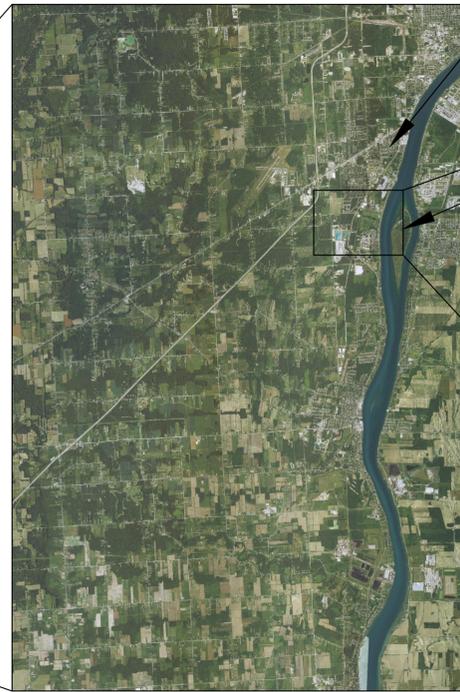




IMAGE SOURCE: COMMONS.WIKIMEDIA.ORG

STATE MAP
NOT TO SCALE



AERIAL IMAGE SOURCE: USDA GEOSPATIAL GATEWAY

LOCAL AREA MAP
NOT TO SCALE



AERIAL IMAGE SOURCE: USDA GEOSPATIAL GATEWAY

VICINITY MAP
NOT TO SCALE

CUTTLE CREEK RESTORATION ST. CLAIR RIVER MARYSVILLE, MICHIGAN

PREPARED FOR
EPA REGION 5
CHICAGO, ILLINOIS

NO.	DATE	BY	DESCRIPTION



CUTTLE CREEK RESTORATION
ST. CLAIR RIVER
MARYSVILLE, MICHIGAN

TITLE SHEET



EA
EA ENGINEERING,
SCIENCE, AND
TECHNOLOGY,
(MI), PLLC
455 EAST EISENHOWER
PARKWAY, SUITE 50
ANN ARBOR, MI 48108
(734)-369-3410

DATE	JUNE 2014
DESIGNED BY	JJM
DRAWN BY	CNS
CHECKED BY	JMT
PROJECT MANAGER	DLB
PROJECT NUMBER	62561.08A
SCALE	AS SHOWN
FILE NAME	SEE FILE PATH
DRAWING NUMBER	C-001
SHEET NUMBER	1 OF 33

FILE PATH: F:\FEDERAL\NOI_DOD\GLUES\PROJECTS\62561\08 - ST. CLAIR RIVER HABITAT RESTORATION\DESIGN\FIGURES\CAD\CUTTLE CREEK\1 TITLE SHEET.DWG [1 TITLE SHEET] 4/15/14 jmt@ea

GENERAL CONSTRUCTION NOTES:

- ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR IS RESPONSIBLE FOR PERFORMING ALL WORK IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS AS REQUIRED.
- THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING IN PLACE ALL ACTIVE UTILITY STRUCTURES (BOTH BELOW AND ABOVE GROUND), PIPING, AND APPURTENANCES THAT ARE TO REMAIN IN PLACE UNLESS OTHER TREATMENT IS SPECIFIED.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR MINIMIZING AND CLEANING UP DUST AND MUD ON ALL ROADS DUE TO VEHICLES ARRIVING AND LEAVING THE JOB SITE AS PART OF THIS WORK.
- IT SHALL BE DISTINCTLY UNDERSTOOD THAT FAILURE TO MENTION SPECIFICALLY ANY WORK THAT WOULD NORMALLY BE REQUIRED TO COMPLETE THE PROJECT SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY TO COMPLETE SUCH WORK.
- SHOULD THE CONTRACTOR DISCOVER DISCREPANCIES BETWEEN THE PLANS AND FIELD CONDITIONS, THE OWNER SHALL BE NOTIFIED IMMEDIATELY TO RESOLVE THE SITUATION. THE CONTRACTOR SHALL ASSUME ALL RESPONSIBILITY FOR ANY FIELD CORRECTIONS OR ADJUSTMENTS MADE WITHOUT NOTIFYING THE OWNER.
- EXISTING UTILITIES AND STRUCTURES (UNDERGROUND, SURFACE, OR OVERHEAD) ARE INDICATED ONLY TO THE EXTENT THAT SUCH INFORMATION WAS MADE AVAILABLE TO OR DISCOVERED BY THE ENGINEER IN PREPARING THE DRAWINGS. LOCATION, CONFIGURATIONS, AND ELEVATIONS OF EXISTING UNDERGROUND POWER, TELEPHONE, FIBER OPTIC CABLE, DUCT WAYS, SPRINKLER SYSTEMS, SEPTIC SYSTEMS, AND WATER, GAS, AND SEWER SERVICE LINES MAY NOT ALL BE INDICATED. OTHER UTILITIES AND STRUCTURES MAY BE PRESENT. UNDERGROUND LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES AND STRUCTURES, AS FURNISHED BY THE OWNER OF EACH UTILITY OR STRUCTURE, ARE APPROXIMATE. OVERHEAD UTILITIES ARE NOT SHOWN IN PROFILE.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE AND INSTALL CONSTRUCTION FENCING FOR SECURITY AND PUBLIC SAFETY. JOB SAFETY SHALL BE SOLELY THE RESPONSIBILITY OF THE CONTRACTOR.
- SEED IN ACCORDANCE WITH SPECIFICATIONS.
- CLEAR AND GRUB IN ACCORDANCE WITH SPECIFICATIONS.
- RESTORE ANY EXISTING STRUCTURES THAT ARE DISTURBED, DAMAGED, OR REMOVED BY CONSTRUCTION TO THEIR ORIGINAL LOCATION AND CONDITION.
- CONTRACTOR SHALL INSTALL 10 BLUEBIRD NESTING BOXES AND 5 WOOD DUCK NESTING BOXES. COORDINATE WITH OWNER AND ENGINEER FOR PLACEMENT AND SEE TECHNICAL SPECIFICATIONS FOR DETAILS.

SEQUENCE OF CONSTRUCTION

- PHASE 1 - RAIL ROAD CULVERT TO BOXCAR BRIDGE
- PHASE 2 - BOXCAR BRIDGE TO EXISTING DAM
- PHASE 3 - EXISTING DAM TO RIVER ROAD (PHASE 3 MAY OCCUR CONCURRENTLY WITH PHASES 1 AND 2)

- PREPARATION AND APPROVAL OF REQUIRED PLANS AND SUBMITTALS
- LOCATE UTILITIES
- INSTALL ABUTMENTS FOR NEW PEDESTRIAN/GOLF CART BRIDGE
- PLACE BRIDGE ON FOOTINGS
- INSTALL NEW IRRIGATION PIPING
- PHASE 1 BIOSWALES
- PHASE 1 IN-STREAM RESTORATION ACTIVITIES
- PHASE 1 SITE STABILIZATION
- PHASE 2 DAM REMOVAL
- PHASE 2 IN-STREAM RESTORATION ACTIVITIES
- PHASE 2 SITE STABILIZATION
- PHASE 3 TEMPORARY SEDIMENT AND EROSION CONTROL TECHNIQUES
- PHASE 3 CONCRETE SEWER ENCASEMENT
- PHASE 3 IN-STREAM RESTORATION ACTIVITIES
- PHASE 3 SITE STABILIZATION
- PLANTING OF STREAM AND SITE
- DEMobilIZATION
- VEGETATIVE MAINTENANCE
- SEDIMENT AND EROSION CONTROL REMOVAL
- RECORD DOCUMENTS

EACH DAY DISTURB ONLY WHAT CAN BE ACCOMPLISHED DURING THAT DAY.

ABBREVIATIONS:

'	FEET
"	INCHES
APPROX.	APPROXIMATE
BKFW	BANK FULL WIDTH
BMP	BEST MANAGEMENT PRACTICES
CC	CUTTLE CREEK
CMP	CORRUGATED METAL PIPE
CPP	CORRUGATED PLASTIC PIPE
DBH	DIAMETER BREAST HEIGHT
EA	EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.
LDD	LIMITS OF DISTURBANCE
MIN	MINIMUM
N	NORTH
NAD83	NORTH AMERICAN DATUM 1983
NO.	NUMBER
NRCS	NATURAL RESOURCES CONSERVATION SERVICE
OHWM	ORDINARY HIGH WATER MARK
O/H	OVERHEAD POWER LINE
PEM	PALUSTRINE EMERGENT
PFO	PALUSTRINE FORESTED
PSI	POUNDS PER SQUARE INCH
PSS	PALUSTRINE SCRUB SHRUB
POI	POINT OF INFLECTION
PVC	POLYVINYL CHLORIDE PIPE
RGC	RIFFLE GRADE CONTROL STRUCTURE
SAN	SANITARY SEWER PIPE
SF	SILT FENCE
STA	STATION
STM	STORM SEWER PIPE
TW	THALWEG
TYP	TYPICAL
USDA	UNITED STATES DEPARTMENT OF AGRICULTURE
WET	WETLAND LIMITS
WUS	WATERS OF THE UNITED STATES

INDEX:

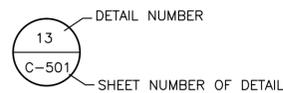
DRAWING NO.	SHEET NO.	TITLE
G-001	1	TITLE SHEET
G-002	2	ABBREVIATIONS, GENERAL NOTES, LEGEND, AND DRAWING INDEX
C-101	3	SITE SHEET INDEX
C-102	4	EXISTING CONDITIONS PLAN
C-103	5	EXISTING CONDITIONS PLAN
C-201	6	STAGING AND SITE ACCESS PLAN
C-202	7	STAGING AND SITE ACCESS PLAN
C-203	8	PROPOSED IMPROVEMENTS I
C-204	9	PROPOSED IMPROVEMENTS II
C-205	10	PROPOSED IMPROVEMENTS III
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C-207	12	PROPOSED IMPROVEMENTS V
C-208	13	PROPOSED IMPROVEMENTS VI
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C-507	30	DETAILS VII
C-508	31	IRRIGATION IMPROVEMENTS PLAN
C-509	32	BOX CULVERT DETAILS
C-510	33	CART AND PEDESTRIAN BRIDGE DETAILS

INFORMATION SOURCE NOTES:

- TOPOGRAPHIC SURVEY COMPLETED BY ROWE PROFESSIONAL SERVICES COMPANY, DATE OF SURVEY, AUGUST AND NOVEMBER 2013 AND AUGMENTED BY SAINT CLAIR COUNTY LIDAR CONTOURS.
- HORIZONTAL DATUM IS MICHIGAN SOUTH STATE PLANE NAD83 AND VERTICAL DATUM IS NAVD88.
- WATER SURFACE ELEVATION OF EXISTING POND AT TIME OF SURVEY WAS 596.0 FEET.
- IMAGE SOURCE: USDA <DATAGATEWAY.NRCS.USDA.GOV> AND GOOGLE EARTH.
- WATERS OF THE UNITED STATES LINE WAS FIELD DELINEATED BY EA.

NOTE:

- IF THE SECTION, DETAIL, SCHEMATIC, OR DIAGRAM IS REFERENCED ON MULTIPLE SHEETS, ALL SHEETS ARE REFERENCED WITHIN THE DETAIL BUBBLE.



LEGEND:

	580	EXISTING CONTOURS
		OBSERVED EDGE OF WATER
		EDGE OF WATERS OF THE UNITED STATES
		EDGE OF BRUSH
		STORM SEWER
		SANITARY SEWER LINE
		OVERHEAD ELECTRIC
		FENCE
		DECIDUOUS TREE
		CONIFEROUS TREE
		SIGN
		GUARD RAIL
		TREES
		UTILITY POLE
		STORM SEWER MANHOLE
		GAS UTILITY
		BUILDING
		CONTROL POINT
		RAILROAD
		GOLF HOLE (TEE BOX, GREEN, AND FAIRWAY)
		WETLAND AREA
		STAGING/ LAYDOWN AREA
		STAGING AREA (ONLY)
		CONSTRUCTION ENTRANCE
		LIMITS OF DISTURBANCE
		ACCESS ROAD
		TEMPORARY BRIDGE/CROSSING
		PROPOSED CONTOURS
		SILT FENCE
		IRRIGATION PIPE
		TEMPORARY PROJECT IDENTIFICATION SIGN/INTERPRETIVE SIGN
		PROPOSED RANDOM BOULDER CLUSTER
		PROPOSED LOG VANE/ROOT WAD
		PROPOSED RIFFLE GRADE CONTROL
		PROPOSED CROSS VANE
		PROPOSED CART/ PEDESTRIAN BRIDGE
		PROPOSED IMBRICATED RIPRAP
		PROPOSED RIPRAP

LEGEND:

	PROPOSED FILL
	PROPOSED CUT
	PROPOSED CONCRETE
	OPEN WATER PLANTING
	RIPARIAN PLANTING (NON-FAIRWAY)
	FORESTED ENHANCEMENT SEEDING AND PLANTING
	FORESTED AND SCRUB SHRUB WETLANDS PLANTING
	RIPARIAN PLANTING (FAIRWAY)
	TURF SEEDING
	WOVEN FIBER MATTING
	BIOSWALE PLANTING

NO.	DATE	BY	DESCRIPTION



**CUTTLE CREEK RESTORATION
ST. CLAIR RIVER
MARYSVILLE, MICHIGAN**

**ABBREVIATIONS, GENERAL NOTES, LEGEND, AND
DRAWING INDEX**

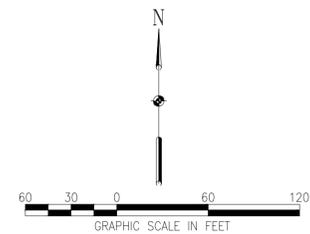


EA
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, (MI), PLC
455 EAST EISENHOWER PARKWAY, SUITE 50
ANN ARBOR, MI 48108
(734)-369-3410

DATE	JUNE 2014
DESIGNED BY	JJM
DRAWN BY	CNS
CHECKED BY	JMT
PROJECT MANAGER	DLB
PROJECT NUMBER	62561.08A
SCALE	AS SHOWN
FILE NAME	SEE FILE PATH
DRAWING NUMBER	G-002
SHEET NUMBER	2 OF 33



IMAGE SOURCE: GOOGLE EARTH 2010



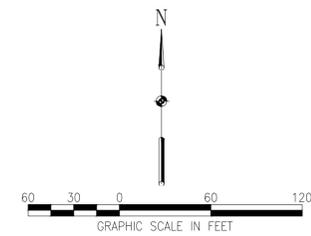
REVISIONS	
NO.	DESCRIPTION

<p>CUTTLE CREEK RESTORATION ST. CLAIR RIVER MARYSVILLE, MICHIGAN</p>
<p>EXISTING CONDITIONS PLAN</p>
<p>PREPARED FOR: EPA</p>
<p> EA ENGINEERING, SCIENCE, AND TECHNOLOGY, (MI), PLC 455 EAST EISENHOWER PARKWAY, SUITE 50 ANN ARBOR, MI 48108 (734)-369-3410</p>
<p>DATE: JUNE 2014</p>
<p>DESIGNED BY: JJM</p>
<p>DRAWN BY: CNS</p>
<p>CHECKED BY: JMT</p>
<p>PROJECT MANAGER: dlb</p>
<p>PROJECT NUMBER: 62561.08A</p>
<p>SCALE: AS SHOWN</p>
<p>FILE NAME: SEE FILE PATH</p>
<p>DRAWING NUMBER: C-102</p>
<p>SHEET NUMBER: 4 OF 33</p>

FILE PATH: F:\FEDERAL\NODD\GUES\PROJECTS\62561.08 - ST. CLAIR RIVER HABITAT RESTORATION\DESIGN\FIGURES\CAD\CUTTLE CREEK\3 EXISTING CONDITIONS PLAN\4 EXISTING CONDITIONS PLAN\4.17.14.mxd



IMAGE SOURCE: GOOGLE EARTH 2010



REVISIONS		DESCRIPTION
NO.	DATE	BY

CUTTLE CREEK RESTORATION ST. CLAIR RIVER MARYSVILLE, MICHIGAN EXISTING CONDITIONS PLAN
PREPARED FOR:
 EA ENGINEERING, SCIENCE, AND TECHNOLOGY, (MI), PLC 455 EAST EISENHOWER PARKWAY, SUITE 50 ANN ARBOR, MI 48108 (734)-369-3410 <small>EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. (EA) DOES BUSINESS AS EA SCIENCE AND TECHNOLOGY IN THE STATE OF MICHIGAN AND EA IS AN AFFILIATE OF EA ENGINEERING, SCIENCE, AND TECHNOLOGY (MI), PLC.</small>
DATE: JUNE 2014 DESIGNED BY: JJM DRAWN BY: CNS CHECKED BY: JMT PROJECT MANAGER: dlb PROJECT NUMBER: 62561.08A SCALE: AS SHOWN FILE NAME: SEE FILE PATH DRAWING NUMBER: C-103 SHEET NUMBER: 5 OF 33

FILE PATH: F:\FEDERAL\NOI_DOD\GLUES\PROJECTS\62561.08 - ST. CLAIR RIVER HABITAT RESTORATION DESIGN\FIGURES\CAD\CUTTLE CREEK\3 EXISTING CONDITIONS.DWG (3 EXISTING CONDITIONS PLAN) 4/17/14 jmtar



- NOTES:
1. PROPOSED GRADING IS SHOWN FOR REFERENCE.
 2. ACCESS ROAD SIDE SLOPES SHALL BE FLATTENED AT ALL CART PATH CROSSINGS AND AS NEEDED TO ALLOW CART ACCESS TO THE GOLF COURSE.
 3. HARDWOOD MAT AND MULCH ACCESS ROADS SHALL BE USED IN CRITICAL ROOT ZONES OF THE TREES 6 INCHES DBH OR GREATER. THE CRITICAL ROOT ZONE IS DEFINED AS ONE FOOT OF RADIUS FOR EVERY INCH OF DBH AS MEASURED 4.5 FEET ABOVE THE GROUND SURFACE.
 4. EXISTING IRRIGATION HEADS SHALL BE FLAGGED BY CONTRACTOR PRIOR TO CONSTRUCTION. CONTRACTOR SHALL REPLACE IRRIGATION HEADS AND ASSOCIATED PIPING IN KIND IF DAMAGED BY CONSTRUCTION.
 5. ALL TREES GREATER THAN 2" DIAMETER AND NOT MARKED FOR REMOVAL SHALL BE PRESERVED.

REVISIONS	
NO.	DESCRIPTION

SEAL



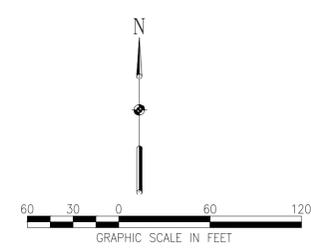
CUTTLE CREEK RESTORATION
ST. CLAIR RIVER
MARYSVILLE, MICHIGAN

STAGING AND SITE ACCESS PLAN

PREPARED FOR:
EPA

EA
EA ENGINEERING,
SCIENCE, AND
TECHNOLOGY,
(MI), PLC
455 EAST EISENHOWER
PARKWAY, SUITE 50
ANN ARBOR, MI 48108
(734)-369-3410

DATE	JUNE 2014
DESIGNED BY	JM
DRAWN BY	CNS
CHECKED BY	JMT
PROJECT MANAGER	DLB
PROJECT NUMBER	62561.08A
SCALE	AS SHOWN
FILE NAME	SEE FILE PATH
DRAWING NUMBER	C-201
SHEET NUMBER	6 OF 33



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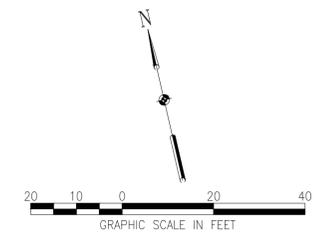


CONSTRUCTION BASELINE
STAKEOUT TABLE:

STATION	NORTHING	EASTING	DESCRIPTION	SHEET
0+00	513868.35	13627916.78	START	8
0+10.76	513862.56	13627925.85	POI	8
0+61.26	513826.53	13627961.25	POI	8
1+25.35	513790.44	13628014.20	POI	8
2+08.93	513745.87	13628084.91	POI	9
3+02.68	513679.95	13628151.56	POI	9
4+48.19	513595.17	13628269.81	POI	9
5+86.61	513541.60	13628397.45	POI	9
6+35.77	513532.23	13628445.71	POI	9
8+69.25	513549.11	13628678.58	POI	10
10+18.20	513551.82	13628827.50	POI	10
10+97.75	513544.96	13628906.75	POI	10
11+58.50	513533.78	13628966.47	POI	10
12+28.14	513500.65	13629027.73	POI	11
13+74.60	513384.71	13629117.20	POI	11
14+10.70	513362.30	13629145.50	POI	11
14+56.21	513359.43	13629190.93	POI	11
15+97.26	513326.76	13629328.14	POI	11
18+76.67	513169.74	13629559.26	POI	12
19+26.28	513158.37	13629607.55	POI	12
20+07.49	513135.08	13629685.34	POI	12
20+79.42	513127.31	13629756.86	POI	12
21+30.28	513127.21	13629807.71	POI	12
22+98.80	513168.48	13629971.10	POI	13
23+18.28	513170.14	13629990.51	POI	13
23+81.94	513162.24	13630053.68	POI	13
24+46.58	513155.53	13630117.97	POI	13
24+67.16	513145.88	13630136.15	POI	13
24+87.01	513128.76	13630146.18	POI	13
25+49.06	513068.91	13630162.55	POI	13
25+73.61	513044.36	13630161.99	POI	13
26+01.78	513016.53	13630157.65	POI	13
26+47.55	512970.76	13630157.24	POI	14
26+77.58	512943.66	13630170.16	POI	14
27+11.79	512909.63	13630173.69	POI	14
27+55.16	512867.31	13630164.19	POI	14
27+72.68	512849.81	13630165.01	POI	14
28+53.44	512771.22	13630183.62	POI	14
29+57.87	512669.09	13630205.40	POI	14
29+73.10	512654.83	13630210.76	POI	14
29+82.99	512649.04	13630218.77	POI	14
30+50.00	512636.00	13630284.50	END	14

NOTES:

- ALL EXISTING WETLANDS RESOURCES ARE TO BE LOCATED AS IDENTIFIED BY A LICENSED SURVEYOR REGISTERED IN THE STATE OF MICHIGAN.
- ALL TREES GREATER THAN 2" DIAMETER AND NOT MARKED FOR REMOVAL, SHALL BE PRESERVED.
- 0.5' CONTOURS SHOWN WHERE NEEDED FOR CLARITY.
- NO LOGS OR OTHER WOODY DEBRIS GENERATED THROUGH WORK SHALL BE TRANSPORTED OFFSITE, CHIPPED, BURNED OR OTHERWISE DESTROYED UNLESS THEIR SOURCE IS FROM THE REMOVAL OF NON-NATIVE OR INVASIVE SPECIES. THE CONTRACTOR IS TO UTILIZE THESE NATURAL MATERIALS IN ACCORDANCE WITH THE STANDARD DETAILS OF THESE CONTRACT DRAWINGS FOR PLANTING AND HABITAT ENHANCEMENT PURPOSES.
- MATERIALS CONTAINING INVASIVE SPECIES ARE TO BE SEPARATED AND TRANSPORTED OFFSITE UNLESS OTHERWISE APPROVED BY THE OWNER.



REVISIONS

SEAL

CUTTLE CREEK RESTORATION
ST. CLAIR RIVER
MARYSVILLE, MICHIGAN

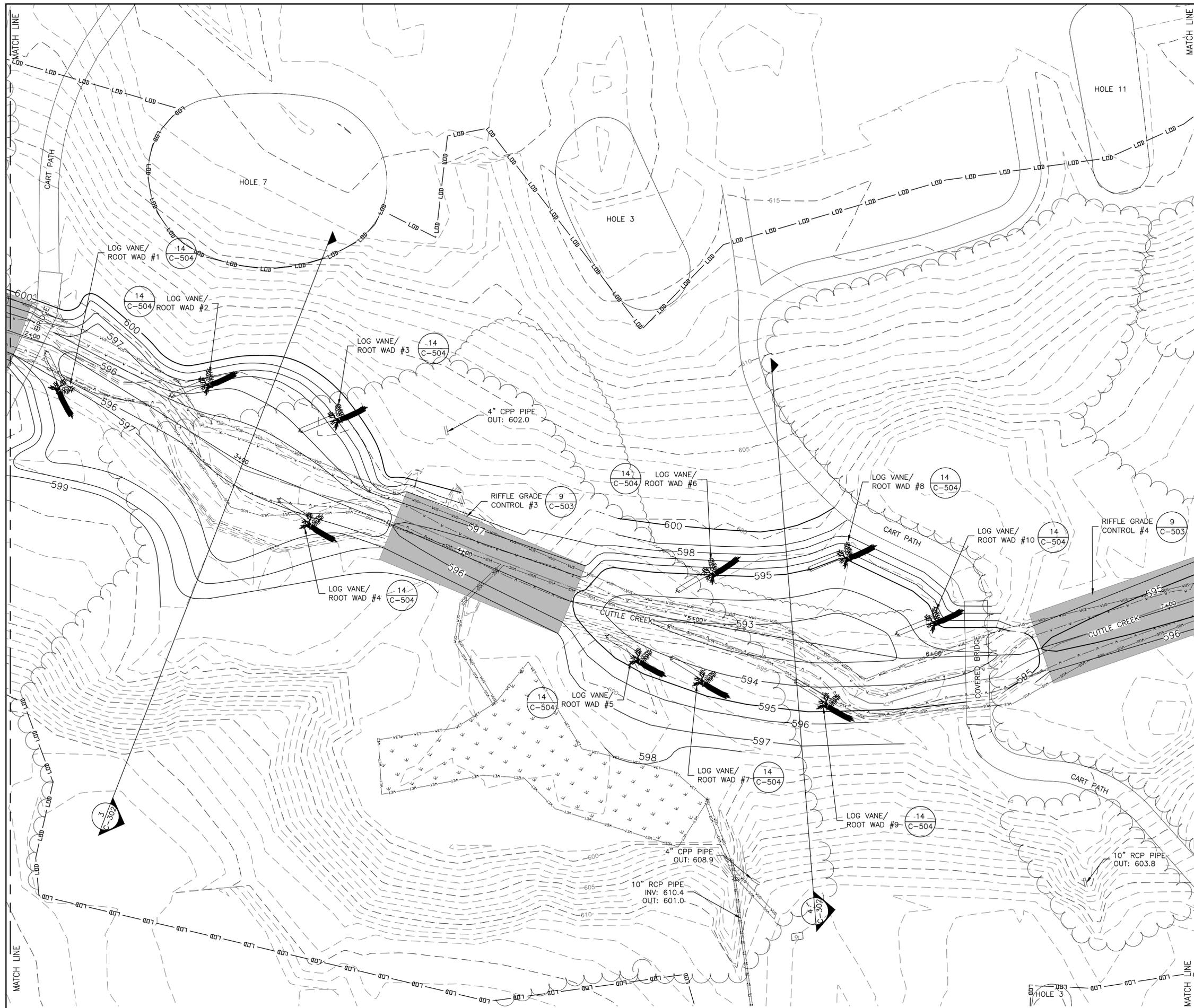
PROPOSED IMPROVEMENTS I

PREPARED FOR:
EPA

EA
EA ENGINEERING,
SCIENCE, AND
TECHNOLOGY,
(MI), PLC
455 EAST EISENHOWER
PARKWAY, SUITE 50
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(734)-369-3410

DATE	JUNE 2014
DESIGNED BY	JJM
DRAWN BY	CNS
CHECKED BY	JMT
PROJECT MANAGER	DLB
PROJECT NUMBER	62561.08A
SCALE	AS SHOWN
FILE NAME	SEE FILE PATH
DRAWING NUMBER	C-203
SHEET NUMBER	8 OF 33

FILE PATH: F:\FEDERAL\NODD\GUES\PROJECTS\2014\08 - ST. CLAIR RIVER HABITAT RESTORATION DESIGN\FIGURES\CAD\CUTTLE CREEK\10 GRADING PLANDWG (8 PROPOSED IMPROVEMENTS I) 4/18/14 .jmadr



- NOTES:**
1. ALL EXISTING WETLANDS RESOURCES ARE TO BE LOCATED AS IDENTIFIED BY A LICENSED SURVEYOR REGISTERED IN THE STATE OF MICHIGAN.
 2. ALL TREES GREATER THAN 2" DIAMETER AND NOT MARKED FOR REMOVAL, SHALL BE PRESERVED.
 3. 0.5' CONTOURS SHOWN WHERE NEEDED FOR CLARITY.
 4. NO LOGS OR OTHER WOODY DEBRIS GENERATED THROUGH WORK SHALL BE TRANSPORTED OFFSITE, CHIPPED, BURNED OR OTHERWISE DESTROYED UNLESS THEIR SOURCE IS FROM THE REMOVAL OF NON-NATIVE OR INVASIVE SPECIES. THE CONTRACTOR IS TO UTILIZE THESE NATURAL MATERIALS IN ACCORDANCE WITH THE STANDARD DETAILS OF THESE CONTRACT DRAWINGS FOR PLANTING AND HABITAT ENHANCEMENT PURPOSES.
 5. MATERIALS CONTAINING INVASIVE SPECIES ARE TO BE SEPARATED AND TRANSPORTED OFFSITE UNLESS OTHERWISE APPROVED BY THE OWNER.

