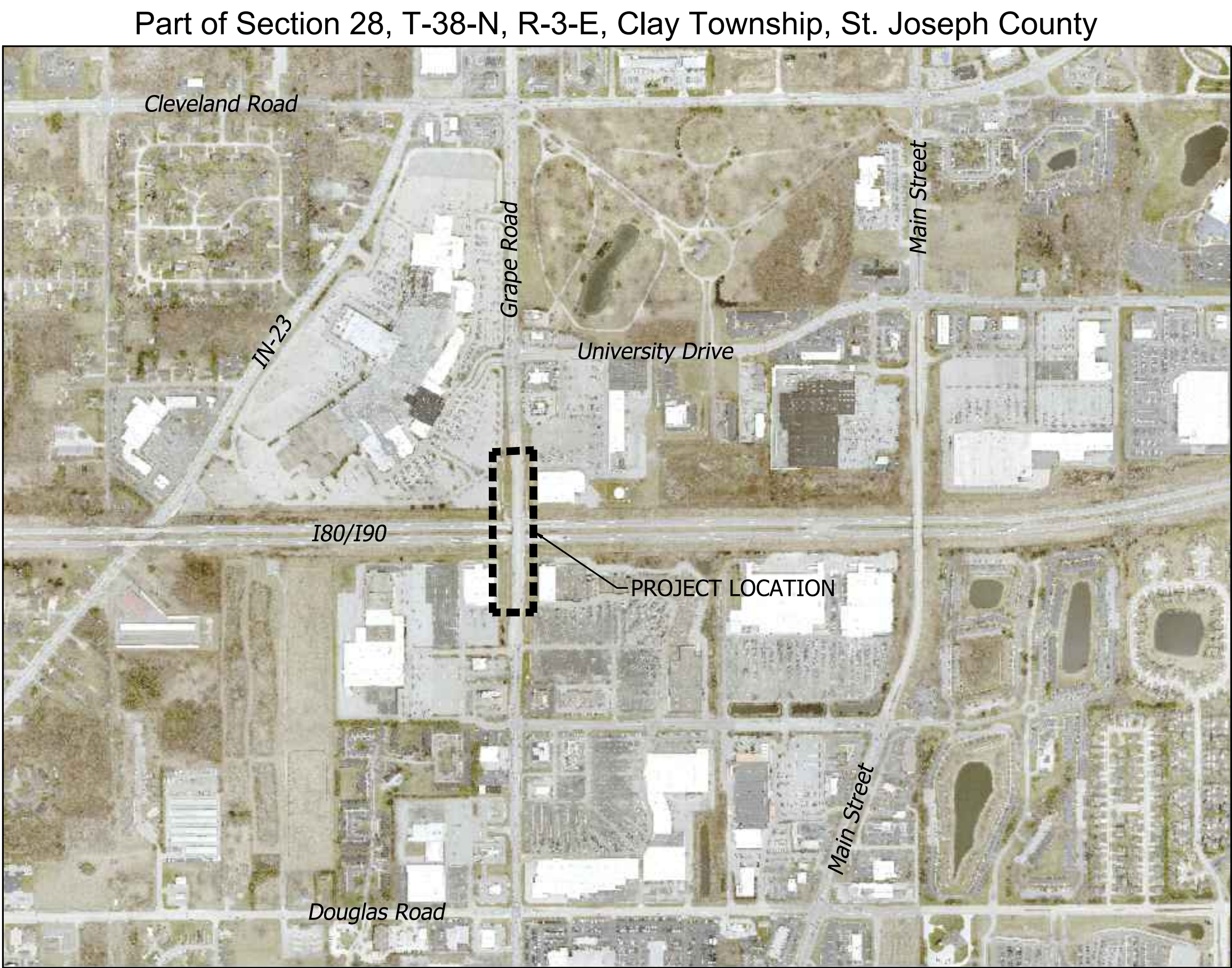
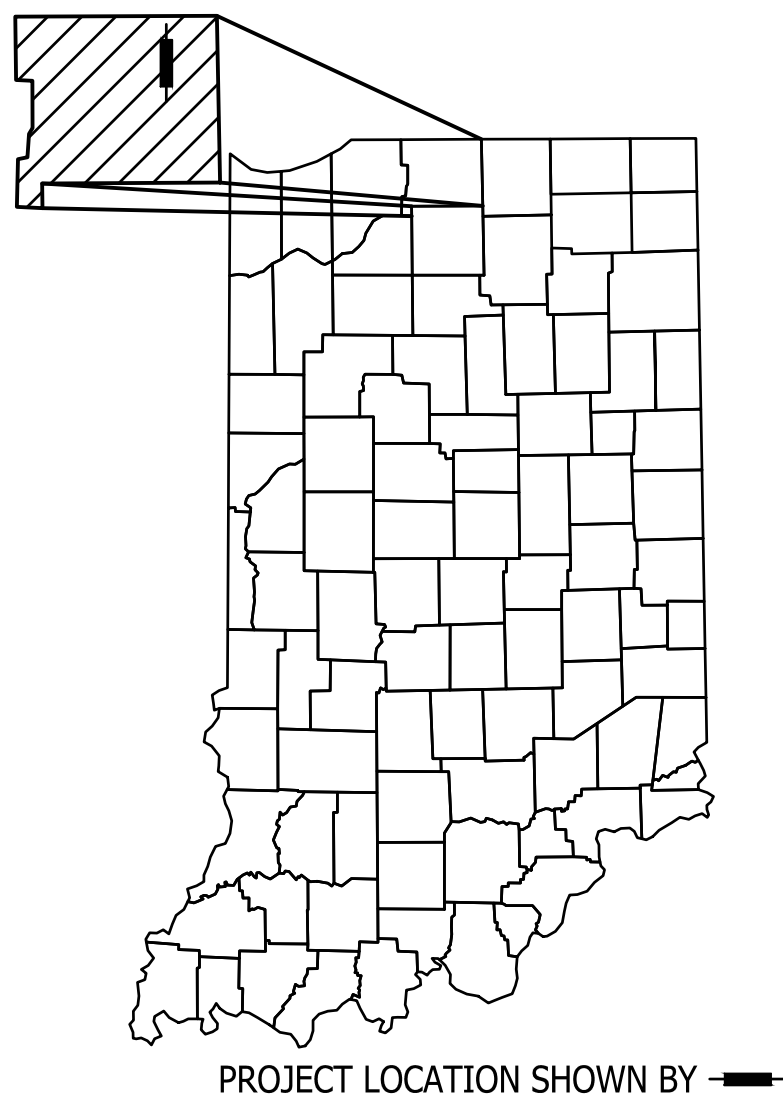


INDIANA TOLL ROAD

GRAPE ROAD SIDEWALK REHABILITATION



VICINITY MAP
(NOT TO SCALE)



SURVEYOR / ENGINEER
ABONMARCHÉ
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THE INDIANA DEPARTMENT OF TRANSPORTATION AND THE INTERNATIONAL TOLL ROAD, STANDARD DRAWINGS AND SPECIFICATIONS CURRENT EDITION AT THE TIME OF BIDDING TO BE USED WITH THESE PLANS.

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INDIANA TOLL ROAD
**GRAPE ROAD SIDEWALK
REHABILITATION**

TITLE SHEET



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PROJECT NO: 25-1090

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UTILITY CONTACTS


<u>Water & Sewer</u> City of Mishawaka 100 Lincolnway West Mishawaka, IN 46544	<u>Electric</u> American Electric Co. (AEP) 3340 Old US 20 E Elkhart, IN 46516 Contact: Kyle Korabek kkorabek@aep.com
<u>Gas</u> NIPSCO 801 E. 86th Avenue Merrville, IN 46410 Contact: Dean Garrett utilitycoordination@nisource.com	<u>Communications</u> Choice Light 130 S. Main Street #275 South Bend, IN 46601 Contact: Brandon Liggett bliggett@choicelight.com
<u>Communications</u> AT&T 4444 Ameritech Drive South Bend, IN 46628 Contact: Tom Pendergast tp9875@acd.net	<u>Communications</u> Metro FiberNet 1530 Ken McIntee Court Mishwaka, IN 46544 Contact: Jerry Holloway jerry.holloway@metronet.com
<u>Communications</u> Zayo Bandwidth 722 North High School Road Indianapolis, IN 46214 zayo.relo.indiana@zayo.com	<u>Communications</u> US Signal Company (RVP Fiber Company) 201 Ionia Avenue SW Grand Rapids, MI 49503 Contact: Ryan Miedema rjmiedema@ussignal.com

REVISIONS

SHEET NO.	DATE	SUBJECT

INDEX

SHEET NO.	SUBJECT
1	Title Sheet
2	Index and General Notes
3-4	Geometric Plan
5-6	Maintenance of Traffic
7	Overall Site Plan
8-9	Site Plan
10-11	Wall Profiles
12-13	Construction Details
14-16	Lighting Plans and Details

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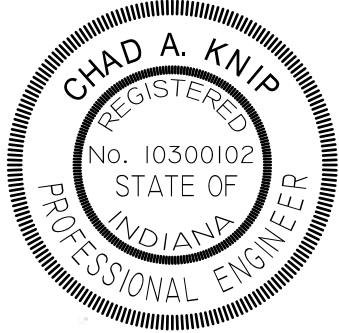
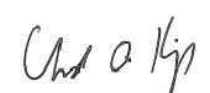
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INDIANA TOLL ROAD

GRAPE ROAD SIDEWALK
REHABILITATION

INDEX SHEET

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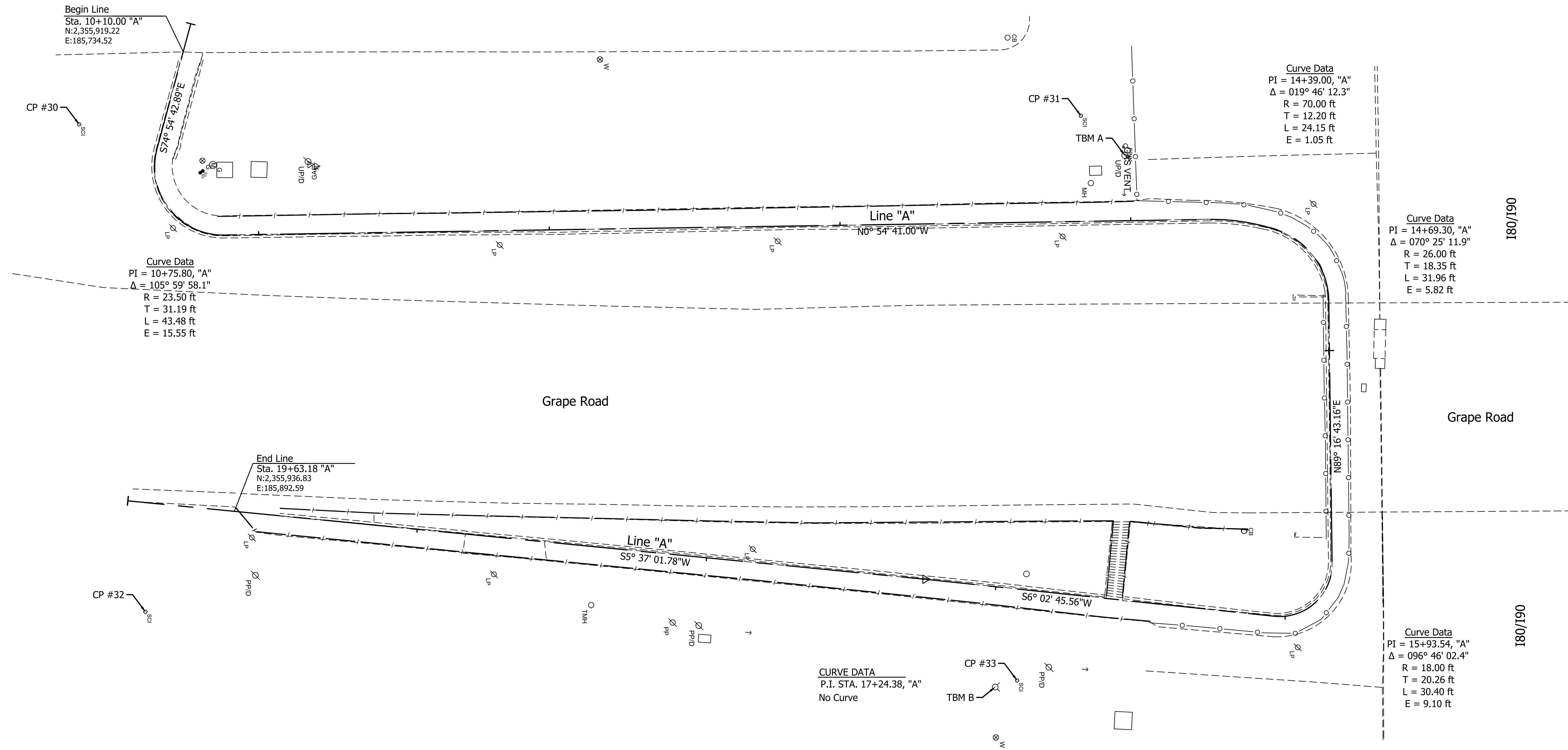
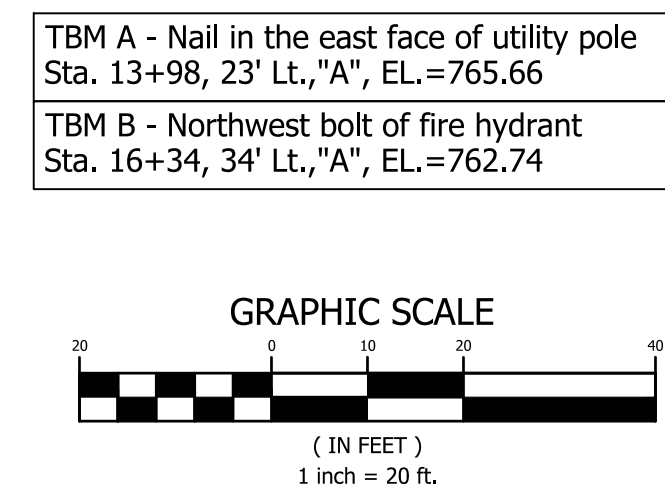
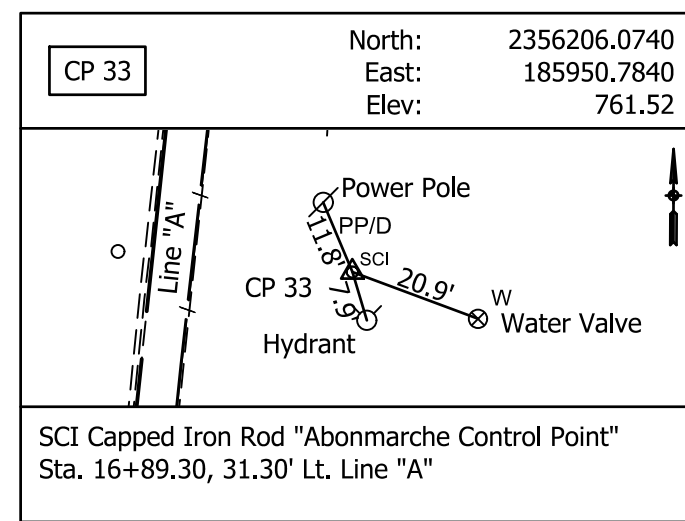
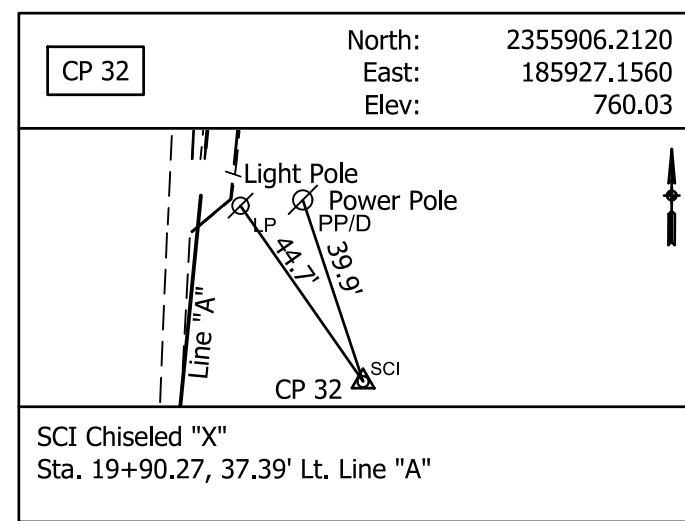
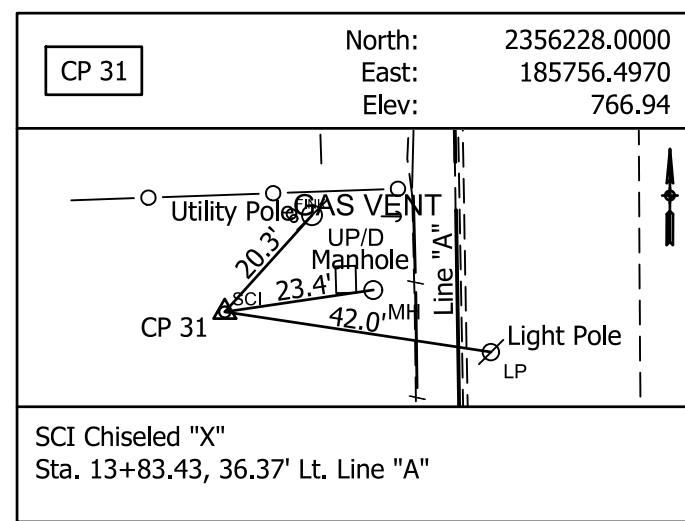
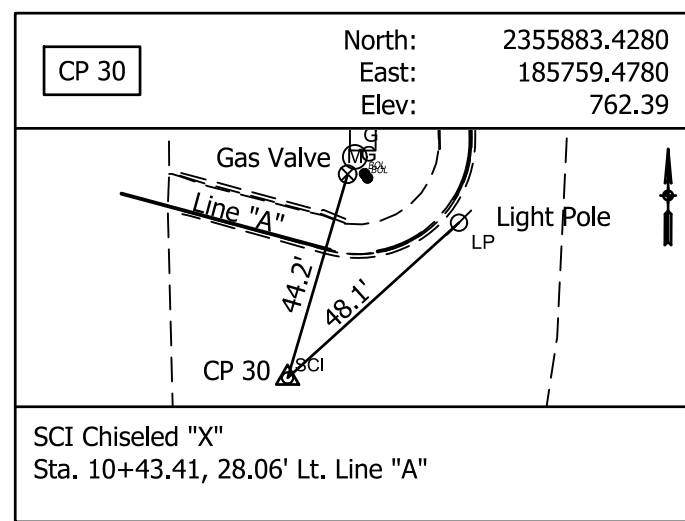
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INDIANA TOLL ROAD

