

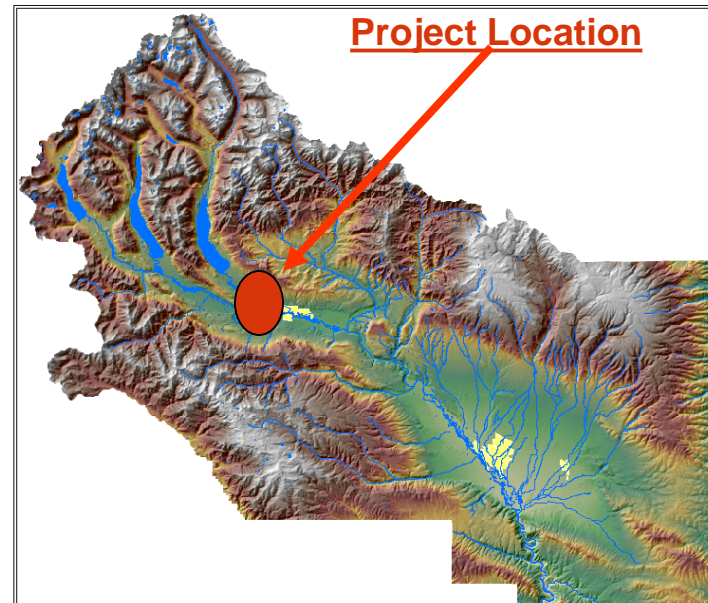
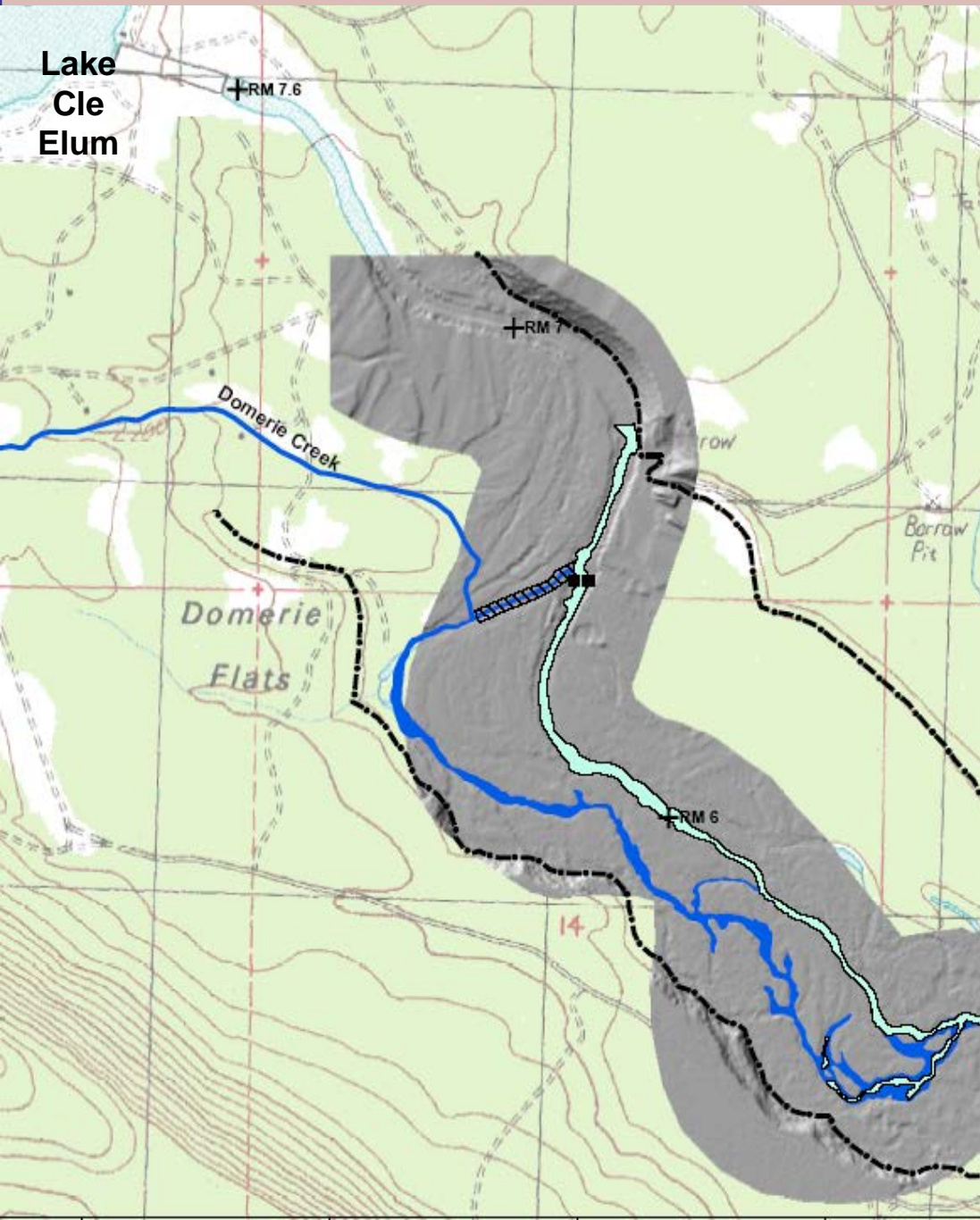
DESIGNS for LARGE ENGINEERED LOG JAMS

