

GENERAL LOCATION OF CONTRACT

# THE STATE OF DELAWARE DEPARTMENT OF TRANSPORTATION

U.S. CUSTOMARY  
UNITS



CONSTRUCTION PLANS FOR:

## LEATHERMANS RUN RESTORATION AT CHRISTIANA HIGH SCHOOL

CONTRACT NUMBER: T201380204

COUNTY: NEW CASTLE AGREEMENT NUMBER ---

### DESIGN DESIGNATION

FUNCTIONAL CLASS: _____	D.H.V. PROJECTED: _____	YEAR: _____
TYPE OF CONSTRUCTION: _____	DESIGN SPEED: _____ M.P.H.	
A.A.D.T. CURRENT: _____	YEAR: _____	TRUCKS: _____ %
A.A.D.T. PROJECTED: _____	YEAR: _____	DIRECTION OF DISTRIBUTION: _____ %

### INDEX OF SHEETS

DRAWING No.	SHEET No.	TABLE OF CONTENTS
TC-01	1	TITLE SHEET
LG-01	2	LEGEND
PN-01	3	PROJECT NOTES
HV-01	4	HORIZONTAL AND VERTICAL CONTROL
CP-01, CP-02, CP-03	5, 6, 7	CONSTRUCTION PLANS
PF-01, PF-02, PF-03	8, 9, 10	PROFILES
XS-01, XS-02	11, 12	CROSS SECTIONS
DT-01, DT-02, DT-03	13, 14, 15	CONSTRUCTION DETAILS
CS-01	16	CONSTRUCTION PHASING AND EROSION CONTROL NOTES
CS-02	17	M.O.T., AND EROSION AND SEDIMENT CONTROL DETAILS
CS-03	18	EROSION AND SEDIMENT CONTROL DETAILS
CS-04	19	CONSTRUCTION PHASING, M.O.T., AND EROSION CONTROL SITE ACCESS PLAN
CS-05, CS-06, CS-07	20, 21, 22	CONSTRUCTION PHASING AND EROSION CONTROL PLANS
EC-01, EC-02	23, 24	ENVIRONMENTAL COMPLIANCE PLAN
LS-01	25	LANDSCAPE PLAN
LS-02	26	LANDSCAPE DETAILS
LS-03	27	LANDSCAPE PLANT SCHEDULE

TOTAL SHEETS: 27

### APPROVED DESIGN EXCEPTIONS

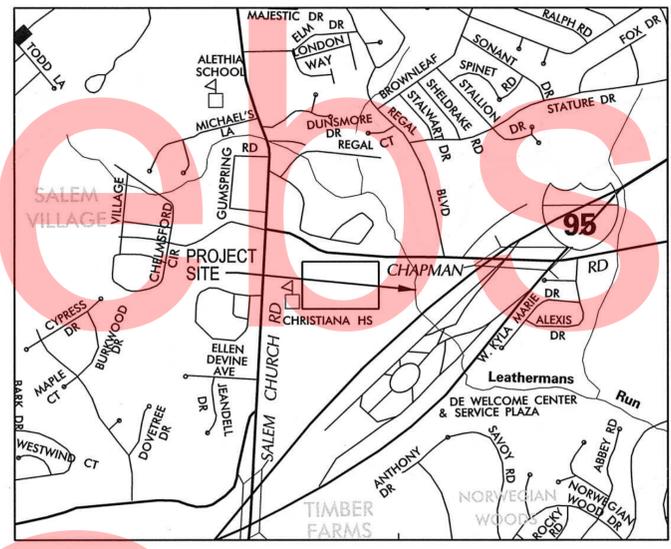
DESIGN PARAMETER	REQUIRED	PROVIDED	DATE
N/A			

### ADDENDA & REVISIONS

DESCRIPTION	NAME & DATE

### ASSOCIATED CONTRACTS

CONTRACT NO.	CONTRACT NAME



LOCATION MAP  
SCALE: 1"=1000'

### RECOMMENDED

*[Signature]* 6/18/15  
MAINTENANCE DESIGN ENGINEER DATE

*[Signature]* 6/18/15  
DISTRICT ENGINEER DATE

N/A N/A  
STORMWATER ENGINEER DATE

*[Signature]* 6/18/15  
ASSISTANT DIRECTOR STATEWIDE SUPPORT SERVICES DATE

*[Signature]* 6/18/15  
DIRECTOR MAINTENANCE AND OPERATIONS DATE

### RECOMMENDED AS TO PROCESS

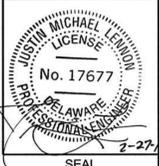
*[Signature]*  
CHIEF ENGINEER  
DATE 07/01/2015

### RECOMMENDED

*[Signature]*  
NPDES ENGINEER  
DATE 6-16-2015



PREPARED BY  
ENGINEERING CONSULTANT  
**PARSONS BRINCKERHOFF**  
100 S. CHARLES STREET  
TOWER 1, 10TH FLOOR  
BALTIMORE, MD 21201



*[Signature]*  
ENGINEER  
DATE 2-27-2015

FINAL PLAN

**EXISTING SYMBOLS**

DRAINAGE	
	DITCH OR STREAM CENTERLINE
	DRAINAGE INLET
	DRAINAGE JUNCTION BOX
	DRAINAGE MANHOLE
	DRAINAGE PIPE AND FLOW ARROW
	DRAINAGE PIPE HEADWALL
	RIPRAP - AREA FEATURE
	100-YEAR STORMWATER SURFACE ELEVATION

MANMADE ROADSIDE FEATURES	
	FENCE - CHAINLINK OR STRANDED
	FENCE - STOCKADE OR SPLIT RAIL
	FLAG POLE
	GUARDRAIL - STEEL BEAM
	PAVEMENT - FLEXIBLE
	PAVEMENT - RIGID
	TRAFFIC SIGN AND POST

NATURAL ROADSIDE FEATURES	
	TREE - DECIDUOUS
	DELINEATED WETLAND BOUNDARY LINE
	WOODS LINE BOUNDARY

SURVEY CONTROL & MONUMENTATION	
	SURVEY BENCHMARK LOCATION
	SURVEY TIE POINT LOCATION
	SURVEY TRAVERSE POINT
	POINT OF CURVATURE OR TANGENCY
	POINT OF INTERSECTING TANGENTS

RIGHT-OF-WAY SYMBOLS	
	EXISTING RIGHT-OF-WAY
	EXISTING PROPERTY LINE
	EXISTING EASEMENT
	EXISTING R/W & DENIAL OF ACCESS

UTILITY	
	SANITARY SEWER MANHOLE
	TRAFFIC - CONDUIT JUNCTION WELL
	TRAFFIC - SIGNAL CABINET & BASE
	TRAFFIC - SIGNAL POLE AND BASE
	UTILITY BOX
	UTILITY POLE
	WATER - FIRE HYDRANT
	WATER METER
	WATER VALVE
	UTILITY POLE GUY WIRE ANCHOR

UTILITY COMPANY FACILITIES	
	EXISTING DELMARVA AERIAL POWER LINES
	EXISTING DELMARVA POWER-ELECTRIC
	EXISTING DELMARVA POWER-GAS

OTHER	
	EXISTING CONTOURS

**PROPOSED SYMBOLS**

CONSTRUCTION	
	PROPOSED CONTOUR (MAJOR)
	PROPOSED CONTOUR (MINOR)
	BASELINE
	FURNISHED RIFFLE BED MATERIAL
	RIPRAP, R-6
	PROPOSED 8' CHAIN LINK FENCE
	TOP ROCKS
	DROP ROCKS
	CUTOFF ROCKS (TO BE BURIED)
	LIMIT OF CONSTRUCTION
	PIPE & DIRECTIONAL FLOW ARROW

LANDSCAPING	
	NATIVE SITE RESTORATION SEED MIX
	RIPARIAN BUFFER SEED MIX WITH TREE PLANTINGS
	RIPARIAN BUFFER SEED MIX
	WET MEADOW SEED MIX AND SHRUB PLANTINGS
	LANDSCAPING QUANTITIES/SPECIES

RIGHT-OF-WAY SYMBOLS	
	TEMPORARY CONSTRUCTION EASEMENT

EROSION & SEDIMENT CONTROL	
	DEWATERING BAG
	SANDBAG DIVERSION
	STABILIZED CONSTRUCTION ENTRANCE
	SILT FENCE
	SILT FENCE - REINFORCED
	MULCH ACCESS
	TIMBER MATS
	TREE PROTECTION FENCE
	CLEAR WATER PUMP
	DIRTY WATER PUMP

IDENTIFIERS	
	FENCE
	PIPE
	REMOVE BY CONTRACTOR
	RIPRAP
	OUTFALL

T:\173230A-DELDOT-STORMWATER-RETROFIT\2.2 - LEATHERMAN RUN DESIGN\CADD\XREFS\X-BORDERS\BD\_01.DGN

GENERAL NOTES

1. THIS PROJECT IS TO BE CONSTRUCTED IN ACCORDANCE WITH THE DELAWARE DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS", DATED AUGUST 2001 AND THE DELAWARE DEPARTMENT OF TRANSPORTATION "STANDARD CONSTRUCTION DETAILS", DATED 2001, INCLUDING ALL REVISIONS UP TO THE DATE OF ADVERTISEMENT.
2. THE CONTRACTOR SHALL GIVE TWO (2) WEEKS NOTICE TO THE PROPERTY OWNER WHEN ANY FIXTURE, SHRUB OR OTHER OBJECT MUST BE REMOVED FROM THE RIGHT OF WAY OR EASEMENT AREA. IF THE OWNER HAS NOT ATTEMPTED TO SALVAGE THIS PROPERTY, THE CONTRACTOR SHALL REMOVE IT WITHOUT OBLIGATION. COMPENSATION SHALL BE INCIDENTAL TO THE CONTRACT.
3. STAGING AREAS - PROPER EROSION AND SEDIMENT CONTROL MEASURES AS DETERMINED BY THE ENGINEER SHALL BE INSTALLED IN ALL STAGING AREAS. ALL AREAS USED BY THE CONTRACTOR FOR STAGING OPERATIONS SHALL BE FULLY RESTORED BY THE CONTRACTOR UPON COMPLETION OF THE CONTRACT. IF THE STAGING AREA IS PAVED, IT SHALL BE RESTORED TO ITS ORIGINAL CONDITION. IF THE AREA IS UNPAVED, IT SHALL BE RE-GRADED, TOPSOILED, SEEDED AND MULCHED IN ACCORDANCE WITH DELAWARE STANDARD SPECIFICATIONS 908 AND 735, FOR TOPSOIL, SEED AND MULCH TO THE SATISFACTION OF THE ENGINEER. THE SEED SHALL ADHERE TO THE SPECIFICATIONS OF SECTION 908 FOR PERMANENT GRASS SEEDING - DRY GROUND. ALL COSTS ASSOCIATED WITH RESTORATION OF THE STAGING AREA SHALL BE AT THE CONTRACTOR'S EXPENSE. IF THE ENGINEER DETERMINES THAT A SATISFACTORY STAND OF GRASS DOES NOT EXIST AT THE TIME OF FINAL INSPECTION, ALL COSTS ASSOCIATED WITH REESTABLISHING A SATISFACTORY STAND OF GRASS SHALL BE AT THE CONTRACTOR'S EXPENSE.
4. SITE REVIEWER - AN EROSION CONTROL SITE REVIEWER SHALL BE A PERSON FROM THE CONTRACTOR'S STAFF ASSIGNED TO EROSION AND SEDIMENT CONTROL IMPLEMENTATION AND MAINTENANCE AND SHALL BE REQUIRED ON SPECIFIC PROJECTS. THE NAME AND DNREC CERTIFICATION NUMBER OF EACH SITE REVIEWER SO REQUIRED SHALL BE SUBMITTED TO THE DEPARTMENT AT THE TIME OF BID. THE NAME OF THE DELAWARE REGISTERED PROFESSIONAL ENGINEER PROVIDING DIRECTION AND SUPERVISION OF THE SITE REVIEWER, AS REQUIRED IN SECTION 12.3 OF THE DELAWARE SEDIMENT AND STORMWATER REGULATIONS, SHALL ALSO BE SUBMITTED TO THE DEPARTMENT AT THE TIME OF BID. THE SITE REVIEWER REQUIREMENTS IN EFFECT ON THIS PROJECT SHALL BE MARKED WITH AN "X" BELOW:

EROSION POTENTIAL FOR THIS PROJECT	SITE REVIEWER REQUIREMENT
( ) INSIGNIFICANT	NONE
( ) MINOR	CONTRACTOR CERTIFICATION COURSE TRAINING ONLY, AS DEFINED IN SECTION 13 OF THE DELAWARE SEDIMENT AND STORMWATER REGULATIONS.
( X ) MEDIUM	AT THE TIME OF BID OF THE CONTRACT, EITHER THE SUPERINTENDENT OR A SEPARATE INDIVIDUAL FROM THE CONTRACTOR'S STAFF SHALL BE A CERTIFIED CONSTRUCTION REVIEWER (CCR), AS DEFINED IN SECTION 12 OF THE DELAWARE SEDIMENT AND STORMWATER REGULATIONS.
( ) MAJOR	SUPERINTENDENT AND AN INDIVIDUAL FROM CONTRACTOR'S STAFF SHALL BE CCR. ONE INDIVIDUAL FROM THE CONTRACTOR'S STAFF MUST BE A CCR AT THE TIME OF BID OF THE CONTRACT. THE SUPERINTENDENT MUST BECOME A CCR WITHIN ONE YEAR AFTER THE AWARD OF CONTRACT.

5. ELECTRONIC PROJECT FILES THAT WILL BE MADE AVAILABLE TO THE CONTRACTOR INCLUDE:

( )	NONE
( X )	ASCII DATA FILES WITH COORDINATES AND ELEVATIONS FOR PROPOSED POINTS AS SELECTED BY THE ENGINEER.
( )	RASTER FILES, IN .CAL FILE FORMAT, FOR ALL PLAN SHEETS.
( )	EXISTING DIGITAL TERRAIN MODEL, IN .DTM FILE FORMAT, COMPATIBLE WITH SOFTWARE CURRENTLY USED BY DELDOT.
( )	PROPOSED DIGITAL TERRAIN MODEL, IN .DTM FILE FORMAT, COMPATIBLE WITH SOFTWARE CURRENTLY USED BY DELDOT.
( )	DESIGN FILE, IN .DGN FILE FORMAT, CONTAINING ONLY THE PROPOSED 3D TRIANGLES OF THE PROPOSED DIGITAL TERRAIN MODEL (DTM).

NOTE: THE DOCUMENT ENTITLED "RELEASE FOR DELIVERY OF DOCUMENTS IN ELECTRONIC FORM TO A CONTRACTOR" MUST BE SIGNED BY ALL PARTIES PRIOR TO THE DELIVERY OF ANY ELECTRONIC PROJECT FILES.

6. AMERICAN TRAFFIC SAFETY SERVICES ASSOCIATION (ATSSA) CERTIFIED TRAFFIC CONTROL SUPERVISOR REQUIREMENT FOR THIS PROJECT.

( X )	THE CONTRACTOR SHALL NOT BE REQUIRED TO HAVE AN ATSSA SUPERVISOR ASSIGNED TO THIS PROJECT.
( )	THE CONTRACTOR SHALL HAVE AN ATSSA SUPERVISOR ASSIGNED TO THIS PROJECT. THE CONTRACTOR'S GENERAL SUPERINTENDENT FOR THIS PROJECT OR ANOTHER ATSSA CERTIFIED MEMBER OF THE CONTRACTOR'S PROJECT STAFF MAY BE THE ATSSA SUPERVISOR.
( )	THE CONTRACTOR SHALL HAVE AN ATSSA SUPERVISOR ASSIGNED TO THIS PROJECT. THE ATSSA SUPERVISOR'S SOLE JOB SHALL BE SUPERVISION OF THE INSTALLATION, OPERATION AND MAINTENANCE OF TRAFFIC CONTROL DEVICES FOR THIS PROJECT. THE CONTRACTOR'S GENERAL SUPERINTENDENT FOR THIS PROJECT SHALL NOT BE THE ATSSA SUPERVISOR.

7. THE DISTURBED AREA FOR THIS PROJECT IS 1.7 ACRES.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADHERING TO THE CONSTRUCTION SITE POLLUTION PREVENTION SPECIFICATIONS AS DETAILED IN SECTION 3.6 OF THE "DELAWARE EROSION AND SEDIMENT CONTROL HANDBOOK". ALL COSTS ASSOCIATED WITH ADHERING TO THE STANDARDS SHALL BE INCIDENTAL TO THE OVERALL CONTRACT COSTS.
9. THE EROSION AND SEDIMENT CONTROL PLANS HAVE BEEN APPROVED BY DELDOT'S STORMWATER ENGINEER UNDER DELDOT'S DELEGATED AUTHORITY. THE EROSION AND SEDIMENT CONTROL PLANS ARE VALID FOR A THREE YEAR PERIOD, BEGINNING ON THE DATE THE STORMWATER ENGINEER SIGNED THE CONSTRUCTION TITLE SHEET. IF THE FINAL ACCEPTANCE OF THE PROJECT IS ANTICIPATED TO EXTEND BEYOND THE THREE YEARS, THE CONTRACTOR SHALL INFORM THE ENGINEER THREE MONTHS PRIOR TO THE EXPIRATION OF THE EROSION AND SEDIMENT CONTROL PLAN APPROVAL. DELDOT WILL REVIEW THE CURRENT EROSION AND SEDIMENT CONTROL PLAN AND ISSUE AN EXTENSION WITH ANY APPROPRIATE MODIFICATIONS.

PROJECT NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL INFORMATION SHOWN ON THESE PLANS INCLUDING ALL EXISTING IMPROVEMENTS AND ELEVATIONS AND SHALL PROVIDE THE ENGINEER A COPY OF THE VERIFICATION PRIOR TO THE COMMENCEMENT OF ANY SITE ACTIVITY. IF EXISTING CONDITIONS AND/OR ELEVATIONS DIFFER FROM THIS PLAN, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING PRIOR TO COMMENCING WORK.
2. CONSTRUCTION OF THE PROPOSED 16" DIP SEWERLINE FROM MH 289-302 TO MH 289-305 AND THE PROPOSED 8" DIP SEWERLINE FROM PROPOSED MH TO MH 289-305 SHALL BE PURSUANT TO NEW CASTLE COUNTY SEWERLINE CONSTRUCTION PLANS. WORK ASSOCIATED WITH SEWERLINE REPLACEMENT SHALL FOLLOW THE TERMS AND CONDITIONS OF THE NWP #3 ISSUED FOR THE SEWERLINE CONSTRUCTION PLANS. ALL WORK ITEMS RELATED TO SEWERLINE CONSTRUCTION SHALL BE COMPENSATED UNDER TERMS OF THE SEWER LINE CONSTRUCTION PLANS.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACEMENT OF DAMAGED OR DESTROYED LANDSCAPE THAT IS DESIGNATED TO REMAIN.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL INSTALLED PIPING UNTIL COMPLETION OF CONSTRUCTION. ADEQUATE TEMPORARY COVER SHALL BE PLACED TO PROTECT PIPES WITH SHALLOW COVER FROM DAMAGE.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SITE PERSONNEL AND TRAFFIC SAFETY AT ALL TIMES AND FOR PERFORMING ALL CONSTRUCTION ACTIVITIES IN COMPLIANCE WITH THE CURRENT OCCUPATIONAL SAFETY AND HEALTH ACT AND ALL RULES AND REGULATIONS THERETO.
6. ANY DAMAGE TO ITEMS NOTED TO BE RELOCATED OR RESET BY THE CONTRACTOR, AT THE DISCRETION OF THE ENGINEER, SHALL BE REPAIRED AND/OR REPLACED IN KIND AT THE CONTRACTOR'S EXPENSE.
7. THE PROJECT SITE SHALL BE ACCESSED FROM CHAPMAN ROAD.
8. UNLESS OTHERWISE NOTED ON THE PLANS, THE CONTRACTOR SHALL, AS PART OF HIS PROJECT SCHEDULE, SUBMIT TO THE ENGINEER AN ESTIMATE OF THE MONTHLY PAYMENTS EXPECTED TO BE RECEIVED ON THE CONTRACT. THIS WILL BE REFERENCED AS THE "MONTHLY PAYMENT CHART".

A CHART IN MICROSOFT EXCEL, MICROSOFT WORD, OR HAND WRITTEN FORMAT WILL BE ACCEPTABLE FOR THIS PURPOSE. THE CHART SHOULD INCLUDE, AS A MINIMUM, COLUMNS FOR THE MONTH, YEAR AND ESTIMATED MONTHLY PAYMENTS. THE TOTAL OF ALL ESTIMATED MONTHLY PAYMENTS SHOULD EQUAL THE AWARDED CONTRACT TOTAL BID PRICE.

THE ENGINEER MAY REQUEST AN UPDATED "MONTHLY PAYMENT CHART" AT HIS DISCRETION, DEPENDING ON THE ACCURACY OF THE INITIAL ESTIMATES AND ACCORDING TO THE OVERALL NEEDS OF THE DEPARTMENT.

THE "MONTHLY PAYMENT CHART" WILL NOT BE CONSIDERED A BINDING DOCUMENT BY EITHER THE CONTRACTOR OR THE DEPARTMENT AND IS CONSIDERED SOLELY INFORMATIONAL.

ON PROJECTS REQUIRING CPM SCHEDULES, THE CONTRACTOR MAY, BUT IS NOT REQUIRED TO, "COST LOAD" THE CPM SCHEDULE IN ORDER TO GENERATE THE MONTHLY SPEND PAYMENT CHART.

COSTS TO PREPARE AND/OR UPDATE THE "MONTHLY PAYMENT CHART" ARE ADDRESSED AS FOLLOWS:

- A. ON CONTRACTS REQUIRING CPM SCHEDULES AND UPDATES, PREPARATION OF THE INITIAL CHART SHALL BE INCIDENTAL TO ITEM 763508. UPDATES SHALL BE INCIDENTAL TO ITEM 763509.
- B. ON CONTRACTS NOT REQUIRING CPM SCHEDULES, THE COST TO PREPARE AND UPDATE THE "MONTHLY PAYMENT CHART" SHALL BE INCLUDED IN ITEM 763000 - INITIAL EXPENSE.

CONTRACTOR SCHEDULE SHALL INCLUDE CONSTRUCTION PHASING AND PLANTING AND SEEDING PHASING WHICH SHOULD OCCUR DURING THE FOLLOWING: PERMANENT SEEDING IS TO OCCUR BETWEEN MARCH 1<sup>ST</sup> TO MAY 1<sup>ST</sup> AND SEPTEMBER 1<sup>ST</sup> TO OCTOBER 31<sup>ST</sup>. TREE AND SHRUB PLANTINGS ARE TO OCCUR BETWEEN MARCH 1<sup>ST</sup> TO MAY 15<sup>TH</sup> AND SEPTEMBER 1<sup>ST</sup> TO NOVEMBER 30<sup>TH</sup>. LIVE STEM STAKING IS TO OCCUR BETWEEN NOVEMBER 15<sup>TH</sup> TO FEBRUARY 15<sup>TH</sup>.

9. THE ENGINEER MAY REQUIRE THE CONTRACTOR TO EXCAVATE TEST PITS ALONG PROPOSED DRAINAGE AND PIPE RUNS, AT POINTS OF POSSIBLE UTILITY CONFLICTS, TO DETERMINE IF A CONFLICT EXISTS. ANY CONFLICTS SHALL BE COORDINATED BY THE CONTRACTOR, WITH THE ENGINEER AND THE UTILITY COMPANY INVOLVED. THE ENGINEER SHALL ULTIMATELY DETERMINE THE SOLUTION TO THE UTILITY CONFLICT. TEST HOLES SHALL BE MEASURED AND PAID FOR IN ACCORDANCE WITH ITEM 208000 - EXCAVATION AND BACKFILL FOR PIPE TRENCHES, BUT ONLY TO THE ACTUAL DEPTH EXCAVATED.
10. THIS PROJECT IS COVERED UNDER AN NPDES GENERAL PERMIT FOR CONSTRUCTION. UNDER THE GENERAL PERMIT, COMPLIANCE WITH DELDOT'S APPROVED EROSION AND SEDIMENT CONTROL PLANS WILL CONSTITUTE COMPLIANCE WITH THE NPDES INDUSTRIAL PERMITTING REQUIREMENTS FOR THIS CONSTRUCTION PROJECT. A COPY OF THE NPDES GENERAL PERMIT AND NOI IS KEPT ON FILE IN EACH OF THE CONSTRUCTION OFFICES AND THE DEPARTMENT'S TEAM SUPPORT SECTION. A COPY OF THE GENERAL PERMIT OR THE NOI CAN BE OBTAINED UPON REQUEST FROM EITHER THE DEPARTMENT'S STORMWATER ENGINEER OR THE APPROPRIATE CONSTRUCTION ENGINEER.

EROSION AND SEDIMENT CONTROL NOTES

1. SEE EROSION AND SEDIMENT CONTROL PLANS FOR NOTES AND DETAILS ASSOCIATED WITH TITLE PROJECT.

ENVIRONMENTAL COMPLIANCE

1. SEE ENVIRONMENTAL COMPLIANCE PLAN FOR FURTHER RESTRICTIONS/GUIDANCE ASSOCIATED WITH THIS PROJECT.

PERMITTING FOR UTILITIES

1. AS OUTLINED IN CHAPTER 3 OF THE DELDOT UTILITIES MANUAL, THE INDIVIDUAL UTILITY COMPANIES ARE RESPONSIBLE FOR OBTAINING ALL REQUIRED PERMITS FROM MUNICIPAL, STATE AND FEDERAL GOVERNMENT AGENCIES AND RAILROADS. THIS INCLUDES BUT IS NOT LIMITED TO WATER QUALITY PERMIT/DNREC WATER QUALITY CERTIFICATION, DNREC SUBAQUEOUS LANDS/WETLANDS PERMITS, DNREC COASTAL ZONE CONSISTENCY CERTIFICATION, COUNTY FLOODPLAIN PERMITS (NEW CASTLE COUNTY ONLY), U.S. COAST GUARD PERMITS, U.S. ARMY CORPS 404 PERMITS, SEDIMENT AND EROSION PERMITS, AND RAILROAD CROSSING PERMITS. THE ENVIRONMENTAL PERMITS CITED ON THE EC SHEETS(S) DO NOT AUTHORIZE ANY PART OF THE UTILITY WORK ASSOCIATED WITH THIS PROJECT, TO INCLUDE THE REPLACEMENT OF THE SEWER LINE.

T:\173230A- DELDOT STORMWATER RETROFIT\2.2 - LEATHERMAN RUN DESIGN\CADD\XREFS\X\_BORDERS\BD\_01.DGN

 <b>DELAWARE DEPARTMENT OF TRANSPORTATION</b>	ADDENDUMS / REVISIONS		<b>LEATHERMANS RUN RESTORATION AT CHRISTIANA HIGH SCHOOL</b>	CONTRACT	<b>PN-01</b>	<b>PROJECT NOTES</b>	SHEET NO.
				T201380204			DESIGNED BY: JML
				COUNTY	CHECKED BY: RPP		TOTAL SHTS.
				NEW CASTLE			27

T:\173230A-DELDOT-STORMWATER-RETROFIT\2.2 - LEATHERMAN RUN DESIGN\CADD\REFS\X-BORDERS.VBD 00.DGN



CHAPMAN ROAD

N 607000

E 579600

E 579600

N 606250

N 606250

E 579600

INTERSTATE 95 (SOUTH BOUND)

Unofficial

Website

Copy

CHRISTIANA HIGH SCHOOL  
TRACK & ATHLETIC FIELD

BASELINE CONSTRUCTION			
STATION	NORTHING	EASTING	BEARING
POB STA. 10+00.00	606954.04	579037.71	
PI STA. 10+06.35	606947.69	579038.01	S 2°45'38" E
PC STA. 10+55.31	606901.90	579055.34	S 20°43'44" E
PI STA. 10+77.92	606880.50	579062.62	--
PRC STA. 10+99.61	606865.07	579079.14	--
PT STA. 11+35.56	606838.20	579103.02	--
PT STA. 11+70.55	606804.14	579114.54	--
STA. 12+50.00	606728.50	579138.85	S 17°48'54" E
PC STA. 13+17.52	606664.21	579159.51	S 17°48'54" E
PI STA. 13+30.87	606652.11	579165.12	--
PRC STA. 13+43.43	606638.93	579163.02	--
PI STA. 13+59.19	606623.22	579161.75	--
PT STA. 13+73.99	606609.56	579169.61	--
PC STA. 14+16.51	606572.30	579190.10	S 28°48'16" E
PI STA. 14+52.01	606539.60	579203.93	--
PT STA. 14+83.86	606506.65	579190.70	--
PC STA. 14+94.47	606496.67	579187.12	S 19°44'30" W
PI STA. 15+09.56	606482.12	579183.11	--
PRC STA. 15+24.29	606467.12	579184.81	--
PI STA. 15+40.25	606451.60	579188.51	--
PT STA. 15+54.50	606438.10	579179.99	--
PC STA. 15+74.81	606420.65	579169.59	S 30°46'30" W
PI STA. 15+84.69	606412.40	579164.17	--
PCC STA. 15+94.45	606403.02	579161.08	--
PI STA. 16+25.43	606374.26	579149.55	--
PT STA. 16+55.46	606343.32	579151.01	--

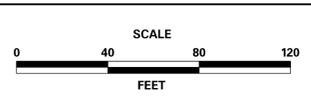
CURVE DATA BASELINE CONSTRUCTION						
CURVE	DELTA	DEGREE	RADIUS	TANGENT	LENGTH	EXTERNAL
C-1	28°09'54"	63°35'25"	90.10	22.60	44.29	2.79
C-2	22°55'55"	32°19'22"	177.26	35.95	70.95	3.61
C-3	33°54'25"	130°52'23"	43.78	13.35	25.91	1.99
C-4	34°33'54"	113°07'18"	50.65	15.76	30.56	2.39
C-5	44°48'27"	66°31'36"	86.12	35.50	67.35	7.03
C-6	21°53'32"	73°25'18"	78.04	15.09	29.82	1.45
C-7	45°41'33"	151°13'50"	37.89	15.96	30.21	3.23
C-8	15°01'54"	76°33'39"	74.84	9.87	19.63	0.65
C-9	24°32'44"	40°13'54"	142.41	30.98	61.01	3.33

SURVEY CONTROL POINTS			
TRAVERSE POINT	ELEVATION	NORTHING	EASTING
TP 21	49.09	606976.21	579072.80
TP 22	46.35	606721.18	579069.74

DATUM REFERENCE:  
 HORIZONTAL - THIS PROJECT IS REFERENCED TO THE DELAWARE STATE PLANE COORDINATE SYSTEM (NAD 83/91).  
 VERTICAL - THIS PROJECT IS REFERENCED TO NAVD 88/2009 AND BASED ON THE FOLLOWING STATE OF DELAWARE BENCHMARKS ESTABLISHED BY THE DELAWARE DEPARTMENT OF TRANSPORTATION:  
 GPS \*CHA1, ELEVATION 73.74'  
 GPS \*CHA2, ELEVATION 73.95'



ADDENDUMS / REVISIONS



**LEATHERMANS RUN  
RESTORATION AT  
CHRISTIANA HIGH SCHOOL**

CONTRACT T201380204	<b>HV-01</b>
COUNTY NEW CASTLE	
DESIGNED BY: JML	CHECKED BY: RPP

**HORIZONTAL AND  
VERTICAL CONTROL**

SHEET NO. 4
TOTAL SHTS. 27

FURNISHED RIFFLE BED MATERIAL OVER HEAVY BACKFILL <sup>4</sup>										TOTAL CU YD	49	
RIFFLE #	STA	OFFSET	STA	ELEV	OFFSET	STA	ELEV	OFFSET	STA	OFFSET	LENGTH	CU YD
1	N/A <sup>5</sup>	N/A <sup>5</sup>	10+50	38.4	9' LT/RT	10+74	38.4	9' LT/RT	N/A <sup>5</sup>	N/A <sup>5</sup>	24.6	3
2	11+05	4.5' LT / 6' RT	11+16	38.3	9' LT/RT	11+46	38.0	9' LT/RT	11+48.8	6' LT/RT	11+48.8	18
3	11+61	6' LT/RT	11+73	38.1	9' LT/RT	12+03	37.8	9' LT/RT	12+03.7	6' LT/RT	12+03.7	20
4	12+15	6' LT/RT	12+21	37.9	9' LT/RT	12+29	37.5	9' LT/RT			14.3	8

SALVAGED CHANNEL BED SAND & GRAVEL (REFER TO PROFILES FOR LOCATIONS)				TOTAL CU YD	7
BEGIN STA	END STA	LENGTH	CU YD		
11+49	11+61	12	4		
12+04	12+15	11	3		

REMOVAL OF FENCE		218.4 LF
STA	OFFSET	
10+00	30.3 LT	
10+42	36.6 LT	
12+29	10.4 LT	

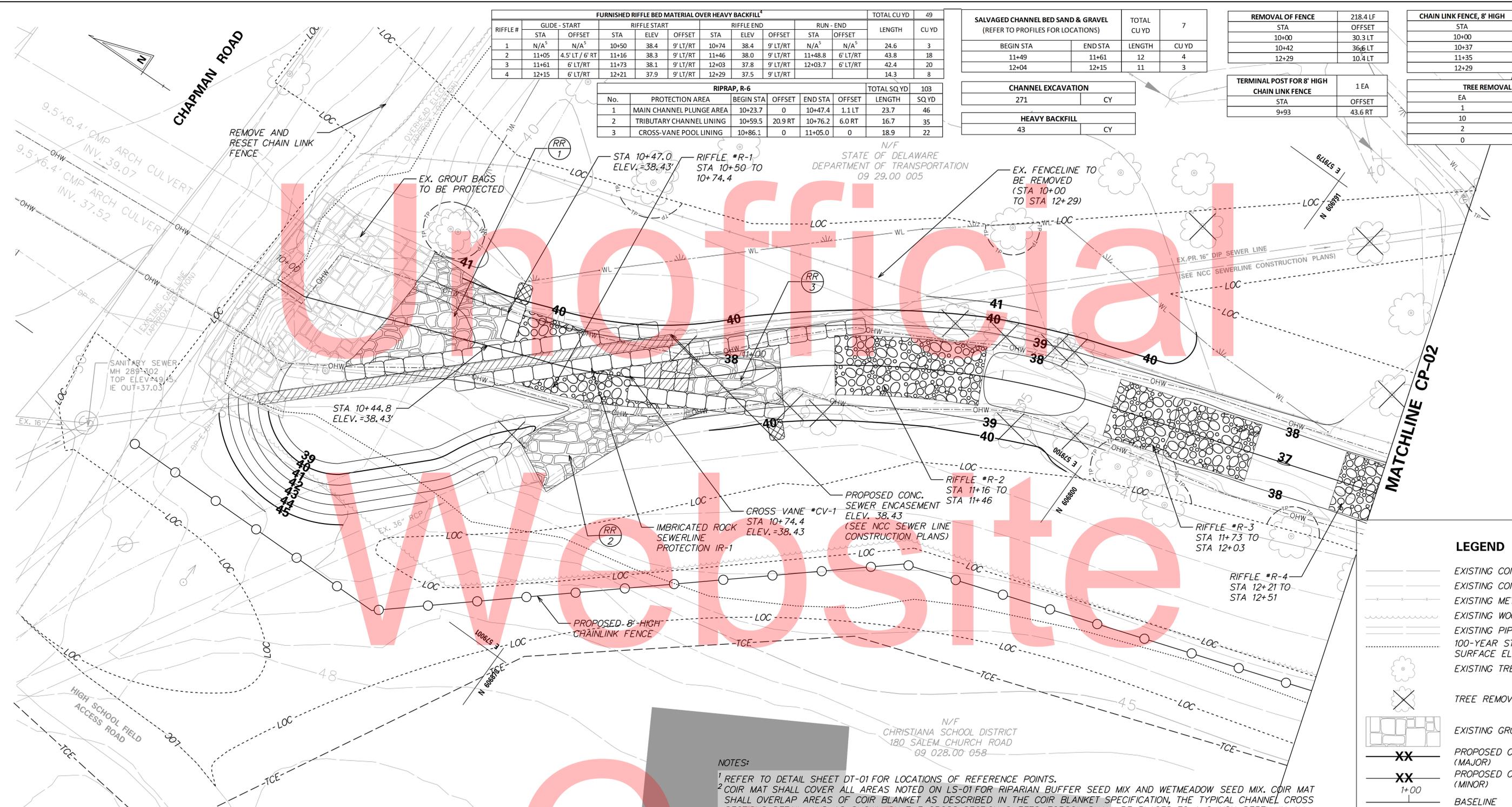
CHAIN LINK FENCE, 8' HIGH		254.1 LF
STA	OFFSET	
10+00	44.2 RT	
10+37	57.7 RT	
11+35	39.8 RT	
12+29	42.0 RT	

RIPRAP, R-6							TOTAL SQ YD	103
No.	PROTECTION AREA	BEGIN STA	OFFSET	END STA	OFFSET	LENGTH	SQ YD	
1	MAIN CHANNEL PLUNGE AREA	10+23.7	0	10+47.4	1.1 LT	23.7	46	
2	TRIBUTARY CHANNEL LINING	10+59.5	20.9 RT	10+76.2	6.0 RT	16.7	35	
3	CROSS-VANE POOL LINING	10+86.1	0	11+05.0	0	18.9	22	

CHANNEL EXCAVATION		271	CY
HEAVY BACKFILL		43	CY

TERMINAL POST FOR 8' HIGH CHAIN LINK FENCE		1 EA
STA	OFFSET	
9+93	43.6 RT	

TREE REMOVAL		EA	SIZE RANGE
1	11" TO 14.9"		
10	15" TO 18.9"		
2	19" TO 24.9"		
0	25" TO 30.9"		



IMBRICATED ROCK STRUCTURES - CROSS VANE															
STR #	REFERENCE STATION	PT A <sup>1</sup>		PT B <sup>1</sup>		PT C <sup>1</sup>		PT D <sup>1</sup>		VANE ARM ANGLE (DEGREES)					
		STA	OFFSET	ELEV	STA	OFFSET	ELEV	STA	OFFSET	ELEV	X	Y			
CV-1	10+00	10+74.4	.24 LT	38.43	10+74.3	4.50 RT	38.43	10+74.1	4.96 LT	38.43	11+04.6	10.34 RT	39.13	97.7	97.7
		11+06.5	7.49 LT	39.13	11+21.6	9.41 LT	39.13	10+80.4	38.13	10+83.4	37.83	10+86.1	37.53		

IMBRICATED ROCK STRUCTURES - IMBRICATED ROCK SEWERLINE PROTECTION													
STR #	REFERENCE STATION	PT AA <sup>1</sup>		PT BB <sup>1</sup>		PT CC <sup>1</sup>		PT DD <sup>1</sup>		PT EE <sup>1</sup> - SILL ARM		PT FF <sup>1</sup> - SILL ARM	
		STA	OFFSET	ELEV	STA	OFFSET	ELEV	STA	OFFSET	ELEV	STA	OFFSET	ELEV
IR-1 W/ SILL ARM	10+00	10+18.1	11.61 RT	38.43	10+79.4	11.31 LT	38.43	10+40.0	7.94 RT	38.43			
		10+73.7	4.89 LT	38.43	10+40.0	7.94 RT	38.43	10+73.7	4.89 LT	38.43			

COIR MAT <sup>2</sup>		1,264	SY
COIR BLANKET <sup>3</sup>		337	LF

**NOTES:**

- REFER TO DETAIL SHEET DT-01 FOR LOCATIONS OF REFERENCE POINTS.
- COIR MAT SHALL COVER ALL AREAS NOTED ON LS-01 FOR RIPARIAN BUFFER SEED MIX AND WETMEADOW SEED MIX. COIR MAT SHALL OVERLAP AREAS OF COIR BLANKET AS DESCRIBED IN THE COIR BLANKET SPECIFICATION, THE TYPICAL CHANNEL CROSS SECTIONS DETAIL, AND AS SHOWN ON THE CROSS-SECTION SHEETS. TOPSOIL SHALL BE PLACED TO A 2-INCH DEPTH IN ALL AREAS OF COIR MAT AND NATIVE SITE RESTORATION SEED MIX AS NOTED ON SHEET LS-01.
- COIR BLANKET SHALL BE PLACED AND WRAPPED ALONG THE LOWER STREAMBANK AS DESCRIBED IN THE COIR BLANKET SPECIFICATION, THE TYPICAL CHANNEL CROSS SECTIONS DETAIL, AND AS SHOWN ON THE CROSS-SECTION SHEETS. COIR BLANKET SHALL BE INSTALLED ALONG THE LEFT TOE OF SLOPE OFFSET FROM STATION 10+45 TO STATION 16+55 AND ALONG THE RIGHT TOE OF SLOPE OFFSET FROM STATION 10+00 TO STATION 10+66, STATION 10+85 TO STATION 13+36, AND STATION 13+56 TO STATION 16+55. THE COIR BLANKET AND COIR MAT SHALL BE INSTALLED WITH A 2-FOOT KEY-IN BELOW THE TOE OF SLOPE (1-FOOT MINIMUM IN POOL AREAS).
- AREAS OF FURNISHED RIFFLE BED MATERIAL AS DEPICTED ON THE CONSTRUCTION PLAN SHEETS (CP-01 - 03) SHOW ONLY THE VISIBLE FINISHED SURFACE OF THE IN-CHANNEL RIFFLE AREAS. ADDITIONAL AREAS OF FURNISHED RIFFLE BED MATERIAL TO BE PLACED IN THE RUN AND GLIDE AREAS OF THE STREAM ARE SHOWN ON THE PROFILE SHEETS (PF-01 - 03) AND AREAS OF A 3-FOOT EXTENSION OF THE FURNISHED RIFFLE BED MATERIALS BEYOND THE FINISHED TOE OF SLOPE ARE SHOWN ON THE CROSS-SECTION SHEETS (XS-01 - 02).
- AREAS ARE NOTED WITH A N/A FOR RUN AND GLIDE PORTIONS OF THE FURNISHED RIFFLE BED AREAS ARE NOT PRESENT DUE TO PLACEMENT OF AN IMBRICATED ROCK STRUCTURE.
- DETAILS, MEASUREMENT, AND PAYMENT FOR ALL WORK ASSOCIATED WITH THE 16" AND 8" DIP SEWER LINE, INCLUDING PIPE REPLACEMENT, CONCRETE ENCASEMENT, AND EXCAVATION FOR UTILITY WORK SHALL BE PERFORMED ACCORDING WITH NEW CASTLE COUNTY SEWER LINE CONSTRUCTION PLANS.

