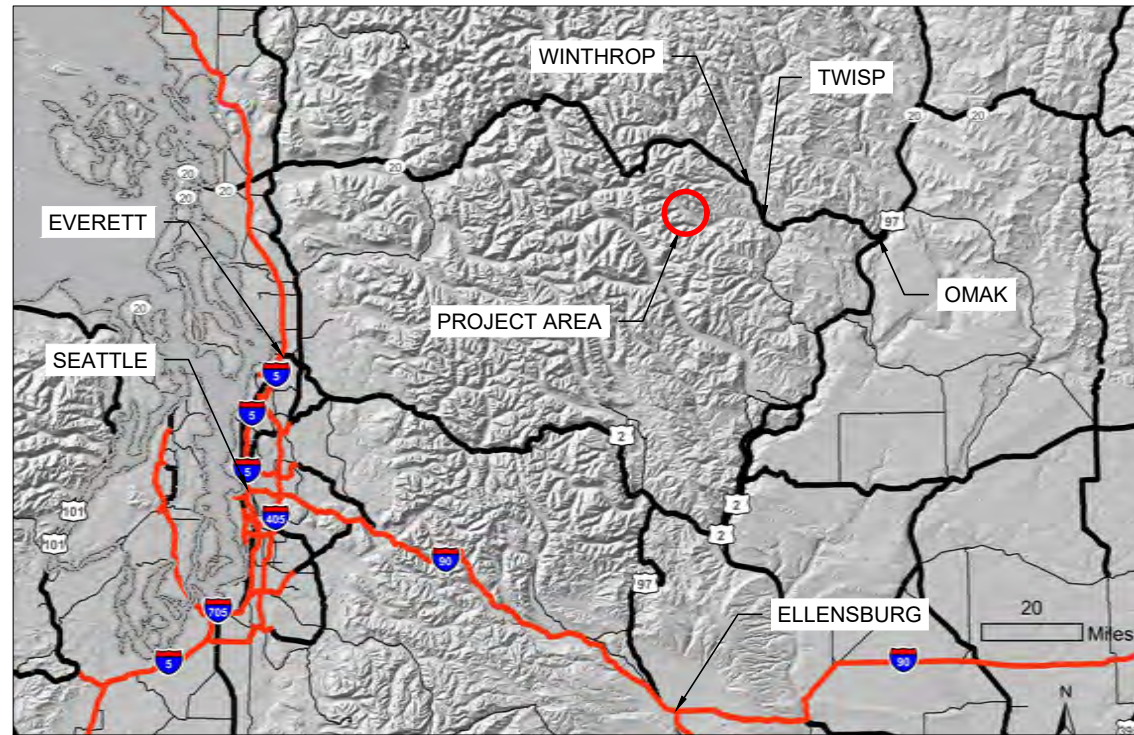
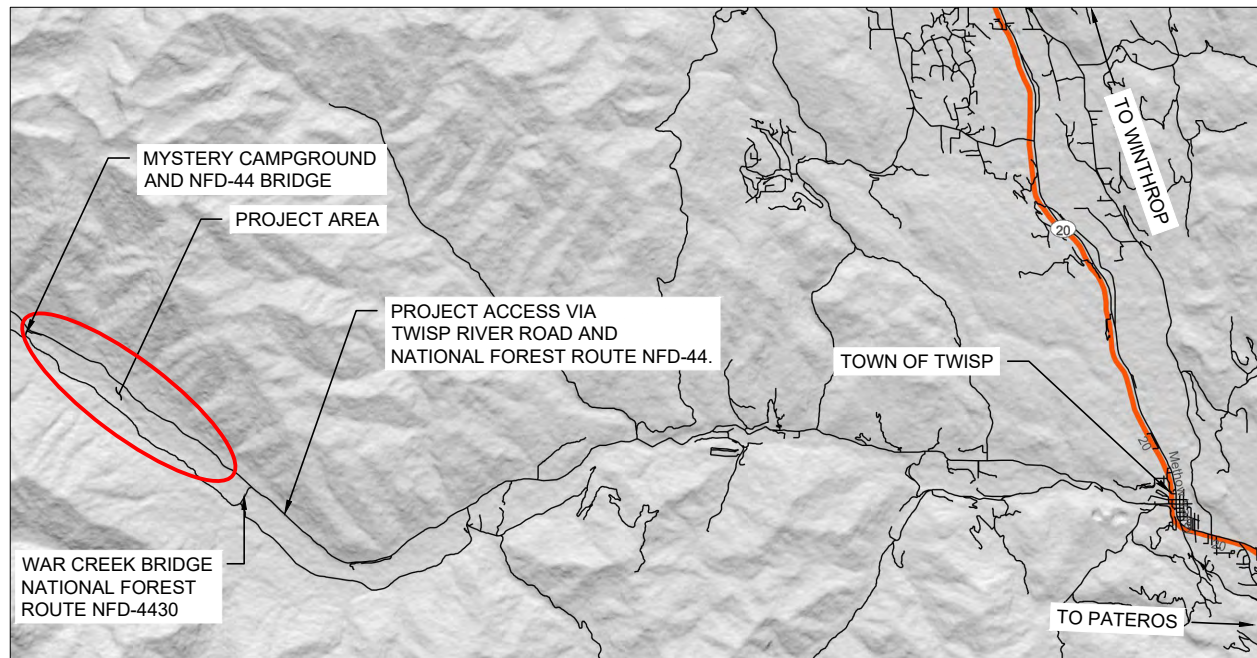


YAKAMA NATION FISHERIES UPPER TWISP RIVER RESTORATION DESIGN PROJECT AREAS 2, 3, AND 4 CONCEPTUAL LEVEL DESIGN PLAN



LOCATION MAP
SCALE: NTS



VICINITY MAP
SCALE: 1" = 2 MILES

DRAWING INDEX	
DWG #	TITLE
GENERAL	
G-001	COVER SHEET
G-002	GENERAL NOTES
CIVIL	
E-001	EXISTING CONDITIONS
C-001 - C-002	DESIGN OVERVIEW - EXISTING AND POTENTIAL ACCESS ROUTES
C-101 - C-107	PROPOSED CONDITIONS
C-108	SIDE CHANNEL RE-CONNECTION EXAMPLE
C-201 - C-203	DETAILS - LWD CONSTRUCTION
C-301	DETAILS - TESC

Z:\PROJECTS\194-6195-YNF-UPPER TWISP DESIGN\15% DESIGN\SHEET FILES\01-COVER PAGE AND NOTES.DWG
PLOT DETAILS: BAILEY, CHAO
August 2, 2018
3:43 PM



NOT FOR
CONSTRUCTION

PLOTTED AS ANSI B (11" X 17"), PLAN SHEET FULL SIZE ANSI D (22" X 34")			DRW	ENG	APP
REV.	DATE	REVISION DESCRIPTION			
A	8/03/18	CONCEPT LEVEL DESIGN	JSA	JSA	CB

YAKAMA NATION FISHERIES -
UPPER TWISP RIVER RESTORATION
CONCEPTUAL LEVEL DESIGN

COVER SHEET

DWG. NO.:	G-001
CREATED:	2/15/2018
SHEET:	1 of 18

ABBREVIATIONS

1H:1V	HORIZONTAL TO VERTICAL EXAGGERATION
%	PERCENT
BPA	BONNEVILLE POWER ADMINISTRATION
BMP	BEST MANAGEMENT PRACTICES
CWA	CLEAN WATER ACT
DWG	DRAWING
EX.	EXISTING
FT, '	FOOT
HIP	HABITAT IMPROVEMENT PROGRAM
IN, "	INCH
LT, (L)	LEFT
LWD	LARGE WOODY DEBRIS
NFD	NATIONAL FOREST DEVELOPMENT ROUTE
NTS	NOT TO SCALE
OHW	ORDINARY HIGH WATER
RD	ROAD
RT, (R)	RIGHT
STA	STATION
TESC	TEMPORARY EROSION SEDIMENT CONTROL
TYP	TYPICAL
USFS	UNITED STATES FOREST SERVICE
USFWS	UNITED STATES FISH AND WILDLIFE SERVICE
WDFW	WASHINGTON DEPARTMENT OF FISH AND WILDLIFE
XS	CROSS SECTION
YR	YEAR

CONSTRUCTION SEQUENCING:

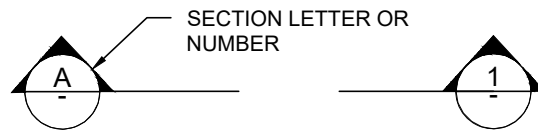
1. PLACE TESC, WORK AREA ISOLATION, AND FISH SALVAGE MEASURES.
2. COMPLETE CLEARING AND GRUBBING.
3. EXCAVATE SIDE CHANNELS 1, 2, AND 3.
4. INSTALL LWD STRUCTURES AND HABITAT BOULDERS IN SIDE CHANNELS AND MAIN CHANNEL.
5. RESTORE AND RE-VEGETATE WORK AREAS.
6. REMOVES TESC, WORK AREA ISOLATION, AND FISH SALVAGE MEASURES.

GENERAL NOTES:

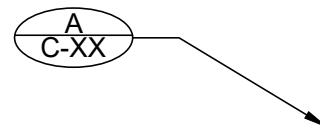
1. HORIZONTAL PROJECTION: NAD83 WASHINGTON STATE PLANES, NORTH ZONE, US FOOT.
2. VERTICAL PROJECTION: NAVD88.
3. PROJECT ALIGNMENT AND STATIONING IS BASED ON 2015 AERIAL IMAGERY, 2005 LIDAR TOPOGRAPHIC DATA AND SUPPLEMENTED BY 2017 FIELD SURVEYS COMPLETED BY TETRA TECH IN OCTOBER 2017.
4. PROPOSED PROJECT DESIGN, CONSTRUCTION ACTIVITIES, AND MATERIALS SUBJECT TO APPROVAL BY LANDOWNER.
5. ALL PROJECT WORK OCCURS WITHIN USFWS PROPERTY.

SYMBOLS

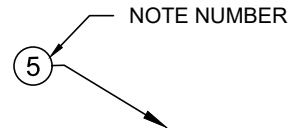
SECTIONS ARE REFERENCED IN THE FOLLOWING MANNER:



CONSTRUCTION DETAILS ARE REFERENCED IN THE FOLLOWING MANNER:



NOTES ARE REFERENCED IN THE FOLLOWING MANNER:



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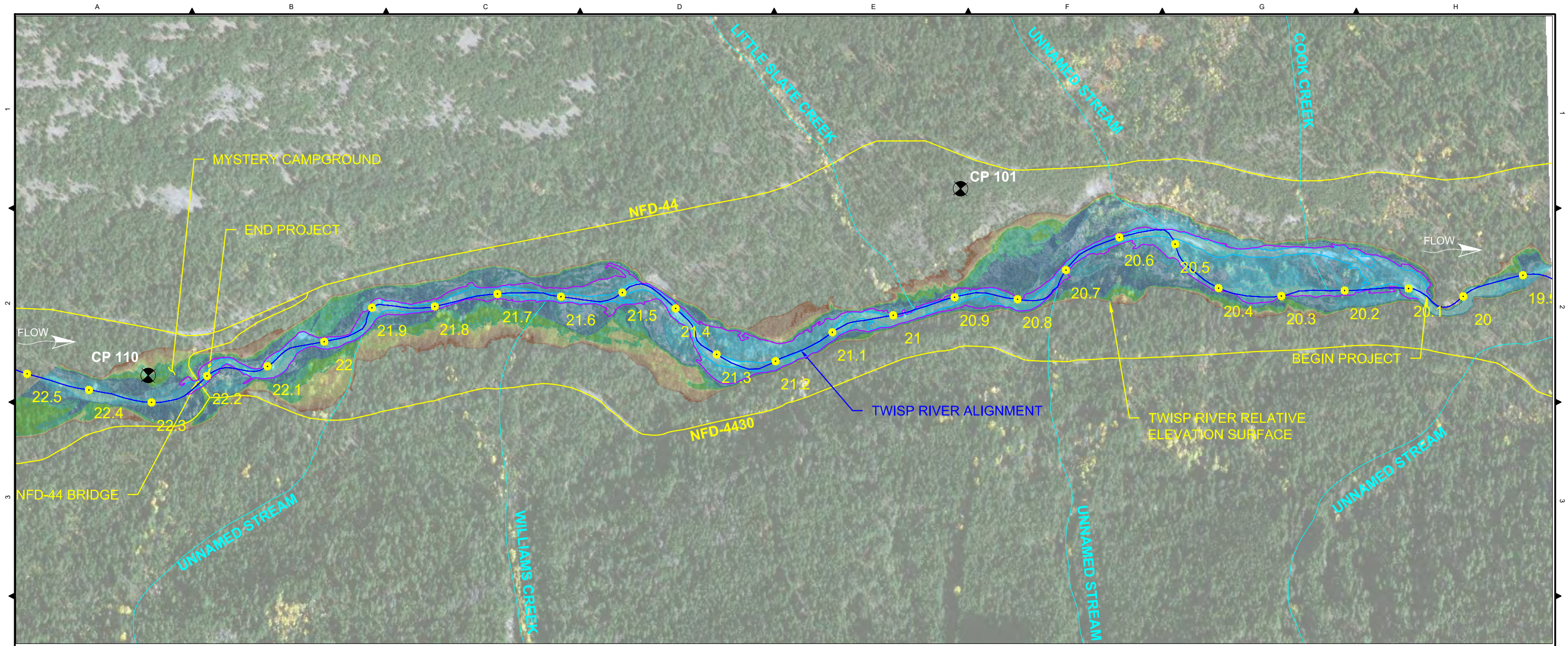
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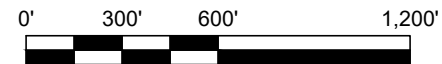
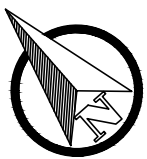
YAKAMA NATION FISHERIES -
UPPER TWISP RIVER RESTORATION
CONCEPTUAL LEVEL DESIGN

GENERAL NOTES

DWG. NO.:	G-002
CREATED:	2/15/2018
SHEET:	2 of 18



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 PLOT DETAILS: BAILEY, CHAO
 AUGUST 2, 2018
 3:32 PM



UPPER TWISP RIVER CONTROL POINTS				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
101	508401.28	1734135.95	2795.17	CP 101
110	511632.19	1728070.96	2805.19	CP 110

- LEGEND:**
- TWISP RIVER ALIGNMENT (USGS RIVER MILES)
 - TRIBUTARY ALIGNMENT
 - RIVER MILE
 - ⊕ SURVEY CONTROL POINT
 - EXISTING 2-YEAR INUNDATION
 - EXISTING 100-YEAR INUNDATION
 - EXISTING ROAD
 - RELATIVE ELEVATION SURFACE
SURFACE RANGE: -3 TO +30 FEET

TETRA TECH
 www.tetrattech.com
 19803 North Creek Parkway
 Bothell, Washington 98011
 Phone: 425-482-7600 Fax: 425-482-7652



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PLOTTED AS ANSI B (11" X 17"), PLAN SHEET FULL SIZE ANSI D (22" X 34")						
REV.	DATE	REVISION DESCRIPTION	DRW	ENG	APP	
A	8/03/18	CONCEPT LEVEL DESIGN	JSA	JSA	CB	

