THE IMPROVEMENTS COVERED BY THESE PLANS SHALL BE DONE IN ACCORDANCE WITH THE MICHIGAN DEPARTMENT OF TRANSPORTATION 2012 STANDARD SPECIFICATIONS FOR CONSTRUCTION.

PHYSICAL ROAD NUMBER (PR#) & MILEPOST (MP) DATA ARE FROM MICHIGAN GEOGRAPHIC FRAMEWORK VERSION # 16.

MICHIGAN DEPARTMENT OF TRANSPORTATION

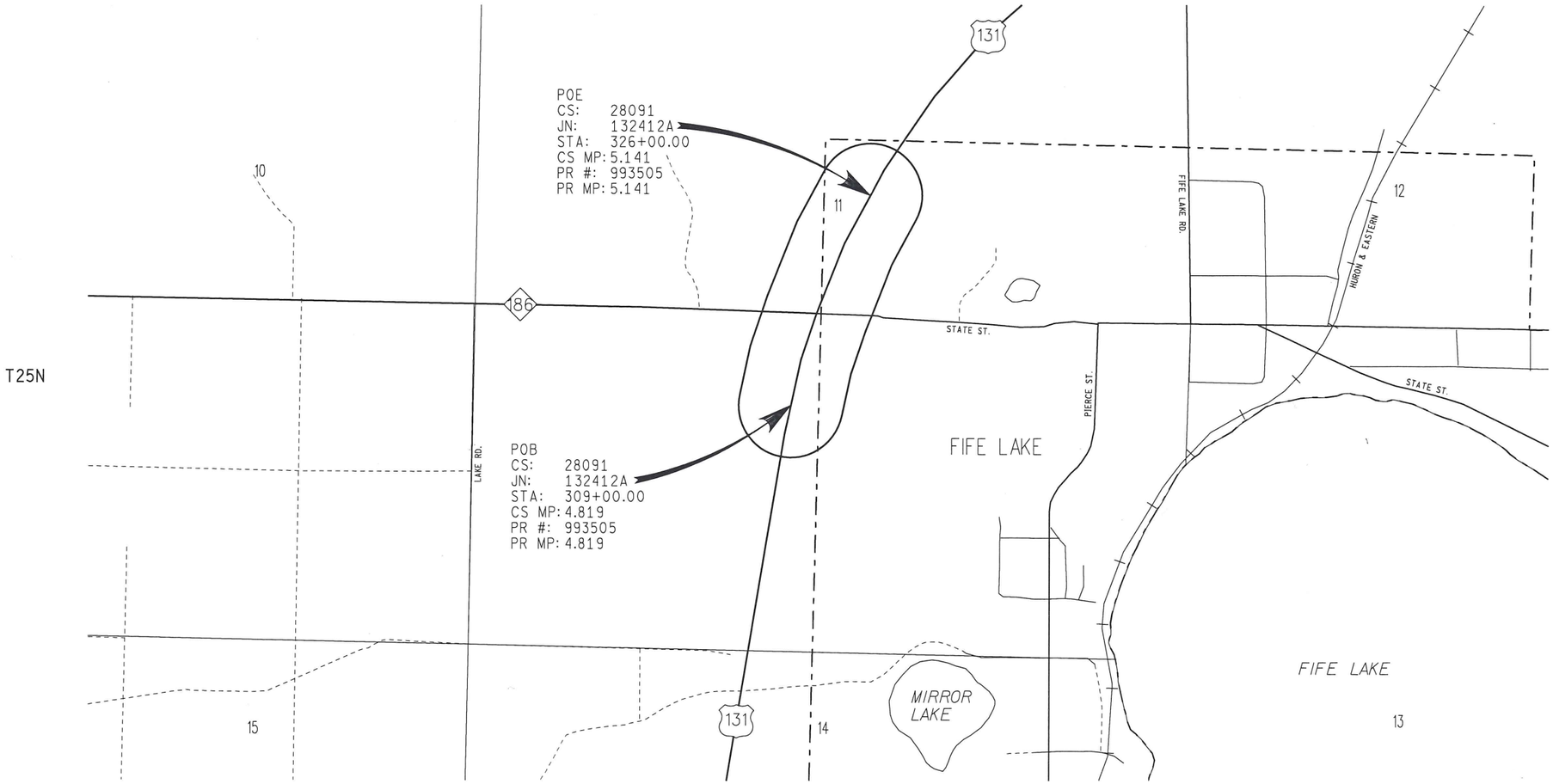
ROUTE: US-131
VILLAGE OF FIFE LAKE
FIFE LAKE TOWNSHIP
GRAND TRAVERSE COUNTY

		TRAFFIC DATA			SPEED DATA		
ROAD	YEAR	ADT	DHV	COMM	DESIGN	POSTED	LIMITS
US-131	2019	5,850	13%	10.5%	60	55	POB TO M-186
	2039	6,750	13%	10.5%	60	55	
US-131	2019	6,650	13%	10%	60	55	M-186 TO POE
	2039	7,750	13%	10%	60	55	
M-186	2019	2,700	12%	6%	60	55	POB TO POE
	2039	3,150	12%	6%	60	55	

SECTION	CONTROL SEC	JOB NO.
1	28091	132412A



COUNTY KEY



N

APPROVALS

RECOMMENDED FOR APPROVAL BY:

9/25/18

DAVID W. McCAW, P.E. - PROJECT MANAGER

09-25-18

DAVID PAX, P.E. - CONSTRUCTION ENGINEER

MICHIGAN DEPARTMENT OF TRANSPORTATION

KIRK T. STEUDLE, P.E. - DIRECTOR

MILES: 0.32

CONTRACT FOR:
ROUNDABOUT CONSTRUCTION

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

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FILE: 132412_us131_title.dgn

DATE: 08/31/18
DESIGN UNIT: TALLON
TSC: TRAVERSE CITY

CS: 28091
JN: 132412A

TITLE SHEET

DRAWING	SHEET
US-131 TITLE 001	SECT 1

PUBLIC UTILITIES

The existing utilities listed below and shown on these plans represent the best information available as obtained on our surveys. This information does not relieve the contractor of the responsibility to be satisfied as to it's accuracy and the location of existing utilities.

Name Of Owner	Type Of Utility
AcenTek Attention: Kelly Stiner 5351 North M-37 PO Box 69 Mesick, Michigan 49668 Phone: (231) 885-3164 Mobile: (616) 499-4818 Email: kstiner@acentek.net	Telecom
AT&T Attention: Kathy Dohm-Beiser 142 East State Street Traverse City, Michigan 49684 Phone: (231) 941-2707 Mobile: (231) 941-3072 Email: kd1484@att.com	Telecom
CenturyLink Attention: Toby Terwillegar 302 John Street Lake City, Michigan 49651 Phone: (231) 839-0505 Mobile: (231) 629-6616 Email: Toby.J.Terwillegar@centurylink.com	Telecom
Charter Communications Attention: James Lucas 1392 Trade Center Drive Traverse City, Michigan 49684 Phone: (231) 941-3727 Mobile: (231) 463-5984 Email: James.Lucas@charter.com	Cable
Cherryland Rural Electric Co-op Attention: Frank Siepker 5930 US-31 South Grawn, Michigan 49637 Phone: (231) 486-9200 Ext. 220 Email: fsiepker@cecelec.com	Electric
Consumers Energy Company Attention: Curtis Hansen 821 Hastings Street Traverse City, Michigan 49686 Phone: (231) 929-6265 Mobile: (231) 499-8201 Email: Curtis.hansen@cmsenergy.com	Electric
DTE Energy Attention: Larry Bourke 609 Bjornson Road Big Rapids, Michigan 49307 Phone: (231) 592-3244 Mobile: (231) 349-2364 Email: Lawrence.bourke@dteenergy.com	Gas
Great Lakes Energy Attention: Mike Chase 1323 Boyne Avenue PO Box 70 Boyne City, Michigan 49712 Phone: (231) 487-1379 Mobile: (231) 519-1020 Email: mchase@glenergy.com	Electric

NOTES APPLYING TO STANDARD PLANS

Where the following items are called for on plans, they are to be constructed according to the standard plan given below opposite each item unless otherwise indicated.

Title	Plan No.
ROAD	
DRAINAGE STRUCTURES	R-1-G *
COVER B	R-7-F
MONUMENT BOXES	R-11-E
COVER J	R-14-D
SIDEWALK RAMP AND DETECTABLE WARNING DETAILS	R-28-J *
DRIVEWAY OPENINGS & APPROACHES AND CONCRETE SIDEWALK	R-29-I
CONCRETE CURB AND CONCRETE CURB & GUTTER	R-30-G
CONCRETE SHOULDER GUTTER AND SPILLWAY	R-35-E *
TRANSVERSE PAVEMENT JOINTS (PLAIN CONCRETE PAVEMENT)	R-39-K
LOAD TRANSFER ASSEMBLIES FOR TRANSVERSE JOINTS	R-40-H
LONGITUDINAL PAVEMENT JOINTS	R-41-H
TYPICAL JOINT LAYOUTS FOR CONCRETE PAVEMENT	R-42-F
LOCATION OF TRANSVERSE JOINTS IN PLAIN CONCRETE PAVEMENT	R-43-I
PAVED AND COBBLE DITCHES, & DRAINAGE TREATMENT DETAILS	R-46-D
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 *
GUARDRAIL APPROACH TERMINAL, TYPE 2M	R-62-H *
BUMPER & PARKING RAILS AND MISC. WOOD POSTS	R-74-D
GRANULAR BLANKET, UNDERDRAINS, OUTLET ENDINGS FOR UNDERDRAINS, AND SEWER BULKHEADS	R-80-E
BEDDING AND FILLING AROUND PIPE CULVERTS	R-82-D
UTILITY TRENCHES	R-83-C
OUTLET HEADWALLS	R-85-D
PRECAST CONCRETE END SECTION FOR PIPE CULVERT	R-86-F *
STEEL END SECTION	R-88-D
SOIL EROSION & SEDIMENTATION CONTROL MEASURES	R-96-E
SEEDING AND TREE PLANTING	R-100-H
WOVEN WIRE FENCE	R-101-B
GRADING CROSS-SECTIONS	R-105-D
SUPERELEVATION AND PAVEMENT CROWNS	R-107-H
PAVEMENT SAFETY EDGE	R-110-A
DELINEATOR INSTALLATIONS	R-127-F
PAVEMENT MARKINGS	
PAVEMENT ARROW AND MESSAGE DETAILS	PAVE-900-F
LONGITUDINAL LINE TYPES AND PLACEMENT	PAVE-905-D
INTERSECTION, STOP BAR AND CROSSWALK MARKINGS	PAVE-945-C
ROUNDABOUT MARKINGS	PAVE-951-B
STATEWIDE TRAFFIC SIGNALS	
SPAN WIRE TS ON STEEL AND WOOD POLES	SIG-010-A *
WOOD POLE GUYS AND SETTING DEPTH	SIG-050-A *
CONTROLLER CABINET MOUNTED ON STEEL OR WOOD POLES	SIG-100-A *
POLE MOUNTED TS CONTROLLER CABINET	SIG-111-A *
SECONDARY SERVICE/DISCONNECT FOR WOOD POLES	SIG-200-A *
COLOR CODE WIRING/EQUIPMENT GROUNDING	SIG-230-A *
HANDHOLE- PRECAST, POLYMER CONCRETE	SIG-240-A *
CONDUIT (DIRECT BURIAL/ENCASED)	SIG-250-A *
SPAN WIRE MOUNTED TS BRACKET ASSEMBLY	SIG-300-A *
BRACKETING FOR 5- SECTION HEADS	SIG-302-A *
SIGN MOUNTED BEACON	SIG-320-A *
VIDEO DETECTION CAMERA	SIG-430-A *
SIGNING	
STANDARD SIGN INSTALLATIONS	SIGN-100-G
STANDARD ROUTE MARKER INSTALLATIONS	SIGN-110-E
SIGN LOCATION CODES PLACEMENT	SIGN-115-C
ROADSIDE SIGN LOCATIONS & SUPPORT SPACING	SIGN-120-E
SIGN SUPPORT SELECTION CHARTS	SIGN-150-D
STEEL POSTS	SIGN-200-D
WOOD POSTS	SIGN-210-B
MISCELLANEOUS SIGN CONNECTION DETAILS	SIGN-740-B
WORK ZONE DEVICES	
GROUND DRIVEN SIGN SUPPORTS FOR TEMP SIGNS	WZD-100-A *
TEMPORARY TRAFFIC CONTROL DEVICES	WZD-125-E *
TEMPORARY SHOULDER DELINEATORS	WZD-126-A *

*** Denotes Special Detail**

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FUNDING CATEGORIES

JN 132412
Category 0001 = Fed / State

ESALs

Total 18 Kip Axle Loadings
Rigid=3,145,060 Flexible=2,201,550

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)								MDOT Michigan Department of Transportation	NO SCALE		DATE: 08/31/18	CS: 28091	PROJECT INFORMATION SHEET	DRAWING	SHEET
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SURVEY

GENERAL

- ALIGNMENT POINT MONUMENT
- MONUMENT BOX

CONTROL

- CP CONTROL POINT
- BM BENCHMARK
- REFERENCE - GPS
- REFERENCE - NGS
- REFERENCE - USGS

BOUNDARY

- CITY LIMIT - MAP
- CITY LIMIT
- PARCEL-L — PARCEL - LEGAL
- PARCEL-NL — PARCEL - NON-LEGAL
- PLAT-L — PLAT - LEGAL
- PLAT-NL — PLAT - NON-LEGAL
- ROW - FREE ACCESS
- ROW - LIMITED ACCESS
- SEC — SECTION LINE
- SEC 1/4 — SECTION LINE - QUARTER
- SEC 1/8 — SECTION LINE - EIGHTH
- SEC 1/16 — SECTION LINE - SIXTEENTH
- TOWNSHIP LINE (MAP)
- CONCRETE MONUMENT
- CONTIGUOUS PROPERTY SYMBOL
- PC PARCEL CORNER - CAPPED IRON
- PARCEL CORNER - IRON PIN
- PARCEL CORNER - IRON PIPE
- PARCEL CORNER - NO ID
- 123456 PARCEL NUMBER BOX
- PLAT CORNER
- PROPERTY OWNERSHIP ARROW
- PROPERTY OWNERSHIP ARROW - DOUBLE
- ROW ROW MONUMENT
- SECTION CORNER - CENTER
- SECTION CORNER - MEANDER
- SECTION CORNER - QUARTER
- SECTION CORNER - QUARTER-HALF
- SECTION CORNER - SECTION
- SECTION CORNER - SECTION-HALF
- SECTION CORNER - SIXTEENTH
- SECTION CORNER - WITNESS

MONUMENT PRESERVATION

- PRESERVE — PRESERVE MONUMENT
- PROTECT — PROTECT MONUMENT

GENERAL LABELING

GENERAL

- LEFT TURN ARROW
- TRAFFIC FLOW ARROW

REMOVAL

- A — ABANDON
- B — BULKHEAD
- C — CLEARING
- R — REMOVE
- SALV — SALVAGE
- S — SAVE

CONSTRUCTION

- ADJ — ADJUST
- ADJ-B — ADJUST - STRUC COVER WITH TYPE
- ADJ-B/O — ADJUST - BY OTHERS

REMOVAL AND CONSTRUCTION

- REL-1 — RELOCATE - WITH CASE NUMBER
- REL-B/O — RELOCATE - BY OTHERS

CONSTRUCTION LIMITS

- SSL SSL — SLOPE STAKE LINE

BORINGS

- BH# — BORING

STRUCTURES

- BEAM UNDERCLEARANCE
- REFERENCE POINT
- S01 OF 12345 — STRUCTURE NO. + CONTROL SEC. LABEL

VEGETATION

- BRUSH LINE
- HEDGE LINE
- TREE LINE - CANOPY OR TRUNK
- TREE LINE - TRUNK (TRUNK LINE)
- SHRUB
- TREE - CONIFER
- TREE - DECIDUOUS
- TREE - STUMP

ENVIRONMENTAL

- 26 — EROSION CONTROL - SILT FENCE
- WETLAND - LEGAL
- WETLAND - NON-LEGAL
- CONTAMINATION - MONITORING WELL
- 12 — EROSION CONTROL NUMBER
- EROSION CONTROL - RIPRAP
- W.T. 12' — WATER TABLE - PLAN NOTE
- WETLAND - SPOT EL
- POTENTIALLY CONTAMINATED SITE

ROADSIDE / SITE

- ANTENNA
- BIG ROCK
- FLAG POLE
- PICNIC STOVE
- PICNIC TABLE
- SATELLITE DISH

NOTE:

EXISTING ITEMS ARE REPRESENTED BY THIN LINE WEIGHTS.
PROPOSED ITEMS ARE REPRESENTED BY HEAVIER LINE WEIGHTS.

RAILROAD

- TRACK
- CROSSING - GATE
- RR CROSSING - SIGNAL BOX
- CROSSING - SIGNAL FLASHING
- CROSSING - SYMBOL

SIGNS

- POST - DOUBLE
- POST - SINGLE
- STRUCTURE - CANTILEVER (EXISTING)
- STRUCTURE - CANTILEVER
- STRUCTURE - TRUSS (EXISTING)
- STRUCTURE - TRUSS
- SS SUSPENDED (EXISTING)

MAINTAINING TRAFFIC

- TYPE III BARRICADE
- CHANNELIZING DEVICE - CONE
- CHANNELIZING DEVICE - DRUM
- LIGHT - HIGH INTENSITY TYPE B
- LIGHT - STEADY BURN TYPE C
- LIGHTED ARROW PANEL - BAR
- LIGHTED ARROW PANEL
- PORTABLE CHANGEABLE MESSAGE SIGN
- TRAFFIC REGULATOR
- TEMPORARY SIGN
- TEMPORARY TRAFFIC SIGNAL
- WORK AREA

BARRIERS

- CABLE BARRIER - NOT TO SCALE
- CABLE BARRIER - TRUE SCALE
- CONCRETE BARRIER - DOUBLE FACE
- CONCRETE BARRIER - SINGLE FACE
- FENCE
- GUARDRAIL - NOT TO SCALE
- GUARDRAIL - TRUE SCALE
- NOISE BARRIER
- FENCE POST
- 123 — GUARDRAIL RUN NUMBER
- IMPACT ATTENUATOR
- POST - MAILBOX
- POST - NO ID

SURFACING

REMOVAL

- CONCRETE RUBBLIZING OR HMA CRUSH & SHAPE
- HMA COLDMILLING
- HMA SURFACE REMOVAL AND / OR PAVEMENT REMOVAL

PROPOSED

- AGGREGATE APPROACH
- BRIDGE APPROACH
- HMA APPROACH
- MISCELLANEOUS CONCRETE

SIDEWALK

- SIDEWALK - REMOVAL
- SIDEWALK - CONCRETE RAMP
- SIDEWALK - DETECT. WARNING SURF.
- SIDEWALK - LANDING
- SWR-F — SIDEWALK - RAMP LABEL

TYPICAL SECTION

- CONCRETE - PROPOSED
- HMA - PROPOSED

CURB & GUTTER

- CURB & GUTTER REMOVAL

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UTILITIES

COMBINED SEWER

- COMBINED SEWER
- COMBINED SEWER - OUT OF SERVICE
- COMBINED SEWER - TO BE TAKEN OUT OF SERVICE
- COMBINED SEWER - TO BE REMOVED

SANITARY SEWER

- MANHOLE WITH COVER (DIA VARIES)
- SEWER
- SEWER - OUT OF SERVICE
- SEWER - TO BE TAKEN OUT OF SERVICE
- SEWER - TO BE REMOVED

COMMUNICATION

- FIBER OPTIC
- FIBER OPTIC - OUT OF SERVICE
- FIBER OPTIC - OVERHEAD
- FIBER OPTIC MARKER
- CABLE
- CABLE - OUT OF SERVICE
- CABLE - OVERHEAD
- CABLE MARKER
- CABLE PEDESTAL
- TELEPHONE
- TELEPHONE - OUT OF SERVICE
- TELEPHONE - OVERHEAD
- TELEPHONE BOX
- TELEPHONE MANHOLE
- TELEPHONE PEDESTAL

WATER

- FIRE HYDRANT
- GATE VALVE AND BOX
- GATE VALVE IN WELL
- IRRIGATION CONTROL VALVE
- IRRIGATION SPRINKLER HEAD
- SERVICE METER
- SERVICE SHUTOFF
- WATER WELL
- IRRIGATION
- WATER MAIN
- WATER MAIN - OUT OF SERVICE
- WATER MAIN - TO BE TAKEN OUT OF SERVICE
- WATER MAIN - TO BE REMOVED

FUEL / PETROLEUM

- GASOLINE FILLER PIPE
- GASOLINE PUMP
- GASOLINE UNDERGROUND TANK
- PETROLEUM PIPELINE
- PETROLEUM PIPELINE - OUT OF SERVICE
- PETROLEUM PIPELINE MARKER
- PETROLEUM WELL
- PROPANE TANK

STEAM

- STEAM
- STEAM - OUT OF SERVICE

NATURAL GAS

- GAS LINE
- GAS LINE - OUT OF SERVICE
- MARKER
- VALVE
- WELL

GENERIC EXISTING UTILITIES

- CATCH BASIN COVER
- MANHOLE COVER
- MARKER
- PEDESTAL
- SEWER CLEANOUT ACCESS
- STRUCTURE BOTTOM (DIA VARIES)
- UTILITY BOX
- UTILITY

DRAINAGE

- CATCH BASIN W/ COVER (DIA VARIES)
- DRAINAGE STRUCTURE NUMBER
- DRAIN CASTING
- DROP INLET
- END SECTION (SIZE VARIES)
- FLOW DIRECTION ARROW
- HEADWALL (SIZE VARIES)
- MANHOLE W/ COVER (DIA VARIES)
- MANHOLE BASE W/ COVER (SIZE VARIES)
- MANHOLE TEE W/ COVER (SIZE VARIES)
- OUTLET HEADWALL (SIZE VARIES)
- CULVERT - EXISTING
- CULVERT (SIZE VARIES)
- DITCH CENTERLINE
- STORM SEWER - EXISTING
- STORM SEWER
- STORM SEWER - TO BE REMOVED
- UNDERDRAIN
- WATER EDGE

NOTE:

EXISTING ITEMS ARE REPRESENTED BY THIN LINE WEIGHTS.
PROPOSED ITEMS ARE REPRESENTED BY HEAVIER LINE WEIGHTS.

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ELECTRICAL

- CONTROLLER CABINET – PAD MOUNTED
- HANDHOLE
- MANHOLE
- POLE UTILITY – EXISTING
- POLE UTILITY
- TRANSFORMER – PAD MOUNTED
- TRANSFORMER – POLE MOUNTED
- CABLE
- CABLE – TO BE REMOVED
- CABLE OVERHEAD
- CABLE OVERHEAD – TO BE REMOVED
- CABLE IN CONDUIT
- CABLE IN CONDUIT – TO BE REMOVED
- CABLE IN CONDUIT – DIRECTIONAL BORE

ARCHITECTURAL

- EXIT SIGN WITH EMERGENCY LIGHT
- LIGHT RECESSED FIXTURE
- MOTOR
- OUTLET BOX
- OUTLET SINGLE
- OUTLET TELEPHONE
- SERVICE DISCONNECT
- SERVICE METER
- SWITCH
- SWITCH THREE WAY
- WALL BRACKET FIXTURE

LIGHTING

- CONTROL PANEL – EXISTING
- CONTROL PANEL
- R&S LIGHT STANDARD EXISTING – TO BE REMOVED & SALVAGED
- LIGHT STANDARD DOUBLE ARM – EXISTING
- LIGHT STANDARD DOUBLE ARM
- LIGHT STANDARD POST TOP – EXISTING
- LIGHT STANDARD POST TOP
- LIGHT STANDARD SINGLE ARM – EXISTING
- LIGHT STANDARD SINGLE ARM
- LIGHT POLE – TEMPORARY
- LUMINAIRE WALL MOUNTED UNDERBRIDGE – EXISTING
- LUMINAIRE WALL MOUNTED UNDERBRIDGE
- T– TOWER LIGHTING UNIT – EXISTING
- T– TOWER LIGHTING UNIT

ITS / SIGNALS

- DYNAMIC MESSAGE SIGN – EXISTING
- DYNAMIC MESSAGE SIGN
- ENVIRONMENTAL SENSOR STATION SITE
- FIBER OPTIC SPLICE CABINET
- HANDHOLE, ROUND, 3 FOOT DIAMETER
- HANDHOLE, ROUND, COMMUNICATIONS
- HANDHOLE, ROUND, ELECTRIC
- HANDHOLE, TYPE D
- ITS CABINET – EXISTING
- ITS CABINET
- MICROWAVE VEHICLE DETECTION SYSTEM – EXISTING
- MICROWAVE VEHICLE DETECTION SYSTEM
- MICROWAVE VEHICLE DETECTION SYSTEM ZONE COVERAGE – EXISTING
- MICROWAVE VEHICLE DETECTION SYSTEM ZONE COVERAGE
- SPUN CONCRETE POLE – EXISTING
- SPUN CONCRETE POLE
- SURVEILLANCE SYSTEM – EXISTING
- SURVEILLANCE SYSTEM
- WIRELESS LINK – EXISTING
- WIRELESS LINK
- ITS COMMUNICATIONS CABLE IN CONDUIT
- ITS COMMUNICATIONS CABLE IN CONDUIT – TO BE REMOVED

- ANTENNA
- CASE SIGN (1-WAY OR 2-WAY)
- CASE SIGN (4-WAY)
- DEDICATED SHORT RANGE COMMUNICATIONS
- CONTROLLER CABINET – POLE MOUNTED
- CONTROL EMERGENCY PREEMPTION OPTICOM
- DILEMMA ZONE DETECTION
- GLOBAL POSITIONING SYSTEM MODULE
- GUY ANCHOR
- PEDESTRIAN PEDESTAL
- PEDESTRIAN PUSHBUTTON
- POLE MAST ARM (LENGTH VARIES) – EXISTING
- POLE MAST ARM (LENGTH VARIES)
- POLE STRAIN
- ROAD SIGN W/ FLASHING SIGN OPTICAL (1-WAY)
- SIGNAL HANDHOLE – POLYMER CONCRETE
- SIGNAL HANDHOLE – 2 FOOT ROUND
- SIGNAL HANDHOLE – 3 FOOT ROUND
- SIGNAL HANDHOLE – 2 FOOT SQUARE
- TS SIGNAL HANDHOLE – 4 FOOT SQUARE
- SIGNAL HEAD PEDESTRIAN – EXISTING
- SIGNAL HEAD PEDESTRIAN 1-WAY
- SIGNAL HEAD PEDESTRIAN 2-WAY
- SIGNAL HEAD VEHICLE 1-WAY – EXISTING
- SIGNAL HEAD VEHICLE 2-WAY – EXISTING
- SIGNAL HEAD VEHICLE 3-WAY – EXISTING
- SIGNAL HEAD VEHICLE 4-WAY – EXISTING
- SIGNAL HEAD VEHICLE 1-WAY
- SIGNAL HEAD VEHICLE 2-WAY
- SIGNAL HEAD VEHICLE 3-WAY
- SIGNAL HEAD VEHICLE 4-WAY
- SIGNAL HEAD VEHICLE BAGGED
- SIGNAL HEAD VEHICLE PROGRAMMABLE
- VEHICLE DETECTION CAMERA
- VEHICLE DETECTION CAMERA – HEMISPHERICAL
- VEHICLE DETECTION LOOP
- VEHICLE DETECTION – RADAR
- WIRELESS VEHICLE DETECTION RADIO RECEIVER
- WIRELESS VEHICLE DETECTION RADIO REPEATER
- WIRELESS VEHICLE DETECTION SENSOR – EXISTING
- WIRELESS VEHICLE DETECTION SENSOR

CABLING / WIRING DIAGRAM

- CIRCUIT BREAKER
- COILED WIRE
- FUSE
- FUSE SWITCH
- GROUND
- ILLUMINATED CASE SIGN
- METER
- SERVICE DISCONNECT
- SIGNAL HEAD

NOTE:

EXISTING ITEMS ARE REPRESENTED BY THIN LINE WEIGHTS.
PROPOSED ITEMS ARE REPRESENTED BY HEAVIER LINE WEIGHTS.

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
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GENERAL NOTES

UTILITIES

MISS DIG/UNDERGROUND UTILITY NOTIFICATION
For the protection of underground utilities and in conformance with Public Act 174 of 2013, the Contractor shall contact MISS DIG System, Inc. by phone at 811 or 800-482-7171 or via the web at either elocate.missdig.org for single address or rte.missdig.org, a minimum of 3 business days prior to excavating, excluding weekends and holidays.

ROW / REAL ESTATE

PROPERTY OWNERS
The names of property owners shown on the plans are for information only, and their accuracy is not guaranteed.

LAWN SPRINKLER SYSTEMS AND LANDSCAPING
Owners of existing lawn sprinkler systems and/or landscaping shall be notified (in writing with a copy sent to the Engineer) by the Contractor two weeks in advance of any work to be done that will affect those systems and/or landscaping. If the property owner fails to relocate the lawn sprinkler system prior to the Contractor beginning work, and if the Contractor cuts the system during the construction, the Contractor shall cap the system pipe and witness the location of the cap with a wooden stake for the property owner's use. The Contractor shall place the salvaged sprinkler heads on the property owner's property. If the property owner fails to relocate the landscaping prior to the Contractor beginning work, the Contractor shall carefully salvage the landscaping items and stockpile them on the property owner's property for the property owner. Any other modification to the lawn sprinkler systems and/or landscaping is the responsibility of the owner and is not part of this contract. This work is included in other items of the project.

SURVEY

ADJUSTING MONUMENT BOXES
All government corners on this project shall be preserved, whether shown or not. It may be necessary to place or adjust monument boxes, as required.

OLD PLANS

OLD ROAD PLANS
The following old road plans were referred to in the design of this project.

28-28 C1 C2 C3 C4 C5 S-14-C-4 (1939)
C2 C3 W-5-1 (1958)
28021-06239 (1983)
28091-37848 (1999)

In addition, other old road plans that predate this project may be available. These plans may be reviewed in the Transportation Service Center (TSC) during normal working hours.

DETAILED GRADES

GRADES FOR INTERSECTIONS
All intersections are to be considered as complete units and their grades determined before construction is started.

UNSIGNALIZED SIDE ROAD TO TRUNK LINE INTERSECTIONS:
The normal edge of pavement grade of the proposed trunk line adjacent to the side road intersection shall be carried across the intersection. The side road approach grade and crown shall be established to provide for drainage.

SIDEWALK AND SIDEWALK RAMP GRADES
All sidewalk and sidewalk ramp grades shall be staked according to Standard Plan R-28 series and as shown on the plans. Prior to constructing the sidewalk and sidewalk ramps, the Engineer will verify the grades and authorize the construction of the sidewalk and sidewalk ramps.

EARTHWORK

EARTHWORK
Earthwork quantities are computed by the average end area method based upon ground survey information.

SLOPES
Class A slopes shall be constructed on this project.

EARTH DISTURBANCE LIMITS
The earth disturbance limit for this project will be limited to 10' beyond the slope stake line or to the ROW line whichever is less for all areas except for wetland areas. For areas adjacent to wetlands, the earth disturbance limit will be limited to the slope stake line. Restoration measures have been included in this set of plans for the approved areas of disturbance. The Contractor shall submit an earth change plan for any work beyond the approved limits to the Engineer to review for approval prior to the disturbance. All costs for obtaining and executing an approved earth change plan, including restoration, shall be at the Contractor's expense.

SOIL EROSION MEASURES
Appropriate soil erosion and sedimentation control measures shall be in place prior to earth-disturbing activities. Place turf establishment items as soon as possible on potential erodable slopes as directed by the Engineer. Critical ditch grades shall be protected with either sod or seed/mulch or mulch blanket as directed by the Engineer.

BASES

AGGREGATE BASE
Aggregate bases shall use aggregate 21AA, unless otherwise specified.

DRAINAGE

CULVERT EXTENSIONS
The extension of existing culverts on this project may require extra work to obtain a tight seal at the joint connecting new culvert pipe to existing culvert pipe. The joint between the existing and new pipes shall be constructed according to the 2012 Standard Specifications for Construction. Any extra work required to obtain tight joints will not be paid for separately, but will be included in compensation for extending culverts.

DRAINAGE MARKER POSTS
Drainage marker posts shall not be placed in medians less than 150' wide.

TEMPORARY BULKHEADS
Temporary bulkheads may be required for the part width construction of the culverts and sewers. All cost associated with the temporary bulkheads are included in the item of the pipe.

PAVEMENT

PAVEMENT AND HMA SURFACE REMOVAL QUANTITIES
Pavement and HMA Surface removal as shown on the plans will be at the discretion of the Engineer. If in his/her judgment, areas of pavement may be left in place, or additional areas added to provide the proper cross-section and base. Changes will be made in the quantities.

SOIL BORINGS AND/OR PAVEMENT CORES
The soil boring logs and/or pavement cores represent point information. No inference should be made that subsurface or pavement conditions are the same at other locations.

CONCRETE HAND FINISHING
Hand finishing of concrete pours to be struck off and consolidated by hand methods will be permitted on variable width lanes and lanes formed by flexible forms for short radius curves, as directed by the Engineer.

GUARDRAIL

9' GUARDRAIL POST
Guardrail shall be constructed using 9 foot posts at all guardrail locations as shown on the plans except in approach and departing terminals. The additional post length will not be paid for separately, but shall be included in the appropriate guardrail pay item.

GUARDRAIL POST HOLES
Posts placed within 3' of existing culverts shall be in drilled holes and shall not be driven.

FENCING

RIGHT OF WAY FENCE
Where fence is called for along the ROW, the Engineer will check the Right of Way as actually acquired before placing fence.

TURF ESTABLISHMENT

SEED MIXTURE
The symbol for the permanent turf seed mixture on this project is symbol TDS.

SIGNS

GENERAL
All signs shall be installed, removed and/or salvaged according to the current edition of "Michigan Manual on Uniform Traffic Control Devices" and the current edition of Michigan Department of Transportation (MDOT) "Standard Specifications for Construction."

All signs on the plans or in the log that do not have a recommendation are to be retained.

EXISTING SIGN RELOCATION
Any permanent signs requiring relocation due to Contractor operations shall be salvaged and reset by the Contractor at locations designated by the Engineer. Signs and posts damaged during the removal and storage operations shall be replaced with new signs and posts. The cost of this work shall be borne by the Contractor.

At least two weeks prior to construction to remove / relocate Michigan Logo or tourist oriented directional signs; the Contractor shall contact Mike Kovalchick, (888) 645-6467 from Michigan Logos.

PLAN SCALE
The final plans submitted with the proposal are not to scale. Where proposed on plan sheets, the signs and structures shall be fabricated in accordance to Typical Plans, Standards, and/or Details at locations described.

SIGN LAYOUT
Sign layouts shall be according to the current English edition of "Standard Highway Signs" manual or as detailed in plans. Legend length shall be determined using the "SignCAD" software.

SHEETING
Handling and installation of all signs shall conform to the sheeting manufacturer's specifications and guidelines.
Signs that have wrinkled or twisted sheeting may be rejected.

SIGN INSTALLATION
When attaching signs to supports, tighten the nut, not the bolt head.

Nylon washers shall be placed between the steel washer and the sign face sheeting. The nylon washers are to be considered part of the attaching devices and hardware. Nylon washers shall have a 3/8 inch inner diameter, a 7/8 inch outer diameter and a 1/16 inch thickness.

The Contractor shall attach a date sticker to the back of all signs installed on the contract. Stickers will be supplied to the Contractor at the preconstruction meeting by the Engineer. Stickers will be supplied by MDOT Operations Field Services Division Statewide Sign Shop, Lansing, which can be contacted at 517-322-3357.

SIGNALS

PREVIOUS GENERAL NOTES
Some notes previously included in "General Notes" are now located within the Frequently Used Special Provision titled "Traffic Signal Work - Construction Methods".

MAINTAINING AGENCY CONTACT INFORMATION
- MDOT: Statewide Signal Shop (517-322-3360)

NOTIFICATIONS TO MAINTAINING AGENCIES
Contact MDOT (and any other maintaining agency) seven working days prior to start of construction and seven working days prior to signal activation.

CABINET SET UP AND CONTROLLER TIMING
Contractor shall deliver where required to the appropriate maintaining agency, the T.S. Cabinet and Controller for set up and timing. Contractor shall pick-up cabinet from the appropriate maintaining agency when ready for installation.

FACILITIES NOT ON PLANS
Existing O.H. & T.S. facilities are not necessarily shown on plans.

WOOD POLE INSTALLATION
Install wood poles so as not to interfere with traffic or future construction stages.

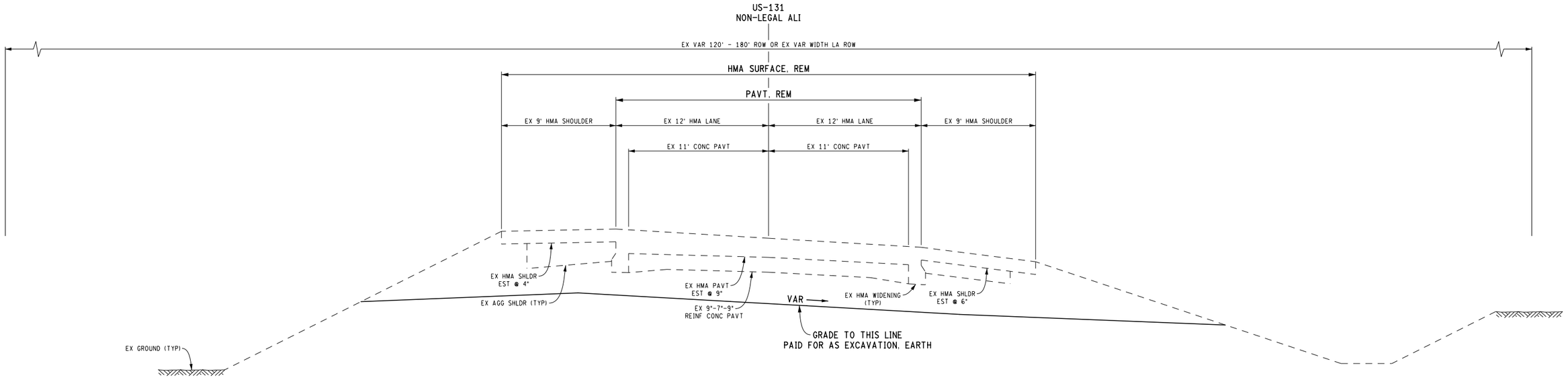
SIGNAL EQUIPMENT DISPOSAL
Disposal of all traffic signal equipment is included in the removal pay items and shall also include the following:
- Notification to MDOT (and any other maintaining agency) that traffic signal equipment is being removed.
- Temporary storage of equipment in a dumpster on site (or as directed by the Engineer) allowing MDOT (and any other maintaining agency) 48 hours to salvage any equipment.
- Proper disposal of any equipment containing environmentally sensitive materials (mercury relay switches for example)
- Disabling or destruction of all remaining equipment to the satisfaction of the engineer such that it cannot be reused or resold.
- Proper disposal of all remaining equipment.

PLAN DEVIATIONS DURING CONSTRUCTION
No changes from plans in location of supporting structures signal head placement or traffic signal equipment will be allowed without prior approval of the Michigan Department Of Transportation, Traffic Signals Unit in Lansing, MI; (517-373-2323).

SIGNAL HEAD LANDING POINT
Ensure each traffic signal head assembly has its own landing point with all neutrals connected together with a metal type jumper.

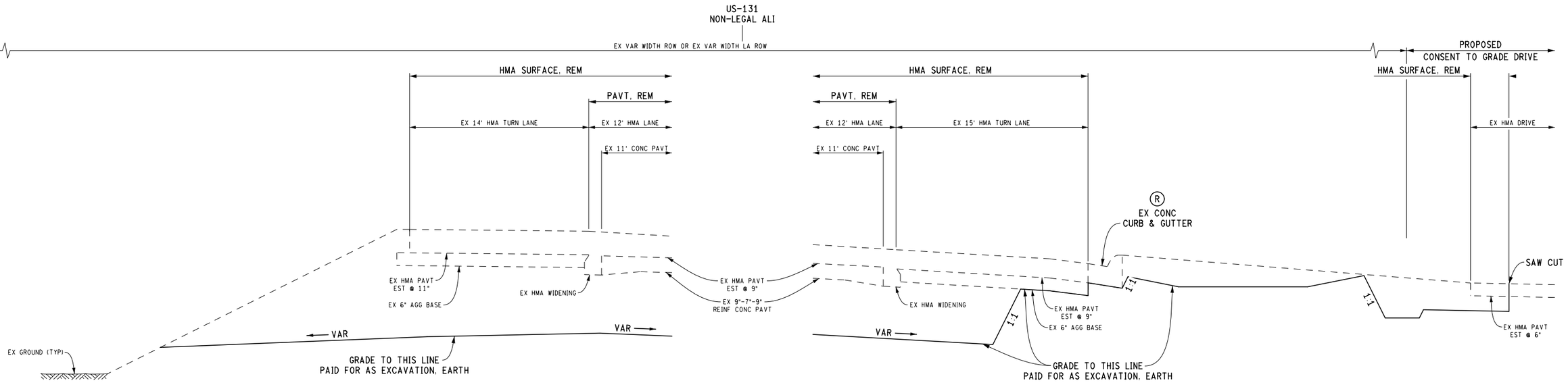
PROJECT SPECIFIC NOTES

ABANDONED MONITORING WELLS
The removal of abandoned monitoring wells within the grading limits of the project will not be paid for separately but included in other items of work.



EXISTING TYPICAL SECTION US-131

SECTION APPLIES TO:
STA 309+00.00 (POB) TO STA 326+00.00 (POE)



EXISTING TURN LANE DETAIL

SECTION APPLIES TO:
STA 315+50.00 LT TO STA 318+50.00 LT

EXISTING TURN LANE DETAIL

SECTION APPLIES TO:
STA 313+60.00 RT TO STA 317+30.00 RT

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

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HORZ. (FT) 0 8

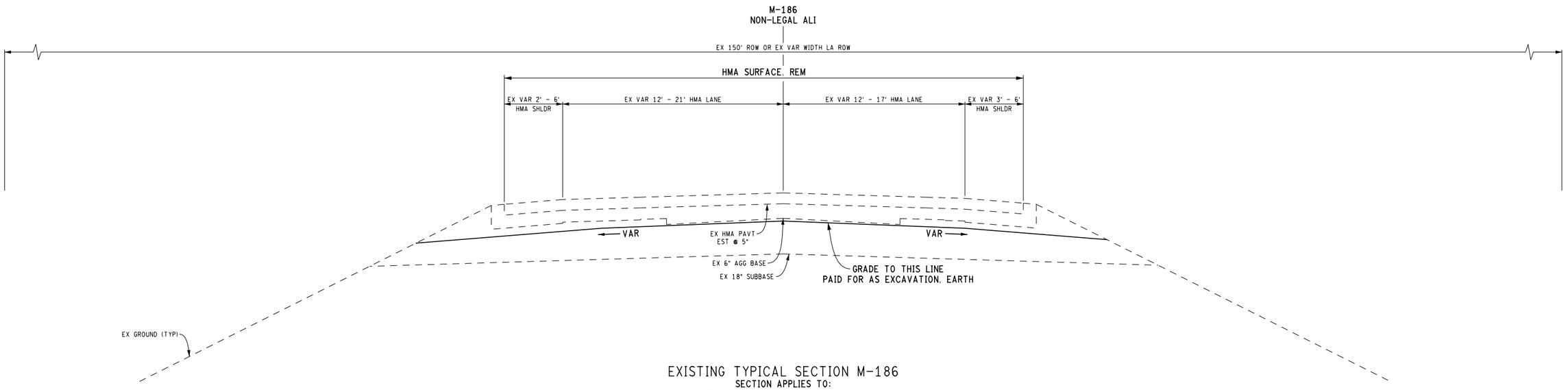
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DATE: 08/31/18
DESIGN UNIT: TALLON
TSC: TRAVERSE CITY

CS: 28091
JN: 132412A

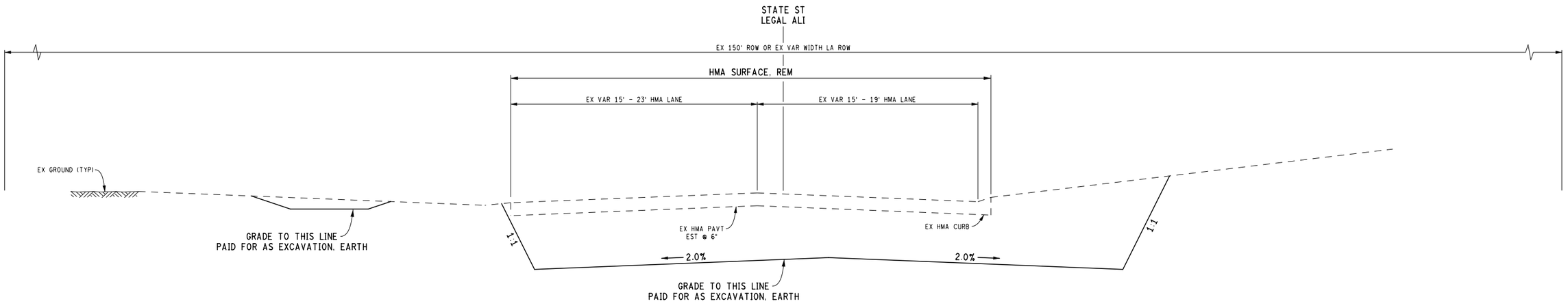
TYPICAL CROSS SECTIONS
EXISTING US-131

DRAWING: US-131 TYP 001
SHEET: SECT 1 — 7



EXISTING TYPICAL SECTION M-186

SECTION APPLIES TO:
STA 672+50.00 TO STA 675+75.00



EXISTING TYPICAL SECTION STATE STREET

SECTION APPLIES TO:
STA 1+00.00 TO STA 3+41.40

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

VERT. (FT) 0 4
HORZ. (FT) 0 8

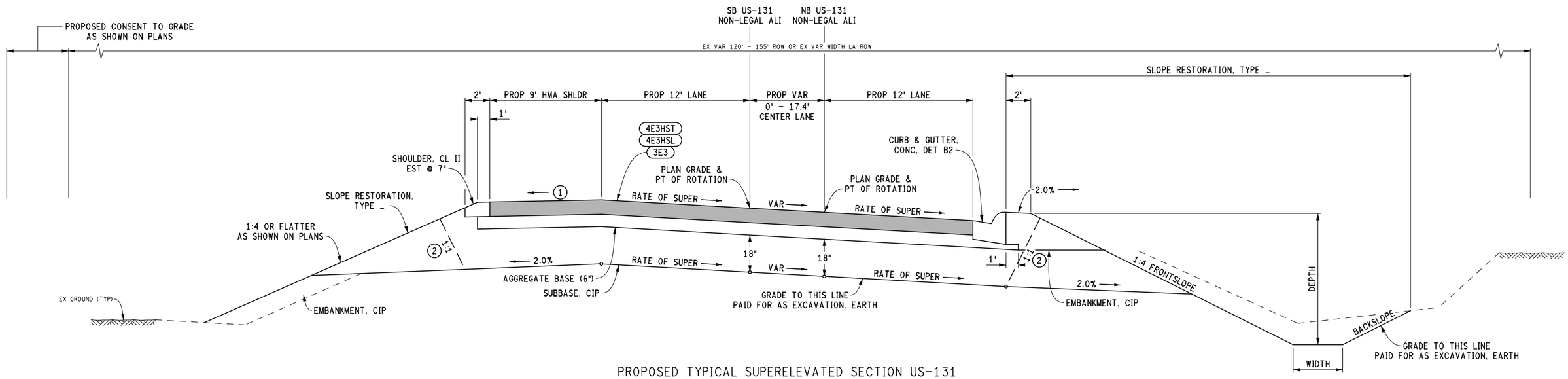
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DATE: 08/31/18
DESIGN UNIT: TALLON
TSC: TRAVERSE CITY

CS: 28091
JN: 132412A

TYPICAL CROSS SECTIONS
EXISTING M-186/STATE ST

DRAWING	SHEET
M-186 TYP 002	SECT 1 8

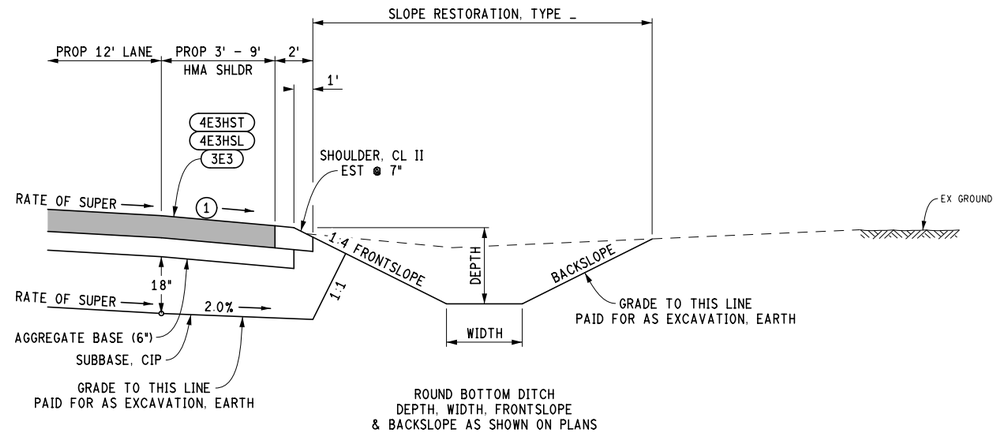


PROPOSED TYPICAL SUPERELEVATED SECTION US-131

SECTION APPLIES TO:
SOUTHBOUND
STA 409+00.00 (POB) TO STA 414+66.99

SECTION APPLIES TO:
NORTHBOUND
STA 509+00.00 (POB) TO STA 514+67.40

ROUND BOTTOM DITCH
DEPTH, WIDTH, FRONTSLOPE
& BACKSLOPE AS SHOWN ON PLANS



PAVED SHOULDER AND DITCH DETAIL

SECTION APPLIES TO:
STA 509+00.00 RT (POB) TO STA 510+00.00 RT
STA 409+00.00 LT (POB) TO STA 411+25.00 LT

ROUND BOTTOM DITCH
DEPTH, WIDTH, FRONTSLOPE
& BACKSLOPE AS SHOWN ON PLANS

HMA APPLICATION ESTIMATE

IDENT NO.	ITEM	RATE LBS PER SYD	PERFORMANCE GRADE	REMARKS
4E3HST	HMA, 4E3, HIGH STRESS	220#	70-28P	TOP COURSE - AWI=260
4E3HSL	HMA, 4E3, HIGH STRESS	220#	70-28P	LEVELING COURSE
3E3	HMA, 3E3	330#	58-28	BASE COURSE
HMA2	HMA APPROACH, HIGH STRESS	220#	70-28P	RESIDENTIAL DRIVES (4E3HST - AWI=260)
HMA7	HMA APPROACH, HIGH STRESS	220#	70-28P	COMMERCIAL DRIVES (4E3HST TOP COURSE - AWI=260)
		220#	70-28P	COMMERCIAL DRIVES (4E3HSL LEVELING COURSE)
		330#	58-28	COMMERCIAL DRIVES (3E3 BASE COURSE)
TEMP	HMA, TEMP PAVT (3E3)	330#	58-28	TEMPORARY ROAD
HP	HAND PATCHING	550#	70-28P	4E3HSL (2 1/2" MAX. LIFT) FOR CURB CONSTRUCTION
	* BOND COAT	0.05-0.15 GAL		

*FOR INFORMATION ONLY

(1) FOR SHOULDER SLOPES
SEE STANDARD PLAN R-107 SERIES

(2) SUBBASE DOES NOT DAYLIGHT
STA 409+00 LT TO STA 412+45 LT
STA 509+00 RT TO STA 511+75 RT

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

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HORZ. (FT) 0 8

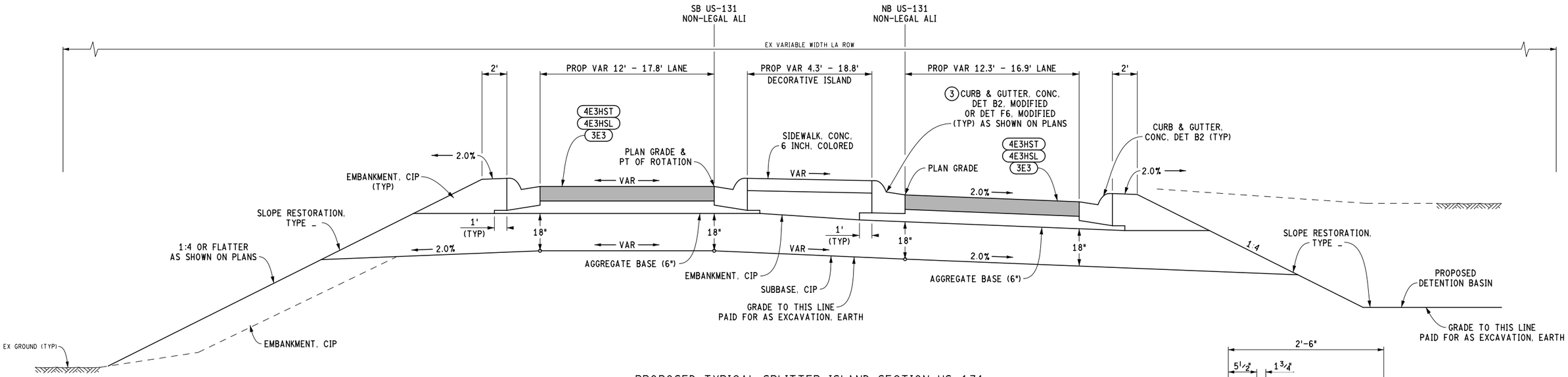
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DATE: 08/31/18
DESIGN UNIT: TALLON
TSC: TRAVERSE CITY

CS: 28091
JN: 132412A

TYPICAL CROSS SECTIONS
PROPOSED US-131

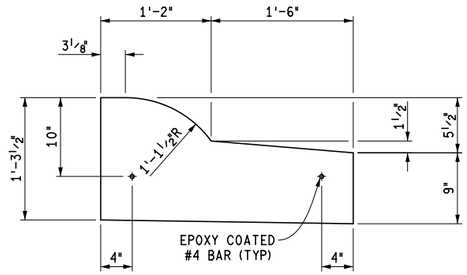
DRAWING: US-131 TYP 003
SHEET: SECT 1



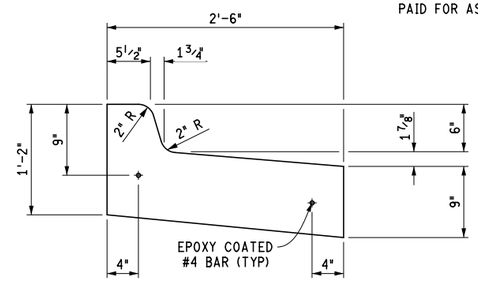
PROPOSED TYPICAL SPLITTER ISLAND SECTION US-131

SECTION APPLIES TO:
SOUTHBOUND
STA 414+66.99 TO STA 415+51.30
STA 417+28.97 TO STA 418+70.16

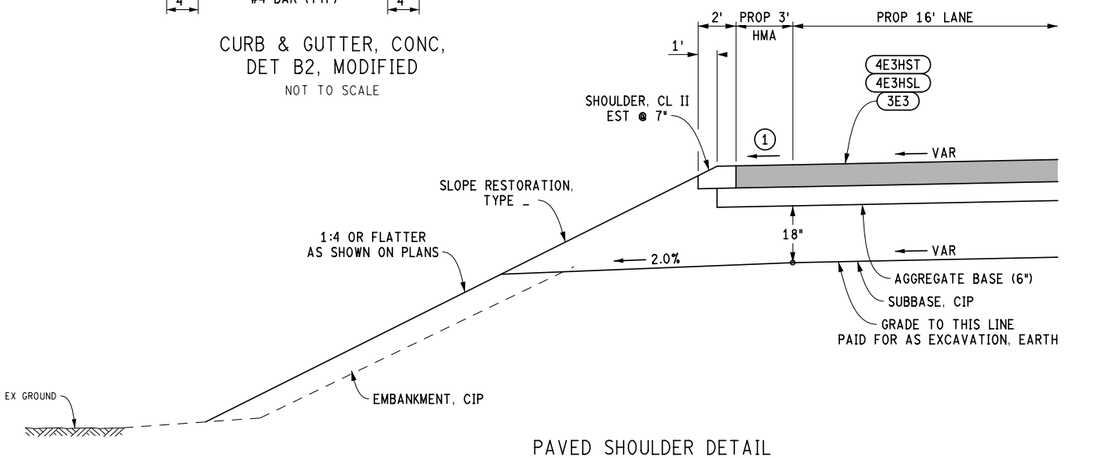
SECTION APPLIES TO:
NORTHBOUND
STA 514+67.40 TO STA 515+50.72
STA 517+17.04 TO STA 518+58.20



CURB & GUTTER, CONC,
DET B2, MODIFIED
NOT TO SCALE

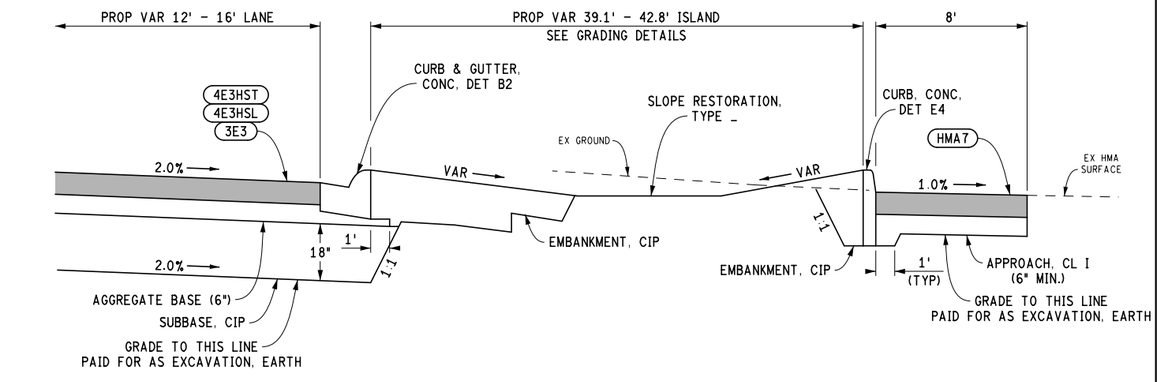


CURB & GUTTER, CONC,
DET F6, MODIFIED
NOT TO SCALE



PAVED SHOULDER DETAIL

SECTION APPLIES TO:
STA 414+66.99 LT TO STA 414+93.31 LT



PROPOSED ISLAND DETAIL

SECTION APPLIES TO:
STA 514+48.05 RT TO STA 515+50.72 RT

(1) FOR SHOULDER SLOPES
SEE STANDARD PLAN R-107 SERIES

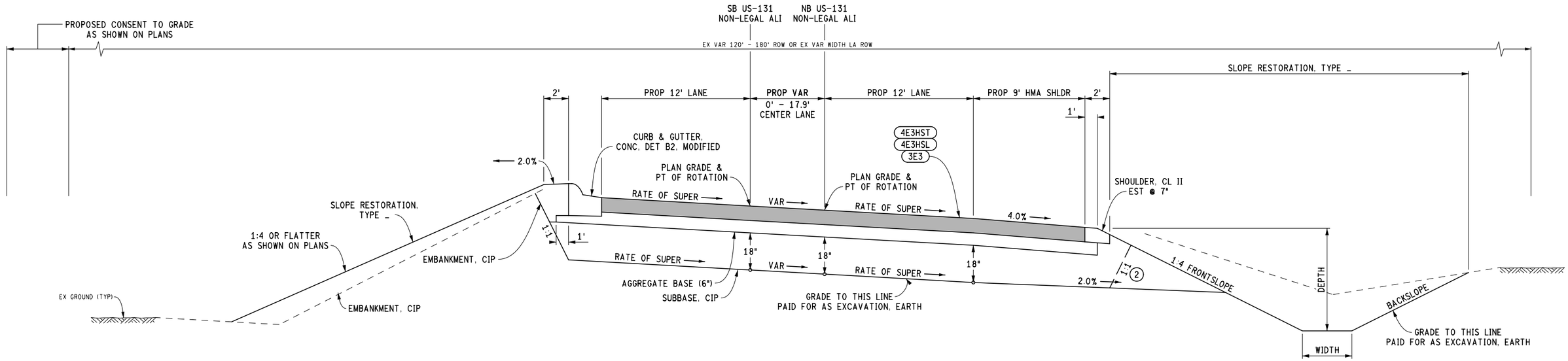
(3) SEE MISC DETAIL ON PLAN VIEW DRAWING
FOR CURB & GUTTER, CONC, DET B2 LOCATIONS

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

0 VERT. (FT) 4
0 HORZ. (FT) 8

	DATE: 08/31/18	CS: 28091	TYPICAL CROSS SECTIONS	DRAWING	SHEET
	DESIGN UNIT: TALLON	JN: 132412A	PROPOSED US-131	US-131 TYP 004	SECT 1
FILE: 132412_us131_typ002.dgn	TSC: TRAVERSE CITY				10

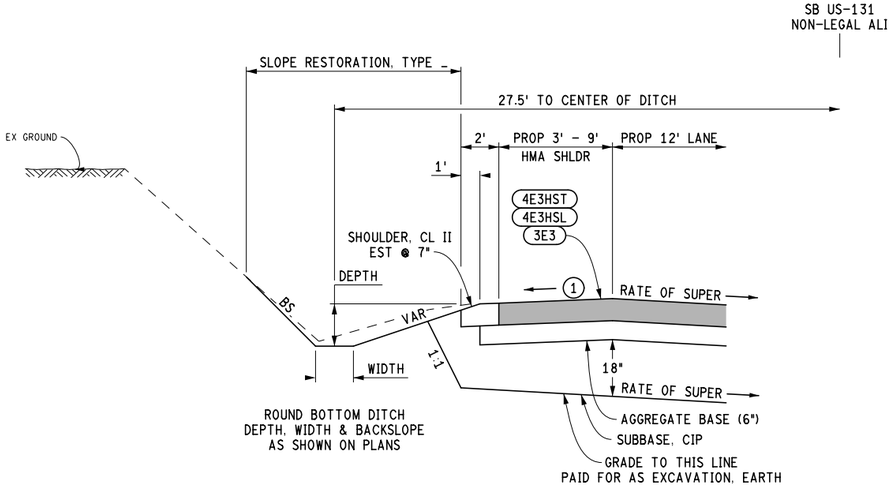


PROPOSED TYPICAL SUPERELEVATED SECTION US-131

SECTION APPLIES TO:
SOUTHBOUND
STA 418+70.16 TO STA 423+85.54

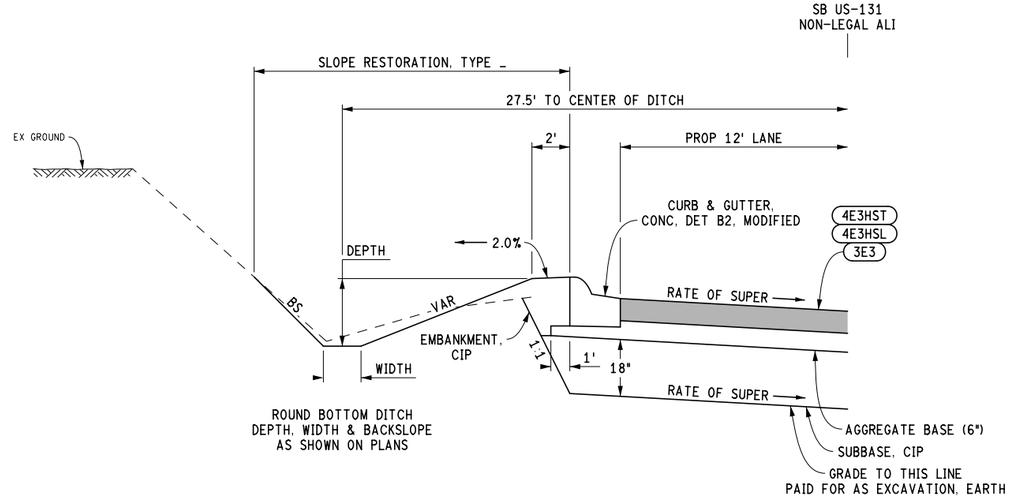
SECTION APPLIES TO:
NORTHBOUND
STA 518+58.20 TO STA 523+72.96

ROUND BOTTOM DITCH
DEPTH, WIDTH, FRONTSLOPE
& BACKSLOPE AS SHOWN ON PLANS



PAVED SHOULDER DETAIL

SECTION APPLIES TO:
STA 422+85.54 LT TO STA 423+85.54 LT



PROPOSED DITCH DETAIL

SECTION APPLIES TO:
STA 421+65.00 LT TO STA 422+85.54 LT

(1) FOR SHOULDER SLOPES
SEE STANDARD PLAN R-107 SERIES

(2) SUBBASE DOES NOT DAYLIGHT
STA 520+50 RT TO STA 523+72.96 RT

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

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HORZ. (FT) 0 8

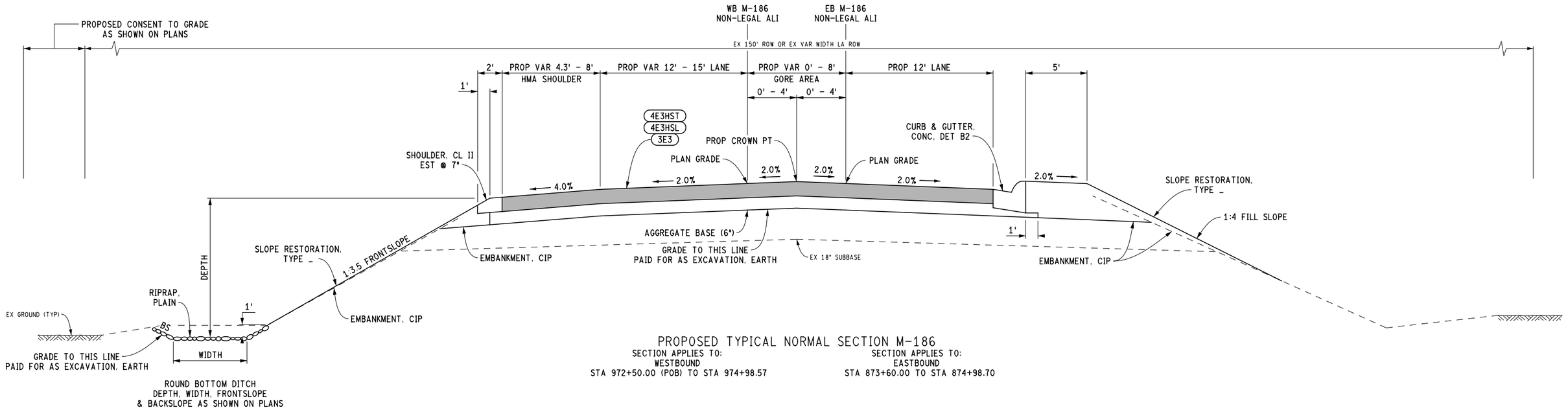
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DATE: 08/31/18
DESIGN UNIT: TALLON
TSC: TRAVERSE CITY

CS: 28091
JN: 132412A

TYPICAL CROSS SECTIONS
PROPOSED US-131

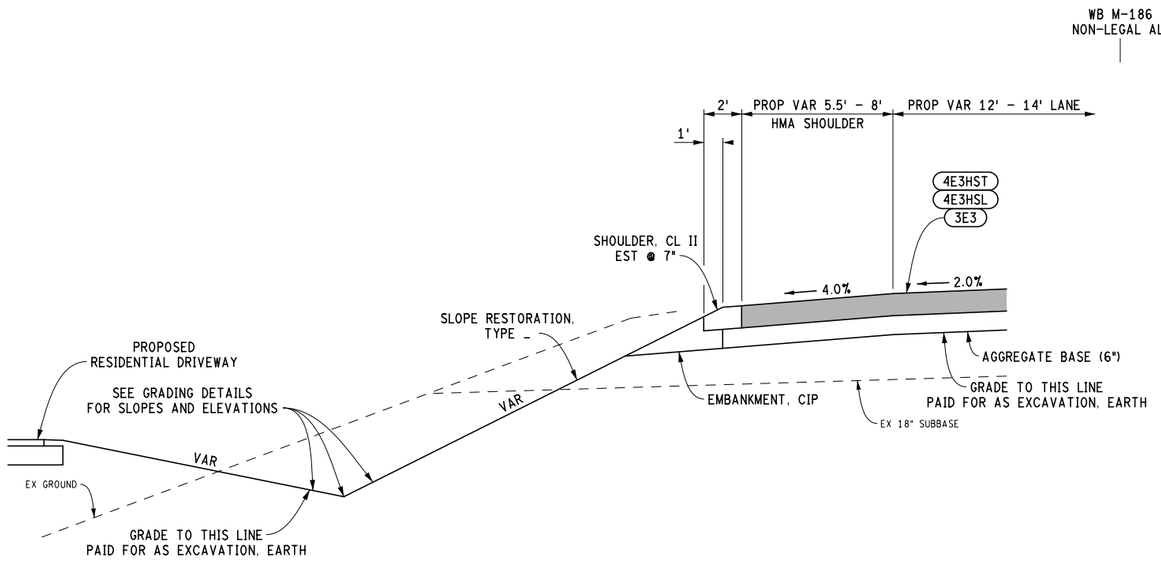
DRAWING: US-131 TYP 005
SHEET: SECT 1 — 11



PROPOSED TYPICAL NORMAL SECTION M-186

SECTION APPLIES TO:
WESTBOUND
STA 972+50.00 (POB) TO STA 974+98.57

SECTION APPLIES TO:
EASTBOUND
STA 873+60.00 TO STA 874+98.70



SLOPE GRADING DETAIL

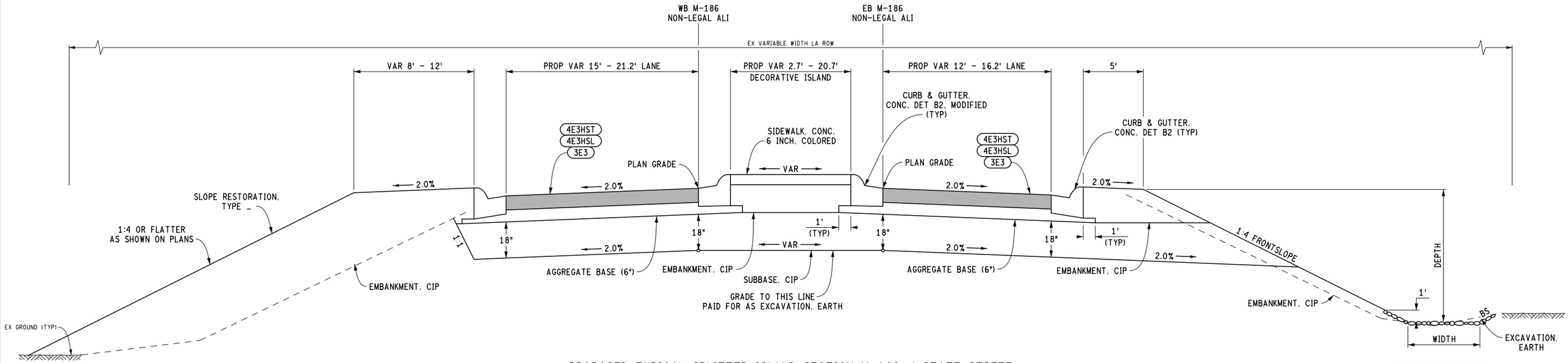
SECTION APPLIES TO:
STA 974+00.00 LT TO STA 974+75.00 LT

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

VERT. (FT) 0 4
HORZ. (FT) 0 8

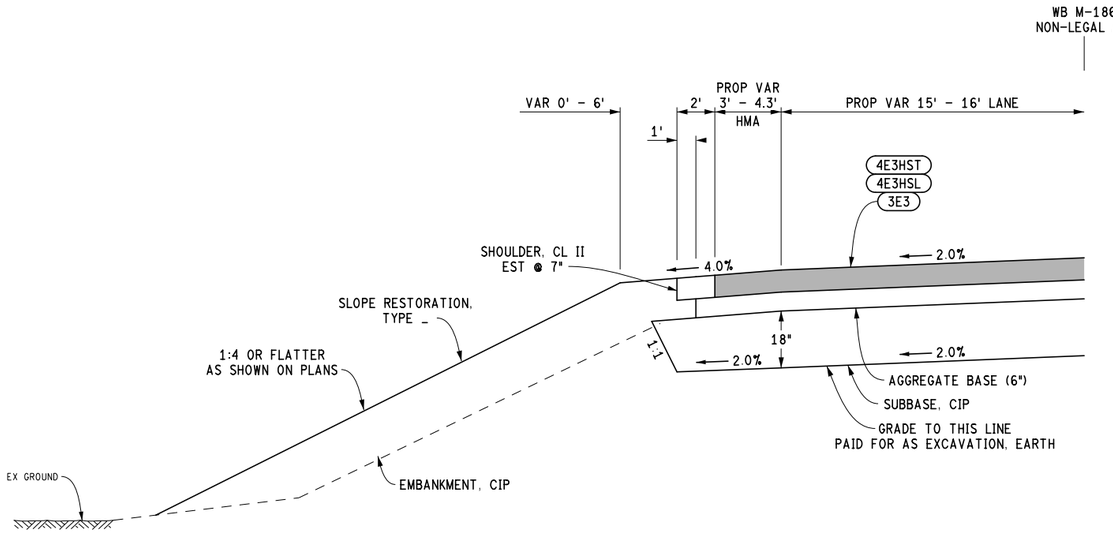
	DATE: 08/31/18	CS: 28091	TYPICAL CROSS SECTIONS	DRAWING	SHEET
	DESIGN UNIT: TALLON	JN: 132412A	PROPOSED M-186	M-186 TYP 006	SECT 1
FILE: 132412_us131_typ002.dgn	TSC: TRAVERSE CITY				12



PROPOSED TYPICAL SPLITTER ISLAND SECTION M-186 / STATE STREET

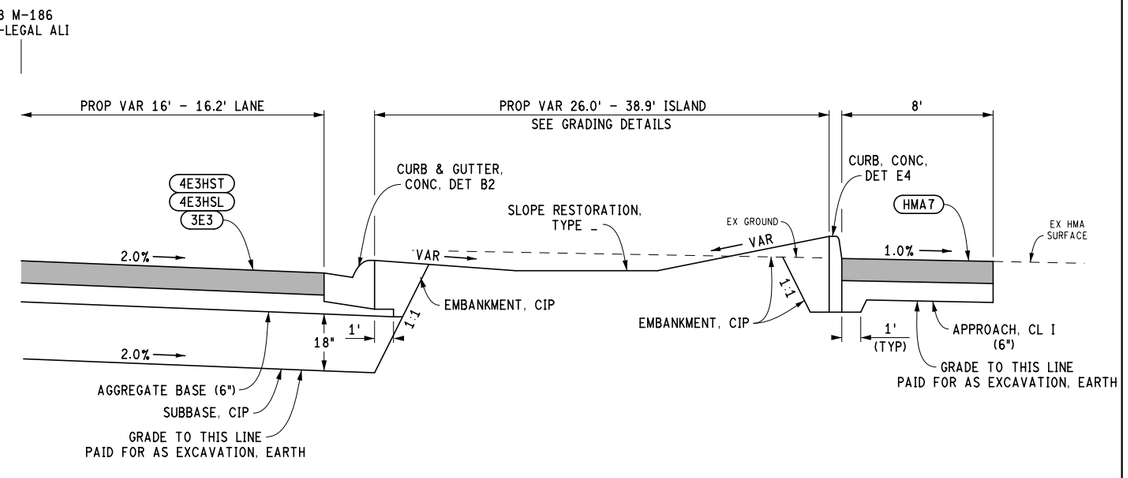
SECTION APPLIES TO:
WESTBOUND
STA 974+98.57 TO STA 975+80.40
STA 977+48.45 TO STA 978+14.40

SECTION APPLIES TO:
EASTBOUND
STA 874+98.70 TO STA 875+78.41
STA 877+51.85 TO STA 878+20.97



PAVED SHOULDER DETAIL

SECTION APPLIES TO:
STA 974+98.57 LT TO STA 975+25.00 LT



PROPOSED ISLAND DETAIL

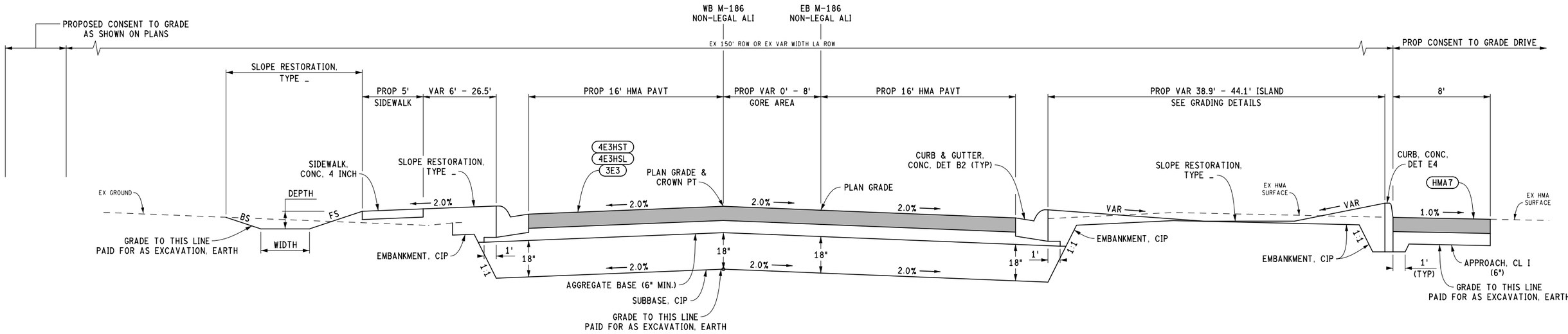
SECTION APPLIES TO:
STA 877+51.85 RT TO STA 878+55.37 RT

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

VERT. (FT) 0 4
HORZ. (FT) 0 8

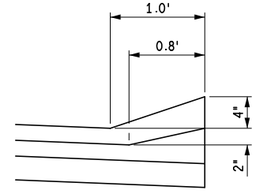
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FILE: 132412_us131_typ002.dgn	TSC: TRAVERSE CITY				13



PROPOSED TYPICAL NORMAL SECTION STATE STREET

SECTION APPLIES TO:
WESTBOUND
STA 978+14.40 TO STA 980+35.00 (POE)

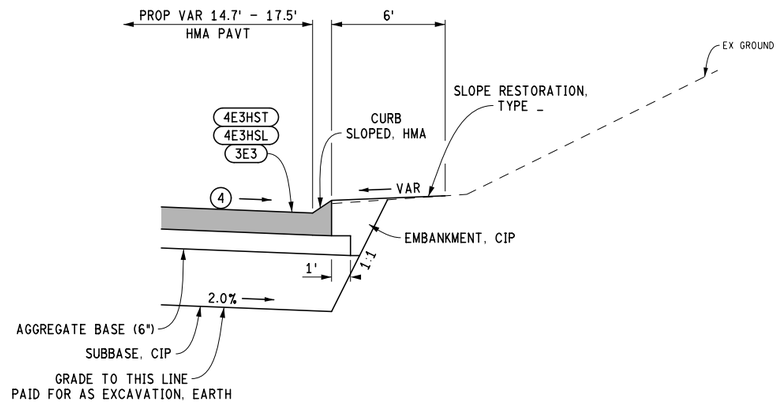
SECTION APPLIES TO:
EASTBOUND
STA 878+20.97 TO STA 879+94.55



CURB SLOPED, HMA DETAIL

NOT TO SCALE

EB M-186
NON-LEGAL ALI



PROPOSED HMA CURB SECTION DETAIL

SECTION APPLIES TO:
STA 979+95.00 RT TO STA 980+35.00 (POE) RT

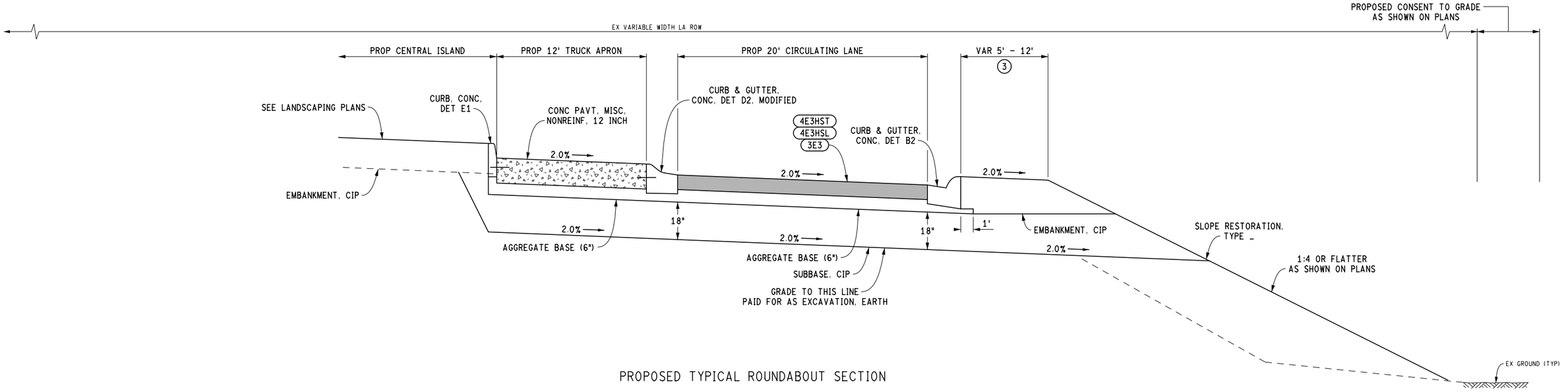
(4) TRANSITION FROM 2.0% TO MATCH EXISTING

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

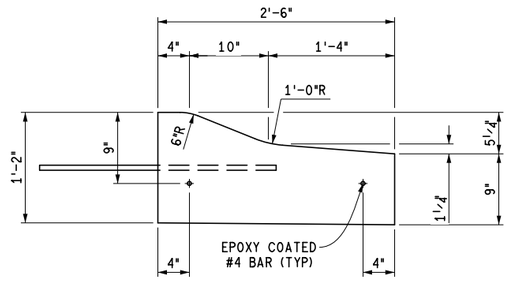
MDOT Michigan Department of Transportation

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HORZ. (FT) 0 8

	DATE: 08/31/18	CS: 28091	TYPICAL CROSS SECTIONS	DRAWING	SHEET
	DESIGN UNIT: TALLON	JN: 132412A	PROPOSED STATE STREET	M-186 TYP 008	SECT 1
FILE: 132412_us131_typ002.dgn	TSC: TRAVERSE CITY				14

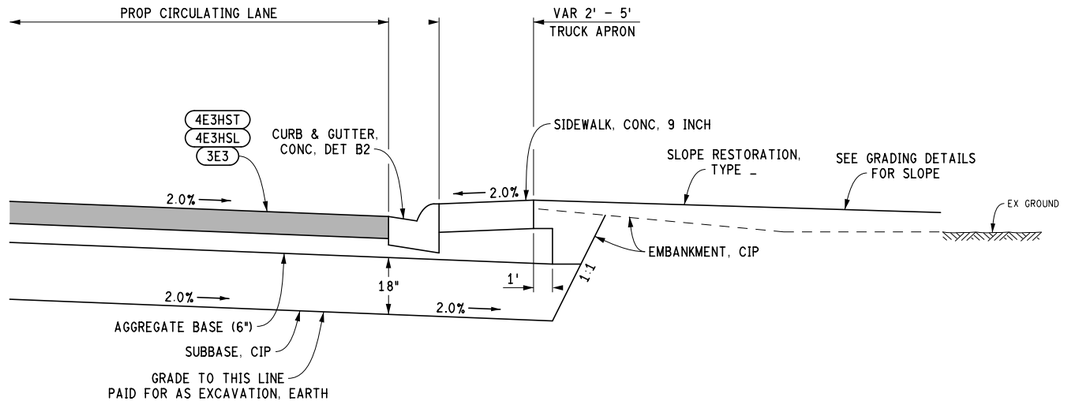


PROPOSED TYPICAL ROUNDABOUT SECTION



CURB & GUTTER, CONC,
DET D2, MODIFIED

NOT TO SCALE



OUTER TRUCK APRON DETAIL

SECTION APPLIES TO:
ROUNDABOUT NE QUADRANT

(3) 5' WIDE, SW QUADRANT
12' WIDE, NW QUADRANT

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

VERT. (FT) 0 4
HORZ. (FT) 0 8

	DATE: 08/31/18	CS: 28091	TYPICAL CROSS SECTIONS	DRAWING	SHEET
	DESIGN UNIT: TALLON	JN: 132412A	PROPOSED ROUNDABOUT	US-131 TYP 009	SECT 1
FILE: 132412_us131_typ002.dgn	TSC: TRAVERSE CITY				15

NOTES

COORDINATE SYSTEM:	STATE PLANE GRID
ZONE:	MICHIGAN CENTRAL 2112
ELLIPSOID:	GRS 80
HORIZONTAL DATUM:	NAD 83 (CORS 2011)
VERTICAL DATUM:	NAVD 88
GEOID:	GEOID 12B
UNITS:	INTERNATIONAL FEET

GROUND DISTANCE CONVERSION

THE COMBINED SCALE FACTOR (CSF) FOR EACH CONTROL POINT IS INCLUDED IN THE CONTROL POINT LIST.

