Gravel [1,2]	All	Not Crossed	0.16	0	16
46.78	Logging Spur (BLM NonInv 29-9-10.A)	Gravel [1,2]	All	Open Cut	0.69	0	16
46.78	Logging Spur	Gravel [1,2]	All	Not Crossed	0.03	0	16
46.81	Unknown Rd (BLM NonInv 29-9-10.D)	Gravel	All	Open Cut	0.10	0	0
47.1	Holmes Creek Spur (BLM 29-9-15.1)	Gravel	All	Not Crossed	0.23	0	0
47.1	Holmes Creek Spur (BLM NonInv 29-9-15.A)	Gravel	All	Not Crossed	0.85	0	0
47.10 - 47.71	Bingham Holmes Road (BLM NonInv 29-9-15.B)	Gravel	All	In ROW	1.21	0	0
47.23	Holmes Crk Sp (BLM 29-9-15.1)	Aggregate	All	In ROW	0.06	0	0
47.23	Deep Reed Divide Spur (BLM 29-9-15.3)	Aggregate	All	Open Cut	0.10	0	0
47.5	Logging Spur	Aggregate	No Ingress / Egress	Not Crossed	0.04	0	14

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
47.72	Logging Spur	Natural	All	In ROW	0.03	0	0
47.73	Logging Spur	Aggregate	All	In ROW	0.07	0	0
48.16	Wildcat Creek Spur (BLM NonInv 29-9-14.A)	Dirt	All	Open Cut	0.58	0	0
48.16	Wildcat Creek Spur (BLM NonInv 29-9-14.B)	Dirt	All	Not Crossed	0.12	0	0
48.21 - 48.54	Deep Creek (BLM 29-9-12.1)	Gravel [2]	All	In ROW	0.53	0	16
48.21 - 48.54	Deep Creek (BLM 29-9-12.1)	Gravel [2]	All-WTC	In ROW	0.44	0	16
48.54 - 48.67	Deep Creek Spur (BLM 29-9-13)	Gravel [2]	All	In ROW	0.30	0	16
48.77 - 49.15	Deep Creek Spur (BLM 29-9-13.2)	Gravel [2]	All	In ROW	0.50	0	16
49	Cnty Rd 132 (Wildcat Rd)	Paved	All-Public	Not Crossed	1.16	0	10
49	Private Rd	Gravel	All	Not Crossed	0.36	0	10
49.76	Cnty Rd 128 (Upper Camas County Rd)	Paved	All-Public	Open Cut	2.21	0	10
49.76	Baldwin Rd	Paved	All-Public	Not Crossed	0.23	0	10
49.8	Camas Weaver Tie Road (BLM 28-9-25.1)	Paved	All	Not Crossed	2.80	0	0
49.8	Lang Creek Rd (BLM 28-8-31.2)	Paved	All-Public	Not Crossed	0.36	0	0
50	Private Rd	Gravel	All	Not Crossed	0.44	0	10
50.2	Private Farm Rd	Dirt	No Ingress / Egress	Open Cut	0.04	0	16
50.55 - 50.75	Barnes Private Rd	Dirt/Gravel [1,2,3]	All	In ROW	0.16	0	16
50.55 - 50.75	Private Rd	Dirt/Gravel [1,2,3]	All	In ROW	0.23	0	16
50.83	Kirkendall Rd	Paved	All-Public	Open Cut	0.08	0	10
51.31 - 51.37	Private Rd	Dirt	No Ingress / Egress	Open Cut	0.06	0	16
51.49	Private Rd	Gravel/Dirt [2,3]	No Ingress / Egress	Open Cut	0.02	0	16
51.54	Quiet Mountain Rd	Paved	All-WTC	Not Crossed	0.48	0	14
51.54	Quiet Mountain Rd	Paved	All-WTC	Not Crossed	0.32	0	14
51.54	State Hwy 42	Paved	All-WTC-Public	Bore	1.17	0	14
52.01	Private Rd	Dirt	No Ingress / Egress	Open Cut	0.05	0	0
52.07	Private Rd	Gravel	All	Open Cut	0.34	0	10
52.11	Private Rd	Gravel	No Ingress / Egress	Open Cut	0.07	0	16
52.2	Private Rd	Gravel	All	Open Cut	0.07	0	10
52.2	5-J Limited Private Rd	Gravel [1,2,3]	All	Not Crossed	0.15	0	0
52.2	5-J Limited Private Rd	Gravel [1,2,3]	All	Not Crossed	0.56	0	0
52.2	Private Rd (BLM NonInv 29-8-16.A)	Gravel	All	Not Crossed	0.32	0	10

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
52.2	Private Rd (BLM 29-8-10)	Gravel	All	Not Crossed	0.07	0	10
52.62	Camas Mountain SP (BLM 29-8-9.3)	Gravel [2,3]	All	Open Cut	1.52	0	16
53.03	Private Logging Rd (Camas Mountain SP) (BLM NonInv 29-8-10.A)	Gravel [2,3]	All	Open Cut	0.05	0	16
53.21 - 53.59	Shields Creek Rd (BLM 29-8-2.2)	Gravel [2]	All	In ROW	0.87	0	16
53.74	Shields Creek Sp BLM 29-8-11.2)	Gravel	All	Open Cut	0.06	0	16
54.2	Shields Creek Spur (BLM 29-8-11)	Gravel [2]	All	Open Cut	0.45	0	19
54.21 - 54.35	Logging Spur (BLM NonInv 29-8-11.A)	Gravel	All	In ROW	0.14	0	14
54.64	Shields Creek Spur (BLM 29-8-2.2)	Gravel [2]	All	Not Crossed	1.51	0	16
54.64	Shields Creek Rd (BLM 29-8-2.2)	Gravel [2]	All	Open Cut	1.09	0	16
54.64	BLM NonInv 29-8-12.A	Gravel [2]	All	Open Cut	0.01	0	16
54.87	Seneca Logging Spur (BLM NonInv 29-8-12.B)	Dirt/Gravel	All	In ROW	0.05	0	16
54.87 - 55.05	Seneca Logging Spur (BLM NonInv 29-8-12.C)	Dirt/Gravel	All	In ROW	0.18	0	16
55.42	Logging Spur	Dirt	All	Open Cut	0.11	0	0
55.75	Unknown Logging Rd	Dirt	All	In ROW	0.33	0	0
55.81	Cnty Rd 365 (Berry Creek Access Rd) (BLM 29-8-1)	Paved	All-WTC-Public	Not Crossed	0.63	0	16
55.81	Berry Creek Access Rd (BLM 29-8-1)	Paved	All-WTC	Not Crossed	1.04	0	20
55.81	Cnty Rd 140 (Ireland)	Paved	All-WTC-Public	Bore	0.26	0	16
55.81	Cnty Rd 365A (Ben Irving Rd)	Paved	All-WTC-Public	Not Crossed	2.22	0	20
56.06	Private Rd	Gravel	All	Open Cut	0.10	0	16
56.12	Private Rd	Gravel	No Ingress / Egress	Open Cut	0.09	0	16
56.16	Private Rd	Gravel	No Ingress / Egress	Open Cut	0.09	0	16
56.20	Private Rd (DG-039)	Gravel	All	Open Cut	0.09	0	16
56.32	Private Rd DG-041	Gravel	All	Open Cut	0.10	0	16
56.74	Cnty Rd 140 (Ireland)	Paved	All-WTC-Public	Open Cut	1.75	0	16
56.74	Cnty Rd 141 (Benedict Rd)	Paved	All-WTC-Public	Not Crossed	0.05	0	16
56.91	Private Rd	Gravel [2]	All	Open Cut	0.06	0	16
57.1	Private Rd	Gravel [2]	All	Open Cut	0.11	0	14
57.35	Private Rd	Gravel [2]	All	Open Cut	0.06	0	14
57.6	Cnty Rd 38 (Olalla Rd)	Paved	All-Public	Not Crossed	2.96	0	16
57.6	Cnty Rd 38 (Upper Olalla)	Paved	All-WTC-Public	Open Cut	0.09	0	16
58.19	Private Rd	Dirt [1,2]	All	Open Cut	0.20	0	16
58.65	Private Rd	Dirt [1,2,3]	All	Open Cut	0.31	0	16

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
59.34	Private Rd	Dirt	No Ingress / Egress	Open Cut	0.03	0	16
59.6	Private Rd	Gravel [2]	All	Open Cut	0.04	0	16
59.62	McNabb Creek Rd (BLM 28-7-3)	Gravel [1,2,3]	All	Open Cut	0.35	0	16
60.58	McNabb Creek Rd (BLM 28-7-34)	Gravel [2]	All	Open Cut	0.55	0	16
60.58	Cnty Rd 125 (Hoover Hill Rd)	Paved	All-Public	Not Crossed	0.17	0	16
61.9	NicholsBRos Private Logging Rd	Dirt	No Ingress / Egress	Open Cut	0.17	0	16
61.9	NicholsBRos Private Logging Rd	Dirt [2,3]	All	Not Crossed	0.62	0	16
61.9	Nichols Rd	Dirt [2,3]	All	Open Cut	1.42	0	0
61.9	NicholsBRos Private Logging Rd	Dirt	All	Open Cut	0.03	0	16
61.90 - 62.44	John Clarke DG-075	Dirt [2,3]	All	In ROW	0.46	0	16
62.52 - 63.62	D R Johnson	Dirt/Gravel [2,3]	All	In ROW	1.18	0	16
63.41	Kents Creek Spur (BLM 28-6-32)	Dirt/Gravel [2,3]	All	Not Crossed	0.51	0	16
63.41	Kents Creek Spur (BLM 28-6-32)	Dirt/Gravel [2,3]	All	Not Crossed	0.36	0	16
63.41	Squaw Creek Spur (BLM 28-6-31)	Dirt/Gravel [1,2,3]	All	Not Crossed	0.39	0	16
63.41	Private Rd	Dirt/Gravel [1,2,3]	All	Open Cut	0.34	0	16
63.9	Private Rd	Gravel	All	Not Crossed	0.13	0	20
63.92	Cnty Rd 100 (Kent Creek)	Paved	All-WTC-Public	Open Cut	1.05	0	14
64.17	Unknown Rd	Dirt	No Ingress / Egress	Open Cut	0.05	0	16
64.55 - 64.60	Private Rd - (BLM NonInv 29-6-5.A)	Dirt [2,3]	All	In ROW	0.26	0	16
64.55 - 64.71	Private Rd - DG-090.500 - PLMP 58.3+4.87	Dirt [2,3]	All	Not Crossed	0.56	0	16
64.60 - 64.71	Private Rd - (BLM NonInv 29-6-5.B)	Dirt [2,3]	All	In ROW	0.13	0	16
64.90 - 65.35	Private Rd - DG-090.500	Dirt/Gravel [2,3]	All	In ROW	0.46	0	16
65.6	Private Rd	Gravel	All	Not Crossed	0.22	0	16
65.82	Cnty Rd 43 (Rice Creek)	Paved	All-WTC-Public	Open Cut	0.08	0	16
66.21	Private Rd - DG-098.000	Gravel [2,3]	All	Open Cut	0.34	0	16
66.37 - 66.47	Private Rd - DG-099.000	Gravel [2,3]	All	Open Cut	0.95	0	16
66.88	Cnty Rd 88A (Willis Creek Rd)	Paved	All-WTC-Public	Open Cut	0.15	0	14
66.9	Private Rd (Track 106)	Dirt	No Ingress / Egress	Open Cut	0.06	0	16
66.97	Barton Private Rd	Dirt	Light	Not Crossed	0.22	0	16
66.97	Private Rd	Dirt	Light	Open Cut	0.41	0	16

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
67.19 - 67.30	Barton Private Rd	Dirt [2,3]	Light	In ROW	0.59	0	16
67.67	Private Rd	Dirt [2,3]	Light	Open Cut	0.44	0	16
67.72 - 68.00	Barton Private Rd	Dirt/Gravel [2,3]	Light	In ROW	0.32	0	16
68.00 - 68.39	Barton Private Rd	Dirt [1,2,3]	Light	In ROW	0.47	0	0
68.39	Barton Private Rd	Dirt [1,2,3]	Light	Open Cut	0.06	0	0
68-59 - 68.88	Unknown Rd	Dirt [2,3]	Light	In ROW	0.41	0	0
69.3	Private Rd	Gravel [1,2]	All	Open Cut	0.52	0	0
70.46	Edies Ln	Gravel [1,2,3]	All	Open Cut	1.23	0	0
71	Hong Private Rd	Dirt/Gravel [1,2,3]	All	Open Cut	1.12	0	0
71.22	I-5	Paved	All-WTC-Public	Direct Pipe	8.65	0	0
71.26	Booth Ranch Rd	Paved	All-Public	Direct Pipe	1.16	0	0
71.33	Cnty Rd 14 (Dole Rd)	Paved	All-WTC-Public	Direct Pipe	0.43	0	14
71.33	Roth Private Rd	Dirt [1,2,3]	All	Not Crossed	0.18	0	14
71.34	Southern Pacific Railroad	Rails	RR	Direct Pipe	1.56	0	0
72.05	Unknown Rd	Dirt [1,2,3]	Light	Open Cut	0.33	0	0
72.23 - 72.66	Unknown Rd	Dirt [1,2,3,4]	All	In ROW	0.52	0.14	0
73.62 - 74.39	Cnty Rd 105 (Clarks Branch)	Bituminous	All-Public	Not Crossed	4.58	0	16
73.70	Unknown Rd	Dirt/Gravel [1,2,3,4]	All	Not Crossed	3.28	3.18	0
74.32 - 74.73	Gow Ranch Private Rd	Gravel [2,3]	Light	Open Cut	0.94	0	16
74.37 - 74.60	Gow Ranch Private Rd	Dirt [1,2,3]	All	Open Cut	0.82	0	16
74.40 - 75.04	Gow Ranch Private Rd	Rock [1,2,3]	All	Not Crossed	0.88	0	16
74.74 - 74.40	Gow Ranch Private Rd	Gravel [2,3]	Light	In ROW	2.80	0	10
75	Garoutte Road (BLM 23-3-5) (Harness Mountain Comm Site)	Gravel	All	Not Crossed - Comm *	0.89	0	10
75	Garoutte Road (BLM 23-3-17.2) (Harness Mountain Comm Site)	Gravel	All	Not Crossed - Comm *	0.73	0	10
75	BLM NonInv 23-3-17.A (Harness Mountain Comm Site)	Gravel	All	Not Crossed - Comm *	5.44	0	10

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
75.04 - 75.35	Bilger Creek Spur (BLM 29-5-2.0)	Gravel [1,2,3]	All	Open Cut	1.08	0	16
75.38 - 75.97	Bilger Creek Rd (BLM 29-5-11)	Rock [1,2,3,4]	All	In ROW	3.97	0.07	16
75.8	Bilger Creek Spur (BLM 29-5-2.2)	Dirt/Rock [1,2,3]	All-WTC	Open Cut	0.21	0	16
75.80 - 75.93	Private Rd - Logging Spur	Gravel	No Ingress / Egress	In ROW	0.14	0	16
76.35	Cnty Rd 103 (Bilger Creek)	Gravel	All-WTC-Public	Open Cut	0.55	0	16
76.58	Unknown Rd	Dirt/Gravel [1,2,3]	Light	Open Cut	0.15	0	0
76.84	Unknown Rd	Dirt/Gravel [1,2,3]	All	Open Cut	0.78	0	0
77.07 - 77.12	Unknown Rd	Dirt/Gravel [1,2,3]	All	In ROW	1.38	0	0
77.31	Unknown Rd	Dirt/Gravel [1,2,3]	All	Open Cut	0.13	0	0
77.61	Private Road (Davis, Wayne)	Dirt/Gravel [1,2,3]	All	Open Cut	0.49	0	0
77.88 - 77.98	Little Lick Private Rd	Dirt [1,2,3]	All	Open Cut	1.20	0	16
78	Private Rd to Big Lick Reservoir	Gravel	All	Not Crossed	1.74	0	10
78.98	Cnty Rd 15 (North Myrtle)	Paved	All-WTC-Public	Open Cut	1.76	0	14
78.98	Cnty Rd 15 (North Myrtle)	Paved	All-Public	Not Crossed	4.00	0	0
78.98	North Myrtle	Paved	All-Public	Not Crossed	0.16	0	0
78.98	Cnty Rd 14 (Dole Rd)	Paved	All-Public	Not Crossed	0.88	0	0
78.98	Cnty Rd 386 (Old Pacific Hwy (Hwy 99))	Paved	All-Public	Not Crossed	0.07	0	0
79.41	Starbuk Lane	Dirt/Gravel [1,2,3]	Light	Not Crossed	0.42	0	16
79.41	Starbuk Lane	Gravel [1,2,3]	Light	Open Cut	0.40	0	16
79.41	Powerline Access Rd	Dirt	Light	Open Cut	0.20	0	20
79.41 - 79.54	Powerline Access Rd	Dirt	Light	In ROW	0.11	0	0
79.89 - 80.42	Pack Saddle Rd (BLM 29-4-17)	Gravel [1,2,3]	All	In ROW	0.98	0	14
79.89 - 80.42	Pack Saddle Rd (BLM 29-4-20)	Gravel [1,2,3]	All	Not Crossed	1.12	0	20
80.71 - 80.73	Roseburg Forest Products	Dirt/Gravel	All	Open Cut	0.08	0	10
80.92	Powerline Private Rd	Gravel	No Ingress / Egress	Open Cut	0.07	0	10
81.09	Roseburg Forest Products	Gravel	All	Open Cut	0.56	0	16
81.09	Roseburg Forest Products (NonInv 29-4-21.A)	Gravel	All	Open Cut	0.06	0	16
81.15	Cnty Rd 18 (South Myrtle)	Paved	All-WTC-Public	Open Cut	4.02	0	24

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
81.15	Cnty Rd 386 (Old Pacific Hwy (Hwy 99))	Paved	All-WTC-Public	Not Crossed	0.48	0	24
81.15	Cnty Rd 18A (South Myrtle Cutoff)	Paved	All-WTC-Public	Not Crossed	1.97	0	24
81.68	Private Road (Sutch, Steve)	Dirt/Gravel [1,2]	All	Open Cut	0.44	0	0
82.23 - 82.42	Unknown Rd (BLM NonInv 29-4-27.B)	Dirt	All	In ROW	0.59	0	0
82.42	Unknown Rd (BLM NonInv 29-4-28.B)	Dirt	All	Open Cut	0.08	0	0
82.64	Unknown Rd (BLM NonInv 29-4-28.B)	Dirt	All	Not Crossed	0.12	0	0
82.64	Unknown Rd (BLM NonInv 29-4-28.A)	Dirt	All	Open Cut	0.11	0	0
82.75 - 83.76	Wood Creek Rd (BLM 29-4-35)	Gravel [1,2,3]	All	In ROW	2.62	0	16
82.97	Wood Creek Spur (BLM 29-4-27.3)	Gravel [1,2,3]	All	Open Cut	0.05	0	16
83.4	Wood Creek Spur (BLM 29-4-27)	Gravel	All	Open Cut	0.17	0	16
83.79	Logging Spur	Dirt	All	In ROW	0.12	0	0
84.05	Unknown Rd (BLM NonInv 29-4-27.A)	Dirt/Gravel [1,2,3]	All	Open Cut	0.32	0	10
84.16	Roseburg Resources	Dirt	No Ingress / Egress	Open Cut	0.05	0	16
84.22	Cnty Rd 92 (Wood Creek)	Gravel	All-Public	Open Cut	0.83	0	16
84.48	Logging Rd	Dirt	All	Not Crossed	0.20	0	0
84.66	Logging Rd	Dirt	All	Open Cut	1.36	0	0
84.67	Logging Rd	Dirt	All	In ROW	0.05	0	0
86.46 - 86.97	High Noon Spur	Gravel [2,3]	All	In ROW	0.54	0	16
86.46 - 87.38	High Noon Spur (BLM 29-3-31.4)	Gravel [2,3]	All	In ROW	0.33	0	16
86.5	Logging Spur	Dirt	All	In ROW	0.05	0	0
86.50 - 87.05	High Noon Spur (BLM 29-3-31.3)	Gravel [2,3]	All	In ROW	1.01	0	14
86.97 - 86.50	High Noon Spur (BLM NonInv 29-3-31.A)	Gravel [2,3]	All	In ROW	0.09	0	16
87.06	Fate Creek Spur (BLM 30-3.6.1)	Gravel [2,3]	All	In ROW	0.63	0	14
87.06	Fate Creek Spur (BLM 29-3-31.2)	Gravel [2,3]	All	Not Crossed	0.12	0	14
87.95	Calley Logging Spur	Dirt	No Ingress / Egress	Open Cut	0.18	0	16
88.09	Private Rd	Gravel/Dirt [2,3]	All	Not Crossed	0.18	0	0
88.21	Fate Creek (BLM 30-3-6)	Gravel [2,3]	All	Open Cut	0.83	0	16
88.53	Cnty Rd 34 (Days Creek)	Paved	All-Public	Open Cut	2.83	0	14
88.93	Seneca Jones Private Rd	Dirt	All	Open Cut	0.48	0	16
89.07	Seneca Jones Private Rd	Dirt	All	Open Cut	0.18	0	16
89.13 - 89.31	Unknown Rd	Dirt	All	In ROW	0.18	0	16

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
89.31 - 89.50	Seneca Jones Private Rd 7 & 8	Dirt/Gravel [2,3]	All	In ROW	0.37	0	16
89.5	Days Crk Sp	Natural	All	Not Crossed	0.02	0	0
89.5	Days Crk Sp	Aggregate	All	Not Crossed	1.63	0	0
89.5	Days Crk Sp (BLM 30-3-4.1)	Aggregate	All	Not Crossed	0.10	0	0
89.5	Days Crk Sp (BLM 29-3-33.4)	Aggregate	All	Not Crossed	2.02	0	0
89.5	Days Crk Sp (Doe Hollow) (BLM 30-3-4.1)	Aggregate	All	Not Crossed	0.08	0	0
89.79 - 89.85	Bland Mtn Spur	Dirt [2,3]	All	In ROW	0.14	0	16
89.87	Bland Mtn Spur (BLM 30-3-17.4)	Dirt [2,3]	All	Open Cut	0.12	0	16
89.96	Bland Mtn Spur (BLM 30-3-17.1)	Gravel [2,3]	All	Open Cut	0.54	0	16
90.19	Bland Mtn (BLM 30-4-1)	Gravel [2,3]	All	Open Cut	3.80	0	16
90.19 - 90.36	Bland Mtn Spur (BLM 30-3-17.2)	Gravel	All	In ROW	0.15	0	16
90.36 - 90.74	Lavadoure Crk Spur (BLM 30-3-20.2)	Dirt	All	In ROW	1.79	0	14
90.47	Bland Mtn Spur (BLM 30-3-17.3)	Gravel [2,3]	All	Open Cut	0.13	0	16
90.60 - 90.67	Lavadoure Crk Spur (BLM NonInv 30-3-16.A)	Dirt	All	In ROW	0.08	0	14
90.85	Lavadoure Creek (BLM 30-3-30.2)	Gravel	All	Not Crossed	2.78	0	16
90.86 - 90.93	Unknown Spur	Dirt	All	In ROW	0.07	0	12
90.88 - 91.19	Logging Spur (BLM 30-3-28.0)	Dirt	All	In ROW	0.41	0	12
91.19 - 91.74	John Days Spur (BLM 30-3-28) (Wook Rd)	Dirt/Gravel [2,3]	All	In ROW	3.15	0	16
91.96 - 92.29	St Johns Creek Spur 1 (BLM NonInv 30-3-22.C)	Dirt [2,3]	All	Open Cut	1.43	0	16
92.29	St Johns Creek Spur 1	Dirt [2,3]	All	Not Crossed	0.25	0	16
92.36	St Johns Creek Spur 2 (BLM NonInv 30-3-22.D)	Gravel [2,3]	All	Open Cut	0.20	0	16
92.63	St Johns Creek Spur (BLM 30-3-34.1)	Gravel [2,3]	All	Not Crossed	0.07	0	16
92.63	St Johns Creek Spur (BLM 30-3-34.1)	Gravel [2,3]	All	Open Cut	2.10	0	16
92.63	St Johns Creek Spur (BLM 30-3-22)	Gravel [2,3]	All	Not Crossed	0.08	0	16
92.8	Stinchfield Private Rd	Dirt	All	Open Cut	0.46	0	0
93.03 - 93.11	Unknown Rd (BLM NonInv 30-3-22.B)	Dirt	All	In ROW	0.07	0	12
93.05	Corn Creek Spur (BLM 30-2-23.7)	Pit run	All	Not Crossed	0.16	0	14

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
93.11 - 93.50	Unknown Rd (BLM NonInv 30-3-22.A)	Dirt	All	In ROW	0.48	0	12
93.5	Corn Creek Spur (BLM 30-2-23)	Pit run	All	Not Crossed	0.67	0	14
93.5	Corn Creek Spur (BLM 30-2-23)	Pit run	All	Not Crossed	1.03	0	14
93.5	Corn Creek Rd (BLM 30-2-26)	Pit run	All	Not Crossed	0.85	0	14
93.58 - 93.62	Corn Creek Spur (BLM 30-3-23.1)	Gravel [2,3]	All	Not Crossed	0.36	0	14
93.65	Logging Spur (BLM 30-3-23.10)	Dirt	All	Open Cut	0.11	0	12
93.74	Maize Ts Rd (BLM 30-3-23.5)	Gravel [2,3]	All	Open Cut	0.86	0	15
93.76 - 94.06	Maize Ts Rd (BLM 30-3-23.11)	Gravel [2,3]	All	In ROW	0.52	0	15
93.76 - 94.06	Maize Ts Rd (BLM NonInv 30-3-27.A)	Gravel [2,3]	All	Not Crossed	0.22	0	15
94.30 - 94.34	Maize Ts Rd	Gravel [2,3]	All	In ROW	0.96	0	15
94.68	State Hwy 227 (Tiller Trail Hwy)	Paved	All-Public	Open Cut	0.62	0	14
94.68	State Hwy 227 (Tiller Trail Hwy)	Paved	All-Public	Open Cut	0.95	0	14
94.81	Milo & Academy Dr	Paved	All	Not Crossed	0.39	0	16
95.51	Academy Rd (BLM 31-3-3)	Gravel [1,2,3]	All	Open Cut	2.01	0	16
95.94 - 96.30	Unknown Rd	Dirt	All	In ROW	0.38	0	0
96.3	Unknown Logging Rd	Dirt	All	Not Crossed	0.03	0	0
96.3	Unknown Logging Rd	Dirt	All	Not Crossed	0.02	0	0
96.3	Unknown Logging Rd	Dirt	All	Not Crossed	0.02	0	0
96.33	Academy Rd (BLM 31-3-3)	Dirt/Gravel [1,2,3]	All	Open Cut	0.80	0	10
96.67 - 96.91	Private Rd (BLM NonInv 31-3-2.A)	Gravel [2,3]	All	In ROW	0.41	0	16
97	Academy Rd (BLM 31-3-3)	Dirt [2,3]	All	Open Cut	0.69	0	10
97.07 - 97.66	Unknown Rd (BLM NonInv 31-3-1.A)	Dirt	All	In ROW	0.70	0	14
97.67	Stouts Creek Spur (BLM 31-3-1.3)	Gravel [2]	All	Not Crossed	0.44	0	16
97.95	E Fk Stouts Creek Spur (BLM 31-3-3.1)	Gravel [2]	All	Not Crossed	1.74	0	16
97.95	E Fk Stouts Creek Spur (BLM 31-3-1)	Gravel [2]	All	Open Cut	1.03	0	16
97.95	E Fk Stouts Creek Spur (BLM 31-3-2.2)	Gravel [2]	All	Not Crossed	0.49	0	16
97.95	E Fk Stouts Creek Spur (BLM 31-3-2.1)	Gravel [2]	All	Not Crossed	0.47	0	16
97.95	W Fk Stouts Creek Rd (BLM 30-3-34)	Gravel [2]	All	Not Crossed	1.11	0	16
97.95	E Fk Stouts Creek Spur (BLM 31-3-3.1)	Gravel [2]	All	Not Crossed	0.23	0	16
97.96	Mighty Fine Ext Spur (BLM 31-3-1.4)	Gravel	All	Open Cut	0.08	0	10

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
98.31 - 98.48	E Fk Stouts Creek Spur (BLM 31-3-1.1)	Dirt [2,3]	All	In ROW	0.65	0	16
98.48 - 99.29	Unknown Rd (BLM NonInv 31-3-12.A)	Dirt [2,3]	All	In ROW	1.30	0	16
98.48 - 99.29	Unknown Rd	Dirt [2,3]	All	In ROW	1.16	0	16
98.94 - 99.12	Unknown Rd	Dirt [2,3]	All	In ROW	0.18	0	16
99.3	East Fork Stouts Creek	Dirt	All	Not Crossed	0.34	0	0
100.02 - 100.40	FS 3220705 (BLM NonInv 31-3-13.A)	Gravel [1,2,3]	All	In ROW	0.38	0	16
100.40 - 100.67	FS 3220705	Gravel [1,2,3]	All	In ROW	0.30	0	16
100.40 - 100.67	FS 3220705	Gravel [1,2,3]	All	Not Crossed	0.21	0	16
100.67 - 100.75	FS 3220705 (BLM 31-3-24.A)	Gravel [1,2,3]	All	In ROW	1.08	0	16
100.76	FS 3220705	Dirt	All	Open Cut	0.32	0	16
100.87 - 100.94	Unknown Rd	Dirt	All	In ROW	0.09	0	0
100.93	Unknown Rd	Dirt	All	Not Crossed	0.44	0	16
100.94 - 101.12	Unknown Rd	Dirt	All	In ROW	0.38	0	0
101.52	Unknown Rd	Dirt	All	Not Crossed	0.94	0	20
101.57	FS 3220707	Dirt [2,3]	No Ingress / Egress	Open Cut	0.05	0	14
101.77 - 101.92	FS 3220790	Dirt	No Ingress / Egress	Open Cut	0.20	0	14
102.25	Sweetheart T.S. (FS 3220792)	Dirt [2,3]	All	In ROW	0.09	0	14
102.3	Green Butte (FS 3220000)	Gravel [2,3]	All	Not Crossed	4.06	0	16
102.3	Green Butte (FS 3220000)	Gravel [2,3]	All	Open Cut	6.84	0	16
102.62 - 102.83	Sweetheart T.S. (FS 3220792)	Dirt [2,3]	All	In ROW	0.42	0	14
102.87 - 103.60	C&D Lumber	Dirt/Gravel [2,3]	All	In ROW	0.82	0	0
103.00 - 103.14	Unknown Rd	Dirt	All	In ROW	0.15	0	0
103.60 - 103.66	C&D Lumber	Dirt/Gravel [2,3]	All	In ROW	0.31	0	16

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
103.79	C&D Lumber	Gravel [2,3]	All	Open Cut	0.37	0	16
103.93	C&D Lumber	Gravel [2,3]	All	Open Cut	0.22	0	16
103.95	FS 3230137	Gravel [2,3]	All	Not Crossed	0.02	0	16
103.95	FS 3230137	Gravel [2,3]	All	Not Crossed	0.19	0	16
104.14	FS 3230136	Gravel [1,2,3]	All	Open Cut	0.40	0	14
104.24	Callahan Crk Rd (FS 3230000)	Gravel [2,3]	All	Open Cut	9.62	0	16
104.27	FS 3230100	Gravel [1,2,3]	All	Open Cut	0.63	0	14
104.27	FS 3230135	Gravel [1,2,3]	All	Not Crossed	0.36	0	14
104.83	FS 3230120	Dirt	No Ingress / Egress	In ROW	0.06	0	14
104.84	FS 3230100	Gravel [1,2,3]	All	Open Cut	0.04	0	14
104.85	FS 3230121	Dirt	No Ingress / Egress	Open Cut	0.01	0	14
105.32	FS 3230100	Gravel [1,2,3]	All	Open Cut	0.66	0	14
105.38 - 105.53	Wildcat Ridge Rd (FS 3200000)	Gravel [2,3]	All-WTC	In ROW	3.90	0	14
105.69 - 106.00	FS 3200255	Dirt [2,3]	All	In ROW	0.39	0	14
106.13 - 106.37	FS 3200260	Gravel [2,3]	All	In ROW	0.46	0	14
106.50 - 106.77	FS 3200269	Dirt	No Ingress / Egress	In ROW	0.25	0	14
106.77	FS 3200280	Gravel	No Ingress / Egress	Not Crossed	0.02	0	14
106.77 - 106.84	Wildcat Ridge Rd (FS 3200000)	Gravel [2]	All-WTC	Not Crossed	0.87	0	14
106.77 - 107.10	Wildcat Ridge I TS (FS 3200270)	Dirt	No Ingress / Egress	In ROW	0.36	0	14
107.26 - 107.47	Wildcat Ridge I TS (FS 3200300)	Dirt	All	In ROW	0.20	0	14
107.43 - 107.63	Wildcat Ridge TS (FS 3200301)	Dirt [2,3]	All	In ROW	0.17	0	14
107.5	Wildcat Ridge Rd (FS 3200300)	Dirt [4]	All	In ROW	0.13	0.01	14
108.09	Wildcat Ridge Rd (FS 3200000)	Gravel [2]	All-WTC	Open Cut	0.87	0	14
108.16	FS 3200330	Gravel	No Ingress / Egress	In ROW	0.11	0	14
108.32	Wildcat Ridge Rd (FS 3200000)	Gravel [2]	All-WTC	Open Cut	0.91	0	14
108.40 - 108.66	FS 3200359	Dirt	No Ingress / Egress	In ROW	0.16	0	0
108.88	E Fk T.S. (FS 3200380)	Gravel	No Ingress / Egress	Open Cut	0.03	0	10
108.96	Cow Creek/Wildcat Ridge Rd (FS 3200000)	Gravel [2]	All-WTC	Open Cut	1.91	0	14
109.15	FS 3200500	Gravel [2]	All	Open Cut	0.54	0	10

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
109.30 - 109.37	FS 3200500	Gravel [2]	All	In ROW	0.42	0	10
109.59 - 109.68	FS 3200500	Gravel [2]	All	In ROW	0.23	0	10
110.15 - 110.54	FS 3232891	Dirt [2,3]	All	In ROW	0.48	0	10
110.4	Pevine Quarry (FS 3232895)	Gravel	All	Not Crossed	0.28	0	10
110.4	Pevine Quarry (FS 3232896)	Gravel	All	Not Crossed	0.15	0	10
110.4	Pevine Quarry (FS 3232898)	Gravel	All	Not Crossed	0.17	0	10
110.55	South Fork Cow Creek (FS 32320000)	Gravel [2,3]	All	Open Cut	8.81	0	16
111	Long Prarie Rd (FS 3200600)	Gravel [2,3]	All-WTC	Not Crossed	4.49	0	14
111.66 - 112.07	Wildcat Ridge Rd (Cow Creek Rd) (FS 3200000)	Gravel [2,3]	All-WTC	In ROW	4.67	0	14
112.07 - 113.06	FS 3200750	Gravel [2,3]	All	In ROW	0.07	0	14
112.07 - 113.06	FS 3200750	Gravel [2,3]	All	In ROW	1.08	0	14
113.37	Unknown Rd (BLM NonInv 32-2-36.B)	Dirt [2,3]	All	Open Cut	0.13	0	16
113.63	Unknown Rd (BLM NonInv 32-2-36.B)	Dirt [2,3]	All	Not Crossed	0.19	0	16
113.66	Beaver Springs Sp (BLM 32-1-31.3)	Dirt [2,3]	All	Not Crossed	0.35	0	16
113.66	Beaver Springs (BLM 32-1-31.1)	Dirt [2,3]	All	Not Crossed	0.30	0	16
113.66	Beaver Springs Sp (BLM NonInv 32-2-36.A)	Dirt [2,3,4]	All	Open Cut	0.81	0.75	16
114.08	Unknown Rd	Dirt	No Ingress / Egress	Open Cut	0.11	0	16
115.13	Beaver Springs Sp (BLM NonInv 32-2-36.A)	Gravel [2,3]	All	Open Cut	1.08	0	16
115.13	Unknown Rd (BLM NonInv 32-2-36.A)	Gravel [2,3]	All	In ROW	0.04	0	16
115.36	Hardway MI (BLM 33-2-12)	Gravel [2,3]	All	Open Cut	0.28	0	17
115.84	Dwinnel Rd (BLM 33-1-5)	Gravel [2,3]	All	Open Cut	2.71	0	16
116.08	Old Ben Ex (BLM 33-1-7.2)	Gravel [2,3]	All	Open Cut	0.17	0	16
116.33	Dwinnel Rd (BLM 33-1-5)	Gravel [2,3]	All	Open Cut	0.43	0	16
117.85	Morris Taylor Dr (BLM NonInv 33-1-20.B)	Dirt [2,3]	All	Open Cut	0.62	0	16
118.25	Morris Taylor Dr (BLM NonInv 33-1-20.A)	Dirt [2,3,4]	All	Open Cut	0.23	0.35	16
118.57	Morris Taylor Dr	Dirt [2,3,4]	All	Not Crossed	0.67	1.27	16
118.57	Morris Taylor Dr	Dirt [2,3,4]	All	Open Cut	0.23	0.35	16
118.57	Morris Taylor Dr (BLM NonInv 33-1-29.A)	Dirt [2,3,4]	All	Not Crossed	0.28	0.73	16
118.80	Morris Taylor Dr	Dirt [2,3]	No Ingress / Egress	Open Cut	0.04	0	16
118.93	West Fork Creek Trail Rd (BLM 33-1-29)	Paved	All-Public	Open Cut	0.55	0	30
119.03	Cabin Canyon Rd (Trail Creek Spur) (BLM 33-1-29.2)	Dirt [2]	All	Open Cut	1.14	0	14

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
119.7	Cabin Canyon MI (BLM 33-1-29.1)	Dirt [2]	All	Open Cut	0.96	0	16
120.00 - 120.08	Canyon Ck Ridge Rd (BLM 33-1-28)	Dirt [2]	All	Open Cut	0.12	0	14
120.05	Unknown Rd	Dirt	No Ingress / Egress	In ROW	0.01	0	14
120.23	Canyon Creek Ridge Rd (BLM 33-1-28)	Dirt	No Ingress / Egress	Open Cut	0.04	0	14
120.28	Canyon Creek Ridge Rd (BLM 33-1-28)	Dirt	No Ingress / Egress	Open Cut	0.04	0	14
120.45	Canyon Creek Spur (BLM NonInv 33-1-33.A)	Dirt	All	Open Cut	0.10	0	14
120.45	Canyon Ck Ridge Rd (BLM 33-1-28)	Dirt [2]	All	Not Crossed	0.19	0	14
120.55	Canyon Creek Spur	Dirt/Gravel [2,3]	All	Not Crossed	0.05	0	16
120.55	Loper Ln	Dirt/Gravel [2,3]	All	Open Cut	0.23	0	16
120.85 - 120.91	Private Rd	Dirt/Gravel [2,3]	All	Open Cut	0.51	0	16
121.8	Unknown Rd	Dirt/Gravel [1,2,3]	All	Open Cut	0.59	0	10
122.05	Private Rd	Gravel	All	Not Crossed	0.31	0	16
122.36	Private Rd	Dirt	No Ingress / Egress	HDD	0.09	0	16
122.54	Ragsdale Rd	Paved	All-Public	HDD	0.59	0	16
122.58	Old Trail Creek Rd.	Gravel/Paved	All-Public	HDD	1.35	0	16
122.6	State Hwy 62 (Crater Lake Highway)	Paved/Concrete	All-WTC-Public	HDD	0.44	0	10
122.76	2500-3013 Old Ferry Rd	Gravel [2,3]	All-WTC	HDD	0.08	0	16
122.99	2500-3013 Old Ferry Rd (BLM 34-1-3.2) (Homesite Spur)	Gravel [2,3,4]	All-WTC	Not Crossed	0.18	0.01	16
122.99	2500-3013 Old Ferry Rd	Gravel [2,3, 4]	All-WTC	Open Cut	0.40	0.01	16
123.08	Old Ferry Rd (BLM 34-1-10)	Gravel [2,3,4]	All-WTC	Open Cut	1.40	0.04	14
123.08	Cnty 513 (Old Ferry Rd)	Gravel [2,3]	All-WTC-Public	Not Crossed	1.34	0	14
123.08	Old Ferry Rd	Gravel [2,3]	All-WTC	Not Crossed	0.34	0	14
124	Flounce Rock Rd (BLM 32-2E-34) (Flounce Rock Comm Site)	Gravel	All	Not Crossed - Comm *	4.58	0	14
124.97 - 125.13	Indian Creek Firebreak (BLM 34-1-23)	Gravel [2,3,4]	All	Open Cut	2.17	2.82	10
124.97 - 125.13	Indian Creek Firebreak (BLM 34-1-23)	Gravel	All	Open Cut	0.15	0	16
124.97 - 125.13	Indian Creek Firebreak (BLM 34-1-23)	Gravel	Light	Open Cut	0.09	0	16
125.40 - 125.56	Indian Creek Firebreak (BLM 34-1-23)	Dirt/Rock [2,3]	Light	In ROW	0.69	0	10
125.87	Indian Creek Firebreak (BLM 34-1-23)	Dirt/Rock [2,3]	Light	Open Cut	0.50	0	10
126.27 - 126.59	Indian Creek Firebreak (BLM 34-1-23)	Dirt/Rock [2,3]	Light	Open Cut	0.56	0	10

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
126.59	Unknown Rd (BLM NonInv 34-1E-18.A)	Dirt [1,2,3]	All	Open Cut	0.05	0	10
127.3	Indian Creek Firebreak (BLM 34-1-23)	Dirt/Rock [2,3,4]	All	Open Cut	1.85	0.66	10
127.3	Indian Lake Reservoir Access	Gravel	All	Not Crossed	0.79	0	10
127.3	Indian View (BLM 34-1E-20)	Dirt/Rock [2,3,4]	All	Not Crossed	0.50	0.65	10
127.3	Kleeman Re-Route Road	Dirt [2,3,4]	All	Not Crossed	0.59	0.65	0
127.3	Indian Creek Firebreak (BLM 34-1-23)	Dirt/Rock [2,3,4]	All	Not Crossed	0.21	0.65	10
128.06 - 128.17	BLM 34-1-23.5	Dirt [2,3]	All	In ROW	0.14	0	16
128.38	Unknown Rd	Dirt	No Ingress / Egress	Open Cut	0.02	0	16
129.28	Reese Creek Spur (BLM 034-1E-30.1)	Dirt [2,3]	All	Open Cut	0.06	0	14
129.67	Unknown Rd	Dirt [2,3]	All	Open Cut	0.05	0	16
129.90	Powerline Rd	Dirt	No Ingress / Egress	Open Cut	0.02	0	16
130.23	Unknown Rd	Dirt [2,3]	No Ingress / Egress	Open Cut	0.02	0	16
130.81	Crowfoot Rd	Paved	All-WTC-Public	Open Cut	0.44	0	16
132.47	Hwy 821 (Butte Falls Hwy)	Paved	All-WTC-Public	Open Cut	0.51	0	16
133.34	Private Rd	Gravel [2]	All	Open Cut	1.05	0	16
133.38	Unknown Rd	Dirt	No Ingress / Egress	Bore	0.31	0	16
133.47	Medford Aqueduct Access Rd (BLM 34-1E-35)	Dirt [2,3]	All	Open Cut	1.69	0	16
133.55	Unknown Rd	Dirt	No Ingress / Egress	Open Cut	0.06	0	16
133.59	Unkonwn Rd.	Dirt	No Ingress / Egress	Open Cut	0.03	0	0
133.98 - 134.14	Unknown Rd	Dirt	Light	Open Cut	0.22	0	16
134.14	Unknown Rd (BLM NonInv 35-1E-11.A)	Dirt [2,3]	Light	Not Crossed	1.79	0	16
134.27	Unknown Rd (BLM NonInv 35-1E-2.A)	Dirt [2,3]	All	Open Cut	0.24	0	16
134.65	OBENCHAIN R/W (BLM 35-1E-18)	Dirt [2,3]	All	Not Crossed	1.74	0	16
134.65	Obenchain R/W (BLM 35-1E-11.1)	Dirt [2,3]	All	Open Cut	0.75	0	16
134.65	Obenchain R/W (BLM 35-1E-11.1)	Dirt [2,3]	All	Not Crossed	0.32	0	16
134.87	Unknown Rd (BLM NonInv 35-1E-11.B)	Dirt [2,3,4]	Light	Open Cut	0.74	0.55	16
134.87	Unknown Rd (BLM NonInv 35-1E-11.B)	Dirt [2,3,4]	All	Open Cut	0.24	0.55	16
134.87	Unknown Rd (BLM NonInv 35-1E-11.C)	Dirt [2,3]	All	In ROW	0.01	0	16
135.53	Unknown Rd (BLM NonInv 35-1E-11.D)	Dirt [2,3,4]	Light	Open Cut	0.08	0.25	16
136.13	Unknown Rd (BLM NonInv 35-1E-11.B)	Dirt [2,3,4]	Light	Open Cut	0.87	1.56	16
136.30 - 136.46	Unknown Rd (BLM NonInv 35-1E-14.A)	Dirt [2,3,4]	Light	Open Cut	0.38	0.48	16
136.46	Unknown Rd	Dirt [2,3,4]	Light	Not Crossed	0.43	0.67	16
136.46	Unknown Rd (BLM NonInv 35-1E-11.B)	Dirt [2,3,4]	Light	Not Crossed	0.14	0.34	16
136.84	Geppert Butte Spur W (BLM 35-1E-13.1)	Dirt [2,3,4]	Light	Open Cut	0.49	0.79	15

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
137.3	Obenchain Rd	Gravel/Paved [2]	All-Public	Open Cut	0.23	0	16
138.08	BLM 35-1E-13	Dirt [2,3,4]	All	Not Crossed	0.64	0.40	16
138.08	Terbeck Existing Access	Dirt [2,3,4]	All	Open Cut	0.21	0.31	16
138.63	Unknown Rd	Dirt [2,3,4]	All	Open Cut	0.22	0.34	16
138.63	BLM 35-1E-13	Dirt [2,3,4]	All	Not Crossed	0.61	0.41	16
139.05	BLM 35-1E-13	Dirt [2,3,4]	All	Not Crossed	0.42	0.41	16
139.45	BLM 35-1E-13	Dirt [2,3,4]	All	Open Cut	0.53	0.40	16
140.31	Unknown Rd	Dirt	No Ingress / Egress	Open Cut	0.05	0	0
140.63	Salt Over Rd (BLM 36-2E-7.1)	Dirt	No Ingress / Egress	Open Cut	0.03	0	0
140.67	Hanscom Driveway (BLM 35-2E-33)	Dirt [2,3]	All	Not Crossed	0.42	0	20
140.67	Unknown Rd	Dirt [2,3,4]	All	Open Cut	0.84	0.96	20
140.67	Salt Over Rd (BLM 36-2E-7.1)	Dirt [4]	All	Not Crossed	0.33	0.18	0
141.45 - 141.80	Unknown BLM Rd	Gravel	No Ingress / Egress	In ROW	0.40	0	0
141.8	Salt Creek Access Rd (BLM 36-2E-7)	Paved	All	Open Cut	2.15	0	20
142.09	Unknown Rd	Dirt [2,3]	All	Open Cut	0.08	0	16
142.59	Unknown Rd	Dirt [2,3]	Light	Open Cut	0.52	0	16
142.8	Unknown Rd	Dirt [1,2,3]	No Ingress / Egress	Open Cut	0.12	0	0
143.64	Unknown Rd	Dirt [2,3,4]	All	Open Cut	2.37	0.04	16
144.06	Gardner Butte Rd (BLM 36-2E-16)	Dirt [1,2,3]	All	Not Crossed	0.14	0	16
144.06	Unknown Rd	Dirt [1,2,3]	All	Open Cut	1.18	0	16
144.69	Salt Creek Rd (BLM 36-2E-19)	Dirt	All	Open Cut	1.62	0	14
145.15	Salt Creek Rd (Gardner Road) (BLM 36-2E-19)	Gravel	All	Not Crossed	1.13	0	14
145.2	Private Rd	Gravel	All	Open Cut	0.68	0	16
145.38	Private Rd	Gravel	All	Open Cut	0.53	0	16
145.58	State Hwy 140 (Lake of the Woods)	Paved	All-Public	Bore	2.79	0	16
145.98	Unknown Rd	Dirt [2,3]	All	Open Cut	0.07	0	16
146.2	Unknown Rd	Dirt [2,3]	All	Open Cut	0.32	0	16
146.81	Hanley South Canal Rd	Dirt [2,3]	All	Open Cut	2.62	0	14
147	Private Rd	Gravel	All	Not Crossed	0.06	0	10
147.68	Unknown Rd	Gravel [2,3]	All	Open Cut	1.12	0	16
147.76 - 148.00	Unknown Rd	Dirt [2,3]	All	Open Cut	0.50	0	10
148	Private Rd	Gravel	All	Not Crossed	0.15	0	10
150.15	Heppsie Mtn B Spur (BLM NonInv 37-2E-2.A)	Gravel	No Ingress / Egress	Open Cut	0.04	0	16
150.22	Heppsie Mtn Quarry Spur	Gravel	No Ingress / Egress	Open Cut	0.09	0	16
150.25	Heppsie Mtn Quarry Spur (BLM 37-2E-1.3)	Gravel	No Ingress / Egress	Open Cut	0.03	0	16

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
150.43 - 150.65	Heppsie Mtn Quarry Spur (BLM 37-3E-6.8)	Gravel	All	Not Crossed	0.86	0	16
150.43 - 150.65	Heppsie Mtn Quarry Spur (BLM 37-2E-1)	Gravel	All	Not Crossed	0.66	0	16
150.43 - 150.65	Heppsie Mtn Quarry Spur (BLM 37-2E-1.3)	Gravel	All	Open Cut	0.52	0	16
150.98 - 151.42	BLM 37-3E-6.10	Dirt [2,3]	All	In ROW	0.54	0	16
151.56	BLM 37-3E-6.10	Dirt [2,3]	All	Open Cut	0.20	0	14
151.68	Unknown Rd (BLM NonInv 37-3E-6.D)	Dirt [2,3]	All	Open Cut	0.08	0	16
151.77	Unknown Rd (BLM NonInv 37-3E-6.C)	Dirt [2,3]	All	Open Cut	0.13	0	16
152.06 - 152.14	BLM 37-3E-6.10	Dirt [2,3]	All	In ROW	0.42	0	14
152.08 - 152.31	Unknown Rd (BLM NonInv 37-3E-6.A)	Dirt	All	Open Cut	0.12	0	10
152.08 - 152.31	Unknown Rd (BLM NonInv 37-3E-6.B)	Dirt	All	Open Cut	0.11	0	10
152.31	Heppsie Mtn Pond Spur (BLM 37-3E-6.3)	Dirt	All	Open Cut	0.19	0	14
152.38	Heppsie Mtn Stub Spur (BLM 37-3E-6.4)	Dirt	All	Open Cut	0.10	0	14
152.56	Heppsie Mtn Mainline (BLM 36-3E-31)	Gravel [2,3]	All	Open Cut	0.21	0	18
152.56	Heppsie Mtn Mainline (BLM 37-3E-31)	Gravel [2,3]	All	Open Cut	4.55	0	18
153.52	Heppsie Mtn Ridgetop Spur (BLM 37-3E-5.2)	Dirt [2,3]	All	Open Cut	0.17	0	12
155.03	Unknown Rd	Dirt [2,3]	All	Open Cut	0.37	0	14
155.45	Unknown Rd	Dirt [2,3]	All	Open Cut	0.31	0	14
155.50 - 155.97	FS 2815410	Dirt/Gravel [2,3]	Light	In ROW	0.81	0	14
155.50 - 155.97	FS 2815410	Dirt/Gravel [2,3]	Light	In ROW	0.63	0	14
155.98	FS 2815415	Dirt	No Ingress / Egress	Open Cut	0.04	0	14
156.32	FS 2815415	Dirt	No Ingress / Egress	Open Cut	0.03	0	14
156.77	FS 2815000	Gravel [2,3]	All	Open Cut	2.71	0	16
156.77	Grizzely Rd (FS 2815000)	Gravel [2,3]	All	Not Crossed	2.56	0	16
157.40	FS-2815320	Decommissioned [2,3]	All	Open Cut	0.07	0	14
157.55	FS-2815300	Gravel [2,3]	All	Open Cut	2.69	0	14
158.72 - 159.41	FS 3707500	Gravel [2,3]	All	In ROW	1.99	0	16