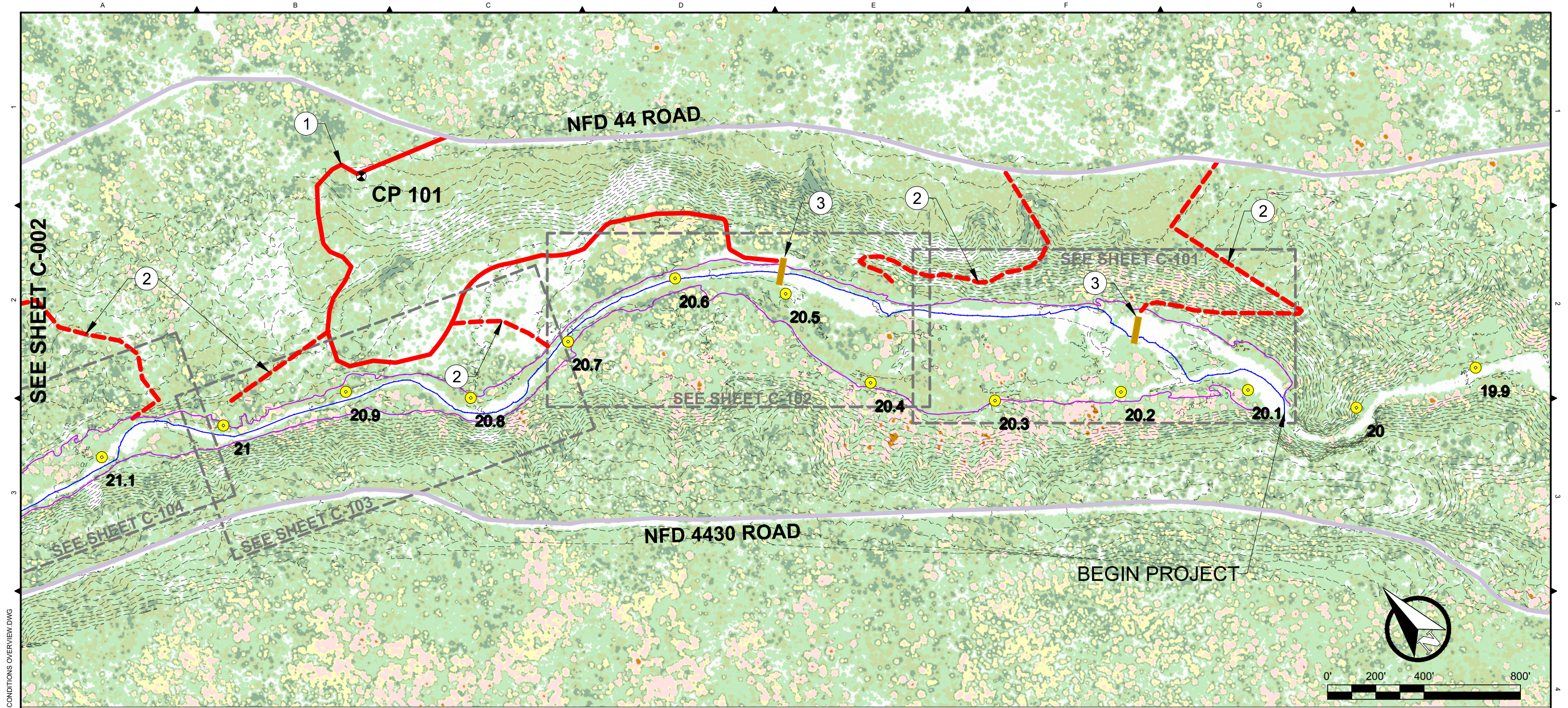
YAKAMA NATION FISHERIES - UPPER TWISP RIVER RESTORATION CONCEPTUAL LEVEL DESIGN

EXISTING CONDITIONS

DWG. NO.: **E-001**

CREATED: 2/15/2018

SHEET: 3 of 18

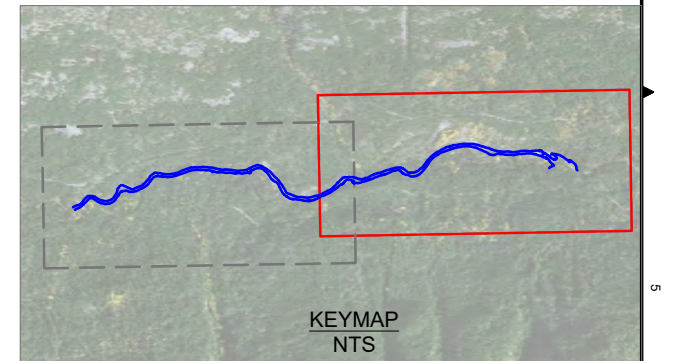


NOTES:

1. EXISTING ACCESS ROUTE .
2. POTENTIAL ACCESS ROUTE SHALL BE VERIFIED IN THE FIELD PRIOR TO CONSTRUCTION ACTIVITIES.
3. POTENTIAL STREAM CROSSING SHALL BE VERIFIED IN THE FIELD PRIOR TO CONSTRUCTION ACTIVITIES.

LEGEND:

- | | |
|------------------------------|--|
| CANOPY HEIGHT (0-3 FT) | UPPER TWISP RIVER ALIGNMENT |
| CANOPY HEIGHT (3-25 FT) | EXISTING ROAD |
| CANOPY HEIGHT (25-50 FT) | EXISTING 10-FOOT CONTOUR |
| CANOPY HEIGHT (50-75 FT) | SHEET BOUNDARY |
| CANOPY HEIGHT (75-100 FT) | RIVER MILE |
| CANOPY HEIGHT (100-150 FT) | SURVEY CONTROL POINT |
| CANOPY HEIGHT (150-205 FT) | EXISTING ACCESS ROUTE |
| STREAM CROSSING | POTENTIAL ACCESS ROUTE TO BE VERIFIED. |
| EXISTING 100-YEAR INUNDATION | |



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REV.		DATE	REVISION DESCRIPTION	DRW	ENG	APP
A		8/03/18	CONCEPT LEVEL DESIGN	JSA	JSA	CB

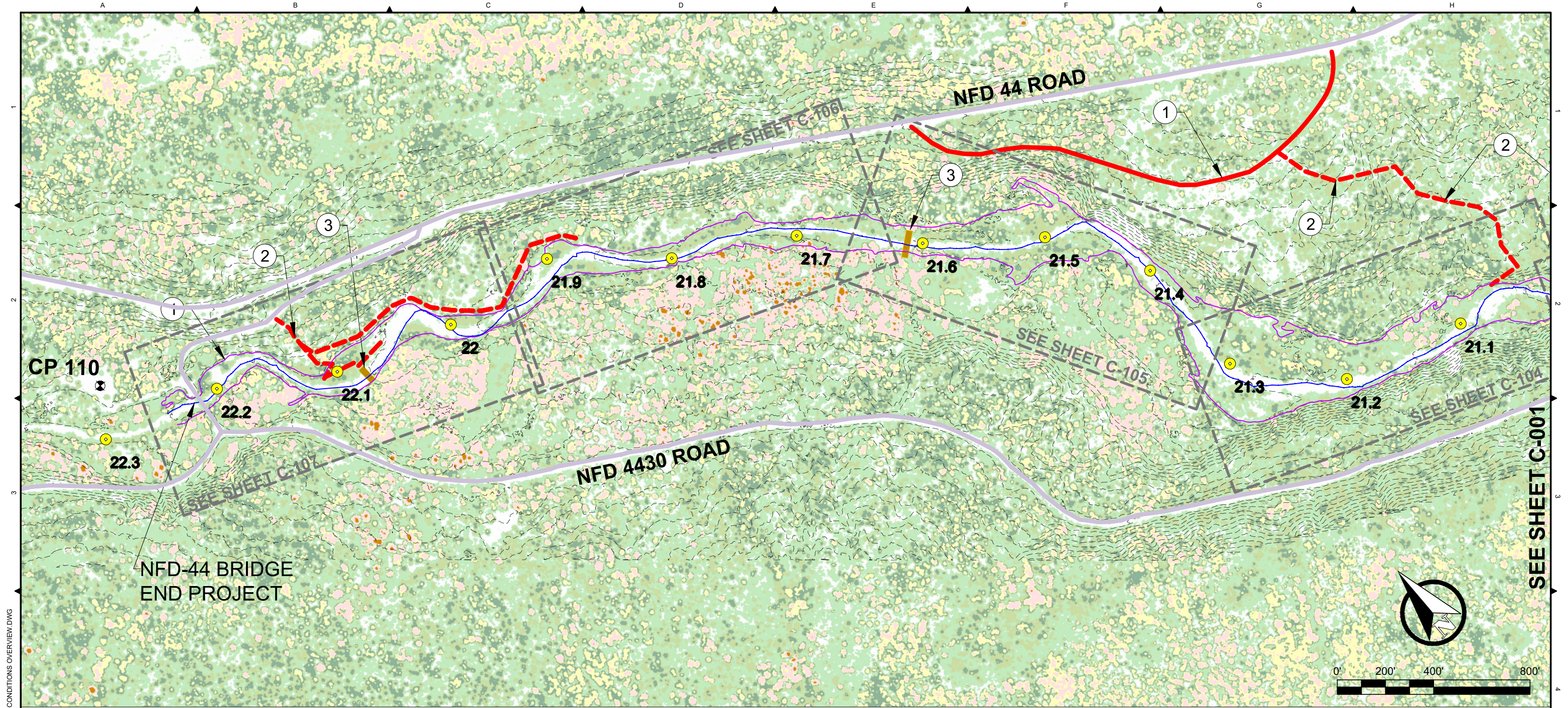
YAKAMA NATION FISHERIES -
UPPER TWISP RIVER RESTORATION
CONCEPTUAL LEVEL DESIGN

PROPOSED CONDITIONS
OVERVIEW, EXISTING AND
POTENTIAL ACCESS ROUTES

DWG. NO.:
C-001

CREATED: 2/15/2018

SHEET: 4 of 18

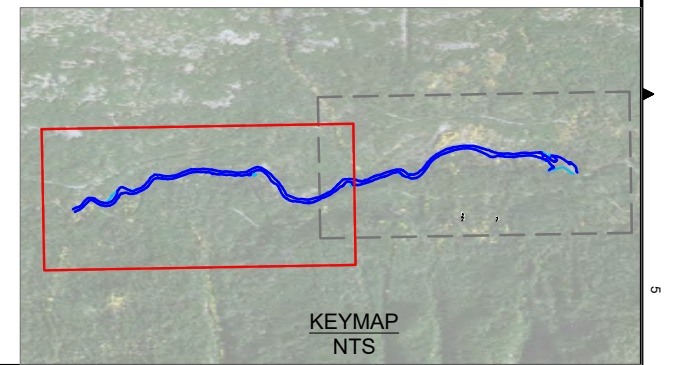


NOTES:

1. EXISTING ACCESS ROUTE .
2. POTENTIAL ACCESS ROUTE SHALL BE VERIFIED IN THE FIELD PRIOR TO CONSTRUCTION ACTIVITIES.
3. POTENTIAL STREAM CROSSING SHALL BE VERIFIED IN THE FIELD PRIOR TO CONSTRUCTION ACTIVITIES.

LEGEND:

- | | |
|------------------------------|--|
| CANOPY HEIGHT (0-3 FT) | UPPER TWISP RIVER ALIGNMENT |
| CANOPY HEIGHT (3-25 FT) | EXISTING ROAD |
| CANOPY HEIGHT (25-50 FT) | EXISTING 10-FOOT CONTOUR |
| CANOPY HEIGHT (50-75 FT) | SHEET BOUNDARY |
| CANOPY HEIGHT (75-100 FT) | RIVER MILE |
| CANOPY HEIGHT (100-150 FT) | SURVEY CONTROL POINT |
| CANOPY HEIGHT (150-205 FT) | EXISTING ACCESS ROUTE |
| STREAM CROSSING | POTENTIAL ACCESS ROUTE TO BE VERIFIED. |
| EXISTING 100-YEAR INUNDATION | |



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REV.	DATE	REVISION DESCRIPTION			
A	8/03/18	CONCEPT LEVEL DESIGN	JSA	JSA	CB

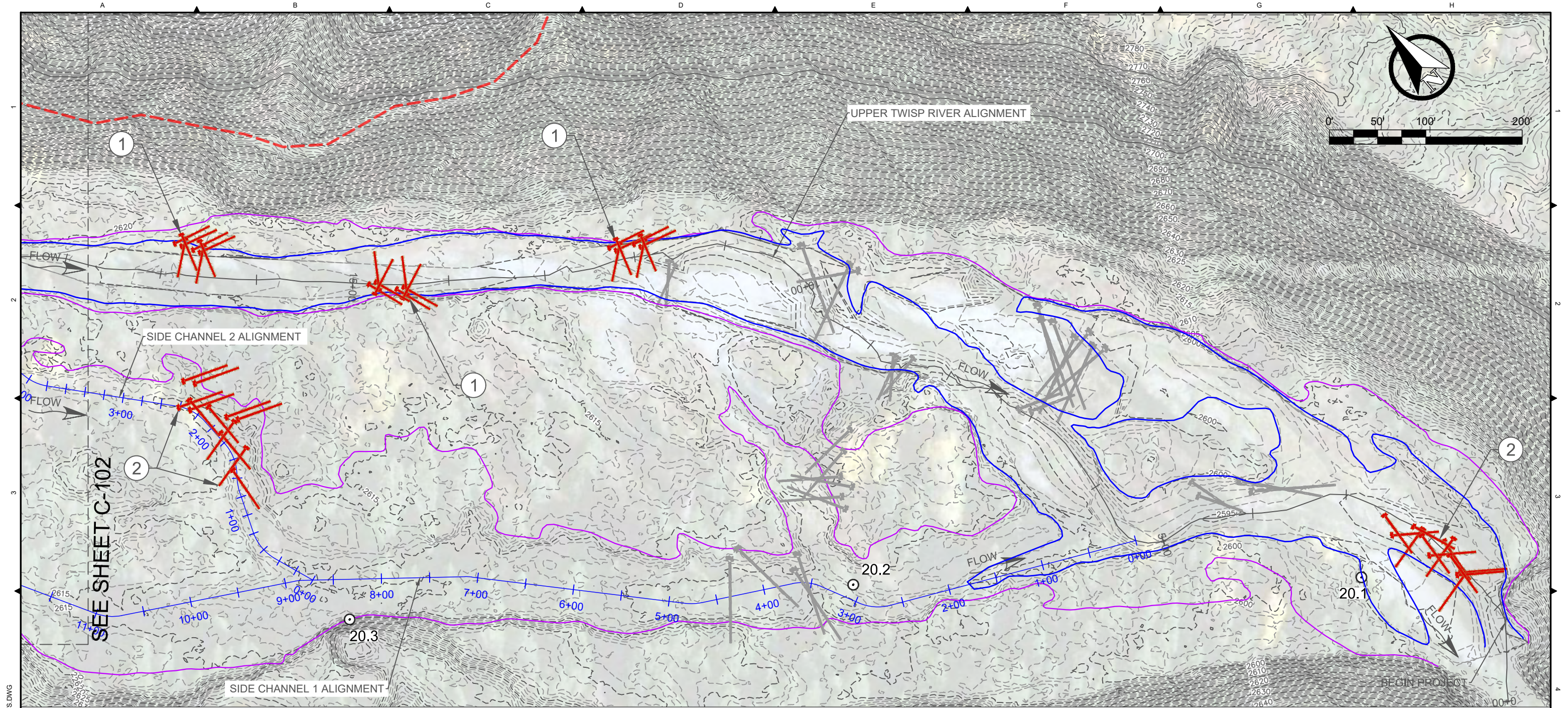
YAKAMA NATION FISHERIES -
UPPER TWISP RIVER RESTORATION
CONCEPTUAL LEVEL DESIGN

PROPOSED CONDITIONS
OVERVIEW, EXISTING AND
POTENTIAL ACCESS ROUTES

DWG. NO.:
C-002

CREATED: 2/15/2018

SHEET: 5 of 18

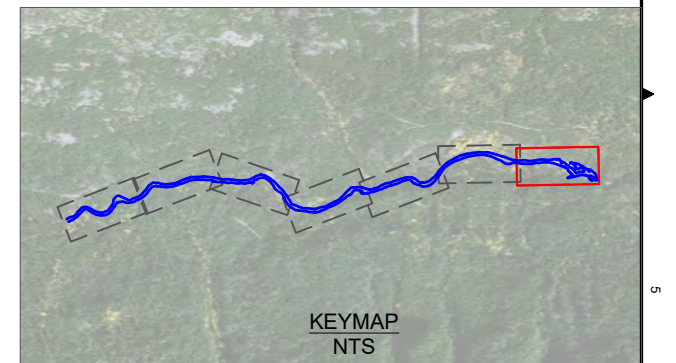


NOTES:

1. INSTALL HELICOPTER BANK JAM STRUCTURE TO INCREASE CHANNEL COMPLEXITY. SEE SHEET C-204 FOR DETAILS. FINAL LWD CONFIGURATION COORDINATION IN THE FIELD.
2. HELICOPTER PLACE LWD FOR ENHANCED HABITAT AND INCREASED CHANNEL COMPLEXITY. FINAL LWD CONFIGURATION COORDINATED IN THE FIELD.

