VERMONT

Vermont Department of Environmental Conservation
Watershed Management Division
1 National Life Drive, Main 2
Montpelier VT 05620-3522
www.watershedmanagement.vt.gov

Agency of Natural Resources

[phone] 802-828-1535
[fax] 802-828-1544

AUTHORIZATION TO CONDUCT STREAM ALTERATION ACTIVITIES

Pursuant to Section C.2.2 of the VT Stream Alteration General Permit (Reporting activities not requiring an application)

Project Number: **SA-06-** 003 **-2015**

Applicant Name: U.S. Forest Service

Mailing Address: 99 Ranger Rd., Rochester VT 05757 Phone: (802) 747-6738

Project Location W. Branch of Wht. River, near CCC Camp Email: dmckinley@fs.fed.us NWketcham@fs.fed.us

The Secretary of the Vermont Agency of Natural Resources (VT ANR) has determined that:

1. This project authorizes Restoration of natural channel conditions and floodplain connection, work due to T.S. Irene gravel extraction
2. The proposed activity is eligible for coverage under the VT ANR Stream Alteration General Permit. C.2.2.6
3. The proposed activity will meet the terms and conditions of the General Permit provided:
   a) The project will be completed and approved as shown on the plan dated 05/29/2014, prepared by USFS, and approved by the Vermont Agency of Natural Resources.
   b) The project will not adversely affect the public safety by increasing flood hazards.
   c) The project will not significantly damage fish life or wildlife.
   d) The project will not significantly damage the rights of riparian owners.
   e) The project will not obstruct the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction.
   f) The project is conducted in a manner which minimizes or avoids any discharge of sediment or other pollutants to surface waters in violation of the VT Water Quality Standards.
   g) The ANR River Management Engineer is notified by phone or email when construction begins and when the project is complete.
   h) In-stream working dates for all GP activities are from July 1st through October 1st; any in-stream work outside these dates will require an Individual Stream Alteration Permit authorization by the River Management Engineer.
   i) This authorization has been posted for three days public comment. This authorization constitutes final approval.

If there are any changes in the project plan or deviation in construction from the plan, the Permittee must notify the River Management Engineer immediately.

If the project is constructed as you have described, as shown on the above referenced approved plans and according to the above conditions, there is no reason to expect any violation of Vermont Water Quality Standards.

Signed this 26th day of January, 2015
David K. Mears, Commissioner
Department of Environmental Conservation

This permit expires October 1, 2015.

by: _____
Jaron Borg, River Management Engineer

VERMONT

Vermont Department of Environmental Conservation
Watershed Management Division
Barre Regional Office
5 Perry Street, Suite 80
Barre, VT 05641
www.watershedmanagement.vt.gov

Agency of Natural Resources

[fax] 802-476-0131
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AUTHORIZATION TO CONDUCT STREAM ALTERATION ACTIVITIES

Pursuant to Section C.2.2 of the VT Stream Alteration General Permit (Reporting activities not requiring an application)

Project Number: **SA-CN-** 134 **-2014**

Applicant Name: U.S. Forest Service c/o Dan McKinley

Mailing Address: 99 Ranger Road, Rochester VT 05767 Phone: 747-6738

Project Location West Branch of White River near the CCC Camp. Email: dmckinley@fs.fed.us nwketcham@fs.fed.us

The Secretary of the Vermont Agency of Natural Resources (VT ANR) has determined that:

1. This project authorizes the restoration of natural channel conditions and floodplain connection, work due to T.S. Irene gravel extraction.
2. The proposed activity is eligible for coverage under the VT ANR Stream Alteration General Permit C.2.2.6
3. The proposed activity will meet the terms and conditions of the General Permit provided:
   a) The project will be completed and approved as shown on the plan dated 5/29/2014, prepared by VSFS, and approved by the Vermont Agency of Natural Resources.
   b) The project will not adversely affect the public safety by increasing flood hazards.
   c) The project will not significantly damage fish life or wildlife.
   d) The project will not significantly damage the rights of riparian owners.
   e) The project will not obstruct the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction.
   f) The project is conducted in a manner which minimizes or avoids any discharge of sediment or other pollutants to surface waters in violation of the VT Water Quality Standards.
   g) The ANR River Management Engineer is notified by phone or email when construction begins and when the project is complete. A final construction inspection is require for all culvert and bridge projects.
   h) In-stream working dates for all GP activities are from July 1st through October 1st; any in-stream work outside these dates will require an Individual Stream Alteration Permit authorization by the River Management Engineer.
   i) This authorization has been posted for three days public comment. This authorization constitutes final approval.
   j) Special Conditions: N/A

If there are any changes in the project plan or deviation in construction from the plan, the Permittee must notify the River Management Engineer immediately.

If the project is constructed as you have described, as shown on the above referenced approved plans and according to the above conditions, there is no reason to expect any violation of Vermont Water Quality Standards.

David K. Mears, Commissioner
Department of Environmental Conservation

by: _____ Dated 6/26/14
Patrick Ross, P.E., River Management Engineer

Attachment 1 – Project Summary

West Branch White River Restoration - Phase I
Vermont Stream Alteration – Review Documents
Project Summary

Proposed Project Purpose

The purpose of this project is to restore the WB White River geomorphic processes, restore the river's functionality as suitable fish and aquatic organism habitat and improve recreational opportunities. Additionally, a restored river will be better able to respond to normal high water events and provide increased resiliency in larger-than annual flood events.

The need for this project arose from unauthorized gravel mining in the WB White River at two sites, one in the vicinity of the former Civilian Conservation Corps Camp, now called the CCC Camp recreation site, and the other approximately 1,000 feet downstream of the CCC camp. Prior to Tropical Storm (TS) Irene, this reach of river had many characteristics of a stable streambed and good in-stream habitat, including large, deep pools, good hiding and thermal cover for fish and other aquatic and semi-aquatic organisms, stable banks, and areas of both fast-water and slow-water habitats.

The damage caused by TS Irene in August 2011 and the subsequent gravel mining turned these sections of the river into a very wide and shallow, plain-bedded stream, with sections of decreased bed slope. These changes have created a substantially shallower stream. The river was also separated in sections from its floodplain by the bulldozer work, resulting in the detrimental effects from accelerated water speed and continual erosion of stream banks.

The proposed project activities form a suite of watershed restoration projects that will more rapidly advance the restoration of the WB White River to functional aquatic and riparian habitats, provide greater flood resiliency than if left to the normal, typical long-term geomorphological stream, floodplain, and riparian re-establishment processes.

Due to funding limitations the project will be phased, with Phase 1 constructing the channel to station 17+00 and constructing the wetland channel. Phase 2 will construct the remaining channel from station 17+00 to station 34+00 (see site plans in Attachment No. 2 for station references). Construction is expected to begin in late summer 2014 and end in the fall of 2015.

Nature of Activity

In-Stream and Floodplain Structure

Engineered large wood structures will be placed in/along the banks of the WB White River. These structures will be made of large trees, many with rootwads still attached and all 16 inches or greater in diameter with boles approximately 40 to 60 feet long. The trees will be placed in trenches created with an excavator, with the rootwads set at an angle facing upstream. Some of the boles (tree trunks) will have additional large trees on top of them in the trench, with or without rootwads, and be anchored with the excavated soil. Other trees will be placed along the bank face woven into the embedded key

logs. The upstream facing rootwads are intended to reduce the potential for sediment delivery by intervening between the bank and the water flow and reducing the velocity of the water along the banks, and creating energy dissipation in the constructed pool. The large wood structures will also collect other woody debris, particularly during the course of flood events. Under the water, the wood structures will provide excellent overwintering and cover fish habitat.

Mounds of gravel abandoned in the channel by the gravel mining operations will be used to bring the channel back into a narrower cross section similar to what was in place prior to TS Irene. Large boulder-sized rocks will also be placed in the streambed, with similar intent of reducing the velocity of the water flow and providing a different type of fish habitat.

The stream channel dimensions will be re-established to those prior to TS Irene and based on hydraulic geometry and hydraulic modeling. Channel sinuosity will also be re-established to help reduce the velocity of the water and direct the stream course away from homes where possible.

The design plans provided in Attachment No. 2 provide the proposed locations for the large wood structures and also provide profile views illustrating existing river profiles versus the design profile.

Upstream of the CCC Camp

A large wedge of sediment that has built up since TS Irene will be reduced in size, and large boulder-sized rocks will also be placed in the streambed, with the intent of reducing the velocity of the water flow and providing fish habitat.

A berm made following TS Irene that is blocking the entry of a side channel will be re-opened for the river to have access to its floodway and floodplain. The re-opening of the side channel also will provide a refuge for aquatic organisms to escape high water from annual snow melt-off in spring and flood flows. This side channel also provides water to a pond that serves as important off-channel fish rearing habitat and stores flood waters facilitating the slower release of water following high water events. The berm is located at station 2+00 and is shown on Sheet S4 in Attachment No. 2.

Perennial Channel and Wetland Creation

A new wetland pond and groundwater channel will be created in the uplands on the south side of the WB White River project area. This channel will be approximately 3 feet wide and about 1 foot deep. The channel will be excavated to a depth of 4 to 7 feet deep depending on the location of the channel in the uplands. The channel will intercept ground water flow that will provide cool water refugia for fish and other aquatic organisms at its outflow into the WB White River. Slow-water habitat for young fish rearing and other slow-moving water dependent species will be created by this new channel. The channel will terminate into a constructed wetland pond that is the low area of the existing hay field, thereby creating greater habitat diversity. The location of this re-rerouted ditch is shown on Sheet S6 in Attachment No. 2.

River Access Trail

The river access trail will be approximately 0.10 mile long. The trail will be approximately 3 to 4 feet wide, and will be at low gradient and have a gravel surface that will meet the design and requirements of the Forest Service Trail Accessibility Guidelines.

Interpretive Signs

Existing signs giving information about the history of the CCC Camp and other activities that have occurred at the CCC Camp location are worn and have out of date information. The Interpretive Site will be moved to the front of the CCC Camp shop building, near where the new river access trail will begin. The existing signs will remain until it is determined how to integrate information about the CCC Camp history, the effects of TS Irene, and the watershed restoration elements that will be established at the CCC Camp and elsewhere along the WB White River.

Construction Considerations

The project will utilize the existing channel and side channel to construct clean water bypass facilities. See sheet 19 of the plans located in Attachment No. 2. The construction areas will be isolated and the turbid water will be pumped out of the construction area to the uplands where they will be filtered by sediment bags and through natural infiltration. The outflow hose will be placed approximately 200 feet from the edge of the river.

Best management practices (BMP's) will be applied to ensure oil, pollution and sediment controls are established. Floating oil boom will be placed downstream of all work areas in the event of an oil leak or spill. Spill clean-up kits will be stationed adjacent to the work site for immediate response.

No additional mitigation should be necessary. The creation of a new wetland will yield a net gain of 0.67 acres of wetland and groundwater channel.

Attachment 2 – Engineering Plans

US Department of Agriculture
Forest Service

Region Nine

WEST BRANCH WHITE RIVER RESTORATION PHASE 1

Green Mountain National Forest
Rochester Ranger District
Vermont

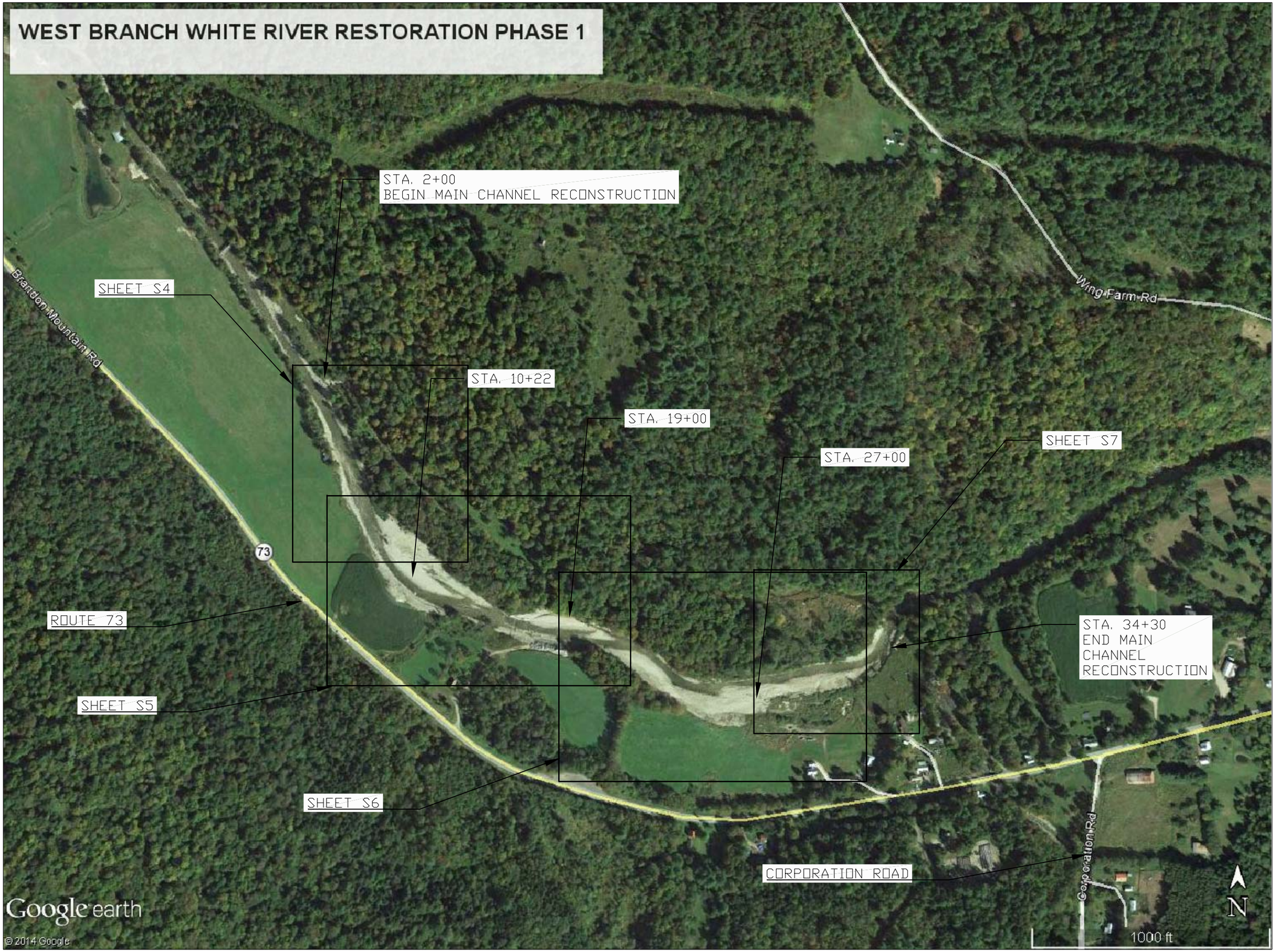
PROJECT LOCATION

SHEET	SHEET TITLE
1	COVERSHEET
2	VICINITY MAP PLAN BOUNDARIES
3	PROJECT AREA PLAN
4	MAIN PLAN VIEW STA. 0+00 TO 9+00
5	MAIN PLAN VIEW STA. 9+00 TO 21+00
6	MAIN PLAN VIEW STA. 21+00 TO 32+00
7	MAIN PLAN VIEW STA. 32+00 TO 38+00
8	TRIBUTARY PLAN VIEW
9	MAIN PROFILE VIEW STA. 5+00 TO 26+00
10	MAIN PROFILE VIEW STA. 26+00 TO 35+00
11	TRIBUTARY PROFILE AND CROSS SECTIONS
12	MAIN CHANNEL CROSS SECTION TEMPLATES
13	APEX LOGJAM DETAILS
14	STA. 27+00 ENGINEERED LOG JAM DETAIL
15	ENGINEERED LOG JAM TYPICAL PLAN VIEW (MULTIFACETED COMPLEX)
16	ENGINEERED LOG JAM TYPICAL PROFILE VIEW
17	ENGINEERED LOG JAM CONCEPTUAL LAYOUT
18	ENGINEERED LOG JAM WITH POOL RIFFILE PLAN LAYOUT
19	MAIN CHANNEL DEWATERING PLAN
20	BANK CONSTRUCTION DETAIL
21	GENDRON PROPERTY WORK

