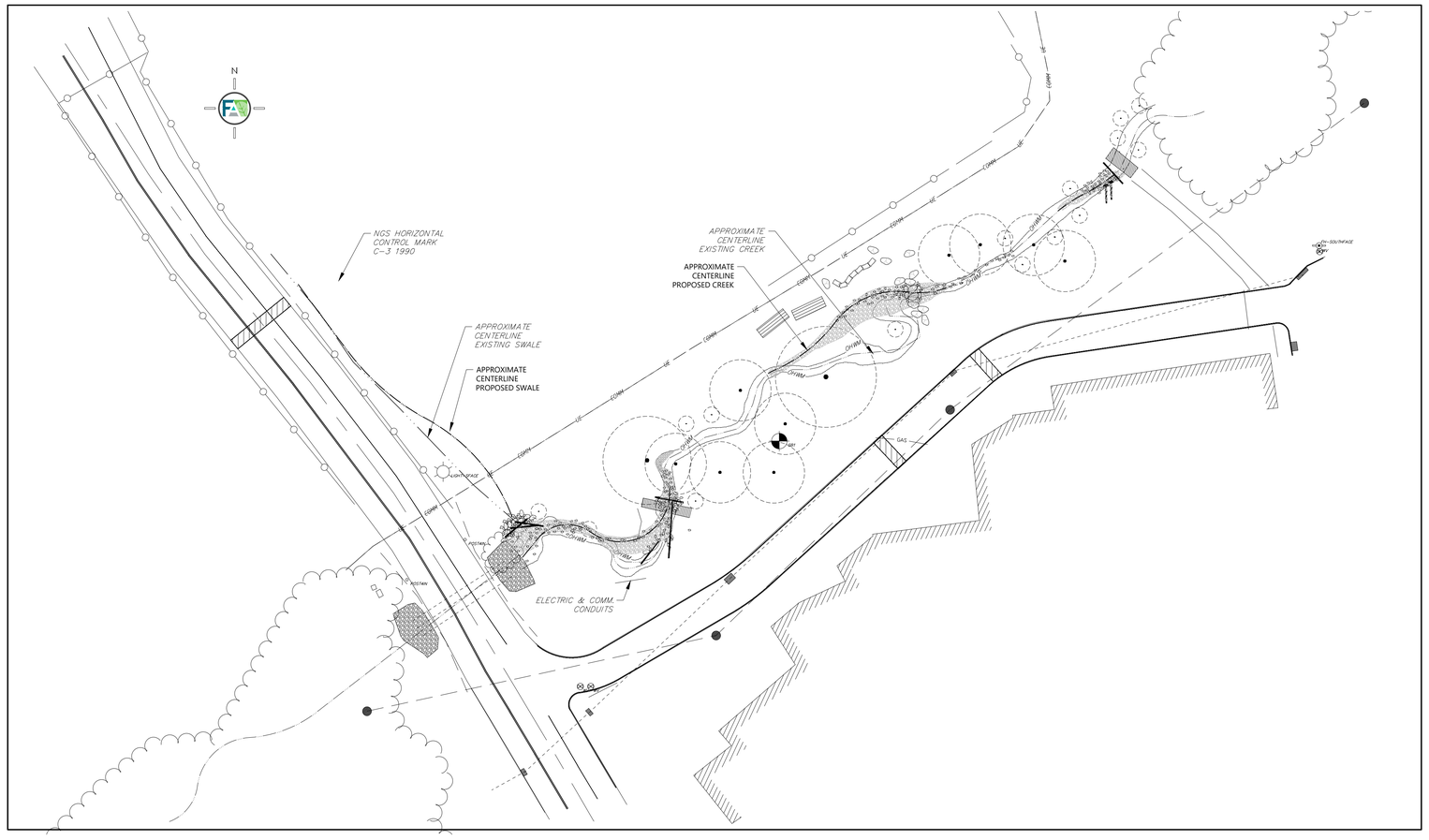
STREAM RESTORATION AT THE INDEPENDENCE SCHOOL



LOCATION MAP
SCALE: 1"= 800'

PLAN INDEX

CERTIFICATE OF OWNER

I CERTIFY THAT ALL LAND CLEARING, CONSTRUCTION AND DEVELOPMENT SHALL BE DONE PURSUANT TO THE APPROVED PLAN AND THAT RESPONSIBLE PERSONNEL (I.E., BLUE CARD HOLDER) INVOLVED IN THE LAND DISTURBANCE WILL HAVE A CERTIFICATION OF TRAINING PRIOR TO INITIATION OF THE PROJECT, AT A DNREC SPONSORED OR APPROVED TRAINING COURSE FOR THE CONTROL OF EROSION AND SEDIMENT DURING CONSTRUCTION. IN ADDITION, I GRANT THE DNREC SEDIMENT AND STORMWATER PROGRAM AND/OR THE RELEVANT DELEGATED AGENCY THE RIGHT TO CONDUCT ON-SITE REVIEWS, AND I UNDERSTAND MY RESPONSIBILITIES UNDER THE NPDES CONSTRUCTION GENERAL PERMIT, AS REFERENCED ON THIS COVERSHEET.

REPRESENTATIVE : THE INDEPENDENCE SCHOOL

DATE

CERTIFICATE OF ACCURACY

I, ANDREW C. HAYES, PE RLA CERP, HEREBY CERTIFY THAT THIS PLAN HAS BEEN PREPARED UNDER MY SUPERVISION AND TO THE BEST OF MY KNOWLEDGE COMPLIES WITH THE APPLICABLE STATE AND LOCAL REGULATIONS AND ORDINANCES.

ANDREW C. HAYES, PE RLA CERP
DE. LICENSE NO. 13280

ANDREW C. HAYES REGISTERED No. 13280 PROFESSIONAL ENGINEER DELAWARE
12 JULY 2023

FORESITE ASSOCIATES
- CIVIL ENGINEERING
- LANDSCAPE ARCHITECTURE
- ECOLOGICAL RESTORATION

FORESITE ASSOCIATES INC.

PHONE: 302.351.3421
INFO@FORESITEASSOCIATES.COM

INDEPENDENCE SCHOOL
STREAM RESTORATION PLAN
NEW CASTLE CONSERVATION DISTRICT
2430 OLD COUNTRY ROAD, NEWARK, DE 19702

#	COMMENT	BY DATE
6	REVISION TO DETAIL 5 SHEET 13 & SPOT ELEVATION UPDATES SHEET 9	DDS 05.30.23
5	PER COMMENTS-NPS&USACE	DDS 05.08.23
4	ISSUED FOR PERMITTING	DDS 04.04.23
3	PER NPS COMMENTS	DDS 02.14.23
2	ISSUED FOR PERMITTING	DDS 12.02.21
1	ISSUED FOR CLIENT REVIEW	DDS 11.23.20

FORESITE ASSOCIATES

INDEX

INDEPENDENCE SCHOOL
STREAM RESTORATON

MILL CREEK HUNDRED
NEW CASTLE COUNTY

NEWARK
DELAWARE

DATE: 06.26.20
PROJECT #: 07101
SURVEYED BY: N/A
CREATED BY: DDS
DRAWN BY: DDS
CHECKED BY: ACH
SHEET: 1
1 OF 15

SCALE: 1"=30'
0 20 40 60

GENERAL NOTES:

1. THIS PLAN PROVIDES DESIGN DRAWINGS FOR STREAM RESTORATION INITIATIVES FOR AN UNNAMED TRIBUTARY LOCATED ON THE GROUNDS OF THE INDEPENDENCE SCHOOL IN NEWARK, DE. THE STREAM RESTORATION IS FOR A LENGTH OF APPROXIMATELY 360 LINEAL FEET FROM THE CULVERT AT THE SCHOOL ENTRY DRIVE UPSTREAM TO THE THIRD EXISTING PEDESTRIAN BRIDGE.
2. THESE PLANS ARE BASED UPON THE STREAM CONDITIONS OBSERVED/SURVEYED ON 04/20/2020. BECAUSE STREAM SYSTEMS ARE DYNAMIC AND EROSION IS LIKELY TO CONTINUE TO OCCUR AFTER THIS DATE, THE CONDITIONS AT THE TIME OF CONSTRUCTION MAY VARY FROM THOSE SHOWN ON THESE PLANS; ADJUSTMENTS TO THE DESIGN SHALL BE MADE IN THE FIELD UNDER THE DESIGN PROFESSIONALS SUPERVISION AS NEEDED TO ADDRESS SITE CONDITION CHANGES.
3. FLOOD PLAIN: ACCORDING TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAP NO. 10003C0130L, EFFECTIVE JANUARY 22, 2020 THIS PROJECT IS NOT LOCATED WITHIN AREAS OF ZONE AE OF THE 100 YEAR FLOOD PLAIN. NOTE, IT IS RECOMMENDED PER THIS PLAN, THE DOWNSTREAM END OF THE CULVERTS BE CLEARED OF SEDIMENT BUILD UP; ACCORDING TO MAP 10003C0130L, THE AE ZONE BEGINS AT THE DOWNSTREAM END OF THE CULVERT.
4. ACCORDING TO A WETLAND DELINEATION BY FORESITE ASSOCIATES IN APRIL OF 2022, THERE ARE NON-WETLANDS WATERS (A PERRENIAL STREAM) WITHIN THE PROJECT AREA'S LIMIT OF DISTURBANCE, BUT NO 404 WETLANDS. OTHER WETLAND AND NON-WETLANDS WATERS BEYOND THE LIMITS OF THE PROJECT'S LIMIT OF DISTURBANCE MAY EXIST ON THE PROPERTY.
5. PER THE NEW CASTLE COUNTY GIS DATA VIEWER, HTTPS://ARCG.IS/CD5XO, THE PROJECT IS LOCATED WITHIN THE COCKEYSVILLE OUTCROP WATER RESOURCE PROTECTION AREA.
6. THIS SITE IS NOT LOCATED IN A CRITICAL NATURAL AREA.
7. EXISTING UTILITIES ARE SHOWN BASED ON VISUAL INFORMATION OBSERVED (SUCH AS THE ERODED AREA EXPOSING A UTILITY LINE). IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CONTACT THE UTILITY COMPANIES INVOLVED IN ORDER TO SECURE THE MOST ACCURATE INFORMATION AVAILABLE AS TO UTILITY LOCATIONS AND ELEVATIONS. THERE ARE PRIVATE AND PUBLIC UTILITIES IN THE VICINITY OF THIS PROJECT.
8. NO CONSTRUCTION AROUND OR ADJACENT TO UTILITIES SHALL BEGIN WITHOUT NOTIFYING THEIR OWNERS AT LEAST 48 HOURS IN ADVANCE. THE CONTRACTOR SHALL TAKE THE NECESSARY PRECAUTIONS TO PROTECT THE EXISTING UTILITIES AND MAINTAIN UNINTERRUPTED SERVICE AND ANY DAMAGE DONE TO THEM SHALL BE IMMEDIATELY AND COMPLETELY REPAIRED AT THE CONTRACTOR'S EXPENSE.
9. BEFORE ANY WORK TAKES PLACE, THE CONTRACTOR SHALL CALL MISS UTILITY AT 811 OR 1.800.282.8555 AT LEAST 48 HOURS PRIOR TO CONSTRUCTION, TO HAVE ALL EXISTING UTILITIES MARKED ONSITE. THERE ARE PRIVATE UTILITIES ON THIS SITE THAT MAY REQUIRE THE SERVICES OF A PRIVATE UTILITY LOCATING FIRM; AS PART OF THE CONTRACTOR'S SCOPE OF WORK, PRIVATE UTILITIES SHALL BE MARKED WITHIN THE LIMITS OF THE LOD.
10. ALL MACHINERY TO BE PRESSURE WASHED PRIOR TO ENTERING PROJECT SITE; SPECIAL ATTENTION SHOULD BE GIVEN TO TRACKS AND UNDERCARRIAGE THAT CAN CONTAIN INVASIVE SEED, SUCH AS PHRAGMITES. MACHINERY TO BE REVIEWED AND CLEANLINESS APPROVED BY NCCD OR NCCD REPRESENTATIVE. EQUIPMENT FOUND TO HAVE UNSATISFACTORY AMOUNTS OF SOIL, DEBRIS, ETC. WILL NEED TO BE REMOVED FROM THE SITE.
11. EXISTING CONDITIONS SHOWN ARE BASED ON FIELD SURVEYING PERFORMED BY FORESITE ASSOCIATES INC. ON APRIL 20,2020.
12. THE LIMIT OF DISTURBANCE FOR EXCAVATION AND GRADING WORK PROPOSED BY THIS PLAN IS APPROXIMATELY 0.98 ACRES.
13. THE OWNER SHALL BE FAMILIAR WITH AND COMPLY WITH ALL ASPECTS OF THE NPDES CONSTRUCTION GENERAL PERMIT ASSOCIATED WITH THE PROJECT, INCLUDING, BUT NOT LIMITED TO, PERFORMING WEEKLY SITE INSPECTIONS DURING CONSTRUCTION AND AFTER RAIN EVENTS, AND MAINTAINING WRITTEN LOGS OF THESE INSPECTIONS.
14. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD-CHECK AND VERIFY PROPOSED CLEARANCES, DIMENSIONS AND EXISTING CONDITIONS. REPORT ANY DISCREPANCIES TO THE DESIGNER & OWNER'S REPRESENTATIVE FOR DIRECTION BEFORE PROCEEDING WITH WORK. FIELD REVISIONS SHALL REQUIRE PRIOR DESIGN REVIEW AND WRITTEN CONFIRMATION FROM THE OWNER'S REPRESENTATIVE. WORK STARTED WITHOUT NOTIFICATION OF AND CONFIRMATION FROM THE OWNER'S REPRESENTATIVE WILL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND WILL BE CORRECTED BY HIM/HER WITHOUT ADDITIONAL COMPENSATION.
15. PERFORM ALL WORK IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS. WHERE DISCREPANCIES OCCUR AND WHERE THERE ARE CONFLICTS OR OMISSIONS IN THE DRAWINGS AND APPLICATIONS, THE CONTRACTOR SHALL NOTIFY THE DESIGNER & OWNER'S REPRESENTATIVE IMMEDIATELY AND REFRAIN FROM STARTING AND COMPLETING SUCH WORK, OR DEPENDENT WORK, UNTIL TOLD BY THE OWNER'S REPRESENTATIVE TO PROCEED.
16. PROTECTION BARRIER SHALL BE INSTALLED AROUND ALL TREES MARKED BY THE DESIGN TEAM AND APPROVED BY THE OWNER'S REPRESENTATIVE, PRIOR TO THE START OF CONSTRUCTION. CONTRACTOR MUST HAVE WRITTEN APPROVAL THAT ALL TREES ARE MARKED AND WORK MAY BEGIN; SHOULD ANY TREES BE DAMAGED OR WORK BEGUN PRIOR TO THIS APPROVAL, REPAIRS WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AND REPLACED PER OWNER'S REPRESENTATIVE DIRECTION.
17. THE TREE PROTECTION BARRIER SHALL BE PLACED AT OR EXTERIOR OF THE DRIP-LINE OF THE TREE, UNLESS OTHERWISE NOTED OR APPROVED BY THE OWNER'S REPRESENTATIVE.
18. THERE SHALL BE NO STORAGE OF MATERIALS OR SUPPLIES OF ANY KIND WITHIN THE AREA OF THE PROTECTION BARRIERS. CONCRETE AND CEMENT MATERIALS, BLOCK, STONE, SAND, AND SOIL SHALL **NOT** BE PLACED WITHIN THE DRIP- LINE OF THE TREES.
19. FUEL STORAGE SHALL **NOT** BE PERMITTED WITHIN 50 FEET OF ANY TREE TO BE PRESERVED. REFUELING, SERVICING AND MAINTENANCE OF EQUIPMENT AND MACHINERY SHALL NOT BE PERMITTED WITHIN 50 FEET OF ANY WATERWAY, WATERBODY, AND/OR TREE TO BE PRESERVED.
20. DEBRIS AND WASTE FROM THE CONSTRUCTION OR OTHER ACTIVITIES SHALL NOT BE PERMITTED WITHIN THE PROTECTED AREAS. WASHDOWN OF CONCRETE OR CEMENT HANDLING EQUIPMENT (IF REQUIRED), IN PARTICULAR, SHALL NOT BE PERMITTED WITHIN 150 FEET OF WATERWAYS, WATERBODIES AND/OR TREES TO BE PRESERVED.
21. ANY DAMAGES OR INJURIES TO TREES TO BE PRESERVED SHOULD BE REPORTED TO THE OWNER'S REPRESENTATIVE AS SOON AS POSSIBLE. SEVERED ROOTS SHALL BE PRUNED CLEANLY TO HEALTHY TISSUE, USING PROPER PRUNING TOOLS. BROKEN BRANCHES OR LIMBS SHALL BE PRUNED ACCORDING TO INTERNATIONAL SOCIETY OF ARBORICULTURE PRUNING GUIDELINES AND ANSI-300 PRUNING STANDARDS. THE OWNER RETAINS THE RIGHT TO CONSULT A CERTIFIED ARBORIST AT THE CONTRACTORS EXPENSE.
22. NO PRUNING OF THE TREE CANOPIES AND BRANCHES IS TO BE DONE TO PROVIDE CLEARANCES FOR THE CONSTRUCTION EQUIPMENT WITHOUT EXPLICIT WRITTEN PERMISSION FOR EACH TREE REQUIRING PRUNING. ALERT OWNER 'S REPRESENTATIVE IF PRUNING IS NECESSARY.
23. NO DEBRIS IS TO BE BURIED ON SITE.
24. POTENTIAL NURSERIES FOR SOURCING OF NATIVE PLANT MATERIALS INCLUDE, BUT ARE NOT LIMITED TO:

    PINELANDS NURSERY & SUPPLY
    323 ISLAND ROAD
    COLUMBUS, NJ 08022

    EDGE OF THE WOODS NATIVE PLANT NURSERY LLC
    2415 ROUTE 100
    OREFIELD, PA 18069

    NORTH CREEK NURSERIES
    LANDENBERG, PENNSYLVANIA 19350

    ERNST CONSERVATION SEEDS, INC.
    8884 MERCER PIKE
    MEADVILLE PA 16335

    OCTORARO NATIVE PLANT NURSERY
    6126 STREET ROAD
    KIRKWOOD, PA 17536

SITE DATA

PROJECT CONTACT:	NEW CASTLE CONSERVATION DISTRICT 2430 OLD COUNTY ROAD NEWARK, DE 19702 302.832.3100
SITE ADDRESS:	THE INDEPENDENCE SCHOOL 1300 PAPER MILL ROD NEWARK, DE 19711
TAX MAP PARCEL NO.:	08-030.00-060
HORIZONTAL DATUM:	NAD 83
VERTICAL DATUM:	NAVD 88
PROJECT BENCH MARK(S):	NGS DISK 'C-3 1990', ELEV. 177.13
PURPOSE OF PLAN:	**STREAM RESTORATION**

GENERAL CONSTRUCTION NOTES:

1. ALL MATERIALS AND METHODS OF CONSTRUCTION SHALL CONFORM TO THE DELAWARE DEPARTMENT OF TRANSPORTATION'S "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION", AUGUST 2016, SECTION 911-PLANTINGS, EXCEPT AS NOTED IN THESE PLANS. FOR ALL INSTANCES IN THIS SECTION OF THE SPECIFICATIONS THAT REFERENCE "THE ENGINEER", THE TERM SHALL BE SUBSTITUTED WITH "PROPERTY OWNER / OWNER'S REPRESENTATIVE". THE SPECIFICATIONS CAN BE ACCESSED ONLINE FREE OF CHARGE. NOTE THIS DOCUMENT REFERENCES THE AMERICAN ASSOCIATION OF NURSERYMEN: AMERICAN STANDARD FOR NURSERY STOCK, LATEST EDITION, WHICH SHALL ALSO BE CONSIDERED PART OF THESE SPECIFICATIONS.
2. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. ALL CONSTRUCTION MUST BE DONE IN COMPLIANCE WITH THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970 AND ALL RULES AND REGULATIONS THERETO APPURTENANT. THESE DRAWINGS DO NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY.
3. CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK. THEY WILL BE SOLELY RESPONSIBLE FOR THE MEANS, METHODS, TECHNIQUES, PROCEDURES, AND SEQUENCE OF CONSTRUCTION.
4. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAKE THEMSELVES THOROUGHLY FAMILIAR WITH THE MOST RECENT REVISION OR AMENDMENTS TO ALL DOCUMENTS REFERENCED IN THESE NOTES.
5. THE CONTRACTOR SHALL AT ALL TIMES PROTECT AGAINST SEDIMENT OR DEBRIS LADEN RUNOFF OR WIND FROM LEAVING THE SITE. PERIMETER CONTROLS (WHEN CALLED FOR) SHOULD BE CHECKED DAILY AND ADJUSTED AND/OR REPAIRED TO FULLY CONTAIN AND CONTROL SEDIMENTATION ON THE SITE. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT HAS REACHED HALF OF THE EFFECTIVE CAPACITY OF THE CONTROL. IN ADDITION, THE CONTRACTOR MAY NEED TO ADJUST OR REPAIR MEASURES IN TIMES OF ADVERSE WEATHER CONDITIONS, OR AS DIRECTED BY THE NCCD.
6. SOILS / SOIL MIXTURES : THIS PROJECT UTILIZES IN-SITU SOILS, ONLY AMENDMENTS NOTED ARE TO BE ADDED UNLESS APPROVED BY THE OWNER'S REPRESENTATIVE. AMENDMENTS NOT TO BE USED INCLUDE, BUT ARE NOT LIMITED TO, PEAT, HUMUS, AND LEAF MULCH.
7. FERTILIZER :
   a. PLANT FERTILIZER SHALL CONSIST OF COMMERCIALLY AVAILABLE PRODUCTS AND SHALL BE MATERIALS SOLD AS "ORGANIC" OR "NATURAL" FERTILIZERS. PRODUCT NUTRIENT CONTENT SHALL BE IDENTIFIED IN THE STANDARD FORM OF NITROGEN (N), PHOSPHOROUS (P) AND POTASSIUM (K) RATIOS. THE MINIMUM ACCEPTABLE NUTRIENT CONTENT SHALL BE 6-2-4, UNLESS OTHERWISE DIRECTED BY THE OWNER / OWNER'S REPRESENTATIVE.
9. WATER :
   a. APPLY WATER BY OPEN-END HOSE SUPPLIED BY GRAVITY OR LOW PRESSURE PUMP(PRESSURE NOT TO EXCEED 10 PSI). APPLY WATER AT A RATE SO THAT THE WATER DOES NOT COMPLETELY RUN-OFF AND WILL THOROUGHLY SOAK AND PERCOLATE INTO THE SOIL IN THE PLANTING PIT. PERFORM WATERING WITHIN 1 CALENDAR DAY IF SITE CONDITIONS REQUIRE WATER TO SAVE THE HEALTH OF THE PLANTS. COMMERCIAL TREE WATERING BAGS OR OTHER CONTAINERS THAT WILL ALLOW A SLOW DISPENSING OF WATER OVER A PERIOD OF TIME EQUAL TO THE DESIRED AMOUNT OF WATER TO BE PROVIDED AT EACH PLANT CAN BE SUBMITTED FOR USE AND APPROVAL FOR THIS OPERATION.
   b. WATER SMALLER TYPE PERENNIAL OR HERBACEOUS PLANTS SUCH AS BULBS, TUBERS, RHIZOMES, PLUGS, STARTER PLANTS, SEEDLINGS AND SMALL TRANSPLANTS WITH 2-GALLONS OF WATER PER PLANT PER WATERING CYCLE.
   c. WATER THE PLANTS ON A 7 TO 10 DAY CYCLE BASED ON A NATURAL RAINFALL CONDITION OF LESS THAN 1-INCH OF RAINFALL PER WEEK, OR WHEN TEMPERATURES AND HUMIDITY REMAIN GREATER THAN 90 DEGREES FOR A PERIOD OF ONE WEEK. DO NOT WATER IF SOIL CONDITIONS ARE DETERMINED TO BE SATURATED. DO NOT WATER AT OR ONTO THE TRUNK OR STEMS OF THE PLANT.
   d. PROVIDE A WATERING SCHEDULE, SOURCE OF WATER, AND LIST OF WATERING EQUIPMENT TO BE USED FOR APPROVAL AT LEAST 30 DAYS PRIOR TO FIRST WATERING ON SITE; IF WATERING METHODOLOGIES CHANGE AT ANYTIME DURING THE PROJECT DURATION OR DURING ESTABLISHMENT PERIOD DOCUMENTATION MUST BE PROVIDED.
10. PLANTING :
    a. ALL STOCK MUST BE HEALTHY AND VIGOROUS AND BE FREE OF DAMAGE FROM DISEASE, MISHANDLING OR POOR PRUNING. PLANTS THAT HAVE EVIDENCE OF STRESS, DISEASE, DIEBACK OR MISHANDLING WILL BE REJECTED.
    b. PLANT MATERIALS MUST BE SELECTED FROM CERTIFIED NURSERIES THAT HAVE BEEN INSPECTED BY STATE AND/OR FEDERAL AGENCIES. NURSERY INSPECTION CERTIFICATES SHALL BE FURNISHED TO DNREC UPON REQUEST.
    c. ALL PLANT MATERIAL MUST BE GROWN IN CONDITIONS SIMILAR TO THE USDA HARDINESS ZONE OF DELAWARE AND OF LOCAL ECOTYPE TO THE PROJECT SITE.
    d. PLANT MATERIAL COLLECTED FROM THE "WILD" IS PROHIBITED.
    e. EACH PLANT OR SAME-SPECIES GROUP OF PLANTS SHIPPED TO THE JOB SITE MUST BE CLEARLY LABELED WITH ITS SCIENTIFIC NAME AND COMMON NAME. THE CONTRACTOR IS RESPONSIBLE TO CHECK TO SEE THAT THE PLANTS ARE CORRECTLY LABELED. THE CONTRACTOR IS PROHIBITED TO ADD, ALTER OR REMOVE LABELS UNTIL AFTER INSTALLATION AND APPROVAL BY THE OWNER / OWNER'S REPRESENTATIVE. THE CONTRACTOR WILL NOT BE PAID FOR MATERIAL THAT IS IMPROPERLY LABELED OR FOR MATERIAL ON WHICH THE CONTRACTOR HAS ALTERED OR REMOVED THE LABELS.
    f. CONTRACTOR SHALL PROVIDE AN AS-BUILT RED-LINED PLAN NOTING ANY DEVIATIONS/SUBSTITUTIONS FROM THE APPROVED PLAN(S).
11. PLANT ESTABLISHMENT :
    a. THE PERIOD OF ESTABLISHMENT AND REPLACEMENT WILL BEGIN FROM THE DOCUMENTED DATE OF ACCEPTANCE OF THE ENTIRE PROJECT BY THE OWNER. OBTAIN WRITTEN CONCURRENCE ON THE VERIFIED DATE OF PLANTING COMPLETION FROM THE OWNER / OWNER'S REPRESENTATIVE.
    b. THE LANDSCAPE CONTRACTOR IS TO GUARANTEE PLANT MATERIAL, WATERING, AND GENERAL CARE FOR PLANTS FOR ONE YEAR FROM PROJECT ACCEPTANCE.
    c. MONITOR THE CONDITION OF THE PLANTS AND INITIATE ALL HORTICULTURAL PRACTICES NECESSARY TO MAINTAIN THE PLANTS IN A HEALTHY CONDITION DURING THE PERIOD OF ESTABLISHMENT.
    d. PROTECT PLANTS FROM WILDLIFE DEPREDATION; DEER PROTECTION SHALL BE PROVIDED FOR ALL WOODY SPECIES.
12. THE CONTRACTOR SHALL TAKE ALL MEASURES NECESSARY TO KEEP THE WORK AREA IN A CLEAN, NEAT CONDITION.

OWNER ON-GOING MAINTENANCE GUIDANCE:

YEAR 1:

YEAR ONE, INSTALLATION TO 365 DAYS FOLLOWING THE FINAL PROJECT PAYMENT, WILL BE THE MOST CRITICAL TIME TO MONITOR THE RESTORATION WORK. THE / A DESIGN CONSULTANT SHOULD BE CONTACTED AT ANY TIME SHOULD THE OWNER OR MAINTENANCE TEAM HAVE LANDSCAPE CARE QUESTIONS OR CONCERNS. THE INSTALLATION CONTRACTOR SHALL PROVIDE A 1-YEAR WARRANTEE ON PLANT MATERAIL

a. DURING DROUGHT AND LOW RAINFALL AMOUNTS FOR THE SPRING, SUMMER, AND FALL SEASONS CHECK PLANT HEALTH FOR WATER STRESS. FOR THE FIRST YEAR THE CONTRACTOR IS EXPECTED TO WARRANTY THE PLANTS UNLESS OTHER ARRANGEMENTS WERE AGREED UPON DURING CONSTRUCTION. THE MAINTENANCE TEAM CAN CALL THE CONTRACTOR AND MAKE THEM AWARE OF THE PLANT STRESS AND/OR THEY CAN WATER THE LANDSCAPE BY PUMPING AND SPRAYING WATER FROM THE STREAM CHANNEL. MEADOW LANDSCAPES SHOULD NOT BE PROVIDED WITH SUPPLEMENTAL WATER.
b. MONITOR THE LANDSCAPE FOR ANIMAL DEPREDATION. GEESE AND DEER ARE FREQUENT VISITORS TO NEW LANDSCAPES IN THE NEW CASTLE COUNTY AREA, BOTH CAN KILL YOUNG LANDSCAPE PLANTS THROUGH INGESTION, REMOVAL FROM SOIL, AND BARK RUBBING. PROTECTION FENCING AND OTHER MEASURES SHOULD REMAIN INTACT DURING THE FIRST YEAR AND SHOULD BE CHECKED FOR BREACHES.
c. A COPY OF THE AS-BUILT PLANTING PLAN (PLANT INCLUDING ANY SUBSTITUTIONS MADE DURING CONSTRUCTION) SHOULD REMAIN WITH THE LANDSCAPE MAINTENANCE TEAM TO IDENTIFY PLANTS TO REMAIN.
d. INVASIVE AND UNWANTED WEEDS SHOULD BE REMOVED IMMEDIATELY BY APPROPRIATE TECHNIQUES. ANNUAL WEEDS / INVASIVES CAN BE TREATED WITH HAND PULLING, PERENNIAL WEEDS / INVASIVES CAN BE TREATED WITH AQUATIC SAFE HERBICIDES. COMMON ANNUALS INCLUDE BUT ARE NOT LIMITED TO: STILT GRASS, LESSER CELENDINE, GARLIC MUSTARD. COMMON PERENNIAL INCLUDE, BUT ARE NOT LIMITED TO: THISTLE, JAPANESE KNOTWEED (AT AQUATIC MARGINS), PURPLE LOOSTRIFE. CONTACT THE DESIGN TEAM AND/OR THE COOPERATIVE EXTENSION OFFICE AT THE UNIVERSITY OF DELAWARE FOR ASSISTANCE IN IDENTIFICATION AND TREATMENT OF UNKNOWN PLANTS.
e. MOWING - MOWING IS AN EFFECTIVE MANAGEMENT IN TRADITIONAL LAWN LANDSCAPES. WHEN ADAPTING MOWING STRATEGIES TO NATURAL LANDSCAPES TRADITIONAL TECHNIQUES REQUIRE MODIFICATIONS. MEADOW LANDSCAPES IN YEAR 1 CAN BE MOWED IN LATE WINTER.
f. THE STREAM CHANNEL SHOULD BE CHECKED FREQUENTLY AND LARGE DEBRIS OR TRASH REMOVED FROM THE CHANNEL. OVER TIME WOODY DEBRIS IS BENEFICIAL TO A STREAM HABITAT, HOWEVER AFTER INITIAL INSTALLATION THE NEWLY GRADED BANK SLOPE MAY BE MORE PRONE TO DAMAGE FROM LARGE DEBRIS.
g. DURING WINTER MONTHS IF TRUNK GUARDS WERE INSTALLED FOR TREE INSTALLATIONS, REMOVE SNOW PACK FROM AROUND TRUCKS AND LOOSEN COLLAR BASE IF AIRFLOW IS CONSTRICTED AROUND ROOT FLARE. TRUNK GUARDS ARE AN EFFECTIVE MEASURE AGAINST DEER RUBBING, HOWEVER IF NOT MONITORED THEY CAN PROMOTE TRUNK ROT AT THE ROOT CROWN AND IMPAIR TREE HEALTH AND LONGEVITY.
h. PRIOR TO THE END OF YEAR ONE, THE OWNER SHOULD SCHEDULE A WALK THROUGH WITH THE CONTRACTOR TO IDENTIFY ANY PLANT MATERIAL NEEDING REPLACEMENTS PRIOR TO THE END OF THE 1 YEAR WARRANTY PERIOD.

