



**U.S. Army Corps
of Engineers**
Baltimore District
PN-23-47

Public Notice

**In Reply to Application Number: NAB-2019-00489-P13
(Pennsylvania Department of General
Services/Butternut Creek Flood Protection Project)**
Comment Period: October 26, 2023 to November 25, 2023

**THE PURPOSE OF THIS PUBLIC NOTICE IS TO INFORM INTERESTED PARTIES
OF THE PROPOSED ACTIVITY AND TO SOLICIT COMMENTS. NO DECISION HAS
BEEN MADE AS TO WHETHER OR NOT A PERMIT WILL BE ISSUED AT THIS
TIME.**

This District has received an application for a Department of the Army permit pursuant to Section 404 of the Clean Water Act (33 USC 1344), as described below:

APPLICANT:

Pennsylvania Department of General Services
Attn: Mr. Bryan Anthony
18th and Herr Streets
Harrisburg, PA 17125

WATERWAY AND LOCATION OF THE PROPOSED WORK:

The proposed project is located adjacent to West Fifth Street, along Butternut Creek, in Mount Carmel Township, Northumberland County, Pennsylvania. (Latitude: 40.793463; Longitude: -76.423002).

OVERALL PROJECT PURPOSE:

To construct a flood protection project along Butternut Creek to provide flood protection for the 1% annual chance flood (100-year flood) for the residents in Mount Carmel, in Northumberland County, Pennsylvania.

PROJECT DESCRIPTION:

To construct approximately 1,564 linear feet of cast-in-place concrete rectangular channel with approximately 125 linear feet of trapezoidal grouted riprap channel downstream of the concrete channel. Project will permanently impact 1,750 linear feet (0.32 acres) of Butternut Creek, a perennial stream that flows directly into Shamokin Creek.

LEAD FEDERAL AGENCY:

The United States Army Corps of Engineers, as the lead federal agency, is responsible for all coordination pursuant to applicable federal authorities.

APPLICANT'S PROPOSED AVOIDANCE, MINIMIZATION, AND COMPENSATORY MITIGATION:

Impacts to aquatic resources from the proposed project are unavoidable due to the severe site constraints of this altered and urban setting and from a history of coal mining activities. Pennsylvania's Function-Based Aquatic Resources Compensation Protocol will be used to determine the amount of compensatory mitigation required.

ALTERNATIVES ANALYSIS:

The applicant has investigated seven (7) project on-site project alternatives during the project design process. The project alternatives are as follows:

Alternative 1: Buyout of Flood Prone Structures

This alternative would require the buyout of 6 homes, 16 townhouses, 4 businesses, a personal care facility, and a newly constructed apartment building. These buyouts would carry significant expense, which could not be funded through the Pennsylvania Department of Environmental Protection flood protection program. In addition, this alternative does not address the public safety risks associated with flooding including inundation and impacts to roadways during high.

Alternative 2: Remove Sediment, Debris, and Existing Walls in Channel

The removal of sediment, accumulated debris, and existing walls that are deteriorating would improve flow within the channel banks. Removal of trees growing along the channel banks and the overgrowth of vegetation in and around the channel would reduce constrictions and reduce future accumulation of debris in the channel. Continuous maintenance of the natural channel would be required on a periodic basis as well as after storm events. Flooding would be reduced for smaller storm events. However, annual, or semi-annual storm events and storm events that cause backwater from Shamokin Creek to inundate the areas outside the banks of Butternut Creek would still exist. The homes and businesses along Butternut Creek would still experience flooding.

Alternative 3: Improve Culvert at West Third Street

The culvert at the West Third Street is a 14-foot wide by 8-foot-high reinforced concrete box culvert constructed in the early 1960s. Replacing the culvert with a precast reinforced concrete with greater conveyance capacity would provide marginal improvement to the hydraulics in the immediate vicinity of the culvert. The existing culvert, however, is already adequately sized to pass the Butternut Creek 100-year flow during supercritical flow conditions. Limited the project to just replace the West Third Street culvert with a larger capacity culvert would not prevent the backwater flooding from Shamokin Creek from overtopping the banks of Butternut Creek and flooding the surrounding properties.

Alternative 4: Upstream Detention Dam within Existing Drainage System

The construction of a detention dam would reduce the Butternut Creek peak flow and prevent flooding. However, Butternut Creek will still experience backwater from Shamokin Creek resulting in flooding from Shamokin Creek high water events. A detention basin would need to be located within the Borough, likely located at the upstream end of the project, to be effective; this would require purchasing property for the detention basin due to the existing development within the Borough. As with Alternative 1, funding is not available for property buyouts. In addition, construction would require disturbance of a large area, which could have unknown environmental impacted related to the potential for release of contaminated soils due to the acid mine runoff.

Alternative 5: Concrete Floodwalls

Concrete floodwalls approximately 11.5 feet high would be required for the approximate 1,550 linear feet of stream channel to contain the 100-year flood with no freeboard. However, the roughness of the existing natural stream channel induces subcritical flow throughout the channel which overtops the channel banks. Construction of these floodwalls require large foundations that would require significant excavations and backfill which would have the potential for release of contaminated soils due to the acid mine runoff. Also, these large floodwall foundations would require demolishing and removing multiple residences and businesses in many areas. As with previous alternatives, property buyouts cannot be funded through the Pennsylvania Department of Environmental Protection flood protection program.

Alternative 6: Compacted Earthen Levees

In lieu of constructing concrete floodwalls along the channel, compacted earthen levees could be constructed along both banks of the channel to contain the 100-year flood. Construction of an earthen levee to an elevation 8-feet higher than the channel banks along Butternut Creek to contain the Shamokin Creek 100-year backwater elevation would require a base width of at least 42 feet. Due to the development along the channel, the construction of an earthen levee is not feasible. In addition, the large footprint of disturbance required would carry increased risk of encountering contamination soils.

Alternative 7: Channel Improvements (Rectangular Concrete Open Channel) – Applicant's Preferred Alternative

Construction of a rectangular reinforced concrete open channel with a top of wall elevation of 1043.5 at the downstream end would contain the 100-year backwater from Shamokin Creek. The remainder of the concrete channel (approximately 1,500 liner feet) would require walls approximately 7.5 feet high to meet the project purpose and needs. Since the wall foundations are essentially within the channel flow area, concrete open channels can be constructed in tight areas where there are structures in proximity, due to the narrow excavation limits. Limiting the extent of excavation also minimizes the risk of encountering contaminated soils due to the reduced construction footprint. The concrete channel would provide a smooth and efficient channel invert resulting in increased flow velocity and decreased water surface elevations by inducing supercritical flow within the channel. A low flow invert would direct the base flow to the center of the channel to aid in sediment transport through the channel, greatly reducing the need to sediment removal. This alternative requires paving approximately 1,550 linear feet of existing natural-bottom stream channel with concrete which will likely require mitigation efforts. Per the applicant's mitigation statement, this alternative is the only technically viable alternative that meets the project purpose and need, and hence is the applicant's preferred alternative for this project.

CORPS EVALUATION REQUIREMENTS:

This project will be evaluated pursuant to Corps Regulatory Program Regulations (33 CFR Parts 320-332). The decision whether to issue a permit will be based on an evaluation of the probable impacts, including cumulative impacts of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit, which reasonable may be expected to accrue from the proposal, must be balanced against its reasonably foreseeable detriments. All factors, which may be relevant to the proposal will be

considered, including the cumulative effects thereof; among those are conservation, economic, aesthetics, general environmental concerns, wetlands, cultural values, fish and wildlife values, flood hazards, flood plain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, and consideration of property ownership and in general, the needs and welfare of the people. The evaluation of the impact of this project will also include application of the Clean Water Act Section 404(b)(1) Guidelines promulgated by the Administrator, United States Environmental Protection Agency.

ENDANGERED SPECIES:

A preliminary review of this application indicates that the proposed work is not likely to adversely affect federally listed threatened or endangered species or their critical habitat, pursuant to Section 7 of the Endangered Species Act, as amended. As the evaluation of this application continues, additional information may become available which could modify this preliminary determination.

ESSENTIAL FISH HABITAT:

The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 04-267), requires all federal agencies to consult with the National Marine Fisheries Service on all actions, or proposed actions, permitted, funded, or undertaken by the agency that may adversely affect Essential Fish Habitat (EFH), including species of concern, life cycle habitat, or Habitat Areas of Particular Concern. The project site does not lie in or adjacent to EFH as described under MSFCMA for managed species under the MSFCMA. The Baltimore District has made a preliminary determination that the project is not within EFH. The Baltimore District has made a preliminary determination that mitigative measures are not required to minimize adverse effects on EFH at this time. This determination may be modified if additional information indicates otherwise.

HISTORIC RESOURCES:

Pursuant to Section 106 of the National Historic Preservation Act of 1966 and applicable guidance, the Corps has reviewed the latest published version of the National Register of Historic Places and initially determined that no registered properties listed as eligible for inclusion, therein, are located at the site of the proposed work. The Corps has made the preliminary determination that the proposed project would have no effect on historic properties. The Corps final eligibility and effect determination will be based on coordination with the State Historic Preservation Office as appropriate and required, and with full consideration given to the proposed undertaking's potential direct and indirect effects on historic properties within the Corps' identified permit area.

TRIBAL RESOURCES:

Section 106 of the National Historic Preservation Act also requires federal agencies to consult with federally recognized American Indian tribes that attach religious and cultural significance to historic properties that may be affected by the agency's undertaking. Corps Tribal Consultation Policy mandates an open, timely, meaningful, collaborative, and effective deliberative communication process that emphasizes trust, respect, and shared responsibility. The policy further emphasizes that, to the extent practicable and permitted by law, consultation works toward mutual consensus and begins at the earliest planning stages before decisions are made and actions taken. The Corps final eligibility and effect determination will be based on coordination with interested tribes, in accordance with the Corps current tribal standard operating procedures as appropriate and required, and with full consideration given to the proposed undertaking's potential direct and indirect effects on tribal resources.

MODIFICATION OF CIVIL WORKS PROJECTS: 33 USC 408 (SECTION 408):

All Section 408 proposals will be coordinated internally at the United States Army Corps of Engineers. The Section 408 decision will be issued along with the Section 404 and/or Section 10 decision. Please see the following link for more information regarding Section 408: <https://www.nab.usace.army.mil/Missions/Regulatory/Section-408-Requests/>.

WATER QUALITY CERTIFICATION:

The applicant is required to obtain a water quality certification in accordance with Section 401 of the Clean Water Act.

COASTAL ZONE MANAGEMENT PROGRAMS:

Where applicable, the applicant has certified in this application that the proposed activity complies with and will be conducted in a manner consistent with the approved Coastal Zone Management Program. By this public notice, we are requesting the state concurrence or objection to the applicant's consistency statement.

The applicant must obtain any state or local government permits which may be required.

SUBMISSION OF COMMENTS:

The Corps of Engineers is soliciting comments from the public; federal, state, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to issue, modify, condition, or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments provided will become part of the public record for this action and are subject to release to the public through the Freedom of Information Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

Written comments concerning the work described above related to the factors listed above or other pertinent factors must be received by the United States Army Corps of Engineers, Baltimore District within the comment period specified above through postal mail at the address below or electronic submission to the project manager email address below. Written comments should reference the Application Number NAB-2019-00489-P13.

PUBLIC HEARING REQUESTS:

Any person who has an interest which may be adversely affected by the issuance of this permit may request a public hearing. The request, which must be in writing, must be received within the comment period as specified above to receive consideration. Also, it must clearly set forth the interest which may be adversely affected by this activity and the manner in which the interest may be adversely affected. The public hearing request may be submitted by electronic mail or mailed to the following address:

Amy Elliott
amy.h.elliott@usace.army.mil
U.S. Army Corps of Engineers, Baltimore District
Regulatory Branch
1631 South Atherton Street
Suite 101
State College, PA 16801

It is requested that you communicate this information concerning the proposed work to any persons known by you to be interested, who did not receive a copy of this notice.

General information regarding the Corps' permitting process can be found on our website at <https://www.nab.usace.army.mil/Missions/Regulatory.aspx>. This public notice has been prepared in accordance with Corps implementing regulations at 33 CFR 325.3. If you have any questions concerning this specific project or would like to request a paper copy of this public notice, please contact Amy Elliott, at 814-235-0573, or at amy.h.elliott@usace.army.mil. This public notice is issued by the Chief, Regulatory Branch.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF GENERAL SERVICES
HARRISBURG, PENNSYLVANIA

TOM WOLF, GOVERNOR CURT TOPPER, SECRETARY

PROJECT NO. D.G.S. 182-19, PHASE 1
BUTTERNUT CREEK
FLOOD PROTECTION PROJECT

MOUNT CARMEL TOWNSHIP
NORTHUMBERLAND COUNTY, PENNSYLVANIA

DESIGN PROFESSIONAL

DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATERWAYS ENGINEERING AND WETLANDS
HARRISBURG, PENNSYLVANIA

INDEX TO DRAWINGS

GENERAL CONSTRUCTION CONTRACT NO. DGS 182-19, PHASE 1.1

INDEX TO DRAWINGS

CS-1 Cover Sheet
GP-1 General Plan

PLAN AND PROFILE

P-1 Sta. 1+00B to Sta. 5+50B
P-2 Sta. 5+50B to Sta. 10+25B
P-3 Sta. 10+25B to Sta. 15+15B
P-4 Sta. 15+15B to Sta. 19+50B

EROSION AND SEDIMENTATION CONTROL

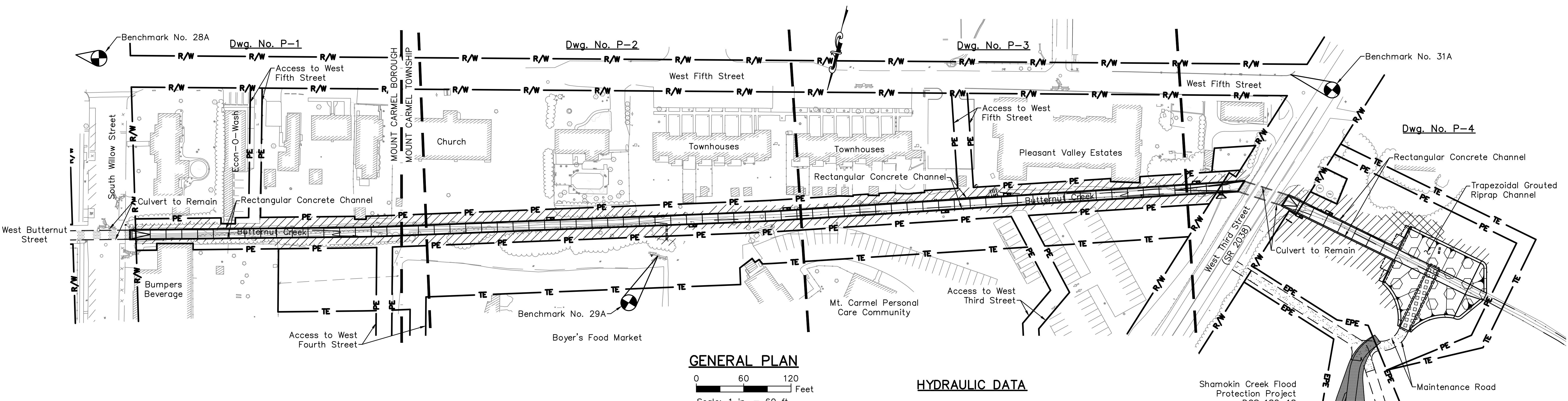
ES-1 E&S General Plan
ES-2 E&S General Notes
ES-3 E&S General Details
ES-4 E&S General Details
ES-5 E&S Detailed Plan - Sta. 1+00B to Sta. 5+50B
ES-6 E&S Detailed Plan - Sta. 5+50B to Sta. 10+25B
ES-7 E&S Detailed Plan - Sta. 10+25B to Sta. 15+15B
ES-8 E&S Detailed Plan - Sta. 15+15B to Sta. 19+50B

CROSS SECTIONS

X-1 Sta. 2+50B to Sta. 13+00B
X-2 Sta. 14+50B to Sta. 18+50B

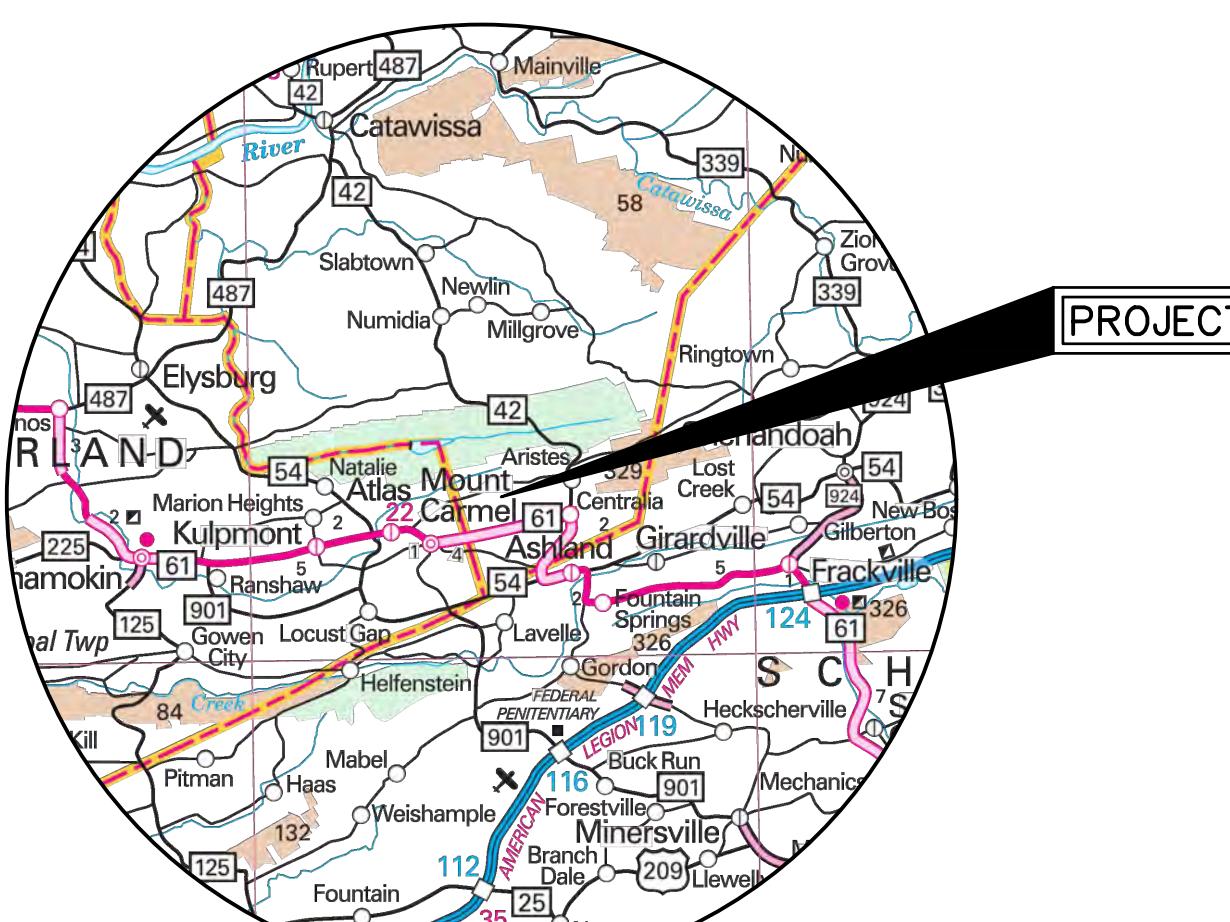
DETAILS

D-1 Joint Schedule and Details
D-2 Drainage Structure and Headwall
D-3 Concrete Channel Structural Details
D-4 Channel Outlet Structural Details
D-5 Miscellaneous Details
D-6 Permanent Project Sign and



GENERAL NOTES:

- The topography shown on the drawings is based on a survey dated December 2001.
- All elevations are based on N.G.V.D. Elevations of features are to be taken from bench marks (B.M.) listed on the drawings.
- Existing contours and existing ground lines are intended to show the general ground configuration. Payment for excavation and fill items will be based upon survey cross sections made by the Department immediately prior to commencement of work.
- Data concerning utilities has been obtained from available information. Accuracy or completeness of this data is not guaranteed. See Utility Listings on this drawing.
- The Contractor's attention is drawn to the "Sponsor Adjustment" tables. The items listed are not part of the Contract. See General Requirement, Supplemental Provision - Flood Protection Projects, Sponsor Adjustments.
- Rights-of-Way Acquisition drawings which show more detailed dimensions for rights-of-way and Contractor's working area limits are on file at the Office of Waterways Engineering & Wetlands, Department of Environmental Protection, Harrisburg, Pennsylvania. These drawings will be furnished to the successful bidder.
- Minor adjustments in alignment and grade may be made to facilitate construction with the approval of the Department.
- Clearing and grubbing is not shown on the drawings but it shall extend to the permanent easement lines unless directed otherwise by the Department.
- Indiscriminate cutting of trees will not be permitted. Approval of the Department will be required prior to cutting any trees. See Section 8 of the Technical Specifications - Clearing and Grubbing.
- The Contractor shall fill and/or grade areas adjacent to the new construction for positive drainage as directed by the Department.
- Spoil and/or borrow areas are to be secured by the Contractor at its cost. See General Requirement, Supplemental Provision - Flood Protection Projects, Securing Borrow and/or Spoil Areas.
- (No.) indicates pay item numbers which correspond to those in the Bid Form.
- The Contractor's methods of protection of existing structures will be subject to the approval of the Department. Such approval, however, does not relieve the Contractor of its full liability for all damages and loss due to the methods of protection.
- Dimensions and construction limits shown on the drawings have been determined from available information and may not be exact. The intent is to build new construction to meet existing construction. Therefore, the dimensions and construction limits may be altered slightly to accomplish this intent.
- Channel invert is non-uniform. The elevations labeled on the Profile Drawings are the outside wall-to-slab joint. The center slab elevation is lower than the outside wall-to-slab joint elevation. For complete invert dimension information, refer to the Structural Detail Drawings.
- The Contractor shall notify the PA Fish and Boat Commission's Northcentral Regional Office at 814-359-5250 prior to on-site mobilization.



LOCATION MAP

Scale: 1 in. = 5 mi.

UTILITY LISTINGS

COMPANY	ADDRESS	CONTACT PERSON	PHONE

Note: The Contractor shall comply with Act 287 of the General Assembly, as amended, which defines the procedures for notification to Public Utilities prior to excavation, drilling or demolition work using power equipment or explosives.

HYDRAULIC DATA

Drainage Area = 0.76 square miles (487 Acres)

100-YR Design Discharge = 815 cfs

Minimum Freeboard in Concrete Channel:
Sta. 1+78 to Sta. 4+00 = 2.5 ft.
Sta. 4+00 to Sta. 7+50 = 3.0 ft.
Sta. 7+50 to Sta. 18+00 = 4.0 ft.

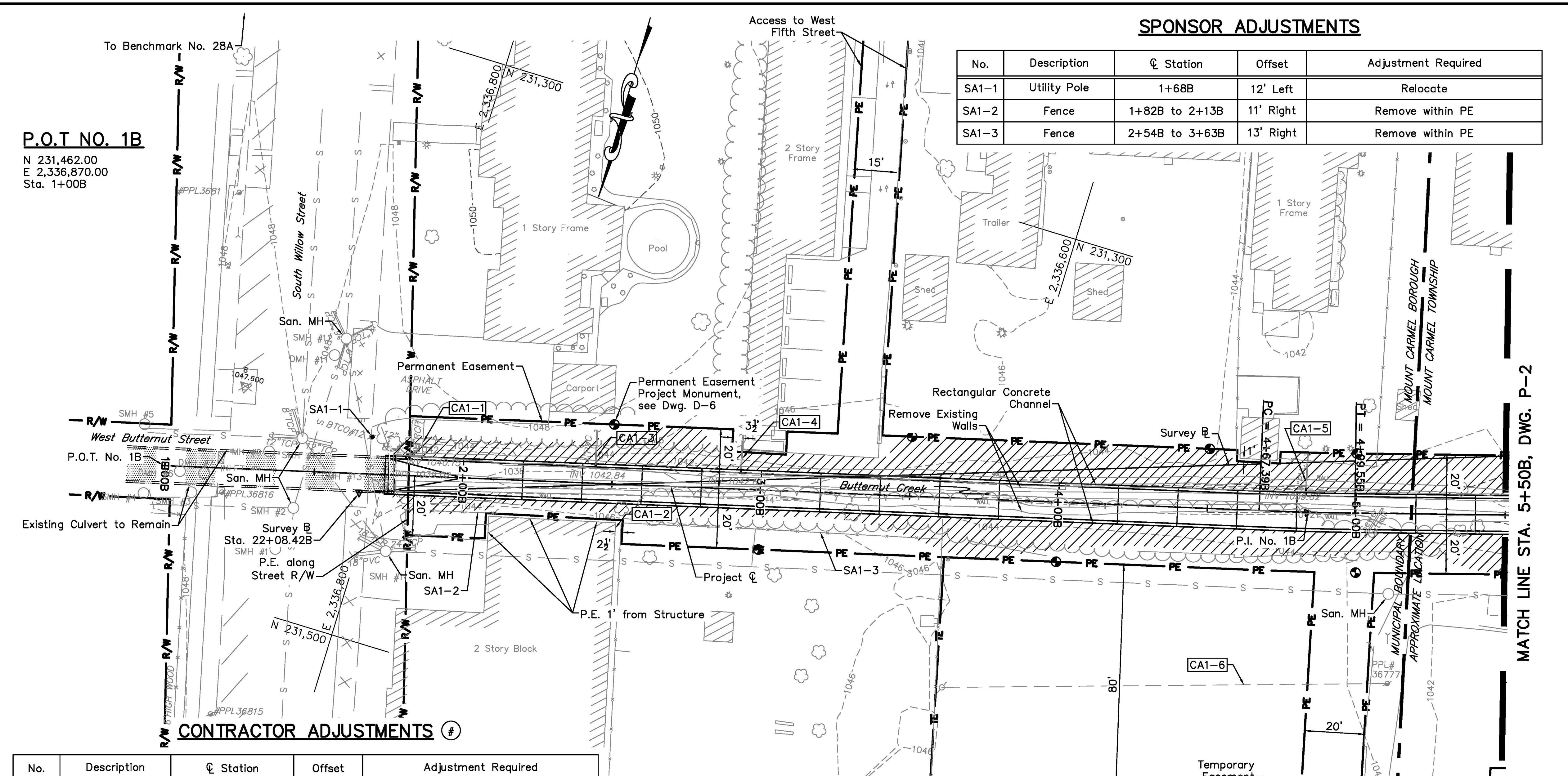
LEGEND

PE	PE	Permanent Easement
EPE	EPE	Existing Permanent Easement
TE	TE	Temporary Easement
R/W	R/W	Existing Road Right-of-Way
- - -	- - -	Municipal Boundary
S	S	Existing Sanitary Sewer Line
—	—	Edge of Stream
---	---	Fill
----	----	Excavation
[hexagonal pattern]	[hexagonal pattern]	Grouted Riprap Channel
[square pattern]	[square pattern]	Concrete Block Mattress
[solid grey]	[solid grey]	Maintenance Road
[diagonal hatching]	[diagonal hatching]	Existing Shamokin Creek Levee
●	●	Permanent Easement Project Monument

CALL BEFORE YOU DIG!

PENNSYLVANIA LAW REQUIRES
3 WORKING DAYS NOTICE FOR
CONSTRUCTION PHASE AND 10 WORKING
DAYS IN DESIGN STAGE - STOP CALL
PA ONE CALL SYSTEM, INC. POCS SERIAL NUMBER
1-800-242-1776 or 8-1-1 XXXXXX

NO. _____	DATE _____	REVISION _____	APPR. _____
SUBMITTED _____			
PROJECT COORDINATOR - D.E.P. _____			
APPROVED _____			
CHIEF - DIVISION OF PROJECT DEVELOPMENT - D.E.P. _____			
APPROVED _____			
DIRECTOR - BUREAU OF WATERWAYS ENGINEERING AND WETLANDS - D.E.P. _____			
DRAFT		PROFESSIONAL'S SIGNATURE _____ DATE _____ PROFESSIONAL'S SIGNATURE _____ DATE _____	
COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION OFFICE OF WATER PROGRAMS			
COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF GENERAL SERVICES HARRISBURG, PENNSYLVANIA			
PROJECT NO. D.G.S. 182-19, PHASE 1			
BUTTERNUT CREEK FLOOD PROTECTION PROJECT			
MOUNT CARMEL TOWNSHIP		NORTHUMBERLAND COUNTY	
GENERAL PLAN			
DRAWN BY S.L.E.	DATE	DRAWING NO.	
CHECKED BY	SCALE As Shown		
GP-1			



SPONSOR ADJUSTMENTS

No.	Description	¢ Station	Offset	Adjustment Required
SA1-1	Utility Pole	1+68B	12' Left	Relocate
SA1-2	Fence	1+82B to 2+13B	11' Right	Remove within PE
SA1-3	Fence	2+54B to 3+63B	13' Right	Remove within PE

BENCH MARK DATA

Point No.	Elevation	Location
28A	1048.88	Square cut in curb at center of inlet, SE corner of Willow and Fifth Streets

SURVEY B DATA

Survey B Station	Coordinates	
	Northing	Easting
22+08.42B	231,451.60	2,336,805.26

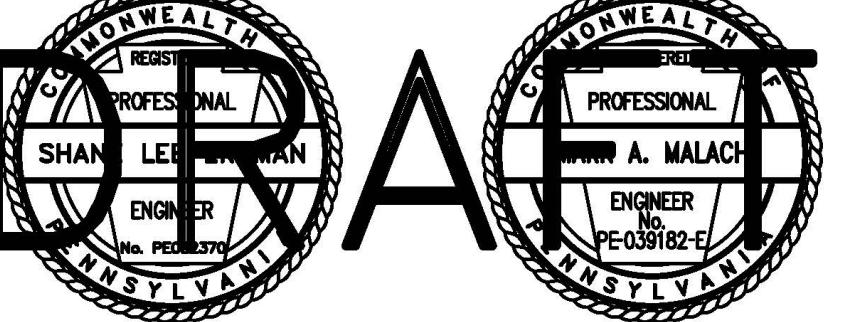
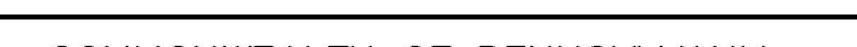
Note: Survey B Station 22+08.42B (HEC 74) does not have a reference.

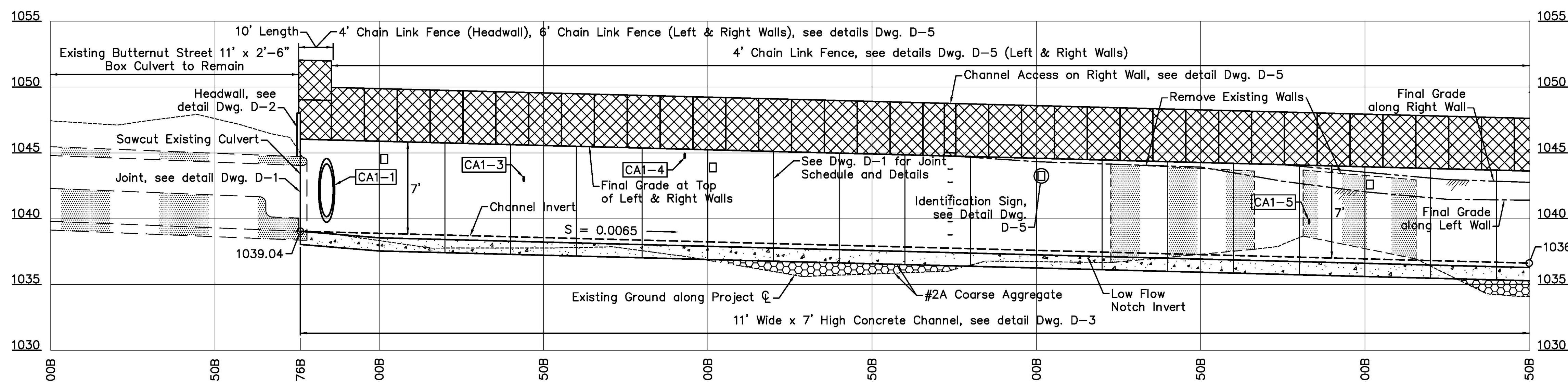
CURVE NO. 1B

P.I. No. 1B { N 231,365.00
E 2,336,499.00
Δ 1° 36' 28"
D 500'00"
R 1145.92'
T 16.08'
L 32.16'
P.C. Sta. 4+67.39B
P.T. Sta. 4+99.55B

NOTES:

- For General Notes, see Dwg. GP-1.
- For Concrete Notes, see Dwg. D-1.
- For Cross Sections, see Dwg. X-1.

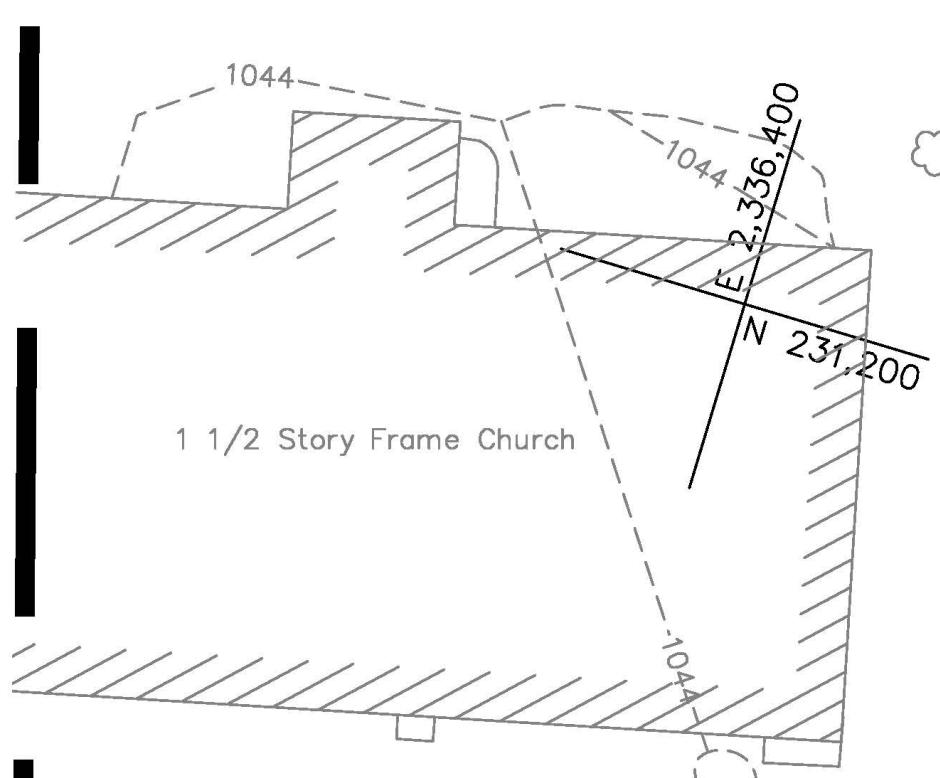
NO.	DATE	REVISION	APPR.
SUBMITTED			
PROJECT COORDINATOR - D.E.P.			
APPROVED			
CHIEF - DIVISION OF PROJECT DEVELOPMENT - D.E.P.			
APPROVED			
DIRECTOR - BUREAU OF WATERWAYS ENGINEERING AND WETLANDS - D.E.P.			
PROFESSIONAL'S SIGNATURE DATE PROFESSIONAL'S SIGNATURE DATE			
    			
COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION OFFICE OF WATER PROGRAMS			
COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF GENERAL SERVICES HARRISBURG, PENNSYLVANIA			
PROJECT NO. D.G.S. 182-19, PHASE 1			
BUTTERNUT CREEK FLOOD PROTECTION PROJECT MOUNT CARMEL TOWNSHIP NORTHUMBERLAND COUNTY			
PLAN AND PROFILE STA. 1+00B TO STA. 5+50B			
DRAWN BY S.L.E.	DATE	DRAWING NO.	P-1
CHECKED BY As Shown	SCALE		



PROFILE

Horizontal Scale: 1 in. = 20 ft.

ALL DIMENSIONS AND EXISTING CONDITIONS SHALL BE CHECKED AND VERIFIED BY CONTRACTOR AT THE SITE.



SPONSOR ADJUSTMENTS

No.	Description	¶ Station	Offset	Adjustment Required
SA2-1	Fence	9+53B to 9+92B	16' Right	Remove
SA2-2	Dumpsters	9+55B to 9+92B	23' Right	Remove
SA2-3	Posts (2)	9+70B, 9+87B	18' Left	Remove

BENCH MARK DATA

Point No.	Elevation	Location
29A	1042.14	Rim of sanitary manhole, 44' right of Sta. 8+42B

SURVEY DATA

Survey Station	Coordinates	
	Northing	Easting
16+62.38B	231,336.25	2,336,281.07
18+10.14B	231,323.18	2,336,428.25

Note: Survey B Stations 16+62.38B (HEC 72) and 18+10.14B (HEC 73) does not have a reference.