Project Manager _____ Date _____

Approved: Forest Supervisor _____ Date _____

Reviewed Forest Engineer _____ Date _____



General Notes		
4		
3		
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No.	Revision/Issue	Date

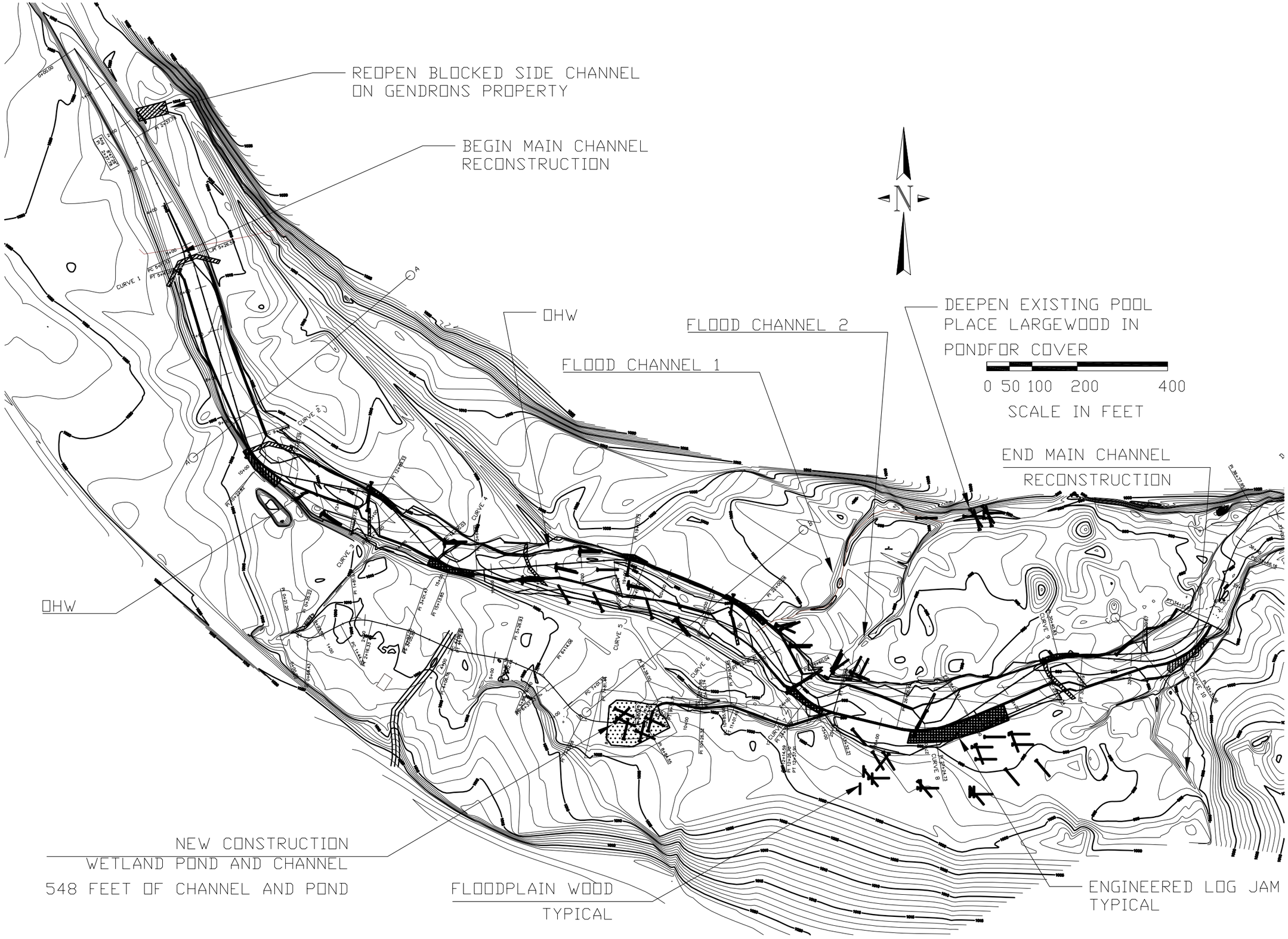
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
R-9
EASTERN REGION

Project Name
WEST BRANCH WHITE RIVER RESTORATION PHASE 1
GREEN MOUNTAIN N.F.
ROCHESTER MIDDLEBURY RANGER DISTRICT

DESIGNER
ROBERT GUBERNICK R.G.
WATERSHED RESTORATION GEOLOGIST
REGION 9 TECHNICAL SERVICES TEAM

Drawing Title
VICINITY MAP - PLAN SHEET BOUNDARY

Drawn R.GUBERNICK	Project
Checked	Drawing No.
CAD File No. 3C_MAIN AND TRIB_PLAN_VIEW_2014_0313	S 2
Date 5/29/2014	
Scale	



General Notes

No.	Revision/Issue	Date
4		
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U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
R-9
EASTERN REGION

Project Name
WEST BRANCH WHITE RIVER
RESTORATION PHASE 1
GREEN MOUNTAIN N.F.
ROCHESTER MIDDLEBURY RANGER DISTRICT

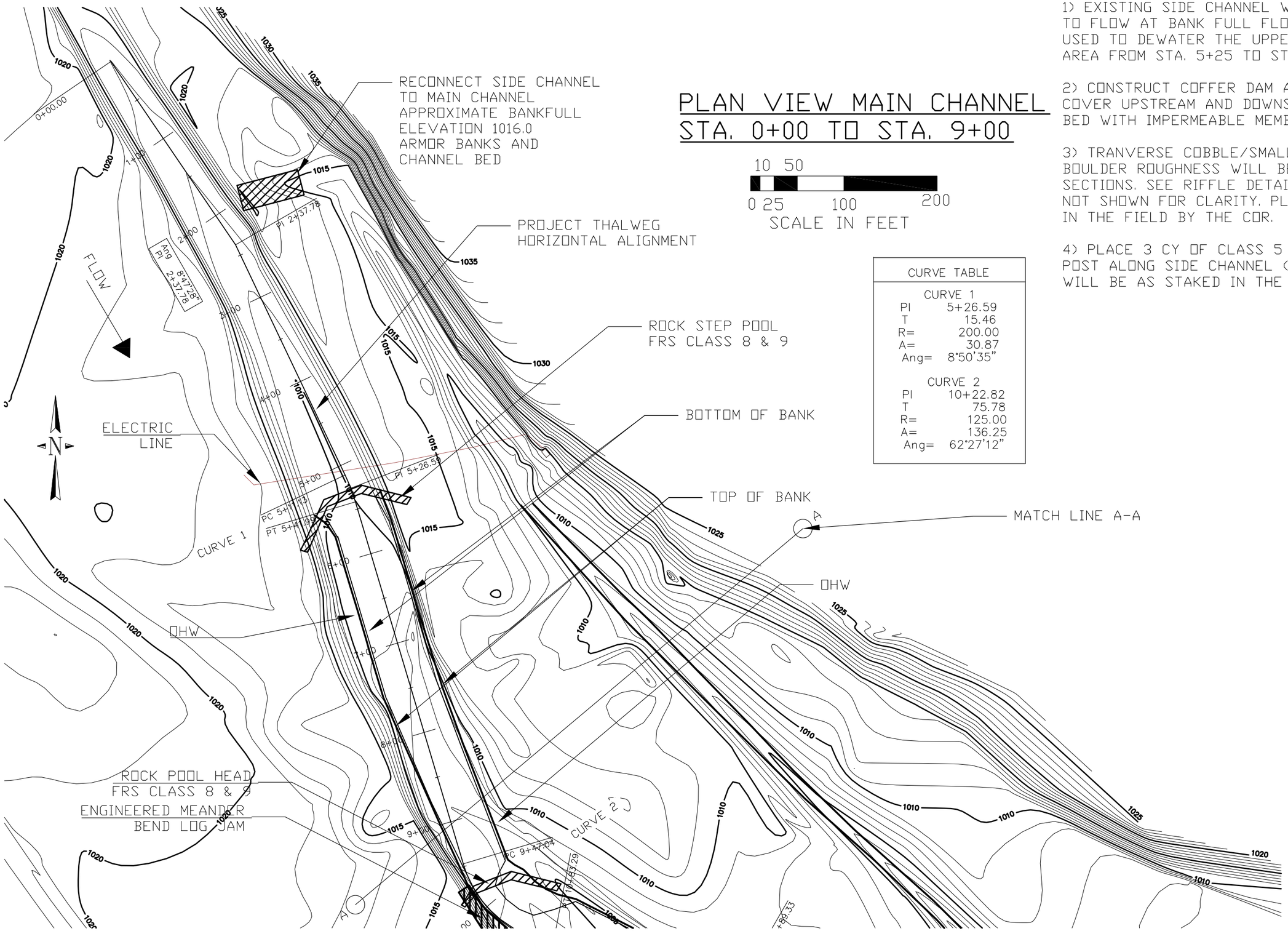
DESIGNER
ROBERT GUBERNICK R.G.
WATERSHED RESTORATION GEOLOGIST
REGION 9 TECHNICAL SERVICES TEAM

Drawing Title
PROJECT AREA PLAN

Drawn R.GUBERNICK	Project
Checked	Drawing No.
CAD File No. 3C_MAIN AND TRIB_PLAN_VIEW_2014_0303	S 3
Date 5/29/2014	
Scale	

PLAN VIEW MAIN CHANNEL
STA. 0+00 TO STA. 9+00

10 50
0 25 100 200
SCALE IN FEET



CURVE TABLE	
CURVE 1	
PI	5+26.59
T	15.46
R=	200.00
A=	30.87
Ang=	8°50'35"
CURVE 2	
PI	10+22.82
T	75.78
R=	125.00
A=	136.25
Ang=	62°27'12"

NOTES:

1) EXISTING SIDE CHANNEL WILL BE REOPENED TO BEGIN TO FLOW AT BANK FULL FLOWS. THIS CHANNEL WILL BE USED TO DEWATER THE UPPER HALF OF THE PROJECT AREA FROM STA. 5+25 TO STA 17+50

2) CONSTRUCT COFFER DAM AT STA 2+15 AND STA 17+30. COVER UPSTREAM AND DOWNSTREAM FACE AND CHANNEL BED WITH IMPERMEABLE MEMBRANE (WATER PROOF TARPS)

3) TRANVERSE COBBLE/SMALL BOULDER RIBS AND BOULDER ROUGHNESS WILL BE CONSTRUCTED IN RIFFLE SECTIONS. SEE RIFFLE DETAILS. RIBS AND ROUGHNESS NOT SHOWN FOR CLARITY. PLACEMENT WILL BE STAKED IN THE FIELD BY THE COR.

4) PLACE 3 CY OF CLASS 5 RIPRAP AT EACH TAP LINE POST ALONG SIDE CHANNEL (7 REQUIRED). PLACEMENT WILL BE AS STAKED IN THE FIELD BY THE COR.

General Notes

No.	Revision/Issue	Date
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U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
R-9
EASTERN REGION

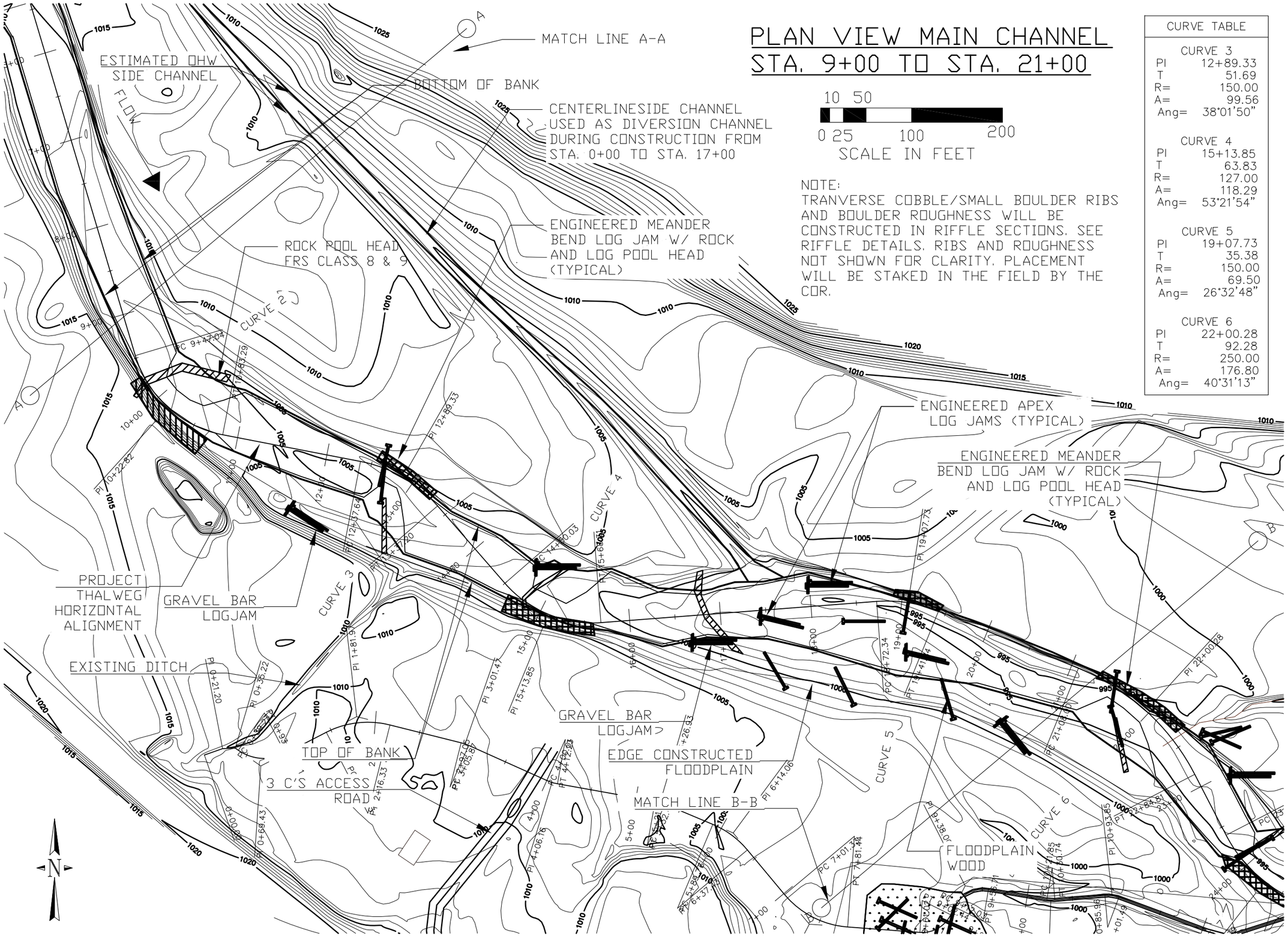
Project Name
WEST BRANCH WHITE RIVER RESTORATION PHASE 1
GREEN MOUNTAIN N.F.
ROCHESTER MIDDLEBURY RANGER DISTRICT

DESIGNER
ROBERT GUBERNICK R.G.
WATERSHED RESTORATION GEOLOGIST
REGION 9 TECHNICAL SERVICES TEAM

Drawing Title
PLAN VIEW S 0+00 TO S 9+00

Drawn R.GUBERNICK	Project
Checked	Drawing No.
CAD File No. 3C_MAIN AND TRIB_PLAN_VIEW_2014_R313	S 4
Date 3/14/2014	
Scale 1=100	

PLAN VIEW MAIN CHANNEL
STA. 9+00 TO STA. 21+00



10 50
0 25 100 200
SCALE IN FEET

NOTE:
TRANVERSE COBBLE/SMALL BOULDER RIBS AND BOULDER ROUGHNESS WILL BE CONSTRUCTED IN RIFFLE SECTIONS. SEE RIFFLE DETAILS. RIBS AND ROUGHNESS NOT SHOWN FOR CLARITY. PLACEMENT WILL BE STAKED IN THE FIELD BY THE COR.

