MIDLAND
COUNTY ROAD COMMISSION
2334 N. MERIDIAN ROAD
SANFORD, MI 48657

Phone (989) 687-9060
Fax (989) 687-9121
www.midlandroads.com

Request for Bid

7 MILE ROAD BRIDGE RECONSTRUCTION OVER THE BULLOCK CREEK

Deadline for Submittal: August 8, 2018 at 10:00 a.m.

Project Description:
The following bid covers all associated costs with the reconstruction of 7 Mile Road bridge over the Bullock Creek. The structure is a pre-cast deck panel structure on GRS abutments. Project includes, but is not limited to, soil erosion and sedimentation control, removal of existing structure and road bed, excavation for GRS abutments, under cutting unsuitable soils if necessary, construct abutments, setting MCRC deck panels, installing guardrail, rebuilding roadway, and installing gravel roadway and gravel on deck panels, slope restoration and asphalt surfacing.

Progress Clause:
Start work no later than **August 20, 2018** after receiving notice of award of contract or on or before the date designated as the starting date in the Detailed Progress Schedule, whichever is later. In no case shall any work commence prior to receipt of formal notice of award by MCRC.

Slope Restoration items on or before **October 15th, 2018.**

The entire Project shall be complete by **November 9th, 2018.**

The low bidder(s) for the work covered by this proposal will be required to meet with Midland County Road Commission and MDOT representatives to work out a detailed progress schedule. The schedule for this meeting will be set within one week after Notice of Award by MCRC.

The Project Engineer will arrange the time and place for the meeting.

The Progress Schedule shall include, as a minimum, the starting and completion date for major items, the final project completion date specified in the Bidding Proposal.

If the Bidding Proposal specified other controlling dates, these shall also be included in the Progress Schedule.

Failure on the part of the Contractor to carry out the provisions of the Progress Schedule, as established, may be considered sufficient cause to prevent bidding future projects until a satisfactory rate of progress is again established.

The starting date, contract time, or completion date for this project may be adjusted by the County without imposing liquidated damages upon the receipt of satisfactory documented evidence that unforeseen delayed delivery of critical materials will prevent the orderly prosecution of the work.

Plans, bid forms and specifications may be obtained by qualified Bidders at the office of Midland County Road Commission, 2334 North Meridian Road, Sanford, MI 48657 at no charge or on the website www.midlandroads.com. The right is reserved to reject any and all bids and any part of same, to waive irregularities in the bid procedure and to award, in the opinion of the Board, in the best interest of the Midland County Road Commission.

Envelopes containing bids must be submitted in a sealed envelope and marked on the face with the name and address of bidder, date and hour of opening, and name of item. Email Option: Bids may be emailed to Brenda@midlandroads.com. Subject line must state confidential bid and list project name. Email time stamp shall govern.

MIDLAND COUNTY ROAD COMMISSION
MIDLAND, MICHIGAN
7 MILE ROAD OVER BULLOCK CREEK
RECONSTRUCTION

JN: XXXX CS: XXXX
FED ITEM: XXX FED. #: XXX

TRAFFIC DATA

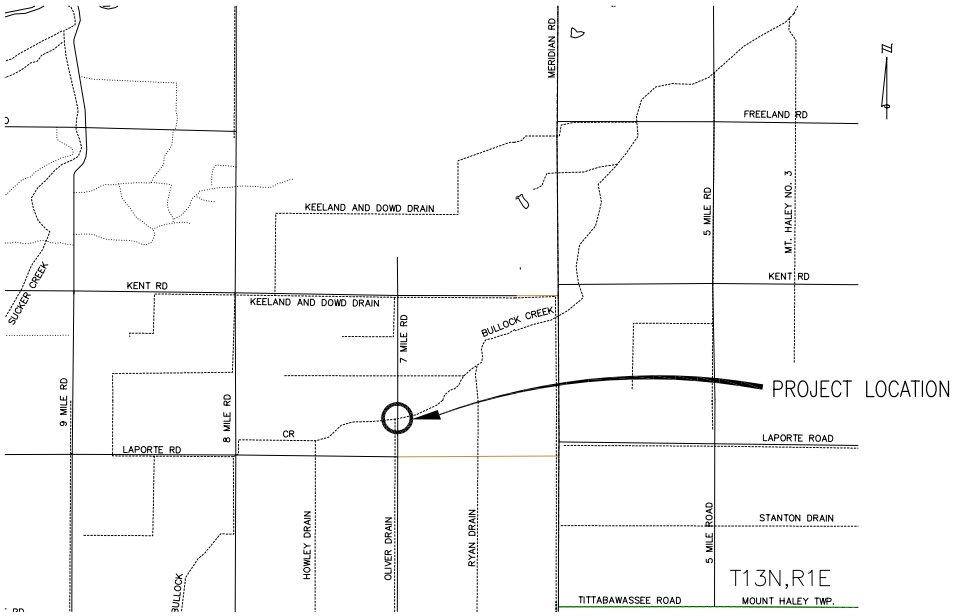
	TOTAL A.D.T.		DESIGN SPEED	POSTED SPEED
	2017	2037		
7 MILE ROAD	XXX	XXX	60 MPH	55 MPH

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	COVER SHEET
2	TYPICAL SHEET
3	LEGEND SHEET
4	REMOVAL SHEET
5	GENERAL PLAN OF SITE
6	GENERAL PLAN OF STRUCTURE
7	ABUTMENTS – GENERAL PLAN OF STRUCTURE
8	DECK PANEL REINFORCEMENT DETAILS
9	DETAIL SHEET
10	MAINTAINING TRAFFIC

M.D.O.T. STANDARD PLANS	
TITLE	PLAN NO.
GUARDRAIL AT BRIDGES AND EMBANKMENTS	R-59-E
GUARDRAIL TYPES A, B, BD, T, TD, MGS-8, MGS-8D, MGS-0 & MGS-0D	R-60-J*
SOIL EROSION & SEDIMENTATION CONTROL MEASURES	R-96-E
SEEDING AND TREE PLANTING	R-100-H
GRADING CROSS-SECTIONS	R-105-D

* SPECIAL DETAILS

M.D.O.T WORK ZONE DEVICES	
TITLE	PLAN NO.
GROUND DRIVEN SIGN SUPPORTS FOR TEMP SIGNS	WZD-100-A
TEMPORARY TRAFFIC CONTROL DEVICES	WZD-125-E



LOCATION MAP
N.T.S.

NOTES:

THE WORK COVERED BY THESE PLANS INCLUDES ROAD WORK, EARTH EXCAVATION, REMOVAL OF THE EXISTING BRIDGE, CONSTRUCTION OF THE PROPOSED BRIDGE, GUARDRAIL, MAINTENANCE OF TRAFFIC, HMA PAVING, PLACING GRANULAR MATERIAL, SLOPE PROTECTION, AND RIPRAP TO THE LIMITS SHOWN.

THE CONTRACTOR SHALL LOCATE ALL ACTIVE UNDERGROUND UTILITIES PRIOR TO STARTING WORK AND SHALL CONDUCT HIS OPERATIONS IN SUCH A MANNER AS TO ENSURE THAT THOSE UTILITIES NOT REQUIRING RELOCATION WILL NOT BE DISTURBED. THERE ARE SEVERAL EXISTING UTILITIES EXPOSED FROM THE WASH OUT. CONTRACTOR SHALL COORDINATE WITH UTILITY COMPANIES TO MAINTAIN UTILITIES TO REMAIN AND PLACE UTILITIES IN EMBANKMENT.

7-MILE ROAD TRAFFIC IS TO BE DETOURED OVER OTHER EXISTING ROADS.

PLAN ELEVATIONS REFER TO NAVD88.

WATER LEVEL IS SUBJECT TO CHANGE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING A DETERMINATION OF WATER LEVELS THAT MAY EXIST DURING CONSTRUCTION.

MEASURES SHALL BE TAKEN TO PREVENT DEBRIS IN WATERWAY. IF DEBRIS FALLS INTO THE WATERWAY, IT SHALL BE REMOVED WITHIN 24 HOURS. SINCE DISTURBANCE OF THE WATERWAY BOTTOM MAY BE AS HARMFUL AS THE DEBRIS ITSELF, THE PREVENTATIVE MEASURES MUST BE EFFECTIVE.

IMMEDIATELY AFTER THE CONSTRUCTION OF AN ABUTMENT IS COMPLETED, SLOPE PROTECTION AND SEEDING OR SODDING SHALL BE PLACED ON THE ADJACENT EMBANKMENT SLOPES.

THE DESIGN OF THIS STRUCTURE IS BASED ON 1.2 TIMES THE CURRENT AASHTO LRFD BRIDGE DESIGN SPECIFICATION HL-93 LOADING WITH THE EXCEPTION THAT THE DESIGN TANDEM PORTION OF THE HL-93 LOAD DEFINITION SHALL BE REPLACED BY A SINGLE 60 KIP AXLE LOAD BEFORE APPLICATION OF THIS 1.2 FACTOR. THE RESULTING LOAD IS DESIGNATED HL-93 MOD. LIVE LOAD PLUS DYNAMIC LOAD ALLOWANCE DEFLECTION DOES NOT EXCEED 1/800 OF SPAN LENGTH.

THE DESIGN OF THE STRUCTURAL MEMBERS IS BASED ON MATERIAL OF THE FOLLOWING GRADES AND STRESSES:

PRECAST CONCRETE	$f'c$ = 5,000 psi
STEEL REINFORCEMENT	fy = 60,000 psi

THE INITIAL FORCE IN THE TRANSVERSE POST-TENSIONING TENDONS SHALL BE 120,000 LBS. EACH. LOCATE POST TENSIONING DUCTS AT $\frac{1}{3}$ POINTS OF BEAMS.

CONTRACT FOR:
CONSTRUCTION OF NEW BRIDGE USING GEOSYNTHETICALLY REINFORCED SOIL ABUTMENTS AND PRECAST CONCRETE SUPERSTRUCTURE.

OHM
Advancing Communities
415 E Main St. | Midland, MI 48640
P (989) 956-2020

PREPARED UNDER THE SUPERVISION OF:

45096
Registration No.

CRAIG D. SCHRIPSEMA

2/23/18
Date

REVISIONS

PROJECT NO.	SHEET NO.
5025-18-0010	1 OF 10

WATER & SEWER UTILITY SYMBOLS

EXISTING

- ST — STORM MANHOLE
- SQUARE CATCH BASIN
- ROUND CATCH BASIN
- CULVERT
- CULVERT W/O END SECTION
- CULVERT W/END SECTION
- S — SANITARY MANHOLE
- CO — CLEAN OUT
- GW — GATE VALVE & WELL
- GATE VALVE & BOX
- W — WATER STOP BOX
- FIRE HYDRANT
- MP — METER PIT
- WATER METER
- SH — SPRINKLER HEAD
- IRRIGATION VALVE

PROPOSED

- STORM MANHOLE
- INLET/CATCH BASIN
- CULVERT END SECTION
- SANITARY MANHOLE
- GV&W — GATE VALVE & WELL
- GV&B — GATE VALVE & BOX
- TSV&W — TAPPING SLEEVE VALVE & WELL
- TSV&B — TAPPING SLEEVE VALVE & BOX
- FIRE HYDRANT

REAL ESTATE SYMBOLS

- CONTIGUOUS PROPERTY SYMBOL
- XXXX — PARCEL NUMBER BOX
- XXXX — NO ROW IMPACTS

MISCELLANEOUS UTILITY SYMBOLS

EXISTING

- GUY WIRE
- GP — GUY POLE
- U — UTILITY POLE
- UL — UTILITY POLE W/LIGHT
- LIGHT/DECOR LAMP POLE
- FLOOD LIGHT
- GAS VALVE
- GAS VENT
- G — GAS METER
- GAS RISER
- TRAFFIC SIGNAL
- PEDESTRIAN RISER
- T — TRANSFORMER PAD
- U — PRIVATE UTILITY MANHOLE
- RXR — RAILROAD CROSSING
- E — ELECTRIC METER
- PB — PHONE BOOTH
- TS — TRAFFIC SIGNAL CONTROLLER
- HAND HOLE
- E — ELECTRIC RISER
- T — TELEPHONE RISER
- C — CABLE TV RISER
- W — MONITORING WELL
- UNDERGROUND MARKER

MISCELLANEOUS SYMBOLS

EXISTING

- RIPRAP
- SIGN
- FLOW DIRECTION
- STUMP
- WETLAND
- CONIFEROUS TREE — CL 1 1" TO 5", CL 2 6" TO 17", CL 3 18" TO 35", CL 4 36" AND UP
- DECIDUOUS TREE
- CONIFEROUS SHRUB
- DECIDUOUS SHRUB
- SB# — SOIL BORING
- SECTION CORNER
- MON — MONUMENT
- IRON ROD/PIPE
- PK — PK NAIL
- BM# — BENCHMARK
- TP# — TRAVERSE POINT
- MAIL/NEWSPAPER BOX
- FP — FLAG POLE
- POST
- HAZARDOUS OR FLAMMABLE MATERIAL — USED WITH UNDERGROUND GAS & ELECTRICAL LINES
- CAUTION – CRITICAL UNDERGROUND UTILITY — USED WITH TELEPHONE & FIBER OPTIC LINES

PROPOSED

- RIPRAP
- SIGN
- FLOW DIRECTION
- XX XX XXX — STRUCTURE NUMBER WM SAN STM
- ADA SIDEWALK RAMP

UTILITY PATTERN

EXISTING

- ELEC — ELECTRICAL *
- 6" (COMPANY) GAS — GAS\OIL
- (COMPANY) CABLE/TEL — CABLE/TELEPHONE *
- FIBER OPTIC — FIBER OPTIC *
- 12" WM — WATER
- 12" SAN — SANITARY
- 12" STM — STORM

PROPOSED

- 12" — STORM/SANITARY/WATER
- 12" — PRIMARY UTILITY WILL HAVE A CONTINUOUS LINESTYLE, WITH THE SECONDARY UTILITY MATCHING ITS RESPECTIVE EXISTING UTILITY LINESTYLE

*OH = OVERHEAD , UG = UNDERGROUND

ROW PATTERN

EXISTING

- ROW — ROW
- SECTION
- PROPERTY/PARCEL

PROPOSED

- ROW — ROW

TOPO PATTERN

EXISTING

- HEDGE/TREE
- FENCE
- GUARDRAIL
- CENTERLINE OF DITCH
- RAILROAD
- WETLAND/EDGE OF WATER

PROPOSED

- GRADING LIMIT (SLOPE STAKE)
- CENTERLINE OF DITCH
- GUARDRAIL
- FENCE

REMOVAL LEGEND

- SIDEWALK REMOVAL
- BRICK REMOVAL
- HMA SURFACE REMOVAL
- PAVEMENT REMOVAL
- COLD MILLING HMA SURFACE
- HMA BASE CRUSHING AND SHAPING
- EXCAVATION, EARTH, MODIFIED
- CURB AND GUTTER, REM
- TREE, REM
- S-XXXXXX — SALVAGE
- B-XXXXXX — BULKHEAD
- A-XXXXXX — ABANDON
- R-XXXXXX — REMOVE
- ADJ-XXXXXX — ADJUST
- REL-XXXXXX — RELOCATE
- REC-XXXXXX — RECONSTRUCT
- R B/O-XXXXXX — REMOVE BY OTHERS
- ADJ B/O-XXXXXX — ADJUST BY OTHERS
- REL B/O-XXXXXX — RELOCATE BY OTHERS

IF NECESSARY FOR CLARITY

- (S) — SALVAGE
- (B) — BULKHEAD
- (A) — ABANDON
- (C) — CLEARING
- (R) — REMOVE
- (REL) — RELOCATE
- (REC) — RECONSTRUCT
- (REL B/O) — RELOCATE BY OTHERS
- (ADJ B/O) — ADJUST BY OTHERS

SPECIAL LEGEND

- HEAVY RIPRAP
- SILT FENCE

Know what's **below.** **Call** before you dig.

OHM
ARCHITECTS ENGINEERS PLANNERS
415 E Main St
Midland, MI 48640
P (989) 956-2020
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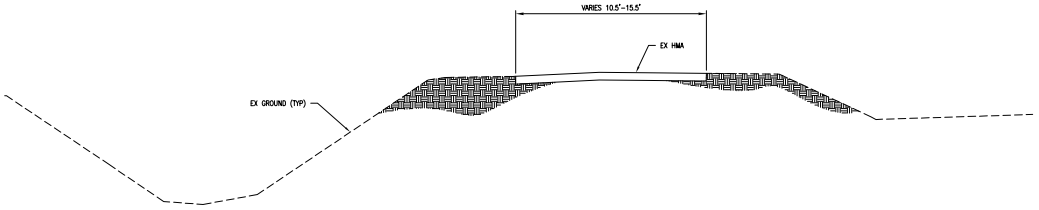
REVISIONS:

DATE	PROJ NUMBER	ENG	PROJ MGR	CADD	COUNTY	CITY/VILLAGE/TOWNSHIP	SCALE	H: NTS	V: NTS	HORIZ DATUM	VERT DATUM
Value	5025-18-0010	CDS	Value	MCH	MIDLAND	Value				Value	Value

MIDLAND COUNTY ROAD COMMISSION
7 MILE ROAD OVER BULLOCK CREEK
TYPICAL SHEET

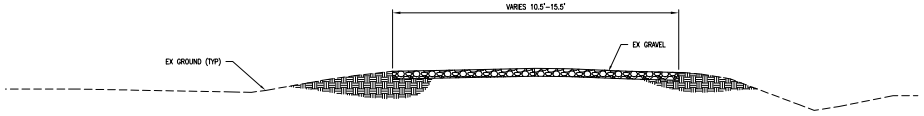
SHEET 2 OF Value

DRAWING PATH: P:\5000_5499\5025180010_7Mile_Over_Bullock_Creek\Drawings\Civil\Misc\180010_EG.dwg Feb. 23, 2018 - 4:04pm



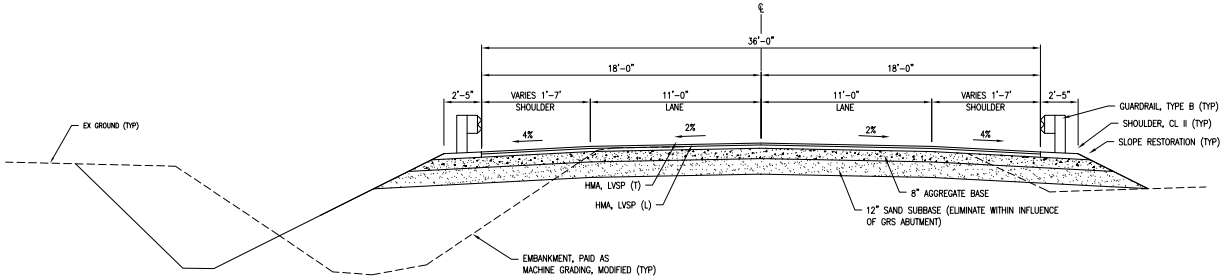
EXISTING TYPICAL SECTION

STA 1+38.90 (POB) TO STA 59+81



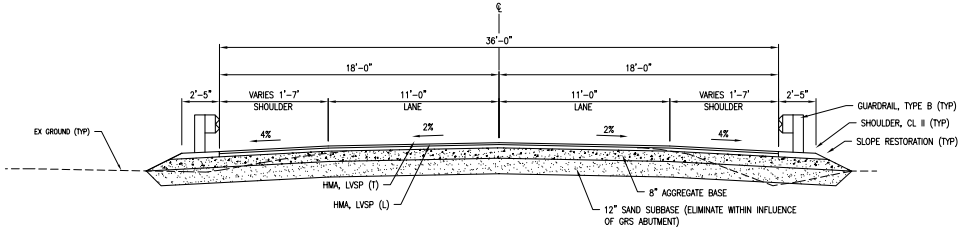
EXISTING TYPICAL SECTION

STA 59+81 TO STA 5+51.32 (POE)



TYPICAL SECTION

STA 1+38.90 (POB) TO STA 2+34.90



TYPICAL SECTION

STA 2+64.90 TO STA 3+60.90 (POE)

INFORMATIONAL EARTH QUANTITIES (POB TO POE)

MACHINE GRADING, MODIFIED	
ITEM	VOLUME
EXCAVATION, EARTH	XXX CYDS
EMBANKMENT, CIP	XXX CYDS

NOTE: QUANTITIES SHOWN FOR INFORMATIONAL PURPOSES ONLY AND ARE INCLUDED WITH PAYMENT FOR MACHINE GRADING, MODIFIED. CONTRACTOR RESPONSIBLE FOR DETERMINING OWN CUT/FILL QUANTITIES.