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
158.72 - 159.41	Candy Bar Rd (FS 3707500)	Gravel [2,3]	All	Not Crossed	0.71	0	16
159.99 - 160.62	S. Fk Little Butte Creek Rd (FS 3730000)	Dirt/Gravel [2,3]	All	In ROW	1.97	0	20
160	FS 3730050 (Robinson Butte Comm Site)	Gravel	All	Not Crossed - Comm *	1.91	0	16
160	S. Fk Little Butte Creek Rd (FS 3730000)	Dirt/Gravel [2,3]	All	Not Crossed	1.50	0	20
160.09	FS 3730180	Dirt	No Ingress / Egress	Open Cut	0.02	0	0
160.41	FS 3730090	Decommissioned	No Ingress / Egress	Open Cut	0.05	0	0
160.59	FS 3730070	Decommissioned	No Ingress / Egress	Open Cut	0.02	0	0
160.62 - 160.73	FS 3700133	Rock [2,3]	All	In ROW	0.15	0	14
160.76	Big Elk Cinder Pit (FS 3700134)	Rock [2,3]	All	Open Cut	0.48	0	14
160.76 - 160.91	FS 3700130	Gravel [2,3]	All	In ROW	0.70	0	18
160.85	FS 3700130	Gravel [2,3]	All	Open Cut	0.02	0	18
161	FS 2800705	Gravel	All	Not Crossed	0.86	0	14
161	FS 2800700	Gravel	All	Not Crossed	0.11	0	14
161.26	FS 3700131	Dirt [2,3]	All	Open Cut	0.23	0	12
161.41	Big Elk Rd (FS 3700000)	Paved	All	Open Cut	5.07	0	16
161.41	FS 3707000	Gravel (cinder)	All	Not Crossed	3.30	0	16
161.41	Big Elk Rd (FS 3700000)	Gravel [2]	All	Not Crossed	3.03	0	16
161.41	Rum Rye Rd (FS 3740000)	Aggregate	All	Not Crossed	1.19	0	0
161.41	Scotch Rd (FS 100)	Aggregate	All	Not Crossed	0.76	0	0
162	FS 2800800	Gravel	All	Not Crossed	0.74	0	18
162.02	FS 3705080 (Decommissioned)	Dirt [4]	All	Open Cut	0.29	0.49	0
162.26	Unknown Rd	Dirt [1,2,3]	All	Not Crossed	0.21	0	0
162.80 - 162.90	FS 3700113	Dirt [2,3]	All	In ROW	0.55	0	14
163.14	FS 3700100	Gravel [2,3]	All	Open Cut	0.95	0	16
163.14 - 163.21	FS 3700115	Unknown	No Ingress / Egress	In ROW	0.09	0	0
163.79 - 164.21	FS 3720180	Decommissioned	No Ingress / Egress	Open Cut	0.28	0	0
163.95	FS 3720185	Decommissioned	No Ingress / Egress	In ROW	0.01	0	0
164.21 - 165.93	FS 3720000	Gravel [2]	All	Open Cut	2.97	0	16
164.3	FS 3720190	Decommissioned	No Ingress / Egress	In ROW	0.04	0	0
164.4	FS 3720200	Decommissioned	No Ingress / Egress	Open Cut	0.03	0	0

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
164.87	Linda Rd	Dirt	All	In ROW	0.00	0	0
165.47	FS 3720480	Decommissioned	No Ingress / Egress	Not Crossed	0.01	0	0
165.68	FS 3705000	Dirt	All	Open Cut	4.49	0	20
165.72	FS 3720500	Gravel [2]	All	Not Crossed	0.19	0	16
166.1	Brown Mtn Rd (FS 3720510)	Decommissioned [2,3,4]	All	Open Cut	0.31	0.50	14
166.45	FS 3720520	Gravel [2,3]	All	Open Cut	0.77	0	16
167.31	Daley Creek Rd (FS 3720000)	Gravel [2,3]	All	Open Cut	3.77	0	16
167.51 - 167.69	FS 3720820	Dirt	No Ingress / Egress	Open Cut	0.19	0	0
168.28 - 168.68	West Muddy Springs (FS 3700750)	Gravel [2]	All	In ROW	0.96	0	14
168.42	FS 3700754	Dirt	No Ingress / Egress	Open Cut	0.02	0	0
168.84	Dead Indian Memorial Rd	Paved	All-WTC-Public	Not Crossed	2.18	0	10
168.84	Dead Indian Memorial Rd	Paved	All-WTC-Public	Open Cut	0.71	0	10
168.85	FS 3700240	Paved	All	Not Crossed	0.52	0	10
168.92	FS 3800991	Dirt	No Ingress / Egress	Open Cut	0.04	0	0
169.1	FS 3800990	Dirt	No Ingress / Egress	Open Cut	0.03	0	0
169.34	FS 3800996	Dirt	No Ingress / Egress	Open Cut	0.03	0	0
169.48	Unknown Rd	Dirt/Gravel	All	Open Cut	0.07	0	10
169.52 - 187.30	Cnty Rd 603 (Clover Creek Rd)	Paved	All-Public	Not Crossed	21.36	0	10
169.52 - 187.30	Cnty Rd 603 (Clover Creek Rd)	Paved	All-Public	Not Crossed	0.22	0	10
169.75	Unknown Rd	Dirt/Gravel	All	Open Cut	0.04	0	10
170.85	FS 3800960	Dirt [2,3]	All	Open Cut	0.03	0	14
170.97	USFS non-system road	Dirt [2,3]	All	Open Cut	0.04	0	10
171.09	Spencer Creek Quarry (FS 3800950)	Dirt [2,3]	All	Open Cut	0.06	0	14
171.41	Private Rd.	Dirt [2,3]	All	Open Cut	0.16	0	16
171.6	FS 3800940	Dirt [2,3]	All	Open Cut	0.19	0	16
172.08	FS 3800900	Dirt [2,3]	All	Open Cut	0.11	0	14
172.24 - 172.31	FS 3800903	Dirt [1,2,3]	All	Open Cut	0.23	0	14
172.57	Desolation (FS 3850000)	Gravel [2,3]	All	Open Cut	0.15	0	16
172.8	Unknown Rd	Dirt	All	Open Cut	0.09	0	0
173.02	BLM NonInv 38-5-12	Dirt [2,3]	All	Open Cut	0.04	0	16
173.79	FS 3800820	Dirt	All	Open Cut	0.11	0	14
174.17	FS 3800790	Gravel [2,3]	All	Open Cut	0.19	0	14

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
174.68	Buck Peak (FS 3852000)	Gravel [2,3]	All	Open Cut	0.04	0	16
175.38 - 175.47	3852015	Dirt [2,3]	All	Open Cut	0.18	0	16
175.64 - 176.02	Unknown Rd	Dirt	All	In ROW	0.51	0	16
176.36	Private Rd (BLM NonInv 38-6E-21.A) (Closed Berm)	Dirt [2,3]	All	Open Cut	0.03	0	16
176.66	N. Clover (BLM 38-6E-21.2)	Rock [2,3]	All	Open Cut	0.07	0	14
177.1	Private Rd (BLM NonInv 38-6E-21.B) (Section 21)	Rock [2,3]	All	Open Cut	0.03	0	16
177.81	Clover Spur (BLM 38-6E-27.1)	Rock [2,3]	All	Open Cut	0.05	0	14
177.99	Rock Rd2 (BLM NonInv 38-6E-21.B) (Section 27)	Rock [2,3]	All	Open Cut	0.07	0	16
178.26 - 178.28	Private Rd (BLM NonInv 38-6E-27.A)	Gravel [2,3]	All	In ROW	0.39	0	16
178.3	Weyco Clover Spur (BLM 38-6E-27)	Gravel [2,3]	All	Open Cut	0.07	0	14
178.76	Private Rd	Rock [2,3]	All	Open Cut	0.03	0	16
179.25	S Clover Butte (BLM 38-6E-35.4)	Rock [2,3]	All	Open Cut	0.04	0	14
179.81	Clover Butte (BLM 38-6E-35) (FS 3828000)	Rock [2,3]	All	Open Cut	0.03	0	14
180.36	206-59 (Private Rd)	Gravel [2,3]	All	Open Cut	0.04	0	16
180.79	Private Rd 101-100 (BLM 39-9E-18)	Rock [2,3]	All	Not Crossed	0.81	0	16
180.79	Private Rd	Rock [2,3]	All	Open Cut	2.08	0	16
181	Private Rd	Dirt [2,3]	All	Open Cut	0.03	0	16
181.33	Private Rd	Dirt [2,3]	All	Open Cut	0.10	0	16
181.55	Private Rd	Dirt [2,3]	All	Open Cut	0.03	0	16
182.13	Private Rd	Gravel (cinder) [2,3]	All	Open Cut	0.08	0	16
182.16	Private Rd	Gravel (cinder) [2,3]	All	Open Cut	0.45	0	16
182.49	201-50 - Private Rd	Rock [2,3]	All	Open Cut	0.03	0	16
182.98	201-50 - Private Rd	Rock [2,3]	All	Open Cut	0.38	0	16
183.6	201-50 - Private Rd	Rock [2,3]	All	Open Cut	0.30	0	16
183.64	Cnty Rd 3451 (NorthBRanch Rd)	Rock [2,3]	All	Open Cut	0.03	0	16
183.79	Unknown Rd	Dirt [2,3]	All	Open Cut	0.04	0	16
184.07	Unknown Rd	Dirt/Cinder [2,3]	All	Open Cut	0.11	0	16
184.81	Private Rd (200-00)	Gravel [2,3]	All	Not Crossed	0.65	0	16
184.81	Private Rd 85105	Gravel [2,3]	All	Open Cut	0.05	0	16
184.81	Private Rd UST-100	Gravel [2,3]	All	Not Crossed	3.44	0	16
184.81	Hwy 66	Paved	All-Public	Not Crossed	0.47	0	0
184.81	Keno Acces (BLM 39-7E-31)	Paved	All	Not Crossed	0.90	0	22

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
184.81	Private Rd (101-100) (BLM 39-9E-18)	Gravel [2,3]	All	Not Crossed	0.42	0	16
184.81	Private Rd	Gravel [2,3]	All	Not Crossed	0.10	0	16
184.81	Private Rd (200-01)	Gravel [2,3]	All	Not Crossed	0.87	0	16
185.26	Unknown Rd	Gravel (cinder) [2,3]	All	Open Cut	0.03	0	16
185.53	Unknown Rd	Gravel (cinder) [2,3]	All	Open Cut	0.03	0	10
185.68	Unknown Rd	Gravel (cinder) [2,3]	All	Open Cut	0.03	0	16
185.94	Unknown Rd	Dirt [2,3]	All	Open Cut	0.03	0	16
186.2	Unknown Rd	Dirt [2,3]	All	Open Cut	0.04	0	10
186.75	Unknown Rd	Dirt [2,3,4]	All	Open Cut	0.03	0.06	16
187.46	Unknown Rd	Gravel	All	Open Cut	0.10	0	16
187.6	Unknown Rd	Dirt	No Ingress / Egress	Open Cut	0.03	0	0
187.76	Power Line Access Road	Dirt	All	Open Cut	0.68	0	16
187.84	Unknown Rd	Dirt	All	Open Cut	0.05	0	0
188.09	Unknown Rd	Dirt	All	Open Cut	0.10	0	0
188.17	Unknown Rd	Dirt	All	Open Cut	0.27	0	0
188.41	Unknown Rd	Dirt	All	Open Cut	0.06	0	0
188.86	Unknown Rd	Dirt [1,2,3]	All	Open Cut	0.55	0	0
188.86	Unknown Rd	Dirt [1,2,3]	All	Not Crossed	0.32	0	0
189.56	Unknown Rd	Dirt [1,2,3]	All	In ROW	0.76	0	0
189.9	Old Wagon Rd	Dirt	All	Not Crossed	1.17	0	10
190.75	Homestead Ln	Dirt [2]	All	Open Cut	0.11	0	16
190.80 - 191.46	Homestead Ln	Dirt [2]	All	In ROW	0.66	0	16
191.48	State Highway 66 - Ashland-Klamath Falls Highway	Paved	All-Public	Not Crossed	3.11	0	10
191.48	State Highway 66 - Ashland-Klamath Falls Highway	Paved	All-Public	Bore	2.10	0	10
191.48	State Highway 66 - Ashland-Klamath Falls Highway	Paved	All-Public	Not Crossed	0.89	0	10
192.57 - 197.61	Weyerhaeuser Timber Company Rd	Paved [2]	All	In ROW	2.37	0	16
192.57 - 197.61	Weyerhaeuser Timber Company Rd	Paved [2]	All	Open Cut	3.09	0	16
194.52	Kerns Swamp Rd	Gravel [2]	All	Open Cut	0.18	0	16
195.14	Unknown Rd	Dirt	All	Open Cut	0.04	0	10
197.57	Weyerhaeuser Timber Company Rd	Paved [2]	All	Not Crossed	0.24	0	16
197.61	Weyerhaeuser Corp Rds	Paved	All	Open Cut	0.20	0	16
197.7	Weyerhaeuser Corp Rd	Paved	All	Open Cut	0.24	0	16

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
198.22 - 198.44	Weyerhaeuser Corp Rd	Paved	All	Open Cut	1.33	0	16
198.4	Unknown Rd	Paved	All	Not Crossed	0.01	0	16
198.42 - 199.00	Weyerhaeuser Corp Rds	Gravel	All	In ROW	0.73	0	16
199.05	Unknown Industrial Rd	Dirt	All	Not Crossed	0.47	0	0
199.19	Unknown Industrial Rd	Gravel	All	Not Crossed	0.93	0	16
199.28	BN & SF Railroad	Rails	RR	HDD	0.26	0	0
199.57	US 97	Paved	All-Public	HDD	0.92	0	10
199.6	Private Rd	Gravel	All	Not Crossed	0.04	0	16
200.07	Southern Pacific Railroad	Rails	RR	Bore	1.55	0	0
200.35	Joe Wright Rd	Paved	All-Public	Open Cut	1.12	0	16
201	Midland Hwy 420 (Tingley Ln)	Paved	All-Public	Bore	0.64	0	10
201	Cnty Rd 528 (Tingley Ln)	Paved	All-Public	Bore	0.14	0	10
201.49	Miller Island Rd/Drway	Gravel [2]	All	Open Cut	0.53	0	16
202.92 - 203.61	Unknown Rd	Dirt	No Ingress / Egress	In ROW	0.66	0	0
203.76	Unknown Rd	Dirt	No Ingress / Egress	Open Cut	0.03	0	0
203.97	Old Midland Rd/Driveway	Paved	All-Public	Open Cut	1.53	0	10
204.13	Old Midland Rd (C-4 Lateral) (BOR 735)	Dirt [2]	All	Open Cut	0.23	0	16
204.32	Road on Levee (C-4-F Lateral) (BOR 736)	Dirt [2]	All	Open Cut	0.13	0	16
204.65	Cnty Rd 876A (Spring Lake Rd)	Paved	All-Public	Open Cut	0.51	0	10
204.75	Pring Lake Rd (3 Drain) (BOR 737)	Dirt [2]	All	Bore	0.14	0	16
204.99	Existing Field/Canal Rd (C-4-D Lateral) (BOR 738)	Dirt [2]	All	Not Crossed	0.21	0	16
205.07	Existing Field/Canal Rd (C-4-D Lateral) (BOR 738)	Dirt [2]	All	Not Crossed	0.17	0	16
205.50	Existing Field Rd (C-4-C Lateral) (BOR 739)	Dirt [2]	All	Bore	0.15	0	16
205.64	Existing Field Rd (C-4-C Lateral) (BOR 739)	Dirt [2]	All	Open Cut	0.16	0	16
205.72	Cnty Rd 830 (Homedale Rd)	Paved	All-Public	Open Cut	1.01	0	10
205.97	Road on Levee	Dirt	No Ingress / Egress	Bore	0.02	0	0
206.5	Cross Rd	Paved	All-Public	Bore	1.00	0	10
207.27	Cnty Rd 889 (Matney Rd)	Paved	All-Public	Bore	1.51	0	10
207.41	Cnty Rd 962 (Levee Rd)	Gravel [2]	All-Public	Bore	0.16	0	16
207.7	Unknown (Matney Rd)	Gravel [2]	All	Not Crossed	0.18	0	16
207.98	Road on Levee (5-A Drain) (BOR 742)	Dirt [2]	All	Not Crossed	0.15	0	16
208.00	Road on Levee (BOR 742)	Dirt [2]	All	Not Crossed	0.02	0	16
208.17	Unknown Rd	Dirt	No Ingress / Egress	Bore	0.03	0	0

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
208.18	Road on Levee (5-A Drain)	Dirt/Gravel [2]	All	Bore	0.18	0	16
208.72	Unknown Rd	Dirt [2]	All	Not Crossed	0.13	0	16
208.78	Southern Pacific Railroad	Rails	RR	Bore	6.63	0	0
208.8	State Hwy 39 (Klamath Falls - Malin Highway)	Paved	All-Public	Bore	5.48	0	10
209.00	2k (BLM 40-10E-3) (Stukel Mountain Comm Site)	Gravel	All	Not Crossed - Comm *	1.71	0	14
209.00	Stukel Quarry Access (BLM 40-10E-5)(Stukel Mountain Comm Site)	Gravel	All	Not Crossed - Comm *	4.73	0	14
209.00	Relay Station (BLM 40-10E-10) (Stukel Mountain Comm Site)	Gravel	All	Not Crossed - Comm *	0.22	0	14
209.04	Cheyne/Elliot Rd	Paved	All	Bore	0.09	0	0
209.14	Matney Rd - Zuckerman Rd	Paved	All-Public	Bore	0.41	0	0
210.16	Cnty Rd 918 (Wong Rd)	Paved	All-Public	Bore	0.91	0	16
210.27	Road on Levee (BOR 743)	Dirt 2	All	Bore	0.26	0	16
210.63	Cnty Rd 982 (Chin Rd)	Gravel [2]	All-Public	Open Cut	0.32	0	16
210.86	17987 Hwy 39 (5-H Drain) (BOR 744)	Gravel [2]	All	Bore	0.04	0	16
211.2	18191 Hwy 39 (5-H Drain) (BOR 745)	Gravel [2]	All	Open Cut	0.06	0	16
211.53 - 211.86	Cnty Rd 988 (IO of Cemetery Rd)	Gravel [2]	All-Public	Not Crossed	0.71	0	16
211.86	Private Rd	Dirt [2]	All	Open Cut	0.04	0	16
212.52	Burlington Northern & Santa Fe RR	Rails	RR	Bore	1.29	0	0
212.94	Gaston Driveway (off Hill Rd) (BOR 746)	Gravel [2]	All	Open Cut	0.36	0	16
213.86	Road on Levee	Dirt	All	Bore	0.27	0	0
214.07	Powerline Access Rd	Dirt	All	Open Cut	0.60	0	16
214.07	Cnty Rd 566 (Hill Rd)	Paved	All-Public	Open Cut	1.83	0	10
214.7	Private Drive (G-3 Lateral) (BOR 747)	Gravel [2]	All	Not Crossed	0.23	0	16
215.05	Unknown Rd	Dirt [2]	All	Open Cut	0.11	0	16
215.13	Unknown Rd	Dirt	No Ingress / Egress	Open Cut	0.03	0	0
215.39 - 215.65	Powerline Access Rd	Dirt	All	Open Cut	2.41	0	16
215.72	Taylor Rd	Dirt	All	Not Crossed	0.38	0	10
217.5	Unknown Rd	Dirt [2]	All	Open Cut	0.43	0	16
217.54	Dodds Hollow Rd	Gravel [2]	All-Public	Open Cut	0.62	0	16
217.54	Unknown Rd	Dirt [2]	All	Open Cut	0.04	0	16
217.67	Dodds Hollow Rd	Gravel [2]	All-Public	Open Cut	1.31	0	16
218.34	Unknown Rd	Gravel [2]	All	Open Cut	0.18	0	16

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
218.84	Pope Rd	Dirt/Paved/Gravel [2,3]	All-Public	Open Cut	3.09	0	16
218.84 - 218.96	Private Rd	Gravel [2]	All	Not Crossed	0.12	0	16
218.96 - 219.98	Powerline Access Rd	Dirt [2]	All	Open Cut	1.12	0	16
219.34	Unknown Rd	Dirt [1,2,3]	All	Open Cut	0.50	0	16
219.59	Unknown Rd	Dirt [1,2,3]	All	Not Crossed	0.18	0	16
219.59	Unknown Rd	Dirt [1,2,3]	No Ingress / Egress	Open Cut	0.03	0	16
219.66	Unknown Rd	Dirt [1,2,3]	All	Open Cut	0.09	0	16
220.67	Unknown Rd	Dirt	All	Not Crossed	0.43	0	0
221.14	Unknown Rd	Dirt	All	Open Cut	0.11	0	0
221.35	Unknown Rd	Dirt	All	Not Crossed	0.03	0	0
221.86	Unknown Rd	Dirt	All	Open Cut	0.13	0	0
221.92	Harpold Rd	Paved	All-Public	Not Crossed	0.85	0	10
221.92	Harpold Rd	Paved	All-Public	Open Cut	0.80	0	10
221.92	Unknown Rd	Dirt	All	Not Crossed	1.17	0	0
221.92	Unknown Rd	Dirt	All	Not Crossed	0.90	0	0
223.1	Unknown Rd	Dirt	All	Not Crossed	0.50	0	0
224.42	Unknown Rd	Dirt	All	Open Cut	0.29	0	0
224.44	30083 Pickett	Dirt/Gravel [2]	All	Not Crossed	0.75	0	16
224.61	Unknown Rd	Dirt	All	Open Cut	0.36	0	0
225.14	Pickett Rd	Paved	All-Public	Not Crossed	2.79	0	16
225.35	Unknown Rd	Dirt	All	Open Cut	0.67	0	16
225.64	Unknown Rd	Dirt [2]	All	Open Cut	0.59	0	16
226.02	Maupin Rd	Paved	All-Public	Open Cut	2.40	0	16
226.03	Unknown Rd	Dirt	All	Not Crossed	0.33	0	16
226.37	Unknown Rd	Dirt	All	Open Cut	0.56	0	16
226.4	Unknown Rd	Dirt	All	Not Crossed	0.50	0	16
226.74	Unknown Rd	Dirt	All	Not Crossed	0.72	0	0
226.74	Unknown Rd	Dirt	All	Not Crossed	0.07	0	0
227.03	Transformer Rd	Paved	All-Public	Not Crossed	0.75	0	16
227.03	Transformer Rd	Paved	All	Not Crossed	0.25	0	16
227.7	More Lock Rd	Gravel	All	Not Crossed	0.54	0	16
227.74	More Lock Rd	Gravel	All	Not Crossed	0.13	0	16
227.77	Unknown Rd	Dirt	All	Open Cut	1.03	0	0
227.88	More Lock Rd	Gravel [2]	All-Public	Not Crossed	0.25	0	16
228.33	Unknown Rd	Dirt	All	Open Cut	0.66	0	0

Milepost	Name	Surface	Ingress/Egress[5]	Crossing Method	Length	Acres Improved	Ave. Width
228.36	Malin Loop Rd	Paved	All-Public	Not Crossed	0.50	0	16
228.6	Unknown Rd	Dirt	All	Open Cut	0.44	0	0
228.8	Unknown Rd	Dirt	All	Open Cut	0.15	0	0
228.8	Unknown Rd	Dirt	All	Not Crossed	0.37	0	0
	Cnty Rd 95 (Starvout Creek Rd) (Starvout Creek (King Mountain) Comm Site)	Bituminous	All-Public	Not Crossed - Comm *	2.16	0	0
	Upper Cow Creek Rd (Starvout Creek (King Mountain) Comm Site)	Bituminous	All-Public	Not Crossed - Comm *	0.85	0	0
	Unknown Rd (Starvout Creek (King Mountain) Comm Site)	Gravel	All	Not Crossed - Comm *	1.32	0	0
	N King Mtn (BLM 32-4-33) (Starvout Creek (King Mountain) Comm Site)	Gravel	All	Not Crossed - Comm *	2.01	0	0
	Starveout Crk (BLM 32-4-20) (Starvout Creek (King Mountain) Comm Site)	Aggregate	All	Not Crossed - Comm *	4.05	0	0
	Unknown Rd (Sheep Hill MW Comm Site)	Dirt/Gravel	All	Not Crossed	1.82	0	0
				Total Acres of Road Improvements		**22.52**	

[1] Requires pothole filing.
[2] Requires blading/grading.
[3] Requires brush limbing.
[4] Requires widening and/or turnouts.
[5] The type of equipment which will use the access roads is represented in the Ingress/Egress column with “All” meaning both heavy and light equipment; “All-WTC” meaning heavy and light with traffic control; and “Light” meaning light duty trucks and low profile equipment.

APPENDIX K

Pacific Connector's Fluming and Dam and Pump Waterbody Crossing Procedures

Pacific Connector GAS PIPELINE

Pacific Connector Gas Pipeline, LP

Stream Fluming Procedures

Pacific Connector Gas Pipeline Project

September 2017

STREAM FLUMING PROCEDURES

During construction various local, state and federal permits will require that flowing streams with coldwater fisheries be crossed utilizing a "dry crossing" technique. Fluming is one of the methods which may be utilized to achieve a dry crossing of a flowing stream. The purpose of this appendix is to outline the techniques that will be utilized to flume stream crossings during construction of the project. These guidelines are subject to change based on permits issued by regulatory agencies.

1.0 Purpose of Flumed Stream Crossings

The primary purpose of fluming a stream is to assure that in-stream construction activities comply with water quality standards for turbidity that have been established by the state to protect aquatic life and other beneficial uses. Overall, a properly installed and maintained flume can be very effective in reducing turbidity during in-stream construction. In most cases, detectable increases in turbidity are limited to short durations when the flume is installed and when the flume is removed from the streambed.

However, installation of a flume does not guarantee that compliance with water quality standards will occur. Flumes require monitoring and occasional repair during the crossing period to ensure the integrity of the structure(s). Adequate pumps play an integral role in a successful flumed crossing.

2.0 Where Flumes Will Be Installed

Any minor or intermediate waterbody with water flowing in the streambed at the time of construction, which has a coldwater fishery as defined by the Oregon Department of Fish and Wildlife (ODFW), may be flumed. A list of streams where dry open cut crossing methods (fluming, dam and pump or diverted open cut) may be utilized is provided as part of Resource Report 2.

3.0 General Layout of a Typical Flumed Stream Crossing

Figure 1 shows a plan view of a typical flumed stream crossing. The primary components of a flumed crossing include:

- flume pipe or multiple flume pipes;
- sandbag/plastic dams;
- spoil storage and staging areas;
- pumps and pump containment structure (s);
- dewater structure(s);
- erosion control structures; and
- spill containment and cleanup materials.

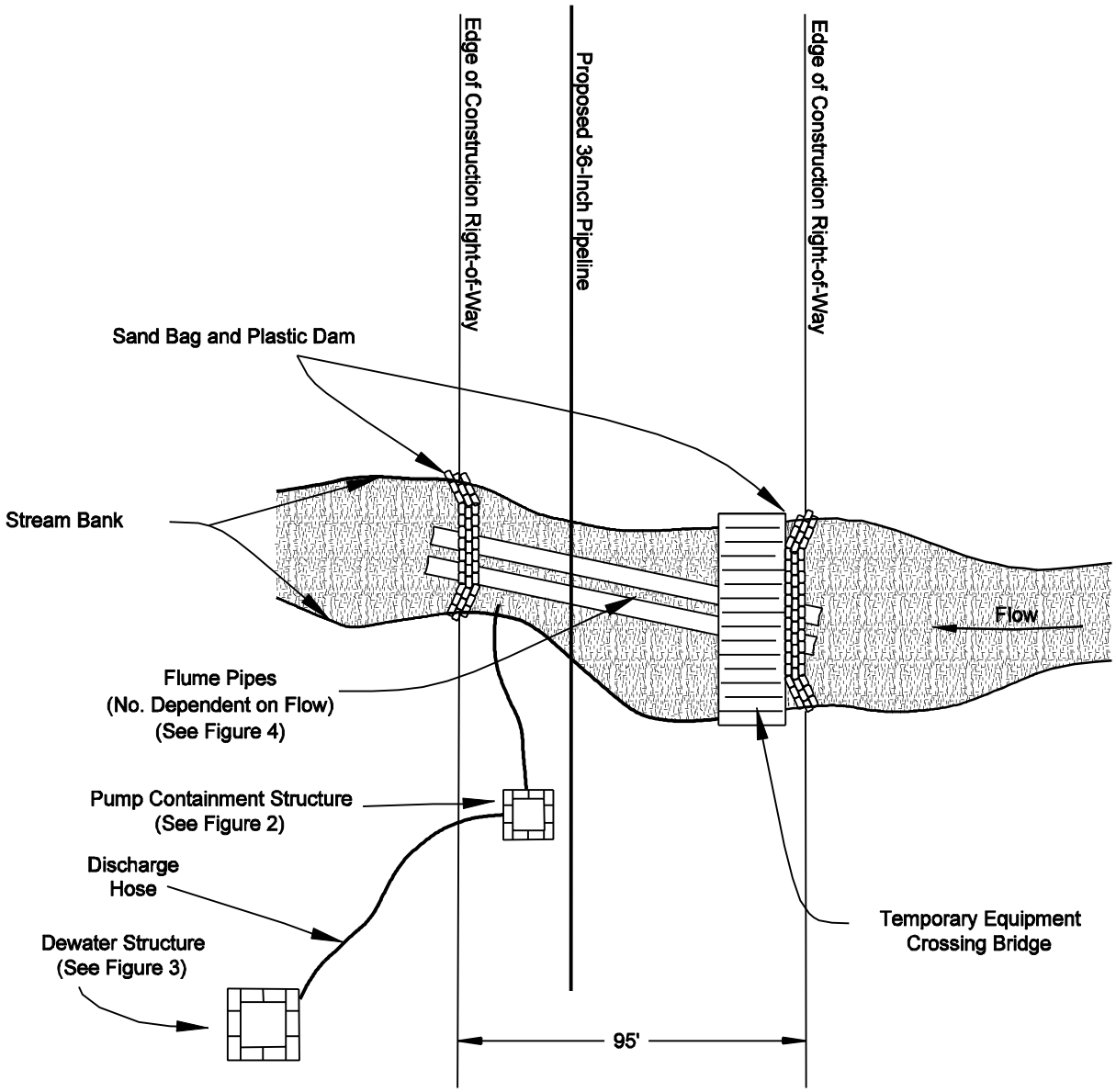


FIGURE 1
PLAN VIEW OF TYPICAL FLUMED STREAM CROSSING

A single or multiple flume pipe(s) are used to temporarily convey the stream flow over the construction area, thereby reducing the introduction of sediments into the water column during ditching and backfilling. The sandbag/plastic dams are used to support and seal the ends of the flume pipe(s) and to direct stream flow into the flume pipe and over the construction area. These structures are also utilized to prevent downstream water from flowing upstream into the construction area. They also serve to contain water that infiltrates into the construction area before it can be removed by the pumps and discharged to an upland area. Finally, the downstream structure serves to contain turbid water, which rises quickly in the construction area during backfilling of the trench.

All waterbodies with water in the streambed at the time of construction must have an equipment crossing bridge.

The temporary spoil storage area is where spoil trenched from the streambed will be stored until backfilling is completed. These temporary extra work areas are identified on the Environmental Alignment Sheets. FERC's Wetland and Waterbody Procedures prohibit the location of staging areas or additional right-of-way within 50 feet of the stream banks or edge of adjacent wetlands unless site-specific conditions such as topography prevent the setback and a variance is approved. Trench spoil must be placed at least 10 feet away from stream banks at all flowing stream crossings. In addition, these areas must be enclosed with silt fence and/or straw bales to prevent runoff of the spoil into the stream.

Adequate pumps are essential for the successful completion of flumed stream crossings. During several phases of the crossing process, it will be necessary to quickly remove large quantities of water from the construction area to prevent overflow or leakage of the sandbag/plastic dams or the temporary equipment crossing bridge. The most effective means of quickly removing water from the construction area is by utilizing well-maintained pumps with adequate pumping rates. In addition, backup pumps will be located on-site, hooked up and maintained as fully operational during the entire crossing process. Backup pumps will be tested prior to the start of construction. Pumps will be located in a spill containment structure that is designed to fully contain any spills of fuel or oil (see Figure 2).

Dewater structures (see Figure 3) will be utilized to reduce the velocity of pump discharge water and subsequent erosion of upland areas. These structures are essential in preventing erosion and the flow of turbid water overland and back into the stream - such overflow effectively defeats the purpose of the flumed crossing by introducing turbid water into the stream.

Runoff control structures are utilized to prevent runoff from the spoil piles or from drainage of water from the trackhoe bucket from flowing around the sandbag/plastic dams or temporary equipment crossing bridges and adding sediment to the stream. Containment and control materials are necessary to respond to any spills of fuel or lubricating oils from operating equipment. A Spill Prevention, Containment, and Countermeasures (SPCC) Plan will be implemented by the contractor in accordance with the provisions of that plan. Erosion control structures address the prevention of runoff from the right-of-way into the stream during and after construction is complete.

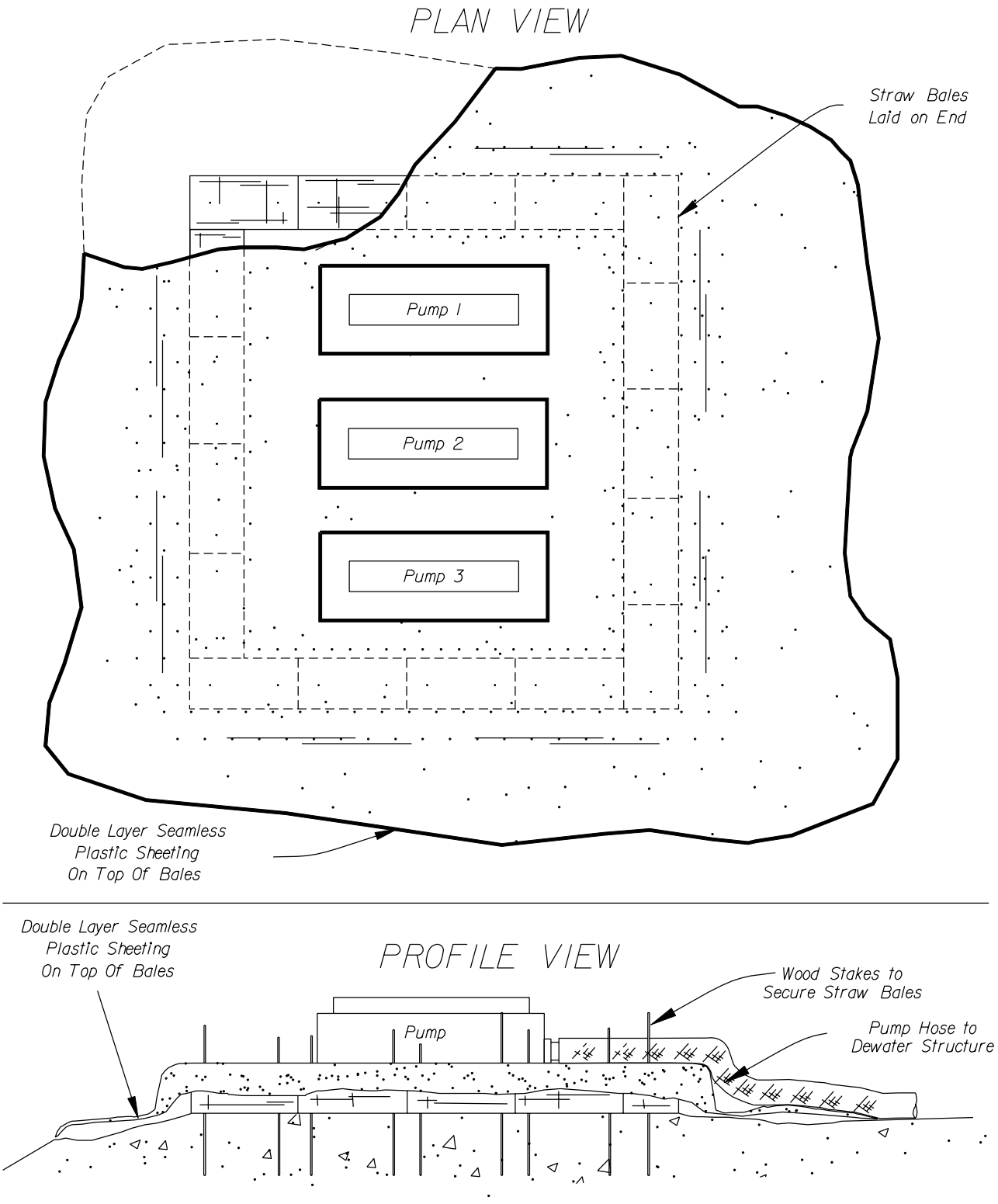


Figure 2
Typical Pump Containment Structure

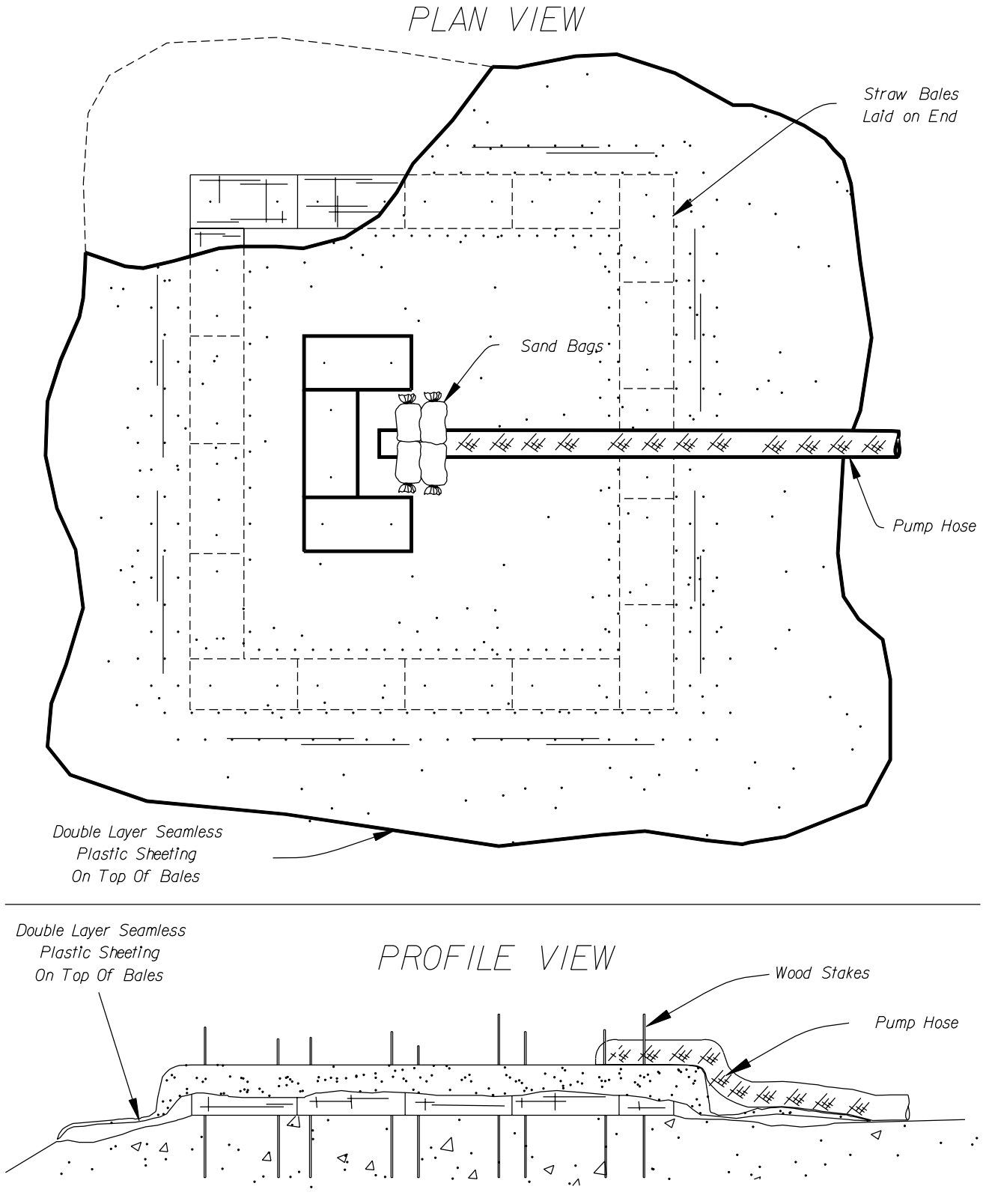


Figure 3
Typical Dewater Structure

4.0 Materials Required to Install and Maintain a Flumed Stream Crossing

The materials discussed below will accommodate most stream crossings. However, certain situations will arise where additional materials are required. Those streams that require additional materials will be addressed on a case-by-case basis.

Typically, scrap steel pipe will be utilized to construct the flume. Before the flume pipe is installed in the stream, it will be inspected to assure that it is free of grease, oil or other pollutants. In addition, excessive dirt will be removed from the flume pipe. If oil or grease is present on the flume pipe, it will be steam-cleaned before the flume pipe is placed in the stream.

Both the inlet and outlet of the flume pipe will be sandbagged and lined with plastic to create a proper seal (see Figure 4). The reason for sandbagging the downstream end of the flume is to create a contained area where turbid water is trapped and to prevent downstream water from flowing up the streambed and flooding the trench.

Sandbags will be filled with a non-leachable material such as clean, pre-washed sand. Sandbags are most effective if they are only filled to approximately 2/3 their capacity. Bags filled to capacity conform poorly to the adjacent bags and make creation of a seal more difficult. The bags must be tied securely before they are installed. If the bags are left un-tied, they tend to spill upon removal from the streambed and are nearly impossible to remove with a trackhoe. It is preferable to utilize burlap sandbags to construct the upstream and downstream dams. Plastic bags tend to rip when removed from the stream and are often too porous to adequately contain small grain sand.

Sandbags alone are often not sufficient to completely seal the upstream and downstream ends of the flume pipes. The dams are typically more effective when sheets of thick plastic are interwoven within the sandbags (see Figure 5). The plastic, when applied as shown on Figure 5, will effectively seal the dams and will greatly reduce the amount of water leaking into the construction area from behind the upstream and downstream sandbag dam.

5.0 Flume Pipe Design

A number of flume pipe designs have been used with varying degrees of success. To improve success, flume pipes with wings welded to the front end of the pipe provide for better conveyance of stream flow into the mouth of the flume (see Figure 6). The most effective wings extend to each stream bank and are angled slightly upstream. Where the bottom of the stream is other than rock, the wings extend approximately 12 inches below the bottom of the flume pipe and are pushed into the stream substrate utilizing a trackhoe during installation. The upstream and downstream portions of the wings are then sandbagged and overlain with plastic as needed to prevent leaks as shown in Figure 7.

The flume pipe(s) installed at the crossing will be of sufficient length so that the integrity of the upstream and downstream sandbag dams are not jeopardized by excessive top of ditch widths within the stream or adjacent stream banks. It is tempting to restrict the flumed width to an area smaller than the actual construction right-of-way. However, experience has shown that the contractor often needs to utilize the majority of the construction right-of-way to complete the crossing. Therefore, the flume pipes must be long enough to span the entire construction right-of-way through the stream (see Figure 4).

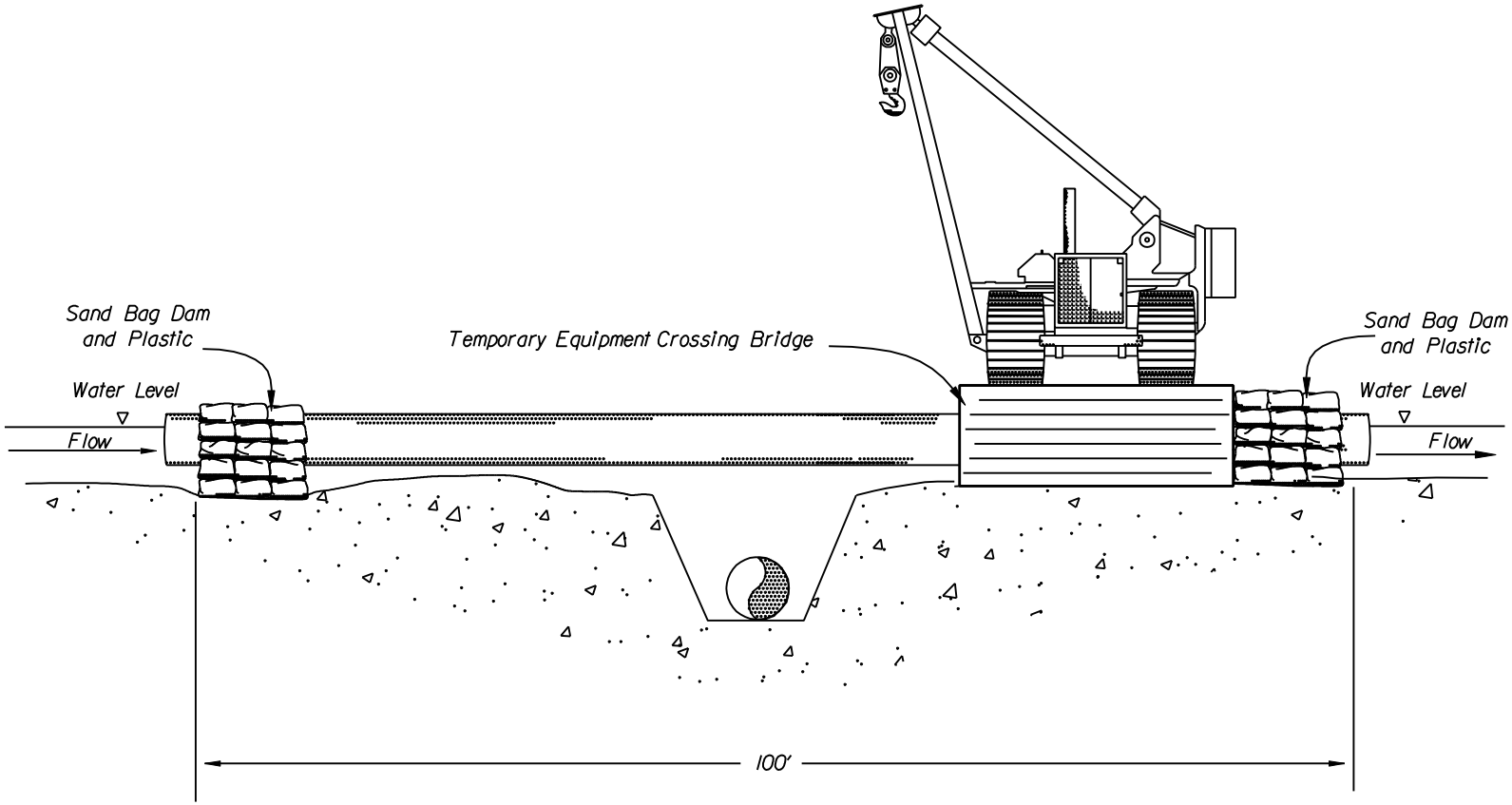


FIGURE 4
FLUME PIPE PLACEMENT ACROSS RIGHT-OF-WAY

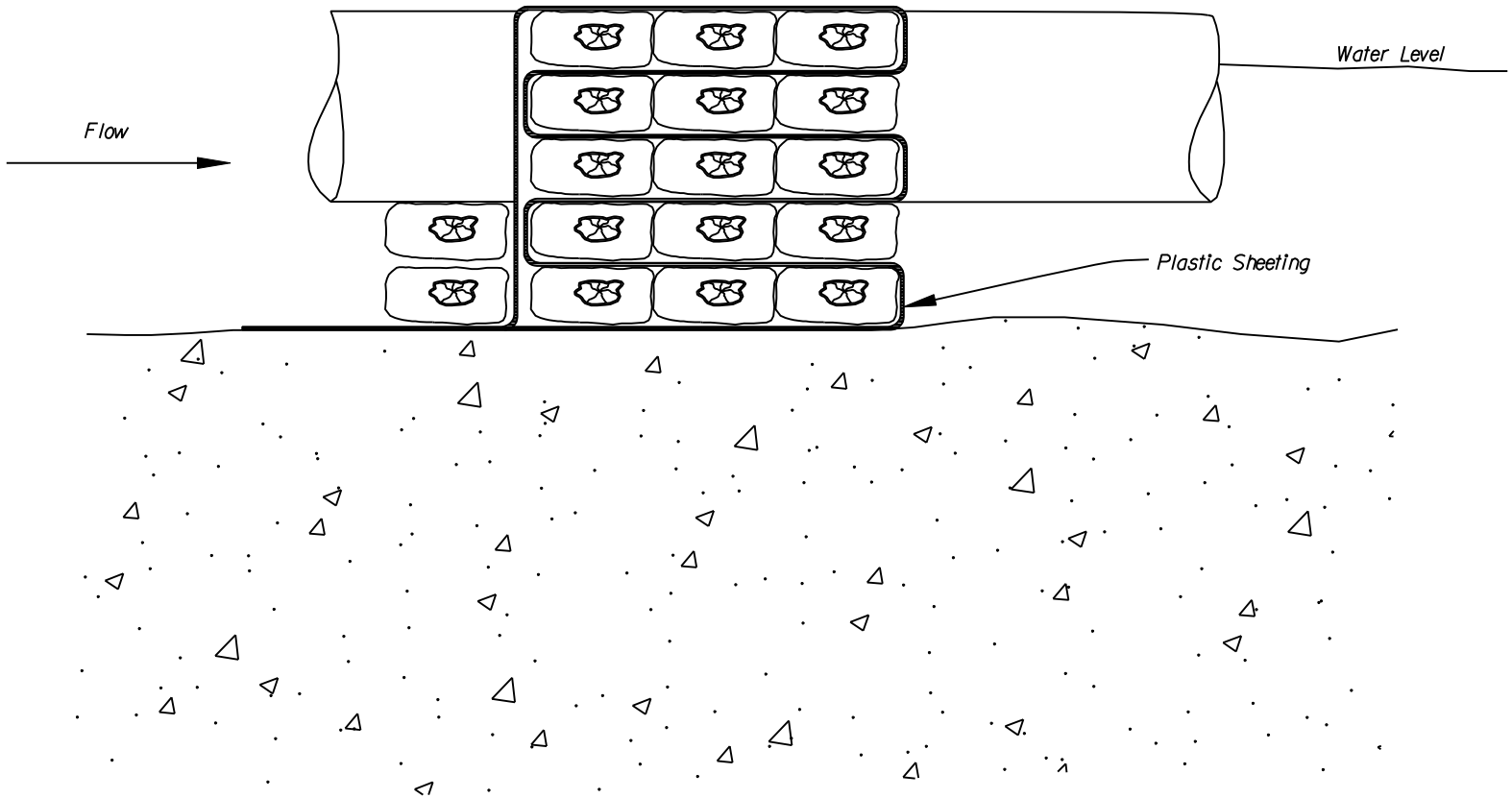
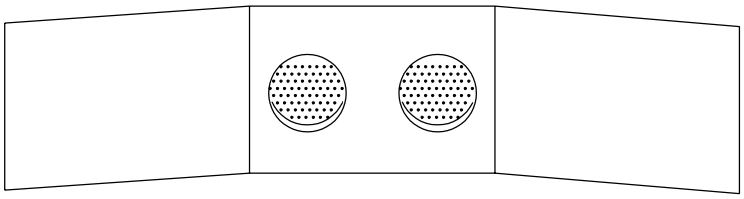


FIGURE 5
PLASTIC SHEETING INTERWOVEN INTO A SAND BAG DAM

FRONT VIEW



TOP VIEW

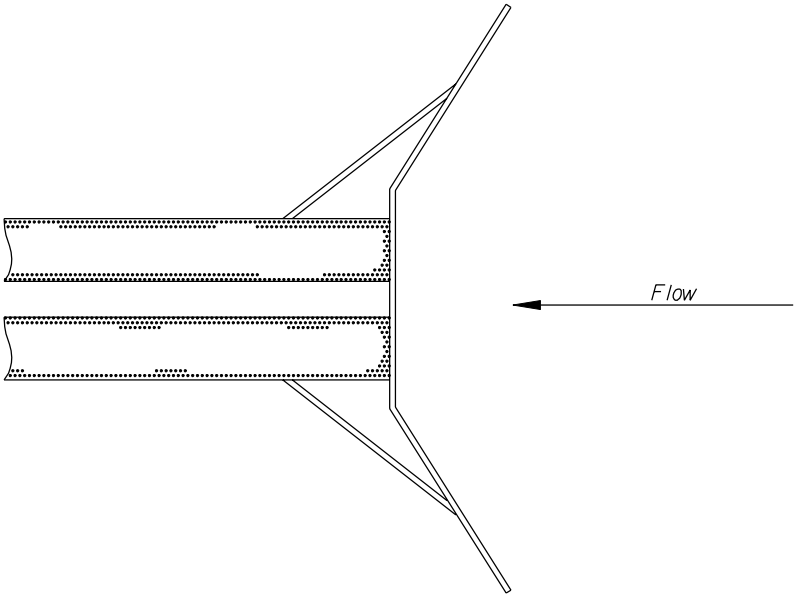


Figure 6
Upstream Flume Wings

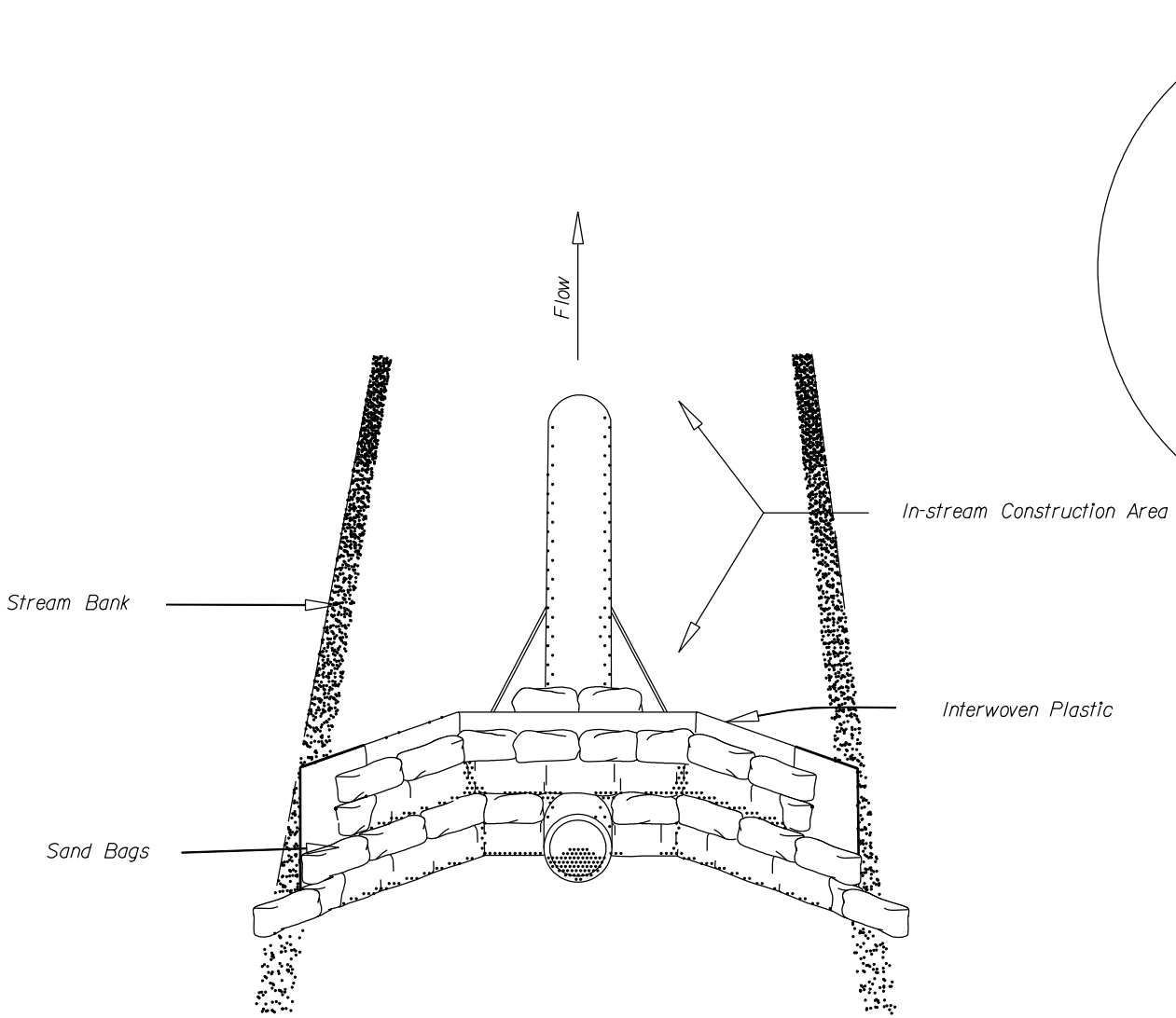


Figure 7
Sand Bag and Plastic Dam

As a general rule, a flume pipe of at least 80 feet in length will be utilized for crossings. The diameter of the flume pipe (s) will depend on the stream discharge at the time of the crossing. However, in all cases the flume pipe diameter will be oversized to accommodate any storm events that might occur during the crossing period.