CURVE TABLE	
CURVE 3	
PI	12+89.33
T	51.69
R=	150.00
A=	99.56
Ang=	38°01'50"
CURVE 4	
PI	15+13.85
T	63.83
R=	127.00
A=	118.29
Ang=	53°21'54"
CURVE 5	
PI	19+07.73
T	35.38
R=	150.00
A=	69.50
Ang=	26°32'48"
CURVE 6	
PI	22+00.28
T	92.28
R=	250.00
A=	176.80
Ang=	40°31'13"

NOTES:

1) EXISTING CHANNEL WILL BE DIVERTED AT STA. 2+00 INTO EXISTING SIDE CHANNEL FOR CONSTRUCTION BETWEEN STA. 5+25 AND STA. 17+50

2) CONSTRUCT A DIVERSION CHANNEL ALONG RIVER RIGHT BANK FROM STA. 17+50 TO STA. 23+50. THIS SECTION WILL BE STAGED CONSTRUCTION. THE THALWEG WILL BE CONSTRUCTED FIRST THEN THE RIGHT HALF OF THE CHANNEL.

3) SIDE CHANNEL IS ONLY GROUNDWATER FLOW EXCEPT DURING OVER BANK EVENTS

General Notes

No.	Revision/Issue	Date
4		
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FOREST SERVICE
R-9
EASTERN REGION

Project Name
WEST BRANCH WHITE RIVER RESTORATION PHASE 1
GREEN MOUNTAIN N.F.
ROCHESTER MIDDLEBURY RANGER DISTRICT

DESIGNER
ROBERT GUBERNICK R.G.
WATERSHED RESTORATION GEOLOGIST
R9 TECHNICAL SERVICES TEAM

Drawing Title
PLAN VIEW S 9+00 TO S 21+00

Drawn R.GUBERNICK	Project
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Date 3/13/2014	
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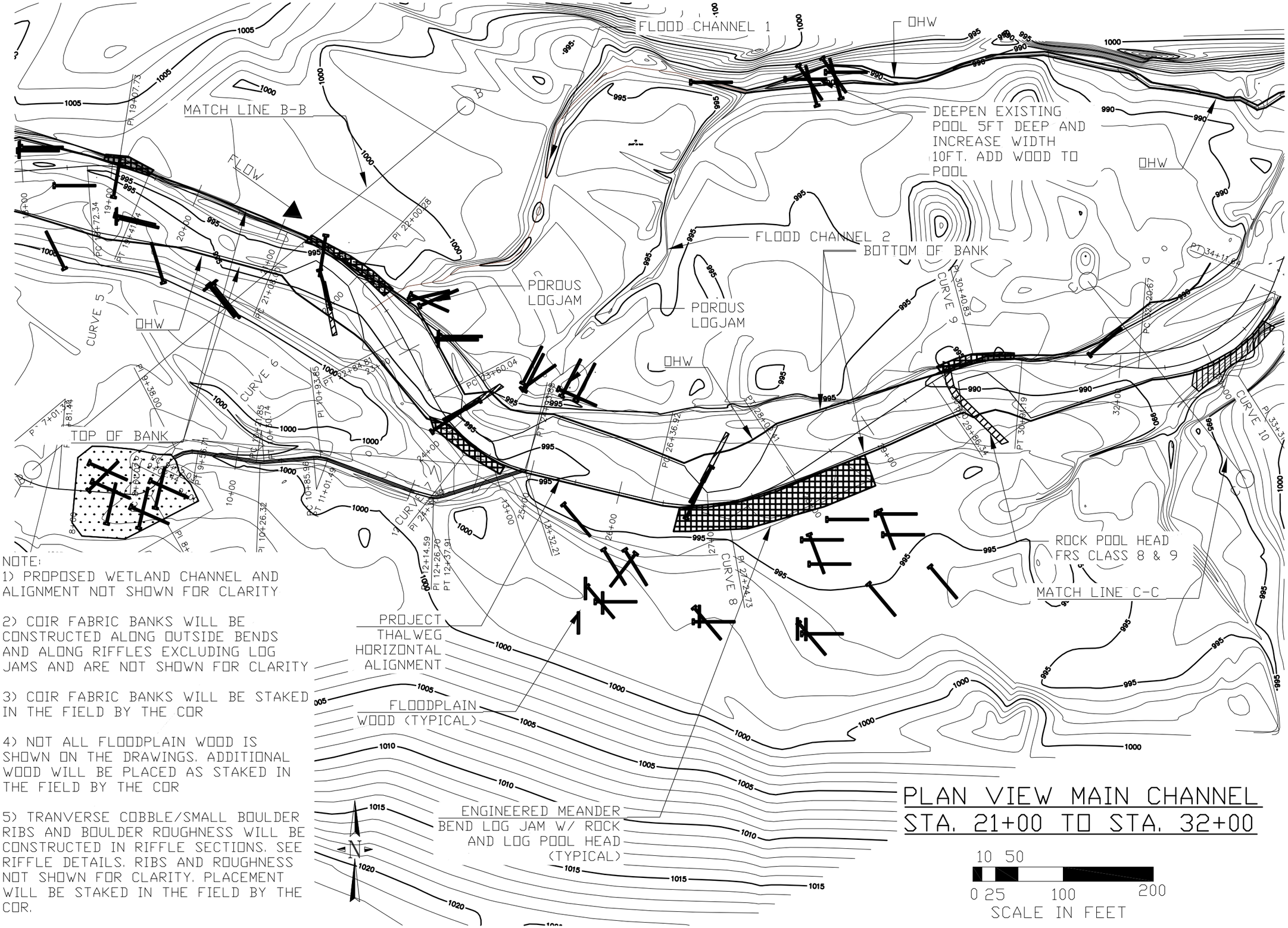

PLAN VIEW MAIN CHANNEL
STA. 21+00 TO STA. 32+00

NOTE:
1) PROPOSED WETLAND CHANNEL AND ALIGNMENT NOT SHOWN FOR CLARITY

2) COIR FABRIC BANKS WILL BE CONSTRUCTED ALONG OUTSIDE BENDS AND ALONG RIFFLES EXCLUDING LOG JAMS AND ARE NOT SHOWN FOR CLARITY

3) COIR FABRIC BANKS WILL BE STAKED IN THE FIELD BY THE COR

4) NOT ALL FLOODPLAIN WOOD IS SHOWN ON THE DRAWINGS. ADDITIONAL WOOD WILL BE PLACED AS STAKED IN THE FIELD BY THE COR

5) TRANVERSE COBBLE/SMALL BOULDER RIBS AND BOULDER ROUGHNESS WILL BE CONSTRUCTED IN RIFFLE SECTIONS. SEE RIFFLE DETAILS. RIBS AND ROUGHNESS NOT SHOWN FOR CLARITY. PLACEMENT WILL BE STAKED IN THE FIELD BY THE COR.

CURVE TABLE	
CURVE 7	
PI	24+31.39
T	71.35
R=	156.00
A=	133.84
Ang=	49°09'24"
CURVE 8	
PI	27+24.73
T	87.81
R=	200.00
A=	165.49
Ang=	47°24'34"
CURVE 9	
PI	30+40.83
T	54.49
R=	156.00
A=	104.85
Ang=	38°30'34"
CURVE 10	
PI	33+31.96
T	111.30
R=	148.36
A=	190.98
Ang=	73°45'12"

NOTE: OHW FOR FLOOD CHANNEL REPRESENTS GROUNDWATER FLOW FROM HILLSIDE SEEPS

General Notes

No.	Revision/Issue	Date
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U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
R-9
EASTERN REGION

Project Name
WEST BRANCH WHITE RIVER RESTORATION PHASE 1
GREEN MOUNTAIN N.F.
ROCHESTER MIDDLEBURY RANGER DISTRICT

DESIGNER
ROBERT GUBERNICK
WATERSHED RESTORATION GEOLOGIST
R9 TECHNICAL SERVICES TEAM

Drawing Title
PLAN VIEW S 21+00 TO S 32+00

Drawn R.GUBERNICK	Project
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Date 3/13/2014	
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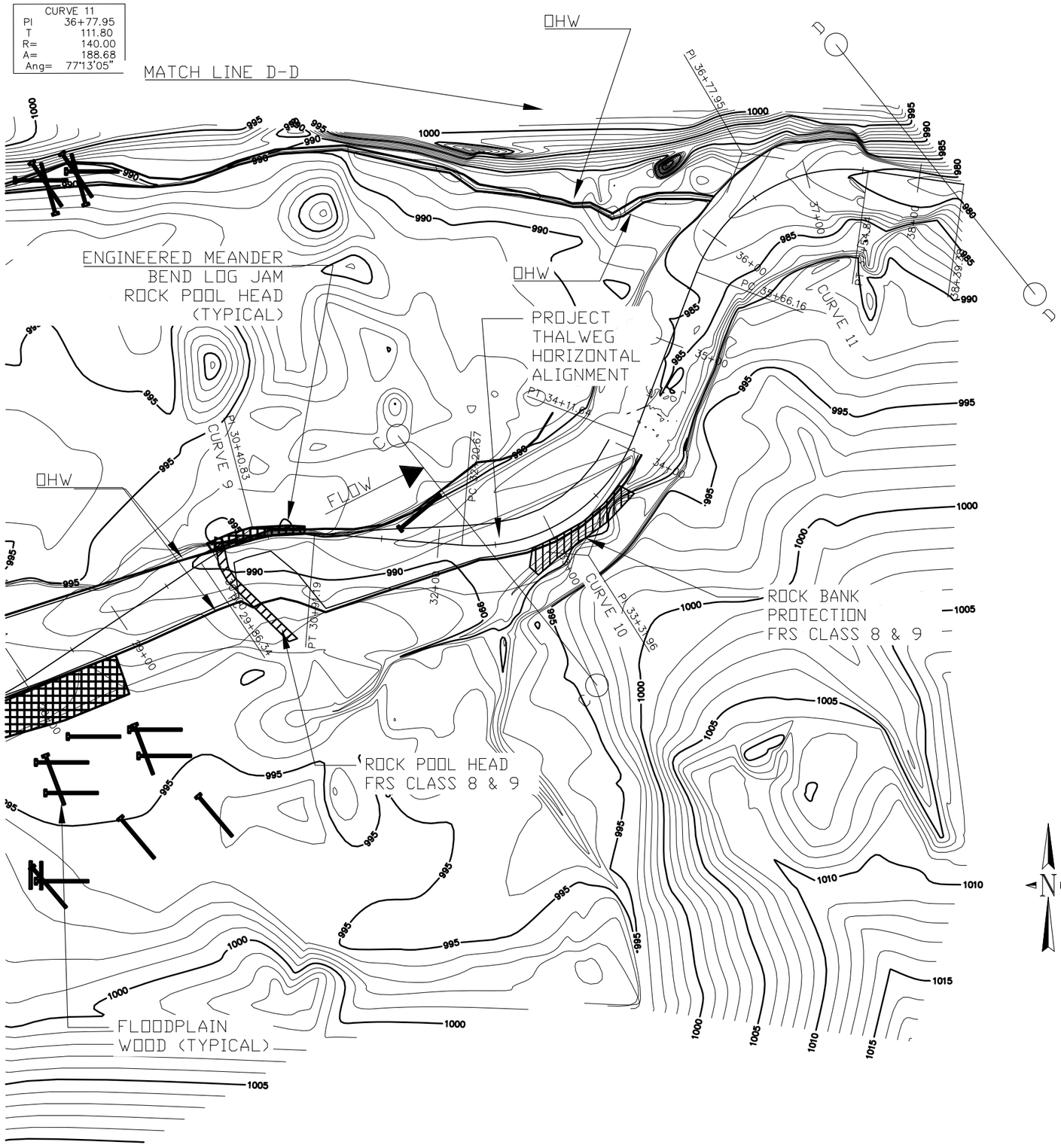

NOTE:

1) END OF INCHANNEL CONSTRUCTION IS STA. 34+05

2) COIR FABRIC BANKS WILL BE CONSTRUCTED ALONG OUTSIDE BENDS AND ALONG RIFFLES EXCLUDING LOG JAMS AND ARE NOT SHOWN FOR CLARITY

3) COIR FABRIC BANKS WILL BE STAKED IN THE FIELD BY THE COR

4) NOT ALL FLOODPLAIN WOOD IS SHOWN ON THE DRAWINGS. ADDITIONAL WOOD WILL BE PLACED AS STAKED IN THE FIELD BY THE COR

5) LOG JAM AT ~STA. 30+40 AND BANK PROTECTION AT STA. 33+30 WILL BE CONSTRUCTED IN WET CONDITIONS.

6) TRANVERSE COBBLE/SMALL BOULDER RIBS AND BOULDER ROUGHNESS WILL BE CONSTRUCTED IN RIFFLE SECTIONS. SEE RIFFLE DETAILS. RIBS AND ROUGHNESS NOT SHOWN FOR CLARITY. PLACEMENT WILL BE STAKED IN THE FIELD BY THE COR.

7) OHW FOR FLOOD CHANNELS ARE ESTIMATED. THESE CHANNELS SEE ONLY GROUNDWATER SEEPAGE FROM HILLSLOPE.

PLAN VIEW MAIN CHANNEL STA. 32+00 TO STA. 34+05

10 50

0 25 100 200

SCALE IN FEET

General Notes

No.	Revision/Issue	Date
4		
3		
2		
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U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
R-9
EASTERN REGION

Project Name
WEST BRANCH WHITE RIVER RESTORATION PHASE 1
GREEN MOUNTAIN N.F.
ROCHESTER MIDDLEBURY RANGER DISTRICT

DESIGNER
ROBERT GUBERNICK
WATERSHED RESTORATION GEOLOGIST
R9 TECHNICAL SERVICES TEAM

Drawing Title
PLAN VIEW S 32+00 TO S 38+00

Drawn R.GUBERNICK	Project
Checked	Drawing No.
CAD File No. 3C_MAIN AND TRIB_PLAN_VIEW_2014_0313	S 7
Date 3/13/2014	
Scale 1 = 100	