HMA APPLICATION ESTIMATE

IDENT NO.	ITEM	RATE (#/SYD)	PERF. GRADE	REMARKS
L	HMA, LVSP	220	58-28	LEVELING COURSE
T	HMA, LVSP	220	58-28	TOP COURSE

NOTES: 1) THE AGGREGATE WEAR INDEX (AWI) FOR THE TOP COURSE SHALL BE 220.
2) RECLAIMED ASPHALT PAVEMENT (RAP) IS LIMITED TO 15% IN THE HMA TOP COURSES
3) PLACE HMA BOND COAT AT 0.05 TO 0.15 GAL/SYD BETWEEN LAYERS AS DIRECTED BY THE ENGINEER (INCLUDED IN PAYMENT FOR HMA PAVING ITEMS)

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REVISIONS:

DATE 2/23/18 | PROJ NUMBER 5025-17-0010 | DES CDS | DRG CDS | PROJ MGR CDS | CADD MCH | COUNTY MIDLAND | CITY/VILLAGE/TOWNSHIP Midland | SCALE H: NTS V: NTS | HORIZ DATUM ---- | VERT DATUM ----

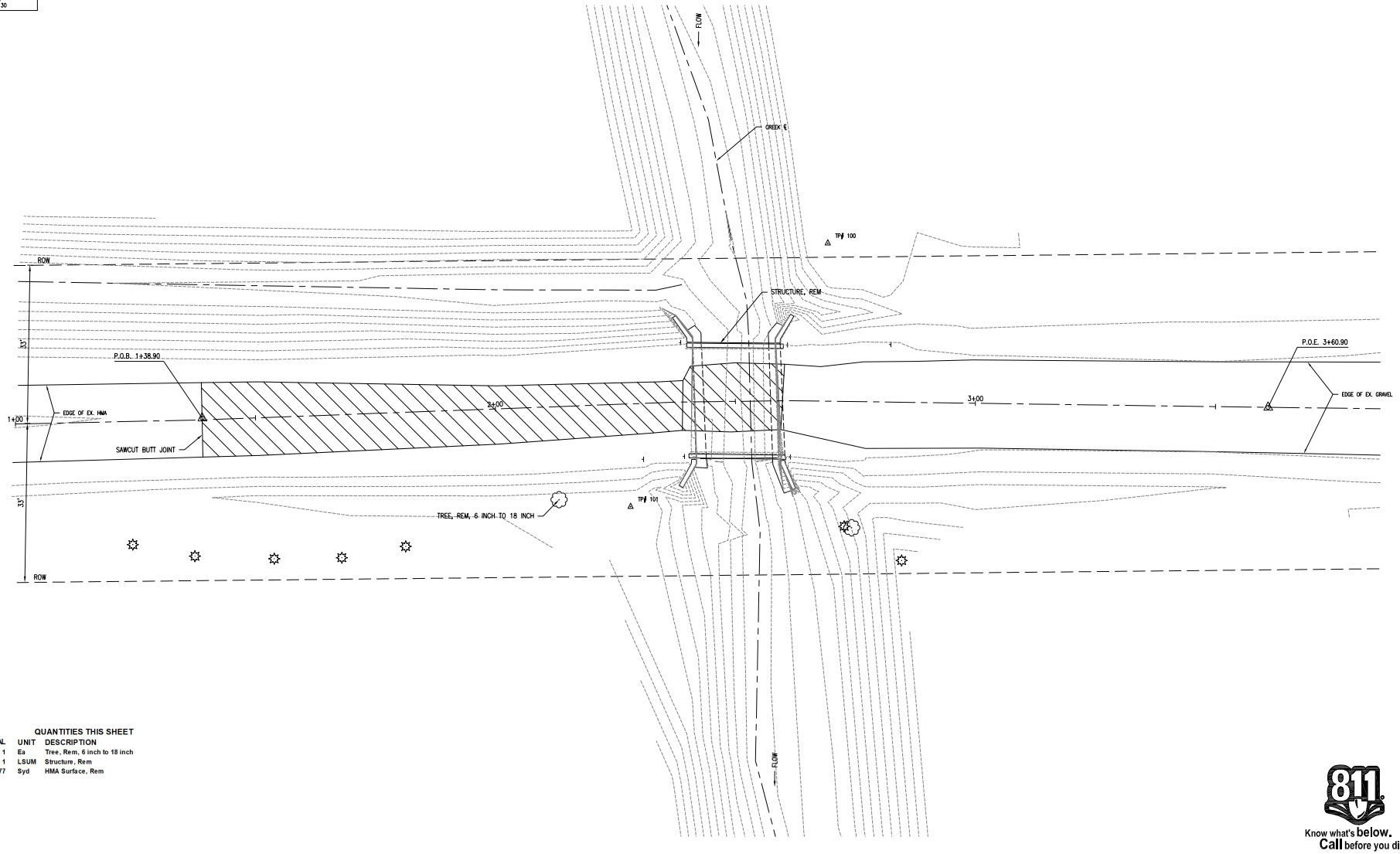
MIDLAND COUNTY ROAD COMMISSION
7 MILE ROAD OVER BULLOCK CREEK
TYPICAL SECTIONS

SHEET 3 OF 10

7 MILE ROAD

BULLOCK CREEK

JOB BENCHMARK # 200 UTILITY POLE N 728524.8320 E 13117204.400 ELEV 676.051	
JOB BENCHMARK # 201 UTILITY POLE N 728154.2120 E 13117283.7600 ELEV 674.877	
TRAVERSE POINT # 100 N 728344.2300 E 13117224.8320	
TRAVERSE POINT # 101 N 728303.16 E 13117279.8680	
TRAVERSE POINT # 102 N 728077.3890 E 13117251.9130	



QUANTITIES THIS SHEET

TOTAL	UNIT	DESCRIPTION
1	Ea	Tree, Rem, 6 inch to 18 inch
1	LSUM	Structure, Rem
177	Syd	HMA Surface, Rem

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2/23/18	5025-18-0010	CDS	CDS	MCH	MIDLAND	Midland	H: 1"=20' V: 1"=20'	----	----

MIDLAND COUNTY ROAD COMMISSION
7 MILE ROAD OVER BULLOCK CREEK
REMOVAL SHEET

SHEET 4 OF 10

Know what's **below.** **Call** before you dig.

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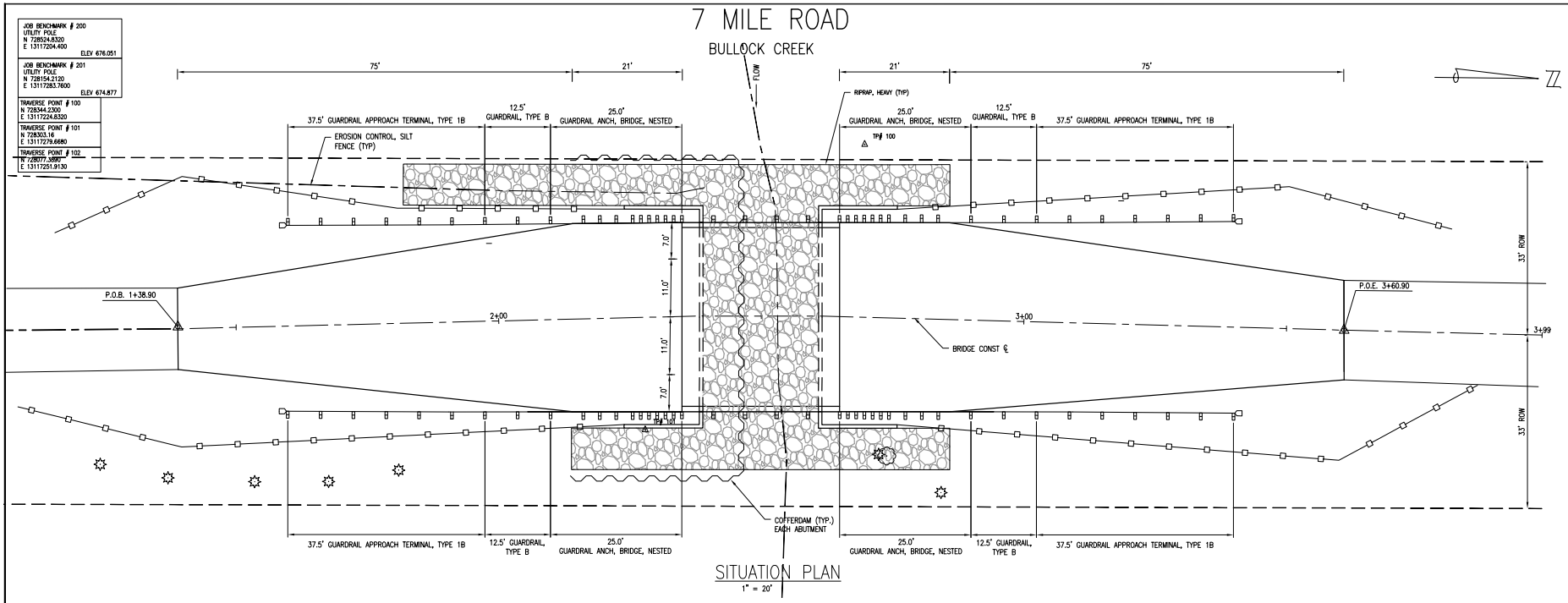
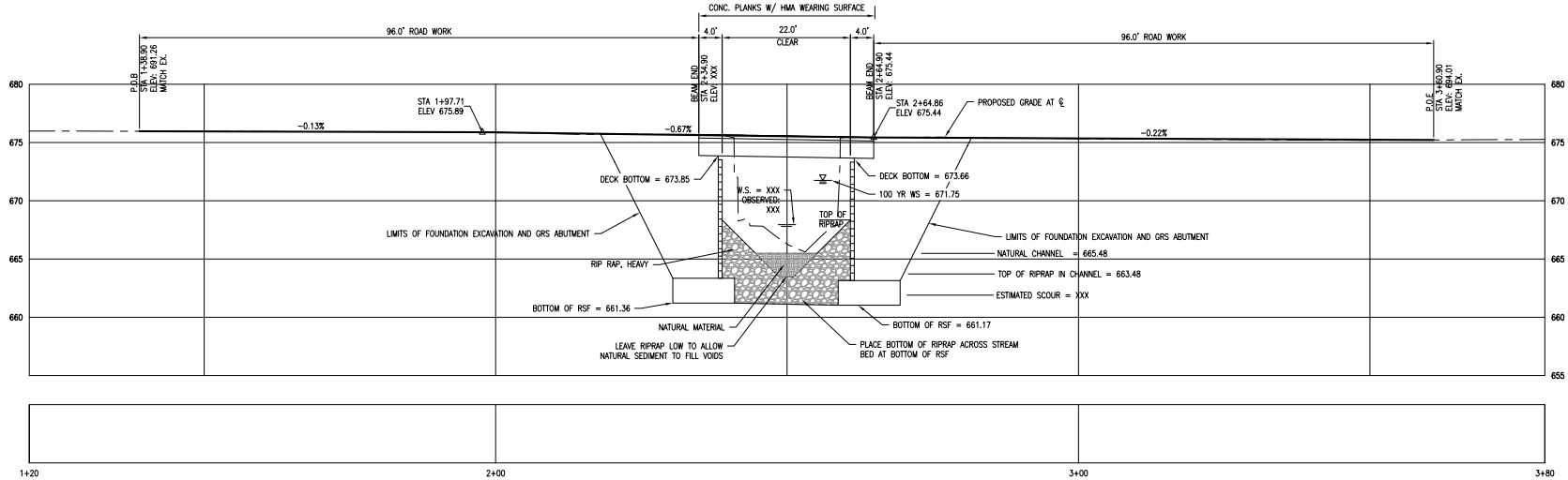
7 MILE ROAD

BULLOCK CREEK



SITUATION PLAN

1" = 20'



PROFILE ALONG CONSTRUCTION ℄ – WEST SHAFFER ROAD

VERT SCALE: 1" = 10'
HORIZ SCALE: 1" = 20'

RSF = REINFORCED SOIL FOUNDATION
GRS = GEOSYNTHETIC REINFORCED SOIL

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DATE	PROJ NUMBER	ENG	PROJ MGR	CADD	COUNTY	CITY/VILLAGE/TOWNSHIP	SCALE	HORIZ DATUM	VERT DATUM
2/23/18	5025-18-0010	CDS	CDS	MCH	MIDLAND	Midland	H: 1"=20' V: 1"=10'	-----	-----

MIDLAND COUNTY ROAD COMMISSION
7 MILE ROAD OVER BULLOCK CREEK
GENERAL PLAN OF SITE

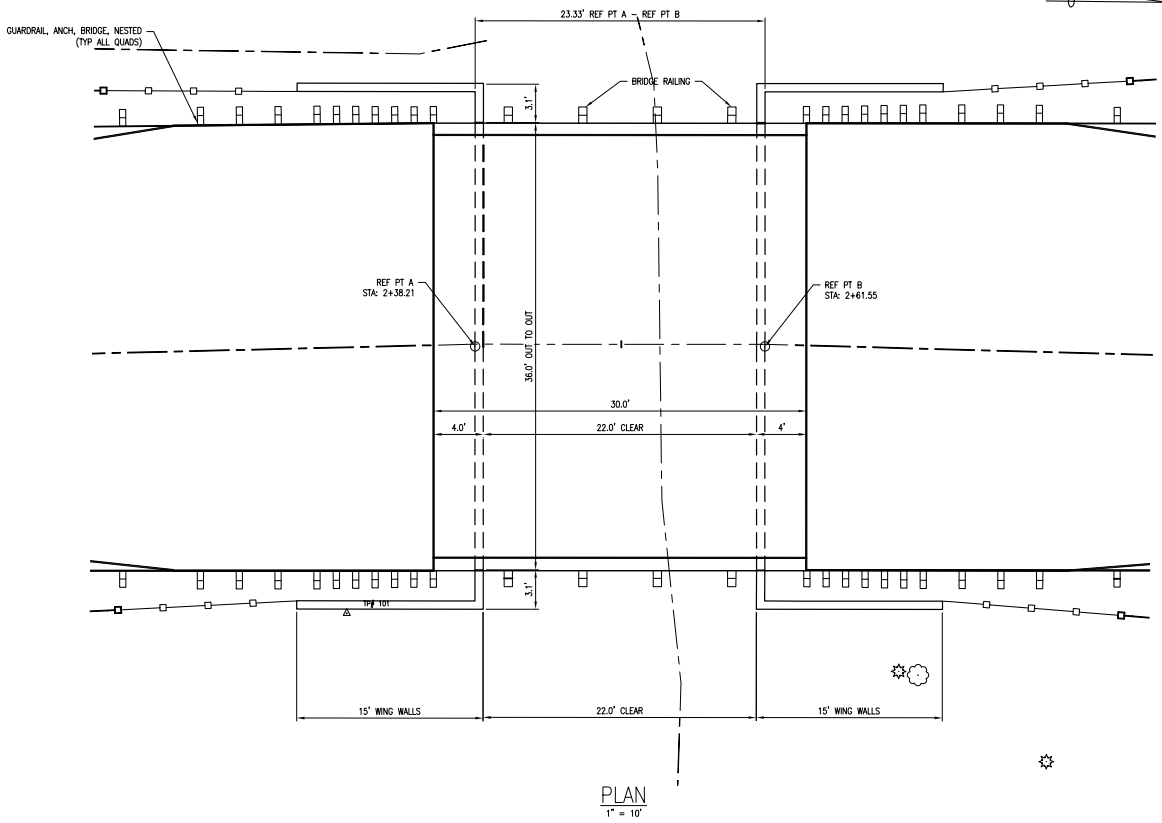
Know what's **below.** **Call** before you dig.

SHEET 5 OF 10

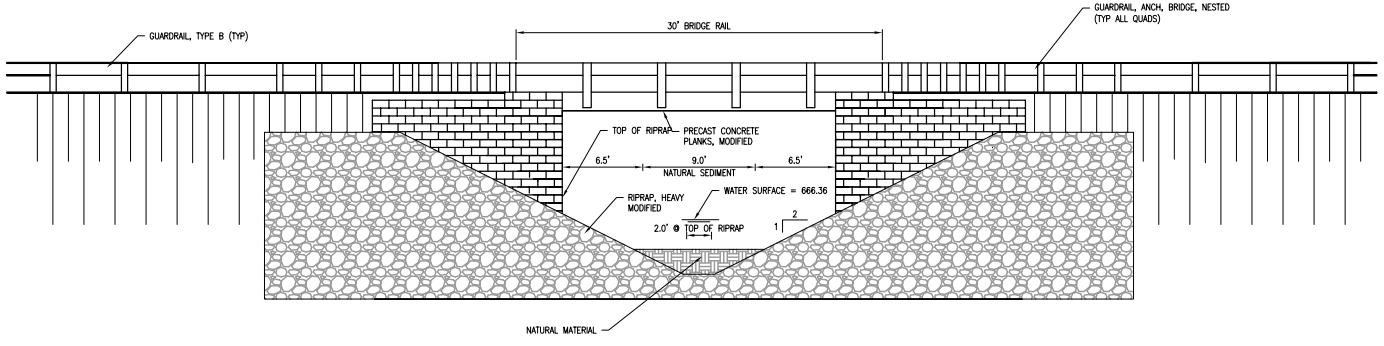
DRAWING PATH: P:\5000-5499\5025180010_7Mile_Over_Bullock_Creek\Drawings\Civil\Plans_Const\180010GN.dwg Feb 23, 2018 - 4:05pm

7 MILE ROAD

BULLOCK CREEK



PLAN
1" = 10'



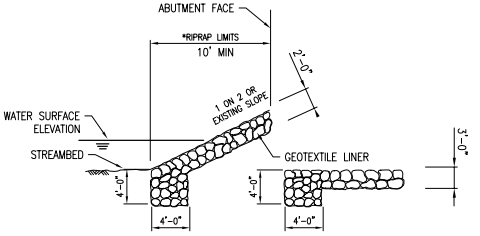
ELEVATION
1" = 10'

SUMMARY OF HYDRAULIC ANALYSIS

FLOOD DATA	DISCHARGE (CFS)	EXISTING: WATER SURFACE ELEV. AT U/S FACE OF STRUCTURE	EXISTING: VELOCITY IN D/S CHANNEL IN (FPS)	PROPOSED: WATER SURFACE ELEVATION AT U/S FACE OF STRUCTURE	PROPOSED: VELOCITY IN D/S CHANNEL IN (FPS)	PROPOSED: WATERWAY AREA (SFT) AT D/S FACE	PROPOSED: CHANGE IN WS EL __ U/S OF PROPOSED STRUCTURE
50-YEAR	480	671.56	6.85	671.19	6.44	217.79	-0.37
100-YEAR	600	672.28	7.52	671.75	7.04	242.42	-0.53

MAXIMUM BRIDGE AREA BELOW LOW CHORD IS 297.35 SQUARE FT

BULLOCK CREEK AT 7 MILE ROAD, SECTION 24, T13N, R1W, PORTER TOWNSHIP, MIDLAND COUNTY, HAS A DRAINAGE AREA OF 7.46 SQUARE MILES. THE 10%, 2%, 1%, 0.5%, AND 0.2% CHANCE PEAK FLOWS ARE ESTIMATED TO BE 270 CUBIC FEET PER SECOND (CFS), 480 CFS, 600 CFS, 700 CFS, AND 950 CFS, RESPECTIVELY. (WATERSHED BASIN NO. 32D TITTABAWASSEE).



RIPRAP HEADER DETAILS

TOP OF RIPRAP MUST BE AT OR BELOW EXISTING STREAMBED/ SLOPE ELEVATION.

AN APPROPRIATE METHOD OF WATER DIVERSION FOR PLACING RIPRAP SHALL BE PROPOSED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER. IF WATER IS SHALLOW (LESS THAN TWO FEET), TEMPORARY CONCRETE BARRIERS OR SANDBAGS MAY BE USED TO DIVERT FLOW.

THE RIPRAP SCHEME SHOWN IS A MINIMUM REQUIREMENT FOR SCOUR.

*RIPRAP LIMITS ARE APPROXIMATE. RIPRAP SHALL EXTEND FROM TOP OF BANK TO BOTTOM OF EXISTING CHANNEL AT A 1 ON 2 SLOPE.

OHM
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Midland, MI 48640
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OHM-ADVISORS.COM

REVISIONS:

DATE: 2/23/18 | PROJ NUMBER: 5025-18-0010 | DSG: CDS | DRG: CDS | PROJ MGR: MCH | CADD: MCH | COUNTY: MIDLAND | CITY/VILLAGE/TOWNSHIP: Midland | SCALE: H: 1"=10' V: 1"=10' | HORIZ DATUM: ----- | VERT DATUM: -----

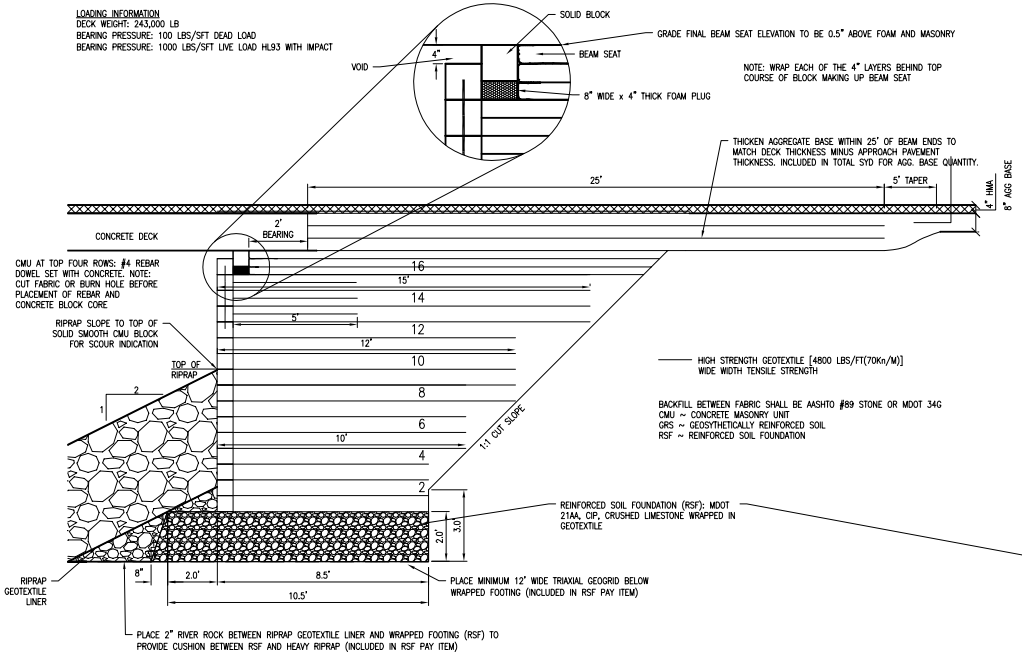
MIDLAND COUNTY ROAD COMMISSION
7 MILE ROAD OVER BULLOCK CREEK
GENERAL PLAN OF STRUCTURE

SHEET 6 OF 10

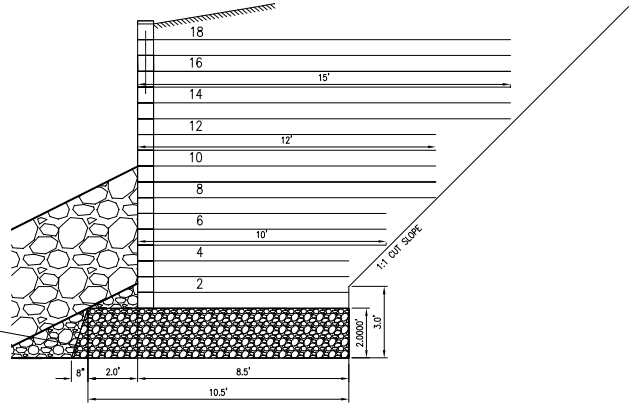
811 Know what's below. Call before you dig.

