

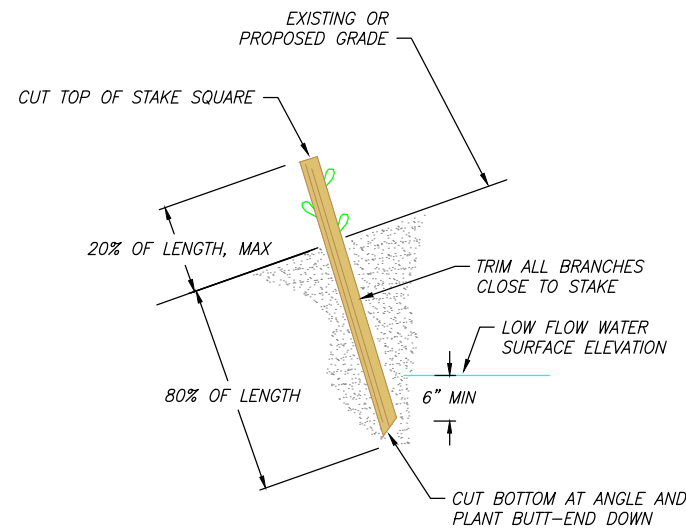
4 LIVE WILLOW TRENCH DETAIL  
NTS



EXAMPLE: INSTALLED LIVE WILLOW TRENCH

LIVE WILLOW TRENCH NOTES:

1. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR QUANTITY OF WILLOW STAKES.
2. EXCAVATE TRENCH TO BELOW LOW WATER TABLE OR INSTALL WITHIN BANK OR STRUCTURE PRIOR TO BACKFILLING/ PLACING BANK MATERIALS
3. LAY LIVE CUTTINGS IN TRENCH AT SPECIFIED DENSITY OR QUANTITY
4. PLACE 6" LAYER OF CLEAN NATIVE FILL OVER LIVE CUTTINGS AND COMPACT WITH EXCAVATOR BUCKET
5. COMPLETE BACKFILL AND WATER THOROUGHLY WITHIN 4 HOURS OF INSTALLATION.



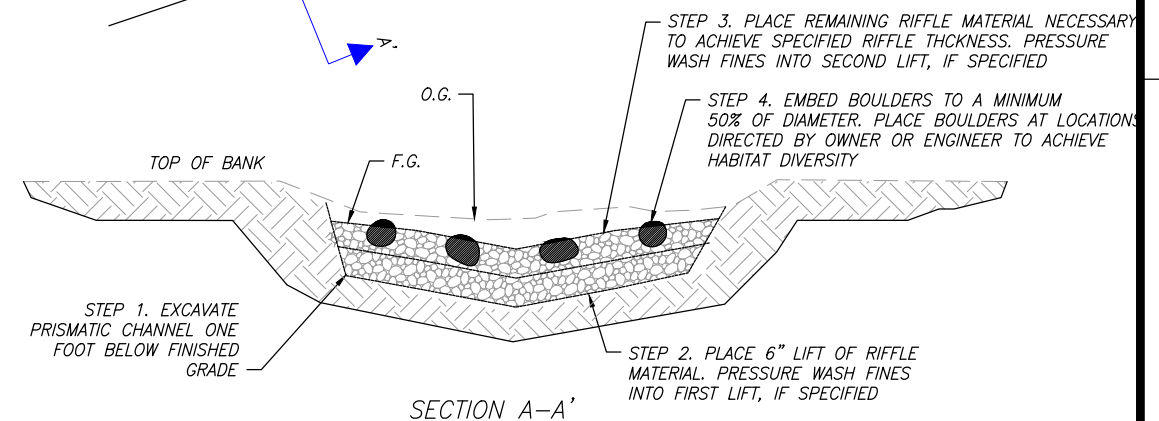
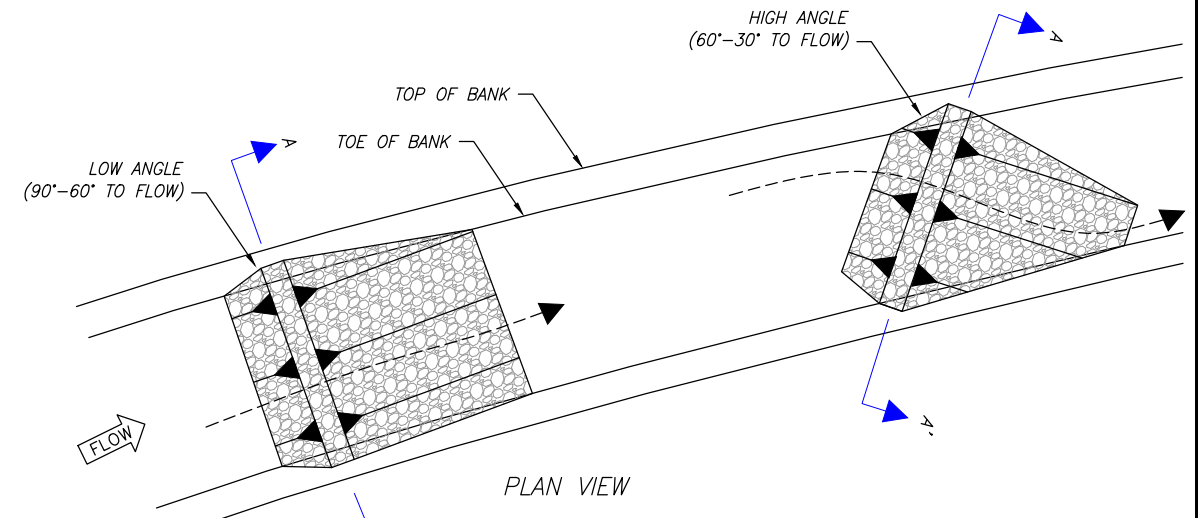
5 LIVE STAKE DETAIL  
NTS



EXAMPLE: INSTALLED LIVE WILLOW STAKE

LIVE STAKE NOTES:

1. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF LIVE STAKES.
2. USE HEALTHY AND DORMANT SPECIES.
3. MAKE CLEAN CUTS AND DO NOT DAMAGE STAKES OR SPLIT ENDS DURING CONSTRUCTION.
4. INSTALL USING PILOT BAR IN FIRM SOILS. ENSURE BUTT-END OF STAKE IS BELOW (6" MIN) LOW WATER TABLE ELEVATION.
5. TAMP SOIL AROUND INSTALLED STAKE AND WATER THOROUGHLY WITHIN 4 HOURS OF INSTALLATION.



6 CONSTRUCTED RIFFLE  
NTS



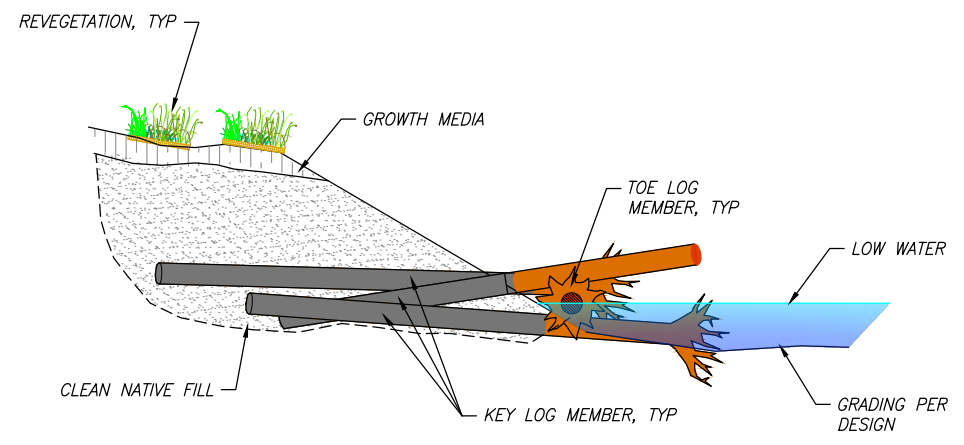
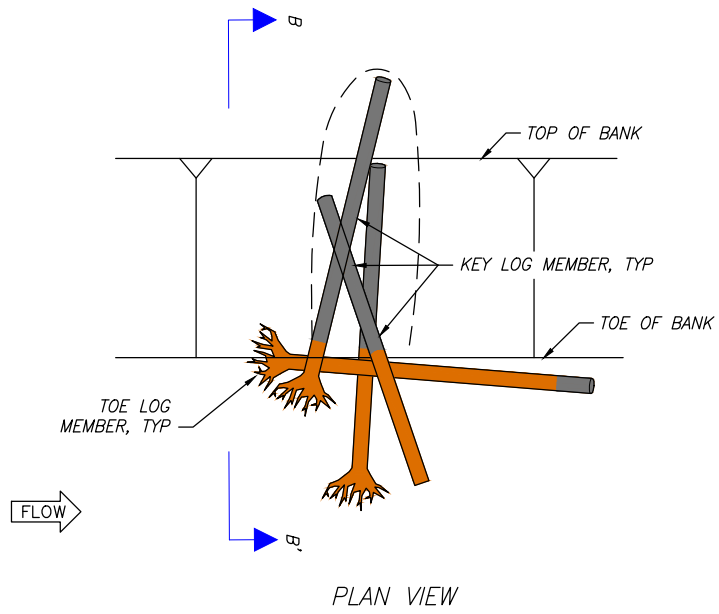
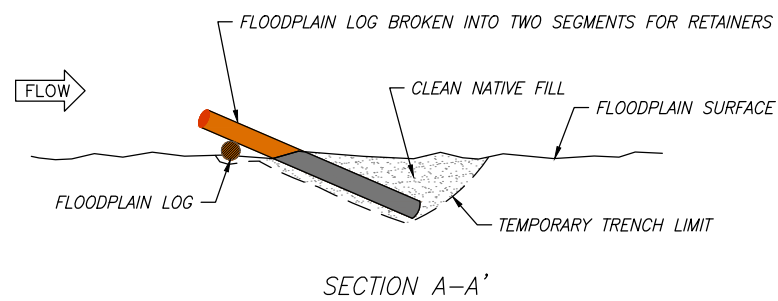
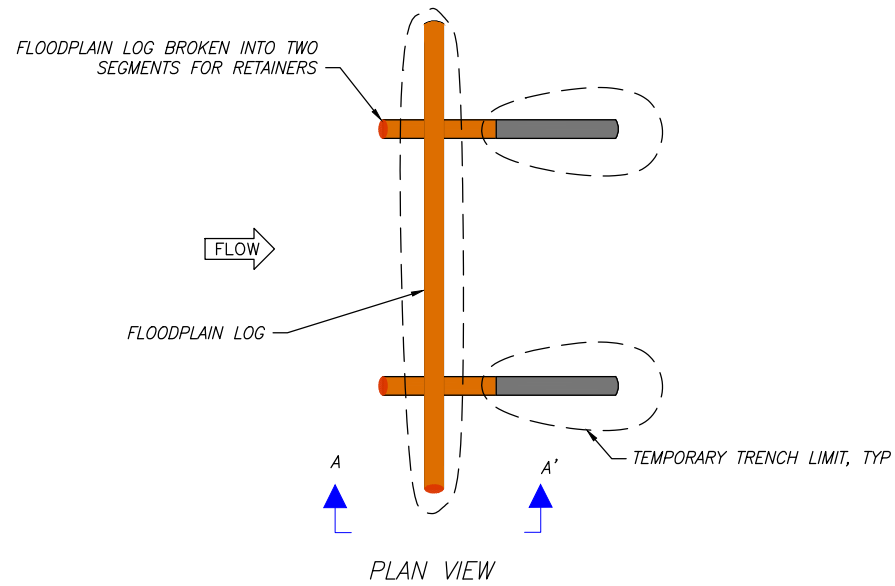
EXAMPLE: CONSTRUCTED RIFFLE

CONSTRUCTED RIFFLE NOTES:

1. INSTALL CONSTRUCTED RIFFLES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.

STRUCTURE INTENT:

1. RIFFLE FEATURES ARE INTENDED TO MIMIC A NATURAL STREAM CHANNEL. RIFFLES ARE TO BE CONSTRUCTED TO BE STABLE AND TO PROVIDE HYDRAULIC ROUGHNESS, FLOODPLAIN ACTIVATION AND FISH RESTING AREAS THROUGH BACKWATER POOL DEVELOPMENT. RIFFLES ARE TO BE CONSTRUCTED SUCH THAT LOW FLOWS REMAIN ON THE SURFACE.
2. HIGH ANGLE CONSTRUCTED RIFFLE PROMOTE THALWEG DEVELOPMENT AND CHANNEL SINUOSITY.



8 TYPICAL TOE LOG STRUCTURE  
NTS

7 LOG FLOODPLAIN ROUGHNESS STRUCTURE  
NTS



EXAMPLE: INSTALLED LOG FLOODPLAIN ROUGHNESS STRUCTURE



EXAMPLE: INSTALLED TOE LOG STRUCTURE



EXAMPLE: INSTALLED TOE LOG STRUCTURE (FOREGROUND)

- TOE LOG STRUCTURE NOTES:**
1. INSTALL TOE LOG STRUCTURES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
  2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
  3. BACKFILL USING NATIVE EXCAVATED MATERIAL UNLESS NATIVE MATERIAL IS UNSUITABLE FOR BACKFILL. PLACE BACKFILL IN 1-FOOT MAXIMUM LIFTS. COMPACT EACH LIFT USING MECHANICAL EQUIPMENT SUCH AS AN EXCAVATOR BUCKET OR EQUIPMENT TRACKING.
  4. STREAMS LESS THAN 10 FEET WIDE MAY HAVE LOGS PLACED ON THE SURFACE OR BURIED INTO THE BANK.

- LOG FLOODPLAIN ROUGHNESS STRUCTURE NOTES:**
1. INSTALL LOG FLOODPLAIN ROUGHNESS STRUCTURES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
  2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
  3. BACKFILL USING NATIVE EXCAVATED MATERIAL UNLESS NATIVE MATERIAL IS UNSUITABLE FOR BACKFILL. PLACE BACKFILL IN 1-FOOT MAXIMUM LIFTS. COMPACT EACH LIFT USING MECHANICAL EQUIPMENT SUCH AS AN EXCAVATOR BUCKET OR EQUIPMENT TRACKING.

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Designed: JF, JY, MP  
Drawn: JF, JY, MP  
Checked: RR  
Approved: --  
Drawing Name

Typical Details  
- 3

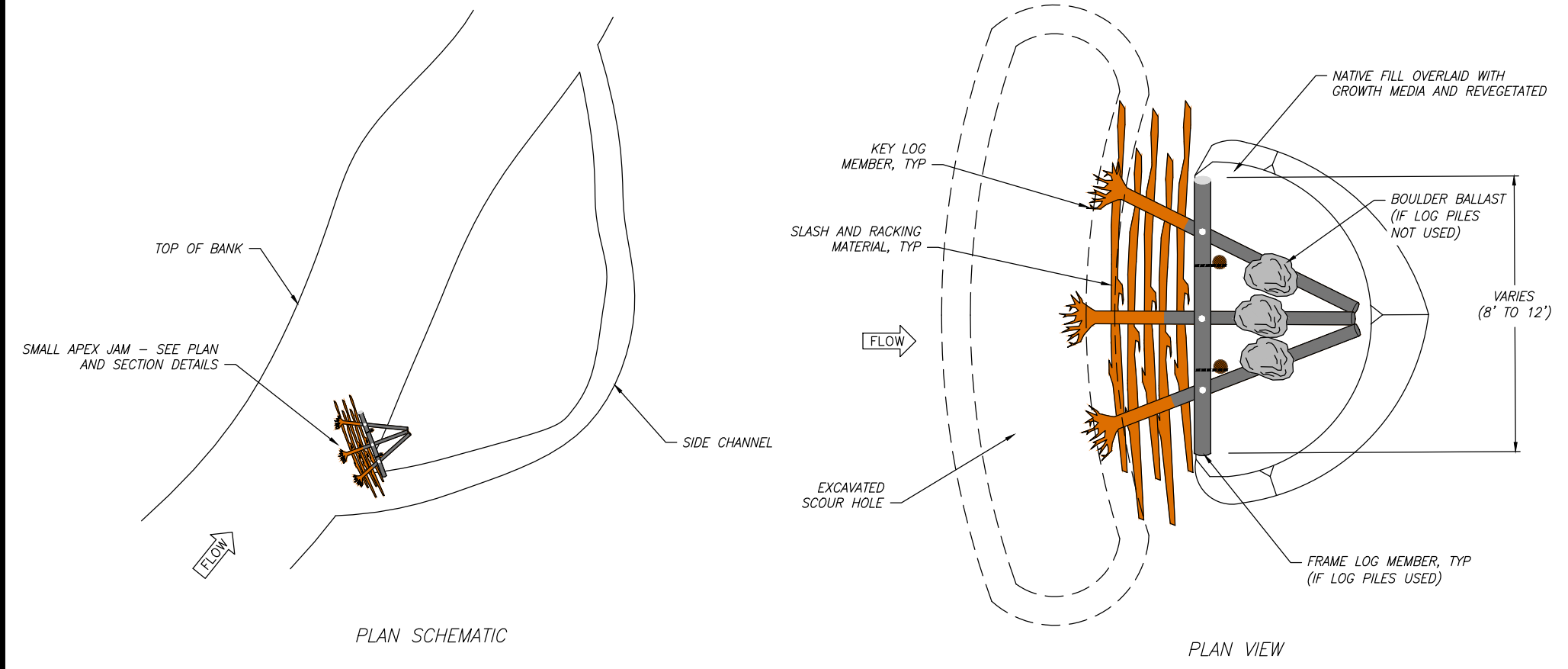
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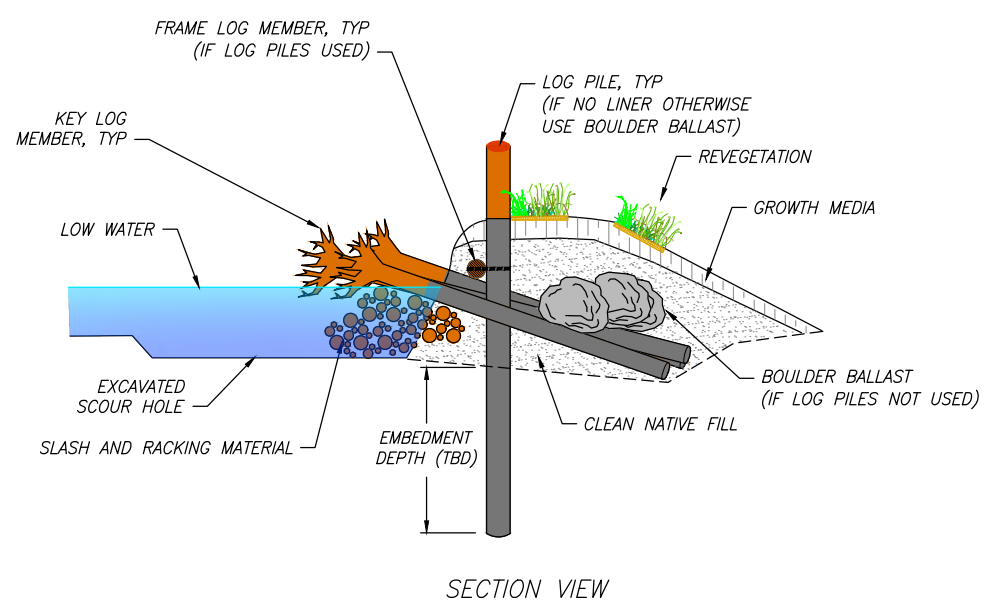
Date: Feb. 2019  
Designed: JF, JY, MP  
Drawn: JF, JY, MP  
Checked: RR  
Approved: --

Drawing Name  
Typical Details  
- 4

Drawing No.  
D-4



- SMALL APEX JAM STRUCTURE NOTES:**
1. INSTALL SMALL APEX JAM STRUCTURES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
  2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
  3. SMALL APEX JAM STRUCTURES ARE SCALEABLE TO THE SIZE OF STREAM AND MAY CONSIST OF FEWER OR MORE LOGS INCLUDING FEWER KEY LOGS.
  4. BACKFILL USING NATIVE EXCAVATED MATERIAL UNLESS NATIVE MATERIAL IS UNSUITABLE FOR BACKFILL. PLACE BACKFILL IN 1-FOOT MAXIMUM LIFTS. COMPACT EACH LIFT USING MECHANICAL EQUIPMENT SUCH AS AN EXCAVATOR BUCKET OR EQUIPMENT TRACKING.
  5. LOG PILES MAY BE USED IF NO CHANNEL LINER PRESENT, OTHERWISE USE BOULDER BALLAST.
  6. STREAMS LESS THAN 10 FEET WIDE DO NOT REQUIRE PILES.



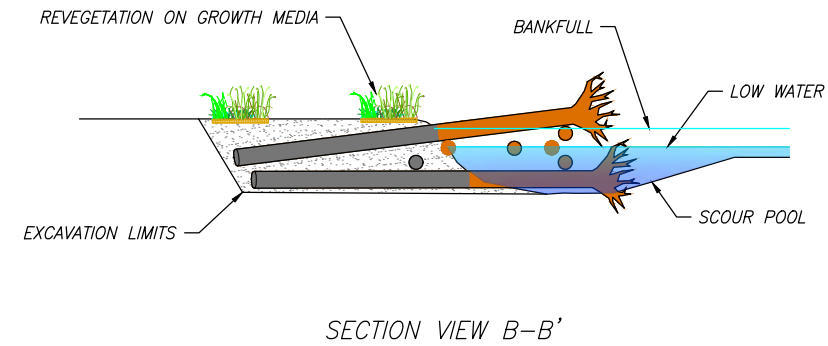
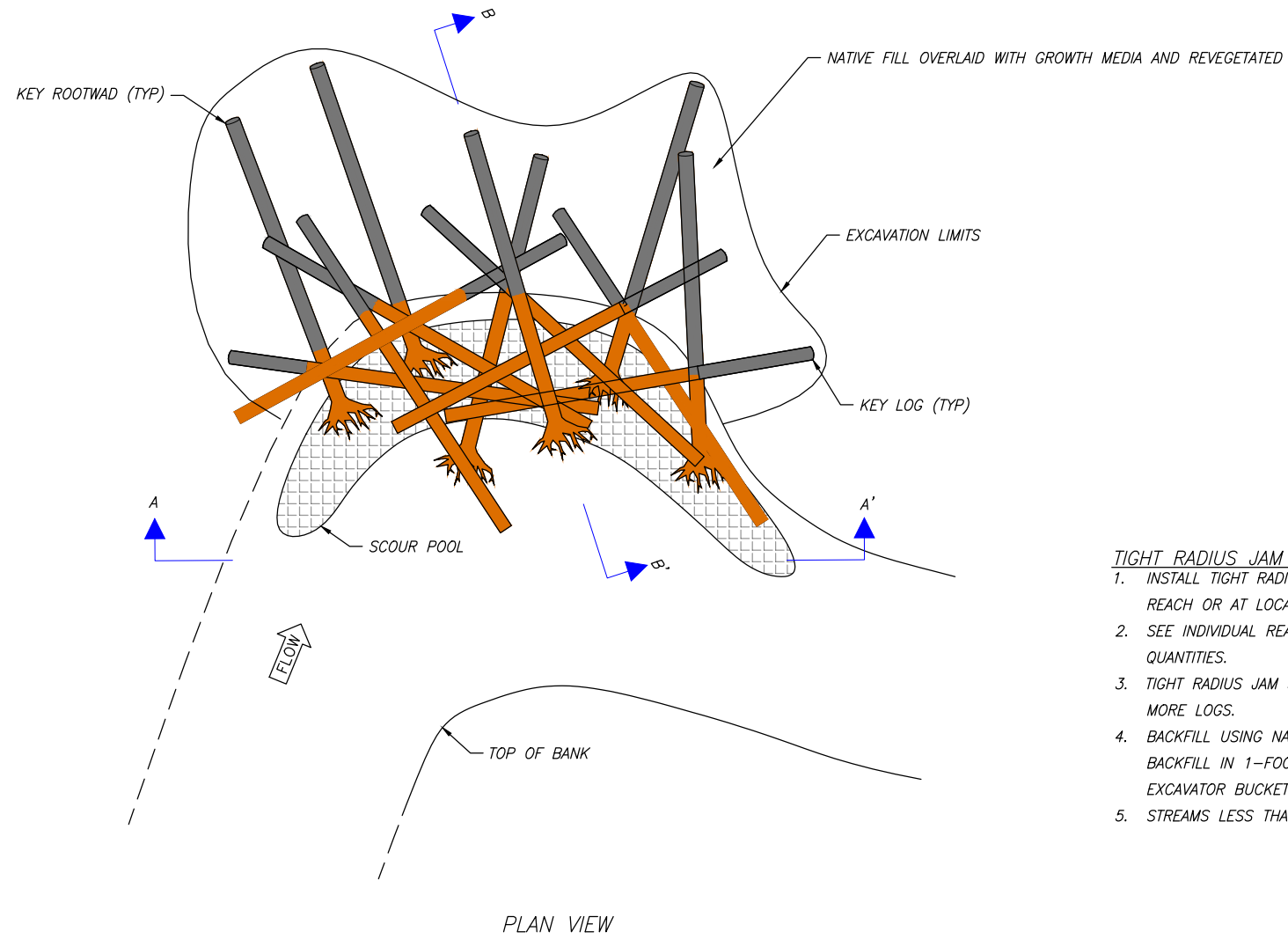
9 TYPICAL SMALL APEX JAM STRUCTURE  
NTS



EXAMPLE: INSTALLED APEX LOG STRUCTURE

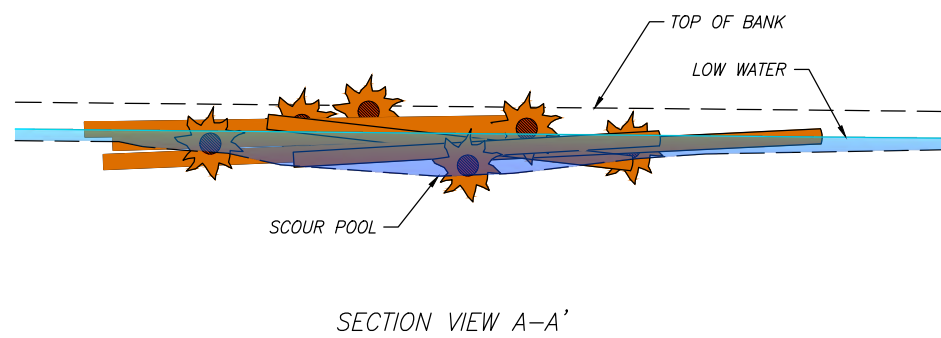


EXAMPLE: INSTALLED SINGLE LOG APEX STRUCTURE



**TIGHT RADIUS JAM STRUCTURE NOTES:**

1. INSTALL TIGHT RADIUS JAM STRUCTURES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
3. TIGHT RADIUS JAM STRUCTURES ARE SCALEABLE TO THE SIZE OF STREAM AND MAY CONSIST OF FEWER OR MORE LOGS.
4. BACKFILL USING NATIVE EXCAVATED MATERIAL UNLESS NATIVE MATERIAL IS UNSUITABLE FOR BACKFILL. PLACE BACKFILL IN 1-FOOT MAXIMUM LIFTS. COMPACT EACH LIFT USING MECHANICAL EQUIPMENT SUCH AS AN EXCAVATOR BUCKET OR EQUIPMENT TRACKING.
5. STREAMS LESS THAN 10 FEET WIDE MAY HAVE LOGS PLACED ON THE SURFACE OR BURIED INTO THE BANK.



**10** TYPICAL TIGHT RADIUS JAM STRUCTURE  
NTS



EXAMPLE: INSTALLED TIGHT RADIUS JAM STRUCTURE



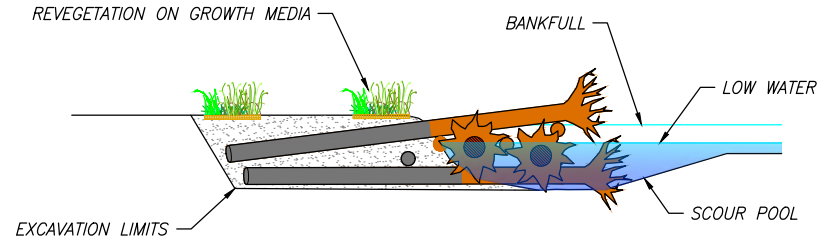
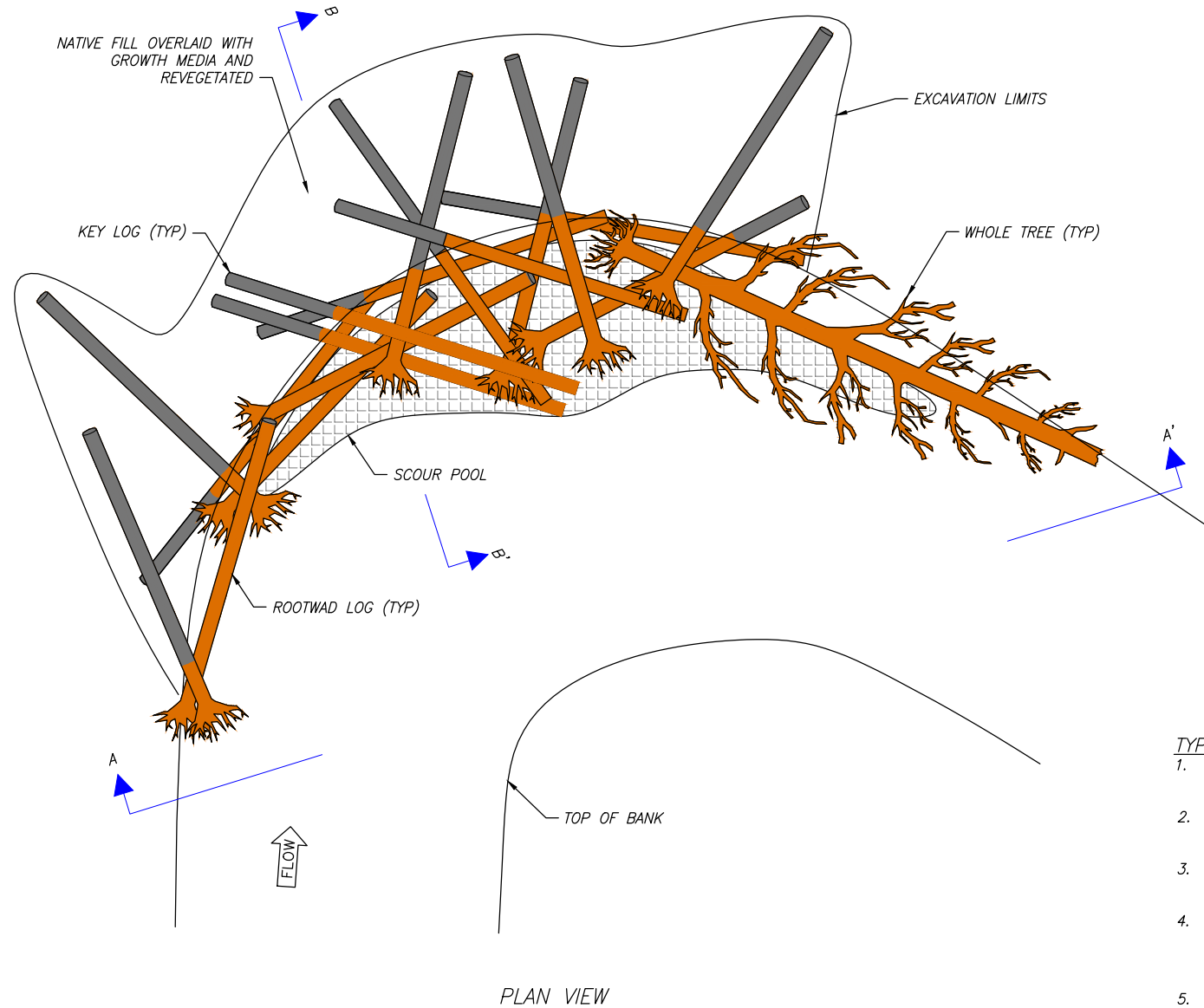
EXAMPLE: INSTALLED TIGHT RADIUS JAM STRUCTURE

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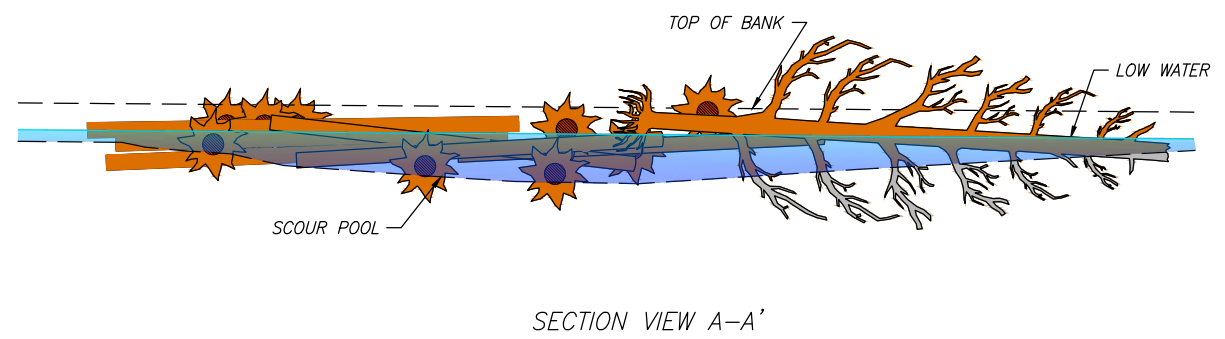
Drawing Name  
Typical Details  
- 5

Drawing No.  
D-5



SECTION VIEW B-B'

- TYPICAL BEND JAM STRUCTURE NOTES:**
1. INSTALL BEND JAM STRUCTURES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
  2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
  3. BEND JAM STRUCTURES ARE SCALEABLE TO THE SIZE OF STREAM AND MAY CONSIST OF FEWER OR MORE LOGS.
  4. BACKFILL USING NATIVE EXCAVATED MATERIAL UNLESS NATIVE MATERIAL IS UNSUITABLE FOR BACKFILL. PLACE BACKFILL IN 1-FOOT MAXIMUM LIFTS. COMPACT EACH LIFT USING MECHANICAL EQUIPMENT SUCH AS AN EXCAVATOR BUCKET OR EQUIPMENT TRACKING.
  5. STREAMS LESS THAN 10 FEET WIDE MAY HAVE LOGS PLACED ON THE SURFACE OR BURIED INTO THE BANK.



SECTION VIEW A-A'

11 TYPICAL BEND JAM STRUCTURE  
NTS



EXAMPLE: INSTALLED BEND JAM STRUCTURE



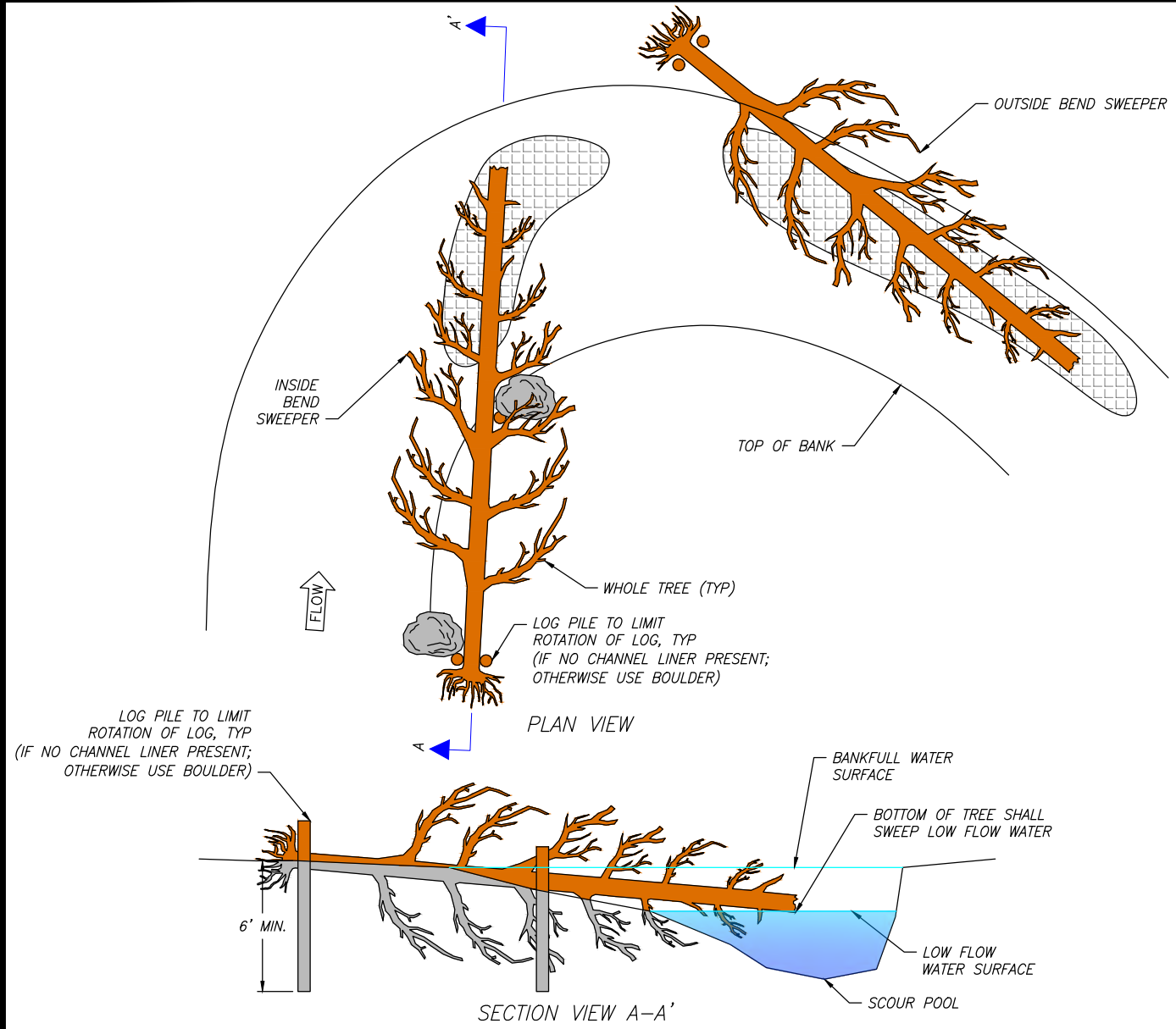
EXAMPLE: INSTALLED BEND JAM STRUCTURE

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Approved: --

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Typical Details  
- 7

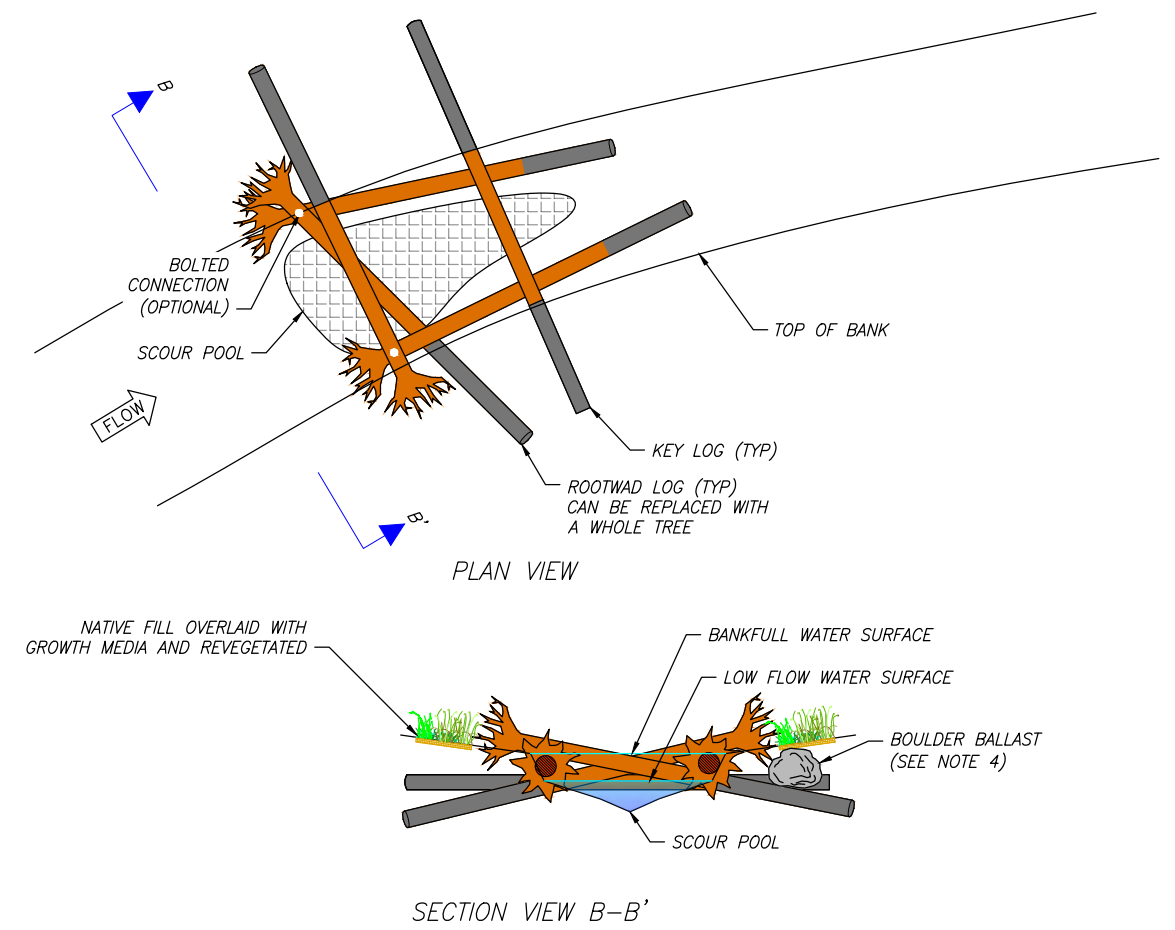
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EXAMPLE: INSTALLED TYPICAL SWEEPER LOG STRUCTURE

12 TYPICAL SWEEPER LOG STRUCTURE  
NTS

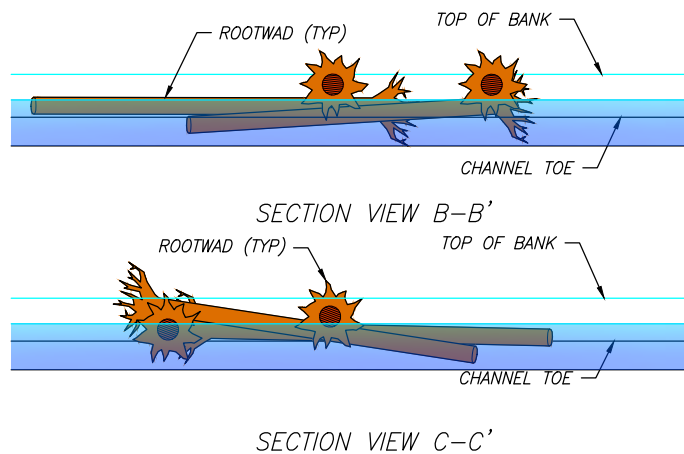
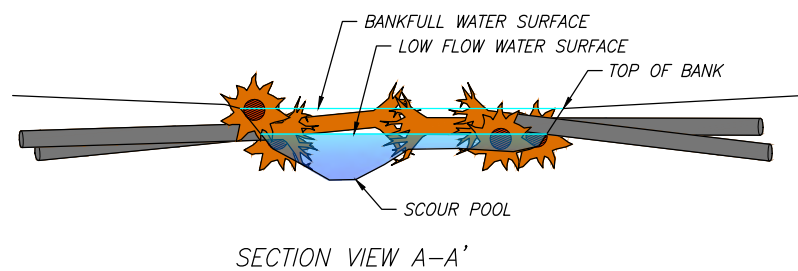
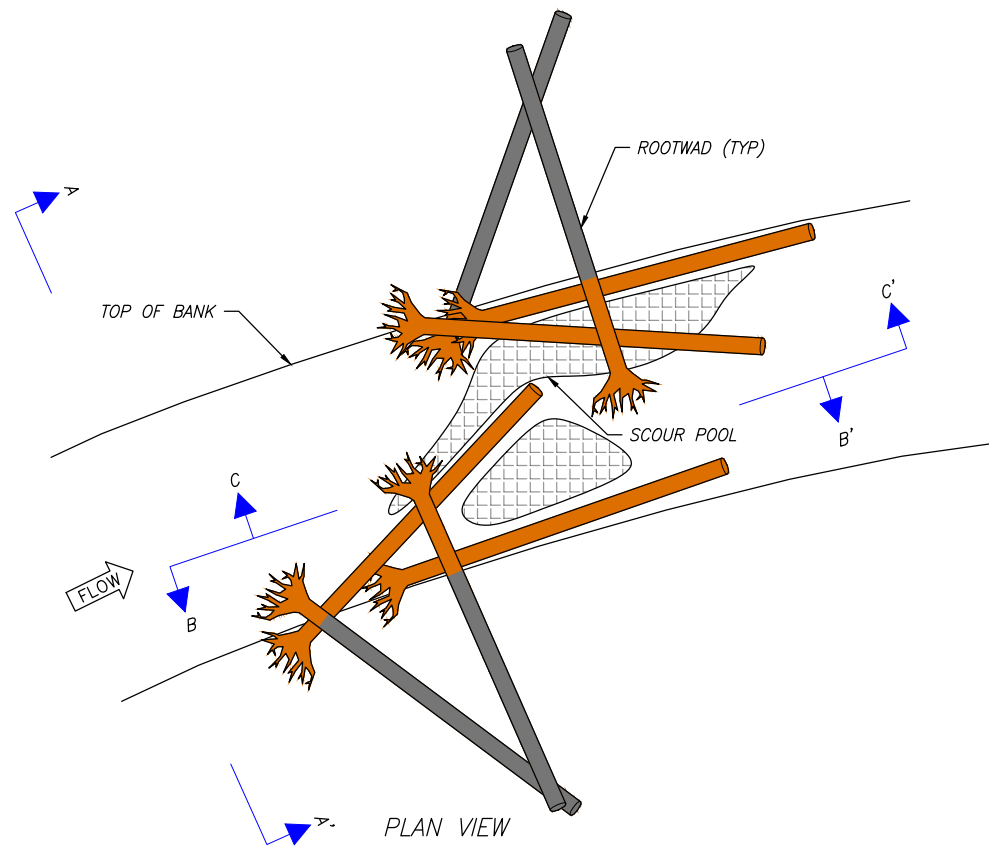
- TYPICAL SWEEPER LOG STRUCTURE NOTES:**
1. INSTALL SWEEPER LOG STRUCTURES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
  2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
  3. LOG PILES MAY BE USED IF NO CHANNEL LINER PRESENT, OTHERWISE USE BOULDER BRACING.
  4. STREAMS LESS THAN 10 FEET WIDE MAY HAVE LOGS PLACED ON THE SURFACE WITHOUT PILES.



EXAMPLE: INSTALLED CHANNEL SPANNING JAM STRUCTURE

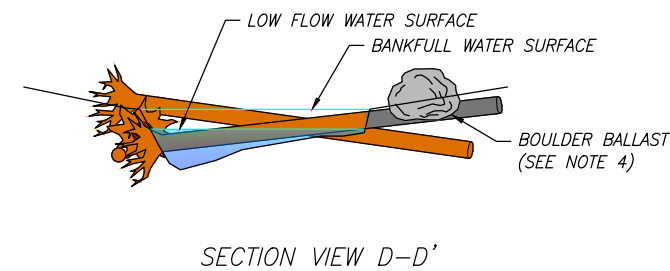
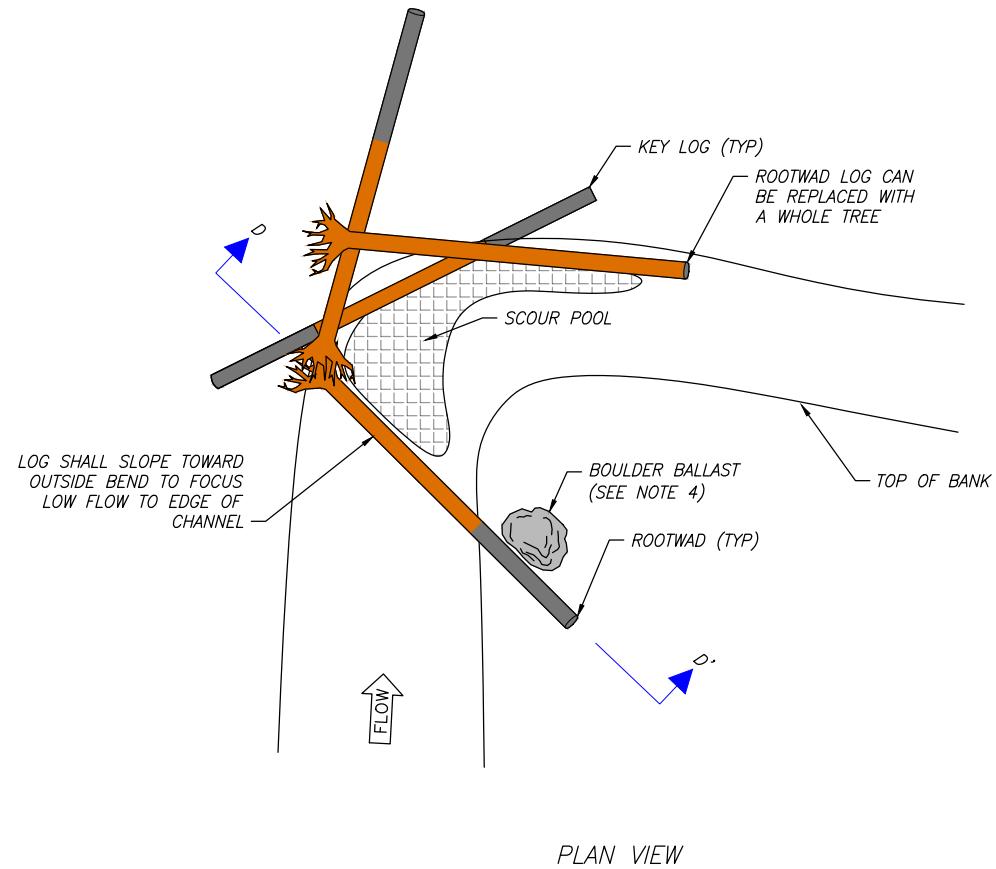
13 TYPICAL CHANNEL SPANNING JAM STRUCTURE  
NTS

- CHANNEL SPANNING JAM STRUCTURE NOTES:**
1. INSTALL CHANNEL SPANNING JAM STRUCTURES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
  2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
  3. PROVIDE BOLTED CONNECTIONS AT SPECIFIED LOCATIONS.
  4. PROVIDE FOR BOULDER BALLAST IF SPECIFIED MINIMUM COVER OVER KEY LOGS NOT POSSIBLE.
  5. STREAMS LESS THAN 10 FEET WIDE MAY HAVE LOGS PLACED ON THE SURFACE OR BURIED INTO THE BANK.



- TYPICAL WOOD HABITAT STRUCTURE NOTES:**
1. INSTALL WOOD HABITAT STRUCTURES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
  2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
  3. PROVIDE FOR BOULDER BALLAST IF SPECIFIED MINIMUM COVER OVER KEY LOGS NOT POSSIBLE.
  4. STREAMS LESS THAN 10 FEET WIDE MAY HAVE LOGS PLACED ON THE SURFACE OR BURIED INTO THE BANK.