6.0 Installation of the Flume Pipe

Short-term elevated levels of turbidity are expected to occur during installation of the flume pipe. However, several measures can be taken to minimize the increased turbidity. Before the contractor attempts to install the flume pipe, all materials necessary to complete the installation process will be located on-site. Installation of the flume cannot begin until all of the precautions outlined in the SPCC Plan have been undertaken. Turbidity sampling will be conducted during all flumed crossings in accordance with the Stormwater Pollution Prevention Plan.

Installing the Flume Utilizing Only Sandbag/Plastic Dams

The first step in installing the flume pipe is to clear away any large rocks and boulders from the sandbag/plastic dam area and under the flume pipe that will prohibit placement of the flume pipe or affect the integrity of the sandbag/plastic dam. It may be necessary to utilize a trackhoe to assist in removing these rocks. However, under no circumstances will the bucket be allowed to dig into the streambed to remove rocks. Rather, the edge of the bucket should be utilized to roll the rocks to the side or a thumb on the bucket will be used to pick up and move rock obstacles.

Before the flume pipe is installed, the contractor will lay at least three rows of sandbags on the streambed (at least two sandbag layers tall) to support the upstream and downstream portions of the flume pipe (see Figure 5). The sandbags may be laid on top of the plastic sheeting that will be used to help seal the sandbag dam. The plastic will be laid such that when it is wrapped around the sandbag dam, the plastic sheeting lays on the upstream face of the dam so that water pressure holds the plastic firmly against the sandbag dam face. The sandbags will be properly seated over the plastic and onto the stream bottom and packed as tightly together as possible.

Once the first rows of sandbags are in place, the flume pipe can be lowered into position. The flume pipe will be lifted over the stream and carefully aligned before it is lowered onto the sandbags over the streambed. The contractor will not push or pull the flume pipe over the stream banks and into the water. Rather, the flume pipe will be suspended over the crossing and lowered into place.

After the flume pipe is laid on the sandbags, the contractor will begin to construct the upstream sandbag/plastic dam. First, the winged upstream portion of the flume pipe will be pushed into the streambed substrate, where possible. Sandbags will be installed upstream and downstream of the wings and interwoven with plastic sheeting to form a tight seal. Typically, the sandbag/plastic dam will extend at least three feet above the water level of the stream to accommodate increased stream discharge during the crossing period (see Figure 7).

After the upstream sandbag/plastic dam is complete, the contractor will immediately begin installation of the downstream dam. The downstream sandbag/plastic dam will be constructed to a height at least three feet above the downstream water level.

7.0 Maintenance of the Flume During Construction

Flumed crossings require constant monitoring and occasional repair during the crossing process. The longer the flume remains in the water, the greater the probability that the dams will begin to leak and that water will invade the construction area in significant quantities. Therefore, it is imperative that once trenching within the stream begins that the construction process is carried to completion non-stop. Typically, this involves installing the flume on the day immediately proceeding construction of the crossing. Ditching of the stream channel should begin early the following morning and the pipe pulled under the flume pipe immediately following completion of the trench. Backfilling should commence immediately following the stringing of the drag section. For most streams it typically, requires 3 to 7 days to install the flume, dig the trench, install the pipe drag section under the flume, backfill the trench and restore and stabilize the stream banks. Smaller streams (less than 10 feet in width) generally require less time to cross using fluming procedures.

While the flume is in place, the contractor will provide a sufficient crew that will be responsible for maintaining the flumed crossing. The crew will apply additional plastic to the dams and add additional sandbags as necessary. In addition, the crew will be responsible for operating the pumps and maintaining the discharge structures. When the crossing is complete, the crew will immediately install the erosion control structures pursuant to FERC's Wetland and Waterbody Procedures.

To be adequately prepared to repair the flume, the contractor must have on-site rolls of thick plastic sheeting and extra filled and tied sandbags. These materials need to be stored directly adjacent to the stream crossing so that they are readily accessible should the need to repair the flume arise.

8.0 Length of the Drag Section

One of the biggest problems encountered during construction of flumed stream crossings is the installation of extremely long drag sections across the stream in a single drag section. The extra length requires that the flume be in place longer than necessary which increases the probability of serious problems with the integrity of the sandbag/plastic dams. In addition, the extra time required to dig additional ditch to accommodate long drag sections can result in integrity problems with the flume dams.

Segments must be kept short and extend only the distance necessary to allow for later tie-in to the upland portions of the pipeline. On most streams the drag section to be pulled under the flume should only be long enough to incorporate the sag bends. In other locations, it may be necessary to install additional pipe to complete the crossing.

The entire drag section must be made up prior to the start of in-stream trenching. Once the drag section is complete (welds x-rayed and joints coated), the drag section can be installed immediately following trenching.

9.0 Trenching Under the Flume Pipes

At some point prior to initiating trenching, chains should be hung from the flume pipe over the ditch line. These chains will be utilized to hang the pump heads or intake pipe into the ditch.

Digging the ditch under the flume requires careful preparation and execution. Two trackhoes will begin trenching from each stream bank at the same time. The trackhoes will begin by trenching under the flume pipe(s) and dig back to the stream banks. Finally, the trackhoes will dig the upland portion of the ditch necessary to install the drag section.

Generally, pumping water from the construction area is not necessary during trenching as the amount of spoil removed from the streambed generally exceeds the volume of water that infiltrates the construction area. However, at times the water flow into the construction area becomes excessive, pumping is necessary to avoid overflow or leakage from the downstream dam.

10.0 Spoil Storage During Trenching

Spoil must be stored in a manner such that runoff from the spoil does not flow into the stream or off the right-of-way. For streams in flat topography, runoff from the spoil storage pile is not typically a problem. However, on steep sloping stream banks water can run back down the right-of-way and enter the stream upstream or downstream of the dams creating a water quality problem. The problem can be compounded as the trackhoes working on the stream banks lift water saturated spoil from the stream and lay it on the right-of-way adjacent to the stream bank before it can be conveyed uphill by additional equipment. To accomplish runoff control during trenching, diversion structures or trenches will be dug within the right-of-way to direct the runoff back into the construction area as shown on Figure 8.

11.0 Spoil Transfer During Construction

Some of the stream crossings may occur adjacent to steep upland areas. In these cases, it will be necessary to utilize additional equipment (trackhoes, dozers, loaders) to transfer spoil dug by the trackhoes at each stream bank to the temporary spoil storage area.

In most cases, the contractor will utilize dozers to push the spoil to the temporary storage area. In other areas, trackhoes will be required to transfer spoil dug by the trackhoe working on the stream bank uphill to a flatter area where it can be moved by dozers. When two trackhoes are utilized to transfer spoil uphill, the trackhoe working on the stream bank places the spoil into a pit (see Figure 9). The spoil from the pit is then picked up by the second trackhoe and lifted further uphill. The pit will significantly reduce the amount of water from the spoil that runs downhill. The pit can be maintained and dug by the trackhoe working uphill from the crossing.

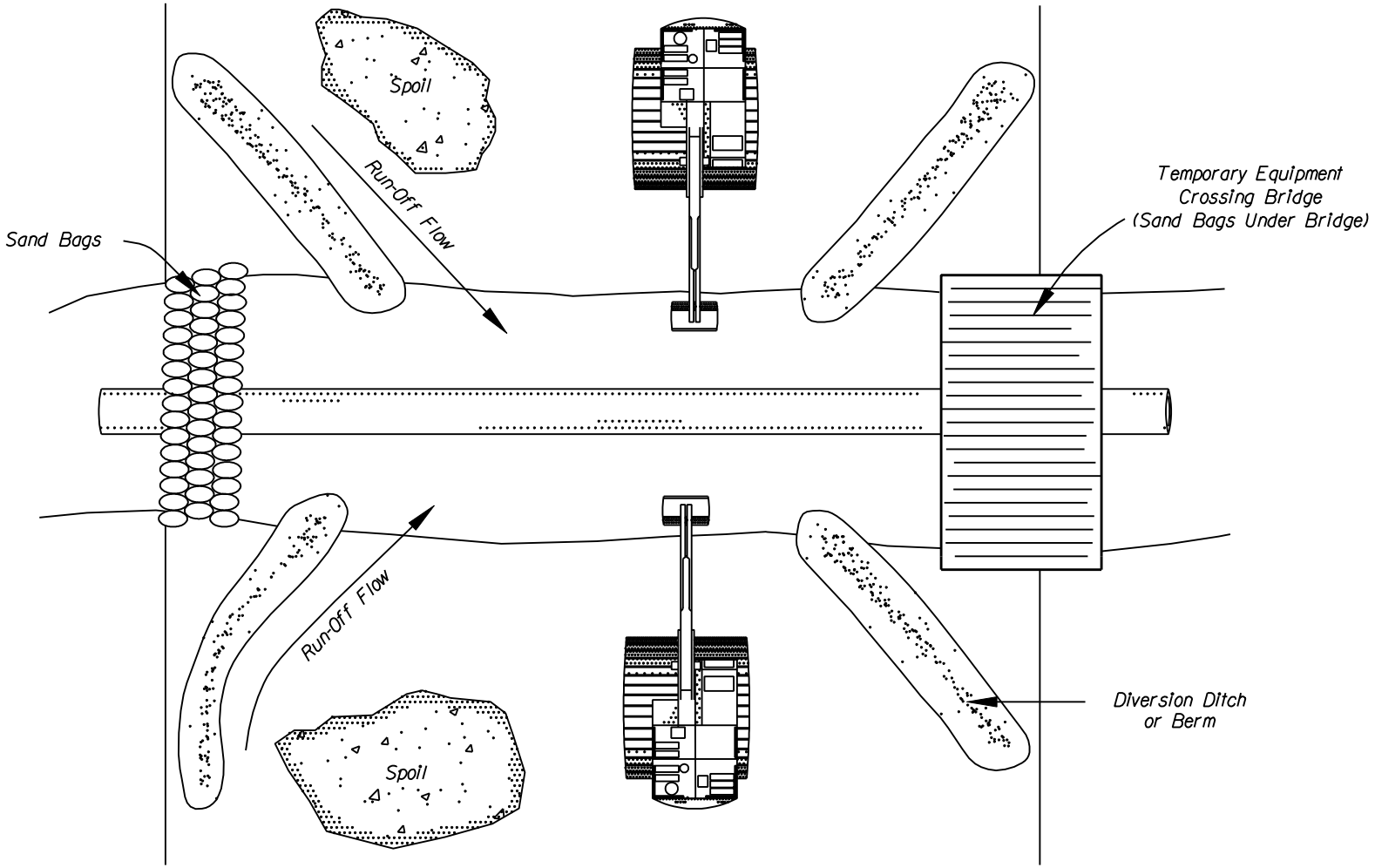


FIGURE 8
DIVERSION DITCH OR BERMS

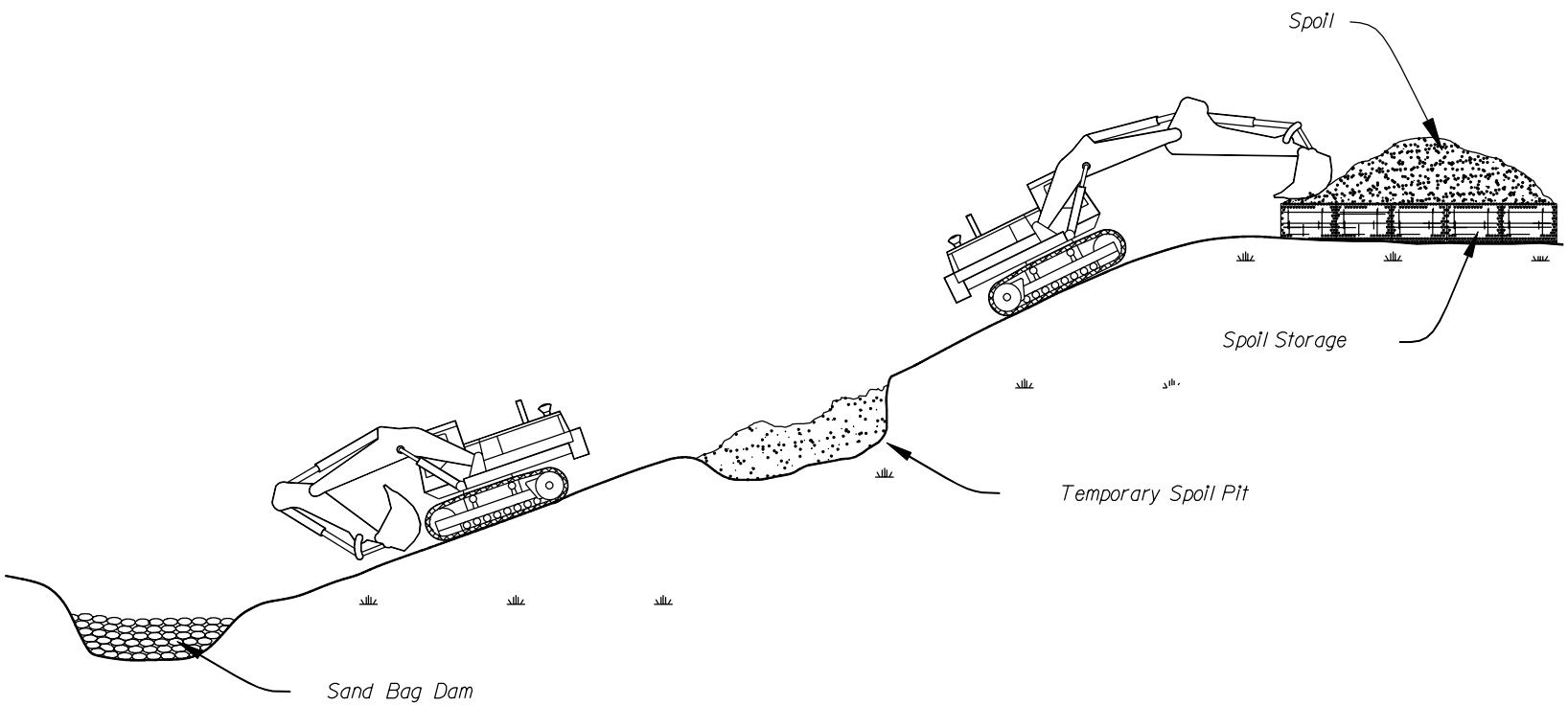


Figure 9
Uphill Slope Transfer

12.0 Installing the Pipe

While trenching is being conducted, the contractor will hook up the drag section to the sideboom tractors so that the pipe may be installed as soon as trenching is completed. It will be necessary at many crossings to float the pipe across the trench (i.e., it may not be feasible to completely dewater the ditch). While the drag section is being slid under the flume pipe, it is essential that pumps be operated to assure that turbid water does not leak through or flow over the dams. The contractor will operate the pumps at a rate so that water displaced by the pipe is immediately removed and discharged to the dewater site.

13.0 Dewatering the Construction Area

Proper operation of pumps is essential to the successful completion of a flumed stream crossing. Pumps will be utilized by the contractor as necessary to control the level of water in the construction area. The purpose of the pumps is not to completely dewater the trench.

If the water level in the construction area exceeds the upstream or downstream level of the dams, the environmental inspectors will notice small amounts of turbid water escaping into the stream either upstream or downstream of the dams. This is known as "bleeding" and the problem can be quickly resolved by increasing the pumping rate and reducing the water level within the construction area. Although bleeding will not typically result in a violation of water quality standards downstream, if left unchecked it can quickly result in erosion of the dams and serious downstream water quality problems.

The contractor will utilize pumps at each crossing to control the water level in the construction area. The contractor will also install backup pumps that will be tested and fully functional prior to the start of the crossing process. Pumps will be installed and tested and the dewater sites constructed the day prior to any in-stream construction. For most crossings, the contractor will setup three pumps. Additional pumps may be required at a few of the stream crossings. Two of the pumps will serve to remove water from the construction area and the third pump will serve as a backup should one of the primary pumps fail.

The pumps will be set in a containment area as shown on Figure 2. The primary purpose of the containment area is to fully contain any fuel or lubricating oil spills. If hydraulic pumps are used, the hose couplings on the side of the pump body will be oriented in the containment area such that they point perpendicularly away from the stream banks. The purpose of orienting the couplings away from the stream is to protect the stream should one of these couples fail and hydraulic fluid escape.

The contractor will carefully inspect each pump prior to its delivery to the crossing site. In particular, any frayed hoses or apparent leaks will be repaired before the pumps are delivered to the crossing site. Pump heads and the hoses will be cleaned of any free hydraulic oil prior to placing the pump heads into the stream.

All pumps will be installed with individual intake hoses or hydraulic heads, trash filters and discharge hoses. All three hydraulic heads will remain in the water during the entire construction process including backfill. In this manner, the backup pump can be immediately employed should one of the primary pumps fail.

Each of the pumps (including the backup pump) will be equipped with a minimum of 300 feet of discharge hose. It is important to stretch the hose on the backup pump and install a dewater structure for that pump at the same time the primary pumps are installed. Hoses should be free of leaks and in good operating condition.

In many cases, it is difficult to locate dewater sites where water will flow away from wetlands or streams. In these cases, careful attention will be paid to the dewater sites and alternative sites (which require additional discharge hose) selected prior to the start of in-stream construction. Often it is necessary to move the location of the dewater site several times during construction of the stream crossing to avoid dewater from reaching sensitive areas.

Dewater structures will be constructed of straw bales and plastic and wooden stakes as shown on Figure 3. The intent of the design provided on Figure 3 is to allow the water to fill the dewater structure and flow evenly over the tops of the bales. Straw bales will be securely staked to the ground utilizing wooden stakes. Alternative structures are also provided in the Erosion Control and Revegetation Plan.

14.0 Backfilling the Ditch

The highest potential for water quality problems during a flumed crossing is during backfilling of the ditch. Quick backfilling into the ditch by the contractor can cause the water level in the construction area to overflow or leak through the downstream dam. Pumps must be carefully managed during backfilling to control the water level in the construction area. The contractor must carefully monitor the effectiveness of the pumps and control the rate of backfill to preclude bleeding through the downstream dam. If backfilling occurs too quickly, the pumps will not be capable of removing the water from the construction area quick enough to prevent the escape of turbid water.

To prevent turbidity, backfilling of the ditch will be conducted in a slow, well-planned manner. Backfilling will begin in the center of the stream directly under the flume pipes and proceed toward each bank simultaneously. In this manner, much of the water in the ditch will be pushed to the ditch outside of the stream channel. If upland portions of the trench are backfilled first, the water in the ditch is pushed into the stream channel and will inevitably leak through or overflow the downstream dam.

Once backfilling of the entire stream channel is complete, the contractor will compact the streambed and construct solid plugs on both banks. Water will remain trapped in the ditch outside of the stream channel. This water will be pumped from the ditch at a later time in the manner described for dewatering the construction area (see Section 13).

15.0 Flume Removal

After the ditch is backfilled, clean gravel fill is placed on the top one foot of the ditch (where necessary). Plugs will be installed at each stream bank and the stream banks stabilized and the flume will be removed from the crossing. To prevent excessive increases in turbidity during flume removal, the contractor will remove all of the sandbags from the downstream dam. A trackhoe can be utilized to remove the top layers of the sandbags as long as the operator takes great care not to dig into the streambed or to increase turbidity.

After the downstream sandbags are completely removed from the streambed (except those few left directly under the flume), the contractor will begin removing the sandbags from the upstream dam. The top rows of sandbags should be removed by hand until the water begins to overflow the top of the dam and flows slowly over the construction area. For the first 10 to 30 minutes, turbidity downstream of the crossing area could increase considerably. However, the streambed portion of the construction area will be flushed clean of sediments left over from construction and the water will flow clear over the disturbed stream bed area. After the turbidity level has decreased to acceptable levels or that of upstream levels, the contractor can proceed with removing the remainder of the upstream dam sandbags.

Once the majority of the sandbags are removed, the flume pipe will be removed. The flume pipe will be raised directly from the streambed in a single movement. Under no circumstances will the contractor drag the flume pipe from the streambed. Rather, it will be lifted and then carried from the crossing area. After the flume is removed, the remaining few sandbags, which were laid directly under the flume pipe, can be removed by hand.

Pacific Connector GAS PIPELINE

Pacific Connector Gas Pipeline, LP

Dam & Pump Procedures

Pacific Connector Gas Pipeline Project

September 2017

DAM & PUMP PROCEDURES

During construction various local, state and federal permits will require that flowing streams with coldwater fisheries be crossed utilizing a "dry crossing" technique. Dam & pump is one of the methods which may be utilized to achieve a dry crossing of a flowing stream. The purpose of this appendix is to outline the techniques that will be utilized to temporarily dam stream crossings and pump the flowing water around the site during construction of the project. These guidelines are subject to change based on permits issued by regulatory agencies.

1.0 Purpose of Dam & Pump Stream Crossings

The primary purpose of damming a stream is to assure that in-stream construction activities comply with water quality standards for turbidity that have been established by the state to protect aquatic life and other beneficial uses. Overall, properly installed and maintained dams can be very effective in reducing turbidity during in-stream construction. In most cases, detectable increases in turbidity are limited to only the short duration when the dams are installed or removed from the streambed.

However, simply installing the dams is no guarantee that compliance with water quality standards will occur. Dams require monitoring and occasional repair during the crossing period to ensure the integrity of the structure(s). Adequate pumps play an integral role in a successful dam & pump crossing.

2.0 Where Dams & Pumps Will Be Installed

Any minor or intermediate waterbody with water flowing in the streambed at the time of construction, which has a coldwater fishery as defined by the Oregon Department of Fish and Wildlife (ODFW), may be dammed & pumped. A list of streams where dry open cut crossing methods (fluming, dam and pump or diverted open cut) may be utilized is provided in Resource Report 2.

3.0 General Layout of a Typical Dam & Pump Stream Crossing

Figure 1 shows a plan view of a typical dam & pump stream crossing. The primary components of a dam & pump crossing include:

- sandbag/plastic dams or other functional designs (e.g., metal plates, water bladders, etc.);
- spoil storage and staging areas;
- pumps and pump containment structure (s);
- dewater structure(s);
- erosion control structures; and
- spill containment and cleanup materials.

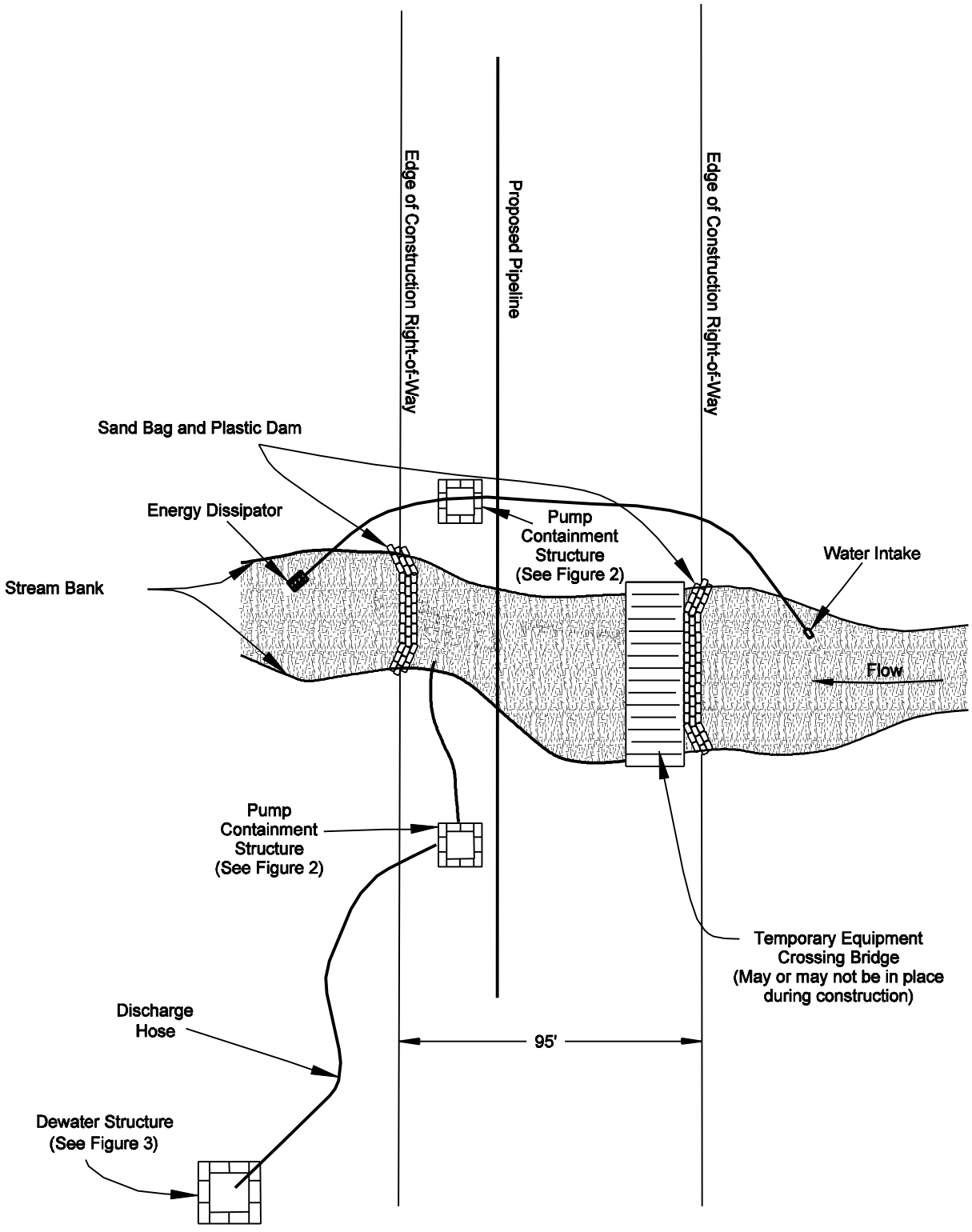


FIGURE 1
PLAN VIEW OF TYPICAL DAM & PUMP STREAM CROSSING

The sandbag/plastic dams (or other functional designs such as metal plates or water bladders) are used to isolate the stream flow from the area of construction. A single pump or multiple pumps are used to temporarily convey the stream flow around the construction area, thereby reducing the introduction of sediments into the water column during ditching and backfilling. These structures are also utilized to prevent downstream water from flowing upstream into the construction area. They also serve to contain water that infiltrates into the construction area before it can be removed by pumps and discharged to an upland area. Finally, the downstream structure serves to contain turbid water, which rises quickly in the construction area during backfilling of the trench.

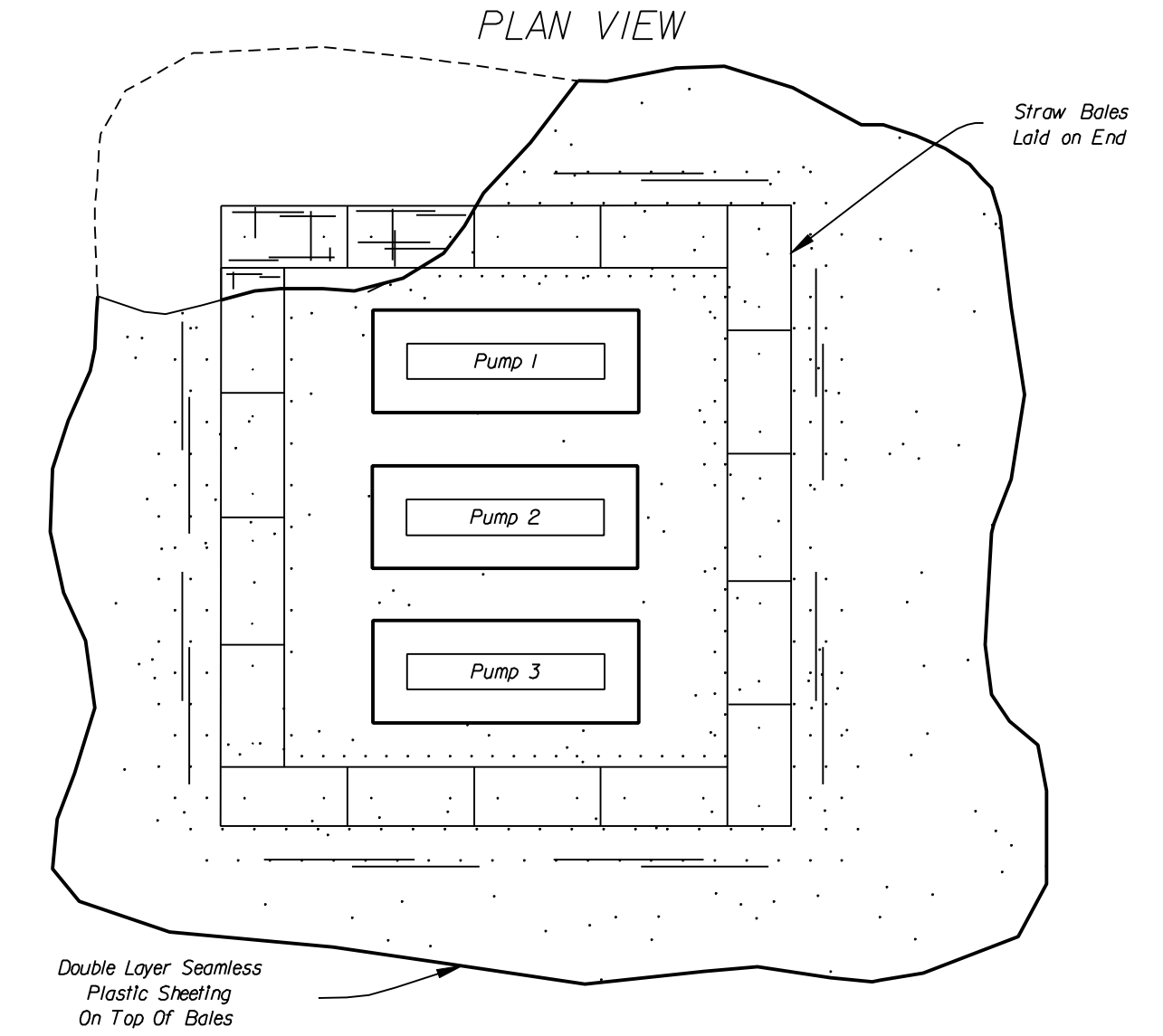
All waterbodies with water in the streambed at the time of construction must have an equipment crossing bridge.

The temporary spoil storage area is where spoil trenched from the streambed will be stored until backfilling is completed. These temporary extra work areas are identified on the Environmental Alignment Sheets. FERC's Wetland and Waterbody Procedures prohibit the location of staging areas or additional right-of-way within 50 feet of the stream banks or edge of adjacent wetlands unless site-specific conditions such as topography prevent the setback and a variance is approved. Trench spoil must be placed at least 10 feet away from stream banks at all flowing stream crossings. In addition, these areas must be enclosed with silt fence and/or straw bales to prevent runoff of the spoil into the stream.

Adequate pumps are essential for the successful completion of dam & pump stream crossings. During several phases of the crossing process, it will be necessary to quickly remove large quantities of water from the construction area to prevent overflow or leakage of the sandbag/plastic dams. In order to quickly and effectively remove water from the construction area, well-maintained pumps with adequate pumping rates must be utilized. In addition, backup pumps will be located on-site, hooked up and maintained as fully operational during the entire crossing process. Backup pumps will be tested prior to the start of construction. Pumps will be located in a spill containment structure that is designed to fully contain any spills of fuel or oil (see Figure 2).

Dewater structures (see Figure 3) will be utilized to reduce the velocity of pump discharge water and subsequent erosion of upland areas. These structures are essential in preventing erosion and the flow of turbid water overland and back into the stream - such overflow defeats the purpose of the dam & pump crossing by introducing turbid water into the stream.

Runoff control structures are utilized to prevent runoff from the spoil piles or from drainage of water from the trackhoe bucket from flowing around the sandbag/plastic dams or temporary equipment crossing bridges and adding sediment to the stream. Containment and control materials are necessary to respond to any spills of fuel or lubricating oils from operating equipment. A Spill Prevention, Containment, and Countermeasures (SPCC) Plan will be implemented by the contractor in accordance with the provisions of that plan. Erosion control structures address the prevention of runoff from the right-of-way into the stream during and after construction is complete.



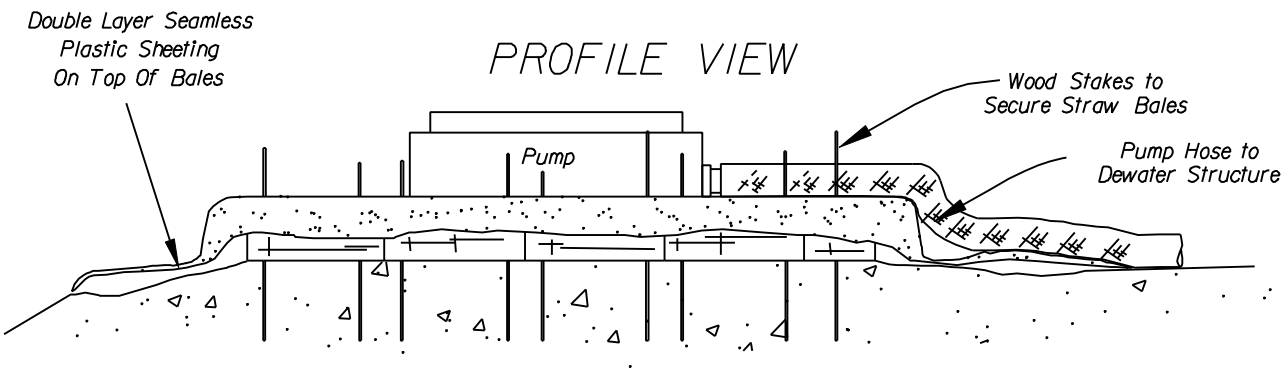
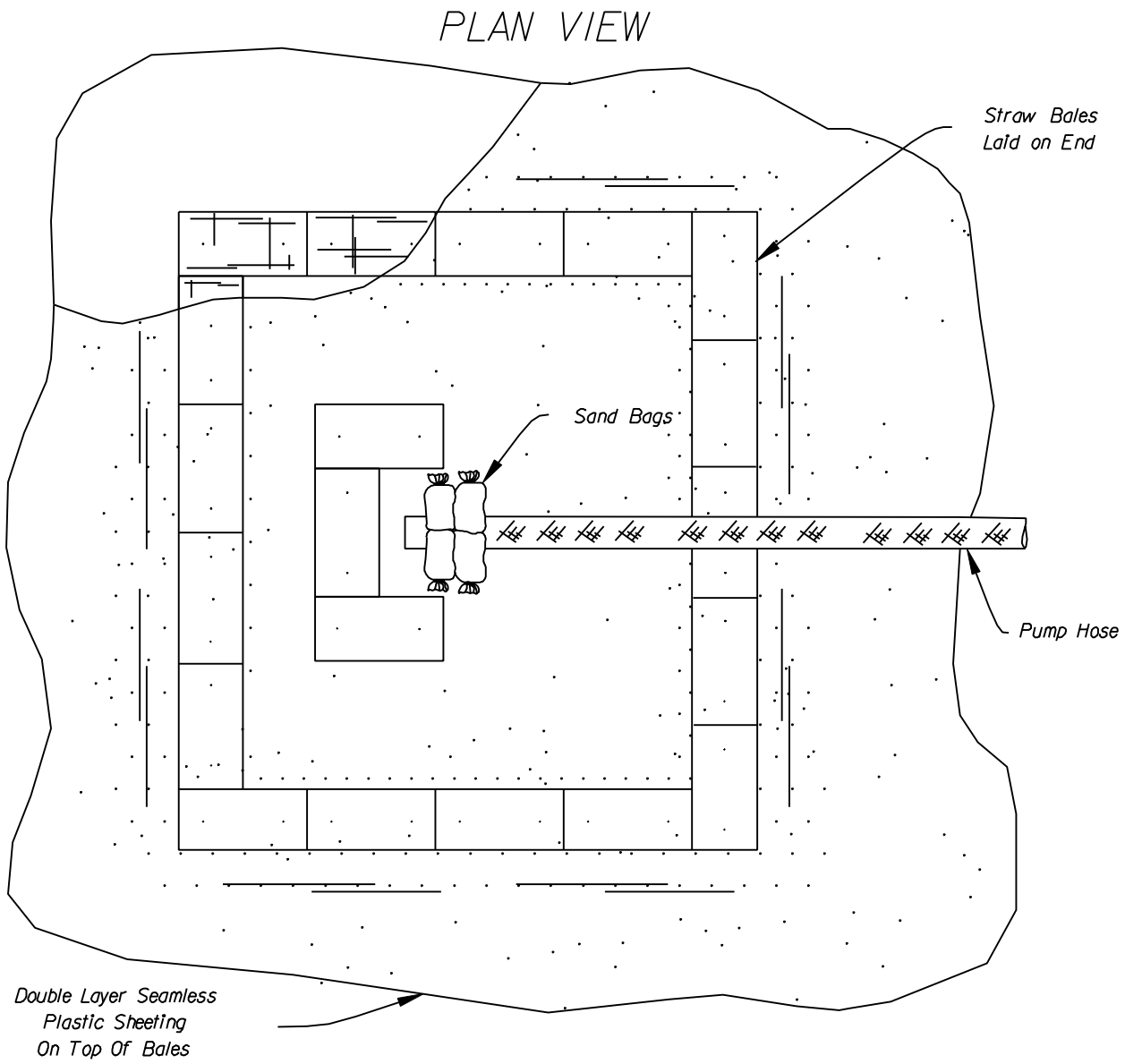


FIGURE 2
TYPICAL PUMP CONTAINMENT STRUCTURE



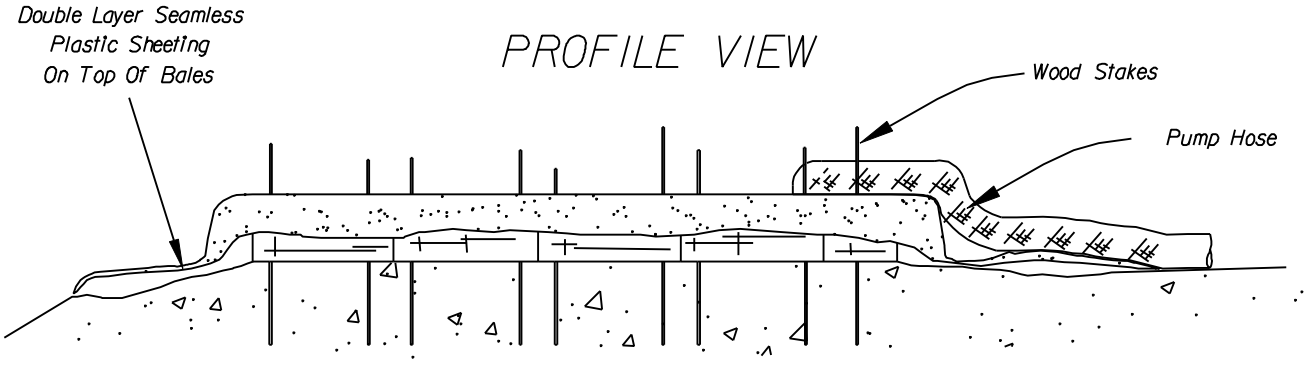


FIGURE 3
TYPICAL DEWATER STRUCTURE

4.0 Materials Required to Install and Maintain a Dam & Pump Stream Crossing

The materials discussed below will accommodate most stream crossings. However, certain situations will arise where additional materials are required. Those streams that require additional materials are site specific and will be addressed on a case-by-case basis.

Sandbags will be filled with a non-leachable material such as clean, pre-washed sand. Sandbags are most effective if they are only filled to approximately 2/3 their capacity. Bags filled to capacity conform poorly to the adjacent bags and make creation of a seal more difficult. The bags must be tied securely before they are installed. If the bags are left un-tied, they tend to spill upon removal from the streambed and are nearly impossible to remove with a trackhoe. It is preferable to utilize burlap sandbags to construct the upstream and downstream dams. Plastic bags tend to rip when removed from the stream and are often too porous to adequately contain small grain sand.

Sandbags alone may not completely seal the upstream and downstream ends of the construction area. The dams are typically more effective when sheets of thick plastic are interwoven within the sandbags (see Figures 4 and 5). The plastic, when applied as shown on Figure 4, will effectively seal the dams and will greatly reduce the amount of water leaking into the construction area from behind the upstream and downstream sandbag dams.

5.0 Installation of the Dams

Short-term elevated levels of turbidity are expected to occur during installation of the dams. However, several measures can be taken to minimize the increased turbidity. Before the contractor attempts to install the dams, all materials necessary to complete the installation process will be located on-site. Installation of the dams cannot begin until all of the precautions outlined in the SPCC Plan have been undertaken. Turbidity sampling will be conducted during all dam & pump crossings in accordance with the Stormwater Pollution Prevention Plan.

Installing the Sandbag/Plastic Dams

The first step in installing the dams is to clear away any large rocks and boulders from the sandbag/plastic dam area that may affect the integrity of the sandbag/plastic dams. It may be necessary to utilize a trackhoe to assist in removing these rocks. However, the bucket will not dig into the streambed to remove rocks. Rather, the edge of the bucket will be utilized to roll the rocks to the side or a thumb on the bucket will be used to pick up and move rock obstacles.

The sandbags may be laid on top of the plastic sheeting that will be used to help seal the sandbag dam. The plastic will be laid such that when it is wrapped around the sandbag dam, the plastic sheeting lays on the upstream face of the dam so that water pressure holds the plastic firmly against the sandbag dam face. The sandbags will be properly seated over the plastic and onto the stream bottom and packed as tightly together as possible.

Sandbags will be installed upstream and downstream and interwoven with plastic sheeting to form a tight seal. Typically, the sandbag/plastic dams will extend at least three feet above the water level of the stream to accommodate increased stream discharge during the crossing period (see Figures 4 and 5).

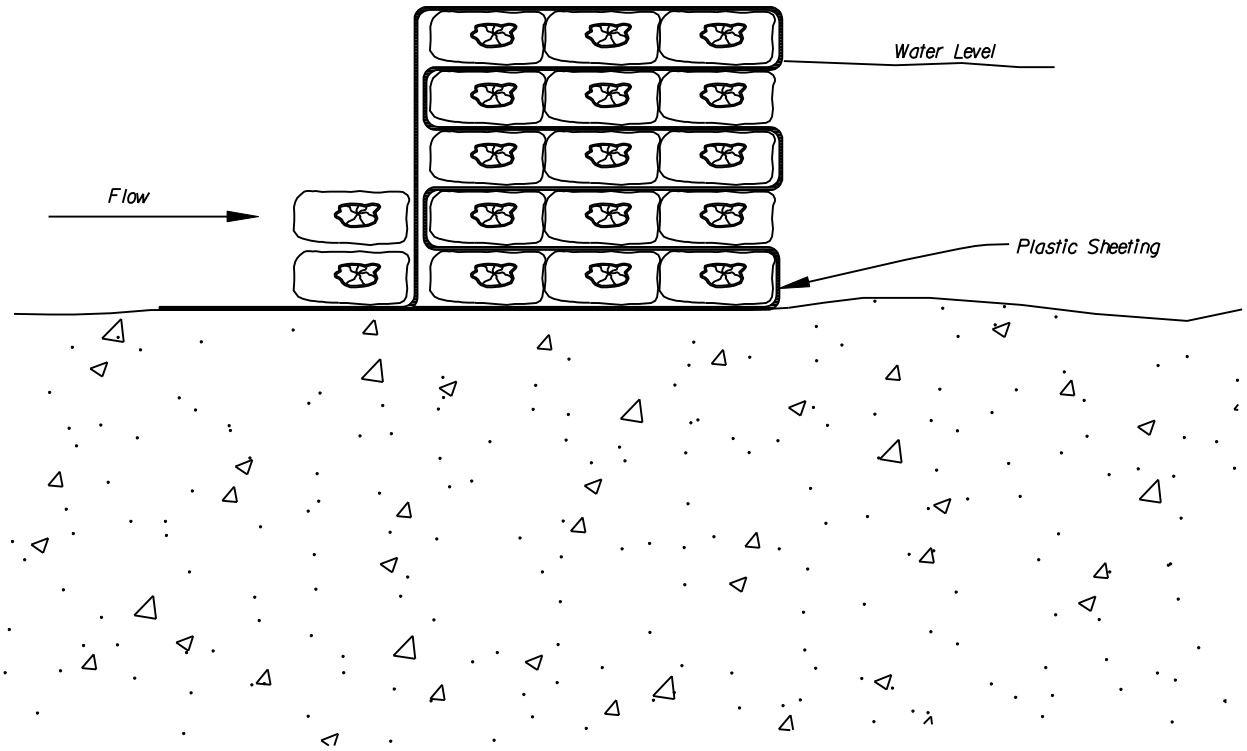


FIGURE 4
PLASTIC SHEETING INTERWOVEN INTO A SAND BAG DAM

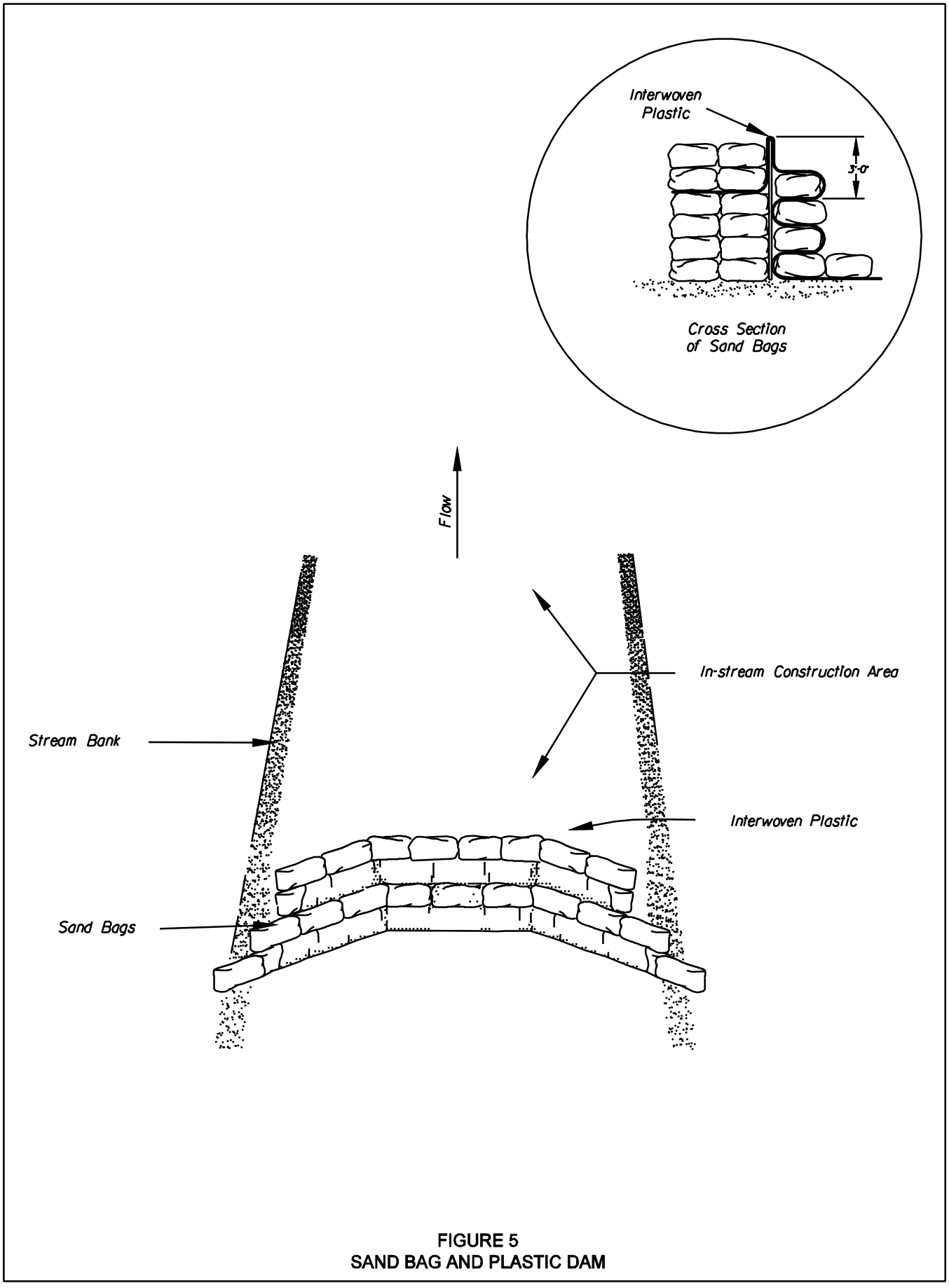


FIGURE 5
SAND BAG AND PLASTIC DAM

While the upstream dam is being installed a properly sized pump(s) will be operating to move stream flow around the dam to prevent stream erosion or bank scour. After the upstream sandbag/plastic dam is complete, the contractor will immediately begin installation of the downstream dam. The pump(s) will continue operating to divert stream flow around the dams throughout installation of the dams and completion of the crossing. The downstream sandbag/plastic dam will be constructed to a height at least three feet above the downstream water level.

6.0 Maintenance of the Dams and Pumps During Construction

Dam & pump crossings may require constant monitoring and occasional repair during the crossing process. The longer the dams remain in the water, the greater the probability they will begin to leak and that water will invade the construction area in potentially significant quantities. Therefore, it is imperative that once trenching within the stream begins that the construction process is carried to completion non-stop. Typically, this involves installing the dams on the day immediately preceding construction of the crossing. Ditching of the stream channel should begin early the following morning and the pipe pulled immediately following completion of the trench. Backfilling should commence immediately following the stringing of the drag section. Most stream crossings typically require approximately 7 - 14 days to install the dams, dig the trench, install the pipe drag section, backfill the trench and restore and stabilize the stream banks depending on site conditions. Smaller streams (less than 10 feet in width) generally require less time to cross using dam & pump procedures.

While the dams are in place, the contractor will provide a sufficient crew that will be responsible for maintaining the dam & pump crossing. That crew will apply additional plastic to the dams and add additional sandbags as necessary. In addition, this crew will be responsible for operating, maintaining and fueling the pumps and maintaining the discharge structures. When the crossing is complete, this crew will immediately install the erosion control structures pursuant to FERC's Wetland and Waterbody Procedures.

To be adequately prepared to repair the dams, the contractor will have on-site rolls of thick plastic sheeting and extra filled and tied sandbags. These materials will be stored directly adjacent to the stream crossing so that they are readily accessible should the need to repair the dams arise.

7.0 Length of the Drag Section

One of the biggest problems encountered during construction of dam & pump stream crossings is the installation of extremely long drag sections across the stream in a single drag section. The extra length requires that the dams be in place longer than necessary which increases the probability of serious problems with the integrity of the sandbag/plastic dams. In addition, the extra time required to dig additional ditch to accommodate long drag sections can result in integrity problems with the sandbag/plastic dams.