LEGEND:

- ++ UPPER TWISP RIVER ALIGNMENT
- ++ PROPOSED SIDE CHANNEL ALIGNMENT
- SHEET BOUNDARY
- RIVER MILE
- ◆ SURVEY CONTROL POINT
- - - EXISTING 1-FT CONTOUR
- - - EXISTING 5-FT CONTOUR
- EXISTING BANKFULL FLOW INUNDATION
- EXISTING 100-YEAR INUNDATION
- XX PROPOSED LWD
- XX PROPOSED HELICOPTER LWD
- XX EXISTING LWD
- EXISTING ACCESS ROUTE
- - - POTENTIAL ACCESS ROUTE



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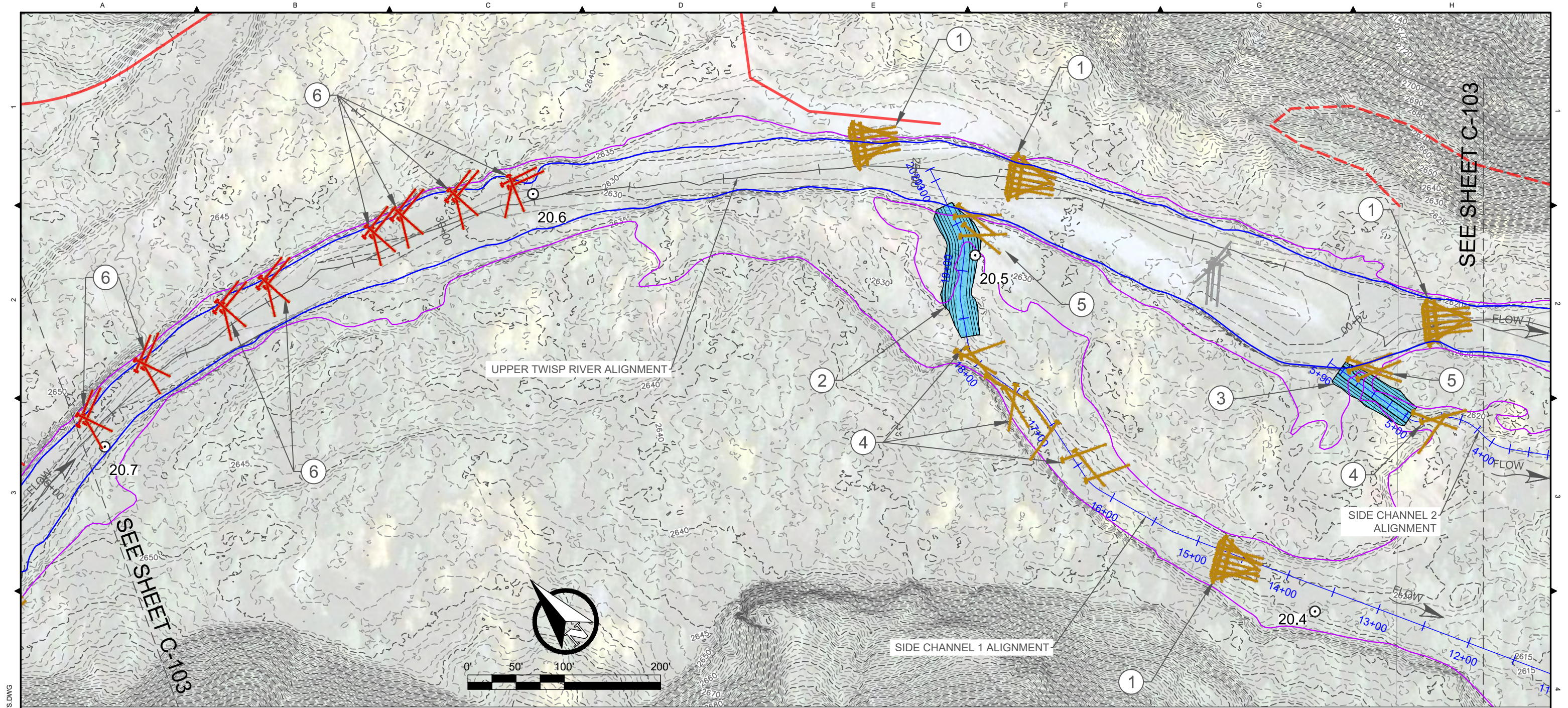
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REV.	DATE	REVISION DESCRIPTION			
A	8/03/18	CONCEPT LEVEL DESIGN	JSA	JSA	CB

YAKAMA NATION FISHERIES - UPPER TWISP RIVER RESTORATION CONCEPTUAL LEVEL DESIGN

PROPOSED CONDITIONS

DWG. NO.:	C-101
CREATED:	2/15/2018
SHEET:	6 of 18

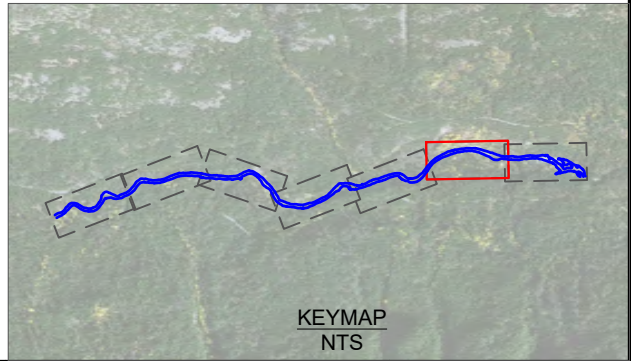


SEE SHEET C-103

SEE SHEET C-103

- NOTES:**
1. INSTALL LOG JAM TO PROMOTE LATERAL CHANNEL MIGRATION AND REDUCE CHANNEL INCISION. SEE SHEET C-203 FOR DETAILS.
 2. EXCAVATE APPROXIMATELY 280 CY OF FLOODPLAIN MATERIAL TO PERENNIALY RECONNECT THE UPPER TWISP RIVER TO APPROXIMATELY 1,920 LINEAR FEET OF RELIC SIDE CHANNEL. SEE SHEET C-108 FOR DETAILS.
 3. EXCAVATE APPROXIMATELY 150 CY OF FLOODPLAIN MATERIAL TO PERENNIALY RECONNECT THE UPPER TWISP RIVER TO APPROXIMATELY 600 LINEAR FEET OF RELIC SIDE CHANNEL. SEE SHEET C-108 FOR DETAILS.
 4. PLACE LWD FOR COVER AND INCREASED HABITAT COMPLEXITY ON RECONNECTED SIDE CHANNEL. FINAL LWD CONFIGURATION COORDINATION IN THE FIELD.
 5. INSTALL 2-LOG CROSS STRUCTURE TO PROMOTE SPLIT FLOW. SEE SHEET C-201 FOR DETAILS.
 6. INSTALL HELICOPTER BANK JAM STRUCTURE TO INCREASE CHANNEL COMPLEXITY. SEE SHEET C-204 FOR DETAILS. FINAL LWD CONFIGURATION COORDINATION IN THE FIELD.

- LEGEND:**
- ++ UPPER TWISP RIVER ALIGNMENT
 - + + PROPOSED SIDE CHANNEL ALIGNMENT
 - SHEET BOUNDARY
 - RIVER MILE
 - ⊕ SURVEY CONTROL POINT
 - - - EXISTING 1-FT CONTOUR
 - - - EXISTING 1-FT CONTOUR
 - EXISTING BANKFULL FLOW INUNDATION
 - EXISTING 100-YEAR INUNDATION
 - - - PROPOSED 1-FT CONTOUR
 - - - PROPOSED 5-FT CONTOUR
 - Y X PROPOSED LWD
 - X X PROPOSED HELICOPTER LWD
 - PROPOSED SIDE CHANNEL EXCAVATION
 - - - EXISTING ACCESS ROUTE
 - - - POTENTIAL ACCESS ROUTE



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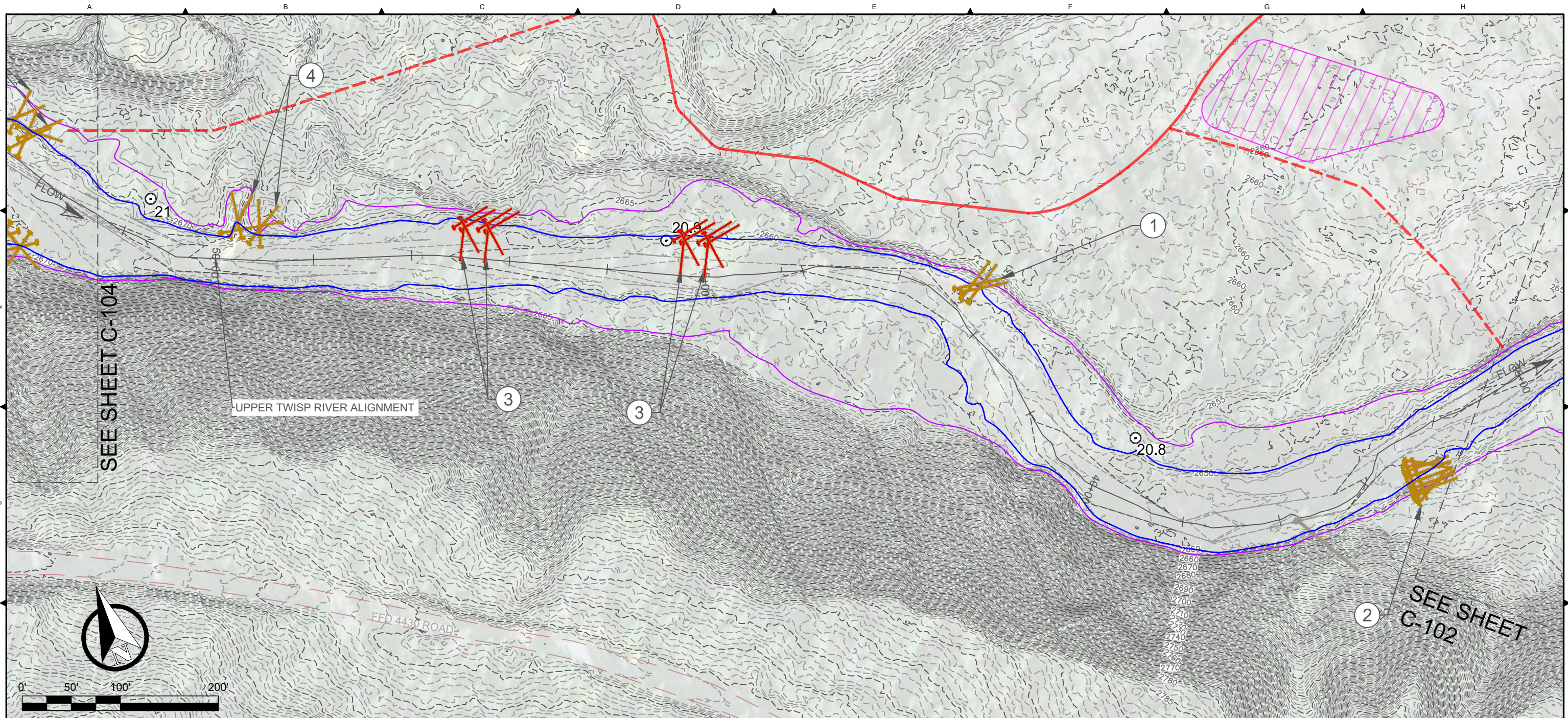
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REV.	DATE	REVISION DESCRIPTION	DRW	ENG	APP
A	8/03/18	CONCEPT LEVEL DESIGN	JSA	JSA	CB

YAKAMA NATION FISHERIES - UPPER TWISP RIVER RESTORATION CONCEPTUAL LEVEL DESIGN

PROPOSED CONDITIONS

DWG. NO.: **C-102**
 CREATED: 2/15/2018
 SHEET: 7 of 18



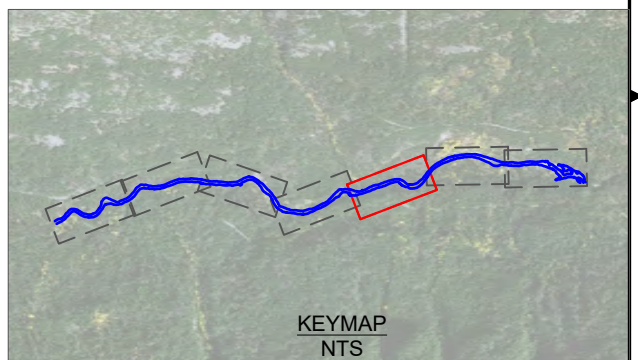
SEE SHEET C-104

UPPER TWISP RIVER ALIGNMENT

SEE SHEET C-102

- NOTES:**
1. AUGMENT EXISTING LWLD WITH 4 LOGS AND ANCHOR TO EXISTING BOULDER.
 2. INSTALL LOG JAM TO PROMOTE LATERAL CHANNEL MIGRATION. SEE SHEET C-201 FOR DETAILS.
 3. INSTALL HELICOPTER BANK JAM STRUCTURE TO INCREASE CHANNEL COMPLEXITY. SEE SHEET C-204 FOR DETAILS. FINAL LWLD CONFIGURATION COORDINATION IN THE FIELD.
 4. INSTALL 2-LOG CROSS STRUCTURE TO EXISTING ALCOVES AND CONFLUENCE WITH SLATE CREEK TO INCREASE COVER AND ENHANCE EXISTING ALCOVE BACKWATER HABITAT. SEE SHEET C-202 FOR DETAILS.

- LEGEND:**
- UPPER TWISP RIVER ALIGNMENT
 - SHEET BOUNDARY
 - EXISTING EDGE OF ROAD
 - RIVER MILE
 - ⊙ SURVEY CONTROL POINT
 - EXISTING 1-FT CONTOUR
 - EXISTING 1-FT CONTOUR
 - EXISTING BANKFULL FLOW INUNDATION
 - EXISTING 100-YEAR INUNDATION
 - XX PROPOSED LWLD
 - XX PROPOSED HELICOPTER LWLD
 - EXISTING ACCESS ROUTE
 - POTENTIAL ACCESS ROUTE
 - STAGING AREA FOR LWLD AND HELICOPTER OPERATIONS



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PLOT DETAILS: BAILEY, CHAO August 15, 2018 2:04 PM

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Bothell, Washington 98011
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REV.	DATE	REVISION DESCRIPTION	DRW	ENG	APP
A	8/03/18	CONCEPT LEVEL DESIGN	JSA	JSA	CB

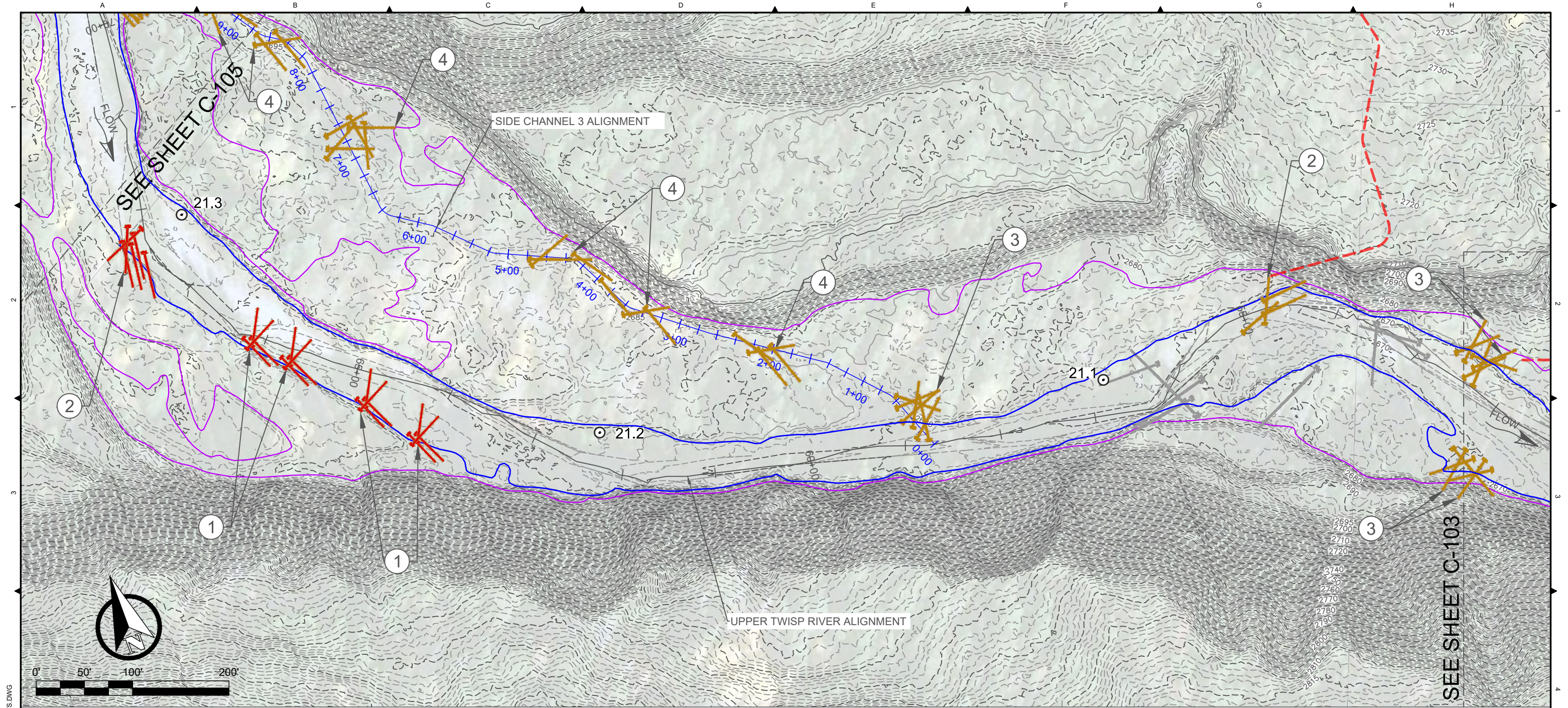
YAKAMA NATION FISHERIES -
UPPER TWISP RIVER RESTORATION
CONCEPTUAL LEVEL DESIGN

PROPOSED CONDITIONS

DWG. NO.:
C-103

CREATED: 2/15/2018

SHEET: 8 of 18

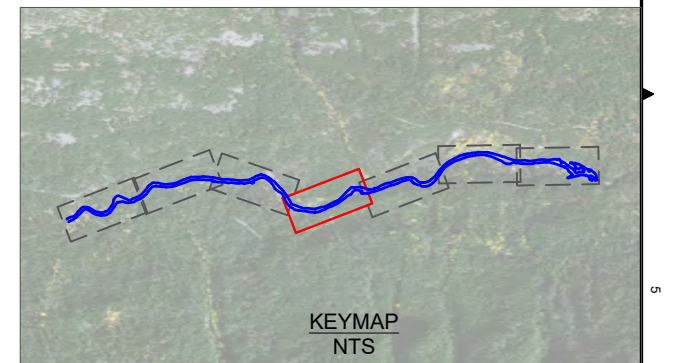


NOTES:

1. PLACE HELICOPTER BANK JAM STRUCTURE TO INCREASE CHANNEL ROUGHNESS, PROMOTE SCOUR POOLS, AND INCREASE HABITAT DIVERSITY. IF PRESENT, INTEGRATE WITH EXISTING BANK VEGETATION OR CHANNEL BOULDERS. SEE SHEET C-204 FOR DETAILS.
2. AUGMENT EXISTING LWD WITH 6 LOGS.
3. INSTALL 2-LOG CROSS STRUCTURE TO EXISTING ALCOVE OR SIDE CHANNEL OUTLET TO INCREASE COVER AND ENHANCED EXISTING BACKWATER ALCOVE HABITAT. SEE SHEET C-202 FOR DETAILS.
4. PLACE LWD FOR COVER AND INCREASED HABITAT COMPLEXITY ON RECONNECTED SIDE CHANNEL. FINAL LWD CONFIGURATION COORDINATION IN THE FIELD.