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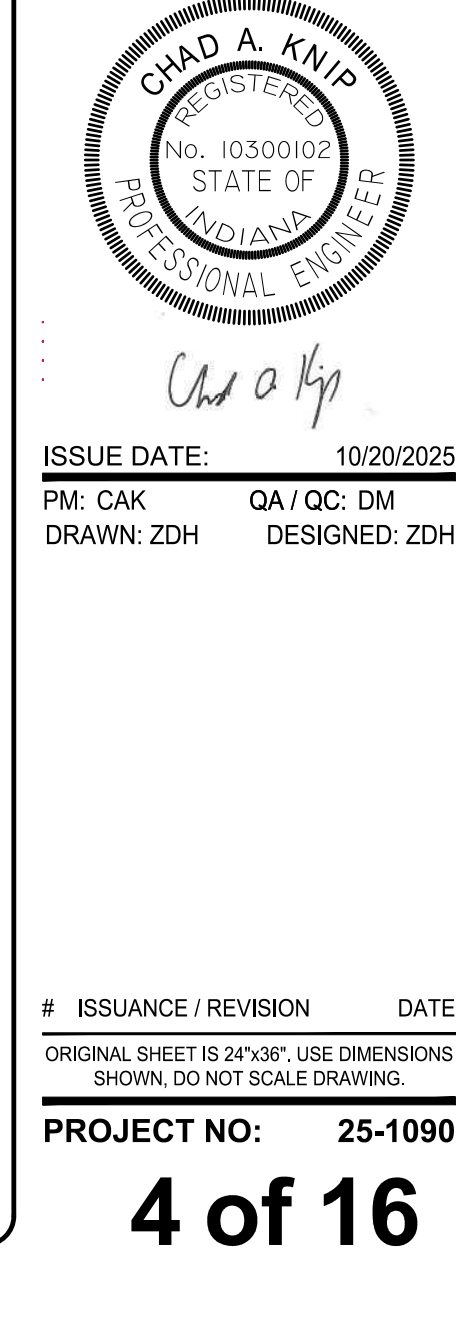


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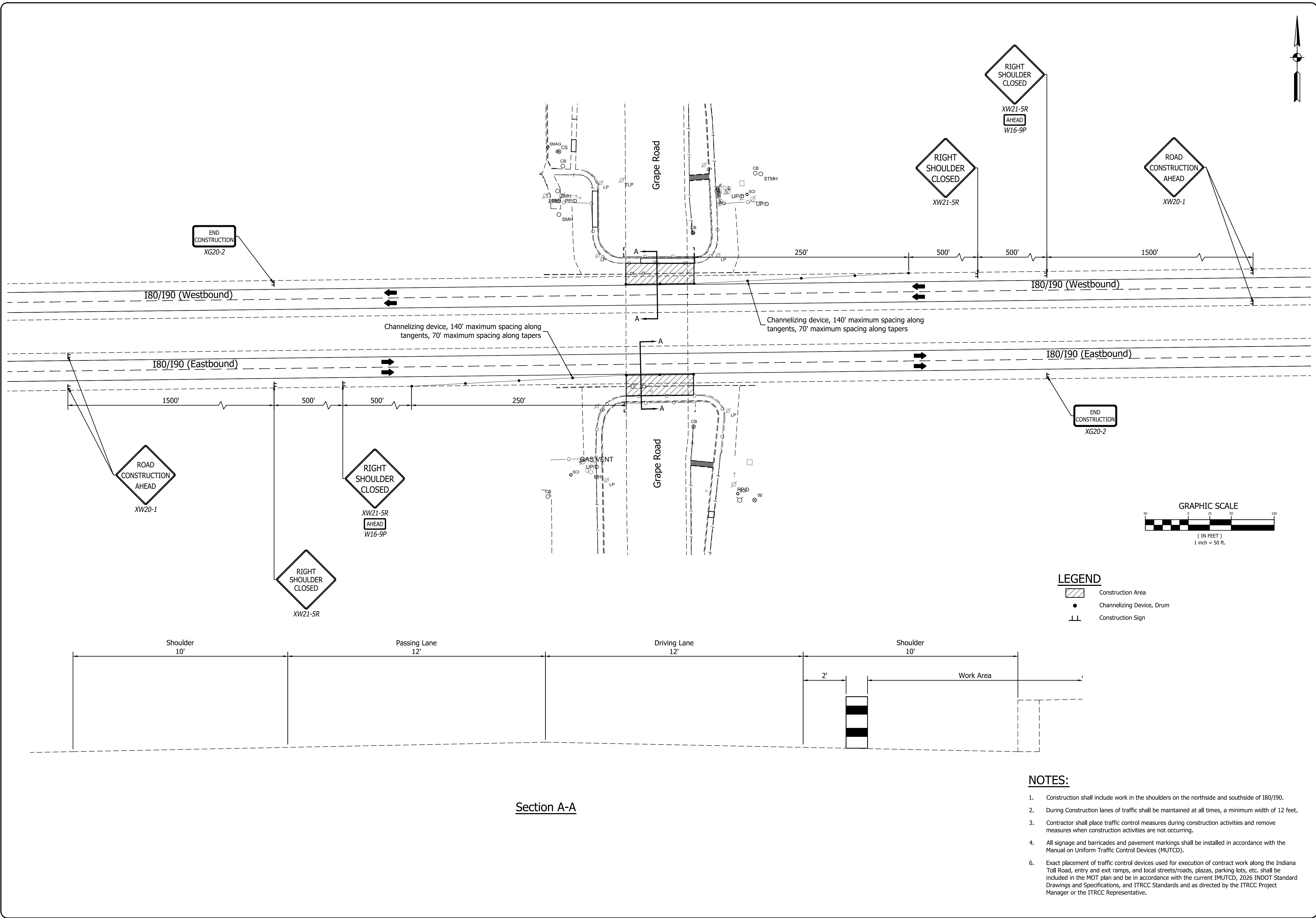
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Section A-A

NOTES:

1. Construction shall include work in the shoulders on the northside and southside of I80/I90.
2. During Construction lanes of traffic shall be maintained at all times, a minimum width of 12 feet.
3. Contractor shall place traffic control measures during construction activities and remove measures when construction activities are not occurring.
4. All signage and barricades and pavement markings shall be installed in accordance with the Manual on Uniform Traffic Control Devices (MUTCD).
6. Exact placement of traffic control devices used for execution of contract work along the Indiana Toll Road, entry and exit ramps, and local streets/roads, plazas, parking lots, etc. shall be included in the MOT plan and be in accordance with the current IMUTCD, 2026 INDOT Standard Drawings and Specifications, and ITRCC Standards and as directed by the ITRCC Project Manager or the ITRCC Representative.

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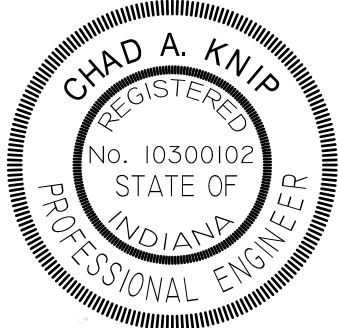
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INDIANA TOLL ROAD

**GRAPE ROAD SIDEWALK
REHABILITATION**

MAINTENANCE OF TRAFFIC - I80-I90

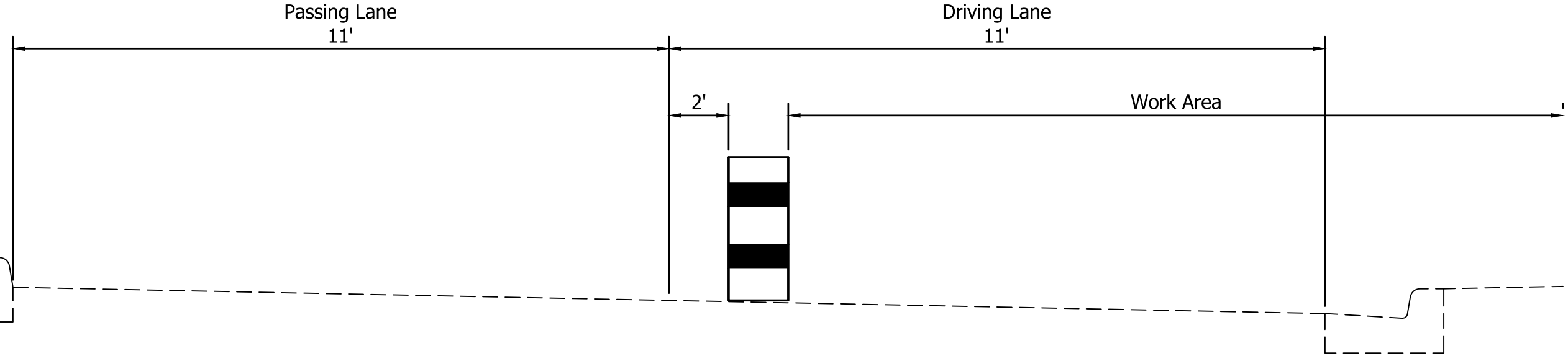
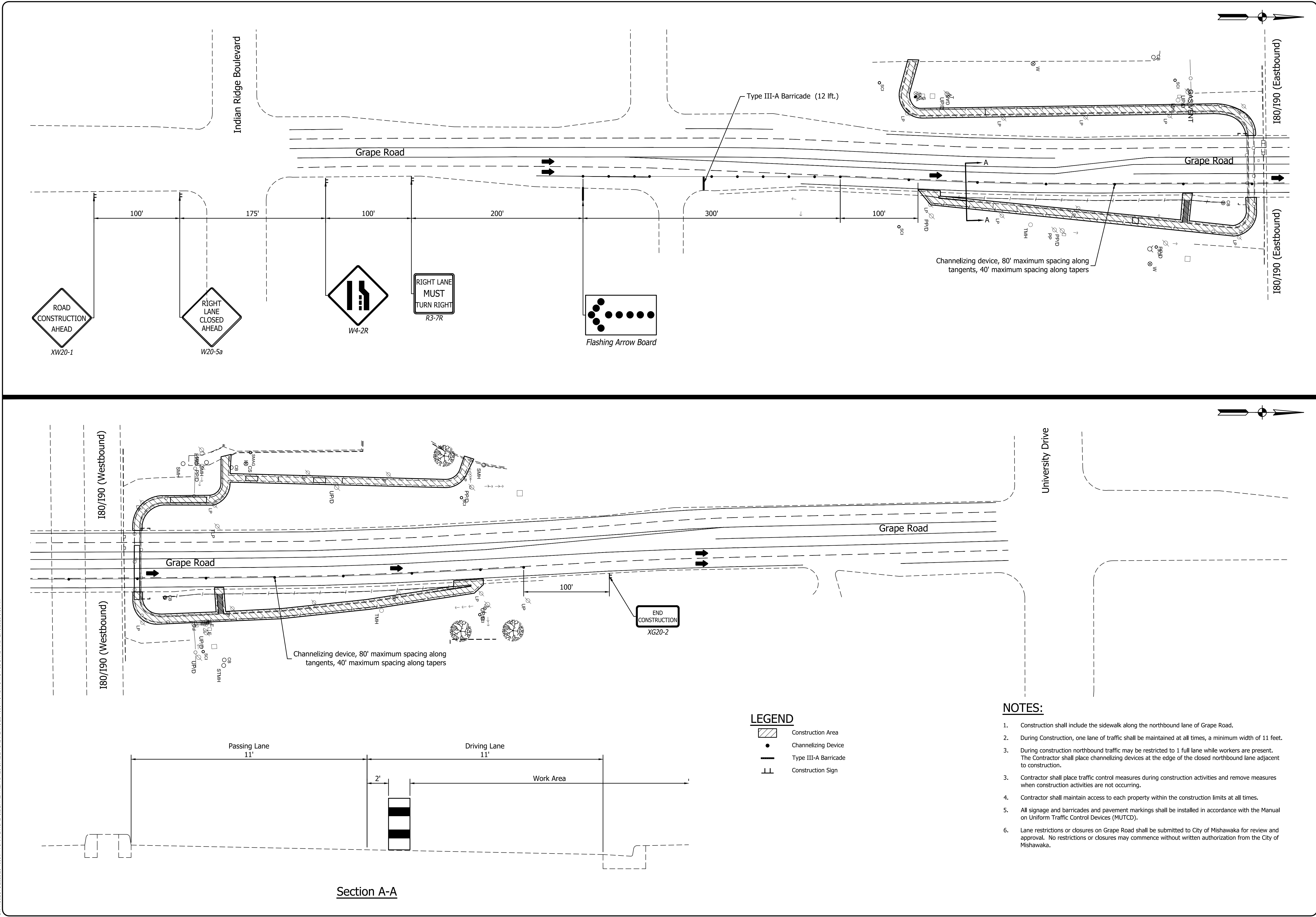

Chad A. Knip

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Section A-A

- LEGEND**
- Construction Area
 - Channelizing Device
 - Type III-A Barricade
 - Construction Sign

- NOTES:**
- Construction shall include the sidewalk along the northbound lane of Grape Road.
 - During Construction, one lane of traffic shall be maintained at all times, a minimum width of 11 feet.
 - During construction northbound traffic may be restricted to 1 full lane while workers are present. The Contractor shall place channelizing devices at the edge of the closed northbound lane adjacent to construction.
 - Contractor shall place traffic control measures during construction activities and remove measures when construction activities are not occurring.
 - Contractor shall maintain access to each property within the construction limits at all times.
 - All signage and barricades and pavement markings shall be installed in accordance with the Manual on Uniform Traffic Control Devices (MUTCD).
 - Lane restrictions or closures on Grape Road shall be submitted to City of Mishawaka for review and approval. No restrictions or closures may commence without written authorization from the City of Mishawaka.

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INDIANA TOLL ROAD

GRAPE ROAD SIDEWALK
REHABILITATION

MAINTENANCE OF TRAFFIC - GRAPE ROAD

CHAD A. KNIP
REGISTERED
No. 10300102
STATE OF
INDIANA
PROFESSIONAL ENGINEER

Chad A. Knip

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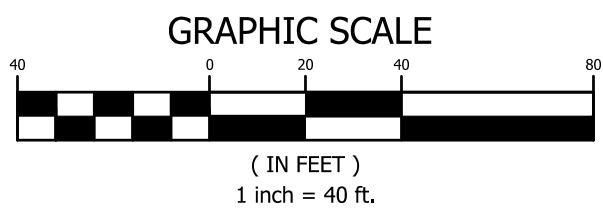
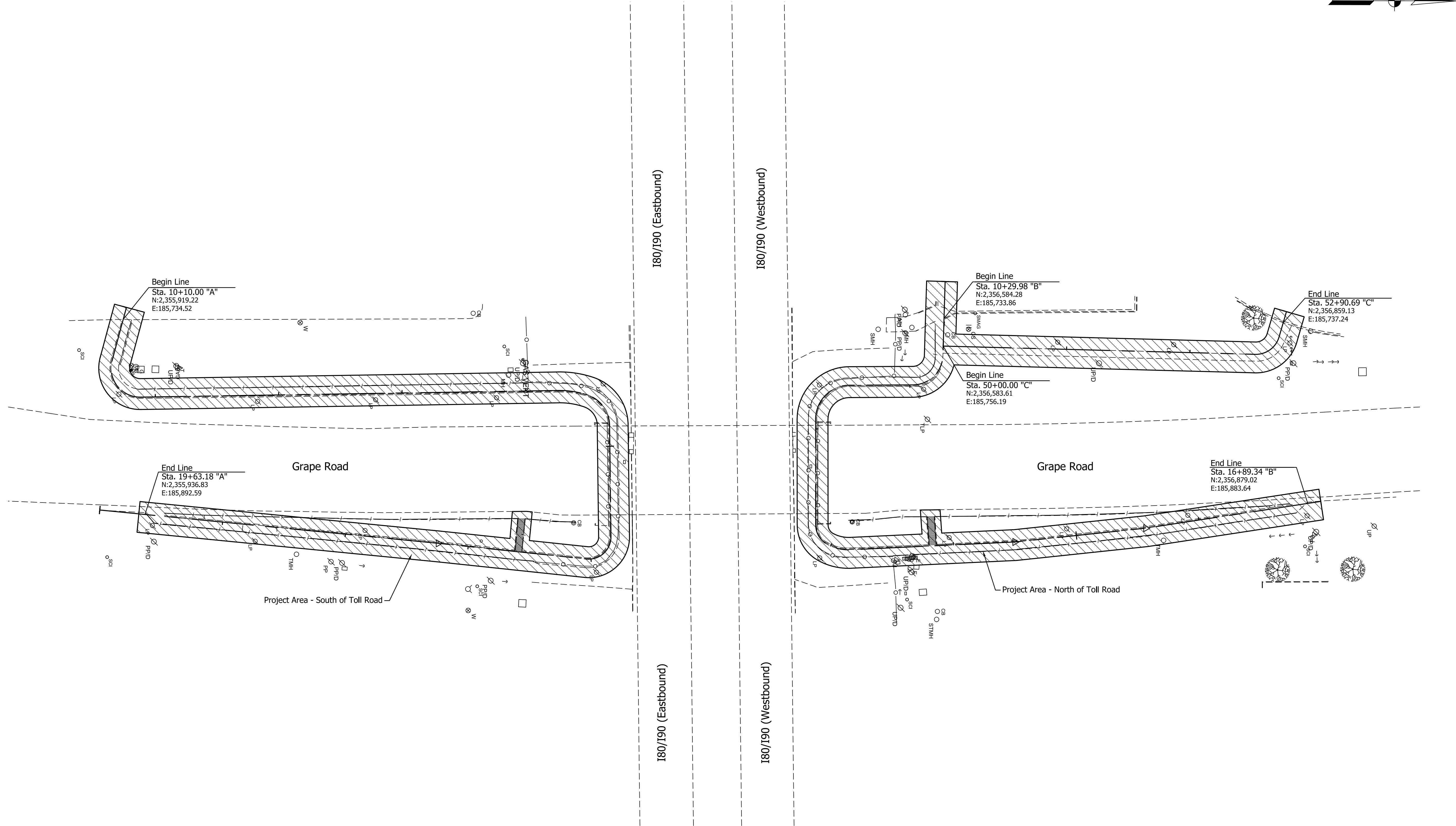
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INDIANA TOLL ROAD
**GRAPE ROAD SIDEWALK
REHABILITATION**