Segments must be kept short and extend only the distance necessary to allow for later tie-in to the upland portions of the pipeline. On most streams the drag section should only be long enough to incorporate the sag bends. In other locations, it may be necessary to install additional pipe to complete the crossing.

The entire drag section must be made up prior to the start of in-stream trenching. Once the drag section is complete (welds x-rayed and joints coated), the drag section can be installed immediately following trenching.

8.0 Spoil Storage During Trenching

Spoil must be stored in a manner such that runoff from the spoil does not flow into the stream or off the right-of-way. For streams in flat topography, runoff from the spoil storage pile is not typically a problem. However, on steep sloping stream banks water can run back down the right-of-way and enter the stream upstream or downstream of the dams creating a serious water quality problem. The problem can be compounded as the trackhoes working on the stream banks lift water saturated spoil from the stream and lay it on the right-of-way adjacent to the stream bank before it can be conveyed uphill by additional equipment. To accomplish runoff control during trenching, diversion structures or trenches will be dug within the right-of-way to direct the runoff back into the construction area as shown on Figure 6.

9.0 Spoil Transfer During Construction

Some of the stream crossings may occur adjacent to steep upland areas. In these cases, it will be necessary to utilize additional equipment (trackhoes, dozers, loaders) to transfer spoil by the trackhoes at each stream bank to the temporary spoil storage area.

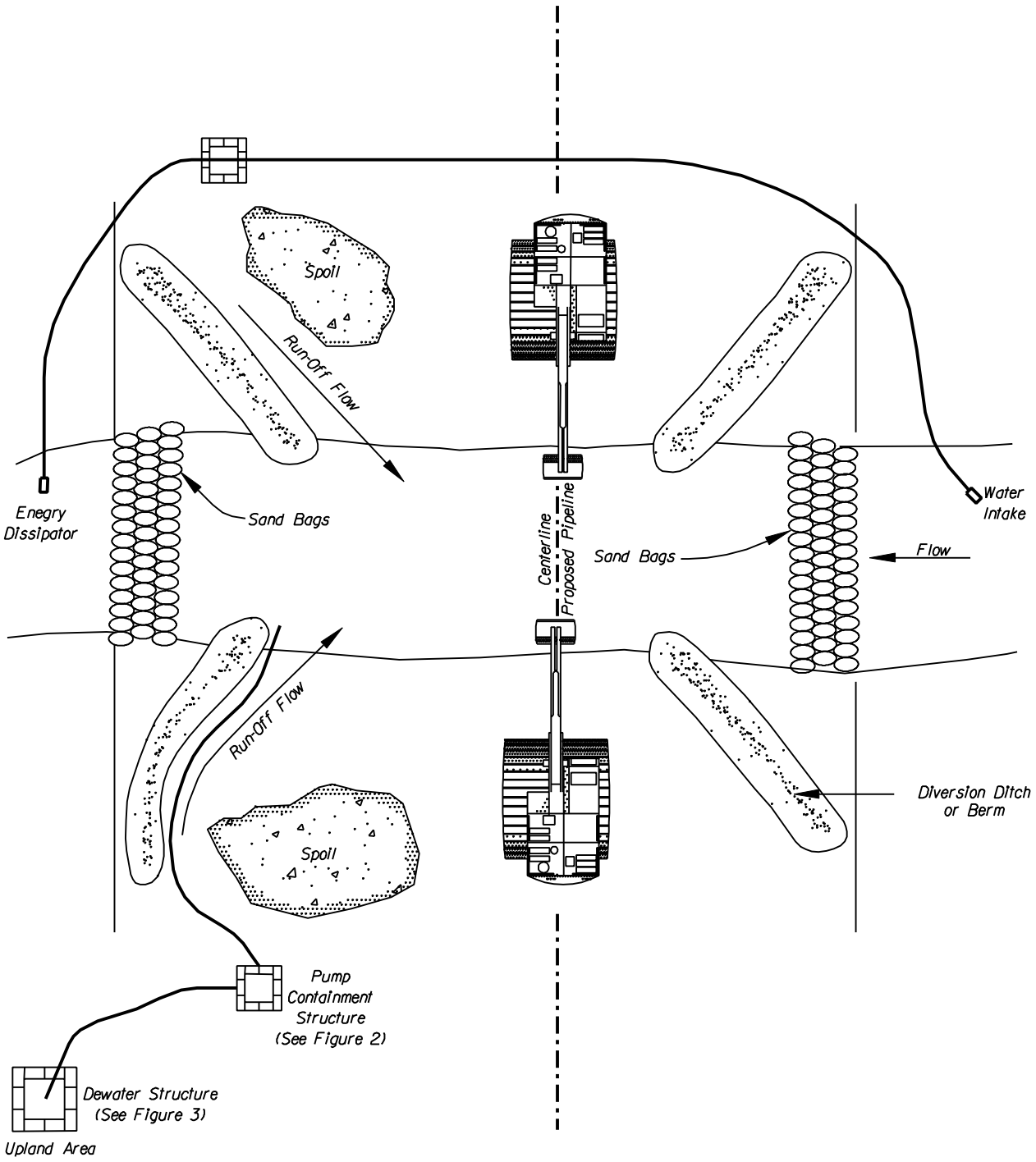
In most cases, the contractor will utilize dozers to push the spoil to the temporary storage area. In other areas, trackhoes will be required to transfer spoil dug by the trackhoe working on the stream bank uphill to a flatter area where it can be moved by dozers. Where two trackhoes are utilized to transfer spoil uphill, it is often desirable to have the trackhoe working on the stream bank place the spoil into a pit (see Figure 7). The spoil from the pit is then picked up by the second trackhoe and lifted further uphill. The pit will significantly reduce the amount of water from the spoil that runs downhill. The pit can be maintained and dug by the trackhoe working uphill from the crossing.

10.0 Installing the Pipe

While trenching is being conducted, the contractor will hook up the drag section to the sideboom tractors so that the pipe may be installed as soon as trenching is completed. It will be necessary at many crossings to float the pipe across the trench (i.e., it may not be feasible to completely dewater the ditch). While the drag section is being lowered into the trench, it is essential that pumps be operated to assure that turbid water does not leak through or flow over the dams. The contractor will operate the pumps at a rate so that water displaced by the pipe is immediately removed and discharged to the dewater site.

11.0 Dewatering the Construction Area

Proper operation of pumps to dewater the construction area is essential to the successful completion of a dam & pump stream crossing. Pumps will be utilized by the contractor as necessary to control the level of water in the construction area. The purpose of the pumps is not to completely dewater the trench.



NOTE:
Temporary Bridge may or may not be in place during trenching operations.

FIGURE 6
DIVERSION DITCH OR BERMS

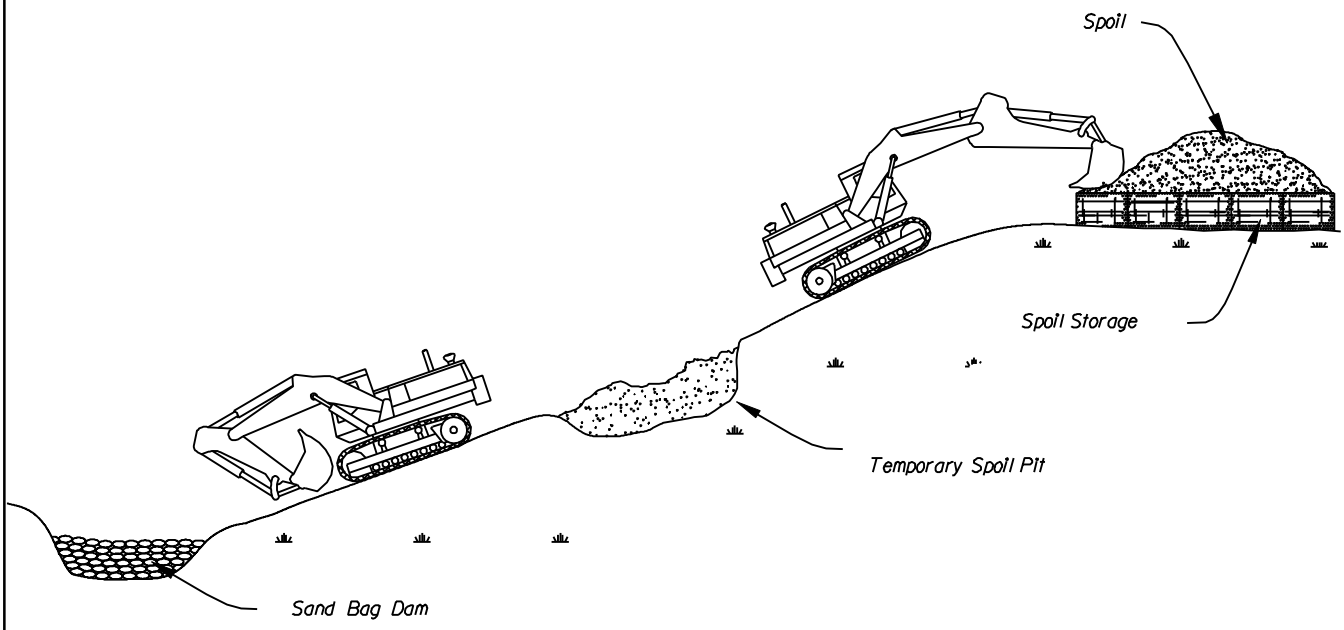


FIGURE 7
UPHILL SPOIL TRANSFER

If the water level in the construction area exceeds the upstream or downstream level of the dams, environmental inspectors will notice small amounts of turbid water escaping into the stream either upstream or downstream of the dams. This is known as "bleeding" and the problem can be quickly resolved by increasing the pumping rate and reducing the water level within the construction area. Although bleeding will not typically result in a violation of water quality standards downstream, if left unchecked it can quickly result in erosion of the dams and serious downstream water quality problems.

The contractor will utilize pumps at each crossing to control the water level in the construction area. The contractor will also install backup pumps that will be tested and fully functional prior to the start of the crossing process. Pumps will be installed and tested and the dewater sites constructed the day prior to any in-stream construction. For most crossings, the contractor will setup three pumps. Additional pumps may be required at a few of the stream crossings. Two of the pumps will serve to remove water from the construction area and the third pump will serve as a backup should one of the primary pumps fail.

The pumps will be set in a containment area as shown on Figure 2. The primary purpose of the containment area is to fully contain any fuel or lubricating oil spills. If hydraulic pumps are used, the hose couplings on the side of the pump body will be oriented in the containment area such that they point perpendicularly away from the stream banks. The purpose of orienting the couplings away from the stream is to protect the stream should one of these couples fail and hydraulic fluid escape.

The contractor will carefully inspect each pump prior to its delivery to the crossing site. In particular, any frayed hoses or apparent leaks will be repaired before the pumps are delivered to the crossing site. Pump heads and the hoses will be cleaned of any free hydraulic oil prior to placing the pump heads into the stream.

All pumps will be installed with individual intake hoses or hydraulic heads, trash filters and discharge hoses. All hydraulic heads will remain in the water during the entire construction process including backfill. In this manner, the backup pump can be immediately employed should one of the primary pumps fail.

Each of the pumps (including the backup pump) will be equipped with a minimum of 300 feet of discharge hose. It is important to stretch the hose on the backup pump and install a dewater structure for that pump at the same time the primary pumps are installed. Hoses should be free of leaks and in good operating condition.

In many cases, it is difficult to locate dewater sites where water will flow away from wetlands or streams. In these cases, careful attention will be paid to the dewater sites and alternative sites (which require additional discharge hose) selected prior to the start of in-stream construction. Often it is necessary to move the location of the dewater site several times during construction of the stream crossing to avoid dewater from reaching sensitive areas.

Dewater structures will be constructed of straw bales and plastic and wooden stakes as shown on Figure 3. The intent of the design provided on Figure 3 is to allow the water to fill the dewater structure and flow evenly over the tops of the bales. Straw bales will be securely staked to the ground utilizing wooden stakes. Alternative structures are also provided in the Erosion Control and Revegetation Plan.

12.0 Backfilling the Ditch

The highest potential for water quality problems during a dam & pump crossing is during backfilling of the ditch. Quick backfilling into the ditch by the contractor can cause the water level in the construction area to overflow or leak through the downstream dam. Pumps must be carefully managed during backfilling to control the water level in the construction area. The contractor must carefully monitor the effectiveness of the pumps and control the rate of backfill to preclude bleeding through the downstream dam. If backfilling occurs too quickly, the pumps will not be capable of removing the water from the construction area quick enough to prevent the escape of turbid water.

To prevent turbidity, backfilling of the ditch will be conducted in a slow, well-planned manner. Backfilling will begin in the center of the stream and proceed toward each bank simultaneously. In this manner, much of the water in the ditch will be pushed to the ditch outside of the stream channel. If upland portions of the trench are backfilled first, the water in the ditch is pushed into the stream channel and will inevitably leak through or overflow the downstream dam.

Once backfilling of the entire stream channel is complete, the contractor will compact the streambed and construct solid plugs on both banks. Water will remain trapped in the ditch outside of the stream channel. This water will be pumped from the ditch at a later time in the manner described for dewatering the construction area (see Section 11).

13.0 Removal of Dams

After the ditch is backfilled, clean gravel fill will be placed on the top one foot of the ditch (where necessary). Plugs will be installed at each stream bank and the stream banks stabilized and the dams will be removed from the crossing. To prevent excessive increases in turbidity during dam removal, the contractor will remove all of the sandbags from the downstream dam. A trackhoe can be utilized to remove the top layers of the sandbags as long as the operator takes great care not to dig into the streambed or to increase turbidity.

After the downstream sandbags are completely removed from the streambed, the contractor will begin removing the sandbags from the upstream dam. The top rows of sandbags should be removed by hand until the water begins to overflow the top of the dam and flows slowly over the construction area. For the first 10 to 30 minutes, turbidity downstream of the crossing area could increase considerably. However, the streambed portion of the construction area will be flushed clean of sediments left over from construction and the water will flow clear over the disturbed stream bed area. After the turbidity level has decreased to acceptable levels or that of upstream levels, the contractor can proceed with removing the remainder of the upstream dam sandbags.

APPENDIX L

Pacific Connector's Spill Prevention, Containment, and Countermeasures Plan

Pacific Connector GAS PIPELINE

Pacific Connector Gas Pipeline, LP

Spill Prevention, Containment, and Countermeasures Plan

Pacific Connector Gas Pipeline Project

(During the previous NEPA process, PCGP submitted a Plan of Development to meet BLM Right-of-Way Grant requirements based on BLM regulations. These plans will be updated in consultation with the Federal land managing agencies [BLM, USFS, and Reclamation]) during the current NEPA process.).

September 2017

SPILL PREVENTION, CONTAINMENT, AND COUNTERMEASURES PLAN FOR OIL & HAZARDOUS SUBSTANCES

1.0 INTRODUCTION

This Spill Prevention, Containment, and Countermeasures (SPCC) Plan identifies measures to be taken by Pacific Connector Gas Pipeline, LP (Pacific Connector) and its contractors (Contractor) to prevent, contain and respond to spills during the construction of the Pacific Connector Gas Pipeline (PCGP) Project.

2.0 PLAN DETAILS

The following is a description and listing of the different components of the SPCC Plan:

I. Provisions of Plan and Responsibilities of Employees

A. The goal of the plan:

1. To minimize the potential for a spill.
2. In the event of a spill to contain the spillage in the smallest area possible.
3. To protect areas that are of environmental concern.

B. Responsibilities:

It is Pacific Connector's intent that everything practical is done to minimize the potential for and consequences of a spill during the construction of the Pacific Connector Gas Pipeline Project. Therefore, it is the responsibility of every person associated with the project to be on the lookout for spills or leaks from equipment and take the appropriate action. *Pacific Connector will complete Attachment A (Emergency Contact List) prior to beginning work, provide the attachment to the contractor and inspection personnel and update as required during construction.*

II. Training

The Chief Environmental Inspector (EI) will hold Spill Prevention, Containment, and Countermeasure (SPCC) training prior to the start of any construction for all personnel involved with the project. All personnel added during the course of the project must receive the pre-job SPCC training. No one will be allowed to work on the construction right-of-way without project-specific SPCC training. A second training session will be held for all project personnel just prior to hydrostatic testing of the pipeline to train all those involved on response procedures in case of a hydrostatic test failure. Individual training sessions will also be conducted by the EI for those contractor employees responsible for completing the horizontal directional drills (HDDs). The contractor will be required to maintain a record of those workers that have received training.

III. Hazardous Materials Inventory

Attachment B provides an anticipated inventory of oil, fuel and hazardous substances that will be utilized during construction which, if released, may pose a threat to human health or the environment. In addition, Attachment B provides the reportable quantity

(RQ)[1] for each of these materials. Material Safety Data Sheets (MSDS) for each of these chemicals is presented in Attachment B. *Attachment B must be completed by the contractor and MSDSs provided by the contractor prior to beginning work and updated as required during construction.*
Any materials brought to the construction right-of-way, yard or temporary extra work areas will be inventoried, reported to the EI and managed in accordance with the guidelines in this plan.

IV. Precautions for Spill Prevention and Control Equipment and Material Locations

A. Spill Prevention and Control:

Hazardous substances, chemicals, fuels and lubricating oils will not be stored within 150 feet of waterbody banks or wetlands or within 200 feet of water supply wells (400 feet of municipal or community water supply wells). Equipment will not be fueled or maintained in wetlands or within 150 feet of waterbody banks or wetlands or within 200 feet of water supply wells (400 feet of municipal or community water supply wells) unless the procedures specified in Section IV. A. 1. e. of this Plan are utilized. Each of the no fueling areas will be clearly identified and their limits staked in the field. To assure that storage and fueling occur in an environmentally acceptable location, the EI must approve the location of all oil, hazardous substance, and chemical storage and fueling areas, other material storage areas and construction equipment maintenance areas prior to their use.

In compliance with 48 CFR Chapter 4 Part 452.236-74, pollutants such as fuels, lubricants, bitumens, raw sewage, and other harmful materials shall not be discharged on the ground; into or nearby rivers, streams, or impoundments; or into natural or man-made channels. Wash water or waste from concrete or aggregate operations shall not be allowed to enter live streams prior to treatment by filtration, settling, or other means sufficient to reduce the sediment content to not more than that of the stream into which it is discharged.

1. Fueling, lubricating or maintaining equipment.

a. Fuels and lubricating oils will not be stored and equipment will not be fueled, lubricated or otherwise maintained in wetlands or within 150 feet of waterbody banks, wetlands, or Bureau of Reclamation (Reclamation) facilities or within 200 feet of water supply wells (400 feet of municipal or community water supply wells), unless the procedures specified in Section e. below are utilized. Each of these areas will be clearly identified and their limits staked in the field.

b. All vehicles used to transport lubricants and fuel must be equipped with an emergency spill response kit. At a minimum this kit must include:

- Ten, 48" x 3" oil socks;

[1] RQs for specific constituents can be found from one or more of the following:
1) 49 CFR 172;
2) 40 CFR Part 302; or
3) MSDS documents.

- Five, 17" x 17"oil pillows;
- One, 10' x 4" oil boom;
- Twenty, oil absorbent mat pads (Pigalog MAT415 or equivalent);
- Garden size, 6 mil, polyethylene bags;
- Ten pair of liquid proof gloves compatible with materials on-site; and
- One, 55-gallon polyethylene open-head drum.

c. Any fuel or lubricant spilled to the ground during fueling or maintenance of equipment will be cleaned up and properly disposed of immediately. This includes all soil contaminated by the spill.

d. If vehicles/equipment require maintenance on-site, the contractor will install drip pans or other suitable containment devices to collect all fluids. Under no circumstances will the contractor allow material from the liner to spill on the ground surface. All waste fluids will be removed from the site and disposed of properly.

e. Where site-specific conditions/constraints require equipment (including boring machines) to be refueled in wetlands or within 150 feet of waterbody banks, wetlands, or Reclamation facilities or within 200 feet of water supply wells (400 feet of municipal or community water supply wells), the following procedures will be implemented to avoid or minimize potential spills.

1. Where possible, the refueling location will be selected with the best topography to prevent or limit any potential spill from entering a wetland or waterbody.
2. The equipment being refueled will only be filled to ¾ capacity to prevent accidental spills from overtopping.
3. Oil absorbent mat pads or diapers will be placed around the equipment's fuel tank opening to absorb any drips/spills.
4. Drip pans or other suitable containment/liner materials (i.e., plastic sheeting) will also be placed under equipment to ensure that any fuel spills or drips are contained. Under no circumstances will the contractor allow material from the liner to spill on the ground surface. All waste fluids will be removed from the site and disposed of properly.

2. Dewatering pumps, generators and hydrostatic test pumps.

a. Pumps and generators used for dewatering or hydrostatic testing within or in the vicinity (within 150 feet) of waterbodies, wetlands, or Reclamation facilities or within 200 feet water supply wells (400 feet of municipal or community water supply wells) will be set in containment structures.

1. Containment structures may be constructed out of strawbales and lined with a minimum of 2 plastic sheets (6 mil plastic) that drape to the ground outside the structure. However, containment structures for small portable pumps/generators may consist of plastic basins such as a child's pool or other similar containers as approved by the EI. The EI may consult with a federal inspector to

determine appropriate types of containment structures on federal lands. The basins shall not be reused if cracked, punctured or contaminated with oil or grease.

2. Fuel for pumps and generators will be carried in by hand and removed immediately after fueling takes place. Under no circumstances will fuel or lubricants be stored within the containment structure.
3. "Heavy Duty" garbage bags for disposal of used materials and a supply of 40 absorbent pads will be kept in the containment structure.
4. When the containment structure is dismantled, the plastic sheeting will be placed in trash bags and immediately hauled away for proper disposal.

3. Leaks in hoses or fittings on equipment.

   a. The contractor will visually inspect all equipment for leaks and repair all leaks prior to moving the equipment onto the construction right-of-way.
   b. Any leaks that develop while equipment is in use will be repaired immediately. The equipment will not be utilized until repairs are completed.
   c. A minimum of 40 absorbent pads will be kept on all pieces of equipment. When used, they will be properly disposed of and replaced immediately.

4. Hose or fitting (valves, seals, gaskets) failure or rupture.
   Contain spills immediately to reduce spill to the smallest area possible and follow the procedures in this plan.

5. Fuel storage tanks and hazardous materials containers

   a. All fuel storage tanks/hazardous material containers will be located inside earthen-diked berms designed to hold 1.5 times the capacity of the largest tank/container within the berm. The diked area will incorporate a 12-mil (or thicker) liner in its design. The tank will be set directly on the liner. Non-abrasive padding may be used under the tank to provide stability as long as the integrity of the liner is not compromised. The purpose of this liner is to protect soils located under the tank or used in dike construction from contamination. Any spilled materials located on the liner will be removed immediately and prior to dismantling the tank and dike.
   b. Prior to their use, the contractor will visually inspect each tank for cracks, excessive corrosion, or other flaws which may compromise the integrity of the tank. Hoses and valves will be similarly inspected. If the contractor determines that the equipment is in good mechanical condition, it may be moved onto the right-of-way which includes staging areas and pipe yards. Otherwise, the equipment will be rejected and alternative equipment in good condition employed.
   c. The contractor will inspect the integrity of all dikes and the liner at least daily and repair the dikes or replace the liner immediately if they become breached or torn.

d. It may be necessary to drain accumulated stormwater from within the diked area containing fuel storage tanks. If the stormwater has been contaminated with fuel or other pollutants, all water will be removed by vacuum truck or similar means and hauled to a disposal facility approved by the State of Oregon. However, if no oil sheen is present and there are no other visible signs of pollution, the stormwater may be left to evaporate within the dike after the tank has been removed. Under no circumstances will the contractor allow the surface discharge or other release of water contained within the diked area without the prior approval of the EI or a federal inspector on federal lands.

B. Material locations:

1. Each work site will have on hand and maintain emergency response equipment. While construction activities are ongoing, all such equipment will be inspected daily for operability and accessibility. The location of fire extinguishers and related emergency response equipment will be clearly marked with signs. Each foreman in charge of construction activities will be provided with and will maintain readily accessible, a copy of this plan.
2. The contractor will designate a single individual who will be responsible for maintenance of all emergency response/spill response materials and equipment.
3. Spill absorbent material and booms of adequate size and number to handle a spill of fuel or other hazardous materials will be stored at a central location(s) readily accessible to each construction crew for immediate response in case of emergency. The location of these stockpiled materials will be at designated locations to be determined prior to the start of construction. If these materials are not stockpiled at the site as required by this plan, construction will not be allowed to commence.
4. At a minimum the following spill control materials will be included in each centrally located spill response kit stockpile:

   - Six bales (200 count each) of absorbent mat pads (Pigalog MAT423 or equivalent);
   - Four boxes of absorbent spaghetti strips (Pigalog PLP402 or equivalent);
   - Four boxes of absorbent pulp (Pigalog SA8010 or equivalent);
   - 300 feet of 5 or 8-inch diameter absorbent skimmer boom material (Pigalog BOM 408 or equivalent);
   - 20 straw bales;
   - 10 packages of garden size, 6 mil, polyethylene bags;
   - Ten pair of liquid proof gloves compatible with materials on site; and
   - One, 55-gallon polyethylene open-head drum.

   Absorbent pads, spaghetti, pulp, and booms will be of the type that is capable of absorbing petroleum products but repels water. (The above list may be modified by the EI in consultation with Pacific Connector's Environmental Representative to better fit the needs of the project).
5. A minimum of 40 absorbent pads will be kept on each piece of equipment. When used, they will be properly disposed of and replaced immediately.

6. The contractor will stockpile bales of straw on or adjacent to the construction right-of-way for the sole purpose of emergency response. After construction is complete, the unused straw may be utilized as mulch in upland areas during reclamation.
7. Contractor foremen and EIs will keep a minimum of one bale (200 count) of absorbent pads in their vehicles.

V. Spill Response: Initial response to an emergency will be to protect human health and safety, and then the environment.

A. Initiate Control, If Safe. Make every effort to stop source of spill and contain spill.

- Shut off equipment;
- Shut off source of spill, if possible;
- Warn all personnel at the construction site, stop all vehicular traffic and work in the area, and remove unnecessary personnel;
- Immediately contact the EI and report observer's name, location, nature and extent of spill;
- Contain the spill to the smallest area possible and stop it from reaching waterways or other sensitive areas (i.e., wetlands, waterbodies, wells, etc.);
- Block spill with backhoe or other equipment as necessary;
- Construct ditch or dike around spill as necessary - earthen dike, strawbales, sand bags;
- Install straw barriers and booms in stream;
- Excavate side pool and isolate spill; and
- Dam stream channel to stop movement of the spill, if necessary.

B. Conduct Initial Assessment (note the following):

- Observers name;
- Any injuries and their extent;
- Location, time and approximate size of spill area;
- Type and approximate amount of material spilled;
- Status of source;
- Did the spill enter a waterbody? Is there a threat to a waterbody; and
- If not contained, direction spill is heading and rate of release.

C. Contact Pacific Connector’s Environmental Inspector (EI) Or Chief Inspector

- Provide the information collected above;
- EI or Alternate will be the Emergency Coordinator; and
- The EI will contact and dispatch necessary personnel. If the accident is beyond the capabilities of the equipment and material located on-site to handle, the EI will contact appropriate County emergency assistance (i.e., County HazMat Team) and Pacific Connector’s Environmental Representative.

D. EI or Alternate Contact Pacific Connector’s Environmental Representative (ER)

- Obtain initial assessment Information;

- Contact County emergency response agency as appropriate;
- Notify appropriate State officials;
- Report any spill that enters any water to the U.S. Coast Guard National Response Center (800) 424-8802;
- Report any spill that enters any facility, land, or waterbody under the Bureau of Reclamation, Klamath Project's jurisdiction (541) 883-6935 (Environmental Management Systems Coordinator);
- Assist contractor and EI in coordinating response and clean-up; and
- Assist contractor and EI to ensure proper dispose of all waste.

E. Pacific Connector's Construction Superintendent

- Provide equipment and manpower as necessary to quickly and safely control and cleanup the spill; and
- Evaluate spill source and determine if procedural changes are necessary to prevent similar future events.

F. Pacific Connector's Environmental Representative

- Evaluate initial assessment information and assist as required in notification of agencies;
- Coordinate and approve disposal of waste materials;
- Conduct cleanup inspection if required; and
- Evaluate spill source and determine if procedural changes are necessary to prevent similar future events

VI. Cleanup and Disposal of Spills

The following section outlines specific procedures to be followed by the Contractor and Pacific Connector when addressing releases. At all times, worker and public safety is a paramount consideration and should be contemplated in all spill response situations.

1. All spilled liquids and contaminated materials will be cleaned up immediately. Restrict spills to the containment area if possible by stopping or diverting flow from the oil/fuel tank. Every effort shall be made to prevent the seepage of oil into soils and waterways.

2. If a release occurs into a facility drain, nearby stream, or wetland, immediately pump any floating layer into drums. For streams and wetlands, place a barrier between the release area and the site boundary. This barrier may include but is not limited to oil booms, hay bales, and under flow dams. As soon as possible excavate contaminated soils and sediments.

3. Cleanup of contaminated materials includes the removal of all soils which have been subjected to the pollutant. If necessary, the EI may require the contractor to collect samples of soil strata below the spill to assure that all contaminated soils have been removed from the site. On federal lands, soil samples may be required by a third party after any cleanup of contaminated materials. For larger quantities of soils, construct temporary waste piles using plastic liners. Plastic-lined roll-off bins shall be leased for storing this material as soon as feasible.

4. All materials used to clean-up the spill will be double bagged and inspected prior to removal from the spill site. All vegetation contaminated by the spilled material will be similarly collected, bagged and disposed at an approved State of Oregon Department of Environmental Quality (DEQ) disposal facility.

5. Dispose of oily soils and contaminated articles in accordance with applicable federal, state and local regulations. Decontaminate all emergency response equipment used during the incident before storing. Decontamination of equipment used to clean any spill shall occur within a containment structure such as a drip pan or other suitable container/liner such that the contaminated material can be properly contained and hauled off to a DEQ approved disposal facility.

6. Transportation manifests, disposal receipts and weight tickets will be supplied to the EI and be made available to federal inspectors upon request.

Disposal of Contaminated Materials/Soils

1. The Contractor shall be responsible for the proper disposal of wastes generated by their actions, including obtaining applicable authorization, registrations, and/or EPA/State I.D. Numbers.

2. All contaminated articles and soils recovered during a release event shall be properly handled and stored in approved DOT containers.

3. In accordance with Pacific Connector's policy, all wastes generated as a result of spill response activities shall be analyzed to determine if they are hazardous, unless knowledge of contaminant(s) is applied to classify these wastes/spill materials as non-hazardous.

4. Those wastes determined to be hazardous shall be properly labeled, profiled, and manifested to an authorized DEQ hazardous waste treatment, storage, and disposal facility.

5. Pacific Connector may utilize a remediation firm or a waste management firm to initiate waste disposal activities.

6. At no time shall hazardous waste be stored on-site for a period exceeding 90 days.

7. Hazardous wastes shall be stored in a secured location (i.e., fenced and locked) until such time as this material is transported off-site.

8. Non-hazardous, oil contaminated soils and articles shall be properly disposed of at authorized non-hazardous land disposal facilities. While on-site, these materials shall be managed in accordance with the procedures outlined previously, and with applicable federal, state, and local regulations.

VII. Response to Hydrostatic Test Failure

All available personnel will be put into groups of 2 or 3. The groups will be strategically located along the test section. Each group will have a radio, a minimum of one bale (200 count) of absorbent pads, 200 feet of double absorbent booms, 10 fence posts, 1 post driver, 200 feet of rope, and a knife. Radio communication will be used to alert others of the rupture location. Booms and pads will be used at the site and downstream of the rupture on any waterbody to which the ruptured water may be headed. The EI will take water samples to check for oil and grease residues from the rupture pit and downstream of each set of booms installed. A proper chain of custody form will be completed and samples sent to a local laboratory for analysis. On federal lands, all hydrostatic test failure sites resulting in any breach shall be reviewed by a federal inspector in conjunction with EI.

ATTACHMENT A
Emergency Contact List

Emergency all Counties– 911
Coos County Fire and Sheriff's Department – 541-488-1095
Douglas County Fire and Sheriff's Department – 541-440-4450
Jackson County Fire and Sheriff's Department – 541-774-6800
Klamath County Fire and Sheriff's Department – 541-883-5130
Oregon Department of Environmental Quality – Spills contact nearest DEQ office
- **Coos Bay – 541-269-2721**
- **Medford – 541-776-6010**
- **Roseburg – 541-440-3338**

Oregon Emergency Response System (OERS) – 800-452-0311
National 24-Hour Spill Response Center (Coast Guard) - 1-800-424-8802

Forest Service Contacts		
Name	**Title**	**Telephone Number**
Umpqua National Forest		
Robert Marshall	Tiller Ranger District Hazardous Materials Coordinator & Spill Coordinator	541-825-3122
Kevin Sands	Tiller Ranger Alternate	541-825-3132
John Beagle	Forest-wide Hazardous Materials Coordinator	541-957-3397
Mikeal Jones	Forest-wide Spill Coordinator	541-957-3356
Debra Gray	Forest-wide Alternate	541-957-3405
If above personnel are unavailable	Forest Dispatcher	During business hours: 541-957-3325 After business hours: 541-672-6601
Rogue River-Siskiyou National Forest		
Steve Rucker	High Cascades Ranger District Hazardous Materials & Spill Coordinator	541-560-3421 (cell: 541-944-9916)
Pete Jones	Forest-wide Hazardous Materials & Spill Coordinator	541-858-2632
If above personnel are unavailable	Forest Dispatcher	During business hours: 841-618-2510 After business hours: 541-776-7114 or 541-858-2200
Fremont-Winema National Forest		
Waiyen Yee	Hazardous Materials & Spill Coordinator	541-883-6813 (cell: 541-891-6977)
Rich Kehr	Alternate Contact	541-883-6722 (cell: 541-891-0143)
If above personnel are unavailable	Forest Dispatcher	During business hours: 541-883-6850 After business hours: 541-884-0516 or 541-947-6200
Bureau of Land Management – Coos Bay & Roseburg Districts		
Paul Gammon	Hazardous Materials and Spill	541-751-4463

	Coordinator	
Bureau of Land Management – Medford District		
Sonia Mason	Hazardous Materials Alternate	541-618-2287
Bureau of Land Management – Lakeview District		
Tom Cottingham	Hazardous Materials Coordinator	541-883-6916
Bureau of Reclamation		
Timothy Thompson	Klamath Basin Area Office Contact	541-880-2568
Kristen Hiatt	Alternate Contact	541-883-6935

EMERGENCY SPILL COORDINATOR (ESC), usually the Chief EI

Name: _____ Method of Contact: _____
Alternate Phone #:

AUTHORIZED ALTERNATE (Contact only if you are unable to reach the ESC)

Name: _____Method of Contact: _____
Alternate Phone #:

CONTRACTOR

Name of construction foreman and his/her designated representative, and method of contact. This information to be provided by contractor.

Name: _____Method of Contact: _____
Alternate Phone #:

CONTRACTOR SPILL MATERIAL COORDINATOR

This person is responsible for maintaining all spill control equipment and material. This information to be provided by contractor.

Name: _____Method of Contact: _____
Alternate Phone #:

PACIFIC CONNECTOR'S ENVIRONMENTAL REPRESENTATIVE

Name: Mike Warson
(Office) 713-400-2839
(Cell) 713-647-1118

PACIFIC CONNECTOR'S ALTERNATE ENVIRONMENTAL REPRESENTATIVE

Name: Mike Warson
(Office) 713-400-2839
(Cell) 713-647-111

ATTACHMENT B

HAZARDOUS MATERIALS INVENTORY

Material	Quantity (gallons)	Storage Location	Reportable Quantity (include reference)
Oil/Fuel:			
Commercial Chemicals:			
Hazardous Wastes:			

The contractor will designate an individual who will be primarily responsible for maintenance and placement of spill control materials and equipment. This individual will assure that all control equipment is in place and operational prior to the start of construction.

APPENDIX M

Pacific Connector Waterbodies Crossed

Table M-1
Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Proposed Route (revised April 2018)

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Coast Range Ecoregion, Coos Sub-basin (HUC 17100304), Coos Bay-Frontal Pacific Ocean (HUC 1710030403) Fifth field Watershed [8], Coos County, Oregon												
Estuary Drain (Alt Wet NH (West))	17100304006491 State	0.00	Estuarine Major	Pullback TEWA Adjacent to Pipeline	The Estuary Drain is not crossed by the centerline. TEWA 0.10, which crosses the drain, is required for the HDD of Coos Bay to fabricate the HDD pipe string and to facilitate the HDD pullback operations. The Estuary Drain will be bridged to minimize disturbance	• Southern DPS Green Sturgeon, T, CH • Oregon Coast ESU Coho, migration, rearing habitat T, CH	Fall Chinook, Coho, Winter Steelhead, Pacific Lamprey	Various Marine Fish and Shellfish	4 Coastal Pelagic spp., 21 Groundfish spp, 2 Salmonid spp. Pelagic, Groundfish, and Salmonids (see Table 3B- 6)	Coastal Pelagic spp., Groundfish spp, Salmonid spp. Fall Chinook/ Coho Rearing, Migration	Oct 1 to Feb 15 [10a]	Y
Coos Bay (NE-26) WB-T02-001	17100304006491 State	0.28 to 1.00	Estuarine Major	HDD	HDD feasibility based on geometry, topography, and expected geotechnical conditions along proposed alignment. Primary HDD activities are significantly set back from crossing. The HDD crossing method will not encumber the Federal Navigation crossed along the HDD alignment. The HDD avoids in-water open cut crossing methods. Other trenchless crossing methods (conventional bore and Direct Pipe®) are not feasible based on crossing length.	• Southern DPS Green Sturgeon, T, CH • Oregon Coast ESU Coho, migration, rearing habitat T, CH	Fall Chinook, Coho, Winter Steelhead, Pacific Lamprey	Various Marine Fish and Shellfish	4 Coastal Pelagic spp., 21 Groundfish spp, 2 Salmonid spp. Pelagic, Groundfish, and Salmonids (see Table 3B- 6)	Coastal Pelagic spp., Groundfish spp, Salmonid spp. Fall Chinook/ Coho Rearing, Migration	Oct 1 to Feb 15 [10a]	N

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale[4]	ESA Species Present/Habitat[5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Coos Bay (NE-26) WB-T02-002 W-T02-001D	1710030400649 61 State	1.46 to 3.02	Estuarine	HDD	HDD feasibility based on geometry, topography, and expected geotechnical conditions along proposed alignment. Primary HDD activities are significantly set back from crossing. The HDD crossing method will not encumber the Federal Navigation crossed along the HDD alignment. The HDD avoids in-water open cut crossing methods. Other trenchless crossing methods (conventional bore and Direct Pipe®) are not feasible based on crossing length.	• Southern DPS Green Sturgeon, T, CH • Oregon Coast ESU Coho, migration, rearing habitat T, CH	Fall Chinook, Coho, Winter Steelhead, Pacific Lamprey	Various Marine Fish and Shellfish	4 Coastal Pelagic spp., 21 Groundfish spp, 2 Salmonid spp. Pelagic, Groundfish, and Salmonids (see Table 3B- 6)	Coastal Pelagic spp., Groundfish spp, Salmonid spp. Fall Chinook/ Coho Rearing, Migration	Oct 1 to Feb 15 [10b]	N
Kentuck Slough EE-SS-9004 (EE-6)		3.02 to 6.39R	Perennial Minor	HDD Pullback TEWA Adjacent riparian zone	Adjacent riparian zone overlaps construction ROW	• Oregon Coast ESU Coho, spawning habitat T, CH	Coho, Winter Steelhead	Assumed	Coho	Coho Rearing, Migration	Jul 1 to Sep 15	
Trib to Coos Bay (S1-01/EE-6)	17100304000767 Private	6.39R	Perennial Minor	Dry Open-Cut	Dry open-cut method feasible/practical on small channelized tributary within golf coarse lacking effect riparian vegetation.	• Oregon Coast ESU Coho, assumed habitat T	Coho Assumed, Winter Steelhead	Assumed	Coho Assumed	Unknown	Jul 1 to Sep 15	Y*
Willanch Slough (EE-7) S1-04 (EE-7 MOD))	17100304001393 Private	8.27R	Perennial Intermediate	Dry Open-Cut	Dry open-cut method feasible/practical on small tributary within pasture/hayfield lacking effect riparian vegetation.	• Oregon Coast ESU Coho, migration, rearing habitat T, CH	Coho, Winter Steelhead	Assumed	Coho	Coho Rearing, Migration	Jul 1 to Sep 15	Y*
Johnston Creek Willanch Creek S1-05 (GDX-29 / EE-8 (MOD))	17100304000413 17100304000409 Private	8.35R	Perennial	Adjacent riparian zone	Adjacent riparian zone overlaps construction ROW	• Oregon Coast ESU Coho, spawning habitat T, CH	Coho, Winter Steelhead	Assumed	Coho	Coho Rearing, Migration	Jul 1 to Sep 15	
Trib. to Willanch Slough S-T0-1-003(GDX030)	Private	8.46R	Intermittent Intermediate	Dry Open-Cut	Dry open-cut method feasible/practical on small intermittent channelized tributary on edge of pasture.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to Cooston Channel (Echo Creek) S-T01-003 (SS-100-002)	17100304005045 Private	10.21R	Intermittent Intermediate	Dry Open-Cut	Dry open-cut method feasible/practical on small headwater tributary, if flowing at the time of construction.	• Oregon Coast ESU Coho, spawning habitat T	Winter Steelhead Coho	Assumed	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y*

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale[4]	ESA Species Present/Habitat[5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Coos River (BSP-119)	17100304005030 Private	11.13R	Estuarine Major	HDD [10] Level 1 [11]	HDD feasible based on geometry, topography, and geotechnical conditions along proposed alignment. Primary HDD activities are significantly set back from crossing. Conventional bore not feasible/practical because of crossing length and high groundwater areas on either side of river. Dry open-cut or diverted open-cut methods not practical/feasible based on flow volumes and tidal influence.	• Southern DPS Green Sturgeon, T, CH • Oregon Coast ESU Coho, migration, rearing habitat T, CH	Fall Chinook, Coho, Winter Steelhead, Green Sturgeon, Pacific Lamprey	Various Marine Fish and Shellfish	Chinook, Coho Pelagic, Groundfish, (see Table 3B- 5)	Fall Chinook/ Coho (Rearing, Migration)	Oct 1 to Feb 15 [10c]	N
Vogel Creek (SS-100-005)	17100304005031 Private	11.55BR	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical during low flow period within fish window. A conventional bore crossing is problematic because of expected high groundwater levels within the Coos River floodplain that would be encountered within the bore pit at design depths.	• Oregon Coast ESU Coho, spawning habitat T, CH	Coho, Winter Steelhead	Assumed	Coho	Coho Rearing, Migration	Jul 1 to Sep 15	Y*
Ditch Trib. to Vogel Creek (BR-S-04)	17100304000790 Private	11.88BR	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent ditched tributary if flowing at the time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Y*
Ditch Trib. to Vogel Creek (BR-S-06)	17100304000798 Private	12.11BR	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 2' wide intermittent ditched tributary if flowing at the time of construction.	None	None	Assumed	None	None	Jul 1 to Sep 15	Y*

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale[4]	ESA Species Present/Habitat[5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. to Stock Slough (EE-SS-9026)	17100304015021 Private	13.92BR	Intermittent N/A	Adjacent to centerline within TEWA	Small headwater, interpreted Intermittent, tributary not crossed by centerline on edge of TEWA and can likely be avoided, if present. If present and cannot be avoided, would be restored to approximate original contour and grade during restoration.	None	None	None	None	None	Jul 1 to Sep 15	N
Trib. to Stock Slough (BR-S-31)	17100304002068 Private	14.72BR	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small non-fish intermittent ditched tributary if flowing at the time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Y*
Trib. to Stock Slough (Laxstrom Gulch) (BR-S-30)	17100304000493 Private	14.82BR	Intermittent	Adjacent riparian zone	Adjacent riparian zone overlaps construction ROW	• Oregon Coast ESU Coho, spawning habitat T, CH	Coho, Winter Steelhead,	Assumed	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	
Stock Slough (BR-S-36)	17100304000507 Private	15.11BR	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on creek during low flow period within fish window. A conventional bore crossing is problematic because of expected high groundwater levels within the Stock Slough floodplain and Laxstrom Gluch that would be encountered within the bore pit at design depths.	• Oregon Coast ESU Coho, spawning habitat T, CH	Coho, Winter Steelhead,	Assumed	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y*
Trib. To Stock Slough (Laxstrom Gulch)	17100304000493 Private	15.16BR	Intermittent Minor	Adjacent to centerline within ROW crossed by PAR 15.07	PAR 15.07 uses an existing road with a culverted crossing that does not need to be improved for project use - no impacts	• Oregon Coast ESU Coho, spawning habitat T	Coho, Winter Steelhead	Assumed	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	N
Stock Slough (EE-SS-9068)	17100304000507 Private	15.32BR	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small waterbody during low flow period within fish window and if flowing at the time of construction. A conventional bore crossing is problematic because of expected high groundwater levels within the Stock Slough floodplain that would be encountered within the bore pit at design depths. A bore crossing is not feasible because of topographic constraints on west side of creek because of grading/excavation requirements for a bore pit.	• Oregon Coast ESU Coho, spawning habitat T, CH	Coho, Winter Steelhead,	Assumed	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y*

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Coast Range Ecoregion, Coquille Sub-basin (HUC 17100305), North Fork Coquille River (HUC 1710030504) Fifth field Watershed [8] Coos County, Oregon												
Steinnon Creek (SS-500-003; BR-S-63)	17100305000361 BLM	20.20BR	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small non-fish tributary. Steep topographic conditions prevent a conventional bore because of bore pit grading/excavation requirements on both sides of the crossing.	None	Unknown	Assumed	None	None	Jul 1 to Sep 15	Y
Steinnon Creek (BR-S-63)	171003050000361 BLM	24.32BR	Perennial Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical during low flows periods within ODFW in- water work window. Right-of- way has been necked down to 75 feet and TEWAs located in cleared areas to minimize riparian disturbance. A conventional bore (geotechnical conditions unknown) would require additional riparian impacts because TEWAs to accommodate the bore pits would be required closer to the waterbody in forested riparian areas.	• Oregon Coast ESU Coho, spawning, rearing habitat T, CH	Fall Chinook, Coho, Winter Steelhead, Pacific Lamprey	Assumed	Chinook, Coho	Fall Chinook, Coho Rearing, Migration	Jul 1 to Sep 15	Y-1i
Ditch (DA-10X)	17100305012102 Private	22.72	Intermittent Minor	Dry Open-Cut	Dry-open cut methods feasible/practical on small field drainage ditch if flowing during construction.	None	Unknown	Assumed	None	None	Jul 1 to Sep 15	Y*
North Fork Coquille River (BSP-207)	17100305000339 Private	23.06	Perennial Intermediate	Dry Open-Cut Level 1 [11]	Dry open-cut method feasible/practical on 20' wide river during low flow period within fish window. Impacts to riparian vegetation minimized by placement/setbacks of TEWAs on west side of river in field and eastside setback 100 feet from waterbody. ROW also necked down to 75 feet. Topographic conditions on east side of the crossing prevent HDD crossing methods because of elevation differences between entry/exit and necessary workspace grading requirements.	• Oregon Coast ESU Coho, spawning, rearing, migration habitat T, CH	Spring Chinook, Fall Chinook, Coho, Winter Steelhead, Pacific Lamprey	Cutthroat Trout, Assumed	Chinook, Coho	Spring and Fall Chinook, Coho Rearing, Migration	Jul 1 to Sep 15	Y-1i

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. to Middle Creek S-T02-001 (EE-SS-9073)	17100305012832 Private	25.18	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent headwater, non- fish-bearing tributary if flowing at the time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Y*
Trib. to Middle Creek (BSI-137)	BLM- Coos Bay District	27.01	Intermittent Intermediate	Dry Open-Cut	Intermittent tributary to be crossed at the same time as the crossing of Middle Creek at MP 27.04 using dry open-cut. Tributary expected to be dry at the time of construction.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to Middle Creek (BSI-135)	BLM- Coos Bay District	27.03	Intermittent Minor	Adjacent to centerline within ROW Level 2	Intermittent tributary not crossed by centerline.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	N
Middle Creek (BSP-133)	17100305000323 BLM- Coos Bay District	27.04	Perennial Intermediate	Dry Open-Cut Level 2 [11]	Dry open-cut methods feasible/practical on creek during low flow period within fish window. A conventional bore crossing is not feasible because of topographic constraints on west side of creek because of grading/excavation requirements for bore pit. An HDD is not feasible because of topographic/geometry conditions.	• Oregon Coast ESU Coho, rearing, migration habitat T, CH	Fall Chinook, Coho, Winter Steelhead, Pacific Lamprey	Cutthroat Trout	Chinook, Coho	Fall Chinook, Coho Rearing, Migration	Jul 1 to Sep 15	Y-1i

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Coast Range Ecoregion, Coquille Sub-basin (HUC 17100305), East Fork Coquille River (HUC 1710030503) Fifth field Watershed [8], Coos County, Oregon												
Trib. To E. Fork Coquille (BSP-77)	7100305002504 Private	28.86	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12] Level 1	Dry open-cut methods feasible/practical on small incised headwater trib. Dam and pump crossing method most logical dry open-cut method based on topographic conditions to eliminate difficulties of threading pipe string under flume with associated safety risks including upsetting flume during process. Steep topographic conditions prevent a conventional bore because of bore pit grading/excavation requirements on both sides of the crossing.	• Oregon Coast ESU Coho, assumed habitat T	Assumed	Cutthroat Trout	Coho Assumed	Unknown	Jul 1 to Sep 15	Y
Trib. To E. Fork Coquille (BSP-74)	17100305002598 Private	29.30	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small tributary. Steep topographic conditions prevent a conventional bore because of bore pit grading/excavation requirements on west side of the crossing.	• Oregon Coast ESU Coho, assumed habitat T	Assumed	Present	Coho Assumed	Unknown	Jul 1 to Sep 15	Y*
Trib. To E. Fork Coquille (BSI-76)	17100305002647 Private	29.47	Intermittent Minor	Dry Open-Cut (Streambed-bedrock) [12]	Dry open-cut methods feasible/practical on small 3-4' intermittent tributary if flowing at the time of construction.	• Oregon Coast ESU Coho, assumed habitat T	Assumed	Unknown	Coho Assumed	Unknown	Jul 1 to Sep 15	Y*

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code and Jurisdiction [1]	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
East Fork Coquille River (BSP-71)	17100305000286 Private	29.85	Perennial Intermediate	Dry Open-Cut Level 1 [11]	Project alignment was selected based on landowner negotiations and requirement to avoid landowner's air strip. Dry open-cut methods feasible/practical during low flow crossing period during ODFW in-water work window. Conventional bore is not practical because of significant grading/excavation requirements for bore pits. The river is deeply incised below stream banks requiring extensive pits for installation below streambed. Continued bore pit dewatering would be required to keep bore pits dry. A temporary bridge is also necessary to prevent entire spread move around. A crossing bridge will require bank grading for crossing access. An HDD is probable at the approximate crossing location based on the topography, geometry and expected geotechnical conditions. Significant HDD costs, HDD time requirements and the need for a crossing bridge were the determinants for the proposed dry-open cut crossing method.	• Oregon Coast ESU Coho, spawning, rearing, migration habitat T, CH	Spring Chinook, Fall Chinook, Coho, Winter Steelhead, Pacific Lamprey	Cutthroat Trout	Chinook, Coho	Spring Chinook Rearing, Migration Fall Chinook Spawning, Rearing, Coho Rearing, Migration	Jul 1 to Sep 15	Y-1i
Trib. to E. Fork Coquille (SS-003-007A)	17100305002813 Private	30.22	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent tributary if flowing at the time of construction	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to E. Fork Coquille (SS-003-007B)	17100305002813 Private	30.29	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent tributary if flowing at the time of construction.	• Oregon Coast ESU Coho, assumed habitat T	Assumed	Assumed	Coho Assumed	Unknown	Jul 1 to Sep 15	Y*

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale[4]	ESA Species Present/Habitat[5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. To E. Fork Coquille (BSI-70)	17100305018097 BLM- Coos Bay District	31.64	Intermittent Minor	Dry Open-Cut	Small 1-wide intermittent headwater tributary, dry open- cut methods feasible/practical, if flowing at time of construction.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Elk Creek (BSP-57)	1240218431116 Private	32.40	Perennial Minor	Dry Open-Cut Level 1 [11]	Dry open-cut methods feasible/practical on small 8' wide tributary. Steep topographic conditions on north side of stream prevent a conventional bore because of grading/excavation requirements for bore pit. StreamNet data indicates anadromy below crossing (~ 1 mile). Waterbody is within the ¼ mile buffer of MAMU-occupied stand (C3098). Conflicts with ODFW recommended in-water work periods are not expected based on proposed two-year construction schedule. However, proposed Year Two daily timing restrictions during construction to minimize impacts to MAMU should be waived during the stream crossing installation to minimize the duration of instream work and installation of flumes or dams/pumps.	• Oregon Coast ESU Coho, assumed habitat T	Assumed	Cutthroat Trout, Assumed	Coho Assumed	Unknown	Jul 1 to Sep 15	Y

