

WETLANDS AND SUBAQUEOUS LANDS SECTION PERMIT APPLICATION FORM

**For Subaqueous Lands, Wetlands, Marina and
401 Water Quality Certification Projects**

**State of Delaware
Department of Natural Resources and Environmental Control
Division of Water**

Wetlands and Subaqueous Lands Section



**APPLICATION FOR APPROVAL OF
SUBAQUEOUS LANDS, WETLANDS, MARINA
AND WATER QUALITY CERTIFICATION PROJECTS**

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY**Application Instructions:**

1. Complete each section of this basic application and appropriate appendices as thoroughly and accurately as possible. Incomplete or inaccurate applications will be returned.
2. All applications must be accompanied by a scaled plan view and cross-section view plans that show the location and design details for the proposed project. Full construction plans must be submitted for major projects.
3. All applications must have an original signature page and proof of ownership or permitted land use agreement.
4. Submit an original and two (2) additional copies of the application (total of 3) with the appropriate application fee and public notice fee* (prepared in separate checks) to:

**Department of Natural Resources and Environmental Control
Wetlands and Subaqueous Lands Section
89 Kings Highway
Dover, Delaware 19901**

*Application and public notice fees are non-refundable regardless of the Permit decision or application status.

5. No construction may begin at the project site before written approval has been received from this office.

Helpful Information:

1. Tax Parcel Information:

New Castle County	(302) 395-5400
Kent County	(302) 736-2010
Sussex County	(302) 855-7878
2. Recorder of Deeds:

New Castle County	(302) 571-7550
Kent County	(302) 744-2314
Sussex County	(302) 855-7785
3. A separate application and/or approval may be required through the Army Corps of Engineers. Applicants are strongly encouraged to contact the Corps for a determination of their permitting requirements. For more information, contact the Philadelphia District Regulator of the Day at (215) 656-6728 or visit their website at: <http://www.nap.usace.army.mil/Missions/Regulatory.aspx>.
4. For questions about this application or the Wetlands and Subaqueous Lands Section, contact us at (302) 739-9943 or visit our website at: <http://www.dnrec.delaware.gov/wr/Services/Pages/WetlandsAndSubaqueousLands.aspx>. Office hours are Monday through Friday 8:00 AM to 4:30 PM, except on State Holidays.

APPLICANT'S REVIEW BEFORE MAILING

DID YOU COMPLETE THE FOLLOWING?

<u> X </u>	Yes	BASIC APPLICATION
<u> X </u>	Yes	SIGNATURE PAGE (Page 3)
<u> X </u>	Yes	APPLICABLE APPENDICES
<u> X </u>	Yes	SCALED PLAN VIEW
<u> X </u>	Yes	SCALED CROSS-SECTION OR ELEVATION VIEW PLANS
<u> X </u>	Yes	VICINITY MAP
<u> X </u>	Yes	COPY OF THE PROPERTY DEED & SURVEY
<u> X </u>	Yes	THREE (3) COMPLETE COPIES OF THE APPLICATION PACKET
<u> X </u>	Yes	APPROPRIATE APPLICATION FEE & PUBLIC NOTICE FEE (Separate checks made payable to the State of Delaware)

Submit 3 complete copies of the application packet to:

**Department of Natural Resources and Environmental Control
Wetlands and Subaqueous Lands Section
89 Kings Highway
Dover, Delaware 19901**

Before signing and mailing your application packet, please read the following:

The Department requests that the contractor or party who will perform the construction of your proposed project, if other than the applicant, sign the application signature page along with the applicant in the spaces provided. When the application is signed by the contractor as well as the applicant, the Department will issue the Permit to both parties. For Leases, the contractor will receive a separate construction authorization that will make them subject to all of the terms and conditions of the Lease relating to the construction

Section 1: Applicant Identification

1. Applicant's Name: Brooks Cahall
 Mailing Address: DNREC Office of the Secretary
89 Kings Highway, Dover DE, 19901

Telephone #: 302-739-9210
 Fax #: _____
 E-mail: brooks.cahall@delaware.gov

2. Consultant's Name: Kristen Coveleski
 Mailing Address: 220 Concord Ave., 2nd Floor,
Cambridge, MA 02138

Company Name: Inter-Fluve Inc.
 Telephone #: 617 599 8716
 Fax #: _____
 E-mail: kcoveleski@interfluve.com

3. Contractor's Name: _____
 Mailing Address: _____

Company Name: _____
 Telephone #: _____
 Fax #: _____
 E-mail: _____

Section 2: Project Description

4. Check those that apply:

☒ New Project/addition to existing project? ☐ Repair/Replace existing structure? (If checked, must answer #16)

5. Project Purpose (attach additional sheets as necessary):

The primary purpose of this project is to restore habitat connectivity upstream and downstream of White Clay Creek Dam 7. This goal is best achieved through the removal of the existing dam and the restoration of the adjacent channel, while maintaining pedestrian access and the existing recreational opportunities. Through the removal of this dam, we will restore natural channel processes, improve passage potential for migratory fish, improve connectivity of habitat for important resident fish species, and restore instream habitat above and below the dam for riverine fish and macroinvertebrates. Additionally, this project aims to improve water quality, restore the floodplain and a diversity of native riparian vegetation along the Creek, improve opportunities for recreation, and maintain the existing seasonal surface water withdrawal for the State-owned golf course (Deerfield). See Attachment for design details.

	A. Boat Docking Facilities		G. Bulkheads		N. Preliminary Marina Checklist
	B. Boat Ramps	X	H. Fill		O. Marinas
	C. Road Crossings		I. Rip-Rap Sills and Revetments		P. Stormwater Management
X	D. Channel Modifications/Dams	X	J. Vegetative Stabilization		Q. Ponds and Impoundments
	E. Utility Crossings		K. Jetties, Groins, Breakwaters		R. Maintenance Dredging
	F. Intake or Outfall Structures		M. Activities in State Wetlands		S. New Dredging

Section 3: Project Location

7. Project Site Address: _____
39°43'7.17"N, 75°45'40.38"W

County: ☒ N.C. ☐ Kent ☐ Sussex
 Site owner name (if different from applicant): State of Delaware
 Address of site owner: _____

8. Driving Directions: See Attachment, Sheet 1

(Attach a vicinity map identifying road names and the project location)

9. Tax Parcel ID Number: See Attachment, Sheet 11 Subdivision Name: _____

WSLS Use Only:		Permit #s: _____		_____		_____		_____	
Type	SP <input type="checkbox"/>	SL <input type="checkbox"/>	SU <input type="checkbox"/>	WE <input type="checkbox"/>	WQ <input type="checkbox"/>	LA <input type="checkbox"/>	SA <input type="checkbox"/>	MP <input type="checkbox"/>	WA <input type="checkbox"/>
Corps Permit: SPGP 18 <input type="checkbox"/> 20 <input type="checkbox"/>		Nationwide Permit #: _____		Individual Permit # _____					
Received Date: _____		Project Scientist: _____							
Fee Received? Yes <input type="checkbox"/> No <input type="checkbox"/>		Amt: \$ _____		Receipt #: _____					
Public Notice #: _____		Public Notice Dates: ON _____		OFF _____					

Section 3: Project Location (Continued)

10. Name of waterbody at Project Location: White Clay Creek waterbody is a tributary to: Christina River

11. Is the waterbody: ☐ Tidal ☒ Non-tidal Waterbody width at mean low or ordinary high water 120 ft

12. Is the project: ☒ On public subaqueous lands? ☐ On private subaqueous lands?*

☒ In State-regulated wetlands? ☐ In Federally-regulated wetlands?

*If the project is on private subaqueous lands, provide the name of the subaqueous lands owner:

(Written permission from the private subaqueous lands owner must be included with this application)

13. Present Zoning: ☐ Agricultural ☐ Residential ☐ Commercial ☐ Industrial ☒ Other

Section 4: Miscellaneous

14. A. List the names and complete mailing addresses of the immediately adjoining property owners on all sides of the project (attach additional sheets as necessary):

State of Delaware

B. For wetlands and marina projects, list the names and complete mailing addresses of property owners within a 1,000 foot radius of the project (attach additional sheets as necessary):

NA

15. Provide the names of DNREC and/or Army Corps of Engineers representatives whom you have discussed the project with:

Matthew Jones (DNREC)

David Caplan (ACOE)

Daniel Kelly (ACOE)

A. Have you had a State Jurisdictional Determination performed on the property?

☐ Yes ☒ No

B. Has the project been reviewed in a monthly Joint Permit Processing Meeting?

☒ Yes ☐ No

*If yes, what was the date of the meeting? May 18th, 2023

16. Are there existing structures or fill at the project site in subaqueous lands?

☒ Yes ☐ No

*If yes, provide the permit and/or lease number(s):

No permit found.

*If no, were structures and/or fill in place prior to 1969?

☒ Yes ☐ No

17. Have you applied for or obtained a Federal permit from the Army Corps of Engineers?

☐ No

☒ Pending

☐ Issued

☐ Denied

Date: _____

Type of Permit: Nation Wide Permit 27 Federal Permit or ID #: _____

18. Have you applied for permits from other Sections within DNREC?

☒ No

☐ Pending

☐ Issued

☐ Denied

Date: _____ Permit or ID #: _____

Type of permit (circle all that apply): Septic Well NPDES Storm Water

Other: _____

Section 5: Signature Page**19. Agent Authorization:**

If you choose to complete this section, all future correspondence to the Department may be signed by the duly authorized agent. In addition, the agent will become the primary point of contact for all correspondence from the Department.

I do not wish to authorize an agent to act on my behalf

I wish to authorize an agent as indicated below x

I, Brooks Cahall, hereby designate and authorize Kristen Coveleski
(Name of Applicant) (Name of Agent)
to act on my behalf in the processing of this application and to furnish any additional information requested by the Department.

Authorized Agent's Name: Kristen Coveleski Telephone #: 617-599-8716
Mailing Address: 220 Concord Ave. Second Floor Fax #: _____
Cambridge, MA 02138 E-mail: kcoveleski@interfluve.com

20. Agent's Signature:

I hereby certify that the information on this form and on the attached plans are true and accurate to the best of my knowledge. I further understand that the Department may request information in addition to that set forth herein if deemed necessary to appropriately consider this application.

Kristen Coveleski
Agent's Signature

1/25/2024
Date

21. Applicant's Signature:

I hereby certify that the information on this form and on the attached plans are true and accurate to the best of my knowledge and that I am required to inform the Department of any changes or updates to the information provided in this application. I further understand that the Department may request information in addition to that set forth herein if deemed necessary to appropriately consider this application. I grant permission to authorized Department representatives to enter upon the premises for inspection purposes during working hours.

[Signature]
Applicant's Signature

4/6/2024
Date

Brooks P. Cahall
Print Name

22. Contractor's Signature:

I hereby certify that the information on this form and on the attached plans are true and accurate to the best of my knowledge, and that I am required to inform the Department of any changes or updates to the information provided in this application. I further understand that the Department may request information in addition to that set forth herein if deemed necessary to appropriately consider this application.

Contractor's Name

Date

Print Name

CHANNEL MODIFICATIONS OR IMPOUNDMENT STRUCTURES (DAMS)

Please check applicable box(es) and complete all appropriate sections(s). Make sure answers to all of the questions in this appendix correspond to information on the application drawings

Section I. ☒ CHANNEL MODIFICATIONS

Section II. ☐ IMPOUNDMENT STRUCTURES (DAMS)

I. CHANNEL MODIFICATIONS

1. What are the dimensions of the existing channel to be modified relative to mean high water (for tidal areas only) or ordinary high water (for non-tidal areas only)?
 44 ft length _1.5 ft_ depth _100 ft_ base width _120 ft_ top width
2. What will be the dimensions of the new or modified channel relative to mean high water (for tidal areas only) or ordinary high water (for non-tidal areas only)?
 ___44 ft___ length ___5___ depth ___117___ base width ___140___ top width
3. State type and approximate composition percentage of the existing stream bed (e.g. clay 10%, sand 10%, silt 45%, gravel 10%, etc.)
 100 % course gravel, cobble, and boulder.
4. State the type and approximate composition percentage of the new or modified stream bed?
 100 % course gravel, cobble, and boulder.
5. What are the approximate normal discharge rate and drainage area of the existing water body.
 2 yr. _4,525_ cfs _41,856_ acres
 10yr. _10,330_ cfs 100 yr. _19,383_ cfs
6. What will be the approximate normal flow-rate and drainage area of the new or modified water body (for non-tidal areas only)?
 2 yr. _4,525_ cfs _41,856_ acres
 10 yr. _10,330_ cfs 100 yr. _19,383_ cfs
7. What will be the change (if any) in slope and cross-sectional area?
 The average channel slope from the dam crest to 44 ft downstream of the dam will be changed from approximately 10% to 3%.
 The average channel slope and cross-sectional area of the overall channel will remain the same.
8. What type of material(s) will be used to stabilize the banks of the new or modified channel (e.g. rip-rap, vegetation, bulkhead, etc.)? Complete additional Appendices as necessary.
 See Appendix J - Vegetative Stabilization.
9. What will be the change in floodplain area upstream of the channel modification for a two year or ten year storm? Please indicate change in area on plans.
 ___0 acres___ 2 yr. ___0 acres___ 10 yr.

II. IMPOUNDMENT STRUCTURES (DAMS)

1. What type(s) of material(s) will be used to construct the impoundment structure (e.g. earth, rock, concrete, etc.)?
2. How many cubic yards of material for the impoundment structure will be obtained from:
 - a. Upland sources? _____ cubic yards
 - b. Dredged material? _____ cubic yards
 - c. Other? (explain below) _____ cubic yards
3. What will be the dimensions of the impoundment structure relative to mean high water (for tidal areas only) or ordinary high water (for non-tidal areas only)?
4. What will be the impoundment's?

Storage capacity: _____ acre-feet
Surface area: _____ acres; _____ square feet
5. What is the approximate drainage area of the water body upstream of the proposed impoundment? _____ acres
6. Have you obtained the appropriate County Conservation District office approval for an erosion and sediment control plan for your project? _____ Yes _____ No _____ N/A

If your answer is "No", contact the County Conservation District.
7. What is the approximate discharge rate from the 2, 10, 100 year frequency storm prior to construction?
2 yr. _____ cfs
10 yr. _____ cfs
100 yr. _____ cfs

FILL

Please make sure answers to all of the questions in this appendix correspond to information on the application drawings.

1. How many linear feet will the fill extend channelward of the:

- a. Tidal waters: mean high water line? _____ ft.
 mean low water line? _____
- b. Non-tidal waters: ft. ordinary high water line? 50 ft.

2. What is the area of fill that will be located:

- a. on subaqueous land (channelward of mean high water) 750 sq. ft.
- b. on vegetated wetlands? 0 sq. ft.

3. What is the source of the fill?

X Hauled in from upland sources: What is the source company/location/parcel number?

 Obtained from dredged material: Complete Dredging Appendix.