YEAR 2:

YEAR TWO IS A CRITICAL YEAR TO GET AHEAD OF ANY PROBLEMATIC CONDITIONS OBSERVED IN YEAR ONE, I.E. HIGH GOOSE DEPREDATION OR INVASVIE PLANT PRESSURE.

a. MONITOR ANY WARRANTEE PLANT REPLACEMENTS FOR ENVIRONMENTAL STRESSES SUCH AS LACK OF WATER AND SPOT TREAT.
b. WATER ALL PLANT MATERIAL, EXCEPT MEADOW PLANTINGS, IF EXCESSIVE DROUGHT CONDITIONS OCCUR.
c. MONITOR FOR ANIMAL DEPREDATION AND REPLACE BREACHES IN PROTECTION MEASURES. PROTECTION MEASURES SHOULD REMAIN UP UNTIL THE END OF YEAR 3.
d. MONITOR AND SPOT TREAT INVASIVE AND UNWANTED WEEDS.
e. MOW MEADOW AND STREAM BANK HERBACEOUS LANDSCAPES ONCE IN LATE WINTER; MOWING DURING THIS TIME FRAME IN DELAWARE IS USUALLY OPTIMAL FOR PROTECTING GROUND NESTING BIRDS AND YOUNG MEADOW PLANTINGS HAVE NOT EMERGED TO BEYOND THE PREFERRED MOW HEIGHT OF 6". NO ADDITIONAL MOWING OF THE MEADOWS SHOULD OCCUR UNTIL THE FOLLOWING SPRING FOR HABITAT VALUE.
f. MONITOR THE STREAM FOR OVERALL HEALTH AND ESTABLISHMENT. DURING YEAR 2 THE CHANNEL SHOULD BE ABLE TO RESPOND TO NATURAL DEBRIS, HOWEVER IF UNUSUAL FLOOD PATTERNS OR BANK FAILURES ARE OBSERVED DUE TO THE PRESENCE OF LARGE WOODY DEBRIS THE DEBRIS SHOULD BE REMOVED, IF SEVERE CONTACT THE / A DESIGN PROFESSIONAL. HUMAN TRASH SHOULD BE REMOVED FROM THE STREAM CHANNEL.

YEAR 3:

ALTHOUGH LANDSCAPE MAINTENANCE IN NATURAL AREAS IS PERPETUAL DUE TO HUMAN INDUCED PRESSURES, BY YEAR 3 NEW LANDSCAPES ARE GENERALLY THOUGHT TO HAVE MATURED ENOUGH TO REDUCE REGULAR MAINTENANCE.

a. MONITOR THE LANDSCAPE MONTHLY FOR INVASIVE PLANT PRESSURE. IF PROBLEMATIC WEEDS WERE IDENTIFIED IN PRIOR YEARS, ADDITIONAL SCOUTING MAY BE REQUIRED BASED ON THE SPECIFIC PHENOLOGY OF THAT WEED.
b. AT THE END OF YEAR THREE ANIMAL DEPREDATION PROTECTION MEASURES CAN BE REMOVED IF NO VISIBLE BROWSE IS OBSERVED; SHOULD DEER BE PRESENT IN THE RESTORATION AREA, NEW DEER PROTECTIONS SHOULD BE INSTALLED ON TREES UNTIL THEY REACH 6" DIAMETER.
c. SHRUBS AND TREES SHOULD BE PRUNED AS NEEDED TO REMOVE DEAD, DAMAGED, OR DISEASED LIMBS UTILIZING INDUSTRY BEST PRACTICES.
d. REMOVE / REPLACE DEAD / DYING PLANTINGS. AS LANDSCAPES MATURE PAST YEAR 3 DETERMINE IF THE DEAD OR DECLINING PLANT PROVIDES HABITAT VALUE PRIOR TO REMOVAL.
e. MOWING OF MEADOW STREAM BANK HERBACEOUS LANDSCAPES SHOULD CONTINUE IN PERPETUITY PER THE GUIDELINES FOR YEAR 2; ADDITIONAL SEEDING CAN BE INITIATED TO PROMOTE DESIRABLE SPECIES.
f. THE STREAM CORRIDOR SHOULD BE MONITORED OCCASIONALLY FOR STABILITY AND TRASH SHOULD BE REMOVED REGULARLY.

LEGEND

EXISTING FEATURES

UNDERGROUND ELECTRIC
FENCE
ROAD CENTERLINE
ROADWAY STRIPING
GUARDRAIL
360 *CONTOUR MAJOR*
361 *CONTOUR MINOR*
OHWM *ORDINARY HIGH WATER MARK*
STREAM
EDGE OF PAVEMENT
TREE
TREE LINE (ESTIMATE FROM AERIAL IMAGE)
SHRUB LINE (ESTIMATE FROM AERIAL IMAGE)
PIPE (UNDERGROUND)
MANHOLE
BUILDING
ASPHALT PAVING
RIP RAP
X 361 *ELEVATION POINT*
SOIL BORING

PROPOSED FEATURES

STREAM
TRANSITION COBBLE 6"-18" SEE CONSTRUCTION DETAILS
ANCHOR STONE 18"-36" SEE CONSTRUCTION DETAILS
MIXED ANGULAR AND ROUND STONES SEE CONSTRUCTION DETAILS
HARDWOOD SALVAGED TIMBERS SEE CONSTRUCTION DETAILS
IMBRICATE SEAT WALL BOULDER
EXISTING TREE TO BE REMOVED
INTERLOCKING CONCRETE PAVER
RIP RAP
BOULDER COBBLE STREAM BED STONE POOL
BOULDER COBBLE STREAM BED STONE CHANNEL
STREAM TOE STABILIZATION
360 CONTOUR MAJOR
361 CONTOUR MINOR
LOD/SF LIMIT OF DISTURBANCE DELINEATED WITH SILT FENCE
LOD/CFL LIMIT OF DISTURBANCE DELINEATED WITH COMPOST FILTER LOGGED
IP-3 INLET PROTECTION TYPE-3
SCE STABILIZED CONSTRUCTION ENTRANCE
CIP-STONE STONE CULVERT INLET PROTECTION
SAP SENSITIVE AREA OF PROTECTION *IN AREAS WHERE SAP ABUTS STREAM BANK USE CAUTION TO NOT DESTABILIZE EXISTING BANKS; CONTACT OWNER'S REPRESENTATIVE AS NEEDED

FORESITE ASSOCIATES
- CIVIL ENGINEERING
- LANDSCAPE ARCHITECTURE
- ECOLOGICAL RESTORATION

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INDEPENDENCE SCHOOL
STREAM RESTORATION PLAN
NEW CASTLE CONSERVATION DISTRICT
2430 OLD COUNTRY ROAD, NEWARK, DE 19702

#	COMMENT	BY DATE
6	REVISION TO DETAIL 5 SHEET 13 &	DDS 05.30.23
	SPOT ELEVATION UPDATES SHEET 9	
5	PER COMMENTS-NPS&USACE	DDS 05.06.23
4	ISSUED FOR PERMITTING	DDS 04.04.23
3	PER NPS COMMENTS	DDS 02.14.23
2	ISSUED FOR PERMITTING	DDS 12.02.21
1	ISSUED FOR CLIENT REVIEW	DDS 11.23.20

FORESITE ASSOCIATES

SEAL

NOTES & LEGEND

INDEPENDENCE SCHOOL
STREAM RESTORATON

MILL CREEK HUNDRED NEW CASTLE COUNTY	NEWARK DELAWARE
DATE: 06.26.20	PROJECT #: 071.01
SURVEYED BY: N/A	SHEET:
CREATED BY: DDS	2
DRAWN BY: DDS	
CHECKED BY: ACH	2 OF 15

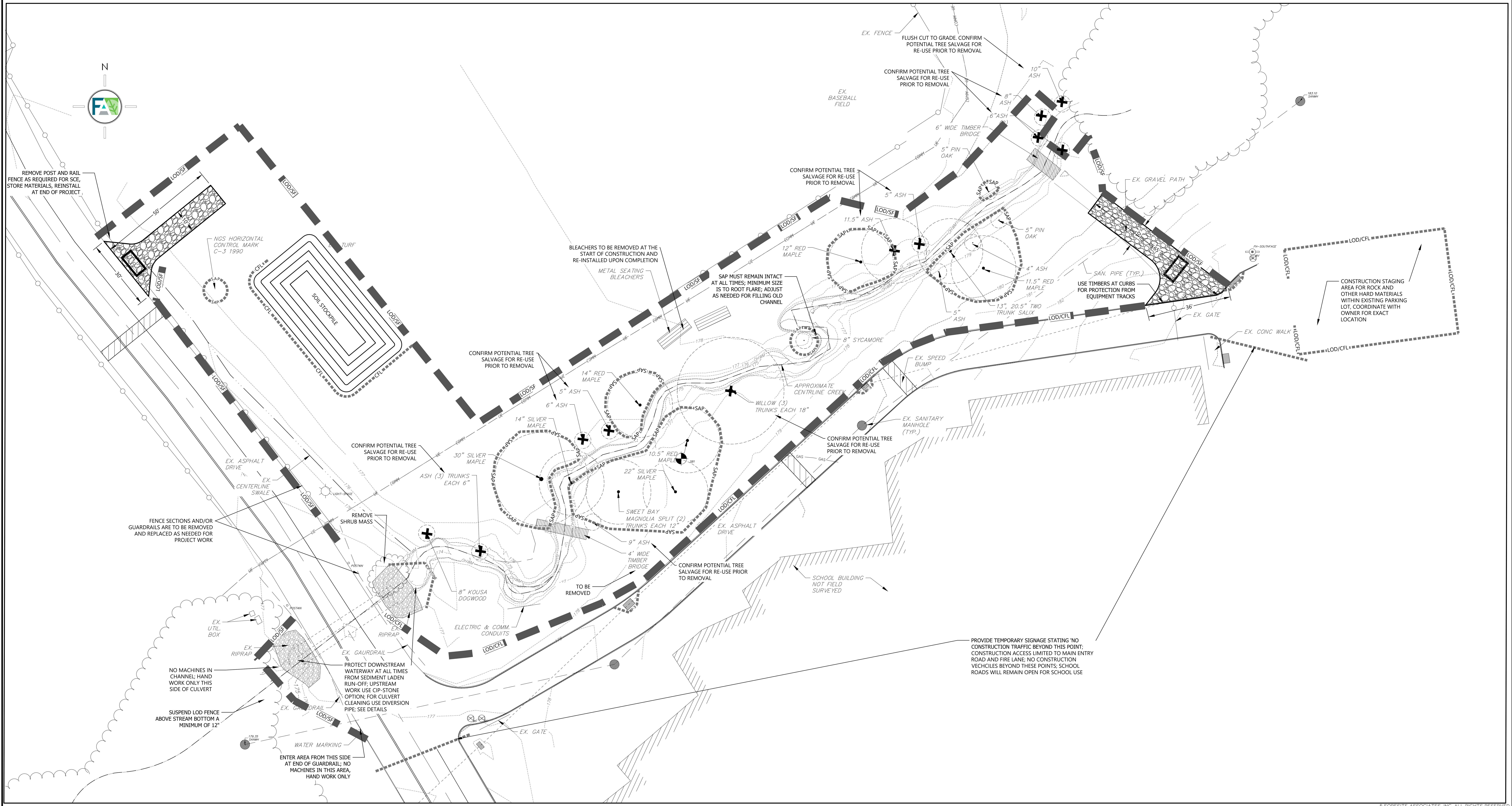
SCALE: 1"=30'
0 20 40 60

E & S NOTES

1. A PRE-CONSTRUCTION MEETING MUST BE HELD PRIOR TO COMMENCING CONSTRUCTION. CONTACT DNREC OR THE NEW CASTLE CONSERVATION DISTRICT. FAILURE TO DO SO CONSTITUTES A VIOLATION OF THE APPROVED SEDIMENT AND STORMWATER MANAGEMENT PLAN.
2. NCCD MUST BE NOTIFIED IN WRITING FIVE (5) DAYS PRIOR TO COMMENCING WITH CONSTRUCTION. FAILURE TO DO SO CONSTITUTES A VIOLATION OF THE APPROVED PLAN.
3. REVIEW AND APPROVAL OF THIS PLAN SHALL NOT RELIEVE THE CONTRACTOR FROM HIS OR HER RESPONSIBILITIES FOR COMPLIANCE WITH THE DELAWARE SEDIMENT AND STORMWATER REGULATIONS, NOR SHALL IT RELIEVE THE CONTRACTOR FROM ERRORS OR OMISSIONS ON THE PLAN. THE OWNER / OWNER'S REPRESENTATIVE SHALL BE RESPONSIBLE FOR ACQUIRING ANY AND ALL AGREEMENTS, EASEMENTS, ETC. NECESSARY TO COMPLY WITH ALL APPLICABLE REGULATIONS, CODES, STANDARDS, GUIDELINES AND POLICIES. ANY DEVIATION FROM THE APPROVED PLANS REQUIRES WRITTEN APPROVAL FROM THE OWNER'S REPRESENTATIVE AND DESIGNER.
2. UNLESS OTHERWISE AUTHORIZED IN WRITING BY THE OWNER'S REPRESENTATIVE AND/OR DESIGNER, ALL WORK MUST BE DONE IN ACCORDANCE WITH THESE PLANS.
3. IF THE APPROVED PLAN NEEDS TO BE MODIFIED, ADDITIONAL SEDIMENT AND STORMWATER CONTROL MEASURES MAY BE REQUIRED AS DEEMED NECESSARY BY DNREC OR THE DELEGATED AGENCY.
4. FOLLOWING SOIL DISTURBANCE OR REDISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED FOR ALL PERIMETER SEDIMENT CONTROLS, SOIL STOCKPILES, AND ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE WITHIN 14 CALENDAR DAYS UNLESS MORE RESTRICTIVE FEDERAL REQUIREMENTS APPLY.
5. ALL PROPOSED EROSION AND SEDIMENT CONTROLS WILL BE INSTALLED IN ACCORDANCE WITH THE DELAWARE EROSION AND SEDIMENT CONTROL HANDBOOK LATEST EDITION. WHERE THIS PLAN CONFLICTS WITH SAID REGULATIONS, THE CONTRACTOR SHALL NOTIFY THE DESIGNER PRIOR TO IMPLEMENTING THE WORK/PRACTICE.
6. AT ANY TIME A DEWATERING OPERATION IS USED, IT SHALL BE PREVIOUSLY APPROVED BY THE AGENCY CONSTRUCTION SITE REVIEWER FOR A NON-EROSIVE POINT OF DISCHARGE, AND A DEWATERING PERMIT SHALL BE APPROVED BY THE DNREC WELL PERMITTING BRANCH AS REQUIRED.
7. APPROVED S&S PLANS EXPIRE FIVE (5) YEARS FROM THE DATE OF PLAN APPROVAL.
8. POST CONSTRUCTION VERIFICATION DOCUMENTS, WHEN REQUIRED, ARE TO BE SUBMITTED TO DNREC OR THE DELEGATED AGENCY WITHIN 60 DAYS OF STORMWATER MANAGEMENT FACILITY COMPLETION.
9. APPROVAL OF A SEDIMENT AND STORMWATER MANAGEMENT PLAN DOES NOT GRANT OR IMPLY A RIGHT TO DISCHARGE STORMWATER RUNOFF. THE OWNER/DEVELOPER IS RESPONSIBLE FOR ACQUIRING ANY AND ALL AGREEMENTS, EASEMENTS, ETC. NECESSARY TO COMPLY WITH STATE DRAINAGE AND OTHER APPLICABLE LAWS.
10. THE OWNER SHALL BE FAMILIAR WITH AND COMPLY WITH ALL ASPECTS OF THE NPDES CONSTRUCTION GENERAL PERMIT ASSOCIATED WITH THE PROJECT, INCLUDING, BUT NOT LIMITED TO, PERFORMING WEEKLY SITE INSPECTIONS DURING CONSTRUCTION AND AFTER RAIN EVENTS, AND MAINTAINING WRITTEN LOGS OF THESE INSPECTIONS.
11. BEST AVAILABLE TECHNOLOGY (BAT) SHALL BE EMPLOYED TO MANAGE TURBID DISCHARGES IN ACCORDANCE WITH REQUIREMENTS OF 7. DEL C. CH 60, REGULATIONS GOVERNING THE CONTROL OF WATER POLLUTION, SECTION 9.1.02, KNOWN AS SPECIAL CONDITIONS FOR STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITIES, AND DEPARTMENT POLICIES, PROCEDURES, AND GUIDANCE.
12. DOCUMENTATION OF SOIL TESTING AND MATERIALS USED FOR TEMPORARY OR PERMANENT STABILIZATION INCLUDING BUT NOT LIMITED TO SOIL TEST RESULTS, SEED TAGS, SOIL AMENDMENT TAGS, ETC. SHALL BE PROVIDED TO THE NCCD TO VERIFY THAT THE PERMANENT OR TEMPORARY STABILIZATION HAS BEEN COMPLETED IN ACCORDANCE WITH THE APPROVED PLAN. THE NCCD MAY REQUIRE ADDITIONAL SOIL TESTING AND REAPPLICATION OF PERMANENT OR TEMPORARY STABILIZATION IN ACCORDANCE WITH SPECIFICATIONS PROVIDED IN THE DELAWARE EROSION AND SEDIMENT CONTROL HANDBOOK, OR ALTERNATIVE MEASURES THAT PROVIDE FUNCTIONAL EQUIVALENCY.
13. DNREC AND NEW CASTLE CONSERVATION DISTRICT PERSONNEL SHALL HAVE THE RIGHT TO CONDUCT ON-SITE INSPECTIONS OF LAND DISTURBING ACTIVITIES.
14. ALL PERIMETER CONTROLS INCLUDING TREE PROTECTION, MUST BE INSTALLED, STABILIZED, INSPECTED BY THE CCR OR CONSERVATION DISTRICT INSPECTOR, AND APPROVED BY NCCD PRIOR TO BULK GRADING, BUILDING PERMIT ISSUANCE, OR ANY UTILITY INSTALLATION ON NONRESIDENTIAL PROJECTS. THE CCR OR INSPECTOR IS REQUIRED TO SUBMIT A REPORT VERIFYING THAT THE PERIMETER CONTROLS HAVE BEEN INSTALLED CORRECTLY AND ARE FUNCTIONING PROPERLY. PRIOR TO THIS PRE-BULK INSPECTION NO DISTURBANCE MAY OCCUR ON-SITE OTHER THAN THOSE AREAS NECESSARY TO ESTABLISH THE PERIMETER EROSION AND SEDIMENT CONTROLS. INSTALL THE PERIMETER CONTROLS PURSUANT TO THIS PLAN. ALL PERIMETER SEDIMENT CONTROLS, INCLUDING SOIL STOCKPILES, SHALL BE VEGETATIVELY STABILIZED.
15. THE CCR OR INSPECTOR IS RESPONSIBLE TO REPORT THE CONDITIONS OF SITE WORK AS COMPARED TO THE LATEST APPROVED SEDIMENT AND STORMWATER PLAN. ANY DEVIATION FROM THE APPROVED PLANS REQUIRES WRITTEN APPROVAL FROM DNREC OR THE DELEGATED AGENCY.
16. THE CCR OR INSPECTOR WILL BE RESPONSIBLE FOR WEEKLY EROSION AND SEDIMENT CONTROL INSPECTIONS. THE CCR SHALL CONTACT, IN WRITING, NEW CASTLE CONSERVATION DISTRICT TO CONSIDER ANY REQUEST TO DEVIATE FROM THE REQUIRED FREQUENCY OF INSPECTIONS. APPROVAL OF SUCH A REQUEST SHALL BE AT THE DISCRETION OF DNREC OR THE DELEGATED AGENCY.
17. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED PERIODICALLY 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 THE PRE-CONSTRUCTION PLAN AND/OR AS DIRECTED BY THE DESIGNER. SEDIMENT THAT ACCUMULATES IN THE AREA OF WORK IS A PROJECT GOAL AND THUS MAY NOT NEED TO BE REMOVED.
18. ALL INSPECTION REPORTS FROM BOTH THE CCR (IF REQUIRED) AND THE CONSERVATION DISTRICT/INSPECTOR SHALL BE ELECTRONICALLY SUBMITTED WEEKLY TO ALL PARTIES INCLUDED ON THE CONSTRUCTION INFORMATION SHEET. THESE REPORTS SHALL INCLUDE A DATE BY WHICH ALL DEFICIENCIES MUST BE RESOLVED. FAILURE TO RESOLVE THE DEFICIENCIES INDICATED ON THE INSPECTION REPORT BY THE GIVEN DATE MAY RESULT IN ENFORCEMENT ACTION CONSIDERED APPROPRIATE BY THE DEPARTMENT.
19. THE NCCD ENGINEER/E&S INSPECTOR MUST BE NOTIFIED 48 HOURS PRIOR TO ALL ELEMENTS OF SITE WORK WHICH REQUIRE INSPECTION. FAILURE TO PROVIDE THE APPROPRIATE NOTIFICATION MAY RESULT IN THE CONTRACTOR EXCAVATING SUFFICIENT MATERIAL TO VERIFY CONSTRUCTION IN ACCORDANCE WITH THE APPROVED SEDIMENT AND STORMWATER MANAGEMENT PLAN.
20. SHOULD QUESTIONS ARISE REGARDING THE MAINTENANCE OF EROSION AND SEDIMENT CONTROL PRACTICES, THE SITE CONTRACTOR SHALL CONTACT THE NEW CASTLE CONSERVATION DISTRICT AND THE CONSULTING ENGINEER EXPEDITIOUSLY FOR TECHNICAL ASSISTANCE.
21. UPON RECEIPT OF TWO CONSECUTIVE UNSATISFACTORY CCR (IF REQUIRED) AND/OR DNREC OR THE NCCD EROSION AND SEDIMENT CONTROL INSPECTION REPORTS, THE SITE MAY BE ISSUED A STOP WORK ORDER AND A SHOW CAUSE HEARING SCHEDULED.
22. THE APPROVED S&S PLAN INCORPORATES POLLUTION PREVENTION PRACTICES LISTED UNDER STANDARDS AND SPECIFICATIONS FOR CONSTRUCTION SITE POLLUTION PREVENTION IN THE DELAWARE EROSION AND SEDIMENT CONTROL HANDBOOK, DATED APRIL 2019 AND ITS REVISIONS.
23. IT SHALL BE THE OWNER'S RESPONSIBILITY TO REPAIR AND STABILIZE EROSION AND SEDIMENT CONTROLS AND STORMWATER MANAGEMENT PRACTICES DURING CONSTRUCTION, INCLUDING AREAS DISTURBED BY UTILITY COMPANIES.
24. IT SHALL BE THE OWNER'S RESPONSIBILITY TO INSPECT AND PERFORM MAINTENANCE AND/OR REPAIRS OF THE STORMWATER MANAGEMENT PRACTICES, IF ANY, AFTER CONSTRUCTION.

E&S SEQUENCE OF CONSTRUCTION

1. NOTIFY NEW CASTLE CONSERVATION DISTRICT IN WRITING AT LEAST FIVE (5) DAYS PRIOR TO THE START OF CONSTRUCTION. FAILURE TO DO SO CONSTITUENTS A VIOLATION OF THE APPROVED SEDIMENT AND STORMWATER MANAGEMENT PLAN.
2. PRIOR TO ANY CLEARING, INSTALLATION OF SEDIMENT CONTROL MEASURES, OR GRADING, SCHEDULE AND CONDUCT A PRE-CONSTRUCTION MEETING WITH THE NCCD AND PROJECT DESIGN LEAD. THE LANDOWNER/DEVELOPER REPRESENTATIVE, SITE CONTRACTOR, AND CERTIFIED CONSTRUCTION REVIEWER ARE REQUIRED TO BE IN ATTENDANCE AT THE PRE-CONSTRUCTION MEETING; THE SITE DESIGNER IS RECOMMENDED TO ATTEND.
3. ALL MACHINERY TO BE PRESSURE WASHED PRIOR TO ENTERING PROJECT SITE; SPECIAL ATTENTION SHOULD BE GIVEN TO TRACKS AND UNDERCARRIAGE THAT CAN CONTAIN INVASIVE SEED, SUCH AS PHRAGMITES. MACHINERY TO BE REVIEWED AND CLEANLINESS APPROVED BY THE NCCD PRIOR TO BEING UNLOADED. EQUIPMENT FOUND TO HAVE UNSATISFACTORY AMOUNTS OF SOIL, DEBRIS, ETC. WILL NOT BE ALLOWED ON SITE AND ANY TIME LOSS TO CONSTRUCTION WILL BE AT THE CONTRACTOR'S EXPENSE.
4. TREE PROTECTION SHALL BE IN PLACE PRIOR TO ANY ACTIVITY ON THE SITE. CONTRACTOR IS RESPONSIBLE FOR TREATMENT AND OR REPLACEMENT OF ANY TREES DEEMED DAMAGE DURING CONSTRUCTION BY THE OWNER OR OWNER'S DELEGATED REPRESENTATIVE; AT THE DISCRETION OF OWNER / OWNER'S REPRESENTATIVE, A CERTIFIED ARBORIST MAY BE CONTACTED TO PROVIDE TREATMENT RECOMMENDATIONS; THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL CONSULTATION AND TREATMENT COSTS DUE TO DAMAGE OF MATURE TREES AS DETERMINED BY THE OWNER / OWNER'S REPRESENTATIVE.
5. INSTALL THE STABILIZED CONSTRUCTION ENTRANCE(S) AS INDICATED ON THE PLAN, FOLLOWED BY THE PERIMETER CONTROLS (I.E., BERMS, SILT FENCE, COMPOST LOGS) AND INLET PROTECTION ON ANY EXISTING INLETS. MARK THE LIMITS OF SENSITIVE AREAS AND OTHER SECTIONS THAT ARE NOT TO BE DISTURBED WITH A PHYSICAL BARRIER (WHEN SHOWN ON THE PLAN). ONLY CLEAR AREAS THAT ARE REQUIRED TO INSTALL THE PERIMETER CONTROLS (AS NEEDED).
6. SCHEDULE A PERIMETER CONTROL REVIEW WITH NEW CASTLE CONSERVATION DISTRICT.
7. ALL PERIMETER CONTROLS ARE TO BE REVIEWED BY NEW CASTLE CONSERVATION DISTRICT AND APPROVED PRIOR TO PROCEEDING WITH FURTHER SITE DISTURBANCE OR CONSTRUCTION.
8. THE CONTRACTOR SHALL AT ALL TIMES PROTECT AGAINST SEDIMENT OR DEBRIS LADEN RUNOFF OR WIND FROM LEAVING THE SITE. PERIMETER CONTROLS SHOULD BE CHECKED DAILY AND ADJUSTED AND/OR REPAIRED TO FULLY CONTAIN AND CONTROL SEDIMENTATION ON THE SITE. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT HAS REACHED HALF OF THE EFFECTIVE CAPACITY OF THE CONTROL. IN ADDITION, THE CONTRACTOR MAY NEED TO ADJUST OR REPAIR MEASURES IN TIMES OF ADVERSE WEATHER CONDITIONS, OR AS DIRECTED BY THE AGENCY CONSTRUCTION SITE REVIEWER.
9. CLEAR AND GRUB REMAINING AREAS WITHIN THE LIMITS OF DISTURBANCE.
10. COMPLETE BULK GRADING.
11. STOCKPILE EXCAVATED SUBSOILS WHEN REQUIRED. STOCKPILES SHALL BE SURROUNDED WITH A PERIMETER CONTROL, LOCATED ON LAND WITH A LOW SLOPE, AND STABILIZED ONCE INACTIVE.
12. COMPLETE GRADE CONTROL AND TOE PROTECTION
13. FINE GRADE ALL AREAS INTENDED TO RECEIVE PERMANENT STABILIZATION MEASURES WITH COMPACTED TOPSOIL RECOVERED FROM THE SITE.
14. IN AREAS TO BE TURF, PROVIDE TEMPORARY AND PERMANENT SEEDING AS SPECIFIED AND STRAW MULCH OR OTHER APPROVED TEMPORARY MULCH.
15. INSTALL EROSION CONTROL MATTING AS SPECIFIED. RESEED AREAS DISTURBED FROM EROSION CONTROL MATTING INSTALLATION.
16. INSTALL PLANTING MATERIAL AS SPECIFIED ON THE LANDSCAPE PLAN.
17. THE EROSION AND SEDIMENT CONTROL DEVICES SHOULD BE REMOVED ONLY AFTER WORK IN AN AREA HAS BEEN COMPLETED AND STABILIZED, WITH WRITTEN APPROVAL FROM THE NCCD. COORDINATE THE INSPECTION, AND AFTER THE WRITTEN APPROVAL, REMOVE THE REMAINING CONSTRUCTION SITE CONTROLS.
18. ALL SITE STABILIZATION, INCLUDING BUT NOT LIMITED TO SEEDING, IS TO BE IN PLACE, INSPECTED, AND APPROVED PRIOR TO REMOVAL OF SILT FENCING AND OTHER PERIMETER CONTROLS. ALSO, ANY AREAS DISTURBED BY SILT FENCE REMOVAL ARE TO BE IMMEDIATELY STABILIZED.
19. THE TERMINATION OF THE CONSTRUCTION GENERAL PERMIT WILL REQUIRE SUBMISSION AND ACCEPTANCE OF THE POST CONSTRUCTION VERIFICATION DOCUMENTS, INCLUDING FINAL STABILIZATION THROUGHOUT THE SITE, ALL ELEMENTS OF THE SEDIMENT AND STORMWATER MANAGEMENT PLAN IMPLEMENTED, AND ACCEPTANCE OF THE FINAL OPERATION AND MAINTENANCE PLAN.



