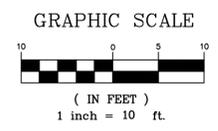
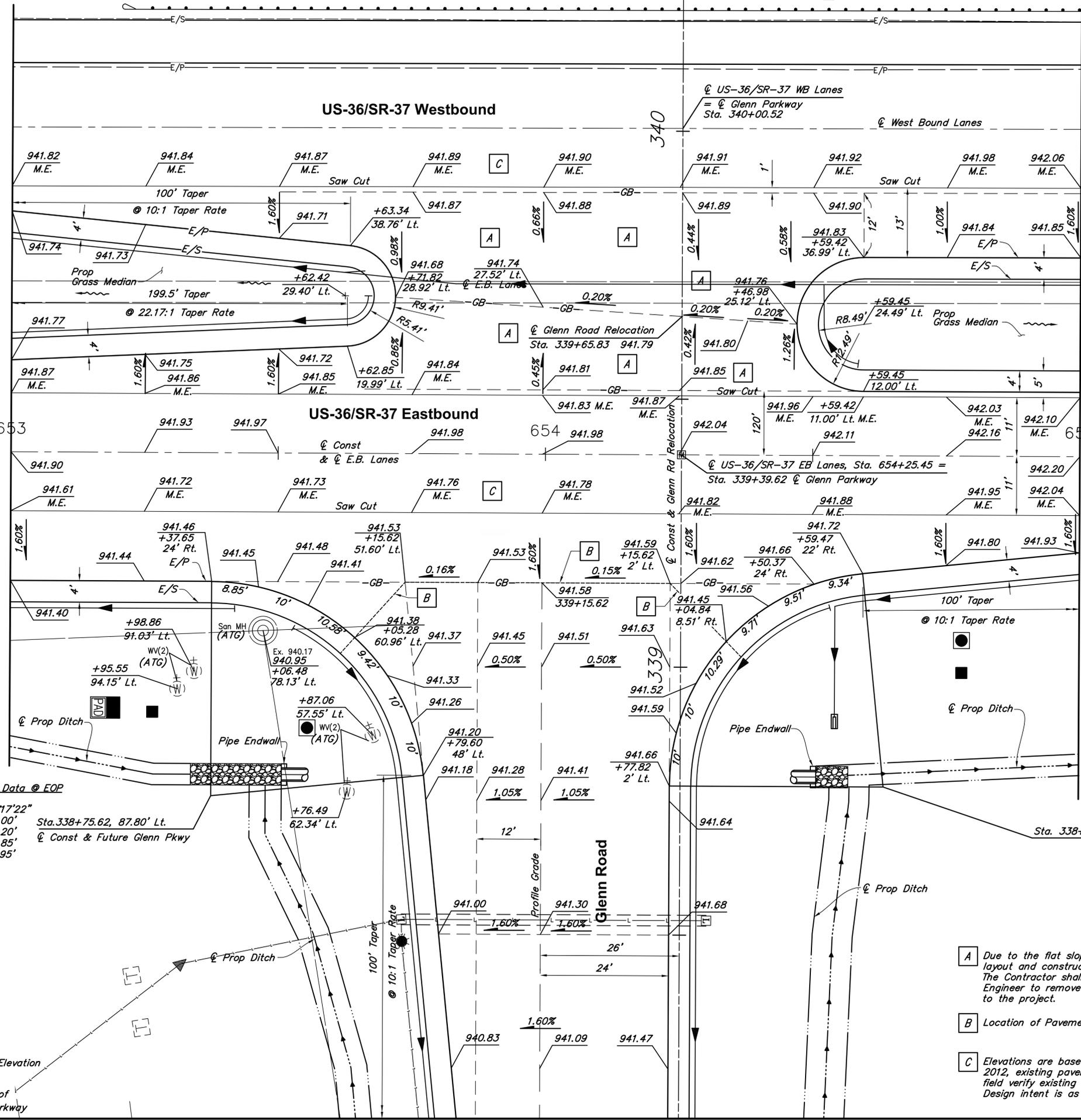


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Match Line Sta 653+00
 See Sheet 50 for US-36/SR-37 Pavement Detail

Match Line Sta 655+00
 See Sheet 50 for US-36/SR-37 Pavement Detail



Radius Return Data @ EOP
 $\Delta = 84^\circ 17' 22''$
 $R = 40.00'$
 $T = 36.20'$
 $L = 58.85'$
 $E = 13.95'$
 Sta. 338+75.62, 87.80' Lt.
 @ Const & Future Glenn Pkwy

Radius Return Data @ EOP
 $\Delta = 84^\circ 17' 22''$
 $R = 40.00'$
 $T = 36.20'$
 $L = 58.85'$
 $E = 13.95'$
 Sta. 338+77.82, 38.00' Rt. @ Const & Future Glenn Pkwy

LEGEND

- PG = Profile Grade
- GB = Grade Break
- E/P = Edge of Pavement
- E/S = Edge of Shoulder
- F/C = Face of Curb
- B/C = Back of Curb
- T/DC = Top of Depressed Curb
- T/P = Top of Pavement
- T/C = Top of Curb
- TC = Top of Casting
- P/L = Property Line
- B/L = Building Line
- R/W = Right-of-Way
- F/F = Face of Curb to Face of Curb
- ME = Match Existing
- B/W = Back of Walk
- EB = Eastbound
- WB = Westbound
- XXX.XX = Proposed Finished Pavement Elevation
- (XXX.XX) = Existing Pavement Elevation

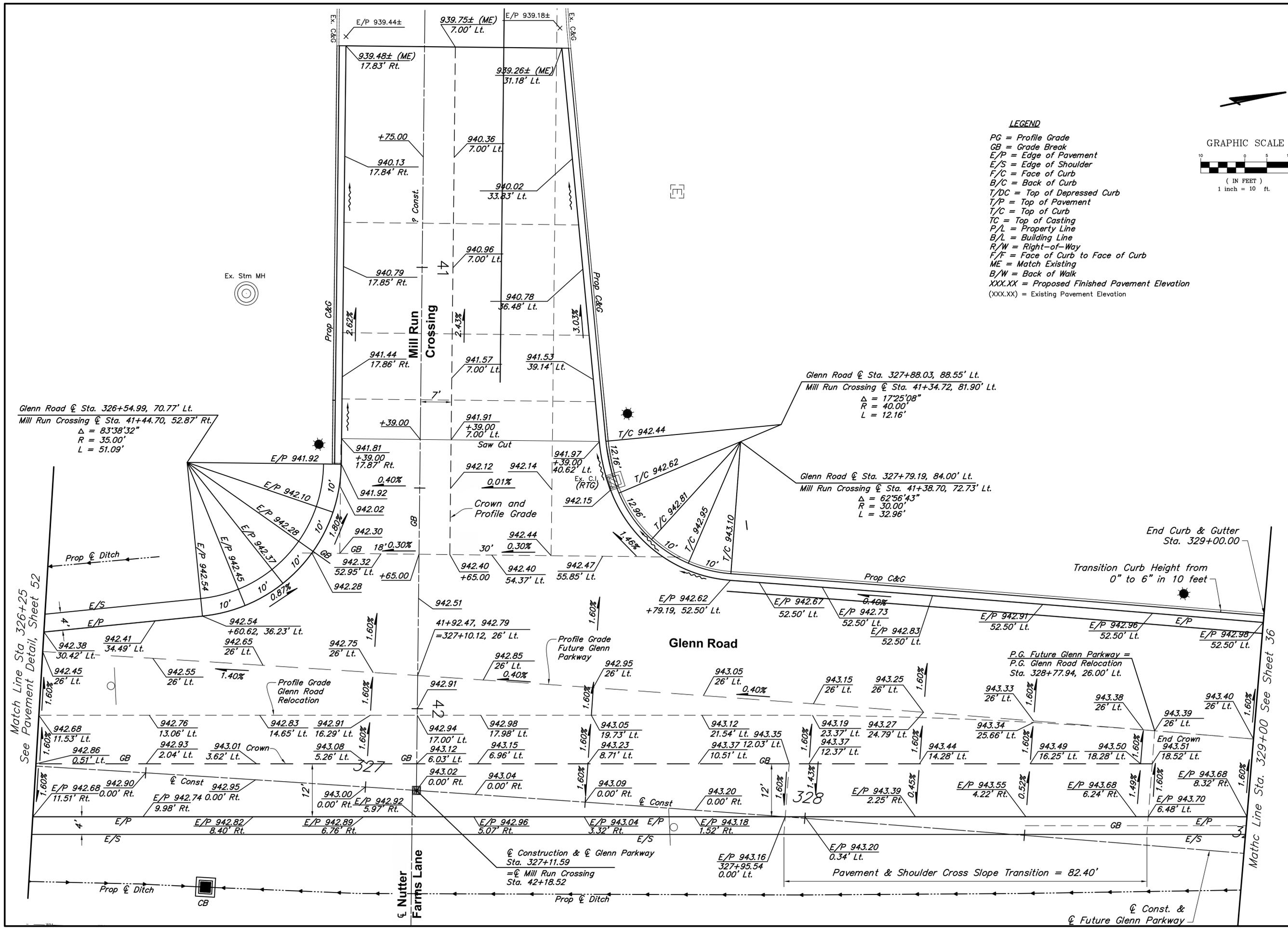
Note: $\text{\textcircled{C}}$ shown along Glenn Road is $\text{\textcircled{C}}$ of Construction and Future Glenn Parkway

- A** Due to the flat slopes, the Contractor is required to carefully layout and construct the pavement to drain and not pond water. The Contractor shall repair the pavement as directed by the Engineer to remove areas that pond water at no additional cost to the project.
- B** Location of Pavement Build-Up Change.
- C** Elevations are based on topographic survey performed in 2008. In 2012, existing pavement was planned and resurfaced. Contractor to field verify existing elevations and notify the City of discrepancies. Design intent is as shown on the typical sections.

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|---|----------|-------------|-----------------|
| Job No. | 20080386 | Date | February 2015 |
| Sheet | 51 / 74 | Scale | Horiz, 1" = 10' |
| CITY OF DELAWARE, DELAWARE COUNTY, OHIO STREET IMPROVEMENT PLAN FOR GLENN ROAD / US-36 TO MILL RUN CROSSING IMPROVEMENTS | | | |
| INTERSECTION DETAIL US-36/SR-37 & GLENN ROAD RELOCATION | | | |
| MARK | DATE | DESCRIPTION | |
| | | | |



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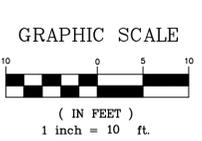
Glenn Road @ Sta. 326+54.99, 70.77' Lt.
 Mill Run Crossing @ Sta. 41+44.70, 52.87' Rt.
 $\Delta = 83^{\circ}38'32''$
 $R = 35.00'$
 $L = 51.09'$

Glenn Road @ Sta. 327+88.03, 88.55' Lt.
 Mill Run Crossing @ Sta. 41+34.72, 81.90' Lt.
 $\Delta = 17^{\circ}25'08''$
 $R = 40.00'$
 $L = 12.16'$

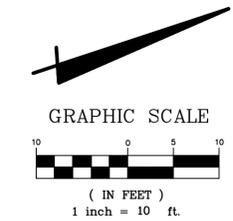
Glenn Road @ Sta. 327+79.19, 84.00' Lt.
 Mill Run Crossing @ Sta. 41+38.70, 72.73' Lt.
 $\Delta = 62^{\circ}56'43''$
 $R = 30.00'$
 $L = 32.96'$

LEGEND

- PG = Profile Grade
- GB = Grade Break
- E/P = Edge of Pavement
- E/S = Edge of Shoulder
- F/C = Face of Curb
- B/C = Back of Curb
- T/DC = Top of Depressed Curb
- T/P = Top of Pavement
- T/C = Top of Curb
- TC = Top of Casting
- P/L = Property Line
- B/L = Building Line
- R/W = Right-of-Way
- F/F = Face of Curb to Face of Curb
- ME = Match Existing
- B/W = Back of Walk
- XXX.XX = Proposed Finished Pavement Elevation
- (XXX.XX) = Existing Pavement Elevation



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|---|-----------------|-------------|
| Job No. | 20080386 | |
| Date | February 2015 | |
| Scale | Horiz. 1" = 10' | |
| Sheet | 53 / 74 | |
| CITY OF DELAWARE, DELAWARE COUNTY, OHIO STREET IMPROVEMENT PLAN FOR GLENN ROAD / US-36 TO MILL RUN CROSSING IMPROVEMENTS | | |
| INTERSECTION DETAIL & GLENN ROAD & MILL RUN CROSSING | | |
| MARK | DATE | DESCRIPTION |
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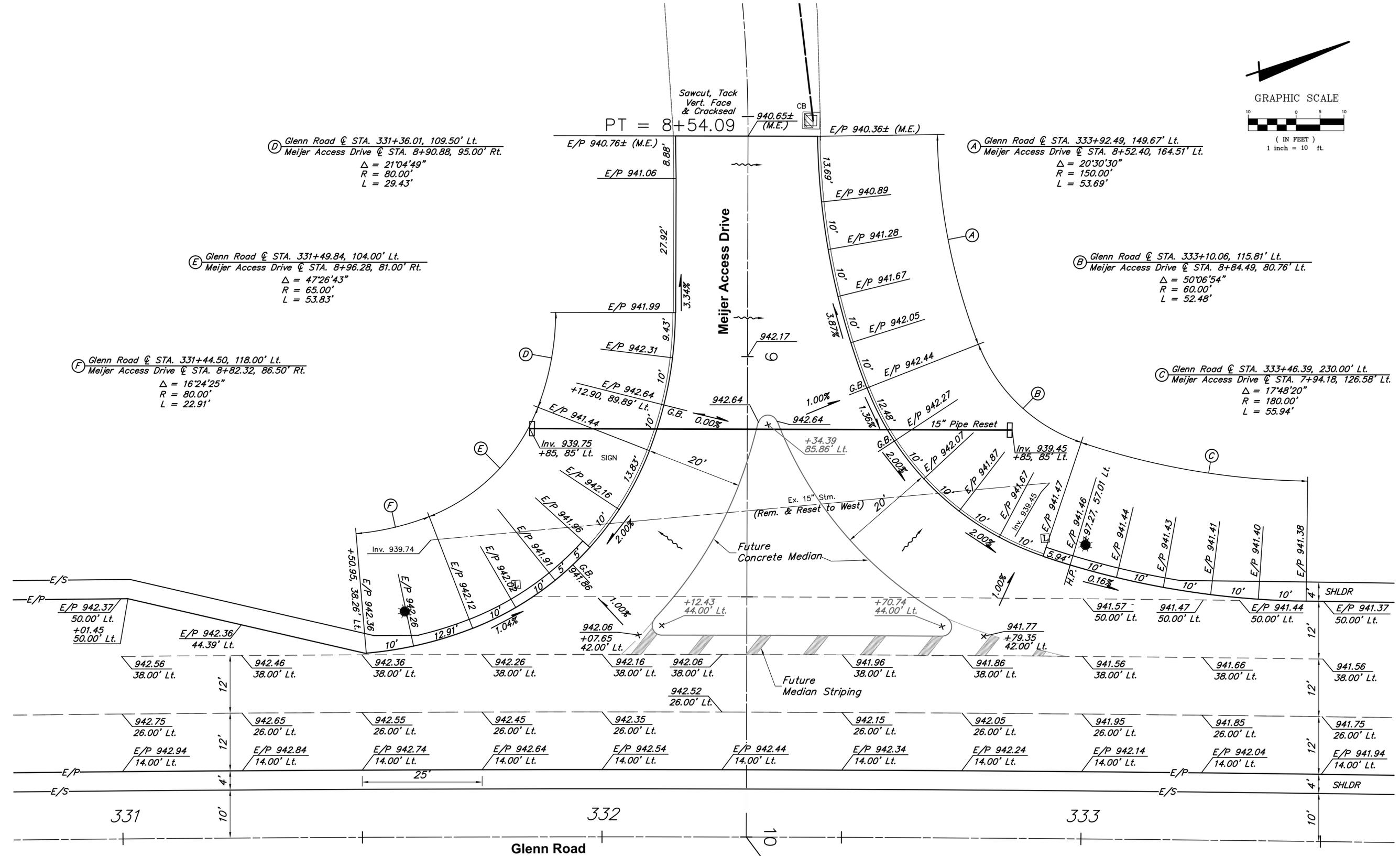
Ⓓ Glenn Road CL STA. 331+36.01, 109.50' Lt.
 Meijer Access Drive CL STA. 8+90.88, 95.00' Rt.
 $\Delta = 2104'49''$
 $R = 80.00'$
 $L = 29.43'$

Ⓔ Glenn Road CL STA. 331+49.84, 104.00' Lt.
 Meijer Access Drive CL STA. 8+96.28, 81.00' Rt.
 $\Delta = 4726'43''$
 $R = 65.00'$
 $L = 53.83'$

Ⓕ Glenn Road CL STA. 331+44.50, 118.00' Lt.
 Meijer Access Drive CL STA. 8+82.32, 86.50' Rt.
 $\Delta = 1624'25''$
 $R = 80.00'$
 $L = 22.91'$

Ⓑ Glenn Road CL STA. 333+10.06, 115.81' Lt.
 Meijer Access Drive CL STA. 8+84.49, 80.76' Lt.
 $\Delta = 5006'54''$
 $R = 60.00'$
 $L = 52.48'$

Ⓒ Glenn Road CL STA. 333+46.39, 230.00' Lt.
 Meijer Access Drive CL STA. 7+94.18, 126.58' Lt.
 $\Delta = 1748'20''$
 $R = 180.00'$
 $L = 55.94'$



CITY OF DELAWARE, DELAWARE COUNTY, OHIO
 STREET IMPROVEMENT PLAN
 FOR
 GLENN ROAD / US-36 TO MILL RUN
 CROSSING IMPROVEMENTS