AVERAGE COMBINED SCALE FACTOR (ACSF) = (CSF1 + CSF2)/2

GROUND DISTANCE = GRID DISTANCE / ACSF

OVERALL AVERAGE COMBINED SCALE FACTOR = 0.9999329998

PLAN ELEVATION

ELEVATIONS SHOWN ON THESE PLANS ARE BASED ON NGS BENCHMARK PL0201 TRANSERRED TO THE SITE USING DIFERENTIAL GPS, AND ON SITE LEVELING THROUGH THE REMAINDER OF THE CONTROL POINTS.

PRIMARY CONTROL

MICHIGAN CONTINUALLY OPERATING REFERENCE STATIONS (CORS)

INTERMEDIATE CONTROL

THE INTERMEDIATE HORIZONTAL CONTROL WAS POSITIONED USING OPUS VALUES FOR CP 103.

CP100
DESCRIPTION: SET 5/8" BY 36" REBAR WITH PLASTIC CAP STAMPED GPI CONTROL POINT SET 50' N OF C/L DRIVE TO BLD 7677
NORTHING: 460093.389 2σ STD DEV: 0.002
EASTING: 19425083.026 2σ STD DEV: 0.001
ELEVATION: 1054.537 2σ STD DEV: 0.004
CSF: 0.99988824
STATION: 206+06.07 OFFSET: 55.38 RIGHT
ALIGNMENT: US-131 LEGAL ALI
WITNESSES:

SOUTH	26.00'	B/C DRIVE TO BLD 7677
WEST	43.50'	EPB US 131
S 40° E	27.50'	W. LEG LP GAS SIGN

CP101
DESCRIPTION: SET 5/8" BY 36" REBAR WITH PLASTIC CAP STAMPED GPI CONTROL POINT LOCATED APPROXIMATELY 275' SOUTH OF THE INTERSECTION OF M-186 AND US-131 OPPOSITE AN ELECTRONIC GAS STATION SIGN
NORTHING: 460837.605 2σ STD DEV: 0.004
EASTING: 19425223.787 2σ STD DEV: 0.004
ELEVATION: 1053.0252σ STD DEV: 0.003
CSF: 0.99988809
STATION: 213+68.56 OFFSET: 29.39 RIGHT
ALIGNMENT: US-131 LEGAL ALI
WITNESSES:

WEST	2.0'	B/C US 131
N 80° E	63.50'	NW BOLT ON SIGN MOUNT B&B SIGN
SOUTH	32.50'	W LEG SIGN FOR FIFE LAKE PUBLIC ACCESS

CP102
DESCRIPTION: SET 5/8" BY 36" REBAR WITH PLASTIC CAP STAMPED GPI CONTROL POINT LOCATED AT THE SOUTHEAST QUADRANT OF THE US-131 INTRSECTION WITH M-186
NORTHING: 461079.720 2σ STD DEV: 0.004
EASTING: 19425320.081 2σ STD DEV: 0.003
ELEVATION: 1052.7302σ STD DEV: 0.001
CSF: 0.99988803
STATION: 216+30.28 OFFSET: 47.24 RIGHT
ALIGNMENT: US-131 LEGAL ALI
WITNESSES:

N 45° W	2.0'	B/C US-131
S 25° E	15.50'	NE PARKING LOT CORNER
S 5° W	48.78'	LIGHT POLE

CP103
DESCRIPTION: SET 5/8" BY 36" REBAR WITH PLASTIC CAP STAMPED GPI CONTROL POINT LOCATED AT THE NORTHEAST CORNER OF THE US-131 AND M-186 INTERSECTION.
NORTHING: 461242.077 2σ STD DEV: 0.000
EASTING: 19425398.930 2σ STD DEV: 0.000
ELEVATION: 1051.6642σ STD DEV: 0.000
CSF: 0.99988803
STATION: 218+11.60 OFFSET: 65.89 RIGHT
ALIGNMENT: US-131 LEGAL ALI
WITNESSES:

WEST	40.0'	ESB 131
N 30° W	39.0'	SIGN POST FOR 131 NORTH
S 15° W	97.0'	POWER POLE FOR SIGNAL LIGHT
N 17° E	92.64'	SET 5/8" REBAR WITH 2" ROW CAP

CP104
DESCRIPTION: SET 5/8" BY 36" REBAR WITH PLASTIC CAP STAMPED GPI CONTROL POINT LOCATED WEST OF US 131 APPROXIMATELY 750' NORTHEAST OF M-186
NORTHING: 461829.946 2σ STD DEV: 0.002
EASTING: 19425550.429 2σ STD DEV: 0.005
ELEVATION: 1053.6462σ STD DEV: 0.002
CSF: 0.99988776
STATION: 224+12.43 OFFSET: 33.72 LEFT
ALIGNMENT: US-131 LEGAL ALI
WITNESSES:

EAST	12.75'	ESB US-131
N 15° E	58.38'	POWER POLE
N 70° W	45.0'	6" OAK

CP105
DESCRIPTION: SET 5/8" BY 36" REBAR WITH PLASTIC CAP STAMPED GPI CONTROL POINT LOCATED ON THE EAST SIDE OF US-131 JUST NORTH OD DRIVE TO HOUSE 468, SOUTH OF END GUARDRAIL POST
NORTHING: 462298.733 2σ STD DEV: 0.004
EASTING: 19425887.891 2σ STD DEV: 0.003
ELEVATION: 1056.0192σ STD DEV: 0.003
CSF: 0.9998875
STATION: 229+86.78 OFFSET: 26.70 RIGHT
ALIGNMENT: US-131 LEGAL ALI
WITNESSES:

NORTH	3.50'	S GUARD RAIL POST E SIDE US 131
WEST	7.0'	ESB US-131
S 15° W	56.0'	MAIL BOX POST HOUSE 468

BENCHMARKS

BM50
FOUND NAIL IN N FACE POWER POLE EAST OF 131 NORTH OF DRIVE TO BLD 7677
NORTHING: 460157
EASTING: 19425113
ELEVATION: 1056.805 2σ STD DEV: 0.004
STATION: 206+74.83 OFFSET: 75.16 RIGHT
ALIGNMENT: US-131 LEGAL ALI
WITNESSES:

WEST	54.0'	ESB US 131
N 45° W	120.00'	SIGN POST US-131, M-186 INTERSECTION AHEAD
SOUTH	30.00'	NW CORNER OF ASPHALT PARKING TO BLD 7677

BM51
FOUND X ON BOLT OF B&B GAS SIGN AT THE SOUTH ENTRANCE TO B&B GAS STSTION, IN THE NW CORNER OF SIGN
NORTHING: 460841
EASTING: 19425114
ELEVATION: 1056.805 2σ STD DEV: 0.002
STATION: 213+81.69 OFFSET: 63.71 RIGHT
ALIGNMENT: US-131 LEGAL ALI
WITNESSES:

WEST	35.00'	B/C US-131
NORTH	15.00'	C/L LIGHT POLE
S 45° W	50.00'	E LEG FIFE LAKE ACCESS SIGN

BM52
SET BENCHTIE NAIL IN GUARDRAIL POST EAST SIDE OF US-131 NORTH OF DRIVE TO HOUSE
NORTHING: 460841
EASTING: 19425114
ELEVATION: 1056.805 2σ STD DEV: 0.004
STATION: 230+23.63 OFFSET: 22.28 RIGHT
ALIGNMENT: US-131 LEGAL ALI
WITNESSES:

N 15° E	23.50'	SIGN POST PASS WITH CARE SIGN
WEST	2.0'	ESB US 131
S 30° W	33.0'	S. END OF GUARDRAIL
S 30° W	93.0'	MAILBOX POST HOUSE 468

PLSS CORNERS

I-05
FOUND REMON CORNER AT INTERSECTION OF 2 2 TRACK DIRT ROADS
NORTHING: 458555.41 EASTING: 19422618.12
STATION: OFF CHAIN
ALIGNMENT: US-131 LEGAL ALI
WITNESSES:

S 13° E	77.50'	FD NAIL IN 12" RED PINE
N 12° E	97.02'	FD NAIL IN 20" WHITE PINE
S 34° W	46.12'	FD NAIL IN 16" WHITE PINE
S 35° E	38.87'	FD NAIL IN 10" OAK

J-05
FOUND REMON CORNER AT INTERSECTION OF 2 2 TRACK DIRT ROADS
NORTHING: 458478.39 EASTING: 19425254.13
STATION: 190+41.59 OFFSET: 491.18 RIGHT
ALIGNMENT: US-131 LEGAL ALI
WITNESSES:

NORTH	36.75'	FD NAIL IN 12" RED PINE
N 1° E	33.25'	FD DNR POST
N 55° W	17.73'	FD NAIL 13" OAK
S 21° W	51.38'	FD NAIL 22" WHITE PINE

I-04
FOUND REMON CORNER IN MON BOX AT INTERSECTION OF M-186 AND 2 TRACK SOUTH
NORTHING: 461173.72 EASTING: 19422655.52
STATION: 210+87.65 OFFSET: 2538.83 LEFT
ALIGNMENT: US-131 LEGAL ALI
WITNESSES:

S 50° W	69.72'	FOUND NAIL & TAG 9" JACK PINE
N 30° W	85.80'	FOUND NAIL & TAG 12" OAK
N 68° W	17.36'	FOUND PK NAIL
N 50° E	96.08	FOUND NAIL 15" OAK

J-04
FOUND PK NAIL IN BIT PATCH 60 FEET MORE OR LESS EAST OF C/L US-131, 2.29' NORTH OF C/L M-186
NORTHING: 461096.89 EASTING: 19425338.56
STATION: 216+52.77 OFFSET: 59.05 RIGHT
ALIGNMENT: US-131 LEGAL ALI
WITNESSES:

S 25° W	69.50'	X IN NW BOLT OF LIGHT POLE BASE
N 80° W	61.54'	C/L US 131
S 70° W	132.94'	SET MAG NAIL IN POWER POLE
N 12° E	61.35'	SET MAG NAIL IN POWER POLE

K-04
FOUND REMON CORNER IN MON BOX AT THE INTERSECTION OF STATE STREET AND BOYD STREET
NORTHING: 461015.61 EASTING: 19428156.82
STATION: 232+49.61 OFFSET: 2626.15 RIGHT
ALIGNMENT: US-131 LEGAL ALI
WITNESSES:

S 48° W	32.71'	FD NAIL IN UTILITY POLE
N 63° W	49.65'	FD NAIL IN POWER POLE
N 58° E	39.23'	FD NAIL IN POWER POLE
S 40° E	33.00	FD NAIL IN POWER POLE

J-03
FOUND REMON CORNER IN C/L GRAVEL ROAD
NORTHING: 463710.34 EASTING: 19425418.85
STATION: 237+64.05 OFFSET: 1192.86 LEFT
ALIGNMENT: US-131 LEGAL ALI
WITNESSES:

S 37° E	45.30'	FOUND NAIL & TAG 24" MAPLE
S 03° E	41.13'	FOUND NAIL & TAG 26" MAPLE
N 09° E	33.98'	FOUND POST 6' CHAIN LINK FENCE
S 68° W	47.25'	FOUND NAIL 12" CLUMPED COTTONWOOD

K-03
FOUND REMON CORNER IN MON BOX AT INTERSECTION OF BOYD STREET AND VANS LANE
NORTHING: 463633.21 EASTING: 19428127.19
STATION: 257+06.40 OFFSET: 630.01 RIGHT
ALIGNMENT: US-131 LEGAL ALI
WITNESSES:
S 37° E 45.30' FOUND NAIL & TAG 24" MAPLE
S 03° E 41.13' FOUND NAIL & TAG 26" MAPLE
N 09° E 33.98' FOUND POST 6' CHAIN LINK FENCE
S 68° W 47.25' FOUND NAIL 12" CLUMPED COTTONWOOD

ALIGNMENT POINTS

872 PC STA 206+74.33
SET PK NAIL US-131 0.85' WEST OF PHYSICAL C/L US-131
NORTHING: 460169.87 EASTING: 19425039.70
STATION: 206+74.33 OFFSET: 0.00
ALIGNMENT: US-131 LEGAL ALI
WITNESSES:
N 72 W 59.10' FOUND CENTER OF ROW CONC MON
N 22 W 61.55' FOUND NAIL / TAG IN 19" PINE
S 76 E 75.30' FOUND NAIL / TAG POWER POLE
S 72 E 0.85' PHYSICAL C/L US 131

10614 POTC STA 216+10.01
FOUND REBAR 81 FEET WEST OF C/L US 131; 2.5 FEET SOUTH OF C/L M-186
NORTHING: 461100.99 EASTING: 19425195.68
STATION: 216+10.01 OFFSET: 77.32 LEFT
ALIGNMENT: US-131 LEGAL ALI
WITNESSES:
EAST 142.78' CENTER OF SECTION 11
N 15 E 43.96' S. POST STOP SIGN
EAST 81.03' C/L US 131
NORTH 2.53' C/L M-186
S 20 E 51.03' SET MAG NAIL IN POWER POLE FOR SIGNAL LIGHT

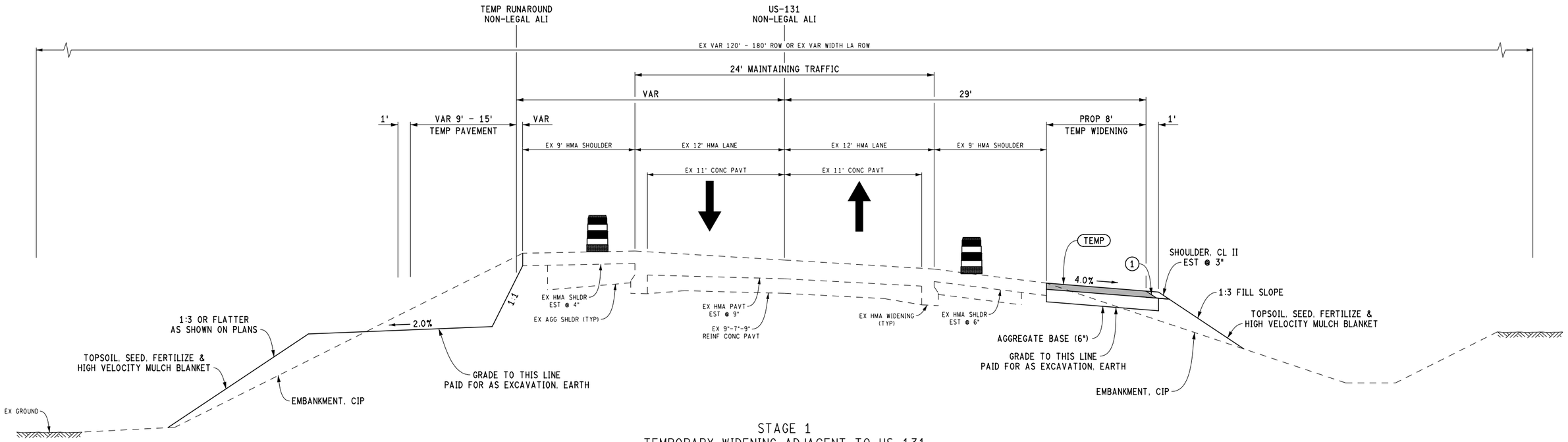
85 POTC STA 241+64.37
FOUND REBAR C/L GRAVEL ROAD 940' +/- WEST OF US-131
NORTHING: 463690.08 EASTING: 19426130.33
STATION: 241+64.37 OFFSET: 653.36 LEFT
ALIGNMENT: US-131 LEGAL ALI
WITNESSES:
S 40° W 40.11' FOUND NAI & TAG 28" MAPLE
N 60° E 41.23' FOUND NAIL & TAG 12" LOCUST
S 45° E 61.59' FOUND NAI & TAG 28" MAPLE

86 POTC STA 260+83.22
FOUND REBAR IN C/L BOYD STREET APPROXIMATELY 50' NORTH OF US-131 INTERSECTION
NORTHING: 464394.58 EASTING: 19428122.88
STATION: 260+83.22 OFFSET: 42.61 LEFT
ALIGNMENT: US-131 LEGAL ALI
WITNESSES:
N 55° E 63.32' FOUND NAIL & TAG IN POWER POLE
N 30° W 79.58' SET NAIL & TAG POWER POLE
WEST 109.20' NE COR HSE 6644
S 15° E 124.54' SET MAG NAIL IN POWER POLE

873 PT STA 267+80.81
SET PK NAIL US-131 APPROXIMATELY 720' NORTHEAST OF BOYD STREET
NORTHING: 464628.35 EASTING: 19428783.79
STATION: 267+80.81 OFFSET: 0.00
ALIGNMENT: US-131 LEGAL ALI
WITNESSES:
WEST 132.81' SET MAG NAIL IN POWER POLE
S 8° E 106.53' N FACE CONCRETE SIGN BASE
S 55° E 75.44' SET MAG NAIL IN 9" ELM
N 75° W 69.69' SET MAG NAIL W. LEG 2 POST FIFE LAKE ROAD SIGN

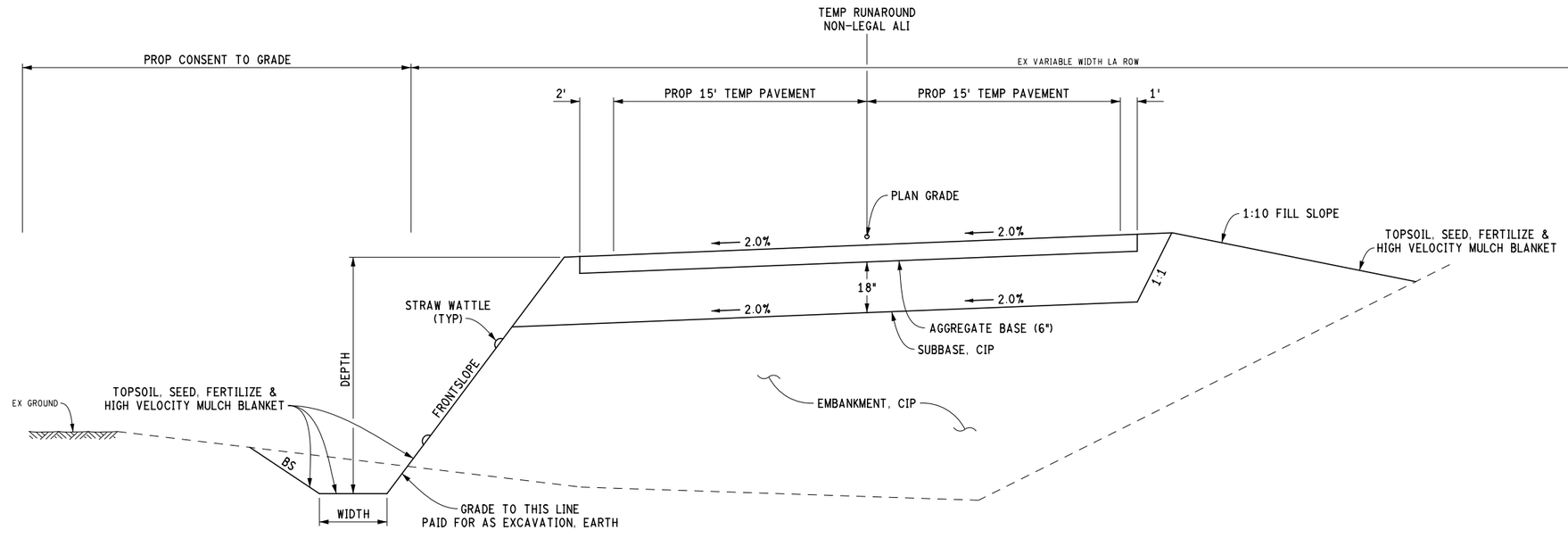
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											DESIGN UNIT: TALLON	JN: 132412A
											FILE: 132412_survey001.doc	TSC: TRAVERSE CITY

SURVEY INFORMATION SHEET	DRAWING	SHEET
	US-131 SURVEY 002	SECT 1 17



STAGE 1
TEMPORARY WIDENING ADJACENT TO US-131

(1) PAVEMENT SAFETY EDGE
SEE STANDARD PLAN R-110 SERIES



STAGE 1
TEMPORARY RUNAROUND

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

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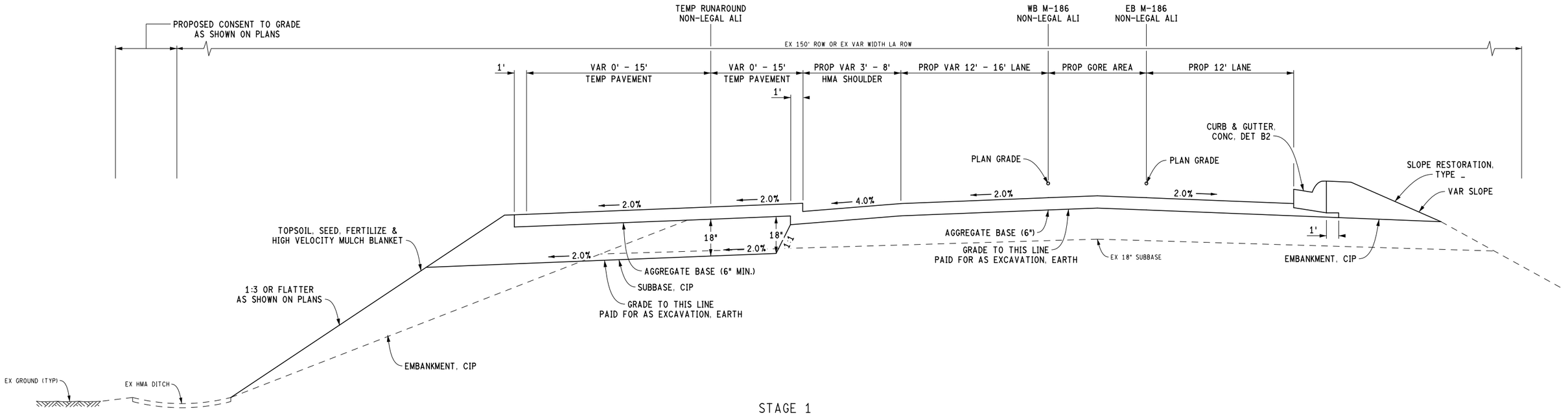
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DATE: 08/31/18
DESIGN UNIT: TALLON
TSC: TRAVERSE CITY

CS: 28091
JN: 132412A

MAINTAINING TRAFFIC/CONSTRUCTION STAGING
TYPICAL CROSS SECTIONS
STAGE 1

DRAWING: US-131 MTTYP 001
SHEET: SECT 1



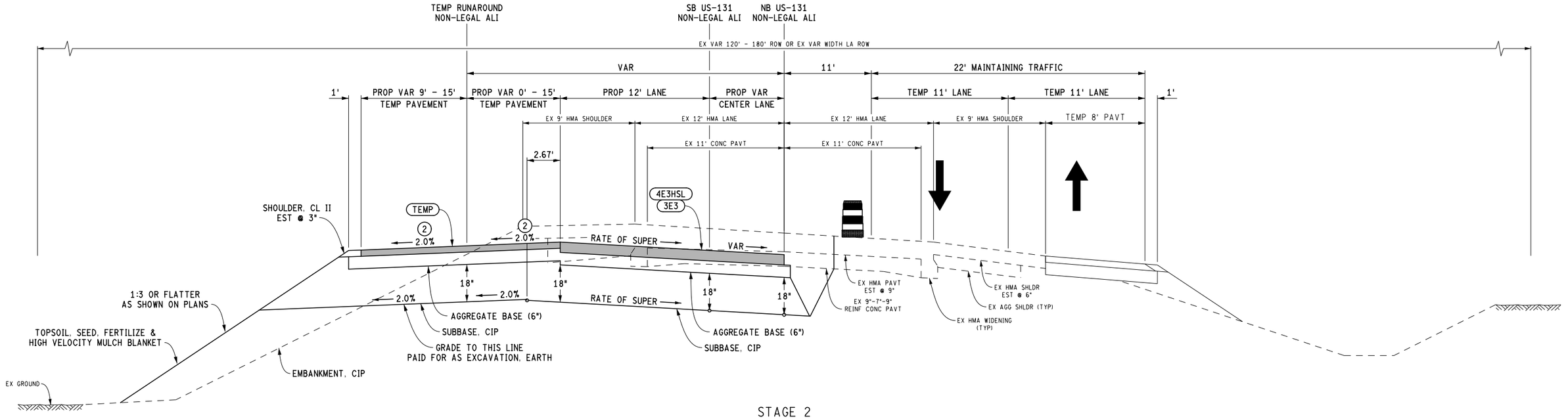
STAGE 1
TEMPORARY WIDENING ADJACENT TO M-186

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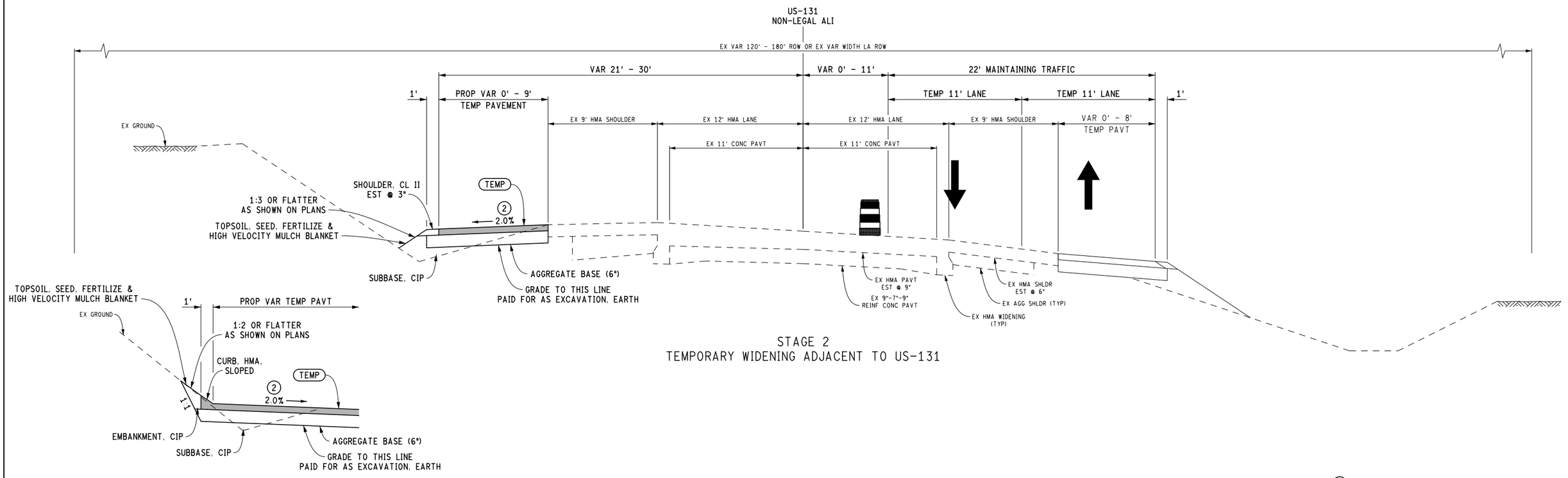
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HORZ. (FT) 0 8

	DATE: 08/31/18	CS: 28091	MAINTAINING TRAFFIC/CONSTRUCTION STAGING	DRAWING	SHEET
	DESIGN UNIT: TALLON	JN: 132412A	TYPICAL CROSS SECTIONS	US-131 MTTYP 002	SECT 1
FILE: 132412_us131_typ003.dgn	TSC: TRAVERSE CITY		STAGE 1		19



STAGE 2
TEMPORARY WIDENING ADJACENT TO US-131



STAGE 2
TEMPORARY WIDENING ADJACENT TO US-131

HMA CURB DETAIL - CUT SECTION

(2) SEE DETAIL GRADES

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MDOT Michigan Department of Transportation

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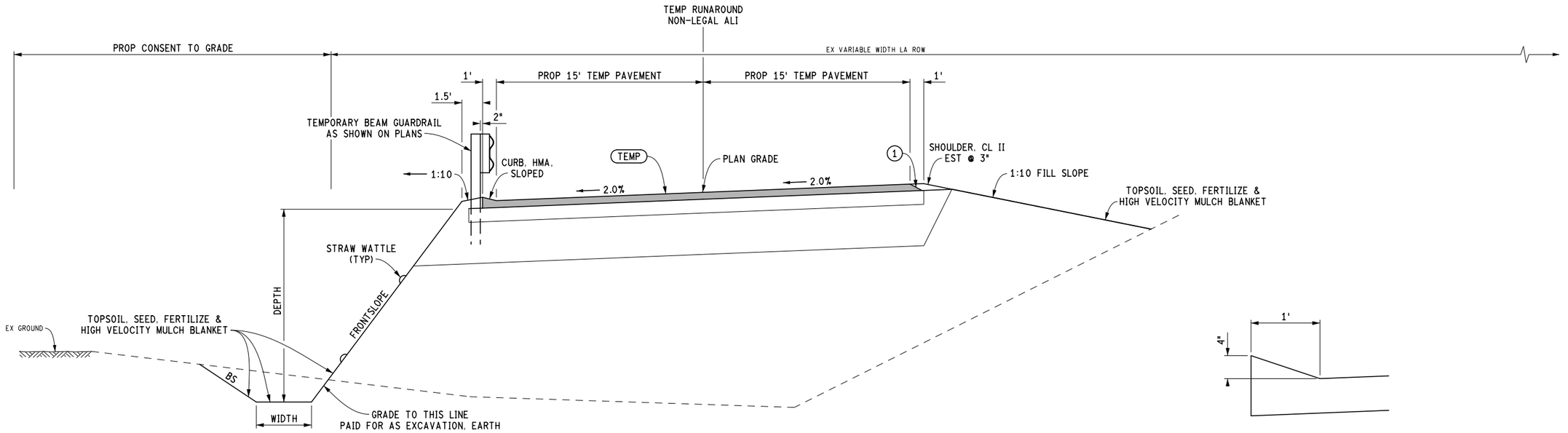
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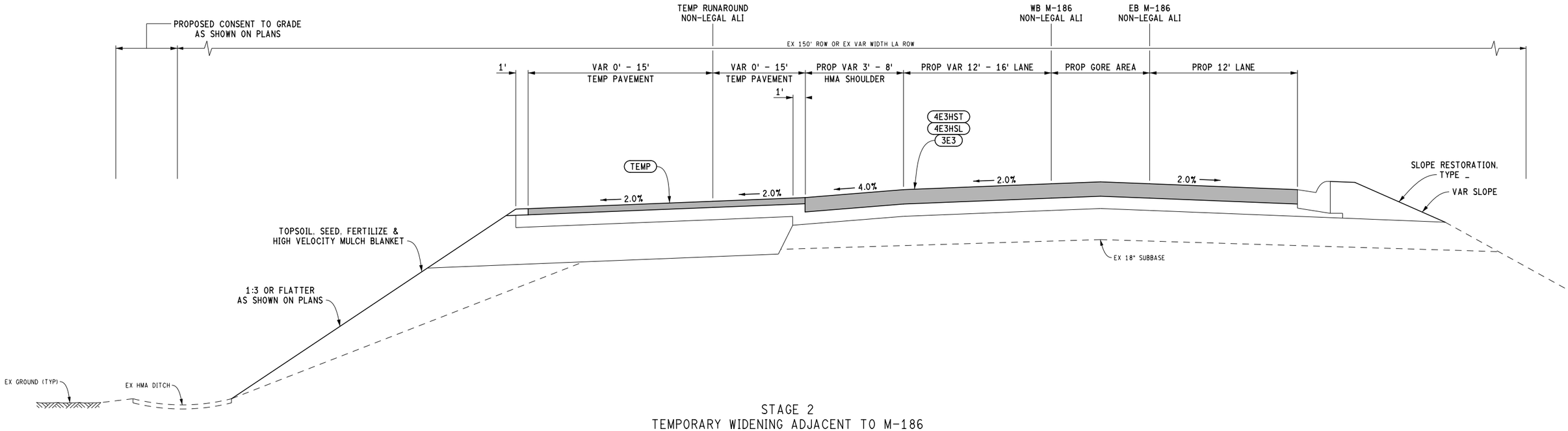
MAINTAINING TRAFFIC/CONSTRUCTION STAGING
TYPICAL CROSS SECTIONS
STAGE 2

DRAWING: US-131 MTTYP 003
SHEET: SECT 1



STAGE 2
TEMPORARY RUNAROUND

CURB SLOPED, HMA DETAIL
NOT TO SCALE



STAGE 2
TEMPORARY WIDENING ADJACENT TO M-186

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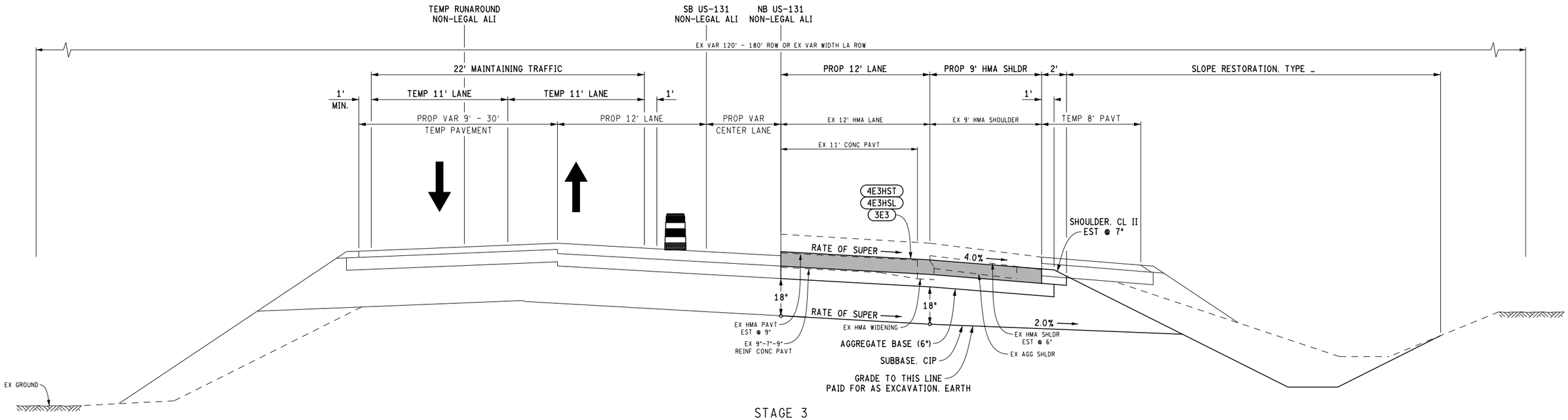
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DESIGN UNIT: TALLON
TSC: TRAVERSE CITY

CS: 28091
JN: 132412A

MAINTAINING TRAFFIC/CONSTRUCTION STAGING
TYPICAL CROSS SECTIONS
STAGE 2

DRAWING: US-131 MTTYP 004
SHEET: SECT 1



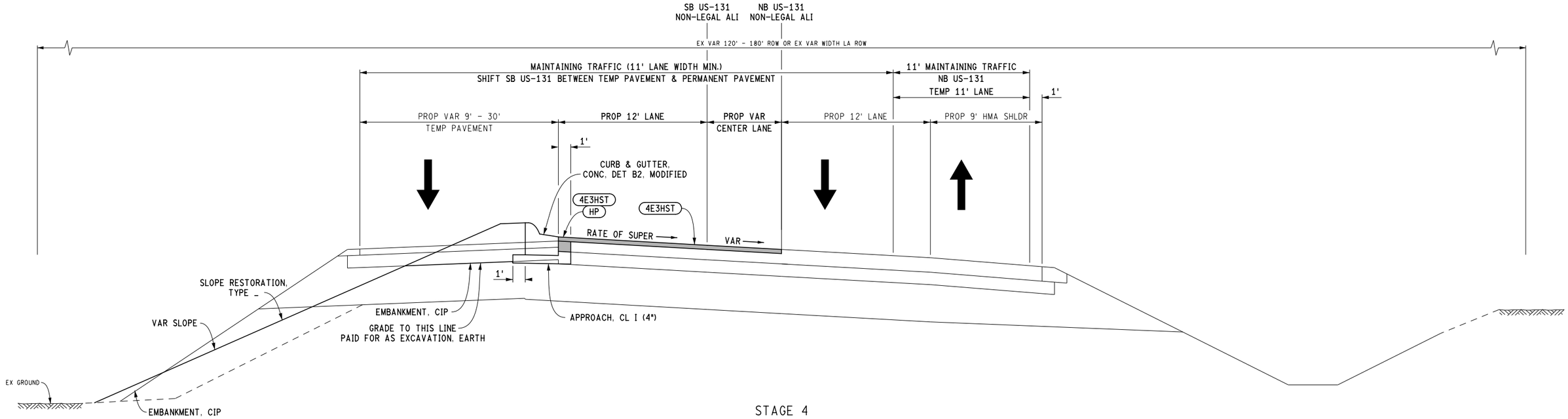
STAGE 3
WITH TEMPORARY WIDENING ADJACENT TO US-131

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

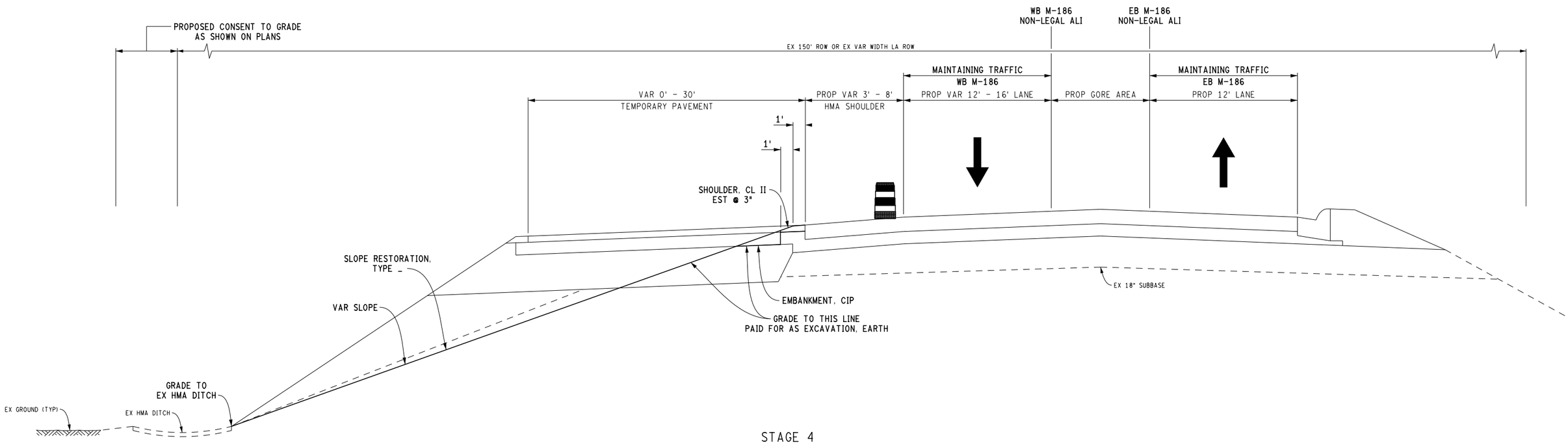
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HORZ. (FT) 0 8

	DATE: 08/31/18	CS: 28091	MAINTAINING TRAFFIC/CONSTRUCTION STAGING	DRAWING	SHEET
	DESIGN UNIT: TALLON	JN: 132412A	TYPICAL CROSS SECTIONS	US-131 MTTYP 005	SECT 1
FILE: 132412_us131_typ003.dgn	TSC: TRAVERSE CITY		STAGE 3		22



STAGE 4
WITH TEMPORARY WIDENING ADJACENT TO US-131



STAGE 4
WITH TEMPORARY WIDENING ADJACENT TO M-186

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
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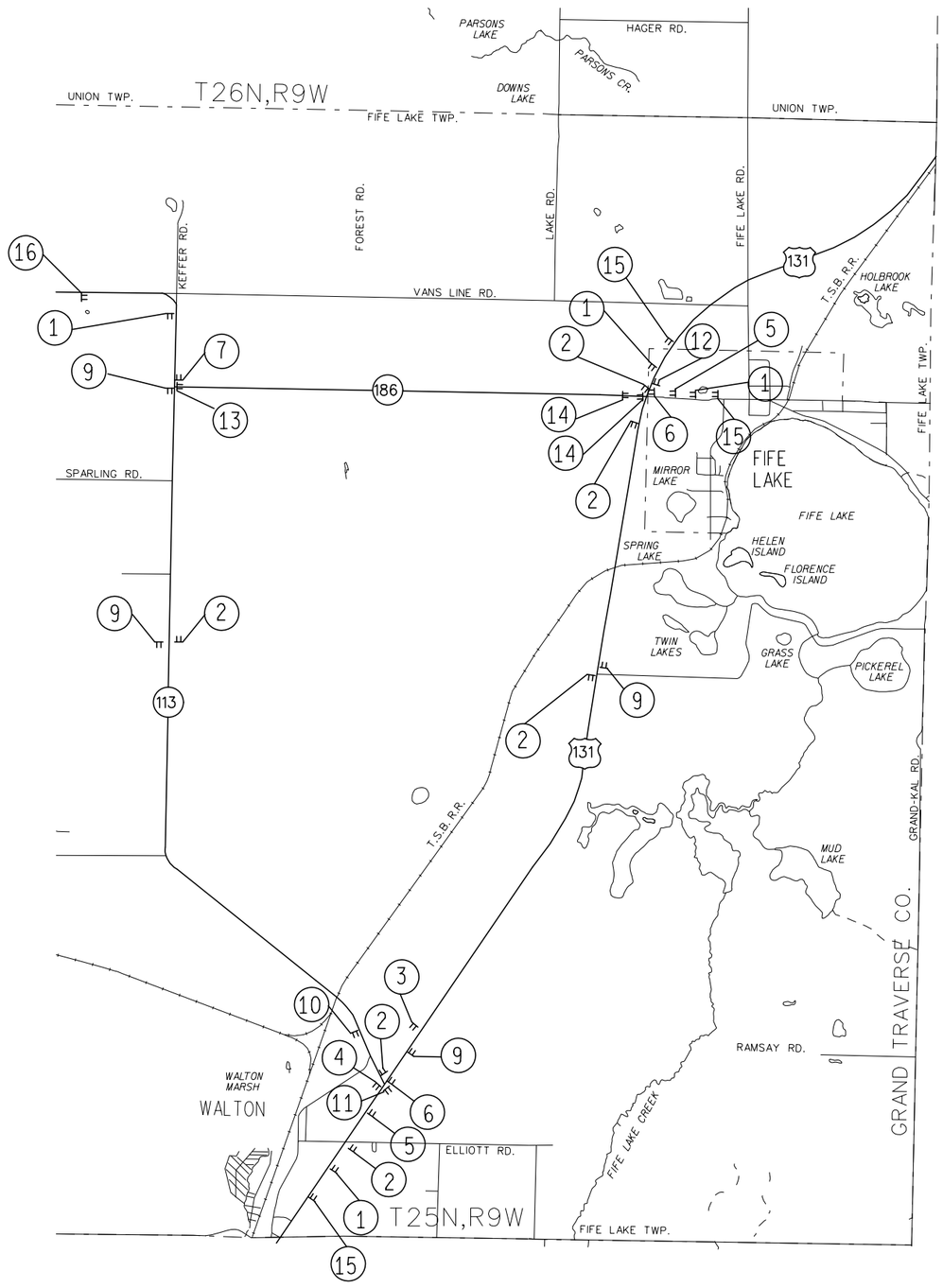
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DATE: 08/31/18
DESIGN UNIT: TALLON
TSC: TRAVERSE CITY

CS: 28091
JN: 132412A

MAINTAINING TRAFFIC/CONSTRUCTION STAGING
TYPICAL CROSS SECTIONS
STAGE 4

DRAWING	SHEET
US-131 MTTYP 006	SECT 1 23



1 DETOUR AHEAD W20-2 / M-186 SF-1i

2 DETOUR M4-8 / WEST M3-4 / 186 M1-6 / M6-3

3 DETOUR M4-8 / WEST M3-4 / 186 M1-6 / M5-1R

4 DETOUR M4-8 / WEST M3-4 / 186 M1-6 / M6-1R

5 DETOUR M4-8 / WEST M3-4 / 186 M1-6 / M5-1L

6 DETOUR M4-8 / WEST M3-4 / 186 M1-6 / M6-1L

7 END DETOUR M4-8a / WEST M3-4 / 186 M1-6

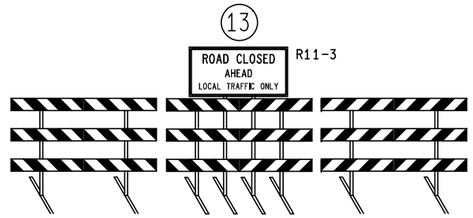
9 DETOUR M4-8 / EAST M3-2 / 186 M1-6 / M6-3

10 DETOUR M4-8 / EAST M3-2 / 186 M1-6 / M5-1L

11 DETOUR M4-8 / EAST M3-2 / 186 M1-6 / M6-1L

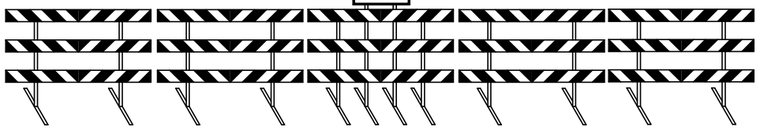
12 END DETOUR M4-8a / EAST M3-2 / 186 M1-6

13 ROAD CLOSED AHEAD LOCAL TRAFFIC ONLY R11-3



3EA TYPE III, LIGHTED BARRICADE (STAGGERED, SEE DETAIL) AND 1EA R11-3

14 ROAD CLOSED R11-2



5EA TYPE III LIGHTED BARRICADES AND 1EA R11-2

15 WEST 186 CLOSED AHEAD FOLLOW DETOUR SF-1a

16 EAST 186 CLOSED AHEAD FOLLOW DETOUR SF-1b

DETOUR QUANTITIES (FOR INFORMATION ONLY)

SIGN	SIZE (W/H)	AREA (SFT)	QUANTITY	AREA (SFT)	LEGEND	BACKGROUND	TYPE
M1-6	24"X24"	4	20	80	BLACK	WHITE	B
M3-2	24"X12"	2	7	14	BLACK	WHITE	B
M3-4	24"X12"	2	13	26	BLACK	WHITE	B
M4-8a	24"X18"	2	2	6	BLACK	ORANGE	B
M4-8	24"X12"	3	18	36	BLACK	ORANGE	B
M5-1L	21"X15"	2.19	3	7	BLACK	WHITE	B
M5-1R	21"X15"	2.19	1	3	BLACK	WHITE	B
M6-1L	21"X15"	2.19	3	7	BLACK	WHITE	B
M6-1R	21"X15"	2.19	1	3	BLACK	WHITE	B
M6-3	21"X15"	2.19	10	22	BLACK	WHITE	B
R11-2	48"X30"	10	2	20	BLACK	ORANGE	B
R11-3	60"X30"	12.5	1	13	BLACK	WHITE	B
SF-1a	54"X35"	13.13	1	14	BLACK	ORANGE	B-SPECIAL
SF-1b	54"X35"	13.13	3	40	BLACK	ORANGE	B-SPECIAL
SF-1i	24"X12"	2	4	8	BLACK	ORANGE	B-SPECIAL
W20-2	36"X36"	9	4	36	BLACK	ORANGE	B

Sign, Type B, Temp, Prismatic, Furn/Oper 273 SFT

Sign, Type B, Temp, Prismatic, Special, Furn/Oper 62 SFT

Barricade, Type III, High Intensity, Double Sided, Lighted, Furn/Oper 13 EA

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)

NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

NO SCALE

FILE:

DATE: 07/26/18

DESIGN UNIT: MCCAW

TSC: TRAVERSE CITY

CS: 28091

JN: 132412A

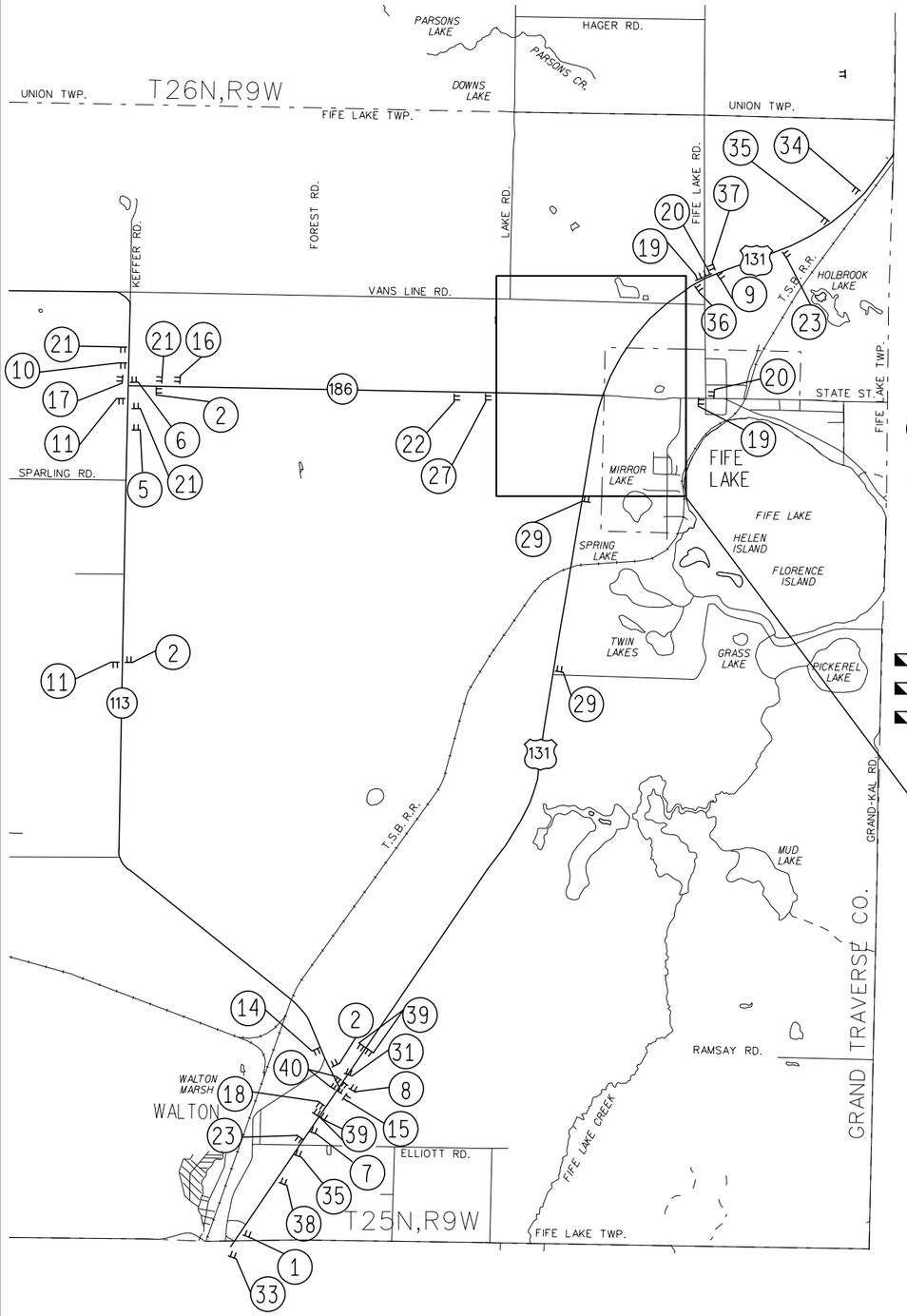
MAINTAINING TRAFFIC - STAGES 1 AND 2

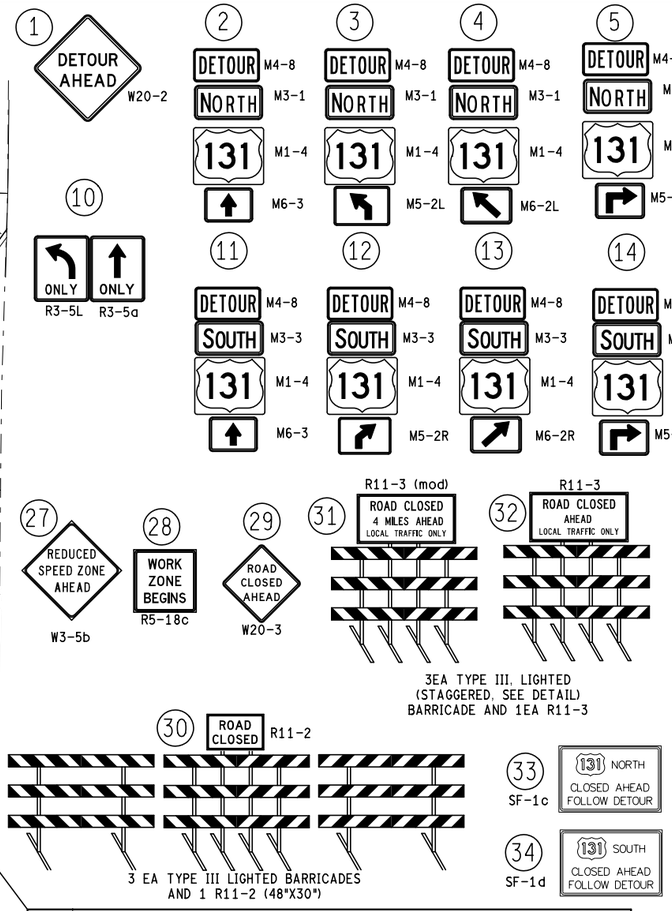
M-186 DETOUR

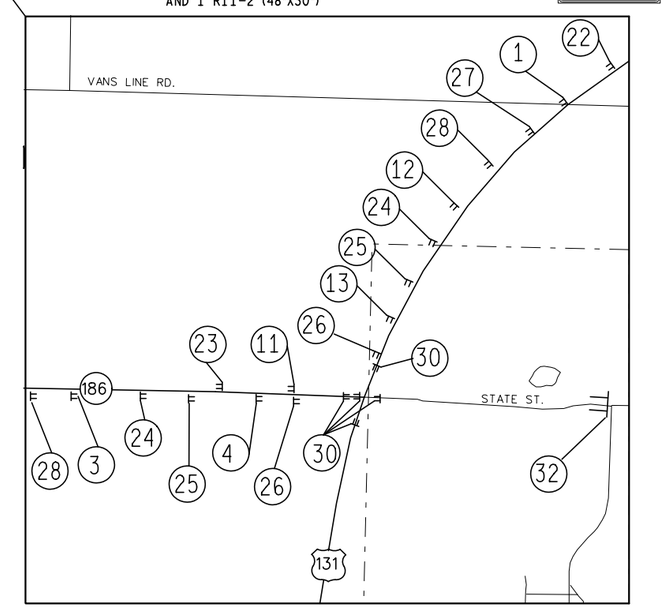
US-131 @ M-186 INTERSECTION

DRAWING: US131 MTDETR 001

SHEET: SECT 1 24







DETOUR QUANTITIES (FOR INFORMATION ONLY)

SIGN	SIZE (W/H)	AREA (SFT)	QUANTITY	AREA (SFT)	LEGEND	BACKGROUND	TYPE
M1-4	24"X24"	4	23	92	BLACK	WHITE	B
M3-1	24"X12"	2	10	20	BLACK	WHITE	B
M3-3	24"X12"	2	10	20	BLACK	WHITE	B
M4-8a	24"X18"	3	2	6	BLACK	ORANGE	B
M4-8	24"X12"	2	19	38	BLACK	ORANGE	B
M5-1L	21"X15"	2.19	1	3	BLACK	WHITE	B
M5-1R	21"X15"	2.19	4	9	BLACK	WHITE	B
M5-2L	21"X15"	2.19	1	3	BLACK	WHITE	B
M5-2R	21"X15"	2.19	1	3	BLACK	WHITE	B
M6-1L	21"X15"	2.19	3	7	BLACK	WHITE	B
M6-1R	21"X15"	2.19	3	7	BLACK	WHITE	B
M6-2L	21"X15"	2.19	1	3	BLACK	WHITE	B
M6-2R	21"X15"	2.19	1	3	BLACK	WHITE	B
M6-3	21"X15"	2.19	6	14	BLACK	WHITE	B
R1-1	48"X48"	16	4	64	WHITE	RED	A
R11-2	48"X30"	10	5	50	BLACK	ORANGE	B
R11-3 (mod)	60"X30"	12.5	1	13	BLACK	WHITE	B
R11-3	60"X30"	12.5	1	13	BLACK	WHITE	B
R2-1	24"X30"	5	9	45	BLACK	WHITE	B
R3-5a	30"X36"	7.5	1	7.5	BLACK	WHITE	B
R3-5L	30"X36"	7.5	1	7.5	BLACK	WHITE	B
R5-18c	36"X36"	9	2	18	BLACK	WHITE	B
SF-1c-d	54"X35"	13.13	2	27	BLACK	ORANGE	B-SPECIAL
SF-1e-h	54"X30"	11.25	5	57	BLACK	ORANGE	B-SPECIAL
W20-1	36"X36"	9	3	27	BLACK	ORANGE	B
W20-2	36"X36"	9	1	9	BLACK	ORANGE	B
W20-3	36"X36"	9	2	18	BLACK	ORANGE	B
W3-1	36"X36"	9	4	36	BLACK	YELLOW	B
W3-3	36"X36"	9	3	27	BLACK	ORANGE	B
W3-5b	36"X36"	9	2	18	BLACK	ORANGE	B

Sign, Type A, Temp, Prismatic, Furn/Oper 64 SFT
Sign, Type B, Temp, Prismatic, Furn/Oper 516 SFT
Sign, Type B, Temp, Prismatic,Special, Furn/Oper 84 SFT
Barricade, Type III, High Intensity, Double Sided, Lighted, Furn/Oper 21 EA

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)

NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

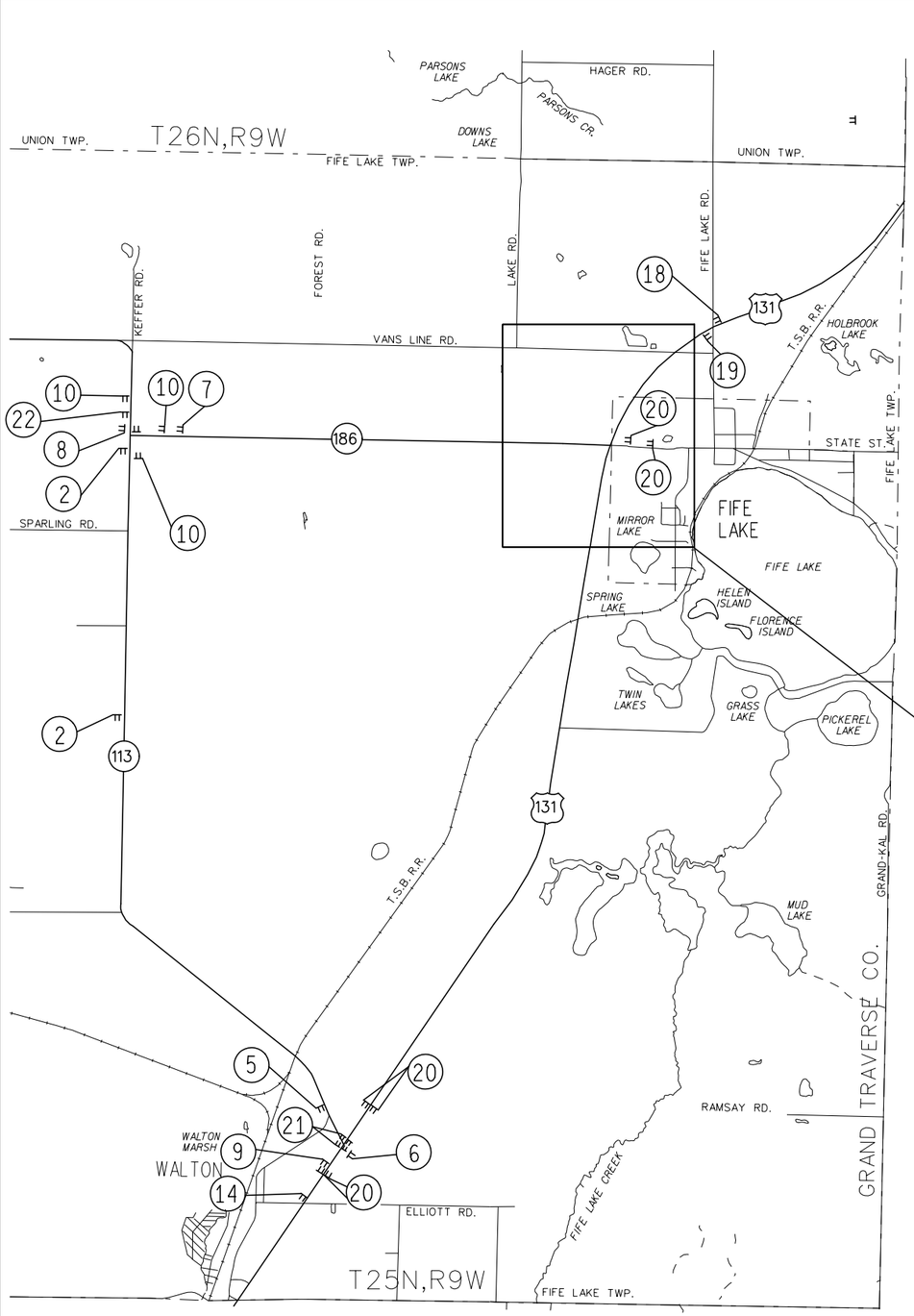
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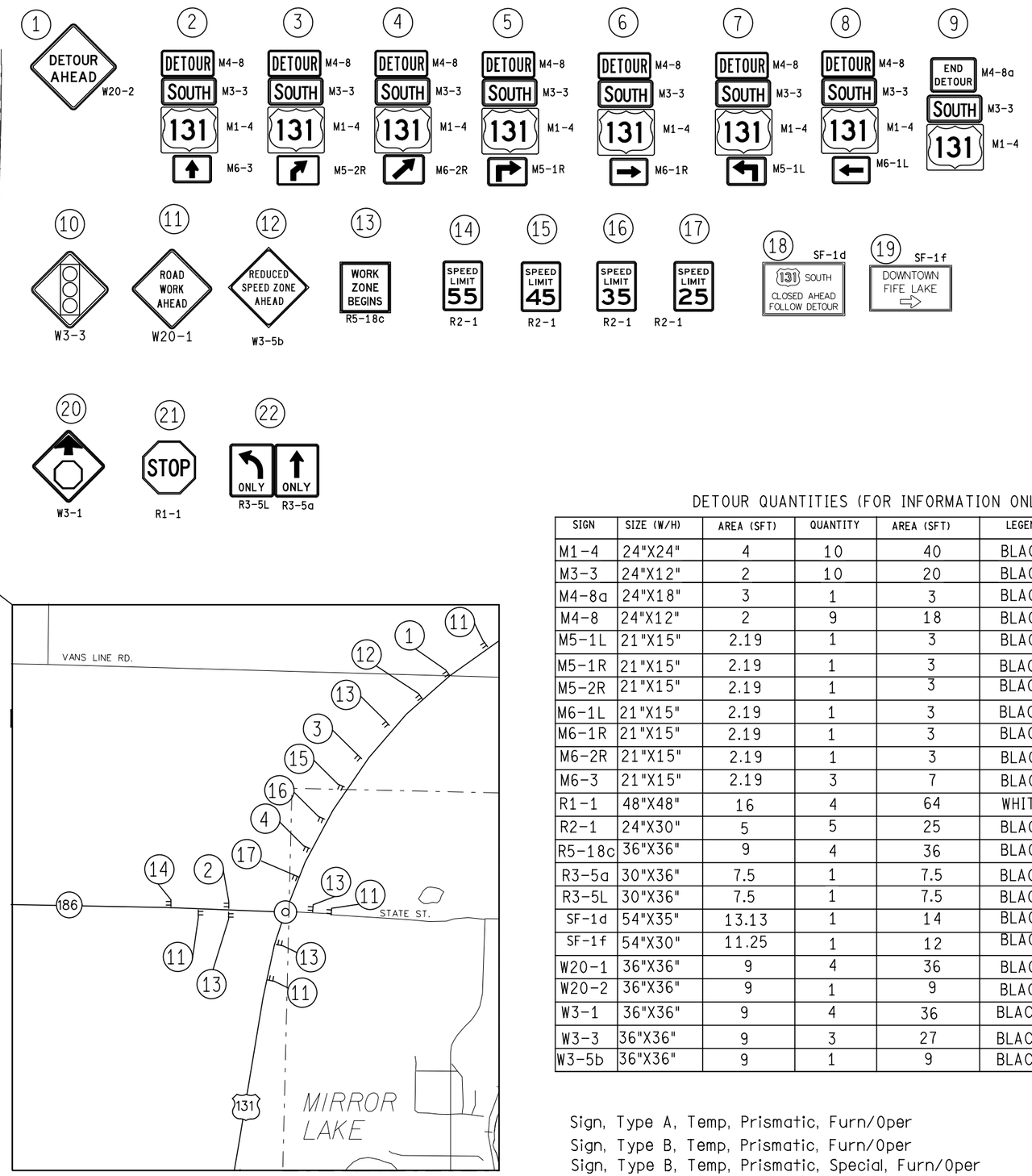
DATE: 07/26/18
DESIGN UNIT: MCCAW
FILE:
TSC: TRAVERSE CITY

CS: 28091
JN: 132412A

MAINTAINING TRAFFIC - STAGE 3
US-131 DETOUR
US-131 @ M-186 INTERSECTION

DRAWING: US131 MTDETR 002
SHEET: SECT 1





1 DETOUR AHEAD W20-2

2 DETOUR M4-8 / SOUTH M3-3 / 131 M1-4 / M6-3

3 DETOUR M4-8 / SOUTH M3-3 / 131 M1-4 / M5-2R

4 DETOUR M4-8 / SOUTH M3-3 / 131 M1-4 / M6-2R

5 DETOUR M4-8 / SOUTH M3-3 / 131 M1-4 / M5-1R

6 DETOUR M4-8 / SOUTH M3-3 / 131 M1-4 / M6-1R

7 DETOUR M4-8 / SOUTH M3-3 / 131 M1-4 / M5-1L

8 DETOUR M4-8 / SOUTH M3-3 / 131 M1-4 / M6-1L

9 END DETOUR M4-8a / SOUTH M3-3 / 131 M1-4

10 W3-3

11 ROAD WORK AHEAD W20-1

12 REDUCED SPEED ZONE AHEAD W3-5b

13 WORK ZONE BEGINS R5-18c

14 SPEED LIMIT 55 R2-1

15 SPEED LIMIT 45 R2-1

16 SPEED LIMIT 35 R2-1

17 SPEED LIMIT 25 R2-1

18 SF-1d — 131 SOUTH CLOSED AHEAD FOLLOW DETOUR

19 SF-1f — DOWNTOWN FIFE LAKE ⇨

20 W3-1

21 STOP R1-1

22 ONLY R3-5L / ONLY R3-5a

DETOUR QUANTITIES (FOR INFORMATION ONLY)

SIGN	SIZE (W/H)	AREA (SFT)	QUANTITY	AREA (SFT)	LEGEND	BACKGROUND	TYPE
M1-4	24"X24"	4	10	40	BLACK	WHITE	B
M3-3	24"X12"	2	10	20	BLACK	WHITE	B
M4-8a	24"X18"	3	1	3	BLACK	ORANGE	B
M4-8	24"X12"	2	9	18	BLACK	ORANGE	B
M5-1L	21"X15"	2.19	1	3	BLACK	WHITE	B
M5-1R	21"X15"	2.19	1	3	BLACK	WHITE	B
M5-2R	21"X15"	2.19	1	3	BLACK	WHITE	B
M6-1L	21"X15"	2.19	1	3	BLACK	WHITE	B
M6-1R	21"X15"	2.19	1	3	BLACK	WHITE	B
M6-2R	21"X15"	2.19	1	3	BLACK	WHITE	B
M6-3	21"X15"	2.19	3	7	BLACK	WHITE	B
R1-1	48"X48"	16	4	64	WHITE	RED	A
R2-1	24"X30"	5	5	25	BLACK	WHITE	B
R5-18c	36"X36"	9	4	36	BLACK	WHITE	B
R3-5a	30"X36"	7.5	1	7.5	BLACK	WHITE	B
R3-5L	30"X36"	7.5	1	7.5	BLACK	WHITE	B
SF-1d	54"X35"	13.13	1	14	BLACK	ORANGE	B-SPECIAL
SF-1f	54"X30"	11.25	1	12	BLACK	ORANGE	B-SPECIAL
W20-1	36"X36"	9	4	36	BLACK	ORANGE	B
W20-2	36"X36"	9	1	9	BLACK	ORANGE	B
W3-1	36"X36"	9	4	36	BLACK	ORANGE	B
W3-3	36"X36"	9	3	27	BLACK	ORANGE	B
W3-5b	36"X36"	9	1	9	BLACK	ORANGE	B

Sign, Type A, Temp, Prismatic, Furn/Oper	64 SFT
Sign, Type B, Temp, Prismatic, Furn/Oper	304 SFT
Sign, Type B, Temp, Prismatic, Special, Furn/Oper	26 SFT

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)

NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

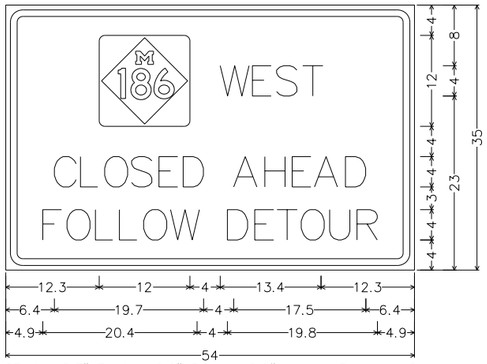
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DATE: 07/26/18
DESIGN UNIT: MCCAW
FILE:
TSC: TRAVERSE CITY

CS: 28091
JN: 132412A

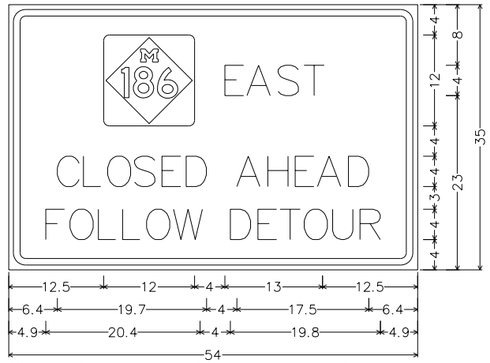
MAINTAINING TRAFFIC - STAGE 4
US-131 SOUTH DIRECTIONAL DETOUR
US-131 @ M-186 INTERSECTION

DRAWING: US131 MTDETR 003
SHEET: SECT 1 — 26



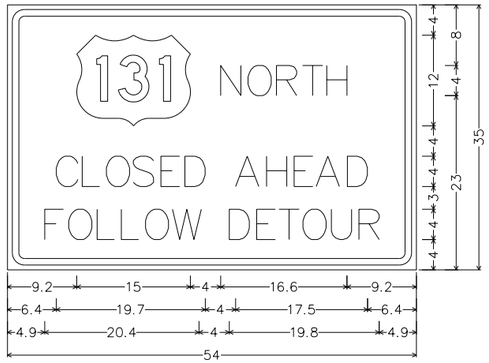
SF-1a; 2.3" Radius, 0.9" Border, 0.6" Indent, Black on Orange;
State Highway 186 M1-6b; [WEST] D; [CLOSED AHEAD] D;
[FOLLOW DETOUR] D;
Table of letter and object lefts.