OVERALL SITE PLAN

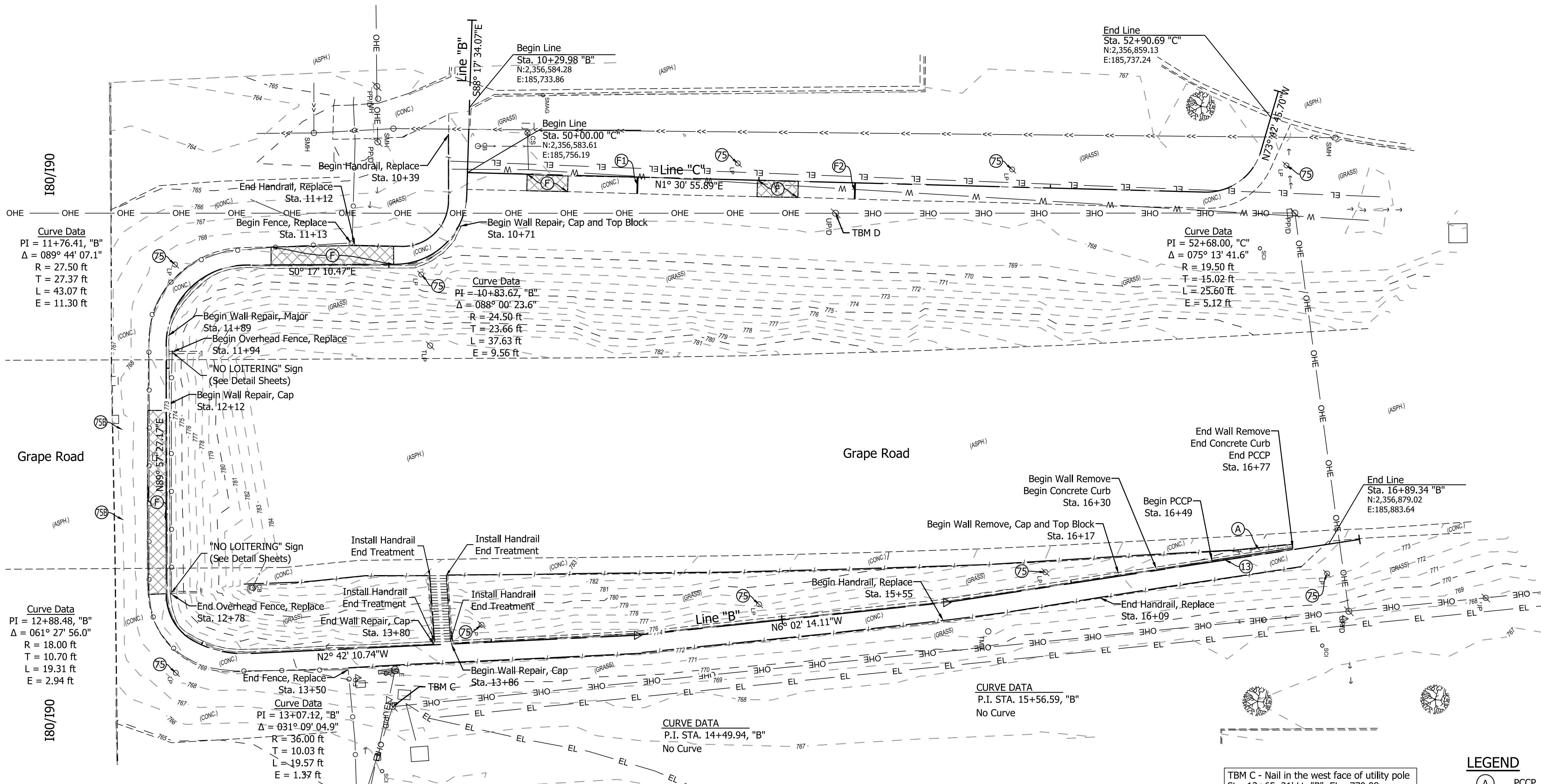


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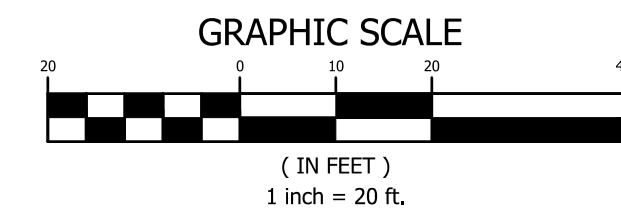
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CONSTRUCTION NOTES:

1. Site Clearing and Cleaning shall include removal of all vegetation within the limits of the sidewalk and the face of the retaining walls and power washing graffiti and stains from the sidewalk and retaining walls.
2. Sidewalk to be removed shall be saw cut at the limits of removal.
3. The cost to remove the existing handrail shall be included in the cost of the new handrail. Disturbance of grass or pavements during the installation or removal of the handrail shall be restored to like or better condition.
4. Spot Replacement shall include work in the base bid to remove and replace segments of the existing handrail as noted. Add Alternate A shall include a deduct of the amount included in the base bid for Spot Replacement and a new cost to include removal and replacement of all Pedestrian Handrail within the project limits.
5. Sidewalk shall be placed on 4" of Compacted Aggregate No. 53 on Compacted Subgrade. Compacted Subgrade shall be included in the cost of sidewalk. Coarse aggregate for concrete sidewalk shall be crushed limestone. White membrane shall be used for concrete curing.
6. Concrete Sidewalk Grinding shall include grinding an existing concrete sidewalk panel to remove vertical displacement to an adjacent panel. Higher panels shall be ground to match the lower adjacent panels using a slope of 12% maximum. The vertical offset of the two panels shall not exceed 1/8 inch, measured using a minimum 4 foot length straightedge. The ground surface shall have a slip resistant texture.
7. Transverse control joints in the concrete curb shall be placed at equal intervals not to exceed 10 feet. Expansion material is required at all cold joints, points of curvature, points of tangency, alignment changes, and at 80 foot maximum intervals. The cost of all necessary joints shall be included in the cost of Concrete Curb. The profile of new curb shall be adjusted to match existing curb at a 12:1 rate. White membrane shall be used for concrete curb curing.
8. Sidewalk, Grout shall include pumping grout beneath existing concrete panels to fill voids and restore support. Work shall be performed in a manner that does not cause damage or excessive lifting of the sidewalk. Subsequent to grouting, the sidewalk panel shall be within 1/4" vertical elevation of each existing sidewalk panel.
9. Erection of the modular block wall and aggregate for the wall shall be included in the Modular Block Wall pay item. All items, including labor, equipment, and materials shall be included in Modular Block Wall, Remove and Modular Block Wall.



LEGEND

- (A) PCCP, 4"
- (F) Concrete Sidewalk, 4"
- (F1) Concrete Sidewalk, Corrective Grinding
- (F2) Concrete Sidewalk, Subgrade Grouting
- (13) Concrete Curb, 8"
- (75) Light Pole, Replace (Foundation to remain)
- (75B) Light Fixture, Remove and Replace
- (X) Concrete, Remove

Concrete Curb, 6"	
Location	Length (feet)
Sta. 16+30 to 16+77, Line "B"	47
Total	47

PCCP, 4"	
Location	Area (syd)
Sta. 16+49 to 16+77, Line "B"	7
Total	7

Sidewalk, Replace	
Location	Area (syd)
Sta. 10+98 to 11+40, Line "B"	30
Sta. 12+14 to 12+77, Line "B"	45
Sta. 50+21 to 50+35, Line "C"	9
Sta. 51+00 to 51+14, Line "C"	9
Total	93

Sidewalk, Corrective Grinding	
Location	Length (feet)
Sta. 50+58, Line "C"	6
Total	6

Sidewalk, Subgrade Grouting	
Location	Volume (cyd)
Sta. 51+33, Line "C"	1
Total	1

Wall Repair, Cap	
Location	Length (feet)
Sta. 12+12 to 13+80, Line "B"	168
Sta. 13+86 to 16+17, Line "B"	231
Total	399

Wall Repair, Cap and Top Block	
Location	Length (feet)
Sta. 10+71 to 11+89, Line "B"	118
Total	118

Wall Repair, Major	
Location	Area (sft)
Sta. 11+89 to 12+12, Line "B"	48
Total	48

Wall Remove, Cap and Top Block	
Location	Length (feet)
Sta. 16+17 to 16+30, Line "B"	13
Total	13

Wall Remove	
Location	Length (feet)
Sta. 16+30 to 16+77, Line "B"	44
Total	44

Wall Block Stain (Alternate B)	
Location	Length (feet)
Sta. 10+71 to 16+30, Line "B"	2088
Total	2088

Handrail, Replace	
Location	Length (feet)
Sta. 10+39 to 11+12, Line "B"	73
Sta. 15+55 to 16+09, Line "B"	54
Total	127

Handrail, Replace (Alternate A)	
Location	Length (feet)
Sta. 10+39 to 11+12, Line "B"	73
Sta. 13+80, Line "B"	24
Sta. 13+86, Line "B"	24
Sta. 13+50 to 16+79, Line "B"	329
Total	450

Fence, Replace	
Location	Length (feet)
Sta. 11+13 to 13+51, Line "B"	238
Total	238

Overhead Fence, Replace	
Location	Length (feet)
Sta. 11+94 to 12+78, Line "B"	84
Total	84

INDIANA TOLL ROAD

GRAPE ROAD SIDEWALK REHABILITATION

SITE PLAN - NORTH OF TOLL ROAD



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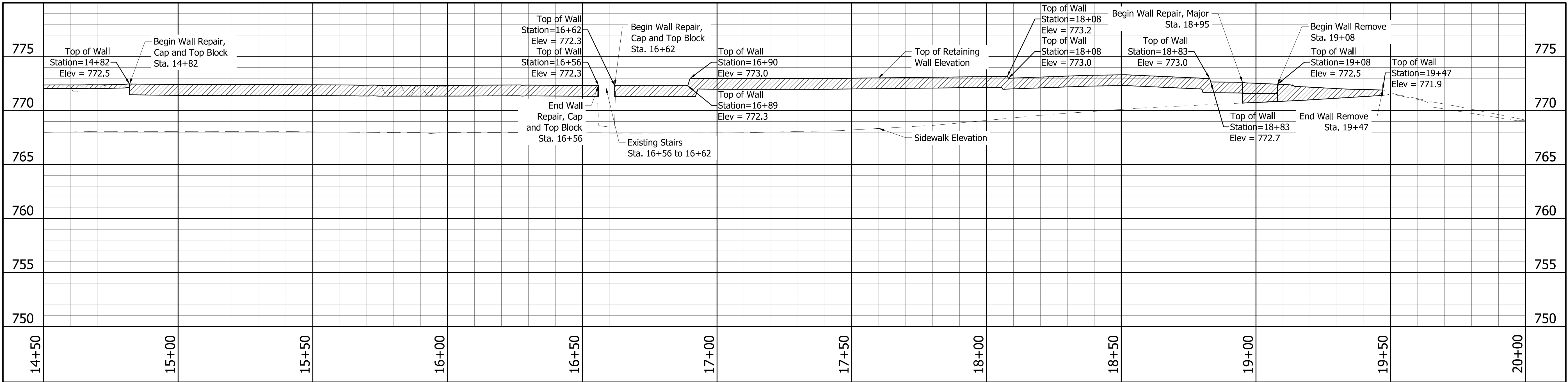
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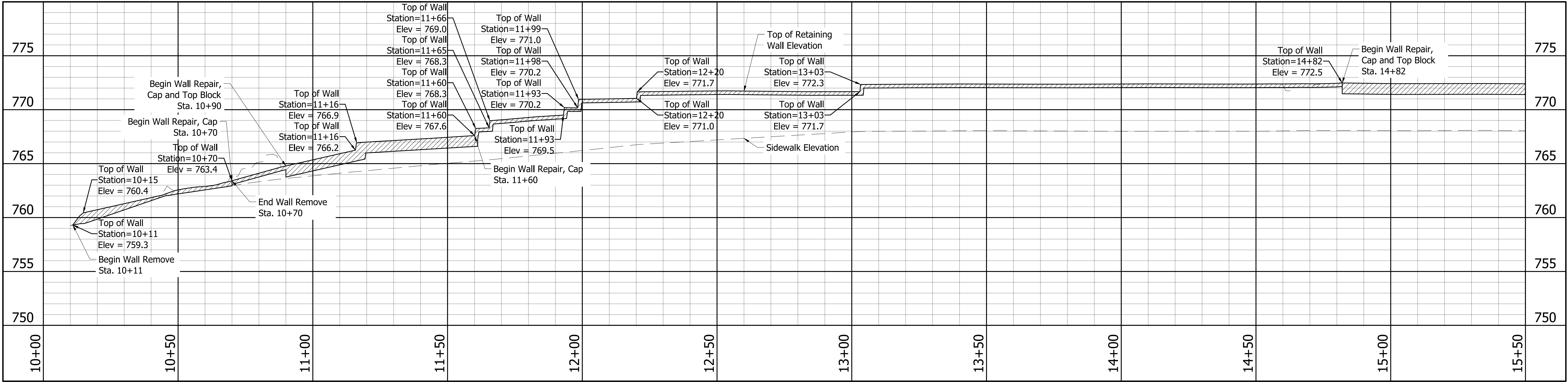
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- Construction Notes:**
- Erection of the modular block wall and aggregate for the wall shall be included in the Modular Block Wall pay item.
 - Modular Block Wall, Stain shall be a water-based, solvent-based, or concentrate stain or dye for exterior concrete walls manufactured by Sika Corporation or approved equal. Existing modular block walls shall be lightly mechanically abraded prior to staining. Surfaces shall be prepared and stained per the approved manufacturers' specifications.
 - Geogrid fabric shall be connected to the new modular block wall where applicable.



INDIANA TOLL ROAD

STRUCTURE 30-3 SAFETY IMPROVEMENTS

SOUTH OF TOLL ROAD - WALL PROFILE 'A'

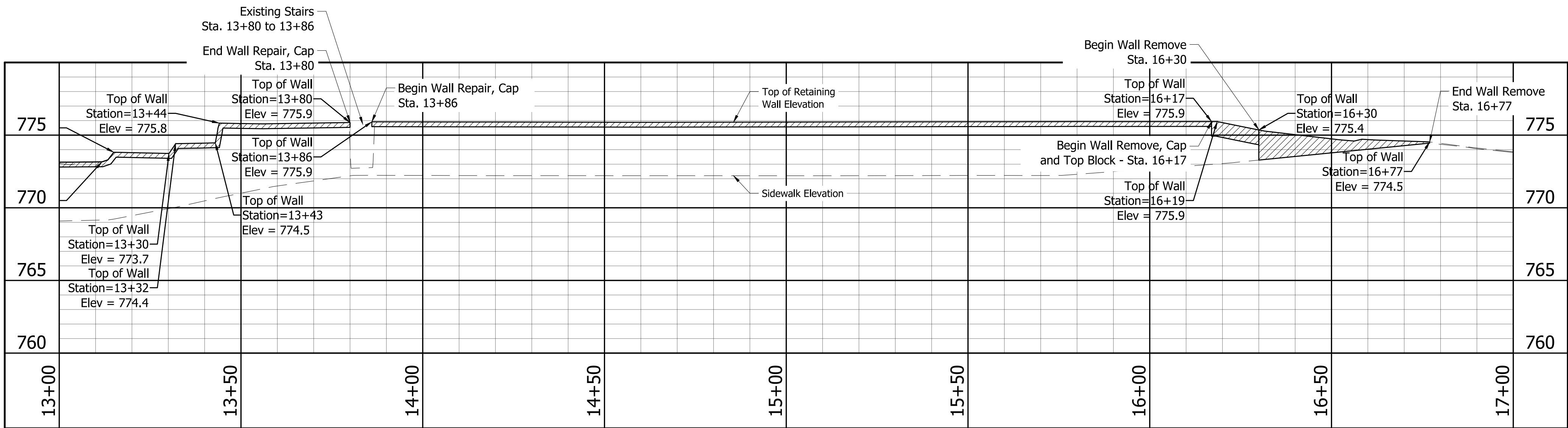


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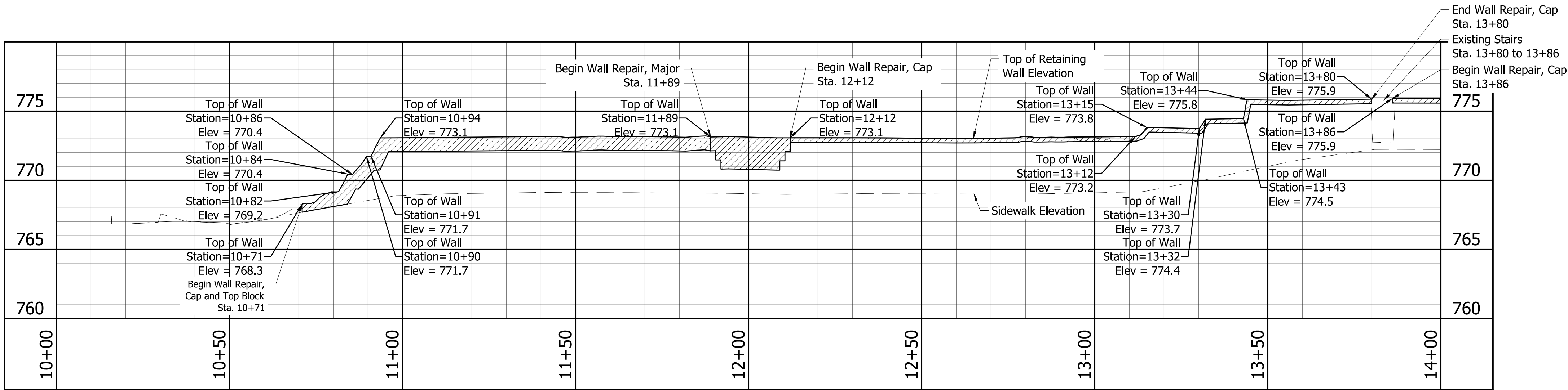
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WALL PROFILE - NORTH OF TOLL ROAD "B"
SCALE: 1" = 20'-0"