INTERSECTION DETAIL
 GLENN ROAD &
 MEIJER ACCESS DRIVE



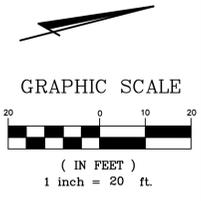
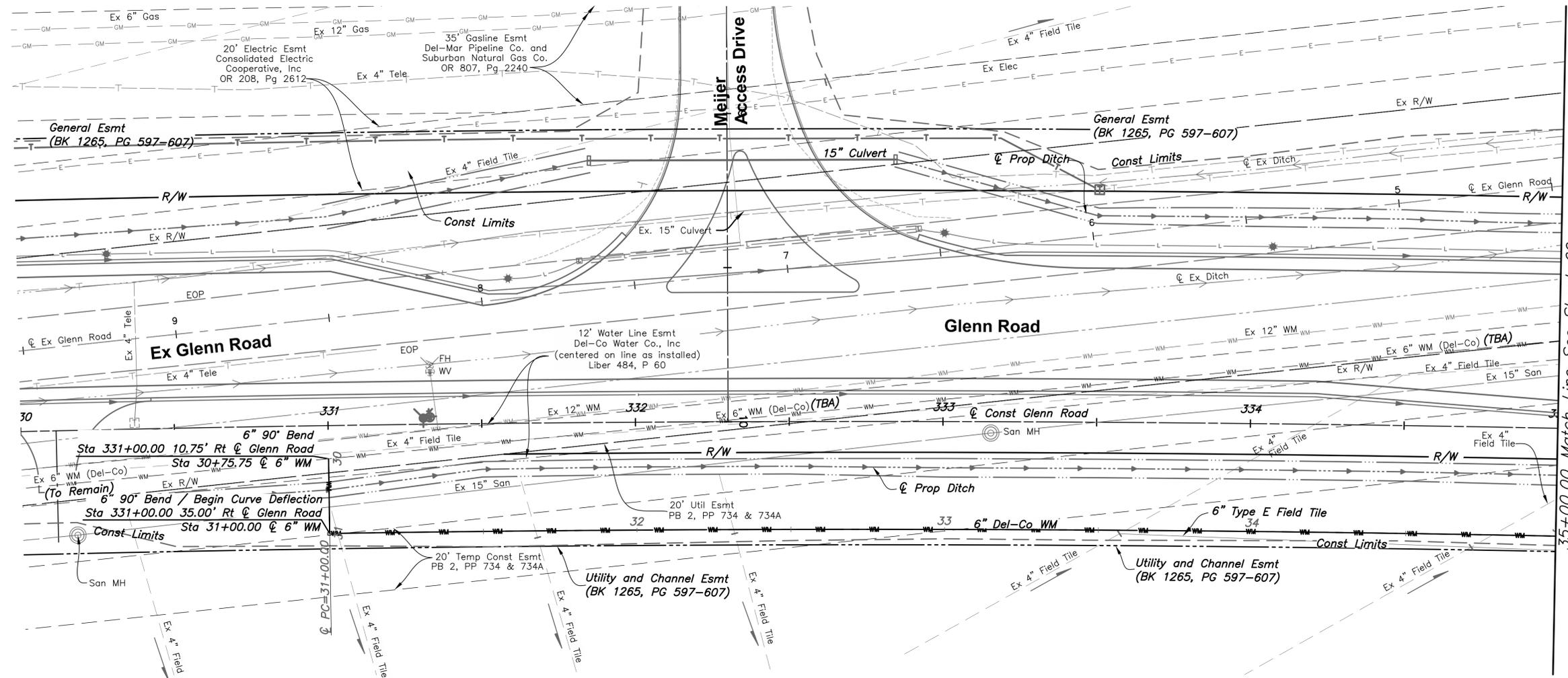
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Job No. 20080386
 Date February 2015
 Scale Horiz. 1" = 10'
 Sheet 54 / 74

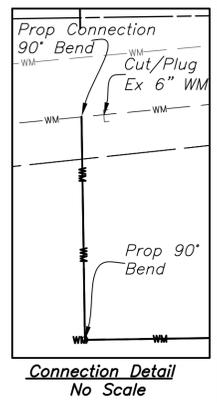
Note: CL shown along Glenn Road is CL of Construction and Future Glenn Parkway

CL Construction & CL Glenn Parkway
 Sta. 332+30.12
 = CL Meijer Access Drive
 Sta. 10+00.00

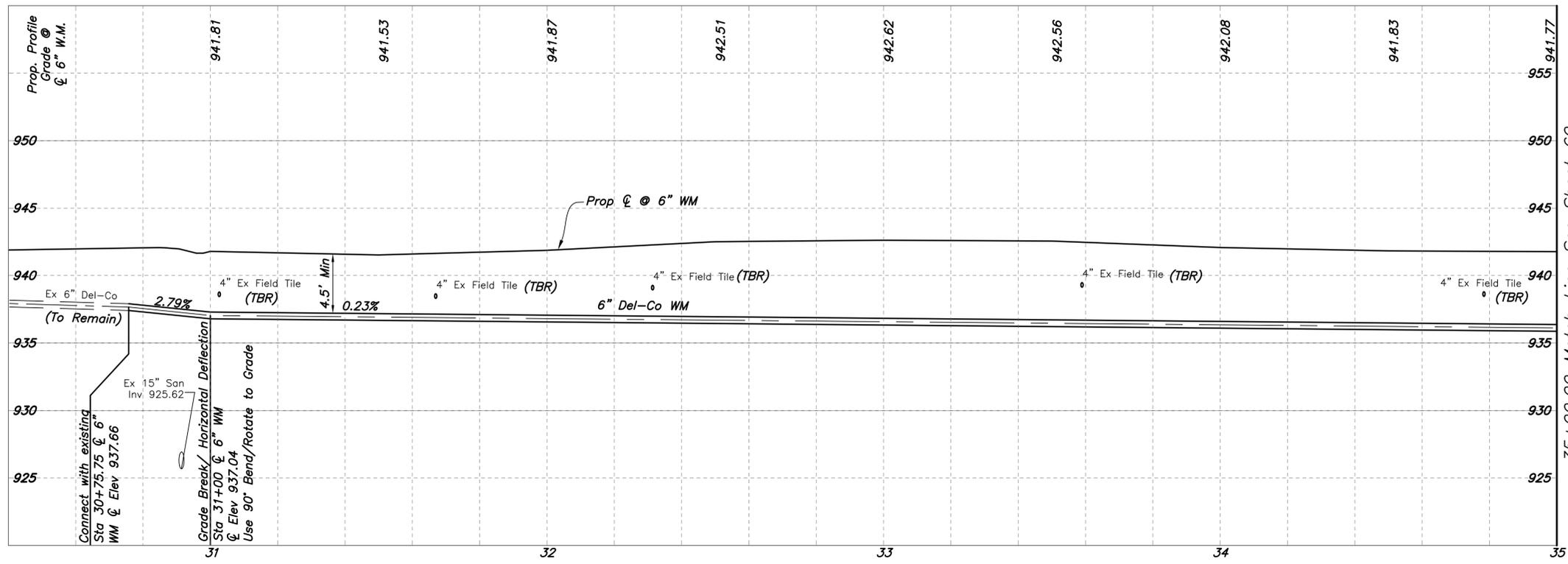
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**GLENN PARKWAY
CONST CURVE DATA**
 P.I. Sta. = 321+75.86
 $\Delta = 16^{\circ}06'23''$
 $Dc = 00^{\circ}30'00''$
 $R = 11459.00'$
 $T = 1621.32'$
 $L = 3221.26'$
 $E = 114.13'$



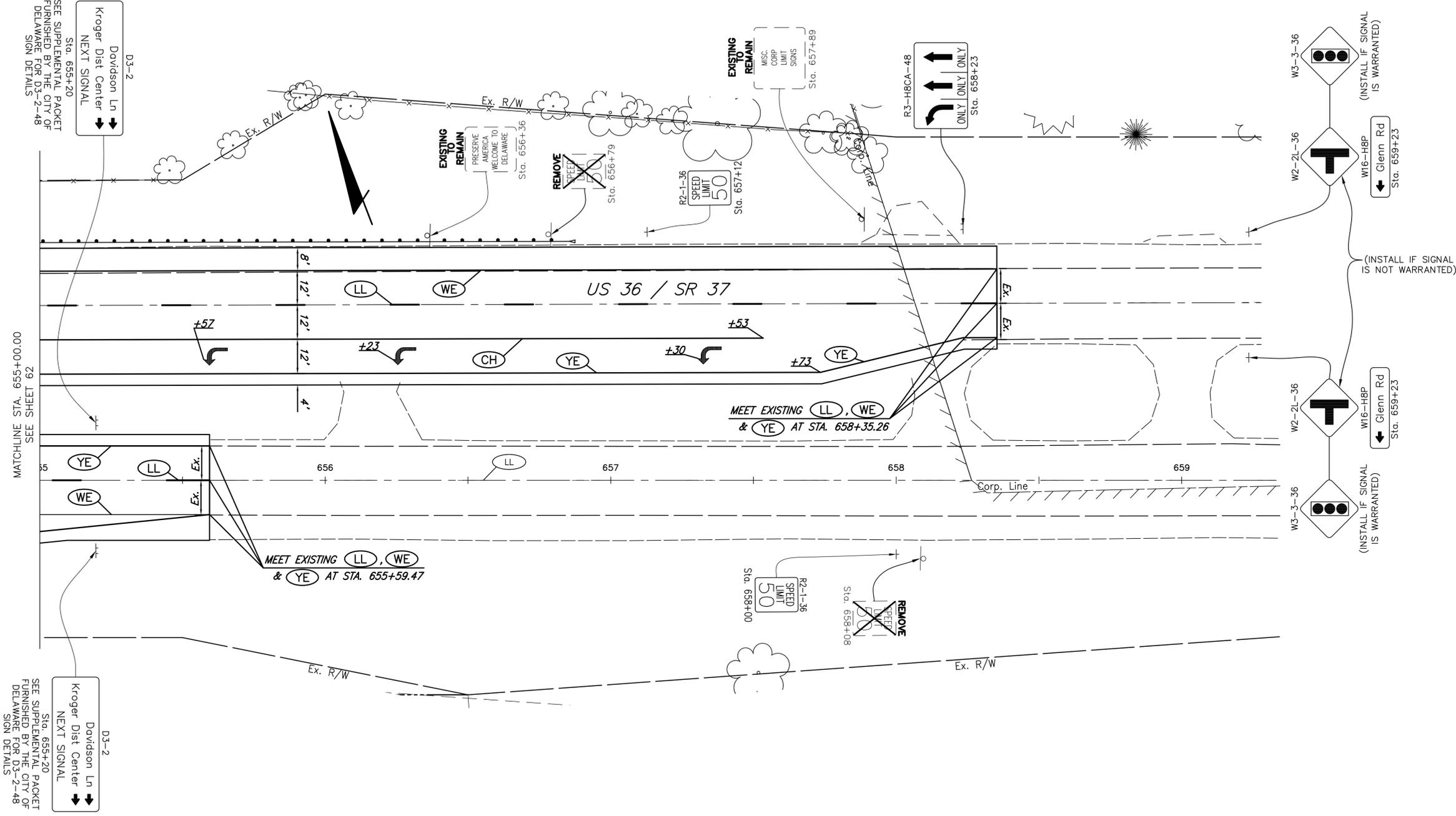
Notes:
 1. See Roadway Plan & Profile sheets for Ex 12" Water Main Improvements
 2. Field tile location is based off of U.S. Dept. of Agriculture soil conservation service upper Mississippi region maps. Received from the City of Delaware. (Delaware Co. SCD Book D-114 P-12-29)



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| Job No. 20080386 | | Date February 2015 | |
| Sheet 59 / 74 | | Scale Horiz: 1" = 20' | |
| CITY OF DELAWARE, DELAWARE COUNTY, OHIO STREET IMPROVEMENT PLAN FOR GLENN ROAD / US-36 TO MILL RUN CROSSING IMPROVEMENTS | | | |
| DEL-CO WATERLINE PLAN & PROFILE STA. 30+75.75 TO STA. 35+00 | | | |
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| REVISIONS | MARK | DATE | DESCRIPTION |
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REVISIONS



**TRAFFIC CONTROL PLAN
GLENN ROAD RELOCATION**

**CITY OF DELAWARE, DELAWARE COUNTY, OHIO
STREET IMPROVEMENT PLAN
FOR
GLENN ROAD / US-36 TO MILL RUN
CROSSING IMPROVEMENTS**

Date: February 2015
Scale: Horizontal: 1" = 20'

Job No.: 20080386
Sheet: 63 / 74

GENERAL

THESE SPECIFICATIONS, TOGETHER WITH THE ACCOMPANYING PLANS, ARE INTENDED TO DESCRIBE THE TYPE, SIZE, AND LOCATION OF THE PRODUCTS AND MATERIALS TO BE PROVIDED AND INSTALLED UNDER VARIOUS BID ITEMS RELATED TO TRAFFIC CONTROL AND COMBINATION HIGHWAY LIGHTING. THE CONTRACTOR SHALL FURNISH AND INSTALL TRAFFIC CONTROL AND COMBINATION HIGHWAY LIGHTING DEVICES AND RELATED MATERIALS IN COMPLIANCE WITH THESE PLANS AND SPECIFICATIONS, AS WELL AS THE 2013 OHIO DEPARTMENT OF TRANSPORTATION CONSTRUCTION AND MATERIAL SPECIFICATIONS, THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS, AND THE STANDARD CONSTRUCTION DRAWINGS ISSUED BY THE OHIO DEPARTMENT OF TRANSPORTATION. THESE SPECIFICATIONS SET FORTH THE MINIMUM PERFORMANCE AND OPERATING REQUIREMENTS OF THE TRAFFIC CONTROL AND HIGHWAY LIGHTING ITEMS REFERRED TO HEREIN.

EACH BIDDER, WITH HIS BID SHALL SUBMIT TWO (2) COMPLETE SETS OF CATALOG CUTS, DIAGRAMS, BROCHURES OR OTHER DESCRIPTIVE DATA FOR THE ITEMS HE INTENDS TO FURNISH. EACH BIDDER SHALL ALSO PROVIDE A LIST OF VARIANCES FROM ODOT SPECIFICATIONS AND THE SPECIFICATIONS CONTAINED HEREIN FOR EACH WITH THE STATED SPECIFICATIONS. ANY BIDDER THAT DOES NOT COMPLY 100 PERCENT DOES NOT COMPLY WITH THIS REQUIREMENT, MAY BE RULED INELIGIBLE AND MAY NOT BE AWARDED A CONTRACT. UNLESS OTHERWISE STATED BY THE BIDDER, THE PROPOSAL WILL BE CONSIDERED AS BEING IN STRICT ACCORDANCE WITH THE SPECIFICATIONS.

UNDERGROUND UTILITIES

THE LOCATION OF THE UNDERGROUND UTILITIES SHOWN ON THESE PLANS ARE AS OBTAINED FROM THE OWNERS OF THE UTILITY AS REQUIRED BY OHIO REVISED CODE SECTION 153.64.

THE CITY OF DELAWARE ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OR THE DEPTHS OF THE UNDERGROUND FACILITIES SHOWN ON THESE PLANS. SUPPORT, PROTECTION, AND RESTORATION OF ALL EXISTING UTILITIES AND APPURTENANCES SHALL BE THE CONTRACTOR'S RESPONSIBILITY. THE COST OF THIS WORK SHALL BE INCLUDED IN THE BID PRICE FOR THE VARIOUS ITEMS OF WORK. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE OHIO UTILITIES PROTECTION SERVICE (OUPS) AND THE UTILITIES NAMED BELOW SO THEIR RESPECTIVE FACILITIES CAN BE MARKED PRIOR TO CONSTRUCTION.

CITY OF DELAWARE
DEPARTMENT OF PUBLIC UTILITIES
1 SOUTH SANDUSKY STREET
DELAWARE, OHIO 43015
ATTN: BRAD STANTON
PHONE: (740) 203-1900

VERIZON COMMUNICATIONS
550 LEADER STREET
MARION, OHIO 43302
ATTN: CHRIS AVERY
PHONE: (740) 383-0551

CONSOLIDATED ELECTRIC
COOPERATIVE, INC.
680 SUNBURY ROAD
P.O. BOX 630
DELAWARE, OHIO 43015
ATTN: TIM APPLIGATE
PHONE: (740) 363-2641
(800) 421-5863

TIME WARNER ENGINEERING
3760 INTERCHANGE DRIVE
COLUMBUS, OHIO 43204
ATTN: RAY MAURER
PHONE: (740) 481-5262

INSIGHT COMMUNICATIONS
3770 EAST LIVINGSTON AVENUE
COLUMBUS, OHIO 43227
ATTN: PAUL SIEMER
PHONE: (614) 501-9432

SUBURBAN NATURAL GAS
2626 LEWIS CENTER ROAD
LEWIS CENTER, OHIO 43035
ATTN: AARON ROLL
PHONE: (740) 548-2450

AMERICAN ELECTRIC POWER CO.
850 TECH CENTER DRIVE
GAHANNA, OHIO 43230
ATTN: RICK ECKLE
PHONE: (614) 883-6289

DEL-CO WATER
6773 OLENTANGY RIVER ROAD
DELAWARE, OHIO 43015
ATTN: SHANE CLARK, P.E.
PHONE: (740) 548-7746

PLAN AND SPECIFICATION COMPLIANCE

THE CONTRACTOR SHALL FURNISH AND INSTALL TRAFFIC SIGNAL DEVICES IN COMPLIANCE WITH THESE PLANS AND SPECIFICATIONS, THE 2013 ODOT CONSTRUCTION AND MATERIAL SPECIFICATIONS INCLUDING ALL SUPPLEMENTAL SPECIFICATIONS, THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS, AND THE "TC" AND "HL" STANDARD CONSTRUCTION DRAWINGS ISSUED BY THE ODOT. THESE SPECIFICATIONS SET FORTH THE MINIMUM DESIGN AND OPERATING REQUIREMENTS FOR TRAFFIC SIGNAL AND HIGHWAY LIGHTING EQUIPMENT.

TRAFFIC SIGNAL CONTROL AND HIGHWAY LIGHTING EQUIPMENT SHALL MEET OR EXCEED THE STANDARDS SPECIFIED IN THE FOLLOWING DOCUMENTS:

- a) SPECIFICATIONS LISTED IN THIS PLAN.
- b) NEMA STANDARDS PUBLICATION NO. TS1-1989 AND/OR TS2-2003 (OR CURRENT NEMA ISSUE) SECTIONS 1, 2, 5, 6, 8, 11, 13 AND 14.
- c) 2013 ODOT CONSTRUCTION AND MATERIAL SPECIFICATIONS 625, 632, 633, 725, 732, 733 AND 815.

IN CASE OF A CONFLICTING SPECIFICATION STATEMENT, THE SPECIFICATION DOCUMENT HIERARCHY SHALL BE IN THE ORDER LISTED FROM (A), HIGHEST, TO (C), LOWEST.