12.3	W 28.3	E 32.6	S 35.8	T 39.2
C 6.4	L 9.9	O 13.1	S 16.6	E 20.3	D 23.4	A 30.1	H 34.2	E 37.8	A 40.8	D 44.9
F 4.9	O 8.1	L 11.8	L 15.0	O 18.2	W 21.8	D 29.3	E 32.9	T 35.8	O 39.0	U 42.8	R 46.4



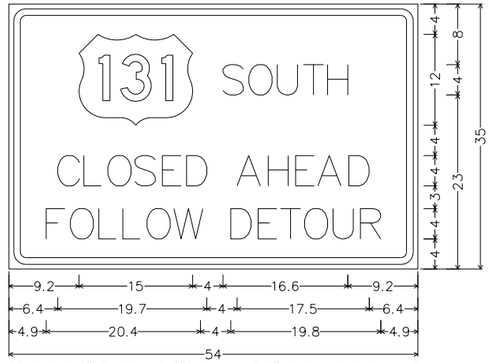
SF-1b; 2.3" Radius, 0.9" Border, 0.6" Indent, Black on Orange;
State Highway 186 M1-6b; [EAST] D; [CLOSED AHEAD] D;
[FOLLOW DETOUR] D;
Table of letter and object lefts.

12.5	E 28.5	A 31.5	S 35.6	T 39.0
C 6.4	L 9.9	O 13.1	S 16.6	E 20.3	D 23.4	A 30.1	H 34.2	E 37.8	A 40.8	D 44.9
F 4.9	O 8.1	L 11.8	L 15.0	O 18.2	W 21.8	D 29.3	E 32.9	T 35.8	O 39.0	U 42.8	R 46.4



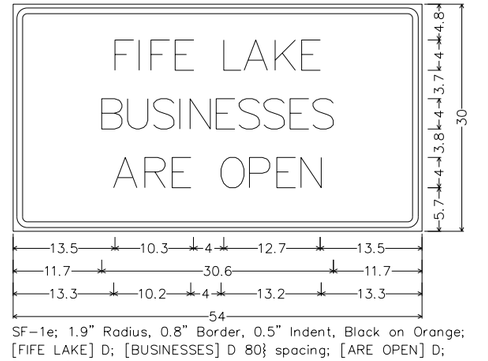
SF-1c; 2.3" Radius, 0.9" Border, 0.6" Indent, Black on Orange;
[NORTH] D; [CLOSED AHEAD] D; [FOLLOW DETOUR] D;
Table of letter and object lefts.

131 9.2	N 28.2	O 31.8	R 35.5	T 39.0	H 42.2
C 6.4	L 9.9	O 13.1	S 16.6	E 20.3	D 23.4	A 30.1	H 34.2	E 37.8	A 40.8	D 44.9
F 4.9	O 8.1	L 11.8	L 15.0	O 18.2	W 21.8	D 29.3	E 32.9	T 35.8	O 39.0	U 42.8	R 46.4



SF-1d; 2.3" Radius, 0.9" Border, 0.6" Indent, Black on Orange;
[SOUTH] D; [CLOSED AHEAD] D; [FOLLOW DETOUR] D;
Table of letter and object lefts.

131 9.2	S 28.2	O 31.7	U 35.4	T 38.9	H 42.1
C 6.4	L 9.9	O 13.1	S 16.6	E 20.3	D 23.4	A 30.1	H 34.2	E 37.8	A 40.8	D 44.9
F 4.9	O 8.1	L 11.8	L 15.0	O 18.2	W 21.8	D 29.3	E 32.9	T 35.8	O 39.0	U 42.8	R 46.4



SF-1e; 1.9" Radius, 0.8" Border, 0.5" Indent, Black on Orange;
[FIFE LAKE] D; [BUSINESSES] D 80} spacing; [ARE OPEN] D;
Table of letter and object lefts.

F 13.5	I 16.6	F 18.2	E 21.4	L 27.8	A 30.5	K 34.6	E 38.1		
B 11.7	U 15.1	S 18.6	I 22.0	N 23.4	E 26.8	S 29.9	S 33.1	E 36.6	S 39.6
A 13.3	R 17.4	E 21.0	O 27.5	P 31.2	E 34.8	N 38.0			



SF-1f; 1.9" Radius, 0.8" Border, 0.5" Indent, Black on Orange;
[DOWNTOWN] D; [FIFE LAKE] D;
Standard Arrow Custom 13.4" X 8.1" 0};
Table of letter and object lefts.

D 9.3	O 13.6	W 18.0	N 23.3	T 27.6	O 31.6	W 36.1	N 41.4	
F 10.1	I 14.1	F 16.0	E 20.0	L 28.0	A 31.4	K 36.5	E 40.9	
⇨ 20.3								



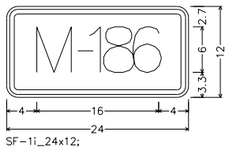
SF-1g; 1.9" Radius, 0.8" Border, 0.5" Indent, Black on Orange;
[DOWNTOWN] D; [FIFE LAKE] D;
Standard Arrow Custom 13.4" X 8.1" 180};
Table of letter and object lefts.

D 9.3	O 13.6	W 18.0	N 23.3	T 27.6	O 31.6	W 36.1	N 41.4	
F 10.1	I 14.1	F 16.0	E 20.0	L 28.0	A 31.4	K 36.5	E 40.9	
⇦ 20.3								



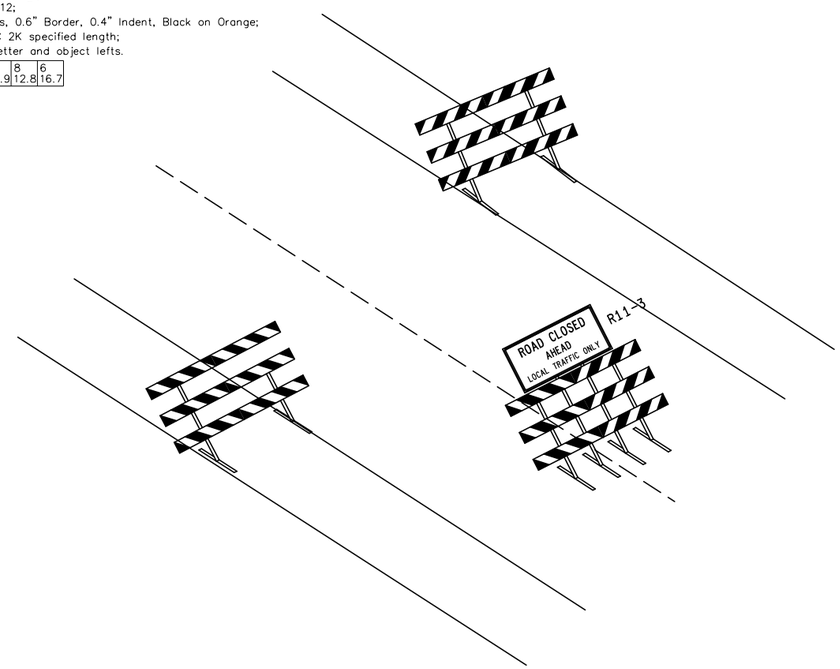
SF-1h; 1.9" Radius, 0.8" Border, 0.5" Indent, Black on Orange;
[DOWNTOWN] D; [FIFE LAKE] D;
[FOLLOW DETOUR] D 80} spacing;
Table of letter and object lefts.

D 9.3	O 13.6	W 18.0	N 23.3	T 27.6	O 31.6	W 36.1	N 41.4				
F 10.1	I 14.1	F 16.0	E 20.0	L 28.0	A 31.4	K 36.5	E 40.9				
F 5.7	O 8.7	L 12.3	L 15.3	O 18.4	W 21.8	D 29.3	E 32.7	T 35.6	O 38.6	U 42.2	R 45.6



SF-1i_24x12;
1.5" Radius, 0.6" Border, 0.4" Indent, Black on Orange;
[M-186] C 2K specified length;
Table of letter and object lefts.

M 4.0	- 8.4	1 10.9	8 12.8	6 16.7



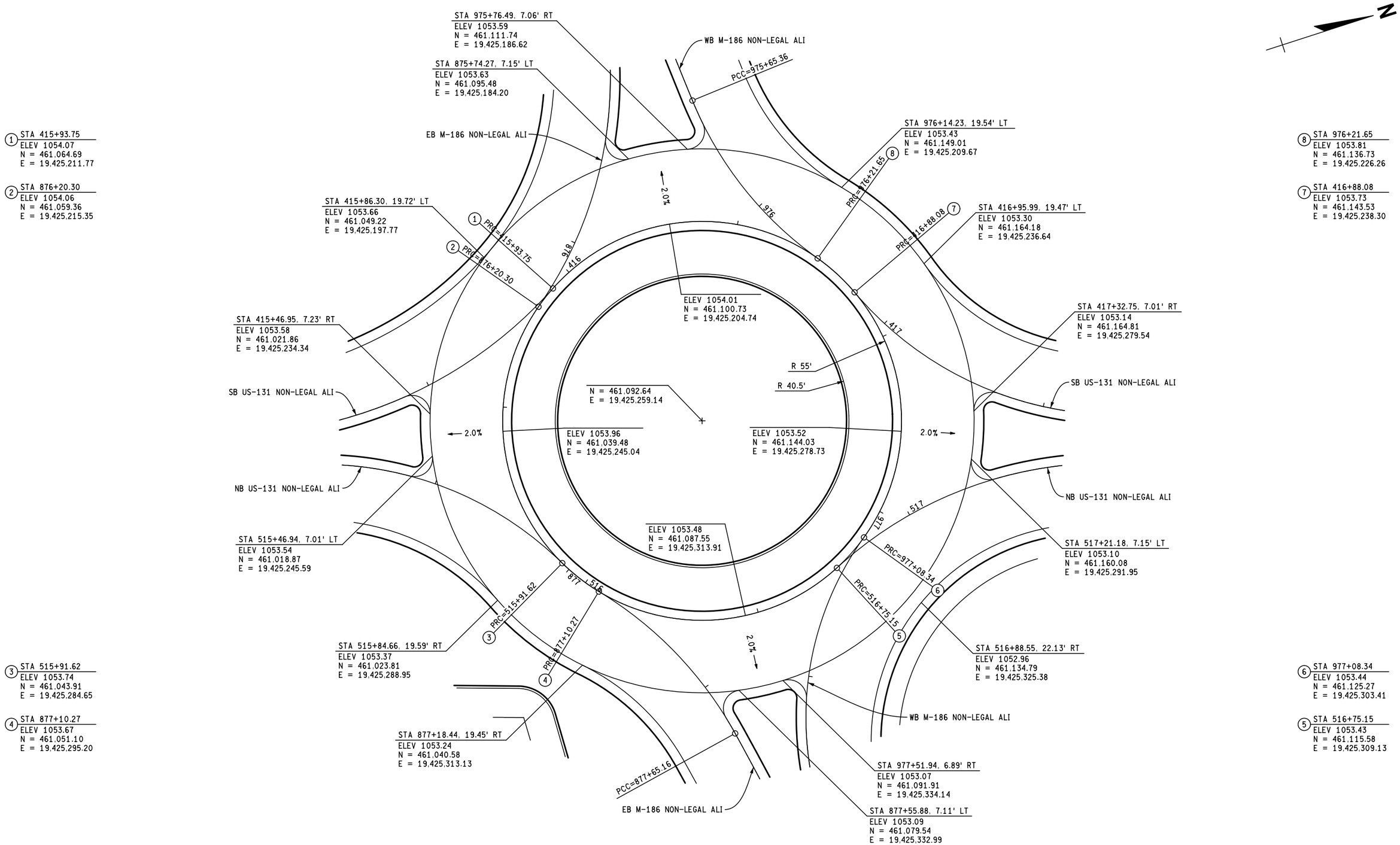
3 BARRICADE STAGGER DETAIL

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

NO SCALE

	DATE: 07/26/18	CS: 28091	MAINTAINING TRAFFIC	DRAWING / SHEET
	DESIGN UNIT: MCCAW	JN: 132412A	DETOUR SIGN DETAIL	US131 MTDETR 004 / SECT 1
FILE:	TSC: TRAVERSE CITY		US-131 @ M-186 INTERSECTION	27



FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

0 HORZ. (FT) 25

	DATE: 08/31/18	CS: 28091	DETAIL GRADES	DRAWING	SHEET
	DESIGN UNIT: TALLON	JN: 132412A	CIRCULATORY AREA	US-131 DETGRD 001	SECT 1
FILE: 132412_us131_detgrd_001.dgn	TSC: TRAVERSE CITY				28

(A) N = 460,569.76
E = 19,425,047.60

(B) N = 460,760.57
E = 19,425,989.74

(C) N = 462,106.42
E = 19,425,342.79

(D) N = 461,137.97
E = 19,425,492.43

(E) N = 461,671.73
E = 19,424,275.64

EB M-186 NON-LEGAL ALI

WB M-186 NON-LEGAL ALI

STA 874+98.70, 4.50' LT
STA 974+98.57, 4.50' RT
N = 461,108.67
E = 19,425,107.79

STA 874+70.00, 12.0' RT
ELEV 1051.82
N = 461,093.87
E = 19,425,078.16

STA 975+25.00, 16.0' LT
ELEV 1052.41
N = 461,130.46
E = 19,425,133.09

N = 461,197.86
E = 19,425,166.80

N = 460,999.07
E = 19,425,111.26

STA 875+41.66, 15.56' RT
ELEV 1052.70
N = 461,085.25
E = 19,425,147.10

STA 975+64.14, 16.0' LT
ELEV 1053.00
N = 461,133.05
E = 19,425,171.81

N = 461,011.61
E = 19,425,132.89

N = 461,221.42
E = 19,425,218.64

STA 414+66.99, 6.30' RT
STA 514+67.40, 6.30' LT
N = 460,940.75
E = 19,425,221.97

STA 415+01.57, 16.22' LT
ELEV 1052.91
N = 460,979.54
E = 19,425,209.33

STA 417+55.63, 15.91' LT
ELEV 1052.44
N = 461,195.56
E = 19,425,272.78

STA 418+37.06, 12.0' LT
ELEV 1052.48
N = 461,268.85
E = 19,425,304.58

SB US-131 NON-LEGAL ALI

NB US-131 NON-LEGAL ALI

N = 461,092.64
E = 19,425,259.14

STA 514+47.64, 12.0' RT
ELEV 1052.67
N = 460,917.71
E = 19,425,235.95

STA 515+16.29, 15.38' RT
ELEV 1052.81
N = 460,982.94
E = 19,425,252.55

STA 517+75.45, 16.0' RT
ELEV 1052.05
N = 461,206.51
E = 19,425,325.99

STA 517+46.27, 16.50' RT
ELEV 1052.34
N = 461,181.53
E = 19,425,317.78

STA 418+70.16, 8.00' RT
STA 518+58.20, 8.00' LT
N = 461,292.12
E = 19,425,335.50

N = 460,964.17
E = 19,425,314.78

N = 460,995.46
E = 19,425,359.93

N = 461,167.01
E = 19,425,375.99

STA 877+65.70, 16.0' RT
ELEV 1052.55
N = 461,059.27
E = 19,425,347.55

STA 977+95.00, 16.10' LT
ELEV 1051.95
N = 461,107.05
E = 19,425,378.11

STA 978+06.26, 16.0' LT
ELEV 1051.75
N = 461,107.51
E = 19,425,389.46

STA 878+20.97, 4.00' LT
STA 978+14.40, 4.00' RT
N = 461,087.90
E = 19,425,398.50

WB M-186 NON-LEGAL ALI

EB M-186 NON-LEGAL ALI

(1) STA 976+98.47, 63.51' LT
ELEV 1052.21
N = 461,178.87
E = 19,425,340.44

(2) STA 977+26.21, 69.24' LT
ELEV 1051.91
N = 461,163.92
E = 19,425,361.37

(3) STA 978+48.00, 34.87' LT
ELEV 1050.96
N = 461,127.88
E = 19,425,431.05

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

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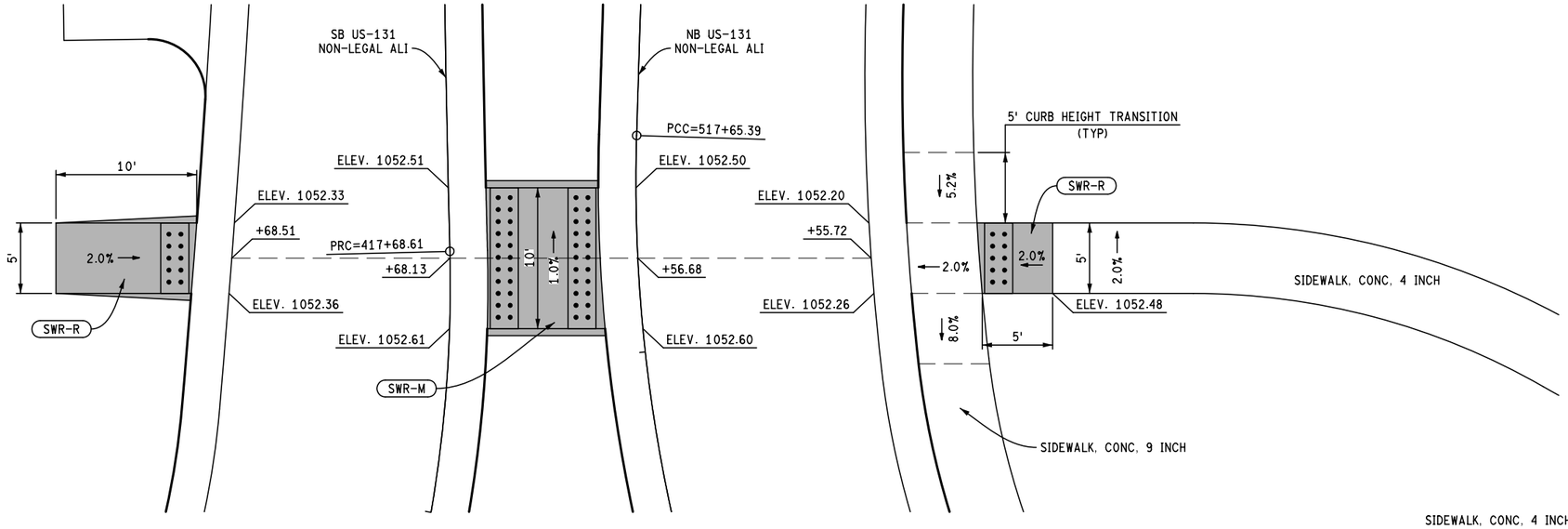
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DESIGN UNIT: TALLON
TSC: TRAVERSE CITY

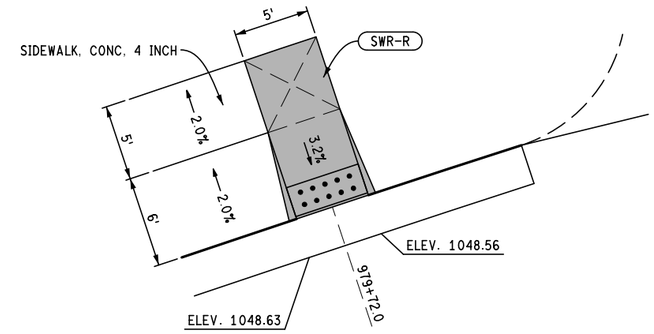
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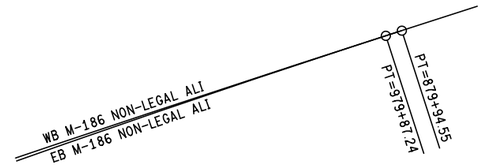
DETAIL GRADES
ROUNDABOUT AREA

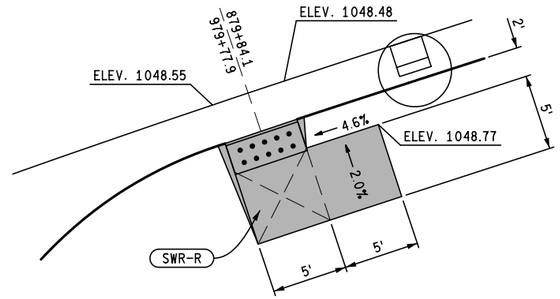
DRAWING: US-131 DETGRD 002
SHEET: SECT 1 29



NORTH LEG SIDEWALK RAMP DETAIL







EAST LEG SIDEWALK RAMP DETAIL

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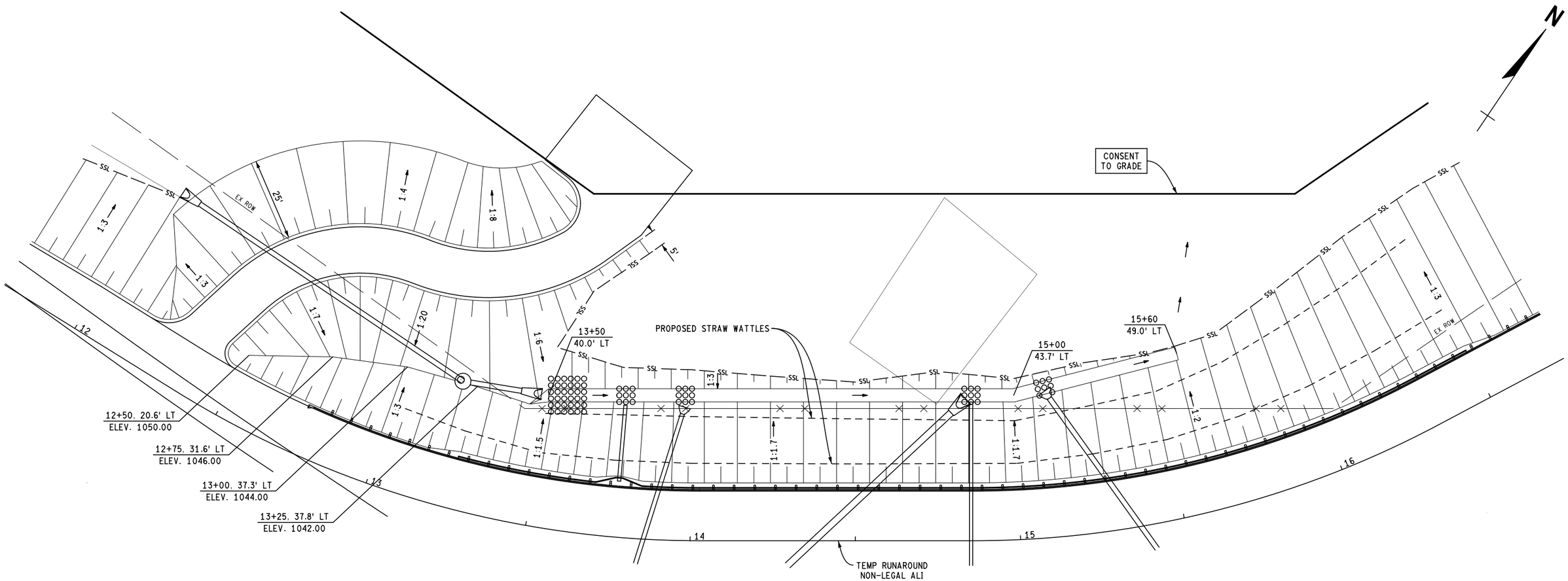
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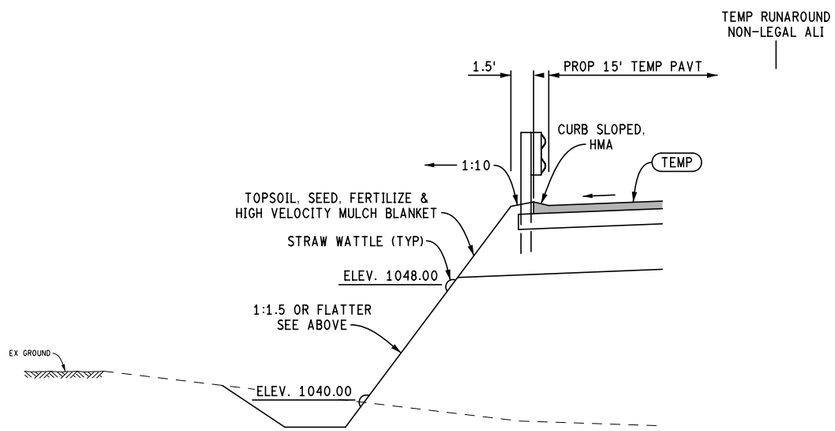
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TSC: TRAVERSE CITY

CS: 28091
JN: 132412A

DETAIL GRADES
SIDEWALK RAMPS

DRAWING	SHEET
US-131 DETGRD 003	SECT 1 30





STRAW WATTLE CROSS-SECTION VIEW
NOT TO SCALE

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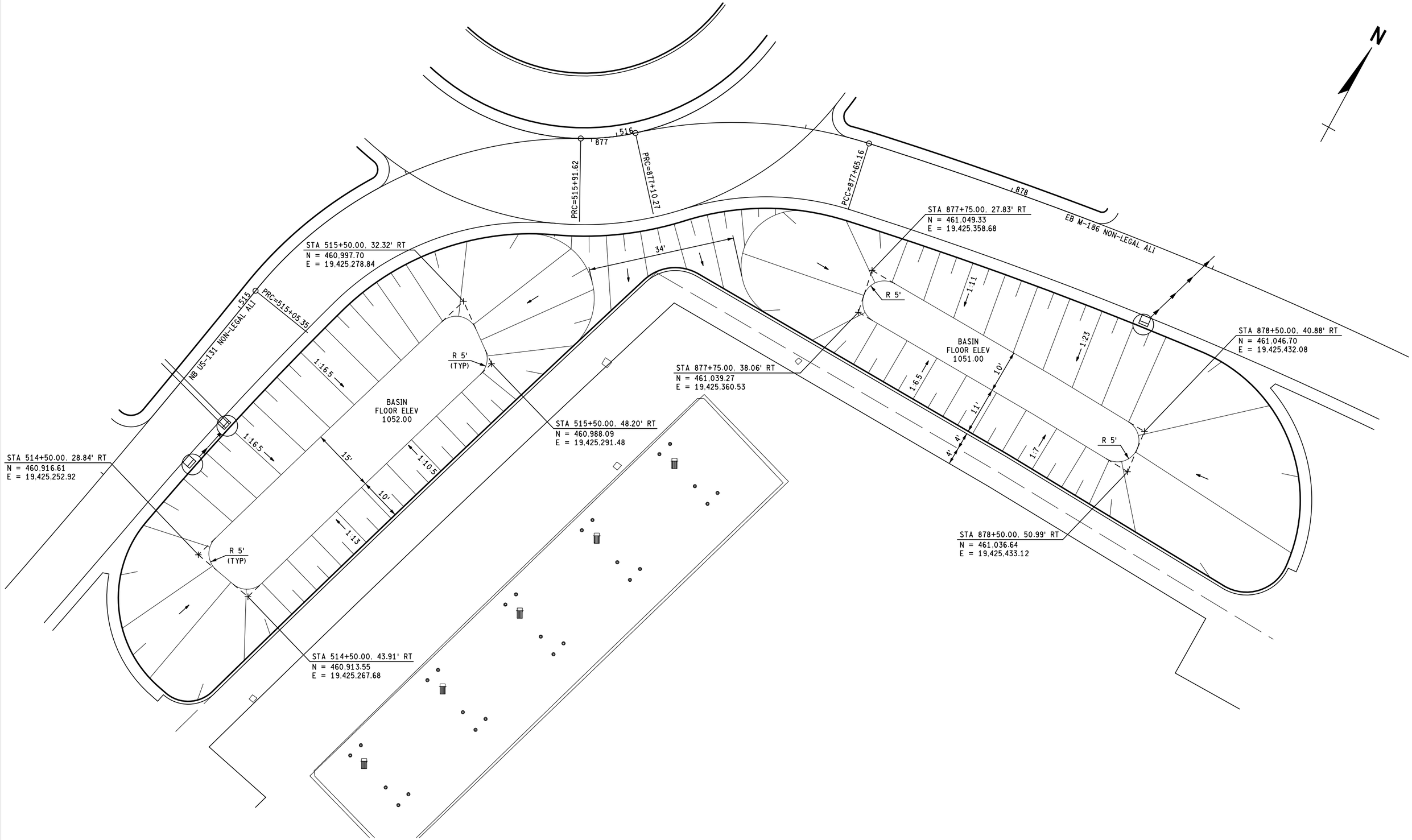
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TSC: TRAVERSE CITY

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GRADING DETAILS
TEMPORARY ROADWAY

DRAWING	SHEET
US-131 GRDNG 001	SECT 1 31

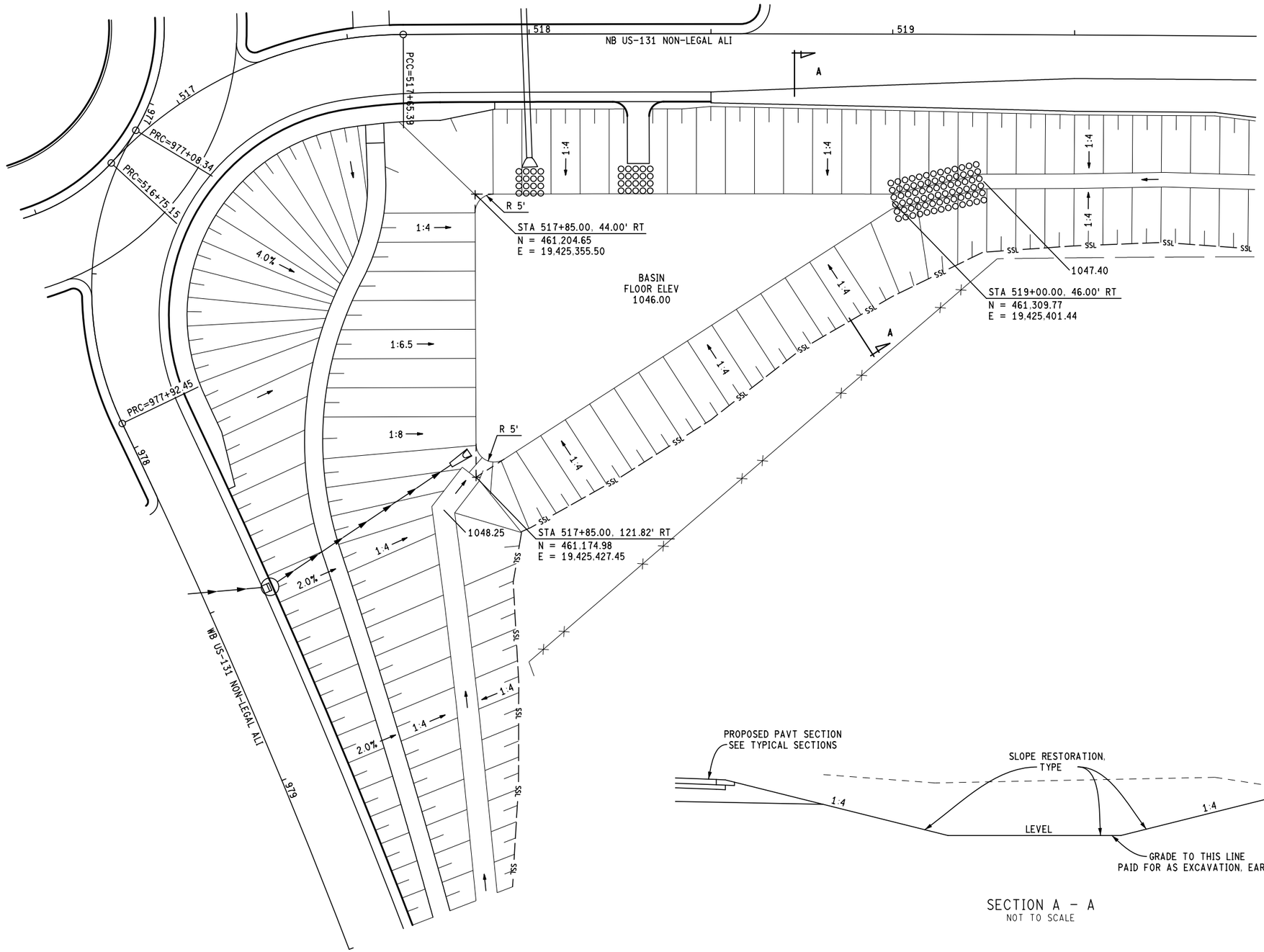


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MDOT Michigan Department of Transportation

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	DESIGN UNIT: TALLON	JN: 132412A	SE QUADRANT DRAINAGE BASINS	US-131 GRDNG 002	SECT 1
FILE: 132412_us131_grdng_002.dgn	TSC: TRAVERSE CITY				32



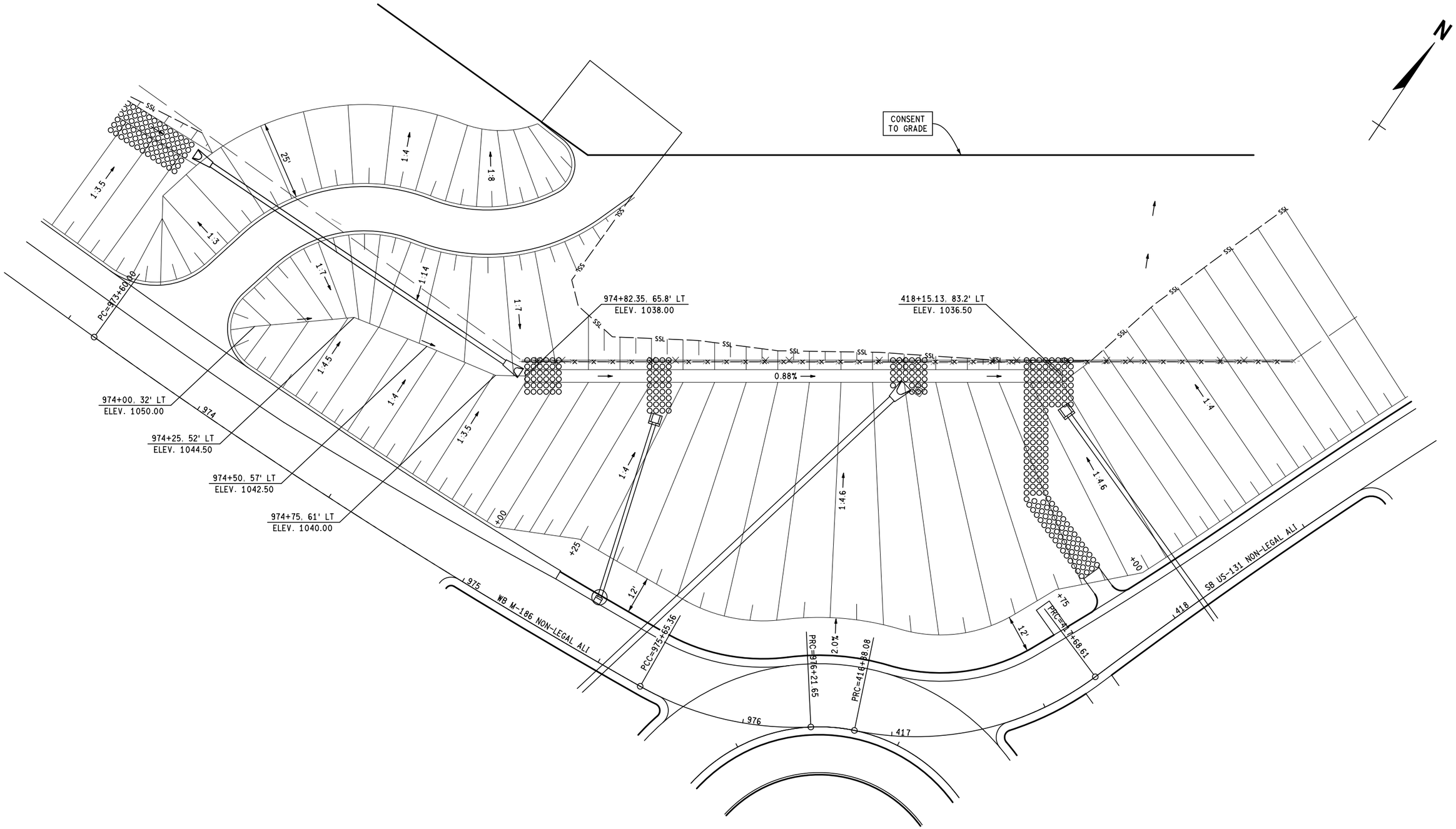
SECTION A – A
NOT TO SCALE

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MDOT Michigan Department of Transportation

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FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
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MDOT Michigan Department of Transportation

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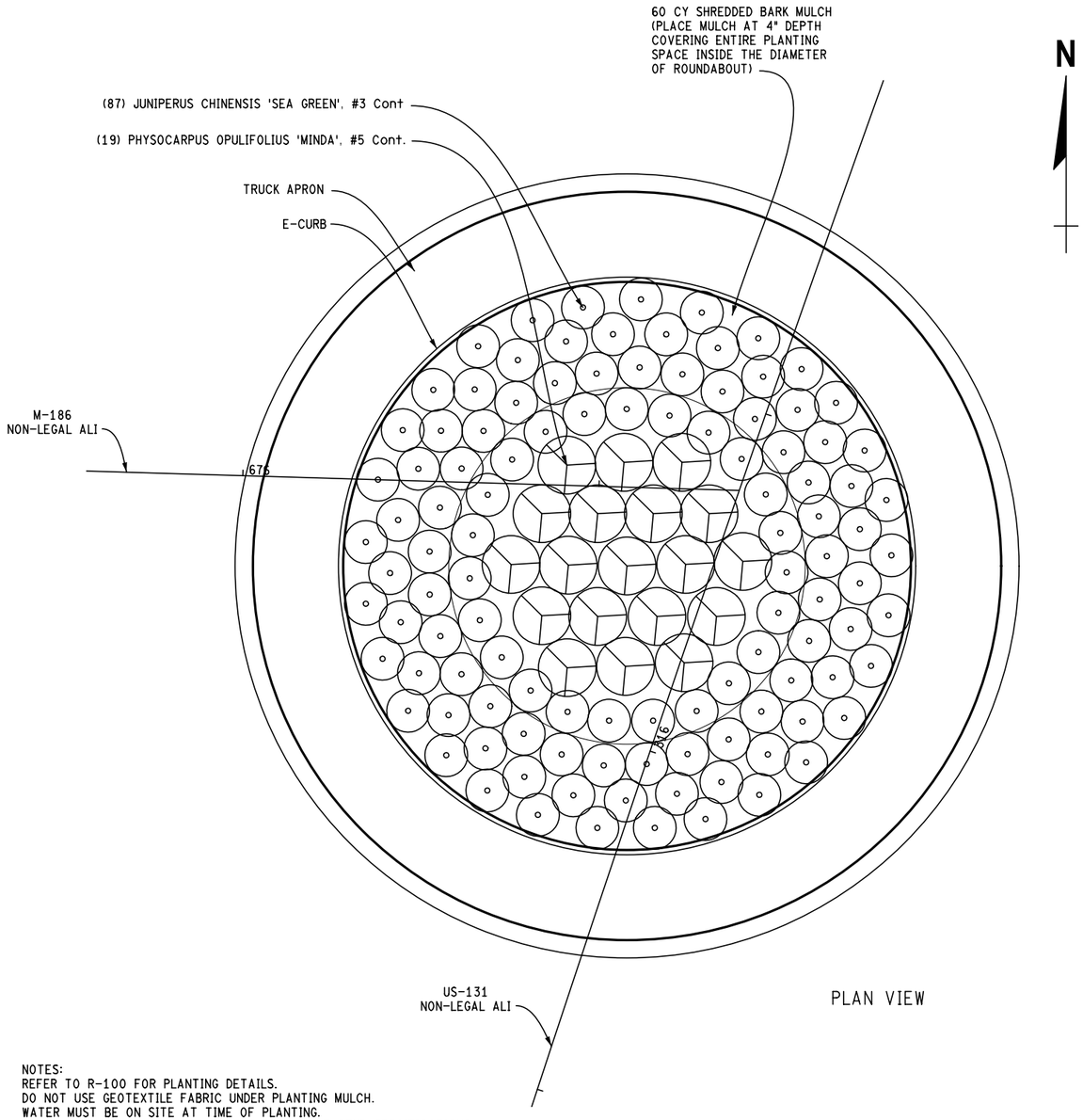
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TSC: TRAVERSE CITY

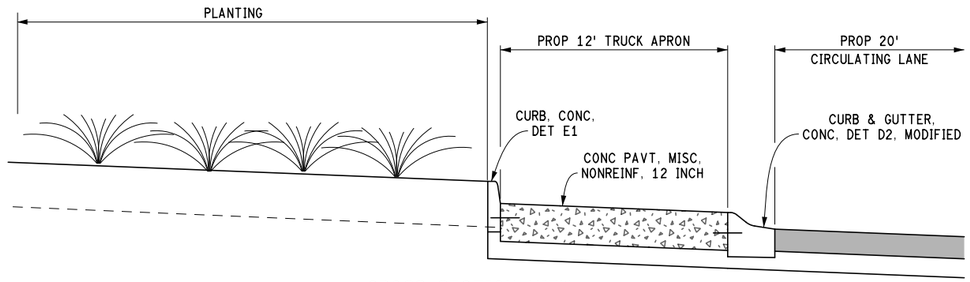
CS: 28091
JN: 132412A

GRADING DETAILS
NW QUADRANT, PERMANENT GRADING

DRAWING	SHEET
US-131 GRDNG 004	SECT 1 34



PLAN VIEW



CROSS SECTION VIEW
NOT TO SCALE

NOTES:
REFER TO R-100 FOR PLANTING DETAILS.
DO NOT USE GEOTEXTILE FABRIC UNDER PLANTING MULCH.
WATER MUST BE ON SITE AT TIME OF PLANTING.
ALL PLANTING MUST CONFORM TO THE 2012 MDOT STND SPECIFICATIONS SECTION 815 AND 917.
USE PREPARED SOIL AS SPECIFIED IN THE 2012 MDOT STND SPECIFICATIONS SECTION 815.03 A AND PAID FOR AS PART OF SITE PREPARATION.

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

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FILE: 132412_us131_lndscp001.dgn

DATE: 08/31/18
DESIGN UNIT: TALLON
TSC: TRAVERSE CITY

CS: 28091
JN: 132412A

LANDSCAPING

DRAWING	SHEET
US-131 LNDSCP 001	SECT 1 35

ABBREVIATIONS

B	BRIDGE
FB	INDICATES ST LTG UNIT WITH FRANGIBLE TRANSFORMER BASE
R	REMOVE
R&S	REMOVE AND SALVAGE
RW	RETAINING WALL
SF	SINGLE FACE BARRIER WALL
DTE	DETROIT EDISON COMPANY
CE	CONSUMERS ENERGY COMPANY
UNO	UNLESS NOTED OTHERWISE

PUBLIC UTILITIES

FOR THE PROTECTION OF UNDERGROUND UTILITIES, THE CONTRACTOR SHALL DIAL 1-800-482-7171 A MINIMUM OF 72 HOURS PRIOR TO EXCAVATING IN THE VICINITY OF THE UTILITIES LINES. ALL MISS DIG PARTICIPATING MEMBERS WILL THUS BE ROUTINELY NOTIFIED. THIS DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBLITY OF NOTIFIYING UTILITY OWNERS WHO MAY NOT BE A PART OF THE "MISS DIG" ALERT SYSTEM. (KEVIN TOMICH)

GENERAL NOTES

a. NOTIFY THE SYSTEM OPERATING ENGINEER, GREAT LAKES ENERGY, MIKE CHASE (231) 487-1379, AND KEVIN TOMICH (231) 258-5611 OFFICE OR (231) 590-2953 CELL OF MDOT MAINTENANCE, 72 HOURS PRIOR TO WORKING ON LIGHTING CIRCUITS.

b. STREET LIGHTING LUMINAIRES SHALL BE LED, MEDIUM DISTRIBUTION, FULL CUTOFF, WITH 240 VOLT INTEGRAL BALLAST, AS NOTED. (NOTE 1)

c. IN ACCORDANCE WITH STATE LAW MICHIGAN P.A.217 SECTION 338.883E, MDOT WILL REQUIRE AND ENFORCE COMPLIANCE OF THE 1:3 LICENSED ELECTRICIAN/APPRENTICE RATIO FOR WORK ON ANY ELECTRICAL SYSTEM WITHIN MDOT ROW. THE PROJECT ENGINEER SHALL REQUIRE THE CONTRACTOR TO FURNISH THE ELECTRICIAN'S/APPRENTICE NAME AT THE PRECONSTRUCTION MEETING.

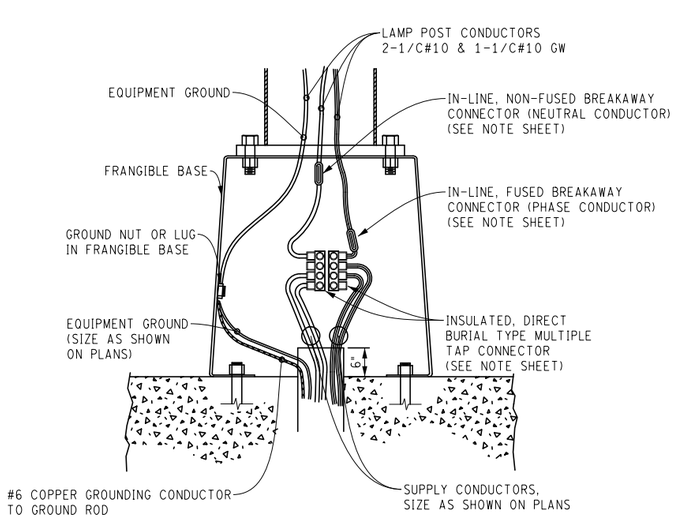
d. ALL ELECTRICAL CONNECTIONS, TERMINALS, AND METAL RACEWAY THREADS SHALL BE COATED WITH AN ELECTRICAL JOINT COMPOUND TO PREVENT OXIDATION.

e. ALL EXPOSED FIELD CUT THREADS, OR UNTREATED METAL SURFACES SHALL BE COATED WITH A ZINC COMPOUND.

f. ALL CONDUCTORS AWG#2 OR SMALLER WILL BE COLORED THE ENTIRE LENGTH:
PHASING TAPE OR PAINT WILL NOT BE ALLOWED:
PHASE "A" - RED:
PHASE "B" - BLACK:
GROUNDED/NEUTRAL CONDUCTOR - WHITE:
GROUND CONDUCTOR - GREEN OR BARE COPPER.
ALL CURRENT CARRYING CONDUCTORS NO. 8 AND LARGER TO BE COPPER STRANDED 600V USE/RHH/RHW RATED.

NOTES

1. ALL MATERIALS AND WORKMANSHIP MUST BE IN ACCORDANCE WITH THE CURRENT MICHIGAN DEPARTMENT OF TRANSPORTATION SPECIFICATIONS FOR CONSTRUCTION.
2. PROPOSED LED LUMINAIRES MUST BE 240 VOLT, 1 PHASE, 3 WIRE, UNO. LUMINAIRE ASSEMBLIES SHALL BE STANDARD MANUFACTURER DARK BRONZE IN COLOR, INCLUDING BUT NOT LIMITED TOO (LUMINAIRE, FRANGIBLE TRANSFORMER BASE, LIGHT STANDARD, LIGHT STANDARD ARM).
3. ALL SPLICES AND CABLE CUTTING REQUIRED TO MAINTAIN CONTINUITY OF THE SERIES CIRCUITS ARE INCLUDED IN THE PROJECT AND WILL NOT BE PAID FOR SEPARATELY.
4. A GROUND WIRE (EQUIPMENT GROUND) SHALL BE RUN IN CONJUNCTION WITH THE PVC BOXES AND CONDUIT.
5. SEE SUBSECTION 908.14 OF THE STANDARD SPECIFICATION FOR CONSTRUCTION FOR ANCHOR BOLT REQUIREMENTS.
6. ORIENT LIGHT STANDARD POLE HANDHOLE AWAY FROM TRAFFIC EXCEPT IT MUST FACE ROADWAY WHEN MOUNTED ON BRIDGE OR MEDIAN WALL. USE STAINLESS STEEL HEX HEAD MACHINE SCREWS. THE HANDHOLES MUST BE PLACED SO THEY DO NOT INTERSECT THE LONGITUDINAL SEAM WELD ON THE POLE.
7. SMOOTH SURFACE CONDUIT ONLY IS ALLOWED ON THIS JOB.
8. ALL CABLE MUST BE INSTALLED IN CONTINUOS UNCUT LENGTH BETWEEN HANDHOLES OR LIGHT STANDARDS.
9. BREAKAWAY CONNECTOR MUST BE BUSSMAN TYPE HEP WITH INSULATING BOOTS, HOMAC MFG. CO. "FLOOD-SEAL" SDK-M, LITTLE FUSE LEBAAS OR APPROVED EQUAL.



TYPICAL MULTIPLE STREET LIGHTING CONNECTION
NOT TO SCALE

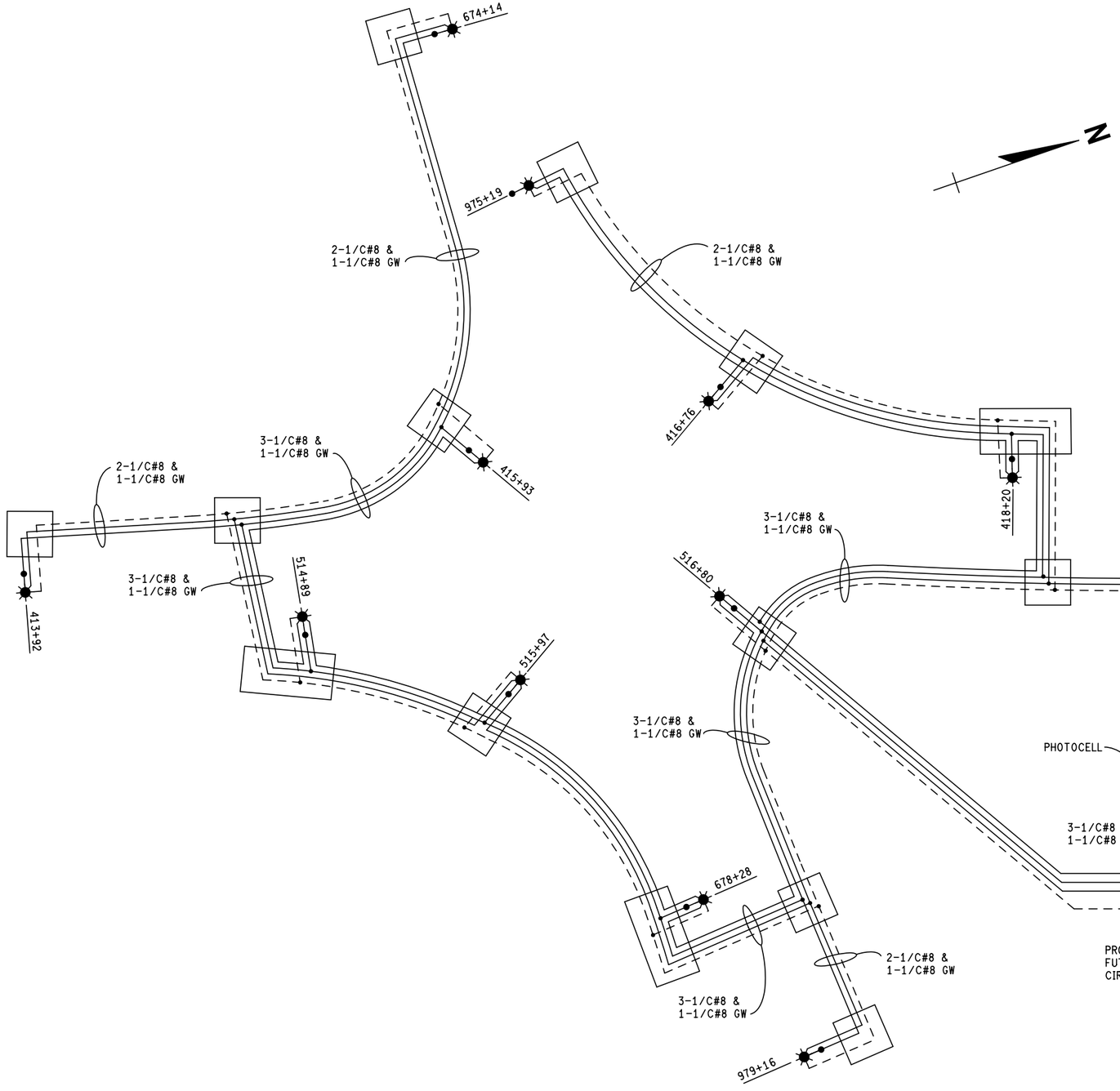
NOTE:
EXISTING ITEMS ARE REPRESENTED BY THIN LINE WEIGHTS.
PROPOSED ITEMS ARE REPRESENTED BY HEAVIER LINE WEIGHTS.

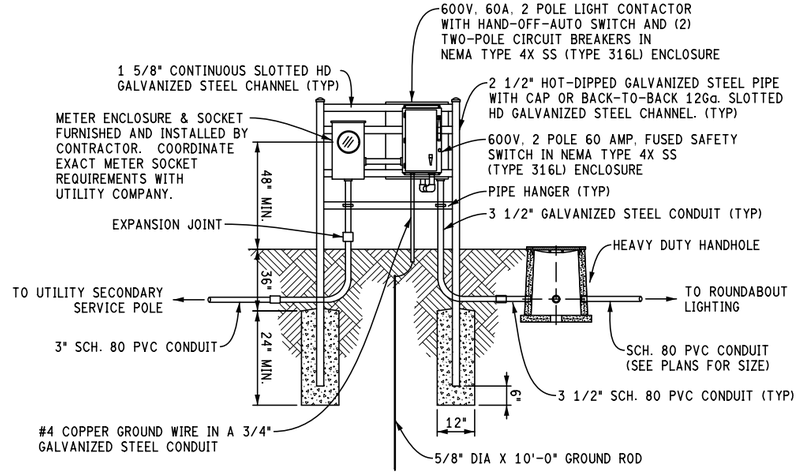
FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

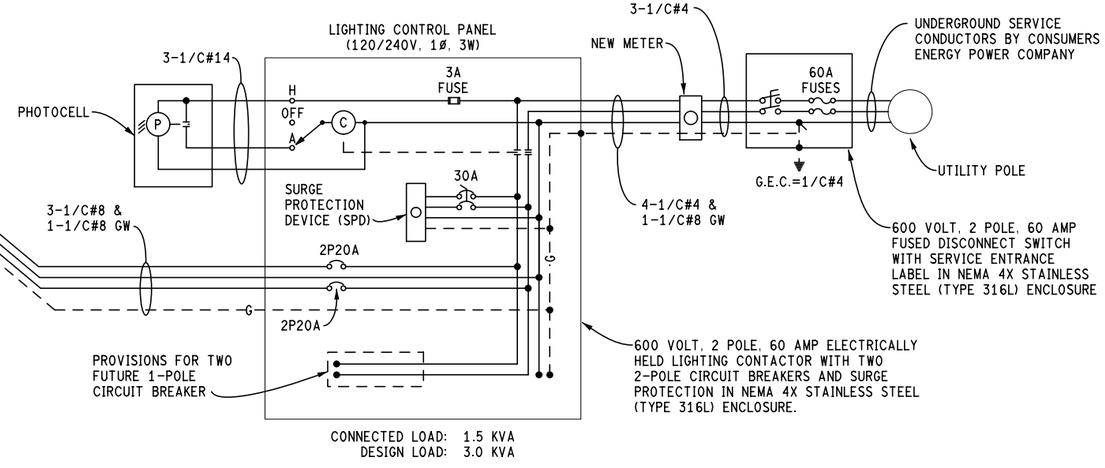
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	DATE: 06/05/18	CS: 28091	NOTES AND LEGEND	DRAWING	SHEET
	DESIGN UNIT: URDA	JN: 132412A	US-131 @ M-186 ROUNDABOUT	US-131 LTG 01	SECT 1
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LIGHTING CONTROL PANEL (120/240V, 1Ø, 3W)
NOT TO SCALE

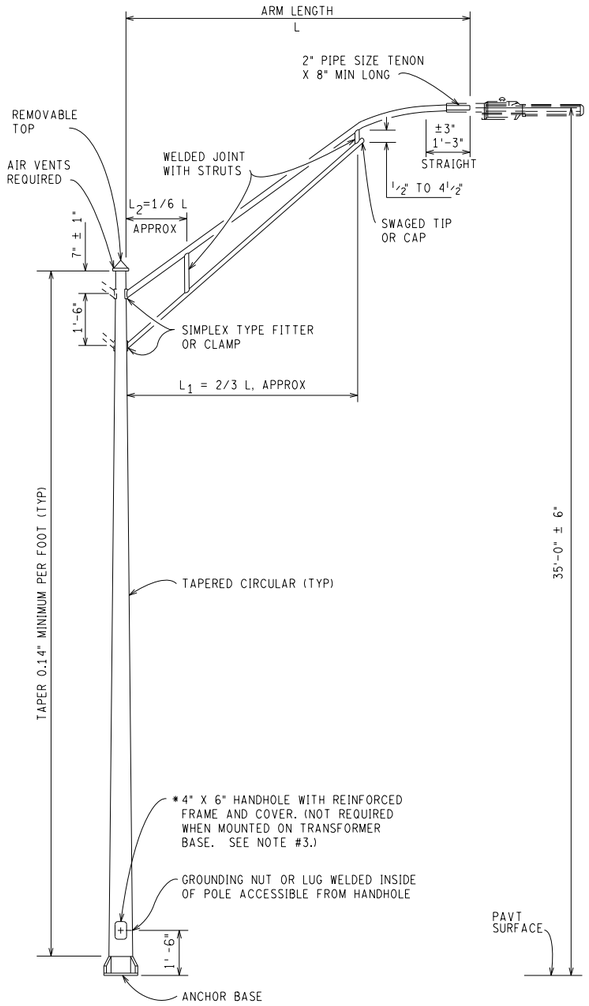


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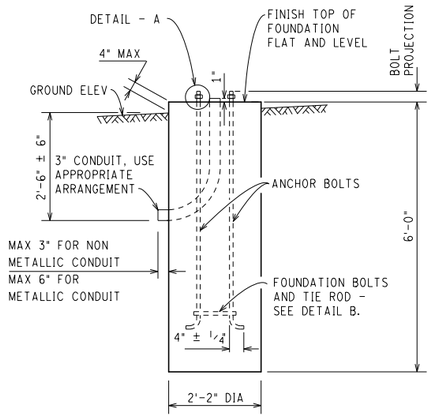
MDOT Michigan Department of Transportation

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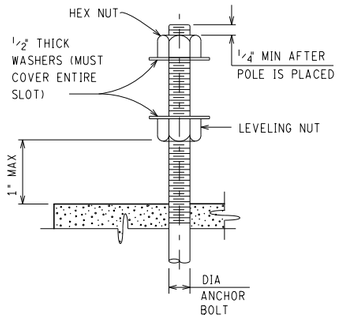
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DARK BRONZE LUMINAIRE ASSEMBLY
RAMP LIGHT STANDARD DETAIL

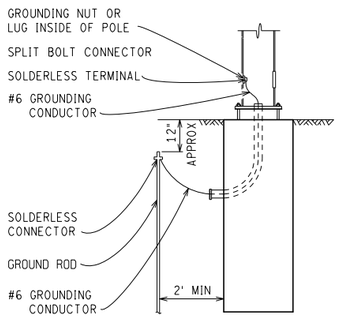


LIGHT STANDARD FOUNDATION DETAIL



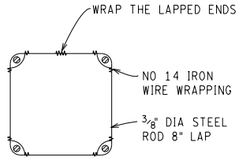
DETAIL - A
ANCHOR BOLT LEVELING DETAIL

(THIS DETAIL DOES NOT APPLY WHEN USING FRANGIBLE TRANSFORMER BASE. SEE FRANGILBLE TRANSFORMER BASE DETAIL SHEET.)



NOTE: IF CONDUIT EXTENDS TO HANDHOLE, DRIVE GROUND ROD IN OR NEAR HANDHOLE.

LIGHT STANDARD GROUNDING DETAIL

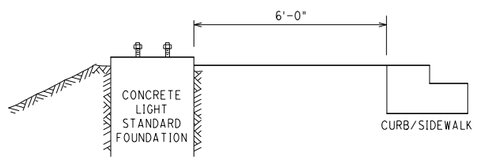


DETAIL - B
ANCHOR BOLTS AND TIE ROD

ANCHOR BASE DETAIL

ROUND OR SLOTTED HOLES CENTERED ON BOLT CIRCLE, (SLOT DIMENSION - 2 X BOLT DIA + 1/4")

NOTE:
DO NOT COVER HANDHOLES.
PLACE PERPENDICULAR TO
SLOPE AT SAME ELEVATION
AS FOUNDATION.



FOUNDATION DETAIL
(ON FILL OR CUT SLOPE)

NOTES:

1. ALL MATERIALS AND WORKMANSHIP MUST BE IN ACCORDANCE WITH THE CURRENT MICHIGAN DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION.
2. EACH BRACKET ARM MUST BE SUPPLIED WITH ITS OWN POLE CONNECTION WITH STAINLESS STEEL HARDWARE. HARDWARE MUST INCLUDE LOCK WASHERS, MEETING ANSI B18.21.1.
3. HANDHOLE TO FACE AWAY FROM TRAFFIC EXCEPT IT MUST FACE ROADWAY WHEN MOUNTED ON BRIDGE OR MEDIAN WALL. USE STAINLESS STEEL HEX HEAD MACHINE SCREWS. THE HANDHOLES MUST BE PLACED SO THEY DO NOT INTERSECT THE LONGITUDINAL SEAM WELD ON THE POLE.
4. IF FOUNDATION IS WITHIN 30 FEET OF HANDHOLE, CONDUIT MAY BE RUN DIRECTLY TO HANDHOLE.
5. BOLT CIRCLE DIMENSION MUST BE EXACT. ANCHOR BOLTS MUST BE SET BY A TEMPLATE AND CENTERED ON THE FOUNDATION.
6. NUT COVERS ARE NOT ALLOWED.
7. WHEN A FRANGIBLE TRANSFORMER BASE IS CALLED FOR ON THE PLANS, NO LEVELING NUT IS TO BE USED. FRANGIBLE TRANSFORMER BASES SHALL BE MOUNTED FLUSH WITH TOP OF FOUNDATION. (DARK BRONZE)
8. LIGHT STANDARDS MOUNTED ON FRANGIBLE TRANSFORMER BASES MUST HAVE THE SAME DIMENSIONS AS OTHER BASE TYPES, EXCEPT SHAFT LENGTH. (DARK BRONZE)

MATERIALS TABLE

MATERIAL	SPECIFICATION	DIMENSIONS	QUANTITY (PER FDN)
ANCHOR BOLTS	MDOT 908.14	DETERMINED BY LIGHT STANDARD CHART	4
ANCHOR NUTS	MDOT 908.14	DETERMINED BY ANCHOR BOLT DIAMETER	8
FLAT WASHER [1] (1" ANCHOR BOLT)	MDOT 908.14	2 3/4" O.D. x 1 1/16 I.D. x 1/2" THK	8 (IF REQUIRED, SEE NOTE 1.)
FLAT WASHERS [1] (1 1/4" ANCHOR BOLT)	MDOT 908.14	2 3/4" O.D. x 1 5/16 I.D. x 1/2" THK	8 (IF REQUIRED, SEE NOTE 1.)
FLAT WASHERS [1] (1 1/2" ANCHOR BOLT)	MDOT 908.14	2 3/4" O.D. x 1 5/16 I.D. x 1/2" THK	8 (IF REQUIRED, SEE NOTE 1.)
PLATE WASHERS [1] (1" ANCHOR BOLT)	ASTM A1018	1 1/16" I.D. x 1/2" THK	8 (IF REQUIRED, SEE NOTE 1.)
PLATE WASHERS [1] (1 1/4" ANCHOR BOLT)	ASTM A1018	1 5/16" I.D. x 1/2" THK	8 (IF REQUIRED, SEE NOTE 1.)
PLATE WASHERS [1] (1 1/2" ANCHOR BOLT)	ASTM A1018	1 5/16" I.D. x 1/2" THK	8 (IF REQUIRED, SEE NOTE 1.)

1. IF LIGHT STANDARD BASE PLATE HAS SLOTTED HOLES, PLATE WASHERS ARE REQUIRED IN LIEU OF CIRCULAR WASHERS AND MUST COVER THE ENTIRE SLOT.
2. ALL ANCHOR BOLTS, NUTS, WASHERS AND PLATE WASHERS MUST BE HOT DIP GALVANIZED ACCORDING TO AASHTO M232.

BRACKET ARM TABLE

BRACKET LENGTH	8'-0"	10'-0"	12'-0"	15'-0"	17'-0"
TOP MEMBER	2" DIA	2" DIA	2" DIA	2" DIA	2 1/2" DIA
BOTTOM MEMBER	1 1/2" DIA	1 1/2" DIA	1 1/2" DIA	2" DIA	2" DIA

LIGHT STANDARD FOR	SQ. (MAX(	A	B	C	D	E	STEEL POLES GAGE (MIN)	** F	*** MINIMUM ANCHOR BASE THICKNESS	ALUMINUM POLES GAGE (MIN)	POLE DIAMETER AT BASE
20 FT NOMINAL MOUNTING HEIGHT (WITHOUT TRANSFORMER BASE)		11	7 3/4"	5'-0"	8 3/4"	5 1/2"		1"Ø X 3'-4"		0.188"	
20 FT NOMINAL MOUNTING HEIGHT (WITH TRANSFORMER BASE)		*11	7 3/4"	5'-0"	8 3/4"	3 1/2"		1"Ø X 3'-4"		0.188"	
30 FT MOUNTING HEIGHT WITH 4 OR 6 FT SINGLE OR DOUBLE BRACKET ARM	11 1/2"	11	7 3/4"	5'-0"	8 3/4"	5 1/2"	11	1"Ø X 3'-4"	1"	0.188"	8 1/4" ± 1/4"
30 FT MOUNTING HEIGHT WITH 8, 10, 12 FT SINGLE OR DOUBLE BRACKET ARM	11 1/2"	11	7 3/4"	6'-0"	8 3/4"	5 1/2"	11	1"Ø X 5'-0"	1"	0.188" SGL ARM 0.219" DBL ARM	8 1/4" ± 1/4"
30 FT MOUNTING HEIGHT WITH 15 FT SINGLE OR DOUBLE BRACKET ARM	11 1/2"	11	7 3/4"	6'-0"	8 3/4"	5 1/2"	7	1"Ø X 5'-0"	1"	0.188" SGL ARM 0.219" DBL ARM	8 1/4" ± 1/4"
30 FT MOUNTING HEIGHT WITH 17 FT SINGLE OR DOUBLE BRACKET ARM	11 1/2"	11	7 3/4"	6'-0"	9"	5 1/2"	7	1 1/4Ø X 5'-0"	1 1/8"	0.188" SGL ARM 0.219" DBL ARM	8 1/4" ± 1/4"
40 & 45 FT MOUNTING HEIGHT WITH 4, 6, 8, 10 12, 15, 17 FT SINGLE OR DOUBLE BRACKET ARM	14"	1'-1"	9 1/4"	8'-6"	10 3/4"	5 1/2"	11 GA. UP TO 15' BKT ARM 7 GA. FOR 15' & 17' BKT ARM	1 1/4Ø X 5'-0"	1 3/8"	0.129" LOWER SECTION 0.188" UPPER SECTION	9" ± 1/2" (40' MH) 9 1/2" ± 1/2" (45' MH)

* THE 11" BOLT CIRCLE SHALL APPLY FOR BOTH THE POLE TO TRANSFORMER BASE AND FOR THE TRANSFORMER BASE TO FOUNDATION.
** LENGTH GIVEN IS LENGTH PRIOR TO BENDING.
*** MINIMUM ANCHOR BASE THICKNESS MAY BE ADJUSTED BASED ON CALCULATIONS PROVIDED BY THE FABRICATOR.