CURVE NO. 2B

P.I. No. 2B { N 231,225.00
E 2,336,019.00
△ 1° 25' 08"
D 5°00'00"
R 1145.92'
T 14.19'
L 28.38'
P.C. Sta. 9+69.28B
P.T. Sta. 9+97.66B

NOTES:

1. For General Notes, see Dwg. GP-1.
 2. For Concrete Notes, see Dwg. D-1.
 3. For Cross Sections, see Dwg. X-1.
 4. Install flap gate on channel wall at pipe outlet

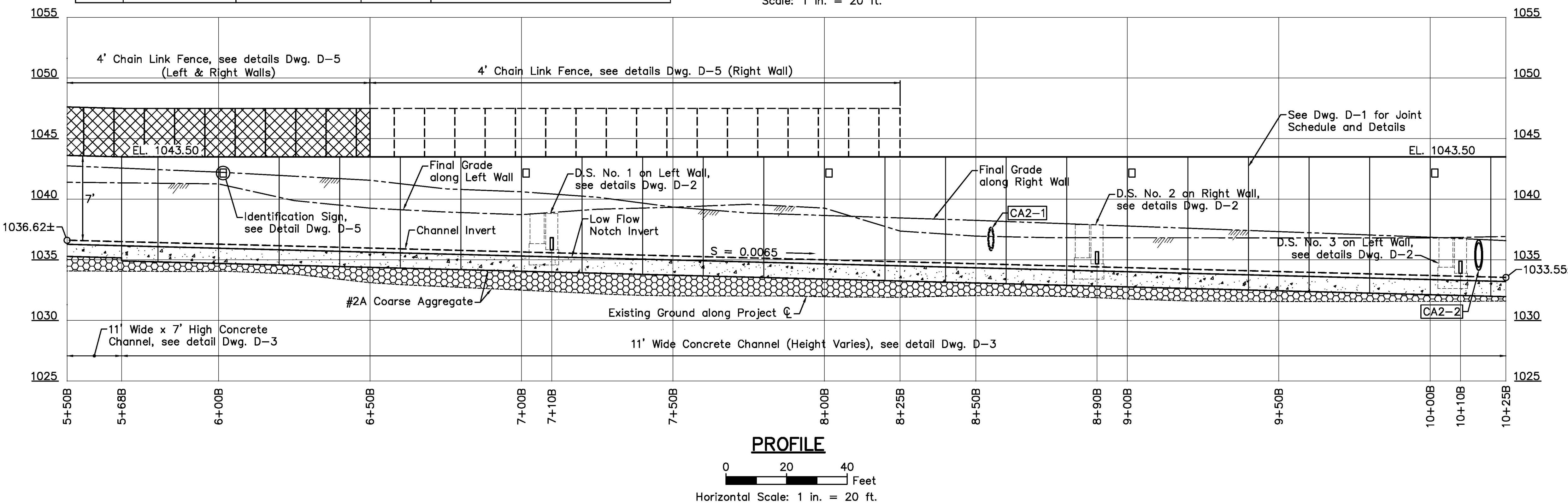
NO.	DATE	REVISION	APPR

CONTRACTOR ADJUSTMENTS

No.	Description	Q Station	Offset	Adjustment Required
CA2-1	18" RCP	8+55B	5.5' Right	Connect to Channel, see Note 4
CA2-2	24" CPP	10+16B	5.5' Left	Connect to Channel, see Note 4

PLAN

scale: 1 in. = 20 ft



**ALL DIMENSIONS AND EXISTING
CONDITIONS SHALL BE CHECKED
AND VERIFIED BY CONTRACTOR
AT THE SITE**

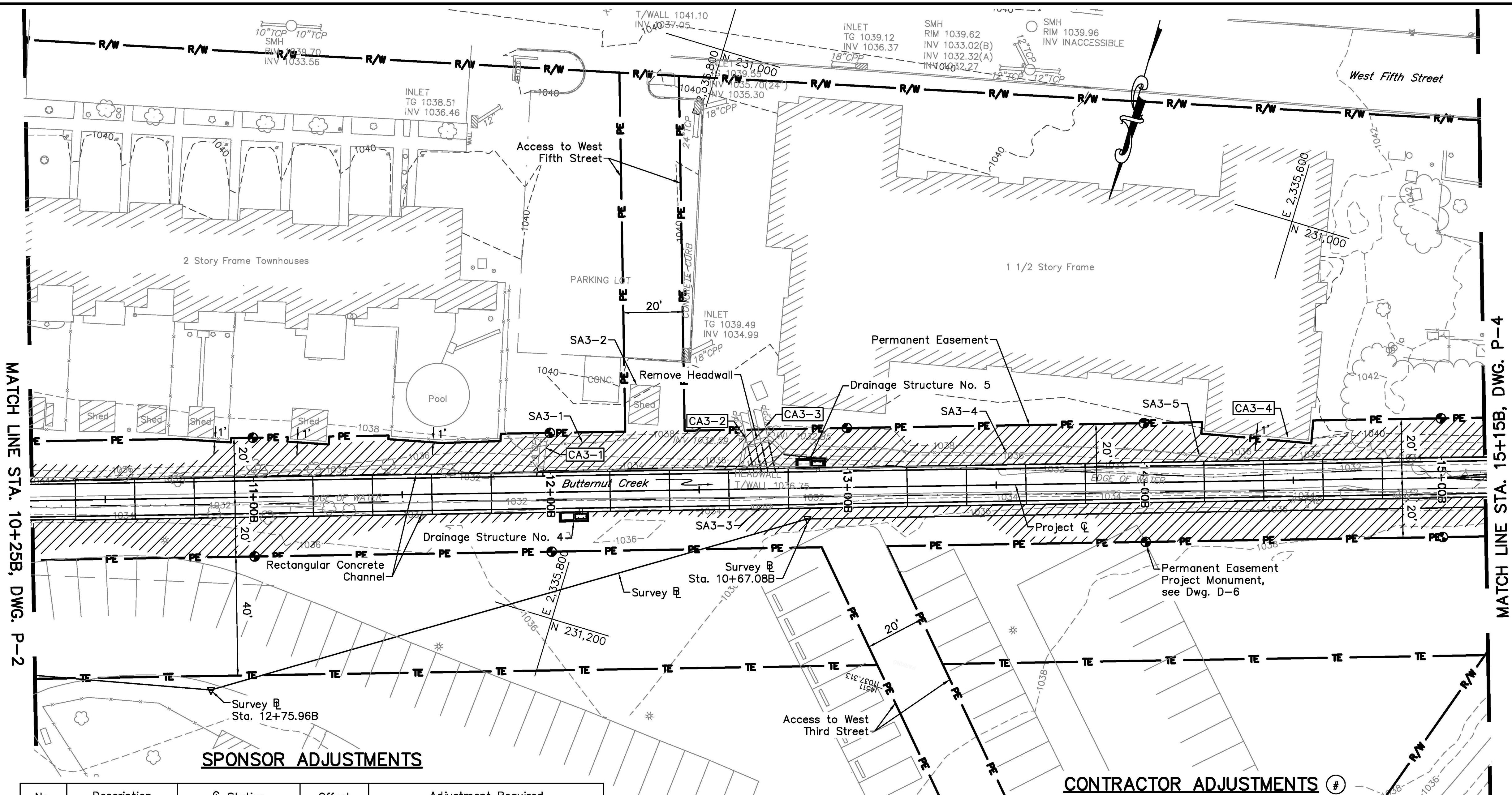
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CHECKED BY	SCALE As Shown	

P-2

SURVEY B DATA

Survey B Station	Coordinates	
	Northing	Easting
10+67.08B	231,142.97	2,335,727.41
12+75.96B	231,255.97	2,335,903.08

Note: Survey B Stations 10+67.08B (HEC 46) and 12+75.96B (HEC 71) does not have a reference.



NOTES:

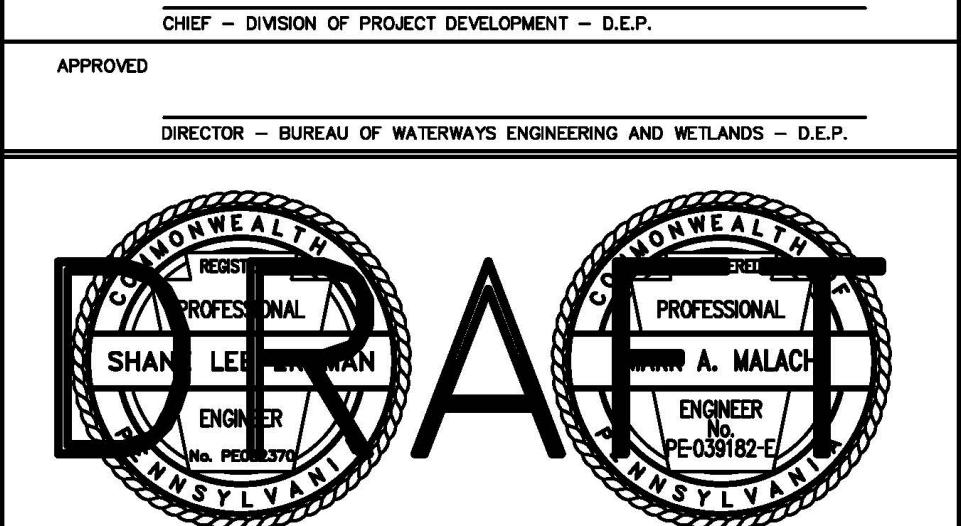
- For General Notes, see Dwg. GP-1.
- For Concrete Notes, see Dwg. D-1.
- For Cross Sections, see Dwg. X-1.
- Install flap gate on channel wall at pipe outlet.

NO.	DATE	REVISION	APPR.

SUBMITTED
PROJECT COORDINATOR - D.E.P.

APPROVED
CHIEF - DIVISION OF PROJECT DEVELOPMENT - D.E.P.

APPROVED
DIRECTOR - BUREAU OF WATERWAYS ENGINEERING AND WETLANDS - D.E.P.



PROFESSIONAL'S SIGNATURE DATE PROFESSIONAL'S SIGNATURE DATE

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF WATER PROGRAMS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF GENERAL SERVICES
HARRISBURG, PENNSYLVANIA

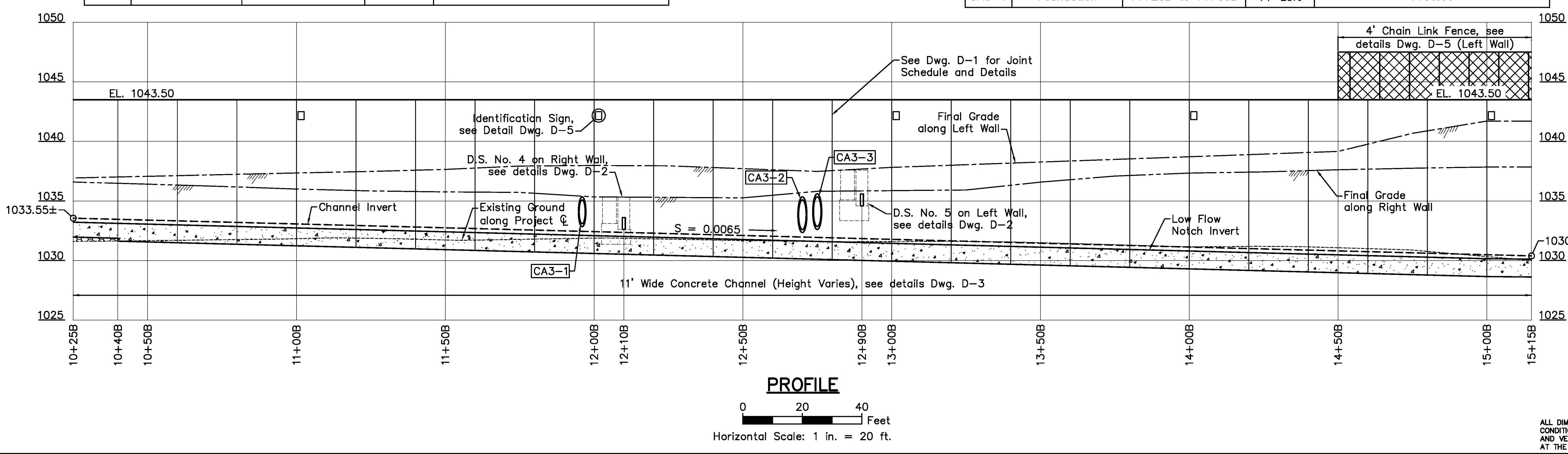
PROJECT NO. D.G.S. 182-19, PHASE 1

BUTTERNUT CREEK
FLOOD PROTECTION PROJECT
MOUNT CARMEL TOWNSHIP NORTHUMBERLAND COUNTY

PLAN AND PROFILE
STA. 10+25B TO STA. 15+15B

DRAWN BY S.L.E.	DATE	DRAWING NO.
CHECKED BY	SCALE	As Shown

P-3

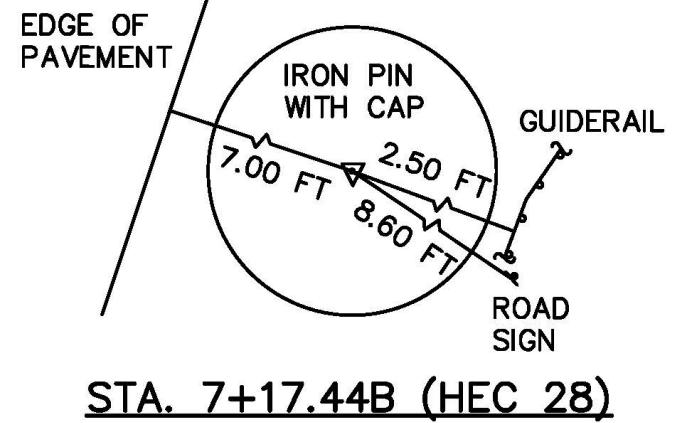


ALL DIMENSIONS AND EXISTING CONDITIONS SHALL BE CHECKED AND VERIFIED BY CONTRACTOR AT THE SITE.

SURVEY B DATA

Survey B Station	Coordinates	
	Northing	Easting
4+44.16B	231,117.45	2,335,133.41
7+17.44B	231,036.41	2,335,394.39

Note: Survey B Station 4+44.16B (HEC 45) does not have a reference.



SURVEY B STATION REFERENCE

No Scale

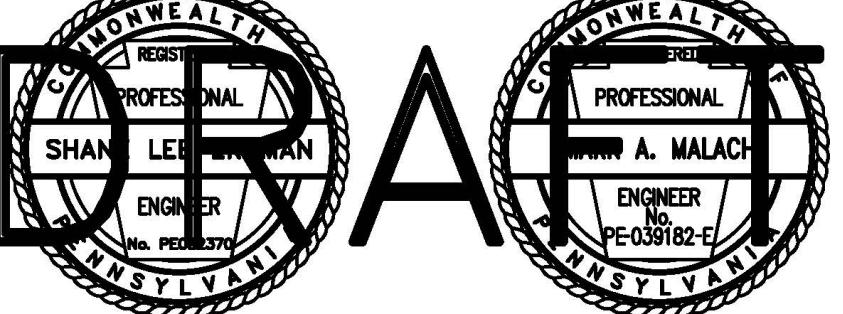
P.O.T. NO. 2L

N 231,183.69
E 2,335,256.78
Sta. 19+95L

NOTES:

- For General Notes, see Dwg. GP-1.
- For Concrete Notes, see Dwg. D-1.
- For Cross Sections, see Dwg. X-2.
- Payment for the removal of the existing 3rd Street box culvert wingwalls and apron shall be made at the unit cost for Removal of Concrete and Masonry Structures, Pay Item #.
- When work is to be performed within PennDOT R/W, contact PennDOT District 3-0 for inspection of work.

NO.	DATE	REVISION	APPR.
SUBMITTED			
PROJECT COORDINATOR - D.E.P.			
APPROVED			
CHEF - DIVISION OF PROJECT DEVELOPMENT - D.E.P.			
APPROVED			
DIRECTOR - BUREAU OF WATERWAYS ENGINEERING AND WETLANDS - D.E.P.			



PROFESSIONAL'S SIGNATURE DATE PROFESSIONAL'S SIGNATURE DATE

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF WATER PROGRAMS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF GENERAL SERVICES
HARRISBURG, PENNSYLVANIA

PROJECT NO. D.G.S. 182-19, PHASE 1

BUTTERNUT CREEK
FLOOD PROTECTION PROJECT
MOUNT CARMEL TOWNSHIP NORTHUMBERLAND COUNTY

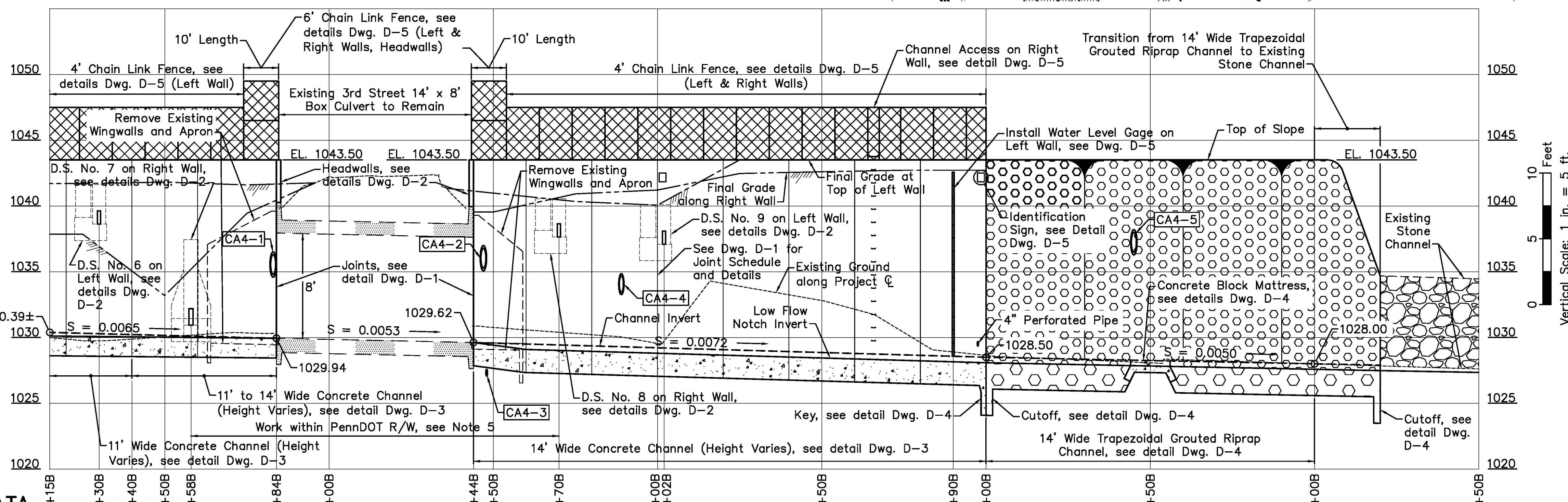
PLAN AND PROFILE
STA. 15+15B TO STA. 19+50B

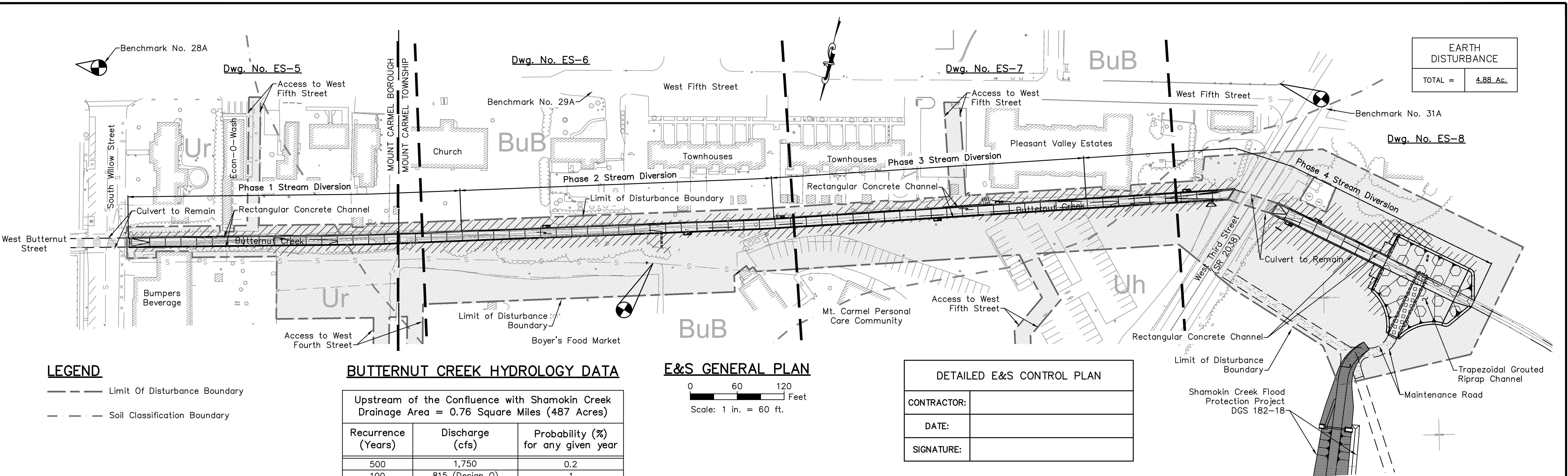
DRAWN BY S.L.E. DATE DRAWING NO.
CHECKED BY SCALE As Shown

P-4

CONTRACTOR ADJUSTMENTS

No.	Description	Q Station	Offset	Adjustment Required
CA4-1	18" RCP	15+83B	7' Left	Connect to Channel
CA4-2	18" CMP	16+47B	7' Left	Connect to Channel
CA4-3	4" Force Main Sewer	16+48B	Lt. Q. Rt.	Protect (Elevation Unknown)
CA4-4	15" RCP	16+89B	7' Left	Connect to Channel
CA4-5	18" TCP	18+45B	25' Left	Connect to Channel





LEGEND

- Limit of Disturbance Boundary
- - - Soil Classification Boundary

BUTTERNUT CREEK HYDROLOGY DATA

Upstream of the Confluence with Shamokin Creek Drainage Area = 0.76 Square Miles (487 Acres)		
Recurrence (Years)	Discharge (cfs)	Probability (%) for any given year
500	1,750	0.2
100	815 (Design Q)	1
50	589	2
25	416	4
10	248	10
5	156	20
2	69	50

Source: Department of Environmental Protection, Bureau of Waterways Engineering Flood Protection Study, Shamokin and Butternut Creeks, Northumberland County, Pennsylvania, December 1999.

E&S GENERAL PLAN

0 60 120 Feet
Scale: 1 in. = 60 ft.

DETAILED E&S CONTROL PLAN		
CONTRACTOR:		
DATE:		
SIGNATURE:		

NOTES:

1. For E&S General Notes, see Dwg. ES-2.
2. For E&S General Details, see Dwgs. ES-3 and ES-4.
3. For E&S Detailed Plans, see Dwgs. ES-5 thru ES-8.

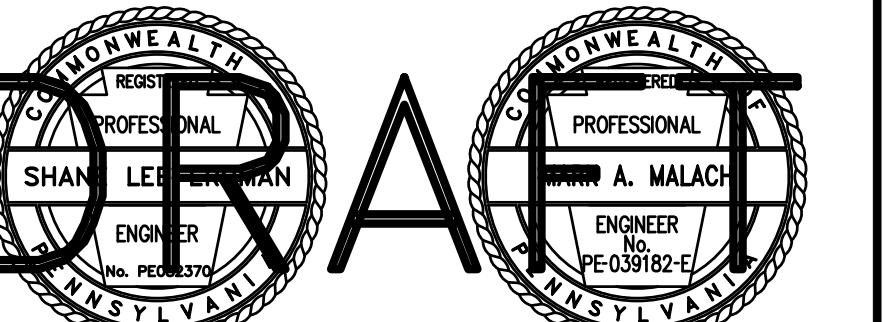
NO.	DATE	REVISION	APPR.

SUBMITTED _____
PROJECT COORDINATOR - D.E.P. _____

APPROVED _____
CHIEF - DIVISION OF PROJECT DEVELOPMENT - D.E.P. _____

APPROVED _____
DIRECTOR - BUREAU OF WATERWAYS ENGINEERING AND WETLANDS - D.E.P. _____

DIRECTOR - BUREAU OF WATERWAYS ENGINEERING AND WETLANDS - D.E.P. _____



PROFESSIONAL'S SIGNATURE DATE PROFESSIONAL'S SIGNATURE DATE

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF WATER PROGRAMS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF GENERAL SERVICES
HARRISBURG, PENNSYLVANIA

PROJECT NO. D.G.S. 182-19, PHASE 1

BUTTERNUT CREEK
FLOOD PROTECTION PROJECT
MOUNT CARMEL TOWNSHIP NORTHBUMBERLAND COUNTY

E&S GENERAL PLAN

ALL DIMENSIONS AND EXISTING CONDITIONS SHALL BE CHECKED AND VERIFIED BY CONTRACTOR AT THE SITE.

DRAWN BY S.L.E.	DATE	DRAWING NO.
CHECKED BY	SCALE	As Shown

ES-1

E&S GENERAL NOTES

The following general directives apply to all phases of construction activities:

1. A copy of the approved Erosion and Sediment Control Plan must be available at the project site at all times.
2. Special care shall be taken to prevent sediment laden stormwater from entering all stormwater management and conveyance facilities until the site has been properly stabilized.
3. During construction, the Contractor is to make certain all runoff is directed to the sediment control devices. Erosion and sediment bmps must be constructed, stabilized, and functional before site disturbance begins within the tributary areas of those bmps.
4. All erosion and sedimentation pollution control measures shall remain in place until the site has been stabilized. Vegetated areas are considered to be stabilized when a uniform 70 percent vegetative cover of erosion resistant perennial species has been achieved, or the disturbed area is covered with an acceptable bmp which permanently minimizes accelerated erosion and sedimentation. Until such time as this standard is achieved, interim stabilization measures and temporary erosion and sediment control bmps that are used to treat project runoff may not be removed. Until the site is stabilized, all erosion and sediment control bmps must be maintained properly. Maintenance must include inspections of all erosion and sediment control bmps after each runoff event and on a weekly basis. All preventative and remedial maintenance work, including cleanout, repair, replacement, re-grading, reseeding, re-mulching and re-netting must be performed immediately. If erosion and sediment control bmps fail to perform as expected, replacement bmps or modifications of those installed will be required.
5. After final site stabilization has been achieved, temporary erosion and sediment bmps must be removed. Areas disturbed during removal of the bmps must be stabilized immediately.
6. Erosion and sediment bmps must be constructed, stabilized, and functional before site disturbance begins within the tributary areas of those bmps.
7. All soil stockpiles shall be seeded with a grass cover immediately to avoid prolonged exposure of the bare soil material to rainfall events. If the area is expected to be disturbed again during the construction process, the temporary seed mixture may be utilized. Stockpiles shall not be greater than 35 feet in height, nor shall stockpile slopes be steeper than 2 to 1. Whenever possible, place all excavated material upslope from disturbed areas. Stockpiles shall be set parallel to grade to reduce runoff.
8. All vehicles and equipment must enter and exit the project site through the rock construction entrances.
9. Erosion control blanket shall be installed on disturbed slopes as shown on the plans or as required in the current D.E.P. E&S Manual.
10. In all cases during construction, the area of disturbance should be minimized.
11. Silt fence shall be placed end to end, securely staked in place, and maintained until area is stabilized.
12. All pumping of sediment laden water shall be through a sediment control bmp, such as a pumped water filter bag or equivalent sediment removal facility, over undisturbed vegetated areas.
13. Upon general completion of the site improvements, topsoil shall be placed and final grading passes shall be made perpendicular to the direction of runoff.
14. Reseed and reestablish any barren and disturbed areas not having established ground cover.
15. Any disturbed area must be stabilized immediately. If the area is expected to be disturbed again during the construction process, the temporary seed mixture may be utilized. During non-germinating periods, mulch must be applied at the recommended rates. Disturbed areas which are not at finished grade and which will be redisturbed within 1 year may be stabilized in accordance with temporary seeding specifications. Disturbed areas which are either at finished grade or will not be redisturbed within one year must be stabilized in accordance with permanent seeding specifications.
16. In all cases, care should be taken to prevent the entry of soil, stone, or other materials and refuse into existing drainage pipes and swales, as well as wetland areas on the site.
17. Fill material for the embankments shall be free of roots, or other woody vegetation, organic material, large stones, and other objectionable materials. The embankment shall be compacted in accordance with the specifications.
18. The Contractor shall be cognizant of appropriate seasons for planting grass seed mixtures, and plan his construction schedule to appropriately utilize the best times of the year for germination of the seed and stabilization of the site.
19. Wherever the term "seeding" is mentioned in the construction sequence or in the Erosion and Sediment Pollution Control Plan, the term means the entire soil preparation, seeding, and mulching process.
20. Sediment and soil material that is removed from clogged or full bmps shall be disposed of by thoroughly mixing with other suitable fill materials on the project site, and incorporated into fill in upland areas of the project site. The fill area and other disturbed areas shall be stabilized in accordance with the Erosion and Sediment Pollution Control Plan. In no case shall the sediment or "waste" soil material be carelessly dumped or otherwise placed in a manner that causes the material to again be eroded and transported by runoff, either on or off the project site.
21. The Contractor shall dispose of waste materials obtained from demolition activities in a legal manner, and shall recycle as much of the waste material as possible, in accordance with applicable sections of the contract specifications. All building materials and wastes must be removed from the site and recycled or disposed of in accordance with the Department's Solid Waste Management Regulations at 25 pa. code 260.1 et seq., 271.1, and 287.1 et seq. No building materials or wastes or unused building materials shall be burned, buried, dumped, or discharged at the site.
22. Should any soil materials be removed from the site at any time, the soil materials must be disposed of properly. The Contractor will be responsible for the proper removal and disposal of any excess topsoil and fill material from the site. The receiving site must have a Soil Erosion and Sedimentation Control Plan approved by the County Conservation District prior to the placement of any fill. In addition, the receiving site may require an NPDES Permit.
23. Immediately upon discovering unforeseen circumstances posing the potential for accelerated erosion and/or sediment pollution, the operator shall implement appropriate best management practices to eliminate the potential for accelerated erosion and/or sediment pollution. Should additional or unexpected erosion or sedimentation occur during construction, or questions regarding the maintenance control practices arise, contact the Bureau of Waterways Engineering & Wetlands.
24. The Contractor will be responsible for the removal of any excess material and make sure site(s) receiving the excess has an approved Erosion and Sediment Control Plan that meets the conditions of chapter 102 and/or other state or federal regulations.
25. Clean fill is defined as: uncontaminated, non-water soluble, non-decomposable, inert, solid material. The term includes soil, rock, stone, dredged material, used asphalt, and brick, block or concrete from construction and demolition activities that is separate from other waste and is recognizable as such. The term does not include materials placed in or on the waters of the Commonwealth unless otherwise authorized. (The term "used asphalt" does not include milled asphalt or asphalt that has been processed for re-use.)
26. Clean fill affected by a spill or release of a regulated substance: fill materials affected by a spill or release of a regulated substance still qualifies as clean fill provided the testing reveals that the fill material contains concentrations of regulated substances that are below the residential limits in tables FP-1a and FP-1b found in the Department's Policy "Management of Fill".
27. Any person placing clean fill that has been affected by a spill or release of a regulated substance must use form FP-001 to certify the origin of the fill material and the results of the analytical testing to qualify the material as clean fill. Form FP-001 must be retained by the owner of the property receiving the fill.
28. Environmental due diligence: investigative techniques, including, but not limited to, visual property inspections, electronic data base searches, review of property ownership, review of property use history, sanborn maps, environmental questionnaires, transaction screens, analytical testing, environmental assessments or audits. Analytical testing is not a required part of due diligence unless visual inspection and/or review of the past land use of the property indicates that the fill may have been subjected to a spill or release of regulated substance. If the fill may have been affected by a spill or release of a regulated substance, it must be tested to determine if it qualifies as clean fill. Testing should be performed in accordance with Appendix A of the Department's Policy "Management of Fill".
29. Fill material that does not qualify as clean fill is regulated fill. Regulated fill is waste and must be managed in accordance with the Department's Municipal or Residual Waste Regulations based on 25 pa. code chapters 287, Residual Waste Management or 271, Municipal Waste Management, whichever is applicable.

Maintenance Program

1. Until the site is stabilized, all erosion and sediment control bmps must be maintained properly. Maintenance must include inspections of all erosion and sediment control bmps after each runoff event and on a weekly basis. All preventative and remedial maintenance work, including cleanout, repair, replacement, re-grading, reseeding, re-mulching and re-netting must be performed immediately. If erosion and sediment control bmps fail to perform as expected, replacement bmps or modifications of those installed will be required.
2. The Permittee and Co-permittee must ensure that visual site inspections are conducted weekly, and after each measurable precipitation event by qualified personnel, trained and experienced in erosion and sediment control, to ascertain that the erosion and sediment control (E&S) bmps are operational and effective in preventing pollution to the waters of the Commonwealth. A written report of each inspection shall be kept, and include:
 - 1) A summary of the site conditions, E&S bmps, and compliance; and
 - 2) The date, time, and the name of the person conducting the inspection.
3. A rock construction entrance shall be placed at the point of construction ingress and egress. The structure will prevent tracking and flowing of sediment onto existing stabilized areas. Clean and redress the rock construction entrance when the voids become choked with mud and sediment. The entrance shall remain functional for the duration of the project.
4. Where dust or wind erosion is a problem, the unstable surface(s) shall be sprinkled with water or other suitable dust suppressor.
5. Any temporary erosion control measure applied to exposed soil surfaces shall remain functional until vegetative cover is sufficiently established.
6. Permanent soil protection will be completed as early as practical.
7. Any debris accumulated at silt barrier fencing shall be removed and properly disposed. Barriers shall be checked daily and realigned or reset as required. Remove sediment when it reaches one half of fence height.
8. Any sediment removed from bmps during construction

will be returned to upland areas on site and incorporated into the site grading.

9. All channels must be kept free of obstructions such as fill ground, fallen leaves & woody debris, accumulated sediment, and construction materials/wastes. Channels should be kept mowed and/or free of all weedy, brushy or woody growth.
10. Vegetated channels shall be constructed free of rocks, tree roots, stumps or other projections that will impede normal channel flow and/or prevent good lining to soil contact. The channel shall be initially over-excavated to allow for topsoil placement.
11. Vegetative stabilization shall be periodically inspected for proper growth. Any areas not responding shall be promptly reseeded. Areas which show signs of erosion prior to stabilization shall be graded, reseeded and re-mulched as soon as possible. Sod shall be utilized at areas where seeding does not appear to be properly stabilizing an area.
12. Clean and re-dress the rock filter berms when the voids become choked with mud and sediment. Rock filter berms shall remain functional for the duration of the project.
13. Replace topsoil and stabilize all exposed or disturbed areas by performing final grading operations at the soil material stockpile areas. Seed, fertilize and mulch exposed or disturbed areas.
14. Perform fine grading operations at disturbed areas adjacent to the channel culvert, and seed the disturbed areas with permanent seed mixture.
15. Upon completion of all earth disturbance activities, removal of all temporary bmps, and permanent *stabilization of all disturbed areas, the owner and/or operators shall contact the County Conservation District for a final inspection. Proper disposal and/or recycling of the bmps is required by the site Contractor as per General E&S note #21.

4. Field-mark all waters of the Commonwealth boundaries including stream buffers, wetland boundaries, floodways etc.

5. Field-mark the project limit of disturbance.
6. Field-mark all limits of disturbance within the interior of the site, including steep slopes, infiltration areas, trees selected to be saved, etc.
7. Install silt barrier as necessary to perform construction of the project and to protect the water body from sediment runoff.
8. Clear and grub the area of proposed construction. Strip topsoil and stockpile at the temporary areas provided, surround with filter fabric and seed per temporary seeding specifications, fertilize and mulch.
9. Construct the project beginning at the upstream end and progress downstream, in segments to be chosen by the Contractor and approved by the Department.
10. Coordinate and overlap segments to provide continuous erosion and sedimentation control for the entire project length.

11. Replace topsoil and stabilize all exposed or disturbed areas by performing final grading operations at the soil material stockpile areas. Seed, fertilize and mulch exposed or disturbed areas.
12. Perform fine grading operations at disturbed areas adjacent to the channel culvert, and seed the disturbed areas with permanent seed mixture.
13. Upon completion of all earth disturbance activities, removal of all temporary bmps, and permanent *stabilization of all disturbed areas, the owner and/or operators shall contact the County Conservation District for a final inspection. Proper disposal and/or recycling of the bmps is required by the site Contractor as per General E&S note #21.

* Stabilization— Permanent stabilization is defined as a minimum uniform 70% perennial vegetative cover or other permanent non-vegetative cover with a density sufficient to resist accelerated surface erosion and subsurface characteristics sufficient to resist sliding and other movements.

- **Immediately after earth disturbance activities cease, the operator shall stabilize any areas disturbed by the activities. During non-germinating periods, mulch must be applied at the specified rates. Disturbed areas which are not at finished grade and which will be redisturbed within 1 year must be stabilized in accordance with the temporary vegetative stabilization specifications. Disturbed areas which are at finished grade or which will not be redisturbed within 1 year must be stabilized in accordance with the permanent vegetative stabilization specifications.

SEED MIXTURES

Temporary Seed Mixture

Temporary seeding shall consist of annual ryegrass (100 percent by weight), or equivalent, and shall be placed at the rate of 2 pounds per 1000 square feet. Temporary seeding shall be applied to those areas that are a potential erosion problem during construction and to those areas exposed for longer than 20 calendar days. If conditions do not permit temporary seeding, mulching shall be employed. Straw mulch shall be applied in long strands, not chopped or finely broken.

Permanent Seed Mixture

The following seeding mixture, applied at the rate of 7.0 pounds per 1,000 square feet:

- A) Fine Perennial Ryegrass Mixture (Lolium Perenne). A blend of 2 to 4 improved certified varieties, such as Pennfine, Regal, Manhattan II, with no one variety exceeding 50% of total ryegrass component. Percentage of total seed mixture by weight: 30%; purity: 98%; germination: 90%; maximum percentage of weed seed: 0.15%.
- B) Strong Creeping Red Fescue or Chewings Fescue (Festuca Rubra). An improved certified variety, such as Pennlawn for creeping red fescue or Longfellow II for chewing fescue. Percentage of total seed mixture by weight: 30%; purity: 98%; germination: 85%; maximum percentage of weed seed: 0.15%.
- C) Kentucky Bluegrass Mixture (Poa Pratensis). A blend of 3 to 4 improved certified varieties, such as Victa, Baron, Fortuna, & Gnome, with no one variety exceeding 40% of total bluegrass component. Percentage of total seed mixture by weight: 40%; purity: 98%; germination: 80%; maximum percentage of weed seed: 0.20%.

MULCH SPECIFICATIONS

On all disturbed areas which do not have an erosion control blanket specified for installation:

Immediately after seeding, or within 6 hours after seeding is completed, spread mulch uniformly over the entire seeded area at a rate of 6,000 pounds (dry weight) per acre. The mulch shall be moist at the time of placement. To prevent the mulch from being blown away or bunched by the wind and to ensure the mulch covers the soil and seed in place, anchor the moist mulch to the soil by an approved means. On slopes where machinery cannot be used, hold the mulch in place by a means that will not be detrimental to subsequent operations.

- Nonasphaltic mulch binders may be applied uniformly over and through the mulch at the manufacturer's recommended rate. Mulches shall be free of foreign materials, coarse or woody materials such as tobacco and soybean stems, substances toxic to plant growth, and mature seed bearing stalks or roots of prohibited and noxious weeds as defined by law. Mulches shall be cut into lengths of not less than 6 inches and cured to less than 20 percent moisture content by weight. Mulches shall be hay, straw, or a combination both. Hay shall be timothy hay, mixed clover and timothy hay, or other approved native or forage grasses. Straw shall be either wheat or oat straw, reasonably free of viable seeds.
- At least 7 days before starting any earth disturbance activities, the owner and/or operator shall invite all Contractors involved in those activities, the landowner, all appropriate municipal officials, the Erosion and Sediment Control Plan preparer, and a representative of the County Conservation District to an on-site pre-construction meeting.
- At least 3 days before starting any earth disturbance activities, all Contractors involved in those activities shall notify the Pennsylvania One Call System Incorporated at 1-800-242-1776 for the location of existing underground utilities.

- All vehicles entering the site shall do so via the rock construction entrances. Any mud or sediment tracked onto macadam roadways shall be removed by the Contractor at the end of each working day. Washing of the roadway is not permitted. The contractor is also responsible for all traffic control devices associated with the access drive throughout the term of construction activities.
- Mulch Binders – Mulch binders shall be nonasphaltic emulsions, of either a water soluble natural vegetable gum blended with gelling and hardening agents or a water soluble blend of hydrophylic polymers, viscosifiers, sticking aids, and gums. Obtain Binders from a producer listed in PA Bulletin 15.

Apply the following soil supplements prior to temporary and permanent seeding:

- A) Pulverized agricultural limestone conforming to the Technical Specification for "Seeding", applied at a rate of 5,000 pounds per acre.
- B) 10-20-20 analysis commercial fertilizer conforming to the Technical Specification for "Seeding", applied at a rate of 750 pounds per acre.