GUARANTEE

THE CONTRACTOR SHALL GUARANTEE THAT THE TRAFFIC CONTROL EQUIPMENT INSTALLED, AS PART OF THE CONTRACT, SHALL OPERATE SATISFACTORILY FOR A PERIOD OF ONE (1) YEAR FOLLOWING COMPLETION OF THE TEN (10) DAY PERFORMANCE TEST. IN THE EVENT OF UNSATISFACTORY OPERATION, THE CONTRACTOR SHALL CORRECT FAULTY INSTALLATIONS, MAKE REPAIRS AND REPLACE DEFECTIVE PARTS WITH NEW PARTS FROM THE SAME MANUFACTURER. MATERIAL AND LABOR COSTS INCURRED IN CORRECTING UNSATISFACTORY OPERATION SHALL BE BORNE BY THE CONTRACTOR. THE GUARANTEE SHALL COVER THE FOLLOWING ITEMS OF THE TRAFFIC SIGNAL INSTALLATIONS: CONTROLLER, DETECTION, CONFLICT MONITOR, RADIOS, INTERCONNECT ITEMS, AND ALL ASSOCIATED EQUIPMENT. ANY MANUFACTURER'S GUARANTEES AND WARRANTIES FOR EQUIPMENT SHALL BE PROVIDED TO THE PUBLIC WORKS DEPARTMENT FOLLOWING ACCEPTANCE OF THE EQUIPMENT. THE COST OF GUARANTEEING THE TRAFFIC CONTROL SYSTEM WILL BE INCIDENTAL TO AND INCLUDED IN THE CONTRACT UNIT PRICE OF THE VARIOUS ITEMS.

WIRING DIAGRAMS

TWO (2) WIRING DIAGRAMS AND TWO (2) EACH SERVICE /OPERATION MANUALS FOR EACH DIFFERENT PIECE OF EQUIPMENT SHALL BE PROVIDED. A HEAVY CLEAR PLASTIC ENVELOPE ATTACHED TO THE INSIDE OF THE CABINET DOOR SHALL BE PROVIDE FOR STORING WIRING DIAGRAMS, (MINIMUM OF 9-INCHES BY 12-INCHES IN SIZE).

TEN DAY TEST REQUIREMENTS

THE CITY OF DELAWARE, REQUIRES A 10 DAY TEST TO START AFTER THE SIGNAL INSTALLATION IS 100% COMPLETE WHICH INCLUDES ESTABLISHING DATA COMMUNICATION IF PRESENT. NO PARTIAL TESTS WILL BE CONDUCTED. THIS CITY SHALL MONITOR THE TEST AND SHALL BE THE SOLE AGENCY TO ACCEPT THE SIGNAL INSTALLATION. IF LESS THAN 100% COMPLETION IS DETECTED UPON INSPECTION BY THIS CITY OR ANY MALFUNCTION IS DETECTED, THEN THE TEN DAY TEST SHALL BE COMPLETELY RESTARTED.

TRANSITION TO SIGNAL CONTROL

THE CONTRACTOR SHALL NOTIFY THE CITY OF DELAWARE FORTY-EIGHT (48) HOURS PRIOR TO THE SIGNAL TURN-ON, THE TURN-ON SHALL NOT BEGIN UNTIL REPRESENTATIVES FROM THE CITY, CONTRACTOR, AND SIGNAL EQUIPMENT SUPPLIER ARE ON-SITE TO OBSERVE THE TURN-ON. THE SIGNAL INSTALLATION SHALL BE PLACED ON FLASH FOR SEVEN (7) DAYS PRIOR TO THE START-UP AND TESTING.

NEW SIGNALS SHALL FLASH FOR SEVEN (7) DAYS PRIOR TO BEING PLACED ON REGULAR CYCLING OPERATION. THE SIGNALS WILL NOT BE PLACED ON FLASH UNTIL THE PERMANENT PAVEMENT MARKINGS AND LANE CONTROL SIGNS HAVE BEEN INSTALLED WITH THE EXCEPTION OF THE INTERSECTION STOP LINES. TEMPORARY PAVEMENT MARKINGS MAY BE USED IN LIEU OF PERMANENT MARKINGS IF THEY REFLECT THE PERMANENT PAVEMENT MARKING LAYOUT. THE STOP LINES SHALL BE IN PLACE PRIOR TO THE SIGNAL BEING PLACED ON REGULAR OPERATION.

STANDARD CONSTRUCTION DRAWING MT-120.00 BY THE OHIO DEPARTMENT OF TRANSPORTATION SHALL BE INVOKED FOR TRANSITION TO SIGNAL CONTROL.

PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS NECESSARY TO COMPLETE THIS ITEM OF WORK SHALL BE INCLUDED IN THE LUMP SUM PRICE BID FOR ITEM 614, MAINTAINING TRAFFIC, AS PER PLAN.

MAINTENANCE OF TRAFFIC SIGNAL INSTALLATIONS

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING TRAFFIC SIGNAL INSTALLATIONS WITHIN THE PROJECT UNDER THE FOLLOWING CONDITION:

- 1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR EXISTING SIGNAL INSTALLATIONS WHICH THE PLAN REQUIRES THE CONTRACTOR TO ADJUST, MODIFY, ADD ON TO, OR REMOVE, OR WHICH THE CONTRACTOR ACTUALLY ADJUSTS, MODIFIES, OR OTHERWISE DISTURBS, FROM THE TIME HIS OPERATIONS FIRST DISTURB THE INSTALLATION UNTIL THE TIME THE INSTALLATION HAS SUBSEQUENTLY BEEN REMOVED OR MODIFIED AND THE WORK HAS BEEN ACCEPTED.
 - 2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTENANCE OF NEW SIGNAL INSTALLATIONS OR DEVICES, INSTALLED BY THE CONTRACTOR, FROM THE TIME OF INSTALLATION UNTIL THE WORK IS ACCEPTED.
- THE CONTRACTOR SHALL CORRECT AS QUICKLY AS POSSIBLE ALL OUTAGES OR MALFUNCTIONS. HE SHALL PROVIDE THE ENGINEER SUCH ADDRESSES AND PHONE NUMBERS WHERE HIS MAINTENANCE FORCES CAN BE CONTACTED. THE CONTRACTOR SHALL PROVIDE ONE OR MORE PERSONS TO RECEIVE ALL CALLS AND DISPATCH THE NECESSARY MAINTENANCE FORCES TO CORRECT OUTAGES. SUCH A PERSON OR PERSONS MAY BE USED TO PERFORM OTHER DUTIES AS LONG AS PROMPT ATTENTION IS GIVEN TO THESE CALLS AND A PERSON IS READILY AVAILABLE CONTINUOUSLY 24 HOURS A DAY, 7 DAYS A WEEK. ALL LAMP OUTAGES, CABLE OUTAGES, ELECTRICAL FAILURES, EQUIPMENT MALFUNCTIONS AND MISALIGNED SIGNAL HEADS SHALL BE CORRECTED TO THE SATISFACTION OF THE ENGINEER WITH THE SIGNAL BACK TO SERVICE WITHIN FOUR HOURS AFTER THE CONTRACTOR HAS BEEN NOTIFIED OF THE OUTAGE.

IN THE EVENT NEW SIGNALS ARE DAMAGED PRIOR TO ACCEPTANCE ALL DAMAGED EQUIPMENT EXCEPT POLES AND CONTROL EQUIPMENT SHALL BE REPLACED BY THE CONTRACTOR TO THE SATISFACTION OF THE ENGINEER WITH THE SIGNAL BACK IN SERVICE WITHIN 8 HOURS AFTER THE CONTRACTOR'S NOTIFICATION OF THE OUTAGE.

IF POLES AND/OR CONTROL EQUIPMENT ARE DAMAGED AND MUST BE REPLACED, THE CONTRACTOR SHALL MAKE TEMPORARY REPAIRS AS NECESSARY TO BRING THE SIGNAL BACK INTO FULL OPERATION WITHIN THE ALLOWED 8-HOUR PERIOD, AND SHALL MAKE PERMANENT REPAIRS OR REPLACEMENT AS SOON THEREAFTER AS POSSIBLE.

NONE OF THE ABOVE SHALL BE CONSTRUED AS COLLECTIVE OR CONSECUTIVE OUTAGE TIME PERIODS AT ANY ONE LOCATION. THAT IS, WHERE MORE THAN ONE OUTAGE OCCURS AT ANY ONE LOCATION, THEN THE ALLOTTED TIME LIMIT SHALL BE FOR THE WORST SINGLE OUTAGE.

WHERE OUTAGES ARE THE DIRECT RESULT OF A VEHICULAR ACCIDENT, THE RESPONSE OF THE CONTRACTOR SHALL BE AS OUTLINED ABOVE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COLLECTION OF ANY COMPENSATION FOR THIS WORK FROM THOSE PARTIES RESPONSIBLE FOR THE DAMAGE.

WHERE THE CONTRACTOR HAS FAILED TO OR CANNOT RESPOND TO AN OUTAGE OR SIGNAL EQUIPMENT MALFUNCTION, AT THESE LOCATIONS WITHIN HIS RESPONSIBILITY, WITHIN PERIODS AS SPECIFIED ABOVE, THE ENGINEER MAY INVOKE THE PROVISIONS OF SECTION 105.15 AND ANY SUBSEQUENT COSTS TO THE OHIO DEPARTMENT OF TRANSPORTATION OR THE CITY OF DELAWARE FOR POLICE SERVICES AND MAINTENANCE SERVICES SHALL BE DEDUCTED FROM MONIES DUE OR TO BECOME DUE THE CONTRACTOR IN ACCORDANCE WITH PROVISIONS OF SECTION 105.15.

WHEN A TRAFFIC SIGNAL MUST BE TAKEN OUT OF SERVICE BY THE CONTRACTOR DUE TO CONSTRUCTION PROCEDURES, THIS OUTAGE SHALL NOT EXCEED 2 HOURS AND SHALL NOT INCLUDE THE HOURS OF 7-9 AM & 3-6 PM. ANY SIGNALIZED INTERSECTION, WHERE THE SIGNAL IS OUT OF SERVICE DUE TO CONSTRUCTION PROCEDURES, OR DUE TO AN OUTAGE OR MALFUNCTION OF EQUIPMENT AS DESCRIBED ABOVE, SHALL BE PROTECTED, BY THE CONTRACTOR, BY THE INSTALLATION OF TEMPORARY "STOP" SIGNS.

THE CONTRACTOR SHALL PROVIDE THE MAINTENANCE SERVICE ENTIRELY WITH HIS FORCES OR HE MAY CHOOSE TO ENTER INTO A COOPERATIVE UNDERSTANDING THE LOCAL MAINTAINING AGENCY TO PROVIDE THE MAINTENANCE. THE CONTRACTOR SHALL INFORM THE DEPARTMENT OF ENGINEERING SERVICES, IN WRITING, OF THE MAINTENANCE METHOD SELECTED.

ANY VEHICULAR TRAFFIC SIGNAL HEAD, EITHER NEW OR EXISTING, WHICH WILL BE OUT OF OPERATION, SHALL BE COVERED IN THE MANNER DESCRIBED IN ODOT CMS 632.25.

THE CONTRACTOR SHALL MAINTAIN COMPLETE RECORDS OF MALFUNCTIONS INCLUDING:
- TIME OF NOTIFICATION OF MALFUNCTION
- TIME OF WORK CREWS ARRIVAL TO CORRECT THE MALFUNCTION
- ACTION TAKEN TO CORRECT THE MALFUNCTION, INCLUDING A LIST OF PARTS REPAIRED OR REPLACED

- A DIAGNOSIS OF THE REASON FOR THE MALFUNCTION AND PROBABILITY OF REOCCURRENCE
- TIME OF COMPLETION OF THE REPAIR AND SYSTEM RESTORED TO FULL SERVICE
- A COPY OF THESE RECORDS SHALL BE PROVIDED THE DEPARTMENT OF ENGINEERING SERVICES WITHIN THREE (3) WORKING DAYS FOLLOWING COMPLETION OF EACH REPAIR.

ALL COSTS RESULTING FROM THE ABOVE REQUIREMENTS SHALL BE CONSIDERED TO BE INCLUDED IN THE LUMP SUM PRICE BID FOR ITEM 614 MAINTAINING TRAFFIC, AS PER PLAN.

GROUNDING AND BONDING

THE REQUIREMENTS OF THE CONSTRUCTION AND MATERIAL SPECIFICATIONS (C&MS) AND THE HL AND TC SERIES OF STANDARD CONSTRUCTION DRAWINGS ARE MODIFIED AS FOLLOWS:

- 1. ALL METALLIC PARTS CONTAINING ELECTRICAL CONDUCTORS SHALL BE PERMANENTLY JOINED TO FORM AN EFFECTIVE GROUND FAULT CURRENT PATH BACK TO THE GROUNDED CONDUCTOR IN THE POWER SERVICE DISCONNECT SWITCH.
 - a. PROVIDE AN EQUIPMENT GROUNDING CONDUCTOR IN METALLIC CONDUITS (725.04) IN ADDITION TO THE CONDUCTORS SPECIFIED AND BOND THE CONDUIT TO THIS GROUNDING CONDUCTOR.
 - b. WHEN AN EQUIPMENT GROUNDING CONDUCTOR IS REQUIRED IN PLASTIC CONDUIT (725.05), THE INSTALLATION SHALL INCLUDE A SEPARATE EQUIPMENT GROUNDING CONDUCTOR IN ADDITION TO THE CONDUCTORS SPECIFIED.
 - c. METALLIC CONDUIT CARRYING THE LOOP WIRES FROM IN THE PAVEMENT TO THE PULL BOX SPLICE LOCATION WILL ONLY BE BONDED AT THE PULL BOX END, AND WILL NOT CONTAIN AN EQUIPMENT GROUNDING CONDUCTOR.
 - d. METAL PULL BOX LIDS SHALL BE BONDED BY ATTACHMENT OF THE EQUIPMENT GROUNDING CONDUCTOR TO THE FRAME DIAGONAL AS PROVIDED ON HL-30.11.
 - e. IF MULTIPLE CONDUITS BEGIN AND END AT THE SAME POINTS, ONLY ONE EQUIPMENT GROUNDING CONDUCTOR IS REQUIRED.
 - f. IF AN EQUIPMENT GROUNDING CONDUCTOR IS NEEDED IN CONDUIT BETWEEN SIGNALIZED INTERSECTIONS FOR UNDERGROUND INTERCONNECT CABLE, THE GROUNDING SYSTEM FOR EACH SIGNALIZED INTERSECTION WILL BE SEPARATED ABOUT MIDWAY BETWEEN THE INTERSECTIONS.
 - g. THE MESSENGER WIRE AT SIGNALIZED INTERSECTIONS WILL BE USED AS THE CONDUCTIVE PATH FROM CORNER TO CORNER IF CONDUIT IS NOT PROVIDED UNDER THE ROADWAY. WHEN CONDUIT CONNECTS THE CORNERS OF AN INTERSECTION, AN EQUIPMENT GROUNDING CONDUCTOR SHALL BE USED IN THE CONDUIT.
- 2. CONDUITS:
 - a. THE 725.04 CONDUIT SHALL HAVE GROUNDING BUSHINGS INSTALLED AT ALL TERMINATION POINTS. THE BUSHING MATERIAL SHALL BE COMPATIBLE WITH GALVANIZED STEEL CONDUIT AND THE GROUNDING LUG MATERIAL SHALL BE COMPATIBLE FOR USE WITH COPPER WIRE. THREADED OR COMPRESSION TYPE BUSHINGS MAY BE USED.
 - b. THE 725.05 CONDUIT SHALL HAVE THE INSIDE AND OUTSIDE DIAMETERS OF THE CONDUIT DEBURRED AT ALL TERMINATION POINTS.
 - c. BOTH ENDS OF METALLIC CONDUIT SHALL BE BONDED TO THE EQUIPMENT GROUNDING CONDUCTOR.
 - d. METALLIC CONDUIT MAY BE BONDED TO METALLIC BOXES THROUGH THE USE OF CONDUIT FITTINGS UL APPROVED FOR THIS TYPE OF CONNECTION, WITH THE BOX BONDED TO THE EQUIPMENT GROUNDING CONDUCTOR.
- 3. WIRE FOR GROUNDING AND BONDING.
 - a. USE INSULATED, COPPER WIRE FOR THE EQUIPMENT GROUNDING CONDUCTOR. BONDING JUMPEERS IN BOXES AND ENCLOSURES MAY BE BARE OR INSULATED COPPER WIRE. WIRE SIZE SHALL BE AS FOLLOWS:
 - i. USE 4 AWG BETWEEN THE POWER SERVICE AND SUPPORTS, POLES, PEDESTALS, CONTROLLER OR FLASHER CABINETS.
 - ii. USE A MINIMUM 8 AWG BETWEEN LOOP DETECTOR PULL BOXES AND THE FIRST CONDUIT THAT REQUIRES A LARGER SIZE AS SPECIFIED IN 3.A.I ABOVE.
 - iii. USE A MINIMUM 8 AWG BETWEEN THE "PREPARE TO STOP WHEN FLASHING" INSTALLATION (INCLUDING SUPPORT) AND THE FIRST CONDUIT THAT REQUIRES A LARGER SIZE AS SPECIFIED IN 3.A.I ABOVE.
 - iv. THE INSULATION SHALL BE GREEN OR GREEN WITH YELLOW STRIPE(S). FOR 4 AWG OR LARGER, INSULATION MAY ALSO BE BLACK WITH GREEN TAPE/LABELS INSTALLED AT ALL ACCESS POINTS.
 - b. IN A HIGHWAY LIGHTING SYSTEM, THE EQUIPMENT GROUNDING CONDUCTOR SHALL BE THE SAME WIRE SIZE AS THE DUCT CABLE OR DISTRIBUTION CABLE CIRCUIT CONDUCTORS, WITH THE MINIMUM CONDUCTOR SIZE OF 4 AWG. BONDING JUMPEERS WILL BE MINIMUM SIZE 4 AWG.
- 4. GROUND ROD.
 - a. A 3/4 INCH SCHEDULE 40 PVC CONDUIT WILL BE USED IN FOUNDATIONS AND CONCRETE WALLS FOR THE GROUNDING CONDUCTOR (GROUND WIRE) RACEWAY TO THE GROUND ROD. SHOULD METALLIC CONDUIT BE USED, BOTH ENDS OF THE CONDUIT SHALL BE BONDED TO THE GROUNDING CONDUCTOR.
 - b. THE TYPICAL GROUNDING CONDUCTOR (GROUND WIRE) SHALL BE 4 AWG INSULATED, COPPER.
- 5. POWER SERVICE AND DISCONNECT SWITCH.
 - a. AT THE POWER SERVICE LOCATION, THE GROUNDING CONDUCTOR (GROUND WIRE) FROM THE DISCONNECT SWITCH NEUTRAL (AC-) BAR TO THE GROUND ROD SHALL BE A CONTINUOUS, UNSPLICED CONDUCTOR. IF SPLICED, IT SHALL BE AN EXOTHERMIC WELD BUTT SPICE.
 - b. THE SERVICE NEUTRAL (AC-) SHALL ONLY BE CONNECTED TO GROUND AT THE PRIMARY POWER SERVICE DISCONNECT SWITCH.
 - i. NEMA CONTROLLER CABINETS: IF A POWER SERVICE DISCONNECT SWITCH IS LOCATED BEFORE THE CONTROLLER CABINET, THE NEUTRAL (AC-) AND THE GROUNDING BARS IN THE CONTROLLER CABINET SHALL NOT BE CONNECTED TOGETHER AS SHOWN IN NEMA TS-2, FIGURE 5-4.
 - ii. IF SECONDARY DISCONNECT SWITCHES ARE CONNECTED AFTER THE PRIMARY DISCONNECT SWITCH, THE NEUTRAL (AC-) SHALL ONLY BE GROUNDED AT THE PRIMARY SWITCH. EQUIPMENT GROUNDING CONDUCTORS SHALL BE BROUGHT TO THE PRIMARY SWITCH, BUT SHALL BE GROUNDED AT BOTH SECONDARY AND PRIMARY SWITCHES.
- 6. PAYMENT.
PAYMENT FOR THE ABOVE WORK SHALL BE INCIDENTAL TO ITEM 625, NO. 4 AWG, 600 VOLT DISTRIBUTION CABLE, AS PER PLAN".