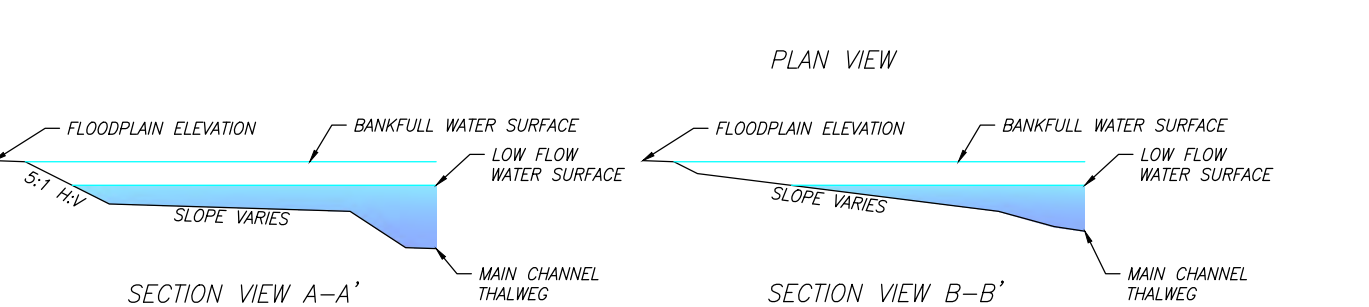
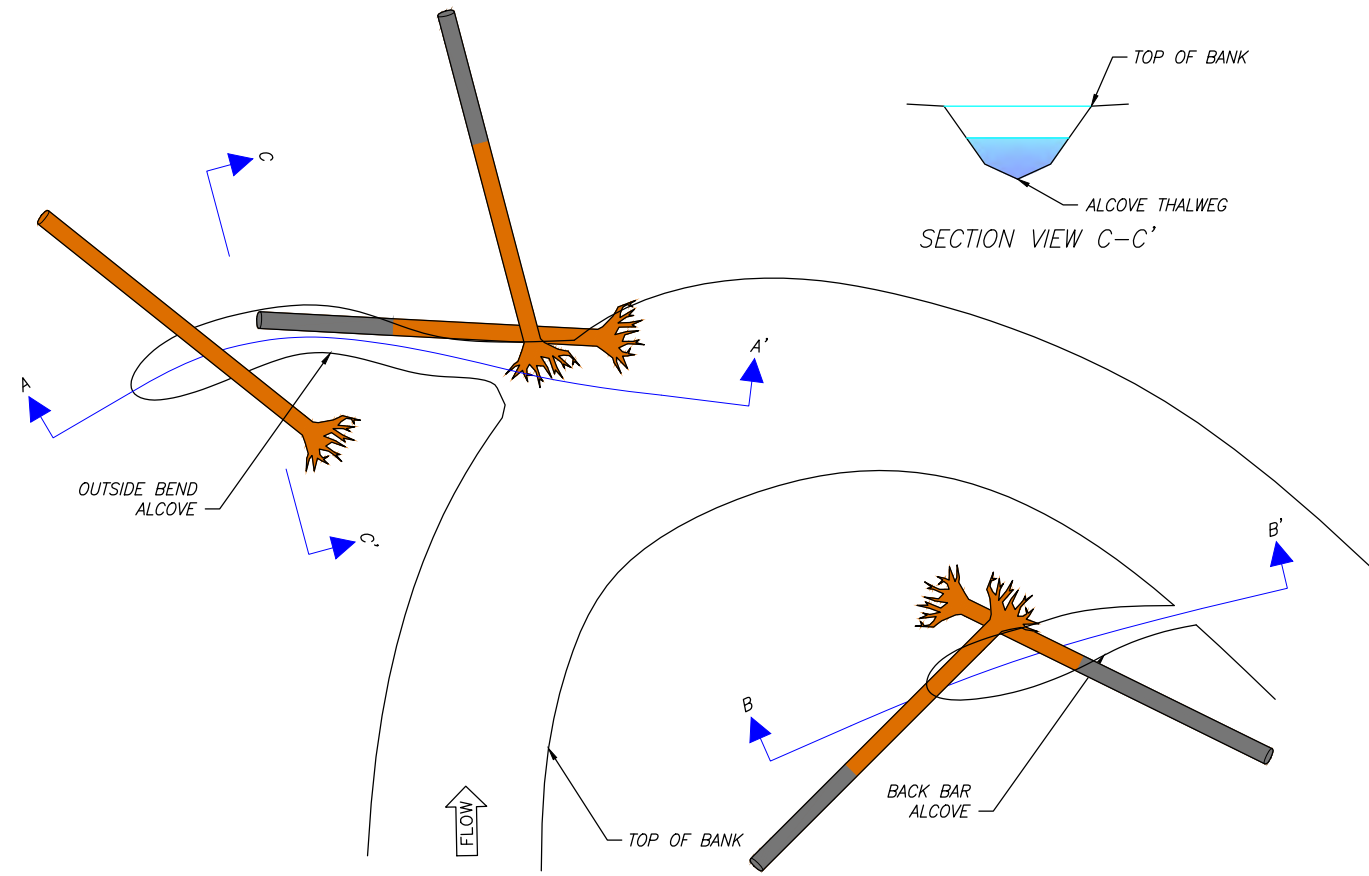
14 TYPICAL WOOD HABITAT STRUCTURE  
NTS



EXAMPLE: NATURAL TURNING LOG STRUCTURE

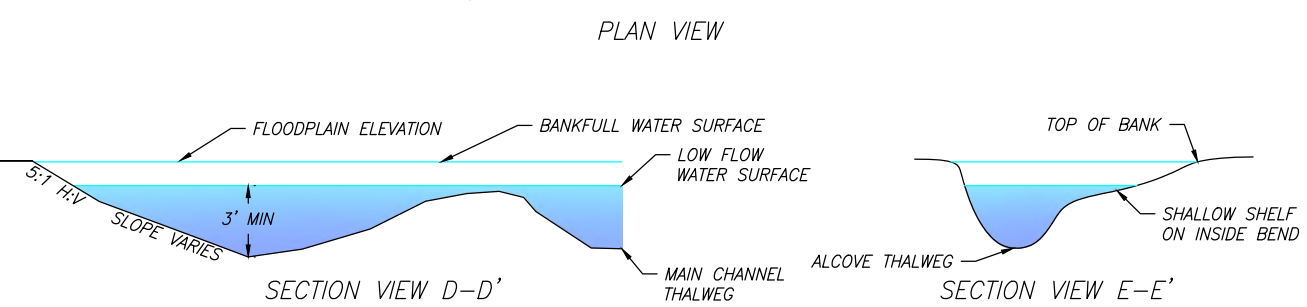
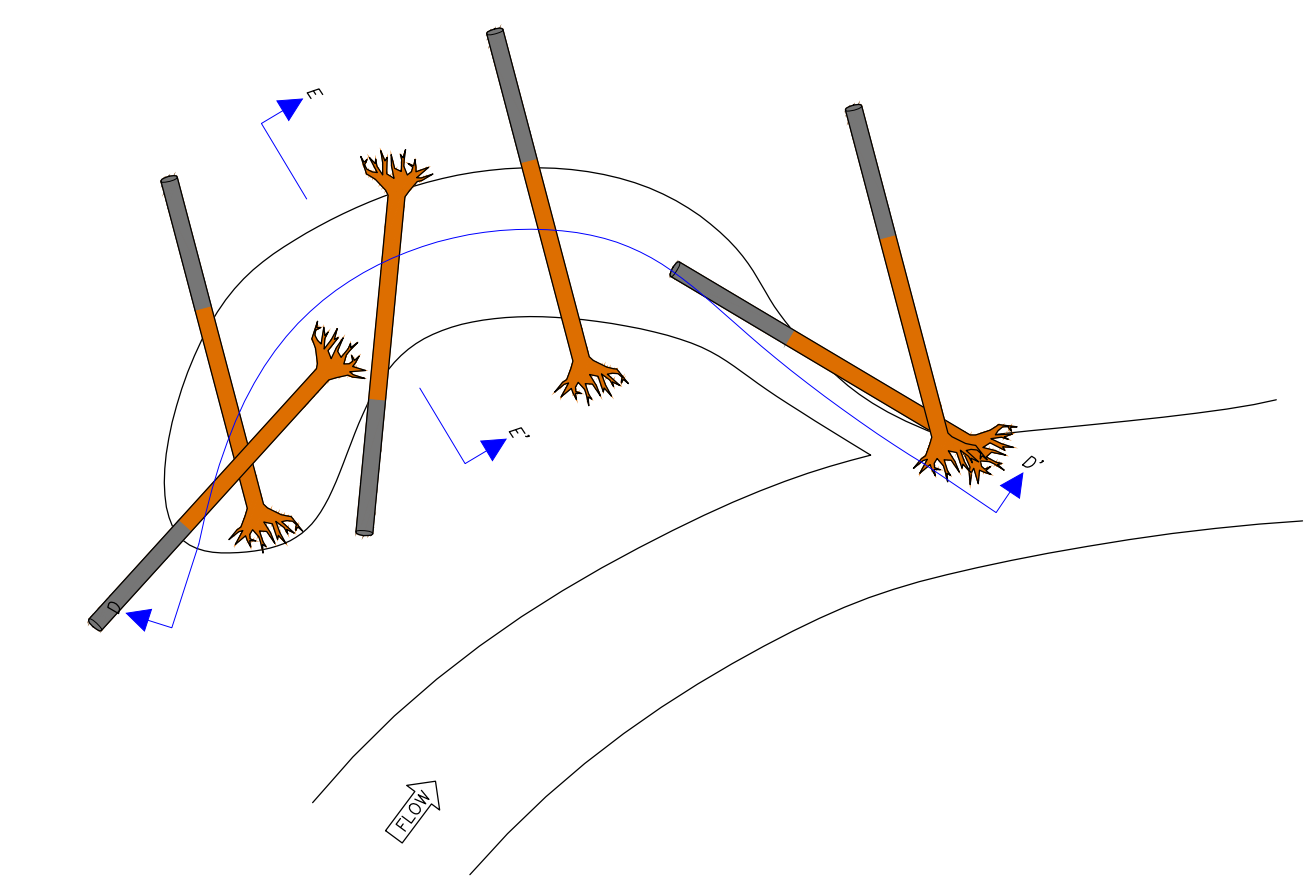
- TYPICAL TURNING LOG STRUCTURE NOTES:**
1. INSTALL TURNING LOG STRUCTURES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
  2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
  3. PROVIDE FOR BOULDER BALLAST IF SPECIFIED MINIMUM COVER OVER KEY LOGS NOT POSSIBLE.
  4. STREAMS LESS THAN 10 FEET WIDE MAY HAVE LOGS PLACED ON THE SURFACE OR BURIED INTO THE BANK.

15 TYPICAL TURNING LOG STRUCTURE  
NTS



EXAMPLE: CONSTRUCTED BACKWATER ALCOVE

- TYPICAL BACKWATER ALCOVE NOTES:**
1. INSTALL BACKWATER ALCOVES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
  2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
  3. BACKWATER ALCOVES SHALL BE INSTALLED PER THE APPROPRIATE SECTION VIEW (OUTSIDE BEND OR BACK BAR). MORE DETAIL (REACH SPECIFIC DIMENSIONS) WILL BE DETERMINED IN A FUTURE DESIGN PHASE.
  4. STREAMS LESS THAN 10 FEET WIDE CAN HAVE LOGS PLACED ON TOP OF THE SURFACE OR BURIED INTO THE BANK.
  5. BURIED LOGS CAN BE REPLACED WITH UNBURIED WHOLE TREES (INCLUDING BRANCHES AND LIMBS).



EXAMPLE: CONSTRUCTED BACKWATER ALCOVE

- TYPICAL OXBOW BACKWATER ALCOVE NOTES:**
1. INSTALL OXBOW BACKWATER ALCOVES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
  2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
  3. OXBOW BACKWATER ALCOVES SHALL BE INSTALLED PER THE SECTION VIEW. MORE DETAIL (REACH SPECIFIC DIMENSIONS) WILL BE DETERMINED IN A FUTURE DESIGN PHASE.
  4. STREAMS LESS THAN 10 FEET WIDE CAN HAVE LOGS PLACED ON TOP OF THE SURFACE OR BURIED INTO THE BANK.
  5. BURIED LOGS CAN BE REPLACED WITH UNBURIED WHOLE TREES (INCLUDING BRANCHES AND LIMBS).

16 TYPICAL BACKWATER ALCOVE  
NTS

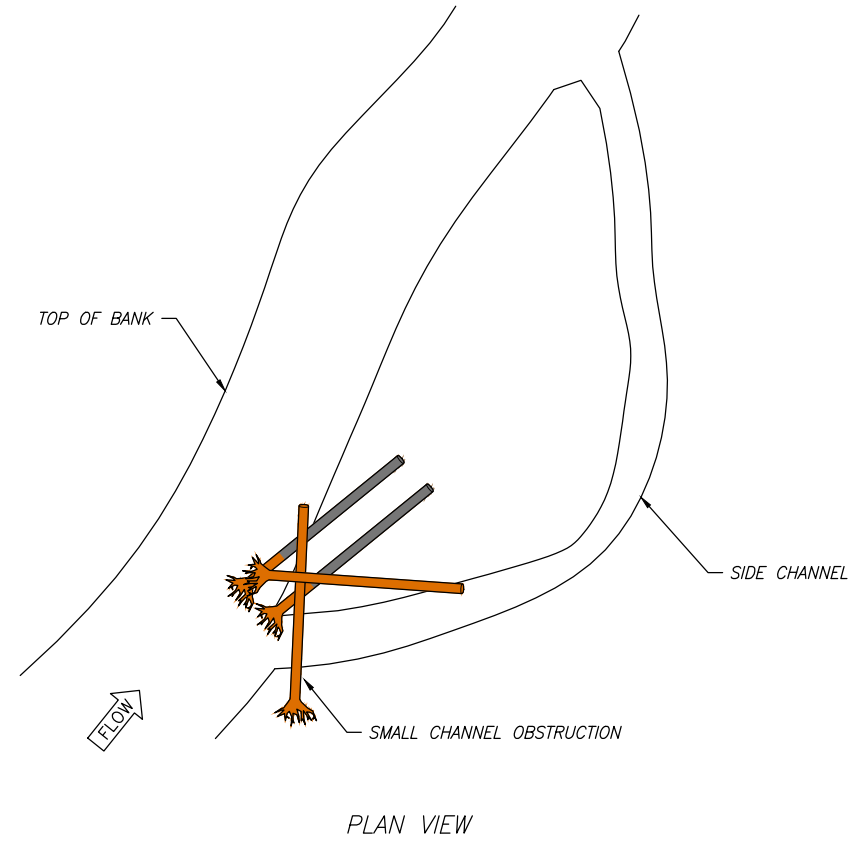
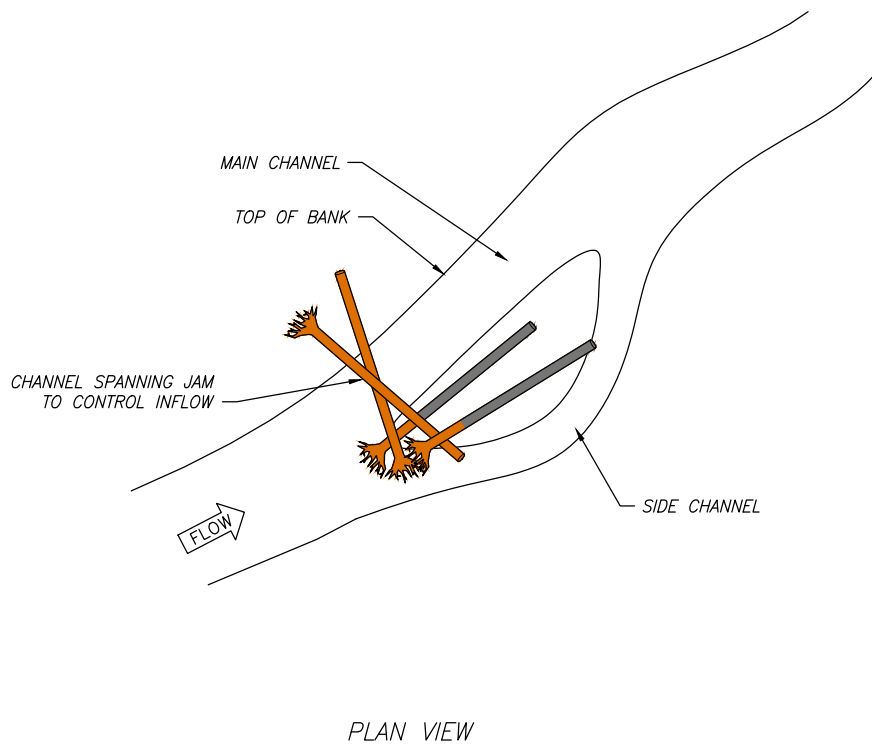
17 TYPICAL OXBOW BACKWATER ALCOVE  
NTS

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Date: Feb. 2019  
Designed: JF, JY, MP  
Drawn: JF, JY, MP  
Checked: RR  
Approved: --

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Typical Details  
- 9

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D-9



EXAMPLE: CONSTRUCTED SPLIT SIDE CHANNEL

- SPLIT FLOW SIDE CHANNEL NOTES:**
1. TARGET FLOW IN SPLIT FLOW SIDE CHANNEL IS 40% OF TOTAL FLOW.
  2. LENGTH OF SPLIT FLOW SIDE CHANNEL SHALL BE LESS THAN 4 BANKFULL WIDTHS.
  3. INSTALL SPLIT FLOW SIDE CHANNELS AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
  4. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
  5. SPLIT FLOW SIDE CHANNELS SHALL HAVE A FLATTER GRADIENT THAN THE ADJACENT MAIN CHANNEL.
  6. SPLIT FLOW SIDE CHANNELS CAN BE PERENNIAL OR DESIGNED TO ACTIVATE ONLY AT HIGH FLOW.
  7. LENGTH OF SPLIT FLOW SIDE CHANNEL IS TYPICALLY LESS THAN SIDE CHANNEL ELEMENTS (SEE DETAIL THIS SHEET).

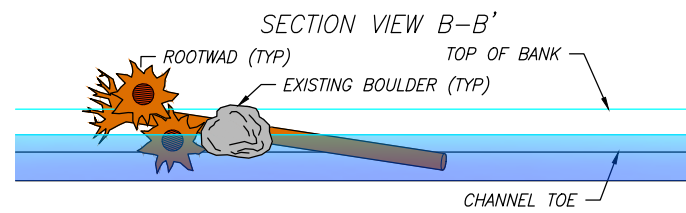
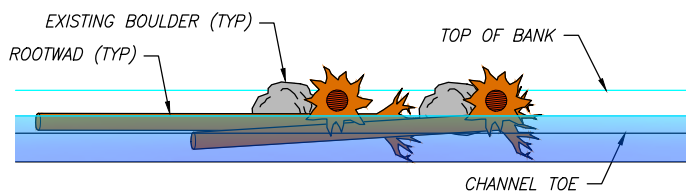
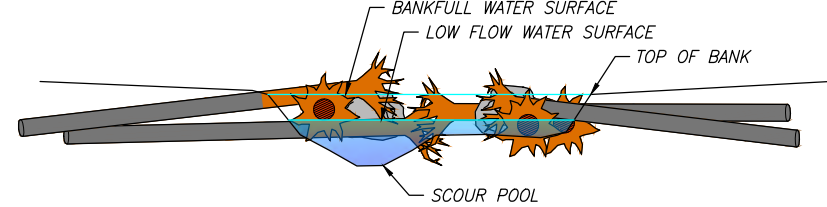
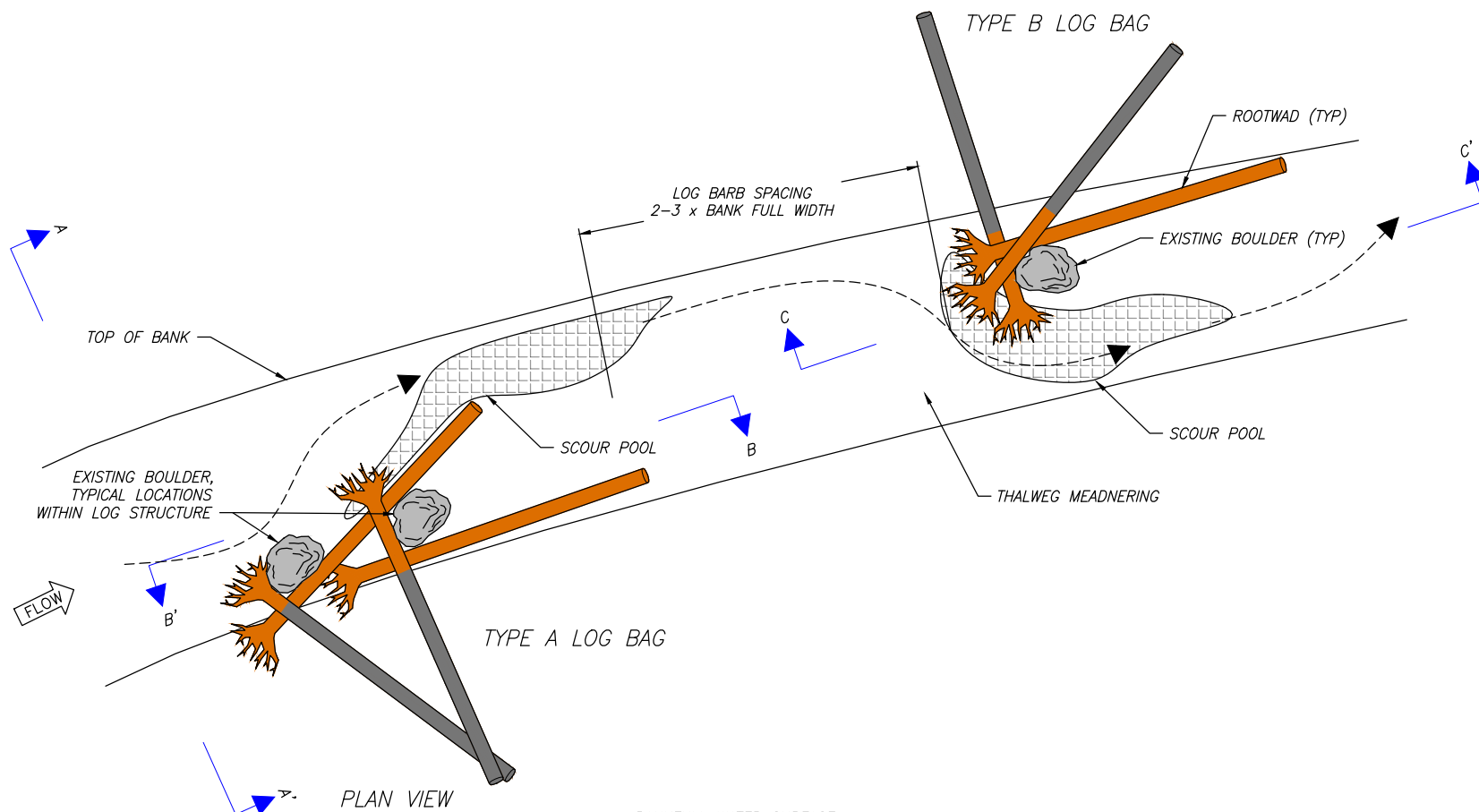


EXAMPLE: CONSTRUCTED SIDE CHANNEL (MAIN CHANNEL IN BACKGROUND)

- SIDE CHANNEL NOTES:**
1. TARGET FLOW IN SIDE CHANNEL IS 20% OF TOTAL FLOW.
  2. LENGTH OF SIDE CHANNEL SHALL BE LONGER THAN 4 BANKFULL WIDTHS.
  3. INSTALL SIDE CHANNELS AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
  4. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
  5. SIDE CHANNELS SHALL HAVE A FLATTER GRADIENT THAN THE ADJACENT MAIN CHANNEL.
  6. SIDE CHANNELS CAN BE DESIGNED TO BE PERENNIAL OR ACTIVATE ONLY AT HIGH FLOW.
  7. LENGTH OF SIDE CHANNELS IS TYPICALLY GREATER THAN SPLIT FLOW SIDE CHANNEL ELEMENTS (SEE DETAIL THIS SHEET).

18 TYPICAL SPLIT FLOW SIDE CHANNEL  
NTS

19 TYPICAL SIDE CHANNEL  
NTS



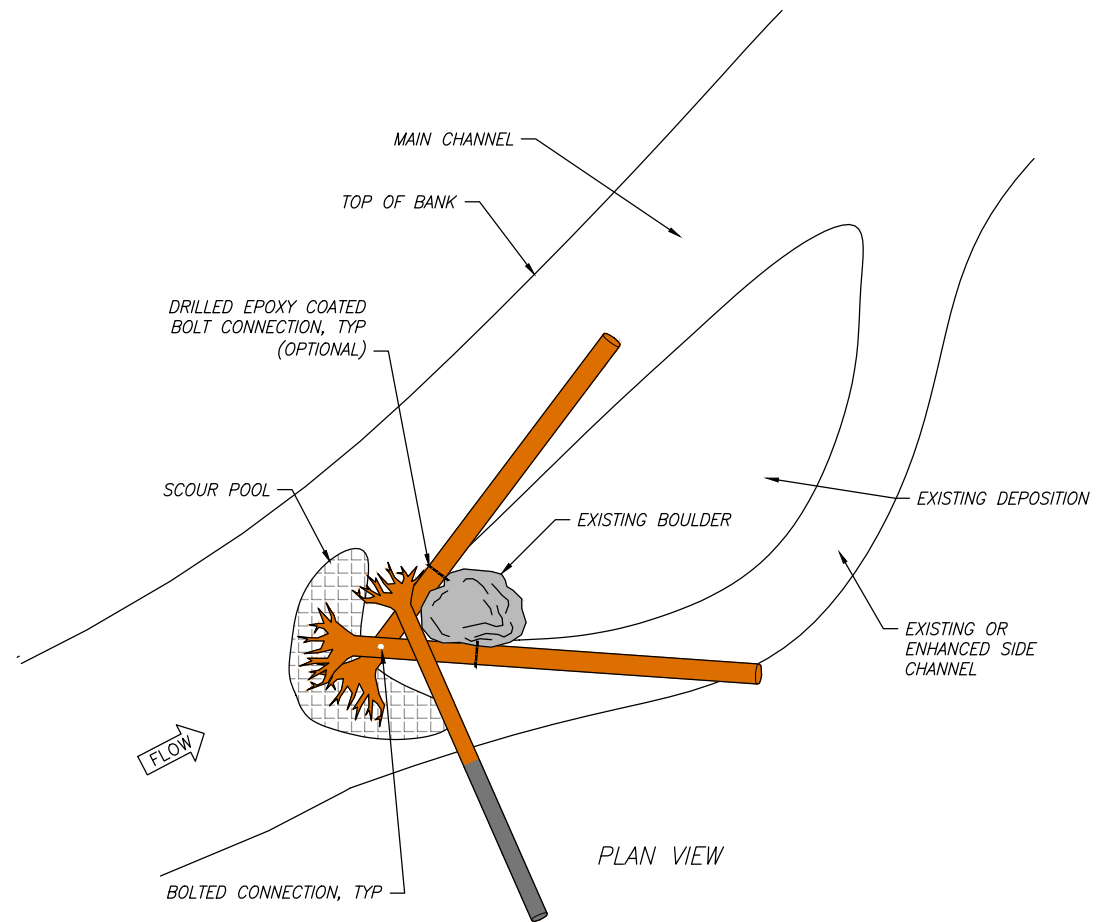
**TYPICAL LOG BANK JAM STRUCTURE NOTES:**

1. INSTALL LOG BANK JAM STRUCTURES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
3. PROVIDE FOR BOULDER BALLAST IF SPECIFIED MINIMUM COVER OVER KEY LOGS NOT POSSIBLE.
4. STREAMS LESS THAN 10 FEET WIDE MAY HAVE LOGS PLACED ON THE SURFACE OR BURIED INTO THE BANK.
5. LOG BARB SPACING 2-5 BANK FULL WIDTH.

**STRUCTURE INTENT:**

1. UTILIZE EXISTING BOULDERS AND/OR LIVE TREES TO STRATEGICALLY BRACE LOGS DEFINING THE THALWEG, FORCING POOL FORMATION, RETAINING GRAVEL, AND PROVIDING IN-STREAM VELOCITY REFUGE.
2. ALTERNATING BANK JAMS PROMOTE THALWEG DEVELOPMENT AND CHANNEL SINUOSITY.
3. TYPE A AND B STRUCTURES CAN BE INSTALLED ON EITHER LEFT OR RIGHT BANK.

20 TYPICAL ALTERNATING LOG BANK JAMS  
NTS



**EXISTING BOULDER APEX JAM STRUCTURE NOTES:**

1. INSTALL EXISTING BOULDER APEX JAM STRUCTURES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
3. SMALL APEX JAM STRUCTURES ARE SCALEABLE TO THE SIZE OF STREAM AND MAY CONSIST OF FEWER OR MORE LOGS INCLUDING FEWER KEY LOGS.
3. PROVIDE FOR BOULDER BALLAST IF SPECIFIED MINIMUM COVER OVER KEY LOGS NOT POSSIBLE.
4. STREAMS LESS THAN 10 FEET WIDE MAY HAVE LOGS PLACED ON THE SURFACE OR BURIED INTO THE BANK.

**STRUCTURE INTENT:**

1. UTILIZE EXISTING BOULDERS AND/OR LIVE TREES TO STRATEGICALLY BRACE LOGS DEFINING THE THALWEG, FORCING POOL FORMATION, FORCING SIDE CHANNEL DEVELOPMENT, RETAINING GRAVEL, AND PROVIDING IN-STREAM VELOCITY REFUGE.

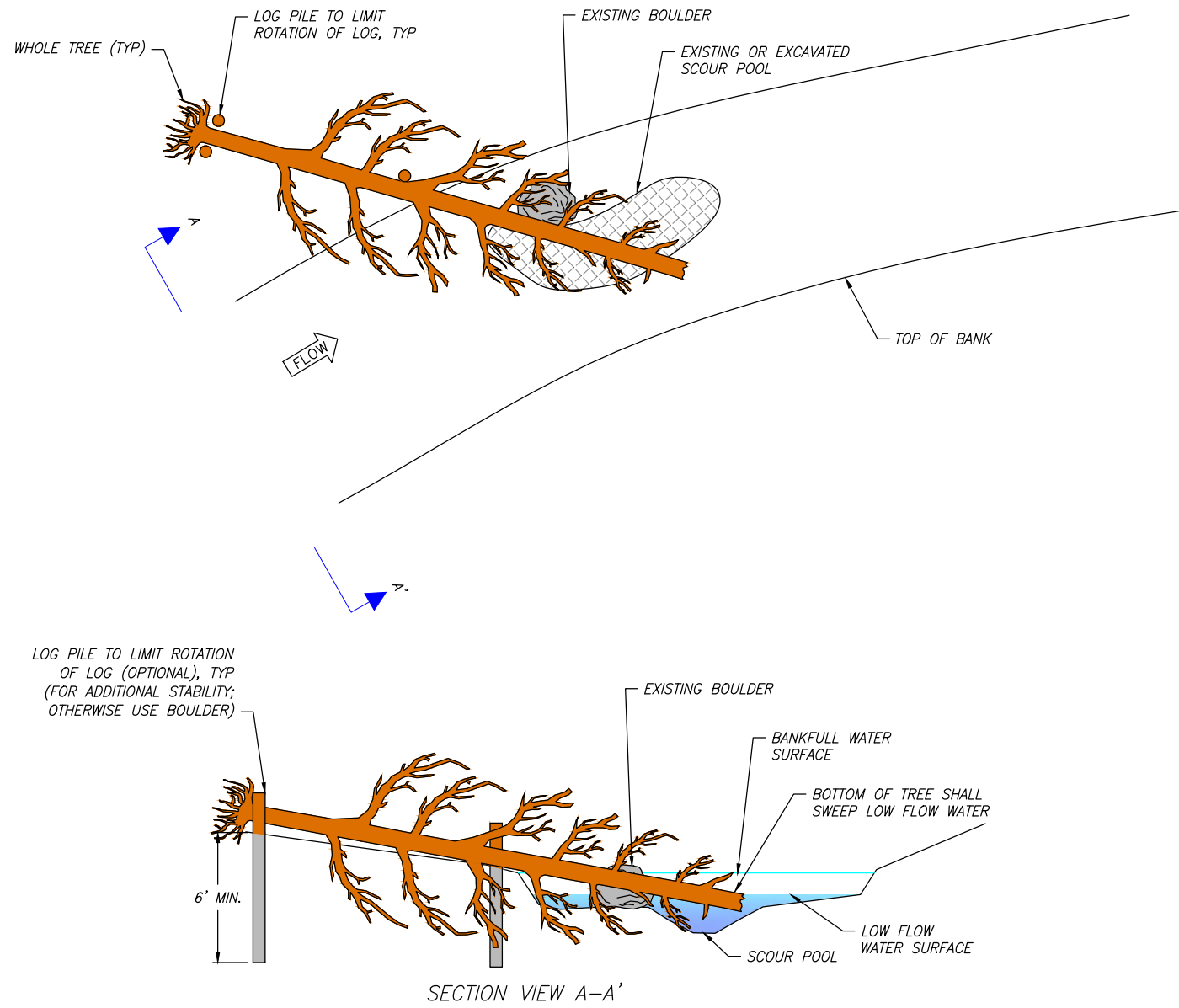
21 TYPICAL EXISTING BOULDER APEX JAM  
NTS

Draft

Date: Feb. 2019  
Designed: JF, JY, MP  
Drawn: JF, JY, MP  
Checked: RR  
Approved: --

Drawing Name  
Typical Details  
- 11

Drawing No.  
D-11



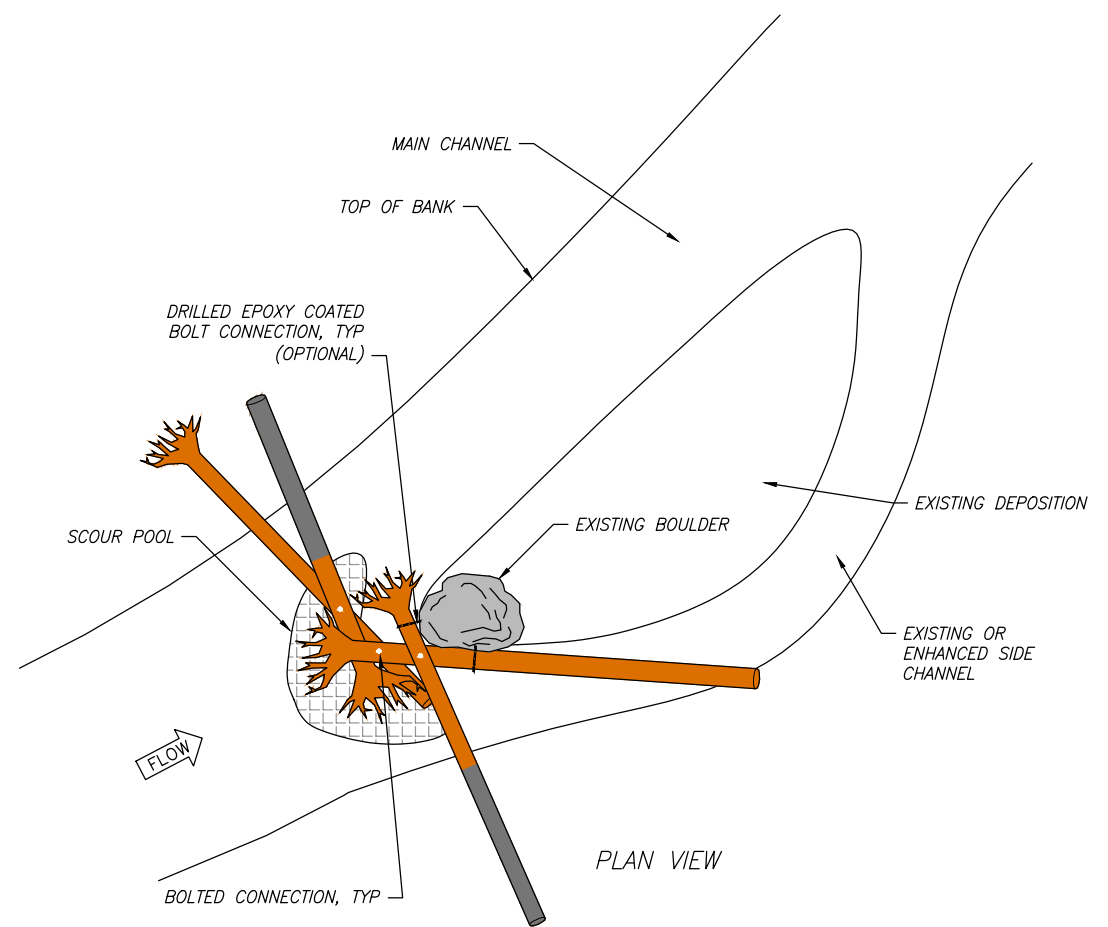
**WHOLE TREE HABITAT STRUCTURE NOTES:**

1. INSTALL WHOLE TREE HABITAT STRUCTURES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
3. LOG PILES MAY BE USED IF NO CHANNEL LINER PRESENT, OTHERWISE USE BOULDER BRACING.
4. STREAMS LESS THAN 10 FEET WIDE MAY HAVE LOGS PLACED ON THE SURFACE WITHOUT PILES.
5. BRACE AGAINST EXISTING BOULDERS OR VEGETATION OR INSTALL WOOD PILES (OPTIONAL) FOR ADDITIONAL STABILITY.

**STRUCTURE INTENT:**

1. UTILIZE EXISTING BOULDERS AND SCOUR POOLS AND ENHANCE WITH WHOLE TREES. STRATEGICALLY BRACE LOGS AGAINST EXISTING BOULDERS AND LIVE TREES, FORCING POOL FORMATION, RETAINING GRAVEL, AND PROVIDING IN-STREAM VELOCITY REFUGE.

22 TYPICAL WHOLE TREE HABITAT STRUCTURE  
NTS



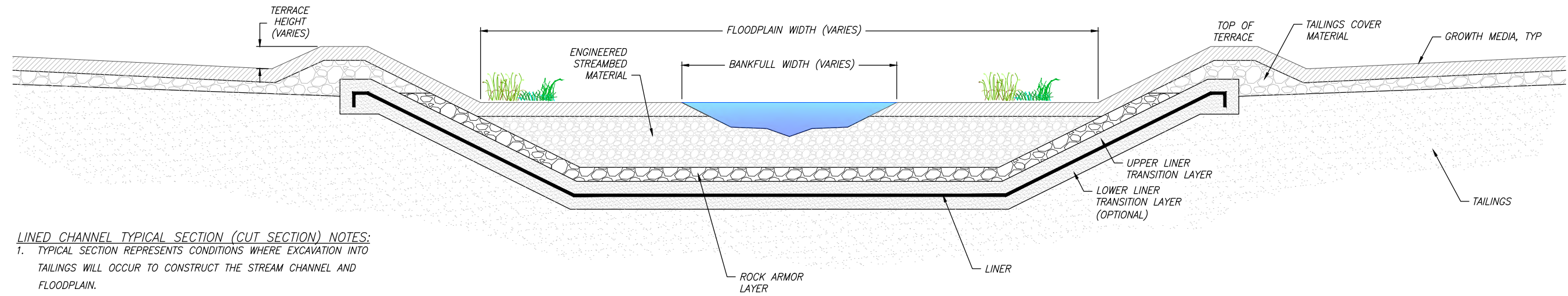
**EXISTING BOULDER APEX JAM STRUCTURE NOTES:**

1. INSTALL EXISTING BOULDER APEX JAM STRUCTURES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
3. SMALL APEX JAM STRUCTURES ARE SCALEABLE TO THE SIZE OF STREAM AND MAY CONSIST OF FEWER OR MORE LOGS INCLUDING FEWER KEY LOGS.
3. PROVIDE FOR BOULDER BALLAST IF SPECIFIED MINIMUM COVER OVER KEY LOGS NOT POSSIBLE.
4. STREAMS LESS THAN 10 FEET WIDE MAY HAVE LOGS PLACED ON THE SURFACE OR BURIED INTO THE BANK.

**STRUCTURE INTENT:**

1. UTILIZE EXISTING BOULDERS AND/OR LIVE TREES TO STRATEGICALLY BRACE LOGS DEFINING THE THALWEG, FORCING POOL FORMATION, FORCING SIDE CHANNEL DEVELOPMENT, RETAINING GRAVEL, AND PROVIDING IN-STREAM VELOCITY REFUGE.

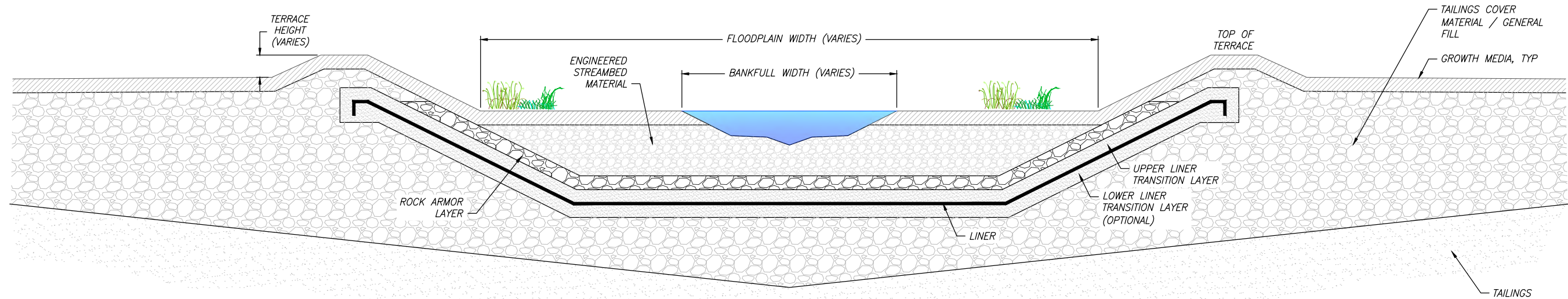
23 TYPICAL EXISTING BOULDER CHANNEL SPANNING JAM  
NTS



**LINED CHANNEL TYPICAL SECTION (CUT SECTION) NOTES:**

1. TYPICAL SECTION REPRESENTS CONDITIONS WHERE EXCAVATION INTO TAILINGS WILL OCCUR TO CONSTRUCT THE STREAM CHANNEL AND FLOODPLAIN.
2. ASSUMED MAXIMUM OF 15 FEET OF EXCAVATION INTO THE TAILINGS NEAR THE DOWNSTREAM END (DAM FACE).
3. ASSUMED MAXIMUM OF 5 FEET OF EXCAVATION INTO THE TAILINGS ELSEWHERE.

LINED CHANNEL TYPICAL SECTION  
- CUT SECTION



**LINED CHANNEL TYPICAL SECTION (FILL SECTION) NOTES:**

1. TYPICAL SECTION REPRESENTS CONDITIONS WHERE STREAM CHANNEL AND FLOODPLAIN WILL BE CONSTRUCTED ON FILL PLACED ABOVE TAILINGS.
2. EXCAVATION MAY BE REQUIRED INTO THE TAILINGS COVER MATERIAL.

LINED CHANNEL TYPICAL SECTION  
- FILL SECTION

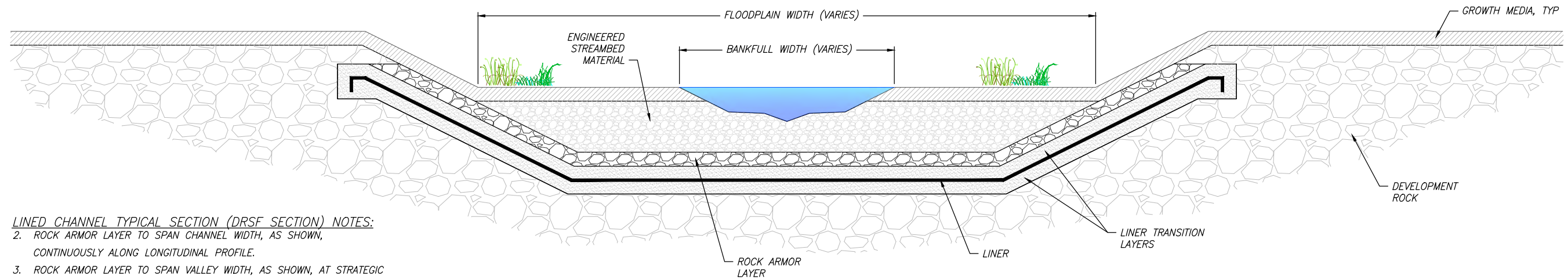
24 LINED CHANNEL TYPICAL SECTIONS (ON TOP OF TSF)  
NTS

Draft

Date: Feb. 2019  
Designed: JF, JY, MP  
Drawn: JF, JY, MP  
Checked: RR  
Approved: --

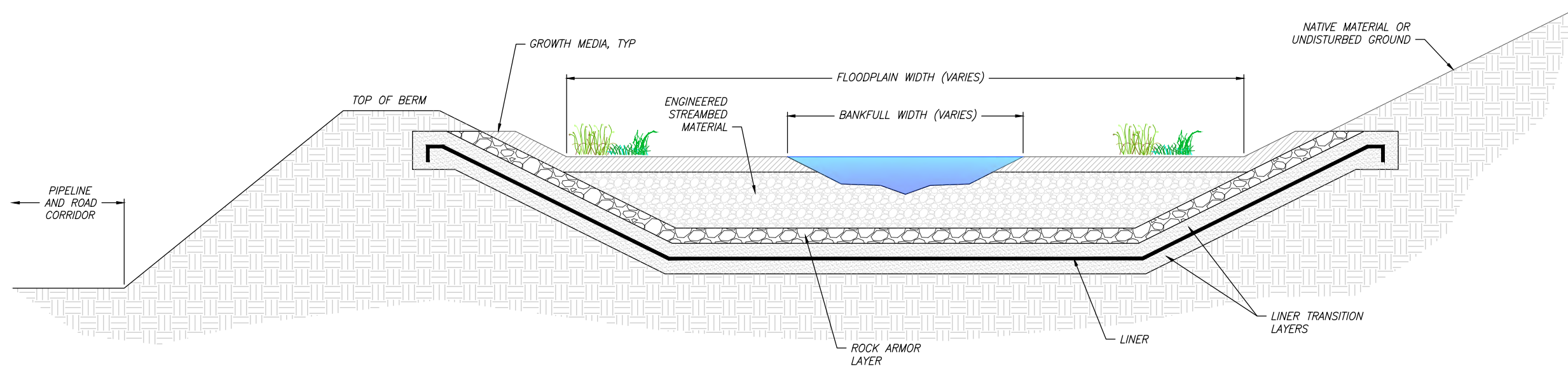
Drawing Name  
Typical Details  
- 13

Drawing No.  
D-13

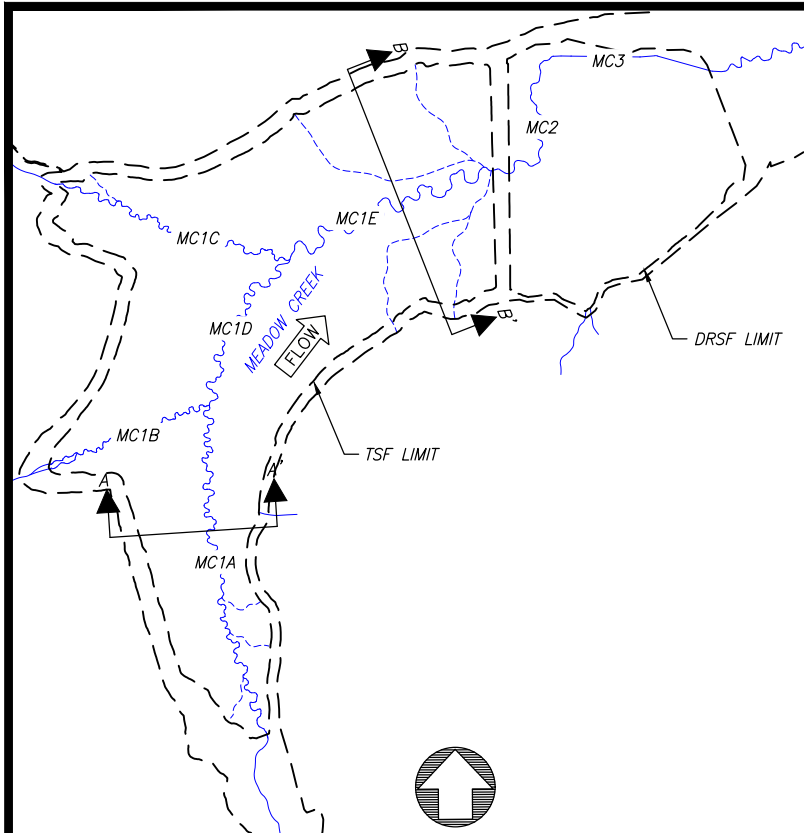


LINED CHANNEL TYPICAL SECTION (DRSF SECTION) NOTES:  
2. ROCK ARMOR LAYER TO SPAN CHANNEL WIDTH, AS SHOWN, CONTINUOUSLY ALONG LONGITUDINAL PROFILE.  
3. ROCK ARMOR LAYER TO SPAN VALLEY WIDTH, AS SHOWN, AT STRATEGIC LOCATIONS (TBD) ALONG LONGITUDINAL PROFILE.

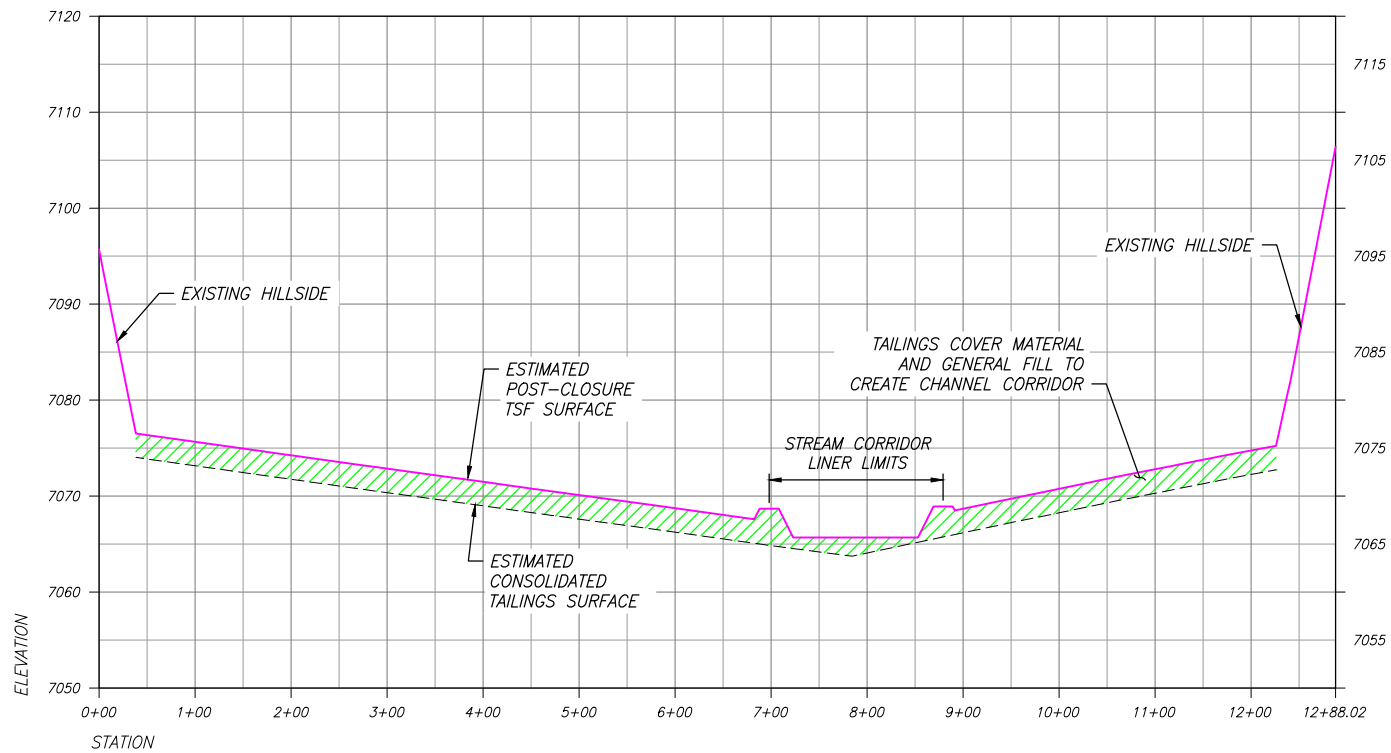
25 LINED CHANNEL TYPICAL SECTION (ON TOP OF DRSF)  
NTS



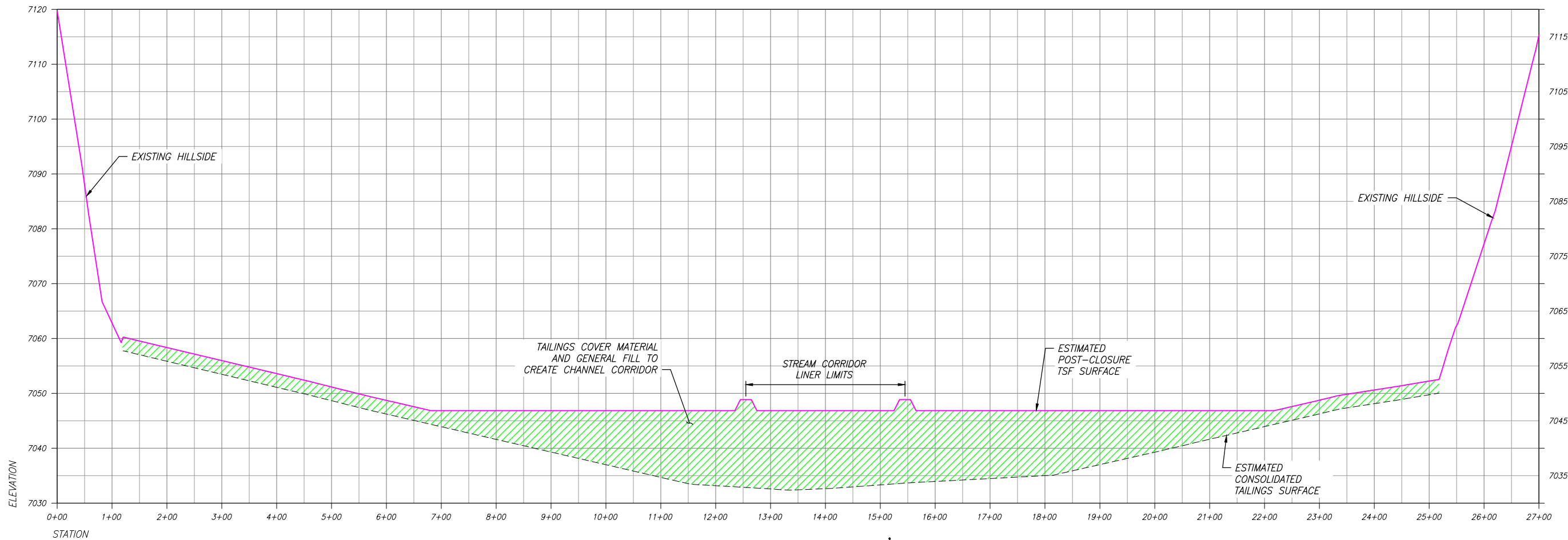
26 LINED CHANNEL TYPICAL SECTION (MC4 AND MC5 DIVERSION CHANNEL)  
NTS



TSF/DRSF VICINITY MAP  
1" = 1,000'



27 TSF SECTION A-A'



28 TSF SECTION B-B'

**NOTES:**

1. SECTIONS ARE CUT LEFT TO RIGHT LOOKING DOWNSTREAM ON THE TSF IN THE MEADOW CREEK DRAINAGE.
2. REFER TO SHEET D-13, DETAIL 24 - LINED CHANNEL TYPICAL SECTIONS (ON TOP OF TSF) FOR ADDITIONAL CHANNEL CORRIDOR DETAIL.
3. REFER TO SHEET MC1A-2 AND MC1E-1 FOR STREAM DESIGN AT SECTION LOCATIONS.

