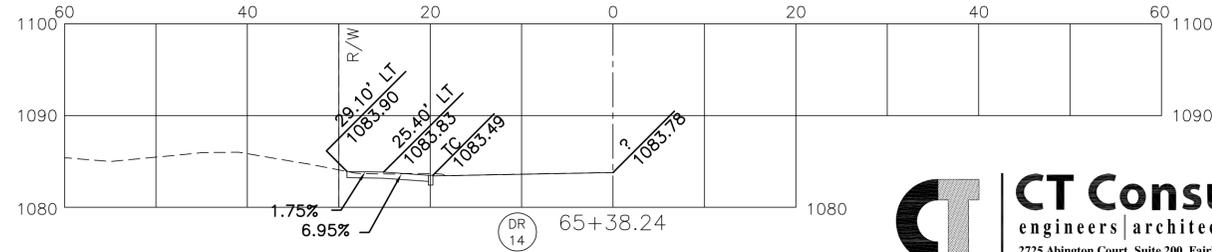
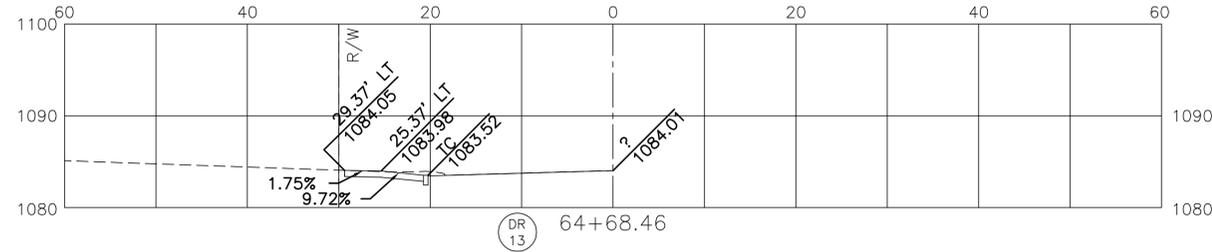
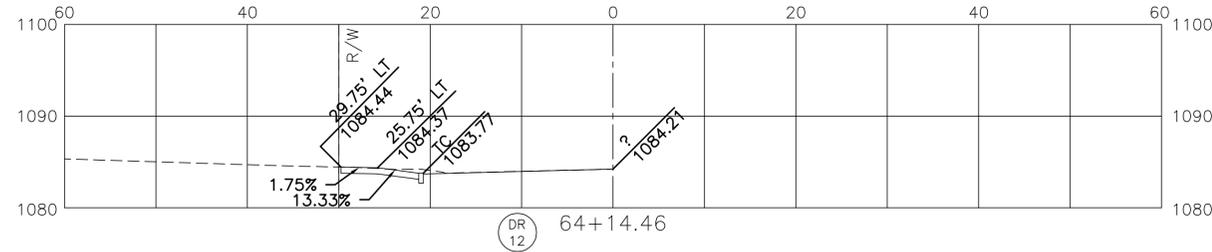
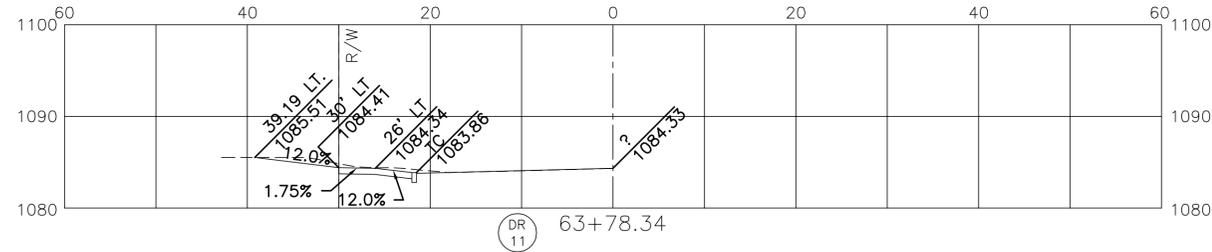
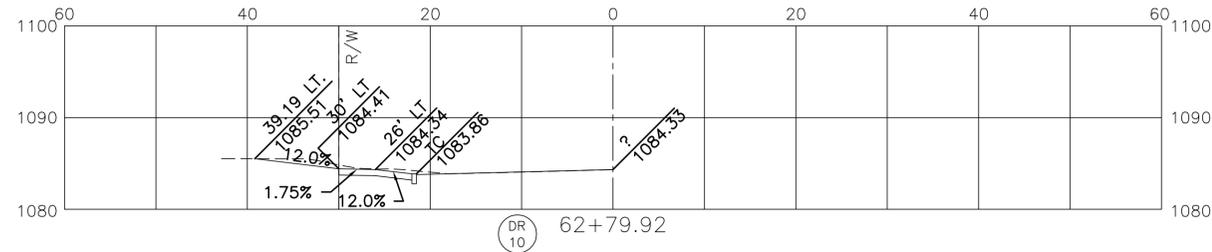
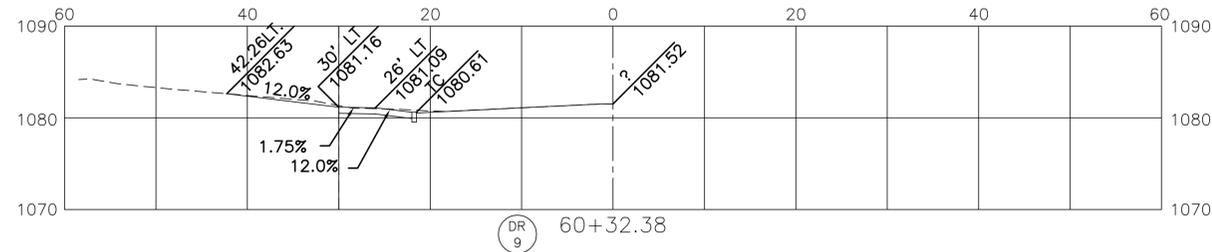
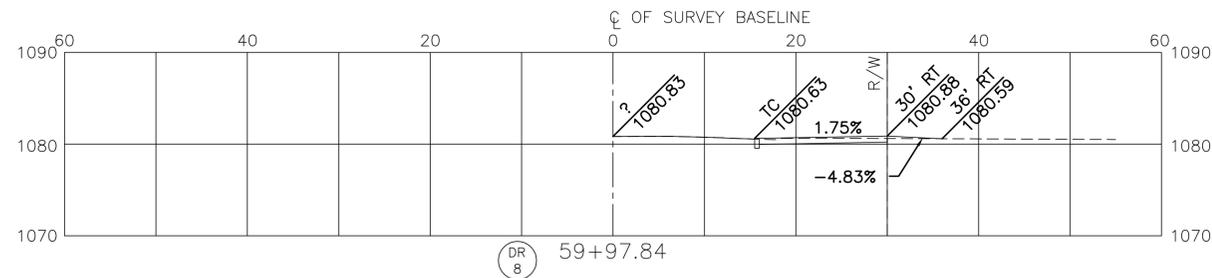
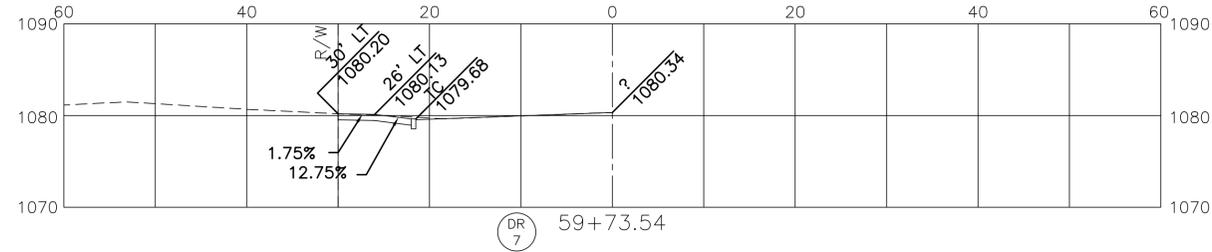
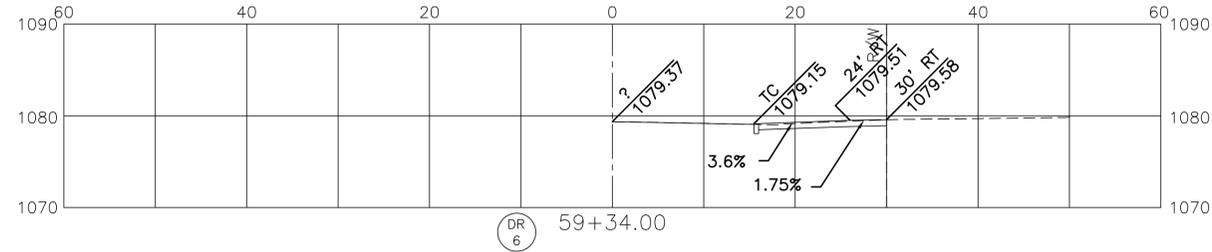
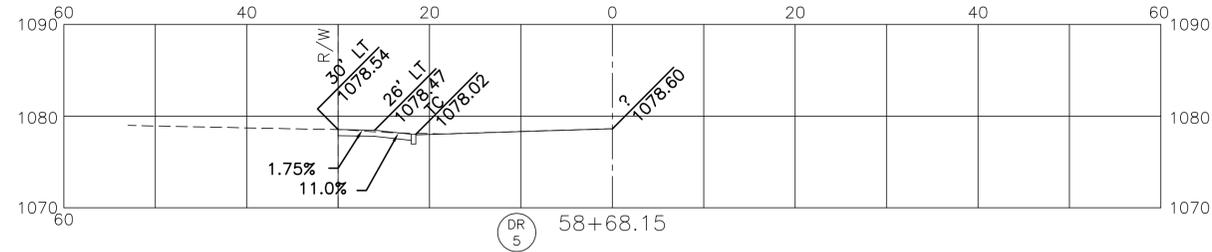
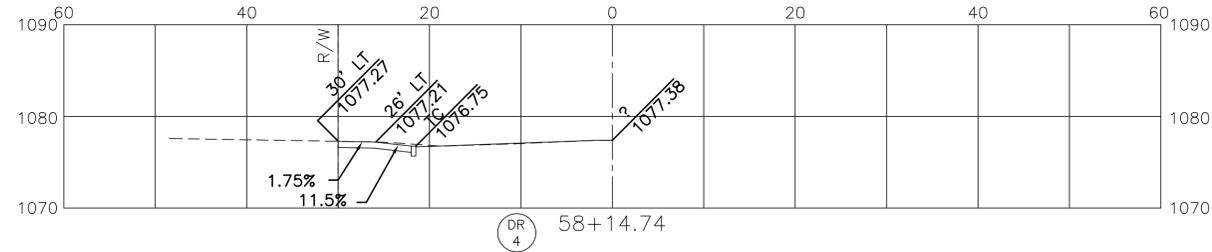
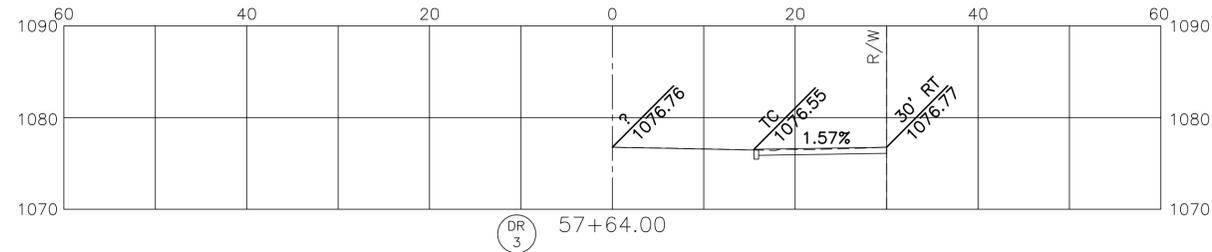
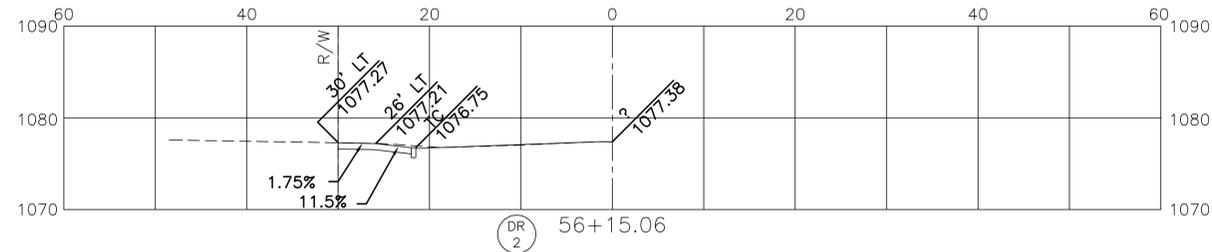
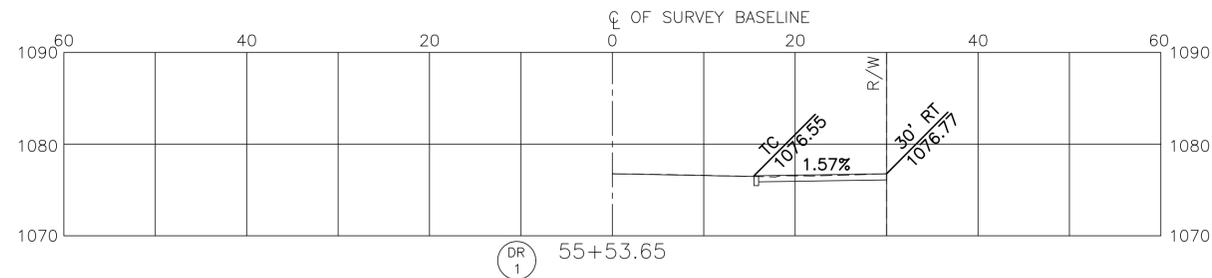


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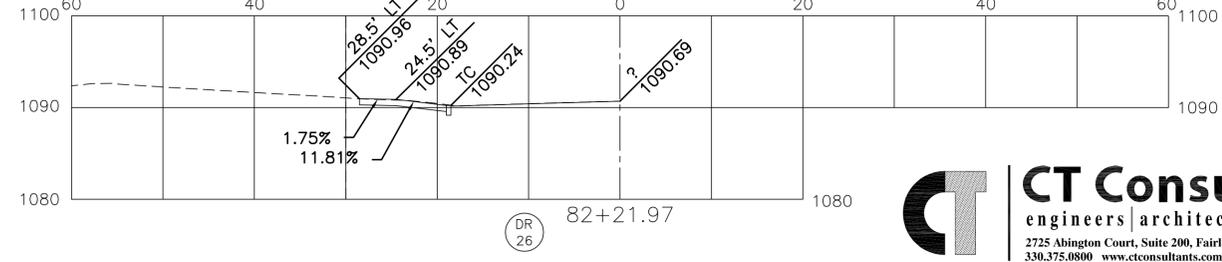
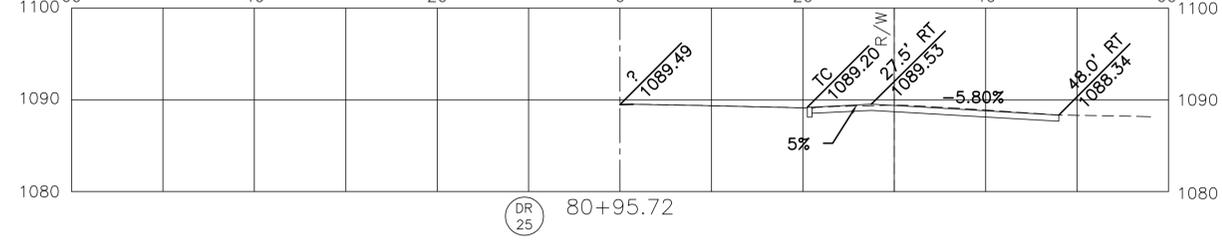
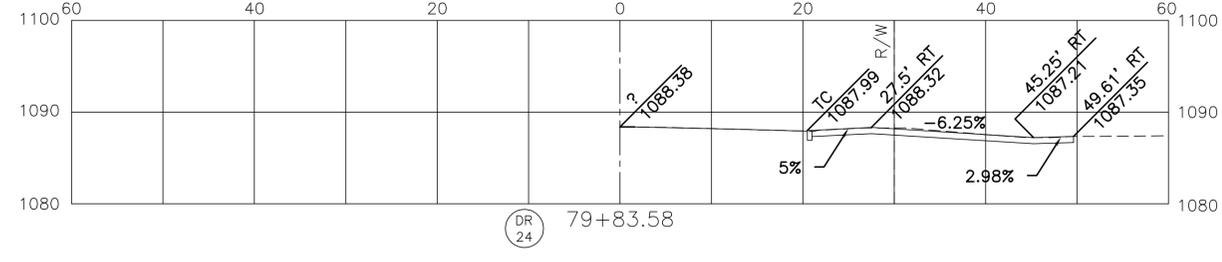
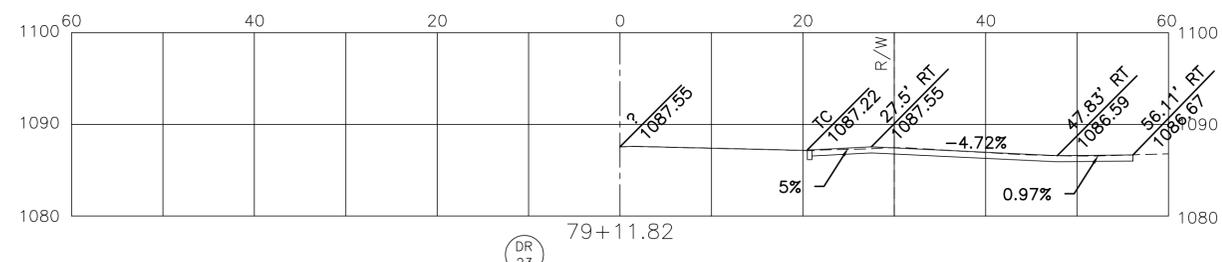
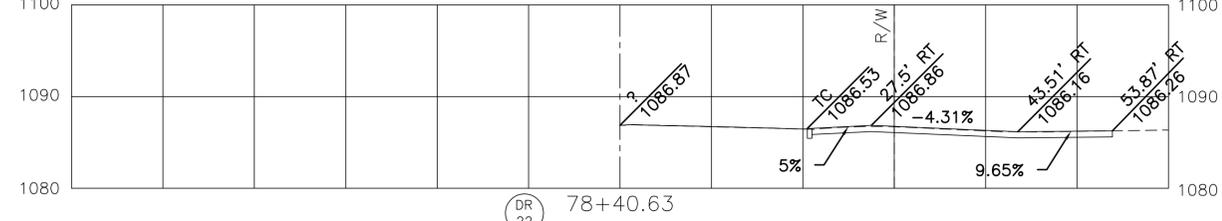
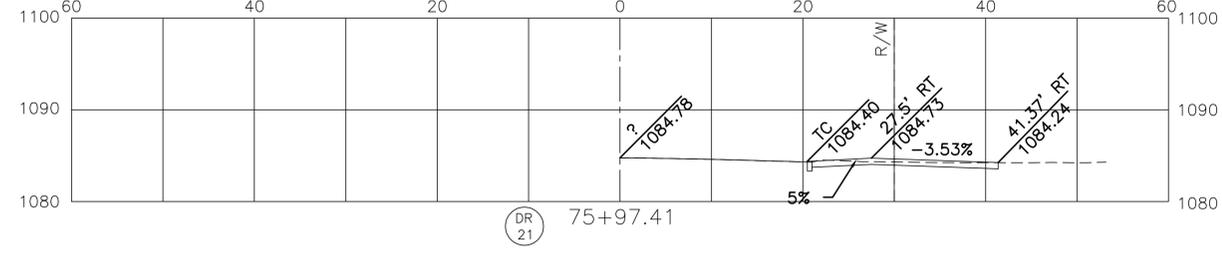
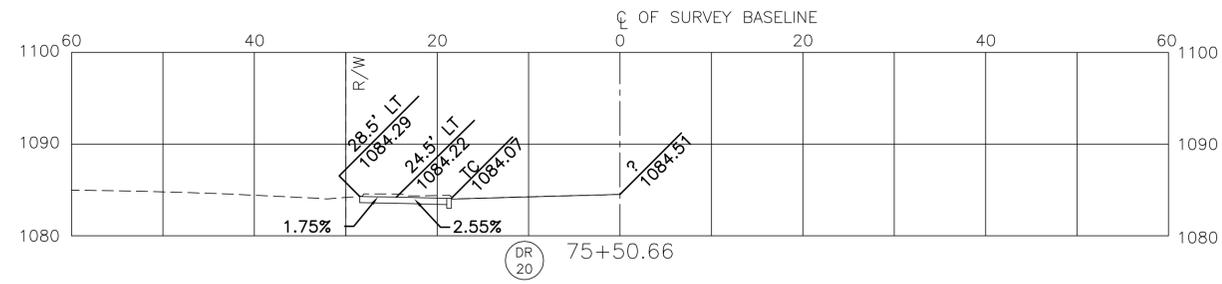
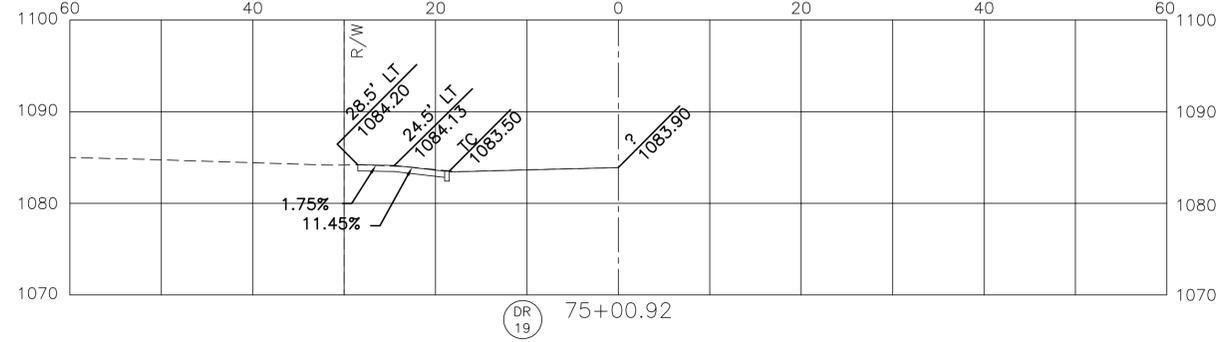
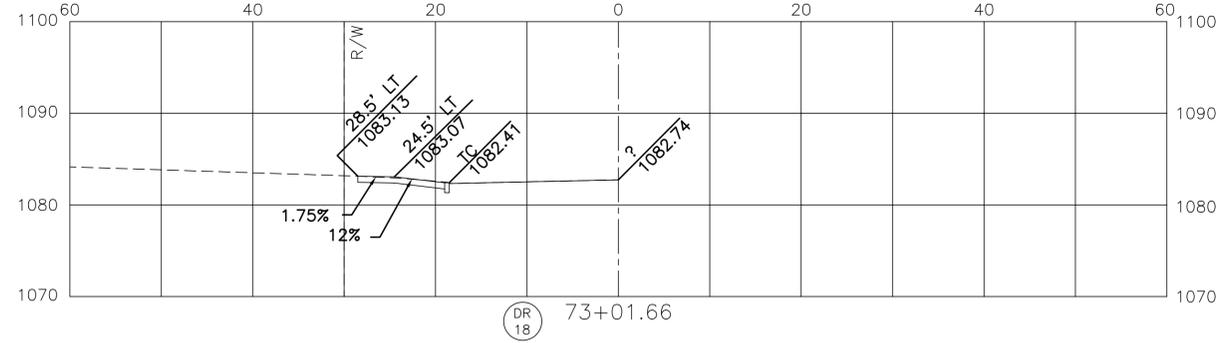
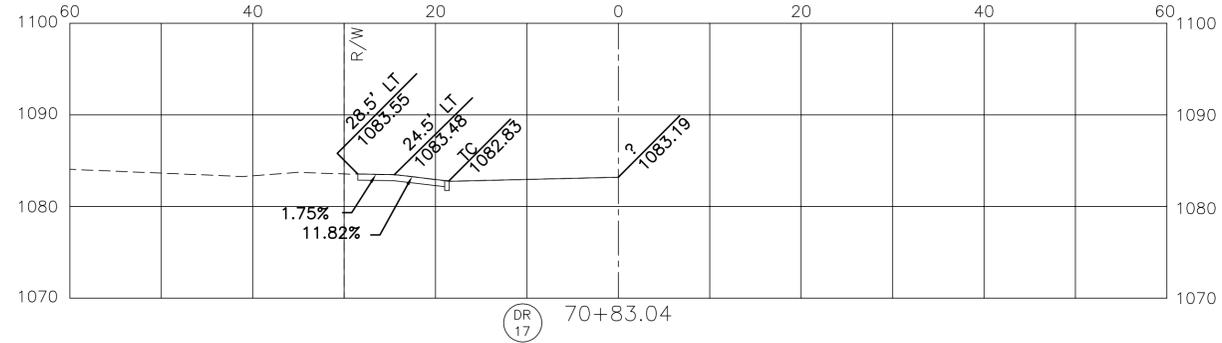
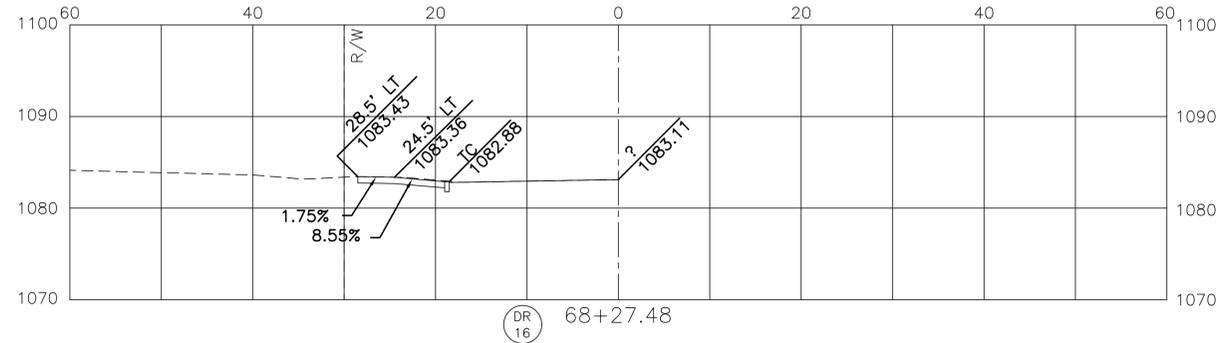
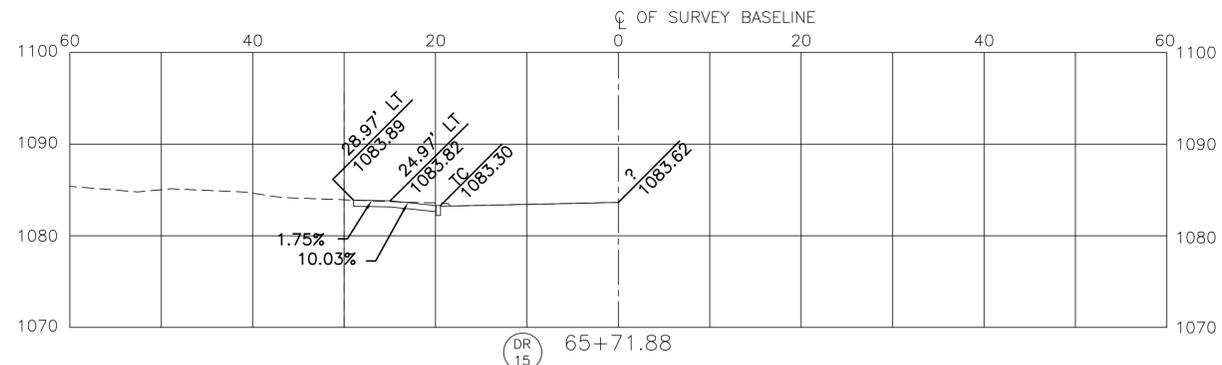
CALCULATED: GEA
 CHECKED: JGC

DRIVEWAY PROFILES
 STA. 57+59.23 TO STA. 59+74.44

REVISIONS	DATE	BY
CONSTRUCTION BIDDING SET	4/21/14	GEA

MAHONING ROAD NE
 STA-0153-01.70

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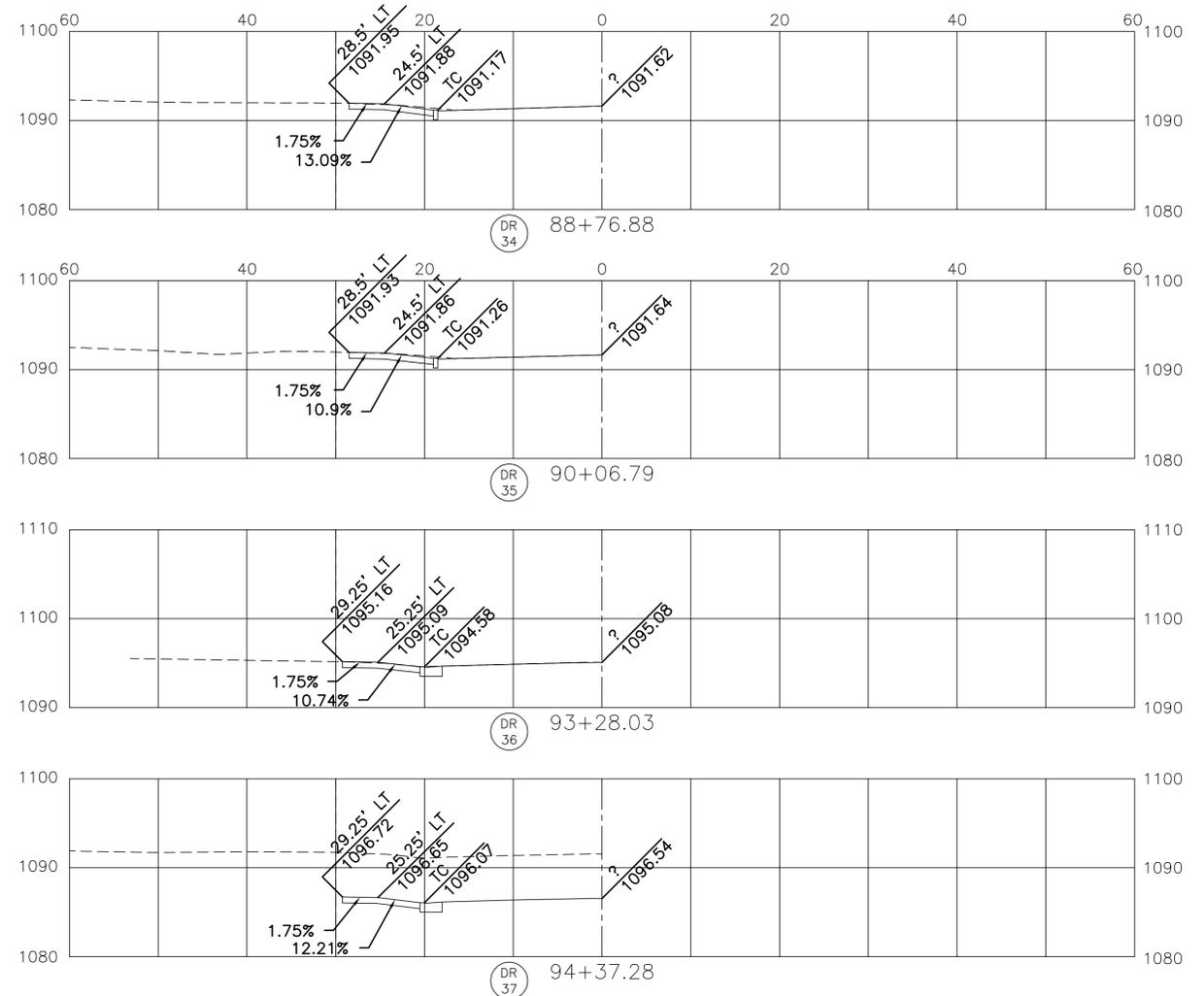
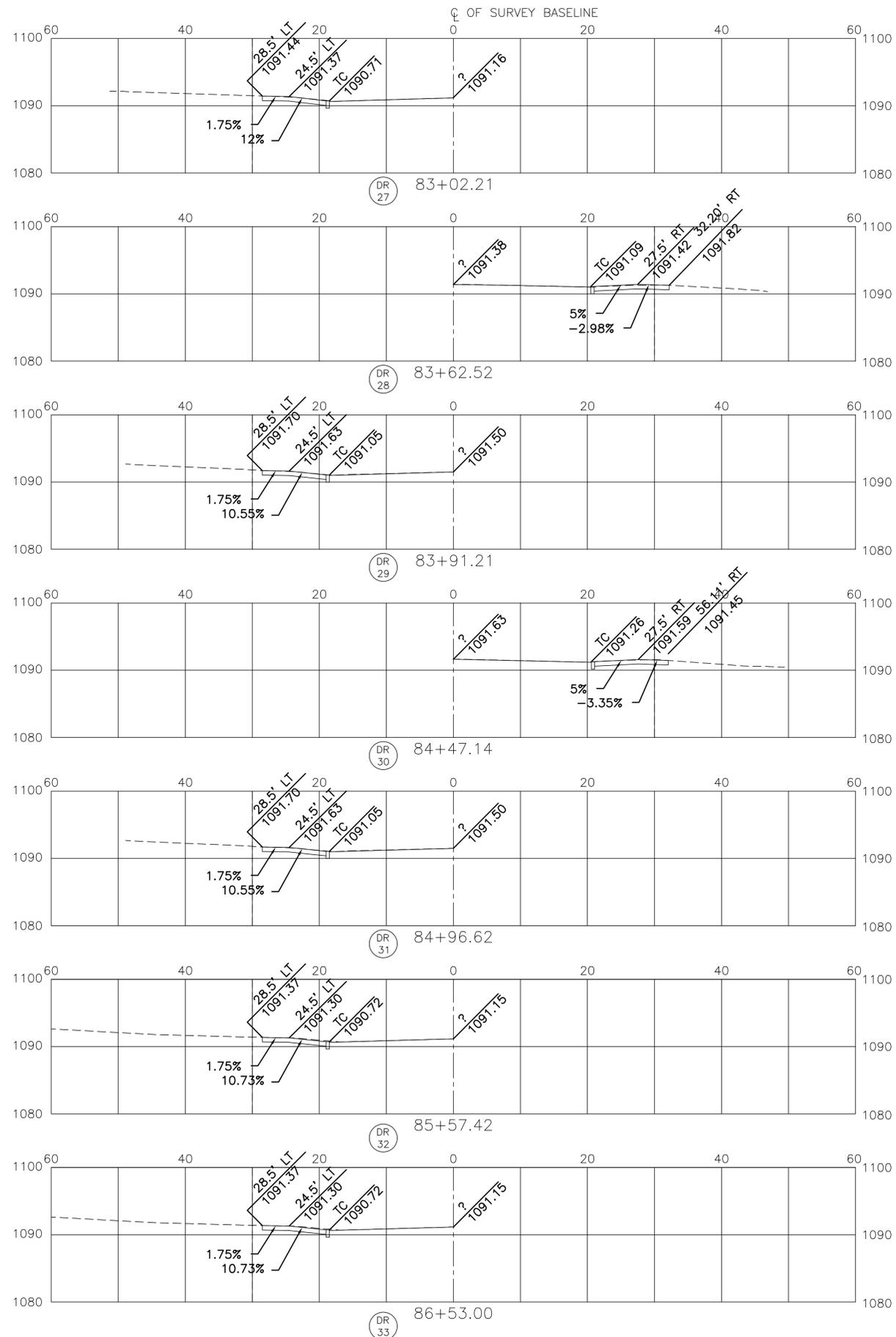
CALCULATED: GEA
 CHECKED: JGC

DRIVEWAYS PROFILES
 STA. 59+97.84 TO STA. 65+38.12

REVISIONS	DATE	BY
CONSTRUCTION BIDDING SET	4/21/14	GEA

MAHONING ROAD NE
 STA-0153-01.70

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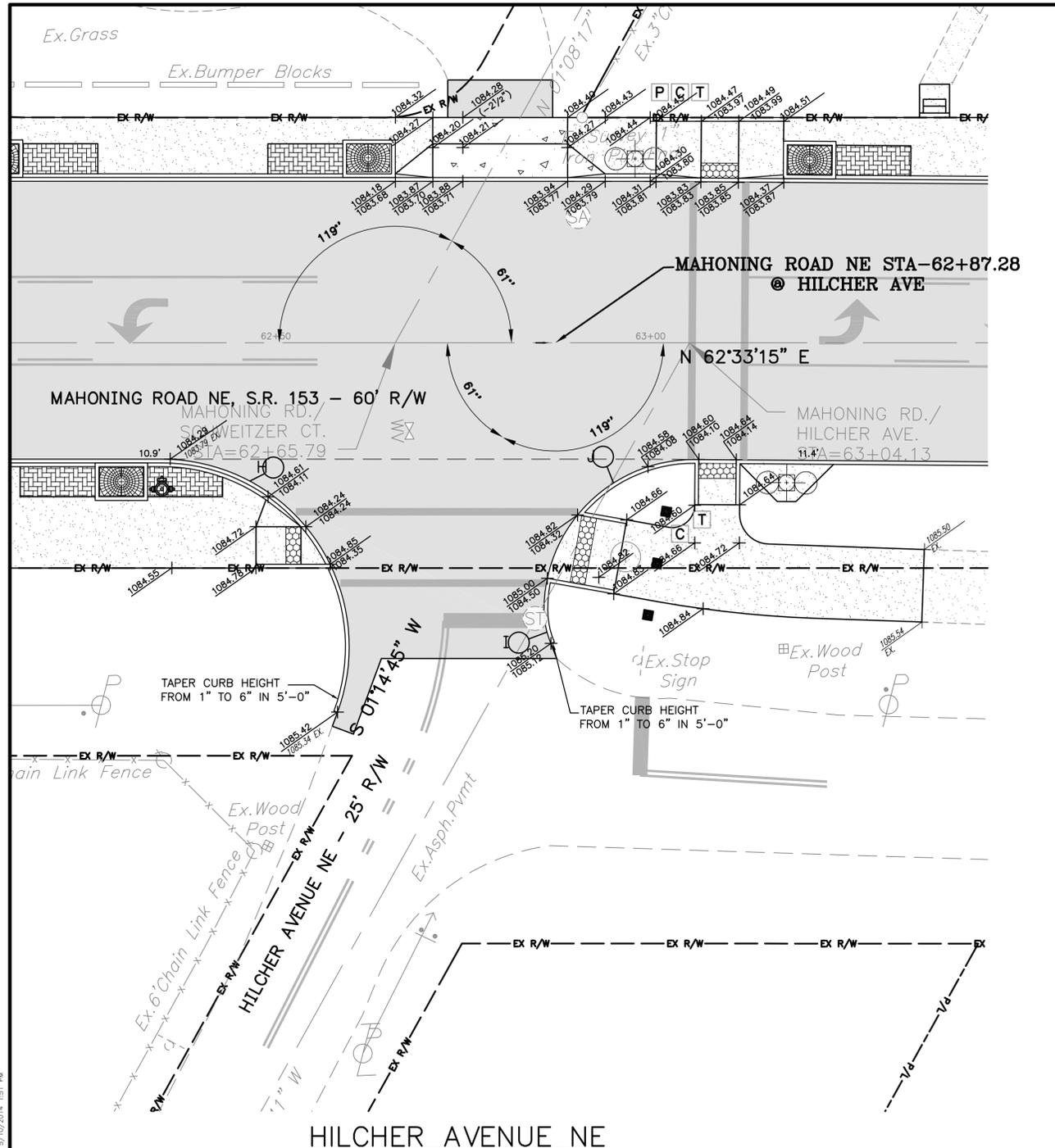


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CHECKED: JGC

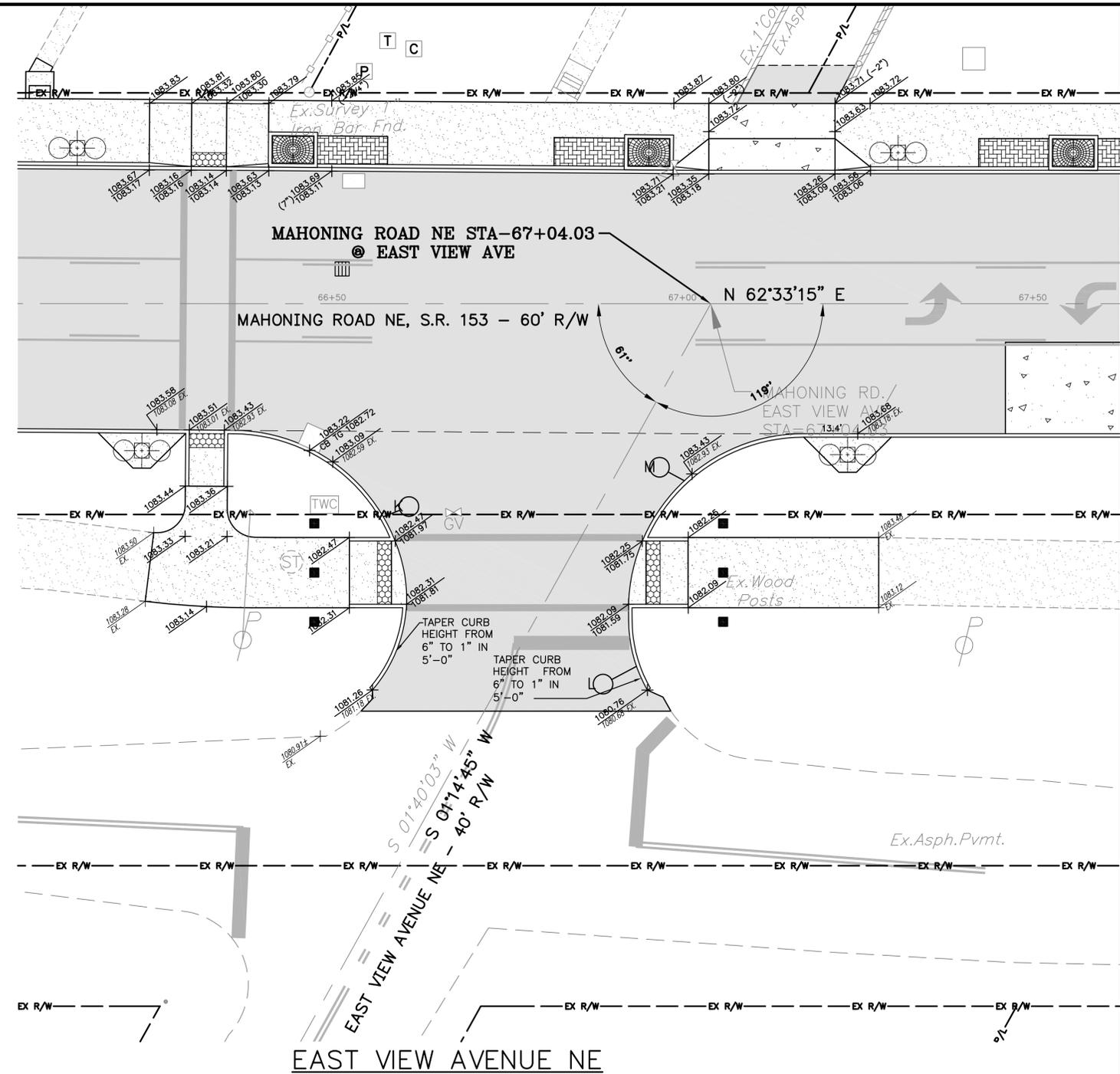
DRIVEWAYS PROFILES
STA. 59+97.84 TO STA. 65+38.12

REVISIONS	DATE	BY
CONSTRUCTION BIDDING SET	4/21/14	GEA

MAHONING ROAD NE
STA-0153-01.70



<p>(H) CURVE DATA $\Delta=109^{\circ}58'48''$ $R=25.00'$ $T=35.69'$ $L=47.99'$ $CH=40.95'$ BEARING=N 62°27'12" W PC STA.=62+35.80 MAHONING RD., 15.50'R PT STA.=62+59.29 MAHONING RD., 49.04'R</p>	<p>(I) CURVE DATA $\Delta=132^{\circ}28'35''$ $R=14.00'$ $T=29.01'$ $L=31.39'$ $CH=25.22'$ BEARING=S 49°35'28" E PC STA.=63+00.17 MAHONING RD., 47.17'R PT STA.=62+90.66 MAHONING RD., 23.81'R</p>
<p>(J) CURVE DATA $\Delta=48^{\circ}20'13''$ $R=25.00'$ $T=20.47'$ $L=21.09'$ $CH=20.47'$ BEARING=S 38°48'56" W PC STA.=62+90.66 MAHONING RD., 23.81'R PT STA.=63+09.40 MAHONING RD., 15.50'R</p>	



<p>(K) CURVE DATA $\Delta=135^{\circ}50'43''$ $R=22.00'$ $T=54.24'$ $L=52.16'$ $CH=40.77'$ BEARING=N 44°05'36" W PC STA.=66+36.30 MAHONING RD., 18.00'R PT STA.=66+51.35 MAHONING RD., 55.90'R</p>	<p>(M) CURVE DATA $\Delta=123^{\circ}07'00''$ $R=24.00'$ $T=44.31'$ $L=51.57'$ $CH=42.21'$ BEARING=S 00°59'45" W PC STA.=67+02.03 MAHONING RD., 55.61'R PT STA.=67+22.13 MAHONING RD., 18.50'R</p>
<p>(L) CURVE DATA $\Delta=37^{\circ}56'59''$ $R=10.00'$ $T=3.44'$ $L=6.62'$ $CH=6.51'$ BEARING=S 79°32'14" E PC STA.=67+07.16 MAHONING RD., 59.61'R PT STA.=67+02.03 MAHONING RD., 55.61'R</p>	

REVISIONS TO THIS SHEET INCLUDED:
 MINOR REVISIONS TO SPOT GRADES.