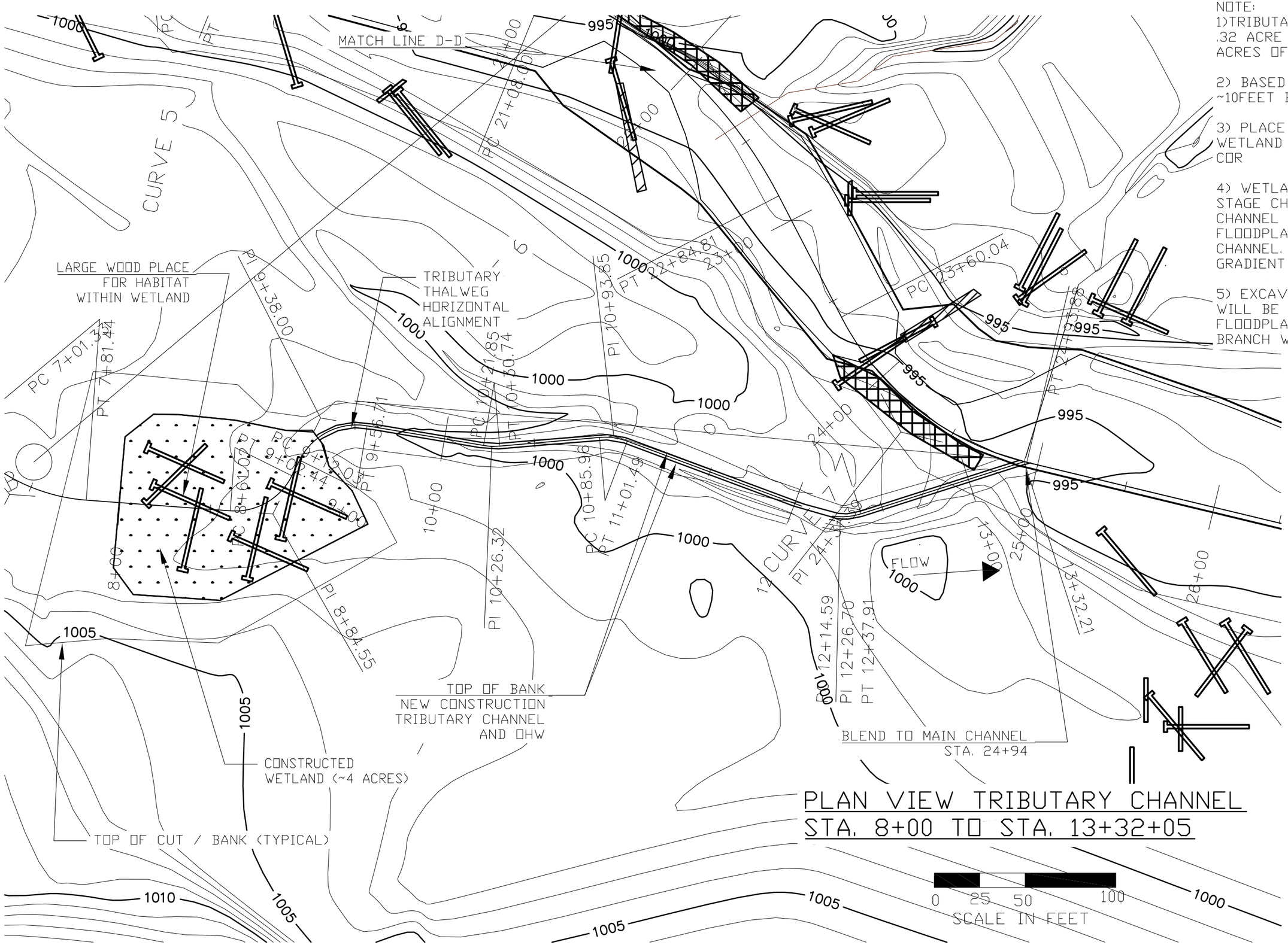
NOTE:
1)TRIBUTARY CHANNEL INCLUDES A .32 ACRE WETLAND WITH 0.08 ACRES OF WETLAND CHANNEL

2) BASED OF WETLAND POND IS ~10FEET BELOW EXISTING GROUND

3) PLACE LARGE WOOD WITHIN WETLAND AS DIRECTED BY THE COR

4) WETLAND CHANNEL IS A 2 STAGE CHANNEL 5FT WIDE CHANNEL WITH 3FT OF FLOODPLAIN EACH SIDE OF CHANNEL. DESIGN CHANNEL GRADIENT ~0.25%.

5) EXCAVATION FORM WETLAND WILL BE INCORPORATED INTO THE FLOODPLAIN OF THE WEST BRANCH WHITE RIVER.



PLAN VIEW TRIBUTARY CHANNEL
STA. 8+00 TO STA. 13+32+05

General Notes		
4		
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No.	Revision/Issue	Date

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
R-9
EASTERN REGION

Project Name
WEST BRANCH WHITE RIVER RESTORATION PHASE 1
GREEN MOUNTAIN N.F.
ROCHESTER MIDDLEBURY RANGER DISTRICT

DESIGNER
ROBERT GUBERNICK
WATERSHED RESTORATION GEOLOGIST
R9 TECHNICAL SERVICES TEAM

Drawing Title
PLAN VIEW TRIBUTARY CHANNEL DESIGN

Drawn R.GUBERNICK	Project
Checked	Drawing No.
CAD File No. 3_MAIN AND TRIB_PLAN_VIEW_2014_1033	S 8
Date 3/17/2014	
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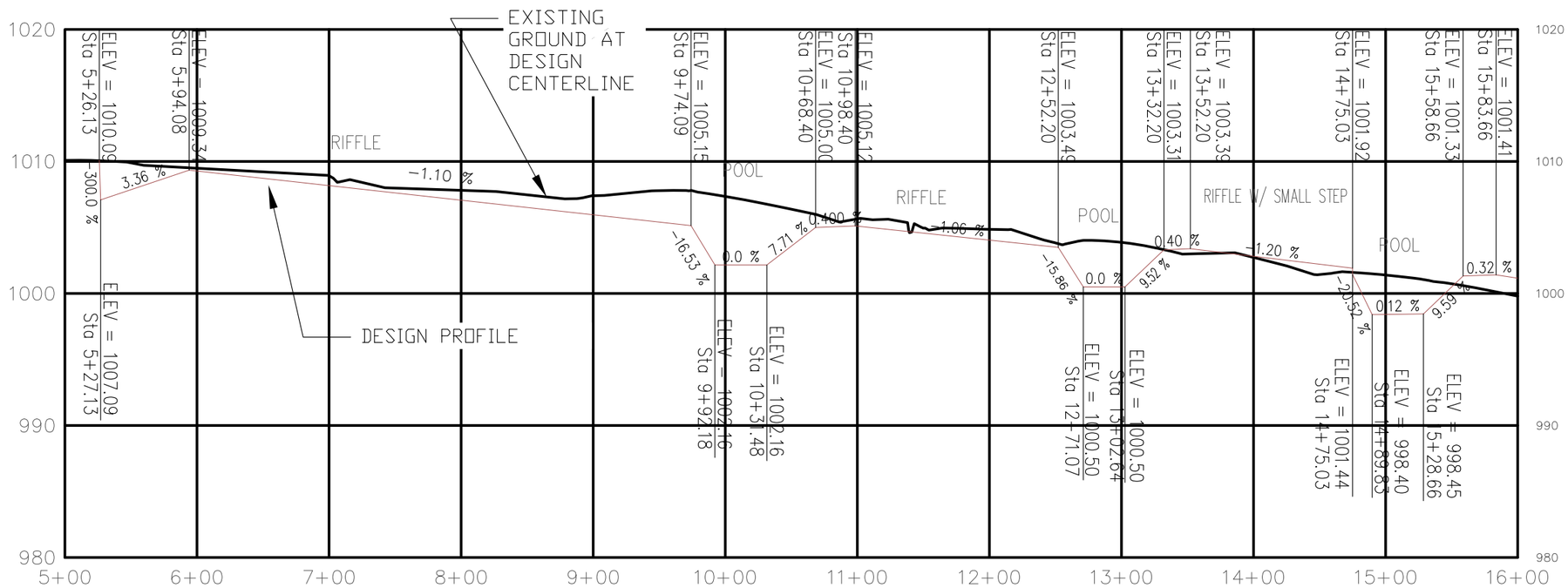
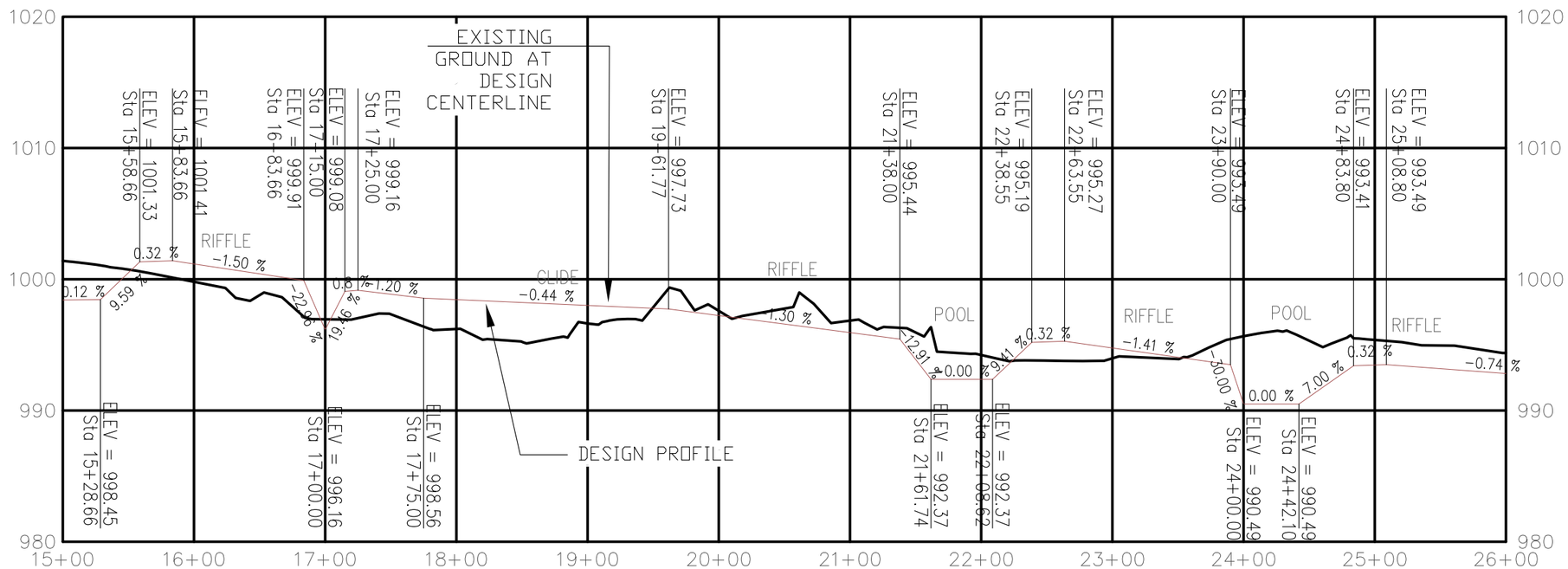


VERTICAL EXG. = 10

PROFILE VIEW MAIN CHANNEL
STA. 5+00 TO STA. 16+00



VERTICAL EXG. = 10

PROFILE VIEW MAIN CHANNEL
STA. 15+00 TO STA. 26+00

0 50 100 200
SCALE IN FEET

General Notes

No.	Revision/Issue	Date
4		
3		
2		
1		

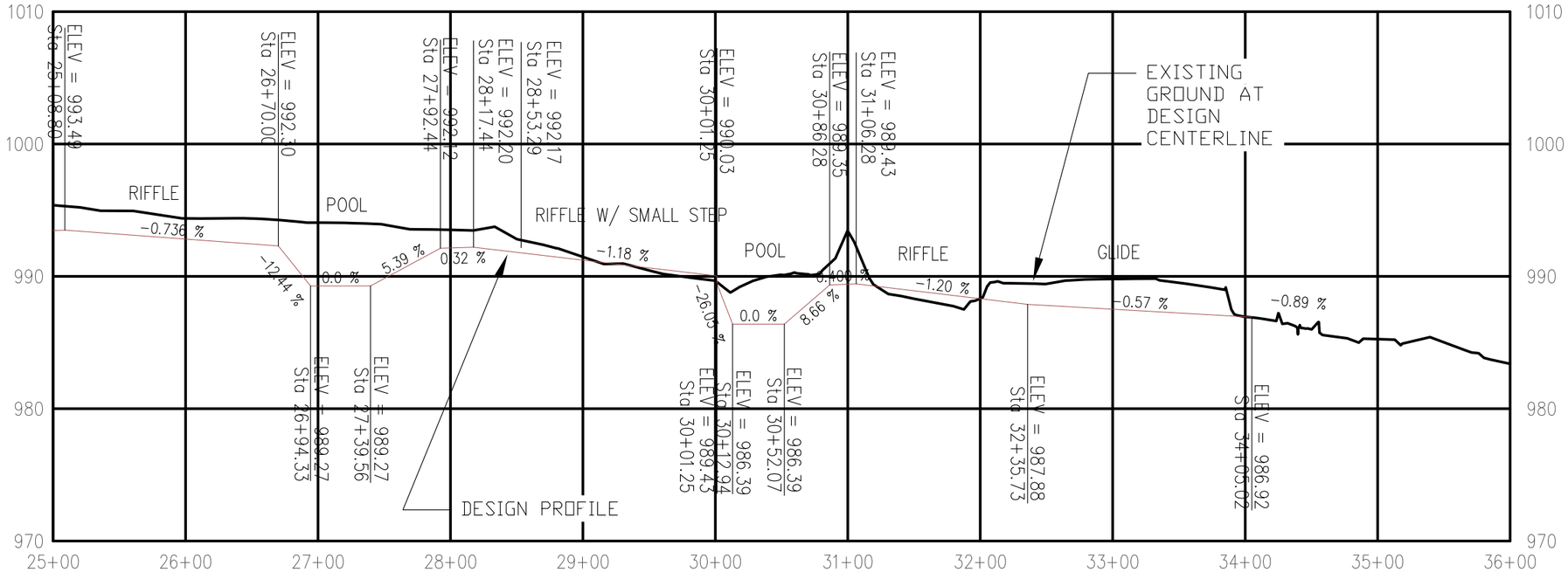
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
R-9
EASTERN REGION

Project Name
WEST BRANCH WHITE RIVER RESTORATION PHASE 1
GREEN MOUNTAIN N.F.
ROCHESTER MIDDLEBURY RANGER DISTRICT

DESIGNER
ROBERT GUBERNICK
WATERSHED RESTORATION GEOLOGIST
R9 TECHNICAL SERVICES TEAM

Drawing Title
PROFILE VIEW MAIN CHANNEL DESIGN
STA. 5+00 TO STA. 26+00

Drawn R.GUBERNICK	Project
Checked	Drawing No.
CAD File No. 3_MAIN AND TRIB_PROFILE_VIEW_2014_0313	S 9
Date 3/31/2014	
Scale 1 = 100	



PROFILE VIEW MAIN CHANNEL
STA. 25+00 TO STA. 35+00

VERTICAL EXG. = 10

0 50 100 200
SCALE IN FEET

General Notes

No.	Revision/Issue	Date
4		
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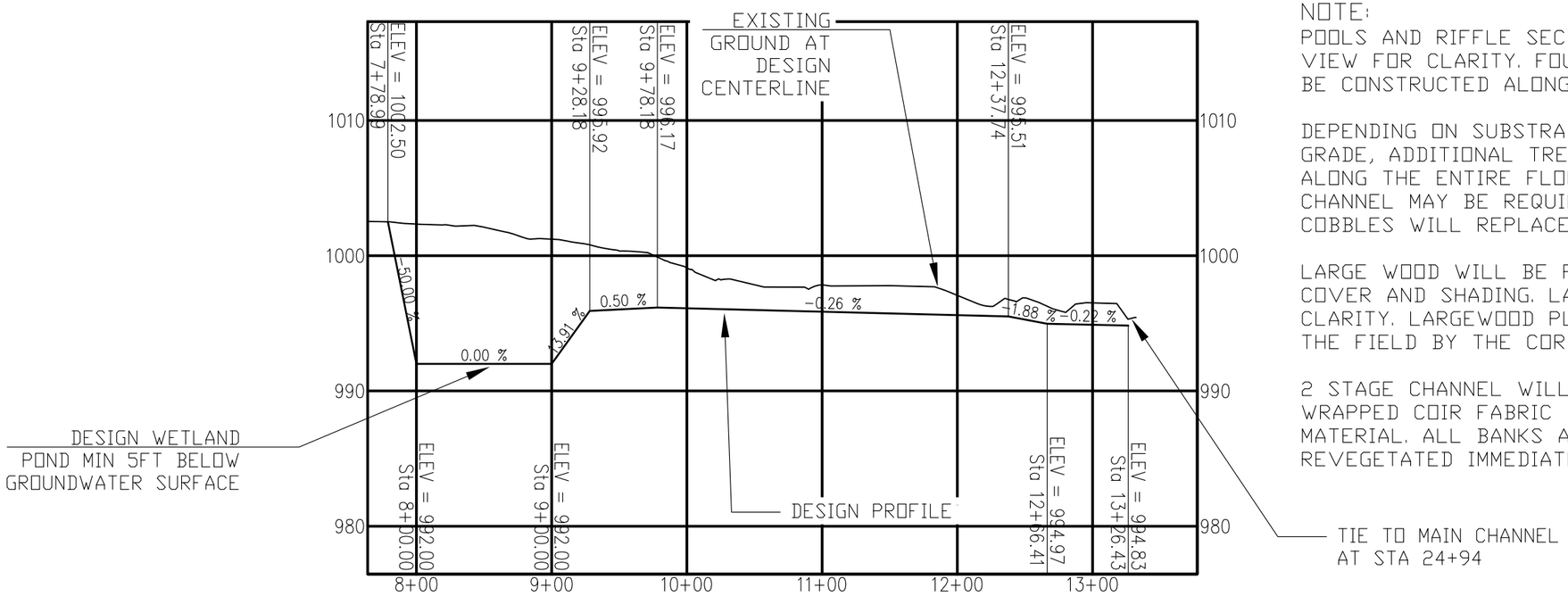
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
R-9
EASTERN REGION

Project Name
WEST BRANCH WHITE RIVER RESTORATION PHASE 1
GREEN MOUNTAIN N.F.
ROCHESTER MIDDLEBURY RANGER DISTRICT

DESIGNER
ROBERT GUBERNICK
WATERSHED RESTORATION GEOLOGIST
R9 TECHNICAL SERVICES TEAM

Drawing Title
PROFILE VIEW MAIN CHANNEL DESIGN
STA. 25+00 TO STA. 35+00

Drawn R.GUBERNICK	Project
Checked	Drawing No. S 10
CAD File No. 3C_MAIN AND TRIB_PROFILE_VIEW_2014_0313	
Date 3/31/2014	
Scale 1 = 100	



NOTE:
POOLS AND RIFFLE SECTIONS NOT SHOWN ON PROFILE VIEW FOR CLARITY. FOUR POOL RIFFLE SEQUENCES WILL BE CONSTRUCTED ALONG THE PROFILE.

