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Atlantic Richfield Company

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April 4, 2016

Mr. Steven Way
On-Scene Coordinator
Emergency Response Program (8EPR-SA)
US EPA Region 8
1595 Wynkoop Street
Denver, CO 80202-1129

Delivered via e-mail

Subject: March 2016 Monthly Progress Report
Rico-Argentine Mine Site – Rico Tunnels
Operable Unit OU01, Rico, Colorado

Dear Mr. Way,

This progress report describes activities conducted during the month of March 2016 at the Rico-Argentine Mine Site (site) and activities anticipated to occur during the upcoming month. These activities are organized by task as identified in the Removal Action Work Plan. This progress report is being submitted in accordance with Paragraph 35.a of the Unilateral Administrative Order for Removal Action (the "UAO"), dated March 17, 2011 (effective March 23, 2011).

ACTIVITIES FOR MARCH

This section describes significant developments during the preceding period including actions performed and any problems encountered during this reporting period. A summary of the St. Louis Tunnel (SLT) Discharge Constructed Wetland Demonstration (Wetland Demonstration) Treatability Study system performance is provided as Attachment 1 (including key performance indicator figures, tables, and a wetland plant update).

Site-Wide Activities

- Monitored site for any major security concerns and system functionality.
- Continued communications with the US Forest Service (USFS) related to site access and the Small Tracts Act application was re-submitted by AR on March 25, 2016. At the USFS' request, the revised application expands the tract described in the December 21, 2015 application to include the segment of the existing access road that is located adjacent to and immediately east of the original tract.
- AR continued communications with the USFS regarding the USFS' request for submittal of an application for Special Use Permit (SUP) authorization that describes planned response actions on public lands, including access and future work activities on the STA parcel. Assessed avalanche conditions for access onto the site following snow events.
- Maintained winter access routes.

Task A – Pre-Design and Ongoing Site Monitoring

- Performed additional evaluation of potential improvements to surface water flow data gathering and telemetry.
- Collected data from pressure transducers at DR-3, DR-6, AT-2, and BAH-01.
- Inspected the St. Louis Ponds System, pond water levels, free-board, and condition of outlet pipes and overflow spillways. Cleared debris from outlet structures. The pond network appears to be flowing well and in good condition.

Task B – Management of Precipitation Solids in the Upper Settling Ponds

- Continued diverting the majority of St. Louis Adit discharge to the Enhanced Wetland Demonstration. A slip stream flow of 50 to 60 gpm continues to be diverted to the Vertical and Horizontal Wetland Treatment Trains. Approximately 550 gpm was directed to the Enhanced Wetland Demonstration system for treatment and colonization.
- Sent all flow not diverted to any of the three treatment systems to Pond 15 for settling. This flow varied between 40 and 100 gpm.
- Continued planning for removal of remaining mining/mineral processing by-products from Upper Ponds.

Task C – Design and Construction of a Solids Repository

- Continued work for interim management of mining/mineral processing solids.

Task D – Hydraulic Control Measures for the Collapsed Area of St. Louis Tunnel Adit

- Continued monitoring at AT-2 and BAH-01 to assess water levels in the tunnel at approximately 70 ft and 145 ft in-by of the point at which flows daylight in the SLT channel.
- Continued assessment of additional long-term hydraulic controls based on recent data.
- Submitted the Request for Proposal (RFP) package to qualified drilling contractors for the installation of the 2 relief wells that are planned to be completed into the St Louis Tunnel.
- Continued work on final design of pumping system to control head in St. Louis Tunnel utilizing casing in relief wells to be installed as suction pipes for pumping system.
- Progressed with the design of relief well discharge piping system and completed the hazard review.
- Held a meeting with the pump design team and San Miguel Power Association (SMPA) representatives to determine optimal power supply for the proposed relief well pump system.
- Continued with design of flow control structure below debris plugs as back-up risk reduction at St. Louis Tunnel.

Task E – Source Water Investigations and Controls

- Continued Blaine Tunnel water depth and flow monitoring behind the Blaine Coffer Dam at the Blaine Tunnel Flume.

Task F – Water Treatment System Analysis and Design

- Completed H_2S monitoring throughout the month and calibrated H_2S monitors.
- Conducted maintenance and process adjustments on the Wetland Demonstration for performance improvement.
- Performed monthly sampling, monitoring, and OM&M activities at the Vertical and Horizontal Wetlands.
- Performed monthly sampling, monitoring, and OM&M activities at the Enhanced Wetland Demonstration (EWD).
- Continued review of the Horizontal Wetland rock drain matrix sampling results.

- Continued development of conceptual design for aeration of water upstream of the demonstration wetlands.

ACTIVITIES FOR UPCOMING MONTH

This section describes developments expected to occur during the upcoming reporting period, including a schedule of work to be performed, anticipated problems, and planned resolution of past or anticipated problems.

Site-Wide Activities

- Perform ongoing security observation of the site.
- Complete assessment of avalanche hazards along site access routes.
- Continue water flow management for St. Louis Adit discharge.
- Follow-up on the pending STA application with the USFS.
- Continue discussions with the USFS related to its request for submittal of an application for Special Use Permit authorization for response activities on public lands.
- Maintain winter access routes, if necessary.

Task A – Pre-Design and Ongoing Site Monitoring

- Inspect the St. Louis Ponds System, water levels, and free-board.

Task B – Management of Precipitation Solids in the Upper Settling Ponds

- Continue routing the majority (up to 550 gpm plus 50-60 gpm) of SLT discharge through the EWD, Vertical, and Horizontal Wetlands. Any excess will be directed to Pond 15.

Task C – Design and Construction of a Solids Repository

- Respond to CDPHE's review of the Solids Repository Construction Completion Report (once comments are received).
- Continue interim management of mining/mineral processing solids in the Interim Drying Facility and Pond 13.

Task D – Hydraulic Control Measures for the Collapsed Area of St. Louis Tunnel Adit

- Monitor water levels real-time in the SLT at AT-2 and BAH-01.
- Continue assessment of additional long-term hydraulic controls.
- Select qualified drilling contractor for relief wells.
- Initiate mobilization and procurement of equipment for drilling work area preparation.
- Continue design of relief well pumping system.
- Continue design of flow control structure.

Task E – Source Water Investigations and Controls

- Continue Blaine Tunnel water depth and flow monitoring behind the Blaine Coffer Dam at the Blaine Tunnel Flume.

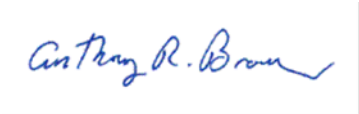
Task F – Water Treatment System Analysis and Design

- Continue scoping additional data needs as necessary related to treatment system alternatives.
- Continue reviewing and evaluating the Horizontal Wetland rock drain matrix sampling results.
- Perform monthly sampling, monitoring, and OM&M activities at the Vertical and Horizontal Wetlands.
- Perform monthly sampling, monitoring, and OM&M activities at the EWD.

- Prepare plans for installation of an oxidation unit to remove carbon dioxide and increase pH near historic St. Louis portal area.
- Continue development of conceptual design for aeration of water upstream of the demonstration wetlands.

If you have any questions, please feel free to contact me at (951) 265-4277.

Sincerely,



Anthony R. Brown
Project Manager
Atlantic Richfield Company

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E. Waecherlin, Esq., Davis Graham & Stubbs
A. Piggott, Esq., U.S. EPA
D. McCarthy, Copper Environmental
K. Sessions, AEEC
C. Hixenbaugh, AEEC
B. Florentin, Amec Foster Wheeler

file: Atlantic Richfield Rico Archives, La Palma, CA
AECOM Denver Project File

Attachment 1

Key Performance Indicators Figures

St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study

and Enhanced Wetland Demonstration

Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

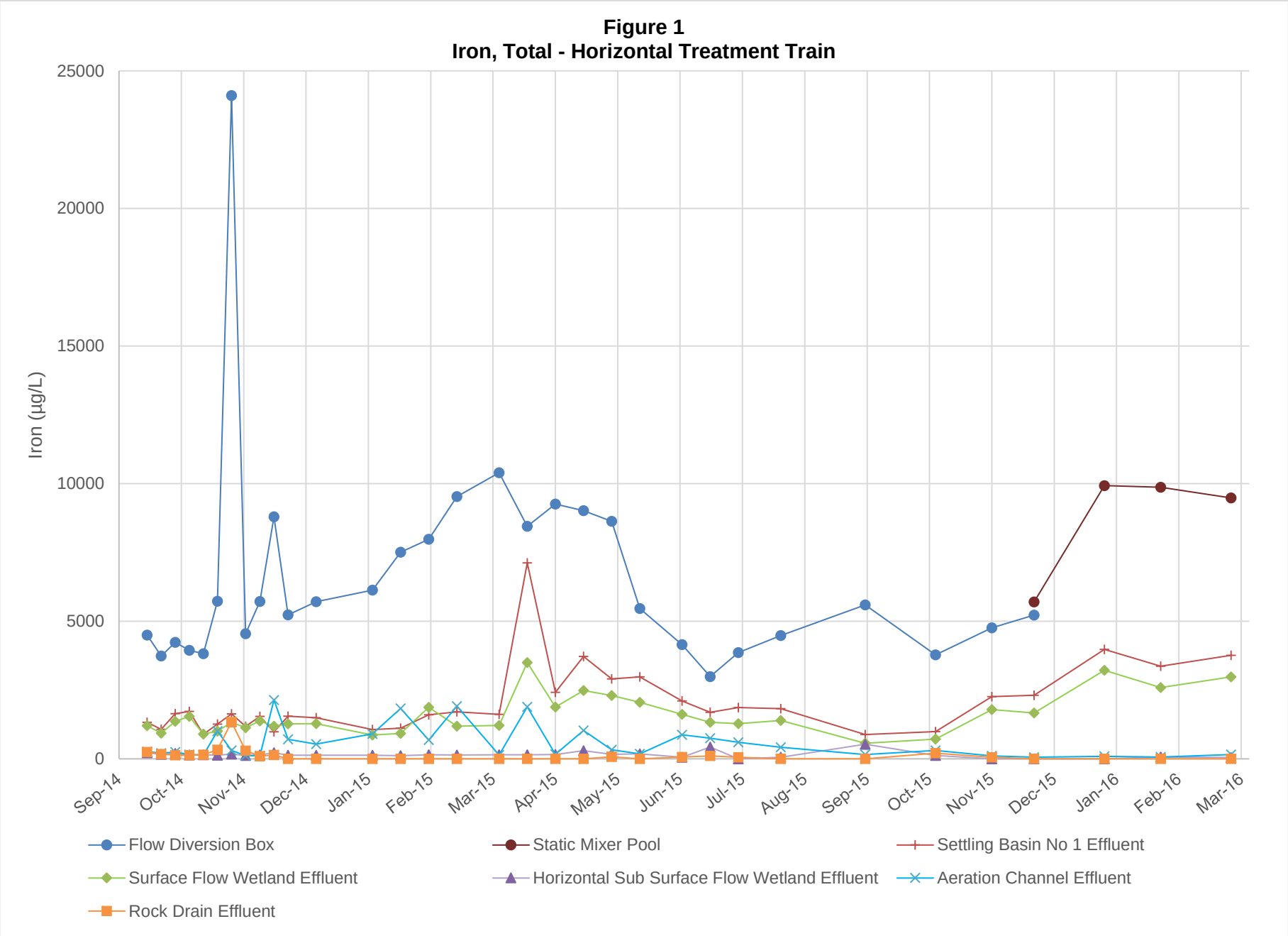


Figure 1
Iron, Total - Horizontal Treatment Train
Iron (µg/L)
25000
20000
15000
10000
5000
0
Sep-14
Oct-14
Nov-14
Dec-14
Jan-15
Feb-15
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Flow Diversion Box
Static Mixer Pool
Settling Basin No 1 Effluent
Surface Flow Wetland Effluent
Horizontal Sub Surface Flow Wetland Effluent
Aeration Channel Effluent
Rock Drain Effluent

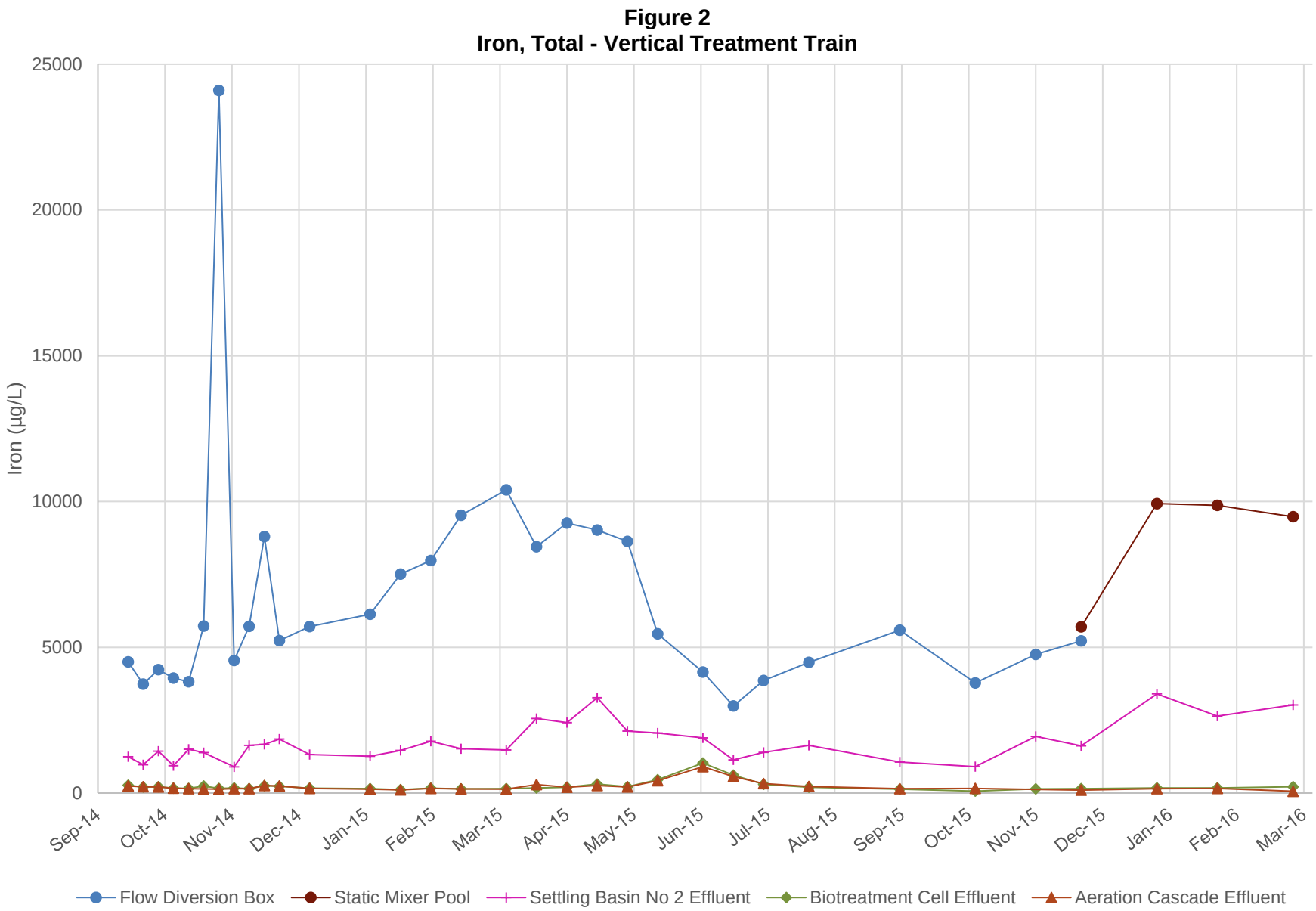


Figure 2
Iron, Total - Vertical Treatment Train
Iron (µg/L)
25000
20000
15000
10000
5000
0
Sep-14
Oct-14
Nov-14
Dec-14
Jan-15
Feb-15
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Flow Diversion Box
Static Mixer Pool
Settling Basin No 2 Effluent
Biotreatment Cell Effluent
Aeration Cascade Effluent

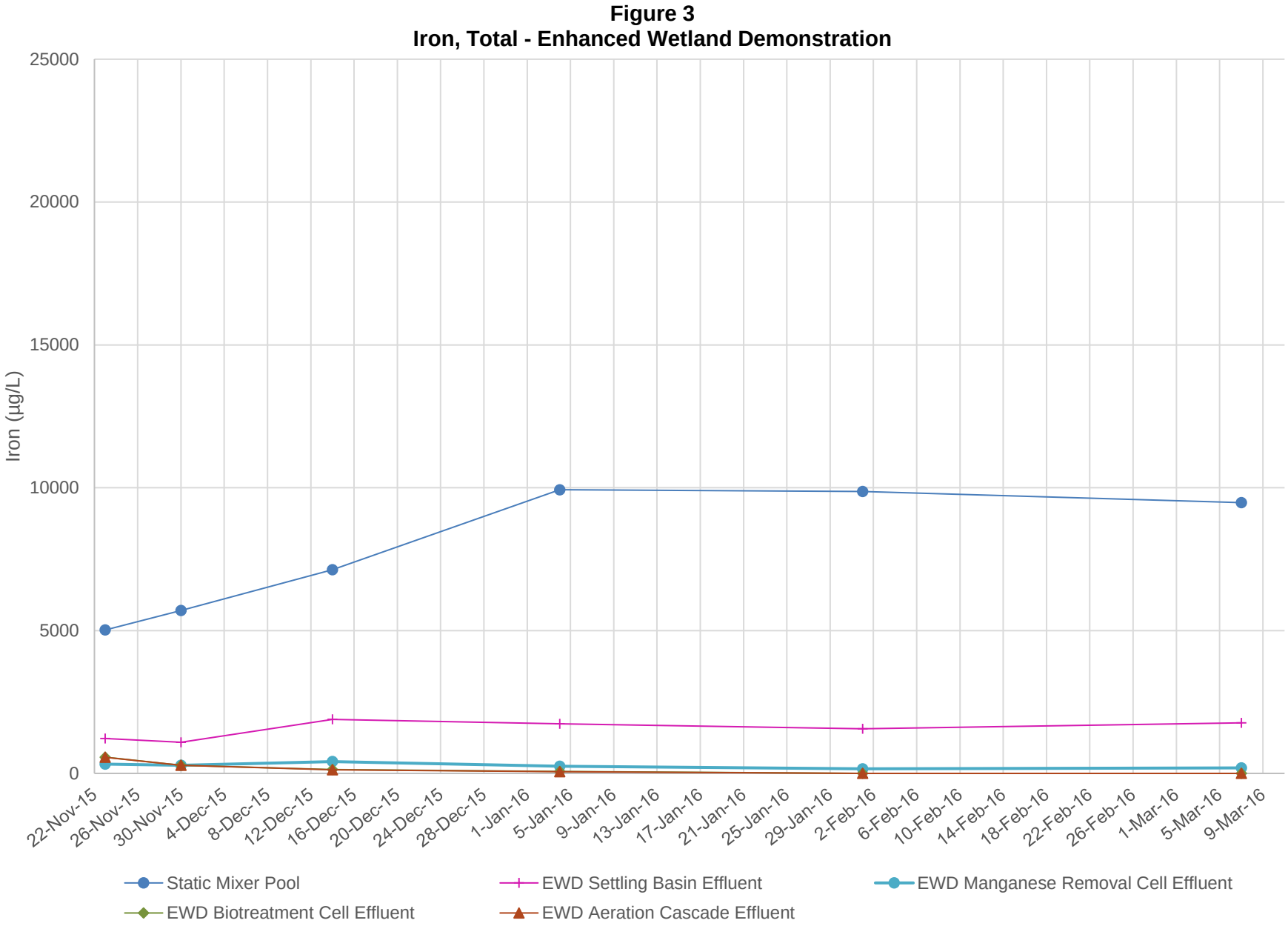


Figure 3
Iron, Total - Enhanced Wetland Demonstration
Iron (µg/L)
25000
20000
15000
10000
5000
0
22-Nov-15
26-Nov-15
30-Nov-15
4-Dec-15
8-Dec-15
12-Dec-15
16-Dec-15
20-Dec-15
24-Dec-15
28-Dec-15
1-Jan-16
5-Jan-16
9-Jan-16
13-Jan-16
17-Jan-16
21-Jan-16
25-Jan-16
29-Jan-16
2-Feb-16
6-Feb-16
10-Feb-16
14-Feb-16
18-Feb-16
22-Feb-16
26-Feb-16
1-Mar-16
5-Mar-16
9-Mar-16
Static Mixer Pool
EWD Settling Basin Effluent
EWD Manganese Removal Cell Effluent
EWD Biotreatment Cell Effluent
EWD Aeration Cascade Effluent

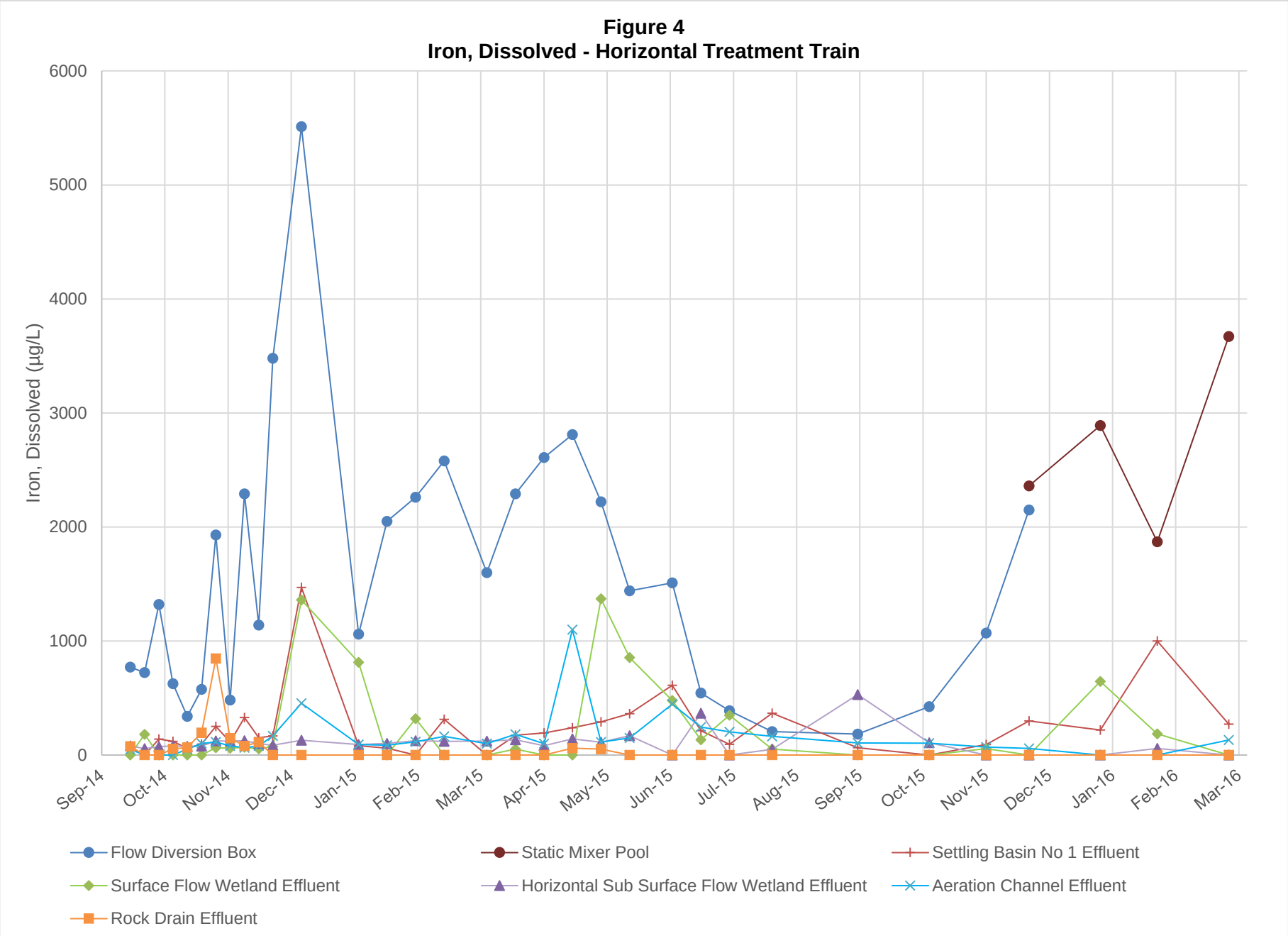


Figure 4
Iron, Dissolved - Horizontal Treatment Train
Iron, Dissolved (µg/L)
6000
5000
4000
3000
2000
1000
0
Sep-14
Oct-14
Nov-14
Dec-14
Jan-15
Feb-15
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Flow Diversion Box
Static Mixer Pool
Settling Basin No 1 Effluent
Surface Flow Wetland Effluent
Horizontal Sub Surface Flow Wetland Effluent
Aeration Channel Effluent
Rock Drain Effluent

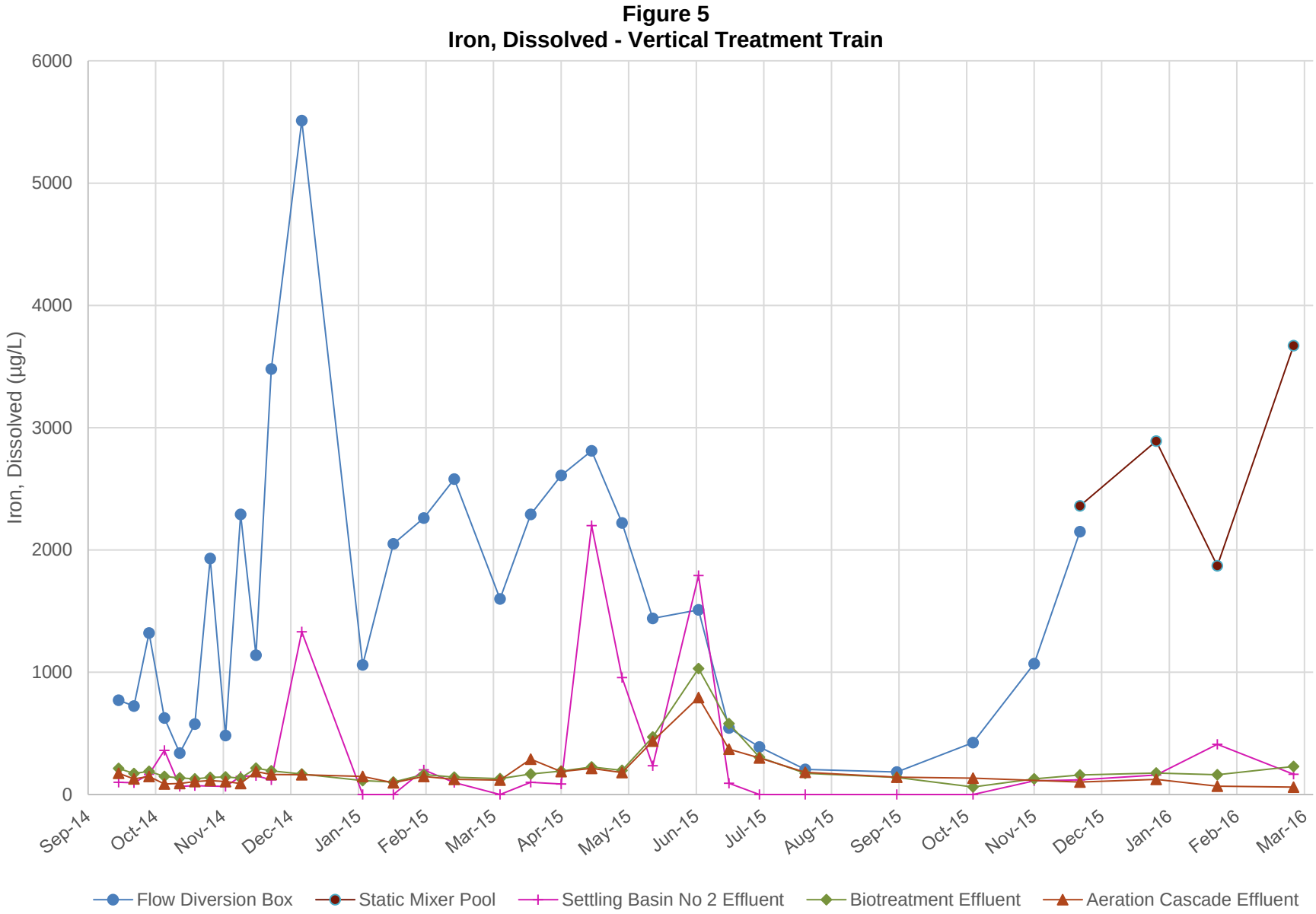


Figure 5
Iron, Dissolved - Vertical Treatment Train
Iron, Dissolved (µg/L)
6000
5000
4000
3000
2000
1000
0
Sep-14
Oct-14
Nov-14
Dec-14
Jan-15
Feb-15
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Flow Diversion Box
Static Mixer Pool
Settling Basin No 2 Effluent
Biotreatment Effluent
Aeration Cascade Effluent

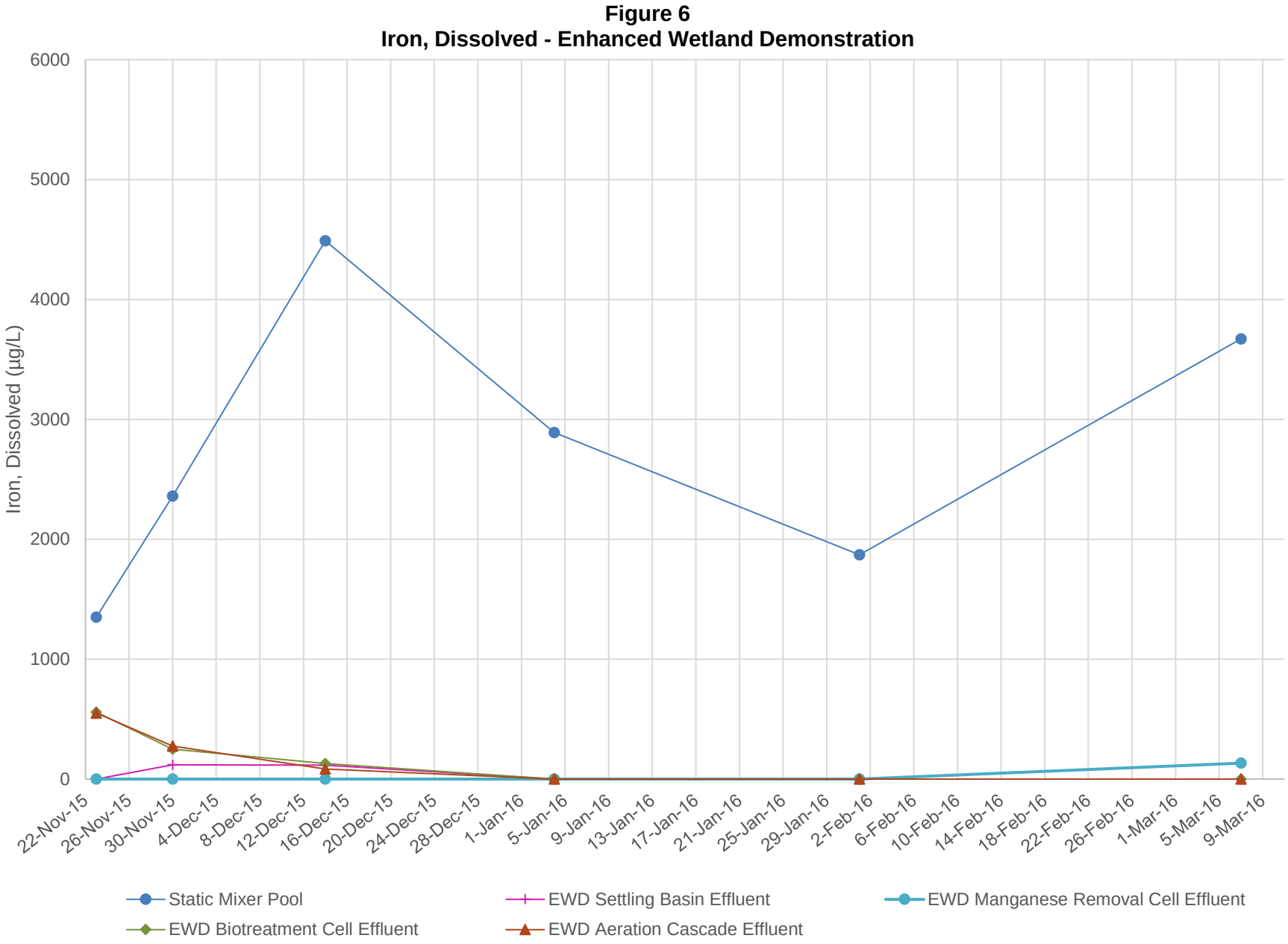


Figure 6
Iron, Dissolved - Enhanced Wetland Demonstration
Iron, Dissolved (µg/L)
6000
5000
4000
3000
2000
1000
0
22-Nov-15
26-Nov-15
30-Nov-15
4-Dec-15
8-Dec-15
12-Dec-15
16-Dec-15
20-Dec-15
24-Dec-15
28-Dec-15
1-Jan-16
5-Jan-16
9-Jan-16
13-Jan-16
17-Jan-16
21-Jan-16
25-Jan-16
29-Jan-16
2-Feb-16
6-Feb-16
10-Feb-16
14-Feb-16
18-Feb-16
22-Feb-16
26-Feb-16
1-Mar-16
5-Mar-16
9-Mar-16
Static Mixer Pool
EWD Settling Basin Effluent
EWD Manganese Removal Cell Effluent
EWD Biotreatment Cell Effluent
EWD Aeration Cascade Effluent