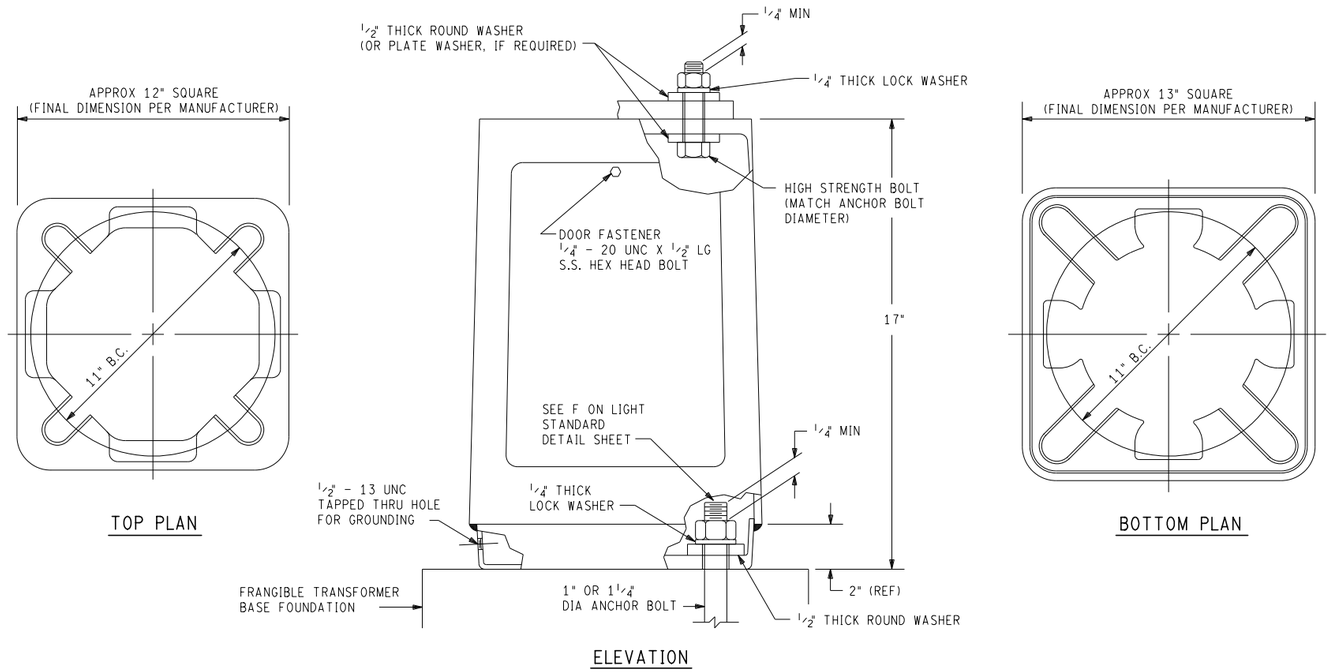
FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

NO SCALE

	DATE: 06/05/18	CS: 28091	LIGHT STANDARD DETAILS (MEDIUM ARM)
	DESIGN UNIT: URDA	JN: 132412A	US-131 @ M-186 ROUNDABOUT
FILE: 132412_LightStd_Med.dgn	TSC: TRAVERSE CITY		

DRAWING	SHEET
US-131 LTG 03	SECT 1 38



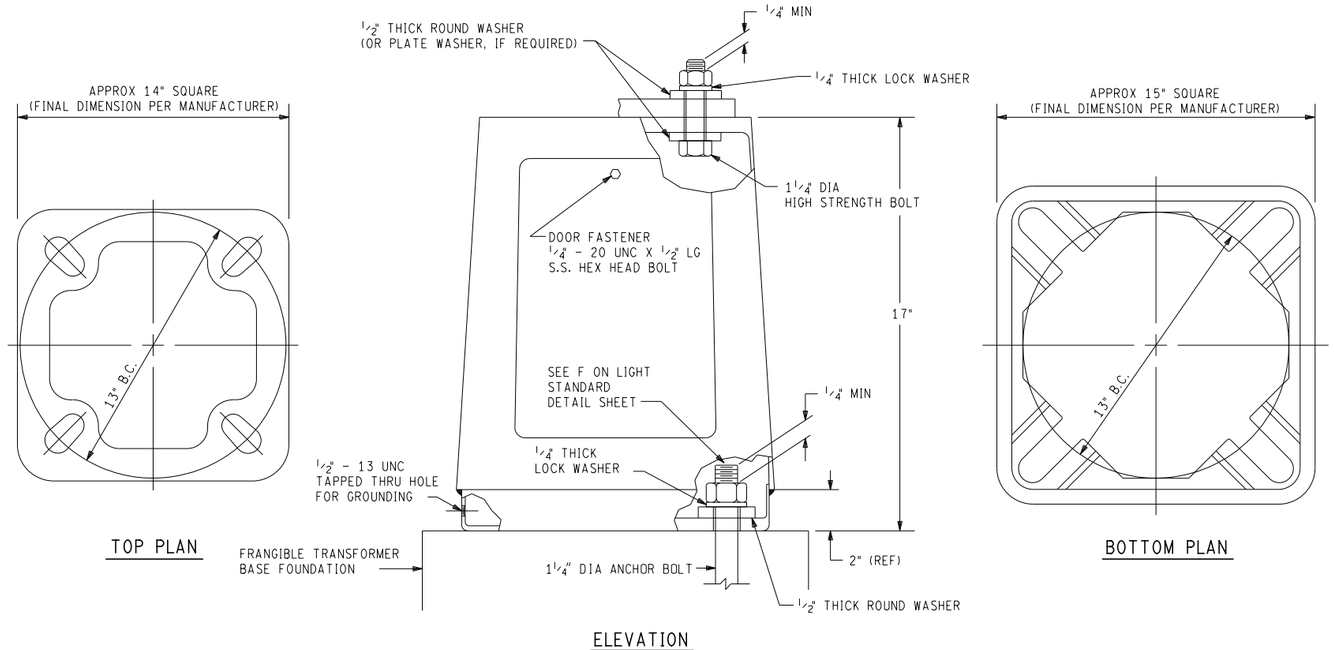
FRANGIBLE TRANSFORMER BASE FOR POLES WITH 11" DIAMETER BOLT CIRCLE

MATERIALS TABLE

MATERIAL	SPECIFICATION	DIMENSIONS	QUANTITY (PER FDN)
ANCHOR BOLTS	MDOT 908.14	DETERMINED BY LIGHT STANDARD DETAIL SHEET	4
ANCHOR NUTS	MDOT 908.14	DETERMINED BY ANCHOR BOLT DIAMETER	4
FLAT WASHER [1] (1" ANCHOR BOLT)	MDOT 908.14	2 3/4" O.D. x 1 1/16 I.D. x 1/2" THK	12 OR 14 (SEE NOTE 1.)
FLAT WASHERS [1] (1 1/4" ANCHOR BOLT)	MDOT 908.14	2 3/4" O.D. x 1 5/16 I.D. x 1/2" THK	12 OR 14 (SEE NOTE 1.)
LOCK WASHERS	ANSI B18.21.1	1/4" THK	8
HIGH STRENGTH BOLTS	MDOT 906.07	LENGTH DETERMINED BY THE CONTRACTOR DIAMETER TO BE SAME AS ANCHOR BOLT	4
CONNECTING NUTS	MDOT 906.07	DETERMINED BY HIGH STRENGTH BOLT DIAMETER	4
PLATE WASHERS [1] (1" ANCHOR BOLT)	ASTM A1018	1 1/16" I.D. x 1/2" THK	8 (IF REQUIRED.)
PLATE WASHERS [1] (1 1/4" ANCHOR BOLT)	ASTM A1018	1 5/16" I.D. x 1/2" THK	8 (IF REQUIRED.)
FRANGIBLE TRANSFORMER BASE	SELECT FROM THE MDOT QUALIFIED PRODUCTS LIST	ACCESS DOOR OPENING: 8 1/2" x 9" x 11"	1

1. IF LIGHT STANDARD BASE PLATE OR FRANGIBLE TRANSFORMER BASE HAS SLOTTED HOLES, PLATE WASHERS ARE REQUIRED FOR THE HIGH STRENGTH BOLTS IN LIEU OF CIRCULAR WASHERS AND MUST COVER THE ENTIRE SLOT.

2. ALL BOLTS, NUTS, WASHERS, LOCK WASHERS AND PLATE WASHERS MUST BE HOT DIP GALVANIZED ACCORDING TO AASHTO M232.



FRANGIBLE TRANSFORMER BASE FOR POLES WITH 13" DIAMETER BOLT CIRCLE

NOTES:

1. THIS DETAIL TO BE USED IN CONJUNCTION WITH FREQUENTLY USED SPECIAL PROVISION "SP810A" AND THE CURRENT MDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.
2. SHAFT LENGTHS MOUNTED ON TRANSFORMER BASES MUST BE ALTERED TO COMPENSATE FOR THE HEIGHT OF THE TRANSFORMER BASE. THE BOLT CIRCLE ON TOP OF THE TRANSFORMER BASE MUST BE THE SAME AS THE BOLT CIRCLE OF THE LIGHT STANDARD ANCHOR BASE.
3. THE ENTIRE BOTTOM OF THE FRANGIBLE TRANSFORMER BASE MUST BE SEATED ON THE FOUNDATION. THE DIAMETER OF THE FOUNDATION MAY BE ALTERED TO MEET THIS REQUIREMENT.
4. ALL HARDWARE COMPONENTS (INCLUDING FLAT AND LOCK WASHERS) MUST BE INSTALLED AS SHOWN IN THE DETAILS ON THIS SHEET.
5. LEVELING NUTS MUST NOT BE USED WITH FRANGIBLE TRANSFORMER BASES.
6. NUT COVERS ARE NOT ALLOWED.
7. FRANGIBLE TRANSFORMER BASES SHALL MATCH DARK BRONZE LUMINAIRE ASSEMBLY COLOR.

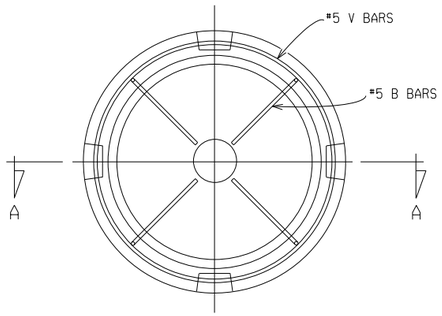
FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

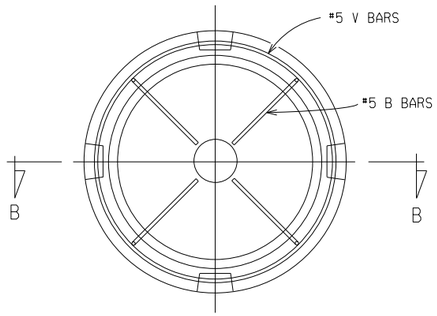
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	DESIGN UNIT: URDA	JN: 132412A	US-131 @ M-186 ROUNDABOUT
FILE:132412 frantransbase.dgn	TSC: TRAVERSE CITY		

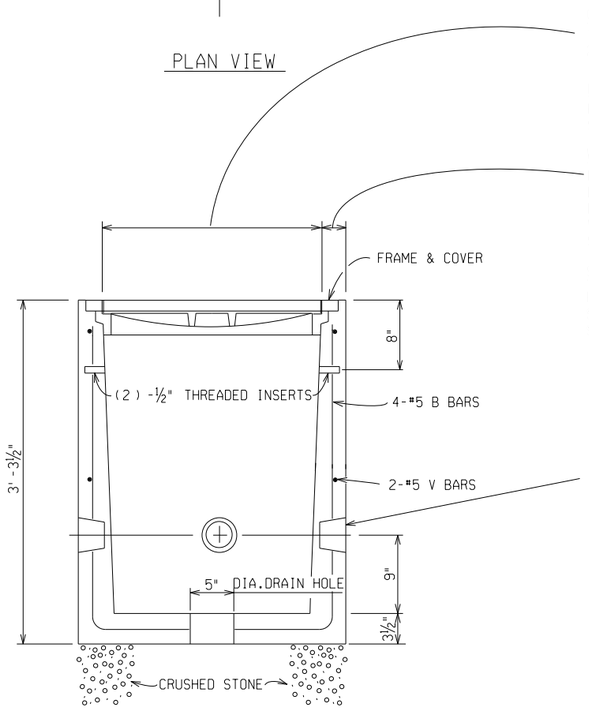
DRAWING	SHEET
US-131 LTG 04	SECT 1 39



PLAN VIEW



PLAN VIEW



SECTION A-A PRECAST CONCRETE HANDHOLE

(TO BE USED IN EARTH)

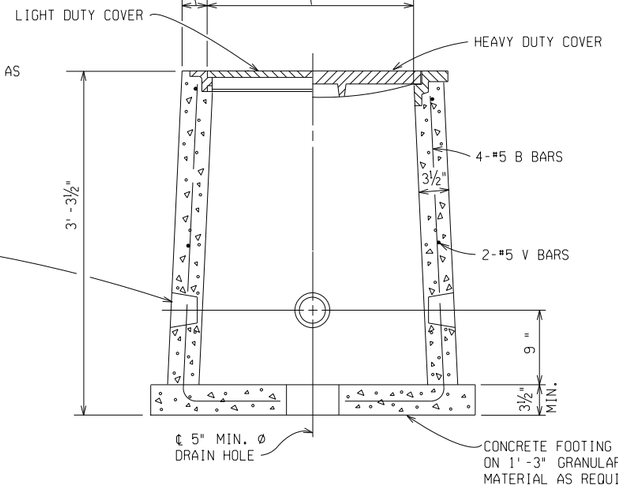
OPENING
18" FOR LIGHT DUTY COVER
24" FOR HEAVY DUTY COVER

FRAME
FRAME & COVER
SEE MATERIAL NOTES

WALL THICKNESS
MIN. WALL THICKNESS FOR LIGHT DUTY COVER - 2¾", FOR HEAVY DUTY COVER - 3½". SHOULD THE WALL BE TAPERED, A 0.3"/FT. SLOPE SHALL BE USED.

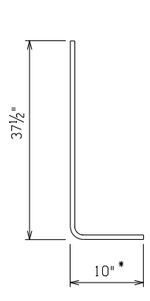
STEEL REINFORCEMENT
REINFORCEMENT SHALL BE #5 BARS AS SHOWN OR AN EQUIVALENT AREA OF STEEL USING WELDED WIRE MESH.

ENTRANCE HOLES AS REQUIRED FOR 3" & 4" CONDUIT. ADDITIONAL OPENINGS SHALL BE PROVIDED AS REQUIRED. HOLES MAY BE DRILLED IN THE FIELD.

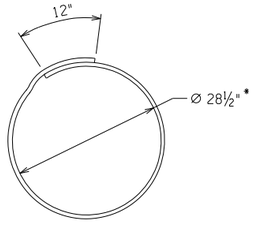


SECTION B-B PRECAST CONCRETE HANDHOLE

(TO BE USED IN EARTH)

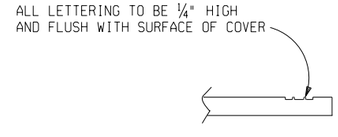


B BAR

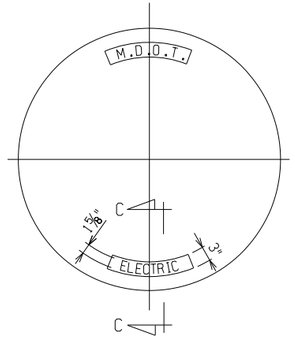


V BAR

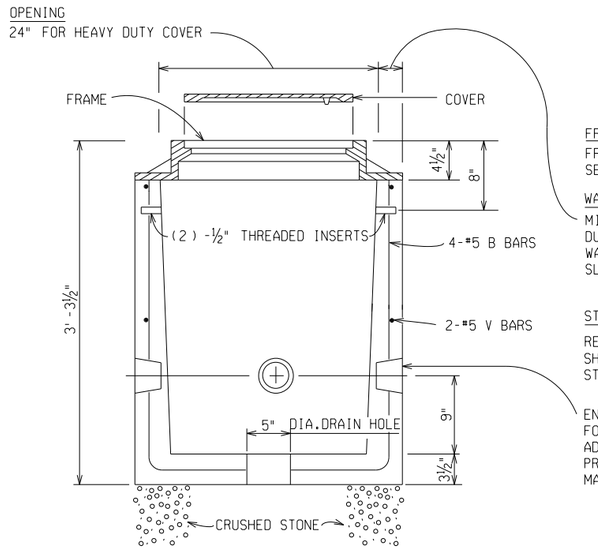
* APPLIES TO 24" HANDHOLE



SECTION C-C



TOP VIEW



FRAME
FRAME & COVER
SEE MATERIAL NOTES

WALL THICKNESS
MIN. WALL THICKNESS FOR HEAVY DUTY COVER - 3½". SHOULD THE WALL BE TAPERED, A 0.3"/FT. SLOPE SHALL BE USED.

STEEL REINFORCEMENT
REINFORCEMENT SHALL BE #5 BARS AS SHOWN OR AN EQUIVALENT AREA OF STEEL USING WELDED WIRE MESH.

ENTRANCE HOLES AS REQUIRED FOR 3" & 4" CONDUIT. ADDITIONAL OPENINGS SHALL BE PROVIDED AS REQUIRED. HOLES MAY BE DRILLED IN THE FIELD.

SECTION A-A PRECAST CONCRETE HANDHOLE

(TO BE USED IN PAVED AREAS- HEAVY DUTY COVER ONLY)

GENERAL NOTES:

THE MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE CURRENT M.D.O.T. STANDARD SPECIFICATIONS.

THE CONTRACTOR MAY CONSTRUCT THE HANDHOLE STRUCTURE OF CONCRETE MASONRY, OR OF PRECAST REINFORCED CONCRETE.

THE INNER SURFACE OF THE HANDHOLE SHALL BE SMOOTH.

ALL CASTINGS SHALL BE CLEANED BY SAND BLASTING.

THE SEATING FACE OF THE COVER AND THE SEAT FOR THE COVER ON THE FRAME IF REQUIRED, SHALL BE GROUND OR MACHINED SO THAT THE COVER SHALL HAVE AN EVEN BEARING ON ITS SEAT TO PREVENT ROCKING OR TILTING.

THE CASTINGS SHALL BE FREE OF POURING FAULTS, BLOW HOLES, CRACKS, AND OTHER IMPERFECTIONS. THEY SHALL BE SOUND, TRUE TO FORM AND THICKNESS, CLEAN AND NEATLY FINISHED AND SHALL BE COATED WITH COAL TAR PITCH VARNISH.

HANDHOLE SHALL BE EQUIPPED WITH CABLE RACK AND HOOKS TO TRAIN CABLE.

LIGHT DUTY COVER SHALL BE BOLTED TO FRAME WITH NOT LESS THAN 2 COUNTERSUNK HEX HEAD BRONZE BOLTS.

PRECAST HANDHOLE WITH HEAVY DUTY COVER SHALL BE SET ON A CONCRETE SLAB .

MATERIAL NOTES:

HEAVY DUTY COVERS SHALL BE CASTINGS WHICH MEET THE REQUIREMENTS OF THE CURRENT SPECIFICATIONS FOR GRAY IRON CASTINGS ASTM DESIGNATION A48 AND SHALL HAVE A MINIMUM STRENGTH AS PROVIDED FOR CLASS NO. 30B GRAY IRON CASTINGS.

ALL CONCRETE MASONRY SHALL BE PER SECTION 913 IN THE GENERAL SPECIFICATION.

HEAVY DUTY COVERS & FRAMES FOR USE IN EARTH SHALL BE EAST JORDAN IRON WORKS #1120A/#2860Z OR NEENAH FOUNDRY #R-6052 D FOR CIRCULAR COVER OR AN APPROVED EQUAL.

HEAVY DUTY COVERS & FRAMES TO BE USED IN PAVED AREAS SHALL BE EAST JORDAN IRON WORKS #1120A/#3100Z FOR CIRCULAR COVER OR AN APPROVED EQUAL.

LIGHT DUTY COVER AND FRAME SHALL BE EAST JORDAN IRON WORKS #2982A-18 OR NEENAH FOUNDRY #R-6012 D FOR CIRCULAR COVER OR AN APPROVED EQUAL.

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

NO SCALE

DATE: 06/05/18
DESIGN UNIT: URDA
FILE: 132412_handhole.dgn
TSC: TRAVERSE CITY

CS: 28091
JN: 132412A

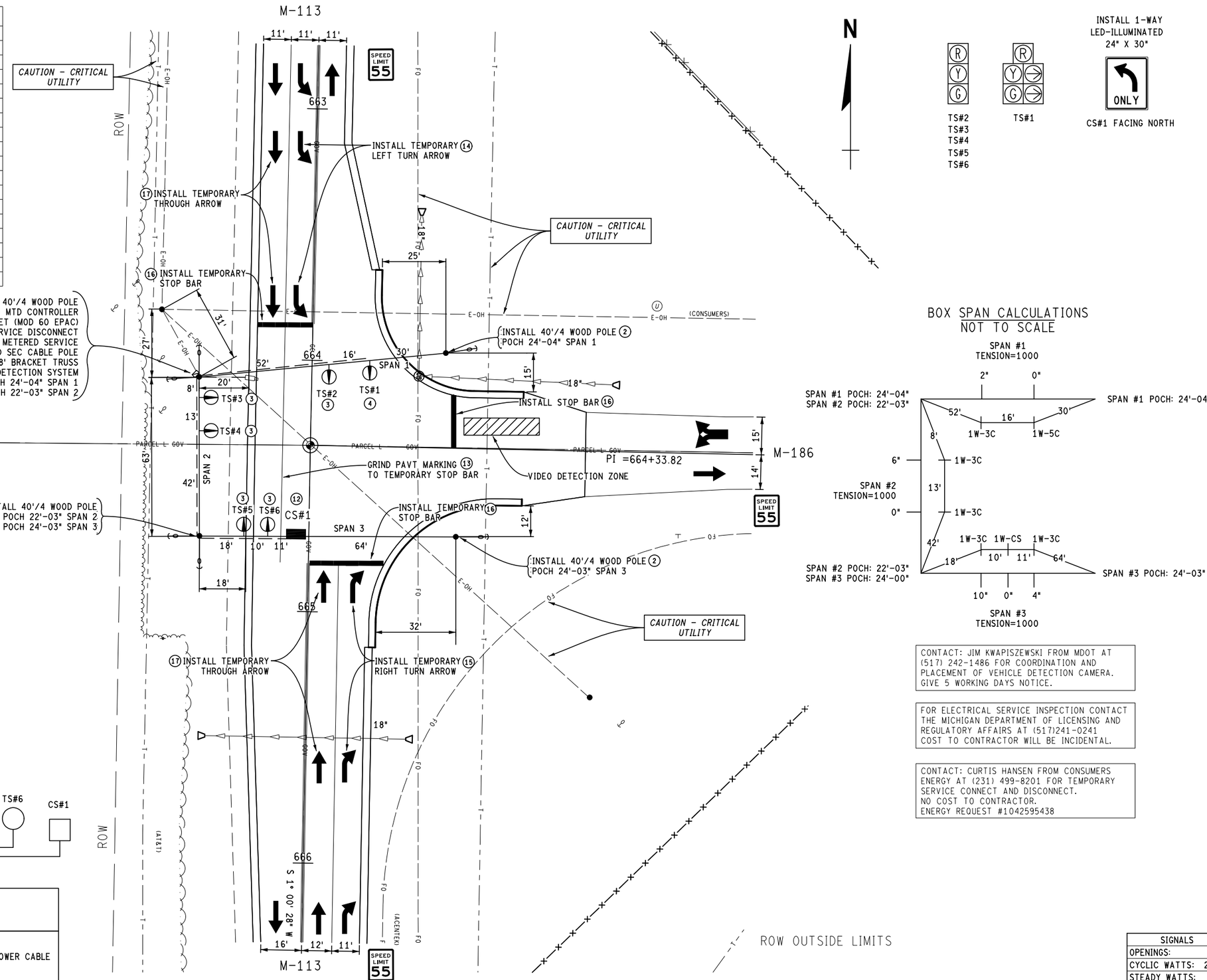
ELECTRICAL HANDHOLE DETAILS
US-131 @ M-186 ROUNDABOUT

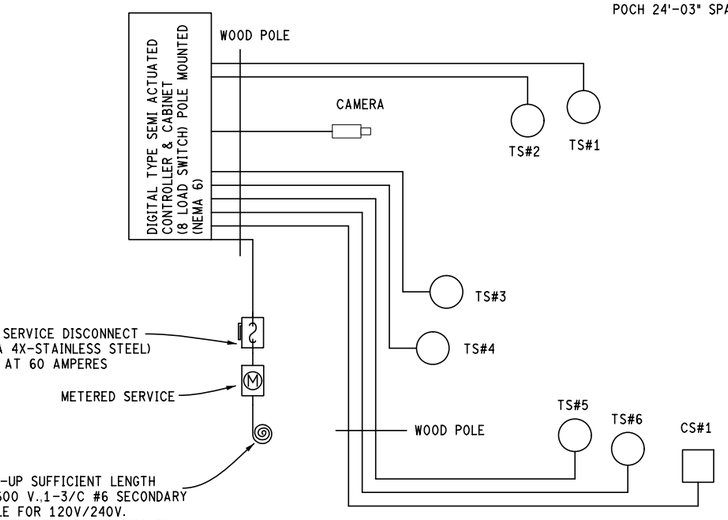
DRAWING	SHEET
US-131 LTG 05	SECT 1 40

LIST OF MATERIAL

NO.	ITEM	QUANTITIES
(1)	Controller and Cabinet, Digital Type	1 Ea
(2)	Wood Pole, Cl 4, 40 foot	4 Ea
(3)	TS, One Way Span Wire Mtd (LED)	5 Ea
(4)	TS, One Way Span Wire Mtd, Five Sect (LED)	1 Ea
(5)	Span Wire	3 Ea
(6)	Metered Serv	1 Ea
(7)	Serv Disconnect	1 Ea
(8)	Wood Pole, Fit Up, TS and Sec Cable Pole	1 Ea
(9)	Video Traf Detection Camera	1 Ea
(10)	Bracket, Truss, With 18 Foot Arm	2 Ea
(11)	Video Traf Detection System	1 Ea
(12)	Case Sign (LED), One Way, 24 inch by 30 inch	1 Ea
(13)	Pavt Mrkg, Longit, 6 inch or Less Width, Rem	75 Ft
(14)	Pavt Mrkg, Wet Reflective, Type R, Tape, Lt Turn Arrow	2 Ea
(15)	Pavt Mrkg, Wet Reflective, Type R, Tape, Rt Turn Arrow	2 Ea
(16)	Pavt Mrkg, Wet Reflective, Type R, Tape, 24 inch, Stop Bar	60 Ft
* (17)	Pavt Mrkg, Wet Reflective, Type R, Tape, Turn Arrow	4 Ea

* NOTE:
PAYMENT FOR TEMPORARY THROUGH ARROWS WILL BE PAID FOR AS TYPE R TURN ARROW.





CABLES TO BE USED UNLESS SPECIFIED OTHERWISE

1. TRAFFIC SIGNAL CABLES ARE 5/C#16 PJ.
2. CABLE TO VIDEO CAMERAS TO BE COMBINATION COAXIAL/POWER CABLE RG 59-3 CONDUCTOR 16AWG.
3. 24" X 30" L.E.D. CASE SIGNS ARE 7/C#16 PJ.

INSTALL 1-WAY LED-ILLUMINATED 24" X 30"

CS#1 FACING NORTH

BOX SPAN CALCULATIONS NOT TO SCALE

CONTACT: JIM KWAPISZEWSKI FROM MDOT AT (517) 242-1486 FOR COORDINATION AND PLACEMENT OF VEHICLE DETECTION CAMERA. GIVE 5 WORKING DAYS NOTICE.

FOR ELECTRICAL SERVICE INSPECTION CONTACT THE MICHIGAN DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS AT (517)241-0241 COST TO CONTRACTOR WILL BE INCIDENTAL.

CONTACT: CURTIS HANSEN FROM CONSUMERS ENERGY AT (231) 499-8201 FOR TEMPORARY SERVICE CONNECT AND DISCONNECT. NO COST TO CONTRACTOR. ENERGY REQUEST #1042595438

ROW OUTSIDE LIMITS

SIGNALS	
OPENINGS:	21
CYCLIC WATTS:	274
STEADY WATTS:	45
PLAN: 28021-01-003	

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

0 HORZ. (FT) 40

FILE: 132412_2802101003_CON001.dgn

DATE: 06/05/18
DESIGN UNIT: SIGNALS
TSC: TRAVERSE CITY

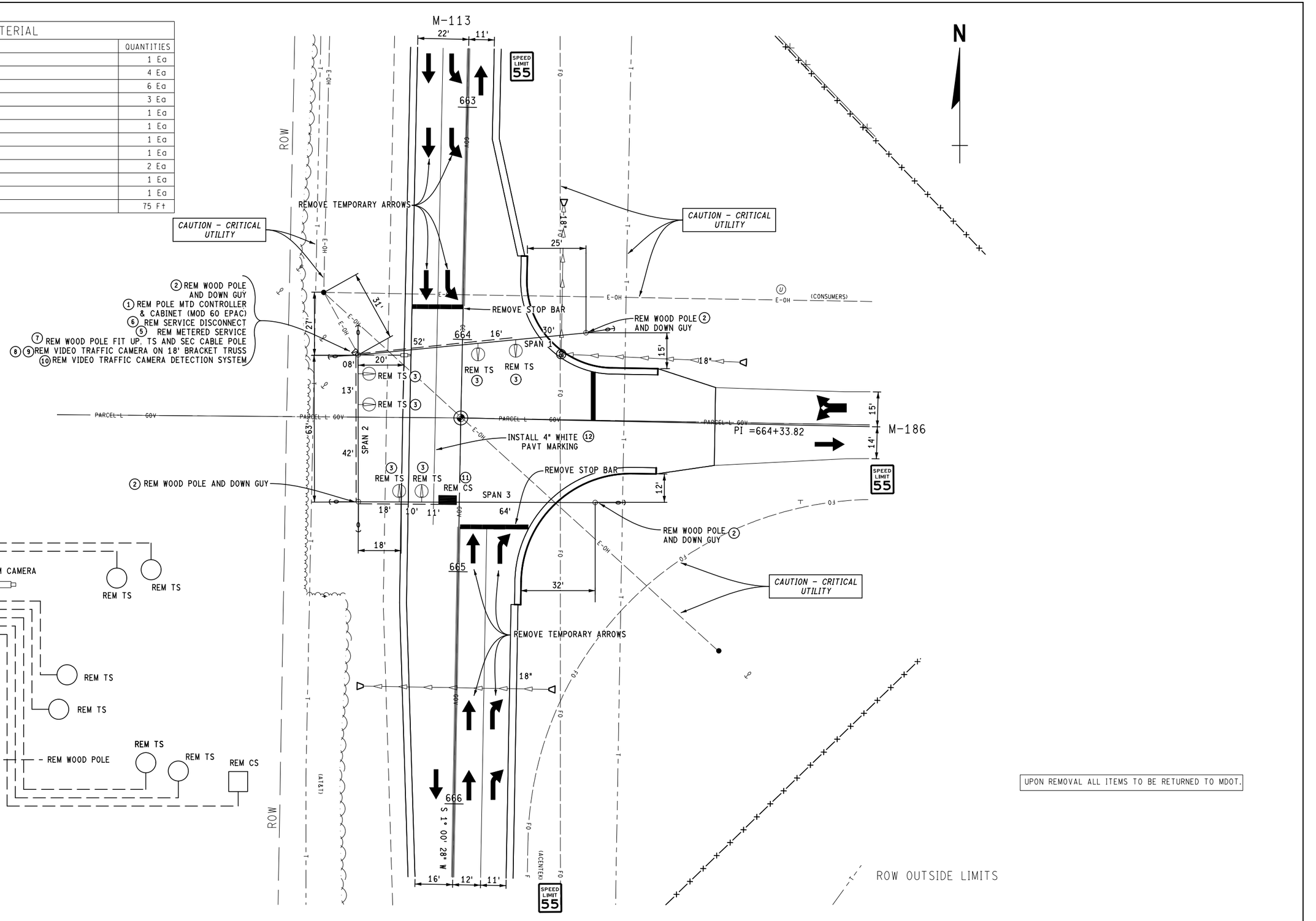
CS: 28021
JN: 132412

TRAFFIC SIGNAL INSTALL SHEET
M-113 @ M-186
GRAND TRAVERSE COUNTY

DRAWING	SHEET
SIG LOC 001	SECT 1 41

LIST OF MATERIAL

NO.	ITEM	QUANTITIES
1	Controller, Rem	1 Ea
2	Wood Pole, Rem	4 Ea
3	TS, Span Wire Mtd, Rem	6 Ea
4	Span Wire, Rem	3 Ea
5	Metered Serv, Rem	1 Ea
6	Serv Disconnect, Rem	1 Ea
7	Cable Pole, TS and Sec, Disman	1 Ea
8	Video Traf Detection Camera, Rem	1 Ea
9	Bracket, Truss, Rem	2 Ea
10	Video Traf Detection System, Rem	1 Ea
11	Case Sign, Rem	1 Ea
12	Pavt Mrkg, Waterborne, 4 inch, White	75 Ft



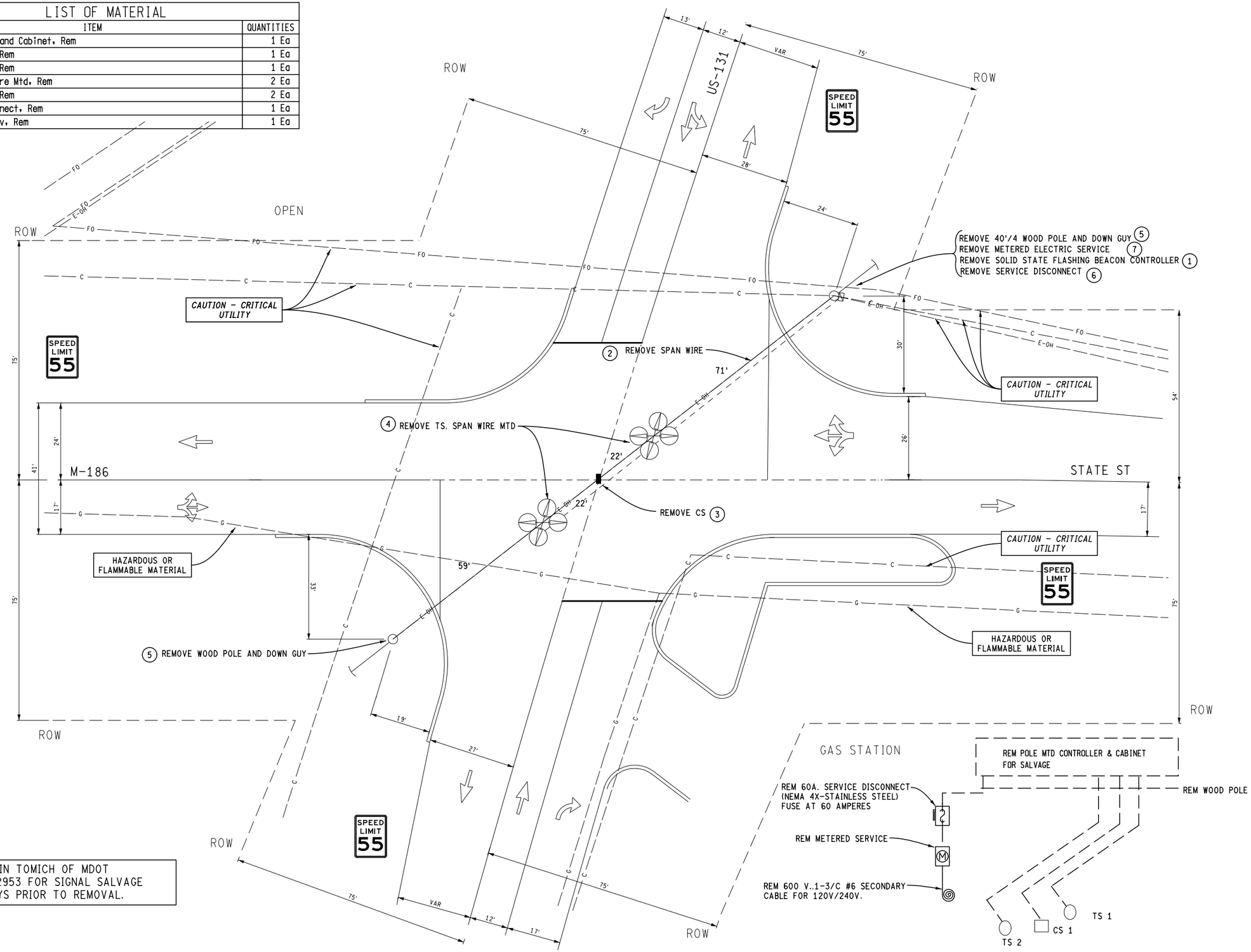
FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

0 HORZ. (FT) 40

	DATE: 06/05/18	CS: 28021	TRAFFIC SIGNAL REMOVAL SHEET	DRAWING	SHEET
	DESIGN UNIT: SIGNALS	JN: 132412	M-113 @ M-186	SIG LOC 001	SECT 1
FILE: 132412_2802101003_REM001.dgn	TSC: TRAVERSE CITY		GRAND TRAVERSE COUNTY		42

LIST OF MATERIAL		
NO.	ITEM	QUANTITIES
(1)	Controller and Cabinet, Rem	1 Ea
(2)	Span Wire, Rem	1 Ea
(3)	Case Sign, Rem	1 Ea
(4)	TS, Span Wire Mtd, Rem	2 Ea
(5)	Wood Pole, Rem	2 Ea
(6)	Serv Disconnect, Rem	1 Ea
(7)	Metered Serv, Rem	1 Ea



CONTACT: KEVIN TOMICH OF MDOT
AT 231-590-2953 FOR SIGNAL SALVAGE
5 WORKING DAYS PRIOR TO REMOVAL.

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

0 HORZ. (FT) 30

FILE: 132412_2809102003_REM001.dgn

DATE: 06/05/18
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TSC: TRAVERSE CITY TSC

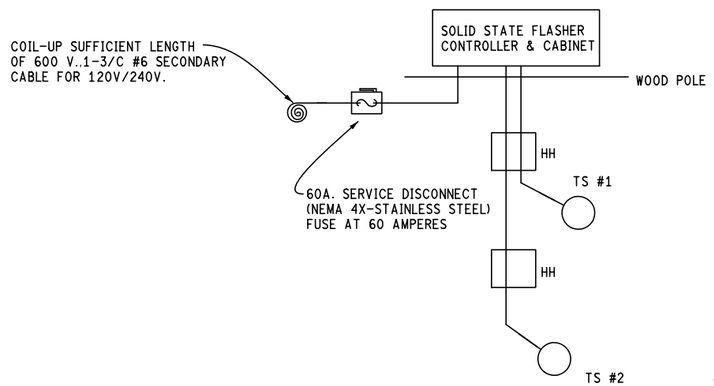
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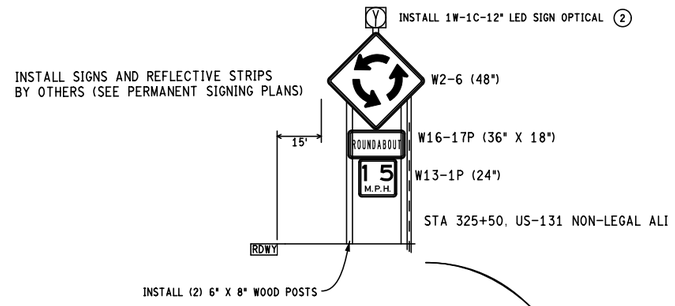
TRAFFIC SIGNAL REMOVAL SHEET
US131 @ M186 & STATE ST
FIFE LAKE TWP, GRAND TRAVERSE COUNTY

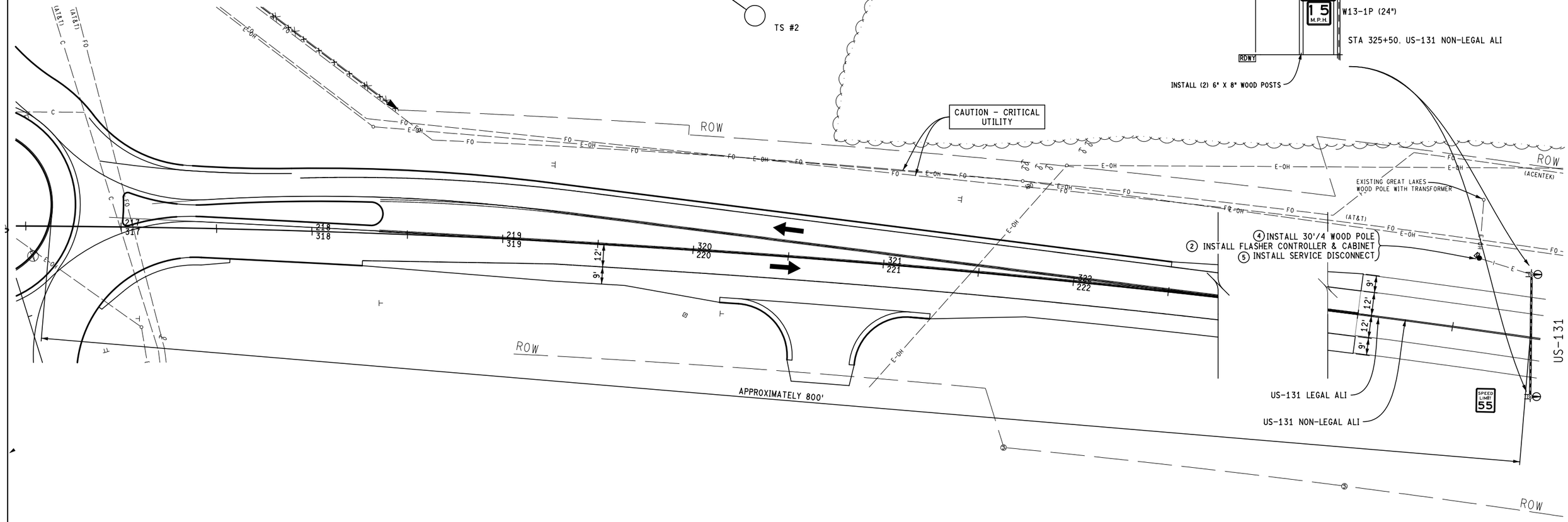
DRAWING

SHEET SECT 1 43

LIST OF MATERIAL		
NO.	ITEM	QUANTITIES
(1)	Fish Beacon, Controller and Cabinet, Solid State	1 Ea
(2)	Sign Optical, (LED)	2 Ea
(3)	Wood Pole, Fit Up, TS and Sec Cable Pole	1 Ea
(4)	Wood Pole, Cl 4, 30 foot	1 Ea
(5)	Serv Disconnect	1 Ea
(6)	Hh, Round	2 Ea
(7)	Conduit, Directional Bore, 1, 3 inch	70 Ft
(8)	Conduit, DB, 1, 3 inch	35 Ft







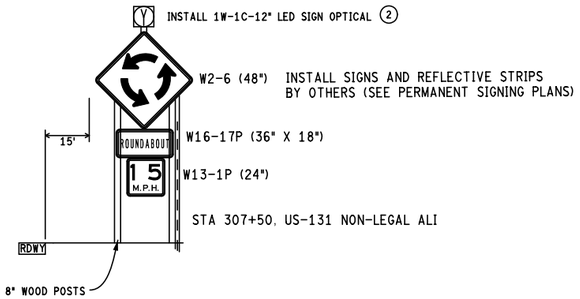
SIGNALS	
OPENINGS:	2
CYCLIC WATTS:	44
STEADY WATTS:	0
PLAN: 28091-10-003	

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

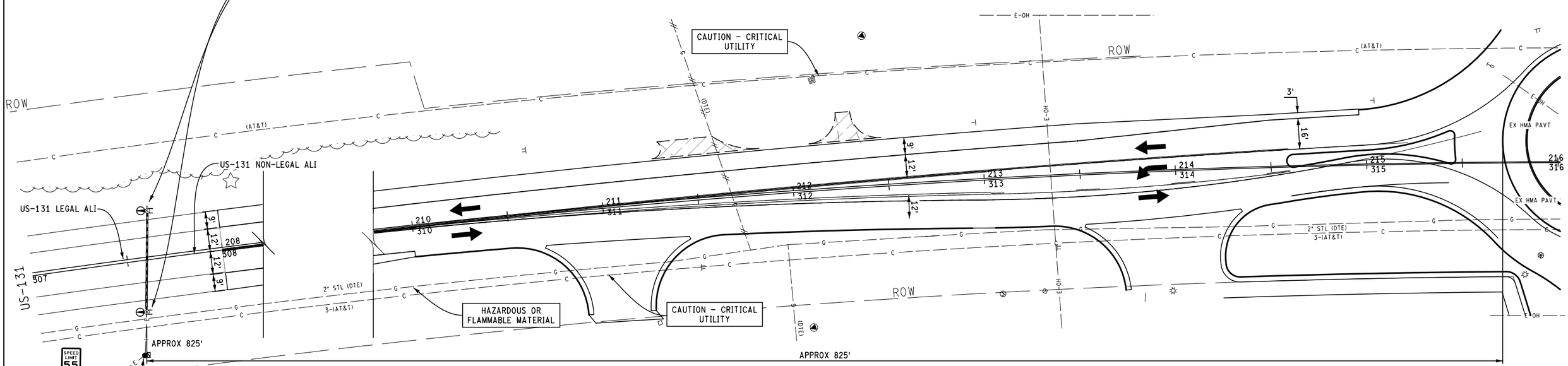
MDOT Michigan Department of Transportation

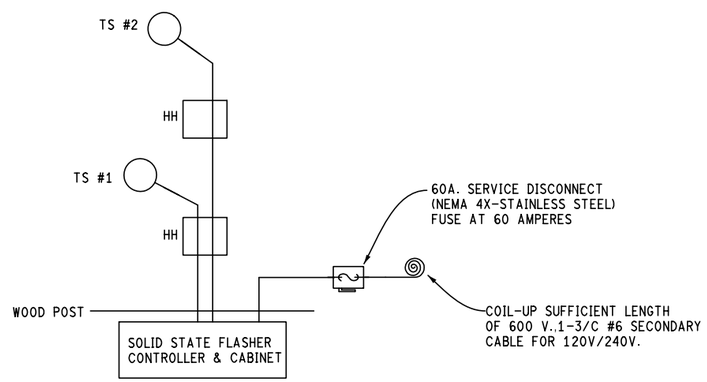
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	DATE: 06/05/18	CS: 28091	TRAFFIC SIGNAL INSTALL SHEET	DRAWING SHEET
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FILE: 132412_2809110003_CON001.dgn	TSC: TRAVERSE CITY		FIFE LAKE TWP, GRAND TRAVERSE COUNTY	44



LIST OF MATERIAL		
NO.	ITEM	QUANTITIES
(1)	Fish Beacon, Controller and Cabinet, Solid State	1 Ea
(2)	Sign Optical, (LED)	2 Ea
(3)	Wood Pole, Fit Up, TS and Sec Cable Pole	1 Ea
(4)	Post, Wood, 6 inch by 8 inch	20 Ft
(5)	Serv Disconnect	1 Ea
(6)	Hh, Round	2 Ea
(7)	Conduit, Directional Bore, 1, 3 inch	60 Ft
(8)	Conduit, DB, 1, 3 inch	60 Ft





SIGNALS	
OPENINGS:	2
CYCLIC WATTS:	44
STEADY WATTS:	0
PLAN: 28091-10-003	

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

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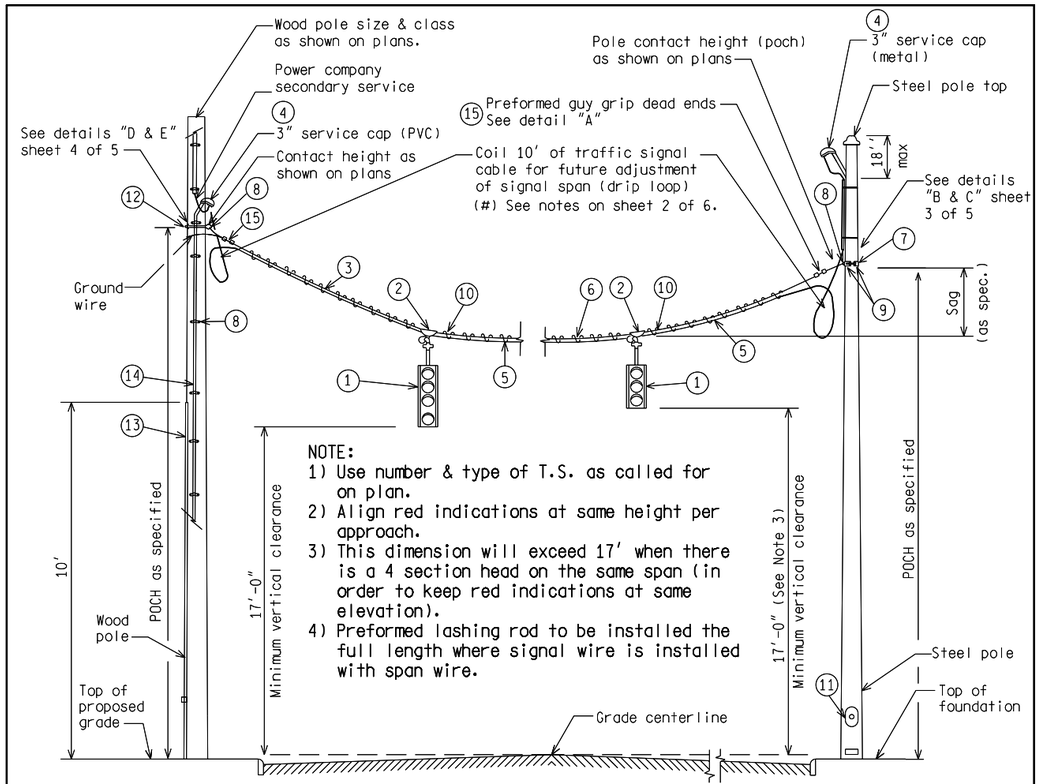
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DESIGN UNIT: SIGNALS
TSC: TRAVERSE CITY

CS: 28091
JN: 132412

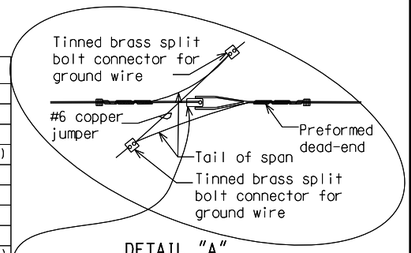
TRAFFIC SIGNAL INSTALL SHEET
US131 @ M186 & STATE ST
FIFE LAKE TWP, GRAND TRAVERSE COUNTY

DRAWING
SHEET SECT 1 45



TYPICAL SPAN WIRE INSTALLATION T.S. ON STEEL AND WOOD POLES

NO.	ITEM
1	Traffic signal (no. heads as indicated)
2	Span wire hanger
3	5/16" extra high strength span wire
4	3" Service cap (weatherhead), (metal for steel and PVC for wood poles)
5	P.J. traffic signal cable (as specified)
6	Preformed lashing rods
7	Pole band clamp (steel pole)
8	Guy thimble (2" dia.)
9	(2) 5/8" x 4" long bolt, nut, washers per pole band clamp (steel pole)
10	Install span wire preformed (armor rod) under each span hanger
11	Access hand hole all new & existing steel poles
12	5/8" eyebolt, oval eye and nut
13	Wood moulding or plastic duct (10' from ground level)
14	3" schedule 80 PVC or rigid metal (*) See note on sheet 2 of 5
15	Preformed guy grip dead ends



DETAIL "A"
COPPER JUMPER

NOTE: Porcelain strain insulator (if required shall meet the codes and placement requirements of the local utility co.

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG010A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

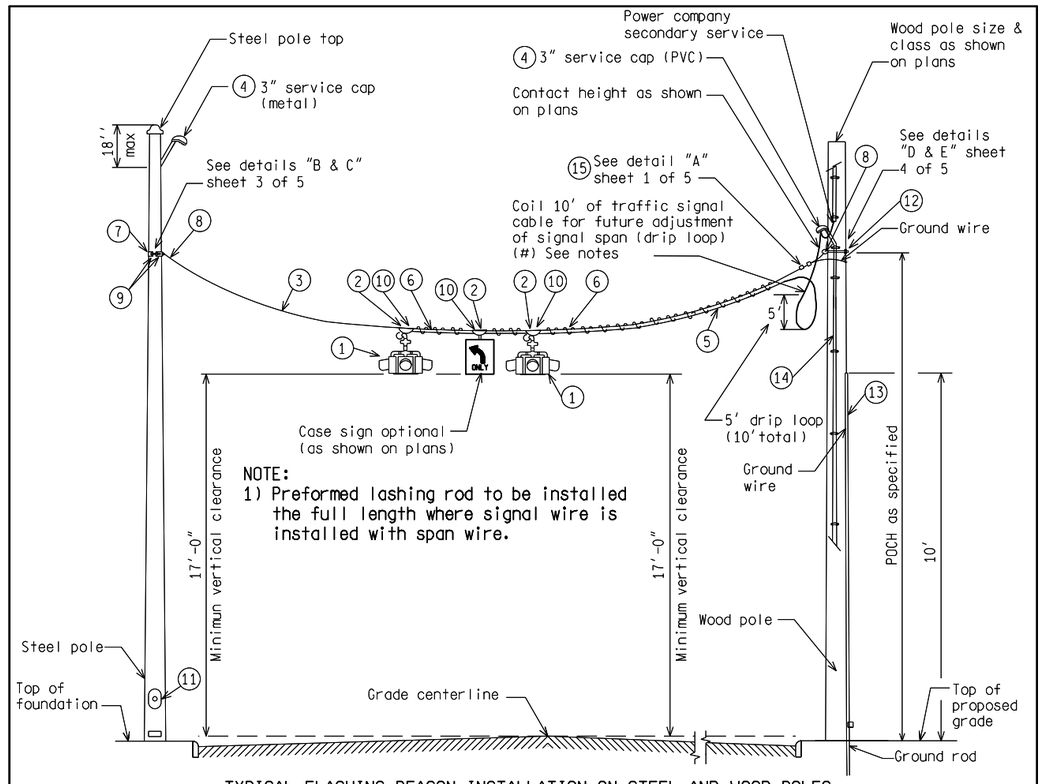
ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL) FHWA APPROVAL DATE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

ALL SPAN WIRE T.S. ON STEEL AND WOOD POLES

PLAN DATE | SIG-010-A | SHEET 1 of 7



TYPICAL FLASHING BEACON INSTALLATION ON STEEL AND WOOD POLES

NO.	ITEM
1	Traffic signal (no. heads as indicated)
2	Span wire hanger
3	5/16" extra high strength span wire
4	3" service cap (weatherhead), (metal for steel and PVC for wood poles)
5	P.J. traffic signal cable (as specified)
6	Preformed lashing rods
7	Pole band clamp (steel pole)
8	Guy thimble (2" dia.)
9	(2) 5/8" x 4" long bolt, nut, washers per pole band clamp (steel pole)
10	Install span wire preformed (armor rod) under each span hanger
11	Access hand hole all new & existing steel poles
12	5/8" eyebolt, oval eye and nut
13	Wood moulding or plastic duct (10' from ground level)
14	1 1/2" to 2" schedule 80 PVC or rigid metal (*) See note
15	Preformed guy grip dead ends

NOTES:
(*) For projects maintained by the Wayne Co. Department of Public Services (WCDPS), use rigid metal for conduit(s) from grade level to 10' (min.) above grade or as directed by the Engineer.

(#) For projects maintained by the Road Commission for Oakland County (RCOC), use drip loop (without coil) for future adjustment of signal span.

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL) FHWA APPROVAL DATE

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PLAN DATE | SIG-010-A | SHEET 2 of 7

AS-LET PLAN REVISIONS

NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

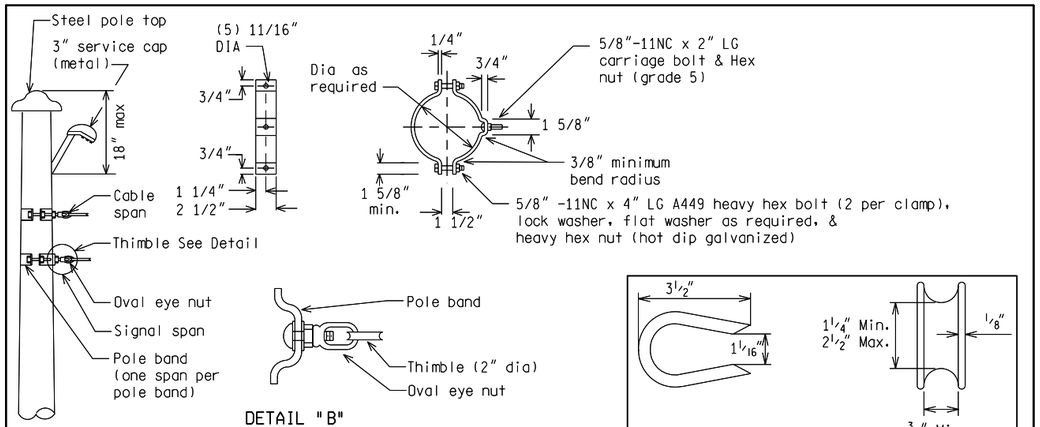
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DATE: 08/31/18
DESIGN UNIT: TALLON
TSC: TRAVERSE CITY

CS: 28091
JN: 132412A

DRAWING | SHEET

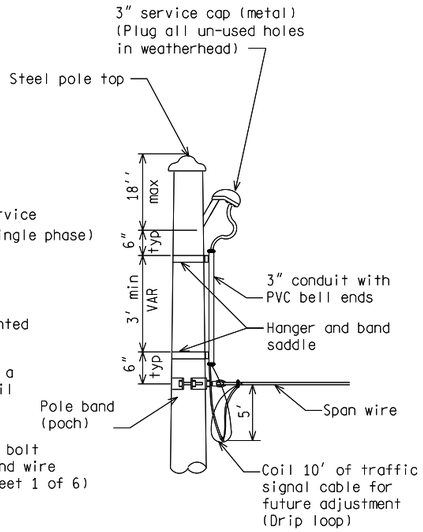
46



DETAIL "B"

POLE BAND CLAMP ON STEEL POLE

ASTM A36 steel pole band clamps must be stamped with identification that is traceable back to the manufacturer, which can be used to determine the month and year of clamp manufacture. The stamping method must be a low stress stamping method. The stamp cannot be located near the bolted flange, must be located near the center of the clamp on the back side facing away from traffic, and be visible after galvanizing. All bend radii are to be a minimum of 1.5 times the pole band thickness.



DETAIL "C"

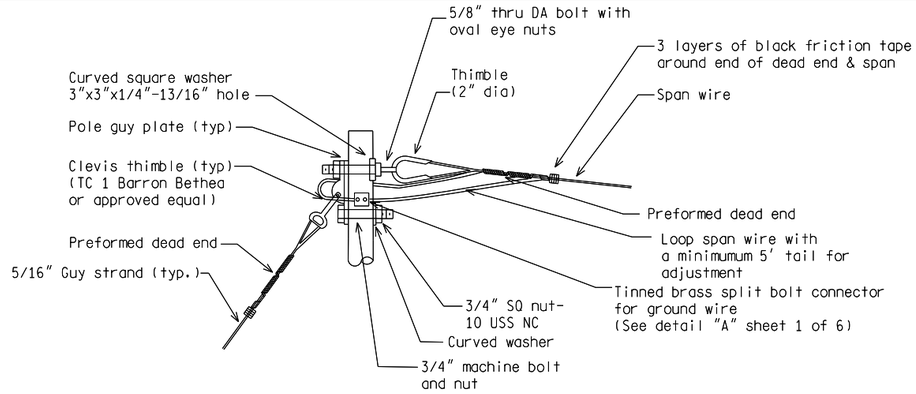
CABLING ON STEEL POLE

DETAIL "C"

SERVICE CABLE ON STEEL POLE

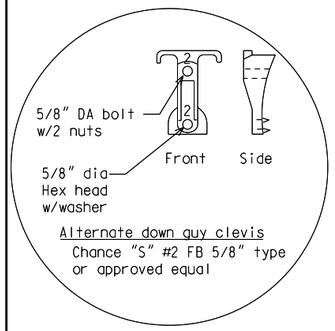
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MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-010-A	SHEET 3 of 7
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG010A.dgn Rev. 02/16/17		PLAN DATE		



DETAIL "D"

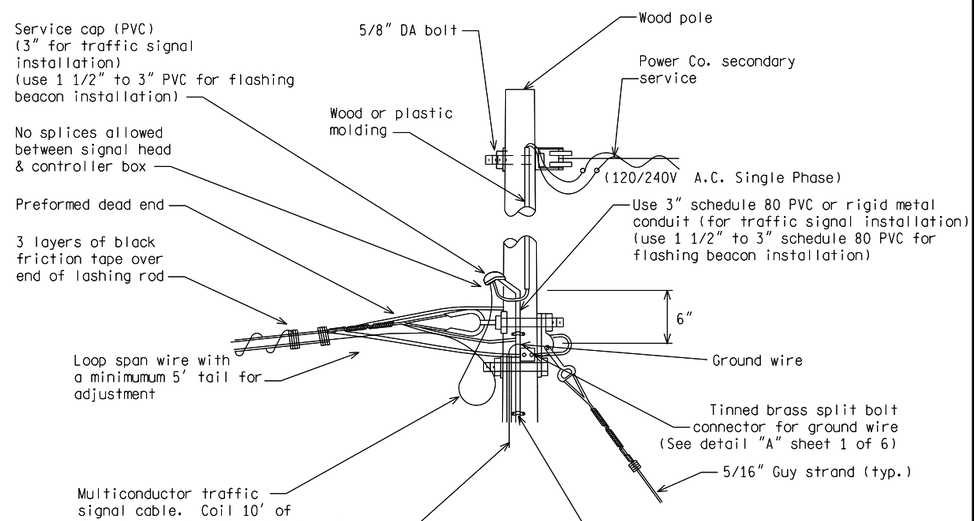
SPAN WIRE POLE PLATE AND HARDWARE ON WOOD POLE



Alternate down guy clevis

Chance "S" #2 FB 5/8" type or approved equal

NOTE:
Porcelain strain insulator (if required) shall meet the codes and placement requirements of the local utility co.



DETAIL "E"

CABLING ON WOOD POLE

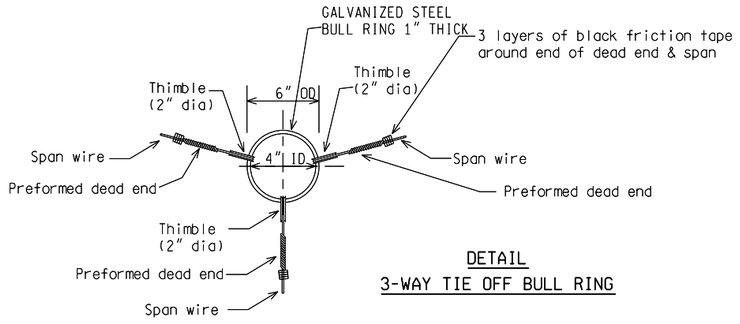
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-010-A	SHEET 4 of 7
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG010A.dgn Rev. 02/16/17		PLAN DATE		

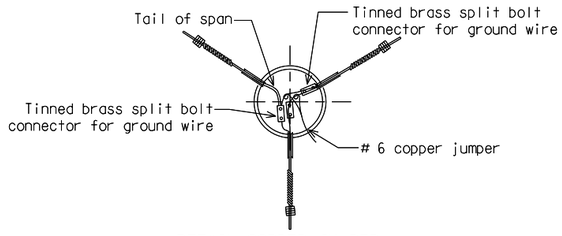
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MDOT Michigan Department of Transportation

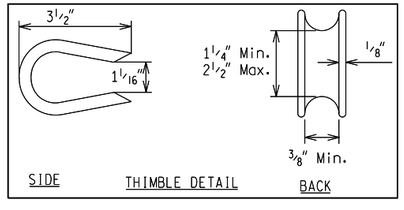
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	DESIGN UNIT: TALLON	JN: 132412A			47
FILE:	TSC: TRAVERSE CITY				



DETAIL
3-WAY TIE OFF BULL RING

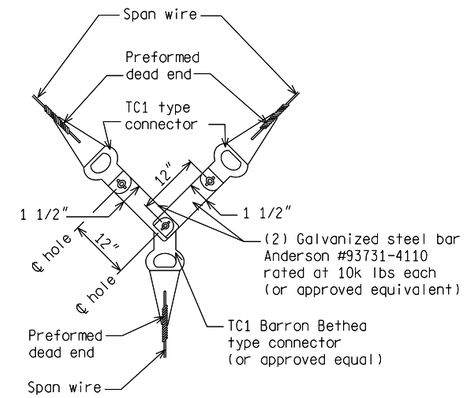


DETAIL COPPER JUMPER
3-WAY TIE OFF

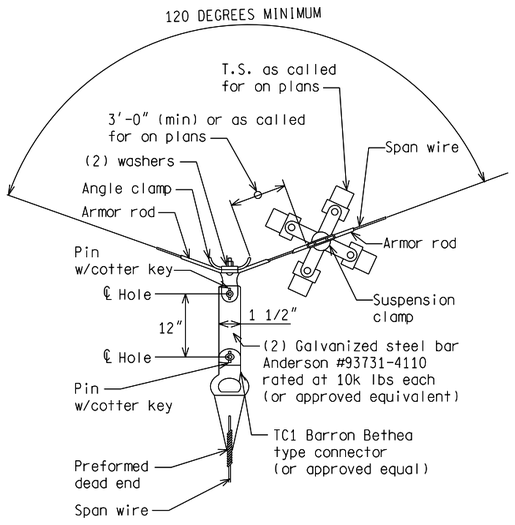


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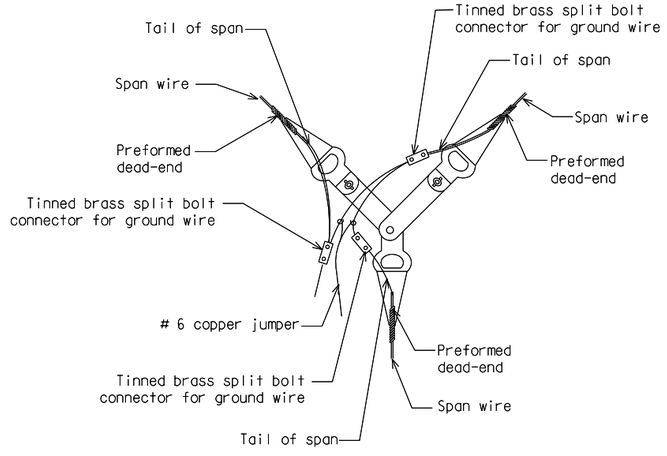
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File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG010A.dgn Rev. 02/16/17		PLAN DATE		



PULL-OFF CONNECTION DETAIL (ALTERNATE)
FOR 3-WAY SUSPENSION



PULL-OFF CONNECTION DETAIL (ALTERNATE)
FOR 3-WAY SUSPENSION

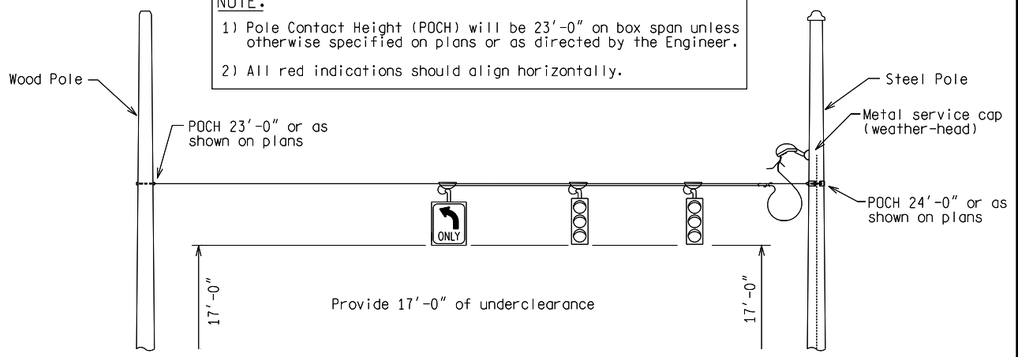


DETAIL COPPER JUMPER (ALTERNATE)
SPAN WIRE GROUNDING

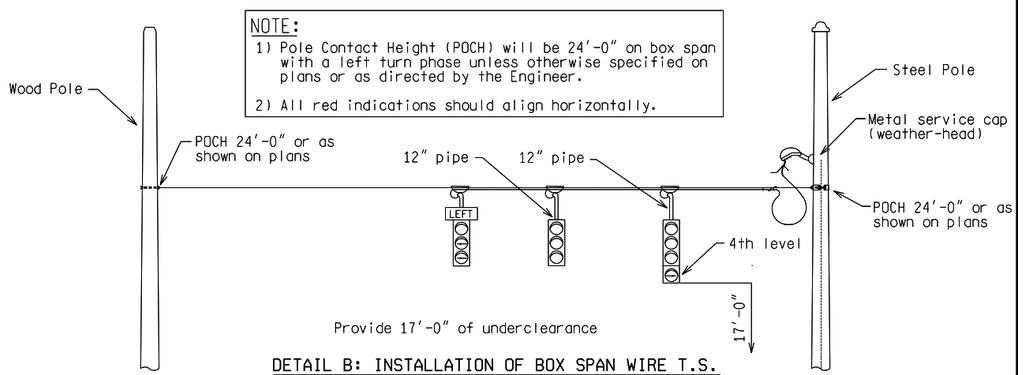
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MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-010-A	SHEET 6 of 7
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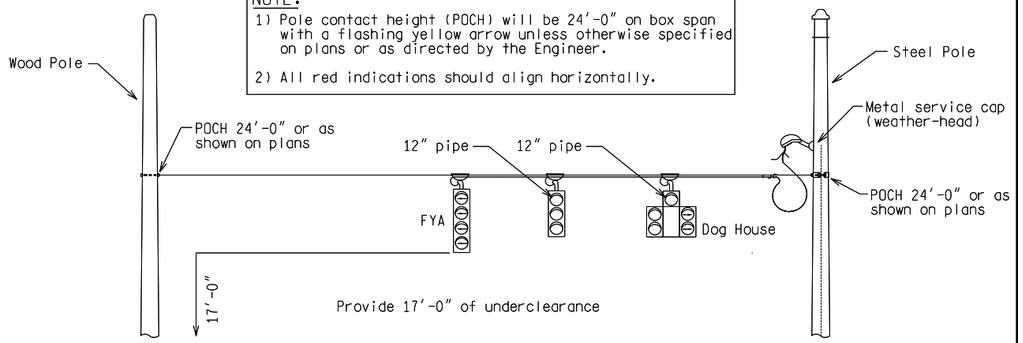
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									DESIGN UNIT: TALLON	JN: 132412A	48
									FILE:	TSC: TRAVERSE CITY	



DETAIL A: INSTALLATION OF BOX SPAN WIRE T.S. ON STEEL OR WOOD POLES



DETAIL B: INSTALLATION OF BOX SPAN WIRE T.S.
W/LT PHASE OR 4TH LEVEL ON STEEL OR WOOD POLES



DETAIL C: INSTALLATION OF BOX SPAN WIRE T.S.
FYA AND DOGHOUSE ON STEEL OR WOOD POLES

BOX SPAN WIRE T.S. ON STEEL OR WOOD POLES

For use on Oakland County roads only.

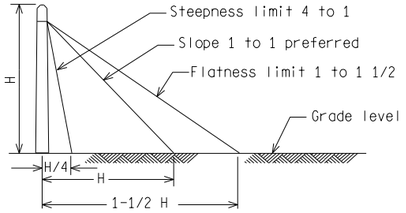
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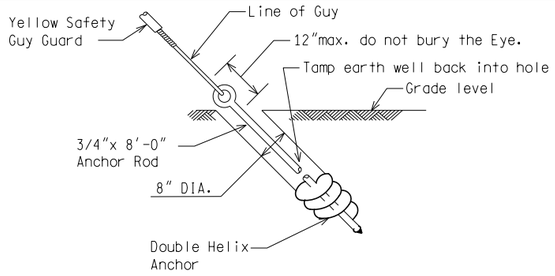
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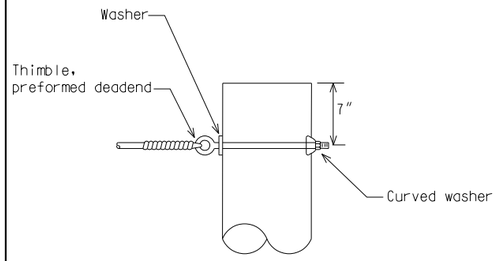
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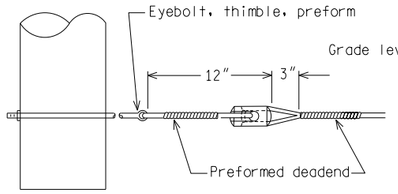


SLOPE LIMITS FOR ANCHOR GUYS

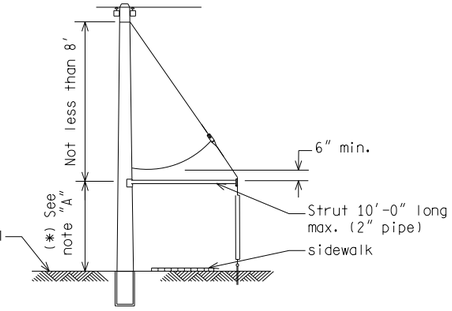
NOTE:
Use screw anchor or Double Helix anchor according to soil condition as directed by the Engineer.



POLE GUY

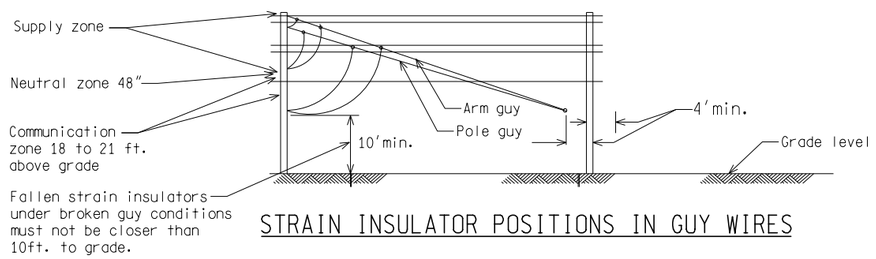


ARM GUY



GUY STRUT

(*) NOTE: "A"
This dimension to be 10' unless otherwise specified.