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. To Elk Creek S-T01-008 (BSP-55)	1239513431370 Private	32.50	Perennial Minor	Dry Open-Cut (Streambed-bedrock) [12]	Dry open-cut methods feasible/practical on small 3-4' wide tributary. Waterbody is within the ¼ mile buffer of MAMU-occupied stand (C3098). Conflicts with ODFW-recommended in-water work periods are not expected based on proposed two-year construction schedule. However, proposed Year Two daily timing restrictions during construction to minimize impacts to MAMU should be waived during the stream crossing installation to minimize the duration of instream work and installation of flumes or dams/pumps.	• Oregon Coast ESU Coho, assumed habitat T	Assumed	Assumed	Coho Assumed	Unknown	Jul 1 to Sep 15	Y
Trib. To Elk Creek S-T01-004 (SS-100-030)	7100305021871 Private	32.56	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small/non-fish-bearing intermittent headwater tributary if flowing at time of construction. Topographic conditions on both sides of stream limit a conventional bore because of grading/excavation requirements for bore pits.	None	Nonen	None	None	None	Jul 1 to Sep 15	Y*
Trib. To Elk Creek (BSP-49)	17100305003372 Private	33.00	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 10' wide tributary. Topographic conditions on both sides of stream limit a conventional bore because of grading/excavation requirements for bore pits.	None	None	None	None	None	Jul 1 to Sep 15	Y

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. To Elk Creek (BSP-50)	17100305003372 Private	33.02	Perennial Minor	Adjacent to centerline within ROW (Streambed-bedrock) [12]	Not crossed by pipeline centerline. Small 2' wide headwater tributary expected to be dry during construction. Trib. would be crossed at the same time as BSP049 at MP 32.99.	None	None	None	None	None	Jul 1 to Sep 15	Y*
South Fork Elk Creek (CSP-5)	17100305000591 Private	34.46	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12] Level 2[11]	Dry open-cut methods feasible/practical on stream. Steep topographic conditions on both sides of stream prevent conventional bore crossing methods because of grading/excavation requirements for bore pits.	• Oregon Coast ESU Coho, spawning, rearing habitat T, CH	Coho, Winter Steelhead	Cutthroat Trout	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y
Trib. To S. Fork Elk Creek (BSI-251)	17100305021783 BLM-Coos Bay District	35.51	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent headwater tributary, if flowing at time of construction. Crossing will occur adjacent to road where existing culvert is in place. This waterbody is located within an occupied MAMU- stand (C3093). Conflicts with ODFW-recommended in-water work periods are not expected based on the proposed two- year construction schedule. However, the proposed Year Two daily timing restrictions during construction to minimize impacts to MAMU should be waived during the stream crossing installation to minimize the duration of instream work and the installation of flumes or dams/pumps.	None	None	None	None	None	Jul 1 to Sep 15	N (In existing road)
Coast Range Ecoregion, Coquille Sub-basin (HUC 17100305), Middle Fork Coquille River (HUC 1710030501) Fifth field Watershed [8], Coos County, Oregon												

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. to Big Creek (BLM 35.87 (CSP-2))	17100305025781 BLM-Coos Bay District	35.87	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent headwater tributary, if flowing at time of construction. Crossing occurs within Elk Creek Road (BLM 28-11-29-0) and flows through a 12" culvert which will be replaced. Waterbody is within the ¼ mile buffer of MAMU-occupied stand (C3093). Conflicts with ODFW-recommended in-water work periods are not expected based on proposed two year construction schedule. However, proposed Year Two daily timing restrictions during construction to minimize impacts to MAMU should be waived during the stream crossing installation to minimize the duration of instream work and to allow the removal of road culvert, installation of flumes or dams/pumps, and replacement of the road culvert	None	None	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. To Big Creek (BLM 36.48)	17100305026477 BLM-Coos Bay District	36.48	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent headwater tributary, if flowing at time of construction. This waterbody is located adjacent to an occupied MAMU-stand (C3073). Conflicts with ODFW-recommended in-water work periods are not expected based on the proposed two-year construction schedule. However, the proposed Year Two daily timing restrictions during construction to minimize impacts to MAMU should be waived during the stream crossing to facilitate the crossing and allow the installation/removal of flumes or dams/pumps and to minimize the duration of instream work.	None	None	Unknown	None	None	Jul 1 to Sep 15	Y*

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. To Big Creek (GSI-25/BSI-253)	17100305004068 BLM-Coos Bay District	36.54	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent headwater tributary, if flowing at time of construction. No additional workspace required. ODFW fish passage barrier data reports a downstream boulder canyon with a 10-foot falls at upper end (RecordID 52488). StreamNet data indicates anadromy below crossing (~ 0.5 mile) at ODFW barrier 52488. This waterbody is located within an occupied MAMU- stand (C3073). Conflicts with ODFW-recommended in-water work periods are not expected based on the proposed two- year construction schedule. However, the proposed Year Two daily timing restrictions during construction to minimize impacts to MAMU should be waived during the stream crossing installation to minimize the duration of instream work and the installation of flumes or dams/pumps.	None	None	Unknown	None	None	Jul 1 to Sep 15	Y*

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. To Big Creek (BLM 36.85)	17100305025748 BLM-Coos Bay District	36.85	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent headwater tributary, if flowing at time of construction. Crossing occurs within Elk Creek Road (BLM 28-11-29-0) and flows through a 12-18" culvert which will be replaced. This waterbody is located within an occupied MAMU- stand (C3073). Conflicts with ODFW-recommended in-water work periods are not expected based on the proposed two- year construction schedule. However, the proposed Year Two daily timing restrictions during construction to minimize impacts to MAMU should be waived during the stream crossing to facilitate the crossing and allow the installation/removal of flumes or dams/pumps and to minimize the duration of instream work.	None	None	Unknown	None	None	Jul 1 to Sep 15	Y*

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. To Big Creek (BSI-252)	17100305004061 BLM-Coos Bay District	36.92	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide intermittent headwater tributary, if flowing at time of construction. No additional workspace required. Alignment and trib. crossing along existing road. ODFW fish passage barrier data reports a downstream boulder canyon with a 10 foot falls at upper end (RecordID 52488). StreamNet data indicates anadromy below crossing (~ 1 mile) at ODFW barrier 52488. This waterbody is located within an occupied MAMU- stand (C3073). Conflicts with ODFW-recommended in-water work periods are not expected based on the proposed two- year construction schedule. However, the proposed Year Two daily timing restrictions during construction to minimize impacts to MAMU should be waived during the stream crossing installation to minimize the duration of instream work and the installation of flumes or dams/pumps.	None	None	Unknown	None	None	Jul 1 to Sep 15	N (In existing road)

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. To Big Creek (ESI-19)	17100305026126 BLM-Coos Bay District	37.32	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide intermittent headwater tributary, if flowing at time of construction. No additional workspace required. ODFW fish passage barrier data reports a downstream boulder canyon with a 10 foot falls at upper end (RecordID 52488). StreamNet data indicates anadromy below crossing (~ 1 mile) at ODFW barrier 52488. StreamNet data indicates anadromy below crossing (~ 1 mile) at ODFW barrier 52488. This waterbody is located within an occupied MAMU- stand (C3090). Conflicts with ODFW-recommended in-water work periods are not expected based on the proposed two- year construction schedule. However, the proposed Year Two daily timing restrictions during construction to minimize impacts to MAMU should be waived during the stream crossing installation to minimize the duration of instream work and the installation of flumes or dams/pumps.	None	None	Unknown	None	None	Jul 1 to Sep 15	Y*

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. To Big Creek (ESP-20)	17100305000606 BLM-Coos Bay District	37.35	Perennial Intermediate	Dry Open-Cut Level 1 [11]	Dry open-cut methods feasible/practical on stream. Dam and pump crossing method most logical dry open- cut method based on topographic conditions to eliminate difficulties of threading pipe string under flume with associated safety risks including upsetting flume during process. Steep topography on both sides of stream prevents conventional bore crossing methods because of grading/excavation requirements for bore pits. No additional workspace proposed. ODFW fish passage barrier data reports a downstream boulder canyon with a 10 foot falls at upper end (RecordID 52488). StreamNet data indicates anadromy below crossing (~ 1 mile) at ODFW barrier 52488. This waterbody is located within an occupied MAMU- stand (C3090). Conflicts with ODFW-recommended in-water work periods are not expected based on the proposed two- year construction schedule. However, the proposed Year Two daily timing restrictions during construction to minimize impacts to MAMU should be waived during the stream crossing installation to minimize the duration of instream work and the installation of flumes or dams/pumps.	None	None	Unknown	None	None	Jul 1 to Sep 15	Y

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Big Creek	17100305000272 BLM	37.41	Perennial Intermediate	Adjacent riparian zone	Adjacent riparian zone overlaps construction ROW	• Oregon Coast ESU Coho, assumed habitat T	Winter Steelhead	Assumed	Coho Assumed	Unknown	Jul 1 to Sep 15	
Upper Rock Creek (BSP-41)	17100305000252 Private	44.21	Perennial Intermediate	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical on stream. Dam and pump crossing method most logical dry open- cut method based on topographic conditions to eliminate difficulties of threading pipe string under flume with associated safety risks including upsetting flume during process. Steep topography on both sides of stream prevents conventional bore crossing methods because of grading/excavation requirements for bore pits. ODFW fish passage barrier data indicated two potential downstream falls may limit passage one report as 6-8 feet (RecordID 52484). StreamNet data indicates anadromy below crossing (~ 6 miles) at ODFW barrier RecordID 52484.	None	None	Cutthroat Trout Assumed	None	None	Jul 1 to Sep 15	Y
Klamath Mountains Ecoregion, Coquille Sub-basin (HUC 17100305), Middle Fork Coquille River (HUC 1710030501) Fifth field Watershed [8], Douglas County, Oregon												
Tributary Trib. to Upper Rock Creek (S3-07 /BW-38)	17100305005585 Private	46.56	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small non-fish-bearing headwater tributary.	None	None	None	None	None	Jul 1 to Sep 15	Y
Ditch (S3-06)	Private	48.21	Intermittent Minor	Dry Open- Cut	Dry open-cut methods feasible/practical on small intermittent road ditch if flowing at time of construction.	None	None	None	None	None	N/A	Y*
Deep Creek (BSP-257)	17100305005863 BLM-Roseburg District	48.27	Perennial Intermediate	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical on broad stream and associated wetlands. ODFW fish passage barrier data (Recordid 56033) reports downstream falls on the Middle Fork Coquille River restrict anadromy at crossing.	None	None	Cutthroat Trout	None	None	Jul 1 to Sep 15	Y-1i

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Ditch (BDX-32)	Private	49.94	Intermittent Minor	Adjacent to ROW	Right-of-way was necked-down to avoid the ditch.	None	None	None	None	None	Jul 1 to Sep 15	N
Ditch (BDX-31)	Private	50.02	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent field ditch if flowing at time of construction.	None	None	None	None	None	N/A	Y*
Middle Fork Coquille River (BSP-30)	17100305000232 Private	50.28	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12] Level 1 [11]	Dry open-cut methods feasible/practical on broad stream during low flows within ODFW in-water work windows. ROW has been necked down to 75 feet and TEWAs located in existing cleared areas to minimize riparian impacts. ODFW fish passage barrier data (Recordid 56033) reports downstream falls on the Middle Fork Coquille River restrict anadromy at crossing. StreamNet data also indicates duplicates this anadromy restriction at this barrier.	None	None	Cutthroat Trout	None	None	Jul 1 to Sep 15	Y-1i
Trib. to Middle Fork Coquille (GDX-36/BSI-66/67)	17100305005874 Private	50.45	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1-4' wide intermittent ditched tributary in ag field if flowing at time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Y*
Belieu Creek (BSP-61/GSI-37)	17100305000706 Private	50.71	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide headwater tributary. Steep topography on west side of crossing prevents conventional bore because of grading/excavation requirements for a bore pit. ODFW fish passage barrier data (RecordID 56033) reports downstream falls on the Middle Fork Coquille River restrict anadromy at the crossing.	None	None	Cutthroat Trout	None	None	Jul 1 to Sep 15	Y
Trib. to Middle Fork Coquille (S1-07/GSI-38)	17100305022784 Private	51.02	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1-4' wide intermittent headwater tributary if flowing at time of construction. No additional workspace required.	None	None	None	None	None	Jul 1 to Sep 15	Y

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale[4]	ESA Species Present/Habitat[5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib to Jim Belieu Creek (SS-222-006)	Private	51.71	Intermittent Minor	Adjacent to centerline within ROW	Dry open-cut methods feasible/practical on small intermittent field ditch if flowing at time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Y*
Klamath Mountains Ecoregion, South Umpqua (HUC 17100302) Sub-basin, Olalla Creek-Lookingglass Creek (HUC 1710030212) Fifth field Watershed [8], Douglas County, Oregon												
Trib. to Shields Creek (BSI-202)	17100302001821 Private	55.90	Intermittent Intermediate	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical on intermittent tributary if flowing at time of construction.	• Oregon Coast ESU Coho, assumed habitat T	Assumed	Assumed	Coho Assumed	Unknown	Jul 1 to Sep 15	Y*
Trib. to Shields Creek (BSI-203)	17100302001894 Private	55.94	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 8' wide intermittent tributary if flowing at time of construction.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to Shields Creek (Denied Access 13)	17100302044091 Private	56.28	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3-4' wide intermittent tributary if flowing at time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Y*
Trib. to Shields Creek (Denied Access 14)	17100302044013 Private	56.34	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3-4' wide intermittent tributary if flowing at time of construction.	None	None	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to Olalla Creek S-T02-002	17100302044083 Private	56.80	Intermittent	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3-4' wide intermittent tributary if flowing at time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Y*
Trib. to Olalla Creek (BSI-140)	17100302048489 Private	57.11	Intermittent Minor	Dry Open-Cut (Streambed – bedrock) [12]	Dry open-cut methods feasible/practical on small intermittent tributaries if flowing at time of construction.	None	None	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to Olalla Creek (BSI-140)	17100302048489 Private	57.14	Intermittent Minor	Dry Open-Cut (Streambed – bedrock) [12]	Dry open-cut methods feasible/practical on small intermittent tributaries if flowing at time of construction.	None	None	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to Olalla Creek (BSI-138)	17100302002187 Private	57.31	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 5' wide intermittent tributary if flowing at time of construction. ROW has been necked down to 75 feet and TEWAs located in existing cleared areas to minimize riparian impacts.	• Oregon Coast ESU Coho, assumed habitat T	Unknown	Present	Coho Assumed	Unknown	Jul 1 to Sep 15	Y*
Trib. to Olalla Creek (BSI-147/EE-12)	17100302002221 Private	57.84	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent tributary if flowing at time of construction. ROW has been necked down to 75 feet and TEWAs located in existing cleared areas to minimize riparian impacts.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Irrigation Canal (BDX148)	Private	57.97	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent field ditch if flowing at time of construction.	None	None	None	None	None	N/A	Y*
Trib. to Olalla Creek (BSI-151)	17100302002311 Private	58.20	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide intermittent tributary if flowing at time of construction. ROW has been necked own to 75 feet and TEWAs located in existing cleared areas to minimize riparian impacts.	None	None	None	None	None	Jul 1 to Sep 15	Y*
Ditch (BDX-157)	Private	58.30 58.51	Intermittent Minor	Adjacent to centerline within ROW and TEWA	Dry open-cut methods feasible/practical on small intermittent field ditch if flowing at time of construction.	None	None	None	None	None	N/A	Y*
Trib. to Olalla Creek (BSP-159)	17100302002420 Private	58.55	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12]	Dry open-cut methods feasible/practical on small 10' wide tributary. ROW has been necked down to 75 feet and TEWA located in existing cleared area to minimize riparian impacts.	None	None	None	None	None	Jul 1 to Sep 15	Y
Olalla Creek (BSP-155)	17100302000047 Private	58.78	Perennial Intermediate	Dry Open-Cut Level 2 [11]	Dry open-cut methods feasible/practical on broad stream during low flows within ODFW in-water work windows. (USGS Gage station 1431120 reports Mean of monthly discharge recording period 1956 to 1973 of 2.0, 0.52 & 0.77 cfs, respectively for Jul, Aug & Sep). TEWAs have been located in existing cleared areas to minimize riparian impacts.	• Oregon Coast ESU Coho, spawning, rearing, migration habitat T, CH	Coho, Winter Steelhead, Pacific Lamprey	Cutthroat Trout	Coho	Coho Spawning, Rearing,	Jul 1 to Sep 15	Y-1i
Ditch - Trib. to Olalla Creek (BDX-153)	17100302002576 Private	59.02	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent field ditch if flowing at time of construction.	None	None	None	None	None	N/A	Y*
Trib. to Olalla Creek (BSI-132)	17100302002635 Private	59.29	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 9' wide intermittent tributary if flowing at time of construction.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y*

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. to Olalla Creek (BSI-129)	17100302000705 Private	59.65	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent tributary if flowing at time of construction.	• Oregon Coast ESU Coho, assumed habitat T	Assumed	Unknown	Coho Assumed	Unknown	Jul 1 to Sep 15	Y*
Trib. to McNabb Creek (NSP-14)	17100302002838 Private	60.13	Perennial Minor	Dry Open-Cut (Streambed-bedrock) [12]	Dry open-cut methods feasible/practical on small 6' wide tributary. Extensive grading/excavation requirements limit feasibility of conventional bore methods.	None	None	None	None	None	None	Y
McNabb Creek (NSP-13)	17100302002924 Private	60.48	Perennial Minor	Dry Open-Cut (Streambed-bedrock) [12] Level 1	Dry open-cut methods feasible/practical on tributary. TEWAs located in existing cleared areas to minimize riparian impacts.	• Oregon Coast ESU Coho, spawning, rearing habitat T, CH	Coho, Winter Steelhead,	Cutthroat Trout, Assumed	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y
Klamath Mountains Ecoregion, South Umpqua (HUC 17100302) Sub-basin, Clark Branch-South Umpqua River (HUC 1710030211) Fifth field Watershed [8], Douglas County, Oregon												
Kent Creek (BSP-240)	17100302000075 Private	63.97	Perennial Intermediate	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical on broad stream during low flows within ODFW in-water work windows. Steep topographic conditions on both sides of the stream prevent conventional bore methods because of extensive grading/excavation requirements for bore pits	• Oregon Coast ESU Coho, spawning, rearing habitat T, CH	Coho, Winter Steelhead,	Cutthroat Trout	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y
Trib. to Kent Creek (BSI-241)	17100302003968 Private	63.97	Intermittent Minor	Adjacent to centerline within ROW Level 1	Not crossed by centerline. Small intermittent tributary expected to be dry during construction and will be restored to approximate original contour and grade during restoration.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	N (can be avoided)
Rice Creek (S2-04; BSP-227)	17100302000079 Private	65.76	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12] Level 1	Dry open-cut methods feasible/practical during low flows periods within ODFW in- water work windows. Alignment is defined by residential development in immediate area. ROW has been necked down to 75 feet and TEWAs located in cleared areas to minimize riparian disturbances.	• Oregon Coast ESU Coho, spawning, rearing habitat T, CH	Coho, Winter Steelhead,	Cutthroat Trout	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y

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Trib to Rice Creek BSI-228	17100302044765 Private	65.83	Intermittent	Adjacent riparian zone	Adjacent riparian zone overlaps construction ROW	None	None	None	None	None	Jul 1 to Sep 15	
Trib. to Willis Creek (BSI-230)	17100302004832 Private	66.87	Intermittent N/A	Adjacent to centerline within ROW (Streambed-bedrock) [12]	Not crossed by centerline, 2' wide intermittent tributary expected to be dry during summer construction period. Tributary will be restored to approximate original contour and grade during restoration.	None	None	None	None	None	Jul 1 to Sep 15	N
Willis Creek (BSP-168)	17100302000083 Private	66.95	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12] Level 1	Dry open-cut methods feasible/practical during low flows periods within ODFW in- water work windows. ROW has been necked down to 75 feet and TEWAs located in cleared areas to minimize riparian disturbances.	• Oregon Coast ESU Coho, spawning, rearing habitat T, CH	Coho, Winter Steelhead	Cutthroat Trout	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y-1i
Trib. to Willis Creek (BSI-169)	17100302048422 Private	67.00	Intermittent Intermediate	Dry Open-Cut (Streambed-bedrock) [12]	Dry open-cut methods feasible/practical on small intermittent tributary, if flowing at time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Y*
Trib. to South Umpqua River (SS-005-001 (SS-100-011)	17100302049984 Private	69.10	Intermittent N/A	Adjacent to centerline within ROW	Not crossed by centerline. Small intermittent headwater tributary expected to be dry during construction and will be restored to approximate original contour and grade during restoration.	None	None	Unknown	None	None	Jul 1 to Sep 15	N
Trib. to South Umpqua River SS-004-004 SS-100-012)	17100302005610 Private	69.29	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical during low flows periods within ODFW in- water work windows. No TEWAs are proposed to minimize riparian and landowner impacts.	None	None	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to South Umpqua River (SS-004-005 SS-100-013)	17100302000727 Private	69.35	Perennial Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical during low flows periods within ODFW in- water work windows. No TEWAs are proposed to minimize landowner impacts.	None	None	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to South Umpqua River (SS-004-006 SS-100-014)	17100302005693 Private	69.57	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on 2'to 3' foot wide headwater tributary which is expected to be dry at the time of construction. If flowing, crossing would be completed during low flows periods within ODFW in-water work windows.	None	None	None	None	None	Jul 1 to Sep 15	Y*

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Trib. to South Umpqua River (SS-999-001)	17100302046930 Private	70.79	Intermittent	Adjacent riparian zone	Adjacent riparian zone overlaps construction ROW	None	None	None	None	None	Jul 1 to Sep 15	
Trib. to South Umpqua River (SS-005-006/SS-100-015)	17100302006216 Private	71.08	Intermittent N/A	Adjacent In TEWA 71.01- N	Tributary is within required laydown area for the Direct Pipe crossing of the South Umpqua River.	None	None	Unknown	None	None	Jul 1 to Sep 15	Y*
South Umpqua River (BSP-26)	17100302000086 Private	71.27	Perennial Major	Direct Pipe Level 2 [11]	The Direct Pipe crossing method has been evaluated and determined to be feasible at the proposed crossing location. The proposed alignment has been rerouted to facilitate the crossings of I-5, South Umpqua River, Dole Road, and the railroad using a single Direct Pipe crossing. Because of subsurface geotechnical conditions the HDD crossing method has been determined to be infeasible. This crossing method/location avoids the need to use a diverted open cut to cross the South Umpqua River on the 2009 FEIS route or an open cut crossing on Reroute 67.6.	• Oregon Coast ESU Coho, migration habitat T, CH	Spring Chinook, Fall Chinook, Coho, Winter Steelhead, Pacific Lamprey	Present, unspecified	Chinook, Coho	Spring Chinook-Migration Fall Chinook Spawning, Rearing, Migration Coho Migration	Jul 1 to Aug 31	N
Trib. to South Umpqua River (SS-005-007)	17100302035572 Private	71.34	Intermittent N/A	Adjacent to potential Roth Pipe Yard	Ditch is avoided.	None	None	None	None	None	Jul 1 to Sep 15	N
Trib. to South Umpqua River (SS-005-08 SS-100-16)	17100302006366 Private	71.35 71.57	Intermittent N/A	Direct Pipe	Crossed by the Direct Pipe installation associated with the South Umpqua River and I-5 Crossing	None	None	None	None	None	Jul 1 to Sep 15	N
Trib. to South Umpqua River (SS-100-017)	17100302047304 Private	71.69	Intermittent N/A	Adjacent to centerline within ROW	Not crossed by centerline. Small intermittent headwater tributary expected to be dry during construction and will be restored to approximate original contour and grade during restoration.	None	None	None	None	None	Jul 1 to Sep 15	N

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. to South Umpqua River (SS-005-009 SS-100-019)	17100302006590 Private	73.04	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on 2'to 3' foot wide headwater tributary which is expected to be dry at the time of construction. If flowing, crossing would be completed during low flows periods within ODFW in-water work windows.	None	None	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to South Umpqua River (SS-005-013 SS-100-020)	17100302050160 Private	73.51	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on 2'to 3' foot wide headwater tributary which is expected to be dry at the time of construction. If flowing, crossing would be completed during low flows periods within ODFW in-water work windows.	None	None	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to South Umpqua River (SS-005-011 & -12 SS-100-021)	17100302049674 Private	73.56	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on 2'to 3' foot wide headwater tributary which is expected to be dry at the time of construction. If flowing, crossing would be completed during low flows periods within ODFW in-water work windows.	None	None	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib. to Richardson Creek S-T-03-002	Private	73.70	Intermittent	Adjacent to centerline within ROW	Ditch is avoided by centerline	None	None	Unknown	None	None	Jul 1 to Sep 15	Y*
Trib to Richardson Creek (SS-005-010)	Private	73.73	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 2' to 3' foot wide headwater tributary that is expected to be dry at the time of the crossing. If flowing, crossing would be completed during low flow periods within ODFW in-water work window.	None	None	Unknown	None	None	Jul 1 to Sep 15	Y
Klamath Mountains Ecoregion, South Umpqua (HUC 17100302) Sub-basin, Myrtle Creek (HUC 1710030210) Fifth field Watershed [8], Douglas County, Oregon												

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code and Jurisdiction [1]	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Rock Creek (EE-SS-9032)	17100302007335 Private	75.33	Perennial Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on non- fish-beargin stream within steep incised drainage. Dam and pump would be the most logical method based on topographic conditions to eliminate difficulties of threading pipe string under flume with associated safety risks, including upsetting flume during process. Topographic conditions on both sides of stream prevent a conventional bore because of grading/excavation requirements for bore pits.	• Oregon Coast ESU Coho, assumed habitat T	Assumed	Unknown	Coho Assumed	Unknown	Jul 1 to Sep 15	Y
Trib. to Rock Creek (EE-SS-9033)	17100302001061 Private	75.34	Perennial Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on non-fish-bearing stream within steep incised drainage. Dam and pump would be the most logical method based on topographic conditions to eliminate difficulties of threading pipe string under flume with associated safety risks, including upsetting flume during process. Topographic conditions on both sides of stream prevent a conventional bore because of grading/excavation requirements for bore pits.	• Oregon Coast ESU Coho, assumed habitat T	Assumed	Unknown	Coho Assumed	Unknown	Jul 1 to Sep 15	Y
Bilger Creek S-T02-004 BSP-1)	17100302000605 Private	76.38	Perennial Minor	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical on small 6' wide tributary. ROW necked down and TEWAs set in existing cleared areas to minimize riparian impacts. ODFW fish passage barrier data indicate two potential downstream barriers (RecordID 2571 & 2603).	• Oregon Coast ESU Coho, spawning, rearing habitat T, CH	Coho, Winter Steelhead,	Cutthroat Trout	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale[4]	ESA Species Present/Habitat[5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Little Lick (BSP-6)	17100302001073 Private	77.71	Perennial Minor	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical on small 7' wide tributary. No additional workspace required. Steep topographic conditions make a conventional bore impractical because of extensive grading/excavation requirements as well as subsequent riparian disturbance.	None	None	Unknown	None	None	Jul 1 to Sep 15	Y
Trib. to Little Lick Creek (BSI-8)	17100302008039 Private	77.93	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical intermittent tributary if flowing at time of construction. The tributary within the TEWA would be matted and silt fenced installed as necessary to minimize disturbance and the potential for sedimentation.	None	None	None	None	None	Jul 1 to Sep 15	Y*
Trib. to Little Lick Creek (BSI-10)	17100302008047 Private	78.02	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical small 2' wide intermittent tributary if flowing at time of construction. The tributary within the TEWA would be matted and silt fenced installed as necessary to minimize disturbance and the potential for sedimentation.	None	None	None	None	None	Jul 1 to Sep 15	Y*
North Myrtle Creek (NSP-37)	17100302000541 Private	79.12	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12] Level 2 [11]	Dry open-cut methods feasible/practical during low flow periods within ODFW in- water work window. (USGS Gage Station 14311000 records mean monthly flow as 5.8, 3.5 & 5.1 cfs respectively for Jul, Aug & Sep). ROW necked down to 75' to minimize riparian impacts.	• Oregon Coast ESU Coho, spawning, rearing habitat T, CH	Coho, Winter Steelhead,	Cutthroat Trout, Assumed	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y
Trib. to North Myrtle Creek (NSP-38)	17100302008397 Private	79.15	Perennial Minor	Dry Open-Cut (Streambed-bedrock) [12]	Dry open-cut methods feasible/practical on small 8.0' wide trib. if flowing at time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Y

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. to N. Myrtle Creek (EE-SS-9038)	17100302045565 Private	79.17	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small interpreted non-fish-bearing tributary if present and flowing at time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Y*
Trib. to N. Myrtle Creek (EE-SS-9039)	17100302045117 Private	79.19	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small interpreted non-fish-bearing tributary if present and flowing at time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Y*
South Myrtle Creek S-T02-003 (BSP-172)	7100302000521 Private	81.19	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12] Level 2 [11]	Dry open-cut methods feasible/practical during low flow periods within ODFW in- water work window. (USGS Gage Station 14310700 records mean monthly flow as 5.6, 3.2 & 5.0 cfs, respectively for Jul, Aug & Sep). ROW necked down to 75' and TEWAs placed in existing cleared areas where feasible to minimize riparian impacts. Conventional bore not feasible/practical because of grading/excavation requirements on north side of stream.	• Oregon Coast ESU Coho, spawning, rearing, migration habitat T, CH	Coho, Winter Steelhead,	Cutthroat Trout	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y-1i
Trib. to S. Myrtle Creek (BSP-259)	17100302008796 Private	81.38	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 2.0' wide trib. if flowing at time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Y
Trib. to S. Myrtle Creek (SS-100-023)	17100302008772 Private	81.45	Intermittent N/A	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent tributary expected to be dry during construction and will be restored to approximate original contour and grade during restoration.	None	None	None	None	None	Jul 1 to Sep 15	N
Trib. to S. Myrtle Creek (EE-SS-9074)	17100302008917 Private	81.93	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small interpreted non-fish-bearing tributary if present and flowing at time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Y*
Klamath Mountains Ecoregion, South Umpqua (HUC 17100302) Sub-basin, Days Creek-South Umpqua River (HUC 1710030205) Fifth field Watershed [8], Douglas County, Oregon												

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code and Jurisdiction [1]	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Wood Creek (BSP-226)	17100302001104 Private	84.17	Perennial Minor	Dry Open-Cut (Streambed-bedrock) [12] Level 1 [11]	Dry open-cut methods feasible/practical on small 8' wide stream. Steep topographic conditions on either side of waterbody prevent conventional bore. Dam and pump crossing method most logical dry open- cut method based on topographic conditions to eliminate difficulties of threading pipe string under flume with associated safety risks including upsetting flume during process. StreamNet data indicates anadromy below crossing (~ 1 mile).	None	None	Present	None	None	Jul 1 to Sep 15	Y
Trib. to Wood Creek (EE-SS-9040)	17100302009813 Private	85.38	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on an interpreted non-fish-bearing intermittent tributary if present and flowing at time of construction. The crossing occurs along a sidehill alignment.	None	None	None	None	None	Jul 1 to Sep 15	Y*
Trib. to Wood Creek (EE-SS-9041)	17100302009881 Private	85.69	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on an interpreted non-fish-bearing intermittent tributary if flowing at time of construction.	None	Unknown	Present	None	None	Jul 1 to Sep 15	Y*
Trib. to Wood Creek (EE-SS-9042)	17100302001103 Private	85.71	Perennial Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on an interpreted non-fish-bearing intermittent tributary if flowing at time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Y*
Trib. to Wood Creek (EE-SS-9043)	17100302036325 Private	85.88	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on an interpreted non-fish-bearing intermittent tributary if present and flowing at time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Y*
Trib. to Wood Creek (EE-SS-9044)	17100302036276 Private	86.07	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on an interpreted non-fish-bearing intermittent tributary if present and flowing at time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Y*

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale[4]	ESA Species Present/Habitat[5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. to Wood Creek (EE-SS-9045)	17100302036276 Private	86.10	Intermittent N/A	Adjacent to centerline within ROW	Dry open-cut methods feasible/practical on an interpreted non-fish-bearing intermittent tributary if present and flowing at time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Y*
Trib. to Fate Creek (BSI-236)	17100302036007 Private	88.20	Intermittent Minor	Dry Open-Cut (Streambed-bedrock) [12]	Dry open-cut methods feasible/practical on small intermittent road ditched tributary if flowing at time of construction. Appropriate BMPs would be installed to minimize disturbance/ sedimentation if flowing at the time of construction. Crossing is also co-located with Fate Creek Rd.	None	None	None	None	None	Jul 1 to Sep 15	Y*
Trib. to Fate Creek (BSI-238 (MOD))	17100302036007 Private	88.23	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on a small non-fish-bearing intermittent tributary if present and flowing at time of construction. Crossing is also co-located with Fate Creek Rd.	None	None	None	None	None	Jul 1 to Sep 15	Y*

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale[4]	ESA Species Present/Habitat[5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Fate Creek (BSP-232)	17100302001124 Private	88.48	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12] Level 1 [11]	Dry open-cut methods feasible/practical on 12' wide stream. Stream flow expected to be insignificant during low flow periods within ODFW in- water work period. TEWAs placed in existing cleared areas and alignment selected to minimize riparian impacts. ODFW fish passage barrier data indicates that immediately downstream of crossing (RecordID 2602): "Gabion below forms pool and creates a probable impassable juvenile barrier. Adults may pass at higher flows. Additional STEP work above culvert" A conventional bore is probable based on topography and geometry but geotechnical investigations have not been completed to confirm. A bridge is required at the crossing which would require bank grading for access. Significant costs, time requirements and the need for a bridge were the determinants for the proposed dry open-cut crossing method. Significant cultural resource sites occur in the area and a dry open-cut crossing will minimize excavation/grading disturbance compared to conventional bore.	• Oregon Coast ESU Coho, spawning, rearing habitat T, CH	Coho, Winter Steelhead	Cutthroat Trout	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Days Creek (BSP-233)	17100302000511 Private	88.60	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12] Level 1 [11]	Dry open-cut methods feasible/practical on stream during low flow periods within ODFW in-water work window. (USGS Gage Station 14308700 records mean monthly flow as 2.2, 1.0 & 1.5 cfs, respectively for Jul, Aug & Sep). The ROW has been necked down to 75' and TEWAs located in previously disturbed areas to minimize riparian impacts. A conventional bore is probable based on topography and geometry but geotechnical investigations have not been completed to confirm. A bridge is required at the crossing which would require bank grading for access. Significant costs, time requirements and the need for a bridge were the determinants for the proposed dry open-cut crossing method. Significant cultural resource sites occur in the area and a dry open-cut crossing will minimize excavation/grading disturbance compared to conventional bore.	• Oregon Coast ESU Coho, spawning, rearing habitat T, CH	Coho, Winter Steelhead,	Cutthroat Trout	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y-1i
Cascades Ecoregion, South Umpqua (HUC 17100302) Sub-basin, Days Creek-South Umpqua River (HUC 1710030205) Fifth field Watershed [8, 9], Douglas County, Oregon												
Saint John Creek (ASP-303)	17100302011280 Private	92.62	Perennial Intermediate	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical during low flow periods within ODFW in- water work window. Steep topographic conditions on either side of creek prevent conventional bore. Dam and pump crossing method most logical dry open-cut method based on topographic conditions to eliminate issues/risk of threading pipe string under flume within the incised valley.	• Oregon Coast ESU Coho, spawning, rearing habitat T, CH	Coho, Winter Steelhead	Cutthroat Trout	Coho	Coho Spawning, Rearing	Jul 1 to Sep 15	Y-1i

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
H3-01	Private	94.60	Pond	Not Crossed Pond adjacent to Milo Yard	N/A – pond avoided by potential yard footprint.	None	None	Unknown	None	None	None	N –to be avoided
H3-02	Private	94.60	Pond	Not Crossed Pond adjacent to Milo Yard	N/A – pond avoided by potential yard footprint.	None	None	Unknown	None	None	None	N –to be avoided
H3-03	Private	94.60	Pond	Not Crossed Pond in Milo Yard	N/A – pond within yard, but would be avoided by potential yard activities.	None	None	Unknown	None	None	None	N–to be avoided
South Umpqua River (ASP-196)	17100302011516 Private	94.73	Perennial Major	Diverted Open-Cut Level 2 [11]	Diverted open-cut methods feasible/practical during low flow periods within ODFW in-water work window. (USGS Gage Station 143308600 records mean monthly flow as 168, 91 & 110 cfs, respectively for Jul, Aug & Sep). ROW and TEWAs locations primarily affect shrub vegetation. Temporary bridge required at crossing because the existing bridge at Milo is not expected to handle project weight limits. Heavy equipment access from the south is restricted by topographic constraints therefore temporary bridge at crossing is critical to facilitate construction (i.e., movement of materials and equipment along ROW). Because of geometry and topographic conditions, the only feasible HDD alignment required the alignment to pass immediately adjacent to the north side of the Milo Academy. From the exit point on the east side of the academy the route then needed to circle back to the west passing immediately adjacent to the south side of the academy. The HDD alignment ultimately required the academy to be encircled by the pipeline on three sides. This alignment would extensively encumber the academy and was determined to be impractical. A conventional bore is feasible based on topography and geometry but geotechnical investigations have not been completed to confirm. If subsoils are similar as surface conditions (cobbles), a bore would be infeasible. Because a bridge is required at the crossing which would require bank grading for access the diverted open-cut crossing method was selected as most appropriate crossing method based on feasibility/practicality and the method with the least risk.	• Oregon Coast ESU Coho, spawning, rearing, migration habitat T, CH	Spring Chinook, Fall Chinook, Coho, Winter Steelhead, Pacific Lamprey	Cutthroat Trout	Chinook, Coho	Spring Chinook Migration Fall Chinook Spawning, Rearing, Migration Coho Rearing, Migration	Jul 1 to Aug 31	Y-1i with mid-stream support

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale[4]	ESA Species Present/Habitat[5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. to South Umpqua River (ASI-193 / ASI-191)	17100302011517 Private	94.85	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent tributary if flowing at the time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Y*
Trib. to South Umpqua River (ASI-193 / ASI-191)	17100302011517 Private	95.03	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent tributary if flowing at the time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Y*
Trib. to South Umpqua (ASI-190)	17100302038007 BLM-Roseburg District	98.46	Intermittent Minor	Dry Open-Cut (Streambed-bedrock) [12]	Dry open-cut methods feasible/practical on small 2-4' wide intermittent tributary (ditch) if flowing at the time of construction	None	None	None	None	None	Jul 1 to Sep 15	Y*
Cascades Ecoregion, South Umpqua (HUC 17100302) Sub-basin, Upper Cow Creek (HUC 1710030206) Fifth field Watershed [8], Douglas County, Oregon												
Ditch (Beaver Creek) (CDX-50)	Forest Service – Umpqua NF	105.41	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1-4' wide intermittent roadside ditch within right-of-way if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Ditch (CDX-49)	Forest Service – Umpqua NF	106.77	Intermittent N/A	Adjacent to centerline within ROW	N/A - small 1-4' wide intermittent roadside ditch within right-of-way if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Roadside Ditch (CDX-47)	Forest Service – Umpqua NF	108.08	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1-3' wide intermittent roadside ditch within right-of-way if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Roadside Ditch (CDX-48)	Forest Service – Umpqua NF	108.40	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1-3' wide intermittent roadside ditch within right-of-way if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Trib. to East Fork Cow Creek (GDX-15)	17100302034497 Forest Service – Umpqua NF	109.13	Intermittent N/A	Adjacent to centerline within TEWA	Dry open-cut methods feasible/practical on small headwater wetland/tributary-if flowing at the time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Y*
Trib. to East Fork Cow Creek (GSI-16/FS-HF-F)	17100302013838 Forest Service – Umpqua NF	109.33	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide headwater intermittent tributary if flowing at the time of construction.	None	None	None	None	None	Jul 1 to Sep 15	Y*

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East Fork Cow Creek (GSP-19/FS-HF-G)	17100302013839 Forest Service – Umpqua NF	109.47	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12]	Dry open-cut methods feasible/practical on small headwater stream during low flow periods within ODFW in- water work period. No additional work areas proposed.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y
East Fork Cow Creek (GSP-22/FS-HF-G ASP297)	17100302013839Forest Service – Umpqua NF	109.69	Perennial Intermediate	Adjacent to centerline within TEWA	Not crossed by centerline. Waterbody flows through culvert on road which is encompassed by TEWA 109.68-N. This TEWA was selected for parking/staging as well as for potential mitigation to remove the culvert if the road is not required.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	N
Trib. to East Fork Cow Creek (FS-HF-J/AW298)	17100302013839Forest Service – Umpqua NF	109.69	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' headwater tributary. ROW necked down to 75' and TEWAs only utilized on north side of creek to minimize riparian impacts. Steep topographic conditions prevent a conventional bore because of extensive grading/excavation requirements.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y
Trib. to East Fork Cow Creek (FS-HF-K/AW-299)	17100302012765 Forest Service – Umpqua NF	109.78	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 2-4' headwater tributary. ROW necked down to 75' and no TEWAs utilized to minimize riparian impacts.	None	Unknown	Unknown	None	None	Jul 1 to Sep 15	Y
Cascades Ecoregion, Upper Rogue (HUC 17100307) Sub-basin, Trail Creek (HUC 1710030706) Fifth field Watershed [8], Jackson County, Oregon												
Pond Trib. to W. Fork Trail Creek (EW-69)	Forest Service – Umpqua NF	110.57	Intermittent Pond	Within Peavine Quarry TEWA 110.73	Small ponded area within Peavine Quarry and TEWA; drainage expected to be dry during construction.	None	None	None	None	None	N/A	N
Trib. to W. Fork Trail Creek (ESI-68) (EW-68)	17100307018629 Forest Service – Umpqua NF	110.57	Intermittent Minor	Within Pevine Quarry Adjacent to centerline within TEWA 110.73	Small 1-2' wide ephemeral drainage located Peavine Quarry within TEWA; drainage to be avoided by construction; drainage expected to be dry during construction.	None	None	None	None	None	N/A	N –to be avoided

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Cascades Ecoregion, South Umpqua Sub-basin (HUC 17100302), Upper Cow Creek (HUC 1710030206) Fifth field Watershed [8], Jackson County, Oregon												
Trib. to E. Fork Cow Creek (FS-HF-N /ESI-68)	17100302034587 Forest Service – Umpqua NF	110.96	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small 2-4' headwater tributary. Right-of-way necked down to 75' and no TEWAs utilized to minimize riparian impacts.	None	None	None	None	None	Jul 1 to Sep 15	Y*
Klamath Mountains Ecoregion, Upper Rogue (HUC 17100307) Sub-basin, Trail Creek (HUC 1710030706) Fifth field Watershed [8], Jackson County, Oregon												
Trib. to West Fork Trail Creek (SS-100-032)	17100307015563 Private	118.80	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent headwater tributary if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*
West Fork Trail Creek (ASP-202)	17100307000492 Private	118.89	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12] Level 2 [11]	Dry open-cut methods practical/feasible during low flow periods during ODFW in- water work window. ROW necked down to 75' and TEWAs located in previously disturbed areas to minimize riparian impacts.	• SONCC Coho, spawning, rearing habitat T, CH	Coho, Summer Steelhead, Winter Steelhead	Trout, unspecified	Coho	Coho Spawning, Rearing	Jun 15 to Sep 15	Y
Trib. to Trail Creek (S1-06 (DA-16 (MOD))	17100307002143 Private	119.84	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent headwater tributary if flowing at the time of construction (Denied Access).	None	None	None	None	None	Jun 15 to Sep 15	Y*
Canyon Creek (NSP-11)	17100307000501 BLM-Medford District	120.45	Perennial Minor	Dry Open-Cut (Streambed-bedrock) [12] Level 1	Dry open-cut methods feasible/practical on small 7' wide tributary during low flow periods within ODFW in-water work window. Only UCSAs utilized at crossing to minimize impacts to riparian areas.	• SONCC Coho, spawning, rearing habitat T, CH	Coho, Summer Steelhead	Trout, unspecified	Coho	Coho Spawning, Rearing	Jun 15 to Sep 15	Y
Trib. to Trail Creek (ASI-205)	17100307009101 Private	120.90	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 6' wide intermittent headwater tributary if flowing at the time of construction. No additional workspace required.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Trail Creek (ASI-206)	17100307002356 Private	121.57	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on 12' wide intermittent tributary if flowing at the time of construction. No additional workspace required.	• SONCC Coho, spawning, rearing habitat T, CH	Coho	Unknown	Coho	Coho Spawning, Rearing	Jun 15 to Sep 15	Y*

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Klamath Mountains Ecoregion, Upper Rogue (HUC 17100307) Sub-basin, Shady Cove-Rogue River (HUC 1710030707) Fifth field Watershed [8], Jackson County, Oregon												
Trib. to Cricket Creek (ESI-71)	Private	121.87	Intermittent N/A	Adjacent to centerline within ROW	Small 1' wide ephemeral stream expected to be dry during construction when the Rogue River HDD pullback would cross this tributary. Rollers would be used to span tributary with HDD pullback string.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Cricket Creek (ESI-73)	Private	121.91	Intermittent N/A	Adjacent to centerline within ROW	Within TEWA associated with HDD pull back.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Cricket Creek (ESI-72)	17100307002397 Private	121.96	Intermittent N/A	Adjacent to centerline within ROW	Small 2' wide ephemeral stream expected to be dry during construction when the Rogue River HDD pullback would occur, however this drainage would be avoided by construction activities.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Cricket Creek (ESI-74)	17100307019333 Private	122.04	Intermittent N/A	Adjacent to centerline within ROW	Small 2' wide ephemeral stream expected to be dry during construction when the Rogue River HDD pullback would occur, however this drainage would be avoided by construction activities.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Cricket Creek (ESI-70)	17100307002397 Private	122.07	Intermittent N/A	Adjacent to centerline within ROW	Small 2' wide ephemeral stream expected to be dry during construction when the Rogue River HDD pullback would occur.	None	None	None	None	None	Jun 15 to Sep 15	Y*

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Rogue River (ASP-235)	17100307000156 Private	122.65	Perennial Major	HDD Level 2 [11]	HDD feasible based on geometry, topography and geotechnical conditions along proposed alignment. Primary HDD activities are significantly set back from crossing and would not be visible from the highway or the river Conventional bore not feasible/practical because highway and topographic constraints on the west side of the crossing Dry open-cut or diverted open-cut methods not practical/feasible based on flow and channel characteristics (USGS Gage Station 14339000 records mean monthly flow as 2,170, 2,160 and 1,710 respectively for Jul, Aug & Sep).	• SONCC Coho, rearing, migration habitat T, CH	Spring Chinook, Fall Chinook, Coho, Summer Steelhead, Winter Steelhead, Pacific Lamprey	Trout, unspecified	Chinook, Coho	Spring, Fall Chinook and Coho Rearing Migration	Jun 15 to Aug 31	N
Trib. to Indian Creek (ASI-223)	17100307014756 Private	125.91	Intermittent Major	Dry Open-Cut	Dry open-cut methods feasible/practical on small <5' wide intermittent headwater tributary if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Indian Creek (ASI-222)	17100307016576 Private	125.98	Intermittent Major	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1' wide intermittent headwater tributary if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Indian Creek (RS-4)	17100307008662 BLM-Medford District	126.53	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1' wide intermittent headwater tributary if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Indian Creek (ASI-221)	17100307008662 BLM-Medford District	126.56	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 5' wide intermittent headwater tributary if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale[4]	ESA Species Present/Habitat[5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Ditch (ADX-287)	17100307015921 Private	127.21	Intermittent N/A	Adjacent to ROW & TEWA	NA – avoided.	None	None	None	None	None	Jun 15 to Sep 15	N - avoided
Ditch (ADX-285)	17100307015921 Private	127.33	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent steam if flowing during construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Deer Creek (ASP-307)	17100307006079 Private	128.49	Perennial Intermediate	Dry Open-Cut (Streambed-bedrock) [12]	Dry open-cut methods feasible/practical during low flow periods within ODFW in- water work window. No additional workspace required. Coho spawn 950 feet below crossing.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y
Indian Creek (AW-278)	17100307003031 Private	128.61	Perennial Minor	Dry Open-Cut Level 1 [11]	Dry open-cut methods feasible/practical small < 10' wide stream low flow periods within ODFW in-water work window. Stream located in heavily grazed irrigated pasture and riparian vegetation consists of emergent pasture species. Coho spawn 600 feet below crossing.	• SONCC Coho assumed habitat T	Assumed	Present, unspecified	Coho Assumed	Unknown	Jun 15 to Sep 15	Y
Trib. To Indian Creek (ASP-310)	17100307017016 Private	128.68	Perennial Minor	Dry Open-Cut (Streambed-bedrock) [12]	Dry open-cut methods feasible/practical small 5' wide ditch tributary located in heavily grazed irrigated pasture. Coho spawn 600 feet below crossing.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y
Trib. To Indian Creek (ASI-400)	BLM-Medford District	129.13	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3-4' wide intermittent headwater trib. if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Trib. To Indian Creek (ASI-306)	BLM-Medford District	129.21	Intermittent N/A	Adjacent to centerline within ROW	Not crossed by centerline. Small headwater tributary expected to be dry at the time of construction and would be restored to approximate original contour and grade during restoration.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	N

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. to Indian Creek (ASI-277)	71003070174 44Private	129.46	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3-4' wide intermittent headwater trib. if flowing at the time of construction.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Klamath Mountains Ecoregion, Upper Rogue (HUC 17100307) Sub-basin, Big Butte Creek (HUC 1710030704) Fifth field Watershed [8], Jackson County, Oregon												
Trib. to Neil Creek (SS-201-014a (AW-244))	17100307010117 Private	130.81	Intermittent Minor	Adjacent to centerline within ROW	Not crossed by centerline. Small tributary expected to be dry at the time of construction and would be restored to approximate original contour and grade during restoration.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Neil Creek (SS-201-14b (AW-244))	17100307010117 Private	130.83	Intermittent Minor	Dry Open-Cut (Streambed-bedrock) [12]	Dry open-cut methods feasible/practical on small < 10' wide intermittent headwater trib. if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Neil Creek (ASI-251)	17100307018233 BLM-Medford District	131.37	Intermittent N/A	Adjacent to within TEWA	Small tributary expected to be dry at the time of construction and would be restored to approximate original contour and grade during restoration.	None	None	None	None	None	Jun 15 to Sep 15	N - avoided
Irrigation Ditch (Trib. to Neil Creek) (S2-02/(ADX-253)	Private	132.03	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1-2' wide intermittent non-fish- bearing ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Neil Creek (ASP-252)	17100307006088 Private	132.12	Perennial Minor	Dry Open-Cut (Streambed-bedrock) [12] Level 1	Dry open-cut methods feasible/practical during low flow within ODFW in-water work window. ROW narrowed to 75 feet and TEWAs placed in pasture to minimize riparian impacts.	• SONCC Coho, spawning, rearing habitat T, CH	Coho, Summer Steelhead	Trout, unspecified	Coho	Coho Spawning, Rearing	Jun 15 to Sep 15	Y

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale[4]	ESA Species Present/Habitat[5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Ditch (EDX-75)	Private	132.26	Intermittent Minor	Dry Open-Cut (Streambed – bedrock)[6]	Dry open-cut methods feasible/practical on small 1-2' wide intermittent non-fish- bearing ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Trib. to Quartz Creek (S5-01/ ASI-265)	17100307000857 Private	132.75	Intermittent Minor	Dry Open-Cut (Streambed-bedrock) [12]	Dry open-cut methods feasible/practical on small intermittent stream/wetland, if flowing at the time of construction. ROW necked down to 75' and	• None	None	None	None	None	Jun 15 to Sep 15	Y*
Quartz Creek (S5-02 / AW-264)	17100307000857 Private	132.77	Intermittent Minor	Dry Open-Cut (Streambed-bedrock) [12]	Dry open-cut methods feasible/practical on small 2' wide intermittent stream if flowing at the time of construction.	• SONCC Coho, spawning, rearing habitat T, CH	Coho, Summer Steelhead	Trout, unspecified	Coho	Coho Spawning, Rearing	Jun 15 to Sep 15	Y*
Trib. to Quartz Creek (ASP-241)	BLM-Medford District	133.35	Perennial Intermediate	Dry Open-Cut	Tributary, which originates from seepage from the Medford Aqueduct, will likely be crossed with the bore of the Medford Aqueduct.	None	Unknown	Unknown	None	None	Jun 15 to Sep 15	Y*
Medford Aqueduct - Ditch 3 (ASP-240)	17100307006008 BLM-Medford District	133.38	Perennial Intermediate	Conventional Bore	Proposed conventional bore feasible/practical based on flow volume, channel geometry and potential risk in disturbing man-made aqueduct. Dry open cut feasible	None	None	None	None	None	N/A	Y
Klamath Mountains Ecoregion, Upper Rogue (HUC 17100307) Sub-basin, Little Butte Creek (HUC 1710030708) Fifth field Watershed [8], Jackson County, Oregon												
Whiskey Creek (ASI-207)	17100307000892 Private	137.48	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small 10' wide intermittent headwater stream if flowing at the time of construction. ROW necked down to 75' and TEWAs set back to minimize riparian impacts.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. To Whiskey Creek SS-200-006	17100307016378 Private	137.50	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small braided intermittent headwater stream if flowing at the time of construction. ROW necked down to 75' and TEWAs set back to minimize riparian impacts	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. To Whiskey Creek SS-200-008	Private	137.60	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 2' wide intermittent stream if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*