**LEGEND:**

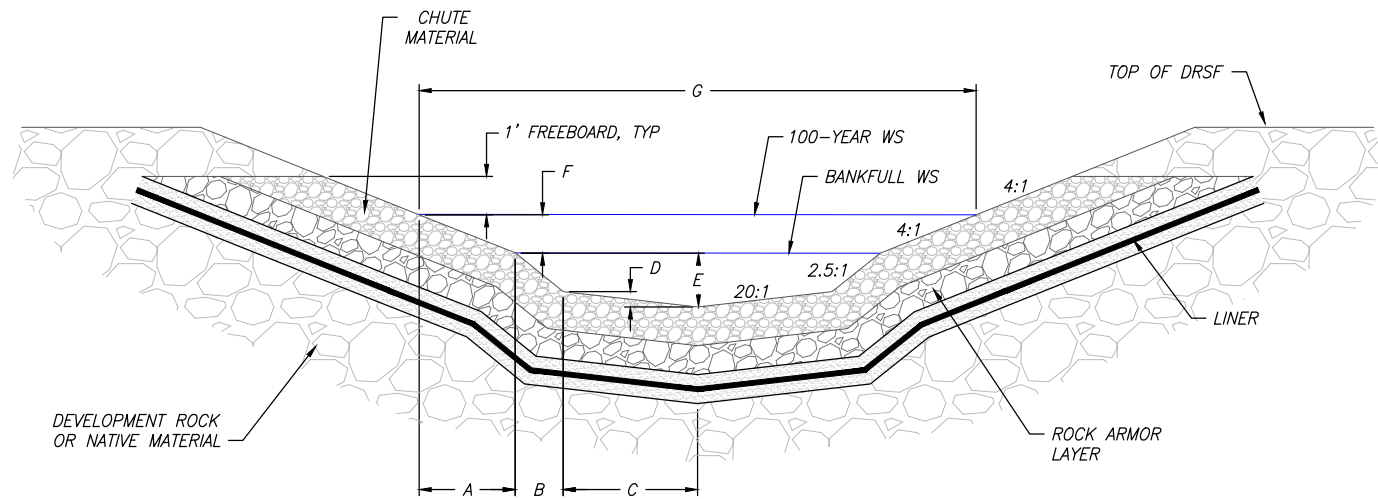
- ESTIMATED TSF CONSOLIDATED GROUND PROFILE
- ESTIMATED POST-CLOSURE TSF GROUND PROFILE
- ▨ FILL ZONE

Draft

Date: Feb. 2019  
Designed: JF, JY, MP  
Drawn: JF, JY, MP  
Checked: RR  
Approved: --

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Typical Details  
- 15

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D-15



SECTION VIEW

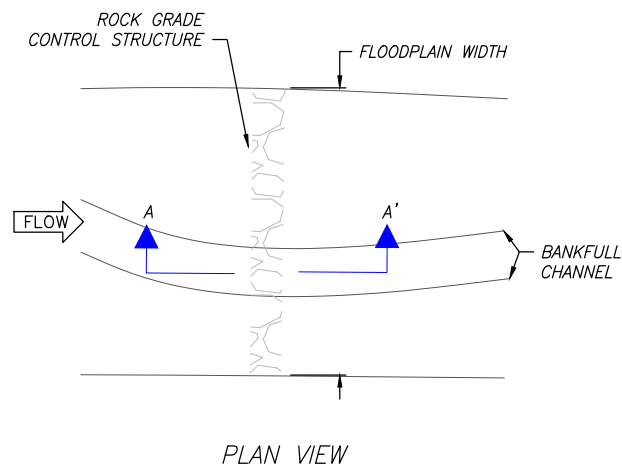
LINED RIPRAP CHUTE  
CHANNEL DEFINITION TABLE

TABLE - A												
REACH ID	100-YR FLOW (CFS)	CHUTE MATERIAL TYPE	CHUTE MATERIAL THICKNESS (IN)	ROCK ARMOR MATERIAL TYPE	ROCK ARMOR MATERIAL THICKNESS (FT)	A (FT)	B (FT)	C (FT)	D (FT)	BANKFULL DEPTH, E (FT)	F (FT)	TOP WIDTH, G (FT)
MC3	243	C1	4.0	A2	2.0	3.6	4.8	2.8	0.1	2.0	0.9	23.6
FC2	43	C2	3.0	A2	2.0	1.2	2.0	2.0	0.2	1.0	0.3	11.1
WE2	5	C2	3.0	A2	2.0	1.2	1.5	0.0	0.0	0.6	0.3	5.4

NOTES

1. CHUTE MATERIAL TYPES: C1 (D50 = XX"), C2 (D50 = XX").
2. ROCK ARMOR MATERIAL TYPES: A1 (D50 = XX"), A2 (D50 = XX").

29 LINED RIPRAP CHUTE  
NTS

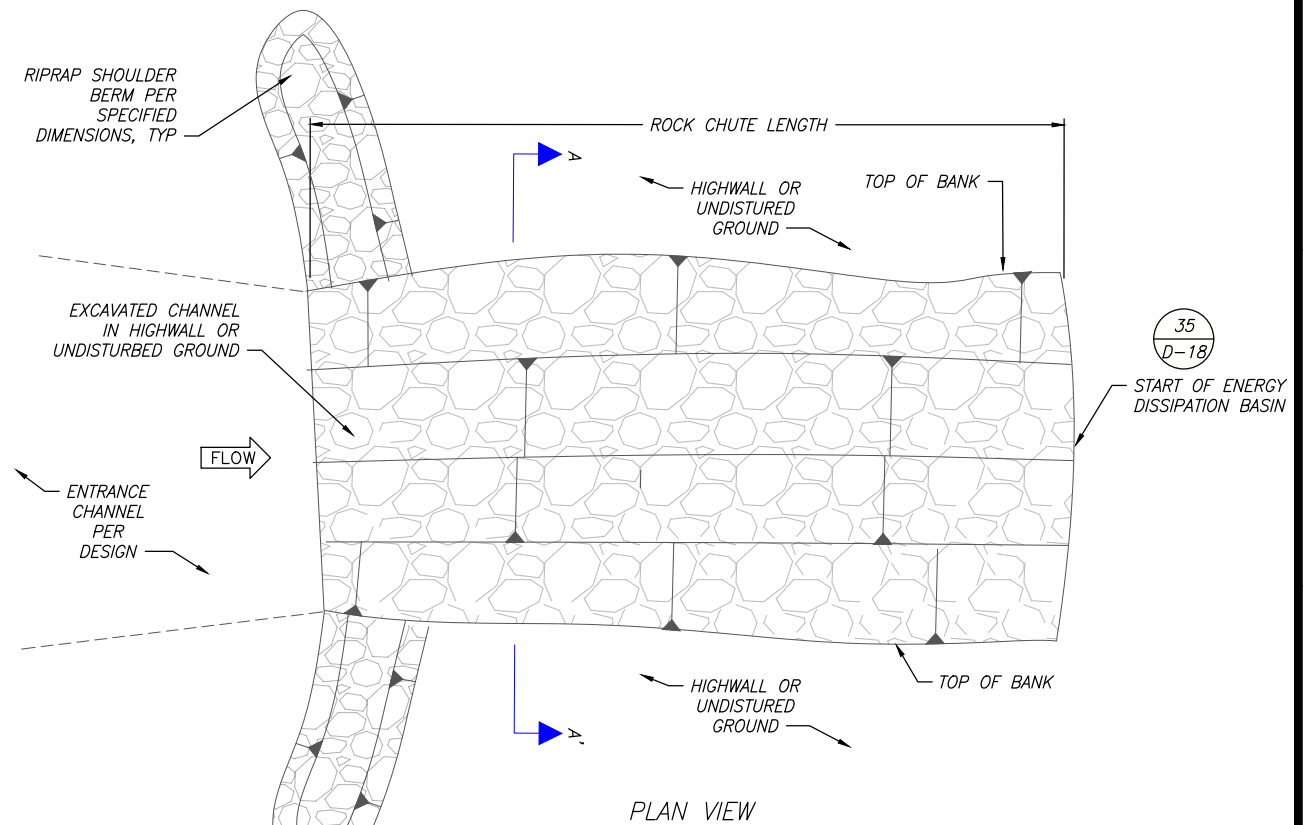


PLAN VIEW

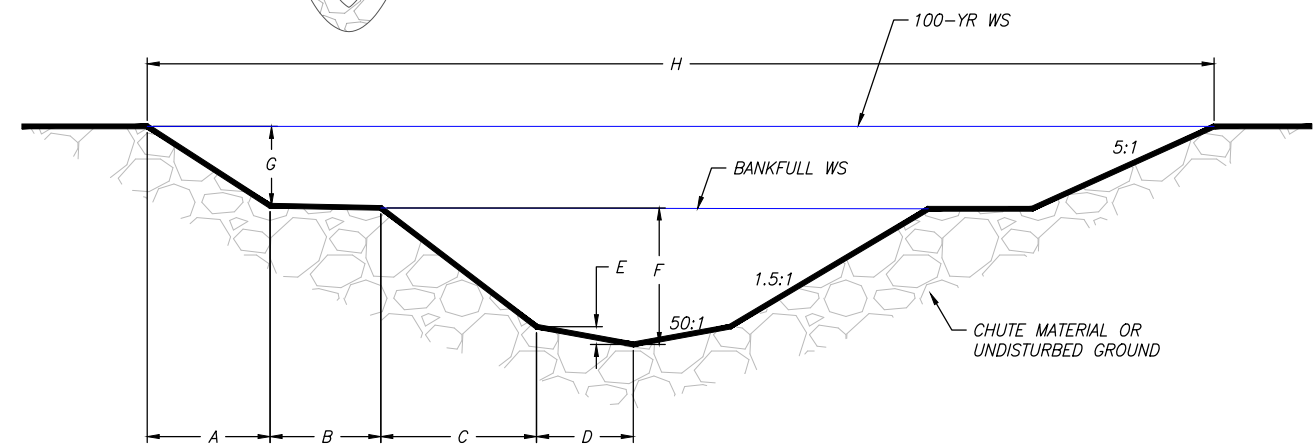
NOTES

1. CONSTRUCT ROCK GRADE CONTROL STRUCTURES TO THE DIMENSIONS SPECIFIED IN THE LINED RIPRAP CHUTE DETAIL (THIS DRAWING).
2. ROCK GRADE CONTROL MATERIAL SHALL CONSIST OF MATERIAL MATCHING THE ROCK ARMOR LAYER FOR THE SAME REACH.

31 ROCK GRADE CONTROL STRUCTURE  
NTS



PLAN VIEW



SECTION VIEW A-A'

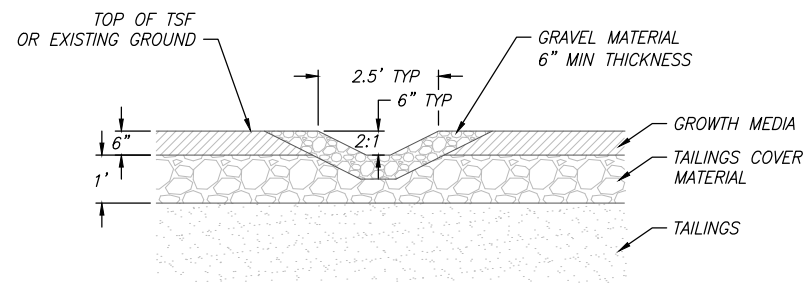
UNLINED CHUTE  
CHANNEL DEFINITION TABLE

TABLE - A												
REACH ID	DESIGN EVENT	FLOW (CFS)	CHUTE MATERIAL TYPE	CHUTE MATERIAL THICKNESS (FT)	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)	F (FT)	G (FT)	H (FT)
HC1	100-YR	14	NATIVE BEDROCK	NA	0.2	0.0	0.8	1.0	0	0.3	.2	2.7
WE3	100-YR	15	C2	2.0	2.5	0.0	0.8	2.0	0.1	0.6	0.5	10.5

NOTES

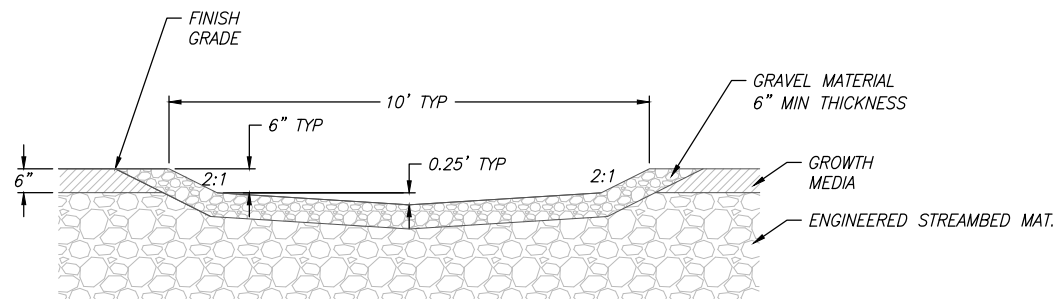
1. CHUTE MATERIAL TYPES: C1 (D50 = XX"), C2 (D50 = XX").

30 UNLINED CHUTE  
NTS



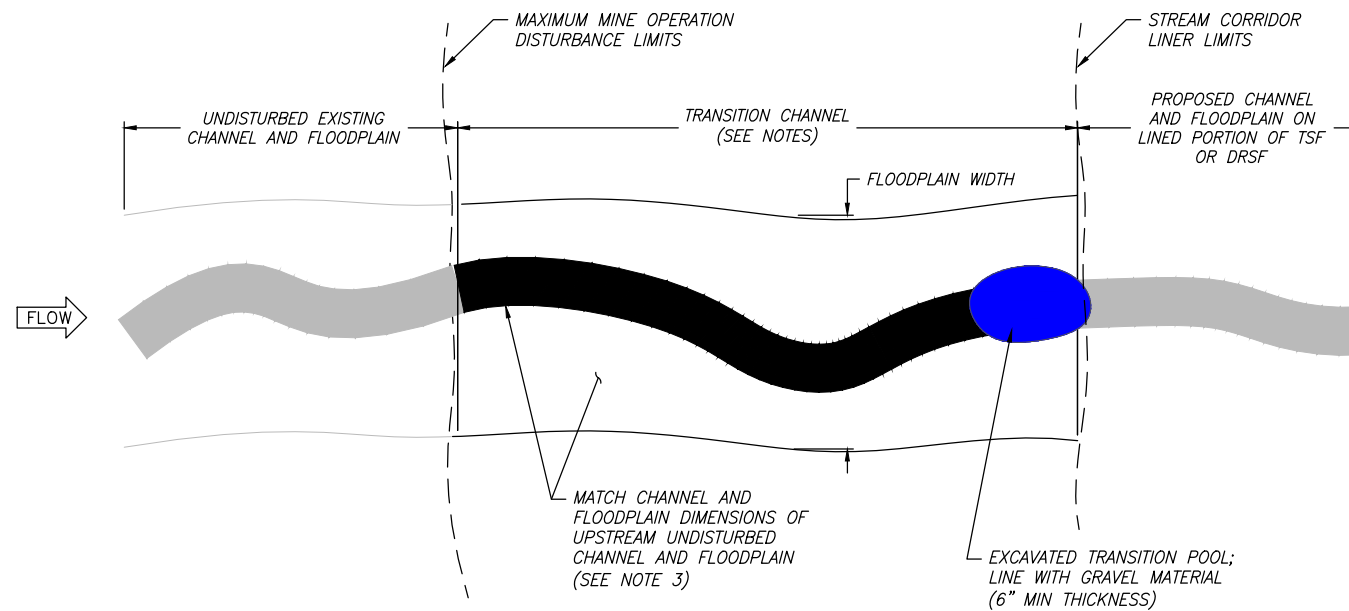
SECTION VIEW

32 NON-PERENNIAL SWALE  
NTS

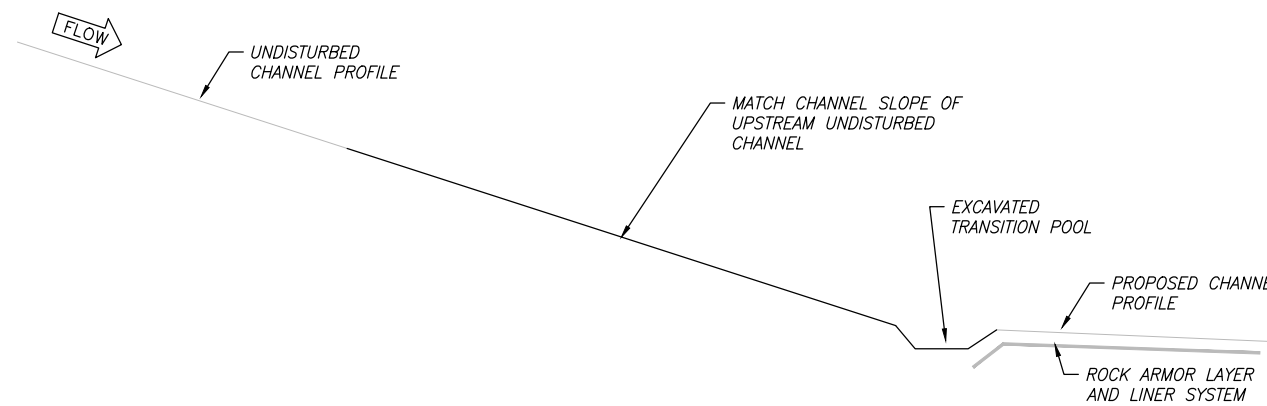


SECTION VIEW

33 HIGH FLOW NON-PERENNIAL CHANNEL  
NTS



TYPICAL PLAN VIEW



TYPICAL PROFILE VIEW

TRANSITION CHANNEL NOTES:

1. TRANSITION CHANNELS SHALL BE LOCATED IN THE REGION BETWEEN STREAM CORRIDOR LINER LIMITS (ON TSF OR DRSF) AND THE MAXIMUM MINE OPERATION DISTURBANCE LIMITS AT LOCATIONS WHERE AN EXISTING (PERENNIAL OR NON-PERENNIAL) IS DISTURBED BY MINE OPERATIONS (RESTORATION OF ACCESS ROADS AND DIVERSION CHANNELS OR ANY OTHER DISTURBANCE).
2. TRANSITION CHANNELS SHALL ALSO BE LOCATED ON PERENNIAL AND NON-PERENNIAL CHANNEL AT LOCATIONS IDENTIFIED ON THE PLAN OVERVIEW SHEETS FOR EACH REACH AND AT LOCATIONS AS DETERMINED BY THE OWNER OR ENGINEER.
3. RE-CONTOUR CHANNEL AND FLOODPLAIN AREA TO ACHIEVE SMOOTH TRANSITION BETWEEN UPSTREAM UNDISTURBED CHANNEL AND DOWNSTREAM PROPOSED CHANNEL (OR DOWNSTREAM EXISTING UNDISTURBED CHANNEL IN SOME CASES; TYPICAL DETAIL SHOWN REPRESENTS TRANSITION AT LINER LIMITS).

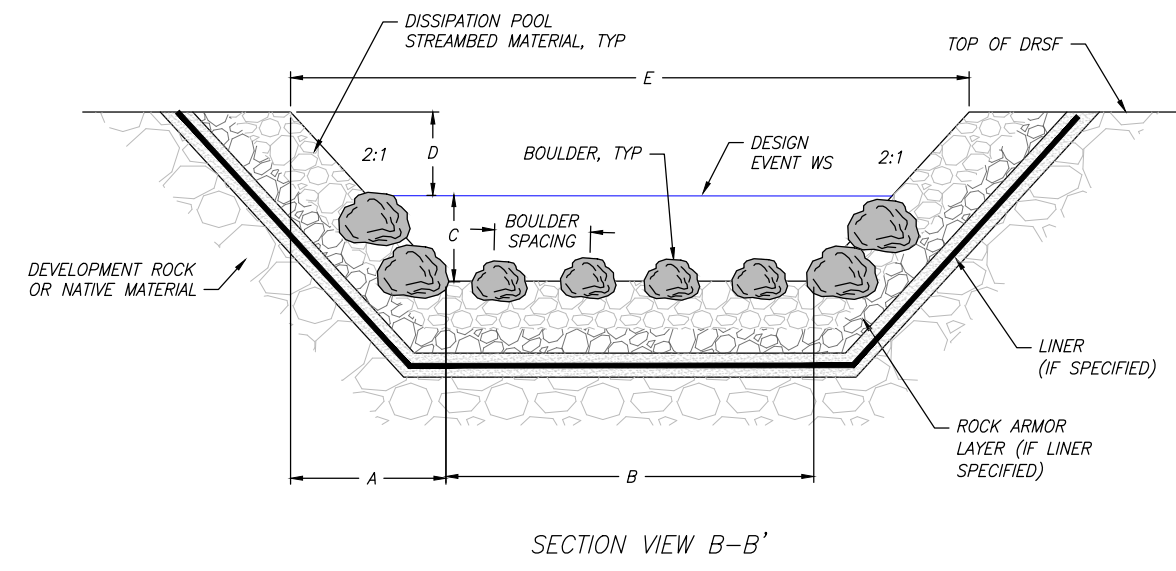
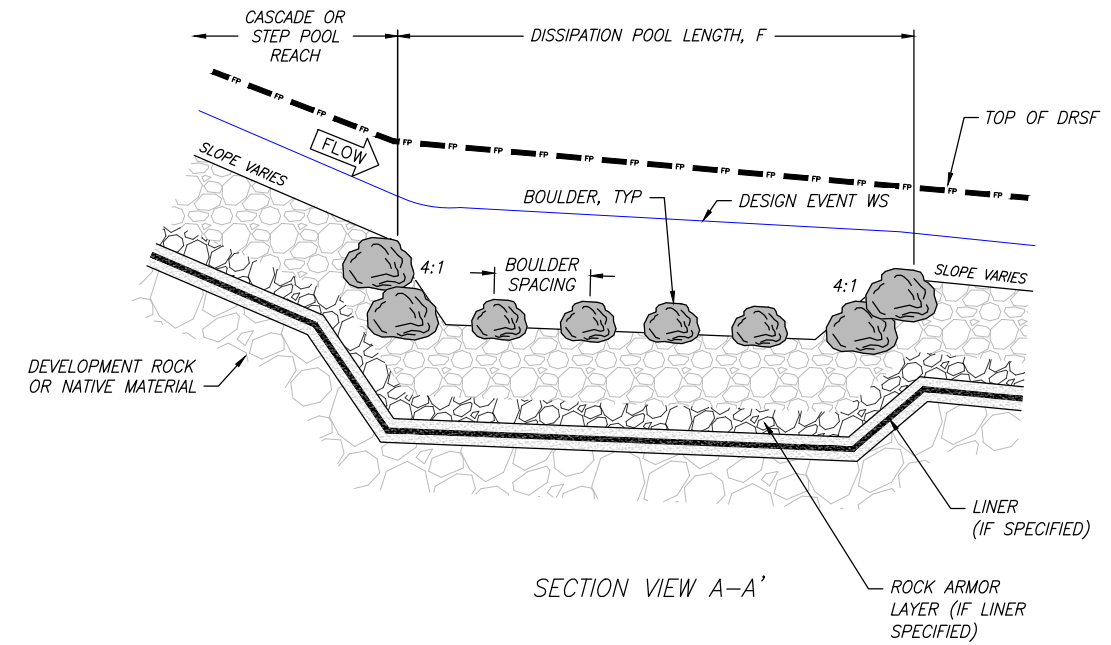
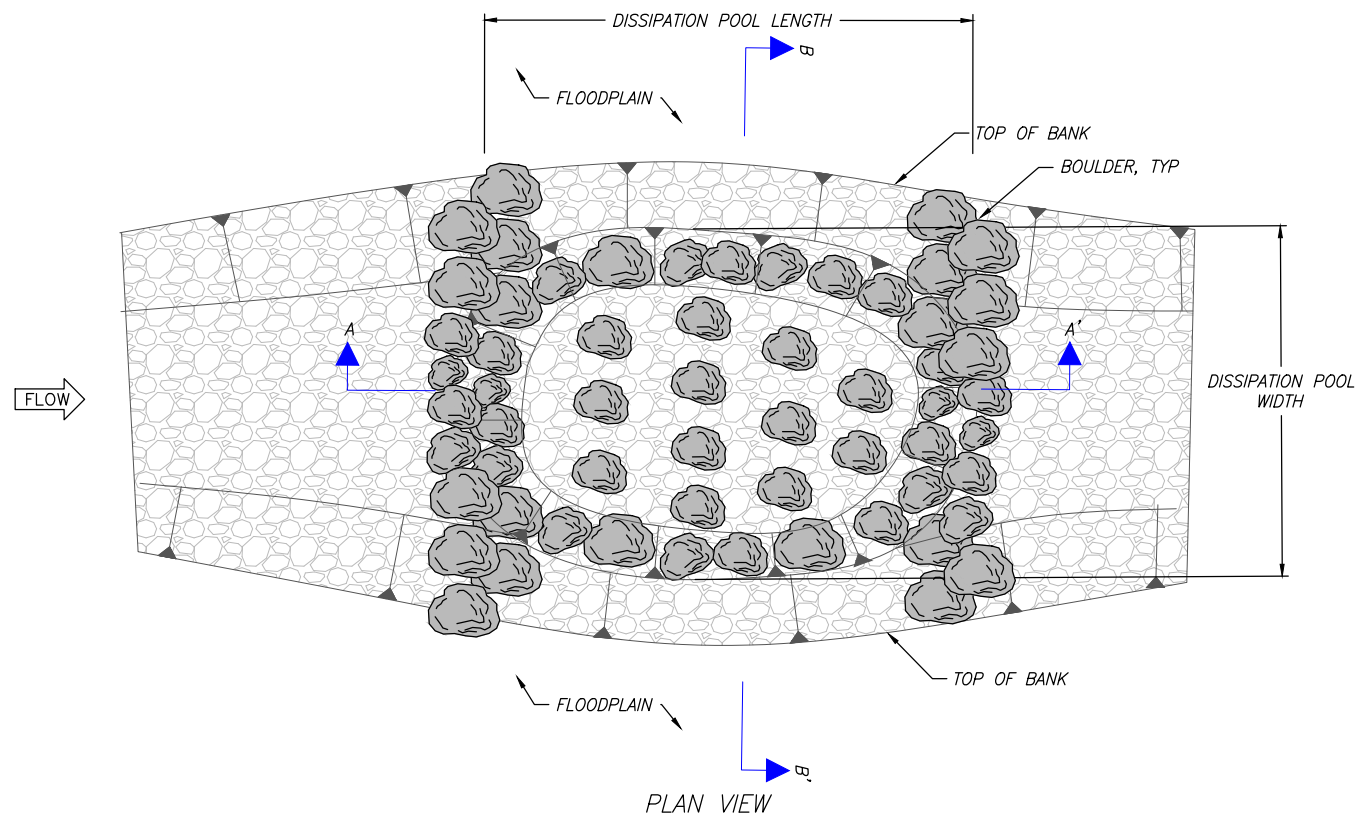
34 TRANSITIONAL CHANNEL  
NTS

Draft

Date: Feb. 2019  
Designed: JF, JY, MP  
Drawn: JF, JY, MP  
Checked: RR  
Approved: --

Drawing Name  
Typical Details  
- 17

Drawing No.  
D-17



ENERGY DISSIPATION BASIN  
DEFINITION TABLE

TABLE - A												
REACH ID	DESIGN EVENT	FLOW (CFS)	BASIN MATERIAL TYPE	BASIN MATERIAL THICKNESS (IN)	ROCK ARMOR MATERIAL TYPE	ROCK ARMOR MATERIAL THICKNESS (IN)	A (FT)	B (FT)	C (FT)	FREEBOARD, D (FT)	CHANNEL TOP WIDTH, E (FT)	POOL LENGTH, F (FT)
MC3	100-YR	243	B1	4.0	A2	2.0	TBD	TBD	TBD	TBD	TBD	TBD
FC2	100-YR	43	B1	3.0	A2	2.0	TBD	TBD	TBD	TBD	TBD	TBD
HC1	100-YR	14	B1	3.0	NA	NA	TBD	TBD	TBD	TBD	TBD	TBD
WE2	100-YR	5	B1	3.0	A2	2.0	TBD	TBD	TBD	TBD	TBD	TBD
WE3	100-YR	15	B1	3.0	NA	NA	TBD	TBD	TBD	TBD	TBD	TBD

- NOTES
1. BASIN MATERIAL TYPES: B1 (D50 = XX")
  2. ROCK ARMOR MATERIAL TYPES: A1 (D50 = XX"), A2 (D50 = XX").

BANK TREATMENT SCHEDULE – LEFT BANK											
REACH ID	BANK TREATMENT	START STA	END STA	BRUSHLAYER		BRUSH LAYER PLANTING		LIVE STAKES		LIVE STAKES PLANTING	
				START STA	END STA	BRUSH LAYER THICKNESS (IN)	PLANTING DENSITY (# CUTTINGS PER L.F.)	START STA	END STA	PLANTING WIDTH (FT)	PLANTING DENSITY (SPACING)
MC1A	A	0+00	0+00	0+00	0+00	12	1	0+00	0+00	2	4' O.C.

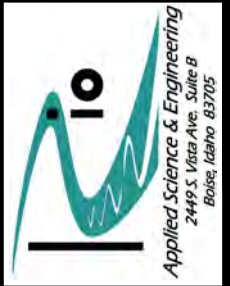
BANK TREATMENT SCHEDULE TO BE COMPLETED IN A FUTURE DESIGN PHASE

NOTES:  
1. SEE SHEET D-1 – TYPICAL DETAILS – 1 FOR BANK TREATMENT TYPES AND DETAILS.

BANK TREATMENT SCHEDULE – RIGHT BANK											
REACH ID	BANK TREATMENT	START STA	END STA	BRUSHLAYER		BRUSH LAYER PLANTING		LIVE STAKES		LIVE STAKES PLANTING	
				START STA	END STA	BRUSH LAYER THICKNESS (IN)	PLANTING DENSITY (# CUTTINGS PER L.F.)	START STA	END STA	PLANTING WIDTH (FT)	PLANTING DENSITY (SPACING)
MC1A	A	0+00	0+00	0+00	0+00	12	1	0+00	0+00	2	4' O.C.

BANK TREATMENT SCHEDULE TO BE COMPLETED IN A FUTURE DESIGN PHASE

NOTES:  
1. SEE SHEET D-1 – TYPICAL DETAILS – 1 FOR BANK TREATMENT TYPES AND DETAILS.



**Stibnite Gold Project**  
Stream and Wetland Restoration Concept Design  
Typical Details  
Valley County, Idaho

Draft

Date: Feb. 2019  
Designed: JF, JY, MP  
Drawn: JF, JY, MP  
Checked: RR  
Approved: --

Drawing Name  
Typical Details  
– 19

Drawing No.  
D-19

ZONE 1 CONTAINER PLANTING SCHEDULE						
SCIENTIFIC NAME	COMMON NAME	PLANT TYPE	WETLAND INDICATOR STATUS	PLANT SIZE / PROPAGULE TYPE	PERCENT OF MIX, %	PLANTING SPACING (ON CENTER), FT
<i>Elodea species (E. canadensis; E. Nuttallii)</i>	waterweed	aquatic macrophyte	OBL	2.5 inch	25	2
<i>Isoetes bolanderi</i>	Bolander's quillwort	aquatic macrophyte	OBL	2.5 inch	15	2
<i>Potamogeton alpinus</i>	alpine pondweed	aquatic macrophyte	OBL	2.5 inch	15	2
<i>Potamogeton epihydrus</i>	ribbonleaf pondweed	aquatic macrophyte	OBL	2.5 inch	15	2
<i>Ranunculus aquatilis</i>	white water crowfoot	aquatic macrophyte	OBL	2.5 inch	15	2
<i>Utricularia macrohiza</i>	common bladderwort	aquatic macrophyte	OBL	2.5 inch	15	2
<b>Total</b>					<b>100</b>	

ZONE 2 CONTAINER PLANTING SCHEDULE						
SCIENTIFIC NAME	COMMON NAME	PLANT TYPE	WETLAND INDICATOR STATUS	PLANT SIZE / PROPAGULE TYPE	PERCENT OF MIX, %	PLANTING SPACING (ON CENTER), FT
<i>Carex canescens var. canescens</i>	silvery sedge	graminoid	OBL	10 ci	10	3 ft
<i>Carex lenticularis var. lipocarpa</i>	lakeshore sedge	graminoid	OBL	10 ci	10	3 ft
<i>Carex utriculata</i>	beaked sedge	graminoid	OBL	10 ci	10	3 ft
<i>Deschampsia elongata</i>	slender hairgrass	graminoid	FACW	10 ci	20	3 ft
<i>Equisetum fluviatile</i>	water horsetail	fern ally	OBL	2.5-in	20	3 ft
<i>Glyceria striata (G. elata)2</i>	fowl mangrass (tall managrass)	graminoid	OBL (FACW)	10 ci	20	3 ft
<i>Juncus ensifolius</i>	swordleaf rush	graminoid	FACW	10 ci	10	3 ft
<b>Total</b>					<b>100</b>	

ZONE 2 SEEDING SCHEDULE						
SCIENTIFIC NAME	COMMON NAME	PLANT TYPE	WETLAND INDICATOR STATUS	PERCENT OF MIX, %	PLS, SEEDS/LB	PLS, LB/ACRE
<i>Deschampsia elongata</i>	slender hairgrass	graminoid	FACW	30	2,300,000	1.03
<i>Glyceria striata (G. elata)2</i>	fowl mangrass (tall managrass)	graminoid	OBL (FACW)	40	1,600,000	1.97
<i>Juncus drummondii</i>	Drummond's rush	graminoid	FACW	15	17,000,000	0.07
<i>Juncus ensifolius</i>	swordleaf rush	graminoid	FACW	15	24,000,000	0.05
<b>Total</b>				<b>100</b>		<b>3.12</b>

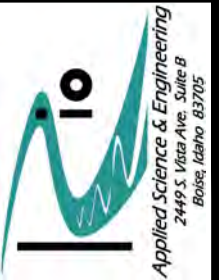
ZONE 3 CONTAINER PLANTING SCHEDULE						
SCIENTIFIC NAME	COMMON NAME	PLANT TYPE	WETLAND INDICATOR STATUS	PLANT SIZE / PROPAGULE TYPE	PERCENT OF MIX, %	PLANTING SPACING (ON CENTER), FT
<i>Betula glandulosa</i>	resin birch	shrub	OBL	D 40	10	6 ft
<i>Calamagrostis canadensis var. canadensis</i>	bluejoint reedgrass	graminoid	FACW	10 ci	10	3 ft
<i>Deschampsia elongata</i>	slender hairgrass	graminoid	FACW	10 ci	10	3 ft
<i>Equisetum hyemale var. affine</i>	scouring rush	fern ally	FACW	2.5-in	5	3 ft
<i>Salix drummondiana</i>	Drummond's willow	shrub	FACW	live stakes; D 40	20	3 ft; 4 ft
<i>Salix geeyeriana</i>	Geyer's willow	shrub	FACW	live stakes; D 40	20	3 ft; 4 ft
<i>Salix melanopsis</i>	dusky willow	shrub	OBL	live stakes; D 40	20	3 ft; 4 ft
<i>Senecio triangularis</i>	arrowleaf ragwort	forb	FACW	10 ci	5	3 ft
<b>Total</b>					<b>100</b>	

ZONE 4 CONTAINER PLANTING SCHEDULE						
SCIENTIFIC NAME	COMMON NAME	PLANT TYPE	WETLAND INDICATOR STATUS	PLANT SIZE / PROPAGULE TYPE	PERCENT OF MIX, %	PLANTING SPACING (ON CENTER), FT
<i>Alnus incana ssp. tenuifolia</i>	thinleaf alder	shrub/tree	FACW	D 40	20	6 ft
<i>Calamagrostis canadensis var. canadensis</i>	bluejoint reedgrass	graminoid	FACW	10 ci	10	3 ft
<i>Cornus sericea (C. alba)</i>	redosier dogwood	shrub	FACW	D 40	15	6 ft
<i>Geum macrophyllum var. perincisum</i>	largeleaf avens	forb	FAC	10 ci	10	3 ft
<i>Lonicera involucrata var. involucrata</i>	twinberry honeysuckle	shrub	FAC	D 40	15	6 ft
<i>Picea engelmannii var. engelmannii</i>	Engelmann's spruce	tree	FAC	D 40	10	8 ft
<i>Ribes lacustre</i>	prickly currant	shrub	FAC	D 40	10	6 ft
<i>Salix drummondiana</i>	Drummond's willow	shrub	FACW	live stakes; D 40	5	3 ft; 4 ft
<i>Salix lasiandra</i>	Pacific willow	shrub	FACW	live stakes; D 40	5	3 ft; 4 ft
<b>Total</b>					<b>100</b>	

ZONE 3 SEEDING SCHEDULE						
SCIENTIFIC NAME	COMMON NAME	PLANT TYPE	WETLAND INDICATOR STATUS	PERCENT OF MIX, %	PLS, SEEDS/LB	PLS, LB/ACRE
<i>Calamagrostis canadensis var. canadensis</i>	bluejoint reedgrass	graminoid	FACW	25	3,800,000	0.52
<i>Deschampsia elongata</i>	slender hairgrass	graminoid	FACW	35	2,300,000	1.19
<i>Glyceria striata (G. elata)3</i>	fowl mangrass (tall managrass)	graminoid	OBL (FACW)	20	1,600,000	0.98
<i>Juncus arcticus ssp. littoralis (J. balticus)</i>	mountain rush	graminoid	FACW	5	7,500,000	0.05
<i>Juncus ensifolius</i>	swordleaf rush	graminoid	FACW	5	24,000,000	0.02
<i>Mimulus lewisii</i>	purple monkeyflower	forb	FACW	5	20,636,363	0.02
<i>Senecio triangularis</i>	arrowleaf ragwort	forb	FACW	5	500,000	0.78
<b>Total</b>				<b>100</b>		<b>3.56</b>

ZONE 4 SEEDING SCHEDULE						
SCIENTIFIC NAME	COMMON NAME	PLANT TYPE	WETLAND INDICATOR STATUS	PERCENT OF MIX, %	PLS, SEEDS/LB	PLS, LB/ACRE
<i>Calamagrostis canadensis var. canadensis</i>	bluejoint reedgrass	graminoid	FACW	30	3,800,000	0.55
<i>Deschampsia elongata</i>	slender hairgrass	graminoid	FACW	20	2,300,000	0.61
<i>Elymus trachycaulus ssp. trachycaulus</i>	slender wheatgrass	graminoid	FAC	40	160,000	17.44
<i>Potentilla gracilis</i>	slender cinquefoil	forb	FAC	10	1,700,000	0.42
<b>Total</b>				<b>100</b>		<b>19.02</b>

PLANTING ZONE NOTES:  
 1. SEE SEE DRAWING D-1 - TYPICAL DETAILS - 1 FOR PLANTING AND SEEDING ZONES ASSOCIATED WITH BANK TREATMENT TYPES.



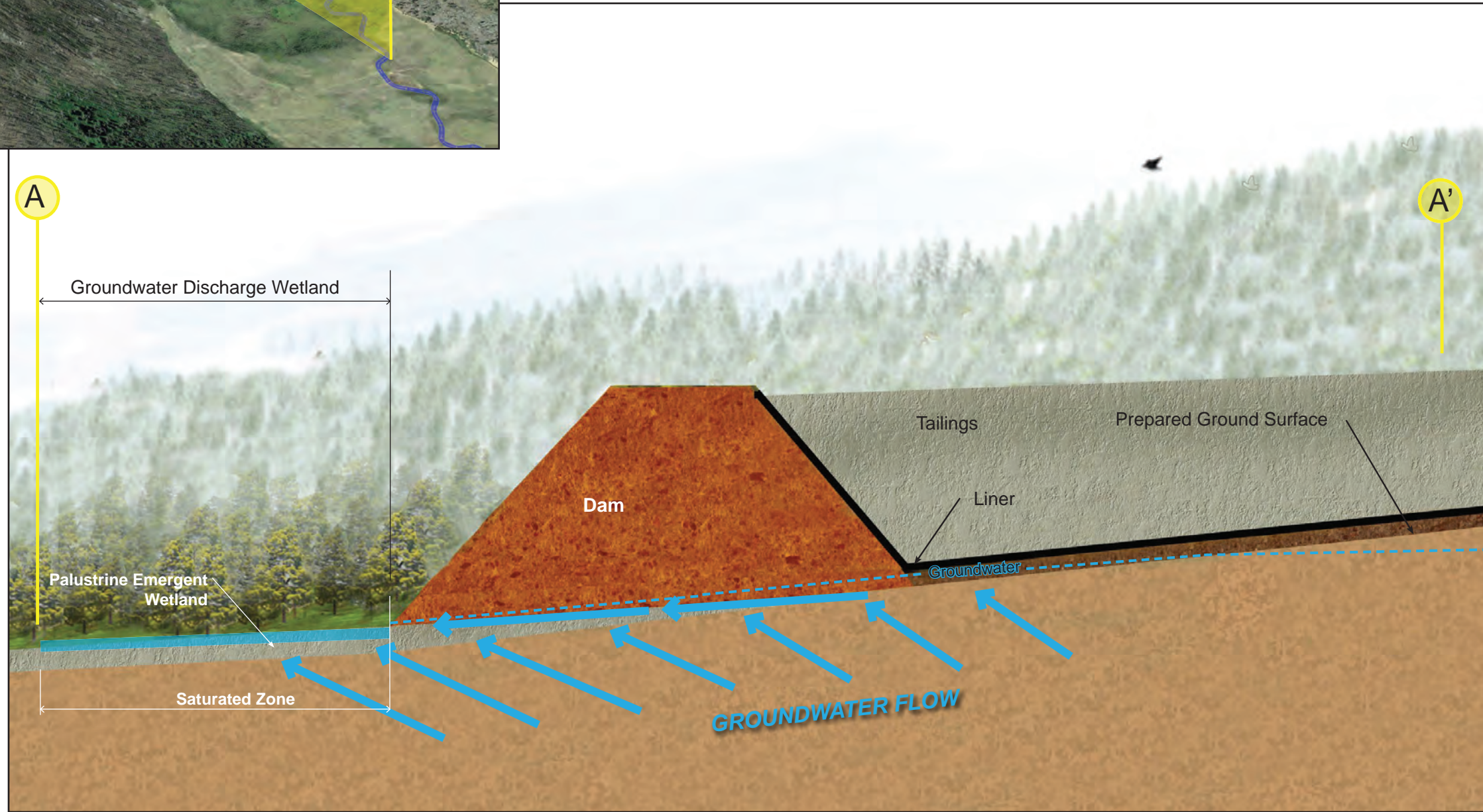
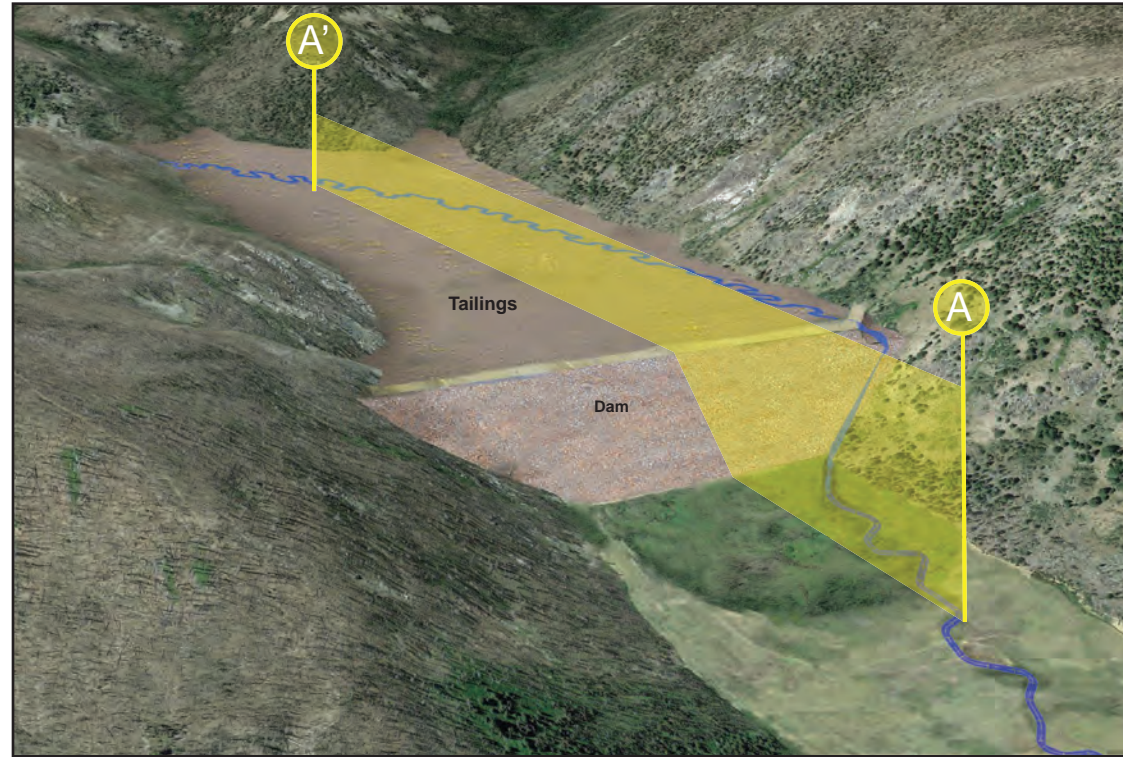
**Stibnite Gold Project**  
 Stream and Wetland Restoration Concept Design  
 Typical Details  
 Valley County, Idaho

Draft

Date: Feb. 2019  
 Designed: JF, JY, MP  
 Drawn: JF, JY, MP  
 Checked: RR  
 Approved: --

Drawing Name  
 Typical Details  
 - 20

Drawing No.  
 D-20



**GROUNDWATER DISCHARGE WETLAND A-A'**

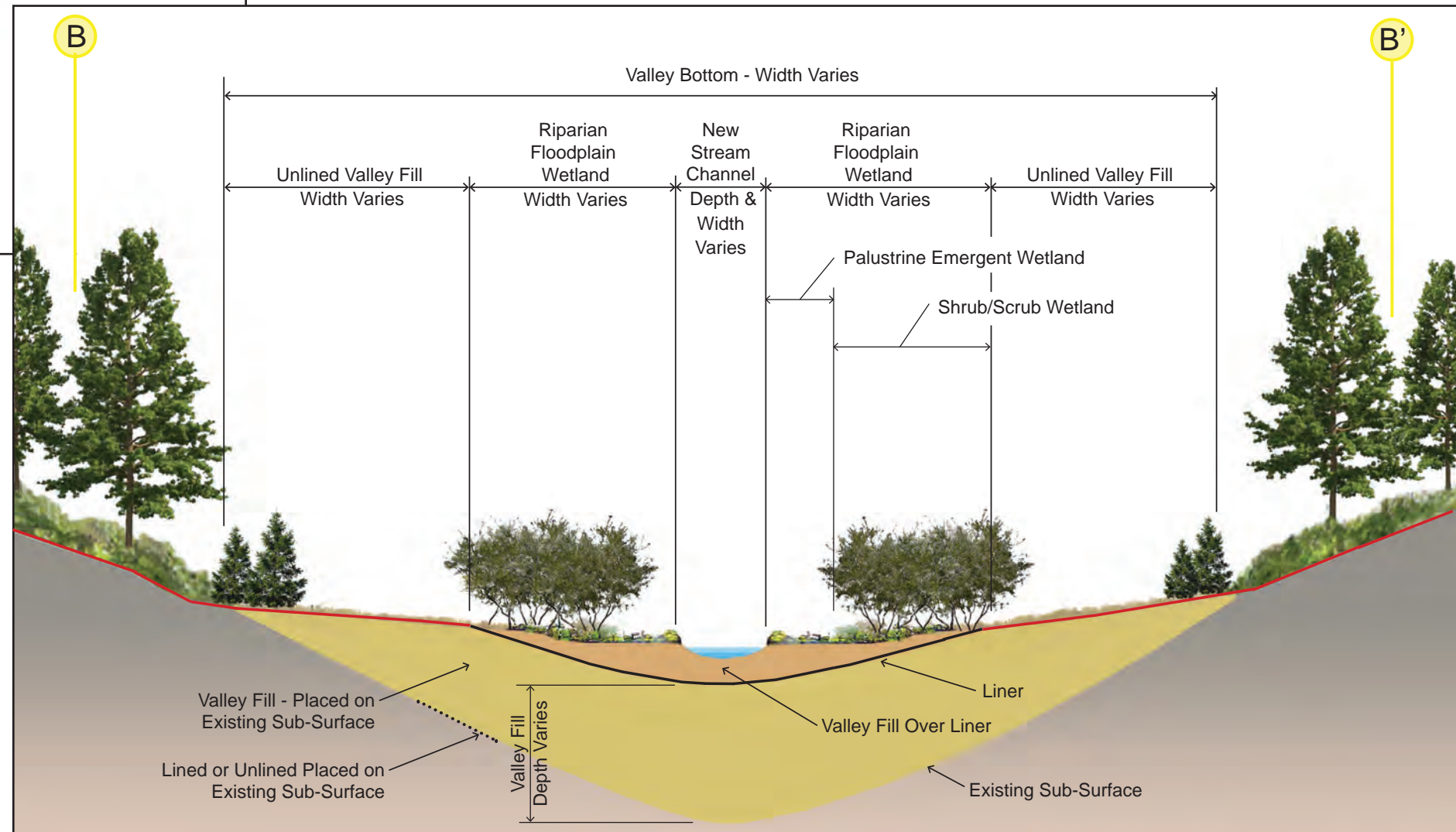
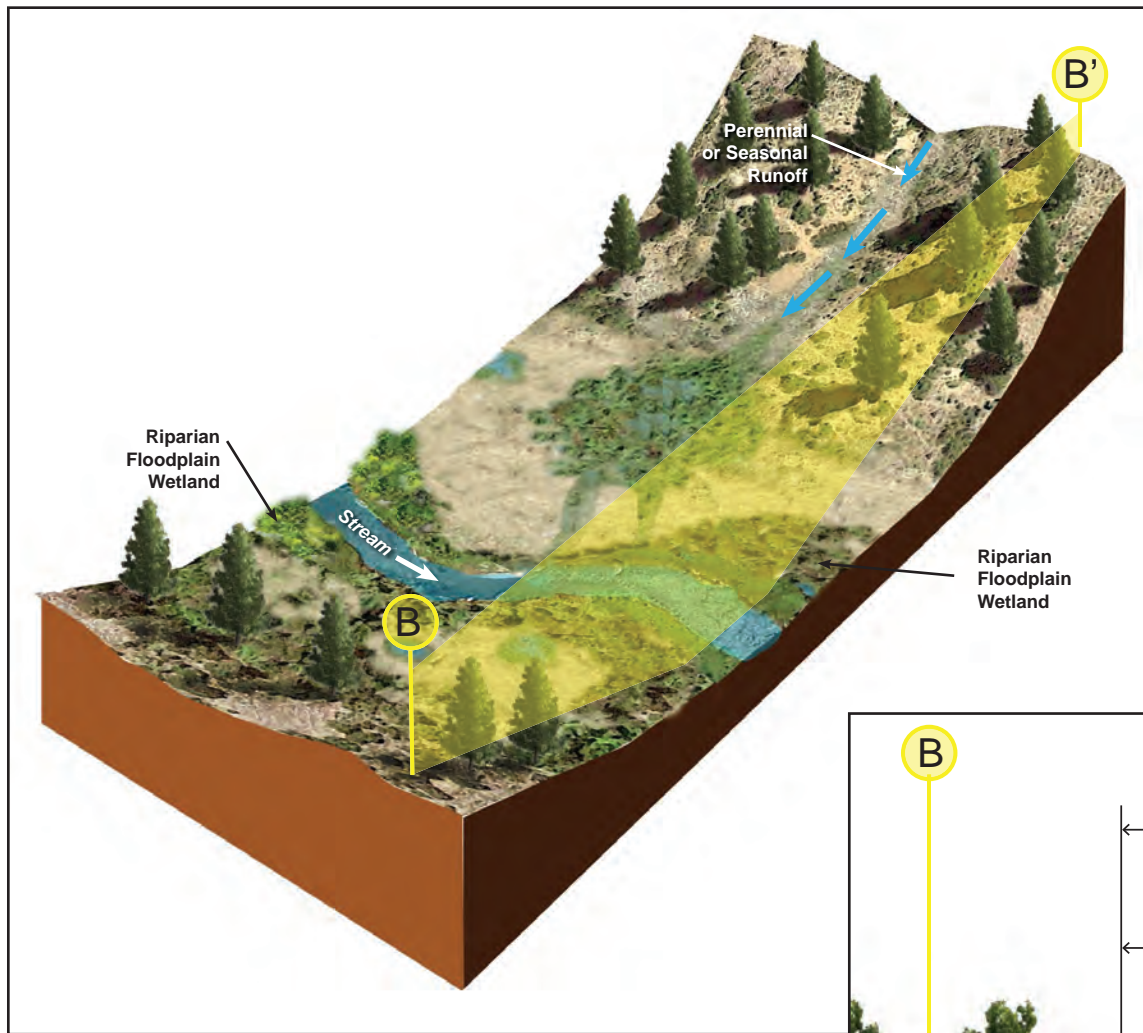
NOT TO SCALE