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INTERSECTION DETAILS
HILCHER AVE. NE / EAST VIEW AVE. NE

MAHONING ROAD NE
 STA-0153-01.70

DATE: 4/21/14
 BY: GEA
 CHECKED: JGC

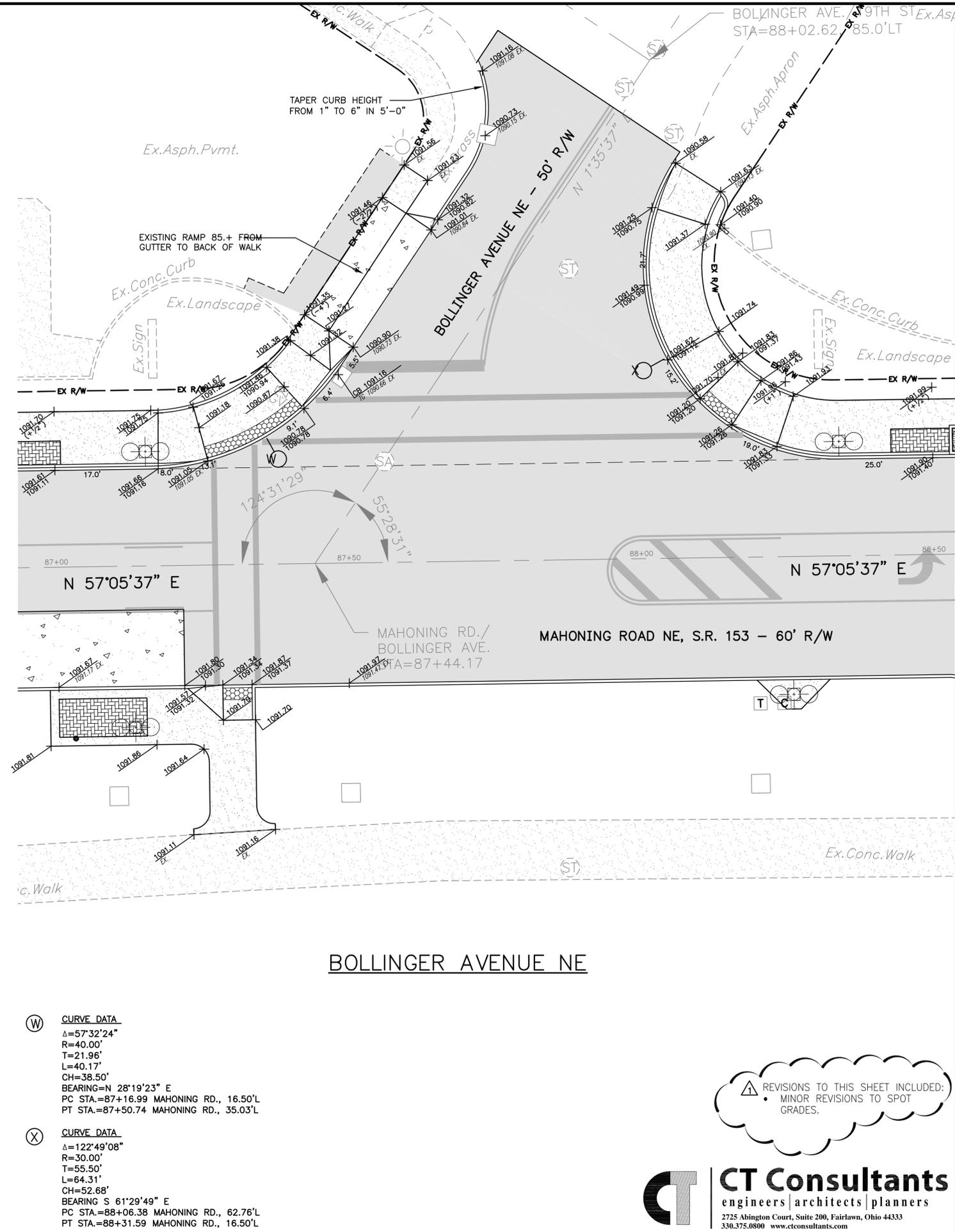
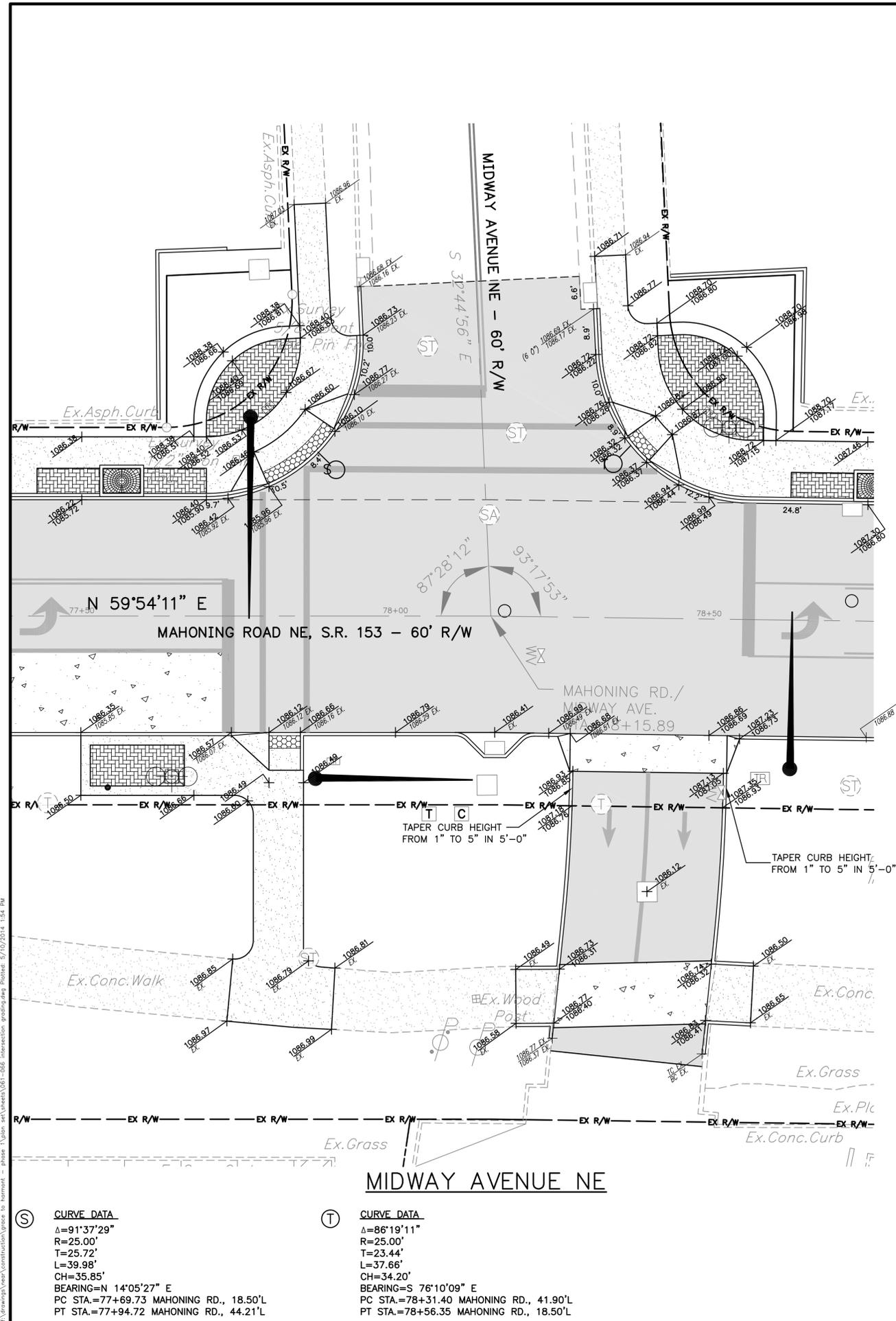
REVISIONS:
 CONSTRUCTION BIDDING SET
 APPENDIX NO. 1

CALCULATED: GEA
 CHECKED: JGC

0 5 10 20'
 HORIZONTAL SCALE
 1" = 10'

62
 108

I:\Projects\2014\Construction\Drawings\phase 1\plan sheets\01-086 Intersection grading.dwg Plot: 5/10/2014 1:51 PM



(S) **CURVE DATA**
 $\Delta=91^{\circ}37'29''$
 $R=25.00'$
 $T=25.72'$
 $L=39.98'$
 $CH=35.85'$
 BEARING=N $14^{\circ}05'27''$ E
 PC STA.=77+69.73 MAHONING RD., 18.50'L
 PT STA.=77+94.72 MAHONING RD., 44.21'L

(T) **CURVE DATA**
 $\Delta=86^{\circ}19'11''$
 $R=25.00'$
 $T=23.44'$
 $L=37.66'$
 $CH=34.20'$
 BEARING=S $76^{\circ}10'09''$ E
 PC STA.=78+31.40 MAHONING RD., 41.90'L
 PT STA.=78+56.35 MAHONING RD., 18.50'L

(W) **CURVE DATA**
 $\Delta=57^{\circ}32'24''$
 $R=40.00'$
 $T=21.96'$
 $L=40.17'$
 $CH=38.50'$
 BEARING=N $28^{\circ}19'23''$ E
 PC STA.=87+16.99 MAHONING RD., 16.50'L
 PT STA.=87+50.74 MAHONING RD., 35.03'L

(X) **CURVE DATA**
 $\Delta=122^{\circ}49'08''$
 $R=30.00'$
 $T=55.50'$
 $L=64.31'$
 $CH=52.68'$
 BEARING S $61^{\circ}29'49''$ E
 PC STA.=88+06.38 MAHONING RD., 62.76'L
 PT STA.=88+31.59 MAHONING RD., 16.50'L

REVISIONS TO THIS SHEET INCLUDED:
 MINOR REVISIONS TO SPOT GRADES.

CALCULATED: GEA
 CHECKED: JGC

HORIZONTAL SCALE
 1" = 10'
 1" = 20'

INTERSECTION DETAILS
 MIDWAY AVE. NE / STA. 84+50 MAHONING

REVISIONS	DATE	BY
CONSTRUCTION BIDDING SET	4/21/14	GEA
ADDENDUM NO. 1	5/7/14	GEA

MAHONING ROAD NE
 STA-0153-01.70

64
 108

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Y CURVE DATA

$\Delta=9^{\circ}20'57''$
R=200.00'
T=16.35'
L=32.63'
CH=32.60'
BEARING S 61°46'06" W
PC STA.=89+97.90 MAHONING RD., 33.50'R
PT STA.=90+30.39 MAHONING RD., 36.16'R

Z CURVE DATA

$\Delta=96^{\circ}43'12''$
R=45.00'
T=55.17'
L=75.57'
CH=67.00'
BEARING N 65°26'50" W
PC STA.=90+30.39 MAHONING RD., 36.16'R
PT STA.=90+66.43 MAHONING RD., 92.64'R

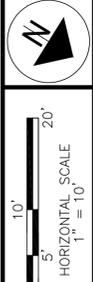
AA CURVE DATA

$\Delta=17^{\circ}38'50''$
R=300.00'
T=46.57'
L=92.40'
CH=92.04'
BEARING N 08°30'49" W
PC STA.=90+66.43 MAHONING RD., 92.64'R
PT STA.=90+28.42 MAHONING RD., 176.46'R

AC CURVE DATA

$\Delta=10^{\circ}29'17''$
R=600.00'
T=55.07'
L=109.83'
CH=109.68'
BEARING N 51°50'59" E
PC STA.=90+07.18 MAHONING RD., 16.50'L
PT STA.=91+16.39 MAHONING RD., 26.52'L

REVISIONS TO THIS SHEET INCLUDED:
MINOR REVISIONS TO SPOT GRADES.



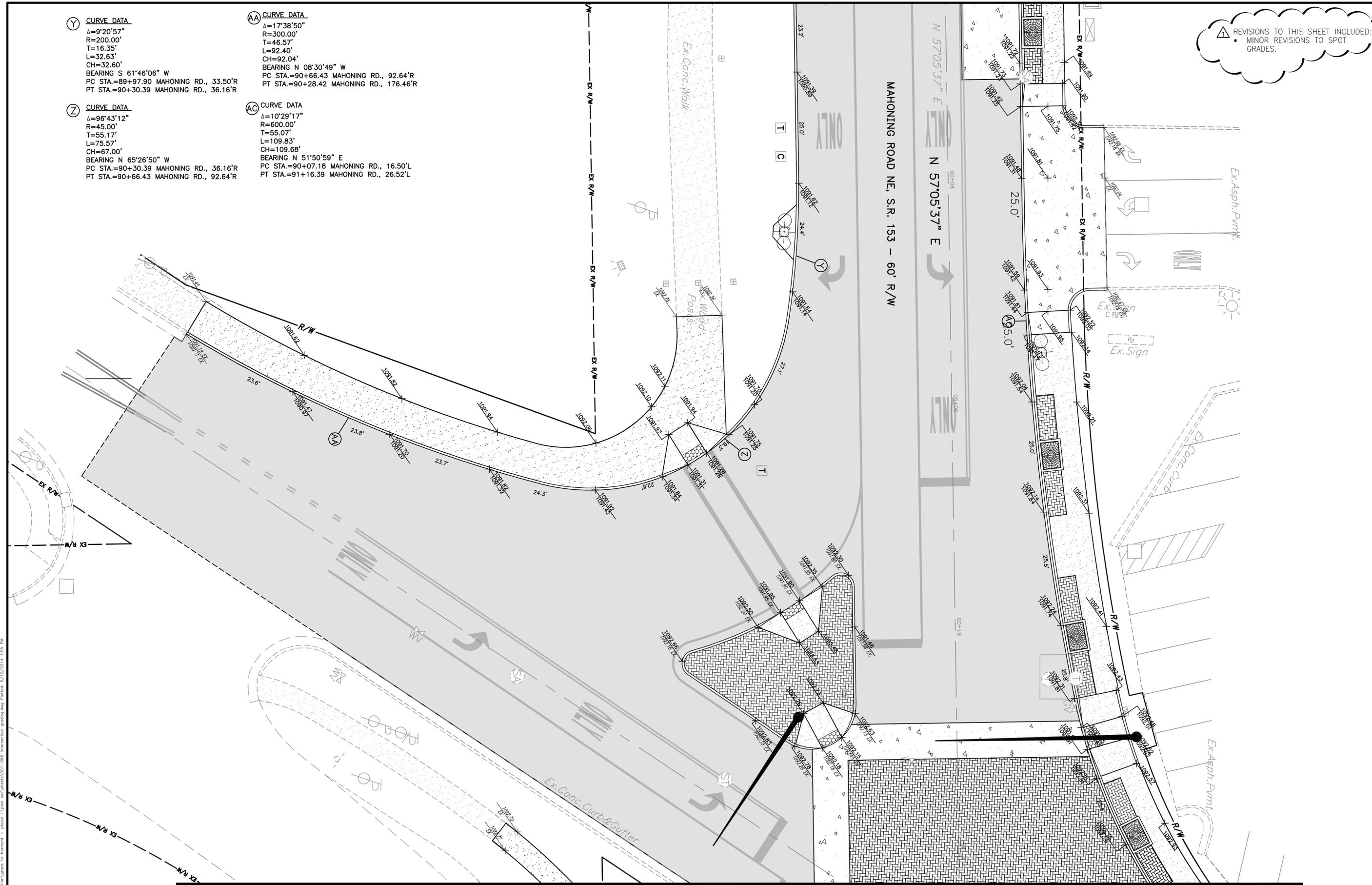
CALCULATED: GEA
CHECKED: JGC

INTERSECTION DETAILS
HARMONT AVENUE NE

REVISIONS	DATE	BY
CONSTRUCTION BIDDING SET	4/21/14	GEA
ADDENDUM NO. 1	5/7/14	GEA

MAHONING ROAD NE
STA-0153-01.70

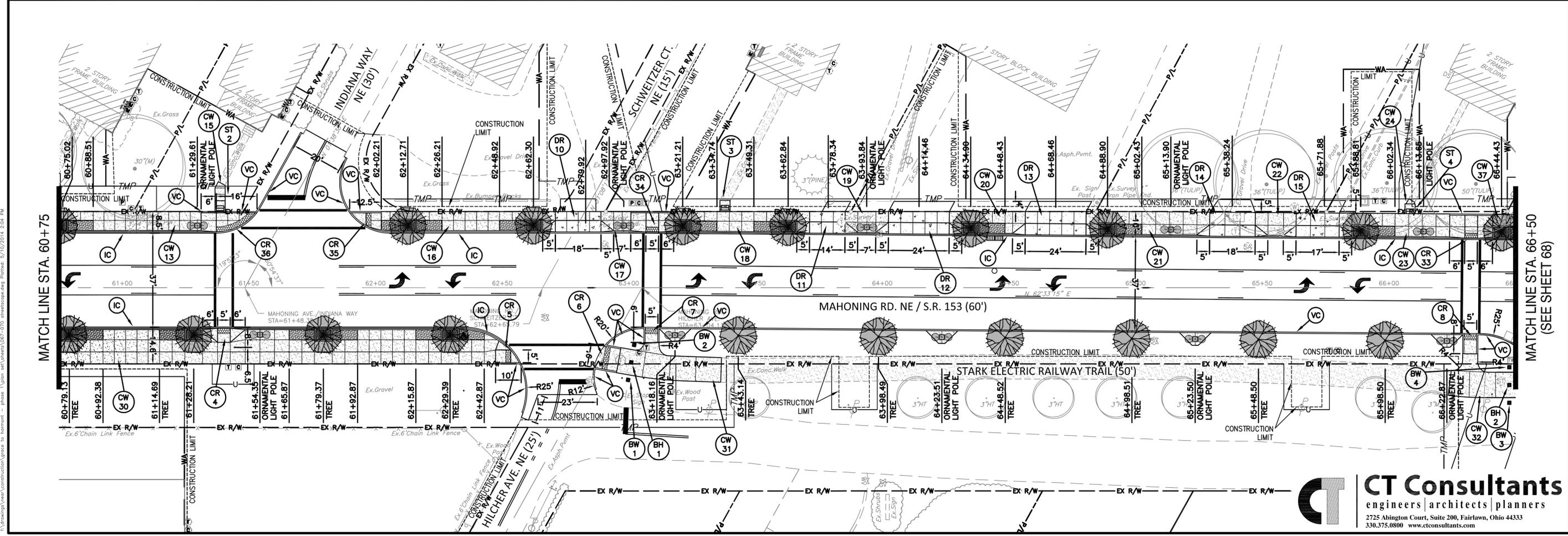
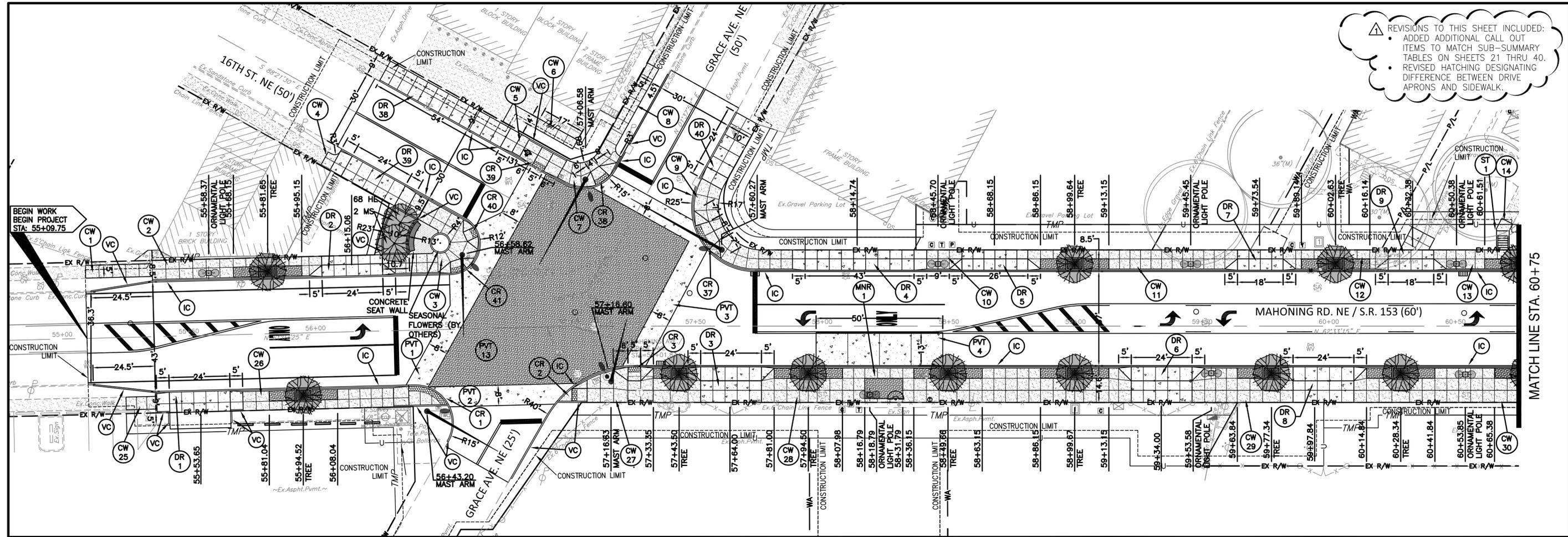
65
108



HARMONT AVENUE NE

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I:\projects\2014\Construction\Drawings to Harmon - phase 1\plan sheets\01-086 Intersection grade.dwg Plotat: 5/10/2014 1:55 PM



REVISIONS TO THIS SHEET INCLUDED:
 • ADDED ADDITIONAL CALL OUT ITEMS TO MATCH SUB-SUMMARY TABLES ON SHEETS 21 THRU 40.
 • REVISED HATCHING DESIGNATING DIFFERENCE BETWEEN DRIVE APRONS AND SIDEWALK.

CALCULATED: GEA
 CHECKED: JGC

STREETSCAPE PLAN
 STA. 54+75 TO STA. 66+50

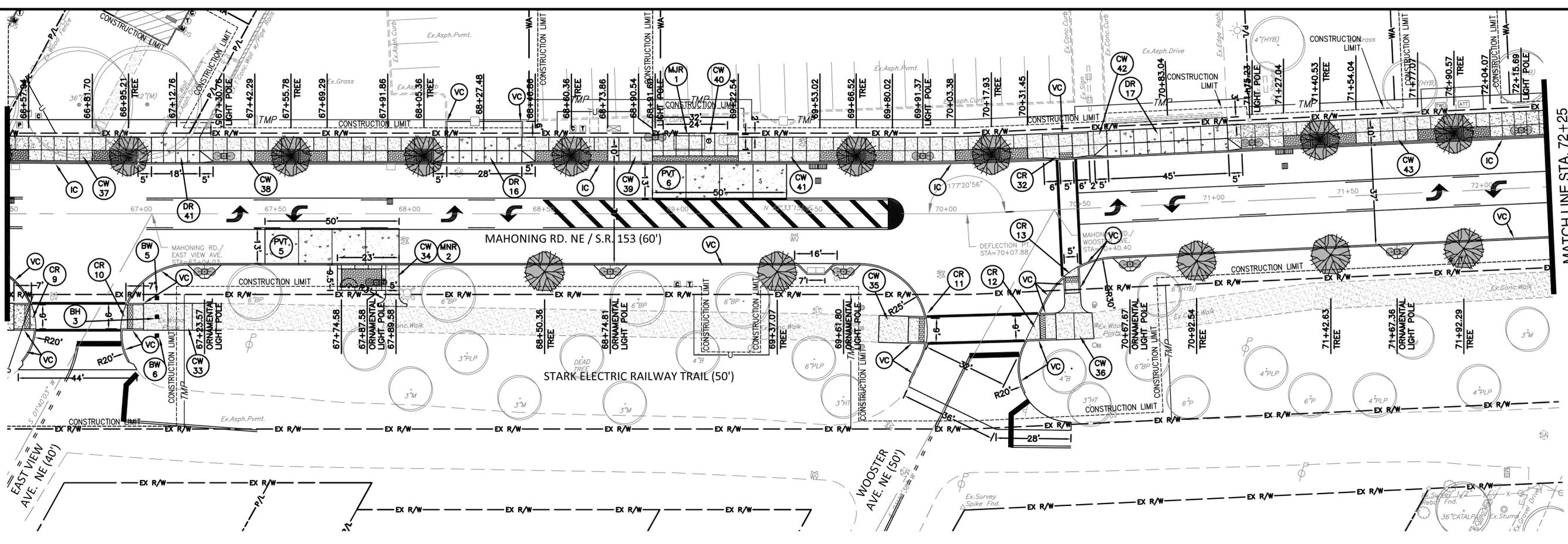
REVISIONS	DATE	BY
CONSTRUCTION BIDDING SET	4/21/14	GEA
APPENDIX NO. 1	5/7/14	GEA

MAHONING ROAD NE
 STA-0153-01.70

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(SEE SHEET 67)
MATCH LINE STA. 66+50



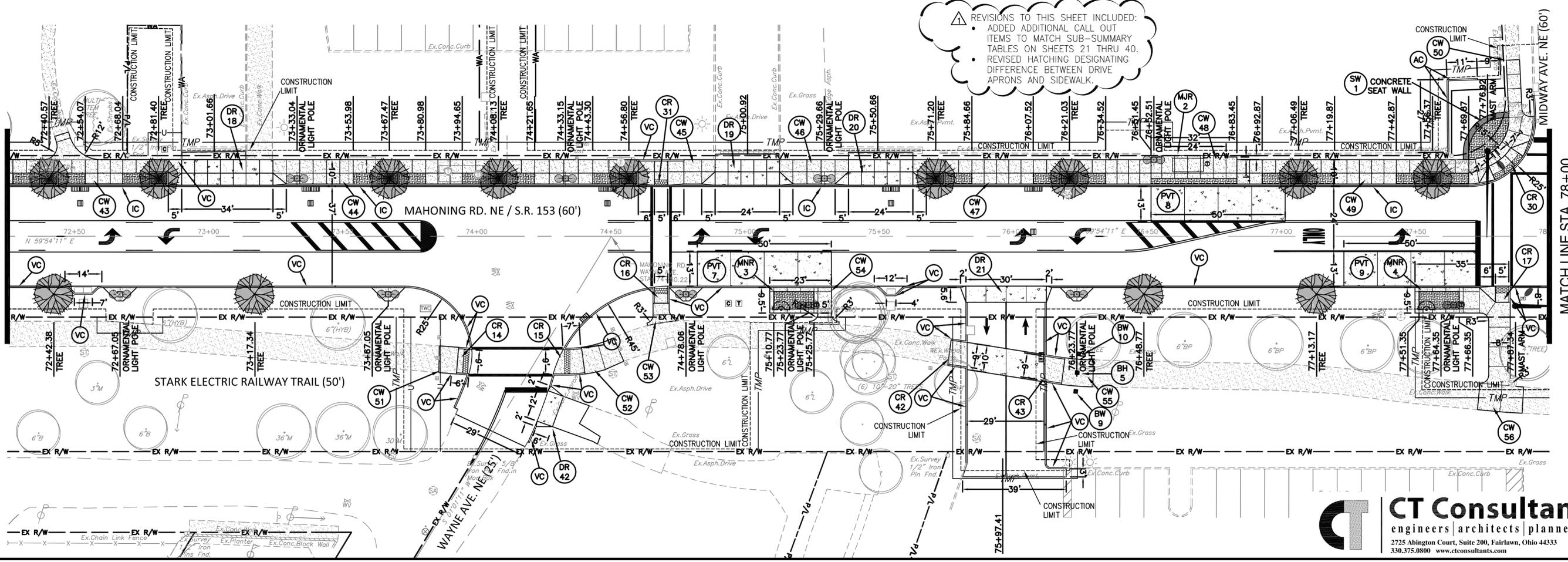
MATCH LINE STA. 72+25

CALCULATED: GEA
 CHECKED: JGC

0 20' 40'
 HORIZONTAL SCALE
 1" = 20'

STREETSCAPE PLAN
 STA. 66+50 TO STA. 78+00

MATCH LINE STA. 72+25



REVISIONS TO THIS SHEET INCLUDED:

- ADDED ADDITIONAL CALL OUT ITEMS TO MATCH SUB-SUMMARY TABLES ON SHEETS 21 THRU 40.
- REVISED HATCHING DESIGNATING DIFFERENCE BETWEEN DRIVE APRONS AND SIDEWALK.

MATCH LINE STA. 78+00
(SEE SHEET 69)

REVISIONS	DATE	BY
CONSTRUCTION BIDDING SET	4/21/14	GEA
APPENDIX NO. 1	5/7/14	GEA

MAHONING ROAD NE
 STA-0153-01.70

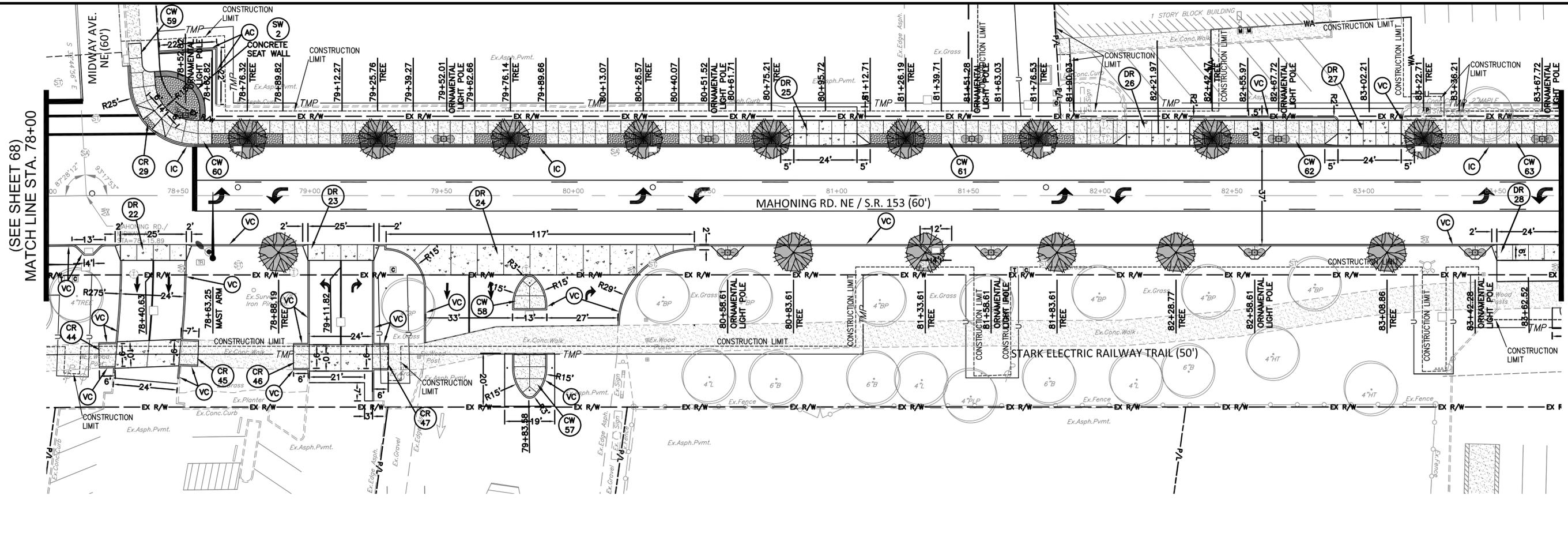
68
 108

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(SEE SHEET 68)
MATCH LINE STA. 78+00

MATCH LINE STA. 83+75

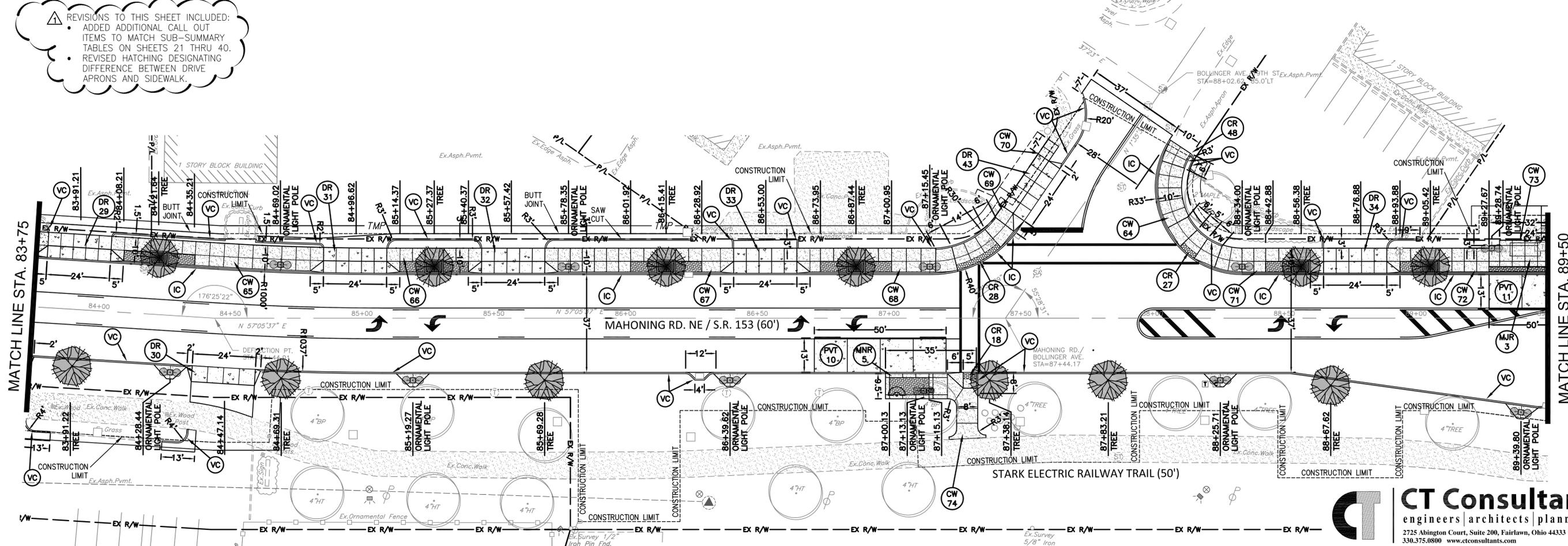


REVISIONS TO THIS SHEET INCLUDED:

- ADDED ADDITIONAL CALL OUT ITEMS TO MATCH SUB-SUMMARY TABLES ON SHEETS 21 THRU 40.
- REVISED HATCHING DESIGNATING DIFFERENCE BETWEEN DRIVE APRONS AND SIDEWALK.

MATCH LINE STA. 83+75

MATCH LINE STA. 89+50
(SEE SHEET 70)



CALCULATED: GEA
CHECKED: JGC

0 20' 40'
10'
HORIZONTAL SCALE
1" = 20'

STREETSCAPE PLAN
STA. 78+00 TO STA. 89+50

REVISIONS	DATE	BY
CONSTRUCTION BIDDING SET	4/21/14	GEA
APPENDIX NO. 1	5/7/14	GEA

MAHONING ROAD NE
STA-0153-01.70

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(SEE SHEET 69)
MATCH LINE STA. 89+50

LEGEND

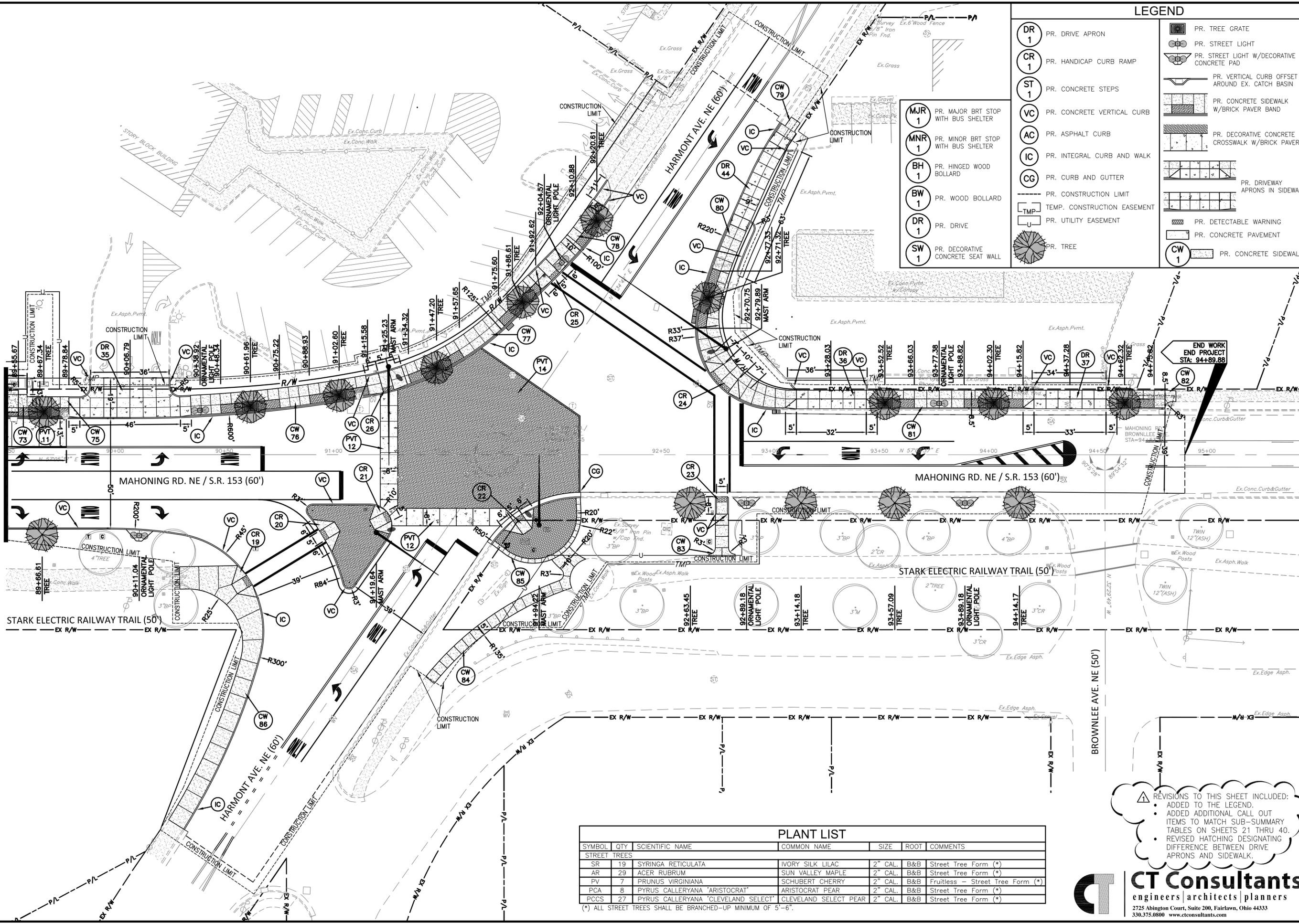
	PR. DRIVE APRON		PR. TREE
	PR. HANDICAP CURB RAMP		PR. STREET LIGHT
	PR. CONCRETE STEPS		PR. VERTICAL CURB OFFSET AROUND EX. CATCH BASIN
	PR. CONCRETE VERTICAL CURB		PR. CONCRETE SIDEWALK W/BRICK PAVER BAND
	PR. ASPHALT CURB		PR. DECORATIVE CONCRETE CROSSWALK W/BRICK PAVERS
	PR. INTEGRAL CURB AND WALK		PR. DRIVEWAY APRONS IN SIDEWALK
	PR. CURB AND GUTTER		PR. DETECTABLE WARNING
	PR. CONSTRUCTION LIMIT		PR. CONCRETE PAVEMENT
	TEMP. CONSTRUCTION EASEMENT		PR. CONCRETE SIDEWALK
	PR. UTILITY EASEMENT		
	PR. DRIVE		
	PR. DECORATIVE CONCRETE SEAT WALL		
	PR. MAJOR BRT STOP WITH BUS SHELTER		
	PR. MINOR BRT STOP WITH BUS SHELTER		
	PR. HINGED WOOD BOLLARD		
	PR. WOOD BOLLARD		
	PR. DRIVE		
	PR. DECORATIVE CONCRETE SEAT WALL		

0 20' 40'
 HORIZONTAL SCALE
 1" = 20'
 CALCULATED: GEA
 CHECKED: JGC

STREETSCAPE PLAN
STA. 89+50 TO STA. 95+50

REVISIONS	DATE	BY
CONSTRUCTION BIDDING SET	4/21/14	GEA
APPENDUM NO. 1	5/7/14	GEA

MAHONING ROAD NE
STA-0153-01.70



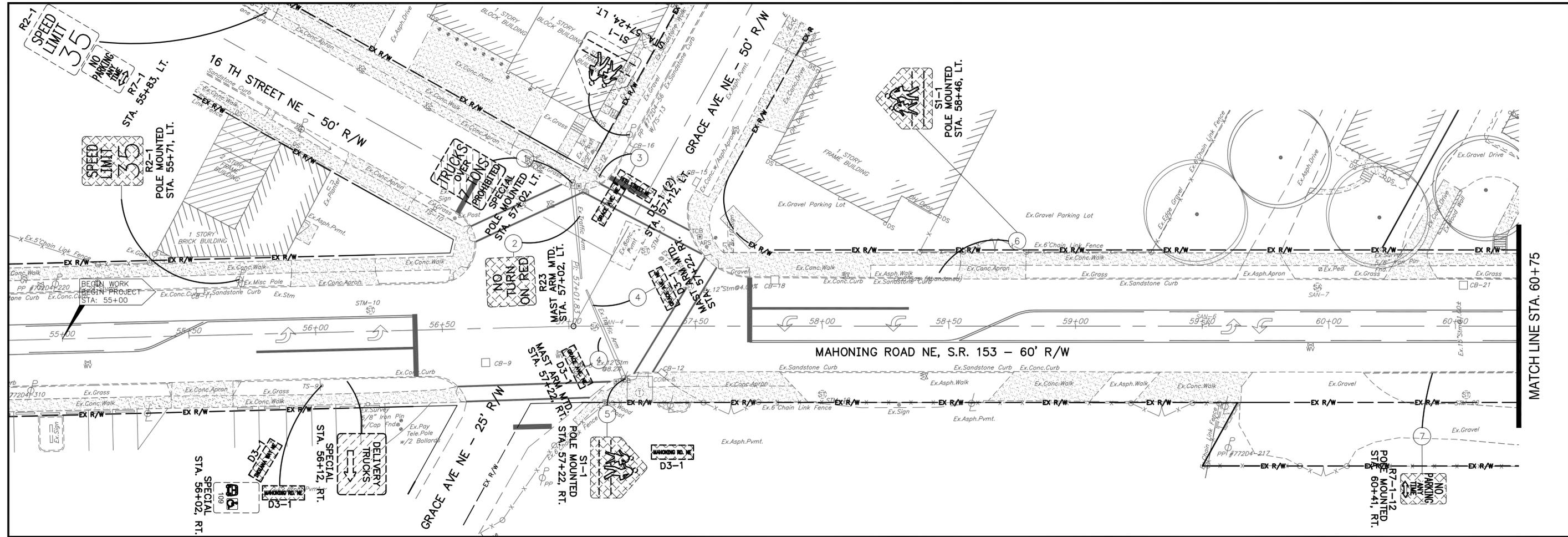
REVISIONS TO THIS SHEET INCLUDED:
 • ADDED TO THE LEGEND.
 • ADDED ADDITIONAL CALL OUT ITEMS TO MATCH SUB-SUMMARY TABLES ON SHEETS 21 THRU 40.
 • REVISED HATCHING DESIGNATING DIFFERENCE BETWEEN DRIVE APRONS AND SIDEWALK.