4. What is the total volume of fill? 83 cubic yards

- a. What is the total fill per running foot of shoreline? 1.4 cubic yards

5. What method will be used to place the fill?

The J hook will be strategically placed into the channel using an excavator, per the design drawings.

6. State the type and composition percentage of the fill material (e.g. sand 80%, silt 5%, clay 15%, etc.)

100% course gravel, cobble, and boulder

7. How will the fill be retained? Complete appropriate appendix.

The stream bed fill will be sized properly so that it will not be transported during high flow events, based on the natural existing stream bed material and engineering calculations.

8. What type of vegetation or ground cover will be provided for the filled area(s) to prevent soil erosion and help keep sediment from reaching State waters?

See Appendix J.

9. Describe the type(s) of structure(s) to be erected on the filled area (if any). Complete appropriate appendix.

No structures will be erected.

Vegetative Stabilization

- Please make sure that all answers in this appendix correspond to information on the application drawing

1. Submit a brief description of the proposed activity

White Clay Creek Dam 7 will be removed in order to restore habitat connectivity along the river. The rock fill material removed from the existing dam will be reused to stabilize the lower portion of the channel banks on both sides of the channel in the immediate vicinity of the existing dam location. The rock toe will extend up to the ordinary high water line. Above the rock toe, two layers of Fabric Encapsulated Soil (FES) lifts will be placed. The lower FES lift will be composed of 50% soil and 50% imported coarse material and the upper FES lift will be 100% soil. Both lifts will be seeded with a native seed blend. All areas of disturbance outside of the FES lifts will be seeded and covered with biodegradable surface fabric. At the completion of construction, all disturbed areas including river banks and floodplains will be planted with species consistent with the existing native vegetative community.

2. Is grading of bank and/or placement of fill part of this project? Yes ☒ No ☐ If yes complete Appendix H

3. Indicate the area of proposed planting that is channelward of the:

- a. Tidal Waters: mean high water line? _____ ft²
mean low water line? _____ ft²
- b. Non-tidal waters: ordinary high water line? 0 ft²

4. What will the water depth of the plantings be relative to the: (provide the range if it varies)

- a. Tidal Waters: mean high water line? _____ f
mean low water line? _____ ft
- b. Non-tidal waters: ordinary high water line? 0 ft

5. Provide the list of plant species that will be utilized.

The vegetation community surrounding the project site has been mapped as a riverine floodplain forest community type, which is ranked S2 (very rare) in Delaware (Coxe, 2012). At the completion of construction, all disturbed areas including river banks and floodplains will be planted with species consistent with this vegetative community. Overstory species shall consist of sycamore (*Platanus occidentalis*) and tuliptree (*Liriodendron tulipifera*). Understory species shall include box-elder (*Acer negundo*), bitternut hickory (*Carya cordiformis*), spicebush (*Lindera benzoin*), and wild black cherry (*Prunus serotina*). In addition to plantings, all disturbed areas shall be seeded with an appropriate native seed mix, such as Ernst Seeds PA Piedmont Province FACW Mix or Ernst Seeds PA Piedmont Province Riparian Mix.

6. Describe the sequence of construction and planting.

Concurrent with the removal of the dam material, the toe of the channel will be stabilized with the stone material. Construction of the channel banks will include the installation of FES Lifts. All disturbed areas and the constructed banks will be planted with the vegetation listed above.

7. Describe the maintenance and monitoring plan for the vegetation.

Newly planted vegetation will be monitored by the selected Contractor annually, and following significant storm events (greater than 5-year recurrence interval), for a three year period following construction. See Attachment C - Adaptive Management Plan, for more details on maintenance and monitoring for vegetation.

Attachment A — 90% Draft Engineering Design Drawings

WHITE CLAY CREEK DAM 7 REMOVAL

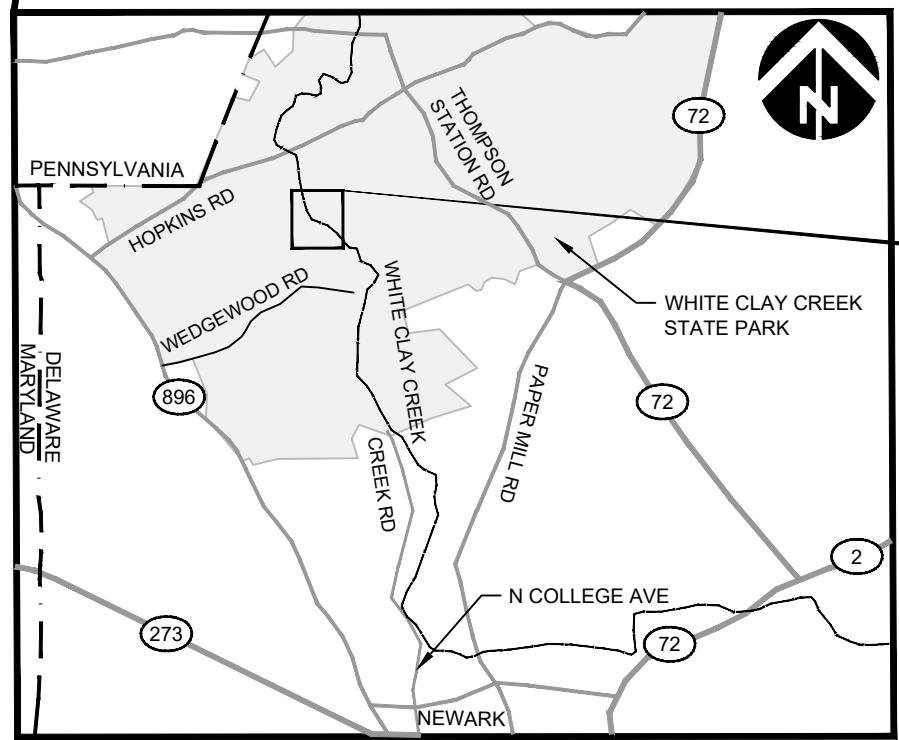
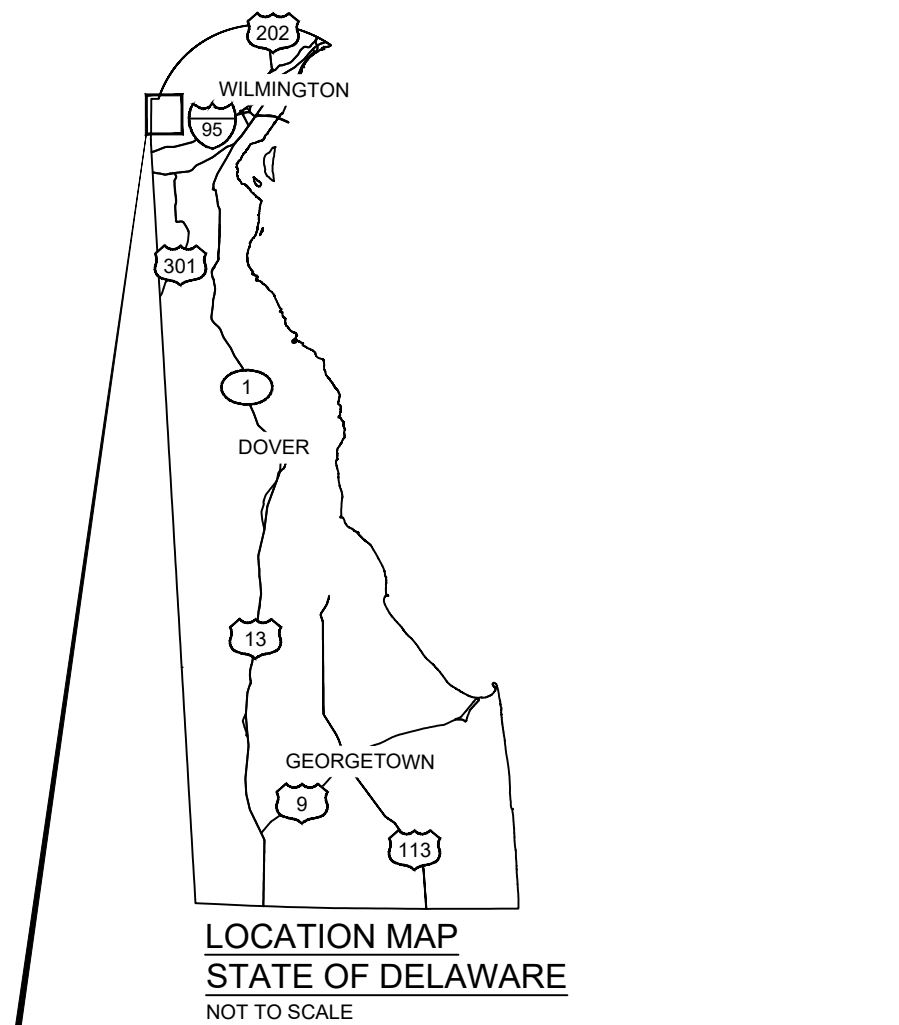
NEWARK, DE

90% DRAFT

JANUARY 12, 2024

LEGEND

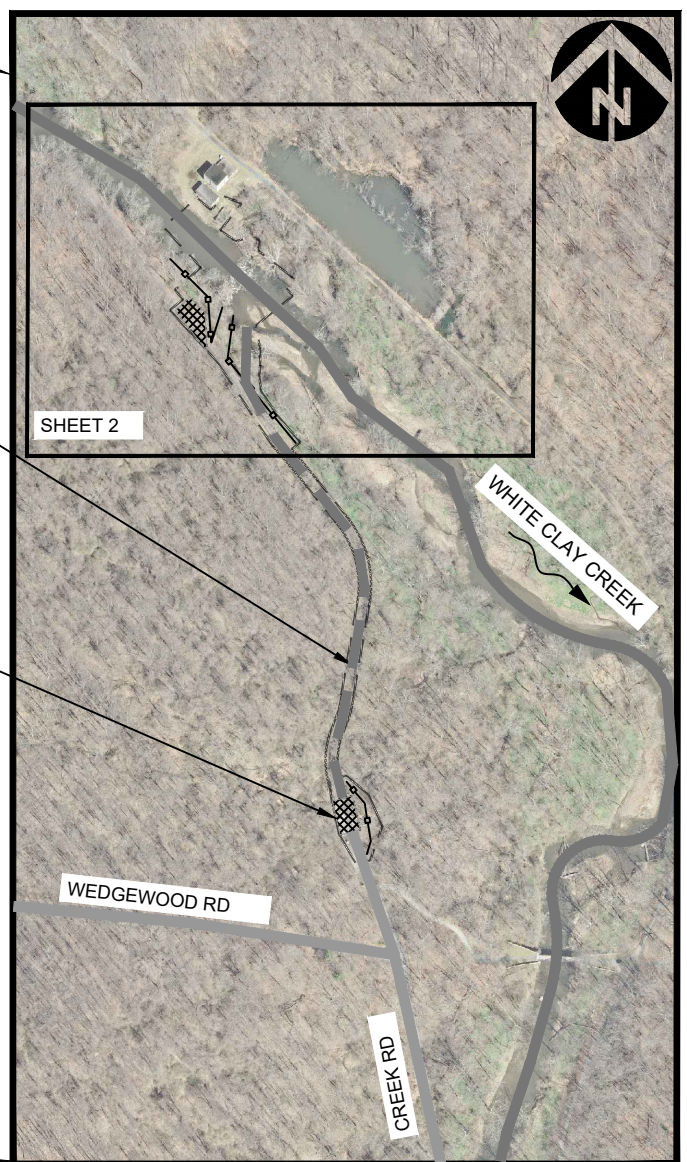
- TEMPORARY ACCESS ROUTE
- LIMITS OF DISTURBANCE
- SILT FENCE/ STRAW WATTLES
- STAGING AREA



PROJECT LOCATION

CONSTRUCTION ACCESS FROM WEDGEWOOD RD.

CONSTRUCTION STAGING IN WHITE CLAY CREEK STATE PARK PARKING LOT



SHEET LIST

- COVER, SHEET INDEX, AND VICINITY MAPS
- EXISTING CONDITONS, SURVEY CONTROL, & GENERAL NOTES
- PROPOSED GRADING PLAN & PROFILE
- PROPOSED LAYOUT AND MATERIALS
- CROSS SECTIONS
- TYPICAL DETAILS
- J-HOOK VANE DETAILS
- FES LIFT DETAILS (1 OF 2)
- FES LIFT DETAILS (2 OF 2)
- SURFACE FABRIC DETAILS
- PLANTING PLAN
- PERMITTING

COORDINATES:
LATITUDE: 39°43'07" N
LONGITUDE: 75°45'41" W

WATERBODY: WHITE CLAY CREEK
TRIBUTARY OF: CHRISTINA RIVER

DRAFT

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NO.	BY	DATE	REVISION DESCRIPTION

BB	KC	SW
DRAWN	DESIGNED	CHECKED
KC	1/12/24	220524
APPROVED	DATE	PROJECT

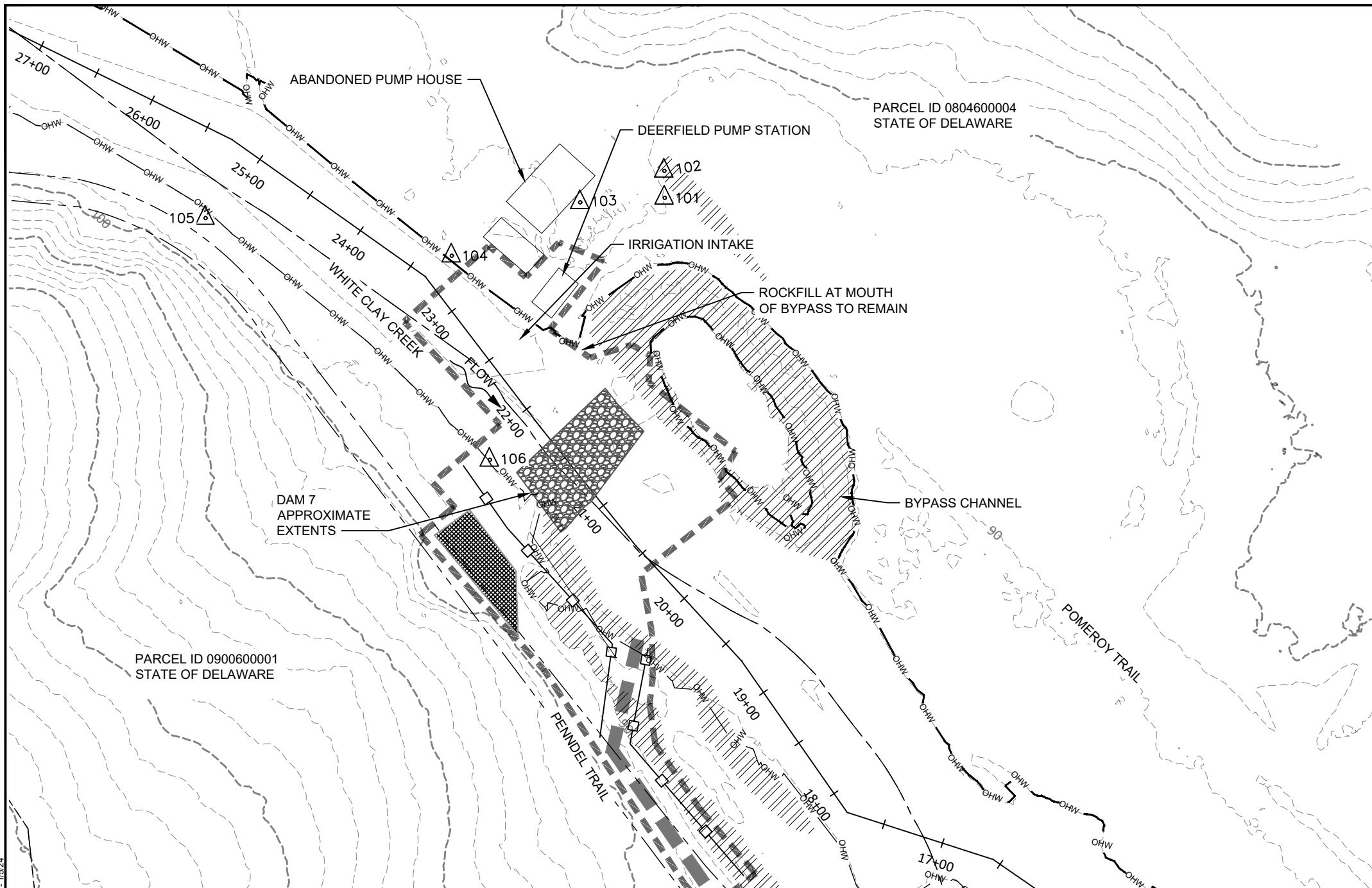
WHITE CLAY CREEK
DAM 7 REMOVAL
90% DRAFT