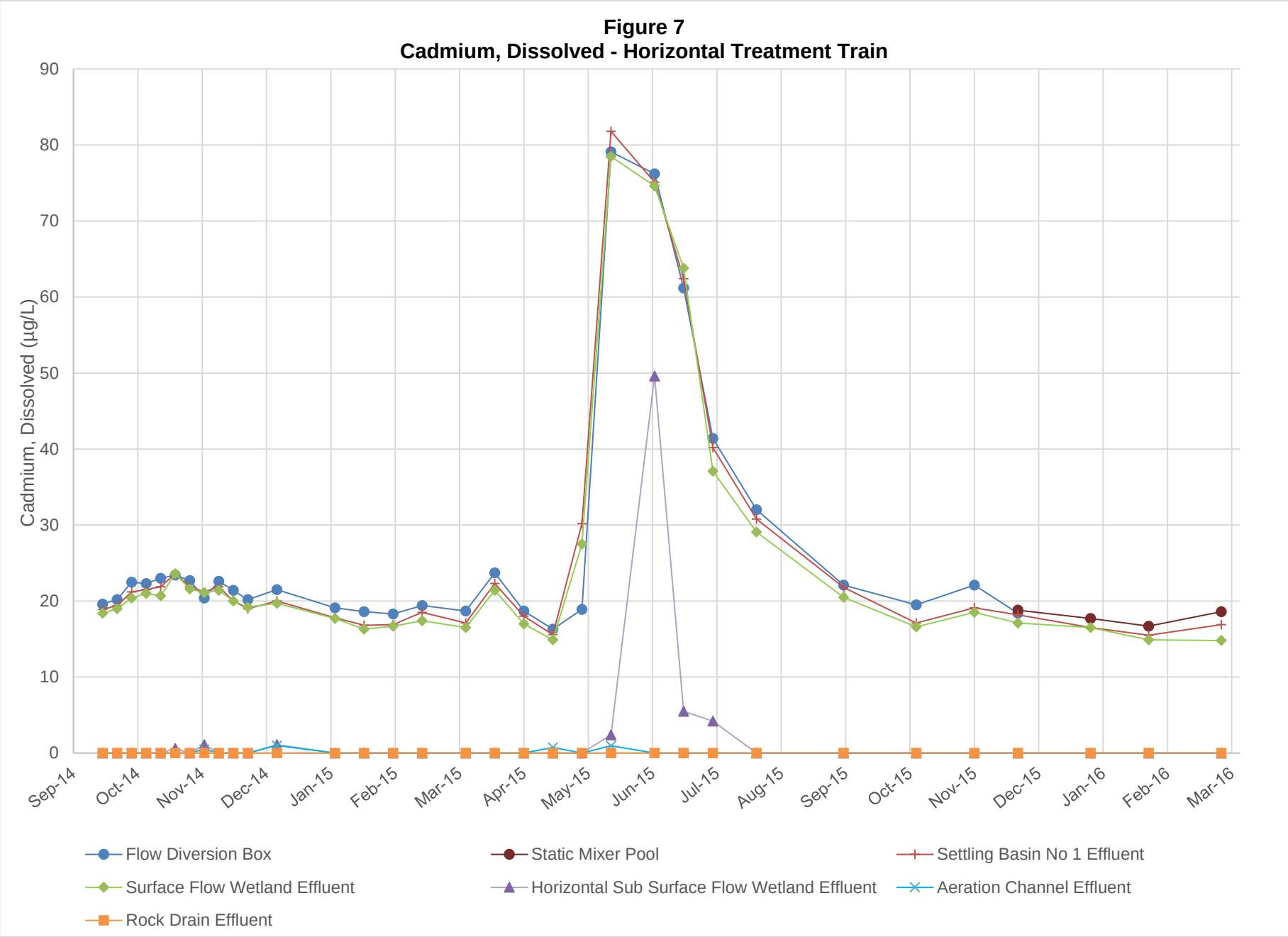


Figure 7
Cadmium, Dissolved - Horizontal Treatment Train
Cadmium, Dissolved (µg/L)
90
80
70
60
50
40
30
20
10
0
Sep-14
Oct-14
Nov-14
Dec-14
Jan-15
Feb-15
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Flow Diversion Box
Static Mixer Pool
Settling Basin No 1 Effluent
Surface Flow Wetland Effluent
Horizontal Sub Surface Flow Wetland Effluent
Aeration Channel Effluent
Rock Drain Effluent

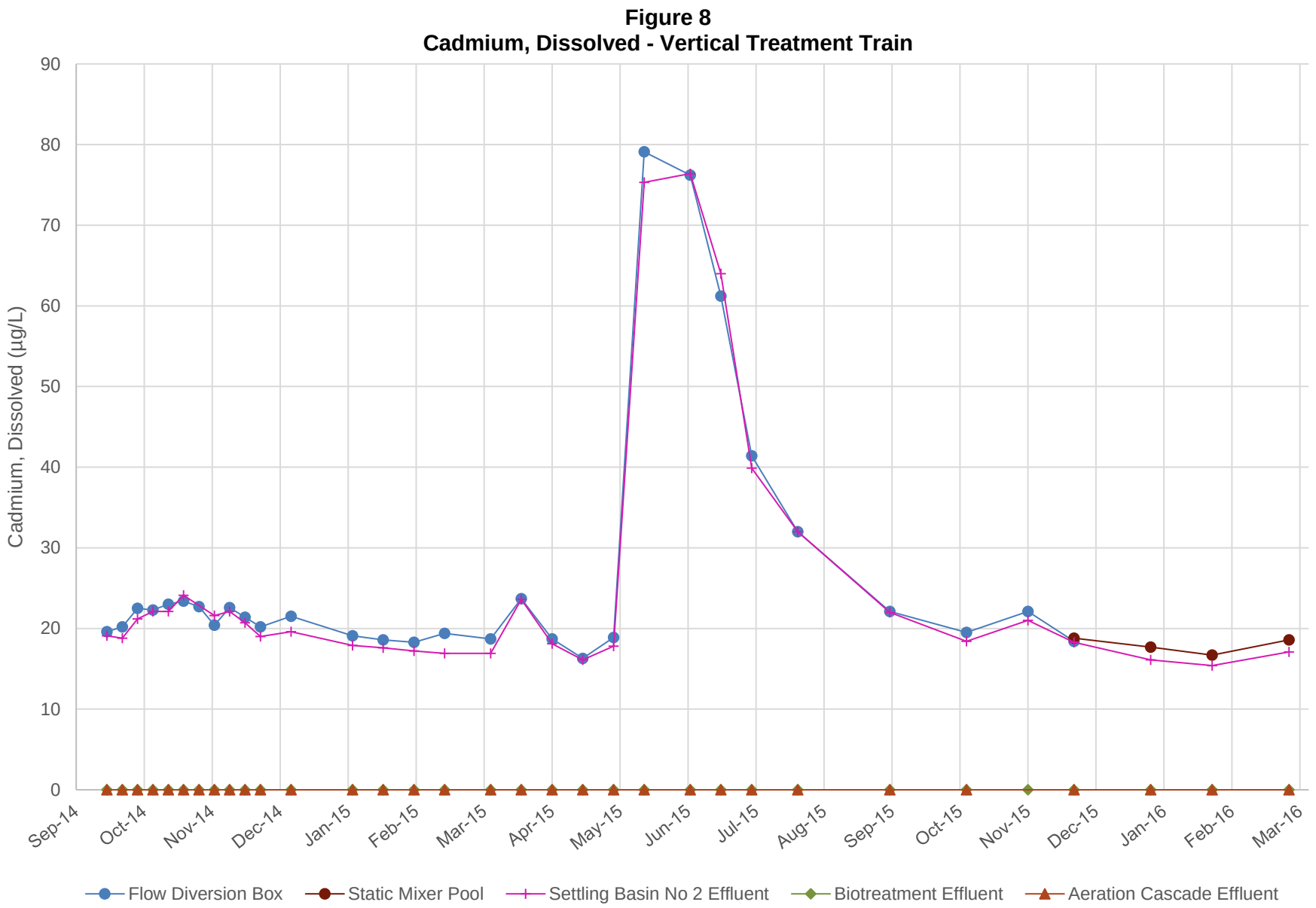


Figure 8
Cadmium, Dissolved - Vertical Treatment Train
Cadmium, Dissolved (µg/L)
90
80
70
60
50
40
30
20
10
0
Sep-14
Oct-14
Nov-14
Dec-14
Jan-15
Feb-15
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Flow Diversion Box
Static Mixer Pool
Settling Basin No 2 Effluent
Biotreatment Effluent
Aeration Cascade Effluent

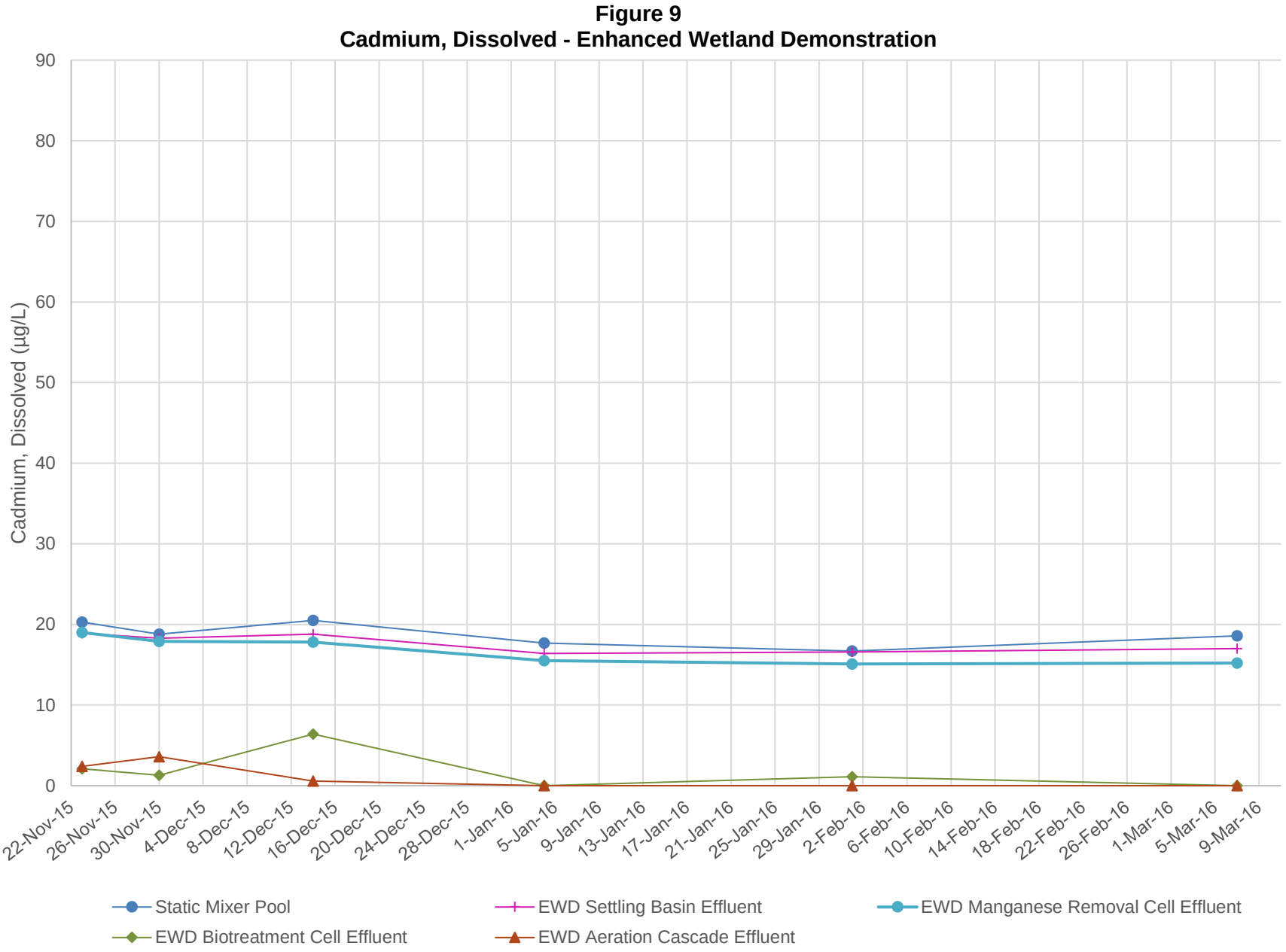


Figure 9
Cadmium, Dissolved - Enhanced Wetland Demonstration
Cadmium, Dissolved (µg/L)
90
80
70
60
50
40
30
20
10
0
22-Nov-15
26-Nov-15
30-Nov-15
4-Dec-15
8-Dec-15
12-Dec-15
16-Dec-15
20-Dec-15
24-Dec-15
28-Dec-15
1-Jan-16
5-Jan-16
9-Jan-16
13-Jan-16
17-Jan-16
21-Jan-16
25-Jan-16
29-Jan-16
2-Feb-16
6-Feb-16
10-Feb-16
14-Feb-16
18-Feb-16
22-Feb-16
26-Feb-16
1-Mar-16
5-Mar-16
9-Mar-16
Static Mixer Pool
EWD Settling Basin Effluent
EWD Manganese Removal Cell Effluent
EWD Biotreatment Cell Effluent
EWD Aeration Cascade Effluent

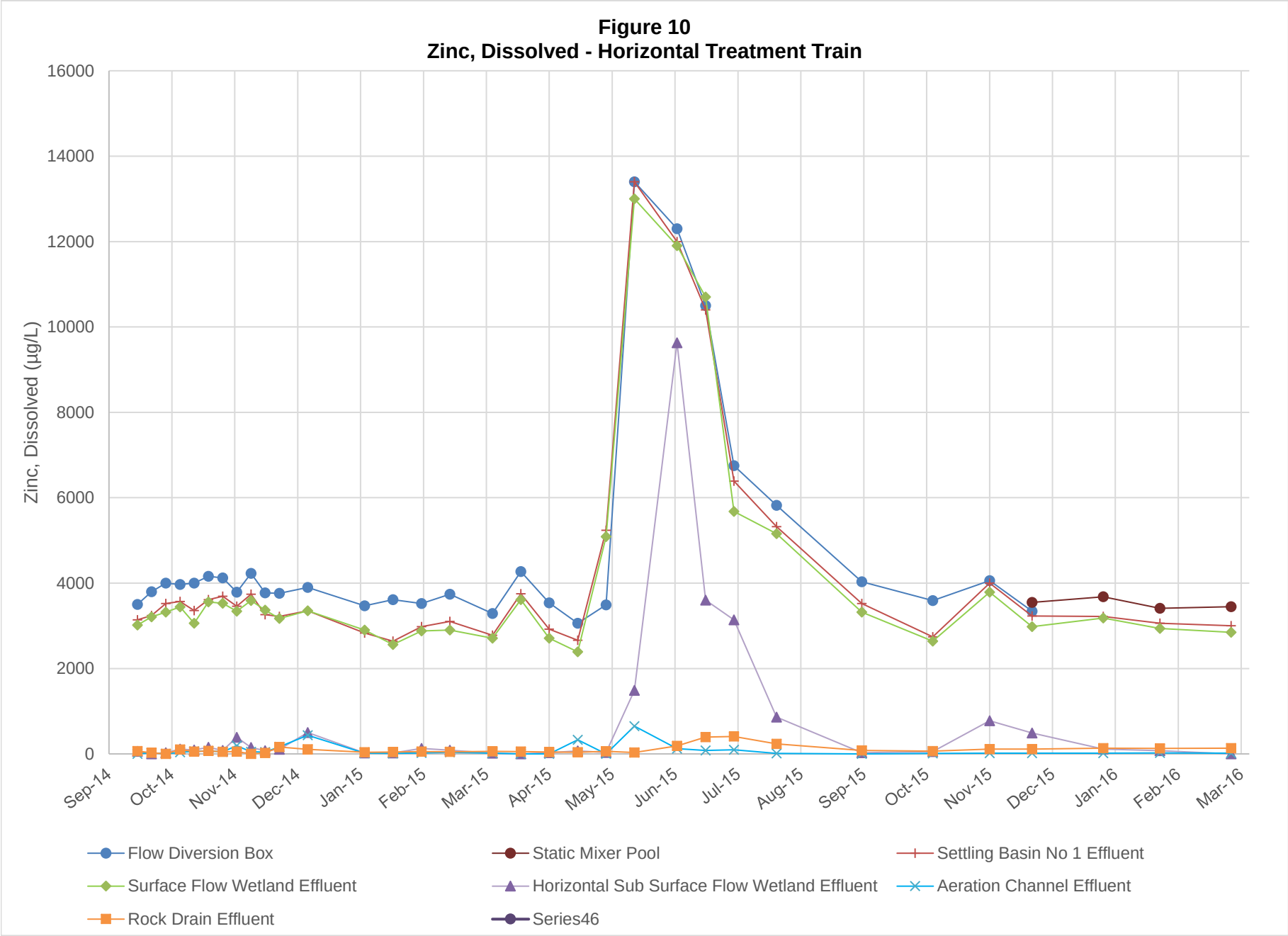


Figure 10
Zinc, Dissolved - Horizontal Treatment Train
Zinc, Dissolved (µg/L)
16000
14000
12000
10000
8000
6000
4000
2000
0
Sep-14
Oct-14
Nov-14
Dec-14
Jan-15
Feb-15
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Flow Diversion Box
Static Mixer Pool
Settling Basin No 1 Effluent
Surface Flow Wetland Effluent
Horizontal Sub Surface Flow Wetland Effluent
Aeration Channel Effluent
Rock Drain Effluent
Series46

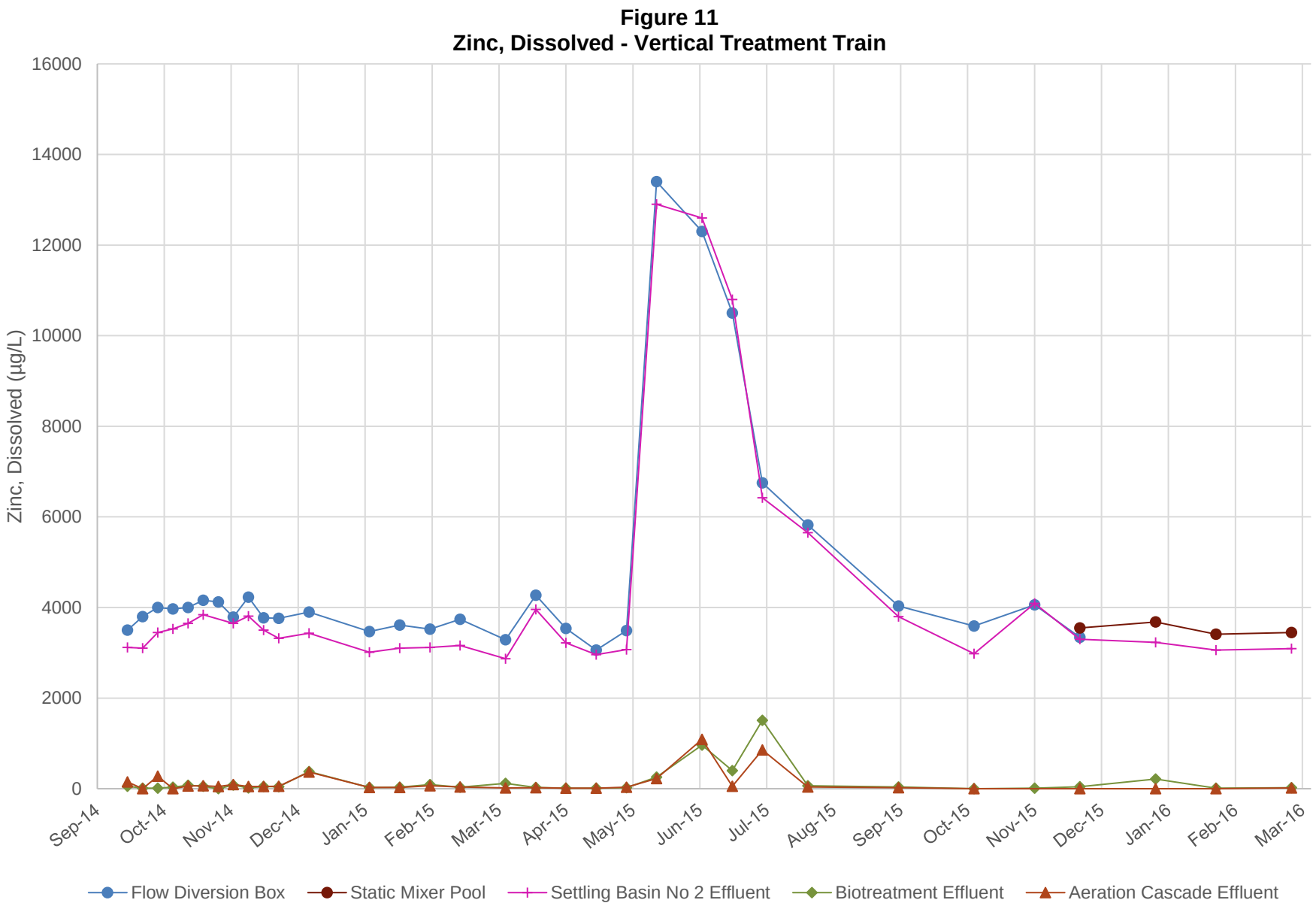


Figure 11
Zinc, Dissolved - Vertical Treatment Train
Zinc, Dissolved (µg/L)
16000
14000
12000
10000
8000
6000
4000
2000
0
Sep-14
Oct-14
Nov-14
Dec-14
Jan-15
Feb-15
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Flow Diversion Box
Static Mixer Pool
Settling Basin No 2 Effluent
Biotreatment Effluent
Aeration Cascade Effluent

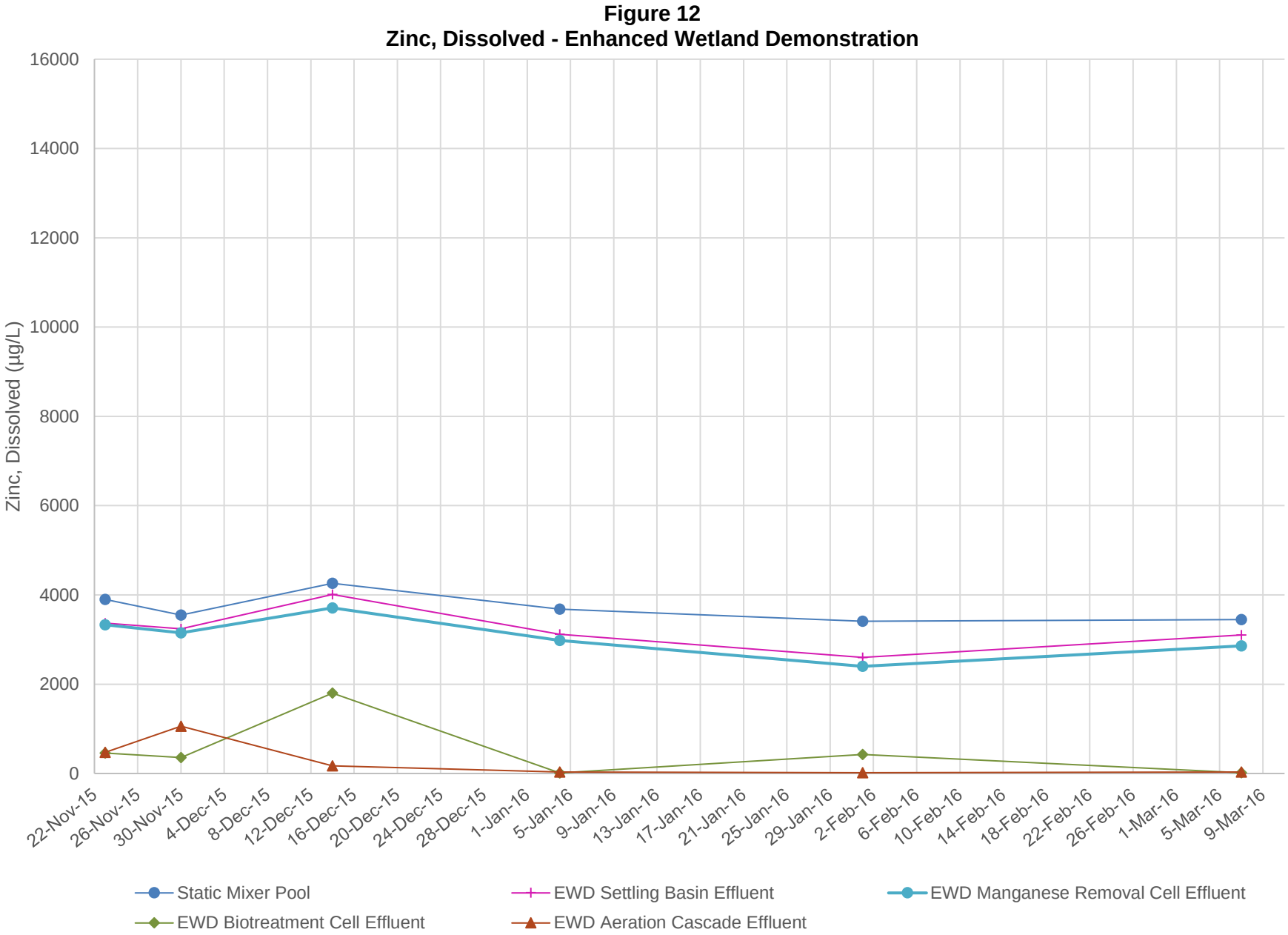


Figure 12
Zinc, Dissolved - Enhanced Wetland Demonstration
Zinc, Dissolved (µg/L)
16000
14000
12000
10000
8000
6000
4000
2000
0
22-Nov-15
26-Nov-15
30-Nov-15
4-Dec-15
8-Dec-15
12-Dec-15
16-Dec-15
20-Dec-15
24-Dec-15
28-Dec-15
1-Jan-16
5-Jan-16
9-Jan-16
13-Jan-16
17-Jan-16
21-Jan-16
25-Jan-16
29-Jan-16
2-Feb-16
6-Feb-16
10-Feb-16
14-Feb-16
18-Feb-16
22-Feb-16
26-Feb-16
1-Mar-16
5-Mar-16
9-Mar-16
Static Mixer Pool
EWD Settling Basin Effluent
EWD Manganese Removal Cell Effluent
EWD Biotreatment Cell Effluent
EWD Aeration Cascade Effluent

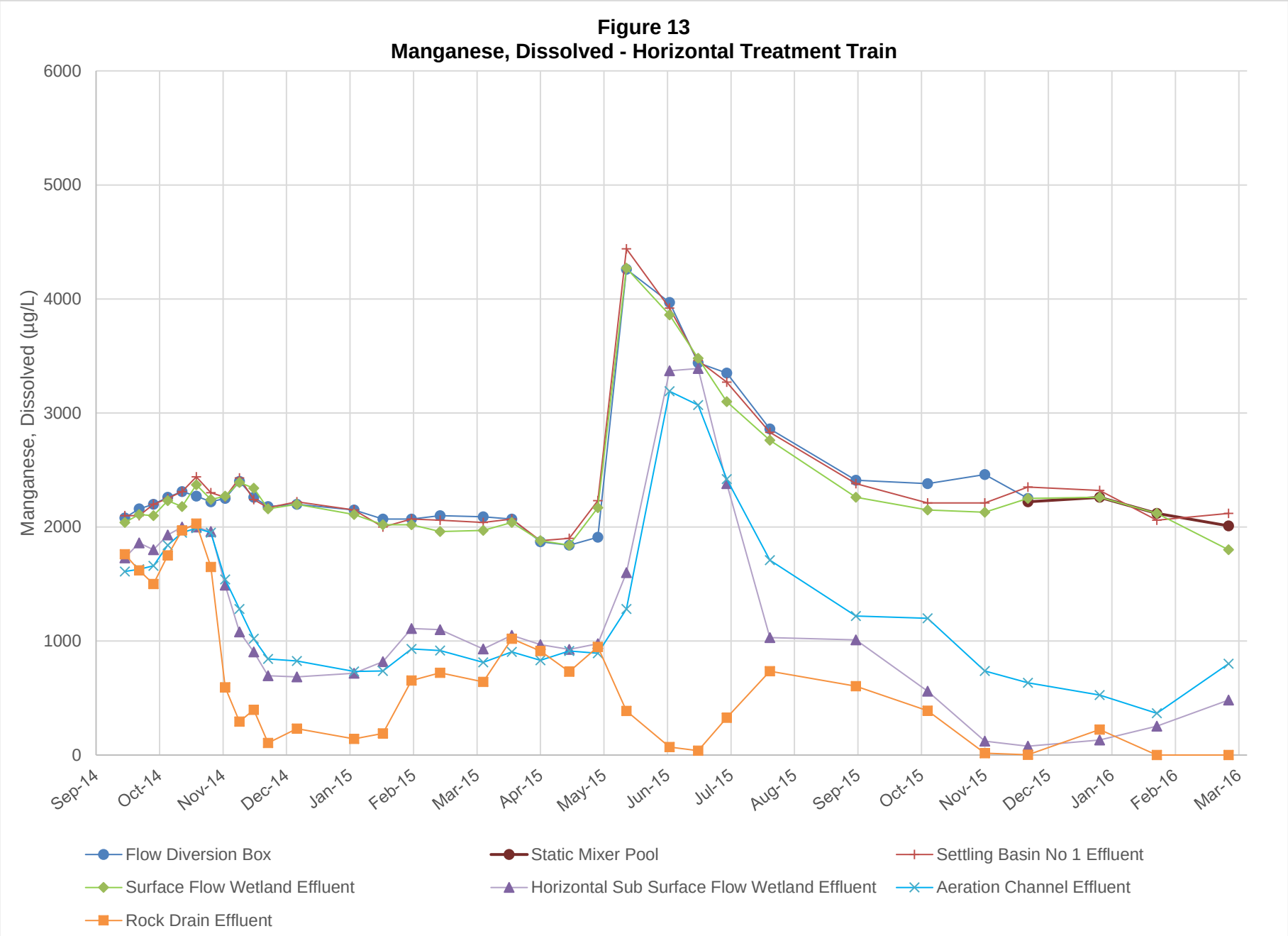


Figure 13
Manganese, Dissolved - Horizontal Treatment Train
Manganese, Dissolved (µg/L)
6000
5000
4000
3000
2000
1000
0
Sep-14
Oct-14
Nov-14
Dec-14
Jan-15
Feb-15
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Flow Diversion Box
Static Mixer Pool
Settling Basin No 1 Effluent
Surface Flow Wetland Effluent
Horizontal Sub Surface Flow Wetland Effluent
Aeration Channel Effluent
Rock Drain Effluent

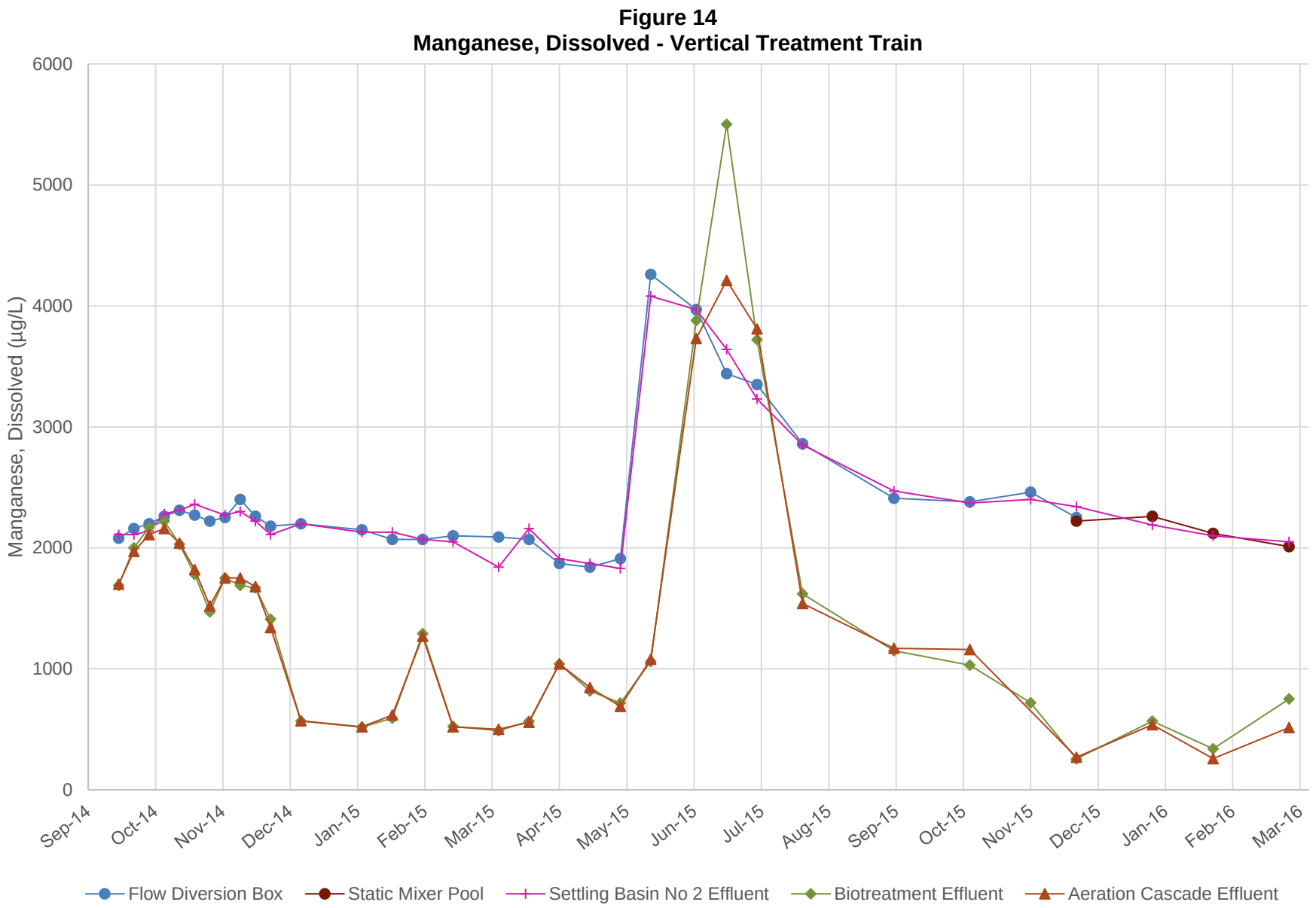


Figure 14
Manganese, Dissolved - Vertical Treatment Train
Manganese, Dissolved (µg/L)
6000
5000
4000
3000
2000
1000
0
Sep-14
Oct-14
Nov-14
Dec-14
Jan-15
Feb-15
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Flow Diversion Box
Static Mixer Pool
Settling Basin No 2 Effluent
Biotreatment Effluent
Aeration Cascade Effluent