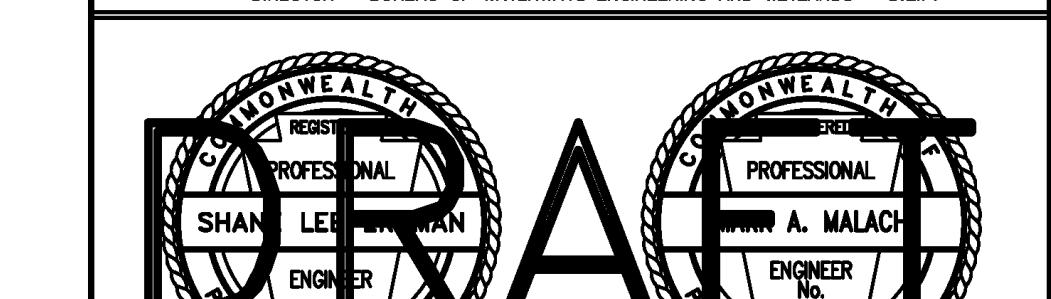
DETAILED E&S CONTROL PLAN

CONTRACTOR:	
DATE:	
SIGNATURE:	

NOTES:

1. For E&S General Plan, see Dwg. ES-1.
2. For E&S General Details, see Dwgs. ES-3 and ES-4.
3. For E&S Detailed Plans, see Dwgs. ES-5 thru ES-8.

NO.	DATE	REVISION	APPR.
SUBMITTED			
PROJECT COORDINATOR - D.E.P.			
APPROVED			
CFO - DIVISION OF PROJECT DEVELOPMENT - D.E.P.			
APPROVED			
DIRECTOR - BUREAU OF WATERWAYS ENGINEERING AND WETLANDS - D.E.P.			



COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION OFFICE OF WATER PROGRAMS

COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF GENERAL SERVICES HARRISBURG, PENNSYLVANIA

PROJECT NO. D.G.S. 182-19, PHASE 1

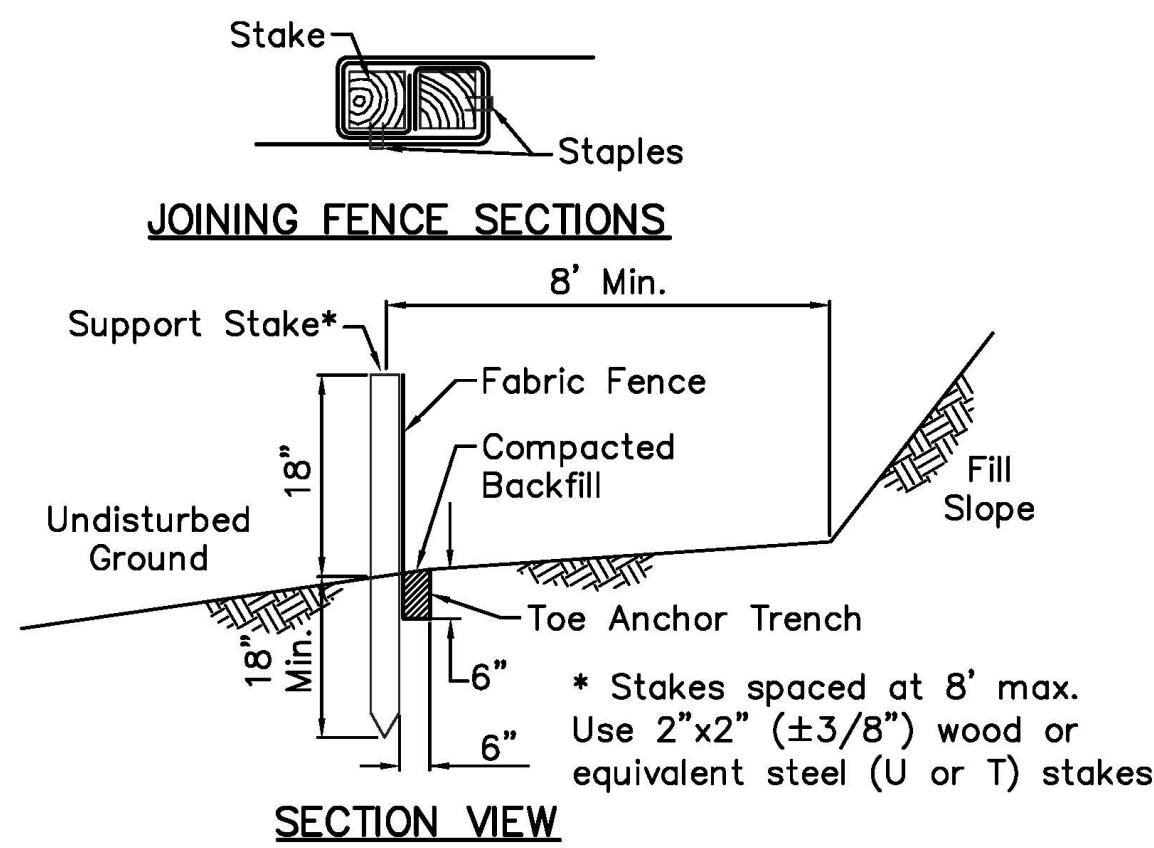
BUTTERNUT CREEK FLOOD PROTECTION PROJECT

MOUNT CARMEL TOWNSHIP NORTHERN HARRISBURG COUNTY

E&S GENERAL NOTES

DRAWN BY	S.L.E.	DATE	DRAWING NO.
CHECKED BY	As Shown	SCALE	

ES-2



NOTES:

Fabric shall have the minimum properties as shown in table 4.3 of the PA DEP Erosion Control Manual.

Fabric width shall be 30 in. minimum. stakes shall be hardwood or equivalent steel (U or T) stakes.

Silt fence shall be placed at level existing grade. Both ends of the fence shall be extended at least 8 feet up slope at 45 degrees to the main fence alignment.

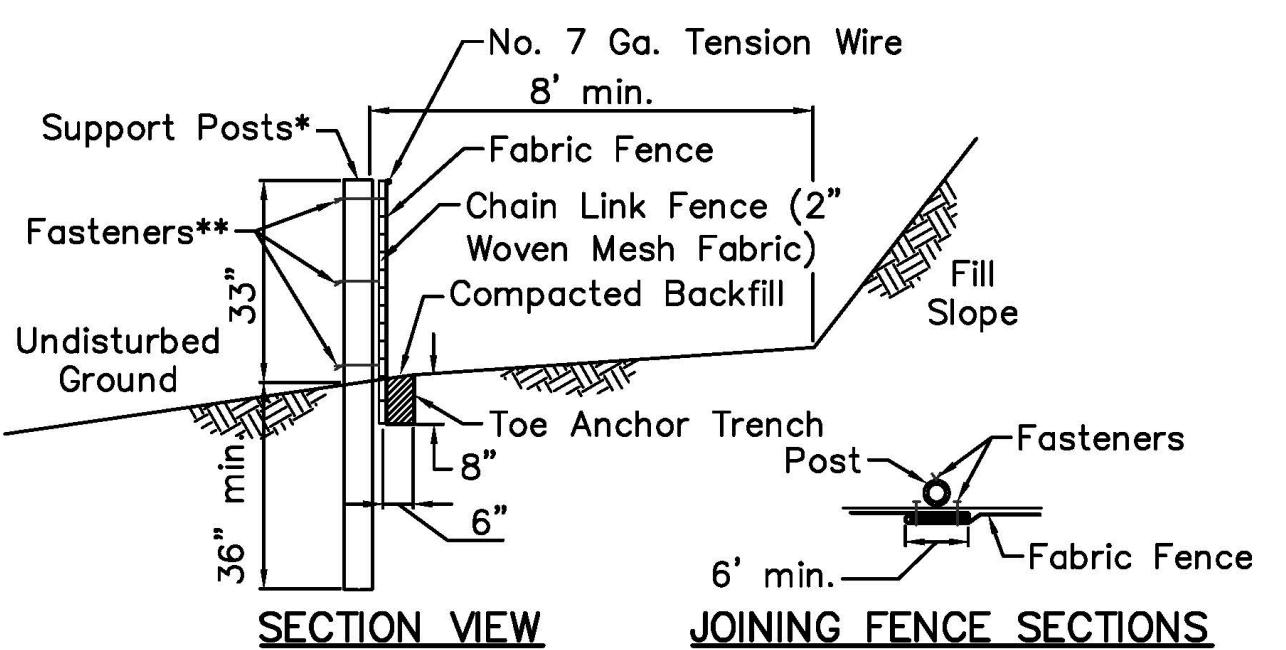
Sediment shall be removed when accumulations reach half the above ground height of the fence.

Any section of silt fence which has been undermined or topped shall be immediately replaced with a rock filter outlet (Standard Construction Detail #4-6).

Fence shall be removed and properly disposed of when tributary area is permanently stabilized.

STANDARD CONSTRUCTION DETAIL #4-7 STANDARD SILT FENCE (18" HIGH)

No Scale



* Posts spaced at 10 ft. max. Use 2-1/2 in. dia heavy duty galvanized or aluminum posts.

** Chain link to post fasteners spaced at 14 in. max. Use No. 9 Ga. aluminum wire or No. 9 galvanized steel wire. Fabric to chain fasteners spaced at 24 in. max. on center.

NOTES:

Fabric shall have the minimum properties as shown in table 4.3 of the PA DEP Erosion Control Manual.

Fabric width shall be 42 in. minimum.

posts shall be installed using a posthole drill.

Chain link shall be galvanized No. 11.5 Ga. steel wire with 2-1/4 in. opening, No. 11 Ga. aluminum coated steel wire in accordance with ASTM-A-491, or galvanized No. 9 Ga. steel wire top and bottom with galvanized No. 11 Ga. steel intermediate wires. No. 7 gage tension wire to be installed horizontally through holes at top and bottom of chain-link fence or attached with hog rings at 5 ft max. centers.

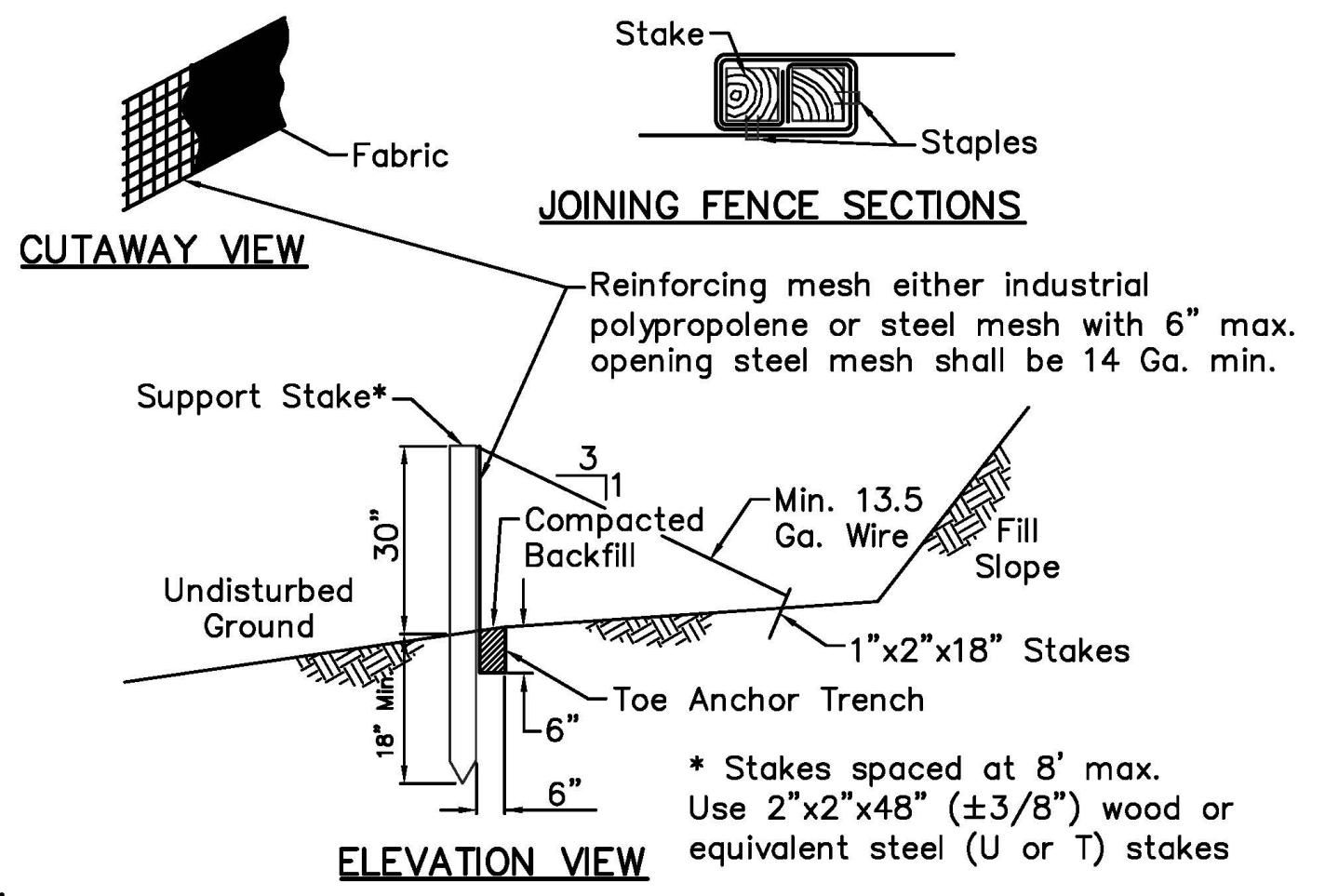
Silt fence shall be placed at level existing grade. Both ends of the fence shall be extended at least 8 feet up slope at 45 degrees to the main fence alignment.

Sediment shall be removed when accumulations reach half the above ground height of the fence.

Fence shall be removed and properly disposed of when tributary area is permanently stabilized.

STANDARD CONSTRUCTION DETAIL #4-10 SUPER SILT FENCE

No Scale



NOTES:

Fabric shall have the minimum properties as shown in table 4.3 of the PA DEP Erosion Control Manual.

Fabric width shall be 42 in. minimum. Stakes shall be hardwood or equivalent steel (U or T) stakes. An 18 in. support stake shall be driven 12 in. minimum into undisturbed ground.

Silt fence shall be placed at level existing grade. Both ends of the fence shall be extended at least 8 feet up slope at 45 degrees to the main fence alignment.

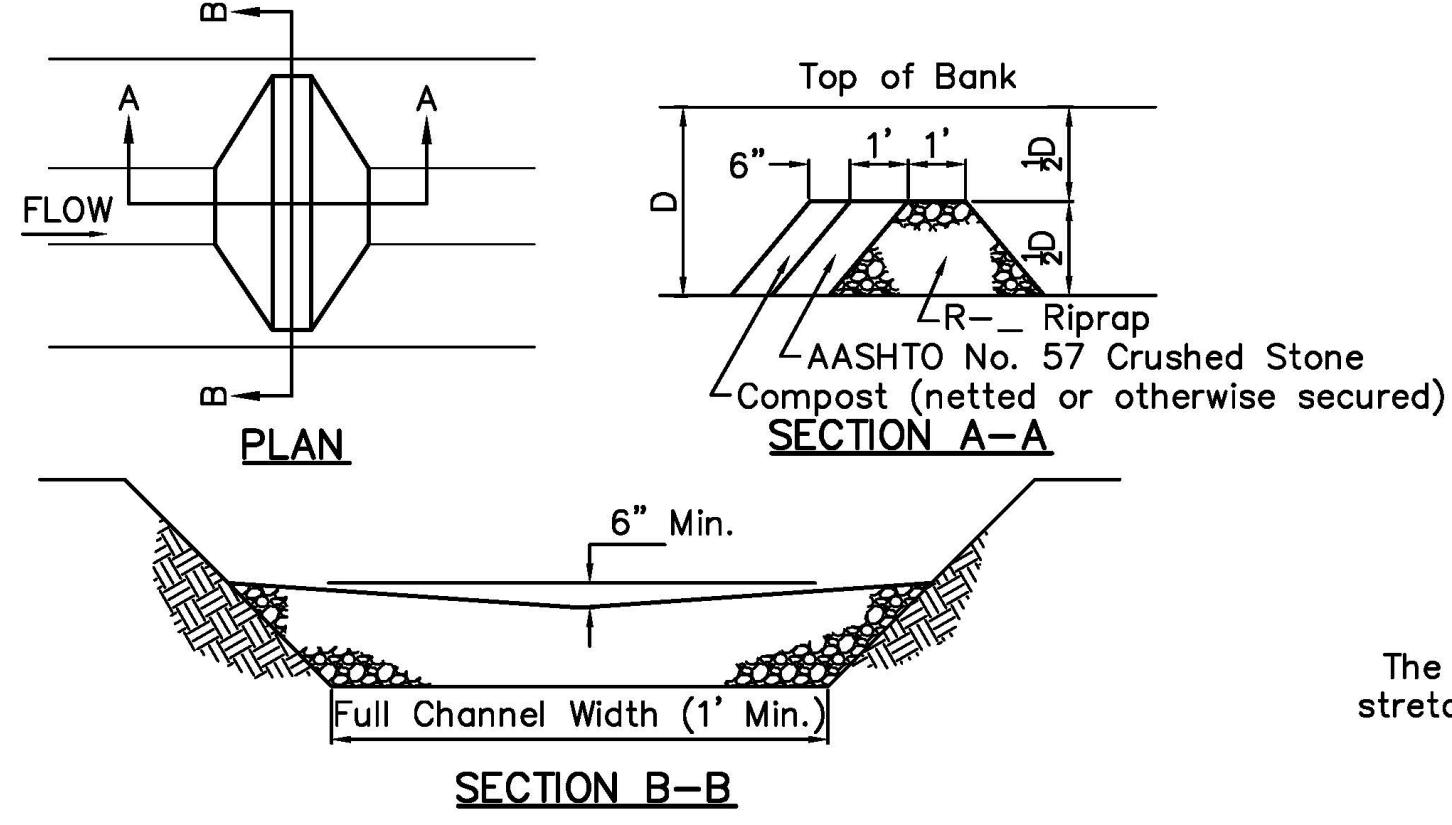
Sediment shall be removed when accumulations reach half the above ground height of the fence.

Any section of silt fence which has been undermined or topped shall be immediately replaced with a rock filter outlet (Standard Construction Detail #4-6).

Fence shall be removed and properly disposed of when tributary area is permanently stabilized.

STANDARD CONSTRUCTION DETAIL #4-8 REINFORCED SILT FENCE (30" HIGH)

No Scale



FOR D ≥ 3' - USE R-4
FOR D ≥ 2' to D < 3' - USE R-3
Not Applicable for D < 2'

ROCK FILTER NO.	LOCATION	D (FT)	RIPRAP SIZE

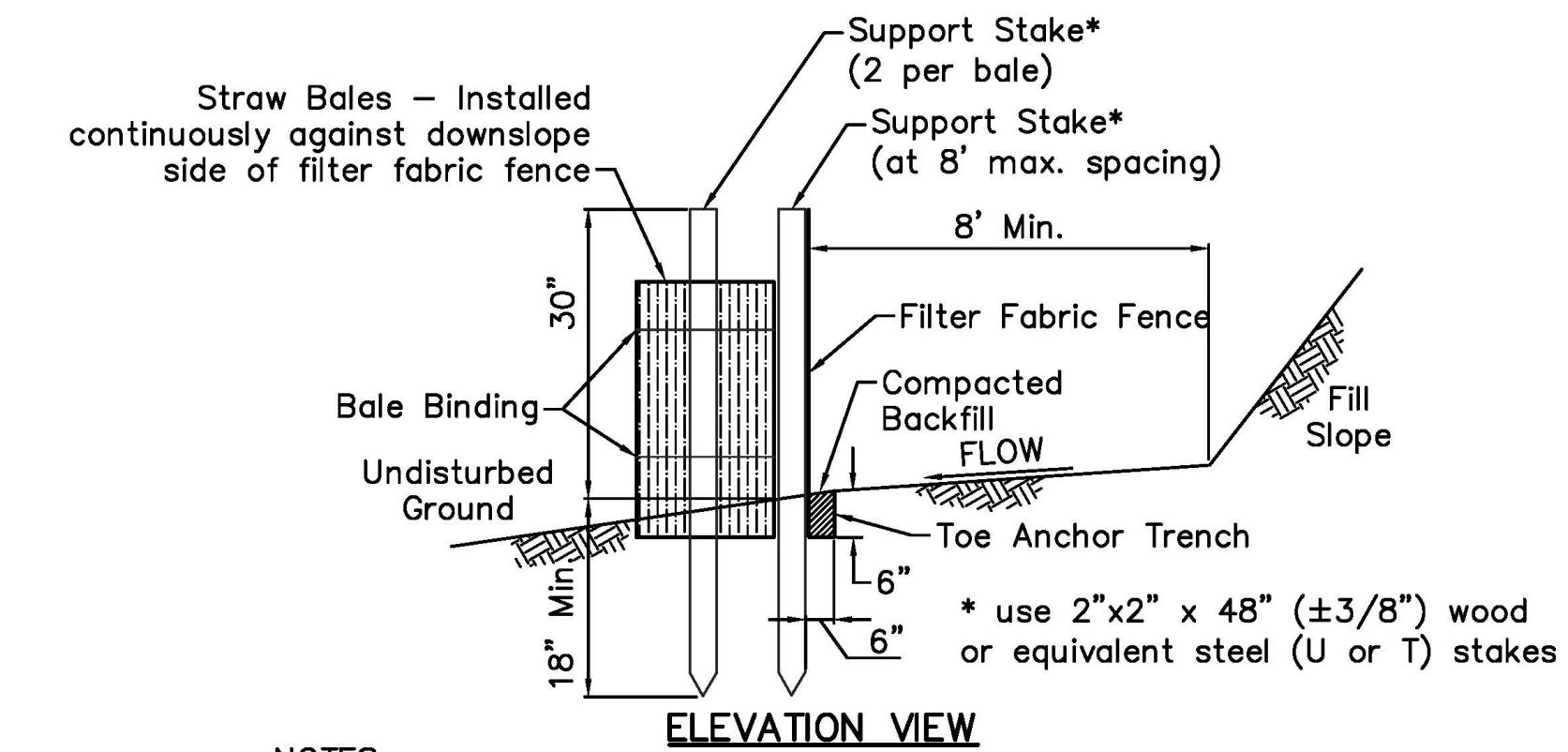
NOTES:

Sediment must be removed when accumulations reach 1/2 the height of the filters.

Immediately upon stabilization of each channel, remove accumulated sediment, remove rock filter, and stabilize disturbed areas.

STANDARD CONSTRUCTION DETAIL #4-14 ROCK FILTER

No Scale



NOTES:

Fabric shall have the minimum properties as shown in table 4.3 of the PA DEP Erosion Control Manual.

This bmp is not suitable for projects lasting longer than 3 months unless bales are replaced quarterly.

Fabric width shall be 42 in. minimum. Stakes shall be hardwood or equivalent steel (U or T) stakes.

Silt fence shall be placed at level existing grade. Both ends of the fence shall be extended at least 8 feet up slope at 45 degrees to the main fence alignment.

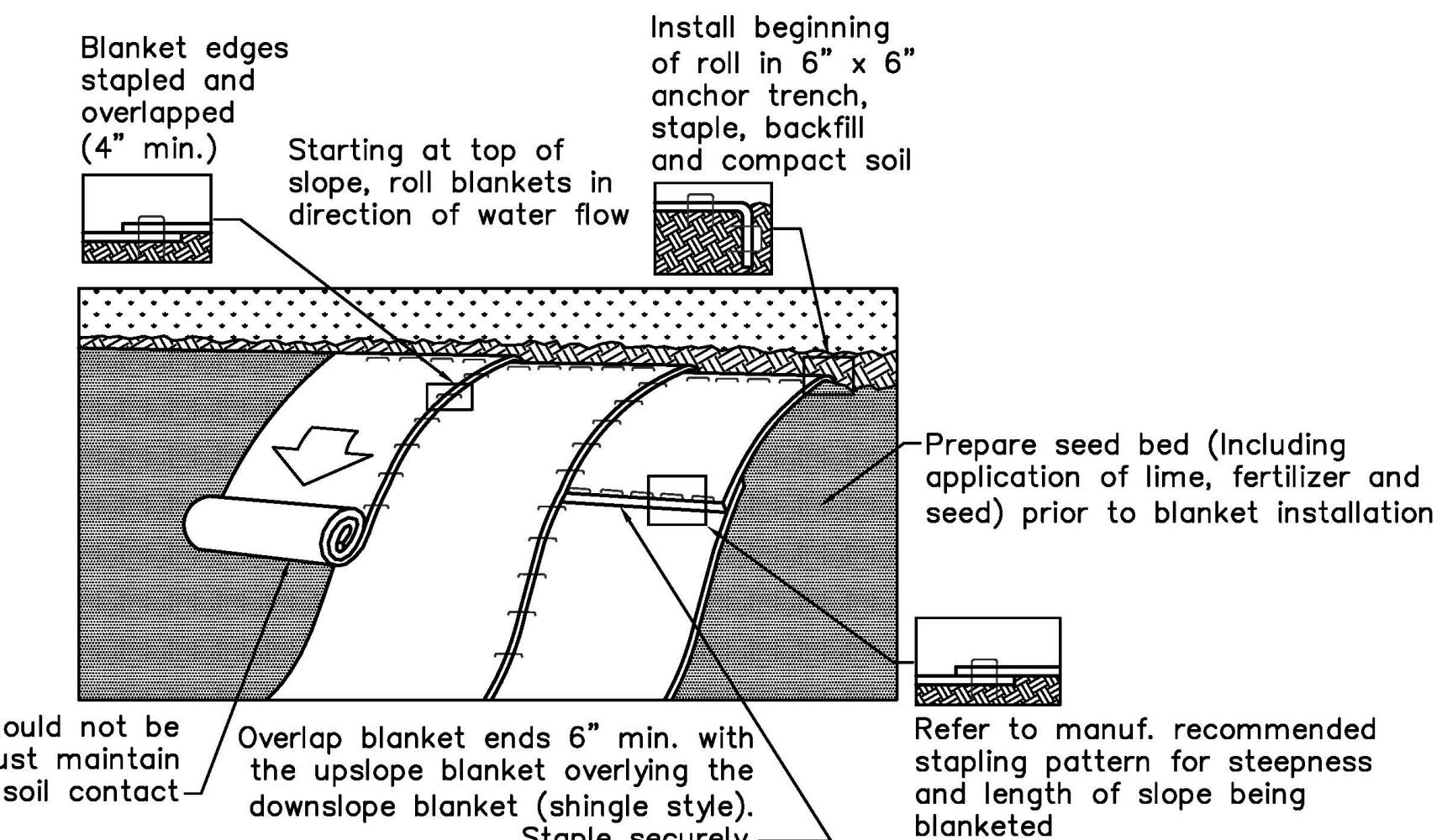
Sediment shall be removed when accumulations reach half the above ground height of the fence.

Any section of silt fence which has been undermined or topped shall be immediately replaced with a rock filter outlet (Standard Construction Detail #4-6).

Fence shall be removed and properly disposed of when tributary area is permanently stabilized.

STANDARD CONSTRUCTION DETAIL #4-9 SILT FENCE REINFORCED BY STAKED STRAW BALES

No Scale



The blanket should not be stretched; it must maintain good soil contact.

Overlap blanket ends 6" min. with the upslope blanket overlying the downslope blanket (shingle style). Staple securely.

NOTES:

Seed and soil amendments shall be applied according to the rates in the plan drawings prior to installing the blanket.

Provide anchor trench at toe of slope in similar fashion as at top of slope.

Slope surface shall be free of rocks, clods, sticks, and grass.

Blanket shall have good continuous contact with underlying soil throughout entire length. Lay blanket loosely and stake or staple to maintain direct contact with soil. Do not stretch blanket.

The blanket shall be stapled in accordance with the manufacturer's recommendations.

Blanketed areas shall be inspected weekly and after each runoff event until perennial vegetation is established to a minimum uniform 70% coverage throughout the blanketed area. Damaged or displaced blankets shall be restored or replaced within 4 calendar days.

STANDARD CONSTRUCTION DETAIL #11-1 EROSION CONTROL BLANKET INSTALLATION

No Scale

ALL DIMENSIONS AND EXISTING CONDITIONS SHALL BE CHECKED AND VERIFIED BY CONTRACTOR AT THE SITE.

DRAWN BY	S.L.E.	DATE	DRAWING NO.
CHECKED BY		SCALE	As Shown

ES-4

DETAILED E&S CONTROL PLAN

CONTRACTOR:	
DATE:	
SIGNATURE:	

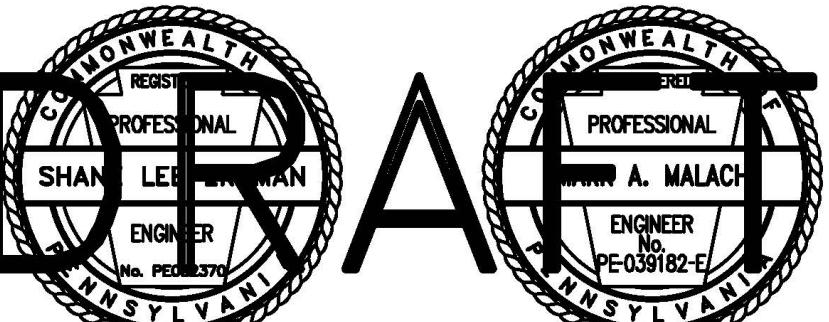
NOTES:

1. For E&S General Plan, see Dwg. ES-1.

2. For E&S General Notes, see Dwg. ES-2.

3. For E&S Detailed Plans, see Dwgs. ES-5 thru ES-8.

NO.	DATE	REVISION
		APPR.
SUBMITTED		
PROJECT COORDINATOR - D.E.P.		
APPROVED		
CHIEF - DIVISION OF PROJECT DEVELOPMENT - D.E.P.		
APPROVED		
DIRECTOR - BUREAU OF WATERWAYS ENGINEERING AND WETLANDS - D.E.P.		
PROFESSIONAL'S SIGNATURE DATE PROFESSIONAL'S SIGNATURE DATE		
PROFESSIONAL'S SIGNATURE DATE PROFESSIONAL'S SIGNATURE DATE		



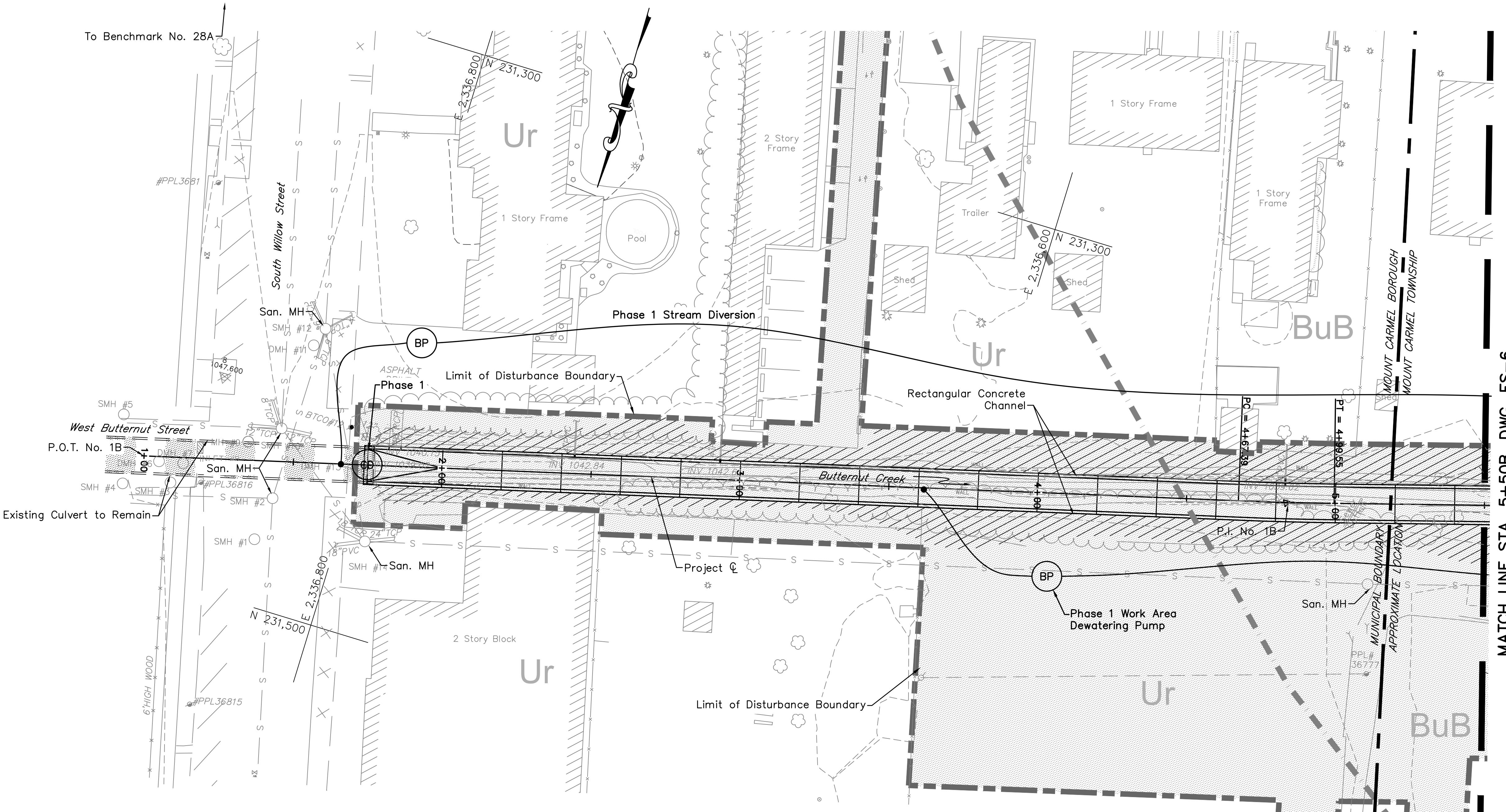
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DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF WATER PROGRAMS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF GENERAL SERVICES
HARRISBURG, PENNSYLVANIA

PROJECT NO. D.G.S. 182-19, PHASE 1

BUTTERNUT CREEK
FLOOD PROTECTION PROJECT
MOUNT CARMEL TOWNSHIP NORTHERN HARRISBURG, PENNSYLVANIA

E&S GENERAL DETAILS

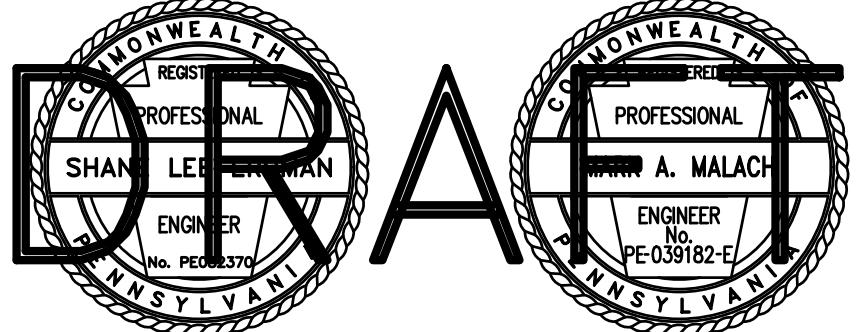


DETAILED E&S CONTROL PLAN	
CONTRACTOR:	
DATE:	
SIGNATURE:	

NOTES:

1. For E&S General Plan, see Dwg. ES-1.
2. For E&S General Notes, see Dwg. ES-2.
3. For E&S General Details, see Dwgs. ES-3 and ES-4.

NO.	DATE	REVISION	APPR.
SUBMITTED			
PROJECT COORDINATOR - D.E.P.			
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APPROVED			
DIRECTOR - BUREAU OF WATERWAYS ENGINEERING AND WETLANDS - D.E.P.			



E&S PLAN

0 20 40
Scale: 1 in. = 20 ft.

LEGEND

- (RCE) Rock Construction Entrance
- (CD) Cofferdam
- (BP) Bypass Pump
- (FB) Filter Bag
- (BC) Bypass Channel
- (PF) Pipe Flume(s)
- (RF) Rock Filter
- (SF) Silt Fence
- (FS) Filter Sock
- (ECB) Erosion Control Blanket

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HARRISBURG, PENNSYLVANIA

PROJECT NO. D.G.S. 182-19, PHASE 1

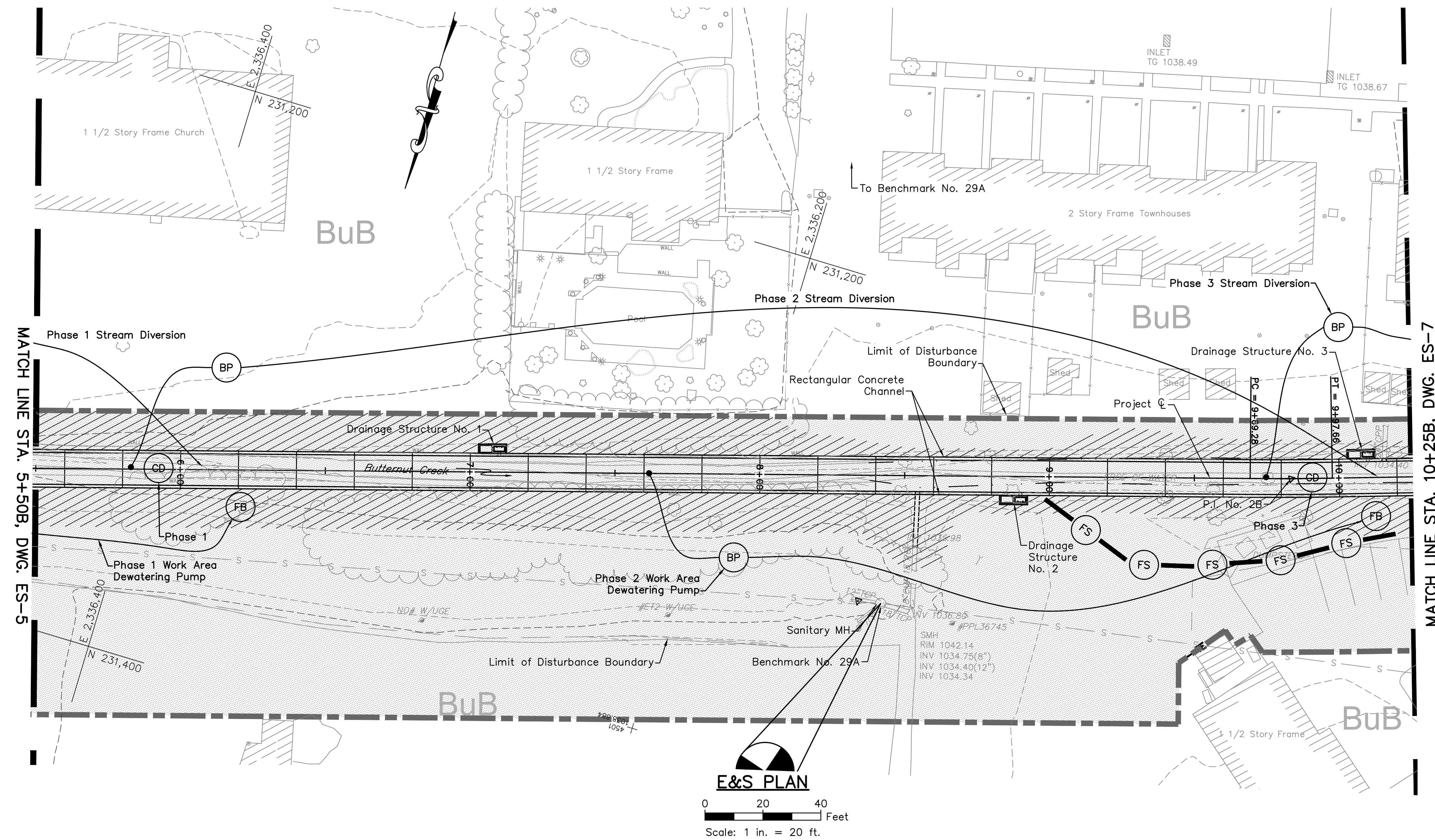
BUTTERNUT CREEK
FLOOD PROTECTION PROJECT
MOUNT CARMEL TOWNSHIP NORTHBUMBERLAND COUNTY

E&S DETAILED PLAN
STA. 1+00B TO STA. 5+50B

ALL DIMENSIONS AND EXISTING CONDITIONS SHALL BE CHECKED AND VERIFIED BY CONTRACTOR AT THE SITE.