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Cambridge, MA 02136
617.714.5537
www.interfluve.com

COVER, SHEET INDEX, AND
VICINITY MAPS

SHEET
1 OF 12

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LEGEND

- EXISTING CONTOURS (1 FT)
- APPROX ORDINARY HIGH WATER
- TEMPORARY ACCESS ROUTE
- ALIGNMENT AND STATION
- TAX LOT LINES (SEE NOTE 5)
- LIMITS OF DISTURBANCE
- SURVEY CONTROL POINT
- EXISTING ROCKFILL DAM
- STAGING AREA
- WETLAND EXTENTS (SEE NOTE 6)
- SILT FENCE/ STRAW WATTLES

GENERAL NOTES:

- TOPOGRAPHIC SURVEY COLLECTED BY INTER-FLUVE OCTOBER 25-28, 2022.
- LIDAR USED FOR GENERAL TOPOGRAPHY OUTSIDE LIMITS OF SURVEY ACQUIRED BY USGS BETWEEN 2013 AND 2014 AND OBTAINED THROUGH DIGITAL COAST DOWNLOADER IN SEPTEMBER, 2022 .
- HORIZONTAL COORDINATE SYSTEM IS DELAWARE STATE PLANE, NAD 83 (2011). VERTICAL DATUM IS NAVD88. UNITS ARE U.S. FEET.
- ALL ACCESS LOCATIONS AND ALIGNMENTS WILL BE FIELD ADAPTED AND VERIFIED AT THE TIME OF CONSTRUCTION.
- TAXLOT LINES FROM NEW CASTLE COUNTY PARCEL BOUNDARIES SHAPEFILE, ACCESSED VIA NEW CASTLE COUNTY GIS DATA DOWNLOAD SERVICES, LAST UPDATED 10/20/2006
- WETLAND EXTENTS PER JUNE, 2023 INTERFLUVE DELINEATION.
- ALL SURVEYED CONTROL POINTS MUST BE PROTECTED FROM DISTURBANCE. IF REQUIRED TO DISTURB, COORDINATE WITH THE ENGINEER PRIOR TO GRADING.
- CONTACT MISS UTILITY OF DELMARVA: 811 PRIOR TO PERFORMING ANY GROUND DISTURBING ACTIVITIIES.

SURVEY CONTROL

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
101	626337.91	559294.56	95.79	REBAR/ CAP
102	626359.80	559294.25	95.51	PK NAIL
103	628476.72	558198.22	99.4	PK NAIL
104	628266.40	557748.69	100.95	PK NAIL
105	628260.86	557827.72	102.33	PK NAIL
106	626334.24	559226.02	97.39	BOLT

DRAFT

NO.	BY	DATE	REVISION DESCRIPTION

BB DRAWN	KC DESIGNED	SW CHECKED
KC APPROVED	1/12/24 DATE	220524 PROJECT

WHITE CLAY CREEK
DAM 7 REMOVAL
90% DRAFT

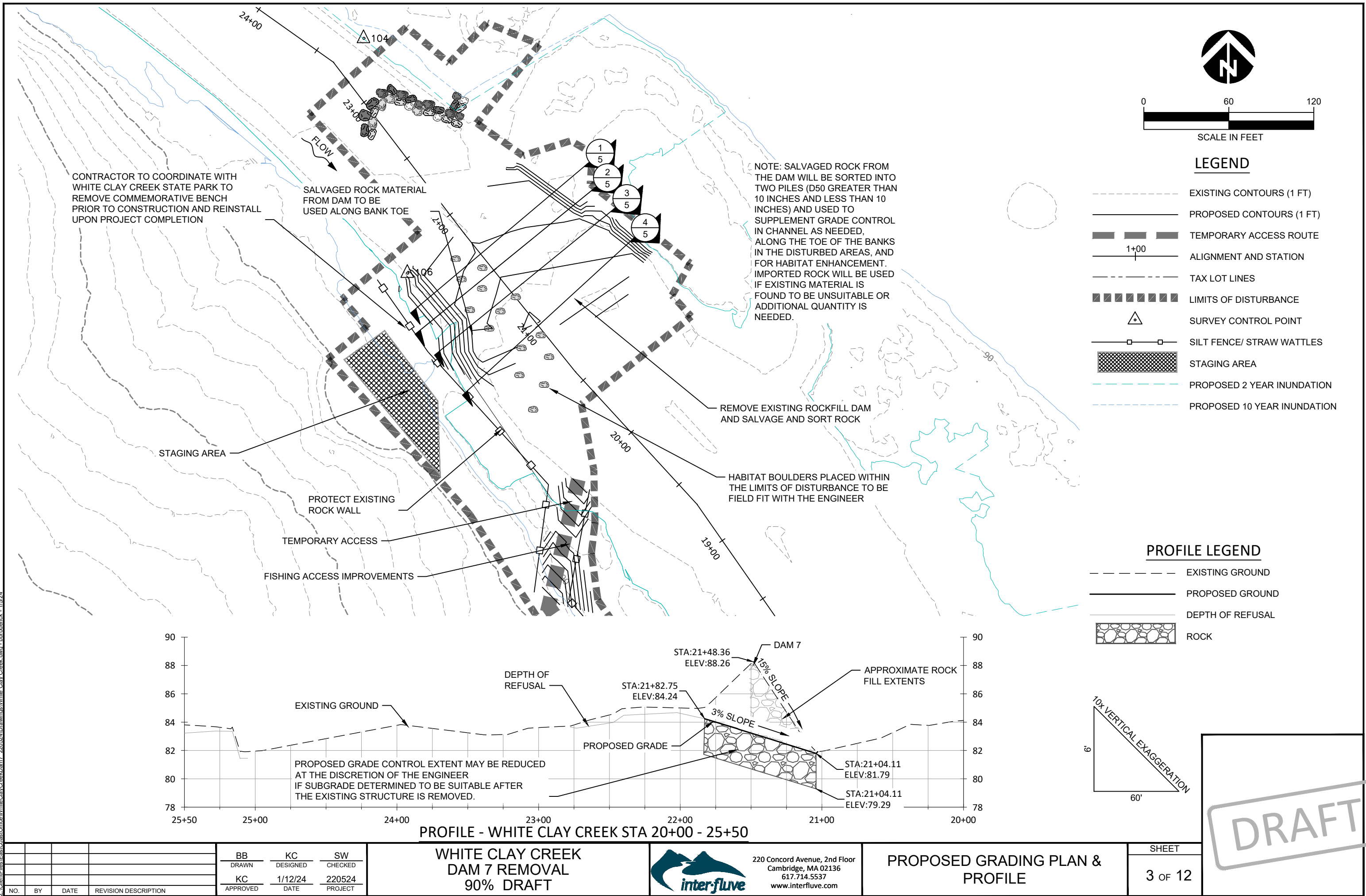


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EXISTING CONDITONS, SURVEY
CONTROL, & GENERAL NOTES

SHEET
2 OF 12

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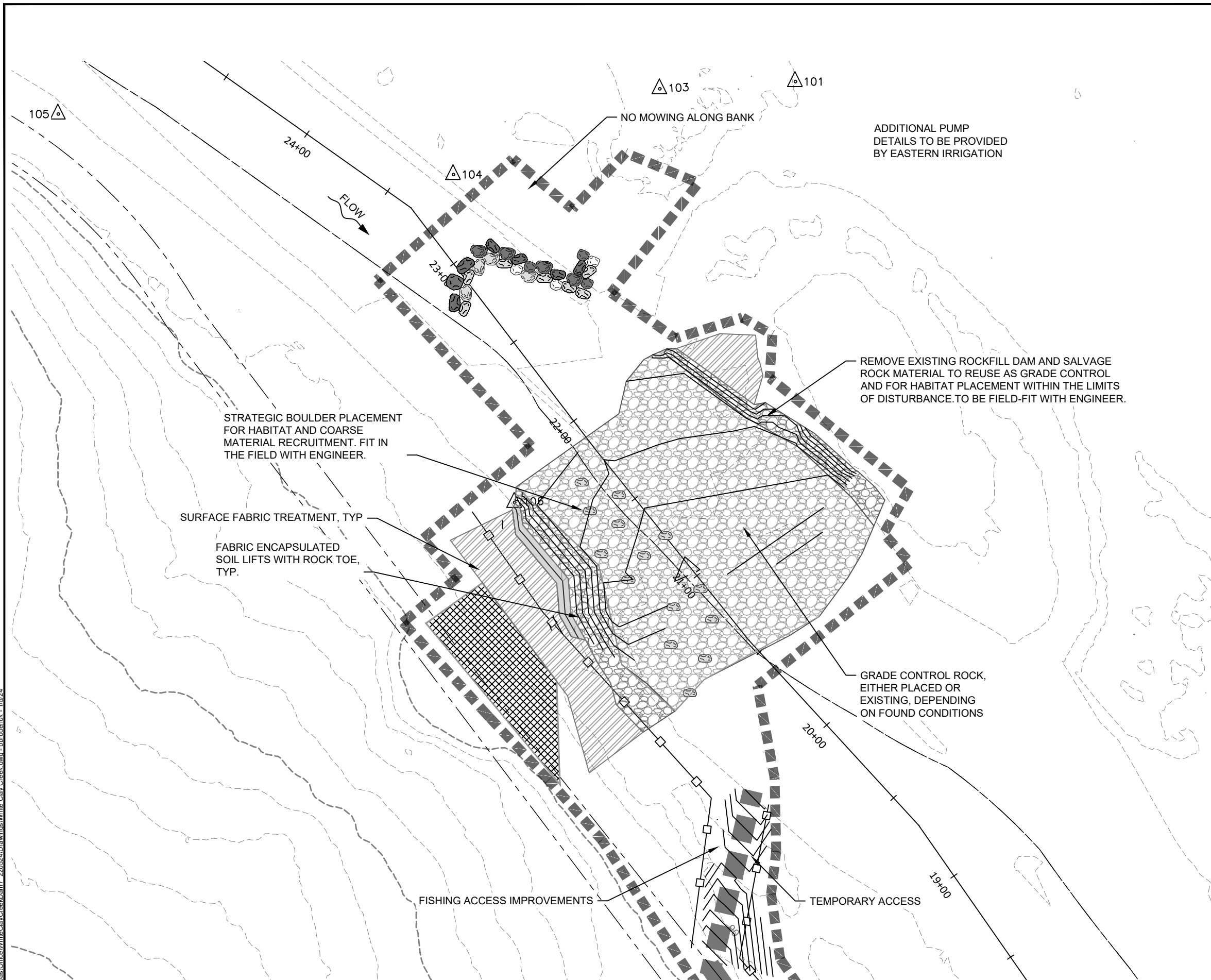
WHITE CLAY CREEK
DAM 7 REMOVAL
90% DRAFT

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PROPOSED GRADING PLAN &
PROFILE

SHEET
3 OF 12

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LEGEND

- EXISTING CONTOURS (1 FT)
- PROPOSED CONTOURS (1 FT)
- TEMPORARY ACCESS ROUTE
- ALIGNMENT AND STATION
- TAX LOT LINES
- LIMITS OF DISTURBANCE
- SURVEY CONTROL POINT
- FABRIC ENCAPSULATED SOIL LIFTS WITH ROCK TOE
- SURFACE FABRIC TREATMENT
- GRADE CONTROL ROCK
- STAGING AREA
- STRATEGIC BOULDER PLACEMENT

NOTE:

SURFACE FABRIC TO BE INSTALLED AND SEEDING IN DISTURBED AREAS

DRAFT

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APPROVED	DATE	PROJECT

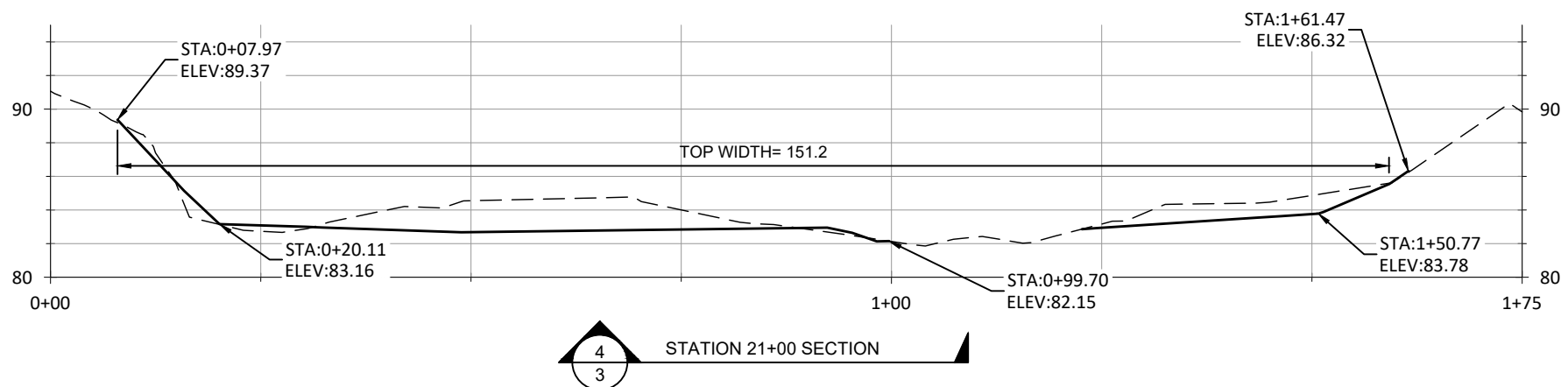
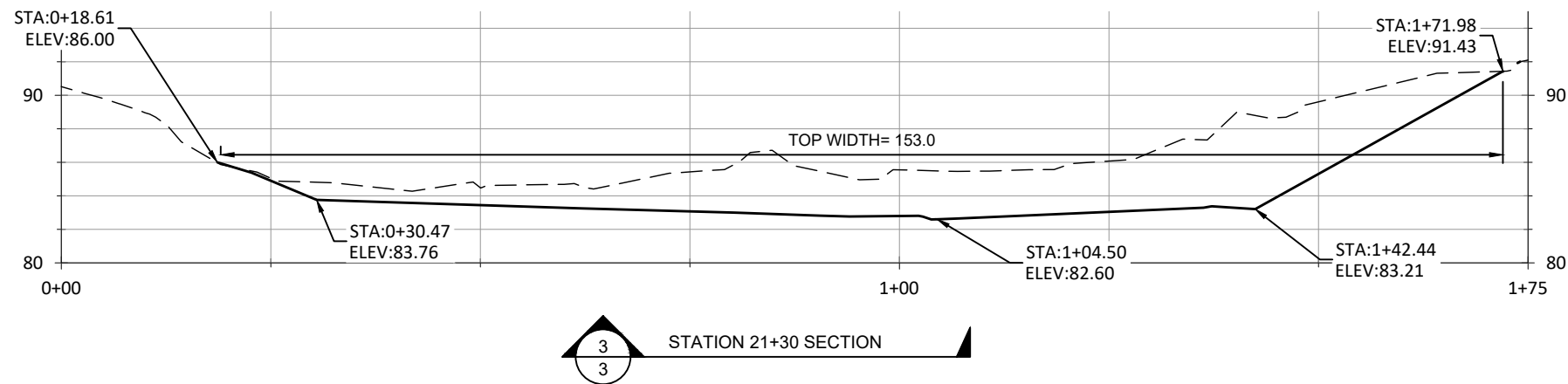
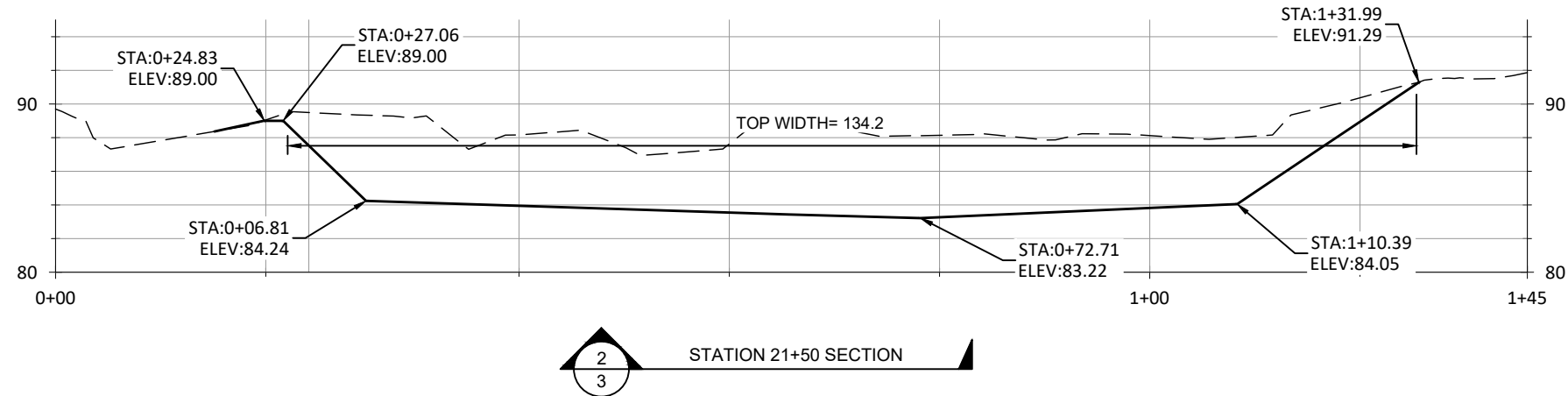
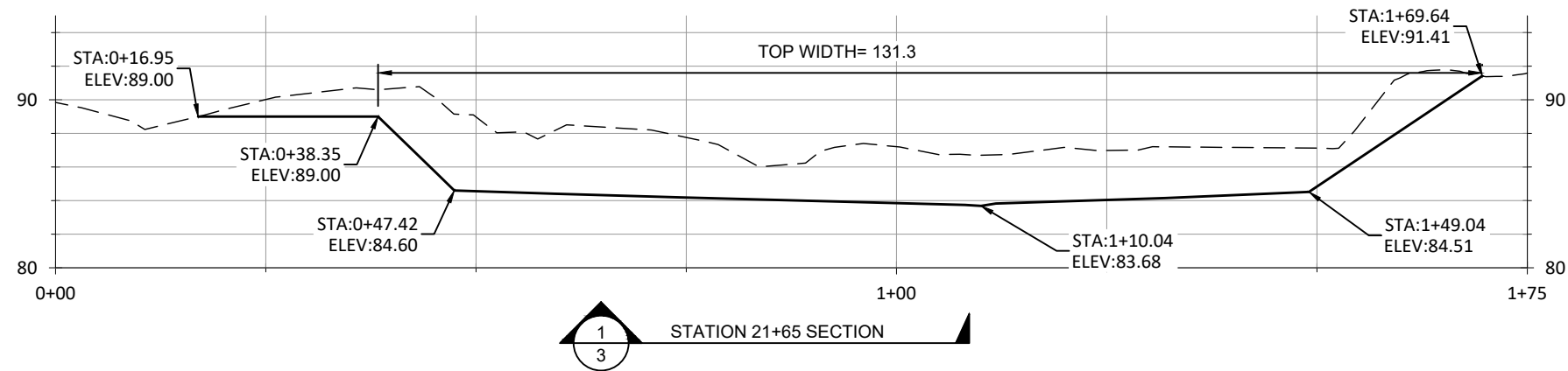
WHITE CLAY CREEK
DAM 7 REMOVAL
90% DRAFT



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Cambridge, MA 02136
617.714.5537
www.interfluve.com

PROPOSED LAYOUT AND
MATERIALS

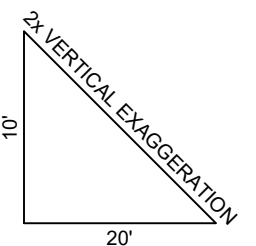
SHEET
4 OF 12



PROFILE LEGEND

--- EXISTING GROUND

— PROPOSED GROUND



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KC	1/12/24	220524
APPROVED	DATE	PROJECT

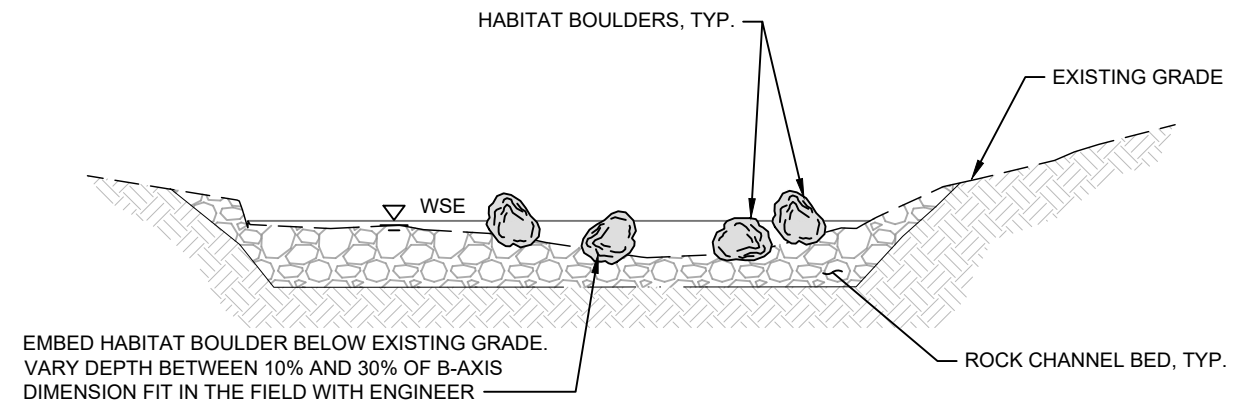
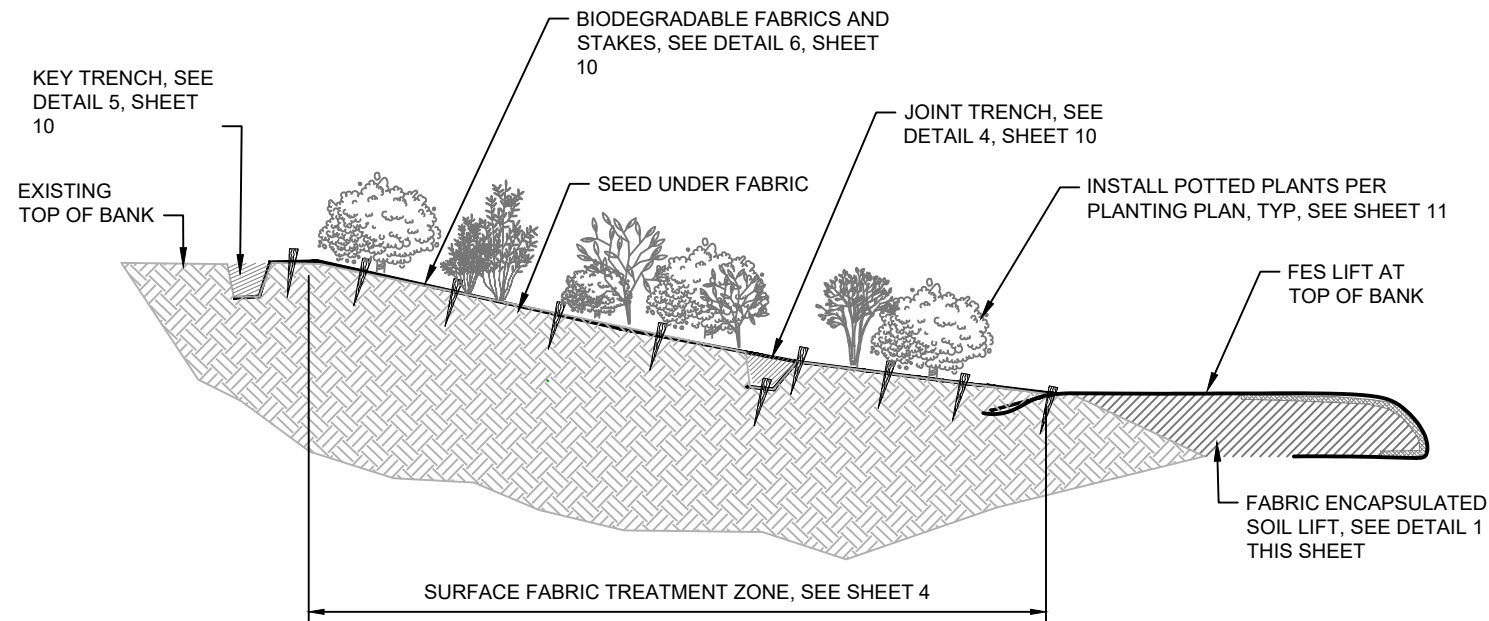
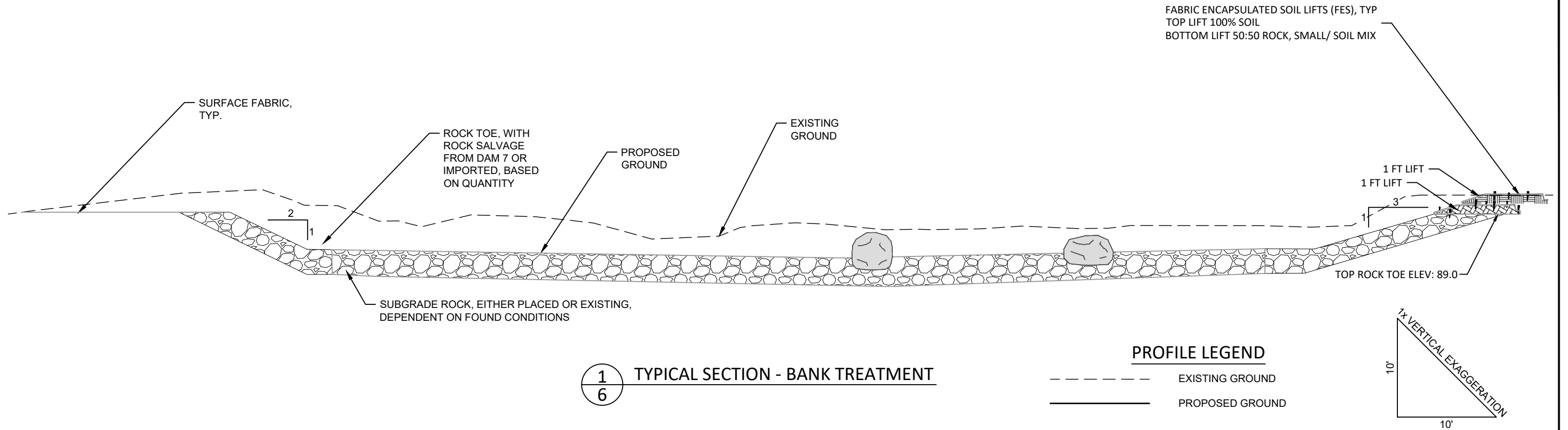
**WHITE CLAY CREEK
DAM 7 REMOVAL
90% DRAFT**