PLANT LIST

SYMBOL	QTY	SCIENTIFIC NAME	COMMON NAME	SIZE	ROOT	COMMENTS
STREET TREES						
SR	19	SYRINGA RETICULATA	IVORY SILK LILAC	2" CAL.	B&B	Street Tree Form (*)
AR	29	ACER RUBRUM	SUN VALLEY MAPLE	2" CAL.	B&B	Street Tree Form (*)
PV	7	PRUNUS VIRGINIANA	SCHUBERT CHERRY	2" CAL.	B&B	Fruitless - Street Tree Form (*)
PCA	8	PYRUS CALLERYANA 'ARISTOCRAT'	ARISTOCRAT PEAR	2" CAL.	B&B	Street Tree Form (*)
PCCS	27	PYRUS CALLERYANA 'CLEVELAND SELECT'	CLEVELAND SELECT PEAR	2" CAL.	B&B	Street Tree Form (*)

(*) ALL STREET TREES SHALL BE BRANCHED-UP MINIMUM OF 5'-6".

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MATCH LINE STA. 60+75

EX. SIGNAGE PLAN
 STA. 54+75 TO STA. 66+50

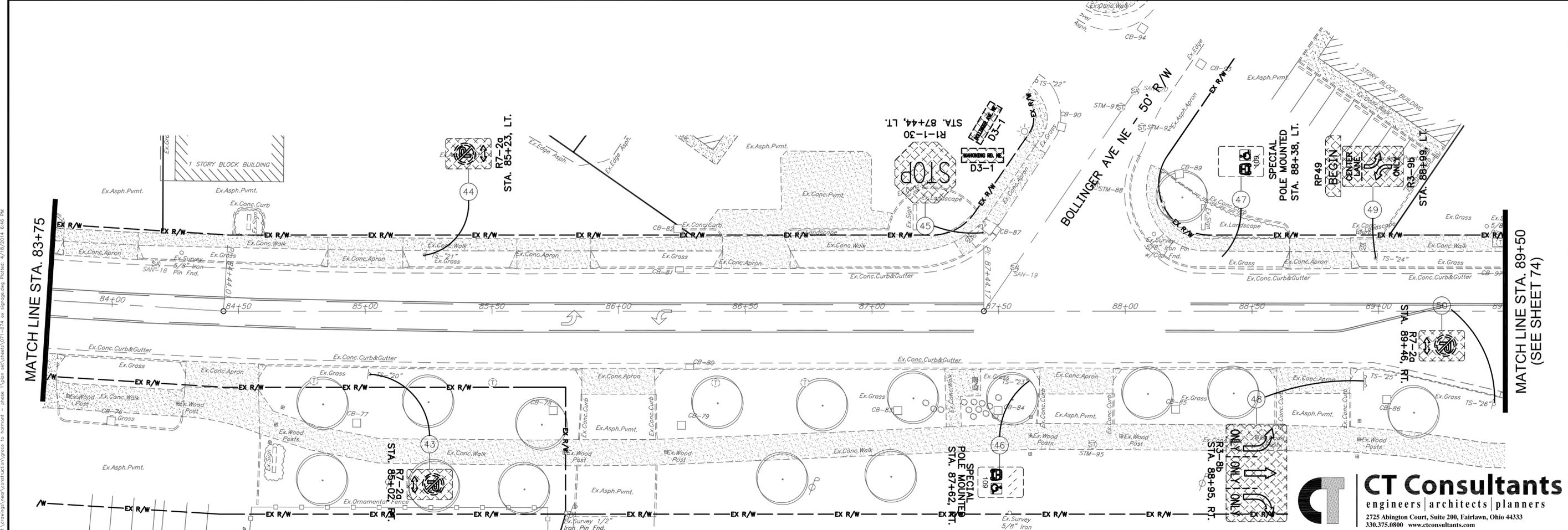
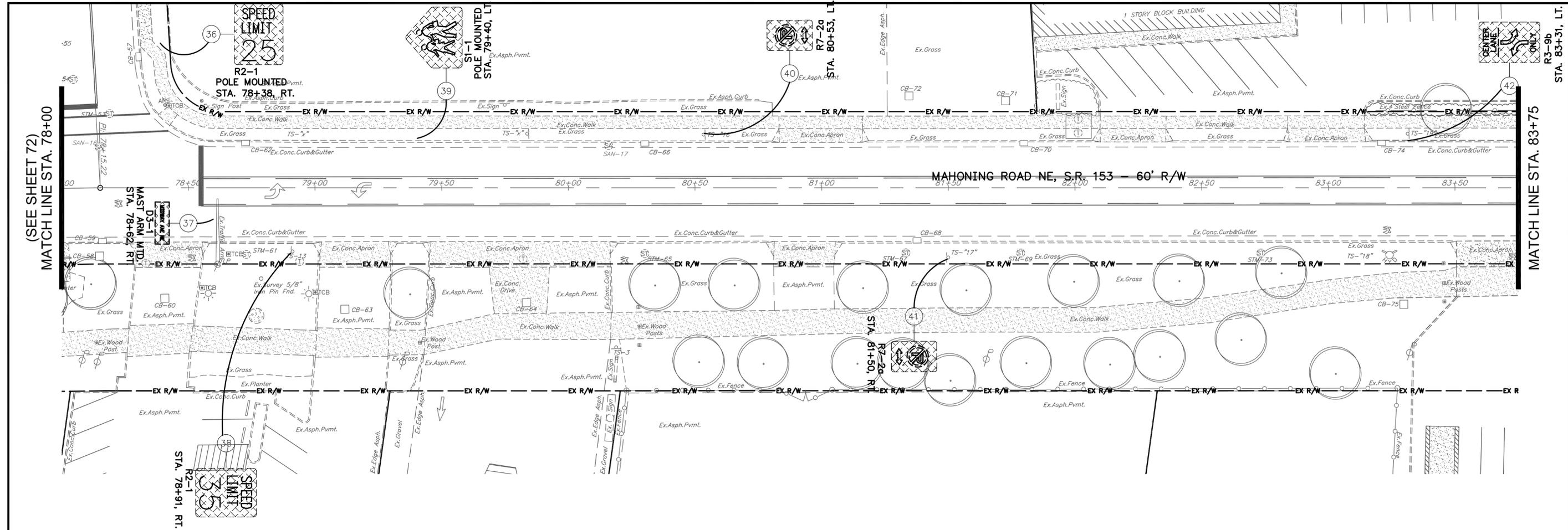
REVISIONS	DATE	BY
CONSTRUCTION BIDDING SET	4/21/14	GEA

MATCH LINE STA. 66+50
 (SEE SHEET 72)

MAHONING ROAD NE
 STA-0153-01.70

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EX. SIGNAGE PLAN
STA. 78+00 TO STA. 89+50

REVISIONS	DATE	BY
CONSTRUCTION BIDDING SET	4/21/14	GEA

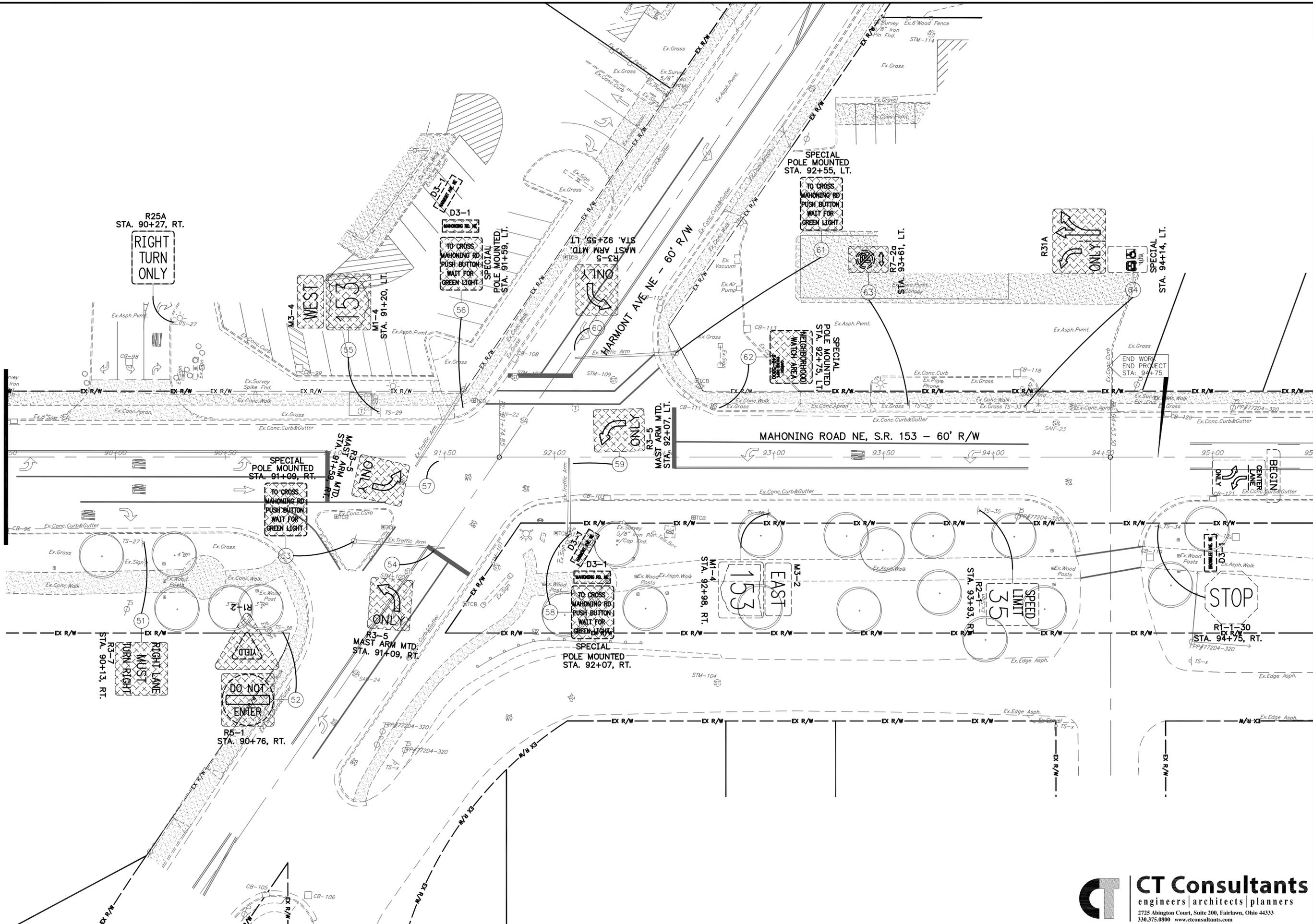
MAHONING ROAD NE
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(SEE SHEET 73)
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HORIZONTAL SCALE

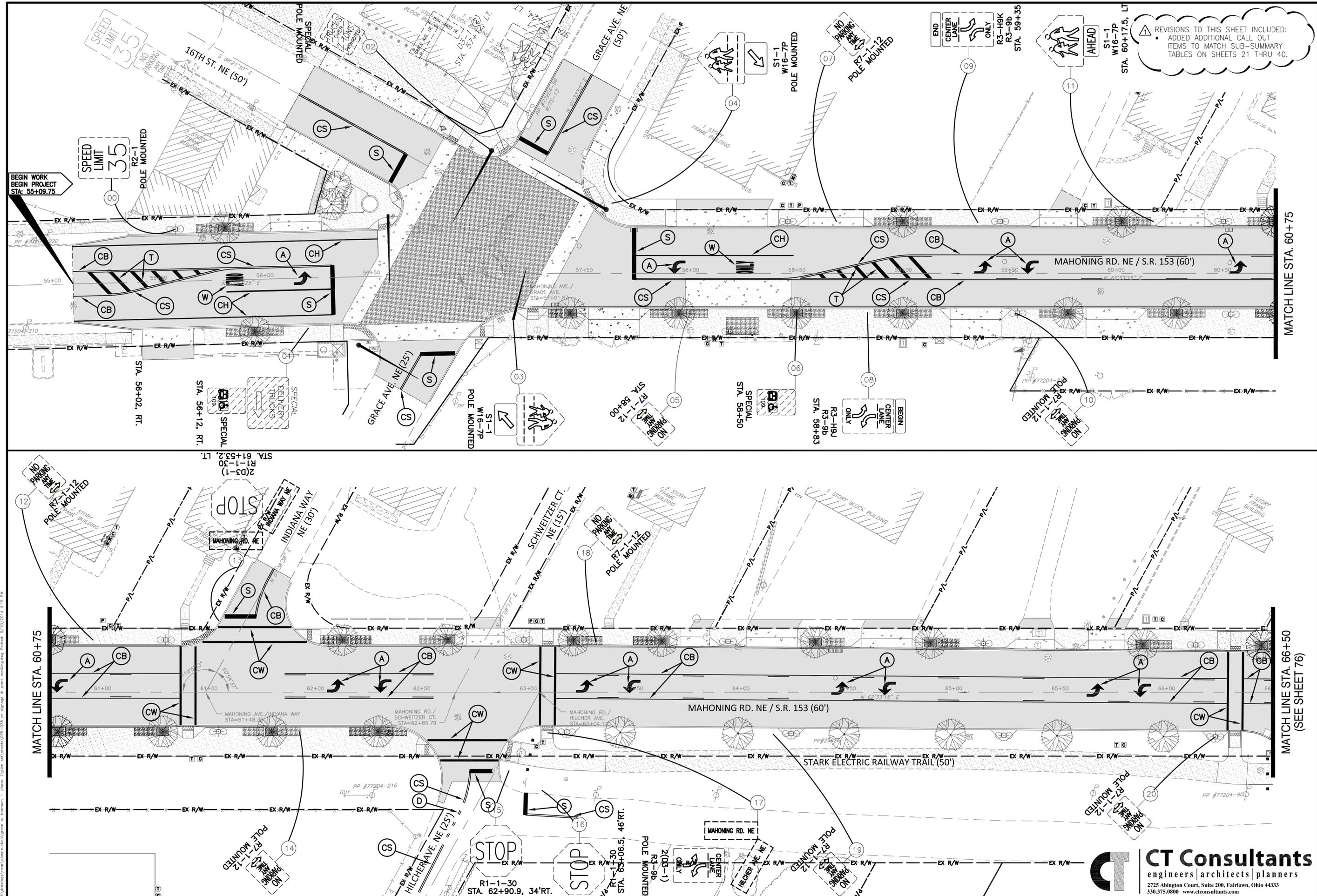
EX. SIGNAGE PLAN
STA. 89+50 TO STA. 95+50

REVISIONS	DATE	BY
CONSTRUCTION BIDDING SET	4/21/14	GEA

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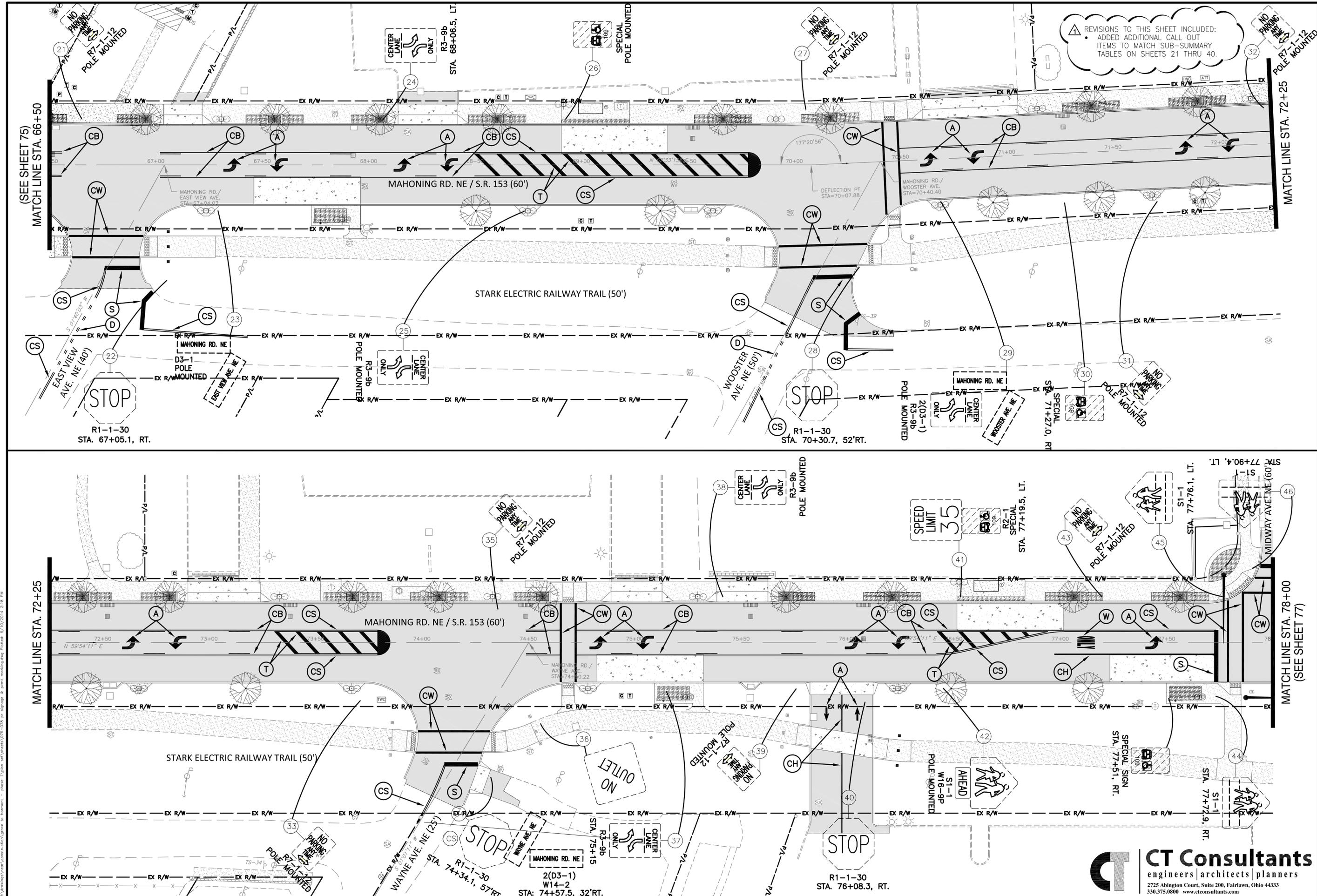
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REVISIONS TO THIS SHEET INCLUDED:
• ADDED ADDITIONAL CALL OUT ITEMS TO MATCH SUB-SUMMARY TABLES ON SHEETS 21 THRU 40.

PR.SIGNAGE & PAVEMENT MARKING PLAN STA. 66+50 TO STA. 78+00	CALCULATED: GEA CHECKED: JGC	SCALE: HORIZONTAL SCALE: 1" = 20' VERTICAL SCALE: 1" = 40'	
	REVISIONS CONSTRUCTION BIDDING SET APPENDIX NO. 1	DATE BY 4/21/14 GEA 5/7/14 GEA	75 108

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(SEE SHEET 75) MATCH LINE STA. 66+50
 MATCH LINE STA. 72+25
 MATCH LINE STA. 72+25
 MATCH LINE STA. 78+00
 MATCH LINE STA. 78+00 (SEE SHEET 77)

MAHONING ROAD NE
 STA. 0153-01.70

PR. SIGNAGE & PAVEMENT MARKING PLAN
 STA. 66+50 TO STA. 78+00

REVISIONS:
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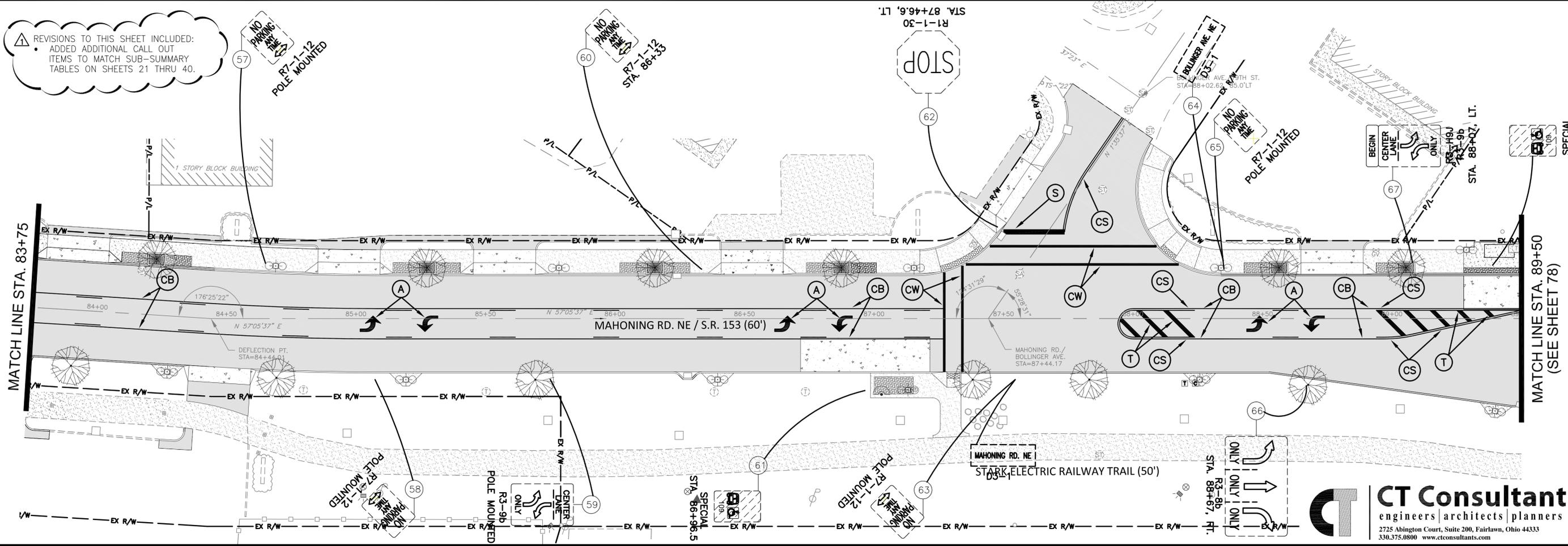
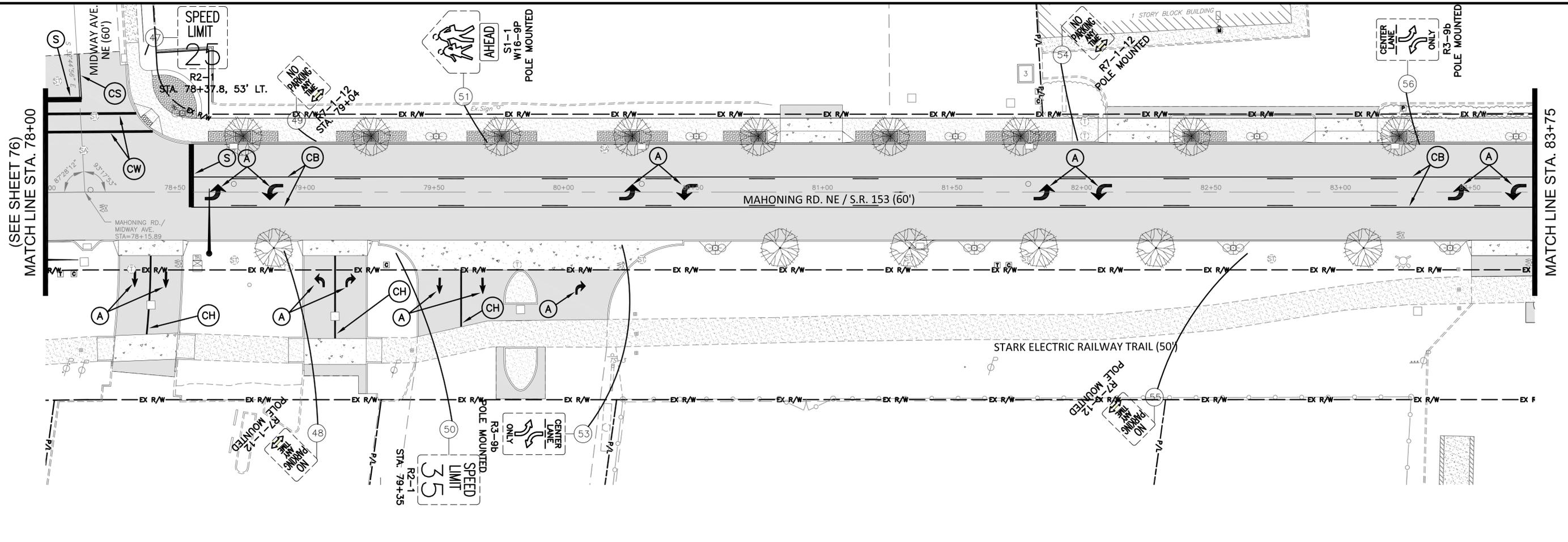
HORIZONTAL SCALE
 1" = 20'
 40'

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 108

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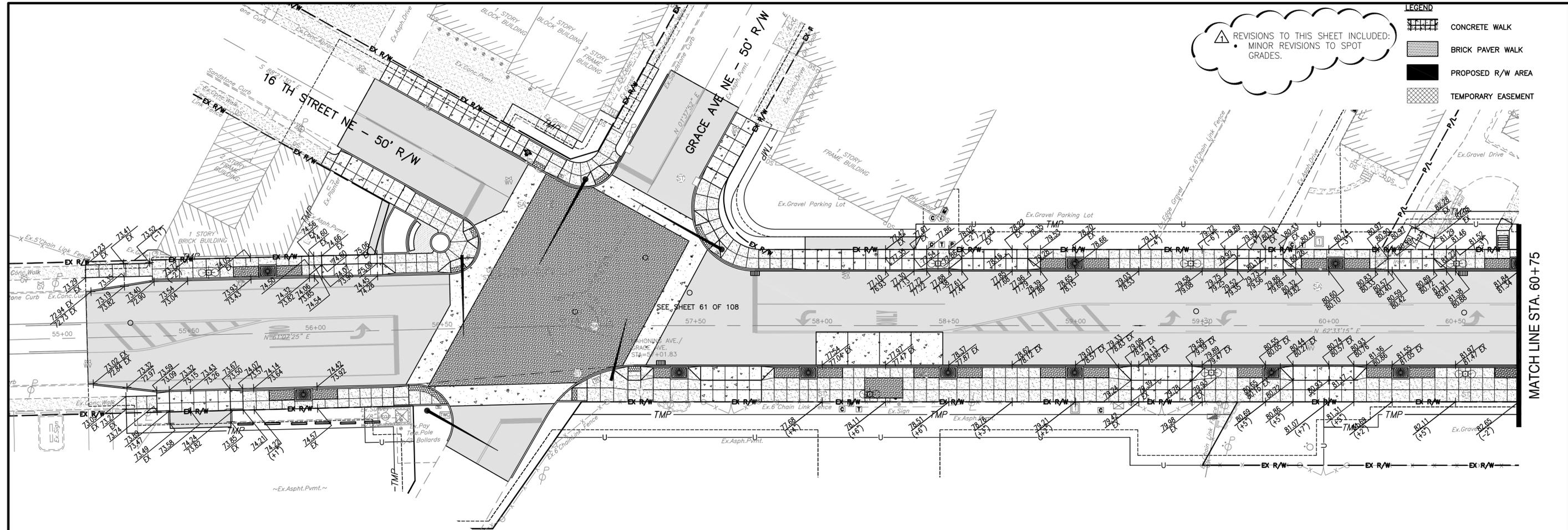
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REVISIONS TO THIS SHEET INCLUDED:
 • ADDED ADDITIONAL CALL OUT ITEMS TO MATCH SUB-SUMMARY TABLES ON SHEETS 21 THRU 40.

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PR. SIGNAGE & PAVEMENT MARKING PLAN STA. 78+00 TO STA. 89+50	
DATE: 4/21/14 BY: GEA	REVISIONS: CONSTRUCTION BIDDING SET: APPENDUM NO. 1 5/7/14 GEA
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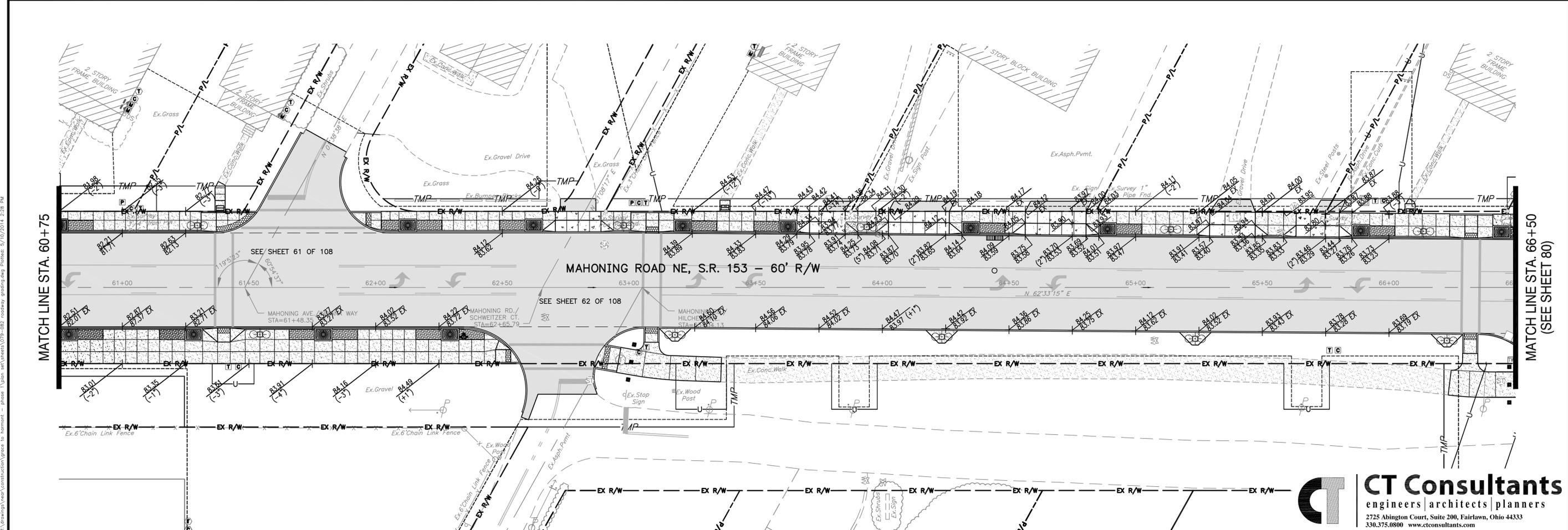


- LEGEND**
- CONCRETE WALK
 - BRICK PAVER WALK
 - PROPOSED R/W AREA
 - TEMPORARY EASEMENT

CALCULATED: GEA
 CHECKED: JGC

0 20' 40'
 10'
 HORIZONTAL SCALE
 1" = 20'

ROADWAY GRADING PLAN
 STA. 66+50 TO STA. 78+00



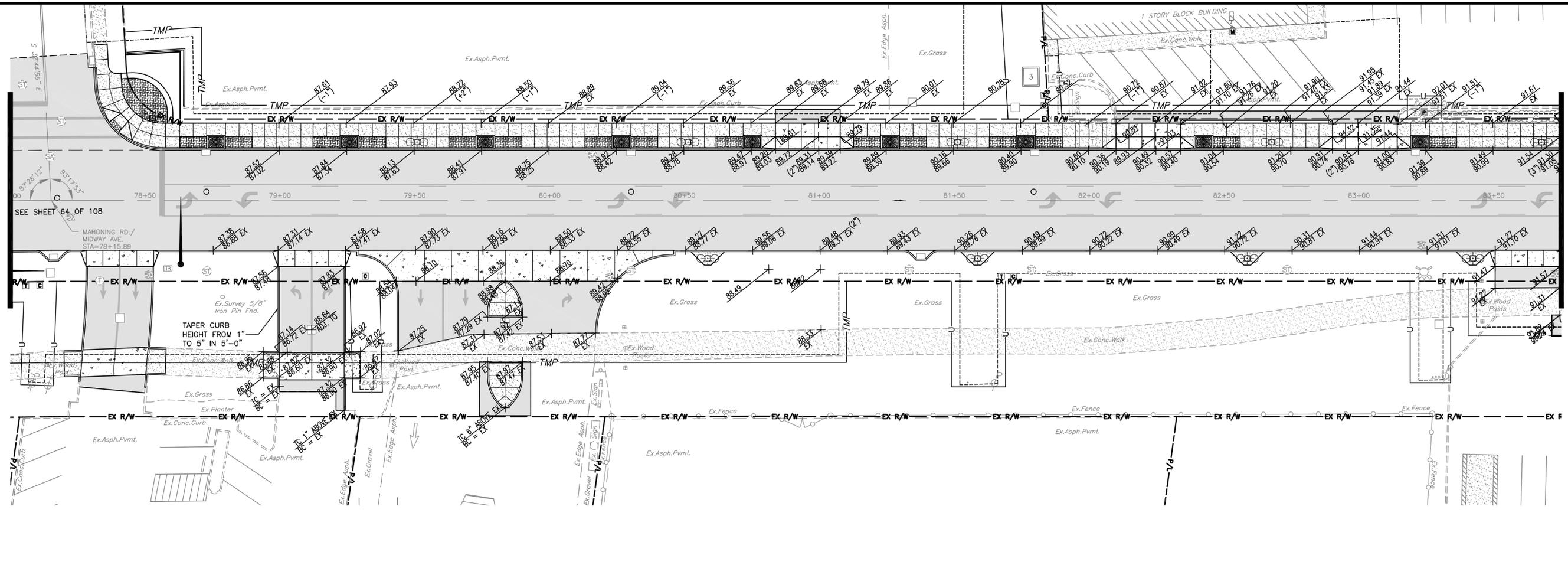
REVISIONS

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1	4/21/14	GEA
2	5/7/14	GEA

MAHONING ROAD NE
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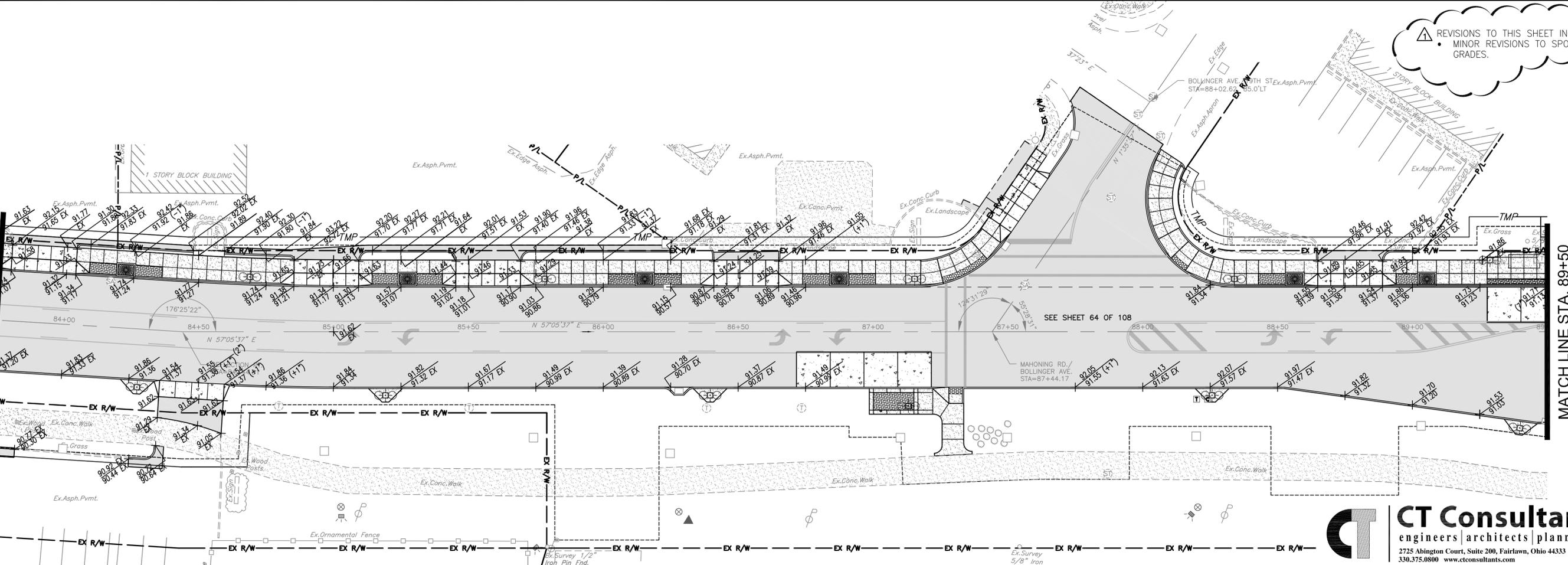
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(SEE SHEET 80)
MATCH LINE STA. 78+00



MATCH LINE STA. 83+75

MATCH LINE STA. 83+75



MATCH LINE STA. 89+50
(SEE SHEET 82)

CALCULATED: GEA
CHECKED: JGC

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10'
HORIZONTAL SCALE
1" = 20'

ROADWAY GRADING PLAN
STA. 78+00 TO STA. 89+50

REVISIONS	DATE	BY
CONSTRUCTION BIDDING SET	4/21/14	GEA
APPENDIX NO. 1	5/7/14	GEA

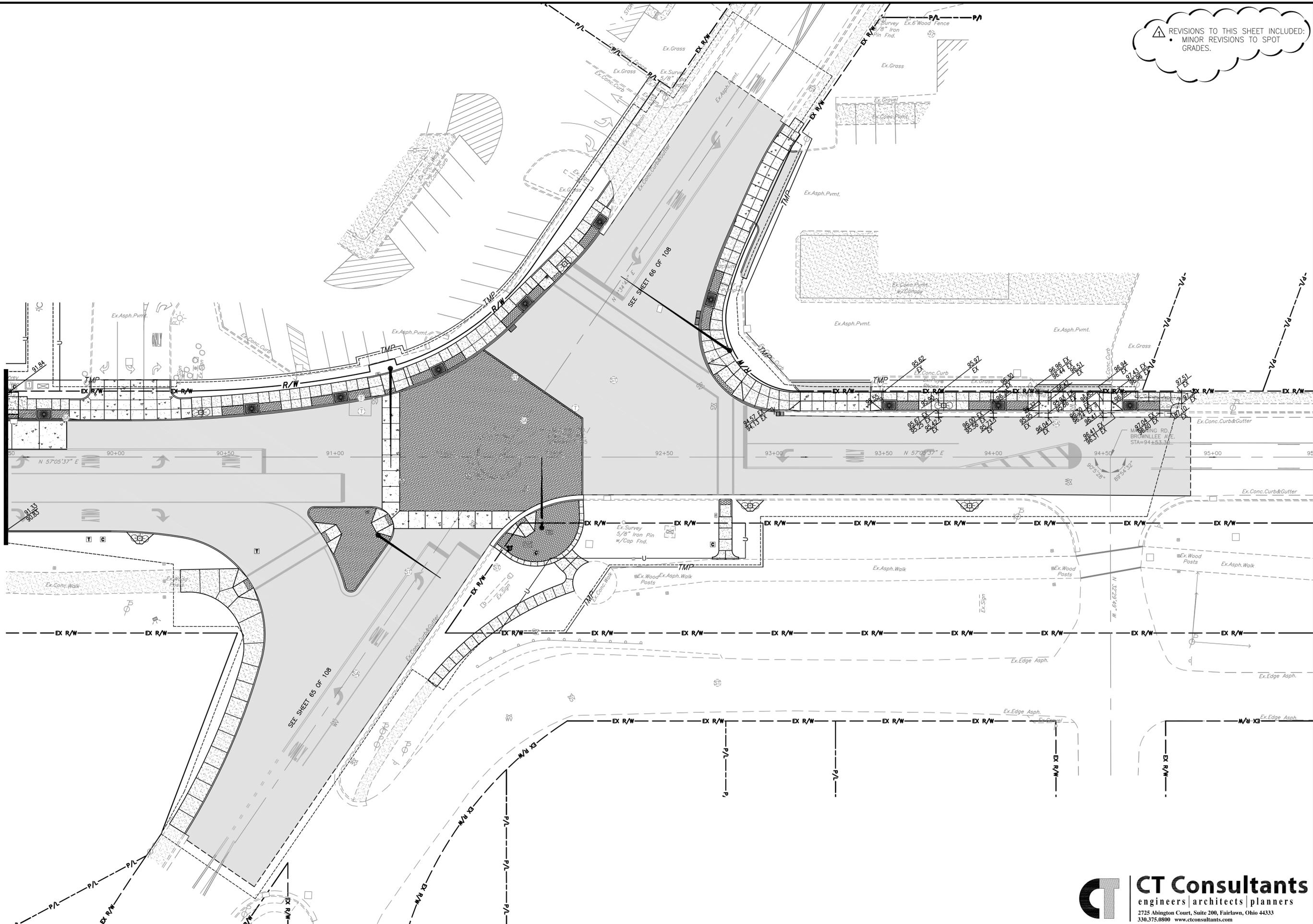
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(SEE SHEET 81)
MATCH LINE STA. 89+50



△ REVISIONS TO THIS SHEET INCLUDED:
• MINOR REVISIONS TO SPOT GRADES.

CALCULATED: GEA
CHECKED: JGC

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HORIZONTAL SCALE
1" = 20'

ROADWAY GRADING PLAN
STA. 89+50 TO STA. 95+50

REVISIONS	DATE	BY
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APPENDIX NO. 1	5/7/14	GEA

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MAINTENANCE OF TRAFFIC

THIS ITEM SHALL CONSIST OF MAINTENANCE OF TRAFFIC ON EXISTING ROADWAYS IN ACCORDANCE WITH THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (OMUTCD) FOR STREETS AND HIGHWAYS, CURRENT EDITION, LATEST REVISION, THE SPECIFICATIONS AND THE FOLLOWING:

- A. MINIMUM OF ONE (1) ELEVEN FOOT LANE IN EACH DIRECTION SHALL BE MAINTAINED ON THE EXISTING PAVEMENT.
- B. THE CONTRACTOR SHALL INFORM THE CITY OF CANTON ENGINEERS OFFICE AT (330) 489-3381 EIGHTEEN (18) DAYS PRIOR TO THE BEGINNING OF WORK.
- C. CONES SHALL NOT BE ACCEPTABLE TRAFFIC CONTROL DEVICES FOR LANE RESTRICTIONS OR LANE REDUCTIONS THAT ARE IN OPERATION ONE-HALF HOUR AFTER SUNSET OR ONE HALF-HOUR BEFORE SUNRISE. ALL NIGHTTIME LANE RESTRICTIONS SHALL REQUIRE DRUMS OR BARRICADES AT A MAXIMUM SPACING OF FIFTY (50) FEET.
- D. LANE RESTRICTIONS OR LANE REDUCTIONS SHALL NOT BE PERMITTED AFTER NORMAL WORKING HOURS, NORMAL WORKING HOURS SHALL BE THOSE HOURS DURING WHICH THE CONTRACTOR HAS A FULL COMPLEMENT OF EMPLOYEES AND EQUIPMENT ACTIVELY REMOVING AND/OR PLACING PAVEMENT MATERIALS.
- E. THE CONTRACTOR SHALL FURNISH, ERECT, MAINTAIN AND SUBSEQUENTLY REMOVE ALL FLAGS, BARRICADES, SIGNS, SIGN SUPPORTS, AND FURNISH AND MAINTAIN ALL FLAGGERS, WATCHERS AND INCIDENTALS RELATED THERETO.