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Trib. to Lick Creek (ASI-208)	17100307012488 Private	138.26	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small 10' wide intermittent headwater stream if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Lick Creek (SS-GM-9)	17100307020234 Private	138.36	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1-2' wide intermittent non-fish-bearing ditch if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Lick Creek (SS-GM-10)	17100307003986 Private	138.44	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1-2' wide intermittent non-fish-bearing ditch if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Lick Creek (ASI-210)	17100307003986 Private	138.50	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small <10' wide intermittent headwater stream if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Lick Creek (SS-GM-11)	17100307000884 Private	138.55	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1-2' wide intermittent non-fish-bearing ditch if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Lick Creek (SS-GM-12)	Private	138.57	Intermittent N/A	Adjacent to centerline within ROW	Not crossed by centerline. Small headwater tributary expected to be dry at the time of construction and would be restored to approximate original contour and grade during restoration.	None	None	None	None	None	Jun 15 to Sep 15	N
Trib. to Lick Creek (ASI-211)	17100307008460 Private	138.71	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 7' wide intermittent headwater stream if flowing at the time of construction. No additional workspace required.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Lick Creek (SS-GM-13)	Private	138.74	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small incised intermittent non-fish-bearing ditch if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Lick Creek S-T04-002A (SS-GM-14)	17100307008463 Private	139.07	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent non-fish-bearing ditch if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*

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Ditch S-T04-002A	Private	139.10	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small non-fish-bearing ditch if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Lick Creek S-T04-006 (SS-GM-15)	Private	139.21	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent non-fish-bearing ditch if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Lick Creek S-T04-007 (SS-GM-16)	Private	139.28	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent non-fish-bearing ditch if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Lick Creek S-T04-008 (ASI-217)	Private	139.42	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent headwater stream if flowing at the time of construction. No additional workspace required.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Lick Creek (ASI-226)	17100307019116 Private	139.59	Intermittent Minor	Dry Open-Cut (Streambed-bedrock) [12]	Dry open-cut methods feasible/practical on small 7' wide intermittent headwater stream if flowing at the time of construction. ROW necked down to 75 feet and TEWAs located in existing disturbed pasture to minimize riparian impacts.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Lick Creek (ASI-227)	Private	139.63	Intermittent Intermediate	Dry Open-Cut (Streambed-bedrock) [12]	Dry open-cut methods feasible/practical on small 1-2' wide intermittent headwater stream if flowing at the time of construction. ROW necked down to 75 feet and no TEWAs utilized to minimize riparian impacts.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Lick Creek (ASI-228)	Private	139.68	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1-2' wide intermittent headwater drainage if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*

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Trib. to Lick Creek SS-GM-43 (AW-230))	Private	139.75	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent headwater drainage if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Lick Creek (SS-GM-19)	Private	139.91	Intermittent N/A	Adjacent to centerline within ROW	Not crossed by centerline. Small headwater tributary expected to be dry at the time of construction and would be restored to approximate original contour and grade during restoration.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Lick Creek (ASI-233)	17100307000130 BLM-Medford District	140.27	Intermittent Intermediate	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical on intermittent drainage if flowing at the time of construction. Dam and pump crossing method most logical dry open- cut method based on topographic conditions to eliminate difficulties of threading pipe string under flume with associated safety risks including upsetting flume during process. ROW necked down to 75' and TEWAs set back to minimize riparian impacts. StreamNet data indicates anadromy below crossing (~ 2 miles)	None	None	Trout, unspecified	None	None	Jun 15 to Sep 15	Y*
Ditch Trib. to Lick Creek (ADX-234)	17100307001378 BLM-Medford District	140.32	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1-2' wide intermittent road ditch if flowing at the time of construction.	None	None	Unknown	None	None	Jun 15 to Sep 15	Y*
Trib. to Lick Creek (ASI-189)	17100307009921 Private	140.58	Intermittent Minor	Dry Open-Cut (Streambed-bedrock) [12]	Dry open-cut methods feasible/practical on small 3' wide intermittent headwater trib. if flowing at the time of construction. No additional workspace required.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Ditch Trib. to Lick Creek (ADX-186)	17100307001383 BLM-Medford District	140.94	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1-2' wide intermittent ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*

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Star Lake Reservoir (Edge-1)	17100307005853 Private	141.01	Perennial N/A	Adjacent to TEWA 140.98 Water Source	N/A – water source.	None	None	None	None	None	N/A	N
Trib. to Salt Creek (ASI-187)	17100307014303 BLM-Medford District	141.18	Intermittent Minor	Dry Open-Cut (Streambed-bedrock) [12]	Dry open-cut methods feasible/practical on small 3' wide intermittent headwater trib. if flowing at the time of construction. No additional workspace required.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Salt Creek (ASI-188)	17100307004291 BLM-Medford District	141.48	Intermittent Minor	Dry Open-Cut (Streambed-bedrock) [12]	Dry open-cut methods feasible/practical on small intermittent headwater trib. if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Salt Creek (RS-17)	17100307004291 BLM-Medford District	141.49	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent headwater trib., if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Salt Creek (ESI-30)	17100307014306 Private	141.95	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 6' wide intermittent headwater trib. if flowing at the time of construction. No additional workspace required.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Ditch (EDX-32)	Private	142.28	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1-2' wide intermittent ditch if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Salt Creek (ESI-31)	17100307018645 Private	142.32 142.35	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent headwater trib. if flowing at the time of construction. Altered trib. part of pasture irrigation system.	None	None	None	None	None	Jun 15 to Sep 15	Y*

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Salt Creek (ESP-34)	17100307000121 Private	142.57	Perennial Intermediate	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical on creek during low flow period within ODFW in-water work window. ROW necked down to 75' and TEWAs located in existing disturbed pasture to minimize riparian impacts. Bore not practical because both bore pits would be located in wetland likely requiring significant dewatering efforts to access bore pits.	• SONCC Coho, spawning, rearing habitat T, CH	Coho, Summer Steelhead, Winter Steelhead	Trout, unspecified	Coho	Coho Spawning, Rearing	Jun 15 to Sep 15	Y
Pasture Ditch (EDX-36)	Private	142.65	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1-2' wide intermittent ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Trib. to Salt Creek (ESI-37)	17100307014301 Private	143.12	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent headwater trib. if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Long Branch Creek (ESI-38)	17100307009770 Private	143.51	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 2' wide intermittent headwater trib. if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Long Branch Creek (ESI-39)	17100307011758 Private	143.74	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide intermittent headwater trib. if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Stock Pond (EL-41)	Private	143.76	Stock Pond N/A	Adjacent to centerline within ROW	Man-made pond expected to be dry at the time of construction and the pond will be reestablished after construction	None	None	None	None	None	N/A	N
Trib. to Long Branch Creek (ESI-38)	17100307009083 Private	143.76	Intermittent N/A	Adjacent to centerline within ROW	Not crossed by centerline. Intermittent drainage on very edge of TEWA; likely can be avoided during construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Trib. to Long Branch Creek (ESI-40)	17100307009083 Private	143.77	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide intermittent headwater trib. if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*

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Long Branch Creek (ESI-38)	17100307000921 Private	144.11	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 2' wide intermittent headwater trib. if flowing at the time of construction.	• SONCC Coho, assumed habitat T	Summer Steelhead	Present	Coho Assumed	Unknown	Jun 15 to Sep 15	Y*
Hanley North Canal Irrigation Ditch (EDX-42)	17100307006072 Private	144.14	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1-2' wide intermittent ditch if flowing at the time of construction.	None	None	Unknown	None	None	N/A	Y*
Trib. to S. Fork Long Branch (GSP-5/ESP-48)	17100307004586 Private	144.70	Perennial Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide intermittent headwater trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jun 15 to Sep 15	Y
South Fork Long Branch Cr (GSI-6/ESP-59)	17100307004616 Private	145.27	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide intermittent headwater trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jun 15 to Sep 15	Y*
Irrigation Ditch (NDX-107)	17100307001458 Private	145.32	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1-2' wide intermittent ditch if flowing at the time of construction.	None	None	Unknown	None	None	N/A	Y*
Irrigation Ditch (NDX-56)	Private	145.37	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1-2' wide intermittent ditch if flowing at the time of construction.	None	None	Unknown	None	None	N/A	Y*
Trib. to S. Fork Long Branch (ESI-61)	17100307004636 Private	145.54	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jun 15 to Sep 15	Y*
Irrigation Ditch (EDX-64)	Private	145.57	Intermittent Minor	Dry Open-Cut (Bored)	Dry open-cut methods feasible/practical on small 1-2' wide intermittent ditch road if flowing at the time of construction. This ditch may likely be bored with Highway 140.	None	None	Unknown	None	None	N/A	Y*

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
North Fork Little Butte Creek (ESP-66)	17100307000113 Private	145.69	Perennial Intermediate	Dry Open-Cut Level 2 [11]	Dry open-cut methods feasible/practical on stream during ODFW in-water work window. USGS Gage Station 1434300 reports that mean monthly flow are 89, 111, 105 and 67 for Jun, Jul, Aug and Sep, respectively. Flows in Jul and Aug are highest yearly flow periods for creek. TEWA set back and located primarily in previously disturbed (pastures) areas to minimize riparian impacts.	• SONCC Coho, spawning, rearing Habitat T, CH	Fall Chinook, Coho, Summer Steelhead, Winter Steelhead	Trout, unspecified	Coho	Fall Chinook Spawning Coho Spawning, Rearing	Jun 15 to Sep 15	Y-1i with mid-stream support
Trib. to N. Fork Little Butte Creek (ESI-56)	17100307004681 Private	146.05	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent trib, if flowing at the time of construction. No additional workspace required.	• SONCC Coho assumed habitat T	Assumed	Unknown	Coho Assumed	Unknown	Jun 15 to Sep 15	Y*
Trib. to N. Fork Little Butte Creek (ESI-55)	17100307004702 Private	146.38	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 2' wide intermittent trib. if flowing at the time of construction.	None	None	None	None	None	Jun 15 to Sep 15	Y*
Hanley South Canal Irrigation Ditch (EDX-51)	17100307001489 Private	146.80	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small intermittent ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Cascades Ecoregion, Upper Rogue (HUC 17100307) Sub-basin, Little Butte Creek (HUC 1710030708) Fifth field Watershed [8, 9], Jackson County, Oregon												
South Fork Little Butte Creek (ASP-165)	17100307000108 Forest Service- Rogue River-Siskiyou NF	162.45	Perennial Intermediate	Dry Open-Cut Level 1	Dry-open cut feasible and practical on creek. ODFW fish passage barrier data (RecordID 51163) indicates that downstream irrigation diversion dam/barrier (~ 0.5 miles): is unladdered and impassible. USGS Gage Station 14339500 – located below diversion reports monthly mean flow of 14, 12 and 11 cfs, respectively for Jul, Aug & Sep. ROW necked down to 75 feet and TEWAs set back to minimize riparian impacts.	None	None	Trout, unspecified	None	None	Jun 15 to Sep 15	Y-1i with mid-stream support

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Daley Creek (ESI-76/ ESI-84)	17100307000107 Forest Service- Rogue River-Siskiyou NF	166.21	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small headwater intermittent trib. if flowing at the time of construction.	None	None	Trout, Unspecified	None	None	Jun 15 to Sep 15	Y*
Eastern Cascades Slopes and Foothills Ecoregion, Upper Klamath River (HUC 18010206) Sub-basin, Spencer Creek (HUC 1801020601) Fifth field Watershed [8, 9], Klamath County, Oregon												
Spencer Creek (WWW-001-013/ EW-85)	18010206000968 Forest Service-Winema NF	171.07	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small < 10' wide stream with associated wetland. ROW necked down 75 feet and TEWAs set back or located to the edge of existing road disturbance to minimize riparian and wetland impacts. Conventional bore not practical because of topographic conditions and grading/excavation requirements on the south side of creek.	None	None	Unknown	None	None	Aug 1 to Sep 30	Y
Trib. to Spencer Creek SS-201-001 (GSP-7)	18010206005900 Forest Service-Winema NF	171.57	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small < 2' wide intermittent trib/wetland. if flowing at the time of construction.	None	None	Unknown	None	None	Aug 1 to Sep 30	Y*
Trib. to Spencer Creek (ESI-106a)	18010206000678 Forest Service-Winema NF	173.74	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small < 5' wide ephemeral trib. if flowing at the time of construction.	None	None	Unknown	None	None	Aug 1 to Sep 30	Y
Trib. to Spencer Creek (ESI-69)	18010206000677 BLM-Lakeview District	176.54	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small < 4' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Aug 1 to Sep 30	Y*
Trib. to Spencer Creek (GSI-10)	18010206000677 BLM-Lakeview District	176.56	Intermittent N/A	Adjacent to centerline within ROW	Not crossed by centerline. Small headwater tributary expected to be dry at the time of construction and would be restored to approximate original contour and grade during restoration.	None	None	Unknown	None	None	Aug 1 to Sep 30	Y*
Clover Creek (SS-502-EW-103/ EW-103)	18010206000330 Private	177.76	Intermittent Minor	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical on small < 10' wide intermittent trib. if flowing at the time of construction. No additional workspace required.	None	None	Redband Trout	None	None	Aug 1 to Sep 30	Y*

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Clover Creek (GSI-11)	18010206000330 Private	177.76	Intermittent Minor	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical on small 1-2 ' wide intermittent tributary if flowing at the time of construction. No additional workspace required.	None	None	Redband Trout	None	None	Aug 1 to Sep 30	Y*
Eastern Cascades Slopes and Foothills Ecoregion, Upper Klamath River (HUC 18010206) Sub-basin, John C Boyle Reservoir-Klamath River (HUC 1801020602) Fifth field Watershed [8], Klamath County, Oregon												
Trib. to Klamath River (ESI-97)	18010206002774 Private	186.61	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide intermittent trib. if flowing at the time of construction. Intermittent stream feeds stock pond.	None	None	Unknown	None	None	Jul 1 to Jan 31	Y*
Trib. to Klamath River (ESI-99)	18010206000682 Private	186.65	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Jan 31	Y*
Trib. to Klamath River S-T03-001 (ESI-100)	18010206000682 Private	186.74	Intermittent Minor	Dry Open-Cut	Small 2' wide intermittent tributary that runs adjacent to centerline within ROW. Tributary expected to be dry during construction and would be restored to approximate original contour and grade during restoration.	None	None	Unknown	None	None	Jul 1 to Jan 31	Y*
Eastern Cascades Slopes and Foothills Ecoregion, Lost (HUC 18010204) Sub-basin, Lake Ewauna-Upper Klamath River (HUC 1801020412) Fifth field Watershed [8], Klamath County, Oregon												
Trib. To Klamath River (SS-001-001/SS-100-025)	18010204003103 Private	188.90	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent trib. if flowing at the time of construction.	None	None	None	None	None	Jul 1 to Jan 31	Y*
Irrigation Ditch (S2-07 (ADX-63 (MOD))	18010204003315 Private	192.67	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent ditch if flowing at the time of construction.	None	None	Unknown	None	None	N/A	Y*
Irrigation Canal (NDX-66)	180102040033481 Private	192.81	Intermittent N/A	Adjacent to centerline within TEWA	N/A - not within right-of-way.	None	None	None	None	None	N/A	Y*
Ditch (ADX-67)	18010204003314 Private	192.99	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*

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Ditch (ADX-69)	Private	193.07	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Ditch (ADX-72)	Private	193.25	Intermittent N/A	Adjacent to centerline within TEWA	N/A - not within right-of-way.	None	None	None	None	None	N/A	Y*
Ditch (ADX-73)	Private	193.47	Intermittent N/A	Adjacent to centerline within TEWA	N/A - not within right-of-way.	None	None	None	None	None	N/A	Y*
Irrigation Ditch SS-201-003 (WW-001-010/(ADX-78)	18010204003303 Private	194.64	Intermittent Major	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent irrigation ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Ditch (ADX-83)	Private	195.12	Intermittent N/A	Adjacent to centerline within ROW	N/A - not within right-of-way.	None	None	None	None	None	N/A	Y*
Ditch (ADX-84)	Private	195.18	Intermittent N/A	Adjacent to centerline within TEWA	N/A – on edge of TEWA/will be avoided.	None	None	None	None	None	N/A	Y*
Ditch (ADX-86)	Private	195.24	Intermittent N/A	Adjacent to centerline within TEWA	N/A – on Edge of TEWA and will be avoided.	None	None	None	None	None	N/A	Y*
Irrigation Ditch (NDX-82)	Private	195.28	Intermittent N/A	Adjacent to centerline within TEWA	N/A - not within right-of-way.	None	None	None	None	None	N/A	Y*
Drainage Ditch (ADX-87)	Private	195.32	Intermittent N/A	Adjacent to centerline within TEWA	N/A - not within right-of-way.	None	None	None	None	None	N/A	Y*
Ditch (ADX-19	Private	195.46	Intermittent N/A	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*

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Ditch (ADX-22)	Private	195.46	Intermittent N/A	Adjacent to centerline within TEWA	N/A – on edge of TEWA and will be avoided.	None	None	None	None	None	N/A	Y*
Wetland Ditch (ADX-20)	Private	195.47	Intermittent N/A	Adjacent to centerline within ROW	Not crossed by centerline. Small field ditch expected to be dry at the time of construction and would be restored to approximate original contour and grade during restoration.	None	None	None	None	None	N/A	Y*
Ditch (GDX-4)	Private	195.67	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Ditch (GDX-3)	Private	195.73	Intermittent Intermediated	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Ditch (GDX-2)	Private	195.91	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Irrigation Ditch (ADX-30)	Private	196.53	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent irrigation ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Drainage Ditch (ADX-31)	Private	196.53	Intermittent Minor	Adjacent to centerline within ROW & TEWA	Not crossed by centerline. Small field ditch expected to be dry at the time of construction and would be restored to approximate original contour and grade during restoration.	None	None	None	None	None	N/A	Y*
Irrigation Canal (ADX-32)	18010204000790 Private	196.64	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent irrigation ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Irrigation Ditch (ADX-36)	Private	196.76	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 1-2’ wide intermittent irrigation ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Irrigation Ditch (ADX-38)	18010204003183 Private	196.78	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent irrigation ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*

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Weyerhaeuser Pond (AL-34)	Private	196.78	Industrial Pond N/A	Adjacent to centerline within ROW	Pond will not be disturbed by construction activities. The pond may be used for water source or discharge.	None	None	None	None	None	N/A	Y*
Irrigation Ditch (ADX-39)	18010204003183 Private	196.89	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent irrigation ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Irrigation Ditch (ADX-40)	Private	197.08	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent irrigation ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Irrigation Ditch (DX-GM-1)	Private	197.22	Intermittent Minor	Adjacent to centerline within ROW	Not crossed by centerline. Small field ditch expected to be dry at the time of construction and would be restored to approximate original contour and grade during restoration.	None	None	None	None	None	N/A	Y*
Irrigation Ditch (DX-GM-3)	Private	197.28	Intermittent Minor	Adjacent to centerline within ROW	Not crossed by centerline. Small field ditch expected to be dry at the time of construction and would be restored to approximate original contour and grade during restoration.	None	None	None	None	None	N/A	Y*
Klamath River (ASP-151)	18010204002564 State	199.38	Perennial Major	HDD Level 1	HDD feasible/practical based on river crossing width (~ 1000') flow volumes, topography, geotechnical and geometry conditions. Dry open-cut infeasible because of width and flow volume. USGS Gage Station 11507501 records mean monthly discharge of 1,190, 1,060, 1,120 cfs respectively for Jul, Aug, Sep.	• Lost River Sucker E, CH • Shortnose Sucker E, CH	Pacific Lamprey	Redband Trout, Endemic Klamath Fish Species	None	None	N/A Jul 1 to Jan 31	N
Irrigation Canal (ADX-293)	Private	200.41	Intermittent N/A	Adjacent to centerline within ROW	Not crossed by centerline. Irrigation ditch expected to be dry at the time of construction and would be restored to approximate original contour and grade during restoration	None	None	None	None	None	N/A	Y*
Irrigation Canal (No. 1 Drain) (ADX-294)	18010204003246 BOR	200.54	Intermittent Intermediate	Bore	Bureau of Reclamation facility to be bored.	Unknown	None	None	None	None	N/A	Y

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Irrigation Ditch (ADX-94)	18010204003251 Private	201.49	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent irrigation ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Irrigation Ditch SS-201-007 (ADX-96) (C-4-E Lateral)	1217823421646 BOR	201.63	Intermittent Intermediate	Bore	Bureau of Reclamation facility to be bored	Unknown	None	None	None	None	N/A	Y
Roadside Ditch (ADX-99)	Private	203.97	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent irrigation ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Irrigation Canal (C-4 Lateral) (ADX-100)	18010204001225 BOR	204.12	Intermittent Intermediate	Bore	Bureau of Reclamation facility to be bored.	Unknown	None	None	None	None	N/A	Y
Irrigation Canal (C-4-F Lateral) (ADX-101)	18010204001222 BOR	204.33	Intermittent Intermediate	Bore	Bureau of Reclamation facility to be bored.	Unknown	None	None	None	None	N/A	Y
Ditch (ADX-103)	Private	204.50	Intermittent N/A	Adjacent to centerline within TEWA	On edge of TEWA and will be avoided.	None	None	None	None	None	N/A	Y*
Ditch No. 3 Drain (ADX-105)	18010204003757 BOR	204.74	Intermittent Intermediate	Bore	Bureau of Reclamation facility to be bored.	Unknown	None	None	None	None	N/A	Y
Irrigation Canal (ADX-106)	Private	204.91	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent irrigation ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Ditch (C-4-C Lateral) (ADX-109)	18010204001218 BOR	205.50	Intermittent Intermediate	Bore	Bureau of Reclamation facility to be bored.	Unknown	None	None	None	None	N/A	Y
Eastern CascadesSlopes and Foothills Ecoregion, Lost (HUC 18010204) Sub-basin, Mills Creek-Lost River (HUC 1801020409) Fifth field Watershed [8], Klamath County, Oregon												
Ditch (ADX-110)	Private	205.94	Intermittent Minor	Bore	Likely bored with BOR C Canal (ADX-111); potentially a dry- open cut crossing if flowing at the time of construction to facilitate bore of C canal.	Unknown	None	None	None	None	N/A	Y
Canal (C Canal) (ADX-111)	18010204004021 BOR	205.96	Intermittent Intermediate	Bore	Bureau of Reclamation facility to be bored.	Unknown	None	None	None	None	N/A	Y
Wetland Ditch (ADX-112)	18010204009070 Private	205.97	Intermittent Intermediate	Bore	To be bored with C Canal.	Unknown	None	None	None	None	N/A	Y

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Irrigation Ditch (D-2 Lateral) (ADX-113)	BOR	206.51	Intermittent Intermediate	Bore	Bureau of Reclamation facility to be bored.	Unknown	None	None	None	None	N/A	Y
Roadside Drainage Ditch (5-A Drain) (ADX-115)	18010204004039 BOR	207.26	Intermittent Intermediate	Bore	Bureau of Reclamation facility to be bored.	Unknown	None	None	None	None	N/A	Y
Irrigation Lateral (C-4-7 Lateral) (ADX-116)	18010204001229 BOR	207.40	Intermittent Intermediate	Bore	Bureau of Reclamation facility to be bored.	Unknown	None	None	None	None	N/A	Y
Irrigation Drain 5-A Drain (ADX-117)	18010204001237 BOR	207.42	Intermittent Intermediate	Bore	Bureau of Reclamation facility to be bored.	Unknown	None	None	None	None	N/A	Y
Irrigation Drain (5-A Drain) (ADX-118)	18010204001237 BOR	207.60	Intermittent Intermediate	Bore	Bureau of Reclamation facility to be bored.	Unknown	None	None	None	None	N/A	Y
Irrigation Drain (5-A Drain) (ADX-119)	18010204001237 BOR	207.99	Intermittent Intermediate	Bore	Bureau of Reclamation facility to be bored.	Unknown	None	None	None	None	N/A	Y
Irrigation Ditch (ADX-120)	Private	208.07	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent irrigation ditch if flowing at the time of construction.	Unknown	None	None	None	None	N/A	Y
Irrigation Ditch (ADX-121)	Private	208.07	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent irrigation ditch if flowing at the time of construction.	Unknown	None	None	None	None	N/A	Y
Drainage Ditch Irrigation Drain (5-A Drain) (ADX-123)	18010204001237 BOR	208.18	Intermittent Intermediate	Bore	Bureau of Reclamation facility to be bored.	Unknown	None	None	None	None	N/A	Y
Ditch (ADX-124)	Private	208.23	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent irrigation ditch if flowing at the time of construction.	Unknown	None	None	None	None	N/A	Y
Irrigation Ditch (ADX-125)	Private	208.28	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent irrigation ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Irrigation Ditch (ADX-126)	Private	208.29	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent irrigation ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Roadside Drainage Ditch (ADX-128)	Private	208.78	Intermittent Intermediate	Bored	Bored with Railroad and Highway 39.	Unknown	None	None	None	None	N/A	N
Roadside Drainage Ditch (ADX-129)	Private	208.85	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent irrigation ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Irrigation Drain 5-K Drain (ADX-130)	18010204001229 BOR	209.02	Intermittent Intermediate	Bore	Bureau of Reclamation facility to be bored.	Unknown	None	None	None	None	N/A	Y
Roadside Drainage Ditch (ADX-131)	Private	209.05	Intermittent Intermediate	Bore	Bored with Reclamation's 5-K Drain.	Unknown	None	None	None	None	N/A	Y*
Roadside Drainage Ditch (ADX-133)	Private	209.15	Intermittent Minor	Bore	Bored with Reclamation's C-9 Lateral.	Unknown	None	None	None	None	N/A	Y*
Irrigation C-9 Lateral (ADX-134)	BOR	209.15	Intermittent Intermediate	Bore	Bureau of Reclamation facility to be bored.	Unknown	None	None	None	None	N/A	Y
Irrigation Ditch (ADX-135)	Private	209.16	Intermittent Minor	Bore	Bored with Reclamation's C-9 Lateral.	Unknown	None	None	None	None	N/A	Y
Roadside Ditch (ADX-142)	Private	210.16	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent irrigation ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Irrigation Ditch (No. 5 Drain) (Trib. to Lost River) (ADX-143/ SS-003-001)	18010204004367 BOR	210.26	Intermittent Intermediate	Bore	Bureau of Reclamation facility to be bored.	Unknown	None	None	None	None	N/A	Y
Irrigation Ditch 5-H Drain (Trib. to Lost River) (ADX-260)	18010204015577 BOR	210.85	Intermittent Intermediate	Bore	Bureau of Reclamation facility to be bored.	Unknown	None	None	None	None	N/A	Y
Irrigation Ditch (ADX-261)	Private	210.87	Intermittent Intermediate	Dry Open-Cut	Likely to be bored with Reclamation's 5-H Drain.	None	None	None	None	None	N/A	Y*
Ditch (NDX-29/SS-003-002)	Private	211.32	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent irrigation ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale[4]	ESA Species Present/Habitat[5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Ditch SS-003-003 (NDX-30)	Private	211.34	Intermittent N/A	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent irrigation ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Ditch (NDX-92)	Private	211.52	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent irrigation ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Irrigation Ditch (SS-003-004 (NDX-93))	Private	211.53 211.68	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent irrigation ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Lost River (NSP001)	18010204004545 State	212.07	Perennial Major	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical during low flow periods during ODFW in- water work window. An HDD and conventional bore are likely probable at the approximate crossing location based on the topography, geometry and expected geotechnical conditions. Landowner restricted access for geotechnical investigations. Significant costs, time requirements were the determinants for the proposed dry open-cut method.	• Lost River Sucker E • Shortnose Sucker E	None	Redband Trout, Endemic Klamath Fish Species	None	None	Jul 1 to Mar 31	Y-1i with mid-stream support
Irrigation Ditch (ADX-318 EDX-55/EDX-90))	18010204004940 Private	213.23	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent irrigation ditch if flowing at the time of construction.	None	None	None	None	None	N/A	Y*
Irrigation Ditch (ADX 318)	18010204004940 Private	213.45	Intermittent N/A	Adjacent to ROW	On edge of TEWA – should be avoided during construction.	None	None	None	None	None	N/A	Y*
Irrigation Ditch (ADX-274)	BOR	213.85	Intermittent Intermediate	Bore	Bureau of Reclamation facility to be bored.	Unknown	None	None	None	None	N/A	Y*
G Canal (G Canal) (ADX-275)	18010204001228 BOR	213.87	Intermittent Intermediate	Bore	Bureau of Reclamation facility to be bored.	Unknown	None	None	None	None	N/A	Y*
Pond (Edge-2)	Private	214.28	Intermittent Pond	Adjacent to centerline within ROW & TEWA	N/A – standing water in feedlot.	None	None	None	None	None	N/A	Y*

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code and Jurisdiction [1]	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Unnamed Creek (ASI-51)	18010204004618 Private	216.10	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on small 6-12' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *
Unnamed Creek (ASI-52)	18010204004618 Private	216.11	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 3' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *
Unnamed Creek (ASI-50)	18010204004617 Private	216.30	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *
Unnamed Creek (ASI-49)	18010204004627 Private	216.44	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 6' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *
Trib. to D Canal (ASI-136)	18010204001993 Private	218.09	Intermittent Intermediate	Dry Open-Cut	Dry open-cut methods feasible/practical on intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *
Trib. to D Canal (ASI-137)	18010204004701 Private	218.46	Intermittent Minor	Dry Open-Cut (Streambed-bedrock) [12]	Dry open-cut methods feasible/practical on small 3' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *
Trib. to D Canal (ASI-291)	18010204004701 Private	219.69	Intermittent Minor	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical on small 1' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *
Excavated Pond (NL-116)	18010204001267 Private	219.70	Excavated Pond N/A	Off ROW – Temp Extra Workspace	Pond will not be disturbed by construction activities. The pond may be used for a water source for dust control.	None	None	None	None	None	Jul 1 to Mar 31	Y *
Trib. to V Canal (SS-502-012)	Private	220.72	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *
Trib. to V Canal SS-502-013	18010204004906 Private	221.15	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. to V Canal SS-502-013b	18010204004906 Private	221.15	Intermittent Minor	Adjacent to centerline within ROW	Not crossed by centerline. Small intermittent stream expected to be dry at the time of construction and would be restored to approximate original contour and grade during restoration.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *
Trib. to V Canal SS-502-014	18010204004906 Private	221.30	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *
Trib. to V Canal SS-502.016	Private	221.72	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 6' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *
Trib. to V Canal SS-502-003b	Private	222.79	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *
Trib. to V Canal SS-502-003a	Private	222.80	Intermittent Minor	Adjacent to centerline within ROW	ot crossed by centerline. Small intermittent stream expected to be dry at the time of construction and would be restored to approximate original contour and grade during restoration.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *
Trib. to V Canal SS-502-004	18010204004894 Private	222.99	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 5' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *
Trib. to V Canal SS-502.005	Private	223.08	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *
Trib. to V Canal SS-502-006	Private	223.12	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *
Trib. to V Canal SS-502.023	Private	223.39	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *
Trib. to V Canal SS-502-011	Private	223.54	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 7' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code and Jurisdiction [1]	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None
Trib. to V Canal SS-502-009a	Private	224.03	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 5' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *
Trib. to V Canal SS-502-009	Private	224.04	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *
Trib. to V Canal SS-502-008	Private	224.17	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *
Trib. to V Canal SS-502-007	Private	224.21	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 5' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *
Trib. to V Canal SS-502-021	Private	224.44	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *
Trib. to V Canal (SS-502-025 (ASI-140))	18010204001318 Private	225.96	Intermittent Intermediate	Dry Open-Cut Level 1	Dry open-cut methods feasible/practical on intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *
Trib. to V Canal SS-502-024	18010204004977 Private	225.99	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *
Trib. to V Canal SS-502-020	Private	227.14	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *
Trib. to V Canal SS-502-017	Private	227.57	Intermittent Minor	Dry Open-Cut	Dry open-cut methods feasible/practical on small 4' wide intermittent trib. if flowing at the time of construction.	None	None	Unknown	None	None	Jul 1 to Mar 31	Y *
Agricultural Pond (AL-288)	Private	228.13	Excavated pond N/A	Off ROW Within TEWA	Pond will not be disturbed by construction activities. The pond may be used for a water source for dust control.	None	None	None	None	None	Jul 1 to Mar 31	Y *

Waterbodies Crossed and Waterbody ID	NHD Waterbody Reach Code [1] and Jurisdiction	Approximate Pipeline Milepost (MP)	Waterbody Type Size [2]	Proposed Crossing Method Scour Level [3]	Waterbody Crossing Rationale [4]	ESA Species Present/Habitat [5]	Anadromous Species Present [6]	Resident Coldwater Species Present	EFH Species Present [7]	EFH Component Present [7]	Fishery Construction Window [6]	Equipment Bridges Y=Yes, Y* = Yes if flowing at time of construction, 1o = 1 pass required outside fish window 1i = 1 pass required inside fish window, i = set inside fish window, N=None

[1] FERC waterbody definitions:
Minor = less than or equal to 10 feet wide
Intermediate = greater than 10 feet wide but less than or equal to 100 feet wide Major = greater than 100 feet wide

[2] Level 1 and 2 waterbodies have been identified; all others are Level 0. According to GeoEngineers 2013 Channel Migration and Scour Analysis for the PCGP Project, channel migration is defined as the lateral movement, over time, of an entire channel segment perpendicular to the direction of stream flow; channel avulsion is the sudden abandonment of an active channel for a newly created or previously abandoned channel located on the floodplain; channel widening is defined as erosion and subsequent recession of one or both stream banks that widens the channel without changing the channel location; streambed scour is erosion of the streambed resulting in the development of deep pools and/or the systematic lowering of the channel floor elevation.
Level 0 = streams not likely subject to migration, avulsion and/or scour
Level 1 = streams with a moderate potential for migration, avulsion and/or scour Level 2 = streams with a high potential for migration, avulsion and/or scour

[3] Dry open-cut crossing methods include Flume or Dam and Pump procedures. Dam and Pump methods would be utilized where streambed blasting is anticipated to eliminate blasting around the flume. The Dam and Pump crossing method is the preferred crossing procedure in steep incised drainage valleys where worker safety may be compromised when placing ("threading") the pipe string under the flume pipe and where there is a risk of upsetting the flume during this operation. The Dam and Pump crossing method is also the preferred crossing method on small streams under low flow conditions during the ODFW recommended in-water work period. PCGP requests permission for temporary/short-term fish passage restriction when completing Dam and Pump crossings within the ODFW recommended in-water work period.

[4] FWS, NMFS, and StreamNet. T = Threatened, E = Endangered, CH = Critical Habitat

[5] ODFW, 2012 (Oregon Department of Fish and Wildlife. 2012. Fish Distribution Data, 1:24,000 Scale. Oregon Department of Fish and Wildlife Natural Resources Information Management Program. Online: https://nrimp.dfw.state.or.us/nrimp/default.aspx?pn=fishdistdata).

[6] PFMC, 1999; ODFW, 2012.

[7] PCGP understands that fisheries' construction windows only apply to those waterbodies flowing at the time of construction and that the windows do not apply to HDD crossings.

[8] USGS Hydrologic Unit Codes.

[9] Key Watershed.

[10a] ODFW's recommended in-water work window is from October 1 through February 15. Because PCGP's Coos Bay HDD footprint overlaps with the LNG Terminal facilities, the HDD needs to be completed prior to construction of the LNG terminal to prevent construction conflicts and delays; therefore PCGP may complete the HDD outside the ODFW recommended in-water work window.

[10b] ODFW's recommended in-water work window is from October 1 through February 15. Because of the extensive wetland located on the east side of Coos Bay within Kentuck Slough, PCGP plans to schedule the HDD outside the in-water work window to minimize surface impacts within the saturated floodplain wetland.

[10c] ODFW's recommended in-water work window is from October 1 through February 15. Because of the extensive wetland location on the south side of the Coos River, PCGP has scheduled the HDD during the dry season outside the in-water work window between August 1 and September 30 to minimize surface impacts within the saturated floodplain wetland.

[11] These sites were field reviewed and analyzed for potential migration, avulsion and/or scour (see GeoEngineers 2013 Channel Migration and Scour Analysis).

[12] Streambed bedrock based on PCGP's Wetland and Waterbody delineation surveys. Streambed bedrock may require special construction techniques to ensure pipeline design depth. Special construction techniques may include rock hammering, drilling and hammering, or blasting. The need for blasting would be determined by the contractor and would only be initiated after ODFW blasting permits are obtained.

Table M-2
Pipeline Construction Effects to Riparian Zones of Waterbodies with Oregon Coast Coho Presence

Subbasins and Fifth-Field Watersheds	1SPTH	Location	Number of Waterbodies Affected			Acres of Vegetation Removed within Riparian Zone (1SPTH) (Coho Presence[1])											Acres of Vegetation Removed within Riparian Zone (1SPTH) (CHU Only[2])										
						Forest					Non-Forested						Forest					Non-Forested					
			Total	Coho Presence[1]	Critical Habitat Only[2]	LSOG	Mid-seral	Regen	Clearcut	Forest Total	Nonforest Wetland	Unaltered Nonforest	Agriculture	Altered Habitat	Non-Forested Total	Overall Total	LSOG	Mid-seral	Regen	Clearcut	Forest Total	Nonforest Wetland	Unaltered Nonforest	Agriculture	Altered Habitat	Non-Forested Total	Overall Total
Coos Subbasin																										
Coos Bay-Frontal Pacific Ocean	225	Crossed	13	9	7		0.67	1.68		2.35	15.05		4.40	2.06	21.52	23.86		0.39	0.50		0.89	9.67		3.59	2.00	15.26	16.15
		Adjacent	6	4	4		0.09	1.40		1.48	14.05		6.22	0.03	20.30	21.79		0.04	1.39		1.43	7.80		6.07	0.03	13.89	15.32
		Total	19	13	11		0.76	3.08		3.83	29.10		10.63	2.09	41.82	45.65		0.43	1.89		2.32	17.46		9.65	2.04	29.16	31.47
Coquille Subbasin																										
North Fork Coquille River	224	Crossed	7	3	3	0.89	1.76			2.65	0.03		1.56	0.11	1.70	4.35	0.89	1.76			2.65	0.03		1.56	0.11	1.70	4.35
		Adjacent	1	0	0	0.07	0.15			0.22			0.25	0.03	0.28	0.50	0.07	0.15			0.22			0.25	0.03	0.28	0.50
		Total	8	3	3	0.97	1.91			2.87	0.03		1.81	0.14	1.98	4.85	0.97	1.91			2.87	0.03		1.81	0.14	1.98	4.85
East Fork Coquille River	204	Crossed	14	8	2		1.75	6.06		7.81	0.01		1.88	0.15	2.04	9.86		0.99	0.48		1.46	0.01		1.88	0.03	1.93	3.39
		Adjacent	1	0	0		0.02	1.14		1.15			0.12	0.41	0.53	1.68		0.02	0.01		0.03			0.12		0.12	0.15
		Total	15	8	2		1.77	7.20		8.97	0.01		2.00	0.56	2.57	11.54		1.00	0.49		1.49	0.01		2.00	0.03	2.05	3.54
Middle Fork Coquille River	189	Crossed	18	0	0																					
		Adjacent	1	1	0	0.75				0.75						0.75										
		Total	19	1	0	0.75				0.75						0.75										
South Umpqua Subbasin																										
Olalla Creek-Lookingglass Creek	169	Crossed	17	5	2	0.02	1.03	0.00	0.18	1.23	0.02	0.14	4.98	0.05	5.18	6.41	0.02	0.55			0.57			1.55		1.55	2.11
		Adjacent	1	0	0	0.13	0.93	0.00	0.00	1.06	0.17		4.87	0.06	5.09	6.15	0.00	0.84			0.84	0.00		3.13		3.13	3.97
		Total	18	5	2	0.15	1.96	0.00	0.18	2.29	0.19	0.14	9.85	0.11	10.27	12.57	0.02	1.38			1.40	0.00		4.68		4.68	6.08
Clark Branch-South Umpqua River	149	Crossed	13	4	4		1.04	0.72		1.76		1.83	0.22	0.20	2.26	4.02		1.04	0.72		1.76		1.83	0.22	0.20	2.26	4.02
		Adjacent	8	0	0		0.05	0.33		0.39		0.44	0.00	0.00	0.45	0.83		0.05	0.33		0.39		0.44	0.00	0.00	0.45	0.83
		Total	21	4	4		1.09	1.05		2.15		2.27	0.22	0.21	2.70	4.85		1.09	1.05		2.15		2.27	0.22	0.21	2.70	4.85
Myrtle Creek	168	Crossed	14	5	3	0.39	2.13			2.52		0.46	1.10	0.13	1.69	4.21	0.39	1.04			1.42		0.46	1.10	0.06	1.62	3.04
		Adjacent	0	0	0	0.02	0.04			0.06		0.04	0.94	0.00	0.99	1.04	0.02	0.00			0.02		0.04	0.94	0.00	0.99	1.01
		Total	14	5	3	0.40	2.18			2.58		0.50	2.05	0.13	2.68	5.25	0.40	1.04			1.44		0.50	2.05	0.06	2.61	4.05
Days Creek-South Umpqua River, KWS[3]	164	Crossed	15	4	4	0.18	2.84			3.02		1.07	2.25	0.53	3.85	6.86	0.18	2.84			3.02		1.07	2.25	0.53	3.85	6.86
		Adjacent	4	0	0	0.36	0.72			1.08		0.02	1.92	0.25	2.19	3.26	0.36	0.72			1.08		0.02	1.92	0.25	2.19	3.26
		Total	19	4	4	0.54	3.56			4.09		1.09	4.17	0.77	6.03	10.12	0.54	3.56			4.09		1.09	4.17	0.77	6.03	10.12
Total Oregon Coast in Affected Subbasins		Crossed	111	38	25	**1.48**	**11.22**	**8.47**	**0.18**	**21.34**	**15.12**	**3.49**	**16.40**	**3.22**	**38.23**	**59.57**	**1.48**	**8.60**	**1.70**	**0.00**	**11.77**	**9.71**	**3.36**	**12.15**	**2.93**	**28.16**	**39.93**
		Adjacent	22	5	4	**1.33**	**2.00**	**2.87**	**0.00**	**6.19**	**14.21**	**0.51**	**14.32**	**0.78**	**29.82**	**36.02**	**0.45**	**1.82**	**1.73**	**0.00**	**4.00**	**7.80**	**0.51**	**12.42**	**0.32**	**21.04**	**25.04**
	Total		133	43	29	**2.81**	**13.22**	**11.33**	**0.18**	**27.54**	**29.33**	**4.00**	**30.72**	**4.01**	**68.06**	**95.59**	**1.93**	**10.41**	**3.43**	**0.00**	**15.77**	**17.51**	**3.86**	**24.58**	**3.25**	**49.20**	**64.97**

1 Known presence (ODFW GIS database; (ODFW, 2018) and Assumed presence (ODF, 2018)
2 Oregon Coast Coho Critical Habitat GIS database (NMFS, 2008)
3 Key Watershed designated within 5th Field Watershed

unaltered nonforest = beach, grassland, shrublands
agriculture = pasture, agriculture
altered habitat = "developed"

Table M-3
Pipeline Construction Effects to Riparian Zones of Waterbodies with SONCC Presence

Subbasins and Fifth-Field Watersheds	1SPTH	Location	Number of Waterbodies Affected			Acres of Vegetation Removed within Riparian Zone (1SPTH) (Coho Presence[1])											Acres of Vegetation Removed within Riparian Zone (1SPTH) (CHU Only[2])										
						Forest					Non-Forested						Forest					Non-Forested					
			Total	Coho Presence[1]	Critical Habitat Only[2]	LSOG	Mid-seral	Regen	Clearcut	Forest Total	Nonforest Wetland	Unaltered Nonforest	Agriculture	Altered Habitat	Non-Forested Total	Overall Total	LSOG	Mid-seral	Regen	Clearcut	Forest Total	Nonforest Wetland	Unaltered Nonforest	Agriculture	Altered Habitat	Non-Forested Total	Overall Total
Upper Rogue River Subbasin																										
Trail Creek	159	Crossed	6	3	3	1.46	0.39	0.02		1.87		1.07			1.07	2.95	1.46	0.39	0.02		1.87		1.07			1.07	2.95
		Adjacent	2	0	0	0.12	0.08			0.20		0.26		0.00	0.27	0.47	0.12	0.08			0.20		0.26		0.00	0.27	0.47
		Total	8	3	3	1.59	0.47	0.02		2.08		1.34		0.00	1.34	3.42	1.59	0.47	0.02		2.08		1.34		0.00	1.34	3.42
Shady Cove-Rogue River	157	Crossed	11	2	1		0.32			0.32	0.32	1.93		0.03	2.28	2.60		0.32			0.32		0.82		0.03	0.85	1.17
		Adjacent	7	0	0							0.23			0.23	0.23											0.0
		Total	18	2	1		0.32			0.32	0.32	2.16		0.03	2.51	2.83		0.32			0.32		0.82		0.03	0.85	1.17
Big Butte Creek	187	Crossed	9	2	2		0.90			0.90	0.01	0.29	0.51	0.10	0.92	1.82		0.90			0.90	0.01	0.29	0.51	0.10	0.92	1.82
		Adjacent	3	0	0		0.16			0.16	0.07	0.03	0.00	0.00	0.11	0.27		0.16			0.16	0.07	0.03	0.00	0.00	0.11	0.27
		Total	12	2	2		1.06			1.06	0.07	0.33	0.51	0.11	1.02	2.09		1.06			1.06	0.07	0.33	0.51	0.11	1.02	2.09
Little Butte Creek, KWS - eastern portion[3]	158	Crossed	46	4	2		2.15			2.15	1.43	0.58	0.03	0.06	2.10	4.25		0.51			0.51	1.43	0.58	0.03		2.03	2.55
		Adjacent	6	0	0		0.18			0.18	0.36	0.74	0.06	0.01	1.17	1.35		0.01			0.01	0.36	0.74	0.06	0.01	1.17	1.19
		Total	52	4	2		2.33			2.33	1.80	1.32	0.08	0.07	3.27	5.60		0.52			0.52	1.80	1.32	0.08	0.01	3.21	3.73
Total SONCC in Affected Subbasins		Crossed	72	11	8	**1.46**	**3.76**	**0.02**	**0.00**	**5.25**	**1.76**	**3.88**	**0.54**	**0.20**	**6.37**	**11.61**	**1.46**	**2.12**	**0.02**	**0.00**	**3.61**	**1.44**	**2.76**	**0.54**	**0.13**	**4.87**	**8.48**
		Adjacent	18	0	0	**0.12**	**0.42**	**0.00**	**0.00**	**0.54**	**0.43**	**1.27**	**0.06**	**0.02**	**1.78**	**2.32**	**0.12**	**0.26**	**0.00**	**0.00**	**0.38**	**0.43**	**1.04**	**0.06**	**0.02**	**1.55**	**1.92**
		Total	90	11	8	**1.59**	**4.18**	**0.02**	**0.00**	**5.79**	**2.19**	**5.15**	**0.60**	**0.21**	**8.14**	**13.93**	**1.59**	**2.38**	**0.02**	**0.00**	**3.99**	**1.87**	**3.80**	**0.60**	**0.15**	**6.42**	**10.41**

1 Known presence (ODFW GIS database; (ODFW, 2018) and Assumed presence (ODF, 2018)
2 ODFW GIS database (ODFW, 2018)
3 Key Watershed designated within 5th Field Watershed

unaltered nonforest = beach, grassland, shrublands
agriculture = pasture, agriculture
altered habitat = "developed"

Table M-4
Pipeline Operation Effects to Riparian Zones of Waterbodies with Oregon Coast Coho Presence

Subbasins and Fifth-Field Watersheds	1SPTH	Location	Number of Waterbodies Affected			Acres of Vegetation Maintained within Riparian Zone (1SPTH) (Coho Presence[1])											Acres of Vegetation Maintained within Riparian Zone (1SPTH) (CHU Only[2])										
						Forest					Non-Forested						Forest					Non-Forested					
			Total	Coho Presence[1]	Critical Habitat Only[2]	LSOG	Mid-seral	Regen	Clearcut	Forest Total	Nonforest Wetland	Unaltered Nonforest	Agriculture	Altered Habitat	Non-Forested Total	Overall Total	LSOG	Mid-seral	Regen	Clearcut	Forest Total	Nonforest Wetland	Unaltered Nonforest	Agriculture	Altered Habitat	Non-Forested Total	Overall Total
Coos Subbasin																										
Coos Bay-Frontal Pacific Ocean	225	Crossed	13	9	7		0.09	0.47		0.56	2.49		0.82	0.10	3.41	3.97		0.09	0.15		0.25	2.23		0.82	0.09	3.14	3.38
		Adjacent	6	4	4		0.02	0.26		0.28	2.60		1.64	0.04	4.28	4.56		0.02	0.26		0.28	2.60		1.64	0.04	4.28	4.56
		Total	19	13	11		0.11	0.73		0.84	5.09		2.46	0.13	7.69	8.53		0.11	0.41		0.52	4.83		2.46	0.12	7.41	7.94
Coquille Subbasin																										
North Fork Coquille River	224	Crossed	7	3	3	0.22	0.48			0.70	0.01		0.23	0.01	0.25	0.95	0.22	0.48			0.70	0.01		0.23	0.01	0.25	0.95
		Adjacent	1	0	0	0.00	0.01			0.01			0.01		0.01	0.02	0.00	0.01			0.01			0.01		0.01	0.02
		Total	8	3	3	0.22	0.49			0.71	0.01		0.24	0.01	0.26	0.98	0.22	0.49			0.71	0.01		0.24	0.01	0.26	0.98
East Fork Coquille River	204	Crossed	14	8	2		0.53	1.43		1.96	0.00		0.23	0.04	0.27	2.23		0.25	0.11		0.36	0.00		0.23	0.01	0.24	0.60
		Adjacent	1	0	0			0.33		0.33			0.00	0.09	0.09	0.42			0.00		0.00			0.00		0.00	0.01
		Total	15	8	2		0.53	1.76		2.28	0.00		0.23	0.13	0.36	2.65		0.25	0.11		0.36	0.00		0.23	0.01	0.24	0.60
Middle Fork Coquille River	189	Crossed	18	0	0											0.0					0.0					0.0	0.0
		Adjacent	1	1	0	0.19				0.19						0.19					0.0					0.0	0.0
		Total	19	1	0	0.19				0.19						0.19					0.0					0.0	0.0
South Umpqua Subbasin																										
Olalla Creek-Lookingglass Creek	169	Crossed	17	5	2	0.00	0.34		0.07	0.41		0.03	1.13	0.01	1.17	1.58	0.00	0.16			0.16			0.35		0.35	0.51
		Adjacent	1	0	0	0.01	0.21		0.00	0.22	0.09		1.07	0.02	1.18	1.40		0.20			0.20			0.53		0.53	0.72
		Total	18	5	2	0.01	0.55		0.07	0.64	0.09	0.03	2.21	0.03	2.35	2.98	0.00	0.35			0.35			0.88		0.88	1.23
Clark Branch-South Umpqua River	149	Crossed	13	4	4		0.24	0.18		0.43		0.30	0.03	0.02	0.34	0.77		0.24	0.18		0.43		0.30	0.03	0.02	0.34	0.77
		Adjacent	8	0	0		0.02	0.07		0.09		0.01	0.00	0.00	0.01	0.10		0.02	0.07		0.09		0.01	0.00	0.00	0.01	0.10
		Total	21	4	4		0.27	0.25		0.52		0.31	0.03	0.02	0.35	0.87		0.27	0.25		0.52		0.31	0.03	0.02	0.35	0.87
Myrtle Creek	168	Crossed	14	5	3	0.09	0.57			0.66		0.10	0.18	0.03	0.31	0.98	0.09	0.32			0.41		0.10	0.18	0.02	0.30	0.71
		Adjacent	0	0	0	0.00	0.01			0.01		0.00	0.01		0.01	0.02	0.00	0.00			0.00		0.00	0.01		0.01	0.01
		Total	14	5	3	0.09	0.58			0.67		0.10	0.19	0.03	0.32	0.99	0.09	0.32			0.41		0.10	0.19	0.02	0.31	0.71
Days Creek-South Umpqua River, KWS[3]	164	Crossed	15	4	4		0.44			0.44		0.12	0.33	0.05	0.50	0.93		0.44			0.44		0.12	0.33	0.05	0.50	0.93
		Adjacent	4	0	0		0.04			0.04		0.00	0.42	0.00	0.42	0.45		0.04			0.04		0.00	0.42	0.00	0.42	0.45
		Total	19	4	4		0.48			0.48		0.12	0.75	0.05	0.91	1.39		0.48			0.48		0.12	0.75	0.05	0.91	1.39
Total Oregon Coast in Affected Subbasins		Crossed	111	38	25	**0.31**	**2.69**	**2.08**	**0.07**	**5.16**	**2.50**	**0.54**	**2.95**	**0.26**	**6.26**	**11.42**	**0.31**	**1.98**	**0.44**	**0.00**	**2.73**	**2.24**	**0.51**	**2.17**	**0.19**	**5.12**	**7.85**
		Adjacent	22	5	4	**0.20**	**0.31**	**0.65**	**0.00**	**1.16**	**2.69**	**0.01**	**3.14**	**0.14**	**5.99**	**7.15**	**0.00**	**0.28**	**0.33**	**0.00**	**0.62**	**2.60**	**0.01**	**2.60**	**0.04**	**5.25**	**5.87**
		Total	133	43	29	**0.51**	**3.00**	**2.74**	**0.07**	**6.32**	**5.19**	**0.56**	**6.10**	**0.41**	**12.25**	**18.57**	**0.31**	**2.26**	**0.78**	**0.00**	**3.35**	**4.84**	**0.53**	**4.77**	**0.23**	**10.37**	**13.72**

1 Known presence (ODFW GIS database; (ODFW, 2018) and Assumed presence (ODF, 2018)
2 Oregon Coast Coho Critical Habitat GIS database (NMFS, 2008)
3 Key Watershed designated within 5th Field Watershed

unaltered nonforest = beach, grassland, shrublands
agriculture = pasture, agriculture
altered habitat = "developed"

Table M-5
Pipeline Operation Effects to Riparian Zones of Waterbodies with SONCC Presence

Subbasins and Fifth-Field Watersheds	1SPTH	Location	Number of Waterbodies Affected			Acres of Vegetation Maintained within Riparian Zone (1SPTH) (Coho Presence[1])											Acres of Vegetation Maintained within Riparian Zone (1SPTH) (CHU Only[2])										
						Forest					Non-Forested						Forest					Non-Forested					
			Total	Coho Presence[1]	Critical Habitat Only[2]	LSOG	Mid-seral	Regen	Clearcut	Forest Total	Nonforest Wetland	Unaltered Nonforest	Agriculture	Altered Habitat	Non-Forested Total	Overall Total	LSOG	Mid-seral	Regen	Clearcut	Forest Total	Nonforest Wetland	Unaltered Nonforest	Agriculture	Altered Habitat	Non-Forested Total	Overall Total
Upper Rogue River Subbasin																										
Trail Creek	159	Crossed	6	3	3	0.42	0.11			0.53		0.24			0.24	0.77	0.42	0.11			0.53		0.24			0.24	0.77
		Adjacent	2	0	0	0.03	0.03			0.06		0.03		0.00	0.03	0.09	0.03	0.03			0.06		0.03		0.00	0.03	0.09
		Total	8	3	3	0.45	0.15			0.59		0.27		0.00	0.27	0.87	0.45	0.15			0.59		0.27		0.00	0.27	0.87
Shady Cove-Rogue River	157	Crossed	11	2	1		0.07			0.07	0.09	0.30			0.38	0.45		0.07			0.07		0.07			0.07	0.13
		Adjacent	7	0	0							0.06			0.06	0.06											0.0
		Total	18	2	1		0.07			0.07	0.09	0.36			0.45	0.52		0.07			0.07		0.07			0.07	0.13
Big Butte Creek	187	Crossed	9	2	2		0.27			0.27	0.00	0.10	0.14	0.05	0.28	0.55		0.27			0.27	0.00	0.10	0.14	0.05	0.28	0.55
		Adjacent	3	0	0		0.06			0.06	0.03	0.00		0.00	0.03	0.10		0.06			0.06	0.03	0.00		0.00	0.03	0.10
		Total	12	2	2		0.33			0.33	0.03	0.10	0.14	0.05	0.32	0.65		0.33			0.33	0.03	0.10	0.14	0.05	0.32	0.65
Little Butte Creek, KWS - eastern portion[3]	158	Crossed	46	4	2		0.56			0.56	0.29	0.09		0.02	0.40	0.96		0.10			0.10	0.29	0.09			0.38	0.48
		Adjacent	6	0	0		0.02			0.02	0.06	0.23			0.29	0.31						0.06	0.23			0.29	0.29
		Total	52	4	2		0.58			0.58	0.35	0.33		0.02	0.70	1.28		0.10			0.10	0.35	0.33			0.67	0.77
Total SONCC in Affected Subbasins		Crossed	72	11	8	**0.42**	**1.01**	**0.00**	**0.00**	**1.43**	**0.38**	**0.73**	**0.14**	**0.07**	**1.31**	**2.74**	**0.42**	**0.55**	**0.00**	**0.00**	**0.97**	**0.29**	**0.50**	**0.14**	**0.05**	**0.97**	**1.94**
		Adjacent	18	0	0	**0.03**	**0.12**	**0.00**	**0.00**	**0.14**	**0.09**	**0.34**	**0.00**	**0.00**	**0.43**	**0.57**	**0.03**	**0.09**	**0.00**	**0.00**	**0.12**	**0.09**	**0.27**	**0.00**	**0.00**	**0.36**	**0.48**
		Total	90	11	8	**0.45**	**1.13**	**0.00**	**0.00**	**1.57**	**0.47**	**1.06**	**0.14**	**0.07**	**1.74**	**3.31**	**0.45**	**0.64**	**0.00**	**0.00**	**1.09**	**0.38**	**0.77**	**0.14**	**0.05**	**1.33**	**2.42**

1 Known presence (ODFW GIS database; (ODFW, 2018) and Assumed presence (ODF, 2018)
2 ODFW GIS database (ODFW, 2018)
3 Key Watershed designated within 5th Field Watershed

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agriculture = pasture, agriculture
altered habitat = "developed"

APPENDIX N

Conservation Measures

Table 1
Monitoring of Conservation Measures Designed to Minimize Potential Impacts during Construction

Monitoring Period	Location	Monitoring Component
LNG Terminal and Marine Facilities		
Pre-Construction	Estuarine Analysis Area	Contractor will develop a turbidity monitoring and management plan (TMMP) that describes measures to reduce and monitor turbidity impacts resulting from dredging activities. Dredging activities will be monitored by the JCEP Environmental Inspector (EI) according to the TMMP and in accordance with any permit requirements.
	Marine Analysis Area	JCEP willl develop a ship strike mitigation strategy that will require the LNG carriers to either slow their speed in the marine analysis area and/or alter their course to avoid whales within 12 nmi of Coos Bay. Because whale activity off the Oregon Coast is largely seasonal, the plan likely would be implemented on a seasonal basis when whale abundance near Coos Bay is highest.
		JCEP will develop a Ship strike mitigation plan that will require review and approval by National Marine Fisheries Service (NMFS). Adherence to the whale strike mitigation plan by the LNG carriers will be a mandatory requirement.
	Estuarine Analysis and LNG Terminal Project	JCEP has prepared a preliminary Spill Prevention, Control, and Countermeasure (SPCC) Plan for both construction and operational phases of the LNG Terminal to minimize the potential for accidental releases of hazardous materials and to establish proper protocol concerning minimization, containment, remediation, and reporting of any releases that occur.
During Construction	Estuarine Analysis and LNG Terminal Project	The SPCC Plan will be finalized prior to construction and implemented. Location of vehicles, equipment, and fuel storage areas, and fuel containment measures, will be approved and monitored by the JCEP EI.
		Water quality monitoring will be performed during active in-water work operations in Coos Bay to ensure compliance with applicable permit terms and conditions. Water quality will be monitored by the contractor and JCEP EI.
During and Post-Construction	LNG Terminal Project	All of the structures associated with the LNG Terminal and marine facilities will be monitored to discourage use by predator species such as crows and ravens. Frequent inspections will ensure that nests are not being constructed and that all nests found will be removed in accordance with the terms of the Migratory Bird Treaty Act (MBTA) and any permit conditions.
Post-Construction	Marine Analysis Area	All LNG vessels calling at the LNG Terminal will be required to confirm that they will comply (or have been in compliance) with all NMFS recommendations to reduce the risk of whale strikes in the waters off the coast of Oregon and the US West Coast. This will be confirmed during the vessel vetting and compatibility acceptance process that each vessel will undergo prior to its first call and at intervals of six months thereafter if the same vessel will call at the terminal on a regular basis.
Pipeline		
Pre-Construction	Waterbodies Crossed	Preparation of Spill Prevention, Containment, and Countermeasures Plan
	Construction Right-of-Way	PCGP has developed a preliminary SPCC Plan that describes measures to prevent and control any inadvertent spill of hazardous materials such as fuels, lubricants, and solvents that could contaminate soils and affect water quality.
		The SPCC Plan will be updated with site-specific information prior to construction and implemented. All employees will receive SPCC training.
		The Lead Environmental Inspector or designee will hold SPCC and Environmental trainings prior to the start of any construction for all personnel. New personnel will receive the pre-job SPCC and Environmental training.