LEGEND:

- ++ UPPER TWISP RIVER ALIGNMENT
- ++ PROPOSED SIDE CHANNEL ALIGNMENT
- SHEET BOUNDARY
- RIVER MILE
- ◆ SURVEY CONTROL POINT
- - - EXISTING 1-FIT CONTOUR
- - - EXISTING 5-FIT CONTOUR
- EXISTING BANKFULL FLOW INUNDATION
- EXISTING 100-YEAR INUNDATION
- X PROPOSED LWD
- X EXISTING LWD
- - - POTENTIAL ACCESS ROUTE



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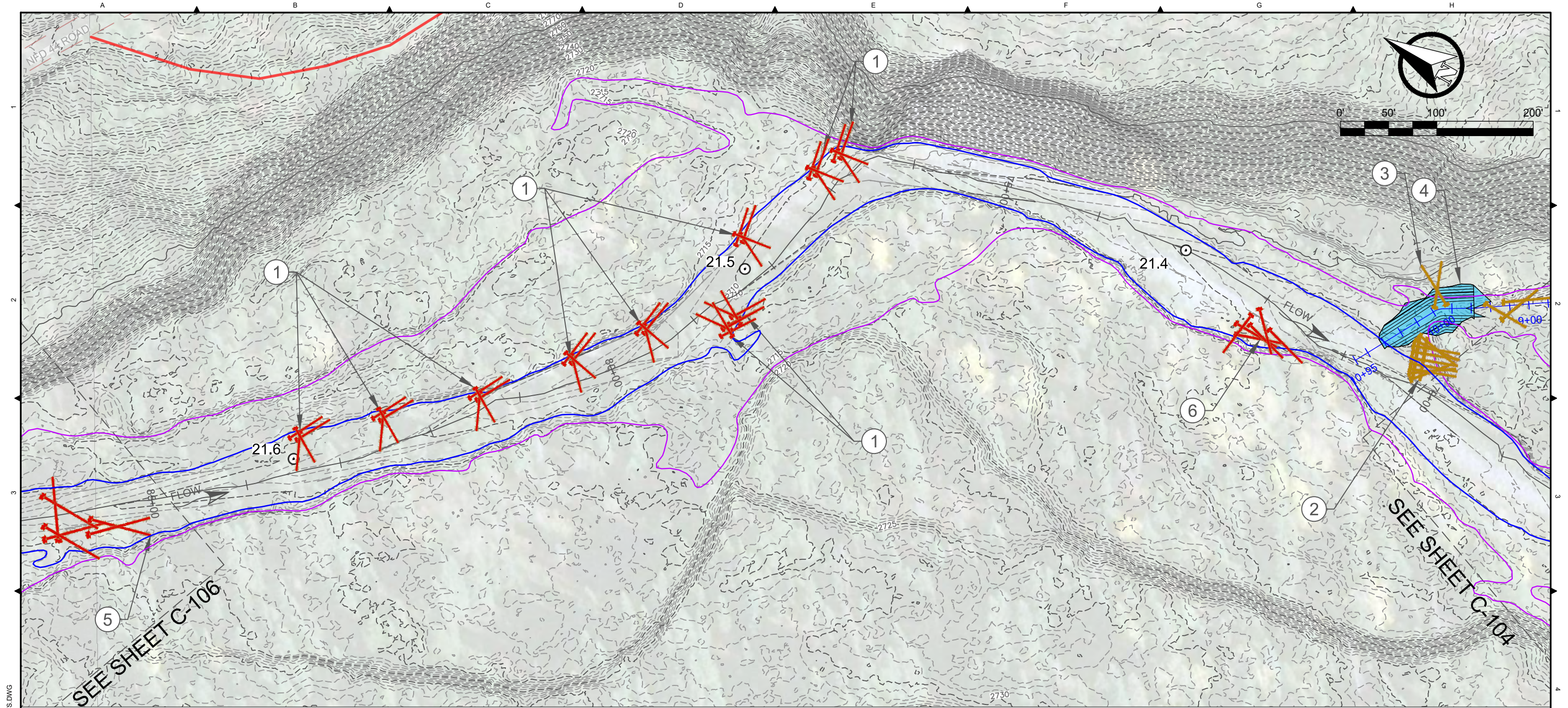
NOT FOR CONSTRUCTION

REV.		DATE	REVISION DESCRIPTION	DRW	ENG	APP
A		8/03/18	CONCEPT LEVEL DESIGN	JSA	JSA	CB

YAKAMA NATION FISHERIES - UPPER TWISP RIVER RESTORATION CONCEPTUAL LEVEL DESIGN

PROPOSED CONDITIONS

DWG. NO.:	C-104
CREATED:	2/15/2018
SHEET:	9 of 18

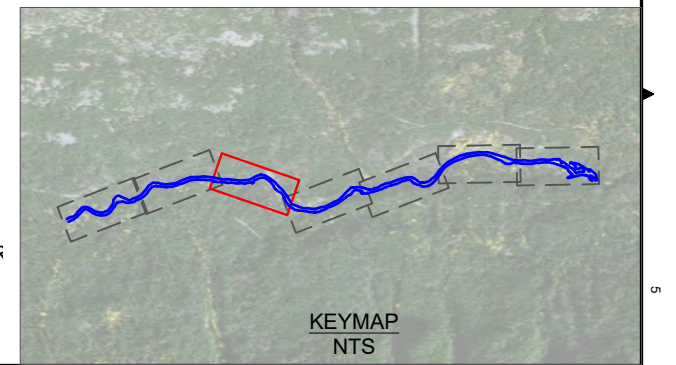


NOTES:

1. INSTALL HELICOPTER BANK JAM STRUCTURE TO INCREASE CHANNEL COMPLEXITY. SEE SHEET C-204 FOR DETAILS. FINAL LWD CONFIGURATION COORDINATION IN THE FIELD.
2. INSTALL LOG JAM TO PROMOTE SPLIT FLOW, DECREASE CHANNEL INCISION, AND INCREASE CHANNEL COMPLEXITY. SEE SHEET C-201 FOR DETAILS.
3. INSTALL 2-LOG CROSS STRUCTURE WITHIN FLOODPLAIN TO PROMOTE DIVERSE FLOODPLAIN FLOW PATHS. SEE SHEET C-202 FOR DETAILS.
4. EXCAVATE APPROXIMATELY 260 CY OF FLOODPLAIN MATERIAL TO RECONNECT RIVER TO APPROXIMATELY 1,060 LINEAR FEET OF RELIC SIDE CHANNEL. SEE SHEET C-108 FOR DETAILS.
5. HELICOPTER PLACE LWD FOR ENHANCED HABITAT AND INCREASED CHANNEL COMPLEXITY. FINAL LWD CONFIGURATION SHALL BE COORDINATED IN THE FIELD.
6. AUGMENT EXISTING LWD ON BAR WITH 4 LOGS.

LEGEND:

- +— UPPER TWISP RIVER ALIGNMENT
- SHEET BOUNDARY
- - - EXISTING EDGE OF ROAD
- RIVER MILE
- ⊕ SURVEY CONTROL POINT
- - - EXISTING 1-FT CONTOUR
- - - EXISTING 1-FT CONTOUR
- EXISTING BANKFULL FLOW INUNDATION
- EXISTING 100-YEAR INUNDATION
- PROPOSED LWD
- PROPOSED HELICOPTER LWD
- EXISTING ACCESS ROUTE
- POTENTIAL ACCESS ROUTE
- STAGING AREA FOR LWD AND HELICOPTER OPERATIONS



Z:\PROJECTS\194-6195-YNF UPPER TWISP DESIGN\15% DESIGN\SHEET FILES\04-PLANSHEETS.DWG 2/15/2018 2:06 PM



NOT FOR CONSTRUCTION

REV.		DATE	REVISION DESCRIPTION	DRW	ENG	APP
A		8/03/18	CONCEPT LEVEL DESIGN	JSA	JSA	CB

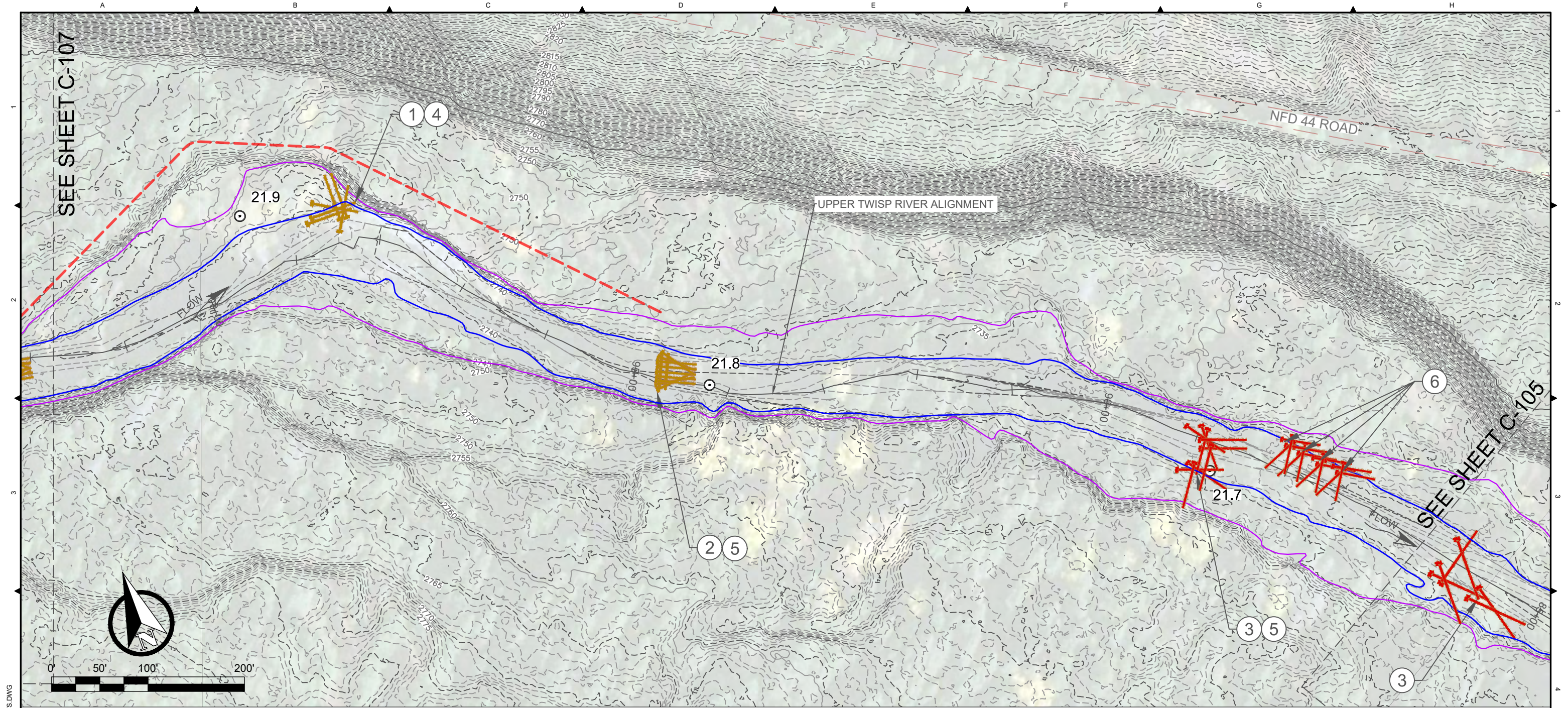
YAKAMA NATION FISHERIES - UPPER TWISP RIVER RESTORATION CONCEPTUAL LEVEL DESIGN

PROPOSED CONDITIONS

DWG. NO.: **C-105**

CREATED: 2/15/2018

SHEET: 10 of 18

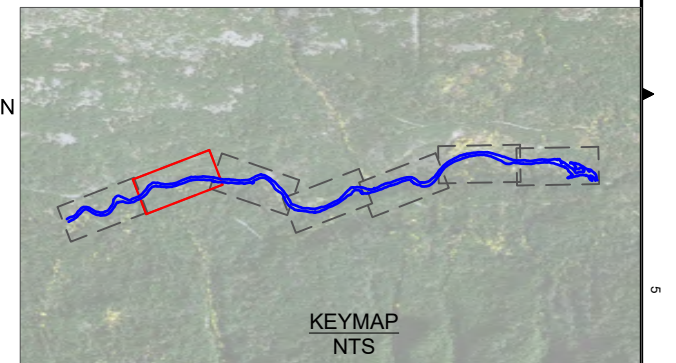


NOTES:

1. INSTALL BANK JAMS TO INCREASE CHANNEL ROUGHNESS, PROMOTE SCOUR POOLS, AND INCREASE HABITAT DIVERSITY. SEE SHEET C-203 FOR DETAILS.
2. INSTALL MID-CHANNEL LOG JAM TO PROMOTE SPLIT FLOW, DECREASE CHANNEL INCISION, AND INCREASE CHANNEL COMPLEXITY. SEE SHEET C-201 FOR DETAILS.
3. HELICOPTER PLACE LWD FOR ENHANCED HABITAT AND INCREASED CHANNEL COMPLEXITY. FINAL LWD CONFIGURATION COORDINATED IN THE FIELD.
4. LIMIT LWD STRUCTURE PROTRUSION INTO CHANNEL. FINAL LWD CONFIGURATION COORDINATED IN THE FIELD.
5. TIP EXISTING TREE ON TOP OF LWD LOGS AS PINNING OR SPANNER LOG ELEMENT.
6. INSTALL HELICOPTER BANK JAM STRUCTURE TO INCREASE CHANNEL COMPLEXITY AND ENCOURAGE RECRUITMENT OF TREES ON RIGHT BANK. SEE SHEET C-204 FOR DETAILS. FINAL LWD CONFIGURATION COORDINATION IN THE FIELD.

LEGEND:

- UPPER TWISP RIVER ALIGNMENT
- SHEET BOUNDARY
- EXISTING EDGE OF ROAD
- EXISTING BANKFULL FLOW INUNDATION
- RIVER MILE
- EXISTING 100-YEAR INUNDATION
- ◆ SURVEY CONTROL POINT
- EXISTING LWD
- EXISTING 1-FT CONTOUR
- EXISTING ACCESS ROUTE
- EXISTING 5-FT CONTOUR
- PROPOSED HELICOPTER LWD
- POTENTIAL ACCESS ROUTE



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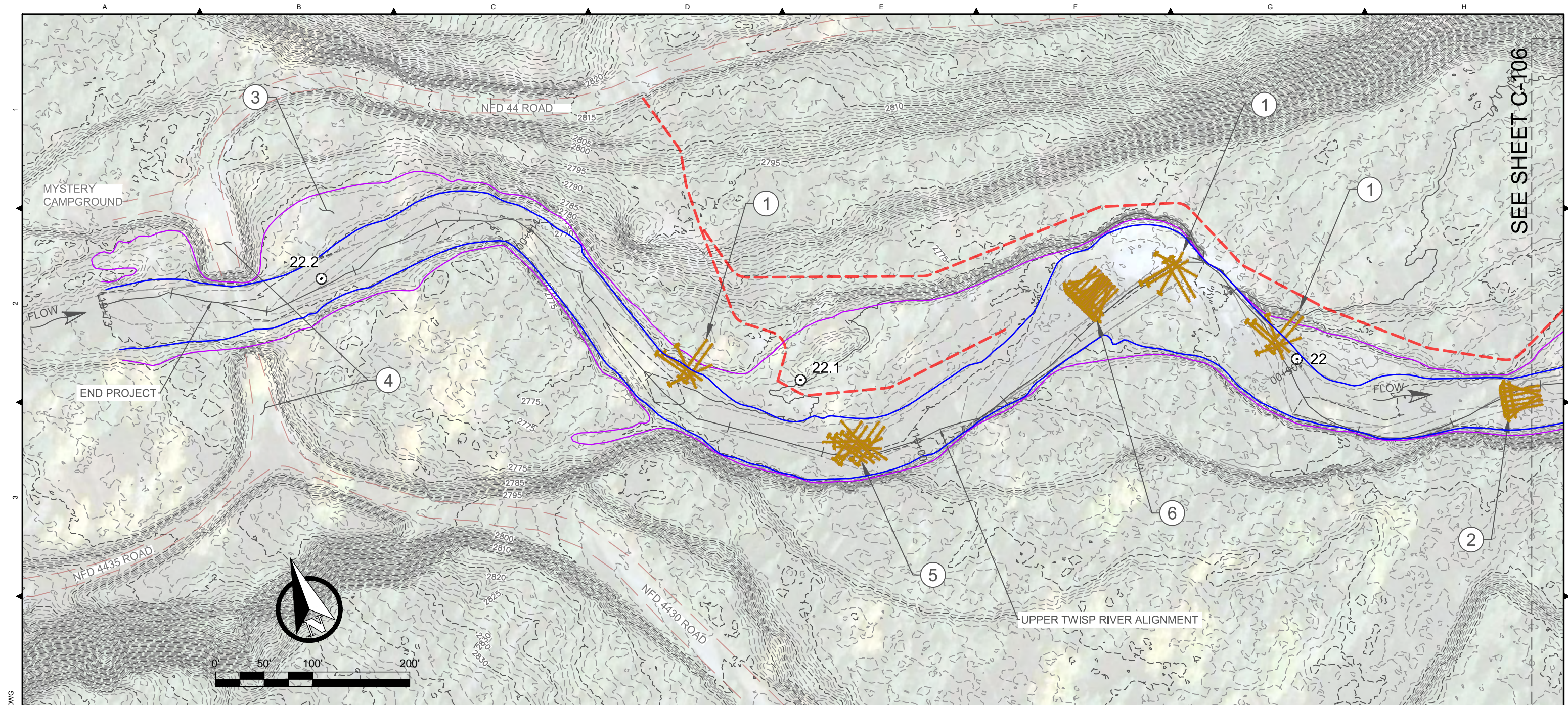
NOT FOR CONSTRUCTION