THE CONTRACTOR SHALL ALSO FOLLOW THE INTERSECTION PRIORITY LIST SEQUENCING WHICH WILL BE PROVIDED AT THE INITIAL ON-SITE MEETING (SEE NOTE REGARDING FOUNDATIONS FOR MORE INFORMATION). THE COST FOR THE ABOVE MAINTENANCE OF TRAFFIC REQUIREMENTS SHALL BE INCIDENTAL TO AND INCLUDED IN THE LUMP SUM PRICE BID FOR ITEM 614 - MAINTAINING TRAFFIC.

MAINTENANCE OF TRAFFIC SIGNAL INSTALLATION

BEFORE ANY WORK IS STARTED REPRESENTATIVES OF THE STATE, THE MAINTAINING AGENCY, AND THE CONTRACTOR SHALL MAKE A VISUAL INSPECTION OF THE EXISTING SIGNAL/FLASHER INSTALLATIONS TO BE MAINTAINED. DURING THIS INSPECTION A WRITTEN RECORD OF THE CONDITION OF THE EXISTING SIGNAL/FLASHER SHALL BE MADE BY THE STATE'S REPRESENTATIVE. THIS WRITTEN REPORT SHALL NOTE INDIVIDUAL ITEMS WHICH ARE NOT IN WORKING ORDER. THE COMPLETED REPORT SHALL BE SIGNED BY THE REPRESENTATIVES OF THE STATE, THE MAINTAINING AGENCY, AND THE CONTRACTOR.

AFTER THE REPORT HAS BEEN SIGNED BY ALL PARTIES, THE SIGNAL INSTALLATION SHALL BE TURNED OVER TO THE CONTRACTOR, WHO SHALL THEN BE REQUIRED TO MAINTAIN THE TRAFFIC SIGNAL INSTALLATIONS WITHIN THE PROJECT UNDER THE FOLLOWING CONDITIONS:

- A. EXISTING SIGNAL INSTALLATIONS WHICH THE PLANS REQUIRE THE CONTRACTOR TO ADJUST, MODIFY, ADD ONTO OR REMOVE, OR WHICH THE CONTRACTOR ACTUALLY ADJUSTS, MODIFIES OR OTHERWISE DISTURBS INCLUDING DAMAGE DUE TO UTILITY RELOCATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE ENTIRE INSTALLATION AT AN INTERSECTION FROM THE TIME THE INSTALLATION IS FIRST DISTURBED, WHETHER FROM UTILITY WORK OR FROM THE CONTRACTOR.
- B. NEW OR REUSED SIGNAL INSTALLATIONS OR DEVICES, INSTALLED BY THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTENANCE OF THESE FROM THE TIME OF INSTALLATION UNTIL THE WORK IS ACCEPTED.

THE CONTRACTOR SHALL CORRECT AS QUICKLY AS POSSIBLE ALL OUTAGES OR MALFUNCTIONS. AT THE PRE-CONSTRUCTION MEETING, THE CONTRACTOR SHALL PROVIDE THE MAINTAINING AGENCY AND THE PROJECT ENGINEER SUCH ADDRESSES AND PHONE NUMBERS WHERE HIS MAINTENANCE FORCES CAN BE CONTACTED. THE CONTRACTOR SHALL PROVIDE ONE (1) 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, SEVEN (7) DAYS A WEEK.

THE CONTRACTOR SHALL HAVE THE MALFUNCTION CORRECTED AND/OR REPAIRED TO THE SATISFACTION OF THE ENGINEER WITHIN EIGHT HOURS OF THE NOTIFICATION OR LIQUIDATED DAMAGES OF \$500 PER HOUR SHALL BE ASSESSED THE CONTRACTOR.

ALL LAMP OUTAGES, ELECTRICAL FAILURES, EQUIPMENT MALFUNCTIONS AND MISALIGNED SIGNAL HEADS SHALL BE CORRECTED TO THE SATISFACTION OF THE PROJECT ENGINEER WITH THE SIGNAL BACK IN SERVICE WITHIN EIGHT (8) HOURS AFTER THE CONTRACTOR HAS BEEN NOTIFIED OF THE OUTAGES.

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 PROJECT ENGINEER WITH THE SIGNAL BACK IN SERVICE WITHIN EIGHT (8) HOURS AFTER THE CONTRACTOR IS NOTIFIED 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 EIGHT (8) HOUR PERIOD, AND SHALL MAKE PERMANENT REPAIRS OR REPLACEMENT AS SOON AS POSSIBLE.

NONE OF THE ABOVE SHALL BE CONSTRUED AS COLLECTIVE OR CONSECUTIVE OUTAGE TIME PERIODS AT ANY ONE (1) LOCATION. WHERE MORE THAN ONE (1) OUTAGE OCCURS AT ANY ONE (1) LOCATION, THEN THE ALLOTTED TIME LIMIT SHALL BE FOR THE WORST SINGLE OUTAGE.

WHERE OUTAGES ARE THE DIRECT RESULT OF A VEHICLE ACCIDENT THE RESPONSE OF THE CONTRACTOR SHALL BE AS OUTLINED ABOVE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COLLECTION OF ANY DAMAGES FOR THIS WORK FROM THOSE PARTIES RESPONSIBLE FOR THE DAMAGES AS PER 107.15.

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 PROJECT ENGINEER MAY INVOKE THE PROVISIONS OF SECTION 105.15 AND ANY SUBSEQUENT BILLINGS TO THE STATE OR THE CITY OF CANTON FOR POLICE SERVICES AND MAINTENANCE SERVICES BY CITY FORCES SHALL BE DEDUCTED FROM MONEYS DUE OR TO BECOME DUE THE CONTRACTOR IN ACCORDANCE WITH PROVISIONS OF SECTION 105.15. IN ADDITION TO THESE BILLINGS, THE CONTRACTOR SHALL BE ASSESSED LIQUIDATED DAMAGES OF \$500/HOUR FOR EACH HOUR BEYOND THE ALLOWED EIGHT HOUR PERIOD THAT THE SIGNAL IS INOPERATIVE.

THE CONTRACTOR SHALL PROVIDE THE MAINTENANCE SERVICES ENTIRELY WITH HIS FORCES OR HE MAY CHOOSE TO ENTER INTO A MUTUALLY ACCEPTABLE AGREEMENT WITH THE LOCAL MAINTAINING AGENCY TO PROVIDE THE MAINTENANCE.

THE CONTRACTOR SHALL INFORM THE PROJECT ENGINEER, IN WRITING, OF THE MAINTENANCE METHOD SELECTED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE DUE TO ANY TRAFFIC SIGNAL COMPONENTS REQUIRED TO BE HANDLED DURING THE RELOCATION OF POLES AND REVISIONS TO THE SIGNAL SYSTEM.

WHEN A TRAFFIC SIGNAL MUST BE TAKEN OUT OF SERVICE BY THE CONTRACTOR DUE TO CONSTRUCTION PROCEDURES, THIS OUTAGE SHALL NOT EXCEED FOUR (4) HOURS FOR INSTALLATIONS UTILIZING NEW FOUNDATIONS AND EIGHT (8) HOURS FOR INSTALLATIONS UTILIZING EXISTING FOUNDATIONS AND NO OUTAGE TIME PERIOD SHALL INCLUDE THE HOURS OF 6:00 AM TO 8:00 AM AND 4:00 PM TO 6:00 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, EXCEPT FOR THE FOLLOWING INTERSECTIONS WHICH SHALL BE PROTECTED BY OFF-DUTY CITY OF CANTON POLICE, HIRED BY THE CONTRACTOR.

- A. MAHONING ROAD & HARMONT AVENUE N.E.

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

THE CONTRACTOR SHALL MAINTAIN COMPLETE RECORDS OF MALFUNCTIONS INCLUDING:
1). TIME OF NOTIFICATION OF MALFUNCTION;
2). TIME OF WORK CREWS ARRIVAL TO CORRECT THE MALFUNCTION;
3). ACTIONS TAKEN TO CORRECT THE MALFUNCTION, INCLUDING A LIST OF PARTS REPAIRED OR REPLACED;
4). A DIAGNOSIS OF REASON FOR THE MALFUNCTION AND PROBABILITY OF REOCCURRENCE; AND
5). TIME OF COMPLETION OF REPAIR AND SYSTEM RESTORED TO FULL SERVICE. A COPY OF THESE RECORDS SHALL BE PROVIDED TO THE ENGINEER WITHIN THREE (3) WORKING DAYS FOLLOWING COMPLETION OF EACH REPAIR.

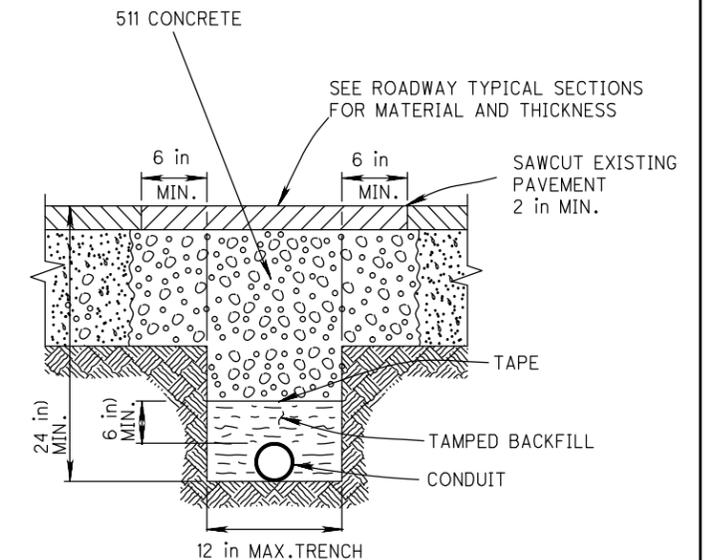
ALL COSTS RESULTING FROM THE ABOVE REQUIREMENTS SHALL BE CONSIDERED TO BE INCLUDED IN THE LUMP SUM PRICE BID FOR ITEM 614 - MAINTAINING TRAFFIC.

ITEM 625 - PULL BOX, MISC.: 725.06 (BY SIZE)

PULL BOXES SHALL BE MANUFACTURED BY CARSON BROOKS, QUAZITE OR SYNERTECH OR APPROVED EQUAL. ALL PULL BOXES SHALL INCLUDE A POLYMER CONCRETE RING AND COVER TYPE, OR EQUAL, AND SHALL BE MARKED "TRAFFIC". THE PULL BOX SHALL BE FIBERGLASS REINFORCED POLYESTER, OR EQUAL, WITH INSERTS AND SHALL BE 18" IN DEPTH. EACH PULL BOX SHALL INCLUDE TWO (2) STAINLESS STEEL HEX BOLTS. EACH PULL BOX AND COVER SHALL HAVE A MINIMUM LOAD RATING OF 20,000 POUNDS CAPACITY IN ACCORDANCE WITH THE WESTERN UNDERGROUND COMMITTEE GUIDE 3.6. UNDERDRAINS SHALL NOT BE INSTALLED IN PULL BOXES.

ITEM 625 - TRENCH IN PAVED AREA BY TYPE, AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF 625.13, THIS ITEM SHALL INCLUDE FULL PAVEMENT REPLACEMENT WHEN TRENCHING IN THE ROADWAY. BORING OR JACKING THE CONDUIT UNDER THE PAVEMENT CAN BE PERFORMED IN LIEU OF TRENCHING. IF BORING OR JACKING IS PERFORMED IN LIEU OF TRENCHING, THE CONDUIT PLACED SHALL BE 725.04 ANY EXTRA COST FOR THE 725.04 CONDUIT SHALL BE INCLUDED IN THIS ITEM.



"T" TRENCH IN PAVED AREA

CALCULATED
JAW
CHECKED
DLW

SIGNAL NOTES

ITEM 632 - VEHICULAR SIGNAL HEAD (LED), BY TYPE, 12" LENS, 1 WAY, POLYCARBONATE, AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF CMS 632 AND 732, THE FOLLOWING REQUIREMENTS SHALL ALSO APPLY:

- A. VEHICULAR SIGNAL HEADS SHALL BE FREE SWINGING.
- B. ALL UPPER SIGNAL SUPPORT HARDWARE AND PIPING UP TO AND INCLUDING THE WIRE INLET FITTING SHALL BE FERROUS METAL FOR SIGNAL DISPLAYS OF TWO OR MORE SECTIONS.
- C. THE ENTRANCE FITTING SHALL BE OF THE TRI-STUD DESIGN WITH SERRATED RINGS IN ORDER TO ACHIEVE POSITIVE LOCKING.
- D. VEHICULAR SIGNAL HEADS SHALL BE PROVIDED WITH A PIVOT AND LOCK BALANCE ADJUSTER. ALL BALANCE ADJUSTERS SHALL HAVE A MINIMUM THREE-QUARTER INCH (19 MILLIMETER) EYE BOLT AND THREE-QUARTER INCH (19 MILLIMETER) WIDE SLOT. EYE BOLTS ARE CAST FROM 316 STAINLESS STEEL AND PROVIDED WITH A SATIN FINISH. THREE-QUARTER INCH (19 MILLIMETER) BODY HALVES ARE CAST FROM AN MINIMUM 65-45-12 DUCTILE IRON AND PROVIDED WITH A BRIGHT ZINC FINISH (ZNI).
- E. ALL LAMP UNITS SHALL BE THE 12 INCH (303 MILLIMETER) SIZE AND BE EQUIPPED WITH 12"x11" CUTAWAY VISORS, UNLESS OTHERWISE NOTED IN PLANS.
- F. SIGNAL HEADS AND VISORS SHALL BE CONSTRUCTED OF POLYCARBONATE PLASTIC AND MEET ITE SPECIFICATIONS.
- G. PIPE, SPACERS AND FITTINGS CONSTRUCTED OF ALUMINUM.
- H. PROPER EXTERIOR COLORS SHALL BE OBTAINED BY USE OF COLORED PLASTIC MATERIAL RATHER THAN PAINTING. ALL EXTERIOR COLOR SHALL BE FEDERAL HIGHWAY BLACK AT INTERSECTIONS THAT CONTAIN NOSTALGIA SIGNAL SUPPORTS AND PEDESTALS.
- I. ALL SIGNAL HEADS SHALL HAVE BLACK BACKPLATES WITH YELLOW RETROREFLECTIVE BORDER STRIP, 2 INCH BORDER AND BE LOUVERED AND FOLLOW THE SHAPE OF THE SIGNAL HEAD.

THE CONTRACTOR SHALL PROVIDE THE CITY, IN WRITING, THE LED MANUFACTURER NAME, SERIAL NUMBER, PART NUMBER, DESCRIPTION OF LAMP, AND DATE OF MANUFACTURER FOR ALL LED UNITS TO BE USED IN THE TRAFFIC SIGNAL HEADS PRIOR TO INSTALLATION, FOR ACCEPTANCE AND WARRANTY PURPOSES. THE INFORMATION SHALL BE SENT TO THE FOLLOWING LOCATION:

TRAFFIC ENGINEERING DEPARTMENT
2436-30TH STREET N.E.
CANTON, OHIO 44705
ATTN: NICHOLAS LOUKAS, P.E.

ODOT WILL MEASURE "VEHICULAR SIGNAL HEAD WITH LED LAMP UNITS, BY TYPE, AS PER PLAN" BY THE NUMBER OF COMPLETE UNITS FURNISHED AND INSTALLED, AND WILL INCLUDE ALL SUPPORT AND MOUNTING HARDWARE, DISCONNECT HANGERS, CLOSURE CAPS, DIMMERS, BACKPLATES AND LAMPS AS SPECIFIED.

ITEM 632 - POWER CABLE, 1 CONDUCTOR, NO. 10 AWG, AS PER PLAN

POWER CABLE SHALL BE 1 CONDUCTOR, NO. 10 AWG STRANDED, COPPER, TYPE UF, 600 VOLT.

ITEM 632 - PEDESTRIAN SIGNAL HEAD (LED), (COUNTDOWN), TYPE D2, AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF CMS 632 AND 732, THE FOLLOWING REQUIREMENTS SHALL ALSO APPLY:

- A. LED, LIGHT EMITTING DIODE, SIGNAL LAMP UNITS SHALL MEET THE REQUIREMENTS OF CMS 732.04. ALL LAMP UNITS SHALL BE THE 16 INCH SIZE AND A SINGLE UNIT.
- B. THE LED LAMP UNIT SHALL DISPLAY THE SYMBOLS FOR THE UPRaised HAND OR THE WALKING PERSON, FILLED.
- C. SIGNAL HEADS AND VISORS SHALL BE CONSTRUCTED OF POLYCARBONATE PLASTIC AND MEET ITE SPECIFICATIONS.
- D. ALL LAMP UNITS SHALL BE PROVIDED WITH QUICK COUPLERS FOR SIDE OF POLE MOUNTING OR WITH TOP OF PEDESTAL MOUNTING HARDWARE, AS SPECIFIED IN THE PLANS.
- E. PROPER EXTERIOR COLORS SHALL BE OBTAINED BY USE OF COLORED PLASTIC MATERIAL (BLACK) RATHER THAN PAINTING.

THE CONTRACTOR SHALL PROVIDE THE CITY, IN WRITING, THE LED MANUFACTURER NAME, SERIAL NUMBER, PART NUMBER, DESCRIPTION OF LAMP, AND DATE OF MANUFACTURER FOR ALL LED UNITS TO BE USED IN THE TRAFFIC PEDESTRIAN HEADS PRIOR TO INSTALLATION, FOR ACCEPTANCE AND WARRANTY PURPOSES. THE INFORMATION SHALL BE SENT TO THE FOLLOWING LOCATION:

TRAFFIC ENGINEERING DEPARTMENT
2436-30TH STREET N.E.
CANTON, OHIO 44705
ATTN: NICHOLAS LOUKAS, P.E.

ODOT WILL MEASURE "PEDESTRIAN SIGNAL HEAD (LED), (COUNTDOWN), TYPE D2, AS PER PLAN" BY THE NUMBER OF COMPLETE UNITS FURNISHED AND INSTALLED, AND WILL INCLUDE ALL SUPPORT AND MOUNTING HARDWARE, CLOSURE CAPS, AND LAMPS AS SPECIFIED.

ALL PROPOSED CONNECTIONS SHALL BE FIELD DRILLED. BANDING OR STRAPPING ON THE NOSTALGIA SIGNAL POLES SHALL NOT BE PERMITTED.

ITEM 632 - PEDESTRIAN PUSHBUTTON, AS PER PLAN

PEDESTRIAN PUSHBUTTON SHALL BE AMERICANS WITH DISABILITIES ACT (ADA) COMPLIANT AND FREEZE PROOF. IN ORDER TO CONFORM TO ADA, THE REQUIREMENTS OF 632.09 AND 732.06 ARE MODIFIED AS FOLLOWS:

- A. THE MAXIMUM FORCE REQUIRED TO OPERATE THE PUSHBUTTON SHALL BE FIVE (5) POUNDS PER FOOT.
- B. THE PUSHBUTTON SHALL BE RAISED OR FLUSH AND SHALL BE A MINIMUM OF TWO (2) INCHES AT THE SMALLEST DIMENSION.

ITEM 632 - SIGNAL SUPPORT, MISC.: NOSTALGIA SIGNAL SUPPORT (BY TYPE)

NOSTALGIA SIGNAL SUPPORTS (MAST ARM POLES AND ARMS) SHALL BE PACIFIC FAMILY 50312GF SERIES AND MANUFACTURED BY:

UNION METAL CORPORATION
1432 MAPLE AVENUE N.E.
P.O. BOX 9920
CANTON, OH. 44711
PHONE: 330-456-7653

THE CONTRACTOR SHALL FURNISH AND INSTALL NOSTALGIA SIGNAL SUPPORTS AS PER PLANS. THE CONTRACTOR SHALL COORDINATE WITH THE CITY TO VERIFY THE CURRENT POLE STANDARD DESIGN PRIOR TO ORDERING. ALL HARDWARE INCLUDING LUMINAIRES AND RELATED EQUIPMENT SHALL BE INCLUDED WITH THIS ITEM.

THE MANUFACTURER SHALL PROVIDE WRITTEN CERTIFICATION TO THE CITY THAT THE ACCEPTED POLE, ARM, LUMINAIRE, AND DECORATIVE SHROUD, IS OR WILL BECOME A STOCK ITEM, READILY AVAILABLE WITH REPLACEMENT PARTS FOR MINIMUM TEN (10) YEAR PERIOD. ALL MATERIAL SUPPLIES SHALL BE WARRANTED BY THE MANUFACTURER FOR ONE (1) YEAR AFTER DELIVERY AGAINST FAULTY MATERIALS AND WORKMANSHIP. THE POLE TOP SHALL BE MECHANICALLY ATTACHED TO THE TOP OF THE POLE SHAFT TO PROVIDE ACCESS FOR WIRING SIGNALS SECURED BY A J-HOOK WIRE SUPPORT. AN OPTIONAL OUTLET FRAME SHALL BE INTEGRALLY WELDED INTO THE POLE SHAFT TO ACCOMMODATE A 20A - 125V GFCI DUPLEX RECEPTACLE WHICH IS ALSO INCLUDED. THE RECEPTACLE COVER SHALL BE WEATHERPROOF WHILE IN USE AND PAINTED TO MATCH POLE. THE MAST ARM SHALL BE DRILLED IN THE FIELD 1' FROM REQUIRED SIGNAL LOCATIONS. TWO (2) RUBBER GROMMETS SHALL BE FURNISHED WITH EACH MAST ARM. SIGNAL HANGER CLAMPS SHALL BE SUPPLIED BY THE SIGNAL SUPPLIER OR MANUFACTURER, AS REQUIRED. A PERMANENT LEGIBLE MARKING INDICATION SHALL BE INCLUDED ON EACH SIGNAL SUPPORT AND ARM. THE FOLLOWING INDICATIONS SHALL BE REQUIRED AS A MINIMUM:

- A. POLE INDICATIONS: MONTH/DATE OF FABRICATION: POLE GAUGE: BOTTOM DIAMETER: POLE HEIGHT: BOLT CIRCLE: ANCHOR BOLT DIAMETER: FLANGE BOLT DIAMETER: AND INTERSECTION LOCATION INCLUDING CORNER QUADRANT.
- B. ARM INDICATIONS: MONTH/DATE OF FABRICATION: ARM GAUGE; ARM DIAMETER: ARM LENGTH: CONNECTING FLANGE BOLT DIAMETER: AND INTERSECTION LOCATION INCLUDING CORNER QUADRANT.

THE ORNAMENTAL BASE SHALL BE UNION METAL BASE NO. 731. THE FOUNDATION SURFACE SHALL BE LEVEL IN ORDER TO ACCEPT THE BASE ASSEMBLY. ALL PROPOSED EXTERIOR CONNECTIONS (PEDESTRIAN SIGNAL HEADS, ETC.) TO NOSTALGIA SIGNAL POLES SHALL BE FIELD DRILLED. BANDING OR STRAPPING ON THE NOSTALGIA SIGNAL POLES SHALL NOT BE PERMITTED.

THE CONTRACTOR SHALL COORDINATE WITH THE CITY THE RELOCATION TO THE NEW SIGNAL POLE OF ANY EXISTING SHOT SPOTTER DEVICE LOCATED ON THE EXISTING POLES. THE RELOCATION OF THE SHOT SPOTTER DEVICE SHALL BE INCLUDED IN THE PRICE OF THE SIGNAL SUPPORT.

ITEM 632 - REMOVAL OF TRAFFIC SIGNAL INSTALLATION, APP

THE REMOVAL SHALL CONSIST OF VEHICULAR SIGNAL HEADS, PEDESTRIAN SIGNAL HEADS, CONTROLLER WITH CABINET, TRAFFIC POLES AND PEDESTALS, FOUNDATIONS, PULL BOXES, MAST ARMS, SIGNAL CABLE, CONDUIT RISER, MISCELLANEOUS ATTACHMENTS, POLE AND MAST ARM MOUNTED SIGNS, AND ALL OTHER PORTIONS OF A TRAFFIC SIGNAL INSTALLATION PER SECTION 632.26. UNLESS OTHERWISE DESIGNATED, ALL TRAFFIC POLES AND ARMS REMOVED SHALL BE DELIVERED TO THE CITY OF CANTON TRAFFIC SIGN AND PAINT DIVISION AT 2506 CLEVELAND AVENUE S.W., CANTON, OHIO. IN ADDITION, UNLESS OTHERWISE DESIGNATED, ALL OTHER ITEMS REMOVED EXCEPT SIGNAL CABLES SHALL BE DELIVERED TO THE CITY OF CANTON TRAFFIC SIGNAL DIVISION AT 2436-30TH STREET N.E., CANTON, OHIO. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DISPOSAL OF SIGNAL CABLES, AND ANY OTHER TRAFFIC SIGNAL ITEMS DESIGNATED BY THE ENGINEER.

ALL PROPOSED SIGNALIZED INTERSECTIONS WITHIN THIS PROJECT SHALL HAVE THE REMOVAL OF THE EXISTING SIGNAL AFTER THE INSTALLATION OF THE PROPOSED SIGNALS. A TOTAL OF 3 EACH OF ITEM 632 - REMOVAL OF TRAFFIC SIGNAL INSTALLATION, AS PER PLAN WILL BE CARRIED TO THE GENERAL SUMMARY.

ITEM 632 - PEDESTAL, MISC.: NOSTALGIA PEDESTAL, 8'

NOSTALGIA PEDESTALS SHALL BE PACIFIC FAMILY P2000G SERIES MANUFACTURED BY:

UNION METAL CORPORATION
1432 MAPLE AVENUE N.E.
P.O. BOX 9920
CANTON, OH 44711
PHONE: 330-456-7653

THE CONTRACTOR SHALL FURNISH AND INSTALL NOSTALGIA PEDESTALS AS PER PLANS. THE CONTRACTOR SHALL COORDINATE WITH THE CITY TO VERIFY THE CURRENT POLE STANDARD DESIGN PRIOR TO ORDERING. PEDESTAL SHALL INCLUDE HANDHOLE, CHAIN, AND COVER. ALL HARDWARE SHALL BE INCLUDED WITH THIS ITEM. THE ENTIRE ASSEMBLY SHALL BE DESIGNED TO MEET THE REQUIREMENTS OF AASHTO. A STEEL FABRICATION TENON SHALL BE WELDED TO THE TOP OF THE SHAFT AND SIZED TO ACCEPT PEDESTRIAN SIGNALS AS REQUIRED. THE ORNAMENTAL BASE SHALL BE UNION METAL CORPORATION BASE NO. 74 AND SHALL BE LEVEL IN ORDER TO ACCEPT THE BASE ASSEMBLY AND SHALL BE AT LEAST AS LARGE AS THE BOTTOM DIMENSION OF THE ORNAMENTAL BASE CASTING. ALL PROPOSED EXTERIOR CONNECTIONS (PEDESTRIAN PUSHBUTTONS, ETC.) TO NOSTALGIA PEDESTALS SHALL BE FIELD DRILLED. BANDING OR STRAPPING ON THE NOSTALGIA PEDESTALS SHALL NOT BE PERMITTED.

ITEM 632 - POWER SERVICE, AS PER PLAN

POWER SERVICE SHALL BE AS PER ODOT SPECIFICATION 632 AND ODOT STANDARD CONSTRUCTION DRAWING TC-83.10. ELECTRIC POWER SHALL BE SUPPLIED BY AMERICAN ELECTRIC POWER (AEP). POWER SERVICE IS TO BE UNMETERED. THE CONTRACTOR WILL BE RESPONSIBLE FOR REQUESTING AND SCHEDULING ANY INSPECTIONS THE POWER COMPANY MAY REQUIRE FOR THE POWER SERVICE HOOK UP. THE CONTRACTOR SHALL BE RESPONSIBLE TO CONTACT THE POWER COMPANY FOR THE ELECTRICAL SERVICE CONNECTION. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR SPLICE POWER CABLE INTO THE POWER COMPANY'S CIRCUITS. THE VOLTAGE SUPPLIED SHALL BE NOMINALLY 240V OR 208V. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ANY NECESSARY PERMITS AND THE PAYING OF ALL FEES. THE CONTRACTOR SHALL PAY ALL POWER CHARGES UNTIL THE SIGNAL IS ACCEPTED BY THE CITY OF CANTON.

ITEM 632 - SIGNAL SUPPORT FOUNDATION, AS PER PLAN

THIS PROJECT REQUIRES CONSTRUCTION OF SIGNAL SUPPORT FOUNDATIONS IN LOCATIONS WHICH CONTAIN NUMEROUS EXISTING UNDERGROUND UTILITIES. ORDERS FOR SIGNAL POLES AND MAST ARMS SHALL BE PLACED SYSTEMATICALLY AFTER THEIR RESPECTIVE FOUNDATIONS HAVE BEEN CONSTRUCTED. FOUNDATIONS THAT HAVE BEEN CONSTRUCTED SHALL BE PROTECTED AS PER SECTION 107.07 OF THE CONSTRUCTION AND MATERIAL SPECIFICATIONS. WITHIN TWO (2) WEEKS OF RECEIVING A SIGNED CONTRACT, THE CONTRACTOR SHALL LAYOUT THE PERIMETER OF EACH FOUNDATION THEN CONTACT OUPS AND ODOT (330-297-0801, EXT 298). A MEETING BETWEEN THE CONTRACTOR, ENGINEER AND A REPRESENTATIVE FROM THE CITY OF CANTON WILL BE HELD ON SITE NO LATER THEN TWO (2) WEEKS AFTER THE OUPS NOTIFICATION. BASED UPON THE PRIORITIES DETERMINED AT THIS MEETING, THE CONTRACTOR WILL CONSTRUCT FOUNDATIONS BEGINNING WITH THE HIGHEST PRIORITY FIRST. IF A UTILITY OR OTHER CONFLICT EXISTS WHICH REQUIRES THAT A SIGNAL SUPPORT BE CONSTRUCTED AT A LOCATION OTHER THAN WHAT IS INDICATED IN THE PLAN, THE ENGINEER SHALL DETERMINE WHETHER THE SPECIFIED MAST ARM LENGTH IS APPROPRIATE. IF A LONGER ARM IS REQUIRED, WITHIN TEN (10) WORKING DAYS, THE CONTRACTOR WILL BE PROVIDED WITH REVISED POLE AND ARM DATA. THE CONTRACTOR SHALL NOT ORDER THE POLES PRIOR TO RECEIVING THIS DATA. SUPPORT FOUNDATION LOCATIONS SHALL BE ADJUSTED ONLY WHEN APPROVED BY THE ENGINEER. THE CONTRACTOR IS ADVISED TO LOCATE AND CONSTRUCT THE SIGNAL SUPPORT FOUNDATIONS AS SOON AS POSSIBLE IN ORDER TO PROVIDE AMPLE LEAD TIME TO ORDER THE SIGNAL SUPPORTS AND THEIR ASSOCIATED MAST ARMS. ALL FOUNDATIONS SHALL BE HAND EXCAVATED UNLESS OTHERWISE DIRECTED BY THE ENGINEER. NO TIME EXTENSIONS SHALL BE GRANTED FOR DELAYS WHICH ARE CAUSED BY THE CONTRACTOR'S FAILURE TO PLAN FOUNDATION WORK AS SOON AS POSSIBLE IN THE CONTRACTORS PROGRESS SCHEDULE.

PAYMENT FOR ITEM 632 - SIGNAL SUPPORT FOUNDATION, AS PER PLAN SHALL BE MADE AT THE UNIT CONTRACT PRICE BID PER EACH. PAYMENT SHALL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, AND OTHER INCIDENTALS NECESSARY TO EXCAVATE AND BUILD THE FOUNDATION SYSTEM, COMPLETE IN PLACE AND ACCEPTED.

BECAUSE OF THE RECOGNIZED TIME DELAY BETWEEN THE CONSTRUCTION OF THE FOUNDATIONS AND THE DELIVERY OF THE SIGNAL SUPPORTS AND/OR PEDESTALS FROM THE MANUFACTURER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING THE NEW CONSTRUCTED FOUNDATIONS BY A DEVICE SUCH AS A WOODEN BOX IN ACCORDANCE WITH ODOT SECTION 107.07. THE TYPE OF PROTECTIVE DEVICE SHALL BE APPROVED BY ODOT PRIOR TO ITS APPLICATION IN THE FIELD. TRAFFIC CONES SHALL NOT BE ACCEPTABLE. PROTECTIVE DEVICES CAN BE REUSED IF THEY ARE NO LONGER NEEDED AT A PREVIOUS INTERSECTION AND THEY MEET ODOT SECTION 107.07.

FOUNDATIONS FOR NOSTALGIA SIGNAL SUPPORTS AND NOSTALGIA PEDESTALS SHALL BE CONSTRUCTED AS PER CITY STANDARDS.

ITEM 633 - PREEMPTION

THIS ITEM OF WORK SHALL CONSIST OF THE INSTALLATION OF PREEMPTION EQUIPMENT AS SHOWN IN THE PLANS.

THE COMMUNICATIONS MEDIUM SHALL EMPLOY SOUND DETECTION TECHNIQUES TO DETERMINE AND LOG THE PRESENCE OF THE EMERGENCY VEHICLE. THE SYSTEM SHALL DETECT THE PRESENCE OF THE VEHICLE THROUGH EXISTING DEVICES MOUNTED ON THE EMERGENCY VEHICLE.

- EACH INTERSECTION SHOWN IN THE PLANS AND THE ADDITIONAL SPARES SHALL BE SUPPLIED WITH THE FOLLOWING COMPONENTS:
- A. PRE-EMPT RECEIVING UNIT
 - B. PRE-EMPT PHASE SELECTOR ASSEMBLY
 - C. PRE-EMPT INTERFACE PANEL

THE PREEMPTION SHALL CONFORM TO ODOT SPECIFICATION 632 AND SHALL UTILIZE COMMUNICATIONS TO IDENTIFY THE PRESENCE OF AN EMERGENCY PRIORITY VEHICLE. IT SHALL CAUSE THE TRAFFIC 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 EQUIPMENT SHALL BE SHELF MOUNTED AND EASILY REMOVABLE AND REPLACEABLE WITHIN THE CABINET. THE EQUIPMENT SHALL BE COMPLETELY WIRED IN THE CONTROLLER CABINET AND TESTED.

THE PREEMPTION DETECTOR CABLE SHALL BE SUPPLIED AND BID SEPARATELY.

THE CONTRACTOR SHALL THOROUGHLY CHECK OUT THE INSTALLED SYSTEM. AS A MINIMUM, THE CONTRACTOR SHALL VERIFY THAT ALL CONNECTIONS ARE PROPERLY MADE TO THE CONTROLLER CABINETS. THE CONTRACTOR SHALL CHECK THAT THE RANGE SETTING IS PROPER. THE CONTRACTOR SHALL VERIFY THAT ALL VEHICLE EMITTERS ARE BEING PROPERLY DETECTED.

PAYMENT FOR ITEM 633 - PREEMPTION WILL BE MADE AT THE CONTRACT LUMP SUM PRICE FOR PREEMPTION IN PLACE AND FULLY OPERATIONAL AS SHOWN IN THE PLANS, EXCEPT FOR THOSE ITEMS BID SEPARATELY.

ITEM 633 - PREEMPTION DETECTOR CABLE

THIS ITEM SHALL CONSIST OF FURNISHING AND INSTALLING PREEMPTION DETECTOR HOME RUN CABLE IN THE LOCATIONS SHOWN IN THE PLANS. IT SHALL CONNECT THE PREEMPT RECEIVING UNITS TO THE PHASE SELECTORS IN THE LOCAL CONTROLLER CABINET.

PREEMPTION DETECTOR CABLE SHALL BE NO. 20 AWG SHIELDED 300 VOLT, TYPE PLTC, 2 CONDUCTOR CABLE IN ACCORDANCE WITH ISMA 50-2. ONLY ONE EXTERNAL SPLICE SHALL BE PERMITTED BETWEEN PREEMPTION RECEIVER UNIT AND CONTROLLER CABINET. THIS SPLICE SHALL MEET THE REQUIREMENTS OF CMS 632.23 USING A WATERPROOF EPOXY SPLICE KIT. THE CABLE SHALL BE APPROVED FOR BOTH OVERHEAD AND UNDERGROUND USE. THE JACKET SHALL WITHSTAND EXPOSURE TO SUNLIGHT AND ATMOSPHERIC TEMPERATURES AND STRESSES REASONABLY EXPECTED IN NORMAL INSTALLATIONS.

PAYMENT FOR ITEM 633 "PREEMPTION DETECTOR CABLE, AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE PER FOOT FOR THE CABLE FURNISHED, IN PLACE, ALL CONNECTIONS MADE AND WIRING COMPLETED, TESTED AND ACCEPTED.

ITEM 633 - PREEMPTION RECEIVING UNIT

RECEIVING UNITS SHALL BE BLACK AND CONSIST OF A LIGHTWEIGHT, WEATHER PROOF AND DIRECTIONAL ASSEMBLY. EACH RECEIVING UNIT SHALL BE 360 DEGREE ADJUSTABLE. THE RECEIVING UNIT SHALL BE CAPABLE OF SENDING THE PROPER ELECTRICAL SIGNAL TO THE TRAFFIC SIGNAL CONTROLLER VIA THE PREEMPTION DETECTOR CABLE. RECEIVING UNITS SHALL BE SUPPLIED WITH MAST ARM MOUNTING HARDWARE AS SHOWN IN THE PLANS.

FURNISH PREEMPTION RECEIVING UNITS WITH 60-MONTH WARRANTIES OR FOR THE MANUFACTURER'S STANDARD WARRANTY WHICHEVER IS GREATER. ENSURE THAT THE WARRANTY PERIOD BEGINS ON THE DATE OF SHIPMENT TO THE PROJECT. ENSURE THAT EACH UNIT HAS A PERMANENT LABEL OR STAMP INDICATING THE DATE OF SHIPMENT.

PAYMENT FOR ITEM 633 "PREEMPTION RECEIVING UNIT" SHALL BE AT THE CONTRACT UNIT FOR EACH RECEIVING UNIT IN PLACE, COMPLETELY INSTALLED AT THE LOCATION SHOWN IN THE PLANS, WIRED, TESTED AND ACCEPTED.

ITEM 633 - PREEMPT PHASE SELECTOR

THIS ITEM SHALL CONSIST OF FURNISHING AND INSTALLING PREEMPT PHASE SELECTORS INCLUDING WIRING INTERFACE PANELS IN THE LOCAL CONTROLLER CABINET AND ALL OTHER ACCESSORIES THAT ARE NECESSARY TO MAKE THE PREEMPT PHASE SELECTORS COMPLETELY FUNCTIONAL AND OPERATIONAL AS SHOWN IN THE PLANS. THIS ITEM SHALL INCLUDE THE EXTRA CABINET SPACE NECESSARY TO BE LOCATED IN THE LOCAL CONTROLLER CABINETS WHERE INDICATED IN THE PLANS.

THE PHASE SELECTORS SHALL CONSIST OF A MODULE OR MODULES THAT WILL PROVIDE THE NECESSARY INPUTS TO THE CONTROLLER. PHASE SELECTORS SHALL BE SUPPLIED WITH SUFFICIENT QUANTITIES OF CHANNELS TO PROVIDE PREEMPTION FOR ALL APPROACHES TO THE INTERSECTION SEPARATELY. POWER SHALL BE OBTAINED FROM THE PHASE SELECTOR OR PHASE SELECTOR POWER SUPPLY AND NOT FROM THE LOCAL CONTROLLER TIMER.

THE PHASE SELECTORS SHALL HAVE FRONT PANEL INDICATORS FOR ACTIVE PREEMPT CHANNEL STATUS. IT SHALL HAVE TEST SWITCHES TO ACTIVATE ALL PREEMPT CHANNELS.

FURNISH PREEMPT PHASE SELECTORS WITH 60-MONTH WARRANTIES OR FOR THE MANUFACTURER'S STANDARD WARRANTY WHICHEVER IS GREATER. ENSURE THAT THE WARRANTY PERIOD BEGINS ON THE DATE OF SHIPMENT TO THE PROJECT. ENSURE THAT EACH UNIT HAS A PERMANENT LABEL OR STAMP INDICATING THE DATE OF SHIPMENT.

PAYMENT FOR ITEM 633 "PREEMPT PHASE SELECTOR" SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH PHASE SELECTOR IN PLACE, COMPLETELY INSTALLED IN THE LOCAL CONTROLLER SHOWN IN THE PLANS, WIRED, TESTED AND ACCEPTED.

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SIGNAL NOTES

MAHONING ROAD NE, S.R. 153
ECONOMIC DEVELOPMENT PROJECT

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ITEM 632 - SIGNALIZATION, MISC.: PTZ CAMERA

THE CONTRACTOR SHALL FURNISH AND INSTALL A CLOSED CIRCUIT TELEVISION (CCTV) SYSTEM CONSISTING OF FIELD EQUIPMENT AND OTHER AUXILIARY AND INCIDENTAL EQUIPMENT REQUIRED TO ASSEMBLE A FULLY FUNCTIONING INTEGRATED TRAFFIC SURVEILLANCE SYSTEM. THE CCTV SYSTEM SHALL BE FURNISHED BY HONEYWELL, AXIS OR APPROVED EQUAL. ALL PROVIDED COMPONENTS SHALL PROVIDE A MEAN TIME BETWEEN FAILURES (MTBFL) OF 50,000 HOURS MINIMUM. COMPLIANCE WITH APPLICABLE ISO QUALITY ASSURANCE STANDARDS IS REQUIRED.

FOR EACH CAMERA, THERE SHALL BE SUPPLIED, INSTALLED, CONNECTED TO THE CAMERA AND MADE OPERATIONAL A VIDEO/DATA TRANSCEIVER. THE TRANSCEIVER SHALL BE CAPABLE OF ETHERNET COMMUNICATIONS PROTOCOL. THE TRANSCEIVER SHALL BE MOUNTED WITHIN A NEMA 4 ENCLOSURE AT THE BASE OF THE POLE ON WHICH THE CAMERA IS MOUNTED.

FOR EACH CAMERA THERE SHALL BE SUPPLIED, INSTALLED, CONNECTED TO THE CAMERA AND MADE OPERATIONAL AN OUTDOOR RATED POWER THE POWER SUPPLY SHALL MEET THE SAME ENVIRONMENTAL SUPPLY. PERFORMANCE STANDARDS AS THOSE OF THE CAMERA AND VIDEO/DATA TRANSCEIVER. THE POWER SUPPLY SHALL BE MOUNTED WITHIN THE SIGNAL CONTROLLER CABINET.

THE CAMERA AND BRACKET ARM SHALL BE BLACK AS TO MATCH ALL OTHER SIGNAL HARDWARE. THE CONTRACTOR SHALL COORDINATE WITH THE CITY TO VERIFY THE CURRENT BRACKET ARM STANDARD DESIGN PRIOR TO ORDERING.

THE CCTV FIELD EQUIPMENT REQUIRED FOR THE CAMERA SITE SHALL INCLUDE INSTALLATION OF THE ITEMS DESCRIBED BELOW. PROCESS AND CONTROL EQUIPMENT FOR THE VIEWING WITH THE SURVEILLANCE CAMERAS IS INCLUDED AS PART OF ITEM 632 SIGNALIZATION, MISC.: PTZ CAMERA.

CAMERA

THE CAMERA SHALL MEET OR EXCEED THE FOLLOWING MINIMUM REQUIREMENTS:

1. COLOR /MONOCHROME ADVANCED DIGITAL SIGNAL PROCESSING (CDSP)
2. 18X OPTICAL ZOOM (4.1 MM TO 73.8 MM) WITH 8X DIGITAL (144X)
3. UTILIZE 1/4-INCH CCD, USING THE MOST CURRENT TECHNOLOGY
4. PROVIDE A MINIMUM HORIZONTAL RESOLUTION OF 470 TVL (NTSC)
5. PROVIDE SHARP, DETAILED IMAGES DOWN TO 0.7 LUX COLOR, .05 LUX COLOR WITH 1/4-SECOND SHUTTER, AND .01 LUX MONOCHROME.
6. WHEN SWITCHING TO MONOCHROME MODE, THE CAMERA MUST AUTOMATICALLY REMOVE THE IR CUT FILTER WHEN NECESSARY, WHICH WILL INCREASE THE INFRARED SENSITIVITY. WHEN ENOUGH AMBIENT LIGHT IS AVAILABLE TO PRODUCE AN ACCEPTABLE COLOR IMAGE, THE CAMERA MUST AUTOMATICALLY ENABLE THE IR CUT FILTER.
7. CONTINUOUS AUTO FOCUS. WHEN REQUIRED, OPERATOR OVERRIDE OF THE AUTO FOCUS SETTINGS MUST BE ALLOWED. AUTO IRIS WITH MANUAL OVERRIDE MUST ALSO BE ALLOWED.