STRAIN INSULATOR POSITIONS IN GUY WIRES

NOT TO SCALE

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MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

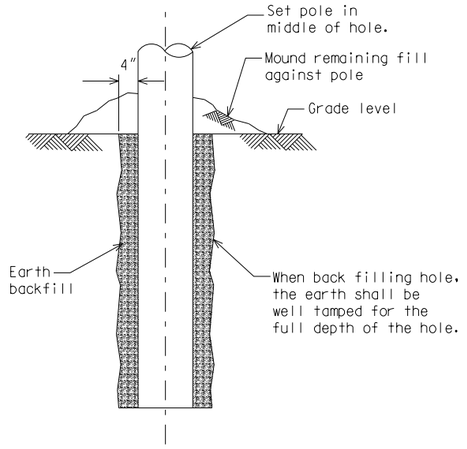
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

WOOD POLE GUYS AND SETTING DEPTH

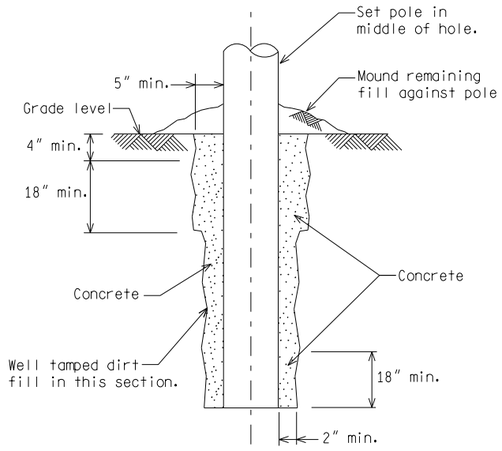
PLAN DATE

SIG-050-A

SHEET 1 of 2



WOOD POLE INSTALLATION



SELF SUPPORTING WOOD POLE IN CONCRETE

POLE HEIGHT	SETTING DEPTH
30'	6.0'
35'	6.0'
40'	6.0'
45'	6.5'
50'	7.0'
55'	7.5'
60'	8.0'

WOOD POLE SETTING DEPTHS

Reference Standard Specification for Construction Section 819.03

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
FHWA APPROVAL DATE

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PLAN DATE

SIG-050-A

SHEET 2 of 2

AS-LET PLAN REVISIONS							
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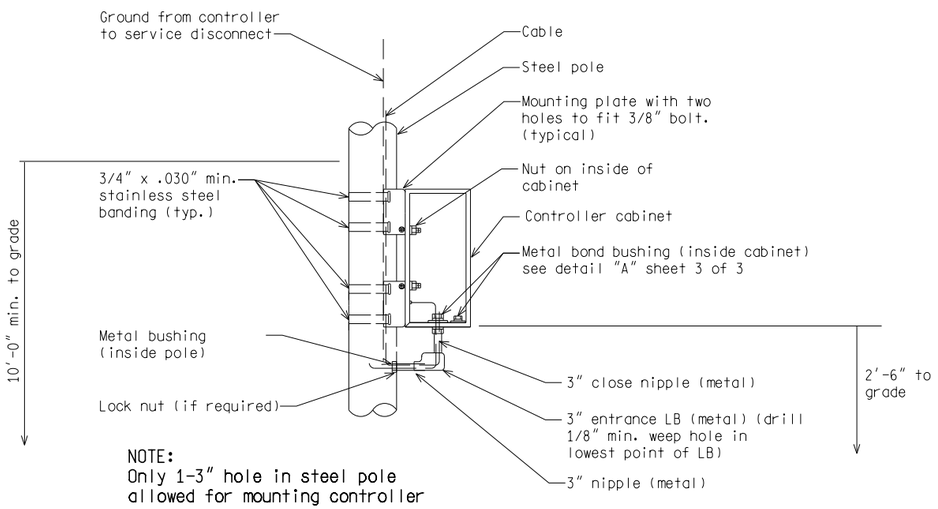
MDOT Michigan Department of Transportation

FILE:

DATE: 08/31/18
DESIGN UNIT: TALLON
TSC: TRAVERSE CITY

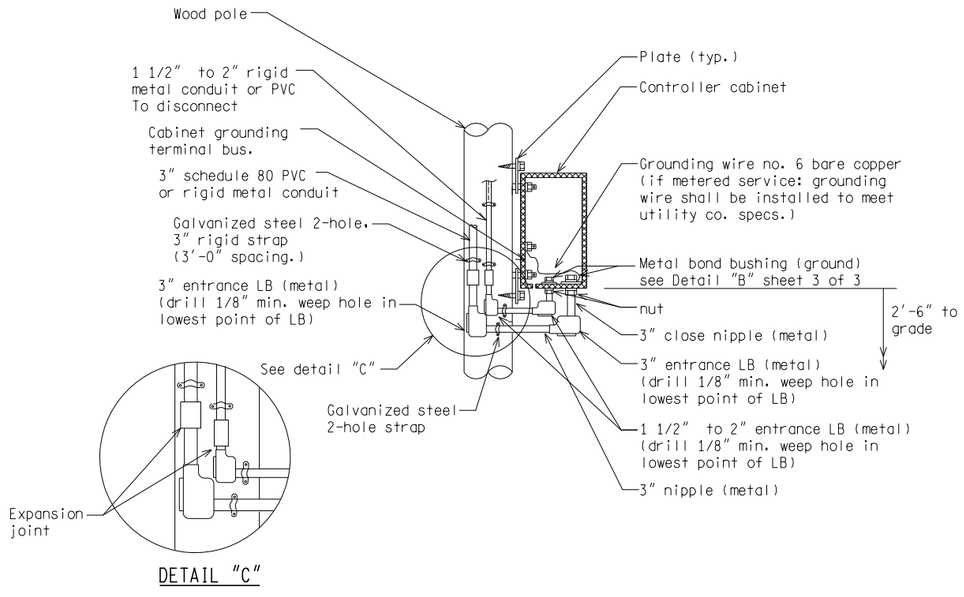
CS: 28091
JN: 132412A

DRAWING	SHEET
	50



NOTE:
Only 1-3" hole in steel pole allowed for mounting controller

TRAFFIC SIGNAL CONTROLLER CABINET MOUNTED ON STEEL POLES



DETAIL "C"

TRAFFIC SIGNAL CONTROLLER CABINET MOUNTED ON WOOD POLES

NOT TO SCALE

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MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL) FHWA APPROVAL DATE

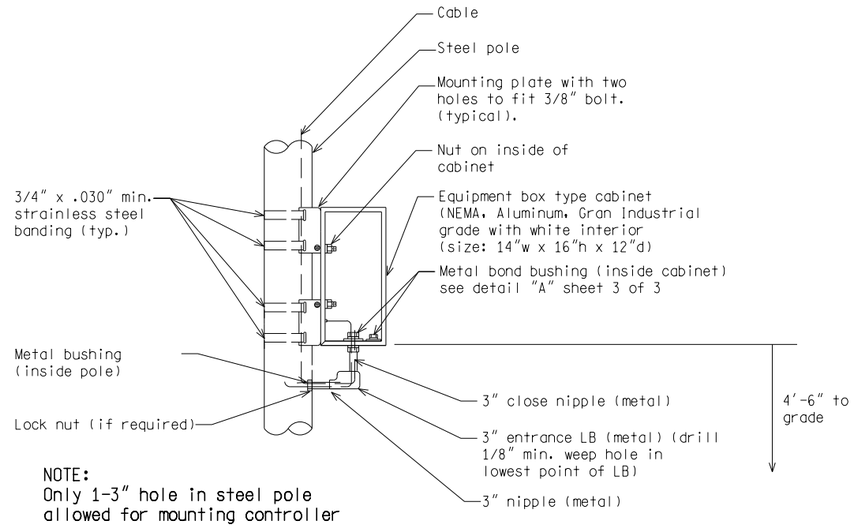
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

CONTROLLER CABINET MOUNTED ON STEEL OR WOOD POLES

PLAN DATE

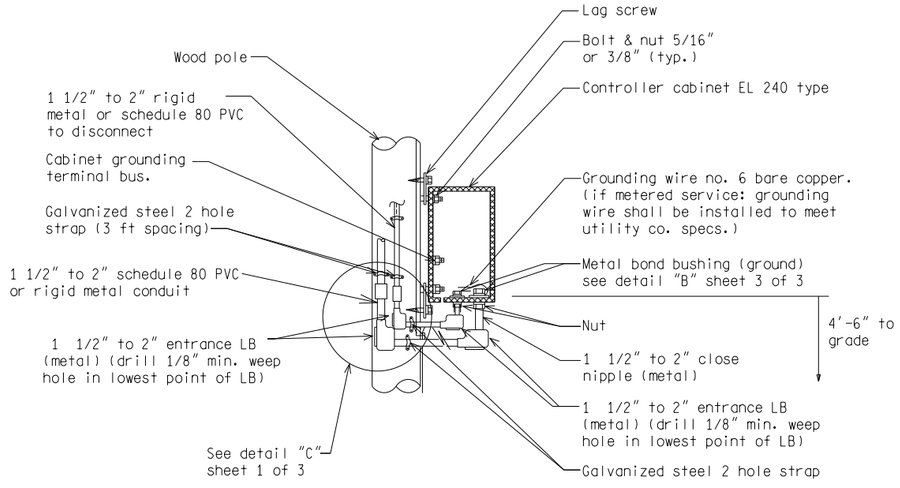
SIG-100-A

SHEET 1 of 3



NOTE:
Only 1-3" hole in steel pole allowed for mounting controller

FLASHING BEACON CONTROLLER CABINET (EQUIPMENT BOX) MOUNTED ON STEEL POLES



FLASHING BEACON CONTROLLER CABINET (EL 240 TYPE OR EQUIVALENT) MOUNTED ON WOOD POLES

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL) FHWA APPROVAL DATE

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PLAN DATE

SIG-100-A

SHEET 2 of 3

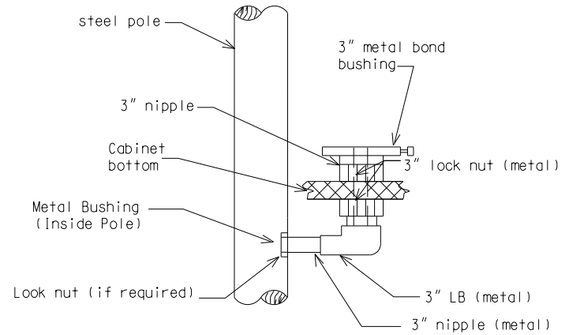
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MDOT Michigan Department of Transportation

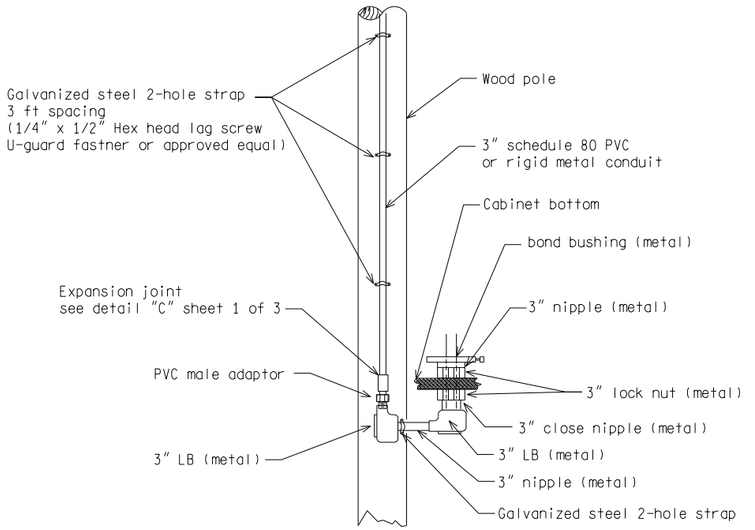
DATE: 08/31/18
DESIGN UNIT: TALLON
TSC: TRAVERSE CITY
FILE:

CS: 28091
JN: 132412A

DRAWING	SHEET
	51



CONTROLLER CABINET MOUNTED ON STEEL POLE DETAIL "A"



CONTROLLER CABINET MOUNTED ON WOOD POLE DETAIL "B"

NOTE:
The distance between LB's as shown on this detail is for clarity of the drawing only. Actual distance between LB's shall be minimized as is practical to the installation.

NOTE:
If rigid metal conduit is used, the conduit must be bonded according to the current N.E.C.

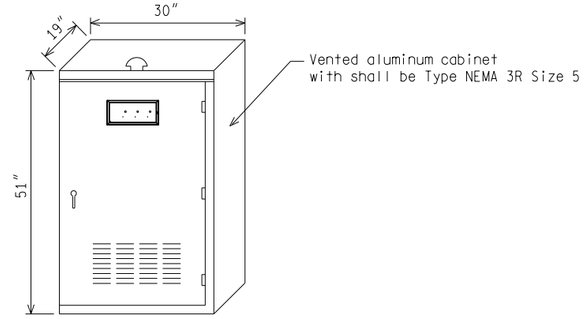
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	PLAN DATE	SIG-100-A	SHEET 3 of 3
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG100A.dgn Rev. 02/16/17				

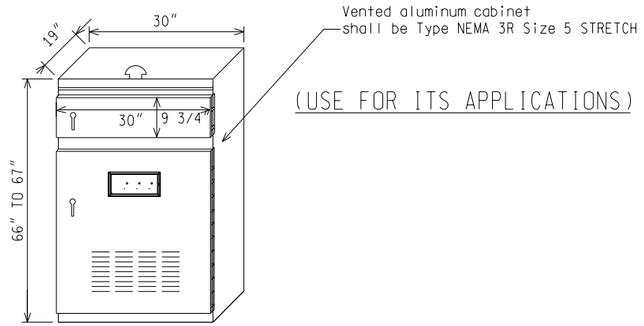
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MDOT Michigan Department of Transportation

	DATE: 08/31/18	CS: 28091		DRAWING / SHEET
	DESIGN UNIT: TALLON	JN: 132412A		
FILE:	TSC: TRAVERSE CITY			52



POLE MOUNTED TRAFFIC SIGNAL CONTROLLER CABINET



(USE FOR ITS APPLICATIONS)

POLE MOUNTED TRAFFIC SIGNAL ITS CONTROLLER CABINET (IF USED)

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG111A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY:

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

POLE MOUNTED T.S.
CONTROLLER CABINET/FOUNDATIONS

PLAN DATE

SIG-111-A

SHEET 1 of 1

AS-LET PLAN REVISIONS

NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

FILE:

DATE: 08/31/18

DESIGN UNIT: TALLON

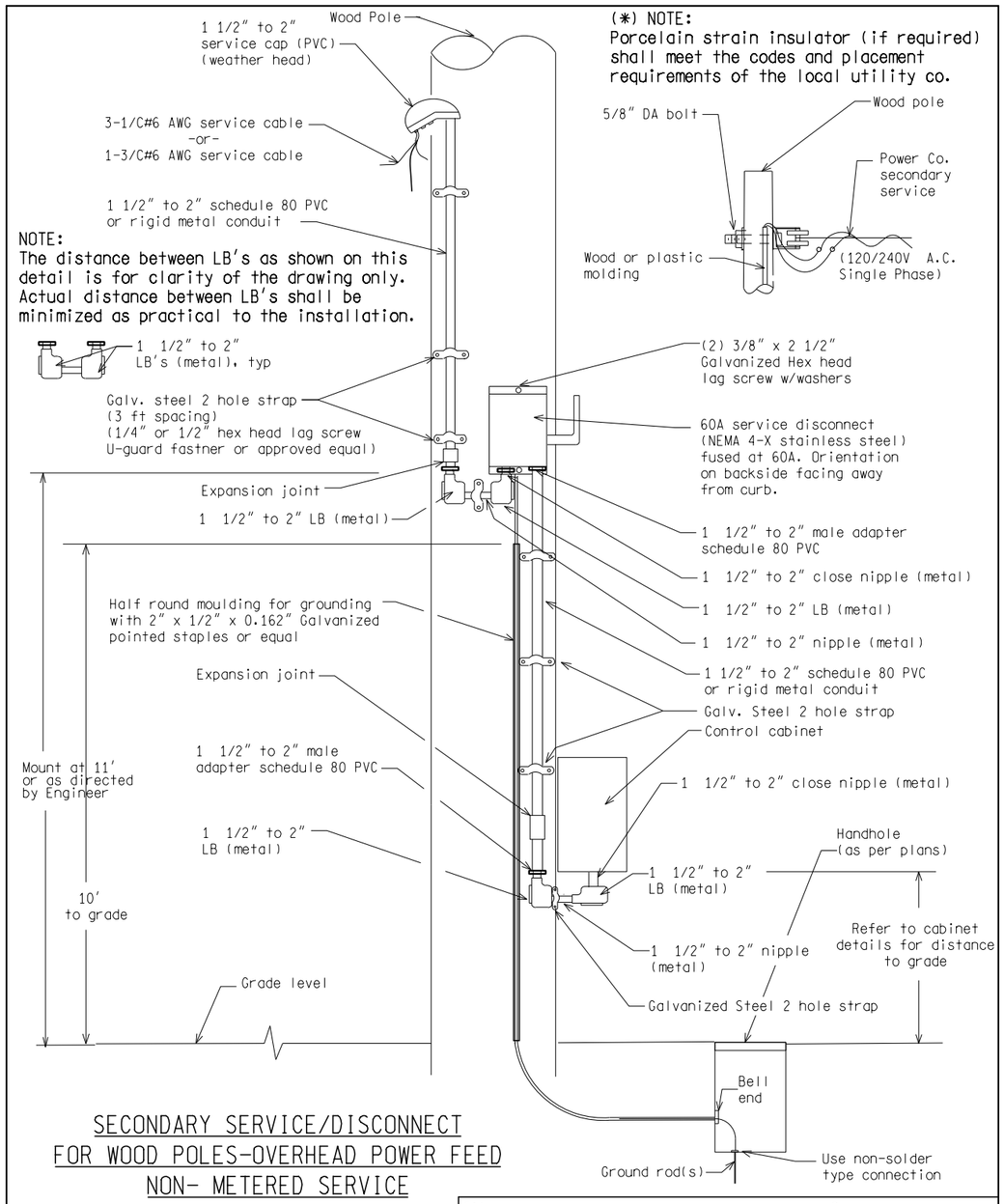
TSC: TRAVERSE CITY

CS: 28091

JN: 132412A

DRAWING

SHEET 53

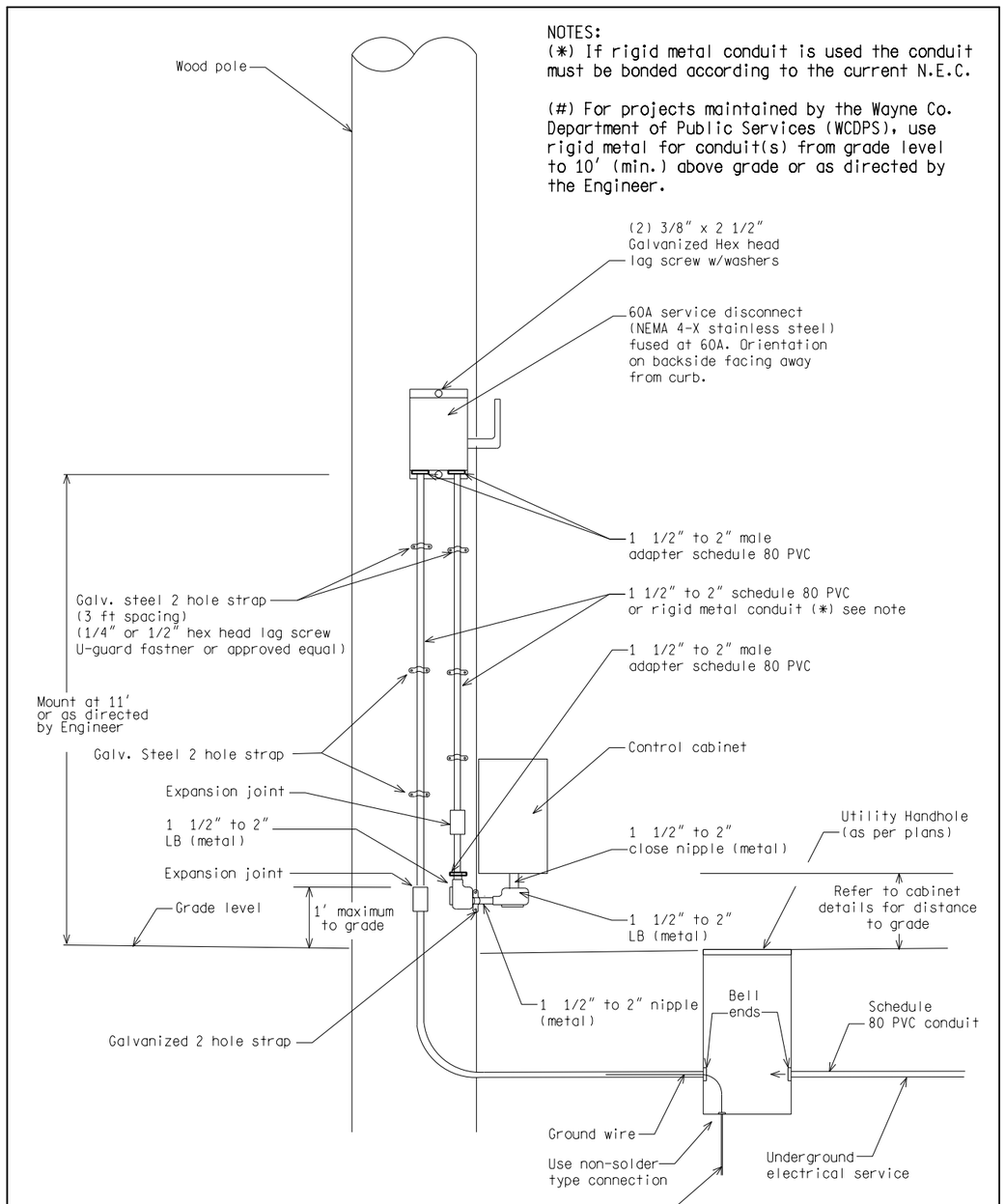


SECONDARY SERVICE/DISCONNECT FOR WOOD POLES-OVERHEAD POWER FEED NON- METERED SERVICE

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG200A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation PREPARED BY TRAFFIC AND SAFETY DRAWN BY: DJF CHECKED BY:	ENGINEER OF DELIVERY ENGINEER OF DEVELOPMENT (SPECIAL DETAIL) FHWA APPROVAL DATE	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR SECONDARY SERVICE/DISCONNECT FOR WOOD POLES PLAN DATE: SIG-200-A SHEET 1 of 4



SECONDARY SERVICE/DISCONNECT FOR WOOD POLES-UNDERGROUND POWER FEED NON-METERED SERVICE

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	PLAN DATE: SIG-200-A SHEET 2 of 4

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG200A.dgn Rev. 02/16/17

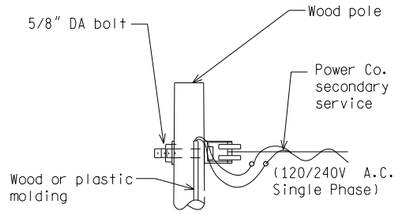
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NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

FILE:	DATE: 08/31/18 DESIGN UNIT: TALLON TSC: TRAVERSE CITY	CS: 28091 JN: 132412A	DRAWING	SHEET 54

(*) NOTE:
This detail is illustrated as a metered installation. If the plans call for an un-metered installation, then the meter shall be omitted and a direct electrical supply shall run to the service disconnect (fused at 60 amps).

(*) NOTE:
Porcelain strain insulator (if required) shall meet the codes and placement requirements of the local utility co.

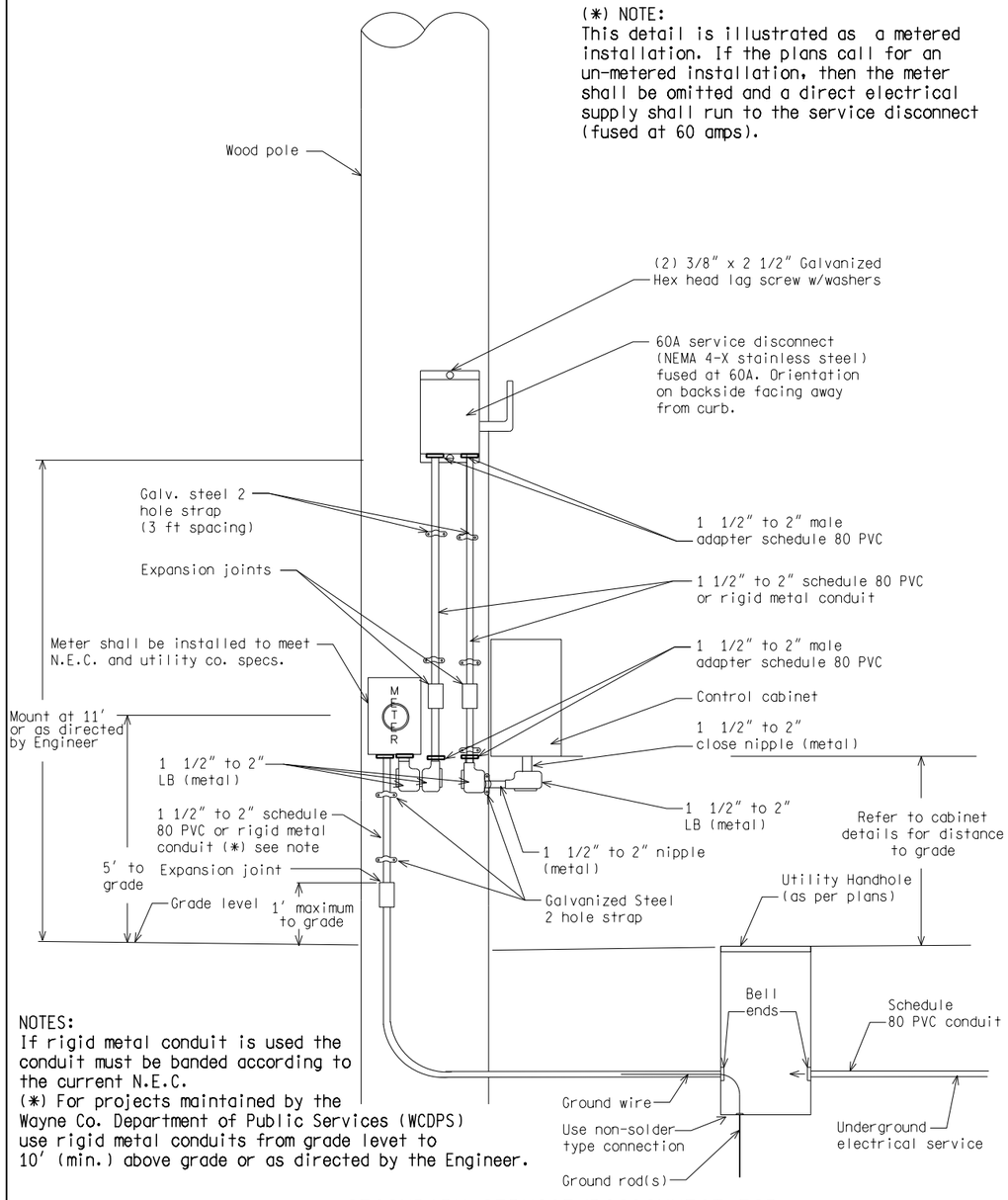


SECONDARY SERVICE/DISCONNECT FOR WOOD POLES-OVERHEAD POWER FEED METERED SERVICE

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-200-A	SHEET 3 of 4
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG200A.dgn Rev. 02/16/17		PLAN DATE		

(*) NOTE:
This detail is illustrated as a metered installation. If the plans call for an un-metered installation, then the meter shall be omitted and a direct electrical supply shall run to the service disconnect (fused at 60 amps).



NOTES:
If rigid metal conduit is used the conduit must be banded according to the current N.E.C.
(*) For projects maintained by the Wayne Co. Department of Public Services (WCDPS) use rigid metal conduits from grade levet to 10' (min.) above grade or as directed by the Engineer.

SECONDARY SERVICE/DISCONNECT FOR WOOD POLES-UNDERGROUND POWER FEED METERED SERVICE

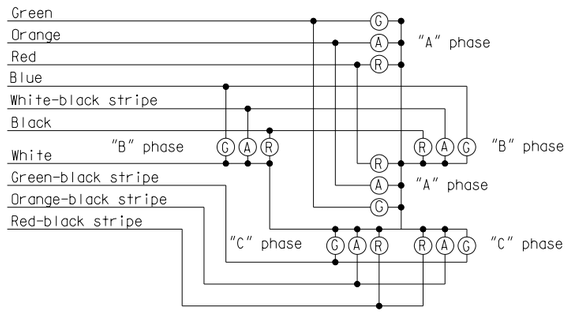
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-200-A	SHEET 4 of 4
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG200A.dgn Rev. 02/16/17		PLAN DATE		

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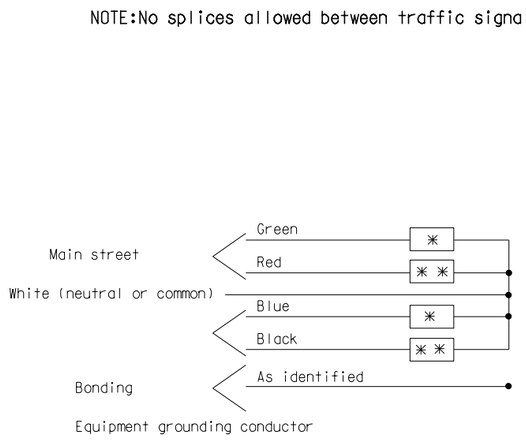
MDOT Michigan Department of Transportation

	DATE: 08/31/18	CS: 28091		DRAWING / SHEET
	DESIGN UNIT: TALLON	JN: 132412A		55
FILE:	TSC: TRAVERSE CITY			



COLOR CODE FOR WIRING CONNECTING TRAFFIC SIGNAL LAMPS

NOTE:No splices allowed between traffic signal head and controller.



COLOR CODE FOR WIRING CONNECTING PEDESTRIAN SIGNAL LAMPS
(WALKING PERSON - HAND SYMBOL)

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG230A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

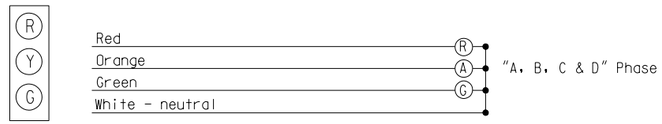
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

COLOR CODE WIRING/ EQUIPMENT GROUNDING

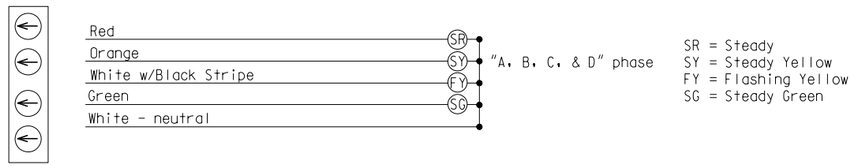
PLAN DATE

SIG-230-A

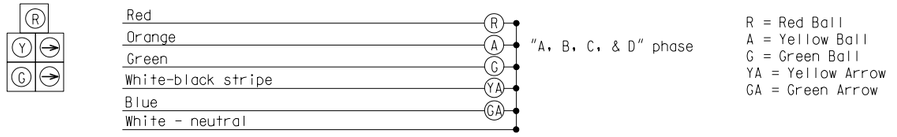
SHEET 1 of 6



STANDARD - 3 COLOR SIGNAL DISPLAY



FLASHING YELLOW ARROW (FYA) - 4 COLOR SIGNAL DISPLAY



DOG HOUSE W/RIGHT TURNS - 5 COLOR SIGNAL DISPLAY

COLOR CODE FOR WIRING CONNECTING TRAFFIC SIGNAL LAMPS

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
FHWA APPROVAL DATE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG230A.dgn Rev. 02/16/17

PLAN DATE

SIG-230-A

SHEET 2 of 6

AS-LET PLAN REVISIONS							
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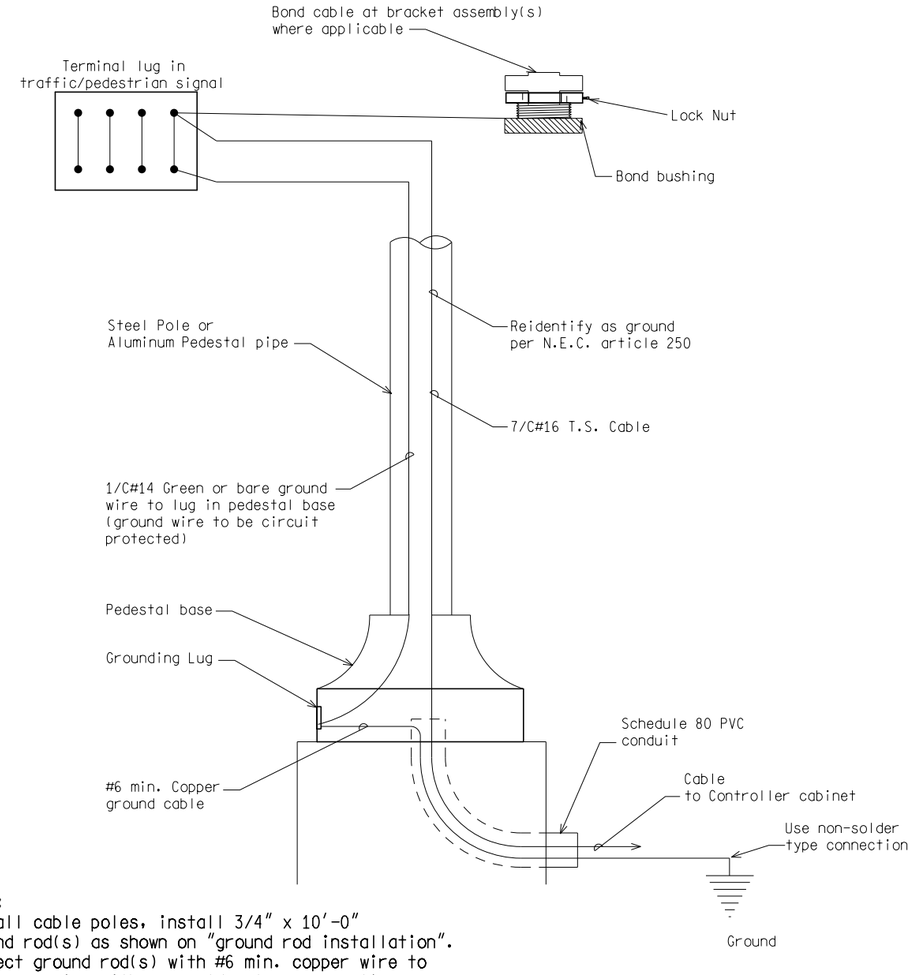
MDOT Michigan Department of Transportation

DATE: 08/31/18
DESIGN UNIT: TALLON
TSC: TRAVERSE CITY
FILE:

CS: 28091
JN: 132412A

DRAWING | SHEET

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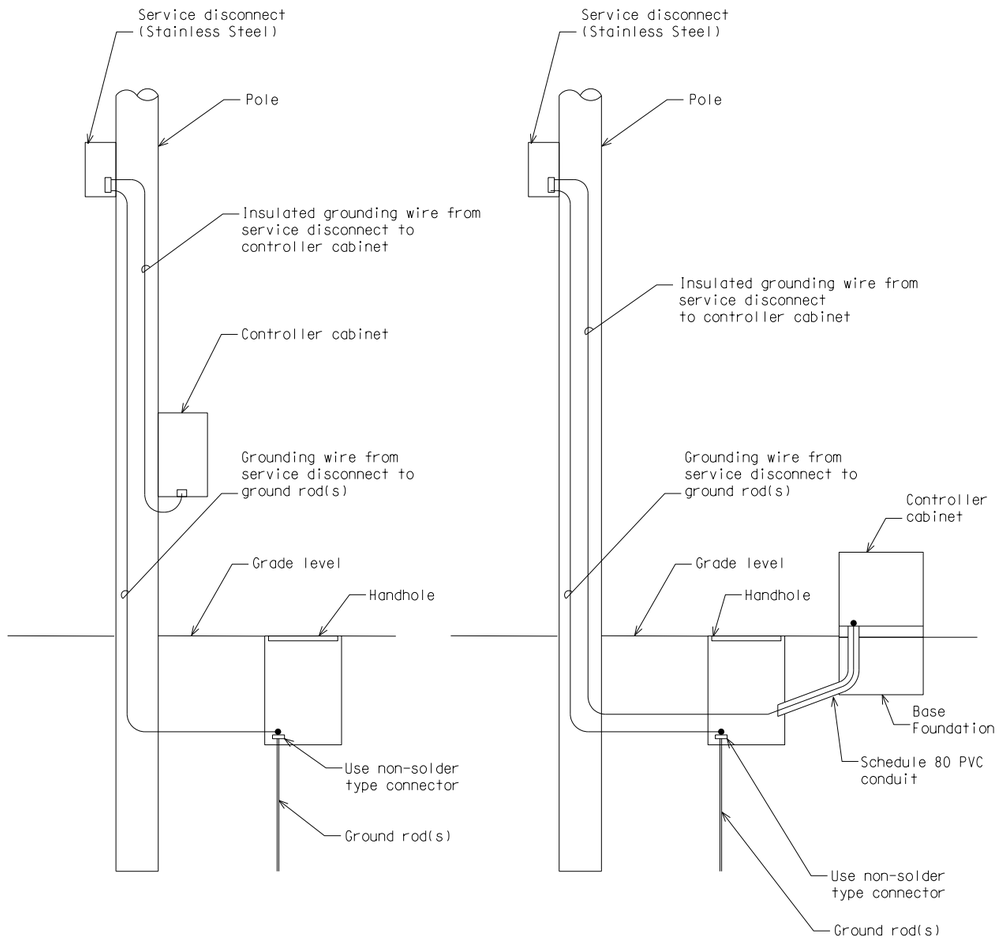


NOTE:
For all cable poles, install 3/4" x 10'-0"
ground rod(s) as shown on "ground rod installation".
Connect ground rod(s) with #6 min. copper wire to
messenger wire with non-solder type connection.

STEEL POLE/PEDESTAL GROUNDING DETAIL

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	PLAN DATE	SIG-230-A	SHEET 3 of 6
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GROUNDING

Install 3/4 " x 10'-0" copper clad ground rod(s) as required to provide less than 10 OHM resistance to ground.

Grounding wire #6 AWG min. bare copper grounding wire shall be installed to meet N.E.C. and utility company specs.

Ground wire from disconnect to ground rod to be in moulding (wood pole or post) or inside the pole (steel). Ground wire from disconnect to controller cabinet to be in conduit (wood pole, wood post, and steel pole).

CONTROLLER CABINET GROUNDING DETAIL

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	PLAN DATE	SIG-230-A	SHEET 4 of 6
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AS-LET PLAN REVISIONS							
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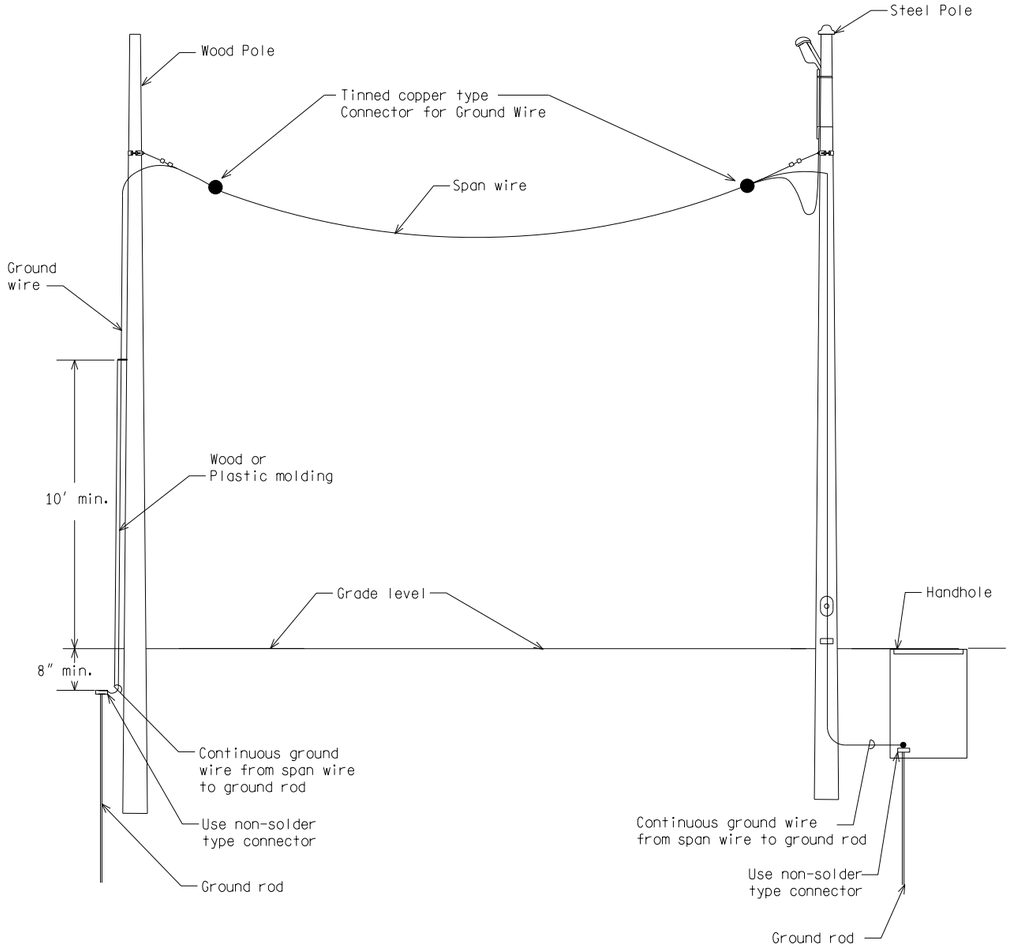
MDOT Michigan Department of Transportation

FILE:

DATE: 08/31/18
DESIGN UNIT: TALLON
TSC: TRAVERSE CITY

CS: 28091
JN: 132412A

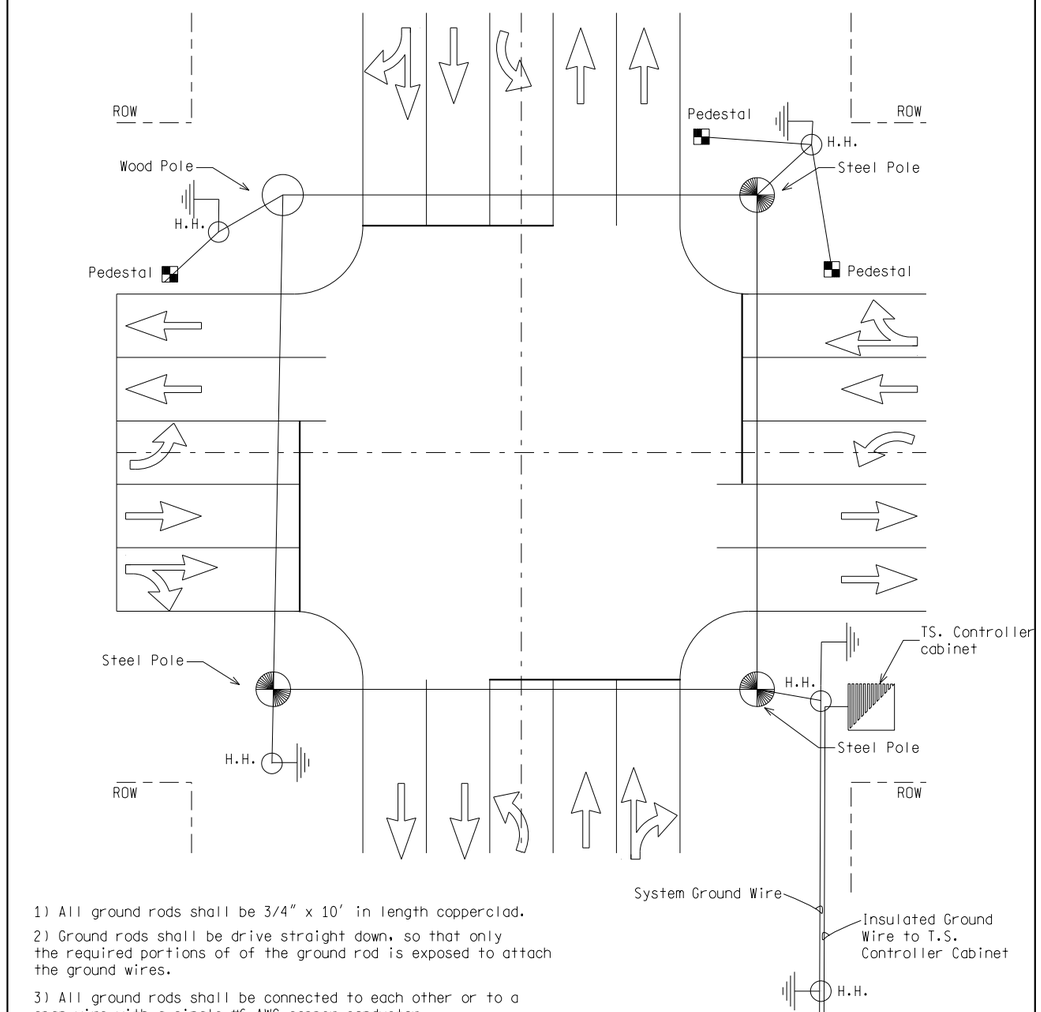
DRAWING	SHEET
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SPAN WIRE GROUNDING DETAIL

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-230-A	SHEET 5 of 6
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1) All ground rods shall be 3/4″ x 10′ in length copperclad.

2) Ground rods shall be drive straight down, so that only the required portions of of the ground rod is exposed to attach the ground wires.

3) All ground rods shall be connected to each other or to a span wire with a single #6 AWG copper conductor.

4) Each ground wire attaching to a ground rod shall have its own approved acorn type connector.

5) Do not install any ground rods within 10′ of any other ground rods from other grounding.

6) The grounding system shall measure 10 ohms or less.

7) A separate insulated green #6 AWG copper ground is required from the service disconnect (safety switch) to the ground bussbar in the controller cabinet.

8) Ground rod for each steel pole, wood pole, pedestal and/or traffic signal controller cabinet shall be located in the adjacent handhole as indicated on the plans or as directed by the Engineer.

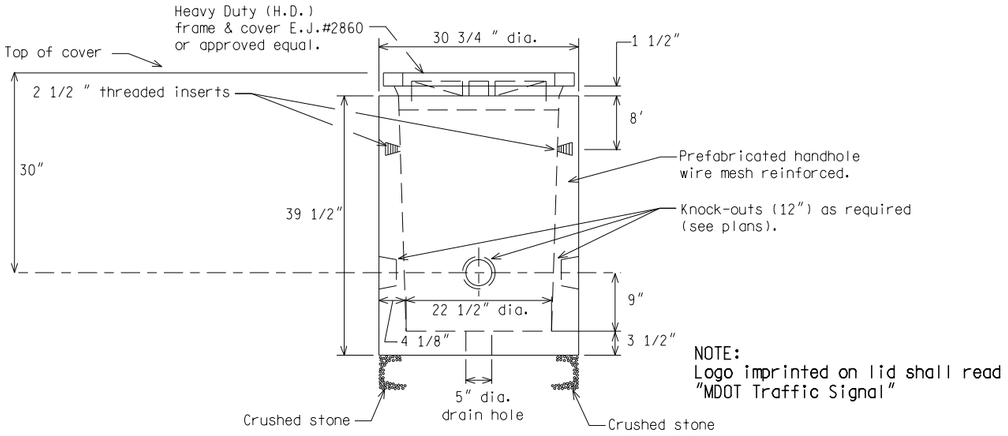
9) All metal bases must be connected to a ground rod with a #6 ground wire.

SYSTEM GROUNDING DETAL

NOT TO SCALE

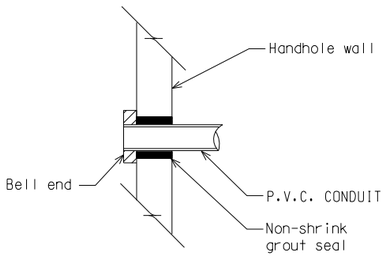
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NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION	MDOT Michigan Department of Transportation			
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									FILE:	TSC: TRAVERSE CITY	58



NOTE:
Logo imprinted on lid shall read "MDOT Traffic Signal"

2' PRECAST ROUND HANDHOLE WITH FLOOR

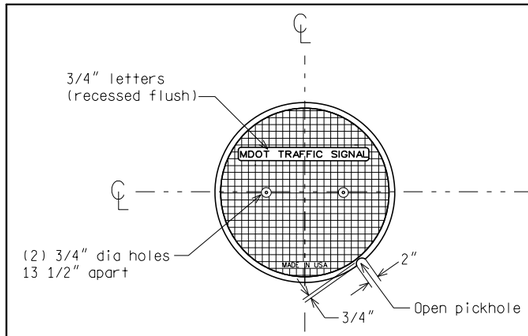


TYPICAL CONDUIT ENTRANCE
AT HANDHOLE

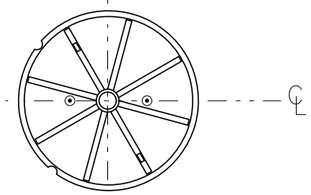
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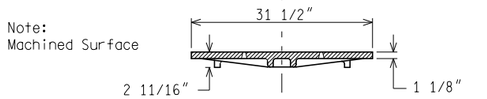
MDOT Michigan Department of Transportation PREPARED BY TRAFFIC AND SAFETY	ENGINEER OF DELIVERY ENGINEER OF DEVELOPMENT (SPECIAL DETAIL) FHWA APPROVAL DATE	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR HANDHOLE- PRECAST, POLYMER CONCRETE
DRAWN BY: DJF CHECKED BY:		PLAN DATE: SIG-240-A — SHEET 1 of 6



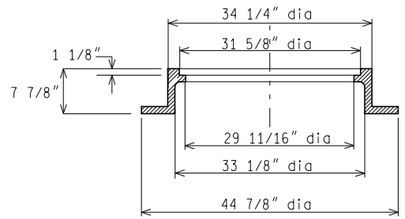
TOP VIEW OF COVER



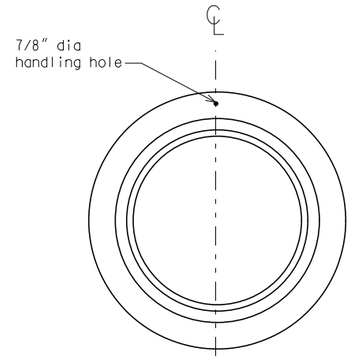
BOTTOM VIEW OF COVER



COVER SECTION



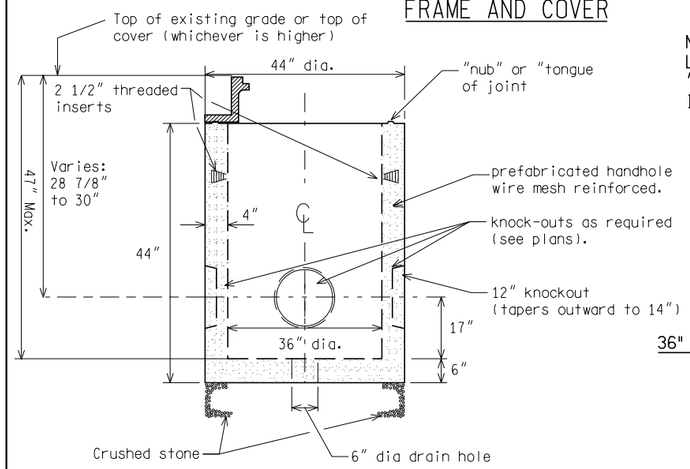
FRAME SECTION



TOP VIEW OF FRAME

The H. D. frame and cover shall be manufactured by East Jordan Iron Works, Model 1220 or approved equal.

FRAME AND COVER



3' DIAMETER ROUND PRECAST CONCRETE HANDHOLE

NOTE:
Logo imprint may read "Traffic Signal" for non MDOT Installation

36" PRECAST ROUND HANDHOLE
SECTION DETAIL

NOT TO SCALE

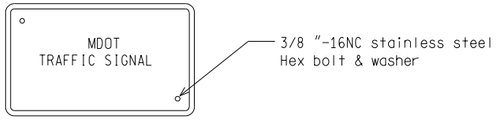
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File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG240A.dgn Rev. 02/16/17			

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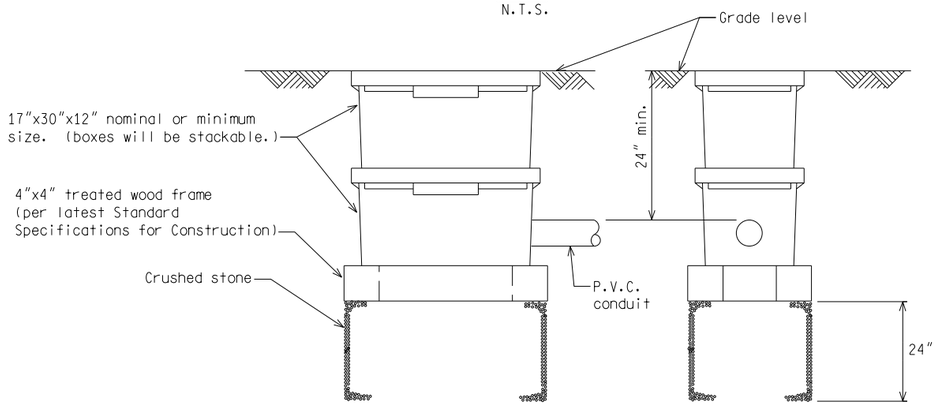
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	DATE: 08/31/18	CS: 28091		DRAWING	SHEET
	DESIGN UNIT: TALLON	JN: 132412A			59
FILE:	TSC: TRAVERSE CITY				

NOTE:
Logo imprint may read "Traffic Signal"
for non MDOT installations



COVER
N.T.S.



POLYMER CONCRETE HANDHOLE

NOTES PERTAIN TO PRECAST OR BRICK:

1) The material and workmanship shall be in accordance with the current M.D.O.T. Standard Specifications for Construction.

2) All concrete masonary shall be grade 30M.

3) The inner surface of the handhole shall be smooth.

4) Heavy Duty covers shall be castings which meet the requirements of the current specifications for gray iron castings ASTM designation A48 and shall have a minimum strength as provided for Class No. 30 gray iron castings.

5) All castings shall be cleaned by sand blasting.

6) The seating face of the cover and the seat for the same on the frame if required, shall be ground or machined so that the cover shall have an even bearing on its seat to prevent rocking or tilting.

7) The castings shall be free of pouring faults, blow holes, cracks,and other imperfections. They shall be sound, true to form and thickness, clean and neatly finished and shall be coated with tar pitch varnish.

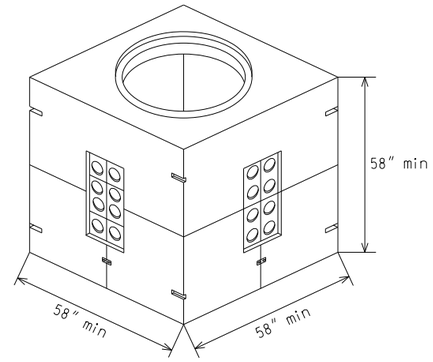
8) Light Duty cover shall be bolted to frame with not less than 2 countersunk Hex head bronze bolts.

9) The Heavy Duty cover & frame shall be East Jordan Iron Works #8206 Neenah Foundry, #R-6662-HP for square cover or East Jordan Iron Works #2860 Type "A", Neenah Foundry #R-6052 D for circular cover or an approved equal.

10) Handhole shall be equipped with cable rack and hooks to train cable.

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-240-A	SHEET 3 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG240A.dgn Rev. 02/16/17		PLAN DATE		

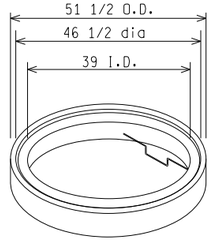


	Length	Width	Height
Inside	48	48	48
Outside	58	58	58
Recommended Hole size	82	82	--

	Min Thickness
Wall	5
Roof	5
Floor	5

	Min Weight lbs
Top	3300
Bottom	3850
Total	7150

NOTE:
Galvanized step is standard with
grade ring ASTM C478.



Dimensions	
A	Min Wt. (lbs)
6	440
9	650
12	860

GRADE RING WITH 39" I.D. &
46 1/2" RECESS

4' x 4' x 4' PRECAST CONCRETE HANDHOLE

NOT TO SCALE

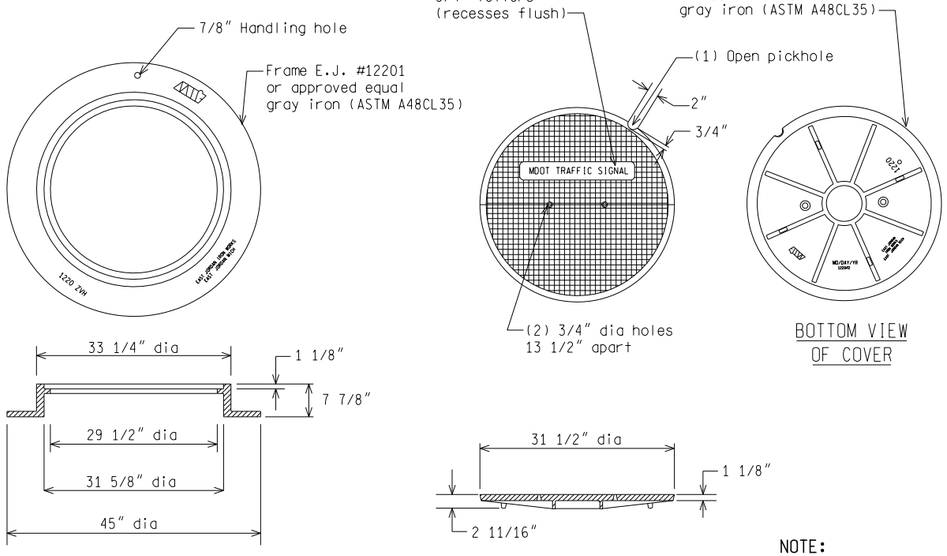
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File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG240A.dgn Rev. 02/16/17		PLAN DATE		

AS-LET PLAN REVISIONS							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

	DATE: 08/31/18	CS: 28091		DRAWING
	DESIGN UNIT: TALLON			SHEET
FILE:	TSC: TRAVERSE CITY	JN: 132412A		60

NOTE:
Logo imprint it on cover shall read "MDOT Traffic Signal" for MDOT installations



BOTTOM VIEW OF COVER

FRAME SECTION

NOTE:
Machined surface

COVER SECTION

NOTE:
Machined surface

MANHOLE FRAME (HEAVY DUTY)

Estimated weight 410 lbs

MANHOLE COVER (HEAVY DUTY)

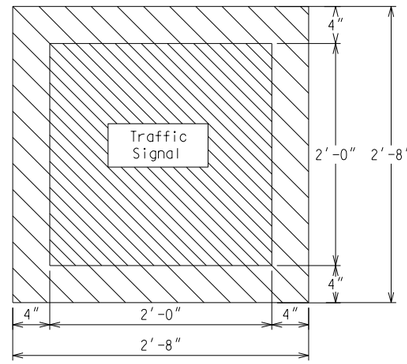
Estimated weight 245 lbs

4' x 4' x 4' PRECAST CONCRETE HANDHOLE

NOT TO SCALE

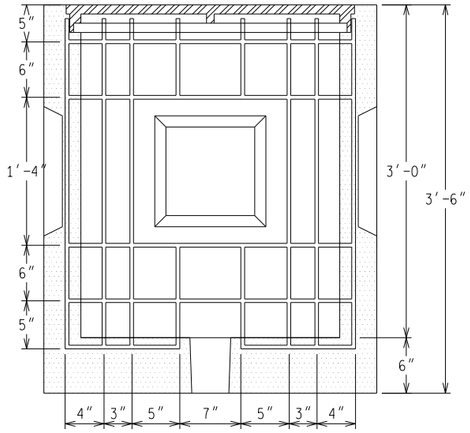
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	PLAN DATE	SIG-240-A	SHEET 5 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG240A.dgn Rev. 02/16/17				

Concrete: 4500 p.s.i. @ 28 days
Reinforcement: Grade 60 rebar
All bars are #4



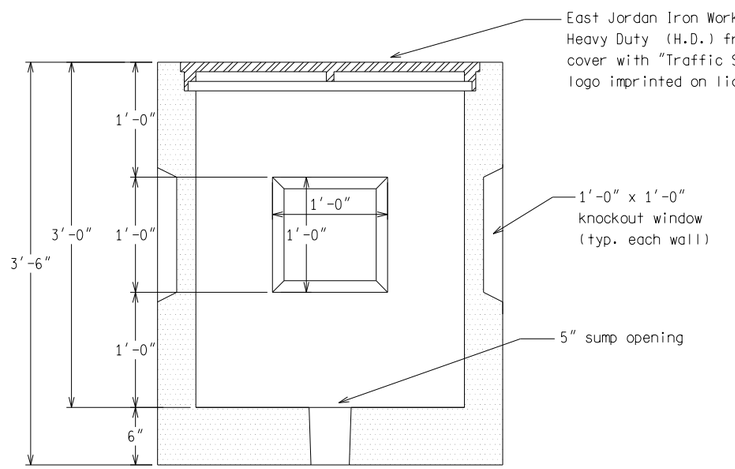
PLAN VIEW

With out frame & cover



SECTION VIEW

Typ. reinforcement all walls



SECTION VIEW

2' x 2' SQUARE x 3' HANDHOLE

For use on Oakland County roads only.

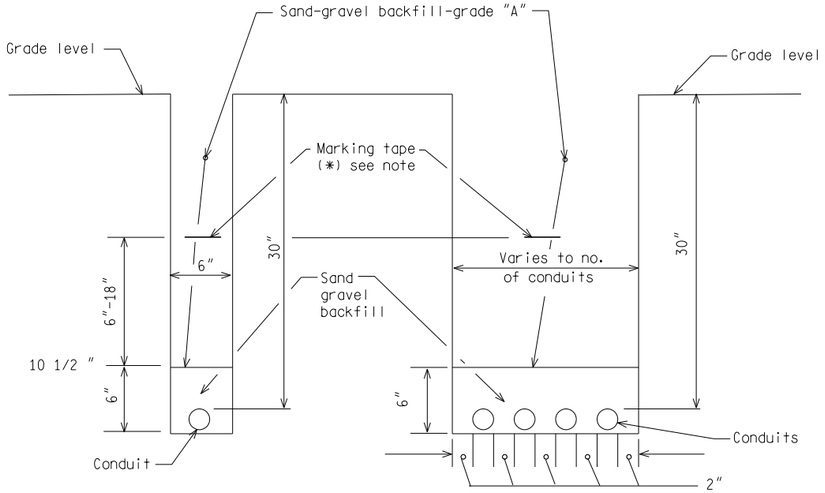
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	PLAN DATE	SIG-240-A	SHEET 6 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG240A.dgn Rev. 02/16/17				

AS-LET PLAN REVISIONS							
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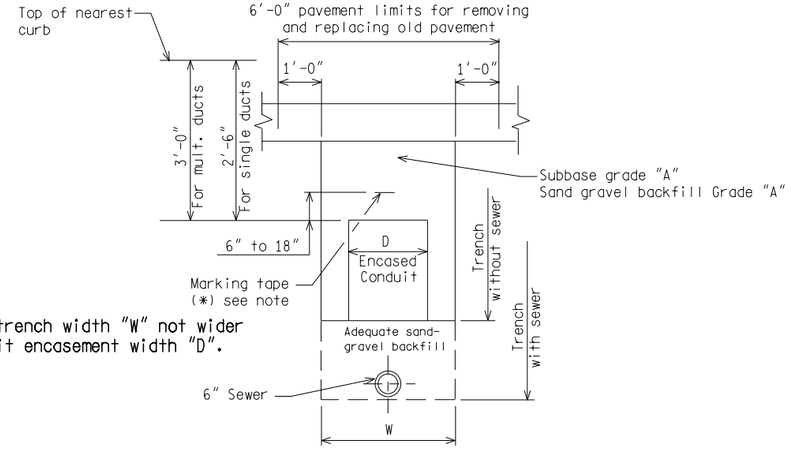
MDOT Michigan Department of Transportation

	DATE: 08/31/18	CS: 28091		DRAWING
	DESIGN UNIT: TALLON	JN: 132412A		SHEET 61
FILE:	TSC: TRAVERSE CITY			



(*) NOTE:
Marking tape shall have proper logo as supplied by the Engineer and installed by the Contractor.

DIRECT BURIAL CONDUIT(S)/CABLE(S)



NOTE:
Preferred trench width "W" not wider than conduit encasement width "D".

TYPICAL SECTION OF TRENCH
ENCASED CONDUIT

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG250A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

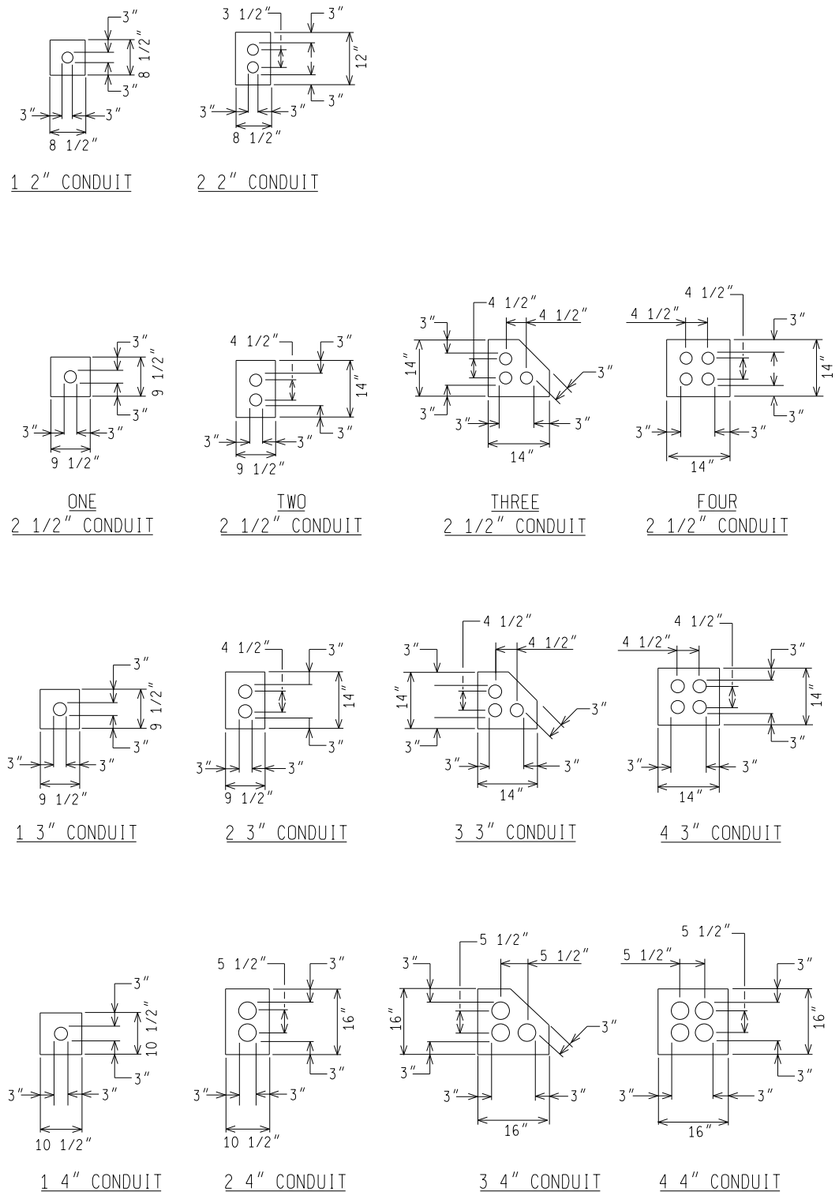
ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL) FHWA APPROVAL DATE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

CONDUIT (DIRECT BURIAL/ENCASED)

PLAN DATE | SIG-250-A | SHEET 1 of 2



ENCASED CONDUIT SECTIONS

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL) FHWA APPROVAL DATE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG250A.dgn Rev. 02/16/17

PLAN DATE | SIG-250-A | SHEET 2 of 2

AS-LET PLAN REVISIONS

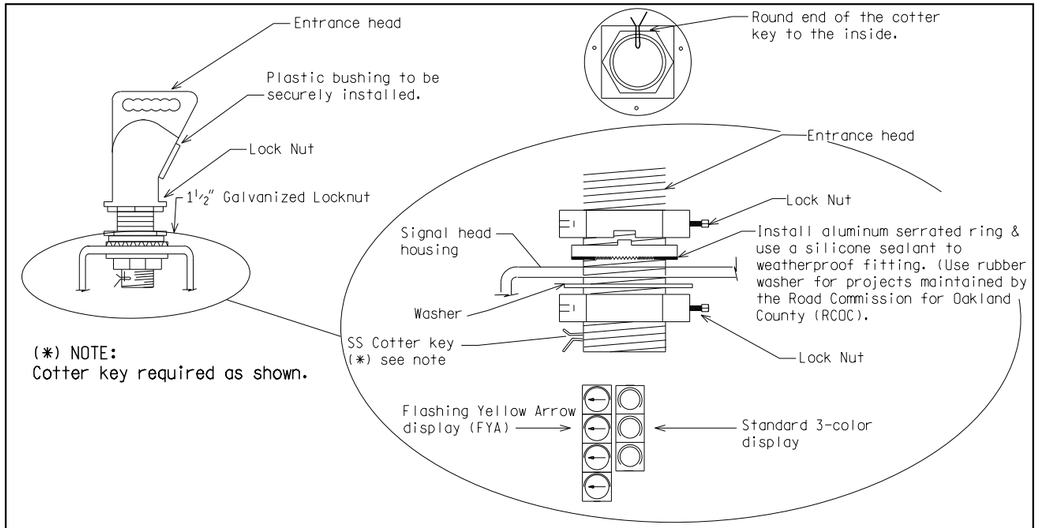
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MDOT Michigan Department of Transportation

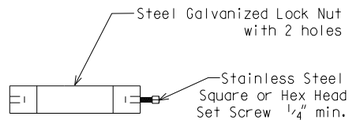
DATE: 08/31/18
DESIGN UNIT: TALLON
TSC: TRAVERSE CITY
FILE:

CS: 28091
JN: 132412A

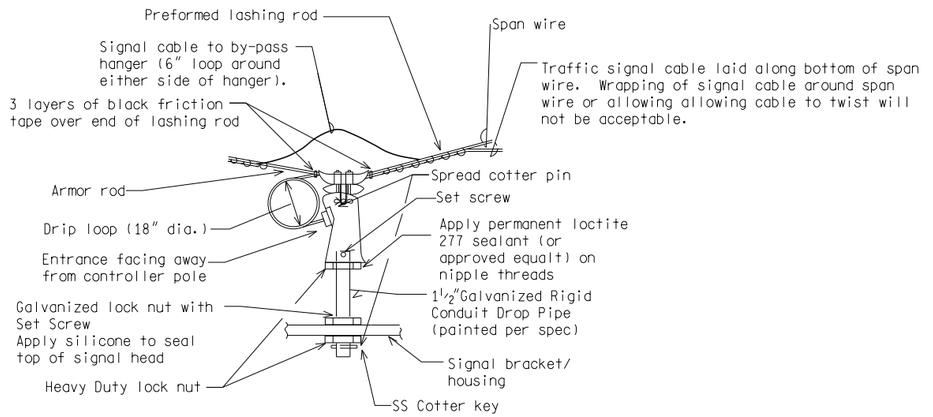
DRAWING | SHEET



ONE-WAY TRAFFIC SIGNAL HEAD



OH SIGNAL LOCK NUT DETAIL



HANGER ATTACHMENT

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG300A.dgn Rev. 02/16/17

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PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

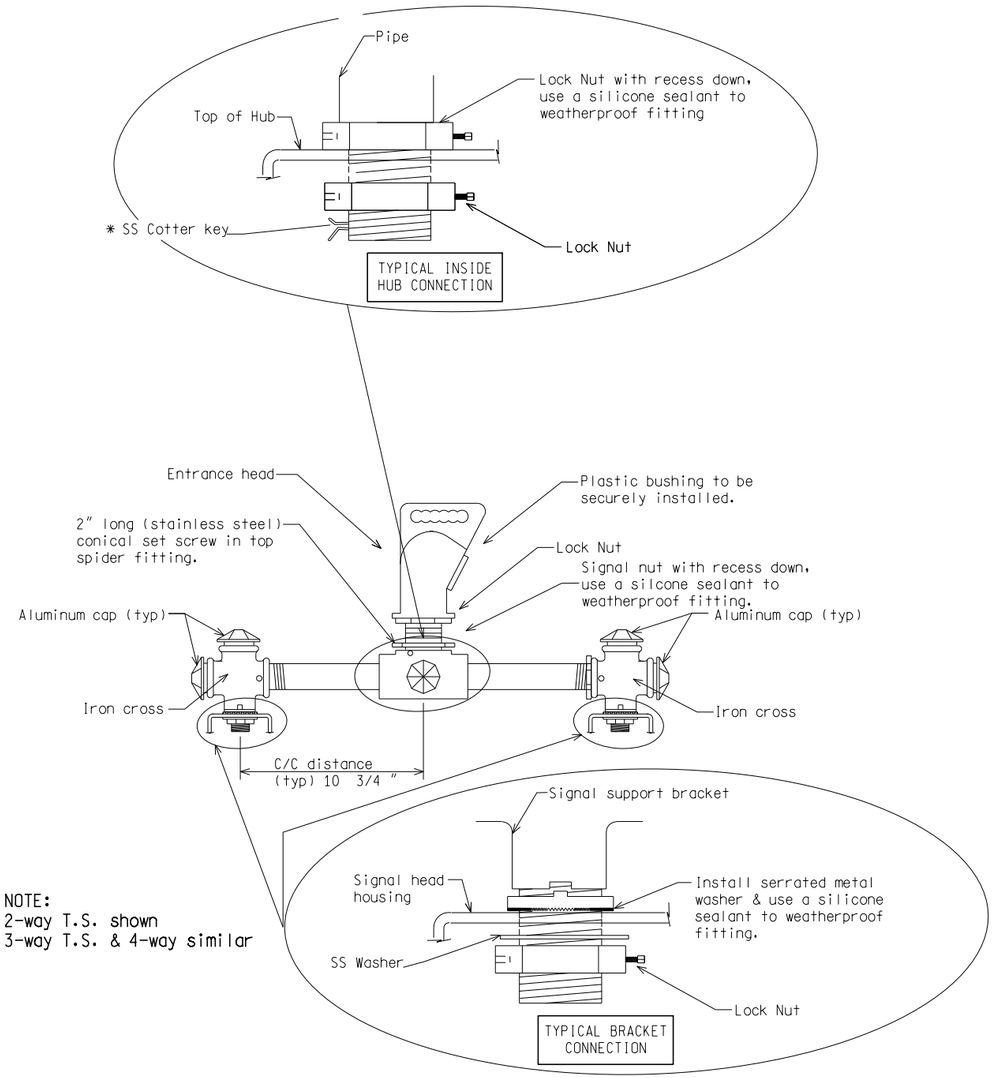
ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL) FHWA APPROVAL DATE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

SPAN WIRE MOUNTED T.S. BRACKET ASSEMBLY

PLAN DATE | SIG-300-A | SHEET 1 of 3



NOTE:
2-way T.S. shown
3-way T.S. & 4-way similar

MULTIPLE-WAY TRAFFIC SIGNAL HEAD(S)

NOTE:
1) Exterior surface of all mounting assemble located below span clamps, including stems, lock nuts, and related hardware must match the current FHWA Highway yellow color tolerance chart per the Standard Specifications for Construction.

2) Tolerance within ±⅛" for all bracketing.

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL) FHWA APPROVAL DATE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG300A.dgn Rev. 02/16/17

PLAN DATE | SIG-300-A | SHEET 2 of 3

AS-LET PLAN REVISIONS

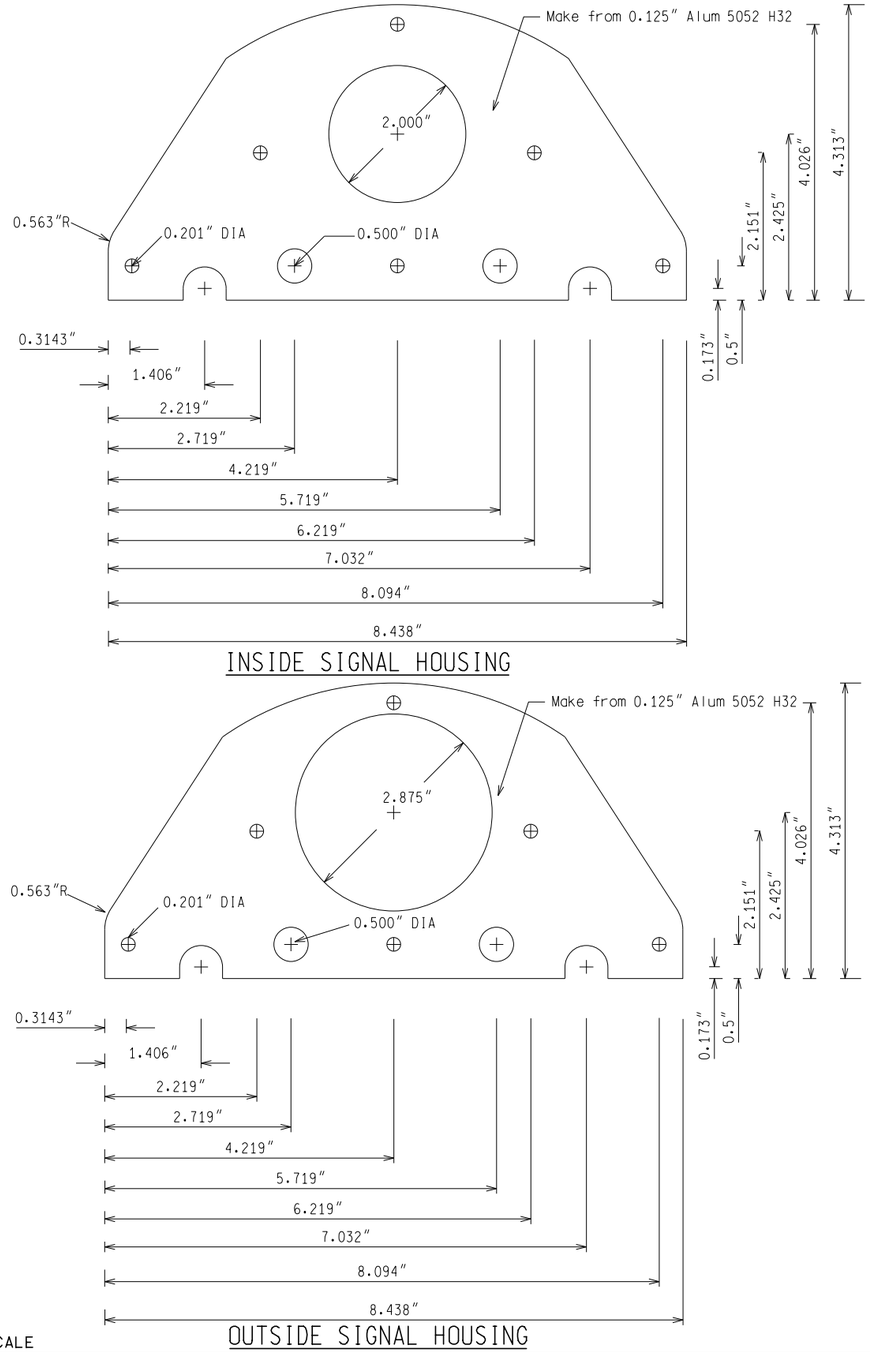
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

DATE: 08/31/18
DESIGN UNIT: TALLON
TSC: TRAVERSE CITY
FILE:

CS: 28091
JN: 132412A

DRAWING | SHEET
63



INSIDE SIGNAL HOUSING

OUTSIDE SIGNAL HOUSING

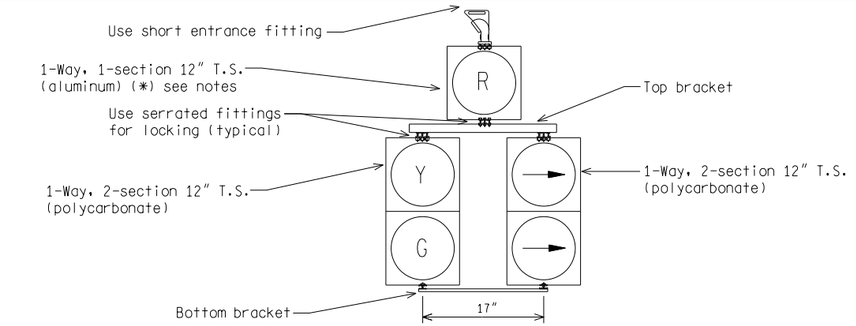
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	PLAN DATE	SIG-300-A	SHEET 3 of 3
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG300A.dgn Rev. 02/16/17				

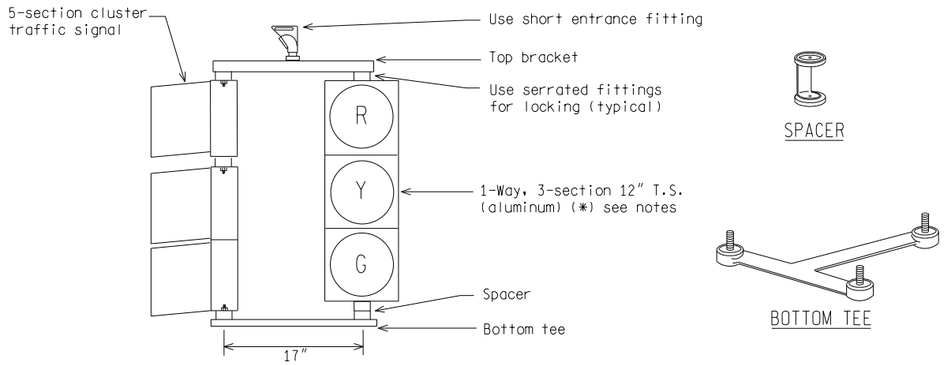
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MDOT Michigan Department of Transportation

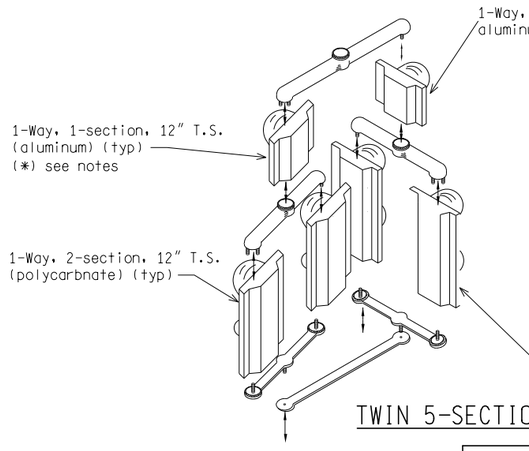
	DATE: 08/31/18	CS: 28091		DRAWING / SHEET
	DESIGN UNIT: TALLON	JN: 132412A		64
FILE:	TSC: TRAVERSE CITY			



5-SECTION CLUSTER (DOGHOUSE) TRAFFIC SIGNAL



COMBINATION 5-SECTION CLUSTER & 1-WAY T.S. (ALUMINUM)



(*) NOTES:

1) Traffic signals must conform to the current ITE publication "Vehicle Traffic Control Signal Heads."
2) Provide cast aluminum alloy housings with a 2" diam. hole top and bottom to receive 1 1/2" inch supporting pipe.
3) Provide a detachable, sheet aluminum visor (min. 0.057" thick), for each signal indication.
4) Provide twist on slots for visor mounting that are either in the visor or on the tabs formed on the visor.