**LEGEND**

- EXISTING CONTOUR (MAJOR)
- EXISTING CONTOUR (MINOR)
- EXISTING METAL FENCE
- EXISTING WOODS LINE
- EXISTING PIPES
- 100-YEAR STORMWATER SURFACE ELEVATION
- EXISTING TREE
- TREE REMOVAL
- EXISTING GROUT BAGS
- PROPOSED CONTOUR (MAJOR)
- PROPOSED CONTOUR (MINOR)
- BASELINE
- FURNISHED RIFFLE BED MATERIAL
- RIPRAP, R-6
- PROPOSED 8' CHAIN LINK FENCE
- IMBRICATED ROCK STRUCTURES (INCLUDING CROSS-VANE, ROCK SILL, AND SEWERLINE PROTECTION)
- TOP ROCKS
- DROP ROCKS
- CUTOFF ROCKS (TO BE BURIED)

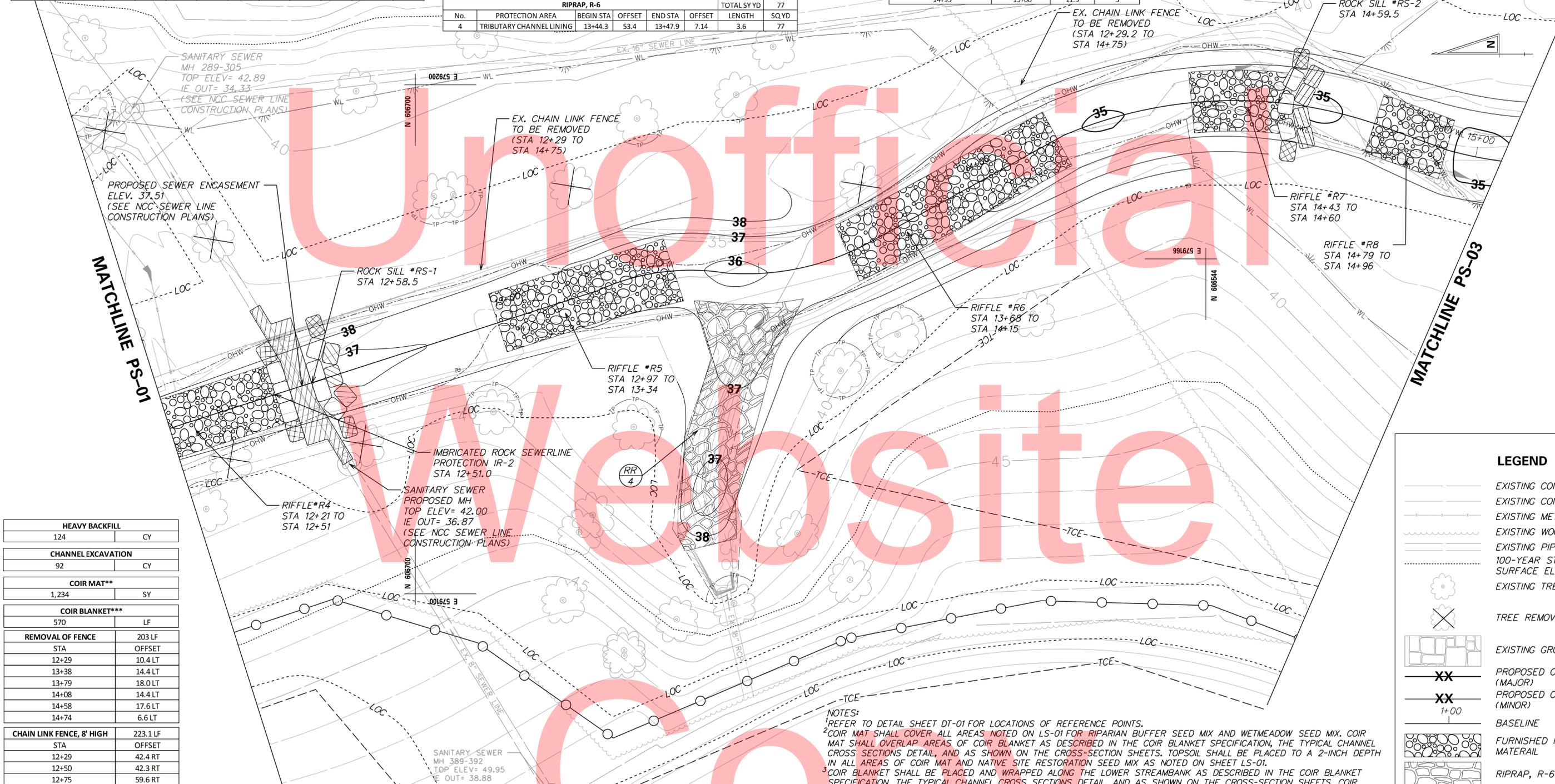
T:\173230A-DELDOT STORMWATER RETROFIT\2.2 - LEATHERMAN RUN DESIGN\CADD\XREFS\X-BORDERS.BD 00.DGN

FURNISHED RIFFLE BED MATERIAL OVER HEAVY BACKFILL <sup>1</sup>										TOTAL CU YD	92	
RIFFLE #	GLIDE - START		RIFFLE START			RIFFLE END			RUN - END		LENGTH	CU YD
	STA	OFFSET	STA	ELEV	OFFSET	STA	ELEV	OFFSET	STA	OFFSET		
4			12+29	37.9	9' LT/RT	12+51	37.5	9' LT/RT	N/A <sup>5</sup>	N/A <sup>5</sup>	22.0	10
5	12+73	6' LT/RT	12+97	37.3	9' LT/RT	13+34	36.6	9' LT/RT	13+40	6' LT/RT	67.0	26
6	13+51	6' LT/RT	13+68	36.6	9' LT/RT	14+15	35.6	9' LT/RT	14+19	6' LT/RT	68.0	29
7	14+30	6' LT/RT	14+43	35.7	9' LT/RT	14+60	34.5	9' LT/RT	N/A <sup>5</sup>	N/A <sup>5</sup>	30.0	13
8	14+71	6' LT/RT	14+79	35.4	9' LT/RT	14+96	35.1	9' LT/RT	14+95	6' LT/RT	25.0	14

CONCRETE SEWER LINE ENCASEMENT <sup>6</sup>									
REFERENCE STATION	PT U			PT V			PT W		
	STA	OFFSET	ELEV	STA	OFFSET	ELEV	STA	OFFSET	ELEV
10+00	12+52.2	13.4	37.51	12+54.0	5.8	37.51	12+54.0	11.5	37.51
	PT X			PT Y			PT Z		
	12+58.5	13.4	37.51	12+58.5	3.5	37.51	12+60.4	11.5	37.51

SALVAGED CHANNEL BED SAND & GRAVEL (REFER TO PROFILES FOR LOCATIONS)				TOTAL CU YD	14
BEGIN STA	END STA	LENGTH	CU YD		
12+65	12+73	8.4	2		
13+40	13+51	11.3	3		
14+19	14+30	11.4	3		
14+66	14+71	5.6	2		
14+95	15+06	11.5	3		

RIPRAP, R-6						TOTAL SY YD	77
No.	PROTECTION AREA	BEGIN STA	OFFSET	END STA	OFFSET	LENGTH	SQ YD
4	TRIBUTARY CHANNEL LINING	13+44.3	53.4	13+47.9	7.14	3.6	77



<b>HEAVY BACKFILL</b>	
124	CY
<b>CHANNEL EXCAVATION</b>	
92	CY
<b>COIR MAT**</b>	
1,234	SY
<b>COIR BLANKET***</b>	
570	LF
<b>REMOVAL OF FENCE</b>	
203	LF
STA	OFFSET
12+29	10.4 LT
13+38	14.4 LT
13+79	18.0 LT
14+08	14.4 LT
14+58	17.6 LT
14+74	6.6 LT
<b>CHAIN LINK FENCE, 8' HIGH</b>	
223.1	LF
STA	OFFSET
12+29	42.4 RT
12+50	42.3 RT
12+75	59.6 RT
12+93	83.5 RT
13+56	73.3 RT
13+71	78 RT
13+96	94.2 RT
14+09	108.4 RT
<b>TREE REMOVAL</b>	
EA	SIZE RANGE
1	11" TO 14.9"
4	15" TO 18.9"
1	19" TO 24.9"
0	25" TO 30.9"

IMBRICATED ROCK STRUCTURES - IMBRICATED ROCK SEWERLINE PROTECTION							
STR #	REFERENCE STATION	PT AA <sup>1</sup>			PT BB <sup>1</sup>		
		STA	OFFSET	ELEV	STA	OFFSET	ELEV
IR-2	10+00	12+51.0	9.9	37.51	1250.1	9.6	37.51
		PT CC <sup>1</sup>			PT DD <sup>1</sup>		
		N/A	N/A	N/A	N/A	N/A	N/A

IMBRICATED ROCK STRUCTURES - ROCK SILL											
STR #	Sill Type	REFERENCE STATION	PT A <sup>1</sup>			PT B <sup>1</sup>			PT C <sup>1</sup>		
			STA	OFFSET	ELEV	STA	OFFSET	ELEV	STA	OFFSET	ELEV
RS-1	TYPE 1	12+29.2	12+58.5	0	37.51	13+11.3	8.4	37.71	13+11.3	8.5	37.71
RS-2	TYPE 2	12+29.2	14+59.5	0	35.50	14+61.3	7.2	35.70	14+61.6	7.1	35.70

**NOTES:**  
 1. REFER TO DETAIL SHEET DT-01 FOR LOCATIONS OF REFERENCE POINTS.  
 2. COIR MAT SHALL COVER ALL AREAS NOTED ON LS-01 FOR RIPARIAN BUFFER SEED MIX AND WETMEADOW SEED MIX. COIR MAT SHALL OVERLAP AREAS OF COIR BLANKET AS DESCRIBED IN THE COIR BLANKET SPECIFICATION, THE TYPICAL CHANNEL CROSS SECTIONS DETAIL, AND AS SHOWN ON THE CROSS-SECTION SHEETS. TOPSOIL SHALL BE PLACED TO A 2-INCH DEPTH IN ALL AREAS OF COIR MAT AND NATIVE SITE RESTORATION SEED MIX AS NOTED ON SHEET LS-01.  
 3. COIR BLANKET SHALL BE PLACED AND WRAPPED ALONG THE LOWER STREAMBANK AS DESCRIBED IN THE COIR BLANKET SPECIFICATION, THE TYPICAL CHANNEL CROSS SECTIONS DETAIL, AND AS SHOWN ON THE CROSS-SECTION SHEETS. COIR BLANKET SHALL BE INSTALLED ALONG THE LEFT TOE OF SLOPE OFFSET FROM STATION 10+45 TO STATION 16+55 AND ALONG THE RIGHT TOE OF SLOPE OFFSET FROM STATION 10+00 TO STATION 10+66, STATION 10+85 TO STATION 13+36, AND STATION 13+56 TO STATION 16+55. THE COIR BLANKET AND COIR MAT SHALL BE INSTALLED WITH A 2-FOOT KEY-IN BELOW THE TOE OF SLOPE (1-FOOT MINIMUM IN POOL AREAS).  
 4. AREAS OF FURNISHED RIFFLE BED MATERIAL AS DEPICTED ON THE CONSTRUCTION PLAN SHEETS (CP-01 - 03) SHOW ONLY THE VISIBLE FINISHED SURFACE OF THE IN-CHANNEL RIFFLE AREAS. ADDITIONAL AREAS OF FURNISHED RIFFLE BED MATERIAL TO BE PLACED IN THE RUN AND GLIDE AREAS OF THE STREAM ARE SHOWN ON THE PROFILE SHEETS (PF-01 - 03) AND AREAS OF A 3-FOOT EXTENSION OF THE FURNISHED RIFFLE BED MATERIALS BEYOND THE FINISHED TOE OF SLOPE ARE SHOWN ON THE CROSS-SECTION SHEETS (XS-01 - 02).  
 5. AREAS ARE NOTED WITH A N/A FOR RUN AND GLIDE PORTIONS OF THE FURNISHED RIFFLE BED AREAS NOT PRESENT DUE TO PLACEMENT OF AN IMBRICATED ROCK STRUCTURES.  
 6. DETAILS, MEASUREMENT, AND PAYMENT FOR ALL WORK ASSOCIATED WITH THE 16" AND 8" DIP SEWERLINE, INCLUDING PIPE REPLACEMENT, CONCRETE ENCASEMENT, AND EXCAVATION FOR UTILITY WORK SHALL BE PERFORMED ACCORDING WITH NEW CASTLE COUNTY SEWER LINE CONSTRUCTION PLANS.

**LEGEND**

- EXISTING CONTOUR (MAJOR)
- EXISTING CONTOUR (MINOR)
- EXISTING METAL FENCE
- EXISTING WOODS LINE
- EXISTING PIPES
- 100-YEAR STORMWATER SURFACE ELEVATION
- EXISTING TREE
- TREE REMOVAL
- EXISTING GROUT BAGS
- PROPOSED CONTOUR (MAJOR)
- PROPOSED CONTOUR (MINOR)
- BASELINE
- FURNISHED RIFFLE BED MATERIAL
- RIPRAP, R-6
- PROPOSED 8' CHAIN LINK FENCE
- IMBRICATED ROCK STRUCTURES (INCLUDING CROSS-VANE, ROCK SILL, AND SEWERLINE PROTECTION)
- TOP ROCKS
- DROP ROCKS
- CUTOFF ROCKS (TO BE BURIED)

T:\173230A-DELDOT-STORMWATER-RETROFIT\2.2 - LEATHERMAN RUN DESIGN\CADD\REFS\X-BORDERS\BD\_00.DGN

RIFFLE #	GLIDE - START		RIFFLE START			RIFFLE END			RUN - END		TOTAL CU YD	49
	STA	OFFSET	STA	ELEV	OFFSET	STA	ELEV	OFFSET	STA	OFFSET	LENGTH	CU YD
9	15+06	6' LT/RT	15+11	35.2	9' LT/RT	15+32	34.8	9' LT/RT	15+32	6' LT/RT	26.0	15
10	15+42	6' LT/RT	15+49	34.9	9' LT/RT	15+83	34.2	9' LT/RT	15+82	6' LT/RT	40.0	22
11	15+92	6' LT/RT	15+95	34.3	9' LT/RT	16+13	34.0	9' LT/RT	N/A <sup>2</sup>	N/A <sup>2</sup>	21.0	12

MATCHLINE CP-02



- NOTES:**
- REFER TO DETAIL SHEET DT-01 FOR LOCATIONS OF REFERENCE POINTS.
  - COIR MAT SHALL COVER ALL AREAS NOTED ON LS-01 FOR RIPARIAN BUFFER SEED MIX AND WETMEADOW SEED MIX. COIR MAT SHALL OVERLAP AREAS OF COIR BLANKET AS DESCRIBED IN THE COIR BLANKET SPECIFICATION, THE TYPICAL CHANNEL CROSS SECTIONS DETAIL, AND AS SHOWN ON THE CROSS-SECTION SHEETS. TOPSOIL SHALL BE PLACED TO A 2-INCH DEPTH IN ALL AREAS OF COIR MAT AND NATIVE SITE RESTORATION SEED MIX AS NOTED ON SHEET LS-01.
  - COIR BLANKET SHALL BE PLACED AND WRAPPED ALONG THE LOWER STREAMBANK AS DESCRIBED IN THE COIR BLANKET SPECIFICATION, THE TYPICAL CHANNEL CROSS SECTIONS DETAIL, AND AS SHOWN ON THE CROSS-SECTION SHEETS. COIR BLANKET SHALL BE INSTALLED ALONG THE LEFT TOE OF SLOPE OFFSET FROM STATION 10+45 TO STATION 16+55 AND ALONG THE RIGHT TOE OF SLOPE OFFSET FROM STATION 10+00 TO STATION 10+66, STATION 10+85 TO STATION 13+36, AND STATION 13+56 TO STATION 16+55. THE COIR BLANKET AND COIR MAT SHALL BE INSTALLED WITH A 2-FOOT KEY-IN BELOW THE TOE OF SLOPE (1-FOOT MINIMUM IN POOL AREAS).
  - AREAS OF FURNISHED RIFFLE BED MATERIAL AS DEPICTED ON THE CONSTRUCTION PLAN SHEETS (CP-01 - 03) SHOW ONLY THE VISIBLE FINISHED SURFACE OF THE IN-CHANNEL RIFFLE AREAS. ADDITIONAL AREAS OF FURNISHED RIFFLE BED MATERIAL TO BE PLACED IN THE RUN AND GLIDE AREAS OF THE STREAM ARE SHOWN ON THE PROFILE SHEETS (PF-01 - 03) AND AREAS OF A 3-FOOT EXTENSION OF THE FURNISHED RIFFLE BED MATERIALS BEYOND THE FINISHED TOE OF SLOPE ARE SHOWN ON THE CROSS-SECTION SHEETS (XS-01 - 02).
  - AREAS ARE NOTED WITH A N/A FOR RUN AND GLIDE PORTIONS OF THE FURNISHED RIFFLE BED AREAS THAT ARE NOT PRESENT DUE TO PLACEMENT OF AN IMBRICATED ROCK STRUCTURES.
  - DETAILS, MEASUREMENT, AND PAYMENT FOR ALL WORK ASSOCIATED WITH THE 16" AND 8" DIP SEWER LINE, INCLUDING PIPE REPLACEMENT, CONCRETE ENCASEMENT, AND EXCAVATION FOR UTILITY WORK SHALL BE PERFORMED ACCORDING WITH NEW CASTLE COUNTY SEWER LINE CONSTRUCTION PLANS.

MATCHLINE

SALVAGED CHANNEL BED SAND & GRAVEL (REFER TO PROFILES FOR LOCATIONS)				TOTAL CU YD	8
BEGIN STA	END STA	LENGTH	CU YD		
15+32	15+42	10	2		
15+83	15+92	9.3	3		
16+19	16+28	8.8	3		

IMBRICATED ROCK STRUCTURES - ROCK SILL		1	EA												
STR #	Sill Type	REFERENCE STATION	PT A <sup>1</sup>			PT B <sup>1</sup>			PT C <sup>1</sup>			PT D <sup>1</sup>		ANGLE	
			STA	OFFSET	ELEV	STA	OFFSET	ELEV	STA	OFFSET	ELEV	ELEV	X	Y	
RS-3	TYPE 2	15+05.1	16+13.0	0	34.10	16+14.7	7.1	34.30	16+14.9	7.1	34.30	33.8	157.2	157.2	

<b>HEAVY BACKFILL</b>	
42	CY
<b>CHANNEL EXCAVATION</b>	
84	CY
<b>TERMINAL POST FOR 8' HIGH CHAIN LINK FENCE</b>	
1 EA	
STA	OFFSET
15+98	142.5 RT
<b>CHAIN LINK FENCE, 8' HIGH</b>	
STA	OFFSET
14+09	108.4 RT
15+03	103.5 RT
15+81	122.8 RT
15+98	142.5 RT
<b>COIR MAT<sup>2</sup></b>	
717	SY
<b>COIR BLANKET<sup>3</sup></b>	
306	LF

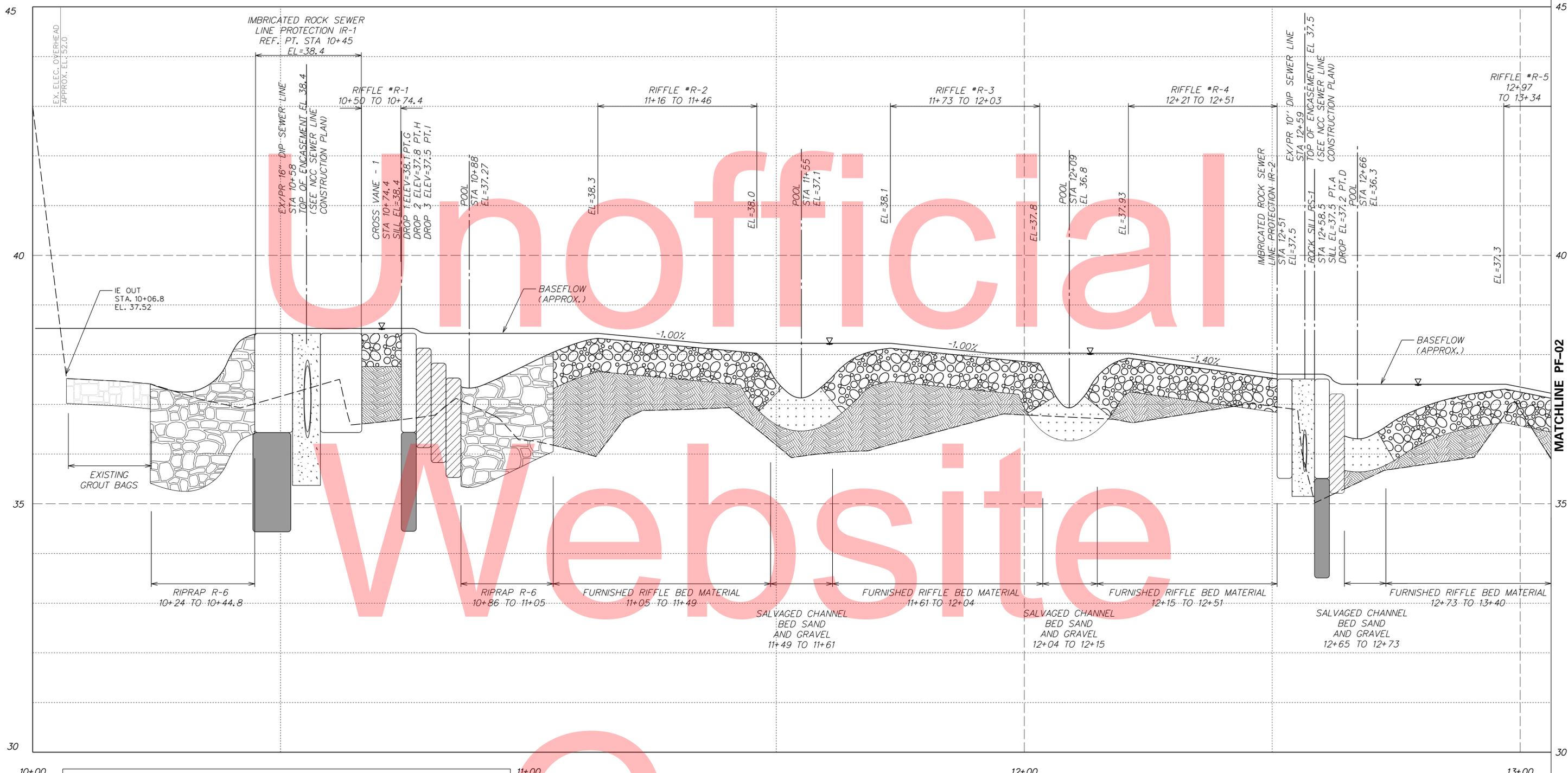
**LEGEND**

- EXISTING CONTOUR (MAJOR)
- EXISTING CONTOUR (MINOR)
- EXISTING METAL FENCE
- EXISTING WOODS LINE
- EXISTING PIPES
- 100-YEAR STORMWATER SURFACE ELEVATION
- EXISTING TREE
- TREE REMOVAL
- EXISTING GROUT BAGS
- PROPOSED CONTOUR (MAJOR)
- PROPOSED CONTOUR (MINOR)
- BASELINE
- FURNISHED RIFFLE BED MATERIAL
- RIPRAP, R-6
- PROPOSED 8' CHAIN LINK FENCE
- IMBRICATED ROCK STRUCTURES (INCLUDING CROSS-VANE, ROCK SILL, AND SEWERLINE PROTECTION)
- TOP ROCKS
- DROP ROCKS
- CUTOFF ROCKS (TO BE BURIED)

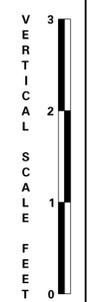
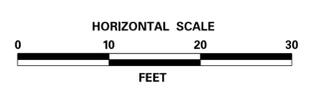
MATCHLINE (SEE INSET ON THIS SHEET)

T:\173230A-DELDOT STORMWATER RETROFIT\2.2 - LEATHERMAN RUN DESIGN\CADD\XREFS\X\_BORDERS\BD\_00.DGN

T:\173230A-DELDOT-STORMWATER-RETROFIT\2.2 - LEATHERMAN RUN DESIGN\CADD\REFS\X-BORDERS\BD\_01.DGN



LEGEND	
	FURNISHED RIFFLE BED MATERIAL
	HEAVY BACKFILL
	SALVAGED CHANNEL BED SAND AND GRAVEL
	RIPRAP, R-6
	EXISTING GROUND
	PROPOSED GROUND
	PROPOSED WSE @ BASEFLOW
IMBRICATED ROCK STRUCTURES	
	TOP ROCK
	FOOTER ROCK
	DROP ROCK



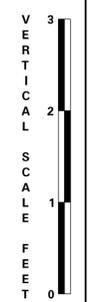
T:\173230A-DELDOT-STORMWATER-RETROFIT\2.2 - LEATHERMAN RUN DESIGN\CADD\REFS\X\_BORDERS\BD\_01.DGN



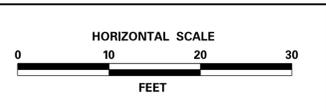
**LEGEND**

	FURNISHED RIFFLE BED MATERIAL		IMBRICATED ROCK STRUCTURES
	HEAVY BACKFILL		TOP ROCK
	SALVAGED CHANNEL BED SAND AND GRAVEL		FOOTER ROCK
	RIPRAP, R-6		DROP ROCK
	EXISTING GROUND		
	PROPOSED GROUND		
	PROPOSED WSE @ BASEFLOW		

EXACT LOCATION AND ELEVATION OF EXISTING UTILITIES SHALL BE FIELD VERIFIED BY CONTRACTOR PRIOR TO CONSTRUCTION.



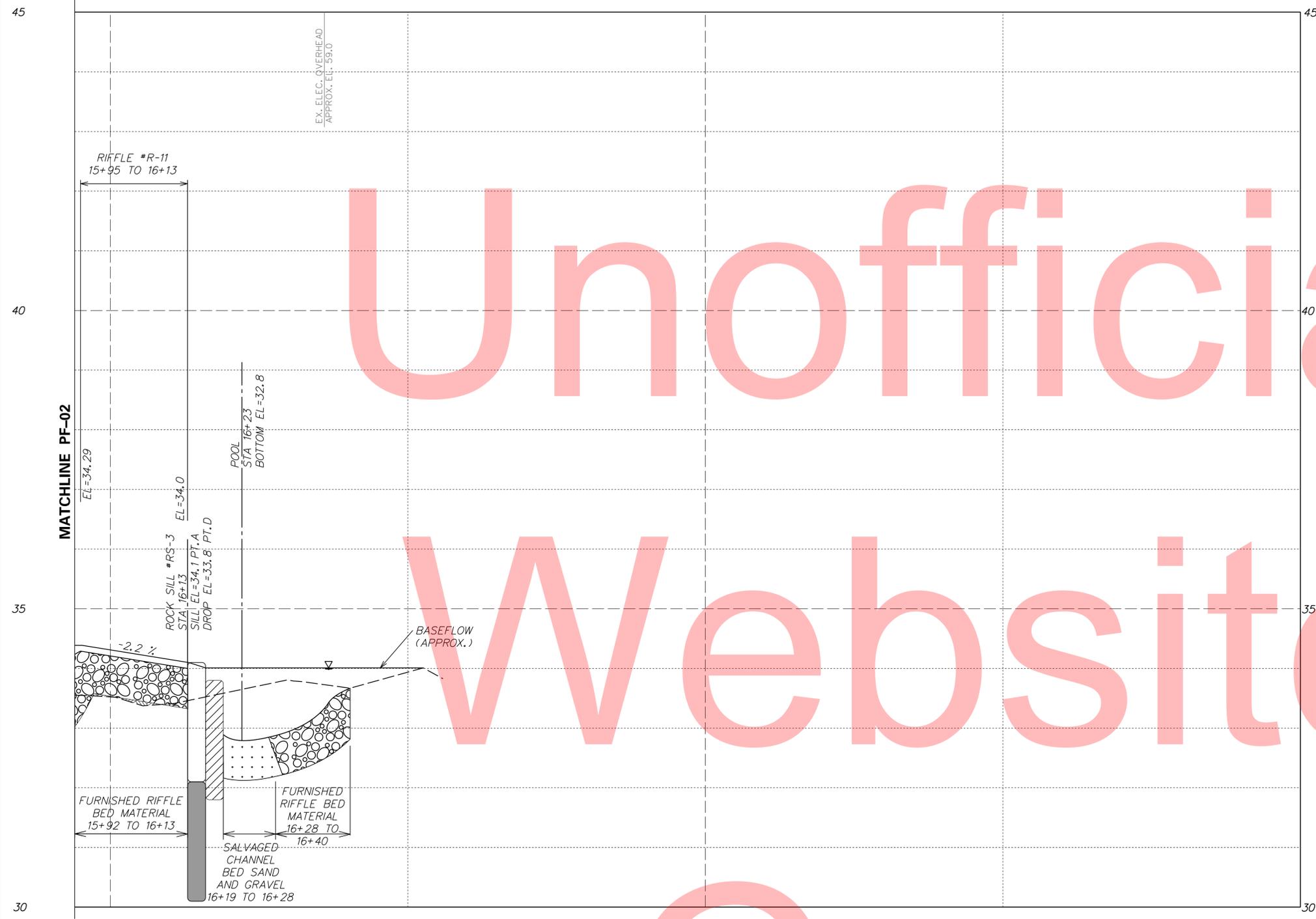
ADDENDUMS / REVISIONS	



CONTRACT T201380204	<b>PF-02</b>
COUNTY NEW CASTLE	DESIGNED BY: JML
	CHECKED BY: RPP

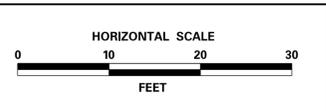
<b>PROFILES</b>	SHEET NO. 9
	TOTAL SHTS. 27

T:\173230A-DELDOT-STORMWATER-RETROFIT\2.2 - LEATHERMAN RUN DESIGN\CADD\REFS\X-BORDERS\BD\_01.DGN



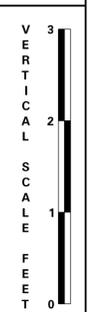
LEGEND	
	FURNISHED RIFFLE BED MATERIAL
	HEAVY BACKFILL
	SALVAGED CHANNEL BED SAND AND GRAVEL
	RIPRAP, R-6
	EXISTING GROUND
	PROPOSED GROUND
	PROPOSED WSE @ BASEFLOW
	IMBRICATED ROCK STRUCTURES
	TOP ROCK
	FOOTER ROCK
	DROP ROCK

ADDENDUMS / REVISIONS

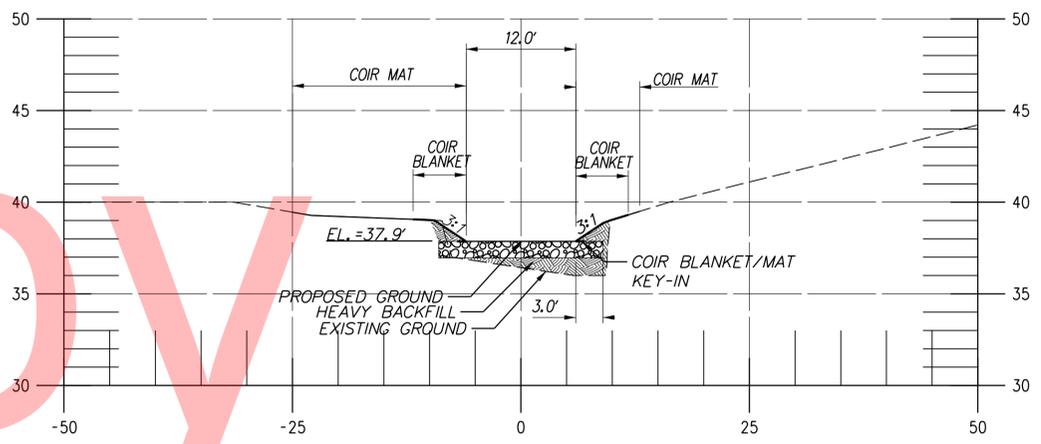
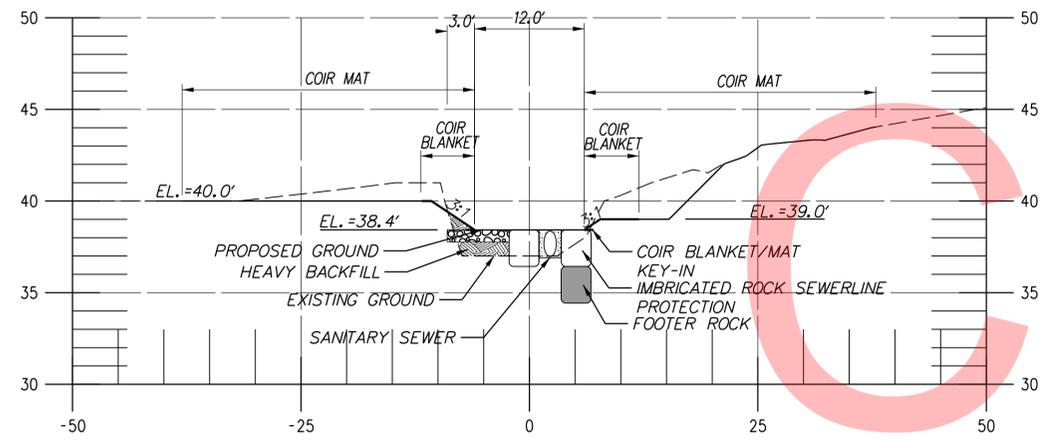
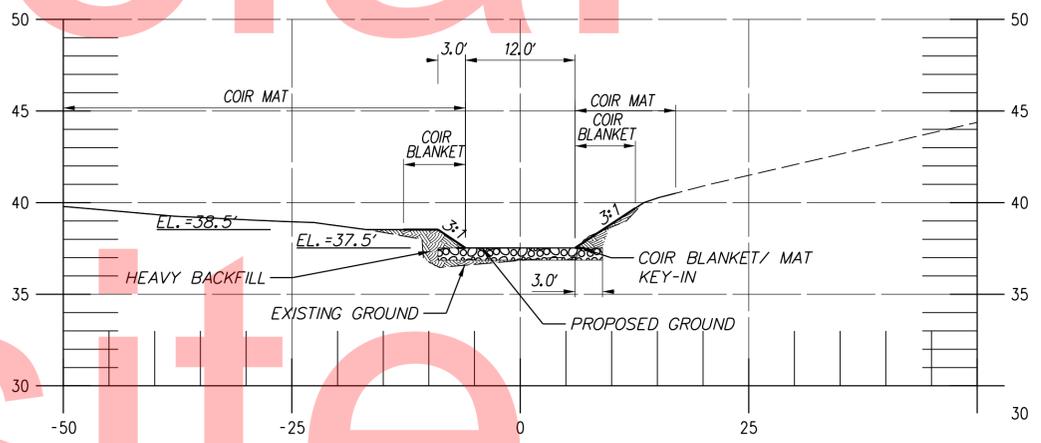
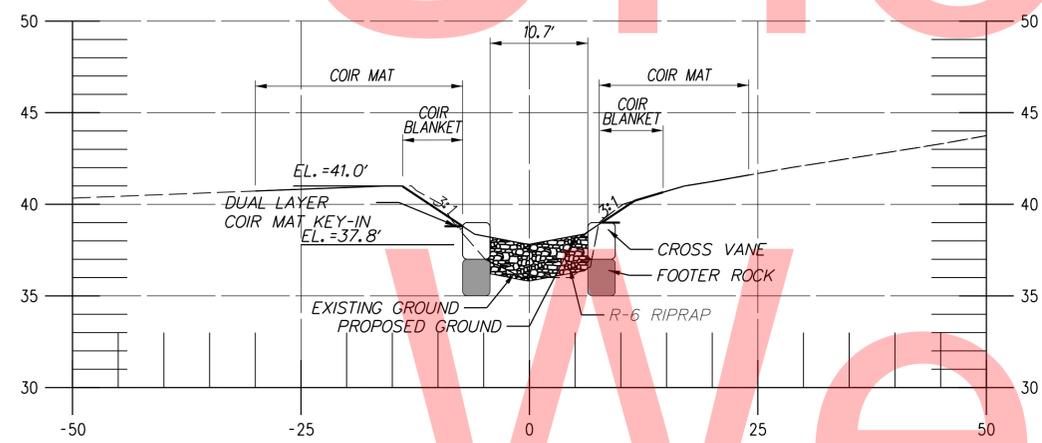
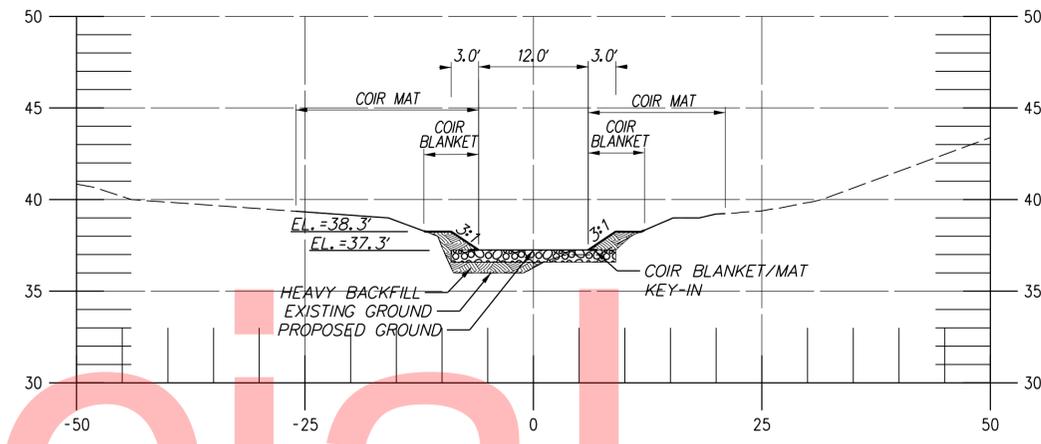
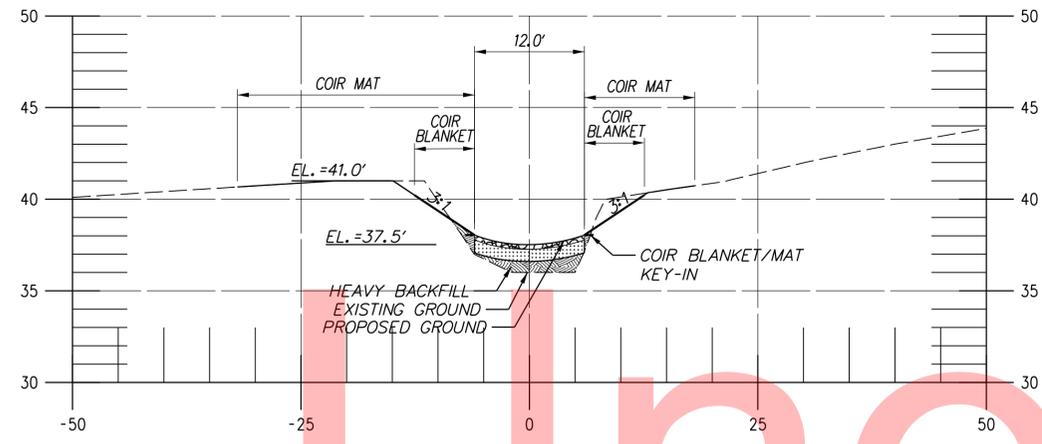


CONTRACT	<b>PF-03</b>
T201380204	DESIGNED BY: JML
COUNTY	CHECKED BY: RPP
NEW CASTLE	

<b>PROFILES</b>	SHEET NO.	3
	TOTAL SHTS.	10
		27

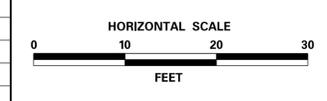


T:\173230A-DELDOT-STORMWATER-RETROFIT\2.2 - LEATHERMAN RUN DESIGN\CADD\XREFS\X\_BORDERS\BD\_01.DGN



**LEGEND**

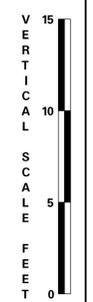
- RIPRAP R-6
- SALVAGED/FURNISHED CHANNEL BED SAND AND GRAVEL
- FURNISHED RIFFLE BED MATERIAL
- HEAVY BACKFILL
- IMBRICATED ROCK STRUCTURES
- TOP ROCK
- FOOTER ROCK