ITEM 625 TRENCH, AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF ODOT CMS 625.13 AND THE STANDARD CONSTRUCTION DRAWINGS, WITHIN EACH TRENCH, THE LOCATION OF UNDERGROUND CABLE OR CONDUIT SHALL BE MARKED BY THE USE OF A CONTINUOUS IDENTIFYING TAPE BURIED IN THE TRENCH ABOVE THE LINE. ONE STRIP OF MARKING TAPE SHALL BE PLACED BETWEEN 6-INCHES AND 12-INCHES BELOW FINISHED GRADE WITH A TAPE LENGTH EQUAL TO LENGTH OF THE CONDUIT OR CABLE. THE TAPE SHALL BE PLACED PARALLEL WITH THE FINISHED SURFACE. THE CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO INSURE THAT THE TAPE IS NOT PULLED, DISTORTED, OR OTHERWISE MISPLACED IN COMPLETION THE TRENCH BACKFILL.

THE TAPE SHALL BE AN INERT MATERIAL HIGHLY RESISTANT TO ALKALIS, ACIDS, AND OTHER CHEMICAL COMPONENTS LIKELY TO BE ENCOUNTERED IN SOILS. THE TAPE SHALL BE 3-INCHES TO 6-INCHES WIDE, AND A HIGH VISIBILITY COLOR SUCH AS ORANGE OR RED. THE TAPE SHALL BE PRINTED WITH THE WORD "ELECTRIC" APPROXIMATELY EVERY SIX (6) FEET IN BLACK LETTERS WITH INK THAT WILL NOT CHANGE WHEN EXPOSED TO ACIDS AND OTHER DESTRUCTIVE SUBSTANCES COMMONLY FOUND IN SOIL. THE TAPE SHALL BE SUPPLIED IN CONTINUOUS ROLLS WITH THE IDENTIFYING LETTERING REPEATED CONTINUOUSLY THE FULL LENGTH OF THE TAPE.

THIS ITEM SHALL BE PAID FOR PER LINEAR FOOT OF ITEM 625, TRENCH, AS PER PLAN, COMPLETE AND IN PLACE.

ITEM 625 NO. 4 AWG, 600 VOLT DISTRIBUTION CABLE, AS PER PLAN
A GREEN OR GREEN WITH YELLOW STRIPE(S), INSULATED, CABLE SHALL BE USED FOR THE GROUND WIRE (GND) WHERE INDICATED. THIS GND CABLE SHALL BE SEPARATE FROM THE GROUND ROD WIRE, BUT SHALL BE CONNECTED TO THE SAME GROUNDING BOLT USED FOR THE GROUND ROD WIRE ATTACHMENT AT THE POLE. THE GND CABLE SHALL BE TAGGED AS "GND SYS" AT ALL POLE LOCATIONS, PULL BOXES AND & CONTROL CABINETS.

PAYMENT SHALL BE AS PER ITEM 625.

ITEM 625 CONDUIT, (BY TYPE), (BY SIZE), 725.051, AS PER PLAN
CONDUIT SHALL BE SCHEDULE 40 PVC CONFORMING TO THE SPECIFICATIONS OF NEMA STANDARD PUBLICATION NO. TC-2.

PAYMENT SHALL BE AS PER ITEM 625.

ITEM 625 PULL BOX, 725.08, (BY SIZE), AS PER PLAN
PULL BOXES SHALL HAVE THE WORD "TRAFFIC" ON THE LID. ALL PULL BOXES WITHIN OR ADJACENT TO SIDEWALK SHALL BE FLUSH WITH THE WALK.

PAYMENT SHALL BE AS PER ITEM 625.

ITEM 625 BRACKET ARM, AS PER PLAN
BRACKET ARMS SHALL BE AS SHOWN IN DETAIL ON THE POLE FABRICATION DATA SHEET AND SHALL BE GALVANIZED AND POWDER COATED TO MATCH THE COMBINATION STRAIN POLES.

CATALOGUE CUTS SHALL BE SUBMITTED TO THE CITY OF DELAWARE FOR REVIEW AND COMMENT.

BRACKET ARMS SHALL INCLUDE ALL HARDWARE NEEDED FOR ATTACHMENT TO THE MAST ARM AND SHALL INCLUDE A TENON FOR ATTACHMENT OF THE LUMINAIRES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THE TENON DIMENSIONS ARE COMPATIBLE WITH THE LUMINAIRE. THE COST OF THIS COORDINATION SHALL BE INCIDENTAL TO THIS ITEM.

PAYMENT SHALL BE AS PER ITEM 625.

ITEM 625 LUMINAIRE CONVENTIONAL: 250 W HPS, 120V, TYPE III, AS PER PLAN
IN ADDITION TO THE REQUIREMENTS OF 625, THE LUMINAIRE SHALL BE AS SPECIFIED BY THE CITY OF DELAWARE AND AN AMERICAN ELECTRIC LIGHTING ROADWAY SERIES 125 CUTOFF STYLE COBRAHEAD. THE LUMINAIRE HOUSING SHALL BE POWDER COATED TO MATCH THE COMBINATION STRAIN POLES.

ALL LUMINAIRES SHALL BE CONTROLLED BY A SINGLE PHOTO CELL. FURNISHING AND INSTALLING THIS SINGLE PHOTO CELL ON TOP OF THE POLE CLOSEST TO THE CONTROLLER AND ALL ASSOCIATED WIRING SHALL BE CONSIDERED INCIDENTAL TO THIS ITEM OF WORK.

PAYMENT FOR THIS ITEM SHALL BE AS PER ITEM 625 AT THE UNIT PRICE BID, COMPLETED, IN PLACE, WITH ALL CONNECTIONS TESTED AND ACCEPTED.

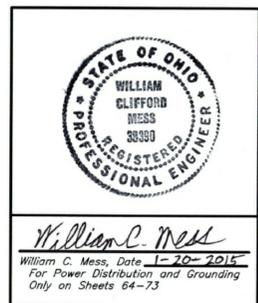
ITEM 630 SIGN, FLAT SHEET, AS PER PLAN
ITEM 630 SIGN HANGER ASSEMBLY, MAST ARM MOUNTED, AS PER PLAN
ITEM 630 SIGN SUPPORT ASSEMBLY, POLE MOUNTED, AS PER PLAN
THE BACK OF ALL SIGNS, MOUNTING HARDWARE, AND SUPPORT ASSEMBLIES MOUNTED ON EITHER SIGNAL SUPPORTS OR PEDESTAL SUPPORTS SHALL BE COATED TO MATCH ITS RESPECTIVE SUPPORT. FINISH REQUIREMENTS SHALL BE IN ACCORDANCE WITH THAT LISTED FOR THE SUPPORT, PEDESTAL, OR LIGHT POLE USED FOR ATTACHMENT.

ALL MAST ARM MOUNTED SIGNS SHALL BE RIGID MOUNTED, WITH CABLE CLAMP ASSEMBLIES. STAINLESS STEEL BANDING WILL NOT BE PERMITTED.

PAYMENT SHALL BE AS PER ITEM 630.

ITEM 632 POWER CABLE, 3 CONDUCTOR, (BY SIZE), AS PER PLAN
ITEM 632 POWER SERVICE, AS PER PLAN

POWER CABLE SHALL BE PROVIDED AS PER 632.23 BETWEEN THE CONTROL CABINET AND THE POWER SOURCE NOTED IN THE PLAN. WHEN THE POWER CABLE IS IN PLACE AND TWO WEEKS PRIOR TO THE TIME THAT ELECTRICAL POWER WILL BE REQUIRED, THE CONTRACTOR SHALL CONTACT CONSOLIDATED ELECTRIC COOPERATIVE, INC. (TIM APPLIGATE (740) 363-2641) WHICH WILL MAKE THE ELECTRICAL SERVICE CONNECTION. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR SPLICE POWER CABLE INTO THE POWER COMPANY'S CIRCUITS.



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| MARK | DATE | DESCRIPTION | REVISIONS | Job No. | 20080386 |
| | | | | Date | February 2015 |
| | | | | Sheet | 64 / 74 |
| | | | | Scale | None |
| | | | CITY OF DELAWARE, DELAWARE COUNTY, OHIO STREET IMPROVEMENT PLAN FOR GLENN ROAD / US-36 TO MILL RUN CROSSING IMPROVEMENTS | | |
| | | | TRAFFIC SIGNAL PLAN GENERAL NOTES | | |

POWER SUPPLIED SHALL BE 120/240 VOLTS SINGLE PHASE AND SHALL BE METERED. A METER AND DISCONNECT SWITCH SHALL BE MOUNTED AT THE CONTROLLER CABINET AS ILLUSTRATED WITHIN.

MEASUREMENT AND PAYMENT SHALL BE AS PER ITEM 632.

ITEM 632 VEHICULAR SIGNAL HEAD, (LED), (BY TYPE AND SIZE), 1-WAY, AS PER PLAN SIGNAL HEADS SHALL BE AS PER ITEM 632 SHALL CONFORM TO THE EQUIPMENT AND MATERIAL STANDARDS OF THE ITE AS PUBLISHED BY THE INSTITUTE OF TRANSPORTATION ENGINEERS AND ALL INDICATIONS SHALL USE A LIGHT EMITTING DIODE (LED) LIGHT SOURCE CONFORMING THERWITH. VEHICULAR SIGNAL HEADS SHALL BE RIGIDLY MOUNTED TO THE SIGNAL SUPPORT AS PER STANDARD DRAWING TC-85.20. HOWEVER, STAINLESS STEEL BANDING WILL NOT BE PERMITTED. ALL BOLTS AND WASHERS FOR SECURING SECTIONS TOGETHER, ALL MOUNTING HARDWARE FOR THE LENS, ALL DOOR LATCHING BOLTS, AND ALL HINGE PINS SHALL BE STAINLESS STEEL.

SIGNAL HEADS SHALL BE AS PER ITEM 632 AND SHALL BE FURNISHED WITH CUT AWAY VISORS AND LOUVERED ALUMINUM BACKPLATES PER ODOT STANDARD DRAWING TC-85.20. ALUMINUM BACKPLATES SHALL HAVE A FACTORY APPLIED BLACK POWDER COAT FINISH. BACKPLATES SHALL INCLUDE A REFLECTIVE YELLOW REFLECTIVE BORDER.

VEHICULAR SIGNAL HEADS SHALL BE POLYCARBONATE AND THE TOP AND BOTTOM OF THE HOUSING SHALL HAVE AN OPENING TO ACCOMMODATE STANDARD 1-1/2" PIPE BRACKETS. MOUNTING HARDWARE SHALL ATTACH TO THE SIGNAL HEAD HOUSING WITH TRI-STUD TYPE CONNECTIONS. SIGNAL SUPPORTS SHALL BE DESIGNED TO ALSO ACCOMMODATE ALUMINUM SIGNAL HEADS. ALL BOLTS AND WASHERS FOR SECURING SECTIONS TOGETHER, ALL MOUNTING HARDWARE FOR THE LENS, ALL DOOR LATCHING BOLTS, AND ALL HINGE PINS SHALL BE STAINLESS STEEL.

THE EXTERIOR HOUSING OF THE VEHICULAR SIGNAL HEADS AND VISORS SHALL BE BLACK TO MATCH THE SIGNAL SUPPORTS. THE INTERIOR OF THE VISOR SHALL BE BLACK PER ITEM 632. PRIOR TO FINISHING THE CONTRACTOR SHALL SUBMIT PAINT SAMPLES TO THE CITY OF DELAWARE OFFICIALS FOR REVIEW AND COMMENT.

DRIP LOOPS SHALL BE USED PER STANDARD DRAWING TC-85.20 TO PREVENT WATER ENTRY INTO THE SIGNAL HEAD ASSEMBLY.

PAYMENT SHALL BE AS PER ITEM 632.

ITEM 632 PEDESTRIAN SIGNAL HEAD, AS PER PLAN PEDESTRIAN SIGNAL HEADS SHALL DISPLAY INTERNATIONAL SYMBOLS IN LIEU OF THE WORDS "WALK" AND "DON'T WALK" AND SHALL BE SUPPLEMENTED BY A CLEARANCE INTERVAL COUNTDOWN TIMER. THE INTERNATIONAL SYMBOLS AND THE COUNTDOWN DISPLAY SHALL BE HOUSED IN A SINGLE ENCLOSURE. THE DISPLAY SHALL UTILIZE AN LED LIGHT SOURCE THAT COMPLIES WITH APPLICABLE STANDARDS PROMULGATED BY THE OHIO DEPARTMENT OF TRANSPORTATION AND THE INSTITUTE OF TRANSPORTATION ENGINEERS.

- COUNTDOWN TIMER REQUIREMENTS:
1. THE COUNTDOWN FEATURE SHALL AUTOMATICALLY ADJUST TO THE PROGRAMMED INTERVALS OF THE TRAFFIC CONTROLLER PER THE REQUIREMENTS OF 732.05
 2. THE COUNTDOWN TIMER SHALL BE TO THE RIGHT OF THE INTERNATIONAL SYMBOLS.
 3. COUNTDOWN NUMBERS SHALL BE CREATED USING TWO ROWS OF L.E.D.'S AND BE 9 INCHES HIGH.
 4. USE A GE LED PED MODULE.
 5. FULL HAND/MAN OVERLAY
 6. 18 INCH OVERLAY

THE HOUSING SHALL BE FIELD DRILLED TO FIT THE HINGED MOUNTING BRACKET AND REINFORCED WITH PARTS FURNISHED BY THE MANUFACTURER. HEADS SHALL BE MOUNTED ON TWO-HINGED TYPE BRACKETS WHICH ARE BOLTED TO THE POLE. BANDING WILL NOT BE PERMITTED. THE CONTRACTOR SHALL SUPPLY THE MOUNTING BRACKETS AND ALL OTHER NECESSARY HARDWARE.

THE BOTTOM OF THE PEDESTRIAN SIGNAL HEADS SHALL BE MOUNTED 8 FEET ABOVE POLE BASE. A CLEAR, SHATTERPROOF, LENS SHALL COVER THE FACE OF THE SIGNAL HEAD AND BE OF SUFFICIENT STRENGTH TO PROTECT THE COMPONENTS FROM ROADSIDE HAZARDS AND VANDALISM.

THE SIGNAL HOUSINGS SHALL BE BLACK POLYCARBONATE TO MATCH THE SIGNAL SUPPORTS.

PAYMENT SHALL BE AS PER ITEM 632.

ITEM 632 COVERING VEHICULAR SIGNAL HEAD, AS PER PLAN
ITEM 632 COVERING PEDESTRIAN SIGNAL HEAD, AS PER PLAN ALL SIGNAL HEADS THAT ARE INSTALLED PRIOR TO BEING USED TO CONTROL TRAFFIC OR PEDESTRIANS SHALL BE COVERED. IF PLASTIC BAGS ARE USED, ONLY HEAVY DUTY PLASTIC BAGS SHALL BE PERMITTED. TWO BAGS PER HEAD SHALL BE USED. THE BAGS SHALL BE SECURELY LASHED DOWN SO THAT WIND DOES NO RIP THEM FROM THE SIGNAL HEAD. ALL SIGNAL HEADS WHILE COVERED SHALL BE DARK EITHER BY REMOVING, UNSCREWING, OR DISCONNECTING THE POWER TO THE BULBS. NO COVERED HEAD SHALL BLOCK THE VIEW OF AN OPERATING HEAD. ANY EXISTING VEHICULAR OR PEDESTRIAN HEAD THAT IS NOT FUNCTIONAL SHALL BE REMOVED IMMEDIATELY OR COVERED.

ITEM 632 COMBINATION SIGNAL SUPPORT, TYPE TC-81.21, (BY SIZE), AS PER PLAN TRAFFIC SIGNAL SUPPORTS SHALL BE AS PER ITEM 632 EXCEPT THAT THE SUPPORT POLES AND ARMS SHALL HAVE A CIRCULAR CROSS SECTION AND SHALL BE TAPERED TUBES HAVING A TRUE AND CONTINUOUS TAPER. MULTI-SIDED OR FLUTED POLES AND POLES HAVING A TAPERED EFFECT ACCOMPLISHED WITH THE USE OF REDUCERS WILL NOT BE ACCEPTED. ARM LENGTH SHALL BE AS SPECIFIED BUT ARMS FORTY FEET IN LENGTH OR LESS SHALL BE OF ONE PIECE CONSTRUCTION. ARMS MORE THAN FORTY FEET LONG MAY BE CONSTRUCTED IN NO MORE THAN TWO PIECES.

SUPPORTS SHALL BE MANUFACTURED BY VALMONT OR UNION METAL ONLY. THE CONTRACTOR SHALL SUBMIT MANUFACTURER DRAWINGS FOR APPROVAL BY THE CITY PRIOR TO ORDERING THE COMBINATION SIGNAL SUPPORTS. THE DRAWINGS SHALL SHOW THE EXACT POLES AND BRACKET ARMS, ANCHOR BOLT CIRCLES, BASES AND BRACKETS HE INTENDS TO FURNISH UNDER THIS ITEM.