DRAWN BY S.L.E.	DATE	DRAWING NO.
CHECKED BY	SCALE As Shown	

ES-5

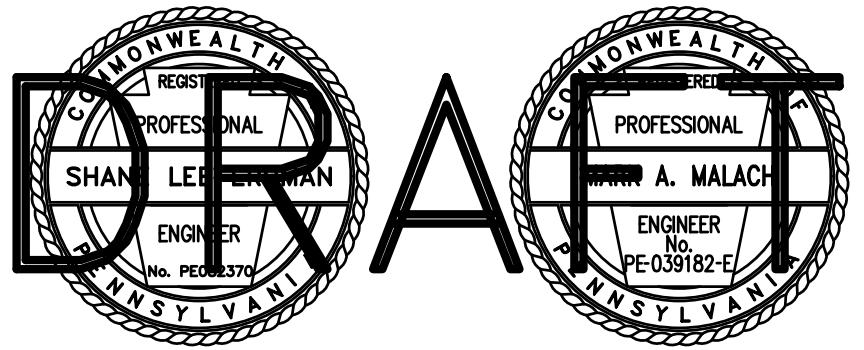


DETAILED E&S CONTROL PLAN	
CONTRACTOR:	
DATE:	
SIGNATURE:	

NOTES:

1. For E&S General Plan, see Dwg. ES-1.
2. For E&S General Notes, see Dwg. ES-2.
3. For E&S General Details, see Dwgs. ES-3 and ES-4.

NO.	DATE	REVISION	APPR.
SUBMITTED			
PROJECT COORDINATOR - D.E.P.			
APPROVED			
CHIEF - DIVISION OF PROJECT DEVELOPMENT - D.E.P.			
APPROVED			
DIRECTOR - BUREAU OF WATERWAYS ENGINEERING AND WETLANDS - D.E.P.			



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PROJECT NO. D.G.S. 182-19, PHASE 1

BUTTERNUT CREEK
FLOOD PROTECTION PROJECT
MOUNT CARMEL TOWNSHIP NORTHERNBERLAND COUNTY

E&S DETAILED PLAN
STA. 5+50B TO STA. 10+25B

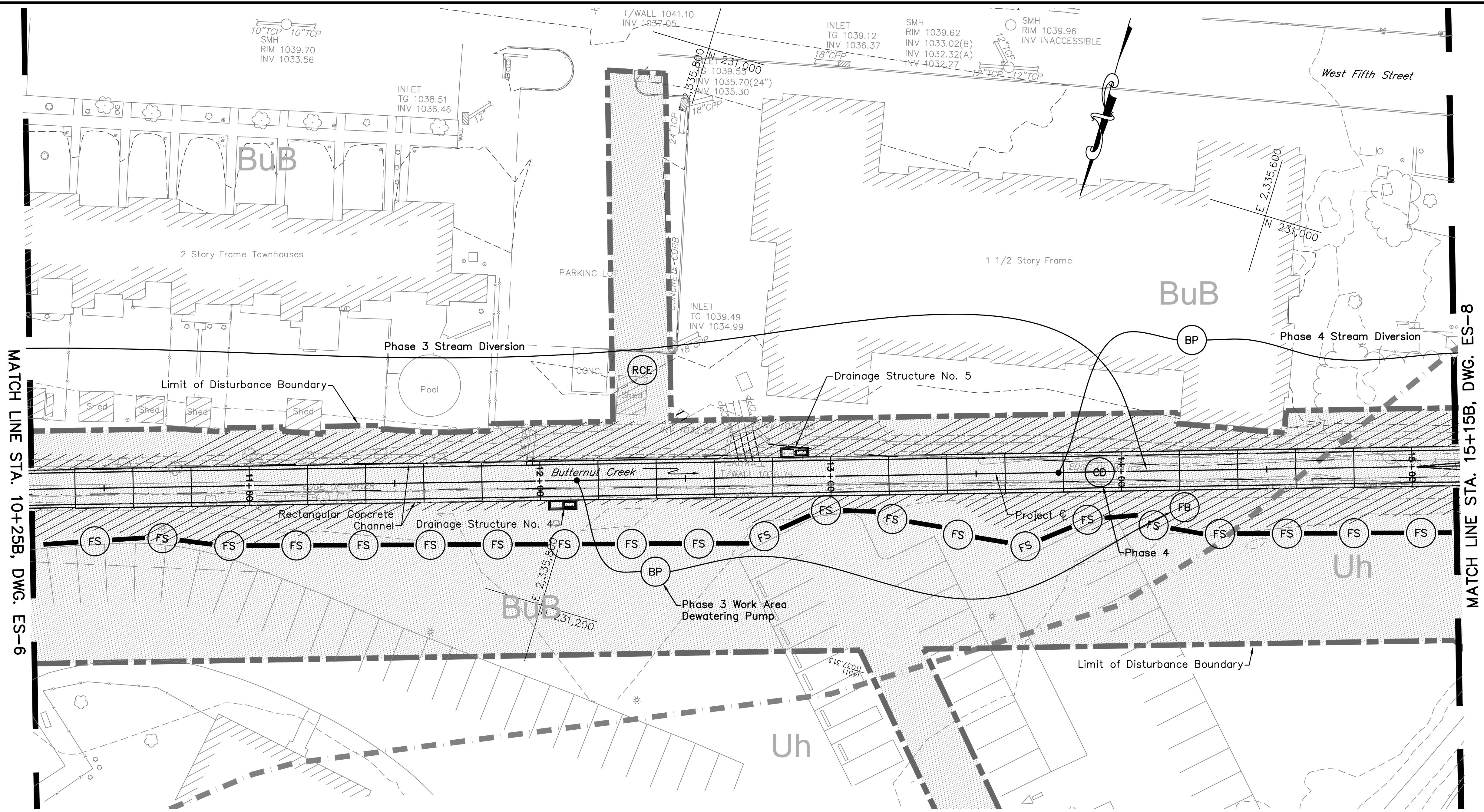
DRAWN BY	S.L.E.	DATE	DRAWING NO.
CHECKED BY		SCALE	As Shown

ALL DIMENSIONS AND EXISTING CONDITIONS SHALL BE CHECKED AND VERIFIED BY CONTRACTOR AT THE SITE.

ES-6

LEGEND

(RCE)	Rock Construction Entrance
(CD)	Cofferdam
(BP)	Bypass Pump
(FB)	Filter Bag
(BC)	Bypass Channel
(PF)	Pipe Flume(s)
(RF)	Rock Filter
(SF)	Silt Fence
(FS)	Filter Sock
(ECB)	Erosion Control Blanket

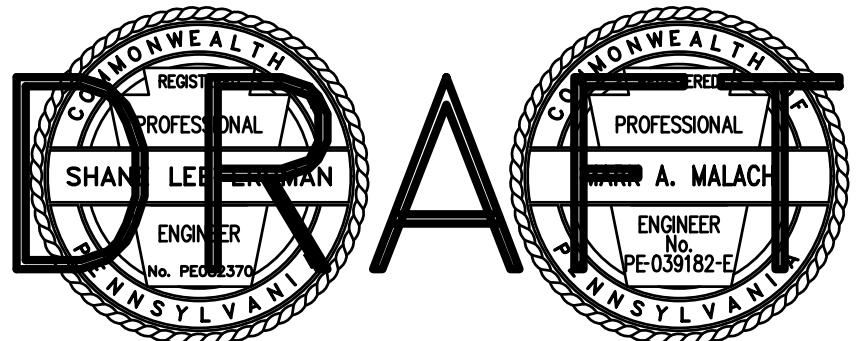


DETAILED E&S CONTROL PLAN	
CONTRACTOR:	
DATE:	
SIGNATURE:	

NOTES:

1. For E&S General Plan, see Dwg. ES-1.
2. For E&S General Notes, see Dwg. ES-2.
3. For E&S General Details, see Dwgs. ES-3 and ES-4.

NO.	DATE	REVISION	APPR.
SUBMITTED			
PROJECT COORDINATOR - D.E.P.			
APPROVED			
CHIEF - DIVISION OF PROJECT DEVELOPMENT - D.E.P.			
APPROVED			
DIRECTOR - BUREAU OF WATERWAYS ENGINEERING AND WETLANDS - D.E.P.			



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 HARRISBURG, PENNSYLVANIA

PROJECT NO. D.G.S. 182-19, PHASE 1

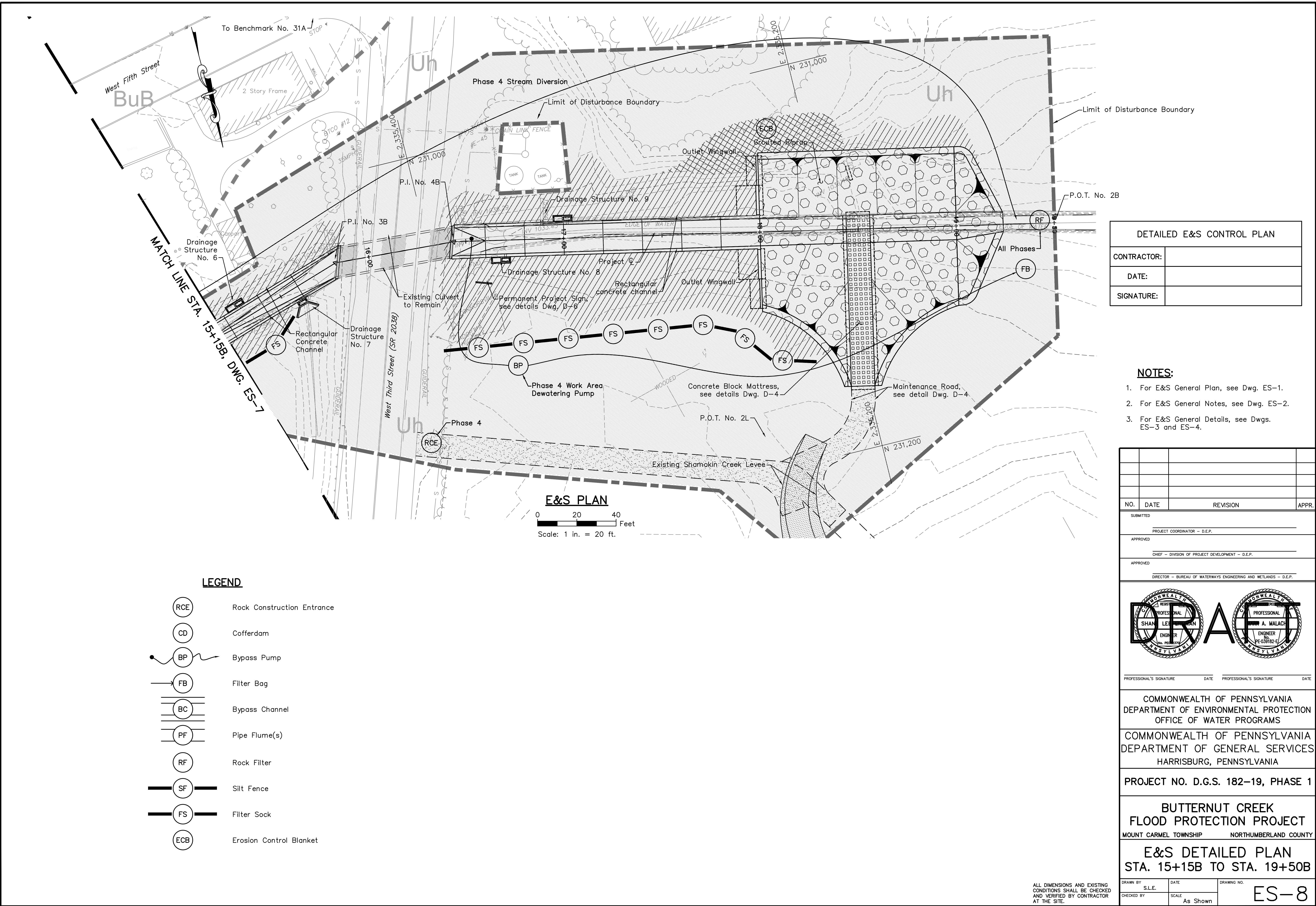
BUTTERNUT CREEK
 FLOOD PROTECTION PROJECT
 MOUNT CARMEL TOWNSHIP NORTHUMBERLAND COUNTY

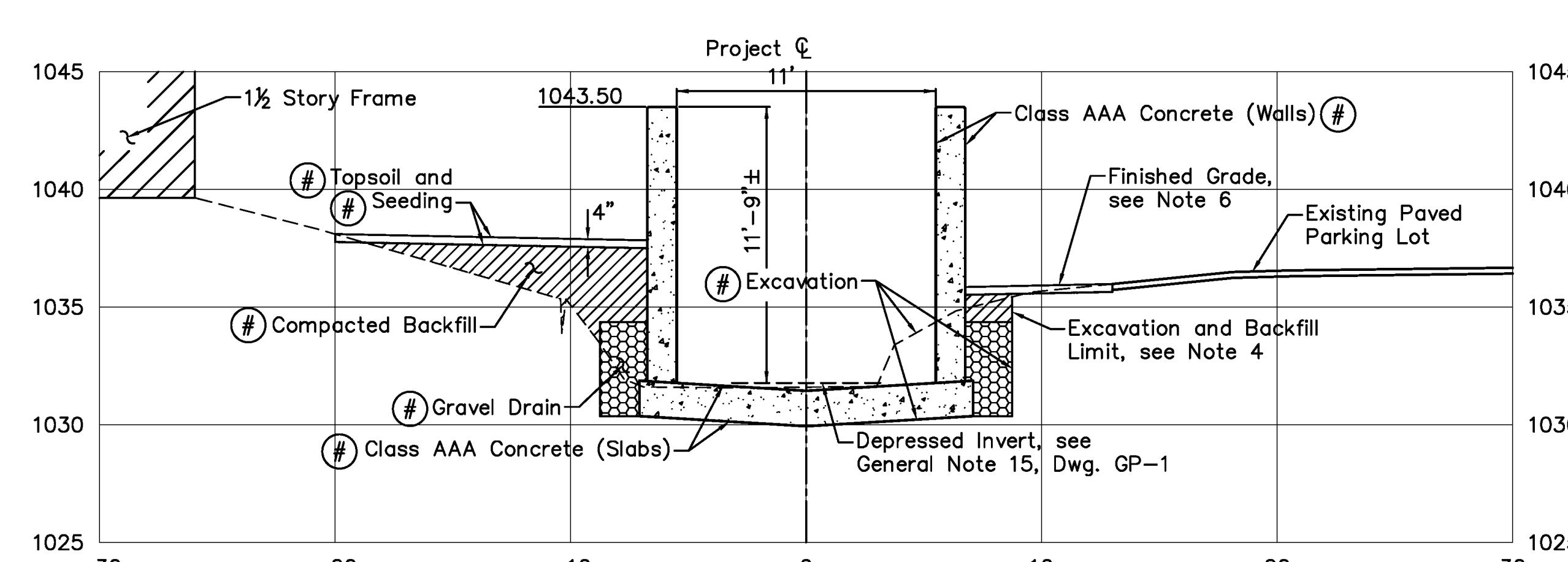
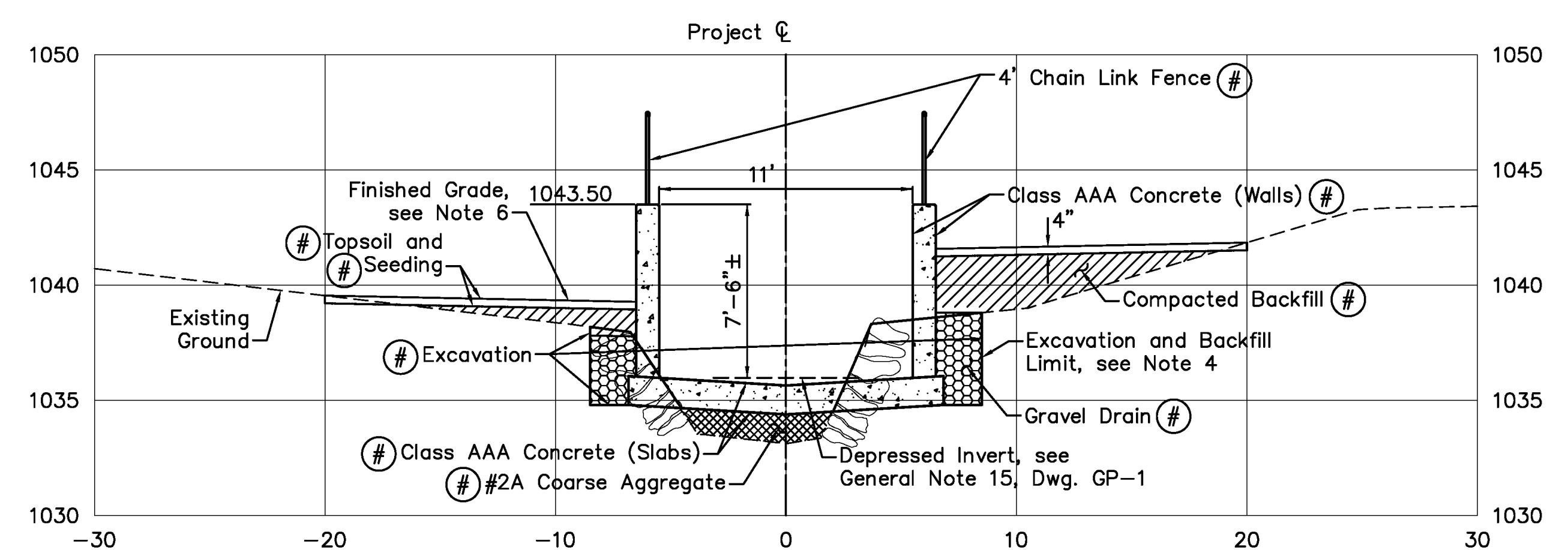
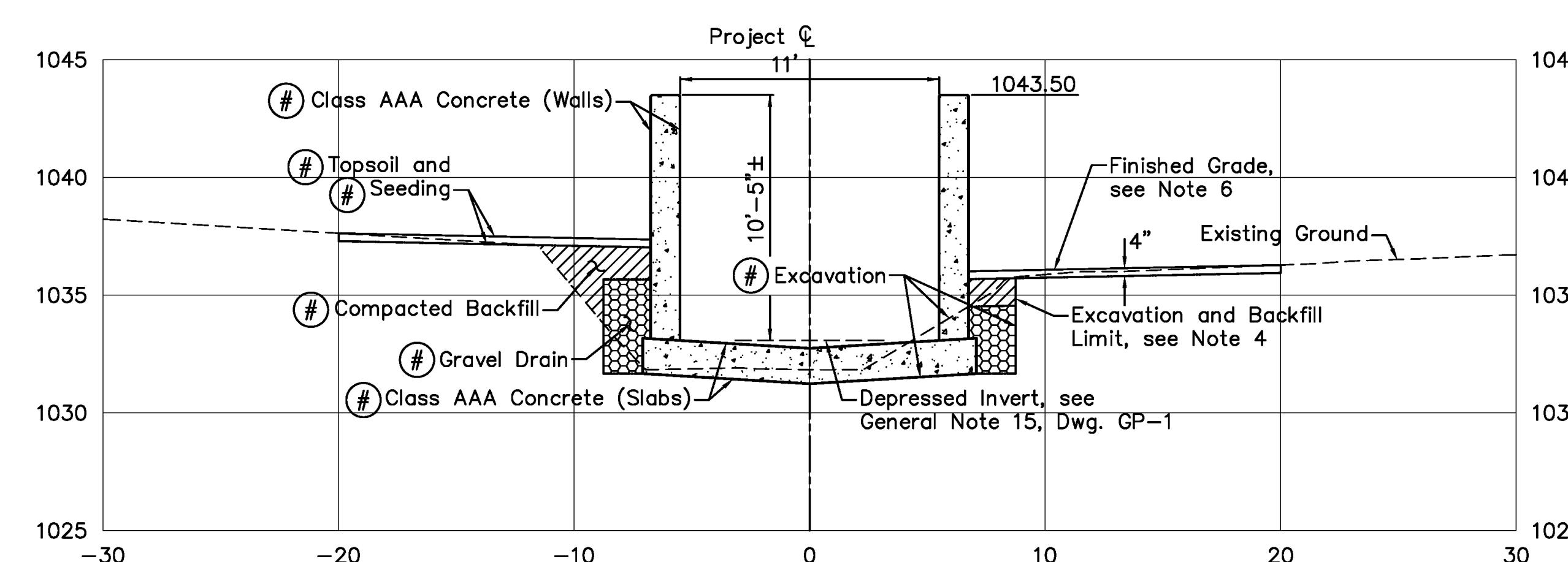
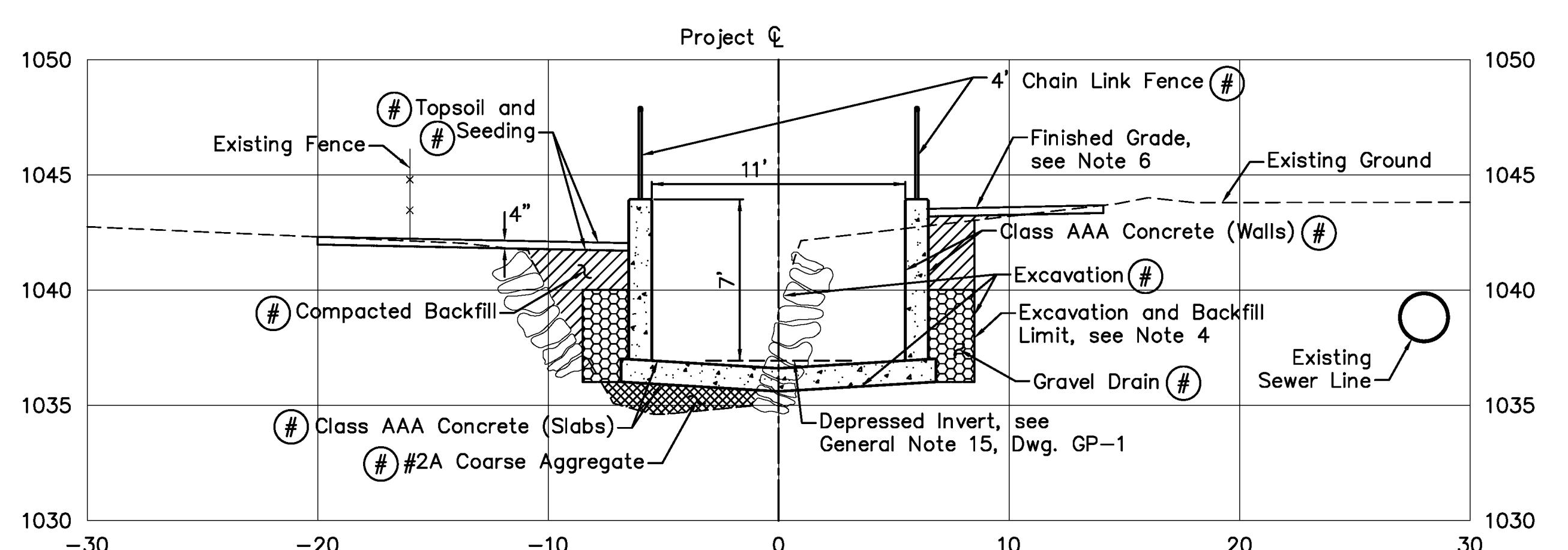
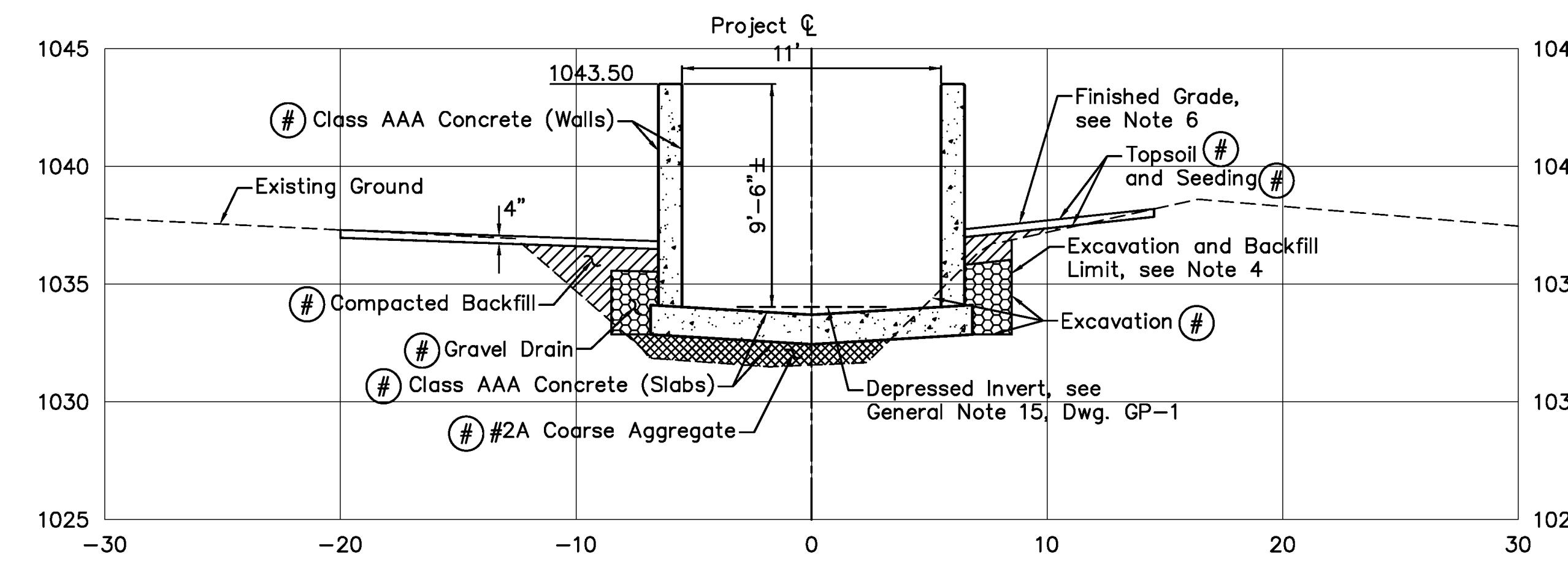
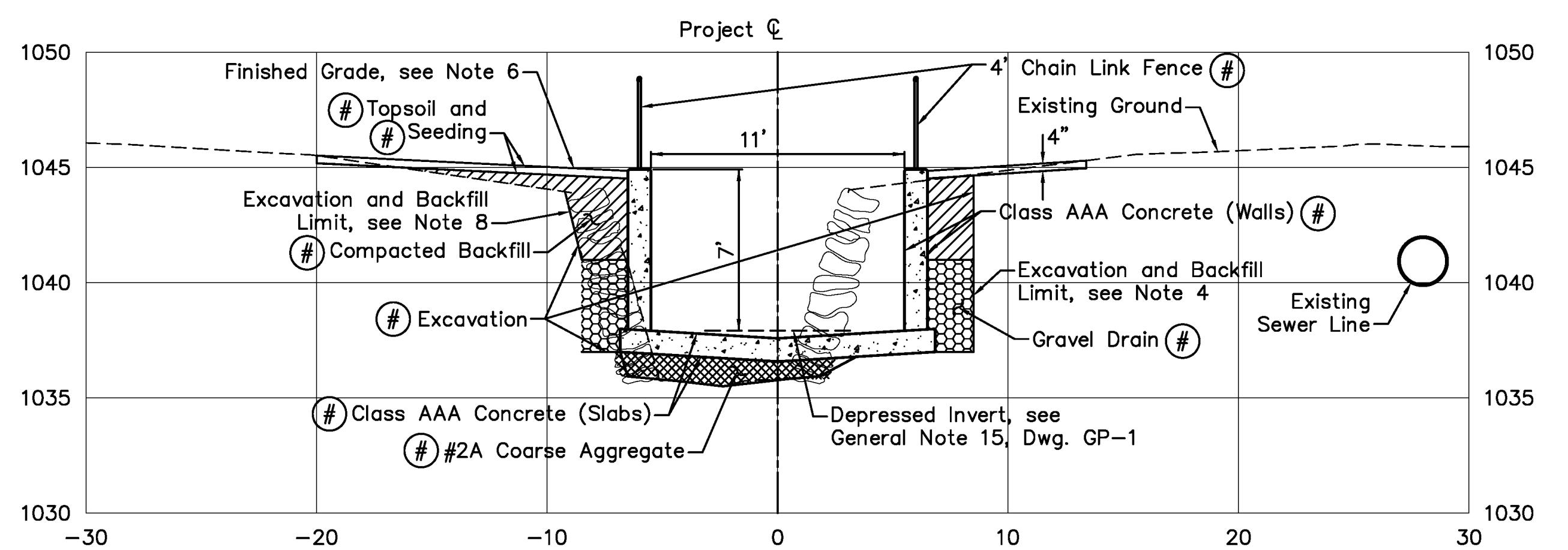
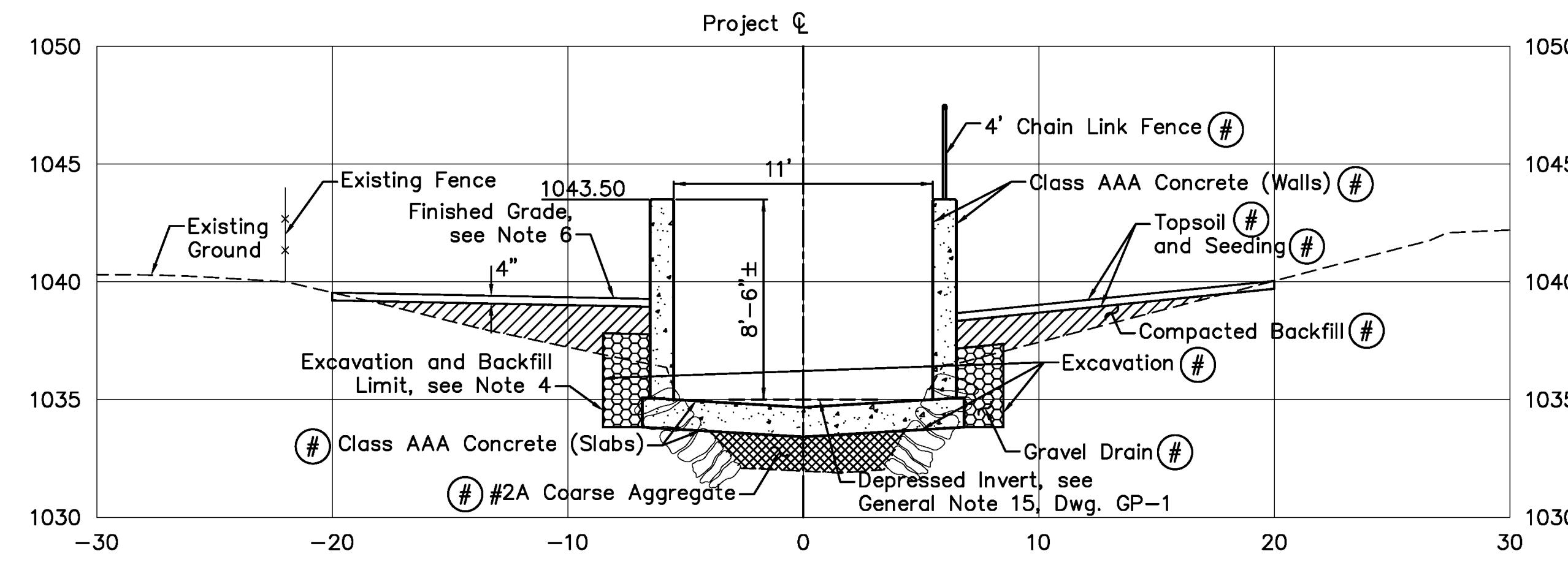
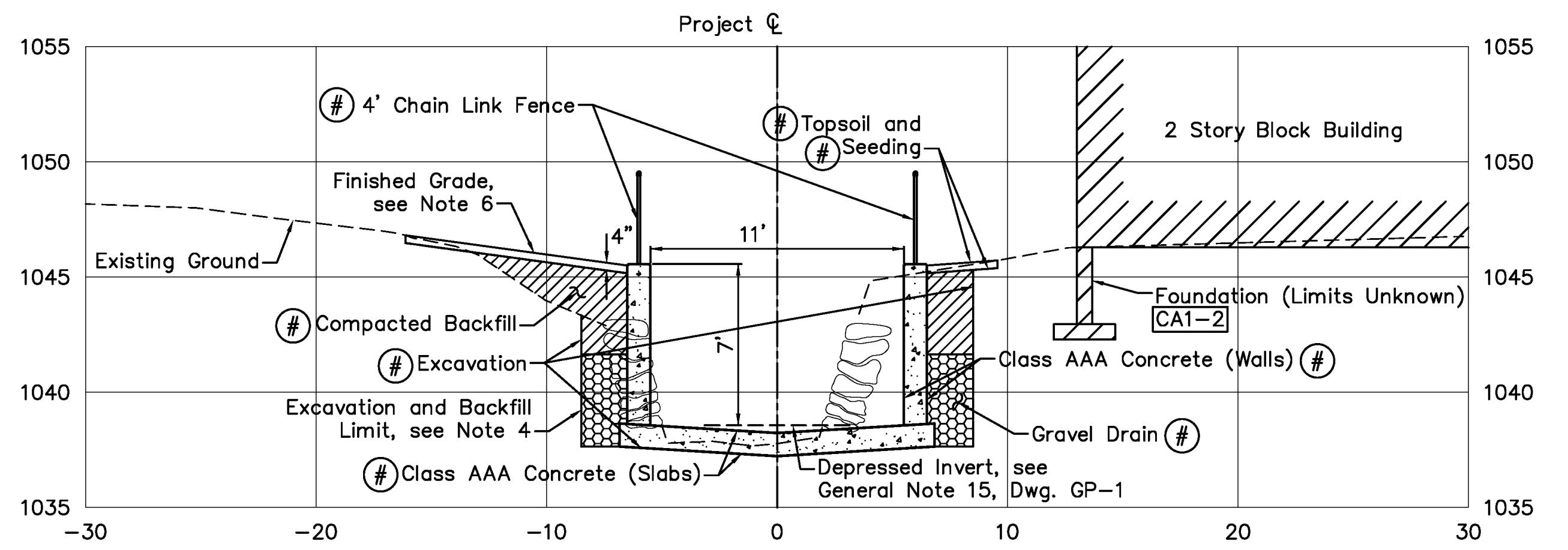
E&S DETAILED PLAN
 STA. 10+25B TO STA. 15+15B

DRAWN BY S.L.E. DATE DRAWING NO.
 CHECKED BY SCALE As Shown

ES-7

ALL DIMENSIONS AND EXISTING CONDITIONS SHALL BE CHECKED AND VERIFIED BY CONTRACTOR AT THE SITE.





CROSS SECTIONS

0 5 10
Feet
Scale: 1 in. = 5 ft.

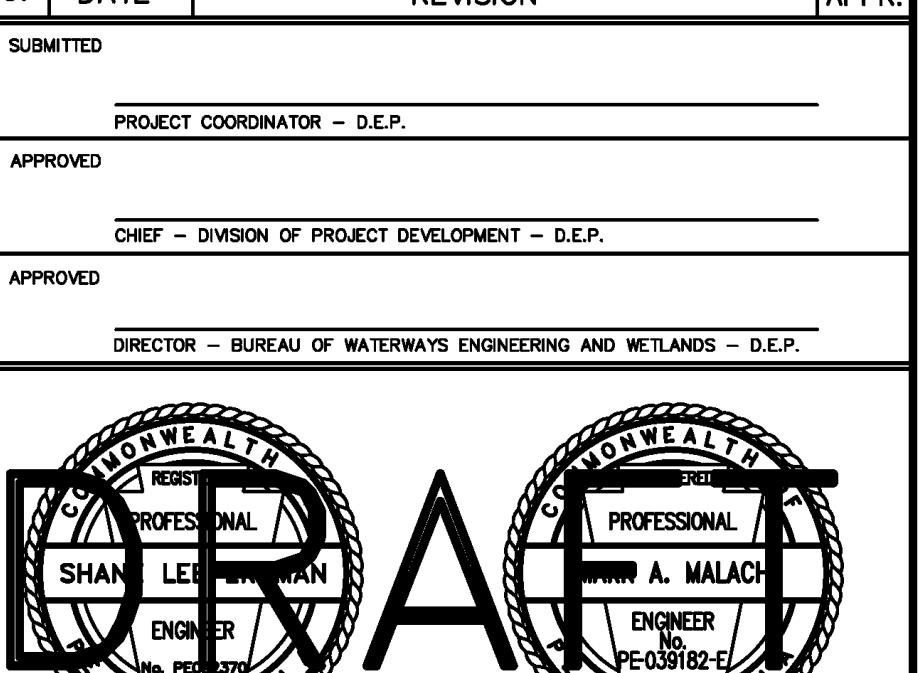
ALL DIMENSIONS AND EXISTING CONDITIONS SHALL BE CHECKED AND VERIFIED BY CONTRACTOR AT THE SITE.

DRAWN BY S.L.E. DATE DRAWING NO.
CHECKED BY SCALE As Shown X-1

NOTES:

- For General Notes, see Dwg. GP-1.
- Cross Sections are shown looking downstream.
- For gravel drain detail, see Dwg. D-1.
- Work beyond pay limits is incidental, see Technical Specifications for "Excavation" and "Compacted Backfill".
- Removal of concrete and masonry structures and stone walls which can be accomplished by heavy earth moving equipment will be measured and paid for as "Common Excavation", Pay Item #.
- Finished grade shall be sloped 2% towards channel wall. Finished grade along channel walls shall be sloped to direct flow over top of channel walls or to drainage inlets.
- All areas disturbed by project construction outside of the pay limits shall be regraded and/or surfaced with a 4-inch layer of topsoil and seeded.
- Pay limits shall be extended as needed to include the existing stone wall.

NO.	DATE	REVISION APPR.
SUBMITTED		
PROJECT COORDINATOR - D.E.P.		
APPROVED		
CHIEF - DIVISION OF PROJECT DEVELOPMENT - D.E.P.		
APPROVED		
DIRECTOR - BUREAU OF WATERWAYS ENGINEERING AND WETLANDS - D.E.P.		