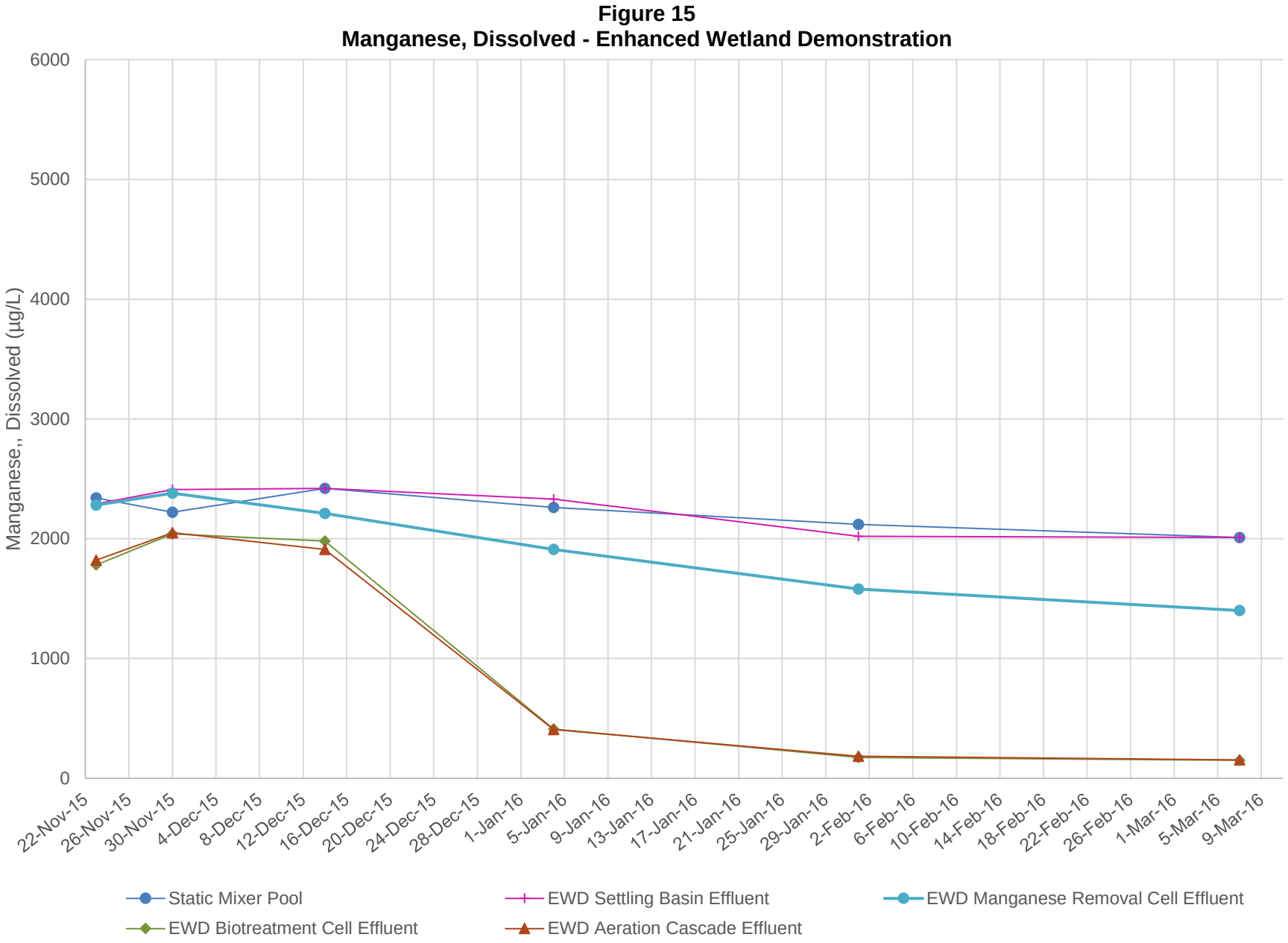
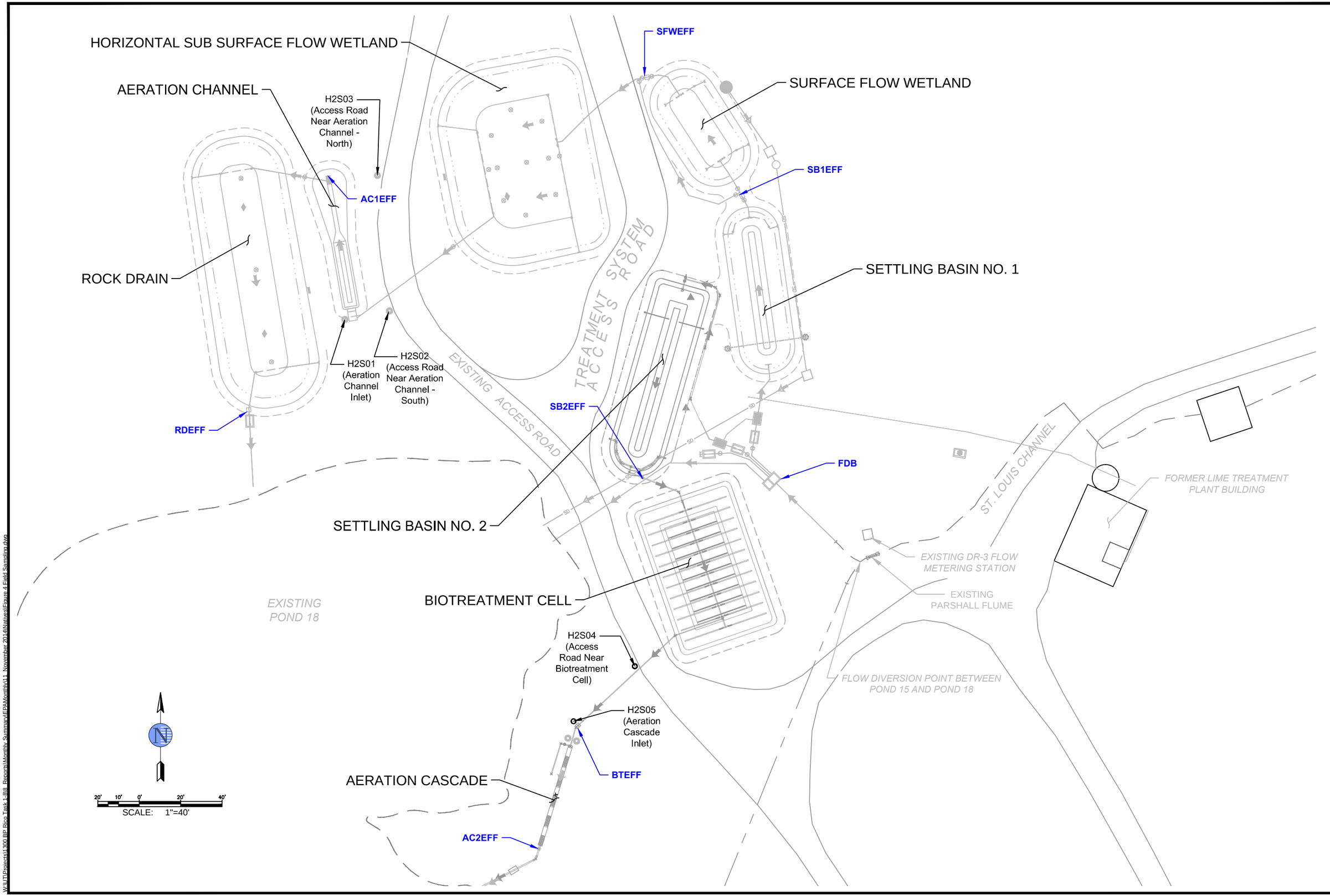


Figure 15
Manganese, Dissolved - Enhanced Wetland Demonstration
Manganese,, Dissolved (µg/L)
6000
5000
4000
3000
2000
1000
0
22-Nov-15
26-Nov-15
30-Nov-15
4-Dec-15
8-Dec-15
12-Dec-15
16-Dec-15
20-Dec-15
24-Dec-15
28-Dec-15
1-Jan-16
5-Jan-16
9-Jan-16
13-Jan-16
17-Jan-16
21-Jan-16
25-Jan-16
29-Jan-16
2-Feb-16
6-Feb-16
10-Feb-16
14-Feb-16
18-Feb-16
22-Feb-16
26-Feb-16
1-Mar-16
5-Mar-16
9-Mar-16
Static Mixer Pool
EWD Settling Basin Effluent
EWD Manganese Removal Cell Effluent
EWD Biotreatment Cell Effluent
EWD Aeration Cascade Effluent



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APPROVED:	KS
JOB No:	1300
CAD FILE:	Figure 4.dwg

REV	DATE	DESCRIPTION

RESOURCE MANAGEMENT CONSULTANTS
8138 SOUTH STATE ST.
SUITE 2A
MIDVALE, UT 84047
801-255-2626

RICO - ARGENTINE MINE SITE
ST LOUIS DISCHARGE CWDTS

Monthly Progress Report Monitoring Locations

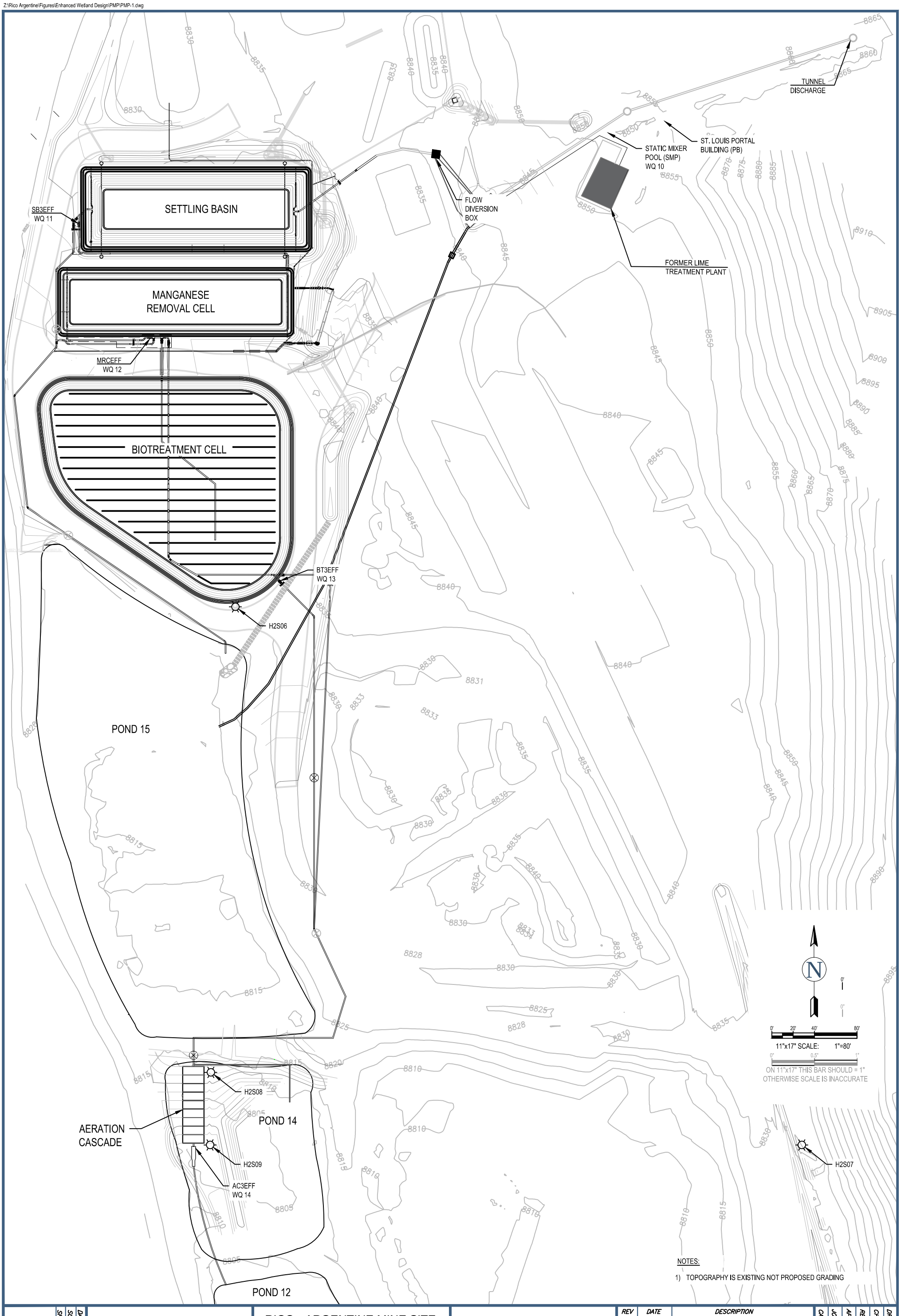
AEEC
www.americanconsultants.com
3489 W 2100 S, Salt Lake City, UT 84119
801-908-5447 Fax 801-972-2741

DATE:	01 DEC 14
SCALE:	1:40
SHEET:	01 OF 01

Figure 16

W:\UT\Projects\1300 BP Rico Task 1-8\8. Reports\Monthly Summary\EPA\Monthly\11. November 2014\Natives\Figure 4 Field Sampling.dwg

Z:\Rico Argentine\Figures\Enhanced Wetland Design\PMP\PMP-1.dwg



NOTES:

1) TOPOGRAPHY IS EXISTING NOT PROPOSED GRADING

Figure 17

DATE:	07 JUL 15
SCALE:	AS SHOWN
SHEET:	01 OF 01

AEEC
www.americanconsultants.com
3489 W 2100 S, Salt Lake City, UT 84119
801-908-5447 Fax 801-972-2741

RICO - ARGENTINE MINE SITE
ENHANCED WETLAND DEMONSTRATION

Enhanced Wetland Demonstration
General Layout and Monitoring Locations

RESOURCE MANAGEMENT CONSULTANTS
REMC Est. 1997 Midvale, Utah
8496 SOUTH HARRISON ST., SUITE 102, MIDVALE, UT 84047

REV	DATE	DESCRIPTION

CAD FILE:	PMP-1.dwg
JOB No:	1300
APPROVED:	JL
REVIEWED:	CH
CHECKED:	JPD
DRAWN BY:	DD

Key Performance Indicators Tables

St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study

and Enhanced Wetland Demonstration

Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Table 1. Iron (µg/L)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW H[1] (gpm)	FLOW V[1,2] (gpm)	FDB	SMP	SB1EFF	SFWEFF	HSSFWMP11	AC1EFF	RDEFF	SB2EFF	BTEFF	AC2EFF
C	W00	15-Sep-14	25.8	33.8	4500	NA	1330	1200	223	261	250	1250	266	246
C	W01	22-Sep-14	30.7	44.5	3740	NA	1070	930	168	203	170	971	206	218
C	W02	29-Sep-14	29.5	41.3	4230	NA	1640	1360	194	250	129	1440	216	210
C	W03	06-Oct-14	30.2	35.1	3940	NA	1720	1540	142	156	134	937	171	165
C	W04	13-Oct-14	26.8	35.7	3820	NA	892	900	146	138	144	1500	161	154
C	W05	20-Oct-14	29.2	35.9	5730	NA	1260	1010	133	1010	326	1390	244	143
C	W06	27-Oct-14	27.7	43.2	24100	NA	1630	1330	171	304	1340	R	157	137
C	W07	03-Nov-14	28.8	32.0	4550	NA	1180	1130	126	118	297	902	175	153
C	W08	10-Nov-14	27.9	29.8	5720	NA	1540	1380	137	115	99.6	1640	151	148
C	W09	17-Nov-14	27.9	29.2	8800	NA	978	1190	218	2140	141	1670	253	260
C	W10	24-Nov-14	27.0	29.2	5230	NA	1550	1270	135	712	<50	1850	236	245
C	W11	01-Dec-14	25.9	28.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
C	W12	08-Dec-14	25.5	27.8	5710	NA	1490	1280	129	538	<50	1320	164	156
C	W13	15-Dec-14	25.1	26.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
C	W14	22-Dec-14	24.1	25.4	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
C	W15	29-Dec-14	23.3	24.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W00	05-Jan-15	22.7	25.7	6130	NA	1060	867	129	905	<50	1260	151	131
TR01	W01	12-Jan-15	21.6	27.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W02	19-Jan-15	20.4	25.9	7510	NA	1110	920	117	1830	<50	1460	116	109
TR01	W03	26-Jan-15	21.9	30.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W04	02-Feb-15	27	32	7980	NA	1600	1870	150	688	<50	1780	164	162
TR01	W05	09-Feb-15	27.8	30.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W06	16-Feb-15	28.7	29.4	9530	NA	1710	1190	136	1910	<50	1520	143	142
TR01	W07	23-Feb-15	28.7	25.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W08	02-Mar-15	28.2	24.9	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W09	09-Mar-15	29.3	28.1	10400	NA	1620	1210	146	140	<50	1480	148	138
TR01	W10	16-Mar-15	29.5	29.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W11	23-Mar-15	34.9	36.4	8450	NA	7120	3500	147	1890	<50	2560	178	291
TR01	W12	30-Mar-15	34.4	38.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W00	06-Apr-15	32.3	36	9260	NA	2420	1880	153	164	<50	2420	205	202
TR02	W01	13-Apr-15	38	39.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W02	20-Apr-15	36.7	39.3	9020	NA	3720	2480	300	1030	<50	3270	309	261
TR02	W03	27-Apr-15	36.1	39.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W04	04-May-15	35.2	39.1	8630	NA	2900	2300	166	327	75.8	2130	218	210
TR02	W05	11-May-15	33.4	37.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W06	18-May-15	32.0	36.6	5460	NA	2980	2050	177	184	<50	2060	457	425
TR02	W07	25-May-16	31.9	36.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W08	01-Jun-15	31.3	35.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W09	08-Jun-15	30.9	35.3	4150	NA	2100	1620	55.5	875	68.8	1890	1030	905
TR02	W10	15-Jun-15	30.8	35.6	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W11	22-Jun-15	30.9	35.7	2990	NA	1690	1330	428	750	106	1140	613	570
TR02	W12	29-Jun-15	30.3	35.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W13	06-Jul-15	30.0	35.4	3860	NA	1860	1280	<50	603	53.9	1400	303	323
TR02	W14	13-Jul-15	30.4	35.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W15	20-Jul-15	30.5	35.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W16	27-Jul-15	28.6	33.7	4480	NA	1820	1390	54.8	417	<50	1640	198	224
TR02	W17	03-Aug-15	28.2	33.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W18	10-Aug-15	28.4	33.6	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W19	17-Aug-15	28.3	33.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W20	24-Aug-15	28.3	33.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W21	31-Aug-15	25.7	31.9	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W22	07-Sep-15	25.0	32.5	5590	NA	883	565	531	155	<50	1060	131	152
TR02	W23	14-Sep-15	28.0	37.4	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W24	21-Sep-15	21.7	32.4	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W25	28-Sep-15	5.2	7.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W26	05-Oct-15	14.8	21.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W27	12-Oct-15	10.1	17.5	3780	NA	991	717	121	303	208	910	65.8	163
TR02	W28	19-Oct-15	23.2	30.1	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W29	26-Oct-15	11.2	17.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W30	02-Nov-15	23.7	26.9	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W31	09-Nov-15	23.2	21.1	4760	NA	2260	1790	<50	106	52.9	1940	145	NS[3]

Table 1. Iron (µg/L)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW H[1] (gpm)	FLOW V[1,2] (gpm)	FDB	SMP	SB1EFF	SFWEFF	HSSFWMP11	AC1EFF	RDEFF	SB2EFF	BTEFF	AC2EFF
TR02	W32	16-Nov-15	23.3	16.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W33	23-Nov-15	22.2	12.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W34	30-Nov-15	21.7	10.3	5220	5700	2310	1670	<50	59.9	<50	1620	150	104
TR02	W35	07-Dec-15	21.3	9.7	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W36	14-Dec-15	31.1	17.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W37	21-Dec-15	46.7	30.3	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W38	28-Dec-15	46.3	29.9	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W39	04-Jan-16	30.2	30.1	NS[4]	9930	3980	3220	<50	89.3	<50	3400	176	155
TR02	W40	11-Jan-16	26.2	29.8	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W41	18-Jan-16	25.9	29.9	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W42	25-Jan-16	25.7	30.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W43	01-Feb-16	25.5	29.6	NS[4]	9870	3370	2590	67.1	67.1	<50	2640	178	159
TR02	W44	08-Feb-16	24.9	31.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W45	15-Feb-16	24.8	31.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W46	22-Feb-16	24.7	30.8	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W47	29-Feb-16	22.9	30.5	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W48	07-Mar-16	21.5	29.7	NS[4]	9480	3760	2980	51	154	<50	3020	215	62.8

NOTES:

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).
AC1EFF = Aeration Channel Effluent/Rock Drain Influent
AC2EFF = Aeration Cascade Effluent
BTEFF = Biotreatment Cell Effluent/Aeration Cascade Influent
C = Colonization
FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)
Flow H = horizontal treatment train average flow rate
Flow V = vertical treatment train average flow rate
gpm = gallons per minute
HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent
NA = not available
NS = not sampled
OU = operable unit
RDEFF = Rock Drain Effluent
R = rejected
RL = reporting limit
SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent
SB2EFF = Settling Basin No. 2 Effluent/Biotreatment Cell Influent
SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent
SMP = Static Mixer Pool
TR** = Testing Phase Test Run
µg/L = microgram per liter
VWTT = Vertical Wetland Treatment Train
W** = Week of Treatability Study Phase

[1] The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.
[2] The Aeration Cascade in the VWTT was bypassed on different occasions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 influent flow rates to better represent metals mass removal by the VWTT.

[3] Monitoring location AC2EFF was not sampled during W31 of phase TR02 because of Enhance Wetland Demonstration construction activities.
[4] As of 04 JAN 2016, monitoring location FDB will not be sampled since it is no longer representative of the HWTT and VWTT influent due to changes during the construction of the Enhanced Wetland Demonstration.

Table 1A. Iron (µg/L)
Enhanced Wetland Demonstration
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW EWD[1] (gpm)	SMP	SB3EFF	MRCEFF	BT2EFF	AC3EFF
EWD-C	W00	23-Nov-15	876.9	5020	1220	328	569	563
EWD-C	W01	30-Nov-15	706.1	5700	1090	288	280	285
EWD-C	W02	07-Dec-15	590.9	NS	NS	NS	NS	NS
EWD-C	W03	14-Dec-15	576.6	7130	1890	413	132	124
EWD-C	W04	21-Dec-15	541.9	NS	NS	NS	NS	NS
EWD-C	W05	28-Dec-15	535.8	NS	NS	NS	NS	NS
EWD-O	W00	04-Jan-16	552.3	9930	1740	251	67	60.9
EWD-O	W01	11-Jan-16	557.3	NS	NS	NS	NS	NS
EWD-O	W02	18-Jan-16	555.4	NS	NS	NS	NS	NS
EWD-O	W03	25-Jan-16	553.5	NS	NS	NS	NS	NS
EWD-O	W04	01-Feb-16	574.3	9870	1560	161	<50	<50
EWD-O	W05	08-Feb-16	535.6	NS	NS	NS	NS	NS
EWD-O	W06	15-Feb-16	537.8	NS	NS	NS	NS	NS
EWD-O	W07	22-Feb-16	540.3	NS	NS	NS	NS	NS
EWD-O	W08	29-Feb-16	543.7	NS	NS	NS	NS	NS
EWD-O	W09	07-Mar-16	542.1	9480	1770	193	<50	<50

NOTES:

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).

AC3EFF = EWD Aeration Cascade effluent monitoring location
BT2EFF = EWD Biotreatment Cell effluent monitoring location
EWD = Enhanced Wetland Demonstration
EWD-C = EWD Colonization Phase
EWD-O = EWD Operation Phase
Flow EWD = EWD average flow rate
gpm = gallons per minute
MRCEFF = EWD Manganese Removal Cell effluent monitoring location
NS = not sampled
OU = operable unit
RL = reporting limit
SB3EFF = EWD Settling Basin effluent monitoring location
SMP = Static Mixer Pool
µg/L = microgram per liter
W** = Week of Treatability Study Phase

[1] The EWD flow rate is estimated based on the system's effluent average flow rate.

Table 2. Iron, Dissolved (µg/L)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW H[1] (gpm)	FLOW V[1,2] (gpm)	FDB	SMP	SB1EFF	SFWEFF	HSSFWMP11	AC1EFF	RDEFF	SB2EFF	BTEFF	AC2EFF
C	W00	15-Sep-14	25.8	33.8	772	NA	56.4	<50	80.7	50.8	76.2	101	213	174
C	W01	22-Sep-14	30.7	44.5	723	NA	<50	182	56	<50	<50	96.2	172	128
C	W02	29-Sep-14	29.5	41.3	1320	NA	140	<50	74.1	<50	<50	166	189	147
C	W03	06-Oct-14	30.2	35.1	625	NA	120	<50	79.8	<50	53.3	360	147	86.2
C	W04	13-Oct-14	26.8	35.7	339	NA	58.2	<50	77	52.8	66.1	67	135	89.4
C	W05	20-Oct-14	29.2	35.9	575	NA	96	<50	78.9	103	195	72.8	128	106
C	W06	27-Oct-14	27.7	43.2	1930	NA	252	64.6	123	113	847	R	140	113
C	W07	03-Nov-14	28.8	32.0	483	NA	113	59.9	122	80.5	148	66.4	143	106
C	W08	10-Nov-14	27.9	29.8	2290	NA	329	67.6	126	64.4	79.8	147	134	90
C	W09	17-Nov-14	27.9	29.2	1140	NA	152	54.6	101	79.2	111	154	215	188
C	W10	24-Nov-14	27.0	29.2	3480	NA	167	73.4	85.4	168	<50	119	194	163
C	W11	01-Dec-14	25.9	28.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
C	W12	08-Dec-14	25.5	27.8	5510	NA	1470	1360	130	454	<50	1330	167	161
C	W13	15-Dec-14	25.1	26.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
C	W14	22-Dec-14	24.1	25.4	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
C	W15	29-Dec-14	23.3	24.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W00	05-Jan-15	22.7	25.7	1060	NA	82.9	813	91.7	92	<50	<50	113	148
TR01	W01	12-Jan-15	21.6	27.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W02	19-Jan-15	20.4	25.9	2050	NA	60.4	<50	103	86.9	<50	<50	102	95.6
TR01	W03	26-Jan-15	21.9	30.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W04	02-Feb-15	27.0	32.0	2260	NA	<50	320	126	115	<50	202	164	148
TR01	W05	09-Feb-15	27.8	30.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W06	16-Feb-15	28.7	29.4	2580	NA	314	<50	120	163	<50	97.9	141	124
TR01	W07	23-Feb-15	28.7	25.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W08	02-Mar-15	28.2	24.9	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W09	09-Mar-15	29.3	28.1	1600	NA	<50	<50	121	100	<50	<50	130	118
TR01	W10	16-Mar-15	29.5	29.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W11	23-Mar-15	34.9	36.4	2290	NA	173	52.9	133	182	<50	99.2	168	289
TR01	W12	30-Mar-15	34.4	38.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W00	06-Apr-15	32.3	36	2610	NA	194	<50	82.3	101	<50	85.2	192	187
TR02	W01	13-Apr-15	38	39.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W02	20-Apr-15	36.7	39.3	2810	NA	240	<50	141	1100	59.9	2200	226	213
TR02	W03	27-Apr-15	36.1	39.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W04	04-May-15	35.2	39.1	2220	NA	292	1370	111	114	52.2	956	197	179
TR02	W05	11-May-15	33.4	37.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W06	18-May-15	32.0	36.6	1440	NA	363	854	169	150	<50	235	470	436
TR02	W07	25-May-16	31.9	36.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W08	01-Jun-15	31.3	35.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W09	08-Jun-15	30.9	35.3	1510	NA	612	479	<50	447	<50	1790	1030	794
TR02	W10	15-Jun-15	30.8	35.6	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W11	22-Jun-15	30.9	35.7	544	NA	213	133	366	246	<50	92	580	371
TR02	W12	29-Jun-15	30.3	35.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W13	06-Jul-15	30.0	35.4	389	NA	94	348	<50	204	<50	<50	306	300
TR02	W14	13-Jul-15	30.4	35.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W15	20-Jul-15	30.5	35.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W16	27-Jul-15	28.6	33.7	206	NA	366	52.2	50.5	163	<50	<50	173	181
TR02	W17	03-Aug-15	28.2	33.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W18	10-Aug-15	28.4	33.6	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W19	17-Aug-15	28.3	33.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W20	24-Aug-15	28.3	33.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W21	31-Aug-15	25.7	31.9	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W22	07-Sep-15	25.0	32.5	184	NA	65.1	<50	530	106	<50	<50	140	141
TR02	W23	14-Sep-15	28.0	37.4	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W24	21-Sep-15	21.7	32.4	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W25	28-Sep-15	5.2	7.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W26	05-Oct-15	14.8	21.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W27	12-Oct-15	10.1	17.5	425	NA	<50	<50	107	105	<50	<50	61.6	134
TR02	W28	19-Oct-15	23.2	30.1	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W29	26-Oct-15	11.2	17.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W30	02-Nov-15	23.7	26.9	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W31	09-Nov-15	23.2	21.1	1070	NA	91.3	55.4	<50	69.9	<50	112	128	NS[3]
TR02	W32	16-Nov-15	23.3	16.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS

Table 2. Iron, Dissolved (µg/L)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW H[1] (gpm)	FLOW V[1,2] (gpm)	FDB	SMP	SB1EFF	SFWEFF	HSSFWMP11	AC1EFF	RDEFF	SB2EFF	BTEFF	AC2EFF
TR02	W33	23-Nov-15	22.2	12.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W34	30-Nov-15	21.7	10.3	2150	2360	299	<50	<50	58.8	<50	119	160	102
TR02	W35	07-Dec-15	21.3	9.7	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W36	14-Dec-15	31.1	17.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W37	21-Dec-15	46.7	30.3	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W38	28-Dec-15	46.3	29.9	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W39	04-Jan-16	30.2	30.1	NS[4]	2890	219	645	<50	<50	<50	159	176	124
TR02	W40	11-Jan-16	26.2	29.8	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W41	18-Jan-16	25.9	29.9	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W42	25-Jan-16	25.7	30.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W43	01-Feb-16	25.5	29.6	NS[4]	1870	1000	186	57.6	<50	<50	410	161	67.2
TR02	W44	08-Feb-16	24.9	31.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W45	15-Feb-16	24.8	31.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W46	22-Feb-16	24.7	30.8	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W47	29-Feb-16	22.9	30.5	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W48	07-Mar-16	21.5	29.7	NS[4]	3670	272	<50	<50	132	<50	165	230	60.7

NOTES:

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).

AC1EFF = Aeration Channel Effluent/Rock Drain Influent
AC2EFF = Aeration Cascade Effluent
BTEFF = Biotreatment Cell Effluent/Aeration Cascade Influent
C = Colonization
FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)
Flow H = horizontal treatment train average flow rate
Flow V = vertical treatment train average flow rate
gpm = gallons per minute
HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent
J = Estimated result
NA = not available
NS = not sampled
OU = operable unit
R = rejected
RDEFF = Rock Drain Effluent
RL = reporting limit
SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent
SB2EFF = Settling Basin No. 2 Effluent/Biotreatment Cell Influent
SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent
SMP = Static Mixer Pool
TR** = Test Run
µg/L = microgram per liter
VWTT = Vertical Wetland Treatment Train
W** = Week of Treatability Study Phase

[1] The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.

[2] The Aeration Cascade in the VWTT was bypassed on different occasions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 influent flow rates to better represent metals mass removal by the VWTT.

[3] Monitoring location AC2EFF was not sampled during W31 of phase TR02 because of Enhance Wetland Demonstration construction activities.

[4] As of 04 JAN 2016, monitoring location FDB will not be sampled since it is no longer representative of the HWTT and VWTT influent due to changes during the construction of the Enhanced Wetland Demonstration.

Table 2A. Iron Dissolved (µg/L)
Enhanced Wetland Demonstration
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW EWD[1] (gpm)	SMP	SB3EFF	MRCEFF	BT2EFF	AC3EFF
EWD-C	W00	23-Nov-15	876.9	1350	<50	<50	558	551
EWD-C	W01	30-Nov-15	706.1	2360	119	<50	249	276
EWD-C	W02	07-Dec-15	590.9	NS	NS	NS	NS	NS
EWD-C	W03	14-Dec-15	576.6	4490	115	<50	129	84
EWD-C	W04	21-Dec-15	541.9	NS	NS	NS	NS	NS
EWD-C	W05	28-Dec-15	535.8	NS	NS	NS	NS	NS
EWD-O	W00	04-Jan-16	552.3	2890	<50	<50	<50	<50
EWD-O	W01	11-Jan-16	557.3	NS	NS	NS	NS	NS
EWD-O	W02	18-Jan-16	555.4	NS	NS	NS	NS	NS
EWD-O	W03	25-Jan-16	553.5	NS	NS	NS	NS	NS
EWD-O	W04	01-Feb-16	574.3	1870	<50	<50	<50	<50
EWD-O	W05	08-Feb-16	535.6	NS	NS	NS	NS	NS
EWD-O	W06	15-Feb-16	537.8	NS	NS	NS	NS	NS
EWD-O	W07	22-Feb-16	540.3	NS	NS	NS	NS	NS
EWD-O	W08	29-Feb-16	543.7	NS	NS	NS	NS	NS
EWD-O	W09	07-Mar-16	542.1	3670	<50	133	<50	<50

NOTES:

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).

AC3EFF = EWD Aeration Cascade effluent monitoring location
BT2EFF = EWD Biotreatment Cell effluent monitoring location
EWD = Enhanced Wetland Demonstration
EWD-C = EWD Colonization Phase
EWD-O = EWD Operation Phase
Flow EWD = EWD average flow rate
gpm = gallons per minute
MRCEFF = EWD Manganese Removal Cell effluent monitoring location
NS = not sampled
OU = operable unit
RL = reporting limit
SB3EFF = EWD Settling Basin effluent monitoring location
SMP = Static Mixer Pool
µg/L = microgram per liter
W** = Week of Treatability Study Phase

[1] The EWD flow rate is estimated based on the system's effluent average flow rate.