DEPENDING ON SUBSTRATE ENCOUNTERED NEAR FINISH GRADE, ADDITIONAL TRENCHING UP TO 2 FEET OF DEPTH ALONG THE ENTIRE FLOODPLAIN AND GROUNDWATER CHANNEL MAY BE REQUIRED. STREAMBED GRAVEL AND COBBLES WILL REPLACE UNSUITABLE EXCAVATION.

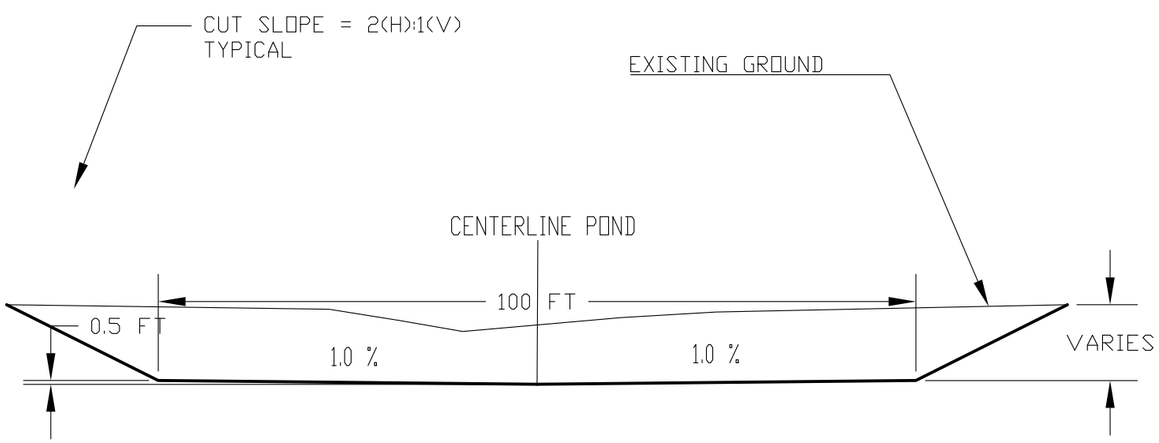
LARGE WOOD WILL BE PLACED IN THE WETLAND POND FOR COVER AND SHADING. LARGE WOOD NOT SHOWN FOR CLARITY. LARGEWOOD PLACEMENT WILL BE AS STAKED IN THE FIELD BY THE COR

2 STAGE CHANNEL WILL BE CONSTRUCTED WITH DOUBLE WRAPPED COIR FABRIC BANKS USING THE EXCAVATED MATERIAL. ALL BANKS AND CUT SLOPES WILL BE REVEGETATED IMMEDIATELY AFTER CHANNEL CONSTRUCTION

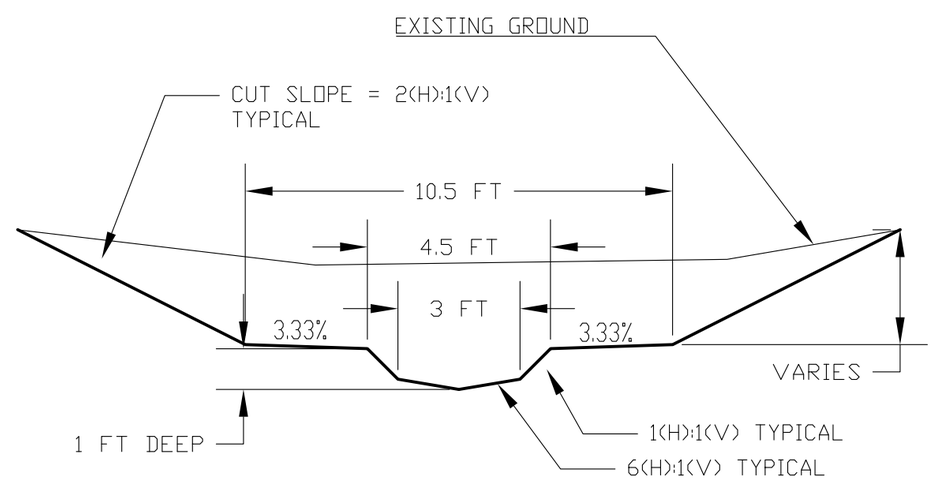
0 50 100 200
SCALE IN FEET

PROFILE VIEW TRIBUTARY CHANNEL
STA. 7+78 TO STA. 13+26

VERTICAL EXG. = 10



CROSS SECTION VIEW
WETLAND POND
STA. 7+78 TO STA. 9+28
DRAWING NOT TO SCALE



CROSS SECTION VIEW
2 STAGE TRIBUTARY CHANNEL
STA. 9+28 TO STA. 13+26
DRAWING NOT TO SCALE

General Notes

No.	Revision/Issue	Date
4		
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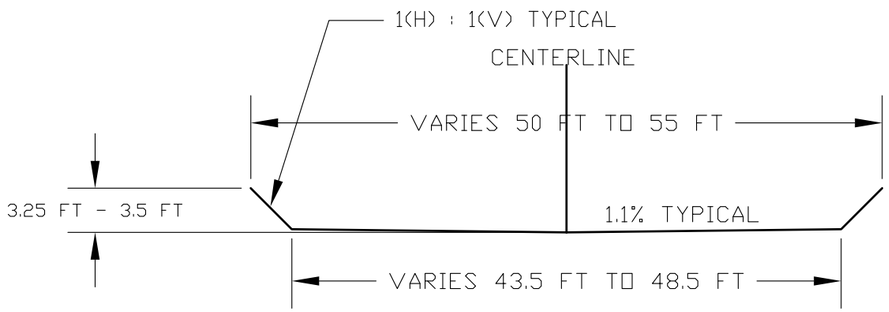
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
R-9
EASTERN REGION

Project Name
WEST BRANCH WHITE RIVER RESTORATION PHASE 1
GREEN MOUNTAIN N.F.
ROCHESTER MIDDLEBURY RANGER DISTRICT

DESIGNER
ROBERT GUBERNICK
WATERSHED RESTORATION GEOLOGIST
R9 TECHNICAL SERVICES TEAM

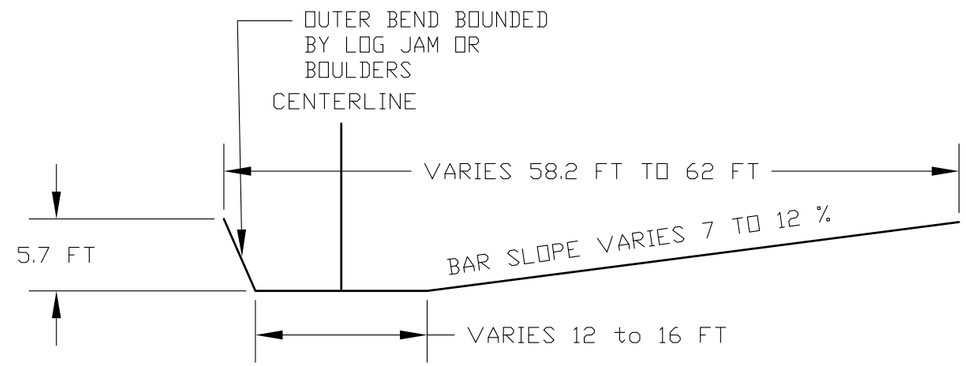
Drawing Title
PROFILE AND CROSS SECTION VIEW
NEW TRIBUTARY CHANNEL

Drawn R.GUBERNICK	Project
Checked	Drawing No. S 11
CAD File No. 3_TRIB_PROFILE_VIEW_2014_0331	
Date 3/31/2014	
Scale 1 = 100	



POOL HEAD CROSS SECTION

NOT TO SCALE



POOL MAXIMUM CROSS SECTION

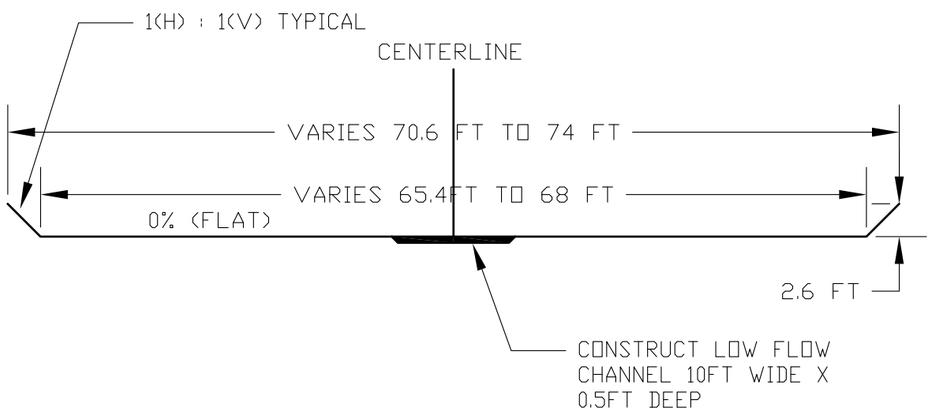
NOT TO SCALE

NOTE:
1) CROSS SECTIONS SHOWN REPRESENT THE TYPICAL BANKFULL CROSS SECTION FOR THE VARIOUS CHANNEL UNITS. TIE POINTS TO EXISTING GROUND BANKS OR FLOODPLAIN WILL BE AT A 0.5% SLOPE UNTILA CATCH POINT IS ENCOUNTERED OR 50FT OF FLOODPLAIN AT 0.5% THEN A 10 (H): -1 (V) SLOPE WILL BE CONSTRUCTED UNTIL IT INTERCEPTS THE FLOODPLAIN.

2) ALL CUT SLOPES ARE 1 (H) : 1 (V)

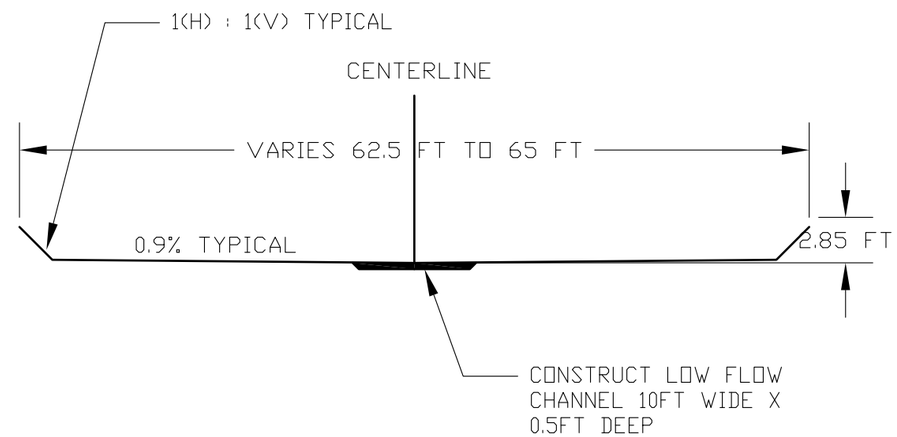
3) BANKS WILL BE A ENGINEERED LOG JAM AND/OR BOULDERS IN THE OUTER BEND AND AT POOL HEADS (SEE PLAN VIEWS).

4) BANK ALONG MID RIFFLES AND OUTER BEND TRANSITIONS OF THE TAILPOOL CRESTS WILL BE DOUBLE



POOLTAIL CREST CROSS SECTION

NOT TO SCALE



MID RIFFLE CROSS SECTION

NOT TO SCALE

NOTE:
1) CROSS SECTION SHAPES SHOWN ARE TYPICAL FOR A SPECIFIC LOCATION. CROSS SECTION WILL TRANSITION SHAPES FROM ONE LOCATION TO THE NEXT.

2) CROSS SECTION ARE VARIABLE IN WIDTH DEPENDENT UPON ENTRENCHMENT. ADDITIONAL TOLERANCES FOR WIDTH AND DEPTH WILL BE ACCOUNTED FOR DURING CONSTRUCTION.

3) WIDTH TOLERANCE + OR -2FT
DEPTH TOLERANCE AT CENTERLINE + OR - 0.25 FT FROM FINISH GRADE

4) CONSTRUCT LOW FLOW CHANNEL 10 FT WIDE BY 0.5 FT DEEP. FINISH PROFILE GRADES DO NOT INCLUDE LOW FLOW CHANNEL. ROUGH OUT CHANNEL CROSS SECTION THEN CONSTRUCT LOW FLOW CHANNEL. VARY LOW FLOW CHANNEL LONGITUDINALLY DOWN THE RECONSTRUCTED CHANNEL.