PROFESSIONAL'S SIGNATURE DATE PROFESSIONAL'S SIGNATURE DATE

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DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF WATER PROGRAMS

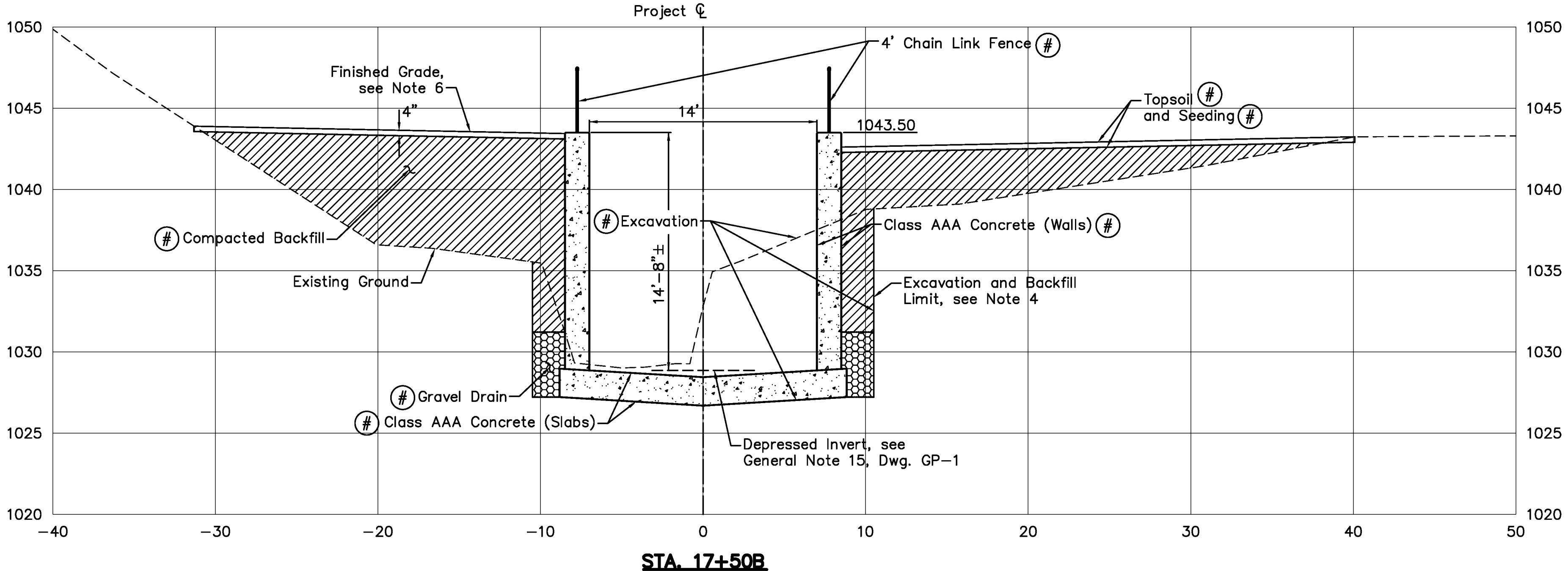
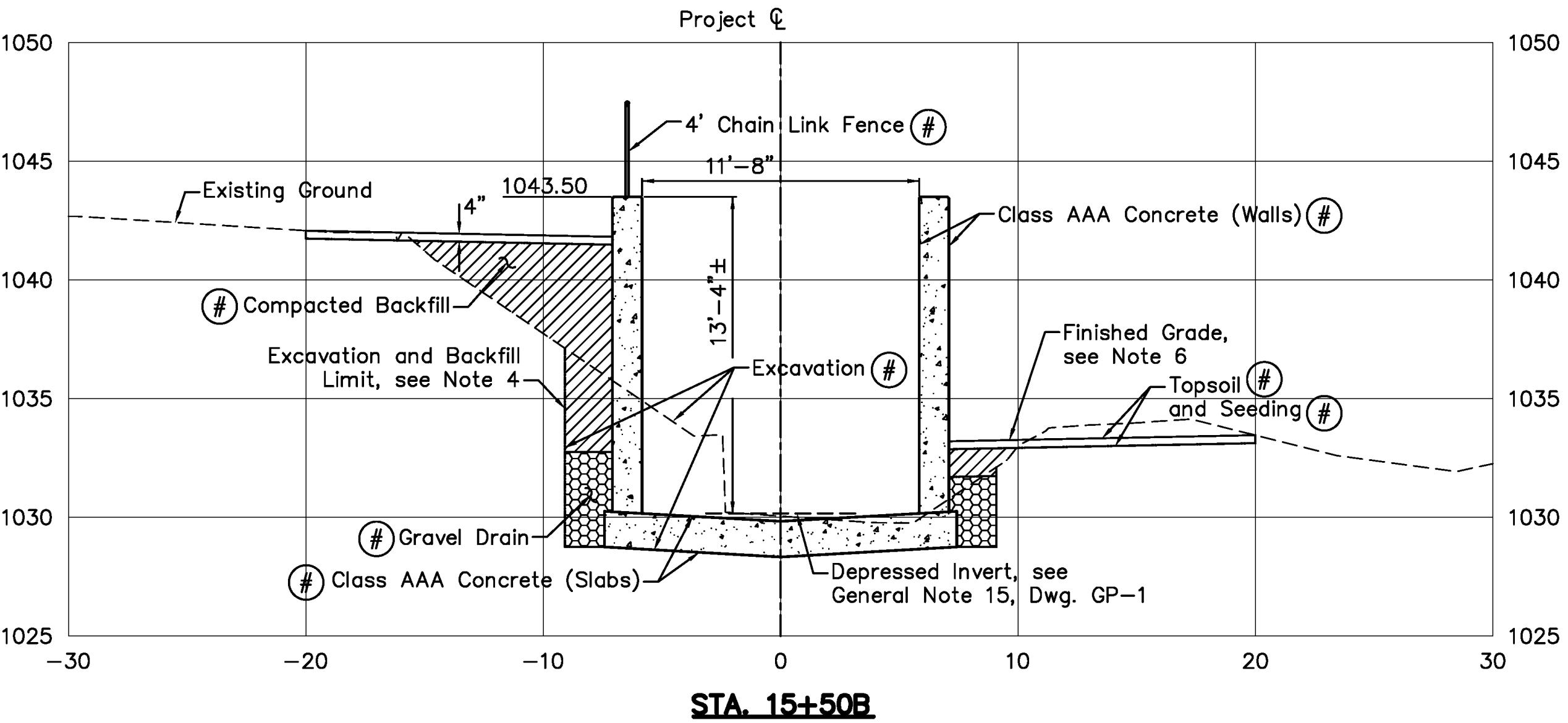
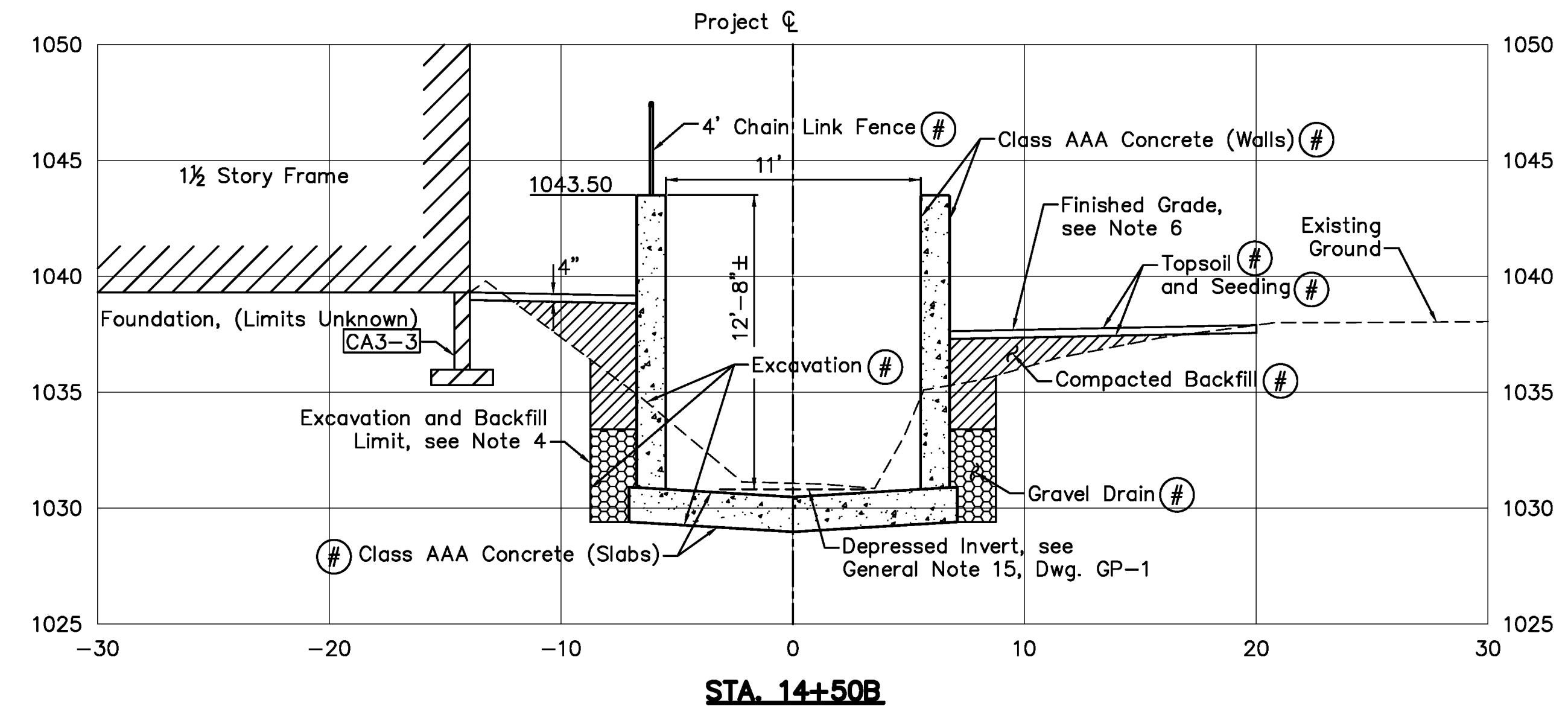
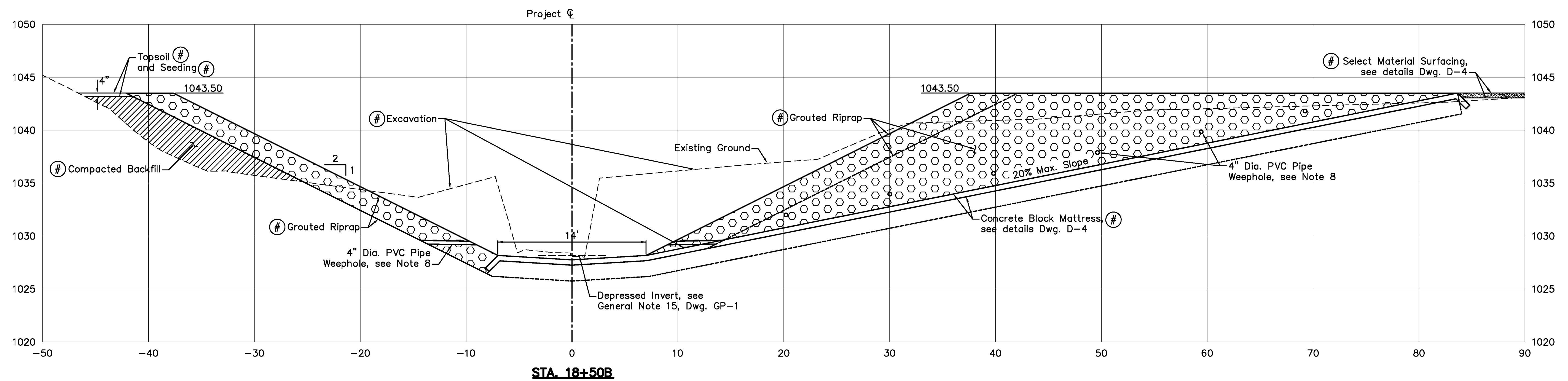
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF GENERAL SERVICES
HARRISBURG, PENNSYLVANIA

PROJECT NO. D.G.S. 182-19, PHASE 1

BUTTERNUT CREEK
FLOOD PROTECTION PROJECT
MOUNT CARMEL TOWNSHIP NORTHUMBERLAND COUNTY

CROSS SECTIONS
STA. 2+50B TO STA. 13+00B

DRAWN BY S.L.E. DATE DRAWING NO.
CHECKED BY SCALE As Shown X-1



CROSS SECTIONS

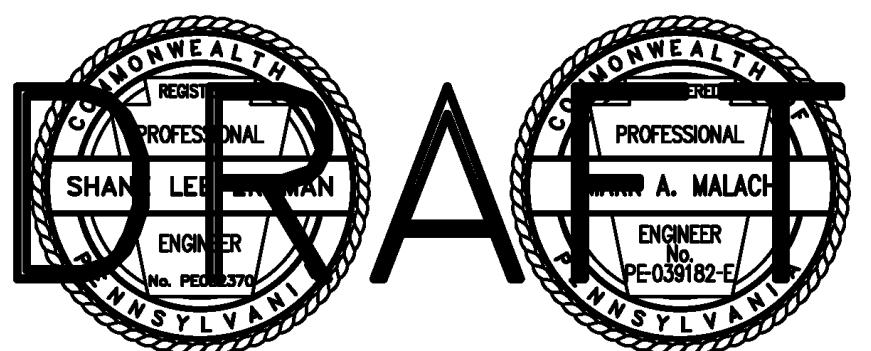
Scale: 1 in. = 5 ft.
0 5 10 Feet

ALL DIMENSIONS AND EXISTING CONDITIONS SHALL BE CHECKED AND VERIFIED BY CONTRACTOR AT THE SITE.

DRAWN BY	S.L.E.	DATE	DRAWING NO.
CHECKED BY		SCALE	X-2
		As Shown	

NOTES:

- For General Notes, see Dwg. GP-1.
- Cross Sections are shown looking downstream.
- For gravel drain detail, see Dwg. D-1.
- Work beyond pay limits is incidental, see Technical Specifications for "Excavation" and "Compacted Backfill".
- Removal of concrete and masonry structures and stone walls which can be accomplished by heavy earth moving equipment will be measured and paid for as "Common Excavation", Pay Item #.
- Finished grade shall be sloped 2% towards channel wall. Finished grade along channel walls shall be sloped to direct flow over top of channel walls or to drainage inlets.
- All areas disturbed by project construction outside of the pay limits shall be regraded and/or surfaced with a 4-inch layer of topsoil and seeded.
- Place weepholes at 10-foot intervals along the channel. On channel banks, place weepholes one foot above invert. On channel inverts, place weepholes in the middle of the channel.



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PROJECT NO. D.G.S. 182-19, PHASE 1

BUTTERNUT CREEK
FLOOD PROTECTION PROJECT
MOUNT CARMEL TOWNSHIP NORTHUMBERLAND COUNTY

CROSS SECTIONS
STA. 14+50B TO STA. 18+50B

JOINT SCHEDULE

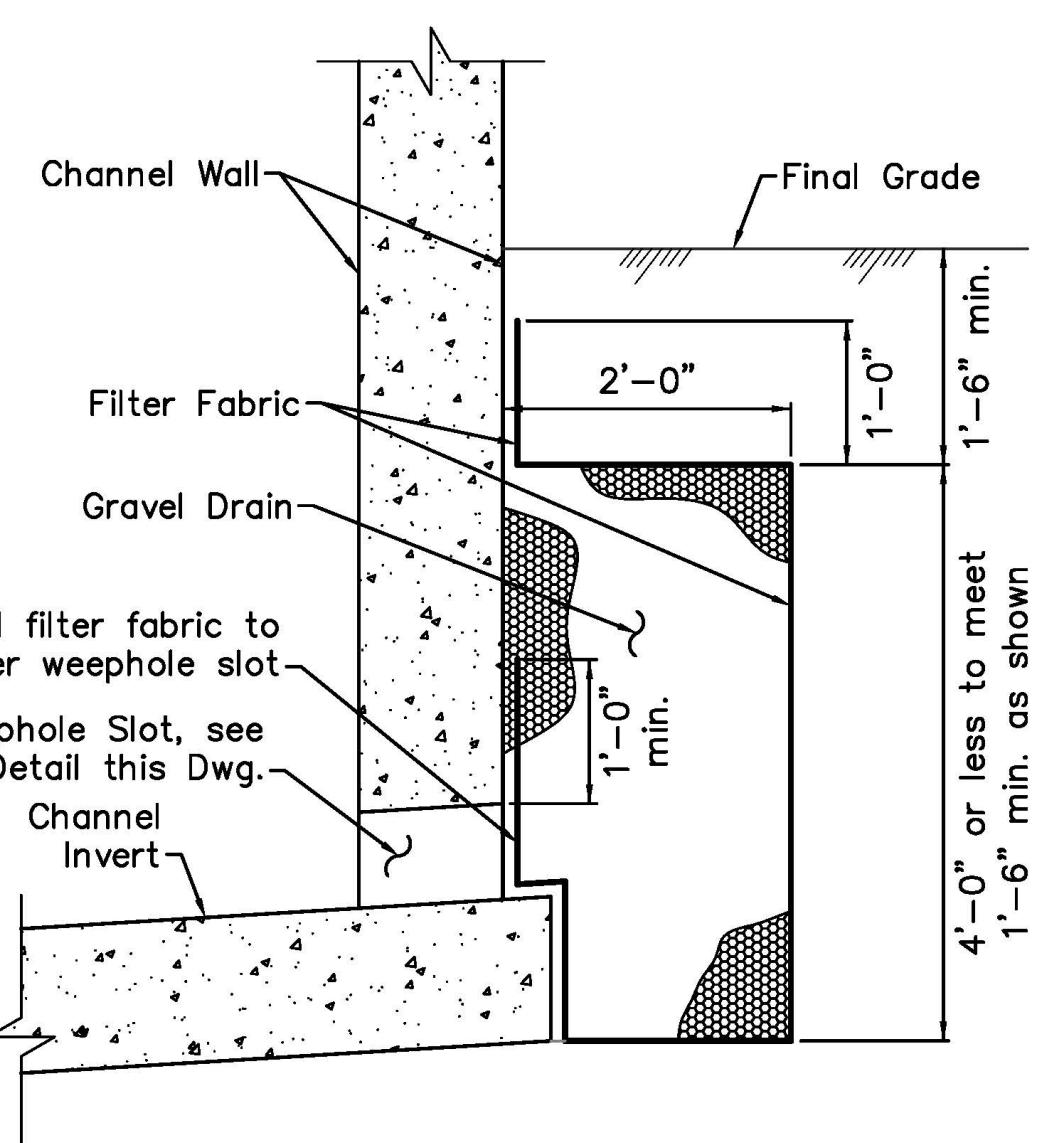
STATION	JOINT TYPE
1+76B	Contraction
2+00B	Contraction
2+20B	Expansion
2+40B	Contraction
2+60B	Contraction
2+80B	Expansion
3+00B	Contraction
3+20B	Contraction
3+40B	Expansion
3+60B	Contraction
3+80B	Contraction
4+00B	Expansion
4+20B	Contraction
4+40B	Contraction
4+60B	Expansion
4+80B	Contraction
5+00B	Contraction
5+20B	Expansion
5+40B	Contraction
5+68B	Contraction
5+80B	Expansion
6+00B	Contraction
6+20B	Contraction
6+40B	Expansion
6+60B	Contraction
6+80B	Contraction
7+00B	Expansion
7+20B	Contraction
7+40B	Contraction
7+60B	Expansion
7+80B	Contraction
8+00B	Contraction
8+20B	Expansion
8+40B	Contraction
8+60B	Contraction
8+80B	Expansion
9+00B	Contraction
9+20B	Contraction
9+40B	Expansion

TYPE OF JOINT	BETWEEN CAST-IN-PLACE CONCRETE	BETWEEN NEW AND EXISTING CONCRETE
CONTRACTION		
EXPANSION		

- ① #6, 2'-0" epoxy-coated smooth dowels @ 12". Coat with bituminous paint on one side (expansion cap end at expansion joint) only.
 ② 3/4" Chamfer in walls. Round with concrete edger in slabs.
 ③ 3/4" Chamfer in walls only.
 ④ Coat with bituminous paint (two coats).
 ⑤ 3/4" Preformed joint filler.
 ⑥ Expansion cap (allow 1" free expansion).
 ⑦ Joint sealant placed over expansion joint material that will be exposed to the atmosphere (Walls only to 1' below finished grade). Plastic cap strip used in slabs only.
 ⑧ Joint sealant placed in notch that will be exposed to the atmosphere (Walls only to 1' below finished grade).
 ⑨ Core 1-1/2" diameter hole in existing concrete 12" deep. Insert epoxy-coated dowel and secure with non-shrink grout.

CONCRETE JOINT DETAILS

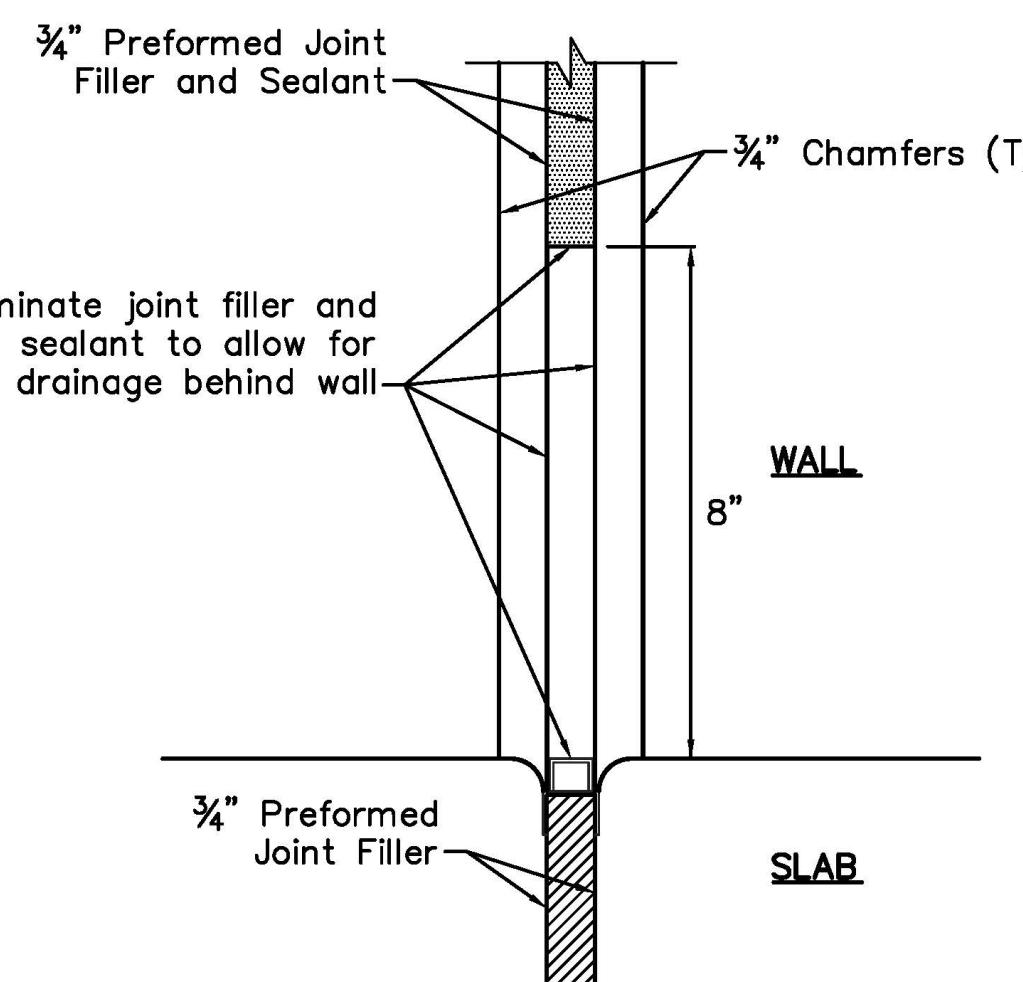
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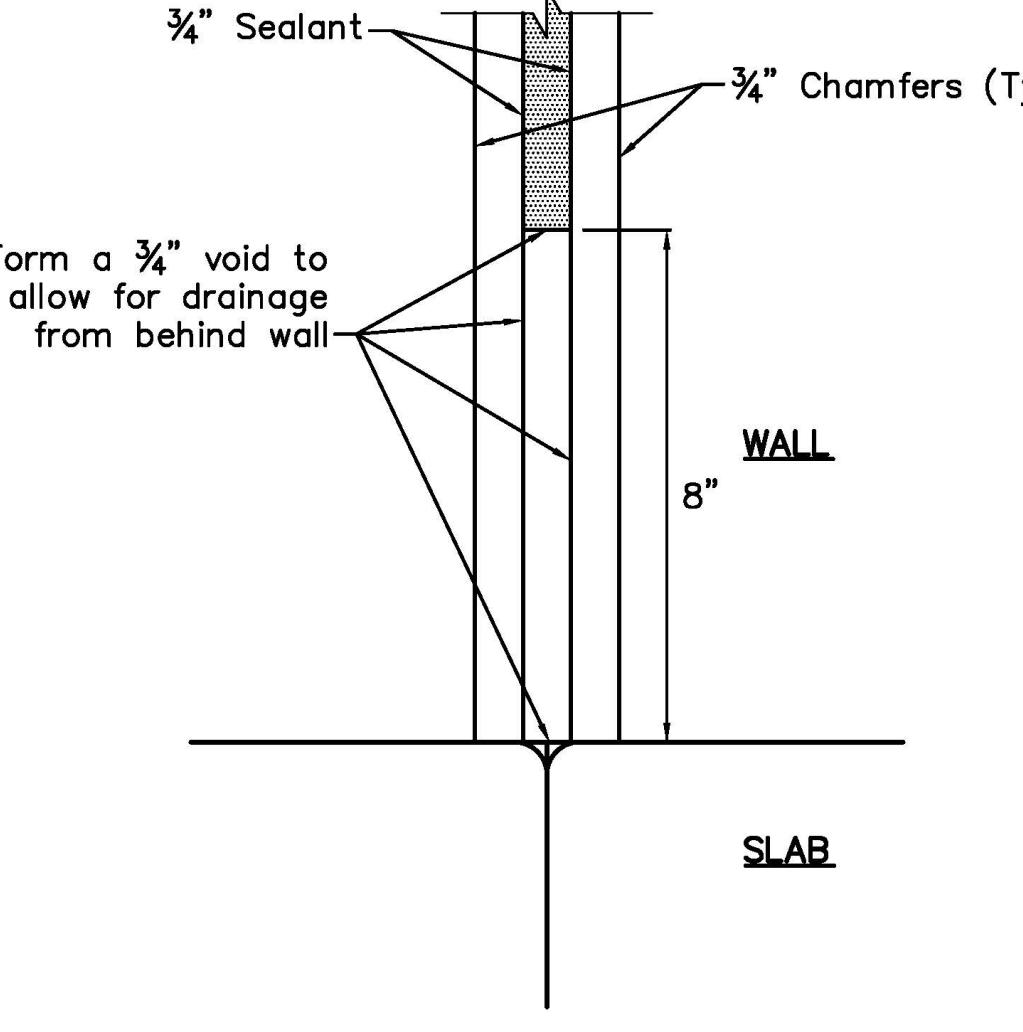
Note: Reinforcement is not shown

WALL GRAVEL DRAIN

No Scale

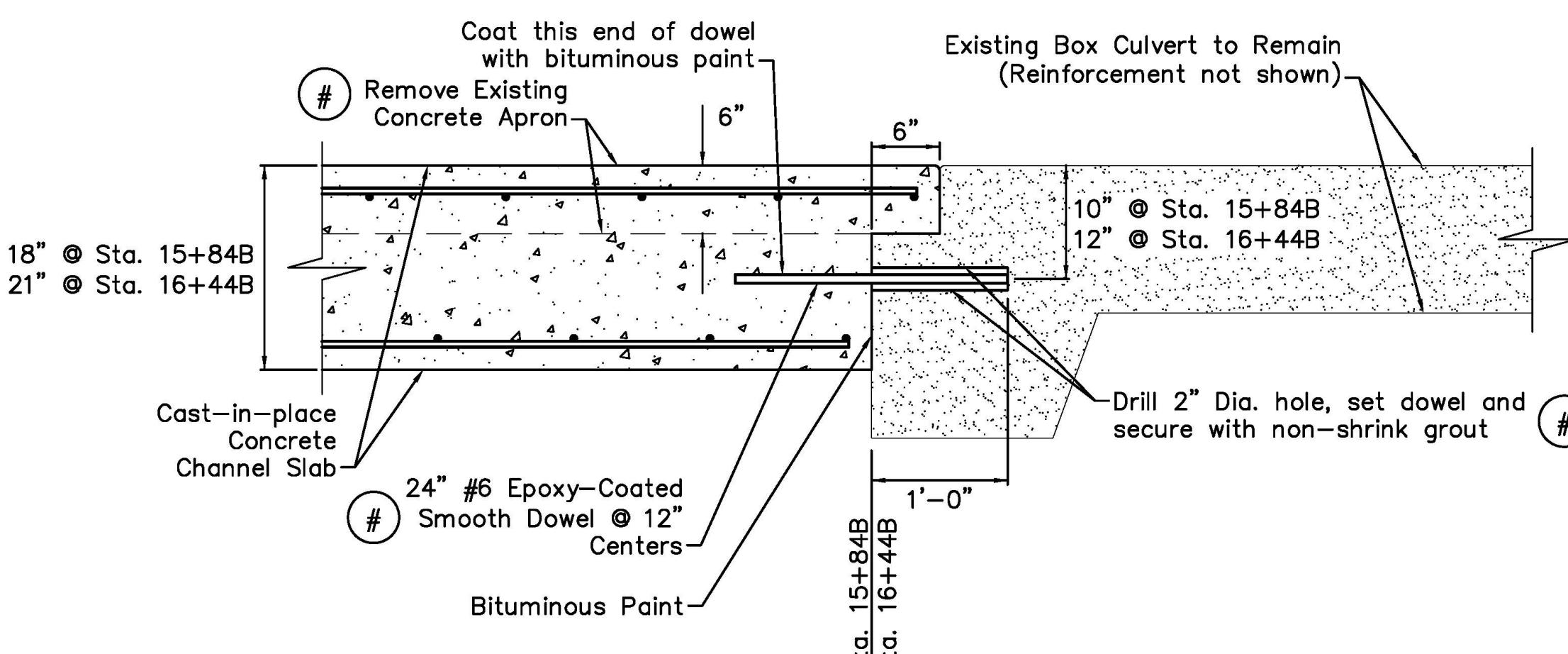


EXPANSION JOINT



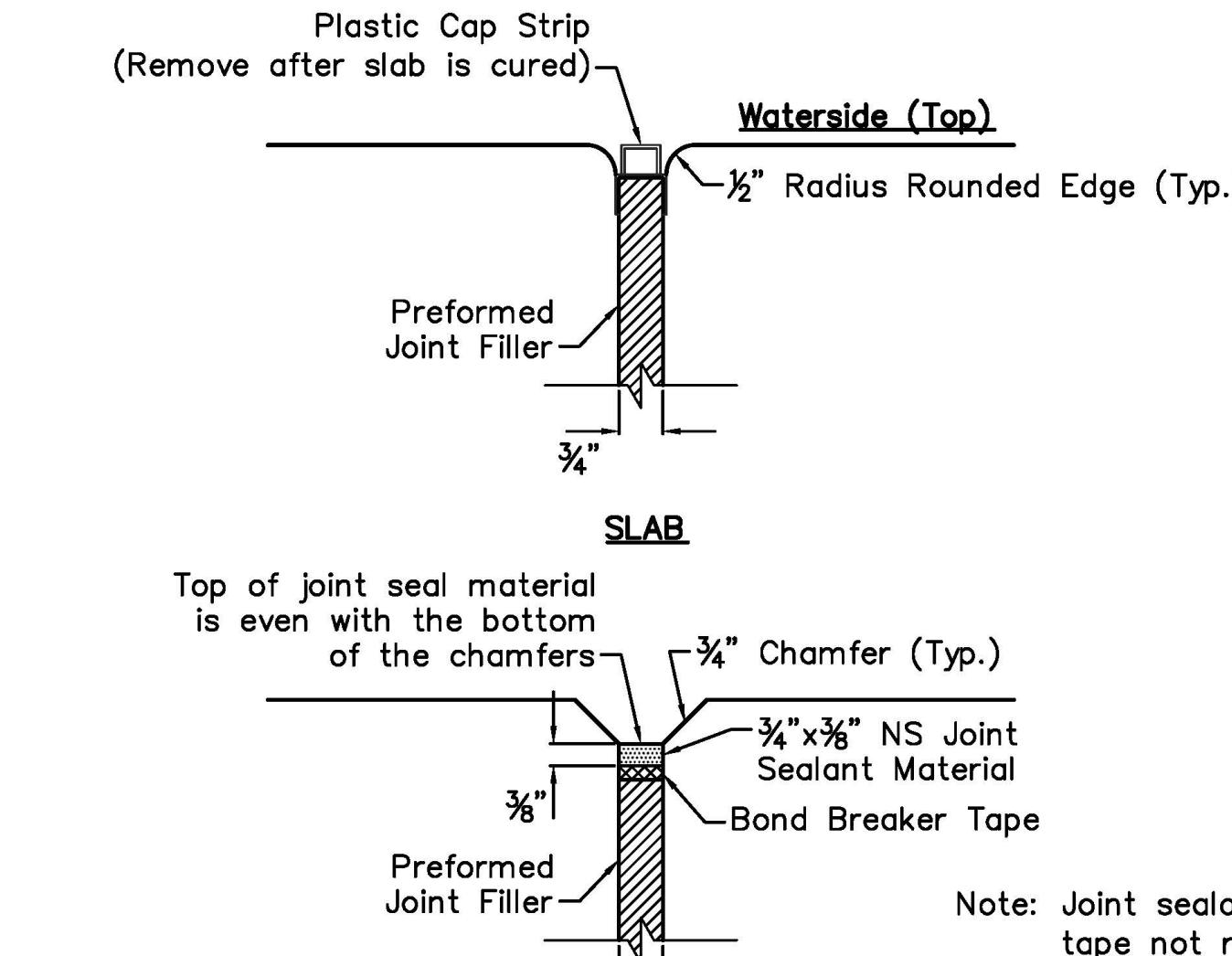
WEEPHOLE SLOT DETAILS

No Scale

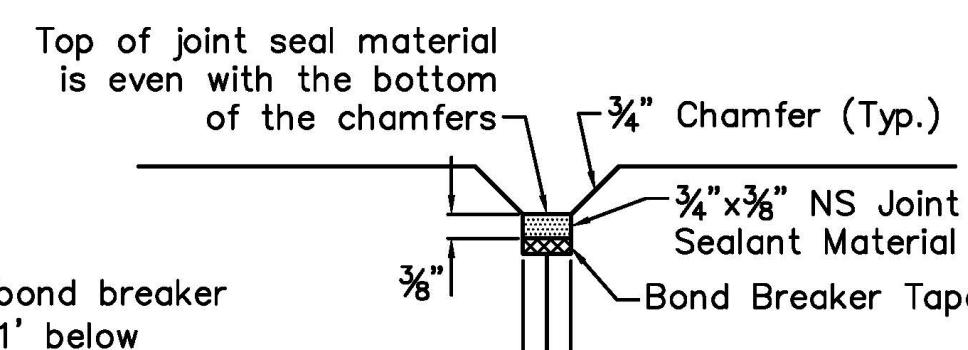
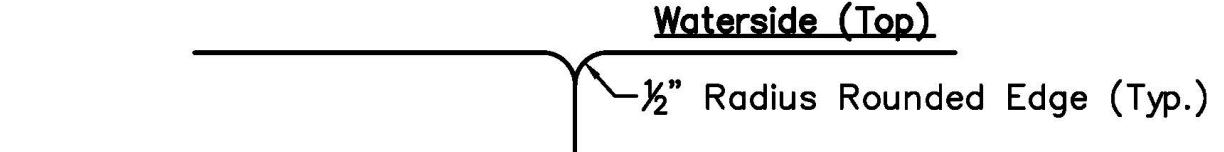


SLAB JOINT DETAIL - STA. 15+84B & STA. 16+44B

Scale: 1" = 1'



Top of joint seal material is even with the bottom of the chamfers



(Waterside, Top of Wall, and Landside to 1' Below Finished Grade)

(Waterside, Top of Wall, and Landside to 1' Below Finished Grade)

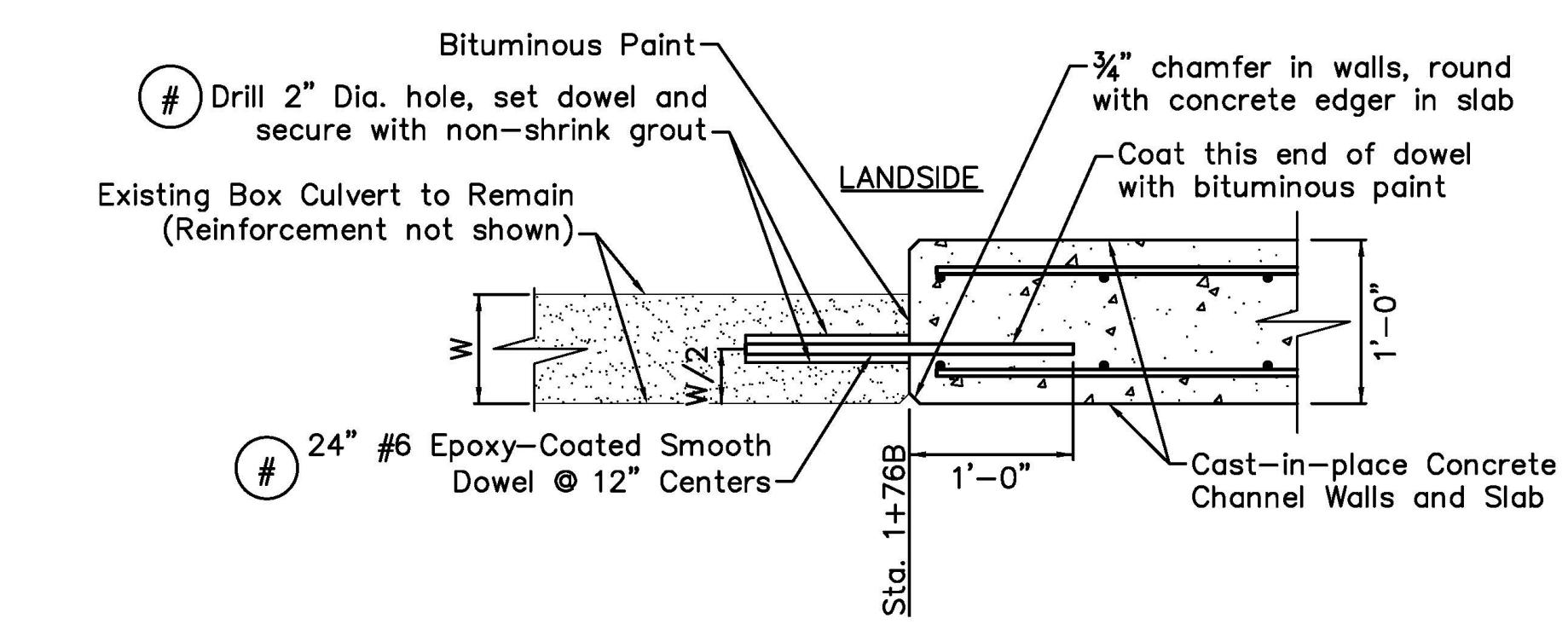
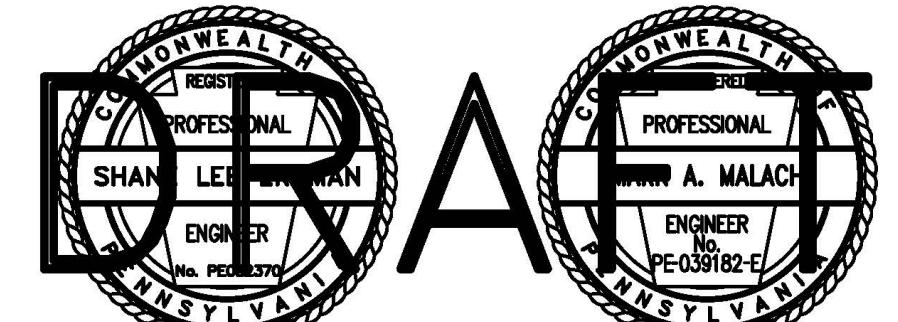
EXPANSION JOINT DETAILS

No Scale

CONCRETE NOTES:

- These notes are applicable to cast-in-place concrete only.
- All concrete is Class AAA Concrete (4,500 psi.) unless otherwise noted on the drawings. Payment items include Walls # and Slabs #.
- Steel reinforcement will be paid for under Pay Item #.
- Splices in reinforcement not shown on these drawings shall be shown on the shop drawings in accordance with the specifications. All splices used by the Contractor for ease of construction will be at the Contractor's cost.
- All steel reinforcement is 2" clear (edge of steel to surface of concrete) unless otherwise noted on the drawings.
- Concrete for slabs or footings shall be poured against undisturbed ground unless otherwise shown or noted.
- < No. denotes concrete finish. See Technical Specifications.
- All exposed edges and horizontal and vertical joints in walls shall be chamfered 3/4" unless otherwise noted on the drawings.
- All exposed slab joints shall be rounded with concrete edger unless otherwise noted on the drawings.
- At Contractor's option, curved walls may be built on chords. Maximum chord length shall be 20 feet.
- Start dowels 1' from top of walls and 6" from edge of slabs with no dowel within 6" of construction joints and weephole slots.