DRAWING PATH: P:\5000_5499\5025180010_7Mile_Over_Bullock_Creek\Drawings\Civil\Plans_Const\180010GN.dwg Feb 23, 2018 - 4:05pm

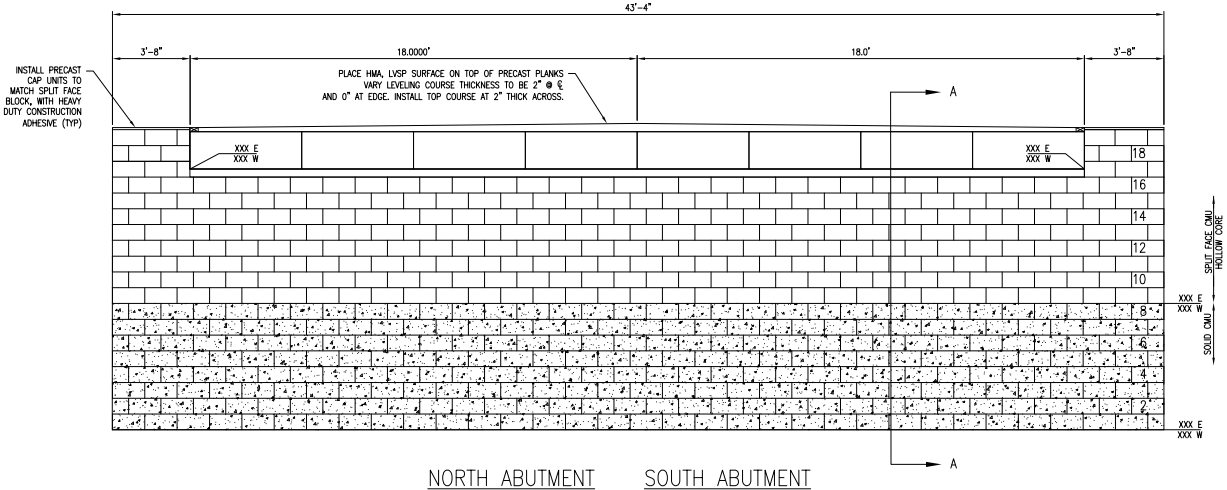
LOADING INFORMATION
DECK WEIGHT: 243,000 LB
BEARING PRESSURE: 100 LBS/SFT DEAD LOAD
BEARING PRESSURE: 1000 LBS/SFT LIVE LOAD HL93 WITH IMPACT



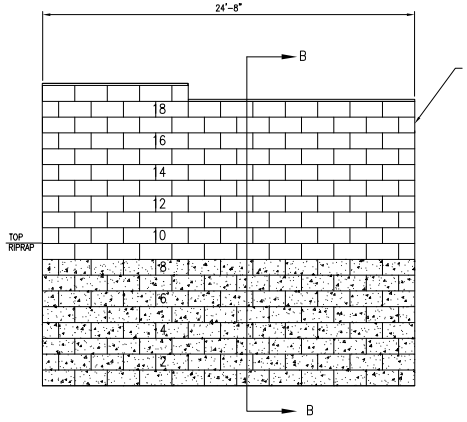
SECTION A–A



SECTION B–B
WINGWALL CONSTRUCTION



NORTH ABUTMENT SOUTH ABUTMENT



WINGWALL

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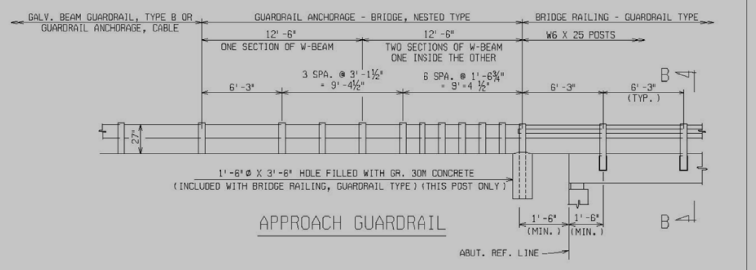
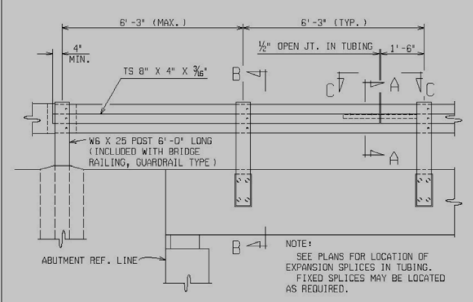
DATE	PROJ NUMBER	ENG	PROJ MGR	CADD	COUNTY	CITY/VILLAGE/TOWNSHIP	SCALE	HORIZ DATUM	VERT DATUM
2/23/18	5025-18-0010	CDS	CDS	MCH	MIDLAND	Midland	H: 1"=10' V: 1"=10'	-----	-----

MIDLAND COUNTY ROAD COMMISSION
7 MILE ROAD OVER BULLOCK CREEK
ABUTMENTS – GENERAL PLAN OF STRUCTURE

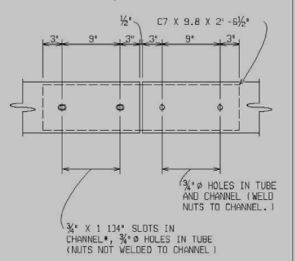
SHEET 7 OF 10



APPROACH GUARDRAIL

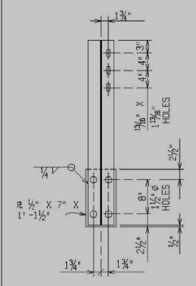


RAILING ELEVATION



VIEW C-C

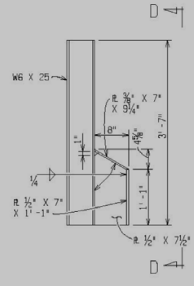
* EXPANSION SPLICE ONLY. USE ¾"Ø HOLES AT FIXED SPLICE.



SECTION E-E

(TYPE 1 POST)

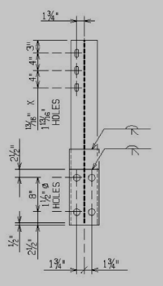
SEE PLANS FOR POST TYPE TO BE USED



POST ELEVATION

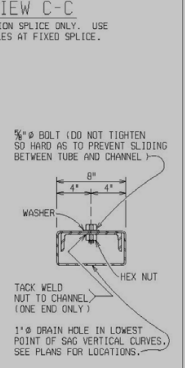
(TYPE 2 POST)

SEE PLANS FOR POST TYPE TO BE USED



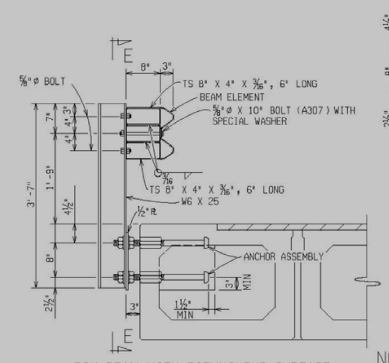
VIEW D-D

(TYPE 2 POST)



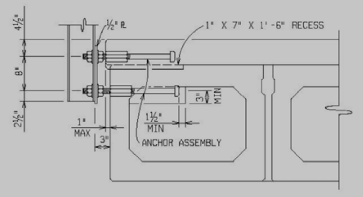
SECTION A-A

PREPARED BY DESIGN DIVISION	ENGINEER OF CONSTRUCTION	ENGINEER - BRIDGE DESIGN	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS STANDARD PLAN FOR BRIDGE RAILING, GUARDRAIL TYPE AND GUARDRAIL ANCHORAGE-BRIDGE, NESTED TYPE			
	ENGINEER OF MAINTENANCE	ENGINEER OF DESIGN				
	ENGINEER OF MATERIALS & TECHNOLOGY					
DRAWN BY: EJ-1						
CHECKED BY:	ENGINEER OF TRAFFIC AND SAFETY	DEPUTY DIRECTOR - HIGHWAYS	F.H.W.A. APPROVAL	09/25/90 PLAN DATE	X-31A	SHEET 1 OF 2



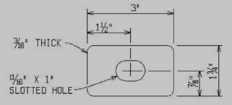
BOX BEAM WITH BITUMINOUS SURFACE

TYPE 1 POST SHOWN

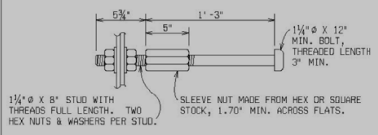


BOX BEAM WITH REINFORCED CONCRETE SLAB

SECTION B-B



SPECIAL WASHER



ANCHOR ASSEMBLY

ALL PARTS GALVANIZED

NOTES:

DETAILS SHOWN ARE IN ACCORDANCE WITH CURRENT AASHTO SPECIFICATIONS.

BRIDGE RAILING, GUARDRAIL TYPE WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER LINEAR FOOT, WHICH PRICE INCLUDES PAYMENT IN FULL FOR ALL WORK AND MATERIAL NECESSARY TO ERECT THE RAILING. PAYMENT FOR ANCHOR ASSEMBLIES EMBEDDED IN BOX BEAMS IS INCLUDED IN THE BID ITEM 'PRESTRESSED CONCRETE DECK'. PAYMENT FOR ANCHOR ASSEMBLIES EMBEDDED IN SUPERSTRUCTURE CONCRETE IS INCLUDED IN THE BID ITEM 'SUPERSTRUCTURE CONCRETE'.

STEEL BEAM GUARDRAIL ELEMENTS AND BACK-UP ELEMENTS SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND STANDARD PLAN R-60 SERIES.

RAIL TUBE ELEMENTS SHALL MEET THE REQUIREMENTS OF A500 GRADE B, WITH A SILICON CONTENT OF LESS THAN 0.06% OR BETWEEN 0.15% & 0.25% AND SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM 123. RAIL TUBE ELEMENTS FROM ALL HEATS SUPPLIED SHALL BE TESTED PRIOR TO DELIVERY OF THE RAIL TO THE CONTRACTOR. SEE SPECIAL PROVISION FOR BRIDGE RAILING, GUARDRAIL TYPE.

POST ASSEMBLIES AND CHANNELS SHALL MEET THE REQUIREMENTS OF ASTM A36, WITH A SILICON CONTENT OF LESS THAN 0.06% OR BETWEEN 0.15% & 0.25% AND SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123.

POST ASSEMBLIES AND CHANNELS SHALL MEET THE CHARPY V-NOTCH REQUIREMENTS AS SPECIFIED IN 9.06.04 OF THE STANDARD SPECIFICATIONS AT A TEST TEMPERATURE OF 10°F(-12°C).

EXCEPT WHERE NOTED, ALL BOLTS, NUTS, AND STUDS FOR BRIDGE RAILING GUARDRAIL TYPE SHALL CONFORM TO THE PHYSICAL REQUIREMENTS OF ASTM A325 EXCEPT THAT THE MINIMUM ELONGATION SHALL BE 10%. THE CHEMICAL PROPERTIES ARE WAIVED. WASHERS SHALL MEET THE MECHANICAL REQUIREMENTS OF ASTM F436. ALL HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153. GALVANIZED NUTS SHALL BE TAPPED OVERSIZE PER THE REQUIREMENTS OF ASTM A563.

ANCHOR ASSEMBLIES CAST IN THE BRIDGE SLAB SHALL BE PRESET BY USE OF A TEMPLATE IN ACCORDANCE WITH 7.06.03 OF THE STANDARD SPECIFICATIONS. FOR PLACEMENT OF RAIL POSTS, SEE PLANS.

GUARDRAIL ANCHORAGE-BRIDGE, NESTED TYPE, WILL PAID FOR AT THE CONTRACT UNIT PRICE EACH, WHICH INCLUDES PAYMENT IN FULL FOR ALL WORK AND MATERIAL NECESSARY TO ERECT THE GUARD RAIL.

GUARDRAIL ANCHORAGE-BRIDGE, NESTED TYPE, SHALL CONFORM TO THE DIMENSIONS FOR GALVANIZED BEAM GUARDRAIL, TYPE B, STANDARD PLAN R-60 SERIES, AND SHALL MEET THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS, EXCEPT WHERE MODIFIED BY THIS STANDARD.

AT POSTS ADJACENT TO TUBE EXPANSION SPLICES, NUTS FOR ⅝"Ø BOLTS SHALL BE INSTALLED FINGER TIGHT WITH THE THREADS BURRED.

PREPARED BY DESIGN DIVISION	ENGINEER OF CONSTRUCTION	ENGINEER - BRIDGE DESIGN	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS STANDARD PLAN FOR BRIDGE RAILING, GUARDRAIL TYPE AND GUARDRAIL ANCHORAGE-BRIDGE, NESTED TYPE			
	ENGINEER OF MAINTENANCE	ENGINEER OF DESIGN				
	ENGINEER OF MATERIALS & TECHNOLOGY					
DRAWN BY: EJ-1						
CHECKED BY:	ENGINEER OF TRAFFIC AND SAFETY	DEPUTY DIRECTOR - HIGHWAYS	F.H.W.A. APPROVAL	09/25/90 PLAN DATE	X-31A	SHEET 2 OF 2

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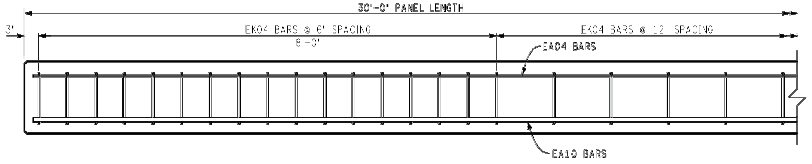
2/23/18	5025-18-0010	CDS	CDS	MCH	MIDLAND	Midland	H: 1"=40' V:	----	----

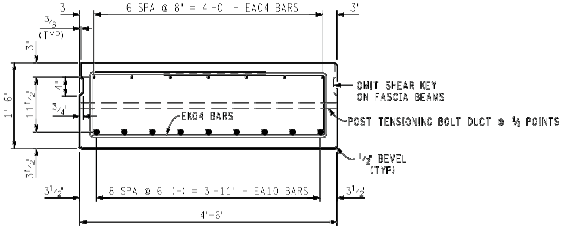
MIDLAND COUNTY ROAD COMMISSION
7 MILE ROAD OVER BULLOCK CREEK
DECK PANEL REINFORCEMENT DETAILS

SHEET 8 OF 10

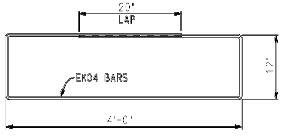


DECK PANEL ELEVATION

(ADJUST EK04 SPACING TO ACCOMMODATE POST-TENSIONING DUCTS)
(EK04 BARS SYMETRICAL ABOUT DECK PANEL)



DECK PANEL SECTION



K BAR DETAIL

NOTES:

THE INITIAL FORCE IN THE TRANSVERSE POST-TENSIONING TENDONS SHALL BE 120,000 LBS. EACH. LOCATE POST TENSIONING DUCTS AT 1/3 POINTS ON BEAMS

NOTES:

-SPLITFACE CONCRETE MASONRY BLOCK – THIS ITEM SHALL CONSIST OF FURNISHING AND PLACING SPLITFACE HOLLOW CORE CONCRETE MASONRY UNITS (CMU) MEETING ASTM C90 WITH THE MODIFICATIONS THAT THE BLOCK SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AND A MAXIMUM ABSORPTION RATE OF 6.5%. PLACE CMU BLOCKS SIDE BY SIDE FOR THE FULL LENGTH OF EACH COURSE OF THE WALL. CHECK WALL PLUMBNESS A MINIMUM OF EVERY 3 LAYERS AND CORRECT DEVIATIONS GREAT THAN ¼". CORRECT MISALIGNED, IMPROPERLY SEATED OR OUT OF LEVEL CMU BLOCKS. ASSURE THAT THE TOPS OF ALL CMU BLOCKS ARE FREE OF LOOSE MATERIAL PRIOR TO THE PLACEMENT OF THE NEXT LAYER OF GEOTEXTILE AND CMU BLOCKS.

-SOLID CONCRETE MASONRY BLOCK – THIS ITEM SHALL CONSIST OF FURNISHING AND PLACING SOLID CONCRETE MASONRY UNITS (CMU) MEETING ASTM C90 WITH THE MODIFICATIONS THAT THE BLOCK SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AND A MAXIMUM ABSORPTION RATE OF 6.5%. BEGIN CONSTRUCTION OF THE ABUTMENT BY PLACING ONE FULL LENGTH OF COURSE OF CMU BLOCK AT A TIME. PLACE THE FIRST COURSE OF CMU BLOCK ON TOP AND IN FULL CONTACT WITH THE REINFORCED SOIL FOUNDATION. THE FIRST ROW OF CMU BLOCK MUST BE CAREFULLY LEVELED IN BOTH DIRECTIONS TO ENSURE PROPER ALIGNMENT FOR THE BALANCE OF THE WALL. CHECK WALL PLUMBNESS A MINIMUM OF EVERY 3 LAYERS AND CORRECT DEVIATIONS GREATER THAN ¼". CORRECTED MISALIGNED, IMPROPERLY SEATED OR OUT OF LEVEL CMU BLOCKS. ASSURE THAT THE TOPS OF ALL CMU BLOCKS ARE FREE OF LOOSE MATERIAL PRIOR TO THE PLACEMENT OF THE NEXT LAYER OF GEOTEXTILE AND CMU BLOCKS.

-HIGH STRENGTH WOVEN POLYPROPYLENE FABRIC – THIS ITEM SHALL HAVE A WIDE WIDTH TENSILE STRENGTH OF 4800/LBS PER FOOT IN BOTH DIRECTIONS AS PER ASTM D-4595. THE GEOSYNTHETIC REINFORCEMENT SHALL BE PLACED AS SHOWN ON SHEET. THE WIDTH AND LENGTH VARY AS SHOWN ON THE DRAWING. GEOSYNTHETIC REINFORCEMENT SHALL EXTEND BETWEEN THE LAYERS OF CMU BLOCK TO PROVIDE A FRICTIONAL CONNECTION. THE GEOSYNTHETIC REINFORCEMENT SHALL NEARLY COMPLETELY COVER THE TOP OF THE CMU BLOCK. PULL THE GEOSYNTHETIC REINFORCEMENT TAUT PRIOR TO BACKFILLING TO REMOVE WRINKLES. THE PRICED BID SHALL INCLUDE FURNISHING AND PLACING THIS MATERIAL. TO LIMIT CONSTRUCTION DAMAGE TO THE GEOTEXTILE REINFORCEMENT, CONSTRUCTION EQUIPMENT SHALL NOT DRIVE DIRECTLY OVER THE GEOTEXTILE. AN AGGREGATE THICKNESS OF 6"IS SUFFICIENT TO PREVENT EQUIPMENT FROM DAMAGING THE GEOTEXTILE. NO LAPPING OF FABRIC SHALL BE PERMITTED ALONG THE FACE. WHERE LAPPED ELSEWHERE A 0.25' THICKNESS OF STONE SHALL BE SPREAD BETWEEN PIECES OF FABRIC.

-THE STONE BACKFILL SHALL BE PLACED BEHIND EACH LAYER OF CMU BLOCK IN A LIFT THICKNESS NOT TO EXCEED THE CMU BLOCK HEIGHT. PLACEMENT OF THE AGGREGATE SHALL BE FROM THE WALL FACE BACKWARD TO PREVENT THE FORMATION OF AND TO REMOVE ANY WRINKLES IN THE GEOTEXTILE. FILL SHALL BE PLACED IN A MANNER TO AVOID WRINKLING OF THE GEOSYNTHETIC REINFORCEMENT. COMPACTION GENERALLY ACHIEVED BY:

1) RODDING THE AGGREGATE FILL BEHIND EACH CMU BLOCK APPROXIMATELY EVERY FOOT WHILE EXERTING DOWNWARD PRESSURE ON THE CMU BLOCK TO PREVENT LATERAL MOVEMENT
2) USING A VIBRATORY PLATE COMPACTOR (> 4 PASSES) DIRECTLY BEHIND THE CMU BLOCK WHILE EXERTING DOWNWARD PRESSURE ON THE CMU BLOCK TO PREVENT LATERAL MOVEMENT
3) LARGER VIBRATORY COMPACTORS MAY BE USED FOR THE BALANCE OF THE AREA MORE THAN 2' BEHIND THE CMU BLOCK. MULTIPLE PASSES OF A VIBRATORY PLATE COMPACTOR CAN ALSO ACHIEVE PROPER DENSITY.

-AT THE END OF A DAY'S OPERATIONS, SLOPE THE LAST LIFT OF BACKFILL AWAY FROM THE WALL FACE TO DIRECT SURFACE RUNOFF AWAY FROM THE WALL. DO NOT ALLOW SURFACE RUNOFF FROM ADJACENT AREAS TO ENTER THE WALL CONSTRUCTION AREA.