ANCHOR BOLT COVERS SHALL BE PROVIDED. ANCHOR BOLTS SHALL BE ORIENTED AS REQUIRED BY THE PLANS HOWEVER THE FORMED TOP OF THE SUPPORT FOUNDATION SHALL BE ORIENTED SQUARE TO THE ADJACENT SIDEWALK IF APPLICABLE.

ALL SIGNAL CABLES SHALL BE RUN INSIDE THE POLES. STANDARD DRAWING TC-83.10

IS HEREBY MODIFIED TO PROHIBIT THE USE OF EXTERNAL CONDUIT RISERS FOR SIGNAL CABLING, OR ANY OTHER USE.

THE CONTRACTOR SHALL PROVIDE ALL NECESSARY ATTACHMENTS OR CONNECTIONS TO THE POLES. ADDITIONAL WIRING HOLES IN THE POLE SHALL BE DRILLED, REAMED, OR HOLE-SAWED. FLAME CUTTING (OXYACETYLENE OR ELECTRICAL ARC) WILL NOT BE ACCEPTED. ALL CUT EDGES OR OTHER DEFECTS IN THE ZINC COATING SHALL BE CLEANED AND COVERED WITH TWO COATS OF ZINC RICH REPAIR PAINT MATCHING THE FACTORY FINISH. BRACKETS AND APPURTENANCES SHALL BE SECURELY ATTACHED WITH STAINLESS STEEL SCREWS OF SUFFICIENT SIZE FOR THE INTENDED LOADING. STAINLESS STEEL BANDING SHALL NOT BE USED. THE CONTRACTOR SHALL COORDINATE WITH CITY OF DELAWARE PERSONNEL PRIOR TO DRILLING OR CUTTING SIGNAL SUPPORTS WHICH INCLUDES BUT IS NOT LIMITED TO PLACEMENT OF PEDESTRIAN PUSH BUTTONS/SIGNAL HEADS, AUXILIARY SIGNAL HEADS.

DESIGN CRITERIA IN ADDITION TO THE REQUIREMENTS OF ITEM 632, SIGNAL SUPPORT STRUCTURES SHALL BE DESIGNED AND CONSTRUCTED BY THE SUPPLIER TO SUPPORT THE LOADS CAUSED BY THE SIGNS, SIGNALS, AND OTHER EQUIPMENT THAT THE PLAN REQUIRES THE CONTRACTOR TO INSTALL. THE USE OF STANDARD ODOT DESIGN DESIGNATIONS SUCH AS THOSE DESCRIBED ON STANDARD DRAWING TC-81.21, AND ANY DETAILS PROVIDED IN THIS PLAN, ARE INTENDED TO PROMOTE UNIFORMITY OF DESIGN AND ARE NOT WARRANTED TO BE STRUCTURALLY ADEQUATE. TO THE MAXIMUM EXTENT PRACTICABLE, THE CONTRACTOR AND SUPPLIER SHALL PROVIDE A STRUCTURALLY ADEQUATE SUPPORT THAT UTILIZES STANDARD ODOT ANCHOR BOLT SIZING AND SPACING. THE CONTRACTOR SHALL VERIFY THE ANCHOR BOLT CIRCLE, ANCHOR BOLT DIAMETER, AND ORIENTATION PATTERN WITH THE SIGNAL SUPPORT MANUFACTURER.

THE MAST ARM SUPPORT POLE ASSEMBLY, AND THE MAST ARM ASSEMBLY SHALL BE MADE BY THE SAME MANUFACTURER AND DESIGNED AND SOLD AS A UNIT. THE MANUFACTURER SHALL BE RESPONSIBLE FOR VERIFYING THE POLE DESIGN, AND SHALL PREPARE SHOP DRAWINGS AND STRUCTURAL DESIGN CALCULATIONS STAMPED BY AN OHIO PROFESSIONAL ENGINEER. THE SHOP DRAWINGS AND CALCULATIONS SHALL BE SUBMITTED TO THE CITY OF DELAWARE FOR APPROVAL PRIOR TO FABRICATION.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING AND COORDINATING WITH THE POLE MANUFACTURER AND THE LUMINAIRE MANUFACTURER THE ATTACHMENT REQUIREMENTS FOR INSTALLING THE LUMINAIRE AND BRACKET ARM ON THE SIGNAL SUPPORT.

ALL PRE-DRILLED HOLES FOR ALL ITEMS SHALL BE DEBURRED AND FREE OF ALL SHARP EDGES. ALL OUTSIDE WELDS SHALL BE ROLLED OR GROUND SMOOTH. ALL INSIDE WELDS SHALL BE VOID OF SHARP EDGES. ANY STRUCTURAL FASTENER (3/4" OR GREATER) SHALL BE GALVANIZED PER ASTM 153 AND SHALL BE MADE OF HIGH STRENGTH CARBON STEEL. ANY OTHER FASTENER (LESS THAN 3/4") SHALL BE STAINLESS STEEL. ALL VISIBLE FASTENERS SHALL MATCH THE COATING OF THE STRUCTURE.

THIS ITEM OF WORK SHALL INCLUDE A FURNISHING AND INSTALLING A MECHANICAL DAMPENING DEVICE PER TC-81.21 ON ALL ARM IN EXCESS OF 59 FEET.

FINISH POLES AND ARMS, INCLUDING BASE AND FLANGE PLATES, BOLT COVERS, HANDHOLES, AND WIRE ENTRANCES, SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH 711.02. ALL VISIBLE ELEMENTS OF THE SIGNAL SUPPORT, AND ANY OTHER PARTS REQUIRED TO BE COATED, SHALL BE GALVANIZED AND THEN POWDER-COATED. ALL PAINTING SHALL BE PERFORMED UNDER CONTROLLED ENVIRONMENTAL CONDITIONS, AND IN ACCORDANCE WITH THE PAINT MANUFACTURER'S RECOMMENDATIONS PERTAINING TO SURFACE PREPARATION, MATERIAL HANDLING, AND APPLICATION. THE TOP FINISH COAT OF PAINT SHALL BE SIMILAR TO FEDERAL SPECIFICATION 595-B COLOR #27038, BLACK. PAINT SAMPLES SHALL BE SUBMITTED WITH THE SIGNAL SUPPORT SHOP DRAWINGS FOR REVIEW.

THE MANUFACTURER SHALL BE RESPONSIBLE FOR BUFFING THE VERTICAL WELDED SEAM TO COSMETICALLY BLEND WITH ADJACENT PARENT MATERIAL.

THE INSIDE OF EACH SIGNAL SUPPORT POLE ASSEMBLY, EACH MAST ARM ASSEMBLY, AND OTHER SIGNAL SUPPORT ACCESSORIES SHALL BE COATED WITH GALVANIZING MATERIAL. THE INSIDE AREA FORMED BY THE GUSSETS, POLE, AND POLE FLANGE PLATE SHALL BE COATED TO PROTECT THE AREA FROM CORROSION. IT IS TO BE NOTED THAT SOME TYPE OF OPENING SHALL BE REQUIRED TO COAT THE GUSSET AREA. THIS OPENING SHALL NOT HAMPER THE STRUCTURAL INTEGRITY OF THE FLANGE ASSEMBLY.

ALL EXTERIOR SURFACES OF THE SIGNAL SUPPORT POLE SHAFT ASSEMBLY, MAST ARM ASSEMBLY, ALL BOLT COVERS, ALL CLAMPS, CLEVIS-TO-CLEVIS UNIVERSAL, WIRE ENTRANCE, ALL HANDHOLE COVERS, LUMINAIRE AND BRACKETS, POLE AND ARM CAPS, SIGNAL HEAD HANGERS AND WEATHER-HEADS SHALL HAVE A COATING PROPERLY APPLIED TO THEM. EXTERIOR SURFACES OF ALL FASTENER BOLTS/SCREWS, WASHERS, NUTS, AND OTHER ATTACHMENT HARDWARE SHALL HAVE A COATING APPLIED TO THEM. FASTENER THREADS SHALL NOT BE CLOGGED WITH COATING MATERIAL.

ALL COATED ITEMS SHALL BE SHIPPED IN A MANNER TO MINIMIZE DAMAGE IN TRANSIT. SURFACES SHOULD BE PROTECTED BY FOAM PADDING, BY WRAPPING IN CARDBOARD, BY SPIRAL WRAPPING WITH WAX PAPER, BY CRATING, BY A COMBINATION OF METHODS, OR BY ANY OTHER METHOD SELECTED BY THE MANUFACTURER WHICH WILL INSURE DELIVERY OF UNDAMAGED MATERIALS. MATERIALS DAMAGED IN TRANSIT CAUSED BY IMPROPER PACKAGING OR IMPROPER TRANSIT HANDLING SHALL BE REJECTED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING MATCHING PAINT COATING MATERIAL FOR TOUCH-UP WORK IDENTICAL TO THE ORIGINAL COATING PLACED ON THE STRUCTURE.

EACH COATING LAYER SHALL BE PROPERLY CURED BEFORE THE APPLICATION OF THE NEXT COAT. THE APPLICATION PROCEDURE SHALL BE SUCH TO GUARANTEE A FINISH THAT WILL NOT SCALE, FLAKE OR PEEL, AND WILL RETAIN ITS COLOR BRIGHTNESS AND FRESH, ATTRACTIVE APPEARANCE FOR 5 YEARS WITHOUT DULLING OR FADING. THE 5 YEAR WARRANTY SHALL INCLUDE A REPAIR WARRANTY OF COATING DELAMINATION, BLISTERING, OR CORROSION. POWDER COATED UNION METAL STRUCTURES SHALL HAVE THE THOMARIOS COATING WARRANTY REVISION DATE JULY 17TH 2007 OR LATER. POWDER COATED VALMONT STEEL STRUCTURES SHALL BE COATED WITH FINISH SPECIFICATION F-573 DATED 4-11-07 OR LATER, WHICH INCLUDES EPOXY POWDER PRIME COAT AND PENTABOND POWDER FINISH COAT.

PAYMENT THIS ITEM OF WORK SHALL BE MEASURED AS EACH COMPLETE SIGNAL SUPPORT, IN PLACE IN ESSENTIALLY A VERTICAL POSITION UNDER FULL PLAN LOADING. ALL LABOR, EQUIPMENT, AND MATERIALS NECESSARY TO PICK UP, TRANSPORT, STORE, ERECT,

ADJUST, AND REPAIR THE SIGNAL SUPPORT AND ANCHOR BOLTS SHALL BE INCLUDED FOR PAYMENT IN THE BID ITEM.

PAYMENT SHALL BE AS PER ITEM 632.

ITEM 632 PEDESTAL, TRANSFORMER BASE, 10.7', AS PER PLAN PEDESTAL SUPPORTS SHALL BE AS PER ITEM 632, EXCEPT THAT THE POLE SHALL CONSIST OF A CIRCULAR CROSS SECTION AND SHALL HAVE A TRUE AND CONTINUOUS TAPER. MULTI-SIDED OR FLUTED POLES, AND POLES HAVING A TAPERED EFFECT ACCOMPLISHED WITH THE USE OF REDUCERS, WILL NOT BE ACCEPTED. SEE DETAIL ON THE MAST ARM ORIENTATION AND FABRICATION DATA SHEET.

ALL EXTERIOR SURFACES SHALL BE COATED IN ACCORDANCE WITH THE FINISH SECTION REQUIREMENTS OF ITEM 632 COMBINATION SIGNAL SUPPORT, TYPE TC-81.21 (BY SIZE), AS PER PLAN. ALL PEDESTAL ATTACHED ACCESSORIES SHALL BE PAINTED INCLUDING SIGNAL HEAD ATTACHMENT HARDWARE, TRANSFORMER BASE, AND MISCELLANEOUS BRACKETS.

ALL SIGNAL CABLES SHALL BE RUN INSIDE THE POLES. STANDARD DRAWING TC-83.10 IS HEREBY MODIFIED TO PROHIBIT THE USE OF EXTERNAL CONDUIT RISERS FOR SIGNAL CABLING, OR ANY OTHER USE.

THIS ITEM SHALL ALSO INCLUDE FURNISHING AND INSTALLING AN AB CHANGE CAT. # C11242NG4VP OR APPROVED EQUAL SCREW-IN FOUNDATION. THE FOUNDATION SHALL BE INSTALLED TO WITHIN 2"± OF THE GROUND ELEVATION.

PAYMENT SHALL BE AS PER ITEM 632.

ITEM 633 EMERGENCY VEHICLE PREEMPTION, AS PER PLAN THIS ITEM CONSISTS OF PROVIDING AND INSTALLING PREEMPTION EQUIPMENT AT THE US36/SR37/GLENN ROAD INTERSECTION.

THE CONTRACTOR SHALL FURNISH AND INSTALL A FULLY FUNCTIONING OPTICOM GPS BASED PRIORITY CONTROL SYSTEM MANUFACTURED BY GLOBAL TRAFFIC TECHNOLOGIES (GTT). THE OPTICOM SYSTEM SHALL BE COMPATIBLE WITH THE EXISTING EMERGENCY VEHICLE PREEMPTION SYSTEM CURRENTLY USED WITHIN THE CITY OF DELAWARE AND COMPATIBLE WITH THE PROPOSED/EXISTING TRAFFIC SIGNAL CONTROLLERS. THE PREEMPTION SYSTEM SHALL BE MODEL OPTICOM RADIO/GPS. THE SYSTEM SHALL INCLUDE: OPTICOM RADIO/GPS POWER SUPPLY (IF NEEDED), PHASE SELECTOR, AND RADIO/GPS ANTENNAS AS MANUFACTURED BY GLOBAL TRAFFIC TECHNOLOGIES.

THE SIGNAL PREEMPTION SHALL MEET ALL REQUIREMENTS IN THE OPTICOM SPECIFICATION FOR THE FOLLOWING OPTICOM EQUIPMENT:

- OPTICOM MODEL 1010 GPS RADIO UNIT CONTAINING A GPS RECEIVER WITH ANTENNA AND A 2.4 GHZ SPREAD SPECTRUM TRANSCIEVER WITH ANTENNA AND ALL WIRING.
- OPTICOM MODEL 764 MULTIMODE PHASE SELECTOR AND WIRING INTERFACE PANEL (IF REQUIRED).
- OPTICOM MODEL 1070 GPS INSTALLATION CABLE
- OPTICOM MODEL 575 CONFIRMATION LIGHTS

THE PREEMPTION SHALL CONFORM TO ODOT SPECIFICATION 633 AND SHALL UTILIZE COMMUNICATIONS TO IDENTIFY THE PRESENCE OF AN EMERGENCY VEHICLE. THE SYSTEM SHALL CAUSE THE SIGNAL CONTROLLER TO SELECT A PRE-PROGRAMMED PREEMPTION PLAN THAT WILL DISPLAY AND HOLD THE DESIRED SIGNAL PHASE FOR THE DIRECTION OF THE EMERGENCY VEHICLE.

THE COMMUNICATIONS MEDIUM SHALL EMPLOY RADIO/GPS DETECTION TECHNIQUES TO DETERMINE AND LOG THE PRESENCE OF THE VEHICLE BY DETECTING THE RF/GPS LOCATION OF THE APPROACHING VEHICLE. THE SYSTEM SHALL BE COMPLETELY COMPATIBLE WITH N.E.M.A. CONTROLLERS AND COMPLETELY WIRED AND TESTED. THE SYSTEM SHALL BE ABLE TO DETECT THE DIRECTION AND ETA OF APPROACHING VEHICLES FROM A DISTANCE OF 2,500 FEET OR MORE.

THE DETECTION ANTENNA AND CONFIRMATION LIGHTS SHALL BE RIGID MOUNTED TO THE MAST ARMS WITH MOUNTING HARDWARE AS RECOMMENDED BY THE EQUIPMENT SUPPLIER. THE SYSTEM SHALL BE CAPABLE OF DETECTING ALL EQUIPPED VEHICLES BY DIRECTION, ETA, SPEED, AND TURN SIGNAL STATUS.

THE CONTRACTOR SHALL PROVIDE TWO CONFIRMATION LIGHTS PER APPROACH. THE CONFIRMATION LIGHTS SHALL BE RIGID MOUNTED TO THE MAST ARMS AND ARE FOR THE PURPOSE OF PROVIDING MOTORISTS A VISUAL INDICATION THAT AN EMERGENCY VEHICLE IS APPROACHING THE INTERSECTION. THE CONFIRMATION LIGHTS FACING THE APPROACH FROM WHICH THE VEHICLE HAS BEEN DETECTED SHALL BE A FLASHING WHITE LIGHT WHILE THE CONFIRMATION LIGHTS FOR ALL OTHER APPROACHES SHALL DISPLAY A STEADY WHITE LIGHT DURING PREEMPTION. THE LIGHT FIXTURES SHALL BE A DUAL INDICATION, LED, WEATHERPROOF FIXTURE UTILIZING A STANDARD OUTDOOR SPOTLIGHT.

THE CONTRACTOR SHALL THOROUGHLY INSPECT THE INSTALLED SYSTEM. AT A MINIMUM THE CONTRACTOR SHALL VERIFY THAT ALL CONNECTIONS ARE PROPERLY MADE TO THE CONTROLLER CABINET. THE CONTRACTOR SHALL CHECK THAT THE PHASE SELECTOR STATUS LIGHTS FOR RADIO AND GPS ARE CORRECT, AND THE CONTRACTOR SHALL ENSURE THAT THE PHASE SELECTOR IS SELECTING THE PROPER PHASE AND TIMING.

PAYMENT FOR THIS ITEM OF WORK SHALL BE AT THE CONTRACT BID PRICE FOR ITEM 633 EMERGENCY VEHICLE PREEMPTION, AS PER PLAN AND SHALL INCLUDE FURNISHING, INSTALLING, TUNING, TESTING AND ACCEPTANCE OF THE OPTICOM SYSTEM. A "SYSTEM" SHALL BE CONSIDERED ALL OF THE EQUIPMENT NEEDED TO RENDER A FULLY FUNCTIONAL EMERGENCY VEHICLE PREEMPTION SYSTEM AT ONE INTERSECTION.

