



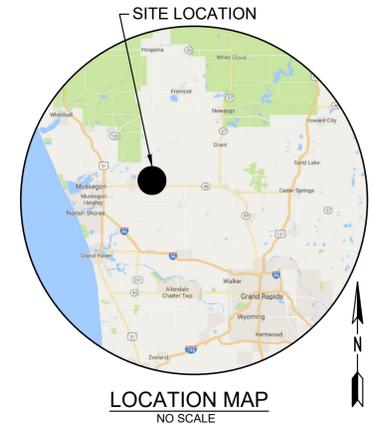
BRENDA M. MOORE
MUSKEGON COUNTY DRAIN COMMISSIONER
STEPHANIE BARRETT, DEPUTY DRAIN COMMISSIONER

BLACK CREEK CONSOLIDATED DRAIN DRAINAGE DISTRICT

DIVISION 7

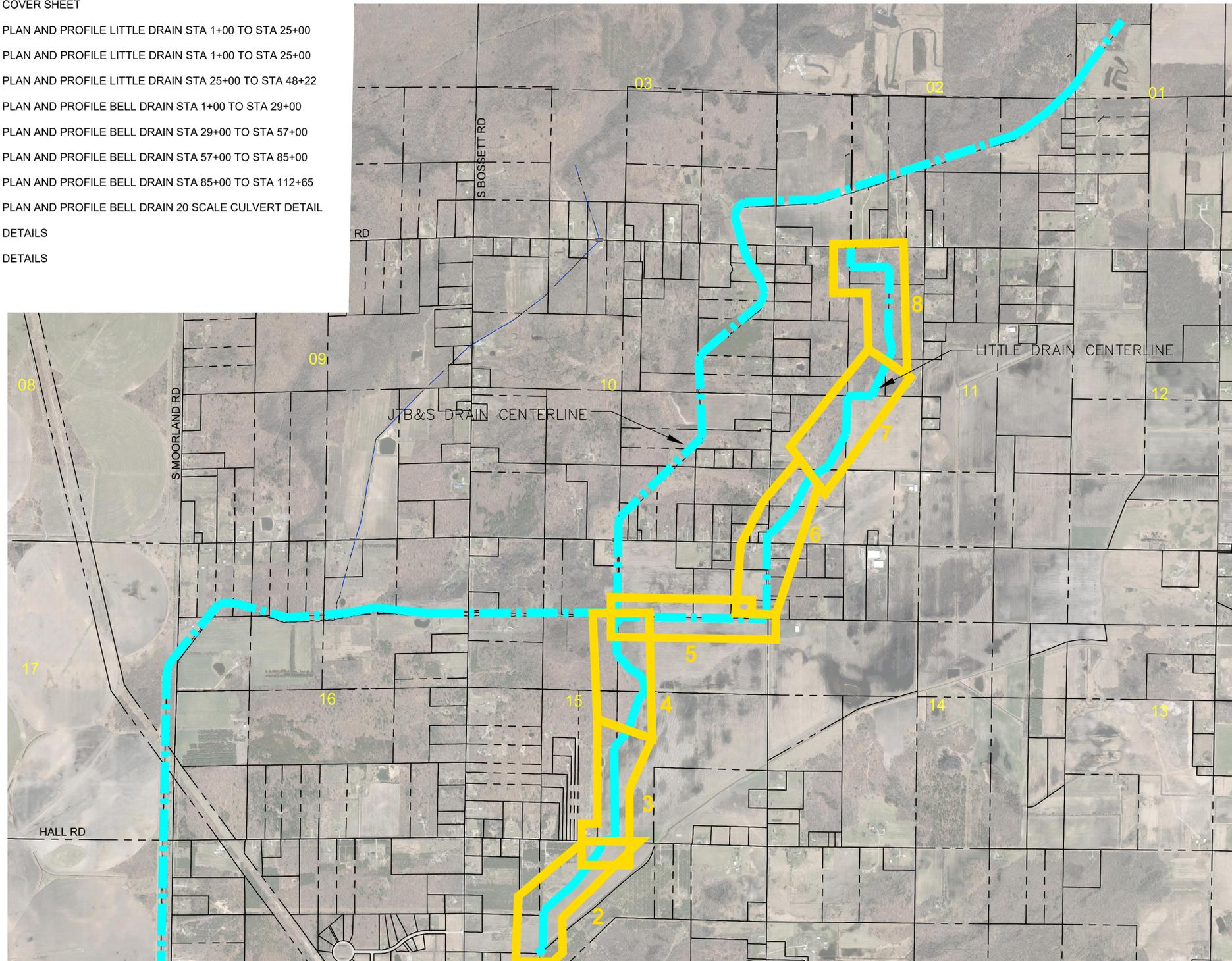
LITTLE DRAIN & BELL DRAIN

PART OF EGELSTON, MOORLAND, RAVENNA & CASNOVIA TOWNSHIPS
MUSKEGON COUNTY, MICHIGAN



LIST OF DRAWINGS

- 1 COVER SHEET
- 2 PLAN AND PROFILE LITTLE DRAIN STA 1+00 TO STA 25+00
- 3 PLAN AND PROFILE LITTLE DRAIN STA 1+00 TO STA 25+00
- 4 PLAN AND PROFILE LITTLE DRAIN STA 25+00 TO STA 48+22
- 5 PLAN AND PROFILE BELL DRAIN STA 1+00 TO STA 29+00
- 6 PLAN AND PROFILE BELL DRAIN STA 29+00 TO STA 57+00
- 7 PLAN AND PROFILE BELL DRAIN STA 57+00 TO STA 85+00
- 8 PLAN AND PROFILE BELL DRAIN STA 85+00 TO STA 112+65
- 9 PLAN AND PROFILE BELL DRAIN 20 SCALE CULVERT DETAIL
- 10 DETAILS
- 11 DETAILS



LIST OF CONTACTS

OWNER
MUSKEGON COUNTY DRAIN COMMISSIONER
BRENDA M MOORE
PHONE: 231-724-6219
STEPHANIE BARRETT
PHONE: 231-724-6319
CENTRAL SERVICES BUILDING
141 E APPLE AVENUE
MUSKEGON, MI 49442

ELECTRIC
CONSUMERS ENERGY
MICHELLE ANDREE
700 E STERNBERG RD
NORTON SHORES, MI 49441
PHONE: 231-332-2621

GAS DISTRIBUTION
DTE ENERGY GAS
VINCE DUCA
2359 OLTHOFF DRIVE
MUSKEGON, MI 49444
PHONE: 231-777-4034

CABLE TELEVISION
COMCAST
JON CHARLAND
700 W BROADWAY AVE
MUSKEGON, MI 49441
PHONE: 231-375-5112

GAS TRANSMISSION
DTE ENERGY GAS
TYLER GAGE, PE
444 WEALTHY STREET
GRAND RAPIDS, MI 49503
PHONE: 989-330-3231
tyler.gage@dteenergy.com

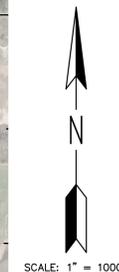
ROADS
MUSKEGON COUNTY ROAD COMMISSION
PAUL R BOUMAN, PE
7700 E APPLE AVENUE
MUSKEGON, MI 49442
PHONE: 231-788-2381

TELEPHONE
FRONTIER COMMUNICATIONS
DAVID FLERMOEN
860 TERRACE STREET
MUSKEGON, MI 49444
PHONE: 231-727-1319

ENGINEER
Eng., Inc.
RYAN C MCHENHILL, PE
16930 ROBBINS ROAD
SUITE 105
GRAND HAVEN, MI 49417
PHONE: 616-743-7070
mchenhillr@engdot.com

LEGEND

- BLACK CREEK DRAIN CENTERLINE
- MUNICIPAL BOUNDARY
- PARCEL LINE
- ROAD
- SECTION LINE
- SECTION NUMBER
- SECTION CORNER
- SHEET LOCATION



RYAN C MCHENHILL, P.E. #56096
DATE 6-25-20

COVER SHEET

NO	REVISIONS	BY	DATE	Drawn	Check	Approved
				SPM		
				5/20/20		

4663 Grand Oak Drive Suite A109
Lansing, MI 48911
517.887.1100

16930 Robbins Road Suite 105
Grand Haven, MI 49417
616.743.7070
engdot.com



BRENDA M. MOORE
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STEPHANIE BARRETT, DEPUTY DRAIN COMMISSIONER
BLACK CREEK CONSOLIDATED DRAIN DRAINAGE DISTRICT
DIVISION 7
LITTLE DRAIN & BELL DRAIN

PROJECT NO.
16041

SHEET NO.
DIVISION 7
1 OF 11



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

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

BM #3 ELEV = 707.92
NE CORNER OF CONCRETE PARKING,
250'± S OF BAILEY C, 860'± W OF
N ADAMS RD C.

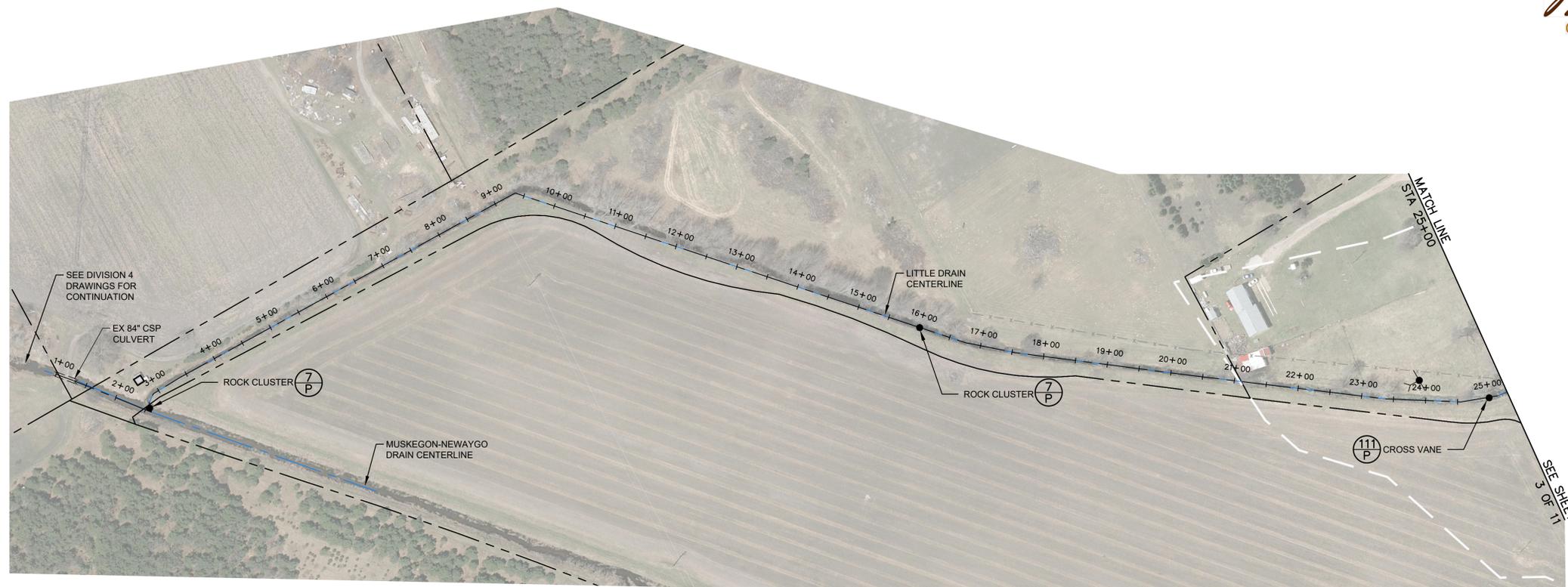
BM #4 ELEV = 707.74
SET SPIKE SW SIDE 10" POPLAR,
75'± N OF CROSSING, 660'± N OF
BAILEY AT EXTENSION OF RAVENNA
RD.

- GENERAL NOTES:
- ALL TREES MUST BE MARKED BY ENGINEER PRIOR TO REMOVAL.
 - FOR ACCESS CLEARING, ALL TREES REMOVED MUST BE CHIPPED OR HAVE LOGS STACKED WITHIN THE EASEMENT LIMITS. ALL OTHER WOODY MATERIAL MUST BE CHIPPED, BURIED-ON-SITE OR REMOVED FROM SITE. ALL TREES REMOVED FROM DITCH BOTTOM OR SIDES MUST BE CUT FLUSH.
 - SPOILS TO BE PLACED AND LEVELED ALONG THE WORKING SIDE OF THE DRAIN, SO AS NOT TO AFFECT THE EXISTING DRAINAGE PATTERNS.
 - LEVEL MULCH AND SEED SPOILS WITH OPEN CHANNEL SEED MIX. SPOILS SHALL NOT BE GREATER THAN 6 INCHES IN HEIGHT IN ANY GIVEN AREA.
 - PROPERTY OWNERS MUST BE NOTIFIED 7 DAYS PRIOR TO ANY ACCESS AND TREE REMOVALS ON THEIR PROPERTY.
 - SITE ACCESS IS RESTRICTED TO EXISTING DRAIN EASEMENTS, TEMPORARY ACCESS EASEMENTS, AND PUBLIC RIGHTS OF WAY SHOWN ON DRAWINGS. ALL OTHER ACCESS TO SITE SHALL BE APPROVED BY THE OWNER.
 - TEMPORARY SESSC MEASURES MUST BE IN PLACE AT 500 FOOT INCREMENTS TO CONTROL SEDIMENT TRANSPORT.