FORESITE ASSOCIATES

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INDEPENDENCE SCHOOL STREAM RESTORATION PLAN

NEW CASTLE CONSERVATION DISTRICT

2430 OLD COUNTRY ROAD, NEWARK, DE 19702

#	COMMENT	BY DATE
6	REVISION TO DETAIL 5 SHEET 13 & SPOT ELEVATION UPDATES SHEET 9	DDS 05.30.23
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2	ISSUED FOR PERMITTING	DDS 12.02.21
1	ISSUED FOR CLIENT REVIEW	DDS 11.23.20

FORESITE ASSOCIATES

ANDREW C. HAYES REGISTERED No. 13280 PROFESSIONAL ENGINEER DELAWARE — 2 JUNE 2023

SEAL

EROSION & SEDIMENT CONTROL PLAN

INDEPENDENCE SCHOOL STREAM RESTORATON

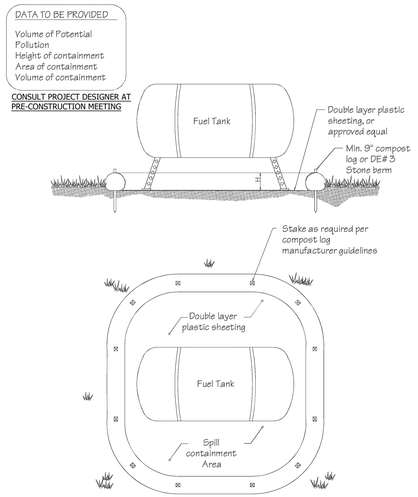
MILL CREEK HUNDRED NEW CASTLE COUNTY — NEWARK DELAWARE

DATE: 06.26.20	PROJECT #: 071.01
SURVEYED BY: N/A	SHEET: 3
CREATED BY: DDS	
DRAWN BY: DDS	
CHECKED BY: ACH	3 OF 15

SCALE: 1"=20'
0 10 20 30 40

Standard Detail & Specifications

Construction Site Waste Mgt & Spill Control



Source:	Symbol:	Detail No.
Delaware ESC Handbook		**DE-ESC-3.6.1** Sheet 1 of 5 Effective FEB 2019

1/4 CONSTRUCTION SITE WASTE MANAGEMENT NOTES

Standard Detail & Specifications

Construction Site Waste Mgt & Spill Control

Pollution Prevention – Spill Prevention

1. Fueling should only take place in signed designated areas, away from downstream drainage facilities and watercourses.
2. Fueling must be with nozzles equipped with automatic shut-off to control drips. Do not top off.
3. Protect the areas where equipment or vehicles are being repaired, maintained, fueled or parked from storm water run-on and runoff.
4. Use barriers such as berms to prevent storm water run-on and runoff, and to contain spills.
5. Place a "Fueling Area" sign next to each fueling area.
6. Store hazardous materials such as fuel, solvents, oil and chemicals in secondary containment.
7. Inspect vehicles and equipment for leaks on each day of use. Repair fluid and oil leaks immediately.
8. Absorbent spill clean-up materials and spill kits must be available in fueling areas and on fuel trucks.
9. If fueling is to take place at night, make sure the fueling area is sufficiently illuminated.
10. Properly dispose of used oil, fluids, lubricants and spill clean-up materials.

CLEAN UP SPILLS

1. If it is safe to do so, immediately contain and clean up any chemical and/or hazardous material spills.
2. Properly dispose of used oil, fluids, lubricants and spill clean-up materials.
3. Do not bury spills or wash them down with water.

LEAKS AND DRIPS

1. Use drip pans or absorbent pads at all times. Place under and around leaky equipment.
2. Do not allow oil, grease, fuel or chemicals to drip onto the ground.
3. Have spill kits and clean up material on-site.
4. Repair leaky equipment promptly or remove problem vehicles and equipment from the site. Clean up contaminated soil immediately.
5. Store contaminated waste in sealed containers constructed of suitable material. Label these containers properly.
6. Clean up all spills and leaks. Promptly dispose of waste and spent clean up materials.

Source:	Symbol:	Detail No.
Delaware ESC Handbook		**DE-ESC-3.6.1** Sheet 2 of 5 Effective FEB 2019

1/4 CONSTRUCTION SITE WASTE MANAGEMENT NOTES

Standard Detail & Specifications

Construction Site Waste Mgt & Spill Control

Notes:

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

1. Material Inventory

Document the storage and use of the following materials:

a. Concrete
b. Detergents
c. Paints (enamel and latex)
d. Cleaning solvents
e. Pesticides
f. Wood scraps
g. Fertilizers
h. Petroleum based products

2. Good housekeeping practices

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

3. Waste management practices

a. All waste materials shall be collected and stored in securely lidded dumpsters in a location that does not drain to a waterbody.
b. Waste materials shall be salvaged and/or recycled whenever possible.
c. 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:	Symbol:	Detail No.
Adapted from USEPA Pub. 840-B-92-002		**DE-ESC-3.6.1** Sheet 3 of 5 Effective FEB 2019

1/4 CONSTRUCTION SITE WASTE MANAGEMENT NOTES

Standard Detail & Specifications

Construction Site Waste Mgt & Spill Control

Notes (cont.)

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

4. Equipment maintenance practices

a. If possible, equipment should be taken to off-site commercial facilities for washing and maintenance.
b. If performed on-site, vehicles shall be washed with high-pressure water spray without detergents in an area contained by an impervious berm.
c. Drip pans shall be used for all equipment maintenance.
d. Equipment shall be inspected for leaks on a daily basis.
e. Washout from concrete trucks shall be disposed of in a temporary pit for hardening and proper disposal.
f. Fuel nozzles shall be equipped with automatic shut-off valves.
g. 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

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

Source:	Symbol:	Detail No.
Adapted from USEPA Pub. 840-B-92-002		**DE-ESC-3.6.1** Sheet 4 of 5 Effective FEB 2019

1/4 CONSTRUCTION SITE WASTE MANAGEMENT NOTES

Standard Detail & Specifications

Construction Site Waste Mgt & Spill Control

Notes (cont.)

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

6. Education

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

CONTACT INFORMATION

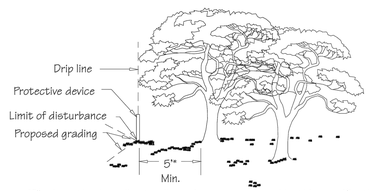
DNREC 24-Hour Toll Free Number	**800-662-8802**
DNREC Solid & Hazardous Waste Management Section	**302-739-9403**

Source:	Symbol:	Detail No.
Adapted from USEPA Pub. 840-B-92-002		**DE-ESC-3.6.1** Sheet 5 of 5 Effective FEB 2019

1/4 CONSTRUCTION SITE WASTE MANAGEMENT NOTES

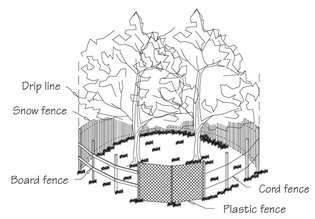
Standard Detail & Specifications

Sensitive Area Protection



*5' min. setback applies to all sensitve areas covered by this specification.

Location of Sensitive Area Protection



Methods of Sensitive Area Protection

Source:	Symbol:	Detail No.
Adapted from VA ESC Handbook	SAP	**DE-ESC-3.7.2** Sheet 1 of 3 Effective FEB 2019

2/4 SENSATIVE AREA PROTECTION

Standard Detail & Specifications

Sensitive Area Protection

Construction Notes:

Fencing shall be installed at the extents of all sensitive areas. For trees, the fencing shall be installed outside the dripline (mature canopy) and at no time within 5 feet of the trunk. 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. If silt fence is to be used for demarcation purposes, appropriate signage shall be provided a minimum of every 20 feet denoting the area as a sensitive area protection zone.

Materials:

1. Snow Fence - Standard 40-inch high snow fence shall be placed at the limits of clearing or construction 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. For tree protecitons, 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:	Symbol:	Detail No.
Adapted from VA ESC Handbook	SAP	**DE-ESC-3.7.2** Sheet 2 of 3 Effective FEB 2019

2/4 SENSATIVE AREA PROTECTION NOTES

Standard Detail & Specifications

Sensitive Area Protection

4. Cord Fence - Posts with a minimum size of 2 inches square or 2 inches in diameter set securely in the ground and protruding at least 4 feet above the ground shall be placed at the limits of clearing with two rows of cord 1/4-inch or thicker at least 2 feet apart running between posts with strips of colored surveyor's flagging tied securely to the string at intervals no greater than 3 feet.
5. Earth Berms - Temporary earth berms shall be constructed according to specifications for a Temporary Earth Dike with the base of the berm on the sensitive area side located along the limits of clearing. Earth berms may not be used for this purpose if their presence will conflict with drainage patterns.
6. Trunk Armoring (Tree Protection Only) - As a last resort, a tree trunk can be armored with burlap wrapping and 2-inch studs wired vertically no more than 2 inches apart to a height of 5 feet encircling the trunk. If this alternative is used, the root zone within the drip line will still require protection. Nothing should ever be nailed to a tree.

Maintenance:

Fencing and armoring devices shall be in place before any excavation or grading is begun, shall be kept in good repair for the duration of construction activities, and shall be the last items removed during the final cleanup after the completion of the project.

Source:	Symbol:	Detail No.
Adapted from VA ESC Handbook	SAP	**DE-ESC-3.7.2** Sheet 3 of 3 Effective FEB 2019

2/4 SENSATIVE AREA PROTECTION NOTES

FORESITE ASSOCIATES

- CIVIL ENGINEERING
- LANDSCAPE ARCHITECTURE
- ECOLOGICAL RESTORATION

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INDEPENDENCE SCHOOL STREAM RESTORATION PLAN

NEW CASTLE CONSERVATION DISTRICT
2430 OLD COUNTRY ROAD, NEWARK, DE 19702

#	COMMENT	BY: DATE
6	REVISION TO DETAIL 5 SHEET 13 & SPOT ELEVATION UPDATES SHEET 9	DDS 05.30.23
5	PER COMMENTS-NPS&USACE	DDS 05.06.23
4	ISSUED FOR PERMITTING	DDS 04.04.23
3	PER NPS COMMENTS	DDS 02.14.23
2	ISSUED FOR PERMITTING	DDS 12.02.21
1	ISSUED FOR CLIENT REVIEW	DDS 11.23.20

FORESITE ASSOCIATES

SEAL

EROSION & SEDIMENT CONTROL DETAILS

INDEPENDENCE SCHOOL
STREAM RESTORATON

MILL CREEK HUNDRED
NEW CASTLE COUNTY

NEWARK
DELAWARE

DATE: 06.26.20	PROJECT #: 07101
SURVEYED BY: N/A	SHEET: 4
CREATED BY: DDS	
DRAWN BY: AZ	4 OF 15
CHECKED BY: ACH	

Standard Detail & Specifications
Dust Control

Temporary Methods:

1. Mulches - See **DE-ESC-3.4.5**, Standard Detail and Specifications for Mulching.
2. Vegetative cover - See **DE-ESC-3.4.3**, Std. Detail and Specifications for Vegetative Stabilization.
3. Adhesives - Use on mineral soils only (not effective on muck soils). Keep traffic off these areas. The following table may be used for general guidance.

Type of Emulsion	Water Dilution	Type of Nozzle	Apply Gal/Ac.
Latex emulsion	12.5:1	Fine spray	235
Resin-in-water emulsion	4.1	Fine spray	300
Acrylic emulsion (non-trafffic)	7:1	Coarse spray	450
Acrylic emulsion (traffic)	3.5:1	Coarse spray	350

4. Tillage - For emergency temporary treatment, scarify the soil surface to prevent or reduce the amount of blowing dust until a more appropriate solution can be implemented. Begin the tillage operation on the windward side of the site using a chisel-type plow for best results.
5. Sprinkling - Sprinkle site with water until the surface is moist . Repeat as needed.
6. ~~Calcium Chloride - Apply as flakes or granular material with a spreader at a rate that~~ will keep ~~the soil surface moist. Re-apply as necessary.~~
7. Barriers - Place barriers such as soild board fences, snow fences, hay bales, etc. at right angles to the prevailing air currents at intervals of approx. 10X their height.

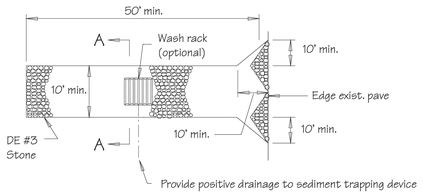
Permanent Methods:

1. Vegetative cover - See **DE-ESC-3.4.3**, Std. Detail and Specifications for Vegetative Stabilization.
2. Stone - Apply layer of crushed stone or coarse gravel to protect soil surface.

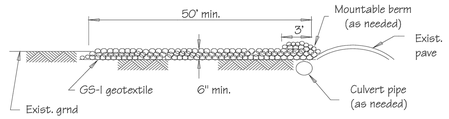
Source:	Symbol:	Detail No.
Adapted from VA ESC Handbook		**DE-ESC-3.4.8** Sheet 1 of 1 Effective FEB 2019

1/5 DUST CONTROL NOTES

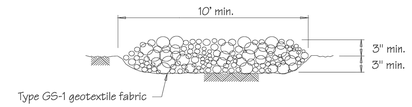
Standard Detail & Specifications
Stabilized Construct. Entrance



Plan



Profile



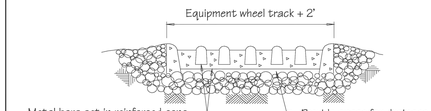
Section A-A (Std.)

Source:	Symbol:	Detail No.
Adapted from VA ESC Handbook	SCE	**DE-ESC-3.4.7** Sheet 1 of 2 Effective FEB 2019

2/5 STABILIZED CONSTRUCTION ENTRANCE

MAT ALTERNATIVES MAY BE ACCEPTABLE PRACTICE; CONSULT NEW CASTLE CONSERVATION DISTRICT FOR APPROVAL.

Standard Detail & Specifications
Stabilized Construct. Entrance



Section A-A (Opt.)

Construction Notes:

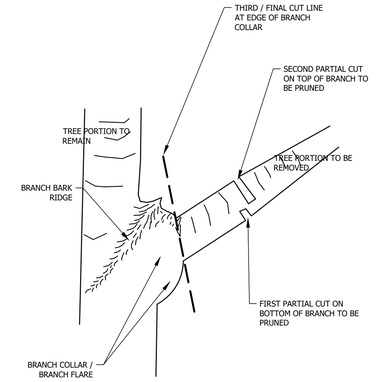
TREE BRANCHES TO BE PRUNED FOR EQUIPMENT ACCESS MUST BE APPROVED IN WRITING BY OWNER OR DESIGN PROFESSIONAL PRIOR TO CUTTING. FAILURE TO DO SO WILL BE SEEN AS TREE DAMAGE AND ALL REPAIRS WILL BE MADE AT THE CONTRACTORS EXPENSE AT THE DISCRETION OF THE OWNER AND/OR DESIGN PROFESSIONAL

1. Stone size - Use DE #3 stone.
2. Length - As required, but not less than 50 feet (except on a single residence lot where a 30 foot minimum length would apply).
3. Thickness - Not less than size (6) inches.
4. Width - Ten (10) foot minimum, but not less than the full width at points where ingress or egress occurs.
5. Geotextile - Type GS-I; placed over the entire area prior to placing of stone.
6. Surface Water - All surface water flowing or diverted toward construction entrances shall be piped across the entrance. If piping is impractical, a mountable berm with 5:1 slopes will be permitted.
7. Maintenance - The entrance shall be maintained in a condition which will prevent tracking or flowing of sediment onto public rights-of-way. This may require periodic top dressing with additional stone as conditions demand and repair and/or cleanout of any measures used to trap sediment. All sediment spilled, dropped, washed or tracked onto public rights-of-way must be removed immediately.
8. Washing - Vehicle wheels shall be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with stone and which drains into an approved sediment trapping device.
9. Inspection - Periodic inspection and needed maintenance shall be provided after each rain.

Source:	Symbol:	Detail No.
Adapted from VA ESC Handbook	SCE	**DE-ESC-3.4.7** Sheet 2 of 2 Effective FEB 2019

2/5 STABILIZED CONSTRUCTION ENTRANCE

MAT ALTERNATIVES MAY BE ACCEPTABLE PRACTICE; CONSULT NEW CASTLE CONSERVATION DISTRICT FOR APPROVAL.

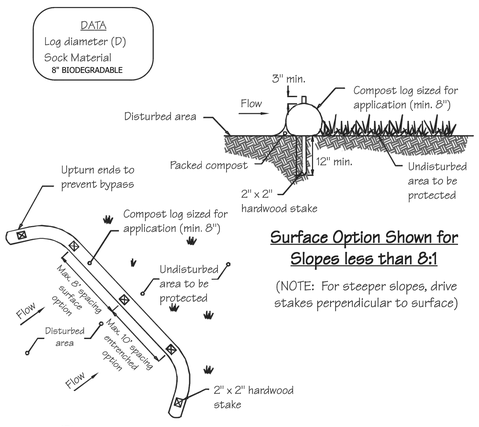


DECIDUOUS TREE BRANCH PRUNING

- ALL BRANCHES TO BE CUT TO BE APPROVED BY OWNER OR DESIGN PROFESSIONAL PRIOR TO CUTTING; FAILURE TO NOTIFY WILL BE SEEN AS DAMAGE TO EXISTING VEGETATION AND REPAIRS WILL BE MADE AT THE CONTRACTORS EXPENSE AT THE DISCRETION OF THE OWNER AND/OR DESIGN PROFESSIONAL
- USE ONLY SHARP DISINFECTED TOOLS; CLEAN AFTER EVERY CUT
- MAKE CUTS AS CLOSE TO THE BRANCH COLLAR AS POSSIBLE WITHOUT INJURY / CUTTING TO BRANCH COLLAR
- DO NOT CUT BEHIND BRANCH BARK RIDGE
- CONSULT A CERTIFIED ARBORIST AS REQUIRED
- FOLLOW INDUSTRY STANDARDS AND GUIDELINES PER THE AMERICAN ASSOCIATION OF NURSERYMAN LATEST EDITION

3/5 BRANCH PRUNING ENLARGEMENT NTS

Standard Detail & Specifications
Compost Filter Log



Surface Option Shown for Slopes less than 8:1

(NOTE: For steeper slopes, drive stakes perpendicular to surface)

Plan

NOTE: Manufacturer's recommendations supersede any installation details shown for this practice

Source:	Symbol:	Detail No.
Adapted from MD Stds & Specs for ESC & Filtrexx™ International	CFL	**DE-ESC-3.1.7** Sheet 1 of 2 Effective FEB 2019

4/5 COMPOST FILTER LOG

Standard Detail & Specifications
Compost Filter Log

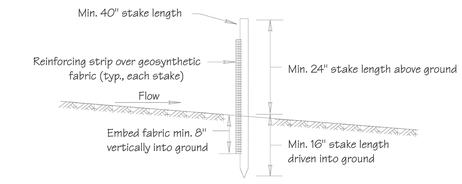
Construction Notes:

1. Prior to installation, clear bedding area of obstructions including rocks or debris larger than 1 inch and fill in any sharp depression areas.
2. If socks are prepared on-site, fill the sock fabric using a pneumatic blower so that the logs are rigid and do not deform. Terminate at the desired length.
3. For trenched applications, excavate 2 to 4 inches below grade along the width and length of the compost filter log.
4. Install the compost filter logs perpendicular to the flow direction and parallel to the slope with the beginning and end of the installation pointing up the slope a minimum of 1 foot elevation difference. On sites where this is not possible, upturn at a minimum length of 10' at a 30 degree angle to prevent runoff bypass.
5. For untrenched applications, blow or hand pack soil, mulch, or compost on the upslope side of the log, filling the bottom void area.
6. Stake the filled log every 10 feet maximum through the center of the sock for trenched applications, or every 8 feet for untrenched. The stake shall be a 2" by 2" hardwood. It should extend 12" below grade and protrude at least 3" above the top of the sock. If located on a slope greater than 8:1, the stake shall be angled downslope at a 45 degree angle to prevent the force of the water from dislodging to log.
7. When the length of the compost filter log needed exceeds the available compost filter sock length, the next sock shall be overlapped a minimum of 12" before being filled, and a stake placed through both socks at the overlap.
8. Remove accumulated sediment when it has reached half of the effective height of the log.
9. Inspect weekly and after rain event. If sock is degrading or the sock is failing, vegetate to secure the compost, replace the log, or reinforce with an additional log. If the log has been crushed due to construction equipment, it can be "fluffed" back to its effective height. If the effective height can no longer be restored, the log shall be replaced or reinforced with an additional compost filter log.

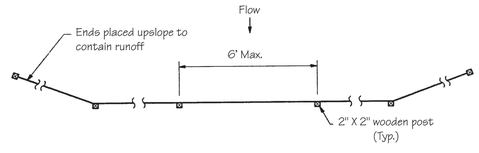
Source:	Symbol:	Detail No.
Adapted from MD Stds & Specs for ESC & Filtrexx™ International	CFL	**DE-ESC-3.1.7** Sheet 2 of 2 Effective FEB 2019

4/5 COMPOST FILTER LOG NOTES

Standard Detail & Specifications
Silt Fence



Section



Plan

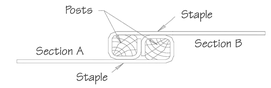
DATA
Max. controlled slope 4-6%

Source:	Symbol:	Detail No.
Adapted form MD Stds. & Specs. for ESC	SF	**DE-ESC-3.1.2.1** Sheet 1 of 2 Effective FEB 2019

5/5 SILT FENCE

Standard Detail & Specifications
Silt Fence

Construction Detail



Method for joining continuous sections

Top

Construction Notes:

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

Materials:

1. Stakes: Steel (either T or U) or 2" x 2" hardwood
2. Geosynthetic Fabric: Type GD-I
3. Reinforcing strip: Wooden lath or plastic strip

Source:	Symbol:	Detail No.
Adapted from MD Stds. & Specs. for ESC	SF	**DE-ESC-3.1.2.1** Sheet 2 of 2 Effective FEB 2019

5/5 SILT FENCE NOTES

FORESITE ASSOCIATES

- CIVIL ENGINEERING
- LANDSCAPE ARCHITECTURE
- ECOLOGICAL RESTORATION

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INDEPENDENCE SCHOOL STREAM RESTORATION PLAN

NEW CASTLE CONSERVATION DISTRICT
2430 OLD COUNTRY ROAD, NEWARK, DE 19702

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FORESITE ASSOCIATES

SEAL

EROSION & SEDIMENT CONTROL DETAILS

INDEPENDENCE SCHOOL
STREAM RESTORATON

MILL CREEK HUNDRED
NEW CASTLE COUNTY

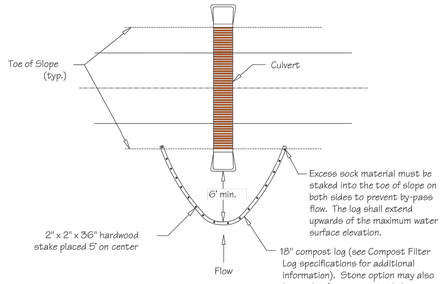
NEWARK
DELAWARE

DATE: 06.26.20
PROJECT #: 071.01
SURVEYED BY: N/A
CREATED BY: DDS
DRAWN BY: AZ
CHECKED BY: ACH

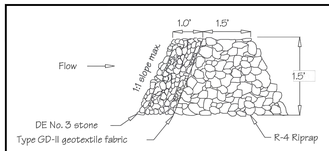
SHEET: 5

5 OF 15

Standard Detail & Specifications
Culvert Inlet Protection



Plan View - Compost Log Option



Section View - Stone Option

Source:	Symbol:	Detail No.
Adapted from VA ESC Handbook & Filtrexx™ International	CIP	**DE-ESC-3.1.6** Sheet 1 of 2

Effective February 2019

1/6 CULVERT INLET PROTECTION STONE OPTION

Standard Detail & Specifications
Culvert Inlet Protection

Construction Notes

1. ~~Compost logs shall be designed and installed in accordance with the Standard Detail and Specifications for Compost Logs (DE-ES-3.1.7).~~
2. If compost logs can not be installed properly or flow conditions exceed the design capabilities of the compost logs, the stone option shall be employed. Additional filtration may be provided by using a Type GD-II geotextile incorporated into the design as an option.
3. Placement of the compost log or stone barrier should be in a "horseshoe" shape and provide a minimum of 6 feet of clearance from the culvert inlet.

Materials

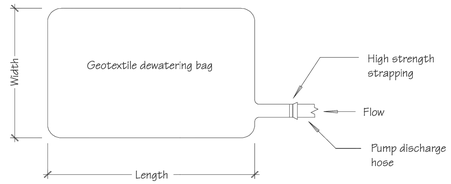
1. Stakes: 2" x 2" x 36" hardwood.
2. Compost media : See requirements in Standard Detail and Specifications for Compost Logs (DE-ES-3.1.7).
3. Filter sock: See requirements in Standard Detail and Specifications for Compost Logs (DE-ES-3.1.7).
4. Geotextile: Type GD-II for stone/riprap option.
5. Stone: DE No. 3 for stone/riprap option.
6. Riprap: R-6 for stone/riprap option.

Source:	Symbol:	Detail No.
Adapted from VA ESC Handbook & Filtrexx™ International	CIP	**DE-ESC-3.1.6** Sheet 2 of 2

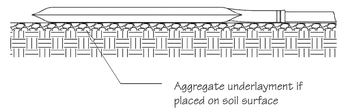
Effective February 2019

1/6 CULVERT INLET PROTECTION STONE OPTION

Standard Detail & Specifications
Geotextile Dewatering Bag



Plan



Profile

NOTE: Pre-manufactured products installed in accordance with manufacturer's recommendations may be used as an equivalent substitute with Departmental approval.

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

Effective FEB 2019

2/6 GEOTEXTILE DEWATERING BAG

Standard Detail & Specifications
Geotextile Dewatering Bag

Construction Notes:

1. 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.
2. 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.
3. Disposal may be accomplished as directed by the construction reviewer. If the site allows, the bag may be buried on site and seeded, visible fabric removed and seeded or removed from site to a proper disposal area.

Materials:

1. The geotextile fabric shall be a Type GD-IV.
2. 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 "J" type. Seam strength test will have the following minimum average 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:	Symbol:	Detail No.
Adapted from ACF Products, Inc.	GB	**DE-ESC-3.2.1.2** Sheet 2 of 2

Effective FEB 2019

2/6 GEOTEXTILE DEWATERING BAG NOTES

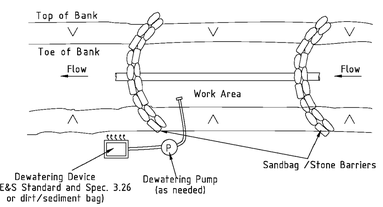
DIVERSION PIPE - GENERAL NOTES
1. DUE TO THE LARGE UPSTREAM WATERSHED A PUMP AROUND PRACTICE IS NOT FEASIBLE TO MEET CODE REQUIREMENTS AND THE PIPE DIVERSION METHOD MUST BE UTILIZED AND REMOVED AT THE END OF EACH DAY DURING WET WEATHER DAYS WITH GREATER THAN 3 INCHES OF BASE FLOW CONDITIONS. THE PIPE DIVERSION METHOD IS ALSO MORE AQUATIC WILDLIFE FRIENDLY.
2. DETAILS HAVE BEEN PROVIDED PER THE CURRENT DNREC ESC MANUAL AS WELL AS THE 2003 VIRGINIA MANUAL. INSTALLATION SHALL FOLLOW THE DNREC MANUAL AS APPLICABLE TO THE DESIGN, THE VIRGINIA DETAIL IS BEING INCLUDED AS AN ADDITIONAL REFERENCE AS IT MORE ACCURATELY DEPICTS THIS SITE PROJECT AS IT IS NOT A UTILITY CROSSING AS ILLUSTRATED IN THE DNREC MANUAL.
3. SET PIPE FOR POSITIVE DRAINAGE.
4. FOR AREAS WHERE THE PIPE DIVERSION NEEDS TO BE OUTSIDE OF THE WORK AREA CONSULT THE DESIGN TEAM AS NEEDED FOR ADDITIONAL GUIDANCE ON PIPE CONNECTIONS.
5. BARRIERS SHALL BE BASE FLOW PLUS 1' OF FREEBOARD AND A MINIMUM OF 2' HIGH.
6. BARRIER SHOULD BE MONITORED FOR LEAKAGE AND REPAIRED AS NECESSARY.
7. IN-STREAM BARRIER LOCATION SHOULD EXTEND BEYOND (UPSTREAM AND DOWNSTREAM) AREA TO BE DISTURBED SO ITS PLACEMENT DOES NOT INTERFERE WITH IN-STREAM CONSTRUCTION.
8. REMOVE ALL LARGE DEBRIS LOCATED WITHIN THE FOUNDATION OF THE BARRIER TO ENSURE PROPER SEALING AND REDUCE LEAKAGE THROUGH THE DIKE.
9. MALLEABLE MATERIAL, SUCH AS SAND, SHOULD BE USED TO FILL BARRIER BAGS.
10. DUE TO STABILITY ISSUES, EQUIPMENT CANNOT BE DRIVEN OVER PIPES. IF THERE IS A POSSIBILITY OF THE PIPES BEING DRIVEN OVER BY CONSTRUCTION EQUIPMENT CONSULT DESIGN ENGINEER FOR ALTERNATIVE ROUTE.
11. PLAN WORK DAY ACCORDINGLY FOR REMOVAL AND INSTALLATION AT THE END OF EACH WET WEATHER WORK DAY, CONSULT THE DESIGN TEAM AS NECESSARY FOR ADDITIONAL GUIDANCE.

DIVERSION PIPE- MATERIAL NOTES
1. PIPE SIZE SHALL BE MIN 24" DIAMETER. THE PIPE SIZE WILL NOT MEET THE DESIGN CRITERIA PER CODE REQUIREMENT AND MUST ONLY BE USED DURING ACTIVE WORK HOURS AND REMOVED AT THE END OF EACH DAY AND IF UNEXPECTED WEATHER OCCURS AND THE WORK DAY ENDS EARLIER THAN ANTICIPATED. THE STREAM CHANNEL MUST BE LEFT OPEN FOR FREE CHANNEL FLOW AT THE END OF EVERY WET WEATHER WORK DAY, NO EXCEPTIONS.
2. HIGH DENSITY POLYETHYLENE PIPE (HDPE) OR EQUIVALENT OF APPROPRIATE THICKNESS AND DIAMETER TO ACCOMPLISH DIVERSION OF STREAM FLOW. THE PIPE SHALL EXTEND A MINIMUM OF ONE FOOT BEYOND THE UPSTREAM AND DOWNSTREAM TOES OF THE BARRIERS.
3. BARRIER BAGS MAY BE FILLED ON SITE OR PRE-FILLED AND MADE OF BURLAP OR POLYPROPYLENE MATERIALS WHICH ARE RESISTANT TO ULTRA-VIOLET RADIATION, TEARING, AND PUNCTURE AND SHOULD BE WOVEN TIGHTLY ENOUGH TO PREVENT LEAKAGE OF THE FILL MATERIAL (I.E., SAND, FINE GRAVEL, ETC.).
4. USE SHEETING AS NECESSARY TO PREVENT UPSTREAM BARRIER LEAKAGE. PLACE SHEETING ON UPSTREAM SIDE OF BARRIER. USE SEAMLESS POLYETHYLENE PLASTIC SHEETING WITH A MINIMUM 4-MIL THICKNESS IMPERVIOUS AND RESISTANT TO PUNCTURE, TEARING AND ULTRAVIOLET DEGRADATION OR EQUIVALENT.
5. IF PROPERLY SET AND THE SYSTEM IS BEING USED DURING DRY WEATHER, PUMPING EQUIPMENT SHOULD NOT BE REQUIRED. IF NEEDED, SET UP TEMPORARY LOW FLOW PUMP, PUMP OUTFLOW VELOCITY SHALL DISCHARGE AT A STABLE RATE. IN WET WEATHER CONDITIONS AND/OR HIGH SEDIMENT DISPOSITION OCCURRENCES A GEOTEXTILE DEWATERING BAG MAY BE REQUIRED, SEE EROSION AND SEDIMENT CONTROL DETAILS. AT NO POINT SHOULD DIVERSION CREATED SEDIMENT LADEN WATER BE PERMITTED TO DISCHARGE DOWN STREAM.