ITEM 633 CONTROLLER UNIT, TYPE TS-2/A2 WITH CABINET, TYPE TS-2, AS PER PLAN THE TRAFFIC SIGNAL CONTROL EQUIPMENT PROVIDED SHALL MEET THE FOLLOWING SPECIFICATION AND BE MANUFACTURED BY SIEMENS. THE EQUIPMENT PROVIDED AS PART OF THIS CONTRACT SHALL BE THE (EPAC M52) LATEST MODEL CURRENTLY UNDER PRODUCTION AND NEW. THE CONTROLLER CABINET AND ACCESSORIES SHALL MEET THE NEMA TS2 STANDARD FOR ACTUATED CONTROLLER UNITS AND COME EQUIPPED WITH ALL ACCESSORIES FOR 8 PHASE OPERATION, FULLY SYSTEM READY FOR THE MARC AND ACTRA SYSTEMS AND CONTAIN A BUILD IN EXTERNAL 10 BASE-T ETHERNET PORT WITH CONFIGURABLE IP. THE CONTROLLER SHALL BE CAPABLE OF ADAPTIVE TRAFFIC CONTROL, REPORTS, PREEMPTION/PRIORITY, DIAGNOSTICS, RADIO INTERCONNECT COMMUNICATION AND INTERNAL TIME BASE CONTROL.

- THE M52 CONTROLLER SHALL SERVE TWO FUNCTIONS:
1. IT SHALL SERVE AS THE LOCAL INTERSECTION CONTROLLER FOR THE US36/SR37/GLENN ROAD INTERSECTION
 - a. FURNISHED WITH SEPAC LOCAL CONTROLLER SOFTWARE.
 - IT SHALL BE CAPABLE OF ALSO SERVING AS THE MASTER CONTROLLER FOR INTERSECTIONS IN THE US 36/SR 37 CORRIDOR.
 - a. FURNISHED WITH SEMARC INTERSECTION SOFTWARE).
 - ALL COORDINATION TIMING DATA WILL BE FURNISHED BY THE CITY OF DELAWARE.
 - CONTRACTOR MUST COORDINATE WITH THE CITY TO PROGRAM CONTROLLER SETTINGS.

THE CONTROLLER AND CABINET SHALL BE FURNISHED AND INSTALLED WITH THE FOLLOWING FEATURES/EQUIPMENT:

- EACH CONTROLLER SHALL HAVE THE ABILITY TO COMMUNICATE AND PRODUCE MULTIPLE FORMS OF OUTPUT INCLUDING: ADAPTIVE TRAFFIC CONTROL OPERATION, REPORTS, PREEMPTION/PRIORITY, DIAGNOSTICS, INTERNAL TIME BASE CONTROL AND RADIO INTERCONNECT COORDINATION.
- PROVIDE FOR AN 6 PORT INDUSTRIAL ETHERNET SWITCH MANUFACTURED BY PHOENIX CONTACT MODEL NO. FL SWITCH SFN 6GT/2LX - 2891987.
- THERE SHALL BE NO LAG LEFT OPERATION. PHASE OMIT SHALL BE ACHIEVED THROUGH OMITTED CALL PROGRAMMING TO PREVENT A LEG LEFT SIGNAL OPERATION.
- THE CONTROLLER CABINET TYPE SHALL BE AN (P44 CABINET) WITH AN AUXILIARY CABINET FOR UNINTERRUPTIBLE POWER EQUIPMENT. THE BATTERY BACKUP CABINET AND EQUIPMENT SHALL BE PAID FOR SEPARATELY.
- THE CABINET SHALL INCLUDE WIRING FROM UNINTERRUPTIBLE POWER SUPPLY TO SIGNAL CABINET TO PROVIDE ALARMS FOR ON BATTERY, TWO HOUR TIMER, LOW BATTERY AND OFF BATTERY IN SIGNAL CABINET. AUXILIARY POWER SHALL CHARGE BATTERIES. SEE ITEM 633 UNINTERRUPTIBLE POWER SUPPLY, AS PER PLAN FOR ADDITIONAL CABINET REQUIREMENTS AND PAYMENT.
- THE CABINET SHALL PROVIDE ENCLOSURES TO HOUSE THE CONTROLLER (WITH ALL ACCESSORIES) AND THE COMPLETE BATTERY BACKUP SYSTEM WITH EACH COMPARTMENT ACCESSIBLE BY A SEPARATE DOOR. THE CABINET SHALL BE ALUMINUM THE NATURAL ALUMINUM FINISH INSIDE AND THE OUTSIDE SHALL BE POWDER COATED TO MATCH THE COLOR OF THE SIGNAL SUPPORTS. A PAINT CHIP SHALL BE SUBMITTED TO THE CITY OF DELAWARE FOR APPROVAL.
- THE LOAD BAY SHALL BE THE TF5016 OR NEWER, WITH 16 LOAD SWITCH POSITIONS AND 16 LOAD SWITCHES PROVIDED (UNUSED LOAD SWITCHES SHALL BE IN A SEPARATE BOX IN THE CABINET). EACH LOAD SWITCH SHALL HAVE LIGHT EMITTING DIODES (LEDS) FOR THE CONTROLLER OUTPUT AND LOAD SWITCH OUTPUT, 8 FLASH RELAY POSITIONS (UNUSED FLASH RELAYS SHALL BE IN A SEPARATE BOX IN THE CABINET). 1 NEMA 2-CIRCUIT FLASHER AND A MALFUNCTION MANAGEMENT UNIT (EBERLY DEIGN MMU16LE).
- THE CABINET SHALL BE CONSTRUCTED TO ACCOMMODATE BOTH OPENING DAY AND THE PROPOSED FUTURE PHASING DIAGRAM ILLUSTRATED WITHIN. ALL ADDITIONAL HARDWARE NEEDED FOR FUTURE PHASING, BUT NOT NEEDED FOR OPENING DAY PHASING SHALL BE PLACED ON A CABINET SHELF.
- THE CABINET SHALL PROVIDE FOR A SLIDE OUT LAPTOP SHELF.
- 12" CABINET RISER.
- A CABINET DOOR OPEN SWITCH AND A CABINET LIGHT ON/OFF SWITCH SHALL ALSO BE SUPPLIED. THE CONTROLLER SHALL HAVE A LIQUID CRYSTAL DISPLAY WITH ADJUSTABLE BACKLIGHT. THE DISPLAY SHALL BE OF SUFFICIENT SIZE TO DISPLAY A MINIMUM OF FOUR (4) LINES OF TEXT WITH A MINIMUM OF 20 CHARACTERS PER LINE. THE DISPLAY SHALL BE READABLE IN DIRECT LIGHT OR DARKNESS.
- THE FOLLOWING INFORMATION SHALL BE LABELED IN THE CONTROLLER CABINET TO IDENTIFY WIRING:
 - o LOOP DETECTOR LEAD-IN CABLE: PHASE NUMBER SERVICED, DIRECTION, MOVEMENT TYPE.
 - o SIGNAL HEAD FIELD WIRING: PHASE NUMBER SERVICED, DIRECTION, MOVEMENT TYPE AND COLOR (RED YELLOW, GREEN YELLOW ARROW, GREEN ARROW) OR PEDESTRIAN MOVEMENT
- THE POLICE PANEL ON THE INSIDE OF THE CABINET DOOR SHALL HAVE VEHICLE DETECTOR AND PEDESTRIAN DETECTOR PUSHBUTTONS TO CALL PHASES 1 TO 8 INDIVIDUALLY. A STOP TIMING SWITCH, CABINET LIGHT SWITCH, AND AN AUTO FLASH SWITCH SHALL ALSO BE SUPPLIED ON THE POLICE PANEL ON THE OUTSIDE OF THE CABINET DOOR.
- A FOURTH CIRCUIT BREAKER (15 AMP) AND A 2-POLE LIGHTING CONTACTOR WITH HAND-OFF AUTO SELECTOR SWITCH SHALL BE FURNISHED AND INSTALLED ON THE CABINET SIDE PANEL (ELECTRICALLY HELD, OPEN STYLE) FOR COMBINATION LIGHTS.
- A GENERATOR POWER PANEL AND ENCLOSURE SHALL BE MOUNTED ON THE OUTSIDE OF THE UPPER SECTION OF THE CONTROLLER CABINET. TWO (2) EACH WIRING DIAGRAMS AND TWO (2) EACH SERVICE/OPERATION MANUALS FOR DIFFERENT PIECE OF EQUIPMENT SHALL BE PROVIDED. A HEAVY CLEAR PLASTIC ENVELOPE ATTACHED TO THE INSIDE OF THE CABINET DOOR SHALL BE PROVIDED FOR STORING WIRING DIAGRAMS. (MINIMUM OF 9" X 12" IN SIZE)
- EACH CONDUIT ENTRANCE TO THE CABINET SHALL BE SEALED WITH A RUBBER PIPE/CONDUIT SEAL GASKET. THE SEAL SHALL BE OF A MATERIAL AND TYPE TIGHTLY FITTING AND ABLE TO SEAL OUT WATER, INSECTS, RODENTS, AND DIRT. THE SEAL SHALL BE EASILY REMOVED FOR SERVICE INSTALLATIONS OR CABLE REPLACEMENTS.
- PROVIDE AN ARC FLASH HAZARD WARNING SIGN ON THE OUTSIDE FRONT DOOR OF THE ENCLOSURE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE PARAGRAPH 110.16. PROVIDE AN AVAILABLE FAULT CURRENT SIGN ON THE OUTSIDE OF THE FRONT DOOR OF THE POWER SERVICE DISCONNECT SWITCH IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE PARAGRAPH 110.24.

PAYMENT OF ITEM 633 CONTROLLER UNIT, TYPE TS-2/A2 WITH CABINET, TYPE TS-2, AS PER PLAN, SHALL BE AT THE CONTRACT BID PRICE PER EACH, COMPLETE AND IN PLACE, INCLUDING ALL CONNECTIONS, SPARE COMPONENTS, TESTED AND ACCEPTED.

ITEM 633 UNINTERRUPTABLE POWER SUPPLY, AS PER PLAN IN ADDITION TO THE REQUIREMENTS OF CMS 633 AND 733, THE BACKUP UNIT SHALL BE AN ALPHA TECHNOLOGIES BRAND, ALPHA FXM UNINTERRUPTABLE POWER MODULE FXM 1100 AND A MEYERS BRAND POWER BACK/BC 100 UPS BATTERY BACKUP CABINET PBM-2000ITS UPS OR APPROVED EQUAL.

THE UPS BATTERY BACKUP EQUIPMENT WITH BATTERIES SHALL BE COMPLETE, MOUNTED AND CONTAINED WITHIN THE UPS BATTERY BACKUP CABINET. THE BATTERY BACKUP CABINET SHALL BE ATTACHED TO THE LEFT SIDE OF THE CONTROLLER CABINET (TO THE LEFT OF THE CABINET DOOR), AND THE EXTERIOR OF THE CABINET SHALL MATCH THE COLOR OF THE TRAFFIC SIGNAL CONTROLLER CABINET. ALL HOOKUPS, CABLE, ATTACHMENT HARDWARE, AND MISCELLANEOUS MATERIALS FOR BOTH ATTACHING THE CABINETS AND FOR FULL OPERATION OF THE BATTERY BACKUP SYSTEM SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THIS ITEM.

THE UPS OUTPUT NOTIFICATIONS FOR ON BATTERY, BATTERY 2 HOUR TIMER, OFF BATTERY AND LOW BATTERY SHALL BE WIRED INTO THE TRAFFIC SIGNAL CABINET BACK PANEL TO PROVIDE SPECIAL STATUS ALARMS FOR EACH OUTPUT INTO THE SIGNAL CONTROLLER.

A MANUAL BY-PASS/DISCONNECT SWITCH INTERNAL TO THE CABINET SHALL BE INCLUDED.

THIS ITEM SHALL INCLUDE A RED LED STATUS INDICATOR LAMP TO ALLOW MAINTENANCE PERSONNEL AND LAW ENFORCEMENT TO QUICKLY ASSESS WHETHER A TRAFFIC SIGNAL CABINET IS BEING POWERED BY AN UNINTERRUPTIBLE POWER SUPPLY (UPS). THE LED HOUSING SHALL BE NEMA 4X OR IP 66 RATED FOR OUTDOOR USE AND BE

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| MARK DATE DESCRIPTION | REVISIONS | Job No. | 20080386 | Sheet | 65 / 74 |
| | | Date | February 2015 | Scale | None |
| | | CITY OF DELAWARE, DELAWARE COUNTY, OHIO | | FOR | |
| | | STREET IMPROVEMENT PLAN | | GLENN ROAD / US-36 TO MILL RUN | |
| | | | | CROSSING IMPROVEMENTS | |
| | | TRAFFIC SIGNAL PLAN | | GENERAL NOTES | |
| | | EMHT | | E.M.H.T. Inc. 1550 New Albany Road, Columbus, OH 43204 Phone: 614/775-5500 Fax: 614/775-5501 | |

MATERIAL SPECIFICATIONS FOR BBS GENERATOR POWER PANEL EQUIPMENT

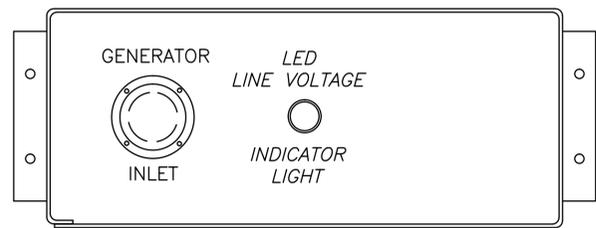
GENERATOR INLET – The inlet shall be 30 amp, 125/250V, locking, four (4) wire grounding and meet the NEMA configuration number L14-30-P 30A 125/250 V specification. The inlet shall be a Hubbell catalog #2715.

LINE VOLTAGE GENERATOR SWITCH – The switch shall be 30 amp, 125/250V AC, two (2) pole, three (3) position (On, Off, On). The switch shall be a Hubbell catalog #1388.

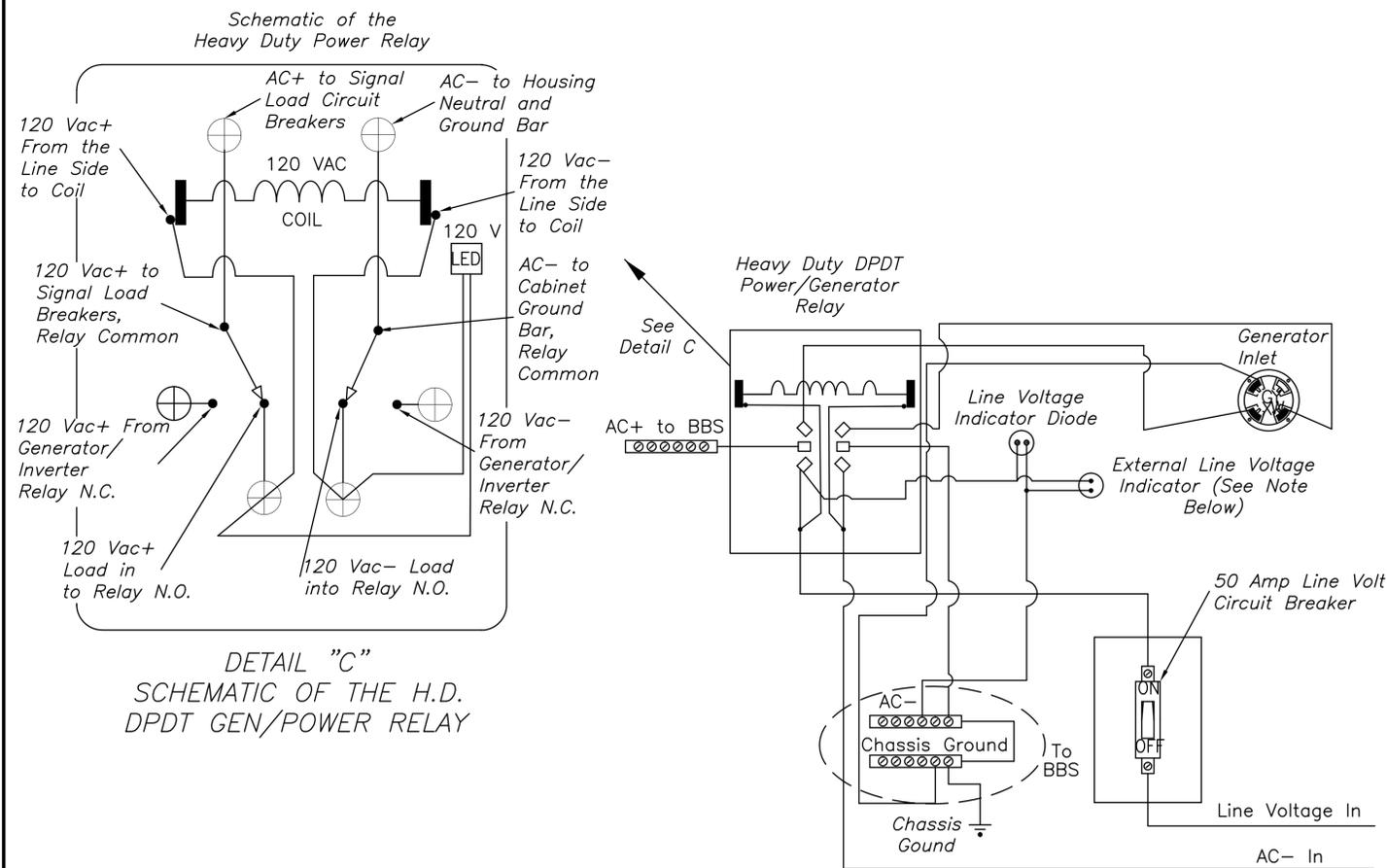
LINE VOLTAGE INDICATOR LIGHT – The indicator light shall be 125V AC light emitting diode with a red lens.

LINE VOLTAGE CIRCUIT BREAKER – The circuit breaker shall be single pole single throw and a minimum of 30 amps. The amperage shall be increased to accommodate greater loads, if necessary. The gauge of the power cable shall be of proper size per N.E.C.

EXTERNAL LINE VOLTAGE INDICATOR LIGHT – The indicator light shall be a 1" waterproof NEMA 4X or IP66 LED lamp with a green lens.



FRONT VIEW OF GENERATOR POWER PANEL



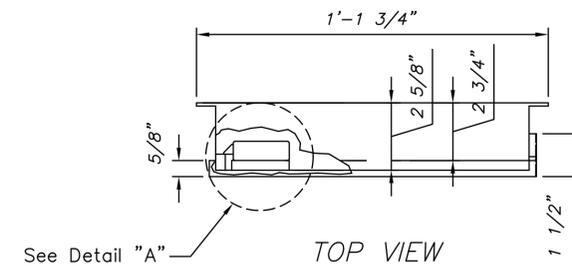
ELECTRICAL HOOKUP DETAIL FOR THE BBS GENERATOR POWER PANEL

NOTE: EXTERNAL LINE VOLTAGE INDICATOR LIGHT required when called for in the plans.
EXTERNAL LINE VOLTAGE INDICATOR LIGHT shall be located on the enclosure exterior for visibility from the adjacent roadway when all cabinet and generator panel doors are closed.