**LEATHERMANS RUN RESTORATION AT CHRISTIANA HIGH SCHOOL**

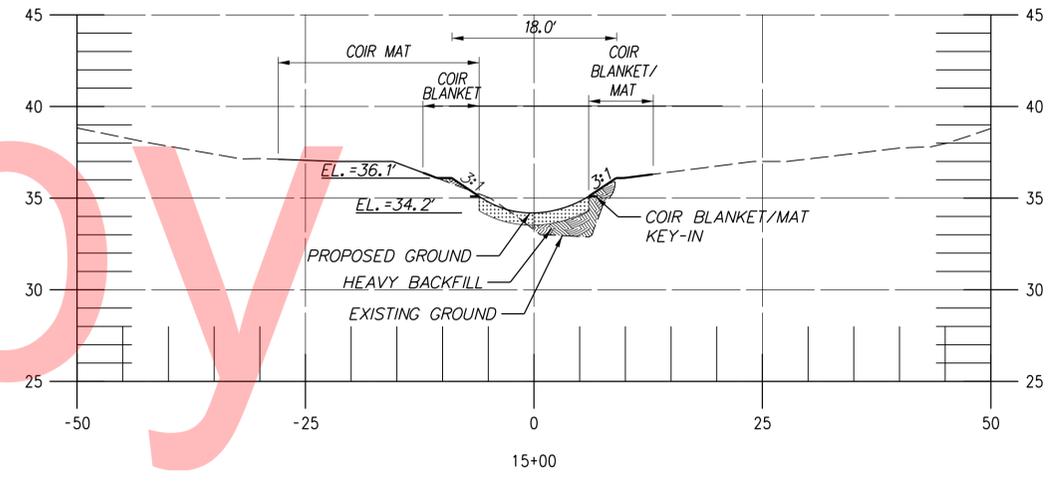
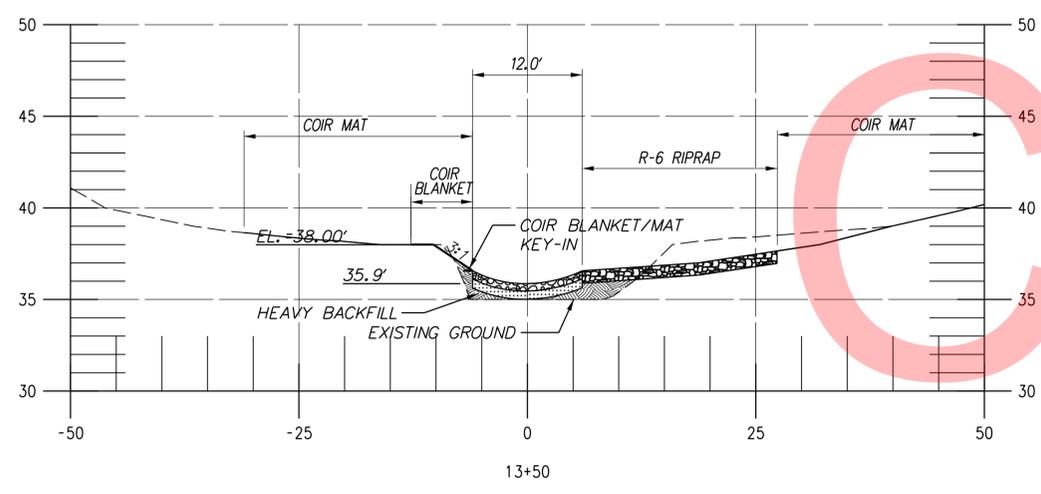
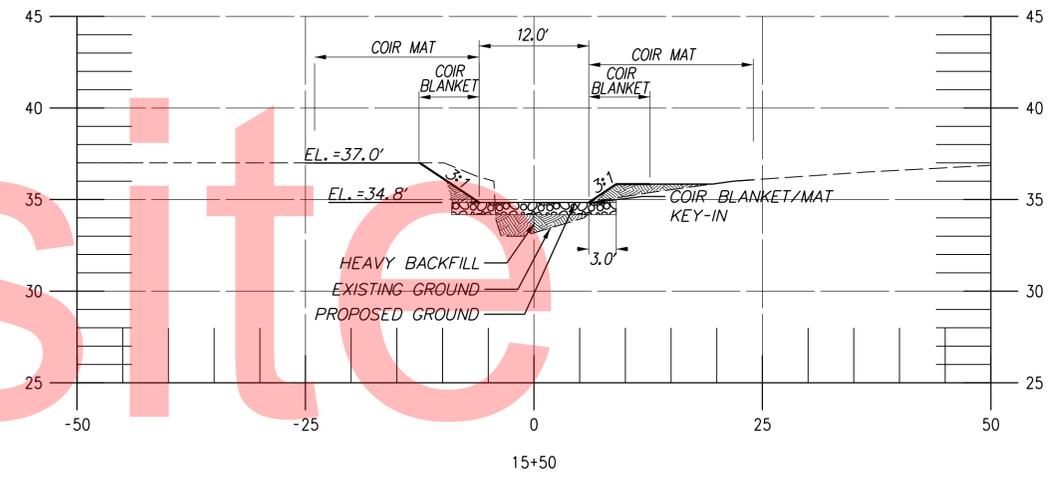
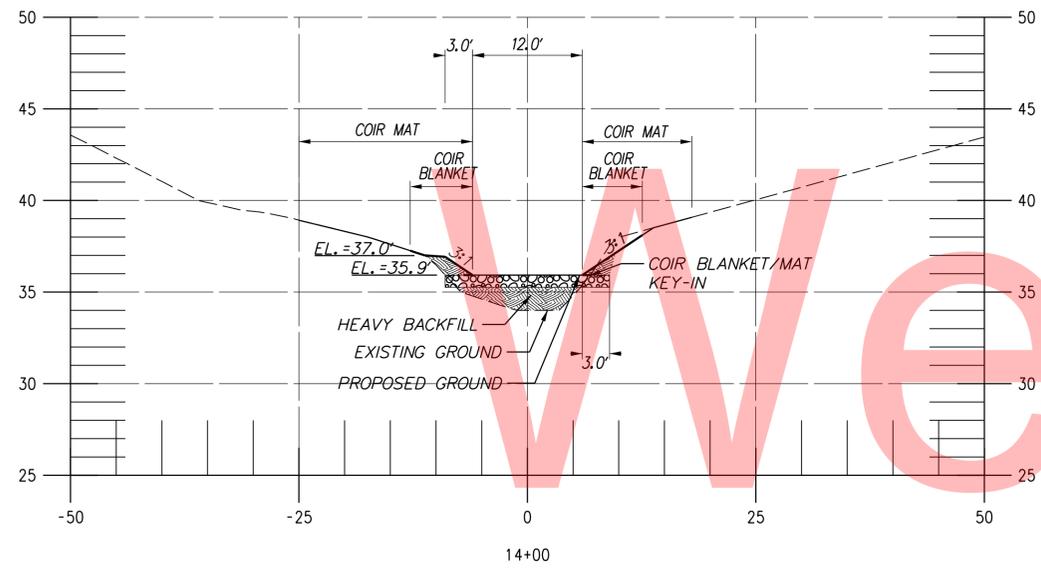
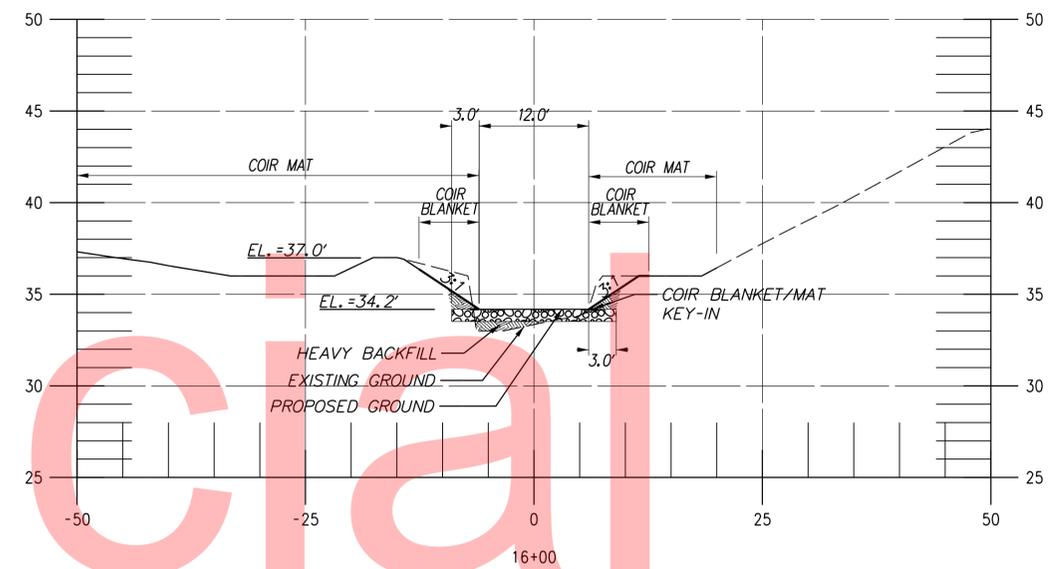
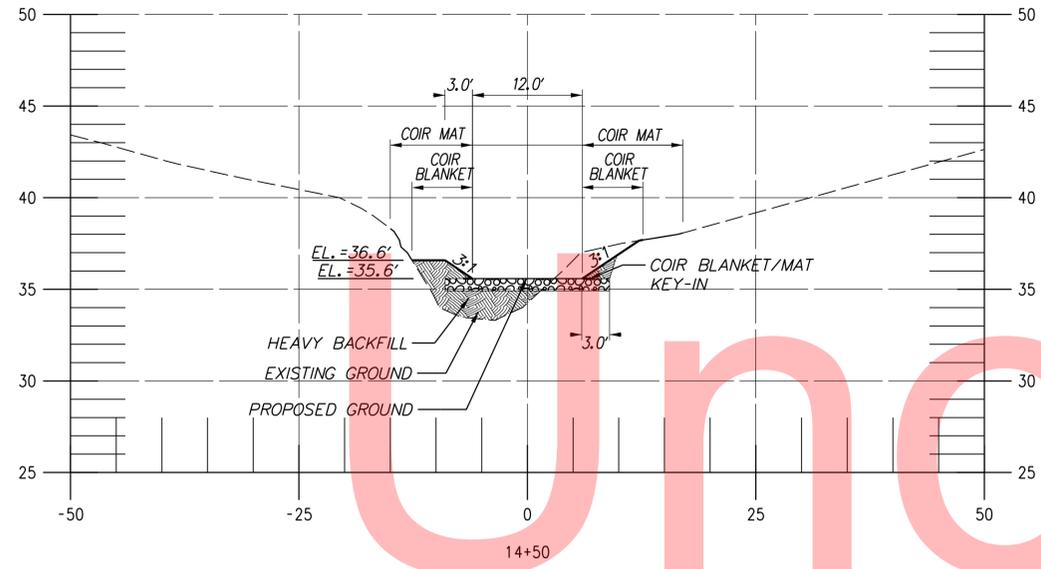
CONTRACT	<b>XS-01</b>
T201380204	DESIGNED BY: JML
COUNTY	CHECKED BY: RPP
NEW CASTLE	

<b>CROSS SECTIONS</b>
SHEET NO. 11
TOTAL SHTS. 27



ADDENDUMS / REVISIONS

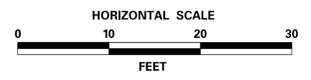
T:\173230A-DELDOT-STORMWATER-RETROFIT\2.2-LEATHERMAN RUN DESIGN\CADD\REFS\X-BORDERS\BD\_01.DGN



**LEGEND**

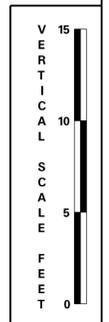
- RIPRAP R-6
- SALVAGED/FURNISHED CHANNEL BED SAND AND GRAVEL
- FURNISHED RIFFLE BED MATERIAL
- HEAVY BACKFILL

ADDENDUMS / REVISIONS	



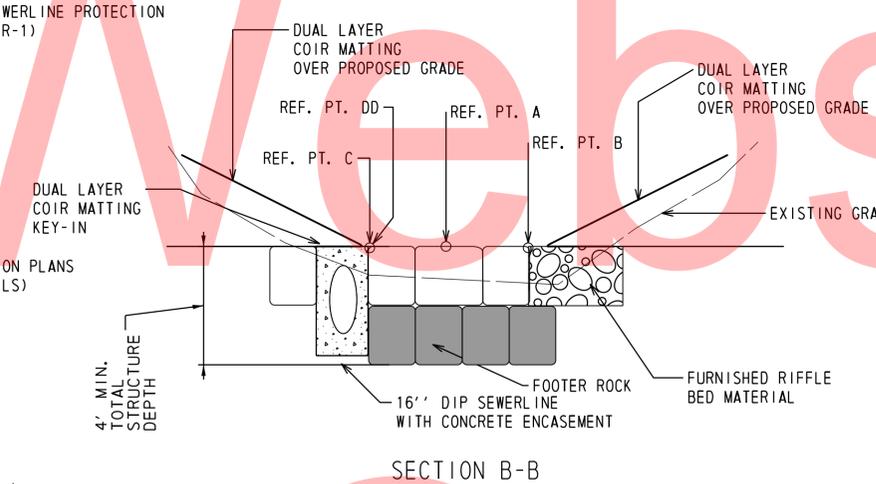
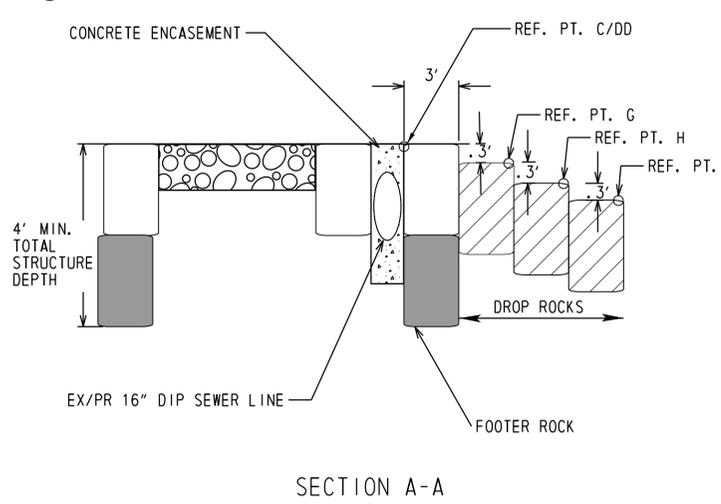
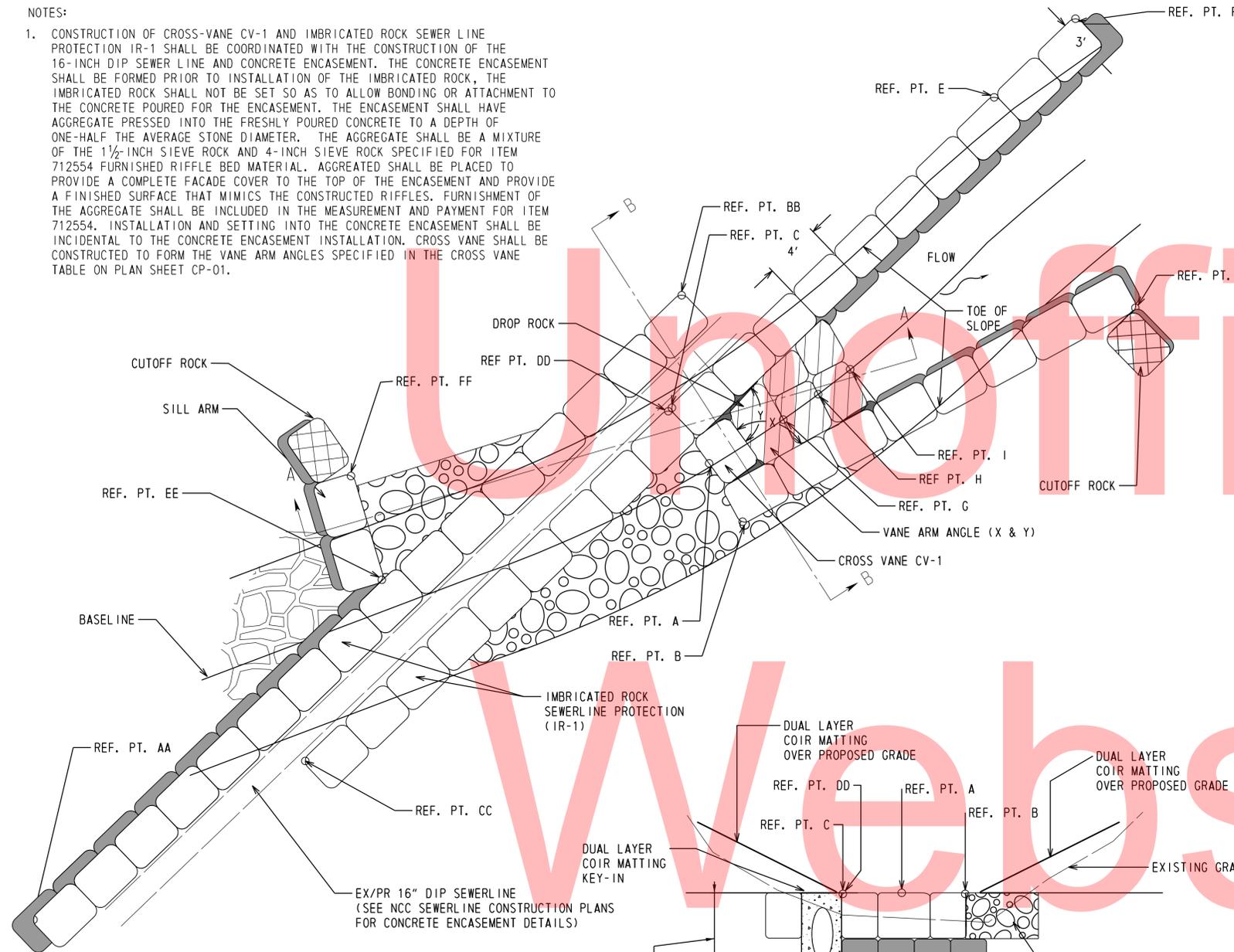
CONTRACT T201380204	<b>XS-02</b>
COUNTY NEW CASTLE	DESIGNED BY: JML
	CHECKED BY: RPP

<b>CROSS SECTIONS</b>
SHEET NO. 12
TOTAL SHTS. 27



NOTES:

- CONSTRUCTION OF CROSS-VANE CV-1 AND IMBRICATED ROCK SEWER LINE PROTECTION IR-1 SHALL BE COORDINATED WITH THE CONSTRUCTION OF THE 16-INCH DIP SEWER LINE AND CONCRETE ENCASEMENT. THE CONCRETE ENCASEMENT SHALL BE FORMED PRIOR TO INSTALLATION OF THE IMBRICATED ROCK, THE IMBRICATED ROCK SHALL NOT BE SET SO AS TO ALLOW BONDING OR ATTACHMENT TO THE CONCRETE POURED FOR THE ENCASEMENT. THE ENCASEMENT SHALL HAVE AGGREGATE PRESSED INTO THE FRESHLY POURED CONCRETE TO A DEPTH OF ONE-HALF THE AVERAGE STONE DIAMETER. THE AGGREGATE SHALL BE A MIXTURE OF THE 1½-INCH SIEVE ROCK AND 4-INCH SIEVE ROCK SPECIFIED FOR ITEM 712554 FURNISHED RIFFLE BED MATERIAL. AGGREGATED SHALL BE PLACED TO PROVIDE A COMPLETE FACADE COVER TO THE TOP OF THE ENCASEMENT AND PROVIDE A FINISHED SURFACE THAT MIMICS THE CONSTRUCTED RIFFLES. FURNISHMENT OF THE AGGREGATE SHALL BE INCLUDED IN THE MEASUREMENT AND PAYMENT FOR ITEM 712554. INSTALLATION AND SETTING INTO THE CONCRETE ENCASEMENT SHALL BE INCIDENTAL TO THE CONCRETE ENCASEMENT INSTALLATION. CROSS VANE SHALL BE CONSTRUCTED TO FORM THE VANE ARM ANGLES SPECIFIED IN THE CROSS VANE TABLE ON PLAN SHEET CP-01.

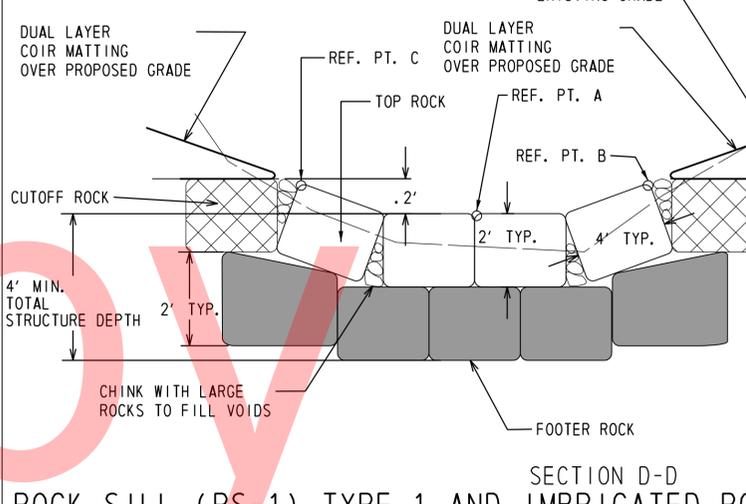
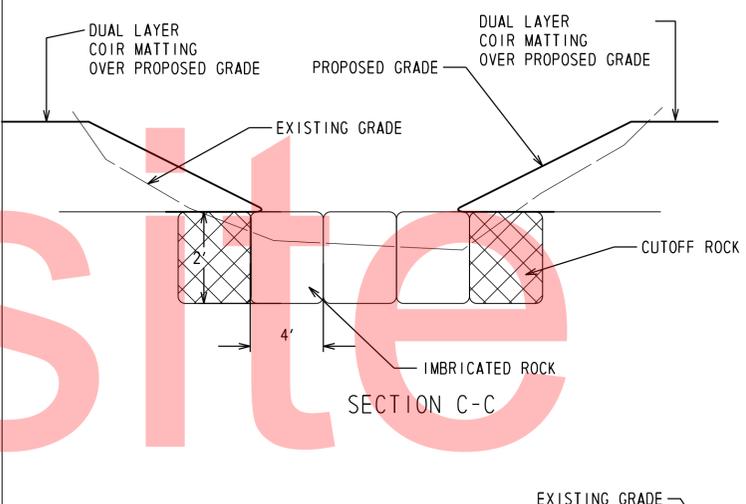
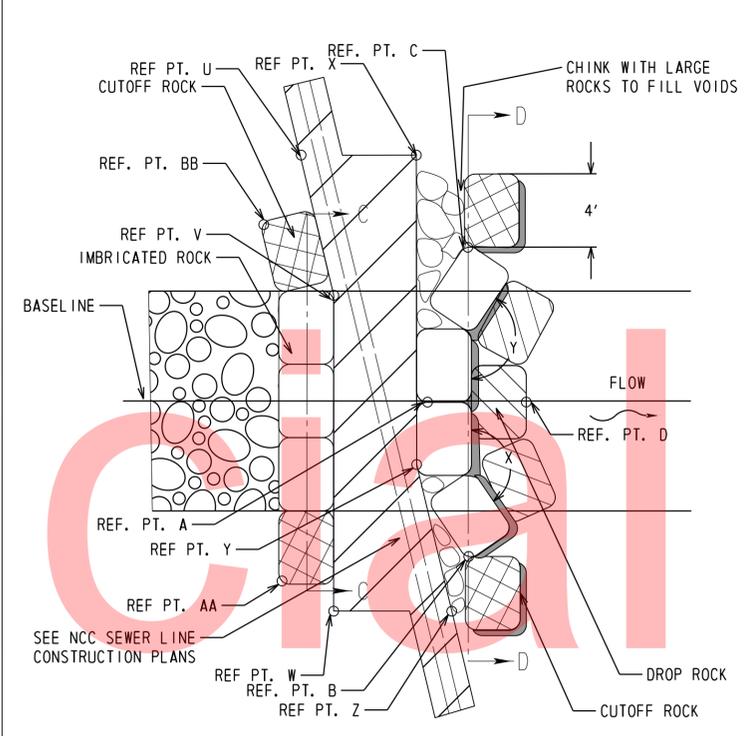


- NOTES (CONT.):
- THE IMBRICATED ROCK SEWER LINE PROTECTION SHALL CONTAIN FOOTER ROCKS AT THE DOWNSTREAM SIDE OF THE SEWER LINE CONCRETE ENCASEMENT.
  - THE TOP ELEVATION OF THE CROSS VANE SHALL MAINTAIN THE SAME ELEVATION AS THE IMBRICATED ROCK SEWER LINE PROTECTION. THE CROSS VANE SHALL INCLUDE A FORMATION OF DROP ROCKS SET A TYPICAL DEPTH OF 0.3- FEET BELOW THE TOP OF THE CROSS VANE.
  - INSTALL TOP AND FOOTER ROCKS ACCORDING TO DETAIL. FOOTER ROCKS SHALL BE PLACED SUCH THAT THE TOP ROCKS IS AT STREAMBED ELEVATION.
  - IMBRICATED BOULDERS FOR CONSTRUCTION OF THE CROSS VANE AND IMBRICATED ROCK SEWER LINE PROTECTION SHALL HAVE THE ROUGH DIMENSIONS OF 2-FOOT X 3-FOOT X 4-FOOT AND HAVE A MINIMUM INDIVIDUAL STONE WEIGHT OF 1.7 TONS. THE ROCKS SHALL BE GENERALLY RECTANGULAR IN SHAPE WITH FLAT TOPS AND BOTTOMS, APPROPRIATE FOR STACKING AND STRUCTURE FORMATION. BOULDERS NOT CONFORMING TO THE GENERAL SIZE, WEIGHT, AND USAGE REQUIREMENTS OF THE PROJECT WILL BE REJECTED BY THE ENGINEER FOR USE IN CONSTRUCTION OF THE CROSS VANE AND IMBRICATED ROCK SEWER LINE.

CROSS-VANE 1 (CV-1) AND IMBRICATED ROCK SEWER LINE PROTECTION (IR-1) DETAIL  
NOT TO SCALE

NOTES:

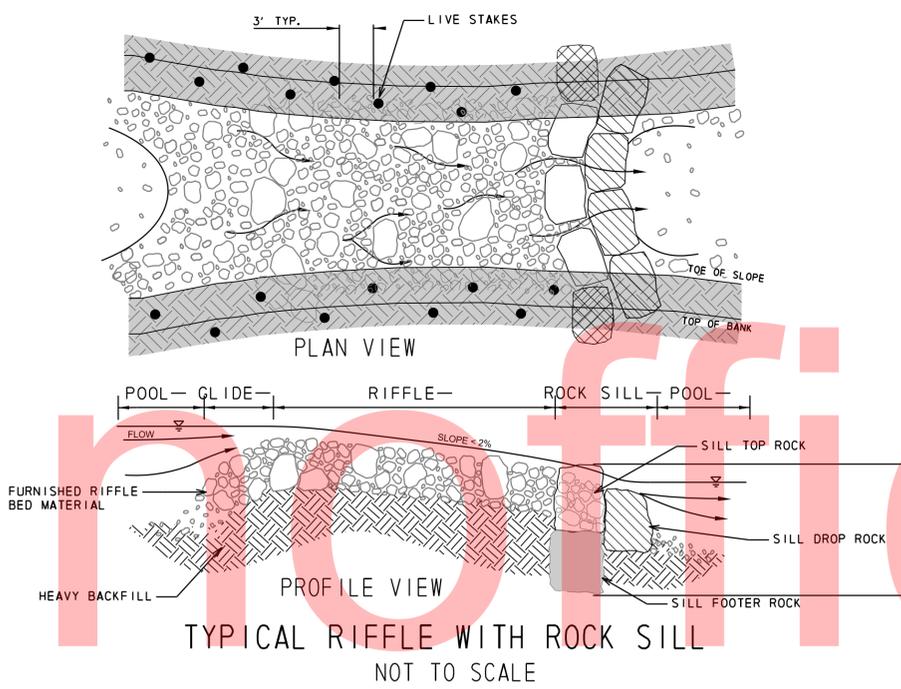
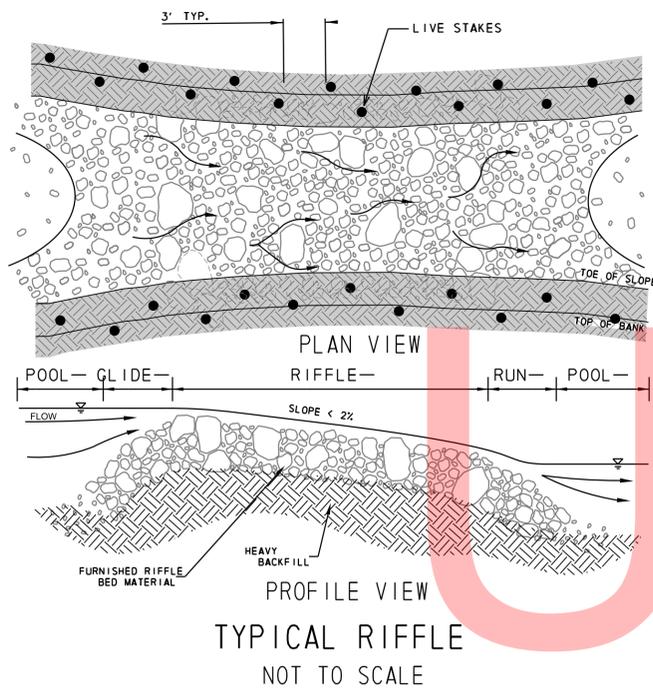
- CONSTRUCTION OF ROCK SILL RS-1 AND IMBRICATED ROCK SEWER LINE PROTECTION IR-2 SHALL BE COORDINATED WITH THE CONSTRUCTION OF THE 8-INCH DIP SEWER LINE AND CONCRETE ENCASEMENT. THE CONCRETE ENCASEMENT SHALL BE FORMED PRIOR TO INSTALLATION OF THE IMBRICATED ROCK, THE IMBRICATED ROCK SHALL NOT BE SET SO AS TO ALLOW BONDING OR ATTACHMENT TO THE CONCRETE POURED FOR THE ENCASEMENT. THE ENCASEMENT SHALL HAVE AGGREGATE PRESSED INTO THE FRESHLY POURED CONCRETE TO A DEPTH OF ONE-HALF THE AVERAGE STONE DIAMETER. THE AGGREGATE SHALL BE A MIXTURE OF THE 1½-INCH SIEVE ROCK AND 4-INCH SIEVE ROCK SPECIFIED FOR ITEM 712554 FURNISHED RIFFLE BED MATERIAL. AGGREGATED SHALL BE PLACED TO PROVIDE A COMPLETE FACADE COVER TO THE TOP OF THE ENCASEMENT AND PROVIDE A FINISHED SURFACE THAT MIMICS THE CONSTRUCTED RIFFLES. FURNISHMENT OF THE AGGREGATE SHALL BE INCLUDED IN THE MEASUREMENT AND PAYMENT FOR ITEM 712554. INSTALLATION AND SETTING INTO THE CONCRETE ENCASEMENT SHALL BE INCIDENTAL TO THE CONCRETE ENCASEMENT INSTALLATION.
- THE CONCRETE ENCASEMENT FOR THE 8-INCH DIP SEWER LINE SHALL BE CONSTRUCTED WITH THE SHAPE AND MEASUREMENT LIMITS AS SHOWN ON THIS DETAIL AND ON CP-01. THE CONCRETE ENCASEMENT SHALL BE SET WITH AN ENLARGED CROSS-SECTION TO ALLOW FOR COMPLETE EMBEDMENT OF THE DIP SEWER LINE AND ALLOW FOR THE ENCASEMENT TO BE SET PERPENDICULAR TO THE STREAM CHANNEL. THE CONCRETE COVER SURROUNDING THE SEWERLINE AND THE FINAL ELEVATIONS OF THE ENCASEMENT SHALL MEET THE REQUIREMENTS AS SPECIFIED IN THE NEW CASTLE COUNTY SANITARY SEWER LINE REPLACEMENT PLANS AND SPECIFICATIONS.
- IMBRICATED BOULDERS FOR THE CONSTRUCTION OF ROCK SILL TYPE 1 SHALL BE TIGHTLY PLACED TOGETHER IN A GAP FREE SEQUENCE. THE TYPE 1 SILLS INCLUDE A FORMATION OF DROP ROCKS SET A TYPICAL DEPTH OF 0.3- FEET BELOW THE TOP OF THE SILL. THE DROP ROCKS SHALL BE SET TO COVER THE ENTIRE CROSS-SECTIONAL FOOTPRINT OF THE CHANNEL, WITH THE SIDES OF THESE ROCKS TO BE BURIED IN THE STREAM BANK.
- IMBRICATED BOULDERS FOR CONSTRUCTION OF THE ROCK SILL SHALL HAVE THE ROUGH DIMENSIONS OF 2-FOOT X 3-FOOT X 4-FOOT AND HAVE A MINIMUM INDIVIDUAL STONE WEIGHT OF 1.7 TONS. THE ROCKS SHALL BE GENERALLY RECTANGULAR IN SHAPE WITH FLAT TOPS AND BOTTOMS, APPROPRIATE FOR STACKING AND STRUCTURE FORMATION. BOULDERS NOT CONFORMING TO THE GENERAL SIZE, WEIGHT, AND USAGE REQUIREMENTS OF THE PROJECT WILL BE REJECTED BY THE ENGINEER FOR USE IN CONSTRUCTION OF THE ROCK SILLS.
- TOP ROCKS FOR THE SILLS SHALL BE SUPPORTED BY FOOTER ROCKS, WITH THE FOOTER ROCKS OFFSET / SHINGLED SUCH THAT TOP AND FOOTER ROCK EDGES DO NOT ALIGN. THERE SHALL BE NO GAP BETWEEN FOOTER ROCKS.
- SEQUENCING OF THE PLACEMENT AND SELECTION OF INDIVIDUAL FOOTER AND TOP ROCKS TO MEET THE PROPOSED DESIGN ELEVATIONS FOR THE TOP OF EACH SILL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. DUE TO THE NATURAL VARIATION IN ROCK MATERIALS AND SIZES, THE CONTRACTOR SHALL MEASURE THE DEPTH OF EACH PROPOSED TOP SILL ROCK AND FOOTER ROCK TO DETERMINE THE MAXIMUM EXCAVATION LIMITS PRIOR TO PLACEMENT OF THE FOOTER ROCKS. FOOTER ROCKS SHALL BE PLACED ON A FIRM FOUNDATION OR ON SALVAGED CHANNEL BED SAND AND GRAVEL TO ELIMINATE POTENTIAL SUBSIDENCE OF THE SILL STRUCTURE. THE CONTRACTOR SHALL SURVEY THE TOP ELEVATION OF EACH FOOTER ROCK TO ENSURE THAT IT IS SET AT THE APPROPRIATE ELEVATION TO MATCH THE THICKNESS OF THE TOP ROCKS PRIOR TO PLACING THE TOP ROCKS TO PROPOSED FINAL GRADE. ONCE PLACED, THE CONTRACTOR SHALL SURVEY THE ELEVATIONS OF THE TOP ROCKS AND IF THE PROPOSED FINAL ELEVATIONS OF THE TOP ROCKS ARE NOT MET, THE CONTRACTOR WILL NEED TO REMOVE THE TOP ROCKS AND ADJUST THE FOOTER ROCKS HIGHER OR LOWER AS NEEDED, OR REPLACE THE TOP ROCKS WITH MORE SUITABLE ROCKS TO MEET THE PROPOSED FINAL GRADE OF THE SILL.
- PLACE CLASS GS-1 GEOTEXTILE ON THE UPSTREAM FACE OF THE SILL PRIOR TO BACKFILLING THE CHANNEL. FABRIC SHALL COVER THE ENTIRE FACE AND SHALL EXTEND A MAXIMUM OF 2- FEET UPSTREAM OF THE STRUCTURE. THE GEOTEXTILE SHALL BE TRIMMED AT THE FACE SUCH THAT NO FABRIC IS VISIBLE ABOVE THE FINISHED SURFACE. THE UPSTREAM EXTENSION OF THE FABRIC SHALL BE BURIED A MINIMUM OF 4- FEET BELOW THE FINISHED GRADE. THE GEOTEXTILE IS TO BE PROVIDED TO PREVENT PIPING OF FINE PARTICLES BETWEEN GAPS IN THE IMBRICATED ROCK.



ROCK SILL (RS-1) TYPE 1 AND IMBRICATED ROCK SEWER LINE PROTECTION (IR-2) DETAIL  
NOT TO SCALE

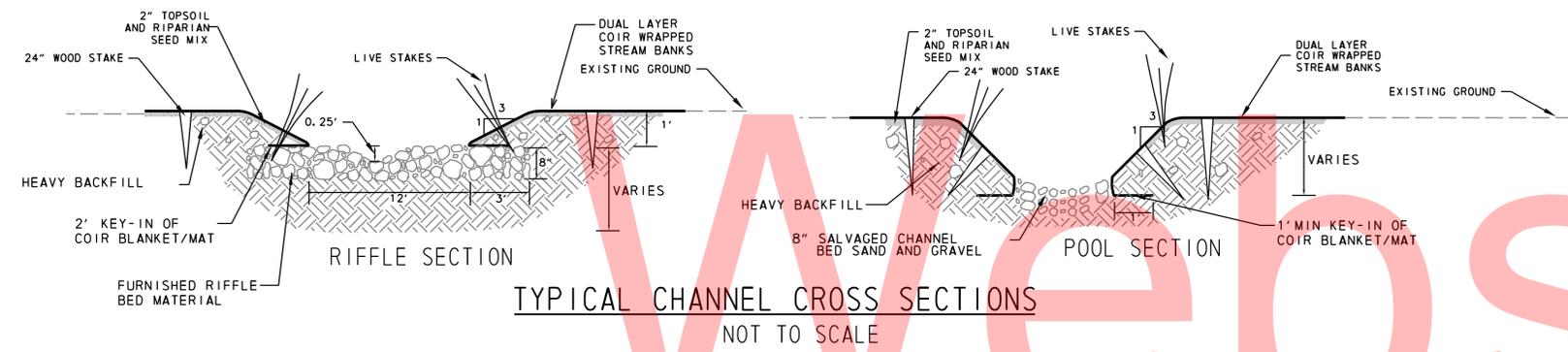
T:\173230A-DELDOT-STORMWATER-RETROFIT\2.2 - LEATHERMAN RUN DESIGN\CADD\XREFS\X\_BORDERS\BD\_00.DGN

	ADDENDUMS / REVISIONS		<b>LEATHERMANS RUN RESTORATION AT CHRISTIANA HIGH SCHOOL</b>	CONTRACT	<b>DT-01</b>	SHEET NO.	
				T201380204		DESIGNED BY: JML	13
				NEW CASTLE		CHECKED BY: JML	TOTAL SHTS. 27



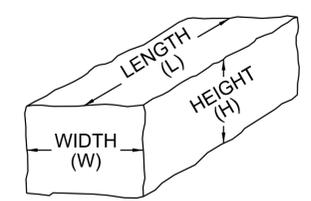
**RIFFLE NOTES:**

- FURNISHED RIFFLE BED MATERIAL SHALL CONSIST OF A HARD DURABLE STONE WITH A WELL GRADED GRAVEL AND COBBLE ROCK MIXTURE WITH A MEDIAN ROCK SIZE OF 4-INCHES AND A MAXIMUM ROCK SIZE OF 8-INCHES. THE ROCK MATERIAL SHALL BE A MIXTURE OF ANGULAR AND ROUND STONES AND SHALL BE A MIXTURE OF GREY, GREY/GREEN, BLUE/GRAY, OR BROWN COLORATION. RED AND WHITE ROCK SHALL NOT BE USED. LIMESTONE, SANDSTONE OR SHALE SHALL NOT BE USED.
- FURNISHED RIFFLE BED MATERIAL SHALL BE PLACED AT A STANDARD DEPTH OF 8-INCHES ALONG THE ENTIRE LIMITS OF THE RIFFLE, GLIDE AND RUN. OVER-EXCAVATION OF THE EXISTING CHANNEL BED MAY BE REQUIRED FOR PLACEMENT OF THE RIFFLE BED MATERIAL TO THE STANDARD DEPTH AT SELECT LOCATIONS.
- POOL BED AREAS SHALL BE FILLED WITH 8-INCHES OF SALVAGED CHANNEL BED SAND AND GRAVEL, IN ALL AREAS OF GENERAL CHANNEL BED FILL OR IF UNSUITABLE MATERIAL IS PRESENT IN THE POOL LOCATION.
- AS SHOWN ON THE PLAN AND PROFILE DETAIL VIEWS, THE LARGER ROCK SIZES IN THE FURNISHED RIFFLE BED MATERIAL (D84 THROUGH D100) SHALL BE PLACED IN GREATER CONCENTRATIONS AT THE HEAD (GLIDE-RIFFLE INTERFACE) AND TAIL (RIFFLE-RUN INTERFACE) OF THE RIFFLES.
- THE FURNISHED RIFFLE BED MATERIAL SHALL BE PLACED TO EXTEND 3-FEET BEYOND THE FINAL TOE OF SLOPE FOR THE CONSTRUCTED STREAM BANK, TO ALLOW FOR LONG-TERM MINOR ADJUSTMENT OF THE STREAM BANKS.
- AFTER COMPLETE PLACEMENT OF THE RIFFLE MATERIAL TO THE FINAL DESIGN LINE AND GRADE, SALVAGED/FURNISHED CHANNEL BED SAND AND GRAVEL SHALL BE WASHED INTO THE RIFFLE MATERIAL TO PROVIDE CHOKING OF THE CHANNEL BED PORE SPACES. THE CHANNEL BED SAND AND GRAVEL SHALL BE WASHED IN USING 1-INCH LIFTS OF MATERIAL EVENLY DISTRIBUTED ON THE SURFACE OF THE RIFFLE BED THEN HYDRAULICALLY WASHED INTO THE RIFFLE MATERIAL USING A METHOD APPROVED BY THE ENGINEER. SUBSEQUENT LIFTS OF CHANNEL BED SAND AND GRAVEL SHALL BE WASHED INTO THE RIFFLE MATERIAL UNTIL REFUSAL OF ADDITIONAL WASH IN. UPON OPENING OF THE CHANNEL SECTION TO NORMAL BASEFLOW, FLOW SHALL TRAVEL ALONG THE SURFACE OF THE RIFFLES WITH MINIMAL SUBSURFACE FLOW. IN THE EVENT OF SUBSTANTIVE SUBSURFACE FLOW, ADDITIONAL MATERIAL WASH IN WILL BE REQUIRED.
- THE LOW CHANNEL BANKS SHALL BE CONSTRUCTED USING A DUAL LAYER OF COIR MATTING AND COIR BALKNET. THE INNER LAYER SHALL CONSIST OF A NON-WOVEN COIR BLANKET WHILE THE OUTER LAYER SHALL CONSIST OF A WOVEN COIR MAT. THE DUAL LAYER COIR WRAP SHALL BE PLACED ALONG THE TOE OF THE CHANNEL BANK GRADING PRIOR TO PLACEMENT OF THE HEAVY BACKFILL LIFTS FOR CONSTRUCTION OF THE BANK. THE DUAL LAYER COIR WRAP SHALL BE SECURED WITH 24-INCH DEAD WOOD STAKES.
- THE COIR BLANKET (INNER LAYER) SHALL BE PLACED LINEARLY ALONG THE RE-CONSTRUCTED STREAM BANKS. THE BLANKET AND OVERLAYING MAT SHALL BE ANCHORED BELOW THE STREAM BANK TO THE DEPTHS AS SHOWN. THE COIR BLANKET SHALL BE PLACED AS A SINGLE LINEAR 8' WIDE PANEL ALONG THE STREAM BANK. COVERAGE OF THE BLANKET SHALL BE LIMITED TO THE 2' KEY-IN, THE 3:1 BANK SLOPE AND 2-FEET TO 4-FEET OFF THE TOP OF THE BANK (DEPENDING ON THE COVERAGE OF THE 8-FOOT WIDE BLANKET). THE COIR MAT (OUTER LAYER) SHALL COVER A LARGER AREA AS NOTED ON LS-01.
- HEAVY BACKFILL MIX SHALL CONSIST OF 10% R-4 RIPRAP, 20% BANK RUN GRAVEL, AND 70% SALVAGED SUBSURFACE SOIL BY VOLUME. THE MIXTURE SHALL BE FIELD MIXED TO AN EVEN DISTRIBUTION OF MATERIALS. THE MIXTURE SHALL BE PLACED IN 12-INCH LIFTS AND COMPACTED TO MEET THE PROJECT LINE AND GRADE.
- AN EVEN 2-INCH LAYER OF TOPSOIL SHALL BE PLACED AND COMPACTED ALONG THE STREAM BANKS AND BENCH TO BRING THE FINISHED SURFACE OF THE STREAM BANKS AND BENCH TO THE FINAL LINE AND GRADE. TOPSOIL SHALL NOT BE PLACED ALONG THE LOWER STREAMBANK PORTION OF THE POOLS, RUNS, AND GLIDES THAT SHALL BE BELOW THE BASEFLOW WATER SURFACE ELEVATION.
- UPON COMPLETION OF GRADING ACTIVITIES, THE ENTIRE STREAMBANK AND BENCH SHALL BE SEED WITH THE RIPARIAN SEED MIX. THE DUAL LAYER COIR WRAP SHALL BE FOLDED TO COMPLETELY ENCAPSULATE THE BANK (AS SHOWN ON THE TYPICAL CROSS-SECTIONS), STAKED AND PLANTED.
- STAKE MAT IN A STAGGERED PATTERN ON 3 FOOT (MAXIMUM) CENTERS THROUGHOUT AND 18 INCHES (MAXIMUM) CENTERS ALONG SEAMS.
- LIVE STAKE AND TUBELING PLANTINGS SHALL BE PERFORMED AFTER PLACEMENT OF MAT. HOLES OF SUFFICIENT SIZE FOR PLANTINGS SHALL BE OPENED BY PRYING AT EXISTING MAT OPENINGS. THE MATTING SHALL NOT BE CUT FOR INSTALLATION OF PLANTINGS.