REVISIONS	
NO.	DESCRIPTION

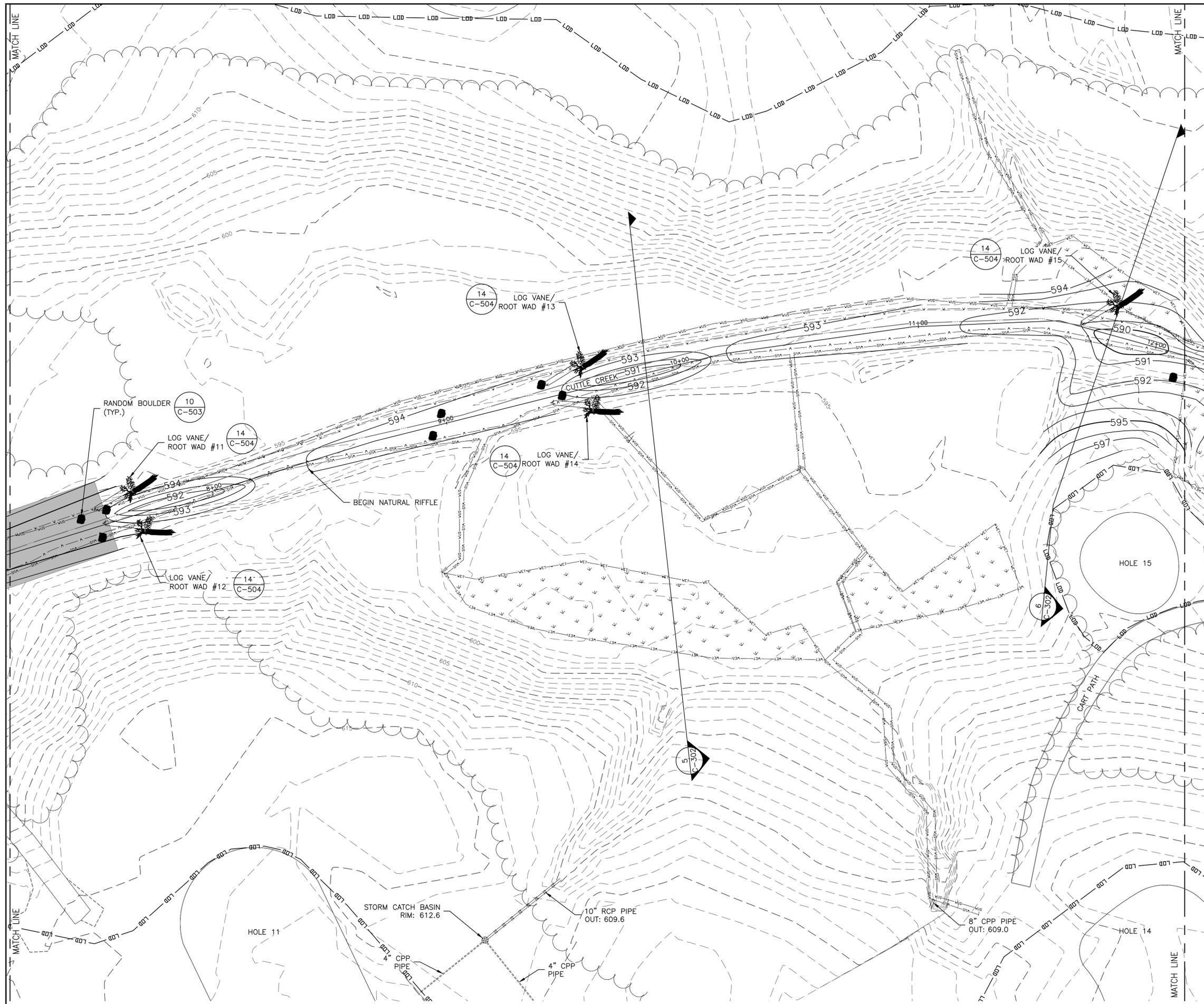

CUTTLE CREEK RESTORATION
ST. CLAIR RIVER
 MARYSVILLE, MICHIGAN
PROPOSED IMPROVEMENTS II

PREPARED FOR:



EA ENGINEERING, SCIENCE, AND TECHNOLOGY, (MI), PLC
 455 EAST EISENHOWER PARKWAY, SUITE 50
 ANN ARBOR, MI 48108
 (734)-369-3410

DATE	JUNE 2014
DESIGNED BY	JJM
DRAWN BY	CNS
CHECKED BY	JMT
PROJECT MANAGER	DLB
PROJECT NUMBER	62561.08A
SCALE	AS SHOWN
FILE NAME	SEE FILE PATH
DRAWING NUMBER	C-204
SHEET NUMBER	9 OF 33



- NOTES:**
1. ALL EXISTING WETLANDS RESOURCES ARE TO BE LOCATED AS IDENTIFIED BY A LICENSED SURVEYOR REGISTERED IN THE STATE OF MICHIGAN.
 2. ALL TREES GREATER THAN 2" DIAMETER AND NOT MARKED FOR REMOVAL, SHALL BE PRESERVED.
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NO.	DATE	BY	DESCRIPTION

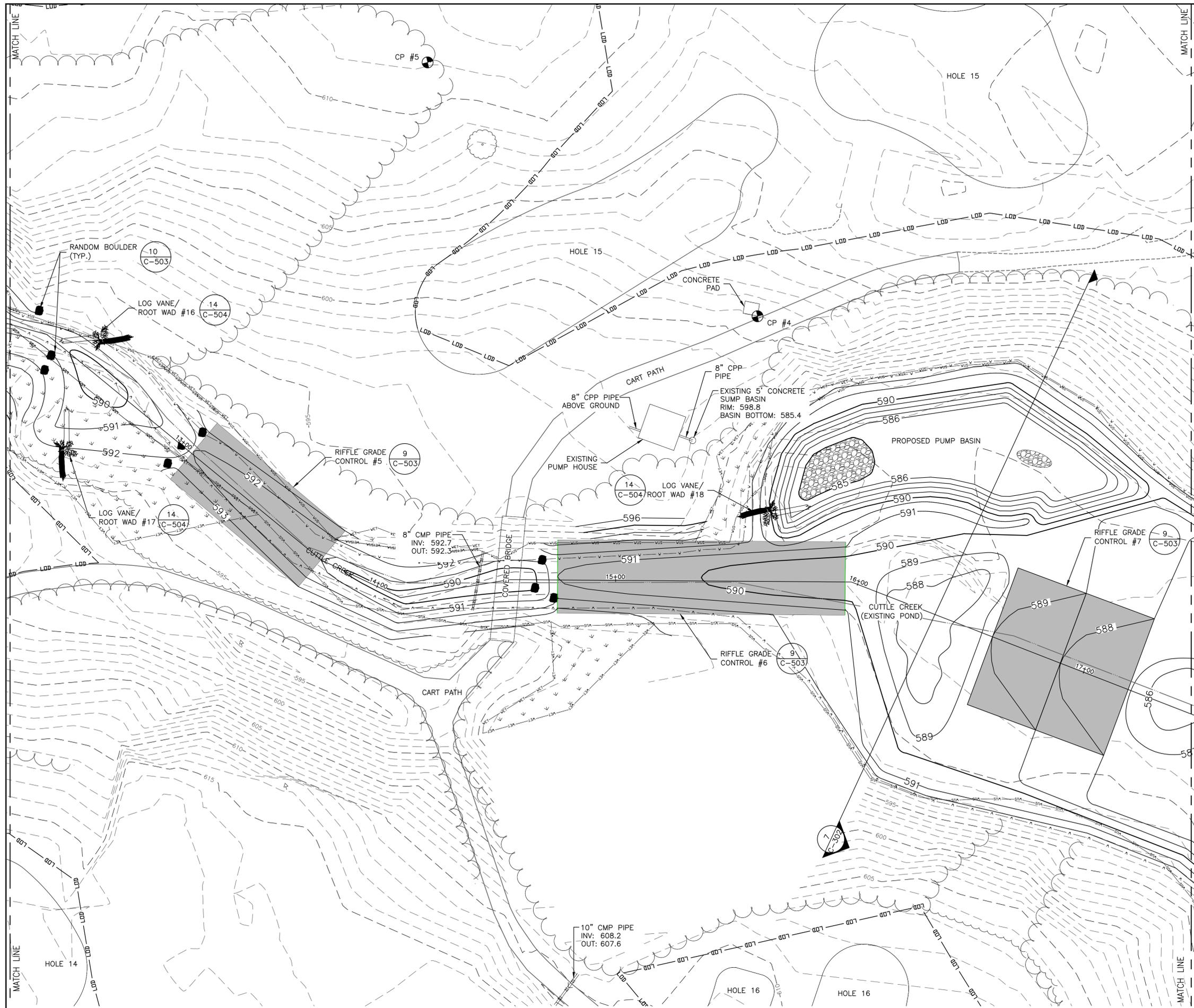
CUTTLE CREEK RESTORATION
ST. CLAIR RIVER
 MARYSVILLE, MICHIGAN
PROPOSED IMPROVEMENTS III



EA
 EA ENGINEERING,
 SCIENCE, AND
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 ANN ARBOR, MI 48108
 (734)-369-3410

DATE	JUNE 2014
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DRAWN BY	CNS
CHECKED BY	JMT
PROJECT MANAGER	DLB
PROJECT NUMBER	62561.08A
SCALE	AS SHOWN
FILE NAME	SEE FILE PATH
DRAWING NUMBER	C-205
SHEET NUMBER	10 OF 33

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- NOTES:**
1. ALL EXISTING WETLANDS RESOURCES ARE TO BE LOCATED AS IDENTIFIED BY A LICENSED SURVEYOR REGISTERED IN THE STATE OF MICHIGAN.
 2. ALL TREES GREATER THAN 2" DIAMETER AND NOT MARKED FOR REMOVAL, SHALL BE PRESERVED.
 3. 0.5' CONTOURS SHOWN WHERE NEEDED FOR CLARITY.
 4. NO LOGS OR OTHER WOODY DEBRIS GENERATED THROUGH WORK SHALL BE TRANSPORTED OFFSITE, CHIPPED, BURNED OR OTHERWISE DESTROYED UNLESS THEIR SOURCE IS FROM THE REMOVAL OF NON-NATIVE OR INVASIVE SPECIES. THE CONTRACTOR IS TO UTILIZE THESE NATURAL MATERIALS IN ACCORDANCE WITH THE STANDARD DETAILS OF THESE CONTRACT DRAWINGS FOR PLANTING AND HABITAT ENHANCEMENT PURPOSES.
 5. MATERIALS CONTAINING INVASIVE SPECIES ARE TO BE SEPARATED AND TRANSPORTED OFFSITE UNLESS OTHERWISE APPROVED BY THE OWNER.

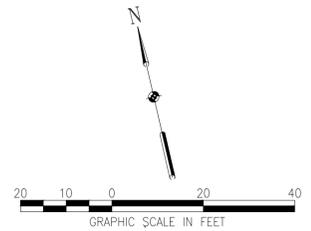
REVISIONS	
NO.	DESCRIPTION

CUTTLE CREEK RESTORATION
ST. CLAIR RIVER
 MARYSVILLE, MICHIGAN
PROPOSED IMPROVEMENTS IV

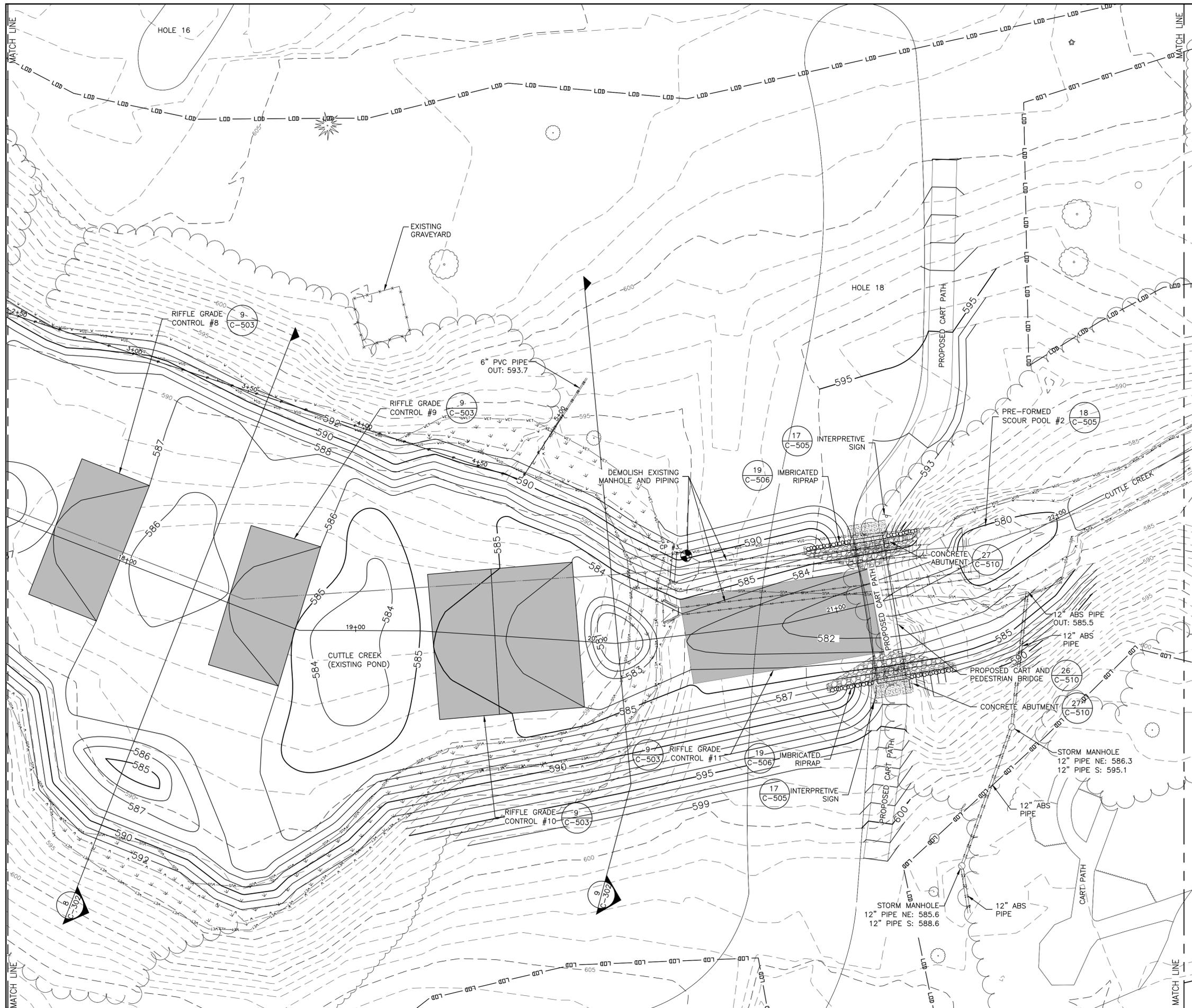


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 (734) 369-3410

DATE	JUNE 2014
DESIGNED BY	JJM
DRAWN BY	CNS
CHECKED BY	JMT
PROJECT MANAGER	DLB
PROJECT NUMBER	62561.08A
SCALE	AS SHOWN
FILE NAME	SEE FILE PATH
DRAWING NUMBER	C-206
SHEET NUMBER	11 OF 33



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NOTES:

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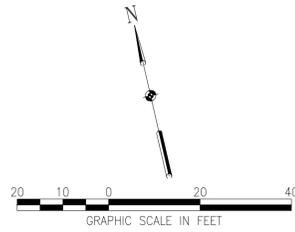
REVISIONS	
NO.	DESCRIPTION

CUTTLE CREEK RESTORATION
ST. CLAIR RIVER
MARYSVILLE, MICHIGAN
PROPOSED IMPROVEMENTS V



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PROJECT MANAGER	DLB
PROJECT NUMBER	62561.08A
SCALE	AS SHOWN
FILE NAME	SEE FILE PATH
DRAWING NUMBER	C-207
SHEET NUMBER	12 OF 33



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REVISIONS	
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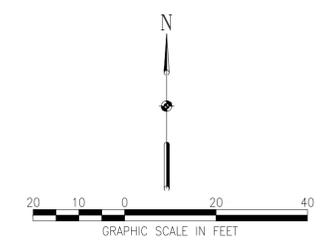

CUTTLE CREEK RESTORATION
ST. CLAIR RIVER
 MARYSVILLE, MICHIGAN
PROPOSED IMPROVEMENTS VI

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 ANN ARBOR, MI 48108
 (734)-369-3410

DATE	JUNE 2014
DESIGNED BY	JJM
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PROJECT MANAGER	DLB
PROJECT NUMBER	62561.08A
SCALE	AS SHOWN
FILE NAME	SEE FILE PATH
DRAWING NUMBER	C-208
SHEET NUMBER	13 OF 33





- NOTES:
1. ALL EXISTING WETLANDS RESOURCES ARE TO BE LOCATED AS IDENTIFIED BY A LICENSED SURVEYOR REGISTERED IN THE STATE OF MICHIGAN.
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NO.	DATE	BY	DESCRIPTION

SEAL

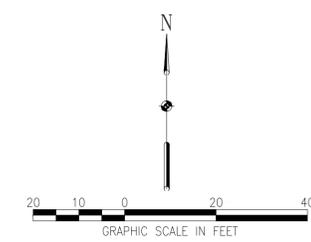
CUTTLE CREEK RESTORATION
ST. CLAIR RIVER
MARYSVILLE, MICHIGAN

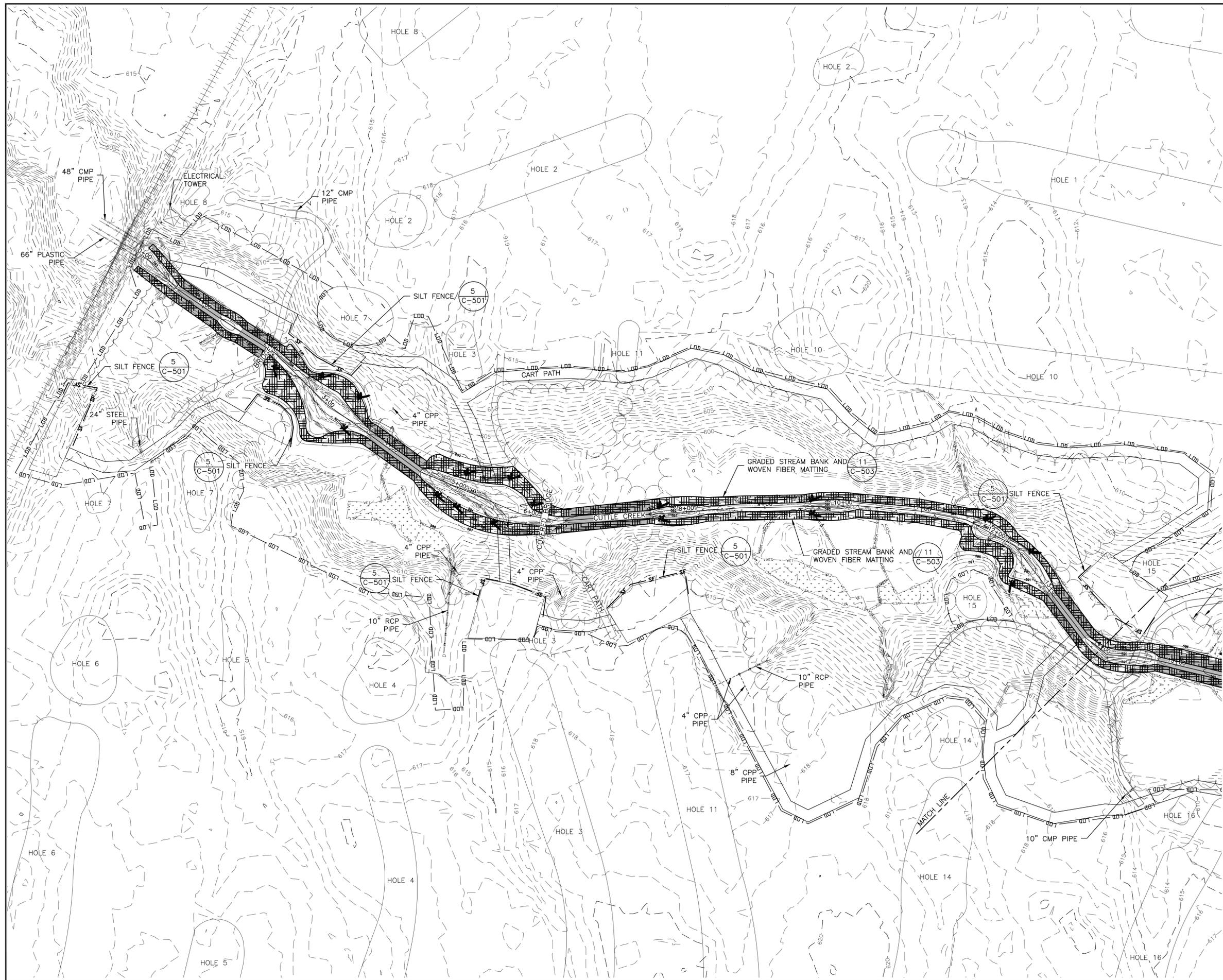
PROPOSED IMPROVEMENTS VII

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455 EAST EISENHOWER
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PROJECT MANAGER	DLB
PROJECT NUMBER	62561.08A
SCALE	AS SHOWN
FILE NAME	SEE FILE PATH
DRAWING NUMBER	C-209
SHEET NUMBER	14 OF 33





- NOTES:
- WOVEN FIBER MATTING SHALL BE INSTALLED ON ALL SLOPES 3:1 OR STEEPER AND WITHIN 10 FEET OF ACTIVE STREAM CHANNEL ON BOTH SIDES.
 - CONTRACTOR SHALL USE PUMP-AROUND PRACTICES, TEMPORARY ACCESS, CULVERTS AND SANDBAG/STONE DIVERSIONS AS DETAILED:
 - PUMP AROUND PRACTICES ARE NOT REQUIRED WHILE THE EXISTING DAM IS STILL IN PLACE.
 - ALL TREES GREATER THAN 2" DIAMETER AND NOT MARKED FOR REMOVAL SHALL BE PRESERVED.