OHM	NO SCALE		DATE: 02/10/17
	JN: 5025-17-0010	SHAFFER ROAD BRIDGE RECONSTRUCTION	DRAWING: SHEET
		MIDLAND COUNTY ROAD COMMISSION	
		DECK PANEL REINFORCEMENT DETAILS	1

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2/23/18	5025-18-0010	CDS	CDS	MCH	MIDLAND	Midland	H: 1"=10' V: 1"=10'	-----	-----

MIDLAND COUNTY ROAD COMMISSION
7 MILE ROAD OVER BULLOCK CREEK
DETAIL SHEET

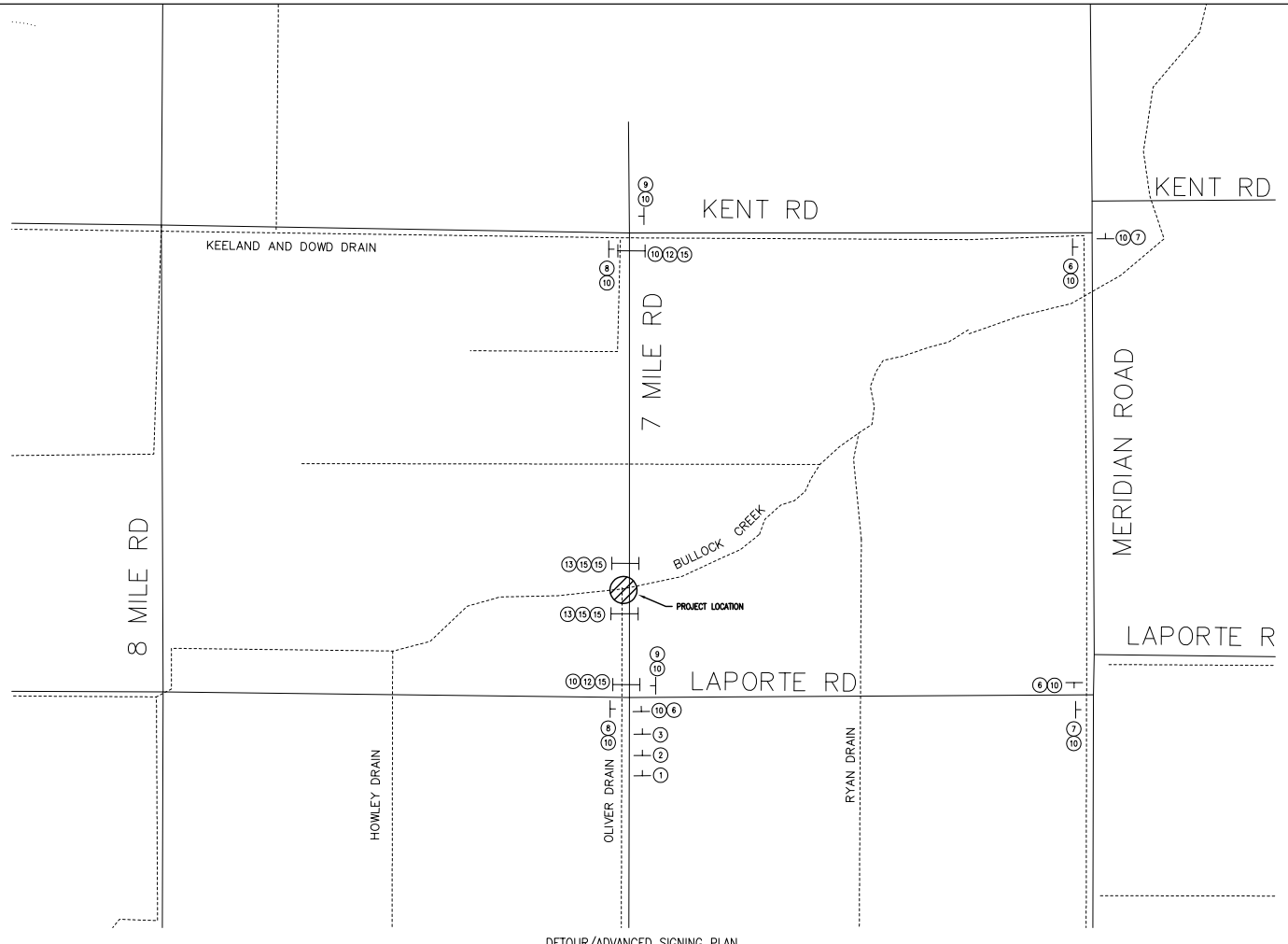
SHEET 9 OF 10

SIGN LEGEND

NO	SIGN	SIGN DESIGNATION	SIZE	NUMBER REQUIRED (FOR INFORMATION ONLY)	AREA (SQ. FT)
1	ROAD WORK AHEAD	W20-1	48"x48"	1	16
2	DETOUR AHEAD	W20-2	48"x48"	1	16
3	ROAD CLOSED AHEAD	W20-3	48"x48"	1	16
4	WORK ZONE BEGINS / TRAFFIC FINES DOUBLED	R5-18cLA	60"x42"	0	0
5	INJURE/KILL A WORKER / FINES - $ 7500 JAIL - 15 YRS	R5-18bLA	60"x42"	0	0
6	DETOUR	M4-9(R)	30"x24"	3	15
7	DETOUR	M4-9(L)	30"x24"	2	10
8	DETOUR	M4-9(S)	30"x36"	2	15
9	DETOUR ENDS	M4-8a	24"x18"	2	6
10	7 MILE RD	D3-1A	30"X12"	11	28
12	ROAD CLOSED AHEAD LOCAL TRAFFIC ONLY	R11-3	30"x48"	2	20
13	ROAD CLOSED	R11-2	30"x48"	2	20
14	END ROAD WORK	G20-2	48"x24"	0	0
15		TYPE III* BARRICADE	8'	6	

TRAFFIC NOTES:

1. DISTANCES SHOWN ARE APPROXIMATE AND MAY BE ADJUSTED IN THE FIELD BY THE CONTRACTOR AS DIRECTED BY THE ENGINEER TO AVOID CONFLICT OR OBSTRUCTION BY EXISTING TREES, SIGNS, DRIVEWAYS ETC, PRESENT IN THE FIELD BUT NOT SHOWN ON THE PLANS.
2. ALL CONSTRUCTION SIGNS SHALL CONFORM WITH THE CURRENT EDITION OF THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
3. ALL TRAFFIC CONTROL DEVICES INCLUDING SIGNS, BARRICADES, PLASTIC DRUMS AND WARNING LIGHTS ARE THE RESPONSIBILITY OF THE CONTRACTOR.
4. SIGNS, IF REQUIRED WITH THE TYPE III BARRICADES, SHALL BE MOUNTED ABOVE THE BARRICADES ON SEPARATE SUPPORTS.
5. TRAFFIC CONTROL DEVICES ARE TO BE MAINTAINED BY THE CONTRACTOR FOR THE DURATION OF THE PROJECT. NIGHT PATROLS OF THE CONSTRUCTION AREA AND DETOUR ROUTE SHALL BE CONDUCTED BY THE CONTRACTOR AND WILL NOT BE PAID SEPARATELY, BUT WILL BE INCLUDED IN THE UNIT PRICE BID FOR TEMPORARY TRAFFIC CONTROL ITEMS.
6. ALL SIGNS SHALL BE RETRO-REFLECTIVE WITH A MATERIAL THAT HAS A SMOOTH, SEALED OUTER SURFACE.
7. ALL SPECIAL SIGNS SHALL BE PLACED ONE (1) WEEK PRIOR TO CONSTRUCTION.



DETOUR/ADVANCED SIGNING PLAN
NTS

LEGEND
- TEMP SIGN
- TYPE III BARRICADES

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DATE 9/12/17 | PROJ NUMBER 5025-18-0010 | DWG CDS | PROJ MGR CDS | CADD MCH | COUNTY MIDLAND | CITY/VILLAGE/TOWNSHIP Midland | SCALE H: NTS V: NTS | HORIZ DATUM ---- | VERT DATUM ----

MIDLAND COUNTY ROAD COMMISSION
7 MILE ROAD OVER BULLOCK CREEK
MAINTAINING TRAFFIC

SHEET 10 OF 10

DRAWING PATH: P:\5000_5499\5025180010_7Mile_Over_Bullock_Creek\Drawings\Civil\Stage\180010DTR.dwg Feb 23, 2018 - 4:05pm

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
GEOSYNTHETIC REINFORCED SOIL WALL

a. Description. The work consists of providing all labor, equipment,and materials necessary to furnish and install a geosynthetic reinforced soil wall in accordance with the contract, the standard specifications, and as directed by the Engineer.

The following definitions apply when used herein and on the plans:

Geotextile Reinforcement. Biaxial geotextile reinforcement having strength and stiffness that are approximately equal in both the machine and the cross machine directions.

Geosynthetic Reinforced Soil (GRS). Alternating layers of compacted granular fill reinforced with geotextile reinforcement. Facing elements are connected to the reinforcement layers to form an outer GRS Wall. Facing elements must consist of either splitface or solid concrete masonry units (CMU).

Reinforced Soil Foundation (RSF). A reinforced soil mass located below the GRS. This mass consists of alternating layers of compacted aggregate and geotextile reinforcement.

Retained Soil. Backfill located behind the GRS wall mass.

b. Materials. The basis of acceptance for all materials not addressed by the standard specifications or specified herein will be a test data certification in accordance with the *Materials Quality Assurance Procedures Manual*. Provide all test data certifications to the Engineer prior to material use.

1. Concrete Masonry Units:
    a. Splitface/Solid Concrete Masonry Block. - Shall meet ASTM C90 with following exceptions:

        i. Minimum Compressive Strength = 4000 psi

        ii. Maximum Absorption Rate = 6.5%

        iii. See plan notes for more information.

2. Geotextile Reinforcement. Within the GRS and RSF, use a woven, high density polyethylene, polypropylene or high-tenacity polyester, biaxial geotextile that is resistant to ultraviolet (UV) oxidation and degradation caused by chemical and temperature exposures encountered in the highway environment. The weatherometer test data certification can be for the product line material type in general and does not have to be tested directly from the lot of geotextile produced for this site.

Identify the ASTM type, class, group, grade, and category of the primary resin used in manufacturing within the test data certification as applicable.

Provide a test data certification showing that the lot of geotextile reinforcement proposed for this site meets the physical property requirements of Table 1.

Table 1: Woven Geotextile Reinforcement Properties

Property	Test Method	Minimum Value (Unless Otherwise Noted)
Ultimate Tensile Strength MD(a) CMD(a)	*ASTM D 4595* Strain Rate of 10% per minute	 4,800 lb/ft 4,800 lb/ft
Tensile Strength @ 2% Strain MD(a) CMD(a)	*ASTM D 4595*	 950 lb/ft 950 lb/ft
Apparent Opening Size	*ASTM D 4751*	0.60 mm Maximum
Inherent Viscosity (PET (b) only)	*ASTM D 4603*	Minimum Number Average Molecular Weight of 25000
Carboxyl End Group (PET (b) only)	*ASTM D 7409*	Maximum of Carboxyl End Group Content of 30
UV Resistance	*ASTM D 4355*	>70% breaking strength after 500 hr
a. "MD" and "CMD" represent 'machine' and 'cross-machine' directions, referring to the principle directions of the manufacturing process. b. PET - Polyester		

The Engineer will obtain samples from on-site material. One sample will be obtained from the first 1,500 square yards with subsequent samples obtained every 5,000 square yards. Samples must be a minimum of 8 feet long by the full roll width, with a 6 square yard minimum. Samples must be rolled, not folded, and shipped in a manner to prevent creases in the fabric. Acceptance testing will be used for ultimate tensile strength, tensile strength at 2 percent strain and apparent opening size. The test data certification will be used for acceptance of inherent viscosity, carboxyl end group and UV resistance.

3. GRS Granular Fill. Use either AASHTO #89 aggregate or 34G open-graded aggregate as granular fill material within the GRS wall mass as noted on the plans. The compacted material must have a minimum angle of internal friction of 38 degrees per *AASHTO T 236* (large scale direct shear test) or *AASHTO T 296* (large scale triaxial compression test, unconsolidated undrained). Provide a test data certification from an independent testing laboratory for the angle of internal friction for the proposed aggregate source. The testing for angle of internal friction must include at least 3 tests on different samples of the proposed source material.

4. Retained Soil. If additional embankment fill is required behind the GRS wall mass, provide Structure Backfill, CIP as detailed on the plans. Backfill, Structure, CIP will be paid for separately.

5. Reinforced Soil Foundation. Provide 21AA or 6A aggregate within the wrapped geotextile reinforcement layers for the RSF volume as noted on the plans. If 6A aggregate is used, it must consist of at least 80 percent crushed material.

6. Miscellaneous Concrete. May be needed for placement inside the hollow core of the segmental block unit or for use as a footing/leveling pad as directed by the Engineer. Use Portland cement concrete meeting the requirements for Grade S1 concrete according to section 701 of the Standard Specifications for Construction, except as modified herein. Use coarse aggregate originating only from geologically natural sources meeting physical requirements of Class 26A.

c. Submittals. Provide an electronic pdf of all submittals to the Engineer at least 21 days prior to the start of RSF or GRS wall construction. The Engineer will approve or reject the submittals within 14 calendar days after receipt of a complete submission. Additional time required due to incomplete or unacceptable submittals will not be justification for time extension or impact or delay claims. All costs associated with incomplete or unacceptable submittals will be borne by the Contractor.

1. Submit test data certifications for the following:

A. Proposed aggregates.

B. Geotextile reinforcement.

C. Proposed CMU.

2. Submit CMU working drawings that include all details, dimensions, quantities, and cross sections necessary to construct the wall. Include how the RSF and GRS zones tie into the CMU used, as well as wall elevation views. Drawings should include but not be limited to the following items:

A. Plan and elevation sheets for each wall.

(1) On wall elevation views, show elevations at the top of the wall for all horizontal and vertical break points and at least every 25 feet along the face of the wall. Show elevations at all steps in the RSF.

(2) On wall plan views, indicate the offsets from the construction centerline to the wall reference line at all changes in horizontal alignment, beginning and ending stations for the wall and the location and size of any obstructions/appurtenances that are behind, in front of, under, mounted upon, or passing through the wall as shown on the plans.

(3) On typical cross sections, show the relationship between existing ground elevations and proposed grades, construction limits, excavation limits and fill requirements. Include obstructions/appurtenances that are behind, in front of, under, mounted upon, or passing through the wall as shown on the plans.

(4) Show general construction and material notes.

(5) Show horizontal and vertical curve data for laying out and constructing the walls.

B. Detail sheets for each wall.

(1) Show parapet barriers, curbs, and sidewalks to be placed on top of the wall.

(2) Show construction around obstructions/appurtenances that are behind, in front of, under, mounted upon, or passing through the wall as shown on the plans. Show details for diverting reinforcement elements around obstructions for each specific occurrence.

(3) Include details for foundation underdrains shown on the plans.

(4) Show details of end treatment at the wall point of beginning (POB) and wall point of ending (POE).

d. Construction.

1. Subgrade Preparation. Excavate to the elevations and dimensions shown on the plans. Provide surface water run-off controls to prevent excessive flow into the excavation. Provide groundwater control for the excavation. Prior to wall construction, inspect the RSF subgrade and compact, if necessary, in accordance with subsection 205.03.I.1 of the Standard Specifications for Construction, or prepare as required in the contract. Undercut unsuitable material as directed by the Engineer. Undercutting of unsuitable material will be paid for separately as Excavation, Fdn. Unless otherwise directed by the Engineer, replace undercut soils with Backfill, Structure, CIP compacted to 95 percent of the maximum density according to section 205 of the Standard Specifications for Construction. Structure Backfill, CIP will be paid for separately.

If the base of the excavation is left open, grade the base to one end to facilitate the removal of any water intrusion with a pump. If the excavation is flooded, remove all water along with any unsuitable soils, as directed by the Engineer. Final subgrade must be smooth, uniform and free from irregular surface shape or protruding objects that would obstruct placement of geotextile wrapped reinforced aggregate fills for the RSF.

2. Reinforced Soil Foundation. For 21AA, construct the RSF in accordance with the plans. Place backfill in lifts measuring not more than 8 inches in thickness. Compact backfill within this zone to 98 percent of its maximum density as determined by the One Point Michigan Cone Test of the *Density Testing and Inspection Manual*. Decrease the maximum lift thickness if necessary to obtain the specified density. For 6A, compact as described in subsection d.3.D of this special provision.

Encapsulate the entire RSF with geotextile reinforcement. The wrapped corners of the RSF must be tight and without exposed soil. Minimum shingle overlaps of 2 feet are required regardless of structure location. For GRS walls adjacent to waterways, overlap the RSF geotextile reinforcement a minimum of 3 feet. For proper shingle flow of water over the overlaps, start with the outer layer of the overlap situated on the upstream side of the RSF. Orient overlapped sections of geotextile reinforcement to prevent water from penetrating the layers of reinforcement.

Pull the Geotextile Reinforcement taut to remove all wrinkles prior to placing and compacting the backfill. Place fill starting at the river side front face and proceeding towards the back to push out folds or wrinkles towards the free end of the reinforcement layer. Locate the end of the overlap at least 3 feet from the RSF edge.

If the Engineer determines that a sheet pile type cofferdam or use of temp sheeting is necessary to adequately complete construction of the RSF, these items will be paid for separately and in accordance with the standard specifications. The Contractor should expect that shallow earth berm type cofferdams will be necessary for RSF construction. The costs associated with establishing earth berm type groundwater control and use of submersible pumps and other dewatering equipment for RSF construction will be included in the items covering the general foundation excavation of the GRS wall volume and in the item Reinforced Soil Foundation Aggregate.

3. Geosynthetic Reinforced Soil Wall. Place courses of CMU, and GRS systematically per the contract and the approved installation procedures.

A. Concrete Masonry Unit Placement. Place each course of CMU level, even, and within plan tolerance. Place adjacent blocks against each other to prevent backfill from escaping between gaps. Offset subsequent courses of block by half a block width so that vertical joints are not continuous.

Check the vertical alignment of the GRS wall face at least every other block layer. Correct any deviations greater than 0.25 inches. Check every other row of block alignment with a string line referenced off the back of the facing block from wall corner to corner. Correct deficiencies as required.

At right-angle wall corners, stagger face wall and wing wall block courses to form a tight, interlocking, stable corner. For walls with angles larger than 90 degrees, form a vertical seam or joint and install rebar and concrete as indicated on the plans.

B. GRS Granular Fill. Follow the placement of each course of block closely with granular fill. Place granular fill so as to avoid any damage or disturbance of the wall materials or any misalignment of the block units or soil reinforcement. Remove and replace any wall CMU and geotextile reinforcement that become damaged or misaligned during granular fill placement at no cost to the Department. Any depressions present behind the CMU must be filled level to the top of the CMU prior to placing the geotextile reinforcement.

For #89 or 34G, compact as described in subsection d.3.D of this special provision to achieve a minimum angle of internal friction of 38 degrees.

Since the CMU are not rigidly connected to the geotextile reinforcement, perform compaction within 3 feet of the back face of the CMU utilizing lightweight, hand operated compaction equipment (e.g., a lightweight mechanical tamper, plate, or roller). Adjust granular fill lift heights in order to achieve the compaction requirements. Check the position of the CMU after compaction. Remove and reset any elements that have been displaced to their proper location and position.

Ensure uniform moisture content throughout each layer of the granular fill prior to and during compaction. Place the granular fill at a moisture content that is no greater than the optimum.

At the end of each day’s operation, slope the last layer of the granular fill away from the wall face and cover with a suitable water-resistant tarp, to rapidly direct runoff away from the wall face. Do not allow surface runoff from adjacent areas to enter the wall

construction site.

C. Geotextile Reinforcement. Place geotextile reinforcement in continuous full-length strips from the wall face to the design strip lengths without use of overlap or factory seam splices in the critical load bearing dimensions. Place the strong direction (typically the machine direction) of the geosynthetic perpendicular to the GRS wall face, unless otherwise directed by the Engineer. Extend the geotextile reinforcement so that it is situated between layers of CMU to provide a frictional connection. The geotextile reinforcement must extend to within 1 inch of the wall face unless dimensioned otherwise on the plans. Remove all excess geotextile reinforcement extending beyond the wall face by cutting with a razor knife or other means approved by the Engineer.

Uniformly tension geotextile reinforcements to remove any slack in the connections or materials, so that geotextile reinforcements are taut, free of wrinkles, and flat. Where overlaps exist on top of the CMU, trim as necessary to prevent varying geotextile reinforcement thickness or excessive gaps between adjacent blocks.

Place granular fill starting at the wall face and moving backwards to remove and prevent the formation of wrinkles in the geotextile reinforcement. Correct any misalignment or distortion of the wall face in excess of the tolerances specified herein at no additional cost to the Department.

Driving equipment directly on the geotextile reinforcement is prohibited. Place a minimum 6 inch layer of granular fill prior to operating any vehicles or equipment over the geotextile reinforcement. Tracked vehicles are prohibited above the geotextile reinforcement.

D. Density Tests. For each layer of granular fill placed behind an GRS wall, the Engineer must perform at least three field density tests. Do not penetrate the geotextile reinforcement with field density equipment. If the granular fill is such that it cannot be tested accurately with a nuclear gauge, then the Engineer will develop a test method passed on a number of passes of the compaction equipment and the visual movement of the aggregate. This test method will address compaction and testing near the wall surface (within 3 feet) for smaller hand operated equipment and further away from the wall for larger ride-on rollers.

e. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay items:

Pay Item	**Pay Unit**
High Strength Woven Polypropylene Fabric	Square Yard
Granular Embankment, AASHTO #89 Stone	Cubic Yard
RSF, MDOT 21AA, CIP, Crushed Limestone	Cubic Yard
Solid Concrete Masonry Block	Each
Splitface Concrete Masonry Block	Each
Reinforcement, Steel, Epoxy Coated Dowel	Linear Feet
Concrete Cap	Linear Feet

1. **High Strength Woven Polypropylene Fabric** includes overlaps when determining the final as placed quantity. **High Strength Woven Polypropylene Fabric** includes miscellaneous hardware.

2. **Granular Embankment, AASHTO #89 Stone** includes miscellaneous hardware, and there will not be any adjustments in price for use of 34G.

3. **RSF, MDOT 21AA, CIP Crushed Limestone** includes all materials, and labor to construct geotextile fabric encasement, aggregates, miscellaneous hardware. Payment for **RSF, MDOT 21AA, CIP Crushed Limestone** also includes any dewatering materials, equipment and labor necessary to place the RSF for the GRS walls.

4. _ **Concrete Masonry Block** includes miscellaneous hardware. Payment for **Block Units** also includes incorporation of aesthetic details (block style and color) required in the contract.

5. **Reinforcement, Steel, Expoxy Coated Dowel** includes all materials to install the #4 rebar in the top four layers of _ Concrete Masonry Block, including the concrete used to fill the hollow cores in those layers.

6. **Concrete Cap** includes materials and installation of precast caps to match the concrete masonry units to finish the tops of the wingwalls and abutments outside of the superstructure.

Underdrains, if required on the plans or by the Engineer, will be paid for separately in accordance with the standard specifications.

Excavation, Fdn and **Structure Backfill, CIP** required for undercutting unsuitable subgrade soils below the plan RSF elevation will be paid for separately in accordance with the standard specifications. The bottom of the RSF reinforced soil mass shown on the plans will be considered the bottom of footing for measurement purposes.

MIDLAND COUNTY ROAD COMMISSION

SPECIAL PROVISION
FOR
SLOPE RESTORATION, MODIFIED

OHM:CDS 1 of 2 03/16

a. Description. Slope Restoration, Modified shall be constructed as shown in the plans and as specified in Section 816 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction.

b. Materials. All materials shall meet the requirements as specified in Section 816.02 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction.

c. Construction. The Contactor shall restore all areas as described in Subsection 816.02 of the MDOT 2012 Standard Specifications for Construction. Materials shall be placed at rates described therein, or as directed by the Engineer.

In addition to using net anchors, mulch blankets adjacent to the road shall be trenched in to the ground at the top of slopes as approved by the Engineer.

Topsoil thickness shall be a minimum of 3 inches. In the event that sufficient suitable topsoil as approved by the Engineer is not available from the machine grading operations, the Contractor shall furnish the additional material as part of the Slope Restoration, Modified bid item. All other items will meet or exceed the rate called for in Section 816 of the MDOT Standard Specification for Construction.