General Notes

No.	Revision/Issue	Date
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U.S. DEPARTMENT OF AGRICULTURE
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EASTERN REGION

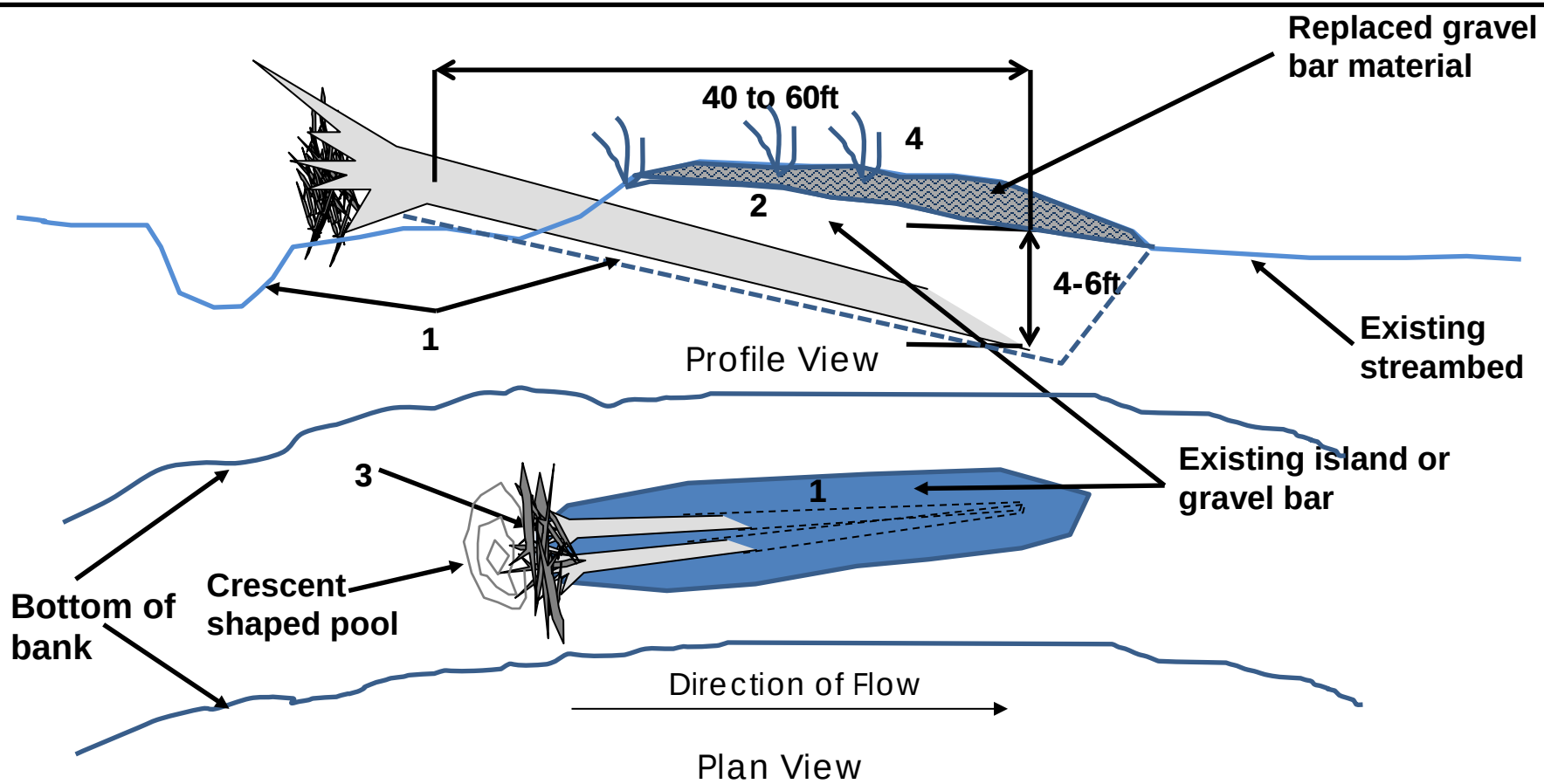
Project Name
WEST BRANCH WHITE RIVER RESTORATION PHASE 1
GREEN MOUNTAIN N.F.
ROCHESTER MIDDLEBURY RANGER DISTRICT

DESIGNER
ROBERT GUBERNICK
WATERSHED RESTORATION GEOLOGIST
R9 TECHNICAL SERVICES TEAM

Drawing Title
MAIN CHANNEL CROSS SECTIONS

Drawn R.GUBERNICK	Project
Checked	Drawing No. S 12
CAD File No. 3_MAIN AND TRIB_PROFILE_VIEW_2014_0303	
Date 4/1/2014	
Scale 1 = 20	

Apex Log Jam Complex

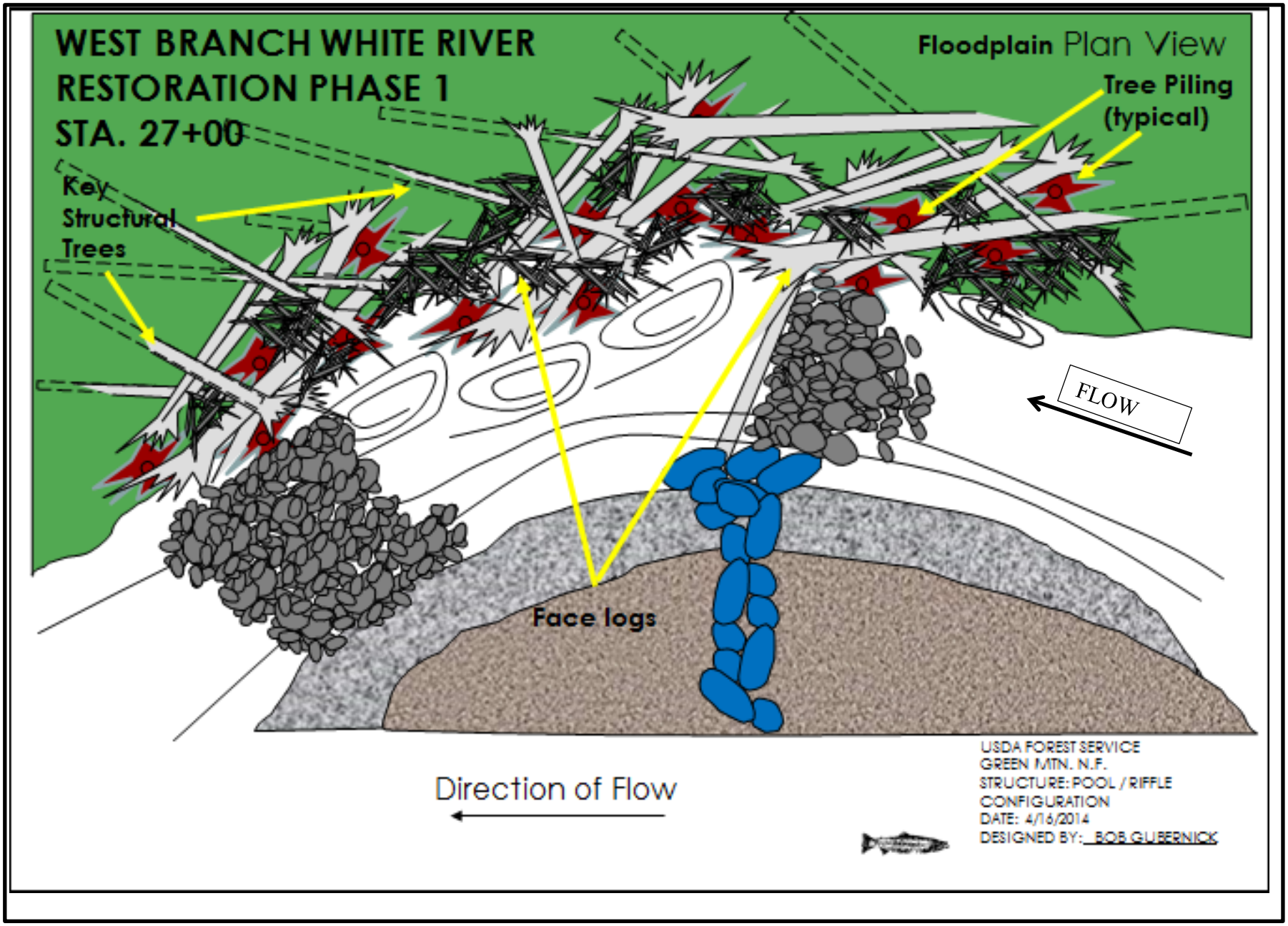


NOTES:

1) Excavate apex jam key log trenches parallel with island / gravel bar and the cresent pool. Excavate trench so the end of the stem is 6ft below the streambed grading up to the rootball. The root ball should set lower than the stream bed so the log at the root ball rests on the top of the bar. Crescent pool should be 3 feet deep 5feet long and as wide as the outer extents of the root balls 2) Place streambed over the embedded log and compact. 3) Place weave / rack additional trees, logs at apex of structure. 4) Plant willows or other vegetation as required in the plans

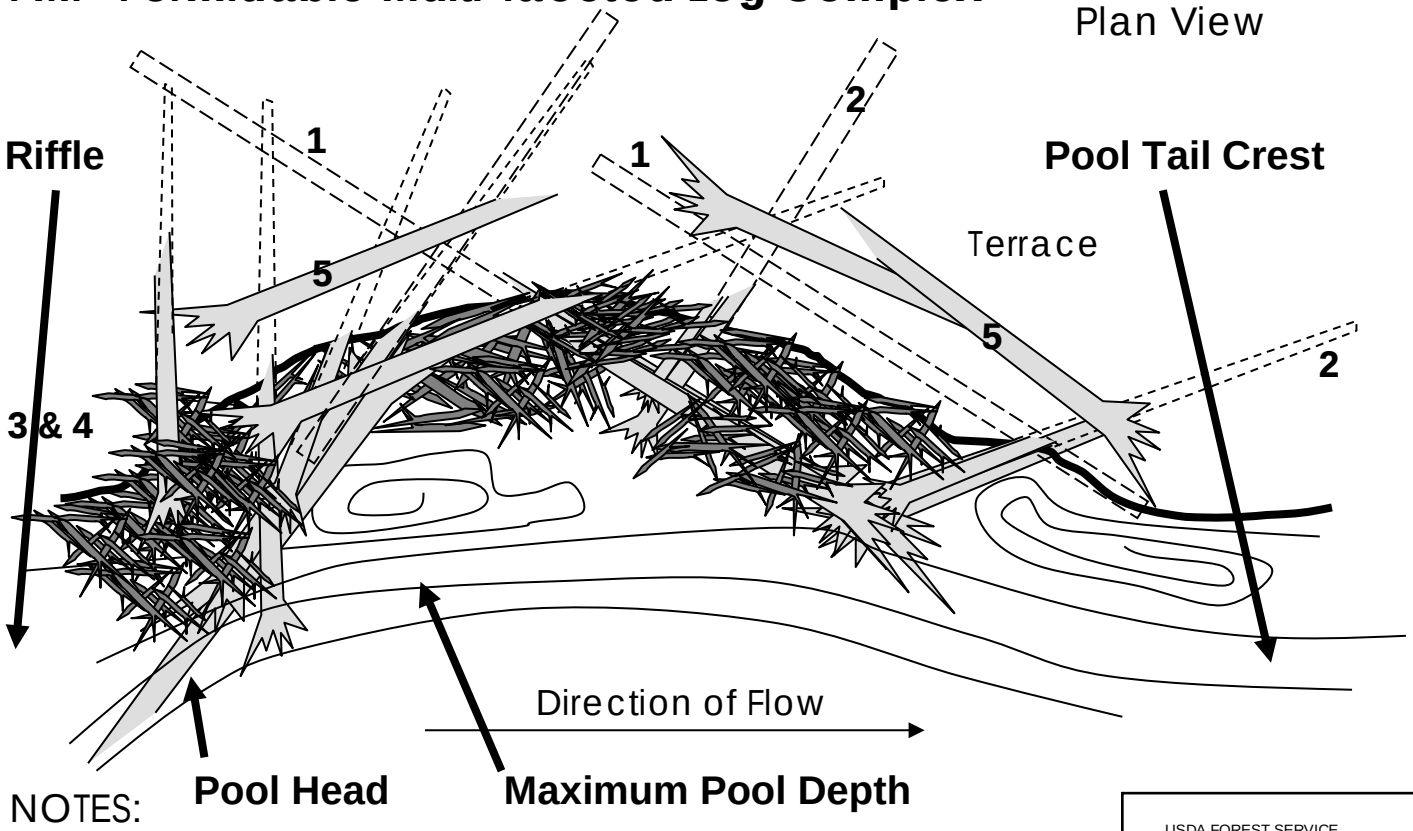
USDA FOREST SERVICE
REGION 9 Green Mtn. NF
STRUCTURE: APEX LOG JAM
DATE: 41/2014
DESIGNED BY: BOB GUBERNICK
DRAWN BY: B. GUBERNICK

WEST BRANCH WHITE RIVER RESTORATION PHASE 1	APPLICANT; xxxxxxxxxxxxxx
DEPARTMENT OF ARMY PERMIT	USDA FOREST SERVICE
TYPICAL APEX JAM PLAN & PROFILE VIEW	DATE: 4/16/2014
LAT. 43° 50’ 60” W LONG -72° 51’ 06” NAD 83	SHEET 13



WEST BRANCH WHITE RIVER RESTORATION PHASE 1	APPLICANT; xxxxxxxxxxxxxxx
DEPARTMENT OF ARMY PERMIT	USDA FOREST SERVICE
TYPICAL FLOOD LOG JAM PLAN VIEW	DATE: 4/16/2014
LAT. 43° 50’ 60” W LONG -72° 51’ 06” NAD 83	SHEET 14

FMF Formidable Multi-faceted Log Complex



NOTES:

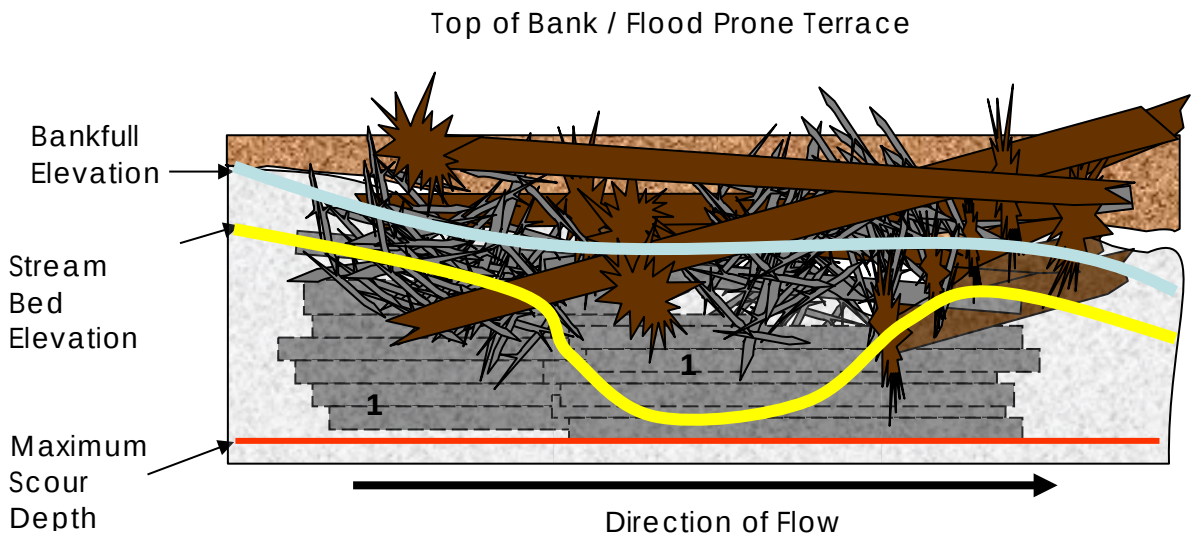
1) Excavate toe log trenches perpendicular to parallel with channel bend based on direction of flood flow. Excavate into bank and below channel bed surface to maximum predicted scour depth. 2) Excavate torsion Log trenches 15 &45degrees (dependent on location in the bend) to flood flow and to bed surface elevation so the root fan faces into flood flow. Torsion logs may need to be layered (lower and upper) depending on bank height. High bank (5ft or more) will require 2 layers of torsion logs to pin down the face logs 3) Place weave additional trees, logs, large boulders, slash or root-wads in apex of structure. 4) Place ample slash and small woody debris on the up-stream bank interface of the structure. 5) Add ballast logs as required to prevent buoyancy at design flow

USDA FOREST SERVICE
REGION 9 GREEN MTN. NF
STRUCTURE: FMF – LOG JAM
DATE: 41/2014
DESIGNED BY: B. BAIR & B. GUBERNICK
DRAWN BY: B. BAIR & B.GUBERNICK

WEST BRANCH WHITE RIVER RESTORATION PHASE 1	APPLICANT; xxxxxxxxxxxxxxx
DEPARTMENT OF ARMY PERMIT	USDA FOREST SERVICE
TYPICAL LOG STRUCTURE PLAN VIEW	DATE: 4/16/2014
LAT. 43° 50” 60’ W LONG -72° 51’ 06”	SHEET 15