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CROSS SECTIONS

SHEET
5 OF 12



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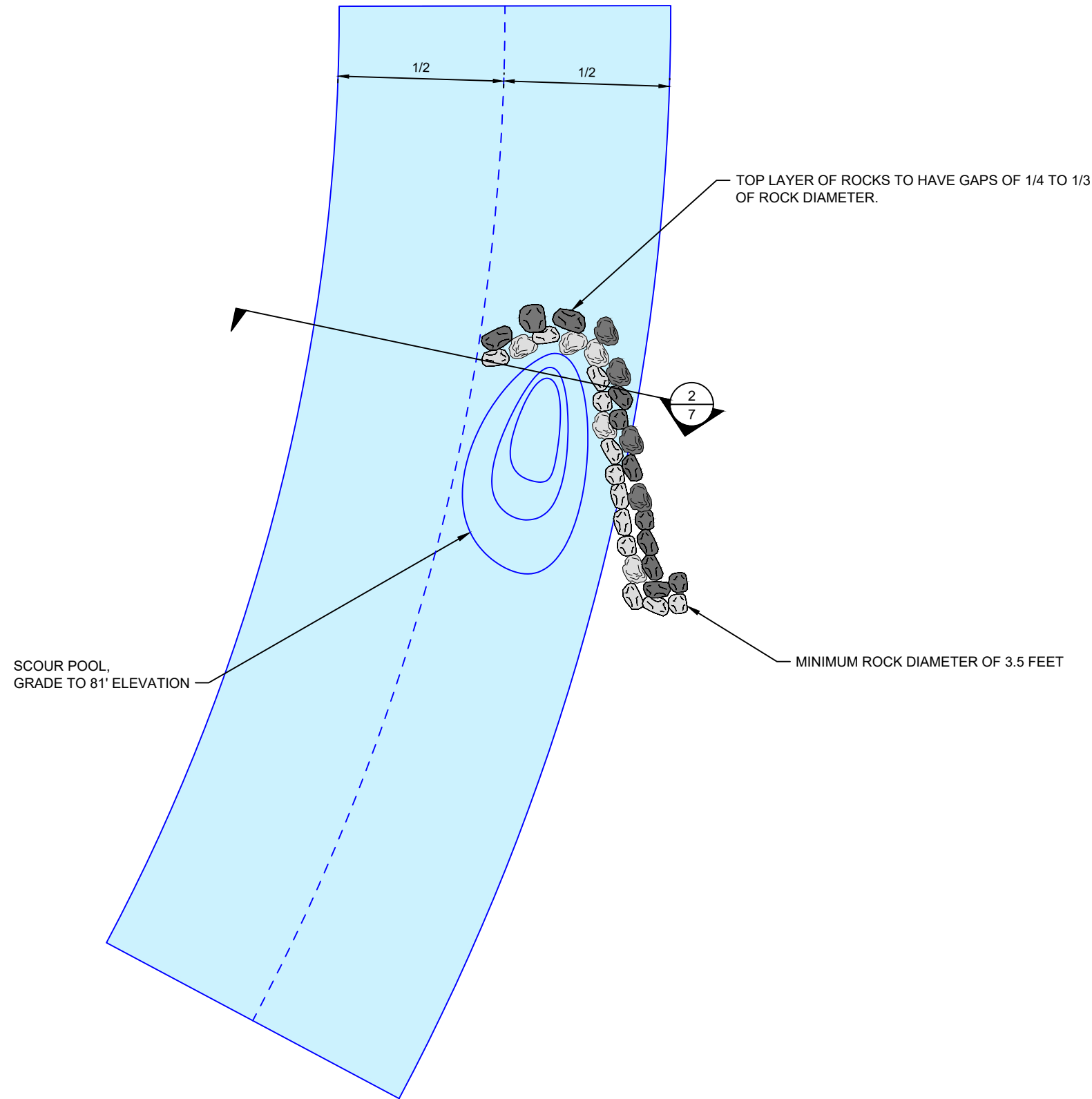
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				WHITE CLAY CREEK DAM 7 REMOVAL 90% DRAFT			TYPICAL DETAILS		SHEET 6 OF 12
NO.	BY	DATE	REVISION DESCRIPTION	BB DRAWN	KC DESIGNED	SW CHECKED			
				KC	1/12/24	220524			
				APPROVED	DATE	PROJECT			

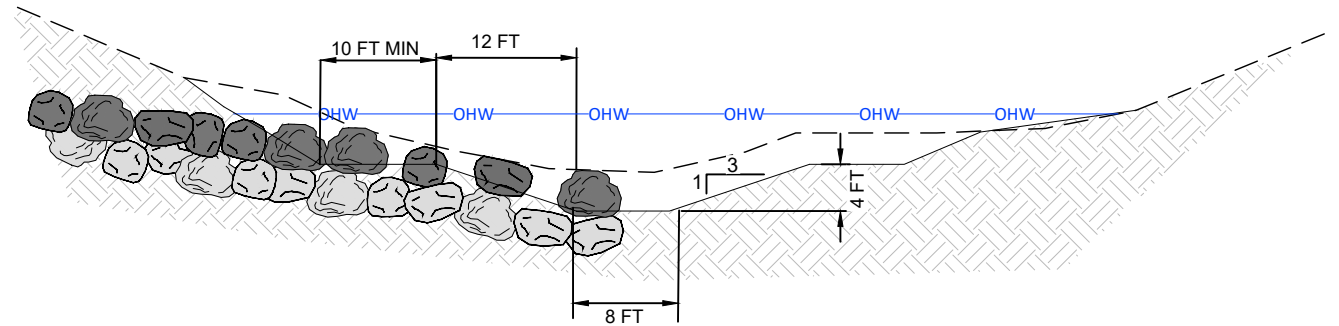


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1
7 TYPICAL DETAIL- J-HOOK VANE
PLAN VIEW



2
7 TYPICAL DETAIL- J-HOOK VANE
SECTION VIEW

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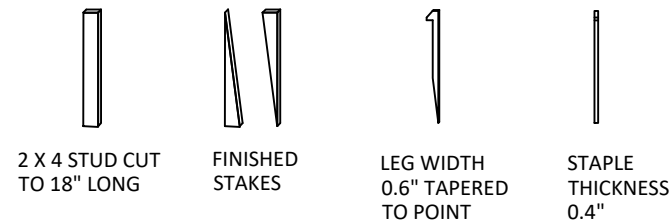
WHITE CLAY CREEK
DAM 7 REMOVAL
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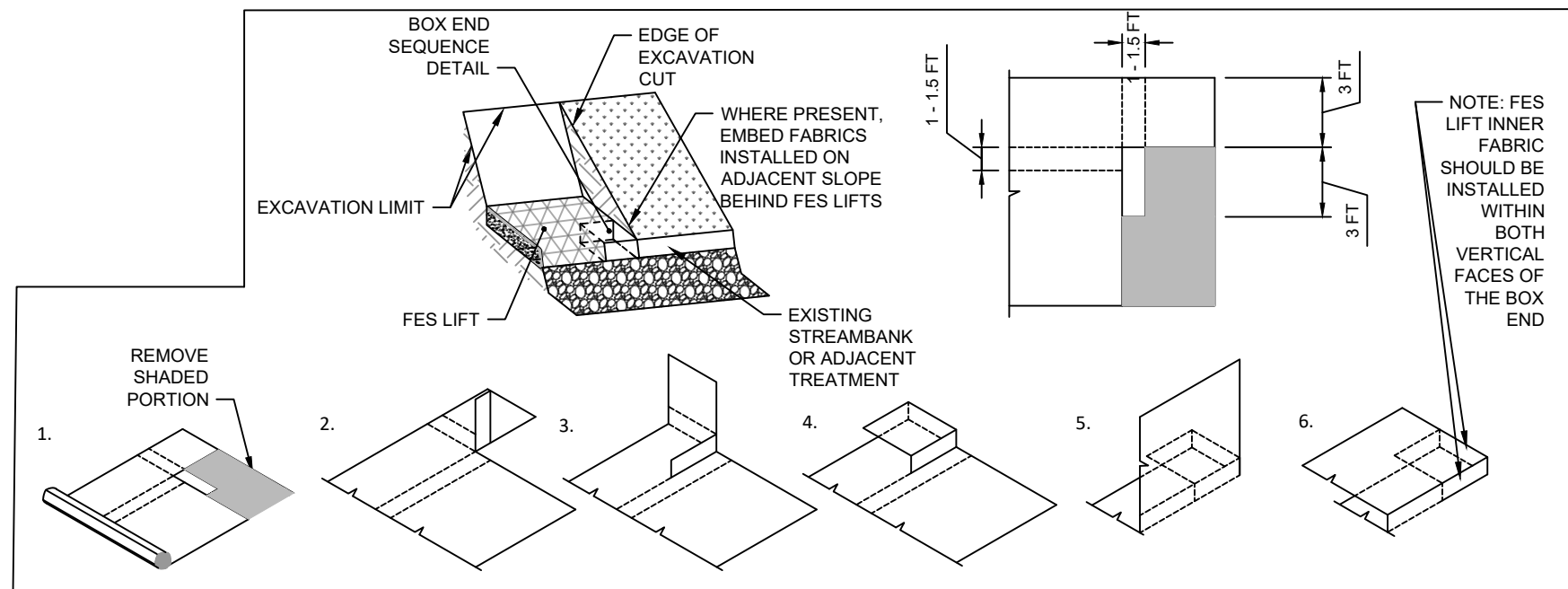
J-HOOK VANE DETAILS

SHEET
7 OF 12



1
8 WOODEN STAKE AND STAPLES- FABRICATING DETAIL

NOT TO SCALE

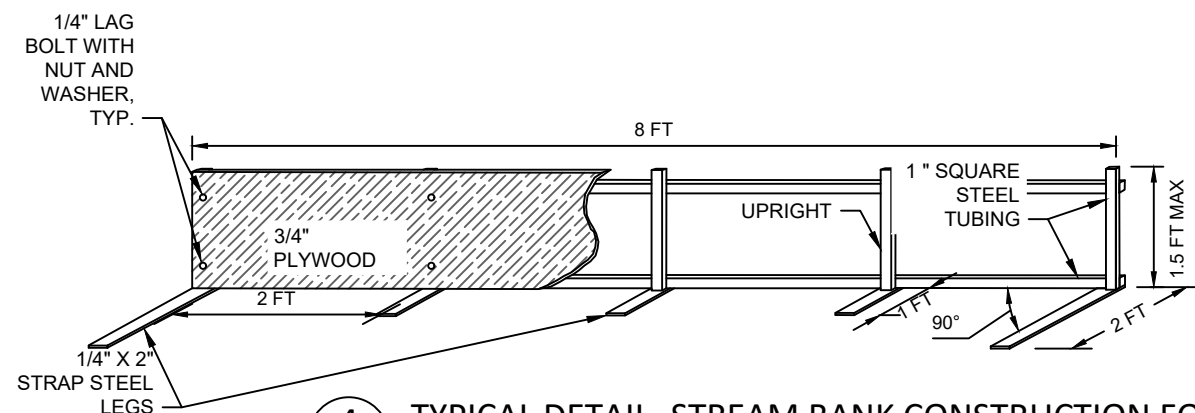


3
8 ISOMETRIC DETAIL- FABRIC JOINING

NOT TO SCALE

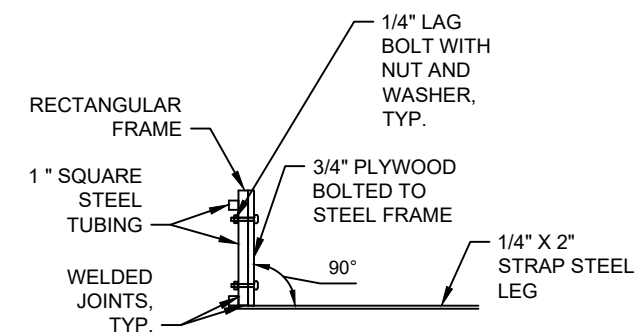
GENERAL NOTES ON SECURING COIR FABRIC

1. SECURE THE OUTER FABRIC (WOVEN, WHERE APPLICABLE), WITH A WOODEN STAKE THROUGH THE FABRIC ON 3 FT CENTERS (SEE DETAIL VIEWS 1 - 3)
NOTE: THE HOLES FOR STAKES SHALL NOT BE PRECUT. ALLOW THE STAKE TO BREAK THE MINIMUM NUMBER OF STRANDS AS IT IS BEING DRIVEN IN. DRIVE STAKES SO THAT 2" TO 3" OF THE TOP OF THE STAKE IS LEFT EXPOSED.
2. OUTER FABRIC ENDS SHALL BE JOINED BY LAPPING THE UPSTREAM PIECE OF FABRIC OVER THE DOWNSTREAM PIECE AS SHOWN IN DETAILS 1-3. OVERLAPS SHALL BE A MINIMUM OF 3 FT, INNER FABRIC ENDS SHALL BE BUTTED TOGETHER, NOT OVERLAPPED. OVERLAPS SHALL BE STAGGERED FROM LIFT TO LIFT BY A MINIMUM OF 15 FT.
3. STAKING SPACING IS DEFINED IN SPECIFICATIONS FOR FES LIFT AND SURFACE FABRIC.



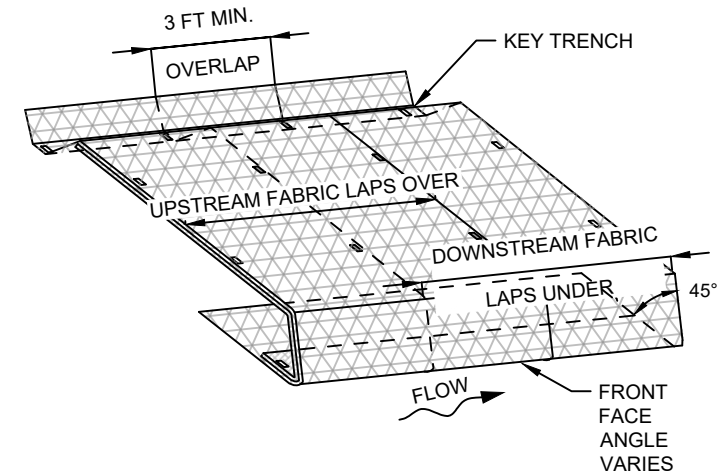
4
8 TYPICAL DETAIL- STREAM BANK CONSTRUCTION FORM-FES LIFT

NOT TO SCALE



5
8 TYPICAL DETAIL- STREAM BANK CONSTRUCTION FORM-FES LIFT

NOT TO SCALE



2
8 ISOMETRIC DETAIL- FARBIC JOINING

NOT TO SCALE

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FES LIFT DETAILS (1 OF 2)

SHEET
8 OF 12

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FIG A.

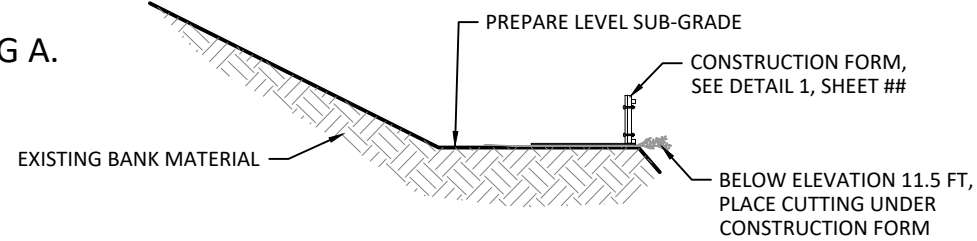


FIG B.

NOTE:
INSERT STAKES WITHOUT BREAKING FABRIC (MANUALLY STRETCH HOLE SO THAT STAKE CAN ENTER WITHOUT BREAKING FABRIC).

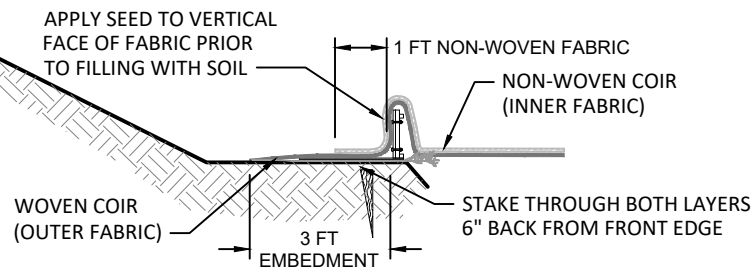


FIG C.