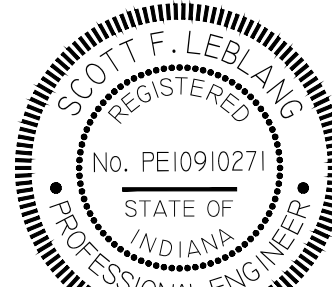
WALL PROFILE - NORTH OF TOLL ROAD "B"
SCALE: 1" = 20'-0"

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INDIANA TOLL ROAD

STRUCTURE 30-3 SAFETY
IMPROVEMENTS

NORTH OF TOLL ROAD - WALL PROFILE 'B'



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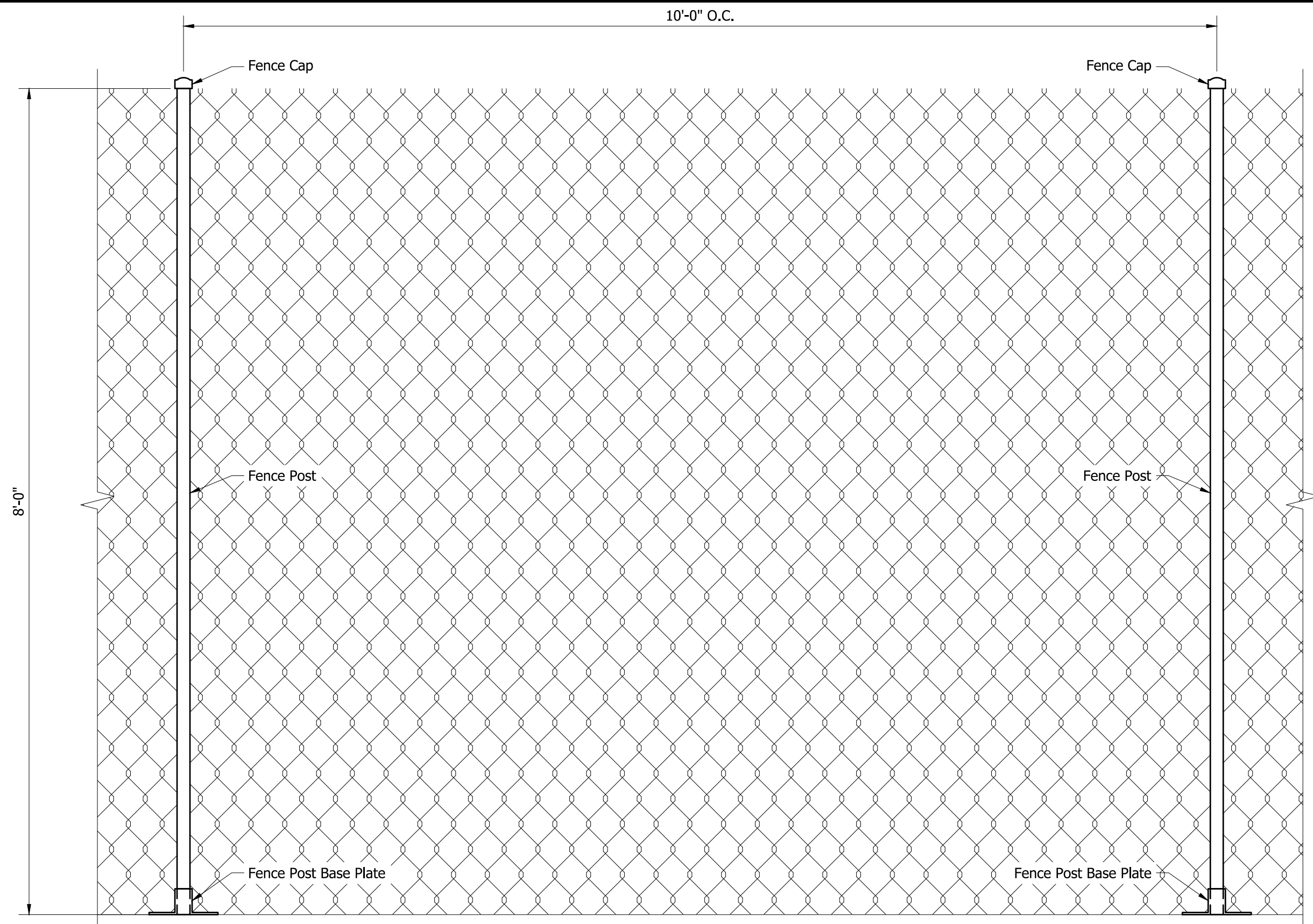


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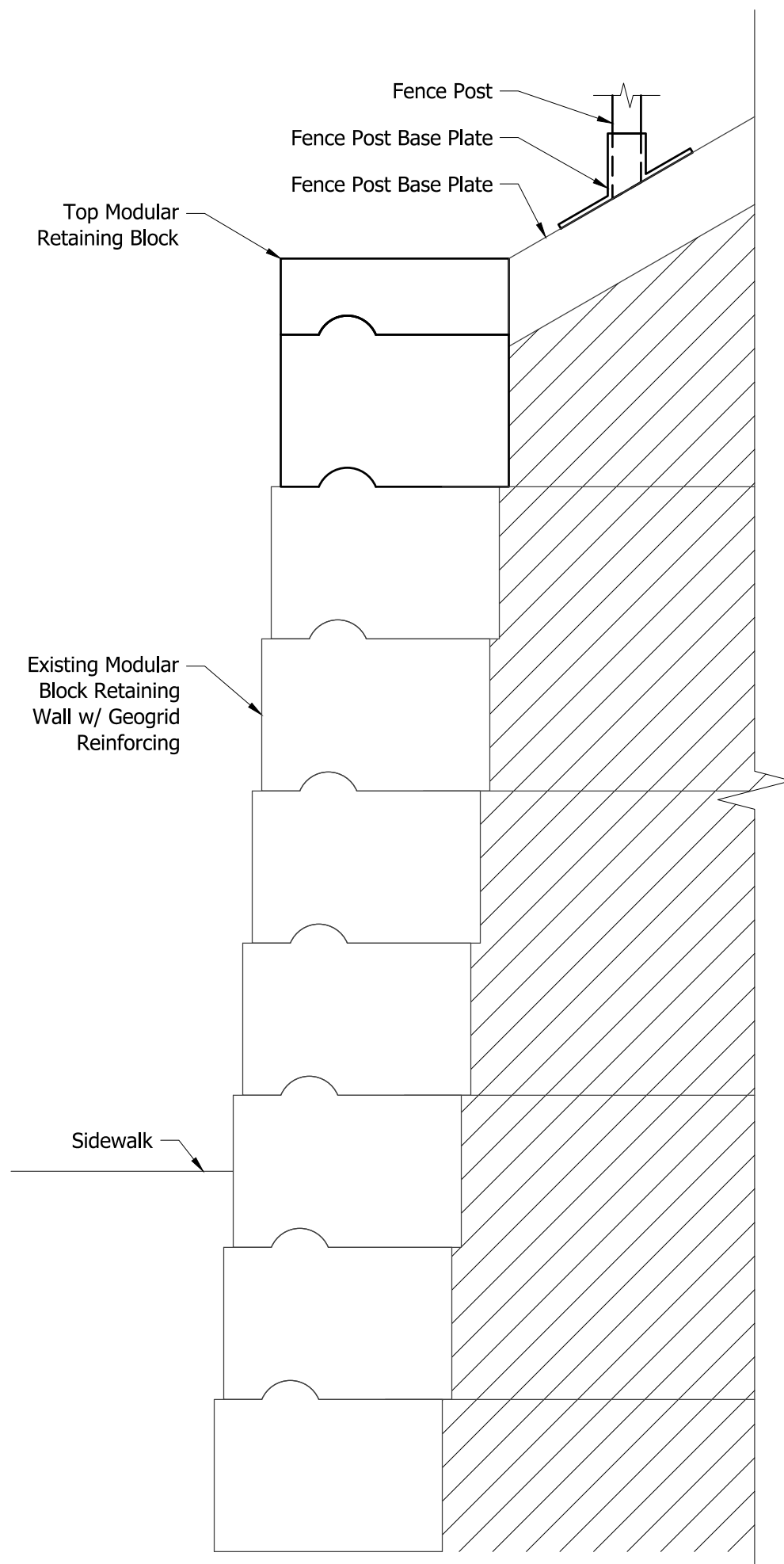
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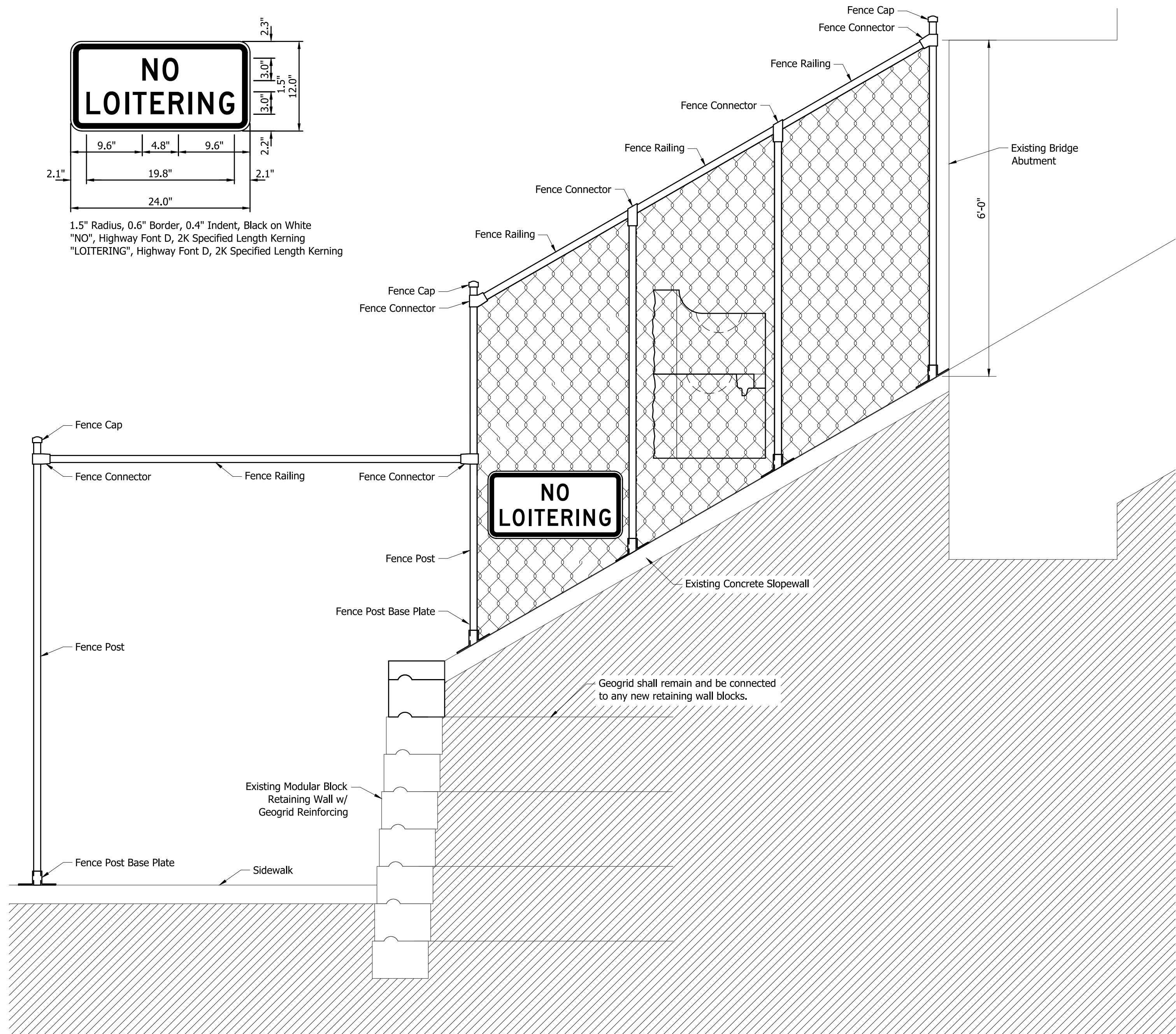
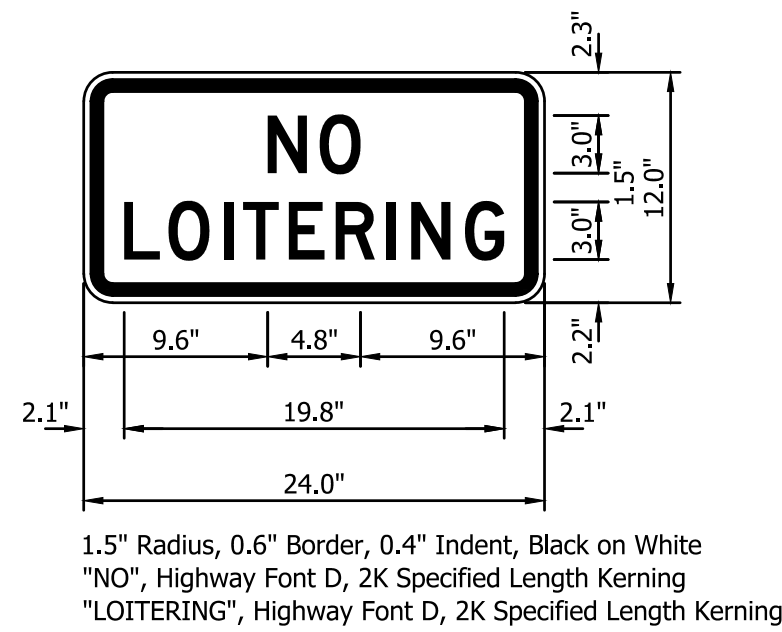
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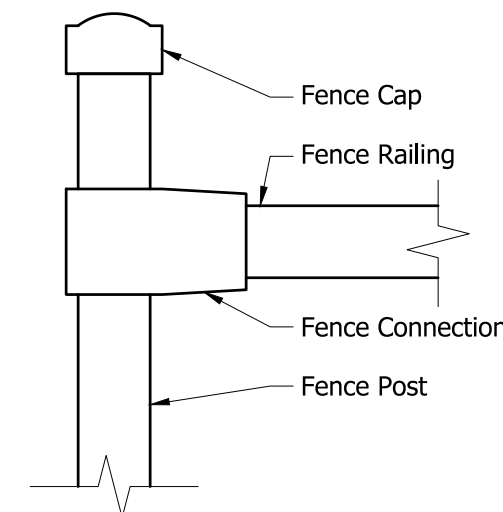
4 FENCE ELEVATION
14 Scale: 1" = 1'-0"



3 RETAINING WALL DETAIL
14 Scale: 1 1/2" = 1'-0"



1 OVERHEAD FENCE SECTION
14 Scale: 1" = 1'-0"



2 FENCE CONNECTION DETAILS
14 Scale: 3" = 1'-0"

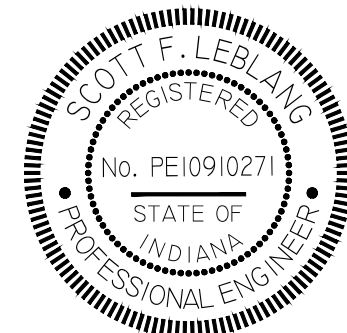
Construction Notes:

- Fence Posts Shall be 2 1/2" O.D. Posts at 10'-0" O.C. with Circular Iron Base with (4) - 1/2" Stainless Steel Anchor Bolts.
- Fence Posts Shall be 2 7/8" O.D. Posts at 5'-0" O.C. at Curves, Corners, and Terminal Posts with Circular Iron Base with (4) - 1/2" Stainless Steel Anchor Bolts.
- All Fittings and Connectors Shall be Galvanized Iron Fitting with Set Screws Manufactured by Kee Industrial Products or Approved Equal.
- All Fence Material Shall Meet INDOT Specifications Section 603. Fence posts shall be galvanized steel pipe in accordance with ASTM A53, Grade B. The fence fabric shall be aluminized chain link type with 1" mesh openings.
- "No Loitering" sheet sign shall be mounted to the fence, as shown. All bolts, brackets, and appurtenances for mounting the signs will not be paid for separately but shall be included in the cost of Sheet Sign. Signs shall constructed of 0.080 gauge aluminum.