REV.		DATE	REVISION DESCRIPTION	DRW	ENG	APP
A		8/03/18	CONCEPT LEVEL DESIGN	JSA	JSA	CB

YAKAMA NATION FISHERIES - UPPER TWISP RIVER RESTORATION CONCEPTUAL LEVEL DESIGN

PROPOSED CONDITIONS

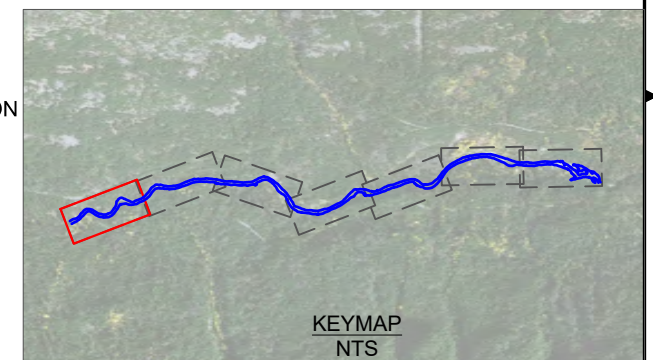
DWG. NO.:	C-106
CREATED:	2/15/2018
SHEET:	11 of 18



SEE SHEET C-106

- NOTES:**
1. INSTALL BANK JAMS TO INCREASE CHANNEL ROUGHNESS, PROMOTE SCOUR POOLS, AND INCREASE HABITAT DIVERSITY. SEE SHEET C-203 FOR DETAILS. TIE INTO EXISTING VEGETATION WHERE FEASIBLE.
 2. INSTALL LOG JAM TO PROMOTE LATERAL CHANNEL MOVEMENT AND INCREASE CHANNEL COMPLEXITY. SEE SHEET C-201 FOR DETAILS.
 3. DECOMMISSION CAMP SITES, DECOMPACT ROAD AND PLANT WITH RIPARIAN VEGETATION.
 4. EVALUATE REMOVING BRIDGE AND BRIDGE APPROACH ROAD FILL TO RECONNECT FLOODPLAIN ON RIVER LEFT AND RIGHT.
 5. AUGMENT EXISTING LWD WITH 12 LOGS TO INCREASE INSTREAM COMPLEXITY AND INUNDATE LEFT FLOODPLAIN.
 6. INSTALL TWO LOG JAMS TO DEVELOP LARGE APEX JAM TO PROMOTE SPLIT FLOW CONDITIONS. SEE SHEET C-201 FOR DETAILS.

- LEGEND:**
- +— UPPER TWISP RIVER ALIGNMENT
 - - - SHEET BOUNDARY
 - - - EXISTING EDGE OF ROAD
 - RIVER MILE
 - ◆ SURVEY CONTROL POINT
 - - - EXISTING 1-FT CONTOUR
 - - - EXISTING 5-FT CONTOUR
 - EXISTING BANKFULL FLOW INUNDATION
 - EXISTING 100-YEAR INUNDATION
 - PROPOSED LWD
 - PROPOSED HELICOPTER LWD
 - - - EXISTING ACCESS ROUTE
 - - - POTENTIAL ACCESS ROUTE



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PLOT DETAILS: BAILEY, CHAO
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2:05 PM

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CONSTRUCTION**

PLOTTED AS ANSI B (11" X 17"), PLAN SHEET FULL SIZE ANSI D (22" X 34")			DRW	ENG	APP
REV.	DATE	REVISION DESCRIPTION			
A	8/03/18	CONCEPT LEVEL DESIGN	JSA	JSA	CB

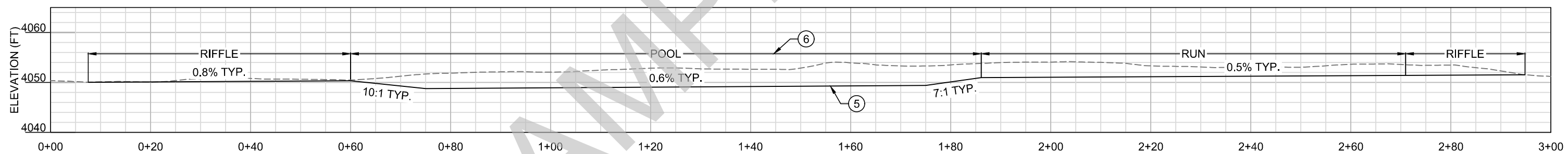
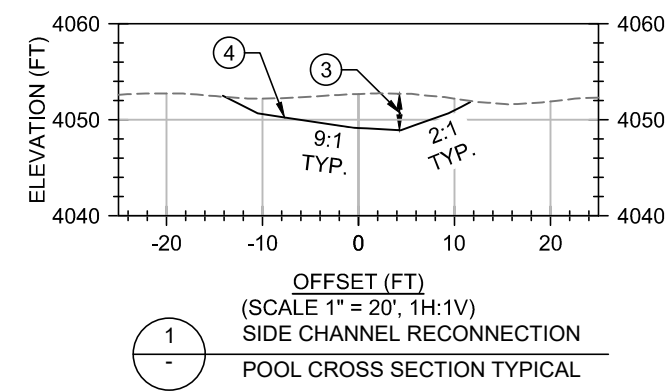
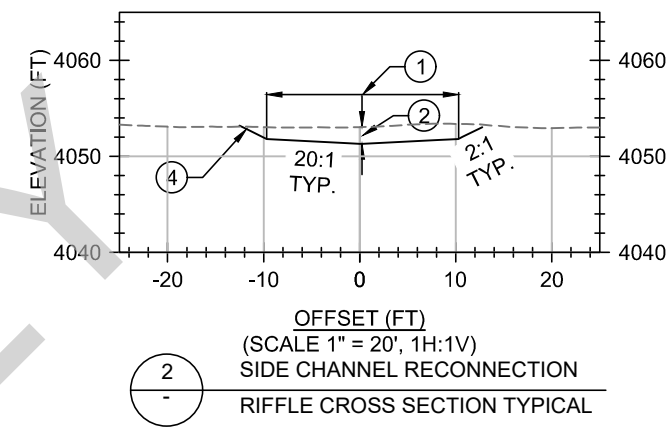
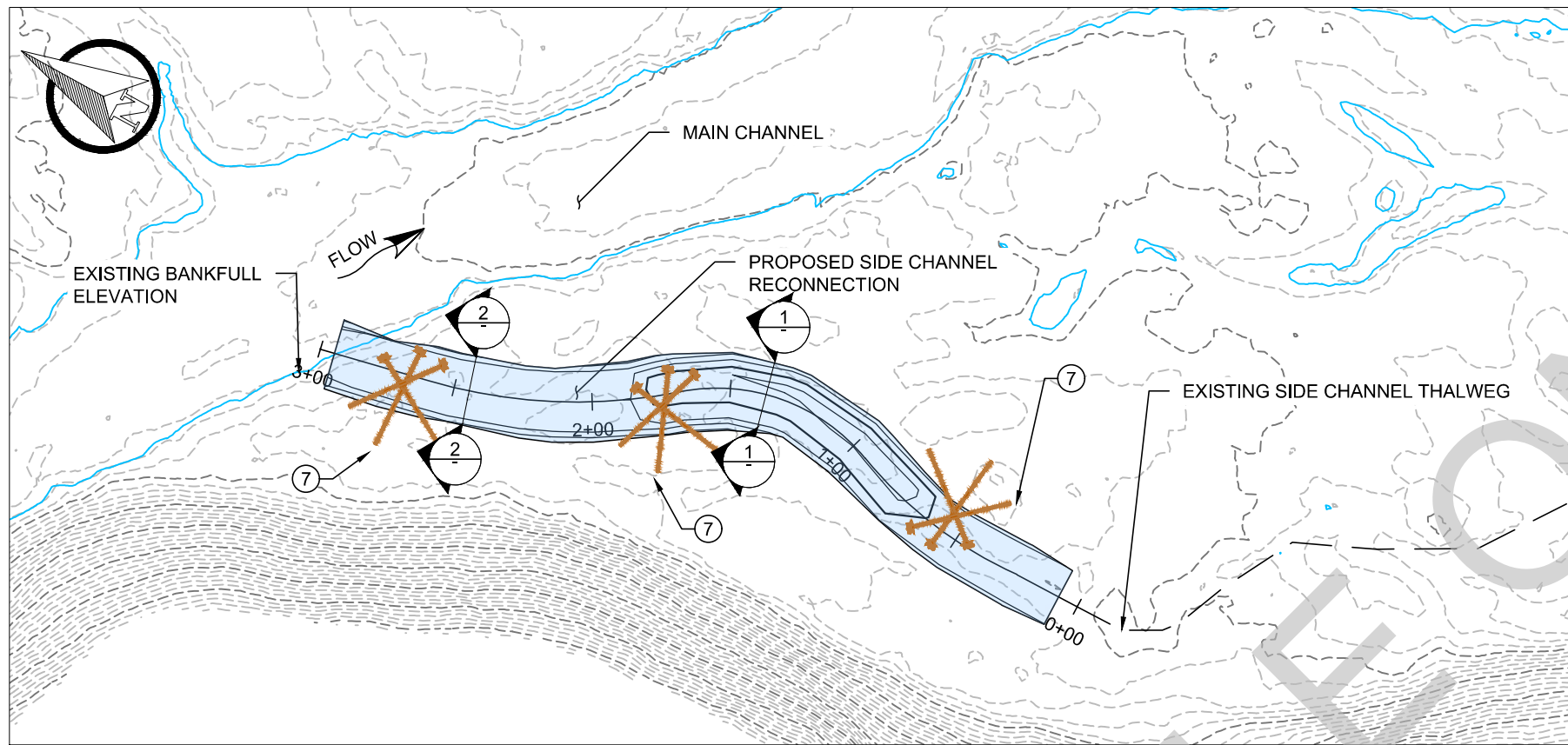
**YAKAMA NATION FISHERIES -
UPPER TWISP RIVER RESTORATION
CONCEPTUAL LEVEL DESIGN**

**PROPOSED
CONDITIONS**

DWG. NO.: **C-107**

CREATED: 2/15/2018

SHEET: 12 of 18



PROFILE (FT)
 (SCALE 1" = 20', 1H:1V)
 SIDE CHANNEL RECONNECTION
 PROFILE VIEW TYPICAL

SIDE CHANNEL RECONNECTION NOTES:

1. BOTTOM WIDTH OF SIDE CHANNEL VARIES AT EACH SIDE CHANNEL LOCATION.
2. DEPTH OF RIFFLE EXCAVATED TO ALLOW INUNDATION AT VARIABLE FLOW EVENTS. DEPTH WILL VARY AT EACH SIDE CHANNEL LOCATION DEPENDING ON INTENDED SIDE CHANNEL FUNCTION.
3. DEPTH OF POOL EXCAVATION WILL VARY AT EACH SIDE CHANNEL AND WILL DEPEND ON INTENDED SIDE CHANNEL FUNCTION.
4. CHANNEL SLOPES SHOWN IN SECTIONS ARE TYPICAL AND WILL VARY AT EACH SIDE CHANNEL LOCATION.
5. LENGTH AND SLOPE OF SIDE CHANNEL RECONNECTION VARIES AT EACH SIDE CHANNEL LOCATION.
6. RIFFLE AND POOL HABITAT LENGTHS WILL VARY AT EACH SIDE CHANNEL RECONNECTION.
7. PLACE LARGE WOOD IN SIDE CHANNEL TO PROVIDE COVER FOR RESIDENT FISH SPECIES. TYPES OF LARGE WOOD STRUCTURES USED WILL VARY AT EACH SIDE CHANNEL LOCATION.

LEGEND:

- - - EXISTING CONTOUR MAJOR - 5FT
- - - EXISTING CONTOUR MINOR - 1FT
- EXISTING BANKFULL ELEVATION
- █ PROPOSED CHANNEL EXCAVATION
- PROPOSED CONTOUR MAJOR - 5FT
- PROPOSED CONTOUR MINOR - 1FT
- █ PROPOSED LWD

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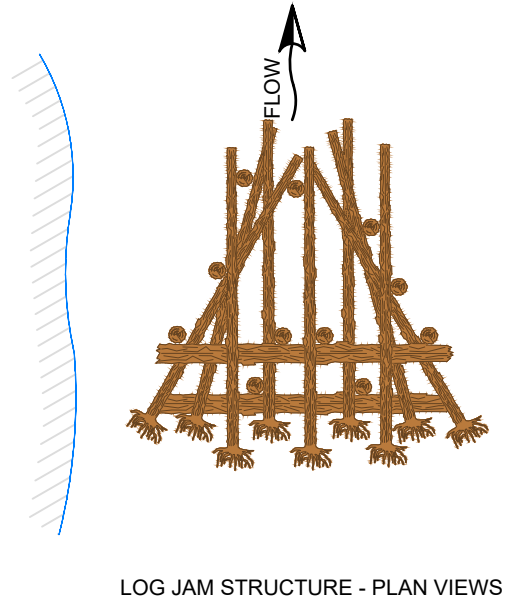
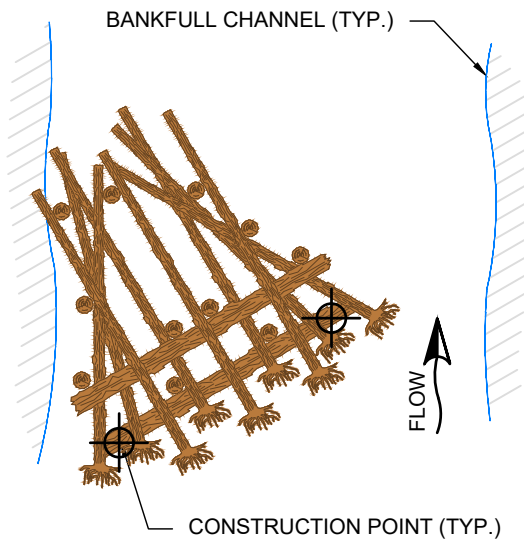
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REV.	DATE	REVISION DESCRIPTION			
A	8/03/18	CONCEPT LEVEL DESIGN	JSA	JSA	CB

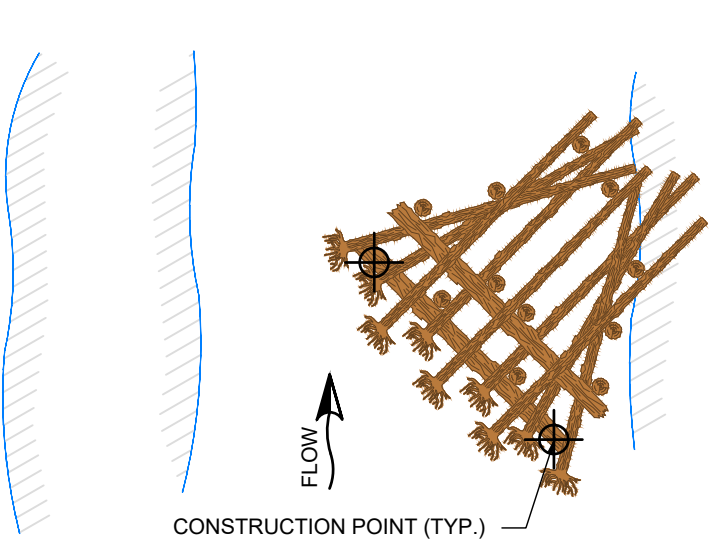
YAKAMA NATION FISHERIES -
 UPPER TWISP RIVER RESTORATION
 CONCEPTUAL LEVEL DESIGN

SIDE CHANNEL RE-CONNECTION EXAMPLE

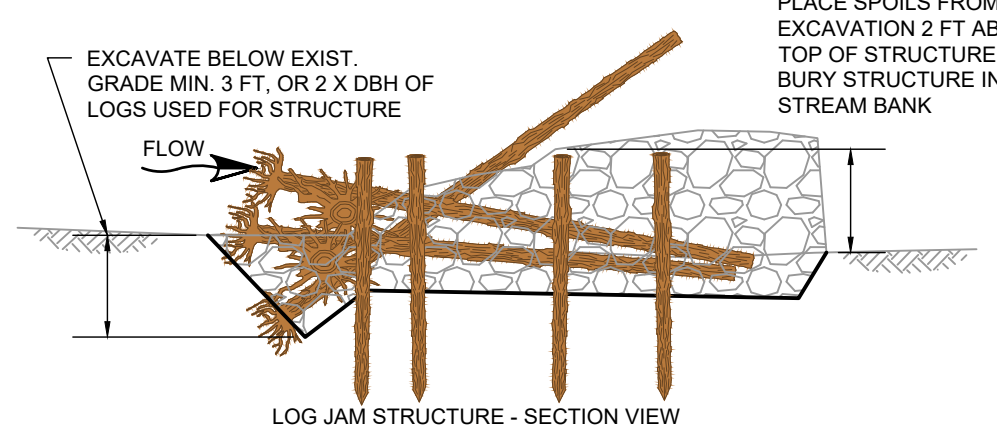
DWG. NO.: **C-108**
 CREATED: 2/15/2018
 SHEET: 13 of 18



LOG JAM STRUCTURE - PLAN VIEWS



CONSTRUCTION POINT (TYP.)