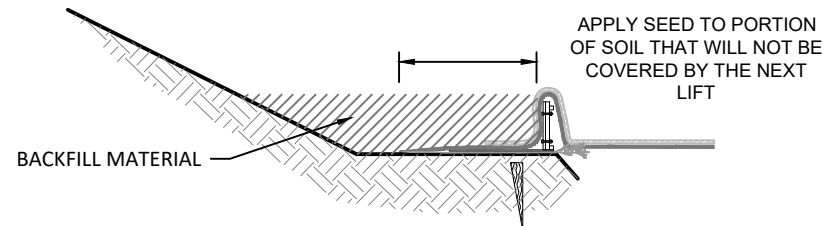


FIG D.

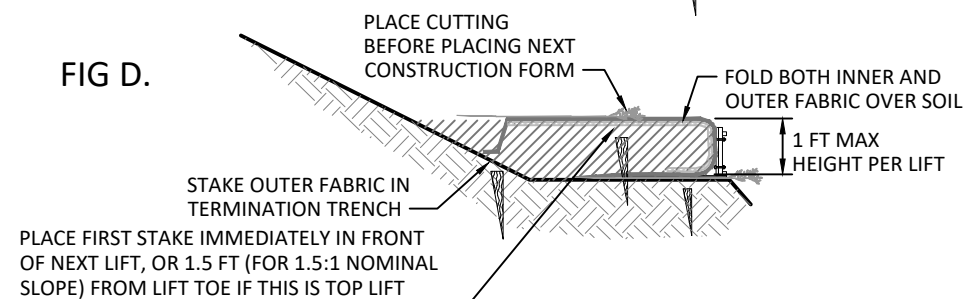


FIG E.

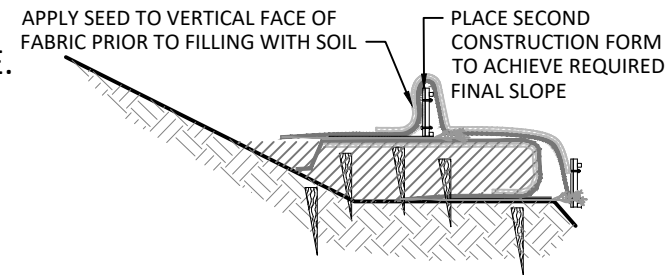


FIG F.

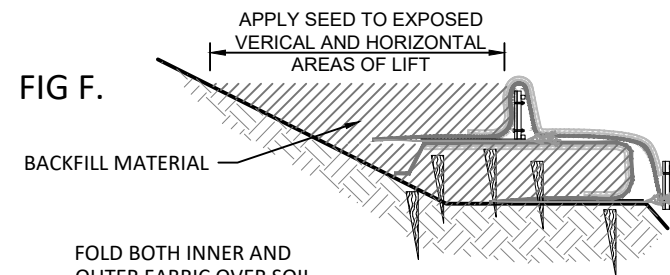


FIG G.

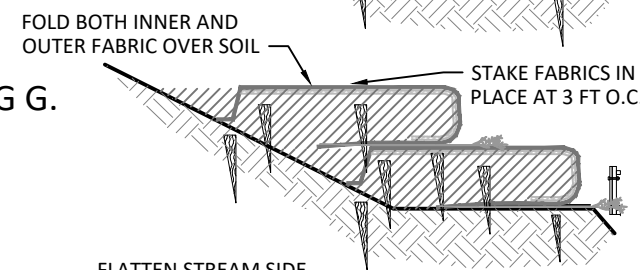
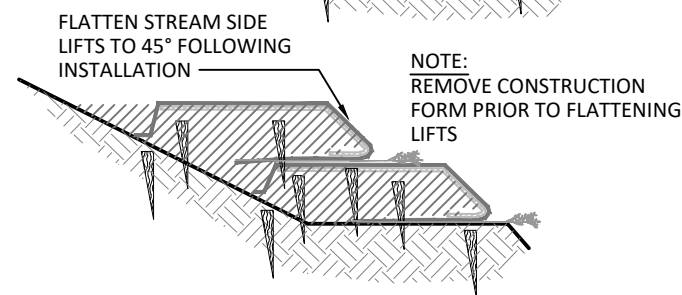


FIG H.



SEQUENCING NOTES:

1. LIFTS SHALL USE 13 FT WIDE WOVEN COIR FOR THE OUTER FABRIC.
2. FES LIFTS MAY BE CONSTRUCTED IN EITHER AN UPSTREAM OR DOWNSTREAM DIRECTION, AS LONG AS THE FABRIC IS OVERLAPPED IN THE PROPER DIRECTION.
3. EACH LIFT MAY HAVE A UNIQUE FILL COMPOSITION AND VARYING PLACEMENT OF CUTTINGS. SEE TYPICAL SECTIONS.
4. PLACE A SERIES OF THREE OR MORE FORMS ON THE GROUND SO THAT THE FORMS FOLLOW THE PROPOSED STREAM BANK ALIGNMENT. BUTT THE ENDS OF THE FORMS TIGHTLY TOGETHER.
5. UNROLL THE OUTER FABRIC PARALLEL TO THE LONG AXIS OF THE CHANNEL AND POSITION IT SO THAT 3 FT EXTENDS FOR EMBEDMENT ON THE BANK SIDE OF THE FORMS (FIG B), AND A MINIMUM 3 FT EXTENDS LENGTHWISE BEYOND THE LAST FORM FOR OVERLAP. DRAPE THE REMAINDER OF THE FABRIC OVER THE TOP OF THE FORMS ON THE STREAM SIDE (FIG B).
6. UNROLL THE INNER FABRIC OVER THE TOP OF THE WOVEN COIR FABRIC (FIG B) AND POSITION IT SO THAT AT LEAST 1 FT OF THE INNER FABRIC EXTENDS AS AN EMBEDMENT LENGTH ON THE BANK SIDE OF THE FORMS (FIG C). DRAPE THE REMAINDER OF THE FABRIC OVER THE TOP OF THE FORMS ON THE STREAM SIDE AND ALIGN THE LONG EDGES OF THE FABRICS. STRETCH AND PULL THE FABRIC LAYERS TO REMOVE WRINKLES.
7. APPLY SEED MIX TO INNER FABRIC ALONG VERTICAL EDGE OF LIFT (FIG C). PLACE SPECIFIED FILL OVER THE FABRIC ON THE BANK SIDE OF THE FORMS. LEVEL THE FILL AND COMPACT TO 85 PERCENT OF MAXIMUM DENSITY (FIG C).
8. APPLY SEED MIX TO TOP OF FILL FROM THE FRONT OF THE LIFT TO THE POINT AT WHICH THE ABOVE LIFT WILL OVERLAP (FIG C).
9. FOLD THE LOOSE ENDS OF THE TWO COIR FABRIC LAYERS BACK OVER THE COMPACTED FILL MATERIAL AND STRETCH TIGHTLY TO REMOVE WRINKLES (FIG D). SECURE WITH WOODEN STAKES AT 3 FT ON CENTER ALONG THE BACK EDGE AND INTO UNDISTURBED SOIL.
10. REMOVE THE FORMS FROM THE FRONT OF THE COMPLETED LIFTS (FIG. G). LEAVE THE LAST FORM IN PLACE AT THE END OF THE NEWLY CONSTRUCTED LIFT (FIG. G).
11. FOR LIFTS AT OR BELOW ELEVATION 11.5 FT, PLACE 0.5 INCH OF SELECT SOIL ON LIFT. PLACE LIVE CUTTINGS AT 1 FT ON CENTER. REPEAT STEPS 2 THROUGH 7 TO ACHIEVE FULL TREATMENT HEIGHT.
12. WHERE THE TOP OF THE LIFT MEETS THE GROUND SURFACE, EXCAVATE A KEY TRENCH 1.5 FT WIDE AND 1 FT DEEP ALONG THE EDGE OF THE OUTER FABRIC LAYER, PARALLEL TO THE FORMS. SEED ENTIRE AREA OF TOP LIFT. SECURE FABRIC IN THE KEY TRENCH WITH WOODEN STAKES AT 3 FT ON CENTER.
13. BACKFILL THE KEY TRENCH AND CONTINUE TO BACKFILL AND COMPACT TO SMOOTHLY MERGE WITH THE ADJACENT FINISHED GRADE. APPLY SEED MIX TO KEY TRENCH AREA.

1
9 TYPICAL SECTION - CONSTRUCTION SEQUENCE FOR FES LIFTS
NOT TO SCALE

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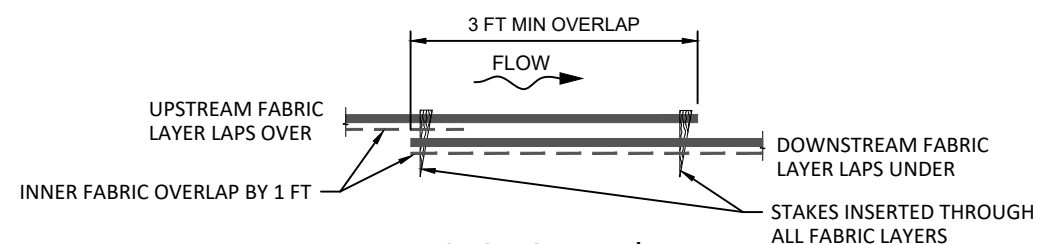
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FES LIFT DETAILS (2 OF 2)

SHEET
9 OF 12

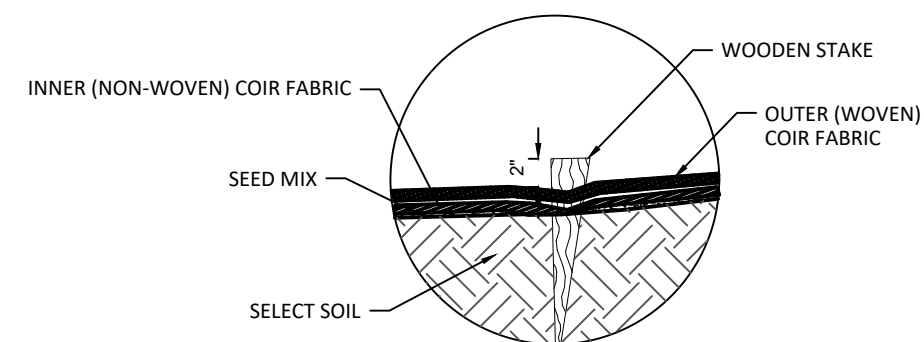


1. INSERT AND DRIVE WOOD STAKES BETWEEN THE FIBERS OF THE WOVEN COIR FABRIC. FIBERS AT WOOD STAKE LOCATION SHALL BE MANUALLY STRETCHED TO ACCOMMODATE THE WOOD STAKE WITHOUT BREAKING THE FABRIC FIBERS. STAKING SHALL NOT BE FACILITATED BY PRE-CUTTING OF THE COIR FABRICS.
2. FORMS MAY BE ANGLED TO CREATE BENDS IN THE LIFTS AS NEEDED. FABRIC SHALL BE FOLDED AS SHOWN. STAKE THE FOLDS AS SHOWN.
3. OUTER FABRIC ENDS SHALL BE JOINED BY LAPPING THE UPSTREAM PIECE OF FABRIC OVER THE DOWNSTREAM PIECE AS SHOWN.

3
10

TYPICAL DETAIL - WOODEN STAKE FABRICATION

NOT TO SCALE



6 BIODEGRADABLE FABRICS AND STAKES
10 NOT TO SCALE

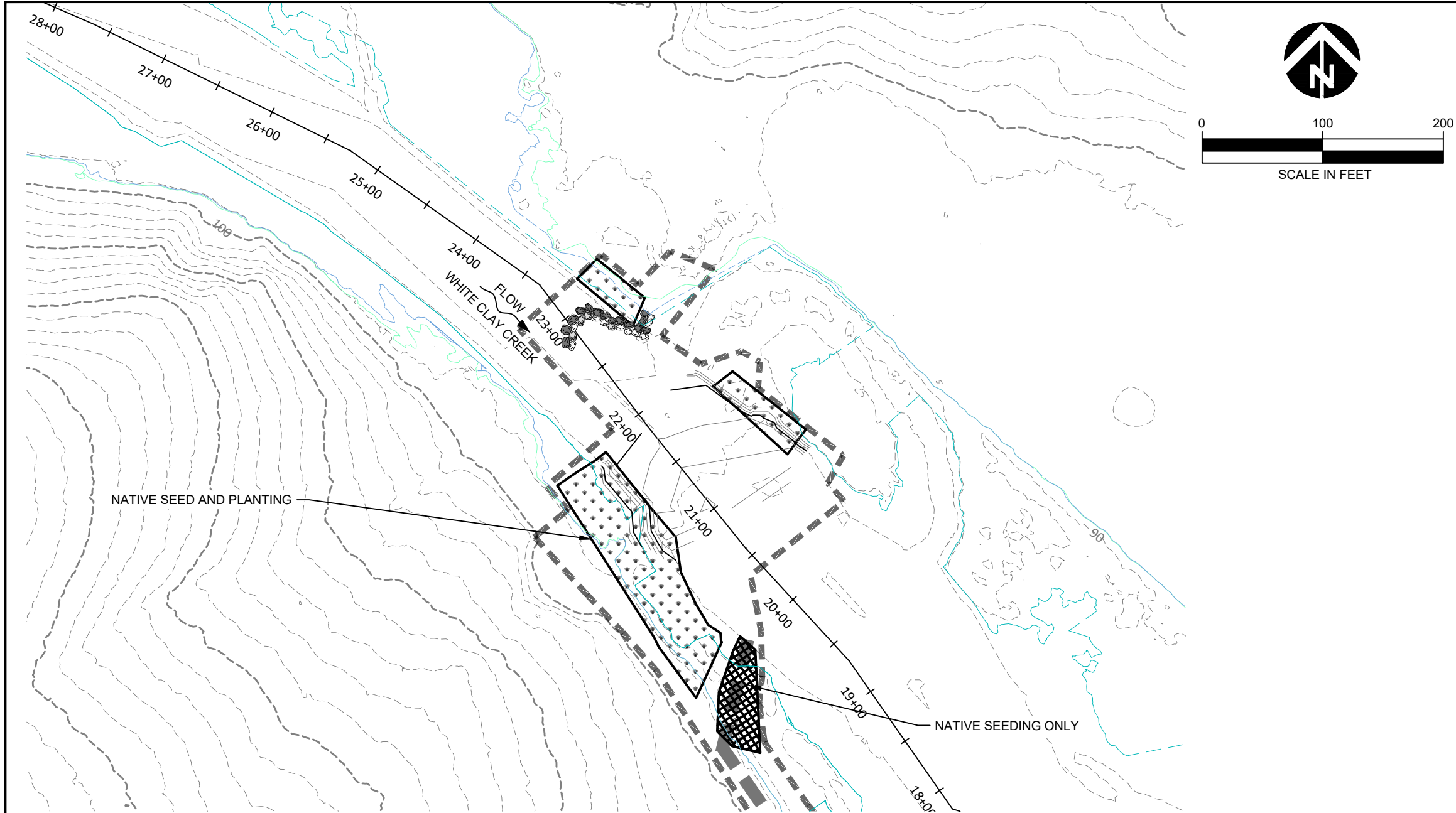
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SHEET