Monitoring Period	Location	Monitoring Component
Pre-Construction	Waterbodies Crossed	All Environmental Inspectors will be trained and conversant in FERC's waterbody crossing procedures.
		Monitor turbidity levels 100 feet downstream from crossing according to 401 Water Quality Certification requirements. If turbidity levels exceed established tolerances, then the procedures outlined in the 401 WQC will be followed.
		Throughout construction on dam and pump waterbody crossings, PCGP will ensure monitoring is undertaken whenever pumps are operating.
	Construction Right-of-Way	At least one Lead Environmental Inspector and several Environmental Inspectors (EIs) per construction spread and will have authority to stop activities that violate the measures set forth in the ECRP as well as other permits and authorizations and will have the authority to stop work and order corrective action(s).
		Individual training sessions will also be conducted for those contractor employees responsible for completing horizontal directional drills (HDDs). The contractor will be required to maintain a record of those workers that have received training.
		To assure that storage and fueling occur in an environmentally acceptable location, the EI must approve the location of all oil, hazardous substance, and chemical storage and fueling areas, and other material storage areas and construction equipment maintenance areas prior to their use.
		EIs will ensure compliance with the measures set forth in the ECRP, the requirements of FERC's Upland Plan and Wetland and Waterbody Procedures, and all other environmental permits and approvals, as well as environmental requirements in landowner agreements.
		EIs will identify, document and oversee corrective actions, as necessary, to bring an activity back into compliance.
		EIs will verify that the limits of authorized construction work areas and locations of access roads are properly marked before clearing.
		EIs will verify the location of signs and highly visible flagging marking the boundaries of sensitive resource areas, waterbodies, wetlands, or areas with special requirements along the right-of-way.
		EIs will verify the location of drainages and irrigation systems.
		EIs will identify erosion/sediment control, stabilization needs in all areas.
		EIs will verify that trench dewatering activities are located such that water is allowed to infiltrate whenever possible, turbid water does not reach a waters of the state, and dewatering does not result in the deposition of sand, silt, and/or sediment. If such deposition is occurring, the dewatering activity shall be stopped and immediate corrective action taken to prevent reoccurrence.
		EIs will test subsoil and topsoil in agricultural, residential, and other areas where it has been requested by the land management agency or landowner to measure compaction and determine the need for corrective action.
		EIs will advise the Chief Inspector when conditions (such as wet weather) make it advisable to restrict construction activities to avoid excessive rutting.
		EIs will determine the need for and ensuring that erosion controls are properly installed, as necessary, to prevent sediment flow into wetlands, waterbodies, sensitive areas and onto roads. This would include evaluating controls prior to a predicted storm event.
		EIs will inspect and ensure the maintenance of temporary erosion control measures at least daily in areas of active construction or equipment operation, on a weekly basis in areas with no construction or equipment operation and within 24 hours of each 0.5 inch or greater rainfall.
		EIs will provide daily reports and records of compliance with conditions of all environmental permits and approvals (including the measures set forth in the ECRP) during active construction and restoration.
		All erosion control devices will be routinely inspected and any damaged or temporarily removed structures will be replaced at the end of each working day to the extent practicalbe.

Monitoring Period	Location	Monitoring Component
During Construction	Construction Right-of-Way	The EI will inspect temporary erosion control structures at least on a daily basis in areas of active construction and equipment operation. In areas where active construction and equipment operation are not occurring, inspections will be made at least weekly. All structures will be inspected by the EI within 24 hours of 0.5 inch or greater of rainfall.
		The EI will be responsible for ensuring that ineffective temporary erosion control measures are repaired as soon as possible but no more than 24 hours after discovery.
		Concrete coating, refueling, and equipment maintenance activities will be conducted according to FERC's Wetland and Waterbody Procedures.
		All hazardous materials will be handled in accordance with the SPCC Plan. If any unanticipated spill occurs during construction, PCGP will implement the procedures outlined in the SPCC Plan.
		PCGP's EIs will visually monitor the release of hydrostatic test water and trench dewatering activities to ensure that no erosion or sedimentation occurs. If sedimentation is observed, the dewatering operations would be immediately adjusted/reinstalled/maintained to ensure that the discharge to surface water is stopped and water quality standards are not exceeded.
		During Hydrostatic Testing: Should a leak or break occur, the pipeline will be repaired and retested until the required specifications are achieved. All hydrostatic test water will be obtained from commercial or municipal sources, private supply wells, or surface water sources permitted through the Oregon Department of Water Resources.
		PCGP will ensure that herbicide use does not impact sensitive species identified during biological surveys.
		Prior to their use, the contractor will visually inspect each tank for cracks, excessive corrosion, or other flaws which may compromise the integrity of the tank. Hoses and valves will be similarly inspected. If the contractor determines that the equipment is in good mechanical condition, it may be moved onto the right-of-way which includes staging areas and pipe yards. Otherwise, the equipment will be rejected and alternative equipment in good condition employed.
		The contractor will inspect the integrity of all dikes and the liner at least daily and repair the dikes or replace the liner immediately if it becomes damaged.
		It may be necessary to drain accumulated stormwater from within the diked area containing fuel storage tanks. If the stormwater has been contaminated with fuel or other pollutants, all water will be removed by vacuum truck or similar means and hauled to a disposal facility approved by the State of Oregon. However, if no sheen is present and there are no other visible signs of contamination, the stormwater may be left to evaporate within the dike after the tank has been removed. Under no circumstances will the contractor allow the surface discharge or other release of water contained within the diked area without the prior approval of the EI.
		Each work site will have on hand and maintain emergency response equipment. While construction activities are ongoing, all such equipment will be inspected for operability and accessibility in accordance with the Emergency Response Plan (ERP). The location of fire extinguishers and related emergency response equipment will be clearly marked with signs. Each foreman in charge of construction activities will be provided with and will maintain readily accessible, a copy of the ERP.
		In areas where ultramafic rock and serpentine soils are present, which are areas where asbestos may be present, PCGP will comply with state and federal regulations related to the handling, removal, storage, transportation, and disposal of asbestos-containing materials.

Table 2A
Conservation Measures Proposed to Minimize Potential Impacts during Construction and Operation of the Marine Facilities

Proposed Action	Location	Conservation Measure
Protection of Fish and Fish Habitat	Estuarine Analysis Area	All in-water work associated with the JCEP LNG Terminal Facilities will be conducted during the Oregon Department of Fish and Wildlife (ODFW)-approved in-water work window for Coos Bay (October 1 to February 15) unless otherwise approved by the appropriate agencies. All in-water work in Kentuck Creek associated with the Kentuck Project will be conducted during the approved in-water work window of July 1 to September 15 unless otherwise approved by the appropriate agencies.
Dredging	Estuarine Analysis Area	If hydraulic dredging (cutter suction) is used, the cutter head would be held at the substrate to the extent practicable to minimize the potential for entrainment of listed fish species and turbidity generation.
		If a mechanical dredge (clamshell or excavator) is used, the clamshell bucket would be lowered and raised slowly through the water column to reduce the potential for entrainment of fish species and to minimize turbidity.
		Dredging and global positioning system (GPS) software will be utilized to model the dredge prism and track previously dredged areas to ensure that dredging efficiency is maximized, thus reducing the duration of dredging activities.
Material Disposal and Handling	Estuarine Analysis Area	The hydraulic dredge transport pipelines for excavated materials from the Navigation Reliability Improvements and Eelgrass Mitigation and to the Kentuck Project will be submerged or float along the Federal Navigation Channel in Coos Bay. Where the dredge transport pipelines cross eelgrass near the APCO Sites 1 and 2 and the Kentuck Project site, impacts will be minimized by placing the pipeline on pile-supported cradles or by other means to minimize impacts.
		If dredge material is transported via barge, the barge will be loaded so that enough of the freeboard remains to allow for safe movement of the barge and its material on its planned route to the approved disposal facility. The barge type is unknown but Industry practice is to use flat deck barges with vertical steel beams welded to the deck. Wooden or metal slats would be placed between the beams or other appropriate measures will be used to minimize the release of turbid water.
		The hydraulic dredge transport pipeline will be a fused polypropylene (seamless) pipeline and will be provided with secondary containment at wetland crossings (if any) or in areas adjacent to water bodies (e.g., the bay) where mechanical joints are located to ensure that those water bodies will not be affected by any breaks or leaks.
	LNG Terminal	The hydraulic dredge transport pipeline will be placed directly on the ground surface from the slip site across the LNG Terminal site or along Roseburg Forest Products' property. The pipeline would be anchored in place.
	LNG Terminal and Estuarine Analysis Area	Upon completion of dredging operations, any temporary in-water and upland facilities will be removed. Slurry and decant water pipelines will be removed, and any areas disturbed by these pipelines will be restored to pre-construction conditions.
	LNG Terminal and APCO Site	The site designated for placement of hydraulically dredged material will be contained by berms and will be sufficiently large to dewater the dredge slurry and contain rainfall.
		Permanent or long-term disposal sites will be stabilized using a seed mix or other appropriate measures to minimize windblown sand from being deposited on roads, upland habitats, and waterways.
	Slip	Excavation and dredging activities in the slip will be isolated from Coos Bay by an earthen berm and will not be subject to the ODFW in-water work window. The berm will be removed during the approved in-water work period (October 1 to February 15) to minimize effects of turbidity on coho salmon and their invertebrate prey resources. The access channel dredging and final dredging of the slip will also occur during the in-water work period.

Proposed Action	Location	Conservation Measure
Material Disposal and Handling	LNG Terminal and Slip	The untreated slurry water will not be allowed to breach the containment berms and enter Coos Bay at the placement site. Passively treated decant water will be transported via pipeline back to the slip, a purpose-built decant basin, or Coos Bay. The passive treatment is that the decant water will be retained for a period sufficient to allow for settling of suspended sediments and reduction of turbidity that meets federal and state water quality standards. Water quality standards will be determined in coordination with Oregon Department of Environmental Quality (DEQ).
Invasive Species Management	Estuarine Analysis Area	To minimize the potential introduction of exotic species, LNG carriers will comply with applicable ballast water management protocols including the 2012 U.S. Coast Guard (USCG) Final Rule on Ballast Water Discharges, the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, the 1996 National Invasive Species Act, and any applicable regulations programs.
	LNG Terminal	To minimize potential introduction or spreading of invasive species, JCEP will follow the recommendations, as applicable, outlined in the Oregon Aquatic Species Management Plan, the Oregon Noxious Weed Strategic Plan, the Bureau of Land Management's multi-state Environmental Impact Statement Northwest Area Noxious Weed Control Program and its supplements, and the Bureau of Land Management's Final Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Report.
Construction and Operation Lighting	Estuarine Analysis Area	Construction lighting will be designed, installed, and operated at a level that allows construction work to be completed safely and effectively while minimizing glare to surrounding areas. Construction lighting will be directed to the surface waters of Coos Bay only when necessary, in order to minimize impact to aquatic organisms. Lighting for in-water work will be limited to the area around each vessel and the area of the in-water work.
	LNG Terminal	Operation lighting levels will be based on American Petroleum Institute standards and provide sufficient light for safety. JCEP will develop the final lighting plan in consultation with regulatory agencies to minimize potential impacts on aquatic resources.
		Directional lighting facing onshore will be used to the extent possible. Screens or lighting hoods will be installed to the extent practical based on considerations in the final lighting plan.
Stormwater Management	LNG Terminal	Infiltration facilities will provide treatment for the majority of the stormwater falling on the LNG Terminal site. The facilities will be designed to capture and infiltrate all stormwater for 100 percent of the 2-year, 24-hour storm. Overflows from the infiltration facilities will be routed to pipe outfalls in the slip and Coos Bay. For locations that are not feasible to infiltrate, stormwater will be routed to cartridge filter devices, where the treated effluent will be discharged to Coos Bay. Stormwater from access roads to the site will flow through vegetated side slopes or ditches for treatment before being discharged to natural grade. Stormwater with no potential for contamination will be collected and conveyed to a system of stormwater swales, which ultimately will infiltrate into the ground or drain to the slip
		Stormwater collected in areas that are potentially contaminated with oil or grease will be collected and conveyed to the oily water collection sumps. Collected stormwater from these sumps will flow to the oily water separator packages before discharging to the industrial wastewater pipeline.

Proposed Action	Location	Conservation Measure
Stormwater Management	Kentuck Project	Stormwater facilities will be designed to provide treatment for 100 percent of the 2-year storm event, wherever feasible. East Bay Drive runoff would sheet flow stormwater to roadside drainage curbs. Water quality treatment facilities would be installed to capture and treat the runoff. Golf Course Land stormwater would flow-through bio-infiltration conveyance systems. The existing stormwater treatment swale at the Kentuck Slough Bridge will be replaced because the swale will be inundated once tidal exchange is restored.
	Trans Pacific Parkway/US-101 Intersection Widening	Stormwater runoff at Trans Pacific Parkway/U.S. Highway (US)-101 will be treated using stormwater filter cartridge systems, where currently no water quality treatment exists. Best management practices (BMPs) in the operations and maintenance plan will include regular inspection and replacement of cartridge filters.
Turbidity/ Water Quality	Estuarine Analysis Area	Water quality monitoring will be performed during active in-water work to ensure compliance with federal and state water quality standards. The contractor will implement measures to reduce water quality impacts, as directed by the JCEP Environmental Inspector (EI).
		The contractor will develop a turbidity monitoring and management plan (TMMP) that describes measures to reduce turbidity impacts resulting from dredging activities.
		The 401 Water Quality Certification measures will be implemented to reduce turbidity impacts resulting from dredging activities. These measures will include: a. Testing Procedures – to ensure procedures are consistent and accurate. b. Water Quality Monitoring – to be performed during in-water activity to ensure compliance with federal and state standards. c. Corrective Measures – If testing results indicate out-of-compliance situations, work will cease until corrective actions are taken.
	LNG Terminal	The hydrotest water will be tested to ensure that the water will meet all applicable regulations upon discharge.
	LNG Terminal, APCO Site, and Temporary Construction Sites	A draft erosion and sediment control plan (ESCP) has been prepared and will be finalized and implemented prior to beginning construction.
		The contractor will delineate all construction clearing limits with high-visibility markings and maintain the markings during construction of the LNG Terminal and facilities. The area outside the clearing limits will not be disturbed.
		The contractor will inspect ESC measures in accordance with NPDES Permit 1200-C, which typically include the following inspection timing to ensure effective function of ESC measures such that sediment does not leave the area, enter drainage systems or waterways, or violate applicable water quatlity standards: • inspect active construction sites weekly, • inspect inactive construction sites (inactive for more than 14 days) once a month, and • inspect construction sites at least daily during rainy periods when 1/2 inch or more of rain has fallen within a 24-hour period. The contractor will repair or install additional ESC measures no later than 24 hours after initial detection of ESC measures not functioning.

Proposed Action	Location	Conservation Measure
Turbidity/ Water Quality	LNG Terminal, APCO Site, and Temporary Construction Sites	The draft ESCP includes the following typical BMPs that could be used to manage sediment discharge in accordance with the NPDES 1200-C permit(s): • Clearing and grading BMPs will include preservation of natural vegetation to the greatest extent possible, sediment barriers, and temporary and permanent seeding. Other BMPs that may be employed, based on site conditions, include, mulches, compost blankets, erosion control blankets and mats, soil binders, soil tackifiers, sodding, vegetative buffer strips, track walking, and sensitive areas with protective construction fences. • Sediment control will be provided along the construction perimeter at all times during construction. BMPs may include sediment fences, straw wattles, filter socks, or similar control measures that will be used to filter sediment-laden storm water. Onsite sediment control BMPs that may be implemented include sediment control devices, earth dikes, drainage swales, and check dams, which discharge to sediment basins. There may also be storm drain inlet and outlet protection, and temporary and permanent sedimentation basins. Sediment will not be intentionally washed into storm sewers or drainage ways. • Temporary stabilization measures, final vegetative cover or permanent stabiliziation measures will be installed on all distrubed areas as work is completed. Temporary or permanent stabilization measures are not required for areas that are intended to be left unvegetated or unstabilized following construction (i.e., dirt access roads, and areas being used for vehicle storage, equipment, or materials), provided that measures are in place to eliminate or minimize erosion. • Following excavation activities, proposed vegetated areas will be stabilized with an approved seed mixture..
		If fertilizers are used to establish vegetation, the application rates would follow manufacturer's guidelines, and the application will be done in such a way that it will minimize the discharge of nutrients to surface waters. The fertilizer mix and application methodology will be determined during detailed design. JCEP will consult NMFS regarding surface fertilizer application within 50-feet of any wetland or waterway.
Pollution Control	Estuarine Analysis Area, LNG Terminal	The contractor will comply with all applicable federal, state, and local laws as they pertain to the storage, handling, management, transportation, disposal, and documentation of waste, hazardous waste, and hazardous substances.
		Use of marine equipment will complywith USCG procedures for spill prevention and controls, including secondary containment and cleanup supplies.
		The contractor will implement the spill prevention, control, and containment plan (SPCC), which includes the following typical containment BMP's: • The contractor will implement containment measures adequate to prevent pollutants or construction and demolition materials, such as waste spoils, fuel or petroleum products, concrete cured less than 24 hours, concrete cure water, or silt from entering waters of the state or U.S • All equipment used will be clean and inspected regularly prior to use to ensure that the equipment has no fluid leaks. If a leak were to develop during use, containment measures will be installed to avoid impacts to the environment. At no time will any fuels or oils be allowed to enter any water body. • There will be no discharge of contaminated or sediment-laden water, including drilling fluids and waste, or water contained within a work area isolation, directly into any waters of the State or U.S. until it has been satisfactorily treated (for example, bioswale, filter, settlement pond, pumping to vegetated upland location, bio-bags, and dirt-bags). Treatment will meet the turbidity requirements in federal and state permits. • Hazardous material containment kits and spill containment kits will be maintained on-site to facilitate the cleanup of hazardous material spills on dry land and/or waters of the State and U.S.
		In the event of a spill or release of a hazardous material, the SPCC Plan would be followed, as appropriate, to contain and clean up the spill. If the quantity released exceeds the State or federal reportable quantities, or if the release impacts or threatens to impact any surface water body, the Oregon Department of Environmental Quality (DEQ) would be notified immediately using the Oregon Emergency Response System (OERS) at 1-800-452-0311, and the Environmental Protection Agency (EPA) and the USCG would be notified immediately through the National Response Center (NRC) at 1-800-424-8802 (federal reportable quantities or spills impacting or potentially impacting water only). If the quantity released is unknown, notification of OERS and NRC would proceed. Reportable quantities are listed at 40 CFR 302.4 and OAR 340-142-0040 to OAR 340-142-0050.

Proposed Action	Location	Conservation Measure
Pollution Control	LNG Terminal	A preliminary SPCC details the location of vehicles, equipment and fuel storage areas. . BMP's include: • Fuel storage and equipment servicing areas will be located at least 100 feet from wetlands and waterways, unless full containment of potential contaminants is provided. • Track-mounted equipment, large cranes, and other equipment whose limited mobility makes it impractical to move them for refueling will take precautions to minimize the risk of fuel reaching wetlands and waterways • Construction equipment, materials, and debris will be stored in a manner that prevents contamination of water and soil, and prevents fugitive dust
Sound Attenuation (pile driving)	Estuarine Analysis Area	Pile installation in fish-bearing waters will occur during the approved ODFW in-water work window.
		The project plans to install the sheet pile with a vibratory hammer. Whenever feasible, a vibratory hammer will be used for pipe/untreated wood piling installation. Otherwise, use an appropriately sized drop or impact hammer to complete the job, and follow manufacturers' reccomendations to drive the piling.
		If an impact hammer is used to drive or proof steel piling within fish-bearing waters, then sound attenuation devices would be used to effectively dampen sound in accordance with the guidance in NMFS and USFWS Impact Pile Driving Sound Attenuation Specifications, Western Washington Fish and Wildlife Office, Revised October 13, 2006.
		If an impact hammer is used to drive or proof piling within fish-bearing waters, the total impact strikes per day will be limited to less than 3,000 or another amount determined in consultation with NMFS
	LNG Terminal, Slip, and Material Offloading Facility (MOF)	Construction of the slip, installation of sheet pile walls and pipe pile for the tug dock will occur when the slip is isolated from Coos Bay by an earthen berm and will not be subject to ODFW in-water work window. However, use of an impact hammer to install 8 land based pipe pile at the MOF would affect listed fish and will be installed during the ODFW in-water work window.
Protection of Wildlife and Wildlife Habitat	LNG Terminal	JCEP and its contractors will comply with the Migratory Bird Treaty Act. Except where allowed by permit, no migratory bird nest containing eggs or dependent young will be disturbed, nor will the surface the nest is built on. If migratory bird nests are encountered that contain eggs or dependent young, all actions that may disrupt the nest will be stopped and the EI will be contacted. Work that may disrupt nesting will not resume until approved by the JCEP-designated EI.

Table 2B
Species-specific Conservation Measures Proposed to
Minimize Potential Impacts during Construction and Operation of the LNG Terminal

Listed Species	Location	Conservation Measure
Marine Mammals	Marine Analysis Area	The LNG Vessel Transit Management Plan for Coos Bay requires LNG vessels to remain more than 50 miles off the U.S. West Coast until clearance is granted by both the U.S. Coast Guard (USCG) and the LNG Terminal for the vessel to enter the Port of Coos Bay and berth at the LNG Terminal.
		During the 96-hour pre-notification process required of all LNG carriers calling on the LNG Terminal, the LNG carriers will consult the Local Notice to Mariners and U.S. Coast Pilot to understand seasonal migration patterns, times, and routes, and to obtain current information on whale sighting in the waters off Coos Bay and the latest recommendations and advisories from the NFMS and USCG. The LNG Carrier Master will take this into account and adjust the vessels speed and route accordingly.
		JCEP will require all LNG carriers calling on the LNG Terminal to adhere to the NMFS (2017) best management practices (such as: reduce speeds to 10 knots or less within 12 nmi of the entrance to Coos Bay during whale migration periods and post extra lookouts, either on the bow (weather permitting) or the bridge wings, who have been briefed in the techniques of spotting signs of migrating whales). If whales are spotted, or are known to be in a specific area through reports, LNG carriers would reroute and maintain a 100-yard distance from the whales observed, avoid crossing in front of the whales, and maintain a parallel route, when navigably possible. In addition, for safety of the vessel and crew, course adjustments would need to be made gradually away from the whales' location or direction of travel. Additionally, LNG carriers will report any sightings or incidents to NMFS and/or the USCG as required.
		To further increase the awareness of local marine mammal species and risk factors, JCEP will provide a Ship Strike Avoidance Measures Package to shippers calling on the LNG Terminal in Coos Bay. This package will include: • Training for LNG carrier bridge crews, including the use of a reference guide such as the Marine Mammals of the Pacific Northwest, including Oregon, Washington, British Columbia and South Alaska (Folkens 2001). This pamphlet will be provided to LNG carriers calling on the LNG Terminal and will be included as part of the LNG Terminal use agreement to the shippers. • A copy of an accredited mariners' guide to whales. Two options are currently considered. The first is the NMFS CD-ROM–based training program titled, "A Prudent Mariner's Guide to Right Whale Protection" (NMFS 2009g). Although this training program is specific to right whales, NMFS has stated that the guidance and avoidance measures are also applicable to fin, humpback, and sperm whales. The second option is focused on Pacific species but is directed to mariners in Canadian waters (Mariners guide to whales, dolphins and porpoises of western Canada [CORI 2016]). If a U.S.-based Pacific guide is developed before operations commence, it would be used. The final decision will be made in consultation with a qualified marine mammal zoologist or biologist to use the most relevant and up-to-date guide available. Measures discussed in the 2010 workshop in California (Reducing Vessel Strikes of Large Whales In California [DeAngelis 2010] as relevant for the species expected in coastal Oregon.
		LNG Carrier Masters would be asked to report sightings of any injured or dead whales as soon as is practicable, regardless of whether the injury or death is caused by the ship. If the injury or death is caused by collision with the ship, within U.S. territorial waters, the appropriate regulatory agency (NMFS) would be notified within 24 hours of the incident. Information to be provided will include the date and location (latitude/longitude) of the strike, the ship name, and the species or a description of the animal, if possible.

Listed Species	Location	Conservation Measure
Eulachon, Green Sturgeon and Oregon Coast Coho	Estuarine Analysis Area	There are no additional species-specific conservation measures. Conservation measures that minimize impacts to listed fish species are outlined in Table 2A above.
Western Snowy Plover	LNG Terminal Terrestrial Action Area	Construction and operations employees will be trained on snowy plover regulations, recreational use restrictions, and conservation measures in the area, such as controlling litter, avoiding nesting and foraging areas, keeping pets on a leash, and remaining on established roads and trails in designated critical habitat. The training program would be developed based on guidance provided in Appendix K of the 2007 Plover Recovery Plan (OPRD 2007). JCEP would consult with agencies prior to implementation.
		JCEP proposes to mitigate potential impacts to western snowy ploers through implementation of best management practices (BMPs), education, and outreach programs. These include: Printed educational materials will be posted at the proposed facilities for the life of the LNG Terminal. Materials will also be distributed to existing North Spit employers during plover training (should those employers elect to have JCEP provide training to their staff). The types of educational materials may vary, but they could include posters, table tents, maps, brochures, or fact sheets.
		JCEP will work with the applicable federal and state agencies to assist with ongoing management activities and use restrictions on the North Spit.
		The Meteorological Station will be constructed outside of the nesting season (March 15 to September 15) to avoid disturbance to snowy plovers.
		If guy wires are required during final design ot the Meteorological Station, bird deterrent measures would be added to the wire to reduce the likelihood of bird collisions. Deterrent measures such as cones or other anti-perching/anti-nesting devices would also be installed on any surface that could provide potential perching/nesting habitat for predatory species Security lighting would be installed at the station and would be shielded in order to minimize glare while meeting safety requirements
		Structures associated with the LNG Terminal will be monitored to discourage use by avian predator species. Frequent inspections will ensure that nests are not being constructed, and if any nest were found, it would be removed immediately. It is anticipated that there would be sufficient inspections and other activities mandated by safety and security requirements to keep the structures nest-free. However, in the unlikely event that a nest becomes established and it is not discovered until young birds are present, the disposition of the nest would be handled in accordance with the provisions of the Migratory Bird Treaty Act.
		Dredge material placement areas will be regularly policed to ensure that no predator denning is occurring in potential hillocks. If necessary, nylon mesh or other exclusion fencing would be installed around the perimeter of the placement areas to prevent the establishment of coyote or skunk dens until the slopes are stabilized or constructed upon.
		To prevent western snowy plover use of the APCO Site, the site will be stabilized by planting American dunegrass or other appropriate measures in consultation with USFWS.

Table 2C
Conservation Measures Proposed to MinimizePotential Impacts during Construction and Operation of the Pipeline

Location	Resource	Potential Impact Pathway	Conservation Measure
Coos Bay Estuary	Eelgrass Beds, EFH-pelagic, groundfish, salmon, other fish and invertebrate species	• Inadvertent return → increased turbidity, decreased water quality → effects on forage species in estuary and juvenile rearing, migration → adverse effects to survival, reproduction	Coos Bay would be crossed by 2 HDDs; entry and exit locations placed in uplands (where feasible) to minimize impact in case of inadvertent return. HDD Contingency Plan is provided in appendix D.
			The following BMPssignificantly reduce the potential for inadvertent returns: 1) maintaining adequate pump volumes; 2) onitoring and maintaining ideal drilling fluid properties; and 3) maintaining appropriate penetration rates to maintain proper drilling fluid circulation.
			There is greater potential for drilling fluid surface releases near the entry and exit locations of the HDD crossing. The entry and exit locations for the HDD crossings have dry land segments where drilling fluid surface releases can be easily detected and contained.
			To isolate and contain potential drilling fluid releases at each of the drill sites, a berm may be built around the entire drilling site area. Hay bales or silt screen may be part of the berm on the river side of the drilling area. To contain and control drilling fluid surface releases on the land area, there will be earth-moving equipment such as backhoes or small bulldozers, portable pumps, hand tools, sand, silt fences, and hay bales available at each of the drilling sites.
			The mudline becomes exposed during low tides across much of the alignment except within the dredged shipping channel. In the event of a drilling fluid release into Coos Bay, the drilling fluid will likely settle onto the bay floor, where it may be contained and removed.
		• Hazardous/toxic substances → mortality of fish and other aquatic species	In contractor yards bordering Coos Bay, hazardous materials and petrochemicals will be stored 150 feet away from waterbody (see SPCC Plan).
			Fuel equipment 150 feet away from any waterbody or wetland boundary (see SPCC Plan).
			Wash water or waste from concrete or aggregate operations shall not be allowed to enter the esturary prior to treatment by filtration, settling, or other means sufficient to reduce the sediment content to not more than that of the esturary at the time it is discharged.

Location	Resource	Potential Impact Pathway	Conservation Measure
Waterbodies Crossed	EFH-freshwater salmon, Fisheries and Aquatic Resources	• Hazardous/toxic substances → mortality of fish and other aquatic species	Store hazardous materials and petrochemicals 150 feet away from waterbody (see SPCC Plan).
			Fuel equipment 150 feet away from any waterbody or wetland boundary (see SPCC Plan).
			Wash water or waste from concrete or aggregate operations shall not be allowed to enter streams prior to treatment by filtration, settling, or other means sufficient to reduce the sediment content to not more than that of the stream into which it is discharged.
		• Inadvertent return → increased turbidity, decreased water quality → effects spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	Crossed by HDD; entry and exit locations placed in uplands (where feasible) to minimize impact in the event of an inadvertent return or inadvertent return. HDD Contingency Plan is provided in appendix D.
			The following operational elements, if executed properly, significantly reduce the potential for inadvertent returns: 1) maintaining adequate pump volumes; 2) monitoring and maintaining ideal drilling fluid properties; and 3) maintaining appropriate penetration rates to maintain proper drilling fluid circulation.
			There is greater potential for drilling fluid surface releases near the entry and exit locations of the HDD crossing. The entry and exit locations for the HDD crossings have dry land segments where drilling fluid surface releases can be easily detected and contained.
			To isolate and contain potential drilling fluid releases at each of the drill sites, a berm may be built around the entire drilling site area. Straw bales or silt fence may be part of the berm on the river side of the drilling area. To contain and control drilling fluid surface releases on the land area, there will be earth-moving equipment such as backhoes or small bulldozers, portable pumps, hand tools, sand, silt fences, and straw bales available at each of the drilling sites.
		• Introduction of invasive species → decreased revegetation potential → degraded habitat → adverse effects to survival, reproduction	Equipment inspection will be performed to ensure it is free of potential weed seed. Prior to transporting construction equipment to the construction right-of-way, all equipment will be inspected to ensure that it is clean and free of potential weed seed or sources (i.e., soil, roots or rhizomes) and power washed, if necessary, as determined by the EI.
		• Introduction of pathogen/parasite → decreased revegetation, increased loss of existing trees → degraded habitat → adverse effects to survival, reproduction	Wash equipment/vehicles to prevent spread of infestations, including the fungus *Verticllium* and the nematode *Meliodogyne chitwoodii*.
		• Fish Entrapment in isolated work space → fish stranding, impingment during water withdrawal → adverse effects to survival	Waterbody crossings using the “dry” crossing methods, flume or dam-and-pump, may result in some fish being entrapped in streams. Flumes and dams would be completely installed and functioning before any in-stream trenching disturbance occurs. Before pipeline trenching begins, fish trapped in any water remaining in the work area between the dams would be removed and released (salvaged) using the *Fish Salvage Plan* (see appendix T).
			Seining would be the primary method used to salvage fish but electrofishing methods may be used if all fish cannot be removed from the area potentially dewatered
			Fish removal personnel would be approved by ODFW and NMFS for listed species. Personnel that would handle and/or remove fish on federal lands would also be approved by the Forest Service or the BLM, or be done directly by agency personnel if approved by ODFW.

Location	Resource	Potential Impact Pathway	Conservation Measure
Waterbodies Crossed	EFH-freshwater salmon, Fisheries and Aquatic Resources	• In-stream disturbance,upland erosion → increased sediment deposition, increased turbidity, decreased water and habitat quality → effects spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	Construct the pipeline across waterbodies within ODFW recommended in-water construction timing window unless in conflict with NSO, MAMU timing windows.
			Equipment necessary to install the bridges will cross each waterbody only once, if possbile. Equipment bridges will not be installed on intermittent waterbodies which are dry at the time of construction.
			Each crossing will be done as a single effort to minimize the time of instream disturbance.
			Flowing stream crossings not crossed by HDDs or conventional bore, will be crossed with dry open cut method aligned as close to perpendicular to minimize disturbance within the riparian zone.
			Crossing by flume, dam and pump dry crossing, or conventional bore (Catching Slough, Medford Aqueduct) if flowing during construction.
		• Fish impingement → adverse effects to survival, reproduction	During the diverted open cut, multiple discharge pumps would be required to keep the tie-in area dry while the welds are being made and to control any flow seepage in the work areas. each pump intake must be screened to NOAA Fisheries' screening criteria
			When using the dam and pump dry open-cut crossing method, surface water will be pumped and each pump intake must be screened to NOAA Fisheries' screening criteria.
		• Degraded water quality, turbidity → effects to spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	All instream excavation is done in the “dry” between the dams. The dams prevent turbid water created by construction from flowing downstream.
			Use of flume or dam and pump will be used to cross minor (<10 feet) to intermediate (10 to 100 feet) flowing waterbodies in order to maintain downstream flows and isolate the construction area from the streamflow between upstream and downstream dams by channeling the flow through flume pipes or by pumping the water around the construction area.
			Turbid water remaining in or clean water seeping into dammed construction site is removed by pumping to upland sites off the right-of-way, and isolated using straw bales, filter fabric, and/or filter bags to trap sediment.
			Sandbags used to support flume will be filled with non-leachable materials and securely tied before being installed by hand; sheets of plastic will be interwoven between the bags to ensure an effective seal.

Location	Resource	Potential Impact Pathway	Conservation Measure
Waterbodies Crossed	EFH-freshwater salmon, Fisheries and Aquatic Resources	• Degraded water quality, turbidity → effects to spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	Pipeline placement will take place by either HDD, Direct Pipe, or conventional bore across 4 perennial streams.
			Compliance with construction windows for waterbodies not crossed by HDD.
			Clearing equipment will not be allowed to cross waterbodies prior to bridge placement or where it is not feasible to install or safely set the temporary bridges from the streambanks; only the equipment necessary to install the bridge or temporary support pier will cross the waterbody with one pass only.
			Use flume or dam-and-pump methods to cross 213 of the 282 waterbodies crossed, if flowing at the time of construction.
			Rail cars may be used as temporary bridges during low flow where possible to provide a safe and stable crossing for construction vehicle traffic. PCGP will consult with the FS regarding design and placement on NFS lands.
			Mechanized equipment will not be operated in flowing streams without written approval by the applicable land managing agency on federally-managed lands.
			EI will ensure that all threaded valves and fittings that may be used on the hydrostatic test headers are cleaned of potential incidental oil and grease before hydrostatic operations.
			A final hydrotest profile will be developed and provided to construction contractors prior to construction; the hydrostatic test plan will be developed that includes anticipated flow rates and intake and discharge volumes, and the targeting ramping rate will be managed so that there is no long term increase or decrease of river flows. Ramping rates will be submitted to ODFW for review prior to hydrotesting.
		• Acoustic Shock from blasting, impact hammers on stream bedrock → physical injury auditory damage, decreased egg viability → adverse effects to survival, reproduction	The *Fish Salvage Plan* includes measures to exclude fish and prevent them from re-entering isolated portions within waterbodies crossed for distances sufficient to avoid or minimize adverse effects by blasting bedrock in streambeds.
			With use of 1- to 2-pound charges in rock, the setback distance (at which 2.7 psi would occur) from the blast trench to the fish habitat is between 34 and 49 feet. Blasting would be conducted within dry streambanks isolated from the water column, most likely using dam-and-pump construction to bypass water around the dry workspace.
			Fish would be salvaged from within the 75-foot or 95-foot wide right-of-way crossing of each stream. The fish salvage area would be isolated by sand bag dams installed upstream and downstream of the centerline. As described in the *Fish Salvage Plan* (see appendix T), fish would be excluded from an area larger than the limits of the construction right-of-way width, isolated by sand bags, an additional 25 feet on each end of the isolated workspace.
		• Soil erosion → increased turbidity, decreased water quality → effects spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	Temporary spoil placement at least 10 feet away from waterbody and contained by sediment barriers.

Location	Resource	Potential Impact Pathway	Conservation Measure
Waterbodies Crossed	EFH-freshwater salmon, Fisheries and Aquatic Resources	• Vegetation loss → soil erosion → increased turbidity, decreased water quality → effects spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	Temporary extra work areas located at least 50 ft from waterbody, where feasible.
			Stabilize banks and install temporary sediment barriers within 24 hours of completing crossing.
			Install temporary slope breakers immediately after initial disturbance of soil and maintain daily throughout construction and maintain until stabilized.
			Construct trench breakers at slope bases adjacent to waterbodies.
			Verify and clearly mark construction limits/boundaries of waterbodies prior to clearing.
		• Vegetation loss → soil erosion → increased turbidity, decreased water quality → effects spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	Install silt fences/straw bales at edges of construction right-of-way, where necessary to prevent sedimentation of sensitive areas.
			To facilitate periodic pipeline corrosion/leak and aerial surveys, a corridor centered on the pipeline and up to 30 feet wide may be maintained in an herbaceous state. Herbicides or pesticides will not be used in or within 100 feet of a waterbody.
	Soil - Fisheries and Aquatic Resources	• Soil erosion → increased turbidity, decreased water quality → effects spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	Vegetation in wetlands will be cut off at ground level, leaving existing root systems in place. Pulling of tree stumps and grading activities will be limited to directly over the trench in wetlands.
			Near waterbodies and wetlands, it will be determined in the field by the EIs if it is necessary to install temporary erosion control measures (i.e., sediment barriers) prior to clearing activities to minimize the potential for runoff to enter a wetland or waterbody.
			Trench breakers will also be installed at the base of slopes adjacent to wetlands and waterbodies and where needed to avoid draining of wetlands or affecting the original wetland or waterbody hydrology.
			A permanent slope breaker and a trench breaker will be installed at the base of slopes near the boundary between the wetland and adjacent upland areas. The trench breaker will be installed immediately upslope of the slope breaker.
			Where necessary, PCGP will use trench plugs constructed of bentonite at appropriate locations to prevent flow from wetlands or streams into the trench and to preserve the original wetland and/or waterbody hydrology.

Location	Resource	Potential Impact Pathway	Conservation Measure
Waterbodies Crossed	Soil - Fisheries and Aquatic Resources	• Soil erosion → increased turbidity, decreased water quality → effects spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	Where possible, PCGP will release water within the same basin from which it was withdrawn. If cascading water makes this impractical, pump screening will be used to minimize potential invasive species transmission from hydrostatic testing. Intake screens would be used to prevent potential entrainment of aquatic species and to prevent spread of noxious weeds. Discharging test water in uplands with no run-off into streams will prevent infecting the aquatic environment. The proposed water source for hydrostatic testing between MPs 0.0 and 50.20 would come from a treated municipal source (i.e., Coos Bay – North Bend Water Board) and from Kinnan Lake between MPs 35.87 and 51.71. Both water sources would be expected to be free from Port Orford cedar root disease (http://www.oregon.gov/ODF/PRIVATE_FORESTS/fh.shtml).
			Hydrostatic test water will be discharged at a rate to prevent scour, erosion, and sediment migration to sensitive resources such as wetlands and waterbodies. The test water will be released into a dewatering device such as a straw bale structure to dissipate energy of the test water flow, filter the test water, to allow release of the test water as sheet flow back into the ground.
			PCGP will follow FERC's Wetland and Waterbody Procedures (Section VII. C. 4.) and will locate all hydrostatic test manifolds/discharge structures outside of wetlands and riparian areas to the maximum extent practicable based on engineering test constraints to ensure that all water infiltrates into the ground and does not flow directly into wetlands or waterbodies.
			The outfall of the slope breakers will be positioned to avoid sedimentation of wetlands, waterbodies and other sensitive areas.
			The mulch application rate will also be increased to 3 tons/acre on all slopes within 100 feet of waterbodies and wetlands.
			The EIs will be qualified to determine if the straw is "clean" or contains other non-straw species. Where the EI is unable to determine specific weed species, the EI will request assistance from local county extension agents or noxious weed control boards or a knowledgeable agronomist or botanist.
		• Hazardous/toxic substances → mortality of fish and other aquatic species	Where possible, the refueling location will be selected with the best topography to prevent or limit any potential spill from entering a wetland or waterbody.
			Pumps and generators used for dewatering or hydrostatic testing within or in the vicinity (within 150 feet) of waterbodies, wetlands or within 200 feet water supply wells (400 feet of municipal or community water supply wells) will be set in containment structures (SPCC Plan).
			Hazardous materials, chemicals, fuels and lubricating oils will be stored in upland areas at least 150 feet from waterbodies and wetlands or in accordance with FERC's Procedures

Location	Resource	Potential Impact Pathway	Conservation Measure
Waterbodies Crossed	Water Quality	• Degraded water quality, turbidity → effects to spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	PCGP will utilize temporary construction bridges during all phases of construction to cross waterbodies. These structures will be designed according to FERC's Wetland and Waterbody Procedures as well as according to the U.S. Army Corps of Engineers and Oregon Department of State Lands and Oregon Department of Fish and Wildlife approval.
			The temporary equipment bridges will be constructed to maintain unrestricted flow and to prevent soil from entering the waterbody.
			Soil will not be used to stabilize equipment bridges. Bridges will be designed to withstand and pass the highest flow expected to occur while the bridge is in place, and, where feasible, bridges will be designed to span the entire Ordinary High Water Mark.
			If it is not possible to span the OHWM with the bridge, a temporary culvert or pier may be required. These culverts/piers would be installed to minimize flow restrictions that may deflect stream flow to banks to prevent streambank erosion or scour. The temporary bridges may include: 1) equipment mats and culvert(s); 2) equipment mats or railroad car bridges without culverts; 3) clean rock fill and culvert(s); and 4) flexi-float or portable bridges. All potential culverts/bridges would be installed within the construction footprint of the right-of-way.
Wetlands, Waterbodies Crossed	Water Quality	• Degraded water quality, turbidity → effects to spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	Clearing equipment will not be allowed to cross waterbodies prior to bridge placement or where it is not feasible to install or safely set the temporary bridges from the streambanks; only the equipment necessary to install the bridge or temporary support pier will cross the waterbody with one pass only.
			Where it is not feasible to install or safely set the temporary bridges from the streambanks, only the equipment necessary to install the bridge or temporary support pier will cross the waterbody making only one pass across the waterbody.
			Any equipment required to enter a waterbody to set a bridge will be inspected to ensure it is clean and free of dirt or hydrocarbons.
			Sediment barriers will be installed immediately after clearing and prior to initial ground disturbance (i.e., grading).
			Sediment barriers will be properly maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration of adjacent upland areas is complete and revegetation has stabilized the disturbed areas.
			The contours of the streambed, shoreline and streambanks will be restored to preconstruction configurations to the extent practicable (i.e., contour/elevations) to restore the physical integrity/conditions of these features.
			In most cases except where topographical or other constraints occur, TEWAs have been located at least 50 feet away from wetland boundaries as required by FERC's Wetland and Waterbody Procedures (V. B. 2. a).
			Where necessary, sediment barriers will be installed across the entire construction right-of-way immediately upslope of the wetland boundary to prevent sediment flow into the wetland.
			Where wetlands are adjacent to the construction right-of-way, sediment barriers will be installed along the edge of the construction right-of-way, as necessary, to prevent sediment flow into the wetland. These sediment barriers will be removed after restoration is complete and revegetation has stabilized the disturbed areas.

Location	Resource	Potential Impact Pathway	Conservation Measure
Wetlands, Waterbodies Crossed	Water Quality	• Degraded water quality, turbidity → effects to spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	In wetlands where standing water or saturated soils are present or if construction equipment causes ruts or mixing of the topsoil and subsoil in wetlands, PCGP will use low-ground-weight construction equipment or will operate normal equipment on timber riprap or standard prefabricated equipment mats.
			Many of the unnamed waterbodies that are crossed by the Pipeline are intermittent headwater streams that are expected to be dry during the summer construction activities.
			Waterbody crossings will generally be completed using a dry crossing method (typically flume or dam and pump).
			Waterbody crossings will be made nearly perpendicular to the axis of the waterbody channel, where practicable, based on engineering and routing constraints to minimize parallel stream alignments and multiple stream crossings.
			In most cases, PCGP has been successful in designing each crossing such that TEWAs are not closer than 50 feet from waterbody boundaries, except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land.
	Forests - Wetlands - Waterbodies	• Logging → soil erosion → increased turbidity, decreased water quality → effects spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	All operations and tree felling will occur within the certificated construction work area limits. Trees within the certificated construction work area limits will be felled or sheared so as to prevent damage to adjacent trees, facilities, or structures and will also be felled away from wetlands, waterbodies, and riparian reserves.
			Landings for clearing operations will not be located in wetlands or riparian reserves on federal lands, and, where feasible, logs yarded out of wetlands or riparian zones will be skidded with at least one end suspended from the ground so as to minimize rutting.
	Instream Fish Passage	• Instream exposure of pipeline by scour → fish passage barrier → decreased survival, reproduction	The depth of the trench will be sufficient to allow for at least three feet of cover on top of the pipe in normal soils. However, the trench depth will be greater in agricultural areas, at stream crossings, and at road crossings. Crossing depths for roads and railroads will typically be five feet unless specified otherwise by the managing agency/owner.
Waterbodies Crossed - Klamath Basin	Lost River and Shortnose sucker Occupied Habitat	• Vegetation loss → soil erosion → increased turbidity, decreased water quality → effects spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	Construction will occur between July 1 and January 31, Lake Ewauna-Upper Klamath River (HUC 1801020412) or between July 1 and March 31, Mills Creek-Lost River (HUC 1801020409). Construction after October 1, during the recommended in-stream work window, outside of typical agriculture period; will allow irrigation canals to be crossed after they have been drained, when mostly dry and not in operation.
			The winter construction schedule will minimize the crossing of high groundwater areas in the Klamath Basin which are caused from irrigation and canal leakage or drainage and will minimize risk of impact to Lost River and Shortnose sucker after canals have be drained by Reclamation.
			PCGP will work with Reclamation, irrigation districts, and landowners to minimize disruption of these canals and ditches during construction and has agreed to utilize trenchless (bored) crossings of these features to minimize any downstream impacts.
			PCGP has developed the Klamath Project Facilities Crossing Plan, as part of the POD (see appendix O to the POD), which identifies 26 locations where the Pipeline crosses facilities managed by Reclamation in the Klamath Basin. The plan was developed in consultation with Reclamation and specifies the methods proposed to cross the facilities.