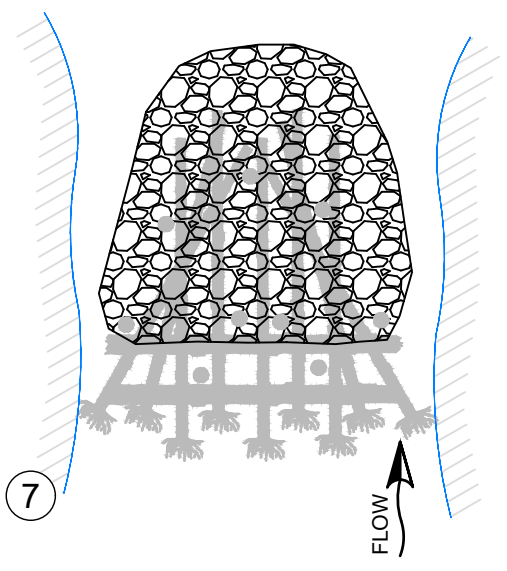
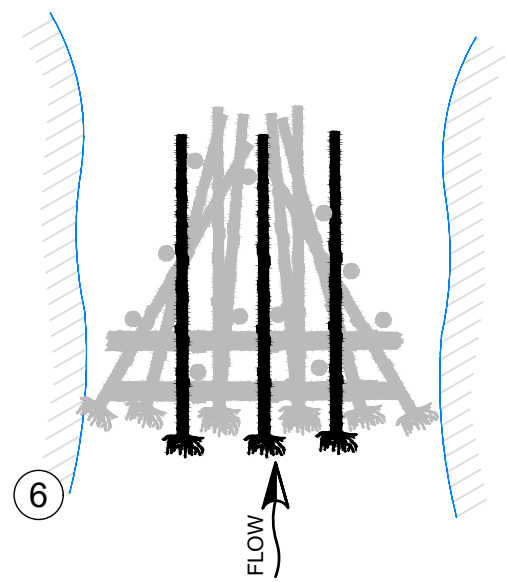
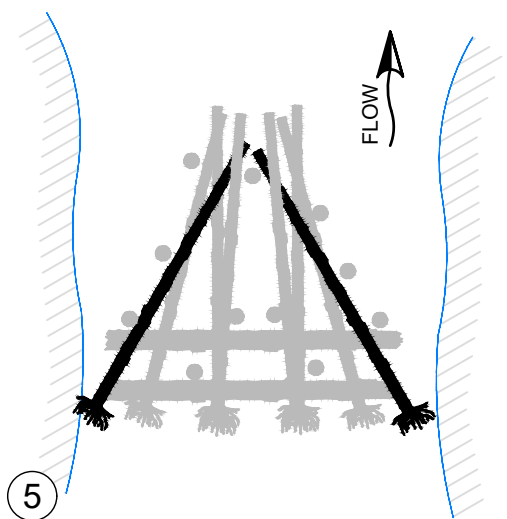
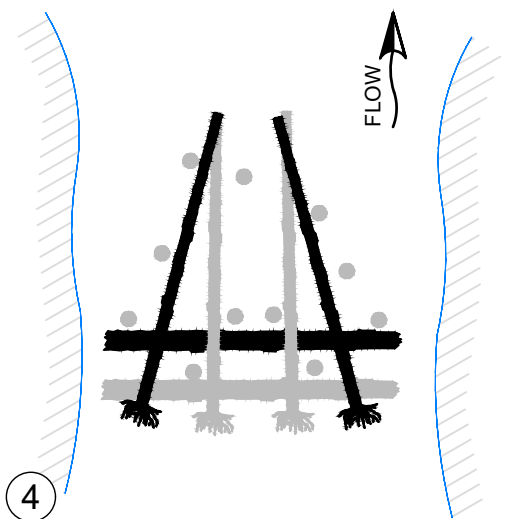
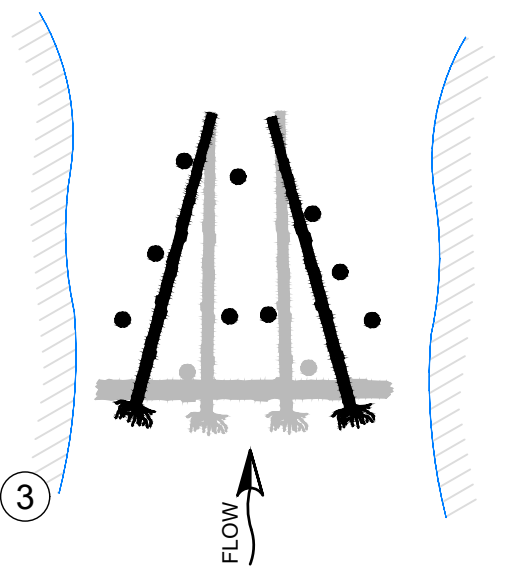
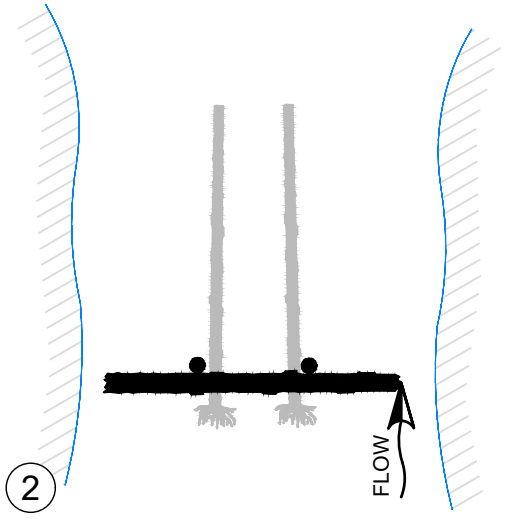
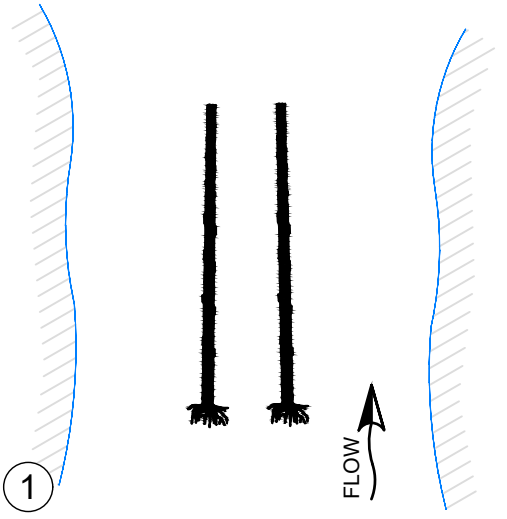
LOG JAM STRUCTURE - SECTION VIEW

CONSTRUCTION QUANTITIES:

COMPONENT	DESCRIPTION	QUANTITY
WHOLE TREE WITH ROOTWAD	MEDIUM (12" - 18" DBH, 35 FT MIN)	5
WHOLE TREE WITH ROOTWAD	LARGE (18"+ DBH, 40 FT MIN)	6
LOGS WITHOUT BRANCHES	LARGE (18"+ DBH, 40 FT MIN)	2
VERTICAL PILING	MEDIUM (12" - 18" DBH, 12 FT MIN)	11
BALLAST	SPOILS/FLOODPLAIN ALLUVIUM	200 CY

LOG JAM STRUCTURE NOTES:

1. INSTALL TEMPORARY COFFERDAM TO ISOLATE WORK AREA.
2. FISH SALVAGE TO BE SUPERVISED BY QUALIFIED FISH BIOLOGIST.
3. EXCAVATE TRENCH A MINIMUM OF 3 FT TO COMPLETELY BURY BOTTOM LAYER OF STRUCTURE. EXCAVATE UPSTREAM PORTION OF TRENCH TO PROVIDE ELEVATED TIPS OF TREES IN SEQUENCE #1 WHEN ROOTWADS ARE PLACED IN TRENCH.
4. PLACE MEDIUM TREES IN SEQUENCE #1. ROOTWADS PLACED IN DEEPEST PORTION OF TRENCH UPSTREAM.
5. LARGE BASE LOG PLACED IN SEQUENCE #2 DOES NOT REQUIRE ROOTWAD. PLACE LOG DOWNSTREAM OF SEQUENCE #1 ROOTWADS. PLACE VERTICAL PILINGS TO LOCK LARGE BASE LOG IN PLACE.
6. SMALL TREES PLACED IN SEQUENCE #3 DO NOT REQUIRE BRANCHES. PLACE VERTICAL PILINGS AROUND PERIMETER OF SMALL TREES TO LOCK IN PLACE.
7. LARGE RISER LOG PLACED IN SEQUENCE #4 SHALL BE PLACED AT BACK OF STRUCTURE AND PUSHED FORWARD INTO PLACE TIPS OF TREES IN SEQUENCE #1 SHALL BE LIFTED ON TOP OF LARGE RISER LOG. TIPS OF SEQUENCE #1 TREES WILL ELEVATE AS LARGE RISER LOG IS PUSHED INTO PLACE.
7. MEDIUM TREES PLACED IN SEQUENCE #5 SHALL BE PLACED SO TIPS OF TREES ARE UNDER ELEVATED SEQUENCE #1 TREE TIPS.
8. PLACE LARGE TREES IN SEQUENCE #6.
9. SPOILS FROM EXCAVATION SHALL BE USED TO BACKFILL STRUCTURE AS CONSTRUCTION PROGRESSES. MATERIAL SHALL BE COMPACTED WITH EXCAVATOR BUCKET. ADDITIONAL ALLUVIAL FLOODPLAIN MATERIAL MAY BE NEEDED TO BURY STRUCTURE AS SHOWN. BALLAST MATERIAL INCIDENTAL TO STRUCTURE COST. RACKING MATERIAL MAY BE ADDED TO FRONT OF STRUCTURE WHEN AVAILABLE.
11. PLANT 15 TO 25 WILLOW STAKES IN STRUCTURE TO COMPLETE CONSTRUCTION. OWNER SHALL BE RESPONSIBLE FOR PLANTING WILLOW STAKES.
12. BANKFULL LOCATION WITH RESPECT TO STRUCTURE LOCATION IS A TYPICAL REPRESENTATION AND MAY VARY AT EACH STRUCTURE LOCATION. FINAL CONFIGURATION OF STRUCTURE SHALL BE AS DIRECTED IN FIELD.



LOG JAM STRUCTURE - LOG PLACEMENT SEQUENCING

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 PLOT DETAILS: BAILEY, CHAO
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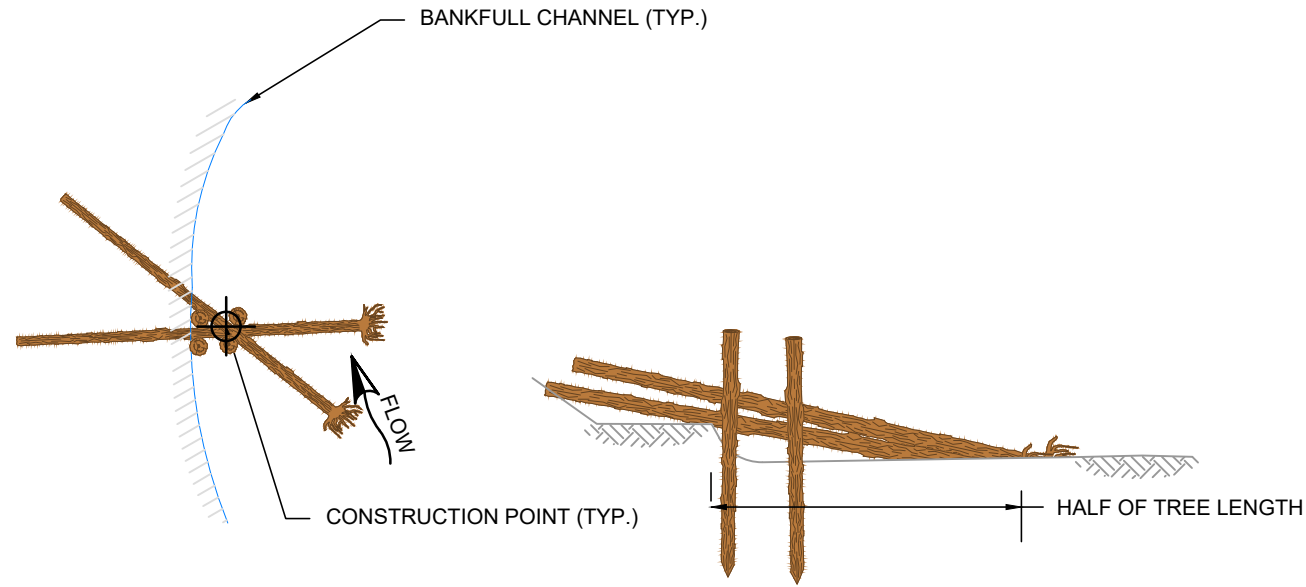
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REV.	DATE	REVISION DESCRIPTION	DRW	ENG	APP
A	8/03/18	CONCEPT LEVEL DESIGN	JSA	JSA	CB

YAKAMA NATION FISHERIES -
 UPPER TWISP RIVER RESTORATION
 CONCEPTUAL LEVEL DESIGN

DETAILS
 LWD CONSTRUCTION

DWG. NO.:	C-201
CREATED:	2/15/2018
SHEET:	14 of 18



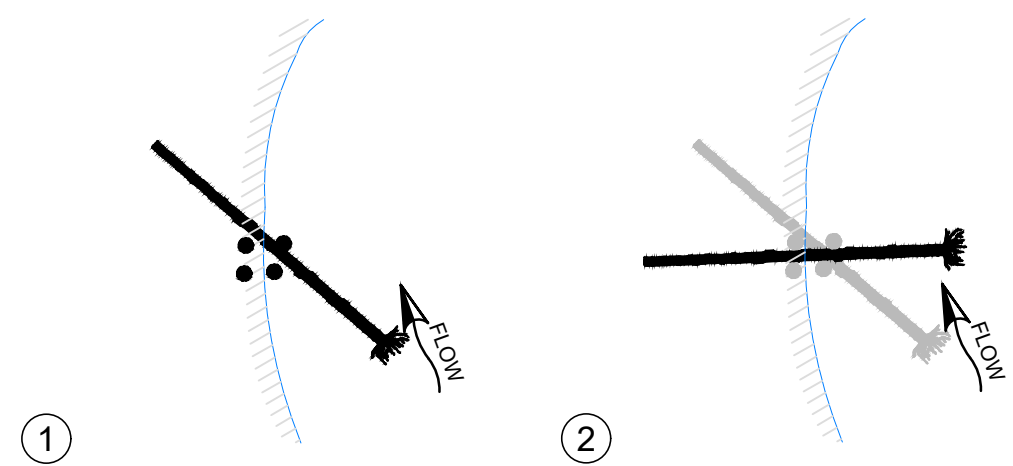
2-LOG CROSS STRUCTURE - LEFT BANK PLAN AND SECTION VIEWS

2-LOG CROSS STRUCTURE - STRUCTURE NOTES:

1. PLACE HALF OF THE LENGTH OF THE LARGE TREE IN SEQUENCE #1 WITHIN BANKFULL CHANNEL WITH TIP OF TREE DOWNSTREAM OF STANDING TREE, IF PRESENT. PLACE VERTICAL PILINGS TO LOCK LOGS IN PLACE.
2. BURY BOTTOM HALF OF SEQUENCE #1 ROOTWAD IN CHANNEL.
3. PLACE QUARTER TO HALF OF THE LENGTH OF THE LARGE TREE IN SEQUENCE #2 WITHIN BANKFULL CHANNEL WITH TIP OF TREE UPSTREAM OF STANDING TREE, IF PRESENT.
4. BURY BOTTOM HALF OF SEQUENCE #2 ROOTWAD IN CHANNEL.
5. BANKFULL LOCATION WITH RESPECT TO STRUCTURE LOCATION IS A TYPICAL REPRESENTATION AND MAY VARY AT EACH STRUCTURE LOCATION. FINAL CONFIGURATION OF STRUCTURE SHALL BE AS DIRECTED IN FIELD.