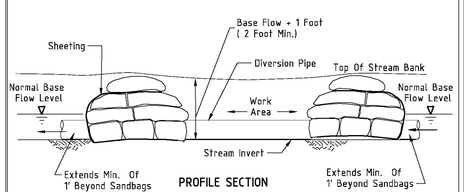
DIVERSION PIPE- INSTALLATION
1. DETERMINE LENGTH OF WORK AREA - LENGTH SHALL NOT EXCEED THAT WHICH CAN BE COMPLETED IN ONE WORKING DAY;
2. SET PIPE INVERT ELEVATION AT NORMAL STREAM GRADE; IF REQUIRED USE FABRIC, STONE, AND/OR REMOVE LARGE OBJECTS TO CREATE SETTING BED FOR PIPE WITH POSITIVE DRAINAGE DOWNSTREAM;
3. INSTALL UPSTREAM BARRIER AND ENSURE PROPER FLOW THROUGH PIPE WITH NO LEAKS IN SYSTEM;
4. DEWATER WORK AREA IF NEEDED;
5. SET DOWNSTREAM BARRIER;
6. COMPLETE IN-STREAM CONSTRUCTION PRACTICES;
7. REMOVE UPSTREAM BARRIER;
8. REMOVE PIPE;
9. REMOVE ANY SEDIMENT THAT MAY HAVE GENERATED ALONG THE DOWNSTREAM BARRIER;
10. CONFIRM WORK AREA IS STABILIZED;
11. REMOVE DOWNSTREAM BARRIER.

3/6 TEMPORARY INSTREAM PROTECTION DIVERSION PIPE

The Virginia Stream Restoration & Stabilization Best Management Practices Guide
DETAIL 5.3: DIVERSION PIPE



PLAN

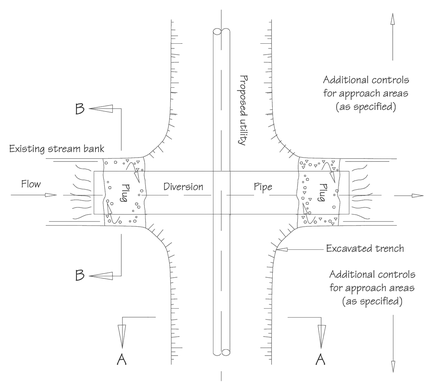


PROFILE SECTION

Adapted From Maryland's Waterway Construction Guidelines

TEMPORARY INSTREAM CONSTRUCTION MEASURES	DECEMBER 2003	VIRGINIA DEPARTMENT OF CONSERVATION RECREATION

Standard Detail & Specifications
Utility Crossing Diversion Pipe



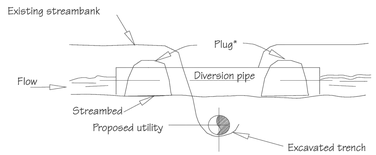
DATA
Diversion pipe diameter (D)
Plug material
Impermeable material
Dewatering practice

Plan

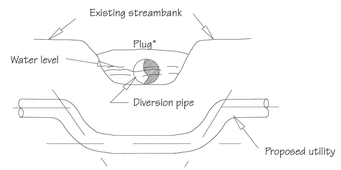
Source:	Symbol:	Detail No.
Adapted from VA ESC Handbook	DP	**DE-ESC-3.5.2.1** Sheet 1 of 3

Effective February 2019

Standard Detail & Specifications
Utility Crossing Diversion Pipe



Section A-A



Section B-B

*NOTE: Plug shall consist of coarse aggregate, rirap, sandbags or other material capable of resisting expected flows. Upstream plug shall be made waterproof using Type GS-1 geotextile or other means, as specified.

Source:	Symbol:	Detail No.
Adapted from VA ESC Handbook	DP	**DE-ESC-3.5.2.1** Sheet 2 of 3

Effective February 2019

Standard Detail & Specifications
Utility Crossing Diversion Pipe

Construction Notes:

1. Pipe diversion shall be operational prior to start of in-stream construction.
2. Controls for approach areas shall be provided in accordance with the approved plan.
3. All materials used must be adequate to withstand expected hydraulic and equipment loads.
4. Pipe shall be of adequate size to convey the normal water channel flow and shall be installed in the stream bed across the proposed utility trench centerline.
5. Impervious plug shall be placed near each end of pipe so as to dam off the channel flow and force it into the diversion pipe.
6. Water trapped between the plugs shall be pumped to an approved dewatering practice prior to excavation of the utility trench.
7. Once the diversion pipe has been made operational and checked for water tightness, excavation of the utility trench may begin. Installation of the utility shall proceed in a timely manner so as to minimize in-stream construction.
8. Once the utility has been installed, trench shall be backfilled and stabilized in accordance with the approved plan.
9. Diversion pipe shall remain in-place until stream bed and banks have been stabilized.

This practice limited to streams less than 10' wide; in-stream construction periods shall be less than 72 hours.

Source:	Symbol:	Detail No.
Adapted from VA ESC Handbook	DP	**DE-ESC-3.5.2.1** Sheet 3 of 3

Effective February 2019

READ ALL NOTES AND FOUR DETAILS ABOVE FOR TEMPORARY IN-STREAM CONSTRUCTION MEASURES. CONSULT DESIGN ENGINEER FOR PROJECT SPECIFIC ALTERATIONS TO MEET CODE COMPLIANCE FOR EACH SECTION OF STREAM REACH CONSTRUCTION. EACH SECTION OF STREAM REACH CONSTRUCTION SHALL BE DETERMINED BY THE CONTRACTOR BASED ON THE LENGTH OF WORK THAT CAN BE COMPLETED IN ONE DAY. EXCEPT FOR DRY WEATHER LOW FLOW CONDITIONS WITH LESS THAN 3 INCHES OF BASE FLOW, ALL IN-STREAM CONTROL MEASURES MUST BE REMOVED AT THE END OF EACH WORK DAY AND RE-SET THE BEGINNING OF THE NEXT.

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INDEPENDENCE SCHOOL
STREAM RESTORATION PLAN
NEW CASTLE CONSERVATION DISTRICT
2430 OLD COUNTRY ROAD, NEWARK, DE 19702

#	COMMENT	BY DATE
6	REVISION TO DETAIL 5 SHEET 13 & SPOT ELEVATION UPDATES SHEET 9	DDS 05.30.23
5	PER COMMENTS-NPS&USACE	DDS 05.04.23
4	ISSUED FOR PERMITTING	DDS 04.04.23
3	PER NPS COMMENTS	DDS 02.14.23
2	ISSUED FOR PERMITTING	DDS 12.02.21
1	ISSUED FOR CLIENT REVIEW	DDS 11.23.20

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SEAL

EROSION & SEDIMENT CONTROL DETAILS

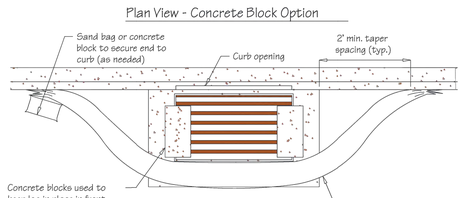
INDEPENDENCE SCHOOL
STREAM RESTORATON

MILL CREEK HUNDRED, NEW CASTLE COUNTY — NEWARK, DELAWARE

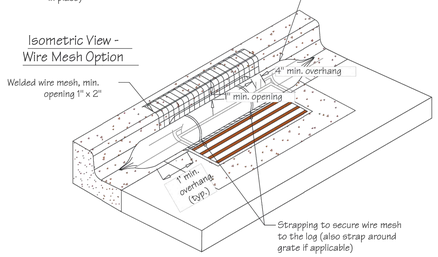
DATE: 06.26.20	PROJECT #: 071.01
SURVEYED BY: N/A	SHEET: 6
CREATED BY: DDS	
DRAWN BY: AZ	
CHECKED BY: ACH	6 OF 15

Standard Detail & Specifications
Inlet Protection - Type 3

Plan View - Concrete Block Option



Isometric View - Wire Mesh Option



Source:	Symbol:	Detail No.
Adapted from Filtrexx™ International	IP-3	**DE-ESC-3.1.5.3** Sheet 1 of 3

Effective February 2019

1/7 INLET PROTECTION TYPE 3

Standard Detail & Specifications
Inlet Protection - Type 3

Notes:

1. This practice shall only be used in situations in which Inlet Protection – Type 1 cannot be used due to site constraints. These include, but are not limited to partially complete parking areas, streets, roads, etc., having a throat or curb opening. It should be used in conjunction with Type 2 Inlet Protection when a grate is also present.
2. The filter log sock fabric shall be high durability netting material to resist puncture and wear in the traffic areas. If compost media is used to fill the sock it must meet the Standards and Specifications for Compost Material in the Appendix, except that the maximum pass through for a 3/8" screen shall be 20% to allow for higher flow through. Additives, such as soluble phosphorus and petroleum hydrocarbons, can be mixed with the compost media to aid in pollutant removal, if desired. Reference the Compost Filter Log design guidelines for additional requirements on the high durability netting material, compost media, and sock filling and installation procedures. Reference the design alternatives below for additional log media options.
3. The maximum contributing drainage area shall be 3 acres, or as recommended by the manufacturer. 8" diameter socks shall be used for standard roadway applications. If in a highly disturbed area, the Engineer or Site Reviewer may opt for larger socks, either 12" or 18" depending on the need. (If used as a replacement for Type 1 Inlet Protection with special approval, minimum 12" diameter socks shall be used.) The top of the log may need to be flattened so that it is always below the top of curb elevation with a minimum 1" opening in order to prevent localized flooding.
4. Concrete blocks shall be used to aid in the log shape and prevent it from entering into the throat. They should be placed between the log and the throat opening, and used to secure the ends of the log against the curb if needed. The end of the log shall extend a minimum of 2 feet past the end of the throat opening. If a grate is also present in addition to the throat opening, the concrete blocks can either be laid perpendicular to the curb (recommended) so that the log lies on the outside of the grate, or parallel to the curb so that the log lies on top of the grate (note, Type 2 Inlet Protection is also used in conjunction with Type 3 if a grate is present). Sand bags can be used as an alternate to the concrete blocks at the end of the log to secure the log against the curb.

Source:	Symbol:	Detail No.
Adapted from Filtrexx™ International	IP-3	**DE-ESC-3.1.5.3** Sheet 2 of 3

Effective February 2019

1/7 INLET PROTECTION TYPE 3

Standard Detail & Specifications
Inlet Protection - Type 3

5. If concrete blocks are not desired due to high traffic volumes, a welded wire screen in an "S" shape can be fitted over the length of the opening and secured to the log with straps, such as zip-ties. This will prevent the sock from falling into the opening. In this case, the log only needs to extend past the curb opening a minimum of 1 foot.
6. In all cases, the log shall provide a physical barrier to the catchbasin to allow for ponding and sedimentation along the upstream side of the log. The logs shall be placed on flat surfaces and maintain constant contact with the paved surface. Any daylight will allow for untreated discharge and is not permitted.
7. All structures must be inspected frequently (24 hours after a storm event and weekly) for proper function. Accumulated sediment shall be removed to avoid future failure, and must not exceed half of the effective height of the log. Reference manufacturer's recommendations for additional maintenance.

Alternatives:

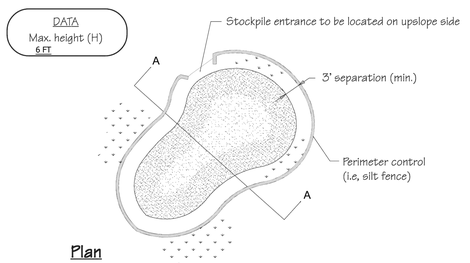
1. In lieu of the compost filter log, crushed DE #3 stone with a fractured face on all sides that is double wrapped in 1" chicken wire made from 10 gauge wire may be used. The wire should be secured using hog rings or wire ties on 6" centers along the length of the joint, and on 1" center on the ends of the rock sock. All installation and maintenance criteria are the same as the compost log above.
2. In lieu of the compost filter media, 100% shredded rubber (typically from tires) can be used.
3. For applications that have a grate and a throat inlet, some Type 2 Inlet Protection manufacturers have developed a catchbasin sack insert that also have a tubular attachment which rests above the grate and against the throat. As long as the sack meets the requirements of Type 2 Inlet Protection, and the provided throat protection extends a minimum of 1' past the limits of the curb opening, without any daylight along the edges, these combination Type 2 and Type 3 devices may be used upon approval of the Department or Delegated Agency.

Source:	Symbol:	Detail No.
Adapted from Filtrexx™ International	IP-3	**DE-ESC-3.1.5.3** Sheet 3 of 3

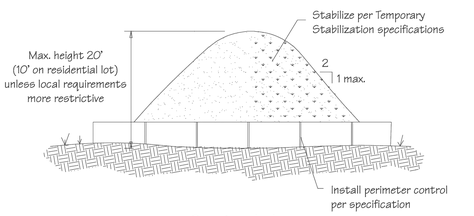
Effective February 2019

1/7 INLET PROTECTION TYPE 3

Standard Detail & Specifications
Soil Stockpile



Plan



Section A-A

Source:	Symbol:	Detail No.
Adapted from Colorado Urban Storm Drainage Criteria Manual, Vol 3	SP	**DE-ESC-3.7.3** Sheet 1 of 2 Effective FEB 2019

2/7 SOIL STOCKPILING

Standard Detail & Specifications
Soil Stockpile

Construction Notes:

1. Locate stockpiles so that they are 50 feet from any storm drain inlet, open channel, wetland or waterbody. Redirect any concentrated flow around the stockpile using an approved erosion and sediment control measure.
2. Secure the perimeter of the stockpile with an approved erosion and sediment control perimeter device.
3. If stockpile is to remain inactive for more than 14 calendar days, the stockpile must be vegetated. Follow the temporary vegetation specifications. The vegetation chosen shall last the duration of the stockpile; the stockpile shall be restabilized if the temporary vegetation dies or erosion results.

ADDITIONAL NCC REQUIREMENTS:

1. Temporary vegetative stabilization shall be completed within seven (7) calendar days of the formation of the stockpile.
2. For any period of inactivity longer than thirty (30) calendar days, the stockpile shall be stabilized with permanent vegetation and maintained in such a manner so that the stockpile is mowable (maximum slope 3:1).

Source:	Symbol:	Detail No.
Adapted from Colorado Urban Storm Drainage Criteria Manual, Vol 3	SP	**DE-ESC-3.7.3** Sheet 2 of 2 Effective FEB 2019

2/7 SOIL STOCKPILING NOTES

Standard Detail & Specifications
Topsoiling

Construction Notes:

1. Site Preparation (Where Topsoil is to be added)

Note: When topsoiling, maintain needed erosion and sediment control practices such as diversions, grade stabilization structures, berms, dikes, waterways and sediment basins.

a. Grading - Grades on the areas to be topsoiled which have been previously established shall be maintained.

b. Liming - Where the topsoil is either highly acid or composed of heavy clays, ground limestone shall be spread at the rate of 4-8 tons/acre (200-400 pounds per 1,000 square feet). Lime shall be distributed uniformly over designated areas and worked into the soil in conjunction with tillage operations as described in the following procedures.

c. Tilling - After the areas to be topsoiled have been brought to grade, and immediately prior to dumping and spreading the topsoil, the subgrade shall be loosened by discing or by scarifying to a depth of a least 3 inches to permit bonding of the topsoil to the subsoil. Pack by passing a bulldozer up and down over the entire surface area of the slope to create horizontal erosion check slots to prevent topsoil from sliding down the slope.

2. Topsoil Material and Application

Note:Topsoil salvaged from the existing site may often be used but it should meet the same standards as set forth in these specifications. The depth of topsoil to be salvaged shall be no more than the depth described as a representative profile for that particular soil type as described in the soil survey published by USDA-SCS in cooperation with Delaware Agricultural Experimental Station.

Source:	Symbol:	Detail No.
USDA - NRCS		**DE-ESC-3.4.1** Sheet 1 of 2 Effective FEB 2019

3/7 TOPSOILING

NTS

Standard Detail & Specifications
Topsoiling

Construction Notes (cont.)

a. Materials - Topsoil shall be a loam, sandy loam, clay loam, silt loam, sandy clay loam, loamy sand or other soil as approved by an agronomist or soil scientist. It shall not have a mixture of contrasting textured subsoil and contain no more than 5 percent by volume of cinders, stones, slag, coarse fragment, gravel, sticks, roots, trash or other extraneous materials larger than 1-1/2 inches in diameter. Topsoil must be free of plants or plant parts of bermudagrass, quackgrass, Johnsongrass, nutsedge, poison ivy, thistles, or others as specified. All topsoil shall be tested by a reputable laboratory for organic matter content, pH and soluble salts. A pH of 6.0 to 7.5 and an organic content of not less than 1.5 percent by weight is required. If pH value is less than 6.0 lime shall be applied and incorporated with the topsoil to adjust the pH to 6.5 or higher. Topsoil containing soluble salts greater than 500 parts per million shall not be used.

Note: No sod or seed shall be placed on soil which has been treated with soil sterilants or chemicals used for weed control until sufficient time has elapsed to permit dissipation of toxic materials.

b. Grading - The topsoil shall be uniformly distributed and compacted to a minimum of four (4) inches. Spreading shall be performed in such a manner that sodding or seeding can proceed with a minimum of additional soil preparation and tillage. Any irregularities in the surface resulting from topsoiling or other operations shall be corrected in order to prevent the formation of depressions or water pockets. Topsoil shall not be placed while in a frozen or muddy condition, when the subgrade is excessively wet, or in a condition that may otherwise be detrimental to proper grading and seedbed preparation.

Note:Topsoil substitutes or amendments as approved by a qualified agronomist or soil scientist, may be used in lieu of natural topsoil. Compost material used to improve the percentage of organic matter shall be provided by a certified supplier.

Compost amendments that are intended to meet specific post-construction stormwater management goals shall further meet the requirements of **Appendix 3.06.2 Post Construction Stormwater Management BMP Standards and Specifications, Section 14.0 Soil Amendments.**

Source:	Symbol:	Detail No.
USDA - NRCS		**DE-ESC-3.4.1** Sheet 2 of 2 Effective FEB 2019

3/7 TOPSOILING NOTES

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INDEPENDENCE SCHOOL
STREAM RESTORATION PLAN
NEW CASTLE CONSERVATION DISTRICT
2430 OLD COUNTRY ROAD, NEWARK, DE 19702

#	COMMENT	BY DATE
6	REVISION TO DETAIL 5 SHEET 13 & SPOT ELEVATION. UPDATES SHEET 9	DDS 05.30.23
5	PER COMMENTS-NPS&USACE	DDS 05.06.23
4	ISSUED FOR PERMITTING	DDS 04.04.23
3	PER NPS COMMENTS	DDS 02.14.23
2	ISSUED FOR PERMITTING	DDS 12.02.21
1	ISSUED FOR CLIENT REVIEW	DDS 11.23.20

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SEAL

EROSION & SEDIMENT CONTROL DETAILS

INDEPENDENCE SCHOOL
STREAM RESTORATON

MILL CREEK HUNDRED
NEW CASTLE COUNTY
NEWARK
DELAWARE

DATE: 06.26.20	PROJECT #: 07101
SURVEYED BY: N/A	SHEET: 7
CREATED BY: DDS	
DRAWN BY: AZ	
CHECKED BY: ACH	7 OF 15

Standard Detail & Specifications
Vegetative Stabilization

TEMPORARY SEEDING BY RATES, DEPTHS AND DATES

Mix #	Species[6]	Seeding Rate		Optimum Seeding Dates [1] O = Optimum Planting Period; A = Acceptable Planting Period							Planting Depth[3]
				Coastal Plain			Piedmont			All	
	Certified Seed	lb/Ac.[5]	lb/1000 sq.ft.	2/1-4/30	[2] 5/1-8/14	8/15-10/31	3/1-4/30	5/1-7/31	8/1-10/31	10/31-2/1	
1	Barley	125	4	O	A	O	O	A	O		1-2 inches 2-3" sandy soils
2	Oats MARCH 1- APRIL 30	125	4	O	A	A	O	A	A		1-2 inches 2-3" sandy soils
3	Rye	125	4	O	A	O	O	A	O	A	1-2 inches 2-3" sandy soils
4	Perennial Ryegrass	125	4	O	A	O	O	A	O		0.5 inches 1-2" sandy soils
5	Annual Ryegrass AUGUST 1- OCTOBER 30	125	4	O	A	O	O	A	O	A	0.5 inches 1-2" sandy soils
6	Winter Wheat NOVEMBER 1 - FEBRUARY 28	125	4	O	A	O	O	A	O	A	1-2 inches 2-3" sandy soils
7	Foxtail Millet MAY 1 - JULY 31	30 PLS	0.7		O			O			0.5 inches 1-2" sandy soils
8	Pearl Millet	20 PLS	0.5		O			O			0.5 inches 1-2" sandy soils

1. Winter seeding requires 3 tons per acre of straw mulch for proper stabilization.
2. May be planted throughout summer if soil moisture is adequate or seeded area can be irrigated.
3. Applicable on slopes 3:1 or less.
4. ~~5 lbs/acre per acre of Annual Lespedeza may be added to 1/2 the seeding rate of any of the above species.~~
5. Use varieties currently recommended for Delaware. Contact a County Extension Office for information.
6. Warm season grasses such as Millet or Weeping Lovegrass may be used between 5/1 and 9/1 if desired. Seed at 3-5 lbs. per acre. Good on low fertility and acid areas. Seed after frost through summer at a depth of 0.5".

NOTE: Alternative seed mixes may be used with prior approval from the Department or Delegated Agency.

Source:	Symbol:	Detail No.
Delaware ESC Handbook		**DE-ESC-3.4.3** Sheet 1 of 4 Effective FEB 2019

1/8 VEGETATIVE STABILIZATION NOTES NOT TO SCALE

FOR TURF AREAS

Standard Detail & Specifications
Vegetative Stabilization

PERMANENT SEEDING AND SEEDING DATES

Mix No.	Certified Seed[4] / Well Drained Soils	Seeding Rate[2] lb/Ac	lb/1000 sq.ft.	Optimum Seeding Dates [3] O = Optimum Planting Period A = Acceptable Planting Period: Coastal Plain 2/1-4/30	Coastal Plain 5/1-8/14	Coastal Plain 8/15-10/31	Piedmont 3/1-4/30	Piedmont 5/1-7/31	Piedmont 8/1-10/31	All[5] 10/31-2/1	Remarks
1	Tall Fescue	140	3.2	A	O	A	A	O	A	Add 100 lbs./ac Winter Rye	Good erosion control mix
	Weeping Lovegrass	10	0.23								Tolerant of low fertility soils. Lovegrass very difficult to mow; Germinates only in hot weather
2	Deertongue	30	0.69	A	O	A	A	O	A	Add 100 lbs./ac Winter Rye	Good erosion control mix
	Sheep Fescue	30	0.69								Tolerant of low fertility soils
	Common Lespedeza[6] Inoculated	15	0.35								Good wildlife cover and food
3	Tall Fescue (Turf-type) **or**	50	1.15	O	A	O	O	A	O	Add 100 lbs./ac Winter Rye	Good erosion control mix
	Strong Creeping Red Fescue **or**	50	1.15								Tall Fescue for droughty conditions. Creeping Red Fescue for heavy shade. Flatpea to suppress woody vegetation
	Perennial Ryegrass	50	1.15								
	plus Flatpea[9]	15	0.34								
4	Strong Creeping Red Fescue	100	2.3	O	A	O	O	A	O	Add 100 lbs./ac Winter Rye	Suitable waterway mix. Canada Bluegrass more drought tolerant. Use Redtop for increased drought tolerance.
	Kentucky Bluegrass	70	1.61								
	~~Perennial Ryegrass **or**~~	15	0.35								
	Redtop	5	0.11								
	plus White Clover[9]	3	0.07								
5	Switchgrass **or**	10	0.23		O			O			Native warm-season mixture.
	Coastal Panicgrass	10	0.23								Tolerant of low fertility soils.
	Big Bluestem	5	0.11								Drought tolerant.
	Little Bluestem	5	0.11								Poor shade tolerance.
	Indian Grass	5	0.1								N fertilizer discouraged - weeds
6	Tall Fescue (turf-type) (Blend of 3 cultivars)	150	3.5	O	A	O	O	A	O		Managed filter strip for nutrient uptake.
7	Tall Fescue	150	3.5	O	A	O	O	A	O		Three cultivars of Kentucky
	Ky. Bluegrass (Blend)	20	0.46								Bluegrass. Traffic tolerant.
	Perennial Ryegrass	20	0.46								
8	Big Bluestem[7]	10	0.23	O	A		O	A			All species are native.
	Indian Grass[7]	10	0.23								Indian Grass and Bluestem have
	Little Bluestem[7]	8	0.18								fluffy seeds. Plant with a
	Creeping Red Fescue	30	0.69								specialized native seed drill.
	plus one of:										
	Partridge Pea	5	0.11								Creeping Red Fescue will
	Bush Clover	3	0.07								provide erosion protection while
	Wild Indigo	3	0.07								the warm season grasses
	Showy Tick-Trefoil	2	0.05								get established.

NOTE: Alternative seed mixes may be used with prior approval from the Department or Delegated Agency.

Source:	Symbol:	Detail No.
Delaware ESC Handbook		**DE-ESC-3.4.3** Sheet 2 of 4 Effective FEB 2019

1/8 VEGETATIVE STABILIZATION NOTES NOT TO SCALE

Standard Detail & Specifications
Vegetative Stabilization

PERMANENT SEEDING AND SEEDING DATES (cont.)

Mix No.	Certified Seed[4] / Poorly Drained Soils	Seeding Rate[2] lb/Ac	lb/1000 sq.ft.	Optimum Seeding Dates [3] O = Optimum Planting Period A = Acceptable Planting Period: Coastal Plain 2/1-4/30	Coastal Plain 5/1-8/14	Coastal Plain 8/15-10/31	Piedmont 3/1-4/30	Piedmont 5/1-7/31	Piedmont 8/1-10/31	All[5] 10/31-2/1	Remarks
9	Redtop	75	1.72	O	A	O	O	A	O	Add 100 lbs./ac Winter Rye	Quick stabilization of disturbed sites and waterways
	Creeping Bentgrass	35	0.8								
	Sheep Fescue	30	0.69								
	Rough Bluegrass	45	1								
10	Reed Canarygrass[8]	10	0.23	A		O	A		O		Good erosion control, wildlife cover and wetland revegetation.
	Residential Lawns										
11	Tall Fescue	100	2.3	O	A	O	O	A	O		High value, high maintenance,
	Perennial Ryegrass	25	0.57								light traffic, irrigation necessary
	Kentucky Bluegrass Blend	30	0.69								Well drained soils, full sun.
12	Tall Fescue	100	2.3	O	A	O	O	A	O		Moderate value,
	Perennial Ryegrass	25	0.57								low maintenance,
	Sheep Fescue	25	0.57								traffic tolerant
13	Creeping Red Fescue	50	1.15	O	A	O	O	A	O		Shade tolerant,
	Chewings Fescue	50	1.15								moderate traffic tolerance,
	Rough Bluegrass	20	0.4								moderate maintenance.
	Kentucky Bluegrass	20	0.4								
14	Creeping Red Fescue	50	1.15	O	A	O	O	A	O		Shade tolerant,
	Rough Bluegrass **or**	90	2.1								moisture tolerant.
	Chewings Fescue										
15	K-31 Tall Fescue	150	3.5	O	A	O	O	A	O		Monoculture, but performs well alone in lawns. Discouraged.

1. When hydroseeding is the chosen method of application, the total rate of seed should be increased by 25%.
2. Winter seeding requires 3 tons per acre of straw mulch. Planting dates listed above are average for Delaware. These dates may require adjustment to reflect local conditions.
3. All seed shall meet the minimum purity and minimum germination percentages recommended by the Delaware Department of Agriculture. The maximum % of weed seeds shall be in accordance with Section 1, Chapter 24, Title 3 of the Delaware Code.
4. Cool season species may be planted throughout summer if soil moisture is adequate or seeded area can be irrigated.
5. All leguminous seed must be inoculated.
6. Warm season grass mix and Reed Canary Grass cannot be mowed more than 4 times per year.
7. Warm season grasses require a soil temperature of at least 50 degrees in order to germinate, and will remain dormant until then.

NOTE: Alternative seed mixes may be used with prior approval from the Department or Delegated Agency.

Source:	Symbol:	Detail No.
Delaware ESC Handbook		**DE-ESC-3.4.3** Sheet 3 of 4 Effective FEB 2019

1/8 VEGETATIVE STABILIZATION NOTES NOT TO SCALE

Standard Detail & Specifications
Vegetative Stabilization

Construction Notes:

1. Site Preparation
   a. Prior to seeding, install needed erosion and sediment control practices such as diversions, grade stabilization structures, berms, dikes, grassed waterways, and sediment basins.
   b. Final grading and shaping is not necessary for temporary seedings.
2. Seedbed Preparation

   It is important to prepare a good seedbed to insure the success of establishing vegetation. The seedbed should be well prepared, loose, uniform, and free of large clods, rocks, and other objectionable material. The soil surface should not be compacted or crusted.
3. Soil Amendments
   a. Lime - Apply liming materials based on the recommendations of a **soil test** in accordance with the approved nutrient management plan. If a nutrient management plan is not required, apply dolomitic limestone at the rate of 1 to 2 tons per acre. Apply limestone uniformly and incorporate into the top 4 to 6 inches of soil.
   b. Fertilizer - Apply fertilizer based on the recommendations of a **soil test** in accordance with the approved nutrient management plan. If a nutrient management plan is not required, apply a formulation of 10-10-10 at the rate of 600 pounds per acre. Apply fertilizer uniformly and incorporate into the top 4 to 6 inches of soils.
4. Seeding
   a. For **temporary stabilization**, select a mixture from **Sheet 1 .** For a **permanent stabilization**, select a mixture from **Sheet 2** or **Sheet 3** depending on the conditions. Alternative seed mixes may be used with prior approval from the Department or Delegated Agency.
   b. Apply seed uniformly with a broadcast seeder, drill, cultipacker seeder or hydroseeder. All seed will be applied at the recommended rate and planting depth.
   c. Seed that has been broadcast should be covered by raking or dragging and then lightly tamped into place using a roller or cultipacker. If hydroseeding is used and the seed and fertilizer is mixed, they will be mixed on site and the seeding shall be done immediately and without interruption.
5. Mulching

   All mulching shall be done in accordance with detail **DE-ESC-3.4.5**.