Measurements for determining yield rates are hereby waived for this project. Performance requirements are not waived and the Contractor is to provide a well-established turf.

c. Measurement and Payment. Slope Restoration, Modified will be measured and paid for by Square Yard. Grading, Topsoil Surface, 3", Seeding, Mix TGM (Roadside) and Mix CR (Cereal Rye), Fertilizer, Chemical Nutrient Cl. A, Mulch Blanket, High Velocity, and Watering shall be used and will be considered as included in the pay item Slope Restoration, Modified. No separate payment will be made for the items of work.

The completed work for Slope Restoration, Modified will be measured for each structure and paid for at the contract Square Yard price for the following contract pay item, which shall be payment in full for all labor, equipment, and materials required.

Contract Item (Pay Item)	**Pay Unit**
Slope Restoration, Modified	Square Yard

Applications for payment for the work Slope Restoration, Modified will be made by the Engineer as follows. Upon completion of the work, 50% of the contract item quantity will be paid. After the grass germinates and the Engineer is satisfied that the grass germination will provide a well-established turf, the remaining balance of 50% of the contract item will be paid.

MIDLAND COUNTY ROAD COMMISSION

SPECIAL PROVISION
FOR
MACHINE GRADING, MODIFIED

OHM:CDS 1 of 1 03/16

a. Description. Machine Grading, Modified shall be constructed as shown in the plans and as specified in Section 205 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction with the following exceptions and additions.

b. Construction. Machine Grading, Modified shall include grading, regardless of depth, to develop the cross section shown on the plans. Operations may include scarifying, plowing, disking, moving, compacting, and shaping the earth. Loading or hauling of material will be necessary and shall be included in this item. This item shall also include stripping and stockpiling of topsoil, and the removal of all existing signs and posts. Ditches shall be graded to drain runoff waters. All intersections, approaches, entrances, and driveways shall be graded as shown or as directed. The Engineer must approve using the excavation from ditches and roadbed in shaping shoulder and adjacent fills.

c. Measurement and Payment. The completed work as measured for Machine Grading, Modified will be paid for at the contract unit price for the following:

Contract Item (Pay Item)	**Pay Unit**
Machine Grading, Modified	Station

Machine Grading, Modified will be measured in place by length in stations along the centerline of the project proper (includes both sides) excluding the length of the proposed bridge, which price shall be payment in full for all labor, equipment, and materials shown on the plans, as specified in this provision, and as directed by the Engineer to accomplish this work. Restoration items will be paid for separately.

MIDLAND COUNTY ROAD COMMISSION

SPECIAL PROVISION
FOR
RIPRAP, HEAVY, MODIFIED
RIPRAP, PLAIN, MODIFIED

a. Description. Riprap, Heavy, Modified and Riprap, Plain, Modified shall be constructed as shown in the plans and as specified in Section 813 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction with the following exceptions and additions.

b. Materials. The materials for Riprap, Heavy, Modified and Riprap, Plain, Modified shall meet the requirements specified in Section 916 of the MDOT 2012 Standard Specifications for Construction and only shall be mined from a 100% limestone quarry.

c. Construction. Prior to placing Riprap, Heavy, Modified the Contractor shall shape the stream bottom and banks to a smooth contour that is parallel to the proposed reference lines. Prior to placing Riprap, Plain, Modified the Contractor shall shape the channel bottom and banks to a smooth contour.

d. Measurement and Payment. The completed work as measured for Riprap, Heavy, Modified and Riprap, Plain, Modified will be paid for at the contract unit price for the following:

Contract Item (Pay Item)	**Pay Unit**
Riprap, Heavy, Modified	Square Yard
Riprap, Plain, Modified	Square Yard

Riprap, Heavy, Modified and Riprap, Plain, Modified will be measured in place by the unit square yard and will be paid for at the contract unit price per square yard, which price shall be payment in full for all labor, equipment, and materials shown on the plans, as specified in this provision, and as directed by the Engineer to accomplish this work.

MIDLAND COUNTY ROAD COMMISSION

SPECIAL PROVISION
FOR
SALVAGEABLE ITEMS

OHM:CDS 1 of 1 02/15

a. Description. This work consists of salvaging and stockpiling removal items as directed by the Engineer.

b. Materials. Salvageable items shall include, but are not limited to signs, sign posts, guardrail, guardrail posts, and reflectors. The contractor shall remove items as determined to be salvageable by the Midland County Road Commission field staff with care and place materials at a designated on site location. The Midland County Road Commission will be responsible for loading and transporting the materials off site. The contractor will be responsible for providing access to the materials and handling them with care.

c. Measurement and Payment. This work will not be paid for separately. Payment will be included in associated removal items.

MIDLAND COUNTY ROAD COMMISSSION

NOTICE TO BIDDER FOR UTILITY COORDINATION

 DATE: 3/16

The contractor shall cooperate and coordinate construction activities with the owners of utilities as stated in Section 104.08 of the Michigan Department of Transportation 2012 Standard Specifications for Construction. In addition, for the protection of underground utilities, the contractor shall follow the requirements in Section 107.12 of the MDOT 2012 Standard Specifications for Construction. Contractor delay claims, resulting from a utility, will be determined based upon Section 108.09 of the MDOT 2012 Standard Specifications for Construction.

For protection of underground utilities and in conformance with Public Act 53, the Contractor shall dial 1-800-482-7171 a minimum of three full working days, excluding Saturdays, Sundays, and holidays prior to beginning each excavation in areas where public utilities have not been previously located. Members will thus be routinely notified. This does not relieve the Contractor of the responsibility of notifying utility owners who may not be a part of the "Miss Dig" alert system.

PUBLIC UTILITIES

The owners of existing service facilities that are within grading or structure limits will move them to locations designated by the Engineer, or will remove them entirely from the highway right-of-way.

Owners of Public Utilities will not be required by the County/City to move additional poles or structures in order to facilitate the operation of construction equipment unless it is determined by the Engineer that such poles or structures constitute a hazard to the public, or are extraordinarily dangerous to the Contractor's operations.

Midland County Drain Commission
Doug Enos
220 W. Ellsworth Street
Midland, MI 48640
989-832-6772 (W)
989-832-681 (F)
denos@co.midland.mi.us

Consumers Energy (Electric)
Greg Squanda
2400 Weiss St
Saginaw, MI 48602
989-791-5353 (W)
989-791-5349 (F)
989-751-2467 (M)

Charter Communications
Gordon Brooks
1480 South Valley Center Drive
Bay City, MI 48706
989-737-5356 (W)
gordon.brooks@charter.com

AT&T
Rob Augustine
309 S. Washington
Saginaw, MI 48607
989-771-5404
ra3174@att.com

Consumers Energy (Gas)
Kyle Skrabut
2400 Weiss St
Saginaw, MI 48602
989-791-5885 (W)
989-791-5719 (F)
989-751-1284 (M)
kyle.skrabut@cmsenergy.com

NOTICE OF AUTHORIZATION

Permit Number: WRP011021 v. 1
Site Name: 56-7 Mile Road at Bullock Creek

Date Issued: April 3, 2018
Expiration Date: April 3, 2023

The Michigan Department of Environmental Quality, Water Resources Division, P.O. Box 30458, Lansing, Michigan 48909-7958, under provisions of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended; specifically:

- ☒ Part 31, Floodplain Regulatory Authority of the Water Resources Protection.
- ☒ Part 301, Inland Lakes and Streams.
- ☐ Part 303, Wetlands Protection.
- ☐ Part 315, Dam Safety.
- ☐ Part 323, Shorelands Protection and Management.
- ☐ Part 325, Great Lakes Submerged Lands.
- ☐ Part 353, Sand Dunes Protection and Management.

Authorized activity:

Remove the existing 24-foot long by 18.5-foot span by 8.22-foot rise steel beam bridge and replace it with a 36-foot long by 22-foot wide by 8.39-foot concrete box beam bridge. The proposed construction includes 400-cubic yards of excavation and 600-cubic yards of fill. 550-yards of riprap is proposed for scour and side slope protection at the ends of the culvert.

To be conducted at property located in: Midland County, Waterbody: Bullock Creek
Section 23, Town 13N, Range 01W, Porter Township

Permittee:

Terry Palmer
Midland County Road Commission
2334 N Meridiand Road
Sanford, MI 48657

Issued By: Luke F. Golden

Luke Golden
Cadillac District Office
Water Resources Division
989-370-1569

This notice must be displayed at the site of work.
Laminating this notice or utilizing sheet protectors is recommended.
Please refer to the above permit number with any questions or concerns.

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER RESOURCES DIVISION PERMIT

Issued To:

Terry Palmer
Midland County Road Commission
2334 N Meridiand Road
Sanford, MI 48657

Permit No: WRP011021 **v.**1
Submission No.: HNB-XA5J-DKTW6
Site Name: 56-7 Mile Road at Bullock Creek
Issued: April 3, 2018
Revised:
Expires: April 3, 2023

This permit is being issued by the Michigan Department of Environmental Quality (MDEQ), Water Resources Division (WRD), under the provisions of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA); specifically:

- ☒ Part 301, Inland Lakes and Streams
- ☐ Part 303, Wetlands Protection
- ☐ Part 315, Dam Safety
- ☒ Part 31, Water Resources Protection (Floodplain Regulatory Authority)
- ☐ Part 323, Shorelands Protection and Management
- ☐ Part 325, Great Lakes Submerged Lands
- ☐ Part 353, Sand Dunes Protection and Management

Permission is hereby granted, based on permittee assurance of adherence to State of Michigan requirements and permit conditions, to:

Authorized Activity:

Remove the existing 24-foot long by 18.5-foot span by 8.22-foot rise steel beam bridge and replace it with a 36-foot long by 22-foot wide by 8.39-foot concrete box beam bridge. The proposed construction includes 400-cubic yards of excavation and 600-cubic yards of fill. 550-yards of riprap is proposed for scour and side slope protection at the ends of the culvert.

Waterbody Affected: Bullock Creek
Property Location: Midland County, Porter Township, Town/Range/Section 13N01W23
Property Tax No.

Authority granted by this permit is subject to the following limitations:

A. Initiation of any work on the permitted project confirms the permittee's acceptance and agreement to comply with all terms and conditions of this permit.
B. The permittee, in exercising the authority granted by this permit, shall not cause unlawful pollution as defined by Part 31 of the NREPA.
C. This permit shall be kept at the site of the work and available for inspection at all times during the duration of the project or until its date of expiration.
D. All work shall be completed in accordance with the approved plans and specifications submitted with the application and/or plans and specifications attached to this permit.
E. No attempt shall be made by the permittee to forbid the full and free use by the public of public waters at or adjacent to the structure or work approved.

F. It is made a requirement of this permit that the permittee give notice to public utilities in accordance with 2013 PA 174 (Act 174) and comply with each of the requirements of Act 174.
G. This permit does not convey property rights in either real estate or material, nor does it authorize any injury to private property or invasion of public or private rights, nor does it waive the necessity of seeking federal assent, all local permits, or complying with other state statutes.
H. This permit does not prejudice or limit the right of a riparian owner or other person to institute proceedings in any circuit court of this state when necessary to protect his rights.
I. Permittee shall notify the MDEQ within one week after the completion of the activity authorized by this permit by completing and forwarding the attached preaddressed postcard to the office addressed thereon.
J. This permit shall not be assigned or transferred without the written approval of the MDEQ.
K. Failure to comply with conditions of this permit may subject the permittee to revocation of permit and criminal and/or civil action as cited by the specific state act, federal act, and/or rule under which this permit is granted.
L. All dredged or excavated materials shall be disposed of in an upland site (outside of floodplains, unless exempt under Part 31 of the NREPA, and wetlands).
M. In issuing this permit, the MDEQ has relied on the information and data that the permittee has provided in connection with the submitted application for permit. If, subsequent to the issuance of a permit, such information and data prove to be false, incomplete, or inaccurate, the MDEQ may modify, revoke, or suspend the permit, in whole or in part, in accordance with the new information.
N. The permittee shall indemnify and hold harmless the State of Michigan and its departments, agencies, officials, employees, agents, and representatives for any and all claims or causes of action arising from acts or omissions of the permittee, or employees, agents, or representative of the permittee, undertaken in connection with this permit. The permittee's obligation to indemnify the State of Michigan applies only if the state: (1) provides the permittee or its designated representative written notice of the claim or cause of action within 30 days after it is received by the state, and (2) consents to the permittee's participation in the proceeding on the claim or cause of action. It does not apply to contested case proceedings under the Administrative Procedures Act, 1969 PA 306, as amended, challenging the permit. This permit shall not be construed as an indemnity by the State of Michigan for the benefit of the permittee or any other person.
O. Noncompliance with these terms and conditions and/or the initiation of other regulated activities not specifically authorized shall be cause for the modification, suspension, or revocation of this permit, in whole or in part. Further, the MDEQ may initiate criminal and/or civil proceedings as may be deemed necessary to correct project deficiencies, protect natural resource values, and secure compliance with statutes.
P. If any change or deviation from the permitted activity becomes necessary, the permittee shall request, in writing, a revision of the permitted activity from the MDEQ. Such revision request shall include complete documentation supporting the modification and revised plans detailing the proposed modification. Proposed modifications must be approved, in writing, by the MDEQ prior to being implemented.
Q. This permit may be transferred to another person upon written approval of the MDEQ. The permittee must submit a written request to the MDEQ to transfer the permit to the new owner. The new owner must also submit a written request to the MDEQ to accept transfer. The new owner must agree, in writing, to accept all conditions of the permit. A single letter signed by both parties that includes all of the above information may be provided to the MDEQ. The MDEQ will review the request and, if approved, will provide written notification to the new owner.
R. Prior to initiating permitted construction, the permittee is required to provide a copy of the permit to the contractor(s) for review. The property owner, contractor(s), and any agent involved in exercising the permit are held responsible to ensure that the project is constructed in accordance with all drawings and specifications. The contractor is required to provide a copy of the permit to all subcontractors doing work authorized by the permit.
S. Construction must be undertaken and completed during the dry period of the wetland. If the area does not dry out, construction shall be done on equipment mats to prevent compaction of the soil.
T. Authority granted by this permit does not waive permit requirements under Part 91, Soil Erosion and Sedimentation Control, of the NREPA, or the need to acquire applicable permits from the County Enforcing Agent (CEA).
U. Authority granted by this permit does not waive permit requirements under the authority of Part 305, Natural Rivers, of the NREPA. A Natural Rivers Zoning Permit may be required for construction, land alteration, streambank stabilization, or vegetation removal along or near a natural river.

V. The permittee is cautioned that grade changes resulting in increased runoff onto adjacent property is subject to civil damage litigation.

W. Unless specifically stated in this permit, construction pads, haul roads, temporary structures, or other structural appurtenances to be placed in a wetland or on bottomland of the water body are not authorized and shall not be constructed unless authorized by a separate permit or permit revision granted in accordance with the applicable law.

X. For projects with potential impacts to fish spawning or migration, no work shall occur within fish spawning or migration timelines (i.e., windows) unless otherwise approved in writing by the Michigan Department of Natural Resources, Fisheries Division.

Y. Work to be done under authority of this permit is further subject to the following special instructions and specifications:

1. All work shall be completed in accordance with plans attached; kept on file at the MDEQ's WRD, Transportation Review Unit.

2. Authority granted by this permit does not waive compliance requirements under Part 91, Soil Erosion and Sedimentation Control, of the NREPA. Any discharge of sediment into waters of the state and/or off the road right-of-way is a violation of this permit, Part 91, and Part 31, Water Resources Protection, of the NREPA. A violation of these parts subjects the permittee to potential fines and penalties.

3. This permit does not authorize or sanction work that has been completed in violation of applicable federal, state, or local statutes.

4. The permittee is responsible for acquiring all necessary easements or rights-of-way before commencing any work authorized by this permit. All construction operations relating to or part of this project shall be confined to the existing right-of-way limits or other acquired easements.

5. Temporary soil erosion and sedimentation control measures shall be installed before or upon commencement of the earth change and shall be maintained daily. Temporary soil erosion and sedimentation control measures shall be maintained until permanent soil erosion and sedimentation control measures are in place and the area is stabilized. Permanent soil erosion and sedimentation control measures for all slopes, channels, ditches, or any disturbed area shall be installed within five (5) calendar days after final grading or the final earth change has been completed.

6. All raw areas in uplands resulting from the permitted construction activity shall be effectively stabilized with sod and/or seed and mulch (or other technology specified by this permit or project plans) in a sufficient quantity and manner to prevent erosion and any potential siltation to surface waters or wetlands. Temporary stabilization measures shall be installed before or upon commencement of the permitted activity, and shall be maintained until permanent measures are in place. Permanent measures shall be in place within five (5) days of achieving final grade.

7. All raw earth within 100 feet of a lake, stream, or wetland that is not brought to final stabilization by the end of the active growing season shall be temporarily stabilized with mulch blankets in accordance with the following dates: September 20th for the Upper Peninsula, October 1st for the Lower Peninsula north of US-10, and October 10th for the Lower Peninsula south of US-10.

8. This permit placard shall be kept posted at the work site, in a prominent location at all times for the duration of the project, or until permit expiration.

9. This permit is being issued for the maximum time allowed and no extensions of this permit will be granted. Initiation of the construction work authorized by this permit indicates the permittee's acceptance of this condition. The permit, when signed by the MDEQ, will be for a five-year period

beginning at the date of issuance. If the project is not completed by the expiration date, a new permit must be sought.

10. All dredge/excavated spoils including organic and inorganic soils, vegetation, and other material removed shall be placed on upland (non-wetland, non-floodplain or non-bottomland), prepared for stabilization, revegetated and reseeded with native Michigan species appropriate to the site, and mulched in such a manner so as to prevent and ensure against erosion of any material into any waterbody, wetland, or floodplain.

11. During removal or repair of the existing structure, every precaution shall be taken to prevent debris from entering any watercourse. Any debris reaching the watercourse during the removal and/or reconstruction of the structure shall be immediately retrieved from the water. All material shall be disposed of in an acceptable manner consistent with local, state, and federal regulations.

12. Prior to the removal of the existing structures, cofferdams of steel sheet piling, gravel bags, clean stone, coarse aggregate, concrete or other acceptable barriers shall be installed to isolate all construction activity from the water. The barriers shall be maintained in good working order throughout the duration of the project. Upon project completion, the accumulated materials shall be removed and disposed of at an upland site.

13. All cofferdam and temporary steel sheet pile shall then be removed in its entirety, unless specifically shown to be left in plan on the accepted plans. Cofferdam and sheet pile that is left in place shall be cut off at the elevation shown on the plans and shall be a minimum of one foot below the stream bottom.

14. The existing structure shall be kept open to pass the stream flow during removal of the existing road fill.

15. The placement of the new culvert and the initial placement of fill in the stream shall be done immediately after removal of the existing culvert. The placement shall be conducted in such a manner that all flow is immediately passed through the new culverts, allowing the major placement of fill to be done in the dry or in still water where erosion and sedimentation will be minimized. The fill material used in this initial placement shall be washed gravel, coarse aggregate, or rock and shall be placed at both ends of the culvert to a level above normal water level before backfill material is placed.

16. The culvert shall be installed to align with the center line of the existing stream at both the inlet and outlet ends, and must be **recessed into the stream bed** to provide a natural channel substrate throughout the structure, as shown on the approved plans.

17. Road fill side slopes shall not be steeper than 1-on-2 (1 vertical to 2 horizontal) except where headwalls of reinforced concrete, mortar masonry, dry masonry, or other acceptable methods are used.

18. Areas to be protected by riprap shall be cleared of brush and debris. All grades shall be shaped and compacted to the required cross section. Geotextile liner shall be placed on the prepared grades. The riprap installation shall not damage the geotextile liner.

19. Any fill shall consist of clean inert material.

20. Any alterations to the existing road grade elevations other than that shown on the plans will require prior approval from the Water Resources Division (WRD).

21. Road fill side slopes terminating in the stream and any raw streambanks resulting from the construction shall be stabilized with temporary measures in accordance with appropriate Best Management Practices based on site conditions, and if necessary, may be riprapped extending above the ordinary

high water mark, before or upon commencement of the permitted activity. Temporary stabilization measures shall be maintained until permanent measures are in place.

22. All other road fill slopes, ditches, and other raw areas draining directly to the stream may be protected with riprap, sod and/or seed and mulch as may be necessary to provide effective erosion protection. The placement of riprap shall be limited to the minimum necessary to ensure proper stabilization of the side slopes and fill in the immediate vicinity of the structure.

23. All riprap shall be properly sized and graded based on wave action and velocity, and shall consist of natural field stone or rock (free of paint, soil or other fines, asphalt, soluble chemicals, or organic material). Broken concrete is allowed.

24. If the project, or any portion of the project, is stopped and lies incomplete for any length of time other than that encountered in a normal work week, every precaution shall be taken to protect the incomplete work from erosion, including the placement of temporary gravel bag riprap, temporary seed and mulch, or other acceptable temporary protection.

25. No work shall be done in the stream during periods of above-normal flows except as necessary to prevent erosion.

26. No work or dredging within the water authorized by this permit is allowed from March 16 to May 31st due to critical spawning, migration, and/or recreational use periods.

27. Prior to the start of construction, all adjacent non-work wetland areas shall be protected by properly trenched sedimentation barrier to prevent sediment from entering the wetland. Orange construction fencing shall be installed as needed to prohibit construction personnel and equipment from entering or performing work in these areas. Fence shall be maintained daily throughout the construction process. Upon project completion, the accumulated materials shall be removed and disposed of at an upland site, the sedimentation barrier shall then be removed in its entirety and the area restored to its original configuration and cover.