SOIL TYPES AND ABBREVIATIONS	
CovabB	Covert-Pipestone sands, 0 to 6 percent slopes
Ga	Granby loamy sand
PifabB	Plainfield sand, lake plain, 0 to 6 percent slopes
PifabD	Plainfield sand, lake plain, 6 to 18 percent slopes
PpsaaA	Pipestone-Covert-Saugatuck sands, 0 to 3 percent slopes
Ra	Roscommon and Au Gres Sands
Sa	Saranac loam
Tc	Tawas and Carlisle mucks

LEGEND

- = PROPERTY LINE OR R.O.W. LINE
- = EDGE OF PAVEMENT
- X-X-X- = FENCE
- - - - - = EXISTING GUARDRAIL
- WETLANDS (AS MARKED BY OTHERS)
- +860 = EXISTING SPOT ELEVATION
- 860 = EXISTING CONTOUR ELEVATION
- = EDGE OF WOODS
- = DECIDUOUS TREE
- = CONIFEROUS TREE
- = BUSH
- = STUMP
- GAS --- = EXISTING GAS LINE
- = EXISTING STORM SEWER
- = EXISTING SANITARY SEWER
- = EXISTING MANHOLE
- = EXISTING STORM CATCH BASIN
- = EXISTING WELL LOCATION
- = EXISTING WATER VALVE
- = EXISTING CURB STOP / METER
- = EXISTING CATCH BASIN
- ◇ BM = BENCH MARK LOCATION
- △ = EXISTING SIGN
- ⊞ = EXISTING MAILBOX
- ⊞ = EXISTING LIGHT POLE
- ⊞ = EXISTING GUY ANCHOR
- ⊞ = EXISTING UTILITY POLE
- ⊞ = EXISTING TELEPHONE PEDESTAL
- = EXISTING DRAIN EASEMENT
- = EXISTING DRAIN C
- = PROPOSED DRAIN C
- = PROPOSED TOP OF BANK
- = PROPOSED TOE OF BANK
- La = SOIL TYPE
- ⊞ = PERMANENT SOIL EROSION CONTROL MEASURE OR RESTORATION DETAIL
- ⊞ = TEMPORARY SOIL EROSION CONTROL MEASURE

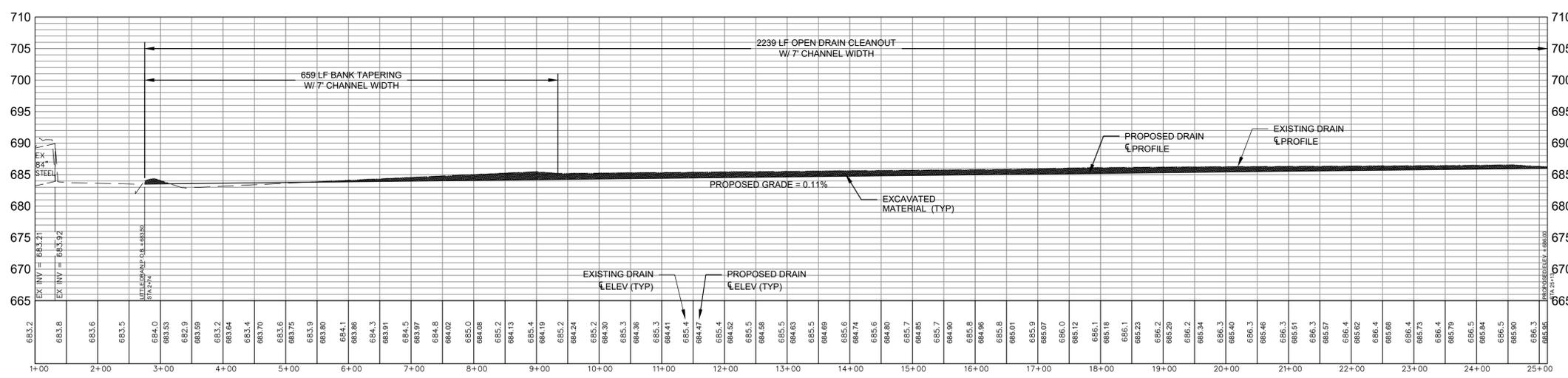
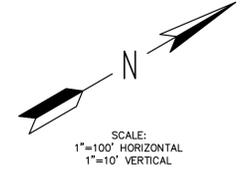


* EASEMENT WIDTH FOR THE LITTLE DRAIN IS A SIGNIFICANT GROUND EASEMENT

WORK ITEM	LOCATION	QUANTITY
OPEN DRAIN CLEANOUT	STA 2+74 TO 25+13	2239 LF
BANK TAPERING	STA 2+74 TO 9+33	659 LF
CROSS VANE	STA 25+00	1 EA
ROCK CLUSTER	STA 2+74 STA 16+00	2 EA

LITTLE DRAIN

- SHEET SPECIFIC NOTES:
- WORK FROM THE WEST SIDE OF THE DRAIN THIS SHEET.
 - ACCESS CLEARING WILL BE REQUIRED THIS SHEET IN THE FORM OF MINOR BRUSH AND WOODY VEGETATION REMOVAL. NOTIFY ENGINEER OR INSPECTOR PRIOR TO ANY CLEARING.
 - MISCELLANEOUS ITEMS OF WORK WILL BE PERFORMED AT THE DIRECTION OF THE ENGINEER. DEPTH OF DRAIN FROM TOP OF BANK RANGES FROM 6 TO 15 FT.



**PLAN AND PROFILE
LITTLE DRAIN
STA 1+00 TO STA 25+00**

BY	DATE	SPM	DATE	APPROVED BY	DATE
			02/25/20		

4063 Grand Oak Drive Suite A109
Lansing, MI 48911
517.887.1100

16930 Robbins Road Suite 105
Grand Haven, MI 49417
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STEPHANIE BARRETT, DEPUTY DRAIN COMMISSIONER
BLACK CREEK CONSOLIDATED DRAIN DRAINAGE DISTRICT
PART OF EGELSTON, MOORLAND, RAVENNA & CASNOVIA TOWNSHIPS
MUSKEGON COUNTY, MICHIGAN

PROJECT NO.
16041

SHEET NO.
DIVISION 7
2 OF 11

DIVISION 7 - LITTLE & BELL DRAIN

T:\Autocad Drawings\16041 - Black Creek\16041 branch P&P.dwg, 6/25/2020 2:45:22 PM, DWG To PDF.pc3



BM #3 ELEV = 707.92
NE CORNER OF CONCRETE PARKING,
250'± S. OF BAILEY E. 860'± W OF
N ADAMS RD E.

BM #4 ELEV = 707.74
SET SPIKE SW SIDE 10" POPLAR,
75'± N OF CROSSING, 660'± N OF
BAILEY AT EXTENSION OF RAVENNA RD

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 - SPOILS TO BE PLACED AND LEVELED ALONG THE WORKING SIDE OF THE DRAIN, SO AS NOT TO AFFECT THE EXISTING DRAINAGE PATTERNS.
 - LEVEL MULCH AND SEED SPOILS WITH OPEN CHANNEL SEED MIX. SPOILS SHALL NOT BE GREATER THAN 8-INCHES IN HEIGHT IN ANY GIVEN AREA.
 - PROPERTY OWNERS MUST BE NOTIFIED 7 DAYS PRIOR TO ANY ACCESS AND TREE REMOVALS ON THEIR PROPERTY.
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 - TEMPORARY SESS MEASURES MUST BE IN PLACE AT 500 FOOT INCREMENTS TO CONTROL SEDIMENT TRANSPORT.

SOIL TYPES AND ABBREVIATIONS	
CovabB	Covert-Pipestone sands, 0 to 6 percent slopes
Ga	Granby loamy sand
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Ra	Roscommon and Au Gres Sands
Sa	Saranac loam
Tc	Tawas and Carlisle mucks

LEGEND

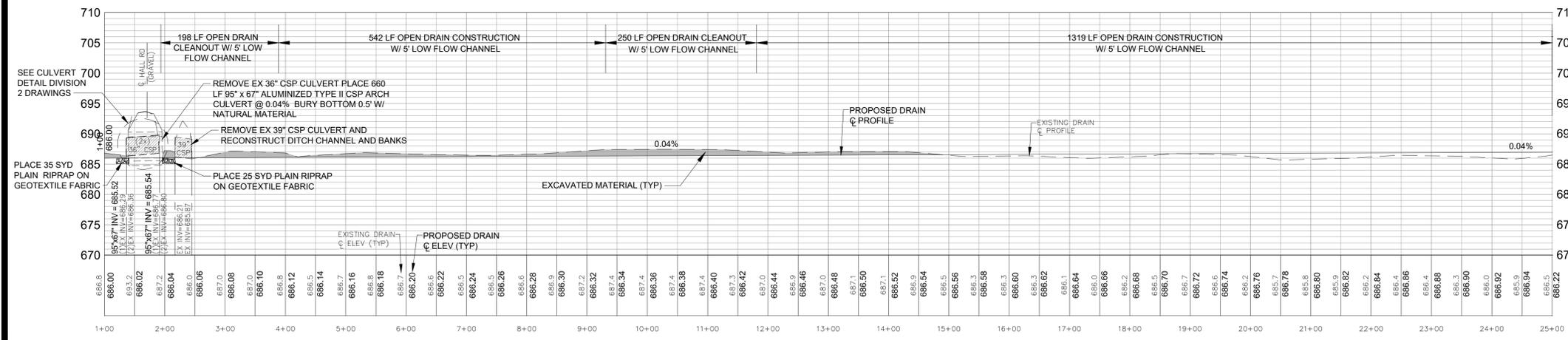
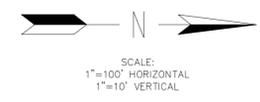
- = PROPERTY LINE OR R.O.W. LINE
- = EDGE OF PAVEMENT
- X - X - X - = FENCE
- - - - - = EXISTING GUARDRAIL
- [Symbol] = WETLANDS (AS MARKED BY OTHERS)
- [Symbol] = EXISTING SPOT ELEVATION
- [Symbol] = EXISTING CONTOUR ELEVATION
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- [Symbol] = DECIDUOUS TREE
- [Symbol] = CONIFEROUS TREE
- [Symbol] = BUSH
- [Symbol] = STUMP
- - - - - = EXISTING GAS LINE
- - - - - = EXISTING STORM SEWER
- - - - - = EXISTING SANITARY SEWER
- [Symbol] = EXISTING MANHOLE
- [Symbol] = EXISTING STORM CATCH BASIN
- [Symbol] = EXISTING WELL LOCATION
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- [Symbol] = SOIL TYPE
- [Symbol] = PERMANENT SOIL EROSION CONTROL MEASURE OR RESTORATION DETAIL
- [Symbol] = TEMPORARY SOIL EROSION CONTROL MEASURE



WORK ITEM	LOCATION	QUANTITY
CULVERT REMOVAL, 36-INCH AND LARGER	STA 1+36 TO 1+91 STA 2+17 TO 2+45	136 LF
OPEN DRAIN CLEANOUT	STA 1+91 TO 3+89 STA 9+31 TO 11+81	448 LF
OPEN DRAIN CONSTRUCTION	STA 3+89 TO 9+31 STA 11+81 TO 25+00	1861 LF
PLAIN RIPRAP ON GEOTEXTILE FABRIC	STA 1+35 STA 1+91 STA 4+00 TO 4+50 STA 20+50	120 SYD

LITTLE DRAIN

- SHEET SPECIFIC NOTES:
- WORK FROM EITHER SIDE OF THE DRAIN THIS SHEET AND WHICH PROVIDES THE LEASE ENVIRONMENTAL IMPACT.
 - ACCESS CLEARING WILL BE REQUIRED THIS SHEET IN THE FORM OF MINOR BRUSH AND WOODY VEGETATION REMOVAL. NOTIFY ENGINEER OR INSPECTOR PRIOR TO ANY CLEARING.
 - MISCELLANEOUS ITEMS OF WORK WILL BE PERFORMED AT THE DIRECTION OF THE EM.
 - DEPTH OF DRAIN FROM TOP OF BANK RANGES FROM 4 TO 13 FT.