DOME
THE CAMERA HOUSING/DOME SHALL MEET OR EXCEED THE FOLLOWING MINIMUM REQUIREMENTS:

1. BE COMPRISED OF A HIGH-SPEED PAN/TILT ASSEMBLY USING PRECISION MOTORS AND HIGH-STRENGTH BELT DRIVE, RESULTING IN ACCURATE AND QUIET OPERATION.
2. INCORPORATE A SEALED SLIP RING TO PROVIDE A CONTINUOUS THREE HUNDRED SIXTY DEGREES (360°) OF ROTATION AND AUTOMATICALLY ADJUST PAN AND TILT SPEED IN PROPORTION TO THE ZOOM POSITION FOR GREATER CONTROL.
3. MANUAL PAN SPEEDS RANGE FROM 0.1° TO 400° PER SECOND
4. MANUAL TILT SPEEDS MUST RANGE FROM 0.1° TO 200° PER SECOND
5. AUTO-PIVOT TRACKING THAT ALLOWS THE DOME TO AUTOMATICALLY TURN 180-DEGREES WHEN REACHING ITS LOWER LIMIT SO TO ALLOW THE OPERATOR TO AUTOMATICALLY TRACK AN INDIVIDUAL MOVING DIRECTLY BELOW THE CAMERA.
6. DUST TIGHT, WEATHERPROOF, AND ABLE TO WITHSTAND MECHANICAL IMPACT IN ACCORDANCE WITH THE INTERNATIONAL ELECTROTECHNICAL COMMISSION STANDARD IP549.
7. BOTTOM OF DOME SHALL BE AVAILABLE IN EITHER CLEAR OR SMOKED, AND SHALL BE ATTACHED WITH A KEY-LOCK TO RESIST TAMPERING.
8. THERMOSTAT-CONTROLLED 24VAC HEATER AND BLOWER MUST BE AVAILABLE TO MAINTAIN A SUFFICIENT OPERATING TEMPERATURE.
9. BUILT-IN POWER ISOLATION AND LIGHTNING SURGE PROTECTION.
10. EQUIPPED WITH A SUN SHADE
11. PRESSURIZED HOUSING MIL-SPEC RESISTANT TO SALT AIR, DUST, HUMIDITY, OR SMOG.

MOUNTING BRACKET
THE MOUNTING HARDWARE SHALL PERMIT THE CAMERA TO BE SECURELY ATTACHED TO THE TOP OR SIDE OF A POLE. ALL BRACKETS, STRUTS, AND MISCELLANEOUS HARDWARE TO ATTACH THE HOUSING AND POWER SUPPLY SHALL BE INCLUDED AS PART OF THIS ITEM. ALL PARTS SHALL BE MADE OF CORROSION RESISTANT MATERIALS SUCH AS PLASTIC, STAINLESS STEEL, ALUMINUM, OR BRASS. THE MOUNTING HEIGHT SHALL BE A MINIMUM OF 25 FEET ABOVE THE ROADWAY.

CABINET
A POLE MOUNTED NEMA 4X RATED CABINET SHALL ENCLOSE THE VIDEO TRANSMISSION EQUIPMENT AND A POWER SUPPLY ASSEMBLY. THE SHALL MEET THE ENVIRONMENTAL REQUIREMENTS OF THE VIDEO HOUSING TRANSMISSION EQUIPMENT. ALL EQUIPMENT SPECIFIED HEREIN SHALL OPERATE ON A POWER SERVICE FROM 95 TO 135 VAC, 60HZ, 3HZ, SINGLE PHASE.

LIGHTNING PROTECTION
THE CONTRACTOR SHALL FURNISH AND INSTALL A PROPERLY FUNCTIONING LIGHTNING ROD AND TRANSIENT SURGE SUPPRESSER TO PROTECT THE FIELD EQUIPMENT FROM LIGHTNING STRIKES AND SUPPLY VOLTAGE SURGES. THIS ITEM IS TO INCLUDE A LIGHTNING ROD.

TESTING AND CERTIFICATION
A. THE CONTRACTOR SHALL DEMONSTRATE THE FUNCTIONALITY OF THE PTZ CAMERA UPON COMPLETION OF INSTALLATION, DOCUMENTING THE RESULT OF ALL TESTS AND PROVIDING THESE RESULTS TO THE OWNER. THE PTZ CAMERA SHALL BE TESTED IN ACCORDANCE WITH THE FOLLOWING:
1. THE CONTRACTOR SHALL CONDUCT A COMPLETE INSPECTION AND TEST OF ALL INSTALLED PTZ CAMERA EQUIPMENT. THIS INCLUDES TESTING AND VERIFYING OPERATION WITH CONNECTED EQUIPMENT.
2. THE CONTRACTOR SHALL PROVIDE STAFF TO TEST ALL DEVICES AND ALL OPERATIONAL FEATURES OF THE SYSTEM FOR WITNESS BY THE OWNER'S REPRESENTATIVE AND THE AUTHORITY HAVING JURISDICTION. ALL TESTING MUST BE WITNESSED BY THE OWNER'S REPRESENTATIVE, PRIOR TO ACCEPTANCE.
3. THE TESTING AND CERTIFICATION SHALL TAKE PLACE AS FOLLOWS:
a. THE PTZ CAMERA SHALL BE TESTED IN CONJUNCTION WITH THE MANUFACTURER'S REPRESENTATIVE.
b. ALL DEFICIENCIES NOTED IN THE ABOVE TEST SHALL BE CORRECTED.
c. TEST RESULTS SHALL BE SUBMITTED TO THE CONSULTANT OR OWNER'S REPRESENTATIVE.
d. THE TEST AND CORRECTION OF ANY DEFICIENCIES SHALL BE WITNESSED BY THE OWNER'S REPRESENTATIVE, AND NOTE.
e. THE OWNER'S REPRESENTATIVE SHALL ACCEPT THE SYSTEM.
f. THE SYSTEM TEST SHALL BE WITNESSED BY THE AUTHORITY HAVING JURISDICTION. ANY DEFICIENCIES NOTED DURING THE TESTING MUST BE CORRECTED.
4. A LETTER OF CERTIFICATION SHALL BE PROVIDED TO INDICATE THAT THE TESTS HAVE BEEN PERFORMED, AND ALL DEVICES ARE OPERATIONAL.

ITEM 633 - CONTROLLER ITEM, MISC.: FIBER OPTIC ETHERNET TRANSCEIVER, AS PER PLAN
THIS ITEM OF WORK SHALL CONSIST OF FURNISHING AND INSTALLING AN INDUSTRY HARDENED, FULLY MANAGED ETHERNET SWITCH PROVIDING DUAL GIGABIT FIBER OPTICAL ETHERNET (1000BASE-T) PORTS USING INDUSTRY STANDARD SC FIBER OPTIC CONNECTORS AND 8 FAST ETHERNET (10/100BASE TX) RJ45 COPPER PORTS. THE TRANSCEIVER SHALL OPERATE ON 120VAC, 10 WATTS AND SHALL MEET AND/OR EXCEED NEMA TS2 ENVIRONMENTAL REQUIREMENTS.
THE FIBER OPTIC TRANSCEIVER SHALL INTERFACE TO SINGLE-MODE (8/125) FIBER OPTIC CABLE WITH AN OPTICAL WAVELENGTH OF 1310NM USING SC CONNECTORS. IT SHALL BE CAPABLE OF OPERATING OVER A DISTANCE OF AT LEAST 10KM WITH AN OPTICAL POWER BUDGET OF 17DB. THE TRANSCEIVER SHALL BE CAPABLE OF OPERATING IN A FAULT TOLERANT FIBER OPTIC LOOP.
PROVIDE A TRANSCEIVER THAT IS FULLY COMPLIANT WITH IEEE 802.3, 802.3U & 802.3Z. THE TRANSCEIVER SHALL PROVIDE FULL-DUPLEX OPERATION AND FLOW CONTROL.
PROVIDE A SIMPLE INTUITIVE USER INTERFACE FOR CONFIGURATION AND MONITORING OF THE TRANSCEIVER VIA STANDARD HTML GRAPHICAL WEB BROWSER, INCLUDING DETAILED ON-LINE HELP. EVENT LOGGING AND RECORDING SHALL BE INCLUDED. ALL SIGNIFICANT EVENTS SHALL BE STORED IN A NON-VOLATILE SYSTEM LOG.
THE OPTICAL ETHERNET TRANSCEIVER SHALL CONNECT TO ALL ETHERNET DEVICES IN THE CONTROLLER CABINET INCLUDING THE CONTROLLER (IF APPLICABLE), VIDEO DETECTION COMMUNICATIONS INTERFACE PANEL AND VIDEO SERVERS AND ANY OTHER ETHERNET DEVICES USING PROPERLY RATED CAT5E CABLES WITH RJ45 CONNECTORS.
SHALL BE INSTALLED IN ALL CONTROLLERS IN THE CLOSED LOOP SYSTEMS DEFINED BY THE CITY OF CANTON.
PAYMENT FOR 633 CONTROLLER ITEM, MISC.: FIBER OPTIC ETHERNET TRANSCEIVER, AS PER PLAN SHALL BE MADE AT THE CONTRACT PRICE BID. PAYMENT SHALL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, TESTING, CERTIFICATIONS AND OTHER INCIDENTALS NECESSARY TO FURNISH COMPLETE IN PLACE, INCLUDING ALL CONNECTIONS MADE AND WIRING COMPLETE, TESTED AND ACCEPTED.

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SIGNAL NOTES

MAHONING ROAD NE, S.R. 153
ECONOMIC DEVELOPMENT PROJECT

ITEM 633 - CONTROLLER UNIT, TYPE TS2/A2, WITH CABINET, TYPE TS1, AS PER PLAN (ECONOLITE)

THE CONTROLLER UNITS PROVIDED IN THIS PROJECT SHALL BE NEMA TYPE MANUFACTURED BY:

ECONOLITE CONTROL PRODUCTS
3360 EAST LA PALMA
ANAHEIM, CA 92806
PHONE: 800-225-6480

THE CONTROLLER SHALL BE MODEL "COBALT". THIS ITEM SHALL CONSIST OF FURNISHING AN ACTUATED, SOLID STATE DIGITAL MICROPROCESSOR TYPE CONTROLLER WITH MENU DRIVEN PROMPTS, INTERNAL TBC, FSK TELEMETRY MODULE FOR CLOSED LOOP COMMUNICATIONS AND ALL OTHER ACCESSORIES THAT ARE REQUIRED TO MAKE THE CONTROLLER COMPLETELY FUNCTIONAL AND OPERATIONAL AS SHOWN IN THE PLANS.

MANUFACTURER GUARANTEES OR WARRANTIES ON ALL INSTALLED TRAFFIC SIGNAL CONTROL EQUIPMENT SHALL BE TRANSFERRED TO THE CITY OF CANTON TRAFFIC SIGNAL DEPARTMENT FOR ACCEPTANCE OF THE EQUIPMENT.

PAYMENT SHALL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, TESTING, CERTIFICATIONS, AND OTHER INCIDENTALS NECESSARY TO FURNISH THE CONTROLLER COMPLETE, INCLUDING ALL CONNECTIONS MADE AND WIRING COMPLETE. TESTED, AND ACCEPTED.

THE CONTROLLER ASSEMBLY AND CABINET SHALL INCLUDE A NEMA TS2 TYPE 2 CONTROLLER AND A NEMA TS2 TYPE 16 MALFUNCTION MANAGEMENT UNIT (MMU) COMPLETE IN A NEMA TS1 CABINET ASSEMBLY. IN ADDITION, THE CONTROLLER ASSEMBLY AND CABINET SHALL CONFORM TO ODOT SPECIFICATION 633. THE CONTROLLER SHALL BE CAPABLE OF AN ADDITIONAL 12 STANDARD OVERLAPS BY ASSIGNING EACH PHASE OUTPUT TO AN OVERLAP.

THE CONTROLLER SHALL INCLUDE TIME-OF-DAY AND COORDINATION CAPABILITIES. IN ADDITION, THE CONTROLLER SHALL INCLUDE PREEMPTION CAPABILITIES INCLUDING SIX (6) RAILROAD, FIRE, AND EMERGENCY VEHICLE HIGH-PRIORITY PREEMPTORS AND FOUR (4) LOW-PRIORITY BUS-PREEMPTORS. CONTROLLER SHALL BE PROGRAMMABLE TO ALLOW FOR FLASHING "DON'T WALK" THROUGH THE YELLOW SIGNAL PHASE. THE CABINET SHALL BE WIRED FOR MONITORING EACH APPROACH SEPARATELY. ALL VEHICLE SIGNAL CIRCUITS SHALL BE ISOLATED (SPLITTING THE HEADS FOR PRE-EMPTION PURPOSES).

THE MMU SHALL PASS ALL TESTS AS PERFORMED BY AN AUTOMATIC MONITOR TESTER. TEST RESULTS SHALL BE PRINTED AND SUPPLIED WITH EACH CABINET. THE POLICE PANEL SHALL HAVE SWITCH ACCESS FOR SIGNAL ON/OFF, FLASH CONTROL, AUTOMATIC/MANUAL TRANSFER, AND MANUAL PUSHBUTTON WITH TEN (10) FEET COILED HAND CORD.

TECHNICIAN SWITCH PANEL SHALL BE MOUNTED ON THE INSIDE OF THE MAIN CABINET DOOR AND SHALL HAVE SWITCH ACCESS FOR STOP TIME ON/OFF, FLASH CONTROL, TIMER POWER ON/OFF, DETECTOR TEST, MOMENTARY PUSHBUTTON.

THE CABINET SHALL BE ALUMINUM, WITH A NATURAL SATIN FINISH OUTSIDE WITH A PAINTED SEMI-GLOSS WHITE ENAMEL FINISH INSIDE. THE CABINETS SHALL COMPLY WITH THE REQUIREMENTS OF 733.03 (SECTION A).

WIRE CONNECTIONS TO THE BACKPANEL SHALL BE MADE WITH CRIMP TERMINALS AND THREADED FASTENERS. SOLDER CONNECTIONS MAY BE USED ON THE BACKSIDE OF A PANEL THAT UTILIZES FEED-THRU STYLE TERMINAL BLOCKS. PRINTED CIRCUIT BOARDS SHALL NOT BE USED ON ANY PART OF THE TERMINALS AND FACILITIES PROVIDED WITHIN THE CABINET. ALL WIRES FASTENED TO THE LOAD SWITCH, FLASHER AND FLASH TRANSFER RELAY SOCKETS SHALL BE SOLDERED IN PLACE. A GOOD MECHANICAL CONNECTION MUST BE MADE PRIOR TO SOLDERING. ALL WIRING OF HARNESSES AND INTERPANEL WIRING, INCLUDING WIRING TO THE POLICE PANEL SHALL BE PROTECTED WITH A NYLON MESH OR "SNAKE SKIN". ANY EXPOSED WIRES, OR THE USE OF CABLE TIES TO HOLD THE WIRE BUNDLES TOGETHER SHALL NOT BE ALLOWED. FOR EASE OF MAINTENANCE, ALL HARNESSES SHALL BE OF SUFFICIENT LENGTH TO PLACE THE EQUIPMENT ON TOP OF THE CABINET AND BE OPERATIONAL.

A COLOR-CODED WIRING SYSTEM SHALL BE USED THROUGHOUT THE WIRING OF THE CABINET. ALL SYSTEMS FUNCTIONS OF THE CONTROLLER SHALL BE TERMINATED ON A SINGLE PANEL. WIRING COLOR-CODE SHALL BE AS FOLLOWS:
A. BLUE CONTROLLER UNIT
B. VIOLET MMU
C. RED RED LOAD SWITCH OUTPUT
D. YELLOW YELLOW LOAD SWITCH OUTPUT
E. BROWN GREEN LOAD SWITCH OUTPUT
F. BLACK AC LINE POWER
G. WHITE AC NEUTRAL
H. GREEN EARTH GROUND
I. GRAY LOGIC GROUND
J. ORANGE FLASH PROGRAMMING

TWO (2) SETS OF CABINET WIRING DIAGRAMS, SERVICE MANUALS, PROGRAMMING AND MAINTENANCE INSTRUCTIONS SHALL BE FURNISHED FOR EACH CABINET AND EQUIPMENT ITEM.

THE CABINET WIRING DIAGRAMS SHALL BE SUPPLIED IN A CLEAR PLASTIC POUCH FASTENED TO THE INSIDE OF THE CONTROLLER CABINET. AN ADDITIONAL ONE (1) CONTROLLER UNIT ASSEMBLIES WITH CABINETS. SUBJECT TO ALL OF THESE SPECIFICATIONS, SHALL BE SUPPLIED AS SPARES UNDER BID ITEM 633 - CONTROLLER UNIT, TYPE TS2/A2, WITH CABINET, TYPE TS1, AS PER PLAN.

THE SUPPLIER SHALL PROVIDE CONTROLLER TRAINING TO THE CITY OF CANTON WITHIN FIVE (5) DAYS OF SYSTEM ACCEPTANCE. TRAINING SHALL BE DIVIDED INTO TWO (2) COURSES, MAINTENANCE TRAINING AND OPERATION TRAINING, AND SHALL INCLUDE, BUT NOT LIMITED TO. THE SOFTWARE AND TROUBLESHOOTING. TRAINING SHALL BE CONDUCTED AT A LOCATION DESIGNATED BY THE CITY OF CANTON. TRAINING COURSES SHALL ACCOMMODATE UP TO TEN (10) PEOPLE AND SHALL CONSIST OF A MINIMUM FOUR (4) HOURS EACH. THE LENGTH OF EACH TRAINING COURSE IS AT THE DISCRETION OF THE CITY OF CANTON. THE COST FOR TRAINING SHALL BE INCIDENTAL TO THE CONTROLLER BID ITEMS (BID ITEMS 633).

ITEM 816- VIDEO DETECTION SYSTEM, AS PER PLAN

THIS ITEM OF WORK SHALL MEET STATE OF OHIO DEPARTMENT OF TRANSPORTATION (ODOT) SUPPLEMENTAL SPECIFICATION 816, VIDEO DETECTION SYSTEM. IN ADDITION TO THE REQUIREMENTS OF ODOT'S SUPPLEMENTAL SPECIFICATION 907 THE FOLLOWING REQUIREMENTS SHALL ALSO APPLY:

THE THERMAL TRAFFIC SENSOR AND DETECTION MODULE MUST BE INTEGRATED IN ONE HOUSING WITHOUT THE NEED FOR ANY ADDITIONAL DETECTION SOFTWARE OUTSIDE OF THIS HOUSING. BY USING ONE OR MORE PREDEFINED DETECTION ZONES, THE DETECTION SOFTWARE WILL HAVE THE ABILITY TO DETECT VEHICLES AND BICYCLES ON MULTIPLE LANES. BICYCLE DETECTION ZONES WILL BE SEPARATE FROM VEHICLE DETECTION ZONES AND WILL UTILIZE A DIFFERENT SET OF DETECTION ALGORITHMS.

THE DETECTION SOFTWARE WILL HAVE THE ABILITY TO DIFFERENTIATE BETWEEN VEHICLES AND BICYCLES WITH A HIGH LEVEL OF ACCURACY AND ALLOW FOR SEPARATE OUTPUTS TO BE USED FOR VEHICLE PRESENCE AND BICYCLE PRESENCE.

THE DETECTION SYSTEM SHALL GENERATE SEPARATE VEHICLE AND BICYCLE PRESENCE EVENTS AND COUNTING DATA. THE GENERATED VEHICLE AND BICYCLE PRESENCE EVENTS WILL BE SENT TO A TRAFFIC SIGNAL CONTROLLER.

IT MUST BE POSSIBLE TO PUT 4 VIRTUAL BICYCLE PRESENCE DETECTION ZONES IN THE IMAGE. STORAGE OF BICYCLE COUNT INFORMATION SHALL BE POSSIBLE.

THE NECESSARY VIDEO DETECTION CAMERAS MUST PROVIDE A COMMUNICATIONS INTERFACE THAT FULLY SUPPORTS AN ETHERNET IEEE 802.3 COMPLIANT 10/100BASE T AUTO SENSING PORT FOR ADVANCED SYSTEMS COMMUNICATIONS. THE ETHERNET PORT SHALL PROVIDE AN UPSTREAM CONNECTION TO OTHER ETHERNET DEVICES IN THE CABINET. AN INDUSTRY STANDARD RJ-45 TYPE CONNECTOR SHALL BE INCLUDED THAT SUPPORTS A SIMPLE CAT5E PATCH CABLE INTERFACE.

THE THERMAL TRAFFIC SENSOR SHALL INCLUDE A 1-YEAR WARRANTY ON THE THERMAL DETECTOR. ALL SOFTWARE UPGRADES NECESSARY TO MAINTAIN THE FUNCTIONALITY OF THIS ITEM IS INCLUDED IN THE COST OF THIS ITEM.

ALL CAMERAS SHALL HAVE THE CABABILITY TO REACH 350 FEET TO DETECT SYSTEM DETECTION ZONES.

THE THERMAL IMAGING SENSOR SHALL BE FLIR ITS TRAFISENSE, BOSCH MODEL VOT-320 THERMAL IP, OR WTI MODEL C-MAX THERMAL SERIES 320.

THE SUPPLIER SHALL PROVIDE VIDEO DETECTION TRAINING TO THE CITY OF CANTON WITHIN FIVE (5) DAYS OF SYSTEM ACCEPTANCE. TRAINING SHALL BE DIVIDED INTO TWO (2) COURSES, MAINTENANCE TRAINING AND OPERATION TRAINING, AND SHALL INCLUDE, BUT NOT LIMITED TO THE SOFTWARE AND TROUBLESHOOTING. TRAINING SHALL BE CONDUCTED AT A LOCATION DESIGNATED BY THE CITY OF CANTON. TRAINING COURSES SHALL ACCOMMODATE UP TO TEN (10) PEOPLE AND SHALL CONSIST OF A MINIMUM FOUR (4) HOURS EACH. THE LENGTH OF EACH TRAINING COURSE IS AT THE DISCRETION OF THE CITY OF CANTON. THE COST FOR TRAINING SHALL BE INCIDENTAL TO THE CONTROLLER BID ITEMS (BID ITEMS 633).

PAYMENT FOR ITEM 816 - VIDEO DETECTION SYSTEM, AS PER PLAN SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH VIDEO DETECTION CAMERA IN PLACE AND FULLY OPERATIONAL AS SHOWN IN THE PLANS. ALL MATERIALS AND WORK REQUIRED TO COMPLETE THIS ITEM, INCLUDING ATTACHMENT BRACKETS, SHALL BE INCLUDED IN THE UNIT COST.

ALTERNATE BID ITEM

ITEM 633- CONTROLLER UNIT, TYPE TS2/A2, WITH CABINET, TYPE TS1, AS PER PLAN (INTELIGHT)

THIS ITEM SHALL BE AN INTELIGHT X SERIES - TS2(TYPE2) CONTROLLER AND THE CONTROLLER SHALL HAVE COLOR TOUCHSCREEN CAPABILITIES AND THE ABILITY TO SHOW MULTIPLE CAMERAS ON THE SCREEN.

THE SUPPLIER SHALL PROVIDE CONTROLLER TRAINING TO THE CITY OF CANTON WITHIN FIVE (5) DAYS OF SYSTEM ACCEPTANCE. TRAINING SHALL BE DIVIDED INTO TWO (2) COURSES, MAINTENANCE TRAINING AND OPERATION TRAINING, AND SHALL INCLUDE, BUT NOT LIMITED TO. THE SOFTWARE AND TROUBLESHOOTING. TRAINING SHALL BE CONDUCTED AT A LOCATION DESIGNATED BY THE CITY OF CANTON. TRAINING COURSES SHALL ACCOMMODATE UP TO TEN (10) PEOPLE AND SHALL CONSIST OF A MINIMUM FOUR (4) HOURS EACH. THE LENGTH OF EACH TRAINING COURSE IS AT THE DISCRETION OF THE CITY OF CANTON. THE COST FOR TRAINING SHALL BE INCIDENTAL TO THE CONTROLLER BID ITEMS (BID ITEMS 633).

PAYMENT SHALL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, TESTING, CERTIFICATIONS, AND OTHER INCIDENTALS NECESSARY TO FURNISH THE CONTROLLER COMPLETE, INCLUDING A SPARE AND ALL CONNECTIONS MADE AND WIRING COMPLETE. TESTED, AND ACCEPTED.

ALTERNATE BID ITEM

ITEM 816- VIDEO DETECTION SYSTEM, AS PER PLAN (TRAFICON)

THIS VIDEO DETECTION SYSTEM ITEM SHALL HAVE THE SAME SPECIFICATIONS AS ITEM 633 - VIDEO DETECTION SYSTEM, AS PER PLAN EXCEPT FOR THE FOLLOWING:

1. THE DETECTION SHALL USE THE TRAFICON USA TRAFFIC VIDEO DETECTION.
2. THE VIDEO DETECTION CAMERAS SHALL BE THERMAL CAMERAS MANUFACTURED BY FLIR.

CALCULATED
JAW
CHECKED
DLW

SIGNAL NOTES

MAHONING ROAD NE, S.R. 153
ECONOMIC DEVELOPMENT PROJECT

87
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GROUNDING AND BONDING

THE REQUIREMENTS OF THE CONSTRUCTION AND MATERIAL SPECIFICATIONS (CMS) AND THE 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. IF MULTIPLE CONDUIT RUNS BEGIN AND END AT THE SAME POINTS, ONLY ONE EQUIPMENT GROUNDING CONDUCTOR IS REQUIRED.
 - E. 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.
 - F. 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 JUMPERS 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. 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.

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 6 AWG INSULATED, COPPER.

5. THE GREEN CONDUCTOR IN SIGNAL CABLES (CONDUCTOR #4) SHALL NOT BE USED TO SUPPLY POWER TO A SIGNAL INDICATION. IT WILL BE CONNECTED TO THE SIGNAL BODY AS AN EQUIPMENT GROUND IN ALUMINUM HEADS AND IT WILL BE UNUSED IN PLASTIC HEADS. UNUSED CONDUCTORS SHALL BE GROUNDED IN THE CABINET. TYPICAL USE OF CONDUCTORS IS AS FOLLOWS:

COND NO.	COLOR	VEHICLE SIGNAL	PEDESTRIAN SIGNAL
1	BLACK	GREEN BALL	#1 WALK
2	WHITE	AC NEUTRAL	AC NEUTRAL
3	RED	RED BALL	#1 DW/FDW
4	GREEN	EQUIPMENT GROUND	EQUIPMENT GROUND
5	ORANGE	YELLOW BALL	#2 DW/FDW
6	BLUE	GREEN ARROW	#2 WALK
7	WHITE/BLACK STRIPE	YELLOW ARROW	NOT USED

6. 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.

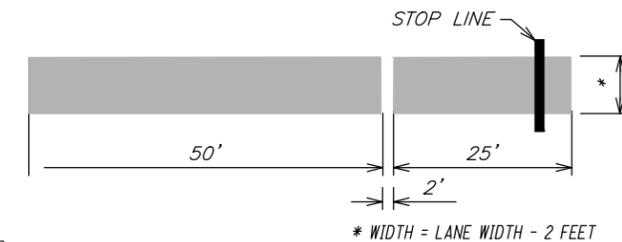
B. THE SERVICE NEUTRAL (AC-) SHALL ONLY BE CONNECTED TO GROUND AT THE PRIMARY POWER SERVICE DISCONNECT SWITCH.

- 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.

7. PAYMENT - ALL MATERIALS AND WORK REQUIRED TO COMPLETE THE EFFECTIVE GROUND FAULT CURRENT PATH SYSTEM ARE INCIDENTAL TO THE CONDUCTORS INSTALLED BY CONTRACT.

VEHICLE DETECTION

STOP LINE DETECTION
THE DETECTION ZONE WILL BE LOCATED 5' IN FRONT OF THE STOP LINE. THE LENGTH AND SPACING SHALL BE AS SHOWN BELOW.



GUARANTEE

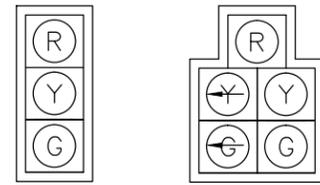
THE CONTRACTOR SHALL GUARANTEE THAT THE TRAFFIC CONTROL SYSTEM INSTALLED AS PART OF THIS CONTRACT SHALL OPERATE SATISFACTORILY FOR A PERIOD OF 180 DAYS FOLLOWING COMPLETION OF THE 10-DAY PERFORMANCE TEST. THE CONTRACTOR AND/OR SUPPLIER SHALL BE RESPONSIBLE FOR NEW EQUIPMENT WARRANTY FOR A ONE (1) YEAR PERIOD. IN THE EVENT OF UNSATISFACTORY OPERATION, THE CONTRACTOR SHALL CORRECT FAULTY INSTALLATIONS, MAKE REPAIRS AND REPLACE DEFECTIVE PARTS WITH NEW PARTS OR EQUAL OR BETTER QUALITY. EQUIPMENT, MATERIAL AND LABOR COSTS INCURRED IN CORRECTING AN UNSATISFACTORY OPERATION SHALL BE BORNE BY THE CONTRACTOR. THE GUARANTEE SHALL COVER THE FOLLOWING ITEMS OF THE TRAFFIC CONTROL SYSTEM: CONTROLLERS AND ASSOCIATED EQUIPMENT, DETECTOR UNITS, INTERCONNECTION ITEMS. CUSTOMARY MANUFACTURER'S GUARANTEES SHALL BE TURNED OVER TO THE MAINTAINING AGENCY FOLLOWING ACCEPTANCE OF ALL EQUIPMENT.

CALCULATED
JAW
CHECKED
DLW

SIGNAL NOTES

MAHONING ROAD NE, S.R. 153
ECONOMIC DEVELOPMENT PROJECT

SIGNAL INDICATIONS (LED), 12"



N1, N2
S1, S2
E2
W2
NE1, NE2

E1
W1

SIGNS



R3-5L
30"x36"
SN1, SN2



R10-4A
12"x9"
SN4, SN6,
SN8,
SN10, SN12



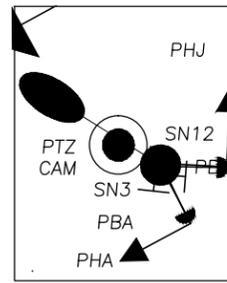
R10-3A
12"x9"
SN3, SN5,
SN7,
SN9, SN11

PEDESTRIAN SIGNAL HEAD WITH LED LAMP UNITS, TYPE D (GREEN)

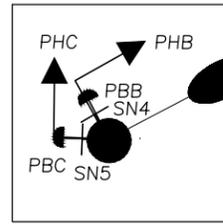


16"x18" LED
PHA-PHJ

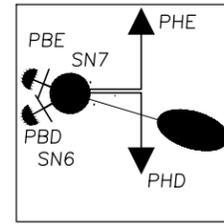
POLE DETAILS



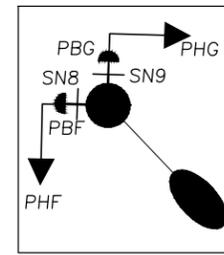
POLE 1-1



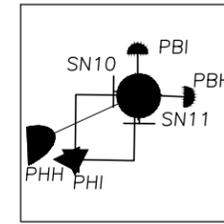
POLE 1-2



POLE 1-3



POLE 1-4



POLE 1-5

PI-4, SIGNAL SUPPORT, NOSTALGIA, SINGLE ARM, W/ BRACKET ARM, LUMINAIRE
STA 57+07, 58' LT

10' CONDUIT, 3", 725.05

PBI-4, PULL BOX, 725.06, 17"x30"
STA 56+96, 59' LT

FIELD WIRING HOOK-UP CHART							
SIGNAL HEAD	INDICATION	TERMINAL HEAD	FLASH	SIGNAL HEAD	INDICATION	TERMINAL HEAD	FLASH
NE1, NE2 (NEB)	R	φ 9 R	R	S1, S2 (SB)	R	φ 4 R	R
	Y	φ 9 Y			Y	φ 4 Y	
	G	φ 9 G			G	φ 4 G	
N1, N2 (NB)	R	φ 8 R	R	W1 (WBLT)	R	φ 6 R	Y
	Y	φ 8 Y			Y	φ 6 Y	
	G	φ 8 G			Y	φ 1 Y	
E1 (EBLT)	R	φ 2 R	Y	W2 (WB)	Y	φ 6 Y	Y
	Y	φ 2 Y			Y	φ 1 Y	
	Y	φ 2 Y			Y	φ 1 G	
	Y	φ 5 Y			R	φ 6 R	
	G	φ 5 G			Y	φ 6 Y	
E2 (EB)	R	φ 2 R	Y	G	φ 6 G	Y	
	Y	φ 2 Y					
	G	φ 2 G					

PI-3, SIGNAL SUPPORT, NOSTALGIA, SINGLE ARM, W/ BRACKET ARM, LUMINAIRE,
STA 56+58, 29' LT

3' CONDUIT, 3", 725.05

PBI-3, PULL BOX, 725.06, 17"x30"
STA 56+60, 28' LT

22' CONDUIT, 3", 725.05

POWER SOURCE (2" RISER)

60' CONDUIT, 2-3", 725.05
(TRENCH IN PAVED AREA, APP)

PBI-2, PULL BOX, 725.06, 17"x30"
STA 56+47, 31' RT

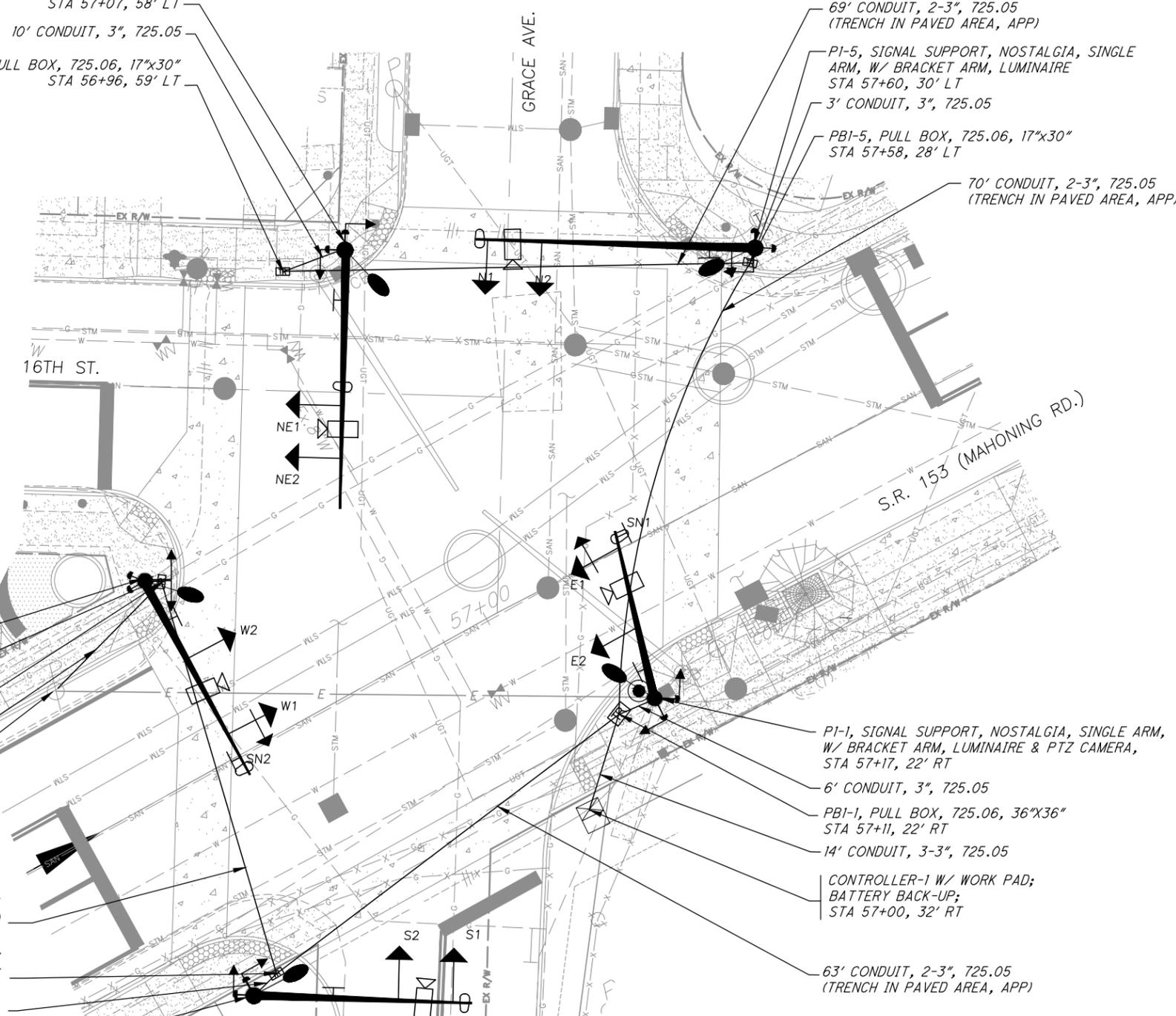
4' CONDUIT, 3", 725.05

PI-2, SIGNAL SUPPORT, NOSTALGIA, SINGLE ARM, W/ BRACKET ARM, LUMINAIRE
STA 56+43, 32' RT

PHASE DIAGRAM			
φ 1 + φ 5	φ 2 + φ 6	φ 4 + φ 8	φ 9
EBL & WBL ACTUATED	EB & WB RECALL	NB & SB ACTUATED	NEB ACTUATED

LEGEND

- SIGNAL POLE
- PEDESTRIAN POLE
- ▣ PULL BOX
- ▢ CONTROLLER W/ PULL BOX
- PED BUTTON (PBA-PBH)
- ↘ PED SIGNAL (PHA-PHH)
- ⊗ LIGHT POLE
- 3 SECTION SIGNAL
- ↕ 3 OR 4 SECTION SIGNAL WITH ARROW
- ↔ 5 SECTION SIGNAL
- ⊥ SIGN
- DETECTION ZONE
- PROP. LUMINAIRE
- PROP. PRE-EMPTION DETECTOR
- ▭ PROP. CAMERA



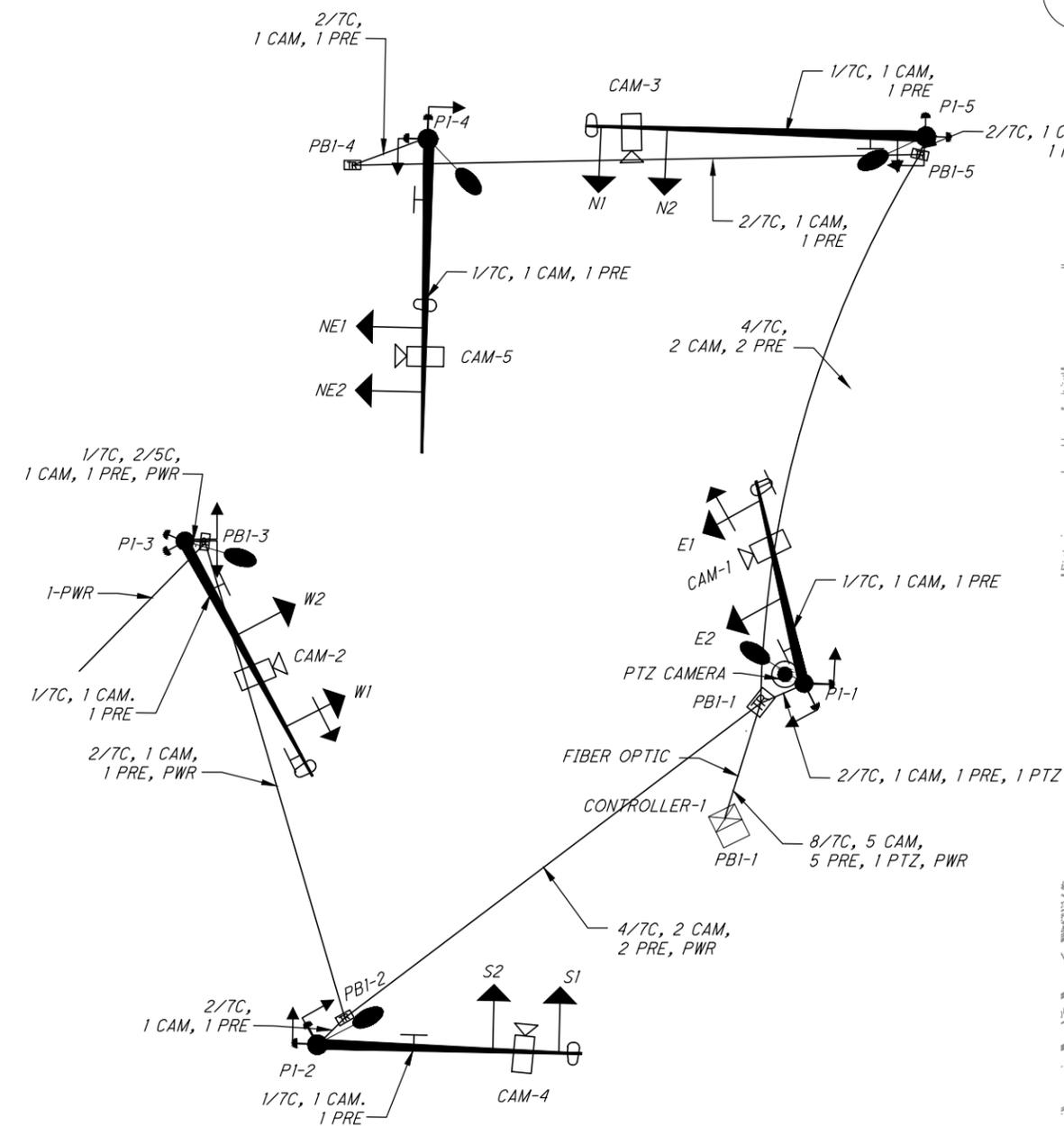
NOTE: FOR SIGNAL DETAILS SEE SHEETS 114-122