NO.	DATE	REVISION	APPR.
SUBMITTED			
PROJECT COORDINATOR - D.E.P.			
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CHIEF - DIVISION OF PROJECT DEVELOPMENT - D.E.P.			
APPROVED			
DIRECTOR - BUREAU OF WATERWAYS ENGINEERING AND WETLANDS - D.E.P.			



WATERSIDE

JOINT DETAIL - STA. 1+76B

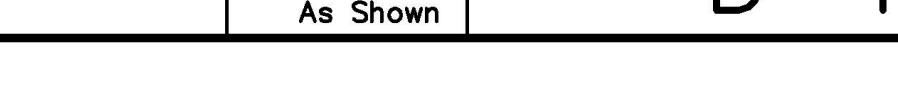
Scale: 1" = 1'

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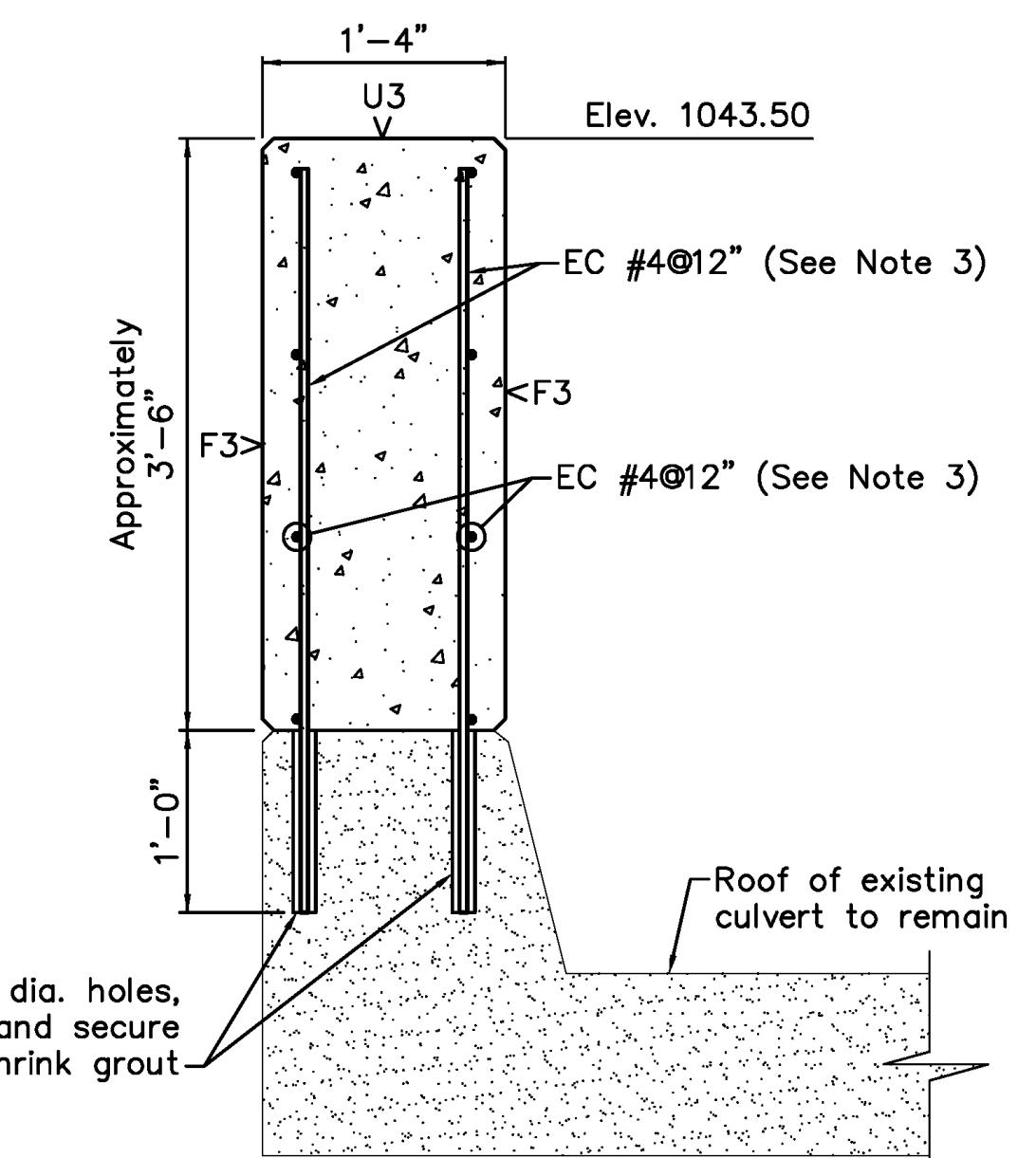
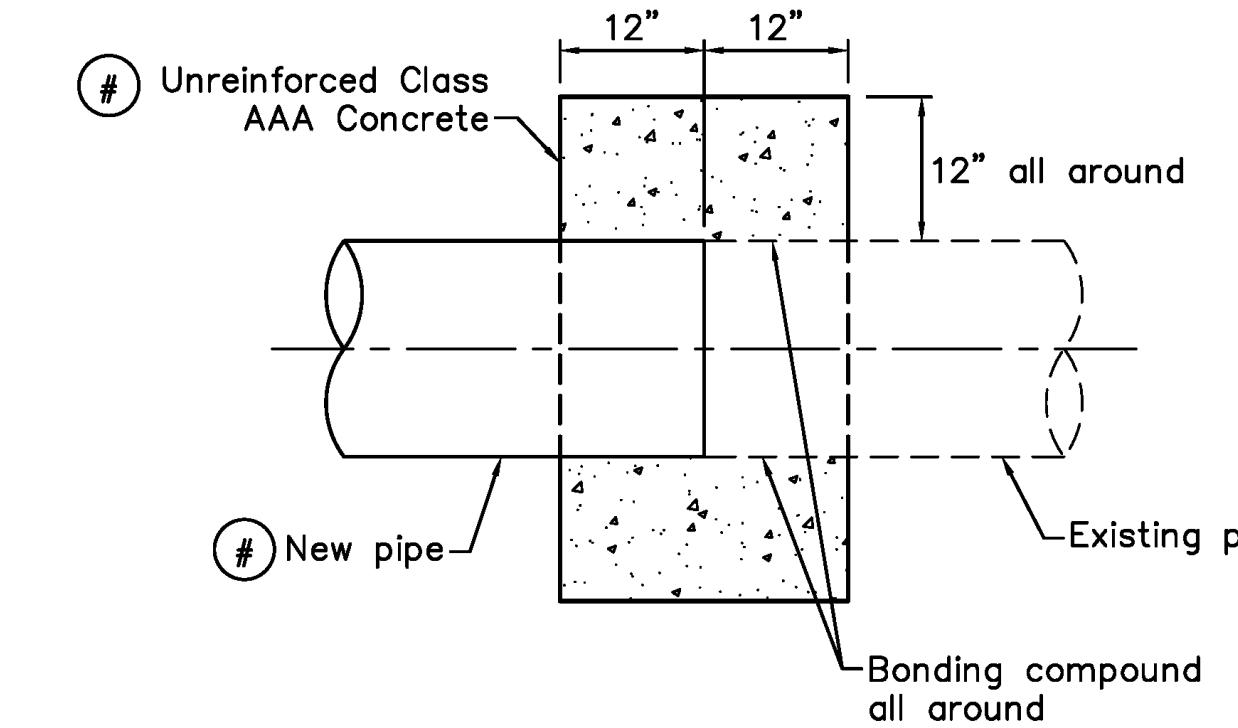
PROJECT NO. D.G.S. 182-19, PHASE 1

BUTTERNUT CREEK
FLOOD PROTECTION PROJECT
MOUNT CARMEL TOWNSHIP NORTHERNBERG COUNTY



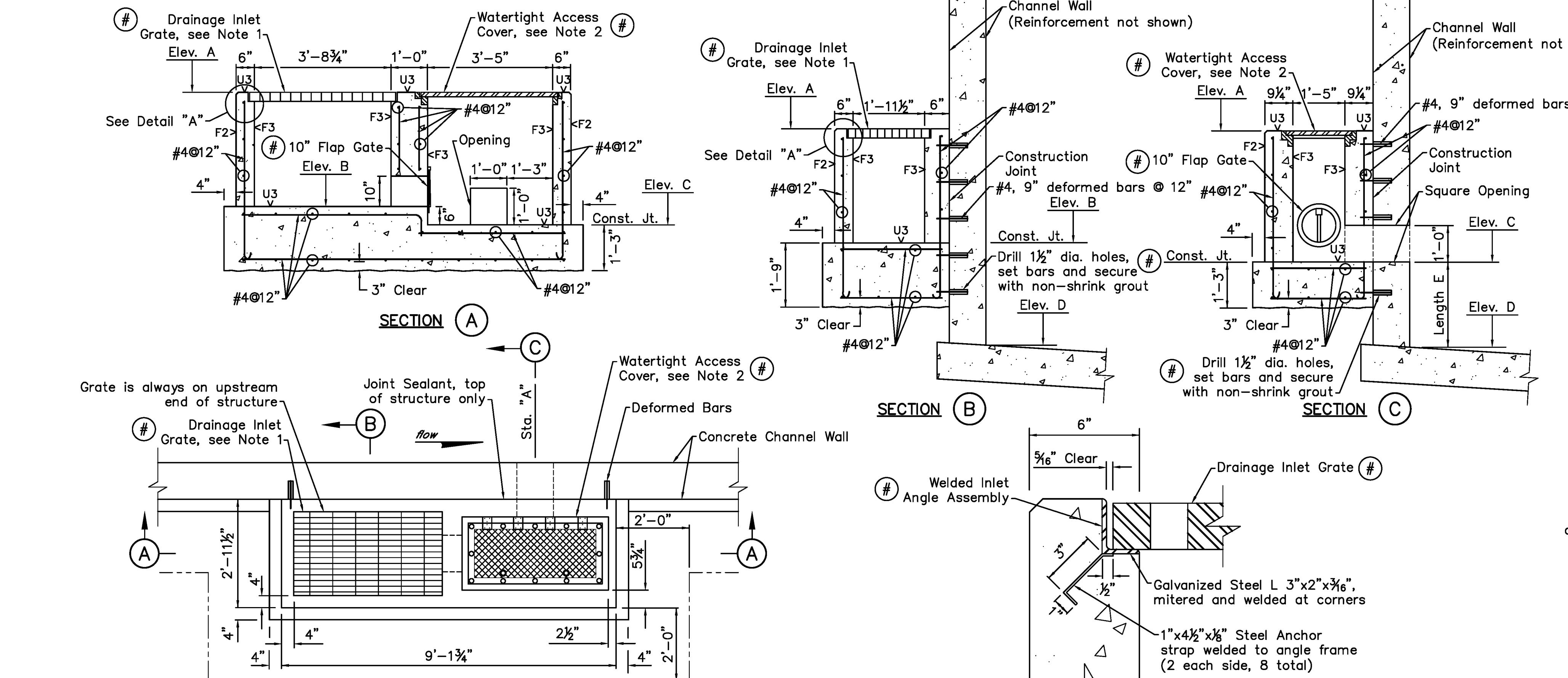
DRAINAGE STRUCTURE DATA TABLE

Structure No.	Station "A"	Side	Type	Elev. A (Top of Grate)	Elev. B (Invert Under Grate)	Elev. C (Invert Under Cover)	Elev. D (Channel Invert at Sta. "A")	Length E
1	7+10B	Left	1	1038.83	1036.33	1035.83	1035.58	0'-3"
2	8+90B	Right	1	1037.90	1035.17	1034.67	1034.42	0'-3"
3	10+10B	Left	1	1036.81	1034.40	1033.90	1033.65	0'-3"
4	12+10B	Right	1	1035.35	1033.11	1032.61	1032.36	0'-3"
5	12+90B	Left	1	1037.59	1035.09	1034.59	1031.84	2'-9"
6	15+30B	Left	1	1041.62	1039.12	1038.62	1030.29	8'-4"
7	15+58B	Right	2	1037.44	1031.44	1030.94	1030.11	0'-10"
8	16+70B	Right	1	1040.56	1038.06	1037.56	1029.43	8'-2"
9	17+02B	Left	1	1040.09	1037.59	1037.09	1029.29	7'-10"



PIPE CONNECTION COLLAR

No Scale

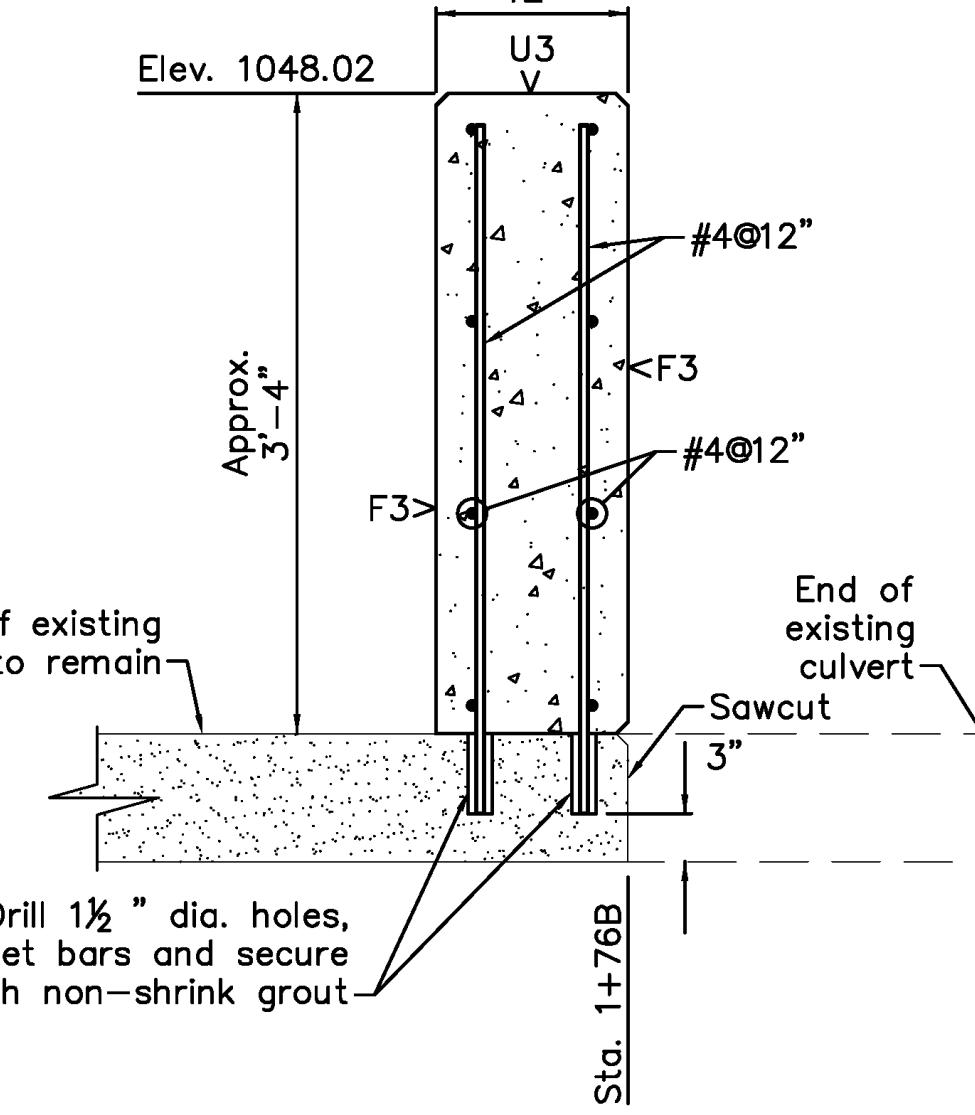


HEADWALL DETAIL - STA. 15+84B & STA. 16+44B

(Fence Not Shown)
No Scale

NOTES:

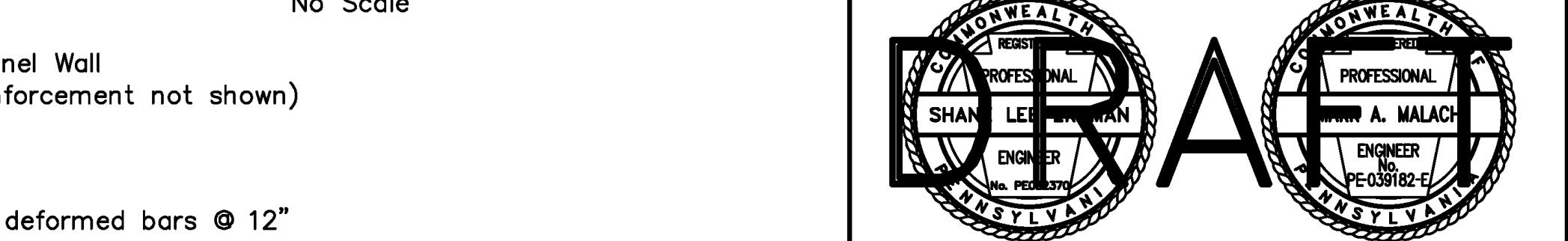
1. Drainage Inlet Grate shall conform to Dwg. No. RC-45, sheet 8 of 20 or 9 of 20, of the PennDOT "Standards for Roadway Construction", Pub. 72M.
2. Watertight access covers shall be Nennah castings R-6665-3EIH or approved equal.
3. All reinforcement shall be epoxy-coated (EC) rebar.



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SUBMITTED			
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APPROVED			
CHIEF - DIVISION OF PROJECT DEVELOPMENT - D.E.P.			
APPROVED			
DIRECTOR - BUREAU OF WATERWAYS ENGINEERING AND WETLANDS - D.E.P.			

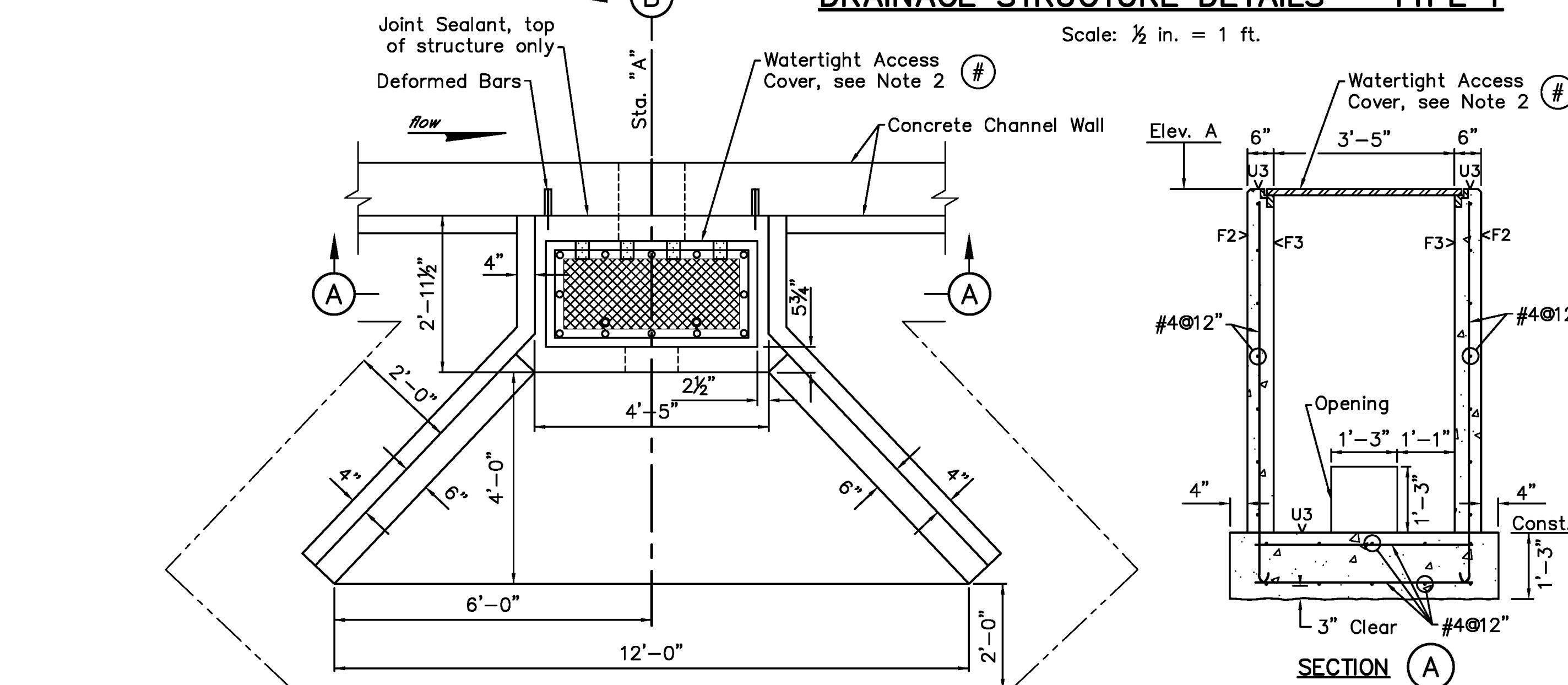
HEADWALL DETAIL - STA. 1+76B

(Fence Not Shown)
No Scale



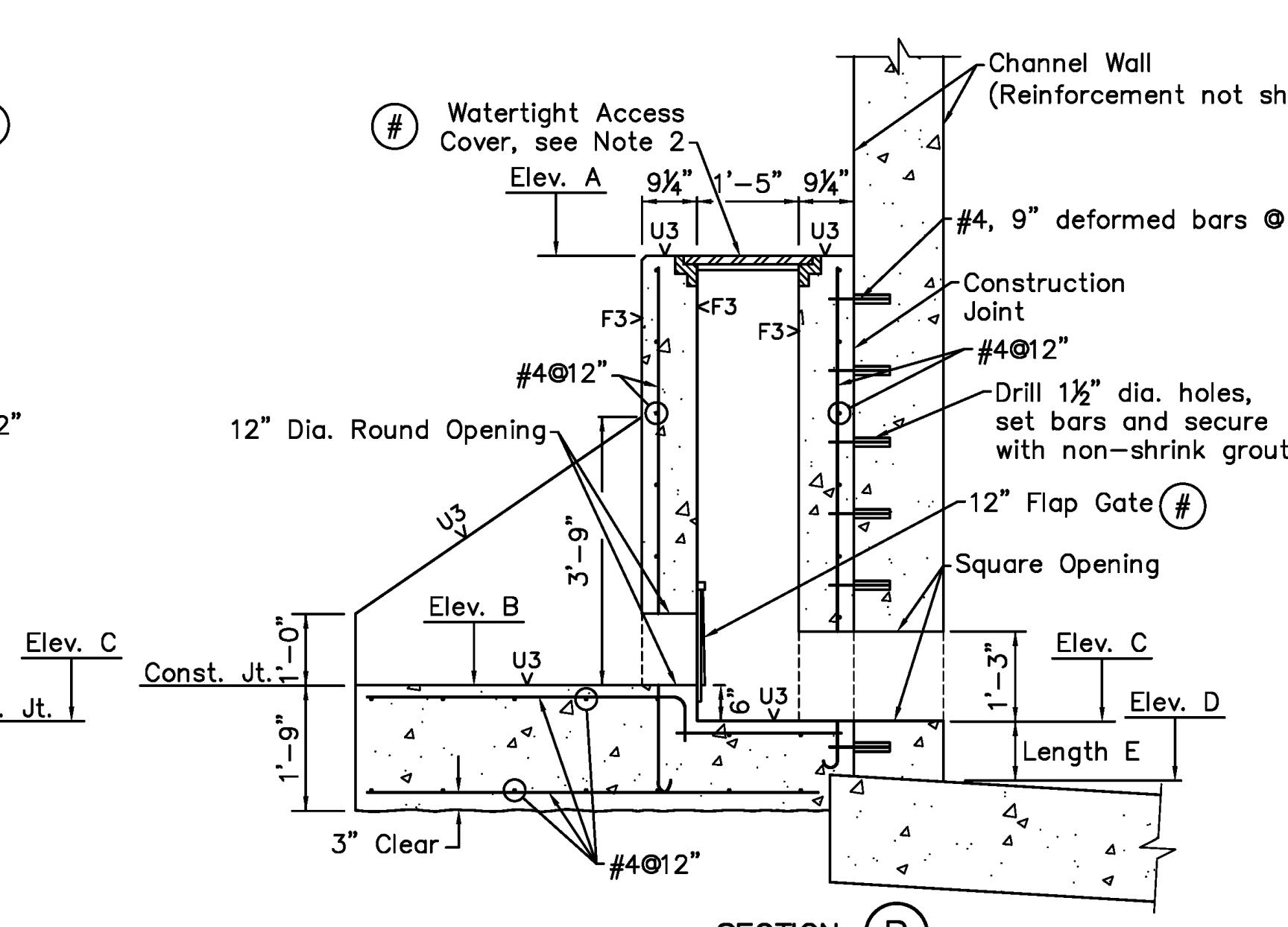
DRAINAGE STRUCTURE DETAILS - TYPE 1

Scale: $\frac{1}{2}$ in. = 1 ft.



DRAINAGE STRUCTURE DETAILS - TYPE 2

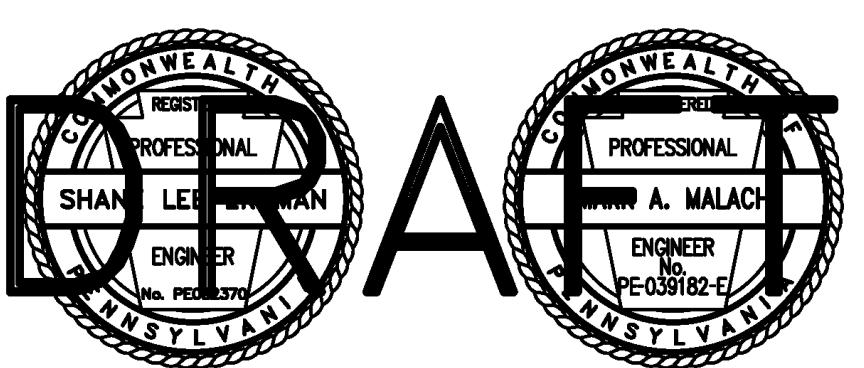
Scale: $\frac{1}{2}$ in. = 1 ft.



ALL DIMENSIONS AND EXISTING CONDITIONS SHALL BE CHECKED AND VERIFIED BY CONTRACTOR AT THE SITE.

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CHECKED BY		SCALE	As Shown

D-2



PROFESSIONAL'S SIGNATURE DATE PROFESSIONAL'S SIGNATURE DATE

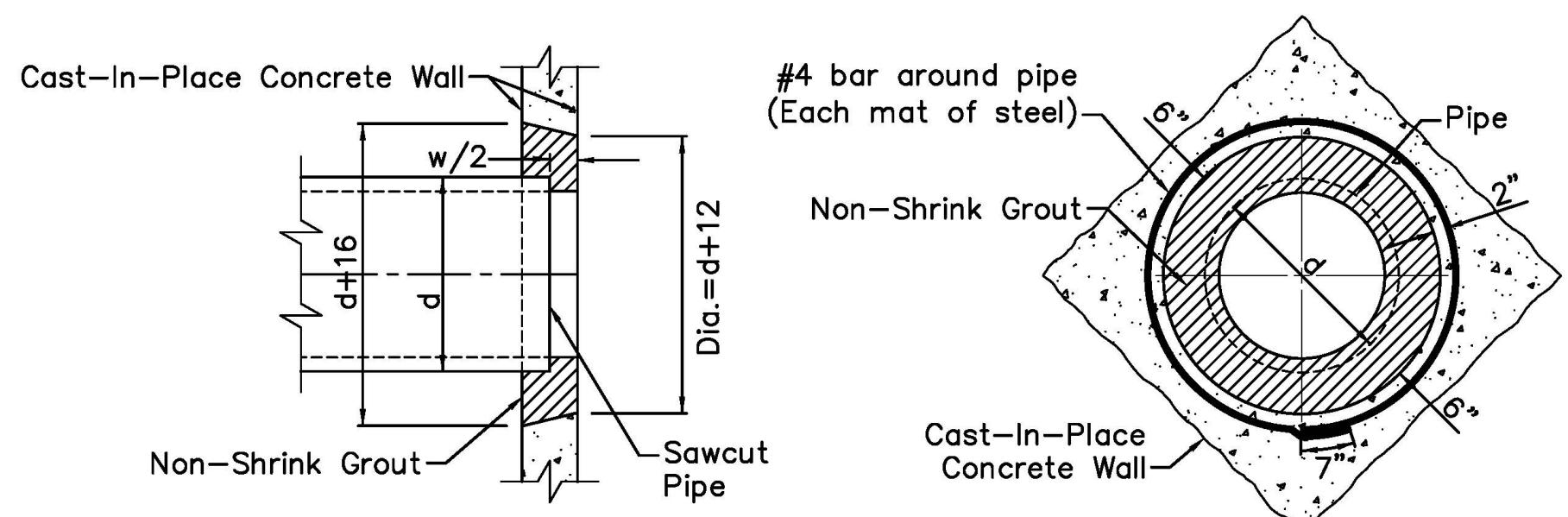
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF WATER PROGRAMS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF GENERAL SERVICES
HARRISBURG, PENNSYLVANIA

PROJECT NO. D.G.S. 182-19, PHASE 1

BUTTERNUT CREEK
FLOOD PROTECTION PROJECT
MOUNT CARMEL TOWNSHIP NORTHUMBERLAND COUNTY

DRAINAGE STRUCTURE &
HEADWALL DETAILS

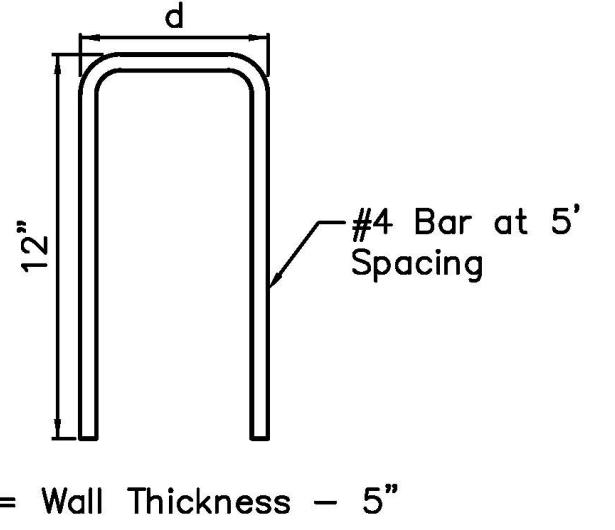


PIPE CONNECTION TO CHANNEL WALL

No Scale

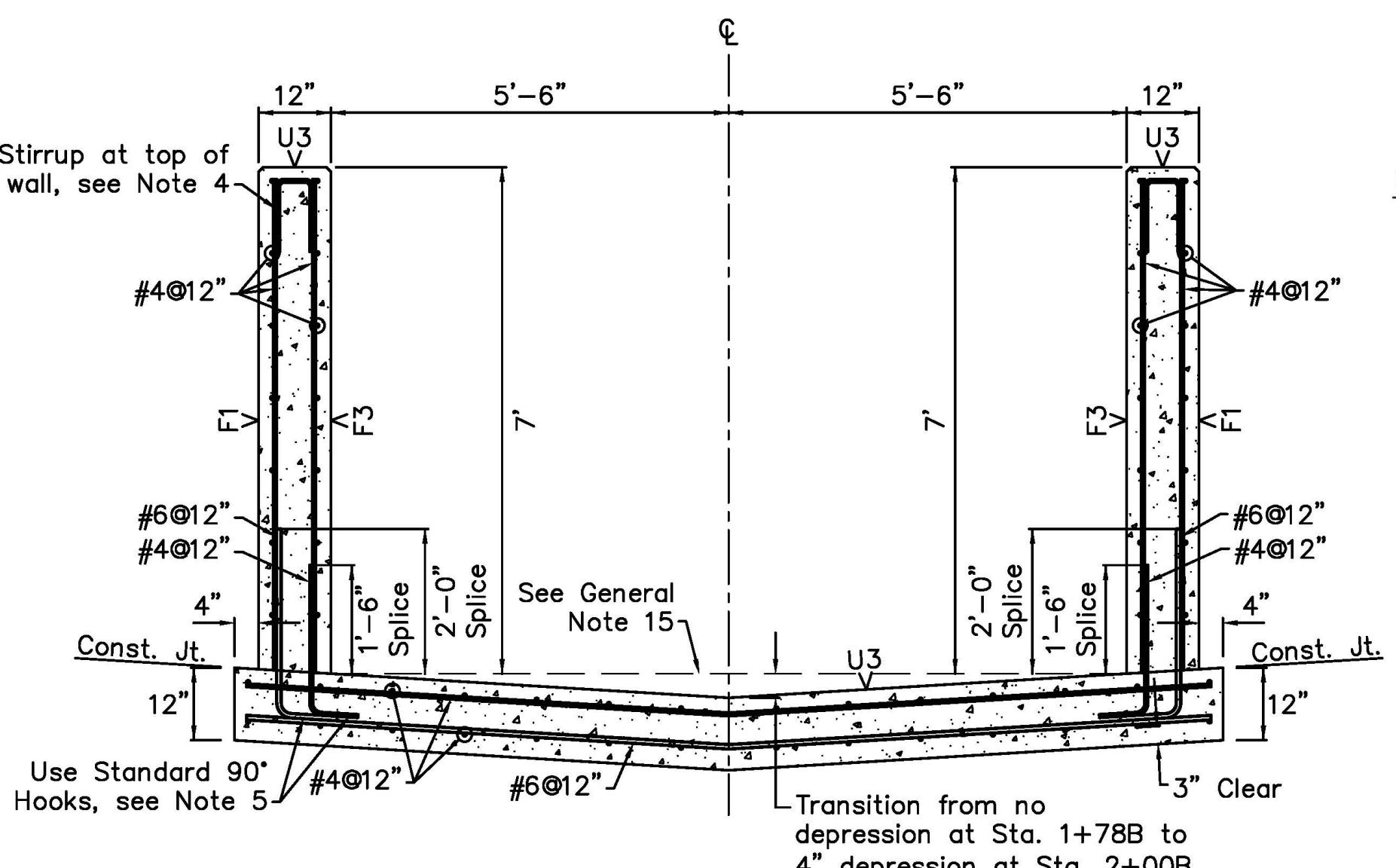
NOTES:

- For General Notes, see Dwg. GP-1.
- For Concrete Notes, see Dwg. D-1.
- Channel invert elevations vary. Elevations shown on the profile drawings are the elevations at the wall-to-slab joint.
- Place appropriate sized stirrups at the top of each wall. For stirrup detail, see this Dwg.
- Bar Hooks, Splices, and Stirrups shown out of position for clarity. During construction these bars are to be placed at the same clearance from the edge of concrete. Also see Standard Hook Detail, this Dwg.