Table 3. Cadmium, Dissolved (µg/L)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW H[1] (gpm)	FLOW V[1,2] (gpm)	FDB	SMP	SB1EFF	SFWEFF	HSSFWMP11	AC1EFF	RDEFF	SB2EFF	BTEFF	AC2EFF
C	W00	15-Sep-14	25.8	33.8	19.6	NA	18.9	18.4	<0.5	<0.5	<0.5	19.1	<0.5	<0.5
C	W01	22-Sep-14	30.7	44.5	20.2	NA	19.4	19	<0.5	<0.5	<0.5	18.8	<0.5	<0.5
C	W02	29-Sep-14	29.5	41.3	22.5	NA	21.2	20.4	<0.5	<0.5	<0.5	21.2	<0.5	<0.5
C	W03	06-Oct-14	30.2	35.1	22.3	NA	21.5	21	<0.5	<0.5	<0.5	22.1	<0.5	<0.5
C	W04	13-Oct-14	26.8	35.7	23	NA	21.9	20.7	<0.5	<0.5	<0.5	22.1	<0.5	<0.5
C	W05	20-Oct-14	29.2	35.9	23.4	NA	23.6	23.6	0.6	<0.5	<0.5	24.1	<0.5	<0.5
C	W06	27-Oct-14	27.7	43.2	22.7	NA	21.9	21.6	<0.5	<0.5	<0.5	R	<0.5	<0.5
C	W07	03-Nov-14	28.8	32.0	20.4	NA	21.2	21.1	1.1	0.51	<0.5	21.6	<0.5	<0.5
C	W08	10-Nov-14	27.9	29.8	22.6	NA	21.9	21.4	<0.5	<0.5	<0.5	22.1	<0.5	<0.5
C	W09	17-Nov-14	27.9	29.2	21.4	NA	20	20	<0.5	<0.5	<0.5	20.7	<0.5	<0.5
C	W10	24-Nov-14	27.0	29.2	20.2	NA	19	19.2	<0.5	<0.5	<0.5	19	<0.5	<0.5
C	W11	01-Dec-14	25.9	28.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
C	W12	08-Dec-14	25.5	27.8	21.5	NA	20	19.7	1.1	1	<0.5	19.6	<0.5	<0.5
C	W13	15-Dec-14	25.1	26.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
C	W14	22-Dec-14	24.1	25.4	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
C	W15	29-Dec-14	23.3	24.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W00	05-Jan-15	22.7	25.7	19.1	NA	17.8	17.7	<0.5	<0.5	<0.5	17.9	<0.5	<0.5
TR01	W01	12-Jan-15	21.6	27.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W02	19-Jan-15	20.4	25.9	18.6	NA	16.8	16.3	<0.5	<0.5	<0.5	17.6	<0.5	<0.5
TR01	W03	26-Jan-15	21.9	30.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W04	02-Feb-15	27	32	18.3	NA	16.9	16.7	<0.5	<0.5	<0.5	17.2	<0.5	<0.5
TR01	W05	09-Feb-15	27.8	30.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W06	16-Feb-15	28.7	29.4	19.4	NA	18.5	17.4	<0.5	<0.5	<0.5	16.9	<0.5	<0.5
TR01	W07	23-Feb-15	28.7	25.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W08	02-Mar-15	28.2	24.9	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W09	09-Mar-15	29.3	28.1	18.7	NA	17.1	16.5	<0.5	<0.5	<0.5	16.9	<0.5	<0.5
TR01	W10	16-Mar-15	29.5	29.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W11	23-Mar-15	34.9	36.4	23.7	NA	22.3	21.4	<0.5	<0.5	<0.5	23.6	<0.5	<0.5
TR01	W12	30-Mar-15	34.4	38.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W00	06-Apr-15	32.3	36	18.7	NA	18	17	<0.5	<0.5	<0.5	18.1	<0.5	<0.5
TR02	W01	13-Apr-15	38	39.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W02	20-Apr-15	36.7	39.3	16.3	NA	15.6	14.9	<0.5	0.75	<0.5	16.1	<0.5	<0.5
TR02	W03	27-Apr-15	36.1	39.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W04	04-May-15	35.2	39.1	18.9	NA	30.2	27.5	<0.5	<0.5	<0.5	17.8	<0.5	<0.5
TR02	W05	11-May-15	33.4	37.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W06	18-May-15	32.0	36.6	79.1	NA	81.8	78.5	2.4	0.96	<0.5	75.3	<0.5	<0.5
TR02	W07	25-May-16	31.9	36.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W08	01-Jun-15	31.3	35.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W09	08-Jun-15	30.9	35.3	76.2	NA	75.1	74.6	49.6	<0.5	<0.5	76.4	<0.5	<0.5
TR02	W10	15-Jun-15	30.8	35.6	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W11	22-Jun-15	30.9	35.7	61.2	NA	62.4	63.8	5.5	<0.5	<0.5	64	<0.5	<0.5
TR02	W12	29-Jun-15	30.3	35.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W13	06-Jul-15	30.0	35.4	41.4	NA	40.2	37.1	4.2	<0.5	<0.5	39.9	<0.5	<0.5
TR02	W14	13-Jul-15	30.4	35.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W15	20-Jul-15	30.5	35.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W16	27-Jul-15	28.6	33.7	32	NA	30.8	29.1	<0.08	<0.08	<0.08	32	<0.08	<0.08
TR02	W17	03-Aug-15	28.2	33.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W18	10-Aug-15	28.4	33.6	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W19	17-Aug-15	28.3	33.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W20	24-Aug-15	28.3	33.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W21	31-Aug-15	25.7	31.9	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W22	07-Sep-15	25.0	32.5	22.1	NA	21.8	20.5	<0.5	<0.5	<0.5	22	<0.5	<0.5
TR02	W23	14-Sep-15	28.0	37.4	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W24	21-Sep-15	21.7	32.4	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W25	28-Sep-15	5.2	7.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W26	05-Oct-15	14.8	21.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W27	12-Oct-15	10.1	17.5	19.5	NA	17.1	16.6	<0.5	<0.5	<0.5	18.4	<0.5	<0.5
TR02	W28	19-Oct-15	23.2	30.1	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W29	26-Oct-15	11.2	17.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W30	02-Nov-15	23.7	26.9	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W31	09-Nov-15	23.2	21.1	22.1	NA	19.1	18.5	<0.5	<0.5	<0.5	21	<0.5	NS[3]

Table 3. Cadmium, Dissolved (µg/L)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW H[1] (gpm)	FLOW V[1,2] (gpm)	FDB	SMP	SB1EFF	SFWEFF	HSSFWMP11	AC1EFF	RDEFF	SB2EFF	BTEFF	AC2EFF
TR02	W32	16-Nov-15	23.3	16.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W33	23-Nov-15	22.2	12.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W34	30-Nov-15	21.7	10.3	18.4	18.8	18.2	17.1	<0.5	<0.5	<0.5	18.3	<0.5	<0.5
TR02	W35	07-Dec-15	21.3	9.7	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W36	14-Dec-15	31.1	17.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W37	21-Dec-15	46.7	30.3	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W38	28-Dec-15	46.3	29.9	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W39	04-Jan-16	30.2	30.1	NS[4]	17.7	16.5	16.5	<0.5	<0.5	<0.5	16.1	<0.5	<0.5
TR02	W40	11-Jan-16	26.2	29.8	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W41	18-Jan-16	25.9	29.9	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W42	25-Jan-16	25.7	30.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W43	01-Feb-16	25.5	29.6	NS[4]	16.7	15.5	14.9	<0.5	<0.5	<0.5	15.4	<0.5	<0.5
TR02	W44	08-Feb-16	24.9	31.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W45	15-Feb-16	24.8	31.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W46	22-Feb-16	24.7	30.8	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W47	29-Feb-16	22.9	30.5	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W48	07-Mar-16	21.5	29.7	NS[4]	18.6	16.9	14.8	<0.5	<0.5	<0.5	17.1	<0.5	<0.5

NOTES:

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).
AC1EFF = Aeration Channel Effluent/Rock Drain Influent
AC2EFF = Aeration Cascade Effluent
BTEFF = Biotreatment Cell Effluent/Aeration Cascade Influent
C = Colonization
FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)
Flow H = horizontal treatment train average flow rate
Flow V = vertical treatment train average flow rate
gpm = gallons per minute
HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent
NA = not available
NS = not sampled
OU = operable unit
R = rejected
RDEFF = Rock Drain Effluent
RL = reporting limit
SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent
SB2EFF = Settling Basin No. 2 Effluent/Biotreatment Cell Influent
SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent
SMP = Static Mixer Pool
TR** = Test Run
µg/L = microgram per liter
VWTT = Vertical Wetland Treatment Train
W** = Week of Treatability Study Phase

[1] The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.

[2] The Aeration Cascade in the VWTT was bypassed on different occasions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 influent flow rates to better represent metals mass removal by the VWTT.

[3] Monitoring location AC2EFF was not sampled during W31 of phase TR02 because of Enhance Wetland Demonstration construction activities.

[4] As of 04 JAN 2016, monitoring location FDB will not be sampled since it is no longer representative of the HWTT and VWTT influent due to changes during the construction of the Enhanced Wetland Demonstration.

Table 3A. Cadmium Dissolved (µg/L)
Enhanced Wetland Demonstration
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW EWD[1] (gpm)	SMP	SB3EFF	MRCEFF	BT2EFF	AC3EFF
EWD-C	W00	23-Nov-15	876.9	20.3	18.9	19	2.1	2.4
EWD-C	W01	30-Nov-15	706.1	18.8	18.3	17.9	1.3	3.6
EWD-C	W02	07-Dec-15	590.9	NS	NS	NS	NS	NS
EWD-C	W03	14-Dec-15	576.6	20.5	18.8	17.8	6.4 J	0.58
EWD-C	W04	21-Dec-15	541.9	NS	NS	NS	NS	NS
EWD-C	W05	28-Dec-15	535.8	NS	NS	NS	NS	NS
EWD-O	W00	04-Jan-16	552.3	17.7	16.4	15.5	<0.5	<0.5
EWD-O	W01	11-Jan-16	557.3	NS	NS	NS	NS	NS
EWD-O	W02	18-Jan-16	555.4	NS	NS	NS	NS	NS
EWD-O	W03	25-Jan-16	553.5	NS	NS	NS	NS	NS
EWD-O	W04	01-Feb-16	574.3	16.7	16.6	15.1	1.1	<0.5
EWD-O	W05	08-Feb-16	535.6	NS	NS	NS	NS	NS
EWD-O	W06	15-Feb-16	537.8	NS	NS	NS	NS	NS
EWD-O	W07	22-Feb-16	540.3	NS	NS	NS	NS	NS
EWD-O	W08	29-Feb-16	543.7	NS	NS	NS	NS	NS
EWD-O	W09	07-Mar-16	542.1	18.6	17	15.2	<0.5	<0.5

NOTES:

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).

AC3EFF = EWD Aeration Cascade effluent monitoring location
BT2EFF = EWD Biotreatment Cell effluent monitoring location
EWD = Enhanced Wetland Demonstration
EWD-C = EWD Colonization Phase
EWD-O = EWD Operation Phase
Flow EWD = EWD average flow rate
gpm = gallons per minute
MRCEFF = EWD Manganese Removal Cell effluent monitoring location
NS = not sampled
OU = operable unit
RL = reporting limit
SB3EFF = EWD Settling Basin effluent monitoring location
SMP = Static Mixer Pool
µg/L = microgram per liter
W** = Week of Treatability Study Phase

[1] The EWD flow rate is estimated based on the system's effluent average flow rate.

Table 4. Zinc, Dissolved (µg/L)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW H[1] (gpm)	FLOW V[1,2] (gpm)	FDB	SMP	SB1EFF	SFWEFF	HSSFWMP11	AC1EFF	RDEFF	SB2EFF	BTEFF	AC2EFF
C	W00	15-Sep-14	25.8	33.8	3500	NA	3140	3020	60.6	<10	62.5	3120	52 J	148
C	W01	22-Sep-14	30.7	44.5	3800 J	NA	3240	3210	<10	27	30	3100	12.8	<10
C	W02	29-Sep-14	29.5	41.3	4000	NA	3520	3320	30.3	<10	<10	3450 J	10.8	279
C	W03	06-Oct-14	30.2	35.1	3970	NA	3570	3440	115	37.9	102	3530	32.7	<10
C	W04	13-Oct-14	26.8	35.7	4000	NA	3360	3060	90.4	60.5	53	3650	76.2	59.4
C	W05	20-Oct-14	29.2	35.9	4160	NA	3610	3560	156	70	69.3	3840	56.4	65.7
C	W06	27-Oct-14	27.7	43.2	4120	NA	3690	3530	79.9	47.8	47.9	R	<10	46.9
C	W07	03-Nov-14	28.8	32.0	3790	NA	3460	3340	391	190	54	3650	83.3	91.7
C	W08	10-Nov-14	27.9	29.8	4230	NA	3740	3590	152	48.3	<10	3810	15.2	49.4
C	W09	17-Nov-14	27.9	29.2	3770	NA	3260	3370	74	44.1	23.5	3500	50.5	48.8
C	W10	24-Nov-14	27.0	29.2	3760	NA	3220	3170	105	168	159	3320	41.8	54.5
C	W11	01-Dec-14	25.9	28.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
C	W12	08-Dec-14	25.5	27.8	3900	NA	3350	3350	503	439	106	3430	380	368
C	W13	15-Dec-14	25.1	26.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
C	W14	22-Dec-14	24.1	25.4	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
C	W15	29-Dec-14	23.3	24.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W00	05-Jan-15	22.7	25.7	3470	NA	2830	2900	21.5	15.3	38.3	3010 J	26.9	26.1
TR01	W01	12-Jan-15	21.6	27.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W02	19-Jan-15	20.4	25.9	3610	NA	2640	2560	20.7	11.1	42.7	3100	33.5	25.3
TR01	W03	26-Jan-15	21.9	30.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W04	02-Feb-15	27	32	3520	NA	2980	2880	129	20.5	52.9	3120	89.4	63.7
TR01	W05	09-Feb-15	27.8	30.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W06	16-Feb-15	28.7	29.4	3740	NA	3100	2900	84.8	38	48.5	3160	30.6	38.4
TR01	W07	23-Feb-15	28.7	25.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W08	02-Mar-15	28.2	24.9	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W09	09-Mar-15	29.3	28.1	3290	NA	2780	2710	19.1	16.6	57.1	2870 J	117	16.7
TR01	W10	16-Mar-15	29.5	29.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W11	23-Mar-15	34.9	36.4	4270	NA	3750	3610	<10	<10	52.4	3960	30.4	24.2
TR01	W12	30-Mar-15	34.4	38.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W00	06-Apr-15	32.3	36	3540	NA	2920	2710	28.2	<10	44	3220	14.2	12.7
TR02	W01	13-Apr-15	38	39.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W02	20-Apr-15	36.7	39.3	3060	NA	2660	2390	68.3	333	38.2	2960	12.6	10.7
TR02	W03	27-Apr-15	36.1	39.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W04	04-May-15	35.2	39.1	3490	NA	5240	5090	32.6	<10	62.2	3070	23.2	34.7
TR02	W05	11-May-15	33.4	37.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W06	18-May-15	32.0	36.6	13400	NA	13400	13000	1490 J	651	31.6	12900 J	257	225
TR02	W07	25-May-16	31.9	36.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W08	01-Jun-15	31.3	35.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W09	08-Jun-15	30.9	35.3	12300	NA	12000	11900	9630	125	187	12600	961	1090
TR02	W10	15-Jun-15	30.8	35.6	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W11	22-Jun-15	30.9	35.7	10500	NA	10400	10700	3600	82.9	393	10800	398	54
TR02	W12	29-Jun-15	30.3	35.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W13	06-Jul-15	30.0	35.4	6750	NA	6390	5680	3140	96.2	408	6420	1510 J	854
TR02	W14	13-Jul-15	30.4	35.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W15	20-Jul-15	30.5	35.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W16	27-Jul-15	28.6	33.7	5820	NA	5320 J	5160	861	11	236	5650	62.8	38.2
TR02	W17	03-Aug-15	28.2	33.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W18	10-Aug-15	28.4	33.6	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W19	17-Aug-15	28.3	33.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W20	24-Aug-15	28.3	33.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W21	31-Aug-15	25.7	31.9	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W22	07-Sep-15	25.0	32.5	4030	NA	3520	3320	27.4	<10	83.1	3800	39.8	20
TR02	W23	14-Sep-15	28.0	37.4	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W24	21-Sep-15	21.7	32.4	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W25	28-Sep-15	5.2	7.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W26	05-Oct-15	14.8	21.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W27	12-Oct-15	10.1	17.5	3590	NA	2740	2640	53.3	13.9	64.6	2980	<10	<10
TR02	W28	19-Oct-15	23.2	30.1	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W29	26-Oct-15	11.2	17.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W30	02-Nov-15	23.7	26.9	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W31	09-Nov-15	23.2	21.1	4060	NA	4000	3790	776	15.4	113	4090	11.3	NS[3]

Table 4. Zinc, Dissolved (µg/L)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW H[1] (gpm)	FLOW V[1,2] (gpm)	FDB	SMP	SB1EFF	SFWEFF	HSSFWMP11	AC1EFF	RDEFF	SB2EFF	BTEFF	AC2EFF
TR02	W32	16-Nov-15	23.3	16.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W33	23-Nov-15	22.2	12.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W34	30-Nov-15	21.7	10.3	3340	3550	3230	2980	491	14.9	111	3300	42	<10
TR02	W35	07-Dec-15	21.3	9.7	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W36	14-Dec-15	31.1	17.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W37	21-Dec-15	46.7	30.3	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W38	28-Dec-15	46.3	29.9	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W39	04-Jan-16	30.2	30.1	NS[4]	3680	3220	3180	111	16.9	136	3230	211	<10
TR02	W40	11-Jan-16	26.2	29.8	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W41	18-Jan-16	25.9	29.9	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W42	25-Jan-16	25.7	30.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W43	01-Feb-16	25.5	29.6	NS[4]	3410	3060	2940	75	23	130	3060	11.7	<10
TR02	W44	08-Feb-16	24.9	31.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W45	15-Feb-16	24.8	31.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W46	22-Feb-16	24.7	30.8	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W47	29-Feb-16	22.9	30.5	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W48	07-Mar-16	21.5	29.7	NS[4]	3450	3000	2850	<10	15	135 J	3090	20.6	17.7

NOTES:

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).
AC1EFF = Aeration Channel Effluent/Rock Drain Influent
AC2EFF = Aeration Cascade Effluent
BTEFF = Biotreatment Cell Effluent/Aeration Cascade Influent
C = Colonization
FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)
Flow H = horizontal treatment train average flow rate
Flow V = vertical treatment train average flow rate
gpm = gallons per minute
HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent
J = Estimated result
MDL = method detection limit
NA = not available
NS = not sampled
OU = operable unit
R = rejected
RDEFF = Rock Drain Effluent
RL = reporting limit
SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent
SB2EFF = Settling Basin No. 2 Effluent/Biotreatment Cell Influent
SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent
SMP = Static Mixer Pool
TR** = Test Run
µg/L = microgram per liter
VWTT = Vertical Wetland Treatment Train
W** = Week of Treatability Study Phase

[1] The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.

[2] The Aeration Cascade in the VWTT was bypassed on different occasions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 influent flow rates to better represent metals mass removal by the VWTT.

[3] Monitoring location AC2EFF was not sampled during W31 of phase TR02 because of Enhance Wetland Demonstration construction activities.

[4] As of 04 JAN 2016, monitoring location FDB will not be sampled since it is no longer representative of the HWTT and VWTT influent due to changes during the construction of the Enhanced Wetland Demonstration.

Table 4A. Zinc Dissolved (µg/L)
Enhanced Wetland Demonstration
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW EWD[1] (gpm)	SMP	SB3EFF	MRCEFF	BT2EFF	AC3EFF
EWD-C	W00	23-Nov-15	876.9	3900	3370	3330	456	475
EWD-C	W01	30-Nov-15	706.1	3550	3240	3150	357	1060
EWD-C	W02	07-Dec-15	590.9	NS	NS	NS	NS	NS
EWD-C	W03	14-Dec-15	576.6	4260	4010	3710	1800 J	172
EWD-C	W04	21-Dec-15	541.9	NS	NS	NS	NS	NS
EWD-C	W05	28-Dec-15	535.8	NS	NS	NS	NS	NS
EWD-O	W00	04-Jan-16	552.3	3680	3120	2980	12.6	31.6
EWD-O	W01	11-Jan-16	557.3	NS	NS	NS	NS	NS
EWD-O	W02	18-Jan-16	555.4	NS	NS	NS	NS	NS
EWD-O	W03	25-Jan-16	553.5	NS	NS	NS	NS	NS
EWD-O	W04	01-Feb-16	574.3	3410	2600	2400	426	17.6
EWD-O	W05	08-Feb-16	535.6	NS	NS	NS	NS	NS
EWD-O	W06	15-Feb-16	537.8	NS	NS	NS	NS	NS
EWD-O	W07	22-Feb-16	540.3	NS	NS	NS	NS	NS
EWD-O	W08	29-Feb-16	543.7	NS	NS	NS	NS	NS
EWD-O	W09	07-Mar-16	542.1	3450	3100	2860	14.6	34.5

NOTES:

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).

AC3EFF = EWD Aeration Cascade effluent monitoring location
BT2EFF = EWD Biotreatment Cell effluent monitoring location
EWD = Enhanced Wetland Demonstration
EWD-C = EWD Colonization Phase
EWD-O = EWD Operation Phase
Flow EWD = EWD average flow rate
gpm = gallons per minute
MRCEFF = EWD Manganese Removal Cell effluent monitoring location
NS = not sampled
OU = operable unit
RL = reporting limit
SB3EFF = EWD Settling Basin effluent monitoring location
SMP = Static Mixer Pool
µg/L = microgram per liter
W** = Week of Treatability Study Phase

[1] The EWD flow rate is estimated based on the system's effluent average flow rate.

Table 5. Manganese, Dissolved (µg/L)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW H[1] (gpm)	FLOW V[1,2] (gpm)	FDB	SMP	SB1EFF	SFWEFF	HSSFWMP11	AC1EFF	RDEFF	SB2EFF	BTEFF	AC2EFF
C	W00	15-Sep-14	25.8	33.8	2080	NA	2100	2040 J	1730 J	1610	1760	2110	1690	1700
C	W01	22-Sep-14	30.7	44.5	2160 J	NA	2100	2110	1860 J	1630	1620	2110	2000	1970
C	W02	29-Sep-14	29.5	41.3	2200	NA	2200	2100	1800	1660	1500	2140 J	2170 J	2110
C	W03	06-Oct-14	30.2	35.1	2260	NA	2250	2230	1930	1840	1750 J	2280	2220 J	2160
C	W04	13-Oct-14	26.8	35.7	2310 B	NA	2310 B	2180 B	2000 B	1950 B	1970 B	2310 B	2030 B	2040 B
C	W05	20-Oct-14	29.2	35.9	2270	NA	2440	2370	2000 J	1990	2030	2360	1780	1820
C	W06	27-Oct-14	27.7	43.2	2220	NA	2300	2240	1960	1950	1650 J	R	1470	1520
C	W07	03-Nov-14	28.8	32.0	2250	NA	2260	2270	1490	1540	594 J	2270	1750	1750
C	W08	10-Nov-14	27.9	29.8	2400	NA	2430	2390	1080	1280	293 J	2300 J	1690 J	1750
C	W09	17-Nov-14	27.9	29.2	2260	NA	2240	2340	904 J	1020	396 J	2220	1670	1680
C	W10	24-Nov-14	27.0	29.2	2180	NA	2170	2160	695 J	843	106 J	2110	1410	1340
C	W11	01-Dec-14	25.9	28.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
C	W12	08-Dec-14	25.5	27.8	2200	NA	2220	2200	686	825	232	2200	568	571
C	W13	15-Dec-14	25.1	26.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
C	W14	22-Dec-14	24.1	25.4	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
C	W15	29-Dec-14	23.3	24.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W00	05-Jan-15	22.7	25.7	2150	NA	2150	2110	717	734	141	2130 J	519	520
TR01	W01	12-Jan-15	21.6	27.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W02	19-Jan-15	20.4	25.9	2070	NA	2000	2020	819 J	737	190	2130	592 J	618
TR01	W03	26-Jan-15	21.9	30.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W04	02-Feb-15	27	32	2070	NA	2070	2020	1110	931	654	2070	1290	1270
TR01	W05	09-Feb-15	27.8	30.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W06	16-Feb-15	28.7	29.4	2100	NA	2060	1960	1100	917	721	2050	525	521
TR01	W07	23-Feb-15	28.7	25.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W08	02-Mar-15	28.2	24.9	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W09	09-Mar-15	29.3	28.1	2090	NA	2040	1970	930 J	812	641	1840 J	489	500
TR01	W10	16-Mar-15	29.5	29.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W11	23-Mar-15	34.9	36.4	2070	NA	2070	2040	1050 J	904	1020	2160	566	558
TR01	W12	30-Mar-15	34.4	38.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W00	06-Apr-15	32.3	36	1870 B	NA	1880 B	1880 B	969 B	830 B	913 B	1910 B	1040 J	1040 B
TR02	W01	13-Apr-15	38	39.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W02	20-Apr-15	36.7	39.3	1840	NA	1900	1840	927	912	732 J	1870	816	844 J
TR02	W03	27-Apr-15	36.1	39.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W04	04-May-15	35.2	39.1	1910	NA	2230	2170	976	893	949	1830	718	689
TR02	W05	11-May-15	33.4	37.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W06	18-May-15	32.0	36.6	4260	NA	4440	4270	1600 J	1280	387	4080 J	1060	1080
TR02	W07	25-May-16	31.9	36.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W08	01-Jun-15	31.3	35.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W09	08-Jun-15	30.9	35.3	3970	NA	3920	3860	3370	3190 J	69.8	3970	3880	3730
TR02	W10	15-Jun-15	30.8	35.6	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W11	22-Jun-15	30.9	35.7	3440 B	NA	3460 B	3480 B	3390 B	3070 J	37.9 B	3640 B	5500 B	4210 B
TR02	W12	29-Jun-15	30.3	35.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W13	06-Jul-15	30.0	35.4	3350	NA	3270	3100	2380	2420	328	3230	3720 J	3810
TR02	W14	13-Jul-15	30.4	35.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W15	20-Jul-15	30.5	35.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W16	27-Jul-15	28.6	33.7	2860	NA	2830 J	2760	1030	1710	736	2850	1620	1540
TR02	W17	03-Aug-15	28.2	33.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W18	10-Aug-15	28.4	33.6	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W19	17-Aug-15	28.3	33.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W20	24-Aug-15	28.3	33.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W21	31-Aug-15	25.7	31.9	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W22	07-Sep-15	25.0	32.5	2410	NA	2380	2260	1010	1220	603	2470	1150	1170
TR02	W23	14-Sep-15	28.0	37.4	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W24	21-Sep-15	21.7	32.4	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W25	28-Sep-15	5.2	7.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W26	05-Oct-15	14.8	21.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W27	12-Oct-15	10.1	17.5	2380	NA	2210	2150	560	1200	389	2370	1030	1160
TR02	W28	19-Oct-15	23.2	30.1	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W29	26-Oct-15	11.2	17.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W30	02-Nov-15	23.7	26.9	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W31	09-Nov-15	23.2	21.1	2460	NA	2210	2130	121	738	16.7	2400	720	NS[3]

Table 5. Manganese, Dissolved (µg/L)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW H[1] (gpm)	FLOW V[1,2] (gpm)	FDB	SMP	SB1EFF	SFWEFF	HSSFWMP11	AC1EFF	RDEFF	SB2EFF	BTEFF	AC2EFF
TR02	W32	16-Nov-15	23.3	16.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W33	23-Nov-15	22.2	12.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W34	30-Nov-15	21.7	10.3	2250	2220	2350	2250	77.5	633	2.4	2340	256	269
TR02	W35	07-Dec-15	21.3	9.7	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W36	14-Dec-15	31.1	17.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W37	21-Dec-15	46.7	30.3	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W38	28-Dec-15	46.3	29.9	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W39	04-Jan-16	30.2	30.1	NS[4]	2260	2320	2260	131	526	224	2190	569	538
TR02	W40	11-Jan-16	26.2	29.8	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W41	18-Jan-16	25.9	29.9	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W42	25-Jan-16	25.7	30.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W43	01-Feb-16	25.5	29.6	NS[4]	2120	2060	2120	253	366	<1	2100	339	258
TR02	W44	08-Feb-16	24.9	31.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W45	15-Feb-16	24.8	31.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W46	22-Feb-16	24.7	30.8	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W47	29-Feb-16	22.9	30.5	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W48	07-Mar-16	21.5	29.7	NS[4]	2010	2120	1800	482	802	1.2	2050	752	514

NOTES:

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).

AC1EFF = Aeration Channel Effluent/Rock Drain Influent
AC2EFF = Aeration Cascade Effluent
B = Analyte is detected in an associated blank
BTEFF = Biotreatment Cell Effluent/Aeration Cascade Influent
C = Colonization
FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)
Flow H = horizontal treatment train average flow rate
Flow V = vertical treatment train average flow rate
gpm = gallons per minute
HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent
J = Estimated result
MDL = method detection limit
NA = not available
NS = not sampled
OU = operable unit
R = rejected
RDEFF = Rock Drain Effluent
RL = reporting limit
SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent
SB2EFF = Settling Basin No. 2 Effluent/Biotreatment Cell Influent
SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent
SMP = Static Mixer Pool
TR** = Test Run
µg/L = microgram per liter
VWTT = Vertical Wetland Treatment Train
W** = Week of Treatability Study Phase

[1] The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.

[2] The Aeration Cascade in the VWTT was bypassed on different occasions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 influent flow rates to better represent metals mass removal by the VWTT.

[3] Monitoring location AC2EFF was not sampled during W31 of phase TR02 because of Enhance Wetland Demonstration construction activities.

[4] As of 04 JAN 2016, monitoring location FDB will not be sampled since it is no longer representative of the HWTT and VWTT influent due to changes during the construction of the Enhanced Wetland Demonstration.

Table 5A. Manganese Dissolved (µg/L)
Enhanced Wetland Demonstration
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW EWD[1] (gpm)	SMP	SB3EFF	MRCEFF	BT2EFF	AC3EFF
EWD-C	W00	23-Nov-15	876.9	2340	2290	2280	1780	1820
EWD-C	W01	30-Nov-15	706.1	2220	2410	2380	2040	2050
EWD-C	W02	07-Dec-15	590.9	NS	NS	NS	NS	NS
EWD-C	W03	14-Dec-15	576.6	2420	2420	2210	1980	1910
EWD-C	W04	21-Dec-15	541.9	NS	NS	NS	NS	NS
EWD-C	W05	28-Dec-15	535.8	NS	NS	NS	NS	NS
EWD-O	W00	04-Jan-16	552.3	2260	2330	1910	410	407
EWD-O	W01	11-Jan-16	557.3	NS	NS	NS	NS	NS
EWD-O	W02	18-Jan-16	555.4	NS	NS	NS	NS	NS
EWD-O	W03	25-Jan-16	553.5	NS	NS	NS	NS	NS
EWD-O	W04	01-Feb-16	574.3	2120	2020	1580	174	183
EWD-O	W05	08-Feb-16	535.6	NS	NS	NS	NS	NS
EWD-O	W06	15-Feb-16	537.8	NS	NS	NS	NS	NS
EWD-O	W07	22-Feb-16	540.3	NS	NS	NS	NS	NS
EWD-O	W08	29-Feb-16	543.7	NS	NS	NS	NS	NS
EWD-O	W09	07-Mar-16	542.1	2010	2010	1400	150	153

NOTES:

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).

AC3EFF = EWD Aeration Cascade effluent monitoring location
BT2EFF = EWD Biotreatment Cell effluent monitoring location
EWD = Enhanced Wetland Demonstration
EWD-C = EWD Colonization Phase
EWD-O = EWD Operation Phase
Flow EWD = EWD average flow rate
gpm = gallons per minute
MRCEFF = EWD Manganese Removal Cell effluent monitoring location
NS = not sampled
OU = operable unit
RL = reporting limit
SB3EFF = EWD Settling Basin effluent monitoring location
SMP = Static Mixer Pool
µg/L = microgram per liter
W** = Week of Treatability Study Phase

[1] The EWD flow rate is estimated based on the system's effluent average flow rate.

Table 6. Total Suspended Solids (mg/L)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW H[1] (gpm)	FLOW V[1,2] (gpm)	FDB	SMP	SB1EFF	SFWEFF	HSSFWMP11	AC1EFF	RDEFF	SB2EFF	BTEFF	AC2EFF
C	W00	15-Sep-14	25.8	33.8	6	NA	<5	<5	<5	<5	<5	<5	<5	<5
C	W01	22-Sep-14	30.7	44.5	6	NA	12	<5	<5	6	<5	<5	<5	<5
C	W02	29-Sep-14	29.5	41.3	8	NA	<5	6	<5	10	<5	9	<5	<5
C	W03	06-Oct-14	30.2	35.1	<5	NA	<5	6	<5	<5	<5	<5	<5	<5
C	W04	13-Oct-14	26.8	35.7	11	NA	10	14	<5	5	<5	15	<5	<5
C	W05	20-Oct-14	29.2	35.9	17	NA	7	9	<5	22	<5	12	6	12
C	W06	27-Oct-14	27.7	43.2	<5	NA	7	<5	<5	<5	5	R	<5	<5
C	W07	03-Nov-14	28.8	32.0	11	NA	6	8	<5	<5	<5	<5	<5	<5
C	W08	10-Nov-14	27.9	29.8	<5	NA	7	6	<5	<5	<5	11	5	10
C	W09	17-Nov-14	27.9	29.2	12	NA	13	15	80	30	11	15	<5	14
C	W10	24-Nov-14	27.0	29.2	42	NA	10	7	<5	15	<5	7	6	14
C	W11	01-Dec-14	25.9	28.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
C	W12	08-Dec-14	25.5	27.8	14	NA	9	<5	<5	<5	<5	<5	<5	<5
C	W13	15-Dec-14	25.1	26.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
C	W14	22-Dec-14	24.1	25.4	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
C	W15	29-Dec-14	23.3	24.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W00	05-Jan-15	22.7	25.7	9	NA	6	9	7	10	8	<5	7	8
TR01	W01	12-Jan-15	21.6	27.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W02	19-Jan-15	20.4	25.9	16	NA	5	6	<5	18	<5	6	<5	<5
TR01	W03	26-Jan-15	21.9	30.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W04	02-Feb-15	27	32	20	NA	11	10	<5	14	6	<5	<5	<5
TR01	W05	09-Feb-15	27.8	30.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W06	16-Feb-15	28.7	29.4	24	NA	12	6	5	8	<5	6	<5	<5
TR01	W07	23-Feb-15	28.7	25.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W08	02-Mar-15	28.2	24.9	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W09	09-Mar-15	29.3	28.1	29	NA	10	11	6	8	5	<5	9	7
TR01	W10	16-Mar-15	29.5	29.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W11	23-Mar-15	34.9	36.4	28	NA	38	19	11	53	9	15	9	18
TR01	W12	30-Mar-15	34.4	38.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W00	06-Apr-15	32.3	36	13	NA	7	7	<5	6	<5	<5	8	9
TR02	W01	13-Apr-15	38	39.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W02	20-Apr-15	36.7	39.3	17	NA	14	<5	<5	<5	6	8	<5	7
TR02	W03	27-Apr-15	36.1	39.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W04	04-May-15	35.2	39.1	27	NA	<5	6	<5	10	<5	10	7	7
TR02	W05	11-May-15	33.4	37.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W06	18-May-15	32.0	36.6	16	NA	5	11	<5	<5	R	<5	<5	<5
TR02	W07	25-May-16	31.9	36.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W08	01-Jun-15	31.3	35.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W09	08-Jun-15	30.9	35.3	6	NA	6	6	<5	7	<5	<5	6	6
TR02	W10	15-Jun-15	30.8	35.6	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W11	22-Jun-15	30.9	35.7	8	NA	10	<5	5	5	<5	10	6	6
TR02	W12	29-Jun-15	30.3	35.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W13	06-Jul-15	30.0	35.4	12	NA	9	<5	<5	9	<5	5	13	12
TR02	W14	13-Jul-15	30.4	35.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W15	20-Jul-15	30.5	35.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W16	27-Jul-15	28.6	33.7	10	NA	10	6	<5	6	<5	6	<5	<5
TR02	W17	03-Aug-15	28.2	33.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W18	10-Aug-15	28.4	33.6	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W19	17-Aug-15	28.3	33.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W20	24-Aug-15	28.3	33.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W21	31-Aug-15	25.7	31.9	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W22	07-Sep-15	25.0	32.5	17	NA	8	10	7	<5	5	10	6	<5
TR02	W23	14-Sep-15	28.0	37.4	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W24	21-Sep-15	21.7	32.4	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W25	28-Sep-15	5.2	7.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W26	05-Oct-15	14.8	21.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W27	12-Oct-15	10.1	17.5	7	NA	<5	<5	<5	<5	<5	5	<5	<5
TR02	W28	19-Oct-15	23.2	30.1	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W29	26-Oct-15	11.2	17.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W30	02-Nov-15	23.7	26.9	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W31	09-Nov-15	23.2	21.1	14	NA	12	9	<5	6	<5	10	5	NS[3]

Table 6. Total Suspended Solids (mg/L)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW H[1] (gpm)	FLOW V[1,2] (gpm)	FDB	SMP	SB1EFF	SFWEFF	HSSFWMP11	AC1EFF	RDEFF	SB2EFF	BTEFF	AC2EFF
TR02	W32	16-Nov-15	23.3	16.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W33	23-Nov-15	22.2	12.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W34	30-Nov-15	21.7	10.3	19		34	26	16 J	20	5	6	6	<5
TR02	W35	07-Dec-15	21.3	9.7	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W36	14-Dec-15	31.1	17.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W37	21-Dec-15	46.7	30.3	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W38	28-Dec-15	46.3	29.9	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W39	04-Jan-16	30.2	30.1	NS[4]	20	9	10	<5	<5	<5	9	<5	<5
TR02	W40	11-Jan-16	26.2	29.8	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W41	18-Jan-16	25.9	29.9	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W42	25-Jan-16	25.7	30.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W43	01-Feb-16	25.5	29.6	NS[4]	27	13	6	<5	6	<5	14	11 J	7
TR02	W44	08-Feb-16	24.9	31.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W45	15-Feb-16	24.8	31.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W46	22-Feb-16	24.7	30.8	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W47	29-Feb-16	22.9	30.5	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W48	07-Mar-16	21.5	29.7	NS[4]	14	21	16	10	10	15 J	13	6	<5

NOTES:

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).
AC1EFF = Aeration Channel Effluent/Rock Drain Influent
AC2EFF = Aeration Cascade Effluent
BTEFF = Biotreatment Cell Effluent/Aeration Cascade Influent
C = Colonization
FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)
Flow H = Horizontal Treatment Train average flow rate
Flow V = Vertical Treatment Train average flow rate
gpm = gallons per minute
HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent
J = Estimated result
mg/L = milligram per liter
NA = not available
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RDEFF = Rock Drain Effluent
RL = reporting limit
SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent
SB2EFF = Settling Basin No. 2 Effluent/Biotreatment Cell Influent
SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent
SMP = Static Mixer Pool
TR** = Test Run
VWTT = Vertical Wetland Treatment Train
W** = Week of Treatability Study Phase

[1] The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.