Draft

Date: Feb. 2019  
 Designed: LC  
 Drawn: JHD  
 Checked: LC  
 Approved: --

Drawing Name  
 Wetland  
 Detail Sheet - 1

Drawing No.  
 D-21



**RIPARIAN FLOOD PLAIN WETLAND B-B'**

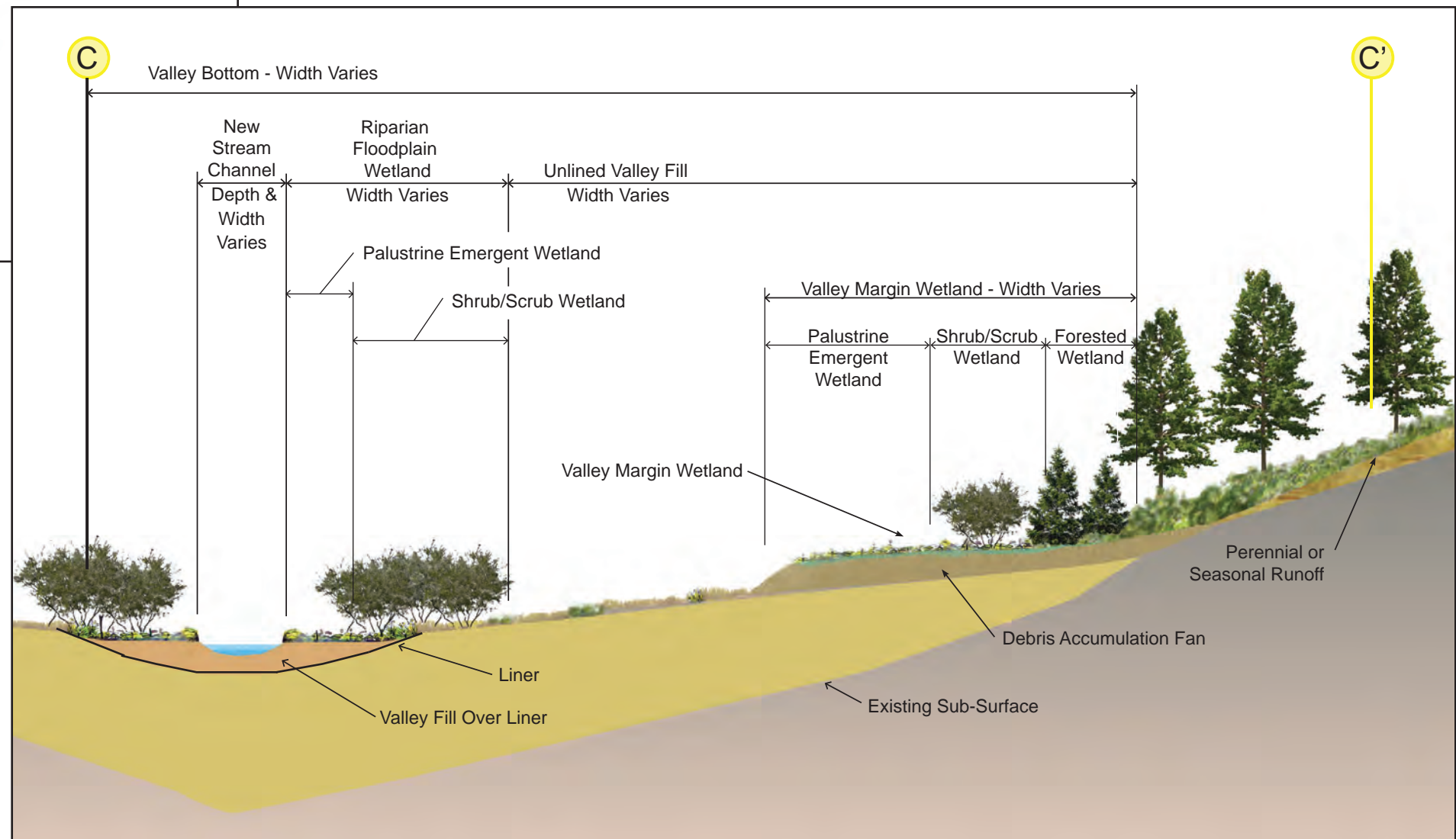
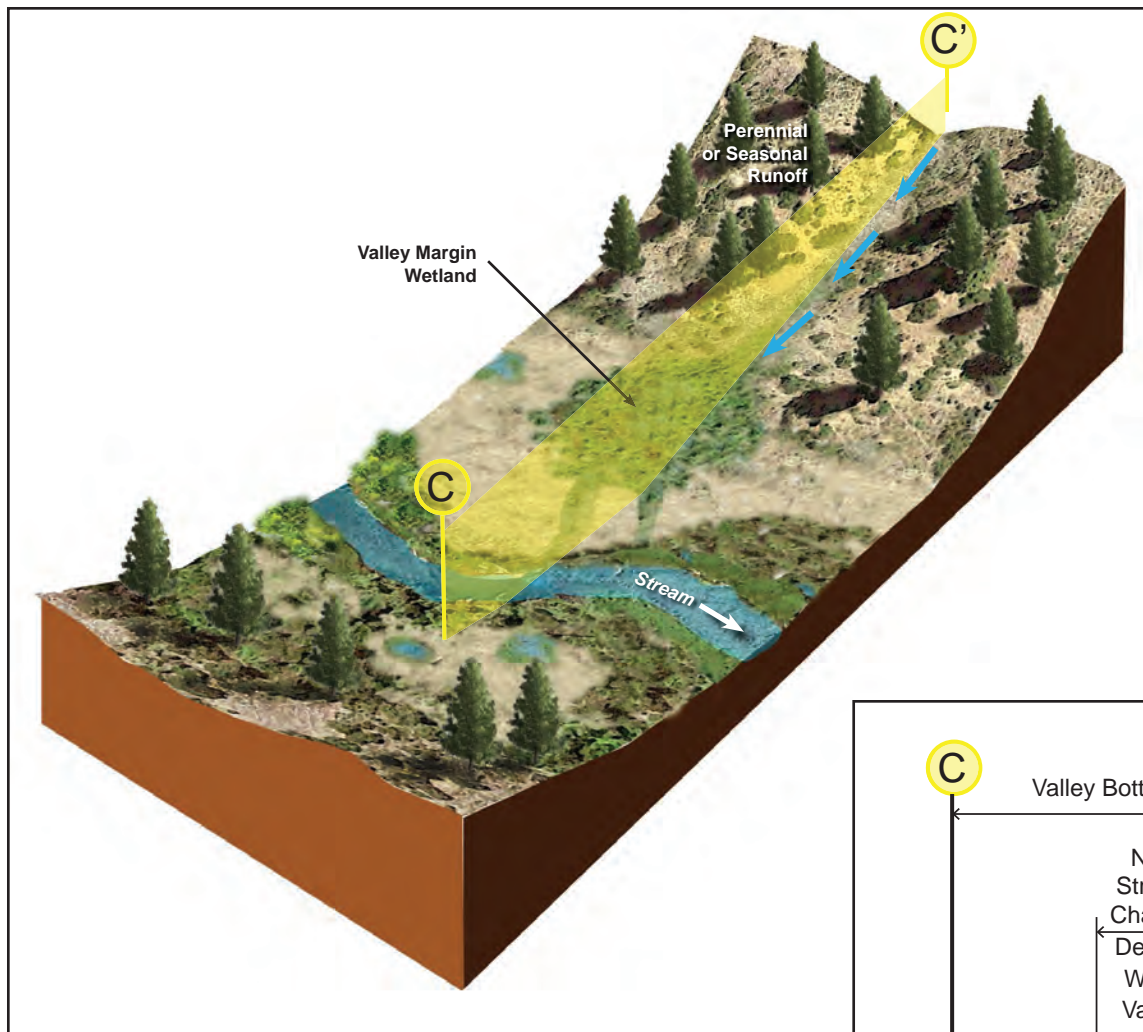
NOT TO SCALE

Draft

Date: Feb. 2019  
 Designed: LC  
 Drawn: JHD  
 Checked: LC  
 Approved: ---

Drawing Name  
 Wetland  
 Detail Sheet - 2

Drawing No.  
 D-22



**VALLEY MARGIN WETLAND C-C'**

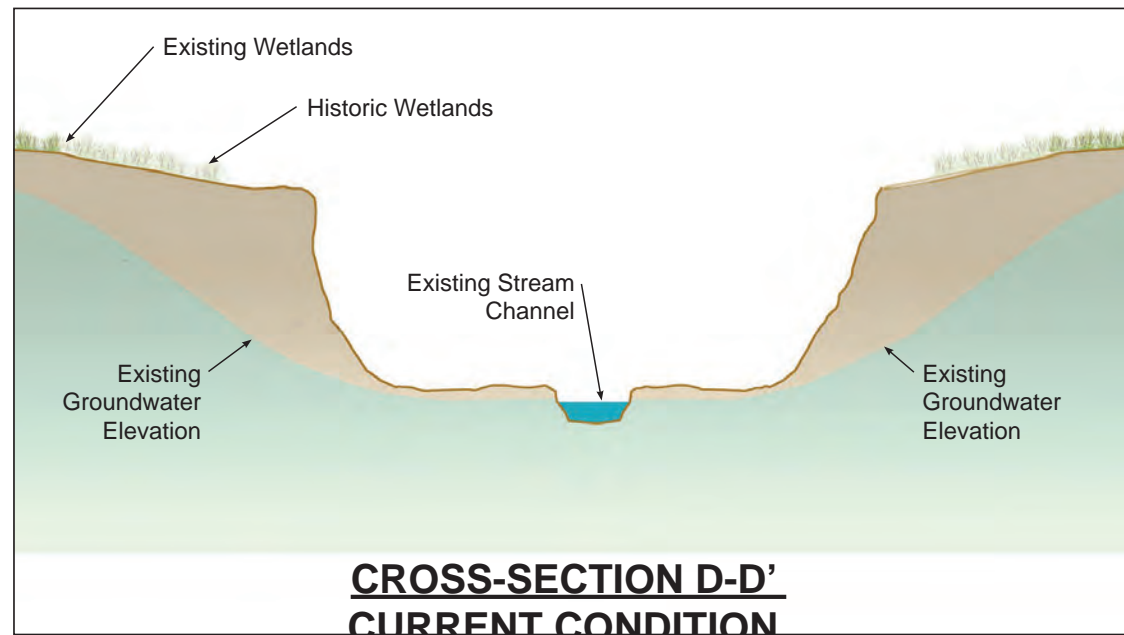
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Draft

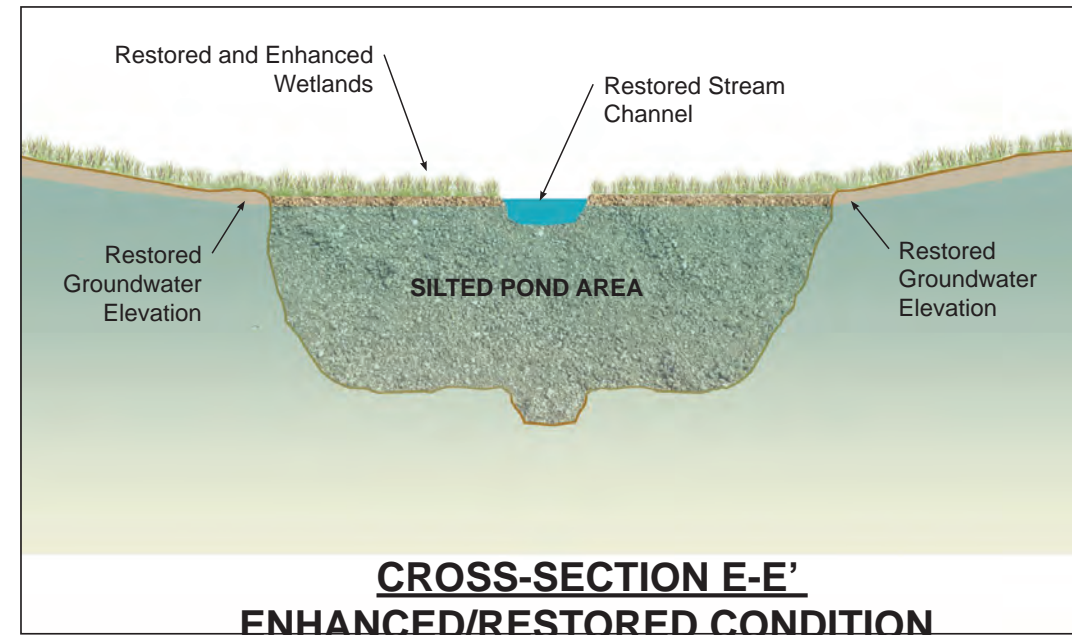
Date: Feb. 2019  
Designed: LC  
Drawn: JHD  
Checked: LC  
Approved:

Drawing Name  
Wetland  
Detail Sheet - 3

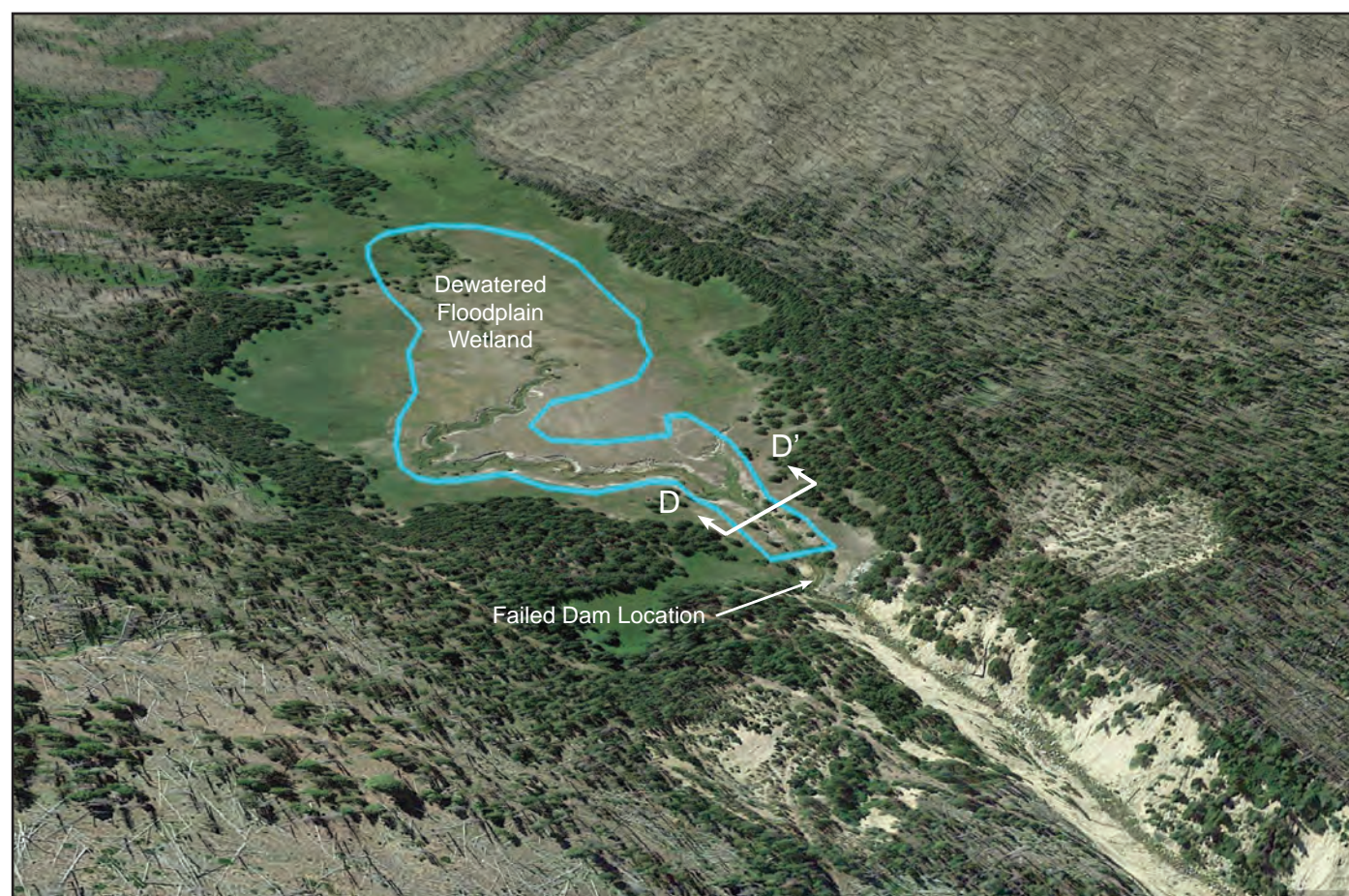
Drawing No.  
D-23



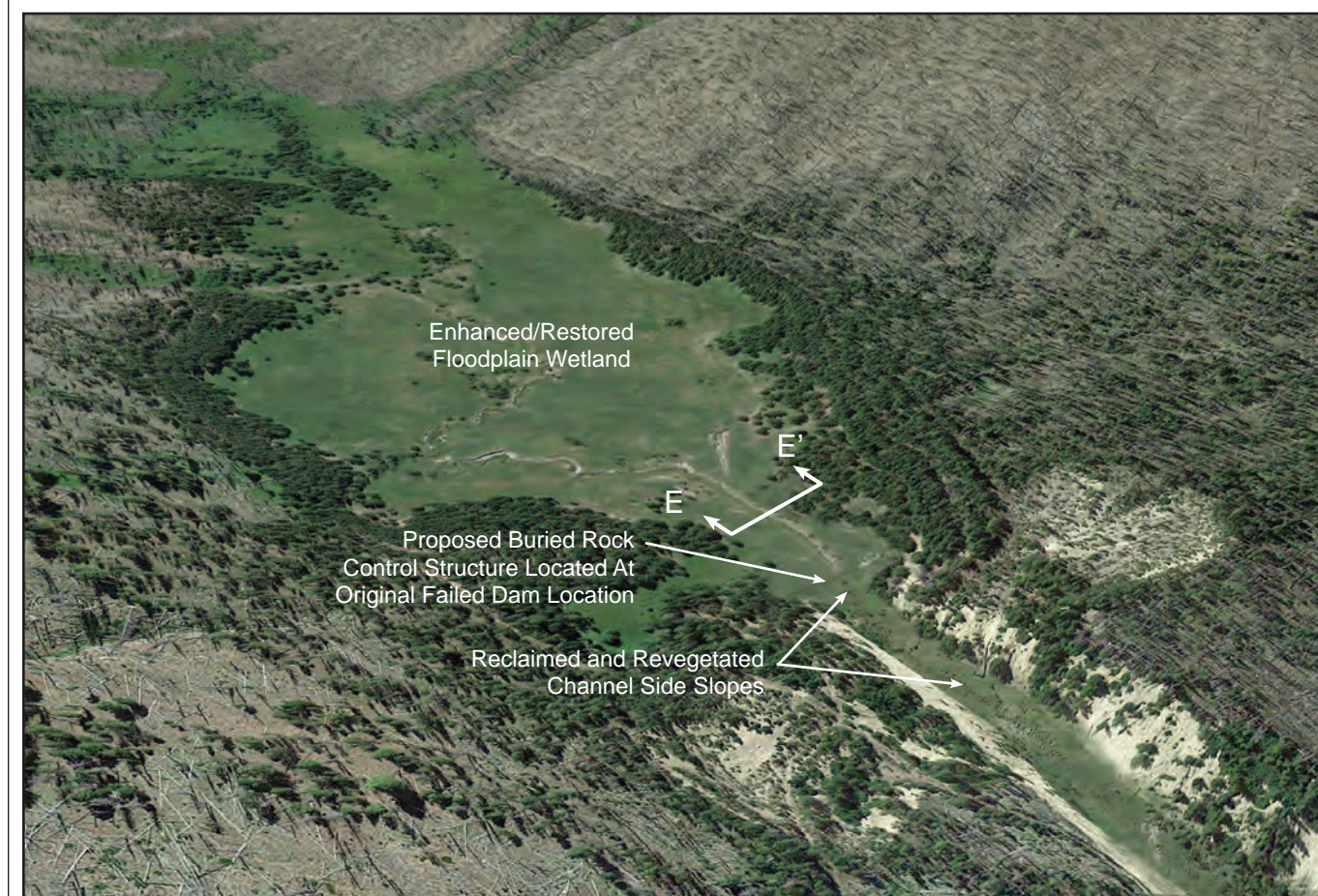
**CROSS-SECTION D-D'**  
**CURRENT CONDITION**



**CROSS-SECTION E-E'**  
**ENHANCED/RESTORED CONDITION**



**BLOWOUT CREEK - CURRENT CONDITION**



**BLOWOUT CREEK - ENHANCED/ RESTORED CONDITION**

Draft

Date: Feb. 2019  
Designed: LC  
Drawn: JHD  
Checked: LC  
Approved: —

Drawing Name  
Wetland  
Detail Sheet - 4

Drawing No.  
D-24

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**APPENDIX F  
REFERENCE REACH  
RIPARIAN VEGETATION  
DATA**

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Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
<b>Meadow Creek, Reach ID 21, Lat 44.889488, Long -115.356419</b>								
1	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 11, 2017
1	<i>Carex lenticularis var. lipocarpa</i>	<i>Carex lenticularis var. pallida</i> ; <i>Carex kelloggii</i>	lakeshore sedge; Kellog's sedge	grasslike	OBL	G5T5, SNR	yes	Sept. 11, 2017
1	<i>Carex scopulorum var. prionophylla</i>	<i>Carex prionophylla</i> ; <i>Carex miserabilis</i>	firethread sedge; sawleaf sedge	grasslike	OBL	G5T3?, SNR	yes	Sept. 11, 2017
1	<i>Carex utriculata</i>	<i>Carex inflata var. utriculata</i> ; <i>Carex rostrata var. utriculata</i>	beaked sedge	grasslike	OBL	G5, SNR	yes	Sept. 11, 2017
1	<i>Equisetum fluviatile</i>		river horsetail	pteridophyte	FAC	G5, SNR	yes	Sept. 11, 2017
1	<i>Juncus drummondii</i>		Drummond's rush	grasslike	FACW	G5, SNR	yes	Sept. 11, 2017
1	<i>Juncus ensifolius var. ensifolius</i>	<i>Juncus ensifolius</i>	three-stamened rush; sword-leaf rush	grasslike	FACW	G5, SNR	yes	Sept. 11, 2017
2	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 11, 2017
2	<i>Carex canescens var. canescens</i>	<i>Carex canescens</i> ; <i>Carex curta</i>	silvery sedge; hoary sedge	grasslike	OBL	G5T5, SNR	yes	Sept. 11, 2017
2	<i>Carex illota</i>		sheep sedge; small-head sedge	grasslike	FACW	G5, SNR	yes	Sept. 11, 2017
2	<i>Carex neurophora</i>		alpine-nerved sedge	grasslike	FACW	G4, SNR	yes	Sept. 11, 2017
2	<i>Deschampsia elongata</i>	<i>Aira elongata</i>	slender hairgrass	grass	FACW	G5, SNR	yes	Sept. 11, 2017
2	<i>Geum macrophyllum var. perincisum</i>	<i>Geum macrophyllum ssp. perincisum</i>	largeleaf avens	herbaceous dicot	FAC	G5T5, SNR	yes	Sept. 11, 2017
2	<i>Glyceria elata</i>	<i>Glyceria striata</i>	tall managrass	grass	FACW	G5, SNR	yes	Sept. 11, 2017
2	<i>Juncus arcticus ssp. littoralis</i>	<i>Juncus balticus</i> ; <i>Juncus balticus ssp. littoralis</i>	mountain rush; shoreline rush	grasslike	FACW	G5T5, SNR	yes	Sept. 11, 2017
2	<i>Juncus ensifolius var. ensifolius</i>	<i>Juncus ensifolius</i>	three-stamened rush; sword-leaf rush	grasslike	FACW	G5, SNR	yes	Sept. 11, 2017
2	<i>Mimulus cusickii</i>	<i>Eunanus cusickii</i> ; <i>Diplacus cusickii</i>	Cusick's monkeyflower	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 11, 2017
2	<i>Salix drummondiana</i>		Drummond's willow	shrub	FACW	G5, SNR	yes	Sept. 11, 2017
2	<i>Salix eastwoodiae</i>		mountain willow	shrub	FACW	G5, SNR	yes	Sept. 11, 2017
2	<i>Salix geyeriana</i>		Geyer's willow	shrub	FACW	G5, SNR	yes	Sept. 11, 2017
2	<i>Solidago multiradiata</i>		Rocky Mountain goldenrod; alpine goldenrod	herbaceous dicot	FACU	G5, SNR	yes	Sept. 11, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
3	<i>Alnus incana ssp. occidentalis</i>	<i>Alnus incana</i> ; <i>Alnus incana ssp. tenuifolia</i>	thinleaf alder, speckled alder	shrub	FACW	G5, SNR	yes	Sept. 11, 2017
3	<i>Anaphalis margaritacea</i>	<i>Anaphalis margaritacea var. angustior</i>	pearly everlasting	herbaceous dicot	FACU	G5, SNR	yes	Sept. 11, 2017
3	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 11, 2017
3	<i>Calamagrostis canadensis var. canadensis</i>	<i>Calamagrostis canadensis</i> ; <i>Calamagrostis canadensis var. robusta</i>	bluejoint reedgrass	grass	FACW	G5T5, SNR	yes	Sept. 11, 2017
3	<i>Cirsium arvense</i>	<i>Breca arvensis</i>	Canada thistle	herbaceous dicot	FAC	G5, SNA (noxious)	no (noxious)	Sept. 11, 2017
3	<i>Delphinium x occidentale</i>	<i>Delphinium cucullatum</i>	western larkspur; duncecap larkspur	herbaceous dicot	FACU	GNA, SNA	yes	Sept. 11, 2017
3	<i>Deschampsia elongata</i>	<i>Aira elongata</i>	slender hairgrass	grass	FACW	G5, SNR	yes	Sept. 11, 2017
3	<i>Equisetum hyemale var. affine</i>	<i>Equisetum hyemale ssp. affine</i>	scouring-rush horsetail	pteridophyte	FACW	G5T5, SNR	yes	Sept. 11, 2017
3	<i>Erigeron speciosus</i>		aspen fleabane	herbaceous dicot	not listed	G5, SNR	yes	Sept. 11, 2017
3	<i>Fragaria virginiana</i>		wild strawberry, Virginia strawberry	herbaceous dicot	FACU	G5, SNR	yes	Sept. 11, 2017
3	<i>Juncus arcticus ssp. littoralis</i>	<i>Juncus balticus</i> ; <i>Juncus balticus ssp. littoralis</i>	mountain rush; shoreline rush	grasslike	FACW	G5T5, SNR	yes	Sept. 11, 2017
3	<i>Mimulus cusickii</i>	<i>Eunanus cusickii</i> ; <i>Diplacus cusickii</i>	Cusick's monkeyflower	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 11, 2017
3	<i>Picea engelmannii var. engelmannii</i>		Engelmann spruce	tree	FAC	G5, SNR	yes	Sept. 11, 2017
3	<i>Salix eastwoodiae</i>		mountain willow	shrub	FACW	G5, SNR	yes	Sept. 11, 2017
3	<i>Salix geyeriana</i>		Geyer's willow	shrub	FACW	G5, SNR	yes	Sept. 11, 2017
3	<i>Trifolium hybridum</i>	<i>Trifolium elegans</i>	alsike clover	herbaceous dicot	FAC	GNR, SNA	no	Sept. 11, 2017
4	<i>Achillea millefolium</i>		common yarrow	herbaceous dicot	FACU	G5, SNR	debate	Sept. 11, 2017
4	<i>Anaphalis margaritacea</i>	<i>Anaphalis margaritacea var. angustior</i>	pearly everlasting	herbaceous dicot	FACU	G5, SNR	yes	Sept. 11, 2017
4	<i>Antennaria rosea</i>		rosy pussytoes	herbaceous dicot	not listed	G5, SNR	yes	Sept. 11, 2017
4	<i>Bromus carinatus</i>	<i>Bromus carinatus var. californicus</i> ; <i>Bromus carinatus var. carinatus</i>	California brome	grass	not listed	G5, SNR	yes	Sept. 11, 2017
4	<i>Chamerion angustifolium var. canescens</i>	<i>Chamerion angustifolium ssp. circumvagum</i> ; <i>Epilobium angustifolium ssp. circumvagum</i>	fireweed	herbaceous dicot	FACU	G5, SNR	yes	Sept. 11, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
4	<i>Elymus trachycaulus ssp. trachycaulis</i>	<i>Agropyron brevifolium</i> ; <i>Agropyron trachycaulum</i>	slender wheatgrass; slender wildrye	grass	FAC	G5T5, SNR	yes	Sept. 11, 2017
4	<i>Festuca idahoensis</i>	<i>Festuca idahoensis ssp. idahoensis</i>	Idaho fescue	grass	FACU	G5, SNR	yes	Sept. 11, 2017
4	<i>Fragaria virginiana</i>		wild strawberry; Virginia strawberry	herbaceous dicot	FACU	G5, SNR	yes	Sept. 11, 2017
4	<i>Luzula parviflora</i>	<i>Juncooides parviflorum</i>	small-flowered woodrush	grasslike	FAC	G5, SNR	yes	Sept. 11, 2017
4	<i>Penstemon procerus var. procerus</i>	<i>Penstemon confertus ssp. procerus</i>	small-flowered penstemon; pincushion beardstongue	herbaceous dicot	FAC	G5T5, SNR	yes	Sept. 11, 2017
4	<i>Pinus contorta ssp. latifolia</i>	<i>Pinus contorta var. latifolia</i>	lodgepole pine	tree	FAC	G5T5, SNR	yes	Sept. 11, 2017
4	<i>Poa wheeleri</i>	<i>Poa nervosa var. wheeleri</i>	Wheeler's bluegrass	grass	FACU	G5?, SNR	yes	Sept. 11, 2017
4	<i>Populus tremuloides</i>		quaking aspen	tree	FACU	G5, SNR	yes	Sept. 11, 2017
4	<i>Pseudotsuga menziesii</i>		Douglas fir	tree	FACU	G5, SNR	yes	Sept. 11, 2017
4	<i>Ribes hudsonianum var. petiolare</i>		northern black currant; western black currant	shrub	FACW	G5T5, SNR	yes	Sept. 11, 2017
4	<i>Trifolium hybridum</i>	<i>Trifolium elegans</i>	alsike clover	herbaceous dicot	FAC	GNR, SNA	no	Sept. 11, 2017

notes: Meadow Creek, Reach ID 21, Lat 44.889488, Long -115.356419

Elevation 6,611 ft amsl, Gradient 1.00% (Rio, 2018)

Zone 1: 10% moss, 10% pteridophyte, 10% forb, 70% graminoid

Zone 2: 50% woody, 20% forb, 30% graminoid

Zone 3: 65% woody, 15% forb, 20% graminoid

Zone 4: 70% woody, 15% forb, 15% graminoid

noxious spp: *Cirsium arvense* - Canada thistle

general: Well vegetated, multi-braded channel with large number of supporting wetland channels and micro-topography, with high water-table. Evidence of past fire, including large stumps from *Picea engelmannii var. engelmannii* - Engelmann spruce.

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
<b>Lower Meadow Creek, Reach ID 22, Lat 44.896169, Long -115.336511</b>								
1	<i>Alopecurus arundinaceus</i>	<i>Alopecurus ventricosus</i>	meadow foxtail; creeping foxtail	grass	FAC	GNR, no state rank	no	Sept. 12, 2017
1	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 12, 2017
1	<i>Carex lenticularis var. lipocarpa</i>	<i>Carex lenticularis var. pallida;</i> <i>Carex kelloggii</i>	lakeshore sedge; Kellog's sedge	grasslike	OBL	G5T5, SNR	yes	Sept. 12, 2017
1	<i>Carex scopulorum var. prionophylla</i>	<i>Carex prionophylla;</i> <i>Carex miserabilis</i>	firethread sedge; sawleaf sedge	grasslike	OBL	G5T3?, SNR	yes	Sept. 12, 2017
1	<i>Carex utriculata</i>	<i>Carex inflata var. utriculata;</i> <i>Carex rostrata var. utriculata</i>	beaked sedge	grasslike	OBL	G5, SNR	yes	Sept. 12, 2017
1	<i>Equisetum fluviatile</i>		river horsetail	pteridophyte	FAC	G5, SNR	yes	Sept. 12, 2017
1	<i>Glyceria elata</i>	<i>Glyceria striata</i>	tall managrass	grass	FACW	G5, SNR	yes	Sept. 12, 2017
1	<i>Juncus drummondii</i>		Drummond's rush	grasslike	FACW	G5, SNR	yes	Sept. 12, 2017
1	<i>Juncus ensifolius var. ensifolius</i>	<i>Juncus ensifolius</i>	three-stamened rush; sword-leaf rush	grasslike	FACW	G5, SNR	yes	Sept. 12, 2017
2	<i>Alopecurus arundinaceus</i>	<i>Alopecurus ventricosus</i>	meadow foxtail; creeping foxtail	grass	FAC	GNR, no state rank	no	Sept. 12, 2017
2	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 12, 2017
2	<i>Carex canescens var. canescens</i>	<i>Carex canescens;</i> <i>Carex curta</i>	silvery sedge; hoary sedge	grasslike	OBL	G5T5, SNR	yes	Sept. 12, 2017
2	<i>Carex illota</i>		sheep sedge; small-head sedge	grasslike	FACW	G5, SNR	yes	Sept. 12, 2017
2	<i>Carex neurophora</i>		alpine-nerved sedge	grasslike	OBL	G4, SNR	yes	Sept. 12, 2017
2	<i>Deschampsia elongata</i>	<i>Aira elongata</i>	slender hairgrass	grass	FACW	G5, SNR	yes	Sept. 12, 2017
2	<i>Geum macrophyllum var. perincisum</i>	<i>Geum macrophyllum ssp. perincisum</i>	largeleaf avens	herbaceous dicot	FAC	G5T5, SNR	yes	Sept. 12, 2017
2	<i>Glyceria elata</i>	<i>Glyceria striata</i>	tall managrass	grass	FACW	G5, SNR	yes	Sept. 12, 2017
2	<i>Juncus arcticus ssp. littoralis</i>	<i>Juncus balticus;</i> <i>Juncus balticus ssp. littoralis</i>	mountain rush; shoreline rush	grasslike	FACW	G5T5, SNR	yes	Sept. 12, 2017
2	<i>Juncus ensifolius var. ensifolius</i>	<i>Juncus ensifolius</i>	three-stamened rush' sword-leaf rush	grasslike	FACW	G5, SNR	yes	Sept. 12, 2017
2	<i>Salix drummondiana</i>		Drummond's willow	shrub	FACW	G5, SNR	yes	Sept. 12, 2017
2	<i>Salix eastwoodiae</i>		mountain willow	shrub	FACW	G5, SNR	yes	Sept. 12, 2017
2	<i>Salix geyeriana</i>		Geyer's willow	shrub	FACW	G5, SNR	yes	Sept. 12, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
2	<i>Solidago multiradiata</i>		Rocky Mountain goldenrod	herbaceous dicot	FACU	G5, SNR	yes	Sept. 12, 2017
3	<i>Alnus incana ssp. occidentalis</i>	<i>Alnus incana</i> ; <i>Alnus incana ssp. tenuifolia</i>	thinleaf alder; speckled alder	shrub	FACW	G5, SNR	yes	Sept. 12, 2017
3	<i>Alopecurus arundinaceus</i>	<i>Alopecurus ventricosus</i>	meadow foxtail; creeping foxtail	grass	FAC	GNR, no state rank	yes	Sept. 12, 2017
3	<i>Betula glandulosa</i>	<i>Betula nana</i>	bog birch; tundra dwarf birch; swamp birch; resin birch	shrub	OBL	G5, SNR	yes	Sept. 12, 2017
3	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 12, 2017
3	<i>Chamerion angustifolium var. canescens</i>	<i>Chamerion angustifolium ssp. circumvagum</i> ; <i>Epilobium angustifolium ssp. circumvagum</i>	fireweed	herbaceous dicot	FACU	G5, SNR	yes	Sept. 12, 2017
3	<i>Cirsium arvense</i>	<i>Breca arvensis</i>	Canada thistle	herbaceous dicot	FAC	G5, SNA (noxious)	no (noxious)	Sept. 12, 2017
3	<i>Cornus sericea</i>	<i>Cornus stolonifera</i>	redosier dogwood	shrub	FACW	G5, SNR	yes	Sept. 12, 2017
3	<i>Deschampsia elongata</i>	<i>Aira elongata</i>	slender hairgrass	grass	FACW	G5, SNR	yes	Sept. 12, 2017
3	<i>Equisetum hyemale var. affine</i>	<i>Equisetum hyemale ssp. affine</i>	scouring-rush horsetail	pteridophyte	FACW	G5T5, SNR	yes	Sept. 12, 2017
3	<i>Erigeron speciosus</i>		aspen fleabane	herbaceous dicot	not listed	G5, SNR	yes	Sept. 12, 2017
3	<i>Juncus arcticus ssp. littoralis</i>	<i>Juncus balticus</i> ; <i>Juncus balticus ssp. littoralis</i>	mountain rush; shoreline rush	grasslike	FACW	G5T5, SNR	yes	Sept. 12, 2017
3	<i>Juncus ensifolius var. ensifolius</i>	<i>Juncus ensifolius</i>	three-stamened rush; sword-leaf rush	grasslike	FACW	G5, SNR	yes	Sept. 12, 2017
3	<i>Mimulus cusickii</i>	<i>Eunanus cusickii</i> ; <i>Diplacus cusickii</i>	Cusick's monkeyflower	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 12, 2017
3	<i>Phleum pratense</i>	<i>Phleum nodosum</i>	European timothy; timothy	grass	FAC	GNR, SNA	no	Sept. 12, 2017
3	<i>Picea engelmannii var. engelmannii</i>		Engelmann spruce	tree	FAC	G5, SNR	yes	Sept. 12, 2017
3	<i>Poa wheeleri</i>	<i>Poa nervosa var. wheeleri</i>	Wheeler's bluegrass	grass	FACU	G5?, SNR	yes	Sept. 12, 2017
3	<i>Rumex acetosella</i>	<i>Acetosella acetosella</i>	sheep sorrel	herbaceous dicot	FACU	GNR, SNA	no	Sept. 12, 2017
3	<i>Salix drummondiana</i>		Drummond's willow	shrub	FACW	G5, SNR	yes	Sept. 12, 2017
3	<i>Salix eastwoodiae</i>		mountain willow	shrub	FACW	G5, SNR	yes	Sept. 12, 2017
3	<i>Salix geyeriana</i>		Geyer's willow	shrub	FACW	G5, SNR	yes	Sept. 12, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
3	<i>Salix melanopsis</i>	<i>Salix exigua ssp. melanopsis</i>	dusky willow	shrub	OBL	G5, SNR	yes	Sept. 12, 2017
3	<i>Trifolium hybridum</i>	<i>Trifolium elegans</i>	alsike clover	herbaceous dicot	FAC	GNR, SNA	no	Sept. 12, 2017
4	<i>Achillea millefolium</i>		common yarrow	herbaceous dicot	FACU	G5, SNR	debate	Sept. 12, 2017
4	<i>Anaphalis margaritacea</i>	<i>Anaphalis margaritacea var. angustior</i>	pearly everlasting	herbaceous dicot	FACU	G5, SNR	yes	Sept. 12, 2017
4	<i>Bromus carinatus</i>	<i>Bromus carinatus var. californicus; Bromus carinatus var. carinatus</i>	California brome	grass	not listed	G5, SNR	yes	Sept. 12, 2017
4	<i>Carex rossii</i>	<i>Carex brevipes</i>	Ross's sedge; short sedge	grasslike	not listed	G5, SNR	yes	Sept. 12, 2017
4	<i>Chamerion angustifolium var. canescens</i>	<i>Chamerion angustifolium ssp. circumvagum; Epilobium angustifolium ssp. circumvagum</i>	fireweed	herbaceous dicot	FACU	G5, SNR	yes	Sept. 12, 2017
4	<i>Elymus elymoides ssp. elymoides</i>	<i>Elymus sitanion; Elymus elymoides var. elymoides; Sitanion hystrix</i>	bottlebrush squirreltail	grass	FACU	G5T5, SNR	yes	Sept. 12, 2017
4	<i>Elymus trachycaulus ssp. trachycaulis</i>	<i>Agropyron brevifolium; Agropyron trachycaulum</i>	slender wheatgrass; slender wildrye	grass	FAC	G5T5, SNR	yes	Sept. 12, 2017
4	<i>Festuca idahoensis</i>	<i>Festuca idahoensis ssp. idahoensis</i>	Idaho fescue	grass	FACU	G5, SNR	yes	Sept. 12, 2017
4	<i>Fragaria virginiana</i>		wild strawberry; Virginia strawberry	herbaceous dicot	FACU	G5, SNR	yes	Sept. 12, 2017
4	<i>Linum lewisii</i>		Lewis flax; prairie flax	herbaceous dicot	not listed	G5, SNR	yes	Sept. 12, 2017
4	<i>Onopordum acanthium</i>		Scotch thistle	herbaceous dicot	not listed	GNR, SNA (noxious)	no (noxious)	Sept. 12, 2017
4	<i>Phacelia heterophylla</i>		varileaf phacelia; scorpionweed	herbaceous dicot	FACU	G4G5, SNR	yes	Sept. 12, 2017
4	<i>Phleum pratense</i>	<i>Phleum nodosum</i>	European timothy; timothy	grass	FAC	GNR, SNA	no	Sept. 12, 2017
4	<i>Pinus contorta ssp. latifolia</i>	<i>Pinus contorta var. latifolia</i>	lodgepole pine	tree	FAC	G5T5, SNR	yes	Sept. 12, 2017
4	<i>Poa wheeleri</i>	<i>Poa nervosa var. wheeleri</i>	Wheeler's bluegrass	grass	FACU	G5?, SNR	yes	Sept. 12, 2017
4	<i>Pseudotsuga menziesii</i>		Douglas fir	tree	FACU	G5, SNR	yes	Sept. 12, 2017
4	<i>Ribes cereum</i>		wax currant; squaw currant	shrub	not listed	G5, SNR	yes	Sept. 12, 2017
4	<i>Ribes hudsonianum var. petiolare</i>		northern black currant; western black currant	shrub	FACW	G5T5, SNR	yes	Sept. 12, 2017
4	<i>Shepherdia canadensis</i>	<i>Elaeagnus canadensis</i>	russet buffaloberry; Canada buffaloberry	shrub	UPL	G5, SNR	yes	Sept. 12, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
4	<i>Thinopyrum inermedium</i>	<i>Agropyron intermedium</i> ; <i>Elytrigia intermedia</i> ; <i>Elymus intermedium</i>	intermediate; pubescent wheatgrass	grass	not listed	GNR, SNA	no	Sept. 12, 2017
4	<i>Trifolium hybridum</i>	<i>Trifolium elegans</i>	alsike clover	herbaceous dicot	FAC	GNR, SNA	no	Sept. 12, 2017
4	<i>Vicia americana</i>		American vetch; American purple vetch	herbaceous dicot	FAC	G5, SNR	yes	Sept. 12, 2017
5	<i>Alopecurus arundinaceus</i>	<i>Alopecurus ventricosus</i>	meadow foxtail; creeping foxtail	grass	FAC	GNR, no state rank	no	Sept. 12, 2017
5	<i>Carex canescens var. canescens</i>	<i>Carex canescens</i> ; <i>Carex curta</i>	silvery sedge; hoary sedge	grasslike	OBL	G5T5, SNR	yes	Sept. 12, 2017
5	<i>Carex illota</i>		sheep sedge; small-head sedge	grasslike	FACW	G5, SNR	yes	Sept. 12, 2017
5	<i>Carex neurophora</i>		alpine-nerved sedge	grasslike	OBL	G4, SNR	yes	Sept. 12, 2017
5	<i>Carex scopulorum var. prionophylla</i>	<i>Carex prionophylla</i> ; <i>Carex miserabilis</i>	firethread sedge; sawleaf sedge	grasslike	OBL	G5T3?, SNR	yes	Sept. 12, 2017
5	<i>Carex utriculata</i>	<i>Carex inflata var. utriculata</i> ; <i>Carex rostrata var. utriculata</i>	beaked sedge	grasslike	OBL	G5, SNR	yes	Sept. 12, 2017
5	<i>Equisetum hyemale var. affine</i>	<i>Equisetum hyemale ssp. affine</i>	scouring-rush horsetail	pteridophyte	FACW	G5T5, SNR	yes	Sept. 12, 2017
5	<i>Equisetum fluviatile</i>		river horsetail	herbaceous dicot	FAC	G5, SNR	yes	Sept. 12, 2017
5	<i>Erigeron speciosus</i>		aspen fleabane	herbaceous dicot	not listed	G5, SNR	yes	Sept. 12, 2017
5	<i>Juncus arcticus ssp. littoralis</i>	<i>Juncus balticus</i> ; <i>Juncus balticus ssp. littoralis</i>	mountain rush; shoreline rush	grasslike	FACW	G5T5	yes	Sept. 12, 2017
5	<i>Juncus drummondii</i>		Drummond's rush	grasslike	FACW	G5, SNR	yes	Sept. 12, 2017
5	<i>Juncus ensifolius var. ensifolius</i>	<i>Juncus ensifolius</i>	three-stamened rush; sword-leaf rush	grasslike	FACW	G5, SNR	yes	Sept. 12, 2017
5	<i>Typha angustifolia</i>		narrowleaf cattail	grasslike	OBL	G5, SNR	debate (invasive)	Sept. 12, 2017

**notes:** Lower Meadow Creek, Reach ID 22, Lat 44.896169, Long -115.336511

**Elevation 6,544 ft amsl, Gradient 0.40% (Rio, 2018)**

**Zone 1:** 25% moss, 15% forb, 60% graminoid

**Zone 2:** 10% moss, 35% woody, 15% forb, 40% graminoid

**Zone 3:** 10% moss, 20% woody, 40% forb, 30% graminoid

**Zone 4:** 60% woody, 20% forb, 20% graminoid

**Zone 5:** 60% graminoid, 40% forb (largely **Equisetum** - horsetail ssp.)

**noxious spp:** *Cirsium arvense* - Canada thistle, *Onopordum acanthium* - scotch thistle, *Typha angustifolia* - narrowleaf cattail

**general:** Lower Meadow Creek was previously restored, with evidence of erosion control blanket clearly visible on lifts. Good *Salix* - willow, *Alnus* - alder community present. Potentially over-designed with too long of runs between riffles.

Due to the influence of Blowout Creek, Lower Meadow is moving a high degree of sediment load.