To reactivate the
DOMERIE SIDE CHANNEL
of the
LOWER CLE ELM RIVER

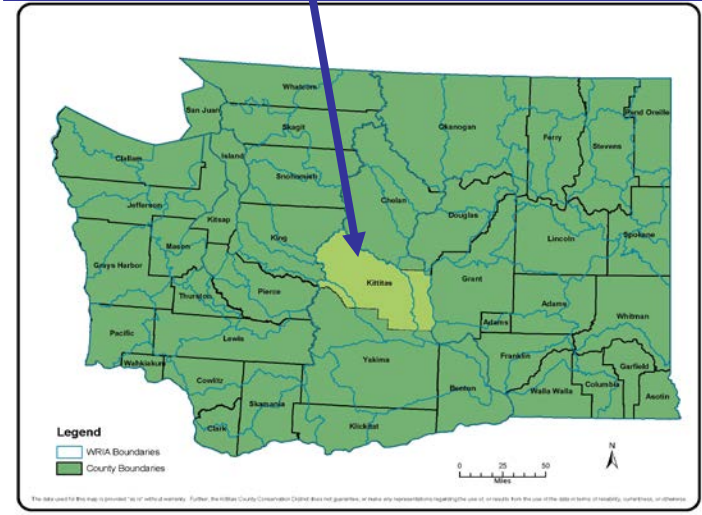
Science & Management Conference June, 2008- Ellensburg



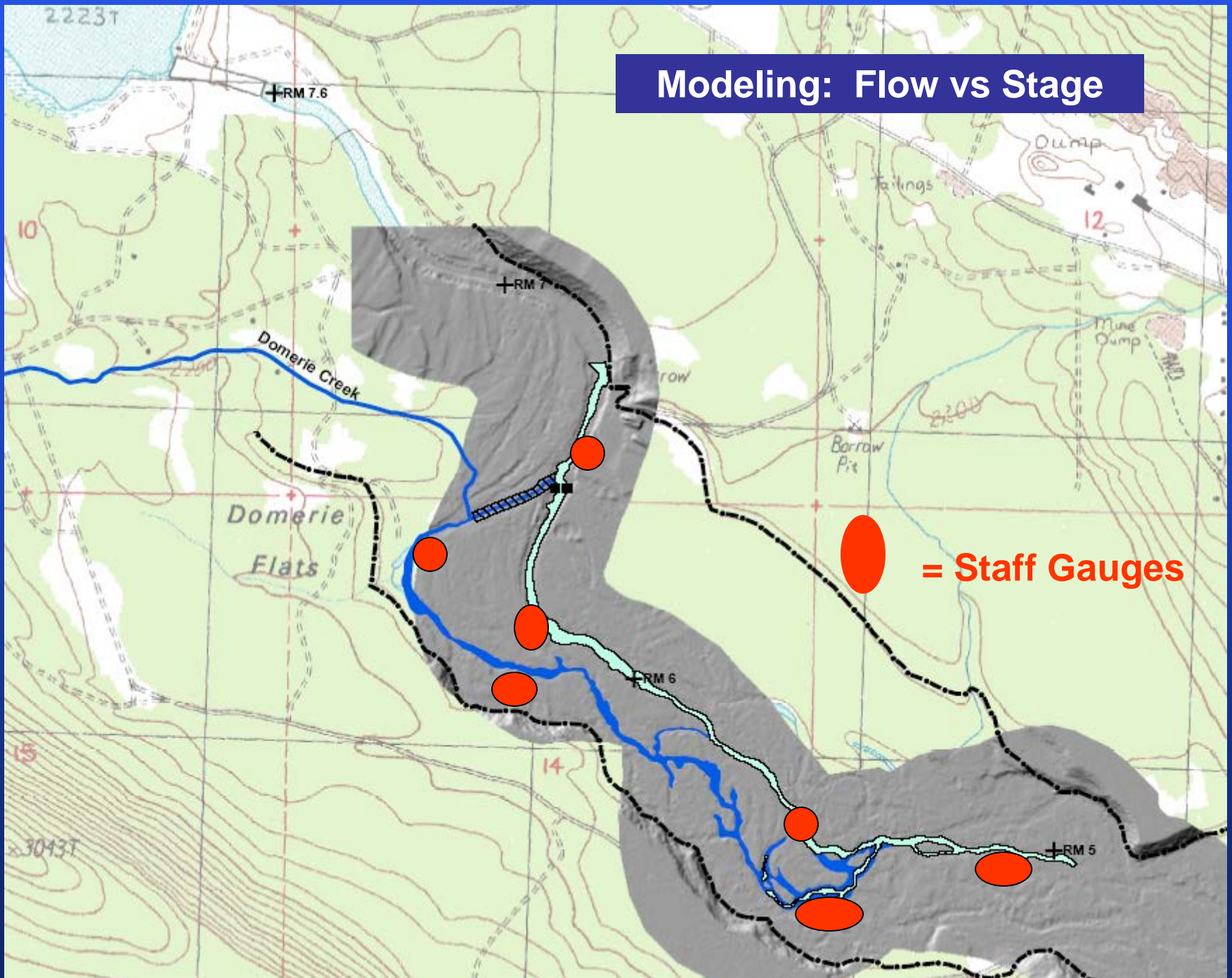
Lower Cle Elum River – River Mile 5 – 7 Domerie Side Channel