[2] The Aeration Cascade in the VWTT was bypassed on different occassions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 influent flow rates to better represent metals mass removal by the VWTT.

[3] Monitoring location AC2EFF was not sampled during W31 of phase TR02 because of Enhance Wetland Demonstration construction activities.

[4] As of 04 JAN 2016, monitoring location FDB will not be sampled since it is no longer representative of the HWTT and VWTT influent due to changes during the construction of the Enhanced Wetland Demonstration.

Table 6A. Total Suspended Solids (mg/L)
Enhanced Wetland Demonstration
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW EWD[1] (gpm)	SMP	SB3EFF	MRCEFF	BT2EFF	AC3EFF
EWD-C	W00	23-Nov-15	876.9	22	13	12	12	13
EWD-C	W01	30-Nov-15	706.1	11	8 J	<5	<5	12
EWD-C	W02	07-Dec-15	590.9	NS	NS	NS	NS	NS
EWD-C	W03	14-Dec-15	576.6	34	9	15	<5	<5
EWD-C	W04	21-Dec-15	541.9	NS	NS	NS	NS	NS
EWD-C	W05	28-Dec-15	535.8	NS	NS	NS	NS	NS
EWD-O	W00	04-Jan-16	552.3	20	<5	<5	<5	<5
EWD-O	W01	11-Jan-16	557.3	NS	NS	NS	NS	NS
EWD-O	W02	18-Jan-16	555.4	NS	NS	NS	NS	NS
EWD-O	W03	25-Jan-16	553.5	NS	NS	NS	NS	NS
EWD-O	W04	01-Feb-16	574.3	27	14 J	<5	9	7
EWD-O	W05	08-Feb-16	535.6	NS	NS	NS	NS	NS
EWD-O	W06	15-Feb-16	537.8	NS	NS	NS	NS	NS
EWD-O	W07	22-Feb-16	540.3	NS	NS	NS	NS	NS
EWD-O	W08	29-Feb-16	543.7	NS	NS	NS	NS	NS
EWD-O	W09	07-Mar-16	542.1	14	<5	<5	<5	<5

NOTES:

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).

AC3EFF = EWD Aeration Cascade effluent monitoring location
BT2EFF = EWD Biotreatment Cell effluent monitoring location
EWD = Enhanced Wetland Demonstration
EWD-C = EWD Colonization Phase
EWD-O = EWD Operation Phase
Flow EWD = EWD average flow rate
gpm = gallons per minute
J = Estimated result
MRCEFF = EWD Manganese Removal Cell effluent monitoring location
NS = not sampled
OU = operable unit
RL = reporting limit
SB3EFF = EWD Settling Basin effluent monitoring location
SMP = Static Mixer Pool
µg/L = microgram per liter
W** = Week of Treatability Study Phase

[1] The EWD flow rate is estimated based on the system's effluent average flow rate.

Table 7. Total Organic Carbon (mg/L)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW H[1] (gpm)	FLOW V[1,2] (gpm)	FDB	SMP	SB1EFF	SFWEFF	HSSFWMP11	AC1EFF	RDEFF	SB2EFF	BTEFF	AC2EFF
C	W00	15-Sep-14	25.8	33.8	NR	NA	<1	<1	12.7	24.9	21.5	<1	38	31.6
C	W01	22-Sep-14	30.7	44.5	NR	NA	1.3	<1	6.8	11.7	12.5	1	21	19.7
C	W02	29-Sep-14	29.5	41.3	NR	NA	<1	<1	5.9	9	9.1	1.3	10.6	9.2
C	W03	06-Oct-14	30.2	35.1	NR	NA	<1	<1	4.2	7.4	7.6	<1	9.2	7.8
C	W04	13-Oct-14	26.8	35.7	NR	NA	<1	<1	3.2	4.9	5.2	1.1	6.2 J	5.3
C	W05	20-Oct-14	29.2	35.9	NR	NA	<1	<1	3	4.2	4.4	<1	4.6	4.4
C	W06	27-Oct-14	27.7	43.2	NR	NA	<1	<1	2.9	4	6.5	R	3.5	3.3
C	W07	03-Nov-14	28.8	32.0	NR	NA	<1	<1	1.6	2.6	2.5	<1	2.6	2.6
C	W08	10-Nov-14	27.9	29.8	NR	NA	<1	<1	1.6	2.5	2.1	<1	2.4	2.4
C	W09	17-Nov-14	27.9	29.2	NR	NA	<1	<1	1.7	2.5	2	<1	2.5	2.4
C	W10	24-Nov-14	27.0	29.2	NR	NA	<1	<1	1.3	2.2	1.5	<1	2.3	2.5
C	W11	01-Dec-14	25.9	28.5	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
C	W12	08-Dec-14	25.5	27.8	NR	NA	<1	1.8	1.8	2.8	1.6	<1	2	1.9
C	W13	15-Dec-14	25.1	26.2	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
C	W14	22-Dec-14	24.1	25.4	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
C	W15	29-Dec-14	23.3	24.5	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W00	05-Jan-15	22.7	25.7	NR	NA	<1	<1	1.5	2.4	1.4 J	<1	1.9	2.1
TR01	W01	12-Jan-15	21.6	27.3	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W02	19-Jan-15	20.4	25.9	NR	NA	<1	<1	1.3	1.7	1.2 J	<1	1.6	1.7
TR01	W03	26-Jan-15	21.9	30.8	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W04	02-Feb-15	27	32	NR	NA	<1	<1	1.3	1.6	1.3	<1	1.9	2.6
TR01	W05	09-Feb-15	27.8	30.3	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W06	16-Feb-15	28.7	29.4	NR	NA	<1	<1	1.2	1.3	1.1	<1	1.1	1.2
TR01	W07	23-Feb-15	28.7	25.2	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W08	02-Mar-15	28.2	24.9	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W09	09-Mar-15	29.3	28.1	NR	NA	<1	<1	1.1	1.6	1.3	<1	1.3	1.4
TR01	W10	16-Mar-15	29.5	29.7	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W11	23-Mar-15	34.9	36.4	NR	NA	<1	<1	<1	1.4	1.2	<1	1.9	2.4
TR01	W12	30-Mar-15	34.4	38.5	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W00	06-Apr-15	32.3	36	NR	NA	<1	<1	<1	1.1	<1	<1	<1	<1
TR02	W01	13-Apr-15	38	39.8	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W02	20-Apr-15	36.7	39.3	NR	NA	<1	<1	2.7	1.1	<1	<1	<1	1
TR02	W03	27-Apr-15	36.1	39.3	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W04	04-May-15	35.2	39.1	NR	NA	<1	<1	<1	1.5	1.7	<1	1.4	1.3
TR02	W05	11-May-15	33.4	37.8	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W06	18-May-15	32.0	36.6	NR	NA	<1	<1	<1	1.1	<1	<1	<1	<1
TR02	W07	25-May-16	31.9	36.2	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W08	01-Jun-15	31.3	35.7	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W09	08-Jun-15	30.9	35.3	NR	NA	<1	<1	1.1	3	2.4	<1	1.1	1.3
TR02	W10	15-Jun-15	30.8	35.6	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W11	22-Jun-15	30.9	35.7	NR	NA	<1	<1	1.6	2.3	1.5	<1	1.1	1.1
TR02	W12	29-Jun-15	30.3	35.5	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W13	06-Jul-15	30.0	35.4	NR	NA	<1	<1	1.4	2.7	1.8	<1	1.1	1
TR02	W14	13-Jul-15	30.4	35.7	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W15	20-Jul-15	30.5	35.7	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W16	27-Jul-15	28.6	33.7	NR	NA	<1	<1	<1	2	1.4	<1	<1	<1
TR02	W17	03-Aug-15	28.2	33.3	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W18	10-Aug-15	28.4	33.6	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W19	17-Aug-15	28.3	33.8	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W20	24-Aug-15	28.3	33.8	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W21	31-Aug-15	25.7	31.9	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W22	07-Sep-15	25.0	32.5	NR	NA	<1	<1	<1	1.6	1.2	<1	<1	<1
TR02	W23	14-Sep-15	28.0	37.4	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W24	21-Sep-15	21.7	32.4	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W25	28-Sep-15	5.2	7.7	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W26	05-Oct-15	14.8	21.3	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W27	12-Oct-15	10.1	17.5	NR	NA	<1	<1	<1	1.6	1.2	<1	<1	<1
TR02	W28	19-Oct-15	23.2	30.1	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W29	26-Oct-15	11.2	17.3	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W30	02-Nov-15	23.7	26.9	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W31	09-Nov-15	23.2	21.1	NR	NA	<1	<1	<1	<1	<1	<1	<1	NS[3]

Table 7. Total Organic Carbon (mg/L)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW H[1] (gpm)	FLOW V[1,2] (gpm)	FDB	SMP	SB1EFF	SFWEFF	HSSFWMP11	AC1EFF	RDEFF	SB2EFF	BTEFF	AC2EFF
TR02	W32	16-Nov-15	23.3	16.2	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W33	23-Nov-15	22.2	12.3	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W34	30-Nov-15	21.7	10.3	NR	NR	<1	<1	<1	<1	<1	<1	<1	<1
TR02	W35	07-Dec-15	21.3	9.7	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W36	14-Dec-15	31.1	17.1	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W37	21-Dec-15	46.7	30.3	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W38	28-Dec-15	46.3	29.9	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W39	04-Jan-16	30.2	30.1	NR	NR	<1	<1	<1	<1	<1	<1	<1	<1
TR02	W40	11-Jan-16	26.2	29.8	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W41	18-Jan-16	25.9	29.9	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W42	25-Jan-16	25.7	30.1	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W43	01-Feb-16	25.5	29.6	NR	NR	<1	<1	<1	<1	<1	<1	<1	<1
TR02	W44	08-Feb-16	24.9	31.1	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W45	15-Feb-16	24.8	31.0	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W46	22-Feb-16	24.7	30.8	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W47	29-Feb-16	22.9	30.5	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W48	07-Mar-16	21.5	29.7	NR	NR	<1	<1	1.2	1.1	1.1	<1	<1	<1

NOTES:

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).
AC1EFF = Aeration Channel Effluent/Rock Drain Influent
AC2EFF = Aeration Cascade Effluent
BTEFF = Biotreatment Cell Effluent/Aeration Cascade Influent
C = Colonization
FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)
Flow H = Horizontal Treatment Train average flow rate
Flow V = Vertical Treatment Train average flow rate
gpm = gallons per minute
HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent
J = Estimated result
MDL = method detection limit
mg/L = milligram per liter
NA = not available
NR = not required
NS = not sampled
OU = operable unit
R = rejected
RDEFF = Rock Drain Effluent
RL = reporting limit
SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent
SB2EFF = Settling Basin No. 2 Effluent/Biotreatment Cell Influent
SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent
SMP = Static Mixer Pool
TR** = Test Run
VWTT = Vertical Wetland Treatment Train
W** = Week of Treatability Study Phase

[1] The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.

[2] The Aeration Cascade in the VWTT was bypassed on different occassions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 influent flow rates to better represent metals mass removal by the VWTT.

[3] Monitoring location AC2EFF was not sampled during W31 of phase TR02 because of Enhance Wetland Demonstration construction activities.

Table 7A. Total Organic Carbon (mg/L)
Enhanced Wetland Demonstration
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW EWD[1] (gpm)	SMP	SB3EFF	MRCEFF	BT2EFF	AC3EFF
EWD-C	W00	23-Nov-15	876.9	NR	NR	<1	60.7	58.5
EWD-C	W01	30-Nov-15	706.1	NR	NR	<1	19.3	16.4
EWD-C	W02	07-Dec-15	590.9	NR	NR	NS	NS	NS
EWD-C	W03	14-Dec-15	576.6	NR	NR	<1	9.9	10
EWD-C	W04	21-Dec-15	541.9	NR	NR	NS	NS	NS
EWD-C	W05	28-Dec-15	535.8	NR	NR	NS	NS	NS
EWD-O	W00	04-Jan-16	552.3	NR	NR	<1	7.5	5.8
EWD-O	W01	11-Jan-16	557.3	NR	NR	NS	NS	NS
EWD-O	W02	18-Jan-16	555.4	NR	NR	NS	NS	NS
EWD-O	W03	25-Jan-16	553.5	NR	NR	NS	NS	NS
EWD-O	W04	01-Feb-16	574.3	NR	NR	<1	4	3.1
EWD-O	W05	08-Feb-16	535.6	NR	NR	NS	NS	NS
EWD-O	W06	15-Feb-16	537.8	NR	NR	NS	NS	NS
EWD-O	W07	22-Feb-16	540.3	NR	NR	NS	NS	NS
EWD-O	W08	29-Feb-16	543.7	NR	NR	NS	NS	NS
EWD-O	W09	07-Mar-16	542.1	NR	NR	<1	2.7	2.5

NOTES:

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).

AC3EFF = EWD Aeration Cascade effluent monitoring location
BT2EFF = EWD Biotreatment Cell effluent monitoring location
EWD = Enhanced Wetland Demonstration
EWD-C = EWD Colonization Phase
EWD-O = EWD Operation Phase
Flow EWD = EWD average flow rate
gpm = gallons per minute
MRCEFF = EWD Manganese Removal Cell effluent monitoring location
NS = not sampled
NR = not required
OU = operable unit
RL = reporting limit
SB3EFF = EWD Settling Basin effluent monitoring location
SMP = Static Mixer Pool
µg/L = microgram per liter
W** = Week of Treatability Study Phase

[1] The EWD flow rate is estimated based on the system's effluent average flow rate.

Table 8. Biological Oxygen Demand, 5 day (mg/L)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW H[1] (gpm)	FLOW V[1,2] (gpm)	FDB	SMP	SB1EFF	SFWEFF	HSSFWMP11	AC1EFF	RDEFF	SB2EFF	BTEFF	AC2EFF
C	W00	15-Sep-14	25.8	33.8	NR	NA	<2	<2	29.3	R	R	<2	77.4	53.4
C	W01	22-Sep-14	30.7	44.5	NR	NA	<2	<2	22.1	30.3	18.8	<2	29.3	28.1
C	W02	29-Sep-14	29.5	41.3	NR	NA	<2	<2	9.4	23.8	10.3	<2	20.3	10.9
C	W03	06-Oct-14	30.2	35.1	NR	NA	<2	<2	7.8	15.7	9.7	<2	20.1	12.6
C	W04	13-Oct-14	26.8	35.7	NR	NA	<2	<2	2.8	7.6	4.5	<2	16.4	17.2
C	W05	20-Oct-14	29.2	35.9	NR	NA	<2	<2	<2	3.5	2.6	<2	10.9	15.7
C	W06	27-Oct-14	27.7	43.2	NR	NA	<2	<2	3.1	2	<2	<2	11.5	8.4
C	W07	03-Nov-14	28.8	32.0	NR	NA	<2	<2	2	2.6	2.3	<2	8	4.7
C	W08	10-Nov-14	27.9	29.8	NR	NA	<2	<2	2.1	2	<2	<2	9.7	3.5
C	W09	17-Nov-14	27.9	29.2	NR	NA	<2	<2	2.9	<2	2	<2	9.6	6.4
C	W10	24-Nov-14	27.0	29.2	NR	NA	<2	<2	3.2	4.2	<2	<2	7.8	4.2
C	W11	01-Dec-14	25.9	28.5	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
C	W12	08-Dec-14	25.5	27.8	NR	NA	<2	<2	5.1	3.8	<2	<2	6.5	2.6
C	W13	15-Dec-14	25.1	26.2	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
C	W14	22-Dec-14	24.1	25.4	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
C	W15	29-Dec-14	23.3	24.5	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W00	05-Jan-15	22.7	25.7	NR	NA	<2	<2	5.1	2.4	<2	<2	3.6	2.4
TR01	W01	12-Jan-15	21.6	27.3	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W02	19-Jan-15	20.4	25.9	NR	NA	<2	<2	4.9	3.1	<2	<2	5.2	<2
TR01	W03	26-Jan-15	21.9	30.8	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W04	02-Feb-15	27	32	NR	NA	<2	<2	7.6	6.3	<2	<2	5.3	3.1
TR01	W05	09-Feb-15	27.8	30.3	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W06	16-Feb-15	28.7	29.4	NR	NA	<2	<2	<2	2.1	<2	<2	4.4	<2
TR01	W07	23-Feb-15	28.7	25.2	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W08	02-Mar-15	28.2	24.9	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W09	09-Mar-15	29.3	28.1	NR	NA	<2	<2	6.4	2	<2	<2	4.8	2.6
TR01	W10	16-Mar-15	29.5	29.7	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W11	23-Mar-15	34.9	36.4	NR	NA	<2	<2	2.3	6	<2	<2	3.7	2.9
TR01	W12	30-Mar-15	34.4	38.5	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W00	06-Apr-15	32.3	36	NR	NA	<2	<2	3.2	<2	<2	<2	2.8	<2
TR02	W01	13-Apr-15	38	39.8	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W02	20-Apr-15	36.7	39.3	NR	NA	<2	<2	2.5	<2	<2	<2	3	<2
TR02	W03	27-Apr-15	36.1	39.3	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W04	04-May-15	35.2	39.1	NR	NA	<2	<2	<2	<2	<2	<2	2.1	<2
TR02	W05	11-May-15	33.4	37.8	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W06	18-May-15	32.0	36.6	NR	NA	<2	<2	<2	<2	R	<2	<2	<2
TR02	W07	25-May-16	31.9	36.2	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W08	01-Jun-15	31.3	35.7	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W09	08-Jun-15	30.9	35.3	NR	NA	<2	<2	<2	<2	<2	<2	<2	<2
TR02	W10	15-Jun-15	30.8	35.6	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W11	22-Jun-15	30.9	35.7	NR	NA	<2	<2	<2	2.4	<2	<2	3.2	<2
TR02	W12	29-Jun-15	30.3	35.5	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W13	06-Jul-15	30.0	35.4	NR	NA	<2	<2	2	2.1	<2	<2	2.5	<2
TR02	W14	13-Jul-15	30.4	35.7	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W15	20-Jul-15	30.5	35.7	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W16	27-Jul-15	28.6	33.7	NR	NA	<2	<2	<2	<2	<2	<2	<2	<2
TR02	W17	03-Aug-15	28.2	33.3	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W18	10-Aug-15	28.4	33.6	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W19	17-Aug-15	28.3	33.8	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W20	24-Aug-15	28.3	33.8	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W21	31-Aug-15	25.7	31.9	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W22	07-Sep-15	25.0	32.5	NR	NA	<2	<2	3	2.7	<2	<2	NS[3]	NS[3]
TR02	W23	14-Sep-15	28.0	37.4	NR	NA	NS	NS	NS	NS	NS	NS	<2	<2
TR02	W24	21-Sep-15	21.7	32.4	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W25	28-Sep-15	5.2	7.7	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W26	05-Oct-15	14.8	21.3	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W27	12-Oct-15	10.1	17.5	NR	NA	<2	<2	<2	<2	<2	<2	<2	<2
TR02	W28	19-Oct-15	23.2	30.1	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W29	26-Oct-15	11.2	17.3	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W30	02-Nov-15	23.7	26.9	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W31	09-Nov-15	23.2	21.1	NR	NA	<2	<2	<2	<2	<2	<2	<2	NS[4]

Table 8. Biological Oxygen Demand, 5 day (mg/L)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW H[1] (gpm)	FLOW V[1,2] (gpm)	FDB	SMP	SB1EFF	SFWEFF	HSSFWMP11	AC1EFF	RDEFF	SB2EFF	BTEFF	AC2EFF
TR02	W32	16-Nov-15	23.3	16.2	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W33	23-Nov-15	22.2	12.3	NR	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W34	30-Nov-15	21.7	10.3	NR	NR	<2	<2	<2	<2	<2	<2	<2	<2
TR02	W35	07-Dec-15	21.3	9.7	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W36	14-Dec-15	31.1	17.1	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W37	21-Dec-15	46.7	30.3	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W38	28-Dec-15	46.3	29.9	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W39	04-Jan-16	30.2	30.1	NR	NR	2.9	<2	5.5	3.5	2.4	<2	3.9	2.2
TR02	W40	11-Jan-16	26.2	29.8	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W41	18-Jan-16	25.9	29.9	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W42	25-Jan-16	25.7	30.1	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W43	01-Feb-16	25.5	29.6	NR	NR	<2	<2	<2	<2	<2	<2	2.6	<2
TR02	W44	08-Feb-16	24.9	31.1	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W45	15-Feb-16	24.8	31.0	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W46	22-Feb-16	24.7	30.8	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W47	29-Feb-16	22.9	30.5	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W48	07-Mar-16	21.5	29.7	NR	NR	<2	<2	4.3	<2	<2	<2	<2	<2

NOTES:

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).
AC1EFF = Aeration Channel Effluent/Rock Drain Influent
AC2EFF = Aeration Cascade Effluent
BTEFF = Biotreatment Cell Effluent/Aeration Cascade Influent
C = Colonization
FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)
Flow H = Horizontal Treatment Train average flow rate
Flow V = Vertical Treatment Train average flow rate
gpm = gallons per minute
HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent
mg/L = milligram per liter
NA = not available
NR = not requrired
NS = not sampled
OU = operable unit
R = rejected
RDEFF = Rock Drain Effluent
RL = reporting limit
SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent
SB2EFF = Settling Basin No. 2 Effluent/Biotreatment Cell Influent
SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent
SMP = Static Mixer Pool
TR** = Test Run
VWTT = Vertical Wetland Treatment Train
W** = Week of Treatability Study Phase

[1] The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.

[2] The Aeration Cascade in the VWTT was bypassed on different occassions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 influent flow rates to better represent metals mass removal by the VWTT.

[3] Samples were canceled due to expired hold times caused by shipping delays. Resamples were collected on 14 SEP 2015.

[4] Monitoring location AC2EFF was not sampled during W31 of phase TR02 because of Enhance Wetland Demonstration construction activities.

Table 8A. Biological Oxygen Demand, 5 day (mg/L)
Enhanced Wetland Demonstration
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW EWD[1] (gpm)	SMP	SB3EFF	MRCEFF	BT2EFF	AC3EFF
EWD-C	W00	23-Nov-15	876.9	NR	NR	<2	60.2	62.7
EWD-C	W01	30-Nov-15	706.1	NR	NR	<2	30.3	19.1
EWD-C	W02	07-Dec-15	590.9	NR	NR	NS	NS	NS
EWD-C	W03	14-Dec-15	576.6	NR	NR	<2	NS[2]	NS[2]
EWD-C	W04	21-Dec-15	541.9	NR	NR	NS	NS	NS
EWD-C	W05	28-Dec-15	535.8	NR	NR	NS	NS	NS
EWD-O	W00	04-Jan-16	552.3	NR	NR	<2	20.1	10.6
EWD-O	W01	11-Jan-16	557.3	NR	NR	NS	NS	NS
EWD-O	W02	18-Jan-16	555.4	NR	NR	NS	NS	NS
EWD-O	W03	25-Jan-16	553.5	NR	NR	NS	NS	NS
EWD-O	W04	01-Feb-16	574.3	NR	NR	<2	9.3	4.3
EWD-O	W05	08-Feb-16	535.6	NR	NR	NS	NS	NS
EWD-O	W06	15-Feb-16	537.8	NR	NR	NS	NS	NS
EWD-O	W07	22-Feb-16	540.3	NR	NR	NS	NS	NS
EWD-O	W08	29-Feb-16	543.7	NR	NR	NS	NS	NS
EWD-O	W09	07-Mar-16	542.1	NR	NR	<2	8	3.7

NOTES:

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).

AC3EFF = EWD Aeration Cascade effluent monitoring location
BT2EFF = EWD Biotreatment Cell effluent monitoring location
EWD = Enhanced Wetland Demonstration
EWD-C = EWD Colonization Phase
EWD-O = EWD Operation Phase
Flow EWD = EWD average flow rate
gpm = gallons per minute
MRCEFF = EWD Manganese Removal Cell effluent monitoring location
NS = not sampled
NR = not required
OU = operable unit
RL = reporting limit
SB3EFF = EWD Settling Basin effluent monitoring location
SMP = Static Mixer Pool
µg/L = microgram per liter
W** = Week of Treatability Study Phase

[1] The EWD flow rate is estimated based on the system's effluent average flow rate.

[2] Biological oxygen demand was not analized due to a delivery delay caused by carrier's mechanical problems.

Table 9. Sulfate (mg/L)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW H[1] (gpm)	FLOW V[1,2] (gpm)	FDB	SMP	SB1EFF	SFWEFF	HSSFWMP11	AC1EFF	RDEFF	SB2EFF	BTEFF	AC2EFF
C	W00	15-Sep-14	25.8	33.8	595	NA	579	575	603	551	571	571	497	523
C	W01	22-Sep-14	30.7	44.5	710	NA	650	724	637	620	555 J	589	582	656
C	W02	29-Sep-14	29.5	41.3	574	NA	615	612	605	587	565	613	573	580 J
C	W03	06-Oct-14	30.2	35.1	570	NA	630	618	707	580	618	622	522	562
C	W04	13-Oct-14	26.8	35.7	632	NA	637	647	660	655	648	644	615 J	612
C	W05	20-Oct-14	29.2	35.9	555	NA	551	584	558	557	574	545	543	552
C	W06	27-Oct-14	27.7	43.2	629	NA	614	596	625	637	673	R	602	606
C	W07	03-Nov-14	28.8	32.0	536	NA	514	526	552	542	535	536	530	525
C	W08	10-Nov-14	27.9	29.8	616	NA	623	640	617	644	815	627	646	657
C	W09	17-Nov-14	27.9	29.2	601	NA	635	584	587 J	901	683	606	591	574
C	W10	24-Nov-14	27.0	29.2	638	NA	662	636	685	749	680	654	674	638
C	W11	01-Dec-14	25.9	28.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
C	W12	08-Dec-14	25.5	27.8	645	NA	623	633	672	687	614	663	597	625
C	W13	15-Dec-14	25.1	26.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
C	W14	22-Dec-14	24.1	25.4	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
C	W15	29-Dec-14	23.3	24.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W00	05-Jan-15	22.7	25.7	673	NA	646	707	631	668	701	652	648	645
TR01	W01	12-Jan-15	21.6	27.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W02	19-Jan-15	20.4	25.9	670	NA	565	582	596	600	617	678	639	801 J
TR01	W03	26-Jan-15	21.9	30.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W04	02-Feb-15	27	32	650	NA	608	623	617	612	609	583	652	653
TR01	W05	09-Feb-15	27.8	30.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W06	16-Feb-15	28.7	29.4	601	NA	664	637	661	709	670	687	642	656
TR01	W07	23-Feb-15	28.7	25.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W08	02-Mar-15	28.2	24.9	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W09	09-Mar-15	29.3	28.1	613	NA	629	658	631	629	626	703 J	639	594
TR01	W10	16-Mar-15	29.5	29.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W11	23-Mar-15	34.9	36.4	672	NA	654	760	703	678	672	659	639	631
TR01	W12	30-Mar-15	34.4	38.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W00	06-Apr-15	32.3	36	613	NA	703	685	674	631	678	678	648	604 J
TR02	W01	13-Apr-15	38	39.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W02	20-Apr-15	36.7	39.3	616	NA	623	623	631	641	637	631	625	637
TR02	W03	27-Apr-15	36.1	39.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W04	04-May-15	35.2	39.1	660	NA	640	646	636	748	630	606	601	595
TR02	W05	11-May-15	33.4	37.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W06	18-May-15	32.0	36.6	718	NA	712	716	708	705	R	708	682	725
TR02	W07	25-May-16	31.9	36.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W08	01-Jun-15	31.3	35.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W09	08-Jun-15	30.9	35.3	688	NA	692	748	711	689	760	689	664	675
TR02	W10	15-Jun-15	30.8	35.6	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W11	22-Jun-15	30.9	35.7	638	NA	644	638	639	633	638	631	624	661
TR02	W12	29-Jun-15	30.3	35.5	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W13	06-Jul-15	30.0	35.4	615	NA	600	573	604	571	564	619	600	594
TR02	W14	13-Jul-15	30.4	35.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W15	20-Jul-15	30.5	35.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W16	27-Jul-15	28.6	33.7	519	NA	523	528	526	529	530	520	524	524
TR02	W17	03-Aug-15	28.2	33.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W18	10-Aug-15	28.4	33.6	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W19	17-Aug-15	28.3	33.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W20	24-Aug-15	28.3	33.8	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W21	31-Aug-15	25.7	31.9	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W22	07-Sep-15	25.0	32.5	532	NA	550	570	550	545	507	524	513	513
TR02	W23	14-Sep-15	28.0	37.4	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W24	21-Sep-15	21.7	32.4	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W25	28-Sep-15	5.2	7.7	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W26	05-Oct-15	14.8	21.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W27	12-Oct-15	10.1	17.5	529	NA	507	504	501	488	517	530	522	509
TR02	W28	19-Oct-15	23.2	30.1	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W29	26-Oct-15	11.2	17.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W30	02-Nov-15	23.7	26.9	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W31	09-Nov-15	23.2	21.1	546	NA	516	534	526	533	536	566 J	557	NS[3]

Table 9. Sulfate (mg/L)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW H[1] (gpm)	FLOW V[1,2] (gpm)	FDB	SMP	SB1EFF	SFWEFF	HSSFWMP11	AC1EFF	RDEFF	SB2EFF	BTEFF	AC2EFF
TR02	W32	16-Nov-15	23.3	16.2	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W33	23-Nov-15	22.2	12.3	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W34	30-Nov-15	21.7	10.3	562		560	585	565	557	542	555	566	551
TR02	W35	07-Dec-15	21.3	9.7	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W36	14-Dec-15	31.1	17.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W37	21-Dec-15	46.7	30.3	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W38	28-Dec-15	46.3	29.9	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W39	04-Jan-16	30.2	30.1	NS[4]	580	579	590	566	572	576	563	556	563
TR02	W40	11-Jan-16	26.2	29.8	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W41	18-Jan-16	25.9	29.9	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W42	25-Jan-16	25.7	30.1	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W43	01-Feb-16	25.5	29.6	NR	615	614	603	600	602	596	622	613	584
TR02	W44	08-Feb-16	24.9	31.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W45	15-Feb-16	24.8	31.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W46	22-Feb-16	24.7	30.8	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W47	29-Feb-16	22.9	30.5	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W48	07-Mar-16	21.5	29.7	NS[4]	612	613	629	587	625	621	614	590	618

NOTES:

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).
AC1EFF = Aeration Channel Effluent/Rock Drain Influent
AC2EFF = Aeration Cascade Effluent
BTEFF = Biotreatment Cell Effluent/Aeration Cascade Influent
C = Colonization
FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)
Flow H = Horizontal Treatment Train average flow rate
Flow V = Vertical Treatment Train average flow rate
gpm = gallons per minute
HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent
J = Estimated result
MDL = method detection limit
NA = not available
OU = operable unit
R = rejected
RDEFF = Rock Drain Effluent
RL = reporting limit
SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent
SB2EFF = Settling Basin No. 2 Effluent/Biotreatment Cell Influent
SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent
SMP = Static Mixer Pool
TR** = Test Run
VWTT = Vertical Wetland Treatment Train
W** = Week of Treatability Study Phase

[1] The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.

[2] The Aeration Cascade in the VWTT was bypassed on different occassions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 influent flow rates to better represent metals mass removal by the VWTT.

[3] Monitoring location AC2EFF was not sampled during W31 of phase TR02 because of Enhance Wetland Demonstration construction activities.

[4] As of 04 JAN 2016, monitoring location FDB will not be sampled since it is no longer representative of the HWTT and VWTT influent due to changes during the construction of the Enhanced Wetland

Table 9A. Sulfate (mg/L)
Enhanced Wetland Demonstration
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW EWD[1] (gpm)	SMP	SB3EFF	MRCEFF	BT2EFF	AC3EFF
EWD-C	W00	23-Nov-15	876.9	587	583	579	551	513
EWD-C	W01	30-Nov-15	706.1	556	568	585	550	551
EWD-C	W02	07-Dec-15	590.9	NS	NS	NS	NS	NS
EWD-C	W03	14-Dec-15	576.6	584	573	572	562	565
EWD-C	W04	21-Dec-15	541.9	NS	NS	NS	NS	NS
EWD-C	W05	28-Dec-15	535.8	NS	NS	NS	NS	NS
EWD-O	W00	04-Jan-16	552.3	580	564	578 J	481	538
EWD-O	W01	11-Jan-16	557.3	NS	NS	NS	NS	NS
EWD-O	W02	18-Jan-16	555.4	NS	NS	NS	NS	NS
EWD-O	W03	25-Jan-16	553.5	NS	NS	NS	NS	NS
EWD-O	W04	01-Feb-16	574.3	615	593	634	608	618
EWD-O	W05	08-Feb-16	535.6	NS	NS	NS	NS	NS
EWD-O	W06	15-Feb-16	537.8	NS	NS	NS	NS	NS
EWD-O	W07	22-Feb-16	540.3	NS	NS	NS	NS	NS
EWD-O	W08	29-Feb-16	543.7	NS	NS	NS	NS	NS
EWD-O	W09	07-Mar-16	542.1	612	617	687	585	612

NOTES:

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).

AC3EFF = EWD Aeration Cascade effluent monitoring location
BT2EFF = EWD Biotreatment Cell effluent monitoring location
EWD = Enhanced Wetland Demonstration
EWD-C = EWD Colonization Phase
EWD-O = EWD Operation Phase
Flow EWD = EWD average flow rate
gpm = gallons per minute
MRCEFF = EWD Manganese Removal Cell effluent monitoring location
OU = operable unit
RL = reporting limit
SB3EFF = EWD Settling Basin effluent monitoring location
SMP = Static Mixer Pool
µg/L = microgram per liter
W** = Week of Treatability Study Phase

[1] The EWD flow rate is estimated based on the system's effluent average flow rate.