TWIN 5-SECTION CLUSTER TRAFFIC SIGNAL

NOT TO SCALE

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MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

BRACKETING FOR 5-SECTION HEADS

PLAN DATE

SIG-302-A

SHEET 1 of 1

AS-LET PLAN REVISIONS

NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

FILE:

DATE: 08/31/18

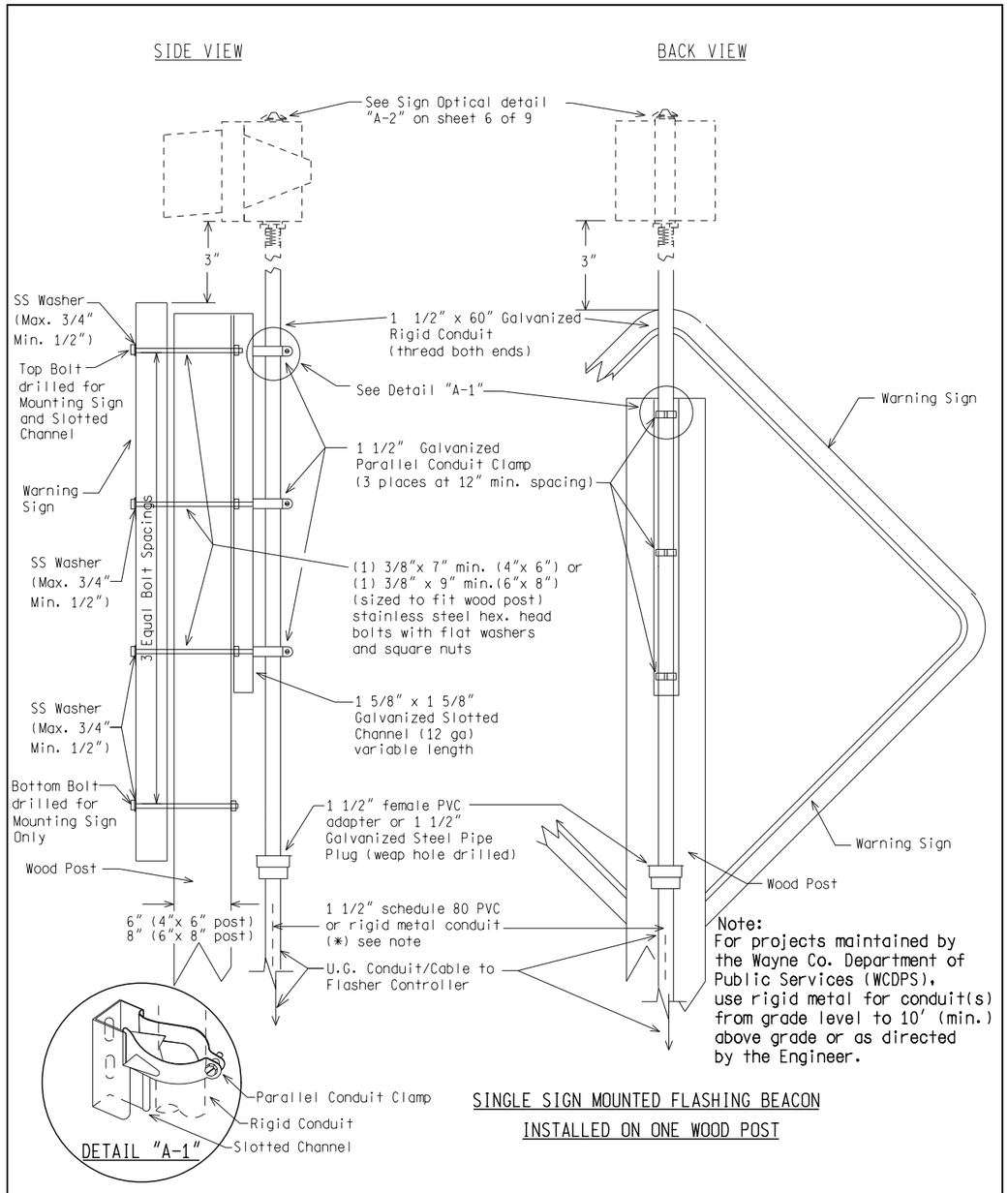
DESIGN UNIT: TALLON

TSC: TRAVERSE CITY

CS: 28091

JN: 132412A

DRAWING	SHEET
	65



SINGLE SIGN MOUNTED FLASHING BEACON

INSTALLED ON ONE WOOD POST

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG320A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL) FHWA APPROVAL DATE

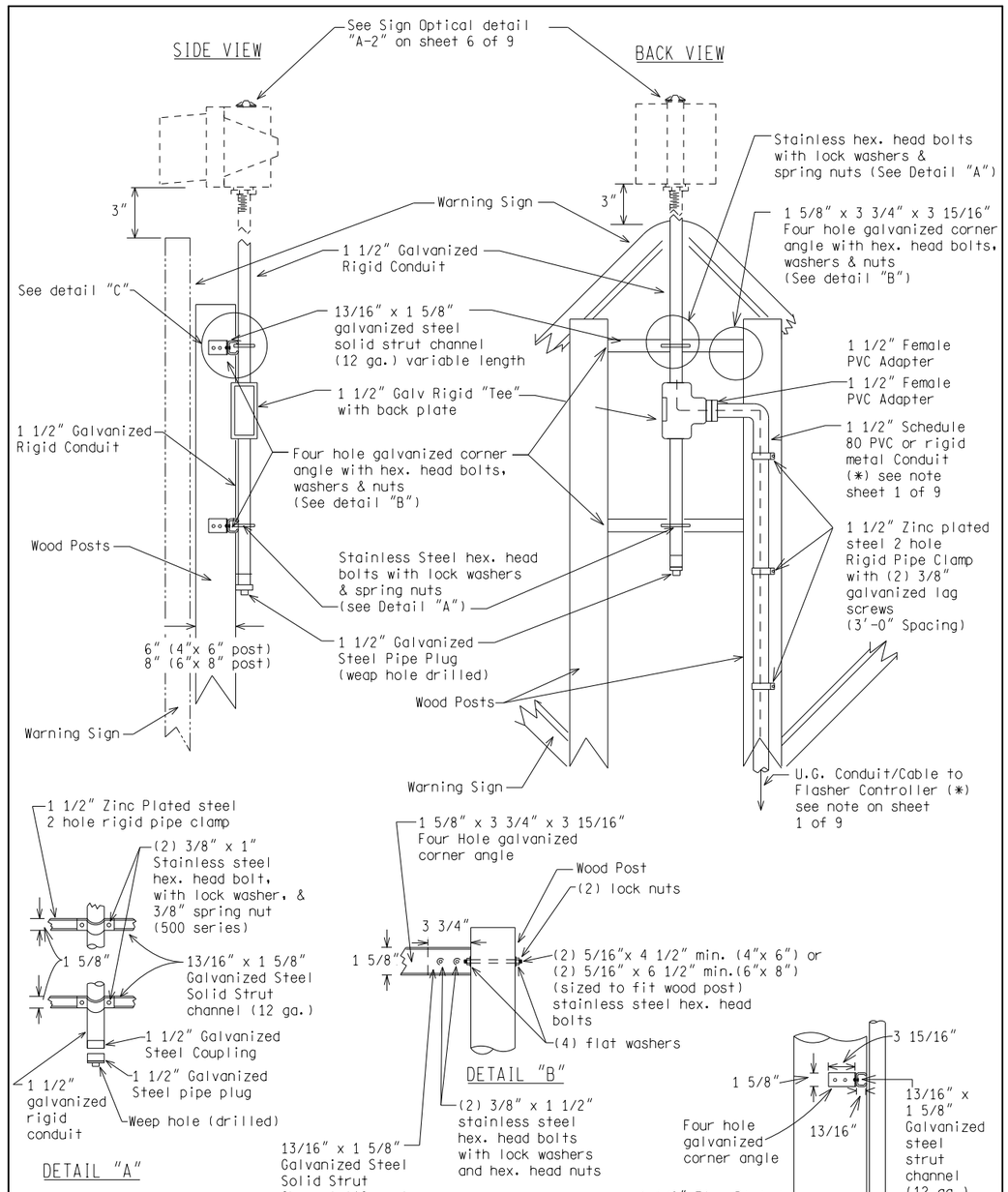
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

SIGN MOUNTED BEACON

PLAN DATE

SIG-320-A

SHEET 1 of 9



SINGLE SIGN MOUNTED FLASHING BEACON

INSTALLED ON TWO WOOD POSTS

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL) FHWA APPROVAL DATE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG320A.dgn Rev. 02/16/17

PLAN DATE

SIG-320-A

SHEET 2 of 9

AS-LET PLAN REVISIONS							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

FILE:

DATE: 08/31/18

DESIGN UNIT: TALLON

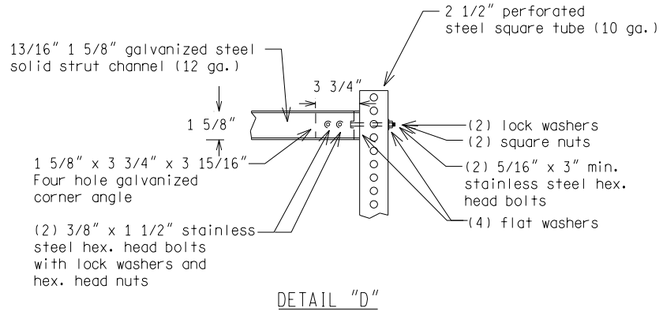
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CS: 28091

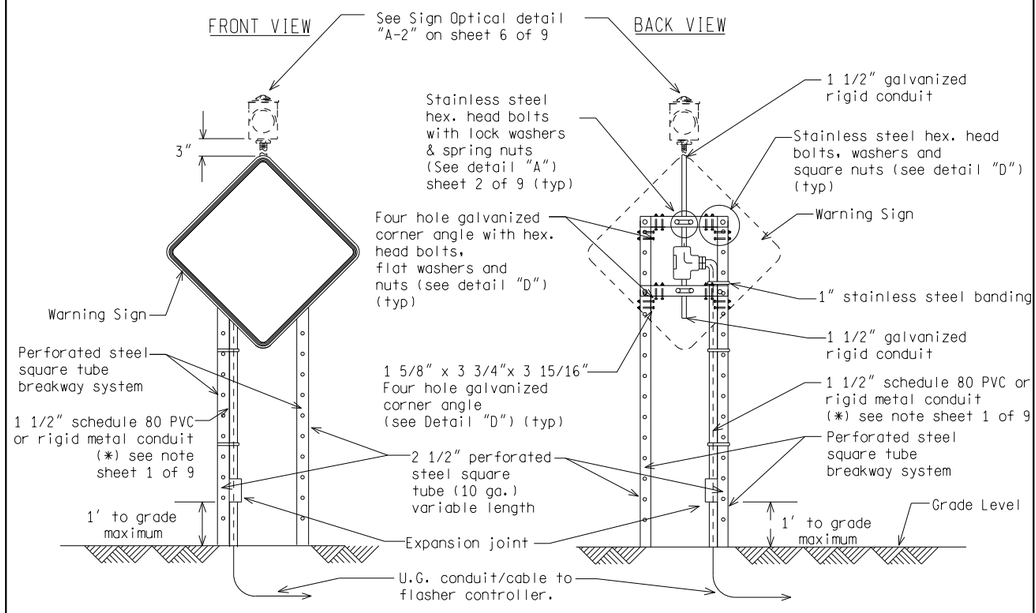
JN: 132412A

DRAWING

SHEET 66



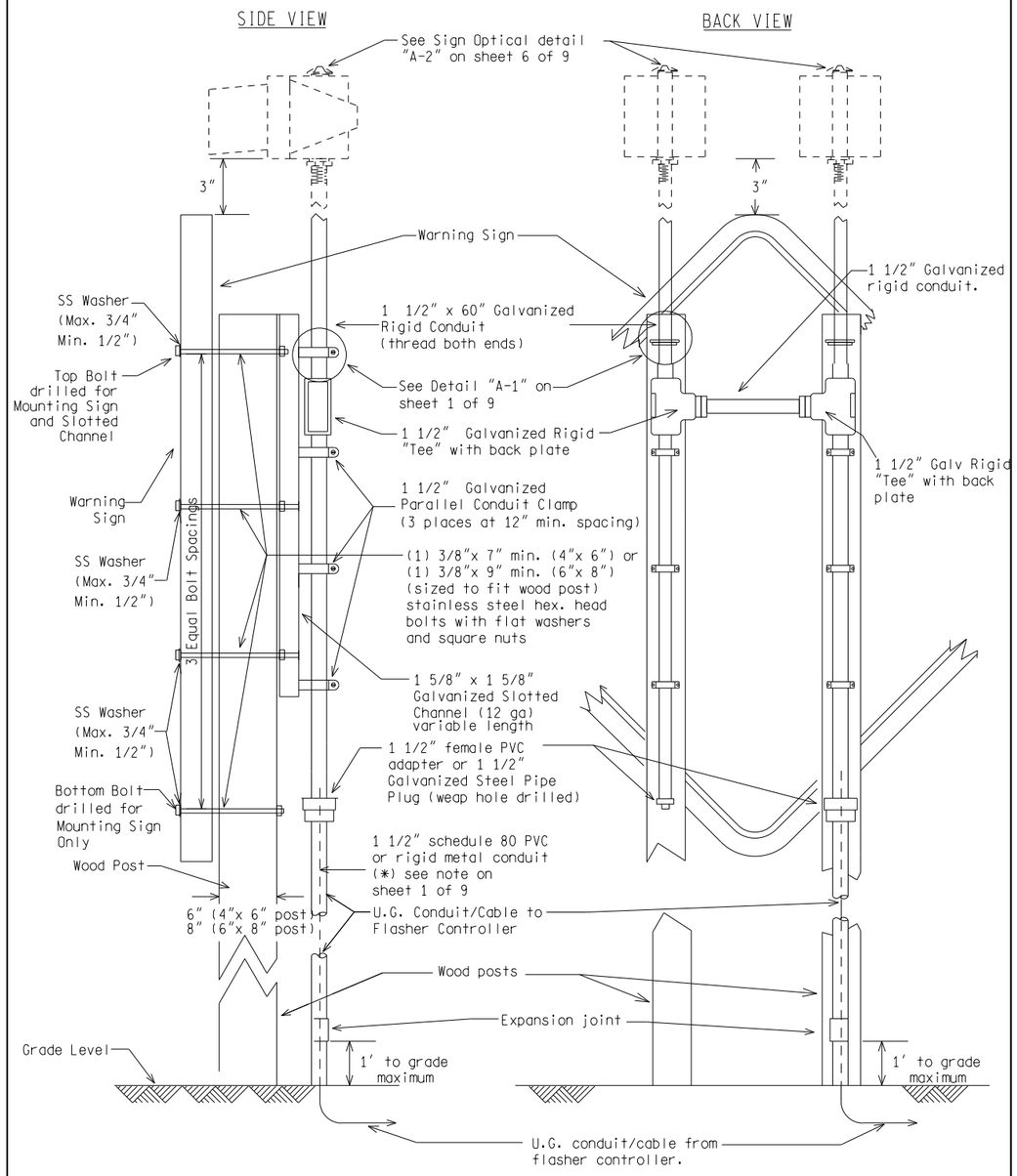
DETAIL "D"



SINGLE SIGN MOUNTED FLASHING BEACON
INSTALLED ON TWO STEEL POSTS
(PERFORATED STEEL SQUARE TUBE BREAKAWAY SYSTEM)

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-320-A	SHEET 3 of 9
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG320A.dgn Rev. 02/16/17		PLAN DATE		



SIGN MOUNTED DUAL FLASHING BEACONS
INSTALLED ON TWO WOOD POSTS

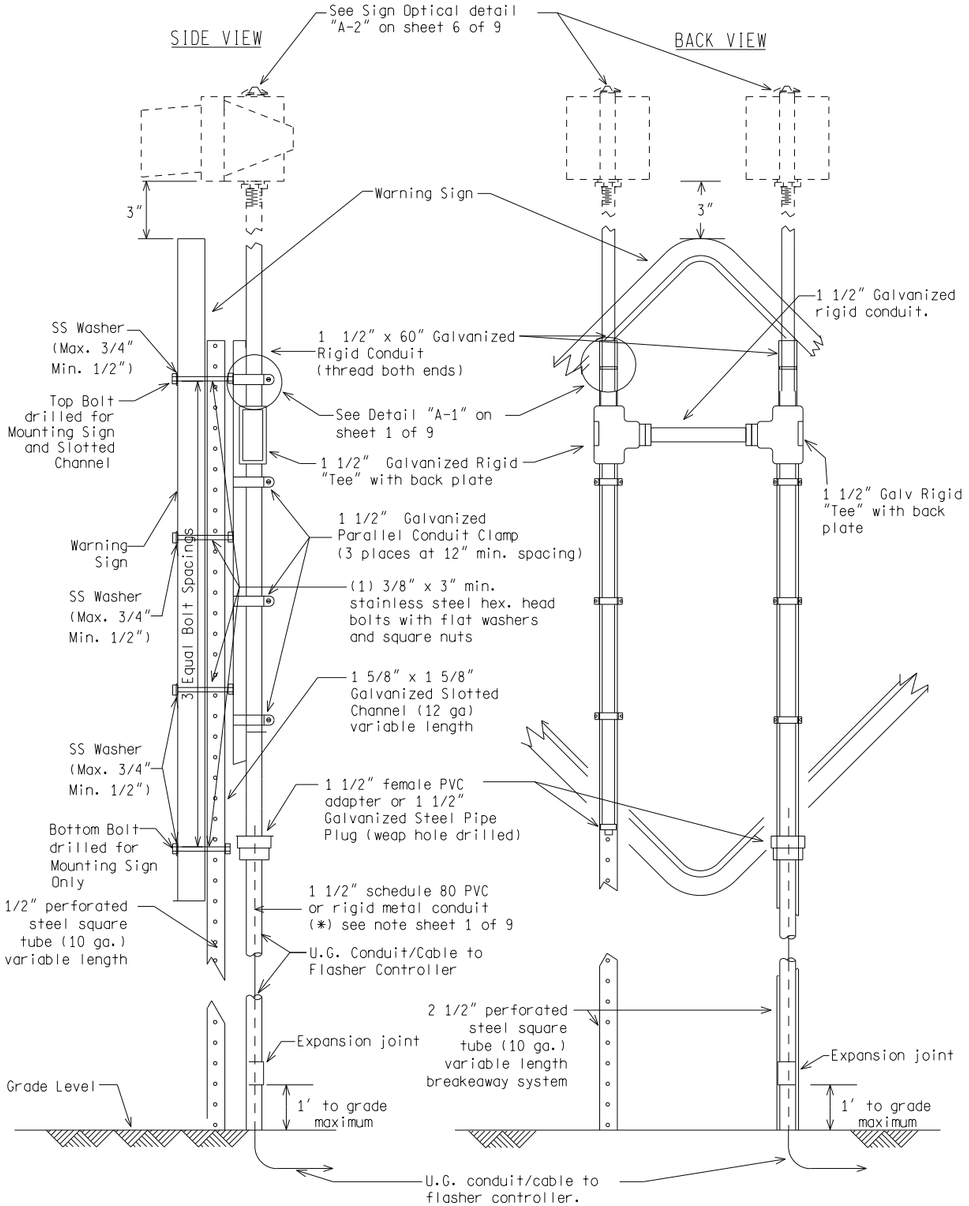
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-320-A	SHEET 4 of 9
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG320A.dgn Rev. 02/16/17		PLAN DATE		

AS-LET PLAN REVISIONS							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

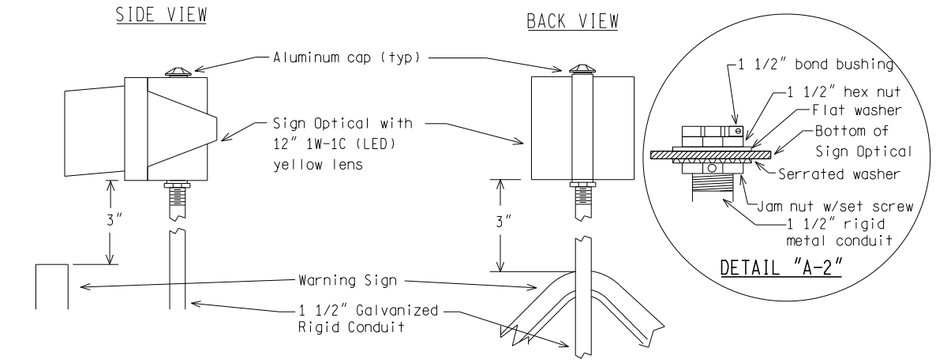
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	DESIGN UNIT: TALLON	JN: 132412A		
FILE:	TSC: TRAVERSE CITY			67



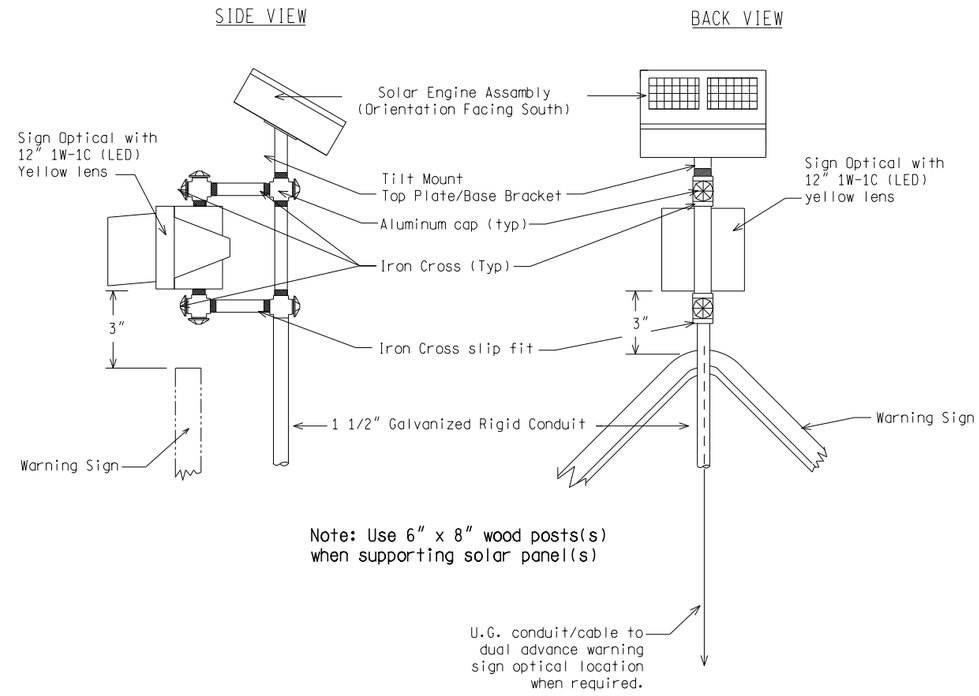
SIGN MOUNTED DUAL FLASHING BEACONS
INSTALLED ON TWO STEEL POSTS
(PERFORATED STEEL SQUARE TUBE BREAKAWAY SYSTEM

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	FHWA APPROVAL DATE	PLAN DATE	SIG-320-A	SHEET 5 of 9
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG320A.dgn Rev. 02/16/17				



SIGN MOUNTED FLASHING BEACON



SIGN MOUNTED
FLASHING BEACON (ONE SOLAR ENGINE ASSEMBLY)

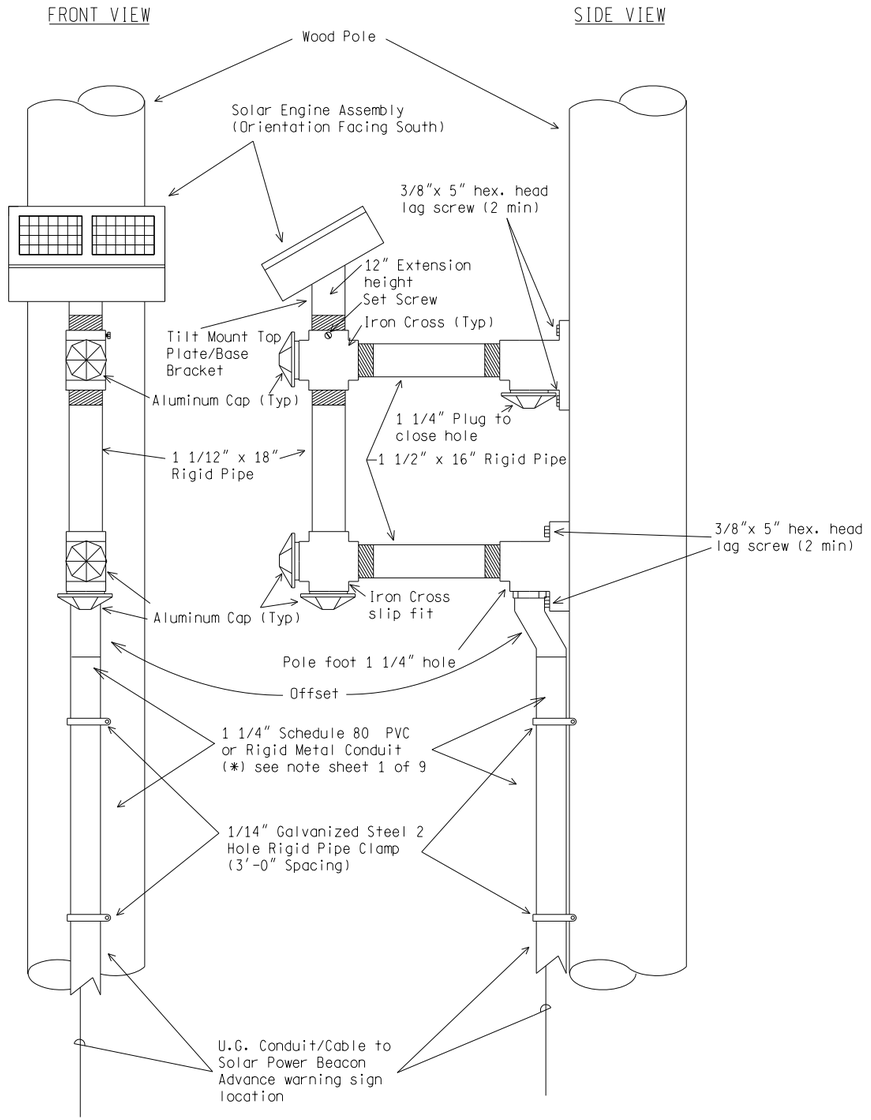
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	PLAN DATE	SIG-320-A	SHEET 6 of 9
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG320A.dgn Rev. 02/16/17				

AS-LET PLAN REVISIONS							
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MDOT Michigan Department of Transportation

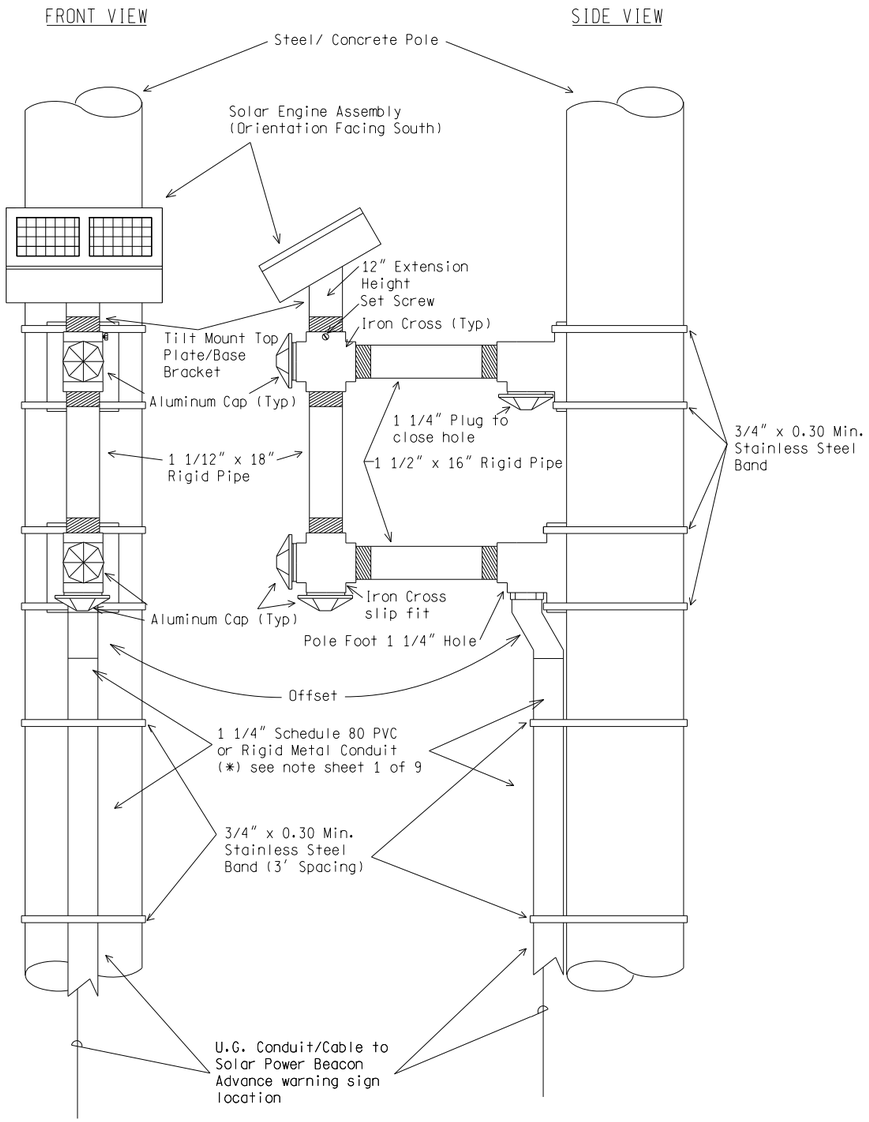
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	DESIGN UNIT: TALLON	JN: 132412A		
FILE:	TSC: TRAVERSE CITY			68



SOLAR ENGINE ASSEMBLY MOUNTED WOOD POLE

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	FHWA APPROVAL DATE	PLAN DATE	SIG-320-A	SHEET 7 of 9
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG320A.dgn Rev. 02/16/17				

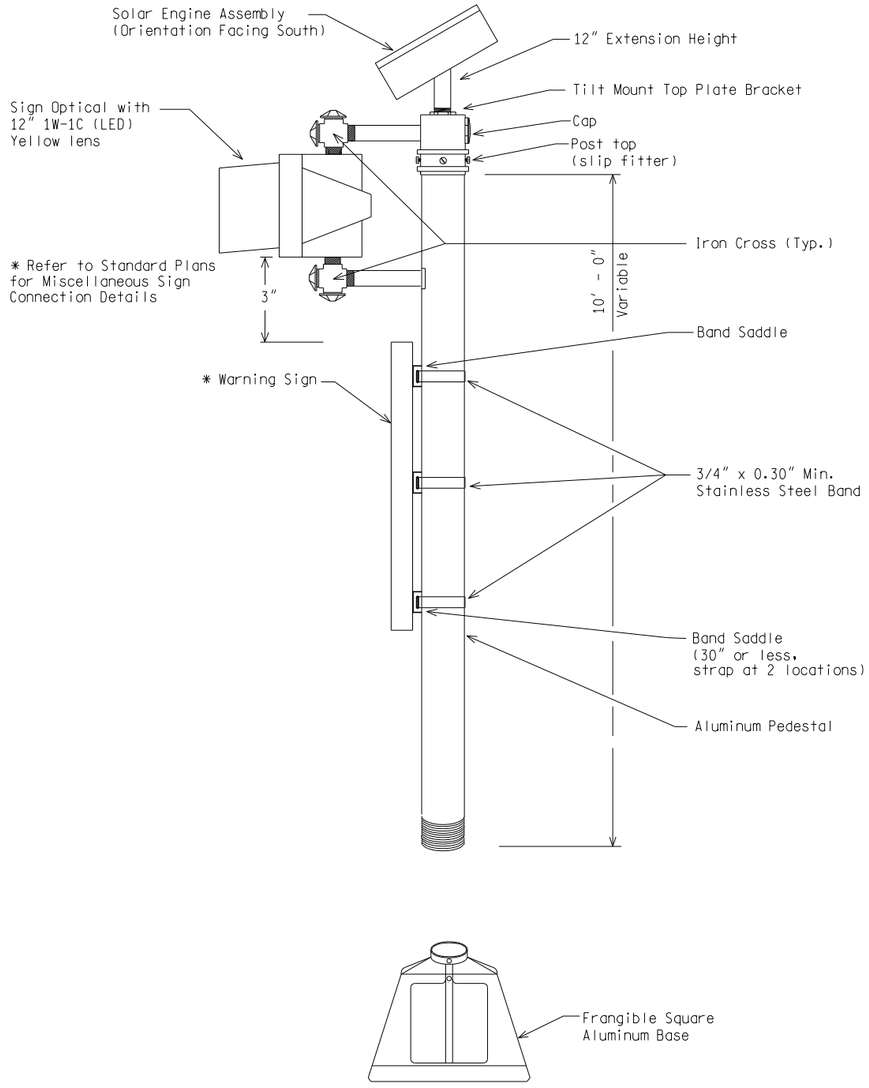


SOLAR ENGINE ASSEMBLY MOUNTED ON STEEL/CONCRETE POLE

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	PLAN DATE	SIG-320-A	SHEET 8 of 9
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG320A.dgn Rev. 02/16/17				

AS-LET PLAN REVISIONS											
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION		DATE: 08/31/18	CS: 28091	DRAWING / SHEET
									DESIGN UNIT: TALLON	JN: 132412A	69
								FILE:	TSC: TRAVERSE CITY		



SQUARE ALUMINUM BASE

Note: Use pedestal collar for pedestal length greater than 14'

SOLAR ENGINE MOUNTED ON PEDESTAL

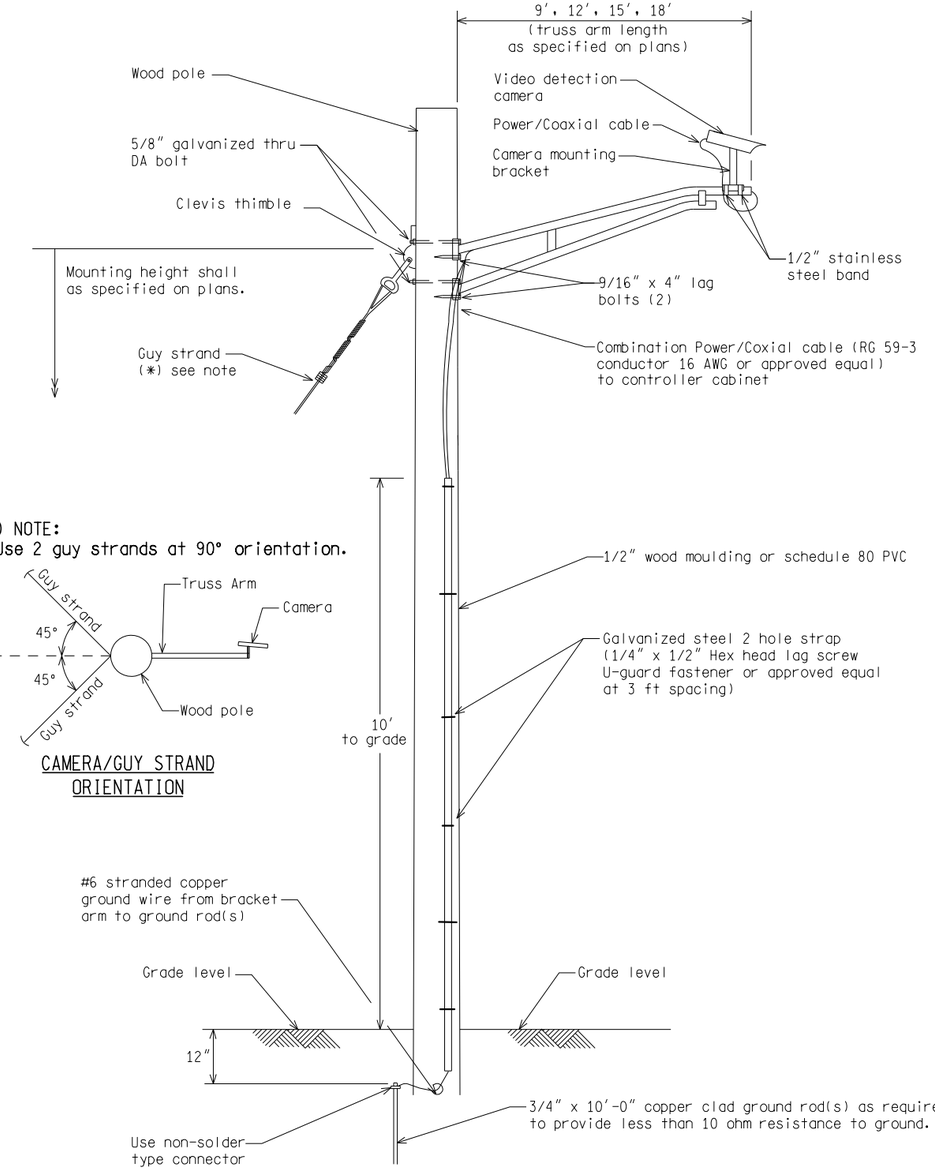
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MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG320A.dgn Rev. 02/16/17		PLAN DATE	SIG-320-A	SHEET 9 of 9

AS-LET PLAN REVISIONS							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

	DATE: 08/31/18	CS: 28091		DRAWING
	DESIGN UNIT: TALLON	JN: 132412A		SHEET 70
FILE:	TSC: TRAVERSE CITY			



CAMERA/GUY STRAND ORIENTATION

BRACKET TRUSS ARM MOUNTED CAMERA (WOOD POLE)

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG430A.dgn Rev. 02/16/17

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL) FHWA APPROVAL DATE

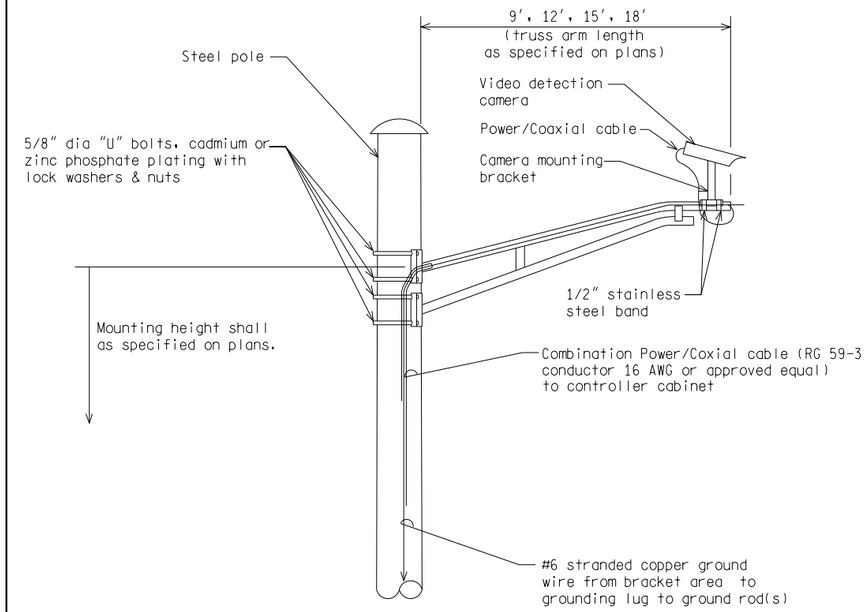
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

VIDEO DETECTION CAMERA

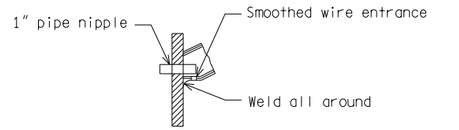
PLAN DATE

SIG-430-A

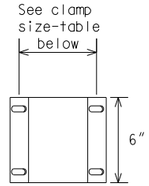
SHEET 1 of 2



BRACKET TRUSS ARM MOUNTED CAMERA (STEEL POLE)



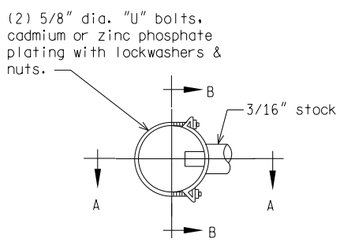
SECTION "A-A"



SECTION "B-B"

CLAMP SIZE TABLE

TYPE	POLE DIAMETER
A	3.6"- 4.5"
B	6.1"- 6.9"



DETAIL "F"

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL) FHWA APPROVAL DATE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG430A.dgn Rev. 02/16/17

PLAN DATE

SIG-430-A

SHEET 2 of 2

AS-LET PLAN REVISIONS

NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

FILE:

DATE: 08/31/18

DESIGN UNIT: TALLON

TSC: TRAVERSE CITY

CS: 28091

JN: 132412A

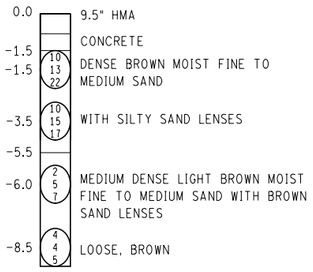
DRAWING

SHEET

BORING NO. B-1

ELEV. 1053.6

STA: 220+00
LOCATION: SB US-131
OFFSET: 7.5 LT OF CL



BORING DATE: 6/1/17

WATER DURING DRILLING: NONE
WATER LEVEL AFTER AUGER REMOVAL: N/A
CAVE-IN DEPTH: 7.9

COORDINATES: N=461456.356, E=19425404.495, LAT=44.578058, LONG=-85.363000

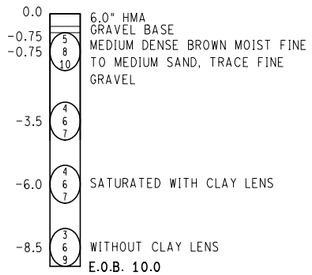
REMARKS: $^{3}/_{16}$" SQUARE WIRE MESH 3.0" BELOW TOP OF CONCRETE. BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS AND ASPHALT COLDPATCH.

LAB TESTING: THE BROWN FINE TO MEDIUM SAND FROM 1.5 TO 3.0 FAILS THE REQUIREMENTS FOR MDOT CLASS II AND PASSES FOR MDOT CLASS III WITH 9% LOSS BY WASH.

BORING NO. B-2

ELEV. 1052.7

STA: 220+00
LOCATION: NB US-131
OFFSET: 17 RT OF CL



BORING DATE: 5/8/17

WATER DURING DRILLING: 6.0
WATER LEVEL AFTER AUGER REMOVAL: 7.8
CAVE-IN DEPTH: 7.8

COORDINATES: N=461445.637, E=19425427.450, LAT=44.578025, LONG=-85.363061

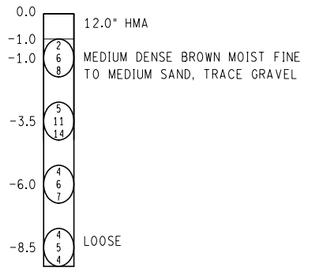
REMARKS: S-1 AND S-3: POOR RECOVERY, POSSIBLE COARSE GRAVEL/COBBLE. COBBLE NOTED AT 6.0. BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS AND ASPHALT COLDPATCH.

LAB TESTING: THE BROWN FINE TO MEDIUM SAND, TRACE FINE GRAVEL FROM 0.75 TO 2.25 FAILS THE REQUIREMENTS FOR MDOT CLASS II AND PASSES FOR MDOT CLASS III WITH 11% LOSS BY WASH.

BORING NO. B-3

ELEV. 1054.0

STA: 218+00
LOCATION: SB US-131
OFFSET: 18 LT OF CL



BORING DATE: 5/9/17

WATER DURING DRILLING: NONE
WATER LEVEL AFTER AUGER REMOVAL: NONE
CAVE-IN DEPTH: NONE

COORDINATES: N=461269.364, E=19425317.190, LAT=44.577538, LONG=-85.363475

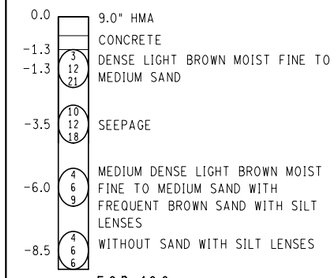
REMARKS: COBBLE NOTED AT 5.0. BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS AND ASPHALT COLDPATCH.

LAB TESTING: THE BROWN FINE TO MEDIUM SAND FROM 1.0 TO 2.5 PASSES THE REQUIREMENTS FOR MDOT CLASS II WITH 4% LOSS BY WASH

BORING NO. B-4

ELEV. 1053.5

STA: 218+00
LOCATION: NB US-131
OFFSET: 6 RT OF CL



BORING DATE: 5/31/17

WATER DURING DRILLING: 3.5
WATER LEVEL AFTER AUGER REMOVAL: NONE
CAVE-IN DEPTH: 7.4

COORDINATES: N=461259.375, E=19425340.951, LAT=44.577515, LONG=-85.363235

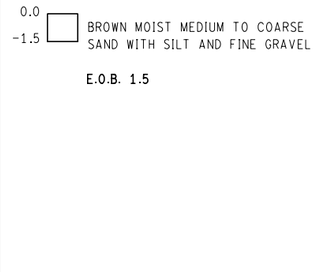
REMARKS: S-2: POOR RECOVERY, POSSIBLE COARSE GRAVEL/ COBBLE. BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS AND ASPHALT COLDPATCH.

LAB TESTING: THE LIGHT BROWN FINE TO MEDIUM SAND FROM 1.3 TO 2.8 PASSES THE REQUIREMENTS FOR MDOT CLASS II WITH 4% LOSS BY WASH.

BORING NO. B-5

ELEV. 1053.0

STA: 216+75
LOCATION: SB US-131
OFFSET: 55 LT OF CL



BORING DATE: 5/11/17

WATER DURING DRILLING: NONE
WATER LEVEL AFTER AUGER REMOVAL: NONE
CAVE-IN DEPTH: NONE

COORDINATES: N=461148.340, E=19425242.120, LAT=44.577203, LONG=-85.363758

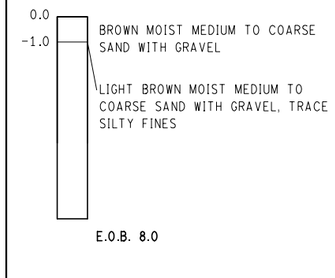
REMARKS: HAND AUGER REFUSAL ON COARSE GRAVEL OR COBBLE. BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS.

LAB TESTING: THE BROWN MEDIUM TO COARSE SAND SUBBASE FROM 0.0 TO 1.5 FAILS THE REQUIREMENTS FOR MDOT CLASS II AND PASSES FOR MDOT CLASS III WITH 15% LOSS BY WASH.

BORING NO. B-6

ELEV. 1052.3

STA: 216+94
LOCATION: NB US-131
OFFSET: 56 RT OF CL



BORING DATE: 5/11/17

WATER DURING DRILLING: NONE
WATER LEVEL AFTER AUGER REMOVAL: NONE
CAVE-IN DEPTH: NONE

COORDINATES: N=461145.988, E=19425351.850, LAT=44.577201, LONG=-85.363337

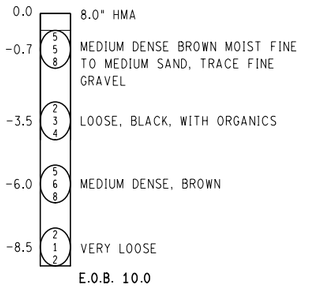
REMARKS: HAND AUGER REFUSAL ON COARSE GRAVEL OR COBBLE. BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS AND ASPHALT COLDPATCH.

LAB TESTING: THE BROWN MEDIUM TO COARSE SAND WITH GRAVEL FROM 0.0 TO 1.0 PASSES THE REQUIREMENTS FOR MDOT CLASS II WITH 2% LOSS BY WASH.

BORING NO. B-7

ELEV. 1051.8

STA: 774+00
LOCATION: WB M-186
OFFSET: 20 LT OF CL



BORING DATE: 5/10/17

WATER DURING DRILLING: NONE
WATER LEVEL AFTER AUGER REMOVAL: N/A
CAVE-IN DEPTH: 7.7

COORDINATES: N=461130.707, E=19425007.380, LAT=44.577147, LONG=-85.364658

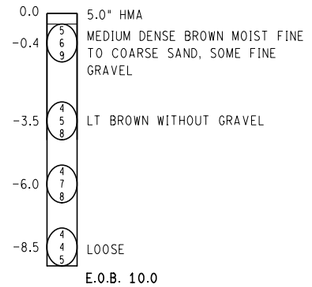
REMARKS: BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS AND ASPHALT COLDPATCH.

LAB TESTING: THE BROWN FINE TO MEDIUM SAND, TRACE FINE GRAVEL FROM 0.7 TO 2.2 PASSES THE REQUIREMENTS FOR MDOT CLASS II WITH 2% LOSS BY WASH.

BORING NO. B-8

ELEV. 1053.5

STA: 776+00
LOCATION: WB M-186
OFFSET: 9 LT OF CL



BORING DATE: 5/10/17

WATER DURING DRILLING: NONE
WATER LEVEL AFTER AUGER REMOVAL: N/A
CAVE-IN DEPTH: 7.7

COORDINATES: N=461115.169, E=19425196.580, LAT=44.577111, LONG=-85.363931

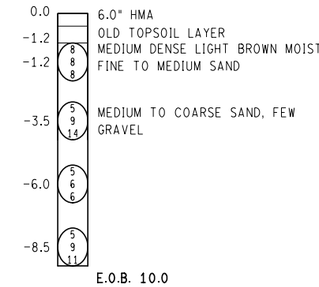
REMARKS: COBBLE NOTED AT 7.5. BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS AND ASPHALT COLDPATCH.

LAB TESTING: THE BROWN FINE TO COARSE SAND, SOME FINE GRAVEL FROM 0.4 TO 1.9 PASSES THE REQUIREMENTS FOR MDOT CLASS II WITH 2% LOSS BY WASH.

BORING NO. B-9

ELEV. 1051.5

STA: 1+00
LOCATION: WB W STATE ST
OFFSET: 19 LT OF CL



BORING DATE: 5/8/17

WATER DURING DRILLING: NONE
WATER LEVEL AFTER AUGER REMOVAL: N/A
CAVE-IN DEPTH: 7.9

COORDINATES: N=461119.835, E=19425383.670, LAT=44.577130, LONG=-85.363213

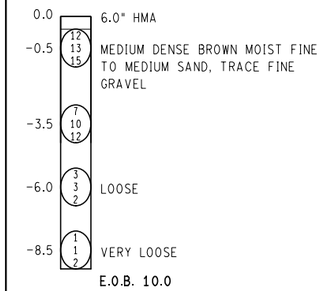
REMARKS: S-1: POOR RECOVERY, POSSIBLE GRAVEL OR COBBLE. BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS AND ASPHALT COLDPATCH.

LAB TESTING: THE LIGHT BROWN FINE TO MEDIUM SAND FROM 1.2 TO 2.7 PASSES THE REQUIREMENTS FOR MDOT CLASS II WITH 2% LOSS BY WASH.

BORING NO. B-10

ELEV. 1049.2

STA: 2+35
LOCATION: WB W STATE ST
OFFSET: 8 LT OF CL



BORING DATE: 5/10/17

WATER DURING DRILLING: NONE
WATER LEVEL AFTER AUGER REMOVAL: N/A
CAVE-IN DEPTH: 7.3

COORDINATES: N=461103.289, E=19425520.930, LAT=44.577089, LONG=-85.362686

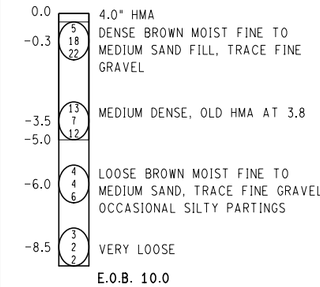
REMARKS: BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS AND ASPHALT COLDPATCH.

LAB TESTING: THE BROWN FINE TO MEDIUM SAND, TRACE FINE GRAVEL FROM 0.5 TO 2.0 FAILS THE REQUIREMENTS FOR MDOT CLASS II AND PASSES FOR CLASS III WITH 12% LOSS BY WASH.

BORING NO. B-11

ELEV. 1052.2

STA: 774+00
LOCATION: EB M-186
OFFSET: 7 RT OF CL



BORING DATE: 5/9/17

WATER DURING DRILLING: NONE
WATER LEVEL AFTER AUGER REMOVAL: N/A
CAVE-IN DEPTH: 7.2

COORDINATES: N=461103.012, E=19425006.260, LAT=44.577071, LONG=-85.364661

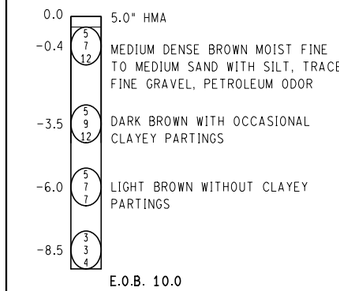
REMARKS: S-1: POOR RECOVERY, POSSIBLE COARSE GRAVEL/COBBLE. OLD ASPHALT LAYER ENCOUNTERED FROM 3.8-4.0. BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS AND ASPHALT COLDPATCH.

LAB TESTING: THE BROWN FINE TO MEDIUM SAND, TRACE FINE GRAVEL FROM 1.0 TO 2.5 PASSES THE REQUIREMENTS FOR MDOT CLASS II WITH 4% LOSS BY WASH.

BORING NO. B-12

ELEV. 1053.5

STA: 776+00
LOCATION: EB M-186
OFFSET: 9 RT OF CL



BORING DATE: 5/9/17

WATER DURING DRILLING: NONE
WATER LEVEL AFTER AUGER REMOVAL: N/A
CAVE-IN DEPTH: 7.7

COORDINATES: N=461095.028, E=19425196.630, LAT=44.577056, LONG=-85.363930

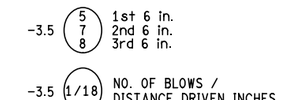
REMARKS: BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS AND ASPHALT COLDPATCH. THE 0.5 TO 2.0 SOIL SAMPLE HAD PID READINGS OF 2.3 TO 7.2 PPM.

LAB TESTING: THE BROWN FINE TO MEDIUM SAND WITH SILT, TRACE FINE GRAVEL FROM 0.4 TO 1.9 FAILS THE REQUIREMENTS FOR MDOT CLASS II AND CLASS III WITH 17% LOSS BY WASH.

NOTES:

BORINGS WERE OBTAINED BY MATERIALS TESTING CONSULTANTS, INC.

NUMBERS IN CIRCLES DENOTE NUMBER OF BLOWS REQUIRED TO DRIVE A 2 in. O.D. SPLIT SPOON SAMPLER 3 SUCCESSIVE 6 in. INCREMENTS USING A 140 lb. HAMMER FALLING 30 in.. ASTM D 1586. SPT HAMMER EFFICIENCY APPROXIMATELY 90%.



WHERE THE SAMPLER IS DRIVEN DISTANCES OTHER THAN 6 in., THE DISTANCE IS SHOWN IN THE CIRCLE WITH NUMBER OF BLOWS IN THE FORM OF A FRACTION. DISTANCE IS IN INCHES.

ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE NOTED.

THE SOIL BORING REPRESENTS POINT INFORMATION. PRESENTATION OF THIS INFORMATION IN NO WAY IMPLIES THAT SUBSURFACE CONDITIONS ARE THE SAME AT LOCATIONS OTHER THAN EXACT LOCATION OF THE BORING.

GROUNDWATER LEVELS MAY FLUCTUATE AND MAY BE DIFFERENT AT THE TIME OF CONSTRUCTION.

CONSISTENCY OF COHESIVE SOIL WAS ESTIMATED BY USE OF A CALIBRATED POCKET PENETROMETER AND A TORVANE SHEAR DEVICE.

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)

NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

Materials Testing Consultants, Inc.

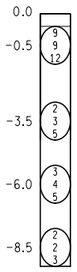
MDOT Michigan Department of Transportation

NO SCALE

DRAWN BY: CK	DATE: 08/06/18	DATE:	CS: 28091	SOIL BORING DATA	DRAWING
CHK'D BY: DS	CORR BY: BGS	DESIGN UNIT: TALLON	JN: 132412A	US-131 & M-186 INTERSECTION	US-131 BORING 001
FILE: 132412_US-131_BORING_REV.dgn		TSC: TRAVERSE CITY			SHEET 72

BORING NO. B-13

ELEV. 1051.8
STA: 1+00
LOCATION: EB W STATE ST
OFFSET: 7 RT OF CL



0.0 6.0" HMA
MEDIUM DENSE BROWN MOIST FINE TO COARSE SAND, FEW FINE GRAVEL

-3.5 LOOSE LIGHT BROWN, TRACE FINE GRAVEL

-8.5 E.O.B. 10.0

BORING DATE: 5/10/17

WATER DURING DRILLING: NONE
WATER LEVEL AFTER AUGER REMOVAL: N/A
CAVE-IN DEPTH: 7.1

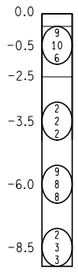
COORDINATES: N=461093.034, E=19425378.320, LAT=44.577056, LONG=-85.363232

REMARKS: S-2: POOR RECOVERY, POSSIBLE COARSE GRAVEL/COBBLE. BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS AND ASPHALT COLDPATCH.

LAB TESTING: THE BROWN FINE TO COARSE SAND, FEW FINE GRAVEL FROM 0.5 TO 2.0 FAILS THE REQUIREMENTS FOR MDOT CLASS II AND PASSES CLASS III WITH 8% LOSS BY WASH.

BORING NO. B-14

ELEV. 1049.7
STA: 2+40
LOCATION: EB W STATE ST
OFFSET: 9 RT OF CL



0.0 6.0" HMA
MEDIUM DENSE BROWN MOIST MEDIUM TO COARSE SAND WITH SILT, FEW FINE GRAVEL

-2.5 VERY LOOSE BROWN MEDIUM TO COARSE SAND, TRACE GRAVEL

-6.0 MEDIUM DENSE LIGHT BROWN FINE TO MEDIUM SAND

-8.5 LOOSE
E.O.B. 10.0

BORING DATE: 5/10/17

WATER DURING DRILLING: NONE
WATER LEVEL AFTER AUGER REMOVAL: N/A
CAVE-IN DEPTH: 7.2

COORDINATES: N=461081.945, E=19425487.290, LAT=44.577029, LONG=-85.362814

REMARKS: COBBLE NOTED AT 1.0. OLD TOPSOIL LAYER ENCOUNTERED FROM 1.5-1.8. S-3: POOR RECOVERY, POSSIBLE COARSE GRAVEL/COBBLE. BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS AND ASPHALT COLDPATCH.

LAB TESTING:THE BROWN MEDIUM TO COARSE SAND WITH SILT, FEW FINE GRAVEL FROM 0.5 TO 2.5 FAILS THE REQUIREMENTS FOR MDOT CLASS II AND CLASS III WITH 23% LOSS BY WASH.

BORING NO. B-15

ELEV. 1052.1
STA: 215+85
LOCATION: SB US-131
OFFSET: 60 LT OF CL



0.0 BROWN MOIST MEDIUM TO COARSE SAND FILL, TRACE SANDY FINES

-1.5 E.O.B. 1.5

BORING DATE: 5/11/17

WATER DURING DRILLING: NONE
WATER LEVEL AFTER AUGER REMOVAL: NONE
CAVE-IN DEPTH: NONE

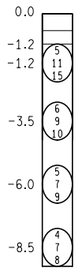
COORDINATES: N=461059.899, E=19425203.360, LAT=44.576959, LONG=-85.363902

REMARKS: HAND AUGER REFUSAL ON OLD ASPHALT LAYER. BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS.

LAB TESTING: THE BROWN MEDIUM TO COARSE SAND FILL FROM 0.0 TO 1.5 FAILS THE REQUIREMENTS FOR MDOT CLASS II AND PASSES FOR CLASS III WITH 9% LOSS BY WASH.

BORING NO. B-16

ELEV. 1054.0
STA: 216+00
LOCATION: SB US-131
OFFSET: 6 LT OF CL



0.0 8.0" HMA
CONCRETE

-1.2 MEDIUM DENSE LIGHT BROWN MOIST FINE TO MEDIUM SAND, TRACE FINE GRAVEL

-8.5 E.O.B. 10.0

BORING DATE: 5/10/17

WATER DURING DRILLING: NONE
WATER LEVEL AFTER AUGER REMOVAL: N/A
CAVE-IN DEPTH: 7.4

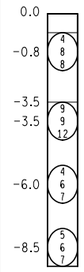
COORDINATES: N=461067.853, E=19425258.550, LAT=44.576983, LONG=-85.363691

REMARKS: BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS AND ASPHALT COLDPATCH.

LAB TESTING: THE LIGHT BROWN FINE TO MEDIUM SAND FROM 1.2 TO 2.7 PASSES THE REQUIREMENTS FOR MDOT CLASS II WITH 3% LOSS BY WASH.

BORING NO. B-17

ELEV. 1053.1
STA: 216+00
LOCATION: NB US-131
OFFSET: 23 RT OF CL



0.0 9.0" HMA

-0.8 MEDIUM DENSE BROWN MOIST FINE TO COARSE SAND, FEW FINE GRAVEL, PETROLEUM ODOR

-3.5 MEDIUM DENSE LIGHT BROWN SATURATED FINE TO MEDIUM SAND, TRACE GRAVEL, PETROLEUM ODOR

-8.5 E.O.B. 10.0

BORING DATE: 5/8/17

WATER DURING DRILLING: 4.5
WATER LEVEL AFTER AUGER REMOVAL: 4.5
CAVE-IN DEPTH: 5

COORDINATES: N=461063.221, E=19425289.000, LAT=44.576971, LONG=-85.363574

REMARKS: BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS AND ASPHALT COLDPATCH. PETROLEUM ODOR NOTED IN ALL THE SOIL SAMPLES.

LAB TESTING: THE BROWN FINE TO COARSE SAND, FEW FINE GRAVEL 0.8 TO 3.5 PASSES THE REQUIREMENTS FOR MDOT CLASS II WITH 3% LOSS BY WASH.

BORING NO. B-18

ELEV. 1053.1
STA: 216+00
LOCATION: NB US-131
OFFSET: 40 RT OF CL



0.0 BROWN MOIST FINE TO COARSE SAND, TRACE FINE GRAVEL

-1.5 LIGHT BROWN MOIST FINE TO COARSE SAND, TRACE FINE GRAVEL

-8.5 E.O.B. 10.0

BORING DATE: 5/11/17

WATER DURING DRILLING: NONE
WATER LEVEL AFTER AUGER REMOVAL: N/A
CAVE-IN DEPTH: N/A

COORDINATES: N=461055.922, E=19425302.200, LAT=44.576952, LONG=-85.363523

REMARKS: HAND AUGERED BORING. BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS.

LAB TESTING: THE BROWN FINE TO COARSE SAND, TRACE FINE GRAVEL FROM 0.0 TO 1.5 FAILS THE REQUIREMENTS FOR MDOT CLASS II AND PASSES FOR MDOT CLASS III WITH 9% LOSS BY WASH.

BORING NO. B-19

ELEV. 1053.4
STA: 215+00
LOCATION: NB US-131
OFFSET: 40 RT OF CL



0.0 BROWN MOIST MEDIUM TO COARSE SAND FILL, TRACE FINE SAND, TRACE FINE GRAVEL

-1.0 E.O.B. 1.0

BORING DATE: 5/11/17

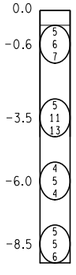
WATER DURING DRILLING: NONE
WATER LEVEL AFTER AUGER REMOVAL: NONE
CAVE-IN DEPTH: NONE

COORDINATES: N=460968.459, E=19425271.200, LAT=44.576711, LONG=-85.363638

REMARKS: NO LAB SAMPLE COLLECTED. HAND AUGER REFUSAL ON OLD ASPHALT LAYER. BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS.

BORING NO. B-20

ELEV. 1054.3
STA: 214+00
LOCATION: SB US-131
OFFSET: 16 LT OF CL



0.0 7.0" HMA
MEDIUM DENSE BROWN MOIST FINE TO MEDIUM SAND

-3.5 WITH FEW FINE GRAVEL

-6.0 LOOSE

-8.5 MEDIUM DENSE, WITH OCCASIONAL CLAYEY PARTINGS
E.O.B. 10.0

BORING DATE: 5/9/17

WATER DURING DRILLING: NONE
WATER LEVEL AFTER AUGER REMOVAL: N/A
CAVE-IN DEPTH: 7.6

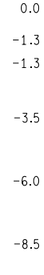
COORDINATES: N=460882.732, E=19425188.570, LAT=44.576473, LONG=-85.363951

REMARKS: BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS AND ASPHALT COLDPATCH.

LAB TESTING: THE BROWN FINE TO MEDIUM SAND FROM 0.6 TO 2.1 PASSES THE REQUIREMENTS FOR MDOT CLASS II WITH 2% LOSS BY WASH.

BORING NO. B-21

ELEV. 1054.0
STA: 213+99
LOCATION: NB US-131
OFFSET: 5 RT OF CL



0.0 9.0" HMA
CONCRETE

-1.3 MEDIUM DENSE BROWN MOIST FINE TO MEDIUM SAND

-3.5

-6.0 LOOSE WITH DARK BROWN SAND WITH SILT LENSES

-8.5 MEDIUM DENSE
E.O.B. 10.0

BORING DATE: 6/1/17

WATER DURING DRILLING: NONE
WATER LEVEL AFTER AUGER REMOVAL: N/A
CAVE-IN DEPTH: 5.6

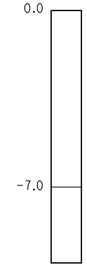
COORDINATES: N=460876.665, E=19425211.008, LAT=44.576461, LONG=-85.363715

REMARKS: BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS AND ASPHALT COLDPATCH.

LAB TESTING: THE BROWN FINE TO MEDIUM SAND FROM 1.3 TO 2.8 PASSES THE REQUIREMENTS FOR MDOT CLASS II WITH 6% LOSS BY WASH.

BORING NO. B-22

ELEV. 1051.8
STA: 213+70
LOCATION: NB US-131
OFFSET: 47 RT OF CL



0.0 BROWN MOIST MEDIUM TO COARSE SAND WITH GRAVEL, FEW FINE SAND, TRACE FINE GRAVEL

-7.0 LIGHT BROWN MOIST MEDIUM TO COARSE SAND WITH GRAVEL, TRACE FINE SAND, LITTLE FINE GRAVEL
E.O.B. 10.0

BORING DATE: 5/11/17

WATER DURING DRILLING: NONE
WATER LEVEL AFTER AUGER REMOVAL: NONE
CAVE-IN DEPTH: NONE

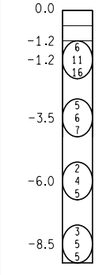
COORDINATES: N=460834.390, E=19425241.740, LAT=44.576342, LONG=-85.363744

REMARKS: HAND AUGERED BORING. BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS.

LAB TESTING: THE BROWN MEDIUM TO COARSE SAND WITH GRAVEL, FEW FINE SAND, TRACE FINE GRAVEL FROM 0.0 TO 1.5 PASSES THE REQUIREMENTS FOR MDOT CLASS II WITH 3% LOSS BY WASH.

BORING NO. B-23

ELEV. 1054.3
STA: 212+00
LOCATION: SB US-131
OFFSET: 5.5 LT OF CL



0.0 7.0" HMA
CONCRETE

-1.2 MEDIUM DENSE BROWN MOIST FINE TO MEDIUM SAND

-3.5 WITH DARK BROWN SAND WITH SILT LENSES

-6.0 LOOSE LIGHT BROWN MOIST FINE SAND

-8.5 E.O.B. 10.0

BORING DATE: 6/1/17

WATER DURING DRILLING: NONE
WATER LEVEL AFTER AUGER REMOVAL: N/A
CAVE-IN DEPTH: 5.9

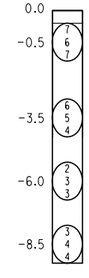
COORDINATES: N=460688.327, E=19425146.381, LAT=44.575942, LONG=-85.363954

REMARKS: $^{3}/_{16}$" SQUARE WIRE MESH 4.25" BELOW TOP OF CONCRETE. BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS AND ASPHALT COLDPATCH.

LAB TESTING: THE BROWN FINE TO MEDIUM SAND FROM 1.2 TO 2.7 PASSES THE REQUIREMENTS FOR MDOT CLASS II WITH 3% LOSS BY WASH.

BORING NO. B-24

ELEV. 1053.6
STA: 212+00
LOCATION: NB US-131
OFFSET: 18 RT OF CL



0.0 6.0" HMA
MEDIUM DENSE LIGHT BROWN MOIST FINE TO COARSE SAND

-3.5 LOOSE TRACE FINE GRAVEL

-8.5 E.O.B. 10.0

BORING DATE: 5/8/17

WATER DURING DRILLING: NONE
WATER LEVEL AFTER AUGER REMOVAL: N/A
CAVE-IN DEPTH: 8.1

COORDINATES: N=460682.622, E=19425170.850, LAT=44.575924, LONG=-85.364009

REMARKS: BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS AND ASPHALT COLDPATCH.

LAB TESTING: THE LIGHT BROWN FINE TO COARSE SAND FROM 0.5 TO 2.0 PASSES THE REQUIREMENTS FOR MDOT CLASS II WITH 1% LOSS BY WASH.

NOTES:

BORINGS WERE OBTAINED BY MATERIALS TESTING CONSULTANTS, INC.

NUMBERS IN CIRCLES DENOTE NUMBER OF BLOWS REQUIRED TO DRIVE A 2 in. O.D. SPLIT SPOON SAMPLER 3 SUCCESSIVE 6 in. INCREMENTS USING A 140 lb. HAMMER FALLING 30 in.. ASTM D 1586. SPT HAMMER EFFICIENCY APPROXIMATELY 90%.

WHERE THE SAMPLER IS DRIVEN DISTANCES OTHER THAN 6 in., THE DISTANCE IS SHOWN IN THE CIRCLE WITH NUMBER OF BLOWS IN THE FORM OF A FRACTION. DISTANCE IS IN INCHES.

ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE NOTED.

THE SOIL BORING REPRESENTS POINT INFORMATION. PRESENTATION OF THIS INFORMATION IN NO WAY IMPLIES THAT SUBSURFACE CONDITIONS ARE THE SAME AT LOCATIONS OTHER THAN EXACT LOCATION OF THE BORING.

GROUNDWATER LEVELS MAY FLUCTUATE AND MAY BE DIFFERENT AT THE TIME OF CONSTRUCTION.

CONSISTENCY OF COHESIVE SOIL WAS ESTIMATED BY USE OF A CALIBRATED POCKET PENETROMETER AND A TORVANE SHEAR DEVICE.

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)

NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

Materials Testing Consultants, Inc.

MDOT Michigan Department of Transportation

NO SCALE

DRAWN BY: CK	DATE: 08/06/18	DATE:	CS: 28091
CHK'D BY: DS	CORR BY: BGS	DESIGN UNIT: TALLON	JN: 132412A
FILE: 132412_US-131_BORING_REV.dgn		TSC: TRAVERSE CITY	

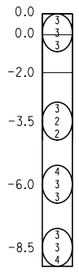
SOIL BORING DATA
US-131 & M-186 INTERSECTION

DRAWING	SHEET
US-131 BORING 002	73

BORING NO. B-101

ELEV. 1050.3

STA: 211+76
LOCATION: NB US-131 E. DITCH LINE
OFFSET: 48 RT OF US-131 CL



0.0 10" TOPSOIL
0.0 LOOSE BROWN MOIST FINE TO MEDIUM SAND WITH SILTY SAND LENSES

-3.5 LOOSE BROWN MOIST FINE TO MEDIUM SAND

-8.5 LIGHT BROWN, TRACE GRAVEL

E.O.B. 10.0

BORING DATE: 1/18/18

WATER DURING DRILLING: NONE
WATER LEVEL AFTER AUGER REMOVAL: NA
CAVE-IN DEPTH: 7.4

COORDINATES: N=460653.943, E=19425189.080,
LAT=44.575845, LONG=-85.363938

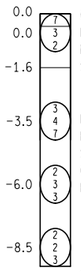
REMARKS: BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS.

LAB TESTING: THE BROWN FINE TO MEDIUM SAND FROM 2.0 TO 10.0 PASSES THE REQUIREMENTS FOR MDOT CLASS II WITH 1% LOSS BY WASH.

BORING NO. B-102

ELEV. 1049.1

STA: 212+40
LOCATION: NB US-131 E. DITCH LINE
OFFSET: 54 RT OF US-131 CL



0.0 6" TOPSOIL
0.0 LOOSE BROWN MOIST FINE TO MEDIUM SAND WITH FREQUENT SILTY SAND LENSES

-3.5 LOOSE TO MEDIUM DENSE LIGHT BROWN MOIST FINE TO MEDIUM SAND, TRACE GRAVEL WITH OCCASIONAL FINE TO COARSE SAND PARTINGS

-8.5

E.O.B. 10.0

BORING DATE: 1/18/18

WATER DURING DRILLING: NONE
WATER LEVEL AFTER AUGER REMOVAL: NA
CAVE-IN DEPTH: 7.1

COORDINATES: N=460715.975, E=19425211.650,
LAT=44.576016, LONG=-85.363854

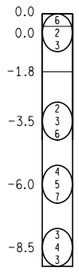
REMARKS: INFILTRATION RATE APPROXIMATELY 13 INCHES/HR. BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS.