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
<b>Upper East South Fork, Reach ID 13, Lat 44.884848, Long -115.286474</b>								
1	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 12, 2017
1	<i>Equisetum fluviatile</i>		river horsetail	pteridophyte	FAC	G5, SNR	yes	Sept. 12, 2017
1	<i>Glyceria elata</i>	<i>Glyceria striata</i>	tall managrass	grass	FACW	G5, SNR	yes	Sept. 12, 2017
1	<i>Mimulus cusickii</i>	<i>Eunanus cusickii</i> ; <i>Diplacus cusickii</i>	Cusick's monkeyflower	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 12, 2017
1	<i>Pedicularis bracteosa ssp. siifolia</i>	<i>Pedicularis bracteosa var. siifolia</i>	yellow lousewort	herbaceous dicot	not listed	G5T1T3, SNR	yes	Sept. 12, 2017
2	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 12, 2017
2	<i>Carex illota</i>		sheep sedge; small-head sedge	grasslike	FACW	G5, SNR	yes	Sept. 12, 2017
2	<i>Carex neurophora</i>		alpine-nerved sedge	grasslike	FACW	G4, SNR	yes	Sept. 12, 2017
2	<i>Equisetum fluviatile</i>		river horsetail	pteridophyte	FAC	G5, SNR	yes	Sept. 12, 2017
2	<i>Glyceria elata</i>	<i>Glyceria striata</i>	tall managrass	grass	FACW	G5, SNR	yes	Sept. 12, 2017
2	<i>Heracleum sphondylium</i>	<i>Heracleum maximum</i>	cow parsnip; American cow parsnip	herbaceous dicot	FAC	G5, SNR	yes	Sept. 12, 2017
2	<i>Osmorhiza occidentalis</i>		mountain sweet-cecily; western sweet-cecily; western sweet-root	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 12, 2017
2	<i>Pedicularis bracteosa ssp. siifolia</i>	<i>Pedicularis bracteosa var. siifolia</i>	yellow lousewort	herbaceous dicot	not listed	G5T1T3, SNR	yes	Sept. 12, 2017
2	<i>Platanthera dilatata</i>	<i>Habenaria dilatata</i> ; <i>Piperia dilatata</i>	tall bog orchid; leafy white orchid	herbaceous monocot	FACW	G5, SNR	yes	Sept. 12, 2017
2	<i>Pyrola asarifolia var. asarifolia</i>	<i>Pyrola asarifolia ssp. asarifolia</i>	bog wintergreen; pink wintergreen	herbaceous dicot	FACU	G5T5, SNR	yes	Sept. 12, 2017
2	<i>Salix drummondiana</i>		Drummond's willow	shrub	FACW	G5, SNR	yes	Sept. 12, 2017
2	<i>Salix eastwoodiae</i>		mountain willow	shrub	FACW	G5, SNR	yes	Sept. 12, 2017
2	<i>Salix geyeriana</i>		Geyer's willow	shrub	FACW	G5, SNR	yes	Sept. 12, 2017
2	<i>Saxifraga odontoloma</i>	<i>Micranthes odontoloma</i>	brook saxifrage	herbaceous dicot	FACW	G5, SNR	yes	Sept. 12, 2017
2	<i>Senecio triangularis</i>	<i>Senecio gibbonsii</i>	arrowleaf groundsel; arrowleaf ragwort	herbaceous dicot	FACW	G5, SNR	yes	Sept. 12, 2017
3	<i>Alnus incana ssp. occidentalis</i>	<i>Alnus incana</i> ; <i>Alnus incana ssp. tenuifolia</i>	thinleaf alder; speckled alder	shrub	FACW	G5, SNR	yes	Sept. 12, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
3	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 12, 2017
3	<i>Calamagrostis canadensis</i> var. <i>canadensis</i>	<i>Calamagrostis canadensis</i>	bluejoint reedgrass	grass	FACW	G5T5, SNR	yes	Sept. 12, 2017
3	<i>Chamerion angustifolium</i> var. <i>canescens</i>	<i>Chamerion angustifolium</i> ssp. <i>circumvagum</i> ; <i>Epilobium angustifolium</i> ssp. <i>circumvagum</i>	fireweed	herbaceous dicot	FACU	G5, SNR	yes	Sept. 12, 2017
3	<i>Delphinium x occidentale</i>	<i>Delphinium cucullatum</i>	western larkspur; duncecap larkspur	herbaceous dicot	FACU	GNA, SNA	yes	Sept. 12, 2017
3	<i>Deschampsia elongata</i>	<i>Aira elongata</i>	slender hairgrass	grass	FACW	G5, SNR	yes	Sept. 12, 2017
3	<i>Erigeron speciosus</i>		aspen fleabane	herbaceous dicot	not listed	G5, SNR	yes	Sept. 12, 2017
3	<i>Fragaria virginiana</i>		wild strawberry; Virginia strawberry	herbaceous dicot	FACU	G5, SNR	yes	Sept. 12, 2017
3	<i>Juncus arcticus</i> ssp. <i>littoralis</i>	<i>Juncus balticus</i> ; <i>Juncus balticus</i> ssp. <i>littoralis</i>	mountain rush; shoreline rush	grasslike	FACW	G5T5, SNR	yes	Sept. 12, 2017
3	<i>Juncus ensifolius</i> var. <i>ensifolius</i>	<i>Juncus ensifolius</i>	three-stamened rush; sword-leaf rush	grasslike	FACW	G5, SNR	yes	Sept. 12, 2017
3	<i>Lonicera involucrata</i> var. <i>involucrata</i>	<i>Lonicera involucrata</i>	twinberry honeysuckle; fly honeysuckle	shrub	FAC	G5T4T5, SNR	yes	Sept. 12, 2017
3	<i>Osmorhiza occidentalis</i>		mountain sweet-cecily; western sweet-cecily; western sweet-root	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 12, 2017
3	<i>Picea engelmannii</i> var. <i>engelmannii</i>		Engelmann spruce	tree	FAC	G5, SNR	yes	Sept. 12, 2017
3	<i>Poa wheeleri</i>	<i>Poa nervosa</i> var. <i>wheeleri</i>	Wheeler's bluegrass	grass	FACU	G5?, SNR	yes	Sept. 12, 2017
3	<i>Polemonium pulcherrimum</i>		Jacob's ladder	herbaceous dicot	not listed	G5, SNR	yes	Sept. 12, 2017
3	<i>Potentilla gracilis</i>		slender cinquefoil; fanleaf cinquefoil; graceful cinquefoil	herbaceous dicot	FAC	G5, SNR	yes	Sept. 12, 2017
3	<i>Rumex acetosella</i>	<i>Acetosella acetosella</i>	sheep sorrel	herbaceous dicot	FACU	GNR, SNA	no	Sept. 12, 2017
3	<i>Salix drummondiana</i>		Drummond's willow	shrub	FACW	G5, SNR	yes	Sept. 12, 2017
3	<i>Salix eastwoodiae</i>		mountain willow	shrub	FACW	G5, SNR	yes	Sept. 12, 2017
3	<i>Salix geyeriana</i>		Geyer's willow	shrub	FACW	G5, SNR	yes	Sept. 12, 2017
3	<i>Salix melanopsis</i>	<i>Salix exigua</i> ssp. <i>melanopsis</i>	dusky willow	shrub	OBL	G5, SNR	yes	Sept. 12, 2017
3	<i>Trifolium hybridum</i>	<i>Trifolium elegans</i>	alsike clover	herbaceous dicot	FAC	GNR, SNA	no	Sept. 12, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
3	<i>Vaccinium scoparium</i>		grouse huckleberry; grouseberry; grouse whortleberry	shrub	FACU	G5, SNR	yes	Sept. 12, 2017
4	<i>Achillea millefolium</i>		common yarrow	herbaceous dicot	FACU	G5, SNR	debate	Sept. 12, 2017
4	<i>Anaphalis margaritacea</i>	<i>Anaphalis margaritacea</i> var. <i>angustior</i>	pearly everlasting	herbaceous dicot	FACU	G5, SNR	yes	Sept. 12, 2017
4	<i>Arnica cordifolia</i>	<i>Arnica cordifolia</i> ssp. <i>genuina</i>	heartleaf arnica	herbaceous dicot	not listed	G5, SNR	yes	Sept. 12, 2017
4	<i>Bromus carinatus</i>	<i>Bromus carinatus</i> var. <i>californicus</i> ; <i>Bromus carinatus</i> var. <i>carinatus</i>	California brome	grass	not listed	G5, SNR	yes	Sept. 12, 2017
4	<i>Elymus elymoides</i> ssp. <i>elymoides</i>	<i>Elymus sitanion</i> ; <i>Elymus elymoides</i> var. <i>elymoides</i> ; <i>Sitanion hystrix</i>	bottlebrush squirreltail	grass	FACU	G5T5, SNR	yes	Sept. 12, 2017
4	<i>Elymus trachycaulus</i> ssp. <i>trachycaulis</i>	<i>Agropyron brevifolium</i> ; <i>Agropyron trachycaulum</i>	slender wheatgrass; slender wildrye	grass	FAC	G5T5, SNR	yes	Sept. 12, 2017
4	<i>Festuca idahoensis</i>	<i>Festuca idahoensis</i> ssp. <i>idahoensis</i>	Idaho fescue	grass	FACU	G5, SNR	yes	Sept. 12, 2017
4	<i>Fragaria virginiana</i>		wild strawberry; Virginia strawberry	herbaceous dicot	FACU	G5, SNR	yes	Sept. 12, 2017
4	<i>Ledum glandulosum</i>	<i>Ledum glandulosum</i> var. <i>californicum</i> ; <i>Rhododendron columbianum</i> ; <i>R. neoglandulosum</i>	western Labrador tea; glandular Labrador tea	shrub	OBL	G5, SNR	yes	Sept. 12, 2017
4	<i>Lonicera involucrata</i> var. <i>involucrata</i>	<i>Lonicera involucrata</i>	twinberry honeysuckle; fly honeysuckle	shrub	FAC	G5T4T5, SNR	yes	Sept. 12, 2017
4	<i>Lupinus sericeus</i>		silky lupine	herbaceous dicot	not listed	G5, SNR	yes	Sept. 12, 2017
4	<i>Pedicularis bracteosa</i> ssp. <i>siifolia</i>	<i>Pedicularis bracteosa</i> var. <i>siifolia</i>	yellow lousewort	herbaceous dicot	not listed	G5T1T3, SNR	yes	Sept. 12, 2017
4	<i>Picea engelmannii</i> var. <i>engelmannii</i>		Engelmann spruce	tree	FAC	G5, SNR	yes	Sept. 12, 2017
4	<i>Pinus contorta</i> ssp. <i>latifolia</i>	<i>Pinus contorta</i> var. <i>latifolia</i>	lodgepole pine	tree	FAC	G5T5, SNR	yes	Sept. 12, 2017
4	<i>Poa wheeleri</i>	<i>Poa nervosa</i> var. <i>wheeleri</i>	Wheeler's bluegrass	grass	FACU	G5?, SNR	yes	Sept. 12, 2017
4	<i>Rumex acetosella</i>	<i>Acetosella acetosella</i>	sheep sorrel	herbaceous dicot	FACU	GNR, SNA	no	Sept. 12, 2017
4	<i>Senecio triangularis</i>	<i>Senecio gibbsonsii</i>	arrowleaf groundsel; arrowleaf ragwort	herbaceous dicot	FACW	G5, SNR	yes	Sept. 12, 2017
4	<i>Solidago multiradiata</i>		Rocky Mountain goldenrod	herbaceous dicot	FACU	G5, SNR	yes	Sept. 12, 2017
4	<i>Thalictrum occidentale</i>		western meadow rue	herbaceous dicot	FACU	G5, SNR	yes	Sept. 12, 2017

Midas Gold Reference Reach Stream Analysis								
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4	<i>Trifolium hybridum</i>	<i>Trifolium elegans</i>	alsike clover	herbaceous dicot	FAC	GNR, SNA	no	Sept. 12, 2017
4	<i>Vaccinium scoparium</i>		grouse huckleberry; grouseberry; grouse whortleberry	shrub	FACU	G5, SNR	yes	Sept. 12, 2017
4	<i>Vicia americana</i>		American vetch; American purple vetch	herbaceous dicot	FAC	G5, SNR	yes	Sept. 12, 2017
5	<i>Alopecurus arundinaceus</i>	<i>Alopecurus ventricosus</i>	meadow foxtail; creeping foxtail	grass	FAC	GNR, no state rank	no	Sept. 12, 2017
5	<i>Calamagrostis canadensis var. canadensis</i>		bluejoint reedgrass	grass	FACW	G5T5, SNR	yes	Sept. 12, 2017
5	<i>Carex canescens var. canescens</i>	<i>Carex canescens; Carex curta</i>	silvery sedge; hoary sedge	grasslike	OBL	G5T5, SNR	yes	Sept. 12, 2017
5	<i>Carex illota</i>		sheep sedge; small-head sedge	grasslike	FACW	G5, SNR	yes	Sept. 12, 2017
5	<i>Carex neurophora</i>		alpine-nerved sedge	grasslike	FACW	G4, SNR	yes	Sept. 12, 2017
5	<i>Carex scopulorum var. prionophylla</i>	<i>Carex prionophylla; Carex miserabilis</i>	firethread sedge; sawleaf sedge	grasslike	OBL	G5T3?, SNR	yes	Sept. 12, 2017
5	<i>Carex utriculata</i>	<i>Carex inflata var. utriculata; Carex rostrata var. utriculata</i>	beaked sedge	grasslike	OBL	G5, SNR	yes	Sept. 12, 2017
5	<i>Delphinium x occidentale</i>	<i>Delphinium cucullatum</i>	western larkspur; duncecap larkspur	herbaceous dicot	FACU	GNA, SNA	yes	Sept. 12, 2017
5	<i>Equisteum fluviatile</i>		river horsetail	herbaceous dicot	FAC	G5, SNR	yes	Sept. 12, 2017
5	<i>Glyceria elata</i>	<i>Glyceria striata</i>	tall managrass	grass	FACW	G5, SNR	yes	Sept. 12, 2017
5	<i>Juncus arcticus ssp. littoralis</i>	<i>Juncus balticus; Juncus balticus ssp. littoralis</i>	mountain rush; shoreline rush	grasslike	FACW	G5T5, SNR	yes	Sept. 12, 2017
5	<i>Juncus drummondii</i>		Drummond's rush	grasslike	FACW	G5, SNR	yes	Sept. 12, 2017
5	<i>Juncus ensifolius var. ensifolius</i>	<i>Juncus ensifolius</i>	three-stamened rush; sword-leaf rush	grasslike	FACW	G5, SNR	yes	Sept. 12, 2017
5	<i>Osmorhiza occidentalis</i>		mountain sweet-cecily; western sweet-cecily; western sweet-root	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 12, 2017
5	<i>Platanthera dilatata</i>	<i>Habenaria dilatata; Piperia dilatata</i>	tall bog orchid; leafy white orchid	herbaceous monocot	FACW	G5, SNR	yes	Sept. 12, 2017
5	<i>Salix drummondiana</i>		Drummond's willow	shrub	FACW	G5, SNR	yes	Sept. 12, 2017
5	<i>Salix eastwoodiae</i>		mountain willow	shrub	FACW	G5, SNR	yes	Sept. 12, 2017
5	<i>Salix geyeriana</i>		Geyer's willow	shrub	FACW	G5, SNR	yes	Sept. 12, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
5	<i>Salix melanopsis</i>	<i>Salix exigua ssp. melanopsis</i>	dusky willow	shrub	OBL	G5, SNR	yes	Sept. 12, 2017

**notes: Upper East South Fork, Reach ID 13, Lat 44.884848, Long -115.286474**

**Elevation 7,183 ft amsl, Gradient 2.43% (Rio, 2018)**

**Zone 1:** 40% moss, 40% forb, 20% graminoid

**Zone 2:** 20% moss, 20% woody, 40% forb, 20% graminoid

**Zone 3:** 10% woody, 30% forb, 60% graminoid

**Zone 4:** 60% woody, 10% forb, 30% graminoid

**Zone 5:** 5% moss, 5% woody, 80% graminoid, 10% forb

**noxious spp:** none noted

**general:** no additional comments.

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
<b>Lower East South Fork, Reach ID 12, lat 44.891102, long -115.303198</b>								
1	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 12, 2017
1	<i>Equisetum fluviatile</i>		river horsetail	pteridophyte	FAC	G5, SNR	yes	Sept. 12, 2017
1	<i>Glyceria elata</i>	<i>Glyceria striata</i>	tall managrass	grass	FACW	G5, SNR	yes	Sept. 12, 2017
2	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 12, 2017
2	<i>Carex illota</i>		sheep sedge; small-head sedge	grasslike	FACW	G5, SNR	yes	Sept. 12, 2017
2	<i>Carex neurophora</i>		alpine-nerved sedge	grasslike	FACW	G4, SNR	yes	Sept. 12, 2017
2	<i>Equisetum fluviatile</i>		river horsetail	pteridophyte	FAC	G5, SNR	yes	Sept. 12, 2017
2	<i>Erigeron speciosus</i>		aspen fleabane	herbaceous dicot	not listed	G5, SNR	yes	Sept. 12, 2017
2	<i>Glyceria elata</i>	<i>Glyceria striata</i>	tall managrass	grass	FACW	G5, SNR	yes	Sept. 12, 2017
2	<i>Juncus drummondii</i>		Drummond's rush	grasslike	FACW	G5, SNR	yes	Sept. 12, 2017
2	<i>Juncus ensifolius var. ensifolius</i>	<i>Juncus ensifolius</i>	three-stamened rush; sword-leaf rush	grasslike	FACW	G5, SNR	yes	Sept. 12, 2017
2	<i>Luzula parviflora</i>	<i>Juncoides parviflorum</i>	small-flowered woodrush	grasslike	FAC	G5, SNR	yes	Sept. 11, 2017
2	<i>Mimulus cusickii</i>	<i>Eunanus cusickii; Diplacus cusickii</i>	Cusick's monkeyflower	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 12, 2017
2	<i>Pedicularis bracteosa ssp. siifolia</i>	<i>Pedicularis bracteosa var. siifolia</i>	yellow lousewort	herbaceous dicot	not listed	G5T1T3, SNR	yes	Sept. 12, 2017
2	<i>Salix drummondiana</i>		Drummond's willow	shrub	FACW	G5, SNR	yes	Sept. 12, 2017
2	<i>Salix eastwoodiae</i>		mountain willow	shrub	FACW	G5, SNR	yes	Sept. 12, 2017
2	<i>Salix geyeriana</i>		Geyer's willow	shrub	FACW	G5, SNR	yes	Sept. 12, 2017
2	<i>Salix melanopsis</i>	<i>Salix exigua ssp. melanopsis</i>	dusky willow	shrub	OBL	G5, SNR	yes	Sept. 12, 2017
2	<i>Saxifraga odontoloma</i>	<i>Micranthes odontoloma</i>	brook saxifrage	herbaceous dicot	FACW	G5, SNR	yes	Sept. 12, 2017
2	<i>Solidago multiradiata</i>		Rocky Mountain goldenrod	herbaceous dicot	FACU	G5, SNR	yes	Sept. 12, 2017
3	<i>Alnus incana ssp. occidentalis</i>	<i>Alnus incana; Alnus incana ssp. tenuifolia</i>	thinleaf alder; speckled alder	shrub	FACW	G5, SNR	yes	Sept. 12, 2017
3	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 12, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
3	<i>Calamagrostis canadensis var. canadensis</i>	<i>Calamagrostis canadensis</i>	bluejoint reedgrass	grass	FACW	G5T5, SNR	yes	Sept. 12, 2017
3	<i>Deschampsia elongata</i>	<i>Aira elongata</i>	slender hairgrass	grass	FACW	G5, SNR	yes	Sept. 12, 2017
3	<i>Erigeron speciosus</i>		aspen fleabane	herbaceous dicot	not listed	G5, SNR	yes	Sept. 12, 2017
3	<i>Fragaria virginiana</i>		wild strawberry; Virginia strawberry	herbaceous dicot	FACU	G5, SNR	yes	Sept. 12, 2017
3	<i>Glyceria elata</i>	<i>Glyceria striata</i>	tall managrass	grass	FACW	G5, SNR	yes	Sept. 12, 2017
3	<i>Heracleum sphondylium</i>	<i>Heracleum maximum</i>	cow parsnip; American cow parsnip	herbaceous dicot	FAC	G5, SNR	yes	Sept. 12, 2017
3	<i>Juncus arcticus ssp. littoralis</i>	<i>Juncus balticus; Juncus balticus ssp. littoralis</i>	mountain rush; shoreline rush	grasslike	FACW	G5T5, SNR	yes	Sept. 12, 2017
3	<i>Juncus ensifolius var. ensifolius</i>		three-stamened rush; sword-leaf rush	grasslike	FACW	G5, SNR	yes	Sept. 12, 2017
3	<i>Ledum glandulosum</i>	<i>Ledum glandulosum var. californicum; Rhododendron columbianum; R. neoglandulosum</i>	western Labrador tea; glandular Labrador tea	shrub	OBL	G5, SNR	yes	Sept. 12, 2017
3	<i>Maianthemum racemosum</i>	<i>Smilacina racemosa</i>	false solomon's seal; feathery false lily-of-the valley	herbaceous dicot	FAC	G5, SNR	yes	Sept. 12, 2017
3	<i>Osmorhiza occidentalis</i>		mountain sweet-cecily; western sweet-cecily; western sweet-root	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 12, 2017
3	<i>Picea engelmannii var. engelmannii</i>		Engelmann spruce	tree	FAC	G5, SNR	yes	Sept. 12, 2017
3	<i>Poa wheeleri</i>	<i>Poa nervosa var. wheeleri</i>	Wheeler's bluegrass	grass	FACU	G5?, SNR	yes	Sept. 12, 2017
3	<i>Rumex acetosella</i>	<i>Acetosella acetosella</i>	sheep sorrel	herbaceous dicot	FACU	GNR, SNA	no	Sept. 12, 2017
3	<i>Salix drummondiana</i>		Drummond's willow	shrub	FACW	G5, SNR	yes	Sept. 12, 2017
3	<i>Salix eastwoodiae</i>		mountain willow	shrub	FACW	G5, SNR	yes	Sept. 12, 2017
3	<i>Salix geyeriana</i>		Geyer's willow	shrub	FACW	G5, SNR	yes	Sept. 12, 2017
3	<i>Salix melanopsis</i>	<i>Salix exigua ssp. melanopsis</i>	dusky willow	shrub	OBL	G5, SNR	yes	Sept. 12, 2017
3	<i>Saxifraga odontoloma</i>	<i>Micranthes odontoloma</i>	brook saxifrage	herbaceous dicot	FACW	G5, SNR	yes	Sept. 12, 2017
3	<i>Senecio triangularis</i>	<i>Senecio gibbonsii</i>	arrowleaf groundsel; arrowleaf ragwort	herbaceous dicot	FACW	G5, SNR	yes	Sept. 12, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
3	<i>Solidago multiradiata</i>		Rocky Mountain goldenrod	herbaceous dicot	FACU	G5, SNR	yes	Sept. 12, 2017
3	<i>Thalictrum occidentale</i>		western meadow rue	herbaceous dicot	FACU	G5, SNR	yes	Sept. 12, 2017
3	<i>Trifolium hybridum</i>	<i>Trifolium elegans</i>	alsike clover	herbaceous dicot	FAC	GNR, SNA	no	Sept. 12, 2017
3	<i>Valeriana occidentalis</i>		western valerian; small-flowered valerian	herbaceous dicot	FAC	G5, SNR	yes	Sept. 13, 2017
4	<i>Achillea millefolium</i>		common yarrow	herbaceous dicot	FACU	G5, SNR	debate	Sept. 12, 2017
4	<i>Anaphalis margaritacea</i>	<i>Anaphalis margaritacea var. angustior</i>	pearly everlasting	herbaceous dicot	FACU	G5, SNR	yes	Sept. 12, 2017
4	<i>Arnica cordifolia</i>	<i>Arnica cordifolia ssp. genuina</i>	heartleaf arnica	herbaceous dicot	not listed	G5, SNR	yes	Sept. 12, 2017
4	<i>Bromus carinatus</i>	<i>Bromus carinatus var. californicus; Bromus carinatus var. carinatus</i>	California brome	grass	not listed	G5, SNR	yes	Sept. 12, 2017
4	<i>Elymus elymoides ssp. elymoides</i>	<i>Elymus sitanion; Elymus elymoides var. elymoides; Sitanion hystrix</i>	bottlebrush squirreltail	grass	FACU	G5T5, SNR	yes	Sept. 12, 2017
4	<i>Elymus trachycaulus ssp. trachycaulis</i>	<i>Agropyron brevifolium; Agropyron trachycaulum</i>	slender wheatgrass; slender wildrye	grass	FAC	G5T5, SNR	yes	Sept. 12, 2017
4	<i>Festuca idahoensis</i>	<i>Festuca idahoensis ssp. idahoensis</i>	Idaho fescue	grass	FACU	G5, SNR	yes	Sept. 12, 2017
4	<i>Lonicera involucrata var. involucrata</i>	<i>Lonicera involucrata</i>	twinberry honeysuckle; fly honeysuckle	shrub	FAC	G5T4T5, SNR	yes	Sept. 12, 2017
4	<i>Lupinus sericeus</i>		silky lupine	herbaceous dicot	not listed	G5, SNR	yes	Sept. 12, 2017
4	<i>Pedicularis bracteosa ssp. siifolia</i>	<i>Pedicularis bracteosa var. siifolia</i>	yellow lousewort	herbaceous dicot	not listed	G5T1T3, SNR	yes	Sept. 12, 2017
4	<i>Picea engelmannii var. engelmannii</i>		Engelmann spruce	tree	FAC	G5, SNR	yes	Sept. 12, 2017
4	<i>Pinus contorta ssp. latifolia</i>	<i>Pinus contorta var. latifolia</i>	lodgepole pine	tree	FAC	G5T5, SNR	yes	Sept. 12, 2017
4	<i>Poa wheeleri</i>	<i>Poa nervosa var. wheeleri</i>	Wheeler's bluegrass	grass	FACU	G5?, SNR	yes	Sept. 12, 2017
4	<i>Ledum glandulosum</i>	<i>Ledum glandulosum var. californicum; Rhododendron columbianum; R. neoglandulosum</i>	western Labrador tea; glandular Labrador tea	shrub	OBL	G5, SNR	yes	Sept. 12, 2017
4	<i>Vaccinium scoparium</i>		grouse huckleberry; grouseberry; grouse whortleberry	shrub	FACU	G5, SNR	yes	Sept. 12, 2017
4	<i>Vicia americana</i>		American vetch; American purple vetch	herbaceous dicot	FAC	G5, SNR	yes	Sept. 12, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
5	<i>Calamagrostis canadensis var. canadensis</i>	<i>Calamagrostis canadensis</i>	bluejoint reedgrass	grass	FACW	G5T5, SNR	yes	Sept. 12, 2017
5	<i>Carex illota</i>		sheep sedge; small-head sedge	grasslike	FACW	G5, SNR	yes	Sept. 12, 2017
5	<i>Carex lenticularis var. lipocarpa</i>	<i>Carex lenticularis var. pallida;</i> <i>Carex kelloggii</i>	lakeshore sedge; Kellog's sedge	grasslike	OBL	G5T5, SNR	yes	Sept. 12, 2017
5	<i>Carex neurophora</i>		alpine-nerved sedge	grasslike	FACW	G4, SNR	yes	Sept. 12, 2017
5	<i>Chamerion angustifolium var. canescens</i>	<i>Chamerion angustifolium ssp. circumvagum;</i> <i>Epilobium angustifolium ssp. circumvagum</i>	fireweed	herbaceous dicot	FACU	G5, SNR	yes	Sept. 12, 2017
5	<i>Delphinium x occidentale</i>	<i>Delphinium cucullatum</i>	western larkspur; duncecap larkspur	herbaceous dicot	FACU	GNA, SNA	yes	Sept. 12, 2017
5	<i>Equisteum fluviatile</i>		river rush	herbaceous dicot	FAC	G5, SNR	yes	Sept. 12, 2017
5	<i>Glyceria elata</i>	<i>Glyceria striata</i>	tall managrass	grass	FACW	G5, SNR	yes	Sept. 12, 2017

**notes: Lower East South Fork Reach ID 12, lat 44.891102, long -115.303198**  
**Elevation 6,895 ft amsl, Gradient 2.10% (Rio, 2018)**  
**Zone 1:** 60% moss, 20% forb, 20% graminoid  
**Zone 2:** 5% moss, 60% woody, 20% forb, 15% graminoid  
**Zone 3:** 5% moss, 60% woody, 15% forb, 20% graminoid  
**Zone 4:** 50% woody, 25% forb, 25% graminoid  
**Zone 5:** 5% moss, 15% woody, 75% graminoid, 5% forb  
**noxious spp:** none noted  
**general:** no additional comments.

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
<b>Sugar Creek, Reach ID 11, Lat 44.946963, Long -115.302364</b>								
1	<i>Alopecurus arundinaceus</i>	<i>Alopecurus ventricosus</i>	meadow foxtail; creeping foxtail	grass	FAC	GNR, no state rank	no	Sept. 13, 2017
1	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 13, 2017
1	<i>Equisetum fluviatile</i>		river horsetail	pteridophyte	FAC	G5, SNR	yes	Sept. 13, 2017
1	<i>Juncus ensifolius var. ensifolius</i>	<i>Juncus ensifolius</i>	three-stamened rush	grasslike	FACW	G5, SNR	yes	Sept. 13, 2017
1	<i>Mimulus cusickii</i>	<i>Eunanus cusickii</i> ; <i>Diplacus cusickii</i>	Cusick's monkeyflower	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 13, 2017
2	<i>Achillea millefolium</i>		common yarrow	herbaceous dicot	FACU	G5, SNR	debate	Sept. 13, 2017
2	<i>Alnus incana ssp. occidentalis</i>	<i>Alnus incana</i> ; <i>Alnus incana ssp. tenuifolia</i>	thinleaf alder; speckled alder	shrub	FACW	G5, SNR	yes	Sept. 13, 2017
2	<i>Alopecurus arundinaceus</i>	<i>Alopecurus ventricosus</i>	meadow foxtail; creeping foxtail	grass	FAC	GNR, no state rank	no	Sept. 12, 2017
2	<i>Anaphalis margaritacea</i>	<i>Anaphalis margaritacea var. angustior</i>	pearly everlasting	herbaceous dicot	FACU	G5, SNR	yes	Sept. 13, 2017
2	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 13, 2017
2	<i>Carex illota</i>		sheep sedge; small-head sedge	grasslike	FACW	G5, SNR	yes	Sept. 13, 2017
2	<i>Carex neurophora</i>		alpine-nerved sedge	grasslike	FACW	G4, SNR	yes	Sept. 13, 2017
2	<i>Equisetum fluviatile</i>		river horsetail	pteridophyte	FAC	G5, SNR	yes	Sept. 13, 2017
2	<i>Erigeron speciosus</i>		aspen fleabane	herbaceous dicot	not listed	G5, SNR	yes	Sept. 13, 2017
2	<i>Glyceria elata</i>	<i>Glyceria striata</i>	tall managrass	grass	FACW	G5, SNR	yes	Sept. 13, 2017
2	<i>Juncus drummondii</i>		Drummond's rush	grasslike	FACW	G5, SNR	yes	Sept. 13, 2017
2	<i>Juncus ensifolius var. ensifolius</i>	<i>Juncus ensifolius</i>	three-stamened rush; sword-leaf rush	grasslike	FACW	G5, SNR	yes	Sept. 13, 2017
2	<i>Mimulus cusickii</i>	<i>Eunanus cusickii</i> ; <i>Diplacus cusickii</i>	Cusick's monkeyflower	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 13, 2017
2	<i>Pedicularis bracteosa ssp. siifolia</i>	<i>Pedicularis bracteosa var. siifolia</i>	yellow lousewort	herbaceous dicot	not listed	G5T1T3, SNR	yes	Sept. 13, 2017
2	<i>Ribes hudsonianum var. petiolare</i>		northern black currant; western black currant	shrub	FACW	G5T5, SNR	yes	Sept. 12, 2017
2	<i>Salix eastwoodiae</i>		mountain willow	shrub	FACW	G5, SNR	yes	Sept. 13, 2017
2	<i>Salix melanopsis</i>	<i>Salix exigua ssp. melanopsis</i>	dusky willow	shrub	OBL	G5, SNR	yes	Sept. 13, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
2	<i>Saxifraga odontoloma</i>	<i>Micranthes odontoloma</i>	brook saxifrage	herbaceous dicot	FACW	G5, SNR	yes	Sept. 13, 2017
2	<i>Taraxacum officinale ssp. officinale</i>	<i>Taraxacum officinale</i>	common dandelion	herbaceous dicot	FACU	GNR, SNR	no	Sept. 13, 2017
3	<i>Achillea millefolium</i>		common yarrow	herbaceous dicot	FACU	G5, SNR	debate	Sept. 13, 2017
3	<i>Alnus incana ssp. occidentalis</i>	<i>Alnus incana</i> ; <i>Alnus incana ssp. tenuifolia</i>	thinleaf alder; speckled alder	shrub	FACW	G5, SNR	yes	Sept. 13, 2017
3	<i>Anaphalis margaritacea</i>	<i>Anaphalis margaritacea var. angustior</i>	pearly everlasting	herbaceous dicot	FACU	G5, SNR	yes	Sept. 13, 2017
3	<i>Bromus carinatus</i>	<i>Bromus carinatus var. californicus</i> ; <i>Bromus carinatus var. carinatus</i>	California brome	grass	not listed	G5, SNR	yes	Sept. 13, 2017
3	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 13, 2017
3	<i>Chamerion angustifolium var. canescens</i>	<i>Chamerion angustifolium ssp. circumvagum</i> ; <i>Epilobium angustifolium ssp. circumvagum</i>	fireweed	herbaceous dicot	FACU	G5, SNR	yes	Sept. 13, 2017
3	<i>Equisetum hyemale var. affine</i>	<i>Equisetum hyemale ssp. affine</i>	scouring-rush horsetail	pteridophyte	FACW	G5T5, SNR	yes	Sept. 13, 2017
3	<i>Fragaria virginiana</i>		wild strawberry; Virginia strawberry	herbaceous dicot	FACU	G5, SNR	yes	Sept. 13, 2017
3	<i>Heracleum sphondylium</i>	<i>Heracleum maximum</i>	cow parsnip; American cow parsnip	herbaceous dicot	FAC	G5, SNR	yes	Sept. 13, 2017
3	<i>Lonicera involucrata var. involucrata</i>	<i>Lonicera involucrata</i>	twinberry honeysuckle; fly honeysuckle	shrub	FAC	G5T4T5, SNR	yes	Sept. 13, 2017
3	<i>Osmorhiza occidentalis</i>		mountain sweet-cecily; western sweet-cecily; western sweet-root	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 13, 2017
3	<i>Picea engelmannii var. engelmannii</i>		Engelmann spruce	tree	FAC	G5, SNR	yes	Sept. 13, 2017
3	<i>Poa wheeleri</i>	<i>Poa nervosa var. wheeleri</i>	Wheeler's bluegrass	grass	FACU	G5?, SNR	yes	Sept. 13, 2017
3	<i>Ribes hudsonianum var. petiolare</i>		northern black currant; western black currant	shrub	FACW	G5T5, SNR	yes	Sept. 13, 2017
3	<i>Ribes lacustre</i>	<i>Limnobotrya lacustris</i> ; <i>Ribes lacustre var. parvulum</i>	prickly currant; bristly black currant	shrub	FAC	G5, SNR	yes	Sept. 13, 2017
3	<i>Salix drummondiana</i>		Drummond's willow	shrub	FACW	G5, SNR	yes	Sept. 13, 2017
3	<i>Salix eastwoodiae</i>		mountain willow	shrub	FACW	G5, SNR	yes	Sept. 13, 2017
3	<i>Salix geyeriana</i>		Geyer's willow	shrub	FACW	G5, SNR	yes	Sept. 13, 2017
3	<i>Salix melanopsis</i>	<i>Salix exigua ssp. melanopsis</i>	dusky willow	shrub	OBL	G5, SNR	yes	Sept. 13, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
3	<i>Solidago multiradiata</i>		Rocky Mountain goldenrod	herbaceous dicot	FACU	G5, SNR	yes	Sept. 13, 2017
4	<i>Achillea millefolium</i>		common yarrow	herbaceous dicot	FACU	G5, SNR	debate	Sept. 13, 2017
4	<i>Anaphalis margaritacea</i>	<i>Anaphalis margaritacea</i> var. <i>angustior</i>	pearly everlasting	herbaceous dicot	FACU	G5, SNR	yes	Sept. 13, 2017
4	<i>Arnica cordifolia</i>	<i>Arnica cordifolia</i> ssp. <i>genuina</i>	heartleaf arnica	herbaceous dicot	not listed	G5, SNR	yes	Sept. 13, 2017
4	<i>Artemisia ludoviciana</i>		Louisiana sagewort; white sagebrush	half-shrub	FACU	G5, SNR	yes	Sept. 13, 2017
4	<i>Bromus carinatus</i>	<i>Bromus carinatus</i> var. <i>californicus</i> ; <i>Bromus carinatus</i> var. <i>carinatus</i>	California brome	grass	not listed	G5, SNR	yes	Sept. 13, 2017
4	<i>Carex rossii</i>	<i>Carex brevipes</i>	Ross's sedge; short sedge	grasslike	not listed	G5, SNR	yes	Sept. 13, 2017
4	<i>Chamerion angustifolium</i> var. <i>canescens</i>	<i>Chamerion angustifolium</i> ssp. <i>circumvagum</i> ; <i>Epilobium angustifolium</i> ssp. <i>circumvagum</i>	fireweed	herbaceous dicot	FACU	G5, SNR	yes	Sept. 13, 2017
4	<i>Elymus trachycaulus</i> ssp. <i>trachycaulis</i>	<i>Agropyron brevifolium</i> ; <i>Agropyron trachycaulum</i>	slender wheatgrass; slender wildrye	grass	FAC	G5T5, SNR	yes	Sept. 13, 2017
4	<i>Festuca idahoensis</i>	<i>Festuca idahoensis</i> ssp. <i>idahoensis</i>	Idaho fescue	grass	FACU	G5, SNR	yes	Sept. 13, 2017
4	<i>Fragaria virginiana</i>		wild strawberry; Virginia strawberry	herbaceous dicot	FACU	G5, SNR	yes	Sept. 13, 2017
4	<i>Phacelia heterophylla</i>		varileaf phacelia; scorpionweed	herbaceous dicot	FACU	G4G5, SNR	yes	Sept. 13, 2017
4	<i>Picea engelmannii</i> var. <i>engelmannii</i>		Engelmann spruce	tree	FAC	G5, SNR	yes	Sept. 13, 2017
4	<i>Pinus contorta</i> ssp. <i>latifolia</i>	<i>Pinus contorta</i> var. <i>latifolia</i>	lodgepole pine	tree	FAC	G5T5, SNR	yes	Sept. 13, 2017
4	<i>Poa wheeleri</i>	<i>Poa nervosa</i> var. <i>wheeleri</i>	Wheeler's bluegrass	grass	FACU	G5?, SNR	yes	Sept. 13, 2017
4	<i>Ribes lacustre</i>	<i>Limnobotrya lacustris</i> ; <i>Ribes lacustre</i> var. <i>parvulum</i>	prickly currant; bristly black currant	shrub	FAC	G5, SNR	yes	Sept. 13, 2017
4	<i>Solidago multiradiata</i>		Rocky Mountain goldenrod	herbaceous dicot	FACU	G5, SNR	yes	Sept. 13, 2017
4	<i>Symphoricarpos albus</i> ssp. <i>laevigatus</i>	<i>Symphoricarpos oreophilus</i> var. <i>utahensis</i> ; <i>Symphoricarpos utahensis</i>	common snowberry	shrub	FACU	G5, SNR	yes	Sept. 13, 2017
4	<i>Tragopogon dubius</i>	<i>Tragopogon dubius</i> ssp. <i>major</i>	yellow salsify; meadow goats-beard	herbaceous dicot	not listed	GNR, SNA	no	Sept. 13, 2017
4	<i>Verbascum thapsus</i>		wooly mullein; common mullein	herbaceous dicot	FACU	GNR, SNA (noxious)	no (noxious)	Sept. 13, 2017
5	<i>Alopecurus arundinaceus</i>	<i>Alopecurus ventricosus</i>	meadow foxtail, creeping foxtail	grass	FAC	GNR, no state rank	no	Sept. 13, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
5	<i>Equisetum hyemale var. affine</i>	<i>Equisetum hyemale ssp. affine</i>	scouring-rush horsetail	pteridophyte	FACW	G5T5, SNR	yes	Sept. 13, 2017
5	<i>Equisetum fluviatile</i>		scouring rush	herbaceous dicot	FAC	G5, SNR	yes	Sept. 13, 2017
5	<i>Glyceria elata</i>	<i>Glyceria striata</i>	tall managrass	grass	FACW	G5, SNR	yes	Sept. 13, 2017
5	<i>Juncus arcticus ssp. littoralis</i>	<i>Juncus balticus; Juncus balticus ssp. littoralis</i>	mountain rush; shoreline rush	grasslike	FACW	G5T5, SNR	yes	Sept. 13, 2017
5	<i>Juncus ensifolius var. ensifolius</i>	<i>Juncus ensifolius</i>	three-stamened rush; sword-leaf rush	grasslike	FACW	G5, SNR	yes	Sept. 13, 2017
5	<i>Salix drummondiana</i>		Drummond's willow	shrub	FACW	G5, SNR	yes	Sept. 13, 2017
5	<i>Salix eastwoodiae</i>		mountain willow	shrub	FACW	G5, SNR	yes	Sept. 13, 2017
5	<i>Salix geyeriana</i>		Geyer's willow	shrub	FACW	G5, SNR	yes	Sept. 13, 2017
5	<i>Salix melanopsis</i>	<i>Salix exigua ssp. melanopsis</i>	dusky willow	shrub	OBL	G5, SNR	yes	Sept. 13, 2017

**notes: Sugar Creek, Reach ID 11, Lat 44.946963, Long -115.302364**

**Elevation 6,227 ft amsl, Gradient 1.76% (Rio, 2018)**

**Zone 1:** mostly devoid of veg (80% bare-ground), 20% vegetated portion comprised of: 80% graminoid, 10% moss, 10% forb

**Zone 2:** 70% bare-ground, remaining 30% comprised of: 50% woody, 35% forb, 15% graminoid

**Zone 3:** 50% woody, 25% forb, 25% graminoid

**Zone 4:** 10% moss, 25% woody, 10% forb, 35% graminoid

**Zone 5:** 20% woody, 75% graminoid, 5% forb

**noxious spp:** *Verbascum thapsus*- woolly mullein

**general:** Sugar Creek is considered to be excellent spawning redd habitat due to an open and well-sorted gravel - cobble bed with a series of deep pools following "pinch" points and under 20% fine sediment.

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed

**Cinnabar Creek, Reach ID 10, Lat 44.951265, Long -115.288873**

1	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 13, 2017
1	<i>Equisetum fluviatile</i>		river horsetail	pteridophyte	FAC	G5, SNR	yes	Sept. 13, 2017
1	<i>Glyceria elata</i>	<i>Glyceria striata</i>	tall managrass	grass	FACW	G5, SNR	yes	Sept. 13, 2017
1	<i>Juncus drummondii</i>		Drummond's rush	grasslike	FACW	G5, SNR	yes	Sept. 13, 2017
1	<i>Juncus ensifolius var. ensifolius</i>	<i>Juncus ensifolius</i>	three-stamened rush; sword-leaf rush	grasslike	FACW	G5, SNR	yes	Sept. 13, 2017
2	<i>Achillea millefolium</i>		common yarrow	herbaceous dicot	FACU	G5, SNR	debate	Sept. 13, 2017
2	<i>Alnus incana ssp. occidentalis</i>	<i>Alnus incana</i> ; <i>Alnus incana ssp. tenuifolia</i>	thinleaf alder; speckled alder	shrub	FACW	G5, SNR	yes	Sept. 13, 2017
2	<i>Alopecurus arundinaceus</i>	<i>Alopecurus ventricosus</i>	meadow foxtail; creeping foxtail	grass	FAC	GNR, no state ranking	no	Sept. 12, 2017
2	<i>Anaphalis margaritacea</i>	<i>Anaphalis margaritacea var. angustior</i>	pearly everlasting	herbaceous dicot	FACU	G5, SNR	yes	Sept. 13, 2017
2	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 13, 2017
2	<i>Chamerion angustifolium var. canescens</i>	<i>Chamerion angustifolium ssp. circumvagum</i> ; <i>Epilobium angustifolium ssp. circumvagum</i>	fireweed	herbaceous dicot	FACU	G5, SNR	yes	Sept. 13, 2017
2	<i>Glyceria elata</i>	<i>Glyceria striata</i>	tall managrass	grass	FACW	G5, SNR	yes	Sept. 13, 2017
2	<i>Heracleum sphondylium</i>	<i>Heracleum maximum</i>	cow parsnip; American cow parsnip	herbaceous dicot	FAC	G5, SNR	yes	Sept. 13, 2017
2	<i>Juncus drummondii</i>		Drummond's rush	grasslike	FACW	G5, SNR	yes	Sept. 13, 2017
2	<i>Juncus ensifolius var. ensifolius</i>	<i>Juncus ensifolius</i>	three-stamened rush; sword-leaf rush	grasslike	FACW	G5, SNR	yes	Sept. 13, 2017
2	<i>Luzula parviflora</i>	<i>Juncoides parviflorum</i>	small-flowered woodrush	grasslike	FAC	G5, SNR	yes	Sept. 13, 2017
2	<i>Maianthemum racemosum</i>	<i>Smilacina racemosa</i>	false solomon's seal; feathery false lily-of-the valley	herbaceous dicot	FAC	G5, SNR	yes	Sept. 13, 2017
2	<i>Pedicularis bracteosa ssp. siifolia</i>	<i>Pedicularis bracteosa var. siifolia</i>	yellow lousewort	herbaceous dicot	not listed	G5T1T3, SNR	yes	Sept. 13, 2017
2	<i>Platanthera dilatata</i>	<i>Habenaria dilatata</i> ; <i>Piperia dilatata</i>	tall bog orchid; leafy white orchid	herbaceous monocot	FACW	G5, SNR	yes	Sept. 13, 2017
2	<i>Ribes hudsonianum var. petiolare</i>		northern black currant; western black currant	shrub	FACW	G5T5, SNR	yes	Sept. 13, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
2	<i>Salix drummondiana</i>		Drummond's willow	shrub	FACW	G5, SNR	yes	Sept. 13, 2017
2	<i>Salix eastwoodiae</i>		mountain willow	shrub	FACW	G5, SNR	yes	Sept. 13, 2017
2	<i>Salix geyeriana</i>		Geyer's willow	shrub	FACW	G5, SNR	yes	Sept. 13, 2017
2	<i>Salix melanopsis</i>	<i>Salix exigua ssp. melanopsis</i>	dusky willow	shrub	OBL	G5, SNR	yes	Sept. 13, 2017
2	<i>Saxifraga odontoloma</i>	<i>Micranthes odontoloma</i>	brook saxifrage	herbaceous dicot	FACW	G5, SNR	yes	Sept. 13, 2017
2	<i>Solidago multiradiata</i>		Rocky Mountain goldenrod	herbaceous dicot	FACU	G5, SNR	yes	Sept. 13, 2017
2	<i>Valeriana occidentalis</i>		western valerian; small-flowered valerian	herbaceous dicot	FAC	G5, SNR	yes	Sept. 13, 2017
2	<i>Xerophyllum tenax</i>	<i>Helonias tenax</i>	beargrass	herbaceous monocot	FACU	G5, SNR	no	Sept. 13, 2017
3	<i>Achillea millefolium</i>		common yarrow	herbaceous dicot	FACU	G5, SNR	debate	Sept. 13, 2017
3	<i>Anaphalis margaritacea</i>	<i>Anaphalis margaritacea var. angustior</i>	pearly everlasting	herbaceous dicot	FACU	G5, SNR	yes	Sept. 13, 2017
3	<i>Chamerion angustifolium var. canescens</i>	<i>Chamerion angustifolium ssp. circumvagum; Epilobium angustifolium ssp. circumvagum</i>	fireweed	herbaceous dicot	FACU	G5, SNR	yes	Sept. 13, 2017
3	<i>Equisetum fluviatile</i>		river horsetail	pteridophyte	FAC	G5, SNR	yes	Sept. 13, 2017
3	<i>Equisetum hyemale var. affine</i>	<i>Equisetum hyemale ssp. affine</i>	scouring-rush horsetail	pteridophyte	FACW	G5T5, SNR	yes	Sept. 13, 2017
3	<i>Fragaria virginiana</i>		wild strawberry; Virginia strawberry	herbaceous dicot	FACU	G5, SNR	yes	Sept. 13, 2017
3	<i>Heracleum sphondylium</i>	<i>Heracleum maximum</i>	cow parsnip; American cow parsnip	herbaceous dicot	FAC	G5, SNR	yes	Sept. 13, 2017
3	<i>Ledum glandulosum</i>	<i>Ledum glandulosum var. californicum; Rhododendron columbianum; R. neoglandulosum</i>	western Labrador tea; glandular Labrador tea	shrub	OBL	G5, SNR	yes	Sept. 13, 2017
3	<i>Lonicera involucrata var. involucrata</i>	<i>Lonicera involucrata</i>	twinberry honeysuckle; fly honeysuckle	shrub	FAC	G5T4T5, SNR	yes	Sept. 13, 2017
3	<i>Luzula parviflora</i>	<i>Juncoides parviflorum</i>	small-flowered woodrush	grasslike	FAC	G5, SNR	yes	Sept. 13, 2017
3	<i>Pedicularis bracteosa ssp. siifolia</i>	<i>Pedicularis bracteosa var. siifolia</i>	yellow lousewort	herbaceous dicot	not listed	G5T1T3, SNR	yes	Sept. 13, 2017
3	<i>Picea engelmannii var. engelmannii</i>		Engelmann spruce	tree	FAC	G5, SNR	yes	Sept. 13, 2017
3	<i>Ribes hudsonianum var. petiolare</i>		northern black currant; western black currant	shrub	FACW	G5T5, SNR	yes	Sept. 13, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
3	<i>Ribes lacustre</i>	<i>Limnobotrya lacustris</i> ; <i>Ribes lacustre</i> var. <i>parvulum</i>	prickly currant; bristly black currant	shrub	FAC	G5, SNR	yes	Sept. 13, 2017
3	<i>Salix drummondiana</i>		Drummond's willow	shrub	FACW	G5, SNR	yes	Sept. 13, 2017
3	<i>Salix eastwoodiae</i>		mountain willow	shrub	FACW	G5, SNR	yes	Sept. 13, 2017
3	<i>Salix geyeriana</i>		Geyer's willow	shrub	FACW	G5, SNR	yes	Sept. 13, 2017
3	<i>Salix melanopsis</i>	<i>Salix exigua</i> ssp. <i>melanopsis</i>	dusky willow	shrub	OBL	G5, SNR	yes	Sept. 13, 2017
3	<i>Shepherdia canadensis</i>	<i>Elaeagnus canadensis</i>	russet buffaloberry; Canada buffaloberry	shrub	UPL	G5, SNR	yes	Sept. 13, 2017
3	<i>Thalectrum occidentale</i>		western meadowrue	herbaceous dicot	FACU	G5, SNR	yes	Sept. 13, 2017
3	<i>Valeriana occidentalis</i>		western valerian; small-flowered valerian	herbaceous dicot	FAC	G5, SNR	yes	Sept. 13, 2017
4	<i>Amelanchier alnifolia</i> ssp. <i>pumila</i>	<i>Amelanchier alnifolia</i> ; <i>Amelanchier pumila</i>	Saskatoon serviceberry	shrub	FACU	G5, SNR	yes	Sept. 13, 2017
4	<i>Arnica cordifolia</i>	<i>Arnica cordifolia</i> ssp. <i>genuina</i>	heartleaf arnica	herbaceous dicot	not listed	G5, SNR	yes	Sept. 13, 2017
4	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 13, 2017
4	<i>Carex rossii</i>	<i>Carex brevipes</i>	Ross's sedge; short sedge	grasslike	not listed	G5, SNR	yes	Sept. 13, 2017
4	<i>Cirsium scariosum</i>	<i>Carduus americanus</i> ;	Drummond's thistle; meadow thistle	herbaceous dicot	FAC	G5, SNR	yes	Sept. 13, 2017
4	<i>Erigeron speciosus</i>		aspen fleabane	herbaceous dicot	not listed	G5, SNR	yes	Sept. 13, 2017
4	<i>Festuca idahoensis</i>	<i>Festuca idahoensis</i> ssp. <i>idahoensis</i>	Idaho fescue	grass	FACU	G5, SNR	yes	Sept. 13, 2017
4	<i>Fragaria virginiana</i>		wild strawberry; Virginia strawberry	herbaceous dicot	FACU	G5, SNR	yes	Sept. 13, 2017
4	<i>Geranium viscosissimum</i>		sticky geranium; sticky purple geranium	herbaceous dicot	FACU	G5, SNR	yes	Sept. 13, 2017
4	<i>Ledum glandulosum</i>	<i>Ledum glandulosum</i> var. <i>californicum</i> ; <i>Rhododendron columbianum</i> ; <i>R. neoglandulosum</i>	western Labrador tea; glandular Labrador tea	shrub	OBL	G5, SNR	yes	Sept. 13, 2017
4	<i>Lonicera involucrata</i> var. <i>involucrata</i>	<i>Lonicera involucrata</i>	twinberry honeysuckle; fly honeysuckle	shrub	FAC	G5T4T5, SNR	yes	Sept. 13, 2017
4	<i>Picea engelmannii</i> var. <i>engelmannii</i>		Engelmann spruce	tree	FAC	G5, SNR	yes	Sept. 13, 2017
4	<i>Pinus contorta</i> ssp. <i>latifolia</i>	<i>Pinus contorta</i> var. <i>latifolia</i>	lodgepole pine	tree	FAC	G5T5, SNR	yes	Sept. 13, 2017

Midas Gold Reference Reach Stream Analysis								
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4	<i>Pseudotsuga menziesii</i>		Douglas fir	tree	FACU	G5, SNR	yes	Sept. 13, 2017
4	<i>Shepherdia canadensis</i>	<i>Elaeagnus canadensis</i>	russet buffaloberry; Canada buffaloberry	shrub	UPL	G5, SNR	yes	Sept. 13, 2017
4	<i>Vaccinium scoparium</i>		grouse whortleberry; grouseberry; western whortleberry	shrub	FACU	G5, SNR	yes	Sept. 13, 2017
4	<i>Xerophyllum tenax</i>	<i>Helonias tenax</i>	beargrass	herbaceous monocot	FACU	G5, SNR	no	Sept. 13, 2017
5	<i>Alopecurus arundinaceus</i>	<i>Alopecurus ventricosus</i>	meadow foxtail; creeping foxtail	grass	FAC	GNR, no state ranking	no	Sept. 13, 2017
5	<i>Carex illota</i>		sheep sedge; small-head sedge	grasslike	FACW	G5, SNR	yes	Sept. 13, 2017
5	<i>Carex lenticularis var. lipocarpa</i>	<i>Carex lenticularis var. pallida</i> ; <i>Carex kelloggii</i>	lakeshore sedge; Kellog's sedge	grasslike	OBL	G5T5, SNR	yes	Sept. 13, 2017
5	<i>Carex neurophora</i>		alpine-nerved sedge	grasslike	FACW	G4, SNR	yes	Sept. 13, 2017
5	<i>Carex scopulorum var. prionophylla</i>	<i>Carex prionophylla</i> ; <i>Carex miserabilis</i>	firethread sedge; sawleaf rush	grasslike	OBL	G5T3?, SNR	yes	Sept. 13, 2017
5	<i>Carex utriculata</i>	<i>Carex inflata var. utriculata</i> ; <i>Carex rostrata var. utriculata</i>	beaked sedge	grasslike	OBL	G5, SNR	yes	Sept. 13, 2017
5	<i>Chamerion angustifolium var. canescens</i>	<i>Chamerion angustifolium ssp. circumvagum</i> ; <i>Epilobium angustifolium ssp. circumvagum</i>	fireweed	herbaceous dicot	FACU	G5, SNR	yes	Sept. 13, 2017
5	<i>Equisetum hyemale var. affine</i>	<i>Equisetum hyemale ssp. affine</i>	scouring-rush horsetail	pteridophyte	FACW	G5T5, SNR	yes	Sept. 13, 2017
5	<i>Equisetum fluviatile</i>		river horsetail	pteridophyte	FAC	G5, SNR	yes	Sept. 13, 2017
5	<i>Glyceria elata</i>	<i>Glyceria striata</i>	tall managrass	grass	FACW	G5, SNR	yes	Sept. 13, 2017
5	<i>Juncus arcticus ssp. littoralis</i>	<i>Juncus balticus</i> ; <i>Juncus balticus ssp. littoralis</i>	mountain rush; shoreline rush	grasslike	FACW	G5T5, SNR	yes	Sept. 13, 2017
5	<i>Juncus drummondii</i>		Drummond's rush	grasslike	FACW	G5, SNR	yes	Sept. 13, 2017
5	<i>Juncus ensifolius var. ensifolius</i>	<i>Juncus ensifolius</i>	three-stamened rush; sword-leaf rush	grasslike	FACW	G5, SNR	yes	Sept. 13, 2017
5	<i>Luzula parviflora</i>	<i>Juncoides parviflorum</i>	small-flowered woodrush	grasslike	FAC	G5, SNR	yes	Sept. 13, 2017
5	<i>Osmorhiza occidentalis</i>		mountain sweet-cecily; western sweet-cecily; western sweet-root	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 13, 2017
5	<i>Platanthera dilatata</i>	<i>Habenaria dilatata</i> ; <i>Piperia dilatata</i>	tall bog orchid; leafy white orchid	herbaceous monocot	FACW	G5, SNR	yes	Sept. 13, 2017
5	<i>Pyrola asarifolia var. asarifolia</i>	<i>Pyrola asarifolia ssp. asarifolia</i>	bog wintergreen; pink wintergreen	herbaceous dicot	FACU	G5T5, SNR	yes	Sept. 13, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
5	<i>Ribes hudsonianum var. petiolare</i>		northern black currant; western black currant	shrub	FACW	G5T5, SNR	yes	Sept. 13, 2017
5	<i>Ribes lacustre</i>	<i>Limnobotrya lacustris</i> ; <i>Ribes lacustre var. parvulum</i>	prickly currant; bristly black currant	shrub	FAC	G5, SNR	yes	Sept. 13, 2017
5	<i>Salix geyeriana</i>		Geyer's willow	shrub	FACW	G5, SNR	yes	Sept. 13, 2017
5	<i>Salix melanopsis</i>	<i>Salix exigua ssp. melanopsis</i>	dusky willow	shrub	OBL	G5, SNR	yes	Sept. 13, 2017
5	<i>Solidago multiradiata</i>		Rocky Mountain goldenrod	herbaceous dicot	FACU	G5, SNR	yes	Sept. 13, 2017

**notes: Cinnabar Creek, Reach ID 10, Lat 44.951265, Long -115.288873  
Elevation 6,396 ft amsl, Gradient 5.00% (Rio, 2018)**

**Zone 1:** predominantly moss due to much energy: 70% moss, 20% forb, 10% grasslike

**Zone 2:** 30% moss, 10% woody, 50% forb, 10% graminoid

**Zone 3:** 5% moss, 60% woody, 25% forb, 10% graminoid

**Zone 4:** 15% moss, 20% woody, 15% forb, 50% graminoid

**Zone 5:** 40% moss, 15% woody, 15% graminoid, 30% forb

**noxious spp:** none noted

**general:** Relatively steep-gradient with water entering stream through subsurface flow from side-slope, forming a marshy hummock adjacent to the stream on river-left. Cinnabar Creek also showed evidence of beaver predation.