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C-502	C-502	C-502

LEGEND:



NO.	DATE	BY	DESCRIPTION

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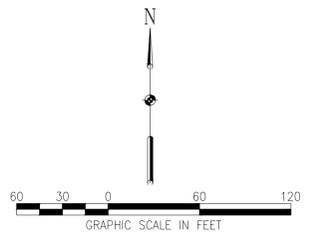
**CUTTLE CREEK RESTORATION
ST. CLAIR RIVER
MARYSVILLE, MICHIGAN**

EROSION AND SEDIMENT CONTROL PLAN

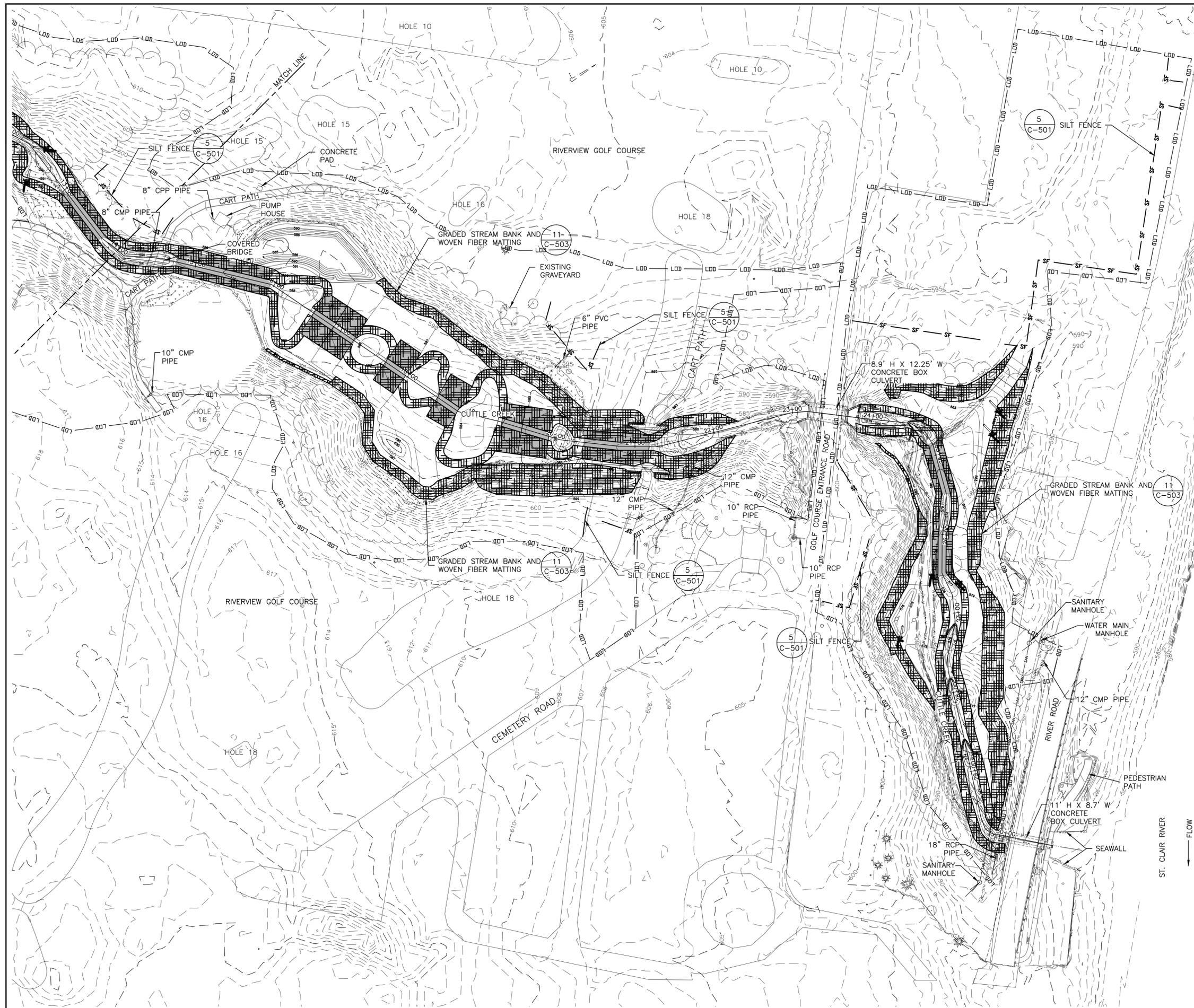


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DATE	JUNE 2014
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PROJECT MANAGER	DLB
PROJECT NUMBER	62561.08A
SCALE	AS SHOWN
FILE NAME	SEE FILE PATH
DRAWING NUMBER	C-210
SHEET NUMBER	15 OF 33



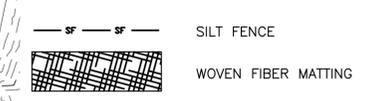
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- NOTES:
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6 C-502	7 C-502	8 C-502
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LEGEND:



NO.	DATE	BY	DESCRIPTION

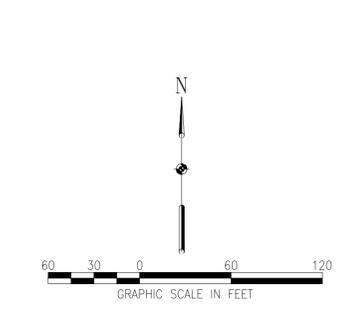
CUTTLE CREEK RESTORATION
ST. CLAIR RIVER
 MARYSVILLE, MICHIGAN

EROSION AND SEDIMENT CONTROL PLAN

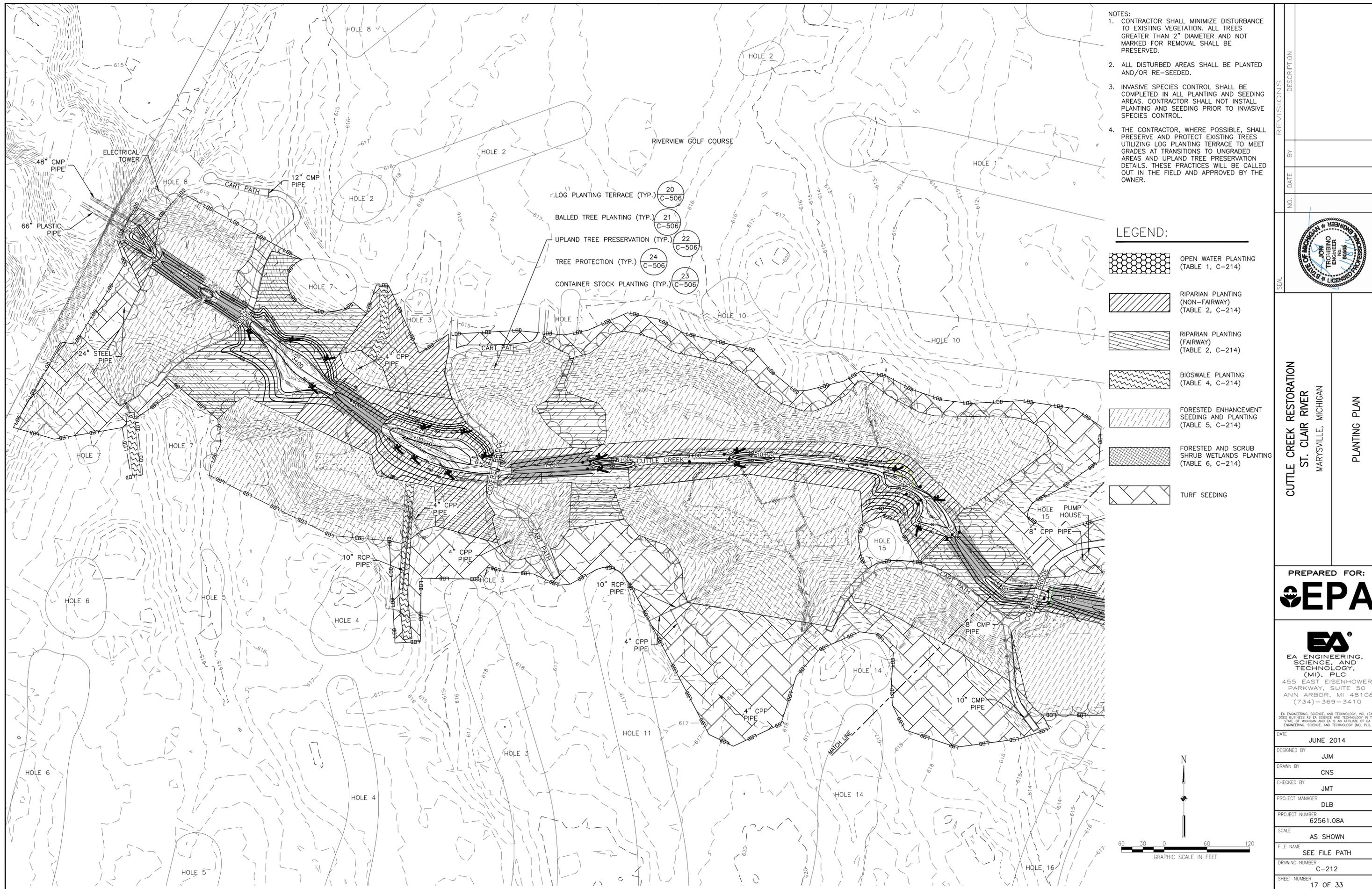
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 PARKWAY, SUITE 50
 ANN ARBOR, MI 48108
 (734)-369-3410

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PROJECT MANAGER	DLB
PROJECT NUMBER	62561.08A
SCALE	AS SHOWN
FILE NAME	SEE FILE PATH
DRAWING NUMBER	C-211
SHEET NUMBER	16 OF 33



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- NOTES:
- CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING VEGETATION. ALL TREES GREATER THAN 2" DIAMETER AND NOT MARKED FOR REMOVAL SHALL BE PRESERVED.
 - ALL DISTURBED AREAS SHALL BE PLANTED AND/OR RE-SEEDED.
 - INVASIVE SPECIES CONTROL SHALL BE COMPLETED IN ALL PLANTING AND SEEDING AREAS. CONTRACTOR SHALL NOT INSTALL PLANTING AND SEEDING PRIOR TO INVASIVE SPECIES CONTROL.
 - THE CONTRACTOR, WHERE POSSIBLE, SHALL PRESERVE AND PROTECT EXISTING TREES UTILIZING LOG PLANTING TERRACE TO MEET GRADES AT TRANSITIONS TO UNGRADED AREAS AND UPLAND TREE PRESERVATION DETAILS. THESE PRACTICES WILL BE CALLED OUT IN THE FIELD AND APPROVED BY THE OWNER.

LEGEND:

- OPEN WATER PLANTING (TABLE 1, C-214)
- RIPARIAN PLANTING (NON-FAIRWAY) (TABLE 2, C-214)
- RIPARIAN PLANTING (FAIRWAY) (TABLE 2, C-214)
- BIOSWALE PLANTING (TABLE 4, C-214)
- FORESTED ENHANCEMENT SEEDING AND PLANTING (TABLE 5, C-214)
- FORESTED AND SCRUB SHRUB WETLANDS PLANTING (TABLE 6, C-214)
- TURF SEEDING

- LOG PLANTING TERRACE (TYP.) 20 C-506
- BALLED TREE PLANTING (TYP.) 21 C-506
- UPLAND TREE PRESERVATION (TYP.) 22 C-506
- TREE PROTECTION (TYP.) 24 C-506
- CONTAINER STOCK PLANTING (TYP.) 23 C-506

REVISIONS	
NO.	DESCRIPTION

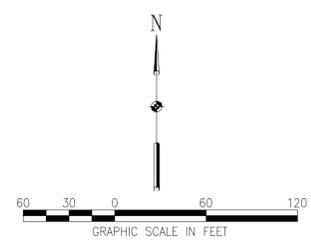
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CUTTLE CREEK RESTORATION
ST. CLAIR RIVER
 MARYSVILLE, MICHIGAN
PLANTING PLAN

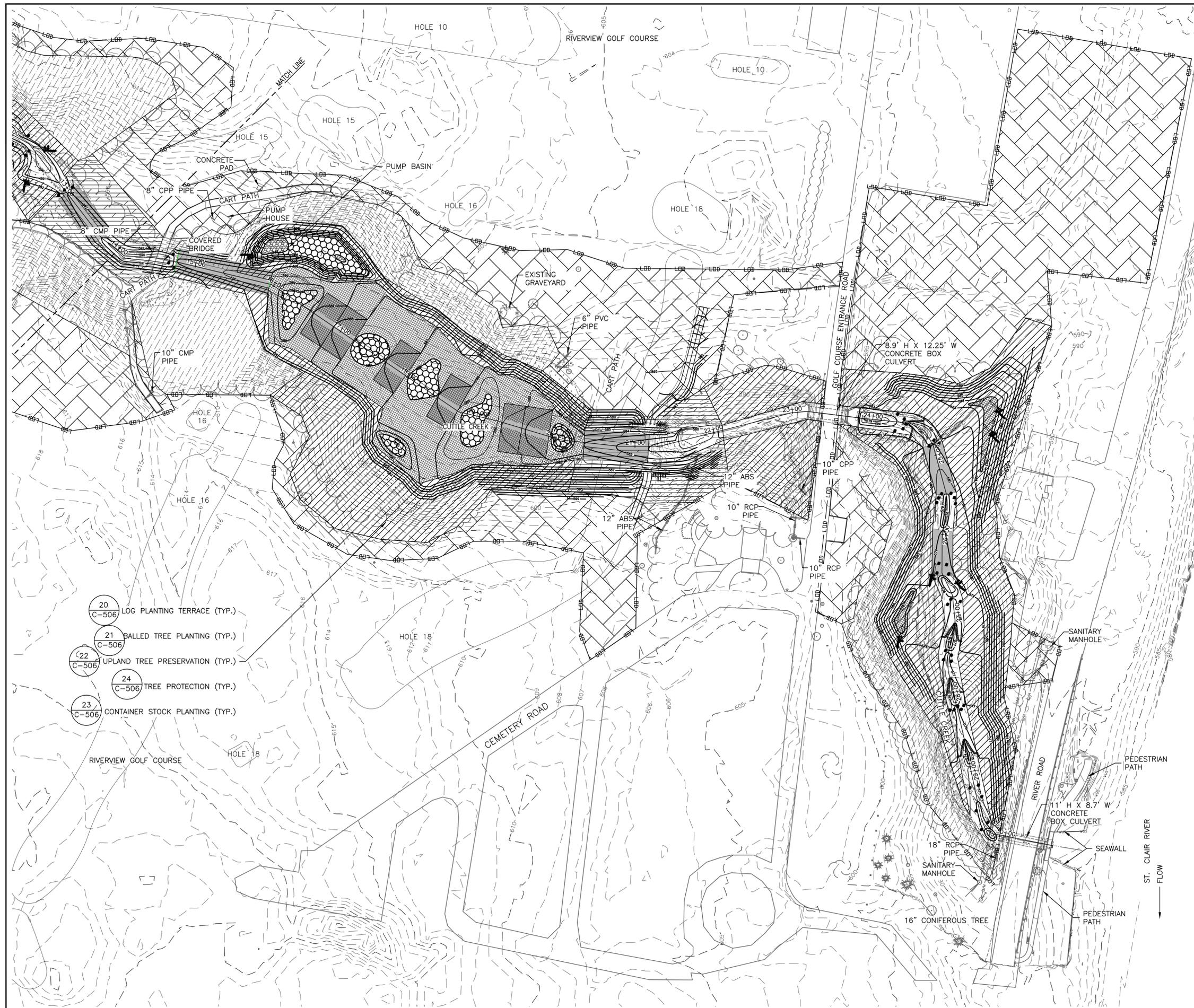
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 455 EAST EISENHOWER PARKWAY, SUITE 50
 ANN ARBOR, MI 48108
 (734)-369-3410

DATE	JUNE 2014
DESIGNED BY	JJM
DRAWN BY	CNS
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PROJECT MANAGER	DLB
PROJECT NUMBER	62561.08A
SCALE	AS SHOWN
FILE NAME	SEE FILE PATH
DRAWING NUMBER	C-212
SHEET NUMBER	17 OF 33



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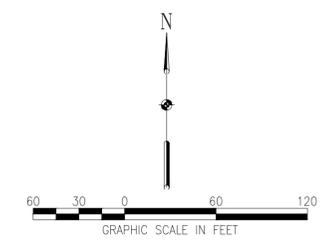


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- RIPARIAN PLANTING (FAIRWAY) (TABLE 2, C-214)
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- FORESTED AND SCRUB SHRUB WETLANDS PLANTING (TABLE 6, C-214)
- TURF SEEDING

- 20 C-506 LOG PLANTING TERRACE (TYP.)
- 21 C-506 BALLED TREE PLANTING (TYP.)
- 22 C-506 UPLAND TREE PRESERVATION (TYP.)
- 24 C-506 TREE PROTECTION (TYP.)
- 23 C-506 CONTAINER STOCK PLANTING (TYP.)



NO.	DATE	BY	REVISIONS	DESCRIPTION

CUTTLE CREEK RESTORATION
ST. CLAIR RIVER
 MARYSVILLE, MICHIGAN

PLANTING PLAN

PREPARED FOR:

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, (M), PLC
 455 EAST EISENHOWER PARKWAY, SUITE 50
 ANN ARBOR, MI 48108
 (734)-369-3410

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. (EA) DOES BUSINESS AS EA SCIENCE AND TECHNOLOGY IN THE STATE OF MICHIGAN AND EA IS AN AFFILIATE OF EA ENGINEERING, SCIENCE, AND TECHNOLOGY (M), PLC.

DATE	JUNE 2014
DESIGNED BY	JJM
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PROJECT MANAGER	DLB
PROJECT NUMBER	62561.08A
SCALE	AS SHOWN
FILE NAME	SEE FILE PATH
DRAWING NUMBER	C-213
SHEET NUMBER	18 OF 33

FILE PATH: F:\FEDERAL\NODD\GLUES\PROJECTS\62561\08 - ST. CLAIR RIVER HABITAT RESTORATION DESIGN\FIGURES\CAD\CUTTLE CREEK\17 PLANTING PLAN\17 PLANTING PLAN.dwg

TABLE 1 OPEN WATER AND EMERGENT WETLAND PLANTING				
SCIENTIFIC NAME	COMMON NAME	TYPE	SPACING (FT)	QUANTITY
HERBACEOUS SUBMERGENTS (GROWING UP OUT OF WATER):				
<i>Elodea canadensis</i>	COMMON WATERWEED	BARE-ROOT PLANT STOCK	24"	239
<i>Potamogeton natans</i>	COMMON PONDWEED	BARE-ROOT PLANT STOCK	24"	239
<i>Stuckenia pectinata (Potamogeton pectinatus)</i>	SAGO PONDWEED	BARE-ROOT PLANT STOCK	24"	239
<i>Nymphaea odorata</i>	WHITE WATER LILY	BARE-ROOT PLANT STOCK	24"	239
HERBACEOUS EMERGENTS (GROWING IMMEDIATELY ALONG SHORELINE):				
<i>Carex crinita</i>	FRINGED SEDGE	PLUG	24"	239
<i>Carex lurida</i>	LURID SEDGE	PLUG	24"	239
<i>Impatiens capensis</i>	JEWELWEED	PLUG	24"	239
<i>Iris versicolor</i>	BLUE FLAG IRIS	PLUG	24"	239
<i>Lobelia cardinalis</i>	CARDINAL FLOWER	PLUG	24"	239
<i>Scutellaria lateriflora</i>	BLUE SKULLCAP	PLUG	24"	239
<i>Scirpus atrovirens</i>	GREEN BULRUSH	PLUG	24"	239
<i>Scirpus cyperinus</i>	WOOLGRASS	PLUG	24"	239
<i>Scirpus validus</i>	GREAT BULRUSH	PLUG	24"	239

TABLE 2 RIPARIAN PLANTING				
SCIENTIFIC NAME	COMMON NAME	SIZE (FT)	SPACING (FT)	QUANTITY
UNDERSTORY HERBACEOUS PLANTS - IN SMALL CANOPY OPENINGS (partial shade)*				
<i>Athyrium filix-femina</i>	LADY FERN	QUART	3-5'	227
<i>Matteuccia struthiopteris</i>	OSTRICH FERN	QUART	3-5'	227
<i>Onoclea sensibilis</i>	SENSITIVE FERN	QUART	3-5'	227
<i>Lilium michiganense</i>	MICHIGAN LILY	QUART	3-5'	227
<i>Impatiens capensis</i> or <i>I. pallida</i>	JEWEL-WEED	QUART (OR SEED)	3-5'	227
<i>Thalictrum dasycarpum</i>	PURPLE MEADOW RUE	QUART (OR SEED)	3-5'	227
UNDERSTORY SHRUBS/TREES				
<i>Celtis occidentalis</i>	HACKBERRY	2-3'	7-10'	558
<i>Cornus amomum</i>	SILKY DOGWOOD	2-3'	7-10'	558
<i>Lindera benzoin</i>	SPICEBUSH	2-3'	7-10'	558
<i>Cornus sericea</i>	RED-OSIER DOGWOOD	2-3'	7-10'	558
<i>Physocarpus opulifolius</i>	NINEBARK	2-3'	7-10'	558
<i>Ribes americanum</i>	EASTERN BLACK CURRANT	2-3'	7-10'	558
CANOPY TREES *				
<i>Acer rubrum</i>	RED MAPLE	4-5'	20-40'	22
<i>Acer saccharinum</i>	SILVER MAPLE	6-8'	40'	22
<i>Carya ovata</i>	SHELLBARK HICKORY	4-5'	40'	22
<i>Fraxinus pennsylvanica</i>	GREEN ASH (OR RED ASH)	4-5'	20-40'	22
<i>Tilia americana</i>	BASSWOOD	4-5'	40'	22
<i>Quercus palustris</i>	PIN OAK	4-5'	40'	22
<i>Quercus bicolor</i>	SWAMP WHITE OAK	6-8'	40'	22

* NO CANOPY TREE PLANTING IN FAIRWAY AREAS

TABLE 3 LIVE STAKES				
SCIENTIFIC NAME	COMMON NAME	SIZE (FT)	SPACING (FT)	QUANTITY
<i>Cephalanthus occidentalis</i>	BUTTONBUSH	NATIVE CUTTINGS	2'	1208
<i>Cornus amomum</i>	SILKY DOGWOOD	NATIVE CUTTINGS	2'	1208
<i>Cornus sericea</i>	RED-OSIER DOGWOOD	NATIVE CUTTINGS	2'	1208
<i>Physocarpus opulifolius</i>	NINEBARK	NATIVE CUTTINGS	2'	1208
<i>Salix exigua</i>	SANDBAR WILLOW	NATIVE CUTTINGS	2'	1208
<i>Salix nigra</i>	BLACK WILLOW	NATIVE CUTTINGS	2'	1208
<i>Sambucus canadensis</i>	ELDERBERRY	NATIVE CUTTINGS	2'	1208

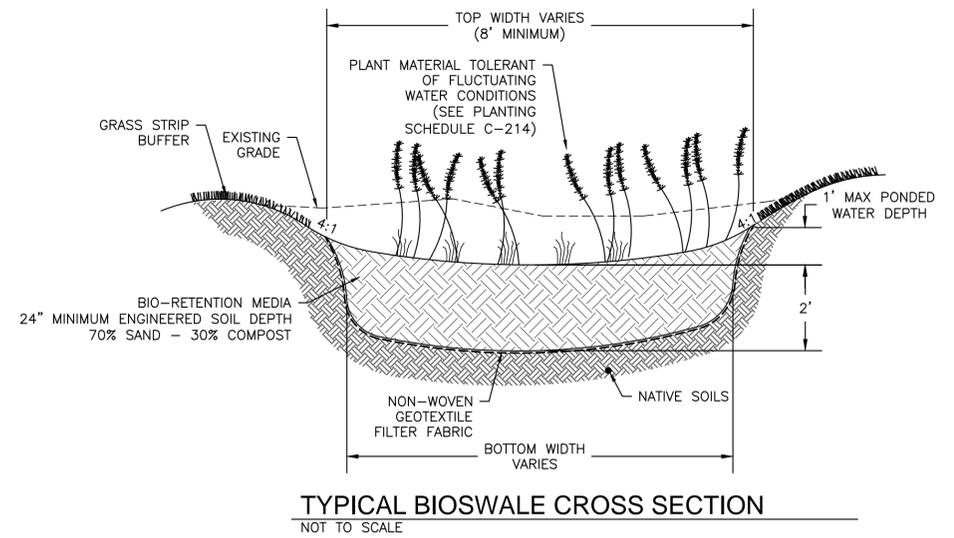
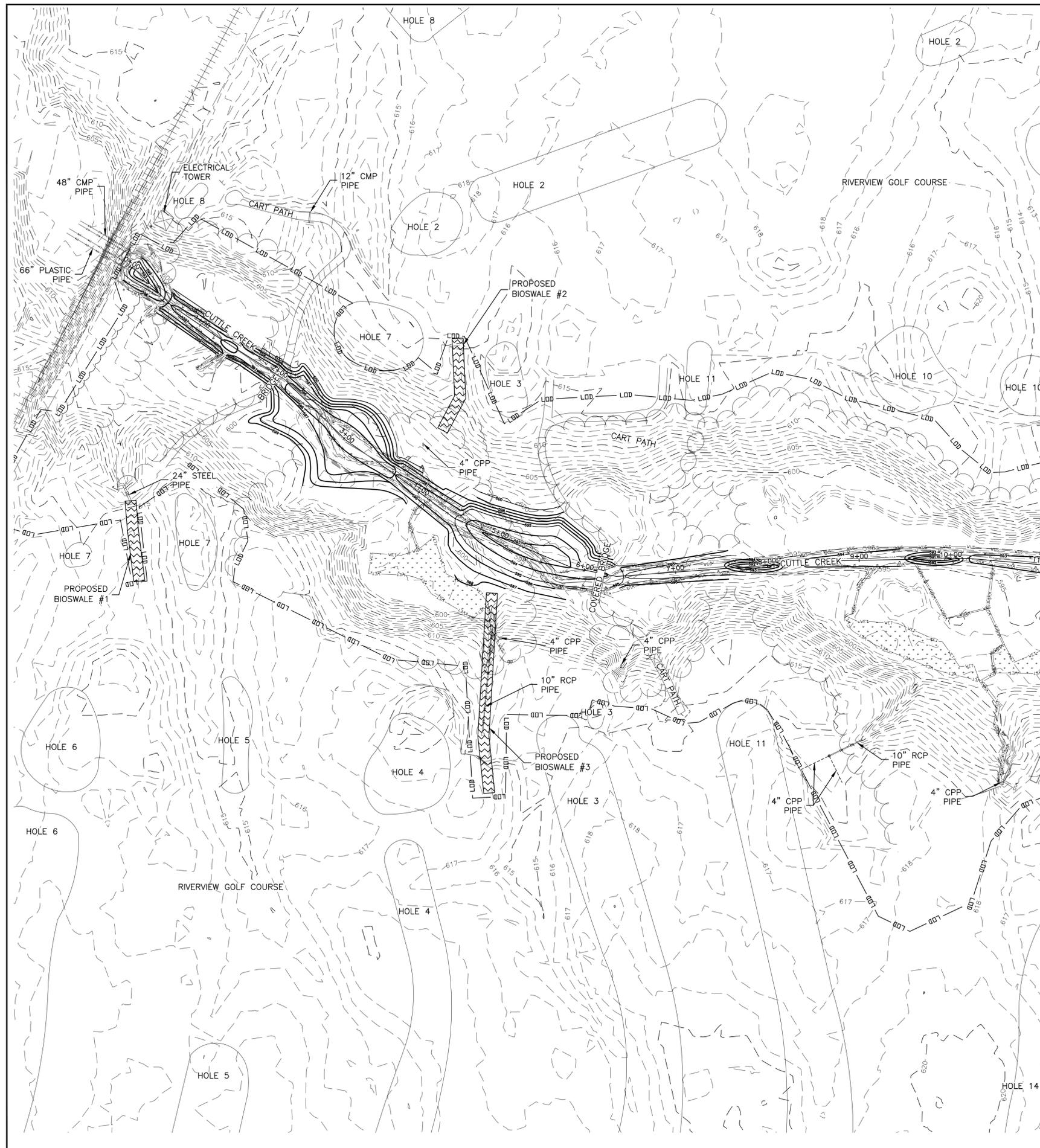
TABLE 4 BIOSWALE SEEDING AND PLANTING				
SCIENTIFIC NAME	COMMON NAME	SIZE (FT)	SPACING (FT)*	QUANTITY
PERENNIALS (PERSISTENT AND SPREADING WOODY-LIKE HERBS)				
<i>Eupatorium maculatum</i> (or similar)	SPOTTED JOE-PYE WEED		SEED MIX - 30%	
<i>Helianthus giganteus</i>	SWAMP SUNFLOWER		SEED MIX - 10%	
<i>Pycnanthemum virginianum</i>	VIRGINIA MOUNTAIN-MINT		SEED MIX - 30%	
<i>Symphotrichum novibellii</i>	NEW YORK ASTER		SEED MIX - 30%	
SHRUBS				
<i>Aronia arbutifolia</i> (or a showier and locally available cultivar)	PURPLE CHOKEBERRY	2-3'	7'	10
<i>Cornus sericea</i>	RED-OSIER DOGWOOD	2-3'	7'	10
<i>Ilex verticillata</i>	WINTERBERRY	2-3'	7'	10
<i>Hypericum pyramidatum</i> *	GIANT ST. JOHNSWORT	2-3'	7'	10
<i>Spiraea tomentosa</i>	STEEPLEBUSH	2-3'	7'	10
<i>Viburnum opulus</i> var. <i>americanum</i>	AMERICAN CRANBERRYBUSH	2-3'	7'	10