**BOULDER NOTES**

- IMBRICATED ROCK SHALL BE RECTANGULAR IN SHAPE. NO ROUND, SQUARE, OR TRIANGULAR IMBRICATED ROCK SHALL BE PERMITTED.
- IMBRICATED ROCK SHALL BE OF A SIMILAR TEXTURE AND COLOR TO THE NATIVE ROCK PRESENT AT THE SITE OBTAINED FROM AN APPROVED SOURCE.
- ALL IMBRICATED ROCK SHALL BE FREE FROM LAMINATIONS, WEAK CLEAVAGES AND WILL NOT DISINTEGRATE FROM THE ACTION OF AIR, SALT WATER AND IN HANDLING AND PLACING. WHITE STONES WILL NOT BE ACCEPTABLE.
- IMBRICATED ROCK SHALL NOT BE HARVESTED FROM STREAMS OR RIVERS OUTSIDE A COMMERCIAL QUARRY OPERATION.
- GRANULAR SEDIMENTARY STONES SHALL NOT BE ACCEPTABLE.
- UNLESS OTHERWISE STATED, THE IMBRICATED ROCK SHALL HAVE A MINIMUM UNIT WEIGHT OF 170 LBS PER CUBIC FOOT.



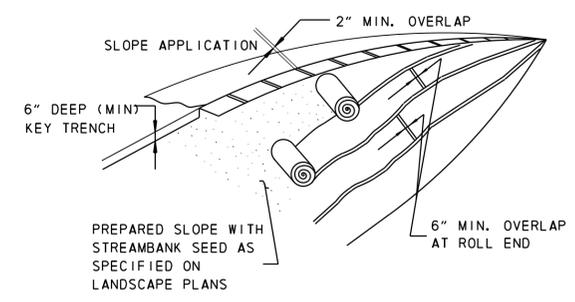
IMBRICATED ROCK		
	DIMENSION	ALLOWABLE DEVIATION (FT)
LENGTH (LONG AXIS) (FT)	4.00	+/- 0.25
WIDTH (MEDIAN AXIS) (FT)	3.00	+/- 0.25
HEIGHT (SHORT AXIS) (FT)	2.00	+/- 0.10
MIN WEIGHT (TONS)	1.70	MIN ACCEPTABLE WEIGHT

**MATERIALS**

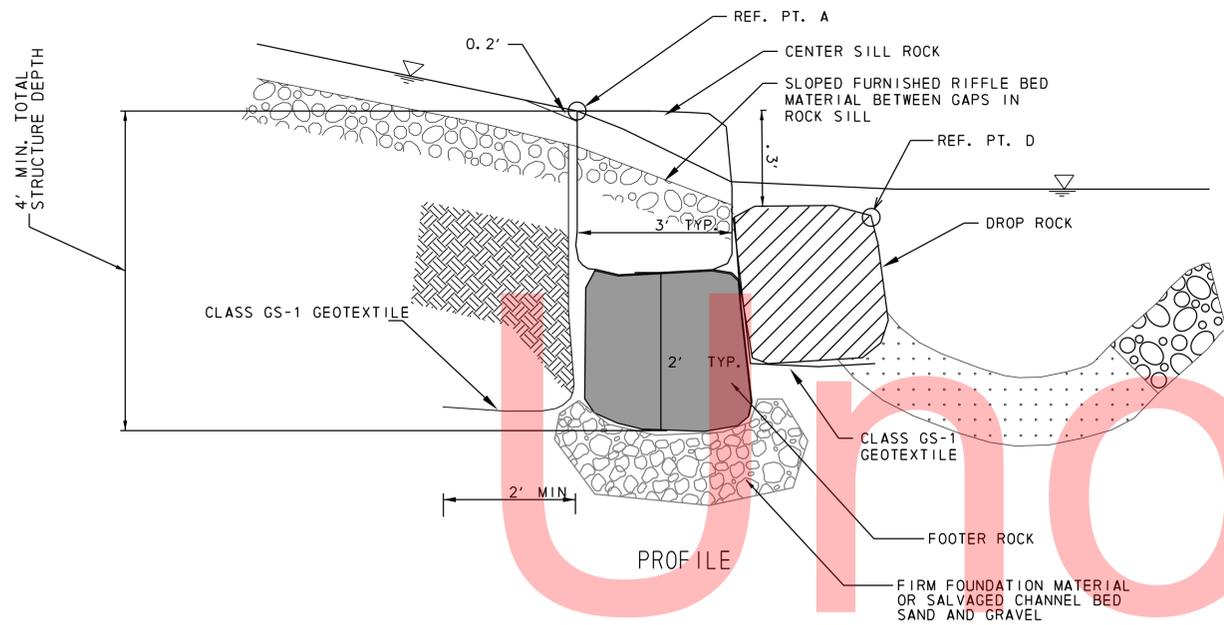
- COIR MATTING SHALL CONSIST OF WOVEN COIR FIBER SOIL STABILIZATION MATTING AS NOTED IN THE CONTRACT DOCUMENTS.
- COVER SEED BEDS WITH STRAW MULCH AT A RATE OF 4,000 LBS PER ACRE.
- THE COIR MATTING SHALL BE SECURED USING TRIANGULAR WOOD STAKES. THE STAKES SHALL BE ROUGH SAWN HARDWOOD, TRIANGULAR IN SHAPE 1 INCHES BY 3 INCHES (MINIMUM) IN CROSS-SECTION AND 24 INCHES IN LENGTH.

**INSTALLATION**

- STREAMBANK AREAS TO BE COVERED WITH A DUAL LAYER OF COIR BLANKET AND COIR MAT SHALL FOLLOW THE INSTRUCTIONS UNDER THE "TYPICAL CHANNEL CROSS SECTION" DETAIL.
- PERFORM FINAL GRADING, TOPSOIL APPLICATION, AND PERMANENT SEEDING IN ACCORDANCE WITH SPECIFICATIONS. MATTING SHALL BE PLACED WITHIN 48 HOURS AFTER SEEDING OPERATIONS HAVE BEEN COMPLETED ON THE AREAS RECEIVING MATTING.
- COVER ALL SPECIFIED TOPSOIL/SEED BED AREAS WITH STRAW MULCH.
- UNROLL MATTING ACROSS THE STREAMBANK SLOPE. LAY MAT SMOOTHLY AND FIRMLY UPON THE SEEDDED SURFACE, AVOID STRETCHING.
- OVERLAP EDGES OF MATTING ROLLS BY 2 INCHES (MINIMUM) AND ROLL ENDS BY 6 INCHES (MINIMUM), WITH THE UP SLOPE MAT OVERLAPPING ON TOP OF THE DOWN SLOPE MAT.
- THE UP SLOPE FACE OF MAT SHALL BE KEYED IN 6 INCHES (MINIMUM) BY DIGGING A TRENCH, PLACING THE MATTING ROLL END IN THE TRENCH, STAPLING THE MAT IN PLACE, REPLACING THE EXCAVATED MATERIAL, AND TAMPING TO SECURE THE MAT END IN THE KEY.
- STAKE MAT IN A STAGGERED PATTERN ON 3 FOOT (MAXIMUM) CENTERS THROUGHOUT AND 18 INCHES (MAXIMUM) CENTERS ALONG SEAMS.
- LIVE STAKE AND TUBELING PLANTINGS SHALL BE PERFORMED AFTER PLACEMENT OF MAT. HOLES OF SUFFICIENT SIZE FOR PLANTINGS SHALL BE OPENED BY PRYING AT EXISTING MAT OPENINGS. THE MATTING SHALL NOT BE CUT FOR INSTALLATION OF PLANTINGS.

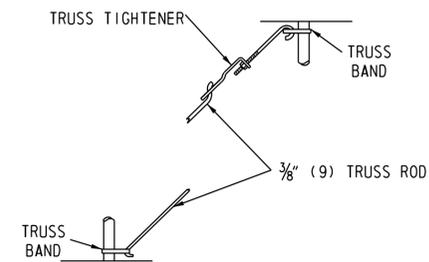
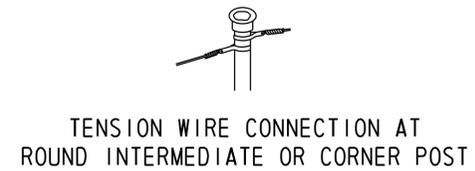


T:\173230A-DELDOT-STORMWATER-RETROFIT\2.2 - LEATHERMAN RUN DESIGN\CADD\XREFS\X-BORDERS\BD\_01.DGN

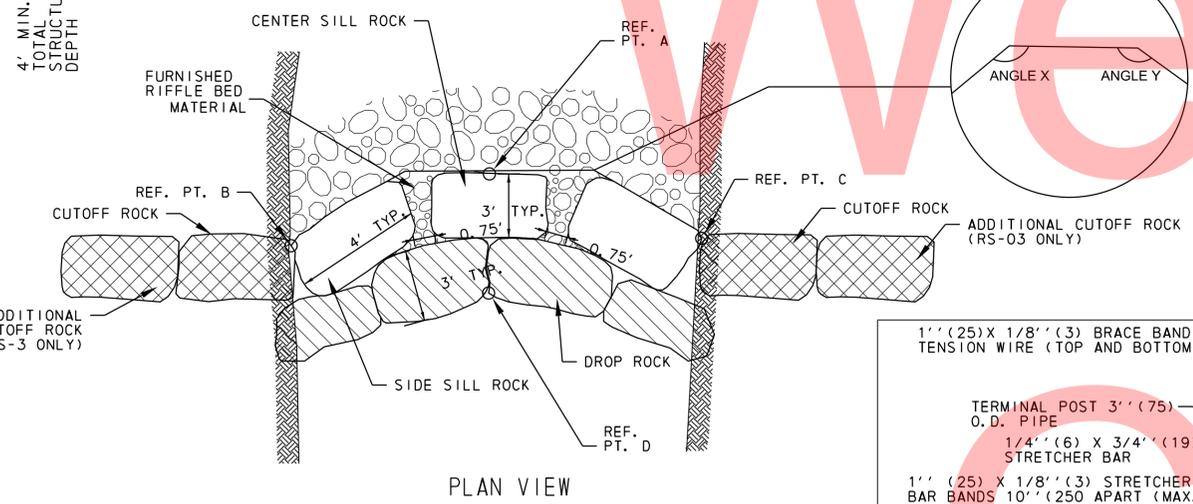
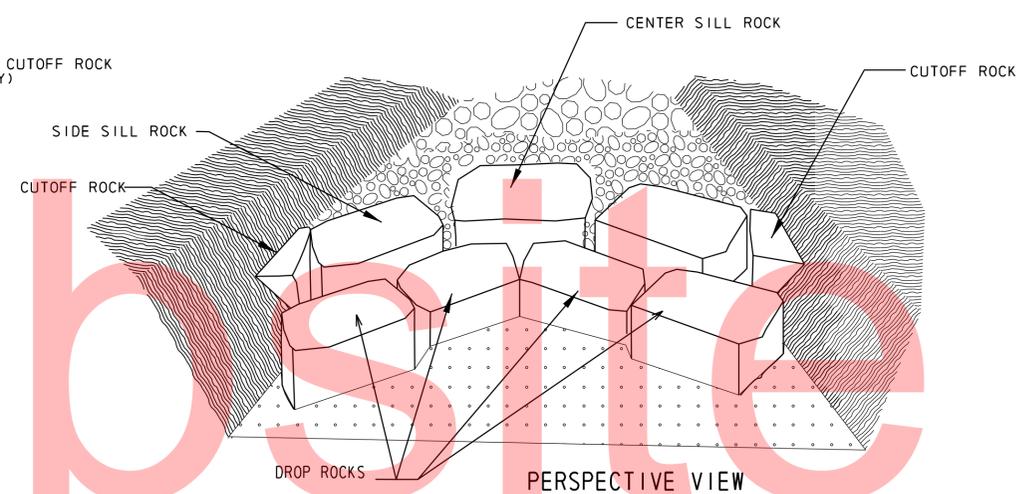
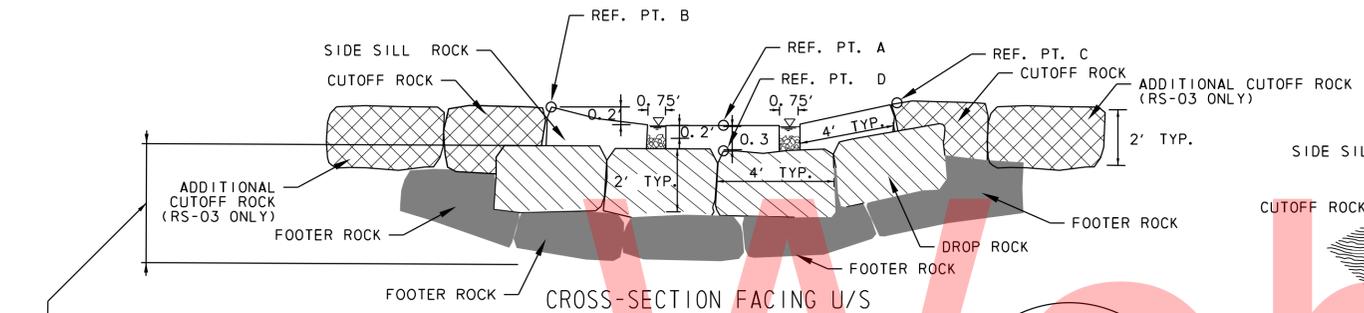


**NOTES:**

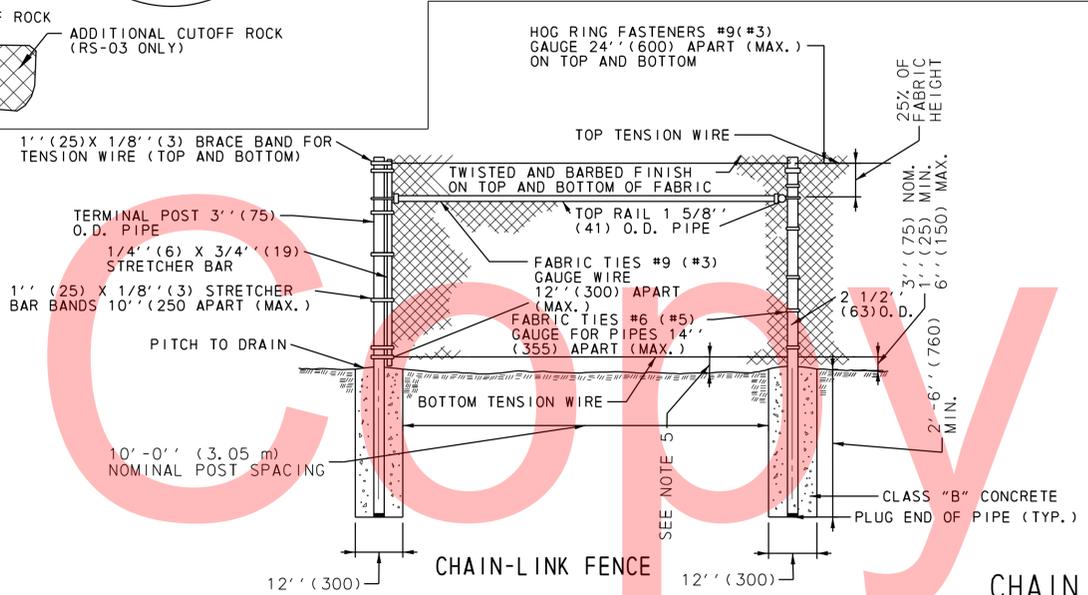
- ROCK SILL (TYPE 2) ARE DESIGNED TO INCLUDE A 0.75-FOOT GAP BETWEEN THE CENTER SILL ROCK(S) AND SIDE SILL ROCKS. THE FOOTER ROCKS AND THE CUTOFF / SIDE SILL ROCKS SHALL BE TIGHTLY PLACED TOGETHER IN A GAP FREE SEQUENCE. THE TYPE 2 SILLS INCLUDE A FORMATION OF DROP ROCKS SET A TYPICAL DEPTH OF 0.3-FOET BELOW THE TOP OF THE SILL. THE DROP ROCKS SHALL BE SET TO COVER THE ENTIRE CROSS-SECTIONAL FOOTPRINT OF THE CHANNEL, WITH THE SIDES OF THESE ROCKS TO BE BURIED IN THE STREAM BANK.
- IMBRICATED BOULDERS FOR CONSTRUCTION OF THE ROCK SILL SHALL HAVE THE ROUGH DIMENSIONS OF 2-FOOT X 3-FOOT X 4-FOOT AND HAVE A MINIMUM INDIVIDUAL STONE WEIGHT OF 1.7 TONS. THE ROCKS SHALL BE GENERALLY RECTANGULAR IN SHAPE WITH FLAT TOPS AND BOTTOMS, APPROPRIATE FOR STACKING AND STRUCTURE FORMATION. BOULDERS NOT CONFORMING TO THE GENERAL SIZE, WEIGHT, AND USAGE REQUIREMENTS OF THE PROJECT WILL BE REJECTED BY THE ENGINEER FOR USE IN CONSTRUCTION OF THE ROCK SILLS.
- TOP ROCKS FOR THE SILLS SHALL BE SUPPORTED BY FOOTER ROCKS, WITH THE FOOTER ROCKS OFFSET / SHINGLED SUCH THAT TOP AND FOOTER ROCK EDGES DO NOT ALIGN. THERE SHALL BE NO GAP BETWEEN FOOTER ROCKS.
- SEQUENCING OF THE PLACEMENT AND SELECTION OF INDIVIDUAL FOOTER AND TOP ROCKS TO MEET THE PROPOSED DESIGN ELEVATIONS FOR THE TOP OF EACH SILL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. DUE TO THE NATURAL VARIATION IN ROCK MATERIALS AND SIZES, THE CONTRACTOR SHALL MEASURE THE DEPTH OF EACH PROPOSED TOP SILL ROCK AND FOOTER ROCK TO DETERMINE THE MAXIMUM EXCAVATION LIMITS PRIOR TO PLACEMENT OF THE FOOTER ROCKS. FOOTER ROCKS SHALL BE PLACED ON A FIRM FOUNDATION OR ON SALVAGED CHANNEL BED SAND AND GRAVEL TO ELIMINATE POTENTIAL SUBSIDENCE OF THE SILL STRUCTURE. THE CONTRACTOR SHALL SURVEY THE TOP ELEVATION OF EACH FOOTER ROCK TO ENSURE THAT IT IS SET AT THE APPROPRIATE ELEVATION TO MATCH THE THICKNESS OF THE TOP ROCKS PRIOR TO PLACING THE TOP ROCKS TO PROPOSED FINAL GRADE. ONCE PLACED, THE CONTRACTOR SHALL SURVEY THE ELEVATIONS OF THE TOP ROCKS AND IF THE PROPOSED FINAL ELEVATIONS OF THE TOP ROCKS ARE NOT MET, THE CONTRACTOR WILL NEED TO REMOVE THE TOP ROCKS AND ADJUST THE FOOTER ROCKS HIGHER OR LOWER AS NEEDED, OR REPLACE THE TOP ROCKS WITH MORE SUITABLE ROCKS TO MEET THE PROPOSED FINAL GRADE OF THE SILL.
- THE GAPS ON THE SILL SHALL BE FILLED WITH FURNISHED RIFFLE BED MATERIAL MATERIALS TO FORM A SLOPED CHANNEL SECTION THAT CONNECTS THE ELEVATION OF THE DROP ROCK TO THE NOTED UPSTREAM ELEVATION OF THE RIFFLE. THE LARGEST POSSIBLE ROCK MATERIALS SHALL BE USED FOR THIS FILL TO PROVIDE A TIGHT / NON-MOBILE FIT IN THE IMBRICATED ROCK GAPS.
- PLACE CLASS GS-1 GEOTEXTILE ON THE UPSTREAM FACE OF THE SILL PRIOR TO BACKFILLING THE CHANNEL. FABRIC SHALL COVER THE ENTIRE FACE AND SHALL EXTEND A MAXIMUM OF 2-FOET UPSTREAM OF THE STRUCTURE. THE GEOTEXTILE SHALL BE TRIMMED AT THE FACE SUCH THAT NO FABRIC IS VISIBLE ABOVE THE FINISHED SURFACE. THE UPSTREAM EXTENSION OF THE FABRIC SHALL BE BURIED A MINIMUM OF 4-FOET BELOW THE FINISHED GRADE. THE GEOTEXTILE IS TO BE PROVIDED TO PREVENT PIPING OF FINE PARTICLES BETWEEN GAPS IN THE IMBRICATED ROCK.



CHAIN-LINK FENCE ASSEMBLIES



ROCK SILL (RS-2 & RS-3) TYPE 2  
DETAIL  
NOT TO SCALE



CHAIN LINK FENCE & POST DETAIL  
NOT TO SCALE

**GENERAL NOTES**

- POSTS
 

	TERMINAL, CORNER AND GATE POSTS	LINE POSTS	TOP OR BRACE RAIL
AASHTO TYPE	3" (75) O.D. PIPE	2 1/2" (64) O.D. PIPE	1 5/8" (41) O.D. PIPE
AASHTO GRADE	1 OR 11	1 OR 11	1 OR 11
	1 OR 2	1 OR 2	1 OR 2
MINIMUM LENGTH OF POST:	10' - 8" (3250)	10' - 8" (3250)	N/A
ACTUAL OUTSIDE DIAMETER	2 7/8" (73)	2 3/8" (60)	1.660" (42)
WALL THICKNESS	GRADE 1 = .203" (5.2) GRADE 2 = .160" (4)	GRADE 1 = .154" (3.9) GRADE 2 = .120" (3)	GRADE 1 = .140" (3.5) GRADE 2 = .111" (2.8)
- THE DEPTH OF CONCRETE FOOTERS IN SOLID ROCK MAY BE REDUCED TO 12" (300) BELOW THE TOP OF ROCK AND THE DIAMETER OF THE HOLE IN ROCK MAY BE REDUCED TO 6" (150).
- BRACE BANDS AND STRETCHER BAR BANDS SHALL BE FURNISHED WITH 3/8" (8) DIA. CARRIAGE BOLTS AND ELASTIC STOP NUTS.
- DRIVE ANCHOR SHOE ASSEMBLY ONLY TO BE USED IN WET AREAS AND WITH PRIOR APPROVAL OF THE ENGINEER.
- THE BOTTOM OF THE FENCE SHALL BE 2" (50) MAX ABOVE HARD GROUND OR PAVEMENT. WHERE THERE IS SOFT GROUND, THE BOTTOM OF THE FENCE SHALL EXTEND INTO THE GROUND IN ORDER TO BE FIRM DUE TO SHIFTING SOIL OR SAND.
- NUTS AND BOLTS SHALL BE TACK WELDED OR BURRED TO PREVENT REMOVAL.
- IF THERE ARE ANY OPENINGS IN THE FENCE LARGER THAN 96 SQ. IN. (620 sq. cm) DUE TO UTILITIES OR GRADED TERRAIN, THE OPENINGS SHALL BE SECURED WITH A METAL GRILL THAT IS LOCKED OR PERMANENTLY WELDED.
- VEGETATION AND PERMANENT STRUCTURES (SUCH AS BUILDINGS, LIGHT POLES, AND UTILITY POLES) SHALL BE AT LEAST 14' (4.2 m) FROM THE FENCE. ANY EXCEPTIONS SHALL REQUIRE THE CONSTRUCTION OF TOP GUARDS.

T:\173230A-DELDOT-STORMWATER-RETROFIT\2.2 - LEATHERMAN RUN DESIGN\CADD\REFS\X-BORDERS.BD 01.DGN

ADDENDUMS / REVISIONS

CONTRACT	<b>DT-03</b>
T201380204	DESIGNED BY: JML
COUNTY	CHECKED BY: RPP
NEW CASTLE	

<b>CONSTRUCTION DETAILS</b>	SHEET NO.
	15
	TOTAL SHTS.
	27

EROSION & SEDIMENT CONTROL NOTES:

1. ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE DELAWARE EROSION AND SEDIMENT CONTROL HANDBOOK, DATED MARCH 2013, AND ALL REVISIONS THEREOF AND ADDITIONS THERETO.

2. INSPECTION OF ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MADE WEEKLY AND AFTER EACH RAINFALL EVENT TO INSURE EFFECTIVE SEDIMENT CONTROL.

3. THE CONTRACTOR MUST NOTIFY DNREC SEDIMENT AND STORMWATER MANAGEMENT PROGRAM IN WRITING FIVE (5) DAYS PRIOR TO COMMENCEMENT OF CONSTRUCTION. FAILURE TO DO SO CONSTITUTES A VIOLATION OF THE APPROVED STORMWATER MANAGEMENT PLAN.

4. REVIEW AND OR APPROVAL OF THE EROSION AND SEDIMENT CONTROL PLAN SHALL NOT RELIEVE THE CONTRACTOR FROM HIS OR HER RESPONSIBILITIES FOR COMPLIANCE WITH THE REQUIREMENTS OF THE SEDIMENT AND STORMWATER REGULATIONS, NOR SHALL IT RELIEVE THE CONTRACTOR FROM ERRORS OR OMISSIONS IN THE APPROVED PLAN.

5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING AND WHEN NECESSARY REPAIRING THE EROSION AND SEDIMENT CONTROL AND STORMWATER MANAGEMENT PRACTICES DURING CONSTRUCTION.

6. FOLLOWING SOIL DISTURBANCE OR REDISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN 14 CALENDAR DAYS AS TO THE SURFACE OF ALL PERIMETER SEDIMENT CONTROLS, SOIL STOCKPILES, AND ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE.

7. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL REMAIN IN PLACE UNTIL FINAL STABILIZATION IS ESTABLISHED.

8. ALL AREAS OUTSIDE OF FACILITIES NOT COVERED BY BUILDINGS OR PAVEMENT WILL BE SEEDED USING PERMANENT SEED MIX AS SPECIFIED ON SHEETS LS-01 AND LS-02.

9. IF CONSTRUCTION ACTIVITY IS COMPLETED OR CEASES FOR A PERIOD OF 14 DAYS, ALL DISTURBED AREAS SHALL BE STABILIZED FOLLOWING THE SPECIFICATIONS AND STANDARDS IN THE DELAWARE EROSION AND SEDIMENT CONTROL HANDBOOK, DATED JUNE 2005, AND ALL REVISIONS THEREOF AND ADDITIONS THERETO.

10. DUST CONTROL SHALL BE ACHIEVED THROUGH TEMPORARY VEGETATIVE COVER, MULCHING AND/OR SPRINKLING WITH WATER.

11. DELDOT RESERVES THE RIGHT TO ADD, MODIFY, OR DELETE ANY SEDIMENT CONTROL MEASURES AS NECESSARY.

12. CONTRACTOR SHALL BE RESPONSIBLE TO REPAIR ANY PORTION OF CHAPMAN ROAD OR THE HIGH SCHOOL FIELD ACCESS ROAD, THAT ARE DAMAGED DUE TO CONSTRUCTION ACTIVITIES. REPAIRS SHALL BE PERFORMED IN ACCORDANCE TO DELDOT STANDARDS.

13. ALL VEHICLES SHALL ENTER AND EXIT THE CONSTRUCTION SITE VIA STABILIZED TEMPORARY CONSTRUCTION ENTRANCE.

14. MECHANIZED CONTRACTOR'S EQUIPMENT AND CLEARING/GRUBBING ARE PROHIBITED OUTSIDE OF THE LIMITS OF CONSTRUCTION (LOC).

15. CLEARING IN WETLAND AREAS WITHIN THE LOC SHALL BE KEPT TO A MINIMUM ABSOLUTELY NECESSARY FOR CONSTRUCTION ACCESS. IN WETLAND AREAS THAT ARE CLEARED, THERE SHALL BE NO GRUBBING EXCEPT WHERE NECESSARY TO CONSTRUCT PROJECT COMPONENTS SUCH AS UTILITIES, BANK GRADING AND RIPRAP PROTECTION. VEGETATION SHALL BE CUT FLUSH WITH THE GROUND (I.E. NO DISTURBANCE OF THE ROOT MAT)

16. TREE LOCATIONS ARE SHOWN FOR INFORMATIONAL PURPOSES ONLY AND MAY NOT BE EXACT. TREE PROTECTION MEASURES SHALL BE INSTALLED OR ADJUSTED TO LIMITS DIRECTED BY THE ENGINEER. MINOR CHANGES TO THE ACCESS ROADS, STRUCTURE PLACEMENT, OR LOC MAY BE NECESSARY TO AVOID UNINTENDED TREE IMPACTS. ANY CHANGES TO THE ACCESS ROADS, STRUCTURES, OR LOC SHALL BE APPROVED BY THE ENGINEER, DELDOT, AND DNREC.

17. NO TREES GREATER THAN 12" DBH SHALL BE REMOVED WITHOUT PRIOR APPROVAL FROM THE ENGINEER, UNLESS OTHERWISE NOTED ON THE CONSTRUCTION PLANS.

18. CONTRACTOR SHALL NOTIFY DELDOT AND THE PROJECT ENGINEER AT LEAST FIVE (5) WORKING DAYS PRIOR TO THE START OF PLANTING AND/OR INVASIVE REMOVAL.

19. NO PLANT SUBSTITUTIONS ARE PERMITTED BY THE CONTRACTOR WITHOUT PRIOR APPROVAL FROM DELDOT AND THE PROJECT ENGINEER.

20. SILT FENCE INSTALLATION ADJACENT TO WOODED WETLAND SHALL UTILIZE THE ALTERNATE SILT FENCE DETAIL.

21. SANDBAG DIVERSIONS SHALL BE CONSTRUCTED AT LOCATIONS AND AS DETAILED ON THE CONSTRUCTION PLANS, AND/OR DIRECTED BY THE ENGINEER TO DIVERT STREAM FLOW AWAY FROM CONSTRUCTION AREAS. SANDBAG DIVERSION SHALL BE INSTALLED PRIOR TO CONSTRUCTION, AND SHALL BE REMOVED AT THE COMPLETION OF WORK. SANDBAG DIVERSION SHALL BE REUSED AND RELOCATED THROUGHOUT THE PHASES OF CONSTRUCTION. RELOCATION OF THE SANDBAG DIVERSION SHALL NOT BE MEASURED AND SHALL BE INCIDENTAL TO THE UNIT COST FOR ITEM 909002.

22. TEMPORARY TIMBER MATS SHALL BE UTILIZED ALONG THE CONSTRUCTION ACCESS ROADS WITHIN ALL WETLAND AREAS.

SEQUENCE OF CONSTRUCTION

1. CONTRACTOR SHALL CONDUCT A PRE-CONSTRUCTION MEETING.

2. THE CONTRACTOR SHALL DIG A TEST HOLE AND LOCATE THE 8" GAS LINE ALONG CHAPMAN ROAD PRIOR TO EXCAVATION FOR INSTALLING THE SCE.

3. INSTALL STABILIZED CONSTRUCTION ENTRANCE AND E&S DEVICES FOR THE STAGING AND STOCKPILE AREA.

4. REMOVE CHAIN LINK FENCE ALONG WEST STREAM BANK, AS NOTED.

5. CLEAR THE MINIMUM AREA FOR INSTALLATION OF THE MULCH ACCESS ROAD (STA 10+00 LEFT TO 16+60 LEFT). TREES DESIGNATED FOR REMOVAL SHALL BE FLUSH, CUT AT GROUND LEVEL. THE TREE ROOT MASS SHALL NOT BE REMOVED.

6. INSTALL CONSTRUCTION SAFETY FENCE (CSF) ALONG THE ENTIRE LENGTH OF THE LOC EXCEPT AT STREAM CROSSINGS AND ACCESS POINTS.

7. INSTALL TREE PROTECTION MEASURES AS SPECIFIED.

8. INSTALL SILT FENCE AND REINFORCED SILT FENCE AT SPECIFIED LOCATIONS.

9. INSTALL SCE'S, MULCH ACCESS ROADS AND TEMPORARY TIMBER MATS AT SPECIFIED LOCATIONS.

10. PLACE DEWATERING PUMPS, SANDBAGS, AND OUTFALL PROTECTION AS SHOWN. START DEWATERING OPERATIONS AS STATED AT EACH STAGE.

STAGE 1 CONSTRUCTION (STA 10+00 TO STA 11+00)

11. PLACE CLEAN WATER PUMP-AROUND CONTROLS INCLUDING PUMPS, HOSE, SANDBAG DIKES, HOSE OUTFALL PROTECTION, AND DEWATERING DEVICES FOR STAGE 1 CONSTRUCTION.

12. START CLEAN WATER DIVERSION AND DIRTY WATER DEWATERING OPERATIONS.

13. PERFORM STAGE 1 CONSTRUCTION STARTING AT THE UPSTREAM END AND PROGRESSING DOWNSTREAM. WORK ITEMS INCLUDE RIPRAP PROTECTION RR-1 AND RR-2, RIFFLE R-1, CROSS VANE CV-1, IMBRICATED ROCK SEWERLINE PROTECTION IR-1, STREAM CHANNEL BED AND FLOODPLAIN BENCH CONSTRUCTION, STREAM BANK GRADING AND STABILIZATION. STAGE 1 WORK SHALL BE COORDINATED WITH CONSTRUCTION OF 16" DIP SEWER LINE AND ASSOCIATED CONCRETE ENCASUREMENT. SEE NEW CASTLE COUNTY SEWER LINE CONSTRUCTION PLANS FOR DETAILS RELATED TO INSTALLATION AND FLOW MAINTENANCE FOR SEWER LINE CONSTRUCTION.

14. STABILIZE REMAINING STREAMBANK AND FLOODPLAIN AREAS WITH COIR MATTING, PERMANENT SEED AND STRAW MULCH. DISK AND RAKE THE EXPOSED GROUND SURFACE PRIOR TO PLACEMENT OF SEED, MULCH AND MATTING.

STAGE 2 CONSTRUCTION (STA 11+00 TO STA 12+90)

15. PLACE CLEAN WATER PUMP-AROUND CONTROLS INCLUDING PUMPS, HOSE, SANDBAG DIKES, HOSE OUTFALL PROTECTION, AND DEWATERING DEVICES FOR STAGE 2 CONSTRUCTION.

16. START CLEAN WATER DIVERSION AND DIRTY WATER DEWATERING OPERATIONS.

17. PERFORM STAGE 2 CONSTRUCTION STARTING AT THE UPSTREAM END AND PROGRESSING DOWNSTREAM. WORK ITEMS INCLUDE RIFFLE R-2, R-3, R-4, IMBRICATED ROCK SEWER LINE PROTECTION IR-2, ROCK SILL RS-1, STREAM CHANNEL BED AND FLOODPLAIN BENCH CONSTRUCTION, STREAM BANK GRADING AND STABILIZATION. STAGE 2 WORK SHALL BE COORDINATED WITH CONSTRUCTION OF THE 8" DIP SEWER LINE AND ASSOCIATED CONCRETE ENCASUREMENT. SEE NEW CASTLE COUNTY SEWER LINE CONSTRUCTION PLANS FOR DETAILS RELATED TO INSTALLATION AND FLOW MAINTENANCE FOR SEWER LINE CONSTRUCTION.

18. STABILIZE REMAINING STREAMBANK AND FLOODPLAIN AREAS WITH COIR MATTING, PERMANENT SEED AND STRAW MULCH. DISK AND RAKE THE EXPOSED GROUND SURFACE PRIOR TO PLACEMENT OF SEED, MULCH AND MATTING.

STAGE 3 CONSTRUCTION (STA 12+90 TO STA 14+75)

19. PLACE CLEAN WATER PUMP-AROUND CONTROLS INCLUDING PUMPS, HOSE, SANDBAG DIKES, HOSE OUTFALL PROTECTION, AND DEWATERING DEVICES FOR STAGE 3 CONSTRUCTION.

20. START CLEAN WATER DIVERSION AND DIRTY WATER DEWATERING OPERATIONS.

21. PERFORM STAGE 3 CONSTRUCTION STARTING AT THE UPSTREAM END AND PROGRESSING DOWNSTREAM WORK ITEMS INCLUDE RIFFLES R-5, R-6, AND R-7, RIPRAP PROTECTION RR-3, ROCK SILL RS-2, STREAM CHANNEL BED AND FLOODPLAIN BENCH CONSTRUCTION, STREAM BANK GRADING AND STABILIZATION.

22. STABILIZE REMAINING STREAMBANKS AND FLOODPLAIN AREAS WITH COIR MATTING, PERMANENT SEED AND STRAW MULCH. DISK AND RAKE THE EXPOSED GROUND SURFACE PRIOR TO PLACEMENT OF SEED, MULCH AND MATTING.

STAGE 4 CONSTRUCTION (STA 14+75 TO STA 16+60)

23. PLACE CLEAN WATER PUMP-AROUND CONTROLS INCLUDING PUMPS, HOSE, SANDBAG DIKES, HOSE OUTFALL PROTECTION, AND DEWATERING DEVICES FOR STAGE 4 CONSTRUCTION.

24. START CLEAN WATER DIVERSION AND DIRTY WATER DEWATERING OPERATIONS.

25. PERFORM STAGE 4 CONSTRUCTION STARTING AT THE UPSTREAM END AND PROGRESSING DOWNSTREAM. WORK ITEMS INCLUDE RIFFLE R-8, R-9, R-10, R-11, ROCK SILL RS-3, STREAM CHANNEL BED AND FLOODPLAIN BENCH CONSTRUCTION, STREAM BANK GRADING AND STABILIZATION.

26. STABILIZE REMAINING AREAS WITH COIR MAT, PERMANENT SEED AND STRAW MULCH. DISK AND RAKE THE EXPOSED GROUND SURFACE PRIOR TO PLACEMENT OF SEED, MULCH AND MATTING.