Source:	Symbol:	Detail No.
Delaware ESC Handbook		**DE-ESC-3.4.3** Sheet 4 of 4 Effective FEB 2019

1/8 VEGETATIVE STABILIZATION NOTES NOT TO SCALE

Standard Detail & Specifications
Mulching

1. Materials and Amounts

a. *Straw* - Straw shall be unrotted small grain straw applied at the rate of 1-1/2 to 2 tons per acre, or 70 to 90 pounds (two bales) per 1,000 square feet. Mulch materials shall be relatively free of weeds and shall be free of noxious weeds such as; thistles, Johnsongrass, and quackgrass. Spread mulch uniformly by hand or mechanically. For uniform distribution of hand spread mulch, divide area into approximately 1,000 square feet sections and place 70-90 pounds (two bales) of mulch in each section.

b. *Wood chips* - Apply at the rate of approximately 6 tons per acre or 275 pounds per 1,000 square feet when available and when feasible. These are particularly well suited for utility and road rights-of-way. If wood chips are used, increase the application rate of nitrogen fertilizer by 20 pounds of N per acre (200 pounds of 10-10-10 or 66 pounds of 30-0-0 per acre).

c. *Hydraulically applied mulch* -The following conditions apply to hydraulically applied mulch:

i. Definitions:
   a. Wood fiber mulch shall consist of specially prepared wood that has been processed to a uniform state, is packaged for sale as a hydraulic mulch for use with hydraulic seeding equipment, and consists of a minimum of 70% virgin or recycled wood fiber combined with 30% paper fiber and additives.
   b. Blended fiber mulch shall consist of any hydraulic mulch that contains greater than 30% paper fiber. The paper component must consist of specially prepared paper that has been processed to a uniform fibrous state and is packaged for sale as a hydraulic mulch for use with hydraulic seeding equipment.
   c. A bonded fiber matrix (BFM) consists of long strand, specially prepared wood fibers that have been processed to a uniform state held together by a water resistant bonding agent. BFMs shall contain no paper (cellulose) mulch but may contain small percentages of synthetic fibers to enhance performance.
   d. Refer to **Figure 3.4.5a** for conditions and limitations of use for each of the above categories of hydraulic mulch.

ii. All components of the hydraulically applied mulches shall be pre-packaged by the manufacturer to assure material performance. Field mixing of the mulch components is acceptable, but must be done per manufacturers recommendations to ensure the proper results.

iii. Hydraulic mulches shall be applied with a viable seed and at manufacturer's recommended rates. Increased rates may be necessary based on site conditions.

iv. Hydraulically applied mulches and additives shall be mixed according to manufacturers recommendations.

iv. Materials within this category shall only be used when hydraulically applied mulch has been specified for use on the approved Sediment and Stormwater Plan, or supplemental approval from the plan approval agency has been obtained in writing for a specific area.

Source:	Symbol:	Detail No.
Delaware ESC Handbook & Filtrexx™ International		**DE-ESC-3.4.5** Sheet 1 of 3 Effective FEB 2019

2/8 MULCHING NOTES NOT TO SCALE

Standard Detail & Specifications
Mulching

v. Application:
   a. Apply product to geotechnically stable slopes that have been designed and constructed to divert runoff away from the face of the slope.
   b. Do not apply to saturated soils, or if precipitation is anticipated within 24-48 hours.
   c. During the spring (March 1 to May 31) and fall (September 1 to November 30) seasons, hydraulic mulches may be applied in a one-step process where all components are mixed together in single-tank loads. It is recommended that the product be applied from opposing directions to achieve optimum soil coverage.
   d. During the summer (June 1 to August 31) and winter (December 1 to February 28) seasons, the following two-step process is required:
      Step One– Mix and apply seed and soil amendments with a small amount of mulch for visual metering.
      Step Two – Mix and apply mulch at manufacturers recommended rates over freshly seeded surfaces. Apply from opposing directions to achieve optimum soil coverage.
   e. Minimum curing temperature is 40° F (4° C). The best results and more rapid curing are achieved at temperatures exceeding 60° F (15° C). Curing times may be accelerated in high temperature, low humidity conditions on dry soils.

vi. Recommended application rates are for informational purposes only. Conformance with this standard and specification shall be performance-based and requires **100% soil coverage**. Any areas with bare soil showing shall be top dressed until full coverage is achieved.

d. *Compost blanket (CB)* - Loosely applied with a pneumatic blower so that a 1" compost blanket uniformly covers the **soil with 100% coverage**. This application can be used with seed to promote germination by applying the approved seed mix directly into the loosely blown compost. The compost blanket performs best on slopes less than 2:1 and requires no mulch anchoring.

2. Anchoring mulch - Mulch must be anchored immediately to minimize loss by wind or water. This may be done by one of the following methods, depending upon size of area, erosion hazard, and cost.

a. *Crimping* - A crimper is a tractor drawn implement designed to punch and anchor mulch into the top two (2) inches of soil. This practice affords maximum erosion control but is limited to flatter slopes where equipment can operate safely. On sloping land, crimping should be done on the contour whenever possible.
b. *Tracking* - Tracking is the process of cutting mulch (usually straw) into the soil using a bulldozer or other equipment that runs on cleated tracks. Tracking is used primarily on slopes 3:1 or steeper and should be done up and down the slope with cleat marks running across the slope.
c. *Liquid mulch binders* - Applications of liquid mulch binders should be heavier at edges, in valleys, and at crests of banks and other areas where the mulch will be moved by wind or water. All other areas should have a uniform application of binder. The use of synthetic binders is the preferred method of mulch binding and should be applied at the rates recommended by the manufacturer.
d. *Paper fiber* - The fiber binder shall be applied at a net dry weight of 750 lbs/ac. The wood cellulose fiber shall be mixed with water, and the mixture shall contain a maximum of 50 lbs. of wood cellulose fiber per 100 gallons.
e. *Nettings* - Synthetic or organic nettings may be used to secure straw mulch. Install and secure according to the manufacturers recommendations.

Source:	Symbol:	Detail No.
Delaware ESC Handbook & Filtrexx™ International		**DE-ESC-3.4.5** Sheet 2 of 3 Effective FEB 2019

2/8 MULCHING NOTES NOT TO SCALE

Standard Detail & Specifications
Mulching

MULCHING MATERIAL SELECTION GUIDE

Percent Slope	Type of Mulch / App. Rate	Dec. 1 to Feb. 28(29)	March 1 to May 31	June 1 to Aug. 31	Sept. 1 to Nov. 30
Less than 2%	Bonded Fiber @ 2000 lbs/ac. minimum	xxxxxxxxxxxx	OK (1" acc.) xxxxxxxxxxxx	xxxxxxxxxxxx	OK (1" acc.) xxxxxxxxxxxx
	Wood Fiber @ 1500 lbs/ac. min. BFM @ 3000 lbs/ac. min.	OK	OK	OK	OK
	Straw @ 2 Tons/ac. Min.	OK	OK	OK	OK
	Stabilization Matting**	OK	OK	OK	OK
	1" Compost Blanket (CB)	OK	OK	OK	OK
2% to 5.9%	Wood Fiber @ 2000 lbs/ac. min.	xxxxxxxxxxxx	OK	xxxxxxxxxxxx	OK
	BFM @ 3500-4000 lbs/ac. min	OK	OK	OK	OK
	Straw @ 2 Tons/ac. min.	OK	OK	OK	OK
	Stabilization Matting**	OK	OK	OK	OK
	1" Compost Blanket (CB)	OK	OK	OK	OK
6% to 10.9%	Wood Fiber @ 2000-2500 lbs/ac. min.	xxxxxxxxxxxx	OK	xxxxxxxxxxxx	OK
	BFM @ 3500-4000 lbs/ac. min.	OK	OK	OK	OK
	Straw @ 2 Tons/ac. min.	OK	OK	OK	OK
	Stabilization Matting**	OK	OK	OK	OK
	1" Compost Blanket (CB)	OK	OK	OK	OK
11% to 24.9%	Wood Fiber @ 2500-3000 lbs/ac. min.	xxxxxxxxxxxx	OK	xxxxxxxxxxxx	OK
	BFM @ 4000 lbs/ac. min.	OK	OK	OK	OK
	Straw @ 2 Tons/ac. min.	OK	OK	OK	OK
	Stabilization Matting**	OK	OK	OK	OK
	1" Compost Blanket (CB)	OK	OK	OK	OK
25% to 33%	Wood Fiber @ 2500-3000 lbs/ac. min.	xxxxxxxxxxxx	OK	xxxxxxxxxxxx	OK
	BFM @ 4000 lbs/ac. min.	OK	OK	OK	OK
	Straw @ 2 Tons/ac. min.	OK	OK	OK	OK
	Stabilization Matting**	OK	OK	OK	OK
	1" Compost Blanket (CB)	OK	OK	OK	OK
33% and up	BFM @ 4000-4500 lbs/ac. min.	xxxxxxxxxxxx	OK	xxxxxxxxxxxx	OK
	Straw @ 2 Tons/ac. min.*	OK	OK	OK	OK
	Stabilization Matting**	OK	2:1 Max.	2:1 Max.	2:1 Max.

* Note: Manufacturers Recommended Rates for informational purposes only. Performance standard requires 100% soil coverage.
** Note: Stabilization Matting must be applied in accordance with Section 3.4.6 of the Delaware ESC Handbook.
* Note: Straw applied on slopes greater than 33% must be netted (this does not apply to topsoil stockpiles).
OK = Acceptable for use during this time period.
xxx = Not acceptable to use during this time period.
All application rates are minimums

Source:	Symbol:	Detail No.
Delaware ESC Handbook & Filtrexx™ International		**DE-ESC-3.4.5** Sheet 3 of 3 Effective FEB 2019

2/8 MULCHING NOTES NOT TO SCALE

GEOTEXTILE SELECTION TABLE

TYPE	EXAMPLE PRODUCTS
GS-I	MIRAFI 600X
	AMOCO 2006
	GEOTEX 315ST
GD-I	MIRAFI 100X
	GEOTEX 915SC
GD-II	MIRAFI FW402
	AMOCO 4535
GD-III	SILT SACK HIGH FLOW
	DANDY BAG II
	ULTRA-DRAIN GUARD
GD-IV	DIRTBAG 53/55
	DANDY DEWATERING BAG
	TERRATEX N08/N10

3/8 GEOTEXTILE SELECTION TABLE NOT TO SCALE

FORESITE ASSOCIATES
- CIVIL ENGINEERING
- LANDSCAPE ARCHITECTURE
- ECOLOGICAL RESTORATION

FORESITE ASSOCIATES INC.
2401 PHILADELPHIA PIKE
CLAYMONT, DE 19703
PHONE: 302.351.3421
INFO@FORESITEASSOCIATES.COM

INDEPENDENCE SCHOOL STREAM RESTORATION PLAN

NEW CASTLE
2430 OLD COUNTRY ROAD, NEWARK, DE 19702

#	COMMENT	BY DATE
6	REVISION TO DETAIL 5 SHEET 13 & SPOT ELEVATION UPDATES SHEET 9	DDS 05.30.23
5	PER COMMENTS-NPS&USACE	DDS 05.05.23
4	ISSUED FOR PERMITTING	DDS 04.04.23
3	PER NPS COMMENTS	DDS 02.14.23
2	ISSUED FOR PERMITTING	DDS 12.02.21
1	ISSUED FOR CLIENT REVIEW	DDS 11.23.20

FORESITE ASSOCIATES

SEAL

EROSION & SEDIMENT CONTROL DETAILS

INDEPENDENCE SCHOOL
STREAM RESTORATON

MILL CREEK HUNDRED
NEW CASTLE COUNTY

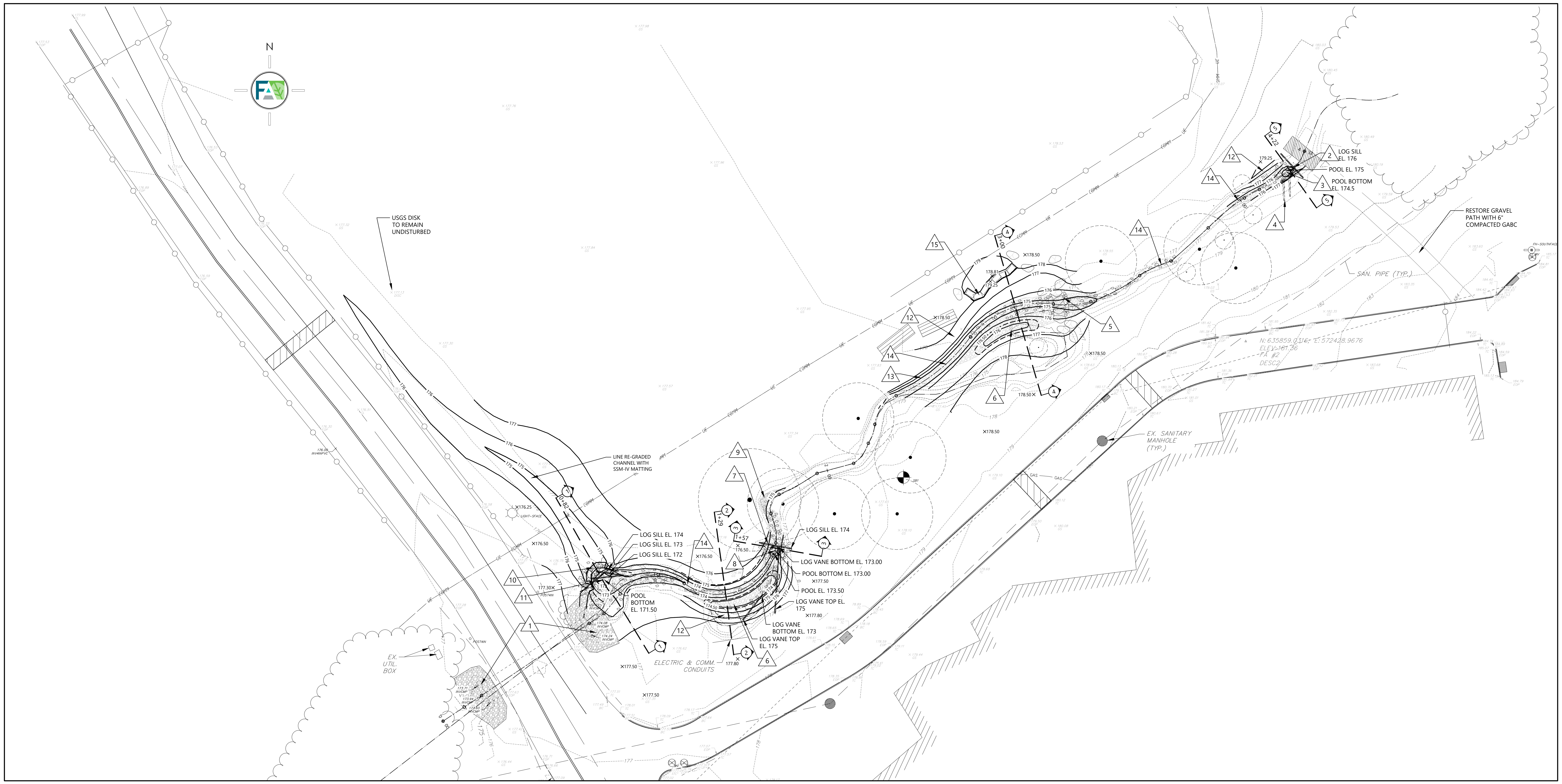
NEWARK
DELAWARE

DATE: 06.26.20
PROJECT #: 071.01
SURVEYED BY: N/A
CREATED BY: DDS
DRAWN BY: AZ
CHECKED BY: ACH

SHEET: 8
8 OF 15

CONSTRUCTION NOTES

1. STABILIZE DOWNSTREAM WORK AREA:
   - 1.1. SEE EROSION AND SEDIMENT CONTROL PLAN
   - 1.2. PROJECT WORK IS IN AN ACTIVE STREAM COURSE AND EROSION AND SEDIMENT CONTROLS MUST BE IN PLACE TO CAPTURE LOOSE SEDIMENT PRIOR TO ENTERING THE DOWNSTREAM WATERWAY.
   - 1.3. REMOVE ACCUMULATED SEDIMENT/EARTH COVERING EXISTING GROUTED RIP RAP; DO NOT DISTURB NATURAL STREAM CHANNEL AT DOWNSTREAM END OF CULVERTS.
   - 1.4. FOR ALL FOLLOWING NOTES REFERENCE THE DETAILS ON SHEET 12-14 FOR ADDITIONAL INFORMATION.
2. INSTALL LOG SILL #2 AT UPSTREAM END OF PROJECT AREA
   - 2.1. USE SALVAGED HARDWOOD TREES FROM PROJECT AREA.
   - 2.2. DUE TO THE IRREGULARITY OF NATURAL MATERIALS, THE CONTRACTOR IS RESPONSIBLE FOR MEASURING AND EXCAVATING TO MEET DESIGN ELEVATION; INSTALLATION ASSUMES A MINIMUM 11" DIAMETER FOOTER LOG BURIED BELOW STREAMBED TO MEET TOP OF SILL DESIGN ELEVATION AT STREAMBED.
   - 2.3. PER DETAIL, OFFSET SILL LOG OVER FOOTER LOG TO PRODUCE UNDERWATER "FISH SHELF"; THE OFFSET SHOULD BE A MAXIMUM OF 1/4 THE SILL DBH, I.E. IF THE SILL LOG IS AN 12" DBH HARDWOOD, ONLY 3 INCHES SHOULD OVERHANG THE FOOTER LOG.
   - 2.4. FOOTER LOG TO BE ONE LOG; SILL LOG MAY BE SMALLER, TO ACHIEVE ADEQUATE OVERHANG FOR FISH SHELF IF USING SMALLER THAN 12" DBH SILL LOGS, CONSULT DESIGN TEAM PRIOR TO INSTALLATION; INADEQUATE FISH SHELF DEPTH WILL NOT BE ACCEPTABLE.
   - 2.5. ANCHOR BOULDERS ARE TO BE SECURELY SET INTO GRADE; WHERE ANCHOR BOULDERS BECOME EXPOSED AT STREAM EDGE, USE COBBLE STONES TO FILL GAPS BETWEEN LOG AND BOULDERS.
   - 2.6. UPSTREAM EDGES TO BE SEALED FROM WATER SEEPAGE BEHIND THE LOG SILL STRUCTURE; AT THE UPSTREAM FACE WHERE GAPS WILL NATURALLY OCCUR IN THE FORMATION DUE TO THE IRREGULAR NATURE OF NATURAL MATERIALS, INSTALL COMPACTED BACKFILL CONSISTING OF 40% #3 STONE 40% COURSE RIVER GRAVEL AND 20% COBBLESTONES; HAND CHINK PIECES INTO GAPS AS NECESSARY AND THEN TAMP STONE INTO GAPS BETWEEN BOULDERS FOR TIGHT FIT. BACKFILL UPSTREAM EDGE OVER STONES WITH A MINIMUM OF 12" OF CLAY BORROW.
   - 2.7. INSTALL DOUBLE LAYER COIR FABRIC ON UPSTREAM FACE OF CLAY BACKFILL PER DETAIL.
3. LOG SILL #1 POOL
   - 3.1. EXCAVATE A MINIMUM OF 8" BELOW BOTTOM OF POOL DESIGN ELEVATIONS
   - 3.2. INSTALL 8" MINIMUM DEPTH OF MIXED BED AND TRANSITION COBBLE STONE
   - 3.3. INSTALL ANCHOR BOULDER(S) AT DOWNSTREAM EDGE OF POOL; ANCHOR STONE TO BE SECURELY SET INTO GRADE WITH APPROXIMATELY 2/3 OF THE STONE HEIGHT BELOW THE STREAM BED
   - 3.4. CHINK TRANSITION COBBLE AND BED COBBLE IN GAPS BETWEEN ANCHOR STONE SO THAT A CHANNEL SPANNING WIDTH OF MIXED BOULDER COBBLE IS AT DOWNSTREAM END OF POOL.
4. ROOT WADS
   - 4.1. ROOT WADS ARE TO BE SET IN THE NATURAL CURVATURE OF THE EXISTING STREAM BANK JUST DOWNSTREAM OF THE UPSTREAM LOG SILL AT THE END OF THE PROJECT AREA; DETERMINE LOCATION AT PRE-CONSTRUCTION MEETING WITH OWNER'S / OWNER'S REPRESENTATIVE AND DESIGN TEAM.
   - 4.2. NUMBER OF ROOT WADS WILL VARY FROM PLAN VIEW AND ARE FOR ILLUSTRATION ONLY; DETERMINE TREES TO BE SALVAGED FOR ROOT WAD USE AT THE PRE-CONSTRUCTION MEETING AND CONSULT DESIGN TEAM FOR SETTING DURING INSTALLATION.
   - 4.3. INSTALL ROOT WADS PER DETAIL; FOOTER LOGS TO BE SECURELY SET IN STREAM TOE PROTECTION.
   - 4.4. PACK SOIL / CLAY BORROW AND COBBLESTONE AS NECESSARY TO CREATE TIGHT FIT BETWEEN ROOT WAD AND FOOTER LOG, TAMP AS NEEDED SO NO GAPS ARE PRESENT.
   - 4.5. USE ANCHOR BOULDERS AT GRADE TO TRANSITION UPLAND SLOPE TO ROOT WAD TO PREVENT SLIPPAGE INTO WAD ROOT "FINGERS".
5. INSTALL STREAM BOULDER PATH:
   - 5.1. PATH IS LARGE SUB-ANGULAR ANCHOR BOULDERS WITH A MINIMUM SIZE OF 24"L x 24"W x 18"H, SET AS RAISED STEPPING STONE PATH TRAVERSING CHANNEL. BOULDERS WILL BE IN THE CHANNEL AND CONTINUE UP THE SIDE SLOPES. THE INSTALLATION WILL BE SIMILAR TO A ROCK VANE BUT WATER CAN MOVE BETWEEN THE STONES AND IT SHOULD NOT FORCE 6" OR LESS OF BASE FLOW ABOVE IT; SEE DETAIL 5 SHEET 13.
   - 5.2. THERE ARE TO BE NO GEOTEXTILE OR OTHER INORGANIC MATERIALS BESIDES STONE, GRAVEL, AND SANDS FOR CONSTRUCTION OF THE PATH.
   - 5.3. INSTALL OVER SMOOTH PREPARED SUBGRADE, COMPACTION 90% STANDARD PROCTOR DENSITY. ANY OVER EXCAVATION IS TO BE BACKFILLED WITH CLAY MATERIAL. GRADED AGGREGATE BASE COURSE MAY BE USED AS A LEVELING COURSE TO ACHIEVE DESIGN SLOPES AND ELEVATIONS NOTED.
   - 5.4. PLACE FLATTEST SIDE OF BOULDER FACING UP FOR STEPPING SURFACE. ADJUST DEPTH OF BOULDERS VERTICALLY AS NEEDED TO KEEP TOP SURFACE WITHIN 3" - 6" OF ADJACENT BOULDER FOR A SOMEWHAT EVEN WALKING SURFACE. IDEAL BOULDER HEIGHT TO BE 1/3 BURIED, 1/3 WITHIN CHANNEL, 1/3 ABOVE CHANNEL.
   - 5.5. ANCHOR BOULDERS WITH COBBLE AND CHINK STONES ON DOWNSTREAM AND UPSTREAM END.
6. FLOODPLAIN SHELF
   - 6.1. AREAS FOR THE STREAM TO FLOOD AND INCREASE AQUATIC HABITAT HAVE BEEN DESIGNED INTO THE PROJECT.
   - 6.2. THESE AREAS SHOULD BE TREATED WITH THE SAME INSTALLATION AS THE PRIMARY STREAM BED.
   - 6.3. THE FLOODPLAIN SHELF AND STREAMBED WILL REMAIN UNDER BASE FLOW CONDITIONS DURING NORMAL WEATHER. A SMALL BERM HAS BEEN DESIGNED BETWEEN THE TWO, SEE PLAN ELEVATIONS.
   - 6.4. INSTALL PLANTINGS IN BERM PER LANDSCAPE PLAN.
7. INSTALL LOG SILL #2 IN MIDDLE OF PROJECT AREA
   - 7.1. THIS STRUCTURE IS BEING IMPLEMENTED TO ASSIST WITH GRADE CONTROL AND IN RE-DIRECTING STREAM FLOWS AWAY FROM THE EXISTING EROSION EXPOSED COMMUNICATIONS AND ELECTRIC LINE.
   - 7.2. PRIVATE UTILITIES ARE LOCATED IN THE VICINITY OF THIS WORK. THE CONTRACTOR SHALL UTILIZE THE SERVICES OF A PRIVATE UTILITY LOCATING CONSULTANT TO MARK THE LOCATION OF EXISTING UTILITIES. CONTRACTOR IS RESPONSIBLE FOR ADJUSTING CONSTRUCTION METHODS AS NEEDED TO AVOID DAMAGE TO THE KNOWN UTILITIES IN THIS AREA. DUE TO THE EXISTING EROSION FORCES FROM THE TIME THIS PLAN WAS WRITTEN TO WHEN IT IS IMPLEMENTED, IF THE CONTRACTOR SUGGESTS DESIGN CHANGES TO STREAM CONSTRUCTION, THE DESIGN TEAM MUST BE CONTACTED AND PLAN MARK-UPS PROVIDED TO THE CONTRACTOR. CONSTRUCTION CHANGES NOT APPROVED BY THE DESIGN TEAM WILL BE A VIOLATION OF THIS PLAN AND ANY CHANGES REQUIRED TO BRING THE CONSTRUCTION INTO COMPLIANCE WITH THE DESIGN ELEVATIONS AND PERMITTING WILL BE AT THE CONTRACTORS COST.
   - 7.3. USE SALVAGED HARDWOOD TREES FROM PROJECT AREA WHERE FEASIBLE.
   - 7.4. DUE TO THE IRREGULARITY OF NATURAL MATERIALS, THE CONTRACTOR IS RESPONSIBLE FOR MEASURING AND EXCAVATING TO MEET DESIGN ELEVATION; INSTALLATION ASSUMES A MINIMUM 11" DIAMETER FOOTER LOG BURIED BELOW STREAMBED TO MEET TOP OF SILL DESIGN ELEVATION AT STREAMBED.
   - 7.5. PER DETAIL. OFFSET SILL LOG OVER FOOTER LOG TO PRODUCE UNDERWATER "FISH SHELF"; THE OFFSET SHOULD BE A MAXIMUM OF 1/4 THE SILL DBH, I.E. IF THE SILL LOG IS AN 12" DBH HARDWOOD, ONLY 3 INCHES SHOULD OVERHANG THE FOOTER LOG.
   - 7.6. FOOTER LOG TO BE ONE LOG; SILL LOG MAY BE SMALLER, TO ACHIEVE ADEQUATE OVERHANG FOR FISH SHELF IF USING SMALLER THAN 12" DBH SILL LOGS, CONSULT DESIGN TEAM PRIOR TO INSTALLATION; INADEQUATE FISH SHELF DEPTH WILL NOT BE ACCEPTABLE.
   - 7.7. INSTALL LOG VANES PER DETAIL; THE LOWEST ELEVATION VANE WILL BE ANCHORED INTO SILL SYSTEM, SEE PLAN GRADES.
   - 7.8. VANE ANGLE IS TO DIRECT FLOWS FROM FUTURE EROSION IN THE DIRECTION OF THE EXISTING UTILITIES; ANGLES ILLUSTRATED MAY NO LONGER BE ACCURATE DUE TO CONTINUED EROSION SINCE PLAN PREPARATION; REVIEW ANGLES AT PRE-CONSTRUCTION MEETING AND CONTACT OWNER'S REPRESENTATIVE / DESIGN TEAM DURING CONSTRUCTION FOR REVIEW.
   - 7.9. ANCHOR BOULDERS ARE TO BE SECURELY SET INTO GRADE; WHERE ANCHOR BOULDERS BECOME EXPOSED AT STREAM EDGE, USE COBBLE STONES TO FILL GAPS BETWEEN LOG AND BOULDERS.
   - 7.10. UPSTREAM EDGES TO BE SEALED FROM WATER SEEPAGE BEHIND THE LOG SILL STRUCTURE; AT THE UPSTREAM FACE WHERE GAPS WILL NATURALLY OCCUR IN THE FORMATION DUE TO THE IRREGULAR NATURE OF NATURAL MATERIALS, INSTALL COMPACTED BACKFILL CONSISTING OF 40% #3 STONE 40% COURSE RIVER GRAVEL AND 20% COBBLESTONES; HAND CHINK PIECES INTO GAPS AS NECESSARY AND THEN TAMP STONE INTO GAPS BETWEEN BOULDERS FOR TIGHT FIT. BACKFILL UPSTREAM EDGE OVER STONES WITH A MINIMUM OF 12" OF CLAY BORROW.
   - 7.11. INSTALL DOUBLE LAYER COIR FABRIC ON UPSTREAM FACE OF CLAY BACKFILL PER DETAIL.
8. LOG SILL #2 POOL
   - 8.1. EXCAVATE A MINIMUM OF 8" BELOW BOTTOM OF POOL DESIGN ELEVATIONS
   - 8.2. INSTALL 8" MINIMUM DEPTH OF MIXED BED AND TRANSITION COBBLE STONE
   - 8.3. INSTALL ANCHOR BOULDER(S) AT DOWNSTREAM EDGE OF POOL; ANCHOR STONE TO BE SECURELY SET INTO GRADE WITH APPROXIMATELY 2/3 OF THE STONE HEIGHT BELOW THE STREAM BED
   - 8.4. CHINK TRANSITION COBBLE AND BED COBBLE IN GAPS BETWEEN ANCHOR STONE SO THAT A CHANNEL SPANNING WIDTH OF MIXED BOULDER COBBLE IS AT DOWNSTREAM END OF POOL.
9. MAPLE TREE EROSION:
   - 9.1. CONSULT OWNER'S REPRESENTATIVE / DESIGN TEAM IF THE TREE IS LEANING INTO THE STREAM COURSE OR MORE THAN 1/3 OF THE ROOT BASE IS EXPOSED, CONSTITUTING A POTENTIAL FALL HAZARD.
   - 9.2. IF THE TREE ROOT STRUCTURE IS STILL INTACT, PROCEED WITH ROCK PACK PER DETAIL.
   - 9.3. PROPOSED GRADING IS ASSUMED ON PLAN AND THE SPACE UNDER THE TREE SHOULD BE FILLED TO THE NATURAL STREAM TOE GRADE AND ALIGN WITH THE DIRECTLY ADJACENT UPSTREAM AREAS OF EXISTING CONDITIONS AND THE DIRECTLY ADJACENT DOWNSTREAM AREAS WHERE STREAM RESTORATION MODIFICATIONS HAVE BEEN IMPLEMENTED.
   - 9.4. USE COBBLE STONES WITH COURSE GRAVEL, CLAY BORROW, AND IN-SITU SOILS, TO CREATE TIGHT SEAL BETWEEN JOINTS.
10. INSTALL LOG SILL #3 WHERE ROADSIDE SWALE MEETS STREAM COURSE
    - 10.1. USE SALVAGED HARDWOOD TREES FROM PROJECT AREA.
    - 10.2. DUE TO THE IRREGULARITY OF NATURAL MATERIALS, THE CONTRACTOR IS RESPONSIBLE FOR MEASURING AND EXCAVATING TO MEET DESIGN ELEVATION; INSTALLATION ASSUMES A MINIMUM 11" DIAMETER FOOTER LOG BURIED BELOW STREAMBED TO MEET TOP OF SILL DESIGN ELEVATION AT STREAMBED.
    - 10.3. GRADE SLOPE FROM SWALE TO POOL TO APPROXIMATE 2:1 WITH BANKS REINFORCED WITH BOULDER AND TRANSITION COBBLE.
    - 10.4. ANCHOR FOOTER LOGS AND LOG SILLS WITHIN THIS BOULDER MATRIX PER PLAN GRADES.
    - 10.5. UPON COMPLETION, THE SYSTEM WILL BE A BOULDER / COBBLE ENFORCED SLOPE WITH SILL AND FOOTER LOGS EMBEDDED INTO THE BANK AND THROUGH THE BOULDERS. THE SILL LOG PLACED AT EL. 174.00 SHALL RUN PERPENDICULAR TO THE SWALE TO FORM A TRADITIONAL SILL INSTALLATION. THE TWO LOWER SILL LOGS WILL BE UNDER BASE FLOW AT ALL TIMES AND SHALL BE EMBEDDED IN AN IRREGULAR PATTERN TO PROVIDE VARIED AQUATIC HABITAT. ANGLES OF UNDERWATER SILLS ARE APPROXIMATED ON PLAN AND ARE TO BE DETERMINED ON SITE WITH THE OWNER'S REPRESENTATIVE AND DESIGN TEAM BASED ON ACTUAL BANK CONDITIONS.
    - 10.6. PER DETAIL, OFFSET TOP SILL LOG OVER FOOTER LOG TO PRODUCE UNDERWATER "FISH SHELF"; THE OFFSET SHOULD BE A MAXIMUM OF 1/4 THE SILL DBH, I.E. IF THE SILL LOG IS AN 12" DBH HARDWOOD, ONLY 3 INCHES SHOULD OVERHANG THE FOOTER LOG.
    - 10.7. FOOTER LOG TO BE ONE LOG; SILL LOG MAY BE SMALLER, TO ACHIEVE ADEQUATE OVERHANG FOR FISH SHELF IF USING SMALLER THAN 12" DBH SILL LOGS, CONSULT DESIGN TEAM PRIOR TO INSTALLATION; INADEQUATE FISH SHELF DEPTH WILL NOT BE ACCEPTABLE.
    - 10.8. ANCHOR BOULDERS ARE TO BE SECURELY SET INTO GRADE; WHERE ANCHOR BOULDERS BECOME EXPOSED AT STREAM EDGE, USE COBBLE STONES TO FILL GAPS BETWEEN LOG AND BOULDERS.
    - 10.9. UPSTREAM EDGES FOR THE TOP SILL LOG AT EL. 174.00 ARE TO BE SEALED FROM WATER SEEPAGE BEHIND THE LOG SILL STRUCTURE; AT THE UPSTREAM FACE WHERE GAPS WILL NATURALLY OCCUR IN THE FORMATION DUE TO THE IRREGULAR NATURE OF NATURAL MATERIALS, INSTALL COMPACTED BACKFILL CONSISTING OF 40% #3 STONE 40% COURSE RIVER GRAVEL AND 20% COBBLESTONES; HAND CHINK PIECES INTO GAPS AS NECESSARY AND THEN TAMP STONE INTO GAPS BETWEEN BOULDERS FOR TIGHT FIT. BACKFILL UPSTREAM EDGE OVER STONES WITH A MINIMUM OF 12" OF CLAY BORROW.
    - 10.10. INSTALL DOUBLE LAYER COIR FABRIC ON UPSTREAM FACE OF CLAY BACKFILL PER DETAIL
11. LOG SILL #3 POOL
    - 11.1. EXCAVATE A MINIMUM OF 8" BELOW BOTTOM OF POOL DESIGN ELEVATIONS
    - 11.2. INSTALL 8" MINIMUM DEPTH OF MIXED BED AND TRANSITION COBBLE STONE.
12. BANK STABILIZATION:
    - 12.1. ALL AREAS OF GRADING WITHIN THE WORK AREA HAVING A SLOPE GREATER THAN OR EQUAL TO 5:1 AND ALL AREAS BELOW THE TOP OF STREAM BANK WITH THE EXCEPTION OF THE STREAM BED (BOTTOM) THAT ARE NOT OTHERWISE COVERED BY A ROCK BASED TREATMENT SHALL GET EROSION CONTROL MATTING.
    - 12.2. EROSION CONTROL MATTING INSTALLATION IS TO BE PER THE DETAIL(S) IN THE APPROVED PLAN. MATTING IS TO BE INSTALLED ON A SMOOTH AND EVEN SURFACE AND KEYED IN BEHIND RESTORATION STRUCTURES WHERE IT MEETS THEM AND IN AN ANCHOR TRENCH AT THE TOP OF BANK.
    - 12.3. AREAS WHERE PLANTINGS ARE MADE THROUGH THE MATTING ARE TO BE CAREFULLY CLOSED AROUND THE PLANT AND SECURED WITH SOD STAPLES ON EACH SIDE OF THE PLANT.
13. RIP RAP TOE:
    - 13.1. INSTALL RIP RAP TOE PROTECTION AT THE LOCATIONS SHOWN ON THE PLAN AND PER THE PLAN DETAIL.
    - 13.2. EXTEND PROTECTION TO THE FACE OF A LOG SILL, VANE, ROOT WAD, OR OTHER STRUCTURE WHERE IT IS SHOWN TO MEET THEM ON THE PLAN. HAND PLACE ROCKS MEETING ADJACENT TREATMENT TO FORM A MINIMAL GAP, USE LARGEST STONE SIZE AT JUNCTION AND CHINK WITH SMALLER STONES.
14. STREAM BED RESTORATION:
    - 14.1. IN AREAS OF RESTORATION TREATMENTS THE DISTURBED STREAMBED WILL BE RESTORED USING A NATURAL COBBLE BOULDER MATRIX AS NOTED IN THE DETAILS FOR VARIED BOULDER COBBLE ROCK SEQUENCE.
    - 14.2. COBBLE WILL BE SET IN THE STREAM BED AS NOTED WITH THE SIZE VARYING AS THE STONES APPROACH AND RECEDE FROM THE PROPOSED RESTORATION TREATMENT, I.E. SILL, VANE, POOL, ETC.
    - 14.3. EXCAVATE A MINIMUM OF 8" AND INSTALL STONE PER DETAIL.
15. IMBRICATE ROCK SEAT WALL
    - 15.1. UPON COMPLETION OF RESTORATION WORK, INSTALL STONE SEAT WALL PER DETAIL.