LAB TESTING: THE LIGHT BROWN FINE TO MEDIUM SAND FROM 1.6 TO 10.0 PASSES THE REQUIREMENTS FOR MDOT CLASS II WITH 1% LOSS BY WASH.

BORING NO. B-103

ELEV. 1048.0

STA: 213+08
LOCATION: NB US-131 E. DITCH LINE
OFFSET: 54 RT OF US-131 CL



0.0 5" TOPSOIL
0.0 LOOSE BROWN MOIST FINE TO MEDIUM SAND WITH FREQUENT SILTY SAND LENSES

-3.5 LOOSE TO MEDIUM DENSE LIGHT BROWN MOIST FINE TO MEDIUM SAND

-8.5

E.O.B. 10.0

BORING DATE: 1/18/18

WATER DURING DRILLING: NONE
WATER LEVEL AFTER AUGER REMOVAL: NA
CAVE-IN DEPTH: 7.1

COORDINATES: N=460774.691, E=19425227.970,
LAT=44.576178, LONG=-85.363794

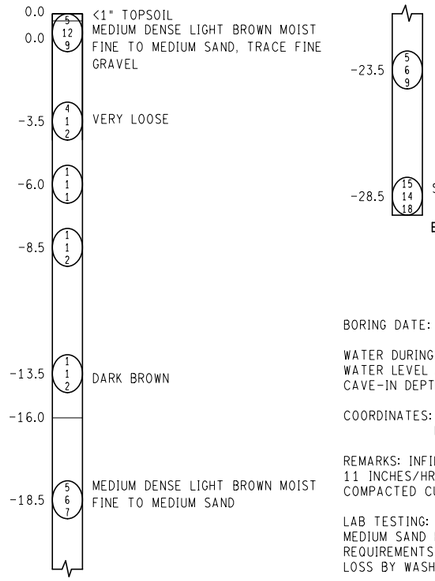
REMARKS: BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS.

LAB TESTING: THE LIGHT BROWN FINE TO MEDIUM SAND FROM 1.8 TO 10.0 PASSES THE REQUIREMENTS FOR MDOT CLASS II WITH 4% LOSS BY WASH.

BORING NO. B-104

ELEV. 1051.9

STA: 217+84
LOCATION: NE QUAD US-131 & M-186
OFFSET: 109 RT OF US-131 CL



0.0 <1" TOPSOIL
0.0 MEDIUM DENSE LIGHT BROWN MOIST FINE TO MEDIUM SAND, TRACE FINE GRAVEL

-3.5 VERY LOOSE

-6.0

-8.5

-13.5 DARK BROWN

-16.0

-18.5 MEDIUM DENSE LIGHT BROWN MOIST FINE TO MEDIUM SAND

-23.5

-28.5 SATURATED FROM 29.5, DENSE

E.O.B. 30.0

BORING DATE: 1/17/18

WATER DURING DRILLING: 29.5
WATER LEVEL AFTER AUGER REMOVAL: NA
CAVE-IN DEPTH: 24.0

COORDINATES: N=461210.398, E=19425428.710,
LAT=44.577380, LONG=-85.363045

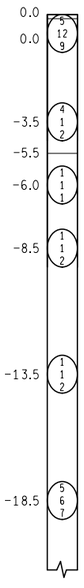
REMARKS: INFILTRATION RATE APPROXIMATELY 11 INCHES/HR. BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS.

LAB TESTING: THE LIGHT BROWN FINE TO MEDIUM SAND FROM 0.1 TO 16.0 PASSES THE REQUIREMENTS FOR MDOT CLASS II WITH 1% LOSS BY WASH.

BORING NO. B-105

ELEV. 1052.3

STA: 217+92
LOCATION: NE QUAD US-131 & M-186
OFFSET: 58 RT OF US-131 CL



0.0 2" TOPSOIL
0.0 LOOSE TO MEDIUM DENSE BROWN MOIST FINE TO MEDIUM SAND FILL

-3.5 1" TOPSOIL LENS AT 4.0

-5.5

-6.0 MEDIUM DENSE BROWN MOIST FINE TO MEDIUM SAND WITH FINE TO COARSE SAND PARTINGS

-8.5

-13.5

-18.5

-23.5 LIGHT BROWN

-28.5 SATURATED FROM 29.5

E.O.B. 30.0

BORING DATE: 1/17/18

WATER DURING DRILLING: 29.5
WATER LEVEL AFTER AUGER REMOVAL: NA
CAVE-IN DEPTH: 21.9

COORDINATES: N=461233.670, E=19425381.530,
LAT=44.577442, LONG=-85.363227

REMARKS: INFILTRATION RATE APPROXIMATELY 16 INCHES/HR. BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS.

LAB TESTING: THE BROWN TO LIGHT BROWN FINE TO MEDIUM SAND FROM 5.5 TO 30.0 PASSES THE REQUIREMENTS FOR MDOT CLASS II WITH 4% LOSS BY WASH.

BORING NO. B-106

ELEV. 1038.9

STA: 776+40
LOCATION: EB M-186
OFFSET: 94 RT OF M-186 CL



0.0 12" TOPSOIL

-1.0 BROWN MOIST FINE TO MEDIUM SAND, TRACE SILT AND GRAVEL

-6.0 LIGHT BROWN MOIST FINE TO MEDIUM SAND, TRACE GRAVEL, WITH FREQUENT BROWN SILTY SAND LENSES FROM 7.0 TO 12.0

E.O.B. 12.0

BORING DATE: 1/19/18

WATER DURING DRILLING: NONE
WATER LEVEL AFTER AUGER REMOVAL: NA
CAVE-IN DEPTH: NONE

COORDINATES: N=461015.660, E=19425157.640,
LAT=44.576837, LONG=-85.364076

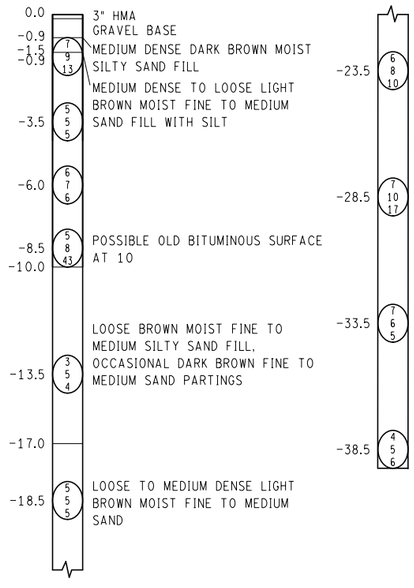
REMARKS: BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS.

LAB TESTING: THE BROWN FINE TO MEDIUM SAND, TRACE SILT AND GRAVEL FROM 1.0 TO 6.0 PASSES THE REQUIREMENTS FOR MDOT CLASS II WITH 7% LOSS BY WASH.

BORING NO. B-107

ELEV. 1053.4

STA: 776+29
LOCATION: EB M-186
OFFSET: 8 RT OF M-186 CL



0.0 3" HMA
-0.9 GRAVEL BASE
-1.5 MEDIUM DENSE DARK BROWN MOIST SILTY SAND FILL
-0.9 MEDIUM DENSE TO LOOSE LIGHT BROWN MOIST FINE TO MEDIUM SAND FILL WITH SILT

-3.5

-6.0

-8.5 POSSIBLE OLD BITUMINOUS SURFACE AT 10
-10.0

-13.5 LOOSE BROWN MOIST FINE TO MEDIUM SILTY SAND FILL, OCCASIONAL DARK BROWN FINE TO MEDIUM SAND PARTINGS

-17.0

-18.5 LOOSE TO MEDIUM DENSE LIGHT BROWN MOIST FINE TO MEDIUM SAND

-23.5 FINE TO COARSE SAND, FREQUENT FINE GRAVEL LENSES AND PARTINGS

-28.5

SATURATED FROM 31.8

-33.5

-38.5

E.O.B. 40.0

BORING DATE: 2/27/18

WATER DURING DRILLING: 31.8
WATER LEVEL AFTER AUGER REMOVAL: NA
CAVE-IN DEPTH: 11.0

COORDINATES: N=461099.507, E=19425173.115,
LAT=44.577071, LONG=-85.363871

REMARKS: BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS AND PATCHED WITH ASPHALT COLDPATCH.

LAB TESTING: THE DARK BROWN SILTY SAND FILL FROM 0.9 TO 1.5 AND THE BROWN SILTY SAND FILL FROM 13.5 TO 15 FAILED THE REQUIREMENTS FOR MDOT CLASS II AND III WITH 26% AND 17% LOSS BY WASH, RESPECTIVELY.

NOTES:

BORINGS WERE OBTAINED BY MATERIALS TESTING CONSULTANTS, INC.

NUMBERS IN CIRCLES DENOTE NUMBER OF BLOWS REQUIRED TO DRIVE A 2 in. O.D. SPLIT SPOON SAMPLER 3 SUCCESSIVE 6 in. INCREMENTS USING A 140 lb. HAMMER FALLING 30 in.. ASTM D 1586. SPT HAMMER EFFICIENCY APPROXIMATELY 90%.

-3.5 (5 / 7 / 8) 1st 6 in. 2nd 6 in. 3rd 6 in.

-3.5 (1/18) NO. OF BLOWS / DISTANCE DRIVEN INCHES

WHERE THE SAMPLER IS DRIVEN DISTANCES OTHER THAN 6 in., THE DISTANCE IS SHOWN IN THE CIRCLE WITH NUMBER OF BLOWS IN THE FORM OF A FRACTION. DISTANCE IS IN INCHES.

ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE NOTED.

THE SOIL BORING REPRESENTS POINT INFORMATION. PRESENTATION OF THIS INFORMATION IN NO WAY IMPLIES THAT SUBSURFACE CONDITIONS ARE THE SAME AT LOCATIONS OTHER THAN EXACT LOCATION OF THE BORING.

GROUNDWATER LEVELS MAY FLUCTUATE AND MAY BE DIFFERENT AT THE TIME OF CONSTRUCTION.

CONSISTENCY OF COHESIVE SOIL WAS ESTIMATED BY USE OF A CALIBRATED POCKET PENETROMETER AND A TORVANE SHEAR DEVICE.

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)

NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

Materials Testing Consultants, Inc.

MDOT Michigan Department of Transportation

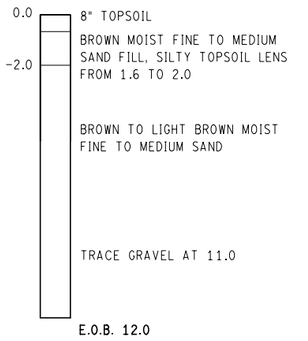
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DRAWN BY: KE & CK DATE: 08/06/18	DATE:	CS: 28091	SOIL BORING DATA	DRAWING
CHK'D BY: DS CORR BY: BGS	DESIGN UNIT: TALLON	JN: 132412A	US-131 & M-186 INTERSECTION	US-131 BORING 003
FILE: 132412_US-131_BORING_REV.dgn	TSC: TRAVERSE CITY			SHEET 74

BORING NO. B-108

ELEV. 1037.5

STA: 776+17
LOCATION: WB M-186
OFFSET: 87 LT OF M-186 CL



BORING DATE: 1/18/18

WATER DURING DRILLING: NONE
WATER LEVEL AFTER AUGER REMOVAL: NA
CAVE-IN DEPTH: NONE

COORDINATES: N=461194.769, E=19425209.24,
LAT=44.577330, LONG=-85.363886

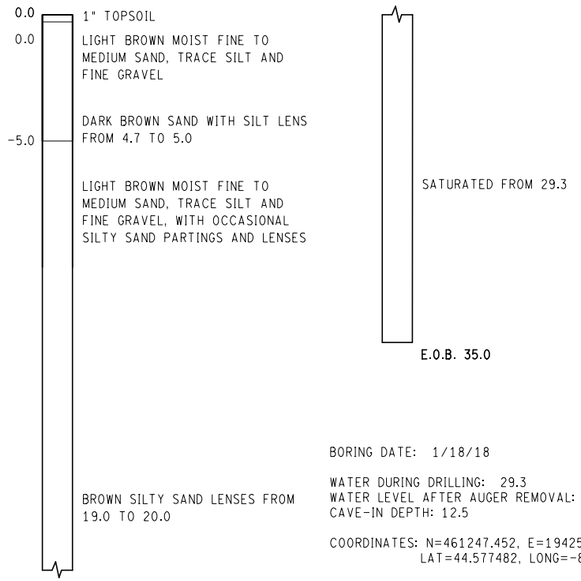
REMARKS: BOREHOLE BACKFILLED WITH COMPACTED CUTTINGS.

LAB TESTING: THE BROWN TO LIGHT BROWN FINE TO MEDIUM SAND FROM 2.0 TO 12.0 PASSES THE REQUIREMENTS FOR MDOT CLASS II WITH 4% LOSS BY WASH.

BORING NO. B-109

ELEV. 1051.1

STA: 218+44
LOCATION: NE QUAD US-131 & M-186 - MONITORING WELL
OFFSET: 115 RT OF US-131 CL



BORING DATE: 1/18/18

WATER DURING DRILLING: 29.3
WATER LEVEL AFTER AUGER REMOVAL: NA
CAVE-IN DEPTH: 12.5

COORDINATES: N=461247.452, E=19425450.270,
LAT=44.577482, LONG=-85.362964

REMARKS: BOREHOLE BACKFILLED WITH MONITORING WELL, SET SCREEN FROM 30 TO 35 FT.

NOTES:

BORINGS WERE OBTAINED BY MATERIALS TESTING CONSULTANTS, INC.

NUMBERS IN CIRCLES DENOTE NUMBER OF BLOWS REQUIRED TO DRIVE A 2 in. O.D. SPLIT SPOON SAMPLER 3 SUCCESSIVE 6 in. INCREMENTS USING A 140 lb. HAMMER FALLING 30 in.. ASTM D 1586. SPT HAMMER EFFICIENCY APPROXIMATELY 90%.

-3.5 (5 / 7 / 8) 1st 6 in. 2nd 6 in. 3rd 6 in.

-3.5 (1/18) NO. OF BLOWS / DISTANCE DRIVEN INCHES

WHERE THE SAMPLER IS DRIVEN DISTANCES OTHER THAN 6 in., THE DISTANCE IS SHOWN IN THE CIRCLE WITH NUMBER OF BLOWS IN THE FORM OF A FRACTION. DISTANCE IS IN INCHES.

ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE NOTED.

THE SOIL BORING REPRESENTS POINT INFORMATION. PRESENTATION OF THIS INFORMATION IN NO WAY IMPLIES THAT SUBSURFACE CONDITIONS ARE THE SAME AT LOCATIONS OTHER THAN EXACT LOCATION OF THE BORING.

GROUNDWATER LEVELS MAY FLUCTUATE AND MAY BE DIFFERENT AT THE TIME OF CONSTRUCTION.

CONSISTENCY OF COHESIVE SOIL WAS ESTIMATED BY USE OF A CALIBRATED POCKET PENETROMETER AND A TORVANE SHEAR DEVICE.

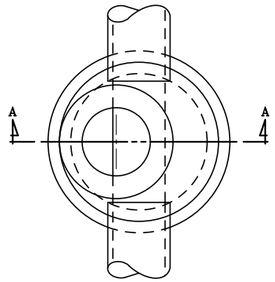
FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

Materials Testing Consultants, INC.

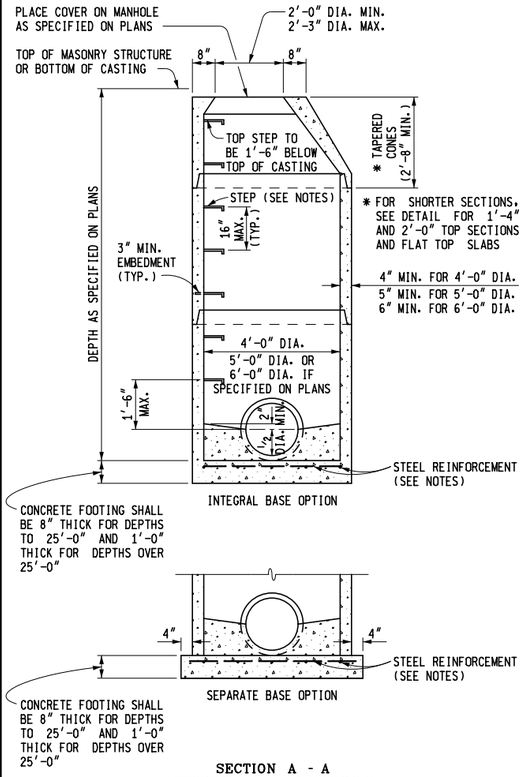
MDOT Michigan Department of Transportation

NO SCALE

DRAWN BY: KE & CK DATE: 08/06/18	DATE:	CS: 28091	SOIL BORING DATA	DRAWING
CHK'D BY: DS CORR BY: BGS	DESIGN UNIT: TALLON	JN: 132412A	US-131 & M-186 INTERSECTION	US-131 BORING 004
FILE: 132412_US-131_BORING_REV.dgn	TSC: TRAVERSE CITY			SHEET 75



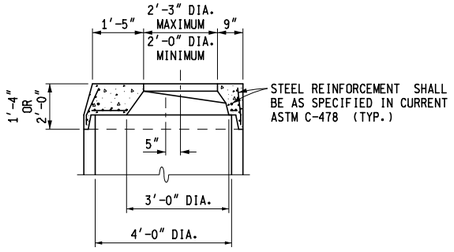
PLAN VIEW



SECTION A - A

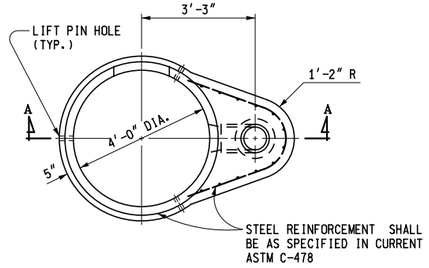
TYPICAL MANHOLE

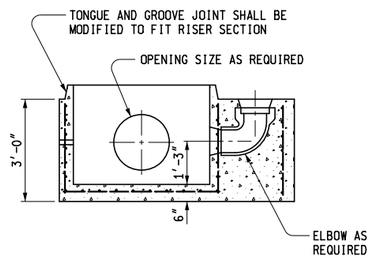
PRECAST REINFORCED CONCRETE SHOWN
OTHER OPTIONS INCLUDE CONCRETE BLOCK, BRICK, OR CAST-IN-PLACE WALL SECTIONS
SEE TYPICAL WALL SECTIONS FOR WALL THICKNESS



DETAIL FOR 1'-4" & 2'-0" TOP SECTIONS

SHAPE MAY VARY FROM DETAIL SHOWN BUT MUST COMPLY WITH ASTM C-478 AND JOINTS SHALL BE COMPATIBLE WITH THE RISER





SECTION A - A

TYPICAL PRECAST REINFORCED BOTTOM SECTION FOR DROP MANHOLE

PREPARED BY DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Kirk T. Steudle

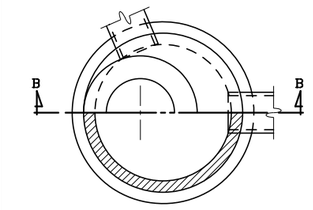
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DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

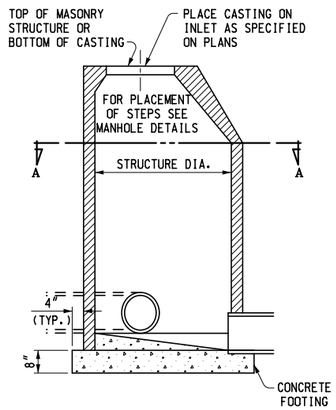
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

DRAINAGE STRUCTURES

F.H.W.A. APPROVAL	6-15-2016 PLAN DATE	R-1-G	SHEET 1 OF 9

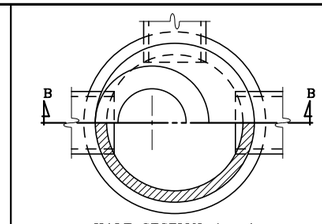


HALF SECTION A - A

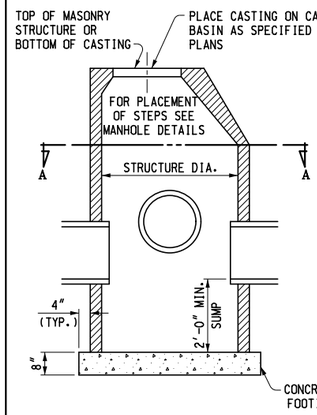


SEE MANHOLE DETAILS FOR SIZE AND BASE OPTIONS
SECTION B - B

INLET

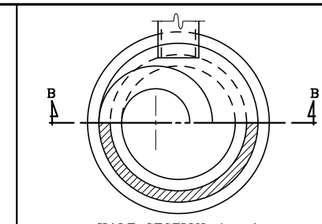


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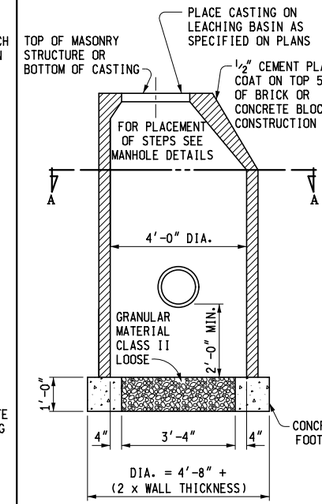


SEE MANHOLE DETAILS FOR SIZE AND BASE OPTIONS
SECTION B - B

CATCH BASIN

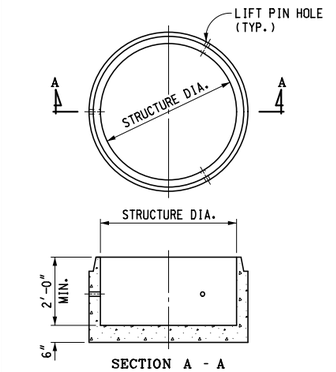


HALF SECTION A - A



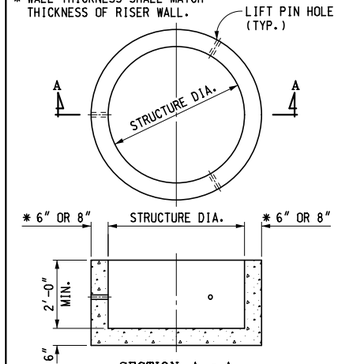
SEE MANHOLE DETAILS FOR BASE OPTIONS
SECTION B - B

LEACHING BASIN



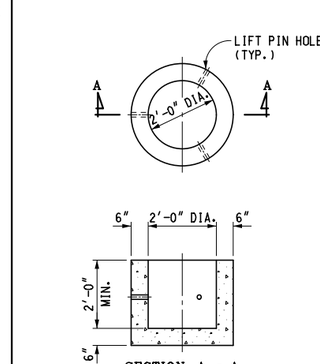
SECTION A - A
SEE MANHOLE DETAILS FOR SIZE AND BASE OPTIONS

PRECAST SUMP FOR PRECAST RISERS



SECTION A - A
SEE TYPICAL BRICK AND BLOCK SECTION FOR SIZE AND BASE OPTIONS

PRECAST SUMP FOR BRICK OR BLOCK CONSTRUCTION



SECTION A - A

PRECAST SUMP FOR 2'-0" DIA. STRUCTURES

MICHIGAN DEPARTMENT OF TRANSPORTATION
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DRAINAGE STRUCTURES

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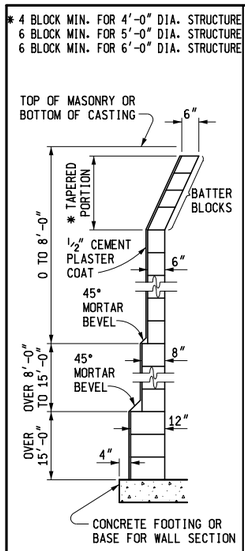
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NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

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HORZ. (FT) 0

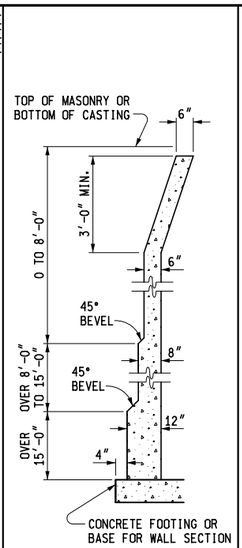
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DESIGN UNIT: TALLON
TSC: TRAVERSE CITY
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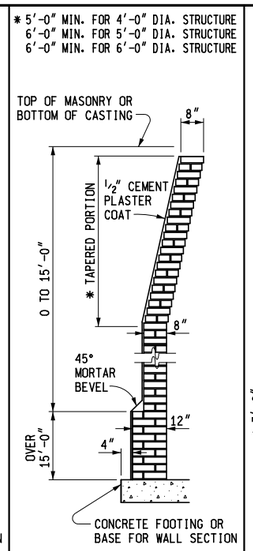
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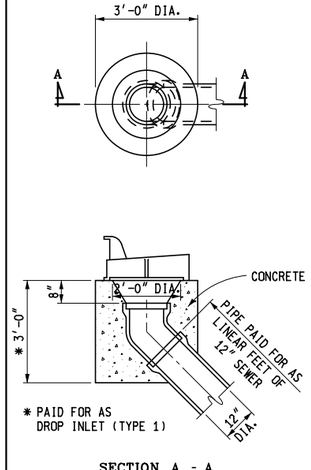
TYPICAL CONCRETE BLOCK WALL SECTION



TYPICAL CAST-IN-PLACE CONCRETE WALL SECTION

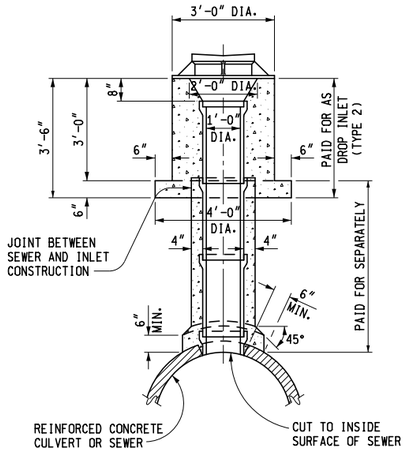


TYPICAL BRICK WALL SECTION



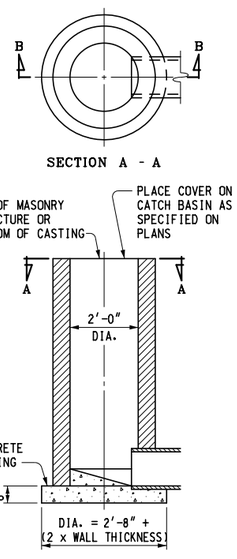
SECTION A - A

DROP INLET (TYPE 1)



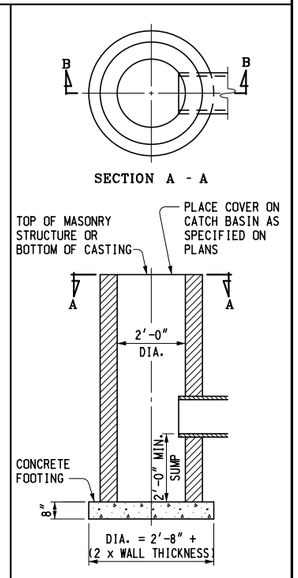
BACKFILL SHALL BE PLACED TO BOTTOM OF INLET AND COMPACTED BEFORE CONSTRUCTING THE INLET

DROP INLET (TYPE 2)



SECTION B - B

INLET



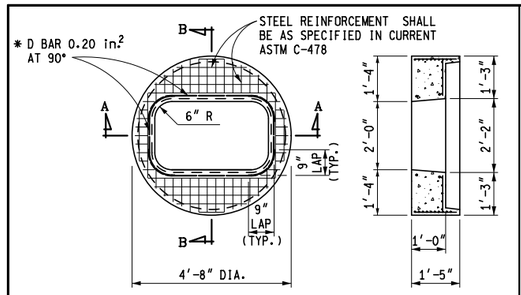
SECTION B - B

CATCH BASIN

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

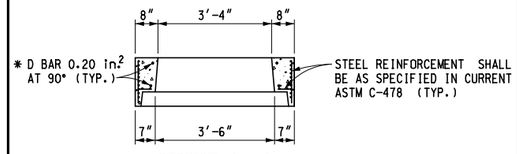
DRAINAGE STRUCTURES

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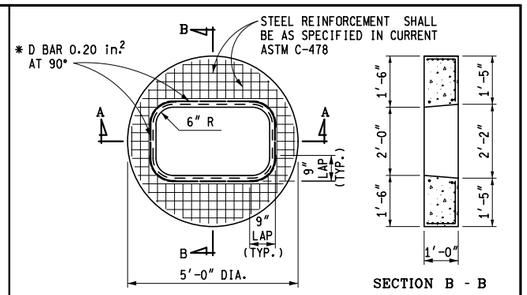
SECTION B - B

* D BARS MAY BE BENT AT A SMALLER RADIUS RATHER THAN PARALLELING THE RADIUS IN THE DRAIN OPENING



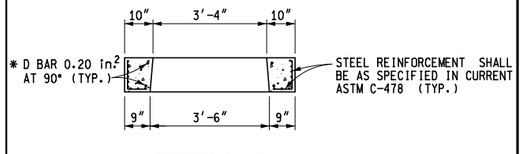
SECTION A - A

PRECAST FLAT SLAB TOP FOR PRECAST CONCRETE STRUCTURE, 2' x 4' CASTING



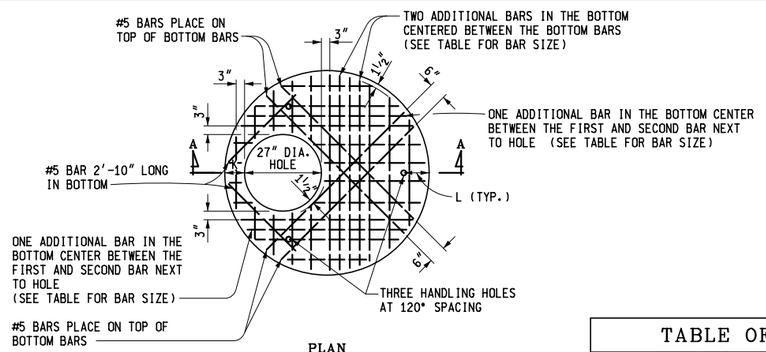
SECTION B - B

* D BARS MAY BE BENT AT A SMALLER RADIUS RATHER THAN PARALLELING THE RADIUS IN THE DRAIN OPENING

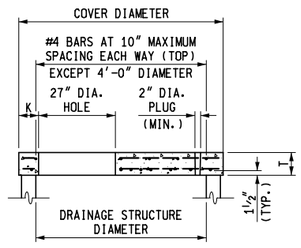


SECTION A - A

PRECAST FLAT SLAB TOP FOR MASONRY STRUCTURE, 2' x 4' CASTING



PLAN
(SHOWING BOTTOM LAYER OF REINFORCEMENT)



SECTION A - A

PRECAST REINFORCED CONCRETE FLAT SLAB TOP

TABLE OF DIMENSIONS					
STRUCTURE DIAMETER	COVER DIAMETER	T	K	L	BAR MAXIMUM SPACING (BOTTOM EACH WAY)
* 4'-0"	58"	6"	6"	8"	#5 AT 6"
5'-0"	72"	8"	7"	9"	#5 AT 7"
6'-0"	86"	8"	8"	10"	#5 AT 6"
7'-0"	101 1/2"	12"	8 3/4"	11"	#5 AT 5"
8'-0"	114"	12"	9"	11"	#6 AT 6"
9'-0"	128"	12"	10"	12"	#5 AT 6"
10'-0"	140"	12"	10"	13"	#5 AT 6"

* ONLY BOTTOM LAYERS OF STEEL NECESSARY

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AS-LET PLAN REVISIONS							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

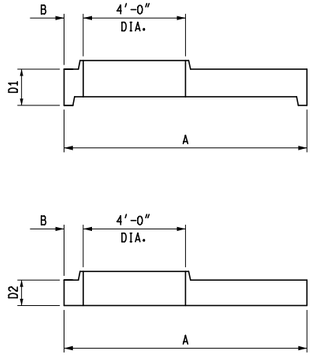
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FILE:

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DESIGN UNIT: TALLON
TSC: TRAVERSE CITY

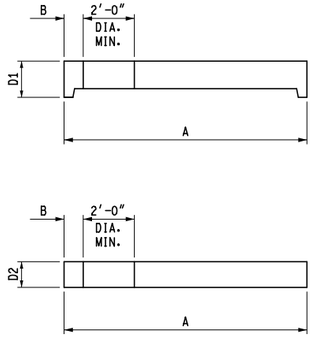
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JN: 132412A

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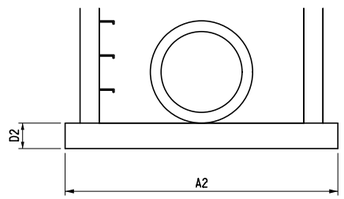
PRECAST REDUCER CAP

REDUCER CAP DIMENSIONS				
STRUCTURE DIAMETER	CAP DIAMETER "A"	B	CAP DEPTH "D1"	CAP DEPTH "D2"
7′-0″	101½″	8¾″	1′-5″	12″
8′-0″	114″	9″	1′-5″	12″
9′-0″	128″	10″	1′-5″	12″
10′-0″	140″	10″	1′-6″	12″



PRECAST FLAT SLAB TOP

FLAT SLAB TOP DIMENSIONS				
STRUCTURE DIAMETER	COVER DIAMETER "A"	B	COVER DEPTH "D1"	COVER DEPTH "D2"
7′-0″	101½″	8¾″	1′-5″	12″
8′-0″	114″	9″	1′-5″	12″
9′-0″	128″	10″	1′-5″	12″
10′-0″	140″	10″	1′-6″	12″



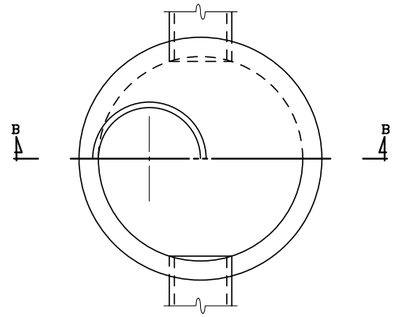
SEPARATE BASE OPTION

BASE AND RISER DIMENSIONS					
STRUCTURE DIAMETER	BASE DIAMETER "A1"	BASE DIAMETER "A2"	MIN. WALL THICKNESS "T"	BASE DEPTH "D1"	BASE DEPTH "D2"
7′-0″	101½″	108″	7″	8″	12″
8′-0″	114″	128″	8″	8″	12″
9′-0″	128″	140″	9″	8″	12″
10′-0″	140″	154″	10″	8″	12″

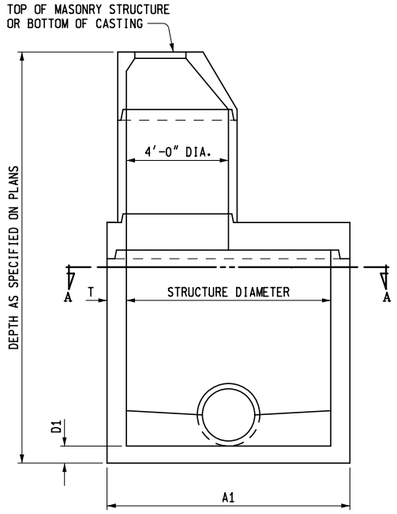
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

DRAINAGE STRUCTURES

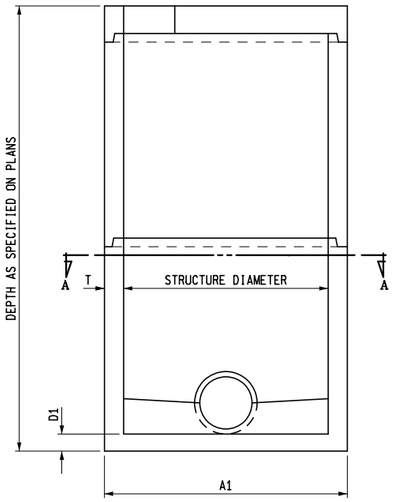
F.H.W.A. APPROVAL	6-15-2016 PLAN DATE	R-1-G	SHEET 5 OF 9



HALF SECTION A - A



SECTION B - B
SHOWING REDUCER CAP



SECTION B - B
SHOWING FLAT SLAB TOP

PRECAST MANHOLE

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AS-LET PLAN REVISIONS							
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MDOT Michigan Department of Transportation

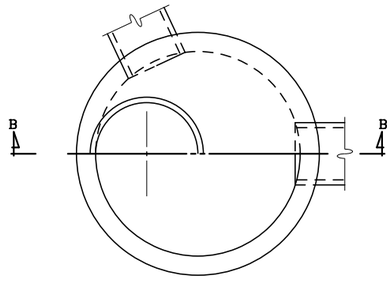
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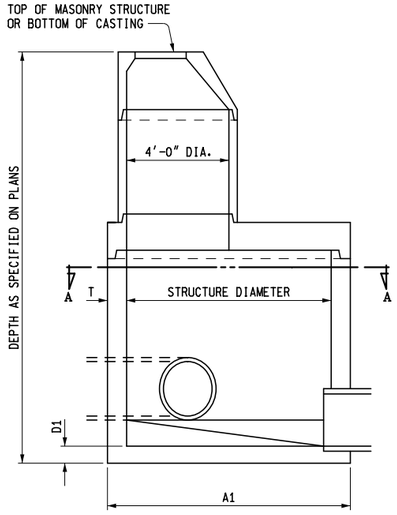
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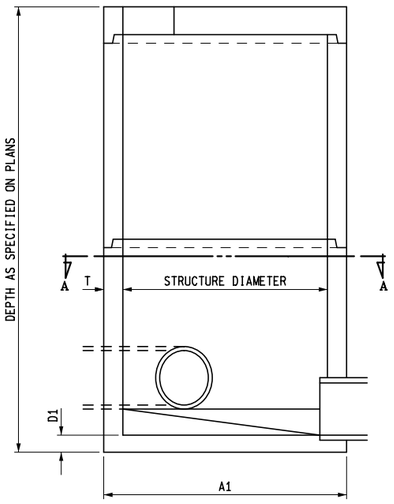
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HALF SECTION A - A

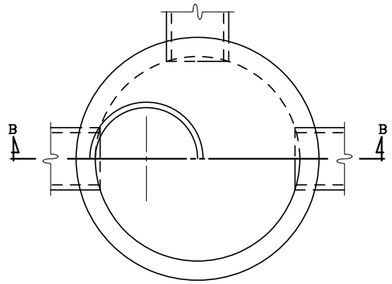


SECTION B - B
SHOWING REDUCER CAP

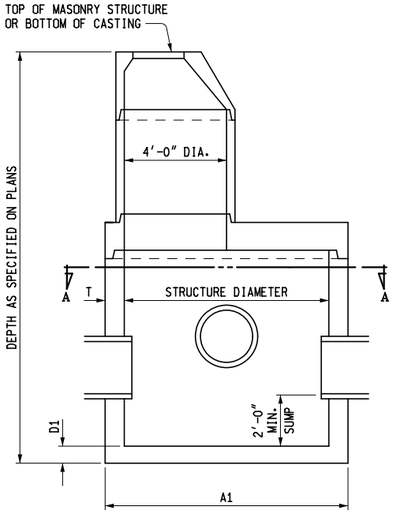


SECTION B - B
SHOWING FLAT SLAB TOP

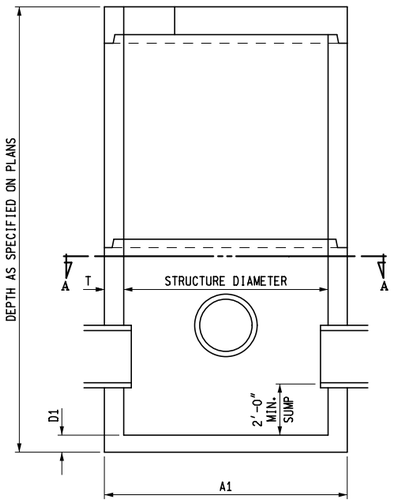
PRECAST INLET



HALF SECTION A - A

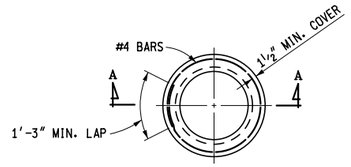


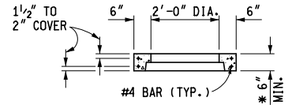
SECTION B - B
SHOWING REDUCER CAP



SECTION B - B
SHOWING FLAT SLAB TOP

PRECAST CATCH BASIN





SECTION A - A

* WHEN RISER TONGUE LENGTH IS GREATER THAN 3", USE 2 TIMES THE TONGUE LENGTH.

NOTE: PRECAST RISER SHALL FULLY ENGAGE THE TONGUE OF THE RISER PIPE.

PRECAST RISER RING

(FOR 2'-0" DIAMETER STRUCTURE)

NOTES:

THE DRAINAGE STRUCTURE COVERS ALLOWED FOR USE ON THESE DRAINAGE STRUCTURES ARE SPECIFIED IN SUBSEQUENT STANDARD PLANS AND ARE INTERCHANGEABLE ON ANY STRUCTURE.

THE TOPS OF MASONRY STRUCTURES SHALL BE SUFFICIENTLY LOW TO PERMIT PROPER ADJUSTMENT OF COVER TO GRADE USING MORTAR OR BRICK AS DIRECTED BY THE ENGINEER.

PREMIUM JOINTS ARE REQUIRED ON ALL SANITARY MANHOLES. SEE ASTM DESIGNATION C-923.

GRANULAR MATERIAL CLASS III SHALL BE USED IN BACKFILLING AROUND ALL STRUCTURES THAT FALL WITHIN THE 1:1 INFLUENCE LINES FROM THE EDGE OF PAVEMENT OR BACK OF CURB.

STEPS FOR DRAINAGE STRUCTURES SHALL BE OF AN APPROVED DESIGN AND MADE FROM CAST IRON, ALUMINUM, OR PLASTIC COATED STEEL. RUNGS SHALL BE A MINIMUM OF 10" IN CLEAR LENGTH, DESIGNED TO PREVENT THE FOOT FROM SLIPPING OFF THE END. THE MINIMUM HORIZONTAL PULL OUT LOAD SHALL BE 400 LBS. THE MINIMUM VERTICAL LOAD SHALL BE 800 LBS.

THE BELL SHALL BE REMOVED FOR THE FIRST LENGTH OF OUTLET PIPE PROJECTING THROUGH THE WALL OF THE MANHOLE.

PRECAST CONCRETE SECTIONS, SUMPS, AND FLAT TOP SLABS SHALL BE BUILT ACCORDING TO CURRENT ASTM C-478 AND ACCORDING TO DETAILS SPECIFIED ON THIS PLAN. PRECAST REINFORCED CONCRETE FLAT TOP SLAB SHALL BE MARKED TO SHOW LOCATION OF REINFORCEMENT. THE WALLS OF THE PRECAST UNITS MAY HAVE A SLIGHT TAPER TO ALLOW FOR FORM REMOVAL. PRECAST CONCRETE 2'-0" DIAMETER DRAINAGE STRUCTURES SHALL HAVE A MINIMUM 3" WALL THICKNESS WITH A 6" MINIMUM BEARING SURFACE ON TOP. SEE PRECAST RISER RING FOR 2'-0" DIAMETER STRUCTURE.

THE MAXIMUM INSIDE DIAMETER OF PIPES ENTERING OR LEAVING PRECAST DRAINAGE STRUCTURES SHALL BE 2'-0" LESS THAN THE INSIDE DIAMETER OF THE DRAINAGE STRUCTURE. A PIPE LEAVING A 2'-0" DIAMETER DRAINAGE STRUCTURE IS ALLOWED TO HAVE 1'-0" INSIDE DIAMETER OR LESS.

THE NUMBER OF PIPE OPENINGS IN A RISER SHALL BE DETERMINED BY THE DESIGNER. SPACING BETWEEN OPENINGS SHALL BE 1'-0" MINIMUM. OPENINGS MAY BE CONSTRUCTED BY CASTING OR SCRIBING IN PRECAST STRUCTURES DURING FABRICATION OR BY CORING THE CURED CONCRETE.

PRECAST CONCRETE FOOTINGS OR BASES SHALL BE REINFORCED WITH #4 BARS SPACED AT 1'-0" BOTH WAYS OR WITH TWO LAYERS OF WELDED WIRE FABRIC OF EQUIVALENT CROSS SECTIONAL AREA LAID AT RIGHT ANGLES AND WIRED TOGETHER. REINFORCEMENT SHALL BE PLACED IN TOP OF FOOTING AND SHALL BE MARKED.

PRECAST CONCRETE FOOTINGS SHALL BE SUPPORTED BY A COMPACTED 6" GRANULAR SUBBASE.

THE MINIMUM WALL THICKNESS FOR ALL 2'-0", 4'-0", 5'-0", AND 6'-0" DRAINAGE STRUCTURES USING CONCRETE BLOCK, BRICK, OR CAST-IN-PLACE CONCRETE SHALL BE AS SPECIFIED IN TYPICAL WALL SECTIONS.

THE CONICAL SECTION OF MANHOLES OR CATCH BASINS CONSTRUCTED OF BLOCK OR BRICK SHALL BE SHROUDED WITH GEOTEXTILE FABRIC TO A MINIMUM DEPTH OF 5'-0" OR THROUGH THE FROST ZONE. ENOUGH GEOTEXTILE MATERIAL SHALL BE LEFT ON THE TOP (8" OR MORE) TO ROLL OVER THE TOP OF THE CONE.

PREFORMED HIGH DENSITY POLYSTYRENE FILLER PIECES WAY BE USED TO CHANNEL FLOW IN THE BOTTOM OF MANHOLES PROVIDED THEY HAVE AT LEAST 2" OF CONCRETE COVER. THE USE OF THIS MATERIAL FOR CHANNEL FLOW IS RESTRICTED TO MANHOLES WHERE THE BOTTOM SECTION IS NOT SUBJECT TO FREEZING. THE USE OF THIS MATERIAL MUST BE APPROVED BY THE ENGINEER.

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BUREAU OF DEVELOPMENT STANDARD PLAN FOR

DRAINAGE STRUCTURES

F.H.W.A. APPROVAL	6-15-2016 PLAN DATE	R-1-G	SHEET 9 OF 9

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

F.H.W.A. APPROVAL	PLAN DATE		SHEET OF

AS-LET PLAN REVISIONS

NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

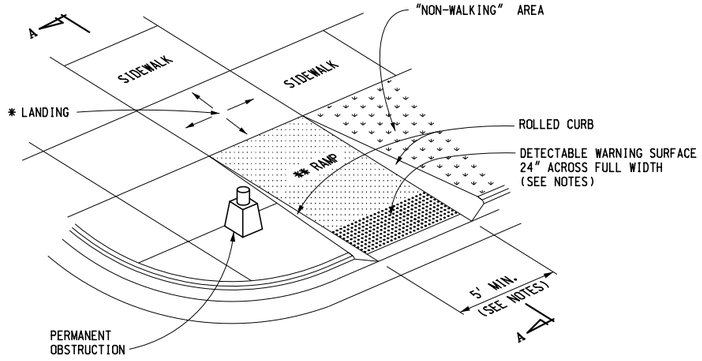
MDOT Michigan Department of Transportation

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	DATE: 08/31/18	CS: 28091		DRAWING
	DESIGN UNIT: TALLON	JN: 132412A		SHEET 80
FILE:	TSC: TRAVERSE CITY			

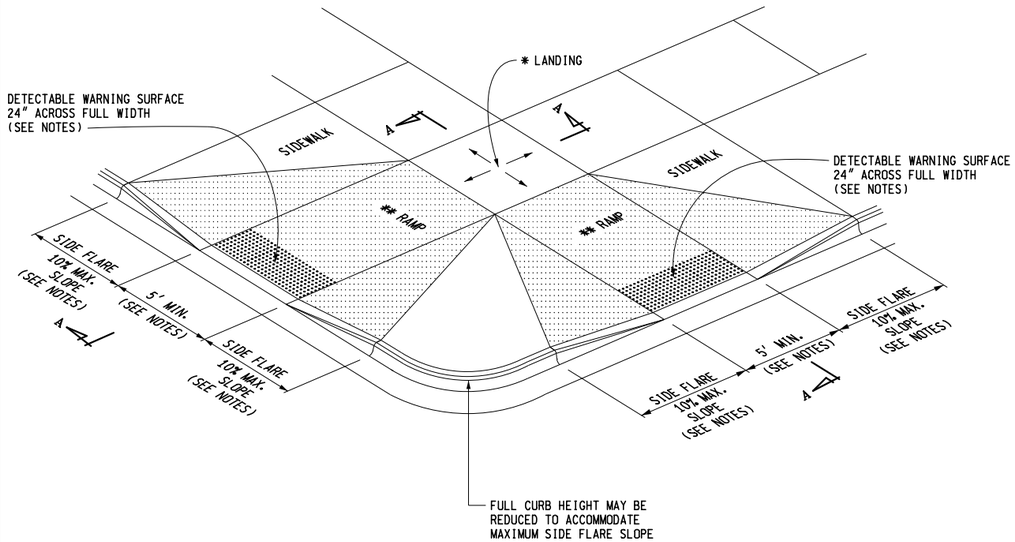
* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. LANDING MINIMUM DIMENSIONS 5′ x 5′. SEE NOTES.

** MAXIMUM RAMP CROSS SLOPE IS 2.0%, RUNNING SLOPE 5% – 7% (8.3% MAXIMUM). SEE NOTES.



SIDEWALK RAMP TYPE R

(ROLLED SIDES)



SIDEWALK RAMP TYPE F

(FLARED SIDES, TWO RAMPS SHOWN)

MDOT Michigan Department of Transportation

PREPARED BY DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Kirk T. Steudle

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

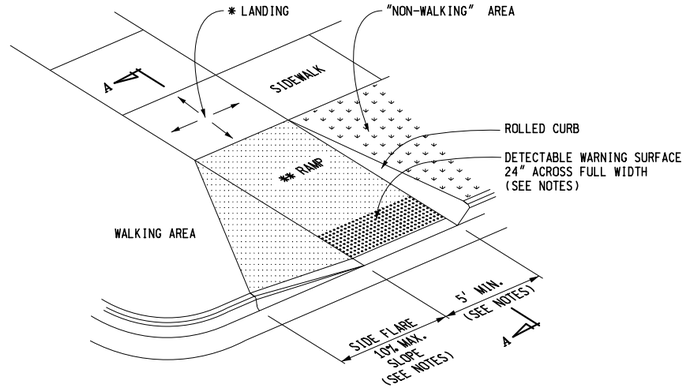
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

F.H.W.A. APPROVAL	12-11-2017 PLAN DATE	R-28-J	SHEET 1 OF 7

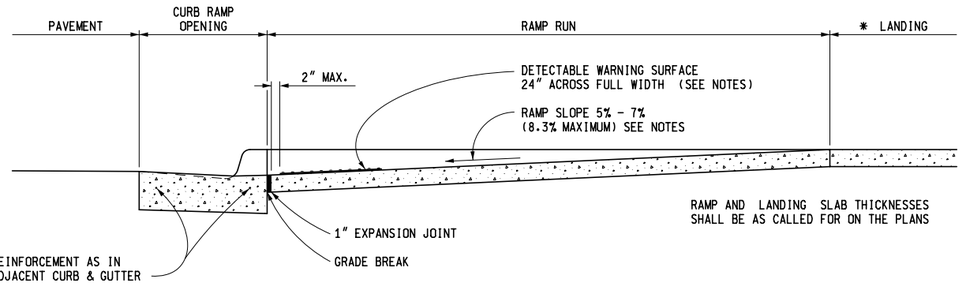
* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. LANDING MINIMUM DIMENSIONS 5′ x 5′. SEE NOTES.

** MAXIMUM RAMP CROSS SLOPE IS 2.0%, RUNNING SLOPE 5% – 7% (8.3% MAXIMUM). SEE NOTES.



SIDEWALK RAMP TYPE RF

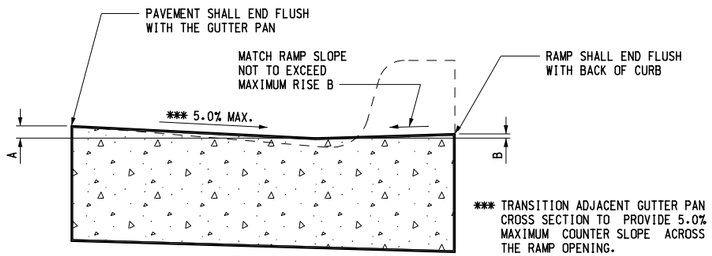
(ROLLED / FLARED SIDES)



CURB TYPE	MAXIMUM RISE (INCHES)	
	A	B
B1	3/4	1
B2	3/4	1
B3	3/4	1
D1	3/4	1
D2	3/4	1
D3	3/4	1
C1	1/2	1/2
C2	1/2	1/2
C3	3/4	1/2
C4	3/4	1/2
C5	1	1/2
C6	1	1/2
F1	1/2	1/2
F2	1/2	1/2
F3	3/4	1/2
F4	3/4	1/2
F5	1	1/2
F6	1	1/2

FOR CURB TYPES SEE STANDARD PLAN R-30-SERIES

SECTION A-A



*** TRANSITION ADJACENT GUTTER PAN CROSS SECTION TO PROVIDE 5.0% MAXIMUM COUNTER SLOPE ACROSS THE RAMP OPENING.

SECTION THROUGH CURB RAMP OPENING

(TYPICAL ALL RAMP TYPES)

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

F.H.W.A. APPROVAL	12-11-2017 PLAN DATE	R-28-J	SHEET 2 OF 7

AS-LET PLAN REVISIONS

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DATE: 08/31/18

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TSC: TRAVERSE CITY

CS: 28091

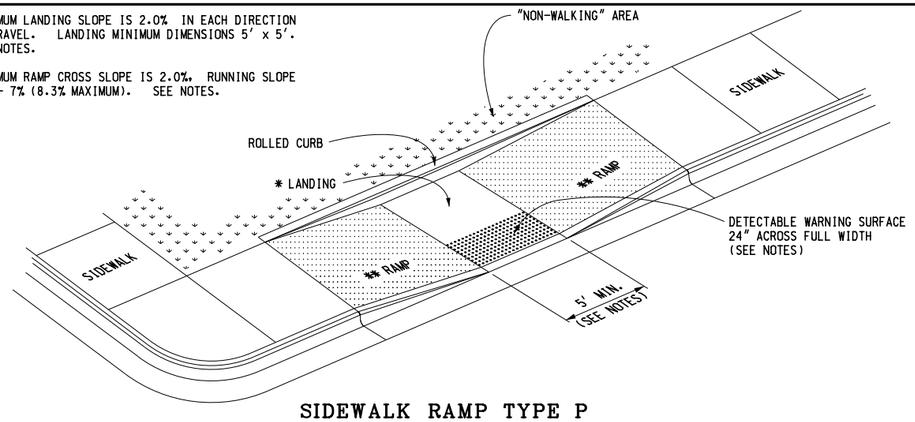
JN: 132412A

DRAWING | SHEET

81

* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. LANDING MINIMUM DIMENSIONS 5′ x 5′. SEE NOTES.

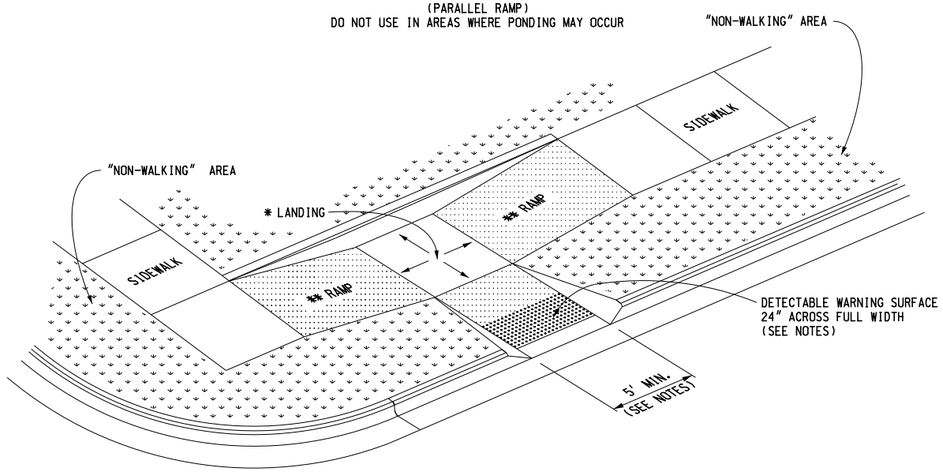
** MAXIMUM RAMP CROSS SLOPE IS 2.0%, RUNNING SLOPE 5% – 7% (8.3% MAXIMUM). SEE NOTES.



SIDEWALK RAMP TYPE P

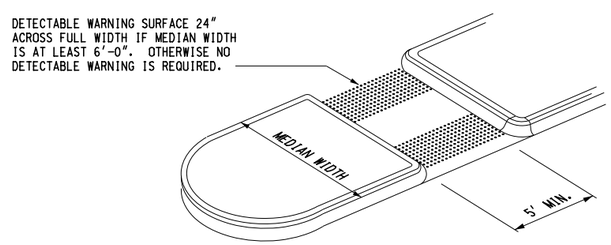
(PARALLEL RAMP)

DO NOT USE IN AREAS WHERE PONDING MAY OCCUR



SIDEWALK RAMP TYPE C

(COMBINATION RAMP)



SIDEWALK RAMP TYPE M

(MEDIAN ISLAND)

MICHIGAN DEPARTMENT OF TRANSPORTATION

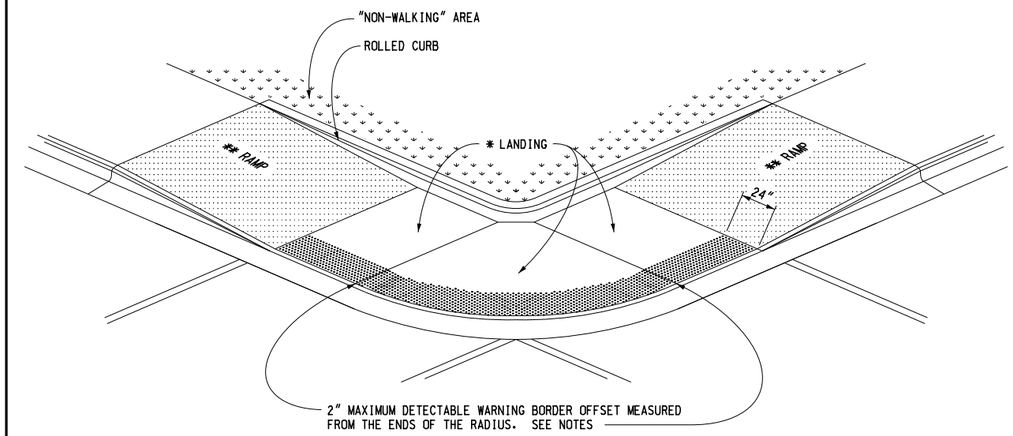
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

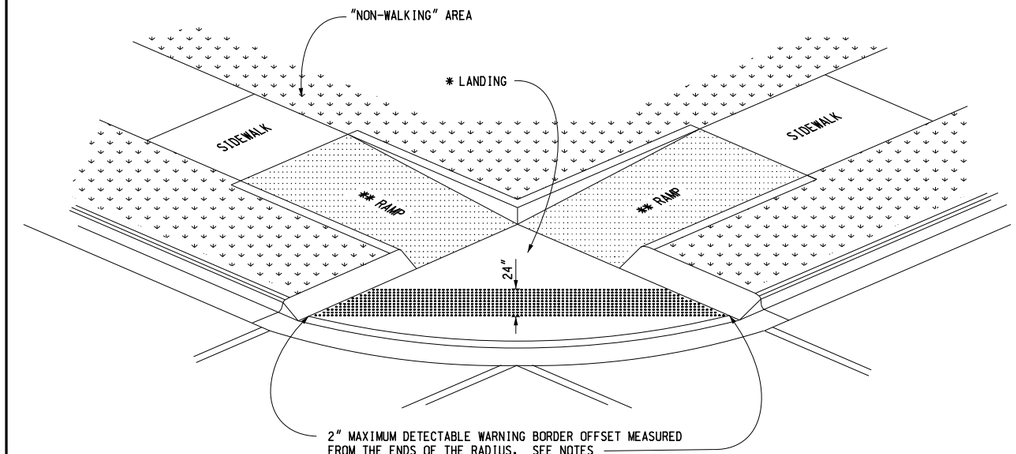
F.H.W.A. APPROVAL	12-11-2017 PLAN DATE	R-28-J	SHEET 3 OF 7

* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. LANDING MINIMUM DIMENSIONS 5′ x 5′. SEE NOTES.

** MAXIMUM RAMP CROSS SLOPE IS 2.0%, RUNNING SLOPE 5% – 7% (8.3% MAXIMUM). SEE NOTES.



(RADIAL DETECTABLE WARNING SHOWN)



(TANGENT DETECTABLE WARNING SHOWN)

SIDEWALK RAMP TYPE D

(DEPRESSED CORNER)

USE ONLY WHEN INDEPENDENT DIRECTIONAL RAMPS CAN NOT BE CONSTRUCTED FOR EACH CROSSING DIRECTION

MICHIGAN DEPARTMENT OF TRANSPORTATION

BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

F.H.W.A. APPROVAL	12-11-2017 PLAN DATE	R-28-J	SHEET 4 OF 7

AS-LET PLAN REVISIONS

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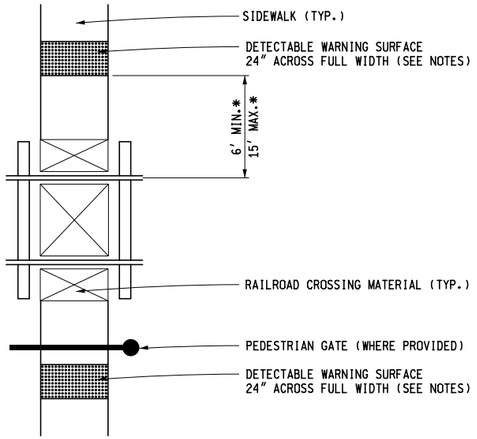
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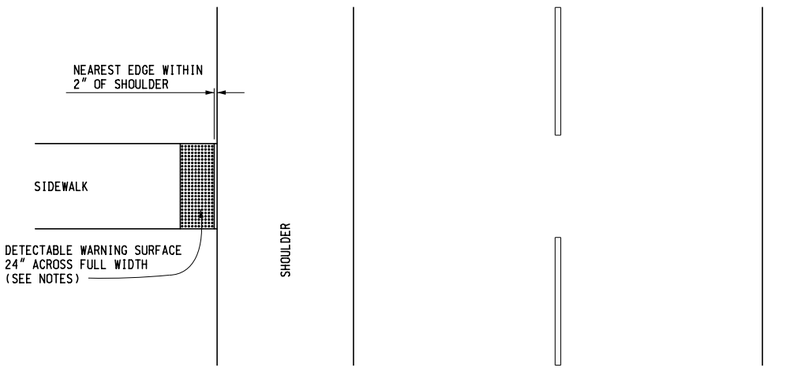
DRAWING

SHEET 82

* THE DETECTABLE WARNING SURFACE SHALL BE LOCATED SO THAT THE EDGE NEAREST THE RAIL CROSSING IS 6′ MINIMUM AND 15′ MAXIMUM FROM THE CENTERLINE OF THE NEAREST RAIL. DO NOT PLACE DETECTABLE WARNING ON RAILROAD CROSSING MATERIAL.



DETECTABLE WARNING AT RAILROAD CROSSING

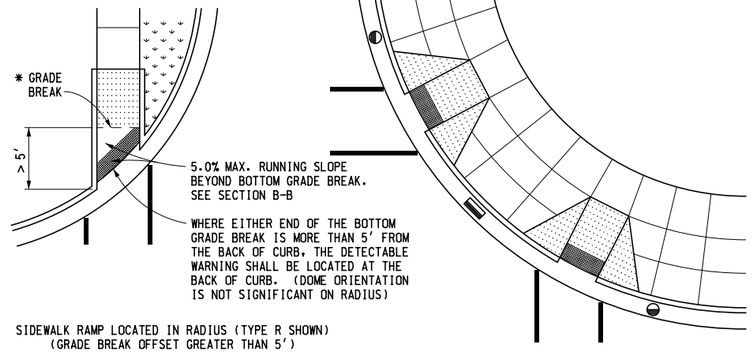


DETECTABLE WARNING AT FLUSH SHOULDER OR ROADWAY

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

F.H.W.A. APPROVAL	12-11-2017 PLAN DATE	R-28-J	SHEET 5 OF 7



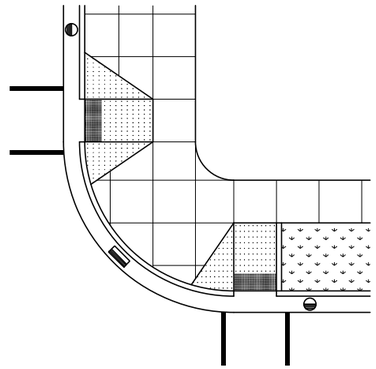
SIDEWALK RAMP LOCATED IN RADIUS (TYPE R SHOWN)
(GRADE BREAK OFFSET GREATER THAN 5′)

SIDEWALK RAMP PERPENDICULAR TO RADIAL CURB (TYPE F SHOWN)

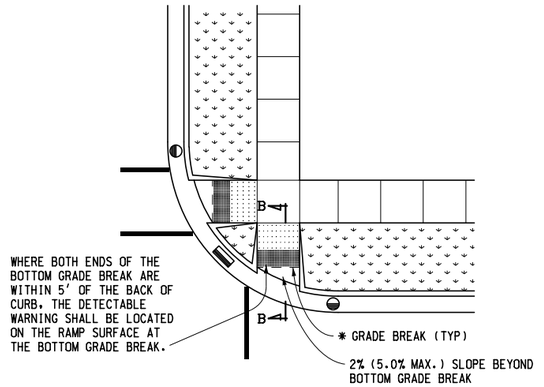
(USE WITH RADIAL CURB WHEN THE CROSSWALK AND SIDEWALK RAMP ARE NOT ALIGNED)

LEGEND

- SLOPED SURFACE
- DETECTABLE WARNING
- "NON-WALKING" AREA
- CROSSWALK MARKING
- PREFERRED LOCATION OF DRAINAGE INLET (TYP.)
- ALTERNATE LOCATION OF DRAINAGE INLET (TYP.)



SIDEWALK RAMP PERPENDICULAR TO TANGENT CURB
(TYPE F AND TYPE RF SHOWN)

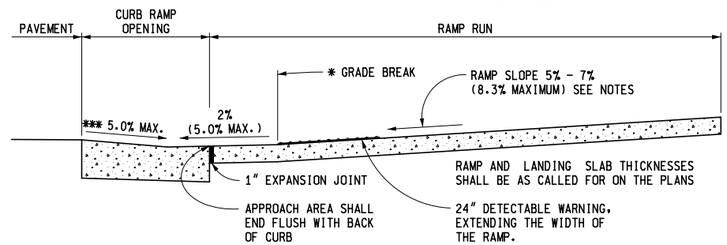


SIDEWALK RAMP LOCATED IN RADIUS (TYPE R SHOWN)
(GRADE BREAK OFFSET LESS THAN 5′)

* GRADE BREAKS AT THE TOP AND BOTTOM OF CURB RAMPS SHALL BE PERPENDICULAR TO THE DIRECTION OF TRAVEL.

*** TRANSITION ADJACENT GUTTER PAN CROSS SECTION TO PROVIDE 5.0% MAXIMUM COUNTER SLOPE ACROSS THE RAMP OPENING.

SEE SHEET 2 FOR CURB RAMP OPENING DETAILS.



SECTION B-B

SIDEWALK RAMP ORIENTATION

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

F.H.W.A. APPROVAL	12-11-2017 PLAN DATE	R-28-J	SHEET 6 OF 7

AS-LET PLAN REVISIONS

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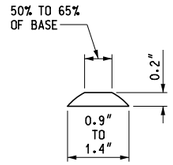
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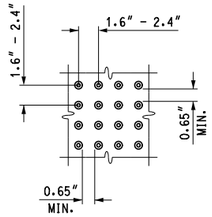
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DESIGN UNIT: TALLON
TSC: TRAVERSE CITY

CS: 28091
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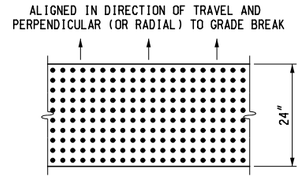
DRAWING
SHEET 83



DOME SECTION



DOME SPACING



DOME ALIGNMENT

DETECTABLE WARNING DETAILS

NOTES:

DETAILS SPECIFIED ON THIS PLAN APPLY TO ALL CONSTRUCTION, RECONSTRUCTION, OR ALTERATION OF STREETS, CURBS, OR SIDEWALKS IN THE PUBLIC RIGHT OF WAY.

SIDEWALK RAMPS ARE TO BE LOCATED AS SPECIFIED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

RAMPS SHALL BE PROVIDED AT ALL CORNERS OF AN INTERSECTION WHERE THERE IS EXISTING OR PROPOSED SIDEWALK AND CURB. RAMPS SHALL ALSO BE PROVIDED AT MARKED AND/OR SIGNALIZED MID-BLOCK CROSSINGS.

SURFACE TEXTURE OF THE RAMP SHALL BE THAT OBTAINED BY A COARSE BROOMING, TRANSVERSE TO THE RUNNING SLOPE.

SIDEWALK SHALL BE RAMPED WHERE THE DRIVEWAY CURB IS EXTENDED ACROSS THE WALK.

CARE SHALL BE TAKEN TO ASSURE A UNIFORM GRADE ON THE RAMP. WHERE CONDITIONS PERMIT, IT IS DESIRABLE THAT THE SLOPE OF THE RAMP BE IN ONLY ONE DIRECTION, PARALLEL TO THE DIRECTION OF TRAVEL.

RAMP WIDTH SHALL BE INCREASED, IF NECESSARY, TO ACCOMMODATE SIDEWALK SNOW REMOVAL EQUIPMENT NORMALLY USED BY THE MUNICIPALITY.

WHEN 5′ MINIMUM WIDTHS ARE NOT PRACTICABLE, RAMP WIDTH MAY BE REDUCED TO NOT LESS THAN 4′ AND LANDINGS TO NOT LESS THAN 4′ x 4′.

CURB RAMPS WITH A RUNNING SLOPE ≤5% DO NOT REQUIRE A TOP LANDING. HOWEVER, ANY CONTINUOUS SIDEWALK OR PEDESTRIAN ROUTE CROSSING THROUGH OR INTERSECTING THE CURB RAMP MUST INDEPENDENTLY MAINTAIN A CROSS SLOPE NOT GREATER THAN 2% PERPENDICULAR TO ITS OWN DIRECTION(S) OF TRAVEL.

DETECTABLE WARNING SURFACE COVERAGE IS 24″ MINIMUM IN THE DIRECTION OF RAMP/PATH TRAVEL AND THE FULL WIDTH OF THE RAMP/PATH OPENING EXCLUDING CURBED OR FLARED CURB TRANSITION AREAS. A BORDER OFFSET NOT GREATER THAN 2″ MEASURED ALONG THE EDGES OF THE DETECTABLE WARNING IS ALLOWABLE. FOR RADIAL CURB THE OFFSET IS MEASURED FROM THE ENDS OF THE RADIUS.

FOR NEW ROADWAY CONSTRUCTION, THE RAMP CROSS SLOPE MAY NOT EXCEED 2.0%. FOR ALTERATIONS TO EXISTING ROADWAYS, THE CROSS SLOPE MAY BE TRANSITIONED TO MEET AN EXISTING ROADWAY GRADE. THE CROSS SLOPE TRANSITION SHALL BE APPLIED UNIFORMLY OVER THE FULL LENGTH OF THE RAMP.

THE MAXIMUM RUNNING SLOPE OF 8.3% IS RELATIVE TO A FLAT (0%) REFERENCE. HOWEVER, IT SHALL NOT REQUIRE ANY RAMP OR SERIES OF RAMPS TO EXCEED 15 FEET IN LENGTH NOT INCLUDING LANDINGS OR TRANSITIONS.

DRAINAGE STRUCTURES SHOULD NOT BE PLACED IN LINE WITH RAMPS. THE LOCATION OF THE RAMP SHOULD TAKE PRECEDENCE OVER THE LOCATION OF THE DRAINAGE STRUCTURE. WHERE EXISTING DRAINAGE STRUCTURES ARE LOCATED IN THE RAMP PATH OF TRAVEL, USE A MANUFACTURER'S ADA COMPLIANT GRATE. OPENINGS SHALL NOT BE GREATER THAN ½″. ELONGATED OPENINGS SHALL BE PLACED SO THAT THE LONG DIMENSION IS PERPENDICULAR TO THE DOMINANT DIRECTION OF TRAVEL.

THE TOP OF THE JOINT FILLER FOR ALL RAMP TYPES SHALL BE FLUSH WITH THE ADJACENT CONCRETE.

CROSSWALK AND STOP LINE MARKINGS, IF USED, SHALL BE SO LOCATED AS TO STOP TRAFFIC SHORT OF RAMP CROSSINGS. SPECIFIC DETAILS FOR MARKING APPLICATIONS ARE GIVEN IN THE "MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

FLARED SIDES WITH A SLOPE OF 10% MAXIMUM, MEASURED ALONG THE ROADSIDE CURB LINE, SHALL BE PROVIDED WHERE AN UNOBSTRUCTED CIRCULATION PATH LATERALLY CROSSES THE SIDEWALK RAMP. FLARED SIDES ARE NOT REQUIRED WHERE THE RAMP IS BORDERED BY LANDSCAPING, UNPAVED SURFACE OR PERMANENT FIXED OBJECTS. WHERE THEY ARE NOT REQUIRED, FLARED SIDES CAN BE CONSIDERED IN ORDER TO AVOID SHARP CURB RETURNS AT RAMP OPENINGS.