28. Stormwater shall not directly outlet to the stream.

Issued By: Luke F Golden

Luke Golden
Cadillac District Office
Water Resources Division
989-370-1569

cc: Porter Township Clerk
Midland County Drain Commissioner
Midland County CEA
Art Buck, Midland County Road Commission

MIDLAND COUNTY ROAD COMMISSION
MIDLAND, MICHIGAN
7 MILE ROAD OVER BULLOCK CREEK RECONSTRUCTION

JN: XXXX CS: XXXX
FED ITEM: XXX FED. #: XXX

TRAFFIC DATA

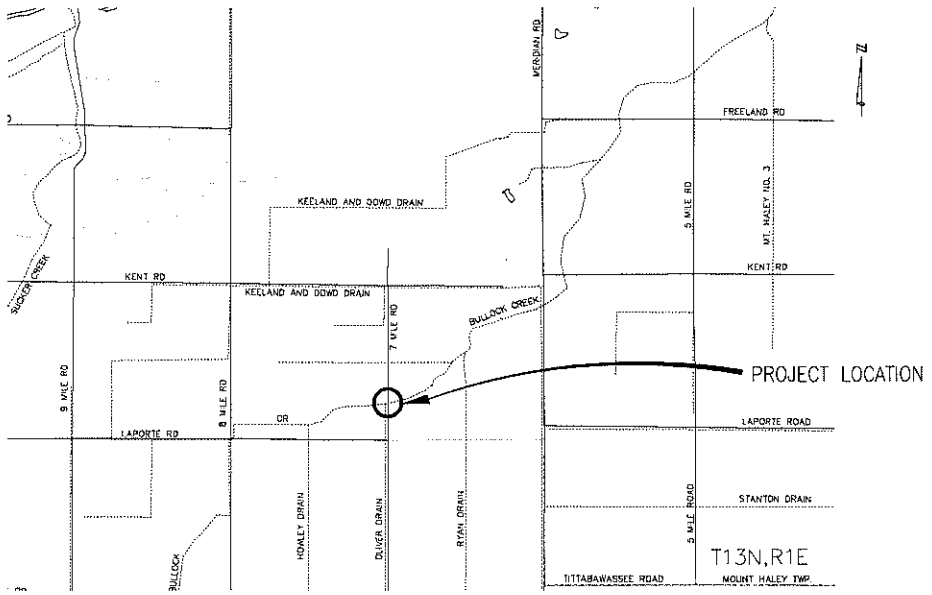
	TOTAL A.D.T.		DESIGN SPEED	POSTED SPEED
	2017	2037		
7 MILE ROAD	XXX	XXX	60 MPH	55 MPH

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	COVER SHEET
2	TYPICAL SHEET
3	LEGEND SHEET
4	REMOVAL SHEET
5	GENERAL PLAN OF SITE
6	GENERAL PLAN OF STRUCTURE
7	ABUTMENTS - GENERAL PLAN OF STRUCTURE
8	DECK PANEL REINFORCEMENT DETAILS
9	DETAIL SHEET
10	MAINTAINING TRAFFIC

M.D.O.T. STANDARD PLANS	
TITLE	PLAN NO.
GUARDRAIL AT BRIDGES AND EMBANKMENTS	R-59-E
GUARDRAIL TYPES A, B, BD, T, TD, MGS-B, MGS-BD, MGS-D & MGS-DD	R-60-J*
SOIL EROSION & SEDIMENTATION CONTROL MEASURES	R-96-E
SEEDING AND TREE PLANTING	R-100-H
GRADING CROSS-SECTIONS	R-105-D

* SPECIAL DETAILS

M.D.O.T WORK ZONE DEVICES	
TITLE	PLAN NO.
GROUND DRIVEN SIGN SUPPORTS FOR TEMP SIGNS	WZD-100-A
TEMPORARY TRAFFIC CONTROL DEVICES	WZD-125-E



LOCATION MAP
N.T.S.

NOTES:

THE WORK COVERED BY THESE PLANS INCLUDES ROAD WORK, EARTH EXCAVATION, REMOVAL OF THE EXISTING BRIDGE, CONSTRUCTION OF THE PROPOSED BRIDGE, GUARDRAIL, MAINTENANCE OF TRAFFIC, HMA PAVING, PLACING GRANULAR MATERIAL, SLOPE PROTECTION, AND RIPRAP TO THE LIMITS SHOWN.

THE CONTRACTOR SHALL LOCATE ALL ACTIVE UNDERGROUND UTILITIES PRIOR TO STARTING WORK AND SHALL CONDUCT HIS OPERATIONS IN SUCH A MANNER AS TO ENSURE THAT THOSE UTILITIES NOT REQUIRING RELOCATION WILL NOT BE DISTURBED. THERE ARE SEVERAL EXISTING UTILITIES EXPOSED FROM THE WASH OUT. CONTRACTOR SHALL COORDINATE WITH UTILITY COMPANIES TO MAINTAIN UTILITIES TO REMAIN AND PLACE UTILITIES IN EMBANKMENT.

7-MILE ROAD TRAFFIC IS TO BE DETOURED OVER OTHER EXISTING ROADS.

PLAN ELEVATIONS REFER TO NAVD88.

WATER LEVEL IS SUBJECT TO CHANGE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING A DETERMINATION OF WATER LEVELS THAT MAY EXIST DURING CONSTRUCTION.

MEASURES SHALL BE TAKEN TO PREVENT DEBRIS IN WATERWAY. IF DEBRIS FALLS INTO THE WATERWAY, IT SHALL BE REMOVED WITHIN 24 HOURS. SINCE DISTURBANCE OF THE WATERWAY BOTTOM MAY BE AS HARMFUL AS THE DEBRIS ITSELF, THE PREVENTATIVE MEASURES MUST BE EFFECTIVE.

IMMEDIATELY AFTER THE CONSTRUCTION OF AN ABUTMENT IS COMPLETED, SLOPE PROTECTION AND SEEDING OR SODDING SHALL BE PLACED ON THE ADJACENT EMBANKMENT SLOPES.

THE DESIGN OF THIS STRUCTURE IS BASED ON 1.2 TIMES THE CURRENT AASHTO LRFD BRIDGE DESIGN SPECIFICATION HL-93 LOADING WITH THE EXCEPTION THAT THE DESIGN TANDEM PORTION OF THE HL-93 LOAD DEFINITION SHALL BE REPLACED BY A SINGLE 60 KIP AXLE LOAD BEFORE APPLICATION OF THIS 1.2 FACTOR. THE RESULTING LOAD IS DESIGNATED HL-93 MOD. LIVE LOAD PLUS DYNAMIC LOAD ALLOWANCE DEFLECTION DOES NOT EXCEED 1/800 OF SPAN LENGTH.

THE DESIGN OF THE STRUCTURAL MEMBERS IS BASED ON MATERIAL OF THE FOLLOWING GRADES AND STRESSES:

PRECAST CONCRETE	f'c = 5,000 psi
STEEL REINFORCEMENT	fy = 60,000 psi

THE INITIAL FORCE IN THE TRANSVERSE POST-TENSIONING TENDONS SHALL BE 120,000 LBS. EACH. LOCATE POST TENSIONING DUCTS AT $\frac{1}{4}$ POINTS OF BEAMS.

CONTRACT FOR:
CONSTRUCTION OF NEW BRIDGE USING GEOSYNTHETICALLY REINFORCED SOIL ABUTMENTS AND PRECAST CONCRETE SUPERSTRUCTURE.

OHM
Advancing Communities

PREPARED UNDER THE SUPERVISION OF:

45096
Registration No.

CRAIG D. SCHRIPSEMA

2/23/18
Date

REVISIONS

PROJECT NO.	SHEET NO.
5025-18-0010	1 OF 10

WATER & SEWER UTILITY SYMBOLS

EXISTING
- STORM MANHOLE
- SQUARE CATCH BASIN
- ROUND CATCH BASIN
- CULVERT
- CULVERT W/O END SECTION
- CULVERT W/END SECTION
- SANITARY MANHOLE
- CLEAN OUT
- GATE VALVE & WELL
- GATE VALVE & BOX
- WATER STOP BOX
- FIRE HYDRANT
- METER PIT
- WATER METER
- SPRINKLER HEAD
- IRRIGATION VALVE

PROPOSED
- STORM MANHOLE
- INLET/CATCH BASIN
- CULVERT END SECTION
- SANITARY MANHOLE
- GATE VALVE & WELL
- GATE VALVE & BOX
- TAPPING SLEEVE VALVE & WELL
- TAPPING SLEEVE VALVE & BOX
- FIRE HYDRANT

REAL ESTATE SYMBOLS
- CONTIGUOUS PROPERTY SYMBOL
- PARCEL NUMBER BOX
- NO ROW IMPACTS

MISCELLANEOUS UTILITY SYMBOLS

EXISTING
- GUY WIRE
- GUY POLE
- UTILITY POLE
- UTILITY POLE W/LIGHT
- LIGHT/DECOR LAMP POLE
- FLOOD LIGHT
- GAS VALVE
- GAS VENT
- GAS METER
- GAS RISER
- TRAFFIC SIGNAL
- PEDESTRIAN RISER
- TRANSFORMER PAD
- PRIVATE UTILITY MANHOLE
- RAILROAD CROSSING
- ELECTRIC METER
- PHONE BOOTH
- TRAFFIC SIGNAL CONTROLLER
- HAND HOLE
- ELECTRIC RISER
- TELEPHONE RISER
- CABLE TV RISER
- MONITORING WELL
- UNDERGROUND MARKER

MISCELLANEOUS SYMBOLS

EXISTING
- RIPRAP
- SIGN
- FLOW DIRECTION
- STUMP
- WETLAND
- CONIFEROUS TREE
- DECIDUOUS TREE
  - CL 1 1" TO 5"
  - CL 2 6" TO 17"
  - CL 3 18" TO 35"
  - CL 4 36" AND UP
- CONIFEROUS SHRUB
- DECIDUOUS SHRUB
- SOIL BORING
- SECTION CORNER
- MONUMENT
- IRON ROD/PIPE
- PK NAIL
- BENCHMARK
- TRAVERSE POINT
- MAIL/NEWSPAPER BOX
- FLAG POLE
- POST
- HAZARDOUS OR FLAMMABLE MATERIAL — USED WITH UNDERGROUND GAS & ELECTRICAL LINES
- CAUTION – CRITICAL UNDERGROUND UTILITY — USED WITH TELEPHONE & FIBER OPTIC LINES

PROPOSED
- RIPRAP
- SIGN
- FLOW DIRECTION
- STRUCTURE NUMBER — WM SAN STM
- ADA SIDEWALK RAMP

UTILITY PATTERN

EXISTING
- ELECTRICAL *
- GAS\OIL
- CABLE/TELEPHONE *
- FIBER OPTIC *
- WATER
- SANITARY
- STORM

PROPOSED
- STORM/SANITARY/WATER
- PRIMARY UTILITY WILL HAVE A CONTINUOUS LINESTYLE, WITH THE SECONDARY UTILITY MATCHING ITS RESPECTIVE EXISTING UTILITY LINESTYLE

*OH = OVERHEAD , UG = UNDERGROUND

ROW PATTERN

EXISTING
- ROW
- SECTION
- PROPERTY/PARCEL

PROPOSED
- ROW

TOPO PATTERN

EXISTING
- HEDGE/TREE
- FENCE
- GUARDRAIL
- CENTERLINE OF DITCH
- RAILROAD
- WETLAND/EDGE OF WATER

PROPOSED
- GRADING LIMIT (SLOPE STAKE)
- CENTERLINE OF DITCH
- GUARDRAIL
- FENCE

REMOVAL LEGEND
- SIDEWALK REMOVAL
- BRICK REMOVAL
- HMA SURFACE REMOVAL
- PAVEMENT REMOVAL
- COLD MILLING HMA SURFACE
- HMA BASE CRUSHING AND SHAPING
- EXCAVATION, EARTH, MODIFIED
- CURB AND GUTTER, REM
- TREE, REM
- S-XXXXXX SALVAGE
- B-XXXXXX BULKHEAD
- A-XXXXXX ABANDON
- R-XXXXXX REMOVE
- ADJ-XXXXXX ADJUST
- REL-XXXXXX RELOCATE
- REC-XXXXXX RECONSTRUCT
- R B/O-XXXXXX REMOVE BY OTHERS
- ADJ B/O-XXXXXX ADJUST BY OTHERS
- REL B/O-XXXXXX RELOCATE BY OTHERS

IF NECESSARY FOR CLARITY
- SALVAGE
- BULKHEAD
- ABANDON
- CLEARING
- REMOVE
- RELOCATE
- RECONSTRUCT
- RELOCATE BY OTHERS
- ADJUST BY OTHERS

SPECIAL LEGEND
- HEAVY RIPRAP
- SILT FENCE

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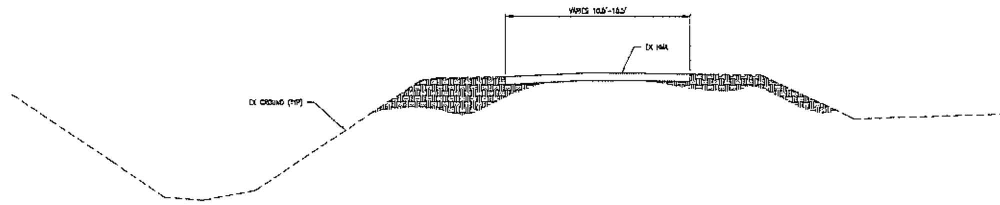
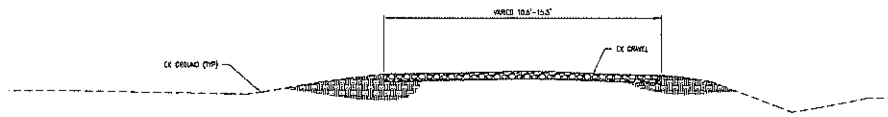
MIDLAND COUNTY ROAD COMMISSION
7 MILE ROAD OVER BULLOCK CREEK
TYPICAL SHEET



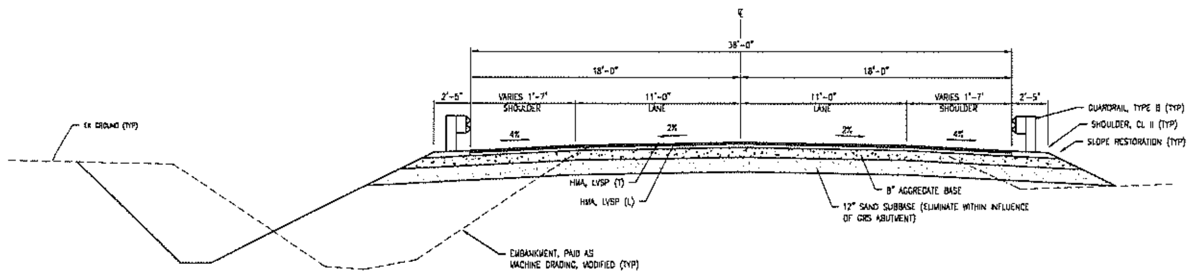
EXISTING TYPICAL SECTION

STA 1+38.90 (POB) TO STA 59+81



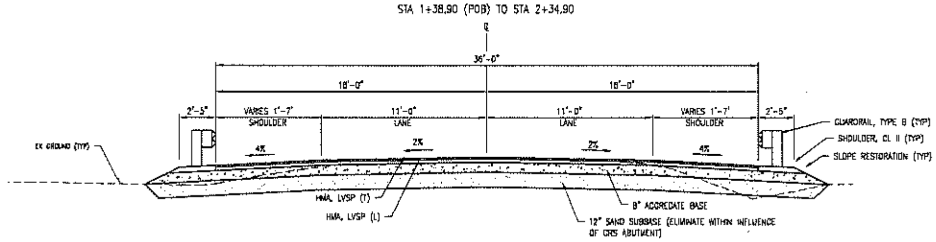
EXISTING TYPICAL SECTION

STA 59+81 TO STA 5+51.32 (POE)


℄
38'-0"
18'-0"
18'-0"
2'-5"
VARIES 1'-7'
SHOULDER
11'-0"
LANE
11'-0"
LANE
VARIES 1'-7'
SHOULDER
2'-5"
4%
2%
2%
4%
GUARDRAIL, TYPE B (TYP)
SHOULDER, CL II (TYP)
SLOPE RESTORATION (TYP)
EX GROUND (TYP)
HMA, LVSP (T)
HMA, LVSP (L)
8" AGGREGATE BASE
12" SAND SUBBASE (ELIMINATE WITHIN INFLUENCE OF GRS ABUTMENT)
EMBANKMENT, PAID AS MACHINE GRADING, MODIFIED (TYP)

TYPICAL SECTION

STA 1+38.90 (POB) TO STA 2+34.90


℄
36'-0"
18'-0"
18'-0"
2'-5"
VARIES 1'-7'
SHOULDER
11'-0"
LANE
11'-0"
LANE
VARIES 1'-7'
SHOULDER
2'-5"
4%
2%
2%
4%
GUARDRAIL, TYPE B (TYP)
SHOULDER, CL II (TYP)
SLOPE RESTORATION (TYP)
EX GROUND (TYP)
HMA, LVSP (T)
HMA, LVSP (L)
8" AGGREGATE BASE
12" SAND SUBBASE (ELIMINATE WITHIN INFLUENCE OF GRS ABUTMENT)

TYPICAL SECTION

STA 2+64.90 TO STA 3+60.90 (POE)

INFORMATIONAL EARTH QUANTITIES (POB TO POE)

MACHINE GRADING, MODIFIED	
ITEM	VOLUME
EXCAVATION, EARTH	XXX CYDS
EMBANKMENT, CIP	XXX CYDS

NOTE: QUANTITIES SHOWN FOR INFORMATIONAL PURPOSES ONLY AND ARE INCLUDED WITH PAYMENT FOR MACHINE GRADING, MODIFIED. CONTRACTOR RESPONSIBLE FOR DETERMINING OWN CUT/FILL QUANTITIES.

HMA APPLICATION ESTIMATE

IDENT NO.	ITEM	RATE (#/SYD)	PERF. GRADE	REMARKS
L	HMA, LVSP	220	58-28	LEVELING COURSE
T	HMA, LVSP	220	58-28	TOP COURSE

NOTES:
1) THE AGGREGATE WEAR INDEX (AWI) FOR THE TOP COURSE SHALL BE 220.
2) RECLAIMED ASPHALT PAVEMENT (RAP) IS LIMITED TO 15% IN THE HMA TOP COURSES
3) PLACE HMA BOND COAT AT 0.05 TO 0.15 GAL/SYD BETWEEN LAYERS AS DIRECTED BY THE ENGINEER (INCLUDED IN PAYMENT FOR HMA PAVING ITEMS)

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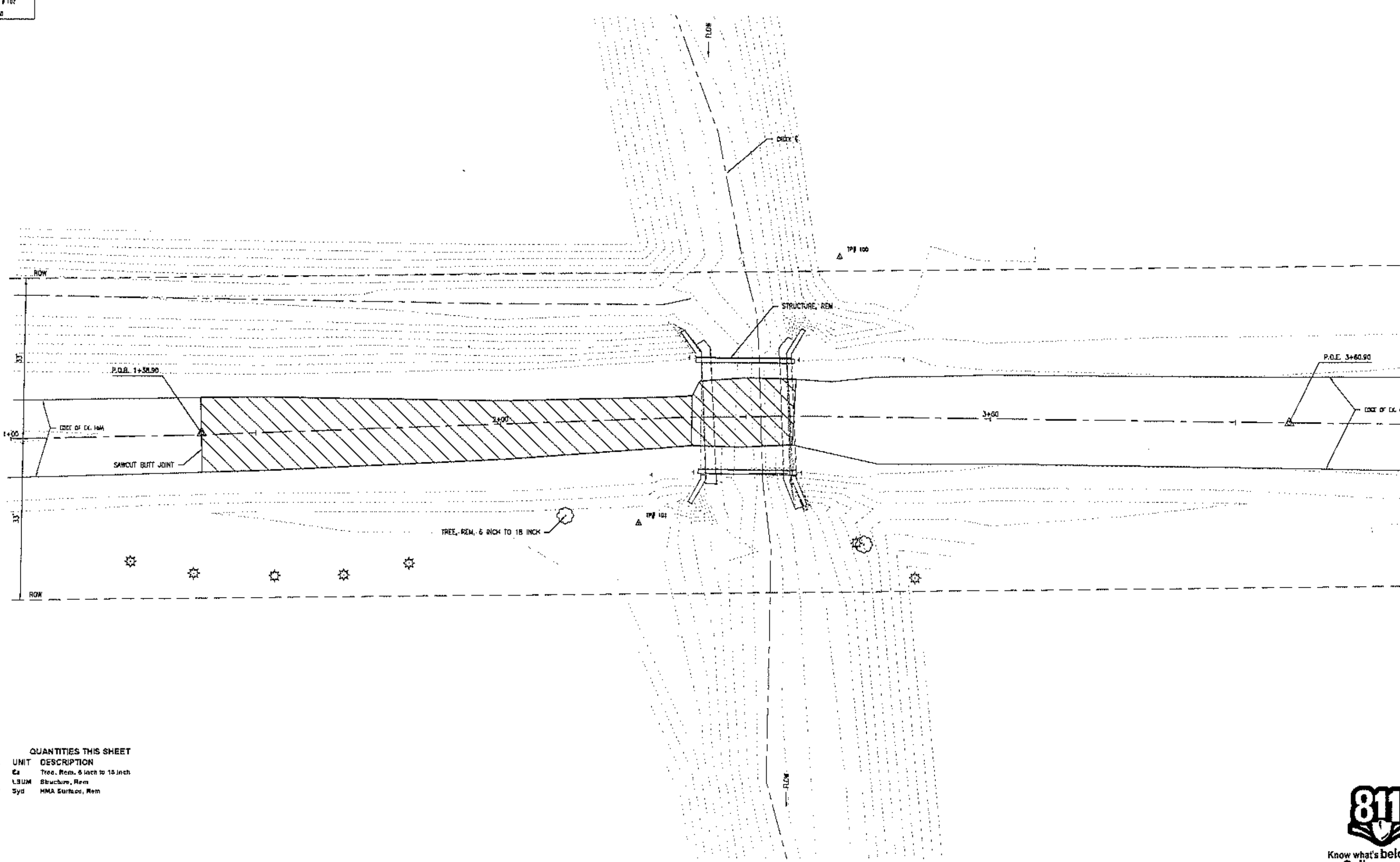
MIDLAND COUNTY ROAD COMMISSION
7 MILE ROAD OVER BULLOCK CREEK
TYPICAL SECTIONS

SHEET 3 OF 10

JOB BENCHMARK # 200 UTILITY POLE N 728524.8320 E 13117204.400 ELEV 678.051
JOB BENCHMARK # 201 UTILITY POLE N 728154.2120 E 13117283.7800 ELEV 674.877
TRAVERSE POINT # 100 N 728344.2300 E 13117224.8320
TRAVERSE POINT # 101 N 728303.18 E 13117278.8680
TRAVERSE POINT # 102 N 728077.3980 E 13117251.9130