LOOP DETECTOR UNIT SUMMARY

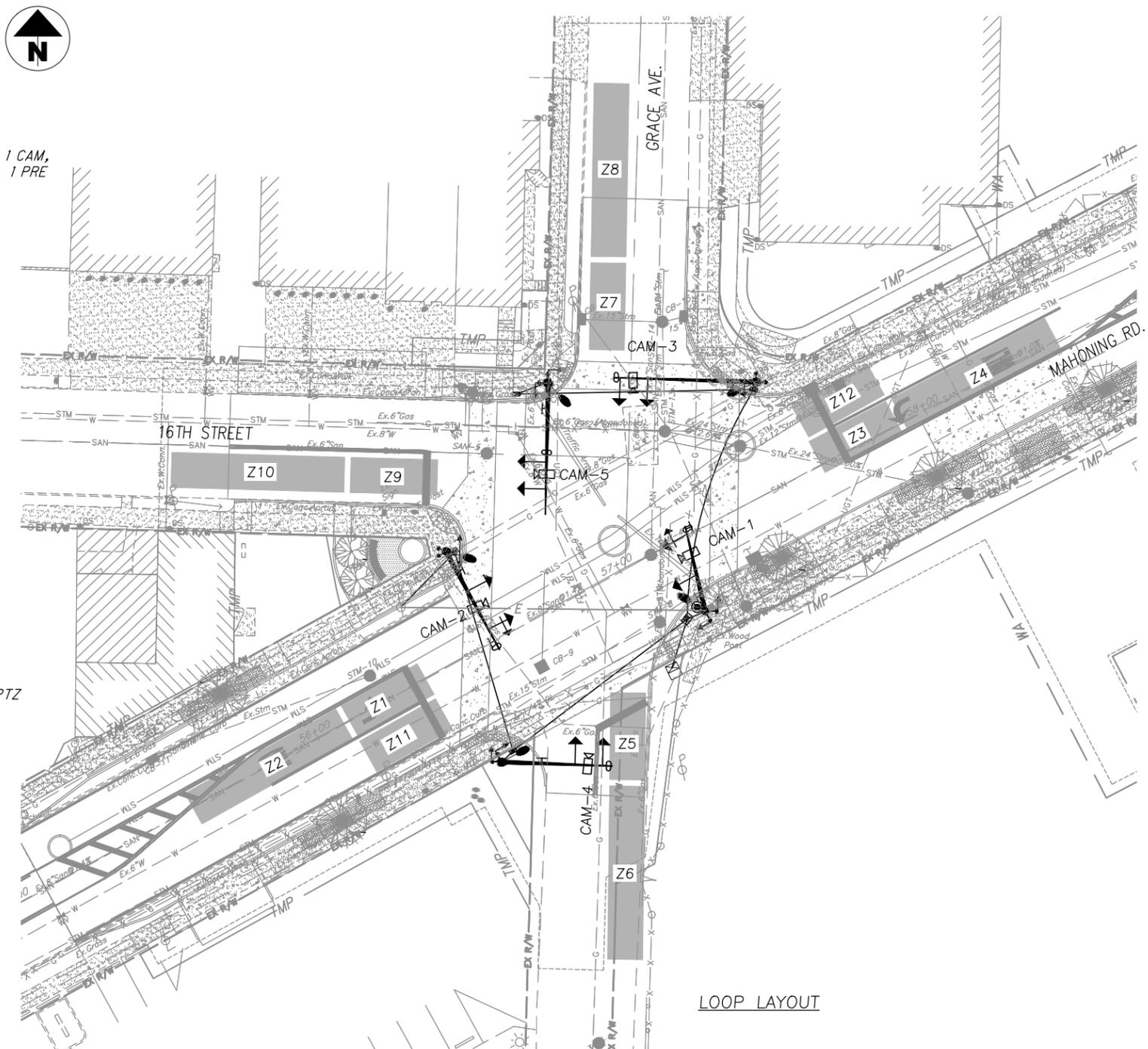
INT	ZONE	ZONE DETECTION TYPE	CAMERA	DETECTOR TYPE	PRESENCE/PULSE	CONNECT TO PHASE	LOCK/ NON-LOCK	MOVEMENT	DELAY	EXT	REMARKS
MAHONING ROAD & GRACE AVENUE	Z1	STOP	CAM-1	VIDEO	PRESENCE	φ5	NON-LOCK	EB-LT	10		DELAY INHIBITED DURING GREEN PHASE
	Z2	LINE	CAM-1	VIDEO	PRESENCE	φ5	NON-LOCK	EB-LT	5		DELAY INHIBITED DURING GREEN PHASE
	Z3	STOP	CAM-2	VIDEO	PRESENCE	φ1	NON-LOCK	WB-LT	10		DELAY INHIBITED DURING GREEN PHASE
	Z4	LINE	CAM-2	VIDEO	PRESENCE	φ1	NON-LOCK	WB-LT	5		DELAY INHIBITED DURING GREEN PHASE
	Z5	STOP	CAM-3	VIDEO	PRESENCE	φ8	NON-LOCK	NB	10		DELAY INHIBITED DURING GREEN PHASE
	Z6	LINE	CAM-3	VIDEO	PRESENCE	φ8	NON-LOCK	NB	5		DELAY INHIBITED DURING GREEN PHASE
	Z7	STOP	CAM-4	VIDEO	PRESENCE	φ4	NON-LOCK	SB	10		DELAY INHIBITED DURING GREEN PHASE
	Z8	LINE	CAM-4	VIDEO	PRESENCE	φ4	NON-LOCK	SB	5		DELAY INHIBITED DURING GREEN PHASE
	Z9	STOP	CAM-5	VIDEO	PRESENCE	φ9	NON-LOCK	NEB	10		DELAY INHIBITED DURING GREEN PHASE
	Z10	LINE	CAM-5	VIDEO	PRESENCE	φ9	NON-LOCK	NEB	5		DELAY INHIBITED DURING GREEN PHASE
	Z11	SYSTEM	CAM-1	VIDEO	PRESENCE	φ2	NON-LOCK	EB			
	Z12	SYSTEM	CAM-2	VIDEO	PRESENCE	φ6	NON-LOCK	WB			

LEGEND

- SIGNAL POLE
- PEDESTRIAN POLE
- ▢ PULL BOX
- ⊠ CONTROLLER W/ PULL BOX
- ↑ PED BUTTON (PBA-PBH)
- ⤵ PED SIGNAL (PHA-PHH)
- ⊙ LIGHT POLE
- 3 SECTION SIGNAL
- ⇩ 3 OR 4 SECTION SIGNAL WITH ARROW
- ⇨ 5 SECTION SIGNAL
- ⊥ SIGN
- DETECTION ZONE
- PROP. LUMINAIRE
- PROP. PREEMPTION RECEIVING UNIT/LIGHT
- PROP. CAMERA
- 7C SIGNAL CABLE, 7 CONDUCTOR, NO. 14 AWG
- CAM VIDEO DETECTION CAMERA CABLE
- PRE PREEMPTION CABLE
- PTZ PAN-TILT ZOOM CAMERA CABLE
- PWR POWER CABLE

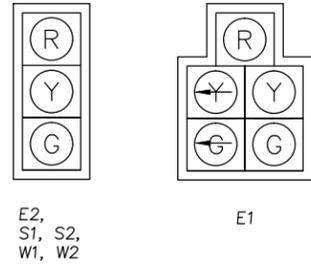


WIRING DIAGRAM

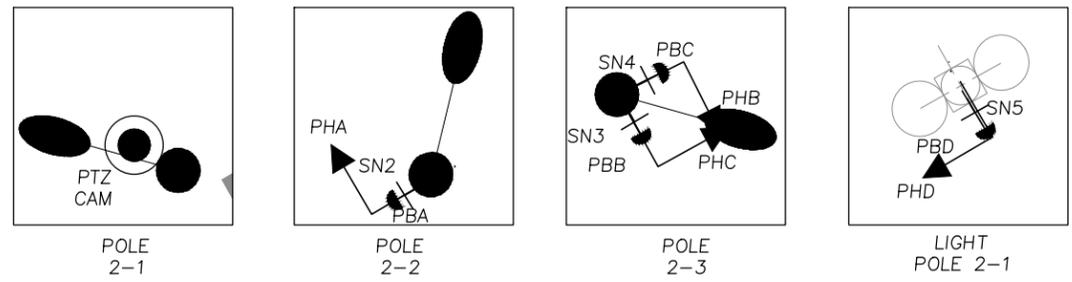


LOOP LAYOUT

SIGNAL INDICATIONS (LED), 12"



POLE DETAILS



SIGNS



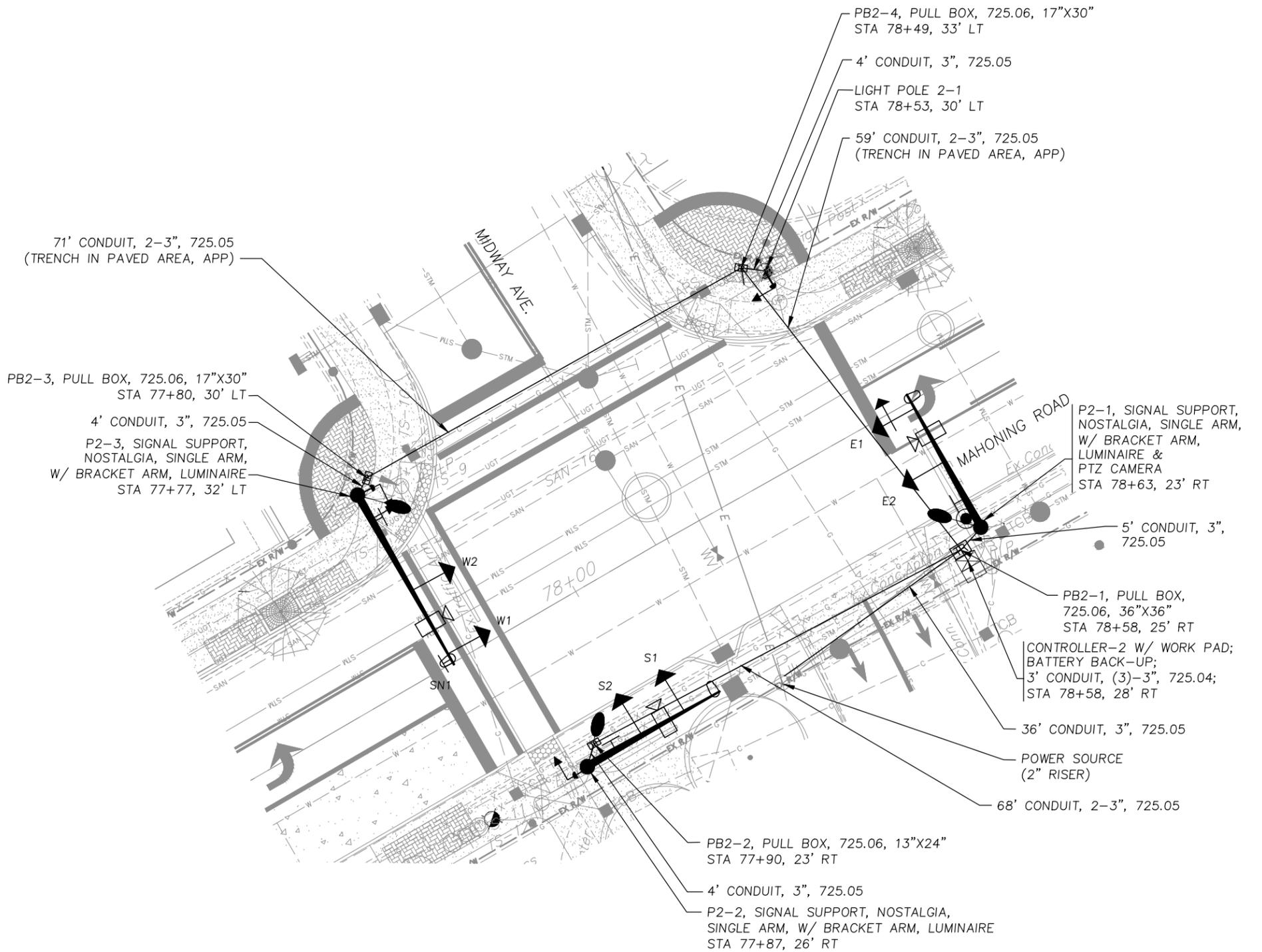
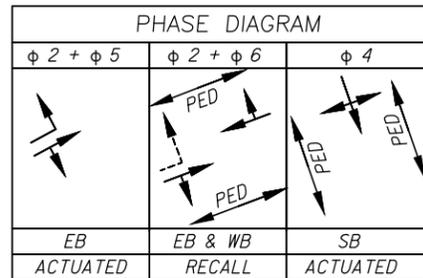
PEDESTRIAN SIGNAL HEAD WITH LED LAMP UNITS, TYPE D (GREEN)



FIELD WIRING HOOK-UP CHART

SIGNAL HEAD	INDICATION	TERMINAL HEAD	FLASH	SIGNAL HEAD	INDICATION	TERMINAL HEAD	FLASH
E1 (EBLT)	R	φ 2 R	Y	S1, S2 (SB)	R	φ 4 R	R
	Y	φ 2 Y			Y	φ 4 Y	
	R	φ 2 R			G	φ 4 G	
	←	φ 5 Y			R	φ 6 R	
	→	φ 5 G			Y	φ 6 Y	
E2 (EB)	R	φ 2 R	Y	W1, W2 (WB)	G	φ 6 G	
	Y	φ 2 Y					
	G	φ 2 G					

PHASE DIAGRAM

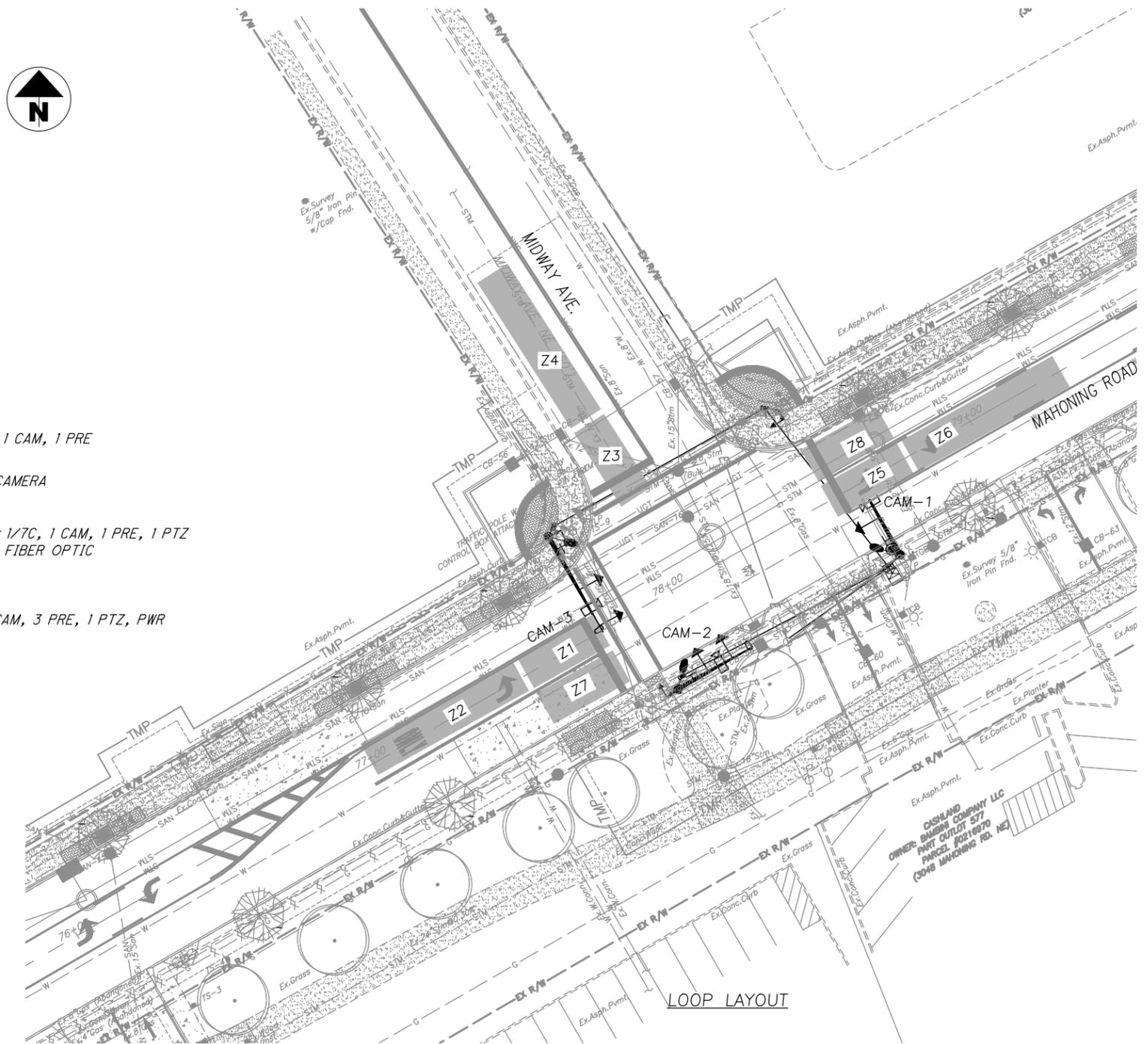
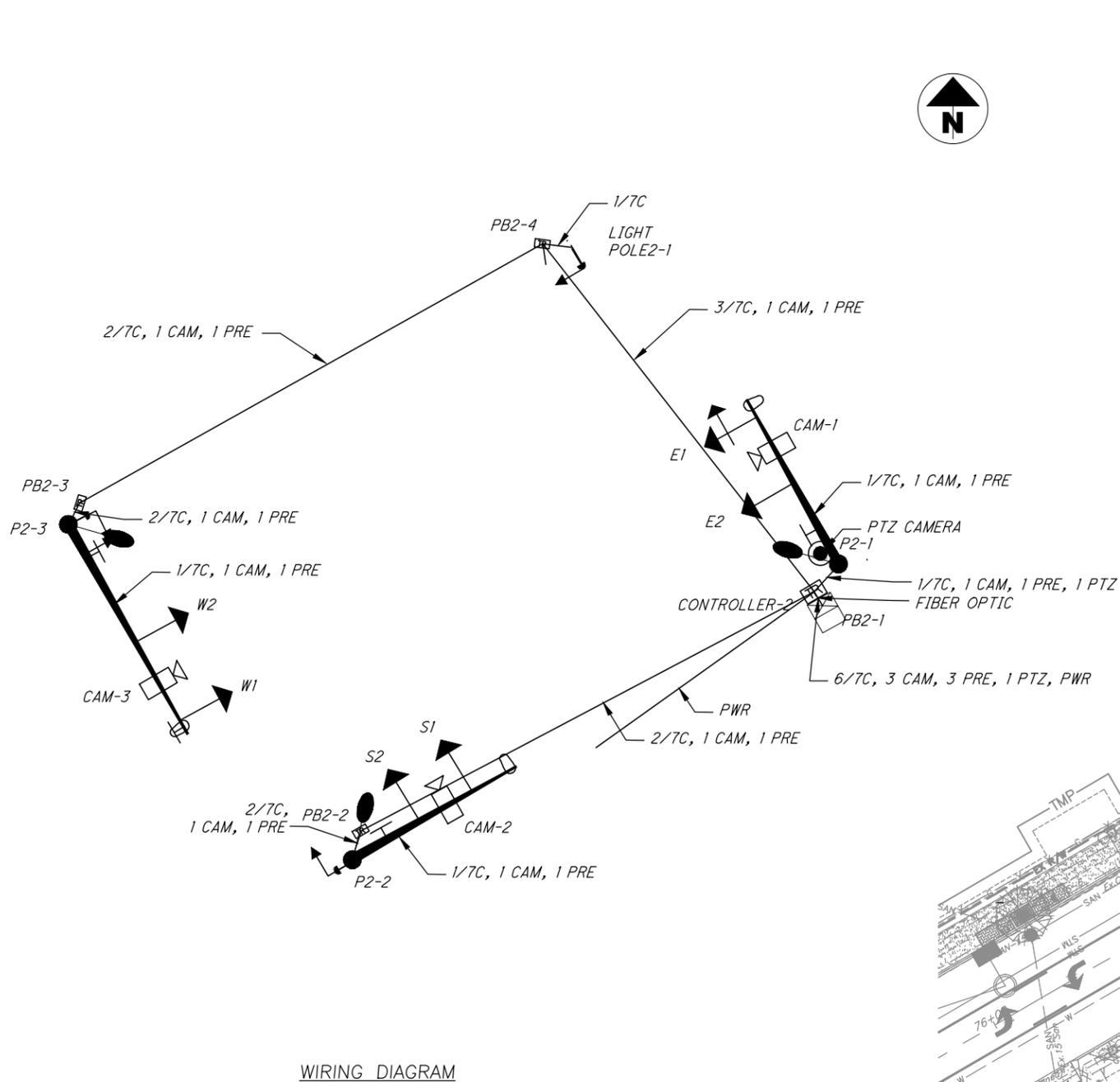


SIGNAL PLANS
MAHONING ROAD AND MIDWAY AVENUE

MAHONING ROAD NE, S.R. 153
ECONOMIC DEVELOPMENT PROJECT

NOTE: FOR SIGNAL DETAILS SEE SHEETS 114-122

LOOP DETECTOR UNIT SUMMARY											
INT	ZONE	ZONE DETECTION TYPE	CAMERA	DETECTOR TYPE	PRESENCE/PULSE	CONNECT TO PHASE	LOCK/ NON-LOCK	MOVEMENT	DELAY	EXT	REMARKS
MAHONING ROAD & MIDWAY AVENUE	Z1	STOP	CAM-1	VIDEO	PRESENCE	φ5	NON-LOCK	EB-LT	10		DELAY INHIBITED DURING GREEN PHASE
	Z2	LINE		VIDEO	PRESENCE	φ5	NON-LOCK	EB-LT	5		DELAY INHIBITED DURING GREEN PHASE
	Z3	STOP	CAM-2	VIDEO	PRESENCE	φ4	NON-LOCK	SB	10		DELAY INHIBITED DURING GREEN PHASE
	Z4	LINE		VIDEO	PRESENCE	φ4	NON-LOCK	SB	5		DELAY INHIBITED DURING GREEN PHASE
	Z5	STOP	CAM-3	VIDEO	PRESENCE	φ6	NON-LOCK	WB	10		DELAY INHIBITED DURING GREEN PHASE
	Z6	LINE		VIDEO	PRESENCE	φ6	NON-LOCK	WB	5		DELAY INHIBITED DURING GREEN PHASE
	Z7	SYSTEM	CAM-1	VIDEO	PRESENCE	φ2	NON-LOCK	EB			
	Z8	SYSTEM	CAM-3	VIDEO	PRESENCE	φ6	NON-LOCK	WB			

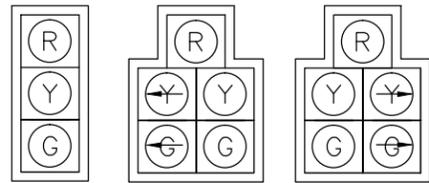


CALCULATED
JAW
CHECKED
DLW

**SIGNAL DETAILS
MAHONING ROAD AND MIDWAY AVENUE**

MAHONING ROAD NE, S.R. 153
ECONOMIC DEVELOPMENT PROJECT

SIGNAL INDICATIONS (LED), 12"



N2, E2,
S2, W2

N1, E1
S1, W1

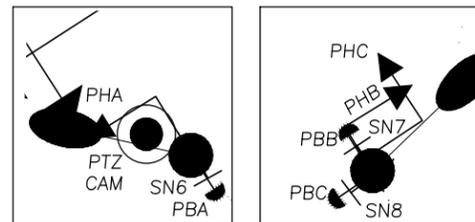
E3

PEDESTRIAN SIGNAL HEAD
WITH LED LAMP UNITS,
TYPE D
(GREEN)



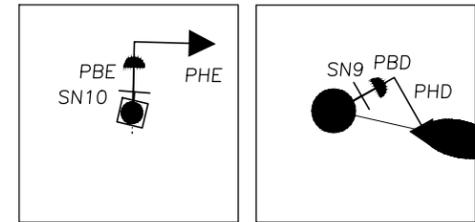
16"x18" LED
PHA-PHH

POLE DETAILS



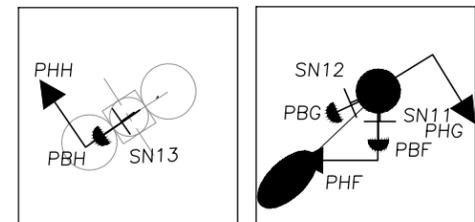
POLE
3-1

POLE
3-2



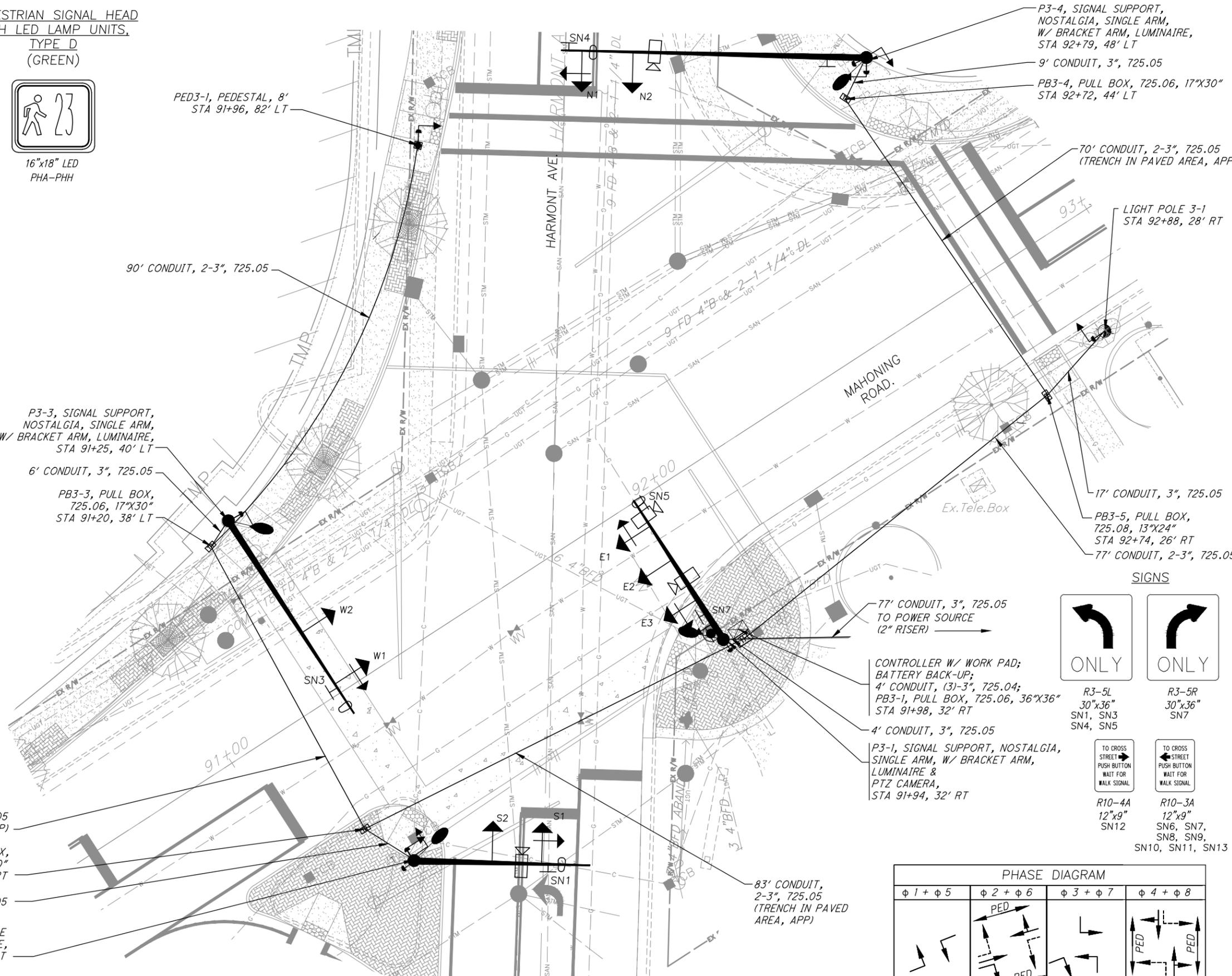
PED
3-1

POLE
3-3



LIGHT
POLE 3-1

POLE
3-4



P3-4, SIGNAL SUPPORT,
NOSTALGIA, SINGLE ARM,
W/ BRACKET ARM, LUMINAIRE,
STA 92+79, 48' LT

9' CONDUIT, 3", 725.05

PB3-4, PULL BOX, 725.06, 17"x30"
STA 92+72, 44' LT

70' CONDUIT, 2-3", 725.05
(TRENCH IN PAVED AREA, APP)

LIGHT POLE 3-1
STA 92+88, 28' RT

P3-3, SIGNAL SUPPORT,
NOSTALGIA, SINGLE ARM,
W/ BRACKET ARM, LUMINAIRE,
STA 91+25, 40' LT

6' CONDUIT, 3", 725.05

PB3-3, PULL BOX,
725.06, 17"x30"
STA 91+20, 38' LT

63' CONDUIT, 2-3", 725.05
(TRENCH IN PAVED AREA, APP)

PB3-2, PULL BOX,
725.06, 17"x30"
STA 91+15, 25' RT

11' CONDUIT, 3", 725.05

P3-2, SIGNAL SUPPORT, NOSTALGIA, SINGLE
ARM, W/ BRACKET ARM, LUMINAIRE,
STA 91+20, 35' RT

SIGNS

ONLY

R3-5L
30"x36"
SN1, SN3
SN4, SN5

ONLY

R3-5R
30"x36"
SN7

R10-4A
12"x9"
SN12

R10-3A
12"x9"
SN6, SN7,
SN8, SN9,
SN10, SN11, SN13

CONTROLLER W/ WORK PAD;
BATTERY BACK-UP;
4' CONDUIT, (3)-3", 725.04;
PB3-1, PULL BOX, 725.06, 36"x36"
STA 91+98, 32' RT

4' CONDUIT, 3", 725.05

P3-1, SIGNAL SUPPORT, NOSTALGIA,
SINGLE ARM, W/ BRACKET ARM,
LUMINAIRE &
PTZ CAMERA,
STA 91+94, 32' RT

77' CONDUIT, 3", 725.05
TO POWER SOURCE
(2" RISER)

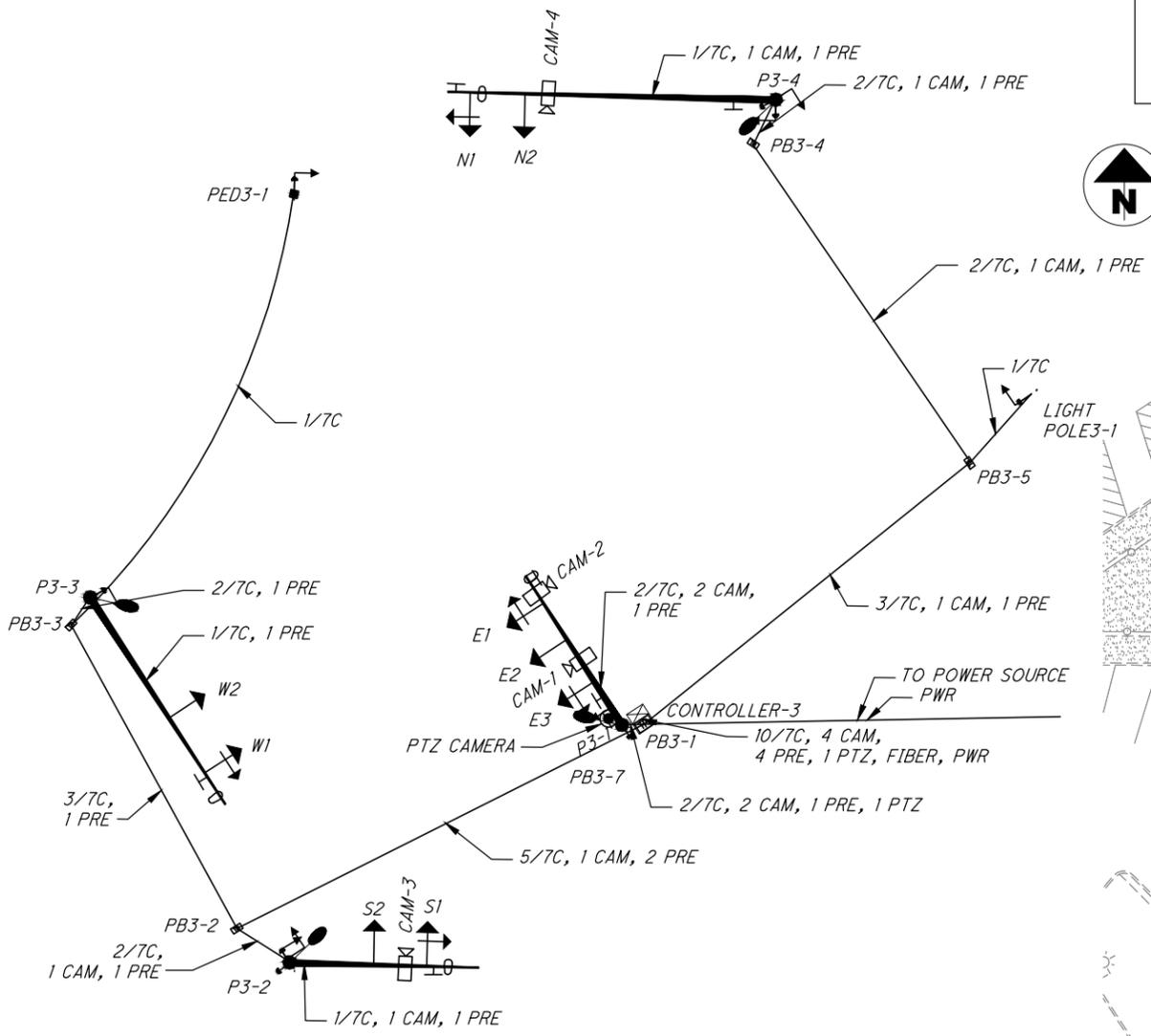
83' CONDUIT,
2-3", 725.05
(TRENCH IN PAVED
AREA, APP)

PHASE DIAGRAM			
φ 1 + φ 5	φ 2 + φ 6	φ 3 + φ 7	φ 4 + φ 8
EBL & WBL OL: SBR	EB & WB	NBL & SBL OL: EBRT	NB & SB
ACTUATED	RECALL	ACTUATED	ACTUATED

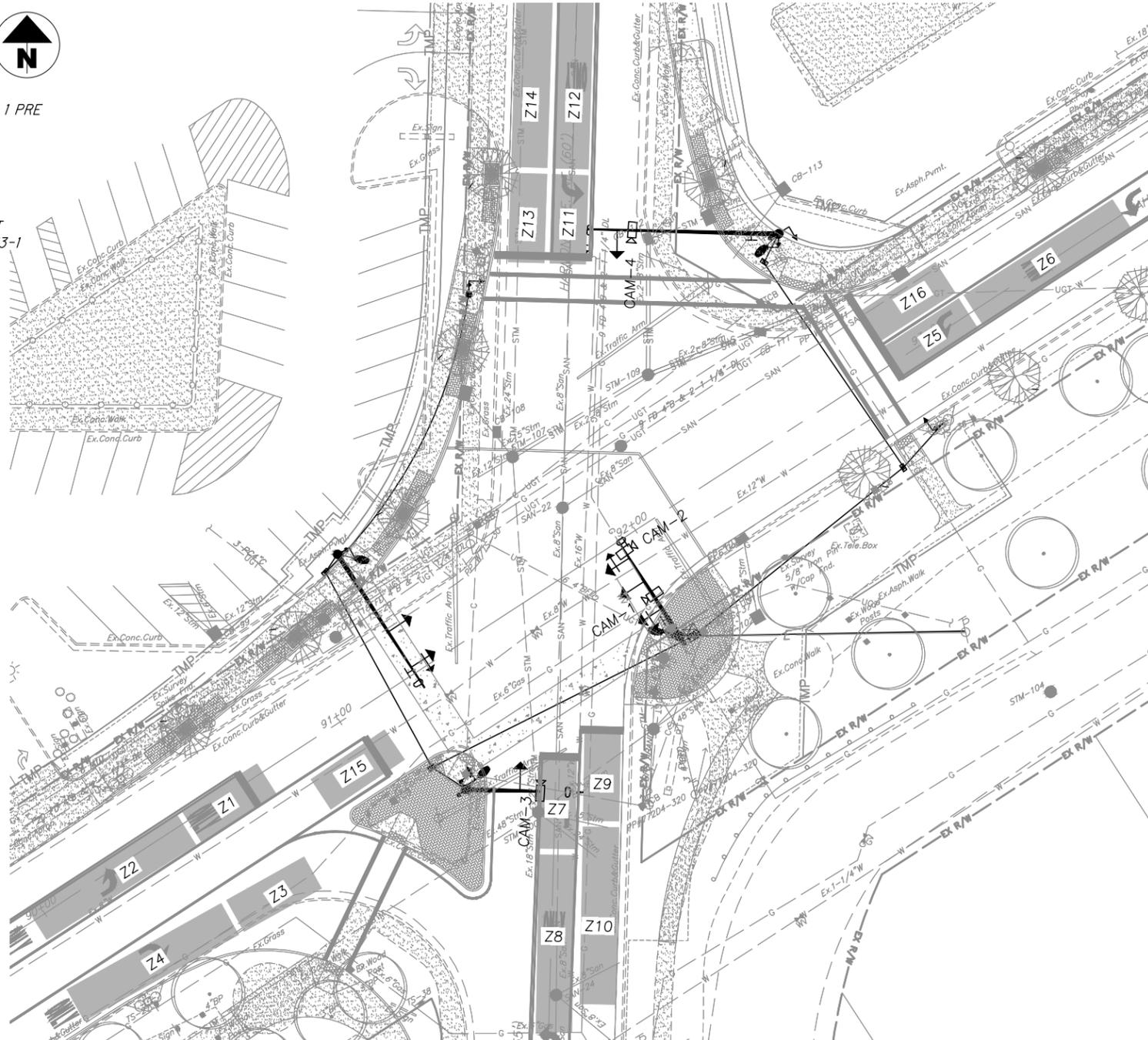
NOTE: FOR SIGNAL DETAILS SEE SHEETS 114-122

LOOP DETECTOR UNIT SUMMARY

INT	ZONE	ZONE DETECTION TYPE	CAMERA	DETECTOR TYPE	PRESENCE/PULSE	CONNECT TO PHASE	LOCK/ NON-LOCK	MOVEMENT	DELAY	EXT	REMARKS
MAHONING ROAD & HARMONT AVENUE	Z1	STOP	CAM-1	VIDEO	PRESENCE	φ5	NON-LOCK	EB-LT	10		DELAY INHIBITED DURING GREEN PHASE
	Z2	LINE		VIDEO	PRESENCE	φ5	NON-LOCK	EB-LT	5		DELAY INHIBITED DURING GREEN PHASE
	Z3	STOP		VIDEO	PRESENCE	φ2	NON-LOCK	EB-RT	10		DELAY INHIBITED DURING GREEN PHASE
	Z4	LINE		VIDEO	PRESENCE	φ2	NON-LOCK	EB-RT	5		DELAY INHIBITED DURING GREEN PHASE
	Z5	STOP	CAM-2	VIDEO	PRESENCE	φ1	NON-LOCK	WB-LT	10		DELAY INHIBITED DURING GREEN PHASE
	Z6	LINE		VIDEO	PRESENCE	φ1	NON-LOCK	WB-LT	5		DELAY INHIBITED DURING GREEN PHASE
	Z7	STOP	CAM-4	VIDEO	PRESENCE	φ3	NON-LOCK	NB-LT	10		DELAY INHIBITED DURING GREEN PHASE
	Z8	LINE		VIDEO	PRESENCE	φ3	NON-LOCK	NB-LT	5		DELAY INHIBITED DURING GREEN PHASE
	Z9	STOP		VIDEO	PRESENCE	φ8	NON-LOCK	NB	10		DELAY INHIBITED DURING GREEN PHASE
	Z10	LINE	CAM-3	VIDEO	PRESENCE	φ8	NON-LOCK	NB	5		DELAY INHIBITED DURING GREEN PHASE
	Z11	STOP		VIDEO	PRESENCE	φ7	NON-LOCK	SB-LT	10		DELAY INHIBITED DURING GREEN PHASE
	Z12	LINE	VIDEO	PRESENCE	φ7	NON-LOCK	SB-LT	5		DELAY INHIBITED DURING GREEN PHASE	
	Z13	STOP	CAM-1	VIDEO	PRESENCE	φ4	NON-LOCK	SB	10		DELAY INHIBITED DURING GREEN PHASE
	Z14	LINE		VIDEO	PRESENCE	φ4	NON-LOCK	SB	5		DELAY INHIBITED DURING GREEN PHASE
	Z15	SYSTEM	CAM-1	VIDEO	PRESENCE	φ2	NON-LOCK	EB			
	Z16	SYSTEM	CAM-2	VIDEO	PRESENCE	φ6	NON-LOCK	WB			



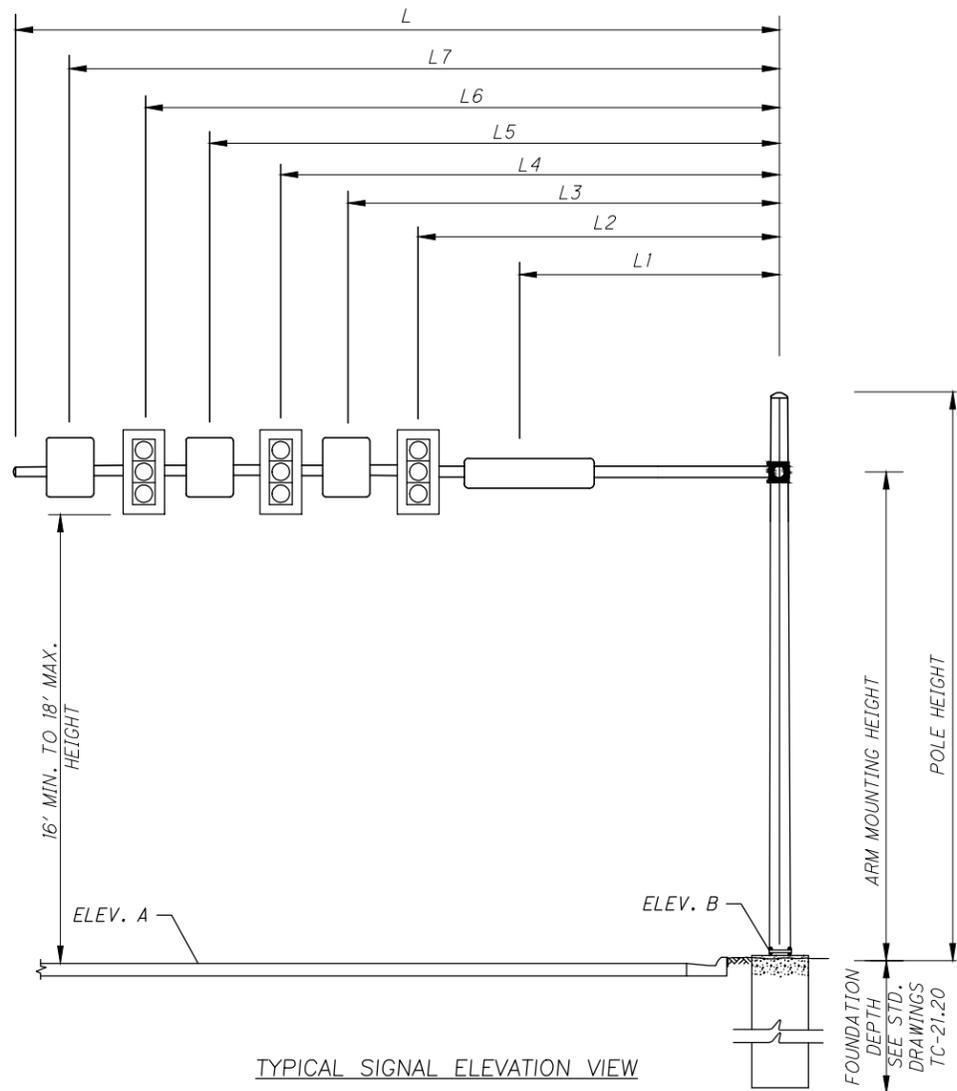
WIRING DIAGRAM



CALCULATED
JAW
CHECKED
DLW

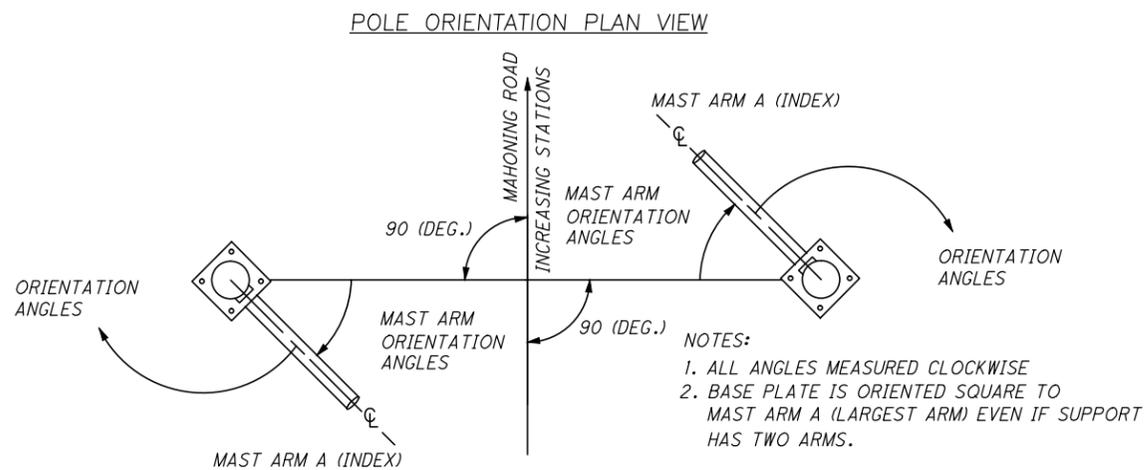
SIGNAL DETAILS
MAHONING ROAD AND HARMONT AVENUE

MAHONING ROAD NE, S.R. 153
ECONOMIC DEVELOPMENT PROJECT



TYPICAL SIGNAL ELEVATION VIEW

NOTE: THE ABOVE DETAIL SHOWS A TYPICAL ARRANGEMENT THAT DOES NOT NECESSARILY MATCH EVERY APPLICATION AS SHOWN IN THE PLANS. DIMENSION L1 IS THE DISTANCE FROM THE POLE TO THE SIGNAL, SIGN OR CAMERA LOCATED CLOSEST TO THE POLE. DIMENSIONS L2 THROUGH L7 ARE THE DISTANCES FROM THE POLE TO EACH ADDITIONAL SIGNAL, SIGN OR CAMERA, IN INCREASING ORDER. SEE WIRING LAYOUT FOR THE ORDER OF MOUNTED ITEMS ON EACH INDIVIDUAL MAST ARM.