PLAN AND PROFILE
LITTLE DRAIN
STA 1+00 TO STA 25+00

DATE	BY	REVISIONS
6/23/17 <td>GTO <td></td> </td>	GTO <td></td>	

4063 Grand Oak Drive Suite A109
Lansing, MI 48911
517.887.1100

16930 Robbins Road Suite 105
Grand Haven, MI 49417
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STEPHANIE BARRETT, DEPUTY DRAIN COMMISSIONER
BLACK CREEK CONSOLIDATED DRAIN DRAINAGE DISTRICT
PART OF EGELSTON, MOORLAND, RAVENNA & CASNOVIA TOWNSHIPS
MUSKEGON COUNTY, MICHIGAN

PROJECT NO.
16041

SHEET NO.
DIVISION 7
3 OF 11



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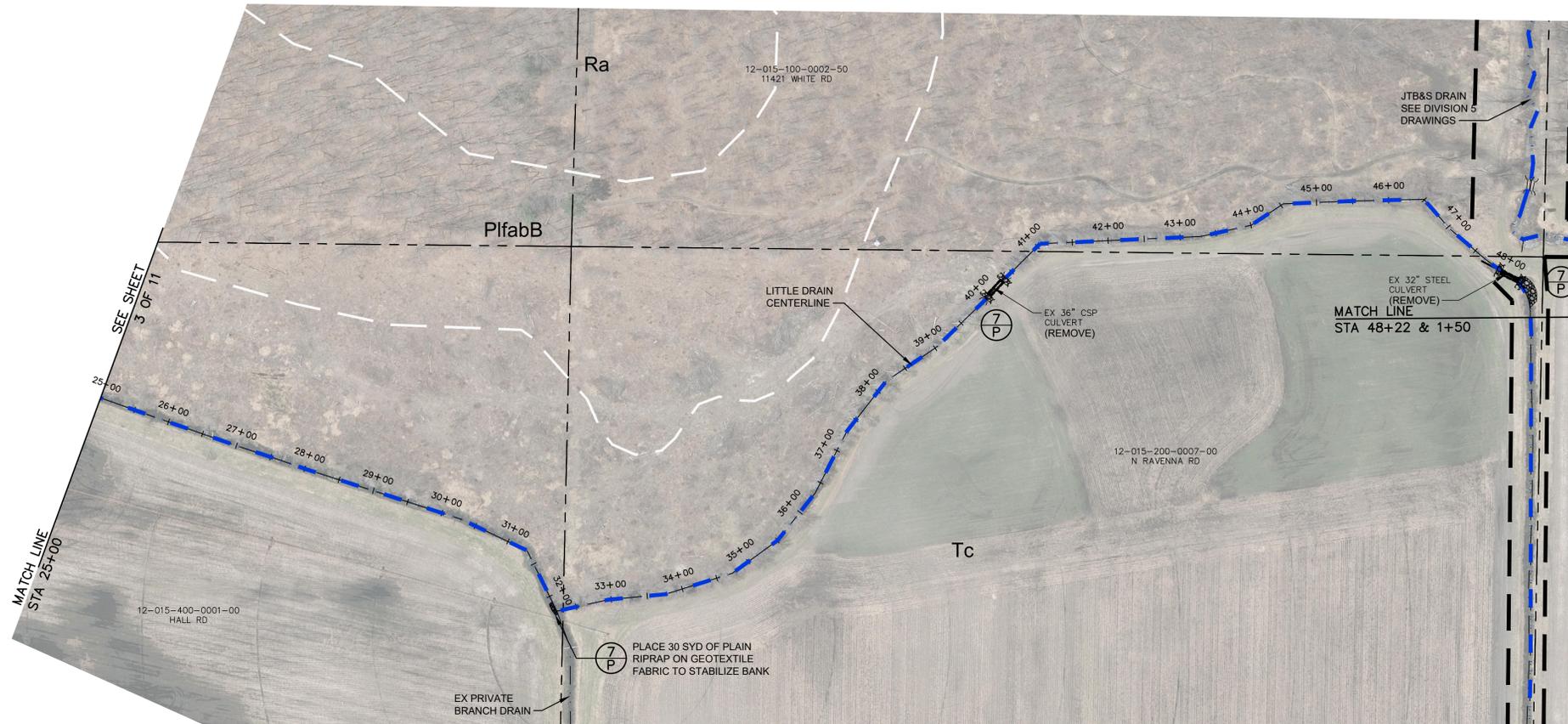
BM #4 ELEV = 707.74
SET SPIKE SW SIDE 10" POPLAR,
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 - TEMPORARY SESC MEASURES MUST BE IN PLACE AT 500 FOOT INCREMENTS TO CONTROL SEDIMENT TRANSPORT.

SOIL TYPES AND ABBREVIATIONS	
CovabB	Covert-Pipestone sands, 0 to 6 percent slopes
Ga	Granby loamy sand
PifabB	Plainfield sand, lake plain, 0 to 6 percent slopes
PifabD	Plainfield sand, lake plain, 6 to 18 percent slopes
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LEGEND

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- = EDGE OF PAVEMENT
- X - X - X - = FENCE
- - - - - = EXISTING GUARDRAIL
- ☒ = WETLANDS (AS MARKED BY OTHERS)
- +860 = EXISTING SPOT ELEVATION
- 860 = EXISTING CONTOUR ELEVATION
- = EDGE OF WOODS
- ☀ = DECIDUOUS TREE
- ☀ = CONIFEROUS TREE
- ☀ = BUSH
- ☀ = STUMP
- GAS --- GAS --- GAS --- = EXISTING GAS LINE
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- ⊕ = EXISTING WELL LOCATION
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- = EXISTING CURB STOP / METER
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- ⊕ = BENCH MARK LOCATION
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- ⊕ = EXISTING MAILBOX
- ⊕ = EXISTING LIGHT POLE
- ⊕ = EXISTING GUY ANCHOR
- ⊕ = EXISTING UTILITY POLE
- ⊕ = EXISTING TELEPHONE PEDESTAL
- = EXISTING DRAIN EASEMENT
- = EXISTING DRAIN €
- = PROPOSED DRAIN €
- = PROPOSED TOP OF BANK
- = PROPOSED TOE OF BANK
- = SOIL TYPE
- ⊕ (XX) = PERMANENT SOIL EROSION CONTROL MEASURE OR RESTORATION DETAIL
- ⊕ (XT) = TEMPORARY SOIL EROSION CONTROL MEASURE

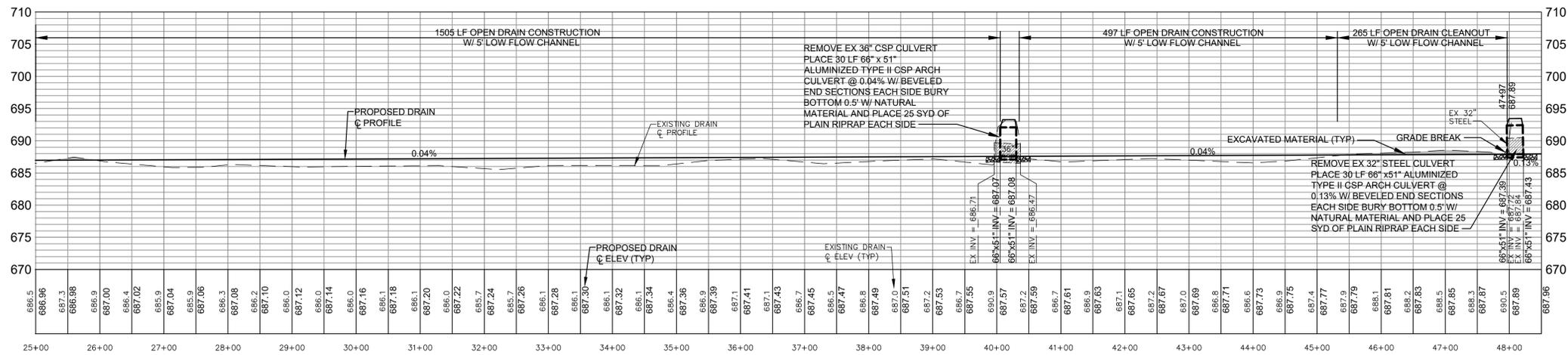
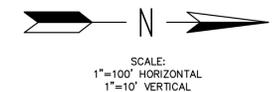


* EASEMENT WIDTH FOR THE LITTLE DRAIN IS A SIGNIFICANT GROUND EASEMENT

WORK ITEM	LOCATION	QUANTITY
CULVERT REMOVAL, SMALLER THAN 36-INCH	STA 47+97 TO 48+22	25 LF
CULVERT REMOVAL, 36-INCH AND LARGER	STA 39+96 TO 40+21	25 LF
OPEN DRAIN CLEANOUT	STA 45+32 TO STA 47+92	265 LF
OPEN DRAIN CONSTRUCTION	STA 25+00 TO STA 40+05 STA 40+35 TO STA 45+32	2002 LF
66" X 51" ALUMINIZED TYPE II CSP ARCH CULVERT	STA 40+05 TO 40+35 STA 47+97 TO 48+22	60 LF
PLAIN RIPRAP ON GEOTEXTILE FABRIC	STA 40+05 STA 40+31 STA 47+97 STA 48+22 STA 32+00 TO 32+40	130 SYD

LITTLE DRAIN

- SHEET SPECIFIC NOTES:
- WORK FROM THE RIGHT SIDE OF THE DRAIN THIS SHEET.
 - ACCESS CLEARING WILL BE REQUIRED THIS SHEET IN THE FORM OF MINOR BRUSH AND WOODY VEGETATION REMOVAL. NOTIFY ENGINEER OR INSPECTOR PRIOR TO ANY CLEARING.
 - MISCELLANEOUS ITEMS OF WORK WILL BE PERFORMED AT THE DIRECTION OF THE EM.
 - DEPTH OF DRAIN FROM TOP OF BANK RANGES FROM 1 TO 4 FT.



**PLAN AND PROFILE
LITTLE DRAIN
STA 25+00 TO STA 48+22**

REVISIONS

NO	DATE	BY	DATE	BY
		GTO		
			02/21/17	

4063 Grand Oak Drive Suite A109
Lansing, MI 48911
517.887.1100

16930 Robbins Road Suite 105
Grand Haven, MI 49417
616.743.7070
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Eng
Engineering & Surveying

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MUSKEGON COUNTY DRAIN COMMISSIONER

STEPHANIE BARRETT, DEPUTY DRAIN COMMISSIONER

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PART OF EGELSTON, MOORLAND, RAVENNA & CASNOVIA TOWNSHIPS
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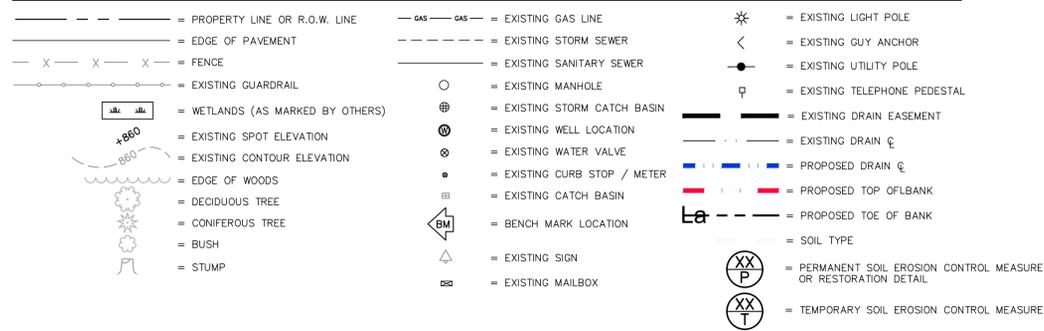
PROJECT NO.
16041

SHEET NO.
DIVISION 7
4 OF 11

- GENERAL NOTES:**
- ALL TREES MUST BE MARKED BY ENGINEER PRIOR TO REMOVAL. FOR ACCESS CLEARING, ALL TREES REMOVED MUST BE CHIPPED OR HAVE LOGS STACKED WITHIN THE EASEMENT LIMITS. ALL OTHER WOODY MATERIAL MUST BE CHIPPED, BURIED-ON-SITE OR REMOVED FROM SITE. ALL TREES REMOVED FROM DITCH BOTTOM OR SIDES MUST BE CUT FLUSH.
 - SPOILS TO BE PLACED AND LEVELLED ALONG THE WORKING SIDE OF THE DRAIN. SO AS NOT TO AFFECT THE EXISTING DRAINAGE PATTERNS.
 - LEVEL MULCH AND SEED SPOILS WITH OPEN CHANNEL SEED MIX. SPOILS SHALL NOT BE GREATER THAN 8-INCHES IN HEIGHT IN ANY GIVEN AREA.
 - PROPERTY OWNERS MUST BE NOTIFIED 7 DAYS PRIOR TO ANY ACCESS AND TREE REMOVALS ON THEIR PROPERTY.
 - SITE ACCESS IS RESTRICTED TO EXISTING DRAIN EASEMENTS, TEMPORARY ACCESS EASEMENTS, AND PUBLIC RIGHTS OF WAY SHOWN ON DRAWINGS. ALL OTHER ACCESS TO SITE SHALL BE APPROVED BY THE OWNER.
 - TEMPORARY SESC MEASURES MUST BE IN PLACE AT 500 FOOT INCREMENTS TO CONTROL SEDIMENT TRANSPORT.

WORK ITEM	LOCATION	QUANTITY
CULVERT REMOVAL, 36-INCH AND SMALLER	STA 8+96 TO 10+36 STA 14+50 TO 15+10 STA 17+69 TO 18+32 STA 20+58 TO 21+00 STA 23+09 TO 23+61 STA 25+24 TO 25+67	400 LF
OPEN DRAIN CLEANOUT	STA 15+10 TO 17+69 STA 18+32 TO 20+58 STA 21+00 TO 23+09 STA 23+61 TO 25+24 STA 25+67 TO 29+00	1632 LF
OPEN DRAIN CONSTRUCTION	STA 1+56 TO 8+96	740 LF
60" BY 46" ALUMINIZED TYPE II CSP ARCH CULVERT	STA 8+96 TO 10+36 STA 14+50 TO 15+10 STA 17+69 TO 18+32 STA 20+58 TO 20+98 STA 23+09 TO 23+49 STA 25+24 TO 25+64 STA 27+50 TO STA 28+00	370 LF
PLAIN RIPRAP ON GEOTEXTILE FABRIC	STA 1+50 TO 2+00 STA 8+96 STA 10+36 STA 14+50 STA 15+10 STA 17+69 STA 18+32 STA 20+58 STA 20+98 STA 23+09 STA 23+49 STA 25+24 STA 25+64 STA 27+50 TO STA 28+00	240 SYD

LEGEND



BM #3
NE CORNER OF CONCRETE PARKING,
250'± S OF BAILEY C, 860'± W OF
N ADAMS RD C.