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
<b>Lower Profile Creek, Reach ID 5, Lat 44.966229, Long -115.423487</b>								
1	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 14, 2017
1	<i>Equisetum fluviatile</i>		scouring rush	pteridophyte	FAC	G5, SNR	yes	Sept. 14, 2017
1	<i>Erigeron speciosus</i>		aspen fleabane	herbaceous dicot	not listed	G5, SNR	yes	Sept. 14, 2017
1	<i>Mimulus cusickii</i>	<i>Eunanus cusickii</i> ; <i>Diplacus cusickii</i>	Cusick's monkeyflower	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 14, 2017
2	<i>Anaphalis margaritacea</i>	<i>Anaphalis margaritacea</i> var. <i>angustior</i>	pearly everlasting	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
2	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 14, 2017
2	<i>Calamagrostis canadensis</i> var. <i>canadensis</i>	<i>Calamagrostis canadensis</i>	bluejoint reedgrass	grass	FACW	G5T5, SNR	yes	Sept. 14, 2017
2	<i>Carex illota</i>		sheep sedge; small-head sedge	grasslike	FACW	G5, SNR	yes	Sept. 14, 2017
2	<i>Carex neurophora</i>		alpine-nerved sedge	grasslike	FACW	G4, SNR	yes	Sept. 14, 2017
2	<i>Chamerion angustifolium</i> var. <i>canescens</i>	<i>Chamerion angustifolium</i> ssp. <i>circumvagum</i> ; <i>Epilobium angustifolium</i> ssp. <i>circumvagum</i>	fireweed	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
2	<i>Equisetum hyemale</i> var. <i>affine</i>	<i>Equisetum hyemale</i> ssp. <i>affine</i>	scouring-rush horsetail	pteridophyte	FACW	G5T5, SNR	yes	Sept. 14, 2017
2	<i>Equisetum fluviatile</i>		river horsetail	pteridophyte	FAC	G5, SNR	yes	Sept. 14, 2017
2	<i>Erigeron speciosus</i>		aspen fleabane	herbaceous dicot	not listed	G5, SNR	yes	Sept. 14, 2017
2	<i>Geranium viscosissimum</i>		sticky geranium; sticky purple geranium	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
2	<i>Geum macrophyllum</i> var. <i>perincisum</i>	<i>Geum macrophyllum</i> ssp. <i>perincisum</i>	largeleaf avens	herbaceous dicot	FAC	G5T5, SNR	yes	Sept. 14, 2017
2	<i>Glyceria elata</i>	<i>Glyceria striata</i>	tall managrass	grass	FACW	G5, SNR	yes	Sept. 14, 2017
2	<i>Heracleum sphondylium</i>	<i>Heracleum maximum</i>	cow parsnip; American cow parsnip	herbaceous dicot	FAC	G5, SNR	yes	Sept. 14, 2017
2	<i>Mentha arvensis</i>		field mint	herbaceous dicot	FACW	G5, SNR	yes	Sept. 14, 2017
2	<i>Mertensia ciliata</i> ssp. <i>ciliata</i>	<i>Mertensia ciliata</i> var. <i>ciliata</i>	alpine bluebell; streamside bluebell	herbaceous dicot	FACW	G5T5?, SNR	yes	Sept. 14, 2017
2	<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>	<i>Populus trichocarpa</i>	black cottonwood	tree	FAC	G5T5, SNR	yes	Sept. 14, 2017
2	<i>Ribes lacustre</i>	<i>Limnobotrya lacustris</i> ; <i>Ribes lacustre</i> var. <i>parvulum</i>	prickly currant; bristly black currant	shrub	FAC	G5, SNR	yes	Sept. 14, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
2	<i>Rubus parviflorus</i>		thimbleberry	shrub	FACU	G5, SNR	yes	Sept. 14, 2017
2	<i>Salix drummondiana</i>		Drummond's willow	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
2	<i>Salix eastwoodiae</i>		mountain willow	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
2	<i>Salix geyeriana</i>		Geyer's willow	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
2	<i>Salix melanopsis</i>	<i>Salix exigua ssp. melanopsis</i>	dusky willow	shrub	OBL	G5, SNR	yes	Sept. 14, 2017
2	<i>Saxifraga odontoloma</i>	<i>Micranthes odontoloma</i>	brook saxifrage	herbaceous dicot	FACW	G5, SNR	yes	Sept. 14, 2017
2	<i>Solidago multiradiata</i>		Rocky Mountain goldenrod	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
2	<i>Urtica dioica</i>		stinging nettle	herbaceous dicot	FAC	G5, SNR	yes	Sept. 14, 2017
3	<i>Acer glabrum var. douglasii</i>		Douglas maple	shrub	FACU	G5T5, SNR	yes	Sept. 14, 2017
3	<i>Achillea millefolium</i>		common yarrow	herbaceous dicot	FACU	G5, SNR	debate	Sept. 14, 2017
3	<i>Alnus incana ssp. occidentalis</i>	<i>Alnus incana</i> ; <i>Amelanchier incana ssp. tenuifolia</i>	thinleaf alder; speckled alder	shrub	FACW	G5, SNR	yes	Sept. 13, 2017
3	<i>Amelanchier alnifolia ssp. pumila</i>	<i>Amelanchier alnifolia</i> ; <i>Amelanchier pumila</i>	Saskatoon serviceberry	shrub	FACU	G5, SNR	yes	Sept. 14, 2017
3	<i>Chamerion angustifolium var. canescens</i>	<i>Chamerion angustifolium ssp. circumvagum</i> ; <i>Epilobium angustifolium ssp. circumvagum</i>	fireweed	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
3	<i>Cornus sericea</i>	<i>Cornus stolonifera</i>	redosier dogwood	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
3	<i>Elymus trachycaulus ssp. trachycaulus</i>	<i>Agropyron brevifolium</i> ; <i>Agropyron trachycaulum</i>	slender wheatgrass; slender wildrye	grass	FAC	G5T5, SNR	yes	Sept. 14, 2017
3	<i>Equisetum hyemale var. affine</i>	<i>Equisetum hyemale ssp. affine</i>	scouring-rush horsetail	pteridophyte	FACW	G5T5, SNR	yes	Sept. 14, 2017
3	<i>Erigeron speciosus</i>		aspen fleabane	herbaceous dicot	not listed	G5, SNR	yes	Sept. 14, 2017
3	<i>Geum macrophyllum var. perincisum</i>	<i>Geum macrophyllum ssp. perincisum</i>	largeleaf avens	herbaceous dicot	FAC	G5T5, SNR	yes	Sept. 14, 2017
3	<i>Picea engelmannii var. engelmannii</i>		Engelmann spruce	tree	FAC	G5, SNR	yes	Sept. 14, 2017
3	<i>Ribes hudsonianum var. petiolare</i>		northern black currant; western black currant	shrub	FACW	G5T5, SNR	yes	Sept. 14, 2017
3	<i>Ribes lacustre</i>	<i>Limnobotrya lacustris</i> ; <i>Ribes lacustre var. parvulum</i>	prickly currant; bristly black currant	shrub	FAC	G5, SNR	yes	Sept. 14, 2017
3	<i>Rosa woodsii ssp. ultramontana</i>	<i>Rosa woodsii var. ultramontan</i> ; <i>Rosa arizonica</i>	Wood's rose; interior rose	shrub	FACU	G5T5, SNR	yes	Sept. 14, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
3	<i>Rubus idaeus ssp. strigosus</i>	<i>Rubus idaeus ssp. aculeatissimus; Rubus idaeus ssp. idaeus</i>	wild raspberry; grayleaf red raspberry; American red raspberry	shrub	FACU	G5T5, SNR	yes	Sept. 14, 2017
3	<i>Salix drummondiana</i>		Drummond's willow	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
3	<i>Salix eastwoodiae</i>		mountain willow	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
3	<i>Salix geyeriana</i>		Geyer's willow	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
3	<i>Salix melanopsis</i>	<i>Salix exigua ssp. melanopsis</i>	dusky willow	shrub	OBL	G5, SNR	yes	Sept. 14, 2017
3	<i>Solidago multiradiata</i>		Rocky Mountain goldenrod	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
3	<i>Sorbus scopulina</i>		mountain ash; Greene's mountain ash; Cascade mountain ash	shrub	FACU	G5, SNR	yes	Sept. 14, 2017
3	<i>Symphoricarpos albus var. laevigatus</i>	<i>Symphoricarpos albus ssp. laevigatus; Symphoricarpos rivularis</i>	common snowberry	shrub	FACU	G5, SNR	yes	Sept. 14, 2017
3	<i>Taraxacum officinale ssp. officinale</i>	<i>Taraxacum officinale</i>	common dandelion	herbaceous dicot	FACU	G5, SNR	no	Sept. 14, 2017
3	<i>Xerophyllum tenax</i>	<i>Helonias tenax</i>	beargrass	herbaceous monocot	FACU	G5, SNR	no	Sept. 14, 2017
4	<i>Amelanchier alnifolia ssp. pumila</i>	<i>Amelanchier alnifolia; Amelanchier pumila</i>	Saskatoon serviceberry	shrub	FACU	G5, SNR	yes	Sept. 14, 2017
4	<i>Arnica cordifolia</i>	<i>Arnica cordifolia ssp. genuina</i>	heartleaf arnica	herbaceous dicot	not listed	G5, SNR	yes	Sept. 14, 2017
4	<i>Bromus carinatus</i>	<i>Bromus carinatus var. californicus; Bromus carinatus var. carinatus</i>	California brome	grass	not listed	G5, SNR	yes	Sept. 14, 2017
4	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 14, 2017
4	<i>Carex rossii</i>	<i>Carex brevipes</i>	Ross's sedge; short sedge	grasslike	not listed	G5, SNR	yes	Sept. 14, 2017
4	<i>Chamerion angustifolium var. canescens</i>	<i>Chamerion angustifolium ssp. circumvagum; Epilobium angustifolium ssp. circumvagum</i>	fireweed	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
4	<i>Elymus trachycaulus ssp. trachycaulus</i>	<i>Agropyron brevifolium; Agropyron trachycaulum</i>	slender wheatgrass; slender wildrye	grass	FAC	G5T5, SNR	yes	Sept. 14, 2017
4	<i>Festuca idahoensis</i>	<i>Festuca idahoensis ssp. idahoensis</i>	Idaho fescue	grass	FACU	G5, SNR	yes	Sept. 14, 2017
4	<i>Fragaria virginiana</i>		wild strawberry; Virginia strawberry	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
4	<i>Galium trifidum var. subbiflorum</i>	<i>Galium trifidum ssp. subbiflorum</i>	threepetal bedstraw	herbaceous dicot	FACW	G5T5, SNR	yes	Sept. 14, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
4	<i>Geranium viscosissimum</i>		sticky geranium; sticky purple geranium	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
4	<i>Heuchera grossulariifolia ssp. grossulariifolia</i>	<i>Heuchera grossulariifolia var. grossulariifolia</i> ; <i>Heuchera grossulariifolia</i>	gooseberry-leaf alumroot	herbaceous dicot	not listed	G4, SNR	yes	Sept. 14, 2017
4	<i>Maianthemum racemosum</i>	<i>Smilacina racemosa</i>	false solomon's seal; feathery false lily-of-the valley	herbaceous dicot	FAC	G5, SNR	yes	Sept. 13, 2017
4	<i>Picea engelmannii var. engelmannii</i>		Engelmann spruce	tree	FAC	G5, SNR	yes	Sept. 14, 2017
4	<i>Poa wheeleri</i>	<i>Poa nervosa var. wheeleri</i>	Wheeler's bluegrass	grass	FACU	G5?, SNR	yes	Sept. 14, 2017
4	<i>Pseudotsuga menziesii</i>		Douglas fir	tree	FACU	G5, SNR	yes	Sept. 14, 2017
4	<i>Rubus parviflorus</i>		thimbleberry	shrub	FACU	G5, SNR	yes	Sept. 14, 2017
4	<i>Symphoricarpos albus var. laevigatus</i>	<i>Symphoricarpos albus ssp. laevigatus</i> ; <i>Symphoricarpos rivularis</i>	common snowberry	shrub	FACU	G5, SNR	yes	Sept. 14, 2017
4	<i>Thalicttrum occidentale</i>		western meadowrue	herbaceous monocot	FACU	G5, SNR	yes	Sept. 14, 2017
4	<i>Xerophyllum tenax</i>	<i>Helonias tenax</i>	beargrass	herbaceous monocot	FACU	G5, SNR	no	Sept. 14, 2017
5	<i>Alnus incana ssp. occidentalis</i>	<i>Alnus incana</i> ; <i>Alnus incana ssp. tenuifolia</i>	thinleaf alder; speckled alder	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
5	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 14, 2017
5	<i>Calamagrostis canadensis var. canadensis</i>	<i>Calamagrostis canadensis</i>	bluejoint reedgrass	grass	FACW	G5T5, SNR	yes	Sept. 14, 2017
5	<i>Chamerion angustifolium var. canescens</i>	<i>Chamerion angustifolium ssp. circumvagum</i> ; <i>Epilobium angustifolium ssp. circumvagum</i>	fireweed	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
5	<i>Cornus sericea</i>	<i>Cornus stolonifera</i>	redosier dogwood	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
5	<i>Equisetum fluviatile</i>		scouring rush	pteridophyte	FAC	G5, SNR	yes	Sept. 14, 2017
5	<i>Erigeron speciosus</i>		alpine fleabane	herbaceous dicot	not listed	G5, SNR	yes	Sept. 14, 2017
5	<i>Geranium viscosissimum</i>		sticky geranium; sticky purple geranium	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
5	<i>Geum macrophyllum var. perincisum</i>	<i>Geum macrophyllum ssp. perincisum</i>	largeleaf avens	herbaceous dicot	FAC	G5T5, SNR	yes	Sept. 14, 2017
5	<i>Glyceria elata</i>	<i>Glyceria striata</i>	tall managrass	grass	FACW	G5, SNR	yes	Sept. 14, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
5	<i>Osmorhiza occidentalis</i>		mountain sweet-cecily; western sweet-cecily; western sweet-root	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 14, 2017
5	<i>Phleum pratense</i>	<i>Phleum nodosum</i>	European timothy; timothy	grass	FAC	GNR, SNA	no	Sept. 14, 2017
5	<i>Platanthera dilatata</i>	<i>Habenaria dilatata</i> ; <i>Piperia dilatata</i>	tall bog orchid; leafy white orchid	herbaceous monocot	FACW	G5, SNR	yes	Sept. 14, 2017
5	<i>Salix drummondiana</i>		Drummond's willow	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
5	<i>Salix eastwoodiae</i>		mountain willow	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
5	<i>Salix geyeriana</i>		Geyer's willow	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
5	<i>Salix melanopsis</i>	<i>Salix exigua ssp. melanopsis</i>	dusky willow	shrub	OBL	G5, SNR	yes	Sept. 14, 2017
5	<i>Saxifraga odontoloma</i>	<i>Micranthes odontoloma</i>	brook saxifrage	herbaceous dicot	FACW	G5, SNR	yes	Sept. 14, 2017
5	<i>Solidago multiradiata</i>		Rocky Mountain goldenrod	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017

**notes: Lower Profile Creek, Reach ID 5, Lat 44.966229, Long -115.423487**

**Elevation 5,340 ft amsl, Gradient 2.66% (Rio, 2018)**

**Zone 1:** Largely bare 60%, predominantly moss due to much energy: 25% moss, 10% forb, 5% grasslike

**Zone 2:** 5% moss, 45% woody, 40% forb, 10% graminoid

**Zone 3:** 5% moss, 60% woody, 25% forb, 10% graminoid

**Zone 4:** 5% moss, 30% woody, 15% forb, 50% graminoid

**Zone 5:** 40% moss, 15% woody, 15% graminoid, 30% forb

**noxious spp:** none noted

**general:** Lower Profile Creek is typified by a steep gradient with accumulation of large woody matter debris into log-jams. However, rises did not serve as an impediment to fish passage, as evidenced by numerous large bull trout upstream at Upper Profile Creek

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
<b>Middle Profile Creek, Reach ID 6, Lat 44.974628, Long -115.420313</b>								
1	<i>Alopecurus aequalis</i>		short-awn foxtail	grass	OBL	G5, SNR	yes	Sept. 14, 2017
1	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 14, 2017
1	<i>Equisetum fluviatile</i>		river horsetail	pteridophyte	FAC	G5, SNR	yes	Sept. 14, 2017
1	<i>Glyceria elata</i>	<i>Glyceria striata</i>	tall mannagrass	grass	FACW	G5, SNR	yes	Sept. 14, 2017
1	<i>Mimulus cusickii</i>	<i>Eunanus cusickii</i> ; <i>Diplacus cusickii</i>	Cusick's monkeyflower	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 14, 2017
1	<i>Saxifraga odontoloma</i>	<i>Micranthes odontoloma</i>	brook saxifrage	herbaceous dicot	FACW	G5, SNR	yes	Sept. 14, 2017
2	<i>Achillea millefolium</i>		common yarrow	herbaceous dicot	FACU	G5, SNR	debate	Sept. 14, 2017
2	<i>Alnus incana ssp. occidentalis</i>	<i>Alnus incana</i> ; <i>Alnus incana ssp. tenuifolia</i>	thinleaf alder; speckled alder	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
2	<i>Anaphalis margaritacea</i>	<i>Anaphalis margaritacea var. angustior</i>	pearly everlasting	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
2	<i>Artemisia ludoviciana ssp. latiloba</i>	<i>Artemisia ludoviciana ssp. candicans</i> ; <i>Artemisia ludoviciana var. candicans</i>	Louisiana sagewort; white sagebrush	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
2	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 14, 2017
2	<i>Chamerion angustifolium var. canescens</i>	<i>Chamerion angustifolium ssp. circumvagum</i> ; <i>Epilobium angustifolium ssp. circumvagum</i>	fireweed	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
2	<i>Cornus sericea</i>	<i>Cornus stolonifera</i>	redosier dogwood	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
2	<i>Galium trifidum var. subbiflorum</i>	<i>Galium trifidum ssp. subbiflorum</i>	threepetal bedstraw	herbaceous dicot	FACW	G5T5, SNR	yes	Sept. 14, 2017
2	<i>Geum macrophyllum var. perincisum</i>	<i>Geum macrophyllum ssp. perincisum</i>	largeleaf avens	herbaceous dicot	FAC	G5T5, SNR	yes	Sept. 14, 2017
2	<i>Glyceria elata</i>	<i>Glyceria striata</i>	tall managrass	grass	FACW	G5	yes	Sept. 14, 2017
2	<i>Heuchera grossulariifolia ssp. grossulariifolia</i>	<i>Heuchera grossulariifolia var. grossulariifolia</i> ; <i>Heuchera grossulariifolia</i>	gooseberry-leaf alumroot	herbaceous dicot	not listed	G4, SNR	yes	Sept. 14, 2017
2	<i>Mimulus cusickii</i>	<i>Eunanus cusickii</i> ; <i>Diplacus cusickii</i>	Cusick's monkeyflower	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 14, 2017
2	<i>Ribes lacustre</i>	<i>Limnobotrya lacustris</i> ; <i>Ribes lacustre var. parvulum</i>	prickly currant; bristly black currant	shrub	FAC	G5, SNR	yes	Sept. 14, 2017
2	<i>Salix drummondiana</i>		Drummond's willow	shrub	FACW	G5, SNR	yes	Sept. 14, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
2	<i>Salix eastwoodiae</i>		mountain willow	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
2	<i>Salix geyeriana</i>		Geyer's willow	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
2	<i>Salix melanopsis</i>	<i>Salix exigua ssp. melanopsis</i>	dusky willow	shrub	OBL	G5, SNR	yes	Sept. 14, 2017
2	<i>Saxifraga odontoloma</i>	<i>Micranthes odontoloma</i>	brook saxifrage	herbaceous dicot	FACW	G5, SNR	yes	Sept. 14, 2017
2	<i>Solidago multiradiata</i>		Rocky Mountain goldenrod	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
3	<i>Acer glabrum var. douglasii</i>		Douglas maple	shrub	FACU	G5T5, SNR	yes	Sept. 14, 2017
3	<i>Achillea millefolium</i>		common yarrow	herbaceous dicot	FACU	G5, SNR	debate	Sept. 14, 2017
3	<i>Alnus incana ssp. occidentalis</i>	<i>Alnus incana</i> ; <i>Alnus incana ssp. tenuifolia</i>	thinleaf alder; speckled alder	shrub	FACW	G5, SNR	yes	Sept. 13, 2017
3	<i>Amelanchier alnifolia ssp. pumila</i>	<i>Amelanchier alnifolia</i> ; <i>Amelanchier pumila</i>	Saskatoon serviceberry	shrub	FACU	G5, SNR	yes	Sept. 14, 2017
3	<i>Artemisia ludoviciana ssp. latiloba</i>	<i>Artemisia ludoviciana ssp. candicans</i> ; <i>Artemisia ludoviciana var. candicans</i>	Louisiana sagewort; white sagebrush	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
3	<i>Chamerion angustifolium var. canescens</i>	<i>Chamerion angustifolium ssp. circumvagum</i> ; <i>Epilobium angustifolium ssp. circumvagum</i>	fireweed	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
3	<i>Cornus sericea</i>	<i>Cornus stolonifera</i>	redosier dogwood	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
3	<i>Dactylis glomerata</i>		orchardgrass	grass	FACU	GNR, SNA	no	Sept. 14, 2017
3	<i>Elymus trachycaulus ssp. trachycaulus</i>	<i>Agropyron brevifolium</i> ; <i>Agropyron trachycaulum</i>	slender wheatgrass; slender wildrye	grass	FAC	G5T5, SNR	yes	Sept. 14, 2017
3	<i>Fragaria virginiana</i>		wild strawberry; Virginia strawberry	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
3	<i>Physocarpus malvaceus</i>		mallow ninebark	shrub	not listed	G5, SNR	yes	Sept. 14, 2017
3	<i>Picea engelmannii var. engelmannii</i>		Engelmann spruce	tree	FAC	G5, SNR	yes	Sept. 14, 2017
3	<i>Populus balsamifera ssp. trichocarpa</i>	<i>Populus trichocarpa</i>	black cottonwood	tree	FAC	G5T5, SNR	yes	Sept. 14, 2017
3	<i>Rhus trilobata</i>		threeleaved sumac; skunkbush sumac	shrub	UPL	G5, SNR	yes	Sept. 14, 2017
3	<i>Ribes hudsonianum var. petiolare</i>		northern black currant; western black currant	shrub	FACW	G5T5, SNR	yes	Sept. 14, 2017
3	<i>Rubus parviflorus</i>		thimbleberry	shrub	FACU	G5, SNR	yes	Sept. 14, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
3	<i>Salix drummondiana</i>		Drummond's willow	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
3	<i>Salix eastwoodiae</i>		mountain willow	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
3	<i>Salix geyeriana</i>		Geyer's willow	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
3	<i>Salix melanopsis</i>	<i>Salix exigua ssp. melanopsis</i>	dusky willow	shrub	OBL	G5, SNR	yes	Sept. 14, 2017
3	<i>Sorbus scopulina</i>		mountain ash; Greene's mountain ash; Cascade mountain ash	shrub	FACU	G5, SNR	yes	Sept. 14, 2017
3	<i>Thalectrum occidentale</i>		western meadowrue	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
4	<i>Amelanchier alnifolia ssp. pumila</i>	<i>Amelanchier alnifolia</i> ; <i>Amelanchier pumila</i>	Saskatoon serviceberry	shrub	FACU	G5, SNR	yes	Sept. 14, 2017
4	<i>Anaphalis margaritacea</i>	<i>Anaphalis margaritacea var. angustior</i>	pearly everlasting	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
4	<i>Antennaria rosea</i>		rosy pussytoes	herbaceous dicot	not listed	G5, SNR	yes	Sept. 14, 2017
4	<i>Artemisia ludoviciana ssp. latiloba</i>	<i>Artemisia ludoviciana ssp. candicans</i> ; <i>Artemisia ludoviciana var. candicans</i>	Louisiana sagewort; white sagebrush	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
4	<i>Bromus carinatus</i>	<i>Bromus carinatus var. californicus</i> ; <i>Bromus carinatus var. carinatus</i>	California brome	grass	not listed	G5, SNR	yes	Sept. 14, 2017
4	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 14, 2017
4	<i>Carex rossii</i>	<i>Carex brevipes</i>	Ross's sedge; short sedge	grasslike	not listed	G5, SNR	yes	Sept. 14, 2017
4	<i>Chamerion angustifolium var. canescens</i>	<i>Chamerion angustifolium ssp. circumvagum</i> ; <i>Epilobium angustifolium ssp. circumvagum</i>	fireweed	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
4	<i>Elymus trachycaulus ssp. trachycaulus</i>	<i>Agropyron brevifolium</i> ; <i>Agropyron trachycaulum</i>	slender wheatgrass; slender wildrye	grass	FAC	G5T5, SNR	yes	Sept. 14, 2017
4	<i>Festuca idahoensis</i>	<i>Festuca idahoensis ssp. idahoensis</i>	Idaho fescue	grass	FACU	G5, SNR	yes	Sept. 14, 2017
4	<i>Fragaria virginiana</i>		wild strawberry; Virginia strawberry	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
4	<i>Galium trifidum var. subbiflorum</i>	<i>Galium trifidum ssp. subbiflorum</i>	threepetal bedstraw	herbaceous dicot	FACW	G5T5, SNR	yes	Sept. 14, 2017
4	<i>Picea engelmannii var. engelmannii</i>		Engelmann spruce	tree	FAC	G5, SNR	yes	Sept. 14, 2017
4	<i>Pseudotsuga menziesii</i>		Douglas fir	tree	FACU	G5, SNR	yes	Sept. 14, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
4	<i>Rubus idaeus ssp. strigosus</i>	<i>Rubus idaeus ssp. aculeatissimus</i> ; <i>Rubus idaeus ssp. idaeus</i>	wild raspberry; grayleaf red raspberry; American red raspberry	shrub	FACU	G5T5, SNR	yes	Sept. 14, 2017
4	<i>Trifolium hybridum</i>	<i>Trifolium elegans</i>	alsike clover	herbaceous dicot	FAC	GNR, SNA	no	Sept. 11, 2017
4	<i>Vicia americana</i>		American vetch; American purple vetch	herbaceous dicot	FAC	G5, SNR	yes	Sept. 14, 2017

**notes: Middle Profile Creek, Reach ID 6, Lat 44.974628, Long -115.420313**

**Elevation 5,471 ft amsl, Gradient 7.00% (Rio, 2018)**

**Zone 1:** Largely bare (90%): of remaining 10%: 80% moss, 10% forb, 10% grasslike

**Zone 2:** Largely rock (65%), of remaining 35%: 20% moss, 60% woody, 10% forb, 10% graminoid

**Zone 3:** 5% moss, 65% woody, 10% forb, 20% graminoid

**Zone 4:** mostly rock (talus): of remaining 30% moss, 20% woody, 10% forb, 40% graminoid

**noxious spp:** *Onopordum acanthium* - Scotch thistle

**general:** steep gradient system (over 10%) with large woody material debris accumulation. This accumulation did not serve as an impediment to fish passage, as evidenced by bull trout at Upper Profile Creek. Steep, rocky profile characterized by having little vegetation, presumably due to the presence of high energy, scouring flows. No Zone 5 was present for the system.

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
<b>Upper Profile Creek, Reach ID 8, Lat 45.08887, Long -115.394073</b>								
1	<i>Alopecurus aequalis</i>		short-awn foxtail	grass	OBL	G5, SNR	yes	Sept. 14, 2017
1	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 14, 2017
1	<i>Carex neurophora</i>		alpine nerve sedge	grasslike	FACW	G4, SNR	yes	Sept. 14, 2017
1	<i>Equisteum fluviatile</i>		river horsetail	pteridophyte	FAC	G5, SNR	yes	Sept. 14, 2017
1	<i>Glyceria elata</i>	<i>Glyceria striata</i>	tall mannagrass	grass	FACW	G5, SNR	yes	Sept. 14, 2017
1	<i>Mimulus cusickii</i>	<i>Eunanus cusickii</i> ; <i>Diplacus cusickii</i>	Cusick's monkeyflower	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 14, 2017
2	<i>Alnus incana ssp. occidentalis</i>	<i>Alnus incana</i> ; <i>Alnus incana ssp. tenuifolia</i>	thinleaf alder; speckled alder	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
2	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 14, 2017
2	<i>Calamagrostis canadensis var. canadensis</i>	<i>Calamagrostis canadensis</i>	bluejoint reedgrass	grass	FACW	G5T5, SNR	yes	Sept. 14, 2017
2	<i>Carex neurophora</i>		alpine nerve sedge	grasslike	FACW	G4, SNR	yes	Sept. 14, 2017
2	<i>Chamerion angustifolium var. canescens</i>	<i>Chamerion angustifolium ssp. circumvagum</i> ; <i>Epilobium angustifolium ssp. circumvagum</i>	fireweed	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
2	<i>Elymus glaucus ssp. glaucus</i>	<i>Elymus glaucus var. breviaristatus</i>	blue wildrye	grass	FACU	G5T5, SNR	yes	Sept. 14, 2017
2	<i>Equisteum fluviatile</i>		river horsetail	pteridophyte	FAC	G5, SNR	yes	Sept. 14, 2017
2	<i>Geum macrophyllum var. perincisum</i>	<i>Geum macrophyllum ssp. perincisum</i>	largeleaf avens	herbaceous dicot	FAC	G5T5, SNR	yes	Sept. 14, 2017
2	<i>Glyceria elata</i>	<i>Glyceria striata</i>	tall managrass	grass	FACW	G5, SNR	yes	Sept. 14, 2017
2	<i>Heracleum sphondylium</i>	<i>Heracleum maximum</i>	cow parsnip; American cow parsnip	herbaceous dicot	FAC	G5, SNR	yes	Sept. 14, 2017
2	<i>Maianthemum racemosum</i>	<i>Smilacina racemosa</i>	false solomon's seal; feathery false lily-of-the valley	herbaceous dicot	FAC	G5, SNR	yes	Sept. 14, 2017
2	<i>Mertensia ciliata</i>		alpine bluebell; streamside bluebell	herbaceous dicot	FACW	G5T5?, SNR	yes	Sept. 14, 2017
2	<i>Mimulus cusickii</i>	<i>Eunanus cusickii</i> ; <i>Diplacus cusickii</i>	Cusick's monkeyflower	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 14, 2017
2	<i>Osmorhiza occidentalis</i>		mountain sweet-cecily; western sweet-cecily; western sweet-root	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 14, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
2	<i>Ribes lacustre</i>	<i>Limnobotrya lacustris</i> ; <i>Ribes lacustre</i> var. <i>parvulum</i>	prickly currant; bristly black currant	shrub	FAC	G5, SNR	yes	Sept. 14, 2017
2	<i>Saxifraga odontoloma</i>	<i>Micranthes odontoloma</i>	brook saxifrage	herbaceous dicot	FACW	G5, SNR	yes	Sept. 14, 2017
2	<i>Urtica dioica</i>		stinging nettle	herbaceous dicot	FAC	G5, SNR	yes	Sept. 14, 2017
3	<i>Alnus incana</i> ssp. <i>occidentalis</i>	<i>Alnus incana</i> ; <i>Alnus incana</i> ssp. <i>tenuifolia</i>	thinleaf alder; speckled alder	shrub	FACW	G5, SNR	yes	Sept. 13, 2017
3	<i>Chamerion angustifolium</i> var. <i>canescens</i>	<i>Chamerion angustifolium</i> ssp. <i>circumvagum</i> ; <i>Epilobium angustifolium</i> ssp. <i>circumvagum</i>	fireweed	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
3	<i>Cornus sericea</i>	<i>Cornus stolonifera</i>	redosier dogwood	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
3	<i>Equisetum fluviatile</i>		river horsetail	pteridophyte	FAC	G5, SNR	yes	Sept. 14, 2017
3	<i>Erigeron speciosus</i>		aspen fleabane	herbaceous dicot	not listed	G5, SNR	yes	Sept. 11, 2017
3	<i>Glyceria elata</i>	<i>Glyceria striata</i>	tall managrass	grass	FACW	G5, SNR	yes	Sept. 14, 2017
3	<i>Picea engelmannii</i> var. <i>engelmannii</i>		Engelmann spruce	tree	FAC	G5, SNR	yes	Sept. 14, 2017
3	<i>Ribes hudsonianum</i> var. <i>petiolare</i>		northern black currant; western black currant	shrub	FACW	G5T5, SNR	yes	Sept. 14, 2017
3	<i>Ribes lacustre</i>	<i>Limnobotrya lacustris</i> ; <i>Ribes lacustre</i> var. <i>parvulum</i>	prickly currant; bristly black currant	shrub	FAC	G5, SNR	yes	Sept. 14, 2017
3	<i>Salix drummondiana</i>		Drummond's willow	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
3	<i>Salix eastwoodiae</i>		mountain willow	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
3	<i>Salix geyeriana</i>		Geyer's willow	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
3	<i>Salix melanopsis</i>	<i>Salix exigua</i> ssp. <i>melanopsis</i>	dusky willow	shrub	OBL	G5, SNR	yes	Sept. 14, 2017
3	<i>Sorbus scopulina</i>		mountain ash; Greene's mountain ash; Cascade mountain ash	shrub	FACU	G5, SNR	yes	Sept. 14, 2017
3	<i>Vaccinium scoparium</i>		grouse huckleberry; grouseberry; grouse whortleberry	shrub	FACU	G5, SNR	yes	Sept. 12, 2017
3	<i>Xerophyllum tenax</i>	<i>Helonias tenax</i>	beargrass	herbaceous monocot	FACU	G5, SNR	no	Sept. 14, 2017
4	<i>Amelanchier alnifolia</i> ssp. <i>pumila</i>	<i>Amelanchier alnifolia</i> ; <i>Amelanchier pumila</i>	Saskatoon serviceberry	shrub	FACU	G5, SNR	yes	Sept. 14, 2017
4	<i>Anaphalis margaritacea</i>	<i>Anaphalis margaritacea</i> var. <i>angustior</i>	pearly everlasting	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
4	<i>Carex rossii</i>	<i>Carex brevipes</i>	Ross's sedge; short sedge	grasslike	not listed	G5, SNR	yes	Sept. 14, 2017
4	<i>Chamerion angustifolium var. canescens</i>	<i>Chamerion angustifolium ssp. circumvagum</i> ; <i>Epilobium angustifolium ssp. circumvagum</i>	fireweed	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
4	<i>Elymus trachycaulus ssp. trachycaulus</i>	<i>Agropyron brevifolium</i> ; <i>Agropyron trachycaulum</i>	slender wheatgrass; slender wildrye	grass	FACU	G5T5, SNR	yes	Sept. 14, 2017
4	<i>Festuca idahoensis</i>	<i>Festuca idahoensis ssp. idahoensis</i>	Idaho fescue	grass	FACU	G5, SNR	yes	Sept. 14, 2017
4	<i>Iliamna rivularis</i>		streambank wild hollyhock	herbaceous dicot	FAC	G5, SNR	yes	Sept. 14, 2017
4	<i>Onopordum acanthium</i>		Scotch thistle	herbaceous dicot	not listed	GNR, SNA (noxious)	no (noxious)	Sept. 14, 2017
4	<i>Picea engelmannii var. engelmannii</i>		Engelmann spruce	tree	FAC	G5, SNR	yes	Sept. 14, 2017
4	<i>Pseudotsuga menziesii</i>		Douglas fir	tree	FACU	G5, SNR	yes	Sept. 14, 2017
4	<i>Shepherdia canadensis</i>	<i>Elaeagnus canadensis</i>	russet buffaloberry; Canada buffaloberry	shrub	UPL	G5, SNR	yes	Sept. 14, 2017
4	<i>Taraxacum officinale</i>	<i>Taraxacum officinale ssp. officinale</i>	common dandelion	herbaceous dicot	FACU	G5, SNR	no	Sept. 14, 2017
4	<i>Vaccinium scoparium</i>		grouse huckleberry; grouseberry; grouse whortleberry	shrub	FACU	G5, SNR	yes	Sept. 14, 2017
5	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 14, 2017
5	<i>Calamagrostis canadensis var. canadensis</i>	<i>Calamagrostis canadensis</i>	bluejoint reedgrass	grass	FACW	G5T5, SNR	yes	Sept. 14, 2017
5	<i>Cornus sericea</i>	<i>Cornus stolonifera</i>	redosier dogwood	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
5	<i>Equisteum fluviatile</i>		river horsetail	pteridophyte	FAC	G5, SNR	yes	Sept. 14, 2017
5	<i>Geum macrophyllum var. perincisum</i>	<i>Geum macrophyllum ssp. perincisum</i>	largeleaf avens	herbaceous dicot	FAC	G5T5, SNR	yes	Sept. 14, 2017
5	<i>Glyceria elata</i>	<i>Glyceria striata</i>	tall managrass	grass	FACW	G5, SNR	yes	Sept. 14, 2017
5	<i>Lonicera involucrata var. involucrata</i>	<i>Lonicera involucrata</i>	twinberry honeysuckle; fly honeysuckle	shrub	FAC	G5T4T5, SNR	yes	Sept. 14, 2017
5	<i>Mimulus cusickii</i>	<i>Eunanus cusickii</i> ; <i>Diplacus cusickii</i>	Cusick's monkeyflower	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 14, 2017
5	<i>Osmorhiza occidentalis</i>		mountain sweet-cecily; western sweet-cecily; western sweet-root	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 14, 2017
5	<i>Salix drummondiana</i>		Drummond's willow	shrub	FACW	G5, SNR	yes	Sept. 14, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
5	<i>Salix eastwoodiae</i>		mountain willow	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
5	<i>Salix geyeriana</i>		Geyer's willow	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
5	<i>Salix melanopsis</i>	<i>Salix exigua ssp. melanopsis</i>	dusky willow	shrub	OBL	G5, SNR	yes	Sept. 14, 2017

**notes: Upper Profile Creek, Reach ID 8, Lat 45.08887, Long -115.394073**

**Elevation 6,122 ft amsl, Gradient 6.21% (Rio, 2018)**

**Zone 1:** Largely bare (90%): of remaining 10%: 75% moss, 12.5% forb, 12.5% grasslike

**Zone 2:** Largely rock (65%), of remaining 35%: 20% moss, 60% woody, 10% forb, 10% graminoid

**Zone 3:** 5% moss, 70% woody, 15% forb, 10% graminoid

**Zone 4:** 30% standing dead, 50% forb, 20% graminoid

**Zone 5:** 30% moss, 20% woody, 25% forb, 25% graminoid

**noxious spp:** *Onopordum acanthium* - Scotch thistle

**general:** Upper Profile Creek recently experienced a fire and is characterized by a braided channel and excellent spawning redd habitat, with numerous large bull trout present.

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
<b>Fiddle Creek, Reach ID 19, Lat44.915427, Long -115.34031</b>								
1	<i>Alopecurus aequalis</i>		short-awn foxtail	grass	OBL	G5, SNR	yes	Sept. 14, 2017
1	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 14, 2017
1	<i>Glyceria elata</i>	<i>Glyceria striata</i>	mannagrass	grass	FACW	G5, SNR	yes	Sept. 14, 2017
1	<i>Mimulus cusickii</i>	<i>Eunanus cusickii</i> ; <i>Diplacus cusickii</i>	Cusick's monkeyflower	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 14, 2017
1	<i>Viola adunca</i>		hookedspur violet; sand violet	herbaceous dicot	FAC	G5, SNR	yes	Sept. 14, 2017
2	<i>Actaea rubra</i>		red baneberry	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
2	<i>Alopecurus aequalis</i>		short-awn foxtail	grass	OBL	G5, SNR	yes	Sept. 14, 2017
2	<i>Fragaria virginiana</i>		wild strawberry; Virginia strawberry	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
2	<i>Maianthemum racemosum</i>	<i>Smilacina racemosa</i>	false solomon's seal; feathery false lily-of-the valley	herbaceous dicot	FAC	G5, SNR	yes	Sept. 14, 2017
2	<i>Saxifraga odontoloma</i>	<i>Micranthes odontoloma</i>	brook saxifrage	herbaceous dicot	FACW	G5, SNR	yes	Sept. 14, 2017
2	<i>Vaccinium scoparium</i>		grouse huckleberry; grouseberry; grouse whortleberry	shrub	FACU	G5, SNR	yes	Sept. 14, 2017
2	<i>Viola adunca</i>		hookedspur violet; sand violet	herbaceous dicot	FAC	G5, SNR	yes	Sept. 14, 2017
3	<i>Acer glabrum var. douglasii</i>		Douglas maple	shrub	FACU	G5T5, SNR	yes	Sept. 14, 2017
3	<i>Actaea rubra</i>		red baneberry	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
3	<i>Alnus incana ssp. occidentalis</i>	<i>Alnus incana</i> ; <i>Alnus incana ssp. tenuifolia</i>	thinleaf alder; speckled alder	shrub	FACW	G5, SNR	yes	Sept. 14, 2017
3	<i>Erigeron speciosus</i>		aspen fleabane	herbaceous dicot	not listed	G5, SNR	yes	Sept. 14, 2017
3	fungi species	not applicable	mushroom (various)	fungi	not applicable	not applicable	yes	Sept. 14, 2017
3	<i>Galium trifidum var. subbiflorum</i>	<i>Galium trifidum ssp. subbiflorum</i>	threepetal bedstraw	herbaceous dicot	FACW	G5T5, SNR	yes	Sept. 14, 2017
3	<i>Ledum glandulosum</i>	<i>Ledum glandulosum var. californicum</i> ; <i>Rhododendron columbianum</i> ; <i>R. neoglandulosum</i>	western Labrador tea; glandular Labrador tea	shrub	OBL	G5, SNR	yes	Sept. 14, 2017
3	<i>Lonicera involucrata var. involucrata</i>	<i>Lonicera involucrata</i>	twinberry honeysuckle; fly honeysuckle	shrub	FAC	G5T4T5, SNR	yes	Sept. 14, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
3	<i>Maianthemum racemosum</i>	<i>Smilacina racemosa</i>	false solomon's seal; feathery false lily-of-the valley	herbaceous dicot	FAC	G5, SNR	yes	Sept. 14, 2017
3	<i>Osmorhiza occidentalis</i>		mountain sweet-cecily; western sweet-cecily; western sweet-root	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 14, 2017
3	<i>Pyrola asarifolia</i> var. <i>asarifolia</i>	<i>Pyrola asarifolia</i> ssp. <i>asarifolia</i>	bog wintergreen; pink wintergreen	herbaceous dicot	FACU	G5T5, SNR	yes	Sept. 14, 2017
3	<i>Ribes lacustre</i>	<i>Limnobotrya lacustris</i> ; <i>Ribes lacustre</i> var. <i>parvulum</i>	prickly currant; bristly black currant	shrub	FAC	G5, SNR	yes	Sept. 14, 2017
3	<i>Viola adunca</i>		hookedspur violet; sand violet	herbaceous dicot	FAC	G5, SNR	yes	Sept. 14, 2017
4	<i>Alnus viridis</i> ssp. <i>sinuata</i>	<i>Alnus alnobetula</i> ; <i>Alnus alnobetula</i> ssp. <i>sinuata</i> ; <i>Alnus viridis</i>	Sitka alder	shrub	FACW	G5T5, SNR	yes	Sept. 14, 2017
4	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 14, 2017
4	<i>Cornus unalaschkensis</i>	<i>Chamaepericlymenum unalaschkense</i>	western cordilleran bunchberry; western dwarf dogwood	shrub	not listed	G5, SNR	yes	Sept. 14, 2017
4	<i>Galium trifidum</i> var. <i>subbiflorum</i>	<i>Galium trifidum</i> ssp. <i>subbiflorum</i>	threepetal bedstraw	herbaceous dicot	FACW	G5T5, SNR	yes	Sept. 14, 2017
4	<i>Ledum glandulosum</i>	<i>Ledum glandulosum</i> var. <i>californicum</i> ; <i>Rhododendron columbianum</i> ; <i>R. neoglandulosum</i>	western Labrador tea; glandular Labrador tea	shrub	OBL	G5, SNR	yes	Sept. 14, 2017
4	<i>Picea engelmannii</i> var. <i>engelmannii</i>		Engelmann spruce	tree	FAC	G5, SNR	yes	Sept. 14, 2017
4	<i>Pseudotsuga menziesii</i>		Douglas fir	tree	FACU	G5, SNR	yes	Sept. 14, 2017
4	<i>Pyrola asarifolia</i> var. <i>asarifolia</i>	<i>Pyrola asarifolia</i> ssp. <i>asarifolia</i>	bog wintergreen; pink wintergreen	herbaceous dicot	FACU	G5T5, SNR	yes	Sept. 14, 2017
4	<i>Ribes lacustre</i>	<i>Limnobotrya lacustris</i> ; <i>Ribes lacustre</i> var. <i>parvulum</i>	prickly currant; bristly black currant	shrub	FAC	G5, SNR	yes	Sept. 14, 2017
4	<i>Viola adunca</i>		hookedspur violet; sand violet	herbaceous dicot	FAC	G5, SNR	yes	Sept. 14, 2017
5	<i>Actaea rubra</i>		red baneberry	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
5	<i>Alopecurus aequalis</i>		short-awn foxtail	grass	OBL	G5, SNR	yes	Sept. 14, 2017
5	<i>Arnica cordifolia</i>	<i>Arnica cordifolia</i> ssp. <i>genuina</i>	heartleaf arnica	herbaceous dicot	not listed	G5, SNR	yes	Sept. 14, 2017
5	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 14, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
5	fungi species	not applicable	mushroom (various)	fungi	not applicable	not applicable	yes	Sept. 14, 2017
5	<i>Galium trifidum var. subbiflorum</i>	<i>Galium trifidum ssp. subbiflorum</i>	threepetal bedstraw	herbaceous dicot	FACW	G5T5, SNR	yes	Sept. 14, 2017
5	<i>Maianthemum racemosum</i>	<i>Smilacina racemosa</i>	false solomon's seal; feathery false lily-of-the valley	herbaceous dicot	FAC	G5, SNR	yes	Sept. 14, 2017
5	<i>Osmorhiza occidentalis</i>		mountain sweet-cecily; western sweet-cecily; western sweet-root	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 14, 2017
5	<i>Pyrola asarifolia var. asarifolia</i>	<i>Pyrola asarifolia ssp. asarifolia</i>	bog wintergreen; pink wintergreen	herbaceous dicot	FACU	G5T5, SNR	yes	Sept. 14, 2017
5	<i>Solidago multiradiata</i>		Rocky Mountain goldenrod	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
5	<i>Thalectrum occidentale</i>		western meadowrue	herbaceous dicot	FACU	G5, SNR	yes	Sept. 14, 2017
5	<i>Viola adunca</i>		hookedspur violet; sand violet	herbaceous dicot	FAC	G5, SNR	yes	Sept. 14, 2017

**notes: Fiddle Creek Reach ID 19, Lat 44.915427, Long -115.34031**

**Elevation 6,620 ft amsl, Gradient 14.52% (Rio, 2018)**

**Zone 1:** 70% moss, 10% forb, 10% graminoid, 10% woody

**Zone 2:** 70% moss, 20% forb, 10% graminoid

**Zone 3:** 5% moss, 70% woody, 15% forb, 10% graminoid

**Zone 4:** 75% woody, 15% forb, 10% graminoid

**Zone 5:** 10% moss, 5% fungi, 20% woody, 55% forb, 10% graminoid

**noxious spp:** none found

**general:** Fiddle Creek is a high gradient system under a dense, mature coniferous canopy. Lower Fiddle Creek has a narrow culvert occurring under the road surface, which effectively serves as a barrier to fish passage.

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
<b>Main Stem East Fork, Reach 23, Lat 44.907573, Long -115.329647</b>								
1	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 15, 2017
1	<i>Carex neurophora</i>		alpine-nerved sedge	grasslike	FACW	G4, SNR	yes	Sept. 15, 2017
1	<i>Carex utriculata</i>	<i>Carex inflata</i> var. <i>utriculata</i> ; <i>Carex rostrata</i> var. <i>utriculata</i>	beaked sedge	grasslike	OBL	G5, SNR	yes	Sept. 15, 2017
1	<i>Equisetum fluviatile</i>		river horsetail	pteridophyte	FAC	G5, SNR	yes	Sept. 15, 2017
1	<i>Erigeron speciosus</i>		aspen fleabane	herbaceous dicot	not listed	G5, SNR	yes	Sept. 15, 2017
1	<i>Maianthemum racemosum</i>	<i>Smilacina racemosa</i>	false solomon's seal; feathery false lily-of-the valley	herbaceous dicot	FAC	G5, SNR	yes	Sept. 15, 2017
1	<i>Osmorhiza occidentalis</i>		mountain sweet-cecily; western sweet-cecily; mountain sweet-root	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 15, 2017
2	<i>Actaea rubra</i>		red baneberry	herbaceous dicot	FACU	G5, SNR	yes	Sept. 15, 2017
2	<i>Alnus incana</i> ssp. <i>occidentalis</i>	<i>Alnus incana</i> ; <i>Alnus incana</i> ssp. <i>tenuifolia</i>	thinleaf alder; speckled alder	shrub	FACW	G5, SNR	yes	Sept. 15, 2017
2	<i>Betula glandulosa</i>	<i>Betula nana</i>	bog birch; dwarf arctic birch; swamp birch; resin birch	shrub	OBL	G5, SNR	yes	Sept. 15, 2017
2	<i>Carex illota</i>		sheep sedge; small-head sedge	grasslike	FACW	G5, SNR	yes	Sept. 15, 2017
2	<i>Carex neurophora</i>		alpine-nerved sedge	grasslike	FACW	G4, SNR	yes	Sept. 15, 2017
2	<i>Chamerion angustifolium</i> var. <i>canescens</i>	<i>Chamerion angustifolium</i> ssp. <i>circumvagum</i> ; <i>Epilobium angustifolium</i> ssp. <i>circumvagum</i>	fireweed	herbaceous dicot	FACU	G5, SNR	yes	Sept. 15, 2017
2	<i>Cornus sericea</i>	<i>Cornus stolonifera</i>	redosier dogwood	shrub	FACW	G5, SNR	yes	Sept. 15, 2017
2	<i>Equisetum fluviatile</i>		river horsetail	pteridophyte	FAC	G5, SNR	yes	Sept. 15, 2017
2	<i>Erigeron speciosus</i>		aspen fleabane	herbaceous dicot	not listed	G5, SNR	yes	Sept. 15, 2017
2	<i>Geum macrophyllum</i> var. <i>perincisum</i>	<i>Geum macrophyllum</i> ssp. <i>perincisum</i>	largeleaf avens	herbaceous dicot	FAC	G5T5, SNR	yes	Sept. 15, 2017
2	<i>Heracleum sphondylium</i>	<i>Heracleum maximum</i>	cow parsnip; American cow parsnip	herbaceous dicot	FAC	G5, SNR	yes	Sept. 15, 2017
2	<i>Juncus arcticus</i> ssp. <i>littoralis</i>	<i>Juncus balticus</i> ; <i>Juncus balticus</i> ssp. <i>littoralis</i>	mountain rush; shoreline rush	grasslike	FACW	G5T5, SNR	yes	Sept. 15, 2017
2	<i>Juncus drummondii</i>		Drummond's rush	grasslike	FACW	G5, SNR	yes	Sept. 15, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
2	<i>Juncus ensifolius var. ensifolius</i>	<i>Juncus ensifolius</i>	three-stamened rush	grasslike	FACW	G5, SNR	yes	Sept. 15, 2017
2	<i>Lonicera involucrata var. involucrata</i>	<i>Lonicera involucrata</i>	twinberry honeysuckle; fly honeysuckle	shrub	FAC	G5T4T5, SNR	yes	Sept. 15, 2017
2	<i>Maianthemum racemosum</i>	<i>Smilacina racemosa</i>	false solomon's seal; feathery false lily-of-the valley	herbaceous dicot	FAC	G5, SNR	yes	Sept. 15, 2017
2	<i>Osmorhiza occidentalis</i>		mountain sweet-cecily; western sweet-cecily; mountain sweet-root	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 15, 2017
2	<i>Ribes lacustre</i>	<i>Limnobotrya lacustris</i> ; <i>Ribes lacustre var. parvulum</i>	prickly currant; bristly black currant	shrub	FAC	G5, SNR	yes	Sept. 15, 2017
2	<i>Salix drummondiana</i>		Drummond's willow	shrub	FACW	G5, SNR	yes	Sept. 15, 2017
2	<i>Salix eastwoodiae</i>		mountain willow	shrub	FACW	G5, SNR	yes	Sept. 15, 2017
2	<i>Salix geyeriana</i>		Geyer's willow	shrub	FACW	G5, SNR	yes	Sept. 15, 2017
2	<i>Salix melanopsis</i>	<i>Salix exigua ssp. melanopsis</i>	dusky willow	shrub	OBL	G5, SNR	yes	Sept. 15, 2017
2	<i>Trifolium hybridum</i>	<i>Trifolium elegans</i>	alsike clover	herbaceous dicot	FAC	GNR, SNA	no	Sept. 15, 2017
2	<i>Viola adunca</i>		hookedspur violet; sand violet	herbaceous dicot	FAC	G5, SNR	yes	Sept. 15, 2017
3	<i>Achillea millefolium</i>		common yarrow	herbaceous dicot	FACU	G5, SNR	debate	Sept. 15, 2017
3	<i>Carex illota</i>		sheep sedge; small-head sedge	grasslike	FACW	G5, SNR	yes	Sept. 15, 2017
3	<i>Carex neurophora</i>		alpine-nerved sedge	grasslike	FACW	G4, SNR	yes	Sept. 15, 2017
3	<i>Chamerion angustifolium var. canescens</i>	<i>Chamerion angustifolium ssp. circumvagum</i> ; <i>Epilobium angustifolium ssp. circumvagum</i>	fireweed	herbaceous dicot	FACU	G5, SNR	yes	Sept. 15, 2017
3	<i>Delphinium x occidentale</i>	<i>Delphinium cucullatum</i>	western larkspur; duncecap larkspur	herbaceous dicot	FACU	GSA, SNA	yes	Sept. 11, 2017
3	<i>Elymus trachycaulus ssp. trachycaulus</i>	<i>Agropyron brevifolium</i> ; <i>Agropyron trachycaulum</i>	slender wheatgrass; slender wildrye	grass	FAC	G5T5, SNR	yes	Sept. 15, 2017
3	<i>Fragaria virginiana</i>		wild strawberry; Virginia strawberry	herbaceous dicot	FACU	G5, SNR	yes	Sept. 15, 2017
3	<i>Heracleum sphondylium</i>	<i>Heracleum maximum</i>	cow parsnip; American cow parsnip	herbaceous dicot	FAC	G5, SNR	yes	Sept. 15, 2017
3	<i>Juncus arcticus ssp. littoralis</i>	<i>Juncus balticus</i> ; <i>Juncus balticus ssp. littoralis</i>	mountain rush; shoreline rush	grasslike	FACW	G5T5, SNR	yes	Sept. 15, 2017
3	<i>Lonicera involucrata var. involucrata</i>	<i>Lonicera involucrata</i>	twinberry honeysuckle; fly honeysuckle	shrub	FAC	G5T4T5, SNR	yes	Sept. 15, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
3	<i>Maianthemum racemosum</i>	<i>Smilacina racemosa</i>	false solomon's seal; feathery false lily-of-the valley	herbaceous dicot	FAC	G5, SNR	yes	Sept. 15, 2017
3	<i>Osmorhiza occidentalis</i>		mountain sweet-cecily; western sweet-cecily; mountain sweet-root	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 15, 2017
3	<i>Picea engelmannii</i> var. <i>engelmannii</i>		Engelmann spruce	tree	FAC	G5, SNR	yes	Sept. 15, 2017
3	<i>Poa wheeleri</i>	<i>Poa nervosa</i> var. <i>wheeleri</i>	Wheeler's bluegrass	grass	FACU	G5?, SNR	yes	Sept. 15, 2017
3	<i>Ribes hudsonianum</i> var. <i>petiolare</i>		northern black currant; western black currant	shrub	FACW	G5T5, SNR	yes	Sept. 14, 2017
3	<i>Salix drummondiana</i>		Drummond's willow	shrub	FACW	G5, SNR	yes	Sept. 15, 2017
3	<i>Salix eastwoodiae</i>		mountain willow	shrub	FACW	G5, SNR	yes	Sept. 15, 2017
3	<i>Salix geyeriana</i>		Geyer's willow	shrub	FACW	G5, SNR	yes	Sept. 15, 2017
3	<i>Salix melanopsis</i>	<i>Salix exigua</i> ssp. <i>melanopsis</i>	dusky willow	shrub	OBL	G5, SNR	yes	Sept. 15, 2017
3	<i>Thalectrum occidentale</i>		western meadowrue	herbaceous dicot	FACU	G5, SNR	yes	Sept. 15, 2017
3	<i>Trifolium hybridum</i>	<i>Trifolium elegans</i>	alsike clover	herbaceous dicot	FAC	GNR, SNA	no	Sept. 15, 2017
3	<i>Viola adunca</i>		hookedspur violet; sand violet	herbaceous dicot	FAC	G5, SNR	yes	Sept. 15, 2017
4	<i>Achillea millefolium</i>		common yarrow	herbaceous dicot	FACU	G5, SNR	yes	Sept. 15, 2017
4	<i>Antennaria rosea</i>		rosy pussytoes	herbaceous dicot	not listed	G5, SNR	yes	Sept. 15, 2017
4	<i>Carex rossii</i>	<i>Carex brevipes</i>	Ross sedge; short sedge	grasslike	not listed	G5, SNR	yes	Sept. 15, 2017
4	<i>Erigeron speciosus</i>		alpine fleabane	herbaceous dicot	not listed	G5, SNR	yes	Sept. 15, 2017
4	<i>Festuca idahoensis</i>	<i>Festuca idahoensis</i> ssp. <i>idahoensis</i>	Idaho fescue	grass	FACU	G5, SNR	yes	Sept. 15, 2017
4	<i>Fragaria virginiana</i>		wild strawberry; Virginia strawberry	herbaceous dicot	FACU	G5, SNR	yes	Sept. 15, 2017
4	<i>Galium trifidum</i> var. <i>subbiflorum</i>	<i>Galium trifidum</i> ssp. <i>subbiflorum</i>	threepetal bedstraw	herbaceous dicot	FACW	G5T5, SNR	yes	Sept. 15, 2017
4	<i>Geranium viscosissimum</i>		sticky geranium; sticky purple geranium	herbaceous dicot	FACU	G5, SNR	yes	Sept. 15, 2017
4	<i>Lupinus sericeus</i>		silky lupine	herbaceous dicot	not listed	G5, SNR	yes	Sept. 12, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
4	<i>Mahonia repens</i>	<i>Berberis repens</i>	creeping mahonia; Oregon grape; creeping barberry	shrub	not listed	G5, SNR	yes	Sept. 15, 2017
4	<i>Penstemon procerus</i> var. <i>procerus</i>	<i>Penstemon confertus</i> ssp. <i>procerus</i>	small-flowered penstemon; pincushion beardstongue	herbaceous dicot	FAC	G5T5, SNR	yes	Sept. 15, 2017
4	<i>Picea engelmannii</i> var. <i>engelmannii</i>		Engelmann's spruce	tree	FAC	G5, SNR	yes	Sept. 15, 2017
4	<i>Pinus contorta</i>		lodgepole pine	tree	FAC	G5T5, SNR	yes	Sept. 15, 2017
4	<i>Poa wheeleri</i>	<i>Poa nervosa</i> var. <i>wheeleri</i>	Wheeler's bluegrass	grass	FACU	G5?, SNR	yes	Sept. 15, 2017
4	<i>Ribes hudsonianum</i> var. <i>petiolare</i>		northern black currant; western black currant	shrub	FACW	G5T5, SNR	yes	Sept. 14, 2017
4	<i>Ribes lacustre</i>	<i>Limnobotrya lacustris</i> ; <i>Ribes lacustre</i> var. <i>parvulum</i>	prickly currant; bristly black currant	shrub	FAC	G5, SNR	yes	Sept. 15, 2017
4	<i>Taraxacum officinale</i> ssp. <i>officinale</i>	<i>Taraxacum officinale</i>	common dandelion	herbaceous dicot	FACU	G5, SNR	no	Sept. 14, 2017
4	<i>Vaccinium scoparium</i>		grouse huckleberry; grouseberry; grouse whortleberry	shrub	FACU	G5, SNR	yes	Sept. 12, 2017
4	<i>Valeriana occidentalis</i>		western valerian; small-flowered valerian	herbaceous dicot	FAC	G5, SNR	yes	Sept. 13, 2017
4	<i>Viola adunca</i>		hookedspur violet; sand violet	herbaceous dicot	FAC	G5, SNR	yes	Sept. 15, 2017
5	<i>Actaea rubra</i>		red baneberry	herbaceous dicot	FACU	G5, SNR	yes	Sept. 15, 2017
5	<i>Alopecurus aequalis</i>		short-awn foxtail	grass	OBL	G5, SNR	yes	Sept. 15, 2017
5	<i>Arnica cordifolia</i>	<i>Arnica cordifolia</i> ssp. <i>genuina</i>	heartleaf arnica	herbaceous dicot	not listed	G5, SNR	yes	Sept. 15, 2017
5	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 15, 2017
5	<i>Calamagrostis canadensis</i> var. <i>canadensis</i>	<i>Calamagrostis canadensis</i>	bluejoint reedgrass	grass	FACW	G5T5, SNR	yes	Sept. 15, 2017
5	<i>Carex illota</i>		sheep sedge; small-head sedge	grasslike	FACW	G5, SNR	yes	Sept. 15, 2017
5	<i>Carex neurophora</i>		alpine-nerved sedge	grasslike	FACW	G4, SNR	yes	Sept. 15, 2017
5	<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>		thickspike wheatgrass; streamside wildrye; streamside wheatgrass	grass	FACU	G5T5, SNR	yes	Sept. 15, 2017
5	<i>Equisetum fluviatile</i>		river horsetail	pteridophyte	FAC	G5, SNR	yes	Sept. 15, 2017
5	<i>Geranium viscosissimum</i>		sticky geranium; sticky purple geranium	herbaceous dicot	FACU	G5, SNR	yes	Sept. 15, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
5	<i>Glyceria elata</i>	<i>Glyceria striata</i>	tall mannagrass	grass	FACW	G5, SNR	yes	Sept. 15, 2017
5	<i>Juncus arcticus ssp. littoralis</i>	<i>Juncus balticus; Juncus balticus ssp. littoralis</i>	mountain rush; shoreline rush	grasslike	FACW	G5T5, SNR	yes	Sept. 15, 2017
5	<i>Juncus drummondii</i>		Drummond's rush	grasslike	FACW	G5, SNR	yes	Sept. 15, 2017
5	<i>Juncus ensifolius var. ensifolius</i>	<i>Juncus ensifolius</i>	three-stamened rush; sword-leaf rush	grasslike	FACW	G5, SNR	yes	Sept. 15, 2017
5	<i>Osmorhiza occidentalis</i>		mountain sweet-cecily; western sweet-cecily; mountain sweet-root	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 15, 2017
5	<i>Phleum pratense</i>	<i>Phleum nodosum</i>	European timothy; timothy	grass	FAC	GNR, SNA	no	Sept. 15, 2017
5	<i>Poa wheeleri</i>	<i>Poa nervosa var. wheeleri</i>	Wheeler's bluegrass	grass	FACU	G5?, SNR	no	Sept. 15, 2017
5	<i>Salix drummondiana</i>		Drummond's willow	shrub	FACW	G5, SNR	yes	Sept. 15, 2017
5	<i>Salix eastwoodiae</i>		mountain willow	shrub	FACW	G5, SNR	yes	Sept. 15, 2017
5	<i>Salix geyeriana</i>		Geyer's willow	shrub	FACW	G5, SNR	yes	Sept. 15, 2017
5	<i>Salix melanopsis</i>	<i>Salix exigua ssp. melanopsis</i>	dusky willow	shrub	OBL	G5, SNR	yes	Sept. 15, 2017