POLE ORIENTATION PLAN VIEW

NOTES:
1. ALL ANGLES MEASURED CLOCKWISE
2. BASE PLATE IS ORIENTED SQUARE TO MAST ARM A (LARGEST ARM) EVEN IF SUPPORT HAS TWO ARMS.

TYPICAL SIGNAL ELEVATION VIEW																							
SUPPORT NO.	SUPPORT DES. #TC-81.21	SUPPORT DES. #TC-12.30	POLE HEIGHT (FT.)	MAST ARM DES. #TC-81.20	ARM MOUNTING HT. (FT.)	SIGNAL SUPPORT TYPE							ELEVATION		ORIENTATION ANGLES (DEG.) FROM MAST ARM A								
						L (FT)	L1 (FT)	L2 (FT)	L3 (FT)	L4 (FT)	L5 (FT)	L6 (FT)	L7 (FT)	A	B	MAST ARM A ORIENTATION ANGLE (DEGREES)	MAST ARM B	PEDESTRIAN SIGNAL	PEDESTRIAN PUSHBUTTON	CONTROLLER	LUMINAIRE BRACKET	HANDHOLE	CABLE ENTRANCE (12" FROM TOP)
P1-1			30			25	6	11	22	24					14		104/165	104/165			315	180	
P1-2			26			25	6	11	22	24					121		180/225	180/225			315	180	
P1-3			26			32	6	13	25	30					0		90/135	90/135			315	180	
P1-4			26			38	7	23	31						29		90/180	90/180			315	180	
P1-5						32	6	11	21	21	29				119		0/270	90/180			315	180	
P2-1			30			25	6	12	22						0						315	180	
P2-2			26			25	6	11	19						90		180	180			315	180	
P2-3			26			32	6	18	30	31					0		0/270	0/270			315	180	
LIGHT2-1																	0	25					
P3-1			30			32	5	6	9	18	26	31			0		0	180			315	180	
P3-2			26			45	5	17	21	29	36	38			124		203	203			315	180	
PED3-1			8														334	37				180	
P3-3			26			45	6	27	39	40					0		274	274			315	180	
P3-4			26			60	6	47	52	56					124		147/270	270/334			315	180	
LIGHT3-1																	270	270					

NOTE: MAST ARM MOUNTING HEIGHT SHALL BE DETERMINED BY CONTRACTOR DEPENDENT UPON MANUFACTURER.

FIELD WIRING HOOK-UP CHART (MAHONING RD. & HARMONT AVE.)							
SIGNAL HEAD	INDICATION	TERMINAL HEAD	FLASH	SIGNAL HEAD	INDICATION	TERMINAL HEAD	FLASH
N1 (NBLT)	R	φ 8 R	R	S1 (SBLT)	R	φ 4 R	R
	Y	φ 8 Y			Y	φ 4 Y	
	R	φ 8 R			R	φ 4 R	
	Y	φ 3 Y			Y	φ 7 Y	
	G	φ 3 G			G	φ 7 G	
N2 (NB)	R	φ 8 R	R	S2 (SB)	R	φ 4 R	R
	Y	φ 8 Y			Y	φ 4 Y	
	G	φ 8 G			G	φ 4 G	
E1 (EBLT)	R	φ 2 R	Y	W1 (WBLT)	R	φ 6 R	Y
	Y	φ 2 Y			Y	φ 6 Y	
	R	φ 2 R			R	φ 6 R	
	Y	φ 5 Y			Y	φ 1 Y	
	G	φ 5 G			G	φ 1 G	
E2 (EB)	R	φ 2 R	Y	W2 (WB)	R	φ 6 R	Y
	Y	φ 2 Y			Y	φ 6 Y	
	G	φ 2 G			G	φ 6 G	
E3 (EBRT)	R	φ 2 R	Y				
	Y	φ 2 Y					
	R	φ 2 R					
	Y	φ 3 Y					

CALCULATED
JAW
CHECKED
DLW

SIGNAL DETAILS

MAHONING ROAD NE, S.R. 153
ECONOMIC DEVELOPMENT PROJECT

REF NO.	ITEM	SHEET NUMBER								ITEM EXT.	GRAND TOTAL	UNIT	DESCRIPTION	SEE SHEET NO.
		E-1	E-2	E-3	E-4	E-5	E-6	E-7	E-8					
	625	877	1008	930	1214	1035	1100	1031	1007		8202	FOOT	CONDUIT, PVC SCHEDULE 40, 2"	
	625	12			36		43		25		116	FOOT	CONDUIT, PVC SCHEDULE 40, 3"	
	625	1754	2016	1860	2428	2070	2200	2062	2014		16404	FOOT	# 8 AWG 600 VOLT DISTRIBUTION CABLE	
	625	2631	3024	2790	3642	3105	3300	3093	3021		24606	FOOT	# 6 AWG 600 VOLT DISTRIBUTION CABLE	
	625	66			216		237		183		702	FOOT	# 2 AWG 600 VOLT DISTRIBUTION CABLE	
	625	3			2		2		2		9	EACH	PULL BOX, POLYMER CONCRETE, 13"W x 24"L X 18"D	
	SPECIAL	717	927	870	1033	985	1057	943	705		7237	FOOT	TRENCH AND BACKFILL IN SIDEWALK OR LAWN AREAS	
	SPECIAL	160	81	60	181	50	43	88	232		895	FOOT	TRENCH AND BACKFILL IN STREETS	
	SPECIAL	5	8	9	11	7	10	9	6		65	EACH	LIGHT POLE MATERIAL ONLY, FIXTURE TYPE A	
	SPECIAL	5	8	9	11	7	10	9	6		65	EACH	LIGHT POLE FOUNDATION, 30" x 72" DEEP	
	SPECIAL	5	8	9	11	7	10	9	6		65	EACH	LIGHT POLE INSTALLATION, FIXTURE TYPE A	
	SPECIAL	5				3			4		12	EACH	CONNECTION ONLY, FIXTURE TYPE B	
	SPECIAL				1		1		1		3	EACH	STUB-UP, SECONDARY RISER POLE, 2" PVC-80	
	SPECIAL	1			1		1		1		4	EACH	POWER PEDESTAL	

PETERS, TSCHANTZ & ASSOCIATES, INC.
CONSULTING ENGINEERS
275 SPRINGSIDE DR., SUITE 300
ARRON, OHIO 44393
PHONE 330-666-3702 FAX -4165
www.pettsa.com

MAHONING ROAD NE. S.R. 153
ECONOMIC DEVELOPMENT PROJECT

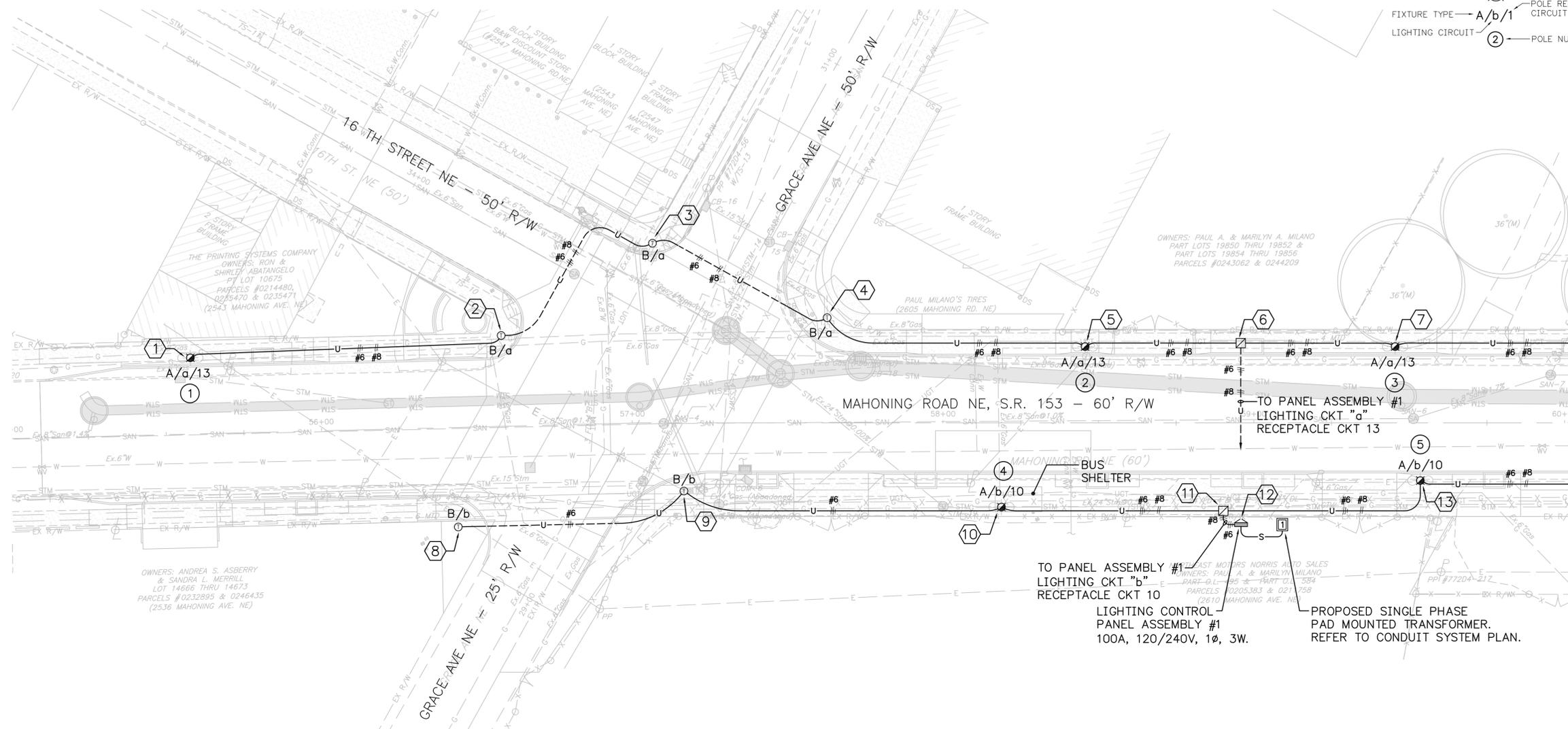
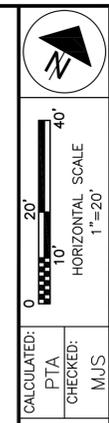
REVISIONS	DATE	BY

CALCULATED: PTA
CHECKED: MJUS

LIGHTING ESTIMATED QUANTITIES

LIGHT POLE LEGEND

- FIXTURE SYMBOL
- FIXTURE TYPE $A/b/1$
- LIGHTING CIRCUIT (2)
- POLE RECEPTACLE CIRCUIT (1)
- POLE NUMBER (2)



MATCH LINE STA. 60+00 - SEE SHEET NO. E-2

STREET LIGHTING PLAN
STA. 55+00 TO STA. 60+00

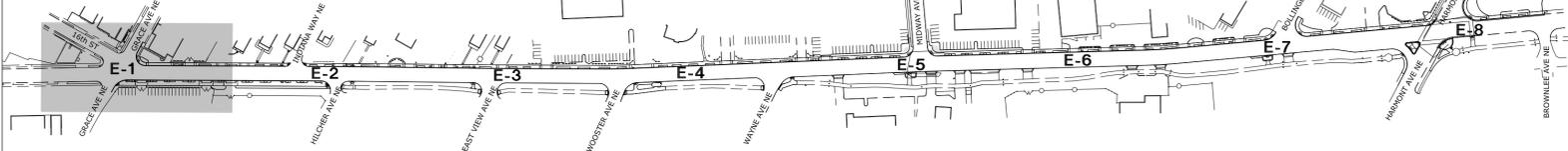
MAHONING ROAD NE

REF. NO.	DESCRIPTION (OWNER)	FURNISHED BY	INSTALLED BY	STATION	OFFSET	SIDE
1	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	CONTRACTOR	CONTRACTOR	55+58.37	24.50	LT
2	TRAFFIC LIGHT POLE(STREET LIGHTING WIRING)	"	"	56+58.62	29.10	LT
3	TRAFFIC LIGHT POLE (STREET LIGHTING WIRING)	"	"	57+06.58	57.60	LT
4	TRAFFIC LIGHT POLE (STREET LIGHTING WIRING)	"	"	57+60.27	33.90	LT
5	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	58+45.70	24.50	LT
6	PULLBOX 13" X 24" X 18" DEEP	"	"	58+95.80	24.50	LT
7	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	59+45.45	24.50	LT
8	TRAFFIC LIGHT POLE(STREET LIGHTING WIRING)	"	"	56+43.20	31.90	RT
9	TRAFFIC LIGHT POLE(STREET LIGHTING WIRING)	"	"	57+16.63	21.80	RT
10	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	58+18.79	27.00	RT
11	PULLBOX 13" X 24" X 18" DEEP	"	"	58+90.50	28.20	RT
12	PANEL ASSEMBLY #1	"	"	59+95.80	32.50	RT
13	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	59+53.58	18.50	RT

NOTES:

- THE STANDARD SPECIFICATIONS FOR THIS PROJECT ARE OH DEPT. OF TRANSPORTATION (ODOT) CONSTRUCTION AND MATERIAL SPECIFICATIONS, DATED JANUARY 1, 2013.
- CONSTRUCTION OF STREET LIGHTING SYSTEM SHALL COMPLY WITH ODOT SPECIFICATIONS SECTION 625, CITY OF CANTON STANDARDS AND AS AMENDED BY THESE DRAWINGS AND SPECIAL PROVISIONS.
- CONSTRUCTION DETAILS NOT SHOWN ON THE DRAWINGS ARE TO CONFORM TO THE OHIO DEPARTMENT OF TRANSPORTATION STANDARD DRAWINGS AND CITY OF CANTON STANDARDS.
- UNDERGROUND RACEWAYS SHALL BE ROUTED TO AVOID CONFLICTS WITH EXISTING AND NEW PLANTINGS.
- REFER TO LANDSCAPING PLANS FOR CROSS SECTION DETAILS ON CURBING AND SIDEWALK FOR GENERAL LOCATION OF UNDERGROUND UTILITIES.
- MAINTAIN A MINIMUM 18" CLEARANCE FROM ALL UNDERGROUND UTILITIES.
- REFER TO LANDSCAPE PLANS TO VERIFY AREAS OF GENERAL CONTRACT WORK. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR CUTTING AND PATCHING AREAS OUTSIDE OF NEW PAVING AND SIDEWALK AREAS.
- REFER TO DWG. 115 (E-11) FOR SYMBOLS AND FIXTURES SCHEDULE.
- REFER TO SPECIAL PROVISIONS FOR ELECTRICAL WORK ASSOCIATED WITH STREET LIGHTING.

KEY PLAN - MAHONING ROAD NE



REVISIONS	DATE	BY

PETERS, TSCHANZ & ASSOCIATES, INC.
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276 SPRINGSIDE DR., SUITE 300
PHONE 330-666-3700 FAX -4185
www.plaengineering.com

MAHONING ROAD NE, S.R. 153
ECONOMIC DEVELOPMENT PROJECT

98
108

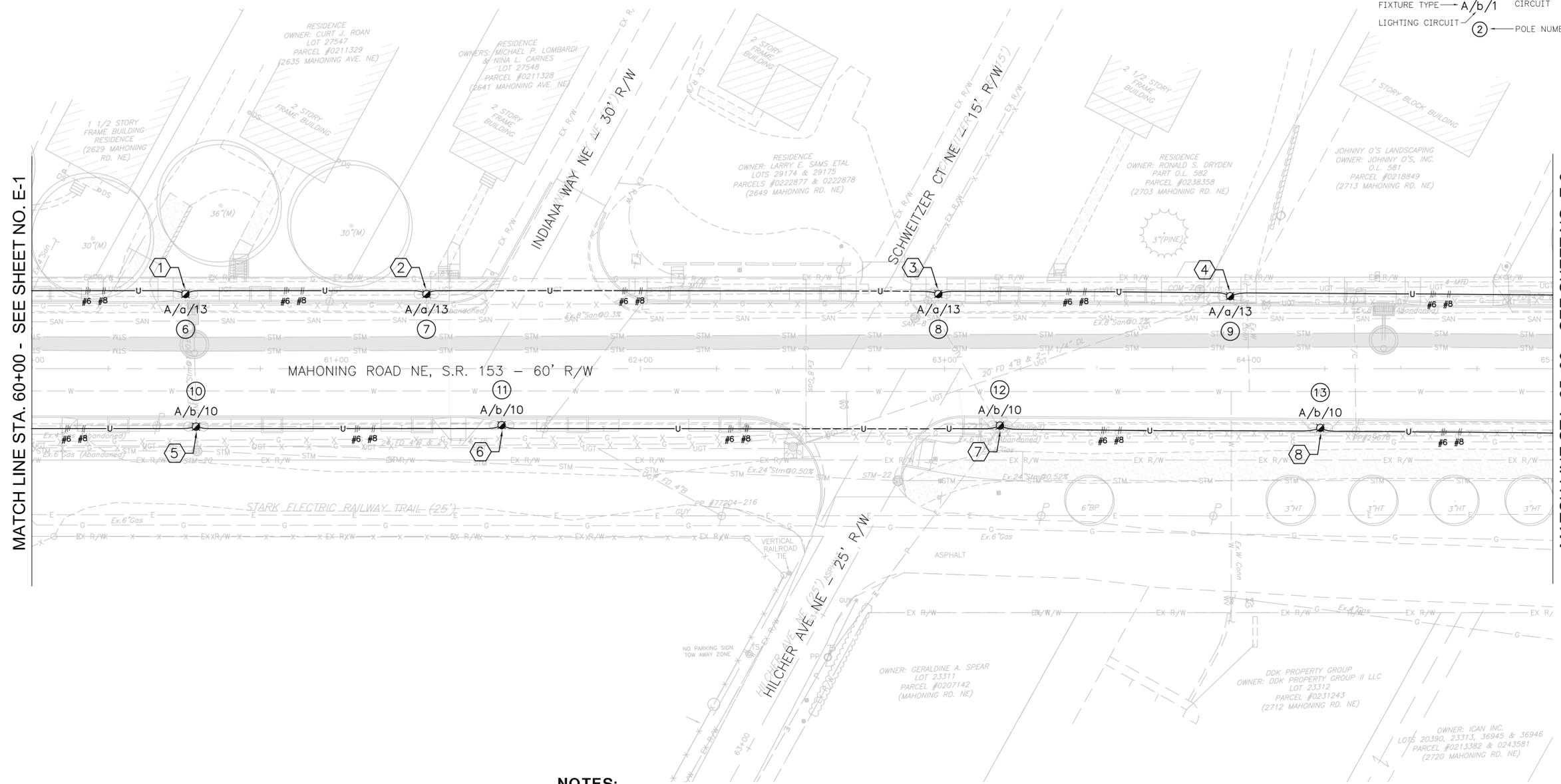
E-1 THRU E-8) MAHONING RD EDP, CANTON - CDS - STREET LIGHTING PLANS.DWG on 04/18/14 at 07:06 by BDM



0 10 20
 HORIZONTAL SCALE
 1"=20'

LIGHT POLE LEGEND

- FIXTURE SYMBOL
- FIXTURE TYPE A/b/1
- LIGHTING CIRCUIT
- POLE RECEPTACLE CIRCUIT
- POLE NUMBER



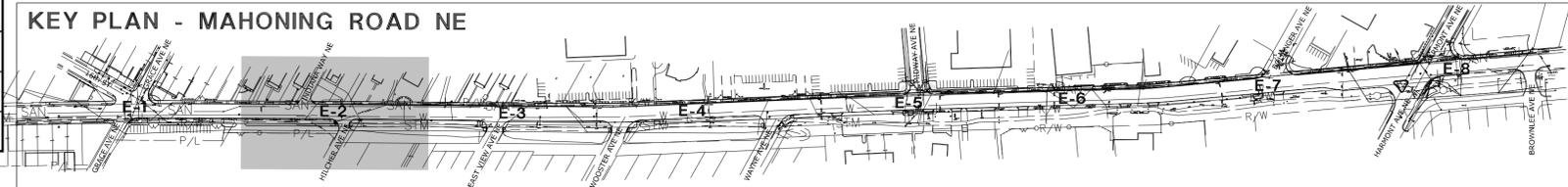
NOTES:

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2. CONSTRUCTION OF STREET LIGHTING SYSTEM SHALL COMPLY WITH ODOT SPECIFICATIONS SECTION 625, CITY OF CANTON STANDARDS AND AS AMENDED BY THESE DRAWINGS AND SPECIAL PROVISIONS.
3. CONSTRUCTION DETAILS NOT SHOWN ON THE DRAWINGS ARE TO CONFORM TO THE OHIO DEPARTMENT OF TRANSPORTATION STANDARD DRAWINGS AND CITY OF CANTON STANDARDS.
4. UNDERGROUND RACEWAYS SHALL BE ROUTED TO AVOID CONFLICTS WITH EXISTING AND NEW PLANTINGS.
5. REFER TO LANDSCAPING PLANS FOR CROSS SECTION DETAILS ON CURBING AND SIDEWALK FOR GENERAL LOCATION OF UNDERGROUND RACEWAYS.
6. MAINTAIN A MINIMUM 18" CLEARANCE FROM ALL UNDERGROUND UTILITIES.
7. REFER TO LANDSCAPE PLANS TO VERIFY AREAS OF GENERAL CONTRACT WORK. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR CUTTING AND PATCHING AREAS OUTSIDE OF NEW PAVING AND SIDEWALK AREAS.
8. REFER TO DWG. 115 (E-11) FOR SYMBOLS AND FIXTURES SCHEDULE.
9. REFER TO SPECIAL PROVISIONS FOR ELECTRICAL WORK ASSOCIATED WITH STREET LIGHTING.

MAHONING ROAD NE

REF. NO.	DESCRIPTION (OWNER)	FURNISHED BY	INSTALLED BY	STATION	OFFSET	SIDE
1	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	CONTRACTOR	CONTRACTOR	60+50.38	24.50	LT
2	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	61+29.61	24.50	LT
3	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	62+97.92	24.50	LT
4	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	63+93.86	23.80	LT
5	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	60+53.85	19.00	RT
6	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	61+54.35	18.50	RT
7	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	63+18.16	18.64	RT
8	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	64+23.50	19.43	RT

KEY PLAN - MAHONING ROAD NE



CALCULATED: PTA
 CHECKED: MJU

STREET LIGHTING PLAN
 STA. 60+00 TO STA. 65+00

REVISIONS	DATE	BY

PETERS, TSCHANZ & ASSOCIATES, INC.
 CONSULTING ENGINEERS
 276 SPRINGSIDE DR., SUITE 300
 CANTON, OHIO 44705
 PHONE 330-666-3702 FAX -4185
 www.ptaengineering.com

MAHONING ROAD NE, S.R. 153
ECONOMIC DEVELOPMENT PROJECT

99
 108

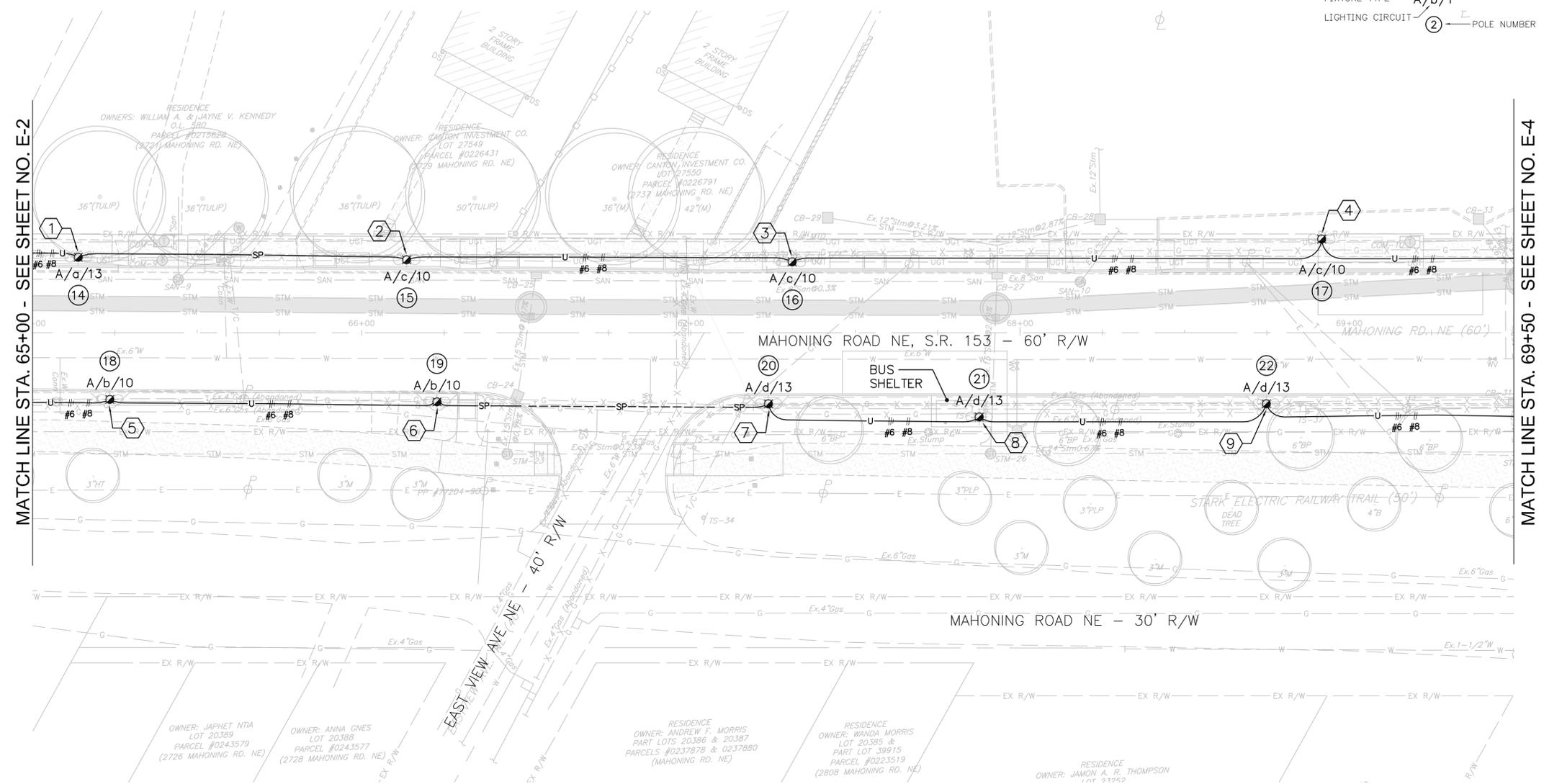
637-10-05 (E-1 THRU E-8) MAHONING RD DEP. CANTON - COS - STREET LIGHTING PLANS.DWG on 04/18/14 at 07:06 by DRW

LIGHT POLE LEGEND

FIXTURE SYMBOL  POLE RECEPTACLE CIRCUIT
 FIXTURE TYPE  A/b/1
 LIGHTING CIRCUIT  POLE NUMBER



CALCULATED: PTA
 CHECKED: MUS



MATCH LINE STA. 65+00 - SEE SHEET NO. E-2

MATCH LINE STA. 69+50 - SEE SHEET NO. E-4

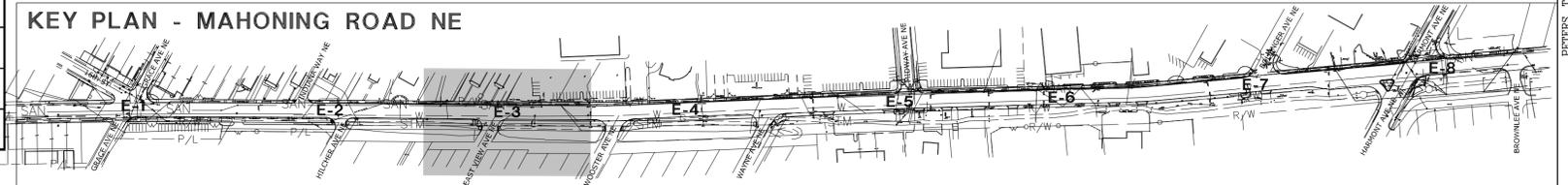
NOTES:

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4. UNDERGROUND RACEWAYS SHALL BE ROUTED TO AVOID CONFLICTS WITH EXISTING AND NEW PLANTINGS.
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6. MAINTAIN A MINIMUM 18" CLEARANCE FROM ALL UNDERGROUND UTILITIES.
7. REFER TO LANDSCAPE PLANS TO VERIFY AREAS OF GENERAL CONTRACT WORK. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR CUTTING AND PATCHING AREAS OUTSIDE OF NEW PAVING AND SIDEWALK AREAS.
8. REFER TO DWG. 115 (E-11) FOR SYMBOLS AND FIXTURES SCHEDULE.
9. REFER TO SPECIAL PROVISIONS FOR ELECTRICAL WORK ASSOCIATED WITH STREET LIGHTING.

MAHONING ROAD NE

REF. NO.	DESCRIPTION (OWNER)	FURNISHED BY	INSTALLED BY	STATION	OFFSET	SIDE
1	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	CONTRACTOR	CONTRACTOR	65+13.90	22.90	LT
2	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	66+13.65	22.15	LT
3	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	67+30.76	21.50	LT
4	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	68+91.60	28.50	LT
5	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	65+23.50	20.18	RT
6	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	66+22.87	20.92	RT
7	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	67+23.57	21.50	RT
8	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	67+87.58	25.50	RT
9	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	68+74.81	21.50	RT

KEY PLAN - MAHONING ROAD NE



E-10-05 (E-1 THRU E-8) MAHONING RD DEP. CANTON - CDS - STREET LIGHTING PLANS.DWG on 04/18/14 at 07:06 by DRM

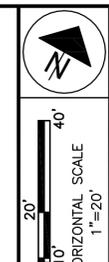
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MAHONING ROAD NE, S.R. 153
ECONOMIC DEVELOPMENT PROJECT

100
 108

LIGHT POLE LEGEND

- FIXTURE SYMBOL
- FIXTURE TYPE A/b/1
- LIGHTING CIRCUIT
- POLE RECEPTACLE CIRCUIT
- POLE NUMBER



CALCULATED: PTA
CHECKED: MUS

STREET LIGHTING PLAN
STA. 69+50 TO STA. 75+00

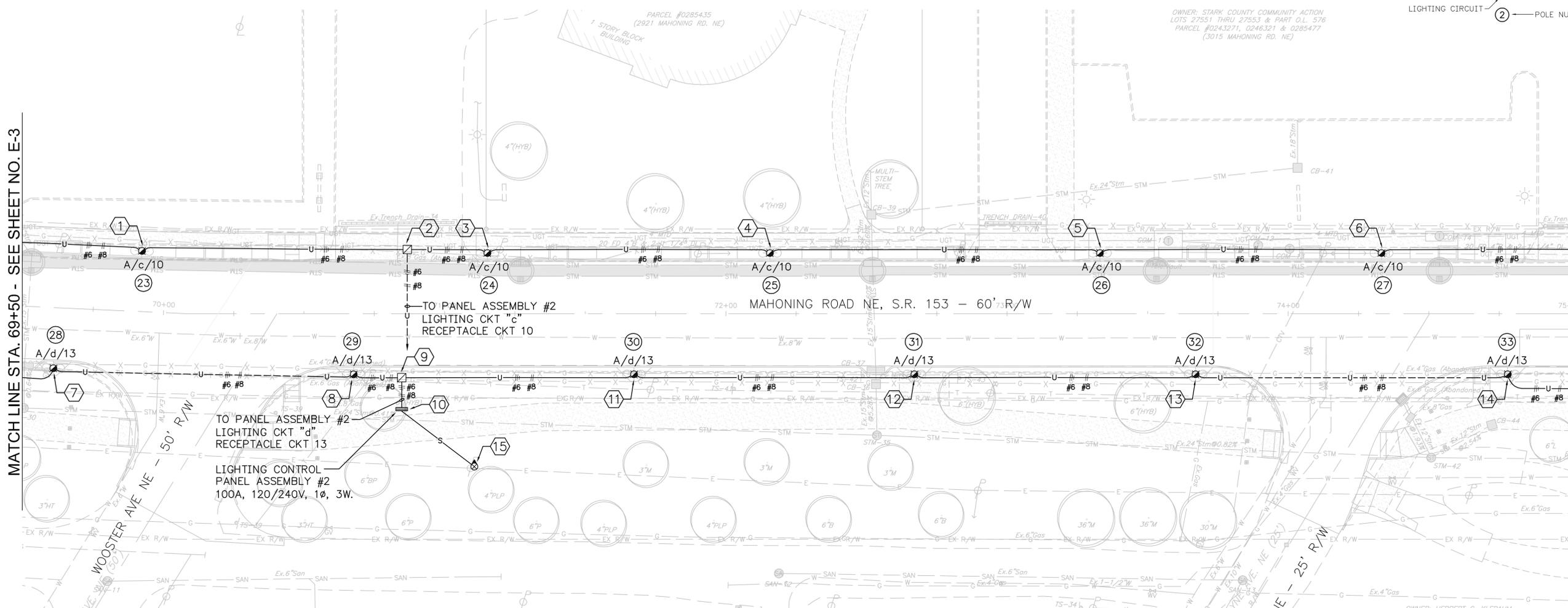
REVISIONS	DATE	BY

MAHONING ROAD NE, S.R. 153
ECONOMIC DEVELOPMENT PROJECT

101
108

MATCH LINE STA. 69+50 - SEE SHEET NO. E-3

MATCH LINE STA. 75+00 - SEE SHEET NO. E-5



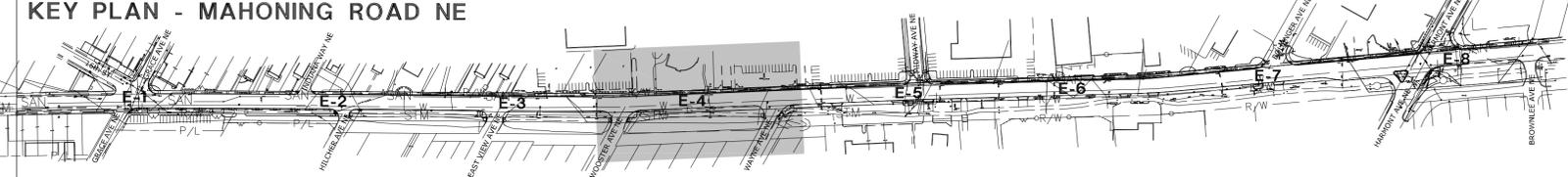
MAHONING ROAD NE

REF. NO.	DESCRIPTION (OWNER)	FURNISHED BY	INSTALLED BY	STATION	OFFSET	SIDE
1	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	CONTRACTOR	CONTRACTOR	69+91.37	21.52	LT
2	PULLBOX 13" X 24" X 18" DEEP	"	"	70+86.50	22.80	LT
3	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	71+15.23	21.50	LT
4	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	72+15.69	21.50	LT
5	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	73+33.04	21.50	LT
6	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	74+33.15	21.50	LT
7	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	69+61.80	21.50	RT
8	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	70+67.67	21.50	RT
9	PULLBOX 13" X 24" X 18" DEEP	"	"	70+84.20	22.90	RT
10	PANEL ASSEMBLY #2	"	"	70+84.20	33.50	RT
11	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	71+67.36	21.50	RT
12	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	72+67.05	21.50	RT
13	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	73+67.05	21.50	RT
14	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	74+78.06	21.50	RT

NOTES:

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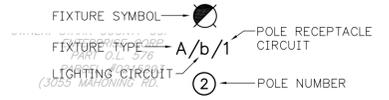
KEY PLAN - MAHONING ROAD NE



E-4 (E-1 THRU E-8) MAHONING RD DEP. CANTON - CDS - STREET LIGHTING PLANS.DWG on 04/18/14 at 07:06 by DBM

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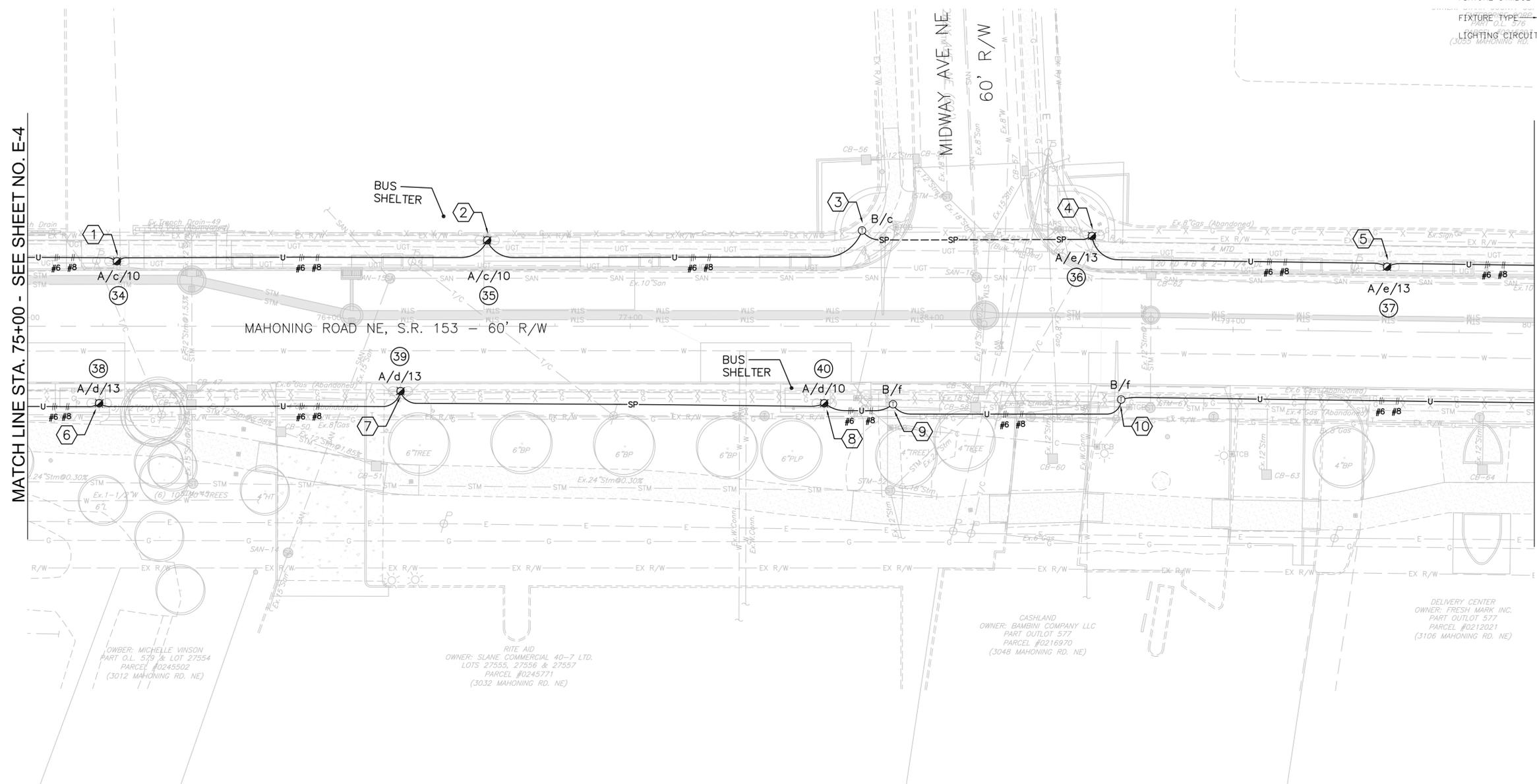
LIGHT POLE LEGEND



CALCULATED: PTA
CHECKED: MJU

MATCH LINE STA. 75+00 - SEE SHEET NO. E-4

MATCH LINE STA. 80+00 - SEE SHEET NO. E-6



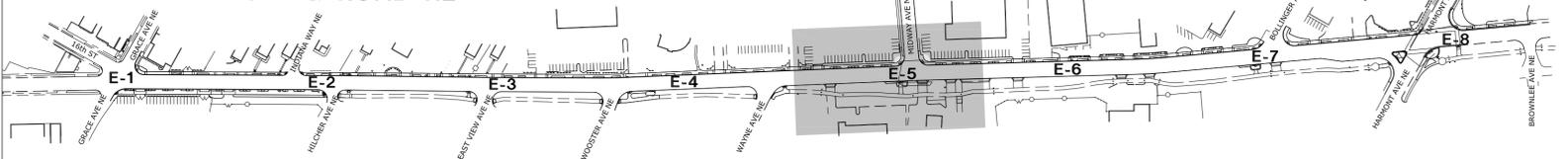
MAHONING ROAD NE

REF. NO.	DESCRIPTION (OWNER)	FURNISHED BY	INSTALLED BY	STATION	OFFSET	SIDE
1	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	CONTRACTOR	CONTRACTOR	75+29.66	21.50	LT
2	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	76+52.51	28.44	LT
3	TRAFFIC LIGHT POLE (STREET LIGHT WIRING BY CONTRACTOR)	"	"	77+76.92	31.60	LT
4	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	78+52.82	30.46	LT
5	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	79+50.84	21.50	LT
6	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	75+23.77	25.50	RT
7	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	76+23.77	21.50	RT
8	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	77+64.35	25.50	RT
9	TRAFFIC LIGHT POLE (STREET LIGHT WIRING BY CONTRACTOR)	"	"	77+87.34	25.70	RT
10	TRAFFIC LIGHT POLE (STREET LIGHT WIRING BY CONTRACTOR)	"	"	78+63.25	21.00	RT

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KEY PLAN - MAHONING ROAD NE

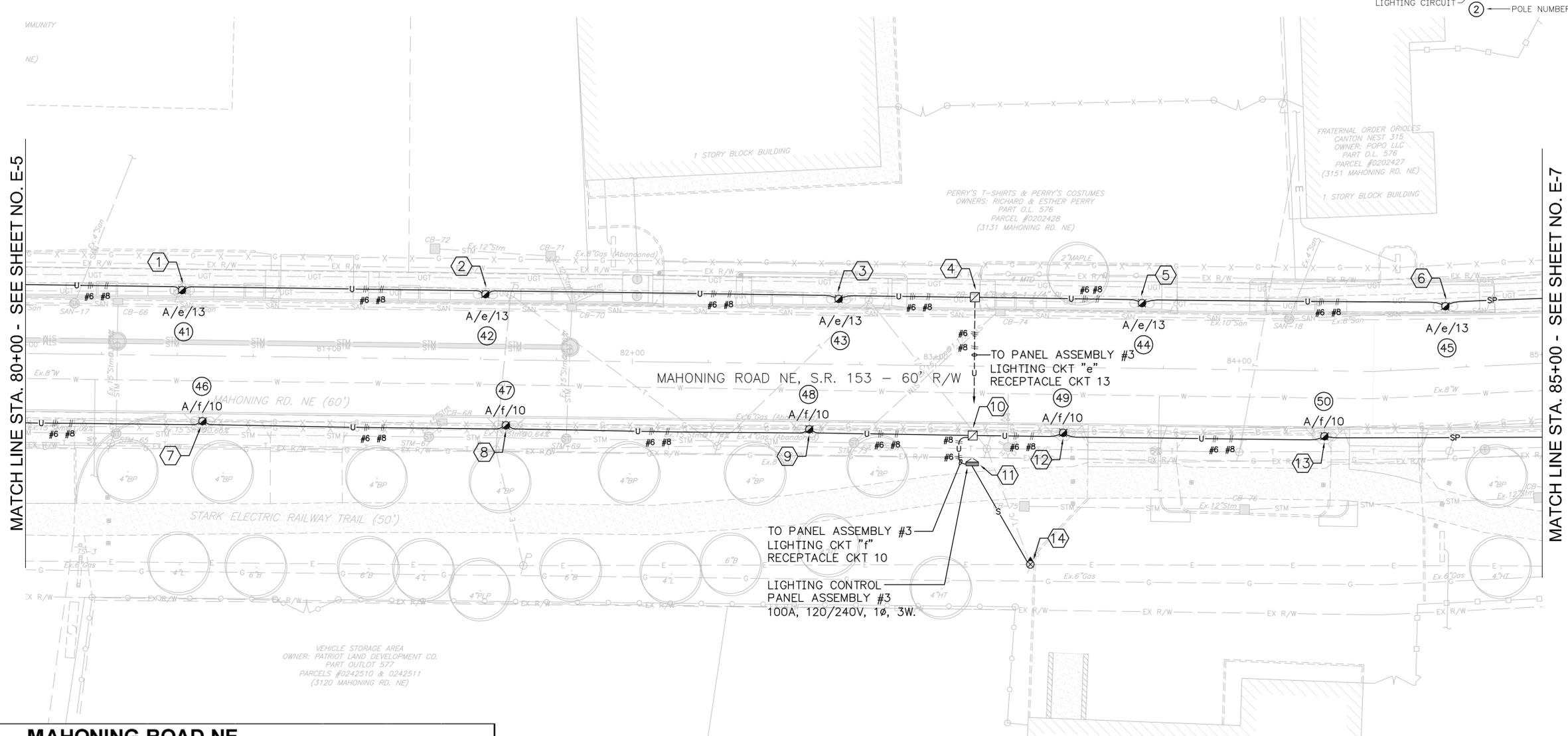
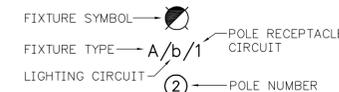