ELEV = 707.92

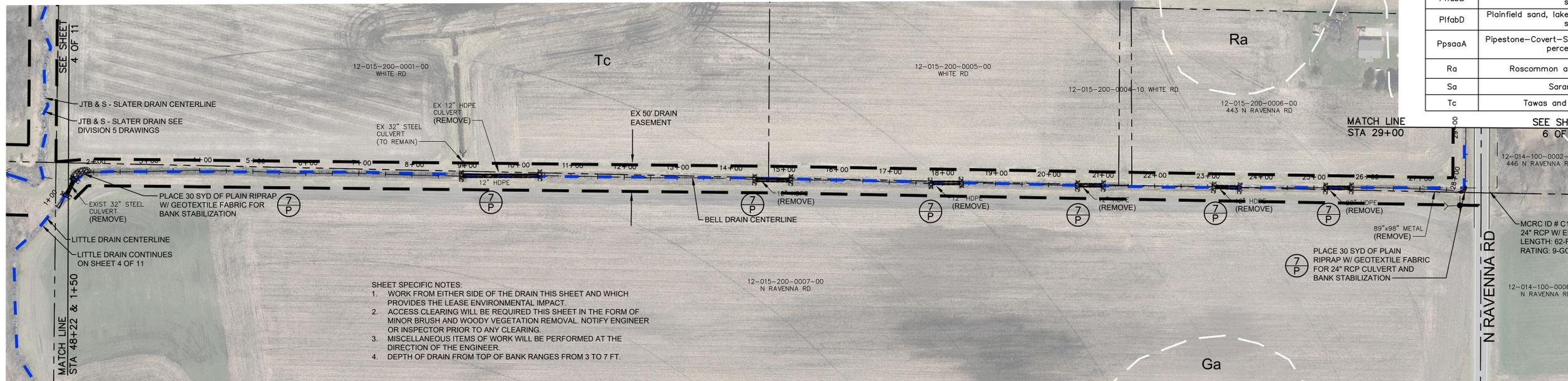
BM #4
SET SPIKE SW SIDE 10' POPLAR,
75'± N OF CROSSING, 660'± N OF
BAILEY AT EXTENSION OF RAVENNA RD.

ELEV = 707.74



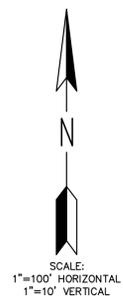
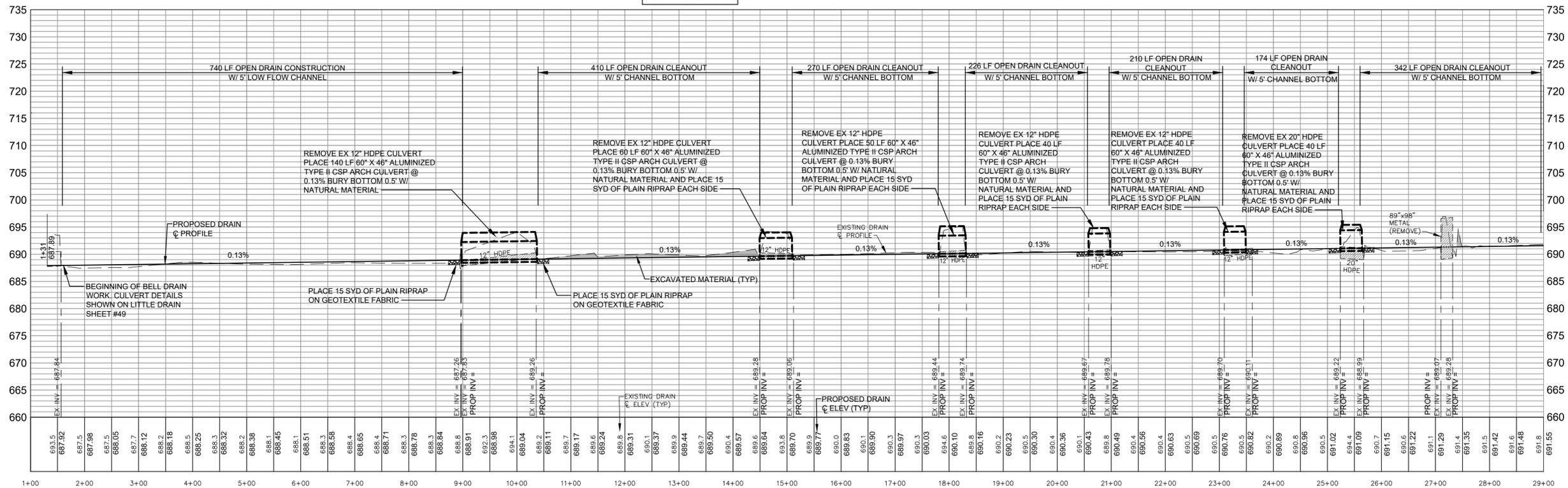
THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

SOIL TYPES AND ABBREVIATIONS	
CovabB	Covert-Pipestone sands, 0 to 6 percent slopes
Ga	Granby loamy sand
PifabB	Plainfield sand, lake plain, 0 to 6 percent slopes
PifabD	Plainfield sand, lake plain, 6 to 18 percent slopes
PpsaaA	Pipestone-Covert-Saugatuck sands, 0 to 3 percent slopes
Ra	Roscommon and Au Gres Sands
Sa	Saranac loam
Tc	Tawas and Carlisle mucks



- SHEET SPECIFIC NOTES:**
- WORK FROM EITHER SIDE OF THE DRAIN THIS SHEET AND WHICH PROVIDES THE LEASE SIDE ENVIRONMENTAL IMPACT.
 - ACCESS CLEARING WILL BE REQUIRED THIS SHEET IN THE FORM OF MINOR BRUSH AND WOODY VEGETATION REMOVAL. NOTIFY ENGINEER OR INSPECTOR PRIOR TO ANY CLEARING.
 - MISCELLANEOUS ITEMS OF WORK WILL BE PERFORMED AT THE DIRECTION OF THE ENGINEER.
 - DEPTH OF DRAIN FROM TOP OF BANK RANGES FROM 3 TO 7 FT.

BELL DRAIN



REVISIONS

NO.	DATE	BY	DATE	BY

4063 Grand Oak Drive Suite A109
Lansing, MI 48911
517.887.1100

16930 Robbins Road Suite 105
Grand Haven, MI 49417
616.743.7070
engdat.com

Eng
Engineering & Surveying

BRENDA M. MOORE
MUSKEGON COUNTY DRAIN COMMISSIONER

STEPHANIE BARRETT, DEPUTY DRAIN COMMISSIONER

BLACK CREEK CONSOLIDATED DRAIN DRAINAGE DISTRICT
PART OF EGELSTON, MOORLAND, RAVENNA & CASNOVIA TOWNSHIPS
MUSKEGON COUNTY, MICHIGAN

PROJECT NO.
16041

SHEET NO.
DIVISION 7
5 OF 11

**PLAN AND PROFILE
BELL DRAIN
STA 1+00 TO STA 29+00**

WORK ITEM	LOCATION	QUANTITY
CULVERT REMOVAL, SMALLER THAN 36-INCH	STA 30+55 TO 30+95 STA 40+84 TO 41+78 STA 43+06 TO 43+68	196 LF
OPEN DRAIN CLEANOUT	STA 29+00 TO 40+84 STA 41+80 TO 43+06 STA 43+70 TO 57+00	2640 LF
60-INCH BY 38-INCH HE RCP CL IV CULVERT	STA 40+84 TO 41+80 STA 43+06 TO 43+70	160 LF
60-INCH BY 38-INCH HE RCP CL IV END SECTIONS	STA 40+84 STA 41+80 STA 43+06 STA 43+70	4 EA
PLAIN RIPRAP ON GEOTEXTILE FABRIC	STA 30+55 STA 30+85 STA 40+84 STA 41+80 STA 43+06 STA 43+00 STA 43+70 STA 44+25	125 SYD
STREAM RESTORATION DETAIL—RIFLE ZONE	STA 49+00	1 EA
STREAM RESTORATION DETAIL—ROCK CLUSTER	STA 30+00 STA 32+00 STA 42+50 STA 54+00	4 EA

- GENERAL NOTES:
- ALL TREES MUST BE MARKED BY ENGINEER PRIOR TO REMOVAL.
 - FOR ACCESS CLEARING, ALL TREES REMOVED MUST BE CHIPPED OR HAVE LOGS STACKED WITHIN THE EASEMENT LIMITS. ALL OTHER WOODY MATERIAL MUST BE TRIPPED, BURIED-ON-SITE OR REMOVED FROM SITE. ALL TREES REMOVED FROM DITCH BOTTOM OR SIDE MUST BE CUT FLUSH.
 - SPOILS TO BE PLACED AND LEVELED ALONG THE WORKING SIDE OF THE DRAIN, SO AS NOT TO AFFECT THE EXISTING DRAINAGE PATTERNS.
 - LEVEL MULCH AND SEED SPOILS WITH OPEN CHANNEL SEED MIX. SPOILS SHALL NOT BE GREATER THAN 8-INCHES IN HEIGHT IN ANY GIVEN AREA.
 - PROPERTY OWNERS MUST BE NOTIFIED 7 DAYS PRIOR TO ANY ACCESS AND TREE REMOVALS ON THEIR PROPERTY.
 - SITE ACCESS IS RESTRICTED TO EXISTING DRAIN EASEMENTS, TEMPORARY ACCESS EASEMENTS, AND PUBLIC RIGHTS OF WAY SHOWN ON DRAWINGS. ALL OTHER ACCESS TO SITE SHALL BE APPROVED BY THE OWNER.
 - TEMPORARY SESC MEASURES MUST BE IN PLACE AT 500 FOOT INCREMENTS TO CONTROL SEDIMENT TRANSPORT.

SOIL TYPES AND ABBREVIATIONS	
CovabB	Covert—Pipestone sands, 0 to 6 percent slopes
Ga	Granby loamy sand
KaB	Kalkaska—Wallace sands, 2 to 6 percent slopes
PifabB	Plainfield sand, lake plain, 0 to 6 percent slopes
PifabD	Plainfield sand, lake plain, 6 to 18 percent slopes
Ra	Roscommon and Au Gres Sands
Tc	Tawas and Carlisle mucks

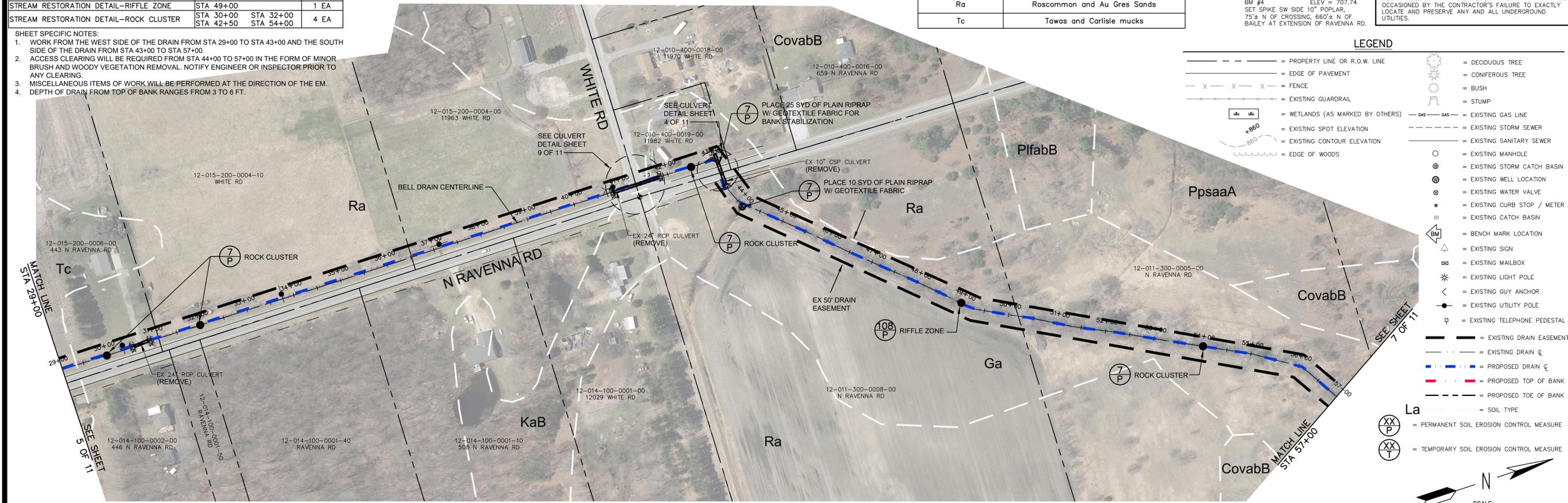


BM #3 ELEV = 707.92
NE CORNER OF CONCRETE PARKING,
250'± S OF BAILEY €, 860'± W OF
N ADAMS RD €.