**UPPER YAKIMA RIVER BASIN
KITITAS COUNTY, WA**



Modeling: Flow vs Stage



20 July 2007

**Stage =
3.48**

**Flow =
3050 cfs**



2 Sept 2007

**Stage =
2.52**

**Flow =
1600 cfs**



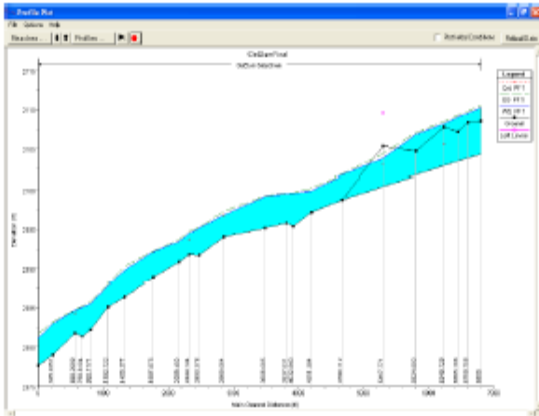
23 Sept 2007

**Stage =
0.96**

**Flow =
210 cfs**



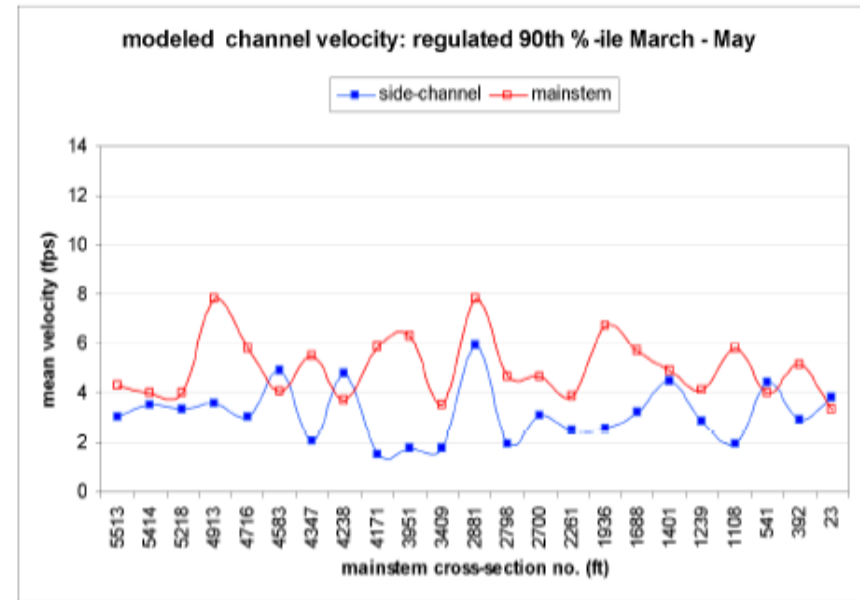
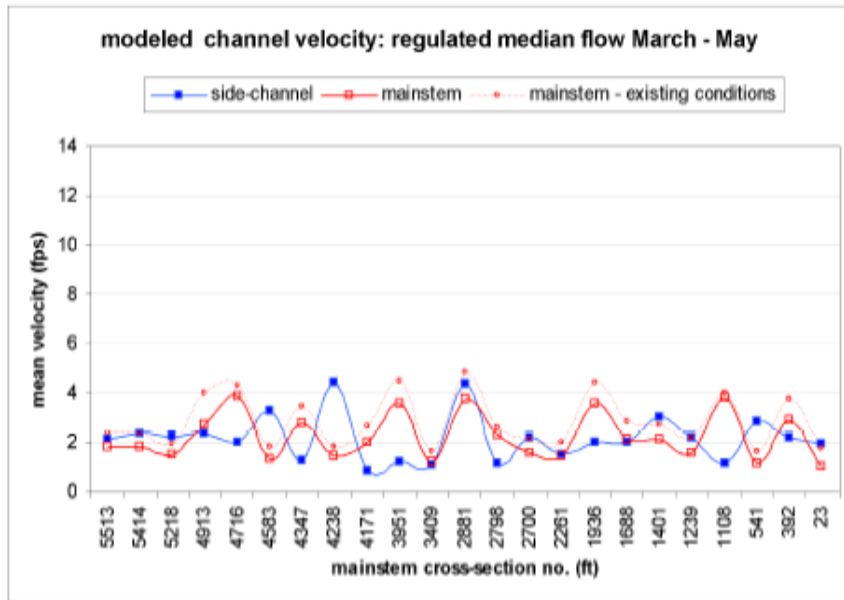
3) model project-relevant flows with HEC-GeoRAS



HEC-RAS Flow Rates (cfs)	Cle Elum River Flow Splits (cfs)			
	Main Channel		Upper Side Channel	
	Existing	Proposed	Existing	Proposed
200	200	107	-	93
500	500	364	-	136
800	800	636	-	164
1600	1600	1381	-	219
2000	1997	1758	3	242
4000	3849	3227	151	773

median flow characteristics

high-flow channel velocities



121°4'30"W 121°4'0"W 121°3'30"W 121°3'0"W 121°2'30"W 121°2'0"W

HEC-RAS Flow Rates (cfs)	Cle Elum River Flow Splits (cfs)			
	Main Channel		Upper Side Channel	
	Existing	Proposed	Existing	Proposed
200	200	107	-	93
500	500	364	-	136
800	800	636	-	164
1600	1600	1381	-	219
2000	1997	1758	3	242
4000	3849	3227	151	773

LEGEND

Proposed Structures

- Primary ELJs
- Valley Extent
- ▨ Excavated Channel

Wetted Channel

- Existing Conditions
- Additional Area from Proposed Structures

FLOW SPLITS

ELJ's

DOMERIE SIDE CHANNEL

Draft

ENTRIX

Kittitas Conservation Trust
 Cle Elum River Restoration
 Modeled Existing and Proposed
 Wetted Channel at 200 cfs



0 500 1,000 2,000 Feet

Background: USGS 1:24K DRG
 Hillshade: Based on LIDAR data
 LIDAR Source: Horizons, Inc. Rapid City, SD
 Flown October 2000
 Wetted channel from ENTRIX, Inc. HEC-RAS Model
 Projection: WA State Plane South
 Datum: NAD 83
 Revised by MGK & JTB on 1/14/08



121°4'30"W 121°4'0"W 121°3'30"W 121°3'0"W 121°2'30"W 121°2'0"W

47°14'30"N

47°14'0"N

47°13'30"N

47°14'30"N

47°14'0"N

47°13'30"N

SCHEMATIC DESIGN PLANS
& DETAILS
NOT FOR CONSTRUCTION

NOTES:

- 1) SEE SHEET C-
- 2) SEE SHEET C-

**EXCAVATED
PILOT CHANNEL**

ELJ's

DOMERIE SIDE CHANNEL

DOMERIE CREEK

OLE ELUM RIVER

PROPOSED RE-ACTIVATED
SIDE CHANNEL

PROPOSED LENGTH
OF EXCAVATION

PROPOSED EXCAVATION OF INLET
TO SIDE CHANNEL.
SEE SHEET C-3 FOR MORE
INFORMATION

APPROXIMATE LOCATION OF ABANDONED
WATER INTAKE











PROPOSED EAST BANK ENGINEERED
LOG JAM.
SEE SHEET C-4 FOR MORE INFORMATION

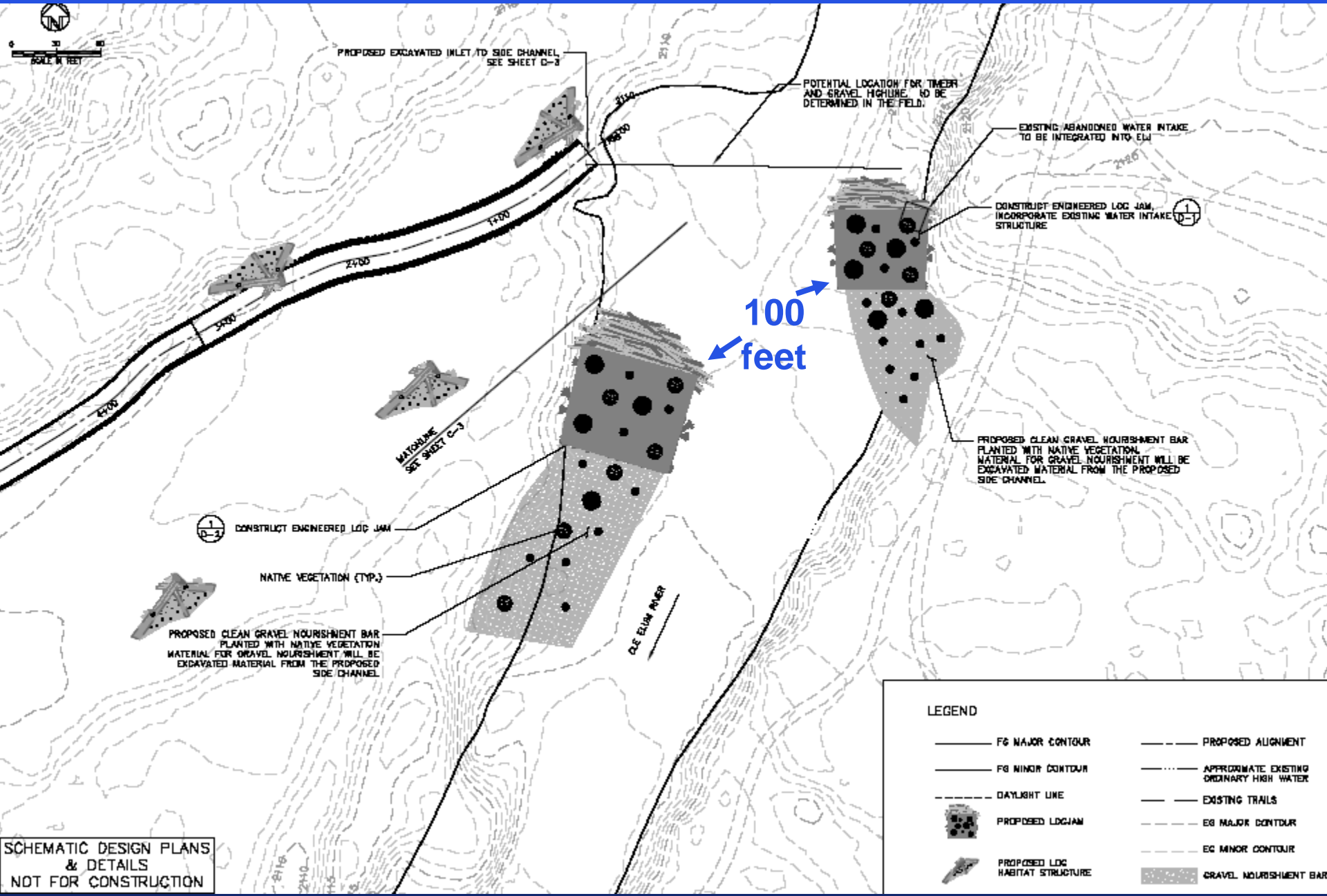
PROPOSED WEST BANK ENGINEERED
LOG JAM.
SEE SHEET C-4 FOR MORE INFORMATION

PROPOSED LOG
HABITAT STRUCTURES
SEE SHEET C-3 FOR
MORE INFORMATION



LEGEND

- | | |
|---|---|
|  PROPOSED AQUATIC HABITAT |  EXISTING PAVED ROAD |
|  FG MAJOR CONTOUR |  EXISTING GRAVEL ROAD |
|  FG MINOR CONTOUR |  EXISTING APPROXIMATE
ORDINARY HIGH WATER |
|  PROPOSED LOGJAM |  EXISTING CREEK |
|  PROPOSED LOG
HABITAT STRUCTURE |  EXISTING TRAILS |



SCHEMATIC DESIGN PLANS
 & DETAILS
 NOT FOR CONSTRUCTION

CLE ELUM DAM
CLE ELUM DAM
SPILLWAY

CLE ELUM RIVER

HWY 903

ROSLYN WATER
LINE BRIDGE

WINSTON RD

TO INTERSTATE-90

LOCATION OF PROPOSED
WINSTON RD. BRIDGE BY
OTHERS

DOVERIE CREEK

BAKERS RD.

NOTE:
CONTRACT LOCAL LOGGER TO SET UP
HIGHLINE TO WINCH LOGS ACROSS CLE ELUM
RIVER

Trees w/
rootwads
collected
from
uplands

PROPOSED
ACCESS ROAD
PROPOSED LOG
HABITAT STRUCTURES
PROPOSED
RE-ACTIVATED
SIDE CHANNEL

STAGING/STORAGE
AREA ±0.5 AC

STAGING/STORAGE
AREA ±1.5 AC

PROPOSED
ENGINEERED LOG
JAWS

Log Staging Areas

LEGEND

PROPOSED STAGING AREA

EXISTING GRAVEL ROAD

EXISTING CREEK

EXISTING ACCESS ROADS

PROPOSED ACCESS ROADS

PROPOSED LOGJAM

PROPOSED LOG
HABITAT STRUCTURE

LOG STAGING AREAS

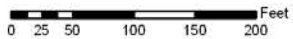
LOG STAGING AREA FOR
CLE ELUM RIVER ENGINEERED LOG JAMS

NOTES:

Stage logs **OUTSIDE** of all side channels and wet areas.