7 MILE ROAD

BULLOCK CREEK



QUANTITIES THIS SHEET

TOTAL	UNIT	DESCRIPTION
1	Ea	Tree, Rem, 6 inch to 18 inch
1	LSUM	Structure, Rem
177	Syd	HMA Surface, Rem

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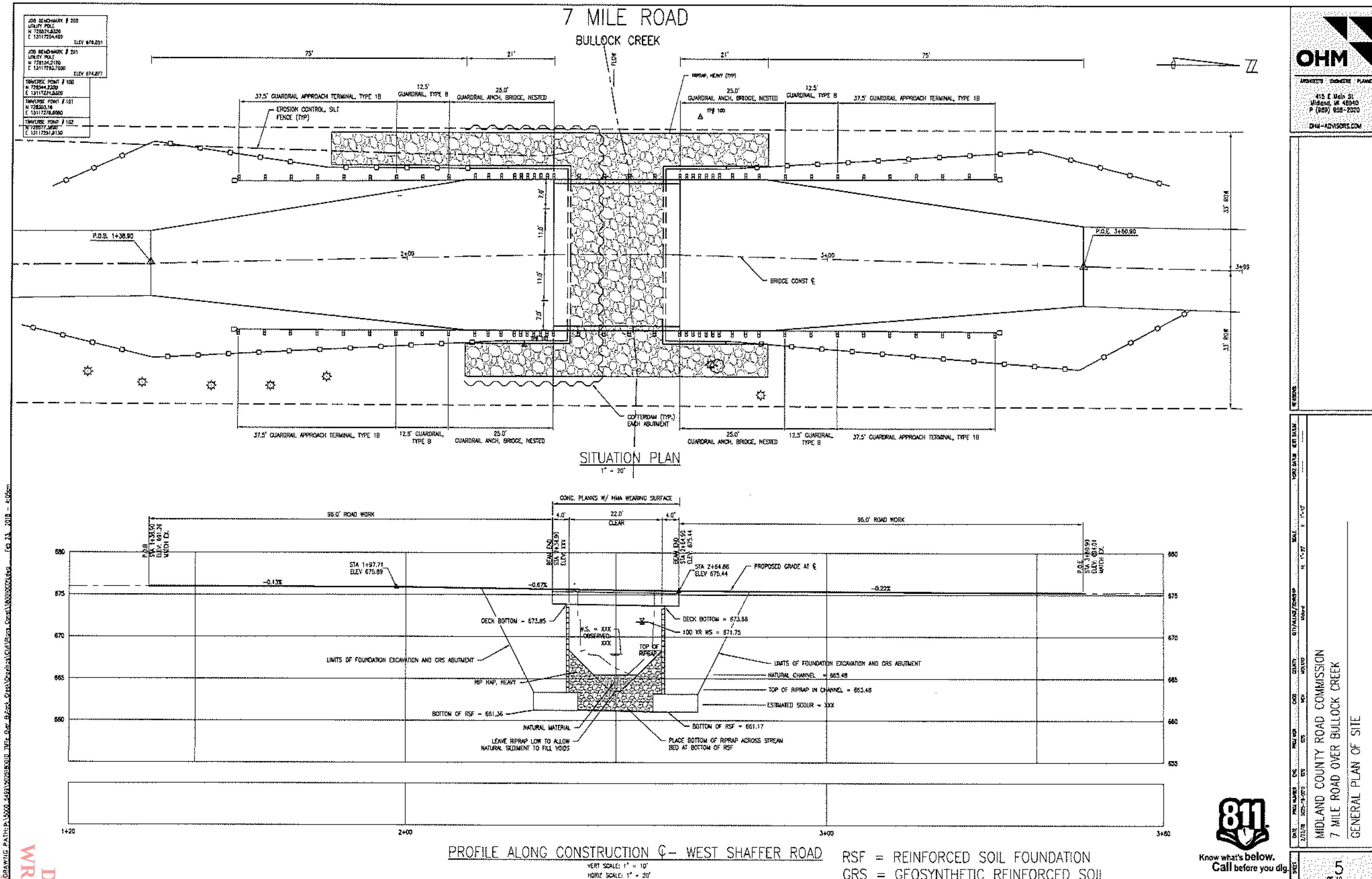
7 MILE ROAD OVER BULLOCK CREEK
REMOVAL SHEET

SHEET 4 OF 10


7 MILE ROAD
BULLOCK CREEK
FLOW
75'
21'
37.5' GUARDRAIL APPROACH TERMINAL, TYPE 1B
12.5' GUARDRAIL, TYPE B
25.0' GUARDRAIL ANCH, BRIDGE, NESTED
RIPRAP, HEAVY (TYP)
EROSION CONTROL, SILT FENCE (TYP)
P.O.B. 1+38.90
P.O.E. 3+60.90
2+00
3+00
BRIDGE CONST ℄
7.0'
11.0'
33' ROW
COFFERDAM (TYP.) EACH ABUTMENT
SITUATION PLAN
1" = 20'
CONC. PLANKS W/ HMA WEARING SURFACE
96.0' ROAD WORK
4.0'
22.0' CLEAR
P.O.B. STA 1+38.90 ELEV. 681.36 MATCH EX.
BEAM END STA 2+34.90 ELEV. XXX
BEAM END STA 2+64.90 ELEV. 675.44
P.O.E. STA 3+60.90 ELEV. 681.01 MATCH EX.
STA 1+97.71 ELEV 675.69
STA 2+64.86 ELEV 675.44
PROPOSED GRADE AT ℄
-0.13%
-0.67%
-0.22%
DECK BOTTOM = 673.85
DECK BOTTOM = 673.88
W.S. = XXX OBSERVED XXX
100 YR WS = 671.75
TOP OF RIPRAP
LIMITS OF FOUNDATION EXCAVATION AND GRS ABUTMENT
NATURAL CHANNEL = 665.48
TOP OF RIPRAP IN CHANNEL = 663.48
ESTIMATED SCOUR = XXX
RIP RAP, HEAVY
BOTTOM OF RSF = 661.36
BOTTOM OF RSF = 661.17
NATURAL MATERIAL
LEAVE RIPRAP LOW TO ALLOW NATURAL SEDIMENT TO FILL VOIDS
PLACE BOTTOM OF RIPRAP ACROSS STREAM BED AT BOTTOM OF RSF
680
675
670
665
660
655
1+20
2+00
3+00
3+60
PROFILE ALONG CONSTRUCTION ℄ – WEST SHAFFER ROAD
VERT SCALE: 1" = 10'
HORIZ SCALE: 1" = 20'
RSF = REINFORCED SOIL FOUNDATION
GRS = GEOSYNTHETIC REINFORCED SOIL
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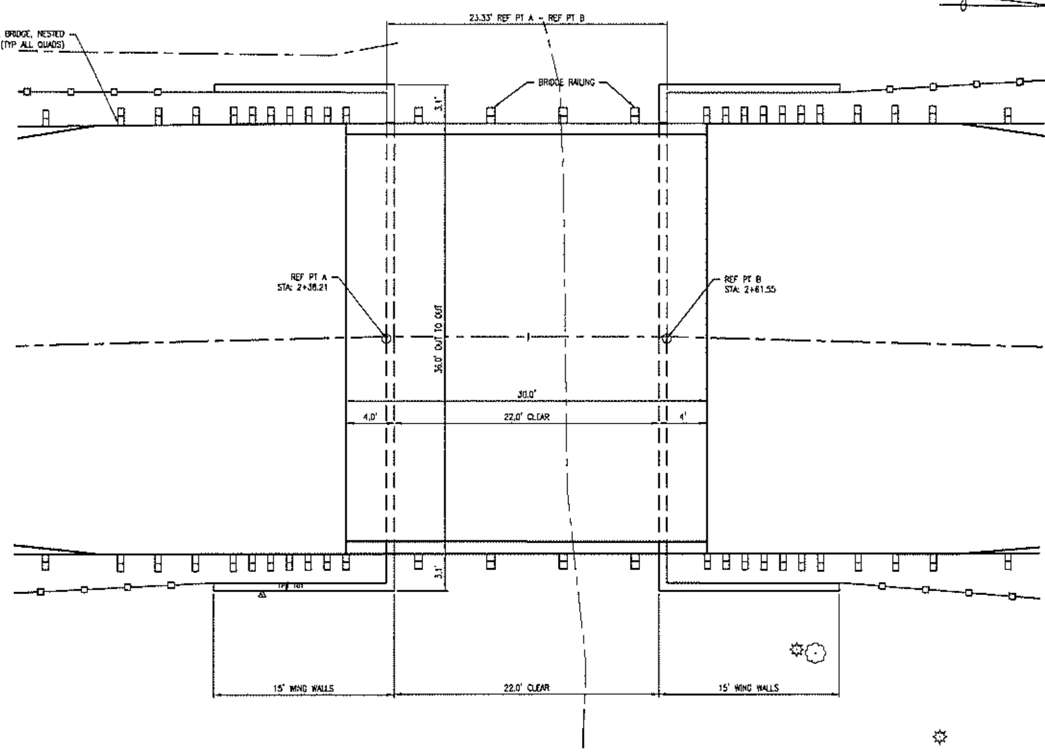
7 MILE ROAD OVER BULLOCK CREEK
GENERAL PLAN OF SITE
5
OF 10

7 MILE ROAD

BULLOCK CREEK



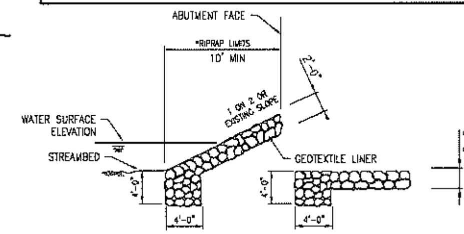
PLAN
1" = 10'

SUMMARY OF HYDRAULIC ANALYSIS

FLOOD DATA	EXISTING: DISCHARGE (CFS)	EXISTING: WATER SURFACE ELEV. AT U/S FACE OF STRUCTURE	EXISTING: VELOCITY IN D/S CHANNEL IN (FPS)	PROPOSED: WATER SURFACE ELEVATION AT U/S FACE OF STRUCTURE	PROPOSED: VELOCITY IN D/S CHANNEL IN (FPS)	PROPOSED: WATERWAY AREA (SFT) AT D/S FACE	PROPOSED: CHANGE IN WS EL ___ U/S OF PROPOSED STRUCTURE
50-YEAR	480	671.56	6.85	671.19	6.44	217.79	-0.37
100-YEAR	600	672.28	7.52	671.75	7.04	242.42	-0.53

MAXIMUM BRIDGE AREA BELOW LOW CHORD IS 297.35 SQUARE FT

BULLOCK CREEK AT 7 MILE ROAD, SECTION 24, T13N, R1W, PORTER TOWNSHIP, MIDLAND COUNTY, HAS A DRAINAGE AREA OF 7.46 SQUARE MILES. THE 10%, 2%, 1%, 0.5%, AND 0.2% CHANCE PEAK FLOWS ARE ESTIMATED TO BE 270 CUBIC FEET PER SECOND (CFS), 480 CFS, 600 CFS, 700 CFS, AND 950 CFS, RESPECTIVELY. (WATERSHED BASIN NO. 32D TITTABAWASSEE).



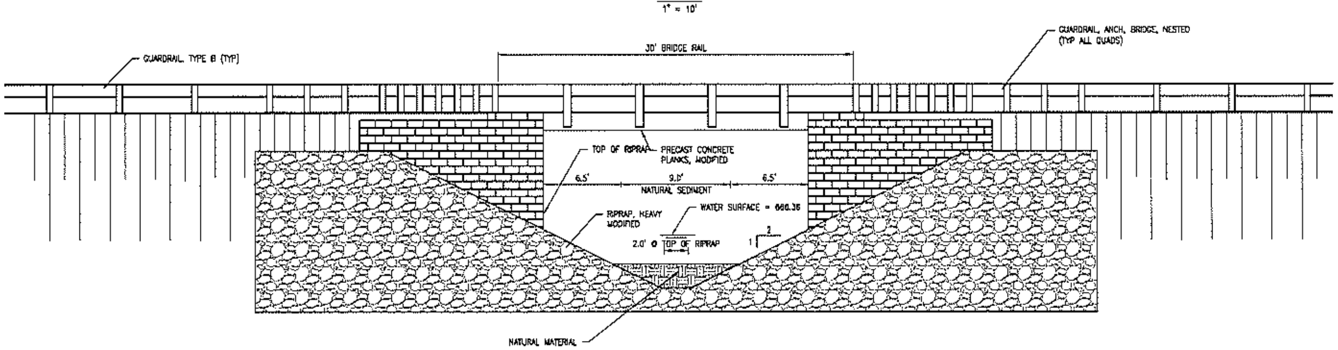
RIPRAP HEADER DETAILS

TOP OF RIPRAP MUST BE AT OR BELOW EXISTING STREAMBED/ SLOPE ELEVATION.

AN APPROPRIATE METHOD OF WATER DIVERSION FOR PLACING RIPRAP SHALL BE PROPOSED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER. IF WATER IS SHALLOW (LESS THAN TWO FEET), TEMPORARY CONCRETE BARRIERS OR SANDBAGS MAY BE USED TO DIVERT FLOW.

THE RIPRAP SCHEME SHOWN IS A MINIMUM REQUIREMENT FOR SCOUR.

*RIPRAP LIMITS ARE APPROXIMATE. RIPRAP SHALL EXTEND FROM TOP OF BANK TO BOTTOM OF EXISTING CHANNEL AT A 1 ON 2 SLOPE.



ELEVATION
1" = 10'

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REVISIONS

MIDLAND COUNTY ROAD COMMISSION
7 MILE ROAD OVER BULLOCK CREEK
GENERAL PLAN OF STRUCTURE

SHEET 6 OF 10

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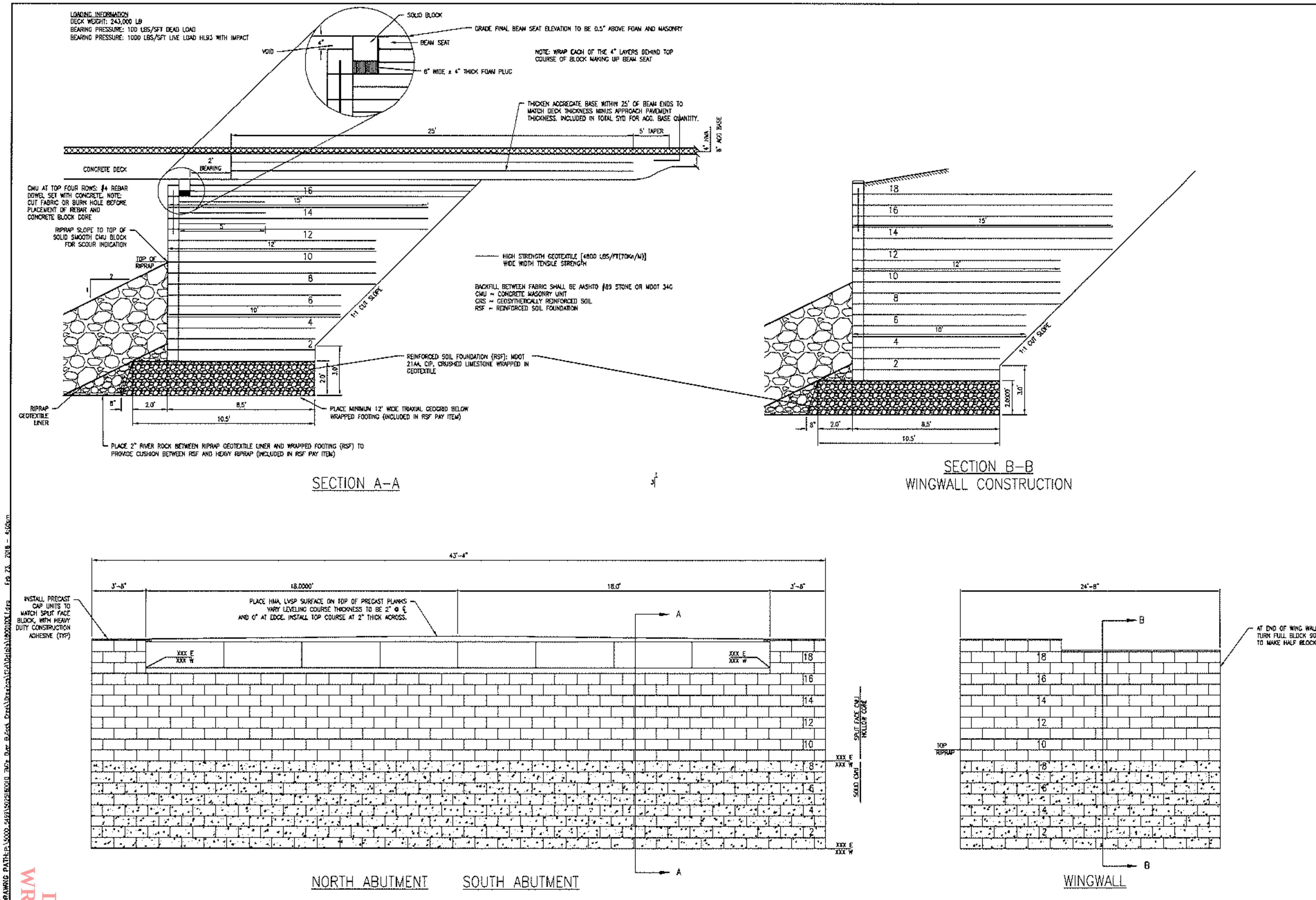
LOADING INFORMATION
DECK WEIGHT: 243,000 LB
BEARING PRESSURE: 100 LBS/SFT DEAD LOAD
BEARING PRESSURE: 1000 LBS/SFT LIVE LOAD HL93 WITH IMPACT
SOLID BLOCK
GRADE FINAL BEAM SEAT ELEVATION TO BE 0.5" ABOVE FOAM AND MASONRY
BEAM SEAT
VOID
NOTE: WRAP EACH OF THE 4" LAYERS BEHIND TOP COURSE OF BLOCK MAKING UP BEAM SEAT
6" WIDE x 4" THICK FOAM PLUG
THICKEN AGGREGATE BASE WITHIN 25' OF BEAM ENDS TO MATCH DECK THICKNESS MINUS APPROACH PAVEMENT THICKNESS. INCLUDED IN TOTAL SYD FOR AGG. BASE QUANTITY.
25'
5' TAPER
4" HMA
8" AGG BASE
CONCRETE DECK
2' BEARING
CMU AT TOP FOUR ROWS: #4 REBAR DOWEL SET WITH CONCRETE. NOTE: CUT FABRIC OR BURN HOLE BEFORE PLACEMENT OF REBAR AND CONCRETE BLOCK CORE
RIPRAP SLOPE TO TOP OF SOLID SMOOTH CMU BLOCK FOR SCOUR INDICATION
TOP OF RIPRAP
HIGH STRENGTH GEOTEXTILE [4800 LBS/FT(70Kn/M)] WIDE WIDTH TENSILE STRENGTH
BACKFILL BETWEEN FABRIC SHALL BE AASHTO #89 STONE OR MDOT 34G
CMU ~ CONCRETE MASONRY UNIT
GRS ~ GEOSYNTHETICALLY REINFORCED SOIL
RSF ~ REINFORCED SOIL FOUNDATION
1:1 CUT SLOPE
REINFORCED SOIL FOUNDATION (RSF): MDOT 21AA, CIP, CRUSHED LIMESTONE WRAPPED IN GEOTEXTILE
RIPRAP GEOTEXTILE LINER
PLACE MINIMUM 12' WIDE TRIAXIAL GEOGRID BELOW WRAPPED FOOTING (INCLUDED IN RSF PAY ITEM)
PLACE 2" RIVER ROCK BETWEEN RIPRAP GEOTEXTILE LINER AND WRAPPED FOOTING (RSF) TO PROVIDE CUSHION BETWEEN RSF AND HEAVY RIPRAP (INCLUDED IN RSF PAY ITEM)
SECTION A-A
SECTION B-B
WINGWALL CONSTRUCTION
43'-4"
3'-8"
18.0000'
18.0'
INSTALL PRECAST CAP UNITS TO MATCH SPLIT FACE BLOCK, WITH HEAVY DUTY CONSTRUCTION ADHESIVE (TYP)
PLACE HMA, LVSP SURFACE ON TOP OF PRECAST PLANKS VARY LEVELING COURSE THICKNESS TO BE 2" @ ℄ AND 0" AT EDGE. INSTALL TOP COURSE AT 2" THICK ACROSS.
SPLIT FACE CMU HOLLOW CORE
SOLID CMU
NORTH ABUTMENT SOUTH ABUTMENT
24'-8"
TOP RIPRAP
AT END OF WING WALL TURN FULL BLOCK 90° TO MAKE HALF BLOCK
WINGWALL

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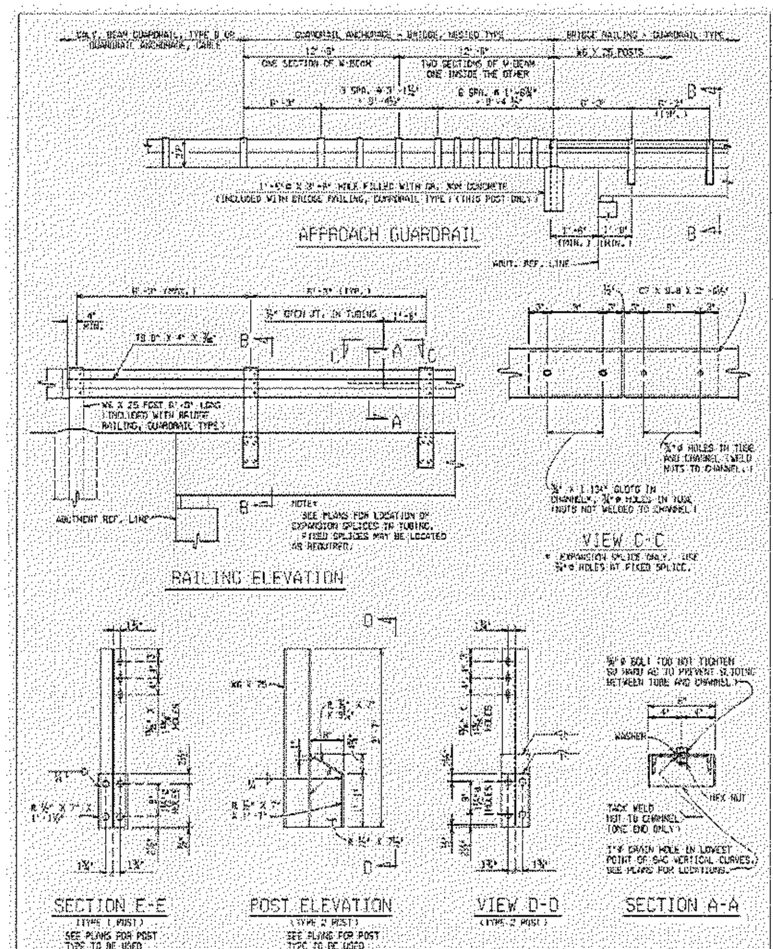
7 MILE ROAD OVER BULLOCK CREEK
ABUTMENTS – GENERAL PLAN OF STRUCTURE

SHEET 7 OF 10

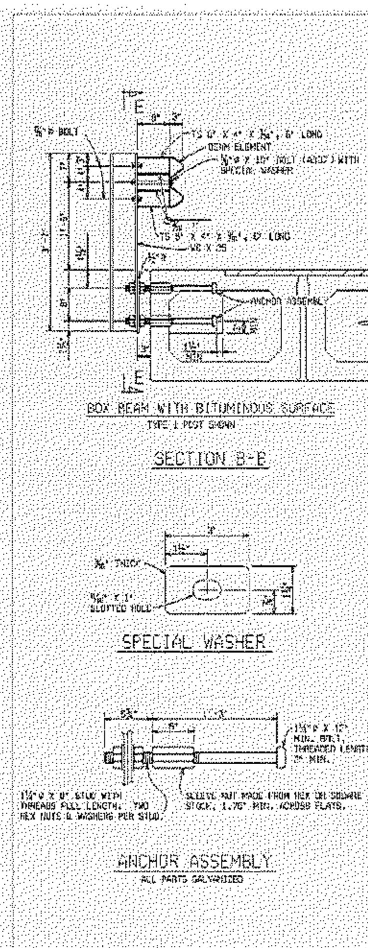


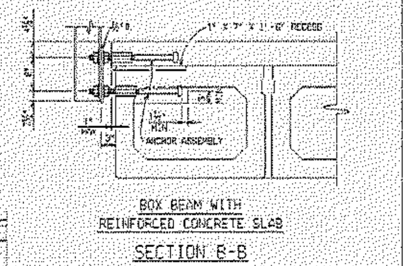
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS STANDARD PLAN FOR
BRIDGE RAILING, GUARDRAIL TYPE AND GUARDRAIL ANCHORAGE-BRIDGE, NESTED TYPE

X-31A — SHEET 1 OF 2

PREPARED BY DESIGN DIVISION — DRAWN BY: EJ-1 — CHECKED BY:

ENGINEER OF CONSTRUCTION — ENGINEER OF MAINTENANCE — ENGINEER OF MATERIALS & TECHNOLOGY — ENGINEER OF TRAFFIC AND SAFETY — ENGINEER - BRIDGE DESIGN — ENGINEER OF DESIGN — DEPUTY DIRECTOR - HIGHWAYS — F.H.W.A. APPROVAL — PLAN DATE





NOTES:

DETAILS SHOWN ARE IN ACCORDANCE WITH CURRENT AASHTO SPECIFICATIONS.