Table 10. Turbidity (NTU)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW H[1] (gpm)	FLOW V[1,2] (gpm)	FDB	SMP	SB1EFF	SFWEFF	HSSFWMP11	AC1EFF	RDEFF	SB2EFF	BTEFF	AC2EFF
C	W00	15-Sep-14	25.8	33.8	18	NA	3	5	R	44	7	8	R	R
C	W01	22-Sep-14	30.7	44.5	18	NA	7	4	11	49	13	4	3	13
C	W02	29-Sep-14	29.5	41.3	22	NA	8	7	8	35	35	7	7	16
C	W03	06-Oct-14	30.2	35.1	NM	NA	7	6	9	32	48	5	6	26
C	W04	13-Oct-14	26.8	35.7	31	NA	8	7	14	56	47	12	7	35
C	W05	20-Oct-14	29.2	35.9	39	NA	9	8	11	60	14	11	9	103
C	W06	27-Oct-14	27.7	43.2	38	NA	9	6	7	33	14	5	5	38
C	W07	03-Nov-14	28.8	32.0	38	NA	9	8	5	21	3	6	3	28
C	W08	10-Nov-14	27.9	29.8	31	NA	5	6	2	25	0	4	5	19
C	W09	17-Nov-14	27.9	29.2	30	NA	8	7	5	23	2	8	5	25
C	W10	24-Nov-14	27.0	29.2	46	NA	59	17	8	43	1	7	17	146
C	W11	01-Dec-14	25.9	28.5	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
C	W12	08-Dec-14	25.5	27.8	33	NA	7	6	2	31	0	8	5	44
C	W13	15-Dec-14	25.1	26.2	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
C	W14	22-Dec-14	24.1	25.4	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
C	W15	29-Dec-14	23.3	24.5	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W00	05-Jan-15	22.7	25.7	33	NA	12	4	4	38	1	14	3	37
TR01	W01	12-Jan-15	21.6	27.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W02	19-Jan-15	20.4	25.9	31	NA	40	4	3	47	1	16	3	33
TR01	W03	26-Jan-15	21.9	30.8	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W04	02-Feb-15	27	32	29	NA	9	6	4	44	3	9	4	22
TR01	W05	09-Feb-15	27.8	30.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W06	16-Feb-15	28.7	29.4	38	NA	11	6	4	50	2	6	3	23
TR01	W07	23-Feb-15	28.7	25.2	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W08	02-Mar-15	28.2	24.9	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W09	09-Mar-15	29.3	28.1	45	NA	6	4	3	41	3	5	1	23
TR01	W10	16-Mar-15	29.5	29.7	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W11	23-Mar-15	34.9	36.4	42	NA	42	19	5	78	1	12	4	22
TR01	W12	30-Mar-15	34.4	38.5	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W00	06-Apr-15	32.3	36	32	NA	14	24	4	26	0	14	3	14
TR02	W01	13-Apr-15	38	39.8	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W02	20-Apr-15	36.7	39.3	28	NA	16	11	4	26	2	12	2	28
TR02	W03	27-Apr-15	36.1	39.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W04	04-May-15	35.2	39.1	28	NA	11	9	4	21	1	8	2	11
TR02	W05	11-May-15	33.4	37.8	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W06	18-May-15	32.0	36.6	26	NA	15	13	19	28	R	10	5	12
TR02	W07	25-May-16	31.9	36.2	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W08	01-Jun-15	31.3	35.7	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W09	08-Jun-15	30.9	35.3	22	NA	12	35	35	60	6	10	17	17
TR02	W10	15-Jun-15	30.8	35.6	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W11	22-Jun-15	30.9	35.7	46	NA	24	48	29	R	1	14	19	25
TR02	W12	29-Jun-15	30.3	35.5	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W13	06-Jul-15	30.0	35.4	65	NA	10	12	0	R	2	6	4	5
TR02	W14	13-Jul-15	30.4	35.7	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W15	20-Jul-15	30.5	35.7	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W16	27-Jul-15	28.6	33.7	65	NA	16	16	1	43	0	28	1	6
TR02	W17	03-Aug-15	28.2	33.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W18	10-Aug-15	28.4	33.6	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W19	17-Aug-15	28.3	33.8	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W20	24-Aug-15	28.3	33.8	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W21	31-Aug-15	25.7	31.9	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W22	07-Sep-15	25.0	32.5	66	NA	6	9	0	46	0	7	0	7
TR02	W23	14-Sep-15	28.0	37.4	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W24	21-Sep-15	21.7	32.4	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W25	28-Sep-15	5.2	7.7	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W26	05-Oct-15	14.8	21.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W27	12-Oct-15	10.1	17.5	38.2	NA	11.6	9.2	4.9	35.3	0	10.3	0.4	12.7
TR02	W28	19-Oct-15	23.2	30.1	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W29	26-Oct-15	11.2	17.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W30	02-Nov-15	23.7	26.9	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W31	09-Nov-15	23.2	21.1	33.5	NA	16.5	13.3	0	13.8	0.5	11	0	NM[3]

Table 10. Turbidity (NTU)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

TR02	W32	16-Nov-15	23.3	16.2	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W33	23-Nov-15	22.2	12.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W34	30-Nov-15	21.7	10.3	16.3	36.1	9.5	5.6	0.4	4.9	0.5	3.4	0.1	0.8
TR02	W35	07-Dec-15	21.3	9.7	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W36	14-Dec-15	31.1	17.1	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W37	21-Dec-15	46.7	30.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W38	28-Dec-15	46.3	29.9	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W39	04-Jan-16	30.2	30.1	NM[4]	23.1	17	18.3	0	3.7	0	11.9	0	1.2
TR02	W40	11-Jan-16	26.2	29.8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W41	18-Jan-16	25.9	29.9	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W42	25-Jan-16	25.7	30.1	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W43	01-Feb-16	25.5	29.6	NM[4]	34.3	10.8	8.2	0	6	0	9.7	0	0.6
TR02	W44	08-Feb-16	24.9	31.1	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W45	15-Feb-16	24.8	31.0	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W46	22-Feb-16	24.7	30.8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W47	29-Feb-16	22.9	30.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W48	07-Mar-16	21.5	29.7	NM[4]	18.3	10.7	6.4	0	5.3	0	8.3	0.6	0

NOTES:
Values presented for physical and chemical parameters are from field measurements obtained during sampling events.
AC1EFF = Aeration Channel Effluent/Rock Drain Influent
AC2EFF = Aeration Cascade Effluent
BTEFF = Biotreatment Cell Effluent/Aeration Cascade Influent
C = Colonization
FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)
Flow H = Horizontal Treatment Train average flow rate
Flow V = Vertical Treatment Train average flow rate
gpm = gallons per minute
HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent
NA = not available
NM = not measured
NTU = Nephelometric Turbidity Units
OU = operable unit
R = rejected
RDEFF = Rock Drain Effluent
SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent
SB2EFF = Settling Basin No. 2 Effluent/Biotreatment Cell Influent
SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent
SMP = Static Mixer Pool
TR** = Test Run
VWTT = Vertical Wetland Treatment Train
W** = Week of Treatability Study Phase

[1] The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.

[2] The Aeration Cascade in the VWTT was bypassed on different occassions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 influent flow rates to better represent metals mass removal by the VWTT.

[3] Monitoring location AC2EFF was not sampled during W31 of phase TR02 because of Enhance Wetland Demonstration construction activities.

[4] As of 04 JAN 2016, monitoring location FDB will not be sampled since it is no longer representative of the HWTT and VWTT influent due to changes during the construction of the Enhanced Wetland

Table 10A. Turbidity (NTU)
Enhanced Wetland Demonstration
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW EWD[1] (gpm)	SMP	SB3EFF	MRCEFF	BT2EFF	AC3EFF
EWD-C	W00	23-Nov-15	876.9	30.4	4.5	0.4	2	6.1
EWD-C	W01	30-Nov-15	706.1	36.1	5.1	0	2.6	8.7
EWD-C	W02	07-Dec-15	590.9	NM	NM	NM	NM	NM
EWD-C	W03	14-Dec-15	576.6	16.7	4.3	0	5.1	15.8
EWD-C	W04	21-Dec-15	541.9	NM	NM	NM	NM	NM
EWD-C	W05	28-Dec-15	535.8	NM	NM	NM	NM	NM
EWD-O	W00	04-Jan-16	552.3	23.1	7.1	0	1	52.3
EWD-O	W01	11-Jan-16	557.3	NM	NM	NM	NM	NM
EWD-O	W02	18-Jan-16	555.4	NM	NM	NM	NM	NM
EWD-O	W03	25-Jan-16	553.5	NM	NM	NM	NM	NM
EWD-O	W04	01-Feb-16	574.3	34.3	3.7	0	0	71.4
EWD-O	W05	08-Feb-16	535.6	NM	NM	NM	NM	NM
EWD-O	W06	15-Feb-16	537.8	NM	NM	NM	NM	NM
EWD-O	W07	22-Feb-16	540.3	NM	NM	NM	NM	NM
EWD-O	W08	29-Feb-16	543.7	NM	NM	NM	NM	NM
EWD-O	W09	07-Mar-16	542.1	18.3	3.9	0	0	32.5

NOTES:

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).

AC3EFF = EWD Aeration Cascade effluent monitoring location
BT2EFF = EWD Biotreatment Cell effluent monitoring location
EWD = Enhanced Wetland Demonstration
EWD-C = EWD Colonization Phase
EWD-O = EWD Operation Phase
Flow EWD = EWD average flow rate
gpm = gallons per minute
MRCEFF = EWD Manganese Removal Cell effluent monitoring location
NM = not measured
OU = operable unit
RL = reporting limit
SB3EFF = EWD Settling Basin effluent monitoring location
SMP = Static Mixer Pool
µg/L = microgram per liter
W** = Week of Treatability Study Phase

[1] The EWD flow rate is estimated based on the system's effluent average flow rate.

Table 11. ORP (millivolts)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW H[1] (gpm)	FLOW V[1,2] (gpm)	FDB	SMP	SB1EFF	SFWEFF	HSSFWMP11	AC1EFF	RDEFF	SB2EFF	BTEFF	AC2EFF
C	W00	15-Sep-14	25.8	33.8	64	NA	151	93	-428	-296	-305	49	-444	-275
C	W01	22-Sep-14	30.7	44.5	-16	NA	R	24	-259	-346	-277	-38	-257	-243
C	W02	29-Sep-14	29.5	41.3	-17	NA	33	-49	-266	-272	-245	23	-265	-230
C	W03	06-Oct-14	30.2	35.1	NM	NA	46	-26	-218	-237	-225	25	-244	-207
C	W04	13-Oct-14	26.8	35.7	32	NA	54	-20	-192	-162	-191	-58	-226	-182
C	W05	20-Oct-14	29.2	35.9	27	NA	65	45	-148	-51	-90	22	-180	-146
C	W06	27-Oct-14	27.7	43.2	-24	NA	41	36	-160	-40	-60	-86	-203	-100
C	W07	03-Nov-14	28.8	32.0	27	NA	26	34	-108	57	20	-21	-170	45
C	W08	10-Nov-14	27.9	29.8	-10	NA	2	-29	-161	-24	-21	-43	-184	3
C	W09	17-Nov-14	27.9	29.2	26	NA	65	61	-179	-96	-40	19	-207	-126
C	W10	24-Nov-14	27.0	29.2	21	NA	51	29	-129	-84	20	36	-205	106
C	W11	01-Dec-14	25.9	28.5	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
C	W12	08-Dec-14	25.5	27.8	-26	NA	16	19	-215	-116	-33	-49	-235	-138
C	W13	15-Dec-14	25.1	26.2	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
C	W14	22-Dec-14	24.1	25.4	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
C	W15	29-Dec-14	23.3	24.5	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W00	05-Jan-15	22.7	25.7	5	NA	45	27	-230	-152	33	59	-256	-177
TR01	W01	12-Jan-15	21.6	27.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W02	19-Jan-15	20.4	25.9	1	NA	50	-27	-225	-118	81	3	-232	-148
TR01	W03	26-Jan-15	21.9	30.8	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W04	02-Feb-15	27	32	-28	NA	51	6	-232	-132	43	-17	-250	-158
TR01	W05	09-Feb-15	27.8	30.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W06	16-Feb-15	28.7	29.4	-25	NA	37	-26	-227	-138	26	15	-221	-151
TR01	W07	23-Feb-15	28.7	25.2	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W08	02-Mar-15	28.2	24.9	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W09	09-Mar-15	29.3	28.1	-4	NA	86	78	-231	-184	62	96	-225	-185
TR01	W10	16-Mar-15	29.5	29.7	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W11	23-Mar-15	34.9	36.4	33	NA	77	81	-131	-112	51	73	-132	-108
TR01	W12	30-Mar-15	34.4	38.5	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W00	06-Apr-15	32.3	36	12	NA	45	4	-224	-154	26	63	-235	-161
TR02	W01	13-Apr-15	38	39.8	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W02	20-Apr-15	36.7	39.3	-15	NA	33	36	-179	-159	23	87	-248	-126
TR02	W03	27-Apr-15	36.1	39.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W04	04-May-15	35.2	39.1	-15	NA	34	20	-213	-157	42	37	-243	-151
TR02	W05	11-May-15	33.4	37.8	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W06	18-May-15	32.0	36.6	78	NA	135	124	-111	-121	85	125	-141	-124
TR02	W07	25-May-16	31.9	36.2	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W08	01-Jun-15	31.3	35.7	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W09	08-Jun-15	30.9	35.3	163	NA	165	165	69	-70	27	170	-36	9
TR02	W10	15-Jun-15	30.8	35.6	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W11	22-Jun-15	30.9	35.7	138	NA	140	115	93	50	153	147	-26	-57
TR02	W12	29-Jun-15	30.3	35.5	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W13	06-Jul-15	30.0	35.4	110	NA	127	43	70	-90	105	122	-158	-104
TR02	W14	13-Jul-15	30.4	35.7	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W15	20-Jul-15	30.5	35.7	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W16	27-Jul-15	28.6	33.7	74	NA	59	52	-21	-113	37	59	-192	-138
TR02	W17	03-Aug-15	28.2	33.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W18	10-Aug-15	28.4	33.6	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W19	17-Aug-15	28.3	33.8	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W20	24-Aug-15	28.3	33.8	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W21	31-Aug-15	25.7	31.9	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W22	07-Sep-15	25.0	32.5	21	NA	31	-2	-181	-112	15	13	-193	-139
TR02	W23	14-Sep-15	28.0	37.4	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W24	21-Sep-15	21.7	32.4	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W25	28-Sep-15	5.2	7.7	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W26	05-Oct-15	14.8	21.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W27	12-Oct-15	10.1	17.5	-7	NA	68	94.6	-203	-116	6	4	-243	-172
TR02	W28	19-Oct-15	23.2	30.1	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W29	26-Oct-15	11.2	17.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W30	02-Nov-15	23.7	26.9	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W31	09-Nov-15	23.2	21.1	2	NA	30	31	-67	-99	10	33	-147	NM[3]

Table 11. ORP (millivolts)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW H[1] (gpm)	FLOW V[1,2] (gpm)	FDB	SMP	SB1EFF	SFWEFF	HSSFWMP11	AC1EFF	RDEFF	SB2EFF	BTEFF	AC2EFF
TR02	W32	16-Nov-15	23.3	16.2	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W33	23-Nov-15	22.2	12.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W34	30-Nov-15	21.7	10.3	-12.5	-3	21.5	41.4	60.4	-124.2	52.9	49.9	-170.4	-6.1
TR02	W35	07-Dec-15	21.3	9.7	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W36	14-Dec-15	31.1	17.1	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W37	21-Dec-15	46.7	30.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W38	28-Dec-15	46.3	29.9	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W39	04-Jan-16	30.2	30.1	NM[4]	-6.7	63.6	62.7	-46.6	-109.4	-14.4	51.2	-155.7	-99.9
TR02	W40	11-Jan-16	26.2	29.8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W41	18-Jan-16	25.9	29.9	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W42	25-Jan-16	25.7	30.1	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W43	01-Feb-16	25.5	29.6	NM[4]	9	60.8	63.4	-151	-111.5	-133.6	59.8	-161.5	-92.4
TR02	W44	08-Feb-16	24.9	31.1	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W45	15-Feb-16	24.8	31.0	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W46	22-Feb-16	24.7	30.8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W47	29-Feb-16	22.9	30.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W48	07-Mar-16	21.5	29.7	NM[4]	-10.7	31.8	25.6	-175.1	-118.2	39.4	34.8	-179.6	-58.9

NOTES:
Values presented for physical and chemical parameters are from field measurements obtained during sampling events.
AC1EFF = Aeration Channel Effluent/Rock Drain Influent
AC2EFF = Aeration Cascade Effluent
BTEFF = Biotreatment Cell Effluent/Aeration Cascade Influent
C = Colonization
FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)
Flow H = Horizontal Treatment Train average flow rate
Flow V = Vertical Treatment Train average flow rate
gpm = gallons per minute
HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent
mV = millivolts
NA = not available
NM = not measured
ORP = Oxidation Reduction Potential
OU = operable unit
R = rejected
RDEFF = Rock Drain Effluent
SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent
SB2EFF = Settling Basin No. 2 Effluent/Biotreatment Cell Influent
SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent
SMP = Static Mixer Pool
TR** = Test Run
VWTT = Vertical Wetland Treatment Train
W** = Week of Treatability Study Phase

[1] The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.

[2] The Aeration Cascade in the VWTT was bypassed on different occassions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 influent flow rates to better represent metals mass removal by the VWTT.

[3] Monitoring location AC2EFF was not sampled during W31 of phase TR02 because of Enhance Wetland Demonstration construction activities.

[4] As of 04 JAN 2016, monitoring location FDB will not be sampled since it is no longer representative of the HWTT and VWTT influent due to changes during the construction of the Enhanced Wetland

Table 11A. ORP (millivolts)
Enhanced Wetland Demonstration
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW EWD[1] (gpm)	SMP	SB3EFF	MRCEFF	BT2EFF	AC3EFF
EWD-C	W00	23-Nov-15	876.9	17	70	-189	86	-95
EWD-C	W01	30-Nov-15	706.1	-3	70.4	200	74.9	-24.2
EWD-C	W02	07-Dec-15	590.9	NM	NM	NM	NM	NM
EWD-C	W03	14-Dec-15	576.6	-21.5	18	-1.1	-129.9	-42.8
EWD-C	W04	21-Dec-15	541.9	NM	NM	NM	NM	NM
EWD-C	W05	28-Dec-15	535.8	NM	NM	NM	NM	NM
EWD-O	W00	04-Jan-16	552.3	-6.7	61.5	70.7	-211.9	117.8
EWD-O	W01	11-Jan-16	557.3	NM	NM	NM	NM	NM
EWD-O	W02	18-Jan-16	555.4	NM	NM	NM	NM	NM
EWD-O	W03	25-Jan-16	553.5	NM	NM	NM	NM	NM
EWD-O	W04	01-Feb-16	574.3	9	114	111.8	-214.3	-95.8
EWD-O	W05	08-Feb-16	535.6	NM	NM	NM	NM	NM
EWD-O	W06	15-Feb-16	537.8	NM	NM	NM	NM	NM
EWD-O	W07	22-Feb-16	540.3	NM	NM	NM	NM	NM
EWD-O	W08	29-Feb-16	543.7	NM	NM	NM	NM	NM
EWD-O	W09	07-Mar-16	542.1	-10.7	62.8	73.9	-222.3	-133.8

NOTES:

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).

AC3EFF = EWD Aeration Cascade effluent monitoring location
BT2EFF = EWD Biotreatment Cell effluent monitoring location
EWD = Enhanced Wetland Demonstration
EWD-C = EWD Colonization Phase
EWD-O = EWD Operation Phase
Flow EWD = EWD average flow rate
gpm = gallons per minute
MRCEFF = EWD Manganese Removal Cell effluent monitoring location
NM = not measured
OU = operable unit
RL = reporting limit
SB3EFF = EWD Settling Basin effluent monitoring location
SMP = Static Mixer Pool
µg/L = microgram per liter
W** = Week of Treatability Study Phase

[1] The EWD flow rate is estimated based on the system's effluent average flow rate.

Table 12. Dissolved Oxygen (mg/L)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW H[1] (gpm)	FLOW V[1,2] (gpm)	FDB	SMP	SB1EFF	SFWEFF	HSSFWMP11	AC1EFF	RDEFF	SB2EFF	BTEFF	AC2EFF
C	W00	15-Sep-14	25.8	33.8	5.6	NA	5.2	6.8	0.2	0.4	0.4	5.2	0.1	0.9
C	W01	22-Sep-14	30.7	44.5	6.6	NA	2.1	6.1	0.9	0.1	1.7	3.5	1.8	3.1
C	W02	29-Sep-14	29.5	41.3	5.9	NA	5.7	7	1.8	1.9	2.4	6.1	0.7	3.2
C	W03	06-Oct-14	30.2	35.1	NM	NA	6.1	6.7	2.6	1.8	1.2	5.9	1.4	3
C	W04	13-Oct-14	26.8	35.7	6.1	NA	6.4	7.2	3.1	3.7	1.8	5.9	1.5	2.9
C	W05	20-Oct-14	29.2	35.9	3.9	NA	6.3	6	3.1	5.4	2.5	6.1	2.1	3.4
C	W06	27-Oct-14	27.7	43.2	6	NA	6.2	6.1	3	6.2	2.3	6	2.5	4.3
C	W07	03-Nov-14	28.8	32.0	ns	NA	6.4	7.3	3.4	6	3.7	6.7	3.1	5.1
C	W08	10-Nov-14	27.9	29.8	6.1	NA	6.2	7	3.6	5.6	2.5	6	1.9	2.5
C	W09	17-Nov-14	27.9	29.2	5.5	NA	6.2	7.3	0.3	5.2	0.2	5.6	0.5	2.8
C	W10	24-Nov-14	27.0	29.2	6	NA	6.1	7.7	1.7	5.6	1.1	5.7	0.4	3.7
C	W11	01-Dec-14	25.9	28.5	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
C	W12	08-Dec-14	25.5	27.8	5.7	NA	6.2	7	1.7	6.1	2.6	5.9	1.8	3.6
C	W13	15-Dec-14	25.1	26.2	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
C	W14	22-Dec-14	24.1	25.4	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
C	W15	29-Dec-14	23.3	24.5	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W00	05-Jan-15	22.7	25.7	5.6	NA	5.9	6.9	0.6	5.8	0.7	5.9	0.3	2.6
TR01	W01	12-Jan-15	21.6	27.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W02	19-Jan-15	20.4	25.9	5	NA	6.5	6.9	0.4	5.9	0.8	5.6	0.3	2.5
TR01	W03	26-Jan-15	21.9	30.8	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W04	02-Feb-15	27.0	32.0	5.3	NA	5.9	7	0.5	5.7	1.8	5.7	0.3	2.2
TR01	W05	09-Feb-15	27.8	30.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W06	16-Feb-15	28.7	29.4	5.3	NA	5.9	7.4	0.5	6.1	2.6	6.7	0.6	2.6
TR01	W07	23-Feb-15	28.7	25.2	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W08	02-Mar-15	28.2	24.9	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W09	09-Mar-15	29.3	28.1	5.5	NA	5.7	6.8	0.7	6.2	1.3	5.6	0.4	2.9
TR01	W10	16-Mar-15	29.5	29.7	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W11	23-Mar-15	34.9	36.4	5.5	NA	5.9	6.5	0.7	5.3	1.4	5.5	0.2	2.4
TR01	W12	30-Mar-15	34.4	38.5	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W00	06-Apr-15	32.3	36	5.5	NA	5.4	6.7	0.5	5.4	0.8	5	0.1	2.9
TR02	W01	13-Apr-15	38	39.8	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W02	20-Apr-15	36.7	39.3	5.5	NA	6.1	6.4	0.4	5	0.4	5.7	R	3.2
TR02	W03	27-Apr-15	36.1	39.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W04	04-May-15	35.2	39.1	5.5	NA	5.6	6.4	0.4	4.5	0.9	5.4	0.3	3.9
TR02	W05	11-May-15	33.4	37.8	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W06	18-May-15	32.0	36.6	5.6	NA	5.6	6.6	0.4	5.5	0.8	5.7	0.4	4.5
TR02	W07	25-May-16	31.9	36.2	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W08	01-Jun-15	31.3	35.7	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W09	08-Jun-15	30.9	35.3	5.7	NA	5.6	6.2	1.9	6.8	1.1	5.7	0.1	5.4
TR02	W10	15-Jun-15	30.8	35.6	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W11	22-Jun-15	30.9	35.7	5.9	NA	6.1	6.2	0.7	5.9	0.3	6	0.1	4.8
TR02	W12	29-Jun-15	30.3	35.5	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W13	06-Jul-15	30.0	35.4	5.9	NA	6	6.6	1.1	5.8	8.1	6.2	0.2	5.2
TR02	W14	13-Jul-15	30.4	35.7	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W15	20-Jul-15	30.5	35.7	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W16	27-Jul-15	28.6	33.7	6.1	NA	5.9	6.6	0.5	5.6	0.6	6.4	0.1	4.9
TR02	W17	03-Aug-15	28.2	33.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W18	10-Aug-15	28.4	33.6	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W19	17-Aug-15	28.3	33.8	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W20	24-Aug-15	28.3	33.8	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W21	31-Aug-15	25.7	31.9	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W22	07-Sep-15	25.0	32.5	6.1	NA	5.9	6.6	0.3	6	0.5	6	0.3	4.4
TR02	W23	14-Sep-15	28.0	37.4	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W24	21-Sep-15	21.7	32.4	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W25	28-Sep-15	5.2	7.7	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W26	05-Oct-15	14.8	21.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W27	12-Oct-15	10.1	17.5	5.9	NA	7.2	7.6	0.6	5.4	0.7	7.2	0.2	3.1
TR02	W28	19-Oct-15	23.2	30.1	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W29	26-Oct-15	11.2	17.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W30	02-Nov-15	23.7	26.9	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W31	09-Nov-15	23.2	21.1	5.6	NA	5.8	7.0	1.0	6.1	3.5	6.0	0.8	NM[3]

Table 12. Dissolved Oxygen (mg/L)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW H[1] (gpm)	FLOW V[1,2] (gpm)	FDB	SMP	SB1EFF	SFWEFF	HSSFWMP11	AC1EFF	RDEFF	SB2EFF	BTEFF	AC2EFF
TR02	W32	16-Nov-15	23.3	16.2	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W33	23-Nov-15	22.2	12.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W34	30-Nov-15	21.7	10.3	5.52	4.35	6.04	7.54	0.94	7.23	3.94	6.39	0.26	6.45
TR02	W35	07-Dec-15	21.3	9.7	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W36	14-Dec-15	31.1	17.1	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W37	21-Dec-15	46.7	30.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W38	28-Dec-15	46.3	29.9	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W39	04-Jan-16	30.2	30.1	NM[4]	4.21	5.52	6.77	0.31	4.7	3.51	5.95	0.28	4.29
TR02	W40	11-Jan-16	26.2	29.8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W41	18-Jan-16	25.9	29.9	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W42	25-Jan-16	25.7	30.1	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W43	01-Feb-16	25.5	29.6	NM[4]	4.35	6.18	7.11	0.36	5.57	2.99	6.37	0.3	5.01
TR02	W44	08-Feb-16	24.9	31.1	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W45	15-Feb-16	24.8	31.0	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W46	22-Feb-16	24.7	30.8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W47	29-Feb-16	22.9	30.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W48	07-Mar-16	21.5	29.7	NM[4]	4.16	5.81	6.75	0.53	6.24	2.36	5.91	0.31	4.17

NOTES:
Values presented for physical and chemical parameters are from field measurements obtained during sampling events.
AC1EFF = Aeration Channel Effluent/Rock Drain Influent
AC2EFF = Aeration Cascade Effluent
BTEFF = Biotreatment Cell Effluent/Aeration Cascade Influent
C = Colonization
FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)
Flow H = Horizontal Treatment Train average flow rate
Flow V = Vertical Treatment Train average flow rate
gpm = gallons per minute
HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent
mg/L = milligram per liter
NA = not available
NM = not measured
OU = operable unit
RDEFF = Rock Drain Effluent
SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent
SB2EFF = Settling Basin No. 2 Effluent/Biotreatment Cell Influent
SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent
SMP = Static Mixer Pool
TR** = Test Run
VWTT = Vertical Wetland Treatment Train
W** = Week of Treatability Study Phase

[1] The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.

[2] The Aeration Cascade in the VWTT was bypassed on different occassions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 influent flow rates to better represent metals mass removal by the VWTT.

[3] Monitoring location AC2EFF was not sampled during W31 of phase TR02 because of Enhance Wetland Demonstration construction activities.

[4] As of 04 JAN 2016, monitoring location FDB will not be sampled since it is no longer representative of the HWTT and VWTT influent due to changes during the construction of the Enhanced Wetland

Table 12A. Dissolved Oxygen (mg/L)
Enhanced Wetland Demonstration
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW EWD[1] (gpm)	SMP	SB3EFF	MRCEFF	BT2EFF	AC3EFF
EWD-C	W00	23-Nov-15	876.9	4.33	6.18	0.19	6.55	3.87
EWD-C	W01	30-Nov-15	706.1	4.35	6.31	0.49	6.69	2.33
EWD-C	W02	07-Dec-15	590.9	NM	NM	NM	NM	NM
EWD-C	W03	14-Dec-15	576.6	4.09	5.89	6.75	1.43	2.83
EWD-C	W04	21-Dec-15	541.9	NM	NM	NM	NM	NM
EWD-C	W05	28-Dec-15	535.8	NM	NM	NM	NM	NM
EWD-O	W00	04-Jan-16	552.3	4.21	6.55	6.83	0.68	3.01
EWD-O	W01	11-Jan-16	557.3	NM	NM	NM	NM	NM
EWD-O	W02	18-Jan-16	555.4	NM	NM	NM	NM	NM
EWD-O	W03	25-Jan-16	553.5	NM	NM	NM	NM	NM
EWD-O	W04	01-Feb-16	574.3	4.35	6.3	7.02	0.82	2.9
EWD-O	W05	08-Feb-16	535.6	NM	NM	NM	NM	NM
EWD-O	W06	15-Feb-16	537.8	NM	NM	NM	NM	NM
EWD-O	W07	22-Feb-16	540.3	NM	NM	NM	NM	NM
EWD-O	W08	29-Feb-16	543.7	NM	NM	NM	NM	NM
EWD-O	W09	07-Mar-16	542.1	4.16	6.01	6.74	1.01	2.54

NOTES:

Non-detects are reported as less than the laboratory Reporting Limit (RL) and estimated as zero for calculations and graphing (Colorado Department of Public Health and Environment Water Quality Control Commission 5 CCR 1002-34).

AC3EFF = EWD Aeration Cascade effluent monitoring location
BT2EFF = EWD Biotreatment Cell effluent monitoring location
EWD = Enhanced Wetland Demonstration
EWD-C = EWD Colonization Phase
EWD-O = EWD Operation Phase
Flow EWD = EWD average flow rate
gpm = gallons per minute
MRCEFF = EWD Manganese Removal Cell effluent monitoring location
NM = not measured
OU = operable unit
RL = reporting limit
SB3EFF = EWD Settling Basin effluent monitoring location
SMP = Static Mixer Pool
µg/L = microgram per liter
W** = Week of Treatability Study Phase

[1] The EWD flow rate is estimated based on the system's effluent average flow rate.

Table 13. Temperature (degrees Celsius)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW H[1] (gpm)	FLOW V[1,2] (gpm)	FDB	SMP	SB1EFF	SFWEFF	HSSFWMP11	AC1EFF	RDEFF	SB2EFF	BTEFF	AC2EFF
C	W00	15-Sep-14	25.8	33.8	18.8	NA	18.1	18.8	14.7	16.2	12.9	18.6	18.8	16.4
C	W01	22-Sep-14	30.7	44.5	20.1	NA	19.1	19.3	17.9	19.1	17.2	19.2	18.3	18
C	W02	29-Sep-14	29.5	41.3	16.8	NA	15.5	16.4	14.4	13.2	12.1	15.3	13.5	13.2
C	W03	06-Oct-14	30.2	35.1	NM	NA	15.9	14	13.2	13.3	12.5	15.5	15.3	15.3
C	W04	13-Oct-14	26.8	35.7	18.7	NA	17.4	18.3	15.5	15.5	18	17.5	17.5	19.4
C	W05	20-Oct-14	29.2	35.9	19.6	NA	17.7	18.2	17.1	15.3	15.2	18	18.3	17.3
C	W06	27-Oct-14	27.7	43.2	18.8	NA	17.7	17.5	15.3	15.4	12.1	18.3	17.3	17.5
C	W07	03-Nov-14	28.8	32.0	19.1	NA	17.7	18.1	14.1	14.8	12.4	16.5	16.5	15.7
C	W08	10-Nov-14	27.9	29.8	15.7	NA	15.9	15.7	13.3	13.1	11.3	15.1	14.7	14.9
C	W09	17-Nov-14	27.9	29.2	18.7	NA	14.9	12.1	11.7	10.5	9.8	16.8	14.7	14.4
C	W10	24-Nov-14	27.0	29.2	18.1	NA	16.3	12.9	5.7	8.4	9.1	15.6	15.1	14.1
C	W11	01-Dec-14	25.9	28.5	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
C	W12	08-Dec-14	25.5	27.8	17.6	NA	14.4	13	12.7	9.6	10.4	15.2	14.7	15.1
C	W13	15-Dec-14	25.1	26.2	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
C	W14	22-Dec-14	24.1	25.4	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
C	W15	29-Dec-14	23.3	24.5	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W00	05-Jan-15	22.7	25.7	19.2	NA	16.1	15.5	12.1	10.9	8.9	16.7	15	13.6
TR01	W01	12-Jan-15	21.6	27.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W02	19-Jan-15	20.4	25.9	18.9	NA	14.5	13.2	10.6	9.2	7.9	15.1	14.9	14.4
TR01	W03	26-Jan-15	21.9	30.8	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W04	02-Feb-15	27.0	32.0	19.2	NA	16.4	16.2	12.5	11.4	9.1	16.3	15.9	15.4
TR01	W05	09-Feb-15	27.8	30.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W06	16-Feb-15	28.7	29.4	19.2	NA	15.9	16	11.1	10	8.3	14.7	14.4	13.8
TR01	W07	23-Feb-15	28.7	25.2	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W08	02-Mar-15	28.2	24.9	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W09	09-Mar-15	29.3	28.1	19.3	NA	16.9	16.7	13.3	12.2	10.5	15.6	14.9	14
TR01	W10	16-Mar-15	29.5	29.7	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR01	W11	23-Mar-15	34.9	36.4	18.6	NA	16.8	16.1	14.1	13.2	12.1	16.2	15.8	15.1
TR01	W12	30-Mar-15	34.4	38.5	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W00	06-Apr-15	32.3	36	18.7	NA	17.3	17.7	14.3	14.3	12.2	16	16.1	15.5
TR02	W01	13-Apr-15	38	39.8	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W02	20-Apr-15	36.7	39.3	19.3	NA	19.4	20.6	15.5	15.7	13.1	17.4	17.1	16.2
TR02	W03	27-Apr-15	36.1	39.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W04	04-May-15	35.2	39.1	19.2	NA	18.4	17.7	16	16.1	13.3	17.9	16.6	16.6
TR02	W05	11-May-15	33.4	37.8	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W06	18-May-15	32.0	36.6	19	NA	19.1	20	16	15.8	13.7	17.1	16.9	16.5
TR02	W07	25-May-16	31.9	36.2	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W08	01-Jun-15	31.3	35.7	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W09	08-Jun-15	30.9	35.3	18.8	NA	18.7	19.2	16.3	16.5	15.7	18.4	17.5	17.3
TR02	W10	15-Jun-15	30.8	35.6	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W11	22-Jun-15	30.9	35.7	19.5	NA	20	21.6	18.6	18.7	17.3	18	18.1	18
TR02	W12	29-Jun-15	30.3	35.5	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W13	06-Jul-15	30.0	35.4	18.7	NA	18.5	17.6	16.8	17	15.8	17.5	17.3	17.5
TR02	W14	13-Jul-15	30.4	35.7	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W15	20-Jul-15	30.5	35.7	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W16	27-Jul-15	28.6	33.7	19	NA	19.5	21.9	17	18.1	16.5	17.8	17.6	17.6
TR02	W17	03-Aug-15	28.2	33.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W18	10-Aug-15	28.4	33.6	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W19	17-Aug-15	28.3	33.8	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W20	24-Aug-15	28.3	33.8	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W21	31-Aug-15	25.7	31.9	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W22	07-Sep-15	25.0	32.5	18.9	NA	19.4	21.1	15.9	17.1	15.2	17.1	16.8	16.7
TR02	W23	14-Sep-15	28.0	37.4	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W24	21-Sep-15	21.7	32.4	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W25	28-Sep-15	5.2	7.7	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W26	05-Oct-15	14.8	21.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W27	12-Oct-15	10.1	17.5	18.9	NA	16.1	14.8	13.1	11.1	12.3	16.3	15.1	14.8
TR02	W28	19-Oct-15	23.2	30.1	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W29	26-Oct-15	11.2	17.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W30	02-Nov-15	23.7	26.9	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W31	09-Nov-15	23.2	21.1	18.4	NA	16.1	15.3	9.2	9.1	6.1	14.7	14	NM[3]

Table 13. Temperature (degrees Celsius)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW H[1] (gpm)	FLOW V[1,2] (gpm)	FDB	SMP	SB1EFF	SFWEFF	HSSFWMP11	AC1EFF	RDEFF	SB2EFF	BTEFF	AC2EFF
TR02	W32	16-Nov-15	23.3	16.2	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W33	23-Nov-15	22.2	12.3	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W34	30-Nov-15	21.7	10.3	17.6	17.1	15.2	12.7	6.1	5	4.7	10.3	10.5	8.8
TR02	W35	07-Dec-15	21.3	9.7	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W36	14-Dec-15	31.1	17.1	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W37	21-Dec-15	46.7	30.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W38	28-Dec-15	46.3	29.9	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W39	04-Jan-16	30.2	30.1	NM[4]	18.7	17.2	15.6	12	10.8	8.1	15.7	14.7	14.1
TR02	W40	11-Jan-16	26.2	29.8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W41	18-Jan-16	25.9	29.9	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W42	25-Jan-16	25.7	30.1	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W43	01-Feb-16	25.5	29.6	NM[4]	18	14.7	12.8	8.6	6.9	6.1	14	13.3	12.6
TR02	W44	08-Feb-16	24.9	31.1	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W45	15-Feb-16	24.8	31.0	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W46	22-Feb-16	24.7	30.8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W47	29-Feb-16	22.9	30.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TR02	W48	07-Mar-16	21.5	29.7	NM[4]	18.7	15.9	14.3	10.2	11	7.5	15.4	14.2	13.5

NOTES:
Values presented for physical and chemical parameters are from field measurements obtained during sampling events.
AC1EFF = Aeration Channel Effluent/Rock Drain Influent
AC2EFF = Aeration Cascade Effluent
BTEFF = Biotreatment Cell Effluent/Aeration Cascade Influent
C = Colonization
DEG C = degrees celsius
FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)
Flow H = Horizontal Treatment Train average flow rate
Flow V = Vertical Treatment Train average flow rate
gpm = gallons per minute
HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent
NA = not available
NM = not measured
OU = operable unit
RDEFF = Rock Drain Effluent
SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent
SB2EFF = Settling Basin No. 2 Effluent/Biotreatment Cell Influent
SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent
SMP = Static Mixer Pool
TR** = Test Run
VWTT = Vertical Wetland Treatment Train
W** = Week of Treatability Study Phase

[1] The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.