Log locations will be located in field and flagged prior to staging.

Access route not shown pending receipt of existing and proposed road locations.



SUNCADIA

FEDERALLY OWNED

Cle Elum River

CAMPGROUND

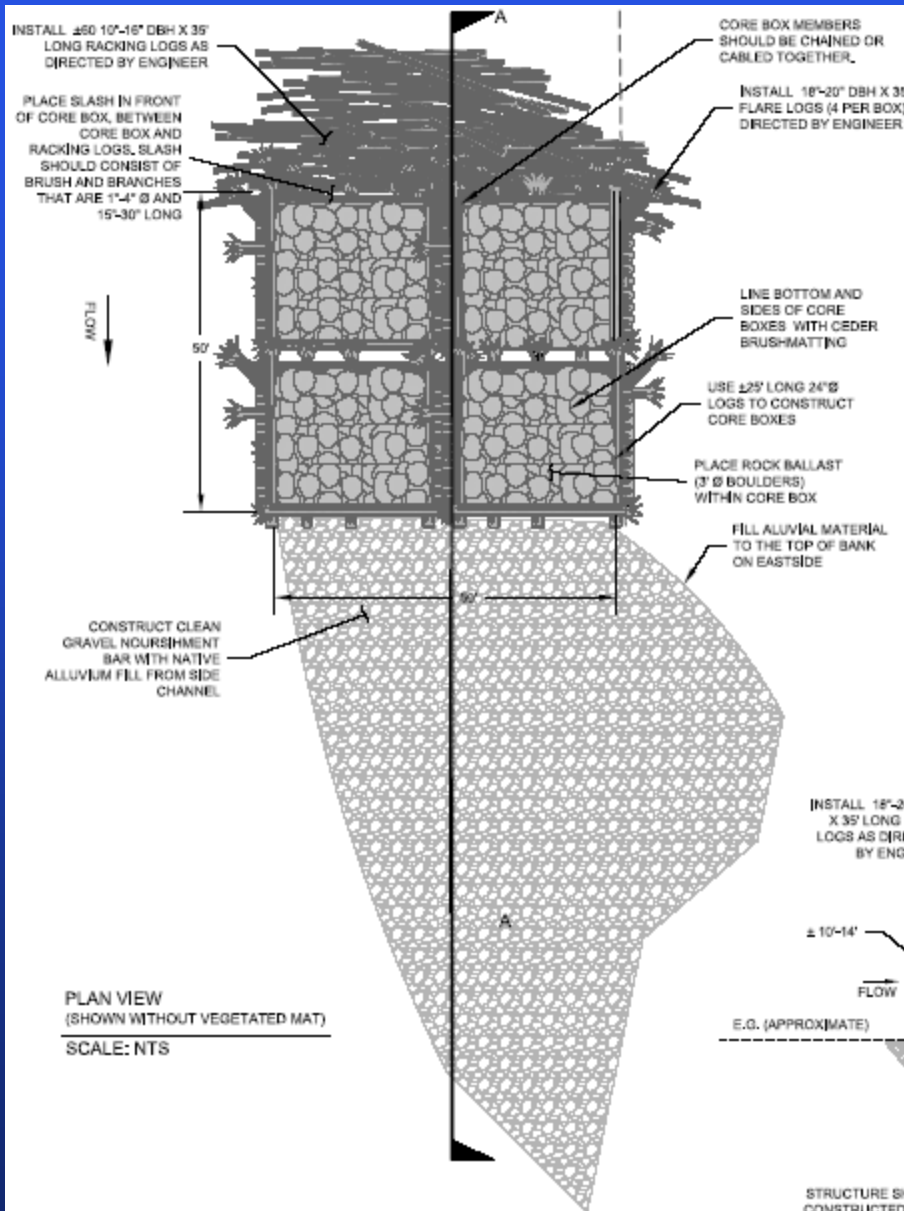
Stage logs a MINIMUM of 80 ft. away from the low point that runs along the north edge of the open area

STAGE LOGS

FEDERALLY OWNED

SUNCADIA

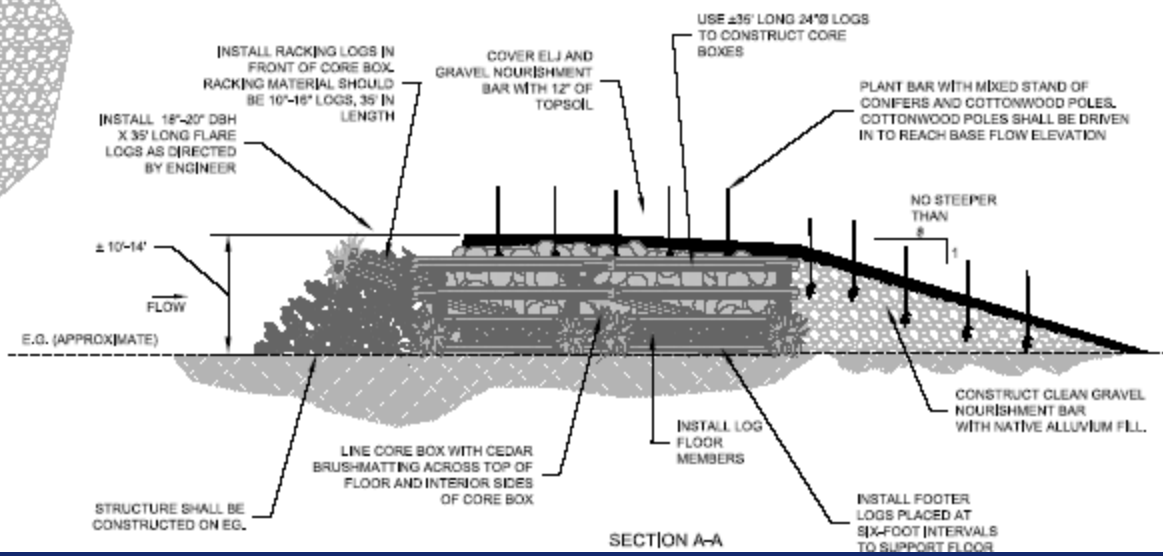
CENTER of Staging Area
GPS Coordinates:
-121.059560 Long
47.233850 Lat