BM #4 ELEV = 707.74
SET SPIKE SW SIDE 10" POPLAR,
75'± N OF CROSSING, 660'± N OF
BAILEY AT EXTENSION OF RAVENNA RD.

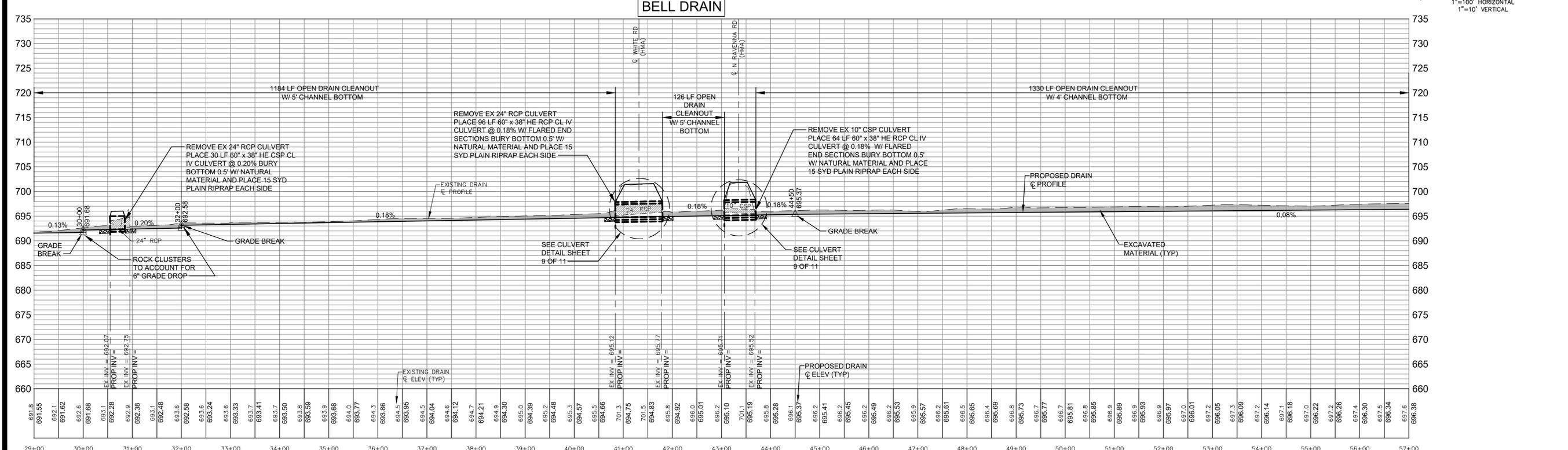
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- SHEET SPECIFIC NOTES:
- WORK FROM THE WEST SIDE OF THE DRAIN FROM STA 29+00 TO STA 43+00 AND THE SOUTH SIDE OF THE DRAIN FROM STA 43+00 TO STA 57+00.
 - ACCESS CLEARING WILL BE REQUIRED FROM STA 44+00 TO 57+00 IN THE FORM OF MINOR BRUSH AND WOODY VEGETATION REMOVAL. NOTIFY ENGINEER OR INSPECTOR PRIOR TO ANY CLEARING.
 - MISCELLANEOUS ITEMS OF WORK WILL BE PERFORMED AT THE DIRECTION OF THE EM.
 - DEPTH OF DRAIN FROM TOP OF BANK RANGES FROM 3 TO 6 FT.



LEGEND

- — — — — = PROPERTY LINE OR R.O.W. LINE
- — — — — = EDGE OF PAVEMENT
- X X X X X = FENCE
- — — — — = EXISTING GUARDRAIL
- — — — — = EXISTING SPOT ELEVATION
- — — — — = EXISTING CONTOUR ELEVATION
- — — — — = EDGE OF WOODS
- = DECIDUOUS TREE
- = CONIFEROUS TREE
- = BUSH
- = STUMP
- — — — — = GAS
- — — — — = EXISTING GAS LINE
- — — — — = EXISTING STORM SEWER
- — — — — = EXISTING SANITARY SEWER
- = EXISTING MANHOLE
- = EXISTING STORM CATCH BASIN
- = EXISTING WELL LOCATION
- = EXISTING WATER VALVE
- = EXISTING CURB STOP / METER
- = EXISTING CATCH BASIN
- BM = BENCH MARK LOCATION
- △ = EXISTING SIGN
- = EXISTING MAILBOX
- = EXISTING LIGHT POLE
- = EXISTING GUY ANCHOR
- = EXISTING UTILITY POLE
- = EXISTING TELEPHONE PEDESTAL
- — — — — = EXISTING DRAIN EASEMENT
- — — — — = EXISTING DRAIN €
- — — — — = PROPOSED DRAIN €
- — — — — = PROPOSED TOP OF BANK
- — — — — = PROPOSED TOE OF BANK
- — — — — = SOIL TYPE
- XX P = PERMANENT SOIL EROSION CONTROL MEASURE
- XX T = TEMPORARY SOIL EROSION CONTROL MEASURE



**PLAN AND PROFILE BELL DRAIN
STA 29+00 TO STA 57+00**

REVISIONS

NO.	DATE	BY	DATE	BY

4063 Grand Oak Drive Suite A109
Lansing, MI 48911
517.887.1100

16930 Robbins Road Suite 105
Grand Haven, MI 49417
616.743.7070

Eng
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BRENDA M. MOORE
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STEPHANIE BARRETT, DEPUTY DRAIN COMMISSIONER

BLACK CREEK CONSOLIDATED DRAIN DRAINAGE DISTRICT
PART OF EGELSTON, MOORLAND, RAVENNA & CASNOVIA TOWNSHIPS
MUSKEGON COUNTY, MICHIGAN

PROJECT NO.
16041

SHEET NO.
DIVISION 7
6 OF 11

WORK ITEM	LOCATION	QUANTITY
CULVERT REMOVAL, SMALLER THAN 36-INCH	STA 72+00 TO 72+08 STA 77+83 TO 78+02 STA 72+20 TO 72+83	27 LF
OPEN DRAIN CLEANOUT	STA 72+20 TO 72+83	2063 LF
OPEN DRAIN CONSTRUCTION	STA 79+03 TO 85+00	697 LF
48-INCH CSP CULVERT	STA 72+00 TO 72+20	20 LF
48-INCH DIA FLARED END SECTION	STA 72+00 STA 72+20	2 EA
PLAIN RIPRAP ON GEOTEXTILE FABRIC	STA 58+75 STA 66+10 TO 66+60 STA 72+00 STA 72+20 STA 73+00 TO 73+50	135 SYD
STREAM RESTORATION DETAIL—ROCK CLUSTER	STA 59+60 STA 68+00 STA 72+80 STA 83+00	4 EA
STREAM RESTORATION DETAIL—RIFLE ZONE	STA 77+50	1 EA

LEGEND

--- --	= PROPERTY LINE OR R.O.W. LINE	--- GAS --- GAS ---	= EXISTING GAS LINE	⊗	= EXISTING MAILBOX	⊗	= PERMANENT SOIL EROSION CONTROL MEASURE OR RESTORATION DETAIL
---	= EDGE OF PAVEMENT	---	= EXISTING STORM SEWER	*	= EXISTING LIGHT POLE	⊗	= TEMPORARY SOIL EROSION CONTROL MEASURE
- X - X - X -	= FENCE	---	= EXISTING SANITARY SEWER	<	= EXISTING GUY ANCHOR	⊗	
---	= EXISTING GUARDRAIL	○	= EXISTING MANHOLE	●	= EXISTING UTILITY POLE		
WETLANDS (AS MARKED BY OTHERS)		⊙	= EXISTING STORM CATCH BASIN	⊕	= EXISTING TELEPHONE PEDESTAL		
⊕	= EXISTING SPOT ELEVATION	⊕	= EXISTING WELL LOCATION	---	= EXISTING DRAIN EASEMENT		
⊕	= EXISTING CONTOUR ELEVATION	⊕	= EXISTING WATER VALVE	---	= EXISTING DRAIN Ⓢ		
---	= EDGE OF WOODS	●	= EXISTING CURB STOP / METER	---	= EXISTING DRAIN Ⓢ		
⊕	= DECIDUOUS TREE	⊕	= EXISTING CATCH BASIN	---	= PROPOSED TOP OF BANK		
⊕	= CONIFEROUS TREE	⊕	= BENCH MARK LOCATION	---	= PROPOSED TOE OF BANK		
⊕	= BUSH	⊕	= EXISTING SIGN	---	= SOIL TYPE		
⊕	= STUMP						



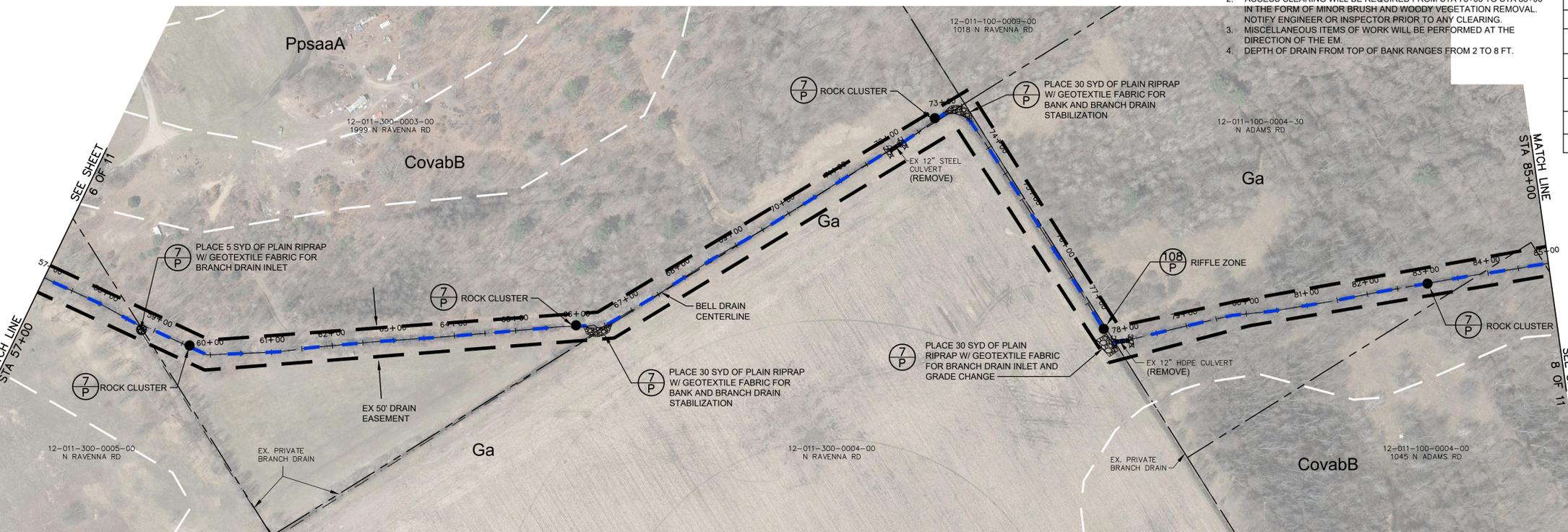
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SET SPIKE SW SIDE 10' POPLAR,
75'± N OF CROSSING, 660'± N OF
BAILEY AT EXTENSION OF RAVENNA RD.

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

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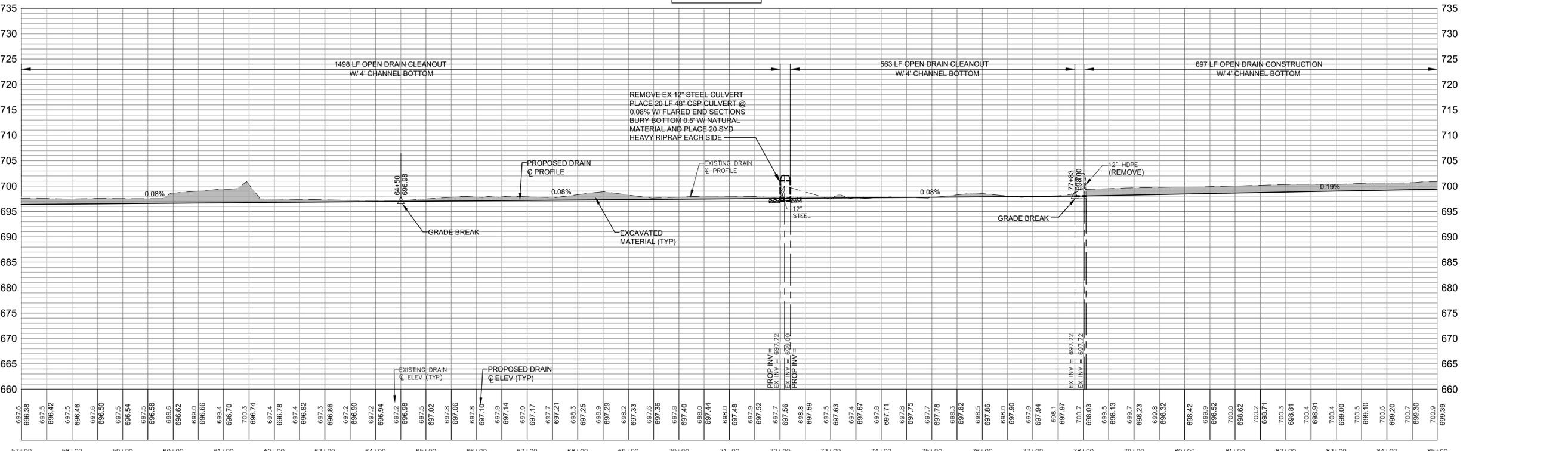
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		GTO	
	02/21/17		