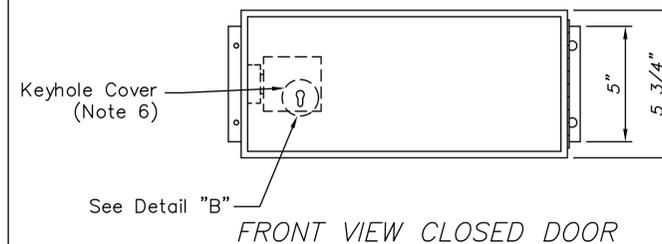
GENERATOR POWER PANEL ENCLOSURE

NOTES:

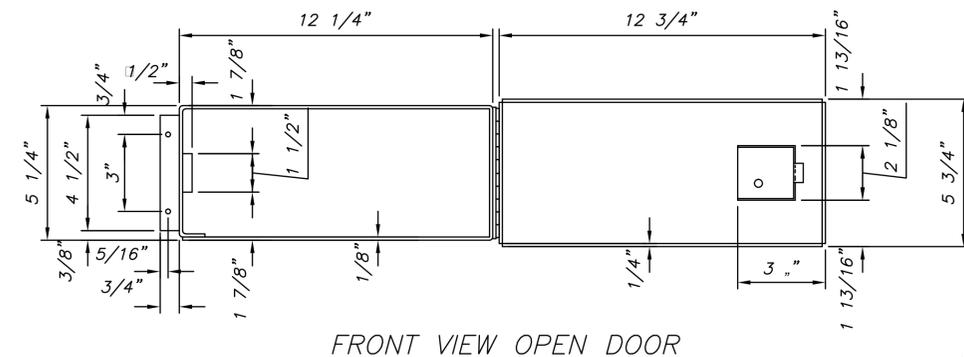
- The enclosure shall be constructed of 1/8" thick aluminum.
- The lock shall be the standard police door type, keyed with the standard flasher door skeleton key.
- The door shall be sealed with a foam rubber gasket to prevent moisture from entering the enclosure.
- The enclosure shall be mounted onto the outside of the controller cabinet with non-accessible bolts and sealed with a high quality silicon caulk at all surfaces touching the cabinet.
- The hinge shall be of stainless steel or equivalent corrosive-resistant material.
- Keyhole shall be covered with a movable circular aluminum or brass cover with top pivot pin.



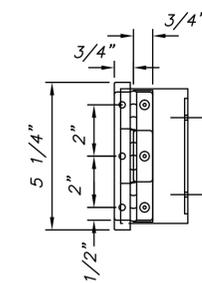
TOP VIEW



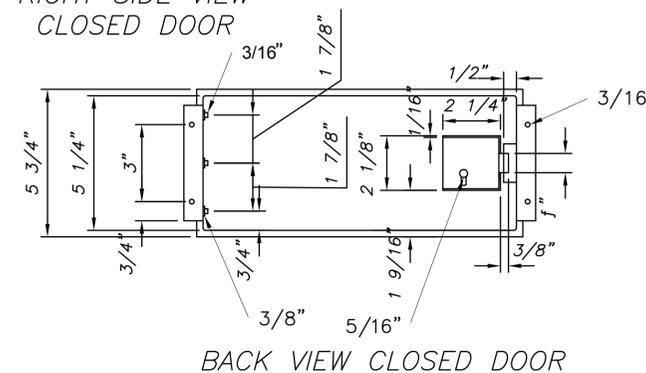
FRONT VIEW CLOSED DOOR



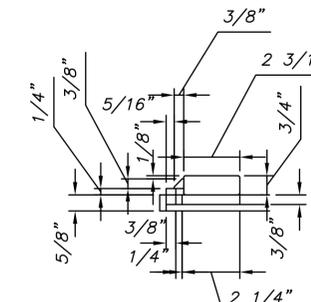
FRONT VIEW OPEN DOOR



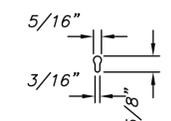
RIGHT SIDE VIEW CLOSED DOOR



BACK VIEW CLOSED DOOR



DETAIL "A"



DETAIL "B"

CITY OF DELAWARE, DELAWARE COUNTY, OHIO
STREET IMPROVEMENT PLAN
FOR
GLENN ROAD / US-36 TO MILL RUN
CROSSING IMPROVEMENTS

TRAFFIC SIGNAL PLAN
GENERAL NOTES

EMHT
Ernst, Meacham, Hamilton & Tison, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43254
Phone: 614/752-5500 Fax: 614/752-5502

REVISIONS

MARK DATE DESCRIPTION

Job No. 20080386
Date February 2015
Scale None
Sheet 67 / 74

LIGHTING NOTES

LIGHT FIXTURE:
GRANVILLE SERIES LUMINARIES LEAF STYLE HOUSING

MODEL:
GV15AHP24FB5RSG-GV1A73B
AOL2003-INTERNAL UPLIGHT SHIELD PERFORATED

LIGHT POLE AND LUMINAIRE SHALL BE FURNISHED AS PER THE DETAILS AND NOTES GIVEN ON THIS SHEET.

BY:
UNIQUE SOLUTIONS, A DIVISION OF HOLOPHANE
515 MCKINLEY AVE.
P.O. BOX 3009
NEWARK, OHIO 43055

THE STREET LIGHTING SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE 2013 OHIO DEPARTMENT OF TRANSPORTATION "CONSTRUCTION AND MATERIAL SPECIFICATIONS" TOGETHER WITH THE REQUIREMENTS OF THE CITY OF DELAWARE, INCLUDING ALL SUPPLEMENTS THERETO, IN FORCE ON THE DATE OF THE CONTRACT, SHALL GOVERN ALL MATERIALS AND WORKMANSHIP INVOLVED IN THE IMPROVEMENTS SHOWN ON THESE PLANS, EXCEPT AS SUCH SPECIFICATIONS ARE MODIFIED BY THE FOLLOWING SPECIFICATIONS OR BY THE CONSTRUCTION DETAILS SET FORTH HEREIN.

THE CONTRACTOR SHALL INSTALL STREET LIGHTS AT THE LOCATIONS SHOWN ON THESE PLANS, INCLUDING ALL CABLE AND DISCONNECTS AND PROVIDE A COMPLETE, OPERATING LIGHTING SYSTEM, THAT COMPLIES WITH CITY OF DELAWARE SPECIFICATIONS.

THE CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS TO AN EQUAL OR BETTER CONDITION THAN EXISTED PRIOR TO CONSTRUCTION.

WHERE EXCAVATIONS OCCUR ALONGSIDE OF CURBS OR SIDEWALKS, THE CONTRACTOR SHALL SHORE, BRACE, OR SUPPORT PIECES IN PLACE SO THAT THEY WILL NOT BECOME DISLODGED OR DAMAGED. ANY DAMAGED CURB OR SIDEWALK SHALL BE REPLACED BY THE CONTRACTOR AT HIS OWN EXPENSE. THE COST OF THE WORK SHALL BE INCLUDED IN THE VARIOUS ITEMS BID.

MAINTAIN A MINIMUM OF 3-FT HORIZONTAL AND 1-FT VERTICAL CLEARANCE FROM ALL WATER AND SEWER LINES.

CIRCUIT VOLTAGE SHALL BE 120/240 VOLT, 3 WIRE, WITH GROUNDED NEUTRAL.

NO SPLICES SHALL BE MADE IN CIRCUIT CABLES, EXCEPT AT NOTED LOCATIONS. SPLICES CAN BE MADE IN PULL BOXES ONLY WHERE CIRCUIT BRANCHES OR WHERE CIRCUIT CROSSES THE STREET TO A LIGHT POLE.

IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE WITH THE POWER UTILITY FOR THE LOCATION OF THE CONTROL CENTER AND POWER FEED TO THE CONTROL CENTER. ALL COST ASSOCIATED WITH MAKING THE CONNECTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE COST OF THE WORK SHALL BE INCLUDED IN THE VARIOUS ITEMS BID.

THE CONTRACTOR SHALL PERFORM THE NECESSARY CONSTRUCTION STAKING AND MAINTENANCE OF STAKING FOR LOCATION OF CABLE ROUTING AND STREET LIGHTING EQUIPMENT (LIGHT STANDARDS, PULL BOXES, CONTROL SITE, ETC.). THE COST OF THE WORK SHALL BE INCLUDED IN THE VARIOUS ITEMS BID.

CONDUITS INSTALLED UNDER DRIVEWAYS SHALL BE PUSHED FROM A MINIMUM DISTANCE OF ONE (1) FOOT BEYOND PAVEMENT EDGES.

CONDUIT LOCATION MAY BE DEFLECTED AND LIGHT POLE FOUNDATIONS MAY BE RELOCATED AROUND OBSTACLES OR UTILITIES AS APPROVED BY DES.

PULL BOXES SHALL BE LOCATED APPROXIMATELY WHERE SHOWN ON PLANS WITH EXACT LOCATION TO BE DETERMINED IN THE FIELD AFTER CONSIDERATION IS GIVEN TO THE LOCATION OF UTILITIES, PAVEMENTS, AND GRADES.

THE CENTERLINE OF THE TRENCH AND FOUNDATION OFFSET SHALL BE LOCATED IN ACCORDANCE WITH THE PLAN DETAILS AND SPECIFICATIONS.

LIGHT STANDARDS- ALL LIGHT STANDARDS SHALL BE ALIGNED ALONG THE ROADWAY, UNLESS OTHERWISE NOTED, WITH FOUNDATION CENTERLINES LOCATED EQUAL DISTANCE FROM EDGE OF CURB. PRIOR TO PLACEMENT OF ANY FOUNDATION, THE CONTRACTOR SHALL CHECK AND VERIFY THE LOCATION OF EXISTING UTILITIES AND ACTUAL MARKINGS AND NOTIFY THE ENGINEER OF ANY CONFLICT ON THE PLANS. ALL PROPOSED LIGHT STANDARDS AND EQUIPMENT LOCATIONS SHALL BE FIELD VERIFIED BY THE CONTRACTOR IN REGARDS TO PROPER CLEARANCES FOR EXISTING OVERHEAD AND UNDERGROUND UTILITIES PRIOR TO PERFORMING AND CONSTRUCTION WORK. IF A FOUNDATION MUST BE RELOCATED OFF THE PROPOSED CENTERLINE, THEN ALL FOUNDATIONS MAY NEED TO BE RELOCATED TO THE SAME OFFSET TO MAINTAIN PROPER ALIGNMENT. UPON APPROVAL OF THE ENGINEER, FOUNDATIONS MAY BE MOVED SLIGHTLY IN A DIRECTION PARALLEL WITH THE CENTERLINE OF OFFSET TO AVOID POTENTIAL CONFLICT WITH OTHER FACILITIES.

ALL TRENCHES WITHIN THE ROAD RIGHT-OF-WAY SHALL BE BACKFILLED OR SECURELY PLATED DURING NON WORKING HOURS.

AS BUILT RECORD- THE CONTRACTOR SHALL MAINTAIN A SET OF PROJECT RECORD DOCUMENTS. THESE DOCUMENTS SHALL INCLUDE REVIEWED SHOP DRAWINGS, CHANGE ORDERS, EQUIPMENT OPERATING INSTRUCTIONS, FIELD TEST RECORDS, AND AS BUILT DRAWINGS. THE AS BUILT DRAWINGS SHALL BE MARKED LEGIBLY IN RED, SHOWING THE ACTUAL LOCATION OF EQUIPMENT AND CONDUITS AS CONSTRUCTED. ALL EQUIPMENT AND UNDERGROUND CONDUITS INSTALLED SHALL HAVE LOCATIONS MARKED IN DISTANCES OFF A LANDMARK AT LEAST EVERY 25 FEET AND AS NECESSARY AT BENDS FOR LOCATION AT A LATER DATE.

CLEAN UP- THE PROJECT CONSTRUCTION SITE SHALL BE MAINTAINED IN A CLEAN HEALTHY STATE AT ALL TIMES. DIRT PILES FROM EXCAVATIONS SHALL BE REMOVED FROM OPEN ROADWAY OR PROPERLY PLACED BACK INTO HOLES OF PITS DAILY. AT THE END OF EACH WORK DAY THE PROJECT SITE SHALL HAVE ALL DEBRIS REMOVED, AND SIDEWALKS, CURBS, GUTTERS, STREET SURFACES BROOM SWEEP. DIRT LYING ON UNDISTURBED SOD AREAS MAY CAUSE DAMAGE TO THE HEALTH OF GRASS AND IS NOT PERMITTED. COST FOR THIS WORK SHALL BE INCLUDED IN THE VARIOUS BID ITEMS.

LIGHT POLE NOTES
THE POST FINISH SHALL BE BLACK SHERWIN WILLIAMS POLANE S PLUS.

ITEM 625 POWER SERVICE, AS PER PLAN

THE POWER SUPPLY SHALL BE 120/240V, SINGLE PHASE, 3-WIRE. THE CONTRACTOR SHALL PAY ELECTRICAL ENERGY CHARGES FOR NEW POWER SERVICES ESTABLISHED BY THIS PROJECT. AFTER ACCEPTANCE OF THIS PROJECT, POWER SERVICE ELECTRICAL ENERGY ACCOUNTS SHALL BE TRANSFERRED TO THE CITY OF DELAWARE.

IN ADDITION TO THE REQUIREMENTS OF ITEM 625 AND THE STANDARD SPECIFICATIONS, THIS ITEM SHALL INCLUDE ALL LABOR, EQUIPMENT AND MATERIALS NECESSARY TO SUPPLY, INSTALL AND MOUNT THE CONTROL SITE ON A PAD MOUNTED CONTROLLER BASE. THE ENCLOSURE SHALL BE FACTORY COATED BLACK TO MATCH THE STREET LIGHT STANDARDS. PAINT SAMPLES SHALL BE FURNISHED WITH THE SHOP DRAWINGS. ALL EQUIPMENT AND MATERIAL PLACED INSIDE THE ENCLOSURE SHALL BE ADJUSTED TO FIT IN THE ENCLOSURE.

FOR POWER SERVICE, THE CONTRACTOR SHALL INSTALL THREE #4 AWG 5KV CABLES FROM THE LINE TERMINALS OF THE CONTROL PANEL TO THE POWER COMPANY'S SERVICE TRANSFORMER OR PEDESTAL LEAVING 4' OF CABLE COILED FOR CONNECTION BY THE POWER COMPANY. ALL COST ASSOCIATED WITH MAKING THE CONNECTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

THE PHOTOELECTRIC CONTROL SHALL BE MOUNTED ON THE FIRST LIGHT STANDARD OF CIRCUIT A. THE THREE CONTROL WIRES SHALL BE INSTALLED IN THE SAME 2" CONDUIT AS THE CIRCUIT CABLE. THE PHOTOELECTRIC CONTROL SHALL BE MOUNTED SUCH THAT NIGHTLY OPERATION OF LUMINAIRE DOES NOT INTERFERE WITH NORMAL OPERATION.

PROVIDE AN ARC FLASH HAZARD WARNING SIGN ON THE OUTSIDE FRONT DOOR OF THE ENCLOSURE IN ACCORDANCE WITH THE CURRENT NATIONAL ELECTRICAL CODE PARAGRAPH 110.16.

PROVIDE AN AVAILABLE FAULT CURRENT SIGN ON THE OUTSIDE OF THE FRONT DOOR OF THE SERVICE DISCONNECT ENCLOSURE IN ACCORDANCE WITH THE CURRENT NATIONAL ELECTRICAL CODE PARAGRAPH 110.24.

PAYMENT SHALL BE MADE AT THE UNIT BID PRICE FOR CMS ITEM 625 POWER SERVICE, AS PER PLAN WHICH SHALL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS AND INCIDENTALS REQUIRED TO COMPLETE THIS ITEM IN A SATISFACTORY AND WORKMANLIKE MANNER.