notes: Main Stem, East Fork, South Fork, Salmon River, Reach 23, Lat 44.907573, Long -115.329647

Elevation 6,383 ft amsl, Gradient 2.90% (Rio, 2018)

Zone 1: 40% moss, 10% forb, 50% graminoid

Zone 2: 70% shrub, 15% forb, 15% graminoid

Zone 3: 70% woody, 10% forb, 20% graminoid

Zone 4: 40% woody, 10% forb, 50% graminoid

Zone 5: 10% moss, 25% woody, 55% forb, 10% graminoid

noxious spp: none found

general: Dense riparian canopy up to the stream edge (predominantly Zone 2 and Zone 3).

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
<b>Goat Creek, Reach 1, Lat 44.755651, Long -115.679964</b>								
1	bryophyte species	not applicable	moss species (various)	bryophyte	not applicable	not applicable	yes	Sept. 15, 2017
1	<i>Carex canescens ssp. canescens</i>	<i>Carex canescens</i> ; <i>Carex curta</i>	silvery sage; hoary sedge	grasslike	OBL	G5T5, SNR	yes	Sept. 15, 2017
1	<i>Carex lenticularis var. lipocarpa</i>	<i>Carex lenticularis var. pallida</i> ; <i>Carex kelloggii</i>	lakeshore sedge; Kellogg's sedge	grasslike	OBL	G5T5, SNR	yes	Sept. 15, 2017
1	<i>Carex neurophora</i>		alpine-nerved sedge	grasslike	FACW	G4, SNR	yes	Sept. 15, 2017
1	<i>Carex utriculata</i>	<i>Carex inflata var. utriculata</i> ; <i>Carex rostrata var. utriculata</i>	beaked sedge	grasslike	OBL	G5, SNR	yes	Sept. 15, 2017
1	<i>Equisetum fluviatile</i>		river horsetail	pteridophyte	FAC	G5, SNR	yes	Sept. 15, 2017
1	<i>Erigeron speciosus</i>		aspen fleabane	herbaceous dicot	not listed	G5, SNR	yes	Sept. 15, 2017
1	<i>Glyceria elata</i>	<i>Glyceria striata</i>	tall mannagrass	grass	FACW	G5, SNR	yes	Sept. 15, 2017
1	<i>Heracleum sphondylium</i>	<i>Heracleum maximum</i>	cow parsnip; American cow parsnip	herbaceous dicot	FAC	G5, SNR	yes	Sept. 15, 2017
1	<i>Juncus arcticus ssp. littoralis</i>	<i>Juncus balticus</i> ; <i>Juncus balticus ssp. littoralis</i>	mountain rush; shoreline rush	grasslike	FACW	G5T5, SNR	yes	Sept. 15, 2017
1	<i>Juncus drummondii</i>		Drummond's rush	grasslike	FACW	G5, SNR	yes	Sept. 15, 2017
1	<i>Juncus ensifolius var. ensifolius</i>	<i>Juncus ensifolius</i>	three-stamened rush; sword-leaf rush	grasslike	FACW	G5, SNR	yes	Sept. 15, 2017
1	<i>Mimulus cusickii</i>	<i>Eunanus cusickii</i> ; <i>Diplacus cusickii</i>	Cusick's monkeyflower	herbaceous dicot	not listed	G4G5, SNR	yes	Sept. 15, 2017
1	pteridophyte species		fern species (various)	pteridophyte	not applicable	not applicable	yes	Sept. 15, 2017
1	<i>Valeriana occidentalis</i>		western valerian; small-flowered valerian	herbaceous dicot	FAC	G5, SNR	yes	Sept. 15, 2017
2	<i>Alnus incana ssp. occidentalis</i>	<i>Alnus incana</i> ; <i>Alnus incana ssp. tenuifolia</i>	thinleaf alder; speckled alder	shrub	FACW	G5, SNR	yes	Sept. 15, 2017
2	<i>Chamerion angustifolium var. canescens</i>	<i>Chamerion angustifolium ssp. circumvagum</i> ; <i>Epilobium angustifolium ssp. circumvagum</i>	fireweed	herbaceous dicot	FACU	G5, SNR	yes	Sept. 15, 2017
2	<i>Equisetum fluviatile</i>		river horsetail	pteridophyte	FAC	G5, SNR	yes	Sept. 15, 2017
2	<i>Equisetum hyemale var. affine</i>	<i>Equisetum hyemale ssp. affine</i>	scouring-rush horsetail	pteridophyte	FACW	G5T5, SNR	yes	Sept. 15, 2017
2	<i>Erigeron speciosus</i>		aspen fleabane	herbaceous dicot	not listed	G5, SNR	yes	Sept. 15, 2017
2	<i>Heracleum sphondylium</i>	<i>Heracleum maximum</i>	cow parsnip; American cow parsnip	herbaceous dicot	FAC	G5, SNR	yes	Sept. 15, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
2	<i>Lonicera involucrata</i> var. <i>involucrata</i>	<i>Lonicera involucrata</i>	twinberry honeysuckle; fly honeysuckle	shrub	FAC	G5T4T5, SNR	yes	Sept. 15, 2017
2	<i>Phalaris arundinacea</i>		reed canarygrass	grass	FACW	G5, SNR	no	Sept. 15, 2017
2	<i>Physocarpus malvaceus</i>		mallow ninebark	shrub	not listed	G5, SNR	yes	Sept. 15, 2017
2	pteridophyte species		fern species (various)	pteridophyte	not applicable	not applicable	yes	Sept. 15, 2017
2	<i>Ribes hudsonianum</i> var. <i>petiolare</i>		northern black currant; western black currant	shrub	FACW	G5T5, SNR	yes	Sept. 15, 2017
2	<i>Solidago multiradiata</i>		Rocky Mountain goldenrod	herbaceous dicot	FACU	G5, SNR	yes	Sept. 15, 2017
2	<i>Viola adunca</i>		hookedspur violet; sand violet	herbaceous dicot	FAC	G5, SNR	yes	Sept. 15, 2017
3	<i>Alnus incana</i> ssp. <i>occidentalis</i>	<i>Alnus incana</i> ; <i>Alnus incana</i> ssp. <i>tenuifolia</i>	thinleaf alder; speckled alder	shrub	FACW	G5, SNR	yes	Sept. 15, 2017
3	<i>Amelanchier alnifolia</i> ssp. <i>pumila</i>	<i>Amelanchier alnifolia</i> ; <i>Amelanchier pumila</i>	Saskatoon serviceberry	shrub	FACU	G5, SNR	yes	Sept. 15, 2017
3	<i>Chamerion angustifolium</i> var. <i>canescens</i>	<i>Chamerion angustifolium</i> ssp. <i>circumvagum</i> ; <i>Epilobium angustifolium</i> ssp. <i>circumvagum</i>	fireweed	herbaceous dicot	FACU	G5, SNR	yes	Sept. 15, 2017
3	<i>Cornus sericea</i>	<i>Cornus stolonifera</i>	redosier dogwood	shrub	FACW	G5, SNR	yes	Sept. 15, 2017
3	<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>	<i>Agropyron brevifolium</i> ; <i>Agropyron trachycaulum</i>	slender wheatgrass; slender wildrye	grass	FAC	G5T5, SNR	yes	Sept. 15, 2017
3	<i>Fragaria virginiana</i>		wild strawberry; Virginia strawberry	herbaceous dicot	FACU	G5, SNR	yes	Sept. 15, 2017
3	<i>Galium trifidum</i> var. <i>subbiflorum</i>	<i>Galium trifidum</i> ssp. <i>subbiflorum</i>	threepetal bedstraw	herbaceous dicot	FACW	G5T5, SNR	yes	Sept. 15, 2017
3	<i>Maianthemum racemosum</i>	<i>Smilacina racemosa</i>	false solomon's seal; feathery false lily-of-the valley	herbaceous dicot	FAC	G5, SNR	yes	Sept. 15, 2017
3	<i>Physocarpus malvaceus</i>		mallow ninebark	shrub	not listed	G5, SNR	yes	Sept. 15, 2017
3	pteridophyte species		fern species (various)	pteridophyte	not applicable	not applicable	yes	Sept. 15, 2017
3	<i>Ribes hudsonianum</i> var. <i>petiolare</i>		northern black currant; western black currant	shrub	FACW	G5T5, SNR	yes	Sept. 15, 2017
3	<i>Ribes lacustre</i>	<i>Limnobotrya lacustris</i> ; <i>Ribes lacustre</i> var. <i>parvulum</i>	spiny currant; bristly black currant	shrub	FAC	G5, SNR	yes	Sept. 15, 2017
3	<i>Rubus parviflorus</i>		thimbleberry	shrub	FACU	G5, SNR	yes	Sept. 15, 2017
3	<i>Rudbeckia occidentalis</i>	<i>Rudbeckia occidentalis</i> var. <i>occidentalis</i>	western coneflower	herbaceous dicot	FAC	G5, SNR	yes	Sept. 15, 2017

Midas Gold Reference Reach Stream Analysis								
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3	<i>Salix barclayi</i>		Barclay's willow	shrub	FACW	G5, SNR	yes	Sept. 15, 2017
3	<i>Sorbus scopulina</i>		mountain ash; Greene's mountain ash; Cascade mountain ash	shrub	FACU	G5, SNR	yes	Sept. 15, 2017
4	<i>Achillea millefolium</i>		common yarrow	herbaceous dicot	FACU	G5, SNR	yes	Sept. 15, 2017
4	<i>Amelanchier alnifolia</i> ssp. <i>pumila</i>	<i>Amelanchier alnifolia</i> ; <i>Amelanchier pumila</i>	Saskatoon serviceberry	shrub	FACU	G5, SNR	yes	Sept. 15, 2017
4	<i>Bromus carinatus</i>	<i>Bromus carinatus</i> var. <i>californicus</i> ; <i>Bromus carinatus</i> var. <i>carinatus</i>	California brome	grass	not listed	G5, SNR	yes	Sept. 15, 2017
4	<i>Carex rossii</i>	<i>Carex brevipes</i>	Ross sedge; short sedge	grasslike	not listed	G5, SNR	yes	Sept. 15, 2017
4	<i>Ceanothus velutinus</i> ssp. <i>velutinus</i>	<i>Ceanothus velutinus</i> var. <i>velutinus</i>	snowbush ceanothus; tobacco ceanothus	shrub	not listed	G5T5, SNR	yes	Sept. 15, 2017
4	<i>Chamerion angustifolium</i> var. <i>canescens</i>	<i>Chamerion angustifolium</i> ssp. <i>circumvagum</i> ; <i>Epilobium angustifolium</i> ssp. <i>circumvagum</i>	fireweed	herbaceous dicot	FACU	G5, SNR	yes	Sept. 15, 2017
4	<i>Festuca idahoensis</i>	<i>Festuca idahoensis</i> ssp. <i>idahoensis</i>	Idaho fescue	grass	FACU	G5, SNR	yes	Sept. 15, 2017
4	<i>Fragaria virginiana</i>		wild strawberry; Virginia strawberry	herbaceous dicot	FACU	G5, SNR	yes	Sept. 15, 2017
4	<i>Galium trifidum</i> var. <i>subbiflorum</i>	<i>Galium trifidum</i> ssp. <i>subbiflorum</i>	threepetal bedstraw	herbaceous dicot	FACW	G5T5, SNR	yes	Sept. 15, 2017
4	<i>Geranium viscosissimum</i>		sticky geranium; sticky purple geranium	herbaceous dicot	FACW	G5, SNR	yes	Sept. 15, 2017
4	<i>Mahonia repens</i>	<i>Berberis repens</i>	creeping mahonia; Oregon grape; creeping mahonia	shrub	not listed	G5, SNR	yes	Sept. 15, 2017
4	<i>Physocarpus malvaceus</i>		mallow ninebark	shrub	not listed	G5, SNR	yes	Sept. 15, 2017
4	<i>Pinus contorta</i>		lodgepole pine	tree	FAC	G5T5, SNR	yes	Sept. 15, 2017
4	<i>Prunus emarginata</i> ssp. <i>emarginata</i>	<i>Prunus emarginata</i> var. <i>emarginata</i> ; <i>Prunus emarginata</i>	bitter cherry	shrub	FACU	G5, SNR	yes	Sept. 15, 2017
4	<i>Rubus idaeus</i> ssp. <i>strigosus</i>	<i>Rubus idaeus</i> ssp. <i>aculeatissimus</i> ; <i>Rubus idaeus</i> ssp. <i>idaeus</i>	wild raspberry; grayleaf red raspberry; American red raspberry	shrub	FACU	G5T5, SNR	yes	Sept. 15, 2017
4	<i>Symphoricarpos albus</i> var. <i>laevigatus</i>	<i>Symphoricarpos albus</i> ssp. <i>laevigatus</i> ; <i>Symphoricarpos rivularis</i>	common snowberry	shrub	FACU	G5, SNR	yes	Sept. 15, 2017
4	<i>Thalectrum occidentale</i>		western meadowrue	herbaceous dicot	FACU	G5, SNR	yes	Sept. 15, 2017

Midas Gold Reference Reach Stream Analysis								
Zone	Scientific Name (14)	Synonyms (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Common Name (2, 3, 4, 5, 6, 7, 8, 11, 12, 14)	Plant Type (2, 3, 4, 5, 6, 7, 8, 11, 12, 13)	NWPL Indicator Status WMVC (4, 5, 6, 11)	Global Conservation Status, Idaho Conservation Status (3, 4, 8, 9, 10)	Native (2, 4, 7, 8, 9, 11, 12, 13)	Date Observed
4	<i>Vaccinium scoparium</i>		grouse huckleberry; grouseberry; grouse whortleberry	shrub	FACU	G5, SNR	yes	Sept. 15, 2017
5	<i>Carex canescens ssp. canescens</i>	<i>Carex canescens; Carex curta</i>	silvery sage; hoary sedge	grasslike	OBL	G5T5, SNR	yes	Sept. 15, 2017
5	<i>Carex illota</i>		sheep sedge; small-head sedge	grasslike	FACW	G5, SNR	yes	Sept. 15, 2017
5	<i>Carex neurophora</i>		alpine-nerved sedge	grasslike	FACW	G4, SNR	yes	Sept. 15, 2017
5	<i>Cornus sericea</i>	<i>Cornus stolonifera</i>	redosier dogwood	shrub	FACW	G5, SNR	yes	Sept. 15, 2017
5	<i>Equisetum hyemale var. affine</i>	<i>Equisetum hyemale ssp. affine</i>	scouring-rush horsetail	pteridophyte	FACW	G5T5, SNR	yes	Sept. 15, 2017
5	<i>Erigeron speciosus</i>		aspen fleabane	herbaceous dicot	not listed	G5, SNR	yes	Sept. 15, 2017
5	<i>Maianthemum racemosum</i>	<i>Smilacina racemosa</i>	false solomon's seal; feathery false lily-of-the valley	herbaceous dicot	FAC	G5, SNR	yes	Sept. 15, 2017
5	<i>Phalaris arundinacea</i>		reed canarygrass	grass	FACW	G5, SNR	no	Sept. 15, 2017
5	<i>Solidago multiradiata</i>		Rocky Mountain goldenrod	herbaceous dicot	FACU	G5, SNR	yes	Sept. 15, 2017

**notes: Goat Creek, Reach 1, Lat 44.755651, Long -115.679964**

**Elevation 4,884 ft amsl, Gradient 6.67% (Rio, 2018)**

**Zone 1:** 55% moss, 5% woody, 25% forb, 15% graminoid

**Zone 2:** 50% woody, 30% forb, 20% graminoid

**Zone 3:** 40% woody, 35% forb, 25% graminoid

**Zone 4:** 45% woody, 35% forb, 20% graminoid

**Zone 5:** 10% moss, 20% pteridophyte, 25% woody, 35% forb, 10% graminoid

**noxious spp:** *Phalaris arundinacea* - reed canarygrass

**general:** Goat Creek flows through an extensive burn area and is characterized by numerous large woody matter at the bottom of a steep (1.5:1) canyon. As the area is further removed from the Midas Gold site, and at a lower elevation, much of the site's vegetation is distinct from the other reference areas, with a stronger Zone 4 (upland) influence.

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- (13)USDA NRCS. 2016. Ecological Site Description, Section I: Ecological Site Characteristics. (online). <https://esis.sc.egov.ESDReport/fsReport.aspx?approved=yes&rptLevel=all&id=F035XG004NM>
- (14)USDA NRCS. 2017. The PLANTS Database. National Plant Data Team, Greensboro, NC. (online). <http://plants.usda.gov/java/>

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## **Appendix G**

# **Construction Quantities and Engineer's Estimate**

Quantities are provided within the design drawings (Appendix E)  
Engineer's Estimate will be provided to Midas

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Appendix **H**  
**Comment Tracking**

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# Appendix H - Comment Tracking

February, 2019

Midas Gold Stibnite Gold Project Environmental Impact Statement Stream Design Report Dated September 2018									
Number	Page # or Global	Section	Paragraph	Comment	Commenter Initials	Disposition A/M/O	Response & Responder's Initials	Adequacy Review Response	Response & Responder's Initials
<b>USFS COMMENTS</b>									
1	1-1	1.2.1	2	Reference 33 CFR 332.2.	LB		Rio – Reference added to the report	AECOM - Resolved	Rio - Comment closed
2	1-4	1.3	N/A	This section really ignores the fact that there are many stream reaches that will be impacted to the SGP that currently have no historical human impacts.	CN		Rio – The stream design report is intended to explain the design rationale, assumptions, and methods related to the stream design and is not intended to be a comprehensive summary of impacts (existing or proposed). The section begins by recognizing impacts are related to both historical and proposed (i.e. new) mining.	AECOM - Resolved	Rio - Comment closed
3	1-4	1.3	1	Have the designs using liners and promising riparian restoration and enhancement" presented here, been implemented anywhere else successfully? At a highly disturbed mine site with issues re: surface/groundwater interaction and losses of long-term soil productivity?	LB		Rio – The use of a stream liner, as discussed in the stream design report, is intended to separate the restored stream from underlying materials in select reaches where proposed actions require, and is not intended to limit the function of the stream. The restored stream atop the liner includes appropriate floodplain width and depth as well as a perched aquifer enabling the natural function (channel migration, scour, hyporheic flow, etc.) of the stream for its given geomorphic character. In other words, the liner will be buried at sufficient depth below the streambed and entire floodplain to enable the stream and associated floodplain elements to function similar to natural (unlined) streams/floodplains. In that way, the stream design atop the liner is "typical" and the approach described in the Stream Design Report has been successfully implemented by Rio ASE (stream design engineer) in numerous locations throughout the Pacific Northwest. Also note that the stream liner is only proposed for select restoration reaches, and enhancement reaches will not feature a liner.  The use of a stream liner may influence the underlying groundwater hydrology, which is not summarized in the Stream Design Report. Stream/floodplain liners were considered in the Proposed Action hydrologic modeling; please refer to that report for discussion of the resulting effects on alluvial groundwater and baseflow.	AECOM - Resolved  USFS - TL-Does this doc need to tie into other documents that reference the interrelated hydrogeology and such? While the question is answered, the design document by itself may lead to uncertainty if other documents are not cited/referenced.	Rio - Reports summarizing groundwater modeling, geochemistry, and temperature modeling are being developed concurrently with the stream design however these reports are not finalized. Draft versions of these reports have been submitted for agency review. One of the primary goals of the pending geochemistry report is to determine if a stream liner is needed. Until then, the assumption is that a stream liner is needed (this is mentioned in the stream design report). We have added a reference to a pending geochemistry report in the footnote on page 3-12 of the stream design report. We will update the report footnote with a reference in the future once the geochem report (and possibly others) are finalized.
4	1-4	1.3	1	To be real, isn't the primary goal to minimize SGP impacts to the extent possible, to create stable long-term channels post operations, and if possible to benefit fish.	CN		Rio – The goals stated in the stream design report accurately reflect those of the stream design and should not be considered to be the overall goals of the Stibnite Gold Project or the associated mitigation effort. It should also be noted that the stream design goals specifically do not include the term "stable" or "stability," as it is believed that a system that exhibits a dynamic-equilibrium is more beneficial (for most stream reaches, with the exception of rock-chutes) than a completely stable system.	AECOM - Resolved  USFS - TL-This comment may lead to uncertainty since Rio is proposing that lined channels could function dynamically.	Rio - The majority of restored channels within the SGP will be designed to function as alluvial channels (allowed to move laterally, vertically, and transport sediment similar to natural channels). In some cases these alluvial channels are located on top of a liner (over an impermeable liner such as on top of the TSF) while in other cases they are located in areas without a liner. Other channels within the SGP will be designed as threshold channels where movement of the channel (laterally and vertically) is limited by lining the channel with appropriately sized rock that will withstand hydraulic forces up to very large flow events. We believe channel design and intended function is clearly discussed in the report and is in alignment with the stated goals of the SGP.
5	1-4	1.3	3	I do not agree with the use of restore/restoration throughout this document. Altering streams because of mining facilities then re-establishing those streams shouldn't be considered restoration. Restoration may be appropriate if reclamation actually improved the stream over the existing condition (which includes impacts from historical activities).  The SGP for some stream reaches likely improves the existing condition but for other reaches likely alters those from what would occur naturally – not restoration.	CN		Rio - The reviewer is suggesting that some reaches may be appropriately termed "restoration" whereas other reaches should be termed differently. The definition of restoration stated in the report is taken directly from 33 CFR 332.2 (Compensatory Mitigation for Losses of Aquatic Resources). We understand that the reviewer may not agree with the definition however it is not our intent to redefine terms – we will continue to use the terminology and associated definitions per the code.	AECOM - Resolved	Rio - Comment closed
6	1-4	1.3	3	These are short-sided. Objective is really to provide stable stream channels during and post mining and benefit aquatic species where it can.	CN		Rio - The stated project-scale objectives are adequate in that they address fish passage, restoration, and enhancement objectives. Reach-scale objectives (biological and physical) for each reach are discussed in Appendix D. The reviewer states "provide stable stream channels". To clarify, restoration reaches are designed with variable degrees of stability depending on the channel type. For example, meandering channel types are designed to be less stable (horizontally and vertically) than rock chute channel types. The degree of stability used for design is consistent with typical channel types of natural channels.	AECOM - Resolved	Rio - Comment closed
7	1-4	1.3	6	I think this term should be Reconstruction as eluded to in section 3.	CN		Rio - See response to Comment #5	AECOM - Resolved	Rio - Comment closed
8	1-4	1.3	6	Isn't this really reconstruction because of the relocation of the stream channel for mining purposes? Enhancement below is modifying some feature of an existing channel.	CN		Rio - See response to Comment #5	AECOM - Resolved	Rio - Comment closed
9	1-4	1.3	6	How is enough "live" topsoil available for amount of miles of stream reach planned to be reclaimed? What is the plan for obtaining topsoil and site productivity?	LB		Rio - Topsoil (growth media), planting, and seeding is discussed in Appendix F: Conceptual Riparian Planting Plan. The need and potential available quantities of such materials are continually being refined at this conceptual phase of the project. We anticipate sufficient volume of material will be available – but growth media will not necessarily be "topsoil" in the usual sense given the site geology and prior disturbance, and much will not be live-handled but rather would be stockpiled and rehandled for stream restoration projects. The Stream Design Report does not address how/where/when growth media is generated and stored; please refer to the upcoming Reclamation and Closure Plan for this information, including mass balance calculations.	AECOM - Resolved	Rio - Comment closed
10	1-4	1.3	Bullet 3	These to not track below. Really don't understand the difference. The two bullets should have defined each.	CN		Rio - We understand the confusion and have revised the text.	AECOM - Resolved	Rio - Comment closed
11	1-4	1.3	Bullet 3	Rehabilitation?	CN		Rio - See response to Comment #10	AECOM - Resolved	Rio - Comment closed
12	2-2	2	N/A	Does this report include details for ditches, etc during operations?	CN		Rio - No. Interim condition ditches/channels are beyond the scope of this basis of design report and will be designed by others.	AECOM - Resolved	Rio - Comment closed

## Appendix H - Comment Tracking

Number	Page # or Global	Section	Paragraph	Comment	Commenter Initials	Disposition A/M/O	Response & Responder's Initials	Adequacy Review Response	Response & Responder's Initials
13	3-1	3.1	2	Where are quantified construction costs for this stream design proposal?	LB		Rio - Construction costs are beyond the scope of this basis of design report. Construction quantities are summarized in Appendix G. Bonding cost estimates, including those of the stream/floodplain restoration effort, will be provided to the USFS and cooperating agencies as part of the upcoming EIS process. Midas plans to follow the Standard Reclamation Cost Estimator (SRCE) to develop those cost estimates.	AECOM - Resolved	Rio - Comment closed
14	3-1	3.1	2	I interpret restoration = reconstruction. Appears all with restoration are streams that are reconstructed during operations then reclamation occurring once mining is complete with another round of reconstruction. Enhancement = some modification of some characteristic but for the most part the stream stays in the same location with most characteristics unimpacted.	CN		Rio - See response to Comment #5	AECOM - Resolved	Rio - Comment closed
15	3-1	3.2	1	Migratory, should include BT	CN		Rio - Anadromous fish access shown in Figure 3-1 includes migratory fish species such as migratory BT. In other words, we propose that migratory BT would be able to access the same reaches proposed for anadromous fish species. It may be worth noting that resident fish also may also utilize anadromous fish reaches shown in Figure 3-1 with no downstream barriers. We have added this clarification to the figure.	AECOM - Clarification not evident on figure. Recommend adding a footnote stating that resident fish may also use anadromous/ migratory reaches.	Rio - Footnote was added below the figure title. We have since moved this note to the figure legend. Comment closed.
16	3-1	3.2	1	But isolated. Resident fish still need connectivity to other local populations to persist long term.	CN		Rio - We recognize that proposed resident reaches shown in Figure 3-1 are located upstream of barrier reaches – fish will be able to migrate downstream but not return upstream. However, the proposed resident fish reaches are connected to upstream, existing, unimpacted reaches. And, all fish barrier reaches shown in Figure 3-1 are located upstream of the existing fish barrier at the Yellow Pine pit that will be removed thereby extending the range of available habitat for the majority of fish populations. We further note that proposed isolated habitat in upper Meadow Creek is the only resident reach of a similar or larger size (drainage area, stream width) compared with existing isolated habitats in Fiddle Creek (upstream passage blocked by FS 412 road culvert, and likely also steep gradient upstream) and Blowout Creek (steep gradient, high velocity, shallow water, and boulder drops in chute below historical dam site). We presume that any isolated population proposed in upper Meadow Creek would be more viable than existing smaller isolated habitats (Fiddle and Blowout Creeks are both about 35% of the basin size as upper Meadow Creek) given the larger post- restoration habitat area proposed in upper Meadow Creek.	AECOM - Resolved	Rio - Comment closed
17	3-1	3.2	1	I'm not sure all would agree with the figure. Resident on the map also includes isolated. Resident fish still need connectivity to persist long term.	CN		Rio - Noted. The figure is showing the proposed stream design reaches along with proposed fish access. This figure sets the stage for selecting the appropriate passage and fish habitat design criteria for each reach. The goal of the stream design moving forward is to sufficiently address concerns and constraints and integrate analyses such that uncertainty is minimized and the potential for fish to actually utilize the proposed reaches is maximized post mining.	AECOM - Resolved but perhaps change legend to "Resident (Isolated Reaches)" and add a footnote stating that isolated reaches are defined as those that have complete fish passage barriers downstream that preclude upstream passage.	Rio - Legend has been revised to specify resident/isolated. Comment closed.
18	3-1	3.2	1	FS differentiates between ephemeral and intermittent, with ephemeral NOT exhibiting bed and bank for the majority of the reach. This is important as intermittent streams can provide some fish habitat during high flow, i.e., refugia for individuals during high flow. Intermittent streams also contribute sediment and potential water quality concerns as they are hydrologically connected part of the year. Appendix B of forest plan assigns different RCAs to intermittent streams and ephemerals.	LB		Rio - Noted. We make no distinction between the design methods and approach for ephemeral and intermittent channels. That said, to avoid confusion, we have updated the report by replacing "ephemeral" with "non-perennial". RCA's are not considered in the stream design. They are however considered in the Stream Functional Assessment. Table 3-2 is being provided for information only for comparison with a similar table in the PRO at the request of others.	AECOM - Partially resolved but may want to clarify in report that ephemeral/ intermittent channels would be designed similarly. It would also be helpful to modify Figure 3-1 to show both proposed perennial and non-perennial reaches. USFS - TL-If the Forest Plan refers to ephemeral and intermittent, project documents should do the same for consistency.	Rio - clarification added to footnote on page 3-1 regarding similarity in design of ephemeral vs intermittent channels (i.e. non-perennial channels). Figure 3-1 modified as requested. It is not feasible to be consistent with every stakeholder agency's individual plans or guidelines. The report clearly defines the term "non-perennial" and includes associated design details that are consistent with the expected conditions for those streams/reaches.
19	3-2	3.2	Table 3-1	Restoration isn't an action but result of an action. Reconstruction is an action that may lead to restoration.	CN		Rio - Disagree. However, we recognize it depends on how one defines it, see response to Comment #5.	AECOM - Resolved	Rio - Comment closed
20	3-3	3.2	Figure 3-1	Might be better to show migratory fish habitat vs anadromous. BT are highly migratory with BT tagged in the YPP migrating to the main Salmon River and back. Then have another for Resident/Isolated fish. Anadromous ends at EF1. May not be the case for BT and STHD. I think I ok to show where migratory fish may migrate to but the analysis isn't completed yet. Migratory fish may not migrate through the pit lake and occupy streams upstream and I have concerns that downstream stream temps from the pit lake could affect where fish migrate to. This figure should probably use the term "potential" fish habitat and let the fish analysis make these kind of conclusions.	CN		Rio - See response to Comments #15 and #17. It's fine if BT or STHD migrate upstream of EF1, it doesn't change the design criteria for EF1 which includes improving fish passage. What is important is that we design EF1 assuming anadromous/migratory fish will utilize the reach so that we do not prevent BT, STHD, or any other migratory fish from utilizing upstream reaches.  For the sake of designing the stream, we must assume that migratory fish can and will migrate through Hangar Flats pit lake; therefore, providing habitat wherever possible for as many fish species (and other aquatic species) as possible. If we assume otherwise, we would not include suitable habitat for such species in our design that may seek to utilize said habitat.  We will assume upstream migration will occur until a credible analysis reports otherwise. Therefore, keep as an anadromous reach.	AECOM - Resolved for now pending further analysis. In Legend, might be helpful to change subtitle from "Proposed Stream..." to "Proposed Fish Use for Design Reaches at Mine Closure". May also consider changing figure title to "Proposed Stream Design Reaches at Mine Closure." to reduce confusion of design reaches at interim stage.	Rio - Requested revisions to the figure has been made. Address pending analysis in future design phase.
21	3-5	3.2	Table 3-2	Assuming this is only for the long term channels?	CN		Rio - The table includes all perennial and non-perennial channels/reaches included in the post-mining stream design (i.e. long term).	AECOM - Resolved	Rio - Comment closed

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Number	Page # or Global	Section	Paragraph	Comment	Commenter Initials	Disposition A/M/O	Response & Responder's Initials	Adequacy Review Response	Response & Responder's Initials
22	3-5	3.2	Table 3-2	Same issue with terms described above. Many of these are reconstructed because of the need to move channels for mining. It is only restored if it is better than what is was before the operation. I have highlighted streams that are probably in an undisturbed condition where activities will alter and then build a replacement channel long term. Does this = restoration?	CN		Rio - See response to Comment #5	AECOM - Resolved	Rio - Comment closed
23	3-6	3.3.1	1	Streams function with or without fish.	CN		Rio - Noted, but the USFS Watershed Condition Indicators evaluate stream and watershed function based in part on "Habitat Access" and several "Habitat Elements" related to fish; therefore, to best evaluate and/or discuss stream function we assume fish passage and habitat are important elements.	AECOM - Resolved	Rio - Comment closed
24	3-6	3.3.1	1	Not sure there is evidence to support this yet.	CN		Rio - Noted; the statement identifies an objective not a proven fact. We assume the objective of providing a net ecological benefit is broadly supported.	AECOM - Resolved	Rio - Comment closed
25	3-6	3.3.1	#2	Why only anadromous?	CN		Rio - Biological objectives based on anadromous usage was prioritized due to being federally listed and being an indicator species (salmonid fish are commonly used as indicator species representing the larger aquatic ecosystem).	AECOM - Resolved	Rio - Comment closed
26	3-6	3.3.1	#2	What about BT and WCT?	CN		Rio - See response to Comment #25	AECOM - Resolved	Rio - Comment closed
27	3-8	3.3.2	2	Only parts of the valley bottom have.	CN		Rio - Disagree. The sentence is in reference to lower Meadow Creek in the vicinity of the SODA and continuing downstream to the confluence with the EFSFSR. The valley bottom has been reworked by historical mining activities in this area such that the "natural" channel character no longer exists, which is the point of the sentence.	AECOM - Resolved	Rio - Comment closed
28	3-11	3.3.2	Bullet 1, Subbullet 1	Accelerated sediment from anthropogenic sources is not generally associated with increases in quality to fish habitat. Photo shows a channel with width/depth increase and disturbance to channel geomorphology.	LB		Rio - The photo is taken from a reach with the highest known density of Chinook salmon spawning in Sugar Creek and included the greatest diversity in high-quality habitat for salmonids of all reference reaches observed. There is no discussion of sediment rates or sources associated with the photo ("accelerated sediment from anthropogenic source" is the commenter's assumption). The conditions observed/measured from this reference site are summarized in Appendix B of the Stream Design Report (Site #11, Figure B-12.1 and B-12.2). The average bankfull width-to-depth ratio for the site was measured at 11 ft/ft, which is similar to other reference sites of similar character in the area.  We agree that sediment from anthropogenic sources is typically assumed to consist of fines which ultimately get washed into channels resulting in adverse habitat impacts. Sediment illustrated in the photo consists primarily of gravel and regardless of the cause (which was not evaluated, but is likely natural given that upstream anthropogenic disturbance is limited to roads and Cinnabar Mine), the associated dynamic channel response has resulted in high-quality habitat. Similar disturbance has been observed in other locations resulting from debris flows, avalanches, and fires. Such disturbance events drive geomorphic process -- wood recruitment, sediment deposition (of multiple sizes), and variable habitat units (pools, riffles, etc.). It should be noted that without disturbance, channels would be static, would not evolve, and would not generate new habitat. Our stream design seeks to include and accommodate dynamic channel response, including sediment deposition.	AECOM - Resolved	Rio - Comment closed
29	3-12	3.3.2	1	Unsupported statement.	CN		Rio - Agree, at this time it is unsupported and the Stream Functional Assessment is being worked on in parallel with other analyses and associated reports. That said, this is a draft and the approach for offsetting/mitigating for mining impacts involves restoration and enhancement actions. We will revise this statement in addition to the proposed stream alterations as analyses and estimated impacts are determined and refined throughout the design process.	AECOM - Resolved for now. Should cite SFA or other supporting documentation after there is sufficient evidence to show that mitigation will "offset" impacts.	Rio - Comment closed
30	3-12	3.3.2	Bullet 2, Subbullet	Is there really a barrier?	CN		Rio - Yes, that is our understanding.	AECOM - Resolved	Rio - Comment closed
31	3-12	3.3.2	Bullet 4	What is the risk if there is surface/ground water interaction? How does stream function and maintain base flows without interaction with shallow water table?	LB		Rio - See Appendix D (Reach-Scale Design Summary) and Appendix E (Design Sheets) for details regarding the liner. See also response to Comment #3. The liner would underlie a corridor filled with clean streambed and/or floodplain material extending across the entire floodplain - thus the channel will be able to function like a natural channel (migrate laterally and vertically) within this corridor. The stream liner will create a perched aquifer with a groundwater elevation estimated to be similar to the water surface elevation in the stream based on simple Darcy's Law calculations of anticipated groundwater transmissivity relative to the volume of flow in the stream. Perched groundwater would occur above the liner that would interact/exchange with surface water. This interaction would be contained above the liner and therefore would not interact/exchange with water in contact with tailings or development rock outside of the liner extents or below the liner. The use of a stream liner may influence the underlying groundwater hydrology, which is not summarized in the Stream Design Report. Stream/floodplain liners were considered in the Proposed Action hydrologic modeling; please refer to that report for discussion of the resulting effects on alluvial groundwater and baseflow.	AECOM - Resolved  USFS - TL-This is a good example of why the document introduction must stress that this is a purely design document that does not take into account factors that are typically interrelated to stream function such as interaction with groundwater.	Rio - based on a previous comment we have revised the footnote on page 3-13 (now page 3-14 in the February 2019 final version of the report) to clarify that concurrent geochemistry and groundwater analyses are being performed - the results of which will determine if a liner is needed. We realize this design documentation report is not all encompassing however this report does consider hydrology, hydraulics, groundwater, sediment transport, and habitat, all of which relate to stream function. Please be on the lookout for future reports addressing geochem, groundwater, temperature, etc.
32	3-13	3.3.2	Subbullet 3	Not sure what this means?	CN		Rio - Over-excavate means additional material will be excavated/mined from the existing Yellow Pine Pit prior to backfill. Revised in the report to simply say "expanded" since over excavation has a particular meaning in civil construction, where it refers to excavation beyond that required to accommodate the dimensions of the intended structure (e.g., a dam or building footing), usually to provide working space or to remove unsuitable foundation material (such as soft or organic soils). Expansion of the pit is not over excavation in that sense.	AECOM - Resolved	Rio - Comment closed
33	3-13	3.3.2	Bullet 1, Subbullet 1	This has yet to be verified by analysis.	CN		Rio - Agree. See response to Comment #29.	AECOM - Resolved  USFS - TL-In a sense, this is a "theoretical" design document and it should clearly be presented as such.	Rio - The statement was provided in a section titled "Proposed Alterations to Streams" and is therefore representative of the design intent (i.e. an objective). It is not considered "theoretical" that the proposed action aims to offset negative impacts associated with mine actions. The overall intent of the Stream Design Report, as stated in Section 1.1 is to "support the SGP Conceptual Mitigation Plan." We believe this clearly identifies the design as conceptual. Additionally, this report contains a significant amount of industry standard approaches and methodologies supporting the proposed design that are not conceptual or theoretical.