SOIL TYPES AND ABBREVIATIONS	
CovabB	Covert-Pipestone sands, 0 to 6 percent slopes
Ga	Granby loamy sand
PifabB	Plainfield sand, lake plain, 0 to 6 percent slopes
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Sa	Saranac loam

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BELL DRAIN



**PLAN AND PROFILE BELL DRAIN
STA 57+00 TO STA 85+00**

BRENDA M. MOORE
MUSKEGON COUNTY DRAIN COMMISSIONER
STEPHANIE BARRETT, DEPUTY DRAIN COMMISSIONER
BLACK CREEK CONSOLIDATED DRAIN DRAINAGE DISTRICT
PART OF EGELSTON, MOORLAND, RAVENNA & CASNOVIA TOWNSHIPS
MUSKEGON COUNTY, MICHIGAN

PROJECT NO.
16041

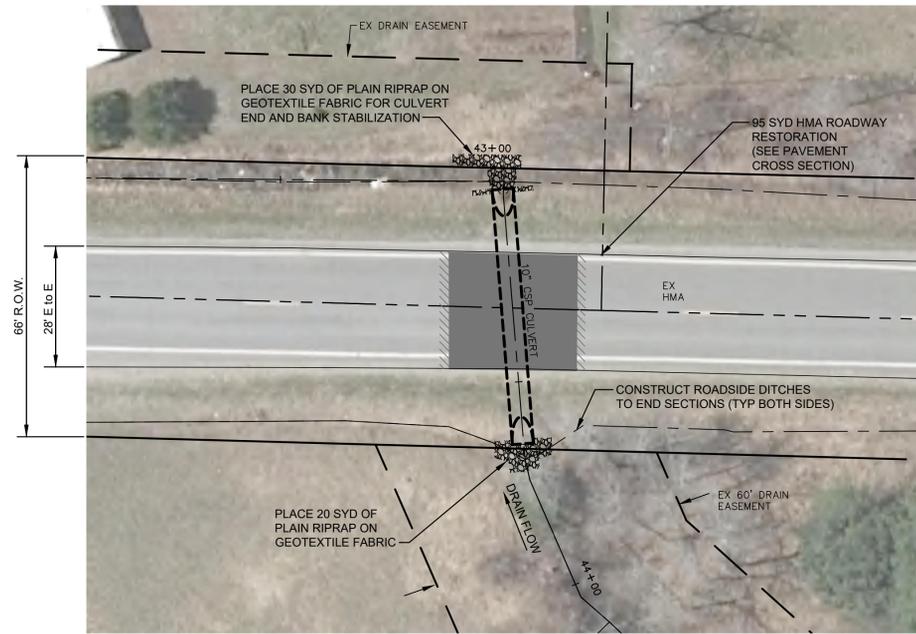
SHEET NO.
DIVISION 7
7 OF 11

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Lansing, MI 48911
577.887.1100

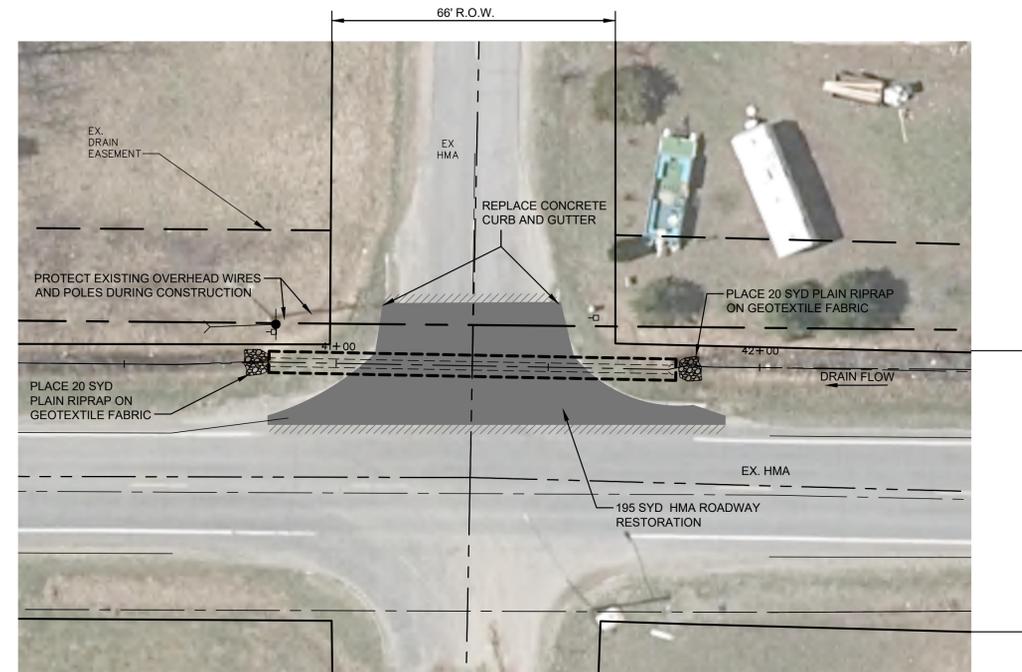
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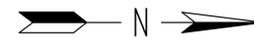
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BELL DRAIN (FMRLY)
N RAVENNA RD CROSSING



BELL DRAIN (FMRLY)
WHITE RD CROSSING

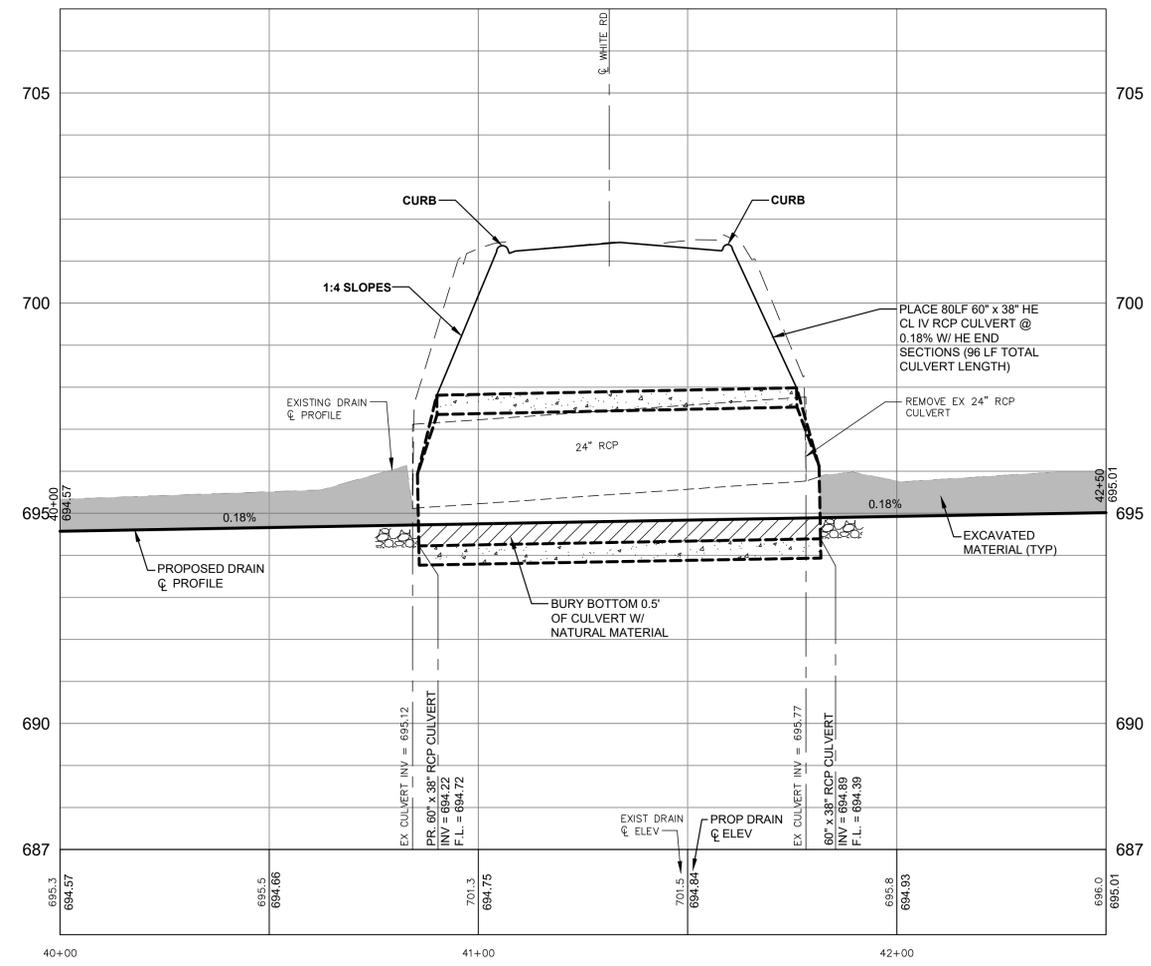
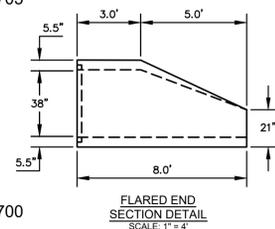
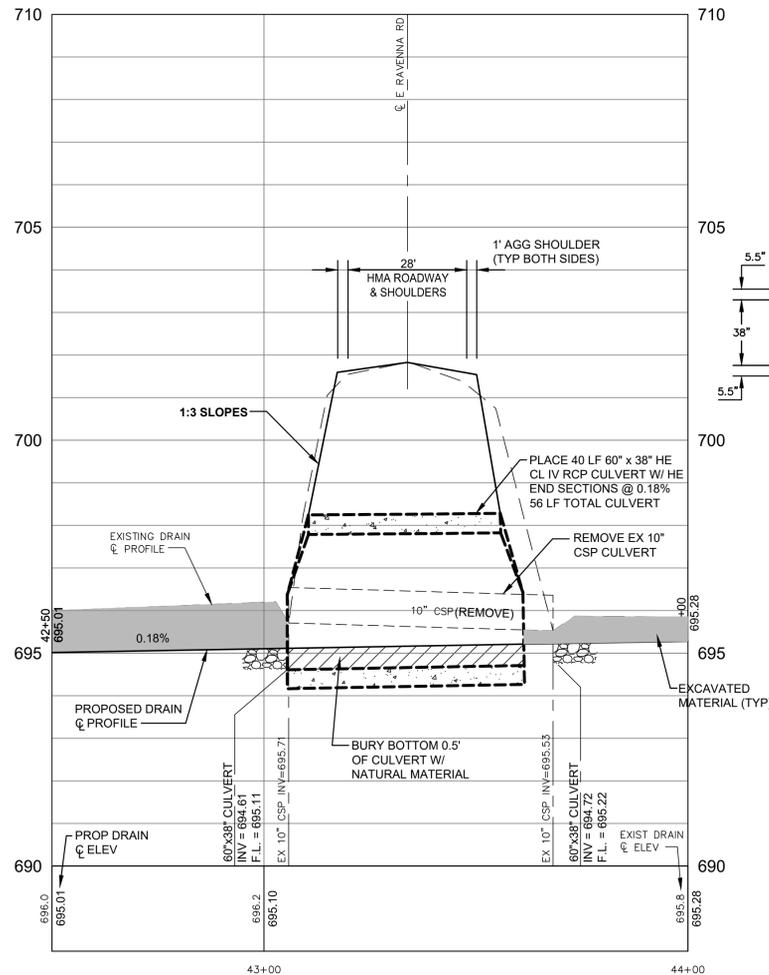


SCALE
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 2'

DIVISION 7

GENERAL NOTES:

1. DURING WORK ON ALL CULVERT REPLACEMENTS AND UNTIL THE SITE IS STABILIZED, BYPASS PUMPING OF STREAM WILL BE REQUIRED IN ACCORDANCE WITH MICHIGAN EGLE PERMIT. THE CONTRACTOR SHALL PROVIDE A DEWATERING AND BYPASS PUMPING PLAN TO THE ENGINEER FOR REVIEW 2 WEEKS PRIOR TO COMMENCEMENT OF SUCH WORK.
2. EXISTING UTILITIES SHALL BE LOCATED PRIOR TO CONSTRUCTION AND PROTECTED DURING CONSTRUCTION.
3. ALL TREE REMOVAL, EXCAVATION, SPOIL REMOVAL AND DISPOSAL, DEWATERING AND PUMPING, BACKFILLING, GRADING, AND RESTORATIONS ARE INCLUDED WITH THE CULVERT.