FORESITE ASSOCIATES

- CIVIL ENGINEERING
- LANDSCAPE ARCHITECTURE
- ECOLOGICAL RESTORATION

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INFO@FORESITEASSOCIATES.COM

INDEPENDENCE SCHOOL
STREAM RESTORATION PLAN
NEW CASTLE CONSERVATION DISTRICT
2430 OLD COUNTRY ROAD, NEWARK, DE 19702

#	COMMENT	BY DATE
6	REVISION TO DETAIL 5 SHEET 13 & SPOT ELEVATION UPDATES SHEET 9	DDS 05.30.23
5	PER COMMENTS-NPS&USACE	DDS 05.06.23
4	ISSUED FOR PERMITTING	DDS 04.04.23
3	PER NPS COMMENTS	DDS 02.14.23
2	ISSUED FOR PERMITTING	DDS 12.02.21
1	ISSUED FOR CLIENT REVIEW	DDS 11.23.20

FORESITE ASSOCIATES

ANDREW C. HAYES REGISTERED No 13280 DELAWARE PROFESSIONAL ENGINEER 2 JUNE 2023
SEAL

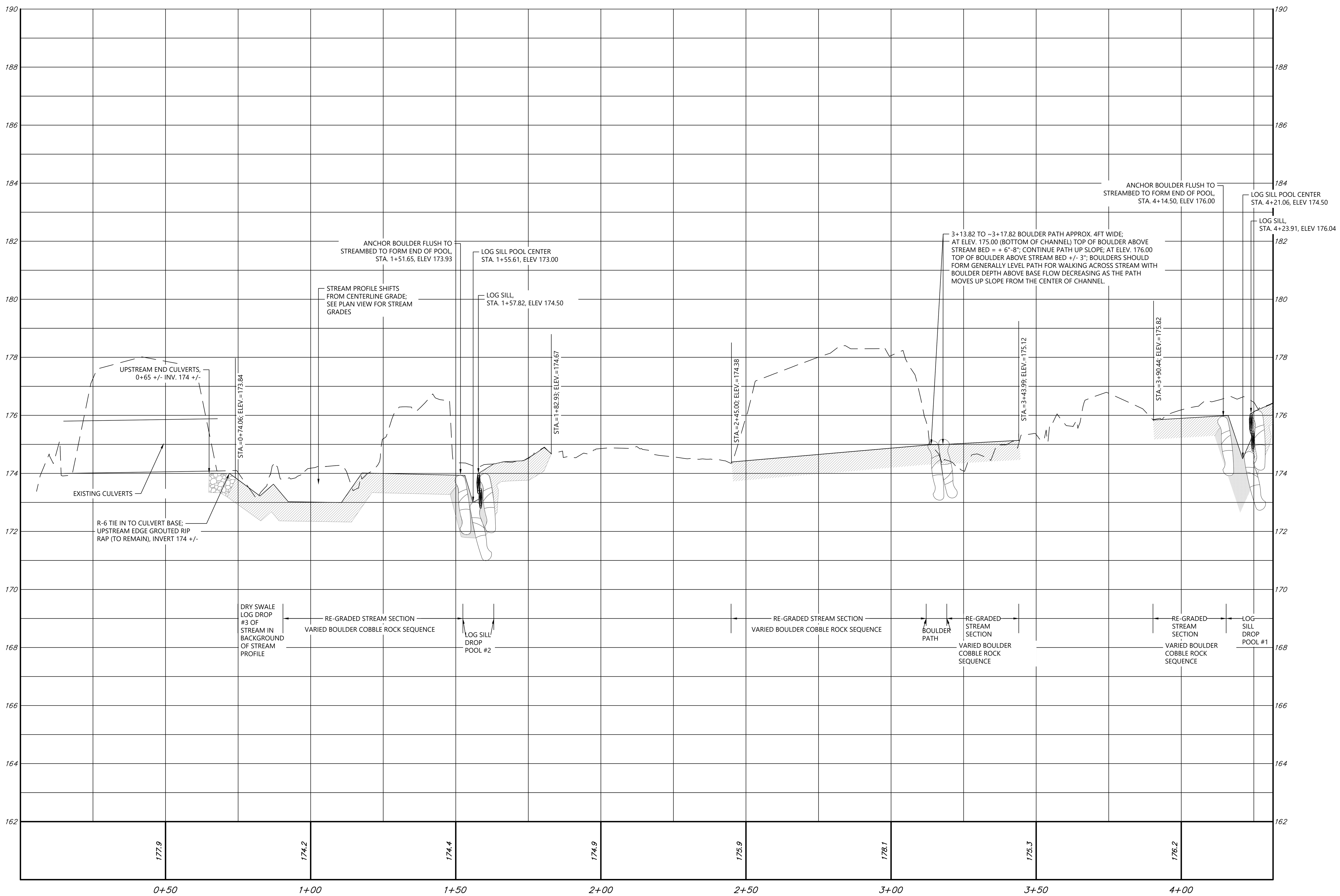
CONSTRUCTION PLAN

INDEPENDENCE SCHOOL
STREAM RESTORATON

MILL CREEK HUNDRED NEWARK
NEW CASTLE COUNTY DELAWARE

DATE: 06.26.20	PROJECT #: 071.01
SURVEYED BY: N/A	SHEET: 9
CREATED BY: DDS	
DRAWN BY: DDS	
CHECKED BY: ACH	9 OF 15

SCALE: 1"=20'
0 10 20 30 40



PROFILE VIEW: CL STREAM
HORZ. SCALE: 1"=20'
VERT. SCALE: 1"= 2'

RIP RAP FOR CULVERT TIE IN

POOL ENERGY DISSIPATION SYSTEM DOWNSTREAM OF SILL STRUCTURES; SEE DETAIL SHEETS

STREAM BED MATERIAL; SEE DETAIL SHEETS

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INDEPENDENCE SCHOOL STREAM RESTORATION PLAN

NEW CASTLE CONSERVATION DISTRICT
2430 OLD COUNTRY ROAD, NEWARK, DE 19702

#	COMMENT	BY DATE
6	REVISION TO DETAIL 5 SHEET 13 & SPOT ELEVATION UPDATES SHEET 9	DDS 05.30.23
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1	ISSUED FOR CLIENT REVIEW	DDS 11.23.20

FORESITE ASSOCIATES

SEAL

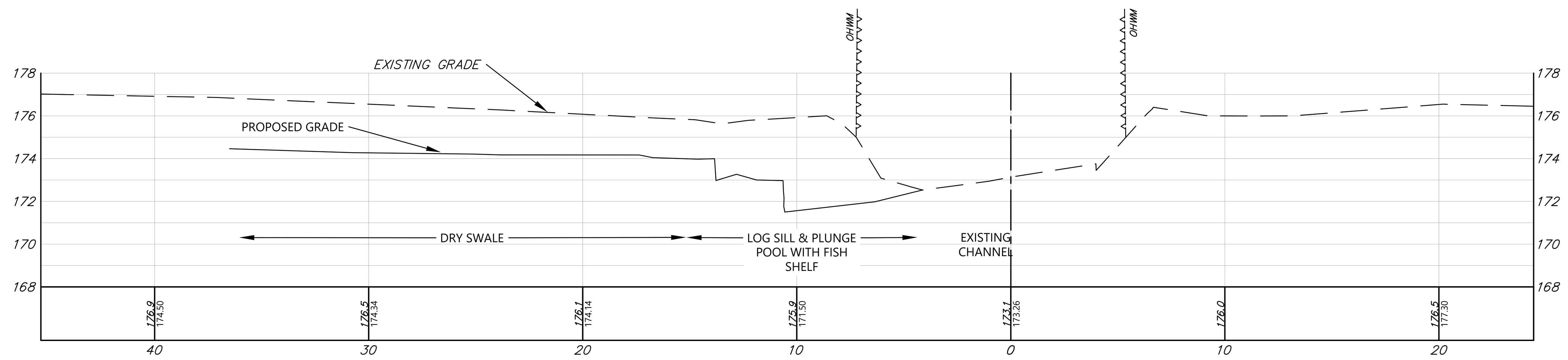
STREAM PROFILE

INDEPENDENCE SCHOOL
STREAM RESTORATON

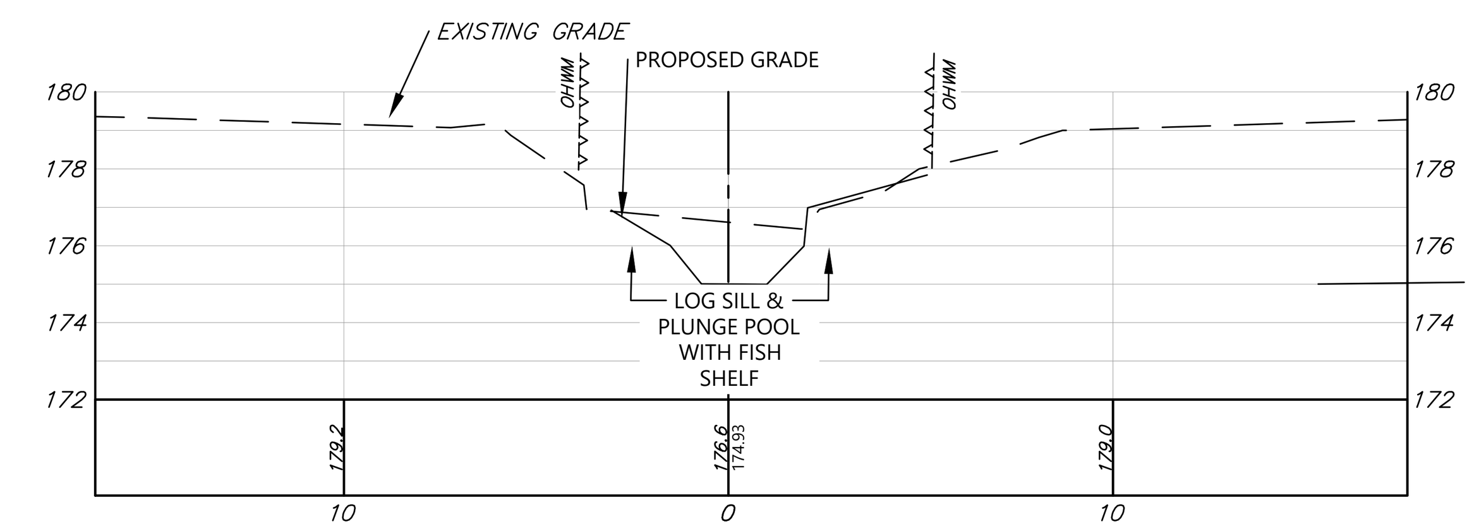
MILL CREEK HUNDRED NEW CASTLE COUNTY — NEWARK DELAWARE

DATE: 06.26.20	PROJECT #: 071.01
SURVEYED BY: N/A	SHEET: 10
CREATED BY: DDS	
DRAWN BY: DDS	
CHECKED BY: ACH	10 OF 15

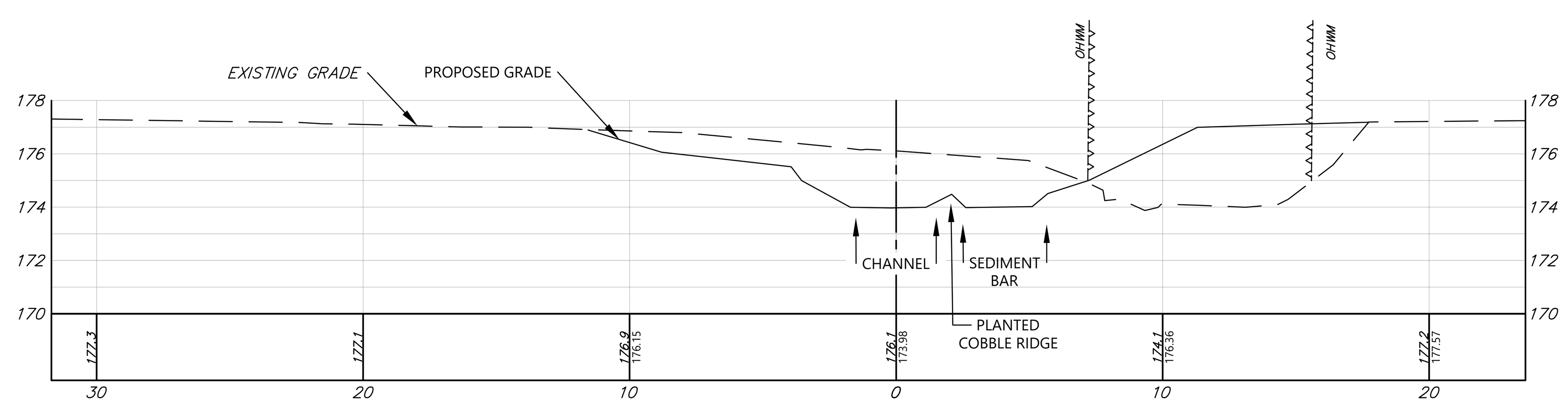
SCALE: AS NOTED



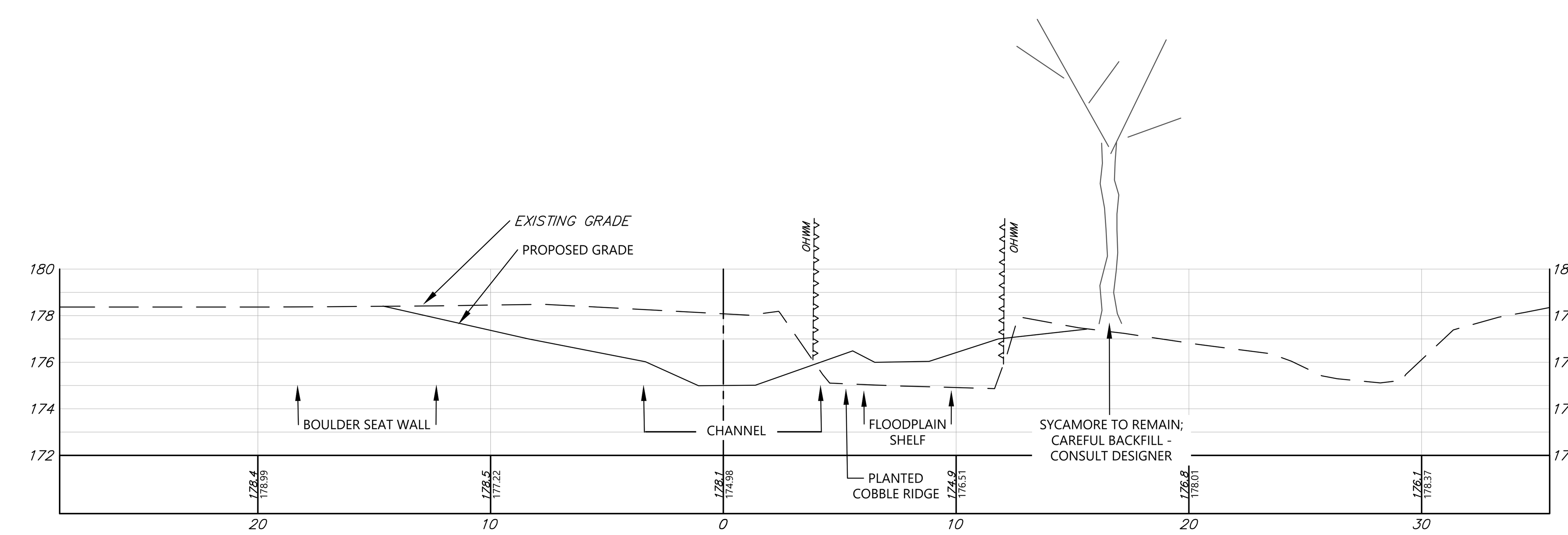
SECTION VIEW 1: CL STREAM
STA. 0+82
HORZ. SCALE: 1"= 20'
VERT. SCALE: 1"= 20'



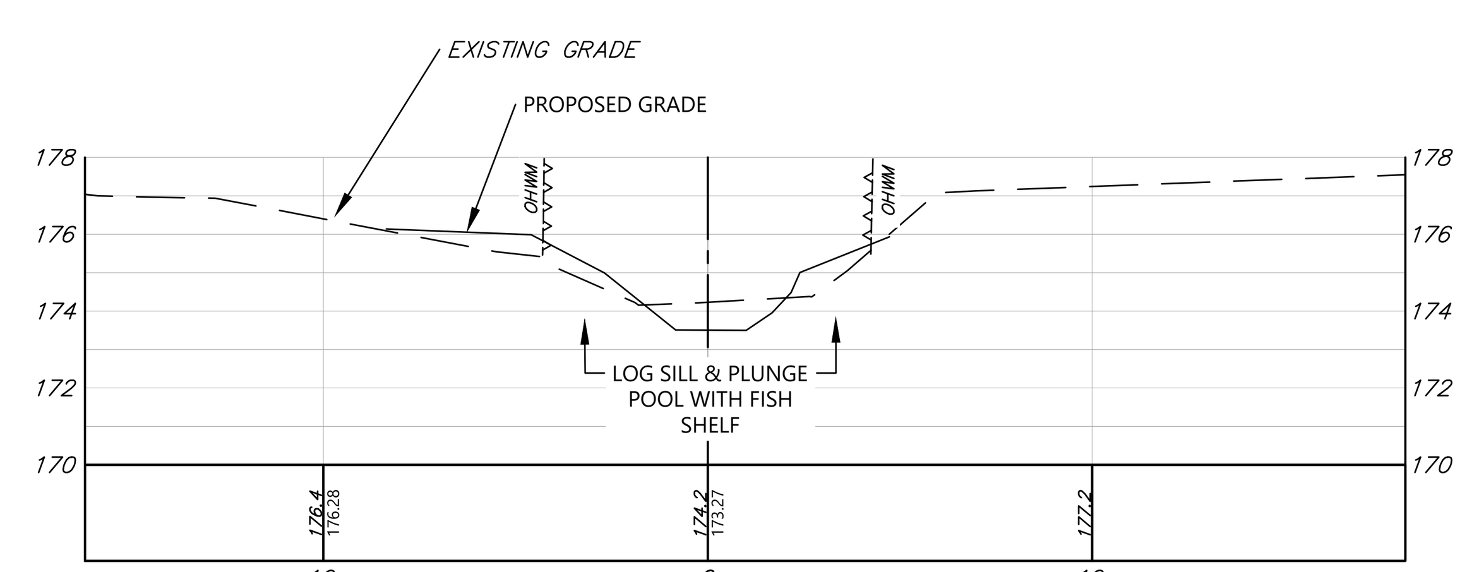
SECTION VIEW 5: CL STREAM
STA. 4+22
HORZ. SCALE: 1"= 20'
VERT. SCALE: 1"= 20'



SECTION VIEW 2: CL STREAM
STA. 1+29
HORZ. SCALE: 1"= 20'
VERT. SCALE: 1"= 20'



SECTION VIEW 4: CL STREAM
STA. 3+00
HORZ. SCALE: 1"= 20'
VERT. SCALE: 1"= 20'



SECTION VIEW 3: CL STREAM
STA. 1+57
HORZ. SCALE: 1"= 20'
VERT. SCALE: 1"= 20'

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INDEPENDENCE SCHOOL
STREAM RESTORATION PLAN
NEW CASTLE CONSERVATION DISTRICT
2430 OLD COUNTRY ROAD, NEWARK, DE 19702

#	COMMENT	BY DATE
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1	ISSUED FOR CLIENT REVIEW	DDS 11.23.20

FORESITE ASSOCIATES

SEAL

STREAM CROSSING SECTIONS

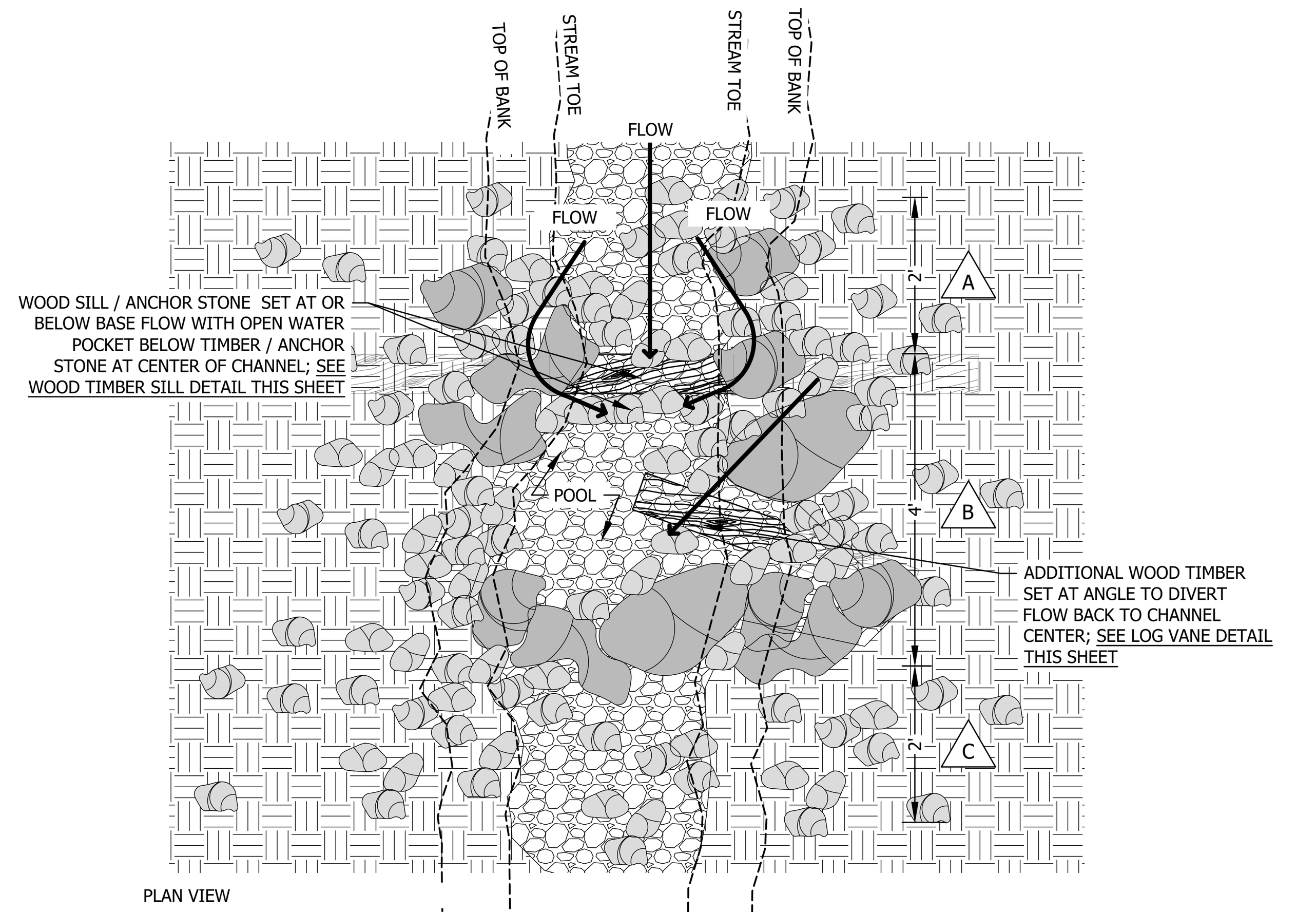
INDEPENDENCE SCHOOL
STREAM RESTORATON

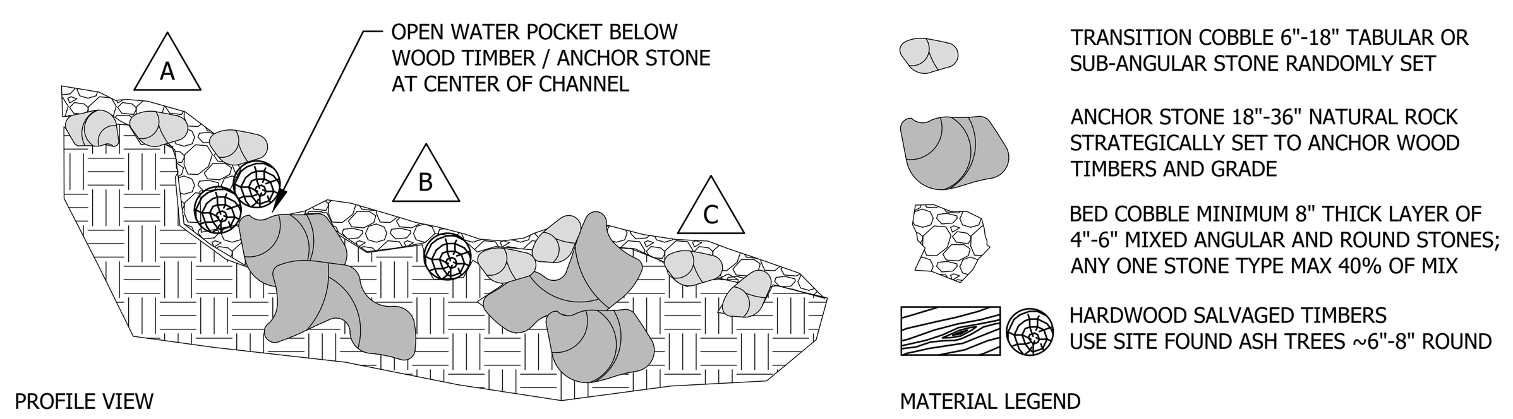
MILL CREEK HUNDRED
NEW CASTLE COUNTY
NEWARK
DELAWARE

DATE: 06.26.20
PROJECT #: 071.01
SURVEYED BY: N/A
CREATED BY: DDS
DRAWN BY: DDS
CHECKED BY: ACH

SHEET:
11
11 OF 15

SCALE:
AS NOTED



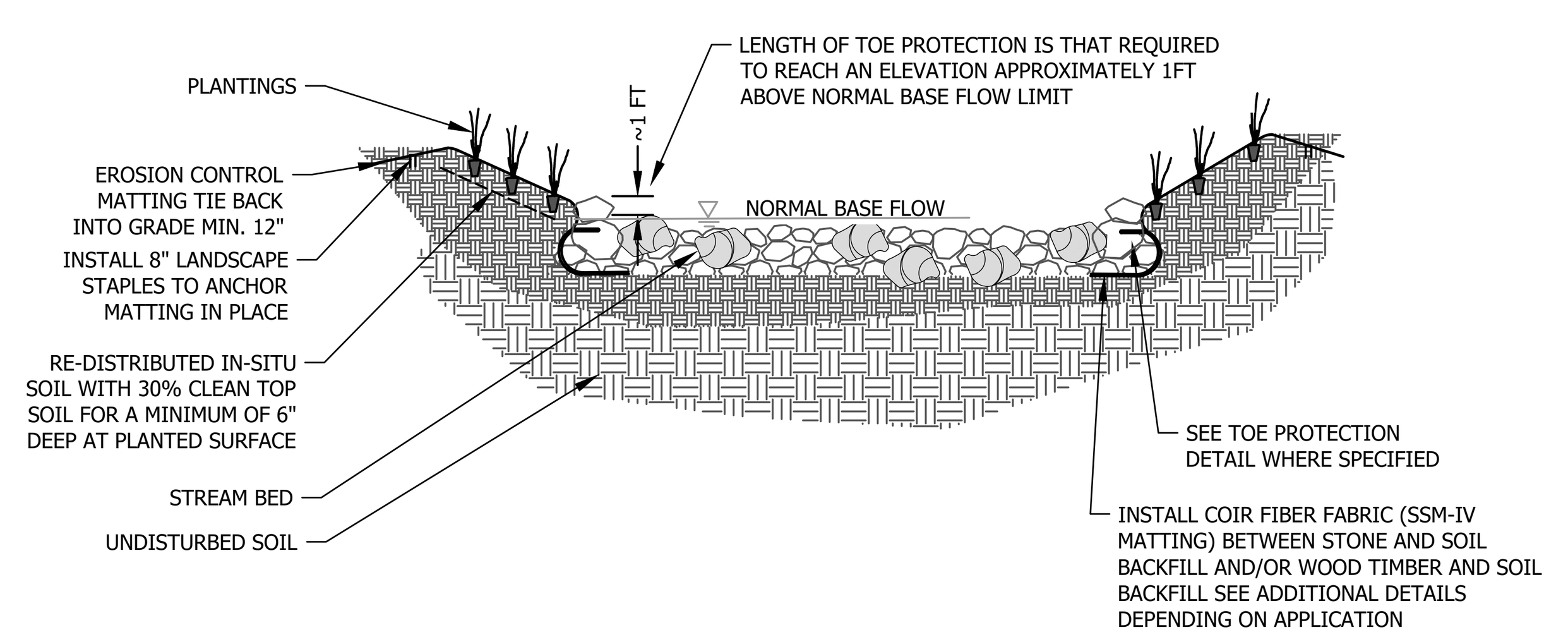


(A) TRANSITION COBBLE INTRODUCED INTO BED COBBLE. PLACE TRANSITION COBBLE RANDOMLY AND DECREASE DISTANCE BETWEEN STONES AS TRANSITION GETS CLOSER TO WOOD TIMBER SILL OR BOULDER PATH ACROSS STREAM.