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LEGEND

- EXISTING CONTOURS (1 FT)
- TEMPORARY ACCESS ROUTE
- ALIGNMENT AND STATION
- LIMITS OF DISTURBANCE
- NATIVE SEEDING AND PLANTING
- NATIVE SEEDING ONLY

NOTES:

- AREAS WITH NO GROUND DISTURBANCE TO BE PLANTED ONLY, NOT SEEDED.
- ALL AREAS INDICATED SHALL BE SEEDED IMMEDIATELY POST-CONSTRUCTION WITH APPROVED NATIVE SEED MIX.
- INSTALLATION OF PLANTS SHALL BE CONFIGURED TO ENHANCE EXISTING VEGETATION LOCATIONS

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DAM 7 REMOVAL
90% DRAFT

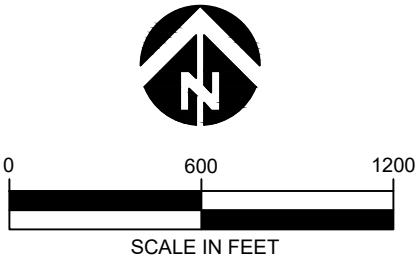
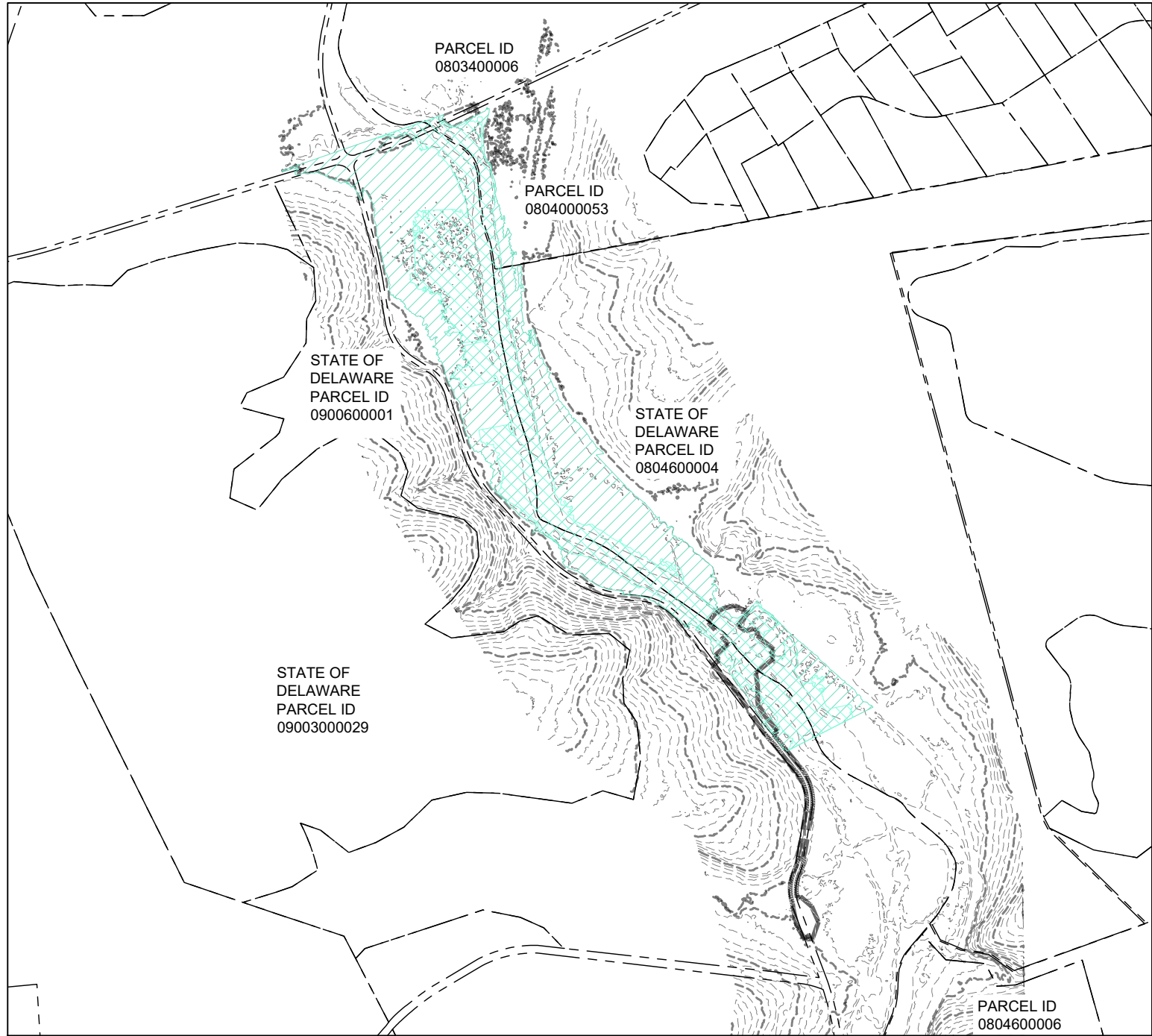


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PLANTING PLAN

SHEET

11 OF 12



- LIMIT OF DISTURBANCE
- PARCEL BOUNDARIES (NEW CASTLE COUNTY 2020)
- EXISTING CONTOURS (5 FT)
- 2 YEAR INUNDATION (EXISTING AND PROPOSED CONDITIONS)
- 10 YEAR INUNDATION (EXISTING AND PROPOSED CONDITIONS)

NOTE:
EXISTING AND PROPOSED AREAS OF
INUNDATION REMAIN THE SAME FOR
BOTH 2 AND 10 YEAR EVENTS

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PERMITTING

SHEET
12 OF 12

Attachment B — Copy of Property Deeds

125760

EX203230202



TAX PARCEL NUMBER:
PART OF 08-C46.00-004

Prepared by:
Henry H. Silliman, III, Esquire

Return to:
State of Delaware c/o Seal, Engr. Remit. Seal
1000 Bar 1266
Wilmington DE 19808

DEED

THIS DEED, made this 20th day of December, 1995,
between E. I. DU PONT DE NEMOURS AND COMPANY, a Delaware
corporation, of 1007 Market Street, Wilmington, Delaware
19898, ("GRANTOR") and the State of Delaware ("GRANTEE").

WITNESSETH:

That GRANTOR, for and in consideration of the sum
of Ten Dollars (\$10.00), receipt of which is hereby
acknowledged, does hereby grant and convey unto the GRANTEE:

PARCEL NO. 2

ALL THAT CERTAIN tract, piece or parcel of land situate off Paper Mill Road, Mill
Creek Hundred, New Castle County, Delaware and shown as Parcel No. 2 on a Record
Resubdivision Plan prepared by VanDemark & Lynch, Inc., Engineers, Planners and
Surveyors, Wilmington, Delaware, dated November 5, 1995, recorded in the
Office of the Recorder of Deeds in and for New Castle County on Microfilm No. 1357 and
described to wit:

NCC 046 1214 022895 011

\$00 ST

NCC 046 1214 022895 012 \$00 NC

9/33/97

RECORDED
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BK 2032 PG 1203

BEGINNING at a point on the northwesterly side of Paper Mill Road (a.k.a. Curtis Mill Road, Delaware Route No. 72/Road Maintenance No. 13) said point being a corner for the herein described parcel and lands of MBNA Properties, Inc. (Deed Record 1842, Page 321) and being distant the three following described courses and distances measured along the said northwesterly side of Paper Mill Road from the southeasterly end of a corner cut-off joining the said northwesterly side of Paper Mill road with the southwesterly side of Thompson Station Road (Road Maintenance No. 53):

- (1) South 22°-12'-16" West, 956.37 feet to a point of curvature;
- (2) Southwesterly by a curve to the right having a radius of 1,511.45 feet, an arc distance of 318.134 feet to a point of tangency for said curve, said point being distant by a chord of South 28°-14'-18" West, 317.75 feet from the last described point; and
- (3) South 34°-16'-19" West, 281.55 feet to the point of Beginning;

THENCE from the said point of Beginning and continuing along the said northwesterly side of Paper Mill Road, South 34°-16'-19" West, 268.25 feet to a point, a corner for lands now or formerly of W. L. Gore and Associates, Inc., Deed Record 1872, Page 275);

THENCE leaving the said northwesterly side of Paper Mill Road and by lines of said lands now or formerly of W. L. Gore and Associates, Inc., the nine following described courses and distances:

- (1) North 45°-17'-48" West, 243.87 feet to a point;
- (2) North 67°-59'-22" West, 835.51 feet to a point;
- (3) South 70°-51'-08" West, 105.71 feet to a point;
- (4) South 46°-53'-15" West, 722.91 feet to a point, a corner for Parcel 11;
- (5) South 72°-52'-01" West, 642.28 feet to a point, a corner for Parcel 11;
- (6) South 70°-35'-13" West, 391.43 feet to a point;
- (7) South 41°-33'-40" West, 401.80 feet to a point;
- (8) South 17°-32'-53" West, 310.00 feet to a point; and
- (9) South 63°-18'-39" West, 1,097.70 feet to a point on the top of bank of White Clay Creek, and a corner for Parcel No. 5;

SK2032-1204

THENCE by lines of said Parcel No. 5, the thirteen following described courses and distances:

- (1) Leaving the said top of bank of White Clay Creek, North 60°-31'-39" East, 1,138.94 feet to a point;
- (2) North 17°-32'-53" East, 244.68 feet to a point;
- (3) North 41°-33'-40" East, 406.52 feet to a point;
- (4) North 70°-35'-13" East, 394.22 feet to a point;
- (5) North 72°-52'-01" East, 634.63 feet to a point;
- (6) North 55°-15'-51" West, 908.26 feet to a point;
- (7) South 82°-17'-47" West, 780.59 feet to a point;
- (8) North 15°-36'-34" West, 1,186.00 feet to a point;
- (9) South 70°-22'-00" West, 294.00 feet to a point;
- (10) South 84°-46'-00" West, 78.00 feet to a point;
- (11) North 28°-54'-00" West, 108.00 feet to a point;
- (12) North 82°-38'-30" West, 169.00 feet to a point; and
- (13) North 43°-29'-35" West, 134.25 feet to a point near the said top of bank of White Clay Creek;

THENCE along the said top of bank, the two following described courses and distances:

- (1) North 59°-35'-41" East, 55.00 feet to a point; and
- (2) South 29°-37'-07" East, 40.01 feet to a point, a corner for Parcel No. 4;

THENCE by lines of said Parcel No. 4, the four following described courses and distances:

- (1) South 64°-27'-35" East, 95.48 feet to a point;
- (2) South 77°-59'-00" East, 140.00 feet to a point;
- (3) South 53°-46'-30" East, 118.00 feet to a point; and
- (4) North 69°-41'-00" East, 583.56 feet to a point, a corner for Parcel No. 8;

THENCE by lines of said Parcel No. 8 the two following described courses and distances:

- (1) North 69°-41'-00" East, 491.44 feet to a point; and
- (2) South 88°-55'-08" East, 958.12 feet to a point;

THENCE along said Parcel No. 8 and Parcel No. 10, South 67°-58'-22" East, 619.60 feet to a point in the northwesterly line of said lands now or formerly of MBNA Properties, Inc;

THENCE by said lands now or formerly of MBNA Properties, Inc., the nine following described courses and distances:

- (1) South 22°-00'-38" West, 286.50 feet to a point;
- (2) South 45°-53'-11" West, 202.30 feet to a point;

EX203277205

- (3) South 64°-14'-39" East, 127.18 feet to a point;
- (4) South 22°-00'-38" West, 44.93 feet to a point;
- (5) South 67°-59'-22" East, 110.00 feet to a point;
- (6) South 22°-00'-38" West, 122.63 feet to a point;
- (7) South 29°-59'-33" East, 319.74 feet to a point;
- (8) South 67°-59'-22" East, 1,248.25 feet to a point; and
- (9) North 77°-02'-16" East, 101.26 feet to a point on the said northwesterly side of Paper Mill Road and the point and place of Beginning;

CONTAINING within said metes and bounds, 76.71 acres of land being the same, more or less...

SUBJECT TO an easement for the State of Delaware from the White Clay Creek, and a thirty foot wide roadway easment for Parcel No. 11, as shown on the aforeaid prepared by VanDemark & Lynch, Inc., Engineers, Planners and Surveyors, Wilmington, Delaware, recorded in the Office of the Recorder of Deeds in and for New Castle County on Microfilm No. 12654.

EX2032-1206

PARCEL NO. 4

ALL THAT CERTAIN tract, piece or parcel of land situate on Thompson Station Road, Mill Creek Hundred, New Castle County, Delaware and shown as Parcel No. 4 on a Record Resubdivision Plan prepared by VanDemark & Lynch, Inc., Engineers, Planners and Surveyors, Wilmington, Delaware, dated November 5, 1995, recorded in the Office of the Recorder of Deeds in and for New Castle County on Microfilm No. 12654 and described to wit:

BEGINNING at a point on the southwesterly side of Thompson Station Road (Road Maintenance No. 53, at 50 feet wide) said point being a corner for the herein described parcel and lands now or formerly of Erik G. Bergstrom and Donna M. Bergstrom (Tax Parcel No. 08-040.00-040);

THENCE from the said point of Beginning and along the said southwesterly side of Thompson Station Road southeasterly by a curve to the left having a radius of 1,389.49 feet, an arc distance of 349.13 feet to a point, a corner for Parcel No. 6, said point being distant by a chord of South 14°-18'-46" East, 348.22 feet from the last described point;

THENCE leaving the said southwesterly side of Thompson Station Road and along the northwesterly line of said Parcel No. 6, South 82°-26'-33" West, 1,860.49 feet to a point;

THENCE along the southwesterly line of said Parcel No. 6, Parcel No. 9 and Parcel No. 7, South 15°-36'-34" East, 2,389.30 feet to a point, another corner for said parcel No. 9;

THENCE along said Parcel No. 9, South 15°-36'-57" East, 63.52 feet to a point, a corner for lands now or formerly of MBNA Properties, Inc.;

THENCE THEREBY, South 25°-36'-10" East, 46.76 feet to a point, a corner for Parcel No. 10;

THENCE THEREBY and along Parcel No. 8, South 46°-17'-16" East, 572.25 feet to a point in the line of Parcel No. 2;

THENCE by lines of said Parcel No. 2, the four following described courses and distances:

- (1) South 69°-41'-00" West, 583.56 feet to a point;
- (2) North 53°-46'-30" West, 118.00 feet to a point;
- (3) North 77°-59'-00" West, 140.00 feet to a point; and

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- (4) North 64°-27'-35" West, 95.48 feet to a point on the top of the bank of White Clay Creek;

THENCE in a general northwesterly direction along the various meanderings of the said top of bank for White Clay Creek, 3,833 feet more or less to a point, a corner for other lands now or formerly of E.I. duPont deNemours and Company (Tax Parcel 08-040.00-053);

THENCE leaving the said top of bank for White Clay Creek and by said lands now or formerly of E.I. duPont deNemours and Company and the southeasterly side of a subdivision known as Hopkins Estate, North 79°-39'-50" East, 3,432.60 feet more or less to a point on the said southwesterly side of Thompson Station Road and the point and place of Beginning;

CONTAINING within said metes and bounds, 94.65 acres of land being the same, more or less...