NOTES:

1. LEAVE FRONT OF CORE BOX OPEN FOR PLACEMENT OF RACKING MATERIAL
2. NUMBER OF ADJACENT CORE BOXES USED WILL VARY ACCORDING TO SIZE OF CORE BOXES REQUIRED TO SPILT FLOW OR PROTECT VEGETATION
3. PLANT CLEAN GRAVEL NOURISHMENT BAR WITH A MIXTURE OF BLACK COTTONWOOD POSTS, RED CEDAR, AND DOUGLAS FIRS.
4. PLANT WILLOWS ALONG THE FLANKS OF THE CORE BOX SO THAT THEIR ROOTS BALLS ARE EXPOSED TO BASE FLOW.
5. CLEAN GRAVEL NOURISHMENT BAR EXTENTS MAY VARY.
6. RACKING MATERIAL SHALL CONSIST OF ± 60 INDIVIDUAL LOGS PER STRUCTURE. LOGS SHALL BE 10'-16" DBH. RACKING PLACEMENT SHALL BE PERFORMED IN CONJUNCTION WITH LOG LAYER PLACEMENT) TO ENSURE RACKING MEMBERS AND SLASH EXTEND THROUGH CORE BOX.
7. CAP ELJ AND GRAVEL NOURISHMENT BAR WITH 12" OF GRUBBED IMPORTED TOP SOIL TO THE EXTENTS SHOWN ON THE PLANS.
8. LIVE COTTONWOOD POLES SHALL BE 12" TO 18" ϕ DRIVEN INTO CLEAN GRAVEL NOURISHMENT BAR USING EXCAVATOR BUCKET TO A MAXIMUM OF 6 FEET AND A MINIMUM OF THE BASE FLOW ELEVATION.
9. TOP OF CORE BOX SHALL BE PLACED AT THE 100 YEAR FLOOD ELEVATION PLUS ± 6 FEET.
10. REFERENCE SHEET D-3 FOR CONSTRUCTION SEQUENCING.

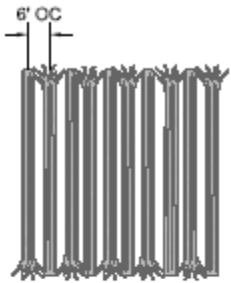
Core boxes filled with material excavated from pilot channel



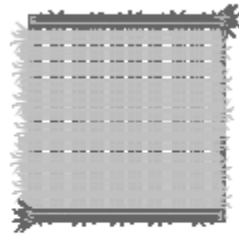
ENGINEERED LOG JAM - EAST BANK

1

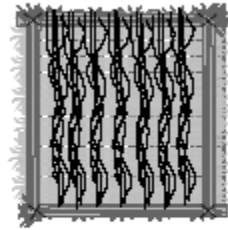
CONSTRUCTION SEQUENCE



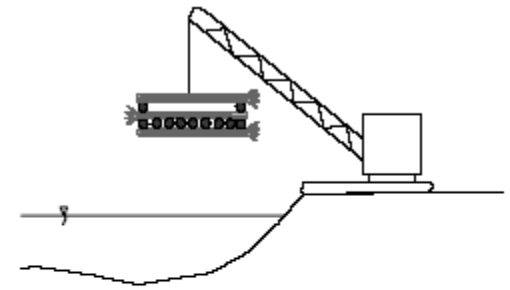
LAYER 1 - FOOTER LOGS



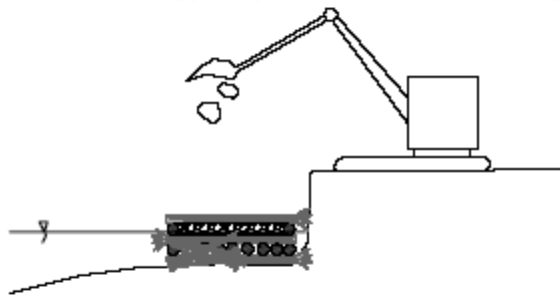
LAYER 2 - FLOOR MEMBERS



LAYER 3 - CORE BOX MEMBERS (CABLED) AND CEDAR BRUSHMATTING



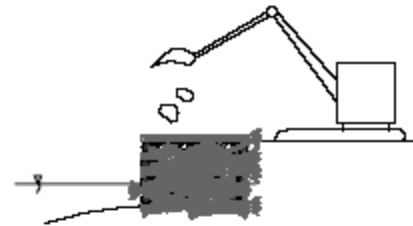
PLACE CORE BOX IN CHANNEL BED



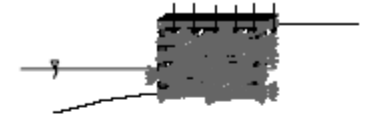
PLACE ROCK BALLAST IN CORE BOX
BEGIN PLACING FLARE LOGS AND RACKING LOGS



PLACE REMAINING LOG LAYERS



PLACE REMAINING BALLAST,
FLARE LOGS, AND RACKING LOGS



CONSTRUCT GRAVEL NOURISHMENT BAR
PLACE TOPSOIL AND REVEGETATE

ENGINEERED LOG JAM - CONSTRUCTION SEQUENCING

SCALE: NTS

1
D-3

NOTES:

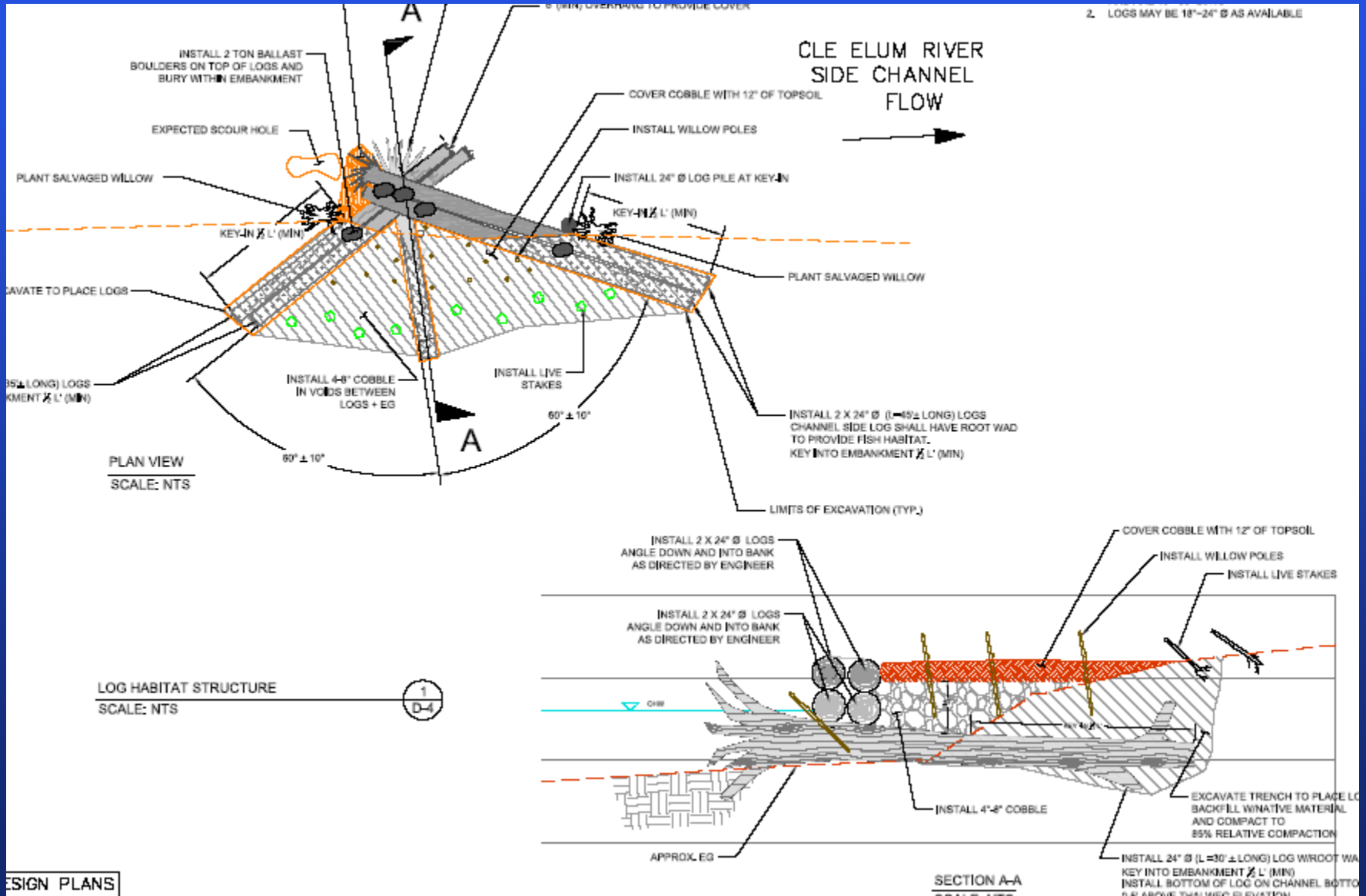
1. SEE SHEET D-1 FOR MORE INFORMATION REGARDING ELJ ON EAST BANK.
2. SEE SHEET D-2 FOR MORE INFORMATION REGARDING ELJ ON WEST BANK.

CONSTRUCTION PHASING:

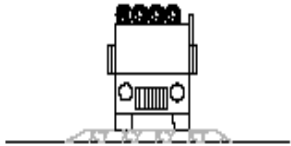
1. CLEAR AND GRUB SALVAGE TREES LESS THAN 30 FT. IN HEIGHT FOR REPLANTING ON BARS.
2. LOG DELIVERY FOR SITE 1(WEST BANK).
3. INSTALL HIGHLINE.



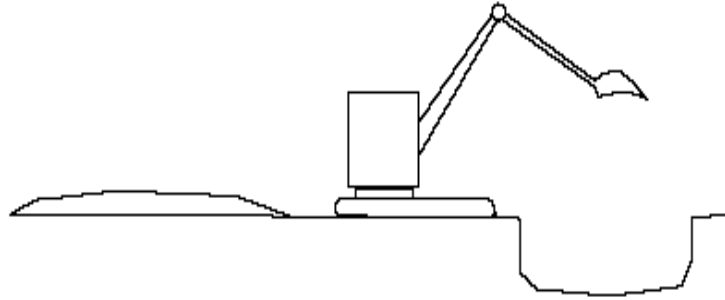
HABITAT FEATURES IN NEW CHANNEL



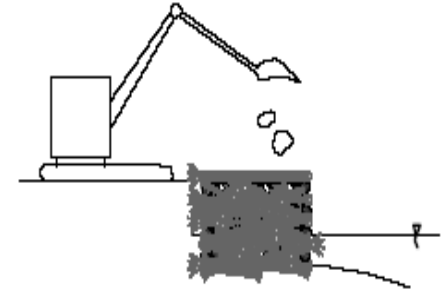
WORK PLAN



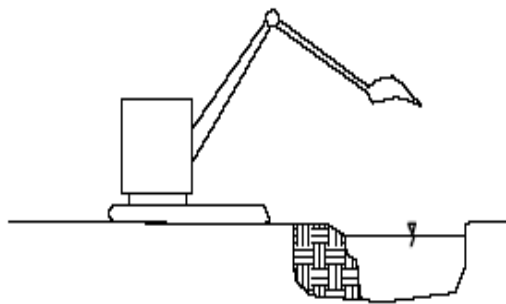
PHASE 1 - MOBILIZE TO SITE
SET UP STAGING AREAS
CONSTRUCT ACCESS ROADS
REFERENCE SHEET C-5