27. WORK STAGES 1, 2, 3, AND 4 ALL UTILIZE THE STREAM DIVERSION PUMP-AROUND PRACTICE. DIVERSION OUTFLOW POINTS, OUTFALL PROTECTION, DOWNSTREAM SAND BAGS, DIRTY WATER PUMPS, AND FILTER BAGS SHALL CHANGE FROM STAGE TO STAGE AS INDICATED ON THE PLANS. FILTER BAGS SHALL BE REPLACED ONCE FILLED TO 70% CAPACITY WITH SEDIMENT OR AT THE DIRECTION OF THE ENGINEER.

28. PROJECT CONSTRUCTION INCLUDES RAISING OF THE STREAMBED THROUGHOUT THE CHANNEL. AT THE END OF EACH DAY, THE CONTRACTOR IS TO STABILIZE THE DOWNSTREAM END OF THE RAISED CHANNEL BED USING CLASS 1 RIPRAP OR SANDBAGS AS SHOWN ON THE END OF DAY STREAMBED STABILIZATION DETAIL. STABILIZATION TREATMENTS SHALL BE ESTABLISHED BEFORE DAILY SHUT-DOWN OF THE PUMP AROUND PRACTICE AND SHALL BE COMPLETELY REMOVED FROM THE CHANNEL AFTER PUMP-AROUND RESTART THE SUCCESSIVE DAY.

29. THE CLEAN WATER PUMP-AROUND SHALL BE SHUT DOWN AND ALL SANDBAG DIKES REMOVED AT THE END OF EACH WORK DAY. PRIOR TO REMOVAL OF SANDBAG DIKES, ALL SEDIMENT LADEN WATER (DIRTY WATER) SHALL BE REMOVED FROM THE STREAM. ALL DIRTY WATER SHALL BE PUMPED TO A FILTER BAG.

30. THE CONTRACTOR SHALL NOT DISTURB ANY EARTH OUTSIDE OF THE IMMEDIATE WORK ZONE. ALL VEHICLES ARE TO TRAVEL ON THE MULCH AND TIMBER ACCESS PATHS. ALL DISTURBED AREAS OUTSIDE OF THE ACCESS PATH ARE TO BE STABILIZED WITH STRAW MULCH BY THE END OF EACH WORK DAY.

31. UPON COMPLETION AND STABILIZATION OF STAGE 1, 2, 3, AND 4 AND WITH THE PERMISSION OF THE EROSION AND SEDIMENT CONTROL INSPECTOR, PROCEED TO STAGE 5

STAGE 5 CONSTRUCTION

32. DISK AND RAKE ALL REMAINING PLANTING AREAS TO BE SEEDED. BROADCAST SEED. PLACE STRAW MULCH AND COIR MATTING

33. WORK ITEMS INCLUDE INSTALLATION OF LANDSCAPE PLANTINGS.

34. UPON COMPLETION OF THE LANDSCAPE PLANTINGS, AND WITH PERMISSION OF THE EROSION AND SEDIMENT CONTROL INSPECTOR, REMOVE REMAINING EROSION AND SEDIMENT CONTROL DEVICES AND THE STABILIZED CONSTRUCTION ENTRANCE.

T:\173230A-DELDOT-STORMWATER-RETROFIT\2.2 - LEATHERMAN RUN DESIGN\CADD\XREFS\X-BORDERS\BD\_00.DGN

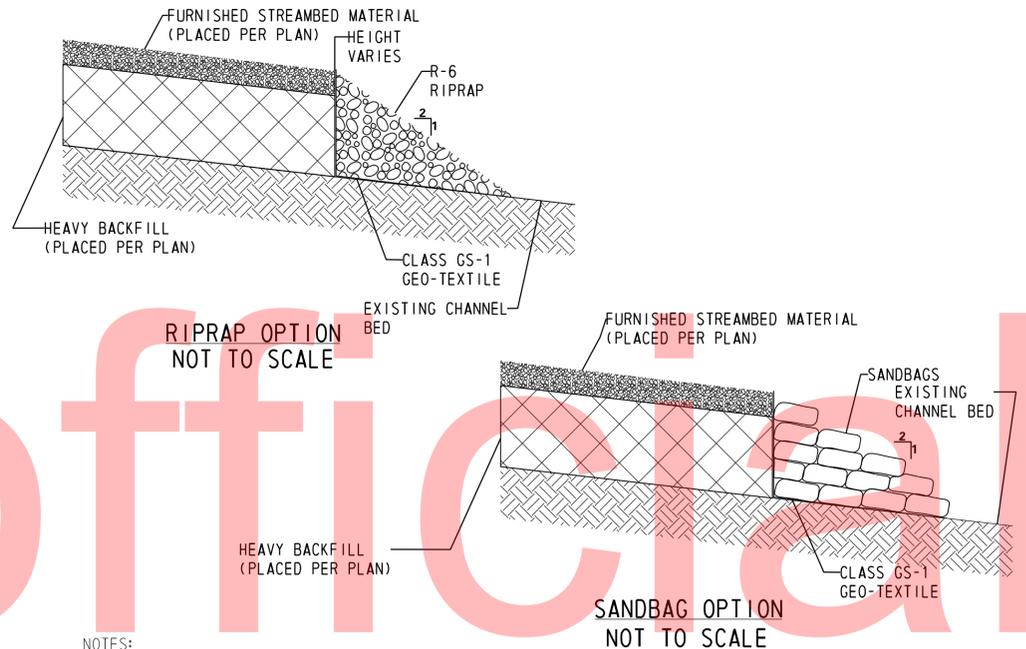
ADDENDUMS / REVISIONS	

CONTRACT	<b>CS-01</b>
T201380204	DESIGNED BY: JML
COUNTY	CHECKED BY: RPP
NEW CASTLE	

<b>CONSTRUCTION PHASING, M.O.T., AND EROSION CONTROL NOTES</b>	SHEET NO.
	16
	TOTAL SHTS.
	27

**MAINTENANCE OF TRAFFIC**

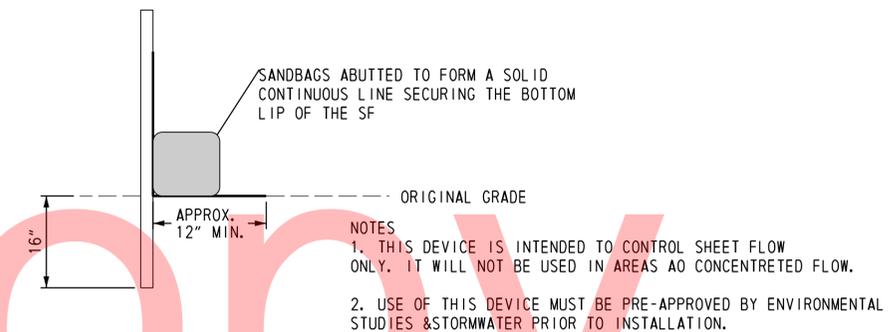
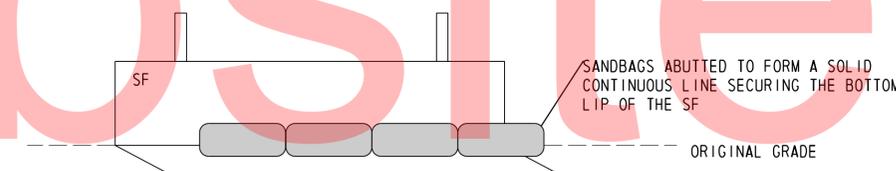
- 1) ALL WORK SHALL BE PERFORMED IN A MANNER THAT WILL REASONABLY PROVIDE THE LEAST PRACTICABLE OBSTRUCTION TO ALL ROAD USERS, INCLUDING VEHICULAR, PEDESTRIAN, AND BICYCLE TRAFFIC, AND SHALL CONFORM TO THE REQUIREMENTS OF THE 2011 DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (DE MUTCD), PART 6, INCLUDING ALL REVISIONS UP TO THE DATE OF ADVERTISEMENT FOR BIDS.
- 2) MAINTENANCE OF TRAFFIC DURING SHOULDER CLOSURES, IF NECESSARY, ON TWO-LANE ROADWAYS SHALL CONFORM TO TYPICAL APPLICATION 3 (TA-3) OF THE DE MUTCD.
- 3) THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING HIS WORK WITH OTHER CONTRACTORS IN THE AREA.
- 4) ALL TRAFFIC CONTROL DEVICES SHALL BE IN NEW OR REFURBISHED CONDITION, SHALL COMPLY WITH THE DE MUTCD, SHALL BE NCHRP 350 AND/OR MASH COMPLIANT, AND SHALL BE APPROVED BY THE DELDOT SAFETY SECTION AND THE ENGINEER PRIOR TO INSTALLATION. TRAFFIC CONTROL DEVICES SHALL BE MAINTAINED IN GOOD CONDITION FOR DURATION OF USE.
- 5) ALL TEMPORARY AND/OR PERMANENT WARNING SIGNS WILL BE COVERED WITH RETROREFLECTIVE FLUORESCENT PRISMATIC SHEETING, ELIMINATING THE NEED FOR TYPE "B" WARNING LIGHTS ON THESE SIGNS. ALL OF THESE SIGNS SHALL BE MOUNTED ON BREAKAWAY POSTS SUCH THAT THE BOTTOM OF THE SIGN IS 7' ABOVE THE GROUND UNLESS OTHERWISE AUTHORIZED BY THE ENGINEER.
- 6) WHERE TYPICAL APPLICATIONS FROM THE DE MUTCD ARE USED, THE CONTRACTOR SHALL REVIEW THE REQUIRED SIGNING AND TRAFFIC CONTROL DEVICES WITH THE ENGINEER TO ENSURE THEIR APPLICABILITY PRIOR TO IMPLEMENTATION. LONGITUDINAL DIMENSIONS FOR PLACEMENT OF PERMANENT OR TEMPORARY WARNING SIGNS MAY BE ADJUSTED SLIGHTLY TO FIT FIELD CONDITIONS AS DIRECTED BY THE ENGINEER. ALL PERMANENT SIGNING SHALL BE 7' HIGH AND ALL TEMPORARY SIGNING SHALL BE 5' HIGH.
- 7) ROADWAY AND SHOULDER WORK, IF NECESSARY, SHALL BE PERFORMED IN A MANNER SUCH THAT POSITIVE DRAINAGE OF THE ROADWAY SURFACE IS MAINTAINED THROUGHOUT CONSTRUCTION. ALL WORK AND MATERIALS TO PROVIDE AND MAINTAIN THIS DRAINAGE SHALL BE INCIDENTAL TO ITEM 743000 MAINTENANCE OF TRAFFIC.
- 8) THE DEPARTMENT WILL NOT MAKE PAYMENT TO THE CONTRACTOR FOR ANY AND ALL TRAFFIC CONTROL DEVICES WHICH ARE IN PLACE AND/OR REQUIRED DURING THE FOLLOWING PERIODS.
  - A) PERIODS WHEN THE CONTRACTOR CAN PURSUE WORK, BUT CHOOSES NOT TO. THIS INCLUDES WEEKENDS WITHIN AND CONTIGUOUS TO THE PERIOD FOR WHICH THE CONTRACTOR CHOOSES NOT TO PURSUE WORK.
  - B) PERIODS WHICH THE CONTRACTOR PURSUES WORK, BUT WHICH ARE OUTSIDE OF THE APPROVED CONTRACT TIME (ALLOCATED WORKING/CALENDAR DAYS AND JUSTIFIABLE EXTENSIONS).
- 9) ENTRANCE AND SIDE ROAD TIE-IN AREAS, IF NECESSARY, SHALL BE CONSTRUCTED ONLY TO THE EXTENT THAT CAN BE PAVED OR TEMPORARILY STABILIZED WITH GRADED AGGREGATE BASE AT THE END OF A WORK DAY.
- 10) TEMPORARY WARNING SIGN ASSEMBLIES CONTAINING MORE THAN ONE TRAFFIC CONTROL SIGN PER SIGN POST SHALL HAVE THE POST(S) EMBEDDED INTO THE GROUND, AND SHALL COMPLY WITH NCHRP-350 REGULATIONS.
- 11) ALL TEMPORARY WARNING SIGN POSTS SHALL BE BREAKAWAY.



**NOTES:**

1. END OF THE DAY STREAMBED STABILIZATION IS FOR USE DURING CONSTRUCTION OF THE PEACHWOOD PARK TRIBUTARY AND THE GOOD HOPE ROAD TRIBUTARY.
2. TREATMENT SHALL BE USED BY THE CONTRACTOR AT THE END OF EACH WORK DAY TO STABILIZE THE DOWNSTREAM LIMIT OF THE DAILY WORK ZONE. TREATMENT SHALL BE INSTALLED PRIOR TO SHUTTING OFF THE PUMP AROUND PRACTICE.
3. TREATMENT SHALL BE COMPLETELY REMOVED FROM THE CHANNEL AT THE START OF THE SUCCESSIVE WORK DAY AFTER ESTABLISHMENT OF THE PUMP-AROUND AND DEWATERING.
4. MATERIALS FROM THE END OF DAY STABILIZATION MAY BE RE-USED BY THE CONTRACTOR.
5. THE CONTRACTOR SHALL USE EITHER R-6 RIPRAP OR SANDBAGS FOR STABILIZATION.
6. THE COST FOR END OF THE DAY STREAMBED STABILIZATION SHALL BE INCIDENTAL TO THE COST FOR MAINTENANCE OF STREAMFLOW.
7. END OF THE DAY STREAM BED STABILIZATION SHALL BE INCLUDED IN THE LUMP SUM COST FOR ITEM 909005-STREAM DIVERSION.

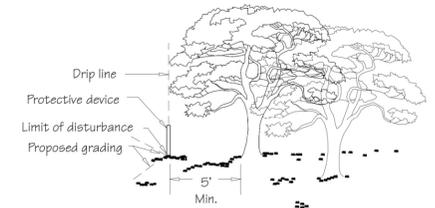
**END OF THE DAY STREAMBED STABILIZATION NOT TO SCALE**



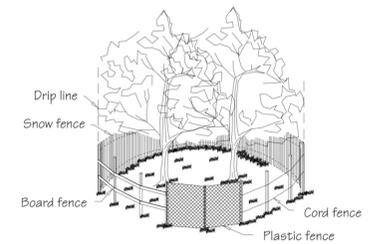
- NOTES**
1. THIS DEVICE IS INTENDED TO CONTROL SHEET FLOW ONLY. IT WILL NOT BE USED IN AREAS AO CONCENTRETED FLOW.
  2. USE OF THIS DEVICE MUST BE PRE-APPROVED BY ENVIRONMENTAL STUDIES & STORMWATER PRIOR TO INSTALLATION.

**ALTERNATE SILT FENCE INSTALLATION WETLANDS/WOODED AREAS ONLY NOT TO SCALE**

**Standard Detail & Specifications Tree Protection**



Location of Tree Protection



Methods of Tree Protection

Source: Adapted from VA ESC Handbook	Symbol: <b>TP</b>	Detail No. <b>DE-ESC-3.7.2</b> Sheet 1 of 3 Date: 12/03
---	----------------------	--

**Standard Detail & Specifications Tree Protection**

**Construction Notes:**

Any device may be used which will effectively protect the roots, trunk and tops of trees retained on the site. However, trees to be retained within 40 feet of a proposed building or excavation shall be protected by fencing. Personnel must be instructed to honor protective devices. The devices described are suggested only, and are not intended to exclude the use of other devices which will protect the trees to be retained.

**Materials:**

1. Snow Fence - Standard 40-inch high snow fence shall be placed at the limits of clearing on standard steel posts set 6 feet apart.
2. Board Fence - Board fencing consisting of 4-inch square posts set securely in the ground and protruding at least 4 feet above the ground shall be placed at the limits of clearing with a minimum of two horizontal boards between posts. If it is not practical to erect a fence at the drip line, construct a triangular fence nearer the trunk. The limits of clearing will still be located at the drip line, since the root zone within the drip line will still require protection.
3. Plastic Fencing - 40-inch high "international orange" plastic (polyethylene) web fencing secured to conventional metal "T" or "U" posts driven to a minimum depth of 18 inches on 6-foot minimum centers shall be installed at the limits of clearing. The fence should have the following minimum physical qualities:
  - a. Tensile yield: Average 2,000 lbs. per 4-foot width (ASTM D638)
  - b. Ultimate tensile yield: Average 2,900 lbs. per 4-foot width (ASTM D638)
  - c. Elongation at break (%): Greater than 1000% (ASTM D638)
  - d. Chemical resistance: Inert to most chemicals and acids

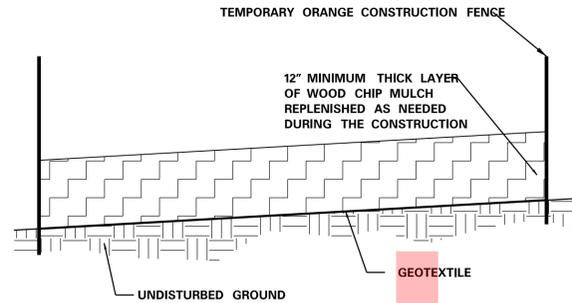
Source: Adapted from VA ESC Handbook	Symbol: <b>TP</b>	Detail No. <b>DE-ESC-3.7.2</b> Sheet 2 of 3 Date: 12/03
---	----------------------	--

**NOTE**  
1. THE TREE PROTECTION IS INCIDENTAL TO ITEM 201000 CLEARING AND GRUBBING.

**TREE PROTECTION DETAIL NOT TO SCALE**

T:\173230A-DELDOT-STORMWATER-RETROFIT\2.2-LEATHERMAN RUN DESIGN\CADD\XREFS\X-BORDERS.VBD 00.DGN

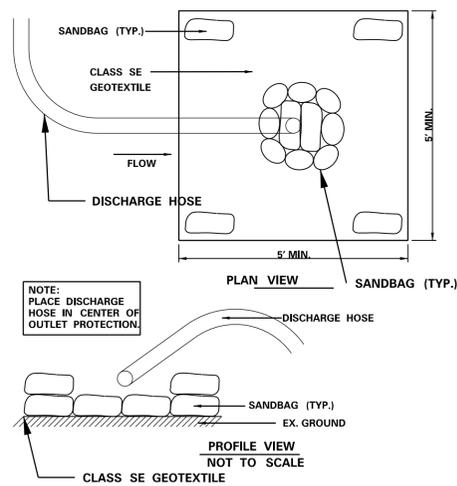
<p><b>DELAWARE DEPARTMENT OF TRANSPORTATION</b></p>	ADDENDUMS / REVISIONS		<p><b>LEATHERMANS RUN RESTORATION AT CHRISTIANA HIGH SCHOOL</b></p>	CONTRACT T201380204	<p><b>CS-02</b></p>	<p><b>M.O.T AND EROSION AND SEDIMENT CONTROL DETAILS</b></p>	SHEET NO. 17
				COUNTY NEW CASTLE			DESIGNED BY: JML
					CHECKED BY: RPP		



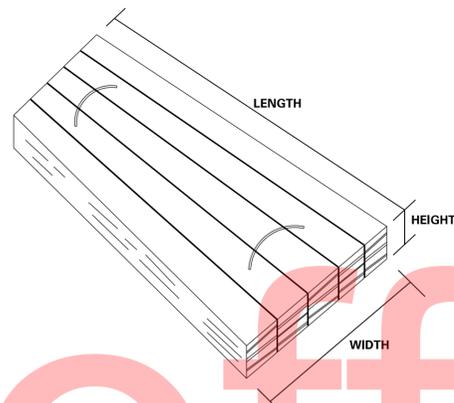
NOTES:

1. ACCESS ROUTES TO BE VERIFIED BY ENGINEER AT PRE-CONSTRUCTION MEETING. REVISIONS TO THE ALIGNMENT THAT MINIMIZE TREE DISTURBANCE ARE ENCOURAGED AND REQUIRE REVIEW AND APPROVAL BY THE ENGINEER.
2. NATURAL FIBER MATTING SHALL BE PLACED WITH SEAMS PARALLEL TO THE FLOW OF TRAFFIC, OVERLAP FABRIC BY 18" MINIMUM AT SEAMS.
3. NATURAL FIBER MATTING MAY BE ELIMINATED AT DIRECTION OF ENGINEER.
4. CONTRACTOR SHALL MAINTAIN MULCH MAT THROUGHOUT CONSTRUCTION PERIOD. AFTER COMPLETION OF THE PROJECT, MULCH CAN REMAIN IN PLACE AT A MAXIMUM DEPTH OF 2".
5. SCARIFICATION OF COMPACTED MULCH TO OCCUR UPON REMOVAL OF HAUL ROAD, AT DIRECTION OF ENGINEER.
6. THE HAUL ROAD IS DESIGNED TO PREVENT COMPACTION OF EXISTING SOILS USING LOW PRESSURE EQUIPMENT WHICH EXERTS NO MORE THAN 8 PSI. IF THE CONTRACTOR INTENDS TO USE ANY EQUIPMENT WITH HIGHER LOADS, ADDITIONAL PROTECTION MEASURES MUST BE PROVIDED, AT NO ADDITIONAL COST TO THE DEPARTMENT, AND THOSE MEASURES MUST BE APPROVED BY THE ENGINEER PRIOR TO IMPLEMENTATION.
7. ALL MULCH AND GEOTEXTILE SHALL BE REMOVED AT THE END OF CONSTRUCTION.

MULCH ACCESS ROAD DETAIL  
NOT TO SCALE



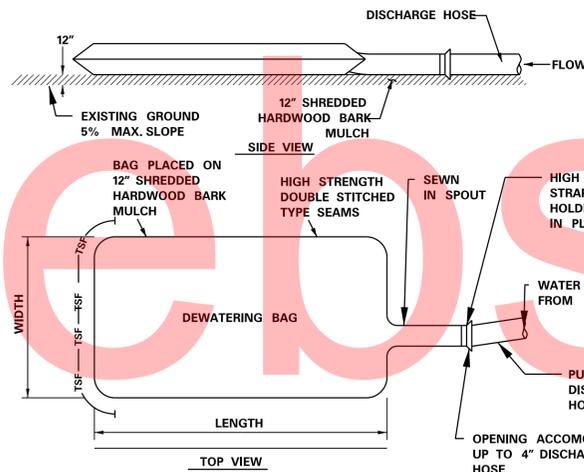
OUTLET PROTECTION  
NOT TO SCALE



NOTES:

1. TIMBER MATS SHALL BE USED TO TRAVERSE STREAM CHANNEL AND IF THERE IS AN UTILITY LINE UNDERGROUND, TIMBER MATS CAN BE REUSED AS NECESSARY THROUGHOUT THE PROJECT.
2. MATERIAL: DRAGLINE MATS OR SIMILAR TIMBER MATTING SHALL BE CONSTRUCTED FROM MIXED AMERICAN OAK HARDWOODS INCLUDING OAK, BEECH AND HICKORY.
3. CONTRACTOR IS RESPONSIBLE TO SELECT APPROPRIATE SIZE/STRENGTH OF TIMBER MATTING BASED ON EQUIPMENT TO BE USED

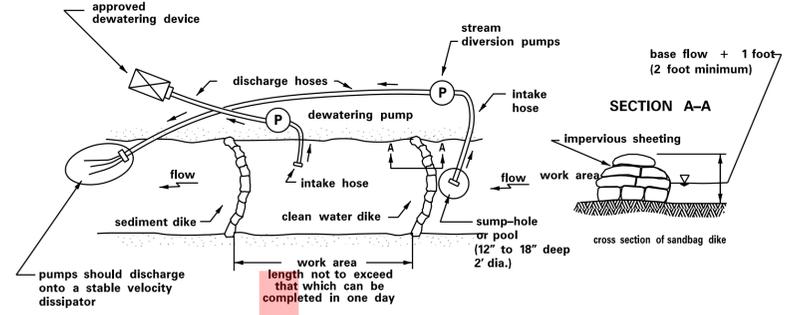
TIMBER MAT DETAIL  
NOT TO SCALE



NOTES:

1. TIGHTLY SEAL SLEEVE AROUND THE PUMP DISCHARGE HOSE WITH A STRAP OR SIMILAR DEVICE.
2. PLACE FILTER BAG ON TWELVE (12) INCHES OF SHREDDED HARDWOOD BARK MULCH THAT EXTENDS A MINIMUM OF ONE (1) FOOT BEYOND THE FOOTPRINT OF THE FILTER BAG ON ALL SIDES. DEWATERING BAG SHALL BE PLACED ON A LEVEL OR 5% MAXIMUM SLOPING SURFACE, AND DISCHARGE TO A STABILIZED AREA. TRENCHLESS SILT FENCE (TSF) SHALL BE PLACED AROUND THE DOWNSTREAM END OF THE FILTER BAG (OR WHERE THE WATER DISCHARGES FROM THE DEWATERING BAG).
3. CONTROL PUMPING RATE TO PREVENT EXCESSIVE PRESSURE WITHIN THE DEWATERING BAG, AS THE BAG FILLS WITH SEDIMENT, REDUCE PUMPING RATE.
4. REMOVE AND PROPERLY DISPOSE OF DEWATERING BAG UPON COMPLETION OF PUMPING OPERATIONS OR AFTER BAG HAS REACHED CAPACITY, WHICHEVER OCCURS FIRST. SPREAD THE DEWATERED SEDIMENT FROM THE BAG IN AN APPROVED UPLAND AREA AND STABILIZE BY THE END OF THE WORK DAY. RESTORE THE SURFACE AREA BENEATH THE BAG TO ORIGINAL CONDITION UPON REMOVAL OF THE DEVICE.
5. USE NONWOVEN GEOTEXTILE WITH A MINIMUM SURFACE AREA OF 225 SQUARE FEET PER SIDE AND WITH DOUBLE STITCHED SEAMS USING HIGH STRENGTH THREAD. SIZE SLEEVE TO ACCOMMODATE A MAXIMUM 4 INCH DIAMETER PUMP DISCHARGE HOSE. THE BAG MUST BE MANUFACTURED FROM A NONWOVEN GEOTEXTILE THAT MEETS OR EXCEEDS MINIMUM AVERAGE ROLL VALUES (MARV) AS DESCRIBED BELOW:

DEWATERING BAG DETAIL  
NOT TO SCALE



DESCRIPTION

THE WORK SHALL CONSIST OF INSTALLING A TEMPORARY PUMP AROUND AND SUPPORTING MEASURES TO DIVERT FLOW AROUND IN-STREAM CONSTRUCTION SITES. ALL PUMPS, HOSES, VELOCITY DISSIPATORS, PUMP HEADS, INTAKES, FUEL, LABOR, AND TOOLS NECESSARY FOR ESTABLISHMENT AND OPERATIONS OF THE CLEAN WATER STREAM DIVERSION AND DIRTY WATER PUMPING SHALL BE PAID FOR UNDER ITEM 909005-STREAM DIVERSION, SANDBAGS AND DEWATERING BAGS SHALL BE PAID FOR UNDER ITEMS 909002 AND 906002, RESPECTIVELY.

IMPLEMENTATION SEQUENCE

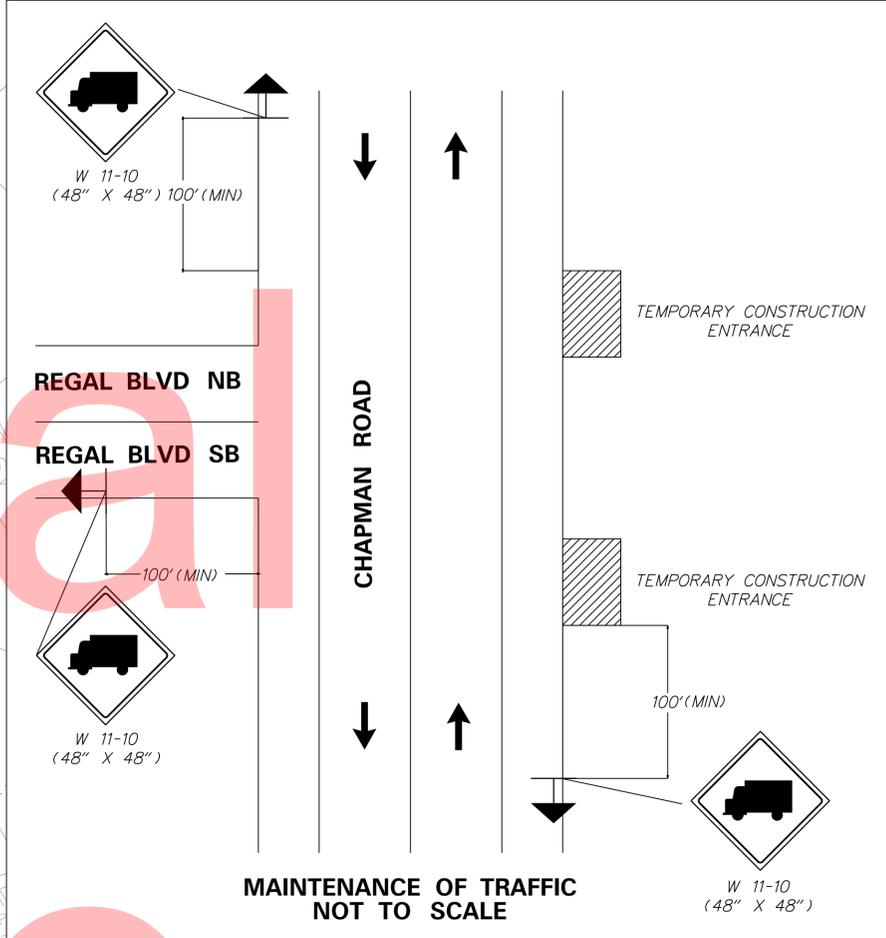
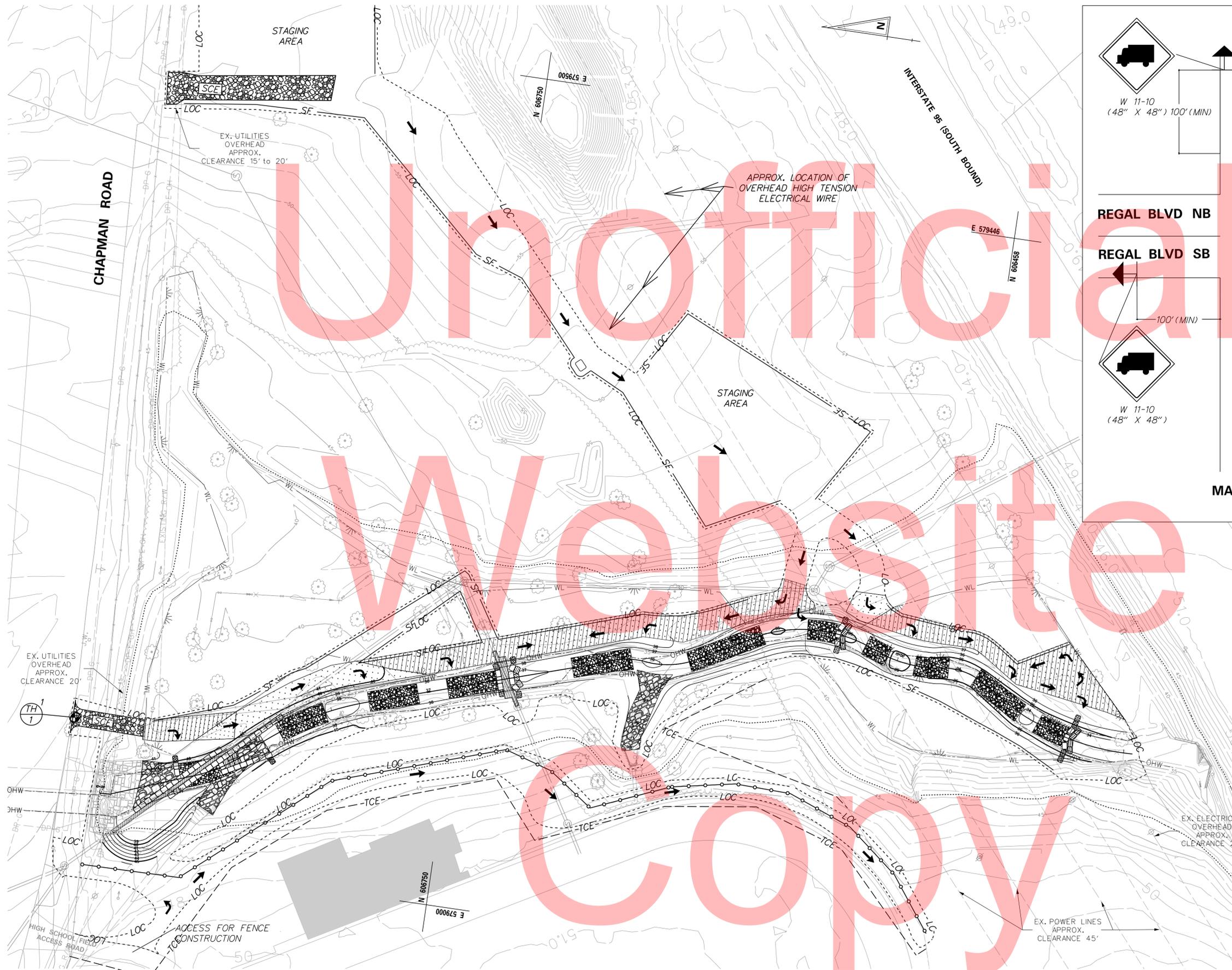
SEDIMENT CONTROL MEASURES, PUMP AROUND PRACTICES, AND ASSOCIATED CHANNEL AND BANK CONSTRUCTION SHALL BE COMPLETED IN THE FOLLOWING SEQUENCE (REFER TO DETAIL 1.2).

1. CONSTRUCTION ACTIVITIES INCLUDING THE INSTALLATION OF EROSION AND SEDIMENT CONTROL MEASURES SHALL NOT BEGIN UNTIL ALL NECESSARY EASEMENTS AND/OR RIGHT-OF-WAYS HAVE BEEN ACQUIRED. ALL EXISTING UTILITIES SHALL BE MARKED IN THE FIELD PRIOR TO CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING UTILITIES THAT MAY RESULT FROM CONSTRUCTION AND SHALL REPAIR THE DAMAGE AT HIS/HER OWN EXPENSE TO THE COUNTY'S OR UTILITY COMPANY'S SATISFACTION.
2. THE CONTRACTOR SHALL NOTIFY THE DELAWARE DEPARTMENT OF TRANSPORTATION OR DNREC SEDIMENT CONTROL INSPECTOR AT LEAST 7 DAYS BEFORE BEGINNING CONSTRUCTION. ADDITIONALLY, THE CONTRACTOR SHALL INFORM THE PROVIDER OF LOCAL UTILITIES A MIN. OF 48 HOURS BEFORE STARTING CONSTRUCTION.
3. THE CONTRACTOR SHALL CONDUCT A PRE-CONSTRUCTION MEETING ON SITE WITH THE DNREC SEDIMENT CONTROL INSPECTOR AND THE ENGINEER TO REVIEW LIMITS OF CONSTRUCTION, EROSION AND SEDIMENT CONTROL REQUIREMENTS, AND THE SEQUENCE OF CONSTRUCTION. THE CONTRACTOR SHALL STAKE OUT ALL LIMITS OF CONSTRUCTION PRIOR TO THE PRE-CONSTRUCTION MEETING SO THEY MAY BE REVIEWED. THE PARTICIPANTS WILL ALSO DESIGNATE THE CONTRACTORS STAGING AREAS AND FLAG ALL TREES WITHIN THE LIMIT OF CONSTRUCTION WHICH WILL BE REMOVED FOR CONSTRUCTION ACCESS. TREES SHALL NOT BE REMOVED WITHOUT APPROVAL FROM THE ENGINEER.
4. CONSTRUCTION SHALL NOT BEGIN UNTIL ALL SEDIMENT AND EROSION CONTROL MEASURES HAVE BEEN INSTALLED AND APPROVED BY THE ENGINEER AND THE SEDIMENT CONTROL INSPECTOR. THE CONTRACTOR SHALL STAY WITHIN THE LIMITS OF THE CONSTRUCTION AS SHOWN ON THE PLANS AND MINIMIZE DISTURBANCE WITHIN THE WORK AREA WHENEVER POSSIBLE.
5. UPON INSTALLATION OF ALL SEDIMENT CONTROL MEASURES AND APPROVAL BY THE SEDIMENT CONTROL INSPECTOR, THE CONTRACTOR SHALL BEGIN WORK AT THE UPSTREAM SECTION AND PROCEED DOWNSTREAM BEGINNING WITH THE ESTABLISHMENT OF STABILIZED CONSTRUCTION ENTRANCES. IN SOME CASES, WORK MAY BEGIN DOWNSTREAM IF APPROPRIATE. THE SEQUENCE OF CONSTRUCTION MUST BE FOLLOWED UNLESS THE CONTRACTOR GETS WRITTEN APPROVAL FOR DEVIATIONS FROM THE DNREC. AT THE END OF EACH WORK DAY, THE WORK AREA MUST BE STABILIZED AND THE PUMP AROUND REMOVED FROM THE CHANNEL. WORK SHALL NOT BE CONDUCTED IN THE CHANNEL DURING RAIN EVENTS.
6. SANDBAG DIKES SHALL BE SITUATED AT THE UPSTREAM AND DOWNSTREAM ENDS OF THE WORK AREA AS SHOWN ON THE PLANS AND STREAM FLOW SHALL BE PUMPED AROUND THE WORK AREA. THE PUMP SHALL DISCHARGE ONTO A STABLE VELOCITY DISSIPATER APPROVED BY DDOT AND THE ENGINEER.
7. WATER FROM THE WORK AREA SHALL BE PUMPED TO A SEDIMENT FILTERING MEASURE SUCH AS A DEWATERING BASIN, SEDIMENT BAG, OR OTHER APPROVED SOURCE. THE MEASURE SHALL BE LOCATED SUCH THAT THE WATER DRAINS BACK INTO THE CHANNEL BELOW THE DOWNSTREAM SANDBAG DIKE.
8. TRAVERSING A CHANNEL REACH WITH EQUIPMENT WITHIN THE WORK AREA WHERE NO WORK IS PROPOSED SHALL BE AVOIDED. IF EQUIPMENT HAS TO TRAVERSE SUCH A REACH FOR ACCESS TO ANOTHER AREA, THEN TIMBER MATS OR SIMILAR MEASURES SHALL BE USED TO MINIMIZE DISTURBANCE TO THE CHANNEL. TEMPORARY STREAM CROSSINGS SHALL BE USED ONLY WHEN NECESSARY AND ONLY WHERE NOTED ON THE PLANS OR SPECIFIED.
9. ALL STREAM RESTORATION MEASURES SHALL BE INSTALLED AS INDICATED BY THE PLANS AND ALL BANKS GRADED IN ACCORDANCE WITH THE GRADING PLANS AND TYPICAL CROSS-SECTIONS. ALL GRADING MUST BE STABILIZED AT THE END OF EACH DAY WITH SEED AND MATTING AS SPECIFIED ON THE PLANS.
10. AFTER AN AREA IS COMPLETED AND STABILIZED, THE CLEAN WATER DIKE SHALL BE REMOVED. AFTER THE FIRST SEDIMENT FLUSH, A NEW CLEAN WATER DIKE SHALL BE ESTABLISHED UPSTREAM FROM THE OLD SEDIMENT DIKE. FINALLY, UPON ESTABLISHMENT OF A NEW SEDIMENT DIKE BELOW THE OLD ONE, THE OLD SEDIMENT DIKE SHALL BE REMOVED.
11. A PUMP AROUND MUST BE INSTALLED ON ANY TRIBUTARY OR STORM DRAIN OUTFALL WHICH CONTRIBUTES BASEFLOW TO THE WORK AREA. THIS SHALL BE ACCOMPLISHED BY LOCATING A SANDBAG DIKE AT THE DOWNSTREAM END OF THE TRIBUTARY OR STORM DRAIN OUTFALL AND PUMPING THE STREAM FLOW AROUND THE WORK AREA. THIS WATER SHALL DISCHARGE ONTO THE SAME VELOCITY DISSIPATER USED FOR THE MAIN STEM PUMP AROUND.
12. IF A TRIBUTARY IS TO BE RESTORED, CONSTRUCTION SHALL TAKE PLACE ON THE TRIBUTARY BEFORE WORK ON THE MAIN STEM REACHES THE TRIBUTARY CONFLUENCE. CONSTRUCTION IN THE TRIBUTARY, INCLUDING PUMP AROUND PRACTICES, SHALL FOLLOW THE SAME SEQUENCE AS FOR THE MAIN STEM OF THE RIVER OR STREAM. WHEN CONSTRUCTION ON THE TRIBUTARY IS COMPLETED, WORK ON THE MAIN STEM SHALL RESUME. WATER FROM THE TRIBUTARY SHALL CONTINUE TO BE PUMPED AROUND THE WORK AREA IN THE MAIN STEM.
13. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ACCESS TO AND MAINTAINING ALL EROSION AND SEDIMENT CONTROL DEVICES UNTIL THE DNREC SEDIMENT CONTROL INSPECTOR APPROVES THEIR REMOVAL.
14. AFTER CONSTRUCTION, ALL DISTURBED AREAS SHALL BE REVEGETATED AS PER THE PLANTING PLAN.

WATER PUMPING FOR STREAM DIVERSION DETAIL  
NOT TO SCALE

T:\173230A-DELDOT-STORMWATER-RETROFIT\2.2 - LEATHERMAN RUN DESIGN\CADD\REFS\X-BORDERS\BD\_00.DGN

T:\173230A-DELDOT-STORMWATER-RETROFIT\2.2 - LEATHERMAN RUN DESIGN\CADD\XREFS\X\_LBORDERS.VBD\_00.DGN



NOTE:  
STREAM IS FEMA FLOOD ZONE X,  
NO REGULATORY FLOODPLAIN  
HAS BEEN DEFINED.