Location	Resource	Potential Impact Pathway	Conservation Measure
Waterbodies Crossed - Klamath Basin	Lost River and Shortnose sucker Occupied Habitat	• Soil Compaction →soil erosion → decreased potential for vegetation restoration	Rutting, compaction, and soil structural damage will be minimized by scheduling the majority of construction activities during the dry season, from May-October; except for Klamath Basin where winter construction is proposed to minimize impacts to agricultural activities and when most irrigation canals will be dry.
			PCGP will work with Reclamation, irrigation districts, and landowners to minimize disruption of canals and ditches during construction within the Klamath Basin and has agreed to utilize trenchless (bored) crossings of these features to minimize any downstream impacts and potential impact to Lost River sucker and shortnose sucker if present in ditches and canals.
			PCGP will use conventional bores to cross 6 waterbodies (ditches, canals) in the Lake Ewauna-Klamath River watershed and 19 waterbodies (ditches, canals) in the Mills Creek-Lost River watershed within range of the Lost River and Shortnose sucker.
Wetlands, Waterbodies Crossed	Soil Conservation - Water Quality	• Soil erosion → decreased potential for vegetation restoration • Degraded water quality, turbidity → effects to spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	Equipment working in wetlands will be limited to that needed to clear the right-of-way, dig the trench, fabricate and install the pipeline, backfill the trench, and restore the right-of-way; if standing water or saturated soils are present, low-ground weight construction equipment will be used or equipment will operate on timber mats; trench dewatering may be required in areas of high groundwater if pipeline trench access is required.
			PCGP will not grade or remove stumps or root systems from the rest of the right-of-way in wetlands unless it is determined that safety-related construction constraints require removal of tree stumps from under the working side of the right-of-way. Minimizing stump and root system removal in wetlands will accelerate restoration efforts by allowing sprouting species to reestablish from existing root systems.
			Where the pipeline trench may drain a wetland, trench breakers will be installed and/or the trench bottom sealed as necessary to maintain the original wetland hydrology.
			Where access roads in upland areas do not provide reasonable access, PCGP will limit all other construction equipment to one pass through wetlands that cannot be appropriately stabilized using the right-of-way.
			To allow multiple passes through wetlands, PCGP will stabilize the right-of-way through wetlands as prescribed in Section VI. B.1.d. of FERC's Wetland and Waterbody Procedures by using timber riprap, prefabricated equipments mats, or terra mats.
			During construction there is the potential, in areas of high groundwater, that trench dewatering may be required. However, the construction schedule will generally coincide with the period when the soils in these areas are dry, thereby minimizing the the amount of trench dewatering required.
			Construction right-of-way in specified areas such as wetlands will be minimized to 75 feet if possible.

Location	Resource	Potential Impact Pathway	Conservation Measure
Wetlands, Waterbodies Crossed	Soil Conservation - Water Quality	• Vegetation loss → soil erosion → increased turbidity, decreased water quality → effects spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	Where uncleared storage areas (UCSAs) are adjacent to or overlap a wetland or waterbody, materials will not be stored within the wetland or waterbody and at least a 10-foot buffer will be maintained around the wetland or waterbody edge
		• Soil Compaction →soil erosion → decreased potential for vegetation restoration	Compaction and soil mixing will be minimized by using low ground-weight equipment working from prefabricated timber or terra mats and/or timber riprap fabricated from materials inside construction right-of-way.
Thirty-six proposed yards	Soils	• Soil Compaction →soil erosion → decreased potential for vegetation restoration	Contractor and pipe storage yards that are chosen will be existing/former industrial sites already disturbed.
Four of the proposed yards			Sites not already disturbed that are located in agricultural fields could use topsoil salvaging and stabilization, gravel may be applied on travel and parking surfaces.
Agate Desert, Shady Grove quadrangle	Vernal Pool Fairy Shrimp Critical Habitat VERFS 3A and 3B	• Introduction of invasive species → decreased revegetation potential → degraded habitat → adverse effects to survival, reproduction	Place temporary construction mats or geotextile fabric and gravel padding as temporary access pad to railroad tracks if offloading pipe is necessary; portions of pipe storage yards will not be used if vernal pools are identified in vicinity; silt fences will be placed along access roads and within yards as necessary to prevent spread/introduction of nonnative plant species.
Pipe yard - staging locations	Soil Conservation - Water Quality	• Hazardous/toxic substances → mortality of fish and other aquatic species • Hazardous/toxic substances → toxic substance in soil → decreased revegetation potential → degraded habitat → adverse effects to survival, reproduction	PCGP may coat pipe at staging locations and pipe yards. Where wetlands or waterbodies may be present at the staging locations or pipe yards, PCGP will avoid impacts by isolating the coating activities within secondary containment and utilizing appropriate BMPs such as silt fencing or straw bales to prevent the potential of wet concrete or disposals from escaping the concrete coating area into wetlands or waterbodies.
Construction Right-of-Way	Forested Vegetation	• Logging → soil compaction →soil erosion → decreased potential for vegetation restoration	Prior to right-of-way easement acquisition, timber cruises will be conducted according to industry and/or federal agency standards in order to develop timber extraction plans, identifying the feasible logging systems that would be practical along the pipeline easement, based on pipeline alignment, construction right-of-way configuration, topographic conditions and restraints, existing access, timber types, and logging system limitations.

Location	Resource	Potential Impact Pathway	Conservation Measure
Construction Right-of-Way	Forested Vegetation	• Logging → soil compaction →soil erosion → decreased potential for vegetation restoration	All timber cleared from the right-of-way will be cut and cleared in accordance with landowner and land management agency requirements, where practical. If, based on site-specific conditions, the landowner or land management agency-recommended timber harvesting method is not feasible, an alternate timber harvesting method will be utilized with approval from the landowner or land managing agency.
			Utilize "Uncleared Storage Areas" (UCSAs) instead of Temporary Extra Work Areas (TEWAs), where feasible, to minimize forest clearing.
			Several acres of UCSAs within MAMU (and NSO) range designated to store forest slash, stumps, dead, and downed materials during construction that will be scattered across the right-of-way after construction/during restoration.
			Linear harvest constraints may include the locations of available log load out areas will be confined to the existing roads that cross the right-of-way or in areas of suitable topography where commercial logging trucks can readily travel and are not limited by slope grade; log landings will be confined by the narrow construction right-of-way corridor and restrictive angles or bends that are too sharp to accommodate cable logging systems.
			The construction right-of-way has been designed to minimize additional TEWAs which will reduce overall disturbance through use of UCSAs. The construction footprint is not large enough in many areas to accommodate both the logs cleared from the right-of-way and accomplish efficient construction activities simultaneously.
			TEWAs have been identified for log storage and decking along the alignment that are located in existing cleared areas adjacent to existing roads where feasible where log storage could occur for extended periods, if necessary.
			Ground-based skidding and cable (where feasible) logging methods will likely be the standard method; however, in some isolated rugged topographic areas with poor access, helicopter logging may be utilized.
			Cable and helicopter logging methods will minimize the potential for soil compaction.
			Where log skidding is accomplished by machine methods, low-ground weight (pressure) vehicles will be used as much as possible.
			Where log skidding is accomplished by machine methods, the removal of soil duff layers will be avoided so that a cushion exists between equipment or logs and the mineral soil.
			Where log skidding is accomplished by machine methods, designated skid trails will be used to restrict soil compaction to a smaller area of the right-of-way (preferably over the pipeline trenching area).

Location	Resource	Potential Impact Pathway	Conservation Measure
Construction Right-of-Way	Forested Vegetation	• Logging → soil compaction →soil erosion → decreased potential for vegetation restoration	Compacted landing, yarding, and load-out areas used for timber harvesting during clearing will be scarified after use and prior to the rainy season where the potential for sediment delivery to waterbodies is possible. Scarification will promote infiltration, and minimize run-off and the potential for sedimentation.
			During right-of-way restoration activities, to be completed after construction , most compacted surfaces from mainline construction activities will be relieved or mitigated by typical regrading, recontouring, scarifying, and final cleanup activities.
		• Logging → soil erosion → increased turbidity, decreased water quality → effects spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	Any debris entering a waterbody as a result of felling and yarding of timber will be removed as soon as practical after entry into the waterbody and shall be placed outside the 100-year floodplain where practical. Logs and slash will not be yarded across perennial streams unless fully suspended.
			During logging/clearing operations, the direction of log or slash movement shall be conducted to minimize sediment delivery to waterbodies, including intermittent streams.
			Cut timber must be removed from the right-of-way to avoid delays due to right-of-way congestion. Avoiding construction and restoration delays and work in the late fall and winter rainy season are important BMPs that PCGP plans to implement to avoid potential and unnecessary impacts.
		• Logging → fuel loading from slash generated during clearing → increased risk of stand-altering wildfire → habitat alteration	Slash from timber clearing will be salvaged at the edge of the right-of-way and scattered/redistributed across the right-of-way during final cleanup and reclamation according to BLM and Forest Service fuel loading specifications to minimize fire hazard risks. However, much of the slash generated during timber clearing operations will remain on the ground and in place to provide cover to minimize erosion over the winter if construction will commence the following season.
			UCSAs will be used to store forest slash, stumps, and dead and downed log materials generated during clearing and construction operations that will be scattered across the right-of-way after construction. These UCSAs were designed to reduce the overall clearing and disturbance footprint which will minimize impacts to forested areas, including late successional reserves (LSRs).
			In areas where slash has been concentrated, such as on landings, and cannot be evenly scattered across the right-of-way according to the fuel loading standards, the slash may be mechanically or hand piled and burned according to state burning requirements.

Location	Resource	Potential Impact Pathway	Conservation Measure
Construction Right-of-Way	Forested Vegetation	• Logging → fuel loading from slash generated during clearing → increased risk of stand-altering wildfire → habitat alteration	The preferred method of handling woody debris and other cut vegetation (slash) on the right-of-way during pipeline construction and right-of-way clean-up, reclamation, and maintenance, is to stockpile and redistribute the material on the right-of-way. If prescribed burning is to be conducted, the Prescribed Burning Plan will be implemented.
			Where burning slash is required, a prescribed burning plan has been developed and approved by the BLM, the Forest Service, and which adheres to the Oregon Department of Forestry (OAR 629-615-300) regulations. The burning plan describes the measures PCGP would utilize, as appropriate, to safely conduct burning and includes, among others: • Those slash piles to be burned would be located within the certificated construction limits and away from surrounding vegetation to prevent potential ignition or damage. • The slash burn piles would be limited to a height/size so that burning is conducted in a controlled manner and avoids potential ignition of surrounding vegetation. • An appropriate area surrounding the slash burn pile would be free from flammable debris to prevent the spread of fire. • A portion of the slash piles would be covered with appropriate material to keep the pile dry for burning during the fall-spring burning season. • The slash piles would only be burned during the appropriate burning season, as defined and allowed by ODF, and when the risk of fire is low. • PCGP would use fire watchmen as appropriate during burning operations and would maintain the appropriate quantities and types of fire suppression tools on site during burning operations as required by the regulating agency (i.e., ODF, BLM or the Forest Service).
		• Logging → loss of habitat structural complexity	Prior to clearing operations, the EI or PCGP's authorized representative will flag large diameter trees on the edges of the construction right-of-way and temporary extra work areas to save/protect as green recruitment or habitat/shade trees.
		• Logging → loss of snag, downed woody debris → loss of habitat structural complexity	Prior to clearing operations, the EI or PCGP's authorized representative will flag existing snags on the edges of the construction right-of-way or temporary extra work areas where feasible to save from clearing.
			Snag and dead/down log densities will be documented prior to construction. The specifications of the Oregon Forest Practices Act will be used to measure salvage snags and green trees and down logs.

Location	Resource	Potential Impact Pathway	Conservation Measure
Construction Right-of-Way	Forested Vegetation	• Logging → soil compaction →soil erosion → decreased potential for vegetation restoration	Prior to right-of-way easement acquisition, timber cruises will be conducted according to industry and/or federal agency standards to confirm the feasible logging systems that would be practical along the pipeline easement, based on pipeline alignment, construction right-of-way configuration, topographic conditions and restraints, existing access, timber types, and logging system limitations (see Right-of-Way Clearing Plan).
		• Logging → soil erosion → increased turbidity, decreased water quality → effects spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	Cut timber must be removed from the right-of-way to avoid delays due to right-of-way congestion. Avoiding construction and restoration delays and work in the late fall and winter rainy season are important BMPs that PCGP plans to implement to avoid potential impacts.
		• Soil erosion → decreased potential for vegetation restoration	Wood chips may also be generated during clearing operations which will be scattered across the right-of-way with the logs and slash. Scattering the material will enhance soil stability and revegetation success.
			In upland forests, PCGP will also limit stump removal to the trenchline and areas where grading is necessary to construct a safe level working plane. Minimizing stump removal in upland areas will minimize soil disturbance and erosion potential and increase soil strength by maintaining soil root structure.
		• Vegetation loss → soil erosion → increased turbidity, decreased water quality → effects spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	Whole trees with attached root wads that are greater than 24 inches DBH and are to be used as large woody debris in the Riparian Reserves from which they are felled will be temporarily stored in adjacent TEWAs until restoration and on-site mitigation measures are employed; if additional trees beyond LWD are requested by the FS, the FS will identify these trees prior to construction and specify where they can be stored. Where timber is removed at a waterbody, LWD is intended to be placed as part of restoration. If the crossing is devoid of timber (e.g. previous (clearcut area), then obtaining LWD and placing it at the crossing would be a mitigation action within the watershed.
			Placement of LWD is proposed at streams crossed or adjacent to the Pipeline in range of SONCC coho and Oregon Coast coho (see APDBA section 3.5.3.4 and section 3.5.4.4).
			Woody vegetation will be cut, mowed, or sheared so roots are left intact.
			To minimize impacting trees during construction when storing forest slash, stumps, and dead and downed log materials within UCSAs, PCGP will leave as much space between the stored material and the trees as practical. Operators will be educated to place materials such that placement and retrieval of these materials minimize potential impacts (i.e., soil compaction and bark damage). PCGP's inspectors will also oversee these practices during construction.
			In areas where the UCSAs may be used to store spoil or to temporarily park equipment/vehicles between the mature trees, these activities will not occur immediately adjacent to the tree so as to minimize impacts (soil compaction or tree damage)

Location	Resource	Potential Impact Pathway	Conservation Measure
Construction Right-of-Way	Forested Vegetation	• Vegetation loss → soil erosion → increased turbidity, decreased water quality → effects spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	Where understory vegetation within an UCSA is disturbed/damaged during construction, PCGP will implement appropriate erosion control and restoration measures as described in the ECRP (i.e., scarification, seeding, replanting, etc.). The appropriate mitigation measures will be determined by the EI or PCGP's authorized representative.
			Where feasible/practical, as determined by the EI or PCGP's authorized representative, cribbing materials (i.e., slash, down wood materials, etc.) that roll beyond equipment reach from the construction right-of-way would be retrieved/pulled back on to the construction right-of-way using cables and chokers to winch or pull the material back onto the construction right-of-way during restoration using standard on-site restoration equipment (i.e., dozers/track hoes). The EI would determine those areas where the recovery of the cribbing material would cause more resource damage than leaving the material in place for decomposition and nutrient recycling.
		• Introduction of pathogen/parasite → decreased revegetation, increased loss of existing trees → degraded habitat → adverse effects to survival, reproduction	Clear construction right-of-way in fir stands (fir engraver) using directionally felled timber; minimize slash accumulations.
			Minimize damage to adjacent trees (flathead borer) when clearing/maintaining right-of-way.
			Infested trees (western pine beetle) will be removed.
			Harvesting, burning and/or girdling trees infested with dwarf misletoe.
			Dry borax will be applied to freshly cut stumps and wounds on trees adjacent to construction right-of-way in infested areas (annosus root, butt rot).
			PCGP will implement the following in areas with Port-Orford-cedar (POC) whether stands are infested or not: 1) pressure wash equipment and vehicles prior to entering uninfested POC areas and prior to departure of infested POC areas with water; 2) limit ground-disturbing construction and maintenance activities to the dry season, if feasible; and 3) prevent use of right-of-way in POC areas from OHV recreationists by blocking access.

Location	Resource	Potential Impact Pathway	Conservation Measure
Construction Right-of-Way	Forested Vegetation	• Introduction of pathogen/parasite → decreased revegetation, increased loss of existing trees → degraded habitat → adverse effects to survival, reproduction	Within areas of POC impacted by the Pipeline project, PCGP will revegetate using POC-resistant strains of seedlings if recommended and available for the affected seed zone.
			Equipment and vehicles will be cleaned prior to moving them onto the construction right-of-way to prevent the import and spread of weeds and that vegetation clearing and grading equipment be cleaned if they pass through known noxious weed infestations. Pressure washing may be used to clean equipment, if deemed necessary.
			The EI will approve the appropriate cleaning station location(s) and will be responsible for determining the effective cleaning method for the grading/clearing equipment (including power washing, if necessary).
	Forests - Wetlands - Waterbodies	• Logging → soil erosion → increased turbidity, decreased water quality → effects spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	Any debris entering a waterbody as a result of felling and yarding of timber will be removed as soon as practical after entry into the waterbody and shall be placed outside the 100-year floodplain where practical. Logs and slash will not be yarded across perennial streams unless fully suspended.
			During logging/clearing operations, the direction of log or slash movement shall be conducted to minimize sediment delivery to waterbodies, including intermittent streams.
			Logs firmly embedded in the bed or bank of waterbodies that are in place prior to felling and yarding of timber will not be disturbed, unless they prevent trenching and fluming operations.
	Marbled Murrelet and Northern Spotted Owl	• Noise → displacement from nesting habitat → nest predation → adverse effect to survival, reproduction	Artificial noise barriers may be utilized during the HDDs to minimize noise and maintain noise levels within regulation standards.
			Use of alternate mechanical methods to attain trench depth; when blasting is necessary, it will be underground and blasting mats will be used.
			PCGP proposes to comply with the “critical nesting period” of March 1 – July 15 (for NSO) to the extent possible as provided in Table 3 in appendix Q. This applies to timber removal, pipeline construction or blasting, or helicopter use in any instance where the activity is within 0.25 mile of an NSO nest.
		• Predator attractants → increased nest predation → adverse effect to reproduction	Appropriate trash disposal will be practiced.
	Marbled Murrelet Critical Habitat and/or Occupied/Suitable Habitat	• Loss of suitable nesting trees → decreased reproduction	Mark trees with nest platforms or potential, and try to avoid removal of these trees.

Location	Resource	Potential Impact Pathway	Conservation Measure
Construction Right-of-Way	Riparian Habitats	• Degraded water quality → effects to spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	Generally slash will not be stored in UCSAs in riparian reserves on federal lands or within riparian buffers on non-federal lands.
	Soil - Fisheries and Aquatic Resources	• Soil erosion → increased turbidity, decreased water quality → effects spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	Each EI will locate dewatering structures and slope breakers to ensure they will not direct water into known cultural resource sites or locations of sensitive species or any wetland or waterbody.
			Each EI will ensure the repair of all ineffective temporary erosion control measures as soon as possible but not longer than 24 hours after identification.
		• Soil erosion → decreased potential for vegetation restoration	After timber clearing operations, the EI will determine appropriate temporary BMPs that will be installed to minimize potential erosion and sedimentation impacts that may include use of slash/brush piles at appropriate locations to prevent off-site runoff and sedimentation.
			After timber clearing operations, the EI will determine appropriate temporary BMPs that will be installed to minimize potential erosion and sedimentation impacts that may include installation of temporary slope breakers at appropriate locations and at spacings to shorten slope lengths, prevent concentrated flow and to divert runoff to stabilized areas.
			After timber clearing operations, the EI will determine appropriate temporary BMPs that will be installed to minimize potential erosion and sedimentation impacts that may include installation of silt fences or straw bale sediment barriers.
			After timber clearing operations, the EI will determine appropriate temporary BMPs that will be installed to minimize potential erosion and sedimentation impacts that may include temporary seeding (using appropriate quick-germinating cover crops such as annual ryegrass or other appropriate quick-growing temporary cover species; this measure would not occur on federal lands where introduced species are restricted).
			After timber clearing operations, the EI will determine appropriate temporary BMPs that will be installed to minimize potential erosion and sedimentation impacts that may include mulching of areas that do not have sufficient cover to ensure effective surface cover.
			Grading of the construction right-of-way in upland areas shall be limited to the minimum required to provide a safe working area necessary to construct the pipeline.
		• Introduction of invasive species → decreased revegetation potential → degraded habitat → adverse effects to survival, reproduction	Each EI will approve of any imported soils for use in agricultural and residential areas if required and verify that the soil is certified free of noxious weeds and soil pests.

Location	Resource	Potential Impact Pathway	Conservation Measure
Construction Right-of-Way	Soil - Fisheries and Aquatic Resources	• Introduction of invasive species → decreased revegetation potential → degraded habitat → adverse effects to survival, reproduction	The straw bales utilized for sediment barriers will be clean straw that does not contain noxious weeds or other undesirable species that could interfere with the existing land use.
		• Vegetation loss → soil erosion → increased turbidity, decreased water quality → effects spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	Each EI will identify areas that should be given special attention to ensure stabilization and restoration after the construction phase.
			Temporary erosion controls will be installed immediately after initial disturbance (clearing) and will be properly maintained throughout construction and reinstalled as necessary until replaced by permanent erosion controls or restoration is complete.
			Silt fence will be used where sediment barriers are required parallel to the right-of-way.
			Sediment barriers placed on the down slope side of the right-of-way where it traverses steep side slopes.
	Soil - Water - Vegetation	• Hazardous/toxic substances → mortality of fish and other aquatic species • Hazardous/toxic substances → toxic substance in soil → decreased revegetation potential → degraded habitat → adverse effects to survival, reproduction	Oil absorbent mat pads or diapers will be placed around the equipment's fuel tank opening to absorb any drips/spills.
			Drip pans or other suitable containment/liner materials (i.e., plastic sheeting) will also be placed under equipment to ensure that any fuel spills or drips are contained. Under no circumstances will the contractor allow material from the liner to spill on the ground surface. All waste fluids will be removed from the site and disposed of properly.
			Containment structures may be constructed out of strawbales and lined with a minimum of 2 plastic sheets (6 mil plastic) that drape to the ground outside the structure. However, containment structures for small portable pumps/generators may consist of plastic basins such as a child's pool or other similar containers as approved by the EI. The basins shall not be reused if cracked, punctured or contaminated with oil or grease.
			Fuel for pumps and generators will be carried in by hand and removed immediately after fueling takes place. Under no circumstances will fuel or lubricants be stored within the containment structure.

Location	Resource	Potential Impact Pathway	Conservation Measure
Construction Right-of-Way	Soil - Water - Vegetation	• Hazardous/toxic substances → mortality of fish and other aquatic species • Hazardous/toxic substances → toxic substance in soil → decreased revegetation potential → degraded habitat → adverse effects to survival, reproduction	"Heavy Duty" garbage bags for disposal of used materials and a supply of 40 absorbent pads will be kept in the containment structure.
			When the containment structure is dismantled, the plastic sheeting will be placed in trash bags and immediately hauled away for disposal.
			The contractor will visually inspect all equipment for leaks and repair all leaks prior to moving the equipment onto the construction right-of-way.
			Any leaks that develop while equipment is in use will be repaired immediately. The equipment will not be utilized until repairs are completed.
			Contain spills immediately to reduce spill to the smallest area possible and follow the procedures in the SPCC plan
			All fuel storage tanks/hazardous material containers 55-gallons or greater will be located inside earthen-diked berms designed to hold 1.5 times the capacity of the largest tank/container within the berm. The diked area will incorporate a 12-mil (or thicker) liner in its design. The tank will be set directly on the liner. Non-abrasive padding may be used under the tank to provide stability as long as the integrity of the liner is not compromised. The purpose of this liner is to protect soils located under the tank or used in dike construction from contamination. Any spilled materials located on the liner will be removed immediately and prior to dismantling the tank and dike.
			The contractor will designate a single individual who will be responsible for maintenance of all emergency response/spill response materials and equipment.
			Spill absorbent material and booms of adequate size and number to handle a spill of fuel or other hazardous materials will be stored at a central location(s) readily accessible to each construction crew for immediate response in case of emergency. The location of these stockpiled materials will be at designated locations to be determined prior to the start of construction. If these materials are not stockpiled at the site as required by this plan, construction will not be allowed to commence.

Location	Resource	Potential Impact Pathway	Conservation Measure
Construction Right-of-Way	Soil - Water - Vegetation	• Hazardous/toxic substances → mortality of fish and other aquatic species • Hazardous/toxic substances → toxic substance in soil → decreased revegetation potential → degraded habitat → adverse effects to survival, reproduction	At a minimum the following spill control materials will be included in each centrally located spill response kit stockpile: Six bales (200 count each) of absorbent mat pads (Pigalog MAT423 or equivalent); Four boxes of absorbent spaghetti strips (Pigalog PLP402 or equivalent); 4 boxes of absorbent pulp (Pigalog SA8010 or equivalent); 300 feet of 5 or 8-inch diameter absorbent skimmer boom material (Pigalog BOM 408 or equivalent); 20 straw bales; 10 packages of garden size, 6 mil, polyethylene bags; Ten pair of liquid proof gloves compatible with materials on site; and One, 55-gallon polyethylene open-head drum
			Absorbent pads, spaghetti, pulp, and booms will be of the type that is capable of absorbing petroleum products but repels water. (The above list may be modified by the EI in consultation with PCGP's Environmental Representative to better fit the needs of the Pipeline project).
			A minimum of 40 absorbent pads will be kept on each piece of equipment. When used, they will be properly disposed of and replaced immediately.
			The contractor will stockpile bales of straw on or adjacent to the construction right-of-way for the sole purpose of emergency response. After construction is complete, the unused straw may be utilized as mulch in upland areas during reclamation.
			Contractor foremen and EIs will keep a minimum of one bale (200 count) of absorbent pads in their vehicles
			All spilled liquids and contaminated materials will be cleaned up immediately. Restrict spills to the containment area if possible by stopping or diverting flow from the oil/fuel tank. Every effort shall be made to prevent the seepage of oil into soils and waterways.
			Cleanup of contaminated materials includes the removal of all soils which have been subjected to the pollutant. If necessary, the EI may require the contractor to collect samples of soil strata below the spill to assure that all contaminated soils have been removed from the site. For larger quantities of soils, construct temporary waste piles using plastic liners. Plastic-lined roll-off bins shall be leased for storing this material as soon as feasible.
			All materials used to clean-up the spill will be double bagged and inspected prior to removal from the spill site. All vegetation contaminated by the spilled material will be similarly collected, bagged and disposed at an approved disposal facility.
			Dispose of oily soils and contaminated articles in accordance with applicable federal, state and local regulations. Decontaminate all emergency response equipment used during the incident before storing.
			The Contractor shall be responsible for the proper disposal of wastes generated by their actions, including obtaining applicable authorization, registrations, and/or EPA/State I.D. Numbers.

Location	Resource	Potential Impact Pathway	Conservation Measure
Construction Right-of-Way	Soil - Water - Vegetation	• Hazardous/toxic substances → mortality of fish and other aquatic species • Hazardous/toxic substances → toxic substance in soil → decreased revegetation potential → degraded habitat → adverse effects to survival, reproduction	Response to Hydrostatic Test Failure - All available personnel will be put into groups of 2 or 3. The groups will be strategically located along the test section. Each group will have a radio, a minimum of one bale (200 count) of absorbent pads, 200 feet of double absorbent booms, 10 fence posts, 1 post driver, 200 feet of rope, and a knife. Radio communication will be used to alert others in the event of a rupture. Booms and pads will be used at the site and downstream of the rupture on any waterbody. The EI will take water samples to check for oil and grease residues from the rupture pit and downstream of each set of booms installed. A proper chain of custody form will be completed and samples sent to a local laboratory for analysis.
			Concrete trucks will not be washed on the right-of-way. Concrete trucks will be washed at the contractors' yards or, if necessary, at a suitable, approved upland location associated with aboveground facilities.
		• Multiple disturbances associated with defective pipeline → soil erosion → decreased potential for vegetation restoration	After backfilling, the pipeline will be strength and leak tested according to 49 CFR Part 192 to ensure that the system is capable of operating at the design pressure. Should a leak or break occur, the line would be repaired and retested until the required specifications are achieved.
			The pipeline will be buried with a minimum of 3 feet of cover in non-consolidated rock. The steel pipe used will be of sufficient strength and thickness to mitigate the risk of puncture from tree limbs.
	Soil Conservation - Water Quality	• Soil erosion → decreased potential for vegetation restoration	Where standing stumps occur on the right-of-way, PCGP will use grinders as necessary to construct a safe level working plane to minimize grading and soil disturbance.
			Temporary erosion control measures will be maintained until successful revegetation has been achieved.
			Temporary erosion control measures will be installed immediately after clearing and prior to grading (initial soil disturbance). (Installation of temporary erosion control measures prior to clearing/logging is ineffective because trees and brush must be cleared to allow proper installation of the BMPs, and the BMPs are typically damaged or destroyed during the clearing activities and must then be re-installed.)
			Whenever possible, the EI will inspect erosion control measures in advance of predicted storm events and take preventative measures to minimize the potential for off right-of-way sedimentation.
			Temporary slope breakers may be constructed of materials such as soil, silt fence, staked straw bales, straw wattles, or sand bags. The outfall of each temporary slope breaker will be to a stable, well-vegetated area or to an energy-dissipating device at the end of the slope breaker and off the construction right-of-way.

Location	Resource	Potential Impact Pathway	Conservation Measure
Construction Right-of-Way	Soil Conservation - Water Quality	• Soil erosion → decreased potential for vegetation restoration	PCGP will install temporary slope breakers on all slopes greater than 5 percent according to the spacing in the table, below unless the EI determines that a closer spacing is required: **Slope Percent Spacing (feet)** 0-5 None Required >5-15 300 >15-30 200 >30 100
			Temporary slope breakers will also be installed as determined necessary by PCGP's EI in skid trails or cable logging haul routes (roads) to minimize erosion potential from these areas during clearing operations.
			PCGP will apply mulch on all disturbed slopes before seeding if it becomes necessary to delay final cleanup, including final grading and installation of permanent erosion control measures, beyond 20 days (10 days in residential areas) after the trench is backfilled in a specific area
			Mulch will also be applied if construction and restoration activities are interrupted for extended periods, such as when seeding cannot be completed due to seeding period restrictions. In these areas mulch will be applied uniformly over the area to cover the ground surface at a rate of two tons/acre of straw or hay or its equivalent
			The mulch will consist of certified weed-free straw or wood fiber hydromulch.
			All graded areas associated with pipeline construction will be regraded and recontoured as feasible to blend into the surrounding landscape and to reestablish natural drainage patterns. The emphasis during recontouring will be to return the entire right-of-way to its approximate original contours, to stabilize slopes, control surface drainage, and to aesthetically blend the right-of-way into the adjacent contours. However, slopes will not be reconstructed at gradients exceeding 2H:1V because even well compacted fill slopes are considered marginally stable at gradients exceeding 2H:1V.

Location	Resource	Potential Impact Pathway	Conservation Measure
Construction Right-of-Way	Soil Conservation - Water Quality	• Soil erosion → increased turbidity, decreased water quality → effects spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	On federal lands, in the event that construction activities are extended beyond the dry season (i.e., May 1 to October 31), soil disturbance in excess of 0.5 acre will have effective ground cover provided (amount of cover necessary for maintaining a disturbed site in a low hazard category for erosion) or other effective BMPs will be utilized as discussed in this ECRP to prevent sedimentation beyond the approved construction right-of-way and associated temporary extra work areas or into wetlands and waterbodies.
			Discharge from hydrostatic testing operations will be performed so that erosion and sedimentation are minimized by selecting appropriate erosion control devices. Straw bale barriers would be anchored in place and designed to intercept and retain sediment as well as decrease the velocity of sheet flow from hydrostatic discharge. The rate, temperature, and quality of discharge will be monitored to stay in compliance with permit conditions.
			Upon completion of a segment hydrostatic test, the water will be cascaded (pumped to the next segment) whenever possible to be re-used for hydrostatic testing purposes. When discharged, the test water will be released adjacent to the construction right-of-way through an energy-dissipating device and a straw bale filter or sediment bag.
			Each EI will locate dewatering structures and slope breakers to ensure they will not direct water into known cultural resource sites or locations of sensitive species.
			Each EI will ensure the repair of all ineffective temporary erosion control measures as soon as possible but not longer than 24 hours after identification.
			Sediment barriers will be properly maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench).
			Equipment mats are comprised of wood and serve to distribute the weight of the equipment. Rocks, soil imported from outside the wetland, tree stumps, or brush riprap will not be used to support equipment on the construction right-of-way.
			If trees are utilized as timber riprap or equipment mats to support equipment in saturated areas on the right-of-way, they will be obtained from clearing operations and will not be cut outside of the approved construction work areas.
			Where timber riprap is used, PCGP will attempt to use no more than two layers of riprap to support equipment on the construction right-of-way.
			All materials utilized to support equipment on the construction right-of-way will be removed after construction.

Location	Resource	Potential Impact Pathway	Conservation Measure
Construction Right-of-Way	Soil Conservation - Water Quality	• Soil erosion → increased turbidity, decreased water quality → effects spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	The duration of construction-related disturbance within wetlands will be minimized and construction equipment operating in wetland areas limited to that needed to clear the right-of-way, dig the trench, fabricate and install the pipe, backfill the trench, and restore the right-of-way. All other construction equipment will use access roads located in upland areas to the maximum extent practicable.
	Soil - Fisheries and Aquatic Resources	• Soil Compaction →soil erosion → decreased potential for vegetation restoration	After timber clearing operations, the EI will determine appropriate temporary BMPs that will be installed to minimize potential erosion and sedimentation impacts that may include scarification of compacted surface to promote infiltration and reduce run-off.
			In isolated, rugged topographic areas with poor access, helicopter logging may be used.
			When log skidding is used, low-ground pressure vehicles will be used as much as possible, soil duff layer removal will be avoided, designated skid trails will be used to restrict soil compaction to a smaller area of the right-of-way, compacted landing, yarding, and load-out areas used for timber harvesting will be scarified after use and prior to rainy season where there is potential for waterbody sediment delivery; scarification will promote infiltration, and minimize run-off and potential sedimentation.
			Rutting, compaction, and structural damage will be minimized by scheduling the majority of construction activities during the dry season, from May-October; except for Klamath Basin where winter construction is proposed to minimize impacts to agricultural activities and when most irrigation canals will be dry
			FS indicated that unless topsoil is replaced and decompacted, displaced topsoil is an "unmitigable" loss of soil productivity; FS recommends road restoration, skid trails, and landings.
	Vegetation - Wildlife - Soil	• Introduction of invasive species → decreased revegetation potential → degraded habitat → adverse effects to survival, reproduction	For weeds: Pretreatment will primarily be accomplished by mechanical operations by mowing to the ground level. It may also be accomplished through hand-pulling methods and spot treatment of herbicides. Infested areas will be cleared in a manner to minimize transport of weed seed, roots, and rhizomes or other vegetative materials and soil from the site down the construction right-of-way.
		• Increased human access → increased disturbance, poaching → decreased habitat suitability → adverse effect to survival, reproduction	OHV barriers will be installed; they may include dirt/rock berms, log barriers, signs, locked gates, and slash from clearing.
			The bridges proposed by PCGP will be temporary and are for construction equipment access and are to be used by construction personnel only. The temporary construction bridges will not be used for public thoroughfare and the public will not be allowed access to the temporary construction bridges.

Location	Resource	Potential Impact Pathway	Conservation Measure
Construction Right-of-Way	Wooded Vegetation	• Introduction of invasive species → decreased revegetation potential → degraded habitat → adverse effects to survival, reproduction	Prior to transporting construction equipment to the construction right-of-way, all equipment will be inspected by the EI to ensure that it is clean and free of potential weed seed or sources (i.e., soil roots or rhizomes). The EI will determine if power washing is necessary.
			Prior to transporting construction equipment to the construction right-of-way, all equipment will be inspected by the EI to ensure that it is clean and free of potential weed seed or sources (i.e., soil roots or rhizomes). The EI will determine if power washing is necessary.
			In areas where infestations have been identified or noted in the field, the contractor will stockpile cleared vegetation and salvage topsoil or graded material adjacent to the area from which they are stripped to eliminate the transport of soil-born noxious weed seeds, roots, or rhizomes. Infested areas and cleaning station locations will be mapped to ensure that these areas are monitored during construction and to ensure that these weeds are controlled and not spread.
			PCGP will use certified weed-free seed during seeding operations as indicated in Section 10.9 of the ECRP. In addition, PCGP will use certified weed-free straw for mulch and sediment barriers, dewatering structures, or other uses along the right-of-way.
			In most cases, if an herbicide is used for control, it would be used in combination with other methods. Where weed control is necessary, PCGP will employ hand and mechanical methods (pulling, mowing, disking, etc,) to prevent the spread of potential weed infestations.

Table 3A
Conservation Measures Proposed to Avoid, Minimize, and Mitigate Potential Impacts after Construction of the Marine Facilities

Location	Resource	Potential Impact Pathway	Conservation Measure
Coos Bay Estuary	Eelgrass beds, Essential Fish Habitat (EFH)-pelagic, groundfish, salmon, and other fish, and invertebrate species	• Habitat disturbances → increased turbidity, decreased water quality, effects to forage (vertebrate, invertebrate) species → adverse effects to survival, reproduction	Approximately, a 3:1 replacement mitigation ratio for eelgrass impacts will be provided at the Eelgrass Mitigation site. Of the 9.3-acre mitigation site, approximately 6 acres of existing intertidal habitat will be enhanced to support a minimum of 2 acres of medium-density or higher eelgrass beds and 4 acres of low-density eelgrass beds.
	Algal flats and unvegetated sand-mud flats, EFH-pelagic, groundfish, salmon, and other fish, and invertebrate species		Approximately, a 3:1 replacement mitigation ratio for impacts to algal flat and unvegetated sand/mudflat will be provided at the Kentuck Project site. Mitigation activities will establish a combination of native estuarine habitats (i.e., salt marsh, tidal sand/mudflats, and tide channels) and freshwater wetland habitat types (i.e., palustrine forested, scrub-shrub, and emergent) that will interact to provide a holistic coastal ecosystem. Mitigation activities will also result in an uplift in ecosystem functions and are expected to be particularly beneficial to coho salmon recovery.
	Shallow subtidal Habitat, EFH-pelagic, groundfish, salmon, and other fish, and invertebrate species		Approximately, a 3:1 replacement mitigation ratio for impacts to shallow subtidal water habitat in Coos Bay will be provided at the Kentuck Project site. Approximately 36.7 acres of deepwater habitat would be created within the boundary of the slip.

Table 3B
Conservation Measures Proposed to Avoid, Minimize, Mitigate Potential Impacts after Construction of the LNG Terminal

Location	Resource	Potential Impact Pathway	Conservation Measure
LNG Terminal	Forest, woodland, shrubland, and herbaceous associated habitats	• Vegetation loss → soil erosion → increased turbidity, decreased water quality • Introduction of invasive species → decreased revegetation potential → degraded habitat	Areas that are disturbed by temporary construction activities (i.e., will not be permanently affected by a facility component) will be stabilized using non-invasive native plant species, to the extent practical, to prevent erosion. Gravel and other suitable erosion control materials will be utilized at Ingram Yard.
	EFH-pelagic, groundfish, salmon, and other fish, and invertebrate species	• Soil erosion → increased turbidity, decreased water quality → juvenile rearing, migration → adverse effects to survival, reproduction	Restoration of areas disturbed by construction of LNG Terminal facility components will be stabilized to prevent erosion by planting non-invasive species, to the extent practical. Gravel and other suitable erosion control materials will be utilized at Ingram Yard.

Table 3C
Conservation Measures Proposed to Avoid, Minimize, Mitigate Potential Impacts after Construction of the Pipeline

Location	Resource	Potential Impact Pathway	Conservation Measure
Waterbodies Crossed	EFH-freshwater salmon, Fisheries and Aquatic Resources	• In-stream disturbance → increased turbidity, decreased water quality → effects spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	Clean gravel/cobbles will be placed in upper one-foot of trench backfill (variance has been requested where substrate is composed of fine sediment).
			Following installation of the pipeline, the stream bottom and banks will be returned to preconstruction contours, banks will be stabilized, and temporary sediment barriers will be installed before returning flow to the waterbody channel. Erosion control fiber fabric or matting will be installed on slopes adjacent to streams. The use of rip-rap is not anticipated, but if used would be limited to the areas where flow conditions preclude effective vegetation stabilization techniques. On some banks, depending on site-specific conditions, fiber rolls may also be installed to stabilize bank toes. The streambanks will be seeded and woody riparian vegetation planted for stabilization.
			Trench will be backfilled with the native material that was excavated from the trench; the upper 1-foot of the trench will be backfilled with clean gravel or native cobbles; stream bed profile will be restored to preexisting contours and grade conditions.
			Waterbody crossings will be stabilized and temporary sediment barriers will be installed within 24 hours of completion of backfilling. On dry open cut crossings (flume or dam and pump) streambed and streambank stabilization will be completed before returning flow to the waterbody channel.
			Any existing logs that are removed from waterbodies to construct the pipeline crossing will be returned to the waterbody after the pipeline has been installed, backfilling is complete, and during the time the streambanks are being restored. Where timber is removed at a crossing, LWD is intended to be placed as part of restoration. If the crossing is devoid of timber (e.g. previous clearcut area), then obtaining LWD and placing it at the crossing would be a mitigation action within the watershed.
Riparian Zones Crossed	EFH-freshwater salmon, Fisheries and Aquatic Resources	• Riparian habitat disturbances → Vegetation loss → soil erosion, mass wasting → increased turbidity, decreased water quality → effects spawning substrate, intergravel embryo development → adverse effects to survival, reproduction	Development of riparian strip at least 100 feet beyond OHWM on federal land within Riparian Reserves.
			The extended riparian planting area within Riparian Reserves would follow species placement that is correlated to moisture regime requirements based on wet, moist, or dry ground; the revegetation species will incorporate fast-growing native trees and shrubs and be placed closest to the bank top to provide canopy recovery; plantings of trees exceeding 15 foot tall growth will be placed no closer than 15 feet to the pipeline.
			Development of riparian strip at least 25 feet wide (on non-Riparian Reserve federally-managed lands).

Location	Resource	Potential Impact Pathway	Conservation Measure
Riparian Zones Crossed	EFH-freshwater salmon, Fisheries and Aquatic Resources	• Riparian habitat disturbances → Vegetation loss → soil erosion, mass wasting → increased turbidity, decreased water quality → effects spawning substrate, intergravel embryo development → adverse effects to survival, reproduction	PCGP will install erosion control fabric (such as jute or excelsior) on streambanks at the time of recontouring.
			Replant trees and shrubs in disturbed wetland and riparian areas; shrubs will be planted and allowed to grow within 5 feet of pipeline center and trees will not be planted within 15 feet of either side of pipeline centerline.
			Restore and enhance, using plantings of native shrubs, right-of-way riparian areas within permanent easement on a site-specific basis and in consultation with landowners.
			To mitigate impacts in wetland and riparian areas, PCGP will plant native shrubs and trees in areas where these species existed prior to construction.
		• Loss of riparian trees → loss of LWD recruitment → degraded habitat → adverse effects to survival, reproduction	Placement of large woody debris on banks and instream to provide shade, bank stability, and habitat for forage species. PCGP proposes to limit LWD to those streams from which timber is removed (see appendix O). Other locations would be treated with LWD only if concurred with by NMFS, ODFW and or FWS.
			Where LWD is acquired for instream habitat use, this material will only be obtained from the certificated construction limits and will be collected outside riparian zones to maintain root structure within the riparian zone.
		• Hazardous/toxic substances → mortality of fish and other aquatic species	Herbicides or pesticides will not be used for right-of-way vegetation maintenance in or within 100 feet of a waterbody.
Construction Right-of-way	Vegetation	• Introduction of invasive species → decreased revegetation potential → degraded habitat → adverse effects to survival, reproduction	Weed survey; pretreatment through mowing; clear infested areas to minimize spread.
	Soil	• Soil erosion → increased turbidity, decreased water quality → effects spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	The contractor will backfill and stabilize areas as soon as possible according to FERC's Upland Plan which specifies that final grading topsoil replacement and installation of permanent erosion control structures will be completed within 20 days of backfilling the trench.
			During the operational life of the Pipeline, PCGP's operational personnel will be responsible for any unforeseen erosion or potential mass movement that may occur.

Location	Resource	Potential Impact Pathway	Conservation Measure
Construction Right-of-way	Soil	• Soil erosion → increased turbidity, decreased water quality → effects spawning substrate, intergravel embryo development, juvenile rearing, migration → adverse effects to survival, reproduction	Materials in permanent storage sites will be shaped, drained, and revegetated; sites will not expand beyond authorized boundaries.
			Permanent slope breakers (waterbars) will be installed across the right-of-way on slopes to minimize erosion 1) by reducing runoff velocities, 2) by shortening slope lengths, 3) preventing concentrated flow, and 4) by diverting water off the construction.
			Slope breakers will be constructed with a two to eight percent outslope so that water does not pool or erode behind the breaker. Outflow will be diverted to a stable area off the right-of-way consistent with FERC's Upland Plan.
			Repair of erosion control structures will occur until the right-of-way has successfully revegetated and has stabilized. Once the site is stabilized, temporary erosion control measures will be removed.
			PCGP's Environmental Inspectors will inspect and ensure the maintenance of temporary erosion control measures at least daily in areas of active construction or equipment operation; on a weekly basis in areas with no construction or equipment operation; and within 24 hours of each 0.5 inch or greater rainfall, as indicated in Section 4.0 of the ECRP in appendix F. This inspection schedule is a FERC Plan specification (II. B. 13.).
		• Soil erosion → decreased potential for vegetation restoration	The emphasis during recontouring will be to return the entire right-of-way to its approximate original contours, to stabilize slopes, control surface drainage, and to aesthetically blend into the adjacent contours. Ruts and other scars will be regraded and all drainage ditches will be returned to their preconstruction condition.
			Construction right-of-way regraded to reestablish preconstruction contours and drainage patterns; cut slopes regraded for stability; installation of permanent slope breakers to shorten slope lengths and reduce concentrated run-off and promote infiltration.
			EIs will ensure restoration of contours and topsoil.
		• Structural damage → Loss of fertility and productivity of soils → vegetation loss → soil erosion, mass wasting, invasives	PCGP will stockpile topsoil from the trenchline separately from all subsoil and will replace the two horizons in the proper order during backfilling and final grading. Topsoil segregation will be performed over the trenchline in croplands.
			Prior to respreading the topsoil, the right-of-way will be scarified (where necessary as determined by the EI) by disking, ripping, or chiseling to loosen compacted areas from equipment traffic. Scarifying the subsoil will also promote water infiltration and improve soil aeration and root penetration.
			Topsoil segregation will be preformed in these areas to prevent mixing of the soil horizons in order to prevent the potential loss of soil fertility or incorporation of excess rock into the topsoil.

Location	Resource	Potential Impact Pathway	Conservation Measure
Construction Right-of-way	Soil	• Structural damage → Loss of fertility and productivity of soils → vegetation loss → soil erosion, mass wasting, invasives	Soils with steep slopes; when the slope approaches and exceeds 30 percent, waterbars, straw mulching, hydromulching or erosion control fabrics will be required.
			12 inches of topsoil salvaged in all unsaturated wetlands over the trenchline; stockpiled to prevent mixing; and returned to trench after construction.
			Soils that are rated as having reclamation sensitivity may require additional measures to reduce erosion and sedimentation, such as adaptive seed mixtures and implementation of revegetation practices such as scarification, and fertilization.
			All salvaged topsoil will be uniformly spread over the portions of the right-of-way from where the soil was salvaged.
			Following construction, gravel will be removed, subsoils will be ripped or scarified to reduce compaction, and topsoil will be replaced and reseeded.
	Forested vegetation	• Forested habitat disturbances → Vegetation loss → soil erosion, mass wasting → loss of fertility and productivity of soils → lower revegetation success → adverse effects to habitats	Manufactured wood fiber mulch will be applied as hydromulch at 2,000 pounds per acre during hydroseeding. A tackifier or bonding agent recommended by the manufacturer will be used to bond the wood fiber mulch to the soil surface.
			Mulch will be applied on all slopes where necessary to stabilize the soil. The source of mulch will be native wood mulch, straw, or hydromulch.
			PCGP will clean up excess rock to a condition similar to adjacent portions of the construction right-of-way unless the landowner and PCGP negotiate different stipulations.
			Where it is not feasible to pull the slash back onto the right-of-way after seeding, seeding in these areas (broadcast or hydroseeding) will occur with specifications to ensure adequate seed coverage. Scattering the slash across the right-of-way will return organic materials back to the right-of-way soil and provide effective ground cover for erosion control to minimize erosion.
			Prior to clearing operations, the EI or PCGP's authorized representative will flag large diameter trees on the edges of the construction right-of-way and temporary extra work areas to save/protect as green recruitment or habitat/shade trees.
		• Logging → loss of snag, downed woody debris → loss of habitat structural complexity → lower habitat function	Habitat diversity created in permanent right-of-way with rock and brush piles.

Location	Resource	Potential Impact Pathway	Conservation Measure
Construction Right-of-way	Forested vegetation	• Logging → loss of snag, downed woody debris → loss of habitat structural complexity → lower habitat function	Any timber cleared from the right-of-way that will be used for instream or upland wildlife habitat diversity structures will be stored on the edge of the right-of-way or in temporary extra work areas for later use during restoration efforts.
			Nesting boxes will be erected in riparian areas where trees that contained nesting cavities were removed. The boxes will become obsolete after 5 years, at which time snag creation should have developed adequate cavities in the local area to replace the boxes.
			Snags will be created in large trees left on the edge of the construction right-of-way by topping or girding trees and injecting heart-rot.
		• Forested habitat disturbances → Vegetation loss → soil erosion, mass wasting → loss of fertility and productivity of soils → lower revegetation success → adverse effects to habitats	Forested areas affected by construction that are outside of the 30-foot-wide operational pipeline easement will be replanted; several acres of hardwoods will be replanted within forested, shrub, and riverine wetlands.
			In several areas forested, regenerating, or clear cut stands removed during construction on big game winter range will be replanted with trees.
			In forest lands disturbed by the Pipeline project, PCGP will replant according to state and federal (BLM and Forest Service) reforestation requirements. Reforestation efforts will occur after construction between about December and April.
			Outside of this 30-foot maintained corridor, the permanent easement will not be maintained, allowing mature trees to reestablish.
	Soil - Water - Vegetation	• Vegetation loss → soil erosion, mass wasting → loss of fertility and productivity of soils → lower revegetation success → adverse effects to habitats	Disturbed areas will be seeded consistent with FERC's Upland Plan following final grading, weather and soil conditions permitting
			Fencing or other techniques to exclude cattle from sensitive areas to protect/enhance habitat.
			PCGP will use a standard fertilization rate of 200 pounds per acre bulk triple-16 fertilizer (16:16:16 - nitrogen, potassium and phosphorus) on all disturbed areas to be reseeded. The elemental nitrogen rate will also satisfy FERC's requirement to add nitrogen where wood chips are used as mulch.
			Seedbed preparation will be conducted, where necessary, immediately prior to seeding to prepare a firm seedbed conducive to proper seed placement and moisture retention. Seedbed preparation will also be performed to break up surface crusts and to eliminate weeds which may have developed between initial reclamation and seeding.
			Seed mixtures for revegetation on banks and construction right-of-way.
			Seeding will be conducted using a mechanical broadcast seeder, hydroseeder, or seed drill according to the guidelines in FERC's Upland Plan. The seed application rates will be as specified for drilling rates and doubled if using broadcast seeding. Fertilizer, lime, or mulch will not be used in wetlands.
			Spot reseeding will be performed if significant disturbance occurs during slash distribution; will take place by hand broadcasting or hydroseeding. Scattering the slash across the right-of-way will hinder off-highway vehicle ("OHV") traffic on the right-of-way and will act as a natural mulch to minimize erosion as well as organic matter for nutrient recycling to maintain long-term soil productivity.
		• Increased human access → increased disturbance, poaching → decreased habitat suitability → adverse effect to survival, reproduction	All temporary access roads will be reclaimed to preconstruction conditions upon completion of construction.