[2] The Aeration Cascade in the VWTT was bypassed on different occasions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 influent flow rates to better represent metals mass removal by the VWTT.

[3] Monitoring location AC2EFF was not sampled during W31 of phase TR02 because of Enhance Wetland Demonstration construction activities.

[4] As of 04 JAN 2016, monitoring location FDB will not be sampled since it is no longer representative of the HWTT and VWTT influent due to changes during the construction of the Enhanced Wetland

Table 13A. Temperature (degrees Celsius)
Enhanced Wetland Demonstration
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	FLOW EWD[1] (gpm)	SMP	SB3EFF	MRCEFF	BT2EFF	AC3EFF
EWD-C	W00	23-Nov-15	876.9	18.3	16.3	10.3	14.5	10.7
EWD-C	W01	30-Nov-15	706.1	17.1	16.2	11.8	13.8	11.4
EWD-C	W02	07-Dec-15	590.9	NM	NM	NM	NM	NM
EWD-C	W03	14-Dec-15	576.6	18.5	15.8	13.3	13	12.8
EWD-C	W04	21-Dec-15	541.9	NM	NM	NM	NM	NM
EWD-C	W05	28-Dec-15	535.8	NM	NM	NM	NM	NM
EWD-O	W00	04-Jan-16	552.3	18.7	15.6	14.5	13.9	13.9
EWD-O	W01	11-Jan-16	557.3	NM	NM	NM	NM	NM
EWD-O	W02	18-Jan-16	555.4	NM	NM	NM	NM	NM
EWD-O	W03	25-Jan-16	553.5	NM	NM	NM	NM	NM
EWD-O	W04	01-Feb-16	574.3	18	16.1	13.4	13.1	13.1
EWD-O	W05	08-Feb-16	535.6	NM	NM	NM	NM	NM
EWD-O	W06	15-Feb-16	537.8	NM	NM	NM	NM	NM
EWD-O	W07	22-Feb-16	540.3	NM	NM	NM	NM	NM
EWD-O	W08	29-Feb-16	543.7	NM	NM	NM	NM	NM
EWD-O	W09	07-Mar-16	542.1	18.7	16.1	13.8	12.7	12.8

EWD = Enhanced Wetland Demonstration
EWD-C = EWD Colonization Phase
EWD-O = EWD Operation Phase
Flow EWD = EWD average flow rate
gpm = gallons per minute
MRCEFF = EWD Manganese Removal Cell effluent monitoring location
NM = not measured
OU = operable unit
RL = reporting limit
SB3EFF = EWD Settling Basin effluent monitoring location
SMP = Static Mixer Pool
µg/L = microgram per liter
W** = Week of Treatability Study Phase

[1] The EWD flow rate is estimated based on the system's effluent average flow rate.

Table 14. Mass Removal
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	Analyte Name	INFLUENT[2] (µg/L)	RDEFF (µg/L)	H Δ CONC (µg/L)	H FLOW (gpm)	H FLOW TOTAL (gallons)	H REMOVAL EFFICIENCY (%)	H MASS REMOVAL RATE (g/day)	AC2EFF (µg/L)	V Δ CONC (µg/L)	V FLOW (gpm)	V FLOW TOTAL (gallons)	V REMOVAL EFFICIENCY (%)	V MASS REMOVAL RATE (g/day)
C	W00	15-Sep-14	Cadmium, Dissolved	19.6	<0.5	19.6	25.8	259,600	100	2.8	<0.5	19.6	33.8	340200	100	3.6
C	W01	22-Sep-14	Cadmium, Dissolved	20.2	<0.5	20.2	30.7	309,600	100	3.4	<0.5	20.2	44.5	448200	100	4.9
C	W02	29-Sep-14	Cadmium, Dissolved	22.5	<0.5	22.5	29.5	297,200	100	3.6	<0.5	22.5	41.3	416100	100	5.1
C	W03	06-Oct-14	Cadmium, Dissolved	22.3	<0.5	22.3	30.2	304,500	100	3.7	<0.5	22.3	35.1	353800	100	4.3
C	W04	13-Oct-14	Cadmium, Dissolved	23	<0.5	23	26.8	270,000	100	3.4	<0.5	23	35.7	359700	100	4.5
C	W05	20-Oct-14	Cadmium, Dissolved	23.4	<0.5	23.4	29.2	294,600	100	3.7	<0.5	23.4	35.9	361600	100	4.6
C	W06	27-Oct-14	Cadmium, Dissolved	22.7	<0.5	22.7	27.7	278,800	100	3.4	<0.5	22.7	43.2	435500	100	5.3
C	W07	03-Nov-14	Cadmium, Dissolved	20.4	<0.5	20.4	28.8	290,300	100	3.2	<0.5	20.4	32	322600	100	3.6
C	W08	10-Nov-14	Cadmium, Dissolved	22.6	<0.5	22.6	27.9	280,900	100	3.4	<0.5	22.6	29.8	300300	100	3.7
C	W09	17-Nov-14	Cadmium, Dissolved	21.4	<0.5	21.4	27.9	281,100	100	3.3	<0.5	21.4	29.2	294300	100	3.4
C	W10	24-Nov-14	Cadmium, Dissolved	20.2	<0.5	20.2	27.0	271,700	100	3	<0.5	20.2	29.2	294300	100	3.2
C	W11	01-Dec-14	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
C	W12	08-Dec-14	Cadmium, Dissolved	21.5	<0.5	21.5	25.5	257,200	100	3	<0.5	21.5	27.8	279900	100	3.3
C	W13	15-Dec-14	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
C	W14	22-Dec-14	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
C	W15	29-Dec-14	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W00	05-Jan-15	Cadmium, Dissolved	19.1	<0.5	19.1	22.7	228,700	100	2.4	<0.5	19.1	25.7	259200	100	2.7
TR01	W01	12-Jan-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W02	19-Jan-15	Cadmium, Dissolved	18.6	<0.5	18.6	20.4	206,100	100	2.1	<0.5	18.6	25.9	261400	100	2.6
TR01	W03	26-Jan-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W04	02-Feb-15	Cadmium, Dissolved	18.3	<0.5	18.3	27.0	272,600	100	2.7	<0.5	18.3	32	322200	100	3.2
TR01	W05	09-Feb-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W06	16-Feb-15	Cadmium, Dissolved	19.4	<0.5	19.4	28.6	288,400	100	3	<0.5	19.4	29.3	295600	100	3.1
TR01	W07	23-Feb-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W08	02-Mar-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W09	09-Mar-15	Cadmium, Dissolved	18.7	<0.5	18.7	29.3	295,000	100	3	<0.5	18.7	28.1	283300	100	2.9
TR01	W10	16-Mar-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W11	23-Mar-15	Cadmium, Dissolved	23.7	<0.5	23.7	34.9	352,200	100	4.5	<0.5	23.7	36.4	367300	100	4.7
TR01	W12	30-Mar-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W00	06-Apr-15	Cadmium, Dissolved	18.7	<0.5	18.7	32.3	325,100	100	3.3	<0.5	18.7	36	362700	100	3.7
TR02	W01	13-Apr-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W02	20-Apr-15	Cadmium, Dissolved	16.3	<0.5	16.3	36.7	369,600	100	3.3	<0.5	16.3	39.3	395800	100	3.5
TR02	W03	27-Apr-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W04	04-May-15	Cadmium, Dissolved	18.9	<0.5	18.9	35.2	355,100	100	3.6	<0.5	18.9	39.1	393700	100	4
TR02	W05	11-May-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W06	18-May-15	Cadmium, Dissolved	79.1	<0.5	79.1	32.0	322800	100	13.8	<0.5	79.1	36.6	368600	100	15.8
TR02	W07	25-May-16	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W08	01-Jun-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W09	08-Jun-15	Cadmium, Dissolved	76.2	<0.5	76.2	31.2	314000	100	13	<0.5	76.2	35.6	358800	100	14.8
TR02	W10	15-Jun-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W11	22-Jun-15	Cadmium, Dissolved	61.2	<0.5	61.2	30.9	311300	100	10.3	<0.5	61.2	35.7	360300	100	11.9
TR02	W12	29-Jun-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W13	06-Jul-15	Cadmium, Dissolved	41.4	<0.5	41.4	30.0	302800	100	6.8	<0.5	41.4	35.4	357000	100	8
TR02	W14	13-Jul-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W15	20-Jul-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W16	27-Jul-15	Cadmium, Dissolved	32	<0.08	32	28.6	289900	100	5	<0.08	32	33.7	339400	100	5.9
TR02	W17	03-Aug-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W18	10-Aug-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W19	17-Aug-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W20	24-Aug-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W21	31-Aug-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Table 14. Mass Removal
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	Analyte Name	INFLUENT[2] (µg/L)	RDEFF (µg/L)	H Δ CONC (µg/L)	H FLOW (gpm)	H FLOW TOTAL (gallons)	H REMOVAL EFFICIENCY (%)	H MASS REMOVAL RATE (g/day)	AC2EFF (µg/L)	V Δ CONC (µg/L)	V FLOW (gpm)	V FLOW TOTAL (gallons)	V REMOVAL EFFICIENCY (%)	V MASS REMOVAL RATE (g/day)
TR02	W22	07-Sep-15	Cadmium, Dissolved	22.1	<0.5	22.1	25.0	252000	100	3	<0.5	22.1	32.5	328000	100	3.9
TR02	W23	14-Sep-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W24	21-Sep-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W25	28-Sep-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W26	05-Oct-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W27	12-Oct-15	Cadmium, Dissolved	19.5	<0.5	19.5	10.1	102100	100	1.1	<0.5	19.5	17.5	176000	100	1.9
TR02	W28	19-Oct-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W29	26-Oct-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W30	02-Nov-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W31	09-Nov-15	Cadmium, Dissolved	22.1	<0.5	22.1	23.2	234100	100	2.8	NS[1]	NS[1]	21.1	212900	NS[1]	NS[1]
TR02	W32	16-Nov-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W33	23-Nov-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W34	30-Nov-15	Cadmium, Dissolved	18.4	<0.5	18.4	21.7	218800	100	2.2	<0.5	18.4	10.3	104100	100	1
TR02	W35	07-Dec-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W36	14-Dec-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W37	21-Dec-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W38	28-Dec-15	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W39	04-Jan-16	Cadmium, Dissolved	17.7	<0.5	17.7	30.2	304100	100	2.9	<0.5	17.7	30.1	303700	100	2.9
TR02	W40	11-Jan-16	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W41	18-Jan-16	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W42	25-Jan-16	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W43	01-Feb-16	Cadmium, Dissolved	16.7	<0.5	16.7	25.5	257000	100	2.3	<0.5	16.7	29.6	298100	100	2.7
TR02	W44	08-Feb-16	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W45	15-Feb-16	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W46	22-Feb-16	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W47	29-Feb-16	Cadmium, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W48	07-Mar-16	Cadmium, Dissolved	18.6	<0.5	18.6	21.5	216500	100	2.2	<0.5	18.6	29.7	299800	100	3
C	W00	15-Sep-14	Iron	4500	250	4250	25.8	259600	94.4	597.7	246	4254	33.8	340200	94.5	783.8
C	W01	22-Sep-14	Iron	3740	170	3570	30.7	309600	95.5	597.4	218	3522	44.5	448200	94.2	854.3
C	W02	29-Sep-14	Iron	4230	129	4101	29.5	297200	97	659.5	210	4020	41.3	416100	95	905
C	W03	06-Oct-14	Iron	3940	134	3806	30.2	304,500	96.6	626.5	165	3775	35.1	353800	95.8	722.3
C	W04	13-Oct-14	Iron	3820	144	3676	26.8	270,000	96.2	537	154	3666	35.7	359700	96	713.4
C	W05	20-Oct-14	Iron	5730	326	5404	29.2	294,600	94.3	860.1	143	5587	35.9	361600	97.5	1093.3
C	W06	27-Oct-14	Iron	24100	1340	22760	27.7	278,800	94.4	3436.6	137	23963	43.2	435500	99.4	5642.9
C	W07	03-Nov-14	Iron	4550	297	4253	28.8	290,300	93.5	667.7	153	4397	32	322600	96.6	767
C	W08	10-Nov-14	Iron	5720	99.6	5620.4	27.9	280,900	98.3	854.8	148	5572	29.8	300300	97.4	905.1
C	W09	17-Nov-14	Iron	8800	141	8659	27.9	281,100	98.4	1316.9	260	8540	29.2	294300	97	1359.3
C	W10	24-Nov-14	Iron	5230	<50	5230	27.0	271,700	100	769.7	245	4985	29.2	294300	95.3	793.5
C	W11	01-Dec-14	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
C	W12	08-Dec-14	Iron	5710	<50	5710	25.5	257,200	100	793.7	156	5554	27.8	279900	97.3	841.6
C	W13	15-Dec-14	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
C	W14	22-Dec-14	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
C	W15	29-Dec-14	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W00	05-Jan-15	Iron	6130	<50	6130	22.7	228,700	100	758.5	131	5999	25.7	259200	97.9	840.4
TR01	W01	12-Jan-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W02	19-Jan-15	Iron	7510	<50	7510	20.4	206,100	100	835.1	109	7401	25.9	261400	98.5	1044.9
TR01	W03	26-Jan-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W04	02-Feb-15	Iron	7980	<50	7980	27.0	272,600	100	1174.5	162	7818	32	322200	98	1363.7
TR01	W05	09-Feb-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W06	16-Feb-15	Iron	9530	<50	9530	28.6	288,400	100	1485.7	142	9388	29.3	295600	98.5	1499.4
TR01	W07	23-Feb-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Table 14. Mass Removal
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	Analyte Name	INFLUENT[2] (µg/L)	RDEFF (µg/L)	H Δ CONC (µg/L)	H FLOW (gpm)	H FLOW TOTAL (gallons)	H REMOVAL EFFICIENCY (%)	H MASS REMOVAL RATE (g/day)	AC2EFF (µg/L)	V Δ CONC (µg/L)	V FLOW (gpm)	V FLOW TOTAL (gallons)	V REMOVAL EFFICIENCY (%)	V MASS REMOVAL RATE (g/day)
TR01	W08	02-Mar-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W09	09-Mar-15	Iron	10400	<50	10400	29.3	295,000	100	1661	138	10262	28.1	283300	98.7	1571.9
TR01	W10	16-Mar-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W11	23-Mar-15	Iron	8450	<50	8450	34.9	352,200	100	1607.5	291	8159	36.4	367300	96.6	1618.9
TR01	W12	30-Mar-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W00	06-Apr-15	Iron	9260	<50	9260	32.3	325,100	100	1630.4	202	9058	36	362700	97.8	1777.5
TR02	W01	13-Apr-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W02	20-Apr-15	Iron	9020	<50	9020	36.7	369,600	100	1804.5	261	8759	39.3	395800	97.1	1876.4
TR02	W03	27-Apr-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W04	04-May-15	Iron	8630	75.8	8554.2	35.2	355,100	99.1	1642.6	210	8420	39.1	393700	97.6	1794.6
TR02	W05	11-May-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W06	18-May-15	Iron	5460	<50	5460	32.0	322800	100	953.1	425	5035	36.6	368600	92.2	1004.5
TR02	W07	25-May-16	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W08	01-Jun-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W09	08-Jun-15	Iron	4150	68.8	4081.2	31.2	314000	98.3	694.1	905	3245	35.6	358800	78.2	629.6
TR02	W10	15-Jun-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W11	22-Jun-15	Iron	2990	106	2884	30.9	311300	96.5	485.8	570	2420	35.7	360300	80.9	470.9
TR02	W12	29-Jun-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W13	06-Jul-15	Iron	3860	53.9	3806.1	30.0	302800	98.6	623.2	323	3537	35.4	357000	91.6	682.8
TR02	W14	13-Jul-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W15	20-Jul-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W16	27-Jul-15	Iron	4480	<50	4480	28.6	289900	100	698.4	224	4256	33.7	339400	95	781.8
TR02	W17	03-Aug-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W18	10-Aug-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W19	17-Aug-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W20	24-Aug-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W21	31-Aug-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W22	07-Sep-15	Iron	5590	<50	5590	25.0	252000	100	761.2	152	5438	32.5	328000	97.3	963.4
TR02	W23	14-Sep-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W24	21-Sep-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W25	28-Sep-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W26	05-Oct-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W27	12-Oct-15	Iron	3780	208	3572	10.1	102100	94.5	196.6	163	3617	17.5	176000	95.7	344.1
TR02	W28	19-Oct-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W29	26-Oct-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W30	02-Nov-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W31	09-Nov-15	Iron	4760	52.9	4707.1	23.2	234100	98.9	595.9	NS[1]	NS[1]	21.1	212900	NS[1]	NS[1]
TR02	W32	16-Nov-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W33	23-Nov-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W34	30-Nov-15	Iron	5220	<50	5220	21.7	218800	100	617.5	104	5116	10.3	104100	98	288
TR02	W35	07-Dec-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W36	14-Dec-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W37	21-Dec-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W38	28-Dec-15	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W39	04-Jan-16	Iron	9930	<50	9930	30.2	304100	100	1633	155	9775	30.1	303700	98.4	1605.4
TR02	W40	11-Jan-16	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W41	18-Jan-16	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W42	25-Jan-16	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W43	01-Feb-16	Iron	9870	<50	9870	25.5	257000	100	1371.7	159	9711	29.6	298100	98.4	1565.5
TR02	W44	08-Feb-16	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W45	15-Feb-16	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Table 14. Mass Removal
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	Analyte Name	INFLUENT[2] (µg/L)	RDEFF (µg/L)	H Δ CONC (µg/L)	H FLOW (gpm)	H FLOW TOTAL (gallons)	H REMOVAL EFFICIENCY (%)	H MASS REMOVAL RATE (g/day)	AC2EFF (µg/L)	V Δ CONC (µg/L)	V FLOW (gpm)	V FLOW TOTAL (gallons)	V REMOVAL EFFICIENCY (%)	V MASS REMOVAL RATE (g/day)
TR02	W46	22-Feb-16	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W47	29-Feb-16	Iron	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W48	07-Mar-16	Iron	9480	<50	9480	21.5	216500	100	1109.9	62.8	9417.2	29.7	299800	99.3	1526.7
C	W00	15-Sep-14	Iron, Dissolved	772	76.2	695.8	25.8	259,600	90.1	97.9	174	598	33.8	340200	77.5	110.2
C	W01	22-Sep-14	Iron, Dissolved	723	<50	723	30.7	309,600	100	121	128	595	44.5	448200	82.3	144.3
C	W02	29-Sep-14	Iron, Dissolved	1320	<50	1320	29.5	297,200	100	212.3	147	1173	41.3	416100	88.9	264.1
C	W03	06-Oct-14	Iron, Dissolved	625	53.3	571.7	30.2	304,500	91.5	94.1	86.2	538.8	35.1	353800	86.2	103.1
C	W04	13-Oct-14	Iron, Dissolved	339	66.1	272.9	26.8	270,000	80.5	39.9	89.4	249.6	35.7	359700	73.6	48.6
C	W05	20-Oct-14	Iron, Dissolved	575	195	380	29.2	294,600	66.1	60.5	106	469	35.9	361600	81.6	91.8
C	W06	27-Oct-14	Iron, Dissolved	1930	847	1083	27.7	278,800	56.1	163.5	113	1817	43.2	435500	94.1	427.9
C	W07	03-Nov-14	Iron, Dissolved	483	148	335	28.8	290,300	69.4	52.6	106	377	32	322600	78.1	65.8
C	W07	03-Nov-14	Iron, Dissolved	2290	79.8	2210.2	27.9	280,900	96.5	336.1	90	2200	29.8	300300	96.1	357.4
C	W09	17-Nov-14	Iron, Dissolved	1140	111	1029	27.9	281,100	90.3	156.5	188	952	29.2	294300	83.5	151.5
C	W10	24-Nov-14	Iron, Dissolved	3480	<50	3480	27.0	271,700	100	512.2	163	3317	29.2	294300	95.3	528
C	W11	01-Dec-14	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
C	W12	08-Dec-14	Iron, Dissolved	5510	<50	5510	25.5	257,200	100	765.9	161	5349	27.8	279900	97.1	810.6
C	W13	15-Dec-14	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
C	W14	22-Dec-14	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
C	W15	29-Dec-14	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W00	05-Jan-15	Iron, Dissolved	1060	<50	1060	22.7	228,700	100	131.2	148	912	25.7	259200	86	127.8
TR01	W01	12-Jan-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W02	19-Jan-15	Iron, Dissolved	2050	<50	2050	20.4	206,100	100	228	95.6	1954.4	25.9	261400	95.3	275.9
TR01	W03	26-Jan-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W04	02-Feb-15	Iron, Dissolved	2260	<50	2260	27.0	272,600	100	332.6	148	2112	32	322200	93.5	368.4
TR01	W05	09-Feb-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W06	16-Feb-15	Iron, Dissolved	2580	<50	2580	28.6	288,400	100	402.2	124	2456	29.3	295600	95.2	392.3
TR01	W07	23-Feb-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W08	02-Mar-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W09	09-Mar-15	Iron, Dissolved	1600	<50	1600	29.3	295000	100	255.5	118	1482	28.1	283300	92.6	227
TR01	W10	16-Mar-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W11	23-Mar-15	Iron, Dissolved	2290	<50	2290	34.9	352,200	100	435.6	289	2001	36.4	367300	87.4	397
TR01	W12	30-Mar-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W00	06-Apr-15	Iron, Dissolved	2610	<50	2610	32.3	325100	100	459.5	187	2423	36	362700	92.8	475.5
TR02	W01	13-Apr-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W02	20-Apr-15	Iron, Dissolved	2810	59.9	2750.1	36.7	369,600	97.9	550.2	213	2597	39.3	395800	92.4	556.3
TR02	W03	27-Apr-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W04	04-May-15	Iron, Dissolved	2220	52.2	2167.8	35.2	355,100	97.6	416.3	179	2041	39.1	393700	91.9	435
TR02	W05	11-May-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W06	18-May-15	Iron, Dissolved	1440	<50	1440	32.0	322800	100	251.4	436	1004	36.6	368600	69.7	200.3
TR02	W07	25-May-16	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W08	01-Jun-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W09	08-Jun-15	Iron, Dissolved	1510	<50	1510	31.2	314000	100	256.8	794	716	35.6	358800	47.4	138.9
TR02	W10	15-Jun-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W11	22-Jun-15	Iron, Dissolved	544	<50	544	30.9	311300	100	91.6	371	173	35.7	360300	31.8	33.7
TR02	W12	29-Jun-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W13	06-Jul-15	Iron, Dissolved	389	<50	389	30.0	302800	100	63.7	300	89	35.4	357000	22.9	17.2
TR02	W14	13-Jul-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W15	20-Jul-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W16	27-Jul-15	Iron, Dissolved	206	<50	206	30.6	308700	100	34.4	181	25	35.8	361000	12.1	4.9
TR02	W17	03-Aug-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W18	10-Aug-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Table 14. Mass Removal
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	Analyte Name	INFLUENT[2] (µg/L)	RDEFF (µg/L)	H Δ CONC (µg/L)	H FLOW (gpm)	H FLOW TOTAL (gallons)	H REMOVAL EFFICIENCY (%)	H MASS REMOVAL RATE (g/day)	AC2EFF (µg/L)	V Δ CONC (µg/L)	V FLOW (gpm)	V FLOW TOTAL (gallons)	V REMOVAL EFFICIENCY (%)	V MASS REMOVAL RATE (g/day)
TR02	W19	17-Aug-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W20	24-Aug-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W21	31-Aug-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W22	07-Sep-15	Iron, Dissolved	184	<50	184	25.0	252000	100	25.1	141	43	32.5	328000	23.4	7.6
TR02	W23	14-Sep-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W24	21-Sep-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W25	28-Sep-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W26	05-Oct-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W27	12-Oct-15	Iron, Dissolved	425	<50	425	10.1	102100	100	23.4	134	291	17.5	176000	68.5	27.7
TR02	W28	19-Oct-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W29	26-Oct-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W30	02-Nov-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W31	09-Nov-15	Iron, Dissolved	1070	<50	1070	23.2	234100	100	135.5	NS[1]	NS[1]	21.1	212900	NS[1]	NS[1]
TR02	W32	16-Nov-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W33	23-Nov-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W34	30-Nov-15	Iron, Dissolved	2150	<50	2150	21.7	218800	100	254.3	102	2048	10.3	104100	95.3	115.3
TR02	W35	07-Dec-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W36	14-Dec-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W37	21-Dec-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W38	28-Dec-15	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W39	04-Jan-16	Iron, Dissolved	2890	<50	2890	30.2	304100	100	475.3	124	2766	30.1	303700	95.7	454.3
TR02	W40	11-Jan-16	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W41	18-Jan-16	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W42	25-Jan-16	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W43	01-Feb-16	Iron, Dissolved	1870	<50	1870	25.5	257000	100	259.9	67.2	1802.8	29.6	298100	96.4	290.6
TR02	W44	08-Feb-16	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W45	15-Feb-16	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W46	22-Feb-16	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W47	29-Feb-16	Iron, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W48	07-Mar-16	Iron, Dissolved	3670	<50	3670	21.5	216500	100	429.7	60.7	3609.3	29.7	299800	98.3	585.2
C	W00	15-Sep-14	Manganese, Dissolved	2080	1760	320	25.8	259,600	15.4	45	1700	380	33.8	340200	18.3	70
C	W01	22-Sep-14	Manganese, Dissolved	2160 J	1620	540	30.7	309,600	25	90.4	1970	190	44.5	448200	8.8	46.1
C	W02	29-Sep-14	Manganese, Dissolved	2200	1500	700	29.5	297,200	31.8	112.6	2110	90	41.3	416100	4.1	20.3
C	W03	06-Oct-14	Manganese, Dissolved	2260	1750 J	510	30.2	304,500	22.6	84	2160	100	35.1	353800	4.4	19.1
C	W04	13-Oct-14	Manganese, Dissolved	2310 B	1970 B	340	26.8	270,000	14.7	49.7	2040 B	270	35.7	359700	11.7	52.5
C	W05	20-Oct-14	Manganese, Dissolved	2270	2030	240	29.2	294,600	10.6	38.2	1820	450	35.9	361600	19.8	88.1
C	W06	27-Oct-14	Manganese, Dissolved	2220	1650 J	570	27.7	278,800	25.7	86.1	1520	700	43.2	435500	31.5	164.8
C	W07	03-Nov-14	Manganese, Dissolved	2250	594	1656	28.8	290,300	73.6	260	1750 J	500	32	322600	22.2	87.2
C	W08	10-Nov-14	Manganese, Dissolved	2400	293	2107	27.9	280,900	87.8	320.4	1750	650	29.8	300300	27.1	105.6
C	W09	17-Nov-14	Manganese, Dissolved	2260	396	1864	27.9	281,100	82.5	283.5	1680	580	29.2	294300	25.7	92.3
C	W10	24-Nov-14	Manganese, Dissolved	2180	106	2074	27.0	271,700	95.1	305.2	1340	840	29.2	294300	38.5	133.7
C	W11	01-Dec-14	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
C	W12	08-Dec-14	Manganese, Dissolved	2200	232	1968	25.5	257,200	89.5	273.6	571	1629	27.8	279900	74	246.9
C	W13	15-Dec-14	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
C	W14	22-Dec-14	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
C	W15	29-Dec-14	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W00	05-Jan-15	Manganese, Dissolved	2150	141	2009	22.7	228,700	93.4	248.6	520	1630	25.7	259200	75.8	228.3
TR01	W01	12-Jan-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W02	19-Jan-15	Manganese, Dissolved	2070	190	1880	20.4	206,100	90.8	209.1	618	1452	25.9	261400	70.1	205
TR01	W03	26-Jan-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W04	02-Feb-15	Manganese, Dissolved	2070	654	1416	27.0	272,600	68.4	208.4	1270	800	32	322200	38.6	139.5