TABLE 5 FORESTED ENHANCEMENT SEEDING AND PLANTING				
SCIENTIFIC NAME	COMMON NAME	SIZE (FT)	SPACING (FT)	QUANTITY
HERBACEOUS PLANTS - ALONG WOODLAND EDGE AND IN CANOPY OPENINGS (partial sun)				
<i>Anemone virginiana</i>	TALL THIMBLEWEED		SEED MIX - 5%	
<i>Aquilegia canadensis</i>	WILD COLUMBINE		SEED MIX - 5%	
<i>Aster cordifolius</i>	HEART-LEAVE ASTER		SEED MIX - 5%	
<i>Campanula americana</i>	TALL BELLFLOWER		SEED MIX - 5%	
<i>Desmodium canadense</i>	SHOWY TICK-TREFOIL		SEED MIX - 5%	
<i>Elymus canadensis</i>	CANADA WILD RYE		SEED MIX - 20%	
<i>Elymus hystrix</i>	BOTTLEBRUSH GRASS		SEED MIX - 20%	
<i>Eupatorium rugosum</i>	SNAKEROOT		SEED MIX - 5%	
<i>Geranium maculatum</i>	WILD GERANIUM		SEED MIX - 5%	
<i>Helianthus divaricatus</i>	WOODLAND SUNFLOWER		SEED MIX - 5%	
<i>Monarda fistulosa</i>	WILD BERGAMOT		SEED MIX - 5%	
<i>Penstemon digitalis</i>	FOXGLOVE BEARDTONGUE		SEED MIX - 5%	
<i>Rudbeckia hirta</i>	BLACK-EYED SUSAN		SEED MIX - 5%	
<i>Schizachyium scoparium</i>	LITTLE BLUESTEM		SEED MIX - 20%	
<i>Solidago caesia</i>	WREATH GOLDENROD		SEED MIX - 5%	
UNDERSTORY SHRUBS/TREES				
<i>Cercis canadensis</i>	REDBUD	2-3'	7-10'	588
<i>Cornus florida</i>	FLOWERING DOGWOOD	2-3'	7-10'	588
<i>Hypericum prolificum</i>	SHRUBBY ST. JOHNSWORT	2-3'	7-10'	588
<i>Prunus virginiana</i>	CHOKECHERRY	2-3'	7-10'	588
<i>Viburnum prunifolium</i>	BLACK HAW VIBURNUM	2-3'	7-10'	588
CANOPY TREES				
<i>Acer rubrum</i>	RED MAPLE (FAC)	4-5'	20-40'	27
<i>Acer saccharum</i>	SILVER MAPLE (FACW)	6-8'	40'	27
<i>Aesculus glabra</i>	OHIO BUCKEYE	6-8'	40'	27
<i>Quercus alba</i>	WHITE OAK	6-8'	40'	27
<i>Quercus rubra</i>	NORTHERN RED OAK	4-5'	40'	27

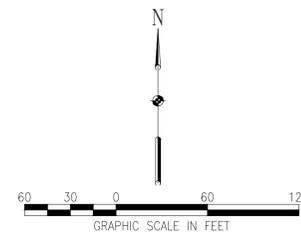
TABLE 6 FORESTED/SCRUB SHRUB WETLAND PLANTING				
SCIENTIFIC NAME	COMMON NAME	SIZE (FT)	SPACING (FT)	QUANTITY
SHRUBS/SMALL TREES				
<i>Alnus incana</i>	SPECKLED ALDER	4-5'	CLUMP IN GROUPS	97
<i>Cephalanthus occidentalis</i>	BUTTONBUSH	2-3'	7-10'	97
<i>Cornus amomum</i>	SILKY DOGWOOD	2-3'	7-10'	97
<i>Cornus sericea</i>	RED-OSIER DOGWOOD	2-3'	7-10'	97
<i>Physocarpus opulifolius</i>	NINEBARK	2-3'	7-10'	97
<i>Ribes americanum</i>	EASTERN BLACK CURRANT	2-3'	7-10'	97
<i>Sambucus canadensis</i>	RED ELDERBERRY	2-3'	7-10'	97
CANOPY TREES				
<i>Acer saccharinum</i>	SILVER MAPLE	6-8'	40'	5
<i>Carya ovata</i>	Shellbark hickory	4-5'	40'	5
<i>Fraxinus pennsylvanica</i>	GREEN ASH (OR RED ASH)	4-5'	20-40'	5
<i>Fraxinus nigra</i>	BLACK ASH	4-5'	20-40'	5
<i>Quercus palustris</i>	PIN OAK	4-5'	40'	5
<i>Quercus bicolor</i>	SWAMP WHITE OAK	6-8'	40'	5

- NOTES:
- UNDERSTORY HERBACEOUS PLANTS IN THE RIPARIAN PLANTING AREA SHALL ONLY BE PLACED IN OPEN CANOPY AREAS, WHICH HAS BEEN ESTIMATED TO BE 0.5 ACRES.
 - LIVE STAKES SHALL BE PLANTED IN 3 ROWS ON EACH BANK, APPROXIMATELY 2,900 LINEAR FEET.
 - IT WAS ASSUMED THAT 25% OF THE FORESTED ENHANCEMENT PLANTING AREA WOULD BE SEEDED WITH HERBACEOUS PLANTS, AND THE UNDERSTORY SHRUBS/TREES AND CANOPY TREES WOULD BE PLANTED IN 75% OF THE AREA.
 - HERBACEOUS PLANT SPECIES WITHIN THE FORESTED AND RIPARIAN AREAS WILL BE PLANTED INTERMITTENTLY BETWEEN SHRUB AND TREE SPECIES AS SPECIFIED IN THE TABLES LISTED ABOVE.
 - TREES AND SHRUBS SHALL BE INSTALLED IN A RANDOM PATTERN RATHER THAN A GRID-LIKE PATTERN WHERE ALL PLANTS ARE INSTALLED AT THE OVERALL SPACING RANGE LISTED AND SPECIFIED ON THE TABLES. SPACINGS APPLY TO EACH GROUP OF PLANTS AS A WHOLE.
 - PLANTS SHOULD BE SPACED AT A MINIMUM DISTANCE SPECIFIED ON THE TABLES ABOVE AND IN A RANDOM OR CLUMPING PATTERN.
 - MINOR ADJUSTMENTS TO PLANT MATERIAL PLACEMENT LOCATIONS MAY BE DIRECTED IN THE FIELD BY THE OWNER'S BIOLOGIST BASED ON EXISTING PLANT COMMUNITY SPECIES AND ECOSYSTEM STRUCTURE, AS WELL AS POST-GRADING FIELD CONDITIONS RELATED TO WITNESS OF A PARTICULAR AREA.
 - THE CONTRACTOR SHALL REPORT THE TOTAL NUMBER OF PLANTS AND STOCK USED PER SPECIES, PER ZONE, AND PER SHEET TO THE OWNER.
 - THE CONTRACTOR SHALL PURCHASE ALL PLANTS FROM A LOCAL NURSERY WITHIN APPROXIMATELY 50 MILES, OF THE SITE TO ENSURE NATIVE ECOTYPES.
 - PLANTING SCHEMES AND LAYOUTS SHOULD BE PLANTED TO CREATE REALISTIC CANOPY AND UNDER STORY HABITATS WITHIN WETLAND AND RIPARIAN BUFFER ZONES.

SEAL	REVISIONS	DESCRIPTION
	NO.	DATE
	BY	
		
CUTTLE CREEK RESTORATION ST. CLAIR RIVER MARYSVILLE, MICHIGAN		
PLANTING SCHEDULE		
PREPARED FOR: 		
 EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. (EA) (MI), PLC 455 EAST EISENHOWER PARKWAY, SUITE 50 ANN ARBOR, MI 48108 (734) 369-3410		
DATE	JUNE 2014	
DESIGNED BY	JJM	
DRAWN BY	CNS	
CHECKED BY	JMT	
PROJECT MANAGER	DLB	
PROJECT NUMBER	62561.08A	
SCALE	AS SHOWN	
FILE NAME	SEE FILE PATH	
DRAWING NUMBER	C-214	
SHEET NUMBER	19 OF 33	



NOTE:
1. THE BIOSWALE SHALL GENERALLY MATCH THE EXISTING SWALE SHAPE.



REVISIONS	
NO.	DESCRIPTION

SEAL



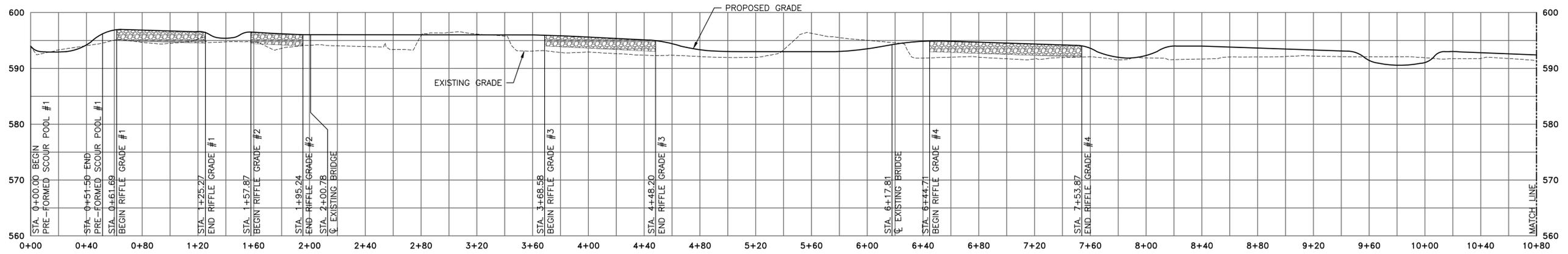
CUTTLE CREEK RESTORATION
ST. CLAIR RIVER
MARYSVILLE, MICHIGAN

BIOSWALE PLAN

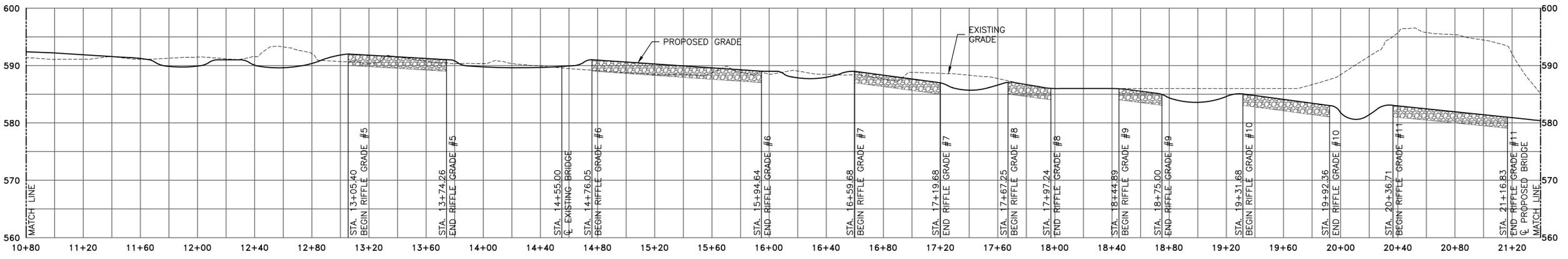
PREPARED FOR:
EPA

EA
EA ENGINEERING,
SCIENCE, AND
TECHNOLOGY,
(MI), PLC
455 EAST EISENHOWER
PARKWAY, SUITE 50
ANN ARBOR, MI 48108
(734)-369-3410

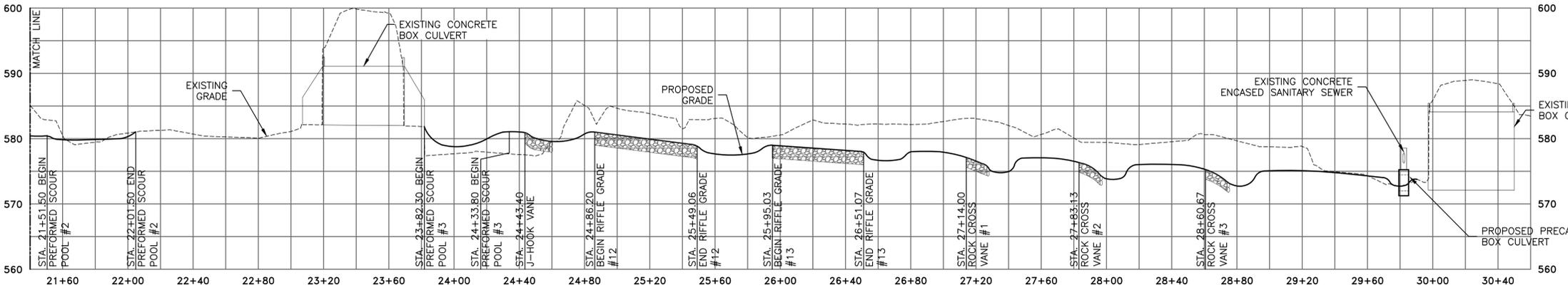
DATE	JUNE 2014
DESIGNED BY	JJM
DRAWN BY	CNS
CHECKED BY	JMT
PROJECT MANAGER	DLB
PROJECT NUMBER	62561.08A
SCALE	AS SHOWN
FILE NAME	SEE FILE PATH
DRAWING NUMBER	C-215
SHEET NUMBER	20 OF 33



1
CUTTLE CREEK PROFILE
 C-203 HORIZONTAL SCALE: 1"=40'
 THRU C-209
 GRAPHIC SCALE IN FEET
 VERTICAL SCALE: 1"=10'
 GRAPHIC SCALE IN FEET



1
CUTTLE CREEK PROFILE (CONT.)
 C-203 HORIZONTAL SCALE: 1"=40'
 THRU C-209
 GRAPHIC SCALE IN FEET
 VERTICAL SCALE: 1"=10'
 GRAPHIC SCALE IN FEET



1
CUTTLE CREEK PROFILE (CONT.)
 C-203 HORIZONTAL SCALE: 1"=40'
 THRU C-209
 GRAPHIC SCALE IN FEET
 VERTICAL SCALE: 1"=10'
 GRAPHIC SCALE IN FEET

LEGEND:
 — PROPOSED GRADE
 - - - - - EXISTING GRADE

NOTES:
 1. FOR STRUCTURE DETAILS SEE SHEETS C-501 TO C-506.
 2. FOR STRUCTURE CRITICAL ELEVATIONS SEE SHEET C-507.

NO.	DATE	BY	DESCRIPTION

CUTTLE CREEK RESTORATION
ST. CLAIR RIVER
 MARYSVILLE, MICHIGAN
PROFILE VIEW

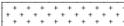
PREPARED FOR:
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DESIGNED BY	JJM
DRAWN BY	CNS
CHECKED BY	JMT
PROJECT MANAGER	DLB
PROJECT NUMBER	62561.08A
SCALE	AS SHOWN
FILE NAME	SEE FILE PATH
DRAWING NUMBER	C-301
SHEET NUMBER	21 OF 33

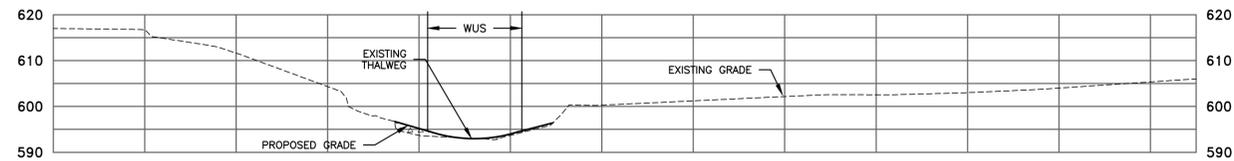
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LEGEND:

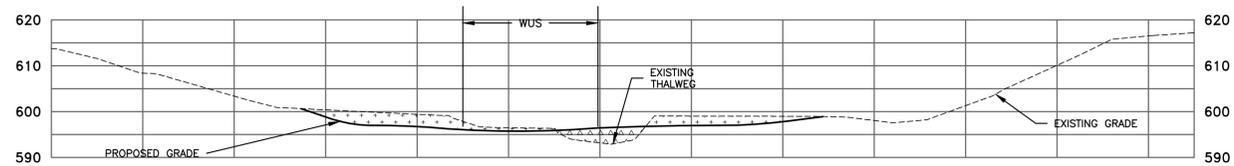
-  PROPOSED FILL
-  PROPOSED CUT
-  PROPOSED GRADE
-  EXISTING GRADE

NOTE:
1. CROSS SECTIONS ARE DEPICTED LEFT BANK TO RIGHT BANK LOOKING DOWNSTREAM

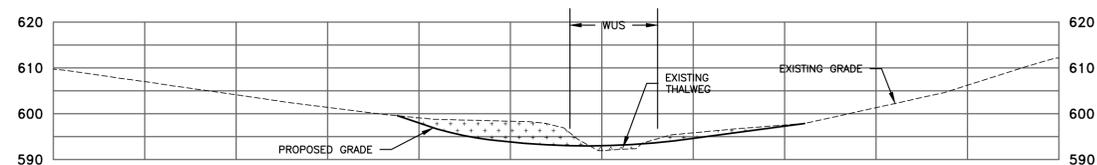
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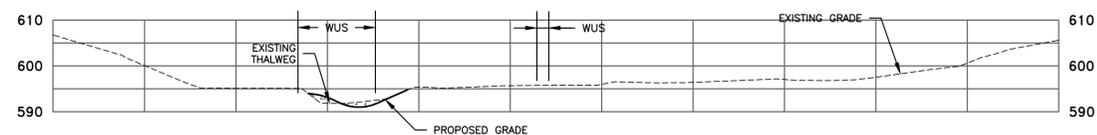
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C-203



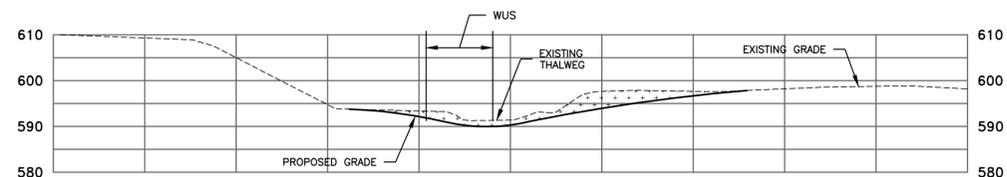
3 CROSS SECTION - STATION 3+01.4
C-204



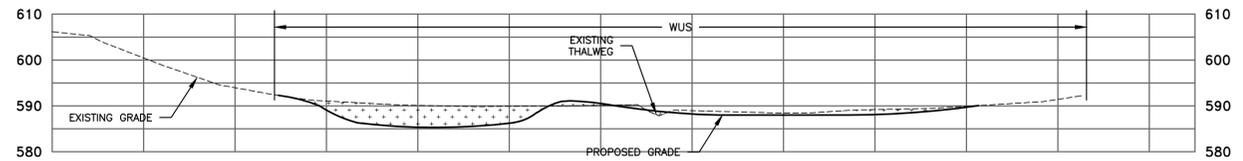
4 CROSS SECTION - STATION 5+41.3
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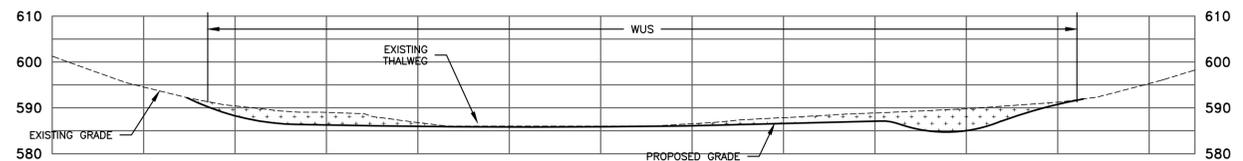
5 CROSS SECTION - STATION 9+85.4
C-205



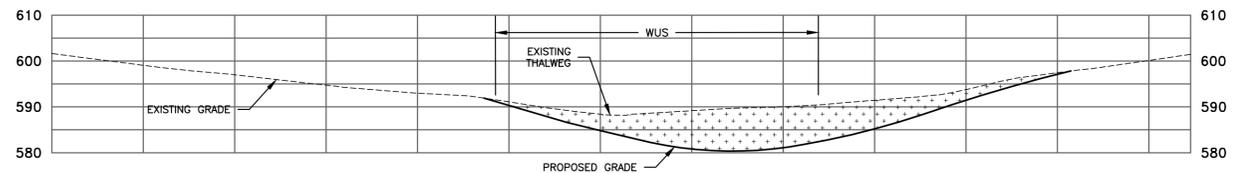
6 CROSS SECTION - STATION 11+80.5
C-205



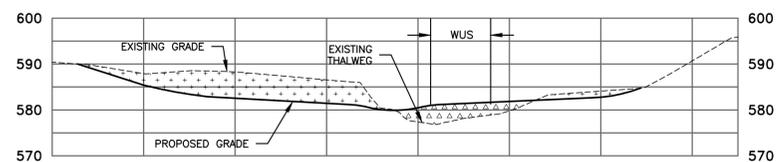
7 CROSS SECTION - STATION 16+34.3
C-206



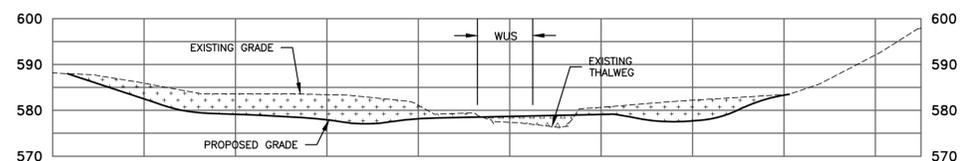
8 CROSS SECTION - STATION 18+29.8
C-207



9 CROSS SECTION - STATION 20+08.5
C-207



10 CROSS SECTION - STATION 24+59.2
C-208



11 CROSS SECTION - STATION 27+10.3
C-209

REVISIONS

NO. DATE BY

SEAL



CUTTLE CREEK RESTORATION
ST. CLAIR RIVER
MARYSVILLE, MICHIGAN

CROSS SECTIONS

PREPARED FOR:
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455 EAST EISENHOWER
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ANN ARBOR, MI 48108
(734)-369-3410

JUNE 2014

DESIGNED BY
JJM

DRAWN BY
CNS

CHECKED BY
JMT

PROJECT MANAGER
DLB

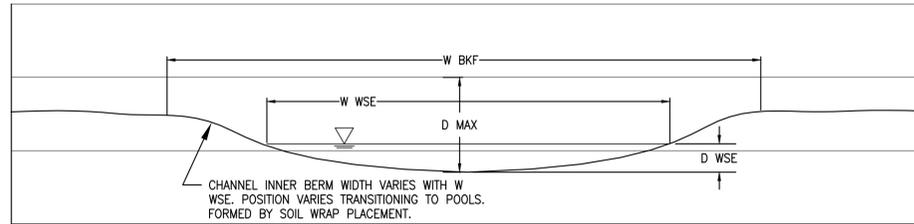
PROJECT NUMBER
62561.08A

SCALE
AS SHOWN

FILE NAME
SEE FILE PATH

DRAWING NUMBER
C-302

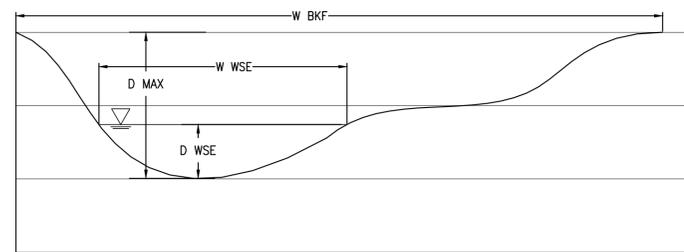
SHEET NUMBER
22 OF 33



TYPICAL RIFFLE CROSS SECTION

NOT TO SCALE

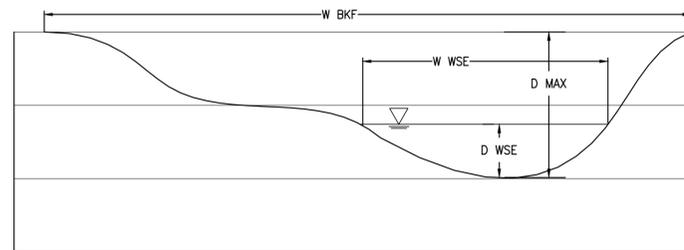
W BKF = 18.0-25.0'
 W WSE = 7.0 - 9.0'
 D MAX = 1.2 - 1.4'
 D WSE = 0.2 - 0.5'
 D AVG = 0.8 - 1.2'
 INNER BERM = >4.0'



TYPICAL POOL LEFT CROSS SECTION

NOT TO SCALE

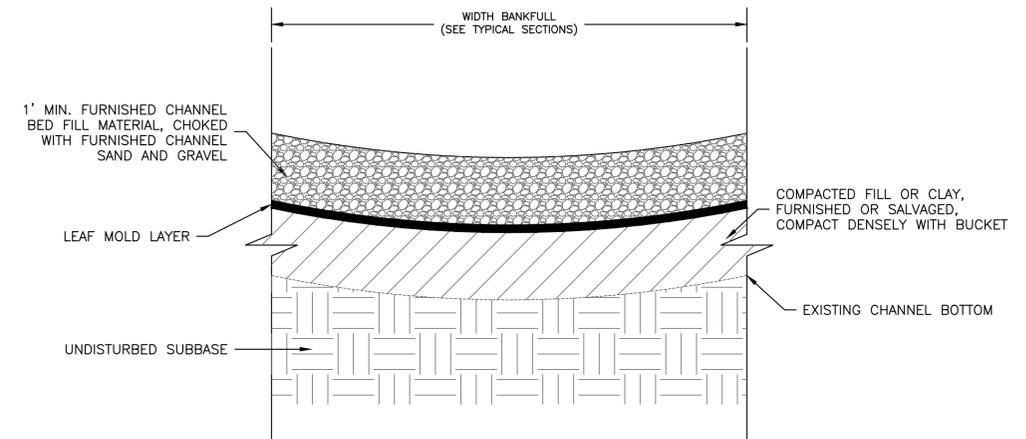
W BKF = 25.0-31.0'
 W WSE = 8.0 - 14.0'
 D MAX = 2.5 - 3.0'
 D WSE = 1.0 - 2.0'
 D AVG = 1.8 - 2.2'



TYPICAL POOL RIGHT CROSS SECTION

NOT TO SCALE

W BKF = 25.0-31.0'
 W WSE = 8.0 - 14.0'
 D MAX = 2.5 - 3.0'
 D WSE = 1.0 - 2.0'
 D AVG = 1.8 - 2.2'



TYPICAL CHANNEL BED FILL DETAIL

NOT TO SCALE

- NOTES:
1. INSTALL COMPACTED FILL MATERIAL, CLAY OR SILTY CLAY, TO PROPER ELEVATION.
 2. INSTALL LAYER OF LEAF MOLD ON NEW SUBGRADE. LOOSE MATERIALS MAY BE 3-6" UNCOMPACTED THICKNESS. LEAF MATERIALS WILL COMPRESS WITH PLACEMENT OF FURNISHED CHANNEL BED MATERIALS.
 3. PLACE FURNISHED CHANNEL BED MATERIAL AND WASH ON LAYER IN CHANNEL SAND AND BANK RUN GRAVEL TO PERCH FLOW. CONSTRUCTION IS COMPLETE WHEN THE STREAM PROPERLY PERCHES BASE FLOW ON THE SURFACE OF THE FINISHED GRADE.