INDIANA TOLL ROAD

STRUCTURE 30-3 SAFETY
IMPROVEMENTS

DETAILS



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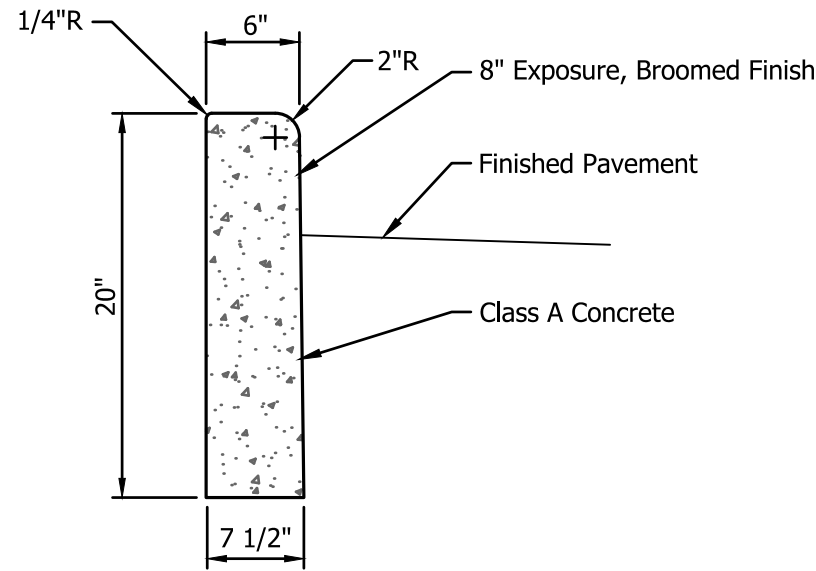
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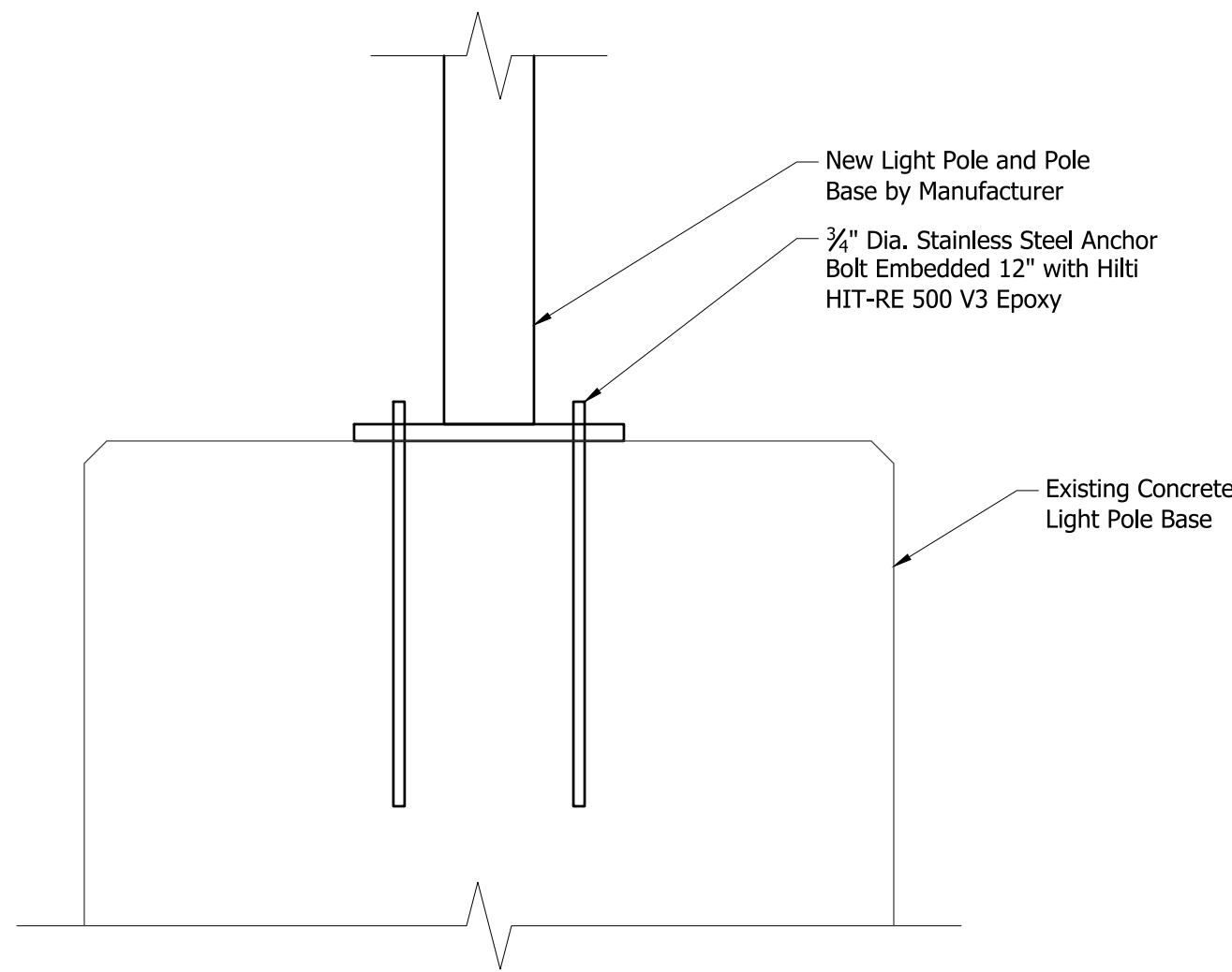
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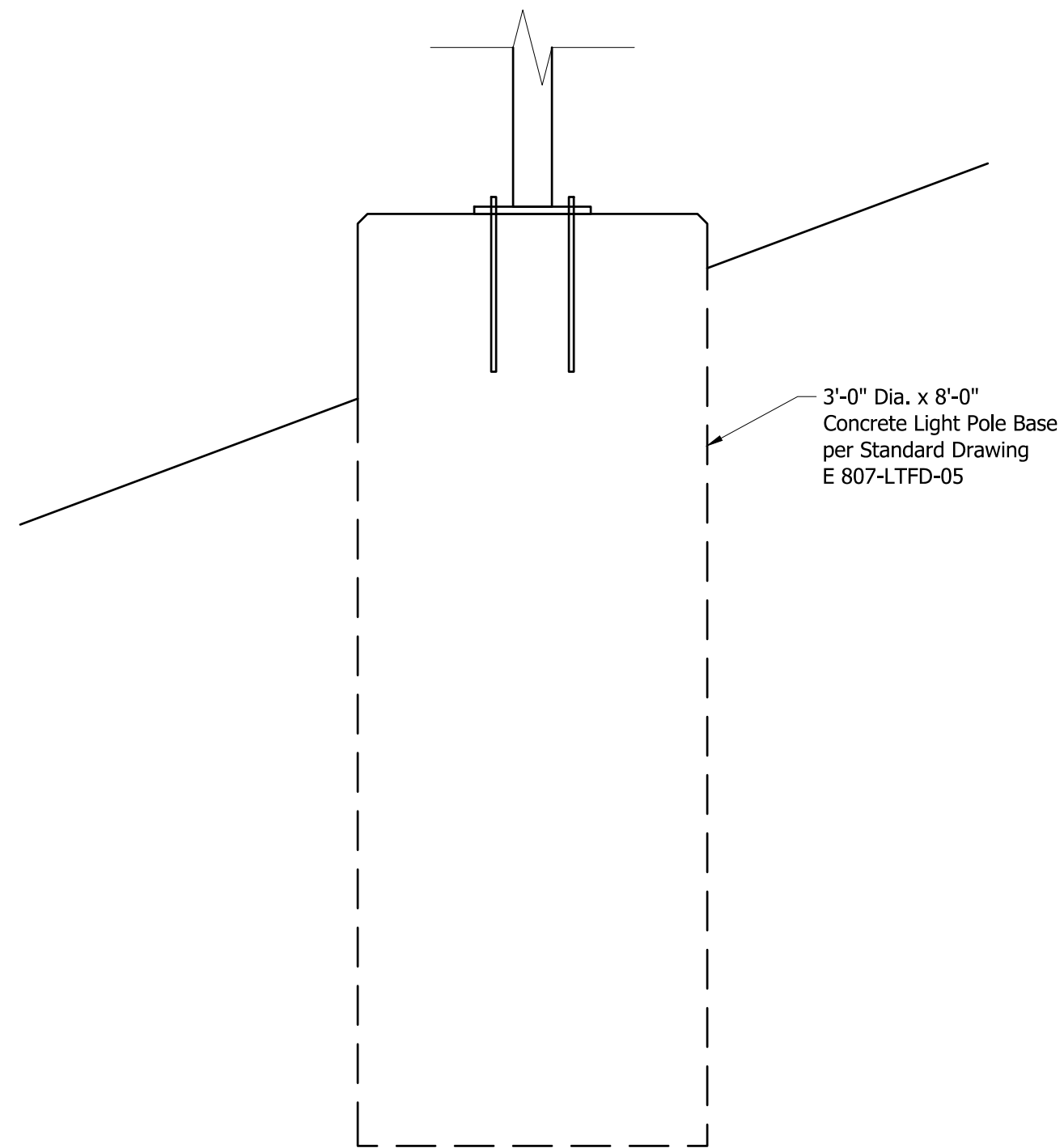
O:\PROJECTS\2025\25-1090 ITR GRAPE ROAD SIDEWALK REPAIR\20 CIVIL\24 CAD\PLANS\25-1090 DETAILS.DWG DETAILS (2) CHAD (NIP) 2/16/2026 9:57 AM



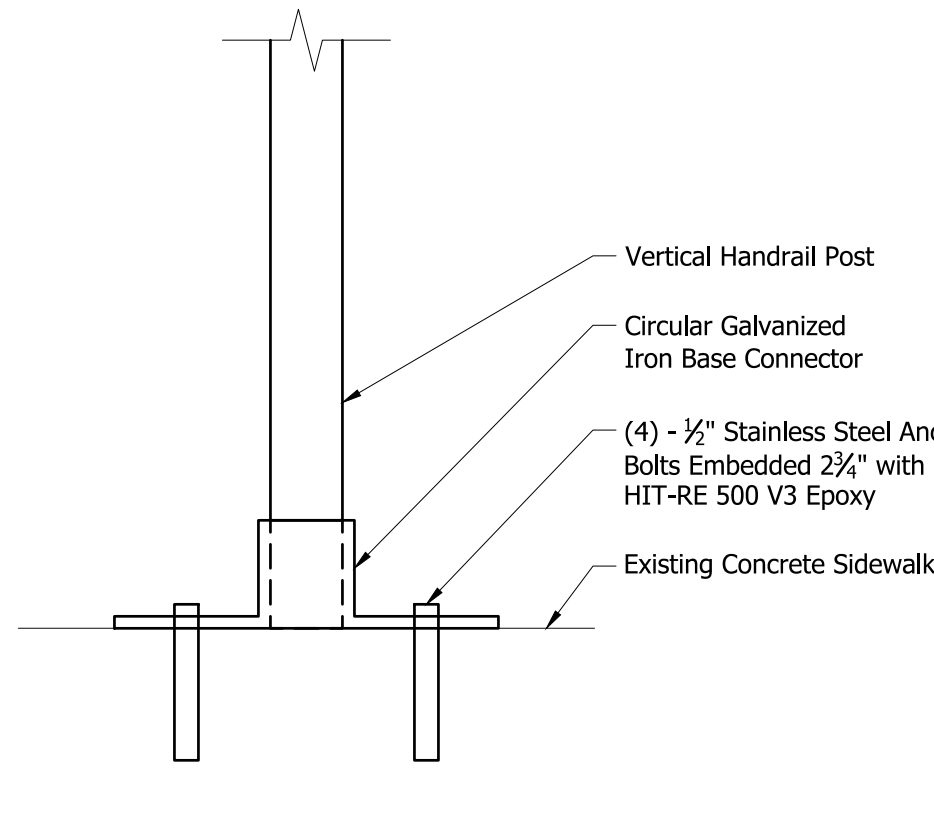
9 CURB, STANDARD
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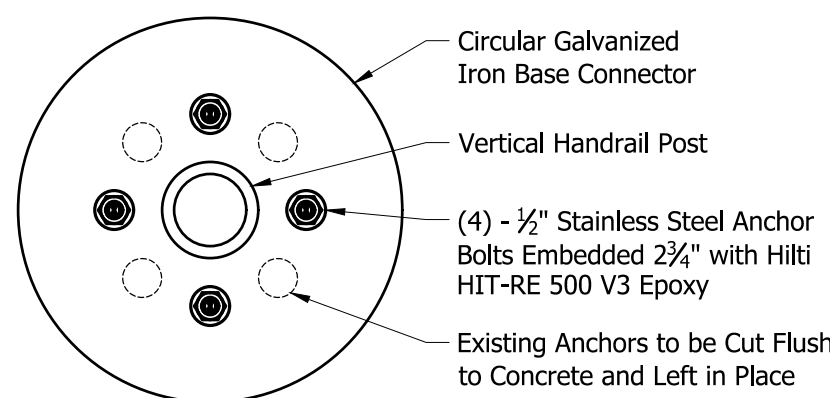
8 LIGHT POLE CONNECTION DETAIL
15 Scale: 3" = 1'-0"



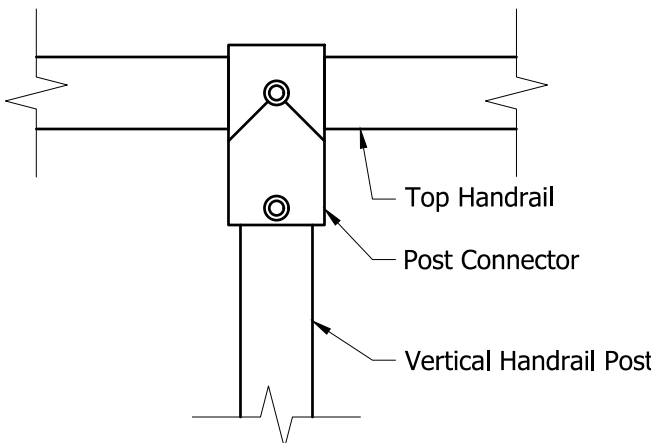
7 LIGHT POLE FOUNDATION DETAIL
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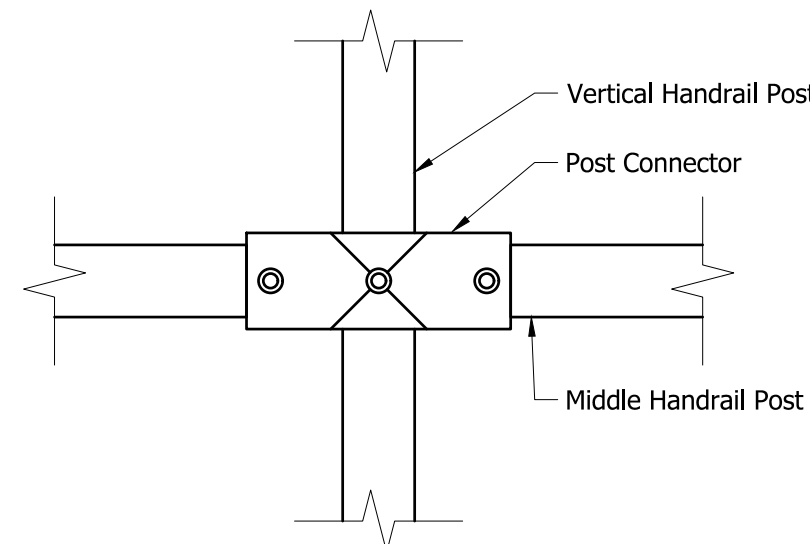
6 HANDRAIL CONNECTION DETAILS
15 Scale: 3" = 1'-0"



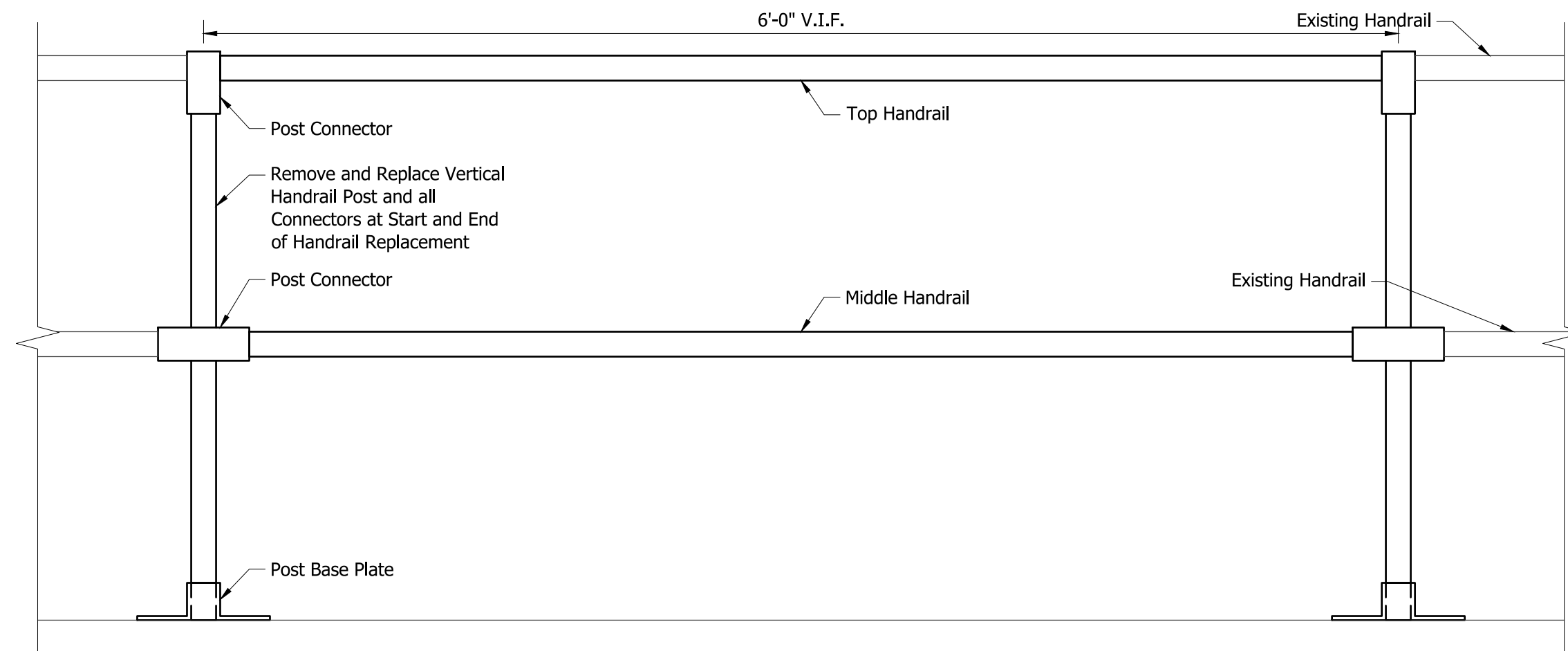
5 POST CONNECTION DETAIL
15 Scale: 3" = 1'-0"