FMF Formidable Multi-faceted Log Complex

Profile View



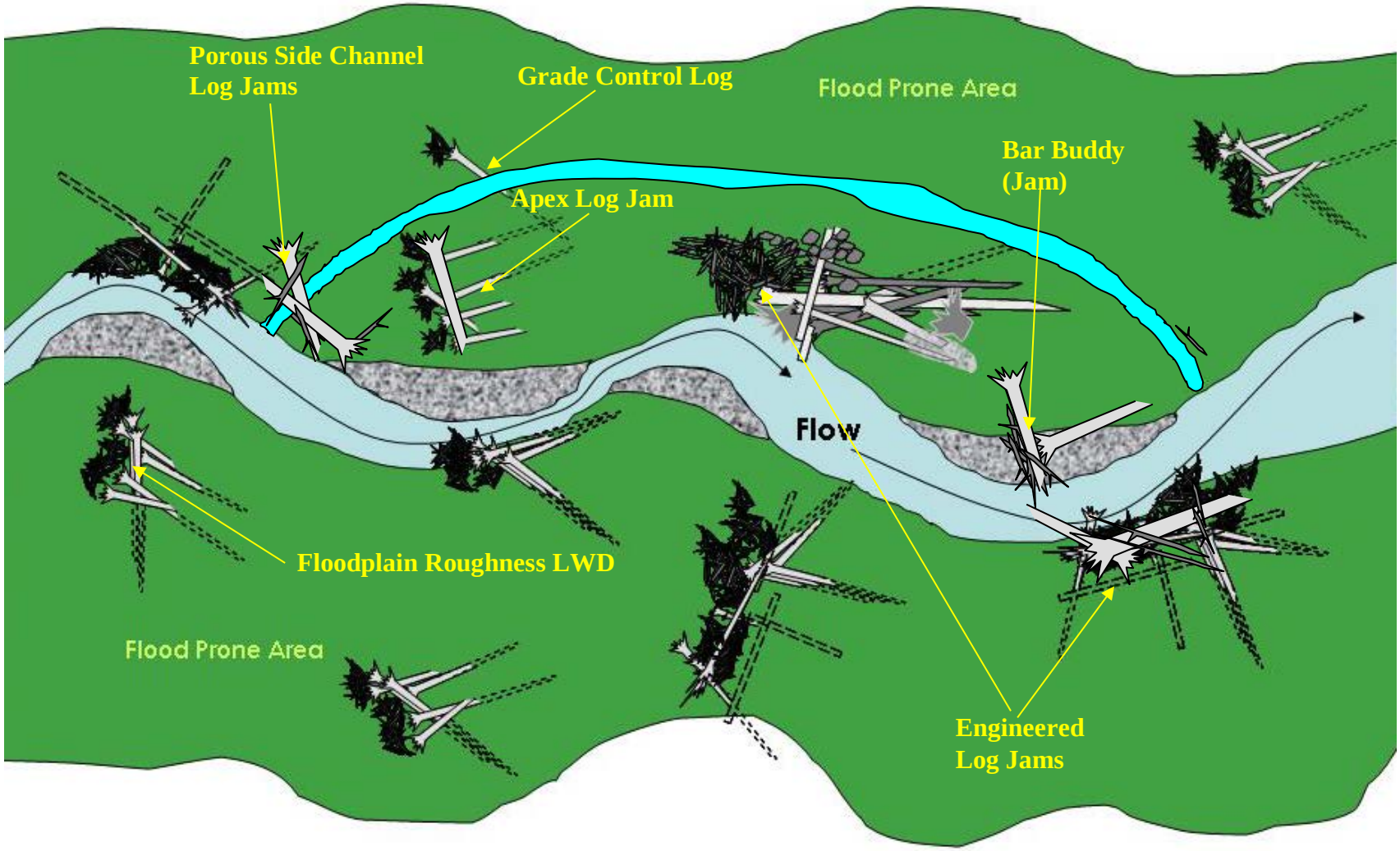
NOTES:

1) Excavate toe log trenches perpendicular to parallel with channel bend based on direction of flood flow. Excavate into bank and below channel bed surface to maximum predicted scour depth. 2) Excavate torsion Log trenches 15 &45degrees (dependent on location in the bend) to flood flow and to bed surface elevation so the root fan faces into flood flow. torsion logs may need to be layered (lower and upper)depending on bank height. High bank (5ft or more) will require 2 layers of torsion logs to pin down the face logs 3) Place weave additional trees, logs, large boulders, slash or root-wads in apex of structure. 4) Place ample slash and small woody debris on the up-stream bank interface of the structure. 5) Add ballast logs as required to prevent buoyancy at the design flow

USDA FOREST SERVICE
REGION 9 MONONGEHELA NF
STRUCTURE: FMF – LOG JAM
DATE: 1/2013
DESIGNED BY: B.BAIR & B. GUBERNICK
DRAWN BY: B. BAIR & B. GUBERNICK

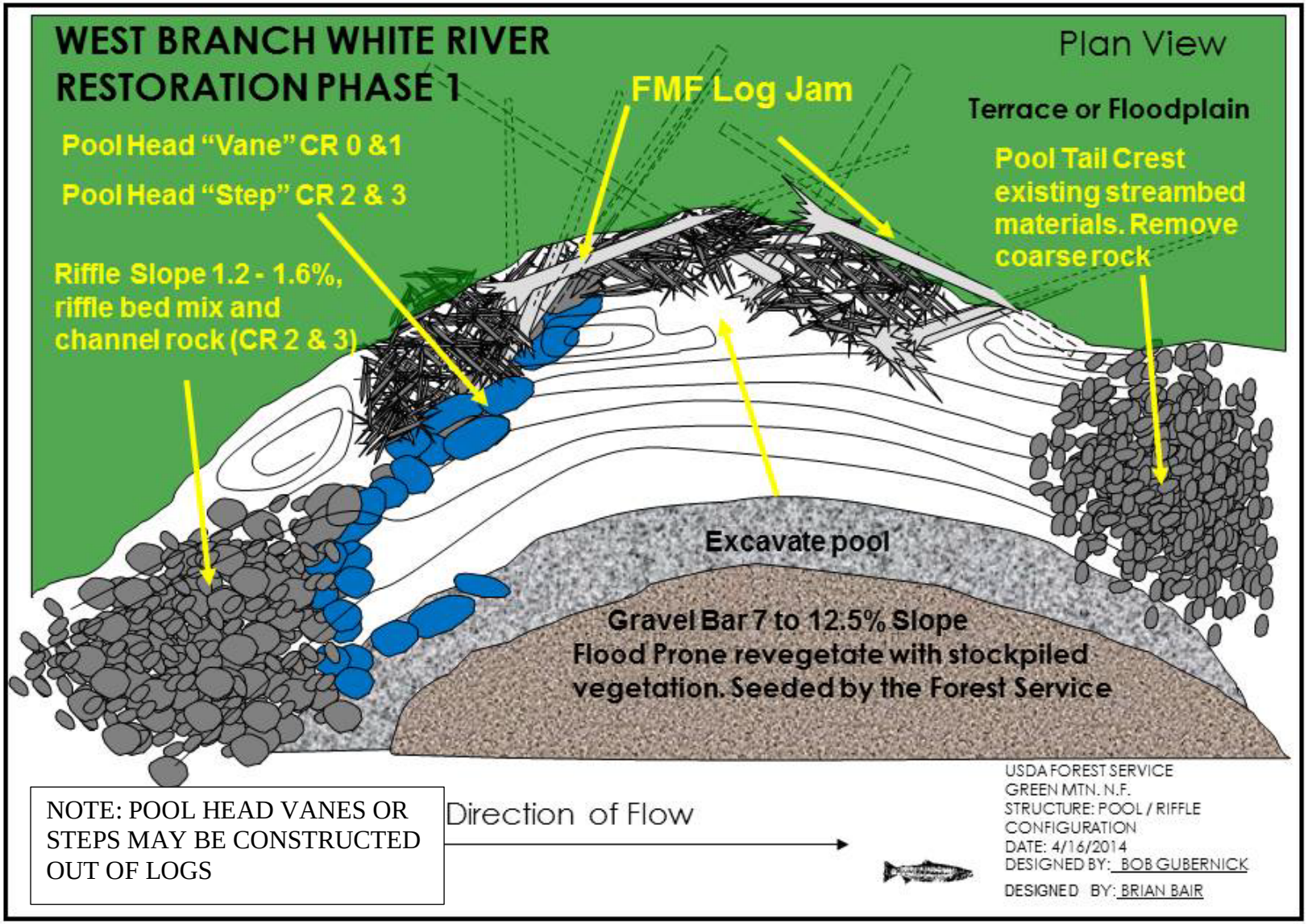
WEST BRANCH WHITE RIVER RESTORATION PHASE 1	APPLICANT; xxxxxxxxxxxxxx
DEPARTMENT OF ARMY PERMIT	USDA FOREST SERVICE
TYPICAL LOG STRUCTURE PROFILE VIEW	DATE: 4/16/2014
LAT. 43° 50” 60’ W LONG -72° 51’ 06” NAD 83	SHEET 16

CONCEPTUAL LARGE WOOD STRUCTURES LAYOUT



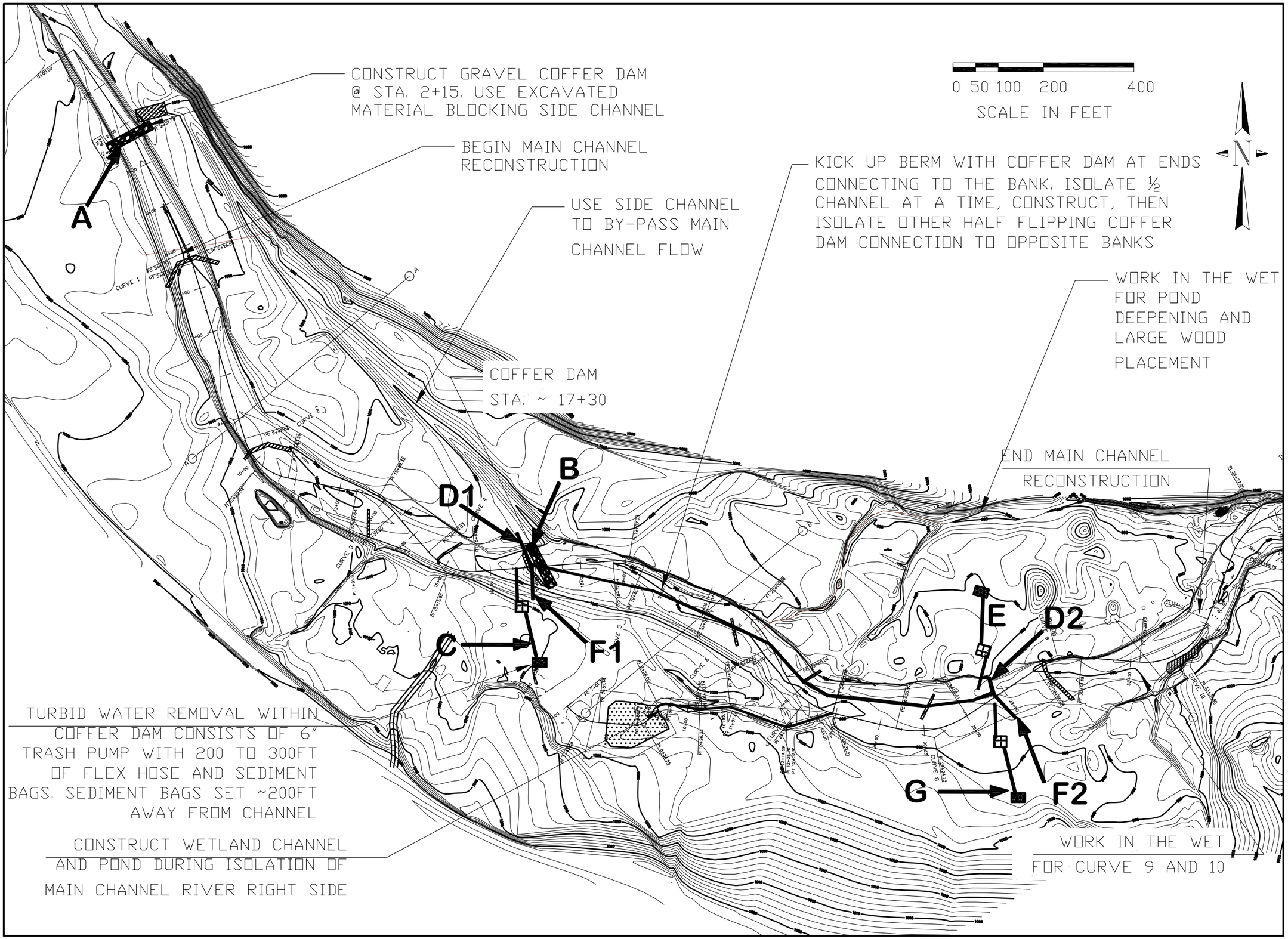
WEST BRANCH WHITE RIVER RESTORATION PHASE 1	APPLICANT; xxxxxxxxxxxxxxx
DEPARTMENT OF ARMY PERMIT	USDA FOREST SERVICE
TYPICAL LOG STRUCTURE CONCEPTUAL LAYOUT	DATE: 4/16/2014
LAT. 43° 50’ 60” W LONG -72° 51’ 06” NAD 83	SHEET 17

CONCEPTUAL POOL RIFFLE LAYOUT



NOTE: POOL HEAD VANES OR STEPS MAY BE CONSTRUCTED OUT OF LOGS

WEST BRANCH WHITE RIVER RESTORATION PHASE 1	APPLICANT; xxxxxxxxxxxxxxx
DEPARTMENT OF ARMY PERMIT	USDA FOREST SERVICE
TYPICAL LOG STRUCTURE CONCEPTUAL LAYOUT	DATE: 4/16/2014
LAT. 43° 50' 60" W LONG -72° 51' 06" NAD 83	SHEET 18



General Notes

No.	Revision/Issue	Date
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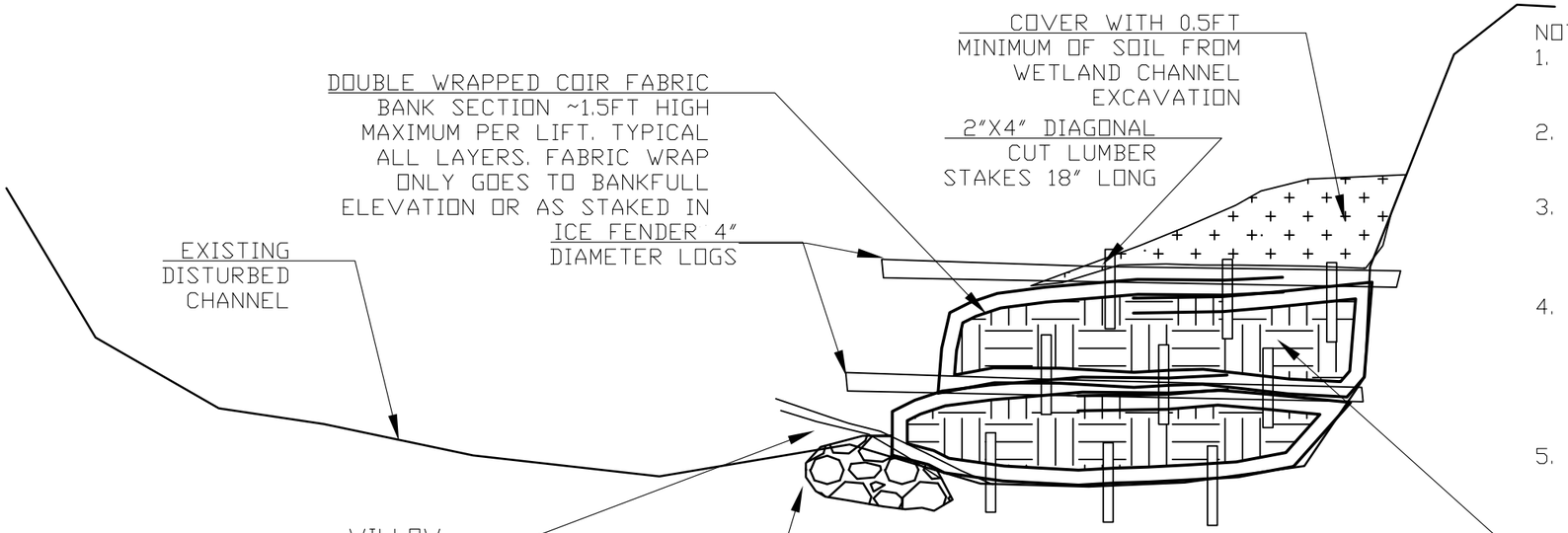
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
R-9
EASTERN REGION