Table 14. Mass Removal
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	Analyte Name	INFLUENT[2] (µg/L)	RDEFF (µg/L)	H Δ CONC (µg/L)	H FLOW (gpm)	H FLOW TOTAL (gallons)	H REMOVAL EFFICIENCY (%)	H MASS REMOVAL RATE (g/day)	AC2EFF (µg/L)	V Δ CONC (µg/L)	V FLOW (gpm)	V FLOW TOTAL (gallons)	V REMOVAL EFFICIENCY (%)	V MASS REMOVAL RATE (g/day)
TR01	W05	09-Feb-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W06	16-Feb-15	Manganese, Dissolved	2100	721	1379	28.6	288,400	65.7	215	521	1579	29.3	295600	75.2	252.2
TR01	W07	23-Feb-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W08	02-Mar-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W09	09-Mar-15	Manganese, Dissolved	2090	641	1449	29.3	295,000	69.3	231.4	500	1590	28.1	283300	76.1	243.5
TR01	W10	16-Mar-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W11	23-Mar-15	Manganese, Dissolved	2070	1020	1050	34.9	352,200	50.7	199.8	558	1512	36.4	367300	73	300
TR01	W12	30-Mar-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W00	06-Apr-15	Manganese, Dissolved	1870 B	913 B	957	32.3	325,100	51.2	168.5	1040 B	830	36	362700	44.4	162.9
TR02	W01	13-Apr-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W02	20-Apr-15	Manganese, Dissolved	1840	732 J	1108	36.7	369,600	60.2	221.7	844 J	996	39.3	395800	54.1	213.4
TR02	W03	27-Apr-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W04	04-May-15	Manganese, Dissolved	1910	949	961	35.2	355,100	50.3	184.5	689	1221	39.1	393700	63.9	260.2
TR02	W05	11-May-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W06	18-May-15	Manganese, Dissolved	4260	387	3873	32.0	322800	90.9	676.1	1080	3180	36.6	368600	74.6	634.4
TR02	W07	25-May-16	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W08	01-Jun-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W09	08-Jun-15	Manganese, Dissolved	3970	69.8	3900.2	31.2	314000	98.2	663.3	3730	240	35.6	358800	6	46.6
TR02	W10	15-Jun-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W11	22-Jun-15	Manganese, Dissolved	3440 B	37.9 B	3402.1	30.9	311300	98.9	573	4210 B	-770	35.7	360300	-22.4	-149.8
TR02	W12	29-Jun-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W13	06-Jul-15	Manganese, Dissolved	3350	328	3022	30.0	302800	90.2	494.8	3810	-460	35.4	357000	-13.7	-88.8
TR02	W14	13-Jul-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W15	20-Jul-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W16	27-Jul-15	Manganese, Dissolved	2860	736	2124	28.6	289900	74.3	331.1	1540	1320	33.7	339400	46.2	242.5
TR02	W17	03-Aug-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W18	10-Aug-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W19	17-Aug-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W20	24-Aug-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W21	31-Aug-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W22	07-Sep-15	Manganese, Dissolved	2410	603	1807	25.0	252000	75	246.1	1170	1240	32.5	328000	51.5	219.7
TR02	W23	14-Sep-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W24	21-Sep-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W25	28-Sep-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W26	05-Oct-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W27	12-Oct-15	Manganese, Dissolved	2380	389	1991	10.1	102100	83.7	109.6	1160	1220	17.5	176000	51.3	116
TR02	W28	19-Oct-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W29	26-Oct-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W30	02-Nov-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W31	09-Nov-15	Manganese, Dissolved	2460	16.7	2443.3	23.2	234100	99.3	309.3	NS[1]	NS[1]	21.1	212900	NS[1]	NS[1]
TR02	W32	16-Nov-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W33	23-Nov-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W34	30-Nov-15	Manganese, Dissolved	2250	2.4	2247.6	21.7	218800	99.9	265.9	269	1981	10.3	104100	88	111.5
TR02	W35	07-Dec-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W36	14-Dec-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W37	21-Dec-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W38	28-Dec-15	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W39	04-Jan-16	Manganese, Dissolved	2260	224	2036	30.2	304100	90.1	334.8	538	1722	30.1	303700	76.2	282.8
TR02	W40	11-Jan-16	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W41	18-Jan-16	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W42	25-Jan-16	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Table 14. Mass Removal
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	Analyte Name	INFLUENT[2] (µg/L)	RDEFF (µg/L)	H Δ CONC (µg/L)	H FLOW (gpm)	H FLOW TOTAL (gallons)	H REMOVAL EFFICIENCY (%)	H MASS REMOVAL RATE (g/day)	AC2EFF (µg/L)	V Δ CONC (µg/L)	V FLOW (gpm)	V FLOW TOTAL (gallons)	V REMOVAL EFFICIENCY (%)	V MASS REMOVAL RATE (g/day)
TR02	W43	01-Feb-16	Manganese, Dissolved	2120	<1	2120	25.5	257000	100	294.6	258	1862	29.6	298100	87.8	300.2
TR02	W44	08-Feb-16	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W45	15-Feb-16	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W46	22-Feb-16	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W47	29-Feb-16	Manganese, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W48	07-Mar-16	Manganese, Dissolved	2010	1.2	2008.8	21.5	216500	99.9	235.2	514	1496	29.7	299800	74.4	242.5
C	W00	15-Sep-14	Zinc, Dissolved	3500	62.5	3437.5	25.8	259,600	98.2	483.4	148	3352	33.8	340200	95.8	617.6
C	W01	22-Sep-14	Zinc, Dissolved	3800 J	30	3770	30.7	309,600	99.2	630.9	<10	3800	44.5	448200	100	921.8
C	W02	29-Sep-14	Zinc, Dissolved	4000	<10	4000	29.5	297,200	100	643.2	279	3721	41.3	416100	93	837.7
C	W03	06-Oct-14	Zinc, Dissolved	3970	102	3868	30.2	304,500	97.4	636.7	<10	3970	35.1	353800	100	759.6
C	W04	13-Oct-14	Zinc, Dissolved	4000	53	3947	26.8	270,000	98.7	576.6	59.4	3940.6	35.7	359700	98.5	766.8
C	W05	20-Oct-14	Zinc, Dissolved	4160	69.3	4090.7	29.2	294,600	98.3	651.1	65.7	4094.3	35.9	361600	98.4	801.2
C	W06	27-Oct-14	Zinc, Dissolved	4120	47.9	4072.1	27.7	278,800	98.8	614.9	46.9	4073.1	43.2	435500	98.9	959.1
C	W07	03-Nov-14	Zinc, Dissolved	3790	54	3736	28.8	290,300	98.6	586.5	91.7	3698.3	32	322600	97.6	645.1
C	W08	10-Nov-14	Zinc, Dissolved	4230	<10	4230	27.9	280,900	100	643.3	49.4	4180.6	29.8	300300	98.8	679.1
C	W09	17-Nov-14	Zinc, Dissolved	3770	23.5	3746.5	27.9	281,100	99.4	569.8	48.8	3721.2	29.2	294300	98.7	592.3
C	W10	24-Nov-14	Zinc, Dissolved	3760	159	3601	27.0	271,700	95.8	530	54.5	3705.5	29.2	294300	98.6	589.8
C	W11	01-Dec-14	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
C	W12	08-Dec-14	Zinc, Dissolved	3900	106	3794	25.5	257200	97.3	527.4	368	3532	27.8	279900	90.6	535.2
C	W13	15-Dec-14	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
C	W14	22-Dec-14	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
C	W15	29-Dec-14	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W00	05-Jan-15	Zinc, Dissolved	3470	38.3	3431.7	22.7	228700	98.9	424.6	26.1	3443.9	25.7	259200	99.2	482.5
TR01	W01	12-Jan-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W02	19-Jan-15	Zinc, Dissolved	3610	42.7	3567.3	20.4	206100	98.8	396.7	25.3	3584.7	25.9	261400	99.3	506.1
TR01	W03	26-Jan-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W04	02-Feb-15	Zinc, Dissolved	3520	52.9	3467.1	27	272600	98.5	510.3	63.7	3456.3	32	322200	98.2	602.9
TR01	W05	09-Feb-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W06	16-Feb-15	Zinc, Dissolved	3740	48.5	3691.5	28.6	288400	98.7	575.5	38.4	3701.6	29.3	295600	99	591.2
TR01	W07	23-Feb-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W08	02-Mar-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W09	09-Mar-15	Zinc, Dissolved	3290	57.1	3232.9	29.3	295000	98.3	516.3	16.7	3273.3	28.1	283300	99.5	501.4
TR01	W10	16-Mar-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR01	W11	23-Mar-15	Zinc, Dissolved	4270	52.4	4217.6	34.9	352,200	98.8	802.4	24.2	4245.8	36.4	367300	99.4	842.4
TR01	W12	30-Mar-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W00	06-Apr-15	Zinc, Dissolved	3540	44	3496	32.3	325100	98.8	615.5	12.7	3527.3	36	362700	99.6	692.2
TR02	W01	13-Apr-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W02	20-Apr-15	Zinc, Dissolved	3060	38.2	3021.8	36.7	369,600	98.8	604.5	10.7	3049.3	39.3	395800	99.7	653.2
TR02	W03	27-Apr-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W04	04-May-15	Zinc, Dissolved	3490	62.2	3427.8	35.2	355,100	98.2	658.2	34.7	3455.3	39.1	393700	99	736.4
TR02	W05	11-May-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W06	18-May-15	Zinc, Dissolved	13400	31.6	13368.4	32.0	322800	99.8	2333.6	225	13175	36.6	368600	98.3	2628.5
TR02	W07	25-May-16	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W08	01-Jun-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W09	08-Jun-15	Zinc, Dissolved	12300	187	12113	31.2	314000	98.5	2060.1	1090	11210	35.6	358800	91.1	2175.1
TR02	W10	15-Jun-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W11	22-Jun-15	Zinc, Dissolved	10500	393	10107	30.9	311300	96.3	1702.4	54	10446	35.7	360300	99.5	2032.8
TR02	W12	29-Jun-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W13	06-Jul-15	Zinc, Dissolved	6750	408	6342	30.0	302800	94	1038.5	854	5896	35.4	357000	87.3	1138.3
TR02	W14	13-Jul-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W15	20-Jul-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Table 14. Mass Removal
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	Analyte Name	INFLUENT[2] (µg/L)	RDEFF (µg/L)	H Δ CONC (µg/L)	H FLOW (gpm)	H FLOW TOTAL (gallons)	H REMOVAL EFFICIENCY (%)	H MASS REMOVAL RATE (g/day)	AC2EFF (µg/L)	V Δ CONC (µg/L)	V FLOW (gpm)	V FLOW TOTAL (gallons)	V REMOVAL EFFICIENCY (%)	V MASS REMOVAL RATE (g/day)
TR02	W16	27-Jul-15	Zinc, Dissolved	5820	236	5584	28.6	289900	95.9	870.5	38.2	5781.8	33.7	339400	99.3	1062.1
TR02	W17	03-Aug-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W18	10-Aug-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W19	17-Aug-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W20	24-Aug-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W21	31-Aug-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W22	07-Sep-15	Zinc, Dissolved	4030	83.1	3946.9	24.980159	252000	97.9	537.4	20	4010	32.5	328000	99.5	710.4
TR02	W23	14-Sep-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W24	21-Sep-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W25	28-Sep-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W26	05-Oct-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W27	12-Oct-15	Zinc, Dissolved	3590	64.6	3525.4	10.099206	102100	98.2	194.1	<10	3590	17.45039683	176000	100	341.5
TR02	W28	19-Oct-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W29	26-Oct-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W30	02-Nov-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W31	09-Nov-15	Zinc, Dissolved	4060	113	3947	23.224206	234100	97.2	499.7	NS[1]	NS[1]	21.12103175	212900	NS[1]	NS[1]
TR02	W32	16-Nov-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W33	23-Nov-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W34	30-Nov-15	Zinc, Dissolved	3340	111	3229	21.7	218800	96.7	381.9	<10	3340	10.32738095	104100	100	188
TR02	W35	07-Dec-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W36	14-Dec-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W37	21-Dec-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W38	28-Dec-15	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W39	04-Jan-16	Zinc, Dissolved	3680	136	3544	30.168651	304100	96.3	582.8	<10	3680	30.12896825	303700	100	604.4
TR02	W40	11-Jan-16	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W41	18-Jan-16	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W42	25-Jan-16	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W43	01-Feb-16	Zinc, Dissolved	3410	130	3280	25.496032	257000	96.2	455.8	<10	3410	29.5734127	298100	100	549.7
TR02	W44	08-Feb-16	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W45	15-Feb-16	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W46	22-Feb-16	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W47	29-Feb-16	Zinc, Dissolved	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TR02	W48	07-Mar-16	Zinc, Dissolved	3450	135	3315	21.5	216500	96.1	388.1	17.7	3432.3	29.7	299800	99.5	556.5

NOTES:
Non-detects are reported as <RL and estimated as zero for calculations and graphing.
% = percent
AC1EFF = Aeration Channel Effluent/Rock Drain Influent
AC2EFF = Aeration Cascade Effluent
B = Analyte is detected in an associated blank
BTEFF = Biotreatment Cell Effluent/Aeration Cascade Influent
C = Colonization
FDB = Flow Diversion Box (Settling Basin No. 1 Influent/Settling Basin No. 2 Influent)
g/day = grams per day
gpm = gallons per minute
H = horizontal
H Δ CONC = horizontal change in concentration
HSSFWMP11 = Horizontal Sub Surface Flow Wetland Effluent/Aeration Channel Influent
HWTT = Horizontal Wetland Treatment Train
J = Estimated result
MDL = method detection limit
NS = not sampled
OU = operable unit
ppm = parts per million

Table 14. Mass Removal
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

Phase	Week	Week of	Analyte Name	INFLUENT[2] (µg/L)	RDEFF (µg/L)	H Δ CONC (µg/L)	H FLOW (gpm)	H FLOW TOTAL (gallons)	H REMOVAL EFFICIENCY (%)	H MASS REMOVAL RATE (g/day)	AC2EFF (µg/L)	V Δ CONC (µg/L)	V FLOW (gpm)	V FLOW TOTAL (gallons)	V REMOVAL EFFICIENCY (%)	V MASS REMOVAL RATE (g/day)

RDEFF = Rock Drain Effluent
RL = reporting limit
SB1EFF = Settling Basin No. 1 Effluent/Surface Flow Wetland Influent
SB2EFF = Settling Basin No. 2 Effluent/Biotreatment Cell Influent
SFWEFF = Surface Flow Wetland Effluent/Horizontal Sub Surface Flow Wetland Influent
SMP = Static Mixer Pool
TR** = Test Run
V = vertical
V Δ CONC = vertical change in concentration
VWTT = Vertical Wetland Treatment Train
W** = Week of Treatability Study Phase

The interpolation method for calculating weekly flow totals for both the horizontal and vertical treatment trains was modified to improve precision.
The Aeration Cascade in the VWTT was bypassed on different occasions between 27 OCT 2014 and 16 NOV 2014. The Aeration Cascade Effluent flow rate was used in the weekly flow calculations in monthly reports for the VWTT prior to DEC 2014. The flow rates for the period 27 OCT 2014 - 16 NOV 2014 (and all other weeks) are now calculated based on the Settling Basin No. 2 influent flow rates to better represent metals mass removal by the VWTT.
[1]Monitoring location AC2EFF was not sampled during W31 of phase TR02 because of Enhance Wetland Demonstration construction activities.
[2]From 15 SEP 2014 to 03 JAN 2016 monitoring location FDB was used to represent the influent of the HWTT and VWTT. As of 04 JAN 2016, monitoring location SMP is used to represent the influent of the HWTT

Table 15. Hydrogen Sulfide Gas (ppm)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

			H2S-01 (Aeration Channel Inlet)			H2S-02 (Access Road near Aeration Channel-South)			H2S-03 (Access Road near Aeration Channel-North)			H2S-04 (Access Road near Biotreatment Cell)			H2S-05 (Aeration Cascade Inlet)		
Phase	**Week**	**Week of**	**average**	**minimum**	**maximum**	**average**	**minimum**	**maximum**	**average**	**minimum**	**maximum**	**average**	**minimum**	**maximum**	**average**	**minimum**	**maximum**
C	W00	15-Sep-14	0.033	0	1.1	0.018	0	1.5	0.0024	0	0.2	0.000	0	0	0.002	0	0.4
C	W01	22-Sep-14	0.016	0	0.7	0.025	0	1	0.0000	0	0	0.000	0	0	0.003	0	0.4
C	W02	29-Sep-14	0.032	0	1.7	0.003	0	0.5	0.0000	0	0	0.007	0	1.1	0.004	0	0.7
C	W03	06-Oct-14	0.022	0	3	0.002	0	0.4	0.0000	0	0	0.004	0	0.7	0.006	0	0.6
C	W04	13-Oct-14	0.005	0	0.5	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
C	W05	20-Oct-14	0.005	0	0.4	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
C	W06	27-Oct-14	0.008	0	0.6	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
C	W07	03-Nov-14	0.000	0	0	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
C	W08	10-Nov-14	0.002	0	0.4	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
C	W09	17-Nov-14	0.000	0	0	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
C	W10	24-Nov-14	0.000	0	0	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
C	W11	01-Dec-14	0.006	0	0.6	0.000	0	0	0.0000	0	0	0.000	0	0	0.002	0	0.4
C	W12	08-Dec-14	0.002	0	0.4	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
C	W13	15-Dec-14	0.008	0	0.7	0.000	0	0	0.0000	0	0	0.000	0	0	0.011	0	0.6
C	W14	22-Dec-14	0.000	0	0	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
C	W15	29-Dec-14	0.000	0	0	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
TR01	W00	05-Jan-15	0.002	0	0.4	0.000	0	0	0.0000	0	0	0.000	0	0	0.005	0	0.4
TR01	W01	12-Jan-15	0.007	0	0.7	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
TR01	W02	19-Jan-15	0.002	0	0.4	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
TR01	W03	26-Jan-15	0.002	0	0.4	0.000	0	0	0.0000	0	0	0.000	0	0	0.002	0	0.4
TR01	W04	02-Feb-15	0.000	0	0	0.000	0	0	0.0000	0	0	0.000	0	0	0.002	0	0.4
TR01	W05	09-Feb-15	0.002	0	0.4	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
TR01	W06	16-Feb-15	0.013	0	0.6	0.000	0	0	NA[1]	NA[1]	NA[1]	0.000	0	0	0.030	0	5
TR01	W07	23-Feb-15	0.033	0	0.8	0.000	0	0	NA[1]	NA[1]	NA[1]	0.000	0	0	0.012	0	0.4
TR01	W08	02-Mar-15	0.005	0	0.5	0.000	0	0	NA[1]	NA[1]	NA[1]	0.000	0	0	0.005	0	0.4
TR01	W09	09-Mar-15	0.000	0	0	0.000	0	0	NA[1]	NA[1]	NA[1]	0.000	0	0	0.000	0	0
TR01	W10	16-Mar-15	0.000	0	0	0.000	0	0	NA[1]	NA[1]	NA[1]	0.000	0	0	0.000	0	0
TR01	W11	23-Mar-15	0.002	0	0.4	0.000	0	0	NA[1]	NA[1]	NA[1]	0.000	0	0	0.000	0	0
TR01	W10	16-Mar-15	0.000	0	0	0.000	0	0	NA[1]	NA[1]	NA[1]	0.000	0	0	0.000	0	0
TR01	W11	23-Mar-15	0.002	0	0.4	0.000	0	0	NA[1]	NA[1]	NA[1]	0.000	0	0	0.000	0	0
TR01	W12	30-Mar-15	0.002	0	0.4	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
TR02	W00	06-Apr-15	0.000	0	0	0.000	0	0	0.0000	0	0	0.000	0	0	0.005	0	0.9
TR02	W01	13-Apr-15	0.002	0	0.4	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
TR02	W02	20-Apr-15	0.000	0	0	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
TR02	W03	27-Apr-15	0.002	0	0.4	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
TR02	W04	04-May-15	0.000	0	0	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
TR02	W05	11-May-15	0.007	0	0.6	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
TR02	W06	18-May-15	0.000	0	0	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
TR02	W07	25-May-16	0.000	0	0	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
TR02	W08	01-Jun-15	0.000	0	0	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
TR02	W09	08-Jun-15	0.000	0	0	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
TR02	W10	15-Jun-15	0.000	0	0	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
TR02	W11	22-Jun-15	0.002	0	0.4	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
TR02	W12	29-Jun-15	0.007	0	0.6	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
TR02	W13	06-Jul-15	0.017	0	1.4	0.002	0	0.4	0.0000	0	0	0.000	0	0	0.000	0	0
TR02	W14	13-Jul-15	0.007	0	0.7	0.005	0	0.4	0.0000	0	0	0.000	0	0	0.000	0	0

Table 15. Hydrogen Sulfide Gas (ppm)
Horizontal and Vertical Wetland Treatment Trains
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

			H2S-01 (Aeration Channel Inlet)			H2S-02 (Access Road near Aeration Channel-South)			H2S-03 (Access Road near Aeration Channel-North)			H2S-04 (Access Road near Biotreatment Cell)			H2S-05 (Aeration Cascade Inlet)		
Phase	**Week**	**Week of**	**average**	**minimum**	**maximum**	**average**	**minimum**	**maximum**	**average**	**minimum**	**maximum**	**average**	**minimum**	**maximum**	**average**	**minimum**	**maximum**
TR02	W15	20-Jul-15	0.002	0	0.4	0.004	0	0.6	0.0000	0	0	0.000	0	0	0.000	0	0
TR02	W16	27-Jul-15	0.029	0	2.1	0.002	0	0.4	0.0000	0	0	0.000	0	0	0.006	0	0.6
TR02	W17	03-Aug-15	0.007	0	0.7	0.002	0	0.4	0.0000	0	0	0.000	0	0	0.020	0	0.6
TR02	W18	10-Aug-15	0.002	0	0.4	0.005	0	0.4	0.0000	0	0	0.000	0	0	0.007	0	0.4
TR02	W19	17-Aug-15	0.002	0	0.4	0.003	0	0.5	0.0000	0	0	0.000	0	0	0.000	0	0
TR02	W20	24-Aug-15	0.011	0	0.6	0.008	0	0.6	0.0000	0	0	0.000	0	0	0.000	0	0
TR02	W21	31-Aug-15	0.034	0	1.6	0.005	0	0.5	0.0000	0	0	0.000	0	0	0.006	0	0.6
TR02	W22	07-Sep-15	0.004	0	0.7	0.004	0	0.6	0.0000	0	0	0.000	0	0	0.002	0	0.4
TR02	W23	14-Sep-15	0.016	0	0.8	0.002	0	0.4	0.0000	0	0	0.000	0	0	0.009	0	0.7
TR02	W24	21-Sep-15	0.010	0	0.7	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
TR02	W25	28-Sep-15	0.000	0	0	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
TR02	W26	05-Oct-15	0.000	0	0	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
TR02	W27	12-Oct-15	0.000	0	0	0.011	0	0.6	0.0000	0	0	0.000	0	0	0.007	0	1.1
TR02	W28	19-Oct-15	0.014	0	0.6	0.000	0	0	0.0000	0	0	0.000	0	0	0.003	0	0.5
TR02	W29	26-Oct-15	0.003	0	0.5	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
TR02	W30	02-Nov-15	0.007	0	1.1	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
TR02	W31	09-Nov-15	0.000	0	0	0.000	0	0	0.0000	0	0	0.000	0	0	0.000	0	0
TR02	W32	16-Nov-15	0.000	0	0	NA	NA	NA	NA	NA	NA	0.000	0	0	NA	NA	NA
TR02	W33	23-Nov-15	0.000	0	0	0.000	0	0	0.000	0.0	0.0	0.000	0	0	0	0	0
TR02	W34	30-Nov-15	0.002	0	0.4	0.000	0	0	0.000	0.0	0.0	0.000	0	0	0	0	0
TR02	W35	07-Dec-15	0.008	0	1.3	0.000	0	0	0.000	0.0	0.0	0.000	0	0	0	0	0
TR02	W36	14-Dec-15	0.006	0	0.5	0.000	0	0	0.000	0.0	0.0	0.000	0	0	0	0	0
TR02	W37	21-Dec-15	0.006	0	0.6	0.000	0	0	0.000	0.0	0.0	0.000	0	0	0	0	0
TR02	W38	28-Dec-15	0.002	0	0.4	0.000	0	0	0.000	0.0	0.0	0.000	0	0	0	0	0
TR02	W39	04-Jan-16	0.011	0	0.6	0.000	0	0	0.000	0.0	0.0	0.000	0	0	0	0	0
TR02	W40	11-Jan-16	0.000	0	0	0.000	0	0	0.000	0.0	0.0	0.000	0	0	0	0	0
TR02	W41	18-Jan-16	0.000	0	0	0.000	0	0	0.000	0.0	0.0	0.000	0	0	0	0	0
TR02	W42	25-Jan-16	0.002	0	0.4	0.000	0	0	0.000	0.0	0.0	0.000	0	0	0	0	0
TR02	W43	01-Feb-16	0.000	0	0	0.000	0	0	0.000	0.0	0.0	0.000	0	0	0	0	0
TR02	W44	08-Feb-16	0.000	0	0	0.000	0	0	0.000	0.0	0.0	0.000	0	0	0	0	0
TR02	W45	15-Feb-16	0.000	0	0	0.000	0	0	0.000	0.0	0.0	0.000	0	0	0	0	0
TR02	W46	22-Feb-16	0.000	0	0	0.000	0	0	0.000	0.0	0.0	0.000	0	0	0	0	0
TR02	W47	29-Feb-16	0.000	0	0	0.000	0	0	0.000	0.0	0.0	0.000	0	0	0	0	0
TR02	W48	07-Mar-16	0.000	0	0	0.000	0	0	0.000	0.0	0.0	0.000	0	0	0	0	0

NOTES:

[1]H2S-03 Sensor was removed due to failure during calibration on 19 FEB 2015. It was reinstalled on 27 MAR 2015 after repairs were completed.

C = Colonization
NA = Not available
OU = operable unit
ppm = parts per million
TR** = Test Run
W** = Week of Treatability Study Phase

Table 15A. Hydrogen Sulfide Gas (ppm)
Enhanced Wetland Demonstration
St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

			H2S-06 (EWD Biocell)			H2S-07 (Access Road near EWD Aeration Cascade)			H2S-08 (EWD Aeration Cascade)		
Phase	**Week**	**Week of**	**average**	**minimum**	**maximum**	**average**	**minimum**	**maximum**	**average**	**minimum**	**maximum**
EWD-C	W00	23-Nov-15	NA	NA	NA	NA	NA	NA	NA	NA	NA
EWD-C	W01	30-Nov-15	0.000	0	0	0.005	0	0.5	0.000	0	0
EWD-C	W02	07-Dec-15	0.005	0	0.4	0.021	0	0.8	0.000	0	0
EWD-C	W03	14-Dec-15	0.000	0	0	0.051	0	2.8	0.002	0	0.4
EWD-C	W04	21-Dec-15	0.000	0	0	0.102	0	1.1	0.000	0	0
EWD-C	W05	28-Dec-15	0.000	0	0	0.040	0	1.2	0.000	0	0
EWD-O	W00	04-Jan-16	0.009	0	1.5	0.295	0	2.2	0.000	0	0
EWD-O	W01	11-Jan-16	0.000	0	0	0.038	0	1	0.000	0	0
EWD-O	W02	18-Jan-16	0.000	0	0	0.061	0	1.4	0.000	0	0
EWD-O	W03	25-Jan-16	0.000	0	0	0.055	0	1.3	0.000	0	0
EWD-O	W04	01-Feb-16	0.000	0	0	0.086	0	1.3	0.000	0	0
EWD-O	W05	08-Feb-16	0.005	0	0.9	0.014	0	0.8	0.000	0	0
EWD-O	W06	15-Feb-16	0.005	0	0.8	0.013	0	0.6	0.000	0	0
EWD-O	W07	22-Feb-16	0.000	0	0	0.040	0	0.9	0.000	0	0
EWD-O	W08	29-Feb-16	0.000	0	0	0.074	0	1.9	0.000	0	0
EWD-O	W09	07-Mar-16	0.000	0	0	0.060	0	2.2	0.000	0	0

NOTES:
EWD = Enhanced Wetland Demonstration
EWD-C = EWD Colonization Phase
EWD-O = EWD Operation Phase
NA = Not available
OU = operable unit
ppm = parts per million
W** = Week of Treatability Study Phase

Wetland Plant Update

MARCH 2016

St. Louis Tunnel Discharge Constructed Wetland Demonstration Treatability Study

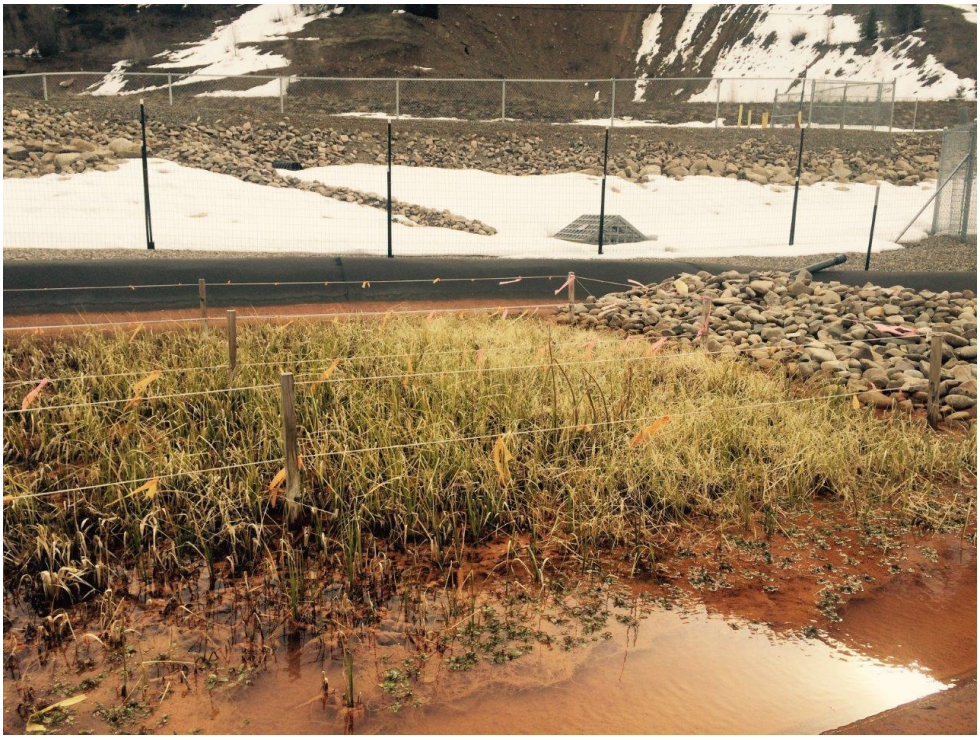
Rico-Argentine Mine Site – Rico Tunnels, Operable Unit OU01

RICO WETLAND DEMONSTRATION PROJECT - SF and HSSF WETLAND CELLS

March 22, 2016 Monitoring

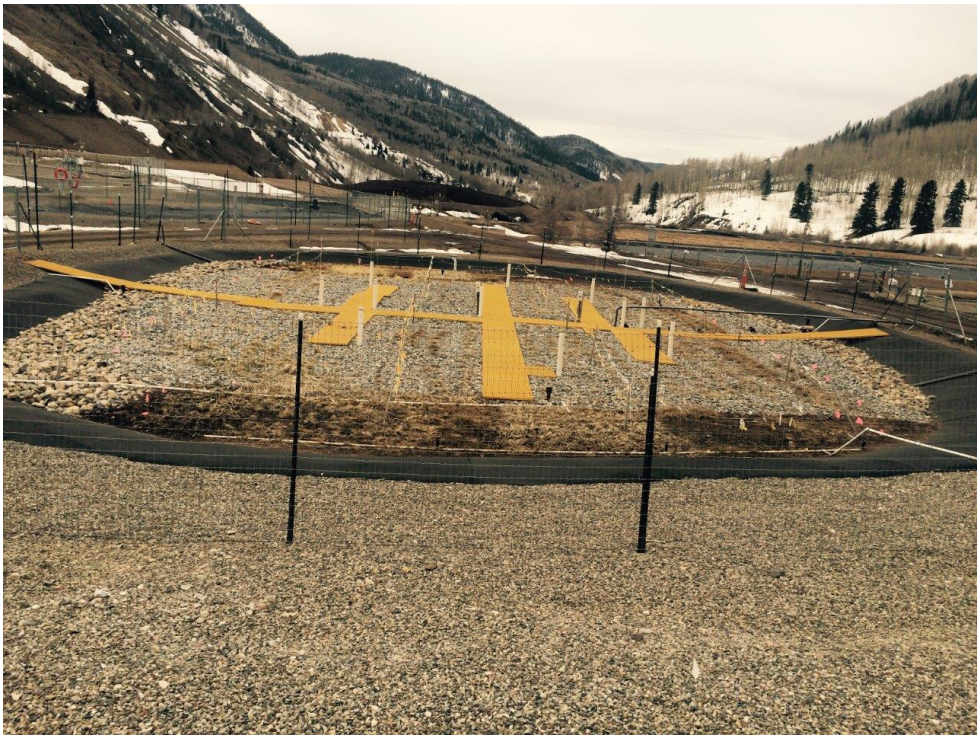
Photograph 1: SF Wetland with Planted Bulrush and Sedge – Looking South on March 22, 2016

Photograph 2: SF Wetland with Planted Bulrush and Sedge – Looking West on March 22, 2016



Photograph 3: SF Wetland with Planted Sedge and Bulrush - Looking Southeast on March 22, 2016

Photograph 4: SF Wetland with Planted Bulrush and Sedge - Looking Northeast on March 22, 2016



Photograph 5: HSSF Wetland with Establishing Wetland Plants – Looking South on March 22, 2016

Photograph 6: HSSF Wetland –Sampling Points Comparing Planted Vegetation on either side of Southwestern FRP on March 22, 2016

Photograph 7: HSSF Wetland –Sampling Points Comparing Planted Vegetation on either side of Southwestern FRP on March 22, 2016

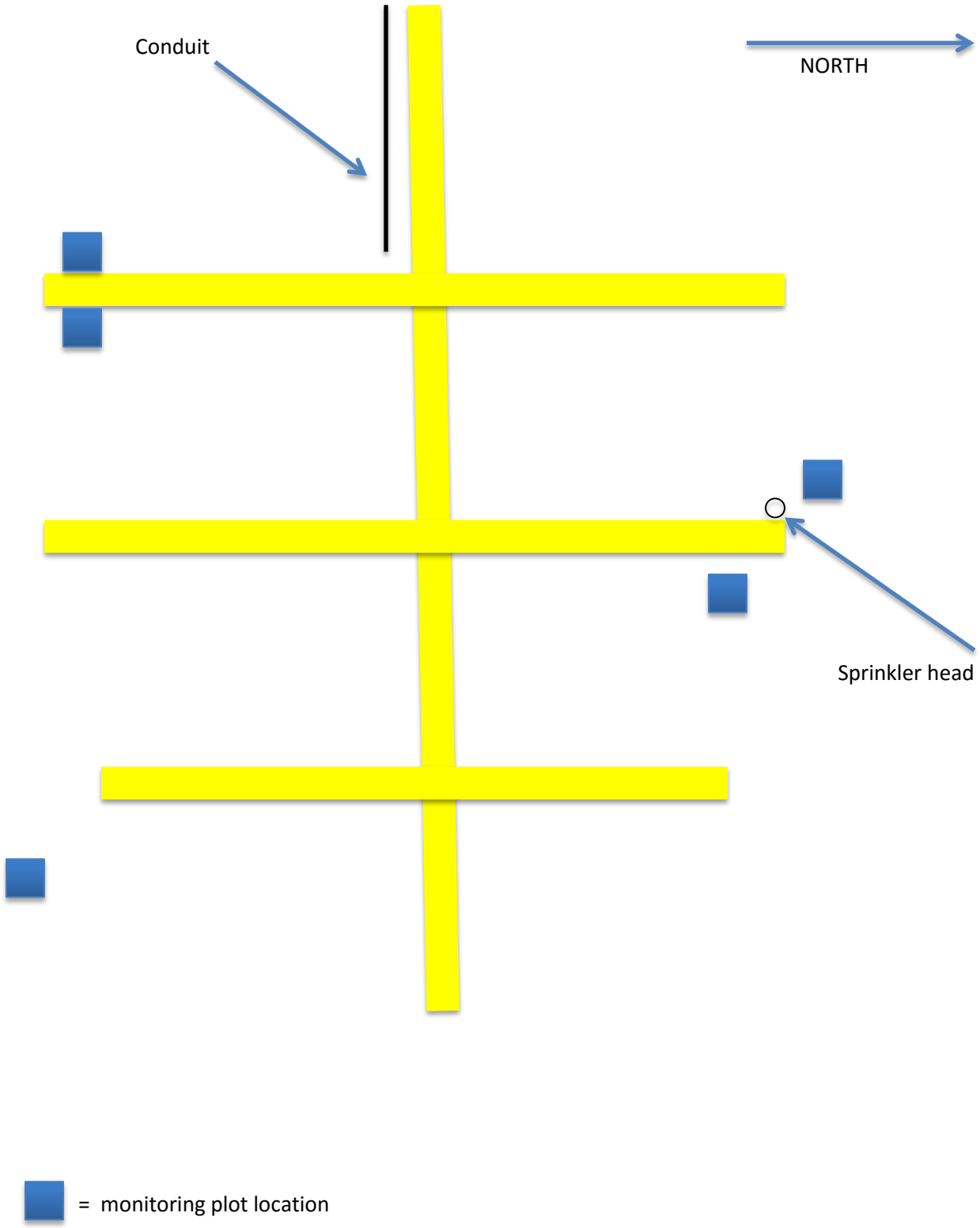
Photograph 8: HSSF Wetland –Sampling Points Comparing Planted Vegetation on either side of Southwestern FRP on March 22, 2016

Photograph 9: HSSF Wetland – Sampling Point in Matrix –
Located East of Middle FRP on March 22, 2016

Photograph 10: HSSF Wetland – Sampling Point in Northern Soil Test Strip –
Located North of Middle FRP on March 22, 2016

Photograph 11: HSSF Wetland – Southeastern Soil Test Strip with Extensive Planted Wetland Vegetation Growth on March 22, 2016

Photograph 12: HSSF Wetland – New Growth of Planted Iris Species Emerging in West side of Matrix on March 22, 2016

RICO WETLAND DEMONSTRATION PROJECT - SF and HSSF WETLAND CELLS

March 22, 2016 Monitoring