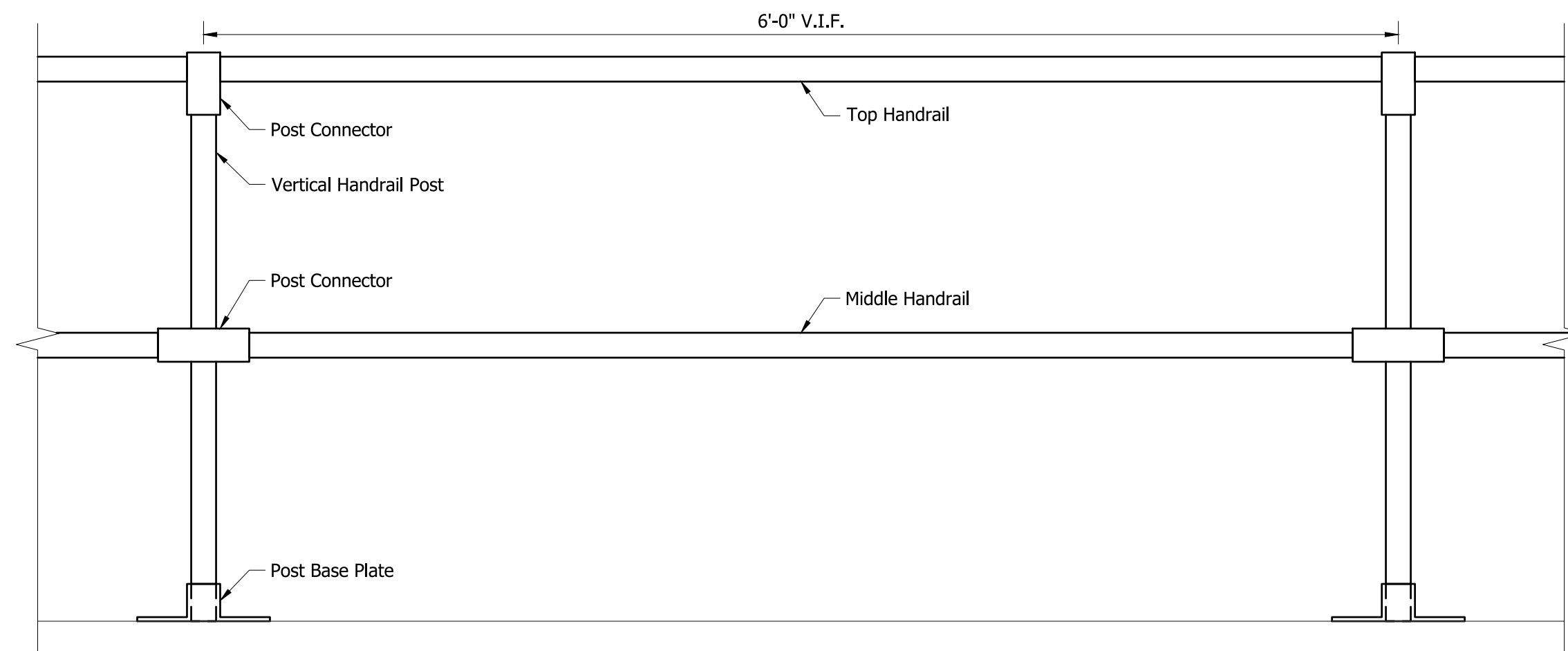
4 HANDRAIL CONNECTION DETAILS
15 Scale: 3" = 1'-0"



3 HANDRAIL CONNECTION DETAILS
15 Scale: 3" = 1'-0"



2 HANDRAIL ELEVATION
15 Scale: 1 1/2" = 1'-0"



1 HANDRAIL ELEVATION
15 Scale: 1 1/2" = 1'-0"

Construction Notes:

- 38" High Continuous Metal Hand Railing, Galvanized Steel with Iron Set Screw Fittings. Handrail shall match existing handrail.
- 38" Galvanized Steel Posts with Circular Iron Base with (4) - 1/2" Stainless Steel Anchor Bolts. Posts shall match existing handrail posts.
- All Fittings and Connectors Shall be Galvanized Iron Fittings with Set Screws Manufactured by Kee Industrial Products or Approved Equal.
- All Handrail Material Shall Meet INDOT Specifications Section 604. Handrail shall be galvanized steel pipe in accordance with ASTM A53, Grade B.
- Epoxy anchors shall all be threaded rods in accordance with ASTM F1154, Grade 36. Epoxy shall be Hilti HIT-RE 500 V3 epoxy. Holes shall be cleaned per manufacturer's specifications and anchors and epoxy shall be installed per manufacturer's specifications.

ABONMARCHÉ CONSULTANTS INC. 1001 J.P. GRAPE ROAD, SIDEWALK REPAIRS/ELECTRICAL SPECIFICATIONS ZACH HAUSERBERGER 2.19.2026 9:01 AM

260500 - GENERAL PROVISIONS

- ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST ADOPTED EDITION OF THE NATIONAL ELECTRIC CODE AND ALL AUTHORITIES HAVING JURISDICTION.
- ARRANGE FOR SERVICE INSTALLATIONS WITH UTILITY COMPANY AND OWNER TO PAY ANY CHARGES THAT ARE IMPOSED, SECURE AND PAY FOR ALL PERMITS AND FEES.
- ELECTRICAL CONTRACTOR SHALL COORDINATE WITH ALL OTHER TRADES FOR INSTALLATION OF ALL EQUIPMENT. FIELD VERIFICATION OF ALL DIMENSIONS IS REQUIRED, EXACT LOCATIONS, DISTANCES, AND LEVELS WILL BE GOVERNED BY ACTUAL FIELD CONDITIONS.
- PROVIDE ALL SUPERVISION, LABOR, MATERIALS, INSTRUMENTATION AND EQUIPMENT NECESSARY TO EFFECTIVELY TEST, MEASURE AND VERIFY THE PERFORMANCE OF THE ELECTRICAL EQUIPMENT SYSTEMS, TEST FOR GROUNDS AND SHORT CIRCUITS.
- PROVIDE SHOP DRAWINGS TO ENGINEER AND ARCHITECT FOR APPROVAL OF THE FOLLOWING PRODUCTS
 - NEW PANELBOARDS
 - MOTOR CONTROL EQUIPMENT
 - LIGHTING CONTROL DEVICES
 - LIGHTING FIXTURES
- WORK SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE.

260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

- CONDUCTOR SIZES AS SHOWN ON ONE-LINE DIAGRAM AND POWER DRAWINGS.
- COPPER BUILDING WIRE
 - DESCRIPTION: FLEXIBLE, INSULATED AND UNINSULATED, DRAWN COPPER CURRENT-CARRYING CONDUCTOR WITH AN OVERALL INSULATION LAYER OR JACKET, OR BOTH, RATED 600 V OR LESS.
- CONDUCTOR AND CABLE MARKING: COMPLY WITH WIRE AND CABLE MARKING ACCORDING TO UL'S "WIRE AND CABLE MARKING AND APPLICATION GUIDE."
- CONDUCTORS: COPPER, COMPLYING WITH ASTM B3 FOR BARE ANNEALED COPPER AND WITH ASTM B494 FOR STRANDED CONDUCTORS.
- CONDUCTOR INSULATION
 - TYPE THHN AND TYPE THWN-2: COMPLY WITH UL 83.
 - TYPE XHHW-2: COMPLY WITH UL 44.
- CONNECTORS AND SPLICES
 - DESCRIPTION: FACTORY-FABRICATED CONNECTORS, SPLICES, AND LUGS OF SIZE, AMPACITY RATING, MATERIAL, TYPE, AND CLASS FOR APPLICATION AND SERVICE INDICATED; LISTED AND LABELED AS DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FOR INTENDED LOCATION AND USE.
- EXECUTION
 - INSTALLATION, GENERAL
 - CONCEAL CABLES IN FINISHED WALLS, CEILINGS, AND FLOORS UNLESS OTHERWISE INDICATED.
 - USE MANUFACTURER-APPROVED PULLING COMPOUND OR LUBRICANT WHERE NECESSARY; COMPOUND USED MUST NOT DEGRADATE CONDUCTOR OR INSULATION, DO NOT EXCEED MANUFACTURER'S RECOMMENDED MAXIMUM PULLING TENSIONS AND SIDEWALL PRESSURE VALUES.
 - INSTALL EXPOSED CABLES PARALLEL AND PERPENDICULAR TO SURFACES OF EXPOSED STRUCTURAL MEMBERS, AND FOLLOW SURFACE CONTOURS WHERE POSSIBLE.
 - INSTALL SLEEVES AND SLEEVE SEALS AT PENETRATIONS OF EXTERIOR FLOOR AND WALL ASSEMBLIES.
 - IDENTIFICATION
 - IDENTIFY AND COLOR-CODE CONDUCTORS AND CABLES ACCORDING TO SECTION 260553 IDENTIFICATION FOR ELECTRICAL SYSTEMS.
 - IDENTIFY EACH SPARE CONDUCTOR AT EACH END WITH IDENTITY NUMBER AND LOCATION OF OTHER END OF CONDUCTOR, AND IDENTIFY AS SPARE CONDUCTOR

260524 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

- GROUNDING AND BONDING CONDUCTORS
 - EQUIPMENT GROUNDING CONDUCTOR
 - GENERAL CHARACTERISTICS: 600 V, THHN/THWN-2, COPPER OBTAINED COPPER WIRE OR CABLE, GREEN COLOR, IN ACCORDANCE WITH SECTION 260519 "LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES."
 - ASTM - BARE COPPER GROUNDING AND BONDING CONDUCTOR(COMPLY WITH ONE OR MORE OF THE FOLLOWING):
 - SOFT OR ANNEALED COPPER WIRE: ASTM B3
 - CONCENTRIC-LAY STRANDED COPPER CONDUCTOR: ASTM B8
 - TIN-COATED SOFT OR ANNEALED COPPER WIRE: ASTM B33
 - 19-WIRE COMBINATION UNILAY-STRANDED COPPER CONDUCTOR: ASTM B787/B787M.
- GROUNDING AND BONDING CLAMPS
 - DESCRIPTION: CLAMPS SUITABLE FOR ATTACHMENT OF GROUNDING AND BONDING CONDUCTORS TO GROUNDING ELECTRODES, PIPES, TUBING, AND REBAR. GROUNDING AND BONDING CLAMPS SPECIFIED IN THIS ARTICLE ARE ALSO SUITABLE FOR USE WITH COMMUNICATIONS APPLICATIONS; SEE SECTION 270526 "GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS;" FOR SELECTION AND INSTALLATION GUIDELINES.
- PERFORMANCE CRITERIA
 - GROUNDING AND BONDING EQUIPMENT: UL CCN KDER, INCLUDING UL 467.
 - GROUNDING AND BONDING EQUIPMENT FOR COMMUNICATIONS: UL CCN KDSH, INCLUDING UL 467.
- GROUNDING AND BONDING CONNECTORS
 - PERFORMANCE CRITERIA
 - GROUNDING AND BONDING EQUIPMENT: UL CCN KDER, INCLUDING UL 467.
 - GROUNDING AND BONDING EQUIPMENT FOR COMMUNICATIONS: UL CCN KDSH, INCLUDING UL 467.
- GROUNDING (EARTHING) ELECTRODES
 - DESCRIPTION: GROUNDING ELECTRODES INCLUDE METAL UNDERGROUND WATER PIPES, METAL BUILDING FRAMES, CONCRETE-ENCASED ELECTRODES, AND PIPE AND PLATE ELECTRODES.
- PERFORMANCE CRITERIA
 - GROUNDING AND BONDING EQUIPMENT: UL CCN KDER, INCLUDING UL 467.
- EXECUTION
 - SELECTION OF GROUNDING AND BONDING CONDUCTORS
 - CONDUCTORS: INSTALL SOLID CONDUCTOR FOR 8 AWG AND SMALLER, AND STRANDED CONDUCTORS FOR 6 AWG AND LARGER UNLESS OTHERWISE INDICATED.
 - CUSTOM-LENGTH INSULATED EQUIPMENT BONDING JUMPERS: 6 AWG, 19-STRAND, TYPE THHN.
 - BONDING CABLE: 28 KCMIL, 14 STRANDS OF 17 AWG CONDUCTOR, 1/4 INCH IN DIAMETER.
 - BONDING CONDUCTOR: 4 AWG OR 6 AWG, STRANDED CONDUCTOR.
 - BONDING JUMPER: COPPER TAPE, BRAIDED CONDUCTORS TERMINATED WITH COPPER FERRULES, 1-5/8 INCH WIDE AND 1/16 INCH THICK.
 - TINNED BONDING JUMPER: TINNED COPPER TAPE, BRAIDED CONDUCTORS TERMINATED WITH COPPER FERRULES, 1-5/8 INCH WIDE AND 1/16 INCH THICK.
 - SELECTION OF CONNECTORS
 - PIPE AND EQUIPMENT GROUNDING CONDUCTOR TERMINATIONS: BOLTED CONNECTORS.
 - UNDERGROUND CONNECTIONS: WELDED CONNECTORS EXCEPT AT TEST WELLS AND AS OTHERWISE INDICATED.
 - CONNECTIONS TO GROUND RODS AT TEST WELLS: BOLTED CONNECTORS.
 - CONNECTIONS TO STRUCTURAL STEEL: WELDED CONNECTORS.
- INSTALLATION:
 - SPECIAL TECHNIQUES:
 - CONDUCTORS:
 - ROUTE ALONG SHORTEST AND STRAIGHTEST PATHS POSSIBLE UNLESS OTHERWISE INDICATED OR REQUIRED BY CODE, AVOID OBSTRUCTING ACCESS OR PLACING CONDUCTORS WHERE THEY MAY BE SUBJECTED TO STRAIN, IMPACT, OR DAMAGE.
 - CONNECTIONS: MAKE CONNECTIONS SO POSSIBILITY OF GALVANIC ACTION OR ELECTROLYSIS IS MINIMIZED. SELECT CONNECTORS, CONNECTION HARDWARE, CONDUCTORS, AND CONNECTION METHODS SO METALS IN DIRECT CONTACT ARE GALVANICALLY COMPATIBLE.
 - USE ELECTROPLATED OR HOT-TIN-COATED MATERIALS TO ENSURE HIGH CONDUCTIVITY AND TO MAKE CONTACT POINTS CLOSER IN ORDER OF GALVANIC SERIES.
 - MAKE CONNECTIONS WITH CLEAN, BARE METAL AT POINTS OF CONTACT.
 - BONDING STRAPS AND JUMPERS: INSTALL IN LOCATIONS ACCESSIBLE FOR INSPECTION AND MAINTENANCE EXCEPT WHERE ROUTED THROUGH SHORT LENGTHS OF CONDUIT.
 - BONDING TO STRUCTURE: BOND STRAPS DIRECTLY TO BASIC STRUCTURE, TAKING CARE NOT TO PENETRATE ADJACENT PARTS.
 - USE EXOTHERMIC-WELDED CONNECTORS FOR OUTDOOR LOCATIONS; IF DISCONNECT-TYPE CONNECTION IS REQUIRED, USE BOLTED CLAMP.
 - GROUNDING AND BONDING FOR PIPING:
 - METAL WATER SERVICE PIPE: INSTALL INSULATED COPPER GROUNDING CONDUCTORS, IN CONDUIT, FROM BUILDING'S MAIN SERVICE EQUIPMENT, OR GROUNDING BUS, TO MAIN METAL WATER SERVICE ENTRANCES TO BUILDING.
 - CONNECT GROUNDING CONDUCTORS TO MAIN METAL WATER SERVICE PIPES; USE BOLTED CLAMP CONNECTOR OR BOLT LUG-TYPE CONNECTOR TO PIPE FLANGE BY USING ONE OF LUG BOLTS OF FLANGE, WHERE DIELECTRIC MAIN WATER FITTING IS INSTALLED. CONNECT GROUNDING CONDUCTOR ON STREET SIDE OF FITTING.
 - BOND METAL GROUNDING CONDUCTOR CONDUIT OR SLEEVE TO CONDUCTOR AT EACH END.
 - WATER METER PIPING: USE BRAIDED-TYPE BONDING JUMPERS TO ELECTRICALLY BYPASS WATER METERS. CONNECT TO PIPE WITH BOLTED CONNECTOR
 - BOND EACH ABOVEGROUND PORTION OF GAS PIPING SYSTEM DOWNSTREAM FROM EQUIPMENT SHUTOFF VALVE.