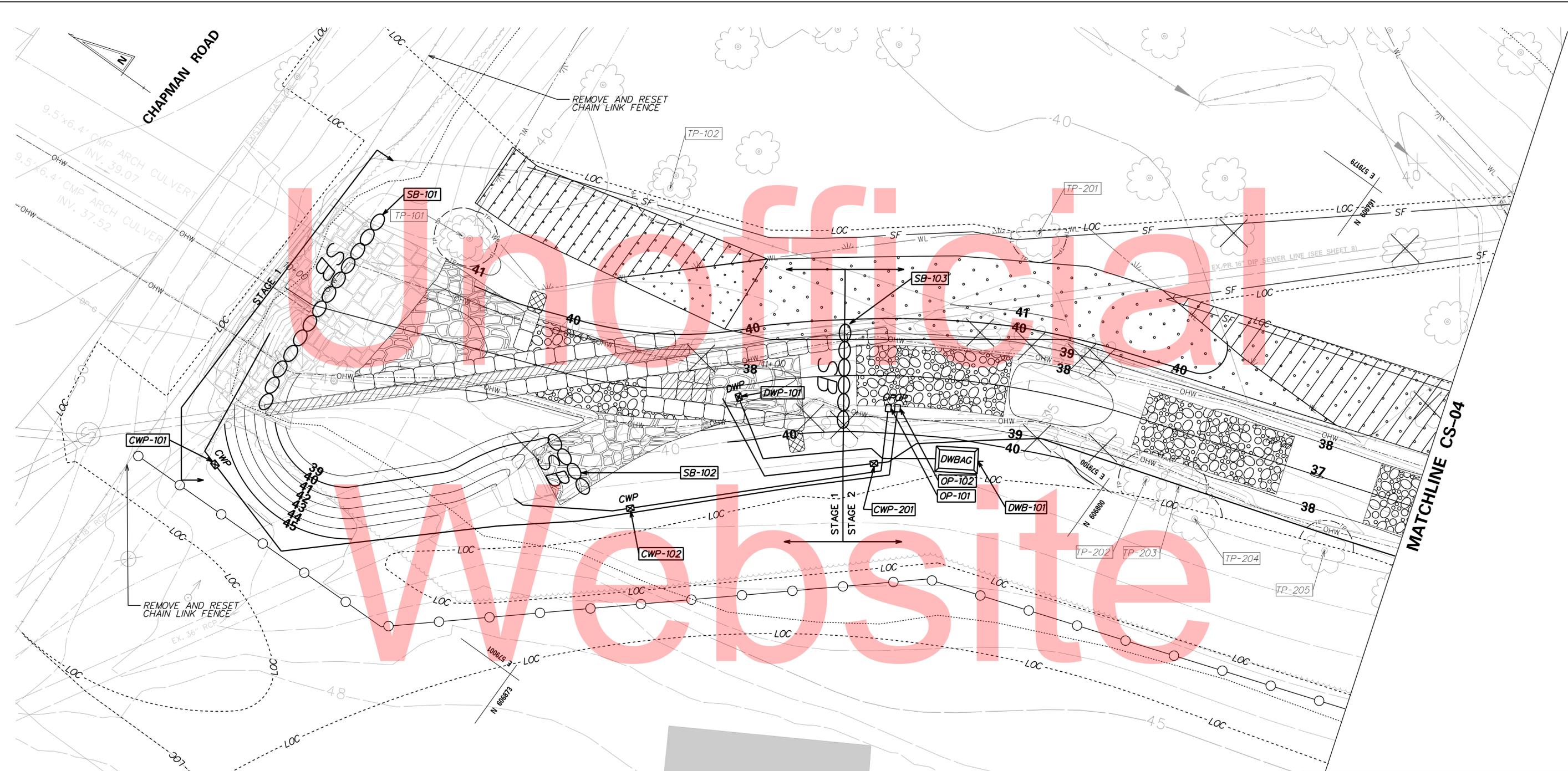
SILT FENCE (SF)*		TOTAL LENGTH	773
FROM STA.	OFFSET	TO STA.	OFFSET
11+56.9	374.5 LT	14+32.2	78 LT
12+41.8	418.7 LT	12+38.4	370.6 LT
13+31.5	170.2 LT	14+42.9	78.1 LT

\*INCLUDED ONLY SILT FENCE NEAR TO SITE ACCESS.  
SCHEDULES FOR SILT FENCE AND REINFORCED SILT  
FENCE SURROUNDING STREAM FOUND AT PLANS  
CS-03 TO CS-05.

<sup>1</sup>TEST HOLE \*TH-1 IS TO BE PERFORMED TO LOCATE THE 8"  
GAS LINE PRIOR TO EXCAVATION FOR ESTABLISHMENT OF  
THE SCE.

EROSION & SEDIMENT CONTROL	
	STABILIZED CONSTRUCTION ENTRANCE
	SILT FENCE
	SILT FENCE - REINFORCED
	LIMIT OF CONSTRUCTION
	MULCH ACCESS
	TIMBER MATS
	TREE PROTECTION FENCE
	DIRECTION OF TRAFFIC

T:\173230A-DELDOT-STORMWATER-RETROFIT\2.2 - LEATHERMAN RUN DESIGN\CADD\REFS\X\_BORDERS\BD\_00.DGN



TREE PROTECTION FENCE				TOTAL	128
TP	STATION*	OFFSET*	QUANTITY (LF)		
TP-101	10+31.5	20.8 RT	46		
TP-102	10+76.9	39.4 RT	15		
TP-201	11+47.1	30.6 RT	18		
TP-202	11+77.7	11.0 RT	15		
TP-203	11+84.2	10.4 RT	10		
TP-204	11+89.2	15.5 RT	7		
TP-205	12+15.5	13.6 RT	17		

\*STATION AND OFFSET MEASURED TO TREE TRUNK.

SILT FENCE (SF)				TOTAL	334.7
FROM STA.	OFFSET	TO STA.	OFFSET		
10+31.1	45.8 LT	12+29.1	62.6 LT		
11+70.6	23.9 LT	12+29.1	23.9 LT		
11+70.6	23.9 LT	12+29.1	52.4 LT		

SANDBAG DIVERSION (SB)				
SB NO.	FROM STA.	OFFSET	TO STA.	OFFSET
SB-101	10+06.4	22.81 RT	10+15.2	20.76 LT
SB-102	10+55.5	17.70 RT	10+60.9	25.48 RT
SB-103	11+13.1	10.37 RT	11+14.0	10.12 LT

DIRTY WATER PUMP (DWP)	
DWP NO.	STA. OFFSET
DWP-101	10+92.4, 2.24 RT

DIRTY WATER BAG (DWB)	
DWB NO.	STA. OFFSET
DWB-101	11+37.5, 15.58 RT

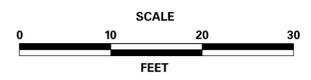
OUTLET PROTECTION (OP)	
OP NO.	STA. OFFSET
OP-101	11+22.5, 6.39 RT
OP-102	11+24.3, 6.36 RT

CLEAN WATER PUMP (CWP)	
CWP NO.	STA. OFFSET
CWP-101	10+08.1, 37.32 RT
CWP-102	10+73.4, 23.45 RT
CWP-201	11+19.6, 17.34 RT

EROSION & SEDIMENT CONTROL	
	DEWATERING BAG
	SANDBAG DIVERSION
	STABILIZED CONSTRUCTION ENTRANCE
	SILT FENCE
	SILT FENCE - REINFORCED
	LIMIT OF CONSTRUCTION
	MULCH ACCESS
	TIMBER MATS
	TREE PROTECTION FENCE
	CLEAR WATER PUMP
	DIRTY WATER PUMP



ADDENDUMS / REVISIONS



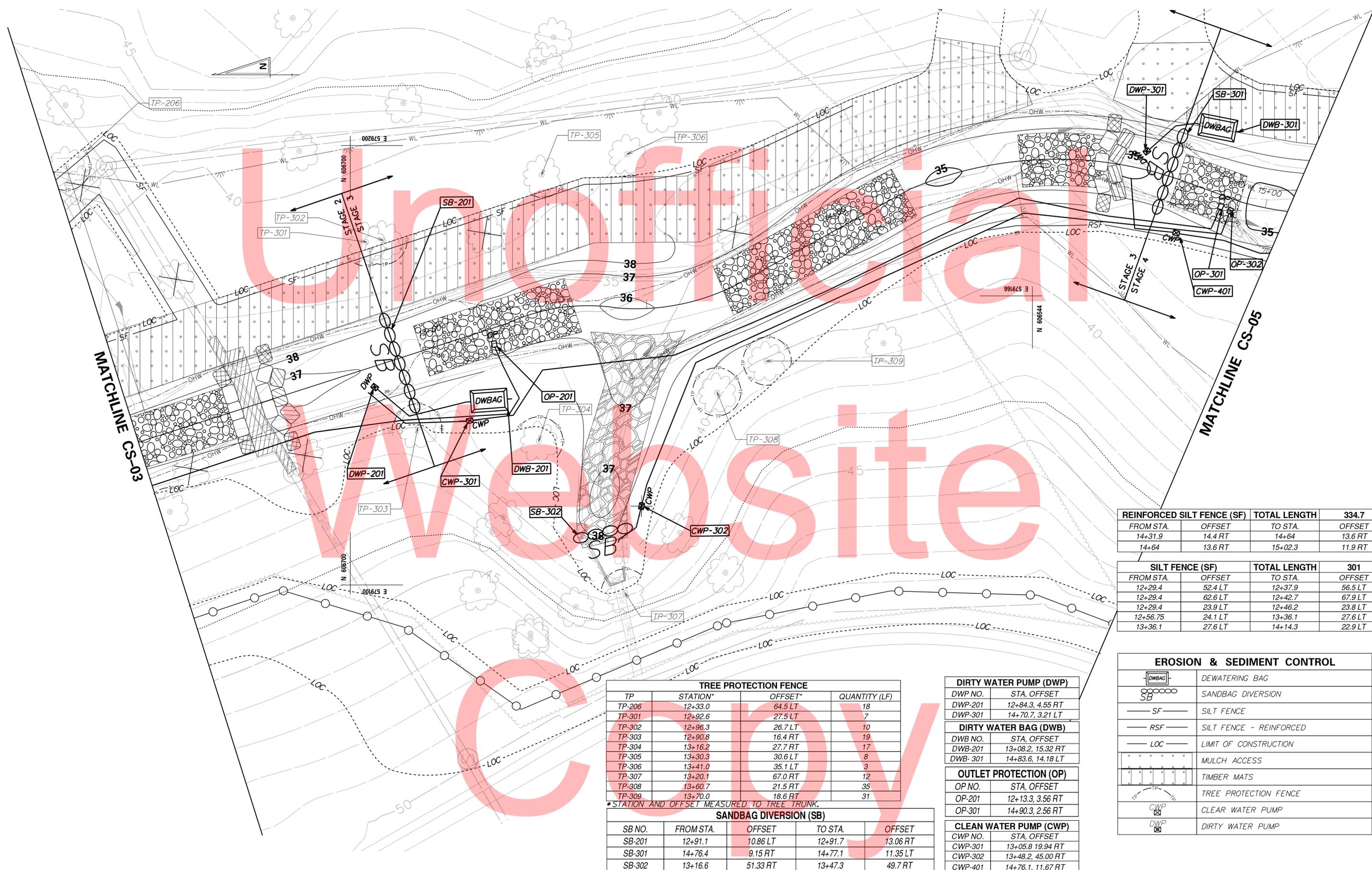
**LEATHERMANS RUN RESTORATION AT CHRISTIANA HIGH SCHOOL**

CONTRACT	T201380204	<b>CS-05</b>
COUNTY	NEW CASTLE	
DESIGNED BY:	JML	CHECKED BY: RPP

**CONSTRUCTION PHASING AND EROSION CONTROL PLAN**

SHEET NO.	20
TOTAL SHTS.	27

T:\173230A-DELDOT-STORMWATER-RETROFIT\2.2 - LEATHERMAN RUN DESIGN\CADD\XREFS\X\_BORDERS.BD 00.DGN



REINFORCED SILT FENCE (SF)		TOTAL LENGTH	334.7
FROM STA.	OFFSET	TO STA.	OFFSET
14+31.9	14.4 RT	14+64	13.6 RT
14+64	13.6 RT	15+02.3	11.9 RT

SILT FENCE (SF)		TOTAL LENGTH	301
FROM STA.	OFFSET	TO STA.	OFFSET
12+29.4	52.4 LT	12+37.9	56.5 LT
12+29.4	62.6 LT	12+42.7	67.9 LT
12+29.4	23.9 LT	12+46.2	23.8 LT
12+56.75	24.1 LT	13+36.1	27.6 LT
13+36.1	27.6 LT	14+14.3	22.9 LT

TP	STATION*	OFFSET*	QUANTITY (LF)
TP-206	12+33.0	64.5 LT	18
TP-301	12+92.6	27.5 LT	7
TP-302	12+96.3	26.7 LT	10
TP-303	12+90.8	16.4 RT	19
TP-304	13+16.2	27.7 RT	17
TP-305	13+30.3	30.6 LT	8
TP-306	13+41.0	35.1 LT	3
TP-307	13+20.1	67.0 RT	12
TP-308	13+60.7	21.5 RT	35
TP-309	13+70.0	18.6 RT	31

SANDBAG DIVERSION (SB)				
SB NO.	FROM STA.	OFFSET	TO STA.	OFFSET
SB-201	12+91.1	10.86 LT	12+91.7	13.06 RT
SB-301	14+76.4	9.15 RT	14+77.1	11.35 LT
SB-302	13+16.6	51.33 RT	13+47.3	49.7 RT

DIRTY WATER PUMP (DWP)	
DWP NO.	STA, OFFSET
DWP-201	12+84.3, 4.55 RT
DWP-301	14+70.7, 3.21 LT

DIRTY WATER BAG (DWB)	
DWB NO.	STA, OFFSET
DWB-201	13+08.2, 15.32 RT
DWB-301	14+83.6, 14.18 LT

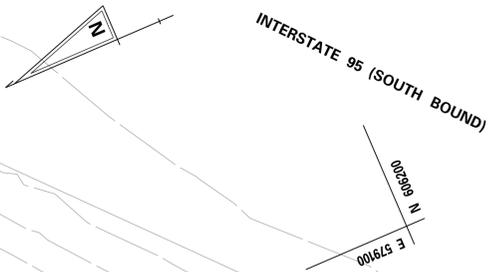
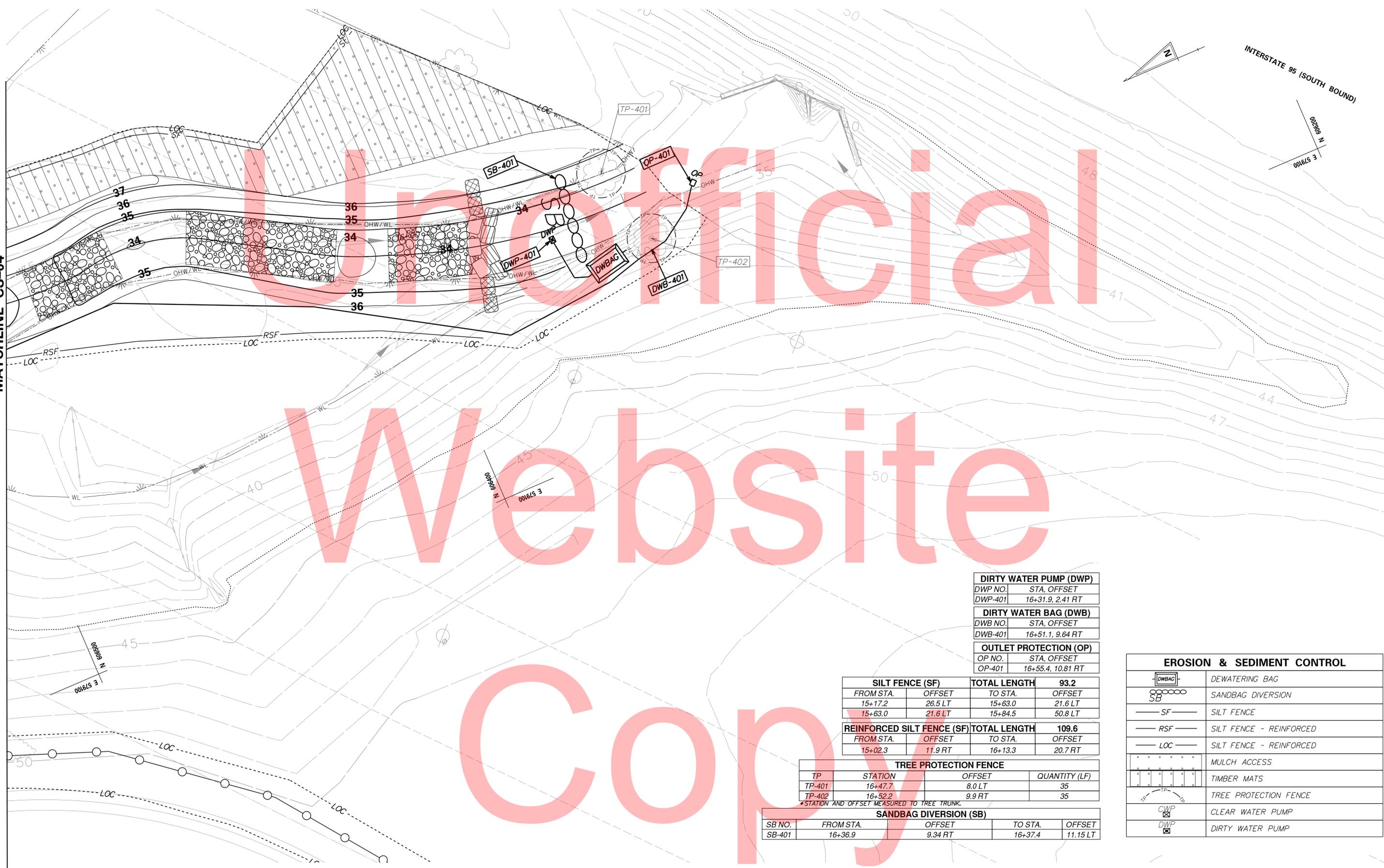
OUTLET PROTECTION (OP)	
OP NO.	STA, OFFSET
OP-201	12+13.3, 3.56 RT
OP-301	14+90.3, 2.56 RT

CLEAN WATER PUMP (CWP)	
CWP NO.	STA, OFFSET
CWP-301	13+05.8, 19.94 RT
CWP-302	13+48.2, 45.00 RT
CWP-401	14+76.1, 11.67 RT

EROSION & SEDIMENT CONTROL	
	DEWATERING BAG
	SANDBAG DIVERSION
	SILT FENCE
	SILT FENCE - REINFORCED
	LIMIT OF CONSTRUCTION
	MULCH ACCESS
	TIMBER MATS
	TREE PROTECTION FENCE
	CLEAR WATER PUMP
	DIRTY WATER PUMP

T:\173230A-DELDOT-STORMWATER-RETROFIT\2.2 - LEATHERMAN RUN DESIGN\CADD\XREFS\X\_BORDERS\BD\_00.DGN

MATCHLINE CS-04



DIRTY WATER PUMP (DWP)	
DWP NO.	STA, OFFSET
DWP-401	16+31.9, 2.41 RT

DIRTY WATER BAG (DWB)	
DWB NO.	STA, OFFSET
DWB-401	16+51.1, 9.64 RT

OUTLET PROTECTION (OP)	
OP NO.	STA, OFFSET
OP-401	16+55.4, 10.81 RT

SILT FENCE (SF)				TOTAL LENGTH	93.2
FROM STA.	OFFSET	TO STA.	OFFSET		
15+17.2	26.5 LT	15+63.0	21.6 LT		
15+63.0	21.6 LT	15+84.5	50.8 LT		

REINFORCED SILT FENCE (RSF)				TOTAL LENGTH	109.6
FROM STA.	OFFSET	TO STA.	OFFSET		
15+02.3	11.9 RT	16+13.3	20.7 RT		

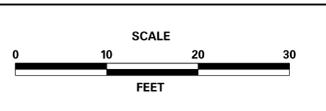
TREE PROTECTION FENCE			
TP	STATION	OFFSET	QUANTITY (LF)
TP-401	16+47.7	8.0 LT	35
TP-402	16+52.2	9.9 RT	35

\*STATION AND OFFSET MEASURED TO TREE TRUNK.

SANDBAG DIVERSION (SB)			
SB NO.	FROM STA.	OFFSET	TO STA. / OFFSET
SB-401	16+36.9	9.34 RT	16+37.4 / 11.15 LT

EROSION & SEDIMENT CONTROL	
	DEWATERING BAG
	SANDBAG DIVERSION
	SILT FENCE
	SILT FENCE - REINFORCED
	SILT FENCE - REINFORCED
	MULCH ACCESS
	TIMBER MATS
	TREE PROTECTION FENCE
	CLEAR WATER PUMP
	DIRTY WATER PUMP

ADDENDUMS / REVISIONS



ENVIRONMENTAL COMPLIANCE NOTES

1. GENERAL NOTES:

- A. THE PURPOSE OF THESE SHEETS IS TO IDENTIFY THOSE ITEMS ASSOCIATED WITH ENVIRONMENTAL COMPLIANCE. IMPACT CALCULATIONS ARE FOR THE AGENCY PERMIT REPORTING PURPOSES ONLY AND ARE NOT TO BE USED FOR BIDDING PURPOSES.
- B. IF A DEPARTURE FROM THE APPROVED PLANS (WHICH WOULD AFFECT ANY NATURAL AND/OR CULTURAL RESOURCES) IS NECESSARY, THE ENVIRONMENTAL STUDIES SECTION SHALL BE CONTACTED AT (302)760-2264 TO ALLOW FOR COORDINATION WITH THE APPROPRIATE RESOURCE AGENCIES AND APPROVAL.
- C. USE OF THESE SHEETS DOES NOT ALLEVIATE THE CONTRACTOR'S RESPONSIBILITY TO COMPLY WITH ALL CONDITIONS SET FORTH IN THE ENVIRONMENTAL STATEMENT AND PERMITS.

2. NATURAL RESOURCE ISSUES:

- A. PERMIT REQUIREMENTS/APPROVALS\*:
  - U.S. ARMY CORPS OF ENGINEERS (COE): NATIONWIDE PERMIT NWP\*27 \*\*\*
  - DNREC - WETLANDS & SUBAQUEOUS LANDS (WLSL): PROJECT CONSISTENT WITH DELAWARE CODE CH-72, SECTION 7217, SPECIAL EXEMPTION (e). (LESS THAN 800 ACRES IN ATLANTIC COASTAL PLAIN)
  - DNREC - WATER QUALITY CERTIFICATION (WQC) & COASTAL ZONE CONSISTENCY (CZM): ISSUED FOR NWP\*27
  - NEW CASTLE COUNTY DEPARTMENT OF LAND USE: FLOODPLAIN APPROVAL\*\*\*
- \* THE PERMITS/APPROVALS LISTED ARE THOSE REQUIRED FOR THE STREAM RESTORATION PORTION OF THIS PROJECT. THE ENVIRONMENTAL STUDIES SECTION IS RESPONSIBLE FOR COORDINATING AND/OR OBTAINING THESE APPROVALS.
- \*\* PERMITTING FOR THE SANITARY SEWER LINE REPLACEMENT/REPAIR WORK, NOTED IN THIS PLAN SET TO OCCUR UNDER NEW CASTLE COUNTY SEWERLINE CONSTRUCTION PLANS, SHALL BE AUTHORIZED UNDER A SEPARATE U.S. ARMY CORPS PERMIT, TO BE APPLIED FOR BY NEW CASTLE COUNTY. THE COUNTY SHALL RETAIN PERMIT RESPONSIBILITY FOR ALL WORK ITEMS AND CONDITIONS RELATED TO THE PERMITTING FOR THE SEWER LINE REPLACEMENT.
- \*\*\* THE CONTRACTOR MUST ENSURE THAT THESE PERMITS/APPROVALS ARE IN THEIR POSSESSION PRIOR TO BEGINNING CONSTRUCTION IN THE PERMITTED AREA(S) AND ENSURE THEY ARE IS DISPLAYED ON-SITE DURING THE ENTIRE CONSTRUCTION PERIOD.
- \*\*\*\* USACE MITIGATION FOR PROJECT IMPACTS - THE CONSTRUCTION ACTIVITIES FOR RESTORATION OF LEATHERMAN RUN ARE PROPOSED TO RESULT IN NET INCREASES IN AQUATIC RESOURCE FUNCTIONS AND SERVICES.
- B. CONSTRUCTION RESTRICTIONS:
  - FISHERIES - NONE
  - ENDANGERED SPECIES - NONE
  - MIGRATORY BIRDS - NONE

3. CULTURAL RESOURCE ISSUES:

- A. NO KNOWN ISSUES.

4. STREAM RESTORATION AND SLOPE RIPRAP TREATMENT

- A. THE CONTRACTOR SHALL FOLLOW THE SPECIAL PROVISIONS OF ITEMS \*712554 - FURNISHED RIFFLE BED MATERIAL, \*712556 - SALVAGE CHANNEL SAND AND GRAVEL MATERIAL, AND \*712557 - FURNISHED CHANNEL SAND AND GRAVEL REGARDS TO THE SALVAGING OF ON-SITE NATURAL STREAM BOTTOM MATERIAL OR THE FURNISHING OF OFF-SITE MATERIAL.
- B. OTHER AREAS OF THE CHANNEL BOTTOM AFFECTED BY CONSTRUCTION (INCLUDING, BUT NOT LIMITED TO, THE LOCATION OF SUMP PITS, STABILIZED OUTFALLS, TEMPORARY PIPES AND/OR SANDBAG DIKES AND DIVERSIONS) SHALL BE RESTORED TO EXISTING CONDITIONS. ANY CAVITIES OR SCOUR HOLES RESULTING FROM CONSTRUCTION ACTIVITIES SHALL BE FILLED WITH FURNISHED RIFFLE MATERIAL. PAYMENT UNDER ITEM \*712554 - FURNISHED RIFFLE BED MATERIAL.
- C. WHEN ALL EROSION AND SEDIMENT CONTROL MEASURES ARE REMOVED AND THE STREAM RETURNS TO ITS NATURAL FLOW CONDITIONS, THE FLOW MUST REMAIN ABOVE GROUND AND ABOVE THE RIFFLE (I.E. THE FLOW CANNOT BE "LOST" IN THE CHANNEL BED). IF THIS IS NOT ACHIEVED, THE CONTRACTOR WILL BE REQUIRED TO PERFORM ADDITION FINE MATERIAL WASH-IN AS DESCRIBED IN THE RIFFLE DETAIL AND IN ITEM \*712554 - FURNISHED RIFFLE BED MATERIAL.
- D. RIPRAP, SHALL BE CHOKED WITH DELAWARE \*57 STONE, PAYMENT FOR RIPRAP AND DELAWARE \*57 STONE SHALL BE PAID FOR UNDER THE RIPRAP ITEM.
- E. NATURAL STREAMBED MATERIAL AND CHANNEL RESTORATION

THE EXISTING STREAMBED MATERIAL (CONSISTING OF NATURAL SEDIMENTS, GRAVEL, PEBBLES, SMALL STONES AND ALL LIKE MATERIAL, DEPTH TO BE FIELD DETERMINED) SHALL BE EXCAVATED FROM THE EXISTING CHANNEL BOTTOM ALONG THE LIMIT OF THE PROPOSED STREAM RESTORATION. EXCAVATION PAID UNDER ITS RESPECTIVE PAYMENT ITEM. THE MATERIAL SHALL BE STOCKPILED SEPARATE FROM OTHER EXCAVATION OR EMBANKMENT MATERIALS AND SHALL BE PROPERLY STABILIZED. THE MATERIAL SHALL BE UTILIZED AS SALVAGED CHANNEL BED SAND AND GRAVEL. THE MATERIAL SHALL BE USED TO CHOKE RIFFLE VOIDS, AND TO FILL VOIDS IN RIPRAP. IF INSUFFICIENT MATERIAL IS SALVAGED FROM THE CHANNEL BED, FURNISHED CHANNEL BED SAND AND GRAVEL SHALL BE UTILIZED.

5. THE CONTRACTOR SHALL ACCESS THE STREAM FROM THE NORTHEAST CORNER AND THE NORTH STAGING AREA AND ACCESS ROAD ONLY. CONTRACTOR ACCESS BEYOND THE LOC (AS DEFINED ON THESE PLANS) IS STRICTLY PROHIBITED. ANY CHANGE IN THE LOC MUST BE COORDINATED WITH THE DELDOT ENVIRONMENTAL STUDIES SECTION.

6. PROTECTION OF RESOURCES

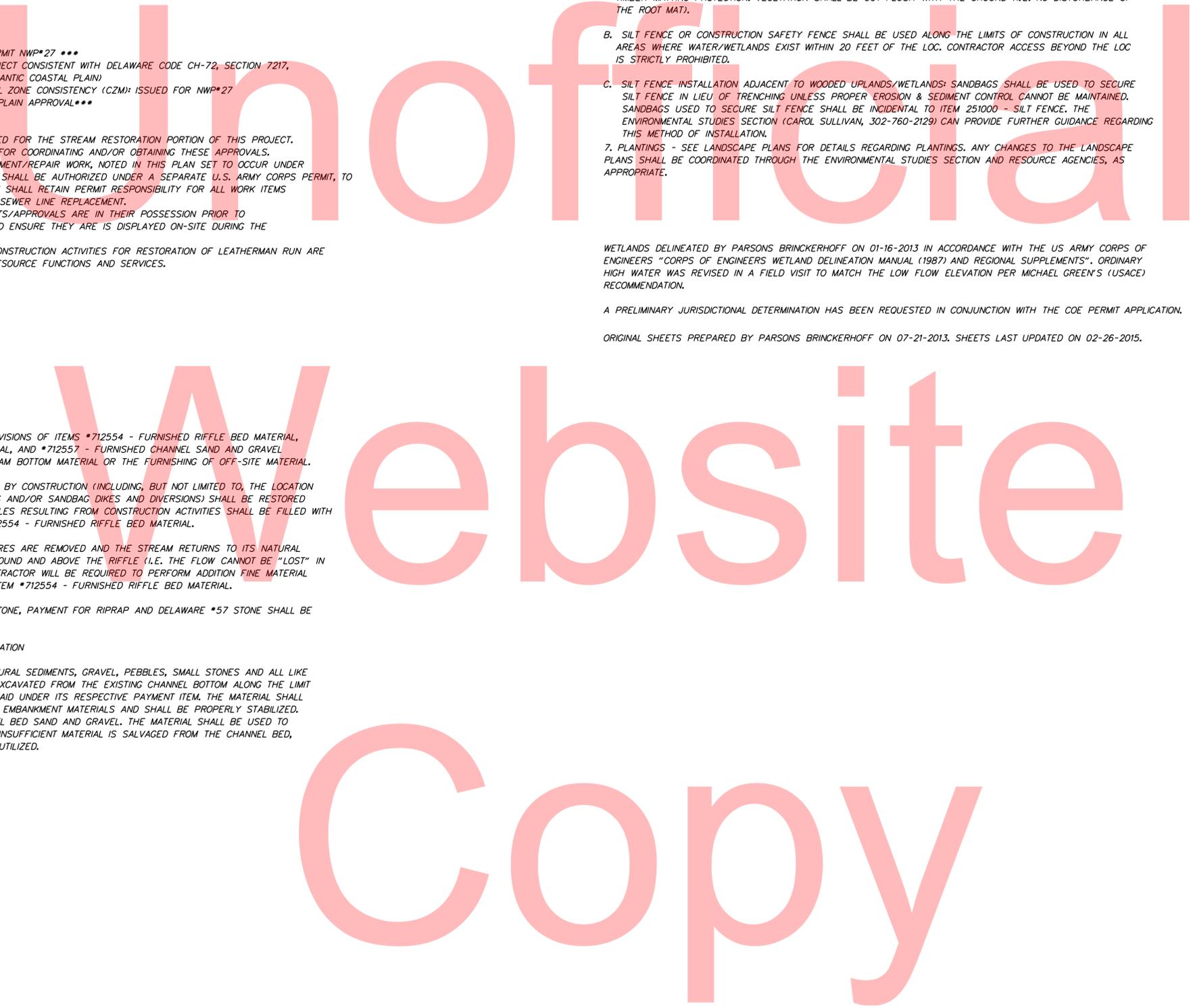
- A. CLEARING IN WETLAND AREAS WITHIN THE LOC SHALL BE KEPT TO THE MINIMUM ABSOLUTELY NECESSARY FOR CONSTRUCTION ACCESS. IN WETLAND AREAS THAT ARE CLEARED, THERE SHALL BE NO GRUBBING EXCEPT WHERE NECESSARY TO CONSTRUCT PROJECT COMPONENTS SUCH AS BANK GRADING, RIPRAP PROTECTION, AND TIMBER MATTING PROTECTION. VEGETATION SHALL BE CUT FLUSH WITH THE GROUND (I.E. NO DISTURBANCE OF THE ROOT MAT).
- B. SILT FENCE OR CONSTRUCTION SAFETY FENCE SHALL BE USED ALONG THE LIMITS OF CONSTRUCTION IN ALL AREAS WHERE WATER/WETLANDS EXIST WITHIN 20 FEET OF THE LOC. CONTRACTOR ACCESS BEYOND THE LOC IS STRICTLY PROHIBITED.
- C. SILT FENCE INSTALLATION ADJACENT TO WOODED UPLANDS/WETLANDS: SANDBAGS SHALL BE USED TO SECURE SILT FENCE IN LIEU OF TRENCHING UNLESS PROPER EROSION & SEDIMENT CONTROL CANNOT BE MAINTAINED. SANDBAGS USED TO SECURE SILT FENCE SHALL BE INCIDENTAL TO ITEM 251000 - SILT FENCE. THE ENVIRONMENTAL STUDIES SECTION (CAROL SULLIVAN, 302-760-2129) CAN PROVIDE FURTHER GUIDANCE REGARDING THIS METHOD OF INSTALLATION.
- 7. PLANTINGS - SEE LANDSCAPE PLANS FOR DETAILS REGARDING PLANTINGS. ANY CHANGES TO THE LANDSCAPE PLANS SHALL BE COORDINATED THROUGH THE ENVIRONMENTAL STUDIES SECTION AND RESOURCE AGENCIES, AS APPROPRIATE.

WETLANDS DELINEATED BY PARSONS BRINCKERHOFF ON 01-16-2013 IN ACCORDANCE WITH THE US ARMY CORPS OF ENGINEERS "CORPS OF ENGINEERS WETLAND DELINEATION MANUAL (1987) AND REGIONAL SUPPLEMENTS". ORDINARY HIGH WATER WAS REVISED IN A FIELD VISIT TO MATCH THE LOW FLOW ELEVATION PER MICHAEL GREEN'S (USACE) RECOMMENDATION.

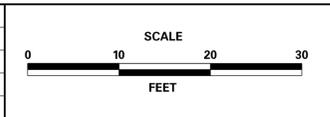
A PRELIMINARY JURISDICTIONAL DETERMINATION HAS BEEN REQUESTED IN CONJUNCTION WITH THE COE PERMIT APPLICATION.

ORIGINAL SHEETS PREPARED BY PARSONS BRINCKERHOFF ON 07-21-2013. SHEETS LAST UPDATED ON 02-26-2015.

T:\173230A-DELDOT-STORMWATER-RETROFIT\2.2 - LEATHERMAN RUN DESIGN\CADD\XREFS\X-BORDERS\BD\_01.DGN



ADDENDUMS / REVISIONS	



CONTRACT	<b>EC-01</b>
T201380204	DESIGNED BY: JML
COUNTY	CHECKED BY: RPP
NEW CASTLE	

SHEET NO.	23
TOTAL SHTS.	27

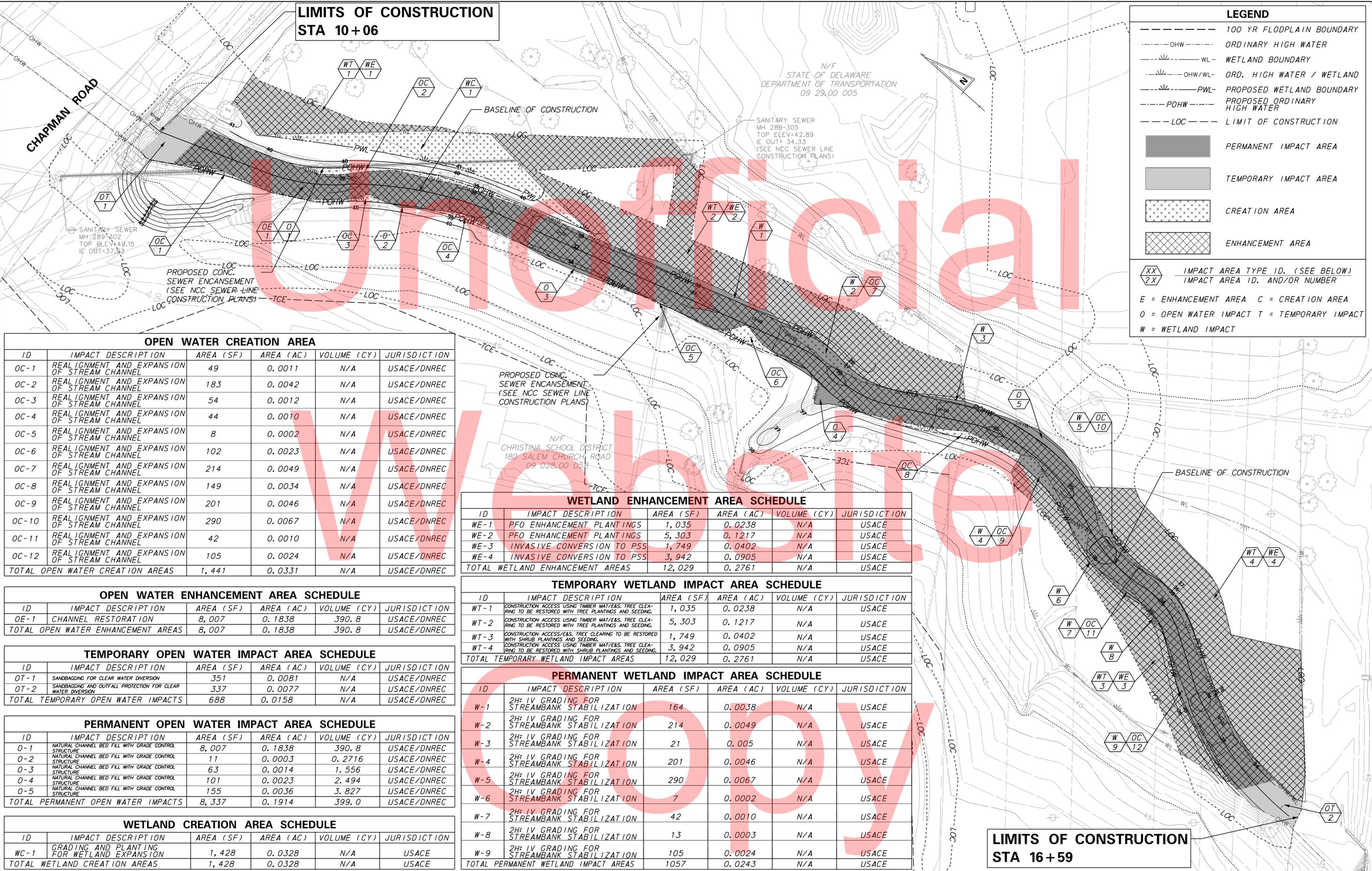
**LIMITS OF CONSTRUCTION  
STA 10+06**

**LEGEND**

- 100 YR FLOODPLAIN BOUNDARY
- OHW --- ORDINARY HIGH WATER
- WL --- WETLAND BOUNDARY
- OHW/WL --- ORD. HIGH WATER / WETLAND
- PWL --- PROPOSED WETLAND BOUNDARY
- POHW --- PROPOSED ORDINARY HIGH WATER
- LOC --- LIMIT OF CONSTRUCTION
- PERMANENT IMPACT AREA
- TEMPORARY IMPACT AREA
- ▨ CREATION AREA
- ▩ ENHANCEMENT AREA

XX  
?X IMPACT AREA TYPE ID. (SEE BELOW)  
IMPACT AREA ID. AND/OR NUMBER

E = ENHANCEMENT AREA C = CREATION AREA  
O = OPEN WATER IMPACT T = TEMPORARY IMPACT  
W = WETLAND IMPACT



**OPEN WATER CREATION AREA**

ID	IMPACT DESCRIPTION	AREA (SF)	AREA (AC)	VOLUME (CY)	JURISDICTION
OC-1	REALIGNMENT AND EXPANSION OF STREAM CHANNEL	49	0.0011	N/A	USACE/DNREC
OC-2	REALIGNMENT AND EXPANSION OF STREAM CHANNEL	183	0.0042	N/A	USACE/DNREC
OC-3	REALIGNMENT AND EXPANSION OF STREAM CHANNEL	54	0.0012	N/A	USACE/DNREC
OC-4	REALIGNMENT AND EXPANSION OF STREAM CHANNEL	44	0.0010	N/A	USACE/DNREC
OC-5	REALIGNMENT AND EXPANSION OF STREAM CHANNEL	8	0.0002	N/A	USACE/DNREC
OC-6	REALIGNMENT AND EXPANSION OF STREAM CHANNEL	102	0.0023	N/A	USACE/DNREC
OC-7	REALIGNMENT AND EXPANSION OF STREAM CHANNEL	214	0.0049	N/A	USACE/DNREC
OC-8	REALIGNMENT AND EXPANSION OF STREAM CHANNEL	149	0.0034	N/A	USACE/DNREC
OC-9	REALIGNMENT AND EXPANSION OF STREAM CHANNEL	201	0.0046	N/A	USACE/DNREC
OC-10	REALIGNMENT AND EXPANSION OF STREAM CHANNEL	290	0.0067	N/A	USACE/DNREC
OC-11	REALIGNMENT AND EXPANSION OF STREAM CHANNEL	42	0.0010	N/A	USACE/DNREC
OC-12	REALIGNMENT AND EXPANSION OF STREAM CHANNEL	105	0.0024	N/A	USACE/DNREC
TOTAL OPEN WATER CREATION AREAS		1,441	0.0331	N/A	USACE/DNREC