REVISIONS		DESCRIPTION
NO.	DATE	BY

**CUTTLE CREEK RESTORATION
ST. CLAIR RIVER
MARYSVILLE, MICHIGAN**

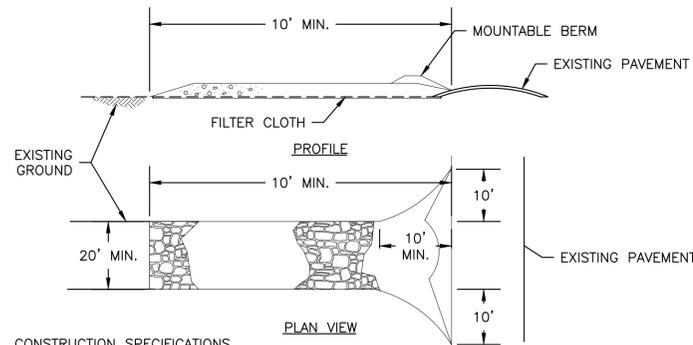
CROSS SECTIONS



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 TECHNOLOGY,
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 455 EAST EISENHOWER
 PARKWAY, SUITE 50
 ANN ARBOR, MI 48108
 (734)-369-3410

DESIGNED BY: JJM
 DRAWN BY: CNS
 CHECKED BY: JMT
 PROJECT MANAGER: DLB
 PROJECT NUMBER: 62561.08A
 SCALE: AS SHOWN
 FILE NAME: SEE FILE PATH
 DRAWING NUMBER: C-303
 SHEET NUMBER: 23 OF 33

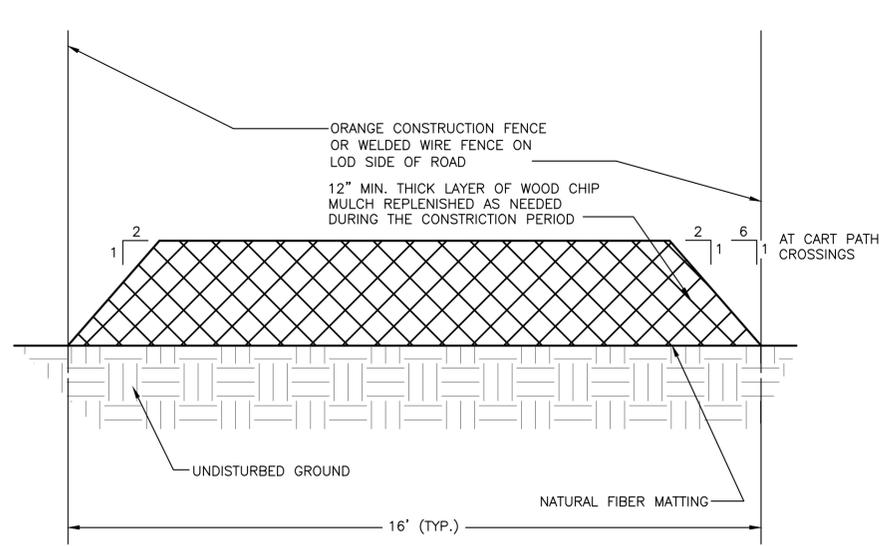
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CONSTRUCTION SPECIFICATIONS

1. STONE SIZE - USE 2" TO 3.5" CLEAN CRUSHED ROCK.
2. LENGTH - AS REQUIRED, BUT NOT LESS THAN 10 FEET.
3. THICKNESS - NOT LESS THAN SIX (6) INCHES. (COMPACTED)
4. WIDTH - TWENTY (20) FOOT MIN., BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
5. FILTER CLOTH - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING 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 ADJACENT ROADS. 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 ROADS MUST BE REMOVED IMMEDIATELY.
8. WASHING - WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO ROADS. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON A WASH PAD.
9. PERIODIC INSPECTION AND REQUIRED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN AND OTHER TIMES WHEN STONE VOIDS HAVE BEEN FILLED WITH SOIL.
10. ACCESS ROADS TO STABILIZED ENTRY POINTS SHALL BE MAINTAINED.
11. CONTRACTOR IS RESPONSIBLE FOR COMPLIANCE WITH FEDERAL, STATE AND LOCAL REGULATORY REQUIREMENTS.

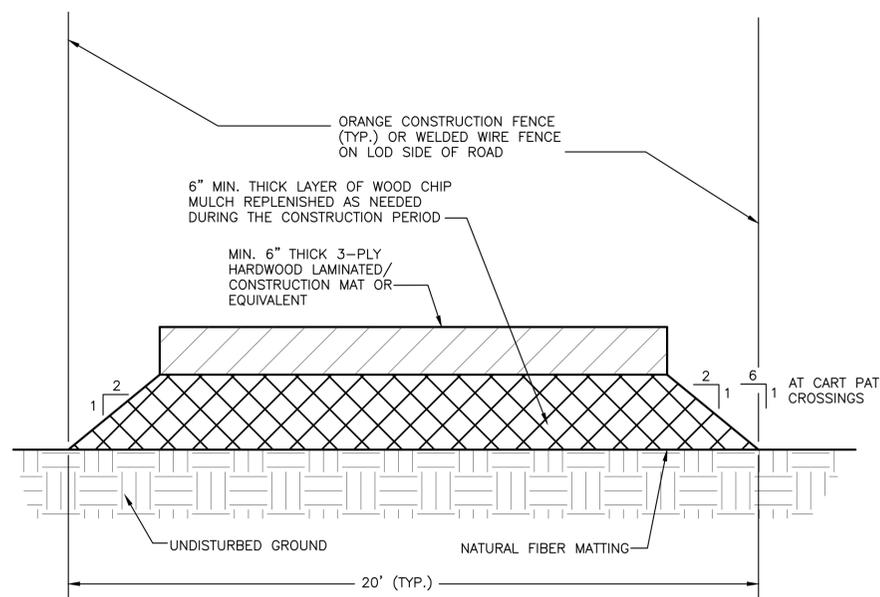
1 STABILIZED CONSTRUCTION ENTRANCE
C-202 NOT TO SCALE



MULCH ACCESS ROAD DETAIL NOTES:

1. ACCESS ROUTES TO BE VERIFIED BY OWNER AT PRE-CONSTRUCTION MEETING. REVISIONS TO THE ALIGNMENT THAT MINIMIZE TREE DISTURBANCE ARE ENCOURAGED AND REQUIRE REVIEW AND APPROVAL BY THE OWNER.
2. NATURAL FIBER MATTING SHALL BE PLACED WITH SEAMS PARALLEL TO THE FLOW OF TRAFFIC, OVERLAP FABRIC BY 18" MINIMUM AT SEAMS.
3. NATURAL FIBER MATTING MAY BE ELIMINATED AT DIRECTION OF OWNER.
4. CONTRACTOR SHALL MAINTAIN MULCH MAT THROUGHOUT CONSTRUCTION PERIOD. UPON COMPLETION OF THE PROJECT, MULCH CAN REMAIN IN PLACE, BEING SPREAD THROUGHOUT THE SITE AT A MAXIMUM DEPTH OF 2". THE CONTRACTOR MUST ENSURE THAT THIS PROCESS IS DONE THROUGHOUT THE GRADING PROCESS, IN A MANNER WHICH ENSURES PROPOSED GRADES ARE MET AND MAINTAINED, WITHOUT DISTURBANCE TO FINAL SEEDING AND PLANTING OF THE SITE. MULCH SHALL NOT BE SPREAD ON TURF GRASS SEEDING AREAS.
5. SCARIFICATION OF COMPACTED MULCH TO OCCUR UPON REMOVAL OF ACCESS ROAD, AT DIRECTION OF THE OWNER.
6. THE ACCESS ROAD IS DESIGNED TO PREVENT COMPACTION OF EXISTING SOILS USING LOW PRESSURE EQUIPMENT WHICH EXERTS NO MORE THAN 12 PSL. IF THE CONTRACTOR INTENDS TO USE ANY EQUIPMENT WITH HIGHER LOADS, ADDITIONAL PROTECTION MEASURES MUST BE PROVIDED, AT NO ADDITIONAL COST TO THE COUNTY, AND THOSE MEASURES MUST BE APPROVED BY THE OWNER PRIOR TO IMPLEMENTATION.

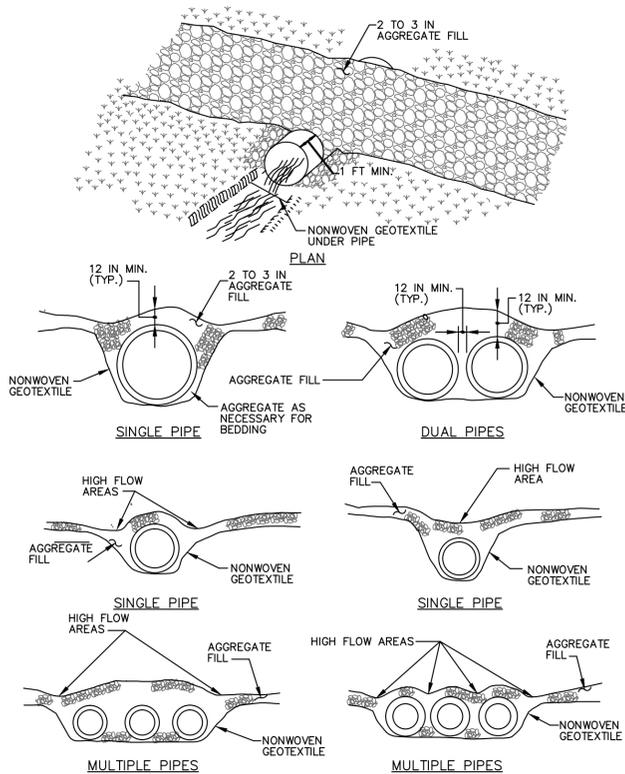
2 MULCH ACCESS ROAD DETAIL
C-201 NOT TO SCALE
C-202



HARDWOOD MAT AND MULCH ACCESS ROAD DETAIL NOTES:

1. HARDWOOD MATS TO BE INSTALLED AS INDICATED ON CONSTRUCTION DOCUMENTS IN CRITICAL ROOT ZONES OF TREES 24" AND GREATER, WETLANDS, AND ABOVE SANITARY LINES.
2. ACCESS ROUTES TO BE VERIFIED BY OWNER AT PRE-CONSTRUCTION MEETING. REVISIONS TO THE ALIGNMENT THAT MINIMIZE TREE DISTURBANCE ARE ENCOURAGED, AND REQUIRE REVIEW AND APPROVAL BY THE OWNER.
3. NATURAL FIBER MATTING MAY BE ELIMINATED AT DIRECTION OF OWNER.
4. NATURAL FIBER MATTING SHALL BE PLACED WITH SEAMS PARALLEL TO THE FLOW OF TRAFFIC, OVERLAP FABRIC BY 18" MINIMUM AT SEAMS.
5. CONTRACTOR SHALL MAINTAIN MULCH MAT THROUGHOUT CONSTRUCTION PERIOD. UPON COMPLETION OF THE PROJECT, MULCH CAN REMAIN IN PLACE AT A MAXIMUM DEPTH OF 2". MULCH SHALL NOT BE SPREAD ON TURF GRASS SEEDING AREAS.
6. SCARIFICATION OF COMPACTED MULCH TO OCCUR UPON REMOVAL OF HAUL ROAD, AT DIRECTION OF THE OWNER.

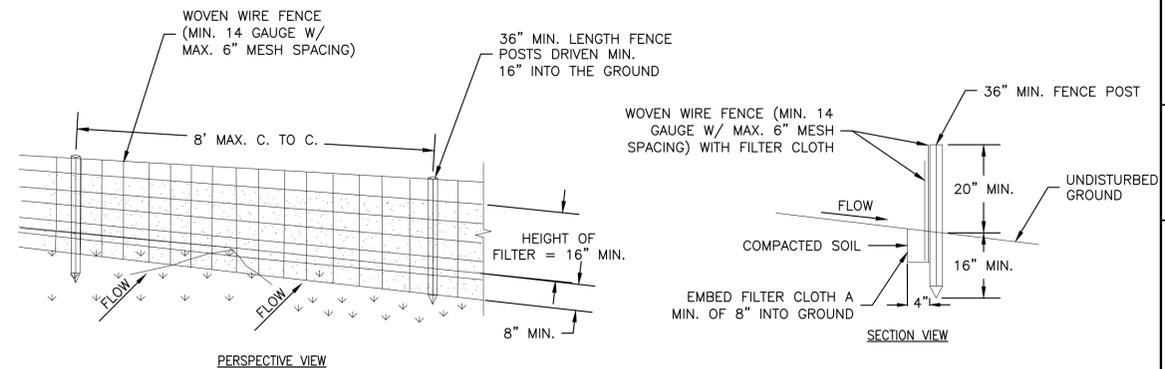
3 HARDWOOD MAT AND MULCH ACCESS ROAD DETAIL
C-201 NOT TO SCALE
C-202



CONSTRUCTION SPECIFICATIONS

1. EXTEND THE CULVERT(S) A MINIMUM OF ONE FOOT BEYOND THE UPSTREAM AND DOWNSTREAM TOE OF THE AGGREGATE PLACED AROUND THE CULVERT.
2. PLACE NONWOVEN GEOTEXTILE ON THE STREAM BED AND STREAM BANKS PRIOR TO PLACEMENT OF THE PIPE CULVERT(S) AND AGGREGATE. COVER THE STREAM BED WITH THE GEOTEXTILE AND EXTEND IT A MINIMUM SIX INCHES AND A MAXIMUM OF ONE FOOT BEYOND THE END OF THE CULVERT AND BEDDING MATERIAL. USE NONWOVEN GEOTEXTILE.
3. PLACE CULVERT(S) ON THE NATURAL STREAM BED GRADE TO MINIMIZE INTERFERENCE WITH FISH PASSAGE.
4. COVER THE CULVERT WITH A MINIMUM OF ONE FOOT OF WASHED AGGREGATE. FOR MULTIPLE CULVERTS PROVIDE AT LEAST 12 INCHES OF COMPACTED AGGREGATE FILL BETWEEN CULVERTS.
5. STABILIZE ALL AREAS DISTURBED DURING CULVERT INSTALLATION WITHIN 24 HOURS OF THE DISTURBANCE IN ACCORDANCE WITH SPECIFICATIONS.
6. STABILIZE APPROACH TO CROSSING AND KEEP FREE OF EROSION. REPLACE DISPLACED STONE, AND MAINTAIN HIGH FLOW AREAS. REMOVE DEBRIS TRAPPED BY CULVERT. REPLACE DAMAGED PIPE(S). MAINTAIN AREAS ADJACENT TO CROSSING TO CONTINUOUSLY MEET REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT IN ACCORDANCE WITH SPECIFICATIONS.
7. AFTER THE TEMPORARY CROSSING IS NO LONGER NEEDED, REMOVE IT WITHIN 14 CALENDAR DAYS. IF SUBJECT TO THE USE DESIGNATION CLOSURE, REMOVE AT THE END OF CLOSURE PERIOD. PROTECT STREAM BANKS DURING CULVERT REMOVAL AND STABILIZE ALL DISTURBED AREAS WITH WOVEN FIBER MATTING. ACCOMPLISH REMOVAL OF THE CULVERT AND CLEAN UP OF THE AREA WITHOUT CONSTRUCTION EQUIPMENT WORKING IN THE WATERWAY CHANNEL. STORE ALL REMOVED MATERIALS IN AN APPROVED STAGING AREA.

4 TEMPORARY BRIDGE/ CROSSING DETAIL
C-201 NOT TO SCALE
C-202



NOTES:

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD WITH A MINIMUM CROSS-SECTIONAL AREA OF 3 SQUARE INCHES.
2. FILTER CLOTH TO BE TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH SPACED EVERY 24" AT TOP, MID SECTION, AND BOTTOM. FENCE SHALL BE WOVEN WIRE, 14 GAUGE, 6" MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE LAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.
4. PREFABRICATED UNITS SHALL BE GEOFAB, ENVROFENCE, OR APPROVED EQUIVALENT.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.
6. ANY TORN SILT FENCE CLOTH SECTIONS SHALL BE REPLACED BY THE CONTRACTOR IMMEDIATELY.

5 TEMPORARY SILT FENCE DETAIL
C-210 NOT TO SCALE
C-211

NO.	DATE	BY	DESCRIPTION

CUTTLE CREEK RESTORATION
ST. CLAIR RIVER
MARYSVILLE, MICHIGAN

DETAILS 1

PREPARED FOR:
EPA

EA
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, (MI), PLC
455 EAST EISENHOWER PARKWAY, SUITE 50
ANN ARBOR, MI 48108
(734)-369-3410

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. (EA) DOES BUSINESS AS EA SCIENCE AND TECHNOLOGY IN THE STATE OF MICHIGAN AND EA IS AN AFFILIATE OF EA ENGINEERING, SCIENCE, AND TECHNOLOGY (M), PLC.

DATE: JUNE 2014

DESIGNED BY: JJM

DRAWN BY: CNS

CHECKED BY: JMT

PROJECT MANAGER: DLB

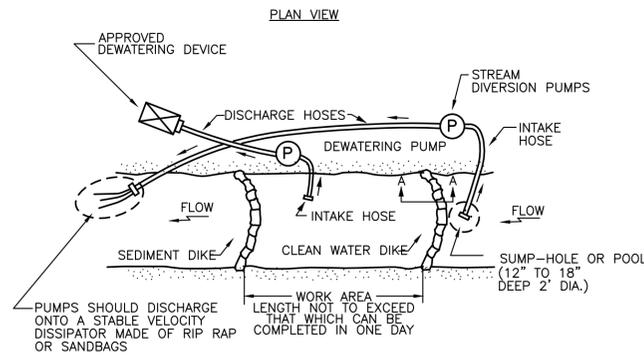
PROJECT NUMBER: 62561.08A

SCALE: AS SHOWN

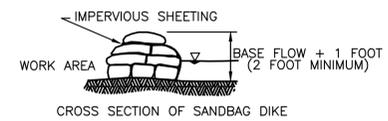
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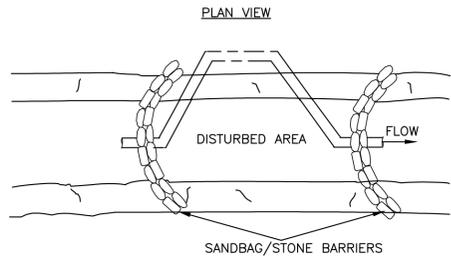
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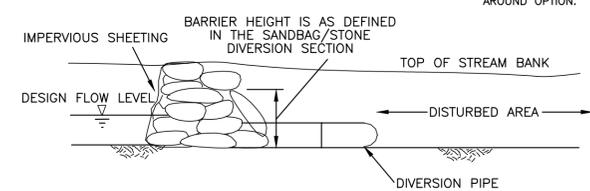
SECTION A-A



8 PUMP-AROUND PRACTICE DETAIL
C-210 NOT TO SCALE
C-211



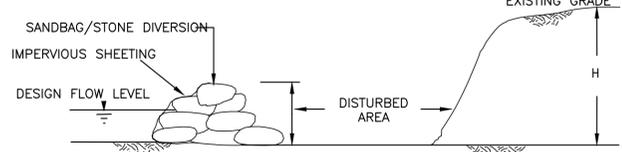
LONGITUDINAL SECTION VIEW



NOTE: THIS IS A GRAVITY DRIVEN PUMP AROUND OPTION.

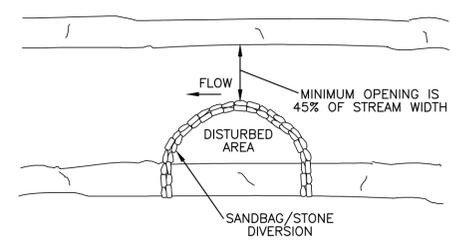
6 TEMPORARY ACCESS CULVERT DETAIL
C-210 NOT TO SCALE
C-211

TRANSVERSE SECTION VIEW



H/2+1 FT (0.3 M) FOR PROJECTS OF DURATION 2 WEEKS;
2-YEAR FLOOD ELEVATION FOR PROJECTS OF LONGER DURATION

PLAN VIEW



7 SANDBAG/STONE DIVERSION DETAIL
C-210 NOT TO SCALE
C-211

PUMP-AROUND PRACTICE STANDARD NOTES:

DESCRIPTION

THE WORK SHALL CONSIST OF INSTALLING A TEMPORARY PUMP AROUND AND SUPPORTING MEASURES TO DIVERT FLOW AROUND INSTREAM CONSTRUCTION SITES.

IMPLEMENTATION SEQUENCE

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

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

PUMP-AROUND PRACTICE NOTES:

- PUMP AROUND PRACTICES ARE INTENDED TO DIVERT AVERAGE DAILY FLOW, WHICH IS ESTIMATED AT APPROXIMATELY 0-1 CUBIC FEET PER SECOND (CFS) OR UP TO 27,000 GALLONS PER HOUR (GPH). THEREFORE, APPROXIMATELY A MINIMUM 4" DIAMETER OUTLET PUMP WILL BE REQUIRED TO DIVERT BASE FLOW.
- PUMPS SHALL BE INSTALLED OUTSIDE OF THE STREAM CHANNEL, AND ATTENDED TO THROUGHOUT THE DAY TO ENSURE THEIR STEADY OPERATION.
- PUMPS SHALL BE PLACED ON A DROP CLOTH, TRAY OR PAN TO COLLECT ANY OIL, GREASE, OR FUEL AND PREVENT POTENTIAL POLLUTION OF SURFACE WATERS.
- IN THE EVENT OF IMPENDING STORMS WHICH WOULD OVERWHELM PUMP-AROUND PRACTICES, THE PRACTICES ARE TO BE REMOVED FROM THE CHANNEL AND FLOOD PRONE AREA, WITH THE CHANNEL STABILIZED TO ALLOW NATURAL STABLE CONVEYANCE OF FLOW.
- IF WORK IS LIMITED TO A SMALL AREA ON ONE BANK, THE CONTRACTOR MAY UTILIZE SANDBAG/STONE DIVERSION DETAIL THIS SHEET TO DIVERT FLOW RATHER THAN A FULL PUMP-AROUND. THIS PRACTICE MAY BE UTILIZED WITH THE APPROVAL OF THE OWNER.
- WITH THE APPROVAL OF THE OWNER, THE CONTRACTOR MAY DIVERT FLOW FROM THE CULVERT AT THE UPSTREAM EXTENT OF THE SITE TO ANY LOWER LOCATION AS CONVENIENT FOR ACCOMPLISHING DAILY WORK. ALTERNATIVELY, WORK MAY ALSO BE COMPLETED FOR ALL WORK UPSTREAM OF THE EXISTING POND WHILE FLOW IS PRESENT IN THE CHANNEL, SO LONG AS THE POND IS UTILIZED AS A SEDIMENT BASIN AND DISCHARGE WATER IS STRICTLY MONITORED FOR TURBIDITY. DAILY STABILIZATION AND OTHER BEST MANAGEMENT PRACTICES MUST BE FOLLOWED AT ALL TIMES.

SANDBAG/STONE CHANNEL DIVERSION PRACTICE STANDARD NOTES:

DESCRIPTION

THE WORK SHOULD CONSIST OF INSTALLING SANDBAG OR STONE FLOW DIVERSIONS FOR THE PURPOSE OF EROSION CONTROL WHEN CONSTRUCTION ACTIVITIES OCCUR WITHIN THE STREAM CHANNEL.

EFFECTIVE USES & LIMITATIONS

DIVERSIONS ARE USED TO ISOLATE WORK AREAS FROM FLOW DURING THE CONSTRUCTION OF IN-STREAM PROJECTS. DIVERSIONS WHICH HAVE AN INSUFFICIENT FLOW CAPACITY CAN FAIL AND SEVERELY ERODE THE DISTURBED CHANNEL SECTION UNDER CONSTRUCTION. THEREFORE, IN-CHANNEL CONSTRUCTION ACTIVITIES SHOULD OCCUR ONLY DURING PERIODS OF LOW RAINFALL. THIS TEMPORARY MEASURE MAY NOT BE PRACTICAL IN LARGE CHANNELS.

MATERIAL SPECIFICATIONS

- MATERIALS FOR SANDBAG AND STONE STREAM DIVERSIONS SHOULD MEET THE FOLLOWING REQUIREMENTS:
- RIPRAP: RIPRAP SHOULD BE WASHED AND HAVE A MINIMUM DIAMETER OF 6 INCHES (0.15 METERS).
- SANDBAGS: SANDBAGS SHOULD CONSIST OF 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.).
- SHEETING: SHEETING SHOULD CONSIST OF POLYETHYLENE OR OTHER MATERIALS WHICH ARE IMPERVIOUS AND RESISTANT TO PUNCTURE AND TEARING.

INSTALLATION GUIDELINES

ALL EROSION AND SEDIMENT CONTROL DEVICES, INCLUDING DEWATERING BASINS, SHOULD BE IMPLEMENTED AS THE FIRST ORDER OF BUSINESS ACCORDING TO A PLAN APPROVED BY THE OWNER. INSTALLATION SHOULD PROCEED FROM UPSTREAM TO DOWNSTREAM DURING PERIODS OF LOW FLOW. IF NECESSARY, SILT FENCE OR STRAW BALES SHOULD BE INSTALLED AROUND THE PERIMETER OF THE WORK AREA.