BRIDGE RAILING, GUARDRAIL TYPE WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER LINEAR FOOT, WHICH PRICE INCLUDES PAYMENT IN FULL FOR ALL WORK AND MATERIAL NECESSARY TO ERECT THE RAILING. PAYMENT FOR ANCHOR ASSEMBLIES EMBEDDED IN BOX BEAMS IS INCLUDED IN THE BID ITEM "PRESTRESSED CONCRETE DECK". PAYMENT FOR ANCHOR ASSEMBLIES EMBEDDED IN SUPERSTRUCTURE CONCRETE IS INCLUDED IN THE BID ITEM "SUPERSTRUCTURE CONCRETE".

STEEL BEAM GUARDRAIL ELEMENTS AND BACK-UP ELEMENTS SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND STANDARD PLAN R-60 SERIES.

RAIL TUBE ELEMENTS SHALL MEET THE REQUIREMENTS OF A500 GRADE B, WITH A SILICON CONTENT OF LESS THAN 0.06% OR BETWEEN 0.15% & 0.25% AND SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM 123. RAIL TUBE ELEMENTS FROM ALL HEATS SUPPLIED SHALL BE TESTED PRIOR TO DELIVERY OF THE RAIL TO THE CONTRACTOR. SEE SPECIAL PROVISION FOR BRIDGE RAILING, GUARDRAIL TYPE.

POST ASSEMBLIES AND CHANNELS SHALL MEET THE REQUIREMENTS OF ASTM A36, WITH A SILICON CONTENT OF LESS THAN 0.06% OR BETWEEN 0.15% & 0.25% AND SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123.

POST ASSEMBLIES AND CHANNELS SHALL MEET THE CHARPY V-NOTCH REQUIREMENTS AS SPECIFIED IN 5.06.04 OF THE STANDARD SPECIFICATIONS AT A TEST TEMPERATURE OF 10°F (-12°C).

EXCEPT WHERE NOTED, ALL BOLTS, NUTS, AND STUDS FOR BRIDGE RAILING, GUARDRAIL TYPE SHALL CONFORM TO THE PHYSICAL REQUIREMENTS OF ASTM A325 EXCEPT THAT THE MINIMUM ELONGATION SHALL BE 10%. THE CHEMICAL PROPERTIES ARE WAIVED. WASHERS SHALL MEET THE MECHANICAL REQUIREMENTS OF ASTM F436. ALL HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153. GALVANIZED NUTS SHALL BE TAPPED OVERSIZE PER THE REQUIREMENTS OF ASTM A563.

ANCHOR ASSEMBLIES CAST IN THE BRIDGE SLAB SHALL BE PRESET BY USE OF A TEMPLATE IN ACCORDANCE WITH 7.05.03 OF THE STANDARD SPECIFICATIONS. FOR PLACEMENT OF RAIL POSTS, SEE PLANS.

GUARDRAIL ANCHORAGE-BRIDGE, NESTED TYPE, WILL PAID FOR AT THE CONTRACT UNIT PRICE EACH, WHICH INCLUDES PAYMENT IN FULL FOR ALL WORK AND MATERIAL NECESSARY TO ERECT THE GUARD RAIL.

GUARDRAIL ANCHORAGE-BRIDGE, NESTED TYPE, SHALL CONFORM TO THE DIMENSIONS FOR GALVANIZED BEAM GUARDRAIL, TYPE B, STANDARD PLAN R-60 SERIES, AND SHALL MEET THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS, EXCEPT WHERE MODIFIED BY THIS STANDARD.

AT POSTS ADJACENT TO TUBE EXPANSION SPLICES, NUTS FOR 5/8"⌀ BOLTS SHALL BE INSTALLED FINGER TIGHT WITH THE THREADS BURRED.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS STANDARD PLAN FOR
BRIDGE RAILING, GUARDRAIL TYPE AND GUARDRAIL ANCHORAGE-BRIDGE, NESTED TYPE

X-31A — SHEET 2 OF 2

PREPARED BY DESIGN DIVISION — DRAWN BY: EJ-1 — CHECKED BY:

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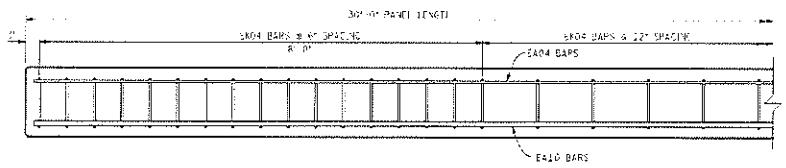
MIDLAND COUNTY ROAD COMMISSION
7 MILE ROAD OVER BULLOCK CREEK
DECK PANEL REINFORCEMENT DETAILS

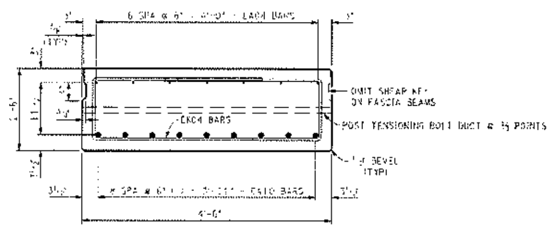
SHEET 8 OF 10

DRAWING PATH — Feb 23, 2018

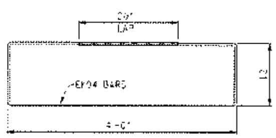


DECK PANEL ELEVATION

*ADJUST EA04 SPACING TO ACCOMMODATE POST-TENSIONING DUCTS
(EK04 BARS SYMETRICAL ABOUT DECK PANEL)



DECK PANEL SECTION



K BAR DETAIL

NOTES:

THE INITIAL FORCE IN THE TRANSVERSE POST-TENSIONING TENDONS SHALL BE 120,000 LBS. EACH. LOCATE POST TENSIONING DUCTS AT ⅓ POINTS ON BEAMS

OHM | NO SCALE | JN: 5025-17-0010 | SHAFFER ROAD BRIDGE RECONSTRUCTION / MIDLAND COUNTY ROAD COMMISSION / DECK PANEL REINFORCEMENT DETAILS | DATE: 02/10/17 | DRAWING | SHEET 1

NOTES:

-SPLITFACE CONCRETE MASONRY BLOCK - THIS ITEM SHALL CONSIST OF FURNISHING AND PLACING SPLITFACE HOLLOW CORE CONCRETE MASONRY UNITS (CMU) MEETING ASTM C90 WITH THE MODIFICATIONS THAT THE BLOCK SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AND A MAXIMUM ABSORPTION RATE OF 6.5%. PLACE CMU BLOCKS SIDE BY SIDE FOR THE FULL LENGTH OF EACH COURSE OF THE WALL. CHECK WALL PLUMBNESS A MINIMUM OF EVERY 3 LAYERS AND CORRECT DEVIATIONS GREAT THAN ¼". CORRECT MISALIGNED, IMPROPERLY SEATED OR OUT OF LEVEL CMU BLOCKS. ASSURE THAT THE TOPS OF ALL CMU BLOCKS ARE FREE OF LOOSE MATERIAL PRIOR TO THE PLACEMENT OF THE NEXT LAYER OF GEOTEXTILE AND CMU BLOCKS.

-SOLID CONCRETE MASONRY BLOCK - THIS ITEM SHALL CONSIST OF FURNISHING AND PLACING SOLID CONCRETE MASONRY UNITS (CMU) MEETING ASTM C90 WITH THE MODIFICATIONS THAT THE BLOCK SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AND A MAXIMUM ABSORPTION RATE OF 6.5%. BEGIN CONSTRUCTION OF THE ABUTMENT BY PLACING ONE FULL LENGTH OF COURSE OF CMU BLOCK AT A TIME. PLACE THE FIRST COURSE OF CMU BLOCK ON TOP AND IN FULL CONTACT WITH THE REINFORCED SOIL FOUNDATION. THE FIRST ROW OF CMU BLOCK MUST BE CAREFULLY LEVELED IN BOTH DIRECTIONS TO ENSURE PROPER ALIGNMENT FOR THE BALANCE OF THE WALL. CHECK WALL PLUMBNESS A MINIMUM OF EVERY 3 LAYERS AND CORRECT DEVIATIONS GREATER THAN ¼". CORRECTED MISALIGNED, IMPROPERLY SEATED OR OUT OF LEVEL CMU BLOCKS. ASSURE THAT THE TOPS OF ALL CMU BLOCKS ARE FREE OF LOOSE MATERIAL PRIOR TO THE PLACEMENT OF THE NEXT LAYER OF GEOTEXTILE AND CMU BLOCKS.

-HIGH STRENGTH WOVEN POLYPROPYLENE FABRIC - THIS ITEM SHALL HAVE A WIDE WIDTH TENSILE STRENGTH OF 4800/LBS PER FOOT IN BOTH DIRECTIONS AS PER ASTM D-4595. THE GEOSYNTHETIC REINFORCEMENT SHALL BE PLACED AS SHOWN ON SHEET. THE WIDTH AND LENGTH VARY AS SHOWN ON THE DRAWING. GEOSYNTHETIC REINFORCEMENT SHALL EXTEND BETWEEN THE LAYERS OF CMU BLOCK TO PROVIDE A FRICTIONAL CONNECTION. THE GEOSYNTHETIC REINFORCEMENT SHALL NEARLY COMPLETELY COVER THE TOP OF THE CMU BLOCK. PULL THE GEOSYNTHETIC REINFORCEMENT TAUT PRIOR TO BACKFILLING TO REMOVE WRINKLES. THE PRICED BID SHALL INCLUDE FURNISHING AND PLACING THIS MATERIAL. TO LIMIT CONSTRUCTION DAMAGE TO THE GEOTEXTILE REINFORCEMENT, CONSTRUCTION EQUIPMENT SHALL NOT DRIVE DIRECTLY OVER THE GEOTEXTILE. AN AGGREGATE THICKNESS OF 6" IS SUFFICIENT TO PREVENT EQUIPMENT FROM DAMAGING THE GEOTEXTILE. NO LAPPING OF FABRIC SHALL BE PERMITTED ALONG THE FACE. WHERE LAPPED ELSEWHERE A 0.25" THICKNESS OF STONE SHALL BE SPREAD BETWEEN PIECES OF FABRIC.

-THE STONE BACKFILL SHALL BE PLACED BEHIND EACH LAYER OF CMU BLOCK IN A LIFT THICKNESS NOT TO EXCEED THE CMU BLOCK HEIGHT. PLACEMENT OF THE AGGREGATE SHALL BE FROM THE WALL FACE BACKWARD TO PREVENT THE FORMATION OF AND TO REMOVE ANY WRINKLES IN THE GEOTEXTILE. FILL SHALL BE PLACED IN A MANNER TO AVOID WRINKLING OF THE GEOSYNTHETIC REINFORCEMENT. COMPACTION GENERALLY ACHIEVED BY:

1) RODDING THE AGGREGATE FILL BEHIND EACH CMU BLOCK APPROXIMATELY EVERY FOOT WHILE EXERTING DOWNWARD PRESSURE ON THE CMU BLOCK TO PREVENT LATERAL MOVEMENT

2) USING A VIBRATORY PLATE COMPACTOR (> 4 PASSES) DIRECTLY BEHIND THE CMU BLOCK WHILE EXERTING DOWNWARD PRESSURE ON THE CMU BLOCK TO PREVENT LATERAL MOVEMENT

3) LARGER VIBRATORY COMPACTORS MAY BE USED FOR THE BALANCE OF THE AREA MORE THAN 2' BEHIND THE CMU BLOCK. MULTIPLE PASSES OF A VIBRATORY PLATE COMPACTOR CAN ALSO ACHIEVE PROPER DENSITY.

-AT THE END OF A DAY'S OPERATIONS, SLOPE THE LAST LIFT OF BACKFILL AWAY FROM THE WALL FACE TO DIRECT SURFACE RUNOFF AWAY FROM THE WALL. DO NOT ALLOW SURFACE RUNOFF FROM ADJACENT AREAS TO ENTER THE WALL CONSTRUCTION AREA.

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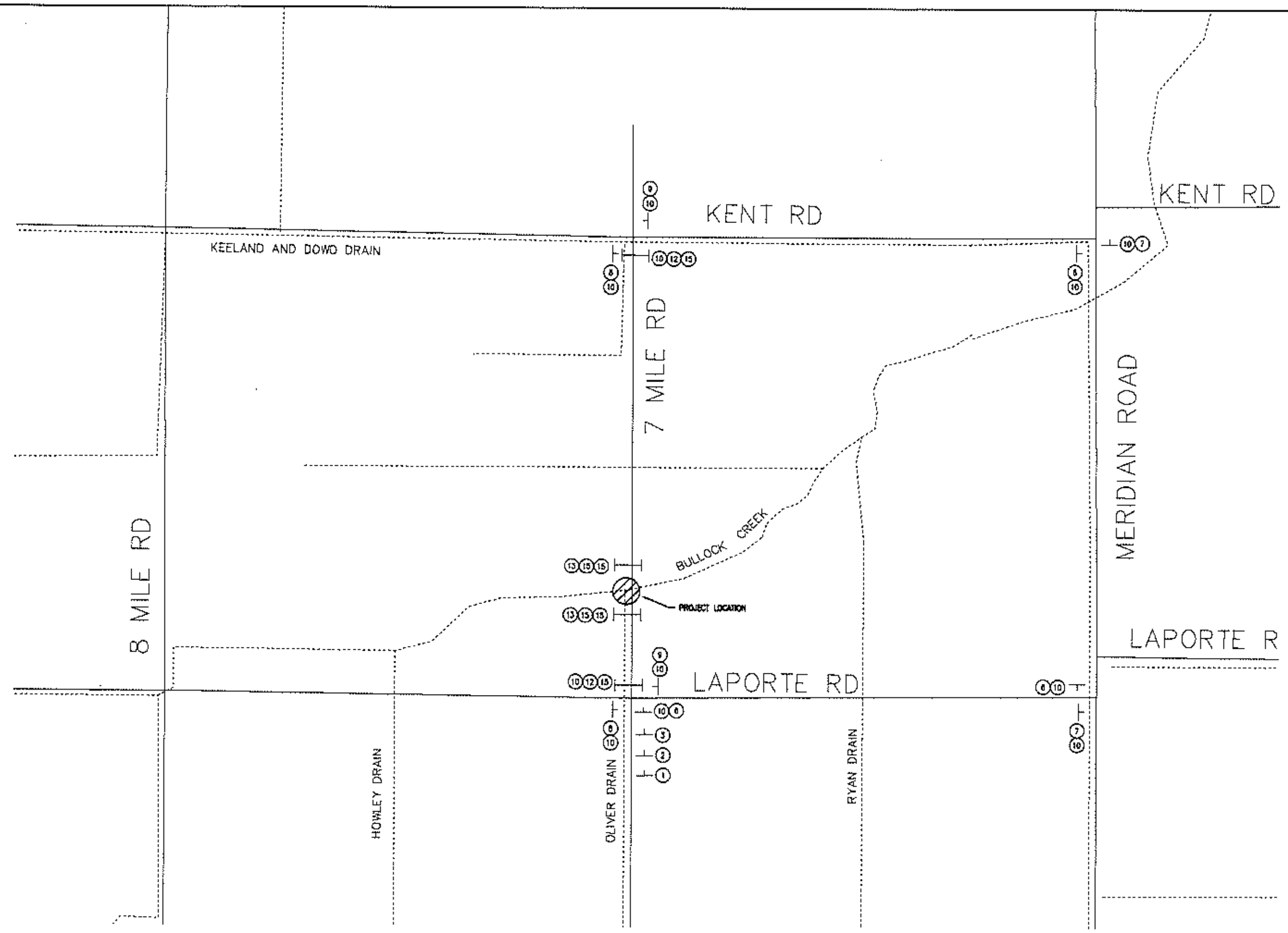
MIDLAND COUNTY ROAD COMMISSION
7 MILE ROAD OVER BULLOCK CREEK
DETAIL SHEET

SIGN LEGEND

NO	SIGN	SIGN DESIGNATION	SIZE	NUMBER REQUIRED (FOR INFORMATION ONLY)	AREA (SQ. FT)
1	ROAD WORK AHEAD	W20-1	48"x48"	1	16
2	DETOUR AHEAD	W20-2	48"x48"	1	16
3	ROAD CLOSED AHEAD	W20-3	48"x48"	1	16
4	WORK ZONE BEGINS / TRAFFIC FINES DOUBLED	R5-18cLA	60"x42"	0	0
5	INJURE/KILL A WORKER / FINES - $ 7500 JAIL - 15 YRS	R5-18bLA	60"x42"	0	0
6	DETOUR →	M4-9(R)	30"x24"	3	15
7	DETOUR ←	M4-9(L)	30"x24"	2	10
8	DETOUR ↑	M4-9(S)	30"x30"	2	15
9	DETOUR ENDS	M4-8a	24"x18"	2	6
10	7 MILE RD	D3-1A	30"X12"	11	28
12	ROAD CLOSED AHEAD LOCAL TRAFFIC ONLY	R11-3	30"x48"	2	20
13	ROAD CLOSED	R11-2	30"x48"	2	20
14	END ROAD WORK	G20-2	48"x24"	0	0
15		TYPE III* BARRICADE	8'	5	

TRAFFIC NOTES:

1. DISTANCES SHOWN ARE APPROXIMATE AND MAY BE ADJUSTED IN THE FIELD BY THE CONTRACTOR AS DIRECTED BY THE ENGINEER TO AVOID CONFLICT OR OBSTRUCTION BY EXISTING TREES, SIGNS, DRIVEWAYS ETC. PRESENT IN THE FIELD BUT NOT SHOWN ON THE PLANS.
2. ALL CONSTRUCTION SIGNS SHALL CONFORM WITH THE CURRENT EDITION OF THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
3. ALL TRAFFIC CONTROL DEVICES INCLUDING SIGNS, BARRICADES, PLASTIC DRUMS AND WARNING LIGHTS ARE THE RESPONSIBILITY OF THE CONTRACTOR.
4. SIGNS, IF REQUIRED WITH THE TYPE III BARRICADES, SHALL BE MOUNTED ABOVE THE BARRICADES ON SEPARATE SUPPORTS.
5. TRAFFIC CONTROL DEVICES ARE TO BE MAINTAINED BY THE CONTRACTOR FOR THE DURATION OF THE PROJECT. NIGHT PATROLS OF THE CONSTRUCTION AREA AND DETOUR ROUTE SHALL BE CONDUCTED BY THE CONTRACTOR AND WILL NOT BE PAID SEPARATELY, BUT WILL BE INCLUDED IN THE UNIT PRICE BID FOR TEMPORARY TRAFFIC CONTROL ITEMS.
6. ALL SIGNS SHALL BE RETRO-REFLECTIVE WITH A MATERIAL THAT HAS A SMOOTH, SEALED OUTER SURFACE.
7. ALL SPECIAL SIGNS SHALL BE PLACED ONE (1) WEEK PRIOR TO CONSTRUCTION.



DETOUR/ADVANCED SIGNING PLAN
NTS

LEGEND
TEMP SIGN
TYPE III BARRICADES

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MIDLAND COUNTY ROAD COMMISSION
7 MILE ROAD OVER BULLOCK CREEK
MAINTAINING TRAFFIC

SHEET 10 OF 10