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Number	Page # or Global	Section	Paragraph	Comment	Commenter Initials	Disposition A/M/O	Response & Responder's Initials	Adequacy Review Response	Response & Responder's Initials
34	3-13	3.3.2	Bullet 1, Subbullet 2	Fish won't have access to all naturally accessible portions. New barrier in Meadow Creek.	CN		Rio - The text refers to <u>lower</u> Meadow Creek, not all of Meadow Creek. We have added clarification that migratory fish access on Meadow creek will extend to the upstream extent of Reach MC3.	AECOM - Resolved	Rio - Comment closed
35	3-13	3.3.2	Bullet 2, Subbullet 1	What are these specifically?	CN		Rio - Examples are wood structures, boulder clusters, constructed riffles, constructed pools. The revised plans (Appendix E) illustrate many of the specific treatments while also identifying many generic treatments for enhancement reaches.	AECOM - Resolved	Rio - Comment closed
36	3-13	3.3.2	Bullet 3	Reconstruct?	CN		Rio - See response to Comment #5	AECOM - Resolved	Rio - Comment closed
37	3-13	3.3.2	1	Is there a table that illustrates the before/after Rosgen stream type of the reclaimed stream?	LB		Rio - No. However, for the purposes of design, reaches are classified into channel types based on proposed slope. See Table 3-15 for equivalent Rosgen channel types.	AECOM - Resolved	Rio - Comment closed
38	3-13	3.3.2	Bullet 8	What are these?	CN		Rio - Several low-flow fish passage barriers were observed within EF1 (assumed barriers for adult Chinook salmon and other fish migrating upstream during low-flow periods). The barriers consisted of multiple large boulder drops without adequate jump pools beneath.	AECOM - Resolved	Rio - Comment closed
39	3-16	3.3.3	2	Stream channel?	CN		Rio - See response to Comment #5	AECOM - Resolved	Rio - Comment closed
40	3-23	3.3.6	N/A	Would be nice to have a map showing where each of these types of reaches will occur.	CN		Rio - See Table 3-16 and Figure 3-1	AECOM - Resolved	Rio - Comment closed
41	3-35	3.3.6	1	Reconstruction	CN		Rio - See response to Comment #5	AECOM - Resolved	Rio - Comment closed
42	3-39	3.3.9	Table 3-17	Bull trout exist throughout Meadow Creek.	CN		Rio - Table 3-17 has been corrected.	AECOM - Resolved	Rio - Comment closed
43	3-39	3.3.9	Table 3-17	Should these from hear and above be a "N" since MC3 prevents passage. These will be isolated populations.	CN		Rio - No. The summary is with regard to each individual reach. A passage barrier is identified only within the reach it occurs. Although isolated by downstream barrier(s), upstream reaches will be passable.	AECOM - Resolved	Rio - Comment closed
44	3-39	3.3.9	Table 3-17	For MC4 & 5. MC4 is low gradient 0.5% slope – a Rosgen response reach. MC5 is a low gradient 2.0% slope – transitioning to a Rosgen transport reach. With the pit lake acting as a sediment catchment basin, what is the longevity of stream substrate in these two reaches? They will become more coarse over time and will they become coarse enough to no longer be spawning habitat.	CN		Rio - We acknowledge this potential issue. Bed substrate within these reaches may become embedded due to limited incoming coarse sediment supply and transport of gravel sized material downstream. That said, Meadow Creek within these reaches will be flowing on glacial alluvium (including gravel-sized material) which will become available as the channel erodes laterally and vertically. The longevity of these reaches will depend on the actual sediment supply and disturbance regime which is dynamic and depends on future climate, fire, and hydrological conditions. We anticipate the reaches below the proposed pit lake would function similar to other reaches downstream of small lakes in the region (e.g. reaches below Riordan Lake, Warm Lake, etc).	AECOM - Partially resolved. This condition will require further design study and analysis prior to construction. USFS - TL_The functionality of these reaches as spawning habitat needs to be disclosed as a potential uncertainty.	Rio - Agree and noted. This may need to be address in a future design phase.
45	3-39	3.3.9	Table 3-17	Same as comment above. These will be isolated populations.	CN		Rio - See response to Comment #43	AECOM - Resolved	Rio - Comment closed
46	3-39	3.3.9	Table 3-17	Same as comment above.	CN		Rio - See response to Comment #43	AECOM - Resolved	Rio - Comment closed
47	3-40	3.5	2	How do you achieve stream revegetation without adequate amounts and quality of topsoil? How do you achieve stream function without interaction with shallow groundwater system if streams exists above a shallow impermeable barrier? Have these designs that are described in this report been shown to be successful elsewhere in similar reclamation conditions? What about channel stability at high flows?	LB		Rio - See response to Comment #3, #9, and #31. Channel stability is discussed in Section 3.3.6.	AECOM - Resolved USFS - TL-This may have to be disclosed as an uncertainty do to the lack of suitable growth media quantities and depths to support veg.	Rio - See response to Comment #9 considered "closed."
48	4-2	4.1	Subbullet 2	What does growth media consist of? Is there more details describing this in another document?	LB		Rio - See response to Comment #9	AECOM - Resolved	Rio - Comment closed
49	N/A	Appendix D	D-20	Many drawings show projected mid-story riparian vegetation growing with the liner just below. How is the root mass accommodated? Are there existing successful examples where this liner concept has supported a riparian midstory and been implemented successfully?	LB		Rio - The proposed depth of soil above the liner is described in Appendix D of the Stream Design Report for each reach with a proposed liner. We acknowledge there being constraints regarding planting of mid-story vegetation over the liner, but soil depth above the liner is believed to be sufficient to support the rooting depth of mid-story riparian vegetation. Topsoil (growth media), planting, and seeding is discussed in Appendix F: Conceptual Riparian Planting Plan.	AECOM - Resolved USFS - TL-This may have to be disclosed as an uncertainty do to the lack of suitable growth media quantities and depths to support veg.	Rio - See response to Comment #9 considered "closed."
50	N/A	Appendix D	Drawing D-22	The Proposed Rock Control Structure is illustrated on the reclaimed design plan as a earthen dam. Very large rock was initially proposed here in an early FS effort from the 90s to provide grade control. Long-term impermeability is important to attain shallow ground water elevation increase and maintain it over time to insure there is not another catastrophic failure.	LB		Rio - Noted. The proposed rock control structure would not be an earthen dam as illustrated on sheet D-22 (poor artist's rendering). It would be comprised of rock for grade control and would be made impermeable. The rock grade control structure would not extend above the grade of the adjacent valley bottom. The intent is to raise the water surface to a level sufficient to overcome incision in this reach and support upstream and adjacent wetlands. Blowout Creek will flow over the structure and downstream over appropriately sized channel fill material placed on the downstream side of the grade control structure to prevent a head-cut.	AECOM - Resolved	Rio - Comment closed
<b>AECOM COMMENTS</b>									
1	Global	N/A	N/A	The approach for the stream design is consistent with current industry practices	N/A		Rio - Noted	AECOM - No response necessary.	Rio - Comment closed
2	Global	N/A	N/A	Intrinsic Potential Modeling was incorporated as part of the design process	N/A		Rio - Noted	AECOM - No response necessary.	Rio - Comment closed
3	Global	N/A	N/A	The design considers existing valley slope/width in regards to species specific habitat suitability	N/A		Rio - Noted	AECOM - No response necessary.	Rio - Comment closed
4	Global	N/A	N/A	Reference reaches used for stream reach design were field surveyed	N/A		Rio - Noted	AECOM - No response necessary.	Rio - Comment closed

## Appendix H - Comment Tracking

Number	Page # or Global	Section	Paragraph	Comment	Commenter Initials	Disposition A/M/O	Response & Responder's Initials	Adequacy Review Response	Response & Responder's Initials
5	Global	N/A	N/A	Though described in the document, the methodology regarding the ledger balance of restored stream length, associated anadromous habitat and temporal duration regarding the mining and subsequent restoration of the Hangar Flats Pit is still unclear. It appears the prime Chinook spawning habitat will be established by the reroute in year 1, dewatered from year 7-10 and then eventually flooded by the filling of the Hangar Flats Pit during closure.	N/A		Rio - The focus of this basis of design report is to document design procedures and methodologies. Project impacts, ledger balance, temporal habitat quality and quantity during mine operations are discussed in the Stream Functional Assessment report and Conceptual Mitigation Plan.  However, to clarify, the sequence for the Hangar Flats pit area is as follows: 1. Meadow Creek diverted in a lined channel/floodplain corridor (with natural channel design / habitat / wetlands) around the future pit early in the project. 2. Dewatering of the adjacent alluvium (isolated by the liner) in years 7 through 10 and discharge to RIBs, while Hangar Flats pit is mined below the valley bottom, with possible impacts to streamflow in downstream reaches between the downstream lined limit and the area of influence of the RIBs. We are presently evaluating mitigation measures for these impacts. 3. Hangar Flats pit lake begins to fill starting in Year 11 (while West End pit is still being mined), taking approximately 8 years to fill. During this time, the lined corridor functions as it did during operations, but there exists a potential for streamflow loss downstream of the liner until the groundwater table rebounds and the lake fills. We are presently evaluating mitigation measures for this impact. 4. Connections between Meadow Creek and Blowout Creek and the lake are constructed upon or in advance of lake filling, and switched over when the lake fills and spills. 5. The lined diversion corridor is abandoned in place (plugged with fill where new channel connections to the lake cross over it), forming oxbow-type features – not flooded by the pit lake.	AECOM - Resolved for now, however, this will continue to be an issue due to the reduction in stream flow as referenced in #3 of Rio's response that will need to be addressed. It is possible that the design may need to be modified if stream flow reductions cannot be mitigated or if the fish analysis indicates that the Hangar Flats pit may not provide suitable passage for anadromous fish.	Rio - Agree and noted. This may need to be address in a future design phase.
6	Global	N/A	N/A	Further technical review will be needed to evaluate the Reference Reach data in relation to proposed stream reach design	N/A		Rio - Noted	AECOM - Resolved	Rio - Comment closed
7	Global	N/A	N/A	Further technical review will be needed of sediment budgets and sediment transport calculations.	N/A		Rio - Noted	AECOM - Resolved	Rio - Comment closed
8	Global	N/A	N/A	This document is logical and organized in a way that makes sense to me and I can understand.	N/A		Rio - Noted	AECOM - No response necessary.	Rio - Comment closed
9	Global	N/A	N/A	This is the first document to treat the alluvial fans separately, which I think is helpful.	N/A		Rio - Noted	AECOM - No response necessary.	Rio - Comment closed
10	Global	N/A	N/A	The engineering and geomorphic portions require some closer review to assess. Lots of equations and quantitative methods.	N/A		Rio - Noted	AECOM - Resolved	Rio - Comment closed
11	Global	N/A	N/A	The "rock chutes" design section needs to be compared with the SFA scoring on the ledger for these sections – they are steep drops off the storage facilities.	N/A		Rio - Noted	AECOM - Resolved	Rio - Comment closed
12	Global	N/A	N/A	I looked through the design sheets at the end but did not see designs for the bypass channels around the Meadow Creek storage facility – as I am curious as to what they look like, based on the ledger scoring.	N/A		Rio - Interim condition ditches/channels are beyond the scope of this basis of design report and will be designed by others. Interim diversions are trapezoidal or V-shaped channels, and either cut in rock or lined with riprap and Geosynthetic Clay Liner (GCL). Side slopes, lining type/size, and dimensions vary according to flow rate, and the materials into which the diversions are excavated (rock/alluvium/colluvium/fill). These channels are described in the PRO; RFAI responses including #27, #57, and #85; SPLNT modeling reports; and the conceptual water management plan.	AECOM - Resolved	Rio - Comment closed
13	N/A	Appendix A	N/A	The Appendix A. biological section is very useful and will be integrated into our documents.	N/A		Rio - Noted	AECOM - No response necessary.	Rio - Comment closed
14	N/A	Appendix A	N/A	The Appendix A used the IP modeling to determine restoration goals, but it is unclear if they used the Cooney and Holzer 2006 results or ran their own. Clarification is needed. It is coarse scale as one value is given for each parameter for each reach. The fish habitat requirements are put together well and the appendix organization is logical and makes sense. It lacks some detail and explanation. The fish distribution, periodicity etc. are all things that could go into the tech report that we can take form this rather than having to do ourselves. Useful.	N/A		Rio – The IP modeling was based on Cooney and Holzer 2006, but only as a coarse-scale analysis to inform habitat and stream design goals/objectives. We plan to use AECOM's detailed IP analysis to revise assumptions from our coarse-scale modeling and to update the SFA Ledger (not discussed in the Stream Design Report).	AECOM - Resolved. It is assumed that the coarse-scale explanation refers to using fewer measurements over a larger area to derive a reach-based analysis rather than a 200m segment based analysis.	Rio - Comment closed
15	3-39	3.3.9	Table 3-17	Table 3-17 contains the reaches that will pass fish and those that won't in the restoration design. This is important to compare to the Functional Units in the ledger.	N/A		Rio - Agree.	AECOM - Resolved	Rio - Comment closed
16	3-39	3.3.9	Table 3-17	In the same table, they list upper meadow creek as restoration targeted at cutthroat trout only. However, in the ledger, they get functional uplift for all species – even though it will not be designed for all species, and there is no migratory fish passage. . . this is a point that I will come back to in my comments on the ledger.	N/A		Rio – Table 3-17 has been updated to include both cutthroat and bull trout. Although the Stream Design Report does not address/discuss the SFA Ledger, the SFA Ledger does not distinguish the difference between fish species except with regards to certain WCI elements (temperature and pool frequency). Subsequent versions of the SFA Ledger (in progress) will enable the user to evaluate conditions for individual fish species (so-called "fish filter" requested by USFS).	AECOM - Resolved	Rio - Comment closed

EPA COMMENTS

## Appendix H - Comment Tracking

Number	Page # or Global	Section	Paragraph	Comment	Commenter Initials	Disposition A/M/O	Response & Responder's Initials	Adequacy Review Response	Response & Responder's Initials
1	Global	N/A	N/A	The reach scale biological objectives are heavily weighted towards promoting functions and services directly related to fish. What other biological objectives could be included and why are they not included currently? Additional suggested biology function-based parameters could include microbial communities, macrophyte communities, benthic macroinvertebrate communities, and landscape connectivity (physical breaks in the corridor/ connectivity) for aquatic organisms other than fish. Measurement methods that could be used with a performance standard could be biological indices (such as the Periphyton Index of Biological Integrity, PIBI) for microbial communities, macrophyte communities, benthic macroinvertebrate communities, and fish communities. See A Function-Based Framework for Stream Assessment & Restoration Projects, EPA 843-K-12-006, May 2012, Appendix Ac for a list of all biological measurement methods along with information about the type, level of effort, level of complexity and whether it is a direct or indirect measure of function. The biological objective of water conveyance is unclear. What are the assessment methods/ measurements and performance standards associated with the inclusion of water conveyance as a biological objective?	CMB		<p>Rio – Biological objectives are focused on indicator species (salmonid fish are commonly used as indicator species representing the larger aquatic ecosystem). Rather than the Function-Based Framework for Stream Assessment &amp; Restoration Projects (EPA 843-K-12-006), existing and proposed stream function has been measured using the Stream Functional Assessment (SFA) methodology and associated Ledger (provided to EPA) based on the US Forest Service Watershed Condition Indicators. The SFA includes an evaluation of water conveyance – Change in Peak/Base Flow. Furthermore, water conveyance is an essential physical and biological function of any stream, providing water to downstream reaches. Certain reach designs were targeted for water conveyance (and associated sediment transport) instead of a broader suite of functions for two main reasons: either the reach was non-perennial, or the reach was intended to be steep out of a desire to minimize its length thereby maximizing length of adjacent lower-gradient, higher-potential habitat reaches. The results of the SFA, while not specifically identified as “objectives” have been and will continue to be used to inform the stream design.</p> <p>It should also be noted that many other parameters have been and will be measured as part of an ongoing monitoring plan associated with the proposed Stibnite Gold Project - Please refer to the Aquatic Resources 2016 Baseline Study (MWH, 2017) and the Stream Functional Assessment (HDR, 2016).</p>	<p>AECOM - Partially resolved. Rio should also mention proposed post-closure monitoring (e.g. vegetation/ macroinvertebrates) stated in fish mitigation plan.</p> <p>EPA - CB/TN- Thank you for the response. Given that the applied assessment method focuses primarily on providing fish habitat post-project: that overall stream system function is not being fully assessed/considered (many streams do not provide fish habitat, but provide other functions, including biological, important to stream system function (Wipfli, Richardson, Naiman 2007; JAWRA 43(1) 72-85)), and it seems that a post-project objective is to convey water quickly to downstream to proposed perennial, low-gradient streams using smaller/non-perennial channels primarily as conveyance and not fully considering the functions provided by smaller order and/or non-perennial streams (including to downstream waters).</p>	Rio - Noted, in addition to the Aquatic Resources 2016 Baseline Study (MWH, 2017) and the Stream Functional Assessment (HDR, 2016), Section 9.3 of the Final Fisheries and Aquatic Resources Mitigation Plan (Brown and Caldwell, 2018) should be referenced for the Aquatic Communities Monitoring Plan.
2	Global	Draft Surface Water Hydrology Report	N/A	It is important to understand peak runoff in small drainage areas. What was used for the calculation of run-off and what is the rationale for utilizing that tool/ calculation method?	CMB		Rio - Appendix C (Draft Surface Water Hydrology Report) specifically outlines the approach and detailed methods for calculating discharge (runoff or otherwise) using standard statistical methods based on existing gage data and drainage basin size. We recognize that the comment asked about peak runoff, but assume the question refers to peak discharge (combination of runoff and groundwater inputs). Peak discharge in snowmelt-dominated systems (such as the SGP area) is of course driven largely by snowmelt runoff.	AECOM - Resolved	Rio - Comment closed
3	Global	Draft Surface Water Hydrology Report	N/A	Has the effective discharge, flow duration, and sediment transport been considered in estimating channel size? Has the flow of the stream designed been modelled for an extended period of time to see if the yield would be the same channel morphology that is shaped by the natural sequence of flows? Flow duration which is needed for performance standards of aquatic resources is not provided. Additional information and scientific rationale on flow duration needed to replace and sustain functions and services of aquatic resources needs to be included.	CMB		Rio – Flow duration and sediment transport have been considered in our determination of the appropriate channel size for each reach. A complete summary of expected discharge return frequencies/intervals (low flow through large floods) is provided in Appendix C. Effective discharge requires sediment volume data which are not available, but a large volume of literature suggests that bankfull stage corresponds to the effective discharge for most streams. We have used reference conditions and published literature (Castro and Jackson 2001; USFS 2004) to calculate the most appropriate bankfull channel geometry for each reach (see the Design Criteria section of the Stream Design Report on page 3-32). At-a-station hydraulic calculations were performed using the proposed geometry for each reach to test sediment transport competency (Appendix D of the Stream Design Report). Statistical gage analyses (Appendix C of the Stream Design Report) and ongoing hydrologic modeling suggest flow duration (especially channel-forming flows around the 1.5-year recurrence interval) will change minimally or not at all for proposed conditions. Furthermore, the designed stream corridors allow for natural readjustment in response to variance from the design conditions or subsequent disturbances such as fire. This is discussed in the Hydrology section of the Stream Design Report and in Appendix C.	<p>AECOM - Resolved</p> <p>EPA - TN/CB- Thank you for the response. Does the hydrology modeling extend to the project end data (20 years post-mining) and do the included modeled parameters reflect consideration of the predicted effects of climate change (e.g. earlier water delivery and increased flashiness) and how it might impact proposed stream design and the ability to provide proposed functions?</p>	Rio - Appendix C of the Stream Design Report discusses how climate change may impact the stream design approach and methodology. Appendix C also describes various flow frequency analyses performed including methods and results. Rio did not produce a rainfall-runoff or meteorological model to predict what flows might occur throughout the duration of the project - that is beyond the scope needed for the stream design. Additional hydrological (baseflow) modeling has been completed by Brown And Caldwell (SPLNT model) which has been made available to the agencies.
4	Global	Draft Surface Water Hydrology Report	N/A	Information is presented on the flow of water in the project area, however, a rationale, summary, and/or information addressing the question of if there is enough water to establish, sustain, and successfully meet the performance standards for the functions and services proposing to be provided by the aquatic resources appears to be lacking. Additional clarification, explanation, and scientific rationale needs to be provided to support the water balance for the proposed project activities. The 2008 mitigation rule suggests a detailed water balance equation be provided as part of the site selection process for any project or task which may be considered a part of compensatory mitigation.	CMB		Rio – See the Stream Design Report Appendix C for hydrologic regime analysis for design. For stream flows during and after mining, see Response to RFAI-88a when it becomes available. To our knowledge, the term “water balance” does not occur in the 2008 Mitigation Rule or in the Background published with it.	AECOM - Resolved if addressed in RFAI-88	Rio - Comment closed
5	Global	N/A	N/A	It would be useful to better understand the flow conditions at the proper season to support diverse habitats and biotic communities adequately assessed. Please provide a summary from hydro analysis, results/ conclusion, discussion of results, and rationale for the chosen methods, analysis, and results/ conclusions.	CMB/LAH		Rio - A summary of hydrologic conditions is provided in Appendix C (Draft Surface Water Hydrology Report). Sections 3, 4 and 5 address discharge at existing gaging stations (including species specific requirements and timing), while Section 7 addresses ungagged streams and stream segments. Standard methods were used, and all methods are described. There are no major conclusions in the hydrology appendix; rather, the results of the hydrologic analysis have been used to inform the stream design.	<p>AECOM - Resolved</p> <p>USFS - TL-This is a good example of the isolated nature of the design document. The document would benefit from additional citations/references to other documents.</p>	Rio - Section 3.3.3 of the Stream Design Report references Appendix C. Appendix C is an appendix to the Stream Design Report and references standard methodologies for analyses completed.
6	Global	N/A	N/A	It is difficult to find out if the Rosgen Stream Classification System was used and if so, what level of classification was utilized. Please make this classification system, if utilized, more apparent in a table with all streams in the area included. If this classification system was not utilized or only partly utilized or described per stream reach, please provide a rationale as to why not all reaches were classified using the Rosgen system. If this information is located elsewhere, please include in the report.	CMB		Rio – The Rosgen stream classification was used to classify every reference reach and proposed restoration/enhancement reach as summarized for the reference reaches in Appendix B, and for each restoration/enhancement reach in Appendix D.	AECOM - Resolved	Rio - Comment closed

## Appendix H - Comment Tracking

Number	Page # or Global	Section	Paragraph	Comment	Commenter Initials	Disposition A/M/O	Response & Responder's Initials	Adequacy Review Response	Response & Responder's Initials
7	Global	N/A	N/A	The design criteria of the rock chutes (MC3, FC2, HC2, WE2, WE3) are poor in providing functions and services of aquatic resources. What additional measures may be incorporated to better promote functions and services of the aquatic resources affected by the rock chutes.	CMB		Rio – The rock chutes emulate steep, boulder-cascade reference reaches and have been designed primarily for stability. Aquatic resources (i.e., habitat) beyond that of stability, temperature, sediment, and chemical contaminants are considered secondary. It is not geomorphically appropriate to seek additional habitat within these reaches. The length of each rock chute has been minimized to maximize the length of adjacent lower gradient reaches with higher-quality habitat potential.	AECOM - Resolved	Rio - Comment closed
8	Global	N/A	N/A	What parameters or measurements are proposed to assess the diversity and variability of the biotic community? What performance standards are being included to address these parameters? If these parameters are not currently included in the report or the stream functional assessment ledger, what is the rationale for their exclusion?	CMB		Rio – Per the 404 permit, performance and success criteria is based on vegetation monitoring. Additionally, many parameters have been and will be measured as part of an ongoing monitoring plan associated with the proposed Stibnite Gold Project - Please refer to the Aquatic Resources 2016 Baseline Study (MWH, 2017) and the Stream Functional Assessment (HDR, 2016).	AECOM - Partially resolved. Rio should also mention proposed post-closure aquatic community monitoring (fish and macroinvertebrates) stated in fish mitigation plan.  EPA - LAH/TN- The response refers to a 404 permit, which has not been issued and is not available for review. EPA continues to express support that the EIS include details about monitoring. Details that should be included are: the parameter monitored, frequency, responsible party, and indicator/performance standard. The response refers to vegetation monitoring as a basis. While this parameter is an important component, other parameters should be included as well (bank stability, WQ, habitat, etc.) We also encourage the use of an adaptive management plan, which would include the action that would be triggered if an performance standard being monitored is not reached or an exceedance of a threshold occurs.	Rio - Noted, in addition to the Aquatic Resources 2016 Baseline Study (MWH, 2017) and the Stream Functional Assessment (HDR, 2016), Section 9.3 of the Final Fisheries and Aquatic Resources Mitigation Plan (Brown and Caldwell, 2018) should be referenced for the Aquatic Communities Monitoring Plan.  Rio - Section 11 of the Final Fisheries and Aquatic Resources Mitigation Plan (Brown and Caldwell, 2018) should be referenced for the adaptive management plan.  Rio - See also discussion regarding dynamic channel provided in response to USFS Comment #4 at the beginning of this Appendix.
9	Global	N/A	N/A	What is the primary source of impairment for the streams in the stream design report? For example, what is the primary source of impairment per stream, per reach, or over a larger area, such as per HUC? Is it possible to better address watershed impairments at their source directly? Of concern, if this primary source cannot be addressed, it would most likely affect the degree of success of functional lift for many if not all proposed parameters.	CMB		Rio – The primary source of impairment is the conversion of the existing natural stream channel to a diversion channel during proposed mine operations, or previous conversion by prior mine operators, depending on the reach in question. The stream designs intend to replace the diversion channels by recreating a naturally functioning channel where possible.  Separating primary vs. secondary sources of impairment adds little value to a complete channel re-design. Regarding "enhancement" reaches, the goal is to improve habitat based on evaluations of limiting conditions (primarily related to passage, pools, and in-stream cover). Watershed-wide impairments such as fire-related deforestation and natural and historical mine-related metals loading are addressed by other aspects of the Proposed Action.	AECOM - Resolved. Recommend modifying last sentence to read... "addressed by other documentation associated with the Proposed Action."	Rio - Comment closed
10	1-1	1	ALL	A Function-Based Framework for Stream Assessment & Restoration Projects, EPA 843-K-12-006, May 2012 suggests utilization of the River Continuum Concept as a theoretical model for visualizing importance of energy relationships have on biodiversity and chemical functions of a stream system. Has this model been utilized? Would it add any benefits to the models which may have been utilized or are currently being utilized for this purpose or a similar purpose?	CMB		Rio – The river continuum (large-scale spatial layout of streams, stream order, tributary junctions, etc.) will not fundamentally change as a result of the project. In other words, 1 <sup>st</sup> order streams will not be replaced with 2 <sup>nd</sup> or 3 <sup>rd</sup> order streams, and the location of tributary junctions (dendritic channel pattern) will not be significantly altered. We are not proposing to modify the river continuum on a scale that would elicit measurable change to the continuum as a whole. It is our understanding that the river continuum concept was not intended to be applied at the reach-scale. We have not used the River Continuum Concept to evaluate energy relationships with biodiversity for this reason. The stream design has been informed by the Stream Functional Assessment, which consists of watershed condition indicators including habitat and water quality (among others).	AECOM - Resolved	Rio - Comment closed
11	1-4	1	4	Would the creation of a new stream channel after the natural channel has been filled may be more adequately described under the compensatory mitigation definition of "Creation" instead of "Restoration"? Given that question, should the "action type" be re-evaluated for the stream reaches listed in Table 3-1?	CMB		Rio – The definition of Establishment (creation) in 33 CFR 332.2 is: "the manipulation of the physical, chemical or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area and functions." We don't believe this to be the appropriate definition for the stream design associated with the Stibnite Gold Project as the resource did exist previously, it was temporarily altered (by Midas Gold or by prior operators) then "restored" (by Midas Gold) via "re-establishment" as described in the stream design report using the definitions from 33 CFR 332.2.	AECOM - Resolved	Rio - Comment closed
12	1-5	1	1	How will LWD be selectively installed? The WCI provides information associated with quantifying LWD; will that be used or does the USFS have information more specific to this project site which could be used to develop a more site-specific performance standard?	CMB		Rio – The stream design is at a conceptual level; therefore, specific treatment locations have not yet been identified for LWD structures. The Stibnite Gold Project Stream and Wetland Restoration Concept Design Drawings (Appendix E) provides typical details for numerous proposed LWD treatments, including installation notes and typical application locations (plan and profile views). More detailed treatment details and locations will be provided as the design is advanced beyond the conceptual phase. It is important to note that many of the proposed restorations may occur as much as 20 years in the future, and there is little to be gained by advancing designs beyond the present level at this time.	AECOM - Resolved	Rio - Comment closed
13	3-5	3	Tbl 3-2	Per Table 3-2, majority of the increase in proposed "enhanced & restored" stream lengths compared to the existing stream length are located in meadow creek (MC1A- MC1E, MC2, MC3, MC4, MC5, MC6). There is loss of stream length in Blowout Creek, Midnight Creek, and Hennessy Creek but no gain in stream length proposed. What is the direct, secondary and cumulative impact to these stream reaches losing stream length without proposed "enhancement" or "restoration"? What functions and services of the aquatic resources may be provided through the single measurement of stream length? What parameters, measurement methods, and performance standards, used to quantify functions and services of aquatic resources is directly dependent on stream length?	CMB		Rio – The impacts and benefits related to changes in proposed stream length are presented in the Stream Functional Assessment (SFA) Ledger, which quantifies stream length per reach for existing, interim, and restored conditions. Also, the stream length is a significant driver in the overall calculation of functional units (similar to weighted usable area) presented at multiple spatial scales (sub-reach, reach, and sub-watershed) in the SFA Ledger. The change in functional units across the life of the mine at each spatial scale should address the question of impact/benefit related to stream length. We further note that the loss of length in Hennessy Creek is because the present course of Hennessy Creek is in a diversion ditch that runs north and roughly parallel to the EFSFSR to discharge into the EFSFSR below the Sugar Creek confluence, rather than its original (pre- Bradley Mining Company) discharge point located east of the start of the diversion, and following a much shorter and more direct path to the EFSFSR where the Yellow Pine pit presently exists. As part of the restoration of this area, Midas Gold would reestablish the Hennessy Creek and Midnight Creek confluences with the EFSFSR closer to their original locations, while also providing important side-channel habitat in the EFSFSR floodplain.  The loss of length in Blowout Creek is mostly associated with the rock drain intended as a temporary sediment management measure. This feature would replace a low-habitat value, high gradient reach that is believed to impair downstream reaches owing to the sediment load it delivers. At closure, this reach would be restored to a stable boulder cascade.	AECOM - Resolved	Rio - Comment closed

## Appendix H - Comment Tracking

Number	Page # or Global	Section	Paragraph	Comment	Commenter Initials	Disposition A/M/O	Response & Responder's Initials	Adequacy Review Response	Response & Responder's Initials
14	3-13	3	ALL	The method of measuring and assigning intrinsic habitat potential (high, medium, low, etc.) for specific actions and targets in the project area needs additional explanation and rationale for better understanding. EPA is seeking rationale which is scientifically based and nationally consistent.	CMB		Rio – Intrinsic Potential is a scientifically-based and nationally recognized approach. The methods and rationale supporting this approach have been published by Cooney and Holzer, 2006 (as referenced on page 3-7 of the Stream Design Report, and in Appendix A). A detailed Intrinsic Potential analysis is currently under development by AECOM, the results of which will be incorporated into the Stream Functional Assessment. Additional rationale for the use of the Intrinsic Potential analysis is provided in Appendix A of the Stream Design Report.	AECOM - Resolved. It is assumed that the coarse-scale explanation refers to using fewer measurements over a larger area to derive a reach-based analysis rather than a 200m segment based analysis.	Rio - Comment closed
15	3-16	3.3.3	2	Sizing low-flow channels to carry a given flow over time carries the most sediment (channel – forming discharge concept). Has the sediment accumulation been accounted for per stream reach in the project design? If so, what does this data mean in consideration of the functional lift proposed for the specific stream reach? What does this information mean regarding the stability and sustainability of the channel design?	CMB		Rio – Channel-forming (or effective) discharge is not related to the low-flow channel, rather it is related to the bankfull channel and is believed to best define the bankfull channel size. Standard at-a-station hydraulic calculations were used to evaluate sediment transport competency for channel-forming (bankfull) channel geometries per reach as summarized in Appendix D. The channel geometries for each reach were refined based on the transport competency results to reduce the potential for excess erosion or deposition based on anticipated sediment grain sizes. The stream geometry and sediment transport character has been quantified as part of the functional uplift (impact vs. benefit) analysis summarized in the Stream Functional Assessment (SFA), specifically with regards to the following specific watershed condition indicator elements: fine sediment, substrate embeddedness, width/depth ratio, streambank condition (stability) and floodplain connectivity. The stream geometry and sediment transport information supports the design process ensuring a relatively stable and sustainable product as summarized throughout the stream design report.  For example, hydraulic calculations are used to estimate shear stress and velocity, which are used to appropriately size streambed material, bank treatments, and in-stream structures. These calculations also enable comparison with suitable reference reaches to further ensure appropriate- sized materials and structures are being proposed such as large woody debris and boulder clusters. Such structures force areas of flow divergence and convergence to retain/sort sediment and scour pools respectively.	AECOM - Resolved	Rio - Comment closed
16	3-16	3.3.3	2	For stream design criteria, what is the importance for stream hydrology of a system dominated by snow melt?	CMB		Rio – Peak flow dominates channel-forming processes. Snowmelt hydrology suggests that peak flows tend to coincide with spring runoff. The 1.5-year recurrence interval peak flow has been shown to roughly equal the effective discharge (channel-forming flow) (Castro and Jackson 2001; USFS 2004). The 1.5-year recurrence interval discharge has been used as the principal design flow for hydraulic analysis within each reach of the stream design.  Snowmelt-dominated systems in general are less variable both year-to-year and over short time steps, and exhibit a more reliable relationship between bankfull and effective discharge than rainfall runoff-dominated systems (with convective rainfall-dominated urban basins representing the other extreme of variability and channel stability). In addition to geomorphic processes, the timing and magnitude of peak flows associated with spring runoff affects the timing and use by various fish species. The hydrology appendix (Appendix C, Section 6) summarizes the range of anticipated discharges as related to several fish species and life stages.	AECOM - Resolved	Rio - Comment closed
17	3-25	3.3.6.1	1	The Rosgen system has a priority classification system I, II, III, or IV, based on the restoration activities being implemented. For example, activities which result in increasing floodplain connectivity are assigned a higher priority level than stream bank treatments. In addition, energy dissipation pools have also been assigned the lowest Rosgen priority. Has this priority level been examined for this project and what benefits would be provided if it was utilized for this project? Bank treatments associated with riprap may provide reduced functional lift or little environmental benefit compared to native materials. The NCS Chapter 8 Stream Design Engineering book provides additional guidance on native materials, such as coconut fiber, which may be utilized for increased channel stability.	CMB		RR – All impacted streams will be restored and have not been prioritized using the simplified Rosgen system based on floodplain connection. Unlike the Rosgen approach, the relative amount of floodplain connection restored should be related to the geomorphic character of the stream. For example, it would not be geomorphically appropriate to attempt to restore a broad floodplain within a steep, narrow valley. In other words, reaches will be restored to a Rosgen Level 1 priority (fully connected floodplain) wherever geomorphically appropriate. This is the case atop the TSF and DRSFs, where gradients are low (less, sometimes much less, than 2%). An inset floodplain (Level 2), step-pool (Level 3), or stabilized-in-place (Level 4) approach has been applied where required by geomorphic conditions (especially gradient and confinement). Confined, steep reaches where the stabilized-in-place/Level 4 approach applies include the faces/groins of the DRSFs (gradients up to approximately 30%), the Blowout Creek chute, and the reach of Hennessy Creek that cascades down the Yellow Pine pit highwall.  Please refer to sheets D-1 through D-10 of the Stream Design (Appendix E) to see the bioengineering techniques proposed for this project. The vast majority of proposed bank treatment length includes bioengineering techniques. Riprap bank treatments are only proposed for boulder chutes. Standard and well-accepted riprap sizing techniques have also been used to evaluate rock sizing in cascades, and step-pools that will be composed of large rock (boulders), similar to reference conditions.	AECOM - Resolved	Rio - Comment closed
18	3-31	3.3.6.4	3	Alluvial fans are naturally in a state of dynamic equilibrium; as such it may not be desirable to add LWD. What other design approaches have been considered for threshold channels besides armoring with rock. A threshold stream may change to an alluvial stream within the same reach; has this been taken into consideration in the design criteria?	CMB		Rio – Most alluvial systems (streams, fans, etc.) are considered to be in a state of dynamic equilibrium, which means the system is sometimes stable and sometimes dynamic. It is highly appropriate and broadly recommended by the scientific community at large to use LWD in a system that is considered to be in a state of dynamic equilibrium. LWD has been shown to influence both stream dynamics and equilibrium and literally create a dynamic equilibrium in forced pool-riffle and forced step-pool systems (Montgomery and Buffington 1997). The NRCS Stream Restoration Design National Engineering Handbook 654 (2007) defines a threshold channel as one where "movement of the channel boundary is minimal or nonexistent for stresses at or below the design flow condition." It is further recommended by the NRCS to "select a channel configuration where the stress applied during design conditions is below the allowable stress for the channel boundary." In other words, design an armor layer. All design reaches have been delineated based on geomorphic character such that no design reach includes both a threshold channel and alluvial channel as these are fundamentally different designs.	AECOM - Resolved	Rio - Comment closed
19	3-31	3.3.6.4	2	What are the design criteria for rock chutes (MC3, FC2, HC2, WE2) and how may the design criteria be improved to provided functional lift.	CMB		Rio - The design criteria for all rock chutes as discussed in section 3.3.6.4 are summarized in USBR, 2007 Rock Chute Reaches. Also, as discussed in section 3.3.6.4, the Rock Chute Reaches will follow the threshold channel design techniques outlined in sections 3.3.6.2 (Forced Step Pool Reaches) and 3.3.6.3 (Cascade Reaches). Rock chutes are designed with stability as the primary objective (refer to EPA comment #7 above).	AECOM - Resolved	Rio - Comment closed
20	3-33	3.3.6.6	3	Rosgen utilized the Floodprone area width (FLA). By utilizing the floodplain width measurement in this project, is this interchangeable with Rosgens FLA?	CMB		RR – The Rosgen-defined floodprone width and the floodplain are not necessarily the same thing. These two terms are not interchangeable for the stream design. The Rio stream design defines the floodplain as that area accessible to the 100-year discharge. Rosgen defines the floodprone area as that area inundated when the water level is twice the bankfull depth. The floodplain width in the stream design is often much larger than the Rosgen-defined floodprone width.	AECOM - Resolved	Rio - Comment closed

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21	3-34	Tbl 3-16	ALL	In table 3-16, it would be helpful to have the reaches to list which reaches in the table are constructed with a liner.	CMB		Rio – Noted (addressed in the revised report)	AECOM - Resolved	Rio - Comment closed
22	4-1	4.1	ALL	In the outline of the schedule, the separation between impacts to waters of the United States and restoration activities which replace functions and services lost from the impact is not clear. Additional clarification should be provided. If an impact occurs which results in lost functions and services, even if it is temporary and even if it is for the purpose of restoration activities, it should be clearly identified.	CMB		Rio – The schedule is only shown in the stream design report for the purpose of summarizing the restoration sequence. The Conceptual Mitigation Plan (CMP) and associated Stream Function Assessment (SFA) are the best references for a summary and evaluation of the timing of impacts and restoration activities. The commenter is referred to these documents.	AECOM - Resolved	Rio - Comment closed
23	D-4	D2	Tbl D-2	Perhaps this table would be a good location to include the Rosgen classification for each stream reach as this standardized method of classifying a stream channel may be more translatable than the verbal sentence format description of the stream order followed by gradient and bank description	CMB		Rio – Noted (not modified as this information is provided elsewhere in the same appendix).  We would like to confirm that the reader has reviewed the PDF version of each appendix. The Microsoft Word version does not include many figures and tables that are intended to support the appendix and overall document. The same is true for all appendices. The PDF version is the complete document; the Word version was only provided to facilitate the provision of comments in Track Changes mode.	AECOM - Resolved	Rio - Comment closed
24	NA	NA	NA	Numerous representative reference sites are located in wooded areas. One example is reference site 12. This site was chosen to represent a reach of Meadow Creek that will be constructed on a tailings impoundment. A large portion of the reference stream is shaded, most likely by a mature tree canopy. The concept of planting these types of trees on a lined impoundment has not been fully evaluated (at least to my limited project knowledge). Will the roots of the trees have the potential to damage the liner? Will there be sufficient depth to provide a stable base to support the tree? Are there examples of this type of revegetation on similar impoundments? The removal of large trees from the reclamation design may have the potential to impact temperature modeling.	T. Leeds		Rio - Currently the proposed vegetation plan does include trees within the riparian zone of stream reaches with a liner. We believe the depth of soil relative to the likely rooting depth of trees to be sufficient to support trees without impact to the stream liner. The proposed depth of materials above the liner is described in Appendix D of the Stream Design Report for each reach with a proposed liner, and summarized in a technical memorandum attached to the RFAI #87 response. Material thickness atop the stream liner is generally expected to exceed 5 feet, the base layers of which would be saturated. The fine details associated with the liner and materials thickness will continue to be refined through future design phases. The stream liner will create a perched aquifer with a groundwater elevation estimated to be similar to the water surface elevation in the stream based on simple Darcy's Law calculations of anticipated groundwater transmissivity relative to the volume of flow in the stream. Typically tree roots do not extend at depth below the groundwater surface which would be several feet above the liner. Observed reference examples include trees (primarily spruce) with shallow root depth exposed via wind-throw within similar meadow-type reference reaches (i.e. reference site #12).	AECOM - Resolved  USFS - TL-Are willows considered "trees"? Are the future fine design details required for impacts analysis?	Rio - Willows are considered shrubs. In regards to the question of future liner design details and impacts analysis, short answer is no - not required. The SFA (impacts analysis tool) incorporates results of analyses addressing hyporheic groundwater flow which is founded on conservative assumptions regarding the liner.
25	NA	NA	NA	I would expect that a low gradient meandering stream design would have the potential to adversely impact stream temperatures, this is confirmed in the SPLNT model report. With temperature being one of the elements of concern for listed species, it would be prudent to evaluate a more direct conveyance of water in the restored reach of Meadow Creek located on the impoundment. Would a straight, higher gradient channel conserve water temperature, and if so to what degree? An evaluation of the trade-off of the following two benefits should be evaluated: 1. Increase in fish habitat, albeit habitat that is not connected in terms of fish passage, to the EFSFSR. Note: This channel could be extremely difficult to construct due to the low gradient. 2. A straight channel to preserve temperature, this channel would still have a low gradient and would also qualify as habitat similar to the longer channel.			Rio - We agree that there needs to be some degree of sensitivity analyses completed as part of the temperature modeling to help inform the design of the reaches on top of the TSF. Temperature modeling was not yet available when these designs were developed. We will continue to make refinements to the design as the results of temperature analyses and other analyses become available.  Note: Channels with low slope are typically not a constructability concern using appropriate and modern equipment and survey tools such as machine control. Furthermore, these reaches are designed to accommodate stream movement – and this could include minor adjustments in bed profile within sections that varied from the design due to construction tolerances.	AECOM - Resolved	Rio - Comment closed
26	NA	NA	NA	Another issue that needs to be addressed is the timing of construction. The tailings will be placed wet via a slurry. The tailings will need to dewater and settle prior to construction of the channel and its associated features to reduce the potential for differential settlement on the impoundment. Considering the ultra-low gradient of the proposed channel, differential settlement could lead to ponding and disruption of the flow path. Large settlements could lead to breaks in the liner.			Rio – The construction sequence outlined in Section 4.1 of the Stream Design Report includes waiting several years for settlement of the tailings before restoring the upper reaches of Meadow Creek. Consolidation testing and modeling to-date suggests that the majority of tailings consolidation and associated settlement will occur during operations (and active tailings deposition) and within the first five years after deposition ends (end of mine year 12). Local ponding due to relatively small topographic differences/complexity (assuming construction tolerances are met) is acceptable. The design allows for adjustments in channel form recognizing that there could be some settlement and aggradation after stream restoration has occurred. Strategic cuts and placement of fill is proposed to address potential ponding in the deepest area of tailings (where the greatest amount of settlement is expected).  Midas Gold - Differential settlement may be less of an issue on tailings than is suggested, as the column height and thus the incremental settlement between adjacent segments (at whatever segment scale one considers) varies gradually from point to point. Ponding is the usual result of excess settlement in this case, assuming one means long-term low-level settlement. The initial (the progression is basically asymptotic) settlement would be over in 5 to 15 years (taking the endpoints from the range of model results so far), and would be confirmed based on predictive modeling, observation, and calibration of modeling during 12 years of operations plus initial closure, before we would place cover material and liner atop the tailings. With reclamation of the TSF over 20 years in the future, there will be considerable opportunity for operational experience on-site and at other lined tailings facilities throughout the world, and there will likely be modeling, material testing, and product development advances that will improve the ultimate TSF closure design.	AECOM - Resolved	Rio - Comment closed

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27	NA	NA	NA	The report provides examples of enhancement designs but does not specify the location or frequencies of proposed features. The one example reach photograph provided (MC6) does not portray a channel that appears to be overly degraded or affected by man-made impacts. Has the potential impacts from construction of enhancement features been conducted? If these reaches are currently functioning, it might be hard to justify the enhancement. Has a survey been conducted to assess the locations of enhancement features?			Rio - For these conceptual designs we are showing the type of enhancement elements that may be incorporated into the design. We have also made assumptions about the frequency and quantity of individual enhancement treatments. The exact location and rationale for enhancement elements will be determined in a future design phase, although several strategic enhancement treatments are shown on the revised Stream Design Plans. Construction impacts for enhancement elements will be quantified. Agree, less enhancement is proposed for those reaches that are considered functioning. At a minimum we propose to address passage barriers and LWD targets.	AECOM - Resolved  USFS - KMG-I don't think this is completely resolved. We had a related conference call with MGII/BC/Rio & USACE on 11/1 that I think resulted in an action item for MGII team to report on the data that was collected to support the need for specific stream enhancements in reaches that would otherwise not be directly impacted by SGP operations, particularly if positive credits are to be assigned as compensation for impacts to WOTUS.	Rio - We believe this is an SFA Ledger comment and has been addressed in revised (2019) SFA Report.
<b>EPA COMMENTS (Received 11/9/18 on Final Document)</b>									
1	Global	N/A	N/A	<u>Literature relevant to channel replacement:</u> As with the proposed tunnel for fish passage, this extensive construction of stream reaches over landscape where the existing channel has been obliterated by the mining action seems extraordinary. I am not aware of studies where this massive of a stream replacement has been conducted. Perhaps this has already been provided in other documents or RFAs. Any literature relevant to the long-term evaluation of massive stream construction where no channel exists should be synthesized to verify the state-of-the-art. This would help to validate that this is indeed within the realm of feasibility.	LH		Rio - We acknowledge the scale of the project. However, the design and construction of new stream channels in previously unoccupied areas is widespread and common. In regards to proposed restored streams within the SGP, we do not deny there are design and construction challenges to overcome. To name a few, these include designing a channel atop an impermeable liner, designing stable channels in very steep terrain, and designing channels that will be self-sustaining and beneficial to people, environment, and fish and wildlife without causing harm in the future. These challenges have been overcome and successful project have been implemented. We acknowledge there is uncertainty and restoring streams on this scale is unique. That said, we encourage everyone to let the design and associated best available data and analyses speak for themselves.		
2	1-4	1.3		<u>Restriction of report to physical attributes:</u> The report uses evaluation of geomorphology of the current stream network to describes the current function and capacities for transport (wood, water, and sediment) and factors affecting channel stability. This analysis is then used to guide the channel design. All of these attributes are physical. Likewise, the fisheries appendix A focuses entirely on the physical aspects of fish habitat. The 'biological objectives' in Appendix A are the physical attributes of streams that are used by the primary fish species. The report does not address the actual biological aspects of functioning streams needed to support stream biota, including the top predators (salmonids). It should be clearly stated in 1.3 that this report is restricted to only the physical aspects of stream design and that no attempt is made to address the hugely important function of the streams (e.g. processing of nutrients, processing of organic matter, and primary and secondary productivity). Not sure where these biological ecological questions will be answered.	LH		Rio - See response to Stream Design Report Dated September 2018 Comment #1 from EPA. Furthermore, the stream design is a conceptual design developed to support the Conceptual Mitigation Plan and therefore is not an all encompassing report. Recent edits to the report include acknowledgement of concurrent efforts and future reports addressing geochemistry and hyporheic groundwater analyses. The stream design report is intended to be updated as new information becomes available and as the stream design advances to future design phases. We disagree with the reviewers comment about the report making no attempt at addressing biological aspects. Biodiversity and the quality of aquatic and riparian life can be thought of being supported by lower-level functions. As described in EPA's Function-Based Framework for Stream Assessment and Restoration Projects (EPA 2012; EPA 843-K-12-006), biology is at the top of the hierarchical pyramid and is supported by stream functional categories ranging from hydrology, hydraulic, geomorphology, and physiochemical. In other words, biological function cannot occur without proper function of the lower level functional categories which are addressed in the stream design report. Please be on the lookout for draft reports addressing geochemistry and hyporheic groundwater analyses.		
3	3-3	Figure 3-1		<u>Isolated populations:</u> Expand on feasibility of establishing fish populations above the barriers. Describe factors that influence long-term sustainability (stream length, gradient, presence of feeder streams). Are these factors sufficient in these reaches that it is feasible – will need to synthesize relevant literature.	LH		Rio - Isolated fish populations currently exist above natural barriers in Fiddle Creek, Blowout Creek, EFSFSR, and Meadow Creek. We recognize that proposed resident reaches shown in Figure 3-1 are located upstream of proposed barrier reaches – fish will be able to migrate downstream but not return upstream, similar to natural barriers. However, the proposed resident fish reaches are connected to upstream, existing, unimpacted reaches. We further note that proposed isolated habitat in upper Meadow Creek is the only resident reach of a similar or larger size (drainage area, stream width) compared with existing isolated habitats in Fiddle Creek (upstream passage blocked by FS 412 road culvert, and likely also steep gradient upstream) and Blowout Creek (steep gradient, high velocity, shallow water, and boulder drops in chute below historical dam site). We presume that any isolated population proposed in upper Meadow Creek would be more viable than existing smaller isolated habitats (Fiddle and Blowout Creeks are both about 35% of the basin size as upper Meadow Creek) given the larger post-restoration habitat area proposed in upper Meadow Creek.		
4	3-13	3.3.2		<u>Beaver activity:</u> Beaver are only mentioned in context of proposed geomorphic targets as an accepted/likely added influence on the low-gradient channel network. Given that the streams are designed to have quasi-equilibrium, is it assumed that the stream function can be sustained with some level of beaver disturbance? Is it assumed that the streams are resilient to this type of disturbance so that impacts by beaver would only added to the diversity of the streams? The influence of beaver is highly variable ranging from small temporary alteration of pools (size, depth, frequency) to relatively expansive and deep complexes. Seems that this perturbation should be addressed. How will these streams respond to levels of beaver activity? The stream design report should describe how the influence of beaver may bear on the design, function, longevity of the design.	LH		Rio - Restoration reaches are designed with variable degrees of stability depending on the channel type. For example, meandering channel types are designed to be less stable (horizontally and vertically) than rock chute channel types. The degree of stability used for design is consistent with typical channel types of natural channels. Also, Floodplain widths are intended to provide adequate room for long-term lateral migration of channels. By using appropriate streambed, bank, and floodplain materials; allowing channels to migrate across appropriately sized floodplains; incorporating horizontal and vertical control at strategic locations; and incorporating bioengineered bank stabilization treatments and revegetation, the design mimics the stability and diversity observed in natural reference streams. In regards to disturbance from beavers, this approach provides a great deal of resilience (primarily due to floodplain terraces; see Drawing D-13) and sets the project up for long-term sustainability. Physical objectives of design reaches are described in Appendix D.		

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5	3-32	Design Criteria		<u>Sediment supply</u> : Although, watershed is thoroughly characterized (geology, disturbance regimes) there still seems to be limited certainty that these will function in the long-term due to the uncertainty of sediment supply. Since this is critical to the long-term success of the constructed channels, what else can be done to reduce this uncertainty? Is the one year of data sufficient to make these estimates (3-22)?	LH		Rio - The designed channels approximate a geomorphically appropriate quasi-equilibrium state. By incorporating and accounting for uncertainty, long term success by response to changing environmental drivers and potential future disturbances from fire, climate change, etc. An analysis of alluvial fans in the vicinity of the SGP indicated that following site closure, new fans would take thousands of year to form in comparable size. An equilibrium slope calculation was performed to determine the amount of aggradation below the alluvial fan. The TSF and DRSF liners and associated terraces, if applicable, have been flared to accommodate the predicted maximum future alluvial fan geometry. See Appendix D for associated discussion.		
6	3-35	3.3.7		<u>Initial versus long-term channel quasi-stability</u> : It is not clear how newly created channels are transitioned to their final quasi-stable state. The constructed channels must have an initial stability –correct? As explained, they are constructed with stability enhancing features (boulders/wood structure/semi-armored terraces, etc.). But through time they establish an equilibrium with other conditions and inputs. So, how is this transition handled? For example, some channel types (low gradient, meandering channels) would normally have lateral movement controlled in a quasi-equilibrium by riparian vegetation. So how are these channels maintained in the interim until the vegetation is adequately established/mature without having to default to a less 'natural' elements for that type of stream? Likewise, the higher gradient channels are designed so they can trap and transport sediment. But how do they function until the sediment and flow regimes are established? In other words, the problem is how to have short-term stability immediately but also have a way for the streams to be mobile. In the long-term. The sample reaches (ref sites) do not really answer this question. This question is relevant to both low-gradient and moderate gradient channels (lateral and vertical movement).	LH		Rio - The designed channels approximate a geomorphically appropriate quasi-equilibrium state. By incorporating bioengineered bank stabilization treatments as well as horizontal and vertical controls at strategic locations, initial stability is formed allowing a mature vegetation to develop and propagate. Refer to Appendix F Design Drawings for bank treatment types. within the channels, appropriate gradations of materials also provide initial stability. Within higher gradient channels, during construction, fines are washed into the course streambed material to promote function when the stream is initially activated.		
7	3-35	3.3.7		<u>Riparian vegetation as temperature and channel movement control</u> . Related to the previous question, it is not clear the temporal relation of the construction of the channels and the functionality of the riparian vegetation to contribute to stream shading and channel stability (both bank stability and inputs of LWD). What is the time – frame? For example, what if the channel migrates in an unpredicted pattern or extent so that vegetation has not grown sufficiently to be large enough to have any functional effect to the stream channel. Relevant to establishment of productivity and conditions suitable by salmonids.	LH		Rio - See response to Comment #6. Through initial stability, riparian vegetation is established. Reduced thermal loading by establishing a weed-free, native riparian and wetland community for improved stream shading.		

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**Appendix I**  
**Report Limitations and Guidelines**

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# **APPENDIX I – REPORT LIMITATIONS AND GUIDELINES**

This appendix provides information to help Midas Gold Idaho, Inc (“Client”) manage your risks with respect to the use of this report associated with the Stibnite Gold Stream Design (“Project”) and in accordance with our Services Agreement (“Agreement”) signed 6/27/17.

## **I.1 Read These Provisions Closely**

Some clients, design professionals and contractors may not recognize that stream and river engineering analysis and design practices are less exact than other engineering and natural science disciplines. Such misunderstanding can create unrealistic expectations, sometimes leading to disappointments, claims and disputes. Rio ASE includes these explanatory “limitations” provisions in our reports to help reduce such risks. Please confer with Rio ASE if you are unclear how these “Report Limitations and Guidelines” apply to your project or site.

## **I.2 Stream and River Design Engineering Services are performed for Specific Purposes, Persons and Projects**

This report has been prepared for the Client and their authorized agents and regulatory agencies for use on the Project(s) specifically identified in the report. The information contained herein is not applicable to other sites or projects.

Rio ASE structures its services to meet the specific needs of its clients. No party other than the Client may rely on the product of our services unless we agree to such reliance in advance and in writing. Within the limitations of the agreed scope of services for the Project, and its schedule and budget, our services have been executed in accordance with our Agreement and generally accepted practices in this area at the time this report was prepared. We do not authorize and will not be responsible for, the use of this report for any purposes or projects other than those identified in the report.

## **I.3 A Stream or River Design Engineering Report is based on a Unique Set of Project-Specific Factors**

This report has been prepared solely for this Project and Client. Rio ASE considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless Rio ASE specifically indicates otherwise, it is important not to rely on this report if it was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site; or
- completed before project changes were made.

For example, changes that can affect the applicability of this report include those that affect:

- the function of the proposed design and/or structure;
- elevation, configuration, location, or orientation of the proposed structures;

- composition of the design team; or
- project ownership.

If changes occur after the date of this report, Rio ASE cannot be responsible for any consequences of such changes in relation to this report unless we have been given the opportunity to review our interpretations and recommendations in the context of such changes. Based on that review, we can provide written modifications or confirmation, as appropriate.

## **I.4 Conditions Can Change**

This report is based on conditions that existed at the time the study/design was performed. The findings and conclusions of this report may be affected by the passage of time, by man-made events such as construction on or adjacent to the site, new information or technology that becomes available subsequent to the report date, or by natural events such as floods, earthquakes, slope instability, stream flow fluctuations or stream channel fluctuations. If more than a few months have passed since issuance of our report or work product, or if any of the described events may have occurred, please contact Rio ASE before applying this report for its intended purpose so that we may evaluate whether changed conditions affect the continued reliability or applicability of our conclusions and recommendations.

Any designs associated with this report may need to be adjusted in the field during construction in order to meet the specific-site conditions and intended function. Rio ASE cannot assume responsibility for the recommendations in this report if unexpected conditions are encountered during construction. We recommend that you allow sufficient monitoring and consultation by Rio ASE during construction to confirm that the conditions encountered are consistent with those indicated in the report, to provide recommendations for design changes if the conditions revealed during the work differ from those anticipated, and to evaluate whether construction activities are completed in accordance with our recommendations.

## **I.5 Report could be Subject to Misinterpretation**

Misinterpretation of this report can result in costly problems. Rio ASE can help reduce the risks of misinterpretation by conferring with appropriate stakeholders after submitting the report, participating in pre-bid and preconstruction conferences, and providing construction observation.

To help reduce the risk of problems, we recommend giving contractors the complete report, including these “Report Limitations and Guidelines.” When providing the report, we recommend that you preface it with a clearly written letter of transmittal that:

- advises contractors that the report was not prepared for purposes of bid development and that its accuracy is limited; and
- encourages contractors to confer with Rio ASE and/or to conduct additional study to obtain the specific types of information they need or prefer.

## **I.6 Hazards of Instream Habitat Structures**

Instream habitat structures (“Structures”) create potential hazards, including, but not limited to:

- persons falling from the Structures and associated injury or death;
- collisions of recreational users and their watercraft with the Structures, and associated risk of injury, and damage of the watercraft;
- mobilization of a portion or all of the Structures during high water flow conditions and related damage to downstream persons and property;
- flooding;
- erosion; and
- channel avulsion.

In some cases, instream habitat structures are only intended to be temporary, providing temporary stabilization while riparian vegetation becomes established or while stream/river processes stabilize. This gradual deterioration with age and vulnerability to major flood events make the risks with temporary Structures inherently greater with their increasing age.

Rio ASE strongly recommends that the Client appropriately address safety concerns, including but not limited to warning construction workers of hazards associated with working in or near deep and fast-moving water and on steep, slippery and unstable slopes. In addition, signs should be placed along the enhanced stream reaches in prominent locations to warn third parties, such as nearby residents and recreational users, of the potential hazards noted above.

## **I.7 Channel Response is Unpredictable**

In general, rivers and streams are dynamic and unpredictable. Any predictions regarding future channel evolution and/or response either stated or implied in this report or associated design(s) shall be considered an estimate based on professional judgment given the data available and conditions that existed at the time the study/design was performed. Channel evolution and/or response may include but is not limited to erosion, deposition, channel migration, avulsion, flooding, and sediment and debris transport. Channel evolution and/or response is inevitable, and it should not be assumed that any condition whether natural or constructed will persist unchanged indefinitely in a riverine environment.

## **I.8 Importance of Monitoring and Maintenance**

In some designs, Rio ASE may have excluded piles, anchors, chains, cables, reinforcing bars, bolts and similar fasteners from woody habitat structures with the intent of mimicking naturally-occurring instream wood structures. In other designs Rio ASE may have included such fasteners in woody habitat structures, if considered appropriate. While Rio ASE designs structures to be relatively stable during flood events, some movement of these structures is expected. We recommend that the Client implement appropriate monitoring and maintenance procedures to minimize potential adverse impacts at or near areas of concern, and consider replacing, adjusting and/or removing damaged, malfunctioning or deteriorated components of structures.

## **I.9 Construction Contractors are Responsible for Site Safety on Their Projects**

Our recommendations are not intended to direct the construction contractor's procedures, means, methods, schedule or management of the work site during construction of any project associated with this report. The construction contractor is solely responsible for job site safety and for managing construction operations to minimize risks to on-site personnel and adjacent properties.