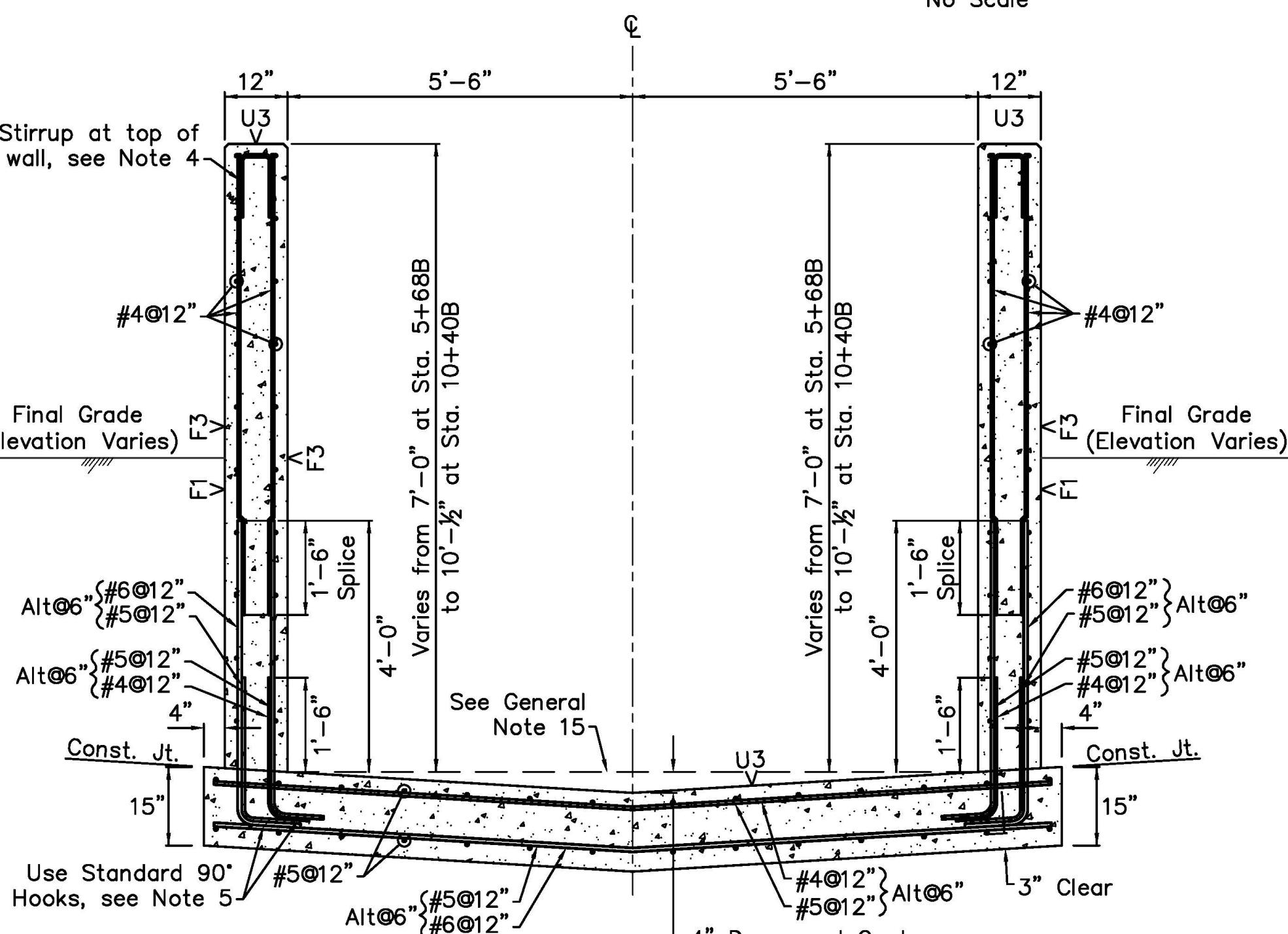


STIRRUP BAR DETAIL

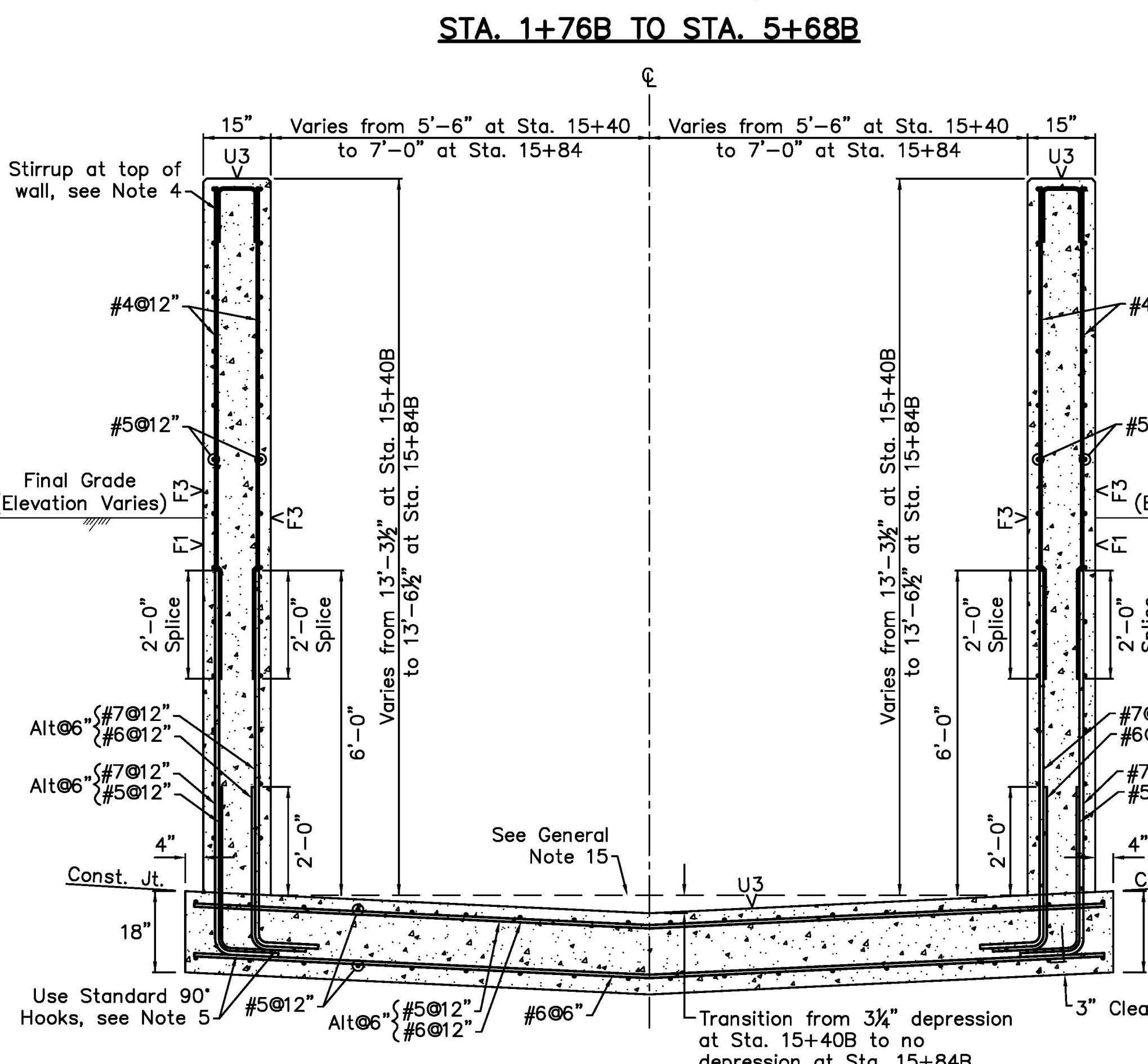
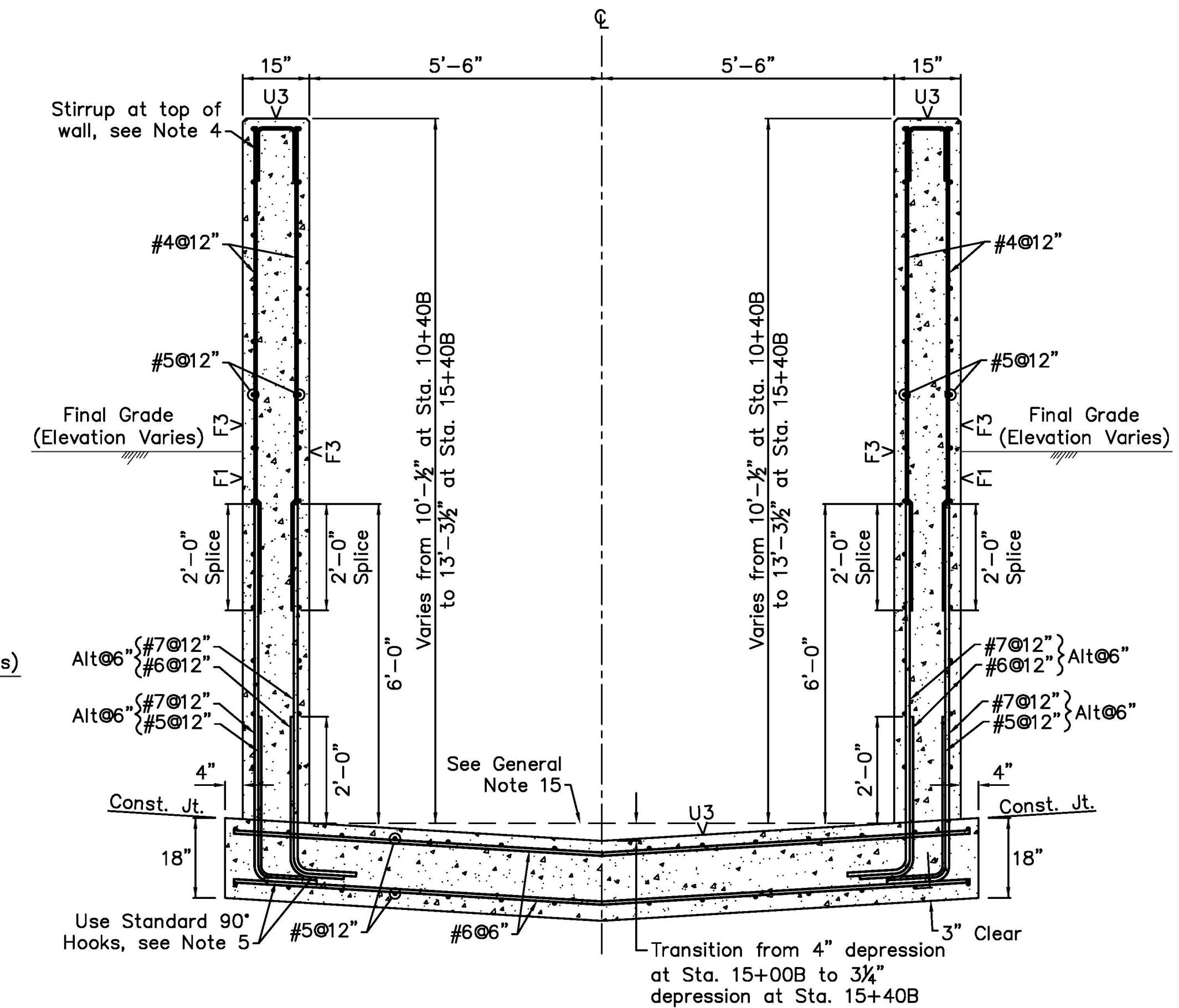
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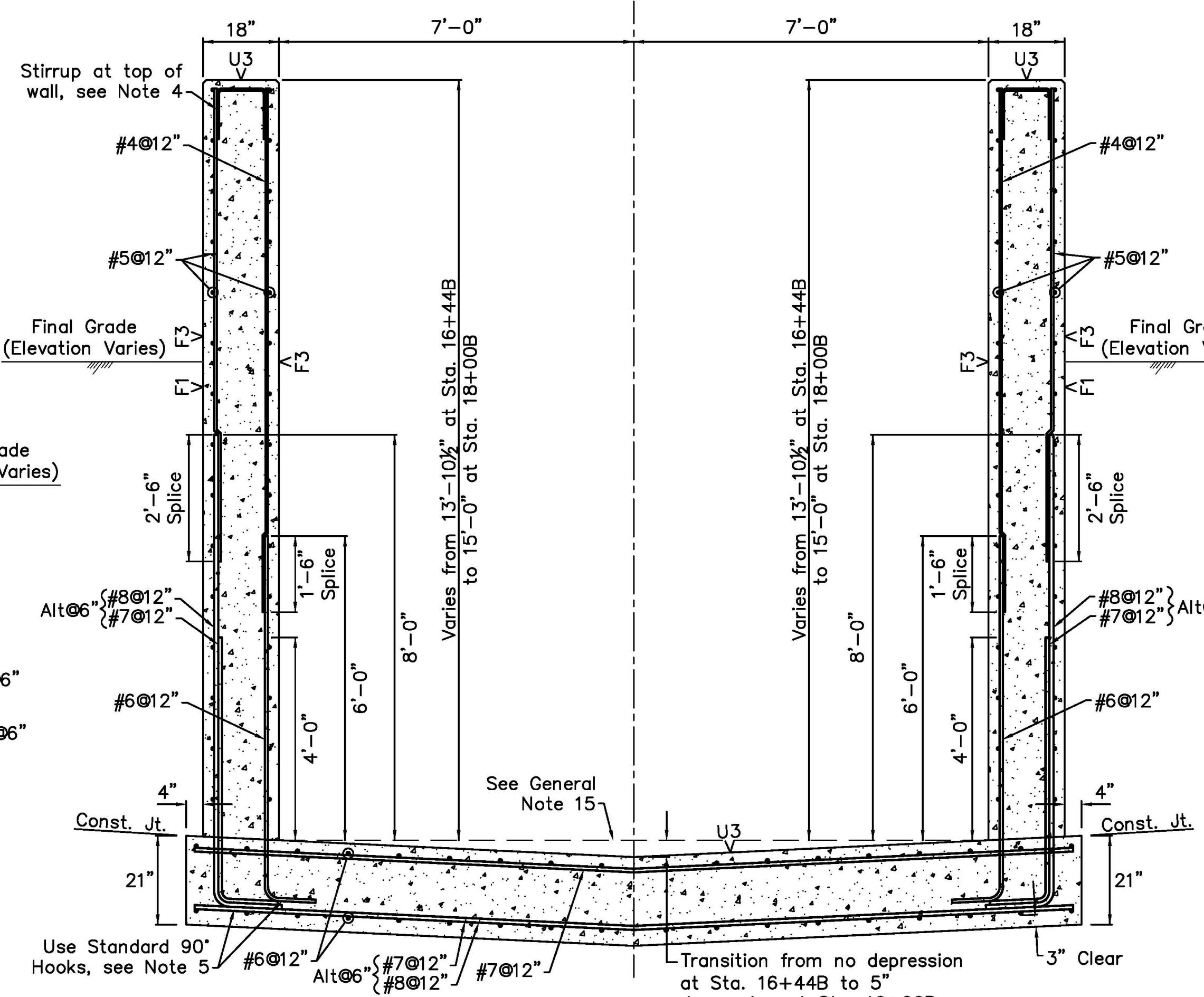
STA. 5+68B TO STA. 10+40B



STA. 10+40B TO STA. 15+40B



STA. 15+40B TO STA. 15+84B

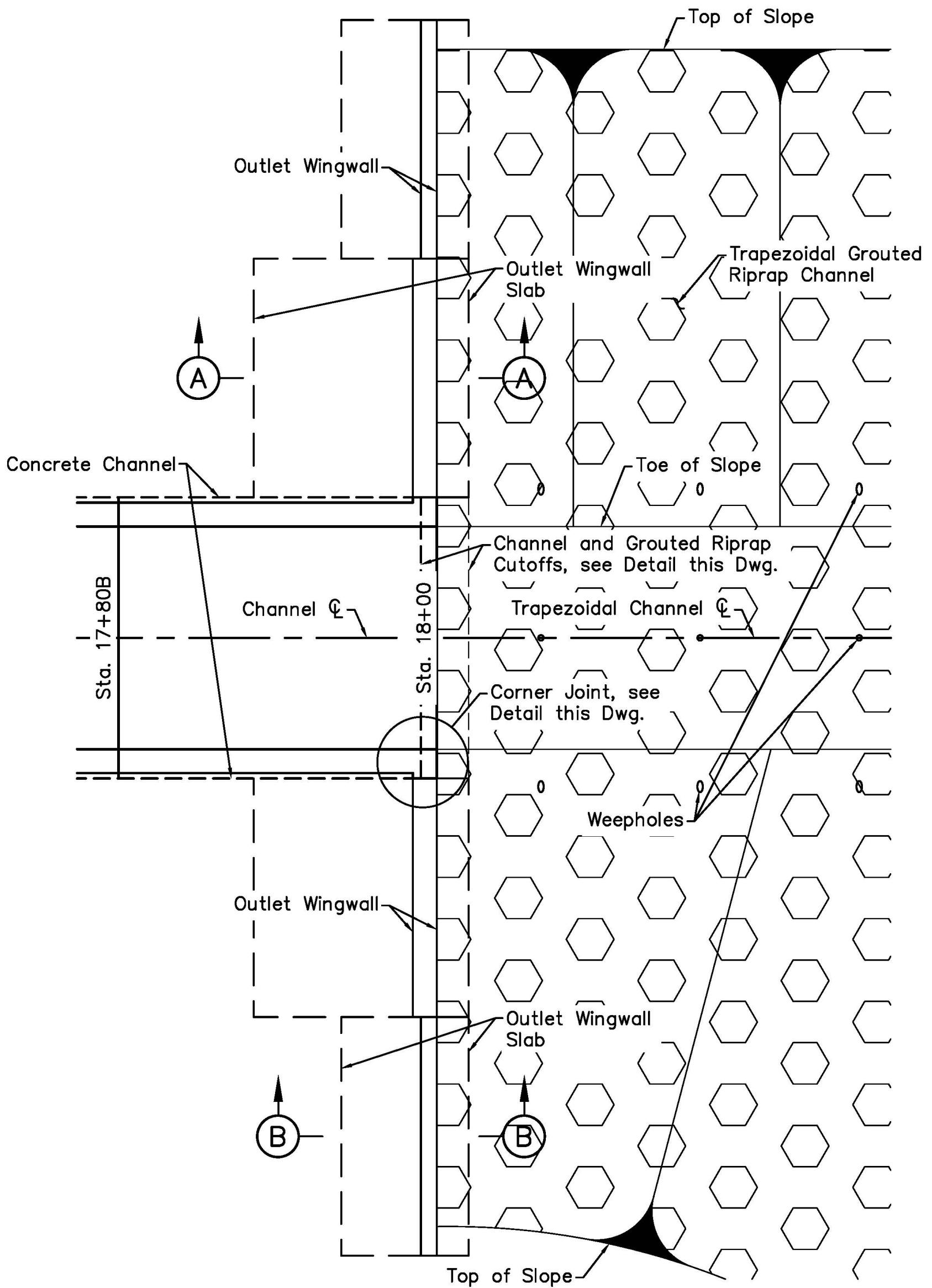


STANDARD DIMENSIONS FOR 90° HOOKS

No Scale

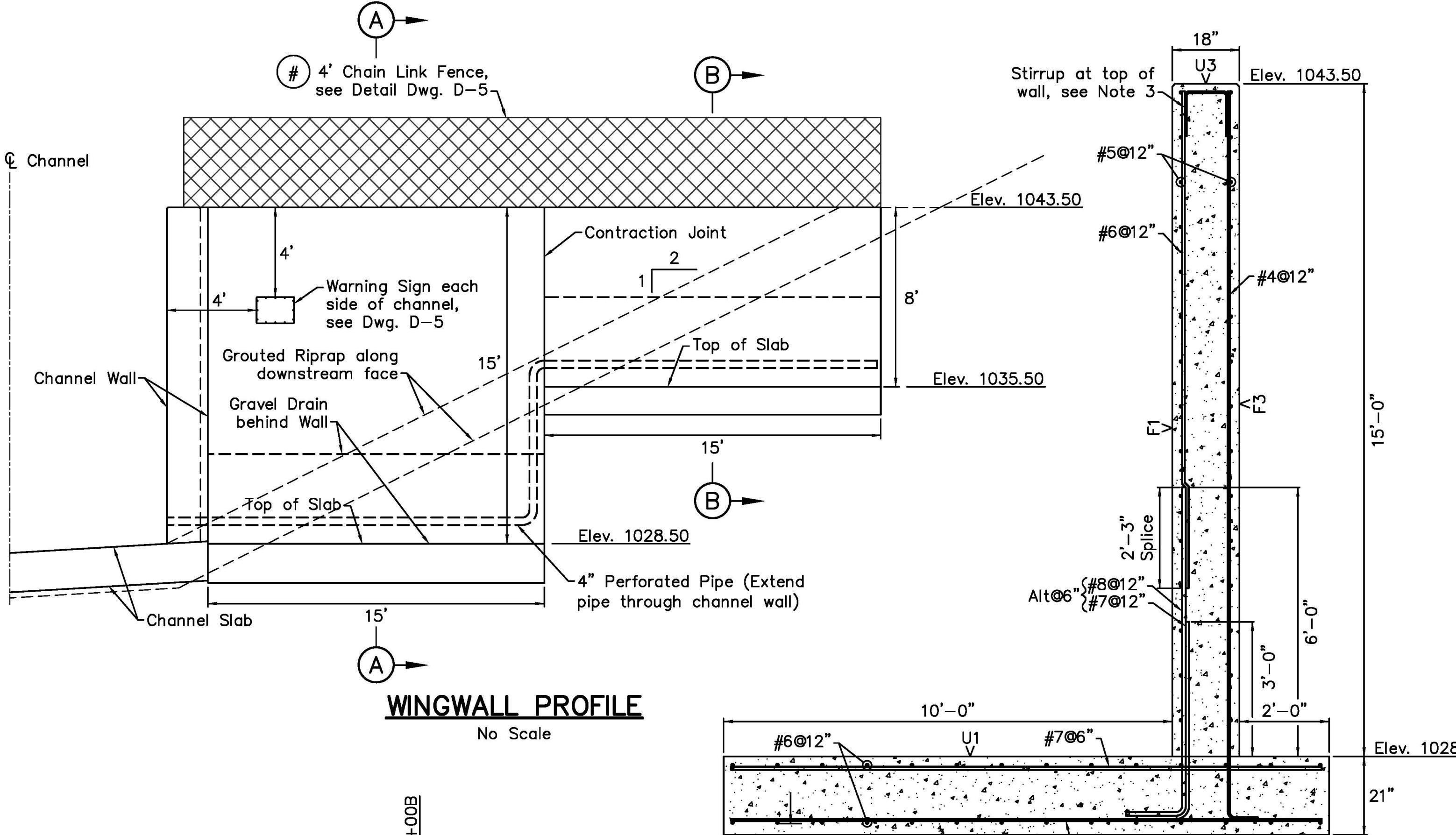
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NO.	DATE	REVISION	APPR.
SUBMITTED			
PROJECT COORDINATOR - D.E.P.			
APPROVED			
CHIEF - DIVISION OF PROJECT DEVELOPMENT - D.E.P.			
APPROVED			
DIRECTOR - BUREAU OF WATERWAYS ENGINEERING AND WETLANDS - D.E.P.			
PROFESSIONAL'S SIGNATURE DATE PROFESSIONAL'S SIGNATURE DATE			
DRAFT			
COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION OFFICE OF WATER PROGRAMS			
COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF GENERAL SERVICES HARRISBURG, PENNSYLVANIA			
PROJECT NO. D.G.S. 182-19, PHASE 1			
BUTTERNUT CREEK FLOOD PROTECTION PROJECT			
MOUNT CARMEL TOWNSHIP NORTHUMBERLAND COUNTY			
CONCRETE CHANNEL STRUCTURAL DETAILS			
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CHECKED BY		SCALE	As Shown



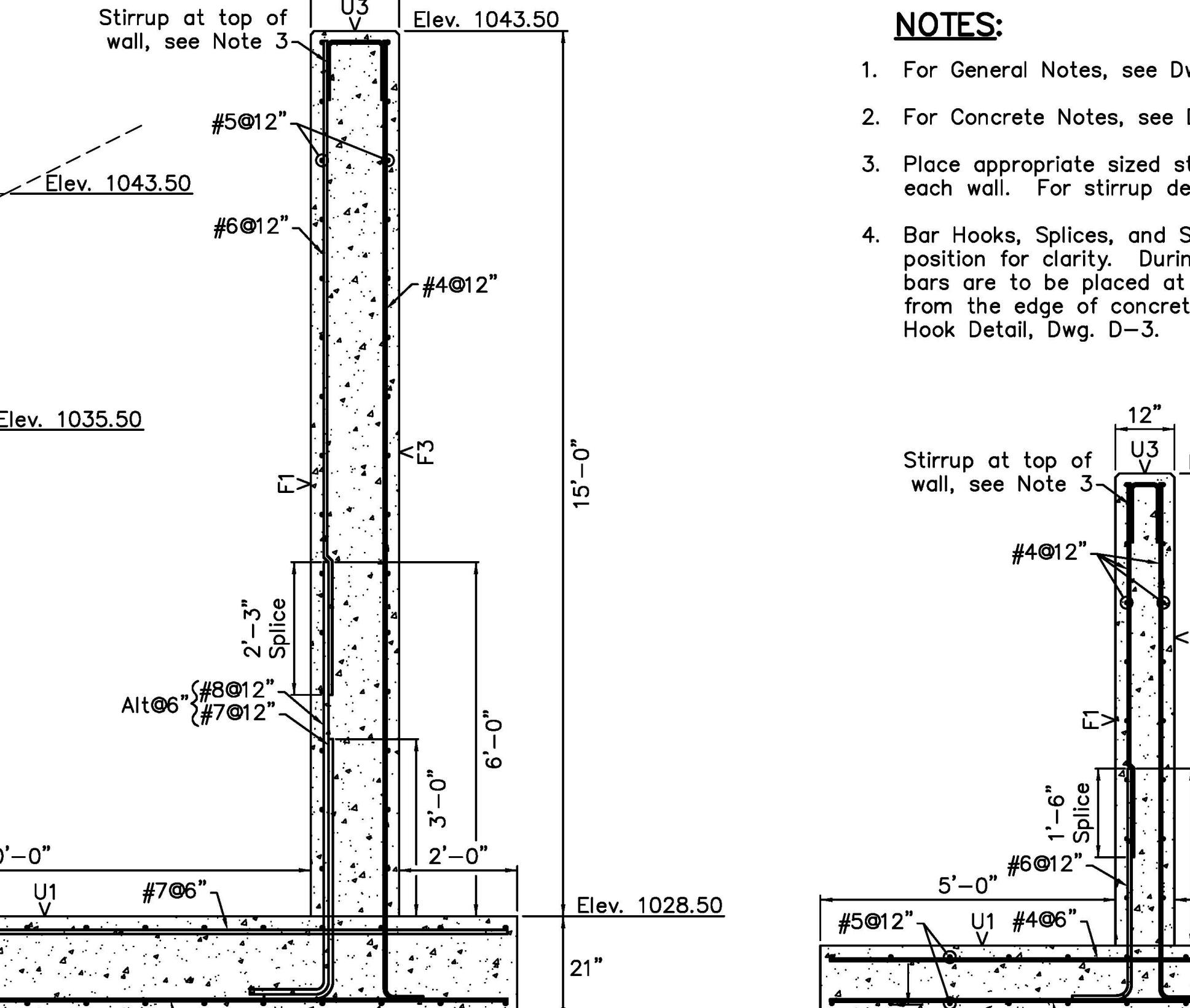
CHANNEL OUTLET PLAN VIEW

No Scale



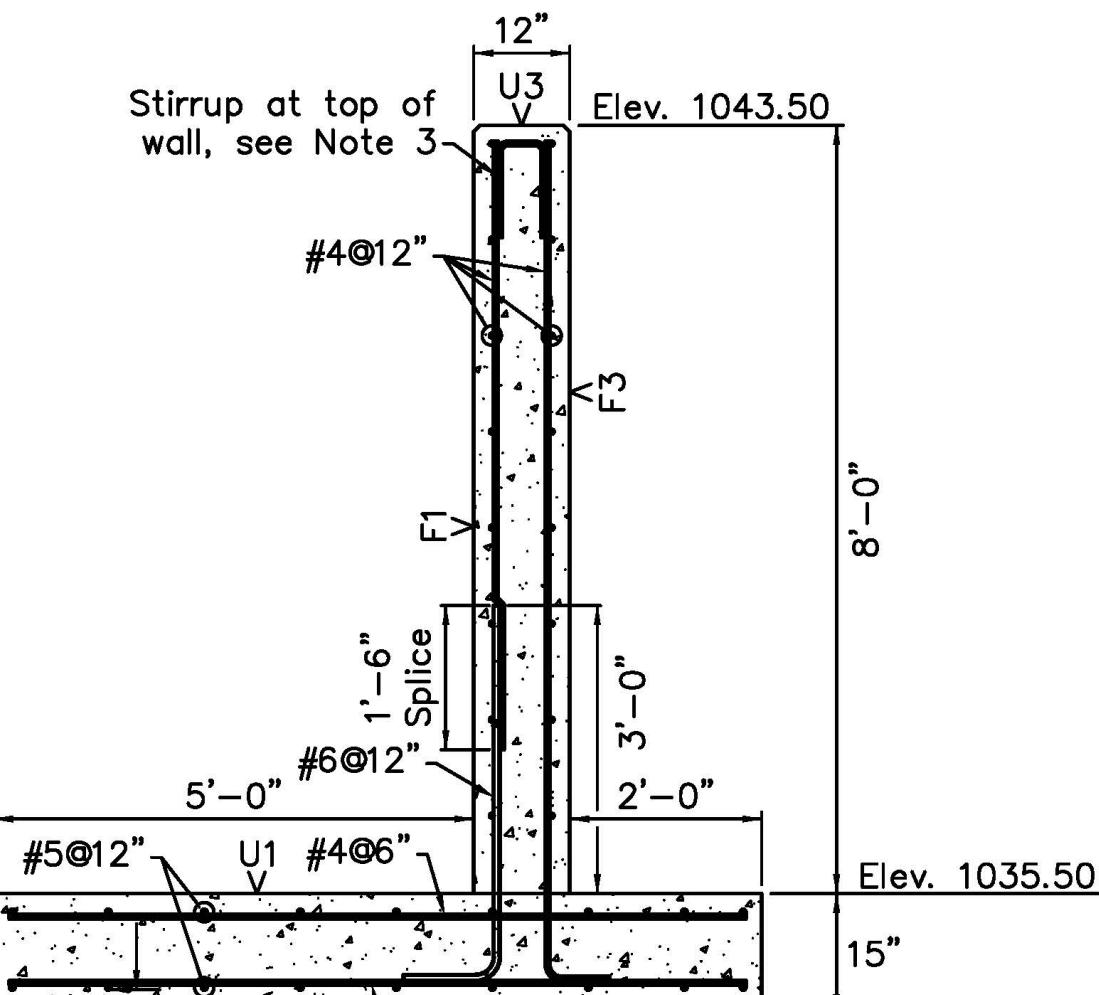
WINGWALL PROFILE

No Scale



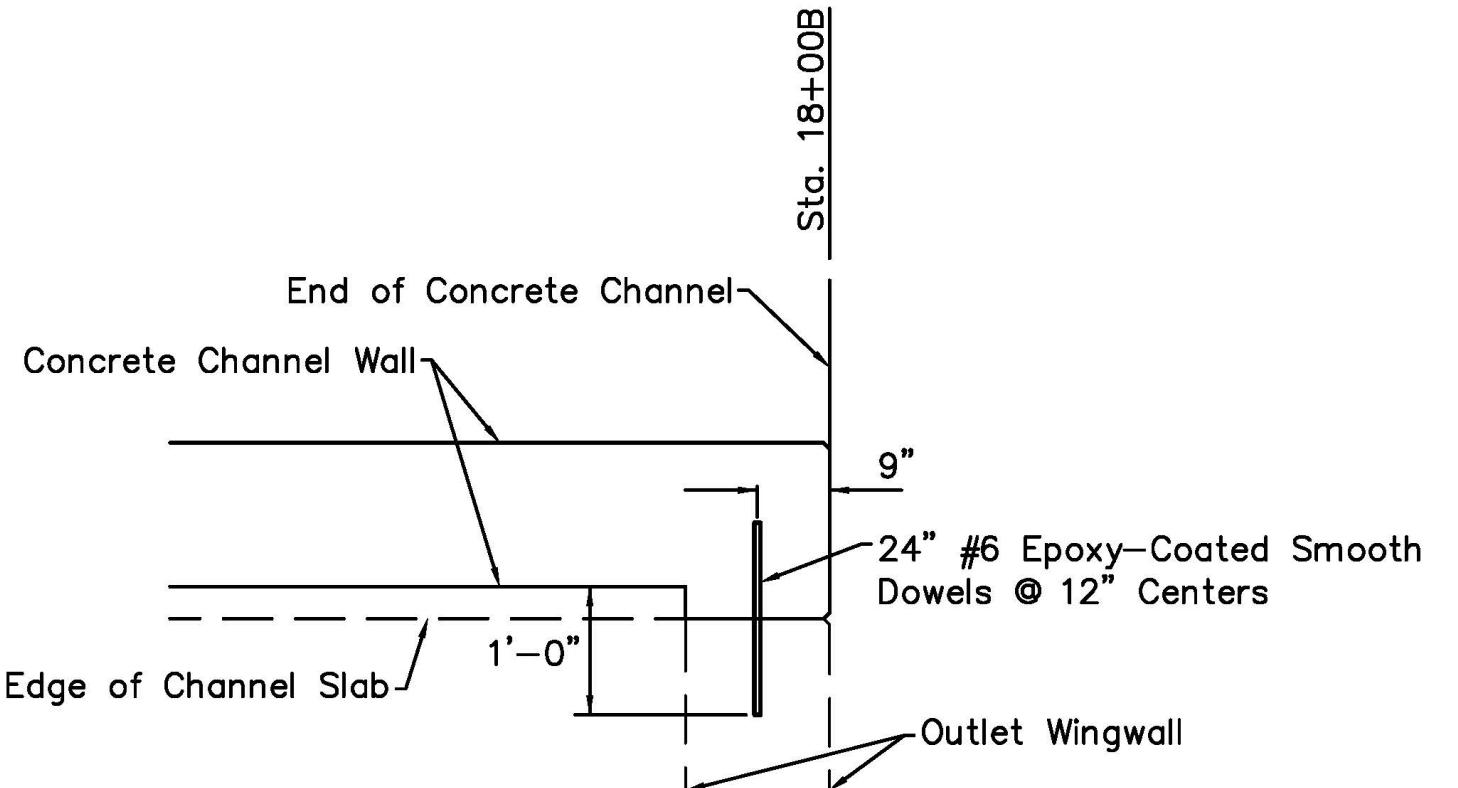
TYPICAL SECTION A

Scale: 1 in. = 2 ft.



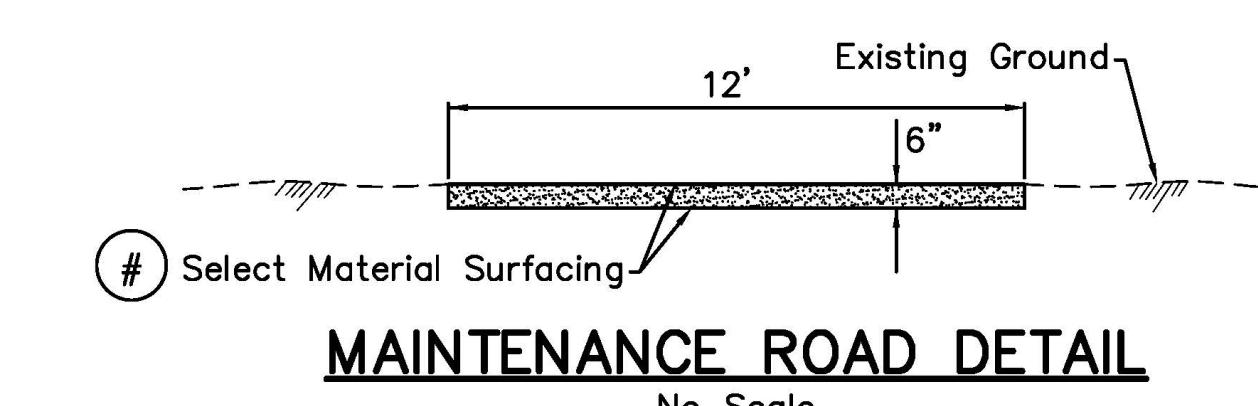
TYPICAL SECTION B

Scale: 1 in. = 2 ft.