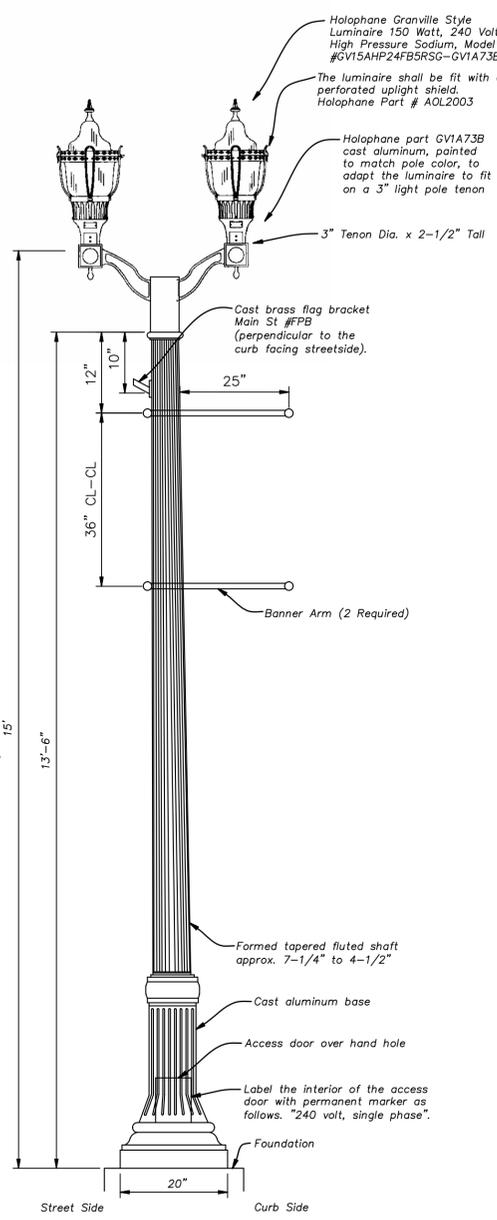
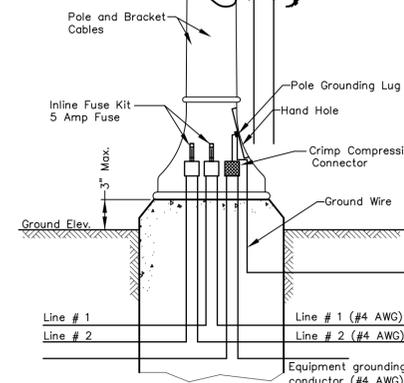
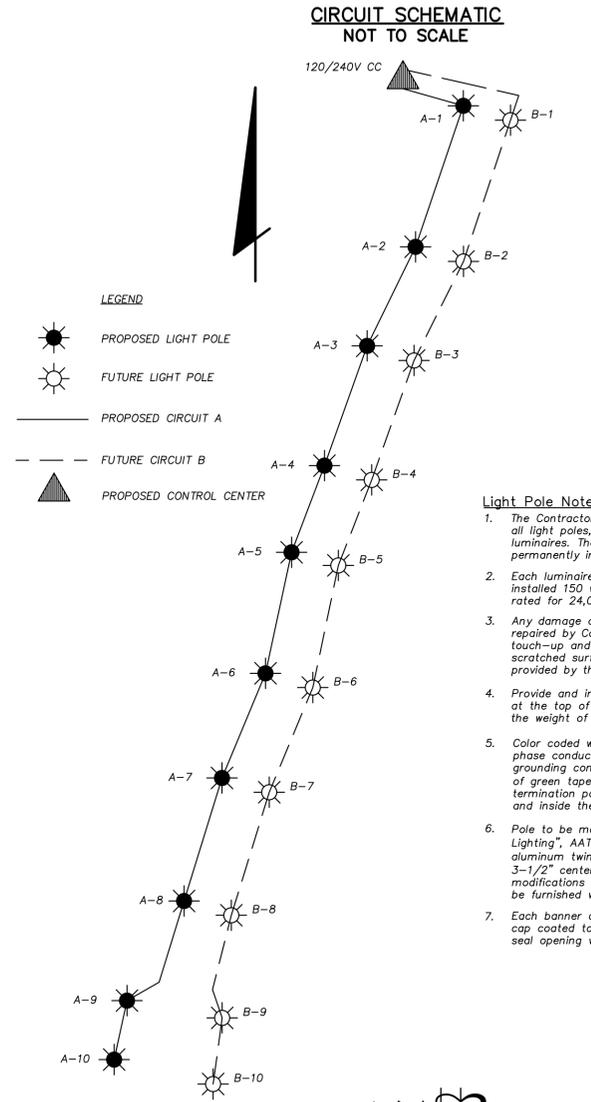
GROUNDING AND BONDING

THE REQUIREMENTS OF THE CONSTRUCTION AND MATERIAL SPECIFICATIONS (C&MS) AND THE HL AND TC SERIES OF STANDARD CONSTRUCTION DRAWINGS ARE MODIFIED AS FOLLOWS:

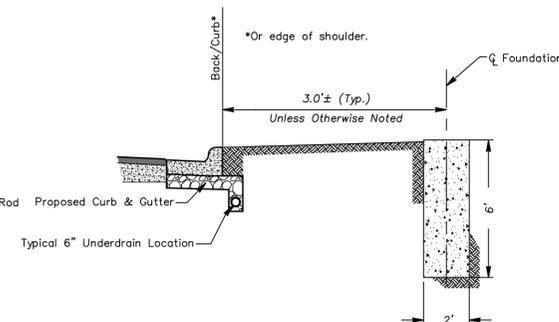
- ALL METALLIC PARTS CONTAINING ELECTRICAL CONDUCTORS SHALL BE PERMANENTLY JOINED TO FORM AN EFFECTIVE GROUND FAULT CURRENT PATH BACK TO THE GROUNDED CONDUCTOR IN THE POWER SERVICE DISCONNECT SWITCH.
 - PROVIDE AN EQUIPMENT GROUNDING CONDUCTOR IN METALLIC CONDUITS (725.04) IN ADDITION TO THE CONDUCTORS SPECIFIED AND BOND THE CONDUIT TO THIS GROUNDING CONDUCTOR.
 - WHEN AN EQUIPMENT GROUNDING CONDUCTOR IS REQUIRED IN PLASTIC CONDUIT (725.05), THE INSTALLATION SHALL INCLUDE A SEPARATE EQUIPMENT GROUNDING CONDUCTOR IN ADDITION TO THE CONDUCTORS SPECIFIED.
 - METALLIC CONDUIT CARRYING THE LOOP WIRES FROM IN THE PAVEMENT TO THE PULL BOX SPLICE LOCATION WILL ONLY BE BONDED AT THE PULL BOX END, AND WILL NOT CONTAIN AN EQUIPMENT GROUNDING CONDUCTOR.
 - METAL PULL BOX LIDS SHALL BE BONDED BY ATTACHMENT OF THE EQUIPMENT GROUNDING CONDUCTOR TO THE FRAME DIAGONAL AS PROVIDED ON HL-30.11.
 - IF MULTIPLE CONDUITS BEGIN AND END AT THE SAME POINTS, ONLY ONE EQUIPMENT GROUNDING CONDUCTOR IS REQUIRED.
 - IF AN EQUIPMENT GROUNDING CONDUCTOR IS NEEDED IN CONDUIT BETWEEN SIGNALIZED INTERSECTIONS FOR UNDERGROUND INTERCONNECT CABLE, THE GROUNDING SYSTEM FOR EACH SIGNALIZED INTERSECTION WILL BE SEPARATED ABOUT MIDWAY BETWEEN THE INTERSECTIONS.
 - THE MESSENGER WIRE AT SIGNALIZED INTERSECTIONS WILL BE USED AS THE CONDUCTIVE PATH FROM CORNER TO CORNER IF CONDUIT IS NOT PROVIDED UNDER THE ROADWAY. WHEN CONDUIT CONNECTS THE CORNERS OF AN INTERSECTION, AN EQUIPMENT GROUNDING CONDUCTOR SHALL BE USED IN THE CONDUIT.
- CONDUITS.
 - THE 725.04 CONDUIT SHALL HAVE GROUNDING BUSHINGS INSTALLED AT ALL TERMINATION POINTS. THE BUSHING MATERIAL SHALL BE COMPATIBLE WITH GALVANIZED STEEL CONDUIT AND THE GROUNDING LUG MATERIAL SHALL BE COMPATIBLE FOR USE WITH COPPER WIRE. THREADED OR COMPRESSION TYPE BUSHINGS MAY BE USED.
 - THE 725.05 CONDUIT SHALL HAVE THE INSIDE AND OUTSIDE DIAMETERS OF THE CONDUIT DEBURRED AT ALL TERMINATION POINTS.
 - BOTH ENDS OF METALLIC CONDUIT SHALL BE BONDED TO THE EQUIPMENT GROUNDING CONDUCTOR.
 - METALLIC CONDUIT MAY BE BONDED TO METALLIC BOXES THROUGH THE USE OF CONDUIT FITTINGS UL APPROVED FOR THIS TYPE OF CONNECTION, WITH THE BOX BONDED TO THE EQUIPMENT GROUNDING CONDUCTOR.
- WIRE FOR GROUNDING AND BONDING.
 - USE INSULATED, COPPER WIRE FOR THE EQUIPMENT GROUNDING CONDUCTOR. BONDING JUMPERS IN BOXES AND ENCLOSURES MAY BE BARE OR INSULATED COPPER WIRE. WIRE SIZE SHALL BE AS FOLLOWS:
 - USE 4 AWG BETWEEN THE POWER SERVICE AND SUPPORTS, POLES, PEDESTALS, CONTROLLER OR FLASHER CABINETS.
 - USE A MINIMUM 8 AWG BETWEEN LOOP DETECTOR PULL BOXES AND THE FIRST CONDUIT THAT REQUIRES A LARGER SIZE AS SPECIFIED IN 3.A.1 ABOVE.
 - USE A MINIMUM 8 AWG BETWEEN THE "PREPARE TO STOP WHEN FLASHING" INSTALLATION (INCLUDING SUPPORT) AND THE FIRST CONDUIT THAT REQUIRES A LARGER SIZE AS SPECIFIED IN 3.A.1 ABOVE.
 - THE INSULATION SHALL BE GREEN OR GREEN WITH YELLOW STRIPE(S). FOR 4 AWG OR LARGER, INSULATION MAY ALSO BE BLACK WITH GREEN TAPE/TAGS INSTALLED AT ALL ACCESS POINTS.
 - IN A HIGHWAY LIGHTING SYSTEM, THE EQUIPMENT GROUNDING CONDUCTOR SHALL BE THE SAME WIRE SIZE AS THE DUCT CABLE OR DISTRIBUTION CABLE CIRCUIT CONDUCTORS, WITH THE MINIMUM CONDUCTOR SIZE OF 4 AWG. BONDING JUMPERS WILL BE MINIMUM SIZE 4 AWG.
- GROUND ROD.
 - A 3/4 INCH SCHEDULE 40 PVC CONDUIT WILL BE USED IN FOUNDATIONS AND CONCRETE WALLS FOR THE GROUNDING CONDUCTOR (GROUND WIRE) RACEWAY TO THE GROUND ROD. SHOULD METALLIC CONDUIT BE USED, BOTH ENDS OF THE CONDUIT SHALL BE BONDED TO THE GROUNDING CONDUCTOR.
 - THE TYPICAL GROUNDING CONDUCTOR (GROUND WIRE) SHALL BE 4 AWG INSULATED, COPPER.

- POWER SERVICE AND DISCONNECT SWITCH.
 - AT THE POWER SERVICE LOCATION, THE GROUNDING CONDUCTOR (GROUND WIRE) FROM THE DISCONNECT SWITCH NEUTRAL (AC-) BAR TO THE GROUND ROD SHALL BE A CONTINUOUS, UNSPLICED CONDUCTOR. IF SPLICED, IT SHALL BE AN EXOTHERMIC WELD BUTT SPICE.
 - THE SERVICE NEUTRAL (AC-) SHALL ONLY BE CONNECTED TO GROUND AT THE PRIMARY POWER SERVICE DISCONNECT SWITCH.
 - NEMA CONTROLLER CABINETS: IF A POWER SERVICE DISCONNECT SWITCH IS LOCATED BEFORE THE CONTROLLER CABINET, THE NEUTRAL (AC-) AND THE GROUNDING BARS IN THE CONTROLLER CABINET SHALL NOT BE CONNECTED TOGETHER AS SHOWN IN NEMA TS-2, FIGURE 5-4.
 - IF SECONDARY DISCONNECT SWITCHES ARE CONNECTED AFTER THE PRIMARY DISCONNECT SWITCH, THE NEUTRAL (AC-) SHALL ONLY BE GROUNDED AT THE PRIMARY SWITCH. EQUIPMENT GROUNDING CONDUCTORS SHALL BE BROUGHT TO THE PRIMARY SWITCH, BUT SHALL BE GROUNDED AT BOTH SECONDARY AND PRIMARY SWITCHES.
- PAYMENT.

PAYMENT FOR THE ABOVE WORK SHALL BE INCIDENTAL TO "ITEM 625, POWER SERVICE, AS PER PLAN".



ITEM 625 LIGHT POLE, AS PER PLAN
ITEM 625 LUMINAIRE, 240 VOLT, AS PER PLAN
NOT TO SCALE

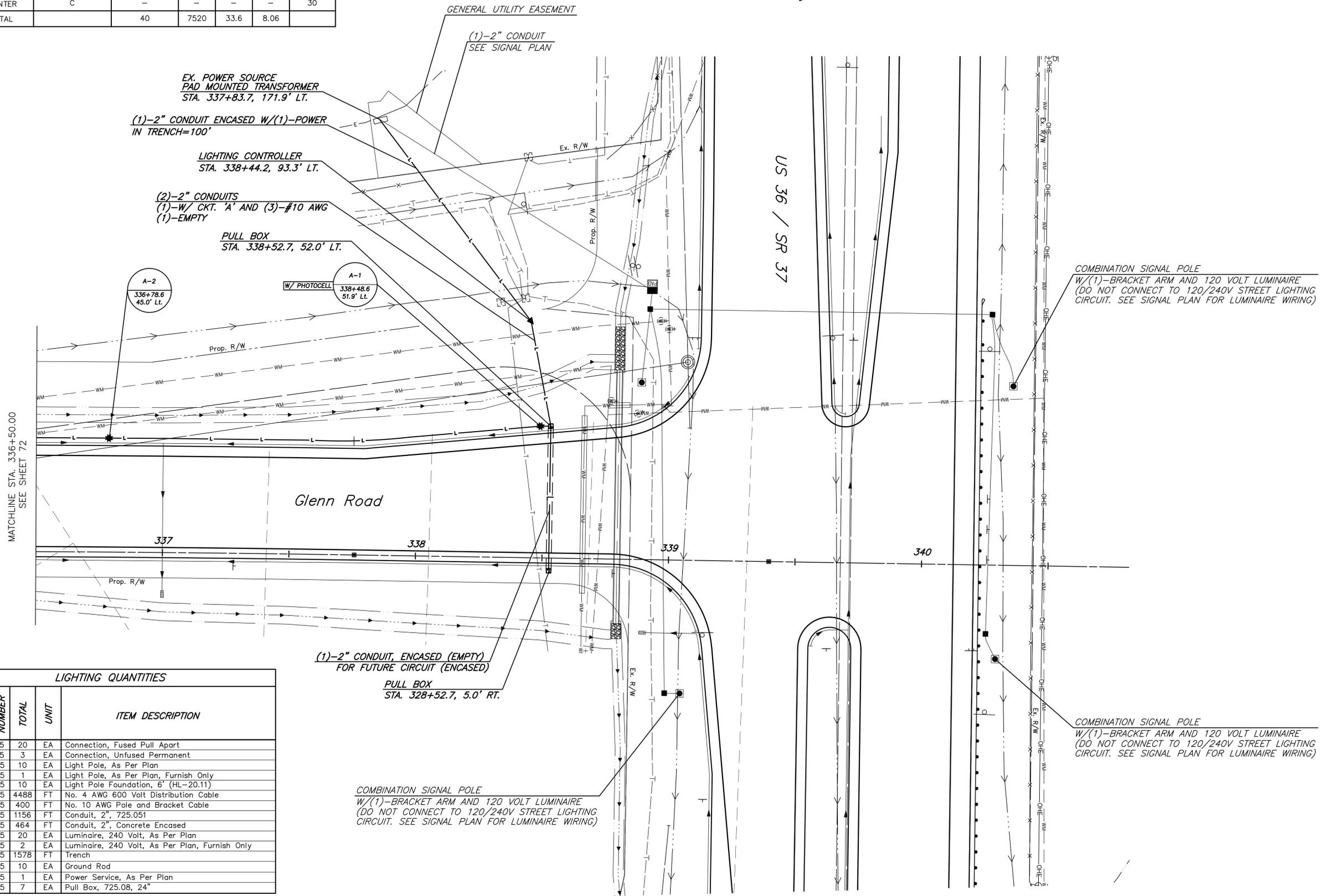


LIGHT POLE FOUNDATION OFFSET DETAIL
NOT TO SCALE

| | | | | | |
|--|----------|-------------|---------------|-------|---------|
| Job No. | 20080386 | Date | February 2015 | Sheet | 71 / 74 |
| | | | None | | Scale |
| CITY OF DELAWARE, DELAWARE COUNTY, OHIO STREET IMPROVEMENT PLAN FOR GLENN ROAD / US-36 TO MILL RUN CROSSING IMPROVEMENTS | | | | | |
| LIGHTING PLAN GENERAL NOTES AND DETAILS | | | | | |
| MARK | DATE | DESCRIPTION | REVISIONS | | |
| | | | | | |

| CONTROL CENTER SCHEDULE | | | | | | |
|--|----------------------|------------------|-------------|------|------|-------------------|
| CONTROL CENTER | CIRCUIT | TOTAL LUMINAIRES | TOTAL WATTS | AMPS | KVA | CIRCUIT FUSE SIZE |
| 120/240 VOLT SINGLE PHASE CONTROL CENTER | A (WEST SIDE) | 20 | 3760 | 16.8 | 4.03 | 30 |
| | B (FUTURE EAST SIDE) | 20 | 3760 | 16.8 | 4.03 | 30 |
| | C | - | - | - | - | 30 |
| TOTAL | | 40 | 7520 | 33.6 | 8.06 | |

| LEGEND | |
|--------|---|
| | Proposed Control Center |
| | Proposed Street Light Pole |
| | Proposed Pull Box |
| | Proposed Light Cable in 2" Conduit |
| | Proposed Circuit A Enclosed as specified on this plan |



| LIGHTING QUANTITIES | | | | | |
|---------------------|-------------|-------|------|--|--|
| SPEC. | ITEM NUMBER | TOTAL | UNIT | ITEM DESCRIPTION | |
| ODOT | 625 | 20 | EA | Connection, Fused Pull Apart | |
| ODOT | 625 | 3 | EA | Connection, Unfused Permanent | |
| ODOT | 625 | 10 | EA | Light Pole, As Per Plan | |
| ODOT | 625 | 1 | EA | Light Pole, As Per Plan, Furnish Only | |
| ODOT | 625 | 10 | EA | Light Pole Foundation, 6" (HL-20.11) | |
| ODOT | 625 | 4488 | FT | No. 4 AWG 600 Volt Distribution Cable | |
| ODOT | 625 | 400 | FT | No. 10 AWG Pole and Bracket Cable | |
| ODOT | 625 | 1156 | FT | Conduit, 2", 725.051 | |
| ODOT | 625 | 464 | FT | Conduit, 2", Concrete Encased | |
| ODOT | 625 | 20 | EA | Luminaire, 240 Volt, As Per Plan | |
| ODOT | 625 | 2 | EA | Luminaire, 240 Volt, As Per Plan, Furnish Only | |
| ODOT | 625 | 1578 | FT | Trench | |
| ODOT | 625 | 10 | EA | Ground Rod | |
| ODOT | 625 | 1 | EA | Power Service, As Per Plan | |
| ODOT | 625 | 7 | EA | Pull Box, 725.08, 24" | |

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| | | | | | | |
|---|------|-------------|-----------|--|----------------------|---------------|
| MARK | DATE | DESCRIPTION | REVISIONS | EMHT Engineers, Architects, Planners & Surveyors 5500 New Albany Road, Columbus, OH 43254 Phone: 614/752-5500 Fax: 614/752-5501 | Job No. | 20080386 |
| | | | | | Date | February 2015 |
| | | | | Sheet | 73 | 74 |
| | | | | Scale | Horizontal: 1" = 20' | |
| CITY OF DELAWARE, DELAWARE COUNTY, OHIO STREET IMPROVEMENT PLAN FOR GLENN ROAD / US-36 TO MILL RUN CROSSING IMPROVEMENTS | | | | | | |
| LIGHTING PLAN GLENN ROAD RELOCATION | | | | | | |