**OPEN WATER ENHANCEMENT AREA SCHEDULE**

ID	IMPACT DESCRIPTION	AREA (SF)	AREA (AC)	VOLUME (CY)	JURISDICTION
OE-1	CHANNEL RESTORATION	8,007	0.1838	390.8	USACE/DNREC
TOTAL OPEN WATER ENHANCEMENT AREAS		8,007	0.1838	390.8	USACE/DNREC

**TEMPORARY OPEN WATER IMPACT AREA SCHEDULE**

ID	IMPACT DESCRIPTION	AREA (SF)	AREA (AC)	VOLUME (CY)	JURISDICTION
OT-1	SANDBAGGING FOR CLEAR WATER DIVERSION	351	0.0081	N/A	USACE/DNREC
OT-2	SANDBAGGING AND OUTFALL PROTECTION FOR CLEAR WATER DIVERSION	337	0.0077	N/A	USACE/DNREC
TOTAL TEMPORARY OPEN WATER IMPACTS		688	0.0158	N/A	USACE/DNREC

**PERMANENT OPEN WATER IMPACT AREA SCHEDULE**

ID	IMPACT DESCRIPTION	AREA (SF)	AREA (AC)	VOLUME (CY)	JURISDICTION
O-1	NATURAL CHANNEL BED FILL WITH GRADE CONTROL STRUCTURE	8,007	0.1838	390.8	USACE/DNREC
O-2	NATURAL CHANNEL BED FILL WITH GRADE CONTROL STRUCTURE	11	0.0003	0.2716	USACE/DNREC
O-3	NATURAL CHANNEL BED FILL WITH GRADE CONTROL STRUCTURE	63	0.0014	1.556	USACE/DNREC
O-4	NATURAL CHANNEL BED FILL WITH GRADE CONTROL STRUCTURE	101	0.0023	2.494	USACE/DNREC
O-5	NATURAL CHANNEL BED FILL WITH GRADE CONTROL STRUCTURE	155	0.0036	3.827	USACE/DNREC
TOTAL PERMANENT OPEN WATER IMPACTS		8,337	0.1914	399.0	USACE/DNREC

**WETLAND CREATION AREA SCHEDULE**

ID	IMPACT DESCRIPTION	AREA (SF)	AREA (AC)	VOLUME (CY)	JURISDICTION
WC-1	GRADING AND PLANTING FOR WETLAND EXPANSION	1,428	0.0328	N/A	USACE
TOTAL WETLAND CREATION AREAS		1,428	0.0328	N/A	USACE

**WETLAND ENHANCEMENT AREA SCHEDULE**

ID	IMPACT DESCRIPTION	AREA (SF)	AREA (AC)	VOLUME (CY)	JURISDICTION
WE-1	PFO ENHANCEMENT PLANTINGS	1,035	0.0238	N/A	USACE
WE-2	PFO ENHANCEMENT PLANTINGS	5,303	0.1217	N/A	USACE
WE-3	INVASIVE CONVERSION TO PSS	1,749	0.0402	N/A	USACE
WE-4	INVASIVE CONVERSION TO PSS	3,942	0.0905	N/A	USACE
TOTAL WETLAND ENHANCEMENT AREAS		12,029	0.2761	N/A	USACE

**TEMPORARY WETLAND IMPACT AREA SCHEDULE**

ID	IMPACT DESCRIPTION	AREA (SF)	AREA (AC)	VOLUME (CY)	JURISDICTION
WT-1	CONSTRUCTION ACCESS USING TIMBER MAT/EAS. TREE CLEARING TO BE RESTORED WITH TREE PLANTINGS AND SEEDING.	1,035	0.0238	N/A	USACE
WT-2	CONSTRUCTION ACCESS USING TIMBER MAT/EAS. TREE CLEARING TO BE RESTORED WITH TREE PLANTINGS AND SEEDING.	5,303	0.1217	N/A	USACE
WT-3	CONSTRUCTION ACCESS/EAS. TREE CLEARING TO BE RESTORED WITH SHRUB PLANTINGS AND SEEDING.	1,749	0.0402	N/A	USACE
WT-4	CONSTRUCTION ACCESS USING TIMBER MAT/EAS. TREE CLEARING TO BE RESTORED WITH SHRUB PLANTINGS AND SEEDING.	3,942	0.0905	N/A	USACE
TOTAL TEMPORARY WETLAND IMPACT AREAS		12,029	0.2761	N/A	USACE

**PERMANENT WETLAND IMPACT AREA SCHEDULE**

ID	IMPACT DESCRIPTION	AREA (SF)	AREA (AC)	VOLUME (CY)	JURISDICTION
W-1	2H: IV GRADING FOR STREAMBANK STABILIZATION	164	0.0038	N/A	USACE
W-2	2H: IV GRADING FOR STREAMBANK STABILIZATION	214	0.0049	N/A	USACE
W-3	2H: IV GRADING FOR STREAMBANK STABILIZATION	21	0.005	N/A	USACE
W-4	2H: IV GRADING FOR STREAMBANK STABILIZATION	201	0.0046	N/A	USACE
W-5	2H: IV GRADING FOR STREAMBANK STABILIZATION	290	0.0067	N/A	USACE
W-6	2H: IV GRADING FOR STREAMBANK STABILIZATION	7	0.0002	N/A	USACE
W-7	2H: IV GRADING FOR STREAMBANK STABILIZATION	42	0.0010	N/A	USACE
W-8	2H: IV GRADING FOR STREAMBANK STABILIZATION	13	0.0003	N/A	USACE
W-9	2H: IV GRADING FOR STREAMBANK STABILIZATION	105	0.0024	N/A	USACE
TOTAL PERMANENT WETLAND IMPACT AREAS		1057	0.0243	N/A	USACE

**LIMITS OF CONSTRUCTION  
STA 16+59**

T:\173230A-DELDOT STORMWATER RETROFIT\2.2 - LEATHERMAN RUN DESIGN\CADD\XREFS\X-BORDERS\BD\_00.DGN



NOTES:

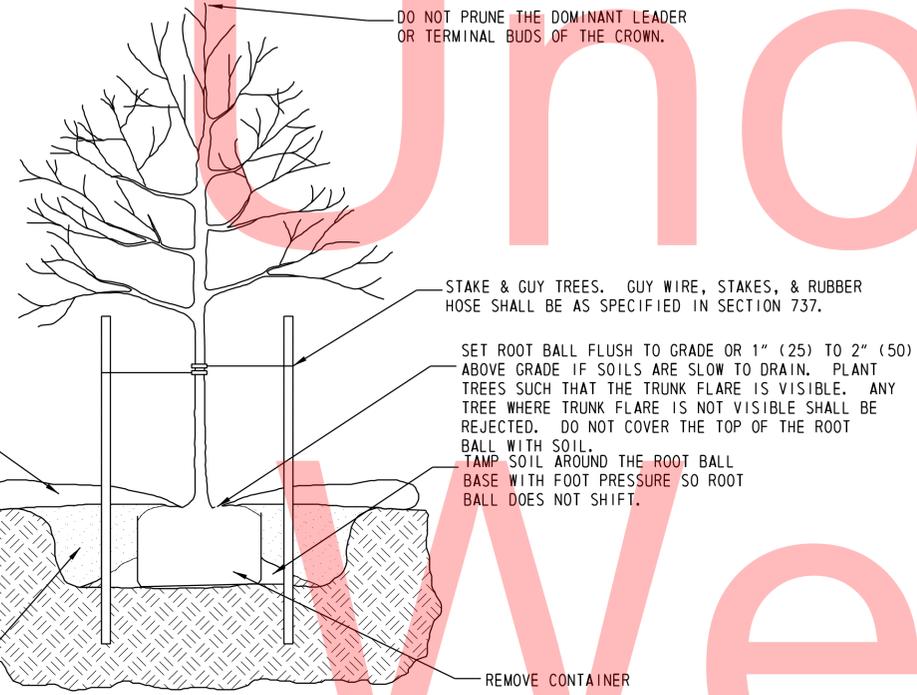
- LIVE STAKE MIX #1 SHALL BE PLANTED ALONG BOTH STREAM BANKS FROM STATION 10+00 TO STATION 14+15. STAKES SHALL BE PLACED ON STREAM BANK SLOPE BETWEEN 0.1-FT AND 1-FT ABOVE BASEFLOW LEVEL. STAKES SHALL BE PLACED IN A RANDOM ZIGZAG PATTERN AND SPACED AT 3-FT APART.
- LIVE STAKE MIX #2 SHALL BE PLANTED ALONG BOTH STREAM BANKS FROM STATION 14+15 TO 16+50. STAKES SHALL BE PLACED ON STREAM BANK SLOPE BETWEEN 0.1-FT AND 1-FT ABOVE BASEFLOW LEVEL. STAKES SHALL BE PLACED IN A RANDOM ZIGZAG PATTERN AND SPACED AT 3-FT APART.
- TOPSOIL SHALL BE PLACED TO A DEPTH OF 2-INCHES IN ALL AREAS OF RIPARIAN BUFFER SEED MIX, NATIVE SITE RESTORATION SEED MIX, AND WET MEADOW SEED MIX.
- COMMON OAT (AVENA SATIVA) OR GRAIN RYE (SECALE CEREALE) SHALL BE APPLIED AS A TEMPORARY STABILIZATION FOR ALL AREAS OF NATIVE SITE RESTORATION, RIPARIAN BUFFER, AND WET MEADOW SEED MIXES.
- PERFORM TOPSOIL APPLICATION AND SEEDING IN ACCORDANCE WITH SPECIFICATIONS. MATTING SHALL BE PLACED WITHIN 48 HOURS AFTER SEEDING OPERATION. THE 8-FOOT COIR BLANKET (INNER LAYER) SHALL BE PLACED LINEARLY ALONG THE BANKS. THE COIR MAT (OUTER LAYER) SHALL COVER A LARGER AREA (FROM STREAM BANKS UPSLOPE TO THE LIMIT OF CONSTRUCTION).
- STRAW MULCH AND COIR MAT SHALL OVERLAY AND TEMPORARY STABILIZE ALL AREAS OF RIPARIAN BUFFER SEED MIX AND WET MEADOW SEED MIX. STRAW MULCH SHALL BE APPLIED AT A RATE OF 4,000 LBS/AC (90 LBS/1,000 LBS), EXCLUDING AREAS TO BE STABILIZED WITH A DUAL LAYER OF COIR MAT AND COIR BLANKET.
- STRAW MULCH SHALL BE USED TO TEMPORARILY STABILIZE ALL AREAS OF NATIVE SITE RESTORATION SEED MIX AND PERMANENT GRASS SEEDING-DRY GROUND (PGS-DG)

TOPSOIL-2" DEPTH*	
4,654	SY
STRAW MULCH**	
6,652	SY

\*TOPSOIL SHALL BE PLACED TO A DEPTH OF 2-INCHES IN ALL AREAS SPECIFIED FOR SEEDING WITH RIPARIAN BUFFER SEED MIX, WET MEADOW SEED MIX, AND NATIVE SITE RESTORATION MIX.  
 \*\*STRAW MULCH TO COVER ALL AREAS NOTED FOR RIPARIAN BUFFER SEED MIX AND WET MEADOW SEED MIX, EXCLUDING AREAS TO BE STABILIZED WITH A DUAL LAYER OF COIR MAT AND COIR BLANKET.

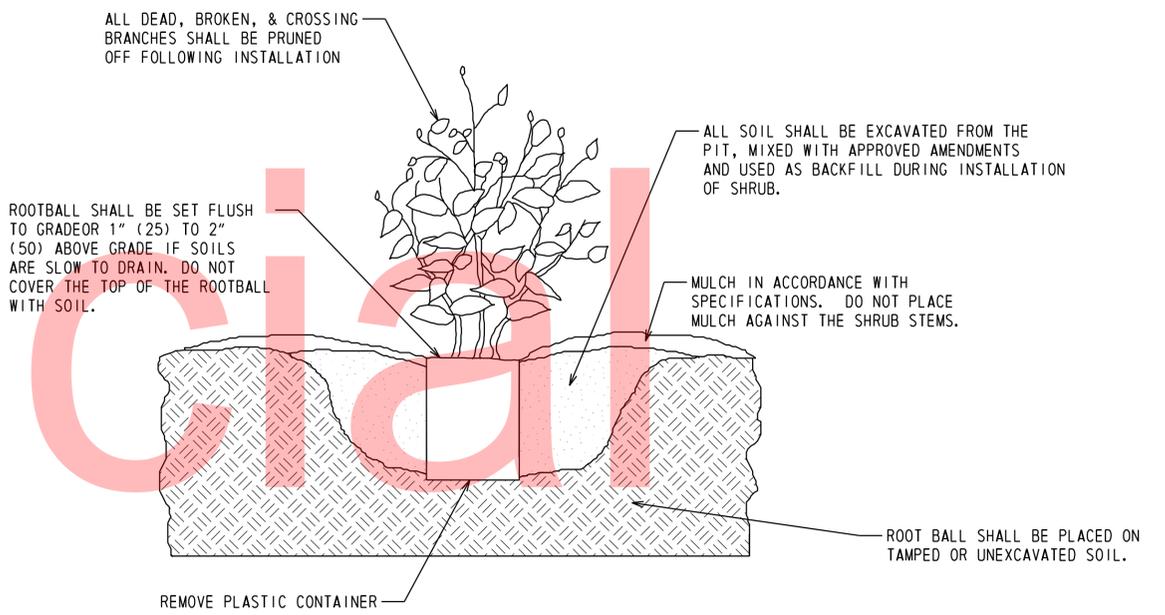
LEGEND	
	PERMANENT GRASS SEEDING DRY GROUND (PGS-DG)
	NATIVE SITE RESTORATION SEED MIX
	RIPARIAN BUFFER SEED MIX WITH TREE PLANTINGS
	RIPARIAN BUFFER SEED MIX
	WET MEADOW SEED MIX AND SHRUB PLANTINGS
	LANDSCAPING QUANTITY/SPECIES

T:\173230A-DELDOT-STORMWATER-RETROFIT\2.2 - LEATHERMAN RUN DESIGN\CADD\XREFS\X-BORDERS\BD\_01.DGN



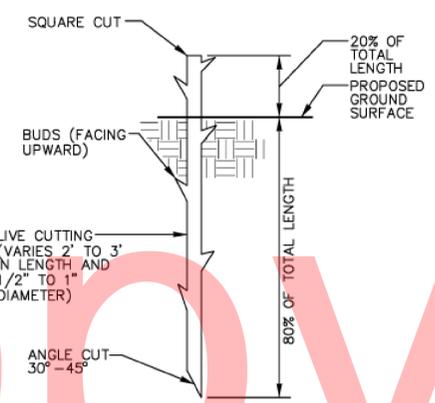
**TREE PLANTING DETAIL**  
NOT TO SCALE

- NOTES
1. ALL PRUNING SHALL BE DONE BY OR UNDER THE DIRECTION OF, AN I.S.A. CERTIFIED ARBORIST OR CERTIFIED NURSERY PROFESSIONAL. DO NOT HEAVILY PRUNE TREES AT PLANTING.
  2. ALL DEAD, BROKEN, & CROSSING BRANCHES SHALL BE PRUNED OFF FOLLOWING INSTALLATION.
  3. BASE OF PLANTING PIT SIZE SHALL BE A MINIMUM WIDTH OF TWICE THE ROOT BALL SIZE AND A MAXIMUM OF THREE TIMES THE ROOT BALL SIZE.
  4. WHEN PLANTING TREES ALONG STREETS, THERE MUST BE A MINIMUM OF 6-FEET BETWEEN THE BACK OF CURB AND THE EDGE OF SIDEWALK AND SHALL BE CENTERED BETWEEN THE BACK OF CURB AND THE EDGE OF SIDEWALK.
  5. WHEN PLANTING TREES ALONG SIDEWALKS, THE TREE SHALL BE LIMBED TO 7-FEET FOR PEDESTRIAN CLEARANCE.



**ROADSIDE SHRUB PLANTING DETAIL**  
NOT TO SCALE

- NOTES:
1. BASE OF PLANTING PIT SHALL BE A MINIMUM WIDTH OF TWICE THE CONTAINER SIZE AND A MAXIMUM OF THREE TIMES THE CONTAINER SIZE.
  2. ALL PRUNING SHALL BE DONE BY AN I.S.A. CERTIFIED ARBORIST, CERTIFIED NURSERY PROFESSIONAL, OR UNDER THE DIRECTION THEREOF. DO NOT HEAVILY PRUNE SHRUBS AT PLANTING.
  3. AUGERED HOLES SHALL BE HAND DUG TO FINAL WIDTH AND TO ELIMINATE GLAZING.



- NOTES
1. LIVE STAKE SHALL BE INSTALLED WHILE DORMANT (LATE FALL TO EARLY SPRING). DO NOT ALLOW THEM TO DRY OUT.
  2. LIVE STAKE MATERIALS SHALL CONSIST OF LIVE DORMANT CUTTINGS OF CORNUS AMOMUM (SILKY DOGWOOD), SAMBUCUS CANADENSIS (ELDERBERRY), AND SALIX NIGRA (BLACK WILLOW). MATERIALS SHALL BE PURCHASED FROM A NURSERY SPECIALIZING IN THE PRODUCTION OF SIMILAR MATERIALS AND SHALL INCLUDE CONFIRMATION OF SPECIES.
  3. THE LIVE STAKES SHOULD BE INSTALLED 3-FEET APART USING AN IRREGULAR ZIGZAG PATTERN SPACING.
  4. FOUR-FIFTHS OF THE LENGTH OF THE LIVE STAKE SHOULD BE INSTALLED INTO THE GROUND, AND SOIL SHOULD BE FIRMLY PACKED AROUND IT AFTER INSTALLATION.
  5. AN IRON BAR CAN BE USED TO MAKE A PILOT HOLE IN FIRM SOIL.
  6. SALIX NIGRA (BLACK WILLOW) LIVE STAKES SHALL NOT BE PLANTED INSIDE UTILITY RIGHT-OF-WAY EASEMENTS OR UNDER ANY POWER LINES.

**LIVE STEM STAKING DETAIL**  
NOT TO SCALE

ADDENDUMS / REVISIONS

CONTRACT T201380204	<b>LS-02</b>
COUNTY NEW CASTLE	DESIGNED BY: JML CHECKED BY: RPP

T:\173230A- DELDOT STORMWATER RETROFIT\2.2 - LEATHERMAN RUN DESIGN\CADD\XREFS\X\_BORDERS\BD\_01.DGN

TREE PLANTINGS								
QUANTITY	KEY	DESCRIPTION		METHOD	WETLAND INDICATOR STATUS	SIZE		COMMENTS
		Botanical Name	Common Name			Min. Height	Min. Caliper	
17	AR	<i>Acer rubrum</i>	Red Maple	NO. 10 CONT.	FAC	5 FT	1.25 IN	AVERAGE 15 FT. ON CENTER MIN 12 FT.- MAX 18 FT. SPACING
16	NS	<i>Nyssa sylvatica</i>	Black Gum	NO. 10 CONT.	FAC	5 FT	1.25 IN	AVERAGE 15 FT. ON CENTER MIN 12 FT.- MAX 18 FT. SPACING
18	PO	<i>Platanus occidentalis</i>	American Sycamore	NO. 10 CONT.	FACW	5 FT	1.25 IN	AVERAGE 15 FT. ON CENTER MIN 12 FT.- MAX 18 FT. SPACING
18	QP	<i>Quercus phellos</i>	Willow Oak	NO. 10 CONT.	FAC	5 FT	1.25 IN	AVERAGE 15 FT. ON CENTER MIN 12 FT.- MAX 18 FT. SPACING

SHRUB PLANTINGS								
QUANTITY	KEY	DESCRIPTION		METHOD	WETLAND INDICATOR STATUS	SIZE		COMMENTS
		Botanical Name	Common Name			Min. Height		
26	AS	<i>Alnus serrulata</i>	Smooth Alder	NO. 3 CONT.	FACW	30 IN		AVERAGE 10 FT. ON CENTER MIN 8 FT.- MAX 12 FT. SPACING
26	AP	<i>Aronia prunifolia</i>	Purple Chokeberry	NO. 3 CONT.	FACW	30 IN		AVERAGE 10 FT. ON CENTER MIN 8 FT.- MAX 12 FT. SPACING
26	SC	<i>Sambucus canadensis</i>	Elderberry	NO. 3 CONT.	FACW	30 IN		AVERAGE 10 FT. ON CENTER MIN 8 FT.- MAX 12 FT. SPACING
26	VN	<i>Viburnum nudum</i>	Possumhaw	NO. 3 CONT.	FACW	30 IN		AVERAGE 10 FT. ON CENTER MIN 8 FT.- MAX 12 FT. SPACING

LIVE STEM STAKING				
QTY (EA)	Botanical Name	Common Name	Size	COMMENTS
MIX #1 - STREAM BANKS FROM STA. 10+00 TO STA. 14+15				
133	<i>Cornus amomum</i>	Silky Dogwood	1/2 IN DIAM., 2 FT LENGTH	SPACE 3 FT. ON CENTER
133	<i>Salix nigra</i>	Black Willow	1/2 IN DIAM., 2 FT LENGTH	SPACE 3 FT. ON CENTER
MIX #2 - STREAM BANKS FROM STA. 14+15 TO STA. 16+50				
77	<i>Cornus amomum</i>	Silky Dogwood	1/2 IN DIAM., 2 FT LENGTH	SPACE 3 FT. ON CENTER
77	<i>Sambucus canadensis</i>	Elderberry	1/2 IN DIAM., 2 FT LENGTH	SPACE 3 FT. ON CENTER

STREAM RESTORATION SEEDING	
NATIVE SITE RESTORATION SEED MIX	1,709 SY / 0.35 AC
WET MEADOW SEED MIX	940 SY / 0.19 AC
RIPARIAN BUFFER SEED MIX	2,005 SY / 0.41 AC
PERMANENT SEEDING	
PERMANENT GRASS SEEDING, DRY GROUND (PSG-DG)	2,340 SY / 0.48 AC

LANDSCAPE NOTES

- ALL LANDSCAPING SHALL BE DONE IN ACCORDANCE WITH DELDOT STANDARD SPECIFICATIONS AND THE SPECIAL PROVISIONS FOR SECTION 737-PLANTINGS.
- THE CONTRACTOR SHALL VERIFY PLANT MATERIAL QUANTITIES SHOWN ON THE PLANS WITH THE TOTALS IN THE PLANT SCHEDULE. THE PLANS SHALL GOVERN.
- THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING MISS UTILITY TO LOCATE ALL UNDERGROUND UTILITY LINES PRIOR TO INSTALLATION OF PLANTINGS.
- ALL PLANTING OPERATIONS SHALL BE UNDER THE SUPERVISION OF AN EXPERIENCED PLANTS MAN.
- EACH TREE AND SHRUB PLANTING AREA SHALL BE SPREAD WITH 4 INCH DEEP SHREDDED HARDWOOD BARK MULCH. EACH PERENNIAL AND ORNAMENTAL GRASS PLANTING AREA SHALL BE SPREAD WITH 2 INCH DEEP SHREDDED HARDWOOD BARK MULCH.
- ALL TREES UP TO 2.5 INCH CALIPER SHALL HAVE A 6-FOOT DIAMETER MULCH BED. ALL TREES 2.5 INCH OR GREATER CALIPER SHALL HAVE AN 8-FOOT DIAMETER MULCH BED. ALL INDIVIDUAL SHRUBS SHALL HAVE A 4-FOOT DIAMETER MULCH BED.
- NO PLANT MATERIAL SHALL BE PLANTED DIRECTLY IN FRONT OF ROADWAY SIGN SIGHT LINES.
- FOR THE PLANT ESTABLISHMENT PERIOD AND FOR LANDSCAPE MAINTENANCE REASONABILITY FOLLOWING FINAL ACCEPTANCE SEE THE SPECIAL PROVISIONS.
- ALL EXISTING TREES DESIGNATED FOR PROTECTION AND OTHER TREES TO REMAIN THAT ARE DISTURBED DURING CONSTRUCTION SHALL HAVE THE DAMAGE CORRECTED BY AN I. S. A. CERTIFIED ARBORIST AT THE CONTRACTOR'S EXPENSES.
- A 12 INCH LAYER OF TEMPORARY MULCHING PROTECTING TREES ALONG ACCESS ROAD SHALL BE MEASURED AND PAID FOR UNDER ITEM 737002 - MULCHING, PLANTS (SY).
- ALL TEMPORARY MULCHING MAY BE RE-USED AS PERMANENT MULCHING WITH THE APPROVAL OF THE ENGINEER.

SEEDING NOTES:

- APPLICATION OF THE RIPARIAN BUFFER, WET MEADOW AND NATIVE SITE RESTORATION SEEDING MIX SHALL ONLY OCCUR BETWEEN THE FOLLOWING DATES: MARCH 1" TO MAY 1" AND SEPTEMBER 1ST TO OCTOBER 31".
- ALL TOPSOIL PLACEMENT AND GRADING WHERE SPECIFIED SHALL BE COMPLETED BEFORE SEEDING. SEEDBED PREPARATION SHALL BE COMPLETED AS NOTED IN THE PLANS OR AS DIRECTED BY THE ENGINEER. ALL TOPSOIL SHALL MEET THE REQUIREMENTS OF SECTION 908 AND THE FOLLOWING:
  - TOPSOIL SHALL CONTAIN NO LESS THAN 3-PERCENT AND NO MORE THAN 10-PERCENT ORGANIC MATTER AS DETERMINED IN ACCORDANCE WITH AASHTO T 194.
  - TOPSOIL SHALL HAVE AN ACIDITY RANGE OF PH 6.0 TO PH 7.5.
  - THE METHOD OF TESTING TOPSOIL SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF AASHTO T 88, MODIFIED; AASHTO T 89, METHOD B; AND AASHTO T 90; AND SHALL MEET THE FOLLOWING GRADATION REQUIREMENTS:

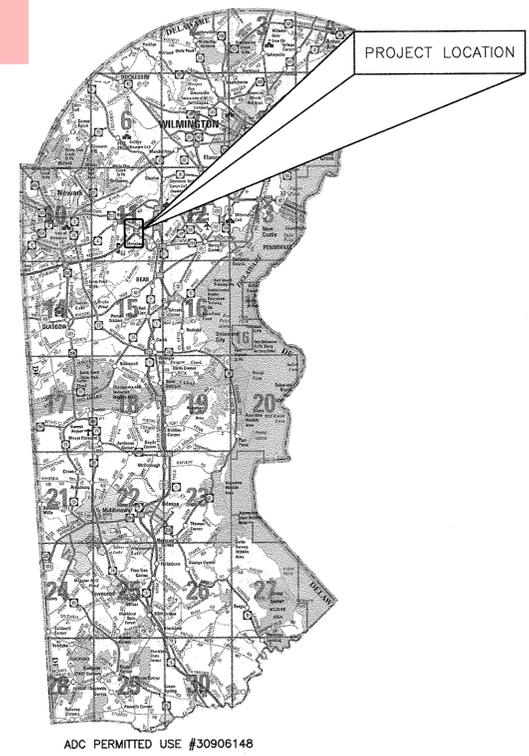
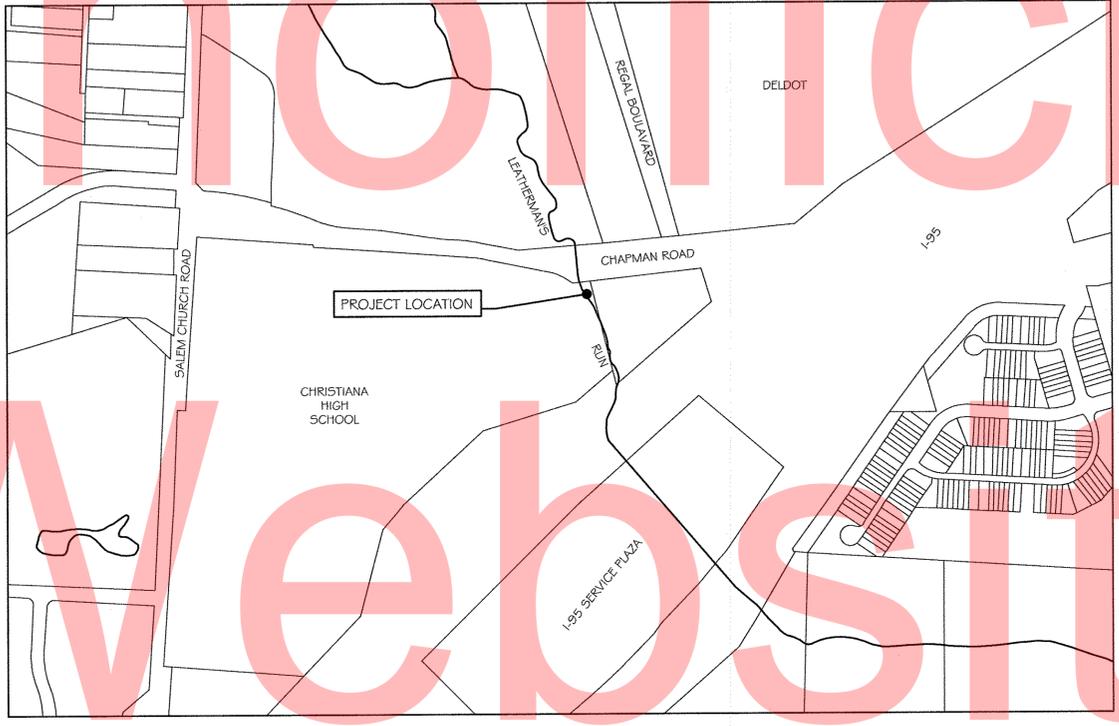
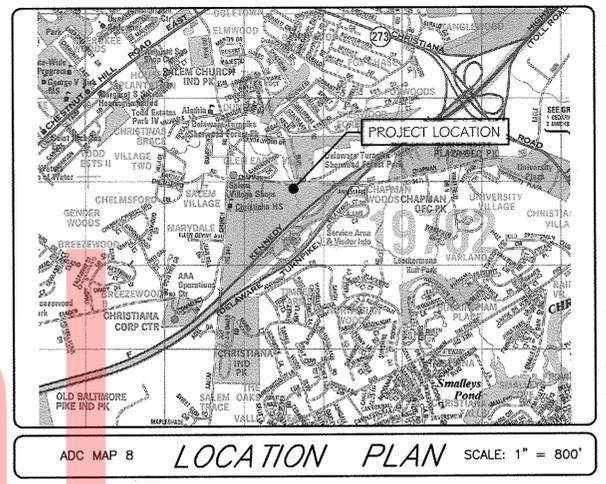
SIEVE SIZE	MINIMUM PERCENT PASSING BY WEIGHT
2" (50 MM)	100
NO. 4 (4.75 MM)	90
NO. 10 (2.00 MM)	80

	MINIMUM PERCENT	MAXIMUM PERCENT
PASSING NO. 10 (2.0 MM AND RETAINED ON NO. 200 (75 µM) SIEVE		
SAND	15	65
PASSING NO. 200 (75 µM) SIEVE		
SAND	10	60
SILT	5	40

Website Copy

# SANITARY SEWER PLAN - CP04 LEATHERMAN'S RUN RESTORATION AT CHRISTIANA HIGH SCHOOL

NEW CASTLE COUNTY  
DELAWARE



DRAWING INDEX		
DRAWING NO	SHEET NO	TITLE
SS-1	1 OF 6	COVER SHEET
SS-2	2 OF 6	GENERAL NOTES
SS-3	3 OF 6	SANITARY SEWER PLAN
SS-4	4 OF 6	PROFILES
SS-5	5 OF 6	SANITARY SEWER CONSTRUCTION DETAILS
SS-6	6 OF 6	EROSION AND SEDIMENT CONTROL

PLAN INDEX  
SCALE: 1"=40'

SANITARY SEWER TABLE						
STREET NAME	MANHOLES	WITHIN ROADWAY	WITHIN R. O. W.	PIPE SIZE	PIPE LENGTH	PIPE MAT'L
OFF ROAD	0	NO	YES	16"	295'	DIP
OFF ROAD	1	NO	YES	8"	81'	DIP

**PURPOSE NOTE:**

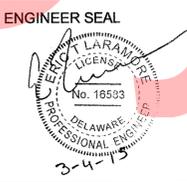
- Project Description – The work under this contract shall include but not be limited to the following:
  - Removal of approximately 295 linear feet of 16 inch diameter and 81 linear feet of 8 inch diameter pipe.
  - Installation of approximately 295 linear feet of 16 inch diameter and 81 linear feet of 8 inch diameter sanitary sewer pipe along with 1 manhole.
  - Performance of all associated clearing and grubbing, road restoration, drainage, stream crossing, stream bed restoration and bank stabilization, and the related erosion and sediment control tasks.

MISS UTILITY  
OF  
DELMARVA



BEFORE YOU DIG CALL  
1-800-282-8555 (in Del.)  
1-800-441-8335 (Md., Va.)  
PROTECT YOURSELF, GIVE TWO  
WORKING DAYS NOTICE

REV.	DESCRIPTION	DRAWN	DATE	ENGINEER SEAL	APPROVALS	DATE	NEW CASTLE COUNTY DEPARTMENT OF SPECIAL SERVICES NEW CASTLE, DELAWARE	
					DRAWN BY:	DCN	2/17/15	PROJECT:
					CHECKED BY:	EL		LEATHERMAN'S RUN RESTORATION AT CHRISTIANA HIGH SCHOOL
					ENGINEER:		SHEET TITLE:	COVER SHEET
					OPERATIONS:		SCALE:	AS NOTED
					REVISION:		CONTRACT NO:	
							SHEET NO:	1 OF 6
							PROJECT NO:	
								SS-1



**GENERAL NOTES:**

- Datum: Vertical: North American Vertical Datum (1988) derived from GPS Observations, processed through the National Geodetic Survey's On-Line Positioning Users Service. (NGS-OPUS)  
Horizontal: Delaware State Plane North American Datum (1983) derived from GPS Observations, processed through the National Geodetic Survey's On-Line Positioning Users Service. (NGS-OPUS)
- Sanitary sewer shall be constructed in accordance with New Castle County, Delaware, Standard Specifications For Construction, March 1975 or as subsequently amended and the Recommended Standards for Waste Water Facilities 2004 published by Health Education Services, Albany, NY or as subsequently amended.
- The contractor shall verify all dimensions, elevations and field conditions prior to beginning work.
- Construction debris shall be lawfully disposed of off site.
- Work shall be performed in accordance with all local, state, county, federal, and environmental requirements.
- The contractor shall be responsible to repair any damage caused by his operations at no cost to New Castle County.
- It shall be the Contractor's responsibility to obtain the approval and the acceptance of the sanitary sewers by New Castle County upon completion of construction.
- Existing utilities are in accordance with the best available information. It shall be the Contractor's responsibility to verify utility locations in the field before beginning work. The contractor is responsible for resolving any and all conflicts with utilities.
- The Contractor shall take all necessary precautions to protect the existing utilities and maintain uninterrupted service. Any damage done to utilities due to Contractor's negligence shall be immediately and completely repaired at Contractor's expense.
- The Contractor shall be responsible for replacement of damaged or destroyed landscaping.
- Plan locations and dimensions shall be strictly adhered to unless otherwise directed by the Engineer.
- No construction shall deviate from the approved plans and specifications without written permission from New Castle County.
- These drawings do not include the necessary components for construction safety. All construction must be done in compliance with the Occupational Safety and Health Act of 1970, and all rules and regulations thereto and appurtenant.
- Contractor shall saw cut and remove existing pavement as required. Disposal off site shall be the responsibility of the Contractor.
- Fabrication and installation of all materials, equipment, etc., shall be in accordance with the standard industry practice, building codes and manufacturers recommendations. All existing conditions and dimensions shall be field verified by the contractor prior to ordering and/or fabrication of any materials.
- Any existing laterals to sanitary sewer shall be reconnected. Sewer service should remain uninterrupted.
- The Contractor shall be responsible for the means, methods, techniques and sequence of construction including any bypass pumping and/or dewatering in conjunction with the work.
- Contractor shall maintain access to Pump Station.
- Miss Utility shall be notified three (3) consecutive working days prior to excavation, at 1-800-282-8555
- All elevation datum are based on survey information provided by Vandemark & Lynch, Inc.,

dated May 4, 2009.

- The limit of disturbance for this construction activity is based on the configuration of sanitary sewer easement depicted on this plan.
- The contractor shall provide a Certified Construction Reviewer to monitor sediment and stormwater management practices according to New Castle County Code Section 12.05.001.
- Upon completion of the installation of the sewer the contractor shall provide a reproducible set of clearly readable "as-built" contract drawings reflecting all changes made during the construction period. "As-built" drawings shall be prepared by, signed, and sealed by a professional engineer or land surveyor registered in the State of Delaware.
- The contractor must restrict all construction activity to "within" the "Limits of Disturbance". Land disturbing activity may not occur beyond the limit of disturbance unless the contractor obtains prior, written approval from an authorized representative of the property owner(s).
- Parking for contractor's vehicles or contractor's employees' vehicles shall be the responsibility of the contractor.
- The contractor shall be responsible for the security of his materials and equipment.
- The contractor shall perform the various items of work under the contract in a sequence of his choosing to meet his progress schedule but in keeping with the requirements of the contract specifications and drawings.
- The contractor shall provide by-pass pumping and successfully by-pass all flows through the sewer system.
- The contractor shall maintain one set of all contract documents (construction drawings, specifications, reference documents and technical documents) at the project location so as to be accessible for inspection and regulatory review.
- Traffic controls for work in the State of Delaware right-of-way shall be the responsibility of the contractor and established according to the The Delaware Department of Transportation Manual on Uniform Traffic Control Devices (MUTCD) for Streets and Highways, Case 2 (Two-Lane, Two-Way Traffic Shoulder Closure - Within Ten Feet of Travelway).