DETECTABLE WARNING PLATES MUST BE INSTALLED USING FABRICATED OR FIELD CUT UNITS CAST AND/OR ANCHORED IN THE PAVEMENT TO RESIST SHIFTING OR HEAVING.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

F.H.W.A. APPROVAL	PLAN DATE	R-28-J	SHEET 7 OF 7
	12-11-2017		

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

F.H.W.A. APPROVAL	PLAN DATE		SHEET OF

AS-LET PLAN REVISIONS

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MDOT Michigan Department of Transportation

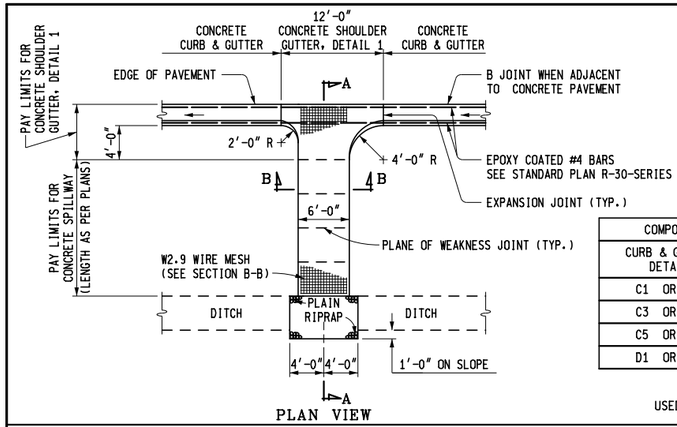
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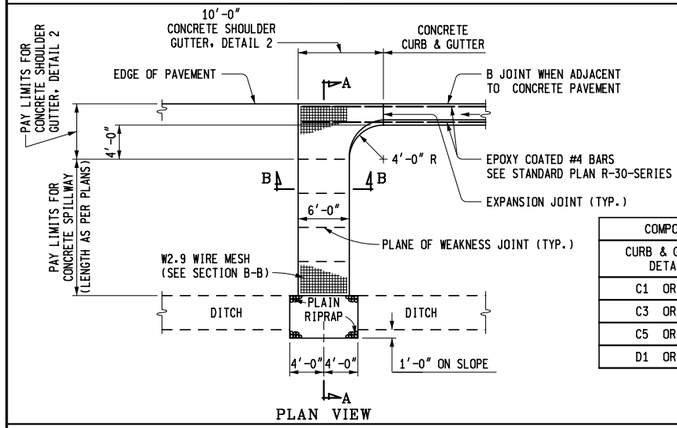
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JN: 132412A

DRAWING	SHEET
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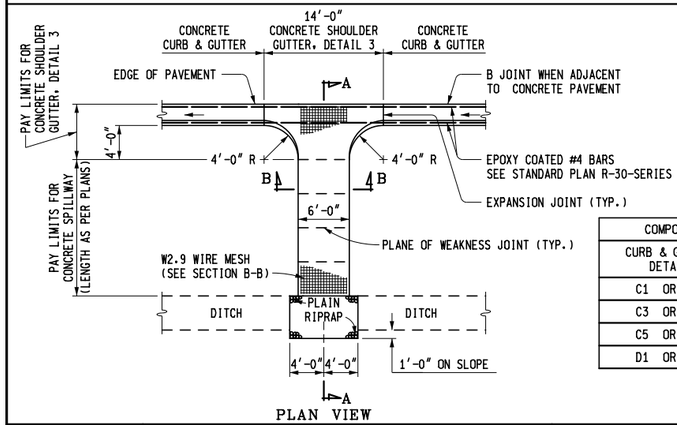
COMPONENTS OF CONCRETE SHOULDER GUTTER, DETAIL 1		
CURB & GUTTER DETAIL	STEEL REINFORCEMENT LBS	CONCRETE CYD
C1 OR C2	39	1.5
C3 OR C4	39	1.7
C5 OR C6	39	1.8
D1 OR D2	39	1.8

DETAIL 1
USED AS INTERMEDIATE OPENING IN CURB & GUTTER



COMPONENTS OF CONCRETE SHOULDER GUTTER, DETAIL 2		
CURB & GUTTER DETAIL	STEEL REINFORCEMENT LBS	CONCRETE CYD
C1 OR C2	36	1.4
C3 OR C4	36	1.5
C5 OR C6	36	1.7
D1 OR D2	36	1.6

DETAIL 2
USED AT END OF CURB



COMPONENTS OF CONCRETE SHOULDER GUTTER, DETAIL 3		
CURB & GUTTER DETAIL	STEEL REINFORCEMENT LBS	CONCRETE CYD
C1 OR C2	41	1.7
C3 OR C4	41	1.9
C5 OR C6	41	2.1
D1 OR D2	41	2.1

DETAIL 3
USED AT LOW POINT IN GUTTER LINE

MDOT Michigan Department of Transportation

PREPARED BY DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Kirk T. Steudle

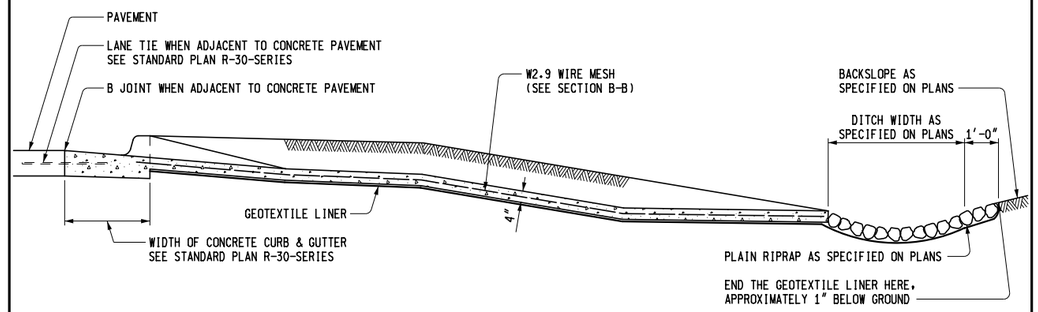
APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

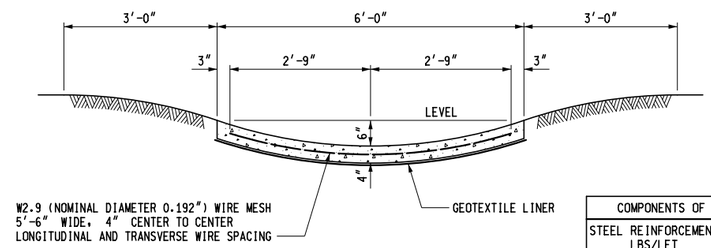
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

CONCRETE SHOULDER GUTTER AND SPILLWAY

F.H.W.A. APPROVAL	7-30-2018 PLAN DATE	R-35-E	SHEET 1 OF 2



SECTION A - A



COMPONENTS OF CONCRETE SPILLWAY	
STEEL REINFORCEMENT LBS/LFT	CONCRETE CYD/LFT
3.56	0.074

SECTION B - B

NOTES:

A GRADUAL UNIFORM TRANSITION SHALL BE MADE FROM THE STANDARD CONCRETE CURB AND GUTTER TO THE CONCRETE SPILLWAY.

PLANE OF WEAKNESS JOINT SPACING SHALL BE AT UNIFORM INTERVALS OF APPROXIMATELY 4′-0″.

THE SPILLWAY SHOULDERS AND FORESLOPES WILL BE UNDERLAID WITH GEOTEXTILE LINER FROM THE BACK SIDE OF CURB TO THE FAR END OF THE PLAIN RIPRAP INCLUDING THE ENTIRE FOOTPRINT OF THE PLAIN RIPRAP.

WHEN USING SPILLWAYS IN OTHER AREAS, SUCH AS BACKSLOPES, THE GEOTEXTILE LINER SHALL UNDERLAY THE FULL LENGTH OF THE SPILLWAY AND THE ENTIRE FOOTPRINT OF THE PLAIN RIPRAP. THE GEOTEXTILE LINER SHALL HAVE A MINIMUM WIDTH EQUAL TO THE WIDTH OF THE SPILLWAY.

THE SPILLWAY SHALL BE GIVEN A TRANSVERSE COARSE BROOM FINISH.

WHILE CONCRETE SPILLWAY IS SHOWN ON THE FORESLOPE, IT MAY BE USED ON THE BACKSLOPE, AS SPECIFIED ON THE PLANS. CONCRETE SHOULDER GUTTER WOULD BE CORRESPONDINGLY OMITTED.

THE CURB AND GUTTER SHALL BE ALIGNED WITH THE BEAM GUARDRAIL AS SPECIFIED ON STANDARD PLAN R-67-SERIES. THE LOCATION OF GUARDRAIL POSTS SHOULD BE DETERMINED PRIOR TO LOCATING THE SPILLWAY OR DOWNSPOUT HEADER.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

CONCRETE SHOULDER GUTTER AND SPILLWAY

F.H.W.A. APPROVAL	7-30-2018 PLAN DATE	R-35-E	SHEET 2 OF 2

AS-LET PLAN REVISIONS

NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

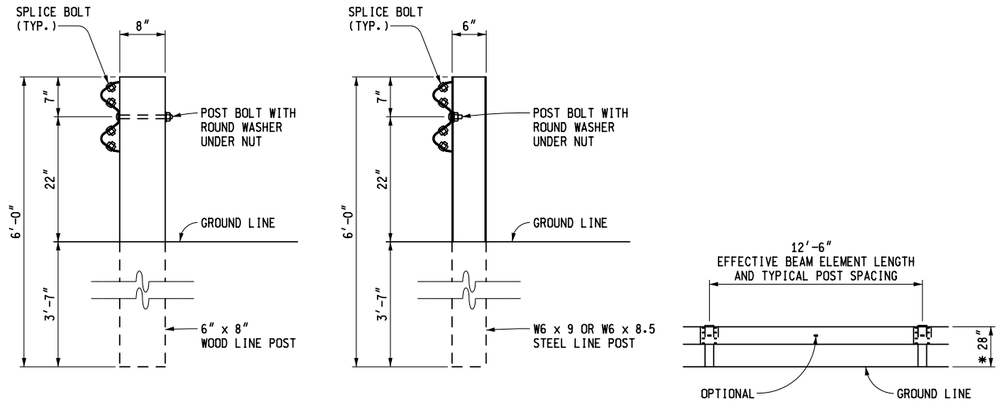
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DATE: 08/31/18
DESIGN UNIT: TALLON
TSC: TRAVERSE CITY

CS: 28091
JN: 132412A

DRAWING
SHEET 85

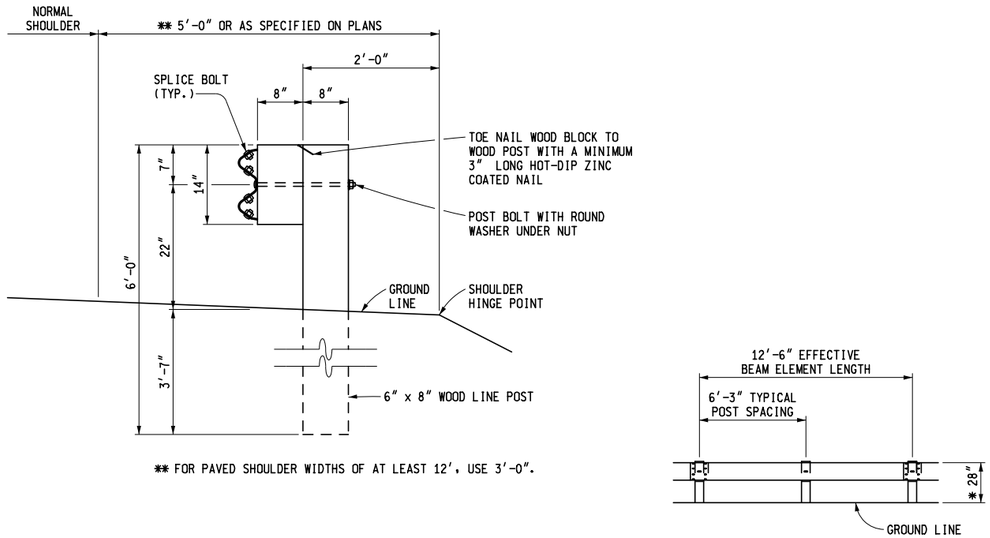


WOOD POST STEEL POST

ELEVATION SHOWING POST SPACING

* SEE NOTES FOR GUARDRAIL IN CONJUNCTION WITH CURB

GUARDRAIL, TYPE A



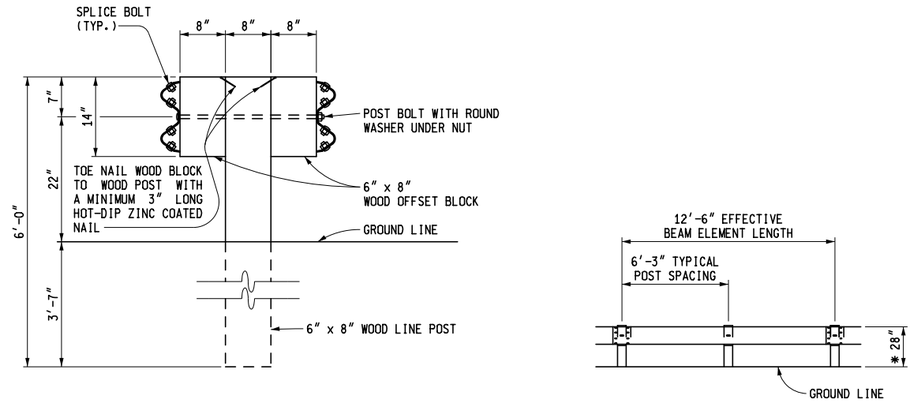
** FOR PAVED SHOULDER WIDTHS OF AT LEAST 12′, USE 3′-0″.

ELEVATION SHOWING POST SPACING

* SEE NOTES FOR GUARDRAIL IN CONJUNCTION WITH CURB

GUARDRAIL, TYPE B
(WOOD POST)

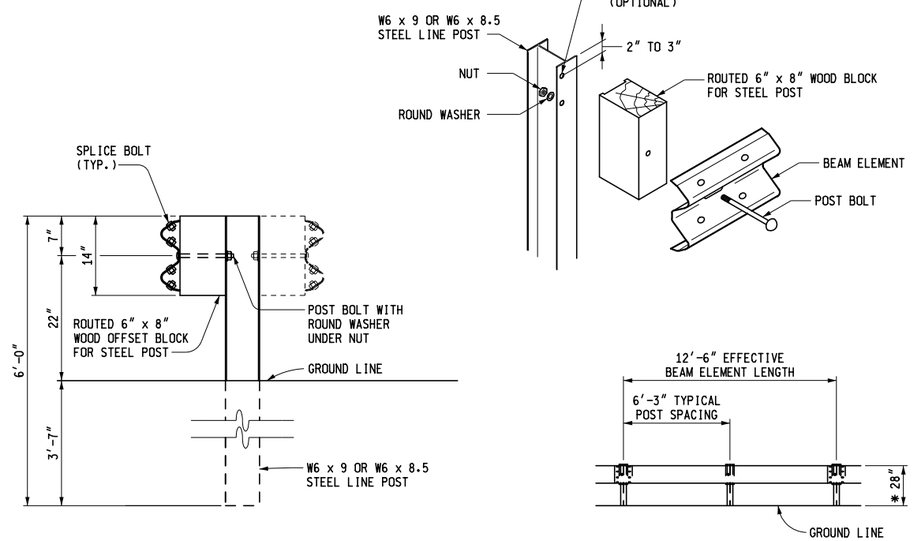
MDOT Michigan Department of Transportation PREPARED BY DESIGN DIVISION DRAWN BY: B.L.T. CHECKED BY: W.K.P.	DEPARTMENT DIRECTOR Kirk T. Steudle APPROVED BY: _____ DIRECTOR, BUREAU OF FIELD SERVICES APPROVED BY: _____ DIRECTOR, BUREAU OF DEVELOPMENT	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D F.H.W.A. APPROVAL | 7-26-2017 PLAN DATE | R-60-J | SHEET 1 OF 17



ELEVATION SHOWING POST SPACING

* SEE NOTES FOR GUARDRAIL IN CONJUNCTION WITH CURB

GUARDRAIL, TYPE BD
(WOOD POST)



ELEVATION SHOWING POST SPACING

* SEE NOTES FOR GUARDRAIL IN CONJUNCTION WITH CURB

GUARDRAIL, TYPE B (OR BD)
(STEEL POST)

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D F.H.W.A. APPROVAL | 7-26-2017 PLAN DATE | R-60-J | SHEET 2 OF 17		

AS-LET PLAN REVISIONS							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

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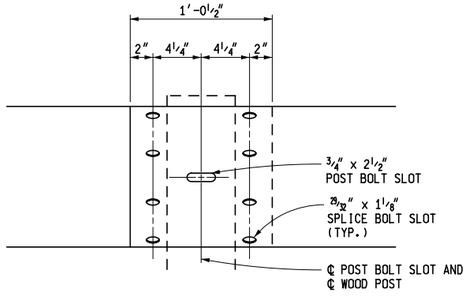
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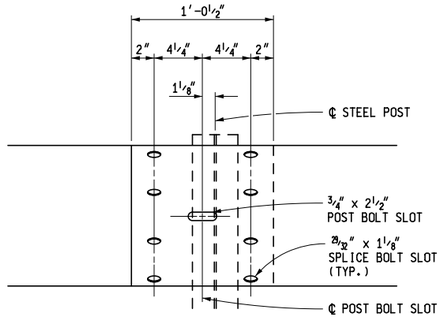
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DRAWING

SHEET 86

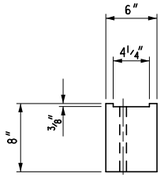


WOOD POST

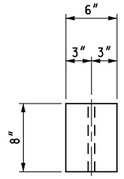


STEEL POST

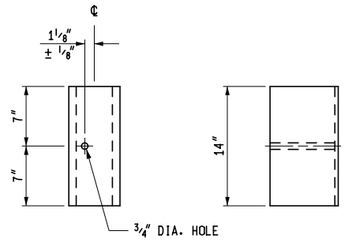
BEAM ELEMENT SPLICE DETAILS



TOP

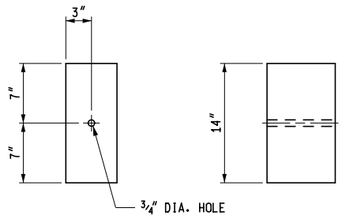


TOP



FRONT SIDE

FOR USE ON STEEL POSTS



FRONT SIDE

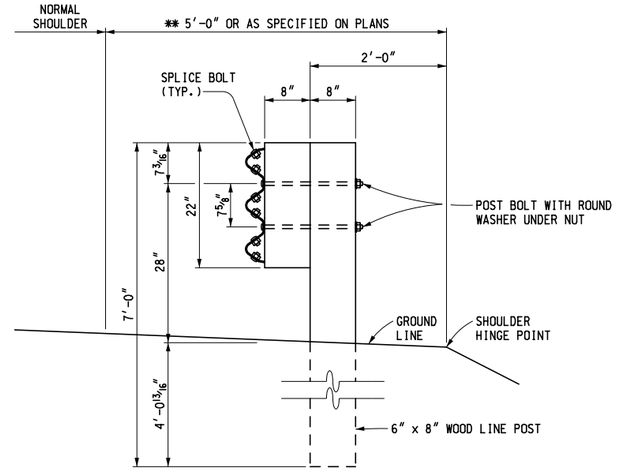
FOR USE ON WOOD POSTS
(SEE NOTES ON SHEET 16 OF 16)

WOOD OFFSET BLOCKS FOR GUARDRAIL, TYPE B AND TYPE BD

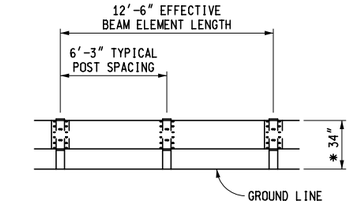
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

F.H.W.A. APPROVAL	7-26-2017 PLAN DATE	R-60-J	SHEET 3 OF 17

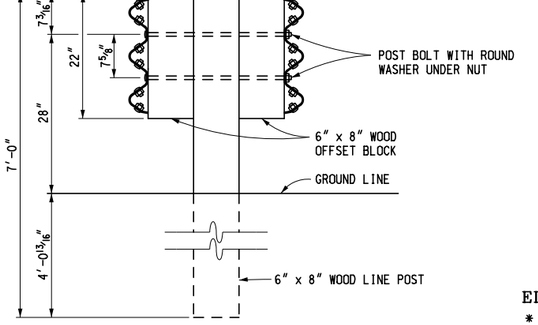


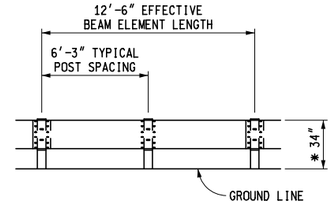
** FOR PAVED SHOULDER WIDTHS OF AT LEAST 12′, USE 3′-0″.



ELEVATION SHOWING POST SPACING
* SEE NOTES FOR GUARDRAIL IN CONJUNCTION WITH CURB

GUARDRAIL, TYPE T
(WOOD POST)





ELEVATION SHOWING POST SPACING
* SEE NOTES FOR GUARDRAIL IN CONJUNCTION WITH CURB

GUARDRAIL, TYPE TD
(WOOD POST)

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

F.H.W.A. APPROVAL	7-26-2017 PLAN DATE	R-60-J	SHEET 4 OF 17

AS-LET PLAN REVISIONS							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

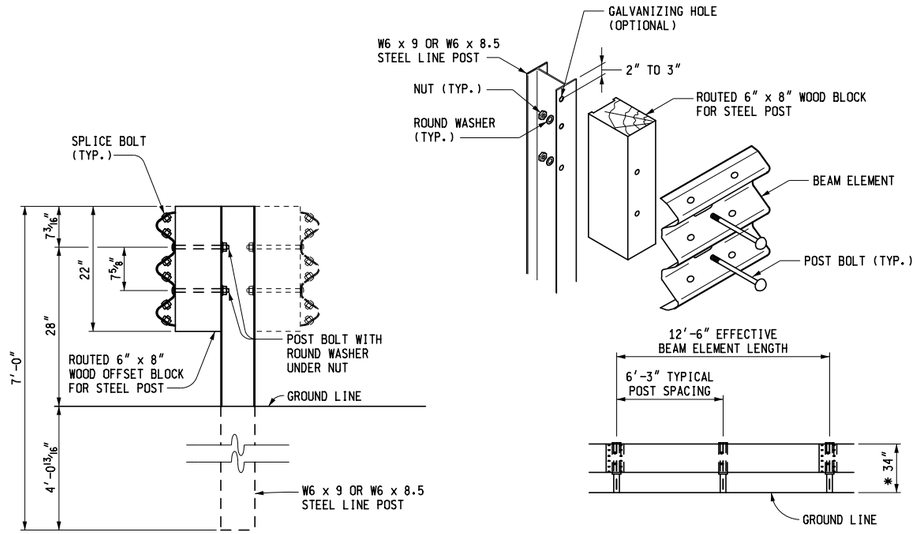
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FILE:

DATE: 08/31/18
DESIGN UNIT: TALLON
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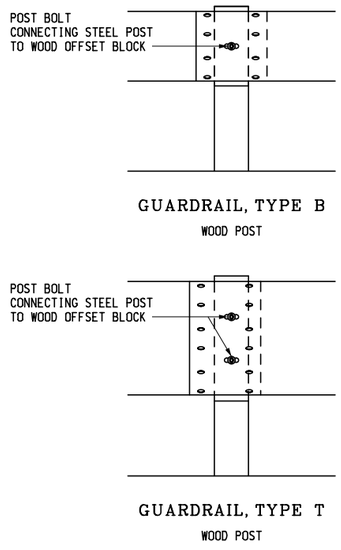
DRAWING | SHEET
87



ELEVATION SHOWING POST SPACING

* SEE NOTES FOR GUARDRAIL IN CONJUNCTION WITH CURB

GUARDRAIL, TYPE T OR TD
(STEEL POST)



GUARDRAIL, TYPE B
WOOD POST

GUARDRAIL, TYPE B
STEEL POST

GUARDRAIL, TYPE T
WOOD POST

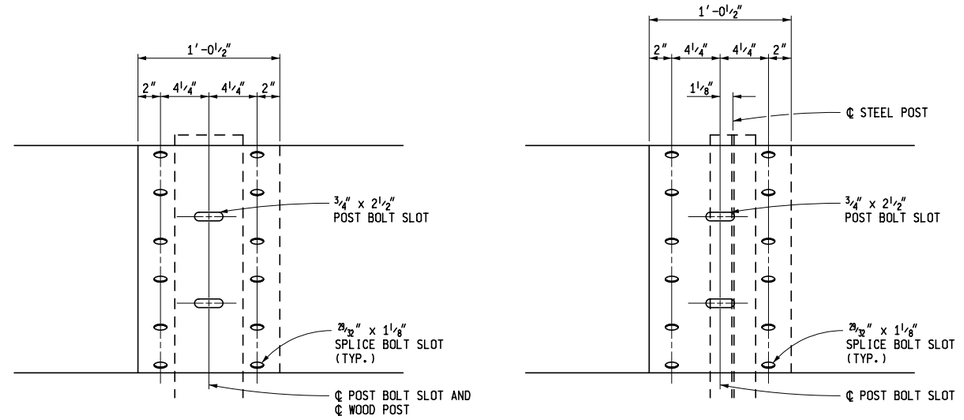
GUARDRAIL, TYPE T
STEEL POST

BLOCK AND POST CONNECTION DETAILS

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

GUARDRAIL,
TYPES A, B, BD, T, TD,
MGS-8, & MGS-8D

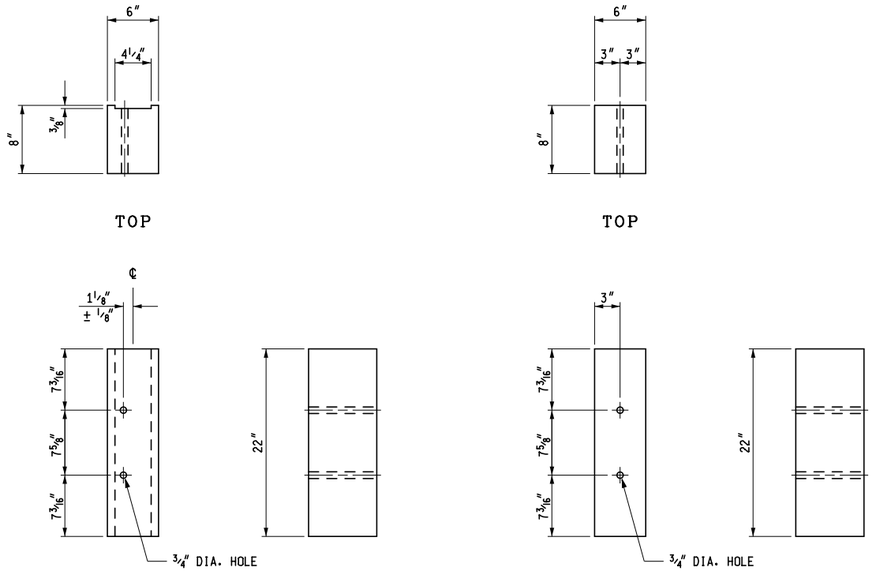
F.H.W.A. APPROVAL	7-26-2017 PLAN DATE	R-60-J	SHEET 5 OF 17



WOOD POST

STEEL POST

THRIE BEAM ELEMENT SPLICE DETAILS



FOR USE ON STEEL POSTS

FOR USE ON WOOD POSTS
(SEE NOTES ON SHEET 16 OF 16)

WOOD OFFSET BLOCKS FOR GUARDRAIL, TYPE T AND TYPE TD

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

GUARDRAIL,
TYPES A, B, BD, T, TD,
MGS-8, & MGS-8D

F.H.W.A. APPROVAL	7-26-2017 PLAN DATE	R-60-J	SHEET 6 OF 17

AS-LET PLAN REVISIONS							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

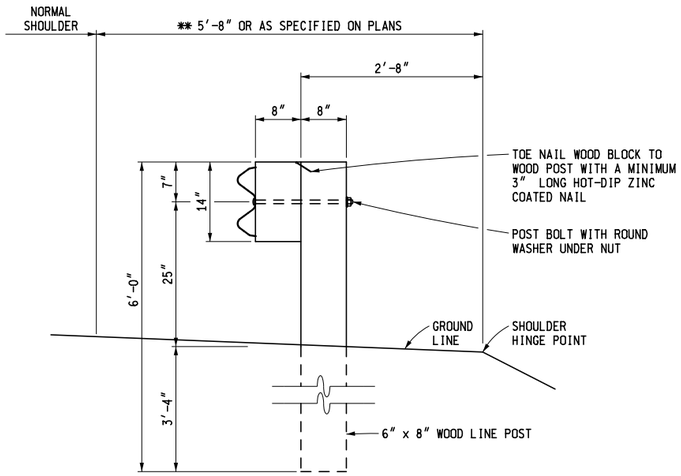
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FILE:

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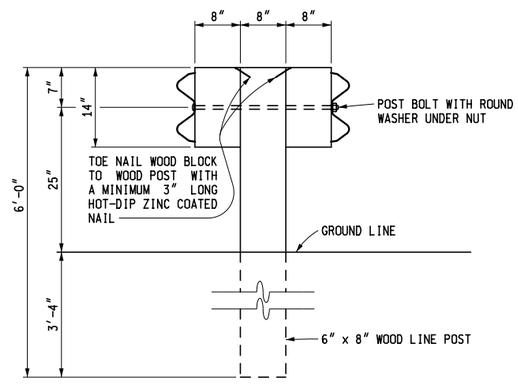
CS: 28091
JN: 132412A

DRAWING | SHEET



** FOR PAVED SHOULDER WIDTHS OF AT LEAST 12′, USE 3′-8″.

GUARDRAIL, TYPE MGS-8
(WOOD POST)



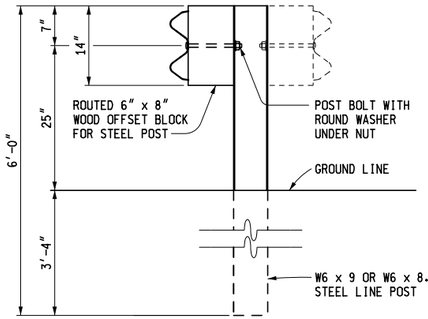
** FOR PAVED SHOULDER WIDTHS OF AT LEAST 12′, USE 3′-0″.

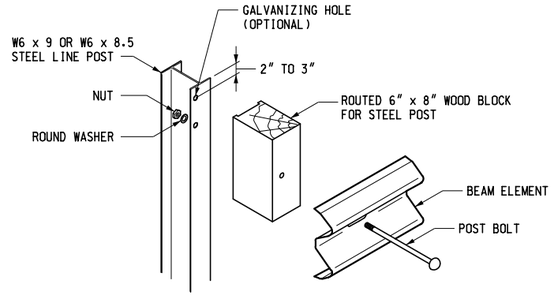
GUARDRAIL, TYPE MGS-8D
(WOOD POST)

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

F.H.W.A. APPROVAL	7-26-2017 PLAN DATE	R-60-J	SHEET 7 OF 17





GUARDRAIL, TYPE MGS-8 (OR MGS-8D)
(STEEL POST)

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

F.H.W.A. APPROVAL	7-26-2017 PLAN DATE	R-60-J	SHEET 8 OF 17

AS-LET PLAN REVISIONS							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

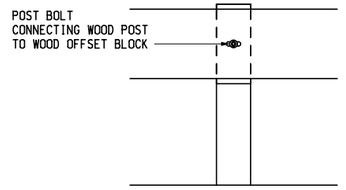
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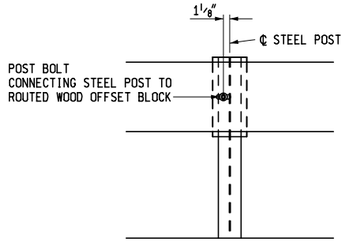
DATE: 08/31/18
DESIGN UNIT: TALLON
TSC: TRAVERSE CITY

CS: 28091
JN: 132412A

DRAWING	SHEET
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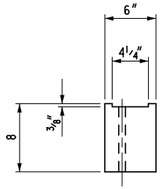


WOOD POST

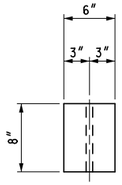


STEEL POST

BLOCK AND POST CONNECTION DETAILS



TOP



TOP

FRONT SIDE

FOR USE ON STEEL POSTS

FRONT SIDE

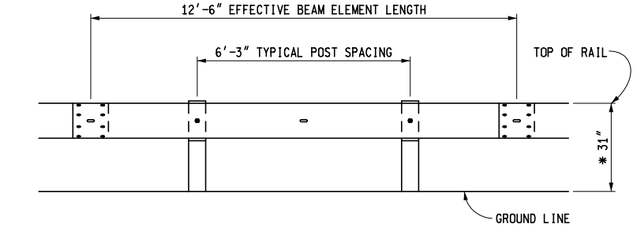
FOR USE ON WOOD POSTS
(SEE NOTES ON SHEET 16 OF 16)

WOOD OFFSET BLOCKS FOR GUARDRAIL, TYPE MGS-8 AND TYPE MGS-8D

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

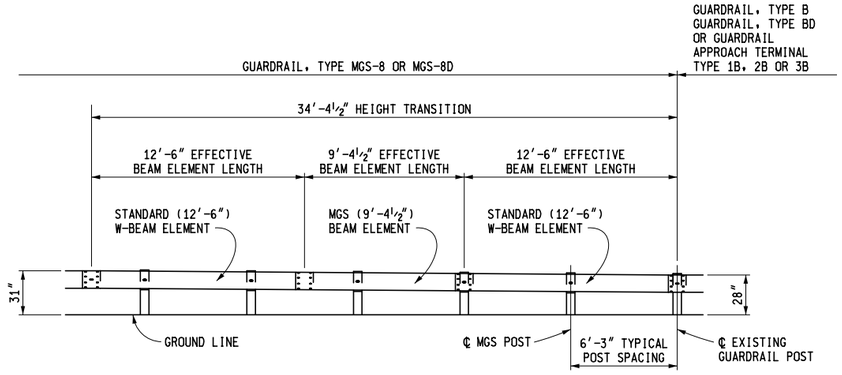
GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

F.H.W.A. APPROVAL	7-26-2017 PLAN DATE	R-60-J	SHEET 9 OF 17

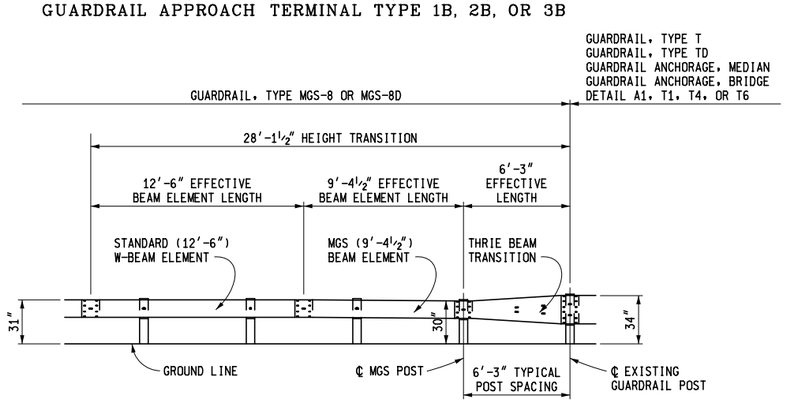


ELEVATION SHOWING POST SPACING FOR GUARDRAIL, TYPE MGS-8 OR MGS-8D

* SEE NOTES FOR GUARDRAIL IN CONJUNCTION WITH CURB



ELEVATION SHOWING TRANSITION DETAIL FOR CONNECTING GUARDRAIL, TYPE MGS-8 OR MGS-8D TO GUARDRAIL, TYPE B, GUARDRAIL, TYPE BD, OR GUARDRAIL APPROACH TERMINAL TYPE 1B, 2B, OR 3B



ELEVATION SHOWING TRANSITION DETAIL FOR CONNECTING GUARDRAIL, TYPE MGS-8 OR MGS-8D TO GUARDRAIL, TYPE T, GUARDRAIL, TYPE TD, GUARDRAIL ANCHORAGE, MEDIAN, GUARDRAIL ANCHORAGE, BRIDGE DETAIL A1, T1, T4 OR T6

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

F.H.W.A. APPROVAL	7-26-2017 PLAN DATE	R-60-J	SHEET 10 OF 17

AS-LET PLAN REVISIONS

NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

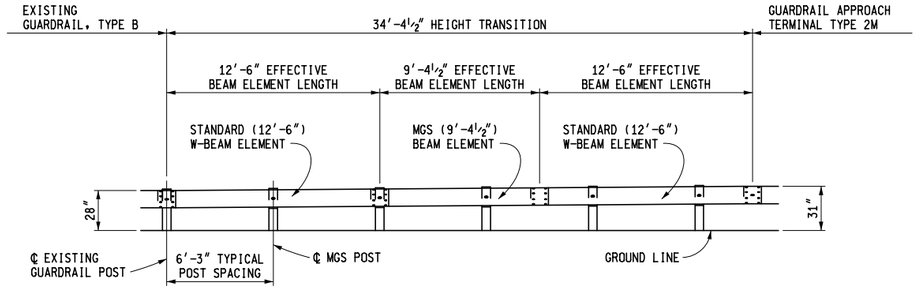
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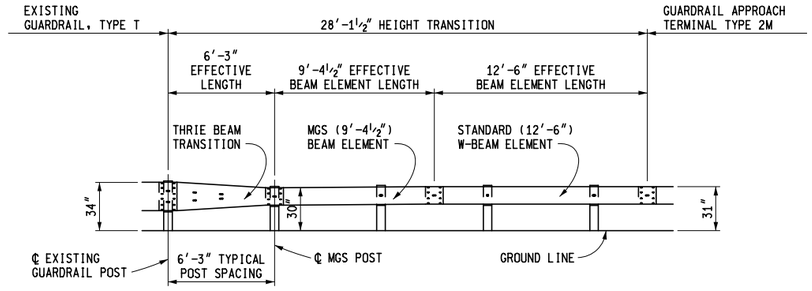
DATE: 08/31/18
DESIGN UNIT: TALLON
TSC: TRAVERSE CITY

CS: 28091
JN: 132412A

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90



ELEVATION SHOWING TRANSITION DETAIL FOR CONNECTING
GUARDRAIL, TYPE B TO
GUARDRAIL APPROACH TERMINAL TYPE 2M

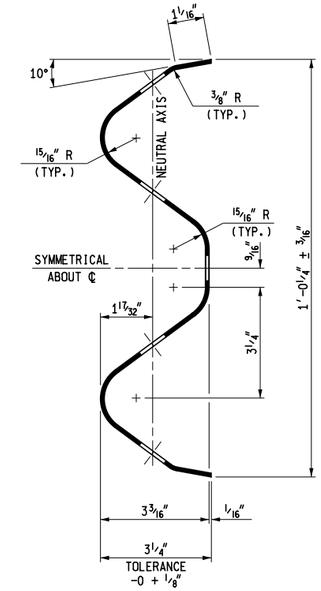


ELEVATION SHOWING TRANSITION DETAIL FOR CONNECTING
GUARDRAIL, TYPE T TO
GUARDRAIL APPROACH TERMINAL TYPE 2M

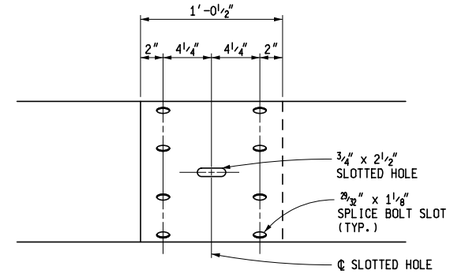
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

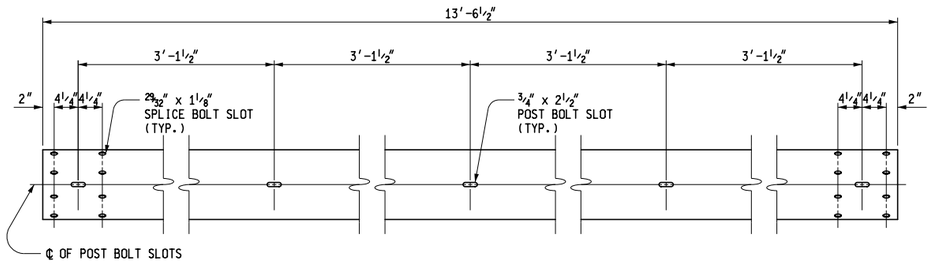
F.H.W.A. APPROVAL	7-26-2017 PLAN DATE	R-60-J	SHEET 11 OF 17



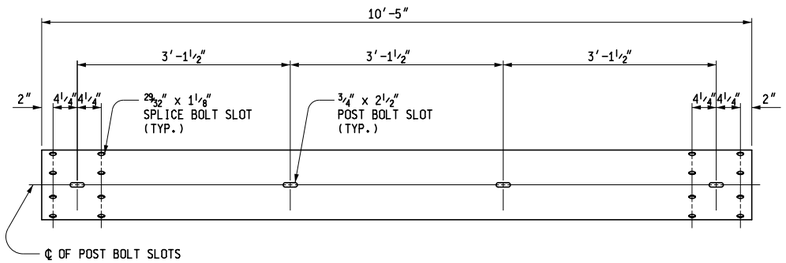
SECTION THROUGH BEAM ELEMENT



BEAM ELEMENT SPLICE DETAILS



FRONT ELEVATION OF BEAM ELEMENT



FRONT ELEVATION OF MGS (9′-4½″) BEAM ELEMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

F.H.W.A. APPROVAL	7-26-2017 PLAN DATE	R-60-J	SHEET 12 OF 17

AS-LET PLAN REVISIONS

NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

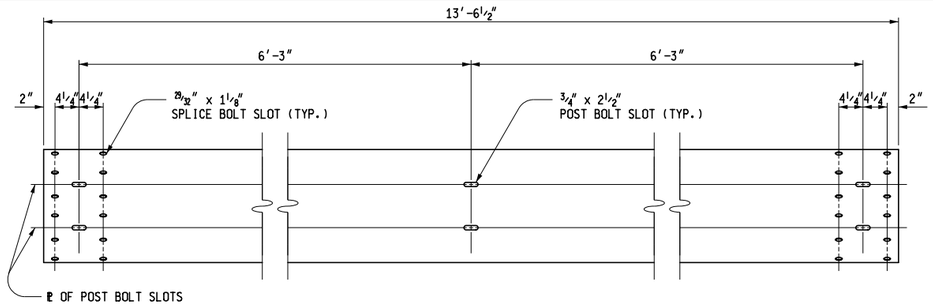
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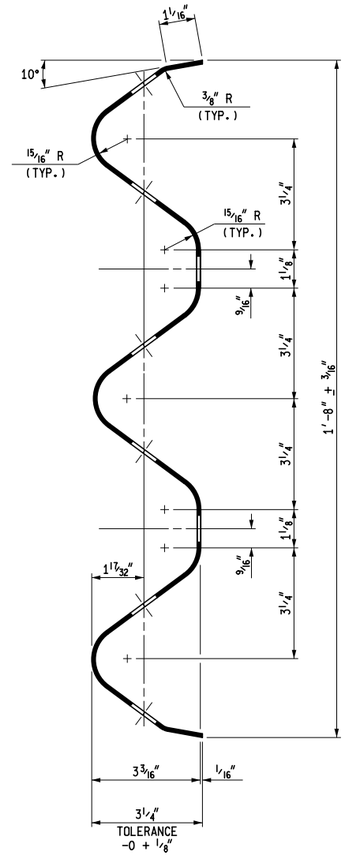
DATE: 08/31/18
DESIGN UNIT: TALLON
TSC: TRAVERSE CITY

CS: 28091
JN: 132412A

DRAWING
SHEET 91



FRONT ELEVATION OF THRIE BEAM ELEMENT

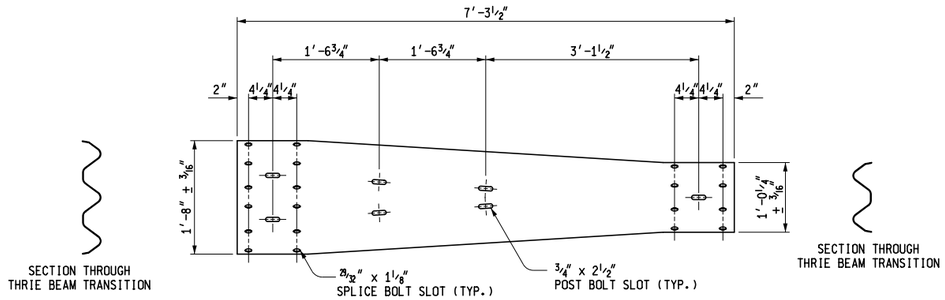


SECTION THROUGH THRIE BEAM ELEMENT
(FOR GUARDRAIL, TYPE T AND TD)

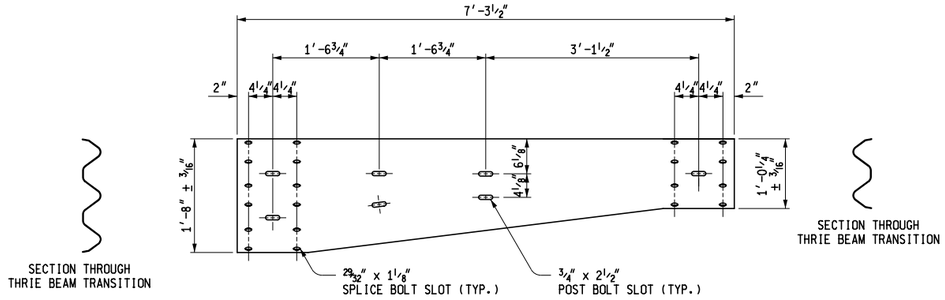
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

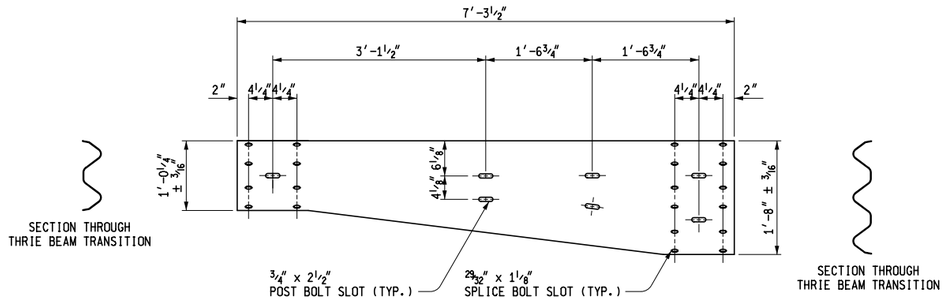
GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

F.H.W.A. APPROVAL	7-26-2017 PLAN DATE	R-60-J	SHEET 13 OF 17



THRIE BEAM TRANSITION





ASYMMETRICAL THRIE BEAM TRANSITIONS
NOTE: ASYMMETRICAL TRANSITION TYPE WILL VARY BY LOCATION DEPENDING ON GUARDRAIL LAYOUT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

F.H.W.A. APPROVAL	7-26-2017 PLAN DATE	R-60-J	SHEET 14 OF 17

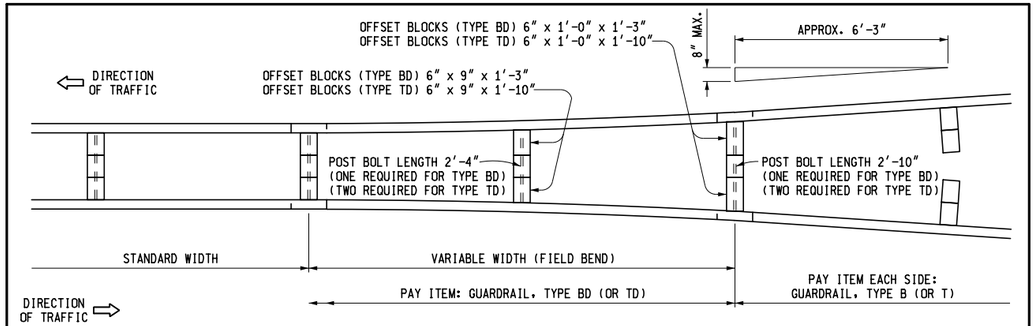
AS-LET PLAN REVISIONS

NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

VERT. (FT) 0
HORZ. (FT) 0

	DATE: 08/31/18	CS: 28091		DRAWING	SHEET
	DESIGN UNIT: TALLON	JN: 132412A			
FILE:	TSC: TRAVERSE CITY				92



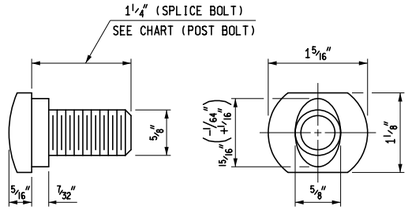
DETAIL SHOWING TRANSITION FROM GUARDRAIL, TYPE B (OR TYPE T) TO GUARDRAIL, TYPE BD (OR TYPE TD)

POST BOLTS, SPLICE BOLTS AND WASHERS AT BEAM ELEMENT SPLICE POSTS AND AT INTERMEDIATE POSTS							
GUARDRAIL TYPE	POST	OFFSET BLOCK	POST BOLTS NO. REQ'D	POST BOLTS LENGTH	SPLICE BOLTS (1¼″ LONG) (NO. REQ'D)	NOT NEEDED AT INTERMEDIATE POSTS	WASHERS (ROUND) (NO. REQ'D)
A	WOOD	N/A	1	9½″	8		1
	STEEL	N/A	1	2″			1
B	WOOD	WOOD	1	18″	8		1
	STEEL	WOOD	1	9½″			1
BD	WOOD	WOOD	1	✱26½″	16		———
	STEEL	WOOD	2	9½″			2
T	WOOD	WOOD	2	18″	12		2
	STEEL	WOOD	2	9½″			2
TD	WOOD	WOOD	2	✱26½″	24		———
	STEEL	WOOD	4	9½″			4

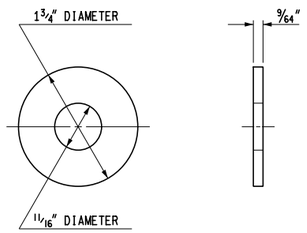
THRIE BEAM TRANSITIONS REQUIRE 20 SPLICE BOLTS EACH (12 ON TYPE T END AND 8 ON TYPE B END).

✱ EXCEPT AS SPECIFIED ON DETAIL SHOWING TRANSITION FROM GUARDRAIL, TYPE B (OR TYPE T) TO GUARDRAIL, TYPE BD (OR TYPE TD). POST BOLTS SHALL NOT EXTEND MORE THAN ½″ BEYOND NUT.

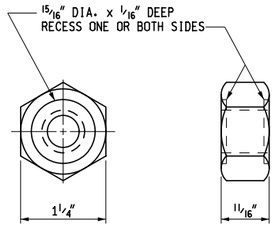
MINIMUM POST BOLT THREAD LENGTH	
BOLT LENGTH	MINIMUM THREAD LENGTH
9½″	1¾″
18″	2½″
26½″	3″



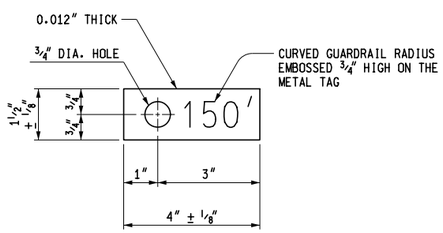
SPLICE BOLT AND POST BOLT



ROUND WASHER



NUT



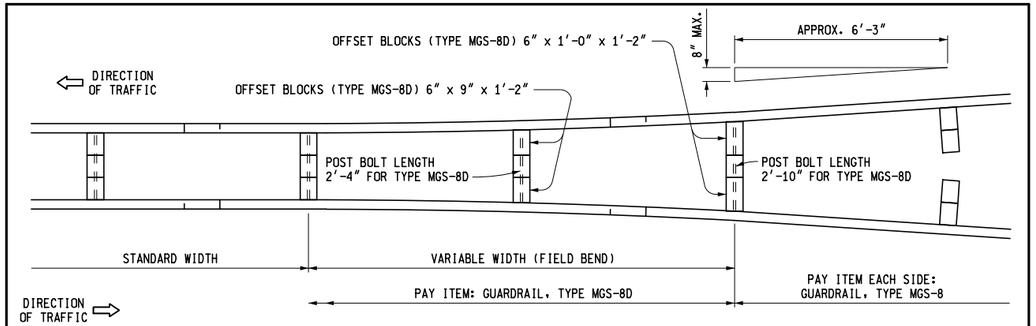
METAL TAG

FOR CURVED GUARDRAIL WITH RADIUS OF 150′ OR LESS

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

F.H.W.A. APPROVAL	7-26-2017 PLAN DATE	R-60-J	SHEET 15 OF 17



DETAIL SHOWING TRANSITION FROM GUARDRAIL, TYPE MGS-8 TO GUARDRAIL, TYPE MGS-8D

POST BOLTS, SPLICE BOLTS AND WASHERS AT BEAM ELEMENT SPLICE POSTS AND AT INTERMEDIATE POSTS						
GUARDRAIL TYPE	POST	OFFSET BLOCK	POST BOLTS NO. REQ'D	POST BOLTS LENGTH	SPLICE BOLTS (1¼″ LONG) (NO. REQ'D)	WASHERS (ROUND) (NO. REQ'D)
MGS-8	WOOD	WOOD	1	18″	8	1
	STEEL	WOOD	1	9½″		1
MGS-8D	WOOD	WOOD	1	✱26½″	16	———
	STEEL	WOOD	2	9½″		2

THRIE BEAM TRANSITIONS REQUIRE 20 SPLICE BOLTS EACH (12 ON TYPE T END AND 8 ON TYPE MGS END).

✱ EXCEPT AS SPECIFIED ON DETAIL SHOWING TRANSITION FROM GUARDRAIL, TYPE MGS-8 TO GUARDRAIL, TYPE MGS-8D POST BOLTS SHALL NOT EXTEND MORE THAN ½″ BEYOND NUT.

MINIMUM POST BOLT THREAD LENGTH	
BOLT LENGTH	MINIMUM THREAD LENGTH
9½″	1¾″
18″	2½″
26½″	3″

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

F.H.W.A. APPROVAL	7-26-2017 PLAN DATE	R-60-J	SHEET 16 OF 17

AS-LET PLAN REVISIONS							
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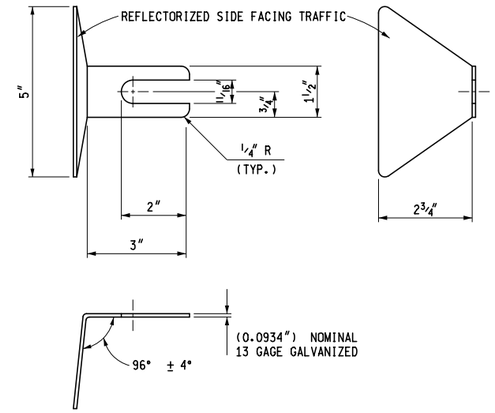
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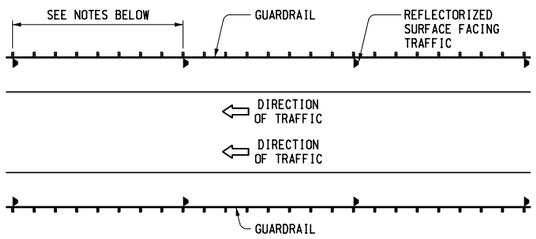
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DESIGN UNIT: TALLON
TSC: TRAVERSE CITY

CS: 28091
JN: 132412A

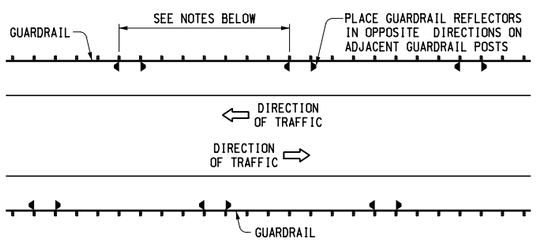
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GUARDRAIL REFLECTOR



ONE-WAY TRAFFIC

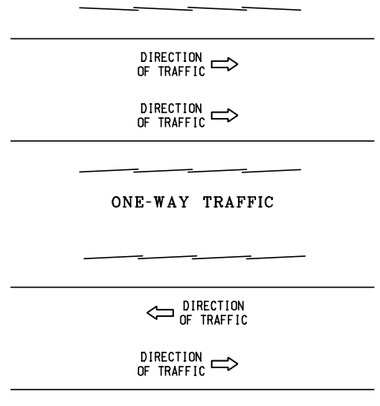


TWO-WAY TRAFFIC

PLACEMENT OF GUARDRAIL REFLECTORS

NOTES GOVERNING THE USE OF GUARDRAIL REFLECTORS

1. GUARDRAIL REFLECTORS SHALL BE USED ON ALL STANDARD GUARDRAIL RUNS, REGARDLESS OF ROADWAY LIGHTING.
2. GUARDRAIL REFLECTORS ARE TO BE SPACED AT THE FOLLOWING INTERVALS:
   a) 50′-0″ ON TANGENT SECTIONS AND CURVES WITH A RADIUS OF 1150′ OR MORE.
   b) 25′-0″ ON CURVES WITH A RADIUS LESS THAN 1150′.
3. FOR GUARDRAIL REFLECTOR PLACEMENT ON APPROACH TERMINALS, SEE THE APPROPRIATE GUARDRAIL APPROACH TERMINAL STANDARD PLAN.
4. A GUARDRAIL REFLECTOR IS TO BE PLACED ON THE SECOND POST FROM THE GUARDRAIL DEPARTING TERMINAL.
5. ON GUARDRAIL, TYPE T AND TYPE TD GUARDRAIL REFLECTORS ARE TO BE PLACED ON THE UPPER POST BOLT.
6. GUARDRAIL REFLECTORS SHALL MATCH COLOR OF EDGE LINE.



TWO-WAY TRAFFIC

DIRECTION OF RAIL LAP

NOTES:

DETAILS SPECIFIED ON THIS STANDARD ARE ACCORDING TO THE AASHTO-AGC-ARTBA JOINT COMMITTEE, TASK FORCE 13 PUBLICATION TITLED "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE."

BEAM ELEMENTS SHALL BE SHOP BENT TO PLAN RADIUS FOR CURVE RADII 150′ OR LESS. A TAG IDENTIFYING THE CURVATURE OF THE SHOP BENT SECTION WILL BE REQUIRED FOR EACH CURVED ELEMENT.

SEE STANDARD PLAN R-61-SERIES, R-62-SERIES OR R-63-SERIES FOR GUARDRAIL APPROACH TERMINALS, STANDARD PLAN R-66-SERIES FOR GUARDRAIL DEPARTING TERMINALS AND STANDARD PLAN R-67-SERIES FOR GUARDRAIL ANCHORAGE, BRIDGE.

WHEN THE PLANS SPECIFY GUARDRAIL (TYPE B OR T) TO BE PLACED ON THE SHOULDER HINGE POINT, RATHER THAN AS SPECIFIED ON THIS PLAN, 8′-0″ POSTS SHALL BE PROVIDED, WITH THE ADDITIONAL LENGTH EMBEDDED FOR ADDED STABILITY. (NOT NECESSARY WHEN THE SLOPE IS REASONABLY LEVEL BEYOND THE SHOULDER HINGE POINT, AS DETERMINED BY THE ENGINEER.)

WHEN THE PLANS SPECIFY GUARDRAIL TYPE MGS-8 TO BE PLACED ON THE SHOULDER HINGE POINT, RATHER THAN AS SPECIFIED ON THIS PLAN, 9′-0″ POSTS SHALL BE PROVIDED, WITH THE ADDITIONAL LENGTH EMBEDDED FOR ADDED STABILITY. (NOT NECESSARY WHEN THE SLOPE IS REASONABLY LEVEL BEYOND THE SHOULDER HINGE POINT, AS DETERMINED BY THE ENGINEER.)

WOOD POSTS WITH 1/2″ BEVELS AT THE TOP MAY BE USED IN LIEU OF WOOD POSTS WITHOUT BEVELS SPECIFIED. THE LENGTH, WIDTH AND DEPTH OF THE POST SHALL BE AS SPECIFIED ON THIS STANDARD AND THE POST BOLT HOLES SHALL BE LOCATED TO ENSURE PROPER RAIL HEIGHT.

WOOD OFFSET BLOCKS WITH 1/2″ BEVELS AT THE TOP AND BOTTOM OR A 1″ BEVELED TOP MAY BE USED IN LIEU OF WOOD BLOCKS WITHOUT BEVELS SPECIFIED. THE LENGTH (FRONT AND BACK FACE), WIDTH AND DEPTH OF THE BLOCK SHALL BE AS SPECIFIED ON THIS STANDARD AND THE POST BOLT HOLES SHALL BE LOCATED TO ENSURE PROPER RAIL HEIGHT AND COMPATIBILITY WITH POST HOLES.

WHEN THE FACE OF GUARDRAIL IS PLACED FLUSH WITH FACE OF CURB, THE RAIL HEIGHT SHOULD BE MEASURED FROM THE FRONT EDGE OF THE GUTTER PAN, WHICH IS THE POINT ON THE GUTTER PAN THAT IS CLOSEST TO THE EDGE OF THE TRAVELED LANE. WHEN THE FACE OF THE GUARDRAIL PANEL IS LOCATED BEHIND THE CURB THE RAIL HEIGHT SHOULD BE MEASURED FROM THE GROUND JUST IN FRONT OF THE GUARDRAIL.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

F.H.W.A. APPROVAL	7-26-2017 PLAN DATE	R-60-J	SHEET 17 OF 17

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

F.H.W.A. APPROVAL	PLAN DATE		SHEET OF

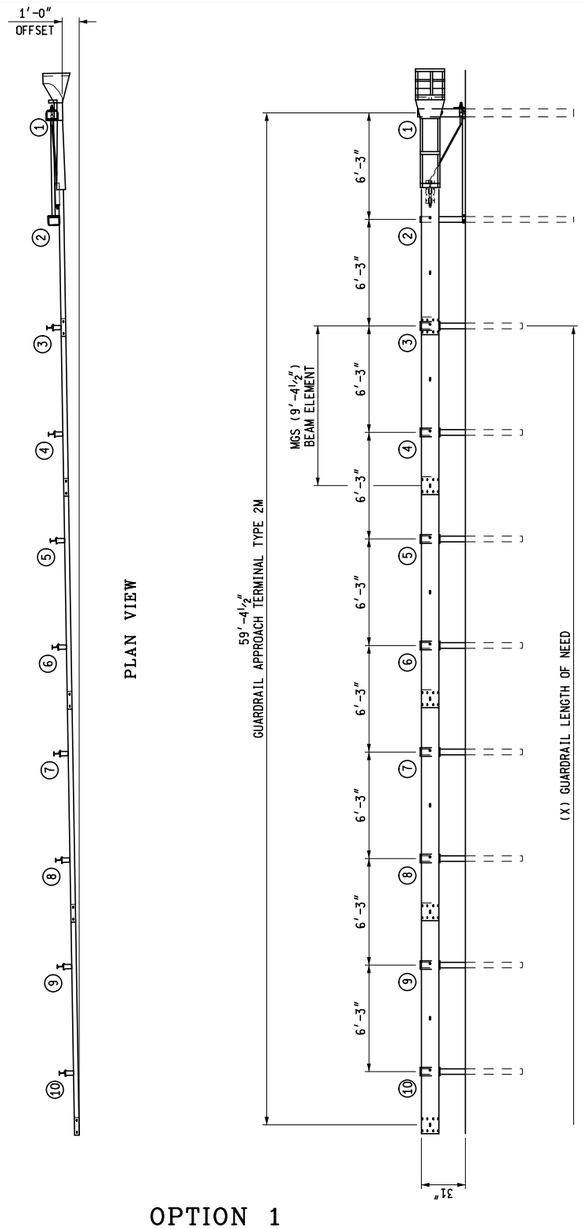
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MDOT Michigan Department of Transportation

VERT. (FT) 0
HORZ. (FT) 0

	DATE: 08/31/18	CS: 28091		DRAWING	SHEET
	DESIGN UNIT: TALLON	JN: 132412A			94
FILE:	TSC: TRAVERSE CITY				



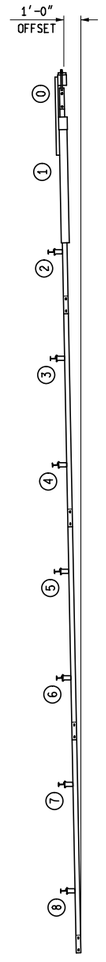
PLAN VIEW

ELEVATION

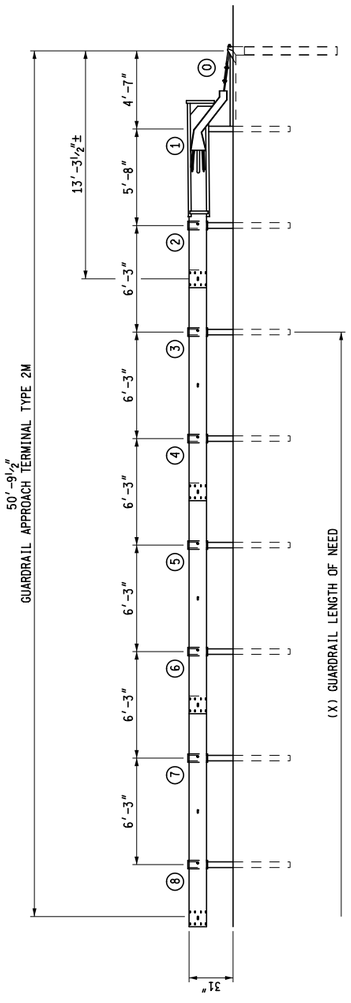
GUARDRAIL APPROACH TERMINAL TYPE 2M "MSKT"

OPTION 1

PREPARED BY DESIGN DIVISION	DEPARTMENT DIRECTOR Kirk T. Steudle	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR GUARDRAIL APPROACH TERMINAL TYPE 2M	
DRAWN BY: B.L.T.	APPROVED BY: _____ DIRECTOR, BUREAU OF FIELD SERVICES		
CHECKED BY: W.K.P.	APPROVED BY: _____ DIRECTOR, BUREAU OF DEVELOPMENT	F.H.W.A. APPROVAL / 5-1-2018 PLAN DATE / R-62-H	SHEET 1 OF 4



PLAN VIEW



ELEVATION

GUARDRAIL APPROACH TERMINAL TYPE 2M "SOFT-STOP"

OPTION 2

		MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR GUARDRAIL APPROACH TERMINAL TYPE 2M	
		F.H.W.A. APPROVAL / 5-1-2018 PLAN DATE / R-62-H	SHEET 2 OF 4

AS-LET PLAN REVISIONS							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

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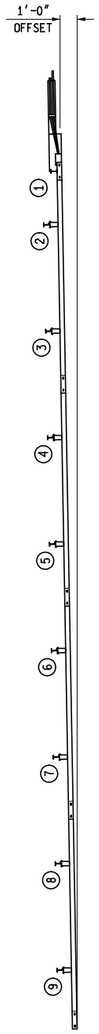
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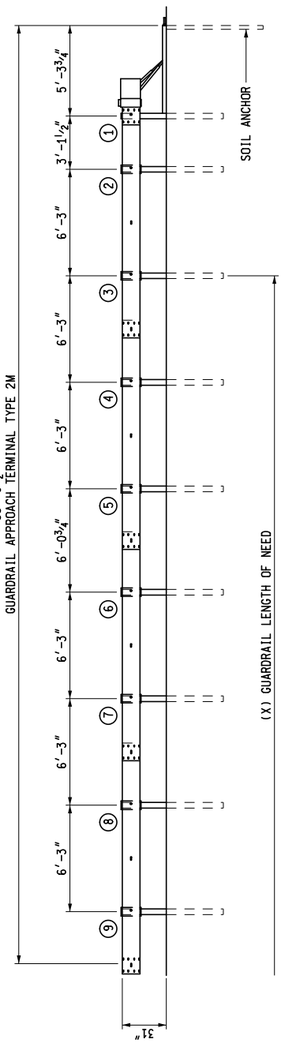
DATE: 08/31/18
DESIGN UNIT: TALLON
TSC: TRAVERSE CITY

CS: 28091
JN: 132412A

DRAWING | SHEET



PLAN VIEW



ELEVATION

GUARDRAIL APPROACH TERMINAL TYPE 2M
"MAX-TENSION"

OPTION 3

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

GUARDRAIL APPROACH TERMINAL TYPE 2M

F.H.W.A. APPROVAL	5-1-2018 PLAN DATE	R-62-H	SHEET 3 OF 4

NOTES:

ALL POSTS, OFFSET BLOCKS, BEAM ELEMENTS, AND HARDWARE (INCLUDING BOLTS, NUTS, AND WASHERS) SHALL CONFORM TO THE MANUFACTURER'S DETAILS AND SPECIFICATIONS.

ALL 1:10 SLOPES SHALL BE GRADED TO CLASS A SLOPE TOLERANCES.

WHEN SITE CONDITIONS WARRANT AND WITH THE APPROVAL OF THE ENGINEER, GUARDRAIL APPROACH TERMINAL TYPE 2M CAN BE INSTALLED STRAIGHT (WITHOUT THE 1'-0" OFFSET FROM THE TANGENT LINE TO THE TRAFFIC FACE OF POST 1).

GUARDRAIL REFLECTORS AND OTHER ATTACHMENTS ARE NOT TO BE USED ON THE GUARDRAIL APPROACH TERMINAL. PLACE REFLECTORS BEGINNING ON STANDARD RUN OF GUARDRAIL.

USE REFLECTIVE SHEETING ACCORDING TO THE FOLLOWING TRAFFIC CONDITIONS: (NOTE: ALTERNATE 3" BLACK AND 3" YELLOW STRIPES ON A 45° ANGLE)



TRAFFIC PASSING ON THE LEFT SIDE | TRAFFIC PASSING ON BOTH SIDES | TRAFFIC PASSING ON THE RIGHT SIDE

THE PORTION OF THE IMPACT HEAD ASSEMBLY FACING TRAFFIC SHALL BE COMPLETELY COVERED WITH HIGH INTENSITY ADHESIVE REFLECTIVE SHEETING.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

GUARDRAIL APPROACH TERMINAL TYPE 2M

F.H.W.A. APPROVAL	5-1-2018 PLAN DATE	R-62-H	SHEET 4 OF 4

AS-LET PLAN REVISIONS							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

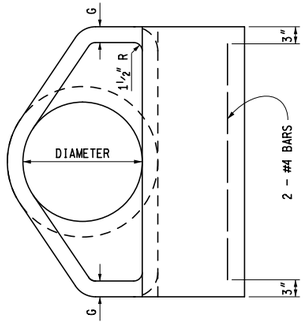
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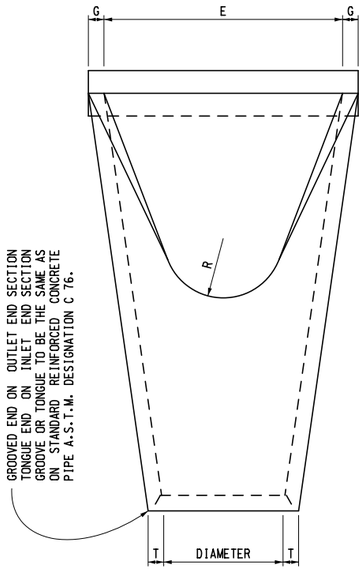
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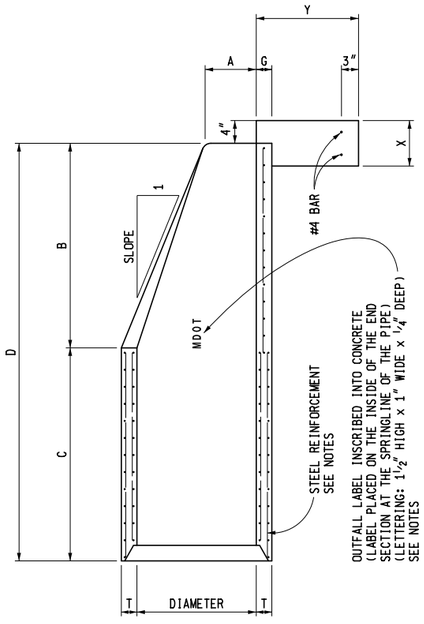
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END ELEVATION

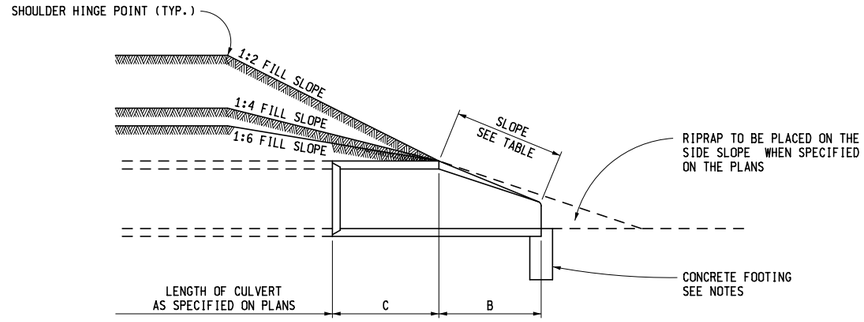


PLAN VIEW



LONGITUDINAL SECTION

DEPARTMENT DIRECTOR Kirk T. Steudle	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR PRECAST CONCRETE END SECTION FOR PIPE CULVERT			
PREPARED BY DESIGN DIVISION DRAWN BY: B.L.T. CHECKED BY: W.K.P.	APPROVED BY: _____ DIRECTOR, BUREAU OF FIELD SERVICES APPROVED BY: _____ DIRECTOR, BUREAU OF DEVELOPMENT	F.H.W.A. APPROVAL	9-13-2018 PLAN DATE	R-86-F	SHEET 1 OF 2



SLOPE DETAIL

TABLE OF DIMENSIONS

PIPE DIAMETER (INCHES)	APPROX. SLOPE	T (INCHES)	A (INCHES)	B (INCHES)	C (INCHES)	D (INCHES)	E (INCHES)	G (INCHES)	R (INCHES)	X (INCHES)	Y (INCHES)
12	2.4 to 1	2	4	24	49	73	24	2	9	8	18
15	2.4 to 1	2 1/4	6	27	46	73	30	2 1/4	11	8	18
18	2.3 to 1	2 1/2	9	27	46	73	36	2 1/2	12	8	18
21	2.4 to 1	2 3/4	9	36	37 1/2	73 1/2	42	2 3/4	13	8	18
24	2.5 to 1	3	9 1/2	43 1/4	30 1/2	73 3/4	48	3	14	8	18
27	2.5 to 1	3 1/4	10 1/2	49 1/4	24 1/2	73 3/4	54	3 1/4	14 1/2	8	18
30	2.5 to 1	3 1/2	12	54	19 3/4	73 3/4	60	3 1/2	15	8	18
36	2.5 to 1	4	15	63	34 3/4	97 3/4	72	4	20	8	18
42	2.5 to 1	4 1/2	21	63	35	98	78	4 1/2	22	10	24
48	2.5 to 1	5	24	72	26	98	84	5	22	10	24
54	2.0 to 1	5 1/2	27	65	33 1/4	98 1/4	90	5 1/2	24	10	24
60	1.9 to 1	6	35	60	39	99	96	5	*	12	24
66	1.7 to 1	6 1/2	30	72	27	99	102	5 1/2	*	12	24
72	1.8 to 1	7	36	78	21	99	108	6	*	12	24
78	1.8 to 1	7 1/2	36	90	21	111	114	6 1/2	*	12	24
84	1.6 to 1	8	36	90 1/2	21	111 1/2	120	6 1/2	*	12	24

* AS FURNISHED BY THE MANUFACTURER

NOTES:

CONCRETE IN THESE END SECTIONS SHALL BE THE SAME GRADE AND STRENGTH AS SPECIFIED FOR REINFORCED CONCRETE PIPE, A.S.T.M. DESIGNATION C 76 CLASS II, EXCEPT AS MODIFIED BY THE STANDARD SPECIFICATION.

REINFORCEMENT IN THE "C" PORTION SHALL BE THE SAME AS SPECIFIED FOR REINFORCED CONCRETE, A.S.T.M. DESIGNATION C 76 CLASS II FOR THE SIZE OF CONNECTING PIPE.

REINFORCEMENT IN THE "B" PORTION SHALL HAVE A CROSS-SECTIONAL AREA EQUAL TO THAT OF ONE LAYER OF STEEL IN THE "C" PORTION.

THE END OF THE PIPE CULVERT SHALL BE PLACED IN THE CONCRETE END SECTION SO THAT THE FLOW LINES ARE FLUSH. THE JOINT MUST BE COMPLETELY FILLED WITH MORTAR ON THE INSIDE AND OUTSIDE AND STRUCK FLUSH. THE JOINT MUST BE WRAPPED WITH GEOTEXTILE BLANKET 36" WIDE WITH A 12" OVERLAP.

TO CHANGE THE FILL SLOPE TO THE SLOPE OF THE END SECTION USE A TRANSITION SLOPE OF APPROXIMATELY 10' IN LENGTH TO PROVIDE A PLEASING APPEARANCE.

VARIATIONS IN DIMENSIONS - THE THICKNESS OF CONCRETE, THE POSITION OF STEEL, AND THE INTERNAL DIAMETER OF THE PIPE SHALL CONFORM WITH THE VARIATIONS IN DIMENSIONS AS PROVIDED IN THE SPECIFICATIONS FOR REINFORCED CONCRETE CULVERT, STORM DRAINS, AND SEWER PIPE, A.S.T.M. DESIGNATION C 76.

PLACE CONCRETE FOOTING AS SHOWN.

OUTFALL LABEL TO BE USED ONLY WHERE STORMWATER WILL DISCHARGE DIRECTLY TO THE WATERS OF THE STATE.

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR PRECAST CONCRETE END SECTION FOR PIPE CULVERT			
F.H.W.A. APPROVAL	9-13-2018 PLAN DATE	R-86-F	SHEET 2 OF 2

AS-LET PLAN REVISIONS							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT Michigan Department of Transportation

VERT. (FT) 0
HORZ. (FT) 0

FILE:

DATE: 08/31/18
DESIGN UNIT: TALLON
TSC: TRAVERSE CITY

CS: 28091
JN: 132412A

DRAWING | SHEET