2-LOG CROSS STRUCTURE - RIGHT BANK PLAN AND SECTION VIEWS



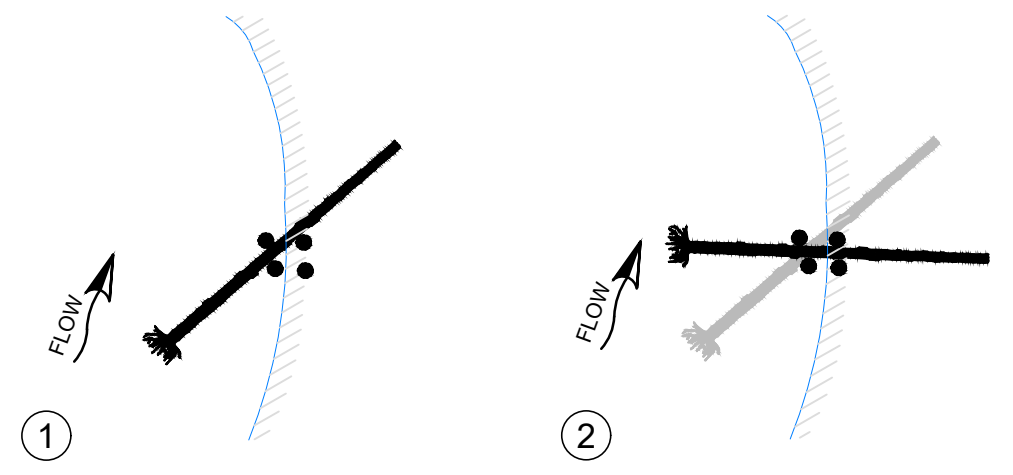
2-LOG CROSS STRUCTURE - LEFT BANK LOG PLACEMENT SEQUENCING

UPPER TWISP RIVER CONSTRUCTION QUANTITIES:

COMPONENT	DESCRIPTION	QUANTITY
WHOLE TREE WITH ROOTWAD	LARGE (18" - 24" DBH, 40 FT MIN)	2

SIDE CHANNEL CONSTRUCTION QUANTITIES:

COMPONENT	DESCRIPTION	QUANTITY
WHOLE TREE WITH ROOTWAD	MEDIUM (12" - 18" DBH, 40 FT MIN)	2



2-LOG CROSS STRUCTURE - RIGHT BANK LOG PLACEMENT SEQUENCING

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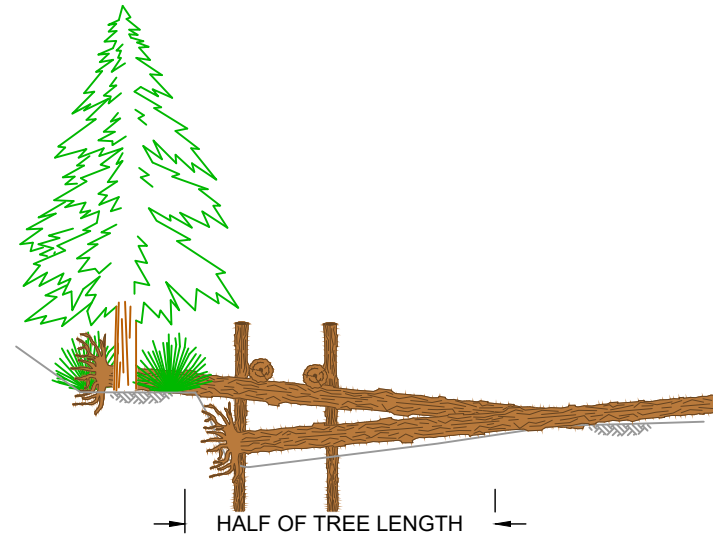
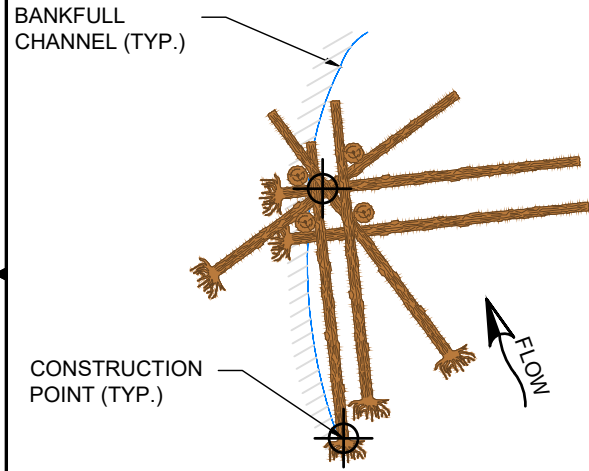
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YAKAMA NATION FISHERIES - UPPER TWISP RIVER RESTORATION CONCEPTUAL LEVEL DESIGN

DETAILS
LWD CONSTRUCTION

DWG. NO.:	C-202
CREATED:	2/15/2018
SHEET:	15 of 18



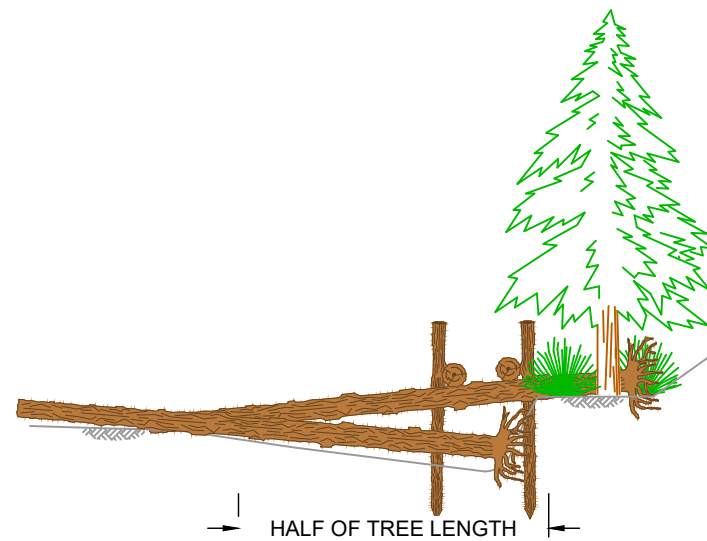
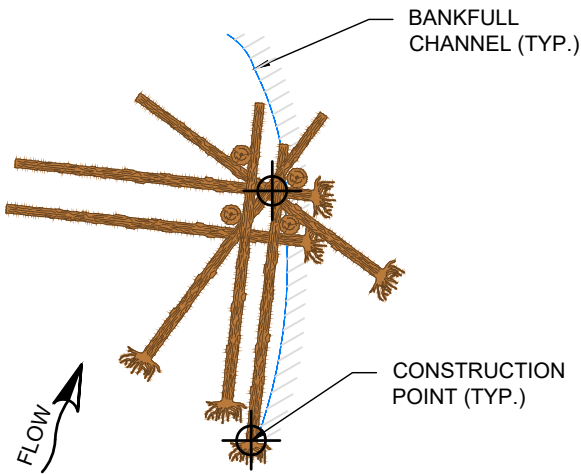
BANK JAM STRUCTURE - LEFT BANK PLAN AND SECTION VIEWS

CONSTRUCTION QUANTITIES:

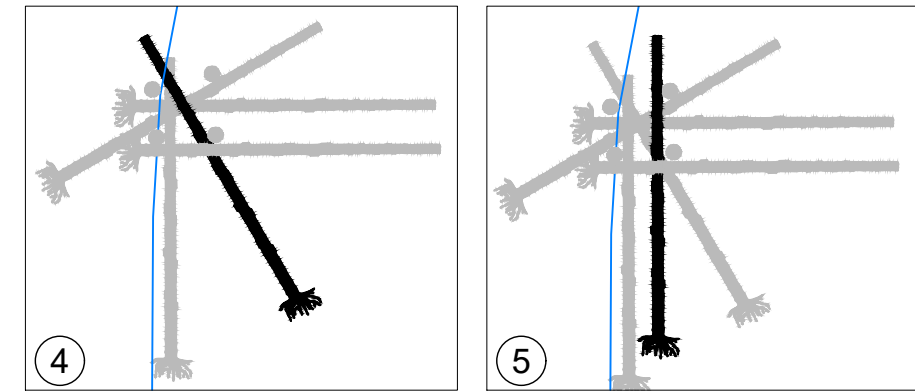
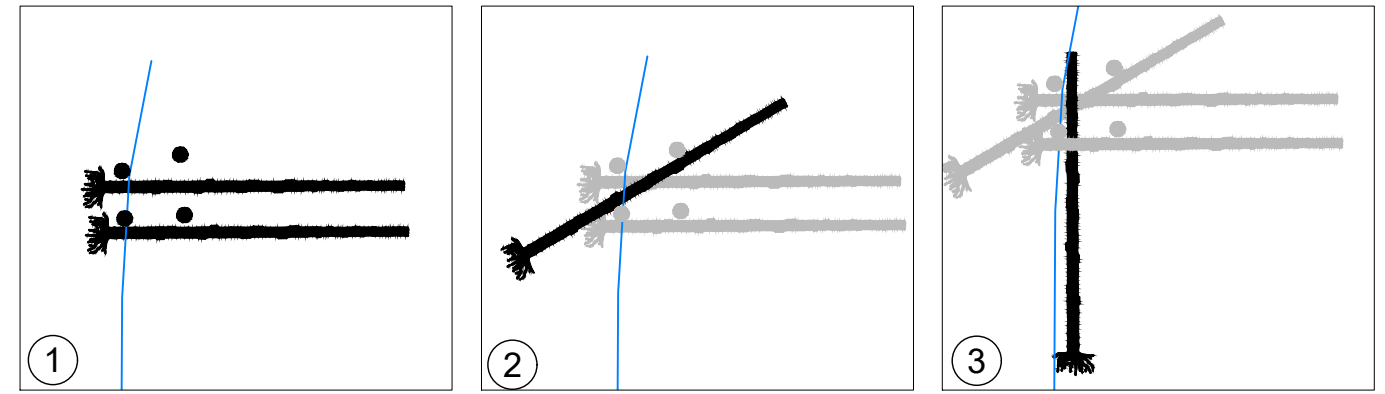
COMPONENT	DESCRIPTION	QUANTITY
WHOLE TREE WITH ROOTWAD	LARGE (24" DBH, 40 FT MIN)	6
VERTICAL PILING	MEDIUM (12" - 18" DBH, 12 FT MIN)	4

BANK JAM STRUCTURE NOTES:

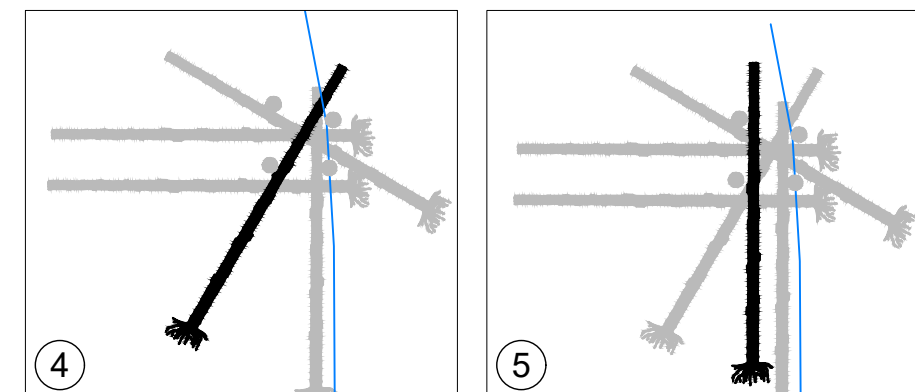
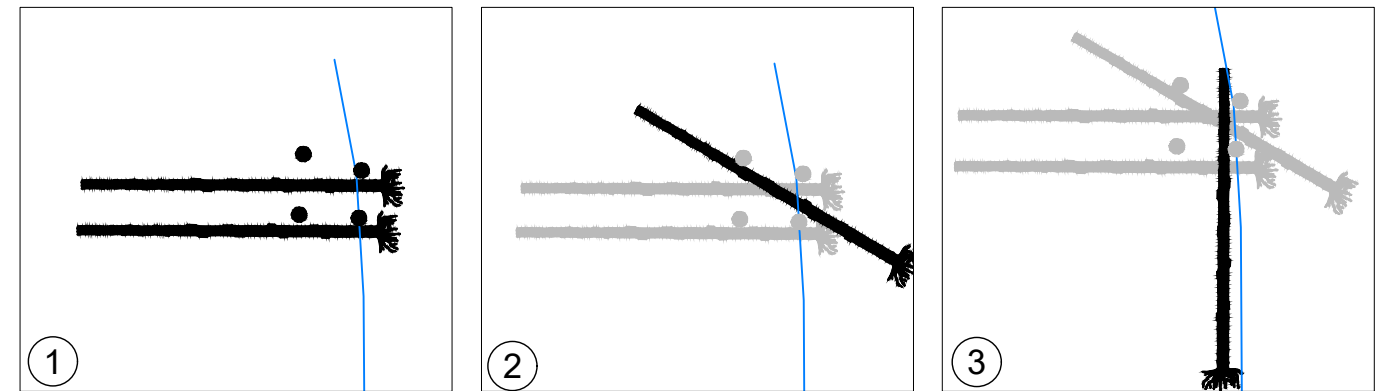
- FIRST TWO LOGS PLACED SHALL BE LARGEST OF SIX LOGS USED TO CONSTRUCT STRUCTURES.
- PLACE ROOTWAD OF LOGS PLACED IN SEQUENCE #1 1 TO 2 FEET FROM BANK FACE. PLACE VERTICAL PILINGS TO LOCK LOGS IN PLACE.
- PLACE ROOTWAD OF THIRD LOG ON TOP OF BANK. PLACE UPSTREAM OF ANY EXISTING VEGETATION.
- PLACE ROOTWAD OF FOURTH LOG IN CHANNEL THALWEG.
- PLACE ROOTWAD OF FIFTH LOG ON OPPOSITE EDGE OF WATER.
- PLACE ROOTWAD OF SIXTH LOG IN CHANNEL THALWEG.
- BANKFULL LOCATION WITH RESPECT TO STRUCTURE ORIENTATION IS A TYPICAL REPRESENTATION AND WILL VARY AT EACH STRUCTURE LOCATION.



BANK JAM STRUCTURE - RIGHT BANK PLAN AND SECTION VIEWS



BANK JAM STRUCTURE - LEFT BANK LOG PLACEMENT SEQUENCING



BANK JAM STRUCTURE - RIGHT BANK LOG PLACEMENT SEQUENCING

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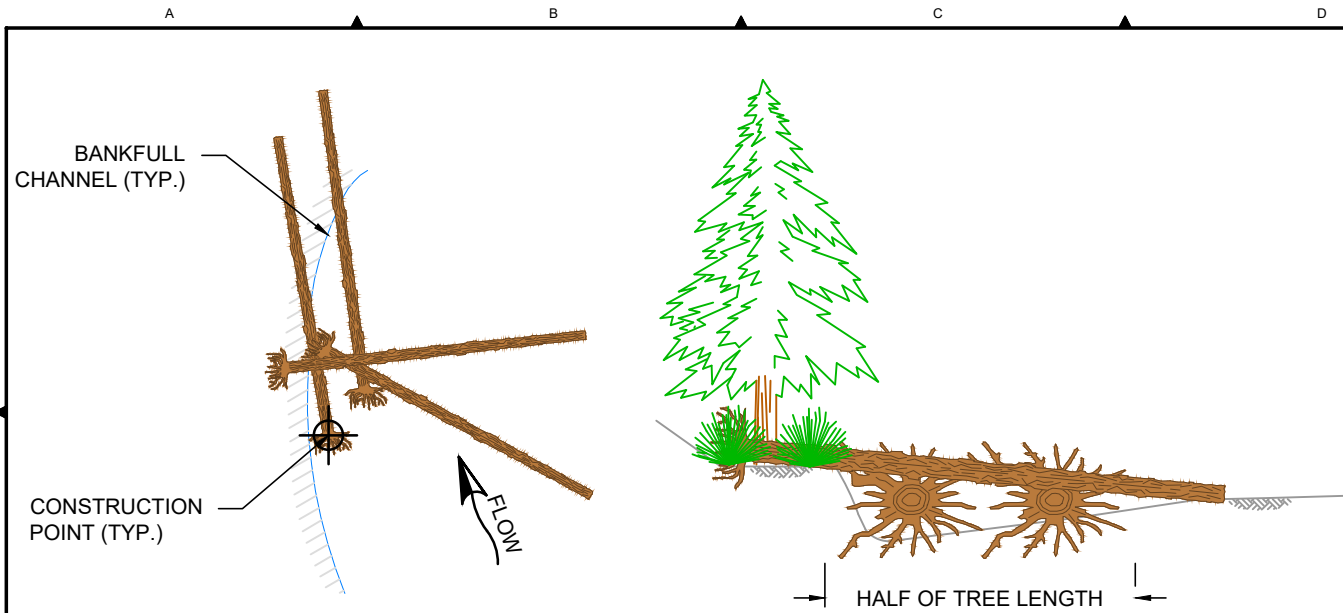
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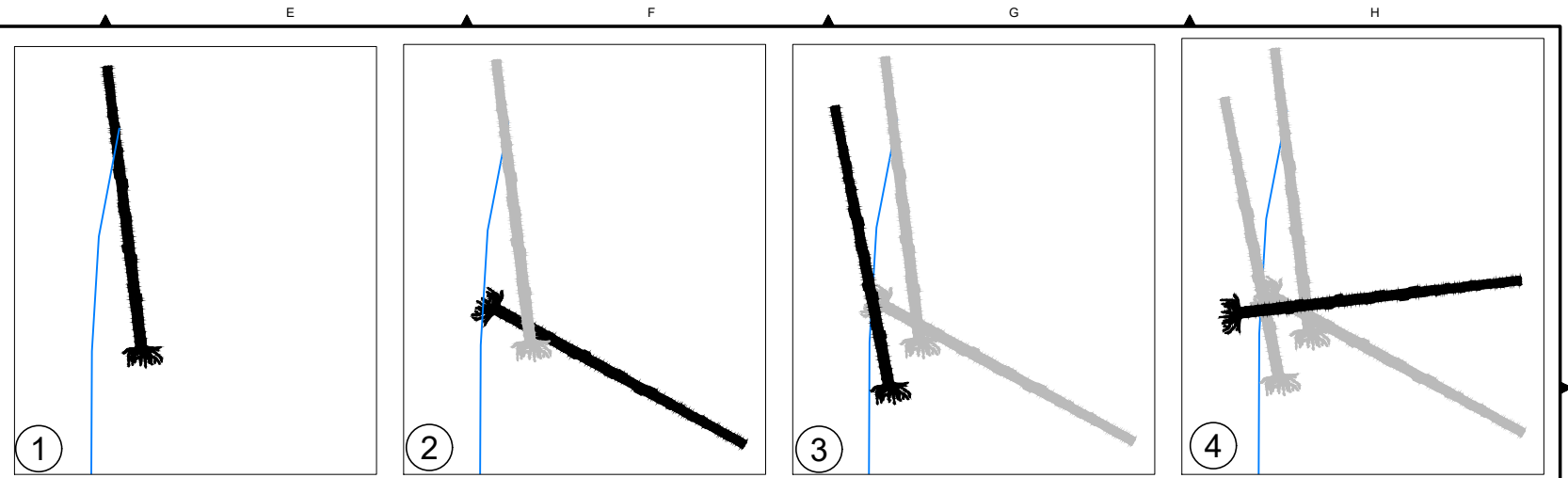
YAKAMA NATION FISHERIES - UPPER TWISP RIVER RESTORATION CONCEPTUAL LEVEL DESIGN