(B) INSTALL TIMBER SILL PERPENDICULAR TO FLOW AND SET INTO GRADE AND SECURE WITH ANCHOR STONE; SEE WOOD SILL DETAIL. IF NO TIMBER SILL IS ILLUSTRATED SUBSTITUTE ANCHOR STONE FOR TIMER SILL IN THE BELOW NOTES.

- B.1. WOOD SHALL BE FULLY SUBMERGED BELOW BASE FLOW ELEVATION; SEE PLAN VIEW FOR ELEVATIONS.
- B.2. AT CENTER OF CHANNEL CREATE DEPRESSION BELOW WOOD SILL SUCH THAT CENTER OF WOOD IS SUSPENDED IN WATER AND FULLY ANCHORED TO GRADE AT BOTH ENDS.
- B.3. PROPER INSTALLATION ACHIEVES AN OPEN WATER FISH SHELF BELOW TIMBER.
- B.4. GRADUALLY INCREASE STREAM BED GRADE FROM B.3 UP TO CREATE POOL DEPRESSION WITHIN SEQUENCE, SEE PLAN VIEW FOR ELEVATIONS.
- B.5. INSTALL ANCHOR STONE SECURELY AT DOWNSTREAM END OF POOL DEPRESSION; ANCHOR STONE TO BE SECURELY SET INTO GRADE WITH APPROXIMATELY 2/3 OF THE STONE HEIGHT BELOW THE STREAM BED.
- B.6. CHINK TRANSITION COBBLE AND BED COBBLE IN GAPS BETWEEN ANCHOR STONE SO THAT A CHANNEL SPANNING WIDTH OF MIXED BOULDER COBBLE IS AT DOWNSTREAM END OF POOL.
- B.7. INTEGRATE WOOD TIMBERS RANDOMLY WITHIN ROCK SEQUENCE AS ILLUSTRATED IN PLAN VIEW. ADDITIONAL WOOD TIMBERS INTEGRATED SHALL NOT PROTRUDE MORE THAN 1/3 INTO THE CHANNEL, ONLY THE SILL LOG SHALL SPAN THE ENTIRE CHANNEL WIDTH. ALL ADDITIONAL WOOD TIMBERS SHALL FOLLOW LOG VANE DETAIL.

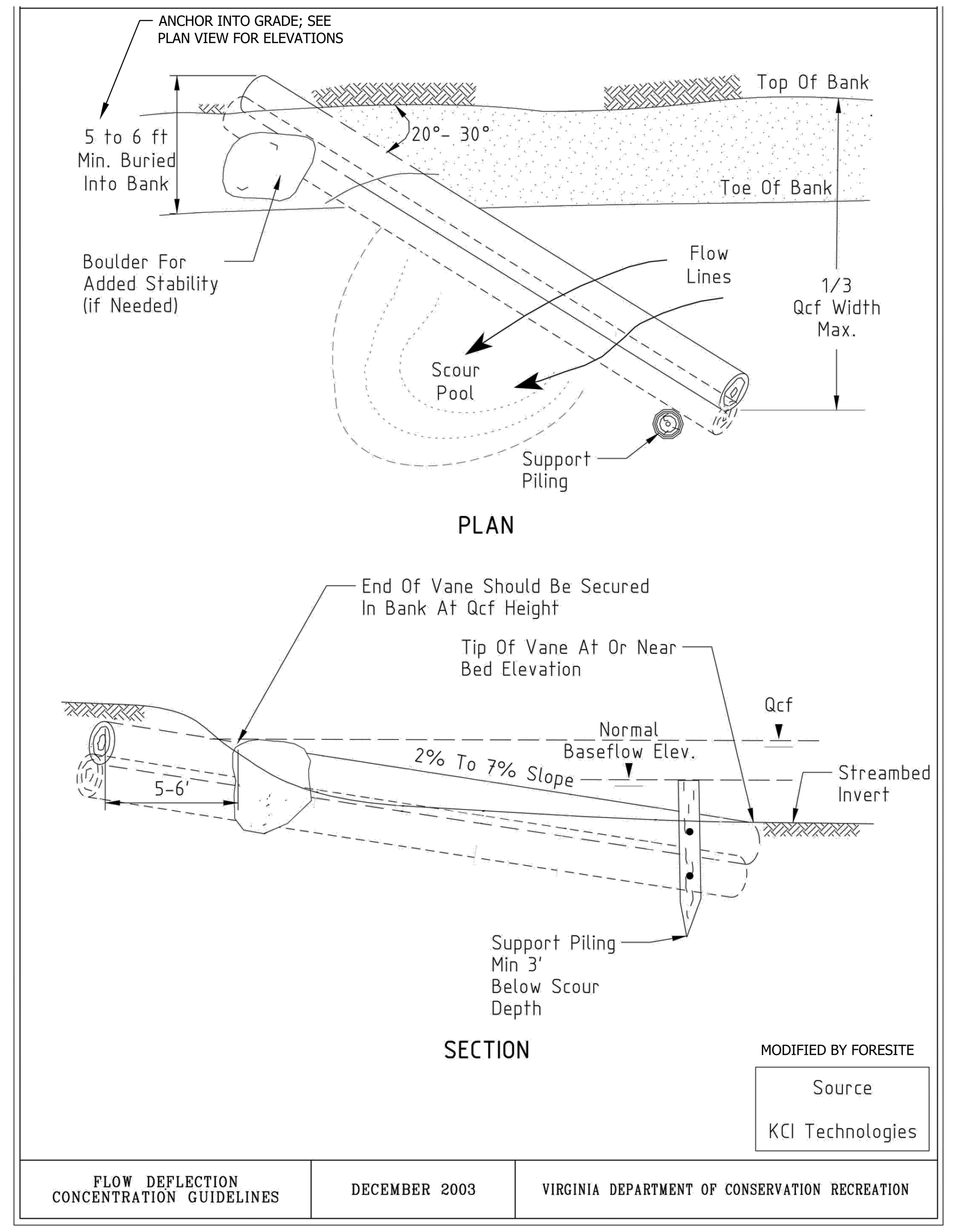
(C) TRANSITION COBBLE INTRODUCED INTO BED COBBLE. PLACE TRANSITION COBBLE RANDOMLY AND INCREASE DISTANCE BETWEEN STONES AS TRANSITION MOVES AWAY FROM POOL ANCHOR STONE.



VARIED BOULDER COBBLE ROCK SEQUENCE NOTES

1. ROCK SEQUENCE STRUCTURES ARE DESIGNED FOR GRADE CONTROL WITH AN AVERAGE SLOPE OF 4:1 WITHIN CHANNEL. WOOD TIMBERS FOR SILL DROP STRUCTURES ARE INTEGRATED WITHIN SOME ROCK SEQUENCES, SEE PLAN AND WOOD SILL NOTES FOR REFERENCE AS APPLICABLE.
2. EXCAVATION AND COBBLE AND/OR TIMBER SETTING TO MEET DESIGN ELEVATIONS ARE THE RESPONSIBILITY OF THE CONTRACTOR. IT IS STRONGLY RECOMMENDED THE CONTRACTOR MEASURE AND SURVEY THE SEQUENCE AND TIMBER SILL AS APPLICABLE AT EVERY STAGE OF CONSTRUCTION TO ENSURE FINAL GRADES ARE MET. IF FINAL GRADES ARE NOT TO WITHIN 0.2' OF THE DESIGN ELEVATION, IT WILL BE AT THE CONTRACTORS COST TO RE-SET AND RE-STABILIZE AT THE DIRECTION OF THE DESIGN TEAM.
3. EXCAVATE A MINIMUM OF 14" BELOW DESIGN ELEVATIONS TO SET MATERIALS.
4. FOR SIDE SLOPES GREATER THAN 2:1 ANCHOR WITH MIXED 12-24" ANGULAR AND ROUND STONE AND TAMP COMPACT TO CHINK STONES IN PLACE.
5. SEE LEGEND DESCRIPTIONS FOR STONE SIZING AND SHAPE; NO RED, WHITE, LIMESTONE, SHALESTONE, OR SANDSTONE TO BE USED. MATERIALS LIST TO BE APPROVED IN WRITING BY OWNER / OWNER REPRESENTATIVE.
6. ONCE STONE IS INSTALLED TO DESIGN ELEVATIONS BEGIN CHANNEL SETTING. TO SET THE STONE IN PLACE (WORKING IN 3 INCH LIFTS IF APPLICABLE) WASH IN EXISTING CHANNEL MATERIALS WITH SAND AT A 1:1 RATIO. CONTINUE WASHING IN SUBSTRATE TO FILL POUR SPACE UNTIL THERE IS NO MATERIAL SETTLING. WHEN THE CONSTRUCTION IS OPENED UP TO NATURAL STREAM FLOW, THE FLOW SHOULD BE ON THE SURFACE OF THE NEW STREAM BED MATERIAL. IF SUBSTANTIAL SUBSURFACE FLOW OCCURS AND/OR STONE MIGRATES IMMEDIATELY AFTER CONSTRUCTION, CONSULT DESIGN ENGINEER.
7. INSTALL EROSION CONTROL MATTING ANCHORED BACK INTO GRADE AT BOTH THE TOP AND BOTTOM OF BANK SLOPE PER E&S DETAILS. IN LOCATIONS OF ROCK TOE INSTALLATIONS OVERLAP, INTERLOCK AND STAPLE COIR MATTING AND LANDSCAPE FABRIC.
8. INSTALL PLANTS PER LANDSCAPE PLAN

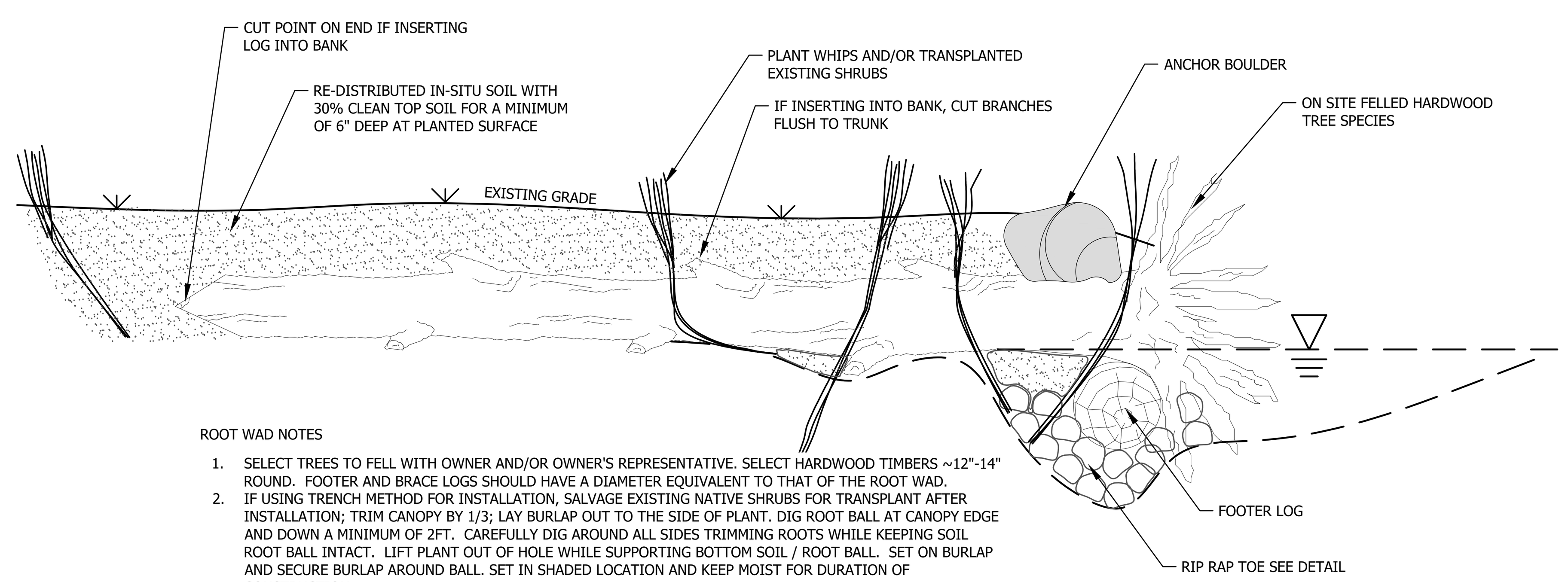
1/12 VARIED BOULDER COBBLE ROCK SEQUENCE
TYPICAL PLAN & SECTION N.T.S.



LOG VANE NOTES

1. SELECT TREES TO FELL WITH OWNER AND/OR OWNER'S REPRESENTATIVE. SELECT HARDWOOD TIMBERS ~8"-14" ROUND
2. ANGLE VANES 20 TO 30 DEGREES FROM THE UPSTREAM BANK. THE BANK-END OF THE VANE SHOULD BE AT THE BANKFULL ELEVATION AND THE TIP OF THE VANE SHOULD BE PARTIALLY EMBEDDED IN THE STREAMBED SUCH THAT IT IS SUBMERGED EVEN DURING LOW FLOWS. THE VANE SHOULD BE PLACED AT A VERTICAL ANGLE OF 3% TO 7%.
3. EXTEND VANES A MAXIMUM OF 1/3 OF THE CHANNEL WIDTH.
4. WHEN INSTALLING VANES, THE BANK END OF THE STRUCTURE SHOULD BE FIRMLY ANCHORED A MINIMUM OF 5 TO 6 FEET INTO THE SLOPE.
5. POSITION ANCHOR BOULDERS ON THE DOWNSTREAM FACE OF THE VANES TO PROVIDE FURTHER STABILITY.
6. NO WIRES, REBAR, OR OTHER NON ORGANIC MATERIAL TO BE USED TO SECURE LOGS. UTILIZE COIR FABRIC, TAMPED COBBLE AND SAND MIXTURE, AND ANCHOR BOULDERS TO SECURE VANES IN PLACE.

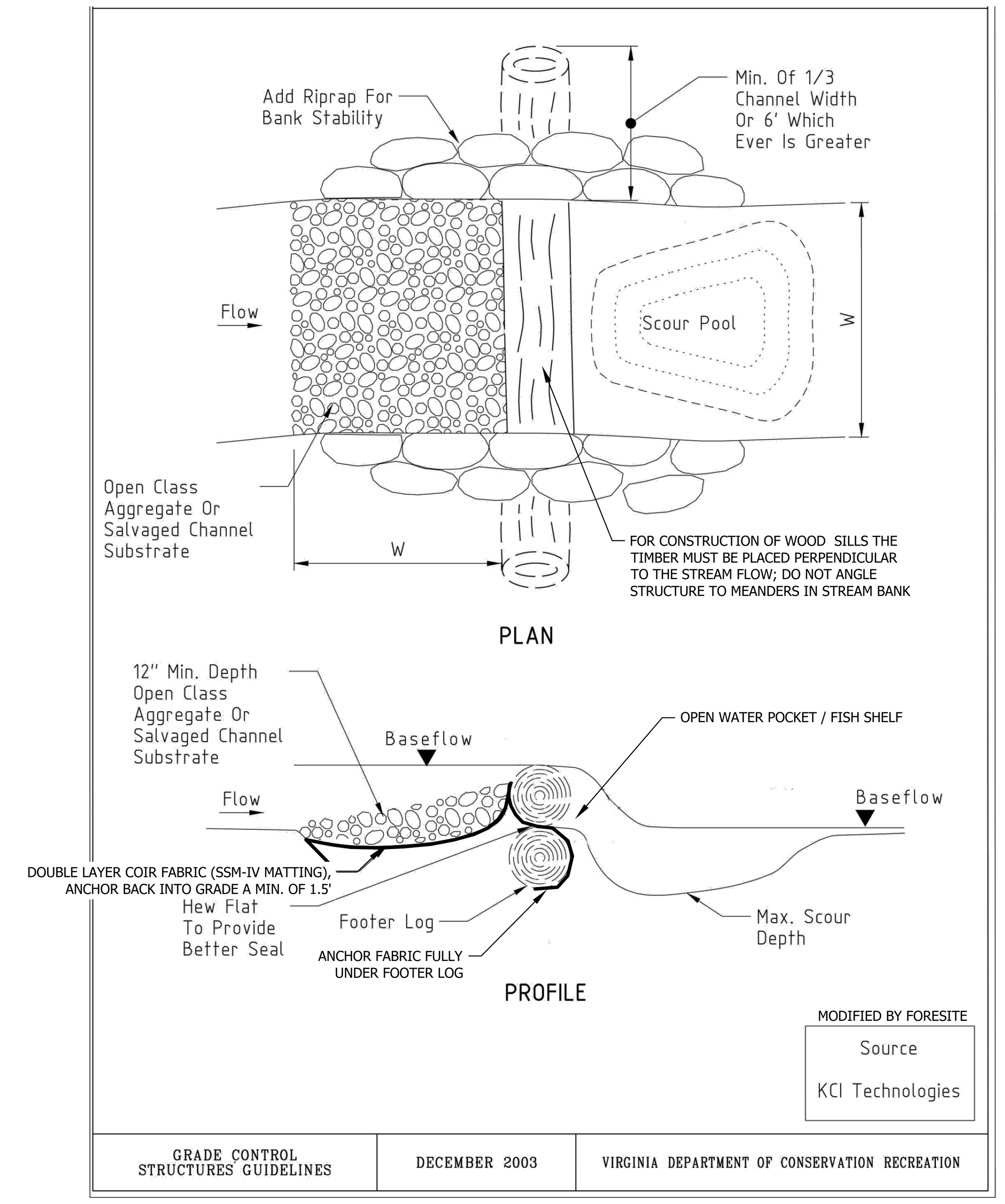
2/12 LOG VANE



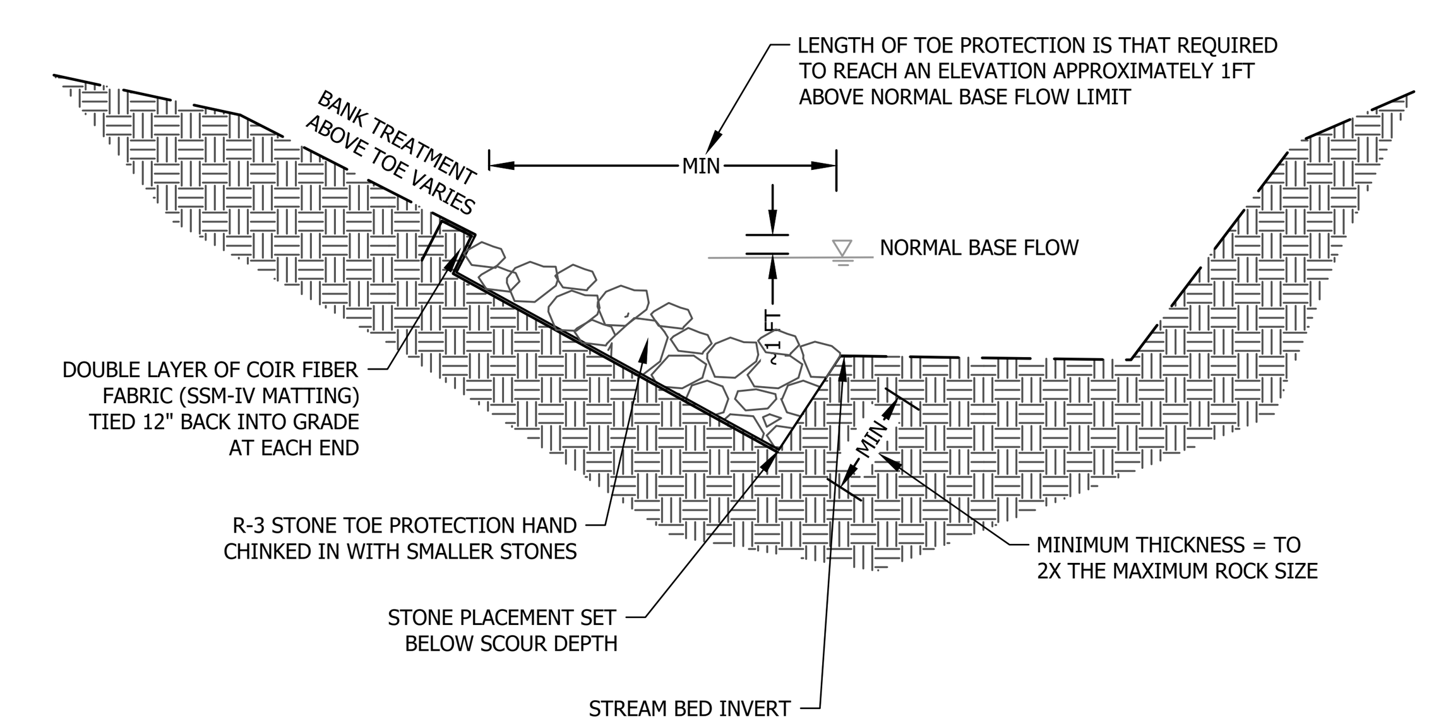
ROOT WAD NOTES

1. SELECT TREES TO FELL WITH OWNER AND/OR OWNER'S REPRESENTATIVE. SELECT HARDWOOD TIMBERS ~12"-14" ROUND. FOOTER AND BRACE LOGS SHOULD HAVE A DIAMETER EQUIVALENT TO THAT OF THE ROOT WAD.
2. IF USING TRENCH METHOD FOR INSTALLATION, SALVAGE EXISTING NATIVE SHRUBS FOR TRANSPLANT AFTER INSTALLATION; TRIM CANOPY BY 1/3; LAY BURLAP OUT TO THE SIDE OF PLANT. DIG ROOT BALL AT CANOPY EDGE AND DOWN A MINIMUM OF 2FT. CAREFULLY DIG AROUND ALL SIDES TRIMMING ROOTS WHILE KEEPING SOIL ROOT BALL INTACT. LIFT PLANT OUT OF HOLE WHILE SUPPORTING BOTTOM SOIL / ROOT BALL. SET ON BURLAP AND SECURE BURLAP AROUND BALL. SET IN SHADED LOCATION AND KEEP MOIST FOR DURATION OF CONSTRUCTION.
3. INSTALL RIP RAP TOE PER DETAIL.
4. INSTALL FOOTER LOG RUN PARALLEL TO BANK, INCORPORATE / PACK ROCK TOE TO SECURE FOOTER LOG. FOOTER LOG SHOULD BE TRIMMED OF ALL SIDE BRANCHES PRIOR TO SETTING.
5. FOOTER LOGS SHOULD BE POSITIONED IN THE TRENCH BELOW THE STREAM INVERT SUCH THAT EACH UPSTREAM LOG IS SHINGLED OVER ITS DOWNSTREAM NEIGHBOR.
6. POSITION ROOT WADS IN TRENCHES SUCH THAT THE ROOT MASS OF THE TRUNK SITS LEVEL WITH THE CUT END OF THE STUMP. THE ROOT MASS SHOULD BE ORIENTED PERPENDICULARLY TO THE DIRECTION OF FLOW. AN ANGLE OF 30 TO 60 DEGREES TO THE CHANNEL CENTER LINE IS USUALLY ADEQUATE. SUBSEQUENT ROOT WADS SHOULD BE SPACED SUCH THAT THE BANK IS SHIELDED FROM FLOWS DEFLECTED BY ADJACENT UPSTREAM ROOT WADS. NOTE AS AN ALTERNATIVE TO TRENCHING, WADS CAN BE INSERTED INTO BANK WITH APPROPRIATE MACHINERY; CONSULT DESIGN TEAM FOR ANGLE PRIOR TO INSERTING, IF THIS IS THE PREFERRED CONTRACTOR METHOD.
7. EXCAVATE GRADE AS NEEDED TO SET TREES WITH TRUNK RESTING ON FOOTER LOG AND ROOT WAD EXTENDING TO STREAM BED.
8. PACK ROCK TOE IN GAPS BETWEEN WAD AND FOOTER LOG FOR SECURE SET UNDER BASE FLOW.
9. BACKFILL BANK; ONLY ROOT WAD SHOULD BE VISIBLE, TREE TRUNK SHOULD NOT BE VISIBLE.
10. RE-INSTALL TRANSPLANTED SHRUBS AND INCORPORATE LIVE STAKES / TREE WHIPS PER PLANTING PLAN.

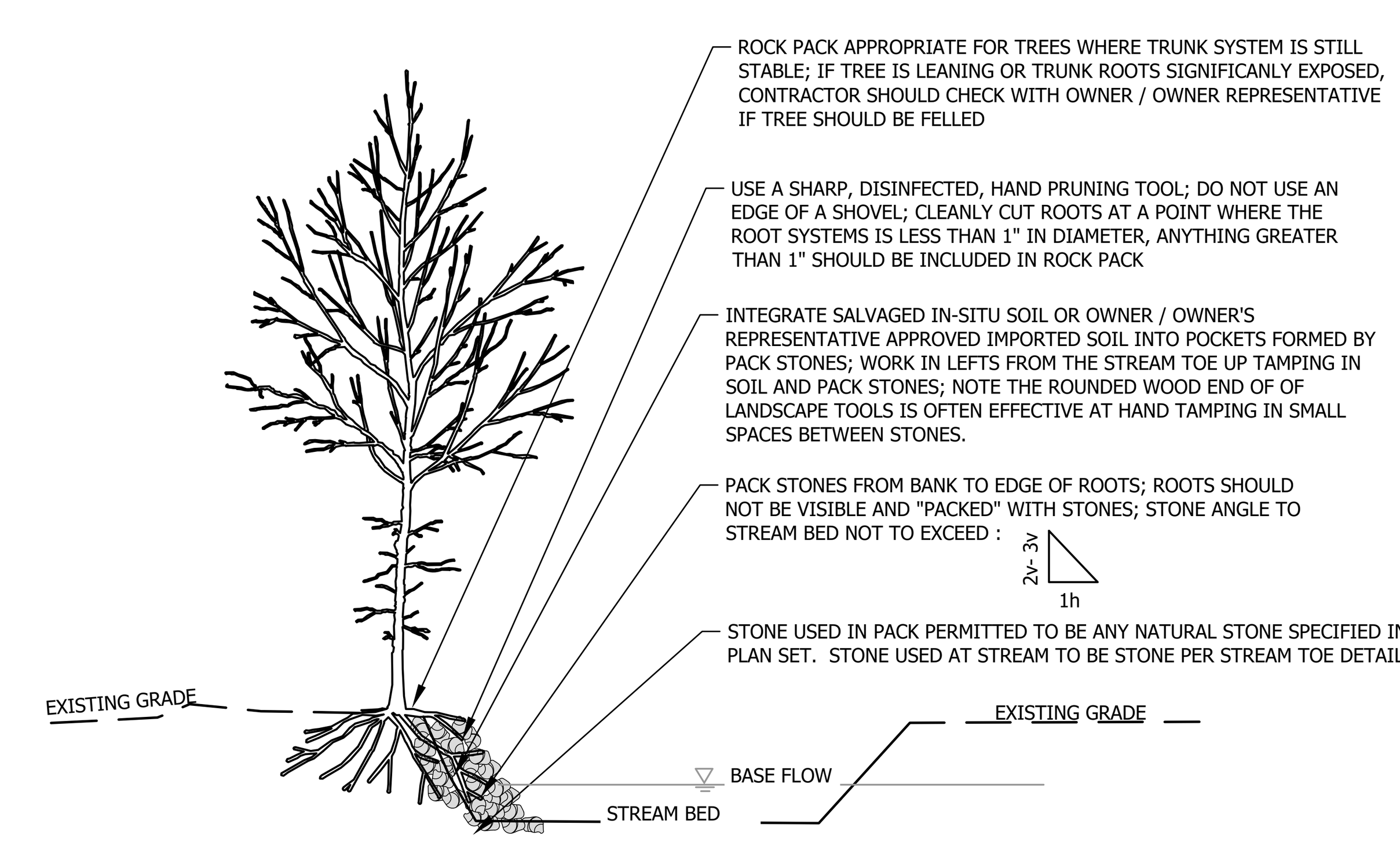
3/12 ROOT WAD
TYPICAL SECTION N.T.S.



4/12 WOOD TIMBER SILL
TYPICAL SECTION AND PLAN N.T.S.



5/12 RIP RAP TOE
TYPICAL SECTION N.T.S.



6/12 ROCK PACK
TYPICAL SECTION N.T.S.