**COMMONLY USED ABBREVIATIONS**

- Ac. = ACRES
- BLDG. = BUILDING
- B.O.B. = BOTTOM OF BANK
- B.O.C. = BACK OF CURB
- C.B. = CATCH BASIN
- C.F. = CUBIC FEET
- C.M. = CONCRETE MONUMENT
- C.M.P. = CORRUGATED METAL PIPE
- C.N. = CURVE NUMBER
- C.O. = CLEANOUT
- DIA.Ø = DIAMETER
- D.I.P. = DUCTILE IRON PIPE
- E.G. = EXISTING GRADE
- EL. = ELEVATION
- ESMT. = EASEMENT
- EX. = EXISTING
- F.E.S. = FLARED END SECTION
- F.G. = FINISHED GRADE
- F.F. = FINISHED FLOOR
- F.M. = FORCE MAIN
- F.E.C. = FACE OF CURB
- H.D.P.E. = HIGH DENSITY POLYETHYLENE
- INV. = INVERT
- I.P.F. = IRON PIPE FOUND
- I.P.S. = IRON PIPE SET
- LAT. = LATERAL
- L.F. = LINEAR FEET
- LOD = LIMIT OF DISTURBANCE
- MAX. = MAXIMUM
- MIN. = MINIMUM
- M.H. = MANHOLE
- N.T.S. = NOT TO SCALE
- O.C. = ON CENTER
- P.L. = PROPERTY LINE
- PR. = PROPOSED
- P.V.C. = POLY-VINYL CHLORIDE
- R.C.P. = REINFORCED CONCRETE PIPE
- R/W = RIGHT-OF-WAY
- SAN. = SANITARY
- S.B. = SOIL BORING
- S.F. = SQUARE FEET
- S.S. = SANITARY SEWER
- STA. = STATION
- T.O.B. = TOP OF BANK
- T.C. = TIME OF CONCENTRATION
- T.P. = TEST PIT
- TYP. = TYPICAL
- UGG = UNDER GROUND GAS
- UGW = UNDER GROUND WATER
- X/S = CROSS SECTION
- NIC = NOT IN CONTRACT

**LEGEND:  
EXISTING**

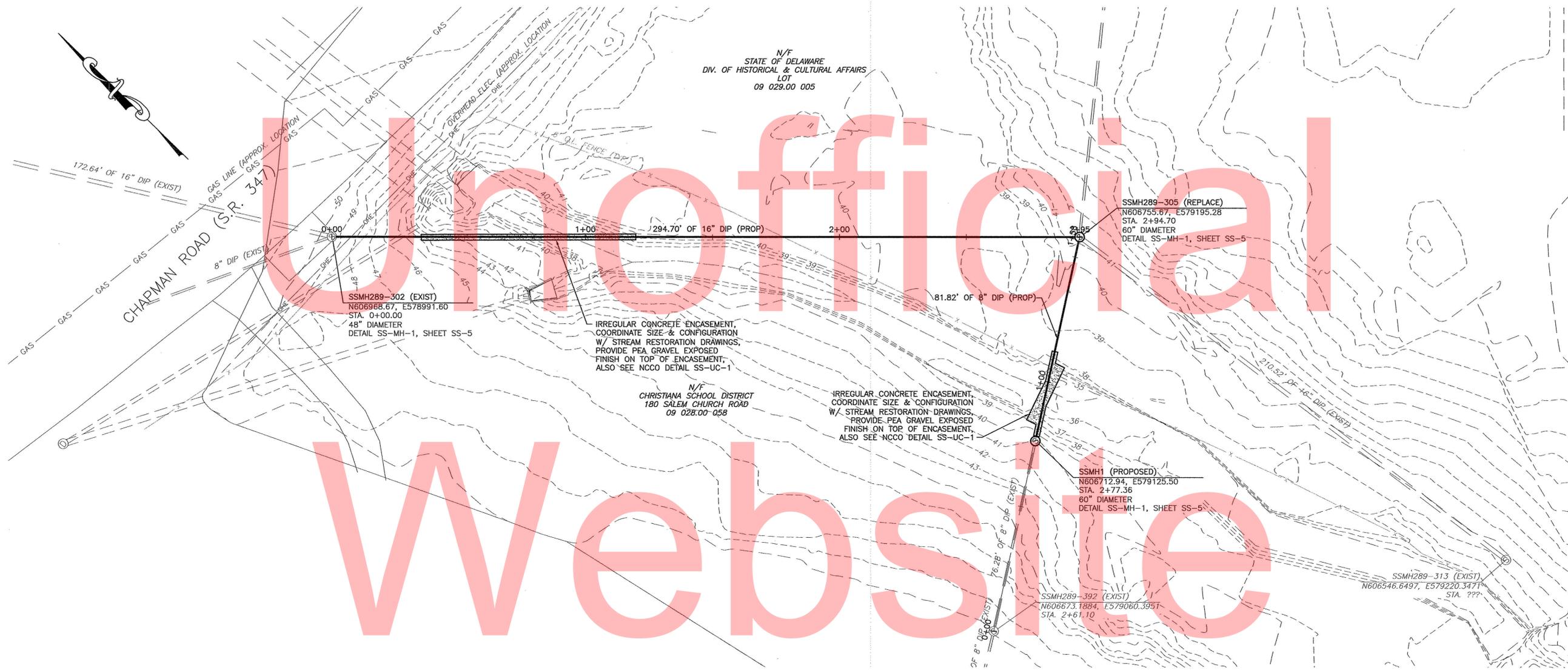
- Water valve 
  - Wood Post 
  - Light pole 
  - Sign 
  - Sanitary Sewer Manhole 
  - Utility Pole W/ Guywire 
  - Telephone Pedestal 
  - Electric Box 
  - Fire Hydrant 
  - Deciduous Tree 
  - Evergreen Tree 
  - Shrub 
  - Concrete 
  - Spot Grade 
  - Gate Post 
  - Storm Sewer Manhole 
  - Fence Line 
  - Woods line 
  - Contour Lines 
  - Pavement 
  - Sanitary Sewer Line 
  - Underground Gas Line 
  - Underground Water Line 
  - Overhead Electric Line 
  - RipRap 
  - Centerline 
  - Property Line 
  - Flood Plane Line 
- PROPOSED**
- Sanitary Sewer Manhole 
  - Underground Sanitary Sewer Line 
  - Limit of Disturbance 
  - Silt Fence 
  - Super Silt Fence 
  - Roadway Patching 

Official Website Copy

REV.	DESCRIPTION	DRAWN	DATE	ENGINEER SEAL	APPROVALS	DATE	NEW CASTLE COUNTY DEPARTMENT OF SPECIAL SERVICES NEW CASTLE, DELAWARE	
					DRAWN BY:	DCN	2/17/15	PROJECT: <b>LEATHERMAN'S RUN RESTORATION AT CHRISTIANA HIGH SCHOOL</b>
					CHECKED BY:	EL		
					ENGINEER:			SCALE: AS NOTED CONTRACT NO:
					OPERATIONS:			SHEET NO: 2 OF 6 PROJECT NO:
					REVISION:			<b>SS-2</b>

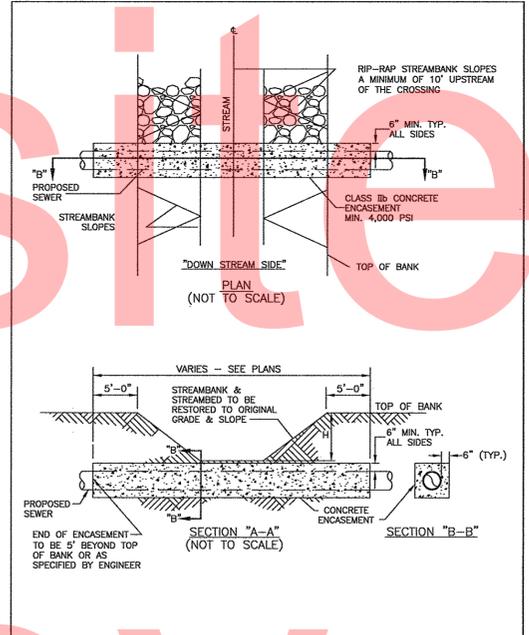
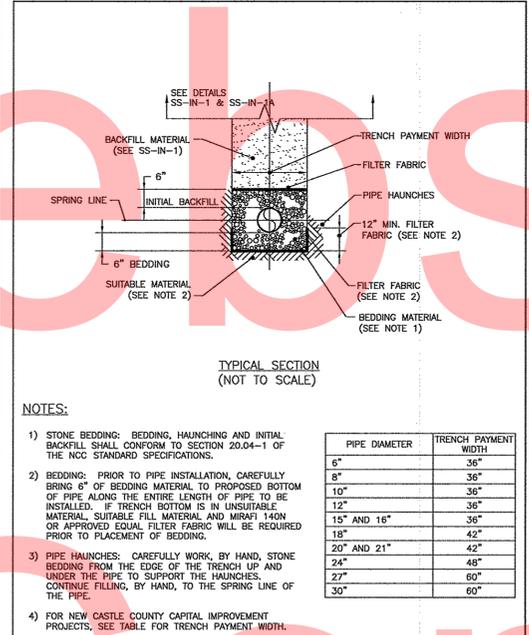
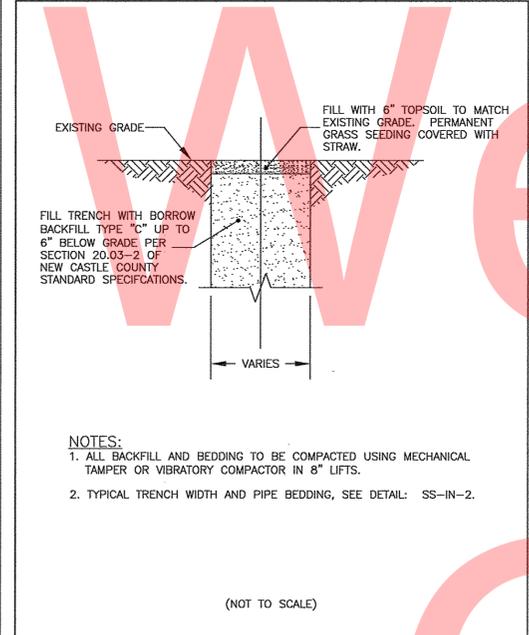
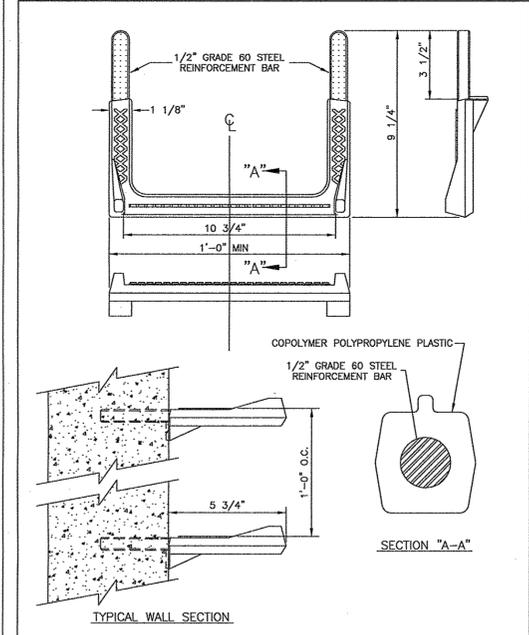
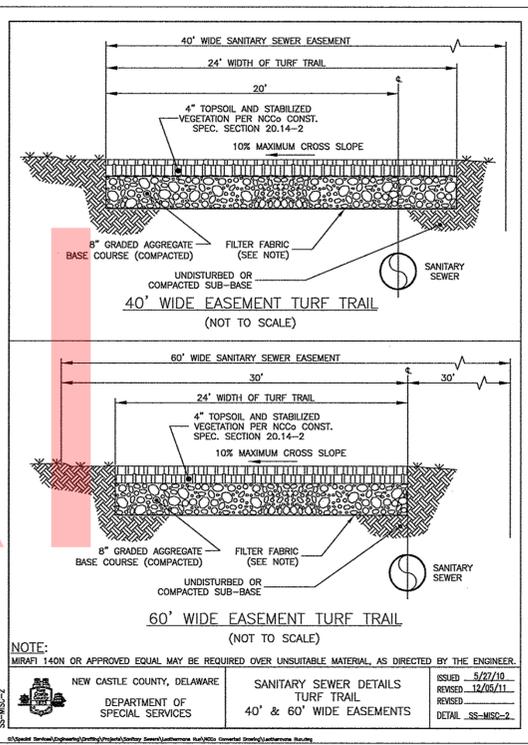
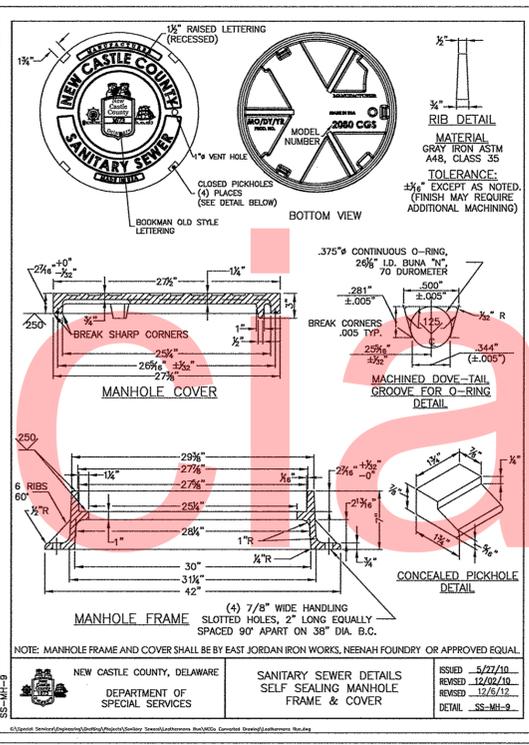
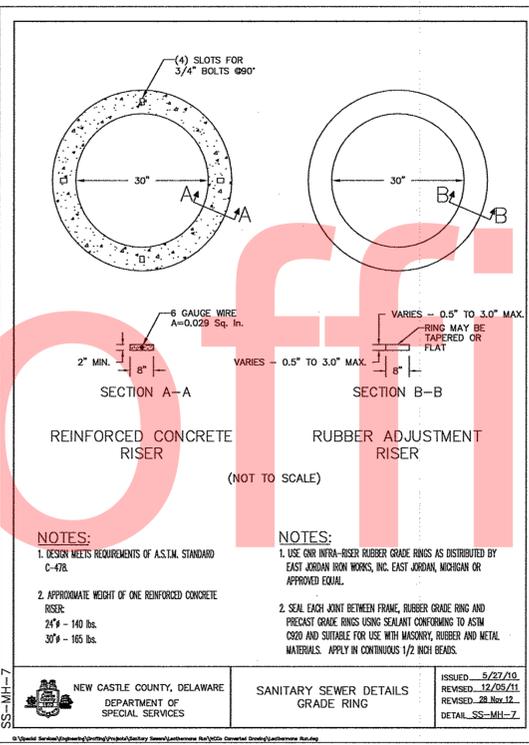
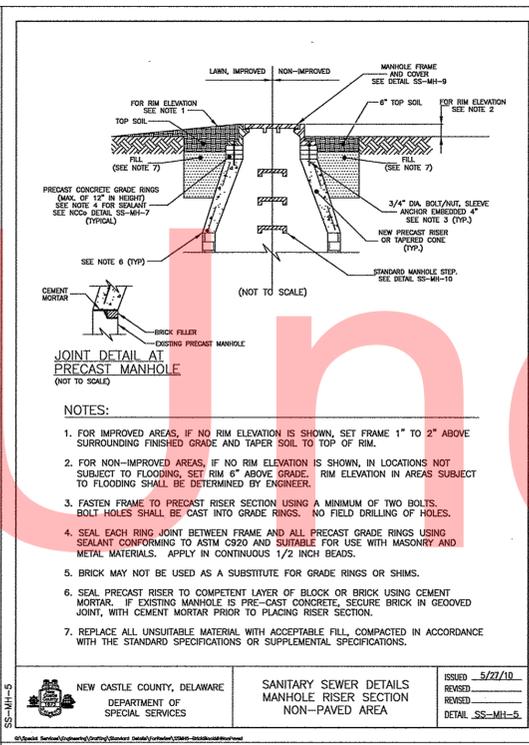
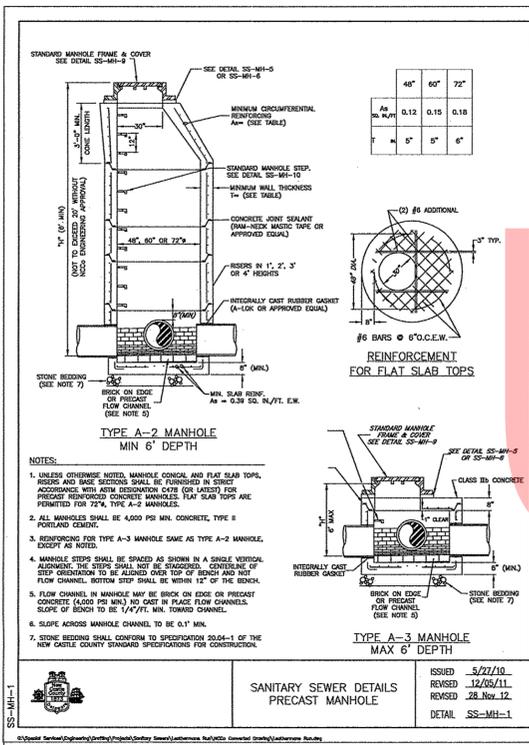
N/F  
STATE OF DELAWARE  
DIV. OF HISTORICAL & CULTURAL AFFAIRS  
LOT  
09 029.00 005

N/F  
CHRISTIANA SCHOOL DISTRICT  
180 SALEM CHURCH ROAD  
09 028.00 058



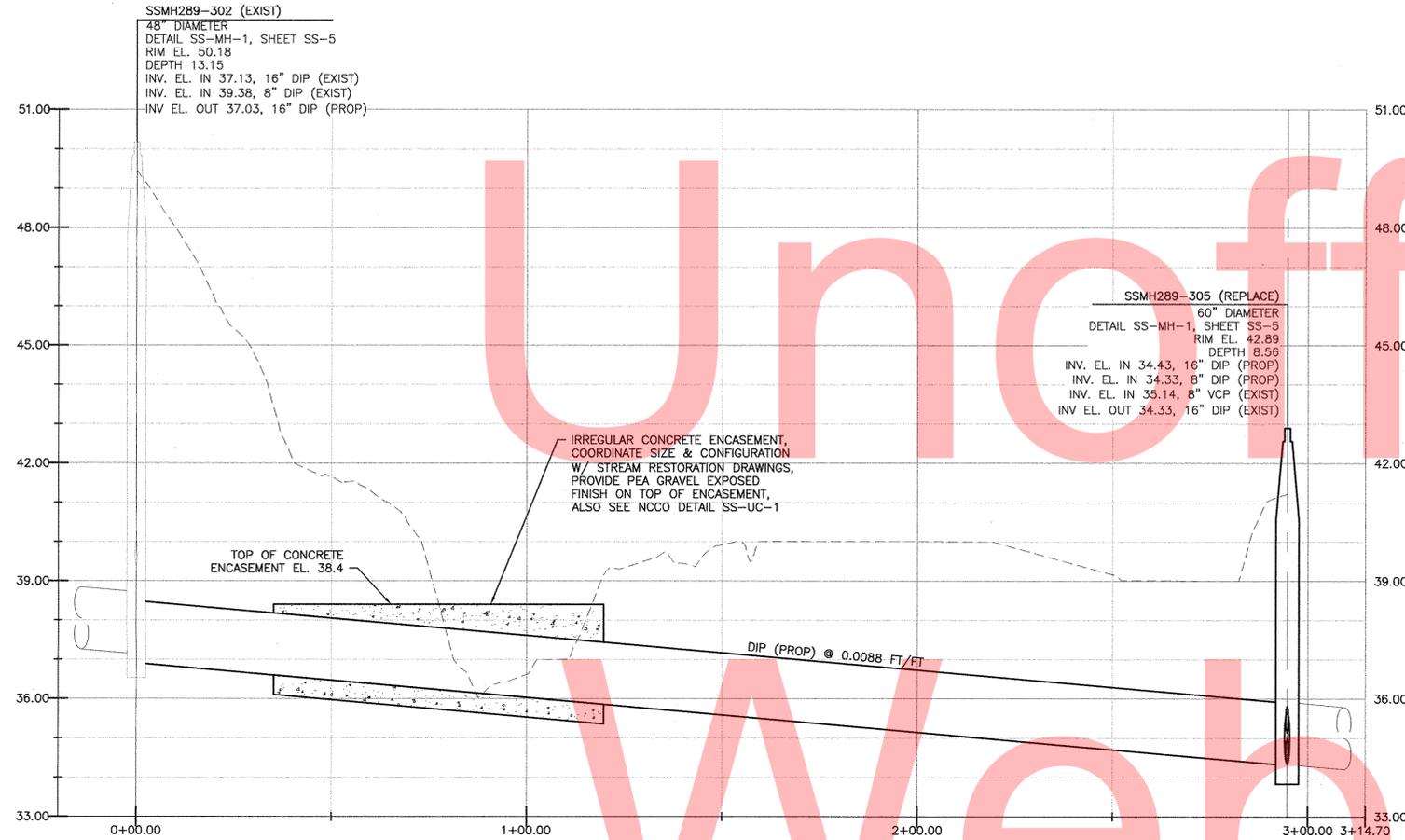
PLAN VIEW  
SCALE: 1"=20'-0"

REV.	DESCRIPTION	DRAWN	DATE	ENGINEER SEAL	APPROVALS	DATE	NEW CASTLE COUNTY DEPARTMENT OF SPECIAL SERVICES NEW CASTLE, DELAWARE	
					DRAWN BY:	DCN	PROJECT: LEATHERMAN'S RUN RESTORATION AT CHRISTIANA HIGH SCHOOL	
					CHECKED BY:	EL	SHEET TITLE: SANITARY SEWER PLAN	
					ENGINEER:		SCALE:	CONTRACT NO:
					OPERATIONS:		SHEET NO: 3 OF 6	PROJECT NO:
					REVISION:			SS-3

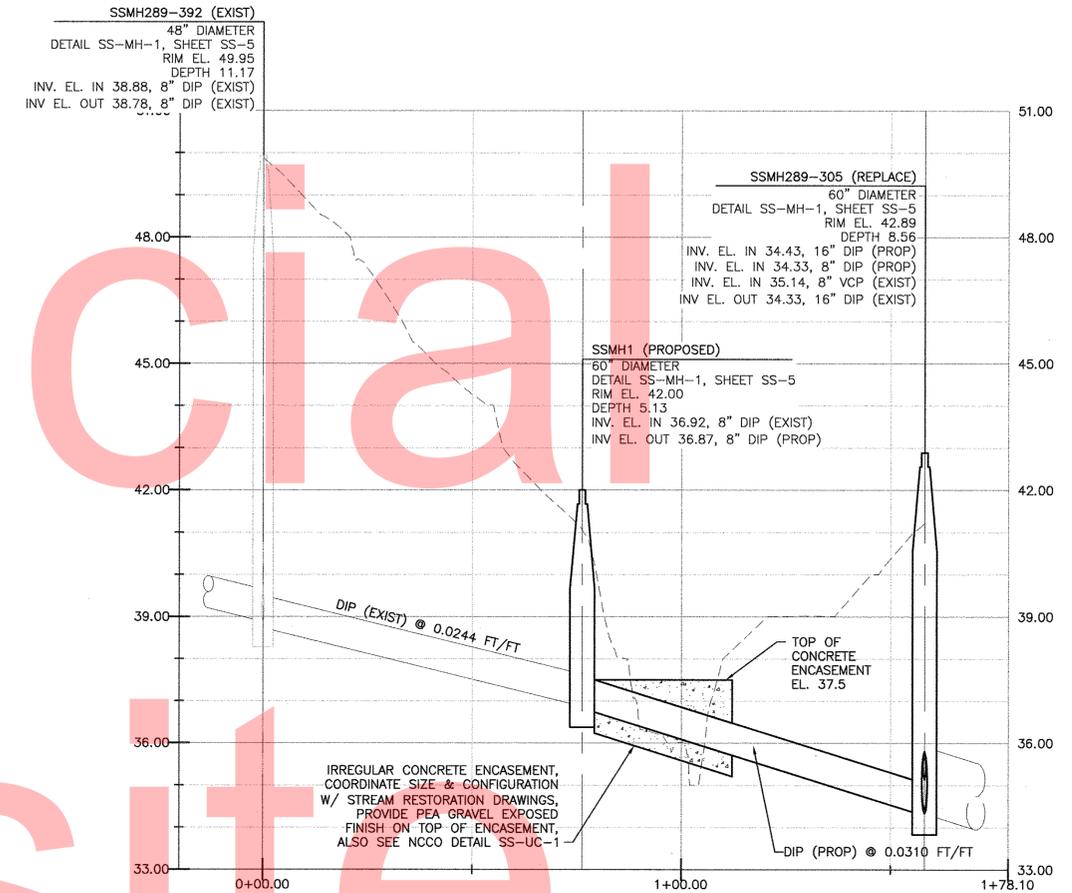


REV.	DESCRIPTION	DRAWN	DATE	ENGINEER SEAL	APPROVALS	DATE
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

<b>NEW CASTLE COUNTY</b> DEPARTMENT OF SPECIAL SERVICES NEW CASTLE, DELAWARE	
PROJECT: <b>LEATHERMAN'S RUN RESTORATION</b> <b>AT CHRISTIANA HIGH SCHOOL</b>	SHEET TITLE: <b>SANITARY SEWER DETAILS</b>
SCALE: SHEET NO: 5 OF 6	CONTRACT NO: PROJECT NO:
APPROVALS DRAWN BY: DCN CHECKED BY: EL ENGINEER: OPERATIONS: REVISION:	DATE: 2/17/15
PROJECT NO: <b>SS-5</b>	



PROFILE VIEW OF SSMH289-302 TO SSMH289-305  
SCALE: HOR. 1"=20', VERT. 1"=2'



PROFILE VIEW OF SSMH289-392 TO SSMH289-305  
SCALE: HOR. 1"=20', VERT. 1"=2'

REV.	DESCRIPTION	DRAWN	DATE	ENGINEER SEAL	APPROVALS	DATE
△						2/17/15 EL
△						
△						
△						
△						

<b>NEW CASTLE COUNTY</b>	
<b>DEPARTMENT OF SPECIAL SERVICES</b>	
NEW CASTLE, DELAWARE	
PROJECT:	<b>LEATHERMAN'S RUN RESTORATION</b>
	<b>AT CHRISTIANA HIGH SCHOOL</b>
SHEET TITLE:	PROFILES
SCALE:	CONTRACT NO:
SHEET NO: 3 OF 6	PROJECT NO:
	<b>SS-4</b>

**Standard Detail & Specifications**  
**Site Pollution Prevention**

**Notes:**  
The Construction Site Pollution Prevention Plan should include the following elements:

**1. Material Inventory**  
Document the storage and use of the following materials:

- Concrete
- Detergents
- Paints (enamel and latex)
- Cleaning solvents
- Pesticides
- Wood scraps
- Fertilizers
- Petroleum based products

**2. Good housekeeping practices**

- Store only enough product required to do the job.
- All materials shall be stored in a neat, orderly manner in their original labeled containers and covered.
- Substances shall not be mixed.
- When possible, all of a product shall be used prior to disposal of the container.
- Manufacturers' instructions for disposal shall be strictly adhered to.
- The site foreman shall designate someone to inspect all BMPs daily.

**3. Waste management practices**

- All waste materials shall be collected and stored in securely lidded dumpsters in a location that does not drain to a waterbody.
- Waste materials shall be salvaged and/or recycled whenever possible.
- The dumpsters shall be emptied a minimum of twice per week, or more if necessary. The licensed trash hauler is responsible for cleaning out dumpsters.

Source: Adapted from USEPA, Pub. 840-B-92-002  
Symbol: **DE-ESC-3.6.1**  
Detail No. Sheet 1 of 3  
Date: 6/05

**Standard Detail & Specifications**  
**Silt Fence**

Source: Adapted from MD Sids. & Specs. for ESC  
Symbol: **SF**  
Detail No. **DE-ESC-3.1.2.1**  
Sheet 1 of 2  
Date: 6/05

**Standard Detail & Specifications**  
**Geotextile Dewatering Bag**

**Construction Notes:**

- The dewatering bag should be placed so the incoming water flows into and through the bag, and then flow off the site without creating more erosion. The neck should be tied off tightly to stop the water from flowing out of the bag without going through the walls. The dewatering bag should be placed on a gravel bed to allow water to flow in all directions.
- The dewatering bag is considered full and should be disposed when it is impractical for the bag to filter the sediment out at a reasonable flow rate. At this point, it should be replaced with a new bag.
- Disposal may be accomplished as directed by the construction reviewer. If the site allows, the bag may be buried on site and seeded, viable fabric removed and seeded or removed from site to a proper disposal area.

**Materials:**

- The geotextile fabric shall be a Type GD-M.
- The dewatering bag shall be sewn with a double needle machine using high strength thread. All structural seams will be sewn with high strength, double stitched 2" type. Seam strength test will have the following minimum coverage roll values:

Type	TEST METHOD	TEST RESULT
Heavy duty	ASTM D-4884	100 lb / in

3. The dewatering bag shall have an opening large enough to accommodate a four (4) inch discharge hose with attached strap to tie off the hose to prevent the pumped water from escaping from the bag without being filtered.

Source: Adapted from ACF Products, Inc.  
Symbol: **GB**  
Detail No. **DE-ESC-3.2.1.2**  
Sheet 2 of 2  
Date: 12/03

**Standard Detail & Specifications**  
**Site Pollution Prevention**

**Notes (cont.)**

- Trash shall be disposed of in accordance with all applicable Delaware laws.
- Trash cans shall be placed at all lunch spots and littering is strictly prohibited. Recycle bins shall be placed near the construction trailer.
- If filter bags can not be stored in a weather-proof location, they shall be kept on a pallet and covered with plastic sheathing which is overlapped and anchored.

**4. Equipment maintenance practices**

- If possible, equipment should be taken to off-site commercial facilities for washing and maintenance.
- If performed on-site, vehicles shall be washed with high-pressure water spray without detergents in an area contained by an impervious berm.
- Drip pans shall be used for all equipment maintenance.
- Equipment shall be inspected for leaks on a daily basis.
- Washout from concrete trucks shall be disposed of in a temporary pit for hardening and proper disposal.
- Fuel nozzles shall be equipped with automatic shut-off valves.
- All used products such as oil, antifreeze, solvents and tires shall be disposed of in accordance with manufacturers' recommendations and local, state and federal laws and regulations.

**5. Spill prevention practices**

- Potential spill areas shall be identified and contained in covered areas with no connection to the storm drain system.
- Warning signs shall be posted in hazardous material storage areas.
- Preventive maintenance shall be performed on all tanks, valves, pumps, pipes and other equipment as necessary.
- Low or non-toxic substances shall be prioritized for use.

Source: Adapted from USEPA, Pub. 840-B-92-002  
Symbol: **DE-ESC-3.6.1**  
Detail No. Sheet 2 of 3  
Date: 6/05

**Standard Detail & Specifications**  
**Silt Fence**

**Construction Detail**

**Construction Notes:**

- Geosynthetic fabric to be fastened securely to fence posts with wire ties or staples.
- When two sections of filter cloth adjoin each other they shall be overlapped by six inches and folded.
- Maintenance shall be performed as needed and material removed when "bulges" develop in the silt fence.

**Materials:**

- Status: Steel I-beam T or UJ or 2" x 2" x 2" hardwood
- Geosynthetic Fabric: Type GD-I
- Reinforcing strip: Wooden lath, plastic strip or other approved equivalent
- Pre-fabricated Litter: Geotext, Envirofence, or approved equivalent

Source: Adapted from MD Sids. & Specs. for ESC  
Symbol: **SF**  
Detail No. **DE-ESC-3.1.2.1**  
Sheet 2 of 2  
Date: 6/05

**Standard Detail & Specifications**  
**Site Pollution Prevention**

**Notes (cont.)**

- Contact information for reporting spills through the DNREC 24-Hour Toll Free Number shall be prominently posted.

**6. Education**

- Best management practices for construction site pollution control shall be a part of regular progress meetings.
- Information regarding waste management, equipment maintenance and spill prevention shall be prominently posted in the construction trailer.

**CONTACT INFORMATION**

DNREC 24-Hour Toll Free Number: 800-442-8802  
DNREC Solid & Hazardous Waste Branch: 302-739-9403

Source: Adapted from USEPA, Pub. 840-B-92-002  
Symbol: **DE-ESC-3.6.1**  
Detail No. Sheet 3 of 3  
Date: 6/05

**Standard Detail & Specifications**  
**Geotextile Dewatering Bag**

Source: Adapted from ACF Products, Inc.  
Symbol: **GB**  
Detail No. **DE-ESC-3.2.1.2**  
Sheet 1 of 2  
Date: 12/03

**GENERAL NOTES**

- DELDOT and NEW CASTLE COUNTY (N.C.C.) HAVE THE RIGHT TO CONDUCT ON-SITE INSPECTIONS OF LAND DISTURBING ACTIVITIES.
- ALL EROSION AND SEDIMENT CONTROL PRACTICES SHALL COMPLY WITH THE LATEST DELAWARE EROSION AND SEDIMENT CONTROL HANDBOOK AND DELDOT REQUIREMENTS.
- NEW CASTLE COUNTY DEPARTMENT OF SPECIAL SERVICES MUST BE NOTIFIED IN WRITING FIVE (5) DAYS PRIOR TO COMMENCING WITH CONSTRUCTION.
- A PRE-CONSTRUCTION MEETING MUST BE HELD PRIOR TO COMMENCING WITH CONSTRUCTION. NEW CASTLE COUNTY ENGINEERING SECTION WILL CONTACT THE CONTRACTOR TO SCHEDULE A MEETING.
- EROSION AND SEDIMENT CONTROLS AND THOSE SEDIMENT TRAPS CONSIDERED NECESSARY IN THE EARLY STAGES OF SITE WORK SHALL BE IN PLACE, INSPECTED AND APPROVED BY DELDOT PRIOR TO CONSTRUCTION.
- SHOULD QUESTIONS ARISE REGARDING THE MAINTENANCE OF EROSION AND SEDIMENT CONTROL PRACTICES, THE SITE CONTRACTOR SHALL CONTACT THE CONSULTING ENGINEER (JASON ZERN, P.E., NEW CASTLE COUNTY, (302) 395-5780) EXPEDITIOUSLY FOR TECHNICAL ASSISTANCE.
- LIMITS OF CONSTRUCTION MUST BE DELINEATED IN THE FIELD.
- IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN AND REPAIR ALL EROSION AND SEDIMENT CONTROL AND STORM WATER MANAGEMENT PRACTICES.
- THE CONTRACTOR SHALL CONTROL SITE DUST IN ACCORDANCE WITH METHODS OUTLINED IN THE DELAWARE EROSION AND SEDIMENT CONTROL HANDBOOK OR DELDOT REQUIREMENTS, WHICHEVER IS MORE STRINGENT.
- IF THE APPROVED PLAN NEEDS TO BE MODIFIED, ADDITIONAL SEDIMENT AND STORMWATER CONTROL MEASURES MAY BE REQUIRED AS DEEMED NECESSARY BY NEW CASTLE COUNTY.
- ALL DISTURBED SOIL SURFACES, INCLUDING SOIL STOCKPILES AND PERIMETER CONTROLS ARE SUBJECT TO EROSION AND SHALL BE STABILIZED EITHER TEMPORARILY OR PERMANENTLY WITHIN SEVEN (7) DAYS.
- EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED WEEKLY AND AFTER EACH RAINFALL. MAINTENANCE MUST BE PERFORMED AFTER EACH INSPECTION AS NECESSARY. ANY ERODED AREAS SHALL BE STABILIZED AND ANY ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF ACCORDING TO PLAN.
- NEW CASTLE COUNTY RESERVES THE RIGHT TO ADD, MODIFY OR DELETE ANY EROSION OR SEDIMENT CONTROL MEASURE AS THEY DEEM NECESSARY.
- CONTRACTOR IS RESPONSIBLE TO PROVIDE AT LEAST ONE PERSON ONSITE WHO HAS TAKEN THE CONTRACTOR CERTIFICATION COURSE (BLUE CARD COURSE) TO PROVIDE INSPECTION DUTIES PER THE STATE OF DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL (DNREC) SEDIMENT AND STORMWATER PROGRAM. THE BLUE CARD HOLDER SHALL REVIEW AND REPORT ON ALL EROSION AND SEDIMENT CONTROLS AS WELL AS STORMWATER MANAGEMENT FACILITY CONSTRUCTION THROUGHOUT THE DURATION OF THE PROJECT PER THE DNREC BLUE CARD HOLDER REQUIREMENTS.
- ALL DISTURBED FLAT AREAS SHALL RECEIVE SEED AND MULCH. ALL SLOPED AREAS SHALL RECEIVE SEED AND STABILIZATION MATING.

**TEMPORARY SEEDING AND MULCHING**

- SEEDBED PREPARATION - LOOSEN UPPER 3 INCHES BY DISCING, RAKING OR OTHER ACCEPTED MEANS.
- SOIL AMENDMENTS - APPLY 50 LBS./1000 SQ. FT. OF DOLOMITIC LIMESTONE AND 14 LBS./1000 SQ. FT. OF 10-10-10 FERTILIZER.
- SEEDING - APPLY 3.2 LBS./1000 SQ. FT. OF DELAWARE RYEGRASS FOR THE PERIOD OF AUGUST 15 THROUGH NOVEMBER 15 AND MARCH 1 THROUGH APRIL 30.
- REFER TO THE DELAWARE EROSION AND SEDIMENT CONTROL HANDBOOK FOR TEMPORARY SEEDING.
- MULCHING - APPLY 70 TO 90 LBS./1000 SQ. FT. OF HAY OR STRAW. ANCHOR MULCH IMMEDIATELY AFTER APPLICATION USING 5 GALLONS/1000 SQ. YDS. OF EMULSIFIED ASPHALT.

**PERMANENT SEEDING AND MULCHING**

- SITE PREPARATION
  - INSTALL EROSION CONTROL PRACTICES.
  - GRADE AS NEEDED AND FEASIBLE TO PERMIT THE USE OF CONVENTIONAL EQUIPMENT FOR SEEDBED PREPARATION, SEEDING, MULCH APPLICATION, ANCHORING AND MAINTENANCE.
- SEEDBED PREPARATION: FLAT AREAS AND SLOPES UP TO 3:1 GRADE SHALL BE LOOSE AND FRAGILE TO A DEPTH OF AT LEAST 4 INCHES. THE TOP LAYER OF SOIL SHALL BE LOOSENED BY RAKING, DISCING, OR OTHER ACCEPTABLE MEANS BEFORE SEEDING.
- SOIL AMENDMENTS: APPLY 90 LBS./1000 SQ. YDS. OF DOLOMITIC LIMESTONE, 23 LBS./1000 SQ. YDS. OF 10-10-10 FERTILIZER.
- SEEDING
  - PERMANENT SEEDING MIX SHALL BE:
    - KENTUCKY 31 TALL FESCUE (75%)
    - REDTOP (5%)
    - CANADA BLUEGRASS (10%)
    - KENTUCKY BLUEGRASS (10%)
 THIS MIX SHALL BE APPLIED AT 90 LBS./ACRE. SEEDING DATES ARE 2/1-4/30 AND 8/15-10/31.
  - SEEDING BETWEEN 5/1 AND 8/14 SHALL BE WITH THE FOLLOWING MIX:
    - KENTUCKY 31 TALL FESCUE AT 60 LBS./ACRE
    - WEEPING LOVEGRASS AT 2 LBS./ACRE
  - TO REESTABLISH EXISTING LAWS USE:
    - KENTUCKY 31 TALL FESCUE AT 220-260 LBS./ACRE
- MULCHING - MATERIALS AND AMOUNTS
  - STRAW - SHALL BE UNROTTED SMALL GRAIN STRAW APPLIED AT 70-90 LBS./1000 SQ. FT. MULCH MATERIALS SHALL BE RELATIVELY FREE OF ALL KINDS OF WEEDS. SPREAD UNIFORMLY BY HAND OR MECHANICALLY. FOR UNIFORM DISTRIBUTION OF HAND SPREAD MULCH, DIVIDE AREA INTO APPROXIMATELY 1,000 SQ. FT. SECTIONS AND PLACE 70-90 POUNDS OF STRAW IN EACH SECTION. MULCH MUST BE ANCHORED IMMEDIATELY TO MINIMIZE LOSS BY WIND OR WATER. REFER TO DELAWARE EROSION AND SEDIMENT CONTROL HANDBOOK FOR STANDARD DETAIL AND SPECIFICATIONS FOR MULCHING (DE-ESC-3.4.5).
  - MULCH NETTINGS SUCH AS JUTE OR EXCELSIOR BLANKET MAY BE USED. STAPLE TO SURFACE IN WATERWAYS AND ON STEEP SLOPES. LIGHTER MATERIALS OF PAPER, PLASTIC AND COTTON MULCH NETTINGS MAY BE USED WHERE EROSION HAZARD IS NOT SEVERE. IF AREA IS TO BE MOVED, DO NOT USE METAL STAPLES.

**TYPICAL UTILITY TRENCH CONSTRUCTION SEQUENCE**

- GENERAL: EXPOSED TRENCH EXCAVATIONS HAVE HIGH POTENTIAL FOR ACCELERATED EROSION AND SEDIMENT POLLUTION BECAUSE THESE EXCAVATIONS ARE TYPICALLY LOCATED AT LOWER ELEVATIONS ALONG OR ACROSS EARTH DISTURBANCE SITES, OPEN TRENCHES SERVE TO CONCENTRATE SEDIMENT LADEN RUNOFF AND CONVEY IT TO SITE BOUNDARIES OR WATERWAYS. THE MOST IMPORTANT EROSION AND SEDIMENT POLLUTION CONTROL CONSIDERATION FOR TRENCH CONSTRUCTION IS THE LIMITING AND SPECIFIC SCHEDULING OF WORK ACTIVITIES.
- CONSTRUCTION SEQUENCE:
  - LIMIT ADVANCE CLEARING AND GRUBBING OPERATIONS TO A DISTANCE EQUAL TO TWO TIMES THE LENGTH OF PIPE INSTALLATION THAT CAN BE COMPLETED IN ONE DAY.
  - WORK CREWS AND EQUIPMENT FOR TRENCHING, PLACEMENT OF PIPE, CONSTRUCTION AND BACKFILLING SHALL BE SEPARATE FROM CLEARING AND GRUBBING AND SITE RESTORATION AND STABILIZATION OPERATIONS.
  - LIMIT DAILY TRENCH EXCAVATION TO THE LENGTH OF PIPE PLACEMENT AND BACKFILLING THAT CAN BE COMPLETED THE SAME DAY.
  - WATER THAT ACCUMULATES IN THE OPEN TRENCH SHALL BE REMOVED BY PUMPING TO A FILTER BAG.
  - ON THE DAY FOLLOWING PIPE PLACEMENT AND TRENCH BACKFILLING, THE DISTURBED AREAS SHALL BE GRADED TO FINAL CONTOURS, AND APPROPRIATE EROSION AND SEDIMENT POLLUTION CONTROL MEASURES/FACILITIES SHALL BE INSTALLED. SEEDING AND MULCHING OF ALL DISTURBED AREAS SHALL BE DONE AT THE END OF EACH WEEK.
  - WHERE POSSIBLE, EXCAVATED MATERIAL SHALL BE STOCKPILED ON THE UPSIDE OF THE SLOPE. STOCKPILE LOCATIONS SHALL NOT AFFECT TRENCH STABILITY.
  - SILT FENCE SHALL BE PLACED ON THE DOWNHILL SIDE OF TRENCHES WHEN:
    - TRENCH IS CONSTRUCTED IN UNPAVED AREAS,
    - TRENCH WILL BE BACKFILLED ON THE SAME DAY IT IS DUG, AND
    - TRENCH WIDTH IS GREATER THAN SIX FEET. SILT FENCE SHALL ALSO BE PLACED AROUND EXCAVATED MATERIAL TO PROVIDE ADEQUATE PROTECTIONS.

REV.	DESCRIPTION	DRAWN	DATE	ENGINEER SEAL	APPROVALS	DATE

APPROVALS	DATE
DRAWN BY: DCN	2/17/15
CHECKED BY: EL	
ENGINEER:	
OPERATIONS:	
REVISION:	

**NEW CASTLE COUNTY**  
**DEPARTMENT OF SPECIAL SERVICES**  
NEW CASTLE, DELAWARE

PROJECT: **LEATHERMAN'S RUN RESTORATION AT CHRISTIANA HIGH SCHOOL**

SHEET TITLE: **EROSION & SEDIMENT CONTROL**

SCALE:  

SHEET NO: 6 OF 6

CONTRACT NO:  

PROJECT NO:  

**SS-6**

G:\Special Services\Engineering\Drafting\Projects\Sanitary Sewers\Leathermans Run\NCCo. Converted Drawing\Leathermans Run.dwg