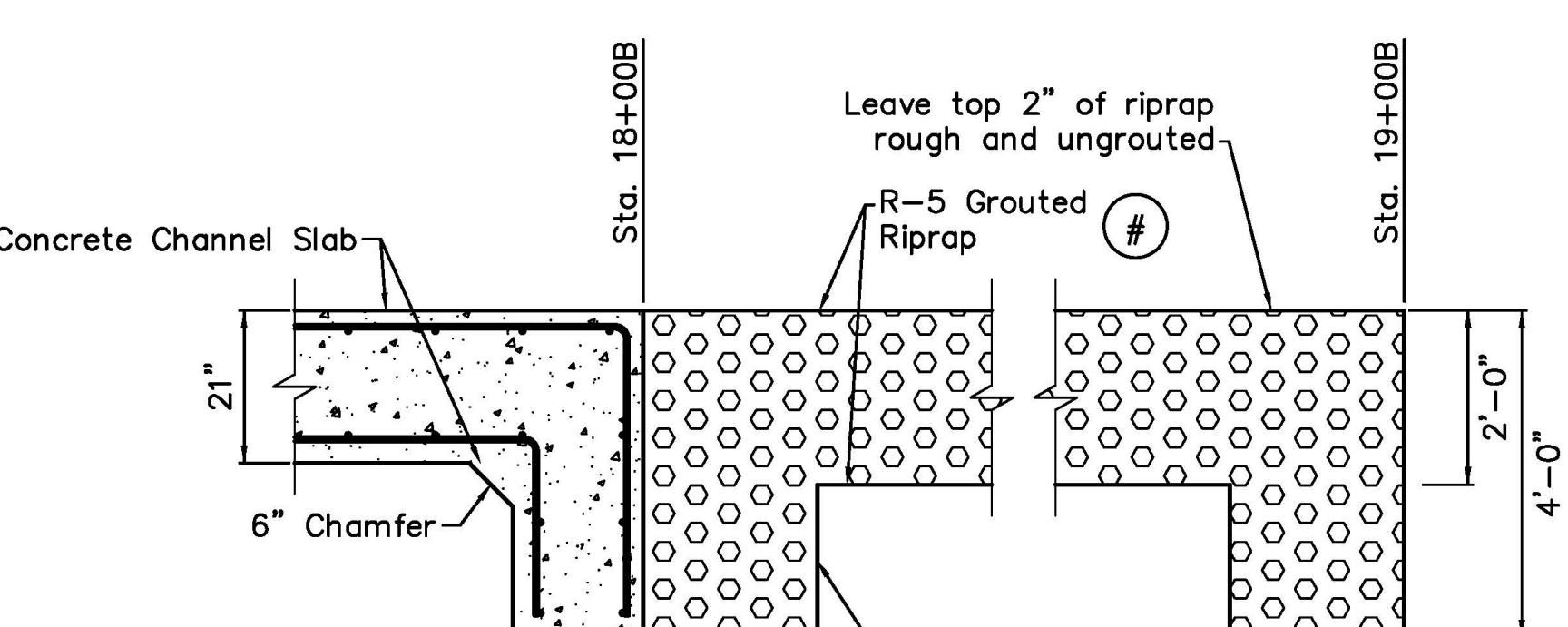
CORNER JOINT DETAIL

No Scale



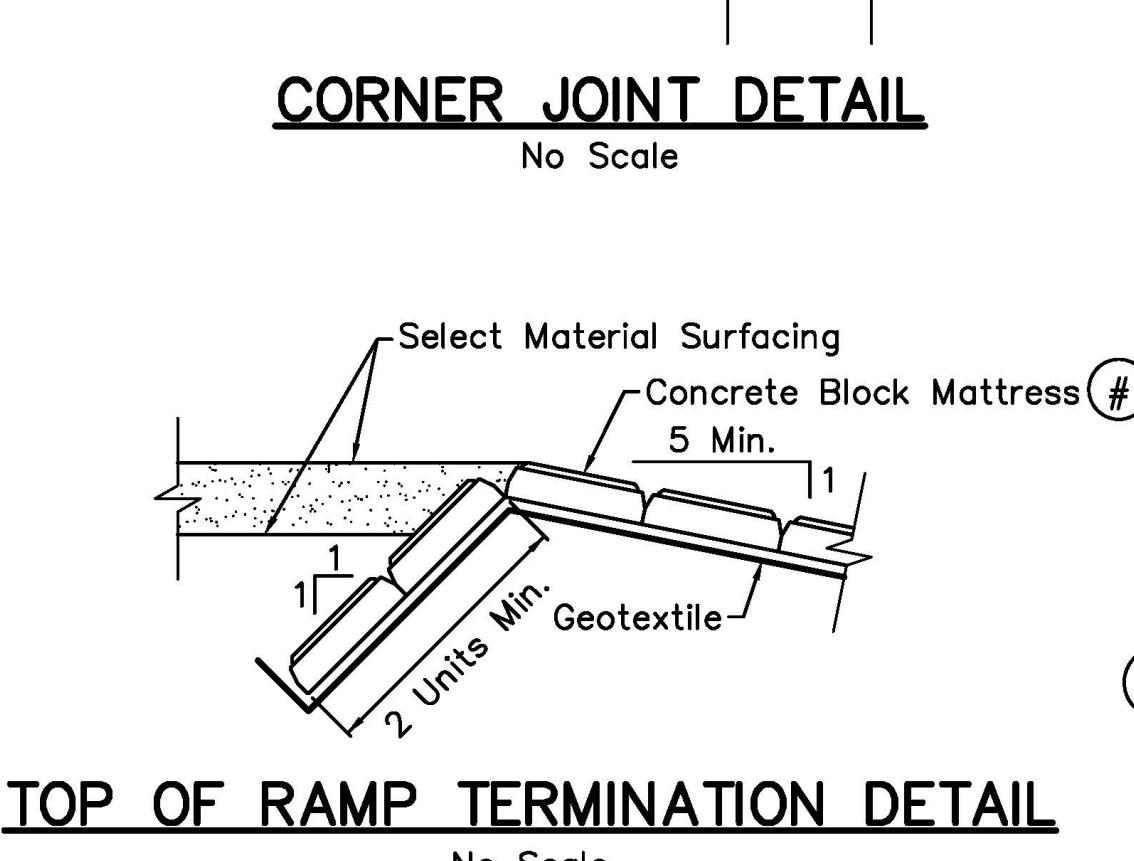
MAINTENANCE ROAD DETAIL

No Scale



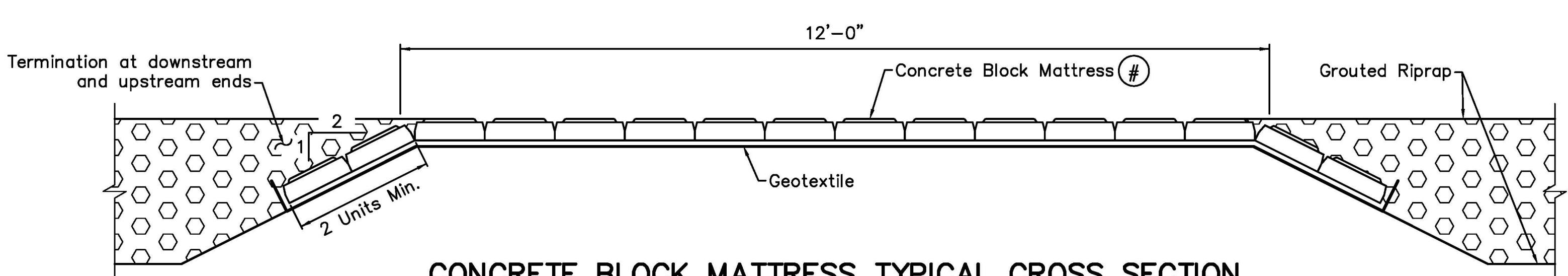
CUTOFF DETAILS

No Scale



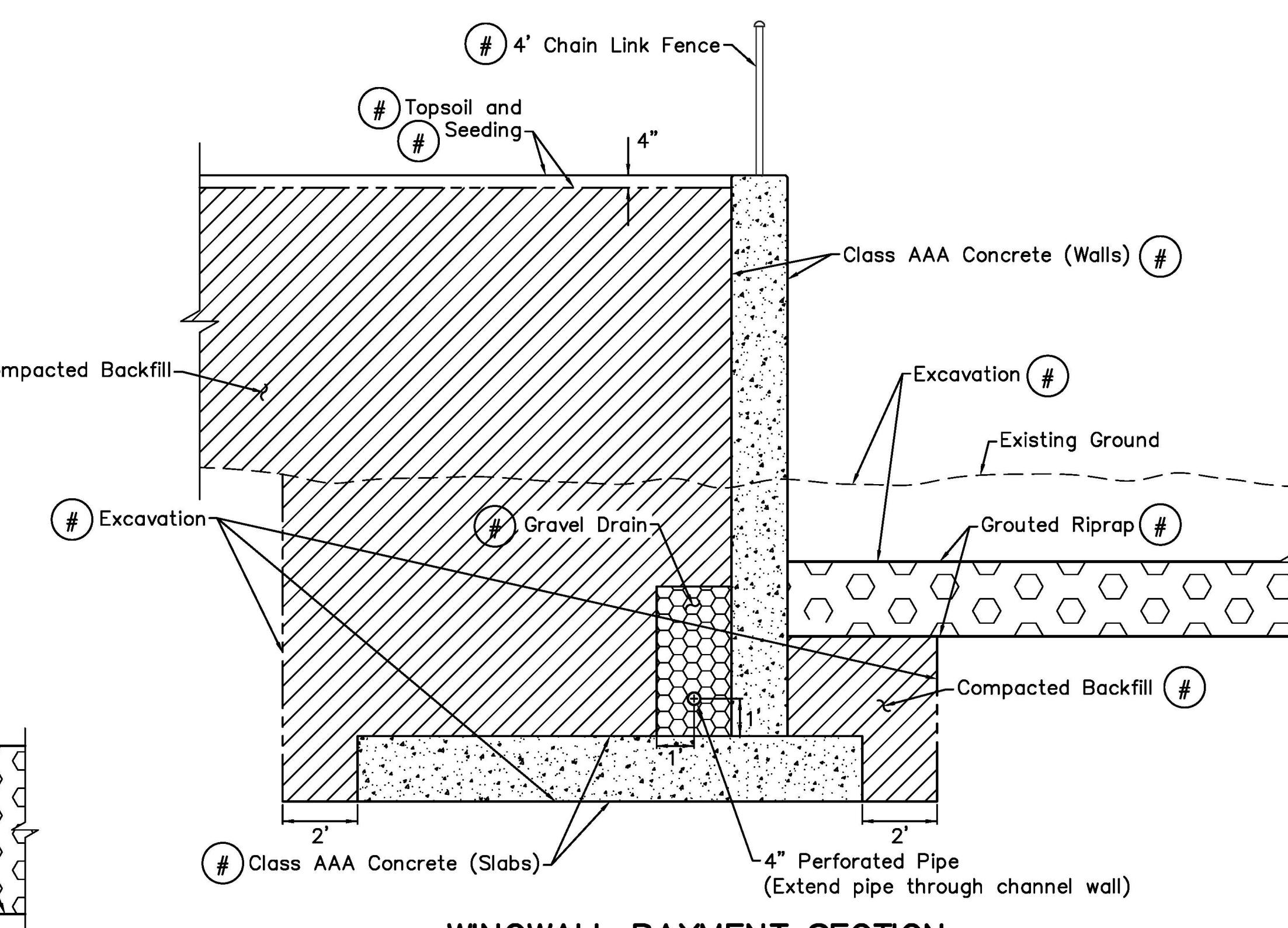
TOP OF RAMP TERMINATION DETAIL

No Scale



CONCRETE BLOCK MATTRESS TYPICAL CROSS SECTION

No Scale

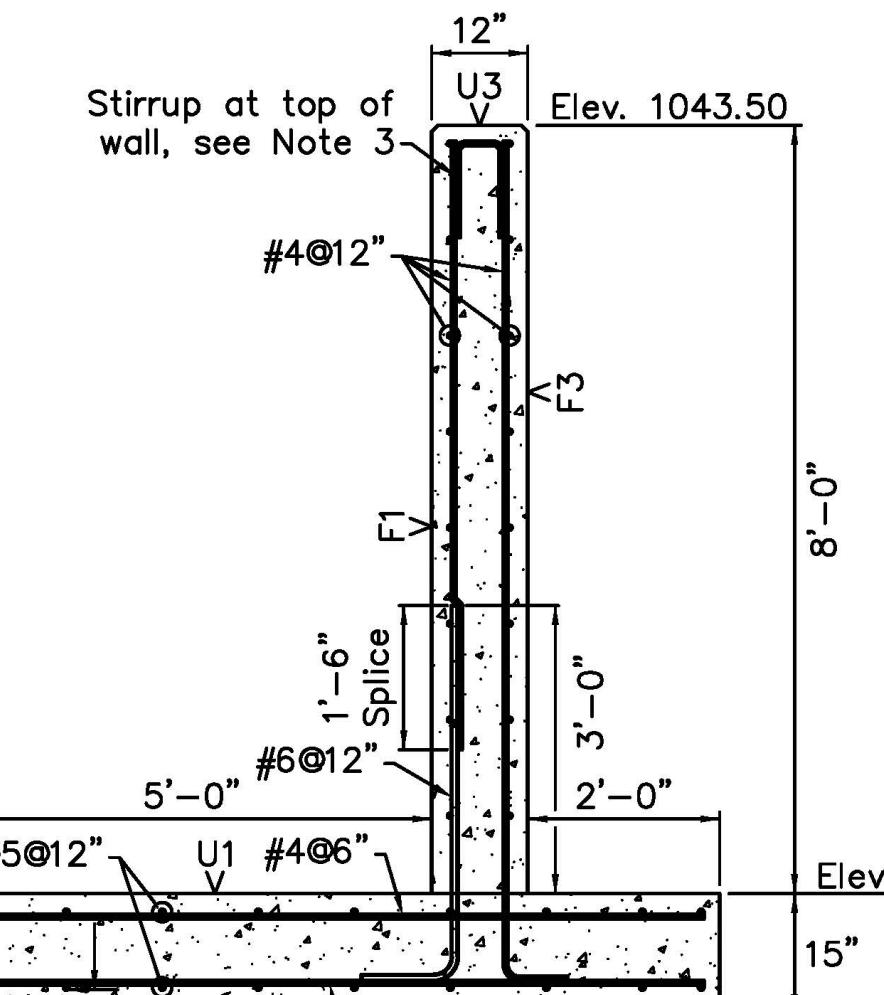


WINGWALL PAYMENT SECTION

No Scale

NOTES:

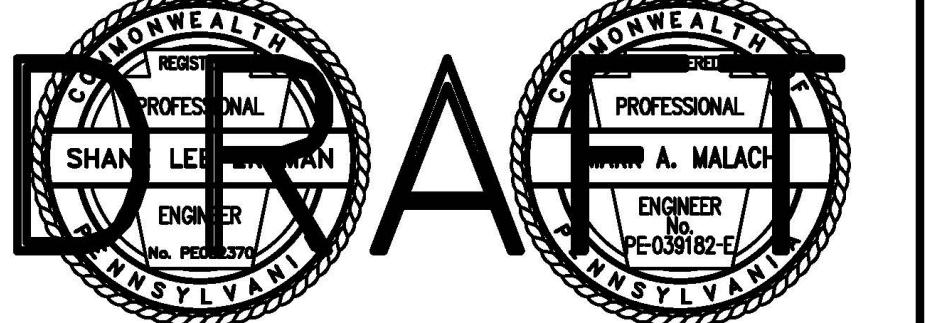
- For General Notes, see Dwg. GP-1.
- For Concrete Notes, see Dwg. D-1.
- Place appropriate sized stirrups at the top of each wall. For stirrup detail, see Dwg. D-3.
- Bar Hooks, Splices, and Stirrups shown out of position for clarity. During construction these bars are to be placed at the same clearance from the edge of concrete. Also see Standard Hook Detail, Dwg. D-3.



TYPICAL SECTION B

Scale: 1 in. = 2 ft.

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SUBMITTED			
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APPROVED			
CHIEF - DIVISION OF PROJECT DEVELOPMENT - D.E.P.			
APPROVED			
DIRECTOR - BUREAU OF WATERWAYS ENGINEERING AND WETLANDS - D.E.P.			



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF WATER PROGRAMS

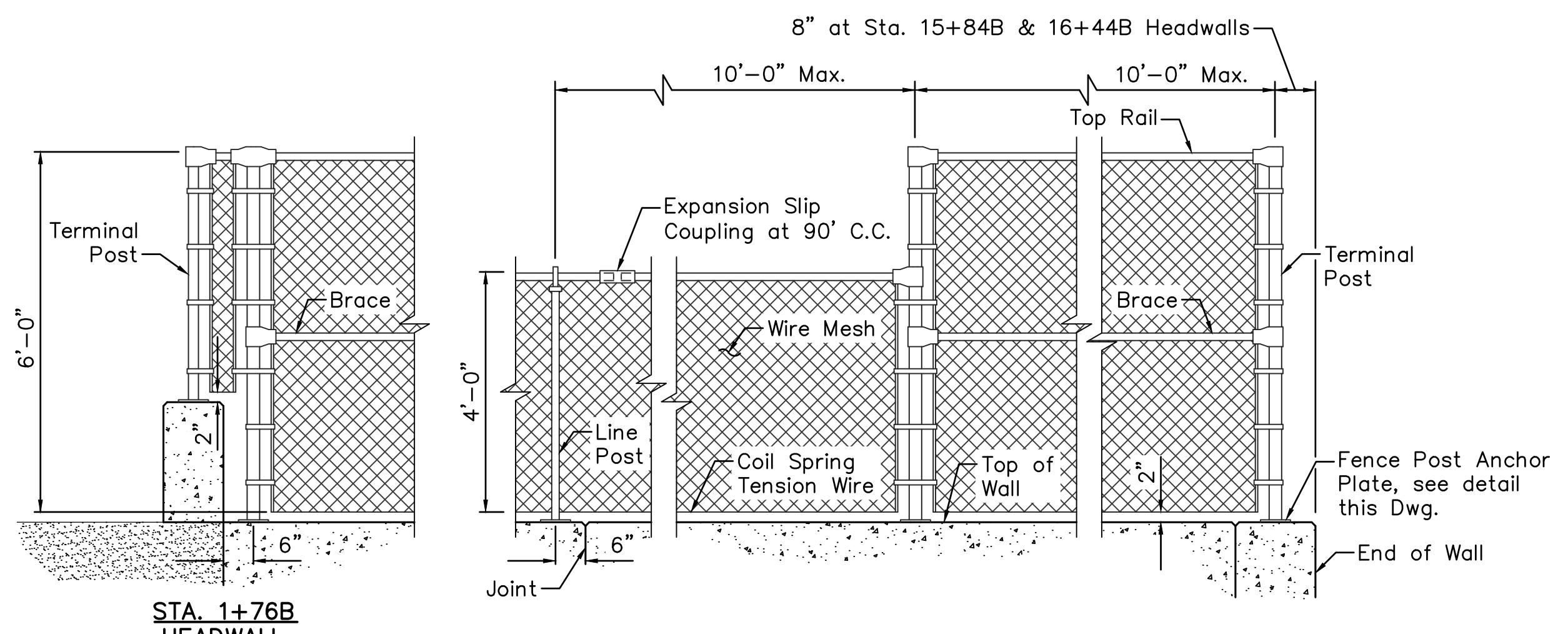
COMMONWEALTH OF PENNSYLVANIA
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HARRISBURG, PENNSYLVANIA

PROJECT NO. D.G.S. 182-19, PHASE 1

BUTTERNUT CREEK
FLOOD PROTECTION PROJECT
MOUNT CARMEL TOWNSHIP NORTHUMBERLAND COUNTY

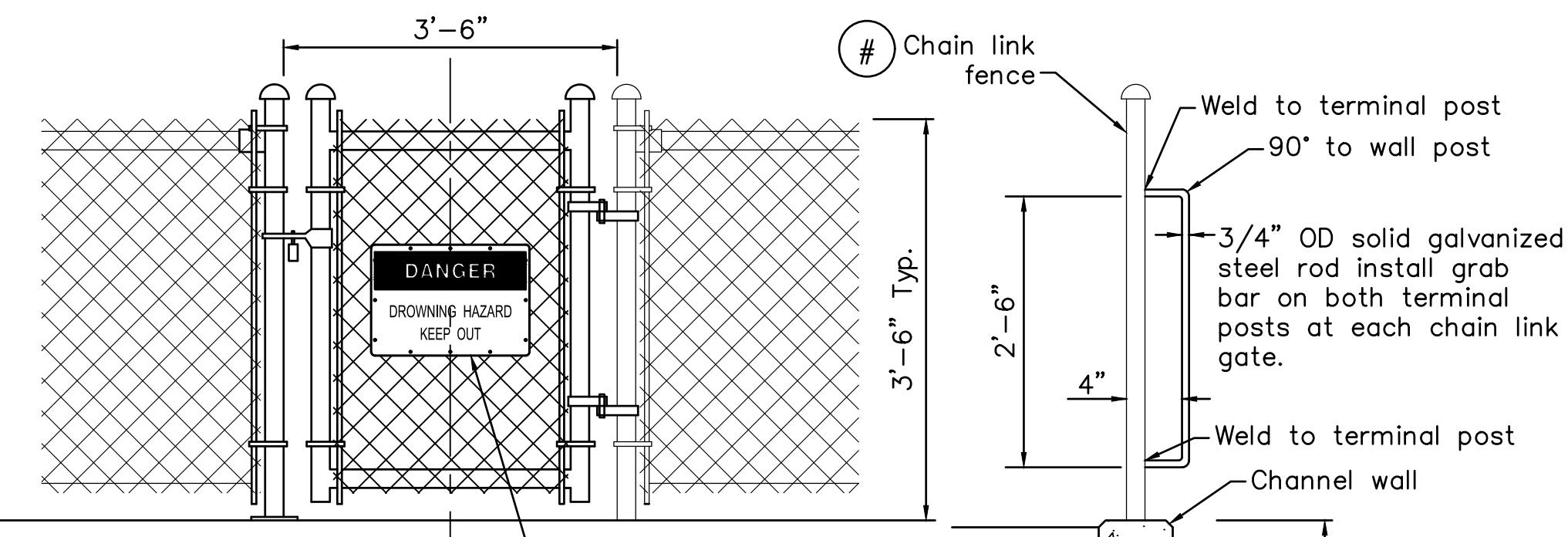
CHANNEL OUTLET
STRUCTURAL DETAILS

DRAWN BY S.L.E.	DATE	DRAWING NO.
CHECKED BY	SCALE As Shown	



STA. 1+76B

HEADWALL

**CHANNEL ACCESS SCHEDULE**

Station
3+74B Rt.
17+66B Rt.

CHANNEL ACCESS

No Scale

GROUNDING ROD LOCATION SCHEDULE

Station	Offset	Description
1+76B	Left	Corner Post
1+76B	Right	Corner Post
3+72B	Right	Access Gate
3+76B	Right	Access Gate
6+50B	Left	Terminal Post
8+25B	Right	Terminal Post
14+50B	Left	Terminal Post
15+84B	Left	Corner Post
18+00B	Left	Corner Post
18+00B	Right	Corner Post
18+00B	Left	Terminal Post
18+00B	Right	Terminal Post

1. Tuck copper wire against wall so as not to interfere with mowing.
2. Connections to fence and ground rod shall meet NEC/EM-385-11-1.
3. Resistance testing shall be a maximum of 25 ohms.

GROUNDING DETAIL

No Scale

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SUBMITTED	PROJECT COORDINATOR - D.E.P.

APPROVED	CHIEF - DIVISION OF PROJECT DEVELOPMENT - D.E.P.

APPROVED	DIRECTOR - BUREAU OF WATERWAYS ENGINEERING AND WETLANDS - D.E.P.

PROFESSIONAL	PROFESSIONAL
SHAN LEE MAN	A. MALACH
ENGINEER	ENGINEER
PEO-30182-E	PEO-30182-E

PROFESSIONAL'S SIGNATURE	DATE	PROFESSIONAL'S SIGNATURE	DATE

COMMONWEALTH OF PENNSYLVANIA	DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA	DEPARTMENT OF GENERAL SERVICES

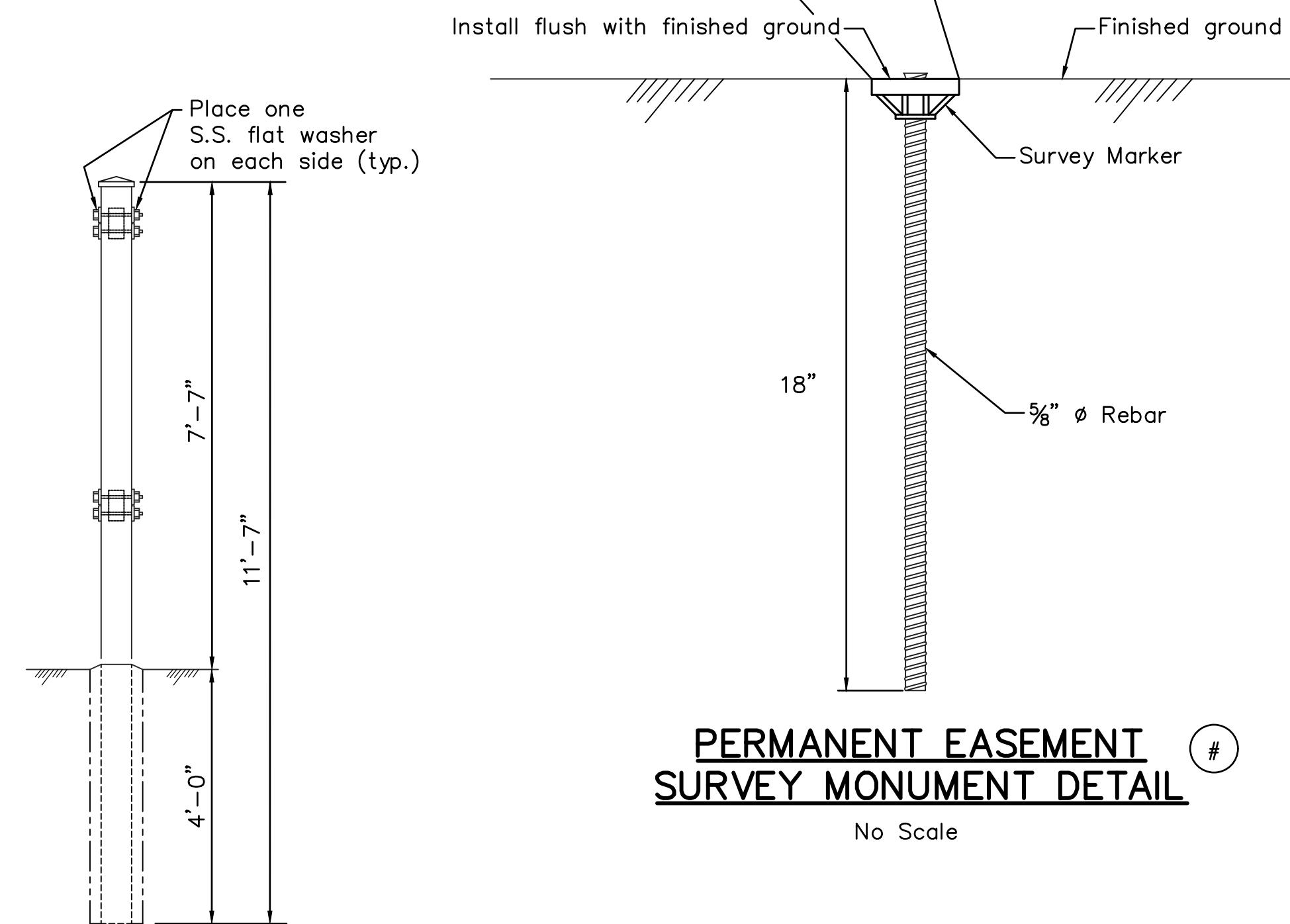
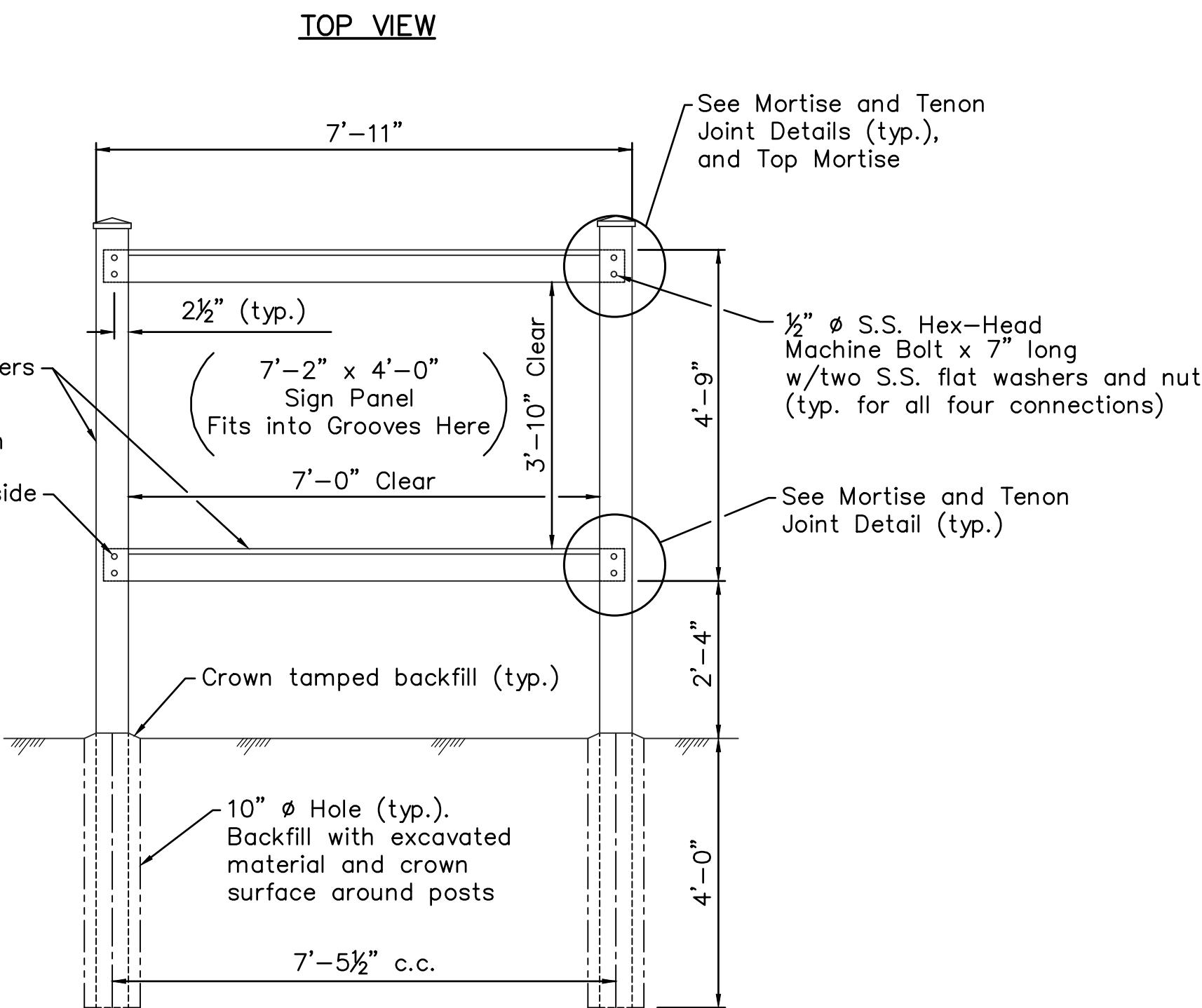
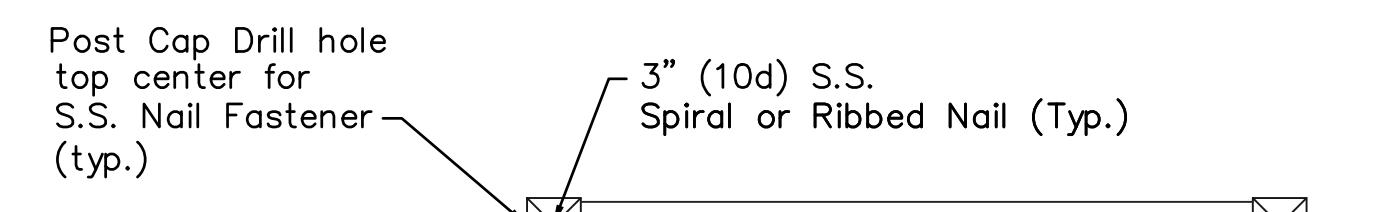
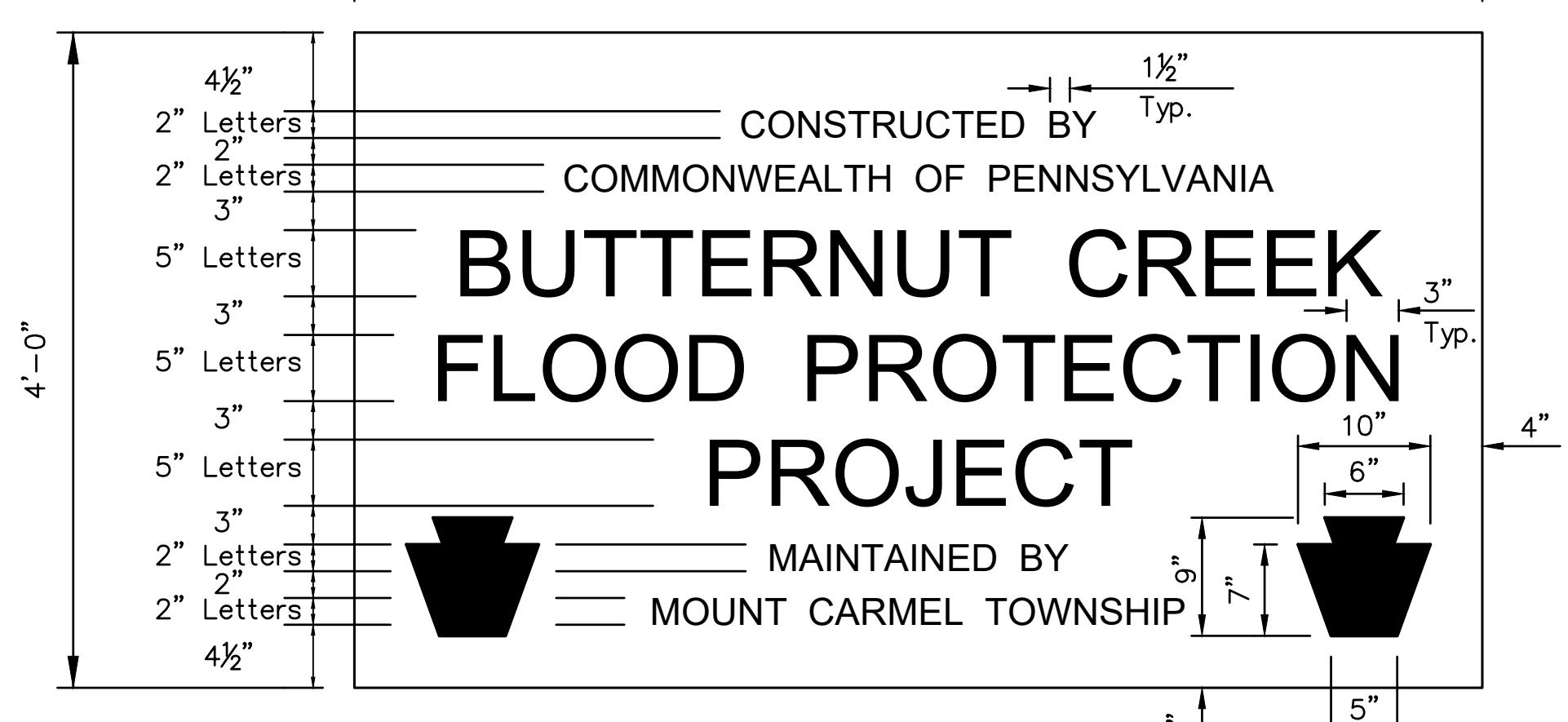
PROJECT NO. D.G.S. 182-19, PHASE 1	

BUTTERNUT CREEK	FLOOD PROTECTION PROJECT
MOUNT CARMEL TOWNSHIP	NORTHUMBERLAND COUNTY

MISCELLANEOUS DETAILS	

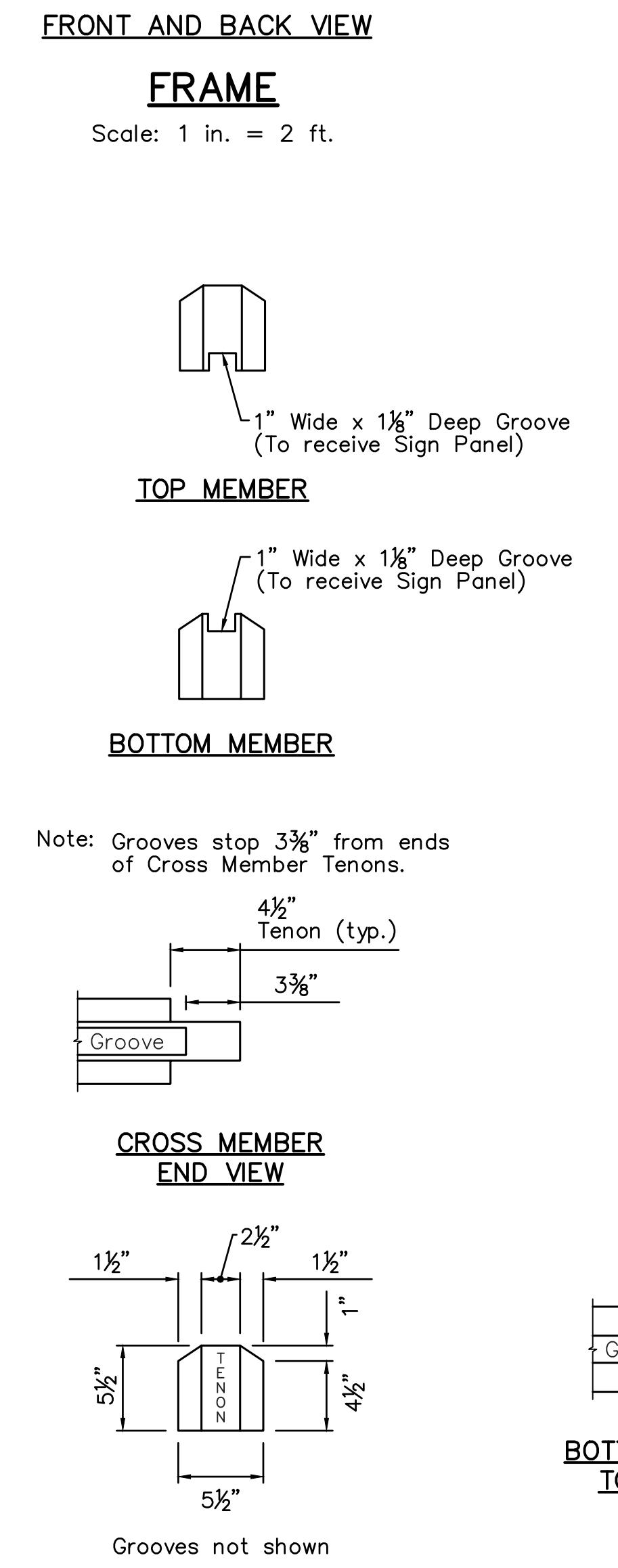
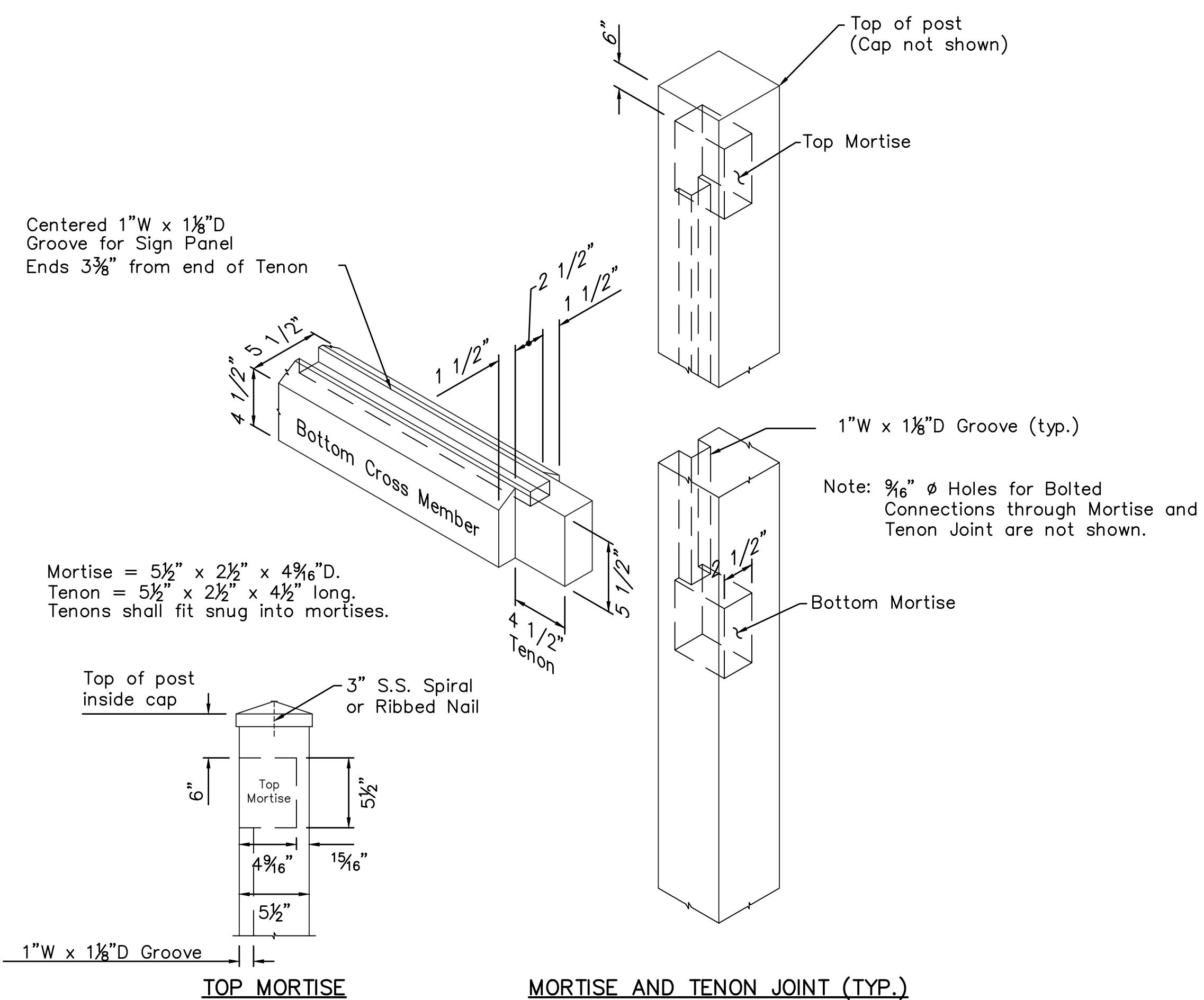
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S.L.E.		
CHECKED BY		
SCALE	As Shown	



PERMANENT EASEMENT SURVEY MONUMENT DETAIL

No Scale



PERMANENT PROJECT SIGN NOTES:

1. Posts and cross members for frame shall be pressure treated lumber, S4S, conforming to TS-80.5A.
2. All wood shall be painted with a brown, exterior grade, latex based, wood stain, conforming to TS-80.5C.
3. Sign panel shall be a 3-layer plastic sheet made from recycled HDPE, conforming to TS-80.5B.
4. Lettering and keystone outlines shall be routed on both sides of the sign panel.
5-inch x 3-inch letters shall be routed 3/4" wide x 3/16" deep.
2-inch x 1 1/2"-inch letters shall be routed 1/4" wide x 3/16" deep.
Keystones shall be routed 3/16" deep.
5. All hardware is stainless steel, conforming to TS-80.5E, with threaded ends of all bolted connections slightly peened.

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APPROVED			
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APPROVED			
PROFESSIONAL'S SIGNATURE DATE PROFESSIONAL'S SIGNATURE DATE			
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COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF GENERAL SERVICES HARRISBURG, PENNSYLVANIA			
PROJECT NO. D.G.S. 182-19, PHASE 1			
BUTTERNUT CREEK FLOOD PROTECTION PROJECT MOUNT CARMEL TOWNSHIP NORTHUMBERLAND COUNTY			
PERMANENT PROJECT SIGN & MONUMENT DETAILS			
DRAWN BY	S.L.E.	DATE	DRAWING NO.
CHECKED BY		SCALE	As Shown

DRAFT

SHAH LEE MAN A. MALACH
PROFESSIONAL ENGINEER
PEO-182-E
PROFESSIONAL ENGINEER
PEO-182-E

DATE DATE

ALL DIMENSIONS AND EXISTING CONDITIONS SHALL BE CHECKED AND VERIFIED BY CONTRACTOR AT THE SITE.

D-6