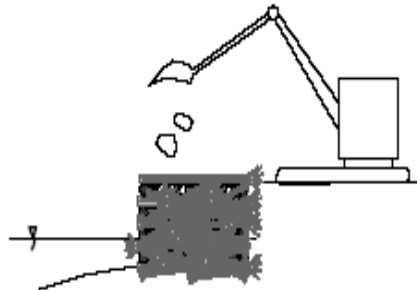
PHASE 2 - EXCAVATE SIDE CHANNEL INLET
SPREAD EXCAVATED MATERIAL LOCALLY
LEAVE EARTHEN PLUG IN PLACE AT UPSTREAM END
DURING ELJ CONSTRUCTION
CONSTRUCT LOG STRUCTURES IN SIDE CHANNEL
REFERENCE SHEET C-3



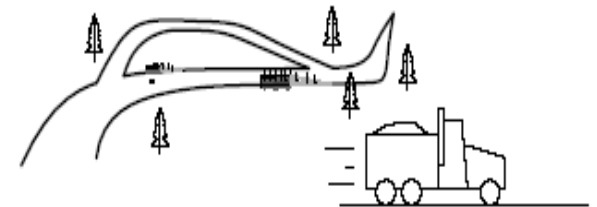
PHASE 3 - CONSTRUCT ELJ ON WEST BANK
REFERENCE SHEET C-4



PHASE 4 - EXCAVATE SIDE CHANNEL PLUG
AND ALLOW FLOW TO ENTER SIDE CHANNEL



PHASE 5 - CONSTRUCT ELJ ON EAST BANK
REFERENCE SHEET C-4



PHASE 6 - SITE CLEANUP AND DEMOBILIZATION

ELJ Location

PROPOSED:

MAINSTEM – 2,562 cfs

SIDE CHANNEL – 618 cfs

21 July 07

Flow =
3,180 cfs

Stage =
3.25



ELJ Location

2 Sept 07

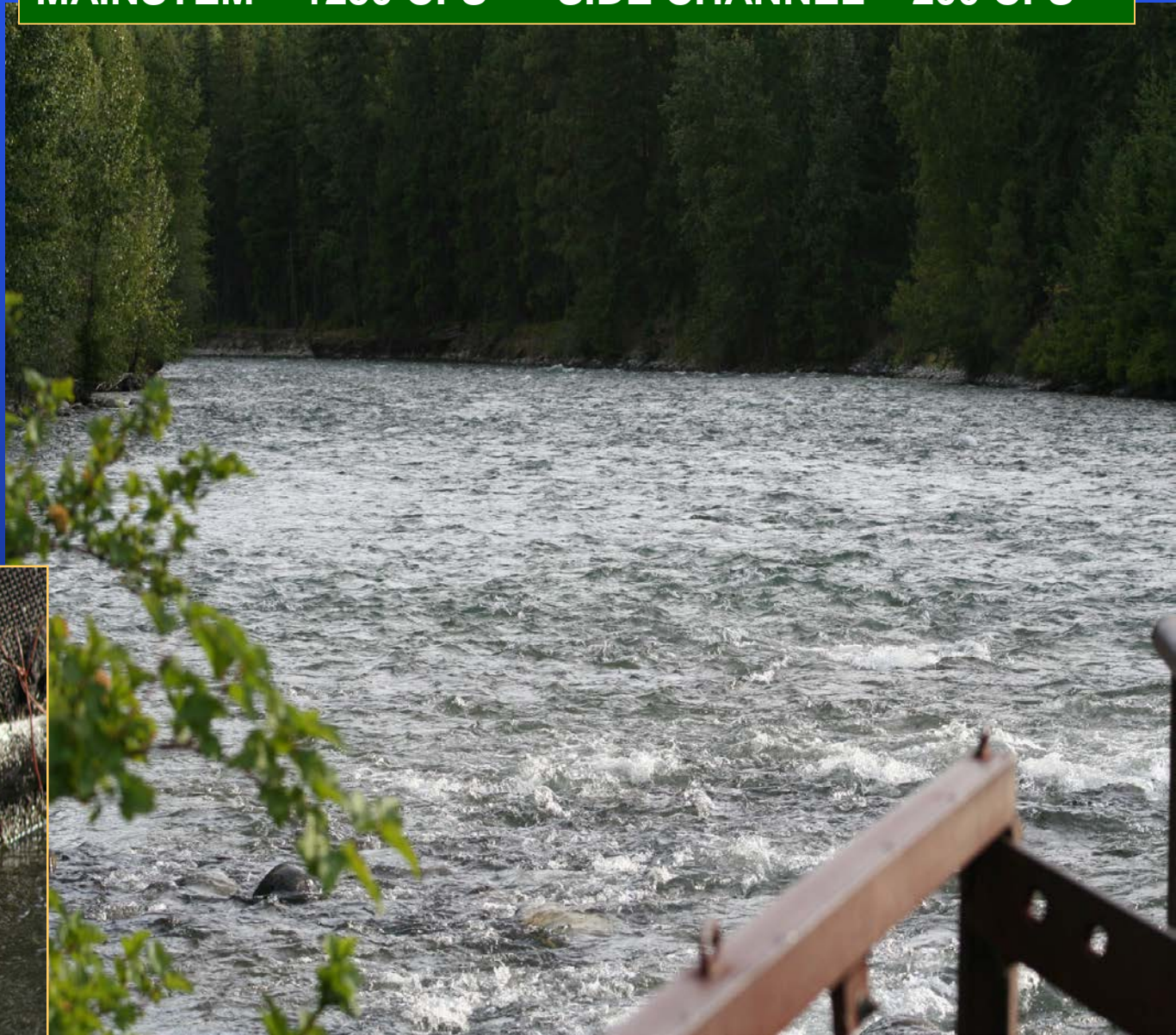
Flow =
1,450 cfs

Stage =
2.16

PROPOSED:

MAINSTEM – 1250 CFS

SIDE CHANNEL – 200 CFS



ELJ Location

PROPOSED:

MAINSTEM – 107 cfs

SIDE CHANNEL – 93 cfs

23 Sep 2007

Flow =
213 cfs

Stage =
0.34