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**MAHONING ROAD NE, S.R. 153
ECONOMIC DEVELOPMENT PROJECT**

102
108

LIGHT POLE LEGEND



MATCH LINE STA. 80+00 - SEE SHEET NO. E-5

MATCH LINE STA. 85+00 - SEE SHEET NO. E-7

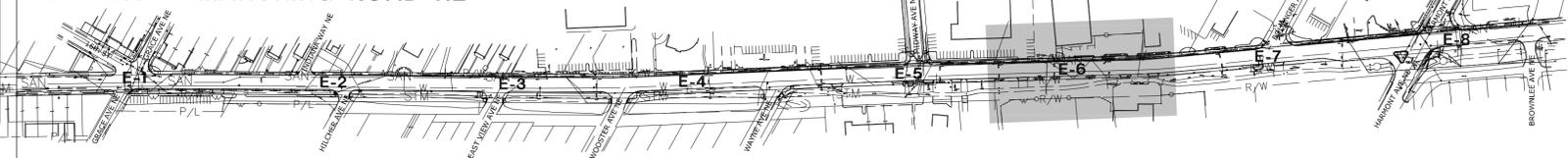
MAHONING ROAD NE

REF. NO.	DESCRIPTION (OWNER)	FURNISHED BY	INSTALLED BY	STATION	OFFSET	SIDE
1	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	CONTRACTOR	CONTRACTOR	80+51.27	21.50	LT
2	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	81+51.28	21.50	LT
3	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	82+67.72	21.50	LT
4	PULLBOX 13" X24" X 18" DEEP	"	"	83+12.8	22.50	LT
5	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	83+67.72	21.46	LT
6	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	84+69.02	20.25	LT
7	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	80+58.61	21.50	RT
8	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	81+58.61	21.50	RT
9	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	82+58.61	21.50	RT
10	PULLBOX 13" X24" X 18" DEEP	"	"	83+11.8	22.80	RT
11	PANEL ASSEMBLY #3	"	"	83+11.8	32.00	RT
12	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	83+42.28	21.50	RT

NOTES:

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KEY PLAN - MAHONING ROAD NE



E-10-05 (E-1 THRU E-8) MAHONING RD DEP. CANTON - COS - STREET LIGHTING PLANS.DWG on 04/18/14 at 07:06 by BRM

STREET LIGHTING PLAN
STA. 80+00 TO STA. 85+00

REVISIONS	DATE	BY

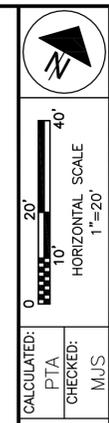
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MAHONING ROAD NE, S.R. 153
ECONOMIC DEVELOPMENT PROJECT

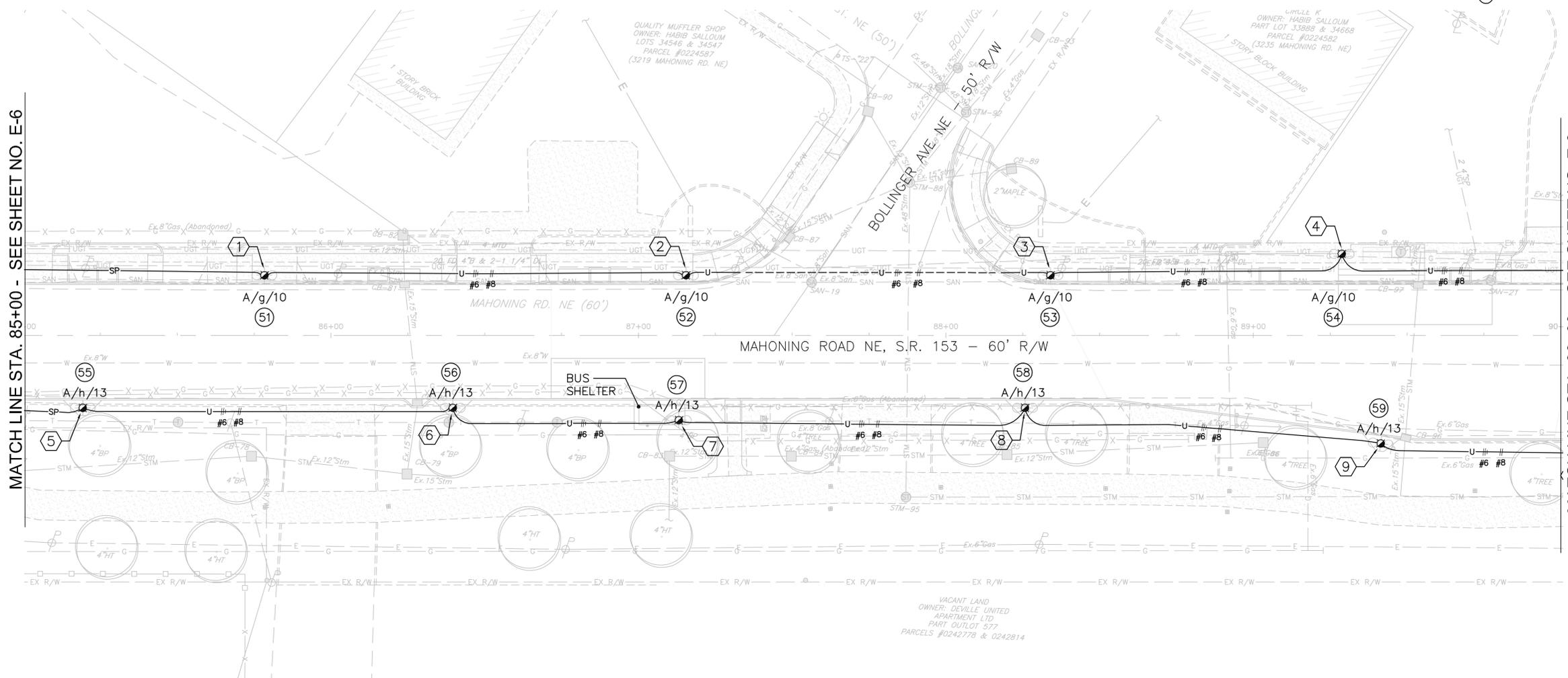
103
108

LIGHT POLE LEGEND

- FIXTURE SYMBOL 
- FIXTURE TYPE A/b/1
- LIGHTING CIRCUIT 
- POLE RECEPTACLE CIRCUIT
- POLE NUMBER



CALCULATED: PTA
CHECKED: MJJ



MATCH LINE STA. 85+00 - SEE SHEET NO. E-6

MATCH LINE STA. 90+00 - SEE SHEET NO. E-8

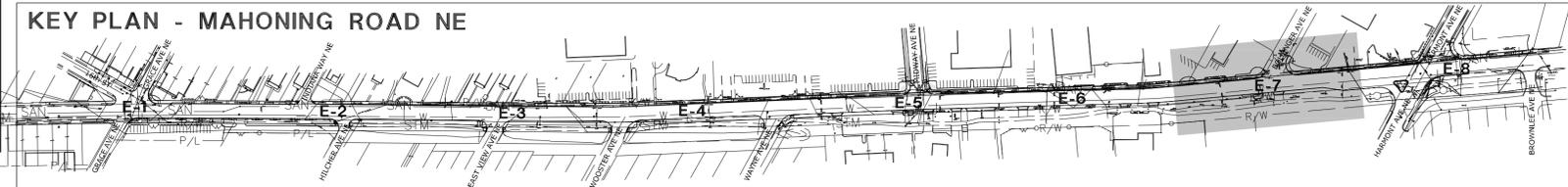
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MAHONING ROAD NE

REF. NO.	DESCRIPTION (OWNER)	FURNISHED BY	INSTALLED BY	STATION	OFFSET	SIDE
1	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	CONTRACTOR	CONTRACTOR	85+78.35	19.50	LT
2	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	87+15.45	19.50	LT
3	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	88+34.00	19.50	LT
4	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	89+28.74	26.44	LT
5	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	85+19.27	23.52	RT
6	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	86+39.62	23.50	RT
7	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	87+13.13	27.50	RT
8	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	88+25.71	23.50	RT
9	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	89+39.80	35.62	RT

KEY PLAN - MAHONING ROAD NE



E-10-05 (E-1 THRU E-8) MAHONING RD DEP. CANTON - COS - STREET LIGHTING PLANS.DWG on 04/18/14 at 07:06 by DRM

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**MAHONING ROAD NE, S.R. 153
ECONOMIC DEVELOPMENT PROJECT**

104
108



0 10 20
 HORIZONTAL SCALE
 1"=20'

CALCULATED: PTA
 CHECKED: MJU

STREET LIGHTING PLAN
 STA. 90+00 TO STA. 95+00

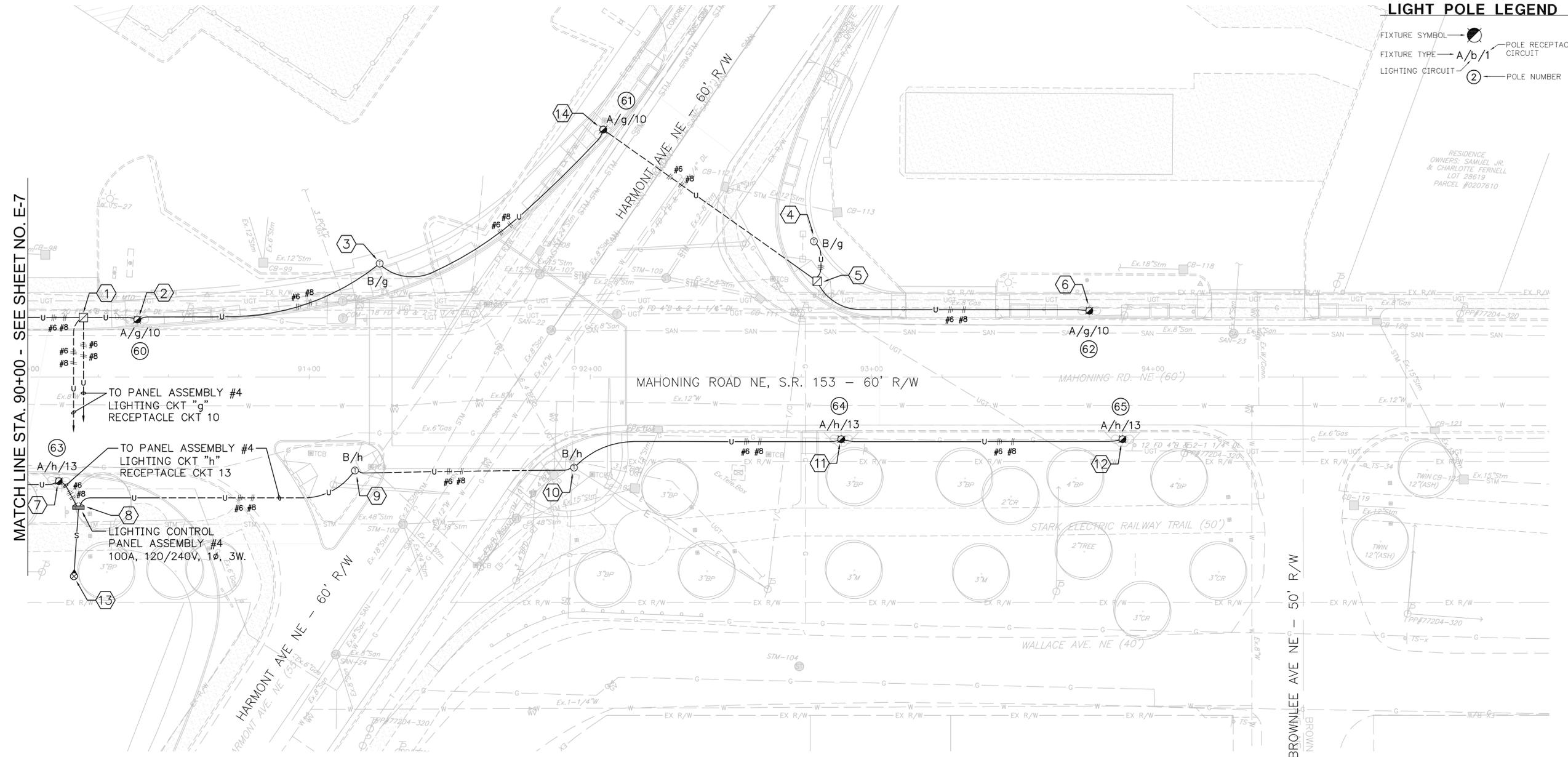
REVISIONS	DATE	BY

MAHONING ROAD NE, S.R. 153
 ECONOMIC DEVELOPMENT PROJECT

105
 108

LIGHT POLE LEGEND

- FIXTURE SYMBOL
- FIXTURE TYPE A/b/1
- LIGHTING CIRCUIT
- POLE RECEPTACLE CIRCUIT
- POLE NUMBER



MATCH LINE STA. 90+00 - SEE SHEET NO. E-7

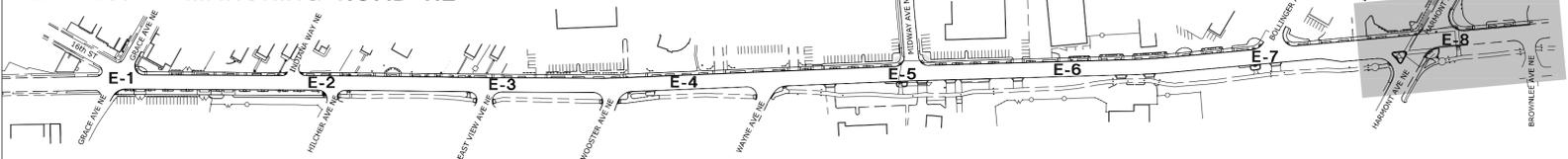
MAHONING ROAD NE

REF. NO.	DESCRIPTION (OWNER)	FURNISHED BY	INSTALLED BY	STATION	OFFSET	SIDE
1	PULLBOX 13" X 24" X 18" DEEP	CONTRACTOR	CONTRACTOR	90+19.90	31.50	LT
2	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	90+38.92	20.34	LT
3	TRAFFIC LIGHT POLE (STREET LIGHT WIRING BY CONTRACTOR)	"	"	91+25.23	40.30	LT
4	TRAFFIC LIGHT POLE (STREET LIGHT WIRING BY CONTRACTOR)	"	"	92+79.89	48.00	LT
5	PULLBOX 13" X 24" X 18" DEEP	"	"	92+80.7	33.80	LT
6	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	93+77.38	23.50	LT
7	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	90+11.04	36.94	RT
8	PANEL ASSEMBLY #4	"	"	90+17.90	45.50	RT
9	TRAFFIC LIGHT POLE (STREET LIGHT WIRING BY CONTRACTOR)	"	"	91+19.64	33.20	RT
10	TRAFFIC LIGHT POLE (STREET LIGHT WIRING BY CONTRACTOR)	"	"	91+94.22	32.20	RT
11	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	92+89.18	22.09	RT
12	LIGHT POLE FOUNDATION, 30" DIA X 72" DEEP	"	"	93+89.18	22.09	RT

NOTES:

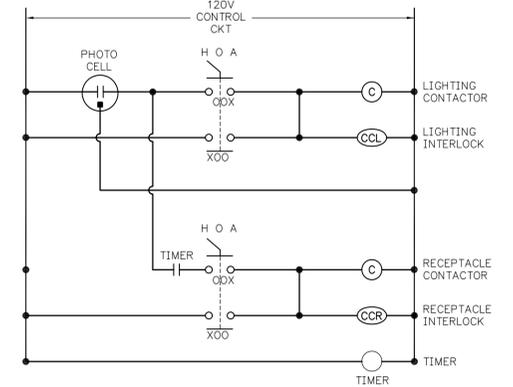
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2. CONSTRUCTION OF STREET LIGHTING SYSTEM SHALL COMPLY WITH ODOT SPECIFICATIONS SECTION 625, CITY OF CANTON STANDARDS AND AS AMENDED BY THESE DRAWINGS AND SPECIAL PROVISIONS.
3. CONSTRUCTION DETAILS NOT SHOWN ON THE DRAWINGS ARE TO CONFORM TO THE OHIO DEPARTMENT OF TRANSPORTATION STANDARD DRAWINGS AND CITY OF CANTON STANDARDS.
4. UNDERGROUND RACEWAYS SHALL BE ROUTED TO AVOID CONFLICTS WITH EXISTING AND NEW PLANTINGS.
5. REFER TO LANDSCAPING PLANS FOR CROSS SECTION DETAILS ON CURBING AND SIDEWALK FOR GENERAL LOCATION OF UNDERGROUND RACEWAYS.
6. MAINTAIN A MINIMUM 18" CLEARANCE FROM ALL UNDERGROUND UTILITIES.
7. REFER TO LANDSCAPE PLANS TO VERIFY AREAS OF GENERAL CONTRACT WORK. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR CUTTING AND PATCHING AREAS OUTSIDE OF NEW PAVING AND SIDEWALK AREAS.
8. REFER TO DWG. 115 (E-11) FOR SYMBOLS AND FIXTURES SCHEDULE.
9. REFER TO SPECIAL PROVISIONS FOR ELECTRICAL WORK ASSOCIATED WITH STREET LIGHTING.

KEY PLAN - MAHONING ROAD NE

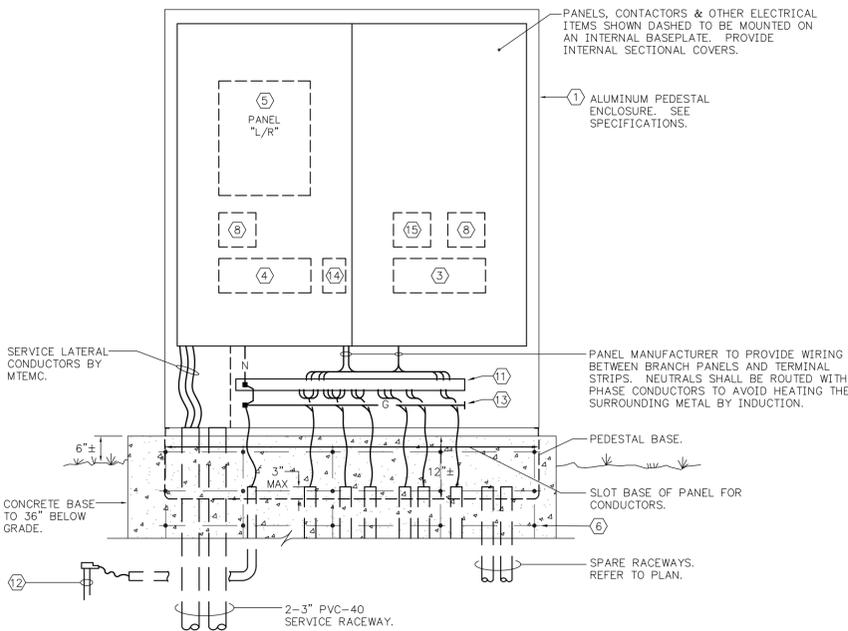


NOTES:

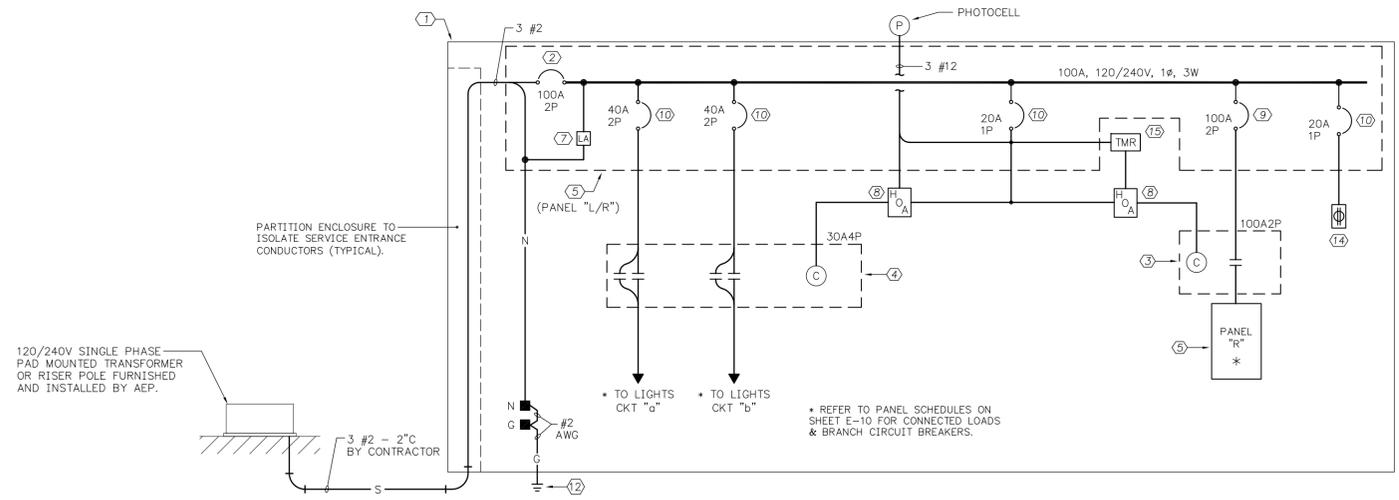
1. THE COST FOR WIRING TO ALL NOSTALGIA LUMINARIES AND RECEPTACLES SHALL BE INCIDENTAL TO THE FIXTURE INSTALLATION PAY ITEMS. ALL WIRING IN POLES AND CONDUITS TO LIGHTS AND RECEPTACLES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
2. ALL WIRING INTO EACH NOSTALGIA POLE BASE SHALL BE NO. 6 AWG WIRE AND CONNECTED TO IN-LINE FUSE HOLDERS. THE COST FOR THIS WIRE SHALL BE INCIDENTAL TO THE NOSTALGIA BID ITEMS.
3. IN-LINE FUSE HOLDERS SHALL BE BUSSMAN (HEB-AW-RYC) INSTALL IN BASE OF POLE. INSTALL FUSES IN PHASE LINES AND SOLID LINK IN NEUTRAL (HET-AW-RYC). USE SPLIT BOLT CONNECTOR FOR GROUND CONNECTION. COPPER GROUND CABLE SHALL BE EXOTHERMICALLY WELDED TO THE GROUND ROD. RUN CABLE FREE END THROUGH 3/4" EMT AND CONNECTED AS SHOWN IN THE POLE WIRING DIAGRAM. THE COST FOR THE IN-LINE FUSE HOLDERS AND ALL RELATED ITEMS SHALL BE INCIDENTAL TO THE FIXTURE INSTALLATION ITEMS.
4. FOR LIGHTS, USE 5 AMP FUSES. FOR RECEPTACLES, USE 10 AMP FUSES. AMP RATINGS SHALL BE BASED UPON 75 DEGREE C RATINGS.
5. CONDUCTORS SHALL BE PULLED FROM POLE TO POLE WITHOUT SPLICES.
6. UNLESS OTHERWISE NOTED IN THESE PLANS, ALL POLE WIRING SHALL BE MINIMUM NO. 12 AWG, COPPER, 600 VOLT RATED. THE FOLLOWING SHALL APPLY TO ALL WIRING:
 - A. ALL POLE WIRING SHALL BE STRANDED "THHN/THWN".
 - B. UNDERGROUND BRANCH CIRCUIT WIRING SHALL BE "XHHW".
7. DETAIL SHOWN IS FOR IN-LINE POLE. CONDUCTORS TO BE ADJUSTED FOR END-OF-LINE POLE LOCATION.



CONTROLLER SCHEMATIC
LIGHTING CONTROL PANEL (TYPICAL REQUIREMENTS)



PANEL ASSEMBLY DETAIL
(TYPICAL REQUIREMENTS) NOT TO SCALE



LIGHTING CONTROL PANEL ASSEMBLY ONE LINE (TYPICAL REQUIREMENTS FOR PANEL #1, #2, #3 & #4 ASSEMBLIES)

NOTES:

- 1 ALUMINUM NEMA 3R PADLOCKABLE ENCLOSURE WITH UNPAINTED NATURAL ALUMINUM FINISH AND PEDESTAL BASE. PEDESTAL ASSEMBLY SHALL BE LABELED AS SUITABLE FOR USE AS SERVICE EQUIPMENT. MILBANK CP3B0115 SERIES WITHOUT EXCEPTION.
- 2 CURRENT LIMITING MAIN BREAKER. SIZE AS INDICATED. 65,000 AIC RATED BY SQUARE D, CUTLER-HAMMER, SIEMENS OR EQUAL.
- 3 RECEPTACLE CONTACTOR WITH 120V COIL. INSTALL ENGRAVED "RECEPTACLE PANEL CONTACTOR" NAMEPLATE ON COVER WITH SCREWS. SQUARE D CLASS 8903, WESTINGHOUSE, GE, ITE OR EQUAL. SEE ONE LINE FOR TYPE AND SIZE.
- 4 SIMILAR TO ITEM 3 EXCEPT NAMEPLATE READING "STREET LIGHTING CONTACTOR". SEE ONE-LINE FOR SIZE AND TYPE.
- 5 MAIN LUG PANELBOARD "L/R" WITH OPEN SLOTTED BOTTOM FOR BRANCH CIRCUIT WIRING. EQUIPPED PER PANEL SCHEDULES. CIRCUIT BREAKERS SHALL BE 10,000 AIC RATED, "BOLT-ON" TYPE. BREAKERS SHALL BE SERIES RATED WITH ITEM 10.
- 6 REINFORCING CAGE CONSISTING OF #4 VERTICAL BARS 12" O.C. AND #4 HORIZONTAL BARS 8" O.C. IN EACH LONG SIDE WITH 2" CONCRETE COVER OVER REBAR. THERMOWELDED GROUNDING CONDUCTOR TO REBAR.
- 7 LIGHTING ARRESTER, 675 VAC TO GROUND MAX. SQUARE D #SDSA3 SERIES OR SIMILAR BY CUTLER HAMMER, SIEMENS OR APPROVED EQUAL.
- 8 THREE-POSITION OILTIGHT SELECTOR SWITCH TAGGED "LIGHTING" OR "RECEPTACLE" AND "HAND-OFF-AUTO". ALLEN-BRADLEY #800T-J17B. REFER TO INTERLOCK SCHEMATIC FOR CONTACT ARRANGEMENT.
- 9 240V BREAKER FOR RECEPTACLE PANEL, 10,000 AIC SERIES RATED WITH 2. TRIP UNIT AS SHOWN ON ONE LINE. ENGRAVED LABEL TO MATCH ASSOCIATED PANEL.
- 10 240V, BREAKER 10,000 AIC SERIES RATED WITH ITEM 2. TRIP UNIT AS SHOWN ON ONE LINE. LABEL TO MATCH ASSOCIATED PANEL OR LOAD.
- 11 TERMINAL STRIP AND STAND OFF TYPE MOUNTING RAIL RATED AT 300 VOLTS FOR LANDING OF FIELD WIRING. PROVIDE SOLDERLESS BOX LUG TYPE TERMINALS FOR #12-4 AWG CONDUCTORS. FURNISH LUGS FOR NEUTRALS, GROUNDS, PHASE CONDUCTORS (INCLUDING THOSE FOR SPARE BREAKERS). SQUARE D CLASS 9080 OR EQUAL.
- 12 1" X 10'-0" COPPERWELD GROUND ROD WITH THERMOWELDED CONNECTION TO GROUNDING ELECTRODE CONDUCTOR.
- 13 EQUIPMENT GROUND BUS. ILSCO "NB" SERIES OR EQUAL.
- 14 20A GFCI RECEPTACLE FOR MAINTENANCE. LOCATE INSIDE ENCLOSURE.
- 15 ASTRONOMIC 24 HOUR, SEVEN DAY ELECTROMECHANICAL TIMER, 120 VOLT MOTOR, AND 40A DPST CONTACTS. TORK MODEL #7200Z, SANGAMO, PRECISION OR EQUAL. INSTALL ENGRAVED NAMEPLATE "POLE AND GROUND LEVEL RECEPTACLE TIMER" ON HINGED ACCESS COVER WITH SCREWS.

CALCULATED: PTA
CHECKED: MJJ

LIGHTING CONTROL PANEL DETAILS

REVISIONS	DATE	BY

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LIGHTING CONTROL PANEL ASSEMBLY #1										
PANEL: "L/R" 100A, 120/240V, 1Ø, 3W										
100A2P MAIN BREAKER			MAIN LUG		TIMER CONTROL	REMARK: GROUND BUS				
KVA	USE	POLES	AMP	CKT		CKT	AMP	POLES	USE	KVA
1.21	LIGHTING CIRCUIT "g"	2	40	1		2	30	2	LIGHTING CIRCUIT "b"	1.10
	SPARE	2	40	3		4	30	2	SPARE	
	SPARE	2	40	5		6	30	2	SPARE	
0.10	TIMER, PHOTOCCELL, CONTACTORS	1	20	7		8	20	1	POLE RECEPTACLE	0.50
0.50	MAINTENANCE RECEPTACLE	1	20	9		10	20	1	SPARE	
0.55	POLE RECEPTACLES	1	20	11		12	20	1	SPARE	
	SPARE	1	20	13		14			SPACE	
	SPARE	1	20	15	16			SPACE		
3.96 KVA CONNECTED										

* KVA LOADS BASED ON 50W MAX PER POLE RECEPTACLE.

LIGHTING CONTROL PANEL #2										
PANEL: "L/R" 100A, 120/240V, 1Ø, 3W										
100A2P MAIN BREAKER			MAIN LUG		TIMER CONTROL	REMARK: GROUND BUS				
KVA	USE	POLES	AMP	CKT		CKT	AMP	POLES	USE	KVA
1.43	LIGHTING CIRCUIT "c"	2	40	1		2	30	2	LIGHTING CIRCUIT "d"	1.32
	SPARE	2	40	3		4	30	2	SPARE	
	SPARE	2	40	5		6	30	2	SPARE	
0.10	TIMER, PHOTOCCELL, CONTACTORS	1	20	7		8	20	1	POLE RECEPTACLES	0.60
0.50	MAINTENANCE RECEPTACLE	1	20	9		10	20	1	SPARE	
0.65	POLE RECEPTACLES	1	20	11		12	20	1	SPACE	
	SPARE	1	20	13		14			SPACE	
	SPARE	1	20	15	16			SPACE		
4.60 KVA CONNECTED										

* KVA LOADS BASED ON 50W MAX PER POLE RECEPTACLE.

LIGHTING CONTROL PANEL ASSEMBLY #3										
PANEL: "L/R" 100A, 120/240V, 1Ø, 3W										
100A2P MAIN BREAKER			MAIN LUG		TIMER CONTROL	REMARK: GROUND BUS				
KVA	USE	POLES	AMP	CKT		CKT	AMP	POLES	USE	KVA
0.77	LIGHTING CIRCUIT "e"	2	40	1		2	30	2	LIGHTING CIRCUIT "f"	0.77
	SPARE	2	40	3		4	30	2	SPARE	
	SPARE	2	40	5		6	100	2	SPARE	
0.10	TIMER, PHOTOCCELL, CONTACTORS	1	20	7		8	20	1	POLE RECEPTACLES	0.35
0.50	MAINTENANCE RECEPTACLE	1	20	9		10	20	1	SPARE	
0.35	POLE RECEPTACLES	1	20	11		12	20	1	SPACE	
	SPARE	1	20	13		14			SPACE	
	SPARE	1	20	15	16			SPACE		
2.84 KVA CONNECTED										

* KVA LOADS BASED ON 50W MAX PER POLE RECEPTACLE.

LIGHTING CONTROL ASSEMBLY #4										
PANEL: "L/R" 100A, 120/240V, 1Ø, 3W										
100A2P MAIN BREAKER			MAIN LUG		TIMER CONTROL	REMARK: GROUND BUS				
KVA	USE	POLES	AMP	CKT		CKT	AMP	POLES	USE	KVA
0.99	LIGHTING CIRCUIT "g"	2	40	1		2	30	2	LIGHTING CIRCUIT "h"	1.10
	SPARE	2	40	3		4	30	2	SPARE	
	SPARE	2	40	5		6	30	2	SPARE	
0.10	TIMER, PHOTOCCELL, CONTACTORS	1	20	7		8	20	1	POLE RECEPTACLES	0.50
0.50	MAINTENANCE RECEPTACLE	1	20	9		10	20	1	SPACE	
0.45	POLE RECEPTACLES	1	20	11		12	20	1	SPACE	
	SPARE	1	20	13		14			SPACE	
	SPARE	1	20	15	16			SPACE		
3.64 KVA CONNECTED										

* KVA LOADS BASED ON 50W MAX PER POLE RECEPTACLE.

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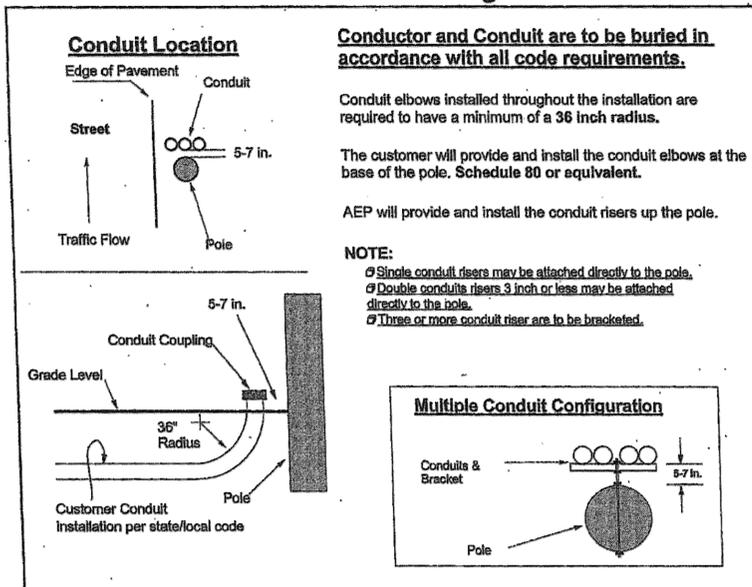
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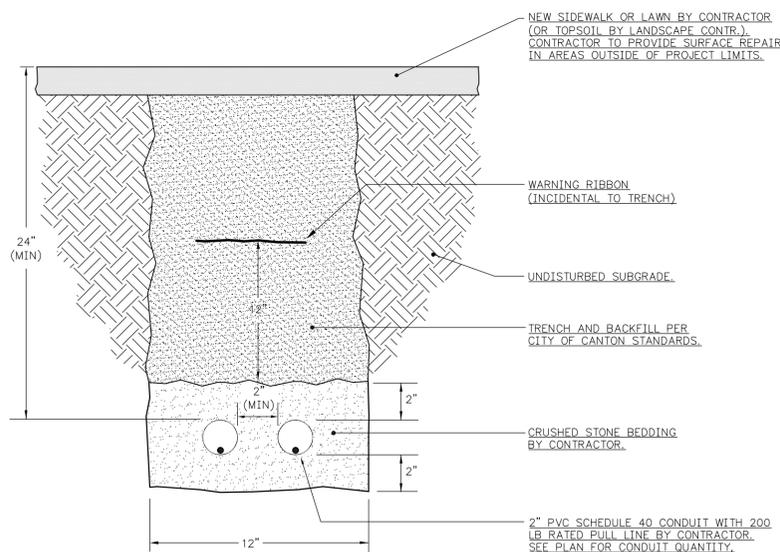
LIGHTING CONTROL PANEL SCHEDULES

CALCULATED: PTA
 CHECKED: MJUS

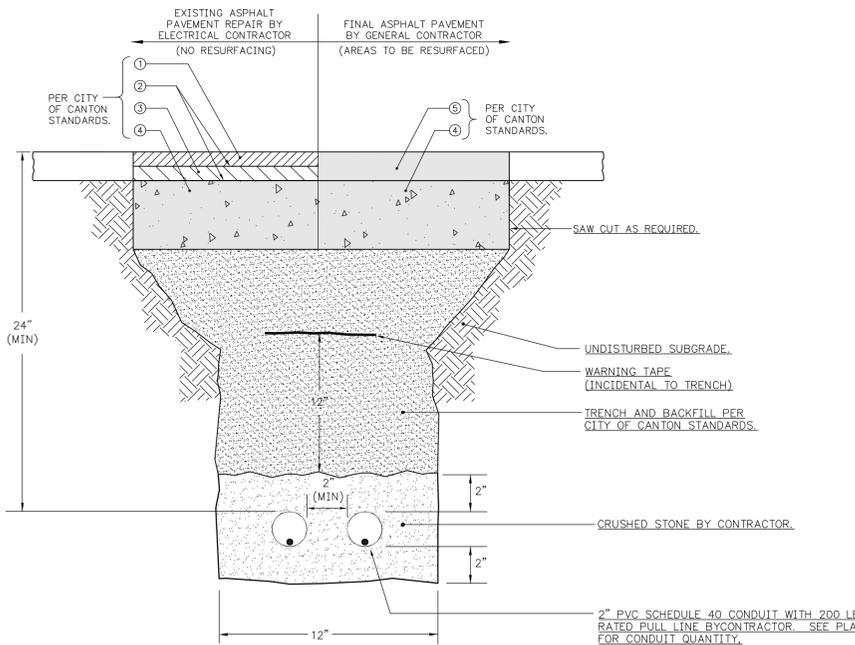
AEP Pole & Conduit Configuration



STUB-UP, SECONDARY RISER POLE (ITEM SPECIAL) NOT TO SCALE



TRENCH AND BACKFILL IN SIDEWALK AND LAWN AREAS (ITEM SPECIAL) NOT TO SCALE



TRENCH AND BACKFILL IN STREETS (ITEM SPECIAL) NOT TO SCALE

SYMBOLS

- ① DOUBLE POST TOP MOUNTED 240 VOLT LED FIXTURE ASSEMBLY & CONCRETE FOUNDATION. SUPERSCRIPT INDICATES "FIXTURE TYPE" / "LIGHTING CIRCUIT" / "RECEPTACLE CIRCUIT". NUMBER WITHIN CIRCLE INDICATES POLE NUMBER. SEE FIXTURE SCHEDULE FOR DESCRIPTION AND CITY OF CANTON STANDARD DRAWINGS NO. 63 AND NO. 65 FOR INSTALLATION.
- ☒ NEW LIGHTING CONTROL PANEL ASSEMBLY FURNISHED AND INSTALLED BY THE CONTRACTOR. DOOR SIDE AS INDICATED ON PLANS. REFER TO DETAILS AND SPECIFICATIONS FOR REQUIREMENTS.
- ☑ 13" X 24" X 18" DEEP (MIN) FLUSH MOUNTED REINFORCED POLYMER CONCRETE PULLBOX WITH OPEN BOTTOM AND NON-METALLIC GASKETED COVER WITH STAINLESS STEEL HEXHEAD BOLTS, PULL SLOT, AND "ELECTRIC" LOGO FURNISHED AND INSTALLED BY THE CONTRACTOR. PROVIDE 6" GRAVEL BASE FOR DRAINAGE. INSTALL PULLBOX SO THAT THE COVER IS FLUSH WITH NEW PAVING, SIDEWALK, OR LANDSCAPING. BOX AND COVER SHALL HAVE GRAY FINISH.
- ⓪ TRAFFIC SIGNAL POLE ELECTRICAL LIGHTING CONNECTION. POLE IS FURNISHED WITH A 240 VOLT LED TEAR DROP STYLE STREET LIGHT LUMINAIRE. THIS CONTRACTOR SHALL PROVIDE POLE WIRING AND FUSING FOR STREET LIGHT LUMINAIRE. REFER TO TRAFFIC SIGNALIZATION DRAWINGS FOR POLE AND LUMINAIRE INSTALLATION.
- U—# DIRECT BURIED UNDERGROUND RACEWAY, 2" PVC SCHEDULE 40 AT 24" MINIMUM BELOW GRADE WITH QUANTITY OF #6 AWG TYPE XHHW CONDUCTORS AS INDICATED BY HASH MARKS FOR STREET LIGHTING AND QUANTITY OF #6 AWG XHHW CONDUCTORS AS INDICATED FOR POLE MOUNTED RECEPTACLES. SHORT HASH DENOTES #6 AWG TYPE XHHW GREEN GROUND CONDUCTOR. REFER TO PLAN FOR HOMERUN DESIGNATION. WHERE NEW WALKWAY OR PAVING IS REQUIRED, CONTRACTOR SHALL DEMO EXISTING SURFACE. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR TRENCH AND BACKFILL.
- U-- SIMILAR TO "—U—" EXCEPT DIRECT BURIED STREET CROSSING AT 24" MINIMUM BELOW GRADE.
- SP— SPARE 2" PVC SCHEDULE UNDERGROUND RACEWAY WITH 200 LB RATED PULL LINE AT 24" MINIMUM BELOW GRADE.
- SP-- SIMILAR TO "—SP—" EXCEPT DIRECT BURIED STREET CROSSING AT 24" MINIMUM BELOW GRADE.
- S— SERVICE CONDUIT FOR LIGHTING/ RECEPTACLE PANEL - 3 #2 TYPE XHHW CONDUCTORS - 2" PVC-40 DIRECT BURIED AT 24" MINIMUM BELOW GRADE.
- ⓪ EXISTING UTILITY POLE TO REMAIN. 2" PVC-80 CONDUIT STUB UP FURNISHED & INSTALLED BY THE CONTRACTOR AT BASE OF UTILITY POLE. INSTALL STUB UP AT EXACT LOCATION & HEIGHT AS DIRECTED BY UTILITY. PROVIDE 30' OF SLACK CONDUCTOR FOR POWER COMPANY CONNECTIONS.

FIXTURE SCHEDULE

- TYPE A: DOUBLE POST TOP STYLE LED STREET LIGHT CONSISTING OF CONCRETE BASE, 14'-6" FLUTED TAPERED STEEL POLE WITH 26" DIA. CAST ALUMINUM BASE WITH TWO ACCESS DOORS, (2) BANNER ARM BRACKETS AND REMOVABLE FLAG POLE HOLDER, LUMINAIRE ASSEMBLIES SHALL CONSIST OF TWO LUMINAIRES WITH TYPE II DISTRIBUTION, CAST ALUMINUM BASE, FINIAL, POLYCARBONATE GLOBE, 55W LED DRIVER WIRE FOR 240 VOLT OPERATION & IN-LINE FUSING IN BASE OR POLE. POLE SHALL BE FITTED WITH (1) 20A GFCI TYPE RECEPTACLE AT TOP WITH A WET WHILE IN USE COVERPLATE. REFER TO CITY OF CANTON STANDARD DRAWING NO. 63 AND SPECIFICATIONS FOR FURTHER INFORMATION.
- TYPE B: TRAFFIC SIGNAL POLE WITH TEAR DROP STYLE STREET LIGHT. REFER TO TRAFFIC SIGNALIZATION PLANS FOR INSTALLATION.

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