ROADWAY CROSSING DETAIL

NO.	REVISIONS	DATE	BY	DATE	BY

4063 Grand Oak Drive Suite A109
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517.867.1100

16930 Robbins Road Suite 105
Grand Haven, MI 49417
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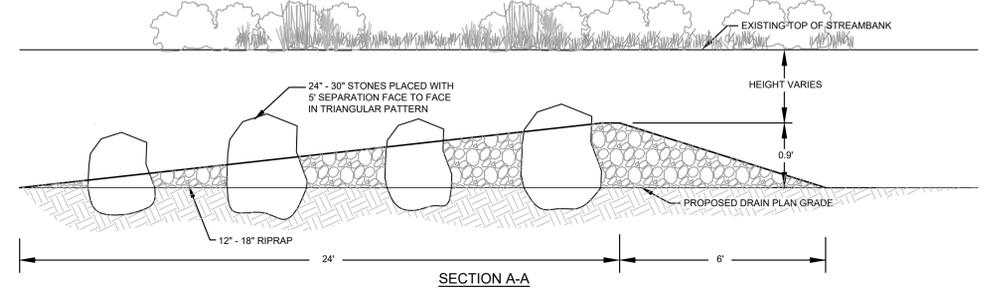
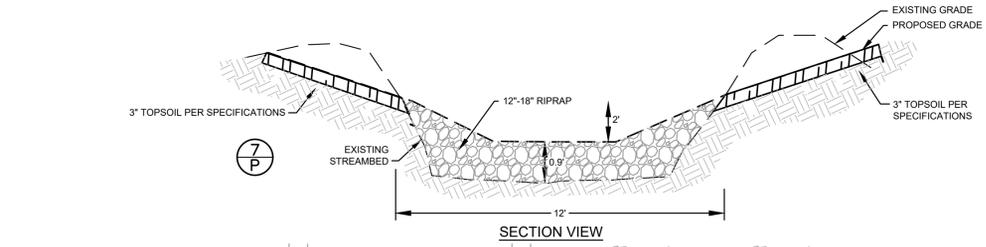
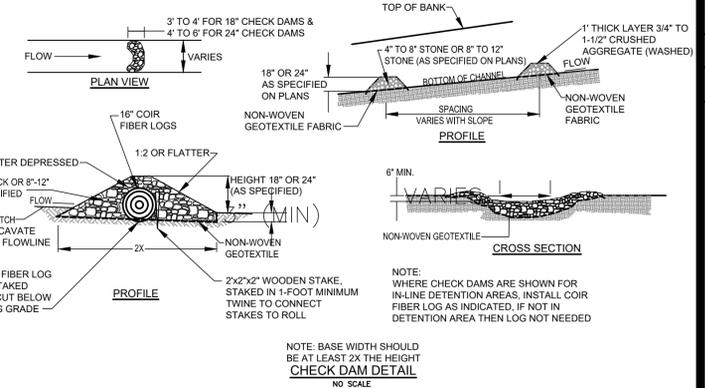
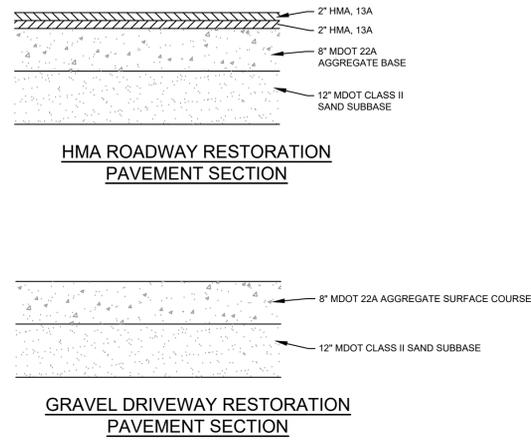
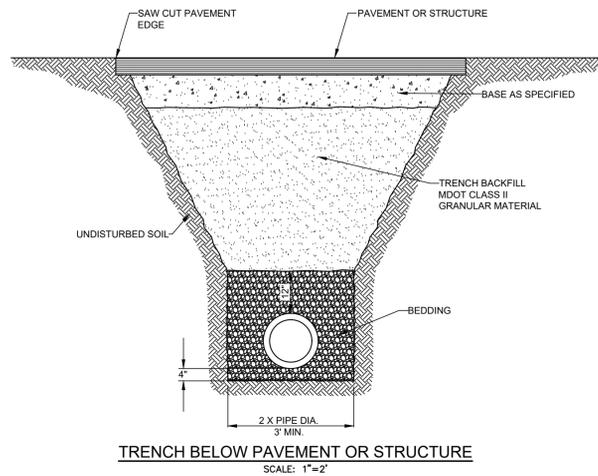


BRENDA M. MOORE
MUSKEGON COUNTY DRAIN COMMISSIONER

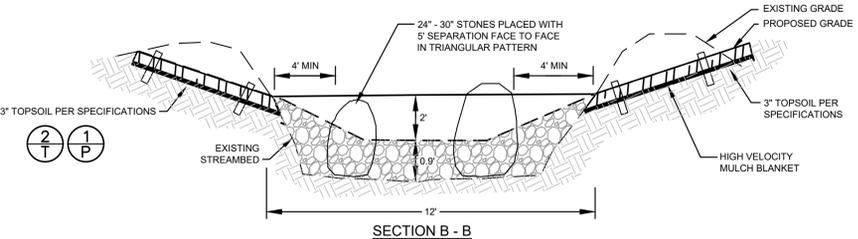
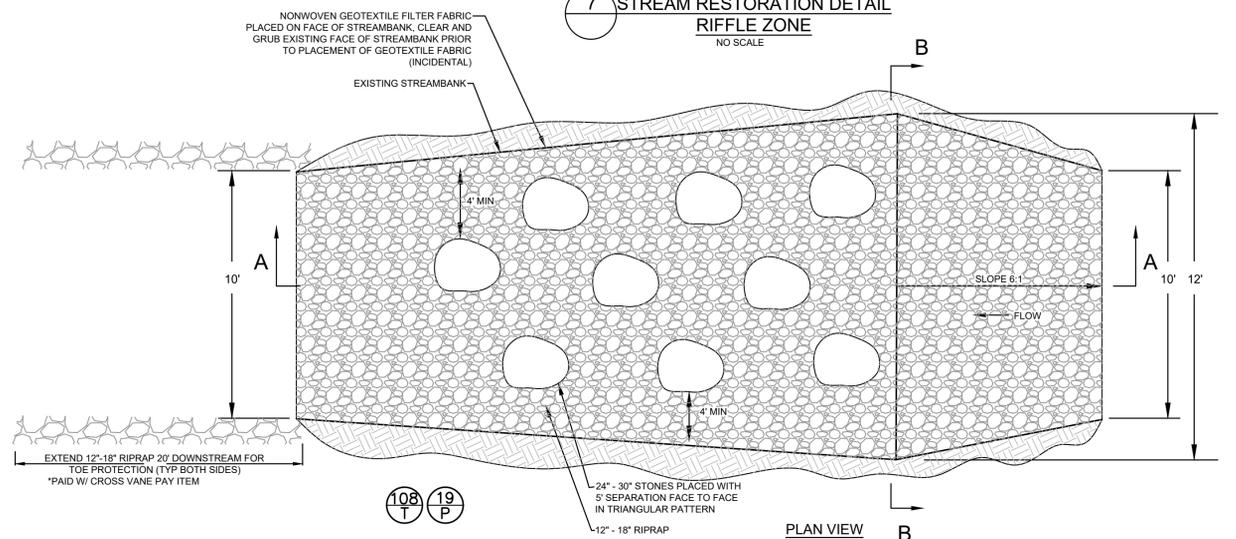
BLACK CREEK CONSOLIDATED DRAIN
PART OF EGELSTON, MOORLAND, RAVENNA & CASNOVIA TOWNSHIPS
MUSKEGON COUNTY, MICHIGAN

PROJECT NO.
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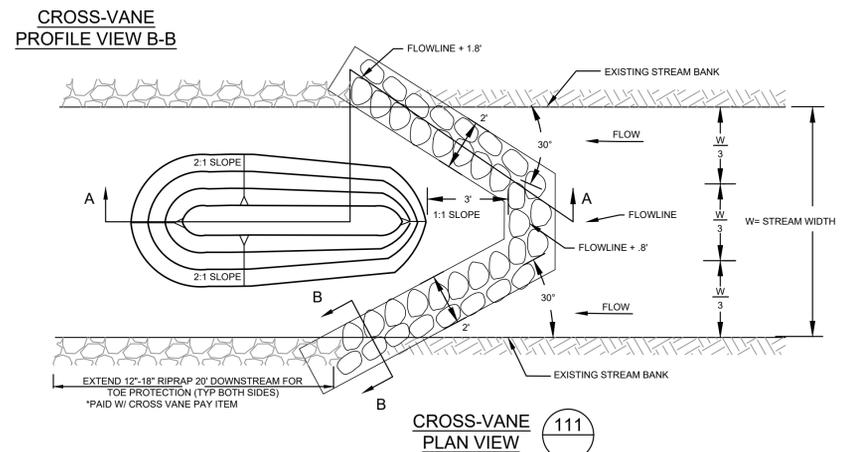
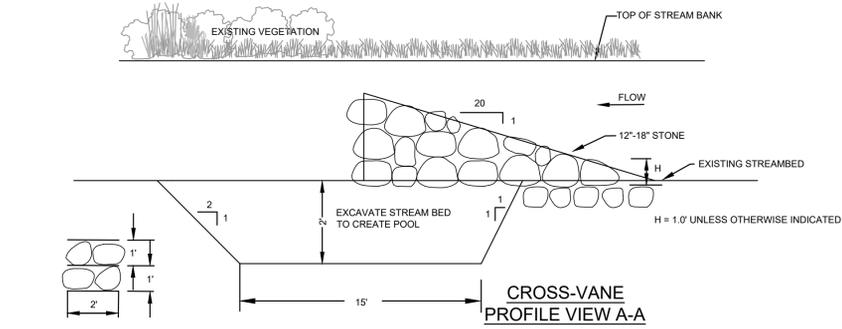
SHEET NO.
DIVISION 7
9 OF 11



7 STREAM RESTORATION DETAIL RIFFLE ZONE
NO SCALE



108 STREAM RESTORATION DETAIL ROCK CLUSTER
NO SCALE



NO.	REVISIONS	DATE	BY	DATE	BY

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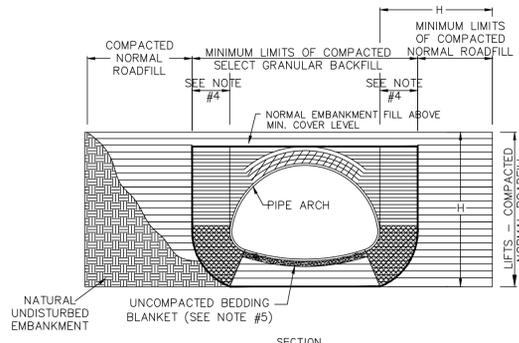
BLACK CREEK CONSOLIDATED DRAIN DRAINAGE DISTRICT
PART OF EGGLESTON, MOORLAND, RAVENNA & CASNOVIA TOWNSHIPS
MUSKEGON COUNTY, MICHIGAN

PROJECT NO.
16041

SHEET NO.
DIVISION 7
10 OF 11

DETAILS

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- CRITICAL BACKFILL ZONE, PRESSURE ON SOIL GREATEST HERE.
- INITIAL LIFTS OVER CROWN OF STRUCTURE AS INDICATED BY SHADED AREA TO BE COMPACTED TO REQUIRED DENSITY WITH HAND OPERATED EQUIPMENT OR WITH SMALL TRACTOR (D-4 OR SMALLER) DRAWN EQUIPMENT.
- SELECT GRANULAR STRUCTURAL BACKFILL LIMITS.

- NOTES:**
- ALL SELECT GRANULAR BACKFILL TO BE PLACED IN A BALANCED FASHION IN THIN LIFTS (6"-8" LOOSE TYPICALLY) AND COMPACTED TO 90 PERCENT DENSITY PER AASHTO T-180.
 - COMPLETE AND REGULAR MONITORING OF THE CSP ARCH SHAPE IS NECESSARY DURING ALL BACKFILLING OF THE STRUCTURE.
 - PREVENT EXCESSIVE DISTORTION OF SHAPE AS NECESSARY BY VARYING COMPACTION METHODS AND EQUIPMENT.
 - THIS WIDTH SHOULD BE EQUAL TO 1/2 SPAN TO ONE SPAN WIDTH TYPICALLY. GREATER OR LESSER DISTANCE MAY BE REQUIRED. DISTANCE DEPENDS ON BEARING LOAD FOR ANY GIVEN LOADING, STRUCTURE SHAPE AND BACKFILL MATERIAL. THIS MUST BE EVALUATED BY THE PROJECT ENGINEER FOR EACH SPECIFIC SITUATION.
 - SHAPED BED FOR A MINIMUM WIDTH OF SPAN/2. MINIMUM BEDDING THICKNESS IS TWICE THE CORRUGATION DEPTH.
 - EMBANKMENT WIDTH H TO BE SUCH THAT A STABLE EMBANKMENT CAPABLE OF RESISTING SIDE PRESSURES FROM CSP PIPE-ARCH SHAPE WILL BE MAINTAINED THROUGHOUT THE LIFE OF INSTALLATION. THIS WIDTH TO BE DETERMINED BY THE PROJECT ENGINEER.