DETAILS
LWD CONSTRUCTION

DWG. NO.: C-203
 CREATED: 2/15/2018
 SHEET: 16 of 18



HELICOPTER BANK JAM STRUCTURE - LEFT BANK PLAN AND SECTION VIEWS

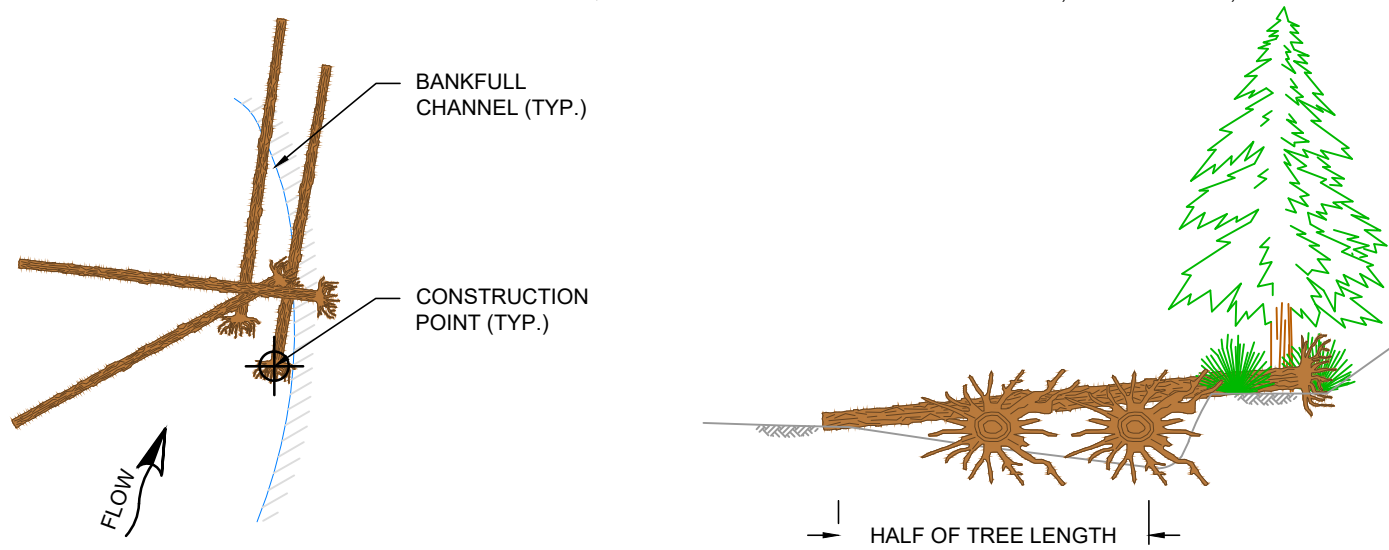


HELICOPTER BANK JAM STRUCTURE - LEFT BANK LOG PLACEMENT SEQUENCING

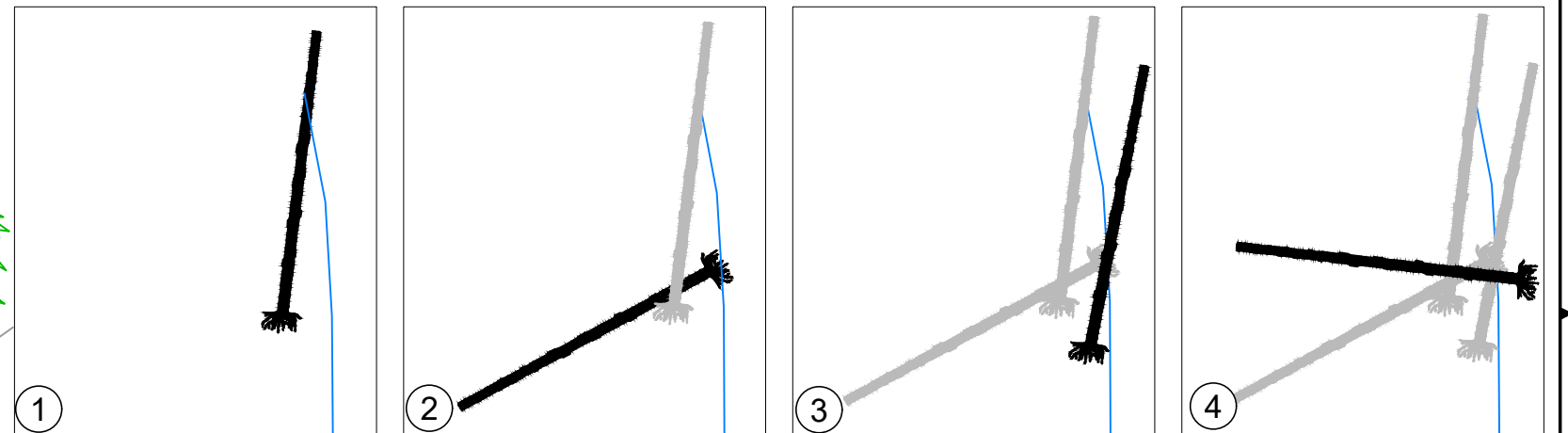
CONSTRUCTION QUANTITIES:		
COMPONENT	DESCRIPTION	QUANTITY
WHOLE TREE WITH ROOTWAD	LARGE (24" DBH, 40 FT MIN)	4

BANK JAM STRUCTURE NOTES:

- FIRST TWO LOGS PLACED SHALL BE LARGEST OF GROUP OF FOUR LOGS USED TO CONSTRUCT STRUCTURES.
- PLACE ROOTWAD OF LOG PLACED IN SEQUENCE #1 PINNED AGAINST EXISTING BOULDERS IF AVAILABLE.
- PLACE ROOTWAD OF LOG PLACED IN SEQUENCE #2 PINNED AGAINST BANKFACE AND OVER LOG PLACED IN #1.
- PLACE ROOTWAD OF THIRD LOG IN CHANNEL THALWEG AND PLACE TRUNK UP ON BANK. PLACE UPSTREAM OF ANY EXISTING VEGETATION.
- PLACE ROOTWAD OF FOURTH LOG UPSTREAM OF ANY EXISTING VEGETATION. .
- BANKFULL LOCATION WITH RESPECT TO STRUCTURE ORIENTATION IS A TYPICAL REPRESENTATION AND WILL VARY AT EACH STRUCTURE LOCATION.
- MULTIPLE STRUCTURES MAY BE PLACED IN SEQUENCE FOR OVERALL STRUCTURES WITH 8, 12 OR 16 LOGS, RESPECTIVELY.



HELICOPTER BANK JAM STRUCTURE - RIGHT BANK PLAN AND SECTION VIEWS



HELICOPTER BANK JAM STRUCTURE - RIGHT BANK LOG PLACEMENT SEQUENCING

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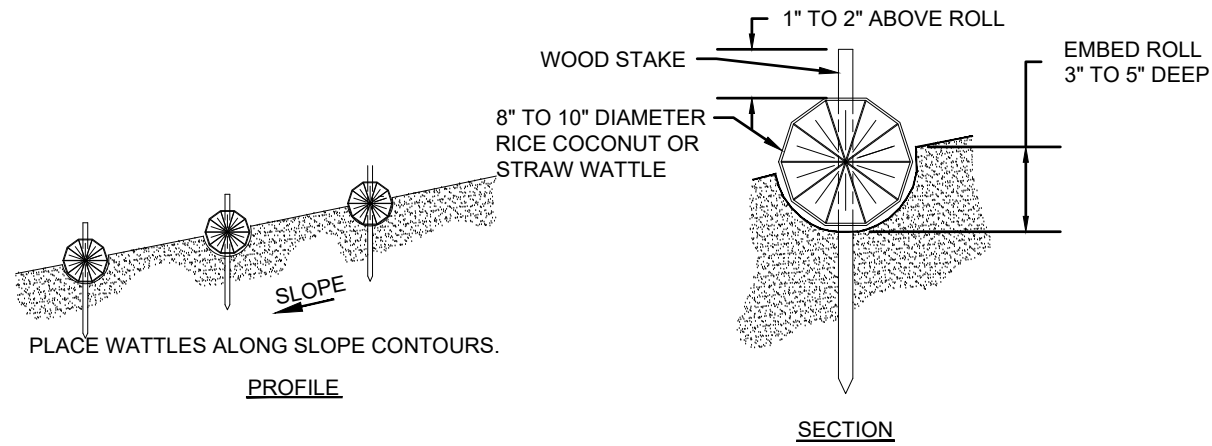


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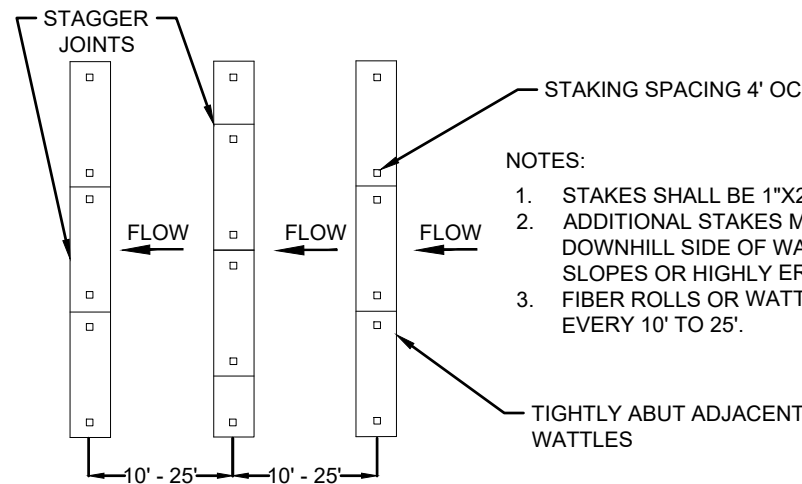
YAKAMA NATION FISHERIES - UPPER TWISP RIVER RESTORATION CONCEPTUAL LEVEL DESIGN
DETAILS
LWD CONSTRUCTION

DWG. NO.:	C-204
CREATED:	2/15/2018
SHEET:	17 of 18



PROFILE

SECTION



PLAN VIEW

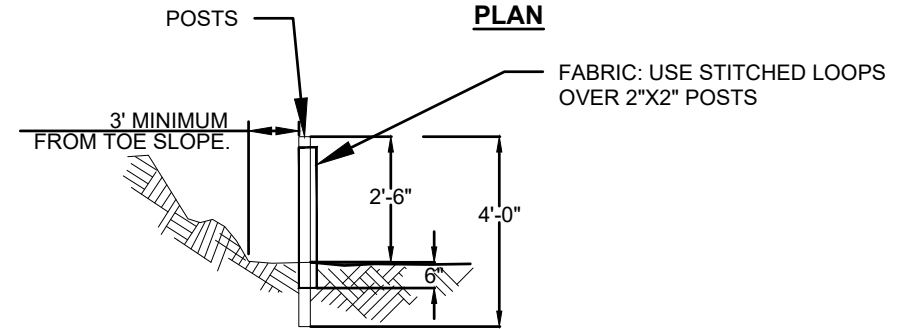
FIBER ROLLS/WATTLES - TYPICAL DETAIL
NTS

NOTES:

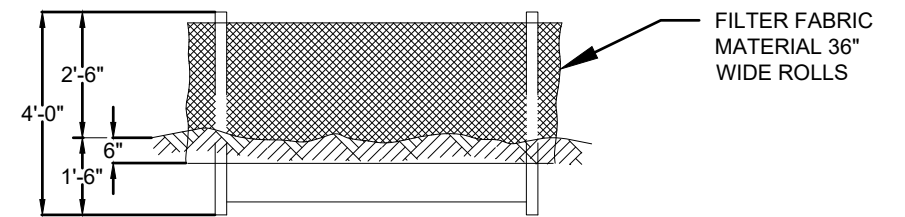
1. STAKES SHALL BE 1"X2" WOODEN STAKES.
2. ADDITIONAL STAKES MAY BE INSTALLED ON DOWNHILL SIDE OF WATTLES, ON STEEP SLOPES OR HIGHLY EROSION SOILS
3. FIBER ROLLS OR WATTLES TO BE INSTALLED EVERY 10' TO 25'.

ANGLE FILTER FABRIC FENCE WHERE NEEDED TO INTERCEPT ALL SURFACE RUNOFF

INTERLOCK 2"X2" POSTS AND ATTACH



PROFILE



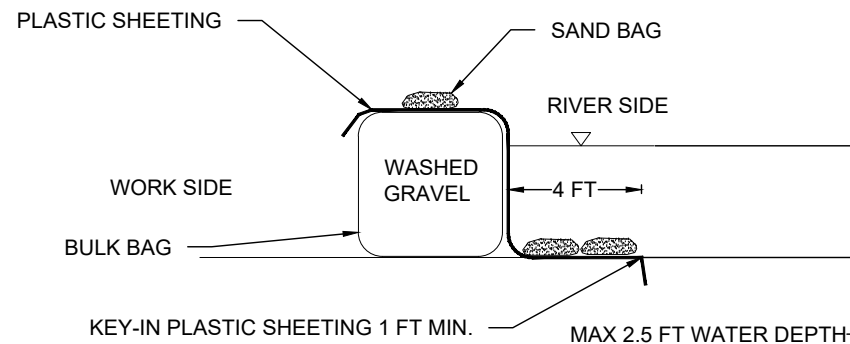
TEMPORARY SILT FENCE TYPICAL DETAIL

SEDIMENT FENCE NOTES:

1. SEDIMENT FENCE SHALL BE INSTALLED ON A LINE OF EQUAL ELEVATION.
2. BOTTOM EDGE OF SEDIMENT FENCE SHALL BE BURIED MIN 6".
3. POSTS MAY BE 2"X2" FIR, PINE OR STEEL.
4. POSTS TO BE INSTALLED ON UPHILL SIDE OF SLOPE.
5. COMPACT BOTH SIDES OF FILTER FABRIC TRENCH.
6. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATION REACHES 1/3 OF THE MEASURE HEIGHT. SEDIMENT SHALL BE DISPOSED OF TO AN AREA THAT CAN BE PERMANENTLY STABILIZED.

COFFERDAM NOTES:

1. ALL WORK IN CHANNEL SHALL ONLY OCCUR BETWEEN JULY 1 AND AUGUST 15.
2. IN-WATER WORK AREAS SHALL BE ISOLATED BY COFFERDAMS.
3. ISOLATED AREAS REQUIRE FISH SALVAGE ACTIVITIES PRIOR TO THE INITIATION OF CONSTRUCTION.
4. FISH SALVAGE TO BE PERFORMED BY QUALIFIED FISH BIOLOGIST.
5. FILL BULK BAG WITH WASHED GRAVEL.
6. SAND BAGS, ECO-BLOCKS, OR SIMILAR MAY BE SUBSTITUTED FOR WASHED GRAVEL BULK BAG.



TEMPORARY COFFERDAM SECTION TYPICAL DETAIL
NTS

Z:\PROJECTS\194-6195-YNF-UPPER TWISP DESIGN\15% DESIGN\SHEET FILES\05-DETAILS_L\WD.DWG August 2, 2018 2:50 PM



NOT FOR CONSTRUCTION

PLOTTED AS ANSI B (11" X 17"), PLAN SHEET FULL SIZE ANSI D (22" X 34")			DRW	ENG	APP
REV.	DATE	REVISION DESCRIPTION			
A	8/03/18	CONCEPT LEVEL DESIGN	JSA	JSA	CB

YAKAMA NATION FISHERIES -
UPPER TWISP RIVER RESTORATION
CONCEPTUAL LEVEL DESIGN

DWG. NO.:
C-301

DETAILS
TESC

CREATED: 2/15/2018
SHEET: 18 of 18