SANDBAG/STONE DIVERSIONS CAN BE USED INDEPENDENTLY OR AS COMPONENTS OF OTHER STREAM DIVERSION TECHNIQUES. INSTALLATION OF THIS MEASURE SHOULD PROCEED AS FOLLOWS:

- THE DIVERSION STRUCTURE SHOULD BE INSTALLED FROM UPSTREAM TO DOWNSTREAM.
- THE HEIGHT OF THE SANDBAG/STONE DIVERSION SHOULD BE A FUNCTION OF THE DURATION OF THE PROJECT IN THE STREAM REACH. FOR PROJECTS WITH A DURATION LESS THAN 2 WEEKS, THE HEIGHT OF THE DIVERSION SHOULD BE ONE HALF THE STREAMBANK HEIGHT, MEASURED FROM THE CHANNEL BED, PLUS 1 FOOT (0.3 METERS) OR BANKFULL HEIGHT, WHICHEVER IS GREATER. FOR PROJECTS OF LONGER DURATION, THE TOP OF THE SANDBAG OR STONE DIVERSION SHOULD CORRESPOND TO BANKFULL HEIGHT. FOR DIVERSION STRUCTURES UTILIZING SANDBAGS, THE STREAM BED SHOULD BE HAND PREPARED PRIOR TO PLACEMENT OF THE BASE LAYER OF SANDBAGS IN ORDER TO ENSURE A WATER TIGHT FIT. ADDITIONALLY, IT MAY BE NECESSARY TO PREPARE THE BANK IN A SIMILAR FASHION.
- ALL EXCAVATED MATERIAL SHOULD BE DEPOSITED AND STABILIZED IN AN APPROVED AREA OUTSIDE THE 100-YEAR FLOODPLAIN UNLESS OTHERWISE AUTHORIZED BY THE OWNER.
- SEDIMENT-LADEN WATER FROM THE CONSTRUCTION AREA SHOULD BE PUMPED TO A DEWATERING BASIN.
- SHEETING ON THE DIVERSION SHOULD BE POSITIONED SUCH THAT THE UPSTREAM PORTION COVERS THE DOWNSTREAM PORTION WITH AT LEAST A 18-INCH (0.45 METERS) OVERLAP.
- SANDBAG OR STONE DIVERSIONS SHOULD NOT OBSTRUCT MORE THAN 45% OF THE STREAM WIDTH. ADDITIONALLY, BANK STABILIZATION MEASURES SHOULD BE PLACED IN THE CONSTRICTED SECTION IF ACCELERATED EROSION AND BANK SCOUR ARE OBSERVED DURING THE CONSTRUCTION TIME OR IF PROJECT TIME IS EXPECTED TO LAST MORE THAN 2 WEEKS.
- PRIOR TO REMOVAL OF THESE TEMPORARY STRUCTURES, ANY ACCUMULATED SEDIMENT SHOULD BE REMOVED, DEPOSITED AND STABILIZED IN AN APPROVED AREA OUTSIDE THE 100-YEAR FLOODPLAIN UNLESS AUTHORIZED BY THE OWNER.
- SEDIMENT CONTROL DEVICES ARE TO REMAIN IN PLACE UNTIL ALL DISTURBED AREAS ARE STABILIZED IN ACCORDANCE WITH AN APPROVED SEDIMENT AND EROSION CONTROL PLAN AND THE INSPECTING AUTHORITY APPROVES THEIR REMOVAL.

BEST MANAGEMENT PRACTICES FOR WORKING IN WETLANDS, WATERWAYS, AND 100-YR FLOOD PLAINS

- NO EXCESS FILL, CONSTRUCTION MATERIAL, OR DEBRIS SHALL BE STOCKPILED OR STORED IN WETLANDS, WATERWAYS, OR 100-YR FLOOD PLAINS UNLESS EXPLICIT EXEMPTION IS GRANTED.
- PLACE MATERIALS IN A LOCATION AND MANNER WHICH DOES NOT ADVERSELY IMPACT SURFACE OR SUBSURFACE WATER FLOW INTO OR OUT OF WETLANDS, WATERWAYS, OR 100-YR FLOODPLAIN.
- PLACE HEAVY EQUIPMENT ON MATS OR SUITABLY OPERATE THE EQUIPMENT TO PREVENT DAMAGE TO WETLANDS, WATERWAYS, OR 100-YR FLOODPLAIN.
- REPAIR AND MAINTAIN ANY SERVICEABLE STRUCTURE OR FILL SO THERE IS NO PERMANENT LOSS OF WETLANDS, WATERWAYS, OR PERMANENT MODIFICATION OF THE 100-YR FLOODPLAIN IN EXCESS OF THAT LOST UNDER THE ORIGINALLY AUTHORIZED STRUCTURE OF FILL.
- RECTIFY ANY WETLANDS, WATERWAYS, OR 100-YR FLOODPLAIN TEMPORARILY IMPACTED BY ANY CONSTRUCTION.
- AFTER INSTALLATION HAS BEEN COMPLETED, MAKE POST-CONSTRUCTION GRADES AND ELEVATIONS THE SAME AS ORIGINAL GRADES AND ELEVATIONS IN TEMPORARY IMPACTED AREAS.
- TO PROTECT AQUATIC SPECIES, IN-STREAM WORK IS PROHIBITED AS DETERMINED BY THE CLASSIFICATION OF THE STREAM:
- STORMWATER RUNOFF FROM IMPERVIOUS SURFACES SHALL BE CONTROLLED TO PREVENT THE WASHING OF DEBRIS INTO THE WATERWAY.
- CULVERTS SHALL BE CONSTRUCTED AND ANY RIPRAP PLACED SO AS NOT TO OBSTRUCT THE MOVEMENT OF AQUATIC SPECIES, UNLESS THE PURPOSE OF THE ACTIVITY IS TO IMPOUND WATER.

SEAL	NO.	DATE	BY	DESCRIPTION

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CHECKED: JMT

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SCALE: AS SHOWN

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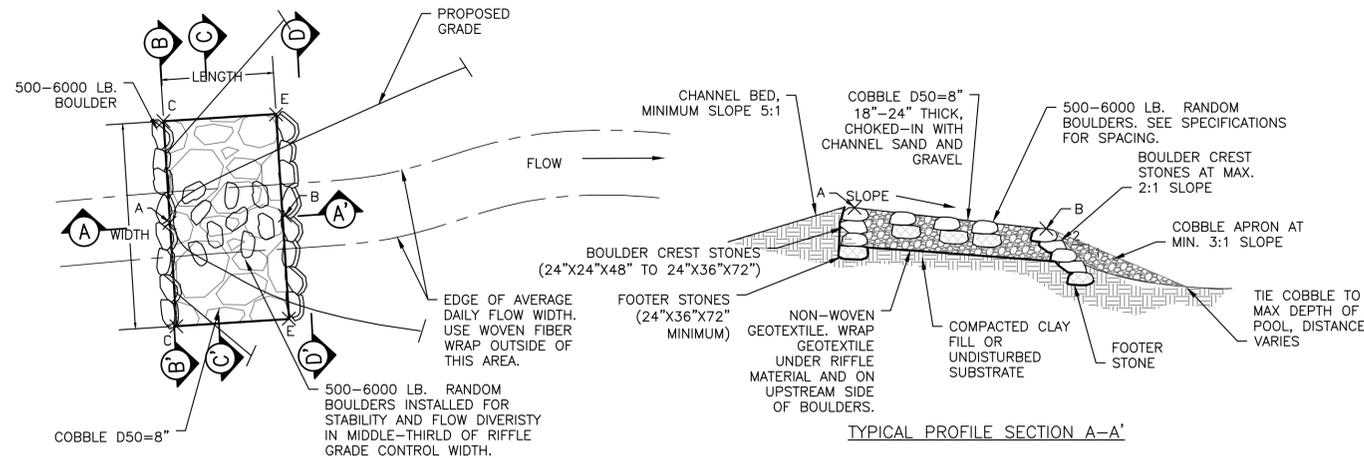
SHEET NUMBER: 25 OF 33

CUTTLE CREEK RESTORATION
ST. CLAIR RIVER
MARYSVILLE, MICHIGAN

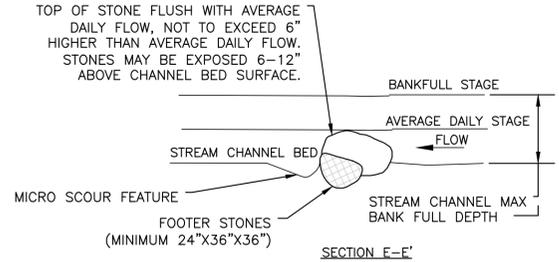
PREPARED FOR:
EPA

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EA ENGINEERING, SCIENCE, AND TECHNOLOGY, (MI), PLC
455 EAST EISENHOWER PARKWAY, SUITE 50
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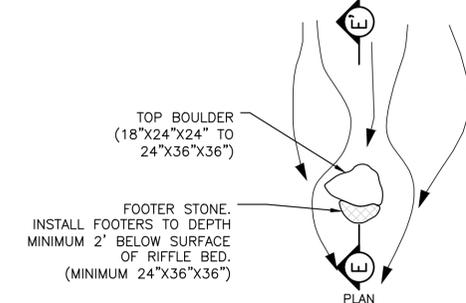
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DESIGNED BY: JMM
DRAWN BY: CNS
CHECKED BY: JMT
PROJECT MANAGER: DLB
PROJECT NUMBER: 62561.08A
SCALE: AS SHOWN
FILE NAME: SEE FILE PATH
DRAWING NUMBER: C-502
SHEET NUMBER: 25 OF 33



TYPICAL PROFILE SECTION A-A'



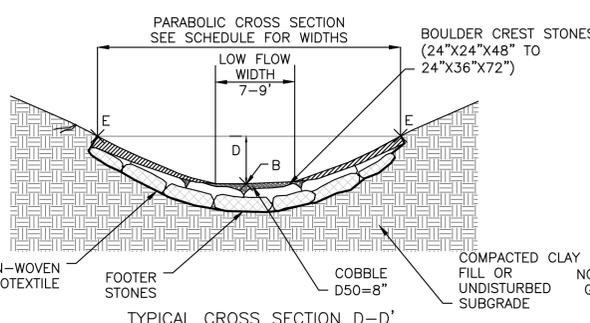
SECTION E-E'



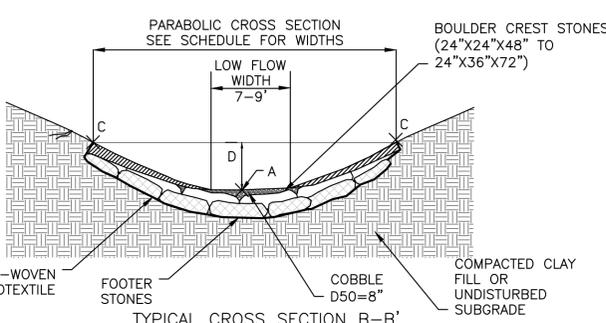
PLAN

9 RIFFLE GRADE CONTROL/ STEP POOL COMPLEX (WEIR) TYPICAL PLAN AND DETAIL

NOT TO SCALE. ELEVATIONS STATED HERE ARE ILLUSTRATIVE ONLY. USE ELEVATIONS AS NOTED IN STRUCTURE SCHEDULES.



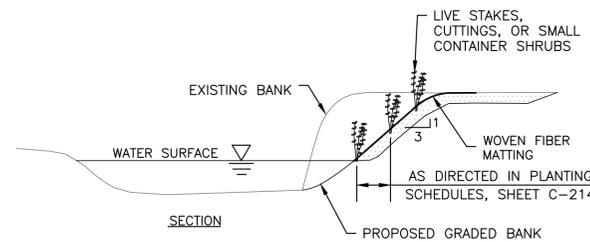
TYPICAL CROSS SECTION D-D'



TYPICAL CROSS SECTION B-B'

10 RANDOM BOULDER DETAIL

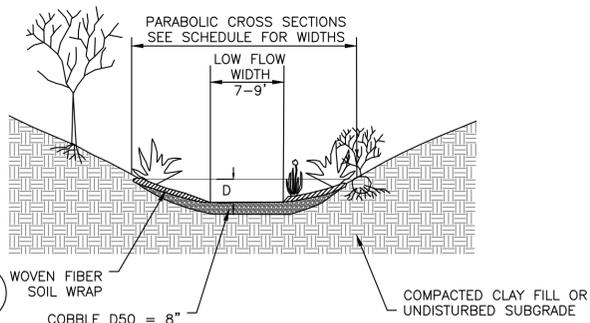
NOT TO SCALE. MUST BE FIELD-FIT. CONFIGURATION AND NUMBER MAY VARY. RANDOM BOULDER INCLUDES TOP BOULDER AND FOOTER STONE.



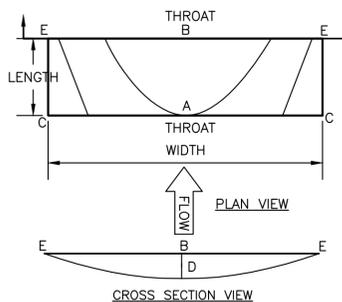
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11 GRADED STREAM BANK AND WOVEN FIBER MATTING DETAIL

NOT TO SCALE

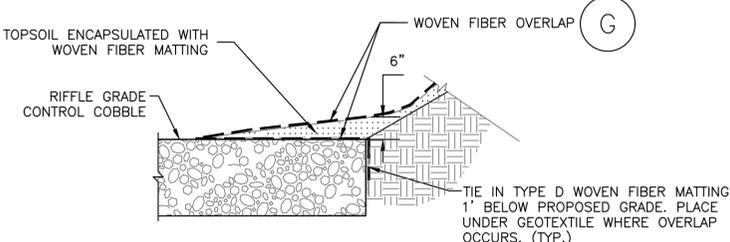


TYPICAL CROSS SECTION C-C'



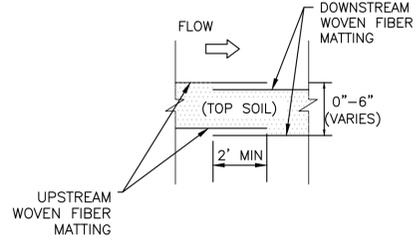
CRITICAL POINT SCHEMATIC

- NOTES:
1. GEOTEXTILE (ASTM D-4833 OR ASTM D-463) SHALL BE PLACED OVER THE PREPARED SURFACE OF THE EXCAVATION AND SAND / WOOD CHIP FILL UNDER THE BOULDERS. USE SECURING PINS TO ANCHOR THE FABRIC IN PLACE. WHERE FABRIC OVERLAPS ARE NECESSARY, THE MINIMUM OVERLAP SHALL BE AT LEAST 12 INCHES WITH THE UPSTREAM GEOTEXTILE PLACED OVER THE DOWNSTREAM PIECE.
 2. WOVEN FIBER SOIL WRAP WILL HAVE OVELAPPING WOVEN FIBER MATTING AT A THICKNESS OF 6" AT THE EDGES OF THE RIFFLE GRADE CONTROL, GRADUALLY REDUCING TO MEET THE LOW FLOW WIDTH. CRITICAL POINTS "C" AND "E" ARE TAKEN ON THE TOP OF THE FINISHED SOIL WRAP. STONE ELEVATIONS ARE 6" LOWER THAN THE FINISHED ELEVATION AT THESE POINTS.
 3. GEOTEXTILE IS REQUIRED UNDER THE BOULDERS. IF GEOTEXTILE IS PUNCTURED THE BOULDERS SHALL BE FULLY REMOVED FOR AT LEAST THREE FEET OUTSIDE THE LIMITS OF THE FABRIC PUNCTURE AND A NEW GEOTEXTILE FABRIC OVERLAP SHALL BE SECURELY FASTENED OVER THE PUNCTURE WITH SECURING PINS.
 4. SEE STRUCTURE TABLE, SHEET C-507.



F WOVEN FIBER SOIL WRAP DETAIL

NOT TO SCALE



G WOVEN FIBER SOIL WRAP OVERLAP DETAIL

NOT TO SCALE

RIFFLE GRADE CONTROL FRONT AND BACK SECTION ELEVATIONS

NOT TO SCALE

RIFFLE GRADE CONTROL BOULDER AND COBBLE TYPICAL SECTIONS

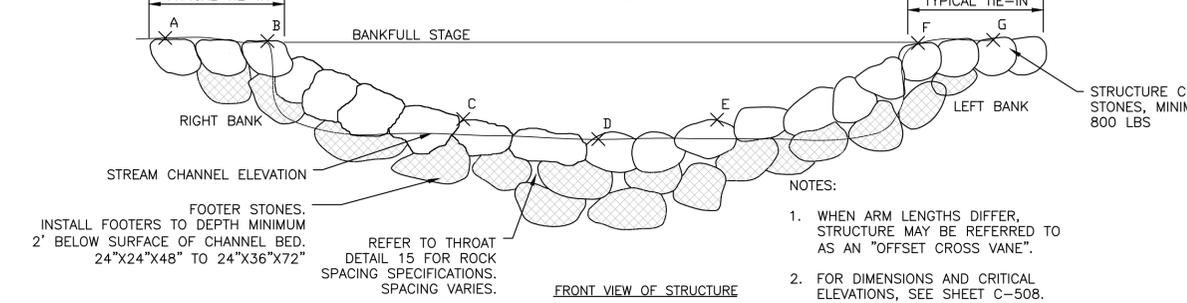
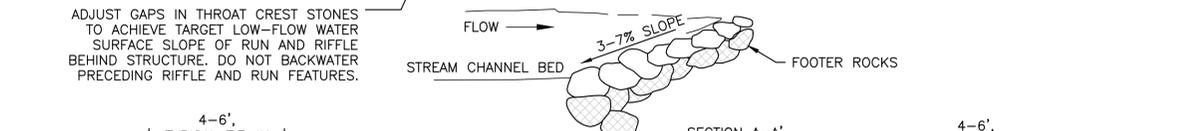
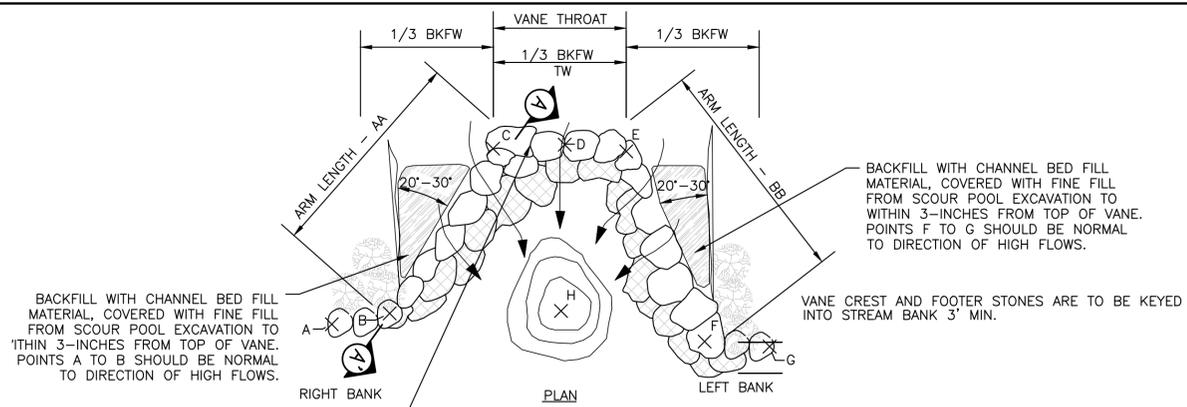
NOT TO SCALE

REVISIONS		DESCRIPTION
NO.	DATE	BY

	<p>CUTTLE CREEK RESTORATION ST. CLAIR RIVER MARYSVILLE, MICHIGAN</p>
	<p>DETAILS III</p>

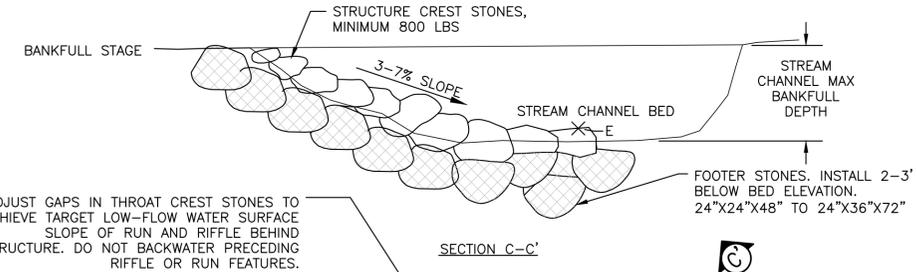
<p>PREPARED FOR: </p>
<p> EA ENGINEERING, SCIENCE, AND TECHNOLOGY, (MI), PLC 455 EAST EISENHOWER PARKWAY, SUITE 50 ANN ARBOR, MI 48108 (734)-369-3410</p>
<p>DATE: JUNE 2014</p>
<p>DESIGNED BY: JJM</p>
<p>DRAWN BY: CNS</p>
<p>CHECKED BY: JMT</p>
<p>PROJECT MANAGER: DLB</p>
<p>PROJECT NUMBER: 62561.08A</p>
<p>SCALE: AS SHOWN</p>
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<p>DRAWING NUMBER: C-503</p>
<p>SHEET NUMBER: 26 OF 33</p>

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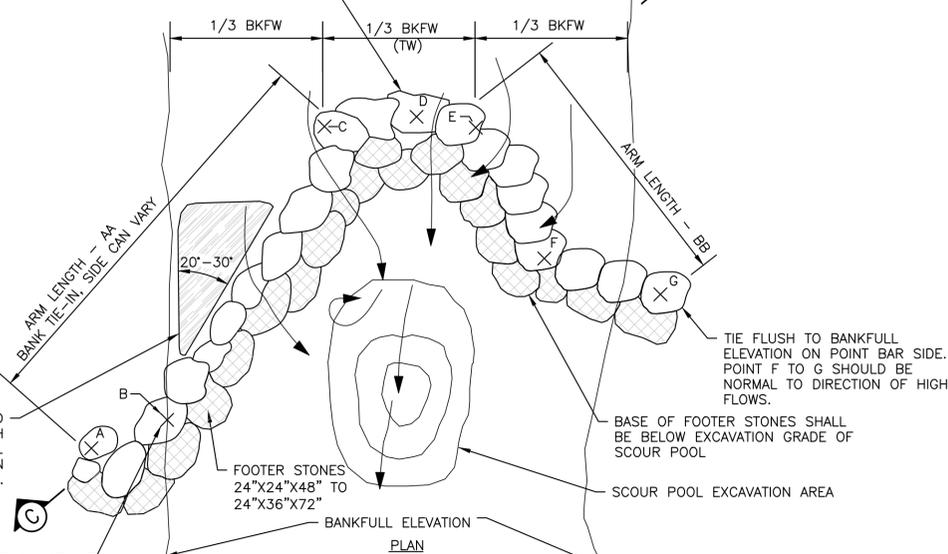


12 ROCK CROSS VANE DETAIL

C-203 NOT TO SCALE
MUST BE FIELD-FIT. CONFIGURATION AND NUMBER OF ROCKS MAY VARY.
C-204 THRU C-209



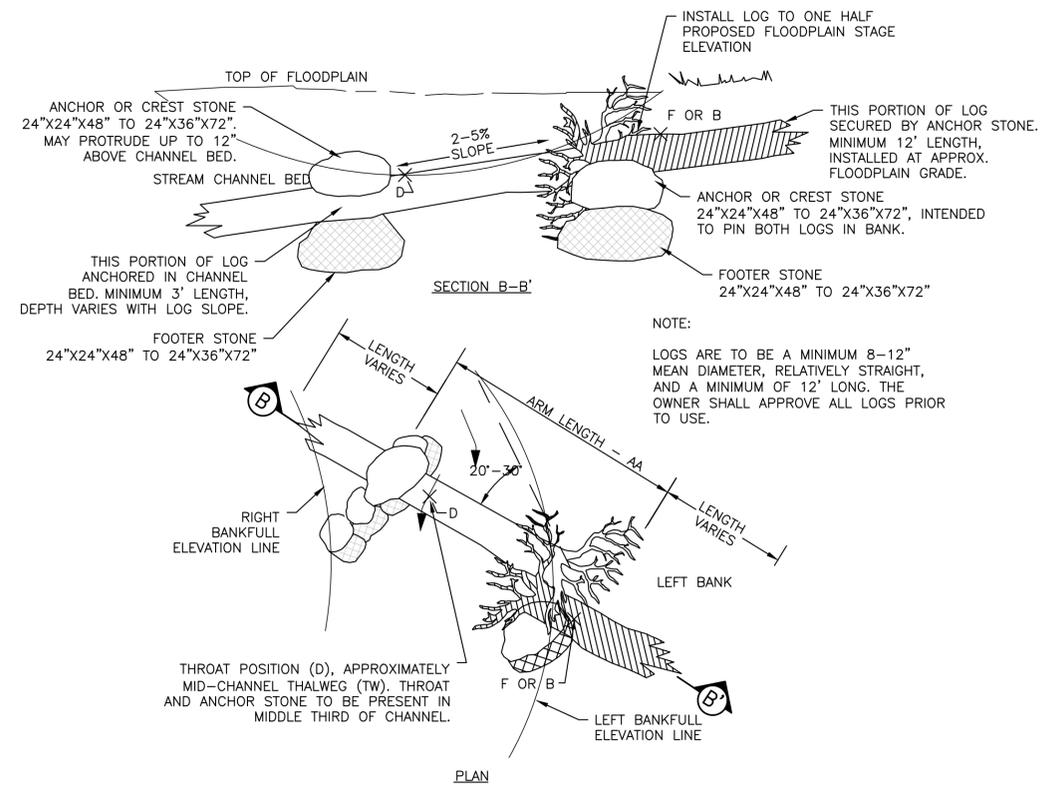
ADJUST GAPS IN THROAT CREST STONES TO ACHIEVE TARGET LOW-FLOW WATER SURFACE SLOPE OF RUN AND RIFLE BEHIND STRUCTURE. DO NOT BACKWATER PRECEDING RIFLE OR RUN FEATURES.



13 J HOOK VANE DETAIL (JHV)

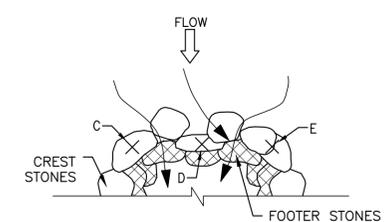
C-203 NOT TO SCALE
MUST BE FIELD-FIT. CONFIGURATION AND NUMBER OF ROCKS MAY VARY.
C-204 THRU C-209

NOTES:
1. FOR DIMENSIONS AND CRITICAL ELEVATIONS, SEE SHEET C-507.



14 LOG VANE/ ROOT WAD DETAIL

C-203 NOT TO SCALE
MUST BE FIELD-FIT. CONFIGURATION MAY VARY. USED FOR SMALL-SCALE GRADE CONTROL IN THALWEG GRADING
C-204 THRU C-209



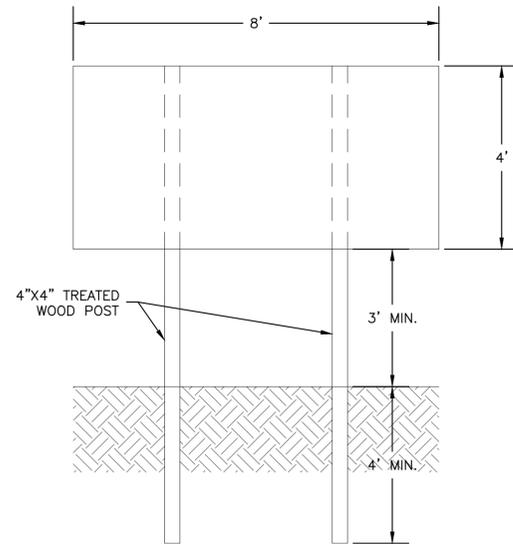
NOTES:
1. ALTERNATE CREST STONES 6-12" TO MANIPULATE AVERAGE DAILY FLOW WATER SURFACE FOR DESIRED SLOPE OF RIFLE UPSTREAM OF STRUCTURE AND FOR FISH PASSAGE. MAINTAIN A CONTINUOUS BRIDGE OF CREST STONES WITH CLOSED GAPS.
2. FOOTER STONES ARE FIT FLUSH AND FORM A CONTINUOUS THROAT AND SHOULD BE SUBMERGED UNDER AVERAGE DAILY FLOW CONDITIONS.