CONTECH
CONSTRUCTION PRODUCTS INC.
CORRUGATED METAL PIPE-ARCH
TYPICAL BACKFILL SECTION

DRAWN BY: CMD REV. BY: XX SCALE: N/A
DATE: 4/20/04 DATE: XX

APPROXIMATE CONSTRUCTION SCHEDULE FOR SESC MEASURES

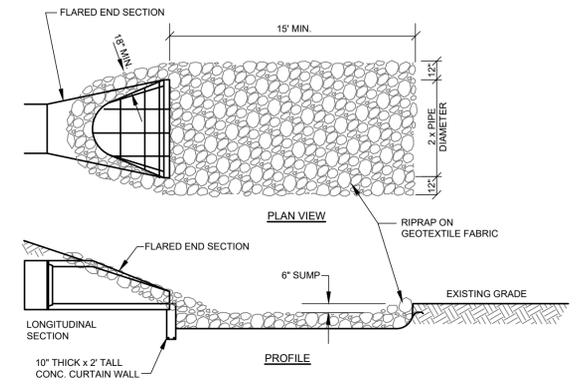
SESC - CONSTRUCTION SEQUENCE	JULY 2021	AUG 2021	SEPT 2021	OCT 2021	NOV 2021
INSTALL TEMPORARY SESC MEASURES:					
A. STABILIZED CONSTRUCTION ACCESSES	■				
B. CONSTRUCTION/TREE PROTECTION FENCE	■				
C. CATCH BASIN PROTECTION	■				
D. STORM DRAIN INLET PROTECTION	■				
E. SEEDING		■	■	■	■
MAINTAIN TEMPORARY SESC MEASURES		■	■	■	■
SITE GRADING		■	■	■	■
OPEN DRAIN CONSTRUCTION		■	■	■	■
CULVERT CONSTRUCTION		■	■	■	■
PAVEMENT CONSTRUCTION				■	■
FINAL GRADE				■	■
FINAL SITE STABILIZATION (TO BE COMPLETED WITHIN 24 HOURS OF FINAL GRADING OR ACTIVITY WITHIN THAT AREA)				■	■
REMOVE TEMPORARY SESC MEASURES					■
PERMANENT SESC MEASURES					■

#P = PERMANENT MEASURE #T = TEMPORARY MEASURE

DETAILED DRAWINGS AND SPECIFICATIONS ARE LOCATED IN THE MICHIGAN ASSOCIATION OF COUNTY DRAIN COMMISSIONERS SOIL EROSION AND SEDIMENTATION CONTROL AUTHORIZED PUBLIC AGENCY PROCEDURES MANUAL

SYMBOLGY FOR INSERTION INTO CONSTRUCTION DRAWINGS:

#P = PERMANENT MEASURE
#T = TEMPORARY MEASURE



FLARED END SECTION DETAIL
NO SCALE

PRECAST CONCRETE BOX CULVERT JOINT DETAIL

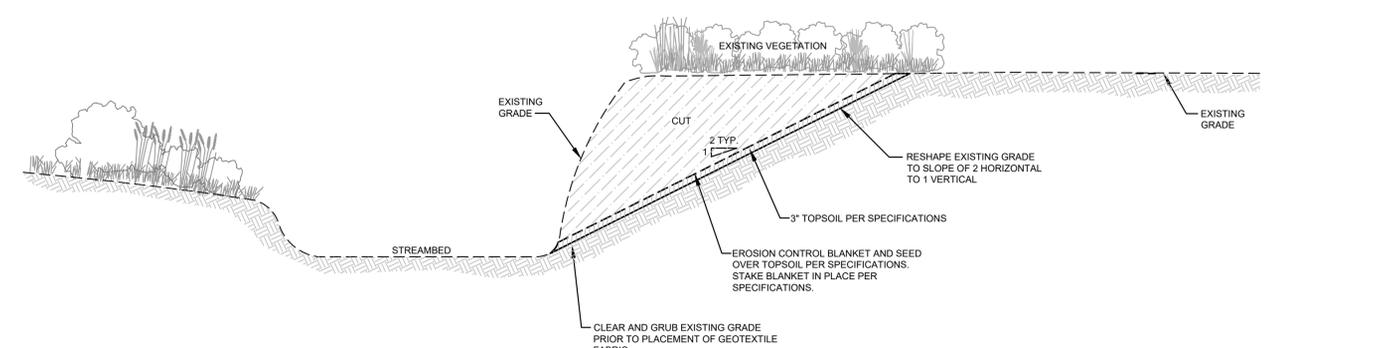
NO SCALE

SESC Notes

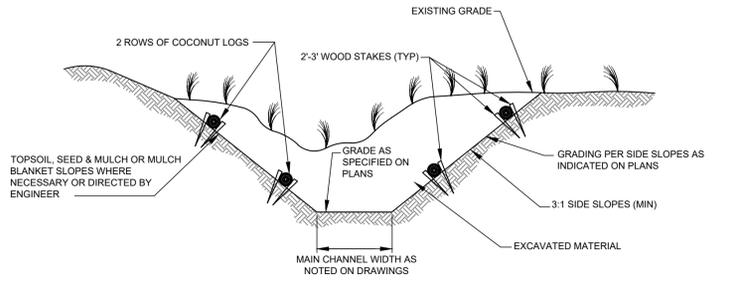
- General Maintenance**
- Temporary SESC measures to be maintained by the contractor at all times.
 - Silt fence**
 - Silt fence is to be trenched in no less than 6 inches below the ground surface
 - Inspect silt fence immediately following each rainfall
 - Repair when silt fence is sagging or has been removed/torn down
 - When silt collects to half the height of the fence all silt is to be removed and fence repaired
 - Remove silt fence when permanent SESC measures are in place and vegetation is established
 - Seeding and Mulching**
 - Seeding practices include topsoil (as required), and mulch or mulch blanket (as directed by Engineer or required on plans).
 - Where necessary, appropriate mulch blanket must be applied based on slope and growing conditions as approved by the engineer.
 - All slopes and highly erosive areas will be temporarily seeded and mulched when construction activity is not taking place
 - Seed and mulch is to be inspected following each rain event to determine if concentrated flows are present
 - In the event that seed and mulch are removed by erosive runoff, repairs are to be made immediately.
 - Site will be permanently stabilized within 5 days of final grade
 - Storm drain inlet protection**
 - Storm drain inlets to be inspected weekly and after each rain event.
 - Empty sediment and keep inlet protection clean during inspection and maintenance operations.
- Compliance with Part 91 of PA 451**
- Stormwater operator/PA owner or maintenance supervisor will inspect monthly through the first growing season. Non established vegetation will be repaired/reseeded as necessary

CONSTRUCTION & SOIL EROSION AND SEDIMENTATION CONTROL NOTES:

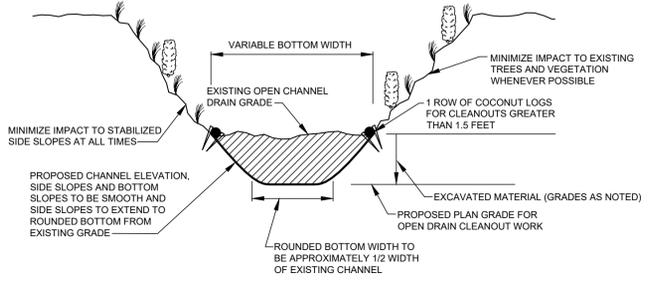
- ALL TEMPORARY SOIL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE IN PLACE BEFORE CONSTRUCTION BEGINS. THE CONTRACTOR IS RESPONSIBLE FOR INSPECTING ALL MEASURES AT LEAST ONCE EACH WEEK AND/OR WITHIN 24 HOURS OF A PRECIPITATION EVENT THAT RESULTS IN STORM WATER RUNOFF OR DISCHARGE.
- SURFACE RESTORATION OF ALL SEWER TRENCHES IN LAWN AREAS SHALL BE TOP SOILED, SEEDED, AND MULCHED WITHIN 5 CALENDAR DAYS OF BACKFILLING THE TRENCH.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR DUST CONTROL AND SHALL PROVIDE ALL EQUIPMENT AND MATERIAL NECESSARY TO KEEP DUST IN CHECK AT ALL TIMES. THE CONTRACTOR SHALL RESPOND IMMEDIATELY TO ANY AND ALL COMPLAINTS. STREETS, PARKING LOTS, DRIVEWAYS, PAVED ACCESS ROADS, AND ALL OTHER PAVED SURFACES SHALL BE SWEEPED AT LEAST ONCE A DAY AND/OR AS NEEDED THROUGHOUT THE DAY.
- MULCH AND/OR MULCH BLANKET SHALL BE APPLIED AND ANCHORED APPROPRIATELY ON ALL SLOPES 3:1 OR GREATER ON ALL SLOPES DEEMED NECESSARY TO PREVENT OR CORRECT EROSION PROBLEMS AND ON ALL DISTURBED AREA DUE TO CONSTRUCTION.
- ALL TEMPORARY SOIL EROSION MEASURES SHALL BE REMOVED AFTER PERMANENT MEASURES HAVE BEEN ESTABLISHED.
- ALL CONSTRUCTION SHALL BE CONFINED TO AREAS OF DISTURBANCE WITHIN THE ROAD RIGHT OF WAY AND/OR WITHIN STORM SEWER EASEMENTS. NO WORK, MATERIAL, OR STOCKPILES WILL BE ALLOWED OUTSIDE OF THESE LIMITS.
- ALL TRENCHES SHALL BE BACKFILLED TO GRADE OR PROPERLY PROTECTED IN ACCORDANCE WITH PROJECT PLANS & SPECIFICATIONS AT THE END OF EVERY DAY. AT NO TIME SHALL A TRENCH BE LEFT OPEN FOR A PERIOD LONGER THAN 48 HOURS.
- UNLESS SPECIFICALLY NOTED OTHERWISE, ALL UTILITY TRENCHES SHALL CONFORM TO TYPICAL TRENCH DETAIL. SEE SHEET 10 OF 10.
- PROTECT ALL TREES AND VEGETATION NOT SCHEDULED TO BE REMOVED. ENGINEER APPROVAL IS REQUIRED FOR ANY UNSCHEDULED REMOVAL OF TREES, SHRUBS OR LANDSCAPING.
- EROSION AND SEDIMENTATION FROM WORK ON THIS PROJECT SHALL BE CONTAINED WITHIN THE WORK AREA AND NOT ALLOWED TO COLLECT ON OFF-SITE AREAS OR IN WATERWAYS - WATERWAYS INCLUDE BOTH NATURAL AND MAN-MADE OPEN DITCHES, STREAMS, STORM DRAINS, LAKES AND PONDS.
- SILT FENCE MAINTENANCE SHALL INCLUDE THE REMOVAL OF ANY BUILT-UP SEDIMENT. CONTRACTORS SHALL BE RESPONSIBLE TO REMOVE, REPLACE, RETRENCH OR REBACKFILL THE SILT FENCE SHOULD IT FAIL OR BECOME DAMAGED DURING THE CONSTRUCTION.
- INLET FILTER MAINTENANCE SHALL INCLUDE THE REMOVAL OF ANY ACCUMULATED SILT OR OTHER DEBRIS. IF INLET FILTERS CANNOT BE CLEANED, OR ARE DAMAGED, THEN THE FILTER AND/OR STONE SHALL BE REPLACED.



85 STREAM RESTORATION DETAIL
STREAMBANK TAPERING AND STABILIZATION
NO SCALE



OPEN DRAIN CONSTRUCTION DETAIL
NO SCALE



OPEN DRAIN CLEANOUT DETAIL
NO SCALE

EROSION CONTROL MEASURES

1	SEEDING		When bare soil is exposed, temporarily or permanently, to erosive forces from wind and/or water on flat areas, mild slopes, grassed waterways and spillways, diversion ditches and dikes, borrow and stockpile areas, and spoil piles.
2	MULCH		On flat areas, mild slopes, grassed waterways and spillways, diversion ditches and dikes, borrow and stockpile areas, and spoil piles when areas are subject to raindrop impact, and erosive forces from wind or water.
7	RIPRAP		Along drain banks, shorelines, or where concentrated flows occur. Slows velocity, reduces erosion and sediment load.
9	OUTFALL STABILIZATION		In the stream or drain bank usually above the ordinary high water mark where an enclosed drain or tile discharges to an open drain.
26	DUST CONTROL		As a temporary measure on exposed and unstabilized areas that must be protected from wind or water erosion.
28	WATTLES		Where a slope or streambank requires stabilization and minimal disturbance is preferred or the site has limited access.
40	CHECK DAM		In constructed and existing flow corridors to reduce flow velocities.

CONSTRUCTION & RESTORATION ACTIVITY DETAILS

108	Rifle Zones	
111	Cross-Vanes	
66	STABILIZED CONSTRUCTION ACCESS	

DETAILS

Drawn By: JAJ Date: 6/24/20
BY: JAJ Date: 6/24/20
Approved By: Date: 6/24/20

REVISIONS

NO. DATE DESCRIPTION

4063 Grand Oak Drive Suite A109 Lansing, MI 48911 517.867.1100
16930 Robbins Road Suite 105 Grand Haven, MI 49417 616.743.7070 engdol.com

Eng
Engineering & Surveying

BRENDA M. MOORE
MUSKEGON COUNTY DRAIN COMMISSIONER
STEPHANIE BARRETT, DEPUTY DRAIN COMMISSIONER
BLACK CREEK CONSOLIDATED DRAIN DRAINAGE DISTRICT
PART OF EGGLESTON, MOORLAND, RAVENNA & CASNOVIA TOWNSHIPS
MUSKEGON COUNTY, MICHIGAN

PROJECT NO.
16041

SHEET NO.
DIVISION 7
11 OF 11