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- ECOLOGICAL RESTORATION

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INDEPENDENCE SCHOOL STREAM RESTORATION PLAN

NEW CASTLE CONSERVATION DISTRICT

2430 OLD COUNTRY ROAD, NEWARK, DE 19702

#	COMMENT	BY DATE
6	REVISION TO DETAIL 5 SHEET 13 &	DDS 05.30.23
	SPOT ELEVATION UPDATES SHEET 9	
5	PER COMMENTS-NPS&USACE	DDS 05.06.23
4	ISSUED FOR PERMITTING	DDS 04.04.23
3	PER NPS COMMENTS	DDS 02.14.23
2	ISSUED FOR PERMITTING	DDS 12.02.21
1	ISSUED FOR CLIENT REVIEW	DDS 11.23.20

FORESITE ASSOCIATES

SEAL: ANDREW C. HAYES, REGISTERED No. 13280, PROFESSIONAL ENGINEER, DELAWARE — 2 JUNE 2023

CONSTRUCTION DETAILS

INDEPENDENCE SCHOOL
STREAM RESTORATON

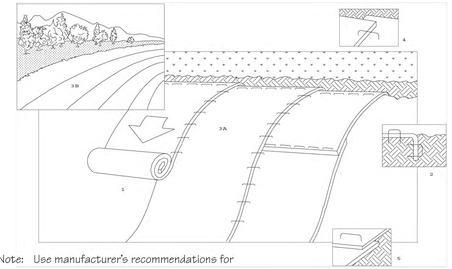
MILL CREEK HUNDRED
NEW CASTLE COUNTY
NEWARK
DELAWARE

DATE: 06.26.20	PROJECT #: 071.01
SURVEYED BY: N/A	SHEET: 12
CREATED BY: DDS	
DRAWN BY: AZ	
CHECKED BY: ACH	12 OF 15

Standard Detail & Specifications

Stabilization Matting - Slope

TO BE USED IN ANY RE-GRADED AREAS NOT SUBJECT TO CONCENTRATED FLOW, I.E. CHANNEL OR SWALE



Note: Use manufacturer's recommendations for stapling patterns for slope installations.

Perspective

Construction Notes:

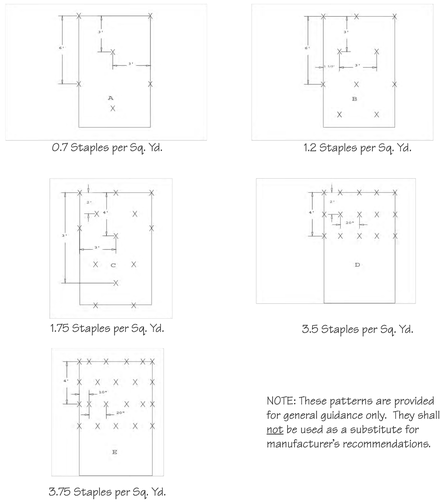
1. Prepare soil before installing matting, including application of lime, fertilizer, and seed.
2. Begin at the top of the slope by anchoring the mat in a 6" deep X 6" wide trench. Backfill and compact trench after stapling.
3. Roll the mats (A) down or (B) horizontally across the slope.
4. The edges of parrallel mats must be stapled with approx. 2" overlap.
5. When mats must be spliced down the slope, place mats end over end (shingle style) with approx. 4" overlap. Staple through overlapped area, approx. 12" apart.

Source:	Symbol:	Detail No.
Adapted from North American Green, Inc.	SM-S	**DE-ESC-3.4.6.1** Sheet 1 of 2 Effective FEB 2019

1/13 TO BE USED IN ANY RE-GRADED AREAS NOT SUBJECT TO CONCENTRATED FLOW, I.E. CHANNEL OR SWALE
STABILIZATION MATTING - SLOPE
STAPLE PATTERNS — NOT TO SCALE

Standard Detail & Specifications

Stabilization Matting - Slope

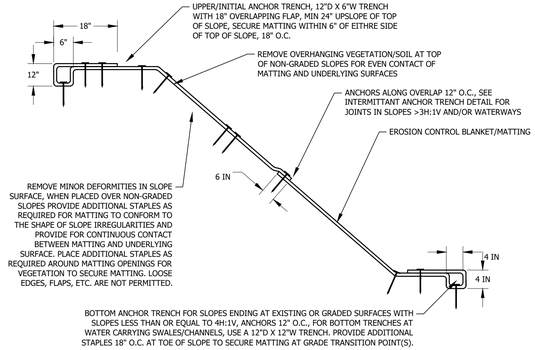


NOTE: These patterns are provided for general guidance only. They shall not be used as a substitute for manufacturer's recommendations.

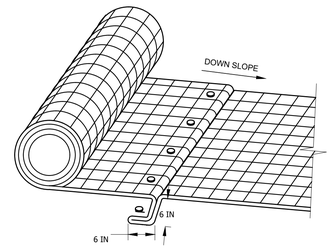
Stapling Patterns

Source:	Symbol:	Detail No.
Adapted from North American Green, Inc.	SM-S	**DE-ESC-3.4.6.1** Sheet 2 of 2 Effective FEB 2019

Effective February 2019

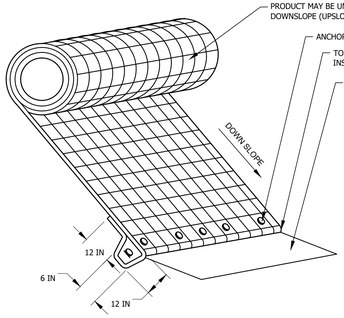


2/13 MATTING
TYPICAL SECTION — N.T.S.



ANCHOR TRENCH NOTES:
1. PROVIDE AT 10' O.C. ACROSS CHANNELS >20% LONGITUDINAL SLOPE, 20' ACROSS CHANNELS <20%.
2. PROVIDE AT 12' O.C. ON GRADED SLOPES EQUAL TO OR GREATER THAN 3H:1V.
3. PROVIDE AT 8' O.C. OR MID-SLOPE ON SIDE SLOPES OF GRADED CHANNELS/DITCHES WITH SLOPE LENGTHS 8'.
4. SECURE AT 1 FT INTERVALS ALONG BOTTOM AND TOP OF CHECK SLOT.
5. BACKFILL ENTIRE TRENCH TO SURFACE AND COMPACT SOIL ABOVE ANCHORS PRIOR TO COVERING TRENCH WITH MATTING.

4/13 INTERMITTENT CHECK SLOT (MATTING)
TYPICAL SECTION — N.T.S.



NOTES:
1. EROSION CONTROL BLANKET/MAT SHALL BE PER THE NOTES AND CALL OUTS ON THE PLAN SHEETS.
   - FOR BANK STABILIZATION AREA USE ROLANKA BIOD-MAT 60 OR APPROVED EQUAL
   - FOR HYBRID STONE DAM USE ROLANKA BIOD-OCF 30 OR APPROVED EQUAL
2. UTILIZE CORRECT ANCHOR PATTERN FOR SLOPE GRADIENT
3. SEED PREPARED SLOPE ACCORDING TO PLANTING PLAN AND/OR NOTES.
4. AVOID ANY TRAFFIC OVER MATERIAL.
5. USE SHOVELS, RAKES, OR BROOMS FOR FINE GRADING AND FINISHING.
6. APPLY SECOND SEEDING AND MULCH (WHEN SPECIFIED) OVER MATTING.
7. MULTIPLE STAPLE TYPES SHOWN, SEE ANCHOR PATTERN DETAIL AND ANCHOR NOTES.
8. DETAIL ADAPTED FROM SYNTHETIC INDUSTRIES, INC.

ANCHOR TRENCH NOTES:
1. SECURE AT 1 FT INTERVALS
2. BACKFILL ENTIRE TRENCH TO SURFACE AND COMPACT SOIL ABOVE ANCHORS PRIOR TO COVERING TRENCH WITH MATTING.

3/13 BOTTOM/TERMINAL ANCHOR TRENCH (MATTING)
TYPICAL SECTION — N.T.S.

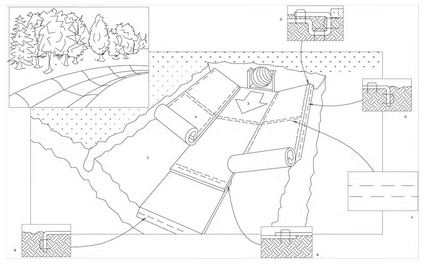
INFORMAL BOULDER PATH
1. SEE CONSTRUCTION NOTE 5 SHEET 9.
2. THIS PATH IS TO BE A NATURALISTIC INFORMAL STEPPING STONE PATH AND NOT A SOLID STRUCTURE.
3. IMAGE ABOVE IS OF A NATURAL CREEK SYSTEM TO ILLUSTRATE DESIGN INTENT DESCRIBED IN NOTE 5 SHEET 9.
4. PER CIRCLE ON IMAGE, BOULDERS ARE TO BE RANDOMLY SET IN A LOOSE PATH FORMATION; NOTE ROCKS IN IMAGE FORM A NEAR CONTINUOUS CONNECTION BETWEEN THE STREAM BANKS.
5. IN THIS IMAGE SOME STONES ARE UNDER WATER.
6. BOULDERS ARE TO BE PARTIALLY BURIED AND PARTIALLY VISIBLE ABOVE LOW FLOW CONDITIONS. IF WORKING DURING HIGHER FLOW CONDITIONS CONTACT OWNER / OWNER'S REPRESENTATIVE FOR STONE SURFACE TO BE VISIBLE ABOVE WATER SURFACE.
7. PER ARROW ON IMAGE BOULDERS ARE TO CONTINUE UP BANK AND STOP APPROXIMATELY IN AREA ILLUSTRATED ON PLAN.

5/13 BOULDER PATH
NOT TO SCALE

Standard Detail & Specifications

Stabilization Matting - Channel

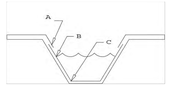
TO BE USED IN ROADSIDE SWALE AND STREAM CHANNEL



Perspective

CRITICAL POINTS

A. Overlaps and seams
B. Projected waterline
C. Channel bottom/side slope vertices



Note: Horizontal staple spacing should be altered if necessary to allow staples to secure the critical points along the channel surface.

Use manufacturer's recommendations for stapling patterns for channel installations.

Source:	Symbol:	Detail No.
Adapted from North American Green, Inc.	SM-C	**DE-ESC-3.4.6.2** Sheet 1 of 3 Effective FEB 2019

6/13 STABILIZATION MATTING - CHANNEL
TO BE USED IN ROADSIDE SWALE AND STREAM CHANNEL — NOT TO SCALE

Standard Detail & Specifications

Stabilization Matting - Channel

Construction Notes:

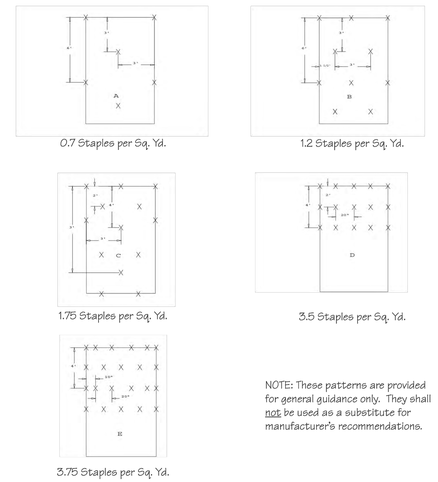
1. Prepare soil before installing matting, including application of lime, fertilizer, and seed.
2. Begin at the top of the channel by anchoring the mat in a 6" deep X 6" wide trench. Backfill and compact the trench after stapling.
3. Roll center mat in direction of water flow on bottom of channel.
4. Place mats end over end (shingle style) with a 6" overlap, use a double row of staggered staples 4" apart to secure mats.
5. Full Length edge of mats at top of side slopes must be anchored in 6" deep X 6" wide trench; backfill and compact the trench after stapling.
6. Mats on side slopes must be overlapped 4" over the center mat and stapled.
7. In high flow channel applications, a staple check slot is recommended at 30 to 40 foot intervals. Use a row of staples 4" apart over entire width of the channel. Place a second row 4" below the first row in a staggered pattern.
8. The terminal end of the mats must be anchored in a 6" X 6" wide trench. Backfill and compact the trench after stapling.

Source:	Symbol:	Detail No.
Adapted from North American Green, Inc.	SM-C	**DE-ESC-3.4.6.2** Sheet 2 of 3 Effective FEB 2019

6/13 STABILIZATION MATTING - CHANNEL
NOT TO SCALE

Standard Detail & Specifications

Stabilization Matting - Channel



NOTE: These patterns are provided for general guidance only. They shall not be used as a substitute for manufacturer's recommendations.

Stapling Patterns

Source:	Symbol:	Detail No.
Adapted from North American Green, Inc.	SM-C	**DE-ESC-3.4.6.2** Sheet 3 of 3 Effective FEB 2019

6/13 STABILIZATION MATTING - CHANNEL
NOT TO SCALE

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INDEPENDENCE SCHOOL STREAM RESTORATION PLAN

NEW CASTLE CONSERVATION DISTRICT
2430 OLD COUNTRY ROAD, NEWARK, DE 19702

#	COMMENT	BY DATE
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3	PER NPS COMMENTS	DDS 02.14.23
2	ISSUED FOR PERMITTING	DDS 12.02.21
1	ISSUED FOR CLIENT REVIEW	DDS 11.23.20

FORESITE ASSOCIATES

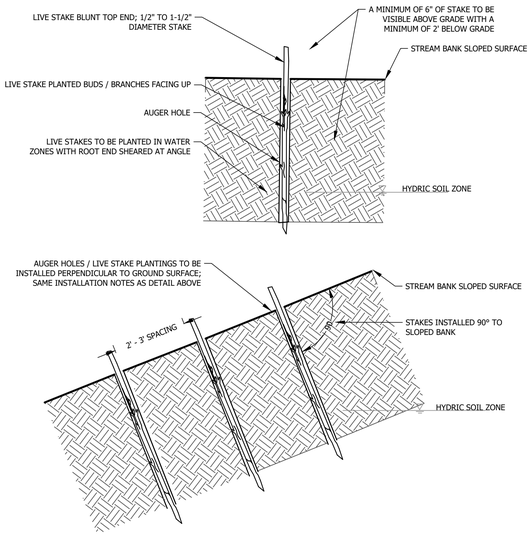
SEAL

CONSTRUCTION DETAILS

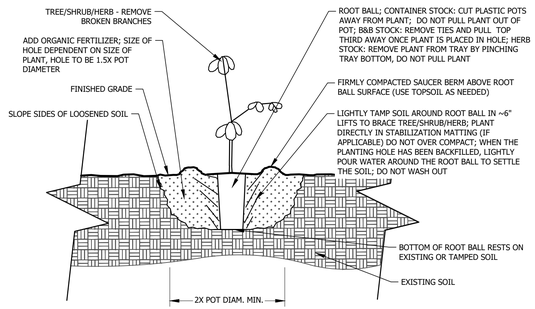
INDEPENDENCE SCHOOL
STREAM RESTORATON

MILL CREEK HUNDRED, NEW CASTLE COUNTY — NEWARK, DELAWARE

DATE: 06.26.20	PROJECT #: 071.01
SURVEYED BY: N/A	SHEET: 13
CREATED BY: DDS	
DRAWN BY: AZ	
CHECKED BY: ACH	13 OF 15



1/14 LIVE STAKE PLANTING
TYPICAL SECTION N.T.S.

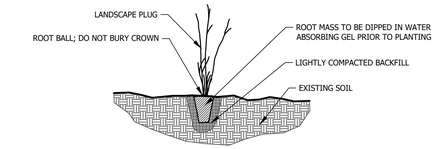


3/14 TREE / SHRUB / HERB PLANTING
TYPICAL SECTION N.T.S.

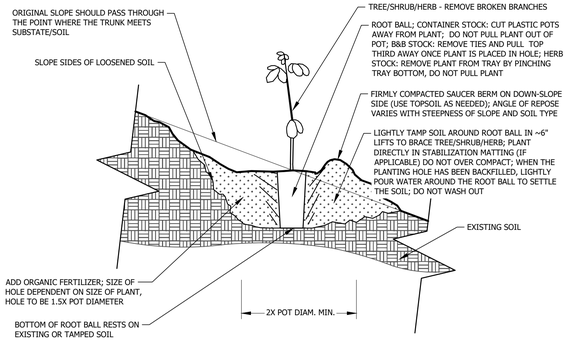
STABILIZATION MATTING SELECTION TABLE			
CRITERIA/ APPLICATION	TYPE	MATERIALS	EXAMPLE PRODUCTS
3:1 OR FLATTER/ SLOPE STABILIZATION ≤ 1.55 PSF/ TEMPORARY CHANNEL LINING	SSM-II	100% STRAW (0.55 LBS/YD²) 2 LAYERS OF PHOTODEGRADABLE POLYPROPYLENE NETTING DEGRADABLE THREAD	NORTH AMERICAN GREEN S150 SYNTHETIC INDUSTRIES LANDLOK S2 ECS-2 (DOUBLE STRAW)
		BIODEGRADABLE: 100% STRAW 2 LAYERS OF ORGANIC JUTE NETTING BIODEGRADABLE THREAD 12 MONTHS	NORTH AMERICAN GREEN S150BN ECS-2B (ACCELERATED DOUBLE STRAW)
2:1 OR FLATTER/ SLOPE STABILIZATION ≤ 1.65 PSF/ TEMPORARY CHANNEL LINING	SSM-II	100% STRAW (0.55 LBS/YD²) 2 LAYERS OF PHOTODEGRADABLE POLYPROPYLENE NETTING DEGRADABLE THREAD	NORTH AMERICAN GREEN S150 SYNTHETIC INDUSTRIES LANDLOK S2 ECS-2 (DOUBLE STRAW)
		BIODEGRADABLE: 100% STRAW 2 LAYERS OF ORGANIC JUTE NETTING BIODEGRADABLE THREAD 12 MONTHS	NORTH AMERICAN GREEN S150BN ECS-2B (ACCELERATED DOUBLE STRAW)
1.5:1 OR FLATTER/ SLOPE STABILIZATION ≤ 1.80 PSF/ TEMPORARY CHANNEL LINING	SSM-III	70% STRAW (0.39 LBS/YD²)/30% COCONUT (0.16 LBS/YD²) TOP LAYER OF UV-STABILIZED NETTING BOTTOM LAYER OF PHOTODEGRADABLE POLYPROPYLENE NETTING DEGRADABLE THREAD	NORTH AMERICAN GREEN SC150 SYNTHETIC INDUSTRIES LANDLOK CS2 ECSC-2 (DOUBLE STRAW/COCONUT)
		BIODEGRADABLE: 70% STRAW (0.39 LBS/YD²)/30% COCONUT (0.16 LBS/YD²) 2 LAYERS OF ORGANIC JUTE NETTING BIODEGRADABLE THREAD 12-24 MONTHS	NORTH AMERICAN GREEN SC150BN ECSC-2B (BIODEGRADABLE DOUBLE STRAW/COCONUT)
1:1 OR FLATTER/SLOPE STABILIZATION ≤ 2.0 PSF/ TEMPORARY CHANNEL LINING	SSM-IV	100% COCONUT (0.55 LBS/YD²) TWO LAYERS OF UV-STABILIZED POLYPROPYLENE NETTING UV-STABILIZED POLYPROPYLENE THREAD	NORTH AMERICAN GREEN C125 SYNTHETIC INDUSTRIES LANDLOK C2 ECC-2 (DOUBLE COCONUT)
		BIODEGRADABLE: 100% COCONUT (0.55 LBS/YD²) TWO LAYERS OF ORGANIC JUTE NETTING BIODEGRADABLE THREAD 12-36 MONTHS	NORTH AMERICAN GREEN C125BN ECC-2B (BIODEGRADABLE DOUBLE COCONUT)
STEEPER THAN 1:1/ SLOPE STABILIZATION ≤ 2 PSF/ PERMANENT CHANNEL LINING	TRM-I	100% POLYPROPYLENE FIBER (0.65 LBS/YD²) TWO LAYERS OF POLYPROPYLENE NETTING UV-STABILIZED POLYPROPYLENE THREAD	LANDLOK TRM 450 (NON-VEGETATED) NORTH AMERICAN GREEN P300 (NON-VEGETATED) CONTECH C-45 (NON-VEGETATED) ECP-2 (POLYPROPYLENE TURF REINFORCEMENT MAT)
2.1 PSF - 5.9 PSF/ PERMANENT CHANNEL LINING	TRM-II	100% POLYPROPYLENE FIBER (0.88 LBS/YD²) TWO LAYERS OF POLYPROPYLENE NETTING UV-STABILIZED POLYPROPYLENE THREAD	MIRAFI MIRAMAT TM8 (VEGETATED) LANDLOK TRM 1060 & 1061B (VEGETATED) CONTECH C-60 (VEGETATED) LANDLOK TRM 450 (VEGETATED) PYRAMAT (NON-VEGETATED) NORTH AMERICAN GREEN P550 (VEGETATED)
6 PSF - 8 PSF AND <1500 LBS TENSILE STRENGTH (MACHINE DIRECTION)/ PERMANENT CHANNEL LINING	TRM-III	100% POLYPROPYLENE FIBER MATRIX (0.50 LBS/YD²) 3-DIMENSIONAL MATTING STRUCTURE	NORTH AMERICAN GREEN P300 & P550 (VEGETATED) COLBOND ENKAMAT 7010 & 7020 (VEGETATED) LANDLOK 300 (VEGETATED)
6 PSF - 8 PSF AND >1500 LBS TENSILE STRENGTH (MACHINE DIRECTION)/ PERMANENT CHANNEL LINING	TRM-IV	100% POLYPROPYLENE FIBER (0.84 LBS/YD²) POLYPROPYLENE MONOFILAMENT YARNS WOVEN INTO PYRAMID-LIKE PROJECTIONS	PYRAMAT HIGH PERFORMANCE TRM (VEGETATED) COLBOND ENKAMAT S-20 (VEGETATED)

NOTE:
FOR THIS SITE, ALL EXPOSED CHANNEL AND SLOPE MATTING SHALL BE BIODEGRADABLE.

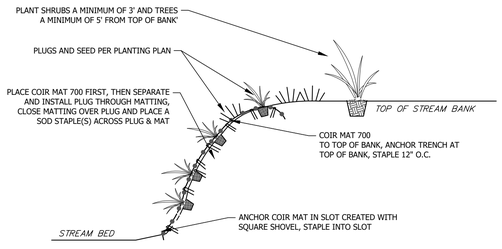
6/14 STABILIZATION MATTING
SELECTION TABLE NOT TO SCALE



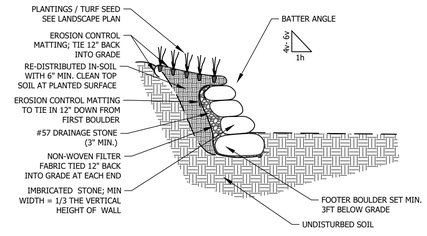
4/14 PLUG SIZE PLANTING
TYPICAL SECTION N.T.S.



2/14 TREE / SHRUB / HERB PLANTING ON SLOPE
TYPICAL SECTION N.T.S.



5/14 PLUGS & CONTAINERS WITH MATTING
TYPICAL SECTION N.T.S.



7/14 IMBRICATED RIP RAP WALL
TYPICAL SECTION N.T.S.

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NEW CASTLE CONSERVATION DISTRICT
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FORESITE ASSOCIATES
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CONSTRUCTION DETAILS

INDEPENDENCE SCHOOL
STREAM RESTORATON

MILL CREEK HUNDRED
NEW CASTLE COUNTY
NEWARK
DELAWARE

DATE:	PROJECT #:
06.26.20	071.01
SURVEYED BY: N/A	SHEET: 14
CREATED BY: DDS	
DRAWN BY: AZ	
CHECKED BY: ACH	14 OF 15

TAKE CARE WHEN WORKING AROUND UNDISTURBED STREAM BANKS. MATTING MAY BE PINNED DOWN THE BANK FACE TO AVOID EXCAVATION INTO ERODED AREAS. IF UNSURE CONSULT DESIGN TEAM. BANK FAILURE REPAIRS AT THE TIME OF PLANTING WILL BE COMPLETED AT THE CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER / NEW CASTLE CONSERVATION DISTRICT.

SAP: SENSITIVE AREA PROTECTION

AT THE START OF THE PROJECT THE ROOT ZONE AROUND ALL TREES TO REMAIN WAS PROTECTED WITH SAP. THESE AREAS ARE CURRENTLY TURF AND WILL BE TRANSITIONED TO NATIVE MEADOW IN THIS PHASE OF THE PROJECT IN THE AREAS NOTED ON THE PLAN.

ALL WORK WITHIN THESE AREAS IS TO BE BY HAND, NO MACHINES ALLOWED WITHIN CANOPY AREAS OF EXISTING TREES;

KILL TURF GRASS AS NEEDED; LIGHTLY SCARIFY THE SURFACE WITH A HAND RAKE; INSTALL A 1"-2" LAYER OF TOPSOIL; BEGIN AT THE ROOT FLARE (~1'-2' OUT FROM THE TRUNK) AND FEATHER TOPSOIL OUT; NO SOIL SHOULD ABUT THE TRUNK OF THE TREE; INSTALL SEED PER SEED NOTES.

LAWN SEED; DETAIL 1-8 MIX NO. 4

PINELANDS NURSERY LOW-GROW MIX DRY SITES

INSTALL UNDER SSM-II MATTING; PER DETAIL 6-14

INSTALL WITH ERNST SEED ANNUAL WILDFLOWER MIX 10-12 LBS/ACRE

PINELANDS NURSERY LOW-GROW MIX WET SITES

INSTALL UNDER / THROUGH SSM-IV MATTING; PER DETAIL 6-14

TO BE INSTALLED IN AREAS ALONG STREAM COURSE AND SWALE PER PLAN. IN AREAS ALONG STREAM COURSE PLANT PLUGS ARE TO BE INSTALLED IN ADDITION TO SEED.

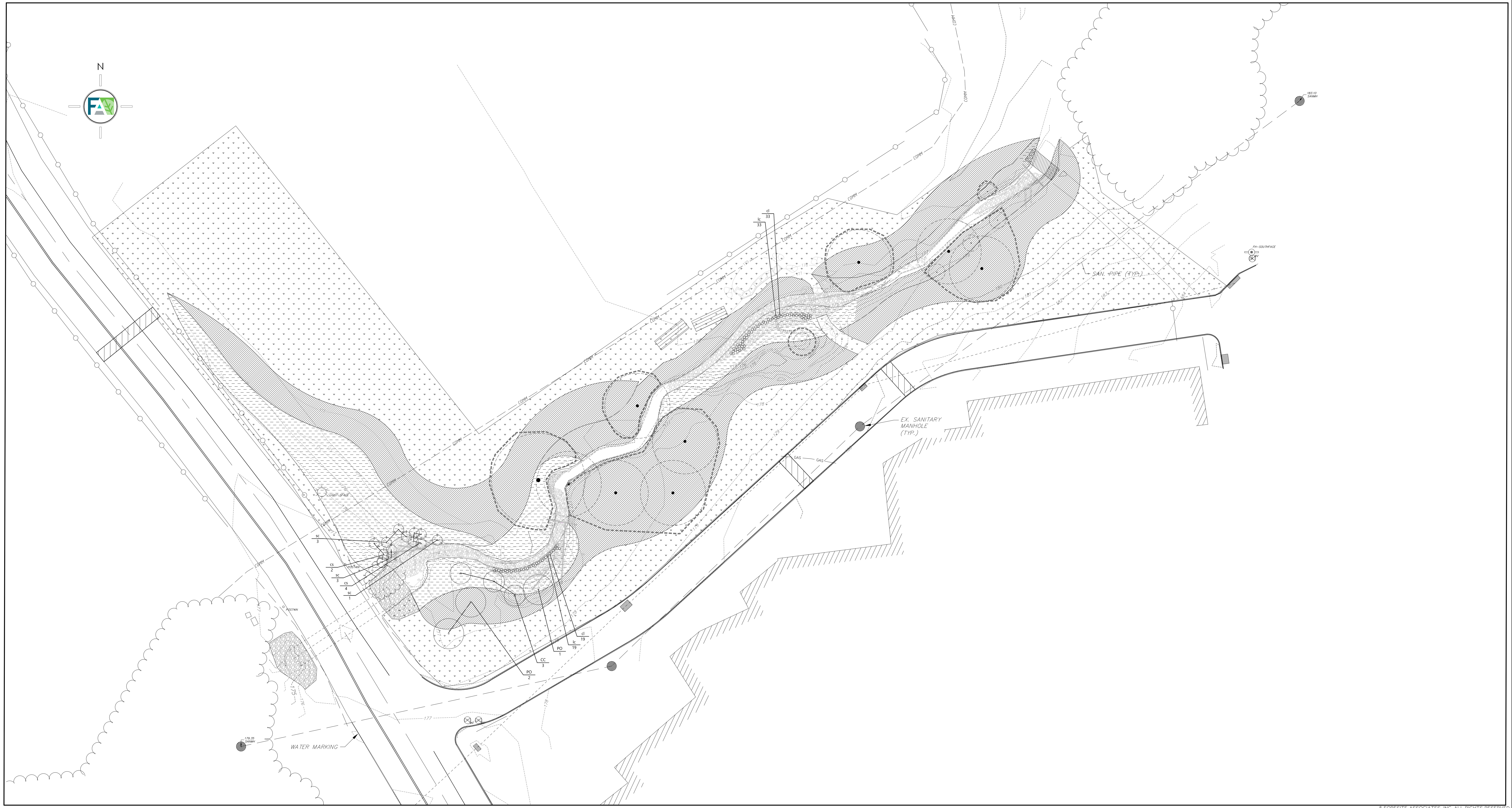
DO NOT PLANT PLUGS WITH EXISTING TREE DRIP LINES / WITHIN SAP IF THERE ARE HEAVY SURFACE ROOTS. CONSULT DESIGN TEAM AS NEEDED TO CONFIRM LOCATIONS OF PLUGS UNDER EXISTING TREES.

PLUG PLANTS
INSTALL A MAX. OF 15" O.C. IN A RANDOM PATTERN.
NO ONE SPECIES WILL COMPRISE MORE THAN 30% OF MIX. SELECT SPECIES INCLUDE:
AGERATINA ALTISSIMA - WHITE SNAKE ROOT
PACKERA AUREA - GOLDEN RAGWORT
SOLIDAGO FLEXICAULIS - ZIGZAG GOLDENROD
POLYSTICHUM ACROSTICHOIDES - CHRISTMAS FERN
ONOCLEA SENSIBILIS - SENSITIVE FERN
CHELONE GLABRA - TURTLEHEAD
IRIS VERSICOLOR - BLUE FLAG IRIS
CAREX LURIDA - SHALLOW SEDGE
CAREX AMPHIBOLA - GRAY SEDGE
CONOCLINIUM COELESTINUM - BLUE MIST FLOWER

PLANTINGS PER PLAN CALL-OUTS

PLANT SCHEDULE

	QTY	LATIN NAME	COMMON NAME	SIZE (min)	COMMENTS	MAINTENANCE
CC	3	Carpinus caroliniana	American hornbeam	8'-10'		Mature size can be 20'+; monitor young bark for sun scaled along south side of tree during winter months
PO	3	Platanus occidentalis	American sycamore	1"-1.5" caliper		Mature size can be 50'+; London Plane Tree is NOT an acceptable substitution
CS	6	Cornus sericea	red-osier dogwood	2-3 gal.	container	cut back in late winter to 1'-2' tall to maintain red color stems and desired height.
SC	7	Sambucus canadensis	American black elderberry	2-3 gal.	container	cut back in late winter to 1'-2' tall to maintain desired height; easily propogated with cuttings
cl	52	Carex lurida	sallow sedge	1qt	container	until year 3 suppemental watering may be required during dry weather
lc	52	Lobelia cardinalis	cardinal flower	1qt	container	until year 3 suppemental watering may be required during dry weather



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FORESITE ASSOCIATES

ANDREW C. HAYES REGISTERED No 13280 PROFESSIONAL ENGINEER DELAWARE 2 JUNE 2023

SEAL

LANDSCAPE PLAN

INDEPENDENCE SCHOOL
STREAM RESTORATON

MILL CREEK HUNDRED NEW CASTLE COUNTY — NEWARK DELAWARE

DATE: 06.26.20	PROJECT #: 071.01
SURVEYED BY: N/A	SHEET: 15
CREATED BY: DDS	
DRAWN BY: DDS	
CHECKED BY: ACH	15 OF 15

SCALE: 1"=20'
0 10 20 30 40