B. ELECTRODES:

- GROUND RODS: DRIVE RODS UNTIL TOPS ARE 2 INCH BELOW FINISHED FLOOR OR FINAL GRADE UNLESS OTHERWISE INDICATED.
- INTERCONNECT GROUND RODS WITH GROUNDING ELECTRODE CONDUCTOR BELOW GRADE AND AS OTHERWISE INDICATED. MAKE CONNECTIONS WITHOUT EXPOSING STEEL OR DAMAGING COATING IF ANY.
- USE EXOTHERMIC WELDS FOR BELOW-GRADE CONNECTIONS.
- FOR GROUNDING ELECTRODE SYSTEM, INSTALL AT LEAST THREE RODS SPACED AT LEAST ONE-ROD LENGTH FROM EACH OTHER AND LOCATED AT LEAST SAME DISTANCE FROM OTHER GROUNDING ELECTRODES, AND CONNECT TO SERVICE GROUNDING ELECTRODE CONDUCTOR.
- CONCRETE-ENCASED ELECTRODE (JUFER GROUND):
 - FABRICATE IN ACCORDANCE WITH NFPA 70; USE MINIMUM OF 20 FT OF BARE COPPER CONDUCTOR NOT SMALLER THAN 4 AWG.
- GROUNDING AT SERVICE:
 - EQUIPMENT GROUNDING CONDUCTORS AND GROUNDING ELECTRODE CONDUCTORS MUST BE CONNECTED TO GROUND BUS. INSTALL MAIN BONDING JUMPER BETWEEN NEUTRAL AND GROUND BUSES.
- EQUIPMENT GROUND
 - INSTALL INSULATED EQUIPMENT GROUNDING CONDUCTORS WITH FEEDERS AND BRANCH CIRCUITS.

260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

- SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS
 - STEEL SLOTTED SUPPORT SYSTEMS, PERFORMED STEEL CHANNELS AND ANGLES WITH MINIMUM 13/32 INCH DIAMETER HOLES AT A MAXIMUM OF 8 INCH ON CENTER IN AT LEAST ONE SURFACE.
 - CONDUIT AND CABLE SUPPORT DEVICES: STEEL STEEL AND MALLEABLE-IRON STAINLESS STEEL, GLASS-FIBER-RESIN HANGERS, CLAMPS, AND ASSOCIATED FITTINGS, DESIGNED FOR TYPES AND SIZES OF RACEWAY OR CABLE TO BE SUPPORTED.
 - SUPPORT FOR CONDUCTORS IN VERTICAL CONDUIT: FACTORY-FABRICATED ASSEMBLY CONSISTING OF THREADED BODY AND INSULATING WEDGING PLUG OR PLUGS FOR NONARMORED ELECTRICAL CONDUCTORS OR CABLES IN RISER CONDUITS. PLUGS MUST HAVE NUMBER, SIZE, AND SHAPE OF CONDUCTOR GRIPPING PIECES AS REQUIRED TO SUIT INDIVIDUAL CONDUCTORS OR CABLES SUPPORTED. BODY MUST BE MADE OF MALLEABLE IRON.
 - STRUCTURAL STEEL FOR FABRICATED SUPPORTS AND RESTRAINTS: ASTM A36/A36M STEEL PLATES, SHAPES, AND BARS; BLACK AND GALVANIZED.
 - FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES
 - DESCRIPTION: WELDED OR BOLTED STRUCTURAL-STEEL SHAPES, SHOP OR FIELD FABRICATED TO FIT DIMENSIONS OF SUPPORTED EQUIPMENT.
- EXECUTION
 - INSTALLATION OF SUPPORTS
 - COMPLY WITH NECA NEBS 101 FOR INSTALLATION REQUIREMENTS EXCEPT AS SPECIFIED IN THIS ARTICLE.
 - RACEWAY SUPPORT METHODS: IN ADDITION TO METHODS DESCRIBED IN NECA NEBS 1, EMT MAY BE SUPPORTED BY OPENINGS THROUGH STRUCTURE MEMBERS, IN ACCORDANCE WITH NFPA 70; MOUNTING AND ANCHORAGE OF SURFACE-MOUNTED EQUIPMENT AND COMPONENTS, ANCHOR AND FASTEN ELECTRICAL ITEMS AND THEIR SUPPORTS TO BUILDING STRUCTURAL ELEMENTS BY THE FOLLOWING METHODS UNLESS OTHERWISE INDICATED BY CODE:
 - TO NEW CONCRETE: BOLT TO CONCRETE INSERTS.
 - TO MASONRY: APPROVED TOGGLE-TYPE BOLTS ON HOLLOW MASONRY UNITS AND EXPANSION ANCHOR FASTENERS ON SOLID MASONRY UNITS.
 - TO EXISTING CONCRETE: EXPANSION ANCHOR FASTENERS.
 - TO STEEL BEAM CLAMPS (MSS SP-98, TYPE 19, 21, 23, 25, OR 27), COMPLYING WITH MSS SP-49.
 - TO LIGHT STEEL: SHEET METAL SCREWS.
 - ITEMS MOUNTED ON HOLLOW WALLS AND NONSTRUCTURAL BUILDING SURFACES: MOUNT CABINETS, PANELBOARDS, DISCONNECT SWITCHES, CONTROL ENCLOSURES, PULL AND JUNCTION BOXES, TRANSFORMERS, AND OTHER DEVICES ON SLOTTED-CHANNEL RACKS ATTACHED TO SUBSTRATE.
- INSTALLATION OF FABRICATED METAL SUPPORTS
 - CUT, FIT, AND PLACE MISCELLANEOUS METAL SUPPORTS ACCURATELY IN LOCATION, ALIGNMENT, AND ELEVATION TO SUPPORT AND ANCHOR ELECTRICAL MATERIALS AND EQUIPMENT.
 - FIELD WELDING: COMPLY WITH AWS D1.1/D1.1M. SUBMIT WELDING CERTIFICATES.
- CONCRETE BASES
 - ANCHOR EQUIPMENT TO CONCRETE BASE AS FOLLOWS:
 - PLACE AND SECURE ANCHORAGE DEVICES. USE SUPPORTED EQUIPMENT MANUFACTURER'S SETTING DRAWINGS, TEMPLATES, DIAGRAMS, INSTRUCTIONS, AND DIRECTIONS FURNISHED WITH ITEMS TO BE EMBEDDED.
 - INSTALL ANCHOR BOLTS TO ELEVATIONS REQUIRED FOR PROPER ATTACHMENT TO SUPPORTED EQUIPMENT.
 - INSTALL ANCHOR BOLTS ACCORDING TO ANCHOR-BOLT MANUFACTURER'S WRITTEN INSTRUCTIONS.

260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

- COMPLY WITH NECA 1 AND NECA 101 FOR INSTALLATION REQUIREMENTS EXCEPT WHERE REQUIREMENTS ON DRAWINGS OR IN THIS ARTICLE ARE STRICTER. COMPLY WITH NFPA 70 LIMITATIONS FOR TYPES OR RACEWAYS ALLOWED IN SPECIFIC OCCUPANCIES AND NUMBER OF FLOORS.
- PROVIDE CONDUIT TYPES AS SHOWN BELOW:
 - OUTDOORS:
 - EXPOSED AND SUBJECT TO PHYSICAL DAMAGE: ERM/C.
 - EXPOSED AND NOT SUBJECT TO PHYSICAL DAMAGE: CORROSION-RESISTANT EMT.
 - CONCEALED CONDUIT, ABOVEGROUND: EMT.
 - DIRECT BURIED: PVC-80/PVC.
 - CONNECTION TO VIBRATING EQUIPMENT (INCLUDING TRANSFORMERS AND HYDRAULIC, PNEUMATIC, ELECTRIC SOLENOID, OR MOTOR-DRIVEN EQUIPMENT: LFMC.
 - SERVICE CONDUITS: RIGID GALVANIZED STEEL.
 - MINIMUM RACEWAY SIZE: 3/4-INCH (16-MM) TRADE SIZE.
- PROVIDE BOX TYPES AS SHOWN BELOW:
 - OUTDOORS:
 - TYPE 3R UNLESS OTHERWISE INDICATED.
 - INDOORS:
 - TYPE 1 UNLESS OTHERWISE INDICATED.
- EXECUTION
 - REFERENCE STANDARDS FOR INSTALLATION: UNLESS MORE STRINGENT INSTALLATION REQUIREMENTS ARE SPECIFIED IN CONTRACT DOCUMENTS OR MANUFACTURER'S PUBLISHED INSTRUCTIONS, COMPLY WITH THE FOLLOWING:
 - TYPE EMT: ARTICLE 358 OF NFPA 70 AND NECA NEBS 101.
 - TYPE ERM/C: ARTICLE 344 OF NFPA 70 AND NECA NEBS 101.
 - TYPE RMC: ARTICLE 348 OF NFPA 70 AND NECA NEBS 101.
 - TYPE LFMC: ARTICLE 350 OF NFPA 70 AND NECA NEBS 101.
 - TYPE PVC: ARTICLE 356 OF NFPA 70 AND NECA NEBS 11.1.
 - EXPANSION FITTINGS: NEMA FB 2.40.
 - INSTALLATION OF CONDUIT:
 - SPECIAL INSTALLATION TECHNIQUES:
 - DO NOT INSTALL CONDUITS WITHIN 2 INCH OF THE BOTTOM SIDE OF A METAL DECK ROOF.
 - CUT CONDUIT PERPENDICULAR TO THE LENGTH, FOR CONDUITS METRIC DESIGNATOR 53 (TRADE SIZE 2) AND LARGER, USE ROLL CUTTER OR A GUIDE TO MAKE CUT STRAIGHT AND PERPENDICULAR TO THE LENGTH. REAM INSIDE OF CONDUIT TO REMOVE BURRS.
 - INSTALL PULL WIRES IN EMPTY DUCT RACEWAYS. PROVIDE POLYPROPYLENE OR MONOFILAMENT PLASTIC LINE WITH NOT LESS THAN 20 LB TENSILE STRENGTH. LEAVE AT LEAST 12 INCH OF SLACK AT BOTH ENDS OF PULL WIRE. CAP UNDERGROUND DUCT RACEWAYS DESIGNATED AS SPARE ABOVE GRADE ALONGSIDE DUCT RACEWAYS IN USE.
 - TYPES ERM/C:
 - THREADED CONDUIT JOINTS, EXPOSED TO WET, DAMP, CORROSIVE, OR OUTDOOR CONDITIONS, APPLY LISTED COMPOUND THAT MAINTAINS ELECTRICAL CONDUCTIVITY TO THREADS OF DUCT RACEWAY AND FITTINGS BEFORE MAKING UP JOINTS. FOLLOW COMPOUND MANUFACTURER'S PUBLISHED INSTRUCTIONS.
 - TYPES RMC, LFMC, AND LFNC:
 - PROVIDE A MAXIMUM OF 72 INCH OF FLEXIBLE CONDUIT FOR EQUIPMENT SUBJECT TO VIBRATION, NOISE TRANSMISSION, OR MOVEMENT; AND FOR TRANSFORMERS AND MOTORS.
 - TYPES PVC:
 - DO NOT INSTALL TYPE PVC, TYPE HDPE, OR TYPE EPEC CONDUIT WHERE AMBIENT TEMPERATURE EXCEEDS 122 DEG F. CONDUCTOR RATINGS MUST BE LIMITED TO 75 DEG C EXCEPT WHERE INSTALLED IN A TRENCH OUTSIDE BUILDINGS WITH CONCRETE ENCASMENT, WHERE 90 DEG C CONDUCTORS ARE PERMITTED.
 - COVERS FOR ELECTRICAL SYSTEMS: WELDING AND FITTINGS.

C. INSTALLATION OF BOXES AND COVERS FOR ELECTRICAL SYSTEMS

- REFERENCE STANDARDS FOR INSTALLATION:
 - OUTLET, DEVICE, PULL AND JUNCTION BOXES: ARTICLE 314 OF NFPA 70.
- SPECIAL INSTALLATION TECHNIQUES:
 - PROVIDE BOXES IN WIRING AND RACEWAY SYSTEMS WHEREVER REQUIRED WITHOUT FILING OF WIRES, MAKING CONNECTIONS, AND MOUNTING OF DEVICES OR FIXTURES.
- MOUNT BOXES AT HEIGHTS INDICATED ON DRAWINGS. IF MOUNTING HEIGHTS OF BOXES ARE NOT INDIVIDUALLY INDICATED, GIVE PRIORITY TO ADA REQUIREMENTS. INSTALL BOXES WITH HEIGHT MEASURED TO CENTER OF BOX UNLESS OTHERWISE INDICATED.
- HORIZONTALLY SEPARATE BOXES MOUNTED ON OPPOSITE SIDES OF WALLS SO THEY ARE NOT IN THE SAME VERTICAL CHANNEL.
- LOCATE BOXES SO THAT COVER OR PLATE WILL NOT SPAN DIFFERENT BUILDING FINISHES.
- SUPPORT BOXES IN RECESSED CEILINGS INDEPENDENT OF CEILING TILES AND CEILING GRID.
- SUPPORT BOXES OF THREE GANGS OR MORE FROM MORE THAN ONE SIDE BY SPANNING TWO FRAMING MEMBERS OR MOUNTING ON BRACKETS SPECIFICALLY DESIGNED FOR PURPOSE.
- FASTEN JUNCTION AND PULL BOXES TO, OR SUPPORT FROM, BUILDING STRUCTURE. DO NOT SUPPORT BOXES BY CONDUITS.
- SET NONMETALLIC FLOOR BOXES LEVEL, TRIM AFTER INSTALLATION TO FIT FLUSH WITH FINISHED FLOOR SURFACE.
- INTERFACES WITH OTHER WORK:
 - COORDINATE WITH SECTION 260529 "HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS" FOR INSTALLATION OF CONDUIT HANGERS AND SUPPORTS, INSTALLATION OF BOXES AND
- CLEANING
 - REMOVE CONSTRUCTION DUST AND DEBRIS FROM BOXES BEFORE INSTALLING WALLPLATES, COVERS, AND HOODS.

260544 - SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLEING

- EXECUTION
 - INSTALLATION OF SLEEVES FOR NON-FIRE RATED ELECTRICAL PENETRATIONS:
 - INTERIOR PENETRATION OF NON-FIRE RATED WALLS AND FLOORS
 - SEAL SPACE OUTSIDE OF SLEEVES WITH MORTAR OR GROUT. PACK SEALING MATERIAL SOLIDLY BETWEEN SLEEVE AND WALL OR FLOOR SO NO VOIDS REMAIN. TOOL EXPOSED SURFACES SMOOTH; PROTECT MATERIAL WHILE CURING.
 - SEAL ANNULAR SPACE BETWEEN SLEEVE AND RACEWAY OR CABLE, USING JOINT SEALANT APPROPRIATE FOR SIZE, DEPTH, AND LOCATION OF JOINT. COMPLY WITH REQUIREMENTS IN SECTION 079200 "JOINT SEALANTS."
 - USE PIPE SLEEVES UNLESS PENETRATION ARRANGEMENT REQUIRES RECTANGULAR SLEEVED OPENING.
 - SIZE PIPE SLEEVES TO PROVIDE 1/4 INCH ANNULAR CLEAR SPACE BETWEEN SLEEVE AND RACEWAY OR CABLE, UNLESS SLEEVE-SEAL SYSTEM IS TO BE INSTALLED.
 - INSTALL SLEEVES FOR WALL PENETRATIONS UNLESS CORE-DRILLED HOLES OR FORMED OPENINGS ARE USED. INSTALL SLEEVES DURING ERECTION OF WALLS. CUT SLEEVE TO LENGTH FOR MOUNTING FLUSH WITH BOTH SURFACES OF WALLS. DEBURR AFTER CUTTING.
 - INSTALL SLEEVES FOR FLOOR PENETRATIONS. EXTEND SLEEVES INSTALLED IN FLOORS 2 INCH ABOVE FINISHED FLOOR LEVEL. INSTALL SLEEVES DURING ERECTION OF FLOORS.
- SLEEVES FOR CONDUITS PENETRATING NON-FIRE-RATED WALL ASSEMBLIES:
 - USE CIRCULAR METAL SLEEVES UNLESS PENETRATION ARRANGEMENT REQUIRES RECTANGULAR SLEEVED OPENING.
 - SEAL SPACE OUTSIDE OF SLEEVES WITH APPROVED JOINT COMPOUND FOR WALL ASSEMBLIES.
- ABOVE GROUND, EXTERIOR-WALL PENETRATIONS: SEAL PENETRATIONS USING STEEL PIPE SLEEVES AND MECHANICAL SLEEVE-SEAL SYSTEMS. SIZE SLEEVES TO ALLOW FOR 1 INCH ANNULAR CLEAR SPACE BETWEEN PIPE AND SLEEVE FOR INSTALLING MECHANICAL SLEEVE SEALS.
- UNDERGROUND, EXTERIOR-WALL AND FLOOR PENETRATIONS:
 - INSTALL STEEL PIPE SLEEVES WITH INTEGRAL WATERSTOPS. SIZE SLEEVES TO ALLOW FOR 1 INCH ANNULAR CLEAR SPACE BETWEEN RACEWAY OR CABLE AND SLEEVE FOR INSTALLING SLEEVE-SEAL SYSTEM. INSTALL SLEEVE DURING CONSTRUCTION OF FLOOR OR WALL.
 - INSTALL STEEL PIPE SLEEVES. SIZE SLEEVES TO ALLOW FOR 1 INCH ANNULAR CLEAR SPACE BETWEEN RACEWAY OR CABLE AND SLEEVE FOR INSTALLING SLEEVE-SEAL SYSTEM. GROUT SLEEVE INTO WALL OR FLOOR OPENING.
- INSTALLATION OF RECTANGULAR SLEEVES AND SLEEVE SEALS
 - INSTALL SLEEVES IN EXISTING WALLS WITHOUT COMPROMISING STRUCTURAL INTEGRITY OF WALLS. DO NOT CUT STRUCTURAL ELEMENTS WITHOUT REINFORCING THE WALL TO MAINTAIN THE DESIGNED WEIGHT BEARING AND WALL STIFFNESS.
 - INSTALL CONDUITS AND CABLE WITH NO CROSSINGS WITHIN THE SLEEVE.
 - FILL OPENING AROUND CONDUITS AND CABLES WITH EXPANDING FOAM WITHOUT LEAVING VOIDS.
- PROVIDE METAL SHEET COVERING AT BOTH WALL SURFACES AND FINISH TO MATCH SURROUNDING SURFACES. METAL SHEET MUST BE SAME MATERIAL AS SLEEVE.