15 BROKEN THROAT DETAIL

C-208 NOT TO SCALE
C-209
(AS APPLIED TO MIDDLE THIRD OF VANE STRUCTURES)

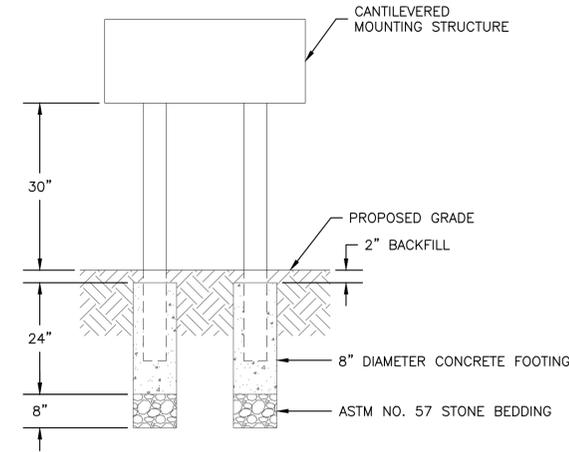
REVISIONS		DESCRIPTION
NO.	DATE	

	
CUTTLE CREEK RESTORATION ST. CLAIR RIVER MARYSVILLE, MICHIGAN	
DETAILS IV	
PREPARED FOR: 	
 EA ENGINEERING, SCIENCE, AND TECHNOLOGY, (MI), PLC 455 EAST EISENHOWER PARKWAY, SUITE 50 ANN ARBOR, MI 48108 (734)-369-3410	
<small>EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. (EA) DOES BUSINESS AS EA SCIENCE AND TECHNOLOGY IN THE STATE OF MICHIGAN AND IS AN AFFILIATE OF EA ENGINEERING, SCIENCE, AND TECHNOLOGY (MI), PLC.</small>	
DATE	JUNE 2014
DESIGNED BY	JJM
DRAWN BY	CNS
CHECKED BY	JMT
PROJECT MANAGER	DLB
PROJECT NUMBER	62561.08A
SCALE	AS SHOWN
FILE NAME	SEE FILE PATH
DRAWING NUMBER	C-504
SHEET NUMBER	27 OF 33

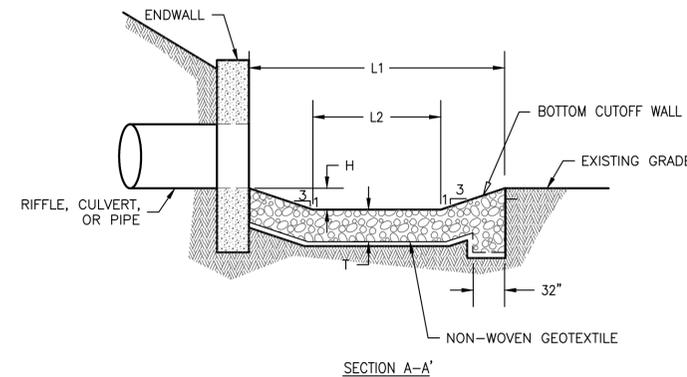
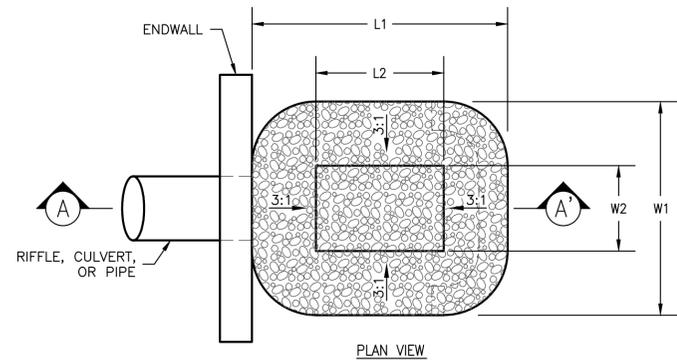


16 PROJECT IDENTIFICATION SIGN DETAIL
C-202 NOT TO SCALE

NOTE:
THE PROJECT IDENTIFICATION
SIGN SHALL BE CLEARLY VISIBLE
FROM THE ADJACENT ROAD.



17 INTERPRETIVE SIGN DETAIL
C-207 NOT TO SCALE



18 PRE-FORMED SCOUR POOL DETAIL
C-203 NOT TO SCALE
C-207, AND C-208

- NOTES:
1. PREPARE SUBGRADE TO THE REQUIRED LINES AND GRADES. COMPACT ANY FILL REQUIRED IN THE SUBGRADE.
 2. THE ROCK MUST CONFORM TO THE SPECIFIED GRADING LIMITS.
 3. USE NON WOVEN GEOTEXTILE AND PROTECT FROM PUNCTURING, CUTTING, OR TEARING. REPAIR ANY DAMAGE OTHER THAN AN OCCASSIONAL SMALL HOLE BY PLACING ANOTHER PIECE OF GEOTEXTILE OVER THE DAMAGED PART OR BY COMPLETELY REPLACING THE GEOTEXTILE. PROVIDE A MINIMUM OF ONE FOOT OVERLAP FOR ALL REPAIRS AND FOR JOINING TWO PIECES OF GEOTEXTILE. EMBED THE GEOTEXTILE A MINIMUM OF 4 INCHES AND EXTEND THE GEOTEXTILE A MINIMUM OF 6 INCHES BEYOND THE EDGE OF THE BASIN AND APRON.
 4. STONE FOR THE BASIN AND APRON MAY BE PLACED BY EQUIPMENT. CONSTRUCT TO THE FULL COURSE THICKNESS IN ONE OPERATION AND IN SUCH A MANNER AS TO AVOID DISPLACEMENT OF UNDERLYING MATERIALS. DELIVER AND PLACE THE STONE FOR THE BASIN AND APRON IN A MANNER THAT WILL ENSURE THAT IT IS REASONABLY HOMOGENEOUS WITH THE SMALLER STONES AND SPALLS FILLING THE VOIDS OF THE LAREGR STONES. PLACE STONE FOR THE BASIN AND APRON IN A MANNER TO PREVENT DAMAGE TO THE GEOTEXTILE. HAND PLACE TO THE EXTENT NECESSARY TO PREVENT DAMAGE.
 5. PLACE STONE FOR THE APRON SO THAT IT BLENDS IN WITH THE EXISTING GROUND SURFACE.
 6. SEE SPECIFICATIONS TABLE ON SHEET C-507 FOR SPECIFIC DIMENSIONS
 7. STONE SHALL BE CHANNEL BED FILL MATERIAL AND CHANNEL SAND AND GRAVEL.

REVISIONS

DESCRIPTION

NO. DATE BY

SEAL

CUTTLE CREEK RESTORATION
ST. CLAIR RIVER
MARYSVILLE, MICHIGAN

DETAILS V

PREPARED FOR:

EPA

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, (MI), PLC

455 EAST EISENHOWER PARKWAY, SUITE 50 ANN ARBOR, MI 48108 (734)-369-3410

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. (EA) DOES BUSINESS AS EA SCIENCE AND TECHNOLOGY IN THE STATE OF MICHIGAN AND EA IS AN AFFILIATE OF EA ENGINEERING, SCIENCE, AND TECHNOLOGY (MI), PLC.

DATE

JUNE 2014

DESIGNED BY

JJM

DRAWN BY

CNS

CHECKED BY

JMT

PROJECT MANAGER

DLB

PROJECT NUMBER

62561.08A

SCALE

AS SHOWN

FILE NAME

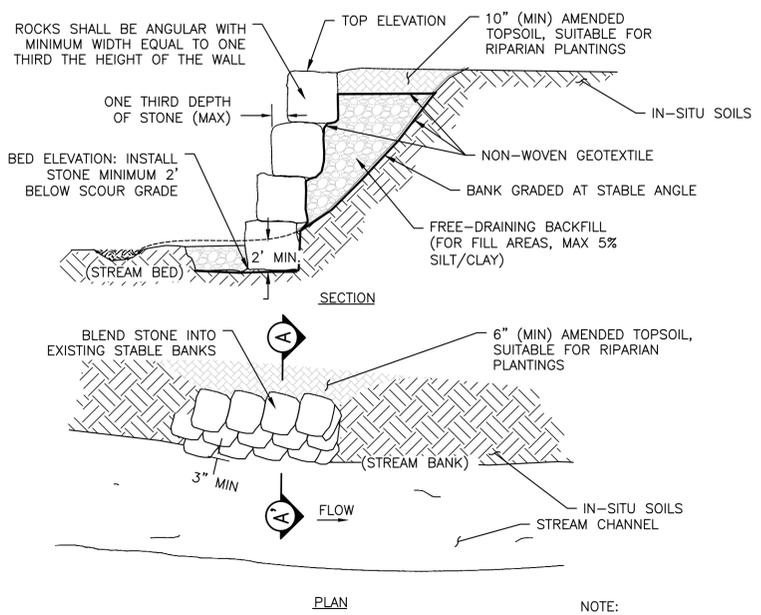
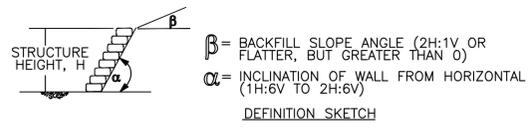
SEE FILE PATH

DRAWING NUMBER

C-505

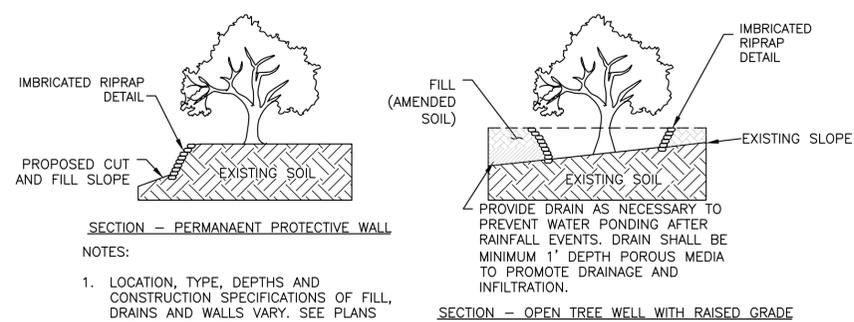
SHEET NUMBER

28 OF 33

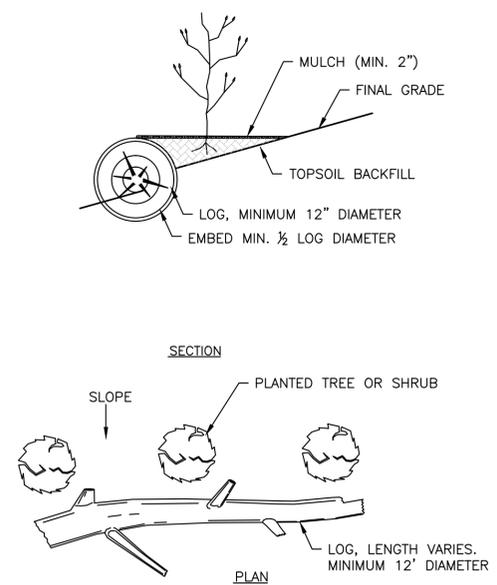


19 IMBRICATED RIPRAP DETAIL
 C-207 NOT TO SCALE
 C-510

NOTE:
 STONE BLOCKS SHALL BE ROTATED INTO THE STREAM BANK DURING PLACEMENT SUCH THAT THE UPSTREAM BLOCKS OVERLAP THE DOWNSTREAM BLOCKS BY A MINIMUM OF 3 INCHES ON MEANDER BENDS.

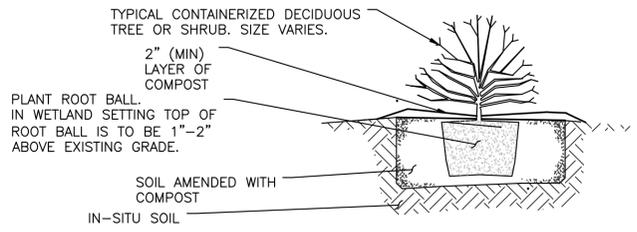


22 UPLAND TREE PRESERVATION DETAIL
 C-212 NOT TO SCALE
 C-213



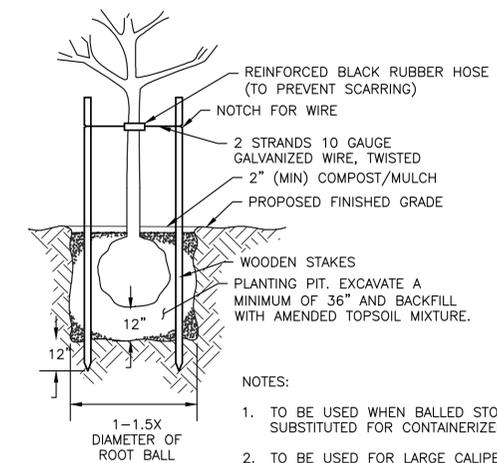
20 LOG PLANTING TERRACE DETAIL
 C-212 NOT TO SCALE
 C-213

NOTES:
 1. TO BE USED AS PART OF WOODY DEBRIS PLACEMENT.
 2. EXCAVATE AREA TO PLACE LOG IN TO 1/2 DIAMETER OF LOG AND BACKFILL UP GRADIENT WITH TOPSOIL FILL.
 3. PLANT PER DETAILS 21 AND 23 ON THIS SHEET.
 4. THIS WOODY DEBRIS PLACEMENT PRACTICE IS TO BE USED TO ACCOMMODATE MINOR GRADE CHANGES AROUND EXISTING TREES AND OTHER AT-GRADE FEATURES TO BE PRESERVED.



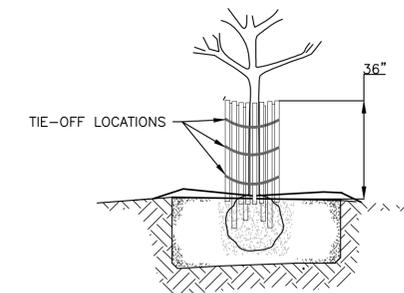
23 CONTAINER STOCK PLANTING DETAIL
 C-212 NOT TO SCALE
 C-213

NOTES:
 1. SHRUB PIT CONFORMS WITH DEPTHS AND WIDTHS IN SPECIFICATIONS.
 2. PRUNE SHRUBS ONLY AFTER INSTALLED AND AFTER THE PLANT HAS BEEN SUFFICIENTLY WATERED.



21 BALLED TREE PLANTING AND STAKING DETAIL
 C-212 NOT TO SCALE
 C-213

NOTES:
 1. TO BE USED WHEN BALLED STOCK IS SUBSTITUTED FOR CONTAINERIZED.
 2. TO BE USED FOR LARGE CALIPER, HIGH-VISIBILITY PLANTINGS.



24 TREE PROTECTION DETAIL
 C-212 NOT TO SCALE
 C-213

NOTES:
 1. USE BIOBARK TREE SHELTERS OR EQUIVALENT AS APPROVED BY THE OWNER.
 2. PLANT TREE ACCORDING TO SPECIFICATIONS. PLACE SHELTER AROUND TREE.
 3. DRIVE LONG STAKES INTO THE GROUND.
 4. TIE OFF ROPE ENDS AROUND THE TREE TO STABILIZE TREE.

NO.	DATE	BY	DESCRIPTION

	CUTTLE CREEK RESTORATION ST. CLAIR RIVER MARYSVILLE, MICHIGAN	DETAILS VI
	PREPARED FOR: 	
 EA ENGINEERING, SCIENCE, AND TECHNOLOGY, (MI), PLC 455 EAST EISENHOWER PARKWAY, SUITE 50 ANN ARBOR, MI 48108 (734)-369-3410		
DATE	JUNE 2014	
DESIGNED BY	JJM	
DRAWN BY	CNS	
CHECKED BY	JMT	
PROJECT MANAGER	DLB	
PROJECT NUMBER	62561.08A	
SCALE	AS SHOWN	
FILE NAME	SEE FILE PATH	
DRAWING NUMBER	C-506	
SHEET NUMBER	29 OF 33	

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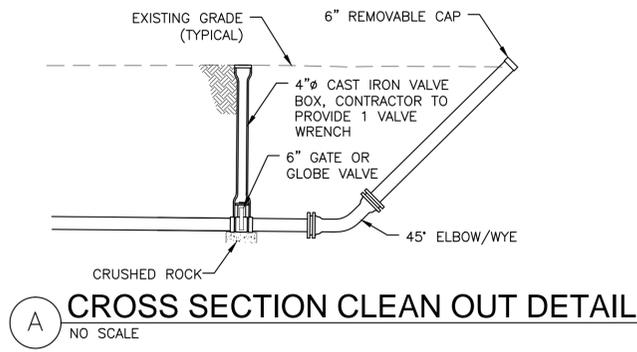
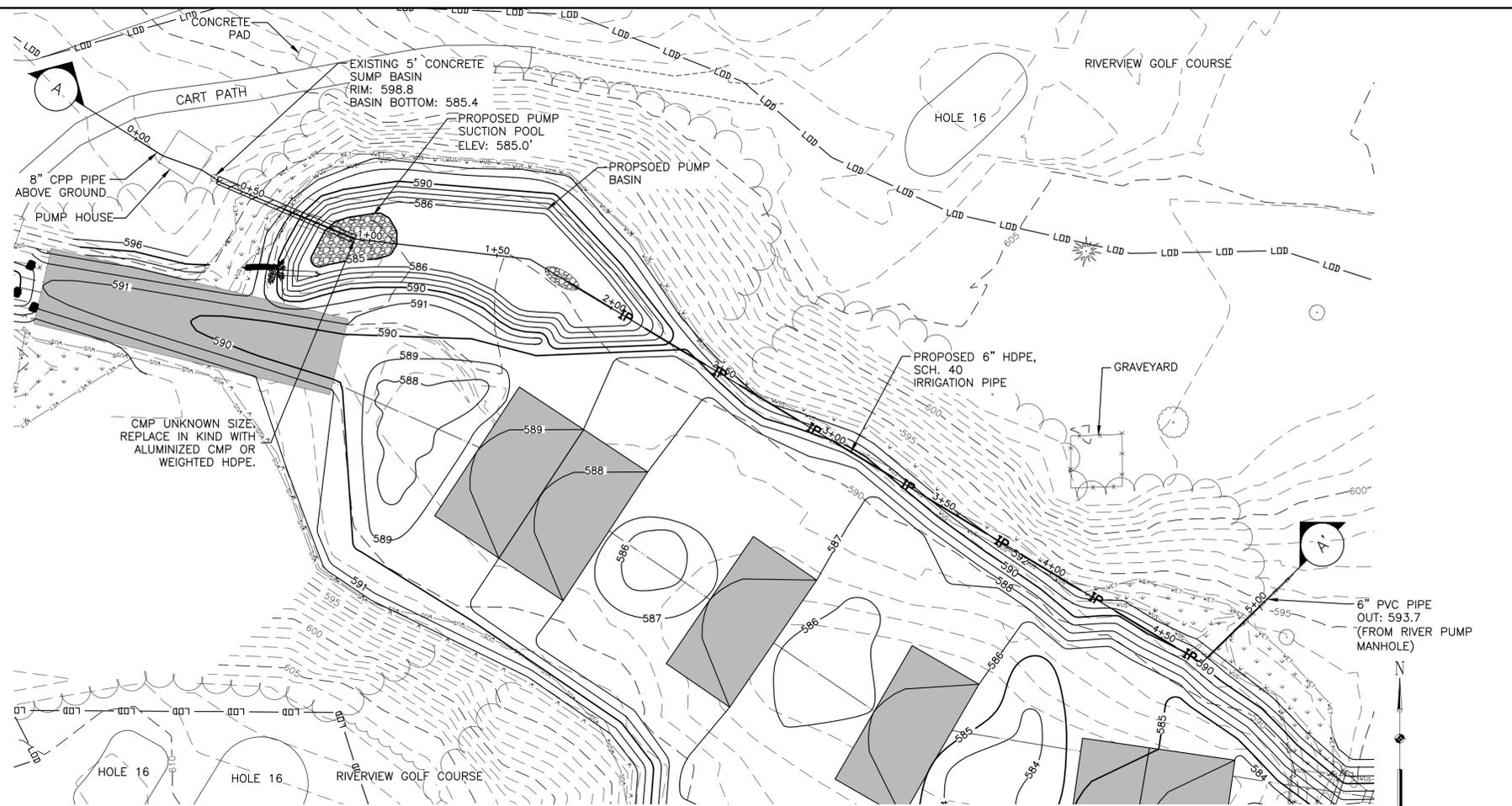
TABLE A - STRUCTURE SCHEDULE																
NUMBER	SHEET	STATION	STRUCTURE DETAIL NUMBER	THROAT DETAIL TYPE	TW	AA (LONGEST)	BB	A	B	C	D	E	F	G	NOTES	
LOG VANE/ROOT WAD #1	9	2+07.40	14	-	-	15-17'	-	-	597	-	596	-	-	-	TIE-IN RIGHT	
LOG VANE/ROOT WAD #2	9	2+61.30	14	-	-	15-17'	-	-	-	-	596	-	597	-	TIE-IN LEFT	
LOG VANE/ROOT WAD #3	9	3+17.80	14	-	-	15-17'	-	-	-	-	597	-	598	-	TIE-IN LEFT	
LOG VANE/ROOT WAD #4	9	3+20.20	14	-	-	15-17'	-	-	596	-	596	-	-	-	TIE-IN RIGHT	
LOG VANE/ROOT WAD #5	9	4+64.70	14	-	-	15-17'	-	-	594.5	-	594.5	-	-	-	TIE-IN RIGHT	
LOG VANE/ROOT WAD #6	9	4+90.45	14	-	-	15-17'	-	-	-	-	594	-	595	-	TIE-IN LEFT	
LOG VANE/ROOT WAD #7	9	4+92.50	14	-	-	15-17'	-	-	595	-	594	-	-	-	TIE-IN RIGHT	
LOG VANE/ROOT WAD #8	9	5+42.70	14	-	-	15-17'	-	-	-	-	595	-	596	-	TIE-IN LEFT	
LOG VANE/ROOT WAD #9	9	5+44.40	14	-	-	15-17'	-	-	594.5	-	594	-	-	-	TIE-IN RIGHT	
LOG VANE/ROOT WAD #10	9	5+82.90	14	-	-	15-17'	-	-	-	-	593.5	-	595	-	TIE-IN LEFT	
LOG VANE/ROOT WAD #11	10	7+50.00	14	-	-	15-17'	-	-	-	-	594	-	595	-	TIE-IN LEFT	
LOG VANE/ROOT WAD #12	10	7+51.80	14	-	-	15-17'	-	-	595	-	594	-	-	-	TIE-IN RIGHT	
LOG VANE/ROOT WAD #13	10	9+43.40	14	-	-	15-17'	-	-	-	-	593	-	594	-	TIE-IN LEFT	
LOG VANE/ROOT WAD #14	10	9+44.30	14	-	-	15-17'	-	-	594	-	593	-	-	-	TIE-IN RIGHT	
LOG VANE/ROOT WAD #15	11	11+67.50	14	-	-	15-17'	-	-	-	-	591	-	592	-	TIE-IN LEFT	
LOG VANE/ROOT WAD #16	11	12+33.00	14	-	-	15-17'	-	-	-	-	590.3	-	591	-	TIE-IN LEFT	
LOG VANE/ROOT WAD #17	11	12+53.00	14	-	-	15-17'	-	-	592	-	591	-	-	-	TIE-IN RIGHT	
LOG VANE/ROOT WAD #18	11	15+50.20	14	-	-	15-17'	-	-	-	-	590	-	586	-	PERPENDICULAR TO BANK	
J-HOOK VANE #1	13	24+43.40	13	BROKEN	5-7'	22-24'	18-22'	582	582	581.2	580.8	581.2	582	582	TIE-IN LEFT	
LOG VANE/ROOT WAD #19	13	24+75.40	14	-	-	15-17'	-	-	-	-	581.7	-	582	-	TIE-IN LEFT	
LOG VANE/ROOT WAD #20	13	24+87.00	14	-	-	15-17'	-	-	-	-	582	-	582	-	TIE-IN LEFT	
LOG VANE/ROOT WAD #21	13	26+36.00	14	-	-	15-17'	-	-	579	-	578.4	-	-	-	TIE-IN RIGHT	
LOG VANE/ROOT WAD #22	13	26+50.90	14	-	-	15-17'	-	-	-	-	578.2	-	579	-	TIE-IN LEFT	
LOG VANE/ROOT WAD #23	14	27+30.00	14	-	-	15-17'	-	-	579	-	578	-	-	-	TIE-IN RIGHT	
ROCK CROSS VANE #1	14	27+14.00	12	BROKEN	5-7'	20-22'	20-22'	578	578	577.2	576.8	577.2	578	578	-	
ROCK CROSS VANE #2	14	27+83.13	12	BROKEN	5-7'	20-22'	20-22'	577	577	576.2	575.8	576.2	577	577	-	
ROCK CROSS VANE #3	14	28+60.67	12	BROKEN	5-7'	20-22'	20-22'	576	576	575.2	574.8	575.2	576	576	-	

TABLE B - RIFFLE GRADE CONTROL SCHEDULE											
NUMBER	SHEET	STATION	DIMENSIONS							SLOPE	
			WIDTH	LENGTH	A	B	C	D, DEPTH	E		
RGC #1	8	0+61.69	30.0	63.0	597.0	596.5	600.0	3.0	599.5	0.79%	
RGC #2	8	1+57.87	30.0	37.0	596.5	596.0	600.0	3.5	599.5	1.35%	
RGC #3	9	3+68.58	30.0	80.0	596.0	595.0	598.0	2.0	597.0	1.25%	
RGC #4	11	6+44.71	30.0	109.0	595.0	594.0	597.0	2.0	596.0	0.92%	
RGC #5	11	13+05.40	30.0	68.0	592.0	591.0	594.0	2.0	593.0	1.47%	
RGC #6	11	14+76.05	30.0	118.0	591.0	589.0	593.5	2.5	591.5	1.69%	
RGC #7	12	16+59.68	60.0	60.0	589.0	587.0	590.0	1.0	588.0	3.33%	
RGC #8	12	17+67.25	60.0	30.0	587.0	586.0	588.0	1.0	587.0	3.33%	
RGC #9	12	18+44.89	60.0	30.0	586.0	585.0	587.0	1.0	586.0	3.33%	
RGC #10	12	19+31.68	60.0	60.0	585.0	583.0	586.0	1.0	584.0	3.33%	
RGC #11	12	20+36.71	35.0	80.0	583.0	581.0	585.0	2.0	583.0	2.50%	
RGC #12	13	24+86.20	25.0	63.0	581.0	579.0	582.0	1.0	580.0	3.17%	
RGC #13	13	25+95.03	25.0	56.0	579.0	578.0	580.0	1.0	579.0	1.79%	

TABLE C - PRE-FORMED SCOUR POOL SCHEDULE									
POOL	SHEET	STATION	DIMENSIONS					H	PLUNGE THICKNESS T
			WIDTH W1	WIDTH W2	LENGTH L1	LENGTH L2			
#1	8	0+00.00	33.0	11.0	51.0	21.0	2.0	1.0	
#2	12	22+01.50	28.0	22.0	50.0	44.0	1.0	1.0	
#3	13	23+82.30	32.0	4.0	48.0	22.0	3.0	1.0	

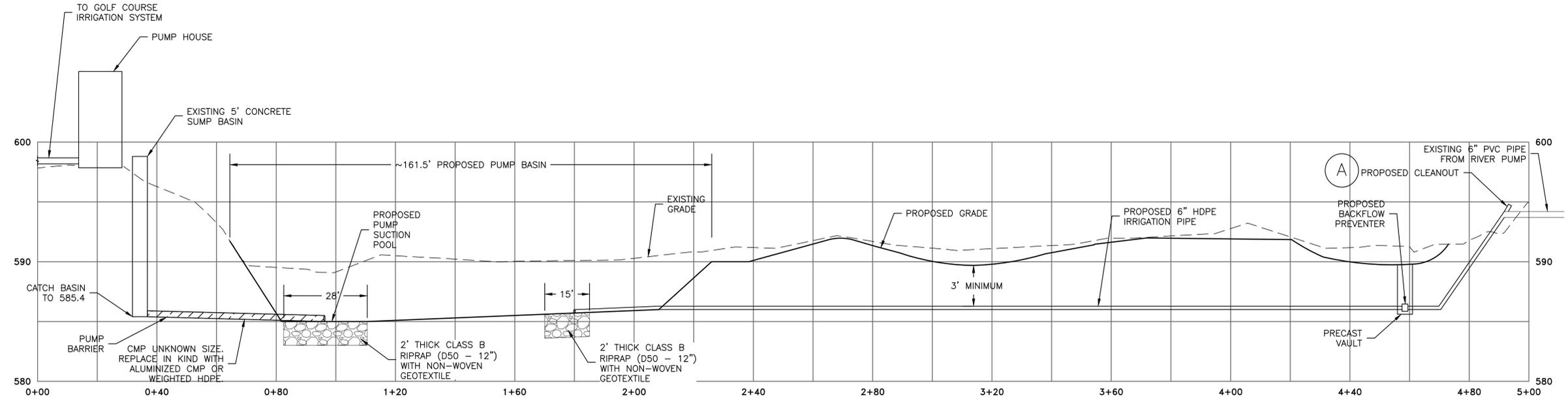
SEAL	REVISONS	DESCRIPTION
NO.	DATE	BY
		
CUTTLE CREEK RESTORATION ST. CLAIR RIVER MARYSVILLE, MICHIGAN DETAILS VII		
PREPARED FOR: 		
 EA ENGINEERING, SCIENCE, AND TECHNOLOGY, (MI), PLC 455 EAST EISENHOWER PARKWAY, SUITE 50 ANN ARBOR, MI 48108 (734)-369-3410 <small>EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. (EA) DOES BUSINESS AS EA SCIENCE AND TECHNOLOGY IN THE STATE OF MICHIGAN AND EA IS AN AFFILIATE OF EA ENGINEERING, SCIENCE, AND TECHNOLOGY (MI), PLC.</small>		
DATE		
JUNE 2014		
DESIGNED BY		
JJM		
DRAWN BY		
CNS		
CHECKED BY		
JMT		
PROJECT MANAGER		
DLB		
PROJECT NUMBER		
62561.08A		
SCALE		
AS SHOWN		
FILE NAME		
SEE FILE PATH		
DRAWING NUMBER		
C-507		
SHEET NUMBER		
30 OF 33		

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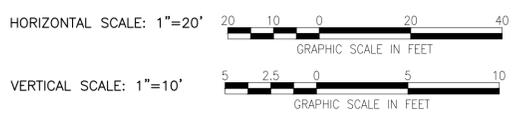


NOTE:
1. THE PUMP HOUSE INTAKE PIPE SHALL BE MOVED FROM THE EXISTING POND TO THE PROPOSED PUMP SUCTION POOL.