SUBJECT TO the 30 foot wide roadway easement for E.I. duPont deNemours and Company, the ten foot wide easement for MBNA irrigation line and the thirty foot wide roadway easements to Parcels 7 and 8 as shown on the aforesaid subdivision plan prepared by VanDemark & Lynch, Inc., Engineers, Planners and Surveyors, Wilmington, Delaware, recorded in the Office of the Recorder of Deeds in and for New Castle County on Microfilm No. 1207;

EX20321208

PARCEL NO. 5

ALL THAT CERTAIN tract, piece or parcel of land situate off Paper Mill Road, Mill Creek Hundred, New Castle County, Delaware and shown as Parcel No. 5 on a Record Resubdivision Plan prepared by VanDemark & Lynch, Inc., Engineers, Planners and Surveyors, Wilmington, Delaware, dated November 5, 1995, recorded in the Office of the Recorder of Deeds in and for New Castle County on Microfilm No. 125, and described to wit:

BEGINNING at a point on the top of the northeasterly bank for White Clay Creek, said point being a corner for the herein described parcel No. 5 and lands now or formerly of W. L. Gore and Associates, Inc., (Deed Record 1872, Page 275);

THENCE from the said point of Beginning, Northwesterly and northeasterly along the said top of bank for White Clay Creek, 3,355 feet more or less to a point, a corner for Parcel No. 2, said point being distant by a tie line of North 03°-34'-45" West, 3,084.66 feet from the point of Beginning;

THENCE leaving the said top of bank for White Clay Creek and by lines of said Parcel No. 2, the thirteen following described courses and distances:

- (1) South 43°-29'-35" East, 134.25 feet to a point;
- (2) South 82°-38'-30" East, 169.00 feet to a point;
- (3) South 28°-54'-00" East, 108.00 feet to a point;
- (4) North 84°-46'-00" East, 78.00 feet to a point;
- (5) North 70°-22'-00" East, 294.00 feet to a point;
- (6) South 15°-36'-34" East, 1,186.00 feet to a point;
- (7) North 82°-17'-47" East, 780.59 feet to a point;
- (8) South 55°-15'-51" East, 908.26 feet to a point;
- (9) South 72°-52'-01" West, 634.63 feet to a point;
- (10) South 70°-35'-13" West, 394.22 feet to a point;
- (11) South 41°-33'-40" West, 406.52 feet to a point;
- (12) South 17°-32'-53" West, 244.68 feet to a point; and
- (13) South 60°-31'-39" West, 1,138.94 feet to a point on the said northeasterly top of bank for White Clay Creek and the point and place of Beginning;

CONTAINING within said metes and bounds, 95.67 acres of land being the same, more or less...

SUBJECT TO a thirty foot wide roadway easement along Parcel No. 2 and a thirty foot wide easement centered on an existing road for duPont as shown on the aforesaid Record Resubdivision Plan prepared by VanDemark & Lynch, Inc., Engineers, Planners and Surveyors, Wilmington, Delaware.

BK 2032701209

Subject to all matters of record and subject to the results of the Record Resubdivision Plan prepared by Van Demark & Lynch, recorded in Microfilm Number 12684 in the Recorder of Deeds Office, for New Castle County, Delaware.

IN WITNESS WHEREOF, GRANTOR, has caused these presents to be executed by its duly authorized officer and its corporate seal to be hereto affixed and attested on the day and year first above written.

ATTEST:

E. I. DU PONT DE NEMOURS AND COMPANY

[Signature] BY: *[Signature]* *HH:35*

Title: DIRECTOR - DEPT. OF COMMERCE

Grantor's Address: State of Delaware
Division of Parks and Recreation
85 Kings Highway
P.O. Box 1401
Dover DE 19703

BK2032701210

STATE OF DELAWARE)
) ss.
COUNTY OF NEW CASTLE)

The foregoing instrument was acknowledged
before me this 24th day of December, 1995, by
Tucker M. Kokjohn of E. I. DU PONT DE NEMOURS
AND COMPANY, a Delaware corporation, on behalf of the
corporation.

My Commission Expires: December 28, 1996

HHS014.65

Attachment C— Adaptive Management Plan

TECHNICAL MEMORANDUM



To: Andy Bowman ¹, and Kevin Donnelly ²

From: Kristen Coveleski, Ph.D., P.E. ³

Date: January 31, 2024

Project: White Clay Creek Dam 7 Removal

Re: Adaptive Management Plan

This memorandum describes the Adaptive Management Plan for the White Clay Creek Dam 7 Removal (the Project), pursuant to the Delaware Department of Natural Resources and Environmental Control (DNREC) Wetlands and Subaqueous Lands Section.

PROJECT SUMMARY

White Clay Creek Dam 7, also known as Deerfield Dam is located in northeastern New Castle County in Newark, DE. The dam is located on White Clay Creek (the Creek), a federally designated Wild and Scenic River. The coordinates of the dam are 39°43'7.17"N, 75°45'40.38"W. White Clay Creek Dam 7 is located approximately 1.6 miles upstream of the City of Newark drinking water intake (White Clay Creek Dam 5). In total, there are 4 dams downstream of White Clay Creek Dam 7 before the Creek enters the Christina River.

The project is an ecological restoration project with the primary goal of restoring habitat connectivity for a number of aquatic species present in White Clay Creek. The intention is to achieve these goals through removal of the existing Dam 7 and the restoration of the channel within the footprint of the dam, while maintaining pedestrian access and the existing recreational opportunities. Through the removal of this dam, we will restore natural channel processes, improve passage potential for migratory fish, improve connectivity of habitat for important resident fish species, and restore instream habitat above and below the dam for riverine fish and macroinvertebrates. Additionally, this project aims to improve water quality, restore the floodplain and a diversity of native riparian vegetation along the Creek, improve opportunities for recreation, and maintain the existing seasonal surface water withdrawal for the State-owned golf course (Deerfield).

ADAPTIVE MANAGEMENT PLAN

Regulatory permits required to complete the Project include the DNREC Wetlands and Subaqueous Lands Section Permit Application. In addition to the basic permit application and applicable appendices, an Adaptive Management Plan (AMP) is also required, as stated by DNREC staff in an email on November 28, 2023. The general outline and methods of the AMP are provided below.

¹ New Castle Conservation District

² New Castle Conservation District

³ Inter-Fluve, Project Engineer and Manager.

MONITORING REACH / AREAS OF CONCERN

The monitoring reach extends from the downstream extent of the Project's limit of disturbance, approximately 300 ft downstream of the existing dam, to the upstream extent of the Project's limit of disturbance, approximately 150 ft upstream of the dam. The monitoring reach includes the location of the existing dam and all channel and adjacent bank work associated with the project. Particular areas of interest within the monitoring reach include the location of the Deerfield water intake and constructed j-hook, as well as all areas of plantings and vegetation installed as part of the Project.

MONITORING METHODS

Inspection of the particular areas of concern within the monitoring reach will be conducted by responsible parties. As owners of the Deerfield Golf Course, the State of Delaware, specifically the DNREC Division of Parks and Recreation and Division of Water, will be responsible for monitoring the Deerfield intake. Currently, John Jacob, Deerfield's superintendent, inspects the intake system annually, at a minimum, and performs sediment removal from the intake as needed. It is recommended that an inspection of the intake would be performed prior to initiating use of the pump, as well annually and after large storm events. The installation of the J-Hook weir is to increase the shear stresses in the area around the pump intake, reducing the amount of sediment that accumulates. During the site inspections, it is recommended that the maintenance crew also inspect the J-Hook, looking to see if any of the rocks have moved or if there are any changes to the sediment erosion or deposition patterns from the initial design. Eastern Irrigation is designing the pump modifications associated with this project and may provide additional recommendations once the design is complete.

The contractor selected to the Project will be responsible for providing a warrantee period of one full growing season on all of the seed and plantings associated with this project. The annual inspection and replacement of vegetation as needed will be included in the Project bid specifications.

General monitoring methods and management triggers for each area of concern can be found in Table 1. The Deerfield intake shall be inspected annually and following any significant storm events for management triggers for one full pumping season following Project construction. The vegetation community shall be inspected following any significant storm events for one full growing season following Project construction. A significant storm event shall be defined as an event greater than the 5-year recurrence interval, which equates to greater than 7,834 cubic feet per second (cfs) at the Project site or flows greater than 7,090 cfs at the United States Geological Survey (USGS) gage located near Strickersville, PA on the White Clay Creek⁴ (USGS gage #01478245).

⁴ Flows for the USGS 01478245 gage can be accessed via (<https://waterdata.usgs.gov/monitoring-location/01478245/#parameterCode=00060&period=P7D&showMedian=false>), as of 01/31/2024.

Table 1. Management Triggers in Areas of Concern

Category of Concern	Monitoring Methods	Management Trigger	Expected Timeframe for Decision-Making	Potential Management Action
Deerfield Intake	Inspection of the proper functionality of the Deerfield intake following significant storm events (greater than 5-year recurrence interval) and prior to use for one full pumping season post construction (a minimum of one inspection total). Including the inspection of the j-hook vane and water level of the upstream pool	Damage or modification to j-hook vane or upstream pool, water intake not functioning properly.	Project Team should be notified within one week. Action to remedy the issue must be taken within one month of management trigger, unless the State of Delaware determines a different timeline based on seasonal intake needs.	Modification to water intake and/or j-hook to restore proper functionality of the water intake and pool water levels.
Vegetative Community	Inspection of the health and success of planted vegetation at the end of the first growing season and following significant storm events (greater than 5-year recurrence interval) for one full growing season post construction (a minimum of one inspection total).	Damage or loss to abundance or health of the vegetation. Improper stabilization of slope due to vegetation damage.	Action must be taken within one month of management trigger	Management to correct damage or loss to abundance or health of vegetation. Includes control of invasive species, additional plantings, and additional bank stabilization.

MANAGEMENT ACTIONS

The work flow presented in the AMP Flow Chart (Figure 1) should be used once a management trigger has been identified (DNREC, 2023). If an identified issue is determined to be caused by the dam removal project, then the responsible party shall work with relevant technical support to identify a management action. Potential management actions related to the Deerfield Intake include modification to the intake structure and modification of the j-hook to maintain the designed water surface elevations for the intake pool. Management actions related to the vegetative community include control of invasive species, additional plantings or seeding, or additional bank stabilization.

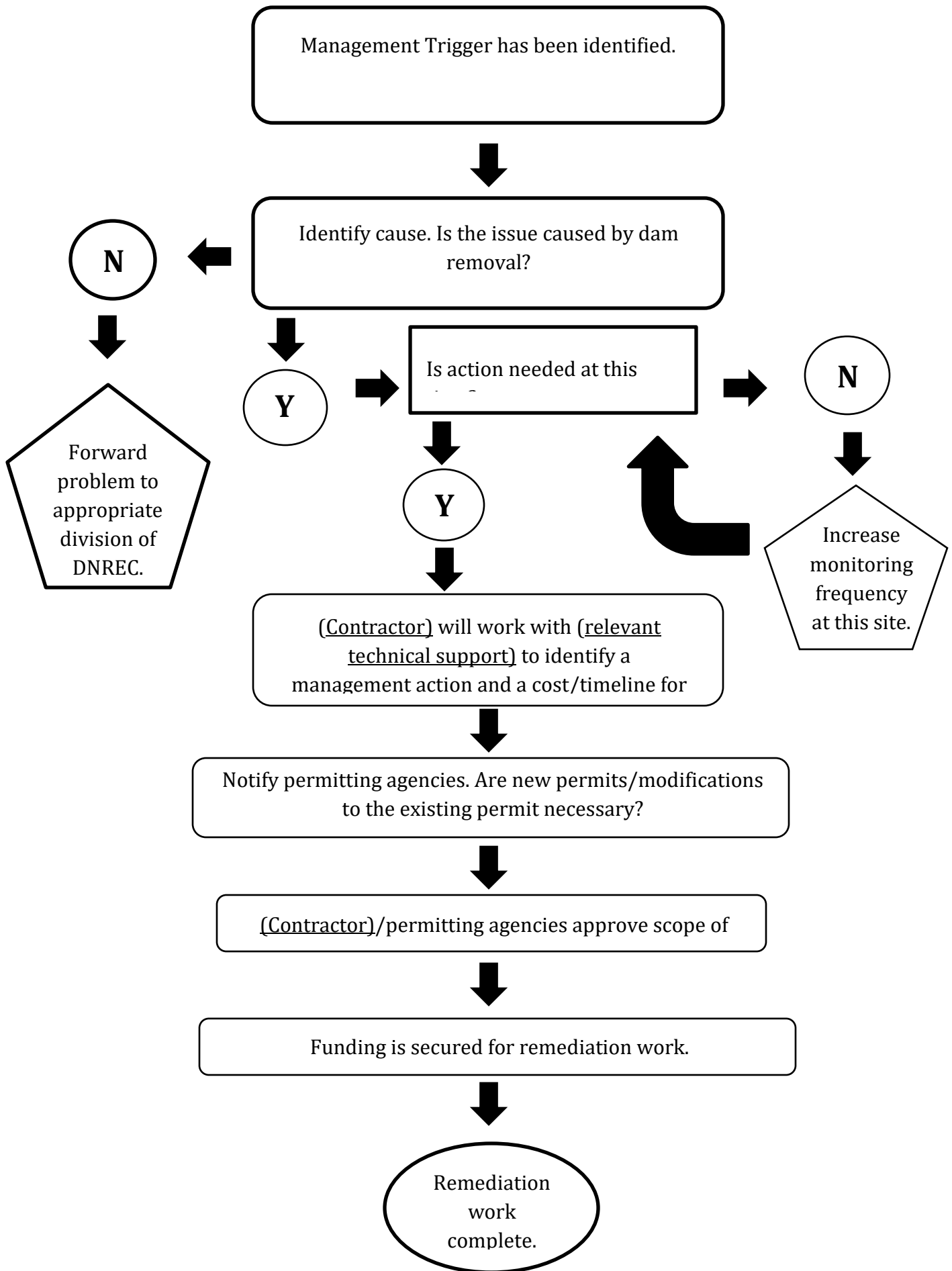


Figure 1. Adaptive Management Plan Flow Chart. Provided by DNREC, 2023.

REFERENCES

Delaware Department of Natural Resources and Environmental Control (DNREC). 2023. Adaptive Management Plan Flow Chart. Provided via email correspondence on November, 28 2023.