260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

- COLOR AND LEGEND REQUIREMENTS
 - RACEWAYS AND CABLES CARRYING CIRCUITS AT 1000 V OR LESS:
 - BLACK LETTERS ON ORANGE FIELD.
 - LEGEND: INDICATE VOLTAGE AND SYSTEM OR SERVICE TYPE.
 - COLOR-CODING FOR PHASE- AND VOLTAGE-LEVEL IDENTIFICATION, 1000 V OR LESS: USE COLORS LISTED BELOW FOR UNGROUNDED SERVICE FEEDER AND BRANCH-CIRCUIT CONDUCTORS.
 - COLOR MUST BE FACTORY APPLIED OR FIELD APPLIED FOR SIZES LARGER THAN 8 AWG IF AUTHORITIES HAVING JURISDICTION PERMIT.
 - COLORS FOR 240/120 V CIRCUITS:
 - COLORS FOR 240/120 V CIRCUITS:
 - PHASE A: BLACK.
 - PHASE B: RED.
 - PHASE C: BLUE.
 - COLOR FOR NEUTRAL: WHITE OR GRAY.
 - COLOR FOR EQUIPMENT GROUNDS: BARE COPPER OR GREEN.
 - COLORS FOR ISOLATED GROUNDS: GREEN WITH TWO OR MORE YELLOW STRIPES.
 - EQUIPMENT IDENTIFICATION LABELS:
 - BLACK LETTERS ON WHITE FIELD.
- LABELS
 - WRAP-AROUND LABELS: PREPRINTED, FLEXIBLE LABELS LAMINATED WITH CLEAR, WEATHER- AND CHEMICAL-RESISTANT COATING AND MATCHING WRAP-AROUND CLEAR ADHESIVE TAPE FOR SECURING LABEL ENDS.
 - SNAP-AROUND LABELS: SLIT, PRETENSIONED, FLEXIBLE, PREPRINTED, COLOR-CODED ACRYLIC SLEEVES, WITH DIAMETERS SIZED TO SUIT DIAMETERS AND THAT STAY IN PLACE BY GRIPPING ACTION.
 - SELF-ADHESIVE WRAP-AROUND LABELS: PREPRINTED, 3 MIL THICK, VINYL FLEXIBLE LABEL WITH ACRYLIC PRESSURE-SENSITIVE ADHESIVE.
 - SELF-LAMINATION: CLEAR, UV- WEATHER- AND CHEMICAL-RESISTANT; SELF-LAMINATING, PROTECTIVE SHIELD OVER LEGEND, LABELS SIZED SUCH THAT CLEAR SHIELD OVERLAPS ENTIRE PRINTED LEGEND.
 - MARKER FOR LABELS:
 - MACHINE-PRINTED, PERMANENT, WATERPROOF, BLACK INK RECOMMENDED BY PRINTER MANUFACTURER.
 - SELF-ADHESIVE LABELS: POLYESTER VINYL, THERMAL, TRANSFER-PRINTED, 3 MIL THICK, MULTICOLOR, WEATHER- AND UV-RESISTANT, PRESSURE-SENSITIVE ADHESIVE LEAFING DISCARDED AND OPERATOR AND MAINTENANCE MANUAL, USE CONSISTENT DESIGNATIONS THROUGHOUT PROJECT.
- TAGS
 - METAL TAGS: BRASS OR ALUMINUM, 2 BY 2 BY 0.05 INCH, WITH STAMPED LEGEND, PUNCHED FOR USE WITH SELF-LOCKING CABLE TIE FASTENER.
 - ALL PREPRINTED TAGS: POLYESTER VINYL TAGS, 0.015 INCH THICK, COLOR-CODED FOR PHASE AND VOLTAGE LEVEL, WITH FACTORY SCREENED PRINTED PERMANENT DESIGNATIONS; PUNCHED FOR USE WITH SELF-LOCKING CABLE TIE FASTENER.
- INSTALLATION
 - VERIFY AND COORDINATE IDENTIFICATION NAMES, ABBREVIATIONS, COLORS, AND OTHER FEATURES WITH REQUIREMENTS IN OTHER SECTIONS REQUIRING IDENTIFICATION APPLICATIONS, DRAWINGS, SHOP DRAWINGS, MANUFACTURER'S WIRING DIAGRAMS, AND OPERATION AND MAINTENANCE MANUAL, USE CONSISTENT DESIGNATIONS THROUGHOUT PROJECT.
 - INSTALL IDENTIFYING DEVICES BEFORE INSTALLING ACOUSTICAL CEILINGS AND SIMILAR CONCEALMENT.
 - VERIFY IDENTITY OF ITEM BEFORE INSTALLING IDENTIFICATION PRODUCTS.
 - COORDINATE IDENTIFICATION WITH PROJECT DRAWINGS, MANUFACTURER'S WIRING DIAGRAMS, AND OPERATION AND MAINTENANCE MANUAL.
 - APPLY IDENTIFICATION DEVICES TO SURFACES THAT REQUIRE FINISH AFTER COMPLETING FINISH WORK.
 - INSTALL SIGNS WITH APPROVED LEGEND TO FACILITATE PROPER IDENTIFICATION, OPERATION, AND MAINTENANCE OF ELECTRICAL SYSTEMS AND CONNECTED ITEMS.

260519 - LED EXTERIOR LIGHTING

- LUMINAIRE REQUIREMENTS
 - BASES-OF-DESIGN: LIGHT FIXTURE SCHEDULE ON DRAWINGS.
- INSTALLATION
 - SUPPORTS:
 - SEED AND RATED FOR LUMINAIRE WEIGHT.
 - ABLE TO MAINTAIN LUMINAIRE POSITION AFTER CLEANING AND RELAMPING.
 - PROVIDE SUPPORT FOR LUMINAIRE WITHOUT CAUSING DEFLECTION OF CEILING OR WALL.
 - LUMINAIRE FRAMING DEVICES SHALL BE CAPABLE OF SUPPORTING A HORIZONTAL FORCE OF 100 PERCENT OF LUMINAIRE WEIGHT AND A VERTICAL FORCE OF 400 PERCENT OF LUMINAIRE WEIGHT.
- WIRING METHOD: INSTALL CABLES IN RACEWAYS, CONCEAL RACEWAYS AND CABLES.
- INSTALL LUMINAIRES LEVEL, PLUMB, AND SQUARE WITH FINISHED GRADE UNLESS OTHERWISE INDICATED. INSTALL LUMINAIRES AT HEIGHT AS INDICATED ON DRAWINGS.
- COORDINATE LAYOUT AND INSTALLATION OF LUMINAIRES WITH OTHER CONSTRUCTION.
- ADJUST LUMINAIRES THAT REQUIRE FIELD ADJUSTMENT OR AIMING.
- ADJUSTING
 - OCCUPANCY ADJUSTMENTS: WHEN REQUESTED WITHIN 12 MONTHS OF DATE OF SUBSTANTIAL COMPLETION, PROVIDE ON-SITE ASSISTANCE IN ADJUSTING THE DIRECTION OF AIM OF LUMINAIRES TO SUIT OCCUPIED CONDITIONS. MAKE UP TO TWO VISITS TO PROJECT DURING OTHER-THAN-NORMAL HOURS FOR THIS PURPOSE. SOME OF THIS WORK MAY BE REQUIRED DURING HOURS OF DARKNESS.
 - DURING ADJUSTMENT VISITS, INSPECT ALL LUMINAIRES, REPLACE LAMPS OR LUMINAIRES THAT ARE DEFECTIVE.
 - PARTS AND SUPPLIES SHALL BE MANUFACTURER'S AUTHORIZED REPLACEMENT PARTS AND SUPPLIES.



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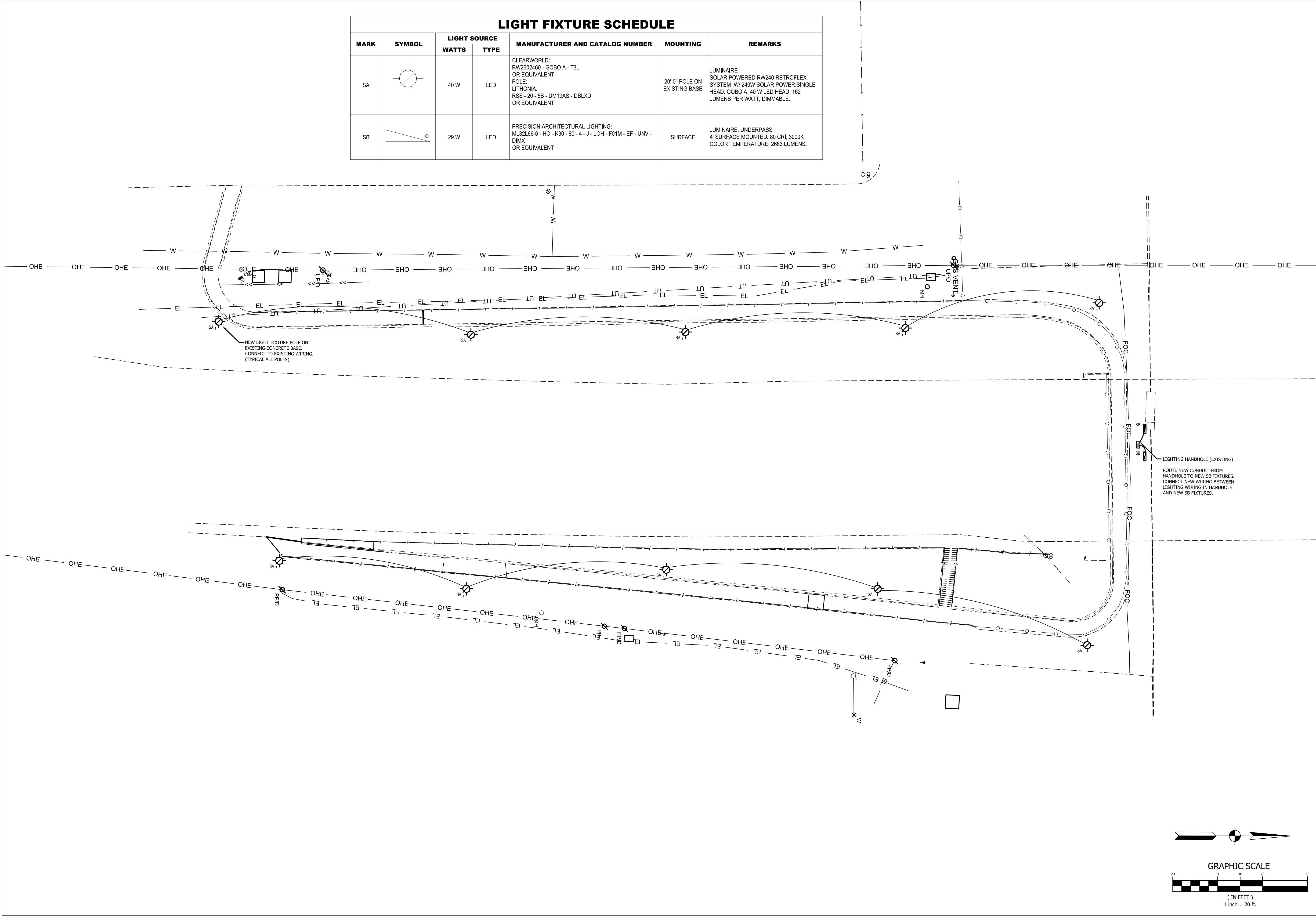
INDIANA TOLL ROAD
STRUCTURE 30-3 SAFETY
IMPROVEMENTS
ELECTRICAL SPECIFICATIONS

ISSUE DATE: 10/20/2025
PM: KM QA/QC: KM
DRAWN: CM DESIGNED: CM

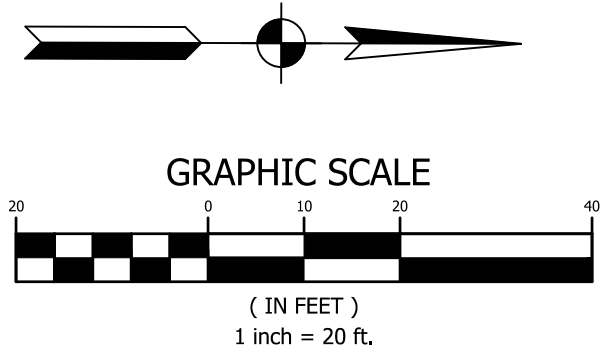
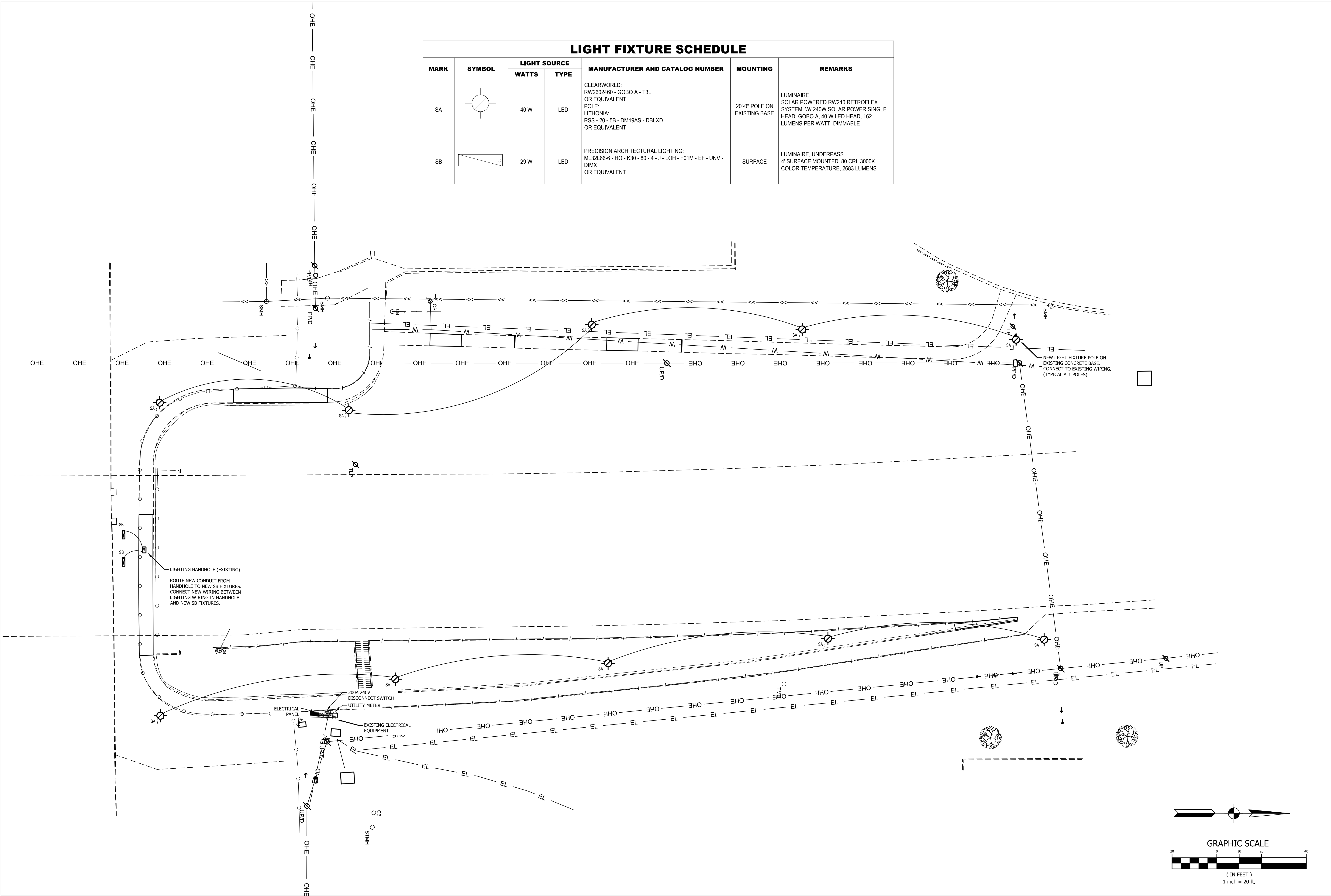
ISSUANCE / REVISION DATE
ORIGINAL SHEET IS 24"x36". USE DIMENSIONS SHOWN, DO NOT SCALE DRAWING.

PROJECT NO: 25-1090

\\ABONMARCHE\COMMON\PROJECTS\2025\25-1090-1\TD GRAPE ROAD SIDEWALK REPAIR\60 ELEC\60 DRAWINGS\25-1090-ELEC.DWG SOUTH ELECTRICAL ZACH HAUSERBERGER 2.19.2025 9:01 AM



LIGHT FIXTURE SCHEDULE					
MARK	SYMBOL	LIGHT SOURCE		MANUFACTURER AND CATALOG NUMBER	REMARKS
		WATTS	TYPE		
SA		40 W	LED	CLEARWORLD: RW2602460 - GOBO A - T3L OR EQUIVALENT POLE: LITHONIA: RSS - 20 - SB - DM19AS - DBLXD OR EQUIVALENT	LUMINAIRE SOLAR POWERED RW240 RETROFLEX SYSTEM -W/ 240W SOLAR POWER,SINGLE HEAD: GOBO A, 40 W LED HEAD, 162 LUMENS PER WATT, DIMMABLE.
SB		29 W	LED	PRECISION ARCHITECTURAL LIGHTING: ML32L66-6 - HO - K30 - 80 - 4 - J - LOH - F01M - EF - UNV - DIMX OR EQUIVALENT	LUMINAIRE, UNDERPASS 4' SURFACE MOUNTED, 80 CRI, 3000K COLOR TEMPERATURE, 2683 LUMENS.



INDIANA TOLL ROAD
**STRUCTURE 30-3 SAFETY
IMPROVEMENTS**

NORTH ELECTRICAL PLAN

ISSUE DATE: 10/20/2025
PM: KM QA / QC: KM
DRAWN: CM DESIGNED: CM

ISSUANCE / REVISION DATE
ORIGINAL SHEET IS 24"x36". USE DIMENSIONS
SHOWN, DO NOT SCALE DRAWING.

PROJECT NO: 25-1090