IRRIGATION IMPROVEMENTS PLAN VIEW

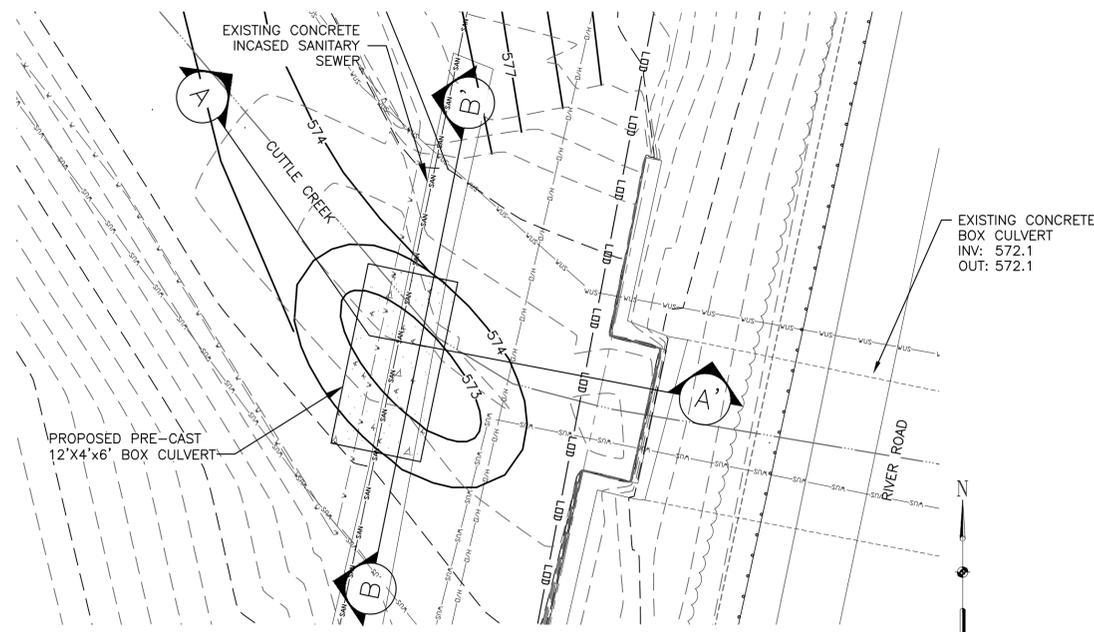


IRRIGATION PIPE PROFILE - A-A'

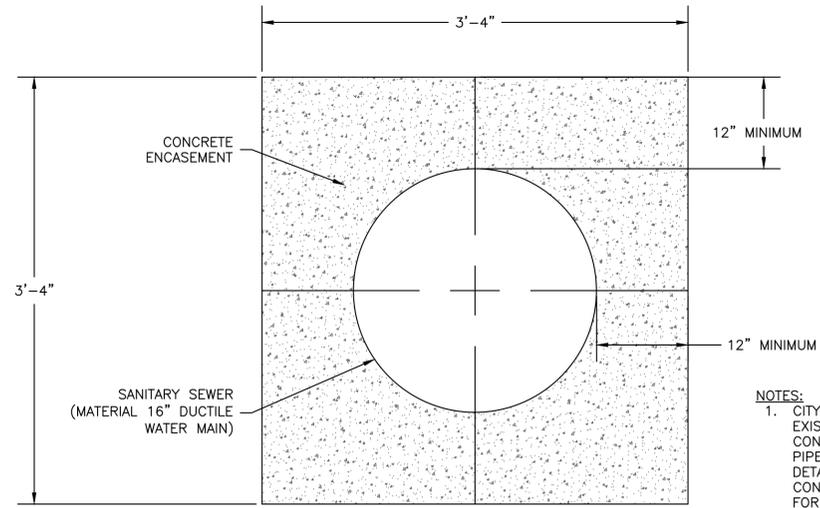


REVISIONS	NO.	DATE	BY	DESCRIPTION
SEAL				
CUTTLE CREEK RESTORATION ST. CLAIR RIVER MARYSVILLE, MICHIGAN IRRIGATION IMPROVEMENTS PLAN				
PREPARED FOR: 				
 EA ENGINEERING, SCIENCE, AND TECHNOLOGY, (MI), PLLC 455 EAST EISENHOWER PARKWAY, SUITE 50 ANN ARBOR, MI 48108 (734)-369-3410 <small>EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. (EA) DOES BUSINESS AS EA SCIENCE AND TECHNOLOGY IN THE STATE OF MICHIGAN AND EA IS AN AFFILIATE OF EA ENGINEERING, SCIENCE, AND TECHNOLOGY (M), PLLC.</small>				
DATE	JUNE 2014			
DESIGNED BY	TC			
DRAWN BY	CNS			
CHECKED BY	JMT			
PROJECT MANAGER	DLB			
PROJECT NUMBER	62561.08A			
SCALE	AS SHOWN			
FILE NAME	SEE FILE PATH			
DRAWING NUMBER	C-508			
SHEET NUMBER	31 OF 33			

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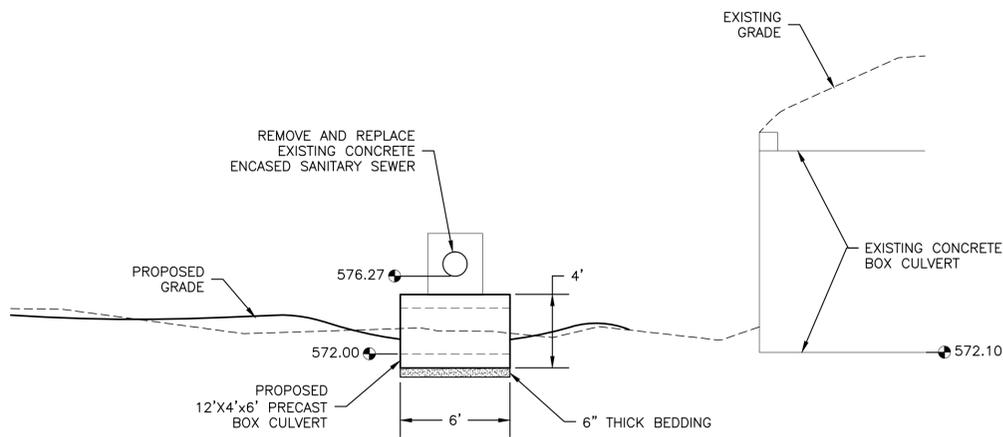


25 BOX CULVERT PLAN VIEW
C-209 NOT TO SCALE

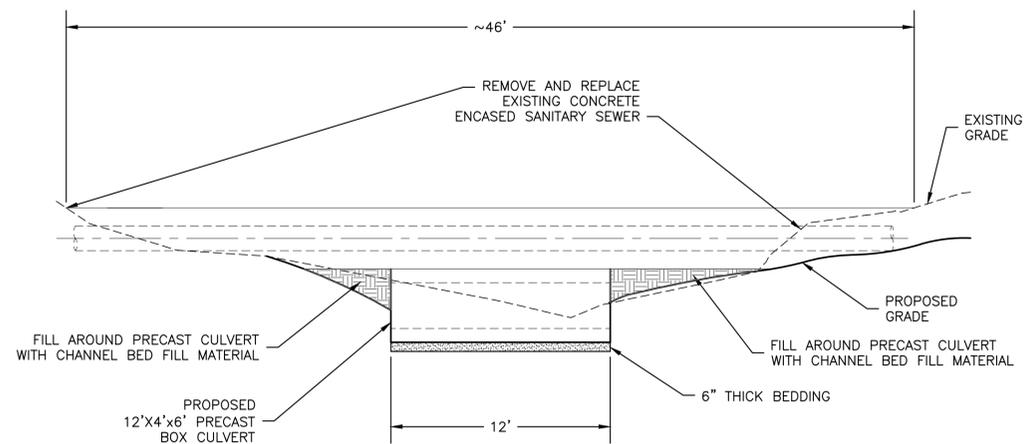


- NOTES:**
1. CITY OF MARYSVILLE SHALL REMOVE EXISTING SEWER PIPE AND CONCRETE AND REINSTALL NEW SEWER PIPE AND CONCRETE ENCASEMENT. DETAILS OF SANITARY SEWER AND CONCRETE ENCASEMENT ARE SHOWN FOR INFORMATION PURPOSES ONLY.
 2. CONTRACTOR SHALL COORDINATE SEWER REPLACEMENT WITH BOX CULVERT INSTALLATION.

SANITARY SEWER CONCRETE ENCASEMENT DETAIL
NOT TO SCALE



CROSS SECTION A-A'
SCALE: 1"=5'



CROSS SECTION B-B'
SCALE: 1"=5'

REVISIONS		DESCRIPTION
NO.	DATE	BY



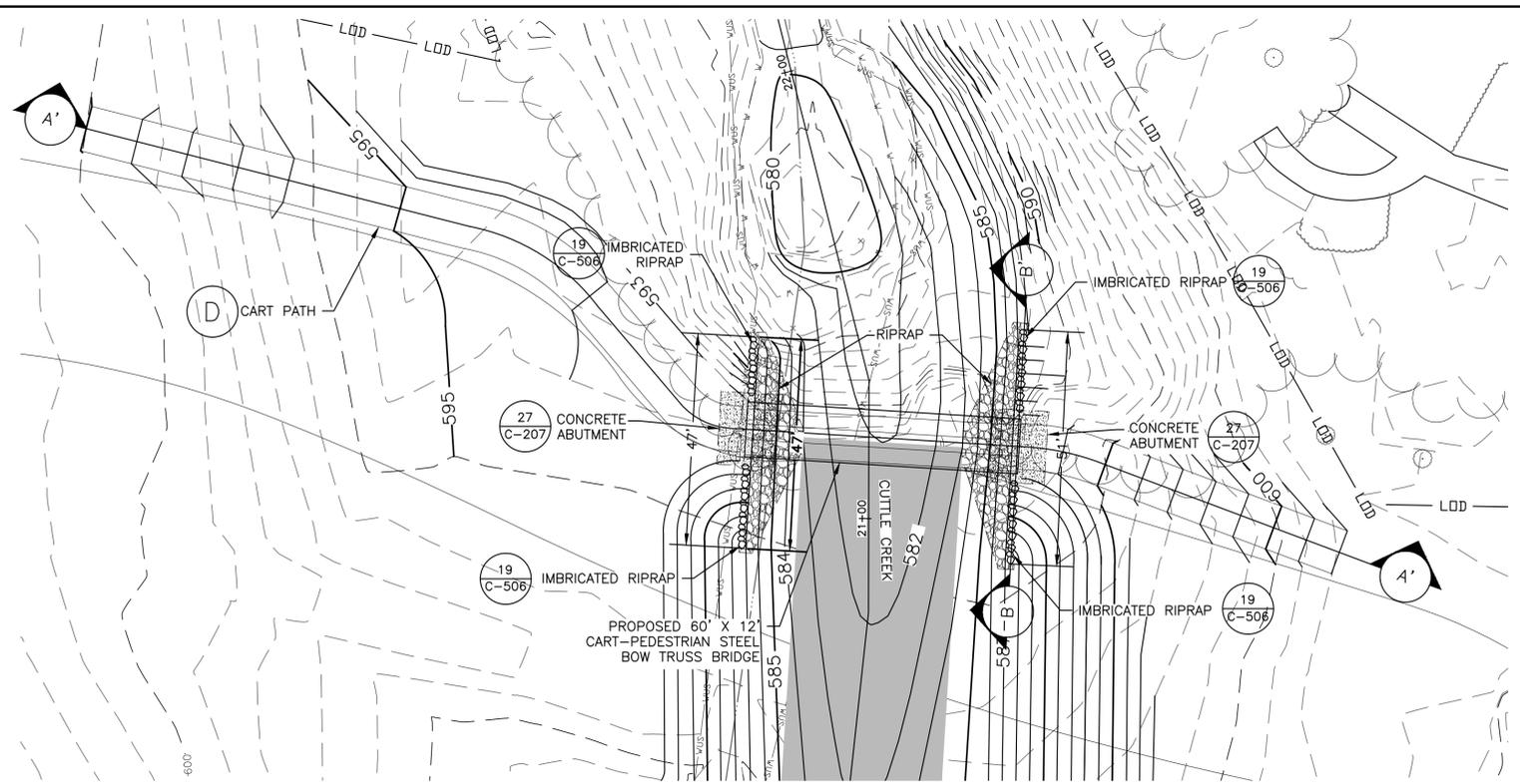
CUTTLE CREEK RESTORATION
ST. CLAIR RIVER
MARYSVILLE, MICHIGAN
BOX CULVERT DETAILS



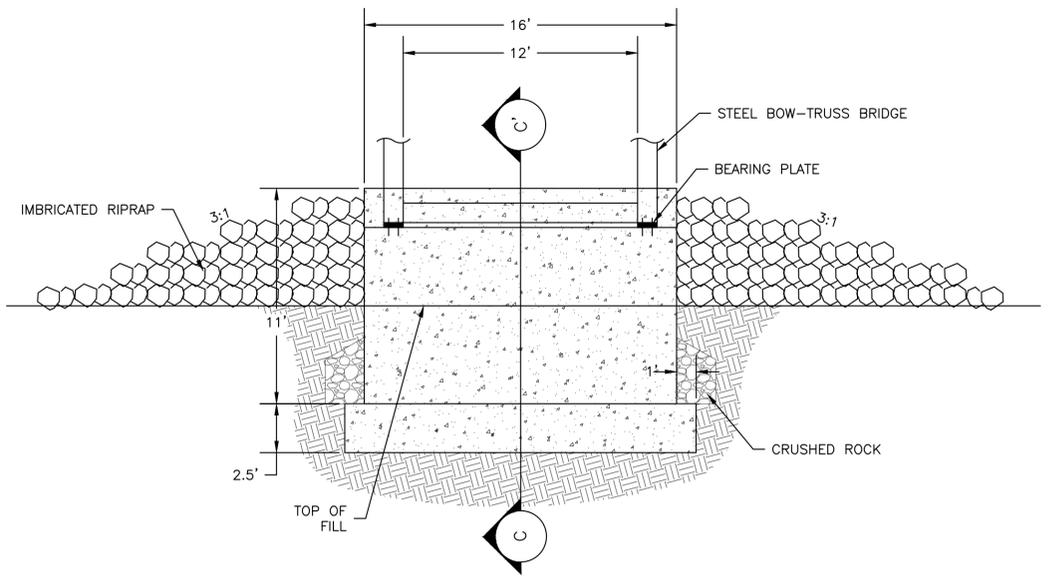
EA
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, (MI), PLLC
455 EAST EISENHOWER PARKWAY, SUITE 50
ANN ARBOR, MI 48108
(734)-369-3410

DATE	JUNE 2014
DESIGNED BY	LLR
DRAWN BY	CNS
CHECKED BY	JMT
PROJECT MANAGER	DLB
PROJECT NUMBER	62561.08A
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DRAWING NUMBER	C-509
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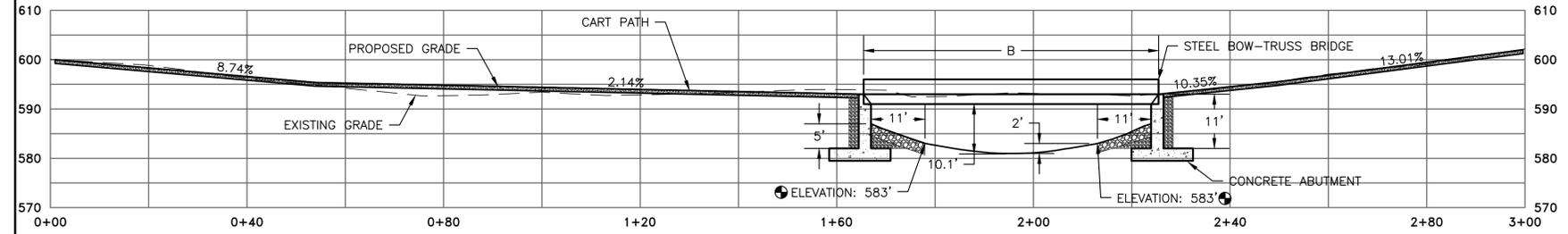
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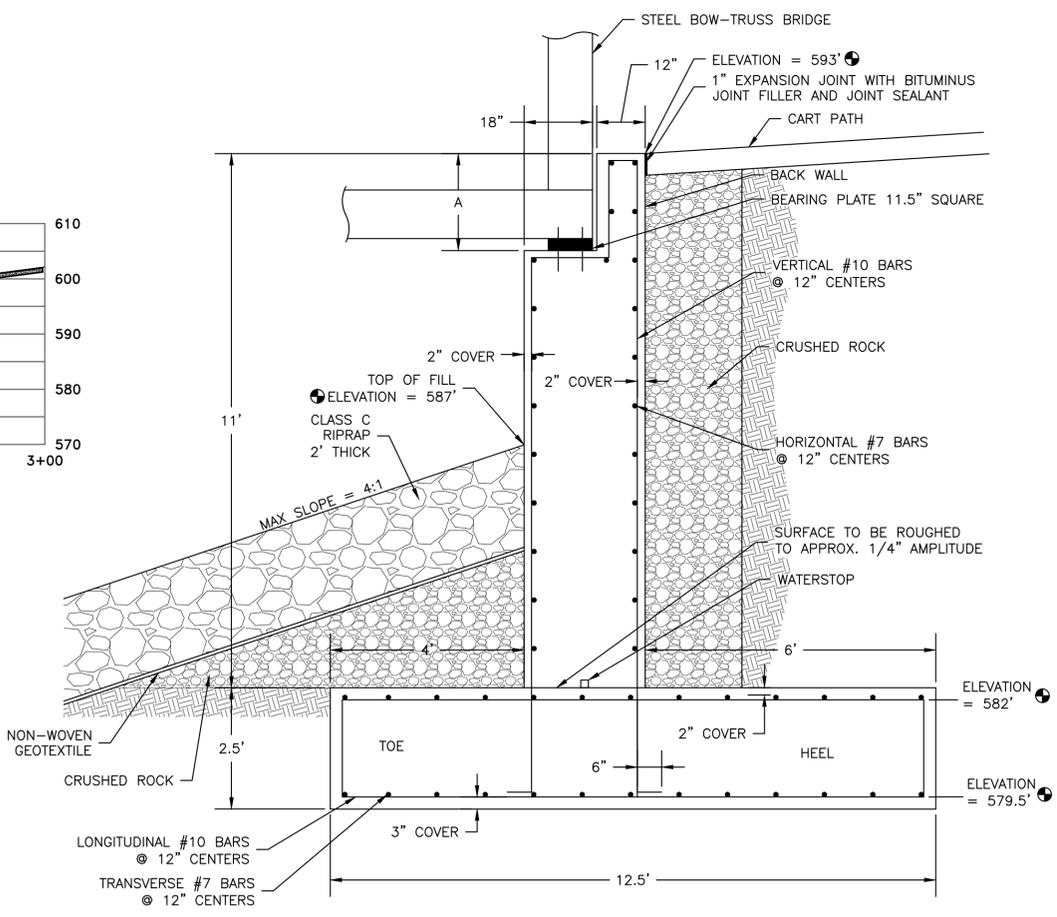
26
C-207
CART AND PEDESTRIAN BRIDGE PLAN VIEW



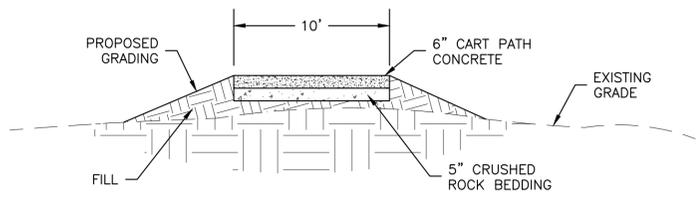
27
C-207
CONCRETE ABUTMENT - CROSS SECTION B-B'
NOT TO SCALE



CROSS SECTION A-A'
NOT TO SCALE



27
C-207
CONCRETE ABUTMENT - CROSS SECTION C-C'
NOT TO SCALE



D
CART PATH DETAIL
NOT TO SCALE

- NOTES:
- DO NOT PLACE BRIDGE ON ABUTMENTS UNTIL CYLINDER TEST CONFIRMS CONCRETE HAS REACHED 3,000 PSI COMPRESSIVE STRENGTH.
 - ENSURE NO PEDESTRIANS OR VEHICLES USE BRIDGE UNTIL AFTER 28 DAYS OF CURING TIME FOR ABUTMENTS OR CYLINDER TEST CONFIRMS CONCRETE HAS REACHED 4,000 PSI COMPRESSIVE STRENGTH.
 - CONTRACTOR SHALL COORDINATE FINAL ABUTMENT DIMENSIONS/LOCATIONS WITH STEEL BOW-TRUSS BRIDGE MANUFACTURER.
 - OWNER MUST APPROVE STEEL REINFORCEMENT PRIOR TO PLACEMENT OF CONCRETE.
 - REINFORCEMENT BARS SHALL BE GRADE 60 STEEL. LAP SPLICES FOR #10 BARS SHALL BE A MINIMUM OF 80".
 - LAP SPLICES FOR #7 BARS SHALL BE A MINIMUM OF 55".
 - A 2" MINIMUM OF CONCRETE COVER OVER REINFORCEMENT IS REQUIRED.
 - DETAILS OF SOUTH ABUTMENT ARE SHOWN.
 - THE CONTRACTOR SHALL PERFORM DEWATERING AS NECESSARY.
 - DIMENSION "B" SHALL BE APPROXIMATELY 60'. FINAL DIMENSION SHALL BE FACE-TO-FACE OF ABUTMENT BACK WALLS PROVIDED BY BRIDGE MANUFACTURER.
 - EXISTING IRRIGATION FEEDER PIPES AND SPRINKLER HEAD CONTROL WIRING IN THE EXISTING DAM SHALL BE RELOCATED AND ATTACHED TO THE BRIDGE.
 - ALL CHAIRS USED TO PLACE REBAR SHALL BE PLASTIC OR CONCRETE BLOCK.
 - DIMENSION "A" WILL BE APPROXIMATELY 2', FINAL DIMENSION WILL BE PROVIDED BY BRIDGE MANUFACTURER.
 - CONTRACTOR SHALL VERIFY SUBGRADE BEARING CAPACITY WITH GEOTECHNICAL TESTING UPON COMPLETION OF EXCAVATION.
 - INSTALL CONTRACTION JOINT EVERY 10 FEET OF CART PATH. CONSTRUCTION JOINT SHALL BE CUT 1/2" WIDE TO 1/4 CONCRETE THICKNESS.

SEAL	REVISIONS	DESCRIPTION
	NO.	DATE
	BY	
CUTTLE CREEK RESTORATION ST. CLAIR RIVER MARYSVILLE, MICHIGAN		
CART AND PEDESTRIAN BRIDGE DETAILS		
PREPARED FOR: 		
 EA ENGINEERING, SCIENCE, AND TECHNOLOGY, (MI), PLLC 455 EAST EISENHOWER PARKWAY, SUITE 50 ANN ARBOR, MI 48108 (734)-369-3410		
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CHECKED BY	JMT	
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SCALE	AS SHOWN	
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