Project Name
WEST BRANCH WHITE RIVER RESTORATION PHASE 1
GREEN MOUNTAIN N.F.
ROCHESTER MIDDLEBURY RANGER DISTRICT

DESIGNER
ROBERT GUBERNICK R.G.
WATERSHED RESTORATION GEOLOGIST
REGION 9 TECHNICAL SERVICES TEAM

Drawing Title
DEWATERING PLAN

Drawn R.GUBERNICK	Project
Checked	Drawing No.
CAD File No. 3C_MAIN AND TRIB_DEWATERING_2014_IG30	S 19
Date 5/29/2014	
Scale	

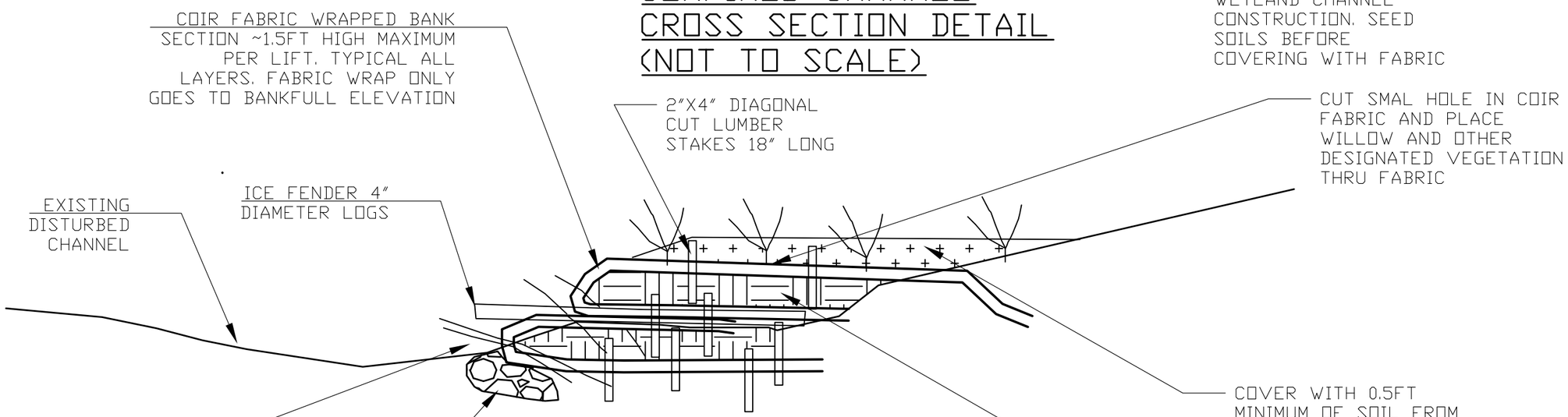


CROSS SECTION VIEW FABRIC WRAPPED BANK CONFINED CHANNEL CROSS SECTION DETAIL (NOT TO SCALE)

NOTE:

1. OUTER LAYER COIR FABRIC WILL BE GEOCOIR 700 (BELTON INDUSTRIES) OR APPROVED EQUAL.
2. INNER FACE LAYER OF COIR FABRIC WILL BE THE GEOJUTE PLUS (BELTON INDUSTRIES) OR APPROVED EQUAL
3. STAKE FABRIC WITH WOOD STAKES ON 3 FT CENTERS ON EACH BOTTOM LAYER OF FABRIC IN A DOMINO PATTERN. STAKE THE TOP LAYER OF THE LAST LIFT FABRIC LIST.
4. RIVER EMBANKMENT FILL WITHIN FABRIC WILL BE 50% RIVER RUN / COBBLES AND SANDY/SILTY LOAM FROM THE WETLAND CHANNEL EXCAVATION. PLACE SEED OVER THE EMBANKMENT MATERIALS BEFORE THE TOP PORTION OF THE COIR FABRIC IS PLACED AND STAKED DOWN.
5. OVERLAP PARALLEL LAYERS GEOCOIR 700 A MINIMUM OF 3FT FOR ADJOINING FABRIC ROWS. GEOJUTE PLUS FABRIC SHOULD BE CONTINUOUS TO EXTENT POSSIBLE. OVERLAP GEOJUTE FABRIC 3FT AT BEGINNING SECTION OF NEW ROLLS.

FILL COIR FABRIC WITH 50% RIVER RUN AND COBBLES AND 50% SANDY/SILTLOAM FROM WETLAND CHANNEL CONSTRUCTION. SEED SOILS BEFORE COVERING WITH FABRIC



CROSS SECTION VIEW FABRIC WRAPPED BANK CONNECTING TO FLOODPLAIN CROSS SECTION DETAIL (NOT TO SCALE)

General Notes

No.	Revision/Issue	Date
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U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
R-9
EASTERN REGION

Project Name
WEST BRANCH WHITE RIVER RESTORATION PHASE 1
GREEN MOUNTAIN N.F.
ROCHESTER MIDDLEBURY RANGER DISTRICT

DESIGNER
ROBERT GUBERNICK
WATERSHED RESTORATION GEOLOGIST
R9 TECHNICAL SERVICES TEAM

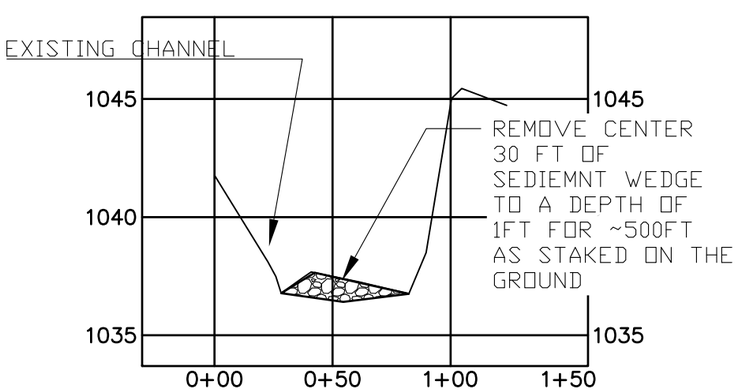
Drawing Title
BANK DETAILS

Drawn R.GUBERNICK	Project
Checked	Drawing No. S 20
CAD File No. 3C_MAIN AND TRIB_PLAN_VIEW_2014_R303	
Date 5/30/2014	
Scale 1 = 50	

GENDRON PROPERTY STREAM WORK AREA

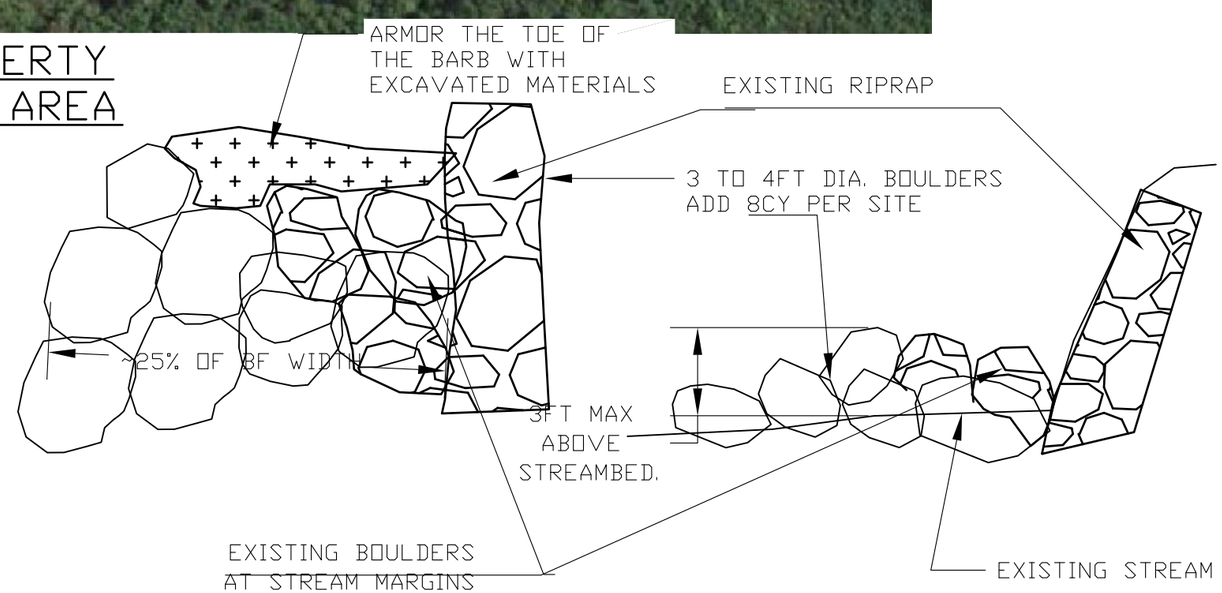
NOTES:

1. CONSTRUCT 5 ROCK BARB / CONSTRICTION FEATURES OUT OF CR CLASS 4 ROCK (36" TO 48" IN DIAMETER.
2. LIMIT CONSTRICTION TO NO MORE THAN 25% OF THE EXISTING CHANNEL WIDTH OR A BANKFULL WIDTH OF 50FT.
3. LIMIT TOPS OF BOULDERS TO A MAXIMUM OF 3FT ABOVE BED OR A MINIMUM OF 2 FT ABOVE THE CHANNEL BED
4. PLACE BARBS ONLY ALONG THE RIVER RIGHT SIDE OF THE PROPERTY ASSOCIATED WITH EXISTING BOULDER ARMOR / RIPRAP
5. EMBED BOULDERS A MINIMU OF 1 FT IN THE CHANNEL BED. PLACE COARSE EXCAVATED SEDIMENT FROM PLACEMENT OF BOULDERS TO ARMOR THE DOWNSTREAM SIDE OF THE BARB

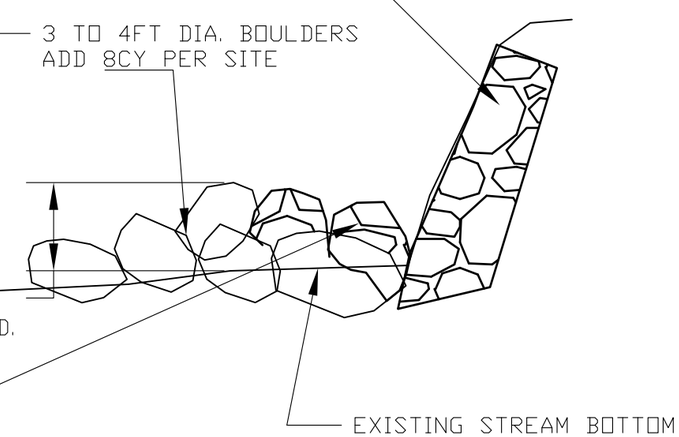


SEDIMENT WEDGE CROSS SECTION (TYPICAL)

VERT. EXG = 5



PLAN VIEW ROCK BARB / CONSTRICTION FEATURE



CROSS SECTION VIEW ROCK BARB (RIGHT BANK

General Notes

No.	Revision/Issue	Date
4		
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FOREST SERVICE
R-9
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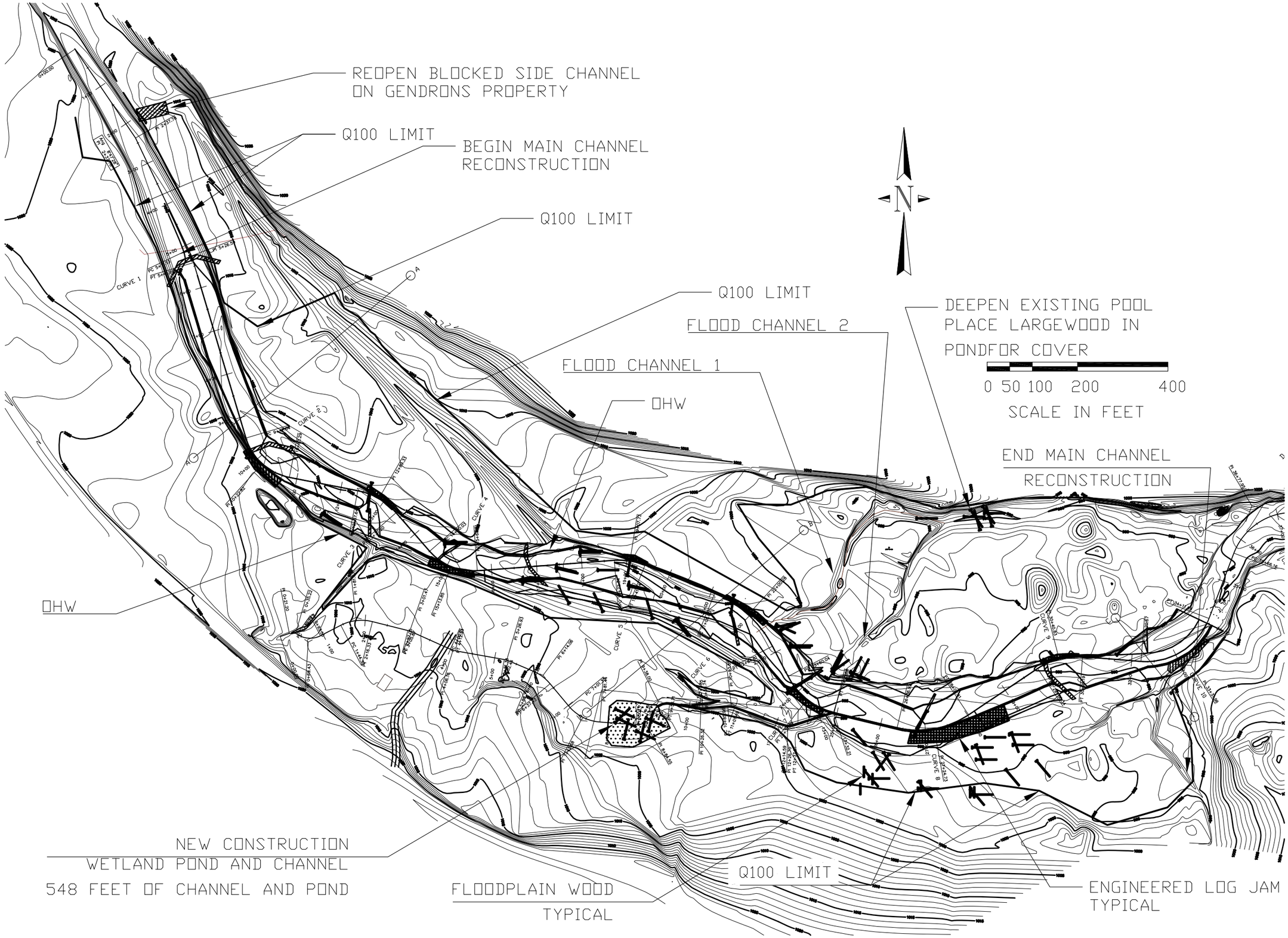
Project Name
WEST BRANCH WHITE RIVER RESTORATION PHASE 1
GREEN MOUNTAIN N.F.
ROCHESTER MIDDLEBURY RANGER DISTRICT

DESIGNER
ROBERT GUBERNICK R.G.
WATERSHED RESTORATION GEOLOGIST
REGION 9 TECHNICAL SERVICES TEAM

Drawing Title
GENDRON PROPERTY WORK

Drawn R.GUBERNICK	Project
Checked	Drawing No.
CAD File No. 3C_MAIN AND TRIB_PROJECT_AREA_2014_0303	S 21
Date 6/03/2014	
Scale	



General Notes

No.	Revision/Issue	Date
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U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
R-9
EASTERN REGION

Project Name
WEST BRANCH WHITE RIVER
RESTORATION PHASE 1
GREEN MOUNTAIN N.F.
ROCHESTER MIDDLEBURY RANGER DISTRICT

DESIGNER
ROBERT GUBERNICK R.G.
WATERSHED RESTORATION GEOLOGIST
REGION 9 TECHNICAL SERVICES TEAM

Drawing Title
Q 100 LIMIT

Drawn R.GUBERNICK	Project
Checked	Drawing No.
CAD File No. 3C_0000_2014_0619	S 22
Date 6/19/2014	
Scale	